SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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October 5, 2016

Municipality of Anchorage
3640 East Tudor Road, Warehouse No. 1
Anchorage, AK 99507

Attn: Mr. Jon Clark

RE: AUGUST 2016 GROUNDWATER MONITORING, FIRE STATION NO.4, 4350 MACINNES STREET, ANCHORAGE, ALASKA

This letter report documents the results of our August 2016 groundwater monitoring activities at the Fire Station No. 4 located at 4350 MacInnes Street in Anchorage, Alaska. The Alaska Department of Environmental Conservation's (ADEC) Hazard ID for the site is 23660, and the ADEC File Number is 2100.26.315. A vicinity map is included as Figure 1.

In a letter dated May 28, 2015, Mr. Joshua Barsis of the ADEC requested sampling of the four groundwater monitoring wells (B1MW through B4MW) located at the site. The objectives of this project were to collect and analyze groundwater samples from the four on-site wells, evaluate contaminant trends, and conduct product recovery if light non-aqueous phase liquid (LNAPL) was encountered at sufficient thickness.

Authorization to proceed with this project was received from Mr. Jon Clark of the Municipality of Anchorage (MOA) on June 8, 2016 in the form of Purchase Order No. 20160747. The project tasks were conducted in general accordance with our June 27, 2016 ADEC-approved work plan.

FIELD ACIVITIES

Project activities consisted of conducting free-product recovery, collecting groundwater samples, laboratory analysis of groundwater samples, managing investigation derived waste (IDW), and conducting a well survey. Analytical testing of the project samples was conducted by SGS North America Inc. (SGS) of Anchorage, Alaska. Field work was led by an ADEC-qualified Environmental Professional, as defined by 18 Alaska Administrative Code (AAC) 75.990. Field notes are provided in Attachment 1.

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ANCHORAGE, ALASKA 99518-1263
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Groundwater Elevations and Flow Direction

On August 16, 2016, Shannon and Wilson, Inc. representatives completed a level-loop survey to determine the relative elevations of the top of well casings with respect to an arbitrary benchmark. The elevation survey of the monitoring wells was closed within an accuracy of 0.01 foot.

Prior to initiating groundwater sampling activities, depth to groundwater was measured in the four on-site monitoring wells (Wells B1MW through B4MW) on August 10, 2016 using a product/water interface probe. Measurements were taken with respect to the top of the well casings and depths were determined to an accuracy of 0.01 foot. The product/water interface probe was decontaminated prior to insertion in each well. The August 2016 water levels are listed in Table 1. As shown on Figure 2, the groundwater flow direction in August 2016 was towards the north-northeast.

LNAPL Recovery

Approximately 0.01 foot of LNAPL was measured in Well B1MW on August 10, 2016. Following water level measurements, LNAPL was recovered from Well B1MW. A 3-inch by 12-inch piece of absorbent pad was lowered into the well to absorb the product. After removing the absorbent pad, the product/water interface probe was placed in the well and measurable LNAPL was no longer present. Well B1MW was monitored for LNAPL at 24 hour intervals over three days. On August 11, 2016 less than 0.01 foot of LNAPL free-product was encountered in the well and was recovered using the methods outlined above. On August 12, 2016 measureable free-product was not observed.

Groundwater Sampling

On August 11, 2016, Wells B2MW, B2MW and B4MW were purged and sampled using a submersible pump placed within 2 feet of the groundwater interface, and disposable polyethylene tubing. The pump rate was set at 0.1 to 0.3 liters per minute (L/min) with a goal of limiting the sustained water drawdown to a maximum of 0.1 meter (4 inches). Field personnel monitored drawdown, water quality parameters (pH, temperature, conductivity, and turbidity), and purge volume at 3- to 5-minute intervals. When the four water quality parameters stabilize, purging was stopped and a groundwater sample collected. The stabilization criteria consists of three successive readings of pH within 0.1 unit, temperature within 3 percent (minimum of 0.2° Celsius), conductivity within 3 percent, and turbidity within 10 percent or three consecutive readings of less than 10 Napthelometric Turbidity Units (NTU). Water quality measurements

stabilize in each well prior to sampling. A groundwater sample was not collected from Well B1MW due to the presence of LNAPL.

The analytical samples were collected by transferring water directly from the pump tubing into laboratory-supplied containers. A field duplicate sample (Sample B5MW) was collected from Well B2MW and submitted blind to SGS. The samples were placed into a chilled cooler for transport to SGS. The purge water was contained in one 5-gallon bucket and stored onsite.

Laboratory Analysis

The August 2016 groundwater samples were delivered to SGS using chain-of-custody procedures. The four groundwater samples, including one duplicate, were analyzed for GRO by Alaska Method (AK) 101; DRO by AK 102; RRO by AK 103; and benzene, ethylbenzene, toluene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B. A water trip blank accompanied the sample cooler and was analyzed for GRO by AK 101 and BTEX by EPA Method 8021B.

DISCUSSION OF RESULTS

The analytical groundwater results were compared to the ADEC cleanup levels presented in the May 8, 2016 18 AAC 75 regulations. The applicable groundwater cleanup levels are presented in Table C of 18 AAC 75.345. The cleanup levels and analytical results for the August 2016 groundwater samples are provided in Table 2, and the laboratory report and completed ADEC Laboratory Data Review Checklist (LDRC) are included in Attachment 2.

Project Samples

Concentrations of GRO, DRO, RRO and BTEX were not detected in the project samples.

Quality Assurance Samples

The project laboratories implement on-going quality assurance/quality control procedures to evaluate conformance to ADEC data quality objectives (DQO). Internal laboratory controls to assess data quality for this project include surrogates, method blanks, and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to determine precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory report (See Attachment 2).

One groundwater field duplicate set (Samples B2MW and B5MW) was collected during the August 2016 sampling event to assess precision of the sampling and analysis process using the

calculated relative percent difference (RPD). The RPDs between the field primary/duplicate could not be calculated due to non-detect results for all target analytes.

One laboratory-supplied trip blank accompanied the sample containers during transport to and from the project during the August 2016 sampling event. GRO and BTEX were not detected in the water trip blank. RRO was detected in the method blank at an estimated (J-flagged) concentration of 0.386 mg/L. RRO was also detected at estimated (J-flagged) concentrations in each project sample. As a result, the RRO results are reported as non-detect at the limit of quantitation and qualified (B-flagged) in Table 2.

Shannon & Wilson reviewed the SGS deliverables and completed the ADEC's Laboratory Data Review Checklist (LDRC) for the data package which is included in Attachment 2. Quality control discrepancies and the impact to data quality/usability are described in further detail in the LDRC. No non-conformances that would adversely impact data usability for the objectives of this project were noted.

INVESTIGATION DERIVED WASTE

IDW for this project consisted of three 5-gallon buckets of purge and decontamination water (one 5-gallon bucket from each well sampled) and one 5-gallon bucket containing a fuel saturated absorbent pad. With approval from the ADEC, the August 2016 purge and decontamination water was discharged to the ground surface at the project site on September 6, 2016.

LNAPL saturated absorbent pads were placed in a 5-gallon bucket, secured with a lid, labeled, and temporarily stored onsite. Following completion of the project, the absorbent pad were disposed as unregulated solid waste.

SUMMARY

Project activities at Fire Station No. 4 consisted of collecting analytical groundwater samples from three on-site wells in August 2016, LNAPL recovery from one well, laboratory testing of the groundwater samples, well survey, and IDW disposal.

During August 2016 sampling, approximately 0.01 foot of LNAPL was measured in source area Well B1MW. The LNAPL thickness measured in Well B1MW is within the historical range. Concentrations of GRO, DRO, RRO and BTEX were not detected in the project samples collected from Wells B2MW, B3MW, and B4MW. Historically target analytes have not been detected in the water samples collected from Wells B3MW and B4MW. This is the first sampling event in which no target analytes have been detected in the primary and duplicate

sample from Well B2MW. Estimated (J-flagged) concentrations of benzene were detected in the primary or duplicate samples from Well B2MW during the previous two sampling events and historically GRO, DRO, benzene and ethylbenzene has been detected in water samples from this well.

CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives in the study of this site. The findings we have presented in this report are based on the limited sampling and analyses that we conducted. They should not be construed as a definite conclusion regarding the site's groundwater quality. As a result, the sampling and analyses performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur over time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations for this site may need to be revised.

You are advised that various state and federal agencies (ADEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore has not, and will not, disclose the results of this study, except with your permission or as required by law.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information derived from electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report, please contact the undersigned.

Shannon and Wilson has prepared the information in Attachment 3, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

We appreciate this opportunity to be of service. Please call the undersigned or Dan McMahon at 907-561-2120 with questions or comments concerning the contents of this report.

Sincerely,

SHANNON & WILSON, INC.

for:

Judy Hepner
Environmental Staff

Enc: Tables 1 and 2; Figures 1 and 2; and Attachments 1, 2, and 3

TABLE 1
WELL SAMPLING LOG

	Monitoring Well Number			
	B1MW	**B2MW**	**B3MW**	**B4MW**
Water Level Measurement Data				
Date Water Level Measured	8/10/2016	8/10/2016	8/10/2016	8/10/2016
Time Water Level Measured	16:59	16:47	16:24	16:11
Surveyed Measuring Point Elevation (feet)	100.47	99.16	99.65	100.42
Measured Depth to LNAPL (feet below TOC)	11.28	-	-	-
Measured Depth to Water (feet below TOC)	11.29	9.98**	10.70	11.40
Product Thickness (feet)	0.01	0.00	0.00	0.00
Water Level Elevation (feet)	89.19*	89.18	88.95	89.02
Purging/Sampling Data				
Date Sampled	NS	8/11/2016	8/11/2016	8/11/2016
Time Sampled	NS	14:16	13:15	11:35
Measured Depth to Water (feet below TOC)	-	9.98**	10.70	11.40
Total Depth of Well Below (feet below TOC)	-	15.26	15.30	14.89
Water Column in Well (feet)	-	5.28	4.60	3.49
Gallons per Foot	-	0.16	0.16	0.16
Water Column Volume (gallons)	-	0.84	0.74	0.56
Total Volume Pumped (gallons)	-	0.6	1.0	0.8
Purging Method	-	SP	SP	SP
Sampling Method	NS	SP	SP	SP
Diameter of Well Casing	2-inch	2-inch	2-inch	2-inch
Water Quality Data				
Temperature, ^{o}C	-	14.0	13.8	12.7
Specific Conductance, µS/cm	-	295	208	333
pH, standard units	-	6.43	6.33	6.93
Turbidity, NTU	-	6.68	4.81	11.15
Remarks	Not sampled due to 0.01 foot of LNAPL	Duplicate Sample B5MW		

Notes:

Survey conducted by Shannon & Wilson on August 16, 2016. Elevations are relative an to arbitrary on-site benchmark.

Water quality parameters were measured with a Hanna water quality instrument and Hach turbidimeter.

* = Groundwater elevation corrected for product thickness; specific gravity of diesel fuel is assumed to be 0.86

** = Groundwater elevation corrected due to PVC being trimmed following water level measurement and prior to well survey

\- = Not applicable or not measured

^{o}C = Degrees Celsius

µS/cm = microsiemens per centimeter

mV = Millivolts

NTU = Nephelometric Turbidity Unit

NS = Not sampled

SP = Submersible pump

TOC = Top of casing

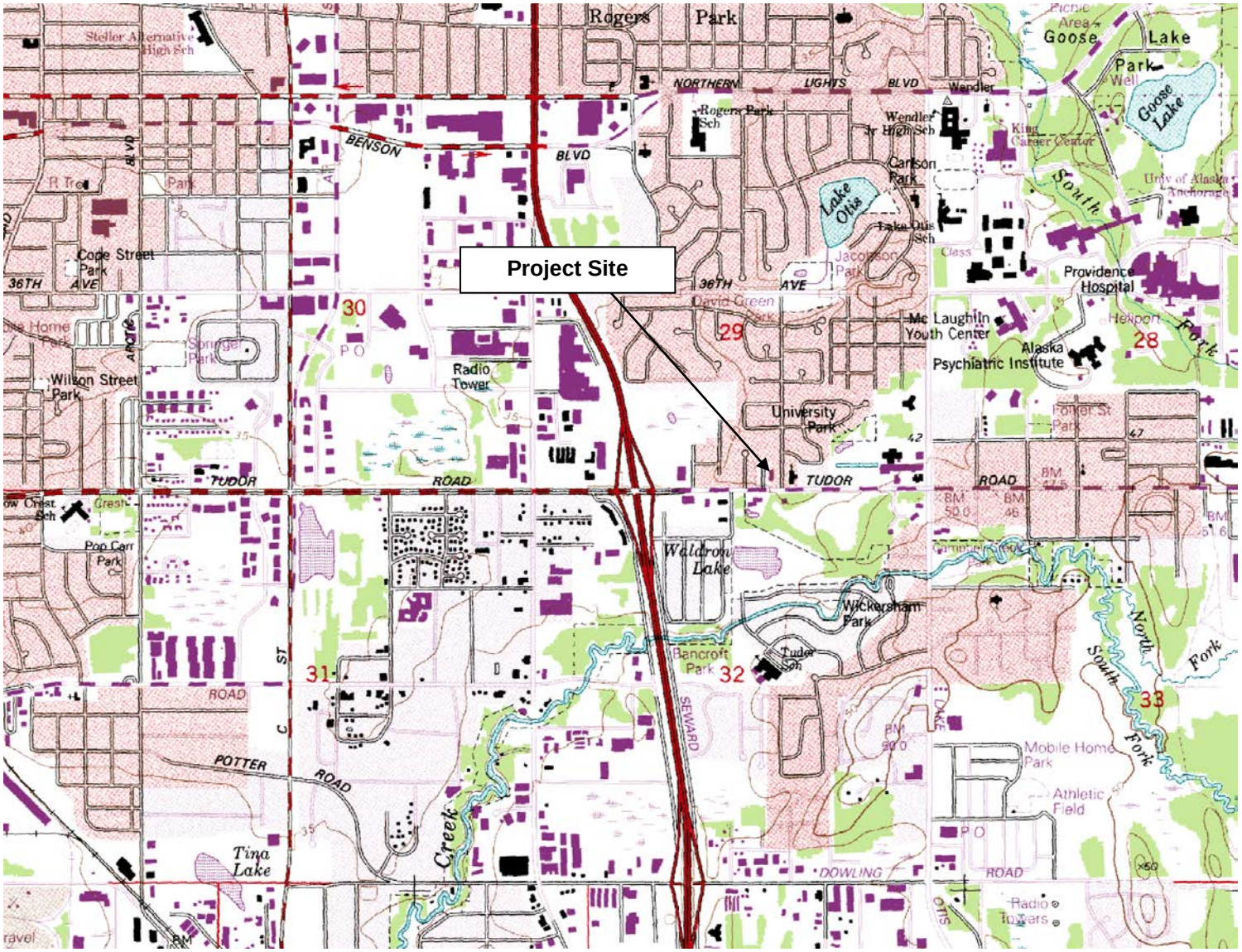
LNAPL = Light non-aqueous phase liquid

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level***	Sample ID Number^ and Water Depth in Feet BTOC (See Table 1 and Figure 2)				
			Monitoring Well				Quality Control
			B2MW	B5MW~	B3MW	B4MW	Trip Blank
			9.98**	9.98**	10.70	11.40	-
Gasoline Range Organics (GRO) - mg/L	AK 101	2.2	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Diesel Range Organics (DRO) - mg/L	AK 102	1.5	<0.300	<0.294	<0.300	<0.294	-
Residual Range Organics (RRO) - mg/L	AK 103	1.1	<0.500 B	<0.490 B	<0.500 B	<0.490 B	-
Aromatic Volatile Organics (BTEX)							
Benzene - mg/L	EPA 8021B	0.005	<0.000250	<0.000250	<0.000250	<0.000250	<0.000250
Toluene - mg/L	EPA 8021B	1.0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene - mg/L	EPA 8021B	0.7	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Xylenes - mg/L	EPA 8021B	10	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150

Notes:

*	= See Attachment 2 for compounds tested, methods, and laboratory reporting limits
**	= Groundwater elevation corrected due to PVC being trimmed prior to well survey
***	= Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (May 8, 2016)
^	= Sample ID number preceded by "17628-" on the chain of custody form
~	= Field duplicate of preceding sample
-	= Not applicable or sample not tested for this analyte
TBW	= Water trip blank
mg/L	= Milligrams per liter
J	= Concentration is an estimate less than the laboratory's limit of quantitation (LOQ). See the TestAmerica laboratory report for details.
<0.0500	= Analyte not detected; laboratory limit of detection of 0.0500 mg/L
B	= Analyte concentration potentially affected by method and/or trip blank contamination. See the ADEC Laboratory Data Review Checklist (LDRC) for details.
BTOC	= Below top of casing



Elevation in Meters
Contour Interval 5 Meters
Taken from Anchorage A-8 NW Quadrangle
U.S. Geological Survey (1994)

0 2,000 4,000

Approximate Scale in Feet

N

4350 MacInnes Street
Anchorage, Alaska

VICINITY MAP

October 2016 32-1-17628-002

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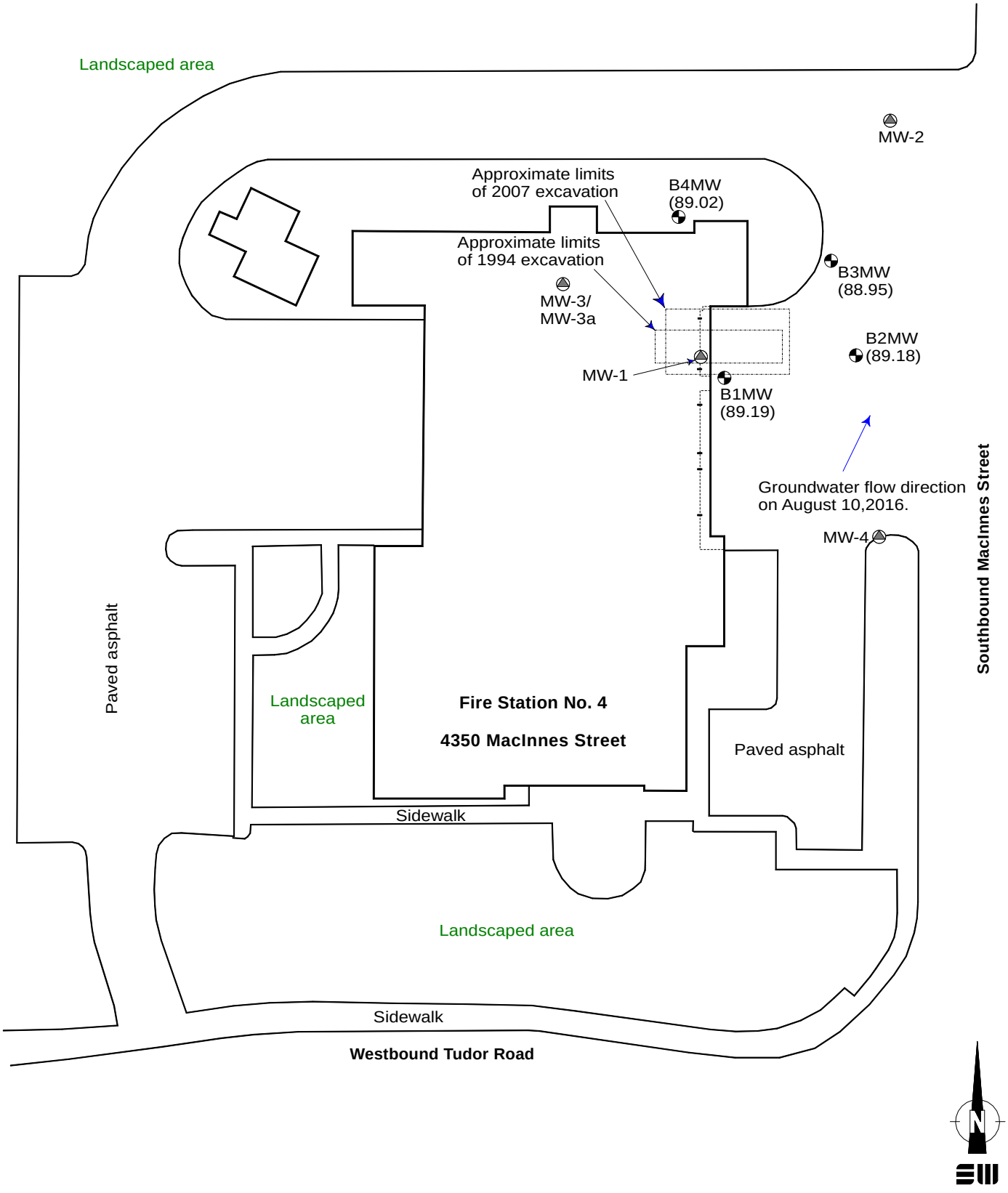
Fig. 1



LEGEND

B1MW — Approximate location of Monitoring Well B1MW. Shannon & Wilson installed Well B1MW in 2008, Wells B2MW and B3MW on February 22, 2013, and Well B4MW on April 15, 2013. Approximate groundwater elevation based on February 26, 2014 water level measurements and level-loop survey.

MW-3 — Approximate former location of Monitoring Well MW-3, installed by HartCrowser in 1994 and decommissioned in 2007.

4350 MacInnes Street
Anchorage, Alaska

SITE PLAN

October 2016

32-1-17628-002

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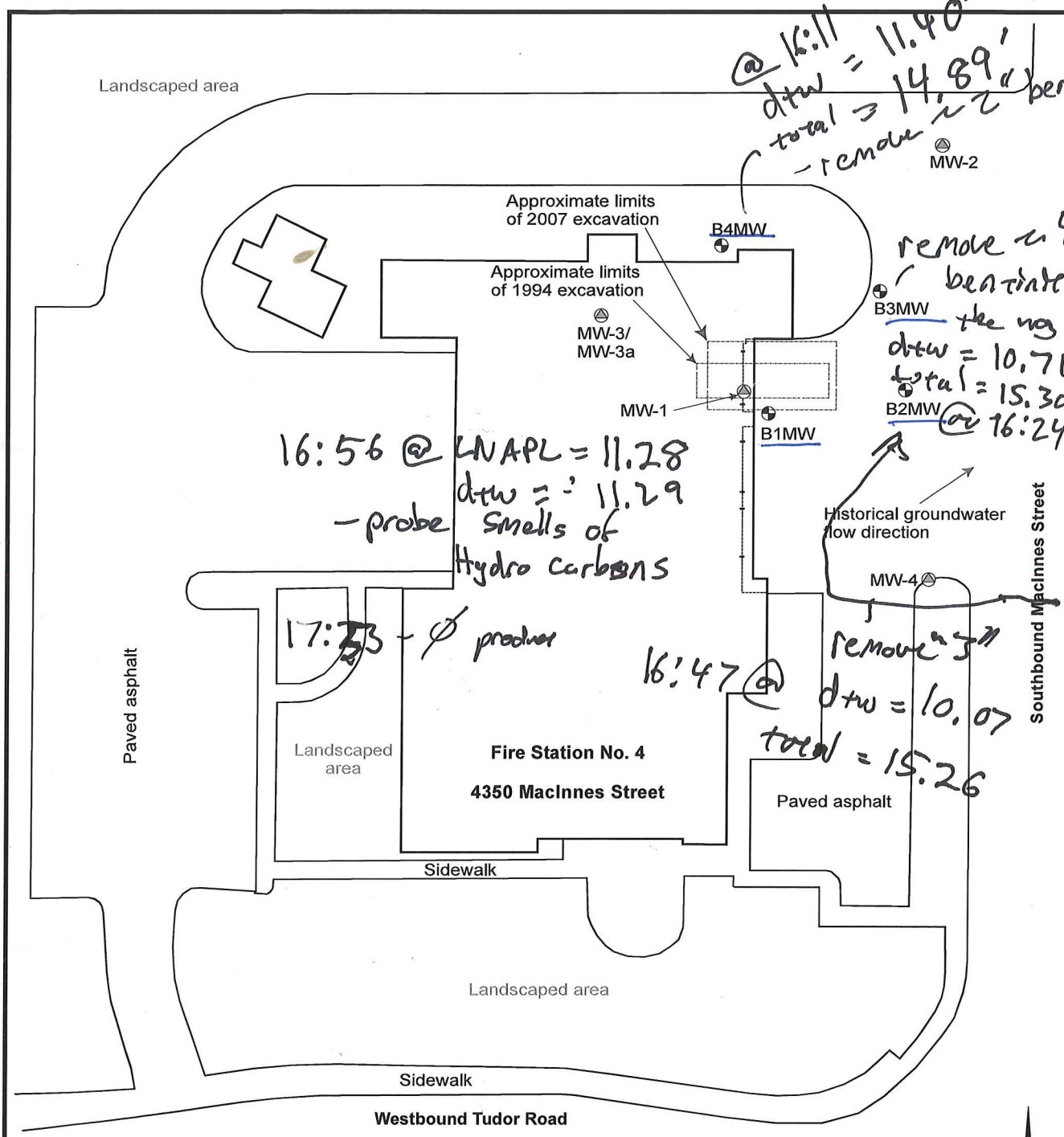
Fig. 2

ATTACHMENT 1

FIELD NOTES



LEGEND

B1MW — Approximate location of Monitoring Well B1MW. Shannon & Wilson installed Well B1MW in 2008, Wells B2MW and B3MW on February 22, 2013, and Well B4MW on April 15, 2013. Approximate groundwater elevation based on February 26, 2014 water level measurements and level-loop survey.

MW-3 — Approximate former location of Monitoring Well MW-3, installed by HartCrowser in 1994 and decommissioned in 2007.

0 40 80
APPROXIMATE SCALE IN FEET

4350 MacInnes Street
Anchorage, Alaska

SITE PLAN

June 2016 32-1-17628-002r1

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Fig. 2

8/11/16
B1MW dtw = 11.25 @ 14:46, LNAP < 0.01
dtw = 11.46 @ 15.27, no ~~LNAP~~ product ~~oil~~

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No: 32-1-17628 Location: Fire Station No.4 Site: 4350 Macinnes St
Well No.: B1MW
Date:

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
8/10/16 16:59	LNAPL = 11.28 / dtw = 11.29									
17:53	no product ~~on~~ by oil interface Probe									
8/11/16 14:46	LNAPL < 0.01, dtw = 11.25									
15:27	no product by oil interface Probe									
8/12/16 18:19	no product by oil interface Probe									
	dtw = 11.22									

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC (May 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (Jan. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.
ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17628 Location: Fire Station No.4 Weather: rain 50's

Well No.: B2MW

Date: 8/11/16 Time Started: 13:40 Time Completed: 14:41

Develop Date: _____ Develop End Time: _____ (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 16:47 Date of Depth Measurement: 8/10/16

Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: _____

Diameter of Casing: 2" Well Screen Interval: ~~✓~~

Total Depth of Well Below MP: 15.26 Product Thickness, if noted: 0 ~~<0.01~~ none

Depth-to-Water (DTW) Below MP: 10.07

Water Column in Well: 5.19 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.83 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 8/11/16 Time Started: 13:58 Time Completed: 14:33

Three Well Volumes: 2.49 (Gallons in Well x 3)

Gallons Purged: 0.6 Depth of Pump (~~generally 2 ft from bottom~~): ~11.0

Max. Drawdown (generally 0.3 ft): 0.31 Pump Rate: 0.1

Well Purged Dry: Yes ☐ No ☐ (If yes, use Well Purged Dry Log)

DTW = 10.06 @ 13:46

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
14:00	0.1	0.1	10.19	0.13	14.5	289		6.50		8.18
14:03	0.2	0.1	10.23	0.17	13.8	291		6.48		7.73
14:06	0.3	0.1	10.26	0.20	13.8	290 ✓		6.40 ✓		8.60 ✓
✓ 14:09	0.4	0.1	10.31	0.25	13.9 ✓	293 ✓		6.40 ✓		8.09 ✓
✓ 14:12	0.5	0.1	10.34	0.29	13.9 ✓	294 ✓		6.43 ✓		7.97 ✓
14:15	0.6	0.1	10.37	0.31	14.0 ✓	295 ✓		6.43 ✓		6.68 ✓
14:16	sample									

SAMPLING DATA

Odor: none Color: clear

Sample Designation: 17628-B2MW Time / Date: 14:16 8/11/16

QC Sample Designation: 17628-B5MW Time / Date: 14:46 8/11/16

QA Sample Designation: _____ Time / Date: _____

Evacuation Method: Submersible Pump / Other: _____

Sampling Method: Submersible Pump / Other: _____

Water Quality Instruments Used/Manufacturer/Model Number Hanna Strict #2, turb #3 O/2 #2

Calibration Info (Time, Ranges, etc) 10:15 8/11/16

Remarks: remove bentonite before dtw - above plug

bail water ~~before~~ from well casing before sampling

Sampling Personnel: SKH

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65

ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23

* cut down pipe 0.09 ft after sampling, before survey

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17628 Location: Fire Station No.4 Weather: light rain 50's
Well No.: B3MW
Date: 8/11/16 Time Started: 12:20 Time Completed: 13:40
Develop Date: ~~_____~~ ~~Develop End Time: _____~~ ~~(24 hour break)~~

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 16:24 Date of Depth Measurement: 8/10/16
Measuring Point (MP): ~~Top of PVC Casing~~ / Top of Steel Protective Casing / Other: _____
Diameter of Casing: 2" Well Screen Interval: —
Total Depth of Well Below MP: 15.30 Product Thickness, if noted: ~~0~~ none
Depth-to-Water (DTW) Below MP: 10.70
Water Column in Well: 4.6 (Total Depth of Well Below MP - DTW Below MP)
Gallons per foot: 0.16
Gallons in Well: 0.74 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 8/11/16 Time Started: 12:34 Time Completed: 13:23
Three Well Volumes: 2.20 (Gallons in Well x 3)
Gallons Purged: 1.0 Depth of Pump (generally 2 ft from bottom): ~ 11.8
Max. Drawdown (generally 0.3 ft): 0.53 Pump Rate: 0.1
Well Purged Dry: Yes ☐ No ☑ (If yes, use Well Purged Dry Log)

DTW = 10.67 @ 12:22 BM=

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:37	0.1	0.2	10.91	0.24	14.0	211		6.70		21.06
12:40	0.3	0.2	10.97	0.30	13.2	210 ✓		6.41		43.16
12:43	0.3	0.1	11.02	0.35	13.4	209 ✓		6.37		46.98
12:46	0.4	0.1	11.06	0.39	13.6 ✓	208 ✓		6.37 ✓		41.37
12:49	0.4	0.1	11.09	0.42	13.8 ✓	208 ✓		6.37 ✓		32.57
12:52	0.5	0.1	11.14	0.47	13.8 ✓	209 ✓		6.34 ✓		25.11

SAMPLING DATA

Odor: none Color: clear
Sample Designation: 17628-B3MW Time / Date: 8/11/16 13:15
QC Sample Designation: / Time / Date: /
QA Sample Designation: / Time / Date: /

Evacuation Method: ~~Submersible Pump~~ / Other: _____
Sampling Method: ~~Submersible Pump~~ / Other: _____
Water Quality Instruments Used/Manufacturer/Model Number Hanna Stick #2, turb #3, DT #2
Calibration Info (Time, Ranges, etc) 10:15 8/11/16
Remarks: removed bentaire before ~~sampling~~ DTW - was rid of manually for about, bail water out of well casing before sampling
Sampling Personnel: JKH

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65
ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No: 32-1-17628 Location: Fire Station No.4 Site: 4350 Macinnes St

Well No.: B3MW

Date: 8/11/16

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:56	0.6	0.1	11.17	0.50	14.0 ✓	208 ✓		6.37 ✓		18.63
12:59	0.6	0.1	11.19	0.52	13.8 ✓	209 ✓		6.37 ✓		13.76
13:02	0.7	0.1	11.22	0.55	13.9 ✓	207 ✓		6.34 ✓		9.89
13:05	0.8	0.1	11.24	0.57	13.8 ✓	208 ✓		6.35 ✓		7.14
✓ 13:08	0.8	0.1	11.26	0.59	13.8 ✓	208 ✓		6.34 ✓		4.27 ✓
✓ 13:11	0.9	0.1	11.28	0.61	13.9 ✓	207 ✓		6.34 ✓		4.64 ✓
13:14	1.0	0.1	11.30	0.63	13.8 ✓	208 ✓		6.33 ✓		4.81 ✓
	Sample	13:15								

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC (May 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (Jan. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.

ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17628 Location: Fire Station No.4 Weather: 50's cloudy

Well No.: B4MW

Date: 8/10/16 Time Started: 10:53 Time Completed: 12:07

~~Develop Date:~~ _____ Develop End Time: _____ ~~(24 hour break)~~

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 16:11 Date of Depth Measurement: 8/10/16

Measuring Point (MP): Top of PVC Casing / Top of Steel Protective Casing / Other: _____

Diameter of Casing: 2" Well Screen Interval: —

Total Depth of Well Below MP: 14.89 Product Thickness, if noted: ~~0~~ none

Depth-to-Water (DTW) Below MP: 11.40

Water Column in Well: 3.49 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.56 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 8/10/16 Time Started: 11:02 Time Completed: 11:44

Three Well Volumes: 1.69 (Gallons in Well x 3)

Gallons Purged: 0.8 Depth of Pump (generally 2 ft from bottom): ~12.5

Max. Drawdown (generally 0.3 ft): 0.33 Pump Rate: 0.1

Well Purged Dry: Yes ☐ No ☒ (If yes, use Well Purged Dry Log)

DTW = 11:35 @ 10:55 BM = 11.73

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C) +/- 3%	Sp. Cond.: (uS/cm) +/- 3%	DO: (mg/L)	pH: (S.U.) +/- 0.1	ORP: (mV)	Turb: (NTU) +/- 10% or <10 NTU x3
11:05	0.1	0.3	11.91	0.18	12.7	352		6.87		16.57
11:08	0.2	0.1	11.96	0.23	12.2	324		6.79		20.41
11:11	0.3	0.1	11.98	0.25	12.2 ✓	320 ✓		6.80 ✓		19.53
11:14	0.4	0.1	12.01	0.28	12.3 ✓	317 ✓		6.81 ✓		15.68
11:17	0.5	0.1	12.01	0.28	12.4 ✓	318 ✓		6.81 ✓		15.44
11:20	0.6	0.1	12.02	0.29	12.6 ✓	317 ✓		6.85 ✓		10.70

SAMPLING DATA

Odor: none Color: clear

Sample Designation: 17628-B4MW Time / Date: 11:35 8/11/16

QC Sample Designation: _____ Time / Date: _____

QA Sample Designation: _____ Time / Date: _____

Evacuation Method: Submersible Pump / Other: _____

Sampling Method: Submersible Pump / Other: _____

Water Quality Instruments Used/Manufacturer/Model Number turb #3, O/I #2, Hanna Stick #

Calibration Info (Time, Ranges, etc) 10:15 8/11/16

Remarks: Bentonite in well over plug, removed extra before sampling

Sampling Personnel: JCH

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.65

ANNULAR SPACE VOLUME (GAL/FT): 4" casing and 2" well = 0.23

LOW-FLOW WATER SAMPLING LOG

Shannon & Wilson, Inc.

Continued from previous page

Job No: 32-1-17628 Location: Fire Station No.4 Site: 4350 Macinnes St

Well No.:

Date:

Time:	Gallons:	Pump Rate (L/min):	DTW (ft BMP):	Drawdown (ft):	Temp: (°C)	Sp. Cond (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
11:23	0.6	0.1	12.04	0.31	12.6	321		6.83		10.85
11:27	0.7	0.1	12.05	0.32	12.7	326		6.88		11.09
11:30	0.9	0.1	12.05	0.32	12.7	329		6.88		10.93
11:33	0.8	0.1	12.06	0.33	12.7	333		6.93		11.15
Sample		11:35								

	Interval (minutes)	Pump Rate (mL/min):	Drawdown (ft):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
ADEC (May 2010)	3 to 5	100 to 150	<0.0328	±3% or ±0.2	±3%	±10%	±0.1	±10	±10%
EPA (Jan. 2010)	5	50	<0.3	±3%	±3%	±10%	±0.1	±10	±10% or <5 NTU

EPA guidance requires all parameters to stabilize for 3 consecutive readings before sampling. If not stable within 2 hours, collect sample.

ADEC guidance requires 3 parameters (4 if using temperature) to stabilize for 3 consecutive readings before sampling.

32-117628-002 Fire Station #4, 4350 Macinnes St.
8/16/16 JKH & ADV

Table 1
Differential Leveling Survey Field Log Sheet and Instructions

SHANNON & WILSON, INC.

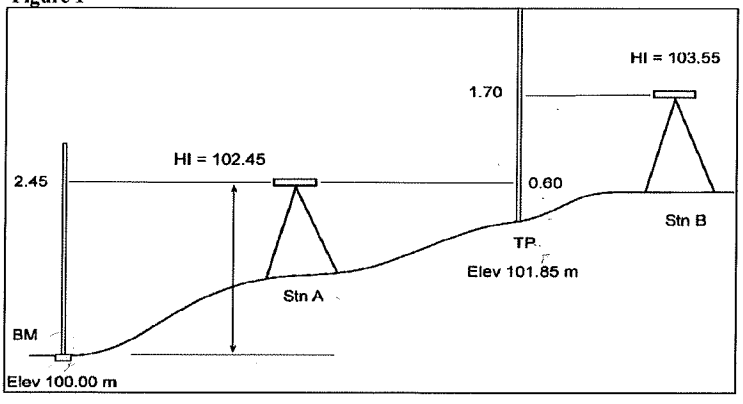
Station or Survey Point ID	Backsight (BS) (+)	Height of Instrument (HI)	Foresight (FS) (-)	Elevation	Comments
TBM	4.34	104.34		100.00	TBM
			3.92	100.42	B4MW
			4.69	99.65	B3MW
			5.18	99.16	B2MW
TP1	4.14	104.14	4.74	100.20	Bar
			4.98	99.16	B2MW
TP2	4.16	104.10	4.20	99.94	
			3.63	100.47	B1MW
TBM			4.10		Final shot back on TBM to close the Loop. 100.00
Sum of TBM & TP FS and BS	12.64		12.64		

Example of Completed Survey

Station or Survey Point ID	Backsight BS (+)	Height of Instrument (HI)	Foresight (FS) (-)	Elevation	Comments
TBM	5.20	1422.04		1416.84	Temporary benchmark w elevation of 1416.84 feet
MW-5			1.40	1420.64	Monitoring well 5
MW-21			3.44	1418.60	
TP1	5.26	1421.46	5.84	1416.20	Instrument moved to new location
MW-23			2.72	1418.74	
MW-24			2.51	1418.95	
MW-22			4.48	1416.98	
MW-8			5.43	1416.03	
TP2	5.52	1421.81	5.17	1416.29	New instrument location to shoot back to TBM
TBM			4.98	1416.83	Final shot back on TBM to close the loop.
Sum of	15.98		15.99		**The Sum of the BS for the TBM and TPs should be within 0.01 of the Sum of the FS for the TBM and TP readings. The difference between these sums will also be equal to the difference between the original TBM and final TBM elevation.**

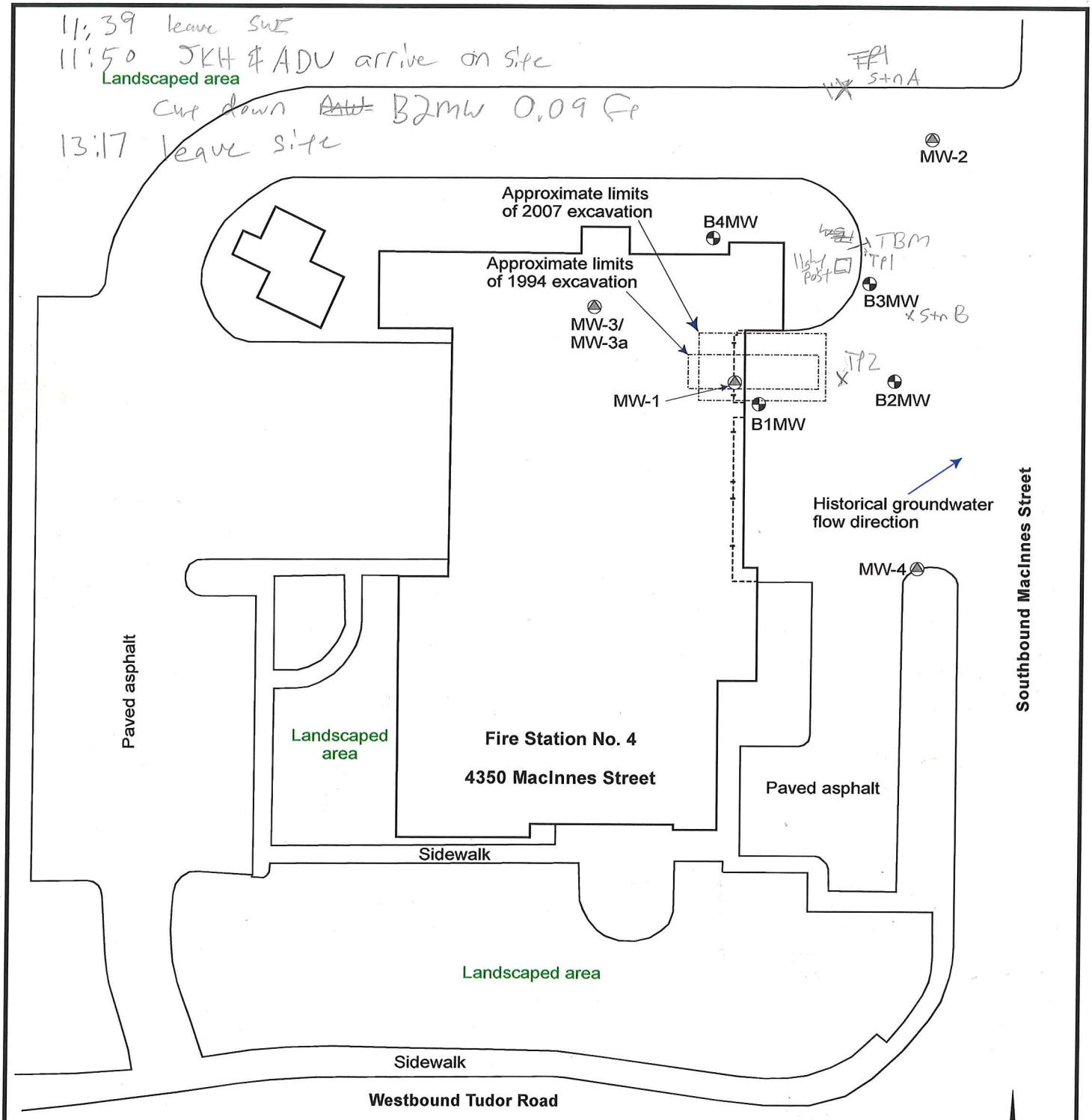
Figure 1 below shows an example of a traverse with one turning point. The traverse carries an elevation from a known benchmark (BM) to the top of a hill. From the first set-up (Stn A), a BS reading is taken to the BM (Elev. = 100.00). Suppose the rod reading is 2.45 meters: the HI @ Stn A is therefore 100.00 + 2.45= 102.45 m. Suppose you then take a FS to another point, and read 0.60 on the rod; the elevation of that point is HI-FS = 102.45-0.60 = 101.85 meters. If you move the instrument, you use that point to turn on, i.e. you move to the top of the hill and take a BS to the rod. The new HI is 101.85 + 1.70 = 103.55.

Figure 1



Instructions for Completing a Survey

* Make sure you have a site map
* An accurate survey must have two turning points.
* When tying in new wells to an existing survey, the TBM should not be a well and the survey must have at least one turning point.
* For small sites with few measuring points, the site should be resurveyed rather than tying in one or two additional wells (discuss with PM and cofirm time is available in budget).
* For large sites with many measuring points, covering a large area, additional wells should be tied in to existing survey.



LEGEND

B1MW — Approximate location of Monitoring Well B1MW. Shannon & Wilson installed Well B1MW in 2008, Wells B2MW and B3MW on February 22, 2013, and Well B4MW on April 15, 2013. Approximate groundwater elevation based on February 26, 2014 water level measurements and level-loop survey.

MW-3 — Approximate former location of Monitoring Well MW-3, installed by HartCrowser in 1994 and decommissioned in 2007.

4350 MacInnes Street
Anchorage, Alaska

SITE PLAN

June 2016 32-1-17628-002r1

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 2

8/10/16

15:44 leave SWI
15:56 check in Fire Station No 4

well	- dtw	LNAP	time	total depth
B4 MW	11.40		16:11	14.89
B3 MW	10.71		16:24	15.30
B2 MW	10.07		16:47	15.26
B1 MW	11.29	11.28	16:56	

17:53 test B1MW & no product dtw = 11.40
18:47 check out of site - turb #3 not calibrating

8/11/16

10:15 calibrate
10:40 check in @ Firestation

leave IDW & purge/decon water near fueling station on site

15:54 leave Site
16:44 drop off samples SGS/unload car

8/12/16

10:07 leave for Site
18:19 arrive dtw = 11.22 - no free product
18:26 leave site

ATTACHMENT 2

RESULTS OF ANALYTICAL TESTING BY SGS NORTH AMERICA INC. OF ANCHORAGE, ALASKA AND LABORATORY DATA REVIEW CHECKLIST

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
907-433-3241

Report Number: **1164658**

Client Project: **32-1-17628 Fire Station 4**

Dear Judy Hepner,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Victoria Pennick Date
Project Manager
Victoria.Pennick@sgs.com

Print Date: 08/25/2016 4:21:39PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1164658**
Project Name/Site: **32-1-17628 Fire Station 4**
Project Contact: **Judy Hepner**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17628-B4MW	1164658001	08/11/2016	08/11/2016	Water (Surface, Eff., Ground)
17628-B3MW	1164658002	08/11/2016	08/11/2016	Water (Surface, Eff., Ground)
17628-B2MW	1164658003	08/11/2016	08/11/2016	Water (Surface, Eff., Ground)
17628-B5MW	1164658004	08/11/2016	08/11/2016	Water (Surface, Eff., Ground)
17628-TB	1164658005	08/11/2016	08/11/2016	Water (Surface, Eff., Ground)

Method	Method Description
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	DRO/RRO Low Volume Water
AK103	DRO/RRO Low Volume Water

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Detectable Results Summary

Client Sample ID: **17628-B4MW**
Lab Sample ID: 1164658001
Semivolatile Organic Fuels

Parameter	Result	Units
Residual Range Organics	0.338J	mg/L

Client Sample ID: **17628-B3MW**
Lab Sample ID: 1164658002
Semivolatile Organic Fuels

Parameter	Result	Units
Residual Range Organics	0.360J	mg/L

Client Sample ID: **17628-B2MW**
Lab Sample ID: 1164658003
Semivolatile Organic Fuels

Parameter	Result	Units
Residual Range Organics	0.386J	mg/L

Client Sample ID: **17628-B5MW**
Lab Sample ID: 1164658004
Semivolatile Organic Fuels

Parameter	Result	Units
Residual Range Organics	0.359J	mg/L

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **17628-B4MW**

Client Sample ID: **17628-B4MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658001
Lab Project ID: 1164658

Collection Date: 08/11/16 11:35
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.294	U	0.588	0.176	mg/L	1		08/25/16 12:38
Surrogates								
5a Androstane (surr)	76.5		50-150		%	1		08/25/16 12:38

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 08/25/16 12:38
Container ID: 1164658001-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.338	J	0.490	0.147	mg/L	1		08/25/16 12:38
Surrogates								
n-Triacontane-d62 (surr)	80.5		50-150		%	1		08/25/16 12:38

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK103
Analyst: NRO
Analytical Date/Time: 08/25/16 12:38
Container ID: 1164658001-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Results of **17628-B4MW**

Client Sample ID: **17628-B4MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658001
Lab Project ID: 1164658

Collection Date: 08/11/16 11:35
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U		0.100	0.0310	mg/L	1		08/20/16 19:14
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		08/20/16 19:14

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 08/20/16 19:14
Container ID: 1164658001-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		08/20/16 19:14
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		08/20/16 19:14
o-Xylene	0.500 U		1.00	0.310	ug/L	1		08/20/16 19:14
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		08/20/16 19:14
Toluene	0.500 U		1.00	0.310	ug/L	1		08/20/16 19:14
Surrogates								
1,4-Difluorobenzene (surr)	92.6		77-115		%	1		08/20/16 19:14

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 08/20/16 19:14
Container ID: 1164658001-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **17628-B3MW**

Client Sample ID: **17628-B3MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658002
Lab Project ID: 1164658

Collection Date: 08/11/16 13:15
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.300	U	0.600	0.180	mg/L	1		08/25/16 12:48
Surrogates								
5a Androstane (surr)	79.6		50-150		%	1		08/25/16 12:48

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 08/25/16 12:48
Container ID: 1164658002-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.360	J	0.500	0.150	mg/L	1		08/25/16 12:48
Surrogates								
n-Triacontane-d62 (surr)	81.5		50-150		%	1		08/25/16 12:48

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK103
Analyst: NRO
Analytical Date/Time: 08/25/16 12:48
Container ID: 1164658002-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Results of **17628-B3MW**

Client Sample ID: **17628-B3MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658002
Lab Project ID: 1164658

Collection Date: 08/11/16 13:15
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U		0.100	0.0310	mg/L	1		08/20/16 18:56
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		08/20/16 18:56

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 08/20/16 18:56
Container ID: 1164658002-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		08/20/16 18:56
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:56
o-Xylene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:56
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		08/20/16 18:56
Toluene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:56
Surrogates								
1,4-Difluorobenzene (surr)	91.3		77-115		%	1		08/20/16 18:56

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 08/20/16 18:56
Container ID: 1164658002-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **17628-B2MW**

Client Sample ID: **17628-B2MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658003
Lab Project ID: 1164658

Collection Date: 08/11/16 14:16
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.300	U	0.600	0.180	mg/L	1		08/25/16 12:59
Surrogates								
5a Androstane (surr)	72.8		50-150		%	1		08/25/16 12:59

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 08/25/16 12:59
Container ID: 1164658003-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.386	J	0.500	0.150	mg/L	1		08/25/16 12:59
Surrogates								
n-Triacontane-d62 (surr)	75.2		50-150		%	1		08/25/16 12:59

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK103
Analyst: NRO
Analytical Date/Time: 08/25/16 12:59
Container ID: 1164658003-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Results of **17628-B2MW**

Client Sample ID: **17628-B2MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658003
Lab Project ID: 1164658

Collection Date: 08/11/16 14:16
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U		0.100	0.0310	mg/L	1		08/20/16 18:37
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		08/20/16 18:37

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 08/20/16 18:37
Container ID: 1164658003-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		08/20/16 18:37
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:37
o-Xylene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:37
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		08/20/16 18:37
Toluene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:37
Surrogates								
1,4-Difluorobenzene (surr)	91.1		77-115		%	1		08/20/16 18:37

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 08/20/16 18:37
Container ID: 1164658003-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **17628-B5MW**

Client Sample ID: **17628-B5MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658004
Lab Project ID: 1164658

Collection Date: 08/11/16 14:46
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.294	U	0.588	0.176	mg/L	1		08/25/16 13:09
Surrogates								
5a Androstane (surr)	63		50-150		%	1		08/25/16 13:09

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK102
Analyst: NRO
Analytical Date/Time: 08/25/16 13:09
Container ID: 1164658004-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.359	J	0.490	0.147	mg/L	1		08/25/16 13:09
Surrogates								
n-Triacontane-d62 (surr)	64		50-150		%	1		08/25/16 13:09

Batch Information

Analytical Batch: XFC12741
Analytical Method: AK103
Analyst: NRO
Analytical Date/Time: 08/25/16 13:09
Container ID: 1164658004-D

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 08/24/16 16:23
Prep Initial Wt./Vol.: 255 mL
Prep Extract Vol: 1 mL

Results of **17628-B5MW**

Client Sample ID: **17628-B5MW**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658004
Lab Project ID: 1164658

Collection Date: 08/11/16 14:46
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U		0.100	0.0310	mg/L	1		08/20/16 18:19
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		08/20/16 18:19

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 08/20/16 18:19
Container ID: 1164658004-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		08/20/16 18:19
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:19
o-Xylene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:19
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		08/20/16 18:19
Toluene	0.500 U		1.00	0.310	ug/L	1		08/20/16 18:19
Surrogates								
1,4-Difluorobenzene (surr)	91		77-115		%	1		08/20/16 18:19

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 08/20/16 18:19
Container ID: 1164658004-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **17628-TB**

Client Sample ID: **17628-TB**
Client Project ID: **32-1-17628 Fire Station 4**
Lab Sample ID: 1164658005
Lab Project ID: 1164658

Collection Date: 08/11/16 15:00
Received Date: 08/11/16 16:33
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500 U		0.100	0.0310	mg/L	1		08/20/16 16:45
Surrogates								
4-Bromofluorobenzene (surr)	106		50-150		%	1		08/20/16 16:45

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 08/20/16 16:45
Container ID: 1164658005-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.250 U		0.500	0.150	ug/L	1		08/20/16 16:45
Ethylbenzene	0.500 U		1.00	0.310	ug/L	1		08/20/16 16:45
o-Xylene	0.500 U		1.00	0.310	ug/L	1		08/20/16 16:45
P & M -Xylene	1.00 U		2.00	0.620	ug/L	1		08/20/16 16:45
Toluene	0.500 U		1.00	0.310	ug/L	1		08/20/16 16:45
Surrogates								
1,4-Difluorobenzene (surr)	90.7		77-115		%	1		08/20/16 16:45

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 08/20/16 16:45
Container ID: 1164658005-A

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 08/20/16 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1741939 [VXX/29393]
Blank Lab ID: 1346724

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1164658001, 1164658002, 1164658003, 1164658004, 1164658005

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	106	50-150		%

Batch Information

Analytical Batch: VFC13242
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 8/20/2016 11:40:00AM

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 8/20/2016 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1164658 [VXX29393]
Blank Spike Lab ID: 1346727
Date Analyzed: 08/20/2016 12:36

Spike Duplicate ID: LCSD for HBN 1164658 [VXX29393]
Spike Duplicate Lab ID: 1346728
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1164658001, 1164658002, 1164658003, 1164658004, 1164658005

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.857	86	1.00	0.875	88	(60-120)	2.10	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500	111	111	0.0500	113	113	(50-150)	2.40	

Batch Information

Analytical Batch: **VFC13242**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29393**
Prep Method: **SW5030B**
Prep Date/Time: **08/20/2016 06:00**
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

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t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1741939 [VXX/29393]
Blank Lab ID: 1346724

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1164658001, 1164658002, 1164658003, 1164658004, 1164658005

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.250U	0.500	0.150	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Surrogates				
1,4-Difluorobenzene (surr)	94.5	77-115		%

Batch Information

Analytical Batch: VFC13242
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 8/20/2016 11:40:00AM

Prep Batch: VXX29393
Prep Method: SW5030B
Prep Date/Time: 8/20/2016 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1164658 [VXX29393]
Blank Spike Lab ID: 1346725
Date Analyzed: 08/20/2016 12:17

Spike Duplicate ID: LCSD for HBN 1164658 [VXX29393]
Spike Duplicate Lab ID: 1346726
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1164658001, 1164658002, 1164658003, 1164658004, 1164658005

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	105	105	100	107	107	(80-120)	1.10	(< 20)
Ethylbenzene	100	106	106	100	106	106	(75-125)	0.04	(< 20)
o-Xylene	100	106	106	100	106	106	(80-120)	0.21	(< 20)
P & M -Xylene	200	215	107	200	216	108	(75-130)	0.28	(< 20)
Toluene	100	110	110	100	110	110	(75-120)	0.22	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	50	99	99	50	97.1	97	(77-115)	1.90	

Batch Information

Analytical Batch: **VFC13242**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX29393**
Prep Method: **SW5030B**
Prep Date/Time: **08/20/2016 06:00**
Spike Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 100 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1742126 [XXX/36137]
Blank Lab ID: 1347540

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1164658001, 1164658002, 1164658003, 1164658004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.300U	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	76.9	60-120		%

Batch Information

Analytical Batch: XFC12740
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: NRO
Analytical Date/Time: 8/25/2016 11:15:00AM

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 8/24/2016 4:23:16PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1164658 [XXX36137]
Blank Spike Lab ID: 1347541
Date Analyzed: 08/25/2016 11:25

Spike Duplicate ID: LCSD for HBN 1164658 [XXX36137]
Spike Duplicate Lab ID: 1347542
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1164658001, 1164658002, 1164658003, 1164658004

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	20	16.9	85	20	16.1	80	(75-125)	5.20	(< 20)
Surrogates									
5a Androstane (surr)	0.4	82.9	83	0.4	80.4	80	(60-120)	3.00	

Batch Information

Analytical Batch: **XFC12740**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **NRO**

Prep Batch: **XXX36137**
Prep Method: **SW3520C**
Prep Date/Time: **08/24/2016 16:23**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1742126 [XXX/36137]
Blank Lab ID: 1347540

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1164658001, 1164658002, 1164658003, 1164658004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.386J	0.500	0.150	mg/L
Surrogates				
n-Triacontane-d62 (surr)	79	60-120		%

Batch Information

Analytical Batch: XFC12740
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: NRO
Analytical Date/Time: 8/25/2016 11:15:00AM

Prep Batch: XXX36137
Prep Method: SW3520C
Prep Date/Time: 8/24/2016 4:23:16PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1164658 [XXX36137]
Blank Spike Lab ID: 1347541
Date Analyzed: 08/25/2016 11:25

Spike Duplicate ID: LCSD for HBN 1164658 [XXX36137]
Spike Duplicate Lab ID: 1347542
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1164658001, 1164658002, 1164658003, 1164658004

Results by **AK103**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	20	16.9	84	20	15.8	79	(60-120)	6.40	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.4	83.9	84	0.4	81.7	82	(60-120)	2.60	

Batch Information

Analytical Batch: **XFC12740**
Analytical Method: **AK103**
Instrument: **Agilent 7890B R**
Analyst: **NRO**

Prep Batch: **XXX36137**
Prep Method: **SW3520C**
Prep Date/Time: **08/24/2016 16:23**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

1164658

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
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1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
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(509) 946-6309

Cooler 1 of 1

Page 1 of 1

Laboratory SGS - Anchorage

Attn: Teri

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO/BTEX AK101/8021B	DRO/RRO AK102/AK103 HCl	HCl	Total Number of Containers	Remarks/Matrix
17628- B4MW	(1) A-E	11:35	8/11/16		X	X	X		5	Groundwater
" - B3MW	(2) A-E	13:15	"							
" - B2MW	(3) A-E	14:16	"							
" - B5MW	(4) A-E	14:46	"							
" - TB	(5) A-C	15:00	"							Trip blank

Project Information	
Project Number: 32-1-17628	
Project Name: Fire Station 4	
Contact: JKH	
Ongoing Project? Yes ☒ No ☐	
Sampler: JKH	

Sample Receipt	
Total Number of Containers	
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Delivery Method: (attach shipping bill, if any)	

Instructions
Requested Turnaround Time:
Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: [signature] Time: 16:33	Signature: Time:	Signature: Time:
Printed Name: Judy Hepner Date: 8/11/16	Printed Name: Date:	Printed Name: Date:
Company: SWI	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: [signature] Time: 1633
Printed Name: Date:	Printed Name: Date:	Printed Name: Jaycee Pearson Date: 8/11/16
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

Temp 9.9 °C CS absent

No. 30848

SGS

e-SAMPLE RECEIPT FORM

1164658

Review Criteria	Y/N (yes/no)	Exceptions Noted below
	Y	exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N	
COC accompanied samples?	Y	
**exemption permitted if chilled & collected <8hrs ago or chlling not required (i.e., waste, oil)	Y	
Temperature blank compliant* (i.e., 0-6 °C after CF)?	N	Cooler ID: 1 @ 7.7 °C Therm ID: 71
	Y	Cooler ID: @ °C Therm ID:
	Y	Cooler ID: @ °C Therm ID:
	Y	Cooler ID: @ °C Therm ID:
	Y	Cooler ID: @ °C Therm ID:
*If >6°C, were samples collected <8 hours ago?	Y	
If <0°C, were sample containers ice free?	~~Y~~ NA	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		~~1 A-E, 2 A-E, 3 A-E, 4 A-E, 5 A-C~~ Samples received < 8hr from collection (vlp)
		Note: Refer to form F-083 "Sample Guide" for hold times.
Were samples received within hold time?	Y	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Y	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous?	Y	
	Y	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Y	
IF APPLICABLE		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Y	
Were all VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	Y	
Were all soil VOAs field extracted with MeOH+BFB?	~~Y~~ NA	

Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

F102b_SRRpm_20160601

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1164658001-A	HCL to pH < 2	OK			
1164658001-B	HCL to pH < 2	OK			
1164658001-C	HCL to pH < 2	OK			
1164658001-D	HCL to pH < 2	OK			
1164658001-E	HCL to pH < 2	OK			
1164658002-A	HCL to pH < 2	OK			
1164658002-B	HCL to pH < 2	OK			
1164658002-C	HCL to pH < 2	OK			
1164658002-D	HCL to pH < 2	OK			
1164658002-E	HCL to pH < 2	OK			
1164658003-A	HCL to pH < 2	OK			
1164658003-B	HCL to pH < 2	OK			
1164658003-C	HCL to pH < 2	OK			
1164658003-D	HCL to pH < 2	OK			
1164658003-E	HCL to pH < 2	OK			
1164658004-A	HCL to pH < 2	OK			
1164658004-B	HCL to pH < 2	OK			
1164658004-C	HCL to pH < 2	OK			
1164658004-D	HCL to pH < 2	OK			
1164658004-E	HCL to pH < 2	OK			
1164658005-A	HCL to pH < 2	OK			
1164658005-B	HCL to pH < 2	OK			
1164658005-C	HCL to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

LABORATORY DATA REVIEW CHECKLIST

Completed by: Judy Hepner
Title: Environmental Staff
Date: August 31, 2016

CS Report Name: Semi-Annual Groundwater Monitoring, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska

Laboratory Report Date: August 25, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America, Inc.
Laboratory Report Number: 1164658

ADEC File Number: *2100.26.315*
ADEC RecKey Number: *NA*
(**NOTE**: ***NA*** = not applicable; Text in *italics* added by Shannon & Wilson, Inc.)

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses? **Yes / No / NA** (please explain)
Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS-approved?
Yes / No / NA (please explain)
Comments:

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?
Yes / No / NA (please explain)
Comments**:**

b. Correct analyses requested? **Yes / No / NA** (please explain)
Comments**:**

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?
Yes / No / NA (please explain)
Comments: *The cooler temperature was 7.7 ° C at the time of sample submittal.*

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)? **Yes / No / NA** (please explain)
Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)? **Yes / No / NA** (please explain)
Comments: *No discrepancies noted.*

d. If there were any discrepancies, were they documented? – For example, incorrect sample containers/preservation, sample temperature outside acceptance range, insufficient or missing samples, etc.? **Yes / No / NA** (please explain)
Comments: *No discrepancies noted.*

e. Data quality or usability affected? Please explain. **NA**
Comments: *The samples were submitted to the laboratory within 5 hours of sample collection. Therefore, it is our opinion that the slightly elevated cooler temperature does not impact data usability.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments:

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments: *Case narrative referred to the sample receipt form.*

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments: *The case narrative does not comment on corrective actions.*

d. What is the effect on data quality/usability, according to the case narrative?
Comments: *The case narrative does not comment on data quality/usability.*

5. Sample Results

a. Correct analyses performed/reported as requested on COC? **Yes / No / NA** (please explain)
Comments:

b. All applicable holding times met? **Yes / No / NA** (please explain)
Comments:

All soils reported on a dry weight basis? **Yes / No / NA** (please explain)
Comments:

c. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project? **Yes / No / NA** (please explain)
Comments:

d. Data quality or usability affected? **NA** Please explain.
Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis, and 20 samples?
Yes / No / NA (please explain)
Comments:

ii. All method blank results less than LOQ? **Yes / No / NA** (please explain)
Comments: *Although less than the LOQ, an estimated (J-flagged) concentration of RRO was detected in the method blank. Both the sample and method blank concentrations are reported at levels less than the LOQ, therefore the sample concentration are reported as non-detect at the LOQ.*

iii. If above LOQ, what samples are affected? ***NA***
Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes / No / NA (please explain)
Comments: *The potentially impacted samples are flagged "B" in Table 2.*

v. Data quality or usability affected? Please explain.
Comments: *Each of the affected sample results are less than the ADEC cleanup level; therefore the affected data is acceptable for the purposes of this report.*

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis, and 20 samples?
(LCS/LCSD required per AK methods, LCS required per SW846) **Yes / No / NA**
(please explain)
Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples? **Yes / No / NA** (please explain)
Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:

iv. Precision – All relative percent differences (RPDs) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%, VOCs 20%; all other analyses see the laboratory QC pages) **Yes / No / NA** (please explain)
Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected? **NA**
Comments:

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

vii. Data quality or usability affected? Please explain. ***NA***
Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses, field, QC and laboratory samples? **Yes / No / NA** (please explain)
Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages) **Yes / No / NA** (please explain)
Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined? **Yes / No / NA** (please explain)
Comments:

iv. Data quality or usability affected? Please explain. ***NA***
Comments:

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.)

i. One trip blank reported per matrix, analysis and cooler? (If not, enter explanation below.) **Yes / No / NA** (please explain)
Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? **(**If not, a comment stating why must be entered below.) **Yes / No / NA** (please explain)
Comments: *Only one cooler was used to store and transport the samples.*

iii. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

iv. If above LOQ, what samples are affected? ***NA***
Comments**:**

v. Data quality or usability affected? Please explain. ***NA***
Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No NA (please explain)
Comments: *Sample B5MW is the field duplicate of Sample B2MW.*

ii. Submitted blind to the lab? **Yes / No / NA** (please explain)
Comments:

iii. Precision – All relative percent differences (RPDs) less than specified DQOs?
(Recommended: 30% for water, 50% for soil) **Yes / No / NA** (please explain)
Comments: *The RPDs could not be calculated because Samples B2MW and B5MW did not contain detectable analyte concentrations.*

iv. Data quality or usability affected? Please explain. ***NA***
Comments:

f. Decontamination or Equipment Blank (if not applicable)
Yes / No / NA (please explain)
Comments: *The use of a decontamination or equipment blank was not included in our ADEC-approved work plan.*

i. All results less than LOQ? **Yes / No / NA** (please explain)
Comments:

ii. If above LOQ, what samples are affected? ***NA***
Comments:

iii. Data quality or usability affected? Please explain. ***NA***
Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-specific, etc.)

a. Defined and appropriate? **Yes / No / NA** (please explain)
Comments: *A key is provided on page 3 of the laboratory report.*

ATTACHMENT 3

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 32-1-17628-002

Date: October 2016
To: Municipality of Anchorage

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