Additional Site Characterization
Fire Station No. 4
4350 MacInnes Street
Anchorage, Alaska

September 2013

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AK	Alaska Method
ASR	Alaska Soil Recycling
bgs	Below the Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
cy	Cubic yards
Discovery	Discovery Drilling of Anchorage, Alaska
DQO	Data Quality Objective
DRO	Diesel Range Organics
Emerald	Emerald Alaska
EPA	Environmental Protection Agency
GRO	Gasoline Range Organics
IDW	Investigation Derived Waste
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LDRC	Laboratory Data Review Checklist
LOQ	Limit of quantitation
MOA	Municipality of Anchorage
MS/MSD	Matrix Spike/Matrix Spike Duplicate
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
ORC-A	Oxygen Releasing Compound Advanced®
PAH	Polynuclear Aromatic Hydrocarbons
PID	Photoionization Detector
ppm	Parts Per Million
PVC	Polyvinyl Chloride
SGS	SGS North America Inc. of Anchorage, Alaska
UST	Underground Storage Tank

ADDITIONAL SITE CHARACTERIZATION
FIRE STATION NO. 4
4350 MACINNES STREET
ANCHORAGE, ALASKA

1.0 INTRODUCTION

This report presents the results of Shannon & Wilson's additional site characterization performed at 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 release from underground storage tanks (UST) was documented at the site when the tanks were removed in 1994.

The project purpose was to collect data necessary to assess the site's eligibility for a Cleanup Complete with or without Institutional Controls status. The data collection objective of this project was to respond to the ADEC's August 22, 2012 review letter requesting further evaluation of the nature and extent of groundwater contamination downgradient of the former USTs.

Authorization to proceed with this project was received from Mr. Jon Clark of the Municipality of Anchorage (MOA) on November 28, 2012 in the form of a signed proposal and Purchase Order No. 20121484. The project tasks were conducted in general accordance with our January 23, 2013 ADEC-approved work plan.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Location and Description

Fire Station No. 6 is located at the northwest corner of the Tudor Road and MacInnes Street intersection in Anchorage, Alaska at 4350 MacInnes Street, as shown in Figure 1. A 500-gallon No. 1 and No. 2 diesel UST and a 1,000-gallon gasoline UST were excavated from the site in 1994. The approximate limits of the 1994 UST excavation are shown in Figure 2. At the time of the UST excavation, the fire station building was located to the south of the excavation. In 2007, the fire station building was expanded to the north, such that an apparatus bay is now located partially over the former UST excavation and a dormitory area is located north of the apparatus bay. Based on Hart Crowser's *Remedial Action Report* (May 14, 2007), engineering controls to

minimize petroleum vapor intrusion into the building were to include a 15-mil vapor barrier under the foundation of the apparatus bay section of the new building and air scrubbers in the apparatus bays.

2.2 Background

The July 14, 1994 *Fire Station No. 4 Gasoline and Diesel UST Closure* report by Hart Crowser documented the June 1994 removal of a 500-gallon No. 1 and No. 2 diesel UST and a 1,000-gallon gasoline UST from the site. Excavation soil samples, collected from 8 to 13 feet below ground surface (bgs), contained up to 10,000 milligrams per kilogram (mg/kg) gasoline range organics (GRO), 8,500 mg/kg diesel range organics (DRO), 16 mg/kg benzene, and 2,416 mg/kg total benzene, toluene, ethylbenzene, and xylenes (BTEX). The soil within the excavation consisted of gravelly sand fill to 6 feet bgs, underlain by sandy silt. Groundwater was encountered at 13 feet bgs. The approximate location of the 1994 excavation is shown in Figure 2. A passive vent system with a riser was installed in the excavation prior to backfilling with clean gravel.

Four monitoring wells, Wells MW-1, MW-2, MW-3, and MW-4, were installed as part of the July 1994 remedial investigation at the locations shown in Figure 2. The results were presented in Hart Crowser's September 9, 1994 *Remedial Site Investigation, Fire Station No. 4, Anchorage, Alaska*. Monitoring Well MW-1 was installed in the former excavation and contained 1.87 feet of free-phase product. The boring soil from Wells MW-2, MW-3, and MW-4 consisted of granular fill material to 8 feet bgs underlain by slightly silty to silty sand. Groundwater samples collected from Wells MW-2, MW-3, and MW-4 contained low or no detections of GRO, DRO, and BTEX. The groundwater flow direction was determined to be towards the north-northeast.

Corrective action initiated in January 1995 consisted of installing Recovery Wells RW-1 and RW-2 in the former UST excavation location, shown on Figure 2, and recovering product with PetroTrap passive hydrocarbon skimmers. Hart Crowser's June 1995 *Corrective Action Start Up Report, Anchorage Fire Department Station No. 4, Anchorage, Alaska* documents hydrocarbon fingerprinting conducted in 1995 which identified the product in Wells MW-1 and RW-1 as a mixture of No. 1 and No. 2 diesel fuel. Hart Crowser initially estimated that the volume of floating product in the subsurface was less than 500 to 1,000 gallons, but then revised their

estimate to 60 to 125 gallons of product in their August 28, 1995 letter to the MOA. Approximately 27 gallons of product was recovered from 1994 to 1997.

Groundwater sampling and product thickness measurements were conducted quarterly in 1995 and 1996 and continued semiannually in 1997 and 1998. Groundwater flow direction from 1995 to 1998 was towards the northeast. An exception was the August 6, 1996 flow determination that indicated an east-northeast flow direction. However, the groundwater measurements were taken after a rainfall event and the relative elevation of groundwater in Well MW-3, located in an unpaved area, was higher than usual compared to the wells in paved areas. During this period, the free-product thickness measured in Well MW-1 ranged from 0.23 foot to 2.7 feet. The maximum product thickness of 2.7 feet in Well MW-1 was measured in January 1995, and product was not measured above 1 foot in Well MW-1 after March 1995. Concentrations of DRO and BTEX reported in Wells MW-2, MW-3, and MW-4 remained either not detected or low and below ADEC cleanup levels. During the last groundwater sampling event of this period, conducted on October 7, 1998, 0.75 foot of product was measured in Well MW-1. DRO and BTEX were not detected in Wells MW-2 and MW-3. DRO was not detected in MW-4 but 0.0018 milligrams per liter (mg/L) total BTEX were measured in Well MW-4. Groundwater sampling results from 1994 through 1998 were stable and did not indicate migration of contaminants away from the vicinity of the former excavation. Groundwater was not sampled again at the site until 2004.

The groundwater monitoring wells were sampled again on May 25, 2004 and September 18, 2006 with results presented in Hart Crowser *Groundwater Monitoring* reports dated July 22, 2004 and November 22, 2006. The PetroTrap passive skimmers were determined to be no longer usable and were removed on May 25, 2004. Monitoring Well MW-1 contained 0.07 foot free-phase product in May 2004 and no free-phase product, but a heavy sheen, in September 2006. An analytical sample was collected from Well MW-1 for the first time in September 2006 and contained concentrations of GRO (103 mg/L), DRO (159 mg/L), benzene (2.65 mg/L), toluene (15.7 mg/L), ethylbenzene (4.16 mg/L), and xylenes (14.0 mg/L) greater than ADEC cleanup levels. Groundwater samples collected from Wells MW-2, MW-3, and MW-4 in May 2004 and September 2006 did not contain detectable concentrations of GRO, DRO, or BTEX. The monitoring wells were resurveyed in 2004, and groundwater flow direction was shown to be towards the northeast, which was consistent with previous findings.

In 2007, the Anchorage Fire Department expanded the Fire Station No. 4 building to the north such that the former UST excavation was partially under the apparatus bay extension of the building. The primary exposure pathway of concern was indoor air – the upward migration of fuel vapors from the subsurface contaminated soil and groundwater into the new apparatus bay portion of the building. Hart Crowser's May 14, 2007 *Remedial Action Report for AFD Station #4* documented the contaminated soil and groundwater removal from the former UST area prior to the building expansion project. The site monitoring wells and recovery wells were decommissioned during the 2007 remedial action. During the excavation at the former UST excavation area, approximately 230 cubic yards (cy) of granular fill material with headspace readings less than 15 parts per million (ppm) were removed from the ground surface to a depth of about 7.5 feet bgs. This soil was later used as backfill. Gray, sandy silt was observed from 7.5 to 12 feet bgs. Groundwater was encountered at 8.5 feet bgs during the excavation. The headspace results from 8.5 feet to 12 feet bgs ranged from 200 ppm to 580 ppm. Approximately 45 cy of soil with headspace results greater than 15 ppm were removed from the former UST area and stored on a liner. This soil was later transported to Alaska Soil Recycling (ASR). A "sump" was excavated to a depth of 14 feet bgs in the eastern portion of the excavation to facilitate contaminated groundwater pumping. Approximately 275 gallons of product and groundwater emulsion were pumped from the sump and eventually disposed by Emerald Alaska (Emerald). After pumping contaminated groundwater, 100 pounds of Oxygen Releasing Compound Advanced® (ORC-A) was placed in the excavation. Soil was backfilled to just above the groundwater interface, and an additional 50 pounds of ORC-A was placed into the smear zone before backfilling the rest of the excavation. Of the six confirmation samples collected from the smear zone in the excavation sidewalls (8 to 8.5 feet bgs), only one sample contained concentrations of target analytes greater than ADEC cleanup levels. Sample S2-SW, collected from the southern sidewall of the 2007 excavation at the location shown in Figure 2 contained 2,350 mg/kg DRO and 7.49 mg/kg ethylbenzene. The sample was located under the existing building foundation, which prevented further excavation.

Shannon & Wilson's December 2008 report, *Monitoring Well Installation, Anchorage Fire Department Station No. 4, 4350 MacInnes Street, Anchorage, Alaska,* documents our July 2008 installation of Monitoring Well B1MW near the southern edge of the 2007 excavation footprint at the location shown in Figure 2. Groundwater was encountered at about 11 feet bgs at the time of drilling. Soil boring samples from 8 to 10 feet and 10 to 11 feet were submitted for analysis. The soil samples contained up to 1,110 mg/kg GRO, 15.1 mg/kg benzene, 146 mg/kg toluene, 67.8 mg/kg ethylbenzene, and 303 mg/kg xylenes, which exceed the respective ADEC Method

Two cleanup levels. DRO was not detected in the soil boring samples. Primary and duplicate groundwater samples collected from Well B1MW contained concentrations of up to 128 mg/L GRO, 5.75 mg/L DRO, 23.5 mg/L benzene, 33.7 mg/L toluene, 4.97 mg/L ethylbenzene, and 15.7 mg/L xylenes, which are greater than ADEC Table C cleanup levels. With the exception of the DRO concentration, these concentrations are greater than the September 2006 sample collected from Well MW-1, located about 9 feet to the northwest. Concentrations of polynuclear aromatic hydrocarbons (PAH) in the soil and groundwater samples were less than ADEC cleanup levels. The soil in the boring consisted of brown, slightly silty, gravelly sand from the ground surface to 7 feet bgs, and gray, silty sand from 7 to 15 feet bgs.

2.3 Project Description

Project activities consisted of advancing three soil borings; collecting soil samples; installing, developing, surveying, and sampling three groundwater monitoring wells; soil and groundwater laboratory testing; investigation derived waste (IDW) disposal; and reporting. The field activities were conducted in two phases. Two monitoring wells (Wells B2MW and B3MW) were installed, developed, surveyed, and sampled in February and March 2013. After determining groundwater flow direction, one additional monitoring well (Well B4MW) was installed, developed, and sampled, and the wells were resurveyed in April 2013 to obtain data downgradient from the former USTs.

Discovery Drilling (Discovery) advanced the borings and installed the groundwater monitoring wells. Analytical testing of the project samples was conducted by SGS North America Inc. (SGS). Alaska Demolition disposed of the IDW soil, and Emerald disposed of the IDW water. Discovery, SGS, Alaska Demolition, and Emerald are based in Anchorage, Alaska and were subcontracted to Shannon & Wilson.

3.0 FIELD ACTIVITIES

The field activities were conducted in general accordance with our January 23, 2013 ADEC-approved work plan. Field work was led by ADEC-qualified personnel, as defined by 18 Alaska Administrative Code (AAC) 75.990. Site photos taken during field activities are presented in Appendix A. Field notes are provided in Appendix B.

3.1 Soil Borings

A utility locates request was sent on February 20, 2013 to locate buried utilities in the project area and identify potential conflicts prior to drilling. Shannon & Wilson's representative visited the project site on February 20 and 21, 2013 to mark and evaluate potential boring locations. An additional utility locates request was sent on April 9, 2013, prior to drilling Boring B4.

Borings B2 and B3 were drilled on February 22, 2013, and Boring B4 was drilled on April 15, 2013. Boring B2 was positioned about 15 feet east of the former UST excavation, Boring B3 was positioned about 15 feet northeast of the former UST excavation, and Boring B4 was positioned about 25 feet north of the former UST excavation, beyond a portion of the fire station building. Discovery provided a truck-mounted drill rig with hollow-stem auger to advance the borings and install the monitoring wells (Photos 1, 2, 3, and 6). During drilling, groundwater contact was observed at between 10.5 and 11.5 feet bgs. The borings were drilled to 16 or 16.5 feet bgs. Drill cuttings were contained in three labeled, 55-gallon drums, and stored on site pending characterization.

Three-inch outside diameter split-spoon samplers were used to collect soil samples continuously from the ground surface to the bottom of the boring, except for portions of the top two feet of Borings B2 and B3 due to frozen ground. Each soil sample was visually classified and "screened" for organic vapors using a Thermo Environmental Instruments OVM 580B photo-ionization detector (PID) and an ADEC-approved headspace sampling method. The PID was calibrated with 100 parts per million (ppm) isobutylene standard gas prior to use. Headspace samples were collected in re-sealable plastic bags by filling them one-third to half full with freshly exposed soil and then sealing. Headspace samples were warmed, and PID readings were obtained within 60 minutes of the sample collection.

Two analytical soil samples from each boring were collected with dedicated stainless steel spoons (Photo 4) at depths selected in accordance with our work plan. One sample from each boring was collected within the first foot above groundwater contact, and one sample from each boring was collected based on highest headspace result. The highest headspace results in Borings B2 and B3 were the near surface samples. The headspace result for each sample in Boring B4 was 0.0 ppm, so the near surface sample was selected for analytical sampling to evaluate the surface soil pathway. A soil sample field duplicate set (Samples B3S6/B3S14) was collected from Boring B3.

Analytical samples were collected by quickly filling the appropriate laboratory-provided jars. The sample containers were filled in order of decreasing volatility. Accordingly, sample containers for GRO/BTEX were filled first, followed by headspace screening samples and moisture content samples. Samples for GRO and BTEX analyses were field preserved in accordance with Environmental Protection Agency (EPA) Method SW-846. Each GRO/BTEX soil sample was quickly placed into a pre-weighed, 4-ounce amber glass jar with septa lid, taking care to minimize disturbance that could lead to volatilization losses. Approximately 50 grams of soil was added to the sample jar, and one 25-milliliter vial of laboratory-provided methanol was immediately added to the sample container, with sufficient volume to completely submerge the soil.

Summaries of soil encountered in the borings are provided in the boring logs presented in Appendix B. Soil sample locations and descriptions are provided in Table 1.

3.2 Monitoring Well Installation and Development

Monitoring Wells B2MW, B3MW, and B4MW were installed through the hollow-stem auger in Boring B2, B3, and B4, respectively. The monitoring wells were constructed of 2-inch nominal diameter Schedule 40 polyvinyl chloride (PVC) pipe with threaded connections. The lower portion of the wells consisted of a 10-foot section of 0.010-inch slotted well screen. The screens extended from approximately 6 feet bgs to approximately 15.5 feet bgs. A filter pack of #10/#20 silica sand was used to backfill around the well screens to approximately 1 foot above the screened section. Bentonite chips were used to backfill around the PVC piping above the sand backfill to 0.8 to 1 foot bgs. Steel, flush-mounted protective casings were installed around the monitoring wells (Photos 2, 5, and 7) and embedding in asphalt (Wells B2MW and B3MW) or pea-gravel (Well B4MW). Swing tie measurements between the wells and permanent site features were recorded. The construction details for the monitoring wells are provided in Appendix B.

Monitoring Wells B2MW and B3MW were developed on February 27, 2013, and Monitoring Well B4MW was developed on April 17, 2013 using a surge block and submersible pump. Prior to well development, the static water level and potential presence of product was measured in the on-site wells using an oil/water interface probe. Product was measured in existing Monitoring Well B1MW (0.03 foot), but not in new Monitoring Wells B2MW, B3MW, and B4MW. Well development consisted of alternating 3-minute periods of surging with a surge block and purging

with a submersible pump with disposable tubing. Water quality parameters, including temperature, specific conductance, pH, and turbidity were recorded during development. Development was considered complete for Wells B2MW and B3MW after the wells were purged dry three times each, with the water level allowed to recover to at least 80 percent of the pre-purge level before surging and purging again. Water level recovery in Well B3MW was slow after the well was purged dry one time. Therefore, approximately 1.5 gallons of potable water was poured into the well, and the well was surged and purged dry one more time to complete the development. Development water was contained in two 55-gallon drums and stored on site pending receipt of analytical results. Well development data are summarized in Table 2.

3.3 Monitoring Well Elevation Survey

Shannon & Wilson personnel conducted a level-loop survey on March 1, 2013 to determine the top-of-casing elevations of existing Monitoring Well B1MW and new Wells B2MW and B3MW relative to a temporary benchmark with an elevation designated 100.00 feet. The elevations were surveyed to an accuracy of 0.01 foot. Another level-loop survey was conducted on April 30, 2013 after Well B4MW was installed to determine the top-of-casing elevations of the four on-site wells.

3.4 Groundwater Elevations and Flow Direction

Depth to groundwater was measured in three monitoring wells (Wells B1MW through B3MW) on February 27, 2013 and four monitoring wells (Wells B1MW through B4MW) on April 18, 2013 using a product/water interface probe (Well B1MW) and electronic water-level indicator (the remaining wells). Measurements were taken with respect to the top of the well casings and depths were determined to an accuracy of 0.01 foot. The water-level indicator and product/water interface probe were decontaminated prior to insertion in each well. The April 18, 2013 water levels are listed in Table 2.

The approximate groundwater flow direction on February 27, 2013 was towards the north-northwest. The groundwater flow direction based on February 27, 2013 measurements provided the information necessary to place Well B4MW in a location downgradient from the former UST location. Using data from all four of the site's monitoring wells, the approximate groundwater flow direction on April 18, 2013 was towards the northwest, as shown in Figure 2. The hydraulic gradient was approximately 0.003 foot per foot.

3.5 Groundwater Sampling

Groundwater samples were collected from Monitoring Wells B2MW, B3MW, and B4MW on March 2, 2013, March 11, 2013, and April 18, 2013, respectively. A groundwater sample was not collected from Well B1MW due to the presence of product in the well. Prior to sampling, the depth to groundwater was measured in monitoring wells using an electronic water-level indicator. The depths to water in the monitoring wells prior to purging are listed in Table 2 in the "Purging/Sampling Data" section.

The monitoring wells were purged and sampled using a low-flow technique to minimize sediment disturbance and the amount of purge water generated. The wells were purged and sampled with a submersible pump and disposable tubing. A pump rate of less than 0.5 liter per minute was used with a goal of limiting the sustained water drawdown to a maximum of 0.1 meter (4 inches). Water quality parameters (temperature, specific conductance, pH, and turbidity), purge volume, and drawdown were recorded at 3 to 5-minute intervals.

The groundwater samples from Wells B2MW and B4MW were collected when the water quality parameters stabilized over three successive readings: pH within 0.1 unit, temperature within 1 degree Celsius, specific conductance within 3 percent, and turbidity within 10 percent or three consecutive readings of less than 10 NTU. During an aborted sampling attempt on March 1, 2013, after purging approximately one well volume, the turbidity in Well B4MW increased to a level that could compromise DRO analytical results. Well B4MW was subsequently sampled on March 11, 2013 after purging one well volume without allowing water quality parameters to stabilize. This procedure was used to keep turbidity low.

Analytical samples were collected by transferring water directly from the pump tubing into laboratory-supplied containers. A field duplicate sample (Sample B4MW) was collected from Well B3MW, and submitted blind to SGS. Note that there are two samples with the "B4MW" designation – the field duplicate for Well B3MW, and the sample from Well B4MW were both named "B4MW". The samples can be differentiated by date in the laboratory reports. The samples were placed into chilled coolers for transport to SGS. The purge water was contained in the same two 55-gallon drums used to contain development water. Purging and sampling data are provided in Table 2.

4.0 LABORATORY ANALYSIS

Soil and groundwater samples were delivered to SGS using chain-of-custody procedures. The samples were tested on a standard 10 business day turn-around-time. Seven soil samples, including one duplicate, were analyzed for GRO by Alaska Method (AK) 101, and BTEX by EPA Method 8021B. Two methanol trip blanks accompanying the sample coolers were also analyzed for GRO and BTEX.

Four groundwater samples, including one duplicate, were submitted to SGS for analysis of GRO by AK 101, DRO by AK 102, and BTEX by EPA 8021B. A total of three water trip blanks accompanying the sample coolers were analyzed for GRO and BTEX.

Under the sample numbering scheme used for this project, a typical analytical sample number is 17548-B2S1 for soil samples and 17548-B2MW for groundwater samples. The "17548" indicates the Shannon & Wilson job number, and the "B2S1" and "B2MW" designations represent the sample identification numbers. For brevity in the text of this report, the "17548" prefix is omitted.

5.0 SUBSURFACE CONDITIONS

Approximately 0.2 foot of asphalt pavement was present at the surface of Borings B2 and B3, while the top 0.5 foot of Boring B4 consisted of vegetation (grass) and top soil. Based on our observation of soil in the borings, a brown, slightly silty, slightly gravelly to gravelly sand layer extended from the surface material to 5.8 feet, 11 feet, and 8.5 feet bgs in Borings B2, B3, and B4, respectively. This was underlain by a brown to gray, silty fine sand layer that extended to the bottom of the boring (16.5 feet bgs) in Boring B2, and 15 feet bgs in Borings B3 and B4. From 15 feet bgs to the bottoms of the borings at 16 feet bgs in Borings B3 and B4, we observed a gray, slightly sandy silt (Boring B3) or gray silt (Boring B4). The top seven feet of soil in Boring B2 and the top four feet of soil in Boring B3 were frozen at the time of drilling. Boring logs are provided in Appendix B.

At the time of drilling, groundwater was encountered in Borings B2, B3, and B4 at approximate depths of 11.5 feet, 11 feet, and 10.5 feet bgs, respectively. The static groundwater depths measured in the on-site monitoring wells on April 18, 2013 ranged from approximately 10.2 feet to 11.7 feet bgs. The groundwater is located in a moderately permeable, silty fine sand water-

bearing zone that appears to be underlain by a less permeable sandy silt to silt layer at 15 feet bgs in Borings B3 and B4.

6.0 DISCUSSION OF RESULTS

The reported contaminant concentrations in the soil and water samples are compared to the cleanup levels listed in 18 AAC 75 (April 2012). The soil criteria are based on the most stringent Method 2 cleanup level listed in Tables B1 and B2 for the "under 40-inch (precipitation) zone". Groundwater cleanup levels are listed in Table C. The cleanup levels and analytical results for soil and groundwater samples collected for this project are provided in Tables 3 and 4, respectively. Copies of the laboratory reports are provided in Appendix D.

6.1 Soil Analytical Results

A total of seven analytical soil samples, including one field duplicate sample, were collected from the three borings. As shown in Table 3, target analyte concentrations in the soil samples did not exceed ADEC Method 2 cleanup levels. Benzene was detected in near surface Samples B2S1 and B3S1 and toluene was also detected in Sample B3S1, but concentrations were less than the laboratory's limit of quantitation (LOQ). There were no other target analyte detections in the soil samples.

6.2 Groundwater Analytical Results

Groundwater samples were collected from three of the four site monitoring wells. An analytical sample was not collected from Monitoring Well B1MW due to the presence of 0.03 foot of product in the well. The DRO concentration in the sample from Well B2MW was measured at 1.81 mg/L, which is greater than the ADEC cleanup level of 1.5 mg/L. GRO, benzene, and ethylbenzene were also detected in the sample from Well B2MW, but at concentrations less than ADEC cleanup levels. Target analytes were not detected in the samples from Wells B3MW and B4MW.

6.3 Quality Assurance Summary

The project laboratory implements on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQOs). Internal laboratory controls to assess data quality for this project included surrogates, method blanks, laboratory control sample/laboratory control sample duplicates (LCS/LCSD), and matrix spike/matrix spike

duplicates (MS/MSD) to assess precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provided a report specific note identifying the problem in the Case Narrative section of their Laboratory Analysis Report (See Appendix D).

Shannon & Wilson reviewed the SGS data deliverables and completed the ADEC's Laboratory Data Review Checklist (LDRC), which are included in Appendix D, for each laboratory report. Field duplicate sample results were also compared. The field duplicate results for both soil and groundwater samples were non-detectable for each target analyte. Quality control discrepancies and the impact to data quality/usability are described in further detail in the LDRCs. In our opinion, no non-conformances that would adversely impact data usability were noted, and we find the project data to be complete and useable to support the project purpose and objectives.

7.0 INVESTIGATION DERIVED WASTE

IDW for this project consisted of three 55-gallon drums of soil generated during monitoring well installation, and two 55-gallon drums of water from decontamination and well development and purging, and disposable sampling gear (gloves, tubing, plastic bags, etc.) The disposable sampling gear was disposed as unregulated soil waste. The drums were temporarily stored on-site pending receipt of analytical results.

The ADEC approved the transport and disposal of the IDW on July 8, 2013 (Appendix E). Target analytes were not detected above ADEC cleanup levels in the soil, so Alaska Demolition transported the three drums of soil to their inert landfill in Palmer on July 8, 2013. The drum containing water from Well B2MW was picked up and disposed by Emerald on July 29, 2013. The drum containing water from monitoring wells that tested clean was discharged on the ground surface at the project site on July 29, 2013. IDW waste disposal documentation is included in Appendix E.

8.0 SUMMARY AND CONCLUSIONS

Project activities at Fire Station No. 4 consisted of advancing three soil borings; installing, developing, and surveying three groundwater monitoring wells; soil and groundwater sampling; laboratory testing; and disposal of IDW.

Concentrations of target analytes in the soil samples were less than ADEC cleanup levels.

Product was measured at a thickness of 0.03 foot in Well B1MW, which is located adjacent to and south of the former UST excavation, and also adjacent to the fire station building. In 2008, Well B1MW contained a heavy sheen. The results from Well B1MW are similar to the results from former Well MW-1 in 2004 to 2006, which was located about 9 feet to the northwest of Well B1MW prior to decommissioning in 2007. Well MW-1 contained product ranging from 0.07 foot to a heavy sheen. Based on the April 18, 2013 groundwater flow direction, the plume may potentially migrate under the northeast corner of the fire station building, which contains an apparatus bay and dormitory space. A soil sample from the installation of Well B1MW in 2008 contained 15.1 mg/kg benzene. Evaluation of the possible impact of contaminated soil on indoor air quality was not part of the scope of this work.

The DRO concentration in Well B2MW was greater than the ADEC cleanup level. Based on the April 18, 2013 water level measurements indicating groundwater flow direction towards the northwest, Well B2MW appears to be up gradient from the former UST location. However, historical groundwater flow determinations have indicated groundwater flow directions ranging from north-northeast to east-northeast, which would make Well B2MW a cross-gradient or downgradient monitoring well. It is also possible that an off-site source may be contributing to the DRO concentrations measured in Well B2MW.

Groundwater samples from Wells B3MW and B4MW did not contain detectable concentrations of target analytes. Well B3MW is downgradient from the former UST location based on historical groundwater flow direction, and Well B4MW is downgradient from the former UST location based on the April 18, 2013 groundwater flow direction. The wells are about half the distance from the former UST location compared to former downgradient Well MW-2. The non-detectable groundwater results measured in March and April 2013 in Wells B3MW and B4MW, respectively, indicate that the plume is relatively stable.

9.0 CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives. The findings we have presented within this report are based on the limited sampling and analyses that we conducted. They should not be construed as definite conclusions regarding the project site's soil or groundwater conditions. It is possible that our subsurface tests missed higher levels, although our intention was to sample areas likely to be impacted. 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 may need to be revised. Shannon & Wilson has prepared the document in Appendix F, Important Information About Your Geotechnical/Environmental Report, to assist you and others in understanding the use and limitations of our reports.

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 unless specifically requested and authorized by you, 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 obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and hard copies, or you question the authenticity of the report, please contact Tim Terry or the undersigned.

SHANNON & WILSON, INC.

Andrew Lee

Andrew Lee
Environmental Scientist

Stafford Glashan, P.E.
Vice President

ASL:TMT/sjg

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location (See Figure 2)	Depth (feet)	Headspace (ppm) ^	Sample Classification** (see Appendix B)
Soil Samples					
Boring B2					
* B2S1	2/22/2013	Boring B2, Sample 1	0.5-1.5	4.2	Very dense (frozen), brown, slightly silty, gravelly SAND; moist
B2S2	2/22/2013	Boring B2, Sample 2	2-4	0.2	Very dense (frozen), brown, slightly silty, gravelly SAND; moist
B2S3	2/22/2013	Boring B2, Sample 3	4-6	0.0	Dense (frozen), brown, slightly silty, gravelly SAND; moist
B2S4	2/22/2013	Boring B2, Sample 4	6-8	0.0	Medium dense, brown, silty fine SAND; moist
B2S5	2/22/2013	Boring B2, Sample 5	8-10	0.0	Medium dense, brown, silty fine SAND; moist
* B2S6	2/22/2013	Boring B2, Sample 6	10-12	0.0	Medium dense, brown, silty fine SAND; moist
B2S7	2/22/2013	Boring B2, Sample 7	12-14	-	Medium dense, brown, silty fine SAND; wet
B2S8	2/22/2013	Boring B2, Sample 8	14-16	-	Medium dense, gray, silty fine SAND; wet
Boring B3					
* B3S1	2/22/2013	Boring B3, Sample 1	0.5-1	9.4	Very dense (frozen), brown, slightly silty, gravelly SAND; moist
B3S2	2/22/2013	Boring B3, Sample 2	2-4	1.9	Very dense (frozen), brown, slightly silty, gravelly SAND; moist
B3S3	2/22/2013	Boring B3, Sample 3	4-6	1.4	Dense, brown, slightly silty, gravelly SAND; moist
B3S4	2/22/2013	Boring B3, Sample 4	6-8	1.0	Dense, brown, slightly silty, gravelly SAND; moist
B3S5	2/22/2013	Boring B3, Sample 5	8-10	3.6	Dense, brown, slightly silty, gravelly SAND; moist
* B3S6	2/22/2013	Boring B3, Sample 6	10-12	0.3	Loose, brown, slightly silty, gravelly SAND; moist
B3S7	2/22/2013	Boring B3, Sample 7	12-14	-	Medium dense, brown, silty fine SAND; moist to wet
B3S8	2/22/2013	Boring B3, Sample 8	14-16	-	Loose, brown, silty fine SAND; wet
* B3S14	2/22/2013	Duplicate of Sample B3S6	10-12	0.3	Loose, brown, slightly silty, gravelly SAND; moist
Boring B4					
* B4S1	4/15/2013	Boring B4, Sample 1	0.5-2	0.0	Loose, brown, slightly silty gravelly SAND; moist; with broken rock
B4S2	4/15/2013	Boring B4, Sample 2	2-4	0.0	Medium dense, brown, slightly silty, gravelly SAND; moist
B4S3	4/15/2013	Boring B4, Sample 3	4-6	0.0	Medium dense, brown, slightly silty, gravelly SAND; moist
B4S4	4/15/2013	Boring B4, Sample 4	6-8	0.0	Medium dense, brown, slightly silty, slightly gravelly SAND; moist
B4S5	4/15/2013	Boring B4, Sample 5	8-10	0.0	Medium dense, brown, silty fine SAND; moist

Notes:

* = Sample analyzed by the project laboratory (See Table 3)

** = Sample classification applies to the portion of the specified sample interval from which the sample was collected.

^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID).

\- = Measurement not recorded or not applicable

ppm = parts per million

TABLE 1
SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location (See Figure 2)	Depth (feet)	Headspace (ppm) ^	Sample Classification** (see Appendix B)
Boring B4 (continued)					
* B4S6	4/15/2013	Boring B4, Sample 6	10-12	0.0	Medium dense, brown, silty fine SAND; moist to wet
B4S7	4/15/2013	Boring B4, Sample 7	12-14	0.0	Medium dense, brown, silty fine SAND; wet
B4S8	4/15/2013	Boring B4, Sample 8	14-16	0.0	Loose, gray, silty fine SAND; wet
Groundwater Sample					
* B2MW	3/1/2013	Monitoring Well B2MW	10.23	-	Groundwater
* B3MW	3/11/2013	Monitoring Well B3MW	10.73	-	Groundwater
* B4MW~	3/11/2013	Duplicate of Sample B3MW	10.73	-	Groundwater
* B4MW	4/18/2013	Monitoring Well B4MW	11.35	-	Groundwater
Quality Control Samples					
* TBS	2/22/2013	Soil trip blank	-	-	Ottawa sand with methanol added in the laboratory
* TBS2	4/15/2013	Soil trip blank	-	-	Ottawa sand with methanol added in the laboratory
* TBW1	3/1/2013	Water trip blank	-	-	Organic-free water blank prepared by laboratory
* TBW2	3/11/2013	Water trip blank	-	-	Organic-free water blank prepared by laboratory
* TBW	4/18/2013	Water trip blank	-	-	Organic-free water blank prepared by laboratory

Notes:

* = Sample analyzed by the project laboratory (See Table 3)

** = Sample classification applies to the portion of the specified sample interval from which the sample was collected.

^ = Field screening instrument was a Thermo Environmental Instruments 580B photoionization detector (PID).

\- = Measurement not recorded or not applicable

ppm = parts per million

~ = There are two Sample B4MWs because the field duplicate of Sample B3MW was designated "Sample B4MW" before Well B4MW was installed.

TABLE 2
WELL SAMPLING LOG

	Monitoring Well Number			
	B1MW	**B2MW**	**B3MW**	**B4MW**
Water Level Measurement Data				
Date Water Level Measured	4/18/2013	4/18/2013	4/18/2013	4/18/2013
Time Water Level Measured	16:08	16:01	15:57	15:52
Surveyed Measuring Point Elevation, Feet	99.68	98.41	98.83	99.59
Depth to Product Below Measuring Point, Feet	11.37	no product	no product	no product
Depth to Water Below Measuring Point, Feet	11.40	10.01	10.55	11.35
Product Thickness, Feet	0.03	0.00	0.00	0.00
Water Level Elevation, Feet	88.31	88.44*	88.28	88.24
Development Data				
Date Developed	7/16/2008	2/27/2013	2/27/2013	4/17/2013
Time Development Initiated	-	12:05	15:20	12:45
Time Development Completed	-	15:20	16:40	15:05
Development Method	-	surge block/pump	surge block/pump	surge block/pump
Gallons of Water Removed	10	11.5	5.5	13.5
Purging/Sampling Data				
Date Sampled	-	3/1/2013	3/11/2013	4/18/2013
Time Sampled	-	13:15	15:40	17:12
Depth to Water Below Measuring Point, Feet	11.48 (3/1/2013)	10.23	10.73	11.35
Total Depth of Well Below Measuring Point, Feet	14.48	15.89	15.56	15.62
Water Column in Well, Feet	3.00	5.66	4.83	4.27
Gallons per Foot	0.16	0.16	0.16	0.16
Gallons in Well	0.48	0.91	0.77	0.68
Total Gallons Pumped/Bailed	0	3.5	1	4.25
Purging Method	-	submersible pump	submersible pump	submersible pump
Sampling Method	-	submersible pump	submersible pump	submersible pump
Diameter of Well Casing	2-inch	2-inch	2-inch	2-inch
Water Quality Data at Time of Sampling				
Temperature, ^{o}C	-	4.36	4.52	7.08
Specific Conductance, mS/cm	-	0.774	0.248	0.404
pH, standard units	-	6.69	6.30	7.68
Turbidity, NTU	-	24.80	47.21	37.72
Remarks	Not sampled due to product in well	Purged dry three times during development	Purged dry, added potable water, purged dry again to develop. Sampled after purging one well volume to keep turbidity low	Purged dry three times during development

Notes:

Monitoring well survey was conducted by Shannon & Wilson on April 30, 2013. Elevations are relative to a temporary benchmark with elevation designated 100.00 feet.

Water quality parameters were measured with a YSI-556 instrument and MicroTPW or Hach turbidimeter.

* = corrected groundwater elevation; Well B2MW was shortened by 0.04 foot on April 30, 2013 prior to well survey

\- = indicates not applicable or not measured

^{o}C = degrees Celsius

mS/cm = millisiemens per centimeter

NTU = Nephthelometric Turbidity Unit

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method	Cleanup Level**	Sample ID Number^ and Collection Depth in Feet (See Table 1, Figure 2, and Appendix D*) Soil Boring Samples				
			B2S1 0.5-1.5	B2S6 10-12	B3S1 0.5-1	B3S6 10-12	B3S14~ 10-12
Headspace Reading - ppm	OVM 580B	-	4.2	0.0	9.4	0.3	0.3
Total Solids - percent	SM21 2540G	-	97.3	83.9	94.4	96.6	96.6
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	<1.37	<1.74	<1.23	<1.11	<1.38
Aromatic Volatile Organics (BTEX)							
Benzene - mg/kg	EPA 8021B	0.025	**0.00595 J**	<0.00926	**0.00633 J**	<0.00594	<0.00734
Toluene - mg/kg	EPA 8021B	6.5	<0.0143	<0.0181	**0.0106 J**	<0.0116	<0.0143
Ethylbenzene - mg/kg	EPA 8021B	6.9	<0.0143	<0.0181	<0.0127	<0.0116	<0.0143
Xylenes - mg/kg	EPA 8021B	63	<0.0417	<0.0529	<0.0373	<0.0338	<0.0419

Notes:

*	= See Appendix D for compounds tested, methods, and laboratory reporting limits
**	= Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75.341 (April 2012).
^	= Sample ID No. preceded by "17548-" on the chain of custody form
ppm	= parts per million
mg/kg	= milligrams per kilogram
~	= duplicate of Sample B3S6
-	= not applicable or sample not tested for this analyte
<1.37	= analyte not detected; laboratory limit of detection of 1.37 mg/kg
0.00595	= bold highlights detected analytes
J	= estimated at a concentration less than the laboratory's limit of quantitation

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method	Cleanup Level**	Sample ID Number^ and Collection Depth in Feet (See Table 1, Figure 2, and Appendix D*)			
			Soil Boring Samples		Quality Control	
			B4S1	B4S6	TBS	TBS2
			0-2	10-12	-	-
Headspace Reading - ppm	OVM 580B	-	0.0	0.0	-	-
Total Solids - percent	SM21 2540G	-	87.8	80.8	-	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	<1.67	<3.20 B	<1.50	<1.50
Aromatic Volatile Organics (BTEX)						
Benzene - mg/kg	EPA 8021B	0.025	<0.00892	<0.0102	<0.00802	<0.00802
Toluene - mg/kg	EPA 8021B	6.5	<0.0174	<0.0199	<0.0156	<0.0156
Ethylbenzene - mg/kg	EPA 8021B	6.9	<0.0174	<0.0199	<0.0156	<0.0156
Xylenes - mg/kg	EPA 8021B	63	<0.0508	<0.0583	<0.0456	<0.0456

Notes:

*	= See Appendix D for compounds tested, methods, and laboratory reporting limits
**	= Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75.341 (April 2012).
^	= Sample ID No. preceded by "17548-" on the chain of custody form
ppm	= parts per million
mg/kg	= milligrams per kilogram
TBS	= soil trip blank
-	= not applicable or sample not tested for this analyte
<1.67	= analyte not detected; laboratory limit of detection of 1.67 mg/kg
B	= result was within five times the concentration in the associated method blank; analyte considered not detected at the limit of quantitation
J	= estimated at a concentration less than the laboratory's limit of quantitation

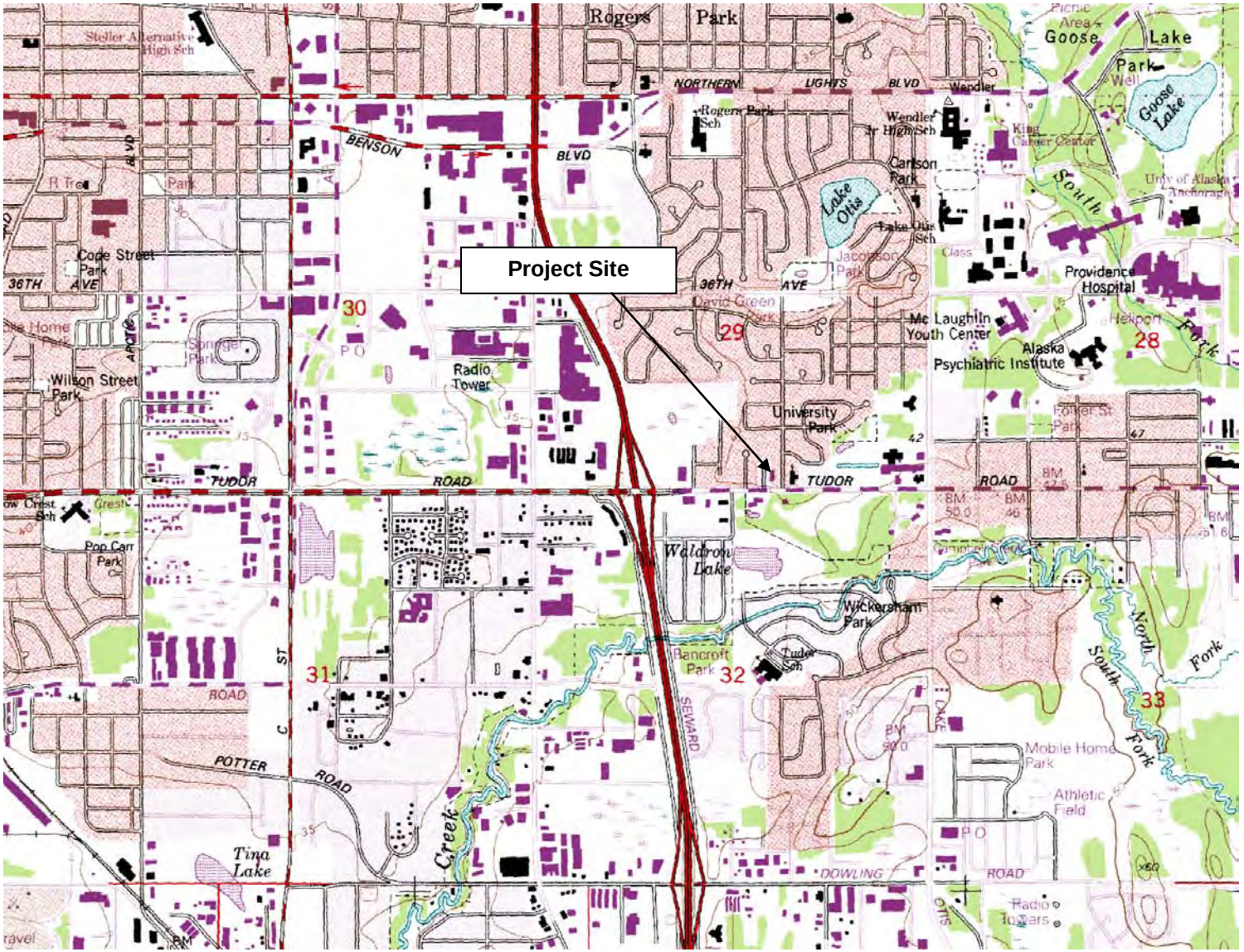
TABLE 4
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level**	Sample ID Number^ and Water Depth in Feet (See Tables 1 and 2, Figure 2, and Appendix D*)			
			Monitoring Well Samples			
			B2MW 10.23	B3MW 10.73	B4MW~ 10.73	B4MW 11.37
Gasoline Range Organics (GRO) - mg/L	AK 101	2.2	**0.0387 J**	<0.0620	<0.0620	<0.100 B
Diesel Range Organics (DRO) - mg/L	AK 102	1.5	**1.81**	<0.376	<0.376	<0.370
Aromatic Volatile Organics (BTEX)						
Benzene - mg/L	EPA 8021B	0.005	**0.00279**	<0.000300	<0.000300	<0.000300
Toluene - mg/L	EPA 8021B	1.0	<0.000620	<0.000620	<0.000620	<0.000620
Ethylbenzene - mg/L	EPA 8021B	0.7	**0.00321**	<0.000620	<0.000620	<0.00100 B
Xylenes - mg/L	EPA 8021B	10	<0.00186	<0.00186	<0.00186	<0.00300 B

Parameter Tested	Method*	Cleanup Level**	Sample ID Number^ and Water Depth in Feet (See Tables 1 and 2, Figure 2, and Appendix D*)			
			Quality Control			
			TBW1 -	TBW2 -	TBW -	
Gasoline Range Organics (GRO) - mg/L	AK 101	2.2	<0.0620	<0.0620	**0.0850 J**	
Aromatic Volatile Organics (BTEX)						
Benzene - mg/L	EPA 8021B	0.005	<0.000300	<0.000300	<0.000300	
Toluene - mg/L	EPA 8021B	1.0	<0.000620	<0.000620	<0.000620	
Ethylbenzene - mg/L	EPA 8021B	0.7	<0.000620	<0.000620	<0.000620	
Xylenes - mg/L	EPA 8021B	10	<0.00186	<0.00186	**0.000330 J**	

Notes:

*	= See Appendix D for compounds tested, methods, and laboratory reporting limits
**	= Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (April 2012)
^	= Sample ID number preceded by "17548-" on the chain of custody form
~	= Duplicate of Sample B3MW
TBW1	= water trip blank number 1
mg/L	= Milligrams per liter
1.81	= Reported concentration exceeds cleanup level
J	= estimated at a concentration less than the laboratory's limit of quantitation
<0.0620	= Analyte not detected; laboratory limit of detection of 0.0620 mg/L
0.0387	= bold highlights detected analytes
B	= reported concentration within five times method blank or trip blank concentration; analyte considered not detected at limit of quantitation.



From U.S. Geological Survey
Anchorage A-8 NW Quadrangle
Contour Interval 5 Meters

0 2,000 4,000

Approximate Scale in Feet

One Inch Equals Approximately 2,000 Feet

N

4350 MacInnes Street
Anchorage, Alaska

VICINITY MAP

September 2013 32-1-17548-001

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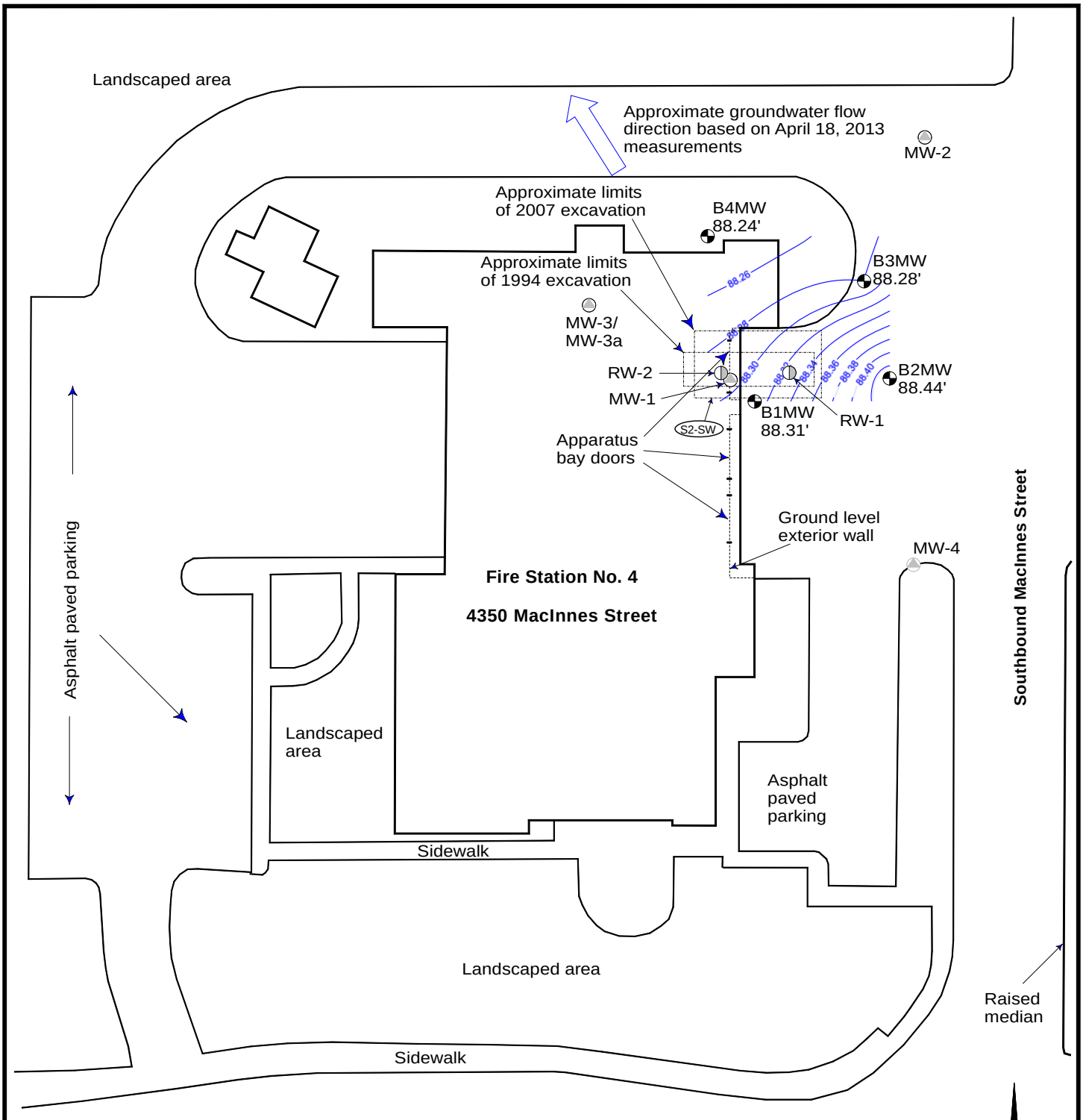
Fig. 1



LEGEND

B1MW	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.
88.31'	Groundwater elevation on April 18, 2013 relative to temporary benchmark designated 100.00 feet
MW-3	Approximate former location of Monitoring Well MW-3, installed by HartCrowser in 1994 and decommissioned in 2007
RW-2	Approximate former location of Recovery Well RW-2, installed by HartCrowser in 1995 and decommissioned in 2007
S2-SW	Approximate location of Soil Sample S2-SW, collected from the 2007 excavation by HartCrowser at a depth of 8 to 8.5 feet below ground surface and containing 2,350 mg/kg DRO and 7.49 mg/kg ethylbenzene
88.26	Groundwater elevation countour line

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SITE PLAN

September 2013 32-1-17548-001

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Fig. 2

APPENDIX A

SITE PHOTOGRAPHS

Photo 1: Looking east, a view of Discovery Drilling drilling Boring B2. (February 22, 2013)

Photo 2: Monitoring Well B2MW was installed in Boring B2. In this view, the well casing is being trimmed down to allow installation of the flush-mount protective casing. (February 22, 2013)

Photo 3: Looking northwest, a view of Discovery Drilling drilling Boring B3. (February 22, 2013)

Photo 4: Shannon & Wilson personnel collected soil samples from the split spoon samplers using dedicated stainless steel spoons. This was Sample B3S4. (February 22, 2013)

Photo 5: Looking southwest from the eastern side of Fire Station No. 4, Monitoring Well B3MW is visible in the foreground. Investigation derived waste was stored in 55-gallon drums. (February 27, 2013)

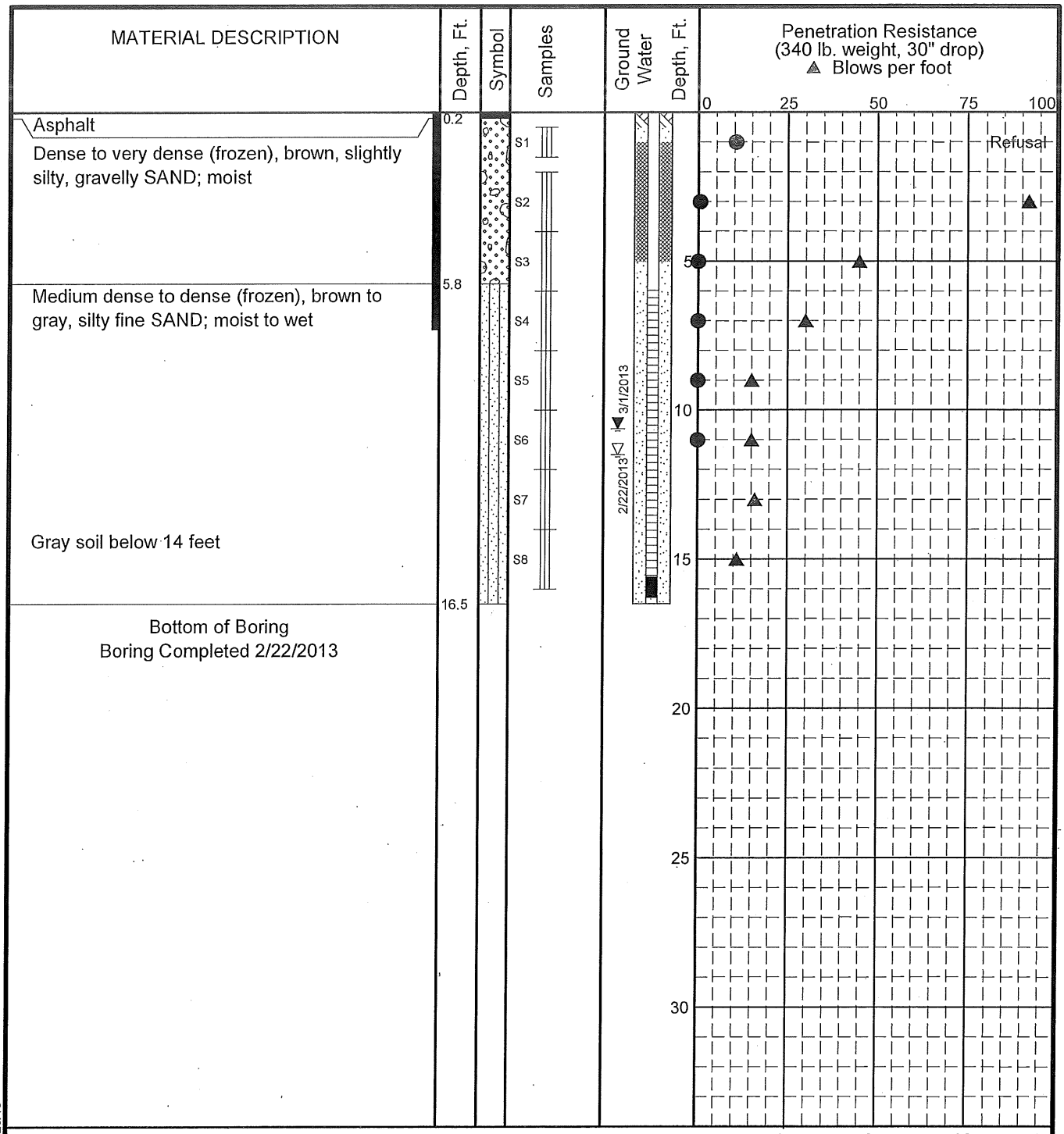
Photo 6: Boring B4 was advanced on the north side of Fire Station No. 4; looking south-southwest. (April 15, 2013)

Photo 7: Looking southeast, a view of Monitoring Well B4MW, which was installed in Boring B4. (April 15, 2013)

Photo 8: Looking west, a view of existing Well B1MW, located on the eastern side of Fire Station No. 4. (February 27, 2013)

APPENDIX B

BORING LOG AND MONITORING WELL CONSTRUCTION DETAILS



LEGEND

- * Sample not recovered
- 3" O.D. Split Spoon Sample
- Frozen
- Ground Water Level At Time Of Drilling
- Static Water Level
- Solid Casing, Sand Pack
- Solid Casing and Annular Seal
- Slotted Section, Filter Sand
- Solid Casing, Cuttings Backfill

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

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LOG OF BORING B2

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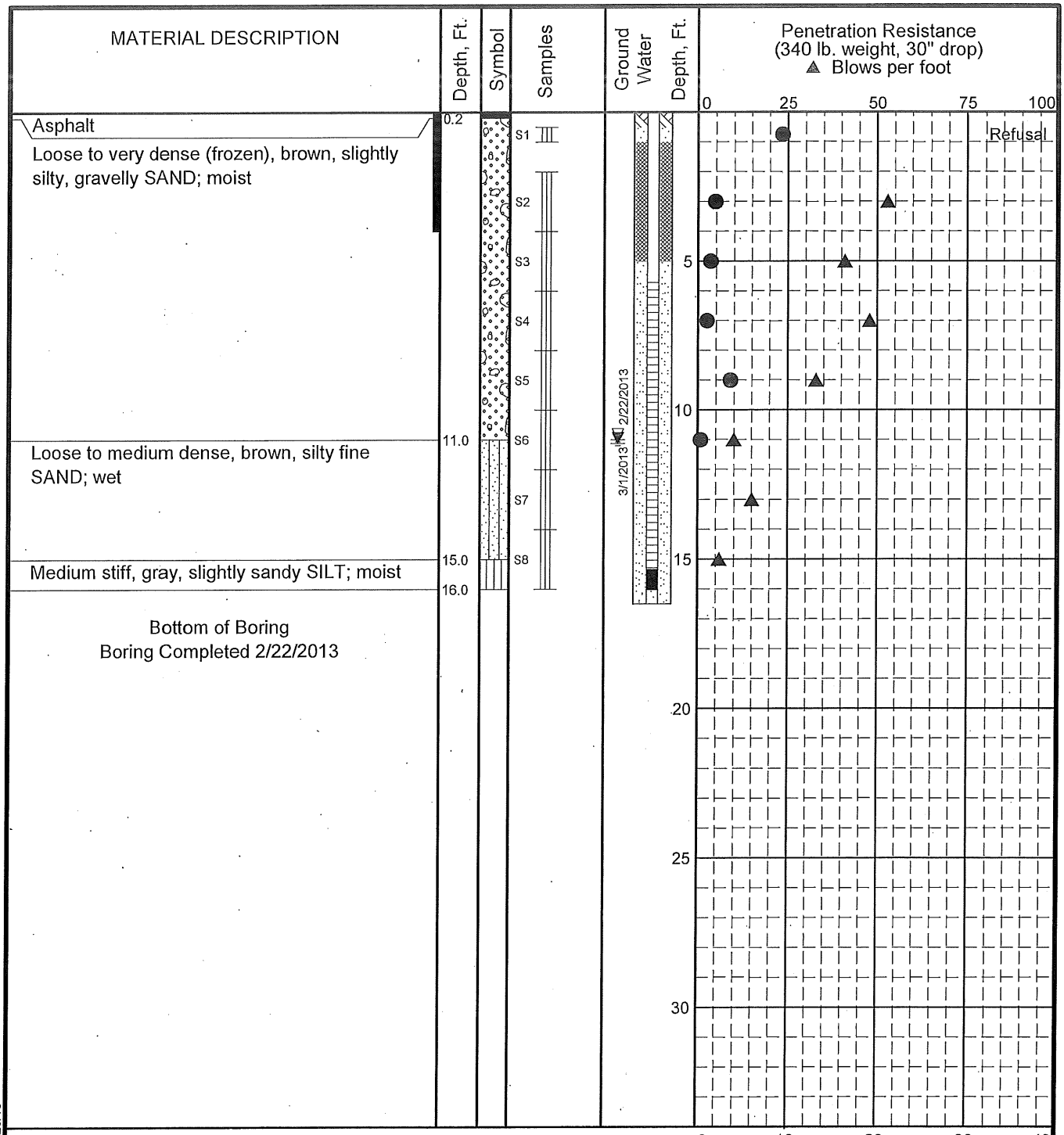
Fig. B-1

ENVIRONMENTAL LOG 17548 BORING.GPJ S&W GEO1.GDT 9/23/13



LEGEND

* Sample not recovered	Ground Water Level At Time Of Drilling
3" O.D. Split Spoon Sample	Static Water Level
	Solid Casing, Sand Pack
	Solid Casing and Annular Seal
Frozen	Slotted Section, Filter Sand
	Solid Casing, Cuttings Backfill

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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LOG OF BORING B3

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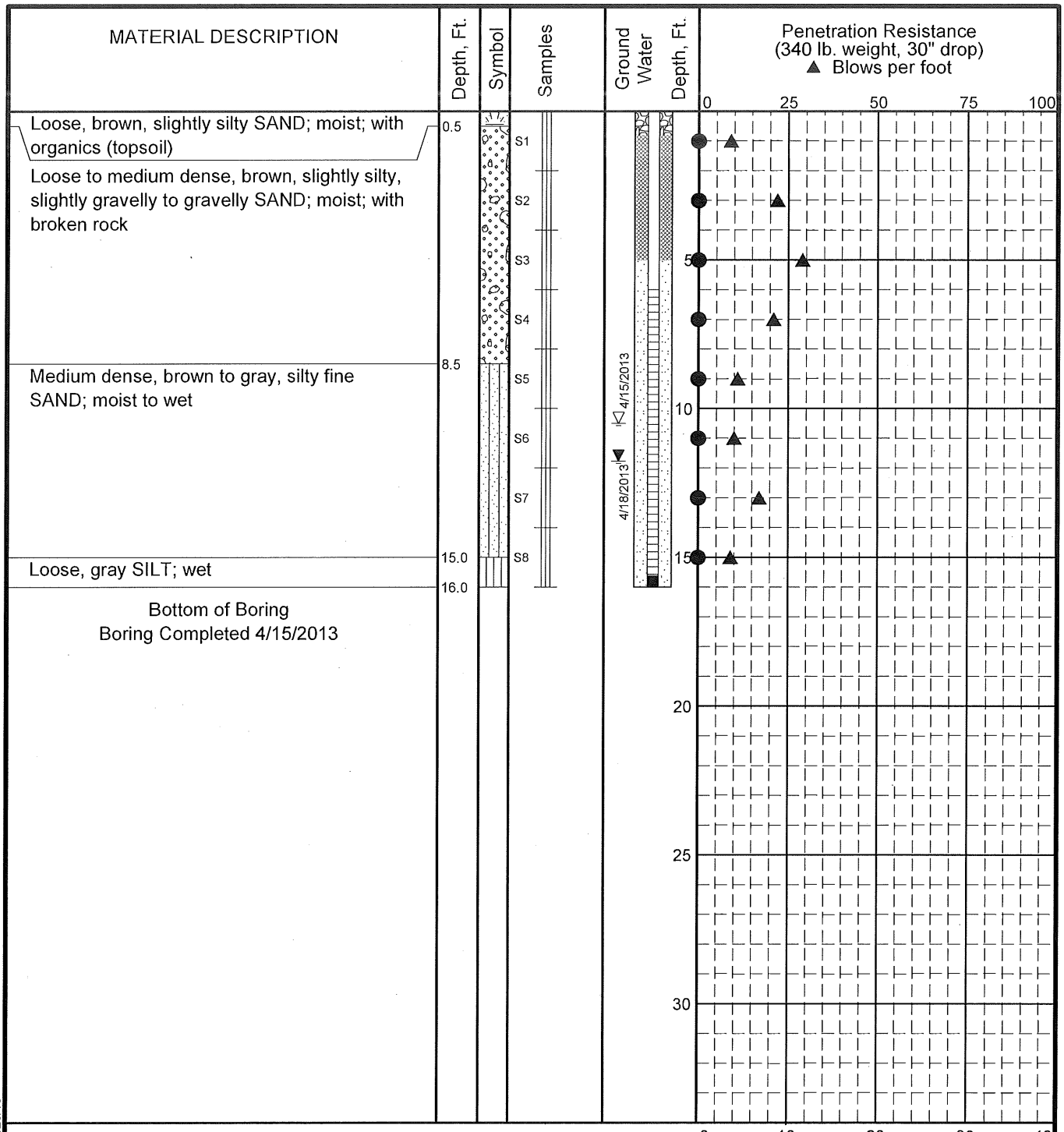
Fig. B-2

ENVIRONMENTAL LOG 17548 BORING.GPJ S&W GEO1.GDT 9/23/13



LEGEND

* Sample not recovered	Ground Water Level At Time Of Drilling
3" O.D. Split Spoon Sample	Static Water Level
	Solid Casing, Sand Pack
	Solid Casing and Annular Seal
	Slotted Section, Filter Sand
	Solid Casing, Cuttings Backfill

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

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LOG OF BORING B4

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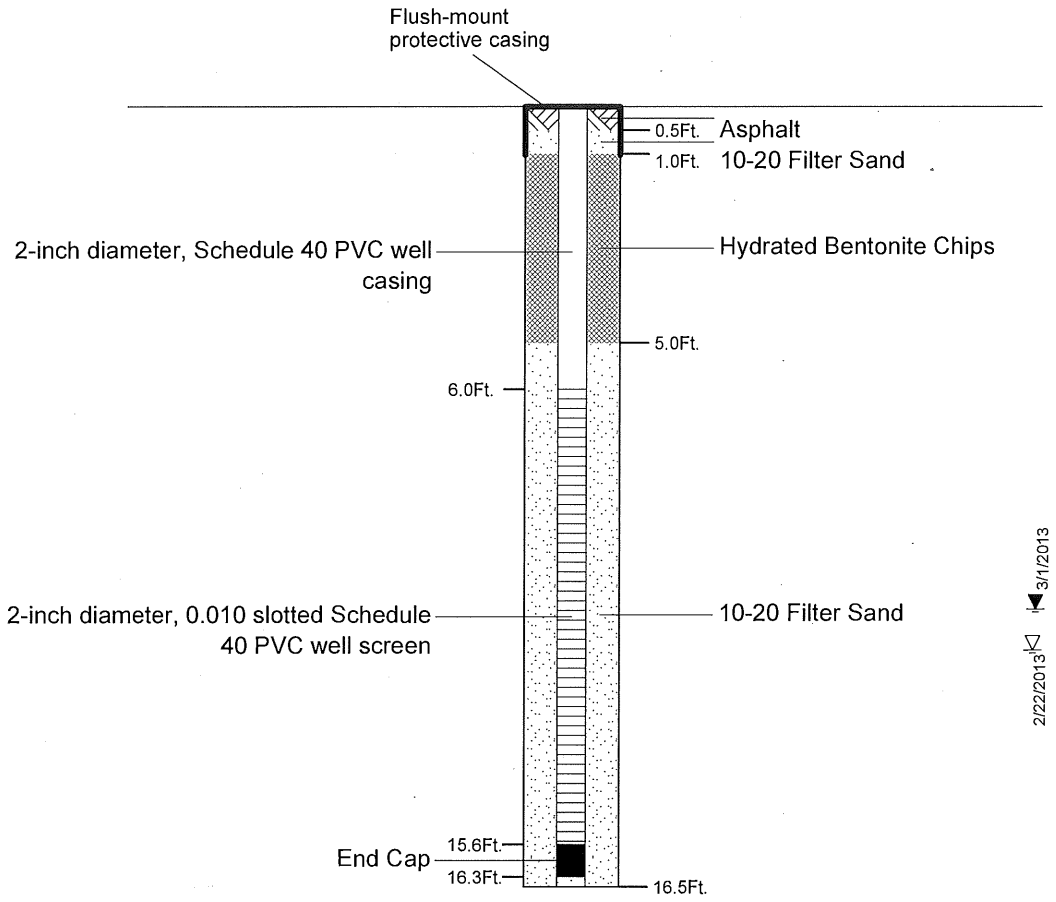
Fig. B-3

ENVIRONMENTAL LOG 17548 BORING.GPJ S&W GEO1.GDT 9/23/13

Casing Description **Backfill Description**



LEGEND

- Groundwater Level ATD
- Static Groundwater Level

NOTE: All joints use threaded connections.

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MONITORING WELL B2MW CONSTRUCTION DETAIL

September 2013 32-1-17548-001

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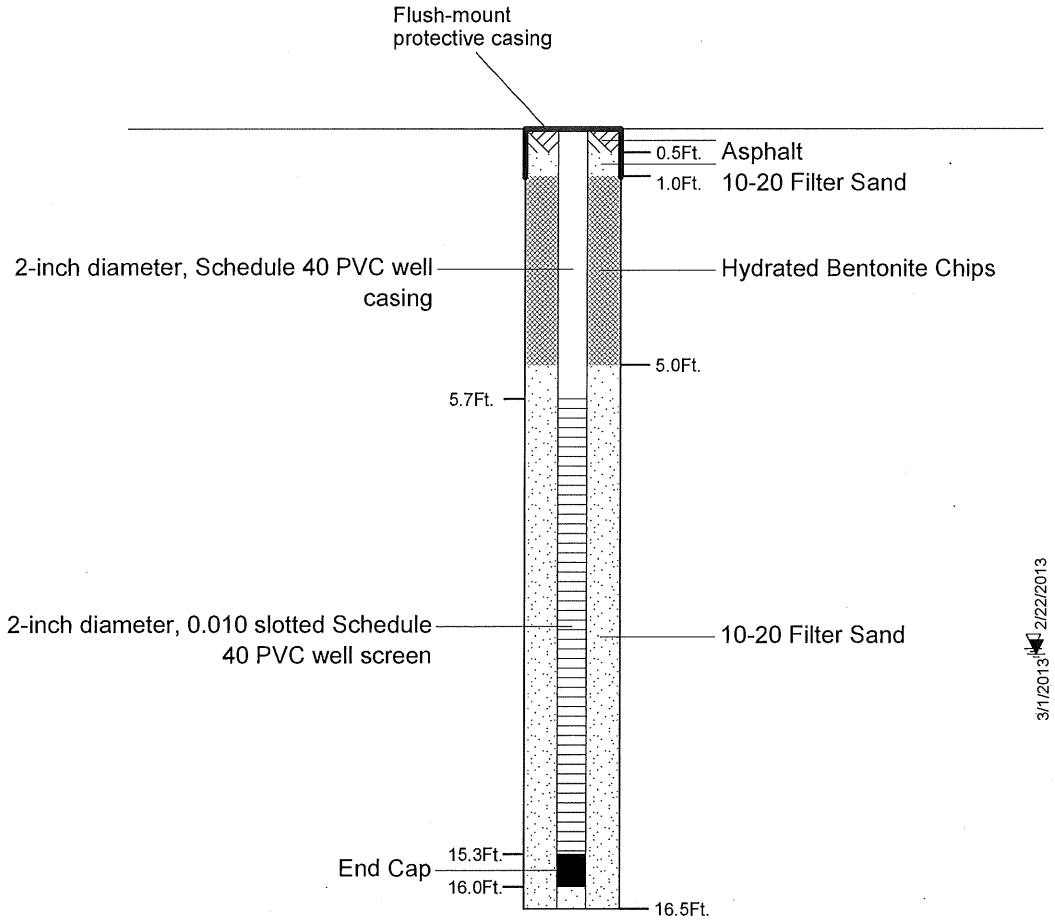
Fig. B-4

Casing Description **Backfill Description**



LEGEND

▽ Groundwater Level ATD

▼ Static Groundwater Level

NOTE: All joints use threaded connections.

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MONITORING WELL B3MW CONSTRUCTION DETAIL

September 2013 32-1-17548-001

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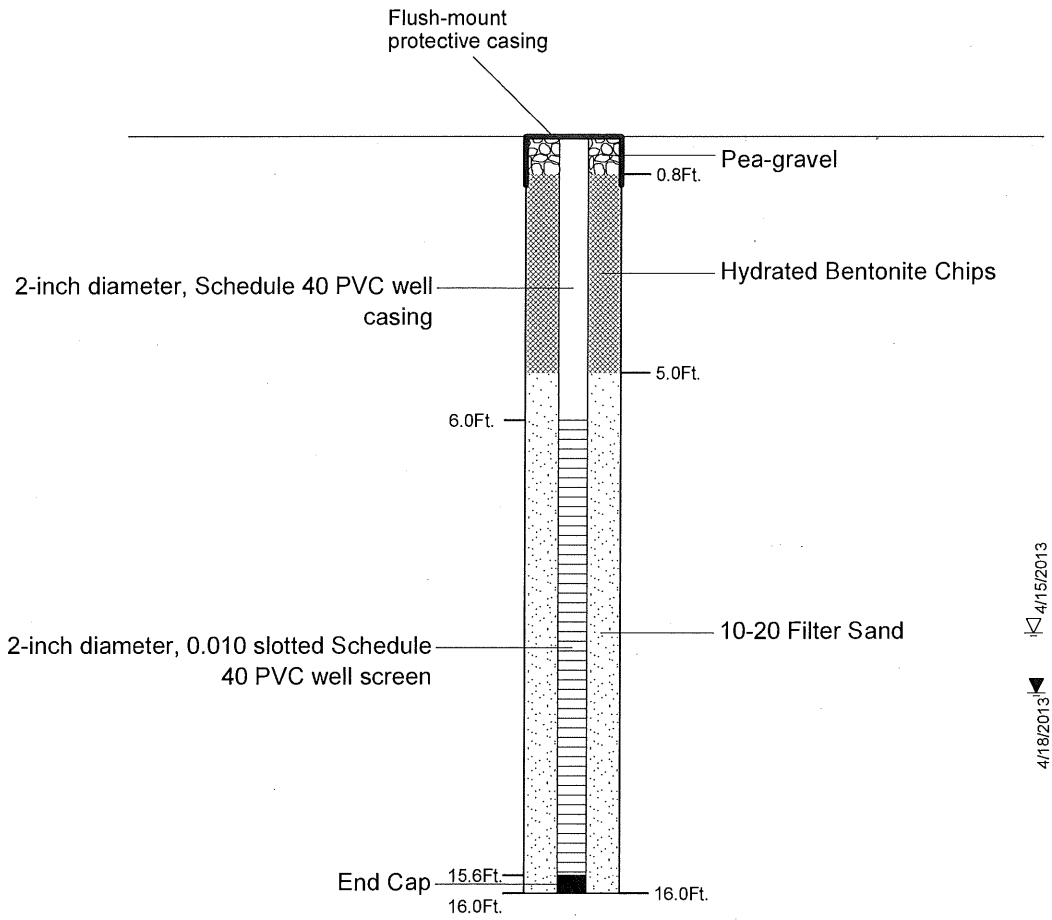
Fig. B-5

Casing Description **Backfill Description**



LEGEND

- Groundwater Level ATD
- Static Groundwater Level

NOTE: All joints use threaded connections.

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MONITORING WELL B4MW CONSTRUCTION DETAIL

September 2013 32-1-17548-001

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Fig. B-6

APPENDIX C

FIELD NOTES

Firestation 4

Wed 2/20/13 17548-001

12:20 on site

Talk to ~~Brett~~ Captain Blake Lindsoe to tell him about the monitoring well installation scheduled for Friday at 9AM. He will be there at the time, so they are informed. 9AM will be shift change, but he says that is OK. They can adjust to the well that will be in front of the Bay.

- Mark proposed boring locations for locates.

off site 12:45 Andrew Lee

Thurs 2/21/13

10:55 on site to meet locators & photograph locate marks

off site 11:08 Andrew Lee

16:20 on site again with Randy to try to locate water line with rods - found water line near PB2MW and another going through PB4MW

off site 16:42 Andrew Lee

32-1-17548-001 Fire Station 4

Friday 2/22/13

9AM meet at Fire Station
Discovery: Adam Saunder & Dorny
SLW: Andrew Lee & Dane Palmer

9:05 Discovery Conducts Safety Meeting

9:15 Talk to Fire station captain - Coordinate so we not be in his way too much.

- Install 2 monitoring wells
  - B2 MW & B3 MW
- IDW: 2 drums of soil (one from each boring)

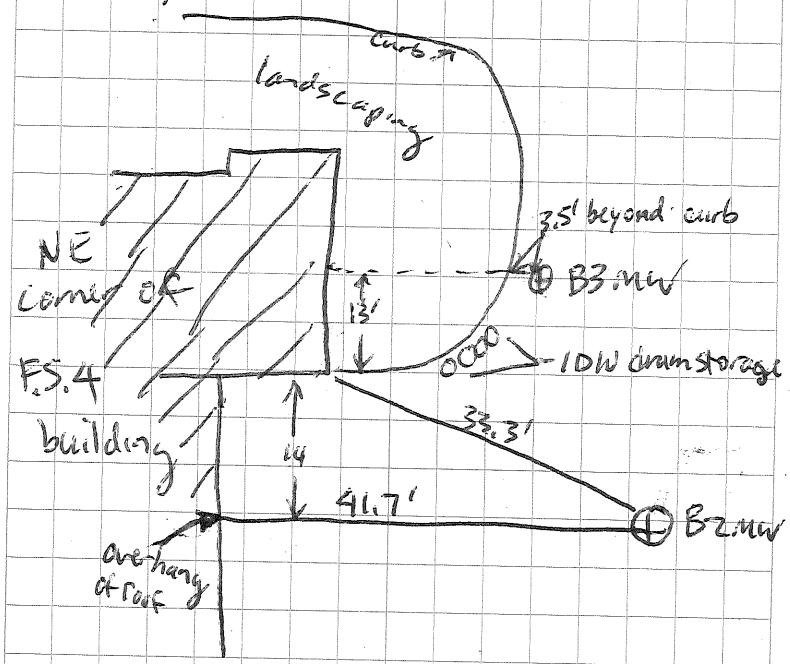
- Also left 2 empty drums at site for well development
- added decimeter to one of the other drums about 7 gallons

- Talk to Captain - tell him drums will be at site for about a month

32-1-17548-001 Fire Station 4

- off site 14:50

Andrew Lee & Dane Palmer



Analytical Samples:

B251	9:55	2/22/13
B256	10:50	"
B351	12:52	"
B356	13:36	"
B3514	13:40	" Duplicate of B356

32-1-17548 Firestation 4

Feb 27, 2013

950 Calibrate YSI-556, Manna meters and MicroTPW turbidimeter

1140 on site: Andrew Lee & Dane Palmer
Talk to Captain Herrick to let him know we are working on wells today. Weather: partly cloudy, 20s°F

- Start by locating wells, opening flush covers, measuring water levels

- Developed wells B2MW and B3MW (See well logs for details)
- IDW water into drum
- Off site 16:45
  - brought 4th drum back to office - will only use 2 drums for soil and 1 drum for water.

— Andrew Lee

32-1-17548 Fire Station 4

Friday March 1, 2013
Calibrate YSI-556, MicroTPW turbidimeter at office.
11:10 on site - Talk to Fire Battalion Chief to let her know we are sampling wells open up wells, measure depth to water

Weather: cloudy, light snow about 30°F
personnel: Andrew Lee & Dane Palmer

11:50 Damaged pump controller - go to office to pick up other controller.
12:15 back on site
Sample B2MW
13:35 Sample B3MW - attempt to Sample, but turbidity increased as we tried to purge low flow - not well developed due to low yield. Call/leave message with Tim Terry

continue with well survey ~~before~~ while waiting to talk to Tim

32-1-17548 Fire Station 4

3/1/13 16:00 well Survey - Andrew Lee & Dave Palmer

	back	forward	elevation
TBM	4.44		100.00
B1MW		4.845	104.44 - 4.845 = 99.595
B2MW		6.075	98.365
B3MW		5.70	98.74
TP1		4.56	99.88
TP1	4.875 (3)		
BiMW		5.215	104.755 - 5.215 = 99.54
B3MW		6.065	98.69
B2MW		6.45	98.305
TP2	~~4.585~~	4.505	99.95
TP2	4.825		
TBM	4.825	4.825	99.95
B1MW		5.23	
sum →	14.14	14.19	Not good - go again
B2MW		6.46	
B3MW		6.08	
TP3		5.185	
TP3	5.285		
TP4		5.00	(4.998)
TP4	5.22		
TBM		5.15	
	15.33	15.335	good survey

32-1-17548 Fire Station 4

17:15 off site

3/1/13

Andrew Lee

March 11, 2013

15:00 on site. Andrew Lee calibrated YSI-550 #1 and Micro TPW turbidimeter in office just prior to driving Over.

Weather: sunny, 30s°F.

Sample well B3MW - will purge 1 well volume at a low flow rate and then sample without waiting for parameters to stabilize this time because we know turbidity increases after 1 well volume.

IDW: 4 drums: 250.1, 1 water, 1 empty.

off site 16:18 Andrew Lee

32-1-17548 Fire Station 4

April 5, 2013 4:30 pm Andrew Lee on site

AFD Captain

Talk to Mike Davidson - he said they tried to move drums, but couldn't. I said we would install ~~3rd~~ well on April 15, 2013, and will bring equipment to move the drums with us.

(Reminder - tell Discovery to bring drum moving gear - dolly or other).

He would like drums to be placed in NW ~~face~~ corner parking spot of the site, behind the dumpster.

There was still almost 2 ft of snow where I want to install well. (see photo).

4:45pm off site

32-1-17548 Fire Station 4 Andrew Lee

April 15, 2013

955 on site - Discovery: Jeremy, Adam & New guy Scott.

weather sunny, about 20°F.

Talk to Fire station personnel

- ~~Tell~~ Calibrate PID #1 to 100ppm isobutylene
- Discovery had to dig out 3' of snow so truck could move over spot for well
- Drill & install well B4MW

Analytical: 17548-B451 @ 10:43 & 17548-B456 @ 11:15

1135 - 11:50 Katrina Chamberlain/ADEC on site to observe.

12:25 Move drums to NW corner of property in far corner parking space ~~behind~~ next to dumpster

IDW: 3 drums soil, 1 drum water, 1 empty empty will be for developing/purging Well B4MW.

12:50 off site

324-17548 · Fire Station 4 Andrew Lee

4/17/13 In office - calibrated Manta#1 and Micro TPW turbidimeter

11:55 on site -

Weather: Sunny, 205°F

~~collect water levels~~

↳ will wait after development.

Developed Well B4MW

- ~~Forgot tubing~~ - 15min RT ↑ return to office

Developed well by surging with block & pumping. Stopped after purging dry 3x.

New 5th IDW drum contains 13.5 gal water from Well B4MW

15:30 off site

324-17548 · Fire Station 4 Andrew Lee

4/18/13

1540 On site - Andrew Lee

Weather - sunny, 305°F

Water levels:

	Time	DTW	DTP
B1MW	16:08	11.40	11.37
B2MW	16:01	10.01	none
B3MW	15:57	10.55	none
B4MW	15:52	11.35	none

Calibrate ~~Manta#1~~ 45I #1

Sample Well B4MW

- Put purge water in same drum as 4/17/13

off site 17:35

Analytical Sample: 17548-B4MW @ 17:12 4/18/13

Andrew Lee - 4/18/13

32-1-17548 Fire Station 4 Andrew Lee & Dave Palmer

April 30, 2013

15:43 on site to survey wells - cloudy 40s F

water levels

B1 MW 10.92 DTW, no product, strong hydrocarbon odor

B2MW 10.41' DTW @ 15:55 before cutting casing.

B3MW 9.81' DTW @ 16:06

B4MW 10.705 DTW @ 16:09

B2MW 10.38' ~~trim~~ down by 0.03' @ 16:40

Depth to Top of Casing B1MW = 0.30'

B2MW 0.19'

B3MW 0.23'

B4MW 0.42'

Survey

	back	forward	elevation
TBM	4.943		
B1MW		4.22	
B2MW		5.486	
B3MW		5.075	
TP1		4.22	
TP1	4.55		
B4MW		4.643	
TP2		5.063	
TP2	5.086		
TBM		4.25	
	14.579	13.533	

← off by over 1'

32-1-17548 Fire Station 4

April 30, 2013 Andrew Lee & Dave Palmer

shown on probe ← B1MW water level @ 16:15

	back	forward	elevation
TBM	4.255		100.00
B1MW		4.58	99.675
B2MW		5.85	98.405
B3MW		5.43	98.825
TP1		5.085	99.17
TP1	5.14		99.17
B4MW		4.725	99.585
TP2		5.34	98.97
TP2	5.385		
TBM		4.35	100.005
	14.78	14.775	

good survey

17:37 ~~off site~~. Andrew Lee & Dave Palmer

New TBM — yellow line near B1MW → north

32-1-17548 Fire Station 4

May 6, 2013

11:55 Andrew Lee on site, partly Sunny 56°F,
recheck water levels to check
inconsistency in groundwater flow direction

Well	Time	DTW	Product?
B1 MW	12:12	10.56	not measurable - sheen on probe
B2 MW	12:08	9.01	none
B3 MW	12:04	9.39	none
B4 MW	12:00	10.10	None

off site 12:19

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery / Adam & Danny
DRILL RIG EQUIPMENT: CME Truck
DRILLING METHOD: H.S. Auger
SAMPLE HAMMER: Auto ROD TYPE/DIA.: 2¾"
HAMMER WEIGHT: 340# HAMMER DROP: 30"
CASING SIZE/TYPE: 4¼" SPOON DIA: 3"

JOB NO: 32-1-17548-1 BORING NO: B2
JOB NAME: Fire Station 4
LOGGED BY: Andrew Lee ELEV.:
LOCATION: east of NE fire Station Bay
DATE: 2/22/13 WEATHER: about 25°F cloudy, light snow

SAMPLE DATA

	SAMP. NO. / TIME	DEPTH FROM / TO	BLOW COUNT / 6 INCH	L. RECOV. / # JARS	PID	CONTACTS / GROUNDWATER	DRILL ACTION	ENV. SAMPLE Y/N	FIELD CLASSIFICATION & SENSORY OBSERVATIONS [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
*	S1 / 9:55	0.5 / 1.5	70 100 / — —	0.5' / 2	4.2		frozen	Y	0.2' Asphalt. Frozen - Brown, slightly silty, gravelly SAND; most frozen Rock in Sp. Duplicate B2S10 moist to dry, frozen
	S2 / 10:05	2 / 4	20 36 / 56 28	2 / 4	0.2		frozen to 3.5'	Y	Brown, slightly silty, gravelly SAND; moist, frozen to 3.5' bgs. Duplicate B2S10
	S3 / 10:15	4 / 6	18 20 / 25 30	2 / 4	0.0			Y	5.75' 4 Same 5.75-6': Brown, silty fine SAND, moist & frozen, Duplicate B2S11
	S4 / 10:28	6 / 8	20 19 / 11 10	2 / 4	0.0		frozen to 7.3'	Y	Brown, silty fine SAND; moist frozen to 7.3' Duplicate B2S12
	S5 / 10:38	8 / 10	3 7 / 8 8	2 / 4	0.0			Y	Brown, silty fine SAND; moist Duplicate B2S13
*	S6 / 10:50	10 / 12	3 6 / 9 9	2 / 4	0.0	about 11.5'		Y	Brown, silty fine SAND; moist to wet Duplicate B2S14
	S7 / 11:00	12 / 14	7 7 / 9 12	2 / 0	—			N	Brown, silty fine SAND; wet

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG

COMMENTS (i.e. materials used, visitors, problems, etc.):
well is slow recharging
Install Monitoring well B2MW in Boring B2.

GROUNDWATER DATA

WATER DEPTH	TIME	DATE
11.5'	10:50	2/22/13

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: 16.5
SAMPLES: 8 Attempted
8 Recovered
DATE/TIME DRILLING INITIATED: 9:45 2/22/13
DATE/TIME DRILLING COMPLETED: ~ 12:30 2/22/13
OTHER:

BORING: B2 SHEET 1 OF 2

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery / Adam & Dorny
DRILL RIG EQUIPMENT: CME Truck
DRILLING METHOD: HS Auger
SAMPLE HAMMER: Auto ROD TYPE/DIA.: 2 3/4"
HAMMER WEIGHT: 340# HAMMER DROP: 30"
CASING SIZE/TYPE: 4 1/4" SPOON DIA: 3"

JOB NO: 17548-1 BORING NO: B2
JOB NAME: Fire Station 4
LOGGED BY: Andrew Lee ELEV.:
LOCATION:
DATE: 2/22/13 WEATHER:

SAMPLE DATA

SAMP. NO. / TIME	DEPTH FROM	DEPTH TO	BLOW COUNT / 6 INCH	L. RECOV. / # JARS	PID	CONTACTS / GROUNDWATER	DRILL ACTION	ENV. SAMPLE Y/N	FIELD CLASSIFICATION & SENSORY OBSERVATIONS [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
S8	14		3 5	2	—			N	Gray, silty fine SAND; wet
11:15	16		6 7	0					

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG

COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: SAMPLES: Attempted / Recovered
DATE/TIME DRILLING INITIATED:
DATE/TIME DRILLING COMPLETED:
OTHER:

BORING: B2 SHEET 2 OF 2

SHANNON & WILSON, INC.
Geotechnical Consultants

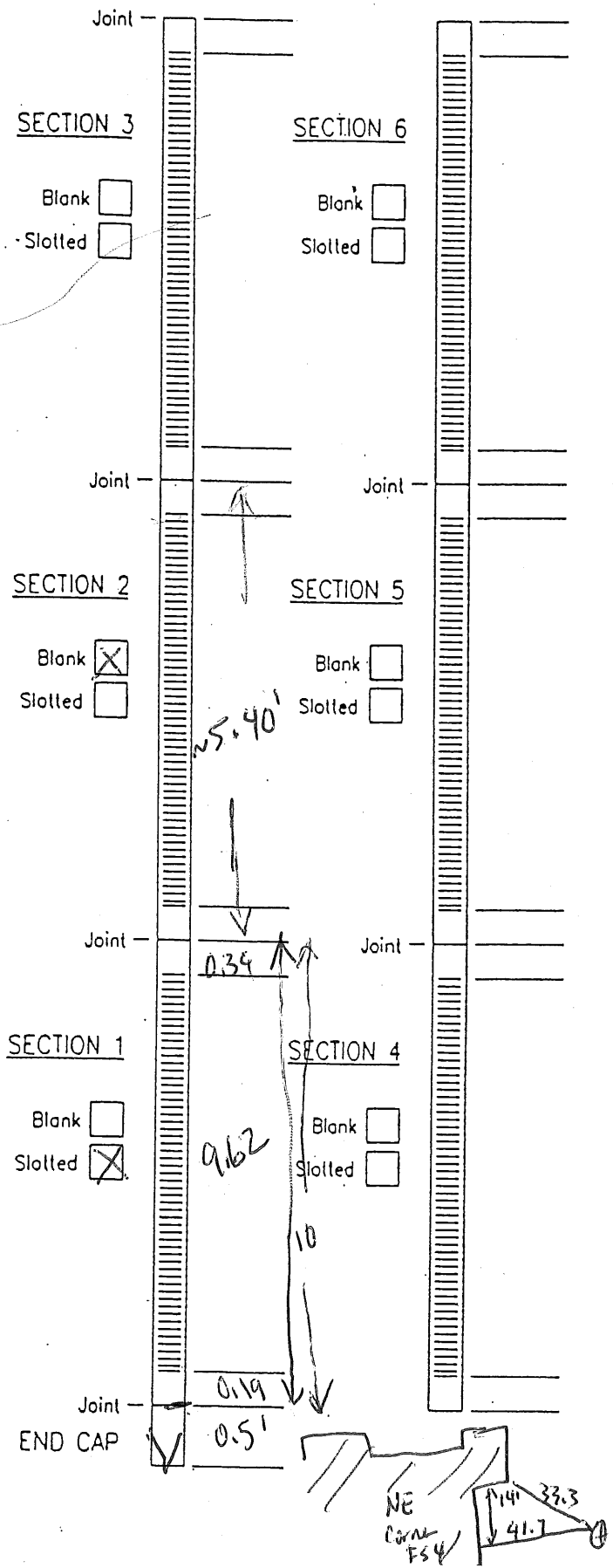
MONITORING WELL CONSTRUCTION DETAILS

Monitoring Well Number B2MW

Job Number 32-1-17548-1

Date Installed 2/22/13

Engineer or Geologist Andrew Lee



WELL DATA:

Pipe Type: PVC [X] Stainless steel [ ] Other ____

Diameter: 2" [X] 4" [ ] Other ____

Slot size: 0.010 [X] 0.020 [ ] Other ____

SEALS:

	Depth below ground surface From	To
Bentonite:	5	1
~~Cement~~ Asphalt:	0.5	0
SAND	1	0.5

MONUMENTS:

Flush mount [X] Post [ ]

Description Monson

Depth below surface Flush

Stickup -0.7

JOINTS:

Type Threaded

Pin end : Down [X] ← ASC

Up [ ]

SAND PACK:

Type or gradation 10-20

Depth: From 16.5 To 5

LOCKS:

Type —

Key number —

Length cutoffs, last section: ~~0.25~~ 3.33+.45+.22+.1

Well stickup ____

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery / Adam & Danny
DRILL RIG EQUIPMENT: CME Truck
DRILLING METHOD: HS Auger
HAMMER TYPE: Auto ROD TYPE/DIA.: 2 3/4"
HAMMER WEIGHT: 340# HAMMER DROP: 30"
CASING SIZE/TYPE: 4 1/4" HOLE SIZE: 3"

JOB NO: 17548-1 BORING NO: B3
JOB NAME: Fire Station 4 4350 Macinnes Anchorage
LOGGED BY: Andrew Lee
LOCATION: ELEV.:
START DATE: 2/22/13 END DATE: 2/22/13
WEATHER DURING DRILLING: snowing, mid 20s F slightly

SAMPLE DATA

TIME / DATE	SAMP. NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS / 6 INCH	L. RECOV. # JARS	DRILL ACTION	CONTACTS / GROUNDWATER	PID	ENV. SAMPLE	FIELD CLASSIFICATION [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
S1		0.5	100 for 6" (refusal)	0.5'	frozen		9.9	Y	~~0.2' Asphalt~~ 0.2' Asphalt Brown, slightly silty, gravelly SAND; moist frozen
1252	SS	1		2					
S2		2	18 22	1.5	frozen		1.9	Y	same
1302	SS	4	31 30	4					duplicate B3S10
S3		4	34 20	2			1.4	Y	Same not frozen
13:11	SS	6	21 19	4					duplicate B3S11
S4		6	22 28	2			1.0	Y	Same
13:18	SS	8	20 17	4					duplicate B3S12
S5		8	25 15	1			3.6	Y	Same
13:27	SS	10	18 19	4					duplicate B3S13
S6		10	4 5	2		11'	0.3	N	10'-11': same 11-12': Brown; silty fine SAND; wet
13:36	SS	12	5 6	4					duplicate B3S14 @13:40
S7		12	3 6	2			—	N	Brown, silty fine SAND; moist to wet
13:40	SS	14	99	0					

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG

COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE
11	13:36	2/22/13

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: 16.5 SAMPLES: 8 Attempted, 8 Recovered
DRILL/SAMPLE ____ hrs. STANDBY: ____ hrs.
SETUP/CLEANUP: ____ hrs. BREAKDOWN: ____ hrs.
OTHER:

BORING: B3 SHEET 1 OF 2

ASC

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery / Adam & Donny
DRILL RIG EQUIPMENT: CME Truck
DRILLING METHOD: HS Auger
SAMPLE HAMMER: Auto ROD TYPE/DIA.: 2 3/4"
HAMMER WEIGHT: 340# HAMMER DROP: 30"
CASING SIZE/TYPE: 4 1/4" SPOON DIA: 3"

JOB NO: 32-1-17548 BORING NO: B3
JOB NAME: Fire Station 4 4350 MacInnes St, Anchorage
LOGGED BY: Andrew Lee ELEV.:
LOCATION:
DATE: 2/22/13 WEATHER: cloudy, mid 20s°F

SAMPLE DATA

SAMP. NO. / TIME	DEPTH FROM	DEPTH TO	BLOW COUNT / 6 INCH	L. RECOV. / # JARS	PID	CONTACTS / GROUNDWATER	DRILL ACTION	ENV. SAMPLE Y/N	FIELD CLASSIFICATION & SENSORY OBSERVATIONS [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
S8	14		3/3	2	—			N	14-15 Brown silty fine SAND; wet
13:49	16		3/4	—					15-16 Gray ~~SILT; moist~~ slightly clayey sandy SILT; moist

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG

COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: SAMPLES: Attempted / Recovered
DATE/TIME DRILLING INITIATED:
DATE/TIME DRILLING COMPLETED:
OTHER:

BORING: B3 SHEET 2 OF 2

SHANNON & WILSON, INC.
Geotechnical Consultants

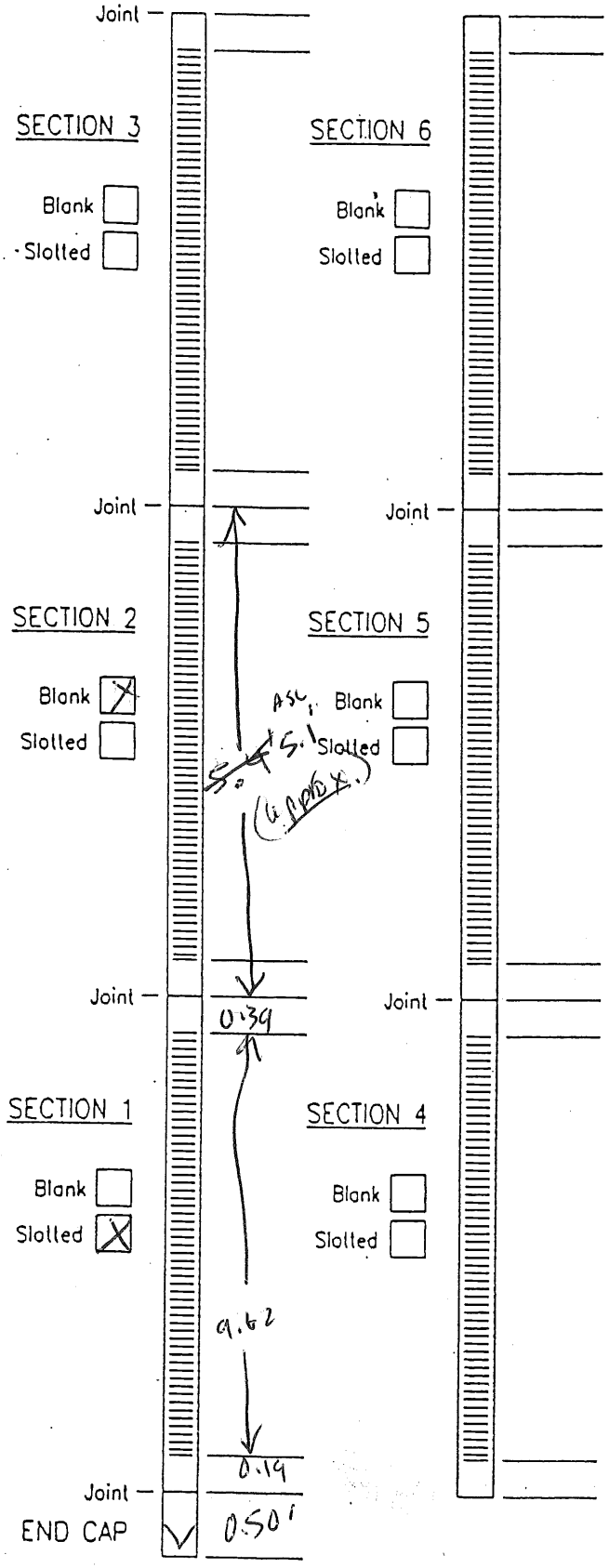
MONITORING WELL CONSTRUCTION DETAILS

Monitoring Well Number B3MW

Job Number 32-1-17548-1

Date Installed Feb 22, 2013

Engineer or Geologist Andrew Lee



WELL DATA:

Pipe Type: PVC [X]
Stainless steel [ ]
Other _____

Diameter: 2" [X]
4" [ ]
Other _____

Slot size: 0.010 [X]
0.020 [ ]
Other _____

SEALS:

	Depth below ground surface From	To
Bentonite:	5	1
Asphalt Cement:	0.5	0
Sand	1	0.5

MONUMENTS:

Flush mount [X] Post [ ]
Description Morrison
Depth below surface flush
Stickup ~0.?

JOINTS:

Type Threaded

Pin end : Down [X]
Up [ ]

SAND PACK:

Type or gradation 10-20
Depth: From 16.5 To 5

LOCKS: Type —
Key number —

Length cutoffs, last section: _____

Well stickup _____

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery - Jeremy, Adam, Scott
DRILL RIG EQUIPMENT: CME Truck
DRILLING METHOD: HS Auger
SAMPLE HAMMER: Auto ROD TYPE/DIA.: 2 3/4"
HAMMER WEIGHT: 340# HAMMER DROP: 30"
CASING SIZE/TYPE: 4 1/4" SPOON DIA: 3"

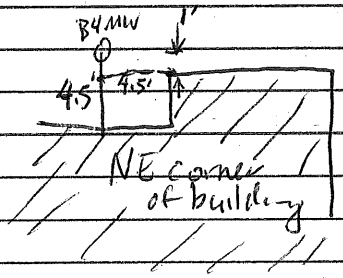
JOB NO: 321-17548 BORING NO: B4
JOB NAME: Fire Station 4 4350 Mackinaw Anchorage
LOGGED BY: Andrew Leo ELEV.:
LOCATION:
DATE: 4/15/13 WEATHER: 20s °F, Sun

SAMPLE DATA

SAMP. NO. / TIME	DEPTH FROM / TO	BLOW COUNT / 6 INCH	L. RECOV. / # JARS	PID	CONTACTS / GROUNDWATER	DRILL ACTION	ENV. SAMPLE Y/N	FIELD CLASSIFICATION & SENSORY OBSERVATIONS [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
X S1	0	3 4	2	0.0			Y	1/2 inch grass Then to 0.5' top soil Brown slightly silty SAND; moist, w/organics
1043	2	5 8	2					0.5-2' Brown, sli silty gravelly SAND; moist with rocks/cobbles
S2	2	8 8	2	0.0			Y	Brown, slightly silty, gravelly SAND; moist
10:49	4	14 15	2					
S3	4	4 14	2	0.0			Y	Same
1055	6	15 16	2					
S4	6	16 12	2	0.0			Y	Brown slightly silty, slightly gravelly SAND; moist
11:01	8	9 5	2					
S5	8	2 4	2	0.0			Y	8-8.5' = Same
1110	10	7 8	2					8.5-10': Brown silty fine SAND; moist
X S6	10	3 5	2	0.0	10.5'		Y	Brown, silty fine SAND; moist to wet
11:15	12	5 9	2					(sample from 10-10.5)
S7	12	2 7	2	0.0			N	Brown silty fine SAND; wet
11:23	14	10 8	0					

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG



COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE
10.5	ATD 11:15	4/15/13

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: 16
SAMPLES: 8 Attempted, 8 Recovered
DATE/TIME DRILLING INITIATED: 10:40
DATE/TIME DRILLING COMPLETED: 12:20
OTHER:

BORING: B4 SHEET 1 OF 2

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIELD LOG OF BORING

DRILL COMPANY/DRILLER: Discovery Jeremy Adlum, Scott
DRILL RIG EQUIPMENT:
DRILLING METHOD:
SAMPLE HAMMER: ROD TYPE/DIA.:
HAMMER WEIGHT: HAMMER DROP:
CASING SIZE/TYPE: SPOON DIA:

JOB NO: 32-1-17548 BORING NO: B4
JOB NAME:
LOGGED BY: Andrew Lee ELEV.:
LOCATION:
DATE: WEATHER:

SAMPLE DATA

SAMP. NO. / TIME	DEPTH FROM / TO	BLOW COUNT / 6 INCH	L. RECOV. / # JARS	PID	CONTACTS / GROUNDWATER	DRILL ACTION	ENV. SAMPLE Y/N	FIELD CLASSIFICATION & SENSORY OBSERVATIONS [density/consistency; color; slightly, minor, MAJOR, then trace constituents; moisture; structure; other; USCS classification (geology)]
S8	14	55	2	0.0			N	14-15 Gray silty fine SAND; micaceous, wet, loose
1534	16	44	0					1516 Gray SILT; wet

SUMMARY FIELD LOG OF BORING

DEPTH FROM	DEPTH TO	USCS CLASSIF.	GENERALIZED SOIL DESCRIPTION FOR DRAFTED GINT LOG

COMMENTS (i.e. materials used, visitors, problems, etc.):

GROUNDWATER DATA

WATER DEPTH	TIME	DATE

SUMMARY OF TIME AND FOOTAGE

FOOTAGE DRILLED: SAMPLES: Attempted / Recovered
DATE/TIME DRILLING INITIATED:
DATE/TIME DRILLING COMPLETED:
OTHER:

BORING: B4 SHEET 2 OF 2

SHANNON & WILSON, INC.
Geotechnical Consultants

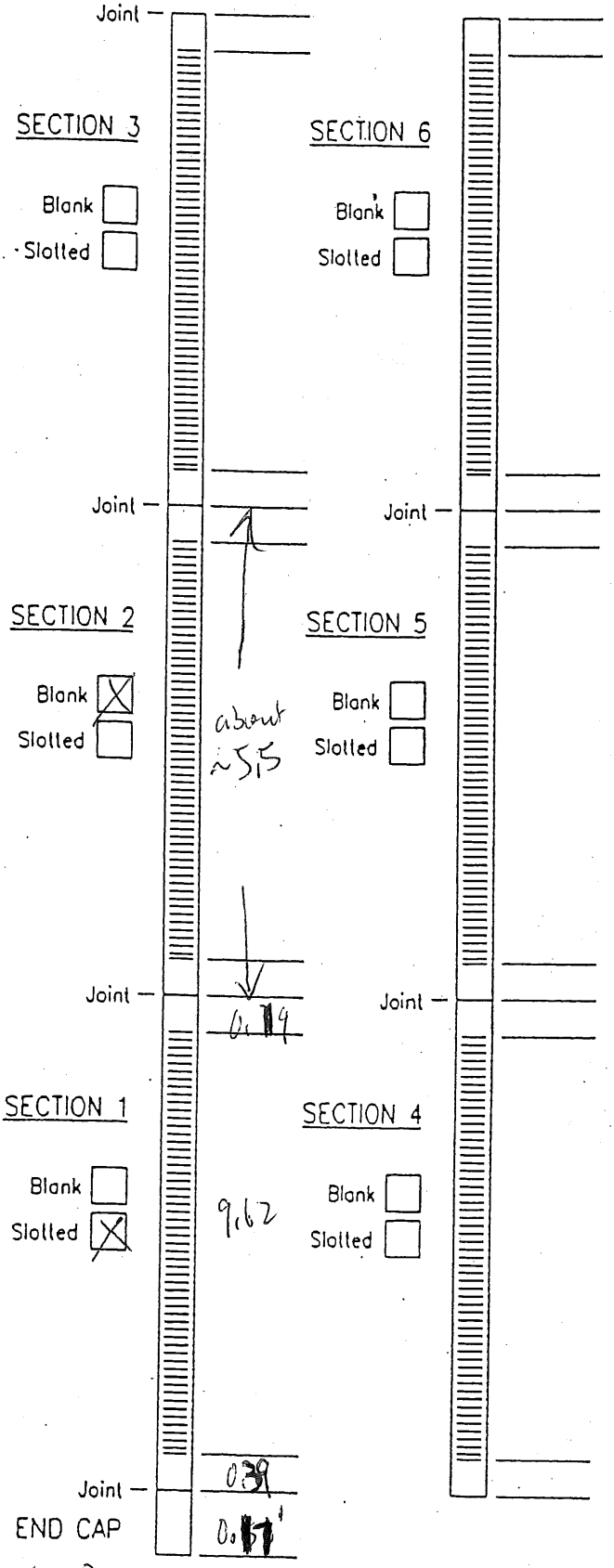
MONITORING WELL CONSTRUCTION DETAILS

Job Number 321-1754B

Monitoring Well Number B4MW

Date Installed 9/15/13

Engineer or Geologist Andrea Lee



(Slip-on type)

→ Total Depth of well 15.62'

WELL DATA:

Pipe Type: PVC [X]
Stainless steel [ ]
Other ____

Diameter: 2" [X]
4" [ ]
Other ____

Slot size: 0.010 [X]
0.020 [ ]
Other ____

SEALS:

Depth below ground surface

	From	To
Bentonite:	5	0.8
Pea gravel	0.8	0
Cement:	____	____
	____	____

MONUMENTS:

Flush mount [X] Post [ ]

Description Morison

Depth below surface Flush

Stickup +0.42'

JOINTS:

Type threaded

Pin end : Down [ ]
Up [X]

SAND PACK:

Type or gradation 10-20

Depth: From 16 To 5

LOCKS: Type —

Key number —

Length cutoffs, last section: about 4.5'

Well stickup ____

~~Peuker~~ ASL

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17548 Location: Fire Station 4, 4350 McInnes St. Anchorage Weather: partly cloudy 20s°F

Well No.: B1MW

Date: 2/27/13 Time Started: 1240 Time Completed: 1250

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 12:50 Date of Depth Measurement: 2/27/13

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

Diameter of Casing: 2" Product Thickness, if noted: 0.02'

Total Depth of Well Below MP: 14.48 Well Screen Interval Length: 10'

Depth-to-Water (DTW) Below MP: 11.42 product / 11.44 water Depth to Top of Well Screen Below MP:

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

Gallons per foot: 0.16

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

PURGING DATA

Date Purged: — Time Started: — Time Completed: —

Gallons Purged: — Depth of Pump Placement: —

Maximum Drawdown: — Pump Rate: —

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

Time:	Gallons:	Temp: (°C)	Sp. Cond.: (mS/cm)	pH: (S.U.)	Turb: (ntu)	DTW: (Feet)

SAMPLING DATA

Odor: hydrocarbon odor Color: yellowish?

Sample Designation: — Time / Date: —

Duplicate Sample Designation: — Time / Date:

Evacuation Method: Decontaminated Submersible Pump / Other: —

Sampling Method: Decontaminated Submersible Pump / Other:

Remarks: measured 0.02' product in well. Confirm visually saw product on probe tip and tape. Well not sampled due to product in well.

Sampling Personnel: Andrew Lee & Dane Palmer

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.64

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

Shannon & Wilson, Inc.

WATER SAMPLING LOG

Job No: 32-1-17548 Location: Fire Station 4 Weather: light snow, about 30 °F

Well No.: B1MW

Date: 3/1/13 Time Started: 11:43 Time Completed: 11:43

Develop Date: 2008 Develop End Time: — (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 11:43 Date of Depth Measurement: 3/1/13

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

Diameter of Casing: 2" Well Screen Interval: 10'

Total Depth of Well Below MP: 14.48 Product Thickness, if noted: 0.02'

Depth-to-Water (DTW) Below MP: 11.46 product – 11.48 water

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

Gallons per foot: 0.16

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

PURGING DATA

N/A

Date Purged: — Time Started: — Time Completed: —

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

Gallons Purged: ______ Depth of Pump Placement: ______

Maximum Drawdown: ______ Pump Rate: ______

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

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)

SAMPLING DATA

Odor: hydrocarbon / product Color: yellowish product residue on probe

Sample Designation: ______ Time / Date: ______

QC Sample Designation: ______ Time / Date: ______

QA Sample Designation: ______ Time / Date: ______

Evacuation Method: Bladder Pump / Submersible Pump / Other: ______

Sampling Method: Bladder Pump / Submersible Pump / Other: ______

Remarks: Not sampled due to product in well

Sampling Personnel: Andrew Lee & Dave Palmer

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

Development

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Fire Station 4 4350 Mackinnes, Anchorage

Job No: 32-1-17548 Location: ~~B2MW~~ Weather: partly cloudy, 20s °F

Well No.: B2MW

Date: 2/27/13 Time Started: 12:05 Time Completed: 15:20

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 12:15 Date of Depth Measurement: 2/27/13

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

Diameter of Casing: 2" Product Thickness, if noted: none

Total Depth of Well Below MP: 15.89 Well Screen Interval Length: 10'

Depth-to-Water (DTW) Below MP: 10.18 Depth to Top of Well Screen Below MP:

Water Column in Well: 5.71 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.91 (Water Column in Well x Gallons per foot) 80% = DTW 11.32

PURGING DATA

Date Purged: 2/27/13 Time Started: 12:XX Time Completed: 14:50

Gallons Purged: 10 + 1.5 = 11.5 Depth of Pump Placement: variable during development

Maximum Drawdown: dry Pump Rate: —

Well Purged Dry: 3 times Yes ☒ No ☐ ~~(If yes, use Well Purged Dry Log)~~ NA

Time:	Gallons:	Temp: (°C)	Sp. Cond.: ~~(mS/cm)~~ uS	pH: (S.U.)	Turb: (ntu)	DTW: (Feet)	
	1.5gal	3.6	549	6.74	>1,000	—	(Not low flow during development)
	4	3.9	905	6.70	>1,000	—	
	5.5	4.1	960	6.97	>1,000	—	
	7	3.7	973	6.76	>1,000	—	
	8.5	3.3	968	6.90	>1,000	—	← switch to Hach Turbidimeter
	10	3.6	951	6.88	>1,000		
~~At end of sampling~~	11.5	3.5	961	6.96	224		

SAMPLING DATA

Odor: ~~gray~~ none Color: gray

Sample Designation: ~~17548-B2MW~~ Time / Date: ~~15:05 2/27/13~~

Duplicate Sample Designation: — Time / Date: —

Evacuation Method: (Decontaminated Submersible Pump) / Other:

Sampling Method: Decontaminated Submersible Pump / Other:

Remarks: developed well with surge block and pump, alternating on 3min cycle

Purged dry at 5.5gal, recovered 80% continue development, purge dry at 8.5gal, recover 80% continue development

Sampling Personnel: Andrew Lee & Dane Palmer 3rd purge dry @ 10gallons.

Stop development due to 3 hrs of effort. allow to recover 80% before sampling.

Purged well dry 3 times during development

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.64

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

allow to recover 80% between ~~purging~~ purging dry. ↓ before ~~sample collection~~ water parameters

will collect sample at a later date because well did not stabilize

Shannon & Wilson, Inc.

WATER SAMPLING LOG

Continued from previous page

Job No: 32-17548 Location: 4350 MacInnes St. Anchorage Site: Five Star Hotel 4

Well No.: B3MW

Date:

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1430	3.5	0.25		4.31	0.232		6.71		2641.2
1434	3.75	0.25		4.42	0.282		6.80		288.3
1438	4	0.25		4.64	0.285		6.78		431.3
1442	4.25	0.25		4.71	0.285		6.76		361.4
1448	4.5	0.25		4.53	0.28		6.73		381.8
1455	4.75	0.15		4.50	0.239		6.72		1084
1510	5	—	13.20	—	—		—		—

Sampling Personnel: Andrew Lee & Dane Palmer

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

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17548 Location: Fire Station 4 4350 Macinnes Anchorage Weather: cloudy, light snow

Well No.: B2MW

Date: 3/1/13 Time Started: 11:30 Time Completed: 13:35

Develop Date: ~~2/27/13~~ Develop End Time: 15:20 (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 11:38 Date of Depth Measurement: 3/1/13

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

Diameter of Casing: 2" Well Screen Interval: 10'

Total Depth of Well Below MP: 15.89 Product Thickness, if noted: none

Depth-to-Water (DTW) Below MP: 10.23

Water Column in Well: 5.66 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.91 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 3/1/13 Time Started: 12:21 Time Completed: 13:13

Three Well Volumes: 2.73 (Gallons in Well x 3)

Gallons Purged: 3.5 Depth of Pump Placement: ~ 1.5' above bottom

Maximum Drawdown: 11.14 Pump Rate: see below

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

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: m(uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:25	0.25	~0.3	10.69	3.64	0.761		—		—
12:28	0.5	~0.3	—	3.92	0.748		5.85		132.5
12:32	0.8	~0.3	10.86	4.09	0.745		6.07		106.3
12:36	1	0.25	—	4.27	0.749		6.33		90.71
1240	1.25	0.25	10.77	4.42	0.757		6.49		80.59
12:44	1.5	~0.25	10.95	4.36	0.758		6.47		67.75
12:48	1.75	~0.25	11.05	4.17	0.760		6.62		35.27
12:50	2	~0.25	—	4.05	0.755		6.51		—
12:54	2.25	0.25	11.07	4.10	0.760		6.52		48.59

SAMPLING DATA

Odor: none Color: light gray to clear

Sample Designation: 17548-B2MW Time / Date: 13:15 3/1/13

QC Sample Designation: — Time / Date: —

QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / (Submersible Pump) / Other:

Sampling Method: Bladder Pump / (Submersible Pump) / Other:

Remarks:

Sampling Personnel: Andrew Lee & Dane Palmer

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

Shannon & Wilson, Inc.

WATER SAMPLING LOG

Continued from previous page

Job No: 321.17548 Location: 4350 Macinnes, Anchorage Site: Fire Station 4

Well No.: B2MW

Date:

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
12:58	2.5	0.25	11.11	4.22	0.762		6.57		45.37
13:02	2.75	0.25	— *	4.34	0.768		6.66		31.35
13:06	3.00	0.3	— *	4.33	0.775		6.70		24.96
13:09	3.25	0.4	— *	4.30	0.775		6.69		24.09
13:13	3.5	0.25	*Equipment measure-probe blocked by top of pump	4.36	0.774		6.69		24.80

Sampling Personnel: Andrew Lee & Dane Palmer

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

Development

WATER SAMPLING LOG

Shannon & Wilson, Inc. 4350 Machinos St Anchorage

Job No: 32-1-17548 Location: Fire Station 4 Weather: partly cloudy, 20s °F

Well No.: B3MW

Date: 2/27/13 Time Started: 15:20 Time Completed: 16:40

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 12:30 Date of Depth Measurement: 2/27/13

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

Diameter of Casing: 2" Product Thickness, if noted: none

Total Depth of Well Below MP: 15.56 Well Screen Interval Length: 10'

Depth-to-Water (DTW) Below MP: 10.65 Depth to Top of Well Screen Below MP: —

Water Column in Well: 4.91 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.79 (Water Column in Well x Gallons per foot)

B3 - DTW 11.63'

PURGING DATA

Date Purged: 2/27/13 Time Started: 15:45 Time Completed: _____

Gallons Purged: 5.5 Depth of Pump Placement: variable during development

Maximum Drawdown: dry Pump Rate: —

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

Time:	Gallons:	Temp: (°C)	Sp. Cond.: (mS/cm)	pH: (S.U.)	Turb: (ntu)	DTW: (Feet)
	2.5	3.7	352	6.97	>1000	—
	3.5	3.8	354	6.90	>1000	—
• purged dry → slow to recharge → add 1.5gal potable water						
→ purged dry again after 2 more gallons						

SAMPLING DATA

Odor: none Color: Brown

Sample Designation: _____ Time / Date: _____

Duplicate Sample Designation: _____ Time / Date: _____

Evacuation Method: ~~Decontaminated Submersible Pump~~ / Other: _____

Sampling Method: Decontaminated Submersible Pump / Other: _____

Remarks: Developed well via surging / purging at 3 min intervals.

purged dry at ~~2.5 gal~~, 3.5 gal, ~~let well recover to 80%, then continued~~ ASC

Sampling Personnel: Andrew Lee & Dane Palmer → Recovery is slow, so added 1.5gal of potable water, surged vigorously for 10 minutes and purged dry again to complete development. (per 2011 ADEC Monitoring well guidance)

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.64

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

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: ~~B3MW~~ 321-17548 Location: Fire Station 4, 4350 MacInnes St. Anchorage Weather: cloudy, light snow, ~30°F

Well No.: B3MW

Date: 3/1/13 Time Started: 13:35 Time Completed: 14:50

Develop Date: 2/27/13 Develop End Time: 16:40 (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 11:41 Date of Depth Measurement: 3/1/13

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

Diameter of Casing: 2" Well Screen Interval: 10'

Total Depth of Well Below MP: 15:56 Product Thickness, if noted: none

Depth-to-Water (DTW) Below MP: 10.72

Water Column in Well: 4.84 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.77 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 3/1/13 Time Started: 1343 Time Completed: 15:45

Three Well Volumes: (Gallons in Well x 3)

Gallons Purged: 5 Depth of Pump Placement: 2' above bottom

Maximum Drawdown: >11.45 Pump Rate:

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

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: m ~~uS~~/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
1348	0.25	~0.3	11.12	4.49	0.260		6.77		824.5
13:52	0.5	0.25	11.30	4.49	0.258		6.69		540.9
13:58	0.75	~0.2	11.45	4.51	0.256		6.87		353.3
14:03	1	0.3+	—	4.38	0.262		6.87		266.3
14:08	2	~0.25	not measured	4.25	0.271		6.84		572.9
14:13	2.25	0.2	probe blocked by pump	4.29	0.273		6.84		530.8
14:18	2.75	~0.4		4.43	0.278		6.77		420.4
14:22	3	0.25		4.42	0.279		6.85		540.9
14:26	3.25	0.25		4.74	0.279		6.81		414.8

SAMPLING DATA

Odor: none Color: brown

Sample Designation: ~~17548-B3MW~~ Time / Date: ~~3/1/13~~

QC Sample Designation: ~~17548-B4MW~~ Time / Date: ~~3/1/13~~

QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / Submersible Pump / Other:

Sampling Method: Bladder Pump / Submersible Pump / Other:

Remarks: Did not collect a sample because water became too turbid for a representative DRO sample

Sampling Personnel: Andrew Lee & Dane Palmer

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

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 32-1-17548 Location: Fire Station 4, 4350 Macinnes St. Anchorage Weather: sunny, 30s °F

Well No.: B3MW

Date: 3/11/13 Time Started: 1500 Time Completed: 16:12

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 15:08 Date of Depth Measurement: 3/11/13

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

Diameter of Casing: 2" Product Thickness, if noted: none

Total Depth of Well Below MP: 15.56 Well Screen Interval Length: 10'

Depth-to-Water (DTW) Below MP: 10.73 Depth to Top of Well Screen Below MP: about 5.6'

Water Column in Well: 4.83 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.77 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 3/11/13 Time Started: 15:23 Time Completed: 15:39

Gallons Purged: 1.0 Depth of Pump Placement: 3' above bottom

Maximum Drawdown: NA Pump Rate: lowest than pump can achieve with a steady flow (~0.25 L/min)

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

Time:	Gallons:	Temp: (°C)	Sp. Cond.: (mS/cm)	pH: (S.U.)	Turb: (ntu)	DTW: (Feet)
15:27	0.25	4.10	0.280	6.34	40.08	NA: pump too tall + wide for water level probe to pass.
15:31	0.5	4.01	0.256	5.63	35.83	
15:35	0.75	4.46	0.244	6.15	46.12	
15:39	1.0	4.52	0.248	6.30	47.21	

SAMPLING DATA

Odor: none Color: gray

Sample Designation: 17548-B3MW Time / Date: 15:40 3/11/13

Duplicate Sample Designation: 17548-B4MW Time / Date: 15:55 3/11/13

Evacuation Method: Decontaminated Submersible Pump / Other:

Sampling Method: Decontaminated Submersible Pump / Other:

Remarks: purged 1 well volume (plus) then sampled before turbidity rises too much

Sampling Personnel: Andrew Lee

WELL CASING VOLUMES (GAL/FT): 1" = 0.04 2" = 0.16 4" = 0.64

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

Shannon & Wilson, Inc.

~~WATER SAMPLING LOG~~ Development

Job No: 32-1-17548 Location: Fire Station 4 Anchorage 4350 Macinnes St. Weather: 20°F, sunny

Well No.: B4MW

Date: 4/17/13 Time Started: 11:58 Time Completed: MS: 25 offsite 15:30

Develop Date: 4/17/13 Develop End Time: 15:05 (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: ____ Date of Depth Measurement: 4/17/13

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

Diameter of Casing: 2" Well Screen Interval: about 6 to 16.5

Total Depth of Well Below MP: 15.62 Product Thickness, if noted: none

Depth-to-Water (DTW) Below MP: 11.37 80% = 12.22

Water Column in Well: 4.25 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: 0.68 (Water Column in Well x Gallons per foot)

~~PURGING~~ Development DATA

Date Purged: ~~1245~~ 4/17/13 Time Started: 1245 Time Completed: 15:05

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

Gallons Purged: - Depth of Pump Placement: variable

Maximum Drawdown: dry Pump Rate: variable

Well Purged Dry: Yes ☒ 3x No ☐ (~~If yes, use Well Purged Dry~~ Log)

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
	0.75			7.2	442		7.24		>1100
	1.5			7.2	431		7.64		>1100
	2.25			7.1	398		7.62		>1100
	3.5			7.3	445		7.40		>1100
	4.25			7.3	427		7.53		>1100
	5			7.2	419		7.63		>1100
	5.75			6.9	407		7.57		>1100
	6.5 - purged dry 1st time			7.3	403		7.73		>1100
	7			6.8	404		7.97		>1100

see back side of page

SAMPLING DATA

Odor: none Color: gray-brown

Sample Designation: — Time / Date: ____

QC Sample Designation: — Time / Date: —

QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / Submersible Pump / Other: ____

Sampling Method: Bladder Pump / Submersible Pump / Other: NA - develop only

Remarks: Develop by surging with surge block then pumping with sub. pump on 3 min/3 min cycle. approx
Purged dry @ 6.5 gal. Allow Recovery to 80% / dry @ 10 gal / recovr 80% / purged dry @ 13.5 gal.

Sampling Personnel: Andreulet

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

Shannon & Wilson, Inc.

WATER SAMPLING LOG

Development

Continued from previous page

Job No: 32-1-17548 Location: Fire Station 4 Site: 4350 Macinnes St Anchorage

Well No.: B4MW

Date: 4/17/13

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
	8.5			7.0	392		7.81		>1100
	9.5			7.4	391		7.83		>1100
	10 purged dry 2nd time			7.1	395		7.93		>1100
	10.75			6.3	393		7.89		>1100
	~~11.5~~ 12			6.7	385		7.74		>1100
	12.5			7.1	389		7.94		>1100
	13.5	purged dry 3rd time		~~7.3~~ ASU	389		7.87		>1100

Sampling Personnel: Andrew Lee

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

WATER SAMPLING LOG

Shannon & Wilson, Inc.

Job No: 321-17548 Location: 4150 MacInnes St Weather: 30°F, sun

Well No.: B4MW

Date: 4/18/13 Time Started: 16:12 Time Completed: 17:15

Develop Date: 4/17/13 Develop End Time: 15:05 (24 hour break)

INITIAL GROUNDWATER LEVEL DATA

Time of Depth Measurement: 15:52 Date of Depth Measurement: 4/18/13

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

Diameter of Casing: 2" Well Screen Interval: about 6' to 15.5'

Total Depth of Well Below MP: 15.62 Product Thickness, if noted: none

Depth-to-Water (DTW) Below MP: 11.35

Water Column in Well: 4.27 (Total Depth of Well Below MP - DTW Below MP)

Gallons per foot: 0.16

Gallons in Well: ~ 0.7 (Water Column in Well x Gallons per foot)

PURGING DATA

Date Purged: 4/18/13 Time Started: 16:27 Time Completed: 17:12

Three Well Volumes: 2.1 (Gallons in Well x 3)

Gallons Purged: 4.25 Depth of Pump Placement: about 2' above bottom

Maximum Drawdown: 12.29 Pump Rate:

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

Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: mS (uS/cm)	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
16:24	0.25	0.5	—	6.81	0.397		7.50		466.4
16:27	0.5	0.3	11.54	6.92	0.399		7.63		335.8
16:33	1	0.3	—	7.24	0.399		7.65		121.4
16:36	1.25	0.3	—	7.47	0.400		7.64		90.34
16:39	1.5	0.3	11.72	7.53	0.398		7.64		62.56
16:42	1.75	0.3	—	7.46	0.399		7.67		48.83
16:45	2	0.3	—	7.62	0.399		7.69		35.01
16:48	2.25	0.3	—	7.85	0.395		7.70		27.84
16:51	2.5	0.3	11.97	7.29	0.398		7.70		35.16

see backside of page

SAMPLING DATA

Odor: none Color: clear

Sample Designation: 17548-B4MW Time / Date: 17:12 4/18/13

QC Sample Designation: — Time / Date: —

QA Sample Designation: — Time / Date: —

Evacuation Method: Bladder Pump / (Submersible Pump) / Other:

Sampling Method: Bladder Pump / (Submersible Pump) / Other:

Remarks:

Sampling Personnel: Andrew Lee

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

Shannon & Wilson, Inc.

WATER SAMPLING LOG

Continued from previous page

Job No: 17548 Location: Fire Station 4 Site:

Well No.: B4MW 4350 Mac Innes Anchorage

Date: 4/18/13

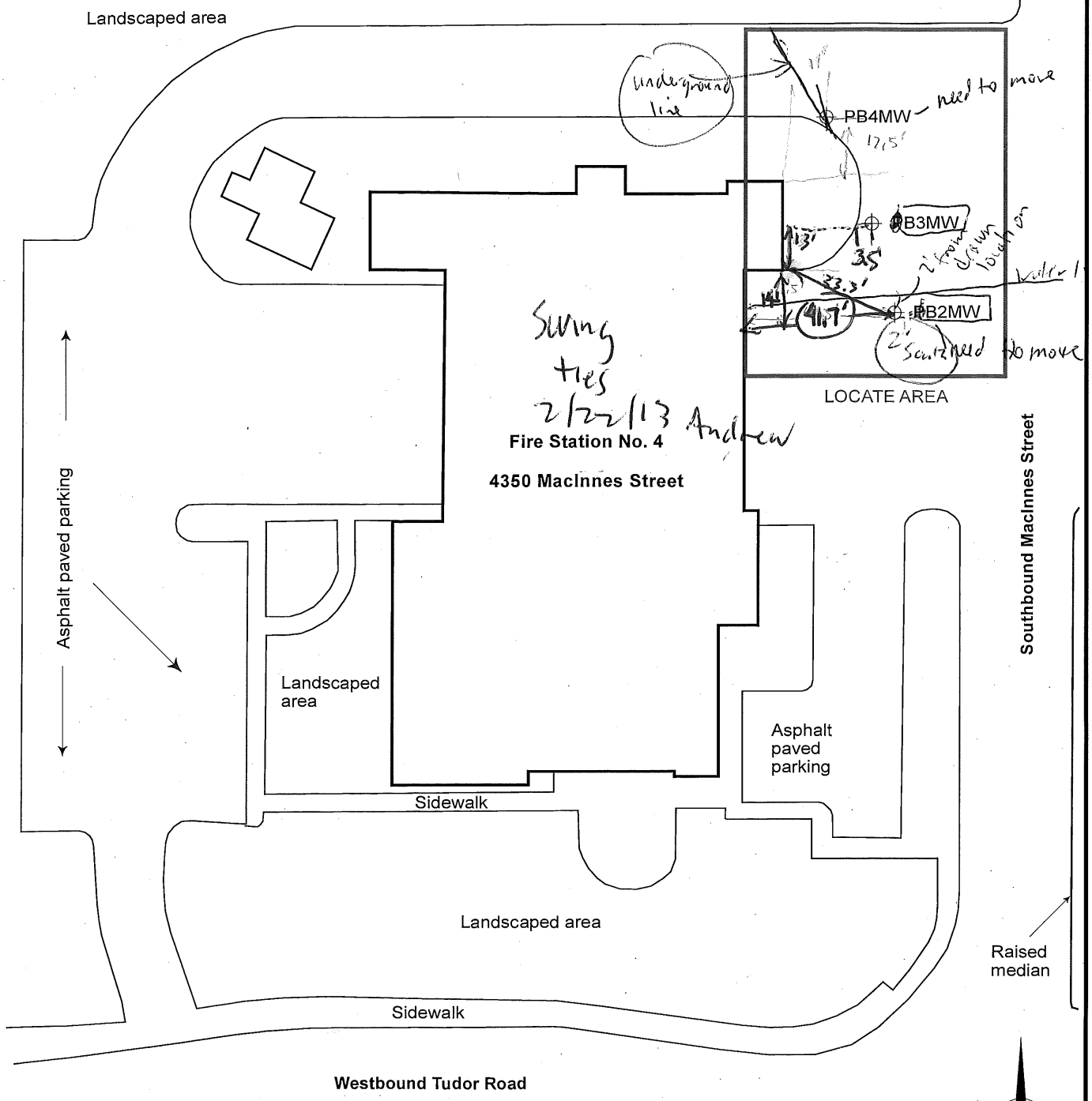
Time:	Gallons:	Pump Rate (L/min):	Drawdown (ft BTOC):	Temp: (°C)	Sp. Cond.: mS ~~(uS/cm)~~	DO: (mg/L)	pH: (S.U.)	ORP: (mV)	Turb: (NTU)
16:54	2.75	0.3	—	7.25	0.401		7.68		58.71
16:57	3	0.3	—	7.18	0.402		7.68		53.51
17:00	3.25	0.3	12.07	7.15	0.406		7.67		52.74
17:03	3.5	0.3	—	7.11	0.407		7.67		44.32
17:06	3.75	0.3	—	7.09	0.408		7.69		39.40
17:09	4	0.3	—	7.05	0.402		7.68		37.25
17:12	4.25	0.3	12.29	7.08	0.404		7.68		37.72

Sampling Personnel: Andrew Lee

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

TODO: Submit locates on Feb 20. Tuesday in Morning



LEGEND

⊕ PB2MW — Proposed boring/monitoring well location for Monitoring Well B2MW

0 40 80

APPROXIMATE SCALE IN FEET

4350 MacInnes Street
Anchorage, Alaska

SITE PLAN

February 2013 32-1-17548-001

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 1

1130677

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Steve Crupi

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(Meoh) GRO AK101	BTEX 8021B					Total Number of Containers	Remarks/Matrix
17548-B2S1	(1) A-B	9:55	2/22/13		X	X						2	Soil
17548-B2S6	(2) A-B	10:50	"		X	X						2	"
17548-B3S1	(3) A-B	12:52	"		X	X						2	"
17548-B3S6	(4) A-B	13:36	"		X	X						2	"
17548-B3S14	(5) A-B	13:40	"		X	X						2	"
17548-TBS	(6) A	8:00	↓	~~X~~		X						1	Soil trip blanks

Project Information		Sample Receipt	
Project Number:	32-1-17548-001	Total Number of Containers	
Project Name:	Fire station 4	COC Seals/Intact? Y/N/NA	
Contact:	Terry & Andrew Lee	Received Good Cond./Cold	3/1°
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	#235
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee	Signature:	Signature:
Time: 16:25	Time:	Time:
Printed Name: Andrew Lee	Printed Name:	Printed Name:
Date: 2/22/13	Date:	Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Signature:	Signature:
Time:	Time:	Time: 2/24/13
Printed Name:	Printed Name:	Printed Name: Justin A. Nelson
Date:	Date:	Date: 1625
Company:	Company:	Company: SGS-Anchorage

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

No. 30019

1130766

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

Page 1 of 1

Laboratory SGS
Attn: Steve Crapi

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX (HCl) AK101 8021B	DRO AK102					Total Number of Containers	Remarks/Matrix
17548-B2MW	(1)A-E	13:15	3/1/13		X	X	X					5	groundwater
17548-TBW1	(2)A-C	8:00	3/1/13			X						1box	trip blank

Project Information		Sample Receipt	
Project Number:	321-17548	Total Number of Containers	
Project Name:	Fire Station 4	COC Seals/Intact? Y/N/NA	
Contact:	Tim Terry/Andrew Lee	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 17:50	Signature: Dane Palmer Time: 3/4/13	Signature: Time:
Printed Name: Andrew Lee Date: 3/1/13	Printed Name: Dane Palmer Date: 3/4/13	Printed Name: Date:
Company: Shannon & Wilson	Company: Shannon and Wilson	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Dane Palmer Time: 17:50	Signature: Time:	Signature: Time: 0748
Printed Name: Dane Palmer Date: 3/1/13	Printed Name: Date:	Printed Name: Date: 3/4/13
Company: Shannon & Wilson	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

5,3#238

No. 30018

1130880

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

Laboratory SGS
Attn: Steve Crupi

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX (HCl) AK101 8021B	DRO (HCl) AK102					Total Number of Containers	Remarks/Matrix
17548 - B3MW	(1) A-E	15:40	3/11/13		X	X	X					5	groundwater
17548 - B4MW	(2) A-E	15:55	3/11/13		X	X	X					5	"
17548 - TBW2	(3) A-C	8:00	3/11/13			X						16oz	trip blank

Project Information		Sample Receipt	
Project Number:	37-1-17548	Total Number of Containers	
Project Name:	Firestation 4	COC Seals/Intact? Y/N/NA	
Contact:	Andrew Lee / Tim Terry	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions

Requested Turnaround Time: Standard

Special Instructions: ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee	Signature:	Signature:
Time: 16:42	Time:	Time:
Printed Name: Andrew Lee	Printed Name:	Printed Name:
Date: 3/11/13	Date:	Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Signature:	Signature:
Time:	Time:	Time: 1642
Printed Name:	Printed Name:	Printed Name: Mary Martinez
Date:	Date:	Date: 3-11-13
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

8.1/138

No. 30083

1131383

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY

Page 1 of 1

Laboratory 565
Attn: Steve Campi

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX AK101 8021B						Total Number of Containers	Remarks/Matrix
17548-B451		10:43	4/15/13		X	X						2	Soil
17548-B456		11:15	4/15/13		X	X						2	"
17548-TBS2		800	4/15/13			X						1	Soil trip blank

Project Information	Sample Receipt
Project Number: 32-1-17548	Total Number of Containers
Project Name: Fire Station 4	COC Seals/Intact? Y/N/NA
Contact: Andrew Lee/Tom Terry	Received Good Cond./Cold
Ongoing Project? Yes ☒ No ☐	Delivery Method: In person in one cooler
Sampler: Andrew Lee	(attach shipping bill, if any)

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 1536	Signature: Time:	Signature: Time:
Printed Name: Andrew Lee Date: 4/15/13	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 1530
Printed Name: Date:	Printed Name: Date:	Printed Name: Mani Martinez Date: 4-15-13
Company:	Company:	Company: 565

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

5-9-205

No. 30093

1131474

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Steve Crupi

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO AK101	BTEX (HCl) 8021B	DRO AK102 (HCl)					Total Number of Containers	Remarks/Matrix
17548-B4MW		17:12	4/18/13		X	X	X						5	water
17548-TBW		8:00	4/18/13			X							1 box	water trip blank

Project Information		Sample Receipt	
Project Number:	321-17548-001	Total Number of Containers	
Project Name:	Fire Station 4	COC Seals/Intact? Y/N/NA	
Contact:	Andrew Lee & Tim Terry	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	In person using single coolers
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 1134	Signature: Time:	Signature: Time:
Printed Name: Andrew Lee Date: 4-19-13	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 1134
Printed Name: Date:	Printed Name: Date:	Printed Name: Mary Martinez Date: 4-19-13
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

5.5/205

No. 30085

APPENDIX D

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

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1130677**

Client Project: **32-1-17548-001 Fire Station 4**

Dear Andrew Lee,

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 five 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 thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Steve 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.

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2013.03.06
14:49:33 -09'00'

Steve Crupi Date
Project Manager
steven.crupi@sgs.com

Print Date: 03/06/2013 8:16:38AM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1130677**
Project Name/Site: **32-1-17548-001 Fire Station 4**
Project Contact: **Andrew Lee**

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	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
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., 2xDL)
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
RL	Reporting Limit
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
17548-B2S1	1130677001	02/22/2013	02/22/2013	Soil/Solid (dry weight)
17548-B2S6	1130677002	02/22/2013	02/22/2013	Soil/Solid (dry weight)
17548-B3S1	1130677003	02/22/2013	02/22/2013	Soil/Solid (dry weight)
17548-B3S6	1130677004	02/22/2013	02/22/2013	Soil/Solid (dry weight)
17548-B3S14	1130677005	02/22/2013	02/22/2013	Soil/Solid (dry weight)
17548-TB5	1130677006	02/22/2013	02/22/2013	Soil/Solid (dry weight)

Method	Method Description
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
SM21 2540G	Percent Solids SM2540G

Print Date: 03/06/2013 8:16:40AM

Detectable Results Summary

Client Sample ID: **17548-B2S1**
Lab Sample ID: 1130677001
Volatile Fuels

Parameter	Result	Units
Benzene	5.95J	ug/Kg

Client Sample ID: **17548-B3S1**
Lab Sample ID: 1130677003
Volatile Fuels

Parameter	Result	Units
Benzene	6.33J	ug/Kg
Toluene	10.6J	ug/Kg

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 **17548-B2S1**

Client Sample ID: **17548-B2S1**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677001
Lab Project ID: 1130677

Collection Date: 02/22/13 09:55
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%): 97.3

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.37	U	2.29	0.686	mg/Kg	1	02/27/13 17:07
Surrogates							
4-Bromofluorobenzene	101		50-150		%	1	02/27/13 17:07

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 17:07
Container ID: 1130677001-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 09:55
Prep Initial Wt./Vol.: 59.849 g
Prep Extract Vol: 26.638 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	5.95	J	11.4	3.66	ug/Kg	1	02/27/13 17:07
Ethylbenzene	14.3	U	22.9	7.14	ug/Kg	1	02/27/13 17:07
o-Xylene	14.3	U	22.9	7.14	ug/Kg	1	02/27/13 17:07
P & M -Xylene	27.4	U	45.8	13.7	ug/Kg	1	02/27/13 17:07
Toluene	14.3	U	22.9	7.14	ug/Kg	1	02/27/13 17:07
Surrogates							
1,4-Difluorobenzene	96.3		72-119		%	1	02/27/13 17:07

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 17:07
Container ID: 1130677001-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 09:55
Prep Initial Wt./Vol.: 59.849 g
Prep Extract Vol: 26.638 mL

Print Date: 03/06/2013 8:16:42AM

Results of **17548-B2S6**

Client Sample ID: **17548-B2S6**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677002
Lab Project ID: 1130677

Collection Date: 02/22/13 10:50
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%): 83.9

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.74	U	2.89	0.868	mg/Kg	1	02/27/13 17:25
Surrogates							
4-Bromofluorobenzene	106		50-150		%	1	02/27/13 17:25

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 17:25
Container ID: 1130677002-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 10:50
Prep Initial Wt./Vol.: 77.065 g
Prep Extract Vol: 37.4182 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	9.26	U	14.5	4.63	ug/Kg	1	02/27/13 17:25
Ethylbenzene	18.1	U	28.9	9.03	ug/Kg	1	02/27/13 17:25
o-Xylene	18.1	U	28.9	9.03	ug/Kg	1	02/27/13 17:25
P & M -Xylene	34.8	U	57.9	17.4	ug/Kg	1	02/27/13 17:25
Toluene	18.1	U	28.9	9.03	ug/Kg	1	02/27/13 17:25
Surrogates							
1,4-Difluorobenzene	96.4		72-119		%	1	02/27/13 17:25

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 17:25
Container ID: 1130677002-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 10:50
Prep Initial Wt./Vol.: 77.065 g
Prep Extract Vol: 37.4182 mL

Print Date: 03/06/2013 8:16:42AM

Results of **17548-B3S1**

Client Sample ID: **17548-B3S1**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677003
Lab Project ID: 1130677

Collection Date: 02/22/13 12:52
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%): 94.4

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.23	U	2.04	0.613	mg/Kg	1	02/27/13 17:43
Surrogates							
4-Bromofluorobenzene	109		50-150		%	1	02/27/13 17:43

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 17:43
Container ID: 1130677003-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 12:52
Prep Initial Wt./Vol.: 75.939 g
Prep Extract Vol: 29.2752 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	6.33	J	10.2	3.27	ug/Kg	1	02/27/13 17:43
Ethylbenzene	12.7	U	20.4	6.37	ug/Kg	1	02/27/13 17:43
o-Xylene	12.7	U	20.4	6.37	ug/Kg	1	02/27/13 17:43
P & M -Xylene	24.6	U	40.9	12.3	ug/Kg	1	02/27/13 17:43
Toluene	10.6	J	20.4	6.37	ug/Kg	1	02/27/13 17:43
Surrogates							
1,4-Difluorobenzene	96.2		72-119		%	1	02/27/13 17:43

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 17:43
Container ID: 1130677003-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 12:52
Prep Initial Wt./Vol.: 75.939 g
Prep Extract Vol: 29.2752 mL

Print Date: 03/06/2013 8:16:42AM

Results of **17548-B3S6**

Client Sample ID: **17548-B3S6**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677004
Lab Project ID: 1130677

Collection Date: 02/22/13 13:36
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%): 96.6

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.11	U	1.85	0.556	mg/Kg	1	02/27/13 16:14
Surrogates							
4-Bromofluorobenzene	102		50-150		%	1	02/27/13 16:14

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 16:14
Container ID: 1130677004-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 13:36
Prep Initial Wt./Vol.: 77.202 g
Prep Extract Vol: 27.6441 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	5.94	U	9.27	2.97	ug/Kg	1	02/27/13 16:14
Ethylbenzene	11.6	U	18.5	5.78	ug/Kg	1	02/27/13 16:14
o-Xylene	11.6	U	18.5	5.78	ug/Kg	1	02/27/13 16:14
P & M -Xylene	22.2	U	37.1	11.1	ug/Kg	1	02/27/13 16:14
Toluene	11.6	U	18.5	5.78	ug/Kg	1	02/27/13 16:14
Surrogates							
1,4-Difluorobenzene	96.3		72-119		%	1	02/27/13 16:14

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 16:14
Container ID: 1130677004-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 13:36
Prep Initial Wt./Vol.: 77.202 g
Prep Extract Vol: 27.6441 mL

Print Date: 03/06/2013 8:16:42AM

Results of **17548-B3S14**

Client Sample ID: **17548-B3S14**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677005
Lab Project ID: 1130677

Collection Date: 02/22/13 13:40
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%): 96.6

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.38	U	2.29	0.688	mg/Kg	1	02/27/13 18:01
Surrogates							
4-Bromofluorobenzene	98.5		50-150		%	1	02/27/13 18:01

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 18:01
Container ID: 1130677005-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 13:40
Prep Initial Wt./Vol.: 61.186 g
Prep Extract Vol: 27.0982 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	7.34	U	11.5	3.67	ug/Kg	1	02/27/13 18:01
Ethylbenzene	14.3	U	22.9	7.15	ug/Kg	1	02/27/13 18:01
o-Xylene	14.3	U	22.9	7.15	ug/Kg	1	02/27/13 18:01
P & M -Xylene	27.6	U	45.9	13.8	ug/Kg	1	02/27/13 18:01
Toluene	14.3	U	22.9	7.15	ug/Kg	1	02/27/13 18:01
Surrogates							
1,4-Difluorobenzene	96.5		72-119		%	1	02/27/13 18:01

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 18:01
Container ID: 1130677005-B

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 13:40
Prep Initial Wt./Vol.: 61.186 g
Prep Extract Vol: 27.0982 mL

Print Date: 03/06/2013 8:16:42AM

Results of **17548-TB5**

Client Sample ID: **17548-TB5**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1130677006
Lab Project ID: 1130677

Collection Date: 02/22/13 08:00
Received Date: 02/22/13 16:25
Matrix: Soil/Solid (dry weight)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.50	U	2.51	0.752	mg/Kg	1	02/27/13 18:19
Surrogates							
4-Bromofluorobenzene	91.1		50-150		%	1	02/27/13 18:19

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 02/27/13 18:19
Container ID: 1130677006-A

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 08:00
Prep Initial Wt./Vol.: 49.852 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	8.02	U	12.5	4.01	ug/Kg	1	02/27/13 18:19
Ethylbenzene	15.6	U	25.1	7.82	ug/Kg	1	02/27/13 18:19
o-Xylene	15.6	U	25.1	7.82	ug/Kg	1	02/27/13 18:19
P & M -Xylene	30.0	U	50.1	15.0	ug/Kg	1	02/27/13 18:19
Toluene	15.6	U	25.1	7.82	ug/Kg	1	02/27/13 18:19
Surrogates							
1,4-Difluorobenzene	95.8		72-119		%	1	02/27/13 18:19

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 02/27/13 18:19
Container ID: 1130677006-A

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 02/22/13 08:00
Prep Initial Wt./Vol.: 49.852 g
Prep Extract Vol: 25 mL

Print Date: 03/06/2013 8:16:42AM

Method Blank

Blank ID: MB for HBN 1417259 [SPT/8925]
Blank Lab ID: 1139202

Matrix: Soil/Solid (dry weight)

QC for Samples:
1130677001, 1130677002, 1130677003, 1130677004, 1130677005

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT8925
Analytical Method: SM21 2540G
Instrument:
Analyst: THV
Analytical Date/Time: 2/28/2013 6:00:00PM

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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Duplicate Sample Summary

Original Sample ID: 1130655001
Duplicate Sample ID: 1139203
Analysis Date: 02/28/2013 18:00
Matrix: Soil/Solid (dry weight)

QC for Samples:

1130677001, 1130677002, 1130677003, 1130677004, 1130677005

Results by **SM21 2540G**

NAME	Original (0.21)	Duplicate ()	RPD (%)	RPD CL
Total Solids	87.5	87.7	0.21	15.00

Batch Information

Analytical Batch: SPT8925
Analytical Method: SM21 2540G
Instrument:
Analyst: THV

Print Date: 03/06/2013 8:16:44AM

Method Blank

Blank ID: MB for HBN 1418459 [VXX/24534]
Blank Lab ID: 1139299

Matrix: Soil/Solid (dry weight)

QC for Samples:
1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.50U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene	79.7	50-150		%

Batch Information

Analytical Batch: VFC11355
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 2/27/2013 1:32:00PM

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 2/27/2013 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1130677 [VXX24534]
Blank Spike Lab ID: 1139311
Date Analyzed: 02/27/2013 15:01

Spike Duplicate ID: LCSD for HBN 1130677 [VXX24534]
Spike Duplicate Lab ID: 1139312
Matrix: Soil/Solid (dry weight)

QC for Samples: 1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	10.0	9.06	91	10.0	9.04	90	(60-120)	0.14	(< 20)
Surrogates									
4-Bromofluorobenzene		80.8	81	1.25	78.3		(50-150)	3.10	

Batch Information

Analytical Batch: **VFC11355**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX24534**
Prep Method: **SW5035A**
Prep Date/Time: **02/27/2013 08:00**
Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1130677 [VXX24534]
Blank Spike Lab ID: 1139313
Date Analyzed: 02/27/2013 15:37

Spike Duplicate ID: LCSD for HBN 1130677 [VXX24534]
Spike Duplicate Lab ID: 1139314
Matrix: Soil/Solid (dry weight)

QC for Samples: 1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	10.0	10.0	100	10.0	10.4	104	(60-120)	3.20	(< 20)
Surrogates									
4-Bromofluorobenzene		85.2	85	1.25	90.5		(50-150)	5.90	

Batch Information

Analytical Batch: **VFC11355**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX24534**
Prep Method: **SW5035A**
Prep Date/Time: **02/27/2013 08:00**
Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1418459 [VXX/24534]
Blank Lab ID: 1139299

Matrix: Soil/Solid (dry weight)

QC for Samples:
1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	8.00U	12.5	4.00	ug/Kg
Ethylbenzene	15.6U	25.0	7.80	ug/Kg
o-Xylene	15.6U	25.0	7.80	ug/Kg
P & M -Xylene	30.0U	50.0	15.0	ug/Kg
Toluene	15.6U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene	96.1	72-119		%

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 2/27/2013 1:32:00PM

Prep Batch: VXX24534
Prep Method: SW5035A
Prep Date/Time: 2/27/2013 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1130677 [VXX24534]
Blank Spike Lab ID: 1139300
Date Analyzed: 02/27/2013 13:50

Spike Duplicate ID: LCSD for HBN 1130677 [VXX24534]
Spike Duplicate Lab ID: 1139301
Matrix: Soil/Solid (dry weight)

QC for Samples: 1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1380	110	1250	1420	113	(75-125)	2.50	(< 20)
Ethylbenzene	1250	1350	108	1250	1380	110	(75-125)	2.40	(< 20)
o-Xylene	1250	1340	107	1250	1360	109	(75-125)	1.70	(< 20)
P & M -Xylene	2500	2710	108	2500	2770	111	(80-125)	2.30	(< 20)
Toluene	1250	1350	108	1250	1380	111	(70-125)	2.30	(< 20)
Surrogates									
1,4-Difluorobenzene		99	99	1250	99.5		(72-119)	0.50	

Batch Information

Analytical Batch: **VFC11355**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX24534**
Prep Method: **SW5035A**
Prep Date/Time: **02/27/2013 08:00**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1130677 [VXX24534]
Blank Spike Lab ID: 1139309
Date Analyzed: 02/27/2013 14:26

Spike Duplicate ID: LCSD for HBN 1130677 [VXX24534]
Spike Duplicate Lab ID: 1139310
Matrix: Soil/Solid (dry weight)

QC for Samples: 1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1400	112	1250	1380	110	(75-125)	1.20	(< 20)
Ethylbenzene	1250	1360	109	1250	1340	108	(75-125)	1.30	(< 20)
o-Xylene	1250	1350	108	1250	1340	107	(75-125)	0.62	(< 20)
P & M -Xylene	2500	2740	110	2500	2710	108	(80-125)	1.00	(< 20)
Toluene	1250	1370	110	1250	1350	108	(70-125)	1.10	(< 20)
Surrogates									
1,4-Difluorobenzene		99.2	99	1250	99		(72-119)	0.20	

Batch Information

Analytical Batch: **VFC11355**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **ST**

Prep Batch: **VXX24534**
Prep Method: **SW5035A**
Prep Date/Time: **02/27/2013 08:00**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1130677004
MS Sample ID: 1139302 MS
MSD Sample ID: 1139303 MSD

Analysis Date: 02/27/2013 16:14
Analysis Date: 02/27/2013 16:31
Analysis Date: 02/27/2013 16:49
Matrix: Soil/Solid (dry weight)

QC for Samples: 1130677001, 1130677002, 1130677003, 1130677004, 1130677005, 1130677006

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	5.94U	839	896	107	839	916	109	75-125	2.10	(< 20)
Ethylbenzene	11.6U	839	855	102	839	892	107	75-125	4.20	(< 20)
o-Xylene	11.6U	839	855	102	839	885	106	75-125	3.50	(< 20)
P & M -Xylene	22.2U	1677	1729	103	1677	1791	107	80-125	3.60	(< 20)
Toluene	11.6U	839	864	103	839	894	107	70-125	3.30	(< 20)
Surrogates										
1,4-Difluorobenzene			840	100		832	99	72-119	0.92	

Batch Information

Analytical Batch: VFC11355
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: ST
Analytical Date/Time: 2/27/2013 4:31:00PM

Prep Batch: VXX24534
Prep Method: AK101 Extraction (S)
Prep Date/Time: 2/27/2013 8:00:00AM
Prep Initial Wt./Vol.: 77.20g
Prep Extract Vol: 25.00mL

Print Date: 03/06/2013 8:16:47AM

1130677

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Steve Crupi

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
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Fairbanks, AK 99709
(907) 479-0600

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Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(Meoh) GRO AK101	BTEX 8021B					Total Number of Containers	Remarks/Matrix
17548-B2S1	(1) A-B	9:55	2/22/13		X	X						2	Soil
17548-B2S6	(2) A-B	10:50	"		X	X						2	"
17548-B3S1	(3) A-B	12:52	"		X	X						2	"
17548-B3S6	(4) A-B	13:36	"		X	X						2	"
17548-B3S14	(5) A-B	13:40	"		X	X						2	"
17548-TBS	(6) A	8:00	"	~~X~~		X						1	Soil trip blanks

Project Information		Sample Receipt	
Project Number:	32-1-17548-001	Total Number of Containers	
Project Name:	Fire station 4	COC Seals/Intact? Y/N/NA	
Contact:	Terry & Andrew Lee	Received Good Cond./Cold	3/1°
Ongoing Project?	Yes ☒ No ☐	Delivery Method:	#235
Sampler:	Andrew Lee	(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee	Signature:	Signature:
Time: 16:25	Time:	Time:
Printed Name: Andrew Lee	Printed Name:	Printed Name:
Date: 2/22/13	Date:	Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Signature:	Signature:
Time:	Time:	Time: 2/24/13
Printed Name:	Printed Name:	Printed Name: Justin A. Nelson
Date:	Date:	Date: 1625
Company:	Company:	Company: SGS-Anchorage

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

No. 30819

SGS

1130677

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? * *Note: Exemption permitted for chilled samples collected less than 8 hours ago.* Cooler ID: 1 @ 3.1° w/ Therm.ID: 238 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ *Note: If non-compliant, use form FS-0029 to document affected samples/analyses.* If samples are 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." **If temperature(s) <0°C, were all sample containers ice free?**	(Yes) No N/A Yes No (N/A)	
Delivery method (specify all that apply): (Client) USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See Attached or (N/A) Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC **(circle one)** or note: (N/A) → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed. SRF Initiated by: (N/A)		
Were samples received within hold time? *Note: Refer to form F-083 "Sample Guide" for hold time information.* Do samples **match COC*** (i.e., sample IDs, dates/times collected)? * *Note: Exemption permitted if times differ <1hr; in that case, use times on COC.* Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	Yes No (N/A) (Yes) No N/A	
Were **proper containers** (type/mass/volume/preservative*) used? * *Note: Exemption permitted for waters to be analyzed for metals.* Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No N/A	
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No (N/A) Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: JM PM = (N/A)
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: (N/A)
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: March 12, 2013

CS Report Name: Additional Site Characterization, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska; ADEC Hazard ID:23660
Laboratory Report Date: March 6, 2013

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1130677

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 3.1° C.*

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: *The laboratory noted that the samples were in good condition.*

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: *The laboratory interpreted the trip blank ID as "17548-TB5"instead of "17548-TBS".*

e. Data quality or usability affected? Please explain.
Comments: *Data quality is not affected because there is only one trip blank in this work order.*

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:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative? **NA**
Comments:

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:

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

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection

level for the project? **Yes / No / NA** (please explain)
Comments:

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

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:

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

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%; 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.) Water and Soil

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: *The samples were delivered in one cooler.*

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 B3S14 is a field duplicate of Sample B3S6.*

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 results of the field duplicate samples were the same, but the RPDs were not calculated because the target analytes were not detected.*

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

f. Decontamination or Equipment Blank
Yes / No / NA (please explain)
Comments: *Dedicated stainless steel spoons were used to collect the soil samples.*

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.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1130766**

Client Project: **32-1-17548 Fire Station 4**

Dear Andrew Lee,

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 five 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 thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Steve 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.

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2013.03.11
13:11:26 -08'00'

Steve Crupi Date
Project Manager
steven.crupi@sgs.com

Print Date: 03/08/2013 4:05:22PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1130766**
Project Name/Site: **32-1-17548 Fire Station 4**
Project Contact: **Andrew Lee**

Refer to sample receipt form for information on sample condition.

17548-B2MW (1130766001) PS

AK102 - The pattern is consistent with a weathered middle distillate.

*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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	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
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., 2xDL)
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
RL	Reporting Limit
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.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17548-B2MW	1130766001	03/01/2013	03/04/2013	Water (Surface, Eff., Ground)
17548-TBW1	1130766002	03/01/2013	03/04/2013	Water (Surface, Eff., Ground)

Method	Method Description
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	Diesel Range Organics (W)

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Detectable Results Summary

Client Sample ID: **17548-B2MW**
Lab Sample ID: 1130766001

Semivolatile Organic Fuels
Volatile Fuels

Parameter	Result	Units
Diesel Range Organics	1.81	mg/L
Benzene	2.79	ug/L
Ethylbenzene	3.21	ug/L
Gasoline Range Organics	0.0387J	mg/L

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Results of **17548-B2MW**

Client Sample ID: **17548-B2MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130766001
Lab Project ID: 1130766

Collection Date: 03/01/13 13:15
Received Date: 03/04/13 09:48
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Diesel Range Organics	1.81		0.625	0.188	mg/L	1	03/07/13 20:27
Surrogates							
5a Androstane	93.8		50-150		%	1	03/07/13 20:27

Batch Information

Analytical Batch: XFC10831
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 03/07/13 20:27
Container ID: 1130766001-D

Prep Batch: XXX28757
Prep Method: SW3520C
Prep Date/Time: 03/07/13 08:40
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL

Print Date: 03/08/2013 4:05:25PM

Results of **17548-B2MW**

Client Sample ID: **17548-B2MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130766001
Lab Project ID: 1130766

Collection Date: 03/01/13 13:15
Received Date: 03/04/13 09:48
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0387	J	0.100	0.0310	mg/L	1	03/06/13 14:38
Surrogates							
4-Bromofluorobenzene	84.6		50-150		%	1	03/06/13 14:38

Batch Information

Analytical Batch: VFC11358
Analytical Method: AK101
Analyst: EAB
Analytical Date/Time: 03/06/13 14:38
Container ID: 1130766001-A

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 03/06/13 08:08
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	2.79		0.500	0.150	ug/L	1	03/06/13 14:38
Ethylbenzene	3.21		1.00	0.310	ug/L	1	03/06/13 14:38
o-Xylene	0.620	U	1.00	0.310	ug/L	1	03/06/13 14:38
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	03/06/13 14:38
Toluene	0.620	U	1.00	0.310	ug/L	1	03/06/13 14:38
Surrogates							
1,4-Difluorobenzene	96.7		77-115		%	1	03/06/13 14:38

Batch Information

Analytical Batch: VFC11358
Analytical Method: SW8021B
Analyst: EAB
Analytical Date/Time: 03/06/13 14:38
Container ID: 1130766001-A

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 03/06/13 08:08
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/08/2013 4:05:25PM

Results of **17548-TBW1**

Client Sample ID: **17548-TBW1**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130766002
Lab Project ID: 1130766

Collection Date: 03/01/13 08:00
Received Date: 03/04/13 09:48
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	03/06/13 15:15
Surrogates							
4-Bromofluorobenzene	83.5		50-150		%	1	03/06/13 15:15

Batch Information

Analytical Batch: VFC11358
Analytical Method: AK101
Analyst: EAB
Analytical Date/Time: 03/06/13 15:15
Container ID: 1130766002-A

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 03/06/13 08:08
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	03/06/13 15:15
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	03/06/13 15:15
o-Xylene	0.620	U	1.00	0.310	ug/L	1	03/06/13 15:15
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	03/06/13 15:15
Toluene	0.620	U	1.00	0.310	ug/L	1	03/06/13 15:15
Surrogates							
1,4-Difluorobenzene	96.8		77-115		%	1	03/06/13 15:15

Batch Information

Analytical Batch: VFC11358
Analytical Method: SW8021B
Analyst: EAB
Analytical Date/Time: 03/06/13 15:15
Container ID: 1130766002-A

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 03/06/13 08:08
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/08/2013 4:05:25PM

Method Blank

Blank ID: MB for HBN 1420579 [VXX/24541]
Blank Lab ID: 1139712

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130766001, 1130766002

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0620U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene	85.1	50-150		%

Batch Information

Analytical Batch: VFC11358
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: EAB
Analytical Date/Time: 3/6/2013 12:29:01PM

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 3/6/2013 8:08:21AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1130766 [VXX24541]
Blank Spike Lab ID: 1139715
Date Analyzed: 03/06/2013 13:24

Spike Duplicate ID: LCSD for HBN 1130766 [VXX24541]
Spike Duplicate Lab ID: 1139716
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130766001, 1130766002

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.947	95	1.00	0.967	97	(60-120)	2.10	(< 20)
Surrogates									
4-Bromofluorobenzene		86	86	0.0500	82.2		(50-150)	4.50	

Batch Information

Analytical Batch: **VFC11358**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **EAB**

Prep Batch: **VXX24541**
Prep Method: **SW5030B**
Prep Date/Time: **03/06/2013 08:08**
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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Method Blank

Blank ID: MB for HBN 1420579 [VXX/24541]
Blank Lab ID: 1139712

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130766001, 1130766002

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
Surrogates				
1,4-Difluorobenzene	96.5	77-115		%

Batch Information

Analytical Batch: VFC11358
Analytical Method: SW8021B
Instrument: Agilent 7890 PID/FID
Analyst: EAB
Analytical Date/Time: 3/6/2013 12:29:01PM

Prep Batch: VXX24541
Prep Method: SW5030B
Prep Date/Time: 3/6/2013 8:08:21AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/08/2013 4:05:28PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1130766 [VXX24541]
Blank Spike Lab ID: 1139713
Date Analyzed: 03/06/2013 13:06

Spike Duplicate ID: LCSD for HBN 1130766 [VXX24541]
Spike Duplicate Lab ID: 1139714
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130766001, 1130766002

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	100	100	100	105	105	(80-120)	4.40	(< 20)
Ethylbenzene	100	101	101	100	106	106	(75-125)	4.70	(< 20)
o-Xylene	100	101	101	100	106	106	(80-120)	4.10	(< 20)
P & M -Xylene	200	202	101	200	213	106	(75-130)	5.10	(< 20)
Toluene	100	99.8	100	100	104	104	(75-120)	4.50	(< 20)
Surrogates									
1,4-Difluorobenzene		103	103	50	103		(77-115)	0.31	

Batch Information

Analytical Batch: **VFC11358**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890 PID/FID**
Analyst: **EAB**

Prep Batch: **VXX24541**
Prep Method: **SW5030B**
Prep Date/Time: **03/06/2013 08:08**
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 1420563 [XXX/28757]
Blank Lab ID: 1139654

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130766001

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.360U	0.600	0.180	mg/L
Surrogates				
5a Androstane	76.7	60-120		%

Batch Information

Analytical Batch: XFC10831
Analytical Method: AK102
Instrument: HP 6890 Series II FID SV D F
Analyst: EAB
Analytical Date/Time: 3/7/2013 7:40:00PM

Prep Batch: XXX28757
Prep Method: SW3520C
Prep Date/Time: 3/7/2013 8:40:00AM
Prep Initial Wt./Vol.: 1000 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 1130766 [XXX28757]
Blank Spike Lab ID: 1139655
Date Analyzed: 03/07/2013 19:50

Spike Duplicate ID: LCSD for HBN 1130766 [XXX28757]
Spike Duplicate Lab ID: 1139656
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130766001

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	5	3.82	76	5	4.21	84	(75-125)	9.70	(< 20)
Surrogates									
5a Androstane		88	88	0.1	97.4		(60-120)	10.10	

Batch Information

Analytical Batch: **XFC10831**
Analytical Method: **AK102**
Instrument: **HP 6890 Series II FID SV D F**
Analyst: **EAB**

Prep Batch: **XXX28757**
Prep Method: **SW3520C**
Prep Date/Time: **03/07/2013 08:40**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL

SGS North America Inc.
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1130766

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

Laboratory SGS
Attn: Steve Crapi

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX (HCl) AK101 8021B	DRO AK102					Total Number of Containers	Remarks/Matrix
17548-B2MW	(1)A-E	13:15	3/1/13		X	X	X					5	groundwater
17548-TBW1	(2)A-C	8:00	3/1/13			X						1box	trip blank

Project Information		Sample Receipt	
Project Number: 321-17548		Total Number of Containers	
Project Name: Fire Station 4		COC Seals/Intact? Y/N/NA	
Contact: Tim Terry/Andrew Lee		Received Good Cond./Cold	
Ongoing Project? Yes ☒ No ☐		Delivery Method:	
Sampler: Andrew Lee		(attach shipping bill, if any)	

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 17:50	Signature: Dane Palmer Time: 3/4/13	Signature: Time:
Printed Name: Andrew Lee Date: 3/1/13	Printed Name: Dane Palmer Date: 3/4/13	Printed Name: Date:
Company: Shannon & Wilson	Company: Shannon and Wilson	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Dane Palmer Time: 17:50	Signature: Time:	Signature: Time: 0748
Printed Name: Dane Palmer Date: 3/1/13	Printed Name: Date:	Printed Name: Date: 3/4/13
Company: Shannon & Wilson	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

5,3#238

No. 30018

SGS

1130766

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	~~Yes~~ No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? * *Note: Exemption permitted for chilled samples collected less than 8 hours ago.* Cooler ID: 1 @ 5.3 w/ Therm.ID: 238 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ *Note: If non-compliant, use form FS-0029 to document affected samples/analyses.* If samples are 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." **If temperature(s) <0°C, were all sample containers ice-free?**	(Yes) No N/A Yes No (N/A)	
Delivery method (specify all that apply): (Client) USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See ~~Attached~~ or N/A Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC (**circle one**) or note: (N/A) → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed.	SRF Initiated by: N/A	
Were samples received within hold time? *Note: Refer to form F-083 "Sample Guide" for hold time information.* Do samples **match COC*** (i.e., sample IDs, dates/times collected)? * *Note: Exemption permitted if times differ <1hr; in that case, use times on COC.* Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): Bubble Wrap Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	(Yes) No N/A Yes No (N/A)	
Were **proper containers** (type/mass/volume/preservative*) used? * *Note: Exemption permitted for waters to be analyzed for metals.* Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No N/A	
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	(Yes) No N/A Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: PM = N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: N/A
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: March 22, 2013

CS Report Name: Additional Site Characterization, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska; ADEC Hazard ID:23660
Laboratory Report Date: March 11, 2013

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1130766

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 5.3° C.*

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: *The laboratory noted that the samples were in good condition.*

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:

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

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:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative? **NA**
Comments:

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:

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

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

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

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:

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

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%; 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.) Water and Soil

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: *The samples were delivered in one cooler.*

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: *A water sample field duplicate was submitted in Work Order 1130880. There was one water sample field duplicate for two project water samples.*

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:

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

f. Decontamination or Equipment Blank
Yes / No / NA (please explain)
Comments: *Equipment blanks were not part of the work plan scope.*

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.
Comments: *The data is usable. Dedicated disposable tubing was used for the wells and the pump was thoroughly decontaminated between the wells at our office.*

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.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1130880**

Client Project: **32-1-17548 Fire Station 4**

Dear Andrew Lee,

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 five 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 thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Steve 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.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Justin Nelson
2013.03.22 14:45:54
-08'00'

Steve Crupi
Project Manager
steven.crupi@sgs.com

Date

Print Date: 03/22/2013 12:00:59PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1130880**
Project Name/Site: **32-1-17548 Fire Station 4**
Project Contact: **Andrew Lee**

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	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
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., 2xDL)
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
RL	Reporting Limit
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.
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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17548-B3MW	1130880001	03/11/2013	03/11/2013	Water (Surface, Eff., Ground)
17548-B4MW	1130880002	03/11/2013	03/11/2013	Water (Surface, Eff., Ground)
17548-TBW2	1130880003	03/11/2013	03/11/2013	Water (Surface, Eff., Ground)

Method	Method Description
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	Diesel Range Organics (W)

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Results of **17548-B3MW**

Client Sample ID: **17548-B3MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130880001
Lab Project ID: 1130880

Collection Date: 03/11/13 15:40
Received Date: 03/11/13 16:42
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Diesel Range Organics	0.376	U	0.625	0.188	mg/L	1	03/20/13 11:19
Surrogates							
5a Androstane	63.7		50-150		%	1	03/20/13 11:19

Batch Information

Analytical Batch: XFC10841
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 03/20/13 11:19
Container ID: 1130880001-D

Prep Batch: XXX28794
Prep Method: SW3520C
Prep Date/Time: 03/19/13 08:30
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL

Print Date: 03/22/2013 12:01:03PM

Results of **17548-B3MW**

Client Sample ID: **17548-B3MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130880001
Lab Project ID: 1130880

Collection Date: 03/11/13 15:40
Received Date: 03/11/13 16:42
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	03/15/13 12:26
Surrogates							
4-Bromofluorobenzene	102		50-150		%	1	03/15/13 12:26

Batch Information

Analytical Batch: VFC11368
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/15/13 12:26
Container ID: 1130880001-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	03/15/13 12:26
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:26
o-Xylene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:26
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	03/15/13 12:26
Toluene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:26
Surrogates							
1,4-Difluorobenzene	94.7		77-115		%	1	03/15/13 12:26

Batch Information

Analytical Batch: VFC11368
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/15/13 12:26
Container ID: 1130880001-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/22/2013 12:01:03PM

Results of **17548-B4MW**

Client Sample ID: **17548-B4MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130880002
Lab Project ID: 1130880

Collection Date: 03/11/13 15:55
Received Date: 03/11/13 16:42
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Diesel Range Organics	0.376	U	0.625	0.188	mg/L	1	03/20/13 11:29
Surrogates							
5a Androstane	70.3		50-150		%	1	03/20/13 11:29

Batch Information

Analytical Batch: XFC10841
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 03/20/13 11:29
Container ID: 1130880002-D

Prep Batch: XXX28794
Prep Method: SW3520C
Prep Date/Time: 03/19/13 08:30
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL

Print Date: 03/22/2013 12:01:03PM

Results of **17548-B4MW**

Client Sample ID: **17548-B4MW**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130880002
Lab Project ID: 1130880

Collection Date: 03/11/13 15:55
Received Date: 03/11/13 16:42
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	03/15/13 12:45
Surrogates							
4-Bromofluorobenzene	95.5		50-150		%	1	03/15/13 12:45

Batch Information

Analytical Batch: VFC11368
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/15/13 12:45
Container ID: 1130880002-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	03/15/13 12:45
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:45
o-Xylene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:45
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	03/15/13 12:45
Toluene	0.620	U	1.00	0.310	ug/L	1	03/15/13 12:45
Surrogates							
1,4-Difluorobenzene	95.1		77-115		%	1	03/15/13 12:45

Batch Information

Analytical Batch: VFC11368
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/15/13 12:45
Container ID: 1130880002-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/22/2013 12:01:03PM

Results of **17548-TBW2**

Client Sample ID: **17548-TBW2**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1130880003
Lab Project ID: 1130880

Collection Date: 03/11/13 08:00
Received Date: 03/11/13 16:42
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0620	U	0.100	0.0310	mg/L	1	03/15/13 13:03
Surrogates							
4-Bromofluorobenzene	92.6		50-150		%	1	03/15/13 13:03

Batch Information

Analytical Batch: VFC11368
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 03/15/13 13:03
Container ID: 1130880003-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	03/15/13 13:03
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	03/15/13 13:03
o-Xylene	0.620	U	1.00	0.310	ug/L	1	03/15/13 13:03
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	03/15/13 13:03
Toluene	0.620	U	1.00	0.310	ug/L	1	03/15/13 13:03
Surrogates							
1,4-Difluorobenzene	94.9		77-115		%	1	03/15/13 13:03

Batch Information

Analytical Batch: VFC11368
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 03/15/13 13:03
Container ID: 1130880003-A

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 03/15/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 03/22/2013 12:01:03PM

Method Blank

Blank ID: MB for HBN 1424034 [VXX/24567]
Blank Lab ID: 1140958

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130880001, 1130880002, 1130880003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0620U	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene	96.6	50-150		%

Batch Information

Analytical Batch: VFC11368
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 3/15/2013 10:12:01AM

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 3/15/2013 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 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 1130880 [VXX24567]
Blank Spike Lab ID: 1140987
Date Analyzed: 03/15/2013 11:13

Spike Duplicate ID: LCSD for HBN 1130880 [VXX24567]
Spike Duplicate Lab ID: 1140988
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130880001, 1130880002, 1130880003

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	1.01	101	1.00	1.03	103	(60-120)	1.60	(< 20)
Surrogates									
4-Bromofluorobenzene		95.3	95	0.0500	100		(50-150)	4.80	

Batch Information

Analytical Batch: **VFC11368**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24567**
Prep Method: **SW5030B**
Prep Date/Time: **03/15/2013 08:00**
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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Method Blank

Blank ID: MB for HBN 1424034 [VXX/24567]
Blank Lab ID: 1140958

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130880001, 1130880002, 1130880003

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.620U	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
Surrogates				
1,4-Difluorobenzene	94.9	77-115		%

Batch Information

Analytical Batch: VFC11368
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 3/15/2013 10:12:01AM

Prep Batch: VXX24567
Prep Method: SW5030B
Prep Date/Time: 3/15/2013 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 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 1130880 [VXX24567]
Blank Spike Lab ID: 1140959
Date Analyzed: 03/15/2013 10:54

Spike Duplicate ID: LCSD for HBN 1130880 [VXX24567]
Spike Duplicate Lab ID: 1140960
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130880001, 1130880002, 1130880003

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	104	104	100	101	101	(80-120)	2.70	(< 20)
Ethylbenzene	100	101	101	100	99.6	100	(75-125)	1.60	(< 20)
o-Xylene	100	100	100	100	100	100	(80-120)	0.13	(< 20)
P & M -Xylene	200	203	102	200	201	101	(75-130)	0.97	(< 20)
Toluene	100	102	102	100	99.2	99	(75-120)	2.50	(< 20)
Surrogates									
1,4-Difluorobenzene		99	99	50	101		(77-115)	2.00	

Batch Information

Analytical Batch: **VFC11368**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24567**
Prep Method: **SW5030B**
Prep Date/Time: **03/15/2013 08:00**
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 1424049 [XXX/28794]
Blank Lab ID: 1141019

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1130880001, 1130880002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.360U	0.600	0.180	mg/L
Surrogates				
5a Androstane	78.5	60-120		%

Batch Information

Analytical Batch: XFC10841
Analytical Method: AK102
Instrument: HP 6890 Series II FID SV D R
Analyst: EAB
Analytical Date/Time: 3/20/2013 10:49:00AM

Prep Batch: XXX28794
Prep Method: SW3520C
Prep Date/Time: 3/19/2013 8:30:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1130880 [XXX28794]
Blank Spike Lab ID: 1141020
Date Analyzed: 03/20/2013 10:59

Spike Duplicate ID: LCSD for HBN 1130880 [XXX28794]
Spike Duplicate Lab ID: 1141021
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1130880001, 1130880002

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	5	4.64	93	5	4.83	97	(75-125)	3.80	(< 20)
Surrogates									
5a Androstane		81.8	82	0.1	89.4		(60-120)	8.90	

Batch Information

Analytical Batch: **XFC10841**
Analytical Method: **AK102**
Instrument: **HP 6890 Series II FID SV D R**
Analyst: **EAB**

Prep Batch: **XXX28794**
Prep Method: **SW3520C**
Prep Date/Time: **03/19/2013 08:30**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 5 mg/L 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

1130880

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory SGS
Attn: Steve Crupi

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

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX (HCl) AK101 8021B	DRO (HCl) AK102					Total Number of Containers	Remarks/Matrix
17548 - B3MW	(1) A-E	15:40	3/11/13		X	X	X					5	groundwater
17548 - B4MW	(2) A-E	15:55	3/11/13		X	X	X					5	"
17548 - TBW2	(3) A-C	8:00	3/11/13			X						16oz	trip blank

Project Information	Sample Receipt
Project Number: 37-1-17548	Total Number of Containers
Project Name: Firestation 4	COC Seals/Intact? Y/N/NA
Contact: Andrew Lee / Tim Terry	Received Good Cond./Cold
Ongoing Project? Yes ☒ No ☐	Delivery Method:
Sampler: Andrew Lee	(attach shipping bill, if any)

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee	Signature:	Signature:
Time: 16:42	Time:	Time:
Printed Name: Andrew Lee	Printed Name:	Printed Name:
Date: 3/11/13	Date:	Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Signature:	Signature: Mary Martinez
Time:	Time:	Time: 1642
Printed Name:	Printed Name:	Printed Name: Mary Martinez
Date:	Date:	Date: 3-11-13
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

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F-19-91/UR

8.1/138

No. 30083

SGS

1130880

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes, No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? * *Note: Exemption permitted for chilled samples collected less than 8 hours ago.* Cooler ID: 1 @ 8.1 w/ Therm.ID: 138 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ *Note: If non-compliant, use form FS-0029 to document affected samples/analyses.* If samples are 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." **If temperature(s) <0°C, were all sample containers ice free?**	Yes (No) N/A Yes No (N/A)	Samples collected w/in last 8 hours
Delivery method (specify all that apply): (Client) USPS Alert Courier C&D Delivery ~~AK Air~~ Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See Attached or N/A Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC **(circle one)** or note: N/A → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed. SRF Initiated by: N/A		
Were samples received within hold time? *Note: Refer to form F-083 "Sample Guide" for hold time information.* Do samples **match COC*** (i.e., sample IDs, dates/times collected)? * *Note: Exemption permitted if times differ <1hr; in that case, use times on COC.* Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/~~breakage~~)? Packing material used (specify all that apply): (Bubble Wrap) Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	(Yes) No N/A Yes No (N/A)	
Were **proper containers** (type/mass/volume/preservative*) used? * *Note: Exemption permitted for waters to be analyzed for metals.* Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No (N/A)	MEM 3-11-13
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	(Yes) No N/A Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: MEM PM = N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: N/A
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: March 22, 2013

CS Report Name: Additional Site Characterization, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska; ADEC Hazard ID:23660
Laboratory Report Date: March 22, 2013

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1130880

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 8.1° C.*

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: *The laboratory noted that the samples were in good condition.*

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:

e. Data quality or usability affected? Please explain.
Comments: *The data quality is not affected because the samples were collected within 8 hours of delivery to the laboratory.*

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments: *The case narrative referred to the sample receipt form for information on sample condition. There were no anomalies to report.*

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative? **NA**
Comments:

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:

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

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection

level for the project? **Yes / No / NA** (please explain)
Comments:

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

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:

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

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%; 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.) Water and Soil

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: *The samples were delivered in one cooler.*

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 B4MW was a field duplicate of Sample B3MW.*

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: *RPDs could not be calculated because the sample results were not detectable.*

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

f. Decontamination or Equipment Blank
Yes / No / NA (please explain)
Comments: *Equipment blanks were not part of the work plan scope.*

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.
Comments: *Dedicated disposable tubing was used for the wells in this project and only one well was sampled on the date covered by this COC. The non-detectable results for the samples in this COC indicate that cross-contamination did not occur.*

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.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1131383**

Client Project: **32-1-17548 Fire Station 4**

Dear Andrew Lee,

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 five 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 thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Steve 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.

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2013.04.23
16:48:49 -08'00'

Steve Crupi Date
Project Manager
steven.crupi@sgs.com

Print Date: 04/23/2013 3:57:58PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1131383**
Project Name/Site: **32-1-17548 Fire Station 4**
Project Contact: **Andrew Lee**

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	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
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., 2xDL)
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
RL	Reporting Limit
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.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17548-B4S1	1131383001	04/15/2013	04/15/2013	Soil/Solid (dry weight)
17548-B4S6	1131383002	04/15/2013	04/15/2013	Soil/Solid (dry weight)
17548-TBS2	1131383003	04/15/2013	04/15/2013	Soil/Solid (dry weight)

Method	Method Description
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **17548-B4S6**
Lab Sample ID: 1131383002
Volatile Fuels

Parameter	Result	Units
Gasoline Range Organics	0.975J	mg/Kg

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Results of **17548-B4S1**

Client Sample ID: **17548-B4S1**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1131383001
Lab Project ID: 1131383

Collection Date: 04/15/13 10:43
Received Date: 04/15/13 15:36
Matrix: Soil/Solid (dry weight)
Solids (%): 87.8

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.67	U	2.79	0.836	mg/Kg	1	04/18/13 13:53
Surrogates							
4-Bromofluorobenzene	113		50-150		%	1	04/18/13 13:53

Batch Information

Analytical Batch: VFC11395
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 04/18/13 13:53
Container ID: 1131383001-B

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 10:43
Prep Initial Wt./Vol.: 68.187 g
Prep Extract Vol: 33.3423 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	8.92	U	13.9	4.46	ug/Kg	1	04/18/13 13:53
Ethylbenzene	17.4	U	27.9	8.69	ug/Kg	1	04/18/13 13:53
o-Xylene	17.4	U	27.9	8.69	ug/Kg	1	04/18/13 13:53
P & M -Xylene	33.4	U	55.7	16.7	ug/Kg	1	04/18/13 13:53
Toluene	17.4	U	27.9	8.69	ug/Kg	1	04/18/13 13:53
Surrogates							
1,4-Difluorobenzene	106		72-119		%	1	04/18/13 13:53

Batch Information

Analytical Batch: VFC11395
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 04/18/13 13:53
Container ID: 1131383001-B

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 10:43
Prep Initial Wt./Vol.: 68.187 g
Prep Extract Vol: 33.3423 mL

Print Date: 04/23/2013 3:58:01PM

Results of **17548-B4S6**

Client Sample ID: **17548-B4S6**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1131383002
Lab Project ID: 1131383

Collection Date: 04/15/13 11:15
Received Date: 04/15/13 15:36
Matrix: Soil/Solid (dry weight)
Solids (%): 80.8

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.975	J	3.20	0.959	mg/Kg	1	04/18/13 15:07
Surrogates							
4-Bromofluorobenzene	99.9		50-150		%	1	04/18/13 15:07

Batch Information

Analytical Batch: VFC11395
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 04/18/13 15:07
Container ID: 1131383002-B

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 11:15
Prep Initial Wt./Vol.: 77.184 g
Prep Extract Vol: 39.8444 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	10.2	U	16.0	5.11	ug/Kg	1	04/18/13 15:07
Ethylbenzene	19.9	U	32.0	9.97	ug/Kg	1	04/18/13 15:07
o-Xylene	19.9	U	32.0	9.97	ug/Kg	1	04/18/13 15:07
P & M -Xylene	38.4	U	63.9	19.2	ug/Kg	1	04/18/13 15:07
Toluene	19.9	U	32.0	9.97	ug/Kg	1	04/18/13 15:07
Surrogates							
1,4-Difluorobenzene	106		72-119		%	1	04/18/13 15:07

Batch Information

Analytical Batch: VFC11395
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 04/18/13 15:07
Container ID: 1131383002-B

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 11:15
Prep Initial Wt./Vol.: 77.184 g
Prep Extract Vol: 39.8444 mL

Print Date: 04/23/2013 3:58:01PM

Results of **17548-TBS2**

Client Sample ID: **17548-TBS2**
Client Project ID: **32-1-17548 Fire Station 4**
Lab Sample ID: 1131383003
Lab Project ID: 1131383

Collection Date: 04/15/13 08:00
Received Date: 04/15/13 15:36
Matrix: Soil/Solid (dry weight)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	1.50	U	2.51	0.752	mg/Kg	1	04/18/13 15:44
Surrogates							
4-Bromofluorobenzene	100		50-150		%	1	04/18/13 15:44

Batch Information

Analytical Batch: VFC11395
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 04/18/13 15:44
Container ID: 1131383003-A

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 08:00
Prep Initial Wt./Vol.: 49.878 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	8.02	U	12.5	4.01	ug/Kg	1	04/18/13 15:44
Ethylbenzene	15.6	U	25.1	7.82	ug/Kg	1	04/18/13 15:44
o-Xylene	15.6	U	25.1	7.82	ug/Kg	1	04/18/13 15:44
P & M -Xylene	30.0	U	50.1	15.0	ug/Kg	1	04/18/13 15:44
Toluene	15.6	U	25.1	7.82	ug/Kg	1	04/18/13 15:44
Surrogates							
1,4-Difluorobenzene	101		72-119		%	1	04/18/13 15:44

Batch Information

Analytical Batch: VFC11395
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 04/18/13 15:44
Container ID: 1131383003-A

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 04/15/13 08:00
Prep Initial Wt./Vol.: 49.878 g
Prep Extract Vol: 25 mL

Print Date: 04/23/2013 3:58:01PM

Method Blank

Blank ID: MB for HBN 1437758 [SPT/8982]
Blank Lab ID: 1145067

Matrix: Soil/Solid (dry weight)

QC for Samples:
1131383001, 1131383002

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT8982
Analytical Method: SM21 2540G
Instrument:
Analyst: ACE
Analytical Date/Time: 4/18/2013 3:39:00PM

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Duplicate Sample Summary

Original Sample ID: 1131389001
Duplicate Sample ID: 1145068
QC for Samples:
1131383001, 1131383002

Analysis Date: 04/18/2013 15:39
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original (15.00)	Duplicate (15.00)	RPD (%)	RPD CL
Total Solids	85.5	85.7	0.19	15.00

Batch Information

Analytical Batch: SPT8982
Analytical Method: SM21 2540G
Instrument:
Analyst: ACE

Print Date: 04/23/2013 3:58:03PM

Method Blank

Blank ID: MB for HBN 1438859 [VXX/24640]
Blank Lab ID: 1145386

Matrix: Soil/Solid (dry weight)

QC for Samples:
1131383001, 1131383002, 1131383003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.06J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene	97.5	50-150		%

Batch Information

Analytical Batch: VFC11395
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 4/18/2013 12:21:00PM

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 4/18/2013 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1131383 [VXX24640]
Blank Spike Lab ID: 1145391
Date Analyzed: 04/18/2013 13:16

Spike Duplicate ID: LCSD for HBN 1131383 [VXX24640]
Spike Duplicate Lab ID: 1145392
Matrix: Soil/Solid (dry weight)

QC for Samples: 1131383001, 1131383002, 1131383003

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	10.0	9.13	91	10.0	10.1	101	(60-120)	10.00	(< 20)
Surrogates									
4-Bromofluorobenzene		92.9	93	1.25	97.1		(50-150)	4.50	

Batch Information

Analytical Batch: **VFC11395**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24640**
Prep Method: **SW5035A**
Prep Date/Time: **04/18/2013 08:00**
Spike Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 10.0 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1438859 [VXX/24640]
Blank Lab ID: 1145386

Matrix: Soil/Solid (dry weight)

QC for Samples:
1131383001, 1131383002, 1131383003

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	8.00U	12.5	4.00	ug/Kg
Ethylbenzene	15.6U	25.0	7.80	ug/Kg
o-Xylene	15.6U	25.0	7.80	ug/Kg
P & M -Xylene	30.0U	50.0	15.0	ug/Kg
Toluene	15.6U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene	103	72-119		%

Batch Information

Analytical Batch: VFC11395
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 4/18/2013 12:21:00PM

Prep Batch: VXX24640
Prep Method: SW5035A
Prep Date/Time: 4/18/2013 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1131383 [VXX24640]
Blank Spike Lab ID: 1145387
Date Analyzed: 04/18/2013 12:40

Spike Duplicate ID: LCSD for HBN 1131383 [VXX24640]
Spike Duplicate Lab ID: 1145390
Matrix: Soil/Solid (dry weight)

QC for Samples: 1131383001, 1131383002, 1131383003

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	982	79	1250	1050	84	(75-125)	7.00	(< 20)
Ethylbenzene	1250	1100	88	1250	1150	92	(75-125)	4.60	(< 20)
o-Xylene	1250	1120	89	1250	1180	94	(75-125)	5.50	(< 20)
P & M -Xylene	2500	2240	90	2500	2370	95	(80-125)	5.50	(< 20)
Toluene	1250	1080	86	1250	1120	90	(70-125)	3.90	(< 20)
Surrogates									
1,4-Difluorobenzene		102	102	1250	106		(72-119)	3.70	

Batch Information

Analytical Batch: **VFC11395**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24640**
Prep Method: **SW5035A**
Prep Date/Time: **04/18/2013 08:00**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1131383001
MS Sample ID: 1145388 MS
MSD Sample ID: 1145389 MSD

Analysis Date: 04/18/2013 13:53
Analysis Date: 04/18/2013 14:12
Analysis Date: 04/18/2013 14:30
Matrix: Soil/Solid (dry weight)

QC for Samples: 1131383001, 1131383002, 1131383003

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	8.92U	1044	871	83	1044	860	82	75-125	1.30	(< 20)
Ethylbenzene	17.4U	1044	957	92	1044	956	92	75-125	0.09	(< 20)
o-Xylene	17.4U	1044	985	94	1044	979	94	75-125	0.66	(< 20)
P & M -Xylene	33.4U	2084	1970	94	2084	1948	93	80-125	0.87	(< 20)
Toluene	17.4U	1044	931	89	1044	934	90	70-125	0.45	(< 20)
Surrogates										
1,4-Difluorobenzene			1096	105		1069	102	72-119	2.40	

Batch Information

Analytical Batch: VFC11395
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 4/18/2013 2:12:00PM

Prep Batch: VXX24640
Prep Method: AK101 Extraction (S)
Prep Date/Time: 4/18/2013 8:00:00AM
Prep Initial Wt./Vol.: 68.19g
Prep Extract Vol: 25.00mL

Print Date: 04/23/2013 3:58:06PM

1131383

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Steve Crupi

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

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX AK101 SGUB					Total Number of Containers	Remarks/Matrix
17548-B451	(1) A-B	10:43	4/15/13		X	X					2	Soil
17548-B456	(2) A-B	11:15	4/15/13		X	X					2	"
17548-TBS2	(3) A	800	4/15/13			X					1	Soil trip blank

Project Information	Sample Receipt
Project Number: 32-1-17548	Total Number of Containers
Project Name: Firestation 4	COC Seals/Intact? Y/N/NA
Contact: Andrew Lee & Tim Terry	Received Good Cond./Cold
Ongoing Project? Yes ☒ No ☐	Delivery Method: In person in one cooler
Sampler: Andrew Lee	(attach shipping bill, if any)

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 1536	Signature: Time:	Signature: Time:
Printed Name: Andrew Lee Date: 4/15/13	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 1536
Printed Name: Date:	Printed Name: Date:	Printed Name: Mary Martinez Date: 4/15/13
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

5.9/205

No. 30093

SGS

1131383

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? * *Note: Exemption permitted for chilled samples collected less than 8 hours ago.* Cooler ID: 1 @ 5.9 w/ Therm.ID: 205 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ *Note: If non-compliant, use form FS-0029 to document affected samples/analyses.* If samples are 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." **If temperature(s) <0°C, were all sample containers ice free?**	(Yes) No N/A Yes No (N/A)	
Delivery method (specify all that apply): (Client) USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See Attached or N/A Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC (**circle one**) or note: (N/A) → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed. SRF Initiated by: (N/A)		
Were samples received within hold time? *Note: Refer to form F-083 "Sample Guide" for hold time information.* Do samples **match COC*** (i.e., sample IDs, dates/times collected)? * *Note: Exemption permitted if times differ <1hr; in that case, use times on COC.* Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): (Bubble Wrap) Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	Yes No (N/A) (Yes) No N/A	
Were **proper containers** (type/mass/volume/preservative*) used? * *Note: Exemption permitted for waters to be analyzed for metals.* Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No N/A	
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant?** If pH was adjusted, were bottles flagged (i.e., stickers)?	Yes No (N/A) Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: MC PM = N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: N/A
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: April 30, 2013

CS Report Name: Additional Site Characterization, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska; ADEC Hazard ID:23660
Laboratory Report Date: April 23, 2013

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1131383

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 5.9° C.*

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: *The laboratory noted that the samples were in good condition.*

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:

e. Data quality or usability affected? Please explain.
Comments:

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments: *The case narrative referred to the sample receipt form for information on sample condition. There were no anomalies to report.*

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative? **NA**
Comments:

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:

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

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

Comments:

e. Data quality or usability affected? Please explain. **NA**
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: *However, an estimated 1.06 J mg/kg GRO was detected in the method blank, which was similar to the concentration reported in Sample B4S6.*

iii. If above LOQ, what samples are affected?
Comments: *Sample B4S6 is affected by the GRO method blank detection.*

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

v. Data quality or usability affected? Please explain.
Comments: *GRO is considered not detected in Sample B4S6.*

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%; 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.) Water and Soil

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: *The samples were delivered in one cooler.*

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: *A field duplicate was not included in this work order, but the overall number of field duplicates for the project meets the one field duplicate per matrix, analysis, and 10 project samples rate.*

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:

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

f. Decontamination or Equipment Blank
Yes / No / NA (please explain)
Comments: *Equipment blanks were not part of the work plan scope.*

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.
Comments: *Dedicated stainless steel spoons were used to collect the soil samples. The non-detectable results for the samples in this COC indicate that cross-contamination did not occur.*

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.*

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street Suite 3
Anchorage, AK 99518
(907)561-2120

Report Number: **1131474**

Client Project: **32-1-17548-001 Fire Station 4**

Dear Andrew Lee,

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 five 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 thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Steve 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.

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2013.04.30
16:44:24 -08'00'

Steve Crupi Date
Project Manager
steven.crupi@sgs.com

Print Date: 04/30/2013 3:41:44PM

Case Narrative

Customer: SHANNOT Shannon & Wilson, Inc.

Project: 1131474 32-1-17548-001 Fire Station 4

Refer to the 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 the associated field samples.

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	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
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., 2xDL)
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
RL	Reporting Limit
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.

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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
17548-B4MW	1131474001	04/18/2013	04/19/2013	Water (Surface, Eff., Ground)
17548-TBW	1131474002	04/18/2013	04/19/2013	Water (Surface, Eff., Ground)

Method	Method Description
AK101	AK101/8021 Combo.
SW8021B	AK101/8021 Combo.
AK102	Diesel Range Organics (W)

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Detectable Results Summary

Client Sample ID: **17548-B4MW**
Lab Sample ID: 1131474001
Volatile Fuels

Parameter	Result	Units
Ethylbenzene	0.380J	ug/L
Gasoline Range Organics	0.0829J	mg/L
o-Xylene	0.580J	ug/L

Client Sample ID: **17548-TBW**
Lab Sample ID: 1131474002
Volatile Fuels

Parameter	Result	Units
Gasoline Range Organics	0.0850J	mg/L
o-Xylene	0.330J	ug/L

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Results of **17548-B4MW**

Client Sample ID: **17548-B4MW**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1131474001
Lab Project ID: 1131474

Collection Date: 04/18/13 17:12
Received Date: 04/19/13 11:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Diesel Range Organics	0.370	U	0.615	0.185	mg/L	1	04/29/13 21:16
Surrogates							
5a Androstane	74.1		50-150		%	1	04/29/13 21:16

Batch Information

Analytical Batch: XFC10881
Analytical Method: AK102
Analyst: EAB
Analytical Date/Time: 04/29/13 21:16
Container ID: 1131474001-E

Prep Batch: XXX28954
Prep Method: SW3520C
Prep Date/Time: 04/29/13 10:20
Prep Initial Wt./Vol.: 975 mL
Prep Extract Vol: 1 mL

Print Date: 04/30/2013 3:41:47PM

Results of **17548-B4MW**

Client Sample ID: **17548-B4MW**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1131474001
Lab Project ID: 1131474

Collection Date: 04/18/13 17:12
Received Date: 04/19/13 11:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0829	J	0.100	0.0310	mg/L	1	04/23/13 16:34
Surrogates							
4-Bromofluorobenzene	95.7		50-150		%	1	04/23/13 16:34

Batch Information

Analytical Batch: VFC11400
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 04/23/13 16:34
Container ID: 1131474001-A

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 04/23/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	04/23/13 16:34
Ethylbenzene	0.380	J	1.00	0.310	ug/L	1	04/23/13 16:34
o-Xylene	0.580	J	1.00	0.310	ug/L	1	04/23/13 16:34
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	04/23/13 16:34
Toluene	0.620	U	1.00	0.310	ug/L	1	04/23/13 16:34
Surrogates							
1,4-Difluorobenzene	101		77-115		%	1	04/23/13 16:34

Batch Information

Analytical Batch: VFC11400
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 04/23/13 16:34
Container ID: 1131474001-A

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 04/23/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 04/30/2013 3:41:47PM

Results of **17548-TBW**

Client Sample ID: **17548-TBW**
Client Project ID: **32-1-17548-001 Fire Station 4**
Lab Sample ID: 1131474002
Lab Project ID: 1131474

Collection Date: 04/18/13 08:00
Received Date: 04/19/13 11:39
Matrix: Water (Surface, Eff., Ground)
Solids (%):

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Gasoline Range Organics	0.0850	J	0.100	0.0310	mg/L	1	04/23/13 17:11
Surrogates							
4-Bromofluorobenzene	96.7		50-150		%	1	04/23/13 17:11

Batch Information

Analytical Batch: VFC11400
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 04/23/13 17:11
Container ID: 1131474002-A

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 04/23/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Date Analyzed
Benzene	0.300	U	0.500	0.150	ug/L	1	04/23/13 17:11
Ethylbenzene	0.620	U	1.00	0.310	ug/L	1	04/23/13 17:11
o-Xylene	0.330	J	1.00	0.310	ug/L	1	04/23/13 17:11
P & M -Xylene	1.24	U	2.00	0.620	ug/L	1	04/23/13 17:11
Toluene	0.620	U	1.00	0.310	ug/L	1	04/23/13 17:11
Surrogates							
1,4-Difluorobenzene	102		77-115		%	1	04/23/13 17:11

Batch Information

Analytical Batch: VFC11400
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 04/23/13 17:11
Container ID: 1131474002-A

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 04/23/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 04/30/2013 3:41:47PM

Method Blank

Blank ID: MB for HBN 1439761 [VXX/24649]
Blank Lab ID: 1145887

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1131474001, 1131474002

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0760J	0.100	0.0310	mg/L
Surrogates				
4-Bromofluorobenzene	98	50-150		%

Batch Information

Analytical Batch: VFC11400
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 4/23/2013 3:20:00PM

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 4/23/2013 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1131474 [VXX24649]
Blank Spike Lab ID: 1145890
Date Analyzed: 04/23/2013 16:15

Spike Duplicate ID: LCSD for HBN 1131474 [VXX24649]
Spike Duplicate Lab ID: 1145891
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1131474001, 1131474002

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.926	93	1.00	0.947	95	(60-120)	2.30	(< 20)
Surrogates									
4-Bromofluorobenzene		99.7	100	0.0500	96.6		(50-150)	3.20	

Batch Information

Analytical Batch: **VFC11400**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24649**
Prep Method: **SW5030B**
Prep Date/Time: **04/23/2013 08:00**
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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Method Blank

Blank ID: MB for HBN 1439761 [VXX/24649]
Blank Lab ID: 1145887

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1131474001, 1131474002

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	0.300U	0.500	0.150	ug/L
Ethylbenzene	0.310J	1.00	0.310	ug/L
o-Xylene	0.620U	1.00	0.310	ug/L
P & M -Xylene	1.24U	2.00	0.620	ug/L
Toluene	0.620U	1.00	0.310	ug/L
Surrogates				
1,4-Difluorobenzene	99.8	77-115		%

Batch Information

Analytical Batch: VFC11400
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 4/23/2013 3:20:00PM

Prep Batch: VXX24649
Prep Method: SW5030B
Prep Date/Time: 4/23/2013 8:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1131474 [VXX24649]
Blank Spike Lab ID: 1145888
Date Analyzed: 04/23/2013 15:57

Spike Duplicate ID: LCSD for HBN 1131474 [VXX24649]
Spike Duplicate Lab ID: 1145889
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1131474001, 1131474002

Results by **SW8021B**

	Blank Spike (ug/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	100	84.9	85	100	86.7	87	(80-120)	2.10	(< 20)
Ethylbenzene	100	90.8	91	100	93.8	94	(75-125)	3.30	(< 20)
o-Xylene	100	93.4	93	100	95.8	96	(80-120)	2.60	(< 20)
P & M -Xylene	200	182	91	200	186	93	(75-130)	2.00	(< 20)
Toluene	100	88.6	89	100	90.9	91	(75-120)	2.60	(< 20)
Surrogates									
1,4-Difluorobenzene		101	101	50	99.7		(77-115)	1.50	

Batch Information

Analytical Batch: **VFC11400**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX24649**
Prep Method: **SW5030B**
Prep Date/Time: **04/23/2013 08:00**
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 1441067 [XXX/28954]
Blank Lab ID: 1146364

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1131474001

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.360U	0.600	0.180	mg/L
Surrogates				
5a Androstane	91.7	60-120		%

Batch Information

Analytical Batch: XFC10881
Analytical Method: AK102
Instrument: HP 6890 Series II FID SV D R
Analyst: EAB
Analytical Date/Time: 4/29/2013 8:48:00PM

Prep Batch: XXX28954
Prep Method: SW3520C
Prep Date/Time: 4/29/2013 10:20:00AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

SGS North America Inc.
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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1131474 [XXX28954]
Blank Spike Lab ID: 1146365
Date Analyzed: 04/29/2013 20:57

Spike Duplicate ID: LCSD for HBN 1131474 [XXX28954]
Spike Duplicate Lab ID: 1146366
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1131474001

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate ()					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	5	4.47	89	5	4.12	82	(75-125)	8.10	(< 20)
Surrogates									
5a Androstane		111	111	0.1	101		(60-120)	8.90	

Batch Information

Analytical Batch: **XFC10881**
Analytical Method: **AK102**
Instrument: **HP 6890 Series II FID SV D R**
Analyst: **EAB**

Prep Batch: **XXX28954**
Prep Method: **SW3520C**
Prep Date/Time: **04/29/2013 10:20**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
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1131474

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

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Portland, OR 97201-2498
(503) 223-6147

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

Page 1 of 1

Laboratory SGS
Attn: Steve Crupi

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO BTEX (HCl) AK101 8021B	DRO (HCl) AK102					Total Number of Containers	Remarks/Matrix
17548-B4MW	(1) A-E	17:12	4/18/13		X	X	X					5	water
17548-TBW	(2) A-C	8:00	4/18/13			X						1 box	water trip blank

Project Information	Sample Receipt
Project Number: 321-17548-001	Total Number of Containers
Project Name: Fire Station 4	COC Seals/Intact? Y/N/NA
Contact: Andrew Lee & Tim Terry	Received Good Cond./Cold
Ongoing Project? Yes ☒ No ☐	Delivery Method: In person - 1 single cooler
Sampler: Andrew Lee	(attach shipping bill, if any)

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	ADEC Level II deliverables

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Andrew Lee Time: 1139	Signature: Time:	Signature: Time:
Printed Name: Andrew Lee Date: 4-19-13	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Mary Martinez Time: 1139
Printed Name: Date:	Printed Name: Date:	Printed Name: Mary Martinez Date: 4-19-13
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

5.5/205

No. 30085

SGS

1131474

SAMPLE RECEIPT FORM

Review Criteria:	Condition:	Comments/Action Taken:
Were **custody seals** intact? Note # & location, if applicable. COC accompanied samples?	Yes No (N/A) (Yes) No N/A	
Temperature blank compliant* (i.e., 0-6°C after CF)? * *Note: Exemption permitted for chilled samples collected less than 8 hours ago.* Cooler ID: 1 @ 5.5 w/ Therm.ID: 205 Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ *Note: If non-compliant, use form FS-0029 to document affected samples/analyses.* If samples are 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." **If temperature(s) <0°C, were all sample containers ice free?**	(Yes) No N/A Yes No (N/A)	
Delivery method (specify all that apply): (Client) USPS Alert Courier C&D Delivery ~~AK Air~~ Lynden Carlile ERA PenAir FedEx UPS NAC Other: → *For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?*	Note ABN/ tracking # See Attached or N/A Yes No (N/A)	
→ For samples received with payment, note amount ($) and cash / check / CC (**circle one**) or note: (N/A) → For samples **received in FBKS**, ANCH staff will verify all criteria are reviewed. SRF Initiated by: (N/A)		
Were samples received within hold time? *Note: Refer to form F-083 "Sample Guide" for hold time information.* Do samples **match COC*** (i.e., sample IDs, dates/times collected)? * *Note: Exemption permitted if times differ <1hr; in that case, use times on COC.* Were analyses requested unambiguous?	(Yes) No N/A (Yes) No N/A (Yes) No N/A	
Were samples in **good condition** (no leaks/cracks/breakage)? Packing material used (specify all that apply): (Bubble Wrap) Separate plastic bags Vermiculite Other:	(Yes) No N/A	
Were all VOA vials **free of headspace** (i.e., bubbles ≤6 mm)? Were all soil VOAs **field extracted** with MeOH+BFB?	(Yes) No N/A Yes No (N/A)	
Were **proper containers** (type/mass/volume/preservative*) used? * *Note: Exemption permitted for waters to be analyzed for metals.* Were **Trip Blanks** (i.e., VOAs, LL-Hg) in cooler with samples?	(Yes) No N/A (Yes) No N/A	
For **special handling** (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)?	Yes No (N/A)	
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was **pH verified and compliant**? If pH was adjusted, were bottles flagged (i.e., stickers)?	(Yes) No N/A Yes No (N/A)	
For **RUSH/SHORT Hold Time**, were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	Yes No (N/A)	
For **SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP**, were containers / paperwork flagged accordingly?	Yes No (N/A)	
For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)?	Yes No (N/A)	SRF Completed by: MEM PM = N/A
Was **PEER REVIEW** of ***sample numbering/labeling completed?***	Yes No (N/A)	Peer Reviewed by: N/A
Additional notes (if applicable):		

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

LABORATORY DATA REVIEW CHECKLIST

Completed by: Andrew Lee
Title: Environmental Scientist
Date: April 30, 2013

CS Report Name: Additional Site Characterization, Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska; ADEC Hazard ID:23660
Laboratory Report Date: April 30, 2013

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: SGS North America Inc.
Laboratory Report Number: 1131474

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 5.5° C.*

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: *The laboratory noted that the samples were in good condition.*

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:

e. Data quality or usability affected? Please explain.
Comments:

4. Case Narrative

a. Present and understandable? **Yes / No / NA** (please explain)
Comments: *The case narrative referred to the sample receipt form for information on sample condition. There were no anomalies to report.*

b. Discrepancies, errors or QC failures identified by the lab? **Yes / No / NA** (please explain)
Comments:

c. Were corrective actions documented? **Yes / No / NA** (please explain)
Comments:

d. What is the effect on data quality/usability, according to the case narrative? **NA**
Comments:

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:

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

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

Comments:

e. Data quality or usability affected? Please explain. **NA**
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: *However, an estimated 0.0760 J mg/L GRO and an estimated 0.310 J mg/L ethylbenzene were detected in the method blanks, which were similar to the concentrations reported in Sample B4MW.*

iii. If above LOQ, what samples are affected?
Comments: *Sample B4MW is affected by the method blank detections.*

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

v. Data quality or usability affected? Please explain.
Comments: *GRO and ethylbenzene are considered not detected in Sample B4W.*

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%; 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.) Water and Soil

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: *The samples were delivered in one cooler.*

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

Comments: *However, the estimated concentration of o-xylene (0.000330 J mg/L) in the trip blank was similar to the concentration in Sample B4MW.*

iv. If above LOQ, what samples are affected?
Comments**:** *Sample B4MW is affected.*

v. Data quality or usability affected? Please explain.
Comments: *o-Xylene is considered not detected in Sample B4MW.*

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
Yes / No / NA (please explain)
Comments: *A field duplicate was not included in this work order, but the overall number of field duplicates for the project meets the one field duplicate per matrix, analysis, and 10 project samples rate.*

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:

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

f. Decontamination or Equipment Blank
Yes / No / NA (please explain)
Comments: *Equipment blanks were not part of the work plan scope.*

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.
Comments: *Dedicated disposable tubing was used for the wells in this project and only one well was sampled on the date covered by this COC. The non-detectable results for the samples in this COC indicate that cross-contamination did not occur.*

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.*

APPENDIX E

INVESTIGATION DERIVED WASTE DISPOSAL DOCUMENTS

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON
WISCONSIN

May 29, 2013

Ms. Katrina Chambon
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

RE: REQUEST TO TRANSPORT CONTAMINATED SOIL AND WATER, FIRE STATION NO. 4, 4350 MACINNES STREET, ANCHORAGE, ALASKA; ADEC HAZARD ID NO. 23660 AND FILE NO. 2100.26.315

Shannon & Wilson is seeking permission from the Alaska Department of Environmental Conservation (ADEC) to transport and dispose of the soil and water investigation derived waste (IDW) from the Fire Station No. 4 site at 4350 MacInnes Street in Anchorage. The IDW was generated from the installation, development, and sampling of Wells B2MW, B3MW, and B4MW in February, March, and April 2013. The IDW consists of three 55-gallons drums of soil and two 55-gallon drums of water.

Concentrations of target analytes in the soil samples are less than 18 AAC 75 Method 2 cleanup level, as shown in the attached Table 3 and the SGS North America Inc. (SGS) laboratory reports for Work Orders 1130667 and 113183. With your approval, Alaska Demolition will pick up the three 55-gallon drums of soil cuttings and dispose of the soil at their inert landfill in Palmer, Alaska. Alaska Demolition will keep the empty drums for re-use. The ADEC Soil Transport and Treatment Approval Form is attached.

Water from Monitoring Well B2MW contains a concentration of 1.81 mg/L DRO, which is greater than the 18 AAC 75 Table C cleanup level. Target analytes in the other groundwater samples were less than the cleanup levels. Groundwater analytical results are summarized in Table 4 and provided in the attached SGS reports for Work Orders 1130766, 1130880, and 1131474. The drum containing water from Monitoring Well B2MW will be treated and disposed by Emerald Alaska. The water will be chemically treated and filtered in their processing plant, and then released to Anchorage Water and Wastewater Utility (AWWU). The water from Well B3MW, although clean, is also contained within the drum with the water from Well B2MW and will be treated. The drum containing water from Well B4MW will be poured onto the ground at the project site.

5430 FAIRBANKS STREET, SUITE 3
ANCHORAGE, ALASKA 99518-1263
907-561-2120 FAX: 907-561-4483
TDD 1-800-833-6388
www.shannonwilson.com

With this letter, Shannon & Wilson would like to petition the ADEC for approval to transport three drums of soil to Alaska Demolition's inert landfill in Palmer, transport one drum of water containing water from Monitoring Wells B2MW and B3MW to Emerald Alaska's facility, and pour water from Monitoring Well B4MW onto the ground at the project site. The ADEC can indicate approval for transportation and treatment and/or disposal of the soil and water by signing the line at the bottom of this letter and the ADEC Contaminated Soil Transport and Treatment Approval Form and returning copies to Shannon & Wilson.

Please feel free to call Tim Terry or the undersigned at (907) 561-2120 with questions or comments regarding this request.

Sincerely,

SHANNON & WILSON, INC.

Andrew Lee
Environmental Scientist

Encl: ADEC Contaminated Soil Transport and Treatment Approval Form
Table 3 – Summary of Soil Analytical Results
Table 4 – Summary of Groundwater Analytical Results
Results of Analytical Testing by SGS North America

ACCEPTANCE

I approve the proposed transportation and treatment and/or disposal of the soil and water from the Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska project site.

By: Katrina Chambon Date: 7/8/2013
ADEC Representative

CERTIFICATE OF DISPOSAL/RECYCLE

GENERATOR: MOA FIRE STATION NO. 4
4350 MACINNES STREET
ANCHORAGE AK 99508

DISPOSAL FACILITY: EMERALD ALASKA, INC.
2020 VIKING DRIVE
ANCHORAGE AK 99501

EPA ID NUMBER: CESQG
MANIFEST/DOCUMENT #: 19884
DATE OF DISPOSAL/RECYCLE: 07/29/2013

LINE	WASTE DESCRIPTION	CONTAINERS	TYPE	QUANTITY	UOM
1	GROUNDWATER / IDW WATER	1	DM55	400	P

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

PREPARED BY: JOHN PEREZ

SIGNATURE: _____ **DATE:** 7/31/2013

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No. 19884

2. Page 1 of 1

3. Generator's Name and Mailing Address
MOA FIRE STATION NO. 4
4350 MACINNES STREET
ANCHORAGE, AK 99508

Site Address
MOA FIRE STATION NO. 4
4350 MACINNES STREET
ANCHORAGE, AK 99508

ANDREW LEE

4. Generator's Phone ((907) 561-2120

5. Transporter 1 Company Name
EMERALD ALASKA, INC

6. US EPA ID Number
AKR000004184

A. State Transporter's ID

B. Transporter 1 Phone (907) 258-1558

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
EMERALD ALASKA, INC.
2020 VIKING DRIVE
ANCHORAGE, AK 99501

10. US EPA ID Number
AKR000004184

E. State Facility's ID

F. Facility's Phone (907) 258-1558

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. MATERIAL NOT REGULATED BY D.O.T.	1	DM	400	P
b.				
c.				
d.				

GENERATOR

G. Additional Descriptions for Materials Listed Above
1)AK02906 GROUNDWATER / IDW WATER

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
I certify that this material is not regulated nor mixed with waste regulated as a Hazardous Waste under 40CFR261 or TSCA regulated waste under 40CFR761. All used oil meets the definition under 40CFR279. Generator agrees to indemnify and hold harmless Emerald Alaska or its subsidiary for any damages, costs, attorneys and expert fees arising from or related to the above certification.

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date (Month / Day / Year)
Andrew Lee/Shannon Shilson for MOA	Andrew Lee	7 / 29 / 13

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month / Day / Year)
Nathen Hansen		7 / 29 / 13

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month / Day / Year)

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date (Month / Day / Year)
John E. Perez		07 / 31 / 13

NON-HAZARDOUS WASTE

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Prevention and Emergency Response Program

Contaminated Soil Transport and Treatment Approval Form

ADEC SPILL #	SPILL NAME	
Hazard ID # 23660	Fire Station No. 4	
SPILL LOCATION		
4350 MacInnes Street, Anchorage, Alaska		
CONTAMINATED SOIL'S CURRENT LOCATION		SOURCE OF THE CONTAMINATION
Three 55-gallon drum at Fire Station No. 4		Boring / Monitoring Well Installation
TYPE OF CONTAMINATION	ESTIMATED VOLUME	DATE(S) STOCKPILE GENERATED
Benzene up to 0.00633 J mg/kg	Three 55-gallon drums	February 22, 2013 and April 15, 2013
POST TREATMENT ANALYSIS REQUIRED *(such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)*		
Not Applicable - soil will not be treated or tested further		
COMMENTS		
Target analytes are less than 18 AAC 75 cleanup levels, Soil to be transported to Alaska Demolitions inert landfill in Palmer, Alaska		

Facility Accepting the Contaminated Soil

NAME OF THE FACILITY	ADDRESS/PHONE NUMBER
Alaska Demolition	550 Rebarcheck Ave, Palmer, Alaska / 907-274-3366

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Municipality of Anchorage / Jon Clark	4700 Elmore Road, Warehouse No. 1 Anchorage, AK 99507 / 907-343-8257
Alaska Demolition / Mike Waddell	1817 Rampart Drive Anchorage, AK 99501 / 907-274-3366

Andrew Lee
Name of the Person Requesting Approval (printed)

Environmental Scientist / Shannon & Wilson
Title/Association

Andrew Lee
Signature

May 29, 2013
Date

907-561-2120
Phone Number

ADEC USE ONLY

Based on the information provided, ADEC approves transport of the above mentioned material for treatment in accordance with the approved facility operations plan. The RP or their consultant must submit to the ADEC Project Manager a copy of weight receipts of the loads transported to the facility and a post treatment analytical report or other approved ADEC treatment/disposal notification. The contaminated soil shall be transported as a covered load in compliance with 18 AAC 60.015.

Katrina Chamberlain
ADEC Project Manager Name (printed)

EPS III
Project Manager Title

Katrina Chamberlain
Signature

7/8/2013
Date

269-7551
Phone Number

Rev. 7/2009

APPENDIX F

IMPORTANT INFORMATION ABOUT YOUR

GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 32-1-17548-001

Date: September 2013
To: Municipality of Anchorage
Re: Fire Station No. 4, 4350 MacInnes Street, Anchorage, Alaska

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