May to August 2016
Phase II Groundwater Monitoring
Seattle Center Lot Number 2
Seattle, Washington

October 26, 2016

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Excellence. Innovation. Service. Value.

Since 1954.

Submitted To:
Seattle Center Redevelopment
Attn: Mr. Ned Dunn
305 Harrison Street, Suite 109
Seattle, Washington 98109

By:
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, Washington 98103

21-1-12176-046

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON
WASHINGTON DC METRO
WISCONSIN

October 26, 2016

Seattle Center Redevelopment
305 Harrison Street, Suite 109
Seattle, WA 98109

Attn: Mr. Ned Dunn

RE: MAY TO AUGUST 2016 PHASE II GROUNDWATER MONITORING, SEATTLE CENTER LOT NUMBER 2, SEATTLE, WASHINGTON

This letter report summarizes the status of Phase II groundwater monitoring activities at the Seattle Center Lot Number 2 property (the site). Remediation of gasoline-contaminated groundwater at the site through the use of an active in situ treatment system was conducted by the City of Seattle in conjunction with redevelopment of the property by IRIS Holdings, LLC, a wholly owned entity of the Bill and Melinda Gates Foundation. The goal of the remediation was to remove gasoline-range petroleum hydrocarbons (TPH-G) in groundwater and meet cleanup levels in groundwater at a conditional point of compliance. Monitoring activities consisted of quarterly groundwater sampling. The groundwater remediation system was turned off in March 2016 in accordance with our discussion during our March 14, 2016, meeting. The system was turned off to determine if remediation of the source areas was completed or if rebound would occur and to evaluate if monitored natural attenuation (MNA) of the remaining contamination was sufficient to be the final groundwater treatment method. This letter report presents groundwater monitoring results from May to August 2016, the twenty-third quarter of Phase II operation and the second monitoring event to be conducted during the rebound test and MNA evaluation.

BACKGROUND

Previous environmental studies have identified gasoline- and benzene-impacted groundwater that originates primarily from two hot spot areas: a former fueling area in the north-central portion of the property and a former gasoline underground storage tank location in the central portion of the site. Baseline sampling data was used to estimate lateral extent of groundwater impacted with benzene (February 2008), as shown in Figure 1.

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103-8636
206-632-8020 FAX: 206-695-6777
www.shannonwilson.com

To facilitate cleanup of gasoline- and benzene-contaminated groundwater at the site, a two-phase remediation plan was developed.[1] Each phase consisted of a system of soil vapor extraction (SVE) and air sparging (AS) wells. Phase I was installed in 2006 to 2007, and operated from June 2007 to June 2008. Phase I was discontinued when redevelopment activities required removal of the equipment. Phase I operated for approximately 8,870 hours.

Phase II of the remediation included reinstalling the AS/SVE system after the current property was completed. The reinstalled system commenced operation in November 2010. Phase II was completed in March 2016 following an analysis of groundwater data that indicated decreasing trends in concentrations of contaminants in source area wells and an absence of contaminants in point of compliance wells. Based on an evaluation of the groundwater data, the remediation system was shut off on March 15, 2016, to conduct a rebound test. Additional analyses were added to the monitoring program to assist with the evaluation of the feasibility of MNA as a final treatment method. Results of the groundwater monitoring for the rebound test and the evaluation of the feasibility of MNA as a final treatment method are discussed below.

GROUNDWATER MONITORING

In accordance with our discussion during our March 14, 2016, meeting, the SVE/AS system was shut off to initiate a rebound test. Groundwater monitoring for the twenty-third round of quarterly sampling was conducted to analyze for the contaminants of concern, evaluate the effects, if any, of the rebound test, and to evaluate the feasibility of MNA as a final groundwater treatment method.

Groundwater sampling was conducted on August 25, 26, and 29, 2016. Sampled wells included compliance wells SW-25, SW-26, and SW-27, and wells SVE-13, SVE-16, SVE-17, SVE-19, SVE-20, SVE-23, SVE-24, SVE-25, and SVE-26. Prior to sampling, approximately 1.25 to 6.75 gallons of groundwater were purged from each well until water quality parameters stabilized. Each monitoring well was sampled using low-flow techniques except SVE-13, SW-25, and SW-27. Groundwater sampling from wells SVE-13, SW-25, and SW-27 was conducted using disposable high-density polyethylene bailers due to a malfunction of the dedicated submersible pumps. Consequently, water quality parameters could not be collected for

[1] Shannon & Wilson, Inc., 2009, Groundwater remediation plan, Phase II remediation design, Seattle Center lot no. 2, Seattle, Washington: Report prepared by Shannon & Wilson, Inc., Seattle, Wash., and Aspect Consulting LLC, Seattle, Wash., project no. 21-1-12176-018, for Seattle Center Redevelopment, Seattle, Wash., June 11.

these locations. Groundwater samples were collected from these wells once three well volumes were removed.

The collected samples were transported under chain-of-custody protocols to OnSite Environmental, Inc. in Redmond, Washington, to analyze for Northwest Total Petroleum Hydrocarbon-Gasoline and benzene, toluene, ethylbenzene, and xylenes by U.S. Environmental Protection Agency (EPA) Method 8021. Additional parameters were added to the monitoring program as recommended in the Guidance for Petroleum Contaminated Ground Water by Natural Attenuation.[2] MNA indicator parameters include: nitrate and sulfate by EPA Method 300.0, manganese by EPA Method 200.8, ferrous iron by SM3500-Fe B, and alkalinity by SM 4500 NH3 E. Depth to groundwater measurements were recorded for the wells sampled during each monitoring event using an electronic water level indicator. The calculated groundwater elevations based on field measurements are presented in Table 3.

Investigation-derived Waste Disposal

Groundwater purged from wells during sampling was contained on site in the 500-gallon treatment system water collection tank. The treatment system water collection tank will continue to be used to store purge water from future sampling events.

Groundwater Results

In the southern plume, TPH-G was detected below the Model Toxics Control Act (MTCA) cleanup criteria and above the cleanup criteria for benzene at SVE-24. TPH-G was detected above the MTCA cleanup criteria and below the cleanup criteria for benzene at SVE-23. TPH-G and benzene were not detected at SVE-20 and SVE-25. Two wells, SVE-23 and SVE-25, have historically exceeded the cleanup criteria for TPH-G since the implementation of the Phase II remediation with the exception of the ninth, tenth, and twentieth quarters at SVE-23 and the last four quarters at SVE-25 (Table 2).

In the middle plume during the twenty-third quarter, TPH-G and benzene were not detected in SVE-16, SVE-17, and SVE-19. As a comparison during the twenty-second quarter, TPH-G was detected below the cleanup criteria at SVE-16 and SVE-19 and was not detected at SVE-17 and

[2] Washington State Department of Ecology, 2005, Guidance on remediation of petroleum-contaminated ground water by natural attenuation (v. 1.0): Olympia, Wash., Washington State Dept. of Ecology, publication no. 05-09-091, 139 p.

benzene was detected below the cleanup criteria at SVE-16 and not detected at SVE-17 and SVE-19.

TPH-G was detected below the cleanup criteria at SVE-13 in the northern plume during the twenty-second and twenty-third quarters. During the twenty-third quarter, benzene continues to be not detected in the northern plume as it has been since the sixth quarter.

Figures 3 and 4 are time series plots that show historical concentrations of TPH-G and benzene, respectively, for each SVE well. A summary of the analytical groundwater results is presented in Table 1. The analytical laboratory report from this quarter's groundwater sampling is contained in Appendix A.

Natural Attenuation Evaluation

Based on soil source removal activities conducted during the construction of the existing building, the decreasing trend in concentrations of TPH-G and benzene in source area wells and the absence of these contaminants in the downgradient point of compliance wells, MNA is being evaluated as a final groundwater treatment method. MNA, under favorable conditions, reduces the mass and concentrations of contaminants in the environment through physical, chemical, and biological processes. In order to evaluate the feasibility of MNA, an analysis of the status of the plumes and a review of the geochemical parameters were conducted. As previously shown in the twenty-second quarter, the results of the plume analyses, the north, middle, and south TPH-G and benzene plumes are either stable or decreasing (Appendix B). One well, SVE-24 yielded no trend which is likely an artifact of the Mann-Kendall statistical analysis that requires the use of half the laboratory detection limits in place of zero values for non-detects which masks any trend in this well. In general, according to the guidance provided by the Washington State Department of Ecology,[3] the analysis of the primary and secondary geochemical parameters show that conditions for MNA through biodegradation continue to be favorable (Table 1).

Additional groundwater monitoring is required to further evaluate the feasibility of MNA. The next groundwater sampling event is scheduled for November 2016. Results of the next quarterly groundwater monitoring event will be used to evaluate any rebound of contaminants and further evaluate MNA as a final groundwater treatment method.

[3] Washington State Department of Ecology, 2005, Guidance on remediation of petroleum-contaminated ground water by natural attenuation (v. 1.0): Olympia, Wash., Washington State Dept. of Ecology, publication no. 05-09-091, 139 p.

CONCLUSIONS

In general, THP-G and benzene are consistent with historical declining trends in concentrations. A rebound of elevated concentrations of TPH-G and benzene in source area wells and detections of contaminants in the downgradient point of compliance wells were not observed during the May and August sampling event which indicates that the current groundwater conditions are likely a reflection of natural conditions uninfluenced by the AS/SVE treatment system. Based on the twenty-second and twenty-third quarter groundwater monitoring results, the AS/SVE treatment system will remain off in order to further evaluate post-treatment groundwater conditions. A Mann-Kendall statistical analysis of the status of the plumes reveals that the north, middle, and south are either stable or decreasing, which indicates that the conditions for natural attenuation are favorable. However, additional groundwater monitoring data will be used to further evaluate the effects, if any, of the rebound test and status of the plumes. Groundwater monitoring data will also be used to continue to evaluate conditions for natural attenuation.

TPH-G and benzene have remained not detected at SVE-24 since the sixteenth quarter. These contaminants were detected during the twenty-third monitoring event with benzene in excess of the cleanup criteria. Benzene has been previously detected at SVE-24 and in excess of the cleanup criteria during the eighth and ninth quarters. Since benzene was not detected during the first rebound monitoring event conducted in May 2016, further monitoring data is required to evaluate whether similar concentrations of benzene will continue to be present at SVE-24.

Source area sampling point SVE-25 has historically exceeded the cleanup criteria since the implementation of the Phase II remediation. Based on the review of the results of other source area wells and the evaluation of the plume status, it is likely that the current absence of detections of TPH-G and benzene and previous detections below the cleanup criteria at SVE-25 are a reflection of the occurrence of biodegradation through natural attenuation. Future groundwater monitoring will be conducted to monitor these conditions.

LIMITATIONS

The data presented in this letter report are based on sampling at the site and should be considered representative of our observations at the time. We also note that the facts and conditions referenced in this letter report may change over time, and that those set forth here are applicable to the facts and conditions as described only at the time this letter report was written. We believe that the conclusions stated here are factual, but no guarantee is made or implied.

SHANNON & WILSON, INC.

This letter report was prepared for the exclusive use of Seattle Center Redevelopment and its representatives, and in no way guarantees that any agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. Shannon & Wilson, Inc. has prepared the enclosed Appendix C, "Important Information About Your Geotechnical/Environmental Report," to help you and others in understanding our reports.

If you have any questions regarding the findings presented herein, please call me at (206) 632-8020.

Sincerely,

SHANNON & WILSON, INC.

Edwin V. Ptak
Environmental Scientist

State of Washington
Hydrogeologist
263
Licensed Geologist
SCOTT W. GAULKE
10/26/2016

Scott W. Gaulke, PE, LHG
Vice President

EVP:SWG/evp

Enc: Table 1 – Groundwater Analytical Results for May 2016
Table 2 – Historical Groundwater Analytical Results (5 pages)
Table 3 – Groundwater Elevations (6 pages)
Figure 1 – Site Plan
Figure 2 – TPH-G and Benzene Concentrations in Groundwater
Figure 3 – Historical TPH-G Concentrations in SVE Wells
Figure 4 – Historical Benzene Concentrations in SVE Wells
Appendix A – Groundwater Analytical Laboratory Report
Appendix B – Plume Status Evaluation
Appendix C – Important Information About Your Geotechnical/Environmental Report

TABLE 1
GROUNDWATER ANALYTICAL RESULTS FOR
AUGUST 2016

Well Number	Sample ID	Date Collected	BTEX (µg/L)				TPH - Gasoline (µg/L)	Secondary Geochemical Indicators					Primary Geochemical Indicators				
			Benzene	Toluene	Ethylbenzene	Xylenes		Manganese (µg/L)	Alkalinity (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	ORP	DO	pH	Specific Conductivity	Temperature
Soil Vapor Extraction Wells																	
SVE-13	SVE-13	8/29/2016	< 4.0	< 4.0	< 4.0	**19**	**520**	**1,500**	**820**	< 0.050	**86**	**1.3**	*	*	*	*	*
SVE-16	SVE-16	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**2,000**	**300**	< 0.050	**120**	**1.1**	210.4	0.31	7.59	0.74	17.1
SVE-17	SVE-17	8/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**2,700**	**340**	**0.15**	**140**	**29**	315.8	0.19	6.60	0.75	17.3
SVE-19	SVE-19	8/26/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**12,000**	**180**	**0.21**	**1,100**	**42**	276.4	0.15	6.98	1.9	16.5
SVE-20	SVE-20	8/26/2016	< 4.0	< 4.0	**6.3**	< 4.0	< 400	**3,200**	**620**	**0.11**	**530**	**28**	85.3	0.18	6.56	1.6	16.1
SVE-23	SVE-23	8/26/2016	< 4.0	**12**	**86**	**218**	**3,100**	**1,300**	**270**	**0.14**	**12**	**25**	248.3	0.21	6.04	0.47	16.0
SVE-24	SVE-24	8/25/2016	**13**	< 4.0	**6.3**	< 4.0	**440**	**4,600**	**500**	< 0.050	**440**	**37**	48.3	0.16	6.44	1.5	15.9
SVE-25	SVE-25	8/25/2016	< 1.0	< 1.0	**1.9**	< 1.0	< 100	**2,700**	**46**	< 0.050	**300**	**6**	343.9	0.18	5.78	0.62	16.0
SVE-26	SVE-26	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**1,200**	**86**	**0.11**	**290**	**46**	101.4	0.20	7.61	0.68	15.8
Compliance Wells																	
SW-25	SW-25	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**2,500**	**56**	**0.059**	**180**	**0.56**	*	*	*	*	*
SW-26	SW-26	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**210**	**190**	**0.061**	**23**	**0.67**	479.4	0.68	7.28	0.31	16.4
SW-27	SW-27	8/25/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**410**	**100**	**0.050**	**59**	**25**	*	*	*	*	*
MTCA Method A Cleanup Levels			5	1,000	700	1,000	800/1,000[1]	--	--	--	--	--	NA	NA	NA	NA	NA

Notes:

[1] Cleanup level for gasoline is 800 micrograms per liter (µg/L) if benzene is present; 1,000 µg/L if no detectable benzene in groundwater.

Bolded text indicates analyte detected.

Shaded text indicates concentration exceeds state cleanup criterion.

* = parameters could not be collected due to pump modification; 3 well volumes were purged and a bailer was used to collect samples

-- = MTCA Method A cleanup criteria not established for this analyte

< = less than reporting limit indicated

BTEX = benzene, toluene, ethylbenzene, and xylenes

DO = dissolved oxygen in milligrams per liter

ID = identification

MTCA = Washington Model Toxics Control Act

NA = not applicable

ORP = oxygen reduction potential in millivolts

SVE = soil vapor extraction

TPH = total petroleum hydrocarbons

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-13	SVE-13	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	**19.0**	**520**	µg/L	*	*
	SVE-13	Q22	5/26/2016	< 1.0	< 1.0	< 1.0	**9.2**	**780**	µg/L	*	*
	SVE-13	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SVE-13	Q20	11/20/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SVE-13	Q19	8/28/2015	< 1.0	< 1.0	**2.9**	**32**	**1,000**	µg/L	*	*
	SVE-13	Q18	5/29/2015	< 4.0	< 4.0	< 4.0	**18**	**680**	µg/L	*	*
	SVE-13	Q17	2/27/2015	< 1.0	< 1.0	**2.1**	**15**	**720**	µg/L	*	*
	SVE-13	Q16	11/21/2014	< 1.0	< 1.0	**3.6**	**13**	**640**	µg/L	*	*
	SVE-13	Q15	8/29/2014	< 1.0	**1.9**	**8.4**	**40**	**1,800**	µg/L	*	*
	SVE-13	Q14	5/28/2014	< 1.0	< 1.0	**1.1**	**2.6**	**220**	µg/L	44.8	1.08
	SVE-13	Q13	2/25/2014	< 1.0	**1.3**	**4.0**	**15**	**720**	µg/L	*	*
	SVE-13	Q12	11/26/2013	< 1.0	**4.4**	**10**	**66**	**1,400**	µg/L	-74.5	0.44
	SVE-13	Q11	8/30/2013	--	--	--	--	--	--	--	--
	SVE-13	Q10	5/30/2013	< 1.0	< 1.0	**1.2**	**5.3**	**270**	µg/L	45.3	0.27
	SVE-13	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	**1.1**	**270**	µg/L	-1.1	0.23
	SVE-13	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	33.9	0.11
	SVE-13-083012	Q7	8/30/2012	< 1.0	**1.6**	**3.8**	**33**	**900**	µg/L	-21.8	0.04
	SVE-13-053012	Q6	5/30/2012	**1.8**	< 1.0	**24**	**21**	**1,100**	µg/L	-219.5	0.30
	SVE-13-022912	Q5	2/29/2012	< 1.0	**1.5**	**3.3**	**16**	**1,500**	µg/L		
	SVE-13-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-10.5	0.40
	SVE-13-083011	Q3	8/30/2011	< 4.0	**5.0**	**5.7**	**20**	**4,900**	µg/L	-96.9	0.99
	SVE-13	Q2	5/27/2011	< 4.0	< 4.0	< 4.0	**8.2**	**2,400**	µg/L	-56.9	0.09
	SVE-13-022411	Q1	2/24/2011	< 1.0	< 5.0	**4.2**	**25**	**5,100**	µg/L	-73	0.35
	SVE-13-052010	Interim	5/20/2010	**8.1**	< 4.0	**33**	**69**	**13,000**	µg/L	-344.7	0.53
SVE-16	SVE-16	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	210.4	0.31
	SVE-16	Q22	5/25/2016	**1.4**	**3.4**	**6.2**	**7.2**	**420**	µg/L	-42.9	0.17
	SVE-16	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	39.2	0.21
	SVE-16	Q20	11/19/2015	**5.7**	**1.9**	**14**	**4.0**	**950**	µg/L	48.9	0.77
	SVE-16	Q19	8/28/2015	**4.8**	**1.3**	**15**	**2.0**	**950**	µg/L	-63.3	0.67
	SVE-16	Q18	5/28/2015	**5.0**	< 1.0	**19**	< 2.0	**830**	µg/L	-30.4	0.35
	SVE-16	Q17	2/27/2015	**1.4**	< 1.0	**4.5**	**3.3**	**570**	µg/L	-41.4	3.19
	SVE-16	Q16	11/21/2014	**2.6**	< 1.0	< 1.0	< 2.0	**400**	µg/L	79.1	0.12
	SVE-16	Q15	8/29/2014	**3.3**	< 1.0	**17**	< 2.0	**970**	µg/L	-54.3	0.08
	SVE-16	Q14	5/28/2014	**5.1**	< 1.0	**24**	**2.2**	**900**	µg/L	-39.5	0.17
	SVE-16	Q13	2/25/2014	**3.6**	< 1.0	**17**	**1.5**	**580**	µg/L	-0.7	0.23
	SVE-16	Q12	11/25/2013	**6.5**	< 1.0	**36**	**2.2**	**790**	µg/L	-99.2	0.22
	SVE-16	Q11	8/30/2013	**5.2**	**1.4**	**29**	**15**	**850**	µg/L	-58.7	0.14
	SVE-16	Q10	5/30/2013	< 4.0	< 4.0	**7.2**	< 8.0	< 400	µg/L	-17.1	0.31
	SVE-16	Q9	2/27/2013	< 1.0	< 1.0	**2.9**	**< 2.0**	**220**	µg/L	-34.4	0.17
	SVE-16	Q8	11/27/2012	**7.9**	**2.7**	**46**	**51**	**1,900**	µg/L	-89.5	0.14
	SVE-16-083012	Q7	8/30/2012	**9.0**	**1.3**	**48**	**21**	**1,200**	µg/L	-36.4	0.06
	SVE-16-053112	Q6	5/31/2012	**2.5**	< 1.0	**11**	**2.1**	**370**	µg/L	-300.4	0.43
	SVE-16-022912	Q5	2/29/2012	**3.1**	< 1.0	**10**	**1.8**	**440**	µg/L	-25	0.94
	SVE-16-112911	Q4	11/29/2011	**10**	< 1.0	**37**	**12**	**1,100**	µg/L	-62.2	0.89
	SVE-16-083011	Q3	8/30/2011	**9.7**	< 1.0	**30**	**11**	**1,100**	µg/L	-59.4	6.02
	SVE-16	Q2	5/27/2011	**8.5**	< 1.0	**5.6**	**1.7**	**480**	µg/L	-13	0.48
	SVE-16-022411	Q1	2/24/2011	**16**	< 1.0	**13**	**20**	**1,300**	µg/L	-15.8	1.27
	SVE-16-052010	Interim	5/20/2010	**17**	< 1.0	**33**	**3.5**	**820**	µg/L	89.9	0.51
SVE-17	SVE-17	Q23	8/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	315.8	0.19
	SVE-17	Q22	5/25/2016	< 1.0	**3.2**	< 1.0	< 2.0	< 100	µg/L	-4.0	0.15
	SVE-17	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-47.2	0.31
	SVE-17	Q20	11/19/2015	**4.0**	**1.2**	**8.4**	**2.7**	**630**	µg/L	-32.4	4.80
	SVE-17	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	5.5	2.76
	SVE-17	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	10.4	0.41
	SVE-17	Q17	2/27/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	47.8	3.41
	SVE-17	Q16	11/21/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	66.3	0.23
	SVE-17	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-5.0	0.21
	SVE-17	Q14	5/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-9.9	2.04
	SVE-17	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-5.4	1.68
	SVE-17	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	9.1	3.44
	SVE-17	Q11	8/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	**120**	µg/L	-26.0	0.15
	SVE-17	Q10	5/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	35.7	0.21
	SVE-17	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	**1.9**	**400**	µg/L	7.1	0.27
	SVE-17	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	**1.4**	**180**	µg/L	-17.7	0.17
	SVE-17-083012	Q7	8/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	**170**	µg/L	28.5	0.09
	SVE-17-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	**2**	**300**	µg/L	-245.0	0.59
	SVE-17-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	**12**	**720**	µg/L	65.5	0.78
	SVE-17-112911	Q4	11/29/2011	**1.2**	< 1.0	< 1.0	**12**	**620**	µg/L	-19.0	0.40
	SVE-17-083011	Q3	8/30/2011	**1.2**	< 1.0	**2.3**	**22**	**880**	µg/L	58.5	4.97
	SVE-17	Q2	5/27/2011	**3.2**	< 1.0	**4.1**	**34**	**1,200**	µg/L	32.4	0.37
	SVE-17-022411	Q1	2/24/2011	**2.6**	**1.1**	**6.4**	**49**	**1,900**	µg/L	85.3	1.29
	SVE-17-052010	Interim	5/20/2010	**2.9**	< 1.0	**8.1**	**6.0**	**590**	µg/L	28.5	0.38

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-19	SVE-19	Q23	8/26/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	276.4	0.15
	SVE-19	Q22	5/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	**160**	µg/L	-18.2	0.16
	SVE-19	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	**240**	µg/L	-59.4	0.08
	SVE-19	Q20	11/19/2015	< 1.0	< 1.0	**4**	**2.4**	**400**	µg/L	33	1.53
	SVE-19	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	**200**	µg/L	39.7	0.30
	SVE-19	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	**180**	µg/L	52.1	0.39
	SVE-19	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	20.1	0.16
	SVE-19	Q16	11/19/2014	< 1.0	< 1.0	**1.3**	< 2.0	**210**	µg/L	14.6	0.11
	SVE-19	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	**170**	µg/L	-14.1	0.18
	SVE-19	Q14	5/27/2014	< 1.0	< 1.0	**4.7**	< 2.0	**510**	µg/L	-39.2	1.11
	SVE-19	Q13	2/25/2014	< 1.0	< 1.0	**4.8**	< 2.0	**560**	µg/L	-51.3	0.27
	SVE-19	Q12	11/25/2013	< 1.0	< 1.0	**3.6**	< 2.0	**400**	µg/L	-28.9	0.19
	SVE-19	Q11	8/30/2013	< 1.0	< 1.0	**5.8**	< 2.0	**780**	µg/L	-23.1	0.19
	SVE-19	Q10	5/30/2013	< 4.0	< 4.0	**44**	< 8.0	**960**	µg/L	-2.1	0.31
	SVE-19	Q9	2/26/2013	< 1.0	< 1.0	**12**	< 2.0	**670**	µg/L	-17.5	0.26
	SVE-19	Q8	11/26/2012	**1.1**	< 1.0	**22**	**4.5**	**1,300**	µg/L	-34.7	0.13
	SVE-19-083012	Q7	8/30/2012	< 1.0	< 1.0	**2.9**	**3.2**	**360**	µg/L	36.3	0.12
	SVE-19-053112	Q6	5/31/2012	**2.0**	< 1.0	**52**	**4.9**	**1,500**	µg/L	-290	0.42
	SVE-19-022912	Q5	2/29/2012	**1.5**	< 1.0	**34**	**8.8**	**1,300**	µg/L	73.4	0.84
	SVE-19-112911	Q4	11/29/2011	**3.2**	< 1.0	**46**	**15**	**1,900**	µg/L	43.3	0.36
	SVE-19-083011	Q3	8/30/2011	**3.4**	< 1.0	**62**	**35**	**2,000**	µg/L	83	5.24
	SVE-19	Q2	5/27/2011	**2.6**	**1.8**	**36**	**70**	**1,400**	µg/L	89.2	0.26
	SVE-19-022411	Q1	2/24/2011	**4.5**	**6.1**	**52**	**168**	**2,400**	µg/L	120.1	0.45
	SVE-19-052010	Interim	5/20/2010	**14**	**3.4**	**94**	**122**	**3,100**	µg/L	-14.3	0.31
SVE-20	SVE-20	Q23	8/26/2016	< 4.0	< 4.0	**6.3**	< 4.0	< 400	µg/L	85.3	0.18
	SVE-20	Q22	5/25/2016	**1.0**	**3.0**	**5.4**	**3.6**	**340**	µg/L	-104.3	0.17
	SVE-20	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	<400	µg/L	-151.3	0.09
	SVE-20	Q20	11/19/2015	< 1.0	< 1.0	**4.8**	**4**	**500**	µg/L	107.5	14.58
	SVE-20	Q19	8/26/2015	< 1.0	< 1.0	**1.9**	< 2.0	**260**	µg/L	-88.4	0.39
	SVE-20	Q18	5/28/2015	< 1.0	< 1.0	**2.1**	< 2.0	**330**	µg/L	-17.4	0.37
	SVE-20	Q17	2/26/2015	< 1.0	< 1.0	**5.0**	< 2.0	**390**	µg/L	-81.2	3.31
	SVE-20	Q16	11/19/2014	**1.2**	< 1.0	**5.1**	**11**	**770**	µg/L	-83.4	0.10
	SVE-20	Q15	8/28/2014	**1.1**	< 1.0	**4.1**	**6.1**	**810**	µg/L	-111.3	0.11
	SVE-20	Q14	5/27/2014	**1.5**	**1.4**	**11**	**15**	**870**	µg/L	-94.2	1.08
	SVE-20	Q13	2/24/2014	**2.0**	**1.7**	**11**	**17**	**840**	µg/L	-89.4	0.45
	SVE-20	Q12	11/25/2013	**1.9**	**1.7**	**13**	**17**	**790**	µg/L	-109.2	0.46
	SVE-20	Q11	8/30/2013	**2.8**	**4.0**	**66**	**63**	**3,000**	µg/L	-95.4	0.38
	SVE-20	Q10	5/29/2013	< 4.0	< 4.0	**22**	**22**	**790**	µg/L	-40.2	0.21
	SVE-20	Q9	2/26/2013	**1.4**	**1.3**	**28**	**23**	**1,100**	µg/L	-63.8	0.28
	SVE-20	Q8	11/26/2012	**2.2**	**2.5**	**50**	**42**	**2,300**	µg/L	-91.2	0.09
	SVE-20-083012	Q7	8/30/2012	< 1.0	< 1.0	**20**	**4**	**690**	µg/L	-26.4	0.11
	SVE-20-053012	Q6	5/30/2012	< 1.0	**1.1**	**2.7**	**12**	**1,300**	µg/L	-232.3	0.44
	SVE-20-022912	Q5	2/29/2012	**3.3**	**1.9**	**51**	**54**	**1,800**	µg/L	-19.1	0.4
	SVE-20-112911	Q4	11/29/2011	**4.1**	**1.1**	**25**	**26**	**1,300**	µg/L	-33.2	0.34
	SVE-20-083011	Q3	8/30/2011	**5.1**	< 4.0	**61**	**40**	**2,200**	µg/L	-67	5.15
	SVE-20	Q2	5/27/2011	**4.7**	< 4.0	**58**	**43**	**3,100**	µg/L	-46.1	0.36
	SVE-20-022411	Q1	2/24/2011	**8.8**	**1.7**	**47**	**50**	**3,000**	µg/L	-73.9	0.53
	SVE-20-052010	Interim	5/20/2010	**13**	< 4.0	**81**	**146**	**4,600**	µg/L	-96.8	0.10
SVE-23	SVE-23	Q23	8/26/2016	< 4.0	**12.0**	**86**	**218**	**3,100**	µg/L	248.3	0.21
	SVE-23	Q22	5/25/2016	**3.2**	**11.0**	**78**	**185**	**3,700**	µg/L	-74.3	0.02
	SVE-23	Q21	2/25/2016	< 1.0	**8.8**	**69**	**175**	**2,800**	µg/L	-113.7	0.08
	SVE-23	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-44.6	0.54
	SVE-23	Q19	8/26/2015	**2.1**	**7.2**	**49**	**87**	**2,200**	µg/L	-47.5	0.67
	SVE-23	Q18	5/28/2015	**1.8**	< 1.0	**45**	**3.8**	**2,200**	µg/L	-12.4	0.68
	SVE-23	Q17	2/26/2015	**2.7**	**8.2**	**62.0**	**143**	**2,800**	µg/L	-75.9	4.93
	SVE-23	Q16	11/19/2014	< 4.0	**8.8**	**85.0**	**210**	**3,500**	µg/L	-31.4	0.16
	SVE-23	Q15	8/28/2014	< 4.0	**6.8**	**81**	**185**	**3,500**	µg/L	-64.2	0.14
	SVE-23	Q14	5/27/2014	**2.9**	**9.8**	**74**	**125**	**2,800**	µg/L	-56.1	1.03
	SVE-23	Q13	2/24/2014	**2.0**	**4.2**	**44**	**43**	**1,400**	µg/L	-40.3	0.46
	SVE-23	Q12	11/25/2013	**4.4**	**11**	**67**	**125**	**2,500**	µg/L	-92.3	0.37
	SVE-23	Q11	8/29/2013	**5.3**	**12**	**67**	**135**	**3,100**	µg/L	-51.3	0.14
	SVE-23	Q10	5/29/2013	**1.1**	**1.5**	**9.8**	**15.1**	**460**	µg/L	43.1	0.26
	SVE-23	Q9	2/26/2013	< 1.0	< 1.0	**3.3**	**5.6**	**230**	µg/L	82.4	0.30
	SVE-23	Q8	11/26/2012	**5.0**	**8.0**	**56**	**89**	**2,400**	µg/L	-55.5	0.05
	SVE-23-083012	Q7	8/30/2012	**8.2**	**11**	**75**	**126**	**3,300**	µg/L	-27.4	0.23
	SVE-23-053112	Q6	5/31/2012	**3.9**	**3.1**	**27**	**30**	**1,200**	µg/L	-232.1	0.54
	SVE-23-022912	Q5	2/29/2012	**3.3**	**2.5**	**27**	**24**	**880**	µg/L	57.4	0.58
	SVE-23-112911	Q4	11/29/2011	**6.9**	**6.5**	**53**	**47**	**1,600**	µg/L	-42.5	0.47
	SVE-23-083011	Q3	8/30/2011	**13**	**8**	**78**	**73**	**2,600**	µg/L	-39.5	5.11
	SVE-23	Q2	5/27/2011	**21**	**10**	**100**	**176**	**4,200**	µg/L	-48.7	0.42
	SVE-23-022411	Q1	2/24/2011	**27**	**7.4**	**130**	**197**	**6,000**	µg/L	-68.9	0.85
	SVE-23-052010	Interim	5/20/2010	**47**	**19**	**250**	**820**	**7,700**	µg/L	-44.1	0.25

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-24	SVE-24	Q23	8/25/2016	**13**	< 4.0	**6.3**	< 4.0	**440**	µg/L	48.3	0.16
	SVE-24	Q22	5/24/2016	< 1.0	**1.0**	< 1.0	< 1.0	< 100	µg/L	-35.4	0.18
	SVE-24	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-4.9	0.24
	SVE-24	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	150.0	16.80
	SVE-24	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-1.6	0.38
	SVE-24	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-28.1	0.34
	SVE-24	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	**150**	µg/L	-96.8	1.41
	SVE-24	Q16	11/19/2014	**2.0**	< 1.0	**3.7**	< 2.0	**330**	µg/L	-21.4	0.13
	SVE-24	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	**190**	µg/L	-70.1	0.12
	SVE-24	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-33.2	1.01
	SVE-24	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	**110**	µg/L	-39.8	0.77
	SVE-24	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-34.0	0.35
	SVE-24	Q11	8/29/2013	< 1.0	< 1.0	**2.5**	< 2.0	**210**	µg/L	-34.2	0.21
	SVE-24	Q10	5/29/2013	< 1.0	< 1.0	**2.4**	< 2.0	**180**	µg/L	-48.1	0.28
	SVE-24	Q9	2/26/2013	**14**	< 1.0	**6.8**	< 2.0	**310**	µg/L	-38.8	0.33
	SVE-24	Q8	11/26/2012	**31**	**1.4**	**9.5**	**3.4**	**500**	µg/L	-71.1	0.15
	SVE-24-082912	Q7	8/29/2012	**3.1**	< 1.0	**2.8**	< 2.0	**260**	µg/L	-15.7	0.27
	SVE-24-053012	Q6	5/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-250.0	0.30
	SVE-24-022912	Q5	2/29/2012	**1.1**	< 1.0	< 1.0	**1.8**	**140**	µg/L	-33.3	3.65
	SVE-24-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-71.0	0.70
	SVE-24-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-11.9	0.15
	SVE-24	Q2	5/31/2011	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-11.4	0.19
	SVE-24-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-42.6	0.68
	SVE-24-052010	Interim	5/20/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-273.6	0.63
SVE-25	SVE-25	Q23	8/25/2016	< 1.0	< 1.0	**1.9**	< 1.0	< 100	µg/L	343.9	0.18
	SVE-25	Q22	5/24/2016	**4**	**1.2**	**14**	**1.6**	**270**	µg/L	-11.9	0.14
	SVE-25	Q21	2/25/2016	< 1.0	< 1.0	**9.5**	< 2.0	< 100	µg/L	-62.4	0.14
	SVE-25	Q20	11/20/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-39.5	0.59
	SVE-25	Q19	8/26/2015	**43**	**8.5**	**130**	**47**	**2,000**	µg/L	-56.0	0.23
	SVE-25	Q18	5/28/2015	**68**	< 4.0	**160**	**12**	**3,000**	µg/L	-4.1	0.29
	SVE-25	Q17	2/26/2015	**120**	**13**	**190**	**106**	**2,900**	µg/L	-137.1	4.39
	SVE-25	Q16	11/19/2014	**250**	**40**	**300**	**140**	**3,800**	µg/L	-57.5	0.07
	SVE-25	Q15	8/28/2014	**170**	**85**	**220**	**281**	**4,400**	µg/L	-98.4	0.16
	SVE-25	Q14	5/27/2014	**91**	**19**	**200**	**158**	**3,500**	µg/L	-68.8	1.04
	SVE-25	Q13	2/24/2014	**120**	**52**	**260**	**257**	**4,800**	µg/L	-53.1	0.77
	SVE-25	Q12	11/25/2013	**100**	**28**	**200**	**113**	**3,200**	µg/L	-90.3	0.26
	SVE-25	Q11	8/29/2013	**93**	**7.5**	**130**	**71**	**2,200**	µg/L	-53.2	0.21
	SVE-25	Q10	5/29/2013	**68**	**4.6**	**82**	**40**	**1,300**	µg/L	-56.9	0.28
	SVE-25	Q9	2/27/2013	**190**	**29**	**150**	**180**	**3,200**	µg/L	-68.1	0.20
	SVE-25	Q8	11/26/2012	**380**	**160**	**270**	**580**	**7,200**	µg/L	-107.6	0.01
	SVE-25-082912	Q7	8/29/2012	**200**	**160**	**180**	**377**	**5,300**	µg/L	-21.3	0.39
	SVE-25-053012	Q6	5/30/2012	**79**	**20**	**63**	**160**	**1,600**	µg/L	-218.5	0.25
	SVE-25-022912	Q5	2/29/2012	**400**	**230**	**330**	**498**	**6,600**	µg/L	-83.2	1.11
	SVE-25-112911	Q4	11/29/2011	**290**	**230**	**240**	**480**	**5,800**	µg/L	-114	0.60
	SVE-25-083011	Q3	8/30/2011	**430**	**220**	**250**	**591**	**6,700**	µg/L	-74.5	0.08
	SVE-25	Q2	5/31/2011	**390**	**330**	**200**	**490**	**6,100**	µg/L	-46.8	0.17
	SVE-25-022411	Q1	2/24/2011	**400**	**370**	**200**	**440**	**6,900**	µg/L	-82.5	0.34
	SVE-25-052010	Interim	5/20/2010	**360**	**130**	**150**	**109**	**2,800**	µg/L	-177.9	0.91
SVE-26	SVE-26	Q23	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	101.4	0.20
	SVE-26	Q22	5/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	36.2	4.41
	SVE-26	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	59.6	5.79
	SVE-26	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-44.1	17.93
	SVE-26	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-42.5	0.19
	SVE-26	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-9.4	1.1
	SVE-26	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-51.9	6.01
	SVE-26	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-15.1	0.11
	SVE-26	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-48	0.21
	SVE-26	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-111	1.02
	SVE-26	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	**130**	µg/L	-66.4	0.59
	SVE-26	Q12	11/25/2013	**1.4**	< 1.0	< 1.0	< 2.0	**170**	µg/L	-104.3	0.35
	SVE-26	Q11	8/29/2013	**2.7**	< 1.0	< 1.0	< 1.0	**180**	µg/L	0.6	0.29
	SVE-26	Q10	5/29/2013	**1.4**	< 1.0	< 1.0	< 2.0	**130**	µg/L	-31.2	0.26
	SVE-26	Q9	2/27/2013	< 1.0	< 1.0	**1.6**	< 2.0	**170**	µg/L	-30	0.87
	SVE-26	Q8	11/26/2012	< 1.0	< 1.0	**4.8**	**4.8**	**270**	µg/L	-64.5	0.03
	SVE-26-082912	Q7	8/29/2012	**7.6**	< 1.0	**20**	**26**	**520**	µg/L	-24.4	0.32
	SVE-26-053012	Q6	5/30/2012	**250**	**54**	**260**	**161**	**3,700**	µg/L	-225.6	0.28
	SVE-26-022912	Q5	2/29/2012	**99**	**21**	**84**	**91**	**1,400**	µg/L	-60.4	1.17
	SVE-26-112911	Q4	11/29/2011	**180**	**86**	**91**	**200**	**2,600**	µg/L	-116	0.70
	SVE-26-083011	Q3	8/30/2011	**170**	**100**	**81**	**180**	**2,200**	µg/L	-54	0.21
	SVE-26	Q2	5/31/2011	**150**	**96**	**28**	**61**	**990**	µg/L	-25.7	0.49
	SVE-26-022411	Q1	2/24/2011	**11**	**2.3**	**1.1**	**11**	**270**	µg/L	-84	0.21
	SVE-26-052010	Interim	5/20/2010	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-149.9	1.90

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SW-25	SW-25	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	*	*
	SW-25	Q22	5/26/2016	< 1.0	**2.9**	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q19	8/28/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q18	5/29/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	104.8	3.41
	SW-25	Q17	3/3/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	108.4	9.41
	SW-25	Q16	11/21/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	102.1	1.39
	SW-25	Q15	8/29/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	61.2	2.11
	SW-25	Q14	5/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	71.8	1.02
	SW-25	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	86.4	0.88
	SW-25	Q12	11/26/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	118.2	2.01
	SW-25	Q11	8/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	37.2	1.1
	SW-25	Q10	5/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	110.6	5.61
	SW-25	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	60.5	2.04
	SW-25	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	78.9	4.03
	SW-25-083012	Q7	8/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	10.7	2.76
	SW-25-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-138.6	3.07
	SW-25-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	66.2	8.51
	SW-25-120911	Q4	12/9/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	81.7	3.14
	SW-25-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	0.8	3.41
	SW-25	Q2	5/31/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	31.7	4.84
	SW-25-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-10.9	5.46
	SW-25-110510	Interim	11/5/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-14	3.58
	SW-25-043010	Interim	4/30/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-85.3	2.17
SW-26	SW-26	Q23	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	479.4	0.68
	SW-26	Q22	5/24/2016	< 1.0	**2.9**	< 1.0	< 1.0	< 100	µg/L	-3.4	0.24
	SW-26	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-21.7	0.19
	SW-26	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-31.0	3.35
	SW-26	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-30.0	0.66
	SW-26	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	26.4	0.68
	SW-26	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-51.9	6.01
	SW-26	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-4.8	0.20
	SW-26	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-57.8	0.17
	SW-26	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-50.1	1.03
	SW-26	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-50.2	0.75
	SW-26	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-52.0	5.71
	SW-26	Q11	8/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-18.1	5.51
	SW-26	Q10	5/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-48.2	5.63
	SW-26	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-70.2	1.32
	SW-26	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-37.6	5.18
	SW-26-082912	Q7	8/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	21.0	5.15
	SW-26-053012	Q6	5/30/2012	**3.1**	< 1.0	**2.2**	**1.1**	**230**	µg/L	-206.7	2.86
	SW-26-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-69.6	1.15
	SW-26-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-93.0	0.70
	SW-26-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-11.5	4.08
	SW-26	Q2	5/31/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	20.8	0.8
	SW-26-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-66.3	2.22
	SW-26-110510	Interim	11/5/2010	**5.5**	< 1.0	**1.0**	< 2.0	< 100	µg/L	-103	1.09
	SW-26-043010	Interim	4/30/2010	**5.5**	< 4.0	< 4.0	< 8.0	< 400	µg/L	-152	0.85
SW-27	SW-27	Q23	8/25/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	*	*
	SW-27	Q22	5/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q15	8/28/2014	< 4.0	< 4.0	< 4.0	< 8.0	< 400	µg/L	*	*
	SW-27	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q11	8/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q10	5/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	79.1	8.72
	SW-27	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	22.4	4.56
	SW-27	Q8	11/27/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	15.4	0.41
	SW-27-082912	Q7	8/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	19.3	3.38
	SW-27-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-165.8	2.3
	SW-27-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	24.2	1.93
	SW-27-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-1.0	6.2
	SW-27-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	39.9	4.41
	SW-27	Q2	5/31/2011	**1.5**	< 1.0	< 1.0	< 2.0	< 100	µg/L	32.7	0.6

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SW-27	SW-27-022411	Q1	2/24/2011	**2.1**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-26.4	0.33
	SW-27-110510	Interim	11/5/2010	**8.0**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-157	0
	SW-27-043010	Interim	4/30/2010	**4.5**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-99.2	0.67
MTCA Method A Cleanup Levels				5	1,000	700	1,000	800/1,000 [1]	µg/L	NA	NA

Notes:

[1] Cleanup level for gasoline is 800 micrograms per liter (µg/L) if benzene is present; 1,000 µg/L if no detectable benzene in groundwater.

Bolded text indicates analyte detected.

Shaded text indicates concentration exceeds state cleanup criterion.

* = parameters could not be collected due to pump modification; bailer used to collect samples

< = less than reporting limit indicated

BTEX = benzene, toluene, ethylbenzene, and xylenes

DO = dissolved oxygen in milligrams per liter

ID = identification

MTCA = Washington Model Toxics Control Act

NA = not applicable

ORP = oxygen reduction potential in millivolts

SVE = soil vapor extraction

TPH = total petroleum hydrocarbons

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-13	8/29/2016	79.67	29.62	50.05
	5/26/2016	79.67	29.28	50.39
	2/26/2016	79.67	27.42	52.25
	11/20/2015	79.67	28.20	51.47
	8/28/2015	79.67	29.19	50.48
	5/29/2015	79.67	28.78	50.89
	2/27/2015	79.67	27.95	51.72
	11/21/2014	79.67	28.55	51.12
	8/29/2014	79.67	29.98	49.69
	5/28/2014	79.67	28.73	50.94
	2/25/2014	79.67	27.25	52.42
	11/26/2013	79.67	28.30	51.37
	8/30/2013	79.67	*	*
	5/30/2013	79.67	25.43	54.24
	2/27/2013	79.67	26.21	53.46
	11/26/2012	79.67	26.66	53.01
	8/30/2012	79.67	28.22	51.45
	5/30/2012	79.67	26.90	52.77
	2/29/2012	79.67	26.28	53.39
	11/29/2011	79.67	26.66	53.01
	8/30/2011	79.67	26.89	52.78
	5/27/2011	79.67	25.40	54.27
	2/24/2011	79.67	24.79	54.88
	5/20/2010	79.67	28.17	51.50
SVE-16	8/29/2016	51.67	7.52	44.15
	5/25/2016	51.67	8.00	43.67
	2/26/2016	51.67	6.21	45.46
	11/19/2015	51.67	8.63	43.04
	8/28/2015	51.67	8.63	43.04
	5/28/2015	51.67	8.63	43.04
	2/27/2015	51.67	8.52	43.15
	11/21/2014	51.67	7.60	44.07
	8/29/2014	51.67	8.55	43.12
	5/28/2014	51.67	8.31	43.36
	2/25/2014	51.67	8.13	43.54
	11/25/2013	51.67	9.25	42.42
	8/30/2013	51.67	8.80	42.87
	5/30/2013	51.67	8.00	43.67
	2/27/2013	51.67	7.44	44.23
	11/27/2012	51.67	6.94	44.73
	8/30/2012	51.67	8.64	43.03
	5/31/2012	51.67	7.91	43.76
	2/29/2012	51.67	7.53	44.14
	11/29/2011	51.67	7.88	43.79
	8/30/2011	51.67	7.55	44.12
	5/27/2011	51.67	6.03	45.64
	2/24/2011	51.67	6.73	44.94
	5/20/2010	51.67	7.02	44.65

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-17	8/26/2016	51.67	9.91	41.76
	5/25/2016	51.67	10.22	41.45
	2/26/2016	51.67	8.67	43.00
	11/19/2015	51.67	9.30	42.37
	8/26/2015	51.67	10.20	41.47
	5/28/2015	51.67	10.78	40.89
	2/27/2015	51.67	10.98	40.69
	11/21/2014	51.67	10.25	41.42
	8/28/2014	51.67	11.48	40.19
	5/28/2014	51.67	**	**
	2/25/2014	51.67	11.25	40.42
	11/25/2013	51.67	11.68	39.99
	8/30/2013	51.67	11.05	40.62
	5/30/2013	51.67	10.03	41.64
	2/27/2013	51.67	9.68	41.99
	11/26/2012	51.67	10.22	41.45
	8/30/2012	51.67	10.98	40.69
	5/31/2012	51.67	10.73	40.94
	2/29/2012	51.67	10.53	41.14
	11/29/2011	51.67	10.94	40.73
	8/30/2011	51.67	10.27	41.40
	5/27/2011	51.67	9.40	42.27
	2/24/2011	51.67	9.41	42.26
	5/20/2010	51.67	9.54	42.13
SVE-19	8/26/2016	51.67	12.98	38.69
	5/25/2016	51.67	13.00	38.67
	2/25/2016	51.67	11.68	39.99
	11/19/2015	51.67	12.13	39.54
	8/26/2015	51.67	14.13	37.54
	5/28/2015	51.67	14.20	37.47
	2/26/2015	51.67	15.12	36.55
	11/19/2014	51.67	14.02	37.65
	8/28/2014	51.67	15.05	36.62
	5/27/2014	51.67	14.40	37.27
	2/25/2014	51.67	14.63	37.04
	11/25/2013	51.67	14.76	36.91
	8/30/2013	51.67	13.93	37.74
	5/30/2013	51.67	13.02	38.65
	2/26/2013	51.67	12.48	39.19
	11/26/2012	51.67	13.01	38.66
	8/30/2012	51.67	13.58	38.09
	5/31/2012	51.67	13.24	38.43
	2/29/2012	51.67	13.42	38.25
	11/29/2011	51.67	13.70	37.97
	8/30/2011	51.67	13.04	38.63
	5/27/2011	51.67	12.38	39.29
	2/24/2011	51.67	12.41	39.26
	5/20/2010	51.67	12.94	38.73

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-20	8/26/2016	51.67	13.61	38.06
	5/25/2016	51.67	14.12	37.55
	2/25/2016	51.67	12.71	38.96
	11/19/2015	51.67	14.30	37.37
	8/26/2015	51.67	15.92	35.75
	5/28/2015	51.67	15.95	35.72
	2/26/2015	51.67	17.05	34.62
	11/19/2014	51.67	15.28	36.39
	8/28/2014	51.67	15.99	35.68
	5/27/2014	51.67	15.65	36.02
	2/24/2014	51.67	16.31	35.36
	11/25/2013	51.67	16.28	35.39
	8/30/2013	51.67	15.10	36.57
	5/29/2013	51.67	14.50	37.17
	2/26/2013	51.67	14.05	37.62
	11/26/2012	51.67	14.17	37.50
	8/30/2012	51.67	14.72	36.95
	5/30/2012	51.67	14.93	36.74
	2/29/2012	51.67	14.85	36.82
	11/29/2011	51.67	15.33	36.34
	8/30/2011	51.67	14.61	37.06
	5/27/2011	51.67	14.01	37.66
	2/24/2011	51.67	12.14	39.53
	5/20/2010	51.67	14.58	37.09
SVE-23	8/26/2016	51.67	14.68	36.99
	5/25/2016	51.67	15.51	36.16
	2/25/2016	51.67	13.97	37.70
	11/19/2015	51.67	14.70	36.97
	8/26/2015	51.67	15.99	35.68
	5/28/2015	51.67	16.97	34.70
	2/26/2015	51.67	16.25	35.42
	11/19/2014	51.67	16.30	35.37
	8/28/2014	51.67	16.98	34.69
	5/27/2014	51.67	17.12	34.55
	2/24/2014	51.67	17.58	34.09
	11/25/2013	51.67	17.50	34.17
	8/29/2013	51.67	16.51	35.16
	5/29/2013	51.67	15.77	35.90
	2/26/2013	51.67	15.74	35.93
	11/26/2012	51.67	15.68	35.99
	8/30/2012	51.67	16.00	35.67
	5/31/2012	51.67	15.71	35.96
	2/29/2012	51.67	15.9	35.77
	11/29/2011	51.67	16.05	35.62
	8/30/2011	51.67	15.22	36.45
	5/27/2011	51.67	15.05	36.62
	2/24/2011	51.67	14.82	36.85
	5/20/2010	51.67	15.41	36.26

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-24	8/25/2016	51.67	15.34	36.33
	5/24/2016	51.67	15.77	35.90
	2/25/2016	51.67	13.80	37.87
	11/19/2015	51.67	15.01	36.66
	8/26/2015	51.67	16.01	35.66
	5/28/2015	51.67	17.13	34.54
	2/26/2015	51.67	15.92	35.75
	11/19/2014	51.67	16.94	34.73
	8/28/2014	51.67	17.90	33.77
	5/27/2014	51.67	18.20	33.47
	2/24/2014	51.67	18.60	33.07
	11/25/2013	51.67	18.44	33.23
	8/29/2013	51.67	17.17	34.50
	5/29/2013	51.67	16.00	35.67
	2/26/2013	51.67	15.57	36.10
	11/26/2012	51.67	16.43	35.24
	8/29/2012	51.67	17.52	34.15
	5/30/2012	51.67	16.58	35.09
	2/29/2012	51.67	16.51	35.16
	11/29/2011	51.67	17.23	34.44
	8/30/2011	51.67	16.29	35.38
	5/31/2011	51.67	16.31	35.36
	2/24/2011	51.67	16.16	35.51
	5/20/2010	51.67	17.59	34.08
SVE-25	8/25/2016	51.67	13.98	37.69
	5/24/2016	51.67	15.10	36.57
	2/25/2016	51.67	12.82	38.85
	11/19/2015	51.67	13.40	38.27
	8/26/2015	51.67	16.62	35.05
	5/28/2015	51.67	16.62	35.05
	2/26/2015	51.67	15.02	36.65
	11/19/2014	51.67	15.85	35.82
	8/28/2014	51.67	16.20	35.47
	5/27/2014	51.67	17.23	34.44
	2/24/2014	51.67	17.34	34.33
	11/25/2013	51.67	17.65	34.02
	8/29/2013	51.67	16.17	35.50
	5/29/2013	51.67	13.00	38.67
	2/27/2013	51.67	14.44	37.23
	11/26/2012	51.67	14.56	37.11
	8/29/2012	51.67	16.08	35.59
	5/30/2012	51.67	15.16	36.51
	2/29/2012	51.67	14.93	36.74
	11/29/2011	51.67	15.61	36.06
	8/30/2011	51.67	14.53	37.14
	5/31/2011	51.67	14.95	36.72
	2/24/2011	51.67	14.78	36.89
	5/20/2010	51.67	16.00	35.67

TABLE 3
GROUNDWATER ELEVATIONS

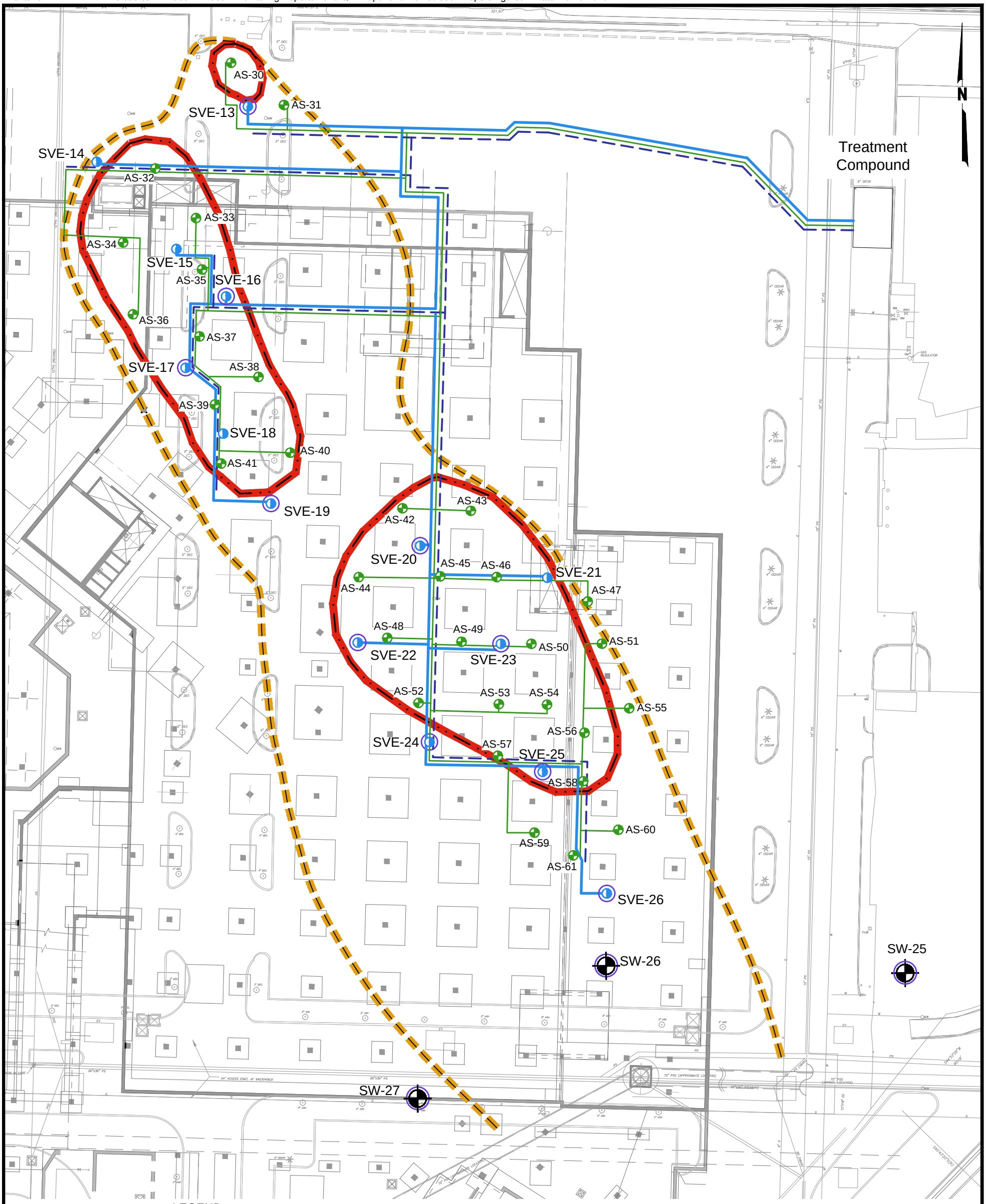
Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-26	8/25/2016	46.67	8.56	38.11
	5/24/2016	46.67	10.25	36.42
	2/25/2016	46.67	7.21	39.46
	11/19/2015	46.67	9.30	37.37
	8/26/2015	46.67	10.33	36.34
	5/28/2015	46.67	13.53	33.14
	2/26/2015	46.67	11.10	35.57
	11/19/2014	46.67	11.40	35.27
	8/28/2014	46.67	9.65	37.02
	5/27/2014	46.67	13.80	32.87
	2/24/2014	46.67	12.32	34.35
	11/25/2013	46.67	13.73	32.94
	8/29/2013	46.67	14.18	32.49
	5/29/2013	46.67	10.91	35.76
	2/27/2013	46.67	10.92	35.75
	11/26/2012	46.67	8.77	37.90
	8/29/2012	46.67	11.41	35.26
	5/30/2012	46.67	10.20	36.47
	2/29/2012	46.67	10.32	36.35
	11/29/2011	46.67	10.40	36.27
	8/30/2011	46.67	9.58	37.09
	5/31/2011	46.67	10.66	36.01
	2/24/2011	46.67	10.99	35.68
	5/20/2010	46.67	12.83	33.84
SW-25	8/29/2016	80.25	64.70	15.55
	5/26/2016	80.25	66.50	13.75
	2/26/2016	80.25	67.21	13.04
	11/20/2015	80.25	63.37	16.88
	8/28/2015	80.25	65.37	14.88
	5/29/2015	80.25	65.45	14.80
	3/3/2015	80.25	63.08	17.17
	11/21/2014	80.25	64.95	15.30
	8/29/2014	80.25	67.35	12.90
	5/28/2014	80.25	70.80	9.45
	2/25/2014	80.25	69.90	10.35
	11/26/2013	80.25	63.40	16.85
	8/30/2013	80.25	63.10	17.15
	5/30/2013	80.25	63.45	16.80
	2/27/2013	80.25	61.34	18.91
	11/26/2012	80.25	61.60	18.65
	8/30/2012	80.25	61.67	18.58
	5/31/2012	80.25	60.81	19.44
	2/29/2012	80.25	59.92	20.33
	12/9/2011	80.25	56.89	23.36
	8/30/2011	80.25	61.97	18.28
	5/31/2011	80.25	59.20	21.05
	2/24/2011	80.25	58.23	22.02
	11/2/2010	80.25	58.04	22.21
	4/30/2010	80.25	56.04	24.21
SW-26	8/25/2016	46.60	14.60	32.00
	5/24/2016	46.60	16.12	30.48
	2/25/2016	46.60	14.90	31.70
	11/19/2015	46.60	14.50	32.10
	8/26/2015	46.60	16.51	30.09

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SW-26	5/28/2015	46.60	20.38	26.22
	2/26/2015	46.60	17.75	28.85
	11/19/2014	46.60	18.10	28.50
	8/28/2014	46.60	16.05	30.55
	5/27/2014	46.60	20.61	25.99
	2/25/2014	46.60	18.57	28.03
	11/25/2013	46.60	19.41	27.19
	8/29/2013	46.60	19.31	27.29
	5/29/2013	46.60	17.65	28.95
	2/27/2013	46.60	17.83	28.77
SW-26	11/26/2012	46.60	13.84	32.76
	8/29/2012	46.60	18.02	28.58
	5/30/2012	46.60	19.25	27.35
	2/29/2012	46.60	19.23	27.37
	11/29/2011	46.60	19.29	27.31
	8/30/2011	46.60	20.09	26.51
	5/31/2011	46.60	20.52	26.08
	2/24/2011	46.60	20.02	26.58
	11/2/2010	46.60	13.67	32.93
	4/30/2010	46.60	22.07	24.53
SW-27	8/25/2016	51.65	23.50	28.15
	5/24/2016	51.65	25.91	25.74
	2/25/2016	51.65	25.80	25.85
	11/19/2015	51.65	23.20	28.45
	8/26/2015	51.65	24.60	27.05
	5/28/2015	51.65	28.10	23.55
	2/26/2015	51.65	25.23	26.42
	11/19/2014	51.65	27.16	24.49
	8/28/2014	51.65	25.95	25.70
	5/27/2014	51.65	25.05	26.60
	2/24/2014	51.65	25.57	26.08
	11/25/2013	51.65	26.30	25.35
	8/29/2013	51.65	28.20	23.45
	5/29/2013	51.65	22.50	29.15
	2/27/2013	51.65	22.82	28.83
	11/26/2012	51.65	22.25	29.40
	8/29/2012	51.65	23.85	27.80
	5/31/2012	51.65	24.20	27.45
	2/29/2012	51.65	23.68	27.97
	11/29/2011	51.65	23.21	28.44
	8/30/2011	51.65	22.36	29.29
	5/31/2011	51.65	23.12	28.53
	2/24/2011	51.65	23.57	28.08
	11/2/2010	51.65	23.64	28.01
	4/30/2010	51.65	23.39	28.26

Notes:
* = Not sampled due to Mercer Street construction activities.
** = Data missing due to malfunction.
Elevations are in feet (North America Vertical Datum [NAVD] 88)
DTW = depth to water
SVE = soil vapor extraction; TOC = top of well casing

Filename:I:\WIP\21-1\12176 bus barn\Phase II\Phase II Monitoring Reports\2016\Q21 Vapor and Remediation Report\Figures Date: 10-19-2016 EVP



LEGEND

- SVE (Soil Vapor Extraction) Well
- AS (Air Sparging) Well
- Well Selected for Groundwater Monitoring
- Compliance Monitoring Well
- Estimated Baseline Extent of Benzene in Groundwater >5 µg/L (February 2008)
- Estimated Baseline Extent of Benzene in Soil >0.3 mg/kg (January-March 2008)
- SVE Piping (Multiple Pipes)
- AS Piping (Multiple Pipes)
- Fugitive Vapor Collection Piping

0 40 80

Scale in Feet

NOTES

1. Well locations and piping are adapted from as-built drawing provided by Sellen Construction, received 5-18-2011.
2. Figure adapted from electronic files provided by Aspect Consulting and KPFF, dated March 2008 and March 2011.
3. Well AS-30 was decommissioned in May 2013.

Phase 2 Remediation Monitoring - 23rd Quarter Seattle Center Lot No. 2
Seattle, Washington

SITE PLAN

October 2016 21-1-12176-046

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

FIG. 1

Filename: J:\211\12176-044\21-1-12176-044 Fig 2-3-Q22.dwg Date: 10-14-2016 EVP

SVE-13	5-26-16	8-29-16
TPH-G	780	520
B	ND	ND

SVE-16	5-26-16	8-29-16
TPH-G	420	ND
B	1.4	ND

SVE-17	5-25-16	8-26-16
TPH-G	ND	ND
B	ND	ND

SVE-19	5-25-16	8-26-16
TPH-G	160	ND
B	ND	ND

SVE-20	5-25-16	8-26-16
TPH-G	340	ND
B	1.0	ND

SVE-23	5-25-16	8-26-16
TPH-G	3700	3100
B	3.2	ND

SVE-24	5-24-16	8-25-16
TPH-G	ND	440
B	ND	13

SVE-25	5-24-16	8-25-16
TPH-G	270	ND
B	4.0	ND

SVE-26	5-24-16	8-25-16
TPH-G	ND	ND
B	ND	ND

SW-26	5-24-16	8-25-16
TPH-G	ND	ND
B	ND	ND

SW-25	5-26-16	8-29-16
TPH-G	ND	ND
B	ND	ND

SW-27	5-24-16	8-25-16
TPH-G	ND	ND
B	ND	ND

LEGEND

- SVE (Soil Vapor Extraction) Well
- AS (Air Sparging) Well
- Well Selected for Groundwater Monitoring
- Compliance Monitoring Well
- Estimated Baseline Extent of Benzene in Groundwater >5 µg/L (February 2008)
- Estimated Baseline Extent of Benzene in Soil >0.3 mg/kg (January-March 2008)
- SVE Piping (Multiple Pipes)
- AS Piping (Multiple Pipes)
- Fugitive Vapor Collection Piping

CONCENTRATIONS LEGEND

TPH-G	Gasoline-Range Hydrocarbons
B	Benzene
µg/L	Micrograms per Liter
ND	Not Detected

0 40 80

Scale in Feet

NOTES

1. Well locations and piping are adapted from as-built drawing provided by Sellen Construction, received 5-18-2011.
2. Figure adapted from electronic files provided by Aspect Consulting and KPFF, dated March 2008 and March 2011.
3. Well AS-30 was decommissioned in May 2013.

Phase 2 Remediation Monitoring - 23rd Quarter
Seattle Center Lot No. 2
Seattle, Washington

TPH-G AND BENZENE CONCENTRATIONS IN GROUNDWATER

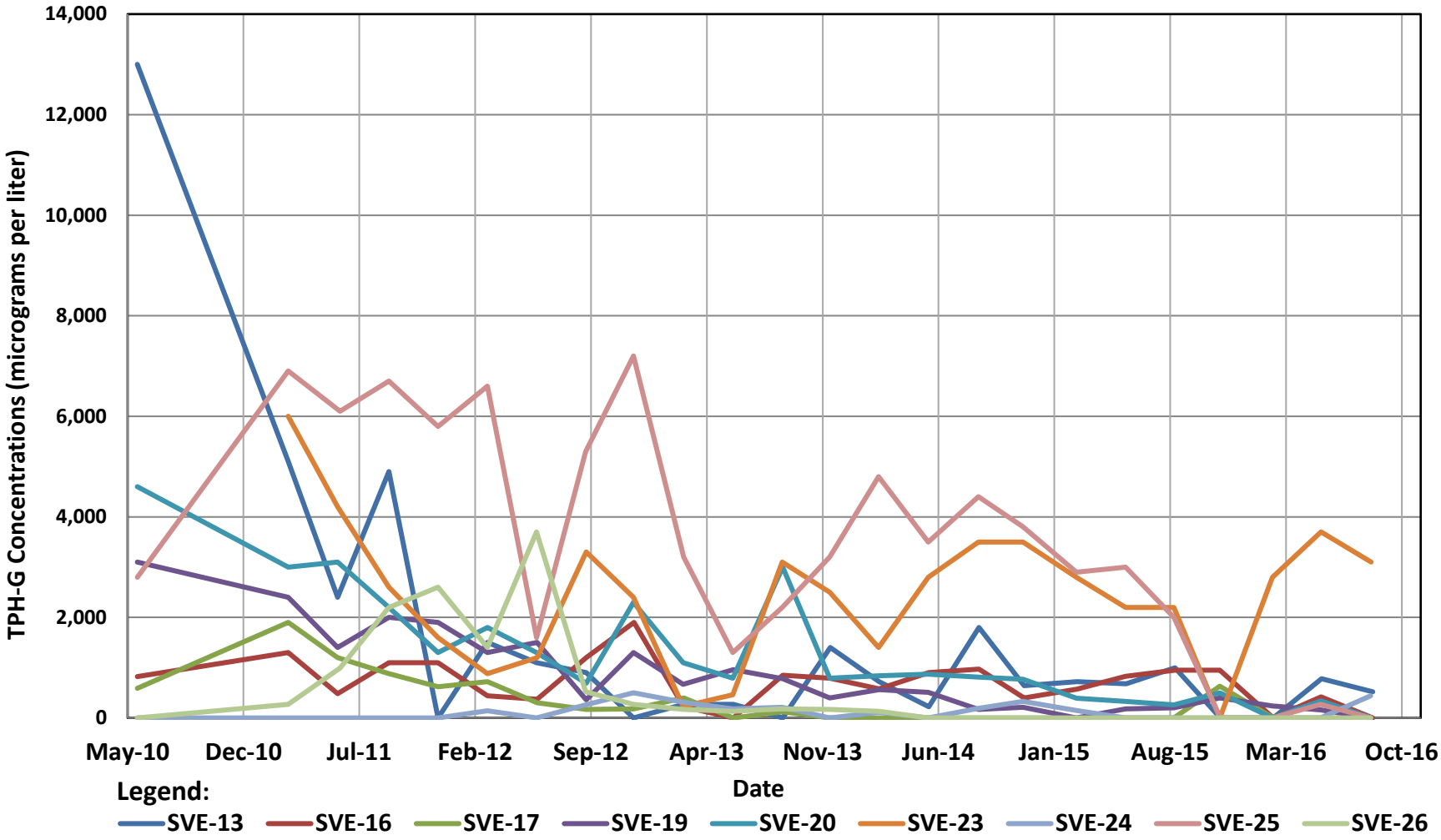
October 2016 21-1-12176-046

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2

FIG. 2

C:\Users\evp\Desktop\stuff\Copy of 21-1-12176-046-Q23-R1f-T1-T3.xlsx



Non-Detects plotted as zero.

Cleanup Level = 800 micrograms per liter

Phase 2 Remediation Monitoring - 23rd Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL TPH-G CONCENTRATIONS IN SVE WELLS

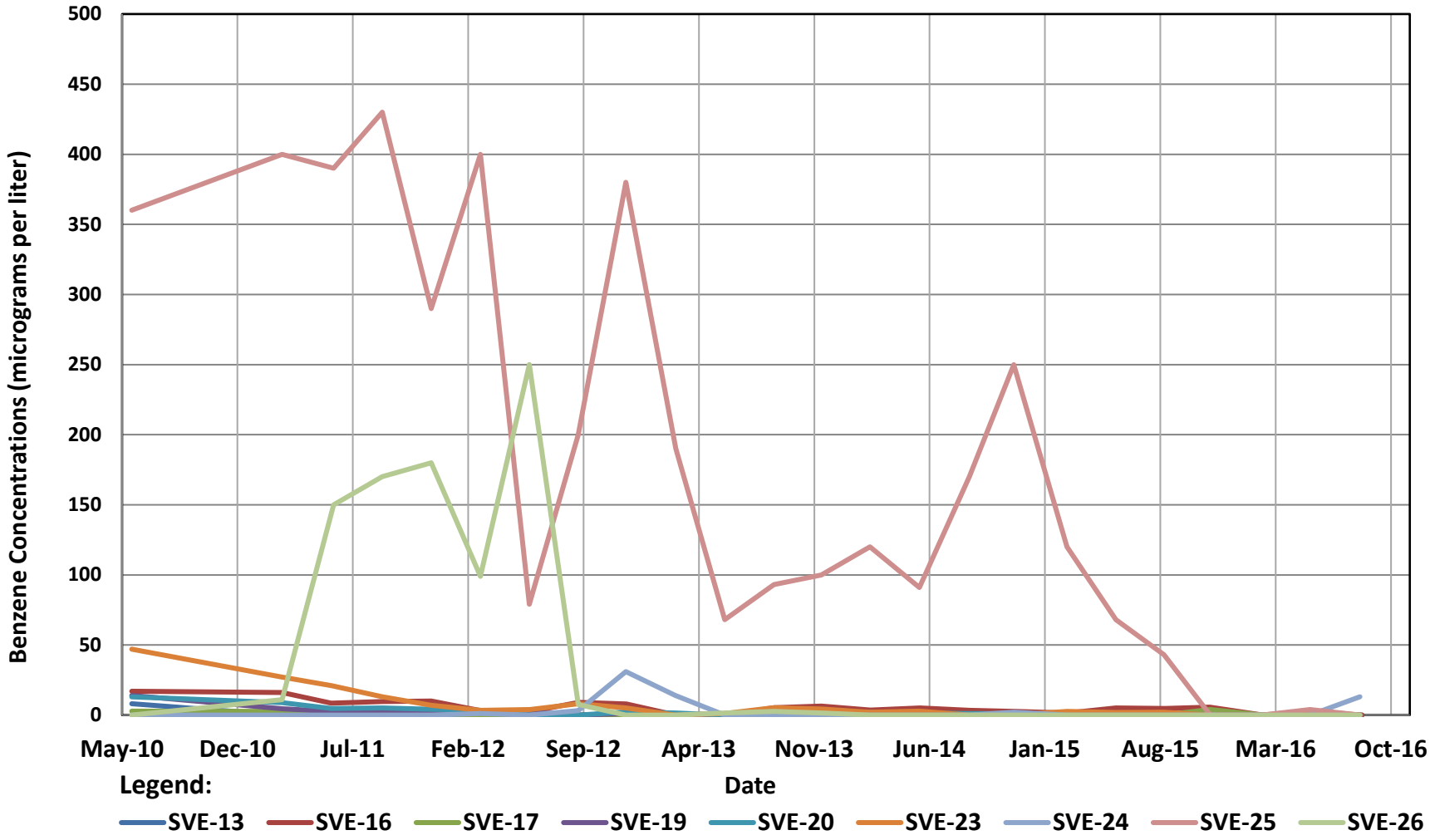
October 2016 21-1-12176-046

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3

FIG. 3

C:\Users\evp\Desktop\stuff\Copy of 21-1-12176-046-Q23-R1f-T1-T3.xlsx



Non-Detects plotted as zero.

Cleanup Level = 5 micrograms per liter

Phase 2 Remediation Monitoring - 23rd Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL BENZENE CONCENTRATIONS IN SVE WELLS

October 2016 21-1-12176-046

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4

FIG. 4

APPENDIX A

GROUNDWATER ANALYTICAL LABORATORY REPORT

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 7, 2016

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1608-321

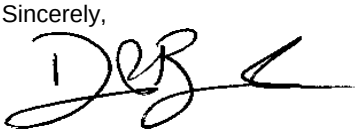
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on August 25, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

Case Narrative

Samples were collected on August 25, 2016 and received by the laboratory on August 25, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	08-321-01					
Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*71-111*				
Client ID:	**SVE-26**					
Laboratory ID:	08-321-02					
Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Toluene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Gasoline	**ND**	100	NWTPH-Gx	8-30-16	8-30-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-111*				
Client ID:	**SW-26**					
Laboratory ID:	08-321-03					
Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Toluene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Gasoline	**ND**	100	NWTPH-Gx	8-30-16	8-30-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*111*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-25**					
Laboratory ID:	08-321-04					
Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-31-16	
Toluene	**ND**	1.0	EPA 8021B	8-30-16	8-31-16	
Ethyl Benzene	**1.9**	1.0	EPA 8021B	8-30-16	8-31-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-31-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-31-16	
Gasoline	**ND**	100	NWTPH-Gx	8-30-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*106*	*71-111*				
Client ID:	**SVE-24**					
Laboratory ID:	08-321-05					
Benzene	**13**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**6.3**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**440**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830W2					
Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Toluene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-30-16	8-30-16	
Gasoline	**ND**	100	NWTPH-Gx	8-30-16	8-30-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*71-111*				
Laboratory ID:	MB0831W1					
Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	100	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*71-111*				
Laboratory ID:	MB0901W2					
Benzene	**ND**	1.0	EPA 8021B	9-1-16	9-1-16	
Toluene	**ND**	1.0	EPA 8021B	9-1-16	9-1-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	9-1-16	9-1-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	9-1-16	9-1-16	
o-Xylene	**ND**	1.0	EPA 8021B	9-1-16	9-1-16	
Gasoline	**ND**	100	NWTPH-Gx	9-1-16	9-1-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-321-04										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**1.91**	**1.82**	NA	NA		NA		NA	5	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*106*	*106*	*71-111*			
MATRIX SPIKES											
Laboratory ID:	08-364-01										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**45.9**	**44.6**	50.0	50.0	ND	**92**	**89**	83-123	3	15	
Toluene	**46.4**	**44.6**	50.0	50.0	ND	**93**	**89**	83-124	4	16	
Ethyl Benzene	**46.5**	**44.9**	50.0	50.0	ND	**93**	**90**	82-123	4	15	
m,p-Xylene	**47.3**	**45.2**	50.0	50.0	ND	**95**	**90**	81-125	5	17	
o-Xylene	**46.2**	**44.7**	50.0	50.0	ND	**92**	**89**	82-123	3	15	
Surrogate:											
Fluorobenzene						*89*	*80*	*71-111*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-321-01					
Client ID:	**SW-27**					
Manganese	**770**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-321-02					
Client ID:	**SVE-26**					
Manganese	**1200**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-321-03					
Client ID:	**SW-26**					
Manganese	**200**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-321-04					
Client ID:	**SVE-25**					
Manganese	**2400**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-321-05					
Client ID:	**SVE-24**					
Manganese	**4600**	50	6010C	9-1-16	9-2-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-1-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0901WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**345**	**361**	5	10	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**918**	115	**914**	114	0	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-321-01					
Client ID:	**SW-27**					
Manganese	**410**	11	6010C	8-26-16	9-1-16	
Lab ID:	08-321-02					
Client ID:	**SVE-26**					
Manganese	**1200**	11	6010C		9-1-16	
Lab ID:	08-321-03					
Client ID:	**SW-26**					
Manganese	**210**	11	6010C		9-1-16	
Lab ID:	08-321-04					
Client ID:	**SVE-25**					
Manganese	**2700**	11	6010C		9-1-16	
Lab ID:	08-321-05					
Client ID:	**SVE-24**					
Manganese	**4600**	50	6010C		9-2-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	8-26-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0826F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1220**	**1240**	2	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**1820**	108	**1850**	114	2	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	08-321-01					
Total Alkalinity	**100**	2.0	SM 2320B	8-26-16	8-26-16	
Client ID:	**SVE-26**					
Laboratory ID:	08-321-02					
Total Alkalinity	**86**	2.0	SM 2320B	8-26-16	8-26-16	
Client ID:	**SW-26**					
Laboratory ID:	08-321-03					
Total Alkalinity	**190**	2.0	SM 2320B	8-26-16	8-26-16	
Client ID:	**SVE-25**					
Laboratory ID:	08-321-04					
Total Alkalinity	**46**	2.0	SM 2320B	8-26-16	8-26-16	
Client ID:	**SVE-24**					
Laboratory ID:	08-321-05					
Total Alkalinity	**500**	2.0	SM 2320B	8-26-16	8-26-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Total Alkalinity	**ND**	2.0	SM 2320B	8-26-16	8-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-310-01								
	ORIG	DUP							
Total Alkalinity	**126**	**124**	NA	NA	NA	NA	2	11	
SPIKE BLANK									
Laboratory ID:	SB0826W1								
	SB		SB		SB				
Total Alkalinity	**98.0**		100	NA	98	91-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	08-321-01					
Nitrate	**0.050**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-26**					
Laboratory ID:	08-321-02					
Nitrate	**0.11**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SW-26**					
Laboratory ID:	08-321-03					
Nitrate	**0.061**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-25**					
Laboratory ID:	08-321-04					
Nitrate	**ND**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-24**					
Laboratory ID:	08-321-05					
Nitrate	**ND**	0.050	EPA 353.2	8-26-16	8-26-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Nitrate	**ND**	0.050	EPA 353.2	8-26-16	8-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-310-01								
	ORIG	DUP							
Nitrate	**9.20**	**8.89**	NA	NA	NA	NA	3	12	
MATRIX SPIKE									
Laboratory ID:	08-310-01								
	MS		MS		MS				
Nitrate	**20.1**		10.0	9.20	109	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0826W1								
	SB		SB		SB				
Nitrate	**2.21**		2.00	NA	111	96-119	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	08-321-01					
Sulfate	**59**	25	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-26**					
Laboratory ID:	08-321-02					
Sulfate	**290**	100	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SW-26**					
Laboratory ID:	08-321-03					
Sulfate	**23**	10	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-25**					
Laboratory ID:	08-321-04					
Sulfate	**300**	130	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-24**					
Laboratory ID:	08-321-05					
Sulfate	**440**	100	ASTM D516-07	8-30-16	8-30-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 25, 2016
Laboratory Reference: 1608-321
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830W1					
Sulfate	**ND**	5.0	ASTM D516-07	8-30-16	8-30-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-310-01								
	ORIG	DUP							
Sulfate	**22.7**	**22.9**	NA	NA	NA	NA	1	9	
MATRIX SPIKE									
Laboratory ID:	08-310-01								
	MS		MS		MS				
Sulfate	**43.7**		20.0	22.7	105	79-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0830W1								
	SB		SB		SB				
Sulfate	**10.4**		10.0	NA	104	86-116	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

07 September 2016

David Baumeister
OnSite Environmental, Inc.
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
16H0241	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.



Amanda Volgardsen, Receiving Supervisor

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Cert# 100006

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

16H0241

Chain of Custody

Page 1 of 1

Company: Shannon & Wilson, Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	ferrous Fe				% Moisture
	SW-27	8/25/16	1000	GW	1																		X				
	SVE-26	↓	1125	↓	1																		X				
	SW-26		1230		1																		X				
	SVE-25		1348		1																		X				
	SVE-24		1450		1																		X				

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		SAW	8/25/16	1525	
Received	Van	Spdy	8/25/16	1525	
Relinquished	Van	Spdy	8/25/16	815	
Received		ARI	8/26/16	0915	
Relinquished					
Received					Data Package: Standard ☐ Level III ☐ Level IV ☐
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Onsite

Project Name: Seattle Center

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 16H0241

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	0.8	

Time: 0845

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0C527C

Cooler Accepted by: _____ Date: 8/26/16 Time: 0815

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES *	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 8/26/16 Time: 1547

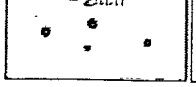
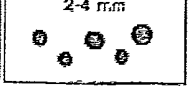
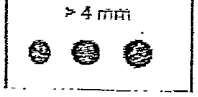
*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

* lab to determine sample preservation

By: AV Date: 8/26/16

Small Air Bubbles = 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-27	16H0241-01	Water	25-Aug-2016 10:00	26-Aug-2016 08:15
SVE-26	16H0241-02	Water	25-Aug-2016 11:25	26-Aug-2016 08:15
SW-26	16H0241-03	Water	25-Aug-2016 12:30	26-Aug-2016 08:15
SVE-25	16H0241-04	Water	25-Aug-2016 13:48	26-Aug-2016 08:15
SVE-24	16H0241-05	Water	25-Aug-2016 14:50	26-Aug-2016 08:15

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

Case Narrative

Sample Receipt

Five water samples were received August 26, 2016. The cooler temperature measured by IR thermometer following ARI SOP was 0.8º C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Ferrous Iron EPA SM 3500

Due to Ferrous Iron being a field test, the system has flagged the samples with an “H” qualifier, marking them out of recommended holding times.

There were no anomalies noted for this analysis.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SW-27

16H0241-01 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:25

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		10	0.400	**24.5**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SW-27

16H0241-01RE1 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:41

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	**18.4**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SVE-26

16H0241-02RE1 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:59

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	**46.3**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SW-26

16H0241-03 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:43

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	**0.672**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SVE-25

16H0241-04 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:26

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		10	0.400	**5.96**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

SVE-24

16H0241-05 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 10:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0555
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	**37.1**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

Wet Chemistry - Quality Control

Batch BEH0555 - No Prep Wet Chem

Instrument: UV1800-2

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BEH0555-BLK1)			Prepared: 26-Aug-2016 Analyzed: 26-Aug-2016 10:25							
Ferrous Iron	ND	0.040	mg/L							U
Duplicate (BEH0555-DUP1)	**Source: 16H0241-01RE1**		Prepared: 26-Aug-2016 Analyzed: 26-Aug-2016 10:42							
Ferrous Iron	18.3	0.800	mg/L		18.4			0.87	20	
Matrix Spike (BEH0555-MS1)	**Source: 16H0241-01RE1**		Prepared: 26-Aug-2016 Analyzed: 26-Aug-2016 10:42							
Ferrous Iron	22.3	0.800	mg/L	4.00	18.4	96.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

Certified Analyses included in this Report

Analyte	Certifications
SM 3500-Fe B-97 in Water	
Ferrous Iron	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/06/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	03/30/2017
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2017
WADOE	WA Dept of Ecology	C558	06/30/2017
WA-DW	Ecology - Drinking Water	C558	06/30/2017

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: 21-1-12176-044	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:47

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
H	Hold time violation - Hold time was exceeded.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 08-321

Company: Shannon & Wilson, Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total/diss manganese	alkalinity	nitrate	sulfate	% Moisture	Ferrous Iron *
1	SW-27	8/25/16	1000	GW	6		X																X	X	X	X	X	X
2	SVE-26		1125		6		X																X	X	X	X	X	X
3	SW-26		1230		6		X																X	X	X	X	X	X
4	SVE-25		1348		6		X																X	X	X	X	X	X
5	SVE-24		1450		6		X																X	X	X	X	X	X

	Signature	Company	Date	Time
Relinquished		S&W	8/25/16	1520
Received	Vaya	3Phy	8/25/16	1520
Relinquished	Vaya	3Phy	8/25/16	1630
Received		ORE	8/25/16	1630
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
- samples are field filtered for diss. manganese with the exception of SW-27 (needs filtered)

* Sent directly to ARI 8/25/16

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 7, 2016

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1608-351

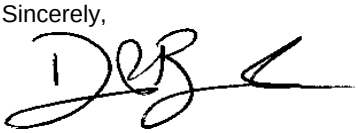
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on August 26, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

Case Narrative

Samples were collected on August 26, 2016 and received by the laboratory on August 26, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-23**					
Laboratory ID:	08-351-01					
Benzene	**ND**	4.0	EPA 8021B	9-1-16	9-1-16	
Toluene	**12**	4.0	EPA 8021B	9-1-16	9-1-16	
Ethyl Benzene	**86**	4.0	EPA 8021B	9-1-16	9-1-16	
m,p-Xylene	**210**	4.0	EPA 8021B	9-1-16	9-1-16	
o-Xylene	**7.5**	4.0	EPA 8021B	9-1-16	9-1-16	
Gasoline	**3100**	400	NWTPH-Gx	9-1-16	9-1-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*106*	*71-111*				
Client ID:	**SVE-20**					
Laboratory ID:	08-351-02					
Benzene	**ND**	4.0	EPA 8021B	9-1-16	9-1-16	
Toluene	**ND**	4.0	EPA 8021B	9-1-16	9-1-16	
Ethyl Benzene	**6.3**	4.0	EPA 8021B	9-1-16	9-1-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	9-1-16	9-1-16	
o-Xylene	**ND**	4.0	EPA 8021B	9-1-16	9-1-16	
Gasoline	**ND**	400	NWTPH-Gx	9-1-16	9-1-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*71-111*				
Client ID:	**SVE-19**					
Laboratory ID:	08-351-03					
Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-17**					
Laboratory ID:	08-351-04					
Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	100	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0831W1					
Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	100	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*71-111*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-361-03										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*88*	*94*	*71-111*			
SPIKE BLANKS											
Laboratory ID:	SB0831W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**48.9**	**49.0**	50.0	50.0		**98**	**98**	83-119	0	13	
Toluene	**50.1**	**49.9**	50.0	50.0		**100**	**100**	83-120	0	13	
Ethyl Benzene	**50.1**	**50.2**	50.0	50.0		**100**	**100**	82-120	0	12	
m,p-Xylene	**49.8**	**49.9**	50.0	50.0		**100**	**100**	80-122	0	13	
o-Xylene	**49.2**	**49.3**	50.0	50.0		**98**	**99**	80-120	0	10	
Surrogate:											
Fluorobenzene						*99*	*99*	*71-111*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-351-01					
Client ID:	**SVE-23**					
Manganese	**1300**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-351-02					
Client ID:	**SVE-20**					
Manganese	**3300**	50	6010C	9-1-16	9-6-16	
Lab ID:	08-351-03					
Client ID:	**SVE-19**					
Manganese	**12000**	50	6010C	9-1-16	9-6-16	
Lab ID:	08-351-04					
Client ID:	**SVE-17**					
Manganese	**2400**	10	6010C	9-1-16	9-1-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-1-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0901WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**345**	**361**	5	10	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**918**	115	**914**	114	0	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-351-01					
Client ID:	**SVE-23**					
Manganese	**1300**	11	6010C		9-1-16	
Lab ID:	08-351-02					
Client ID:	**SVE-20**					
Manganese	**3200**	50	6010C		9-2-16	
Lab ID:	08-351-03					
Client ID:	**SVE-19**					
Manganese	**12000**	50	6010C		9-2-16	
Lab ID:	08-351-04					
Client ID:	**SVE-17**					
Manganese	**2700**	11	6010C		9-1-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	8-29-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0829F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1220**	**1240**	2	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**1820**	108	**1850**	114	2	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-23**					
Laboratory ID:	08-351-01					
Total Alkalinity	**270**	2.0	SM 2320B	8-31-16	8-31-16	
Client ID:	**SVE-20**					
Laboratory ID:	08-351-02					
Total Alkalinity	**620**	2.0	SM 2320B	8-31-16	8-31-16	
Client ID:	**SVE-19**					
Laboratory ID:	08-351-03					
Total Alkalinity	**180**	2.0	SM 2320B	8-31-16	8-31-16	
Client ID:	**SVE-17**					
Laboratory ID:	08-351-04					
Total Alkalinity	**340**	2.0	SM 2320B	8-31-16	8-31-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0831W1					
Total Alkalinity	**ND**	2.0	SM 2320B	8-31-16	8-31-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-351-01								
	ORIG	DUP							
Total Alkalinity	**268**	**266**	NA	NA	NA	NA	1	11	
SPIKE BLANK									
Laboratory ID:	SB0831W1								
	SB		SB		SB				
Total Alkalinity	**104**		100	NA	104	91-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-23**					
Laboratory ID:	08-351-01					
Sulfate	**12**	5.0	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-20**					
Laboratory ID:	08-351-02					
Sulfate	**530**	130	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-19**					
Laboratory ID:	08-351-03					
Sulfate	**1100**	250	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-17**					
Laboratory ID:	08-351-04					
Sulfate	**140**	50	ASTM D516-07	8-30-16	8-30-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830W1					
Sulfate	**ND**	5.0	ASTM D516-07	8-30-16	8-30-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-310-01								
	ORIG	DUP							
Sulfate	**22.7**	**22.9**	NA	NA	NA	NA	1	9	
MATRIX SPIKE									
Laboratory ID:	08-310-01								
	MS		MS		MS				
Sulfate	**43.7**		20.0	22.7	105	79-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0830W1								
	SB		SB		SB				
Sulfate	**10.4**		10.0	NA	104	86-116	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-23**					
Laboratory ID:	08-351-01					
Nitrate	**0.14**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-20**					
Laboratory ID:	08-351-02					
Nitrate	**0.11**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-19**					
Laboratory ID:	08-351-03					
Nitrate	**0.21**	0.050	EPA 353.2	8-26-16	8-26-16	
Client ID:	**SVE-17**					
Laboratory ID:	08-351-04					
Nitrate	**0.15**	0.050	EPA 353.2	8-26-16	8-26-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 26, 2016
Laboratory Reference: 1608-351
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Nitrate	**ND**	0.050	EPA 353.2	8-26-16	8-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-310-01								
	ORIG	DUP							
Nitrate	**9.20**	**8.89**	NA	NA	NA	NA	3	12	
MATRIX SPIKE									
Laboratory ID:	08-310-01								
	MS		MS		MS				
Nitrate	**20.1**		10.0	9.20	109	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0826W1								
	SB		SB		SB				
Nitrate	**2.21**		2.00	NA	111	96-119	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

07 September 2016

David Baumeister
OnSite Environmental, Inc.
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
16H0253	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.



Amanda Volgardsen, Receiving Supervisor

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

16H0253

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson, Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
	SVE-23	8/26/16	1005	GW	1
	SVE-20		1115		
	SVE-19		1235		
	SVE-17		1335		

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	ferrous Fe				% Moisture
SVE-23																		X				
SVE-20																		X				
SVE-19																		X				
SVE-17																		X				

	Signature	Company	Date	Time
Relinquished		S&W	8/26/16	1400
Received		ospdy	11	1400
Relinquished		11	11	1550
Received		ARI	8-26-16	1550
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Onsite

Project Name: Seattle Center

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 16H0253

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.8

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D90576

Cooler Accepted by: JM Date: 8-26-16 Time: 1550

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice (Gel Packs) Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? (YES) NO

Did all bottles arrive in good condition (unbroken)? YES (NO)

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA (YES) NO

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI (NA)

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

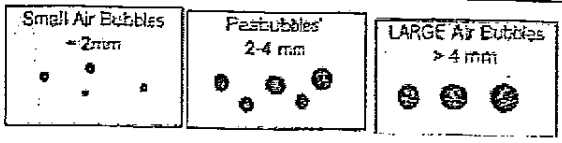
Samples Logged by: JM Date: 8-26-16 Time: 1555

** *Notify Project Manager of discrepancies or concerns* **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SVE-23	16H0253-01	Water	26-Aug-2016 10:05	26-Aug-2016 15:50
SVE-20	16H0253-02	Water	26-Aug-2016 11:15	26-Aug-2016 15:50
SVE-19	16H0253-03	Water	26-Aug-2016 12:35	26-Aug-2016 15:50
SVE-17	16H0253-04	Water	26-Aug-2016 13:35	26-Aug-2016 15:50

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

Case Narrative

Sample Receipt

Four water samples were received August 26, 2016. The cooler temperature measured by IR thermometer following ARI SOP was 5.8º C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Ferrous Iron EPA SM 3500

Due to Ferrous Iron being a field test, the system has flagged the samples with an “H” qualifier, marking them out of recommended holding times.

There were no anomalies noted for this analysis.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

SVE-23

16H0253-01 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 16:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0568
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	**24.5**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

SVE-20

16H0253-02 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0568
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	**27.7**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

SVE-19

16H0253-03 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 16:46

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0568
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	**42.0**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

SVE-17

16H0253-04 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 26-Aug-2016 16:46

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEH0568
Prepared: 26-Aug-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	**29.3**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

Wet Chemistry - Quality Control

Batch BEH0568 - No Prep Wet Chem

Instrument: UV1800-2

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BEH0568-DUP1)	**Source: 16H0253-01**		Prepared: 26-Aug-2016 Analyzed: 26-Aug-2016 16:45							
Ferrous Iron	24.9	2.00	mg/L		24.5			1.82	20	
Duplicate (BEH0568-DUP2)	**Source: 16H0253-01**		Prepared: 26-Aug-2016 Analyzed: 26-Aug-2016 16:45							
Ferrous Iron	25.4	2.00	mg/L		24.5			3.81	20	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

Certified Analyses included in this Report

Analyte	Certifications
SM 3500-Fe B-97 in Water	
Ferrous Iron	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/06/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	03/30/2017
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2017
WADOE	WA Dept of Ecology	C558	06/30/2017
WA-DW	Ecology - Drinking Water	C558	06/30/2017

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	07-Sep-2016 09:53

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
H	Hold time violation - Hold time was exceeded.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson, Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 08-351

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total & diss manganese	alkalinity	sulfate	nitrate	% Moisture	* ferrous Iron
1	SVE-23	8/26/16	1005	GW	7		X																X	X	X	X		X
2	SVE-20	"	1115	"	7		X																X	X	X	X		X
3	SVE-19	"	1235	"	7		X																X	X	X	X		X
4	SVE-17	"	1335	"	7		X																X	X	X	X		X

	Signature	Company	Date	Time
Relinquished		SAW	8/26/16	1500
Received	Celia Forrest	SEEDY	8/26/16	1500
Relinquished	Celia Forrest	SEEDY	8/26/16	1720
Received		ORS	8/26/16	1720
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
- dissolved metals are field filtered.
* Sent directly to ARI 8/26/16. DB

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 7, 2016

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1608-361

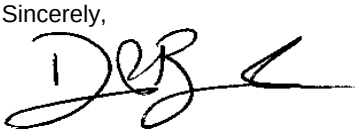
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on August 29, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

Case Narrative

Samples were collected on August 29, 2016 and received by the laboratory on August 29, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	08-361-01					
Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*71-111*				
Client ID:	**SVE-13**					
Laboratory ID:	08-361-02					
Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**19**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**5.4**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**520**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*101*	*71-111*				
Client ID:	**SW-25**					
Laboratory ID:	08-361-03					
Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	4.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	400	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*71-111*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0831W2					
Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Toluene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
o-Xylene	**ND**	1.0	EPA 8021B	8-31-16	8-31-16	
Gasoline	**ND**	100	NWTPH-Gx	8-31-16	8-31-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*71-111*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-361-03										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*88*	*94*	*71-111*			
SPIKE BLANKS											
Laboratory ID:	SB0831W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**48.9**	**49.0**	50.0	50.0		**98**	**98**	83-119	0	13	
Toluene	**50.1**	**49.9**	50.0	50.0		**100**	**100**	83-120	0	13	
Ethyl Benzene	**50.1**	**50.2**	50.0	50.0		**100**	**100**	82-120	0	12	
m,p-Xylene	**49.8**	**49.9**	50.0	50.0		**100**	**100**	80-122	0	13	
o-Xylene	**49.2**	**49.3**	50.0	50.0		**98**	**99**	80-120	0	10	
Surrogate:											
Fluorobenzene						*99*	*99*	*71-111*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-361-01					
Client ID:	**SVE-16**					
Manganese	**1900**	10	6010C	9-1-16	9-1-16	
Lab ID:	08-361-02					
Client ID:	**SVE-13**					
Manganese	**4300**	50	6010C	9-1-16	9-2-16	
Lab ID:	08-361-03					
Client ID:	**SW-25**					
Manganese	**3900**	50	6010C	9-1-16	9-2-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-1-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0901WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**345**	**361**	5	10	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 9-1-16
Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-218-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**918**	115	**914**	114	0	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-361-01					
Client ID:	**SVE-16**					
Manganese	**2000**	11	6010C		9-1-16	
Lab ID:	08-361-02					
Client ID:	**SVE-13**					
Manganese	**1500**	11	6010C	8-29-16	9-1-16	
Lab ID:	08-361-03					
Client ID:	**SW-25**					
Manganese	**2500**	50	6010C	8-29-16	9-2-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	8-29-16
Date Analyzed:	9-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0829F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1220**	**1240**	2	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 9-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-321-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**1820**	108	**1850**	114	2	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	08-361-01					
Total Alkalinity	**300**	2.0	SM 2320B	8-31-16	8-31-16	
Client ID:	**SVE-13**					
Laboratory ID:	08-361-02					
Total Alkalinity	**820**	2.0	SM 2320B	8-31-16	8-31-16	
Client ID:	**SW-25**					
Laboratory ID:	08-361-03					
Total Alkalinity	**56**	2.0	SM 2320B	8-31-16	8-31-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0831W1					
Total Alkalinity	**ND**	2.0	SM 2320B	8-31-16	8-31-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-351-01								
	ORIG	DUP							
Total Alkalinity	**268**	**266**	NA	NA	NA	NA	1	11	
SPIKE BLANK									
Laboratory ID:	SB0831W1								
	SB		SB		SB				
Total Alkalinity	**104**		100	NA	104	91-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	08-361-01					
Sulfate	**120**	25	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SVE-13**					
Laboratory ID:	08-361-02					
Sulfate	**86**	25	ASTM D516-07	8-30-16	8-30-16	
Client ID:	**SW-25**					
Laboratory ID:	08-361-03					
Sulfate	**180**	50	ASTM D516-07	8-30-16	8-30-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830F1					
Sulfate	**ND**	5.0	ASTM D516-07	8-30-16	8-30-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-321-03								
	ORIG	DUP							
Sulfate	**22.7**	**24.1**	NA	NA	NA	NA	6	9	
MATRIX SPIKE									
Laboratory ID:	08-321-03								
	MS		MS		MS				
Sulfate	**43.8**		20.0	22.7	106	79-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0830F1								
	SB		SB		SB				
Sulfate	**10.6**		10.0	NA	106	86-116	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	08-361-01					
Nitrate	**ND**	0.050	EPA 353.2	8-30-16	8-31-16	
Client ID:	**SVE-13**					
Laboratory ID:	08-361-02					
Nitrate	**ND**	0.050	EPA 353.2	8-30-16	8-31-16	
Client ID:	**SW-25**					
Laboratory ID:	08-361-03					
Nitrate	**0.059**	0.050	EPA 353.2	8-30-16	8-31-16	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 7, 2016
Samples Submitted: August 29, 2016
Laboratory Reference: 1608-361
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830F1					
Nitrate	**ND**	0.050	EPA 353.2	8-30-16	8-31-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-361-01								
	ORIG	DUP							
Nitrate	**ND**	**ND**	NA	NA	NA	NA	NA	12	
MATRIX SPIKE									
Laboratory ID:	08-361-01								
	MS		MS		MS				
Nitrate	**2.23**		2.00	ND	112	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0830F1								
	SB		SB		SB				
Nitrate	**2.22**		2.00	NA	111	96-119	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson, Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 08-361

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total + dissolved manganese	alkalinity	sulfate	nitrate		% Moisture
1	SVE-16	8/29/16	1015	GW	7		X															X	X	X	X		
2	SVE-13	"	1105	"	"		X															X	X	X	X		
3	SW-25	"	1145	"	"		X															X	X	X	X		

	Signature	Company	Date	Time
Relinquished	[signature]	S&W	8/29/16	1400
Received	Van	SPdy	8/29/16	1400
Relinquished	Van	SPdy	8/29/16	1550
Received	[signature]	OSE	8/29/16	1550
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
SVE-13 & SW-25 are not field filtered for dissolved metals.

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐
Electronic Data Deliverables (EDDs) ☒ _____

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 26, 2016

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12574-001
Laboratory Reference No. 1609-324

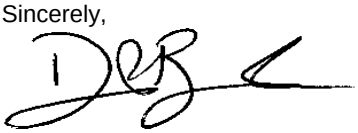
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on September 2, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

26 September 2016

David Baumeister
OnSite Environmental, Inc.
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
16I0029	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.



Amanda Volgardsen, Receiving Supervisor

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

16I0029

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson Inc.
Project Number: 21-1-12574-001
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	ferrous Fe				% Moisture
	SVE-13	9/2/16	1030	GW	1																		X				
	SVE-16	"	1005	"	1																		X				
	SW-25	"	1125	"	1																		X				

	Signature	Company	Date	Time
Relinquished		S&W	9/2/16	1150
Received		Speedy	9/2/16	1150
Relinquished		Speedy	9/2/16	1225
Received		ARI	9-2-16	1220
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

WORK ORDER

16I0029

Client: OnSite Environmental, Inc.	**Project Manager: Amanda Volgardsen**
Project: Seattle Center	**Project Number: Seattle Center**

Preservation Confirmation

Container ID	Container Type	pH
16I0029-01 A	Glass NM, Amber, 250 mL, 2 mL HCl	lab to determine pH
16I0029-02 A	Glass NM, Amber, 250 mL, 2 mL HCl	↓
16I0029-03 A	Glass NM, Amber, 250 mL, 2 mL HCl	

TR
Preservation Confirmed By

9-2-16
Date

Page 3 of 12 16I0029 ARISample FINAL 26 Sep 2016 1256

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: On Site

Project Name: 21-1-12574-001/Seattle Center

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: 16I0029

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.7

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0052276

Cooler Accepted by: TR Date: 9-2-16 Time: 1220

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice (Gel Packs) Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

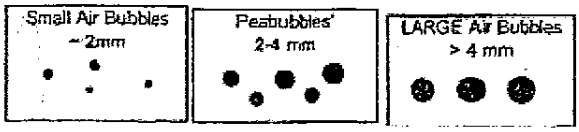
Samples Logged by: TR Date: 9-2-16 Time: 1227

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SVE-13	16I0029-01	Water	02-Sep-2016 10:30	02-Sep-2016 12:20
SVE-16	16I0029-02	Water	02-Sep-2016 10:05	02-Sep-2016 12:20
SW-25	16I0029-03	Water	02-Sep-2016 11:25	02-Sep-2016 12:20

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

Case Narrative

Ferrous Iron-Method SM 3500-Fe

The samples have been flagged with a "H" qualifier, due to the analysis being considered a field test, which would mark them as being received out of recommended holding time.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

SVE-13

16I0029-01 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 02-Sep-2016 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEI0056
Prepared: 02-Sep-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	**1.29**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6201

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

SVE-16

16I0029-02 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 02-Sep-2016 14:11

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEI0056
Prepared: 02-Sep-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	**1.11**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

SW-25

16I0029-03 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97
Instrument: UV1800-2

Analyzed: 02-Sep-2016 14:12

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BEI0056
Prepared: 02-Sep-2016
Sample Size: 5 mL
Final Volume: 5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	**0.557**	mg/L	H

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

Wet Chemistry - Quality Control

Batch BEI0056 - No Prep Wet Chem

Instrument: UV1800-2

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BEI0056-BLK1)			Prepared: 02-Sep-2016 Analyzed: 02-Sep-2016 14:10							
Ferrous Iron	ND	0.040	mg/L							U
LCS (BEI0056-BS1)			Prepared: 02-Sep-2016 Analyzed: 02-Sep-2016 14:10							
Ferrous Iron	0.490	0.040	mg/L	0.500		98.1	90-110			
Duplicate (BEI0056-DUP1)	**Source: 16I0029-01**		Prepared: 02-Sep-2016 Analyzed: 02-Sep-2016 14:11							
Ferrous Iron	1.33	0.040	mg/L		1.29			3.29	20	
DL (BEI0056-DUP3)	**Source: 16I0029-01**		Prepared: 02-Sep-2016 Analyzed: 02-Sep-2016 14:11							
Ferrous Iron	1.26	0.040	mg/L		1.29			1.80	20	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

Certified Analyses included in this Report

Analyte	Certifications
SM 3500-Fe B-97 in Water	
Ferrous Iron	WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/06/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	03/30/2017
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2017
WADOE	WA Dept of Ecology	C558	06/30/2017
WA-DW	Ecology - Drinking Water	C558	06/30/2017

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

OnSite Environmental, Inc.	Project: Seattle Center	
14648 NE 95th Street	Project Number: Seattle Center	**Reported:**
Redmond, WA 98052	Project Manager: David Baumeister	26-Sep-2016 12:56

Notes and Definitions

U	This analyte is not detected above the applicable reporting or detection limit.
H	Hold time violation - Hold time was exceeded.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

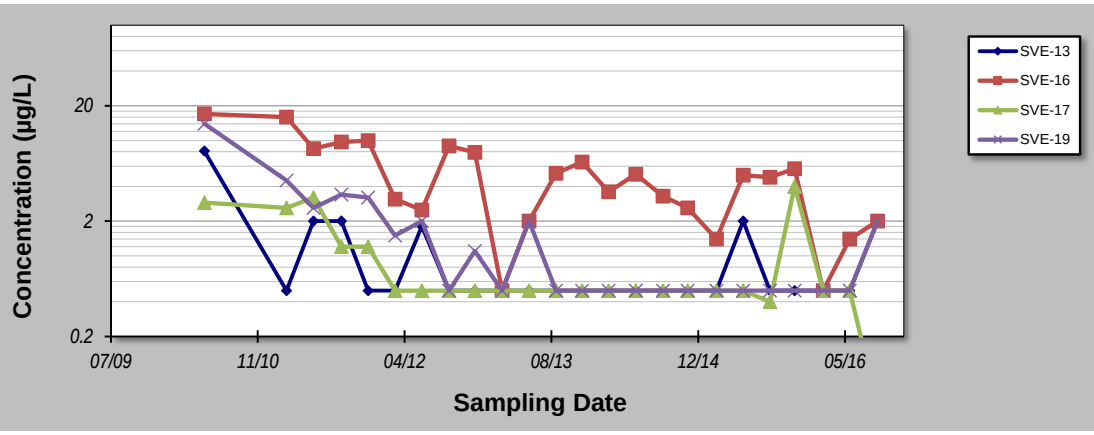
APPENDIX B

PLUME STATUS EVALUATION

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	14-Oct-16	Job ID:	21-1-12176-046
Facility Name:	Seattle Center	Constituent:	benzene
Conducted By:	EVP	Concentration Units:	µg/L

Sampling Point ID:	SVE-13	SVE-16	SVE-17	SVE-19			
Sampling Event	Sampling Date	BENZENE CONCENTRATION (µg/L)						
1	5/20/2010	8.1	17	2.9	14			
2	2/24/2011	0.5	16	2.6	4.5			
3	5/27/2011	2	8.5	3.2	2.6			
4	8/30/2011	2	9.7	1.2	3.4			
5	11/29/2011	0.5	10	1.2	3.2			
6	2/29/2012	0.5	3.1	0.5	1.5			
7	5/30/2012	1.8	2.5	0.5	2			
8	8/30/2012	0.5	9	0.5	0.5			
9	11/26/2012	0.5	7.9	0.5	1.1			
10	2/27/2013	0.5	0.5	0.5	0.5			
11	5/30/2013	0.5	2	0.5	2			
12	8/30/2013		5.2	0.5	0.5			
13	11/26/2013	0.5	6.5	0.5	0.5			
14	2/25/2014	0.5	3.6	0.5	0.5			
15	5/28/2014	0.5	5.1	0.5	0.5			
16	8/29/2014	0.5	3.3	0.5	0.5			
17	11/21/2014	0.5	2.6	0.5	0.5			
18	2/27/2015	0.5	1.4	0.5	0.5			
19	5/29/2015	2	5	0.5	0.5			
20	8/28/2015	0.5	4.8	0.4	0.5			
21	11/20/2015	0.5	5.7	4	0.5			
22	2/26/2016	0.5	0.5	0.5	0.5			
23	5/26/2016	0.5	1.4	0.5	0.5			
24	8/29/2016	2	2	0.05	2			
25								
Coefficient of Variation:		1.42	0.80	1.07	1.57			
Mann-Kendall Statistic (S):		-37	-135	-107	-134			
Confidence Factor:		82.7%	>99.9%	99.7%	>99.9%			
Concentration Trend:		No Trend	Decreasing	Decreasing	Decreasing			



Notes:

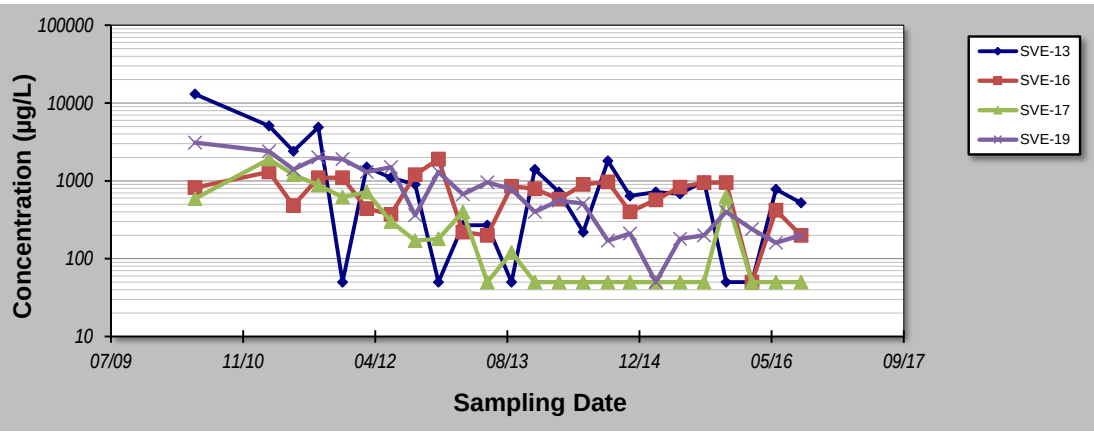
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **14-Oct-16**
Facility Name: **Seattle Center**
Conducted By: **EVP**
Job ID: **21-1-12176-046**
Constituent: **TPH-gas**
Concentration Units: **µg/L**

Sampling Point ID:	SVE-13	SVE-16	SVE-17	SVE-19			
Sampling Event	Sampling Date	TPH-GAS CONCENTRATION (µg/L)						
1	5/20/2010	13000	820	590	3100			
2	2/24/2011	5100	1300	1900	2400			
3	5/27/2011	2400	480	1200	1400			
4	8/30/2011	4900	1100	880	2000			
5	11/29/2011	50	1100	620	1900			
6	2/29/2012	1500	440	720	1300			
7	5/30/2012	1100	370	300	1500			
8	8/30/2012	900	1200	170	360			
9	11/26/2012	50	1900	180	1300			
10	2/27/2013	270	220	400	670			
11	5/30/2013	270	200	50	960			
12	8/30/2013	50	850	120	780			
13	11/26/2013	1400	790	50	400			
14	2/25/2014	720	580	50	560			
15	5/28/2014	220	900	50	510			
16	8/29/2014	1800	970	50	170			
17	11/21/2014	640	400	50	210			
18	2/27/2015	720	570	50	50			
19	5/29/2015	680	830	50	180			
20	8/28/2015	1000	950	50	200			
21	11/20/2015	50	950	630	400			
22	2/26/2016	50	50	50	240			
23	5/26/2016	780	420	50	160			
24	8/29/2016	520	200	50	200			
25								
Coefficient of Variation:		1.75	0.58	1.34	0.94			
Mann-Kendall Statistic (S):		-94	-63	-156	-199			
Confidence Factor:		99.0%	93.8%	>99.9%	>99.9%			
Concentration Trend:		Decreasing	Prob. Decreasing	Decreasing	Decreasing			



Notes:

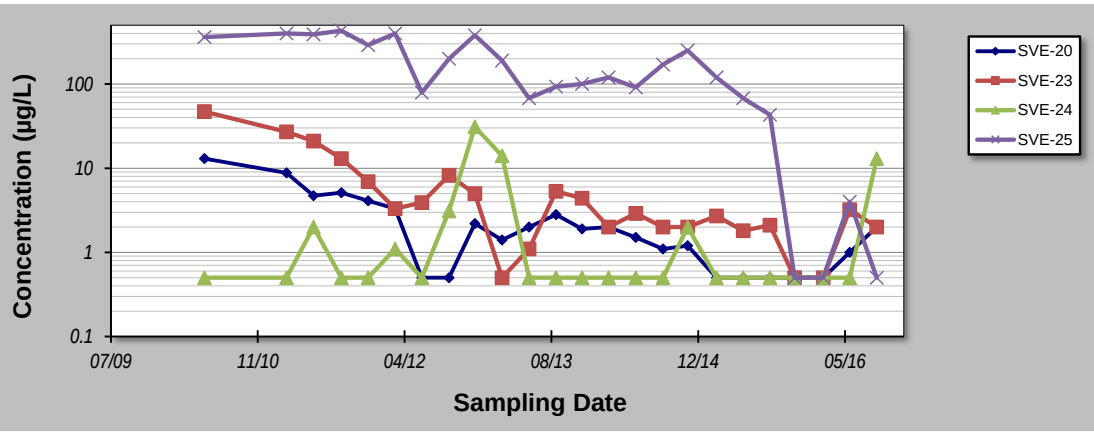
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **14-Oct-16**
Facility Name: **Seattle Center**
Conducted By: **EVP**
Job ID: **21-1-12176-046**
Constituent: **benzene**
Concentration Units: **µg/L**

Sampling Point ID:	SVE-20	SVE-23	SVE-24	SVE-25			
Sampling Event	Sampling Date	BENZENE CONCENTRATION (µg/L)						
1	5/20/2010	13	47	0.5	360			
2	2/24/2011	8.8	27	0.5	400			
3	5/27/2011	4.7	21	2	390			
4	8/30/2011	5.1	13	0.5	430			
5	11/29/2011	4.1	6.9	0.5	290			
6	2/29/2012	3.3	3.3	1.1	400			
7	5/30/2012	0.5	3.9	0.5	79			
8	8/30/2012	0.5	8.2	3.1	200			
9	11/26/2012	2.2	5	31	380			
10	2/27/2013	1.4	0.5	14	190			
11	5/30/2013	2	1.1	0.5	68			
12	8/30/2013	2.8	5.3	0.5	93			
13	11/26/2013	1.9	4.4	0.5	100			
14	2/25/2014	2	2	0.5	120			
15	5/28/2014	1.5	2.9	0.5	91			
16	8/29/2014	1.1	2	0.5	170			
17	11/21/2014	1.2	2	2	250			
18	2/27/2015	0.5	2.7	0.5	120			
19	5/29/2015	0.5	1.8	0.5	68			
20	8/28/2015	0.5	2.1	0.5	43			
21	11/20/2015	0.5	0.5	0.5	0.5			
22	2/26/2016	0.5	0.5	0.5	0.5			
23	5/26/2016	1	3.2	0.5	4			
24	8/26/2016	2	2	13	0.5			
25								
Coefficient of Variation:		1.15	1.53	2.24	0.84			
Mann-Kendall Statistic (S):		-156	-159	-15	-176			
Confidence Factor:		>99.9%	>99.9%	63.5%	>99.9%			
Concentration Trend:		Decreasing	Decreasing	No Trend	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

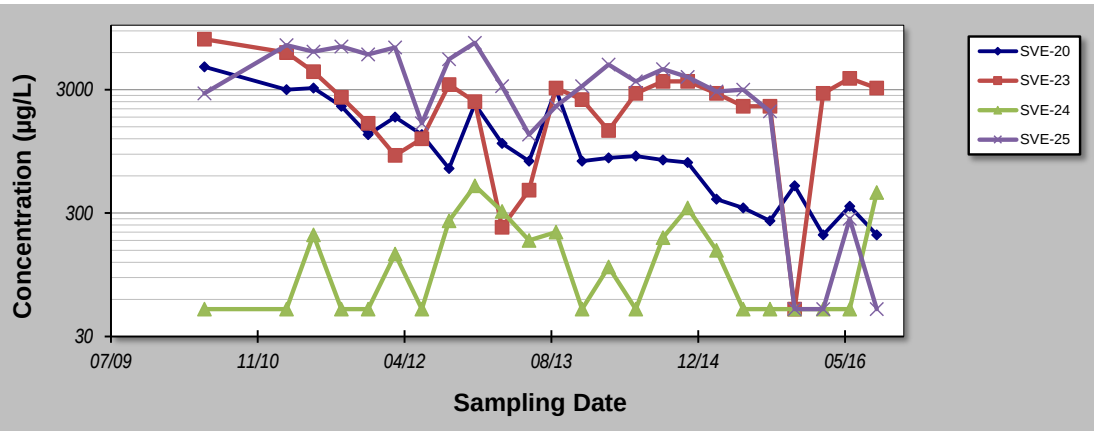
DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 14-Oct-16
Facility Name: Seattle Center
Conducted By: EVP

Job ID: 21-1-12176-046
Constituent: TPH-gas
Concentration Units: µg/L

Sampling Point ID:	SVE-20	SVE-23	SVE-24	SVE-25			
Sampling Event	Sampling Date	TPH-GAS CONCENTRATION (µg/L)						
1	5/20/2010	4600	7700	50	2800			
2	2/24/2011	3000	6000	50	6900			
3	5/27/2011	3100	4200	200	6100			
4	8/30/2011	2200	2600	50	6700			
5	11/29/2011	1300	1600	50	5800			
6	2/29/2012	1800	880	140	6600			
7	5/30/2012	1300	1200	50	1600			
8	8/30/2012	690	3300	260	5300			
9	11/26/2012	2300	2400	500	7200			
10	2/27/2013	1100	230	310	3200			
11	5/30/2013	790	460	180	1300			
12	8/30/2013	3000	3100	210	2200			
13	11/26/2013	790	2500	50	3200			
14	2/25/2014	840	1400	110	4800			
15	5/28/2014	870	2800	50	3500			
16	8/29/2014	810	3500	190	4400			
17	11/21/2014	770	3500	330	3800			
18	2/27/2015	390	2800	150	2900			
19	5/29/2015	330	2200	50	3000			
20	8/28/2015	260	2200	50	2000			
21	11/20/2015	500	50	50	50			
22	2/26/2016	200	2800	50	50			
23	5/26/2016	340	3700	50	270			
24	8/26/2016	200	3100	440	50			
25								
Coefficient of Variation:		0.88	0.64	0.88	0.66			
Mann-Kendall Statistic (S):		-202	-18	0	-142			
Confidence Factor:		>99.9%	66.2%	49.0%	>99.9%			
Concentration Trend:		Decreasing	Stable	Stable	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12176-046

Date: October 26, 2016

To: Seattle Center Redevelopment
Attn: Mr. Ned Dunn

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland