March to May 2016
Phase II Groundwater and
Remediation System Monitoring
Seattle Center Lot Number 2
Seattle, Washington

September 29, 2016

SHANNON & WILSON, INC.

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Submitted To:
Seattle Center Redevelopment
Attn: Mr. Ned Dunn
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Seattle, Washington 98103

By:
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21-1-12176-046

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September 29, 2016

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

Attn: Mr. Ned Dunn

RE: MARCH TO MAY 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. 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 to conduct a rebound test and evaluate the feasibility of natural attenuation as a final groundwater treatment method. This letter report presents groundwater monitoring results from March to May 2016, the twenty-second quarter of Phase II operation.

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. The estimated lateral extent corresponds to the source areas of contamination identified in previous environmental studies.

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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 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 monitored natural attenuation as a final treatment method. Results of the groundwater monitoring for the rebound test and the evaluation of the feasibility of monitored natural attenuation as a final treatment method are discussed below.

GROUNDWATER MONITORING

In accordance with our discussion during our March 14, 2016, meeting, the SVE system was shut off to initiate a rebound test. Groundwater monitoring for the twenty-second 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 natural attenuation as a final groundwater treatment method.

Groundwater sampling was conducted on May 24, 25, and 26, 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 these locations.

[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.

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] Natural attenuation 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 the 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 and benzene were detected at SVE-25 and SVE-20 below the Model Toxics Control Act (MTCA) cleanup criteria. 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-24. Two wells SVE-23 and SVE-25 have historically exceeded the cleanup criteria since the implementation of the Phase II remediation with the exception of the anomalous reading during the twentieth quarter at SVE-23 and the last three quarters at SVE-25 (Table 2).

In the middle plume, TPH-G was detected below the cleanup criteria at SVE-16 and SVE-19 and was not detected at SVE-17 during the twenty-second quarter. Benzene was detected below the cleanup criteria at SVE-16 and not detected at SVE-17 and SVE-19. Concentrations of TPH-G and benzene for the middle plume are consistent in comparison with recent quarterly sampling results. TPH-G was detected below the cleanup criteria at SVE-13 in the northern plume and was not detected during the twentieth and twenty-first quarters.

[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.

Figures 3 and 4 are time series plots showing 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, monitored natural attenuation is being evaluated as a final groundwater treatment method. Monitored natural attenuation, 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 monitored natural attenuation, an analysis of the status of the plumes and a review of the geochemical parameters were conducted. Based on 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 uses 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 natural attenuation through biodegradation are favorable (Table 1).

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

CONCLUSIONS

In general, THP-G and benzene are consistent with historical trends of a decline in concentrations. A rebound of elevated concentrations of TPH-G and benzene in source area

[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.

wells and detections of contaminants in the downgradient point of compliance wells were not observed during the May 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 quarter groundwater monitoring results, the AS/SVE treatment system will remain off in order to further evaluate post-treatment groundwater conditions. Additional groundwater monitoring will be used to further evaluate the effects, if any, of the rebound test and the feasibility of natural attenuation.

As mentioned in the twenty-first quarter report, further evaluation of the concentrations of contaminants in SVE-25 was warranted based on the lack of detections of contaminants during the twentieth and twenty-first quarter. 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 wells in the source area and the evaluation of the plume status, it is likely that the absence of detections of TPH-G and benzene and current 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 further evaluate 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.

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.

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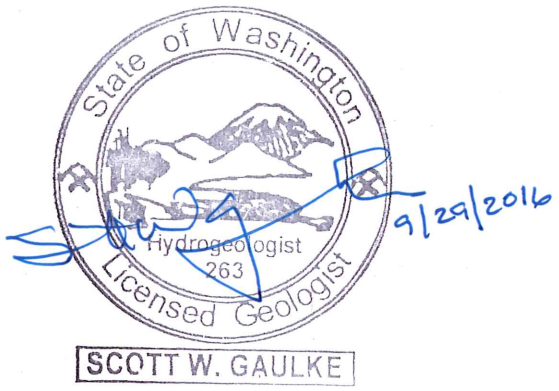
If you have any questions regarding the findings presented herein, please call me at (206) 632-8020.

Sincerely,

SHANNON & WILSON, INC.

Edwin V. Ptak
Environmental Scientist

EVP:SWG/evp



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 (4 pages)
Table 3 – Groundwater Elevations (4 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 Reports
Appendix B – Plume Status Evaluation
Appendix C – Important Information About Your Geotechnical/Environmental Report

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
MARCH - MAY 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	5/26/2016	< 1.0	< 1.0	< 1.0	**9.2**	**780**	**1300**	**780**	< 0.050	**68**	**24**	*	*	*	*	*
SVE-16	SVE-16	5/25/2016	**1.4**	**3.4**	**6.2**	**7.2**	**420**	**1800**	**440**	**0.058**	**36**	**33**	-42.9	0.17	0.17	0.17	0.17
SVE-17	SVE-17	5/25/2016	< 1.0	**3.2**	< 1.0	< 2.0	< 100	**2200**	**290**	**0.050**	**50**	**29**	-4	0.15	0.15	0.15	0.15
SVE-19	SVE-19	5/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	**160**	**12000**	**190**	< 0.050	**1200**	**38**	-18.2	0.16	0.16	0.16	0.16
SVE-20	SVE-20	5/25/2016	**1.0**	**3.0**	**5.4**	**3.6**	**340**	**3200**	**2.0**	**0.050**	**610**	**26**	-104.3	0.17	0.17	0.17	0.17
SVE-23	SVE-23	5/25/2016	**3.2**	**11**	**78**	**185**	**3,700**	**1300**	**240**	< 0.050	**20**	**24**	-74.3	0.17	0.17	0.17	0.17
SVE-24	SVE-24	5/24/2016	< 1.0	**1.0**	< 1.0	< 2.0	< 100	**7200**	**140**	**0.1**	**1300**	**68**	-35.4	0.18	0.18	0.18	0.18
SVE-25	SVE-25	5/24/2016	**4**	**1.2**	**14**	**1.6**	**270**	**4500**	**110**	**0.079**	**530**	**25**	-11.9	0.14	0.14	0.14	0.14
SVE-26	SVE-26	5/24/2016	< 1.0	< 1.0	< 1.0	< 2.0	< 100	**920**	**110**	**0.43**	**390**	**54**	36.2	4.41	4.41	4.41	4.41
Compliance Wells																	
SW-25	SW-25	5/26/2016	< 1.0	**2.9**	< 1.0	< 2.0	< 100	**400**	**40**	**0.59**	**190**	**5.7**	*	*	*	*	*
SW-26	SW-26	5/24/2016	< 1.0	**2.9**	< 1.0	< 2.0	< 100	**510**	**140**	**0.35**	**130**	**4.1**	-3.4	0.24	0.24	0.24	0.24
SW-27	SW-27	5/24/2016	< 1.0	< 1.0	< 1.0	< 2.0	< 100	**430**	**68**	**0.053**	**74**	**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; 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
Soil Vapor Extraction Wells[1]											
SVE-13	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	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	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	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	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	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	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
Soil Vapor Extraction Wells[1] (cont.)											
SVE-25	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	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
Compliance Wells[1]											
SW-25	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	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	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
	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 [2]	µg/L	NA	NA

Notes:

[1] Historical data previously reported in the Interim Groundwater Monitoring (June 2010) and previous quarterly monitoring reports.

[2] 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	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	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
SVE-17	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

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-19	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
SVE-20	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	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

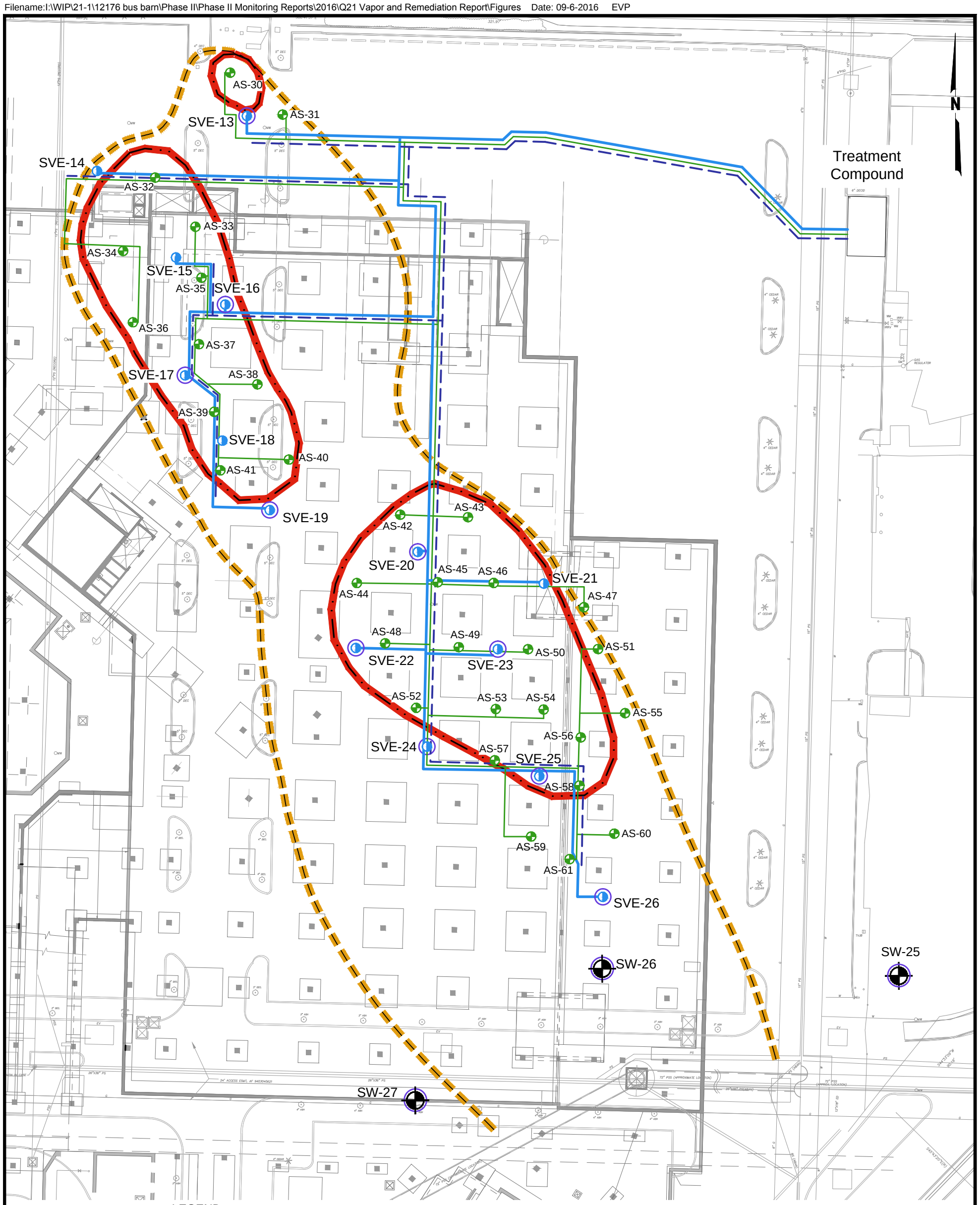
Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-24	5/24/2016	51.67	15.77	35.90
	2/25/2016	51.67	13.80	37.87
	11/19/2015	51.67	15.01	36.66
	8/26/2015	51.67	16.01	35.66
	5/28/2015	51.67	17.13	34.54
	2/26/2015	51.67	15.92	35.75
	11/19/2014	51.67	16.94	34.73
	8/28/2014	51.67	17.90	33.77
	5/27/2014	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	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
SVE-26	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

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SW-25	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	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
	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	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: 09-6-2016 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 - 22nd Quarter Seattle Center Lot No. 2
Seattle, Washington

SITE PLAN

September 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: 09-6-2016 EVP

SVE-13	2-26-16	5-26-16
TPH-G	ND	780
B	ND	ND

SVE-16	2-26-16	5-25-16
TPH-G	ND	420
B	ND	1.4

SVE-17	2-26-16	5-25-16
TPH-G	ND	ND
B	ND	ND

SVE-19	2-25-16	5-25-16
TPH-G	240	160
B	ND	ND

SVE-20	2-25-16	5-25-16
TPH-G	ND	340
B	ND	1.0

SVE-23	2-25-16	5-25-16
TPH-G	ND	3700
B	ND	3.2

SVE-24	2-25-16	5-24-16
TPH-G	ND	ND
B	ND	ND

SVE-25	2-25-16	5-24-16
TPH-G	ND	270
B	ND	4.0

SVE-26	2-25-16	5-24-16
TPH-G	ND	ND
B	ND	ND

SW-26	2-25-16	5-24-16
TPH-G	ND	ND
B	ND	ND

SW-25	2-26-16	5-26-16
TPH-G	ND	ND
B	ND	ND

SW-27	2-25-16	5-24-16
TPH-G	ND	ND
B	ND	ND

Treatment Compound

N

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 - 22nd Quarter
Seattle Center Lot No. 2
Seattle, Washington

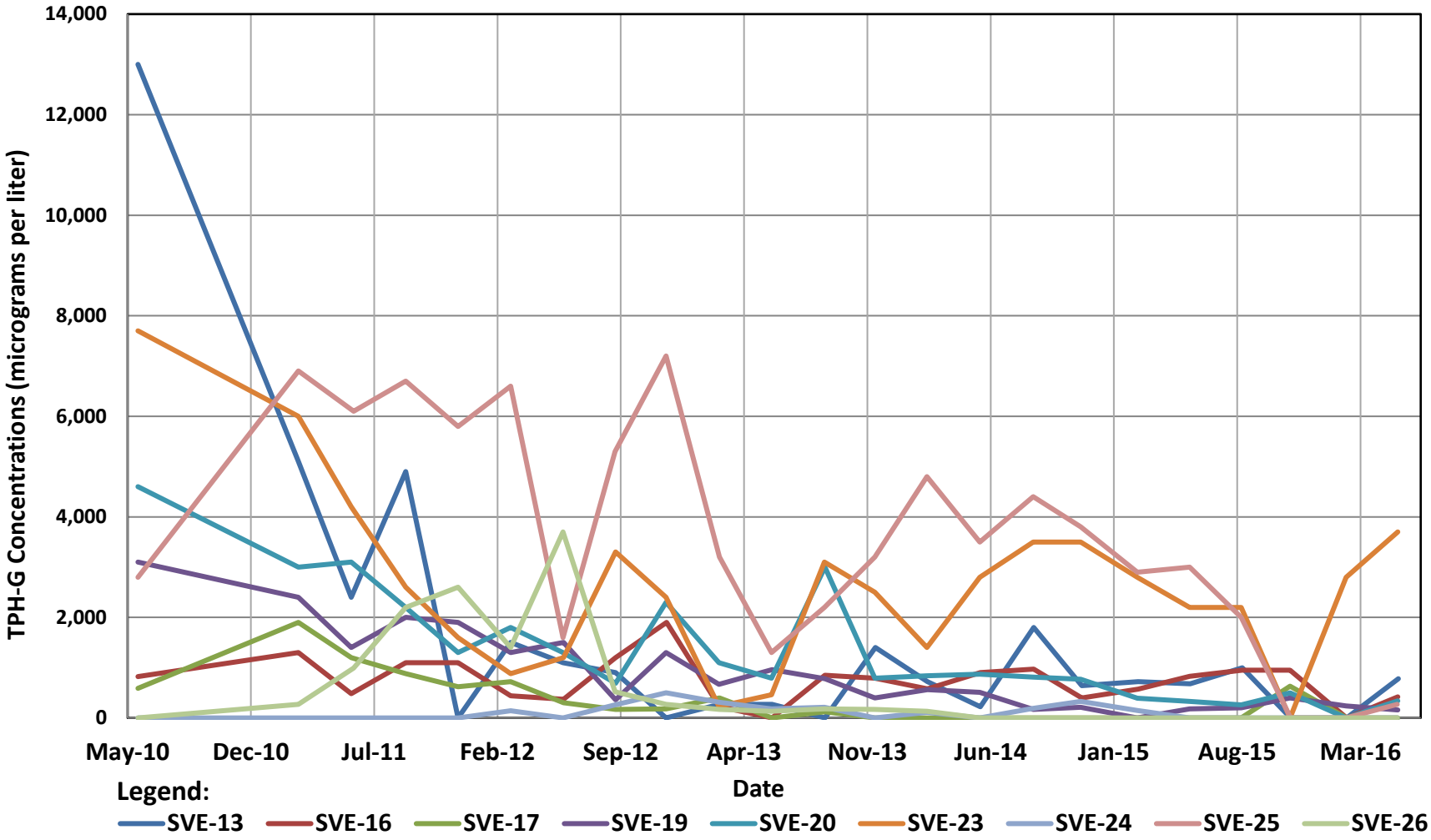
TPH-G AND BENZENE CONCENTRATIONS IN GROUNDWATER

September 2016 21-1-12176-046

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2

FIG. 2



Non-Detects plotted as zero.

Cleanup Level = 800 micrograms per liter

Phase 2 Remediation Monitoring - 22nd Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL TPH-G CONCENTRATIONS IN SVE WELLS

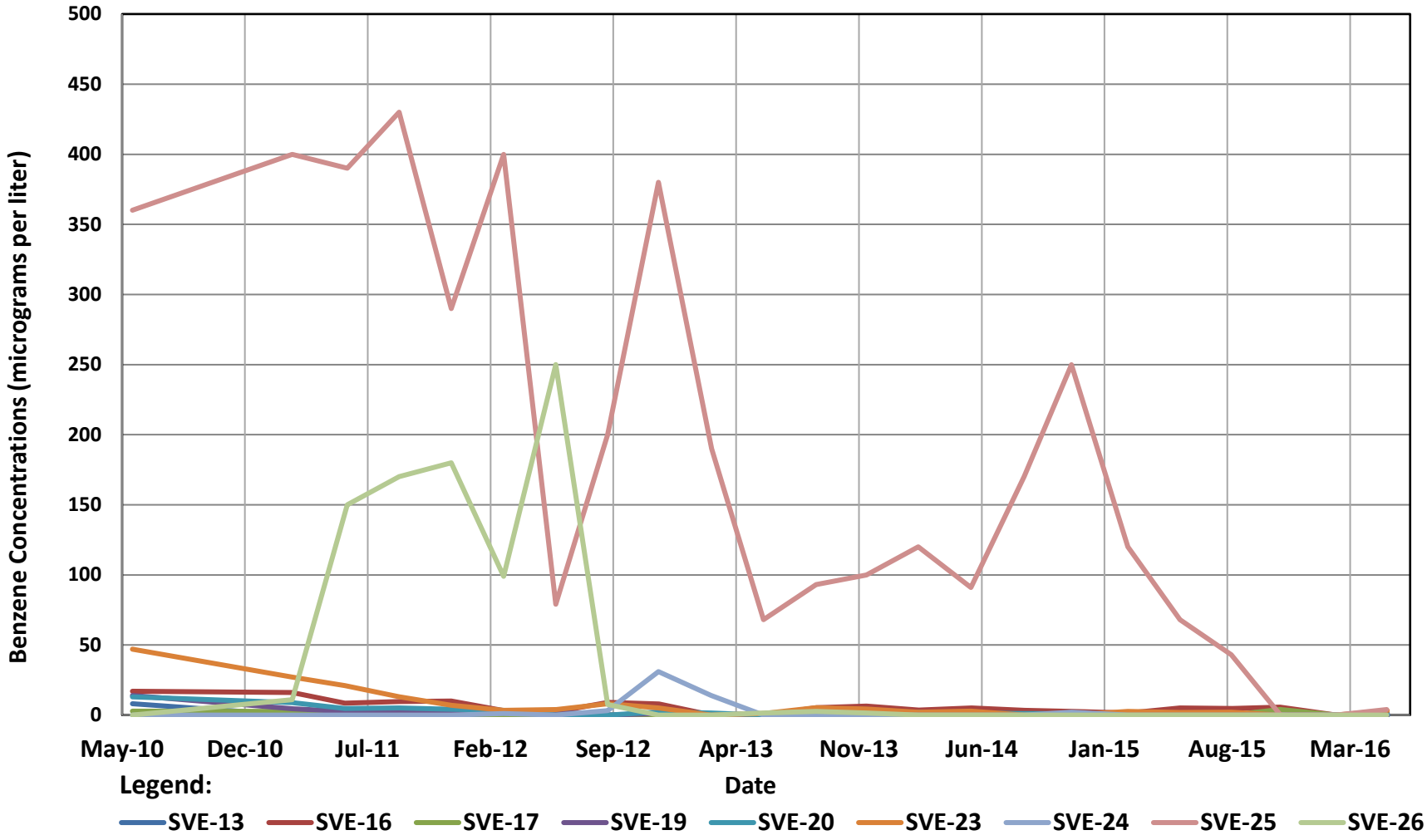
September 2016 21-1-12176-046

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FIG. 3

FIG. 3

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Non-Detects plotted as zero.

Cleanup Level = 5 micrograms per liter

Phase 2 Remediation Monitoring - 22nd Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL BENZENE CONCENTRATIONS IN SVE WELLS

September 2016 21-1-12176-046

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FIG. 4

FIG. 4

APPENDIX A

GROUNDWATER ANALYTICAL LABORATORY REPORTS

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

June 6, 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. 1605-200

Dear Ed:

Enclosed are the analytical results and associated quality control data for samples submitted on May 24, 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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 24, 2016 and received by the laboratory on May 24, 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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**ND**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*71-111*				
Client ID:	**SVE-26**					
Laboratory ID:	05-200-02					
Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**ND**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*71-111*				
Client ID:	**SW-26**					
Laboratory ID:	05-200-03					
Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**2.9**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**ND**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-04					
Benzene	**4.0**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**1.2**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**14**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**1.6**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**270**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*71-111*				
Client ID:	**SVE-24**					
Laboratory ID:	05-200-05					
Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**2.7**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**ND**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*79*	*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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	MB0525W1					
Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Toluene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-25-16	5-25-16	
Gasoline	**ND**	100	NWTPH-Gx	5-25-16	5-25-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*71-111*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-200-01										
	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						*78*	*78*	*71-111*			
SPIKE BLANKS											
Laboratory ID:	SB0525W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**48.2**	**48.2**	50.0	50.0		**96**	**96**	83-119	0	13	
Toluene	**48.3**	**47.6**	50.0	50.0		**97**	**95**	83-120	1	13	
Ethyl Benzene	**47.5**	**47.1**	50.0	50.0		**95**	**94**	82-120	1	12	
m,p-Xylene	**47.7**	**47.1**	50.0	50.0		**95**	**94**	80-122	1	13	
o-Xylene	**47.9**	**47.7**	50.0	50.0		**96**	**95**	80-120	0	10	
Surrogate:											
Fluorobenzene						*78*	*77*	*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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Client ID:	**SW-27**					
Manganese	**540**	10	6010C	5-25-16	5-25-16	
Lab ID:	05-200-02					
Client ID:	**SVE-26**					
Manganese	**990**	10	6010C	5-25-16	5-25-16	
Lab ID:	05-200-03					
Client ID:	**SW-26**					
Manganese	**530**	10	6010C	5-25-16	5-25-16	
Lab ID:	05-200-04					
Client ID:	**SVE-25**					
Manganese	**4600**	50	6010C	5-25-16	5-25-16	
Lab ID:	05-200-05					
Client ID:	**SVE-24**					
Manganese	**7700**	100	6010C	5-25-16	5-26-16	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	5-25-16
Date Analyzed:	5-25&26-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0525WH1

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 5-25-16
Date Analyzed: 5-25&26-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-175-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**ND**	**ND**	NA	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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 5-25-16
Date Analyzed: 5-25&26-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-175-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	1000	**1030**	103	**1010**	101	1	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Client ID:	**SW-27**					
Manganese	**430**	11	6010C	5-24-16	5-27-16	
Lab ID:	05-200-02					
Client ID:	**SVE-26**					
Manganese	**920**	11	6010C	5-24-16	5-27-16	
Lab ID:	05-200-03					
Client ID:	**SW-26**					
Manganese	**510**	11	6010C	5-24-16	5-27-16	
Lab ID:	05-200-04					
Client ID:	**SVE-25**					
Manganese	**4500**	50	6010C	5-24-16	5-27-16	
Lab ID:	05-200-05					
Client ID:	**SVE-24**					
Manganese	**7200**	100	6010C	5-24-16	5-31-16	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	5-24-16
Date Analyzed:	5-27&31-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0524F1

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Filtered: 5-24-16
Date Analyzed: 5-27&31-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-193-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**18.3**	**17.6**	4	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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Filtered: 5-24-16
Date Analyzed: 5-27&31-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-193-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	1110	**1160**	103	**1150**	102	1	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Total Alkalinity	**68**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-26**					
Laboratory ID:	05-200-02					
Total Alkalinity	**110**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SW-26**					
Laboratory ID:	05-200-03					
Total Alkalinity	**140**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-25**					
Laboratory ID:	05-200-04					
Total Alkalinity	**110**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-24**					
Laboratory ID:	05-200-05					
Total Alkalinity	**140**	2.0	SM 2320B	5-26-16	5-26-16	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	MB0526W1					
Total Alkalinity	**ND**	2.0	SM 2320B	5-26-16	5-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-173-01								
	ORIG	DUP							
Total Alkalinity	**400**	**402**	NA	NA	NA	NA	0	11	
SPIKE BLANK									
Laboratory ID:	SB0526W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Nitrate	**0.053**	0.050	EPA 353.2	5-25-16	5-25-16	
Client ID:	**SVE-26**					
Laboratory ID:	05-200-02					
Nitrate	**0.43**	0.050	EPA 353.2	5-25-16	5-25-16	
Client ID:	**SW-26**					
Laboratory ID:	05-200-03					
Nitrate	**0.35**	0.050	EPA 353.2	5-25-16	5-25-16	
Client ID:	**SVE-25**					
Laboratory ID:	05-200-04					
Nitrate	**0.079**	0.050	EPA 353.2	5-25-16	5-25-16	
Client ID:	**SVE-24**					
Laboratory ID:	05-200-05					
Nitrate	**0.11**	0.050	EPA 353.2	5-25-16	5-25-16	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	MB0525W1					
Nitrate	**ND**	0.050	EPA 353.2	5-25-16	5-25-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-173-01								
	ORIG	DUP							
Nitrate	**0.0726**	**0.0689**	NA	NA	NA	NA	5	12	
MATRIX SPIKE									
Laboratory ID:	05-173-01								
	MS		MS		MS				
Nitrate	**2.33**		2.00	0.0726	113	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0525W1								
	SB		SB		SB				
Nitrate	**2.11**		2.00	NA	106	96-119	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	05-200-01					
Sulfate	**74**	25	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SVE-26**					
Laboratory ID:	05-200-02					
Sulfate	**390**	100	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SW-26**					
Laboratory ID:	05-200-03					
Sulfate	**130**	50	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SVE-25**					
Laboratory ID:	05-200-04					
Sulfate	**530**	130	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SVE-24**					
Laboratory ID:	05-200-05					
Sulfate	**1300**	500	ASTM D516-07	5-27-16	6-3-16	

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: June 6, 2016
Samples Submitted: May 24, 2016
Laboratory Reference: 1605-200
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:	MB0527F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-3-16	6-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-200-03							
	ORIG DUP							
Sulfate	**126** **130**	NA	NA	NA	NA	3	9	
MATRIX SPIKE								
Laboratory ID:	05-200-03							
	MS	MS		MS				
Sulfate	**235**	100	126	109	79-126	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0527F1							
	SB	SB		SB				
Sulfate	**10.5**	10.0	NA	105	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

May 31, 2016

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

RE: Client Project: Seattle Center, 21-1-12176-044
ARI Job No: BBD3

Dear David:

Please find enclosed the chain-of-custody (COC) record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples in good condition on May 25, 2016.

The samples were analyzed for ferrous iron as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will remain on file at ARI. Should you have any questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Amanda Volgardsen
Client Services
206/695-6220
amandav@arilabs.com
www.arilabs.com

Enclosures

cc: file BBD3

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6221** fax

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

Chain of Custody BBD3

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	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	Ferrous Fe					% Moisture
	SW-27	5/24/16	1005	GW																		X					
	SVE-26		1110																			X					
	SW-26		1215																			X					
	SVE-25		1315																			X					
	SVE-24		1440																			X					

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	[signature]	stw	5/25/16	1515	
Received	[signature]	spdy	11	11	
Relinquished	[signature]	"	11	1550	
Received	[signature]	ARI	5/24/16	1701	
Relinquished					
Received					
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐
Electronic Data Deliverables (EDDs) ☒ 2013 format EIM

BBD3 : 00002

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: BBD3 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) 3.4

Time: _____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00527G

Cooler Accepted by: TR Date: 5-24-16 Time: 1702

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: 5-24-16 Time: 1707

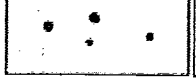
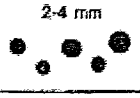
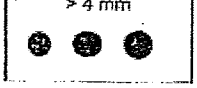
*** Notify Project Manager of discrepancies or concerns ***

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

Additional Notes, Discrepancies, & Resolutions:

Date relinquished by original owner is incorrect - 5/25/16.

By: TR Date: 5-24-16

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)

PRESERVATION VERIFICATION 05/24/16
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **BBD3**

PC: Amanda
VTSR: 05/24/16

Inquiry Number: NONE
Analysis Requested: 05/25/16
Contact: Baumeister, David
Client: OnSite Environmental, Inc.
Logged by: TR
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 21-1-12176-044
Project: Seattle Center
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	BT <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
16-8166 **BBD3A**	SW-27															*							
16-8167 **BBD3B**	SVE-26															*							
16-8168 **BBD3C**	SW-26															*							
16-8169 **BBD3D**	SVE-25															*							
16-8170 **BBD3E**	SVE-24															*							

* Lab to determine preservation

BBD3 : 00001

Checked By _____ Date _____

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: BBD3
Client: OnSite Environmental, Inc.
Project Event: 21-1-12176-044
Project Name: Seattle Center

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SW-27	BBD3A	16-8166	Water	05/24/16 10:05	05/24/16 17:01
2.	SVE-26	BBD3B	16-8167	Water	05/24/16 11:10	05/24/16 17:01
3.	SW-26	BBD3C	16-8168	Water	05/24/16 12:15	05/24/16 17:01
4.	SVE-25	BBD3D	16-8169	Water	05/24/16 13:15	05/24/16 17:01
5.	SVE-24	BBD3E	16-8170	Water	05/24/16 14:40	05/24/16 17:01

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

BBD3 : 00006

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

SAMPLE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Client ID: SW-27
ARI ID: 16-8166 BBD3A

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/24/16 052416#1	SM3500 FeD	mg/L	0.800	24.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Client ID: SVE-26
ARI ID: 16-8167 BBD3B

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/24/16 052416#1	SM3500 FeD	mg/L	2.00	54.5

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Client ID: SW-26
ARI ID: 16-8168 BBD3C

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/24/16 052416#1	SM3500 FeD	mg/L	0.400	4.05

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Client ID: SVE-25
ARI ID: 16-8169 BBD3D

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/24/16 052416#1	SM3500 FeD	mg/L	0.800	25.4

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: V
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Client ID: SVE-24
ARI ID: 16-8170 BBD3E

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/24/16 052416#1	SM3500 FeD	mg/L	2.00	68.0

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: ✓
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Ferrous Iron	SM3500 FeD	05/24/16	mg/L	< 0.040 U	

LAB CONTROL RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Ferrous Iron SM3500 FeD	ICVL	05/24/16	mg/L	0.475	0.500	95.0%

REPLICATE RESULTS-CONVENTIONALS
BBD3-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 05/26/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/24/16
Date Received: 05/24/16

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: BBD3A Client ID: SW-27						
Ferrous Iron	SM3500 FeD	05/24/16	mg/L	24.8	24.6 24.6	0.5%

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

Laboratory Number: 05-200

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	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 & diss manganese	alkalinity	nitrate	sulfate	Ferrous Fe*	% Moisture
1	SW-27	5/24/16	1005	GW	6		X															X	X	X	X	X	
2	SVE-26	"	1110	"	"		X															X	X	X	X	X	
3	SW-26	"	1215	"	"		X															X	X	X	X	X	
4	SVE-25	"	1315	"	"		X															X	X	X	X	X	
5	SVE-24	"	1440	"	"		X															X	X	X	X	X	

	Signature	Company	Date	Time
Relinquished	[signature]	S&W	5/24/16	1515
Received	Van	SpDy	"	"
Relinquished	"	"	"	1550
Received	[signature]	OSE	5/24/16	1550
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
* Sent directly to ARI

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

June 6, 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. 1605-214

Dear Ed:

Enclosed are the analytical results and associated quality control data for samples submitted on May 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

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Date of Report: June 6, 2016
Samples Submitted: May 25, 2016
Laboratory Reference: 1605-214
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 25, 2016 and received by the laboratory on May 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.

Nitrate EPA 353.2 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

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Date of Report: June 6, 2016
Samples Submitted: May 25, 2016
Laboratory Reference: 1605-214
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:	05-214-01					
Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**3.2**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**ND**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*71-111*				
Client ID:	**SVE-16**					
Laboratory ID:	05-214-02					
Benzene	**1.4**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**3.4**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**6.2**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**7.2**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**420**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*76*	*71-111*				
Client ID:	**SVE-19**					
Laboratory ID:	05-214-03					
Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**160**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*76*	*71-111*				

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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-20**					
Laboratory ID:	05-214-04					
Benzene	**1.0**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**3.0**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**5.4**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**1.3**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**2.3**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**340**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*76*	*71-111*				
Client ID:	**SVE-23**					
Laboratory ID:	05-214-05					
Benzene	**3.2**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**11**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**78**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**180**	10	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**5.2**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**3700**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*71-111*				

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Samples Submitted: May 25, 2016
Laboratory Reference: 1605-214
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:	MB0526W2					
Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**ND**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*82*	*71-111*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-219-01										
	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						*85*	*83*	*71-111*			
MATRIX SPIKES											
Laboratory ID:	05-223-01										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**47.8**	**50.0**	50.0	50.0	ND	**96**	**100**	83-123	4	15	
Toluene	**48.2**	**49.4**	50.0	50.0	ND	**96**	**99**	83-124	2	16	
Ethyl Benzene	**46.7**	**47.7**	50.0	50.0	ND	**93**	**95**	82-123	2	15	
m,p-Xylene	**46.5**	**47.4**	50.0	50.0	ND	**93**	**95**	81-125	2	17	
o-Xylene	**46.0**	**46.2**	50.0	50.0	ND	**92**	**92**	82-123	0	15	
Surrogate:											
Fluorobenzene						*88*	*89*	*71-111*			

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Date of Report: June 6, 2016
Samples Submitted: May 25, 2016
Laboratory Reference: 1605-214
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:	05-214-01					
Client ID:	**SVE-17**					
Manganese	**2700**	100	6010C	6-1-16	6-1-16	
Lab ID:	05-214-02					
Client ID:	**SVE-16**					
Manganese	**1800**	50	6010C	6-1-16	6-1-16	
Lab ID:	05-214-03					
Client ID:	**SVE-19**					
Manganese	**12000**	200	6010C	6-1-16	6-1-16	
Lab ID:	05-214-04					
Client ID:	**SVE-20**					
Manganese	**3000**	100	6010C	6-1-16	6-1-16	
Lab ID:	05-214-05					
Client ID:	**SVE-23**					
Manganese	**1300**	50	6010C	6-1-16	6-1-16	

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Samples Submitted: May 25, 2016
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Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-1-16
Date Analyzed:	6-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0601WH1

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

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TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 6-1-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-238-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**113**	**106**	6	10	

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Date of Report: June 6, 2016
Samples Submitted: May 25, 2016
Laboratory Reference: 1605-214
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 6-1-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-238-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD
Manganese	500	**217**	104	**231**	118	6

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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:	05-214-01					
Client ID:	**SVE-17**					
Manganese	**2200**	100	6010C	5-25-16	6-1-16	
Lab ID:	05-214-02					
Client ID:	**SVE-16**					
Manganese	**1800**	50	6010C	5-25-16	6-1-16	
Lab ID:	05-214-03					
Client ID:	**SVE-19**					
Manganese	**12000**	200	6010C	5-25-16	6-1-16	
Lab ID:	05-214-04					
Client ID:	**SVE-20**					
Manganese	**3200**	100	6010C	5-25-16	6-1-16	
Lab ID:	05-214-05					
Client ID:	**SVE-23**					
Manganese	**1300**	50	6010C	5-25-16	6-1-16	

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DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	5-25-16
Date Analyzed:	6-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0525F1

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

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DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Filtered: 5-25-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-214-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**2220**	**2180**	2	100	

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Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Filtered: 5-25-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-214-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	5000	**7010**	96	**6980**	95	0	

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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-17**					
Laboratory ID:	05-214-01					
Total Alkalinity	**290**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-16**					
Laboratory ID:	05-214-02					
Total Alkalinity	**440**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-19**					
Laboratory ID:	05-214-03					
Total Alkalinity	**190**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-20**					
Laboratory ID:	05-214-04					
Total Alkalinity	**470**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-23**					
Laboratory ID:	05-214-05					
Total Alkalinity	**240**	2.0	SM 2320B	5-26-16	5-26-16	

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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:	MB0526W1					
Total Alkalinity	**ND**	2.0	SM 2320B	5-26-16	5-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-173-01								
	ORIG	DUP							
Total Alkalinity	**400**	**402**	NA	NA	NA	NA	0	11	
SPIKE BLANK									
Laboratory ID:	SB0526W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	91-117	NA	NA	

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NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-17**					
Laboratory ID:	05-214-01					
Nitrate	**0.069**	0.050	EPA 353.2	6-2-16	6-2-16	
Client ID:	**SVE-16**					
Laboratory ID:	05-214-02					
Nitrate	**0.058**	0.050	EPA 353.2	6-2-16	6-2-16	
Client ID:	**SVE-19**					
Laboratory ID:	05-214-03					
Nitrate	**ND**	0.050	EPA 353.2	6-2-16	6-2-16	
Client ID:	**SVE-20**					
Laboratory ID:	05-214-04					
Nitrate	**0.11**	0.050	EPA 353.2	6-2-16	6-2-16	
Client ID:	**SVE-23**					
Laboratory ID:	05-214-05					
Nitrate	**ND**	0.050	EPA 353.2	6-2-16	6-2-16	

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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:	MB0602W1					
Nitrate	**ND**	0.050	EPA 353.2	6-2-16	6-2-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-214-01								
	ORIG	DUP							
Nitrate	**0.0693**	**0.0692**	NA	NA	NA	NA	0	12	
MATRIX SPIKE									
Laboratory ID:	05-214-01								
	MS		MS		MS				
Nitrate	**2.30**		2.00	0.0693	112	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Nitrate	**2.07**		2.00	NA	104	96-119	NA	NA	

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SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-17**					
Laboratory ID:	05-214-01					
Sulfate	**150**	50	ASTM D516-07	6-3-16	6-3-16	
Client ID:	**SVE-16**					
Laboratory ID:	05-214-02					
Sulfate	**36**	10	ASTM D516-07	6-3-16	6-3-16	
Client ID:	**SVE-19**					
Laboratory ID:	05-214-03					
Sulfate	**1200**	500	ASTM D516-07	6-3-16	6-3-16	
Client ID:	**SVE-20**					
Laboratory ID:	05-214-04					
Sulfate	**610**	130	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SVE-23**					
Laboratory ID:	05-214-05					
Sulfate	**20**	10	ASTM D516-07	6-3-16	6-3-16	

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SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603W1					
Sulfate	**ND**	5.0	ASTM D516-07	6-3-16	6-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-193-01							
	ORIG DUP							
Sulfate	**22.9** **23.8**	NA	NA	NA	NA	4	9	
MATRIX SPIKE								
Laboratory ID:	05-193-01							
	MS	MS		MS				
Sulfate	**41.2**	20.0	22.9	92	79-126	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0603W1							
	SB	SB		SB				
Sulfate	**10.1**	10.0	NA	101	86-116	NA	NA	

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SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0527F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-3-16	6-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-200-03							
	ORIG DUP							
Sulfate	**126** **130**	NA	NA	NA	NA	3	9	
MATRIX SPIKE								
Laboratory ID:	05-200-03							
	MS	MS		MS				
Sulfate	**235**	100	126	109	79-126	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0527F1							
	SB	SB		SB				
Sulfate	**10.5**	10.0	NA	105	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

June 6, 2016

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

RE: Client Project: Seattle Center, 21-1-12176-044
ARI Job No: BBF7

Dear David:

Please find enclosed the chain-of-custody (COC) record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples in good condition on May 25, 2016.

The samples were analyzed for ferrous iron as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will remain on file at ARI. Should you have any questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Amanda Volgardsen
Client Services
206/695-6220
amandav@arilabs.com
www.arilabs.com

Enclosures

cc: file BBF7

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6221** fax

BBF7

Chain of Custody 8.6°C

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	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	ferrous Fe					% Moisture
	SVE-17	5/25/16	1015	GW	6																	X					
	SVE-16		1125																			X					
	SVE-19		1230																			X					
	SVE-20		1355																			X					
	SVE-23		1450																			X					

	Signature	Company	Date	Time
Relinquished	[signature]	S&W	5/25/16	1500
Received	[signature]	Spdy	11	1500
Relinquished	[signature]	11	11	1645
Received	[signature]	ARI	5/25/16	1645
Relinquished				
Received				

Comments/Special Instructions

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

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

BBF7 160002

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon Wilson Inc. Project Name: Seattle Center

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: BBF7 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): 6.6 ___ ___ ___ ___ ___

Time: _____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00527G

Cooler Accepted by: JM Date: 5-25-16 Time: 1645

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: 5-25-16 Time: 1650

*** 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:

6 containers listed per sample, only 1 received per sample

By: JM Date: 5-25-16

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)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#: 1 Temperature(°C): 8.6

Sample ID	Bottle Count	Bottle Type
Samples over 60		

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Completed by: JM Date: 5-25-16 Time: 1645

BBF7 : 00004

PRESERVATION VERIFICATION 05/25/16
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **BBF7**

PC: Amanda
VTSR: 05/25/16

Inquiry Number: NONE
Analysis Requested: 05/26/16
Contact: Baumeister, David
Client: OnSite Environmental, Inc.
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 21-1-12176-044
Project: Seattle Center
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	BT <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
16-8254 **BBF7A**	SVE-17																						
16-8255 **BBF7B**	SVE-16																						
16-8256 **BBF7C**	SVE-19																						
16-8257 **BBF7D**	SVE-20																						
16-8258 **BBF7E**	SVE-23																						

↑
Labto check

BBF7 : 00005

Checked By JM Date 5-25-16

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: BBF7
Client: OnSite Environmental, Inc.
Project Event: 21-1-12176-044
Project Name: Seattle Center

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SVE-17	BBF7A	16-8254	Water	05/25/16 10:15	05/25/16 16:45
2.	SVE-16	BBF7B	16-8255	Water	05/25/16 11:25	05/25/16 16:45
3.	SVE-19	BBF7C	16-8256	Water	05/25/16 12:30	05/25/16 16:45
4.	SVE-20	BBF7D	16-8257	Water	05/25/16 13:55	05/25/16 16:45
5.	SVE-23	BBF7E	16-8258	Water	05/25/16 14:50	05/25/16 16:45

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

BBF7:00007

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

BBF7:00008

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

SAMPLE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: V
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Client ID: SVE-17
ARI ID: 16-8254 BBF7A

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/25/16 052516#1	SM3500 FeD	mg/L	2.00	28.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Client ID: SVE-16
ARI ID: 16-8255 BBF7B

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/25/16 052516#1	SM3500 FeD	mg/L	2.00	33.3

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Client ID: SVE-19
ARI ID: 16-8256 BBF7C

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/25/16 052516#1	SM3500 FeD	mg/L	2.00	37.8

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Client ID: SVE-20
ARI ID: 16-8257 BBF7D

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/25/16 052516#1	SM3500 FeD	mg/L	2.00	25.9

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Client ID: SVE-23
ARI ID: 16-8258 BBF7E

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/25/16 052516#1	SM3500 FeD	mg/L	2.00	24.2

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Ferrous Iron	SM3500 FeD	05/25/16	mg/L	< 0.040 U	

LAB CONTROL RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Ferrous Iron SM3500 FeD	ICVL	05/25/16	mg/L	0.516	0.500	103.2%

REPLICATE RESULTS-CONVENTIONALS
BBF7-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 05/31/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/25/16
Date Received: 05/25/16

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: BBF7A Client ID: SVE-17						
Ferrous Iron	SM3500 FeD	05/25/16	mg/L	28.8	31.6 29.0	5.2%

BBF7 00017

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: 05-214

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 & diss. manganese	alkalinity	nitrate	sulfate	Ferrous Fe*	% Moisture
1	SVE-17	5/25/16	1015	GW	6		X															X	X	X	X	X	
2	SVE-16		1125				X															X	X	X	X	X	
3	SVE-19		1230				X															X	X	X	X	X	
4	SVE-20		1355				X															X	X	X	X	X	
5	SVE-23		1450				X															X	X	X	X	X	

	Signature	Company	Date	Time
Relinquished		S&W	5/25/16	1500
Received	Van	SPLV	11	1500
Relinquished	11	11	11	
Received		OSE	5/25/16	1600
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
* Sent directly to ARI

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☒ 2013 EIM

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

June 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. 1605-232

Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on May 27, 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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 26, 2016 and received by the laboratory on May 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.

Nitrate EPA 353.2 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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-25**					
Laboratory ID:	05-232-01					
Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**2.9**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**ND**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*71-111*				
Client ID:	**SVE-13**					
Laboratory ID:	05-232-02					
Benzene	**ND**	4.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**ND**	4.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	4.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**9.2**	4.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	4.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**780**	400	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*74*	*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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	MB0526W1					
Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Toluene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
o-Xylene	**ND**	1.0	EPA 8021B	5-26-16	5-26-16	
Gasoline	**ND**	100	NWTPH-Gx	5-26-16	5-26-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*71-111*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-223-01										
	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						*76*	*75*	*71-111*			
MATRIX SPIKES											
Laboratory ID:	05-223-01										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**47.8**	**50.0**	50.0	50.0	ND	**96**	**100**	83-123	4	15	
Toluene	**48.2**	**49.4**	50.0	50.0	ND	**96**	**99**	83-124	2	16	
Ethyl Benzene	**46.7**	**47.7**	50.0	50.0	ND	**93**	**95**	82-123	2	15	
m,p-Xylene	**46.5**	**47.4**	50.0	50.0	ND	**93**	**95**	81-125	2	17	
o-Xylene	**46.0**	**46.2**	50.0	50.0	ND	**92**	**92**	82-123	0	15	
Surrogate:											
Fluorobenzene						*88*	*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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	05-232-01					
Client ID:	**SW-25**					
Manganese	**2400**	100	6010C	6-1-16	6-1-16	
Lab ID:	05-232-02					
Client ID:	**SVE-13**					
Manganese	**1900**	50	6010C	6-1-16	6-1-16	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-1-16
Date Analyzed:	6-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0601WH1

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 6-1-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-238-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**113**	**106**	6	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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 6-1-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-238-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	1000	**1090**	97	**1160**	104	6	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	05-232-01					
Client ID:	**SW-25**					
Manganese	**400**	11	6010C	5-25-16	6-1-16	
Lab ID:	05-232-02					
Client ID:	**SVE-13**					
Manganese	**1300**	50	6010C	5-25-16	6-1-16	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	5-25-16
Date Analyzed:	6-1-16
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0526F1

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

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Filtered: 5-25-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-214-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**2220**	**2180**	2	100	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Filtered: 5-25-16
Date Analyzed: 6-1-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-214-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	5000	**7010**	96	**6980**	95	0	

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and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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-25**					
Laboratory ID:	05-232-01					
Total Alkalinity	**40**	2.0	SM 2320B	5-26-16	5-26-16	
Client ID:	**SVE-13**					
Laboratory ID:	05-232-02					
Total Alkalinity	**780**	2.0	SM 2320B	5-26-16	5-26-16	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	MB0526W1					
Total Alkalinity	**ND**	2.0	SM 2320B	5-26-16	5-26-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-173-01								
	ORIG	DUP							
Total Alkalinity	**400**	**402**	NA	NA	NA	NA	0	11	
SPIKE BLANK									
Laboratory ID:	SB0526W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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-25**					
Laboratory ID:	05-232-01					
Nitrate	**0.59**	0.050	EPA 353.2	6-2-16	6-2-16	
Client ID:	**SVE-13**					
Laboratory ID:	05-232-02					
Nitrate	**ND**	0.050	EPA 353.2	6-2-16	6-2-16	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	MB0602W1					
Nitrate	**ND**	0.050	EPA 353.2	6-2-16	6-2-16	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-214-01								
	ORIG	DUP							
Nitrate	**0.0693**	**0.0692**	NA	NA	NA	NA	0	12	
MATRIX SPIKE									
Laboratory ID:	05-214-01								
	MS		MS		MS				
Nitrate	**2.30**		2.00	0.0693	112	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Nitrate	**2.07**		2.00	NA	104	96-119	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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-25**					
Laboratory ID:	05-232-01					
Sulfate	**190**	100	ASTM D516-07	5-27-16	6-3-16	
Client ID:	**SVE-13**					
Laboratory ID:	05-232-02					
Sulfate	**68**	25	ASTM D516-07	5-27-16	6-3-16	

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: June 7, 2016
Samples Submitted: May 27, 2016
Laboratory Reference: 1605-232
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:	MB0527F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-3-16	6-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-200-03							
	ORIG DUP							
Sulfate	**126** **130**	NA	NA	NA	NA	3	9	
MATRIX SPIKE								
Laboratory ID:	05-200-03							
	MS	MS		MS				
Sulfate	**235**	100	126	109	79-126	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0527F1							
	SB	SB		SB				
Sulfate	**10.5**	10.0	NA	105	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

June 6, 2016

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

RE: Client Project: Seattle Center, 21-1-12176-044
ARI Job No: BBG6

Dear David:

Please find enclosed the chain-of-custody (COC) record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples in good condition on May 26, 2016.

The samples were analyzed for ferrous iron as requested.

These analyses proceeded without incident of note.

An electronic copy of these reports will remain on file at ARI. Should you have any questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Amanda Volgardsen
Client Services
206/695-6220
amandav@arilabs.com
www.arilabs.com

Enclosures

cc: file BBG6

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6221** fax

BBB-6

OnSite Environmental Inc.

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

Chain of Custody

Page 1 of 1

Company: Shannon & Wilson
Project Number: 21-1-12176-044
Project Name: Seattle Conf
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	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	Ferrous Fe					% Moisture
	SW-25	5/26/16	0945	GW	1																	X					
	SVE-13	↓	1045	↓	1																	X					

	Signature	Company	Date	Time
Relinquished		SW	5/26/16	1200
Received		ARI	5-26 16	1327
Relinquished				
Received				
Relinquished				
Received				

Comments/Special Instructions

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☒ EIM Jois

SDG: 20606

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Ons.te

Project Name: Seattle Center

COC No(s): _____ NA

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

Assigned ARI Job No: BBG-6

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) 4.8

Time: _____

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

Temp Gun ID#: D005276

Cooler Accepted by: TR Date: 5-26-16 Time: 1327

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: _____

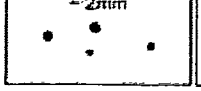
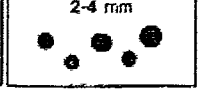
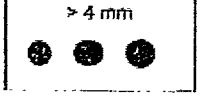
Samples Logged by: JM Date: 5-26-16 Time: 1330

***** 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 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)

PRESERVATION VERIFICATION 05/26/16
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **BBG6**

Inquiry Number: NONE
Analysis Requested: 05/26/16
Contact: Baumeister, David
Client: OnSite Environmental, Inc.
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Amanda
VTSR: 05/26/16

Project #: #
Project: Seattle Center
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	BT <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
16-8270 **BBG6A**	SW-25															*							
16-8271 **BBG6B**	SVE-13															*							

*Lab to check

BBG6 6868

Checked By JM Date 5-26-16

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: BBG6
Client: OnSite Environmental, Inc.
Project Event: 21-1-12176-044
Project Name: Seattle Center

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SW-25	BBG6A	16-8270	Water	05/26/16 09:45	05/26/16 13:27
2.	SVE-13	BBG6B	16-8271	Water	05/26/16 10:45	05/26/16 13:27

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

BBG5 : 00005

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

ARG . 00008

SAMPLE RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: JW
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/26/16
Date Received: 05/26/16

Client ID: SW-25
ARI ID: 16-8270 BBG6A

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/26/16 052616#1	SM3500 FeD	mg/L	0.800	5.70

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/26/16
Date Received: 05/26/16

Client ID: SVE-13
ARI ID: 16-8271 BBG6B

Analyte	Date Batch	Method	Units	RL	Sample
Ferrous Iron	05/26/16 052616#1	SM3500 FeD	mg/L	0.800	24.0

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: JJ
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Ferrous Iron	SM3500 FeD	05/26/16	mg/L	< 0.040 U	

LAB CONTROL RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: J
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Ferrous Iron SM3500 FeD	ICVL	05/26/16	mg/L	0.479	0.500	95.8%

REPLICATE RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: W
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/26/16
Date Received: 05/26/16

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: BBG6A Client ID: SW-25						
Ferrous Iron	SM3500 FeD	05/26/16	mg/L	5.70	5.62	1.4%

MS/MSD RESULTS-CONVENTIONALS
BBG6-OnSite Environmental, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 06/02/16

Project: Seattle Center
Event: 21-1-12176-044
Date Sampled: 05/26/16
Date Received: 05/26/16

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: BBG6A Client ID: SW-25							
Ferrous Iron	SM3500 FeD	05/26/16	mg/L	5.70	23.2	20.0	87.5%

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
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: 05-232

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 & diss. manganese	alkalinity	nitrate	sulfate	Ferrous Fe *	% Moisture
1	SW-25	5/26/16	0945	GW	6		X															X	X	X	X	X	
2	SVE-13	"	1045	"	6		X															X	X	X	X	X	

	Signature	Company	Date	Time
Relinquished		S&W	5/26/16	1300
Received		Alpha	5-26-16	
Relinquished		Alpha	5-26-16	2:33
Received		CORE	5/26/16	1433
Relinquished				
Received				

Comments/Special Instructions

* Send directly to ARI

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☒ 2013 EIM

APPENDIX B

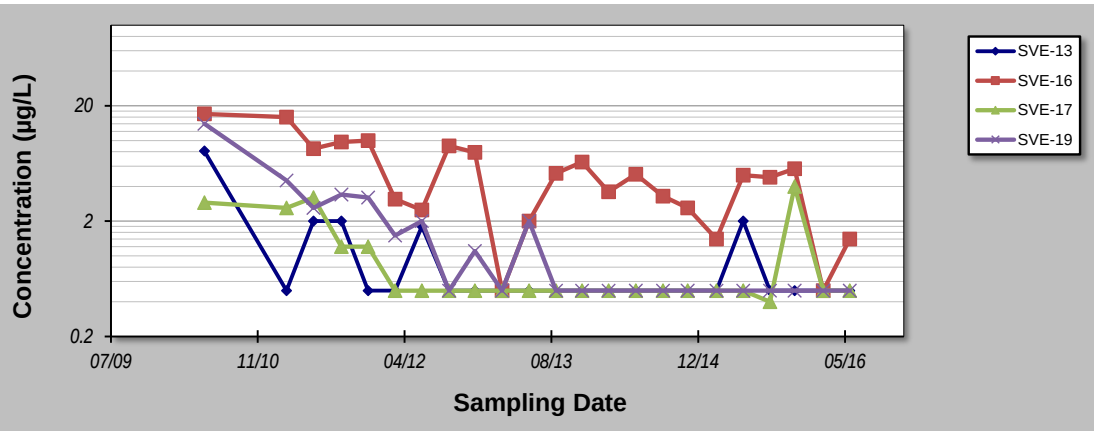
PLUME STATUS EVALUATION

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **27-Jun-16**
Facility Name: **Seattle Center**
Conducted By: **EVP**

Job ID: **21-1-12176-046**
Constituent: **benzene**
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								
25								
Coefficient of Variation:		1.50	0.78	1.03	1.62			
Mann-Kendall Statistic (S):		-54	-121	-84	-145			
Confidence Factor:		93.2%	100.0%	98.6%	>99.9%			
Concentration Trend:		Prob. Decreasing	Decreasing	Decreasing	Decreasing			



Notes:

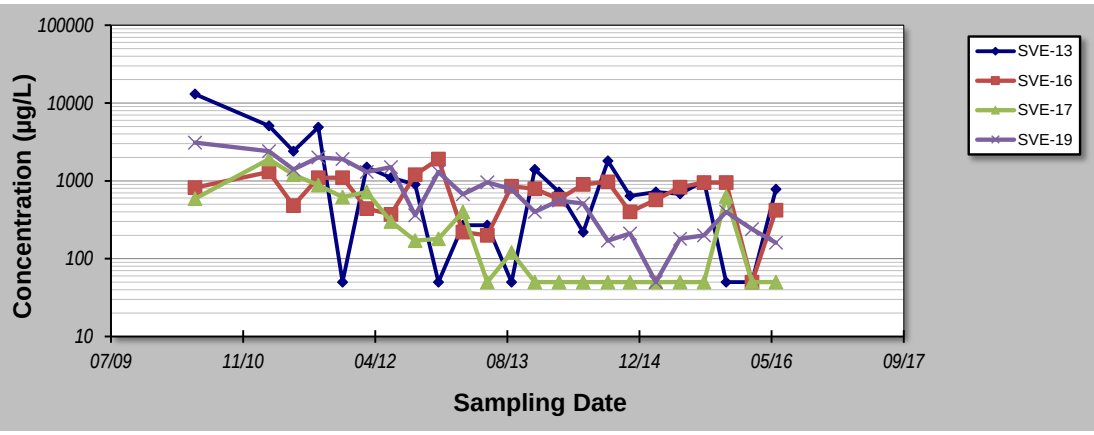
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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: **27-Jun-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								
25								
Coefficient of Variation:		1.73	0.56	1.31	0.92			
Mann-Kendall Statistic (S):		-87	-43	-144	-185			
Confidence Factor:		98.9%	86.5%	>99.9%	>99.9%			
Concentration Trend:		Decreasing	Stable	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.

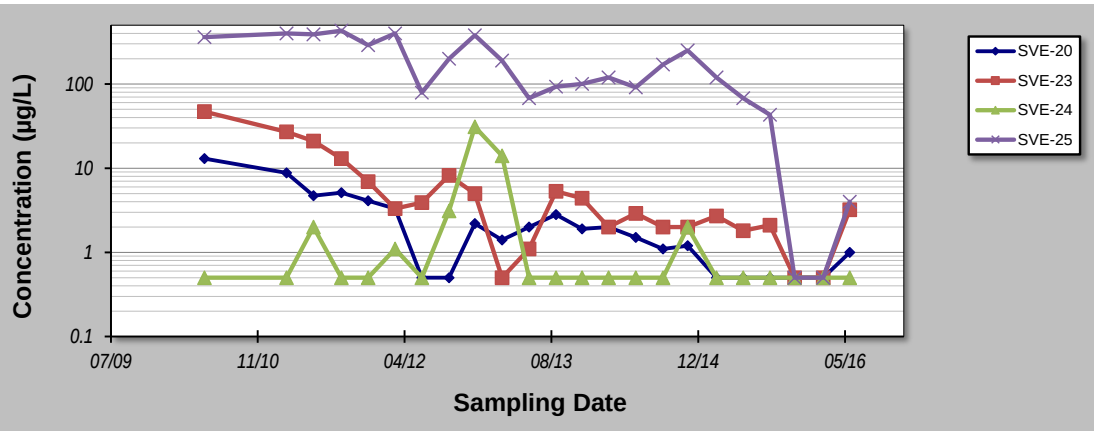
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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **27-Jun-16**
Facility Name: **Seattle Center**
Conducted By: **EVP**

Job ID: **21-1-12176-046**
Constituent: **benzene**
Concentration Units: **µg/L**

Sampling Event	Sampling Date	BENZENE CONCENTRATION (µg/L)						
Sampling Point ID:		SVE-20	SVE-23	SVE-24	SVE-25			
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								
25								
Coefficient of Variation:		1.17	1.51	2.53	0.79			
Mann-Kendall Statistic (S):		-161	-149	-34	-155			
Confidence Factor:		>99.9%	>99.9%	80.6%	>99.9%			
Concentration Trend:		Decreasing	Decreasing	No Trend	Decreasing			



Notes:

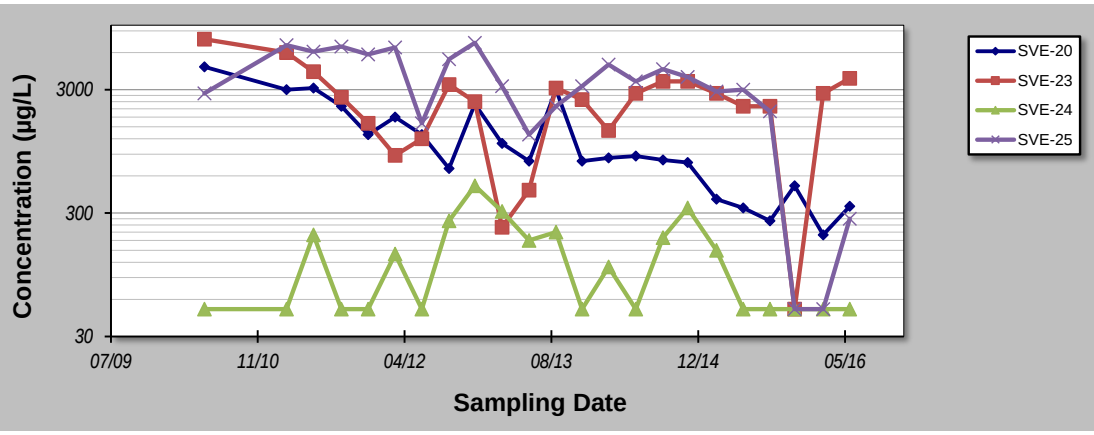
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2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	27-Jun-16	Job ID:	21-1-12176-046
Facility Name:	Seattle Center	Constituent:	TPH-gas
Conducted By:	EVP	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								
25								
Coefficient of Variation:		0.85	0.66	0.87	0.62			
Mann-Kendall Statistic (S):		-180	-26	-21	-121			
Confidence Factor:		>99.9%	74.4%	69.9%	100.0%			
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.
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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: September 29, 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