Groundwater Compliance Monitoring Data Summary Report – July 2016

318 State Avenue NE Property
Olympia, Washington

for
City of Olympia

July 25, 2016

GeoEngineers
Earth Science + Technology

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

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318 State Avenue NE Property
Olympia, Washington

File No. 0415-049-07

July 25, 2016

Prepared for:

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

Attention: Danelle MacEwen

Prepared by:

GeoEngineers, Inc.
1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Garrett R. Leque, LG
Senior Environmental Scientist

Iain H. Wingard
Associate, Environmental Scientist

GRL:IHW:tt

GeoEngineers

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INTRODUCTION

This data summary report presents the results of groundwater compliance monitoring performed by the City of Olympia (City) in July 2016 at the 318 State Avenue NE property in Olympia, Washington (Property) (Figure 1). Groundwater compliance monitoring at the Property is intended to monitor the natural attenuation of chlorinated organic solvents and associated degradation products identified as chemicals of concern (COCs) in groundwater after completion of the soil remedial action performed in September and October 2009. Remediation of soil and groundwater at the Property is being performed to support the goal of achieving a No Further Action (NFA) determination for the entire Property under the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP). An NFA determination was provided by Ecology in February 2016 for the southeast portion of the Property to support redevelopment activities by the Low Income Housing Institute (LIHI) (Ecology, 2016). Groundwater compliance monitoring is being performed at the Property to support achieving an NFA determination for the remaining portion of the Property as well as to fulfill monitoring requirements associated with the NFA for the southeast portion of the Property.

The chlorinated solvents being monitored for natural attenuation as part of groundwater compliance monitoring include tetrachloroethene (PCE) and trichloroethene (TCE) as well as associated degradation products. Monitoring also includes measurement of water quality parameters that are indicators of the natural attenuation. Monitoring of chlorinated solvents, degradation products and natural attenuation parameters is being performed in accordance with the Groundwater Compliance Monitoring Plan prepared for the Property (GeoEngineers, 2010a) as well as a groundwater monitoring plan prepared for the southeast portion of the Property (GeoEngineers, 2015).

Groundwater samples were collected on July 5, 2016 from four monitoring wells that included MW-03, MW-16, MW-18 and MW-19 (Figure 2). These samples were submitted for analysis to TestAmerica Laboratory in Fife, Washington. Groundwater samples and groundwater levels were collected from selected monitoring wells in accordance with the groundwater monitoring plans for the Property (GeoEngineers, 2010a and 2015).

The following sections summarize the background for compliance monitoring, field sampling activities, groundwater gradients at the Property and results of groundwater sampling and analysis.

BACKGROUND

Remedial actions were performed in September and October 2009 to remove soil and fill material containing volatile organic compounds (VOCs) including chlorinated solvents, metals and carcinogenic polycyclic aromatic compounds (cPAHs) at concentrations greater than the Model Toxics Control Act (MTCA) cleanup levels (CULs). Soil samples were subsequently collected from the boundary of remedial action areas to confirm that soil and fill with contaminant concentrations greater than cleanup levels were removed from the remedial excavations. The results of the soil remedial action are presented in the Remedial Action Construction Report prepared for the Property (GeoEngineers, 2010b).

Compliance monitoring is being performed after completion of soil remedial actions to evaluate the concentrations and natural attenuation of chlorinated organic solvents in groundwater at the Property. The

natural attenuation of chlorinated organic solvents has been monitored via quarterly monitoring through February 2012 and semi-annual monitoring starting in August 2012. Monitoring has included the following:

- Installation of two new monitoring wells in May 2010 during the first compliance groundwater monitoring event. Monitoring well MW-17 was installed within Contaminated Soil Zone 1 (CSZ 1) where soil remediation was performed in September and October 2009 and MW-18 was installed north of the CSZ 1. (Figure 2).
- Quarterly groundwater sampling at eight monitoring wells including MW-03, MW-04, MW-08, MW-09, MW-13 and MW-16 through MW-18 in May 2010, August 2010, November 2010 and February 2011.
- Quarterly groundwater sampling at five monitoring wells including MW-03, MW-08 and MW-16 through MW-18 in May 2011, August 2011, November 2011 and February 2012.
- Semi-annual groundwater sampling at five monitoring wells including MW-03, MW-08 and MW-16 through MW-18 in August 2012, February 2013 and August 2013.
- Semi-annual groundwater sampling at three monitoring wells including MW-03, MW-16 and MW-18 in February 2014, August 2014, February 2015, July 2015, February 2016, and July 2016.
- Installation of monitoring well MW-19 on the northern boundary of the southeast portion of the Property in July 2015 to fulfill one of Ecology's requirements to establish an Environmental Covenant and obtain an NFA determination for the southeast portion of the Property (Figure 2).
- Quarterly groundwater sampling at one monitoring well, MW-19, in July 2015, October 2015, February 2016, and May 2016.
- Inclusion of MW-19 in semi-annual monitoring performed in July 2016.
- Analysis for chlorinated organic solvents and associated degradation products including PCE, TCE, 1,1-dichloroethene (1,1-DCE), cis-dichloroethene (cis-DCE), trans-dichloroethene (trans-DCE) and vinyl chloride (VC).
- Monitoring for indicators of natural attenuation including ferrous iron, sulfate, dissolved oxygen (DO), pH, electrical conductivity and oxidation-reduction potential (ORP).
- Monitoring of groundwater gradients by measuring water levels at all existing monitoring wells at the Property through February 2012. Groundwater level measurements have been collected from each well undergoing groundwater sampling after February 2012.
- Groundwater monitoring wells MW-04 and MW-17 were decommissioned by the LIHI on March 2, 2016 to accommodate redevelopment of the SE portion of the Property. The Ecology Notice-of-Intent, as well as the decommissioning well reports, are provided in Appendix A.

Additionally, analysis for arsenic was performed in accordance with the CMP between May 2010 and February 2011 to provide additional information concerning arsenic concentrations in the area. Arsenic analysis was discontinued after the February 2011 groundwater compliance monitoring event because the arsenic results for sampling performed between May 2010 and February 2011 indicate that arsenic concentrations are less than the MTCA Method A CUL in groundwater on the Property. Arsenic concentrations were detected at concentrations greater than the MTCA CUL in locations upgradient of the Property that are likely related to area-wide groundwater conditions or an upgradient source. Ecology

concurrence for discontinuing arsenic analysis was provided in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated May 16, 2011.

Ecology also previously requested that groundwater be analyzed for constituents associated with a petroleum hydrocarbon release during the May 2010 groundwater compliance monitoring event to evaluate the potential impacts from a UST encountered at the Property during the remedial action for soil. The sampling and analysis requirements to assess potential impacts from the former UST were documented in an email from Iain Wingard, GeoEngineers to Eugene Radcliff; Ecology dated May 11, 2010. The additional analyses requested by Ecology were performed during the May 2010 compliance monitoring event (GeoEngineers, 2010c). Only benzene was detected in two samples at concentrations well below the MTCA Method A groundwater CUL. Based on the May 2010 sample results, no additional monitoring was necessary to assess potential impacts from the UST or petroleum hydrocarbons at the Property. However, Ecology requested in an email from Eugene Radcliff of Ecology to Iain Wingard of GeoEngineers dated July 19, 2010 that compliance groundwater monitoring include benzene analysis. Therefore, groundwater compliance monitoring performed between May 2010 and February 2011 continued to include analysis for benzene. Benzene analysis was discontinued after the February 2011 compliance monitoring event because the results for sampling performed between May 2010 and February 2011 indicated that benzene is not present at concentrations greater than the MTCA Method A CUL. Ecology concurrence for discontinuing benzene analysis was provided in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated May 16, 2011.

Eight groundwater wells were sampled during the May 2010, August 2010, November 2010 and February 2011 groundwater compliance monitoring events. The number of groundwater monitoring locations were reduced from eight to five during the May 2011 compliance monitoring event as the results of groundwater compliance monitoring performed between May 2010 and February 2011 indicate that the concentrations of chlorinated organic solvents and associated degradation products are less than the MTCA CULs at monitoring well locations MW-13, MW-04, MW-17 and MW-09. Ecology concurrence for discontinuing groundwater monitoring at monitoring well locations MW-13, MW-04 and MW-09 was provided in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated May 16, 2011. Groundwater compliance monitoring continued to be performed at MW-17 to monitor upgradient/ background conditions on the Property.

Quarterly groundwater compliance monitoring was implemented between May 2010 and February 2012. The frequency of groundwater monitoring was reduced from quarterly to semi-annually during the August 2012 compliance monitoring event after the results of previous groundwater compliance monitoring events indicated that the highest and lowest concentrations of chlorinated organic solvents and associated degradation products were detected during the month of February and August. Groundwater gradient mapping has also been discontinued as part of reporting and is not included in this compliance groundwater report because groundwater gradient patterns have generally been established through groundwater measurements collected between May 2010 and February 2012. Ecology concurrence for reducing compliance monitoring frequency and discontinuing groundwater gradient mapping was provided in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated May 8, 2012.

Five groundwater wells were sampled during the August and February 2011, August and February 2012 and August and February 2013 groundwater compliance monitoring events. The number of groundwater monitoring locations were reduced from five to three during the February 2014 compliance monitoring

event as the results of groundwater compliance monitoring performed between February 2011 and August 2013 indicate that the concentrations of chlorinated organic solvents and associated degradation products are less than the MTCA CULs at monitoring well locations MW-08 and MW-17. Ecology concurrence for discontinuing groundwater monitoring at monitoring well locations MW-08 and MW-17 were provided in two emails from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated October 3, 2013 and November 4, 2013, respectively.

An additional monitoring well, MW-19, was installed at the Property in July 2015 on the eastern portion of the property to support the redevelopment of the southeast portion of the property (Figure 2). The City sold the southeastern portion of the Property for redevelopment by LIHI. LIHI is constructing a multistory, low income residential housing structure with vapor intrusion mitigation controls in accordance with the environmental covenant established as part of the NFA determination by Ecology (Ecology, 2016). Monitoring well MW-19 is located adjacent to northern boundary of the southeast portion of the Property to characterize groundwater from the southeast portion of the Property. A groundwater monitoring plan was prepared that identifies the monitoring approach and schedule for groundwater from MW-19 (GeoEngineers, 2015).

FIELD ACTIVITIES

Groundwater monitoring samples were collected from MW-03, MW-16, MW-18 and MW-19 on July 5, 2016. It should be noted that a fire occurred on the Adams Street Warehouse Company property, located north of and adjacent to the 318 State Avenue Property, during the night prior to the semi-annual monitoring event (i.e., the fire occurred late July 4th and/or early in the morning of July 5th). The fire destroyed a warehouse on the Adams Street property (Figure 2). The fire department extinguished the fire and was present continuing to apply water during the sampling performed on July 5th.

Groundwater samples were collected using low-flow/low-turbidity sampling techniques to minimize the suspension of particulates in the samples. Groundwater samples were obtained from the wells using dedicated submersible electric pumps (Whale Pump Brand) with dedicated flexible vinyl tubing. Groundwater was pumped at approximately 0.5 liters per minute from the approximate mid-point of the screened interval to collect the samples.

Water quality parameters were measured during purging using an YSI 556 MPS water quality meter with a flow-through cell. The measured water quality parameters included electrical conductivity, dissolved oxygen (DO), potential hydrogen (pH), turbidity, reduction potential (ORP), salinity, total dissolved solids (TDS) and temperature. Groundwater samples were collected once the water quality parameters generally varied by less than 10 percent on three consecutive measurements. All field measurements were documented on the field logs.

Following well purging, the flow-through cell was disconnected and the groundwater samples were collected in appropriate laboratory-prepared and -provided containers. The samples were protected and placed into a cooler with ice and delivered to TestAmerica Laboratory in Fife, Washington, for analysis following appropriate chain-of-custody procedures. Purge water was stored in labeled 55-gallon drums for future permitted off-site disposal. The groundwater samples were submitted for the following analyses to provide results for chlorinated organic solvents and associated degradation products as well as water quality parameters as specified in the CMP:

- VOCs by Environmental Protection Agency (EPA) Method 8260
- Sulfate by EPA Method 300.0

Ferrous iron concentrations were evaluated in the field using a Hach field test kit and the results were recorded on the field logs prior to collection of samples for laboratory analysis.

ANALYTICAL RESULTS

The results from semi-annual groundwater sample collection and analysis from MW-03, MW-16 and MW-18 performed in July 2016 are described in the following sections. Table 1 presents the results for the chemical analyses performed as part of semi-annual groundwater compliance monitoring in July 2016. Table 1 also includes the results from previous groundwater compliance monitoring for comparison purposes.

The results from monitoring MW-19 installed in July 2015 are also described below and presented in Table 1. MW-19 is being monitored in accordance with a separate groundwater monitoring plan that was prepared for monitoring groundwater from the southeast portion of the Property and that identifies the monitoring approach and schedule for sampling and analysis of groundwater from MW-19 (GeoEngineers, 2015).

The results for groundwater samples from MW-03, MW-16, MW-18 and MW-19 are compared to MTCA groundwater CULs 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 CULs and screening levels are presented in Table 1. Table 2 summarizes water quality and natural attenuation parameter measurements collected in July 2016 and also includes the results from previous groundwater compliance monitoring for comparison. Finally, Appendix B contains the laboratory analytical reports and Appendix C contains the Data Quality Assessment Report presenting the results of data validation of the chemical analyses performed in July 2016.

Groundwater Compliance Monitoring Analyses

Natural Attenuation Parameters

The geochemical indicators of natural attenuation measured on July 5, 2016 do not generally fit the historical pattern for the Property. Historically, summer measurements indicate a lower water table and more reducing conditions (less oxidative conditions) compared to winter (Table 2). The July 5, 2016 measurements were more typical of conditions observed in winter: high water table and more oxidative conditions (less reducing conditions). The water table was the highest ever recorded in three out of four wells on July 5, 2016 (MW-16, MW-18 and MW-19). The high water table and generally oxidative conditions measured on July 5, 2016 are a result of firefighting activities occurring on the Adams Street Warehouse Company property located north of and adjacent to the 318 State Avenue Property. A large volume of water was used in firefighting activities and a portion of the water likely infiltrated into the area that comprises the northern portion of the 318 State Avenue Property. The water used for fighting the fire was likely more oxidative than typical summer groundwater conditions at the property.

The effects of firefighting on groundwater conditions and degradation of chlorinated compounds is not known at this time due to the amount of time that transpired between firefighting activities and sampling. Physical processes such as mixing and dispersion as well as the substantial change in the groundwater elevation to levels not previously observed at the Property likely affected the types and concentrations of chlorinated compounds measured during the July 2016 monitoring event.

Chlorinated Organic Solvents and Associated Degradation Products

PCE was detected in MW-18 at 0.13 μg/L during the July 2016 monitoring event. This represents the only PCE detection in any of the wells that are currently being monitored (MW-03, MW-16, MW-18 and MW-19). The detected concentration was less than both the MTCA Method B groundwater CUL based on protection of surface water and the screening level for soil vapor intrusion. MW-18 is located closest to where firefighting activities occurred and it is possible the result is due to those activities entraining residual PCE present in shallow soil.

TCE, cis-DCE, trans-DCE and/or VC were detected in groundwater during monitoring in July 2016 (Table 1). 1,1-DCE, cis-DCE and trans-DCE were either not detected in groundwater at the Property or were detected at concentrations less than the MTCA Method B groundwater CULs based on protection of surface water and the screening level for soil vapor intrusion. VC was detected in groundwater from MW-19 at a concentration greater than the MTCA Method B screening level for soil vapor intrusion but was less than the CUL for protection of surface water. VC was either not detected or detected at a concentration less than the CUL for protection of surface water and screening level for soil vapor intrusion in groundwater from MW-03, MW-16 and MW-18. TCE was detected at a concentration greater than the MTCA Method B screening level for soil vapor intrusion in groundwater samples collected from MW-03 but was less than the screening level in groundwater from MW-16, MW-18, and MW-19 during the July 2016 sampling event (Table 1 and Figure 3).Discussion

Natural Attenuation of Chlorinated Solvents and Associated Degradation Products in Groundwater

Temporal analysis of the detected concentrations of chlorinated compounds in groundwater at the Property is being performed to assess trends in the natural attenuation of the chlorinated compounds at the Property. The detected chlorinated compound concentrations plotted through time are presented in Figures 4 through 7. The data presented for monitoring wells MW-03 and MW-16 include the results of the groundwater monitoring event performed prior to remedial actions for soil (i.e., March 2009) as well as the groundwater monitoring events that have been performed after the completion of soil remediation. The data presented for monitoring well MW-18 include the groundwater monitoring events performed after the soil remedial actions as this well was installed after completion of the soil remedial actions. Monitoring well MW-19 was installed in July 2015 and has been sampled in July 2015, October 2015, February 2016, May 2016 and July 2016.

It also should be noted that that July 2016 groundwater levels at the Property were among the highest recorded during post-remediation compliance monitoring likely due to firefighting activities.

The following summarizes the results of the trend analysis for MW-03, MW-16, MW-18 and MW-19:

- MW-03 – Monitoring well MW-03 is located downgradient/crossgradient of the soil remedial action area on the southeast portion of the Property (CSZ 1) (Figure 3). The concentrations of chlorinated

compounds have fluctuated (i.e., increased and decreased) in groundwater at MW-03 between the soil remedial action and 2016 (Figure 4 and Table 1). Higher concentrations of chlorinated compounds are generally present in groundwater at MW-03 in the winter when groundwater levels are higher (Figure 4 and Tables 1 and 2). The concentration of TCE continues to periodically be detected at concentrations greater than the MTCA screening level for soil vapor intrusion (1.55 µg/L) during sampling events performed in the winter (i.e., February 2016, February 2014 and February and November 2011) but is less than the cleanup level for protection of surface water (7 µg/L). The concentration of TCE has generally been below the MTCA screening level for soil vapor intrusion during monitoring events occurring in the summer (i.e., July 2015, August 2014, August 2013, and August 2012). However, the concentration of TCE detected in groundwater from MW-03 during the July 2016 monitoring event was greater than the screening level for soil vapor intrusion (Figure 4 and Table 1). The results for TCE at MW-03 in July 2016 may be attributed to groundwater conditions from infiltration of firefighting water at or near the Property on July 5, 2016. The concentration of VC also continues to periodically be detected at concentrations greater than the MTCA screening level for soil vapor intrusion (0.347 µg/L) during sampling events performed in the winter (i.e., February 2015 through February 2012). The concentration of VC was greater than the cleanup level for protection of surface water (1.6 µg/L) during one event (i.e., February 2015). Similar to TCE, VC has generally been below the MTCA screening level for soil vapor intrusion during monitoring events occurring in the summer (i.e., July 2016, July 2015, August 2014, August 2013, and August 2012). PCE and DCE are either not detected or are detected at concentrations less than the MTCA cleanup levels for protection of surface water and screening level for soil vapor intrusion in groundwater from MW-03 (Table 1).

- MW-16 – Monitoring well MW-16 is located downgradient of the soil remedial action area on the southeast portion of the Property (Figure 2). The concentration of VC in groundwater from MW-16 as well as other chlorinated compounds decreased after completion of soil remedial actions (Figure 5 and Table 1). Higher VC concentrations and concentrations greater than the screening level for soil vapor intrusion are generally present in groundwater in MW-16 during monitoring events performed in the summer (i.e., July 2015, August 2014, August 2013, and August 2012), which is likely attributed to the degradation of TCE and DCE in groundwater flowing from the upgradient area in proximity to MW-03. However, a lower VC concentration and a concentration less than the screening level was observed during the July 2016 sampling event, which may be attributed to infiltration of firefighting water at or near the Property. PCE, TCE, and DCE have been either not detected or detected at concentrations less than the MTCA cleanup level for protection of surface water and screening level for soil vapor intrusion in groundwater from MW-16. The concentration of TCE increased during the July 2016 monitoring event, which may also be attributed to infiltration of firefighting water at or near the Property. The concentration of TCE remained below the cleanup and screening levels in July 2016.
- MW-18 – Monitoring well MW-18 is located downgradient of soil remedial action area on the southeast portion of the Property (Figure 2). The VC concentrations in groundwater at monitoring well MW-18 have fluctuated between the soil remedial action and February 2016 (Figure 6 and Table 1). Similar to MW-16, higher concentrations of VC are generally present in groundwater in MW-18 during summer monitoring events which is likely attributed to the degradation of TCE and DCE in groundwater flowing from the upgradient area in proximity to MW-03. However, similar to MW-16, a lower VC concentration was also observed during the July 2016 sampling event which may be attributed to infiltration of firefighting water at or near the Property. The concentrations of VC in groundwater from MW-18 have been greater than the cleanup level for protection of surface water and/or the screening level for soil vapor instruction but were below the cleanup and screening level during the July 2016 monitoring

event. PCE, TCE, and DCE at MW-18 are consistently either not detected or detected at concentrations less than the MTCA cleanup and screening levels.

- MW-19 – Monitoring well MW-19 was installed in July 2015 to monitor groundwater from the southeast portion of the Property (Figure 2). VC has been detected in groundwater from MW-19 at concentrations greater than the screening level for soil vapor intrusion but less than the cleanup level (CUL) for protection of surface water (Figure 7 and Table 2). TCE concentrations have been detected at concentrations less than the CUL for protection of surface water and the MTCA screening level for soil vapor intrusion with the exception of the February 2016 monitoring event. PCE and DCE at MW-19 have either not been detected or detected at concentrations less than the cleanup and screening levels.

Overview of Groundwater Compliance Monitoring Results

TCE was detected at a concentration greater than the MTCA screening level for soil vapor intrusion at one location, MW-03, during the July 2016 monitoring event (Table 1 and Figure 3). VC was also detected at a concentration greater than the MTCA screening level for soil vapor intrusion at one location, MW-19, during the July 2016 monitoring event. Other chlorinated compounds were either not detected or less than the MTCA cleanup level for protection of surface water and screening level for soil vapor intrusion in groundwater during the July 2016 monitoring event

Geochemical indicators of natural attenuation have fluctuated seasonally between reductive and oxidative conditions during compliance monitoring events performed at the Property. The July 2016 groundwater conditions were anomalous in that they were observed to be more oxidative/less reductive which is similar to monitoring events performed during the winter. The groundwater conditions observed in winter are due to increased precipitation and associated increase in stormwater infiltration on and around the Property. The July 2016 results are likely due to infiltration of firefighting water at or near the Property. The groundwater levels observed in three out of four of the wells monitored during the July 2016 compliance event were the highest ever recorded at the Property. It is anticipated that more reducing/less oxidative conditions will be observed again during the winter months of 2017

Future Groundwater Compliance Monitoring

The next round of semi-annual groundwater compliance monitoring is scheduled to be performed in February 2017. Groundwater compliance monitoring will be performed at groundwater monitoring wells MW-03, MW-16, MW-18, and MW-19.

REFERENCES

Ecology, 2016, No Further Action at a Property associated with a Site: 318 State Ave NE, Olympia, WA 98501, Opinion Letter, dated February 23, 2016.

Email from Iain Wingard, GeoEngineers to Eugene Radcliff, Ecology "Subject: City of Olympia Groundwater Compliance Monitoring," dated May 11, 2010.

Email from Eugene Radcliff of Ecology to Iain Wingard of GeoEngineers, "Subject: State Avenue Property May 2010 Groundwater Compliance Monitoring Report," dated July 19, 2010.

Email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers, "Subject: Ecology response to the February 2011 Groundwater Monitoring Report," dated May 16, 2011.

Email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers, "Subject: Monitoring and Reporting at the City of Olympia 318 State Avenue Property," dated May 8, 2012.

Email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers, "Subject: Groundwater Monitoring Report for City of Olympia 318 S State Street Property," dated October 3, 2013.

Email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers, "Subject: Groundwater Monitoring Report for City of Olympia 318 S State Street Property," dated November 4, 2013.

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

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

GeoEngineers, 2010c, "Groundwater Compliance Monitoring Data Summary Report – May 2010, 318 State Avenue NE, Olympia, Washington," July 16, 2010.

GeoEngineers, 2015, "Groundwater Monitoring Plan, Southeast Portion of the 318 State Avenue NE Property, Olympia, Washington," October 1, 2015.

LIMITATIONS

This Groundwater Monitoring Report has been prepared for use by the City of Olympia. GeoEngineers has performed these services in general accordance with the scope and limitations of our proposal.

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

TABLE 1

SUMMARY OF GROUNDWATER MONITORING PARAMETERS[1] - JULY 2016

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[2]	8.85	7	3.2	NE	4,000	1.6
		Groundwater Screening Level for Soil Vapor Intrusion[3]	22.9	1.55	130	NE	NE	0.347
Location	**Sample ID**	**Sample Date**						
MW-03	MW3-052410-W	05/24/10	0.1 U	**0.48**	0.1 U	**0.14**	0.1 U	**0.48**
	MW3-082510-W	08/25/10	0.1 U	**0.26**	0.1 U	**0.11**	0.1 U	**0.12**
	MW3-112410-W	11/24/10	0.1 U	**1.3**	0.1 U	**0.28**	0.1 U	**1.1**
	MW3-022311-W	02/23/11	0.1 U	**1.6**	0.1 U	**0.59**	0.1 U	**0.92**
	MW3-052511-W	05/25/11	0.1 U	**1.5**	0.1 U	**0.60**	**0.15**	**0.83**
	DUP-052511-W[4]	05/25/11	0.1 U	**1.2**	0.1 U	**0.36**	**0.12**	**0.69**
	MW3-082411-W	08/24/11	0.1 U	**0.64 J**	0.1 U	**0.31**	**0.11**	**0.37 J**
	DUP-082411-W[5]	08/24/11	0.1 U	**0.49 J**	0.1 U	**0.23**	0.1 U	**0.27 J**
	MW3-112911-W	11/29/11	0.1 U	**2.6**	0.1 U	**0.39**	**0.11**	**0.45**
	DUP-112911-W[6]	11/29/11	0.1 U	**2.7**	0.1 U	**0.41**	**0.10**	**0.52**
	MW3-022812-W	02/28/12	0.1 U	**0.99**	0.1 U	**0.63**	**0.18**	**1.4**
	DUP-022812-W[7]	02/28/12	0.1 U	**1.3**	0.1 U	**0.84**	**0.19**	**1.9**
	MW3-082312-W	08/23/12	0.1 U	**0.11**	0.1 U	**0.36**	**0.30**	**0.27**
	DUP-082312-W[8]	08/23/12	0.1 U	**0.11**	0.1 U	**0.34**	**0.33**	**0.26**
	MW3-022813-W	02/28/13	0.1 U	**0.70**	0.1 U	**0.34**	**0.14**	**0.72**
	DUP-022813-W[9]	02/28/13	0.1 U	**0.68**	0.1 U	**0.32**	**0.12**	**0.69**
	MW03-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	**0.24**	**0.28**	**0.15**
	DUP01-82213-W[10]	08/22/13	0.1 U	0.1 U	0.1 U	**0.23**	**0.32**	**0.16**
	MW3-140227-W	02/27/14	0.1 U	**2.5**	0.1 U	**0.75**	**0.12**	**0.79**
	MW03-140825-W	08/25/14	0.1 U	0.1 U	0.1 U	**0.35**	**0.36**	**0.25**
	MW03-150225-W	02/25/15	0.5 U	**0.58**	0.1 U	**1.8**	0.2 U	**3.6**
	MW03-150723-W	07/23/15	0.5 U	0.2 U	0.1 U	**0.34**	**0.34**	**0.28**
	MW3-160217-W	02/17/16	0.5 U	**4.0**	0.1 U	**0.41**	0.2 U	**0.19**
	MW-3-160705-W	07/05/16	0.5 U	**2.2**	0.1 U	**0.84**	0.2 U	**0.34**
MW-16	MW16-052410-W	05/24/10	0.1 U	**0.44**	0.1 U	**0.20**	**0.18**	**0.76**
	MW16-082510-W	08/25/10	0.1 U	**0.46**	0.1 U	**0.32**	**0.34**	**1.0**
	MW16-112410-W	11/24/10	0.1 U	**0.49**	0.1 U	**0.17**	**0.19**	**0.33**
	DUP-1-112410-W[11]	11/24/10	0.1 U	**0.50**	0.1 U	**0.16**	**0.21**	**0.38**
	MW16-022311-W	02/23/11	0.1 U	**0.42**	0.1 U	**0.13**	**0.13**	**0.22**
	DUP-1-022311-W[12]	02/23/11	0.1 U	**0.43**	0.1 U	**0.11**	**0.15**	**0.23**
	MW16-052511-W	05/25/11	0.1 U	**0.47**	0.1 U	0.1 U	**0.16**	**0.18**
	MW16-082411-W	08/24/11	0.1 U	**0.41**	0.1 U	**0.26**	**0.24**	**0.70**
	MW16-112911-W	11/29/11	0.1 U	**0.35**	0.1 U	**0.10**	**0.12**	**0.15**
	MW16-022812-W	02/28/12	0.1 U	**0.40**	0.1 U	0.1 U	**0.13**	**0.17**
	MW16-082312-W	08/23/12	0.1 U	**0.52**	0.1 U	**0.21**	**0.20**	**0.47**
	MW16-022813-W	02/28/13	0.1 U	**0.28**	0.1 U	0.1 U	0.1 U	**0.086**
	MW16-82213-W	08/22/13	0.1 U	**0.26**	0.1 U	**0.22**	**0.13**	**0.44**
	MW16-140227-W	02/27/14	0.1 U	**0.24**	0.1 U	0.1 U	0.1 U	**0.093**
	DUP01-140227-W[13]	02/27/14	0.1 U	**0.26**	0.1 U	0.1 U	0.1 U	**0.090**
	MW16-140825-W	08/25/14	0.1 U	**0.37**	0.1 U	**0.25**	**0.18**	**0.52**
	DUP01-140825-W[14]	08/25/14	0.1 U	**0.36**	0.1 U	**0.25**	**0.19**	**0.51**
	MW16-150225-W	02/25/15	0.5 U	**0.24**	0.1 U	0.2 U	0.2 U	**0.16**
	DUP01-150225-W[15]	02/25/15	0.5 U	**0.23**	0.1 U	0.2 U	0.2 U	**0.15**
	MW16-150712-W	07/23/15	0.5 U	**0.23**	0.1 U	**0.27**	0.2 U	**0.60**
	DUP01-150723-W[16]	07/23/15	0.5 U	**0.24**	0.1 U	**0.28**	0.2 U	**0.54**
	MW16-160217-W	02/17/16	0.5 U	**0.23**	0.1 U	0.2 U	0.2 U	0.02 U
	DUP1-160217-W[17]	02/17/16	0.5 U	**0.25**	0.1 U	0.2 U	0.2 U	0.02 U
	MW-16-160705-W	07/05/16	0.5 U	**0.78**	0.1 U	0.2 U	0.2 U	0.02 U
	DUP01-160705-W[19]	07/05/16	0.5 U	**0.96**	0.1 U	0.2 U	0.2 U	0.02 U
MW-18	MW18-052410-W	05/24/10	0.1 U	**0.62**	0.1 U	**0.28**	**0.16**	**2.3**
	MW18-082510-W	08/25/10	0.1 U	**0.25**	0.1 U	**0.22**	**0.13**	**1.9**
	MW18-112410-W	11/24/10	0.1 U	**0.81**	0.1 U	**0.34**	**0.23**	**1.7**
	MW18-022311-W	02/23/11	0.1 U	**0.72**	0.1 U	**0.30**	**0.16**	**0.90**
	MW18-052511-W	05/25/11	0.1 U	**0.63**	0.1 U	**0.21**	**0.14**	**1.2**
	MW18-082411-W	08/24/11	0.1 U	**0.40**	0.1 U	**0.39**	**0.24**	**2.3**
	MW18-112911-W	11/29/11	0.1 U	**0.57**	0.1 U	**0.30**	**0.15**	**0.86**
	MW18-022812-W	02/28/12	0.1 U	**0.49**	0.1 U	**0.20**	**0.16**	**1.20**
	MW18-082312-W	08/23/12	0.1 U	**0.62**	0.1 U	**0.43**	**0.29**	**2.7**
	MW18-022813-W	02/28/13	0.1 U	**0.34**	0.1 U	0.1 U	0.1 U	**0.15**
	MW18-82213-W	08/22/13	0.1 U	**0.61**	0.1 U	**0.45**	**0.28**	**2.1**
	MW18-140227-W	02/27/14	0.1 U	**0.57**	0.1 U	**0.26**	**0.26**	**1.3**
	MW18-140825-W	08/25/14	0.1 U	**0.48**	0.1 U	**0.51**	**0.43**	**2.7**
	MW18-150225-W	02/25/15	0.5 U	**0.68**	0.1 U	**0.23**	**0.20**	**1.5**
	MW18-150723-W	07/23/15	0.5 U	**0.29**	0.1 U	**0.34**	**0.27**	**2.0**
	MW18-160217-W	02/17/16	0.5 U	**0.48**	0.1 U	**0.26**	**0.26**	**1.5**
	MW18-160705-W	07/05/16	**0.13 J**	**0.16 J**	0.1 U	0.2 U	0.2 U	**0.060**

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[2]			8.85	7	3.2	NE	4,000	1.6
Groundwater Screening Level for Soil Vapor Intrusion[3]			22.9	1.55	130	NE	NE	0.347
Location	**Sample ID**	**Sample Date**						
MW-19	MW-19-150723-W	07/23/15	0.5 U	**0.47**	0.1 U	0.2 U	0.2 U	**0.89**
	MW-19-151027-W	10/27/15	0.5 U	**0.91**	0.1 U	0.2 U	0.2 U	**0.41**
	MW19-160217-W	02/17/16	0.5 U	**1.7**	0.1 U	0.2 U	0.2 U	0.02 U
	MW19-160503-W	05/03/16	0.5 U	**1.2**	0.1 U	**0.1 J**	0.2 U	**0.51**
	DUP1-160503-W[18]	05/03/16	0.5 U	**1.5**	0.1 U	0.2 U	0.2 U	**0.41**
	MW-19-160705-W	07/05/16	0.5 U	**1.5**	0.1 U	**0.31**	**0.18 J**	**1.4**

Notes:

[1] The parameters presented are the groundwater compliance monitoring parameters specified in the Groundwater Compliance Monitoring Plan (GeoEngineers, 2010) for the property and groundwater monitoring plan for the southeast portion of the property (GeoEngineers, 2015).

[2] 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).

[3] 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.

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

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

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

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

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

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

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

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

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

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

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

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

[16] Sample DUP01-150723-W is a field duplicate of sample MW16-150723-W.

[17] Sample DUP1-160217-W is a field duplicate of sample MW16-160217-W.

[18] Sample DUP-1-160503-W is a field duplicate of sample MW19-160503-W.

[19] Sample DUP01-160507-W is a field duplicate of sample MW16-160507-W.

MTCA = Model Toxics Control Act

µg/l = microgram per liter

mg/l = milligram per liter

J = The analyte concentration is estimated

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

NE = Not Established

Bold indicates analyte was detected.

Green shading indicates sample results for the current monitoring event.

Gray shading indicates concentration is greater than groundwater cleanup and/or screening level.

TABLE 2

SUMMARY OF GROUNDWATER QUALITY PARAMETERS[1] - JULY 2016

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 (ppt)	Total Dissolved Solids (g/l)	Turbidity (NTU)	Temperature (C)	ORP[2] (mv)	Water Level (ft btoc)
MW-03	05/24/10	0.9	7.5	4.38	9.79	27.2	0.1	1.4	0.89	16.2	-211	4.27
	08/25/10	1.4	1.2 U	0.31	6.96	75.0	0	0.48	0.94	21.32	-133	4.99
	11/24/10	0.8	6.6	0.00	7.04	66.7	0	0.43	0.84	15.53	-94	3.80
	02/23/11	0.6	2.5	0.01	7.10	46.3	0	0.3	2.51	11.26	-117	4.05
	05/25/11	0.8	2.4	0.01	7.07	46.7	NC	NC	0.59	15.12	-130	4.10
	08/24/11	1.1	1 U	0.40	7.20	72.3	0	0.46	0.44	21.02	-90	4.82
	11/29/11	0.6	11	5.00	7.10	59.0	0	0.38	3.06	13.67	89	3.49
	02/28/12	0.8	40 UJ	2.60	7.25	41.5	0	0.27	5.45	10.99	-59	3.75
	08/23/12	1.0	1.2 U	7.14	6.87	53.0	0	0.34	0.59	21.3	-117	4.92
	02/28/13	1.5	2.1	0.78	6.53	48.0	0	0.31	17.6	11.52	-48	3.98
	08/22/13	1.6	1.2 U	0.10	7.61	61.7	0	0.40	37.4[3]	23.2	-156	4.98
	02/27/14	0.0	11	3.80	7.30	33.2	0	0.31	0.63	10.3	204.4	3.44
	08/25/14	1.8	1.2 U	0.68	7.25	52.0	0.26	0.35	2.48	22.99	-108.6	4.78
	02/25/15	0.5	2.1	1.25	7.31	31.9	0.2	0.26	1.56	12.21	-70.3	4.14
	07/23/15	0.5	1.2 U	0.09	7.11	48.8	0.25	0.34	0.81	22.6	-150	5.04
	02/17/16	0.0	12	4.94	7.50	30.0	0.19	0.25	2.3	12.7	46.5	3.41
	07/05/16	0.7	8.2	2.58	7.04	46.1	0.23	0.32	3.18	22.1	-133.8	3.50
MW-16	05/24/10	0.0	20.0	2.44	8.19	26.6	0	0.17	2.9	15.1	-116	4.24
	08/25/10	0.4	42.0	0.04	7.26	69.8	0	0.44	1.2	21.91	-106	5.02
	11/24/10	0.0	28	1.93	7.54	49.8	0	0.36	1.16	15.42	-34	3.68
	02/23/11	0.0	17	5.08	7.53	37.5	0	0.24	2.58	11.53	-9	4.04
	05/25/11	0.0	11	1.02	7.55	33.1	NC	NC	2.28	13.87	64	4.06
	08/24/11	1.2	4.9	1.00	7.66	51.0	0	0.33	1.28	20.26	-56	4.86
	11/29/11	0.4	19	6.20	7.60	35.3	0	0.23	4.00	13.82	96	3.33
	02/28/12	0.0	54 UJ	6.80	7.70	29.8	0	0.19	1.87	10.89	87	3.72
	08/23/12	0.0	3.9	3.21	7.02	31.4	0	0.2	1.22	19.7	-109	4.91
	02/28/13	0.0	7.7	5.86	6.84	29.4	0	0.19	0.40	11.36	115	3.86
	08/22/13	0.0	3.5	0.11	7.93	46.5	0	0.3	62[3]	22.9	-177	4.91
	02/27/14	0.0	7.3	2.61	7.24	23.6	0	0.21	0.31	10.9	206.2	3.33
	08/25/14	0.5	3.1	0.72	7.59	42.1	0.21	0.28	0.42	22.35	-30.8	4.73
	02/25/15	0.0	5.7	3.07	7.64	23.1	0.15	0.2	1.39	11.51	-52.2	4.09
	07/23/15	0.5	1.2 U	0.11	7.41	42.6	0.22	0.31	0.91	20.6	-168.8	4.93
	02/17/16	0.0	8.5	3.32	7.66	21.3	0.13	0.18	2.65	12.6	40.1	3.28
	07/05/16	0.0	23	5.10	7.23	38.9	0.21	0.28	3.4	19.4	3.2	1.85
MW-18	05/24/10	0.0	34.0	3.92	9.16	9.0	0	0.5	1.9	14.3	-194	4.39
	08/25/10	0.2	11.0	0.00	6.81	71.9	0	0.46	4.12	21.82	-75	5.09
	11/24/10	0.0	38	0.01	7.11	47.9	0	0.31	0.61	15.52	39	3.87
	02/23/11	0.0	23	0.17	7.22	40.3	0	0.26	0.99	11.7	55	4.15
	05/25/11	0.0	17	0.00	7.15	40.8	NC	NC	1.07	12.8	31	4.21
	08/24/11	0.2	18.5	0.50	7.33	74.1	0	0.47	0.48	19.54	-48	4.97
	11/29/11	0.4	23	3.50	6.81	34.3	0	0.22	2.82	13.18	183	3.53
	02/28/12	0.0	67 UJ	8.20	7.21	32.9	0	0.21	1.56	10.33	93	3.87
	08/23/12	1.0	7.5	4.03	7.08	53.4	0	0.34	3	18.2	-110	5.02
	02/28/13	0.0	7.4	5.68	6.05	21.1	0	0.14	7	10.94	182	4.02
	08/22/13	1.1	4.1	1.90	7.72	59.3	0	0.38	54.8[3]	20.9	-153	5.04
	02/27/14	0.0	11	3.00	7.1	22.2	0	0.2	0.48	10.6	201.3	3.52
	08/25/14	0.8	1.2 U	2.02	9.23	46.7	0.25	0.33	2.79	20.37	-102.9	4.85
	02/25/15	0.0	5.9	1.71	7.37	25.4	0.17	0.23	1.81	11.2	-35.2	4.21
	07/23/15	0.6	1.2 U	0.07	7.06	44.2	0.24	0.31	3.67	20.4	-102.6	5.08
	02/17/16	0.0	6.7	1.56	7.23	20.8	0.13	0.18	3.2	11.9	-5.2	3.53
	07/05/16	0.0	140 J	3.47	6.05	48.4	0.25	0.343	3.4	20.9	31.4	2.26
MW-19	07/23/15	0.5	1.2 U	0.11	7.36	47.6	0.34	0.33	5.02	21.6	-144.5	4.66
	10/27/15	1.0	5.0	0.24	7.07	37.8	0.21	0.28	12.9	18.3	-136.7	3.47
	02/17/16	0.0	8.1	6.85	7.69	15.4	0.10	0.13	5.2	12.3	23.4	2.85
	05/03/16	0.0	11.0	0.28	7.02	290.0	0.17	0.23	4.54	15.5	-46.2	3.99
	07/05/16	0.02	13	0.61	7.21	47.0	0.26	0.35	4.62	18.5	-103.1	1.78

Notes:

[1] Groundwater quality parameters include the analytes ferrous iron and sulfate to evaluate and monitor natural attenuation.

[2] ORP field readings are considered to be an estimate.

[3] Turbidity measurements collected at this compliance monitoring location are considered to be biased high due to a water quality equipment malfunction. Visual observation made at the time of sampling identified that the sample was clear and free of particulates.

ORP = Oxidation/reduction potential

mg/l = milligrams per liter

g/l = grams per liter

ppt = parts per trillion

mv = Millivolts

mS/m = milliSiemens per meter

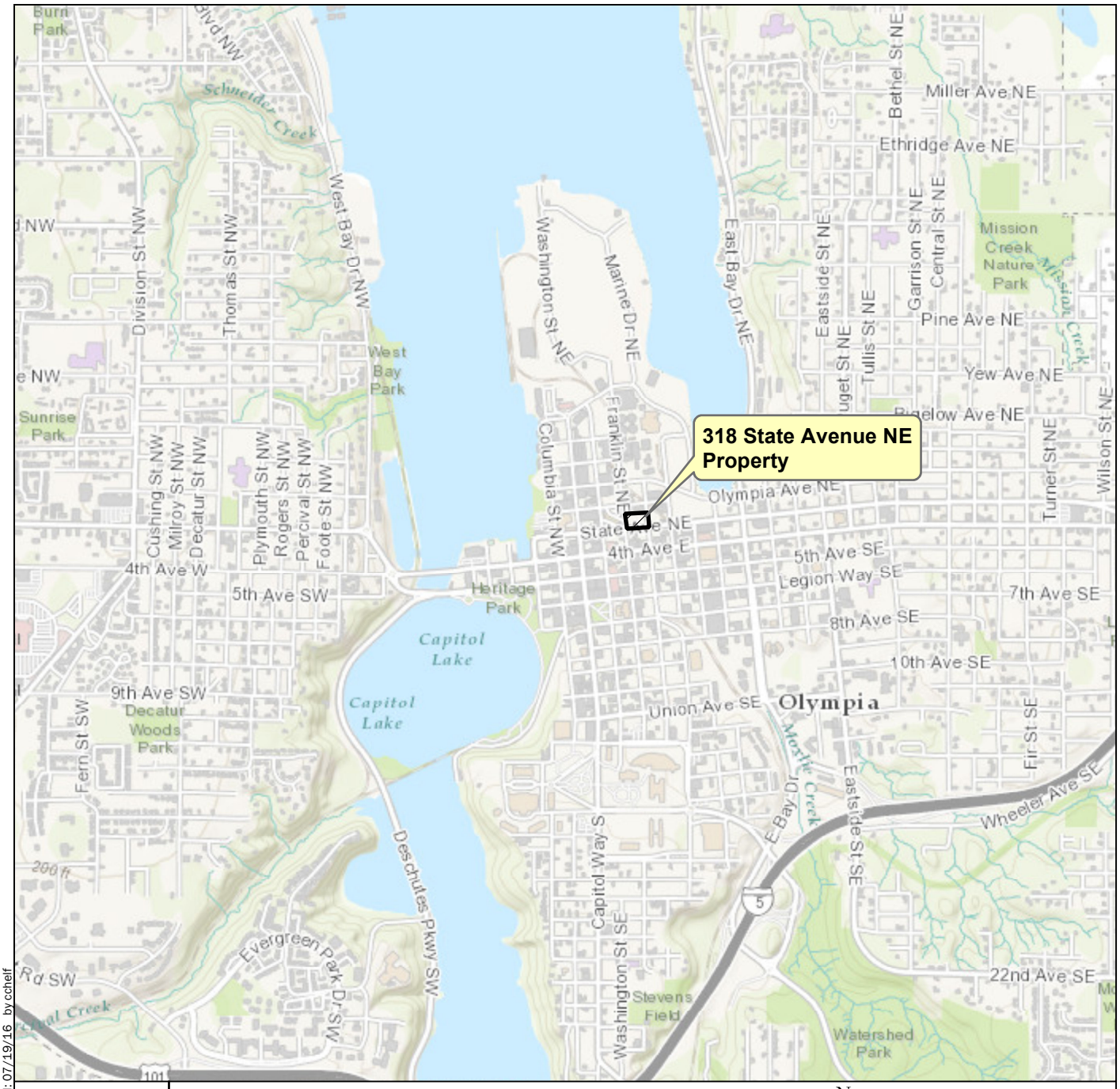
C = Celsius

NTU = nephelometric turbidity unit

NC = Not collected

ft btoc = feet below the top of monitoring well casing

Green shading indicates sample results for the current monitoring event.



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Feet

Notes:

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

Data Source: Mapbox Open Street Map, 2016

Projection: WGS 1984 Web Mercator Auxiliary Sphere

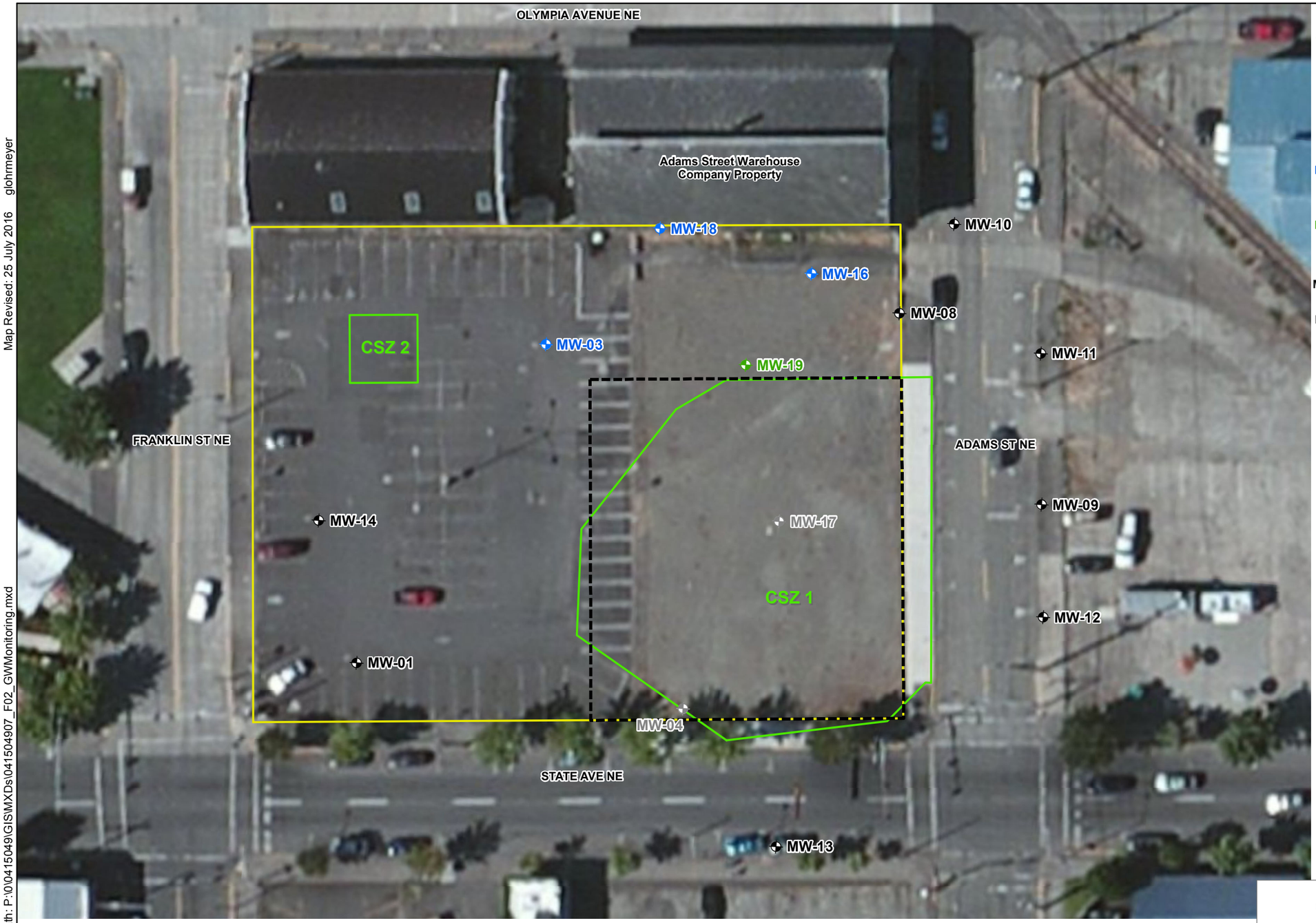
Vicinity Map

318 State Avenue NE Property
Olympia, Washington

GeoEngineers

Figure 1

P:\0\0415049\GIS\MXDs\041504903_Figure1_VicinityMap.mxd Date Exported: 07/19/16 by cchelf



Legend

CSZ 1 — Contaminated Soil Zones (CSZ) Remediated in September-October 2009

Approximate 318 State Avenue NE Property Boundary

Southeast portion of property redeveloped by LIHI

MW-03 — Monitoring well currently being monitored as part of semi-annual monitoring events

MW-19 — Monitoring well installed to monitor groundwater from the southeast portion of the property that is currently being monitored as part of Semi-annual monitoring events.

MW-01 — Monitoring well that was previously monitored as part of quarterly or semi-annual monitoring events

MW-04 — Decommissioned Monitoring Well

N W E S

40 0 40

Feet

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

Data 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

Groundwater Monitoring Locations

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 2

Map Revised: 25 July 2016 glohrmeyer

Path: P:\0\0415049\GIS\MXDs\041504907_F02_GWMonitoring.mxd

Map Revised: 25 July 2016 glohrmeyer

Path: P:\0\0415049\GIS\MXDs\041504907_F03_GWM_July16.mxd

Legend

CSZ 1 — Contaminated Soil Zones (CSZ) Remediated in September-October 2009

Approximate 318 State Avenue NE Property Boundary

Southeast portion of property redeveloped by LIHI

MW-03 — Monitoring well currently being monitored as part of semi-annual monitoring events

MW-19 — Monitoring well installed to monitor groundwater from the southeast portion of the property that is currently being monitored as part of Semi-annual monitoring events.

MW-04 — Decommissioned Monitoring Well

MW-01 — Monitoring well that was previously monitored as part of quarterly or semi-annual monitoring events

Trichloroethene at concentration greater than the screening level based on Guidance for Evaluating Soil Vapor Intrusion in Washington State (1.55 µg/L)

Vinyl Chloride at concentration greater than the screening level based on Guidance for Evaluating Soil Vapor Intrusion in Washington State (0.347 ug/L)

Well	Event	Result
MW-3		
TCE	July 2016	2.2 µg/L
MW-19		
Vinyl Chloride	July 2016	1.4 µg/L

N W E S

35 0 35

Feet

Notes:
1. MTCA = Model Toxics Control Act, µg/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.

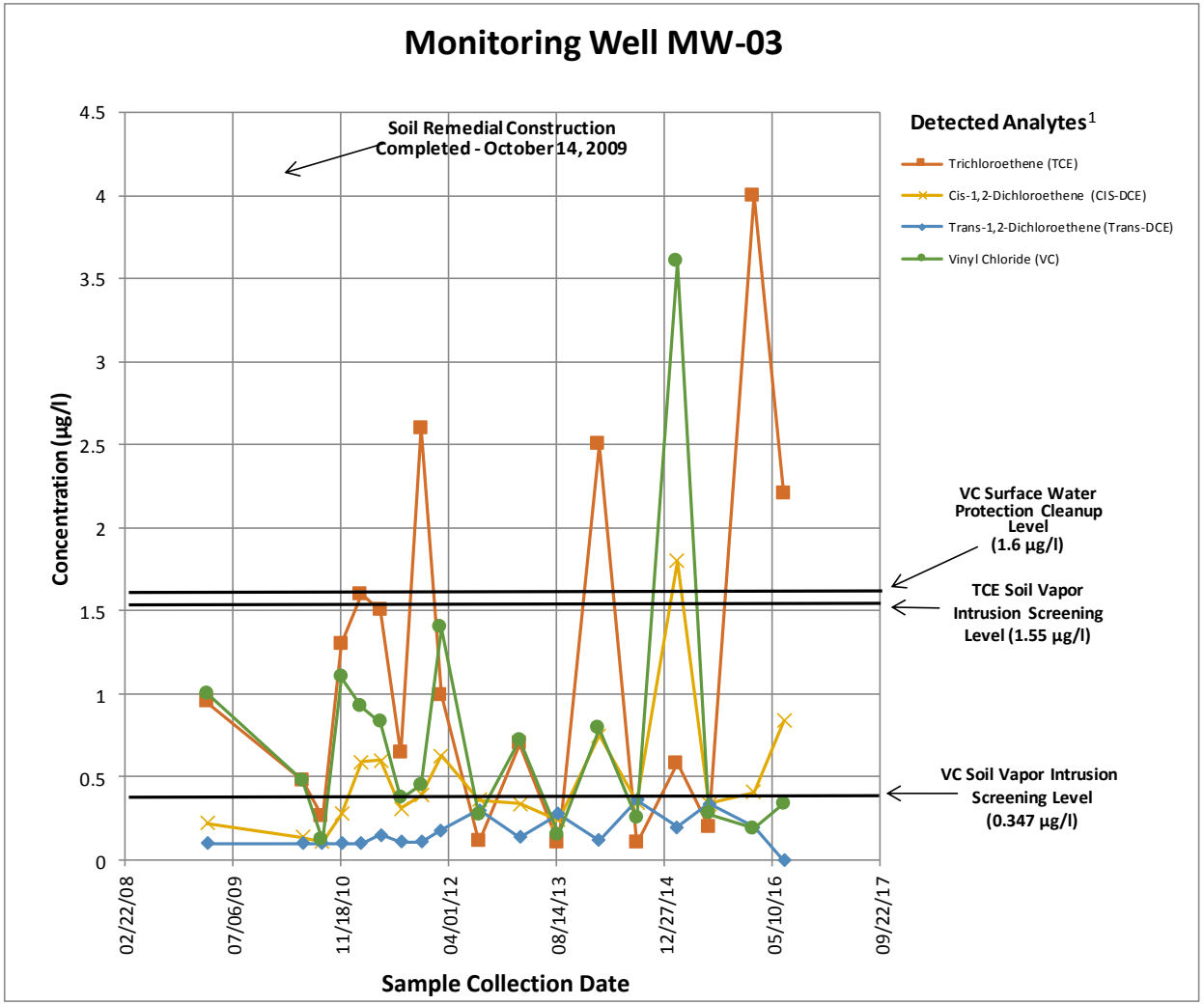
Projection: NAD_1983_StatePlane_Washington_South_FIPS_4602_Feet
Datum: D_North_American_1983

Chemical Analytical Results Exceeding Compliance Criteria

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 3



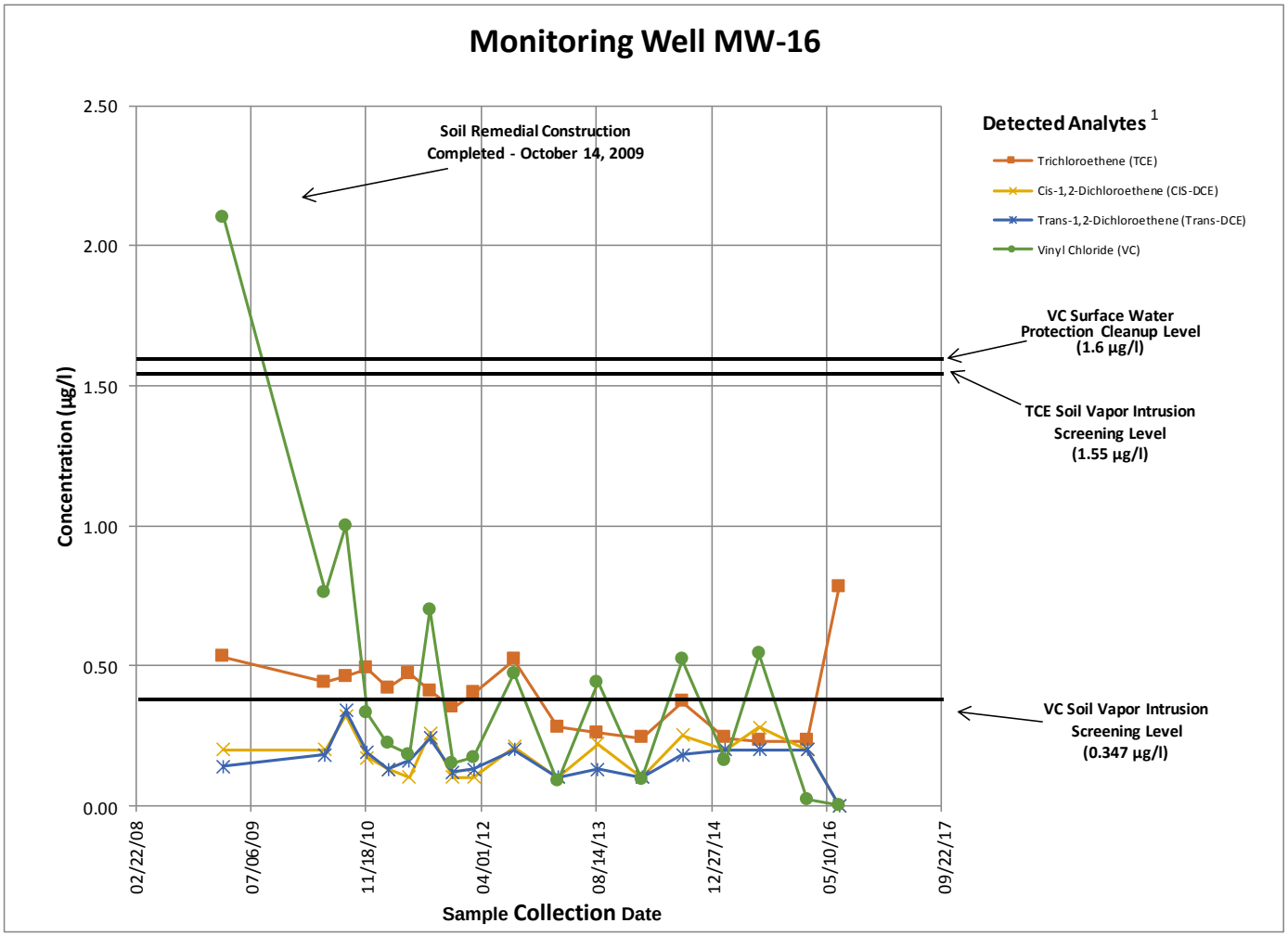
Note:
[1] See Table 1 for a comprehensive summary of the groundwater monitoring results and groundwater cleanup and screening levels.

Trend Analysis – July 2016

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 4



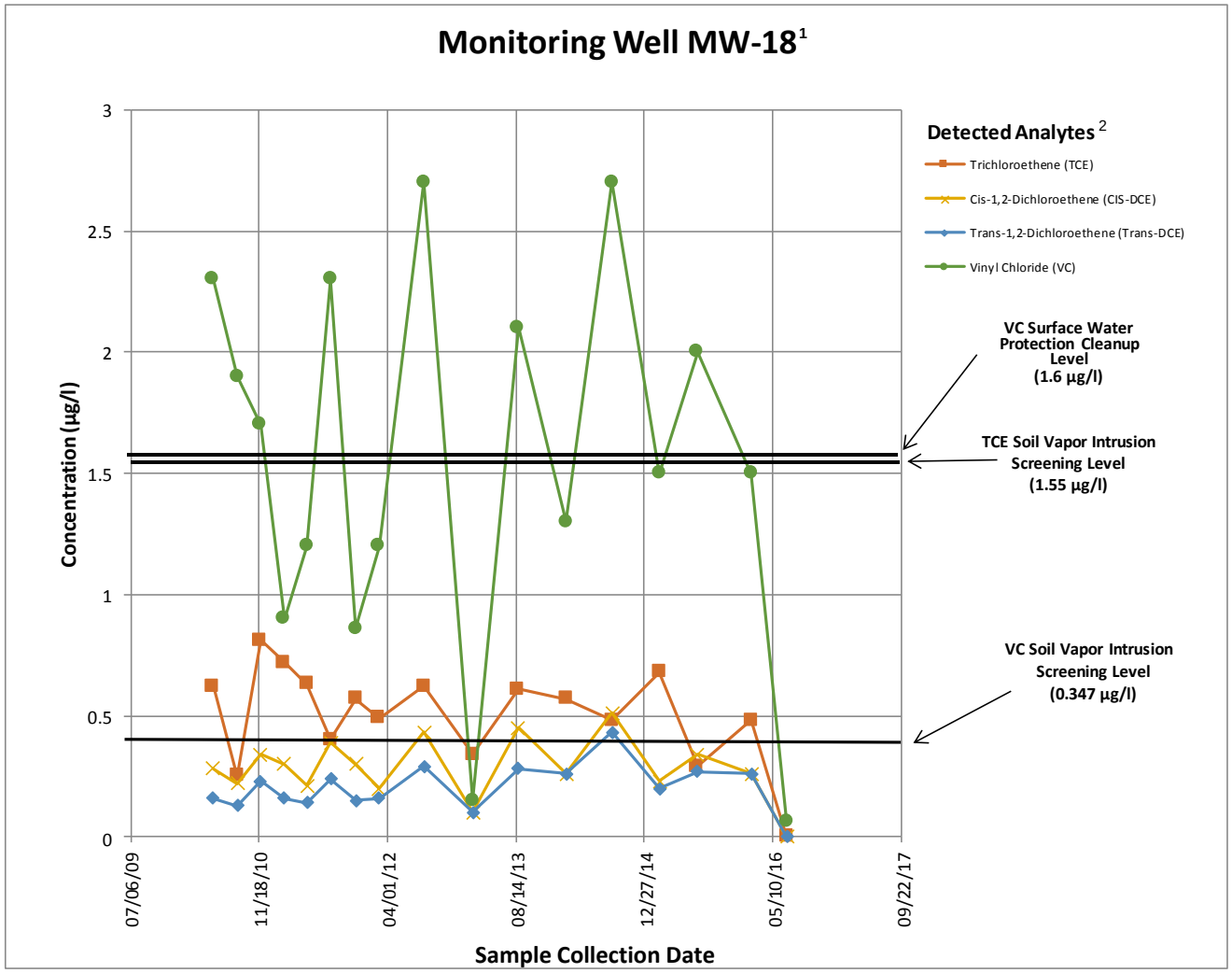
Note:
[1] See Table 1 for a comprehensive summary of the groundwater monitoring results and groundwater cleanup and screening levels.

Trend Analysis – July 2016

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 5



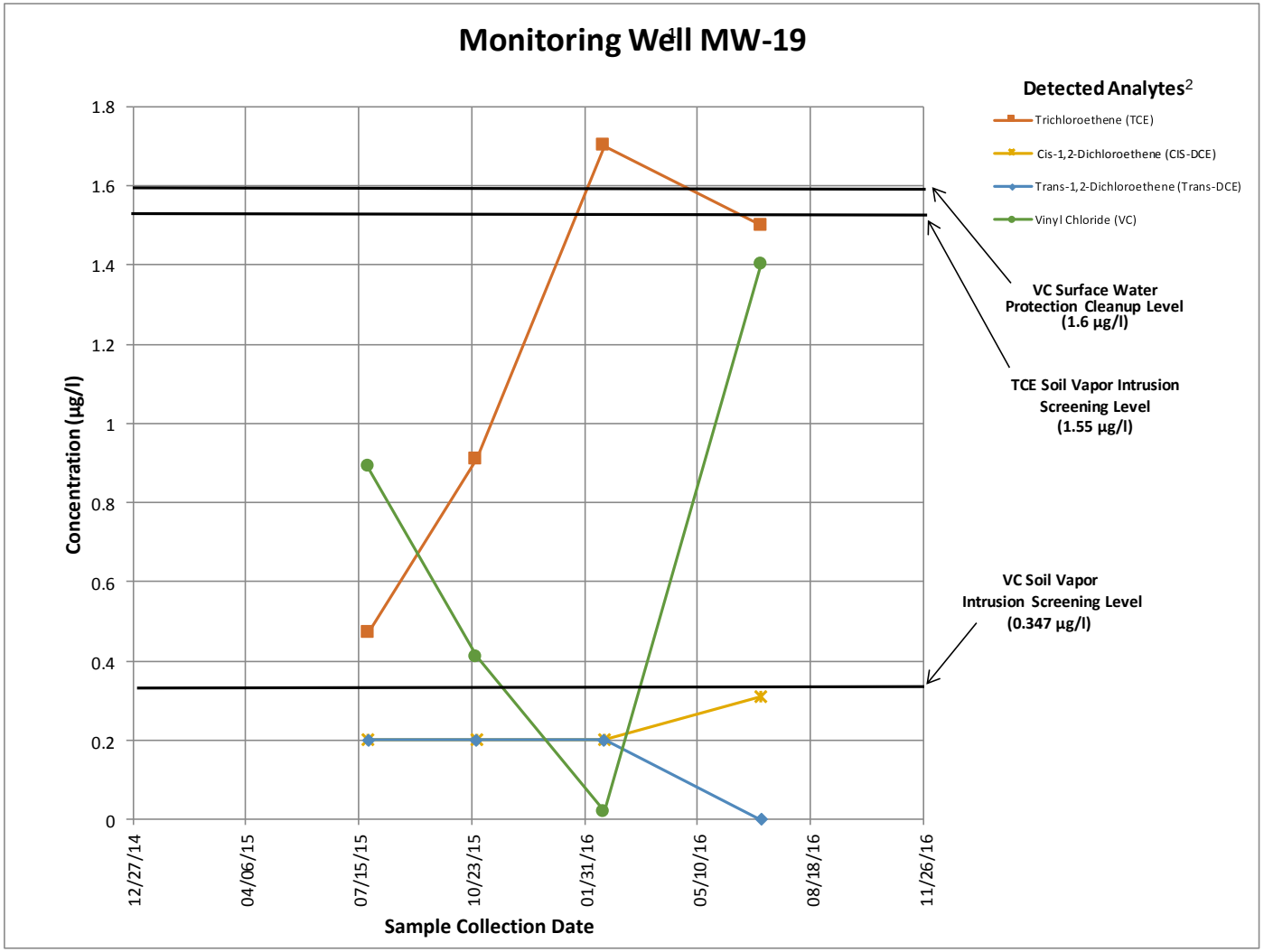
Notes:
[1] MW-18 was installed after remedial actions for soil were completed on October 14, 2009.
[2] See Table 1 for a comprehensive summary of the groundwater monitoring results and groundwater cleanup and screening levels.

Trend Analysis – July 2016

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 6



Notes:
[1] MW-19 was installed on July 16, 2015 as part of monitoring groundwater from the southeast portion of the property.
[2] See Table 1 for a comprehensive summary of the groundwater monitoring results and groundwater cleanup and screening levels.

Trend Analysis – July 2016

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 7

APPENDIX A
Notice-of-Intent and Decommissioning Reports for MW-04 and MW-17

DEPARTMENT OF ECOLOGY
State of Washington

Notice of Intent to Decommission a Well

Notification Number AE36236

This form and required fees **MUST BE RECEIVED** by the Department of Ecology **72 HOURS BEFORE** you construct a well.

Submit one completed form for each job site and required fee (check or money order only) to: Department of Ecology Cashiering Unit, P.O. Box 47611, Olympia, WA 98504-7611

NOTE: Please print. Processing your Notice of Intent may be delayed if all fields are not filled in completely.

1. Property Owner: Low Income Housing Institue Inc			Phone Number	
Mailing Address: 2407 First Ave	City: Seattle	State: WA	Zip Code: 98121	
2. Agent (if different from above)			Phone Number	
Mailing Address	City	State	Zip Code	

3. Well Location

Tax Parcel Number, Township, Range, Section, ¼, and ¼ ¼ are Required. Latitude and longitude (if available).

County Name: Thurston - 34					
Well Site Street Address: 318 State Ave NE	City: olympia	State: WA	Zip Code: 98501		
Tax Parcel Number: 78503200500	Township: 18N	Range: 2W	Section: 47	¼ (within 160 acres): NE	¼ -¼ (within 40 acres): NW
Latitude Degrees	Latitude Time: min sec	Horizontal Collection Method			
Longitude Degrees	Longitude Time: min sec				

4. Notice of Intent Number of well being decomissioned

Unique Well Tag Number of well being decomissioned (if applicable)

5. Well Type to Decommission

How Many? 2

6. Estimated Decommission Start Date: 3/1/2016 12:00:00 Project Name: 318 State Ave NE

7. Professional's License Number

8. Well Drilling Company Name: ESN NORTHWEST	Phone Number: None Supplied
9. Well Driller Name	Driller License Number

10. **Send the entire form.**

Please copy the notification number (located in the upper and lower right corners) and keep in a safe place. Use this reference number when communicating with the Department of Ecology.

Water Well : $50.00
Soil Sampling, Dewatering, Environmental investigation wells: No Fee
All other wells: $20.00 each
Amount Enclosed $ $40

This notification number must be provided to your driller:

AE36236

anisa@esnnw.com

Your Notice of Intent has been processed as of 3/2/2016. Your Cash Journal Validation Number is: 461T1017.
This message being sent at (3/1/2016)

✓ ok

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE36236

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number: R067311

Consulting Firm

Unique Ecology Well IDTag No. APT 843 (MW-4)

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner Low Income Housing Institute

Site Address 318 State Ave NE

City Olympia County Thurston

Location NW1/4-1/4 NE1/4 Sec 47 Twn 18 R 02

EWM ☐ or WWM ☒

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Don Harnden

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 2914

Lat/Long (s, t, r still REQUIRED) Lat Deg ____ Min ____ Sec ____

Long Deg ____ Min ____ Sec ____

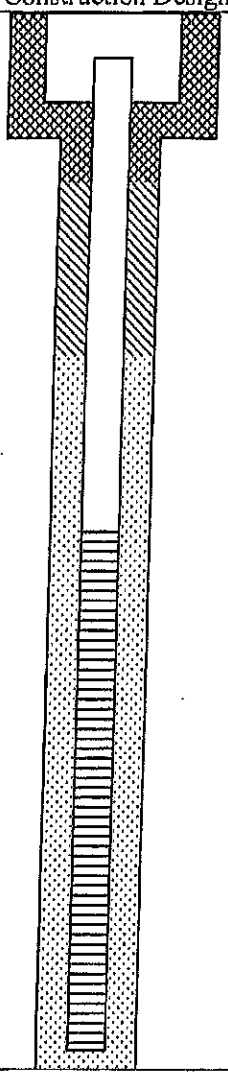
Tax Parcel No. 78503200500

Cased or Uncased Diameter 2" Static Level ____

Work/Decommission Start Date 3/2/2016

Work/Decommission Completed Date 3/2/2016

If trainee, licensed driller's Signature and License Number:

Construction Design	Well Data	Formation Description
	MONUMENT TYPE: flush REMOVED MONUMENT: YES/NO PVC BLANK: 3' SCREEN: 8' WELL DEPTH: 11'	FORMATION NOT OBSERVED – WELL WAS DECOMMISSIONED REMOVED MONUMENT: YES / NO monument will be removed by excavator ☒ WELL WAS CHIPPED/GROUTED IN PLACE ☐ ALL CASING WAS REMOVED AND BACKFILLED BOTTOM UP

SCALE: 1"= ____ PAGE 1 OF 2

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE36236

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number: RE 04570

Consulting Firm

Unique Ecology Well ID Tag No: BCC 426 (MW-17)

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Don Harnden

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 2914

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box")*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner Low Income Housing Institute

Site Address 318 State Ave NE

City Olympia County Thurston

Location NW1/4-1/4 NE1/4 Sec 47 Twn 18 R 02

EWM ☐ or WWM ☒

Lat/Long (s, t, r still REQUIRED) Lat Deg ____ Min ____ Sec ____

Long Deg ____ Min ____ Sec ____

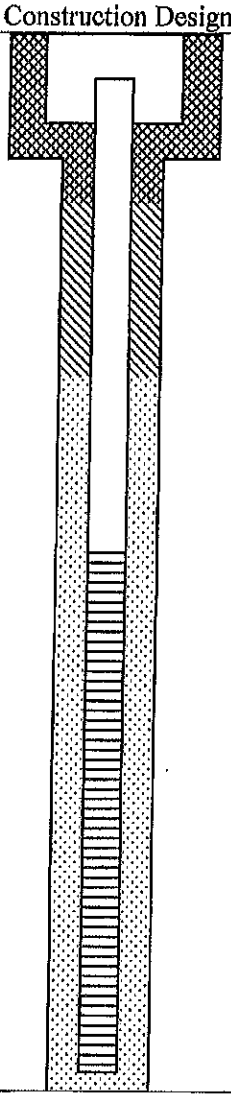
Tax Parcel No. 78503200500

Cased or Uncased Diameter 2" Static Level ____

Work/Decommission Start Date 3/2/2016

Work/Decommission Completed Date 3/2/2016

Construction Design



Well Data

MONUMENT TYPE: flush

REMOVED MONUMENT: YES/NO

PVC BLANK: 3'

SCREEN: 8'

WELL DEPTH: 11'

Formation Description

FORMATION NOT OBSERVED – WELL WAS DECOMMISSIONED

REMOVED MONUMENT: YES / NO

monument will be removed by excavator

☒ WELL WAS CHIPPED/GROUTED IN PLACE

☐ ALL CASING WAS REMOVED AND BACKFILLED BOTTOM UP

SCALE: 1"= ____ PAGE 2 OF 2

ECY 050-12 (Rev. 7/06)

Ecology is an Equal Opportunity Employer

APPENDIX B
Laboratory Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-60790-1
Client Project/Site: 318 State Ave.

For:
GeoEngineers Inc
1101 Fawcett, Suite 200
Tacoma, Washington 98402

Attn: Nick Rohrbach

Authorized for release by:
7/14/2016 10:50:33 AM

Robert Greer, Project Manager II
(253)922-2310
robert.greer@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Case Narrative

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Job ID: 580-60790-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative
580-60790-1

Comments
No additional comments.

Receipt
The samples were received on 7/5/2016 4:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 18.2º C. The sample(s) is considered acceptable since it was collected and submitted to the laboratory on the same day and there is evidence that the chilling process has begun.

GC/MS VOA
Method(s) 8260C: The following samples were re-analyzed for Vinyl Chloride due to the continuing calibration verification (CCV) in the original run failing high: MW-3-160705-W (580-60790-1) and MW-19-160705-W (580-60790-4).

Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 580-222130 recovered outside acceptance criteria, low biased, for 1,2-Dichloroethane-d4 (Surr). Surrogate recovery for QC samples and associated client samples all were within control limits.

Method(s) 8260C: The laboratory control sample duplicate (LCSD) for analytical batch 580-222240 recovered outside control limits for the following analytes: 1,1-Dichloroethene. This analyte was biased high in the LCSD and was not detected in the associated samples; therefore, the data have been reported.

Method(s) 8260C: The matrix spike (MS) and matrix spike duplicate (MSD) recoveries for 1,1-Dichloroethene and Trichloroethene for analytical batch 580-222240 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method(s) 300.0 **-** The matrix spike (MS) and matrix spike duplicate (MSD) recoveries for sulfate for analytical batch 580-222164 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: MW-3-160705-W
Date Collected: 07/05/16 14:40
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-1
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/06/16 19:28	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 19:28	1
cis-1,2-Dichloroethene	**0.84**		0.20	0.025	ug/L			07/06/16 19:28	1
Trichloroethene	**2.2**		0.20	0.025	ug/L			07/06/16 19:28	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/06/16 19:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*75 - 125*		*07/06/16 19:28*	*1*
Trifluorotoluene (Surr)	*99*		*74 - 118*		*07/06/16 19:28*	*1*
Dibromofluoromethane (Surr)	*97*		*42 - 132*		*07/06/16 19:28*	*1*
4-Bromofluorobenzene (Surr)	*95*		*81 - 120*		*07/06/16 19:28*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*46 - 150*		*07/06/16 19:28*	*1*

Method: 8260C - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	**0.34**		0.020	0.013	ug/L			07/12/16 22:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*88*		*75 - 125*		*07/12/16 22:46*	*1*
Trifluorotoluene (Surr)	*96*		*74 - 118*		*07/12/16 22:46*	*1*
Dibromofluoromethane (Surr)	*105*		*42 - 132*		*07/12/16 22:46*	*1*
4-Bromofluorobenzene (Surr)	*107*		*81 - 120*		*07/12/16 22:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*73*		*46 - 150*		*07/12/16 22:46*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.2**		1.2	1.2	mg/L			07/12/16 11:14	1

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: MW-16-160705-W
Date Collected: 07/05/16 12:30
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-2
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/06/16 19:54	1
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/06/16 19:54	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 19:54	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 19:54	1
Trichloroethene	**0.78**		0.20	0.025	ug/L			07/06/16 19:54	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/06/16 19:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*75 - 125*		*07/06/16 19:54*	*1*
Trifluorotoluene (Surr)	*99*		*74 - 118*		*07/06/16 19:54*	*1*
Dibromofluoromethane (Surr)	*100*		*42 - 132*		*07/06/16 19:54*	*1*
4-Bromofluorobenzene (Surr)	*95*		*81 - 120*		*07/06/16 19:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*46 - 150*		*07/06/16 19:54*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.2	1.2	mg/L			07/12/16 11:29	1

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: MW-18-160705-W
Date Collected: 07/05/16 13:35
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-3
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	**0.060**		0.020	0.013	ug/L			07/13/16 19:50	1
1,1-Dichloroethene	ND	* F1	0.10	0.018	ug/L			07/13/16 19:50	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 19:50	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 19:50	1
Trichloroethene	**0.16**	**J F1**	0.20	0.025	ug/L			07/13/16 19:50	1
Tetrachloroethene	**0.13**	**J**	0.50	0.070	ug/L			07/13/16 19:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*75 - 125*		*07/13/16 19:50*	*1*
Trifluorotoluene (Surr)	*97*		*74 - 118*		*07/13/16 19:50*	*1*
Dibromofluoromethane (Surr)	*116*		*42 - 132*		*07/13/16 19:50*	*1*
4-Bromofluorobenzene (Surr)	*98*		*81 - 120*		*07/13/16 19:50*	*1*
1,2-Dichloroethane-d4 (Surr)	*121*		*46 - 150*		*07/13/16 19:50*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**140**		12	12	mg/L			07/12/16 13:53	10

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: MW-19-160705-W
Date Collected: 07/05/16 11:40
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-4
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/06/16 20:20	1
trans-1,2-Dichloroethene	**0.18**	**J**	0.20	0.025	ug/L			07/06/16 20:20	1
cis-1,2-Dichloroethene	**0.31**		0.20	0.025	ug/L			07/06/16 20:20	1
Trichloroethene	**1.5**		0.20	0.025	ug/L			07/06/16 20:20	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/06/16 20:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*75 - 125*		*07/06/16 20:20*	*1*
Trifluorotoluene (Surr)	*100*		*74 - 118*		*07/06/16 20:20*	*1*
Dibromofluoromethane (Surr)	*98*		*42 - 132*		*07/06/16 20:20*	*1*
4-Bromofluorobenzene (Surr)	*96*		*81 - 120*		*07/06/16 20:20*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*46 - 150*		*07/06/16 20:20*	*1*

Method: 8260C - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	**1.4**		0.020	0.013	ug/L			07/12/16 23:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*89*		*75 - 125*		*07/12/16 23:39*	*1*
Trifluorotoluene (Surr)	*98*		*74 - 118*		*07/12/16 23:39*	*1*
Dibromofluoromethane (Surr)	*103*		*42 - 132*		*07/12/16 23:39*	*1*
4-Bromofluorobenzene (Surr)	*107*		*81 - 120*		*07/12/16 23:39*	*1*
1,2-Dichloroethane-d4 (Surr)	*73*		*46 - 150*		*07/12/16 23:39*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**13**		1.2	1.2	mg/L			07/12/16 12:27	1

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: DUP01-160705-W
Date Collected: 07/05/16 14:00
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-5
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/13/16 19:24	1
1,1-Dichloroethene	ND	*	0.10	0.018	ug/L			07/13/16 19:24	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 19:24	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 19:24	1
Trichloroethene	**0.96**		0.20	0.025	ug/L			07/13/16 19:24	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/13/16 19:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*75 - 125*		*07/13/16 19:24*	*1*
Trifluorotoluene (Surr)	*96*		*74 - 118*		*07/13/16 19:24*	*1*
Dibromofluoromethane (Surr)	*120*		*42 - 132*		*07/13/16 19:24*	*1*
4-Bromofluorobenzene (Surr)	*99*		*81 - 120*		*07/13/16 19:24*	*1*
1,2-Dichloroethane-d4 (Surr)	*127*		*46 - 150*		*07/13/16 19:24*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**23**		1.2	1.2	mg/L			07/12/16 12:41	1

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: Trip Blank-160705
Date Collected: 07/05/16 00:01
Date Received: 07/05/16 16:25

Lab Sample ID: 580-60790-6
Matrix: Water

Method: 8260C - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/06/16 18:09	1
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/06/16 18:09	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 18:09	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 18:09	1
Trichloroethene	ND		0.20	0.025	ug/L			07/06/16 18:09	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/06/16 18:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*75 - 125*		*07/06/16 18:09*	*1*
Trifluorotoluene (Surr)	*97*		*74 - 118*		*07/06/16 18:09*	*1*
Dibromofluoromethane (Surr)	*101*		*42 - 132*		*07/06/16 18:09*	*1*
4-Bromofluorobenzene (Surr)	*98*		*81 - 120*		*07/06/16 18:09*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*46 - 150*		*07/06/16 18:09*	*1*

Method: 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-221664/6
Matrix: Water
Analysis Batch: 221664

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/06/16 13:37	1
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/06/16 13:37	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 13:37	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/06/16 13:37	1
Trichloroethene	ND		0.20	0.025	ug/L			07/06/16 13:37	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/06/16 13:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*75 - 125*		*07/06/16 13:37*	*1*
Trifluorotoluene (Surr)	*97*		*74 - 118*		*07/06/16 13:37*	*1*
Dibromofluoromethane (Surr)	*95*		*42 - 132*		*07/06/16 13:37*	*1*
4-Bromofluorobenzene (Surr)	*100*		*81 - 120*		*07/06/16 13:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*46 - 150*		*07/06/16 13:37*	*1*

Lab Sample ID: LCS 580-221664/7
Matrix: Water
Analysis Batch: 221664

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	5.00	5.98		ug/L		120	59 - 140
1,1-Dichloroethene	5.04	5.73		ug/L		114	64 - 125
trans-1,2-Dichloroethene	5.01	4.94		ug/L		99	69 - 124
cis-1,2-Dichloroethene	5.01	5.38		ug/L		107	73 - 130
Trichloroethene	5.01	5.19		ug/L		104	72 - 123
Tetrachloroethene	5.01	4.88		ug/L		97	67 - 123

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*75 - 125*
Trifluorotoluene (Surr)	*92*		*74 - 118*
Dibromofluoromethane (Surr)	*96*		*42 - 132*
4-Bromofluorobenzene (Surr)	*101*		*81 - 120*
1,2-Dichloroethane-d4 (Surr)	*90*		*46 - 150*

Lab Sample ID: LCSD 580-221664/8
Matrix: Water
Analysis Batch: 221664

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	5.00	6.30		ug/L		126	59 - 140	5	30
1,1-Dichloroethene	5.04	5.68		ug/L		113	64 - 125	1	28
trans-1,2-Dichloroethene	5.01	5.04		ug/L		101	69 - 124	2	27
cis-1,2-Dichloroethene	5.01	5.65		ug/L		113	73 - 130	5	20
Trichloroethene	5.01	5.29		ug/L		106	72 - 123	2	20
Tetrachloroethene	5.01	5.01		ug/L		100	67 - 123	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*75 - 125*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-221664/8
Matrix: Water
Analysis Batch: 221664

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Trifluorotoluene (Surr)	93		74 - 118
Dibromofluoromethane (Surr)	97		42 - 132
4-Bromofluorobenzene (Surr)	100		81 - 120
1,2-Dichloroethane-d4 (Surr)	90		46 - 150

Lab Sample ID: MB 580-222130/6
Matrix: Water
Analysis Batch: 222130

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/12/16 15:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	89		75 - 125		07/12/16 15:58	1
Trifluorotoluene (Surr)	95		74 - 118		07/12/16 15:58	1
Dibromofluoromethane (Surr)	104		42 - 132		07/12/16 15:58	1
4-Bromofluorobenzene (Surr)	103		81 - 120		07/12/16 15:58	1
1,2-Dichloroethane-d4 (Surr)	77		46 - 150		07/12/16 15:58	1

Lab Sample ID: LCS 580-222130/7
Matrix: Water
Analysis Batch: 222130

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Vinyl chloride			5.00	5.46		ug/L		109	59 - 140		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	88		75 - 125
Trifluorotoluene (Surr)	93		74 - 118
Dibromofluoromethane (Surr)	102		42 - 132
4-Bromofluorobenzene (Surr)	106		81 - 120
1,2-Dichloroethane-d4 (Surr)	72		46 - 150

Lab Sample ID: LCSD 580-222130/8
Matrix: Water
Analysis Batch: 222130

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride			5.00	5.17		ug/L		103	59 - 140	5	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	87		75 - 125
Trifluorotoluene (Surr)	90		74 - 118
Dibromofluoromethane (Surr)	104		42 - 132
4-Bromofluorobenzene (Surr)	105		81 - 120
1,2-Dichloroethane-d4 (Surr)	73		46 - 150

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-222240/5
Matrix: Water
Analysis Batch: 222240

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			07/13/16 14:35	1
1,1-Dichloroethene	ND		0.10	0.018	ug/L			07/13/16 14:35	1
trans-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 14:35	1
cis-1,2-Dichloroethene	ND		0.20	0.025	ug/L			07/13/16 14:35	1
Trichloroethene	ND		0.20	0.025	ug/L			07/13/16 14:35	1
Tetrachloroethene	ND		0.50	0.070	ug/L			07/13/16 14:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*75 - 125*		*07/13/16 14:35*	*1*
Trifluorotoluene (Surr)	*93*		*74 - 118*		*07/13/16 14:35*	*1*
Dibromofluoromethane (Surr)	*116*		*42 - 132*		*07/13/16 14:35*	*1*
4-Bromofluorobenzene (Surr)	*100*		*81 - 120*		*07/13/16 14:35*	*1*
1,2-Dichloroethane-d4 (Surr)	*120*		*46 - 150*		*07/13/16 14:35*	*1*

Lab Sample ID: LCS 580-222240/6
Matrix: Water
Analysis Batch: 222240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	5.00	5.24		ug/L		105	59 - 140
1,1-Dichloroethene	5.04	6.13		ug/L		122	64 - 125
trans-1,2-Dichloroethene	5.01	5.48		ug/L		109	69 - 124
cis-1,2-Dichloroethene	5.01	5.86		ug/L		117	73 - 130
Trichloroethene	5.01	5.83		ug/L		116	72 - 123
Tetrachloroethene	5.01	5.17		ug/L		103	67 - 123

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*93*		*75 - 125*
Trifluorotoluene (Surr)	*95*		*74 - 118*
Dibromofluoromethane (Surr)	*112*		*42 - 132*
4-Bromofluorobenzene (Surr)	*97*		*81 - 120*
1,2-Dichloroethane-d4 (Surr)	*114*		*46 - 150*

Lab Sample ID: LCSD 580-222240/7
Matrix: Water
Analysis Batch: 222240

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	5.00	5.60		ug/L		112	59 - 140	7	30
1,1-Dichloroethene	5.04	6.74	*	ug/L		134	64 - 125	9	28
trans-1,2-Dichloroethene	5.01	5.85		ug/L		117	69 - 124	7	27
cis-1,2-Dichloroethene	5.01	5.97		ug/L		119	73 - 130	2	20
Trichloroethene	5.01	6.12		ug/L		122	72 - 123	5	20
Tetrachloroethene	5.01	5.50		ug/L		110	67 - 123	6	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*93*		*75 - 125*

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-222240/7
Matrix: Water
Analysis Batch: 222240

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Trifluorotoluene (Surr)	*88*		*74 - 118*
Dibromofluoromethane (Surr)	*115*		*42 - 132*
4-Bromofluorobenzene (Surr)	*102*		*81 - 120*
1,2-Dichloroethane-d4 (Surr)	*118*		*46 - 150*

Lab Sample ID: 580-60790-3 MS
Matrix: Water
Analysis Batch: 222240

Client Sample ID: MW-18-160705-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	0.060		5.00	5.93		ug/L		117	59 - 140
1,1-Dichloroethene	ND	* F1	5.04	7.17	F1	ug/L		142	64 - 125
trans-1,2-Dichloroethene	ND		5.01	6.02		ug/L		120	69 - 124
cis-1,2-Dichloroethene	ND		5.01	6.09		ug/L		122	73 - 130
Trichloroethene	0.16	J F1	5.01	6.45	F1	ug/L		126	72 - 123
Tetrachloroethene	0.13	J	5.01	5.90		ug/L		115	67 - 123

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*75 - 125*
Trifluorotoluene (Surr)	*96*		*74 - 118*
Dibromofluoromethane (Surr)	*113*		*42 - 132*
4-Bromofluorobenzene (Surr)	*100*		*81 - 120*
1,2-Dichloroethane-d4 (Surr)	*114*		*46 - 150*

Lab Sample ID: 580-60790-3 MSD
Matrix: Water
Analysis Batch: 222240

Client Sample ID: MW-18-160705-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	0.060		5.00	5.89		ug/L		117	59 - 140	1	35
1,1-Dichloroethene	ND	* F1	5.04	6.97	F1	ug/L		138	64 - 125	3	35
trans-1,2-Dichloroethene	ND		5.01	6.08		ug/L		121	69 - 124	1	35
cis-1,2-Dichloroethene	ND		5.01	6.06		ug/L		121	73 - 130	0	35
Trichloroethene	0.16	J F1	5.01	6.50	F1	ug/L		127	72 - 123	1	35
Tetrachloroethene	0.13	J	5.01	5.54		ug/L		108	67 - 123	6	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*75 - 125*
Trifluorotoluene (Surr)	*97*		*74 - 118*
Dibromofluoromethane (Surr)	*115*		*42 - 132*
4-Bromofluorobenzene (Surr)	*98*		*81 - 120*
1,2-Dichloroethane-d4 (Surr)	*114*		*46 - 150*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-222164/3
Matrix: Water
Analysis Batch: 222164

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		1.2	1.2	mg/L			07/12/16 10:15	1

Lab Sample ID: LCS 580-222164/4
Matrix: Water
Analysis Batch: 222164

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate			50.0	47.3		mg/L		95	90 - 110		

Lab Sample ID: LCSD 580-222164/5
Matrix: Water
Analysis Batch: 222164

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate			50.0	47.3		mg/L		95	90 - 110	0	15

Lab Sample ID: 580-60790-3 MS
Matrix: Water
Analysis Batch: 222164

Client Sample ID: MW-18-160705-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	140	F1	50.0	174	F1	mg/L		77	90 - 110		

Lab Sample ID: 580-60790-3 MSD
Matrix: Water
Analysis Batch: 222164

Client Sample ID: MW-18-160705-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	140	F1	50.0	175	F1	mg/L		78	90 - 110	0	15

Lab Chronicle

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: MW-3-160705-W
Lab Sample ID: 580-60790-1
Date Collected: 07/05/16 14:40
Matrix: Water
Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	221664	07/06/16 19:28	W1T	TAL SEA
Total/NA	Analysis	8260C	RA	1	222130	07/12/16 22:46	TL1	TAL SEA
Total/NA	Analysis	300.0		1	222164	07/12/16 11:14	RSB	TAL SEA

Client Sample ID: MW-16-160705-W
Lab Sample ID: 580-60790-2
Date Collected: 07/05/16 12:30
Matrix: Water
Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	221664	07/06/16 19:54	W1T	TAL SEA
Total/NA	Analysis	300.0		1	222164	07/12/16 11:29	RSB	TAL SEA

Client Sample ID: MW-18-160705-W
Lab Sample ID: 580-60790-3
Date Collected: 07/05/16 13:35
Matrix: Water
Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	222240	07/13/16 19:50	CJ	TAL SEA
Total/NA	Analysis	300.0		10	222164	07/12/16 13:53	RSB	TAL SEA

Client Sample ID: MW-19-160705-W
Lab Sample ID: 580-60790-4
Date Collected: 07/05/16 11:40
Matrix: Water
Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	221664	07/06/16 20:20	W1T	TAL SEA
Total/NA	Analysis	8260C	RA	1	222130	07/12/16 23:39	TL1	TAL SEA
Total/NA	Analysis	300.0		1	222164	07/12/16 12:27	RSB	TAL SEA

Client Sample ID: DUP01-160705-W
Lab Sample ID: 580-60790-5
Date Collected: 07/05/16 14:00
Matrix: Water
Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	222240	07/13/16 19:24	CJ	TAL SEA
Total/NA	Analysis	300.0		1	222164	07/12/16 12:41	RSB	TAL SEA

Lab Chronicle

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Client Sample ID: Trip Blank-160705

Lab Sample ID: 580-60790-6

Date Collected: 07/05/16 00:01

Matrix: Water

Date Received: 07/05/16 16:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	221664	07/06/16 18:09	W1T	TAL SEA

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Laboratory: TestAmerica Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Washington	State Program	10	C553	02-17-17

Analysis Method	Prep Method	Matrix	Analyte

Sample Summary

Client: GeoEngineers Inc
Project/Site: 318 State Ave.

TestAmerica Job ID: 580-60790-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-60790-1	MW-3-160705-W	Water	07/05/16 14:40	07/05/16 16:25
580-60790-2	MW-16-160705-W	Water	07/05/16 12:30	07/05/16 16:25
580-60790-3	MW-18-160705-W	Water	07/05/16 13:35	07/05/16 16:25
580-60790-4	MW-19-160705-W	Water	07/05/16 11:40	07/05/16 16:25
580-60790-5	DUP01-160705-W	Water	07/05/16 14:00	07/05/16 16:25
580-60790-6	Trip Blank-160705	Water	07/05/16 00:01	07/05/16 16:25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle
5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.testamericainc.com

☐ Rush
☐ Short Hold

Chain of Custody Record

Client: GeoEngineers | Client Contact: Nick Rohrback | Date: 7/5/16 | Chain of Custody Number: 29624
Address: 1101 S. Fawcett Ave #200 | Telephone Number (Area Code)/Fax Number: 253-383-4940 | Lab Number: 60790 | Page 1 of 1
City: Tacoma | State: WA | Zip Code: | Sampler: PAC | Lab Contact:
Project Name and Location (State): 318 State Ave | Billing Contact:
Contract/Purchase Order/Quote No.: GEI # 0415-049-07

	Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: VOC 8260B	Sulfide	Special Instructions/ Conditions of Receipt
-1	MW-3-160705-W	7/5	1440		X			1			3			X	X	* Reporting Limits,
-2	MW-16-160705-W	7/5	1230		X			1			3			X	X	Analyte list,
-3	MW18-160705-W		1335		X			1			3			X	X	QA/QC to be
	MW18-160705-MS		1335		X			1			3			X	X	achieved see
	MW18-160705-MSD		1335		X			1			3			X	X	Table B-4 on
-4	MW-19-160705-W		1140		X			1			3			X	X	monitoring Plan
-5	DUP81-160705-W	7/5	1400		X			1			3			X	X	
-6	TRIP BLANK-160705	7/5			X									X		

580-60790 Chain of Custody

Cooler: ☐ Yes ☐ No Cooler Temp: _____
Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown
Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required (business days): ☐ 24 Hours ☐ 48 Hours ☒ 5 Days ☐ 10 Days ☐ 15 Days ☐ Other _____
QC Requirements (Specify):

	Date	Time
1. Relinquished By Sign/Print: Paul Robinette	7/5	1625
2. Relinquished By Sign/Print:		
3. Relinquished By Sign/Print:		

	Date	Time
1. Received By Sign/Print: Tom Blankinship	7/5/16	1625
2. Received By Sign/Print:		
3. Received By Sign/Print:		

Comments:
TB A2 Cooler Cor 18.2 w/o Unc 18.2
Cooler Dsc Med Rec w@Lab
Wet/Packs Packing bub
clidro

Login Sample Receipt Checklist

Client: GeoEngineers Inc

Job Number: 580-60790-1

Login Number: 60790
List Number: 1
Creator: Blankinship, Tom X

List Source: TestAmerica Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX C
Data Quality Assessment Summary

GeoEngineers

1101 Fawcett Avenue, Suite 200, Tacoma, Washington 98402, Telephone: 253.383.4940, Fax: 253.383.4923 www.geoengineers.com

Data Validation Report

Project:	City of Olympia – 318 NE State Avenue Site Ninth Semi-annual Groundwater Monitoring, July 2016
GEI File No:	0415-049-07
Date:	July 25, 2016

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of groundwater samples collected as part of the semi-annual groundwater monitoring sampling event performed on July 5, 2016 and the associated laboratory and field quality control (QC) samples. The samples were obtained from the 318 NE State Avenue Property located in Olympia, Washington.

OBJECTIVE AND QUALITY CONTROL ELEMENTS

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2008) and Inorganic Superfund Data Review (USEPA 2010) (National Functional Guidelines) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with the Quality Assurance Project Plan (QAPP), Appendix B of the Groundwater Compliance Monitoring Plan (GeoEngineers 2015), the data validation included review of the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries
- Method and Trip Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Laboratory/Field Duplicates

VALIDATED SAMPLE DELIVERY GROUPS

This data validation included review of the sample delivery group (SDG) listed below in Table 1.

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated
580-60790-1	MW-3-160705-W, MW-16-160705-W, DUP01-160705-W, MW-18-160705-W, MW-19-160705-W, Trip Blank-160705

CHEMICAL ANALYSIS PERFORMED

TestAmerica Laboratories, Inc. (TestAmerica), located in Tacoma, Washington, performed laboratory analysis on the groundwater samples using the following methods:

- Volatile Organic Compounds (VOCs) by Method SW8260C; and
- Sulfate Anions by Method EPA300.0

DATA VALIDATION SUMMARY

The results for each of the QC elements are summarized below.

Data Package Completeness

TestAmerica provided all required deliverables for the data validation according to the National Functional Guidelines. The laboratory followed adequate corrective action processes and all identified anomalies were discussed in the relevant laboratory case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COC was accurate and complete when submitted to the laboratory.

Holding Times and Sample Preservation

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses. The sample cooler arrived at the laboratory outside the appropriate temperatures of between 2 and 6 degrees Celsius. The out-of-compliance temperature is detailed below.

SDG 580-60790-1: The sample cooler temperature recorded at the laboratory was 18.2 degrees Celsius. It was determined through professional judgment that since the samples were received by the laboratory the same day they were collected, this temperature should not affect the sample analytical results.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are

added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recoveries are calculated following analysis. All surrogate percent recoveries for field samples were within the laboratory control limits.

Method and Trip Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. A method blank was analyzed with each batch of samples, at a frequency of 1 per 20 samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the method blanks.

Trip blanks are analyzed to assess whether field sampling or sample transport processes may have introduced measurable concentrations of volatile analytes of interest into project samples. None of the analytes of interest were detected above the reporting limits in the trip blank.

Matrix Spikes/Matrix Spike Duplicates

Since the actual analyte concentration in an environmental sample is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis on one sample from the associated batch, known as the parent sample. One aliquot of the sample is analyzed in the normal manner and then a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery is calculated. Matrix spike duplicate (MSD) analyses are generally performed for organic analyses as a precision check and analyzed in the same sequence as a matrix spike. Using the result values from the MS and MSD, the relative percent difference (RPD) is calculated. The percent recovery control limits for MS and MSD analyses are specified in the laboratory documents, as are the RPD control limits for MS/MSD sample sets.

One MS/MSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for all analyses and the percent recovery and RPD values were within the proper control limits, with the following exceptions:

SDG 580-60790-1: (VOCs) The laboratory performed an MS/MSD sample set on Sample MW-18-160705-W. The percent recoveries for 1,1-Dichloroethene and trichloroethene were greater than the control limits in the MS/MSD extracted on 7/13/2016. The positive result for trichloroethene was qualified as estimated (J) in Sample MW-18-160705-W. There were no positive results for 1,1-Dichloroethene in this sample; therefore, no action was required.

(Sulfate) The laboratory performed an MS/MSD sample set on Sample MW-18-160705-W. The percent recovery for sulfate was less than the control limits in the MS/MSD extracted on 7/12/2016. The positive result for sulfate was qualified as estimated (J) in Sample MW-18-160705-W.

Laboratory Control Samples/Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. Given that matrix interference is not an issue, the LCS/LCSD control limits for accuracy and precision are usually more rigorous than for MS/MSD analyses. Additionally, data qualification based on LCS/LCSD analyses would apply to all samples in the associated batch, instead of just the parent sample. The percent recovery control limits for LCS and LCSD analyses are specified in the laboratory documents, as are the RPD control limits for LCS/LCSD sample sets.

One LCS/LCSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for all analyses and the percent recovery and RPD values were within the proper control limits, with the following exception:

SDG 580-60790-1: (VOCs) The percent recovery for 1,1-Dichloroethene was greater than the control limits in the LCSD extracted on 7/13/2016. The percent recovery for this target analyte was within the control limits in the corresponding LCS; therefore, no action was required for this outlier.

Laboratory Duplicates (Sulfate Anions Only)

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the samples used has a concentration less than five times the reporting limit for that sample, the absolute difference is used instead of the RPD. The RPD control limits are specified in the laboratory documents.

There were no laboratory duplicates performed on the associated field samples.

Field Duplicates

In order to assess precision, a field duplicate sample was collected and analyzed along with the reviewed sample batches. The duplicate sample was analyzed for the same parameters as the associated parent sample. Precision is determined by calculating the RPD of sample concentrations between each pair of samples. If one or more of the sample analytes has a concentration greater than five times the reporting limit for that sample, then the absolute difference is used instead of the RPD. The RPD control limit for water samples is 30 percent.

SDG 580-60790-1: One field duplicate sample pair, MW-16-160705-W and DUP01-160705-W, was submitted with this SDG. The precision criteria for all target analytes were met for this sample pair.

OVERALL ASSESSMENT

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD percent recovery values, with the exceptions noted above. Precision was acceptable, as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

The data are acceptable for the intended use, with the following qualifications listed below in Table 2.

TABLE 2: SUMMARY OF QUALIFIED SAMPLES

Sample ID	Analyte	Qualifier	Reason
MW-18-160705-W	Trichloroethene	J	MS/MSD %R
	Sulfate	J	MS/MSD %R

REFERENCES

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01. June 2008.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review," EPA-540-R-10-011. January 2010.

GeoEngineers, Inc. "Groundwater Compliance Monitoring Plan," prepared for City of Olympia. October 1, 2015.