ASSOCIATED
ENVIRONMENTAL
GROUP, LLC

PHASE II ESA – SUBSURFACE INVESTIGATION

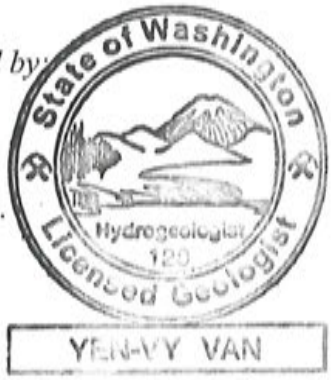
Conducted on:

SAMISH INDIAN NATION
DEPARTMENT OF NATURAL RESOURCES OFFICE
1017 29th Street
Anacortes, Washington 98221

Prepared for:

Samish Indian Nation
P.O. Box 217
Anacortes, Washington 98221

Prepared and Reviewed by:



Yen-Vy Van, P.G., P.H.G.
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PG, PHG # 128
AHERA No.: 104315

AEG Project #: 12-107

Date of Report: March 12, 2012

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1 INTRODUCTION

Associated Environmental Group, LLC (AEG) has completed a Phase II Environmental Site Assessment – Subsurface Investigation at the Samish Indian Nation Department of Natural Resources Office property, located at 1017 29th Street in Anacortes, Skagit County, Washington (the Site). Written authorization from Ms. Leslie Eastwood, General Manager with Samish Indian Nation, to perform the subsurface investigation was provided to AEG in February 2012. Field work for the investigation included the advancement of four borings (DP-1 through DP-4) and collection of soil and groundwater samples for analysis of constituents of concern. The scope of work for the Phase II Environmental Site Assessment (ESA) – Subsurface Investigation was developed in accordance with the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method A cleanup regulations and a discussion with the Ecology Site Manager. The investigation was performed in general accordance with the American Society for Testing and Materials (ASTM) Standard E 1903-97, *Standard Guide Environmental Site Assessments: Phase II Environmental Site Assessment Process*.

1.1 Site & Vicinity Area Background

The Site is currently occupied by the Samish Indian Nation Department of Natural Resources (DNR) office and is located approximately 200 ft west of intersection of Highway 20 (Commercial Ave) & 29th St. in Anacortes. It corresponds to Skagit County parcel number P33134 (Section 30, Township 35 North, Range 2 East). The Site was previously occupied as a residential property in 2009.

Figure 1, *Site & Vicinity Map*, presents the general boundaries and vicinity area of the Site. Figure 2, *Site Plan*, presents the layout of the Site and approximate location of the former heating oil tank excavation. Photographs of the Site are presented in Appendix A, *Site Photographs*.

1.2 Previous Environmental Work Summary

A 500-gallon capacity heating oil underground storage tank (UST), located on the south side of the building structure at the Site, was the heating source for the residence. Budget Environmental Services (Budget) was retained to decommission the UST on February 6, 2009. Budget noted "*that the underlying soils in the vicinity of the UST's excavation had a distinct petroleum odor*". Laboratory analytical results of soil samples collected from depths ranging from 1 to 6 feet below ground surface (bgs) indicated presence of diesel range total petroleum hydrocarbons (TPH), ranging from 80 to 5,400 parts per million, also referred to as milligrams per kilogram (Budget, 2009). The Washington State Department of Ecology Model Toxics Control Act (MTCA) Method A soil cleanup level for this constituent is 2,000 mg/Kg.

Water was reportedly present in the excavation pit at 6 feet bgs but did not recharge. "*An area of shallow contaminated soil extended into the crawl space beneath the house. Water in the initial UST excavation (in contact with contaminated soil) was sampled and found to be contaminated above the Method A cleanup level for groundwater*" (Ecology, 2011). Approximately 81 tons of petroleum contaminated soil was excavated and disposed offsite at Cemex in Everett, WA. The excavation "*measured approximately 7 feet long by 5 feet wide by 6 feet deep*" (Budget, 2009). Confirmation soil samples were collected to confirm that petroleum contaminated soil, above cleanup level, had been removed.

1.3 Objectives and Scope of Work

The objectives of the Phase II ESA – Subsurface Investigation at the Site included the following: 1) evaluate the potential presence of residual diesel petroleum hydrocarbons and/or associated volatile organic compounds contamination at the Site, specifically at the former heating oil tank area; and 2) assess whether groundwater, if encountered, has been adversely impacted.

AEG's scope of work for the subsurface investigation effort included: subsurface explorations via a direct push probe drilling rig; analytical laboratory testing of soil and groundwater samples, data analysis; and preparation of this report. Figure 2, *Site Plan*, depicts the property boundaries and boring locations.

Specific tasks performed for the subsurface investigation included the following:

- Conducted both public and private utilities locates for the Site. The locates performed by Underground Utilities Locate Center included only areas in the public right-of-ways. Applied Professional Services (APS) provided private utility locates on the Site.

- Advanced four borings onsite (DP-1 through DP-4) via a direct push probe drilling rig to a maximum depth of 15 feet bgs. The borings were placed at selected areas to evaluate potential residual presence of petroleum hydrocarbons impacted soil and/or groundwater at the Site and at inferred downgradient locales.

- Continuously logged soil borings documenting soil lithologies encountered, lithologic contacts, moisture, relative density, sample depths, photoionization detection readings, and information regarding sheens and odors, as applicable. Field screen each sample utilizing a Photoionization Detector (PID) to facilitate the selection of appropriate soil samples to be submitted to the analytical laboratory. The soil samples were handled and transported in accordance with industry standard chain-of-custody protocols to ESN Northwest Inc. laboratory.

- Collected soil samples at selected intervals from each of the borings advanced for this investigation. Selected one soil sample from a selected interval from each boring for laboratory analysis.

- Groundwater (due to backfill) was encountered only at boring DP-1 (located within the former backfill area) and was collected for laboratory analysis.

- Analyzed selected soil and the groundwater sample for the following constituents of concern via their respective laboratory analyses on a standard laboratory turn-around-time:
    - ❖ Diesel and heavy oil range total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Dx/Dx Extended; and
    - ❖ Volatile organic compounds (VOC) including benzene, toluene, ethylbenzene, and total xylenes (BTEX) via EPA Method 8260.

- Compared soil and groundwater analytical results to Ecology MTCA Method A soil and groundwater cleanup levels for the above indicated constituents.

- Prepared this report containing a summary of the subsurface conditions encountered, a discussion of Site soil and groundwater conditions, analytical laboratory results, findings, and recommendations.

1.4 Site Geology and Hydrogeology

According to the *Geologic Map of Washington, Northwest Quadrant*, the Site and vicinity area is underlain by glacial Quaternary period age undifferentiated outwash (Qgo) and glaciomarine drift (Qgdm). The undifferentiated outwash deposits typically consists of "*recessional and proglacial stratified sand, gravel, and cobblers with minor silt and clay interbeds deposited in delta, ice-contact, beach, and meltwater stream environments; may include advance outwash*". The Glaciomarine drift deposits typically consist of "*diamictons and poorly stratified gravelly silt with dropstones; poorly compacted and locally fossiliferous; contains lense to thick layers of fluvial, deltaic, and glaciomarine gravel, sand, silt, and clay*" (Dragovich, J.D., Logan, R.L., 2002).

The subsurface conditions at the Site, at locations of investigation, generally consist of fill deposits underlain by clayey soil. Fill deposits were encountered at all locales from below ground surface to at least approximately four feet bgs. However, at boring B-1 (placed within the excavation pit for the former leaking fuel tank) fill deposits were logged to approximately six feet bgs. Fill deposits at B-1 consisted of sandy gravel backfill; else where it generally consisted

of soft to medium stiff silty clay with local gravel. These deposits were underlain by native soil represented by stiff, low plasticity, expansive clay to 15 feet bgs, the maximum depth explored.

Groundwater was encountered only at boring B-1, at approximately 4 feet bgs. However, in our professional opinion this water was represented of surface water which had infiltrated the subsurface due to the presence of sandy gravel. Thus, it did not represent groundwater. Groundwater was not encountered at the remaining borings B-2 through B-4 due to the lack of sandy gravel backfill. The low porosity and transmissivity stiff clay did not yield moisture nor show indication of accumulated groundwater at the bottom of the borehole (with a PVC screen) after four hours of open hole.

The direction of groundwater flow at the Site can be highly variable due to the presence of variable depth to shallow groundwater and glacial till in the vicinity area. Therefore, no definite statement can be made regarding the direction of shallow groundwater flow without groundwater elevation from monitoring wells. However, based on surface topography the direction of regional groundwater flow appears to be to the northeast, towards Fidalgo Bay, approximately 3,000 feet to the east-northeast.

2 FIELD METHODOLOGY

AEG advanced four borings (DP-1 through DP-4) at the Site on February 22, 2012 to assess the subsurface media for the potential residual presence of petroleum hydrocarbons and/or associated volatile organic compounds contamination due to the former heating oil tank leakage at the Site. The locales selected for subsurface investigation were based on Budget's findings and a discussion with the Ecology Site Manager. AEG obtained authorization from the Samish Indian Nation to conduct subsurface investigation at locales off-property adjacent to the east (boring DP-2) and northeast (boring DP-3) of the Site in order to assess whether adjoining nearby area had been adversely impacted.

The borings were advanced via a truck mounted direct push probe drilling rig operated by ESN Northwest, Inc. of Olympia, Washington. The soil sampling procedure during the direct push probe drilling involved pushing in increments of four feet using a two-inch, inside diameter, stainless steel sample corer with a four foot long Teflon sample sleeve insert and connecting drilling rods. The maximum depth of borings advanced was 15 feet bgs.

The borings were advanced as follows: 1) borings DP-1 was advanced within the excavation pit for the former fuel tank; 2) boring DP-2 was placed approximately 25 feet east and in the inferred downgradient locale of the of the former fuel tank and area of confirmed contamination; 3) boring DP-3 was advanced approximately 30 feet northeast and in an inferred downgradient locale; and 4) and boring DP-4 was placed approximately 20 feet north-northeast and in an inferred downgradient locale. Figure 2, *Site Plan*, presents the locations of these borings and location of the excavation pit for the former leaking fuel tank at the Site.

Based on the above presented environmental concerns, AEG submitted selected soil samples for the following constituents of concern: diesel and heavy oil range TPH and volatile organic compounds (VOCs) associated with petroleum fuel, specifically benzene, toluene, ethylbenzene, and total xylenes. Photo documentation of the subsurface investigations is presented in Appendix A, *Site Photographs*.

2.1 Soil Sampling Procedures

Soil samples were collected and observed to document soil lithology, color, moisture content, and sensory evidence of impairment. Select intervals were screened for VOCs using a photo ionizing detector (PID) to aid in the selection of laboratory samples. Soil sampling methods for this work followed the protocols established by Ecology's Method 5035A, "*Collecting and Preparing Soil Samples for VOC Analysis*". The samples were collected using a 1 ½ foot split spoon sampler during the hollow stem auger drilling. Samplers were properly decontaminated between sampling intervals prior to the collection of laboratory samples. All soil samples were

classified in the field and immediately transferred to laboratory provided pre-weighed 40-ml VOA glass vials with septum sealed Teflon-lined screw caps and 4 oz. glass jars. Soil sampling for VOC and field preservation methods followed methods set forth by Ecology's Method 5035A, "*Collecting and Preparing Soil Samples for VOC Analysis*" which minimizes VOC losses. The soil samples were placed in a portable chilled ice chest and transported to ESN Northwest, Inc. laboratory, a Washington state certified analytical laboratory located in Olympia, Washington, for analysis following industry standard chain-of-custody procedures.

Selected soil samples were analyzed for the constituents of concern. Laboratory analytical results are presented in Table 1, *Summary of Soil Analytical*. Analytical soil results were compared to Ecology MTCA Method A soil cleanup levels. Boring logs and soil laboratory analytical results are provided in Appendix B, *Supporting Documents.*

2.2 Groundwater Sampling Procedures

At all borings, a temporary 5-foot long PVC screen was advanced to approximately 5 feet bgs to attempt to collect groundwater. Sufficient "groundwater" for sampling purposes was available only at boring DP-1 due to the presence of sandy gravel backfill. Groundwater or moisture was not observed at the remaining borings despite of allowing the screen to remain within the boring for at least four hours. A peristaltic pump was utilized to collect the groundwater samples at boring DP-1 via the U.S. EPA approved low-flow purge technique using dedicated polyethylene tubing. The tubing was inserted into the retractable screen. The groundwater was purged until the discharge had been relatively free of sediment for sample collection. The groundwater samples collected were selectively analyzed for petroleum hydrocarbons and selected VOCs constituents of concern. The groundwater samples were placed in laboratory provided containers including 40 milliliter (mL) glass VOAs (vials) for VOC analyses and 500 mL ambers for diesel/heavy oil range TPH. Table 2, *Summary of Groundwater Analytical Results,* present analytical groundwater results as compared to Ecology MTCA Method A groundwater cleanup levels.

To reasonably ensure the purity of AEG's samples, the following actions were taken (1) nitrile gloves were used in handling all sampling jars and sampling devices; (2) the sampling equipment was scrubbed with Alconox detergent and rinsed with water prior to each sample extracted; and (3) the containers were then placed in a chilled cooler and transported under a chain-of-custody to ESN Northwest Inc. laboratory.

2.3 Quality Controls

All soil and groundwater samples were collected in general accordance with industry protocols for the collection, documentation, and handling of samples. Descriptions of soil and sampling depths were carefully logged in the field, and the drillers and geologist confirmed sample depths

as soil samples were collected. Boring location maps were completed prior to leaving the Site to document sampling locations.

Soil samples were tightly packed into jars to eliminate sample headspace. Water samples were filled carefully in the sampling bottles to prevent volatilization. Upon sampling, all samples were placed immediately into chilled ice chests.

All samples were transported and submitted under standard chain-of-custody protocols and remained refrigerated until delivery to ESN Northwest Inc. laboratory. The laboratory provided standard quality assurance/quality control (QA/QC) which included the following: surrogate recoveries for each sample, method blank results, duplicate analyses, matrix or blank spiked analyses, and duplicate spiked analyses.

2.4 Investigation Derived Waste

Investigation derived waste for this project consisted of soil cuttings from the subsurface exploration activities vicinity area, decontamination water from decontamination of the probes and associated equipment, and purge water. These wastes were combined and placed in a Washington State Department of Transportation (DOT) approved 20 gallon drum. The drum was stored on the south side of the building structure for subsequent characterization and disposal.

3 CONCLUSIONS AND RECOMMENDATIONS

The findings and conclusions derived during the Phase II ESA – Subsurface Investigation for the Samish Indian Nation DNR office property are as follows:

- A total of four borings (DP-1 through DP-4) were advanced via a direct push probe drilling rig by AEG on February 22, 2012 to evaluate the potential presence of residual diesel petroleum hydrocarbons and/or associated volatile organic compounds contamination at the Site, specifically at the former heating oil tank area, and at nearby inferred downgradient locales.

- The constituents of concern at the Site include diesel and heavy oil range TPH, VOCs associated with petroleum fuel.

- Laboratory analytical results for all soil samples collected for analysis indicated no detectable concentrations of all constituents of concern (refer to Table 1).

- Laboratory analytical results for the groundwater sample collected within the backfill excavation area for the former leaking fuel tank also indicated no detectable concentrations of all constituents of concern (refer to Table 2).

Recommendation:
No further investigation at the Site is warranted based on the above presented laboratory analytical results and findings. AEG recommends petitioning Ecology for a No Further Action determination for the Site.

4 LIMITATIONS

This report summarizes the findings of the services authorized under our agreement. It has been prepared using generally accepted professional practices, related to the nature of the work accomplished. This report was prepared for the exclusive use of Samish Indian Nation and its designated representatives for the specific application to the project purpose.

Recommendations, opinions, site history and proposed actions contained in this report apply to conditions and information available at the time this report was completed. Since conditions and regulations beyond our control can change at any time after completion of this report, or our proposed work, we are not responsible for any impacts of any changes in conditions, standards, practices and/or regulations subsequent to our performance of services. We cannot warrant or validate the accuracy of information supplied by others, in whole or part.

5 REFERENCES

American Society for Testing and Materials (ASTM) Standard E 1903-97, *Standard Guide Environmental Site Assessments: Phase II Environmental Site Assessment Process*.

Budget Environmental Services, 2009. *Remedial Action Final Report, 1017 29th Street, Anacortes, WA 98221*.

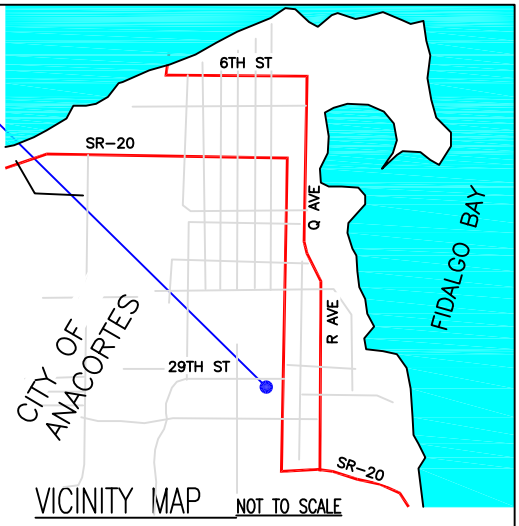
Dragovich, J.D., Logan, H.W., Walsh, T.J. et al, 2002. Geologic Map of Washington, Northwest Quadrant, Washington Division of Geology and Earth Resources Geologic Map GM-50.

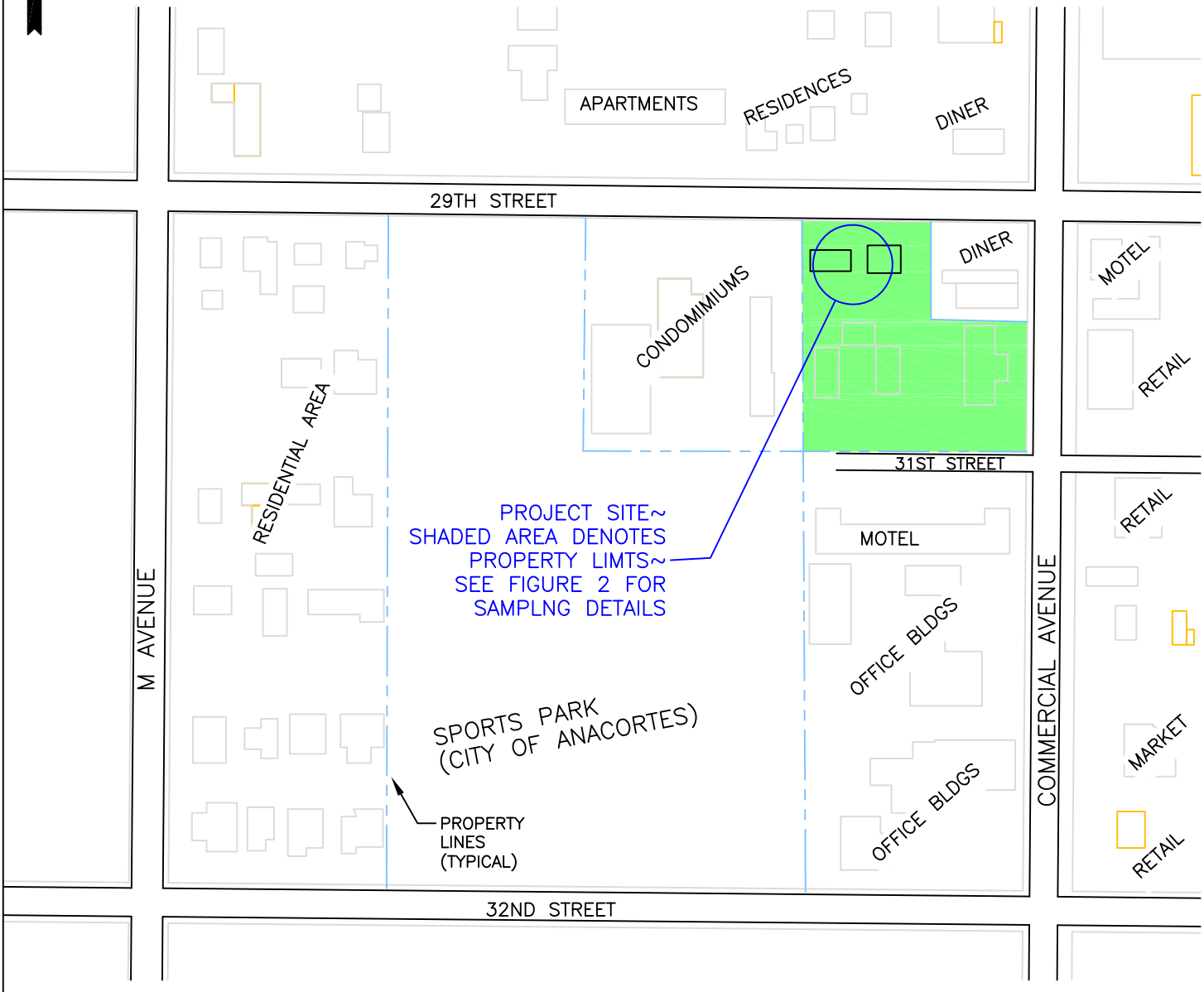
Washington Department of Ecology, 2011. *Opinion Pursuant to WAC 173-340-515(5) on Remedial Action for the following Hazardous Waste Site: 1017 29th St, Anacortes, WA*.

FIGURES

Notes: (1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from notes provided by AEG, LLC.





DRAWING SCALE: 1"= 200'

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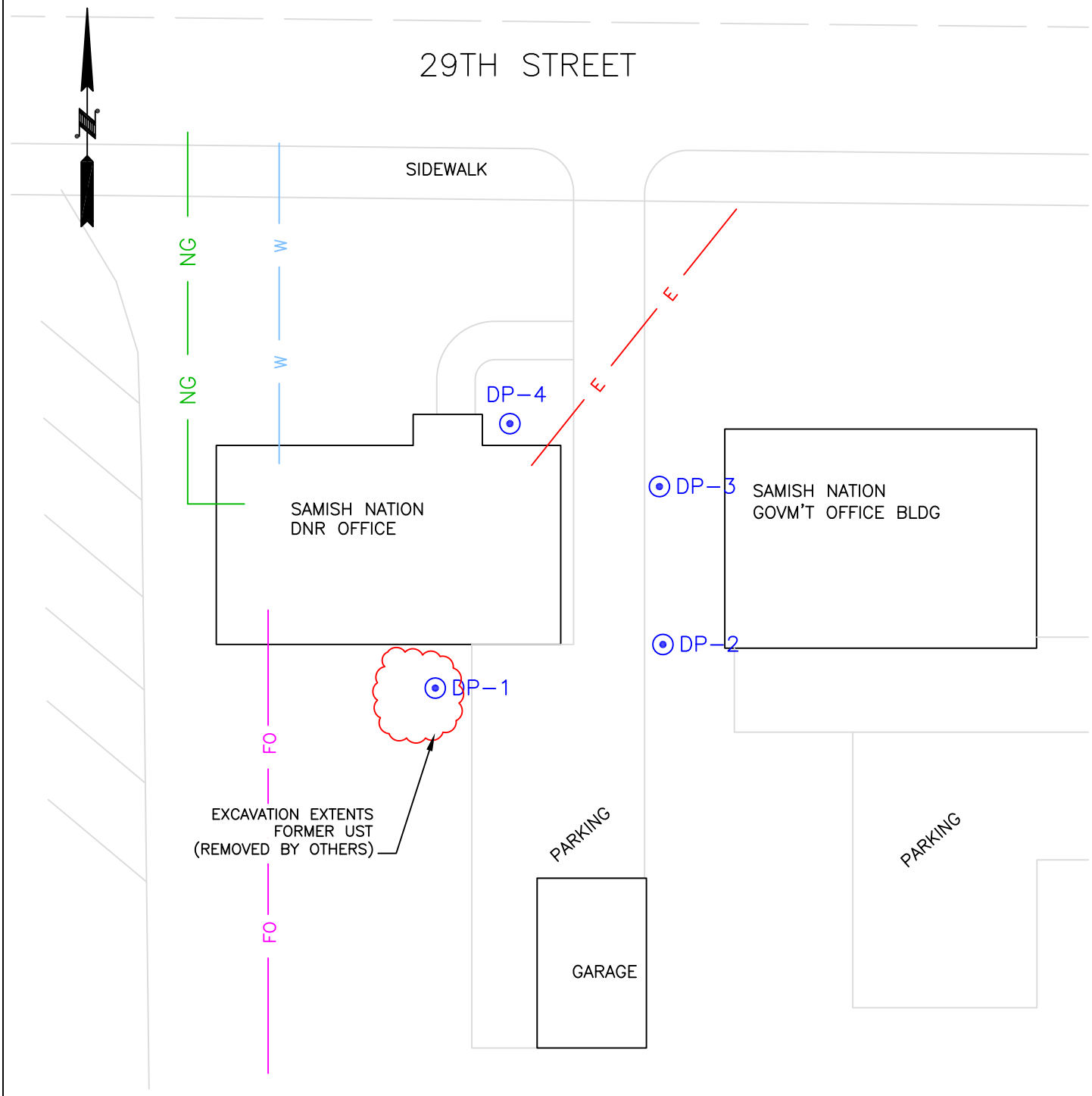
FIGURE 1

SITE & VICINITY MAP

SAMISH NATION DNR OFFICE
1017 29TH STREET
ANACORTES, WA

Project# 12-107	Date: 03/11/2012
File: FILE NAME	Sheet 1 OF 2



LEGEND

- E — OVERHEAD POWER LINE
- NG — NATRUAL GAS LINE
- W — WATER LINE
- FO — FIBER OPTIC LINE
- DP-1 — BORING SAMPLES BY AEG

DRAWING SCALE: 1"= 20'

Notes: (1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from notes provided by AEG, LLC.

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FIGURE 2
SITE
PLAN

SAMISH NATION DNR OFFICE
1017 29TH STREET
ANACORTES, WA

Project# 12-107	Date: 03/11/2012
File: FILE NAME	Sheet 3 OF3

TABLES

Table 1 Summary of Soil Analytical Results
Samish Nation - Department of Natural Resources Property
Anacortes, WA

Sample Number[1]	Depth Sampled (feet)	Date Sampled	Select Volatile Organic Compounds[2] (mg/Kg)				Diesel Extended TPH[3] (mg/Kg)	
			Benzene	Toluene	Ethylene	Total Xylenes	Diesel	Heavy Oil
DP1-S2-7.5/8.0	7.5-8.0	2/22/2012	<0.02	<0.05	<0.05	<0.15	<50	<100
DP2-S2-6.0/6.5	6.0-6.5	2/22/2012	<0.02	<0.05	<0.05	<0.15	<50	<100
DP3-S2-6.5/7.0	6.5-7.0	2/22/2012	<0.02	<0.05	<0.05	<0.15	<50	<100
DP4-S1-3.5/4.0	3.5-4.0	2/22/2012	<0.02	<.05	<0.05	<0.15	<50	<100
PQL			0.02	0.05	0.05	0.15	50	100
Ecology MTCA Method A Clean Up Levels			0.03	7	6	9	2,000	2,000

Notes:
[1]Approximate sample locations are shown in figure 2
[2]Select Volatile Organic Compounds. Analyzed by EPA Method Method 8260
[3]Diesel extended range total petroleum hydrocarbons (TPH). Analyzed by Northwest Method NWTPH-Dx/Dx Extended
mg/Kg = milligrams per kilograms
MTCA = Model Toxics Control Act
PQL=Practical Quantitation Limits
-- = not analyzed for this constituent
< = not detected above laboratory limits
* Ecology has not designated a MTCA Method A cleanup level for this constituent
Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Table 2 Summary of Groundwater Analytical Results
Samish Nation - Department of Natural Resources Property
Anacortes, WA

Sample Number[1]	Date Sampled	Select Volatile Organic Compounds[2] (ug/L)				Diesel Extended TPH[3] (ug/L)	
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel	Heavy Oil
DP1-W	2/22/2012	<1.0	<1.0	<1.0	<3.0	<250	<500
PQL		1.0	1.0	1.0	3.0	250	500
Ecology MTCA Method A Clean Up Levels		5	1,000	700	1,000	500	500

Notes:
[1]Approximate sample location is shown in figure 2
[2]Select Volatile Organic Compounds. Analyzed by EPA Method 8260.
[3]Diesel extended range total petroleum hydrocarbons (TPH). Analyzed by Northwest Method NWTPH-Dx/Dx Extended
ug/L= micrograms per liter
MTCA = Model Toxics Control Act
PQL=Practical Quantitation Limits
-- = not analyzed for this constituent
< = not detected above laboratory limits
* Ecology has not designated a MTCA Method A cleanup level for this constituent
Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

APPENDIX A
SITE PHOTOGRAPHS

ASSOCIATED
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SITE PHOTOGRAPHIC RECORD

Project No.: 12-107 **Project Name: Samish Nation DNR Office, Anacortes, WA – Phase II ESA**

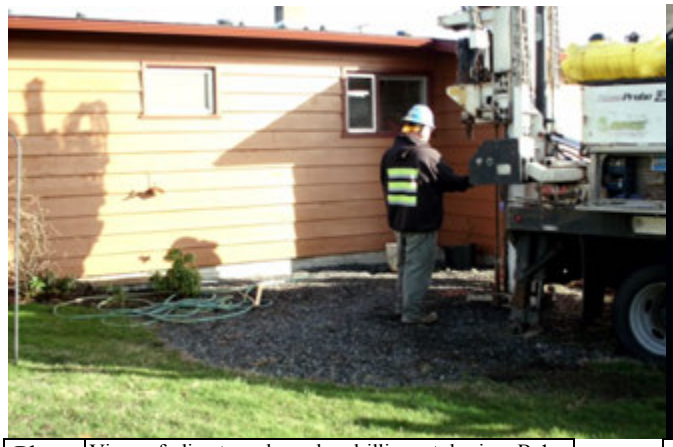

Photo #1:	View of direct push probe drilling at boring B-1 – where former heating oil fuel tank was located. Note gravel surface area indicated area of excavation.

Photo #2:	View of the typical soil encountered at the Site – stiff clay. These cuttings are from boring B-1.

Photo #3:	View of direct push probe drilling at boring B-2, inferred downgradient east of former fuel tank (looking to the east).

Photo #4:	View of attempt to collect groundwater at boring B-2 via leaving a temporary PVC screen in the subsurface for at least 3 hours.

Photo #5:	View of direct push probe drilling at boring B-3, inferred downgradient northeast of former fuel tank (looking to the northeast).

Photo #6:	Close-up view of subsurface investigation at boring B-3. Note the top of a gray PVC screen at boring B-2, in the foreground. (view looking to the north).

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SITE PHOTOGRAPHIC RECORD

Project No.: 12-107 **Project Name: Samish Nation DNR Office, Anacortes, WA – Phase II ESA**

Photo #7:	View of direct push probe drilling at boring B-4, inferred downgradient north-northeast of former fuel tank (looking to the south).

Photo #8:	Alternate view of subsurface investigation at boring B-4 (looking to the north).

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APPENDIX B
SUPPORTING DOCUMENTS

BORING LOGS

ASSOCIATED ENVIRONMENTAL GROUP, LLC — LOG OF BOREHOLE

PROJECT:	Samish Nation DNR Office - Phase II ESA	**JOB # 12-107**	**BORING # DP-1** **PAGE 1 OF 1**
Location:	1017 - 29th Street, Anacortes WA 98221	**Approximate Elevation:**	
Subcontractor/Equipment:	ESN - Carlos Trujillo	**Drilling Method:**	Direct Push Probe
Date:	2/22/2012	**Logged By:**	Y. Van

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Gravel surface underlain by Sandy GRAVEL (FILL)	GW				0905	NA			NA
	at 4 feet: wet gravel backfill, water from surface infiltrated into backfill.				DP1-S1-3.5/4.0	0912		0.0	Not Observed	
5	Brown, dry, stiff, CLAY. Expansive, low plasticity.	CL								
	At 8 feet: No petroleum fuel odor.				DP1-S2-7.5/8.0	0920		0.0	Not Observed	
10					DP1-S3-11.5/12.0	0930		0.0	Not Observed	
15	At 15 feet: No petroleum fuel odor.				DP1-S4-14.5/15.0	0940		0.0	Not Observed	
	TD at 15 feet bgs. Shallow backfill water encountered at approximately 4 feet bgs ATD. Inserted temporary PVC screen at 0 feet to 5 feet. Collected water sample at 1012. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC — LOG OF BOREHOLE

PROJECT:	Samish Nation DNR Office - Phase II ESA	**JOB #** 12-107	**BORING #** DP-2 **PAGE 1 OF 1**
Location:	1017 - 29th Street, Anacortes WA 98221	**Approximate Elevation:**	
Subcontractor/Equipment:	ESN - Carlos Trujillo	**Drilling Method:**	Direct Push Probe
Date:	2/22/2012	**Logged By:**	Y. Van

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Grass underlain by Dark brown, moist, soft, silty CLAY. (FILL)	CL				1030	NA			NA
	Brown, dry, stiff, CLAY, with local gravel (FILL).	CL			DP2-S1-3.5/4.0	1037		0.0	Not Observed	
5	Dark brown, dry, stiff CLAY, low plasticity, minor iron oxide.	CL								
	At 6 feet: No petroleum fuel odor.				DP2-S2-6.0/6.5	1046		0.0	Not Observed	
	At 8 feet: becomes stiff to very stiff, dry, expansive clay.									
10	at 11 feet: no petroleum fuel odor.				DP2-S3-10.5/11.0	1052		0.0	Not Observed	
	TD at 11 feet bgs. No groundwater / surface fill water encountered ATD. Attempted to collect groundwater. Installed temporary PVC screen at 0 feet to 5 feet. Boring backfilled with bentonite chips.									
15										
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC — LOG OF BOREHOLE

PROJECT:	Samish Nation DNR Office - Phase II ESA	**JOB #** 12-107	**BORING #** DP-3 **PAGE 1 OF 1**
Location:	1017 - 29th Street, Anacortes WA 98221	**Approximate Elevation:**	
Subcontractor/Equipment:	ESN - Carlos Trujillo	**Drilling Method:**	Direct Push Probe
Date:	2/22/2012	**Logged By:**	Y. Van

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Grass underlain by Dark brown, moist, soft, silty CLAY. (FILL)	CL				1108	NA			NA
	Brown, dry, medium stiff, CLAY with local gravel. (FILL)	CL			DP3-S1-3.5/4.0	1116		0.0	Not Observed	
5	Brown, dry, stiff, CLAY, low plasticity, minor iron oxide.	CL								
	At 7 feet: No petroleum fuel odor. Stiff to very stiff, dry, expansive clay				DP3-S2-6.5/7.0	1122		0.0	Not Observed	
10	at 11 feet: no petroleum fuel odor.				DP3-S3-10.5/11.0	1131		0.0	Not Observed	
	TD at 11 feet bgs. No groundwater / fill water encountered ATD. Attempted to collect groundwater. Installed temporary PVC screen at 0 feet to 5 feet. Boring backfilled with bentonite chips.									
15										
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC — LOG OF BOREHOLE

PROJECT:	Samish Nation DNR Office - Phase II ESA	**JOB # 12-107**	**BORING # DP-4** **PAGE 1 OF 1**
Location:	1017 - 29th Street, Anacortes WA 98221	**Approximate Elevation:**	
Subcontractor/Equipment:	ESN - Carlos Trujillo	**Drilling Method:**	Direct Push Probe
Date:	2/22/2012	**Logged By:**	Y. Van

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Grass underlain by Dark brown, moist, soft, silty CLAY. (FILL)	CL				1200	NA			NA
	Brown, dry, medium stiff, CLAY with local gravel. (FILL)	CL			DP4-S1-3.5/4.0	1215		0.0	Not Observed	
5	Brown, dry, stiff, CLAY, low plasticity, minor iron oxide.	CL								
	At 8 feet: No petroleum fuel odor.				DP4-S2-7.5/8.0	1226		0.0	Not Observed	
10	at 11 feet: no petroleum fuel odor.				DP4-S3-10.5/11.0	1234		0.0	Not Observed	
	TD at 11 feet bgs. No groundwater / fill water encountered ATD. Attempted to collect groundwater. Installed temporary PVC screen at 0 feet to 5 feet. Boring backfilled with bentonite chips.									
15										
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
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- Grout/Concrete
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- Blank Casing

LABORATORY ANALYTICAL RESULTS

ESN NORTHWEST, INC. Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: AGL

ADDRESS: 1018 CAPITOL WAY S. #202, OLYMPIA, WA

PHONE: 360-352-9835 FAX: -8164

CLIENT PROJECT #: 12-107 PROJECT MANAGER: M. CHUN

DATE: 2/22/12 PAGE 1 OF 1

PROJECT NAME: SAMISH NATION - ANACORTES

LOCATION: 1017 29th St., ANACORTES, WA

COLLECTOR: Y. VAN DATE OF COLLECTION 2/22/12

Sample Number	Depth	Time	Sample Type	Container Type	TPH-HCID	TPH - DIESEL & OIL	TPH - GASOLINE	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos-PLM	GRO Suite	DRO Suite	WO Suite			NOTES	Total Number of Containers	Laboratory Note Number
1. DP1-S2-7.5/8.0	7.5-8.0	0920	Soil	VOA, 4oz		X		X																	3	
2. DP1-W (DP1-W)	—	1012	H2O	Amber VOA		X		X																	3	
3. DP2-S2-6.0/6.5	6.0-6.5	1046	Soil	VOA, 4oz		X		X																	3	
4. DP3-S2-6.5/7.0	6.5-7.0	1122	Soil	↓		X		X																	3	
5. DP4-S1-3.5/4.0	3.5-4.0	1215	Soil	↓		X		X																	3	
6.																										
7.																										
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18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	2/22/12 1430		

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☒ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
SAMISH NATION-ANACORTES PROJECT
Client Project #12-107
Anacortes, Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analysis of Diesel Range Organics & Lube Oil Range Organics in Soil by Method NWTPH-Dx/Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (mg/kg)	Lube Oil Range Organics (mg/kg)
Method Blank	2/23/2012	2/23/2012	83	nd	nd
DP1-S2-7.5/8.0	2/23/2012	2/23/2012	67	nd	nd
DP1-S2-7.5/8.0 Duplicate	2/23/2012	2/23/2012	78	nd	nd
DP2-S2-6.0/6.5	2/23/2012	2/23/2012	79	nd	nd
DP3-S2-6.5/7.0	2/23/2012	2/23/2012	88	nd	nd
DP4-S1-3.5/4.0	2/23/2012	2/23/2012	81	nd	nd
Reporting Limits				50	100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Diesel Range Organics & Lube Oil Range Organics in Water by Method NWTPH-Dx/Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (ug/L)	Lube Oil Range Organics (ug/L)
Method Blank	2/24/2012	2/24/2012	74	nd	nd
DP1-W	2/24/2012	2/24/2012	83	nd	nd
Reporting Limits				250	500

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analyses of BTEX (EPA Method 8260) in Soil

Sample Number	Date Analyzed	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Surrogate Recovery (%)
Method Blank	2/24/2012	nd	nd	nd	nd	103
LCS	2/24/2012	107%	101%	97%	91%	97
LCSD	2/24/2012	84%	83%	80%	69%	105
DP1-S2	2/24/2012	nd	nd	nd	nd	103
DP2-S2	2/24/2012	nd	nd	nd	nd	107
DP3-S2	2/24/2012	nd	nd	nd	nd	101
DP4-S1	2/24/2012	nd	nd	nd	nd	95
Method Detection Limits		0.02	0.05	0.05	0.15	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (4-Bromofluorobenzene) & LCS : 65% TO 135%

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Analyses of BTEX in Water by Method 8260

Sample Number	Date Analyzed	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Surrogate Recovery (%)
Method Blank	2/27/2012	nd	nd	nd	nd	91
LCS	2/27/2012	119%	111%	106%	105%	93
LCSD	2/27/2012	122%	106%	108%	105%	104
DP1-W	2/27/2012	nd	nd	nd	nd	95
		1.0	1.0	1.0	3.0	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (4-Bromofluorobenzene) & LCS : 65% TO 135%