



TERRA ASSOCIATES, Inc. ^{RECEIVED}

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

SEP 07 2012

DEPT OF ECOLOGY
TCP - NWRO

September 6, 2012
Project No. T-6552

HALCO PROPERTIES, LLC
Mr. Brett Cowman
c/o Mr. Livingston Wernecke
Betts, Patterson & Mines, P.S.
701 Pike Street, Suite 1400
Seattle, Washington 98101-3927

Subject: Technical Memo – Interim Action Project Progress
5221 Ballard Avenue NW
Seattle, Washington
VCP NW 2496

- References:
1. Phase II Environmental Site Assessment, prepared by Terra Associates, Inc., dated July 29, 2011
 2. Technical Memo, Fall Quarter Sampling, prepared by Terra Associates, Inc., dated October 12, 2011
 3. Technical Memo, prepared by Terra Associates, Inc., dated December 1, 2011
 4. Technical Memo, prepared by Terra Associates, Inc., dated May 3, 2012

Dear Mr. Cowman:

This memo updates the progress at the 5221 Ballard Avenue NW project. The attached memo presents the results of analytical testing subsequent to the memo dated May 3, 2012 and our current conclusions in more detail.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Respectfully submitted,
TERRA ASSOCIATES, INC.


Charles R. Lie, L.H.G.
Project Manager

cc: Ms. Heather Vick, NWRO WDOE



CHARLES R. LIE

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**Technical Memo – Interim Action Project Progress
Summer 2012
5221 Ballard Avenue NW
Seattle, Washington
VCP NW 2496**

1.0 EXECUTIVE SUMMARY

This memo summarizes the current status of the interim action at the parcel at 5221 Ballard Avenue NW in Seattle, Washington. We previously prepared memos dated December 1, 2012 and May 3, 2012. This memo also addresses concerns raised in a February 12, 2012 letter from Ecology. As discussed in our prior memos, construction of a multi-story building across the street from the site has dewatered the site. The bottom of the monitoring wells constructed for this project are all now well above the static water level. The initial remedial plan to use enhanced bio remediation using a slow release oxygen compound in the groundwater has been replaced with a vapor extraction system that is both physically removing the residual paint thinner and has increased air flow to enhance natural bio degradation of the hydrocarbons.

The current status summarized in more detail in the following sections of this memo.

2.0 SCOPE OF WORK

Our scope of work for this supplemental report consisted of the following:

- Measuring groundwater in all of the accessible monitoring wells on this site and the adjacent site along Shilshole Avenue NW.
- Subcontracting analytical testing of vapor samples.
- Appropriate analysis of the data.
- Monitoring the VES system.
- Preparation of this memo.

3.0 SITE CONDITIONS

3.1 Surface

The site is located at 5221 Ballard Avenue NW in Seattle, Washington. The site location is shown on Figures 1 and 2. The site layout and exploration locations are shown on Figure 3.

Adjacent New Construction Project

The construction project at 5214 Ballard Avenue NW involves the construction of a 4-story mixed-use building with 3 levels of underground parking. With a surface elevation of about Elev. 36, this places the lower parking level at about Elev. 6. We have reviewed geotechnical information for the site and have incorporated the additional subsurface information into a generalized Geologic Cross Section on Figure 4. The boring logs and site plan from the geotechnical report are attached in Appendix A.

On-site UST Distribution System

Prior to proceeding with the VES pilot test, the existing distribution system was evaluated to reduce impacts such as short circuiting through pipes or pipe bedding. Each of the USTs had a turbine pump. The USTs were vented to the west elevation of the building on-site. The distribution pipes extended from the turbine pump vaults at each UST towards the south. The distribution pipes penetrated the northern basement wall of the building at 5242 Shilshole Avenue NW and extend above grade to former paint formulation stations. No underground distribution system is believed to exist on the property at 5242 Shilshole Avenue NW.

Since the USTs were not used for the storage of vehicle fuel, there were no pump islands associated with the USTs.

3.2 Groundwater

Table 1 summarizes the current and previous groundwater measurements. Historic groundwater contours that predate the dewatering are shown on Figure 3. The current projected static water levels are shown on Figure 4. The current groundwater gradient is currently towards the north-east, inconsistent with the previous measurements. The gradient has reversed due to active dewatering at a new construction project northeast of the site as discussed in Section 3.1. As can be seen in the summary below, the static water levels in the wells on and adjacent to the site are all below the bottom of the existing monitoring well network.

Table 1
Groundwater Measurements

Monitoring Well	Surface Elev.	MP Elev.	5/6/11		5/10/2011		6/29/2011		9/29/11	
			Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
MW-101	36.77	36.37	10.3	26.07	10.45	25.92	10.78	25.59	11.63	24.74
MW-102	36.35	35.93	10.25	25.68	9.81	26.12	10.08	25.85	11	24.93
MW-103	36.13	35.79	10.25	25.54	9.38	26.41	9.74	26.05	10.86	24.93
MW-104	28.23	27.98					2.76	25.22	3.55	24.43

Table 1
(continued)
Groundwater Measurements

Monitoring Well	Surface Elev.	MP Elev.	10-17-11		11-18-11		11-29-11		5-2-12	
			Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
MW-101	36.77	36.37	11.50	24.87	15.68	20.69	17.19	19.18	>20	<16.37
MW-102	36.35	35.93	10.86	25.07	15.78	20.15	17.32	18.61	>20	<15.93
MW-103	36.13	35.79	10.54	25.25	16.83	18.96	18.54	17.25	>20	<15.79
MW-104	28.23	27.98			6.83	21.15			>15	<12.98
MW-8	27.97	27.51			5.22	22.29			>8	<18.60
MW-9	30.24	29.99			7.39	22.60			>8	<19.51

Table 1
(continued)
Groundwater Measurements

Monitoring Well	Surface Elev.	MP Elev.	8-22-12	
			Depth	Elev.
MW-101	36.77	36.37	NM	N/A
MW-102	36.35	35.93	NM	N/A
MW-103	36.13	35.79	NM	N/A
MW-104	28.23	27.98	>15	<12.98
MW-8	27.97	27.51	>8	<18.60
MW-9	30.24	29.99	>8	<19.51

Notes: MP is the north side of the top of the PVC casing within the surface monument.
Ground surface elevations are from a survey by Jim Hart and Associates.
NM indicates the well was not measured due to the use of the well in the VES system on-site.

4.0 VACUUM EXTRACTION SYSTEM

The production VES system started operation on May 7, 2012. The production system consists of a trench that provides an individual pipe to each of the three monitoring wells on-site. The individual pipes are routed to allow the system to operate with any one well, two wells, or all three wells in vacuum. Each pipe has a sample port to allow measurement of induced vacuum and to allow sampling of the active vacuum flow. Based on the analytical testing during the pilot test and subsequent production samples, no permit from the Clean Air Agency is required. This is based on Section 603, Notice of Construction (C) Exemptions (94). The only Toxic Air Contaminant is m,p xylene. With the levels of xylene measured as being present, an assumed maximum air flow of 100 CFM and one year of operation, less than 20 pounds of xylene would be discharged. This is well below the threshold of 1,000 pounds per year. The discharge of generic gasoline range hydrocarbons is not regulated.

The system has been monitored since initial construction. The air flow has been about 40 cfm. The vacuum is about 44 inches of water. The system operated until June 18, 2012 on MW-2. The system was then changed to pull vacuum from all three wells. The system operated 24 hours each day until June 28, 2012 when it was changed to operate 12 hours a day to reduce conflicts with nearby apartments. A graphical summary of the estimated mass removal due to the VES is shown on Figure 5. This mass removal does not include the amount of hydrocarbons that have been degraded through enhanced bio degradation with the enhanced air flow from the VES operations.

The results of the vapor sampling are attached in Appendix B. As can be seen, no benzene is present above the practical quantitation limit in any of the samples.

5.0 CONFIRMATION SAMPLING

To evaluate the performance of the VES operation, Terra Associates proposes that confirmation sampling consist of two elements. The first element is confirmation of the soil conditions through the use of Direct Push Technology sampling. The existing soil data is summarized on the generalized geologic section, Figure 4. The schematic locations of the proposed sample points are shown on Figure 6. The DPT explorations would be sampled at the depths where prior testing had found contamination, 10 feet and at 15 feet. If field screening suggests that contamination extends deeper than 15 feet, the DPTs will be driven to a depth of 20 feet or refusal whichever occurs first. The sampling will include a DPT southeast of the UST cluster as suggested by Ecology in their review letter last spring.

The samples will be analyzed for total petroleum hydrocarbons in the gasoline through oil range and BETX. In addition, at least two samples with the highest TPH values will be analyzed using the EPH/VPH test methods to allow an evaluation of a site specific Method B TPH cleanup value. The initial values based on prior sampling was 2,100 ppm.

We propose using the Method B benzene soil cleanup value of 18 ppm for direct contact of the benzene. The Method A cleanup value of 0.03 ppm is based on the protection of drinking water. The prior groundwater sampling on-site had a maximum value of benzene of 1.5 parts per billion benzene. This value was within the MCL for benzene of 5 ppb in the drinking water regulations. Thus, prior to the change in the groundwater level and the current remedial measures, the soils were not creating elevated levels of benzene relative to the Method A groundwater value for benzene.

The only anticipated beneficial use of the groundwater beneath the site is recharge to the adjacent freshwater body of Salmon Bay. The surface water Method B cleanup value for benzene is 23 parts per billion. While no additional groundwater sampling is possible due to the permanent decrease in the groundwater beneath the site, the prior samples of groundwater met the Method B cleanup value for benzene. No further groundwater sampling for benzene is planned at this time. Finally, the vapor samples taken from the VES system have all been non-detect for benzene.

Table 2
Proposed Remediation Levels
Soil and Groundwater

Media	Proposed Remediation Level	Maximum Documented Level from Prior Study
Soil-TPH G	2,000 ppm	3,900 ppm
Soil Benzene	18 ppm	<0.058 ppm
Groundwater TPH G	800 ppb	940 ppb
Groundwater-TPH D	500 ppb	<700
Groundwater Benzene	23 ppb	2.8 ppb

Notes: TPH G to be determined using EPH VPH and MTCATPH methodology.

Groundwater levels of TPH D and G in MW-103 appear to be drilling relicts and would only present in the initial samples from the wells prior to site dewatering.

TPH D and G groundwater are from WAC 173-340-730 (3) (iii) (C).

The second element is the levels of benzene and hydrocarbons in indoor air in the basement at 5221 Ballard Avenue NW. The prior samples had indicated that the levels of hydrocarbons and benzene were above the cleanup values. With the decrease in the static water elevation and the increased flow of air due to the operation of the VES system, we anticipate significant reductions. Performance sampling will be done following a week with the VES system turned off to allow the sub slab vapor conditions to stabilize. Oxygen readings done during the month of august showed atmospheric levels of oxygen in the sub slab vapor points. Confirmation sampling will be done using the same techniques used for the initial sampling. Follow up indoor air sampling may be done if the sub slab samples continue to be elevated to the current screening levels for benzene and hydrocarbons presented in Ecology Publication 09-09-047.

6.0 DISCUSSION

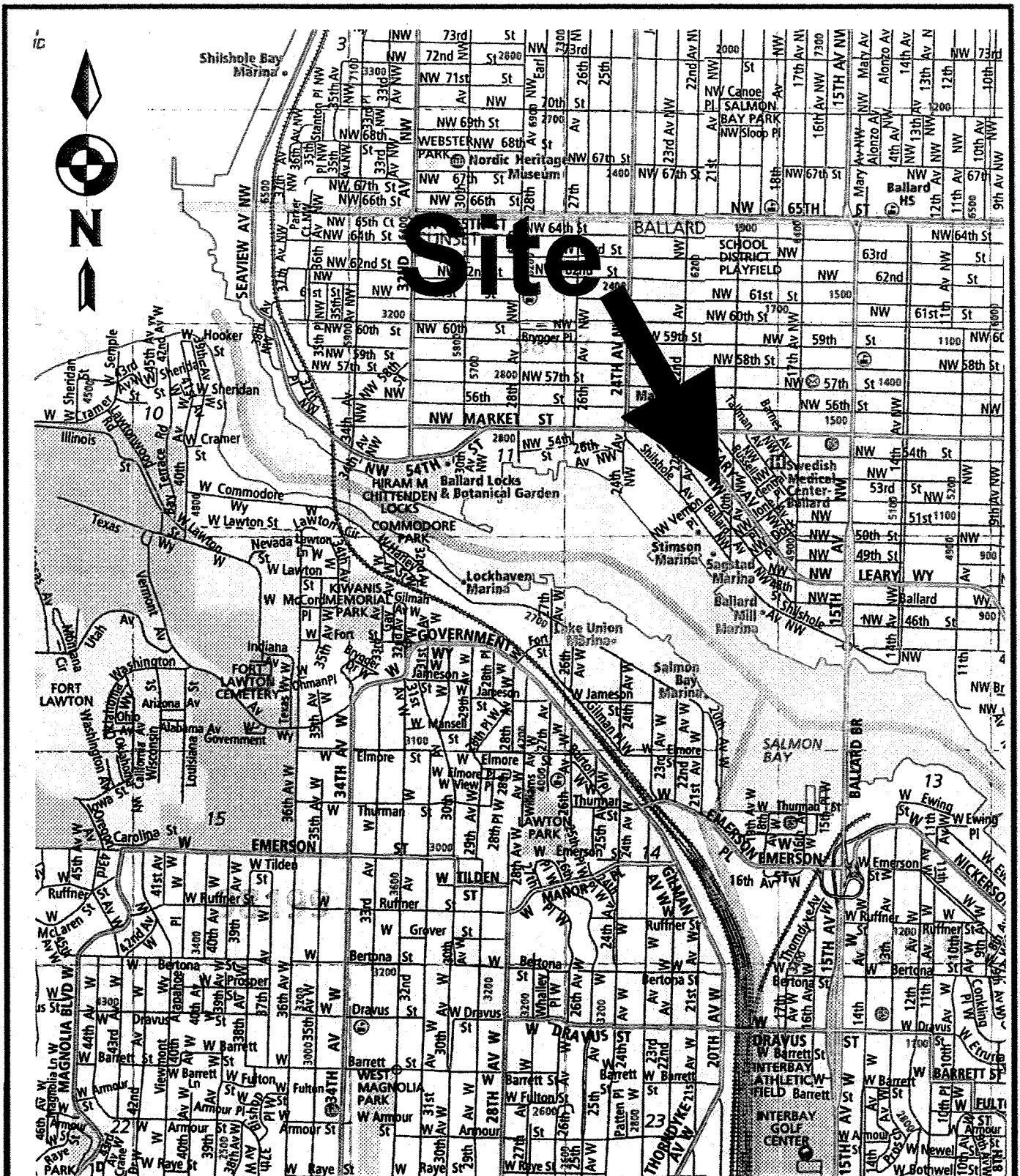
We are in the process of completing a Remedial Investigation/Feasibility Study to document the project and evaluate the cleanup procedures that have been incorporated into the interim action. In the event the confirmation sampling discussed above shows that the site is still not in compliance with the final cleanup levels, it is our opinion that the VES system may continue to operate to further reduce the levels of hydrocarbons through both vacuum extraction and enhanced biodegradation. The timing of the sampling discussed in this memo should be at least six months following the startup of the vacuum system. The system started on May 2, 2012. Thus, we recommend considering resampling the site during the first part of November 2012.

7.0 LIMITATIONS

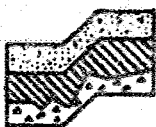
This memo is the copyrighted property of Terra Associates, Inc. and was prepared in accordance with generally accepted local geo-environmental engineering practices and within the limitations of time and budget. Analytical testing of samples was based on our understanding of past land uses documented in reports by others and the tax records. In the event additional information regarding site history or current site uses is found, the information should be brought to our attention, as it may affect our conclusions.

This memo is intended for specific application to the 5221 Ballard Avenue NW project, and is for the exclusive use of Halco Properties, LLC and their authorized representatives. No other warranty, expressed or implied, is made.

The analyses and recommendations presented in this memo are based on information prepared by others together with data obtained from explorations advanced on the site, and selected analyses of environmental samples for this study. The conclusions reached in this report are our opinions based on the previous and current explorations and analytical test data summarized and discussed in this report. Subsurface conditions may vary and seasonal variations in groundwater may occur.



Reference: Thomas Bros King County Road Atlas. NOT TO SCALE



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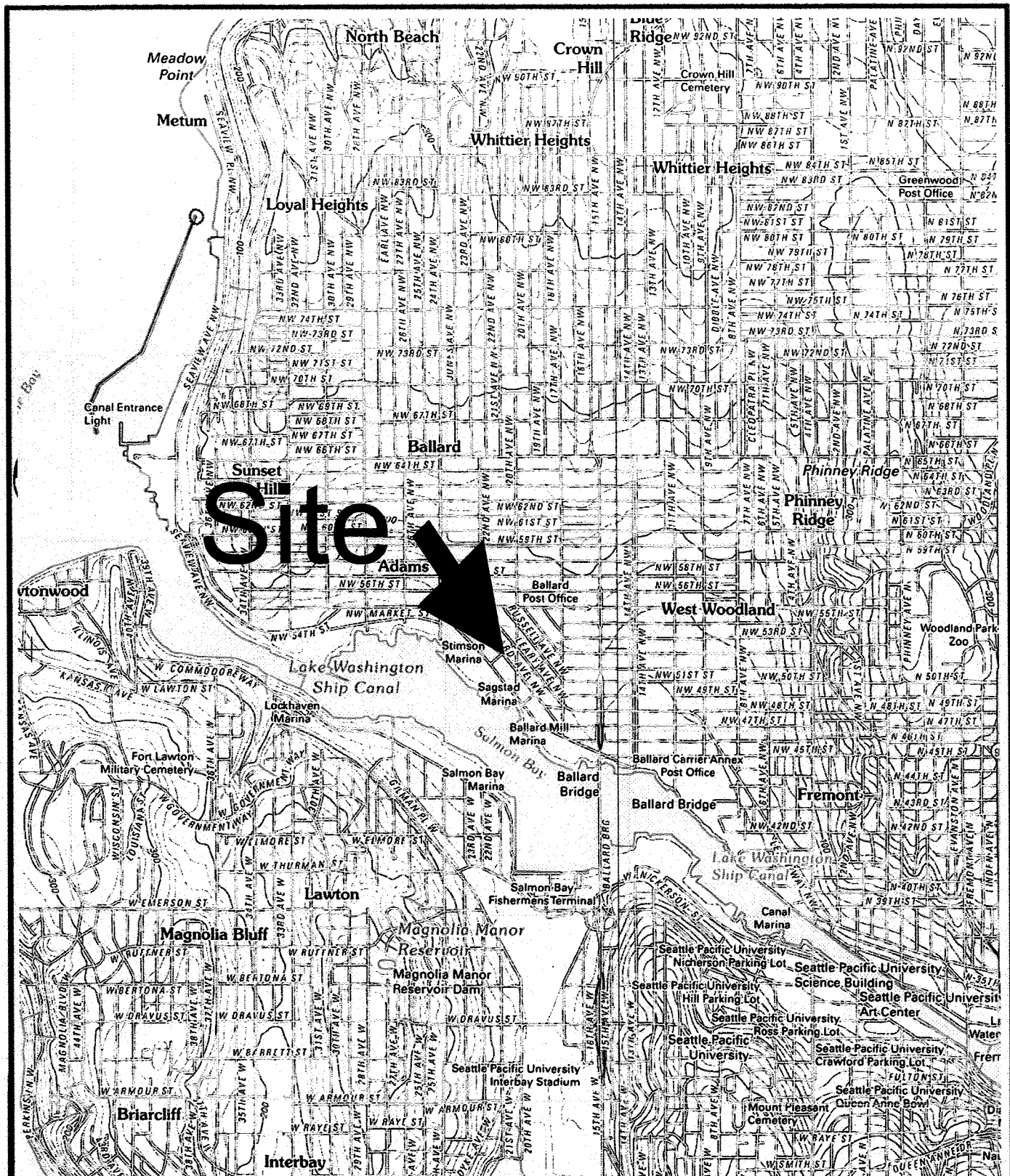
Geotechnical Consultants

Vicinity Map
5221 Ballard Ave NW
Seattle, Washington

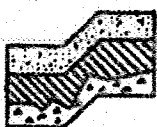
Proj. No T-6552

Date Sept 2012

Figure 1



Reference: Bellevue Seattle North and Shilshole Bay USGS Quadrangles



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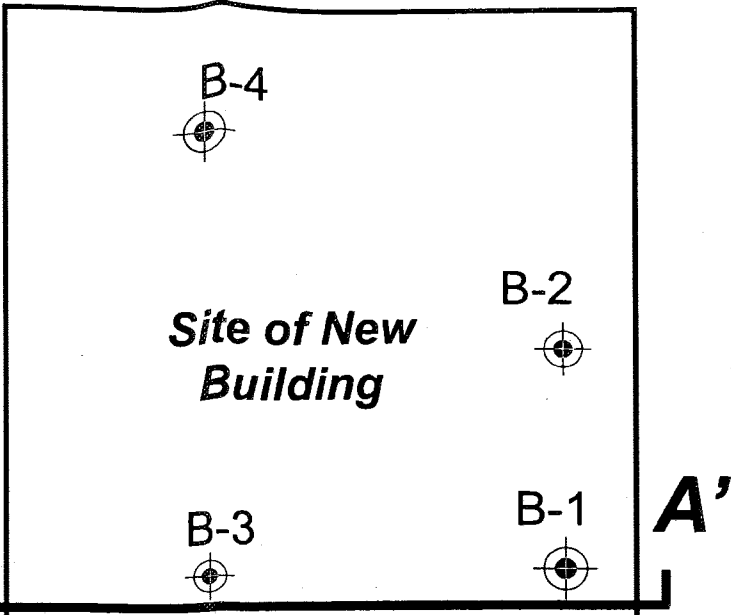
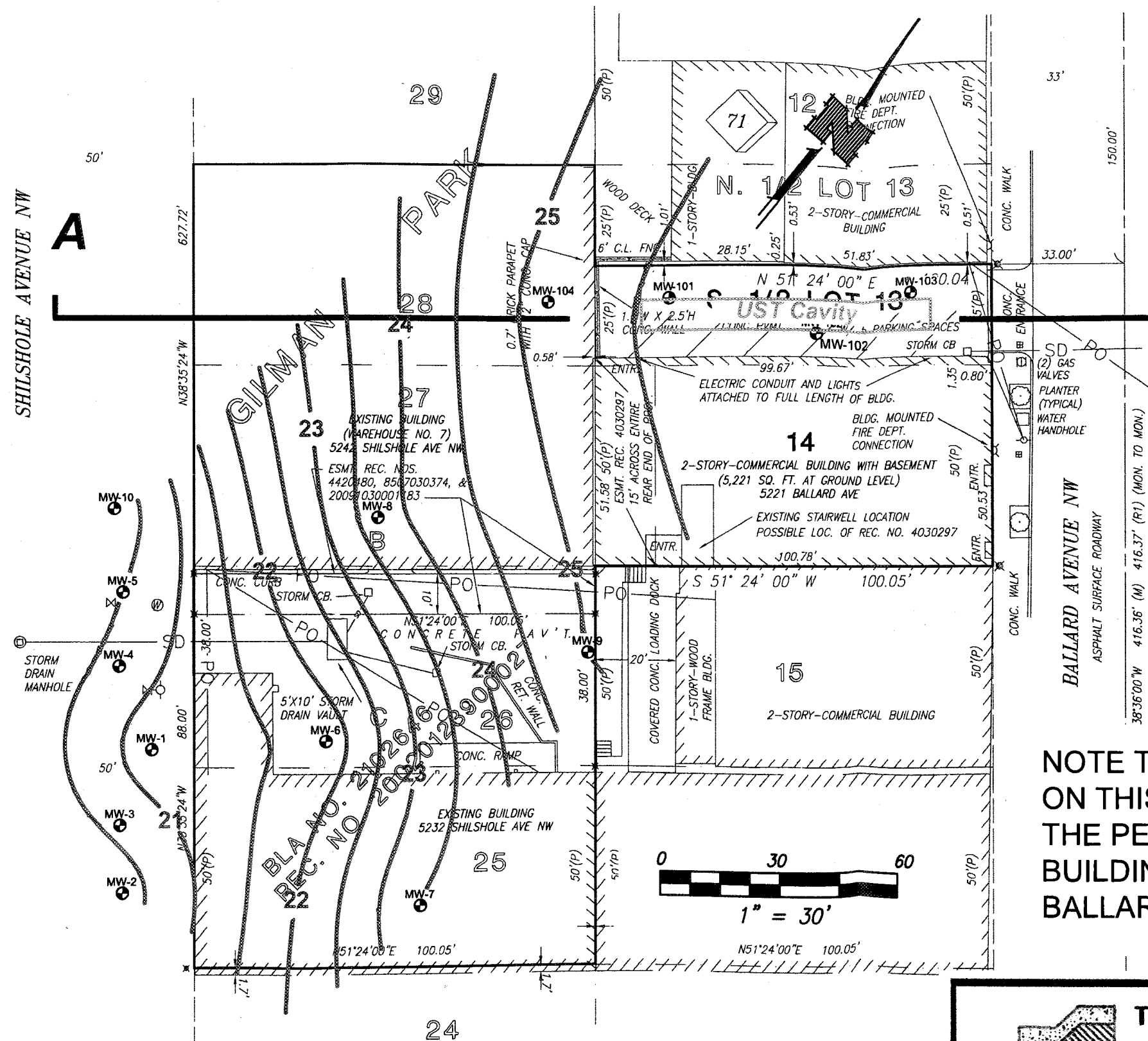
Geotechnical Consultants

**Topographic Vicinity Map
5221 Ballard Ave NW
Seattle, Washington**

Proj. No T-6552

Date Sept 2012

Figure 2



LEGEND

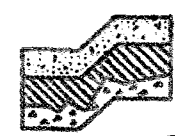


MW-9
Surveyed Location of Monitoring Well

B-3
Approx. Location of Geotechnical Boring by others

NOTE THAT THE STATIC WATER LEVELS SHOWN ON THIS MAP ARE HISTORIC LEVELS THAT PREDATE THE PERMANENT DEWATERING AT THE NEW BUILDING ON THE NORTHEAST SIDE OF BALLARD AVE NW.

Reference: Survey by Jim Hart and Associates



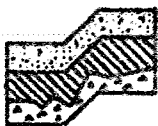
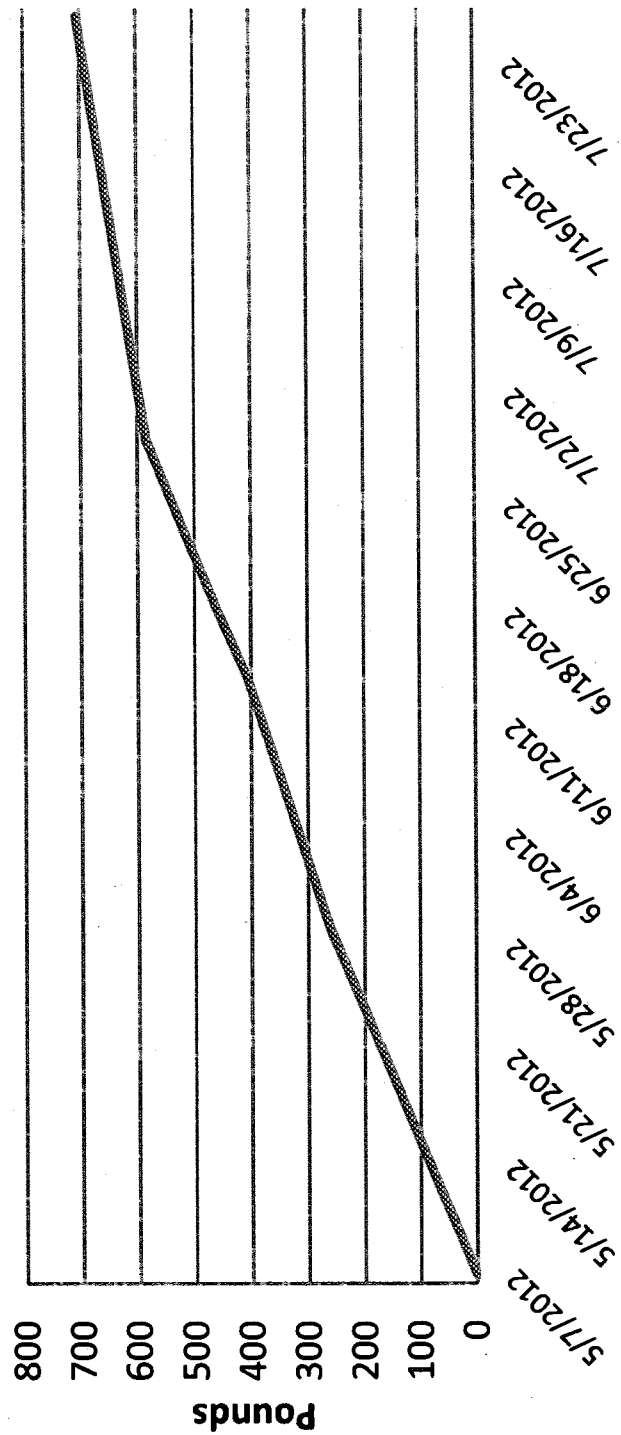
**TERRA
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Geotechnical Consultants

Exploration Location Plan
5221 Ballard Ave NW
Seattle, Washington

Proj. No. T-6552 Date Sept 2012 Figure 3

Cumulative Paint Thinner Removed by VES



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Geotechnical Consultants

VES Mass Removal Estimate
5221 Ballard Ave NW
Seattle, Washington

Proj. No T-6552

Date Sept 2012

Figure 5

APPENDIX A

BORING LOGS

**Geotechnical Report
Ballard Mixed Use Facility
5214 Ballard Avenue NW
Seattle, Washington**

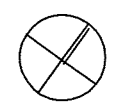
Project 1466-01
July 17, 2007

Prepared for:
Ballard LLC
Jim Riggle
5301 Ballard Avenue NW
Seattle, WA 98107

Prepared by:
The Galli Group
5034 18th Avenue NE
Seattle, Washington 98105
206-525-5097

Appendix

**Logs of Exploratory Borings
Laboratory Testing**



- B-1 approx boring location

Ballard Ave. Mixed Use Building
5214 Ballard Ave. NW
Seattle, WA 98107

Figure 2

Generalized Soil Stratigraphy Section A - A'

1" = 10 feet

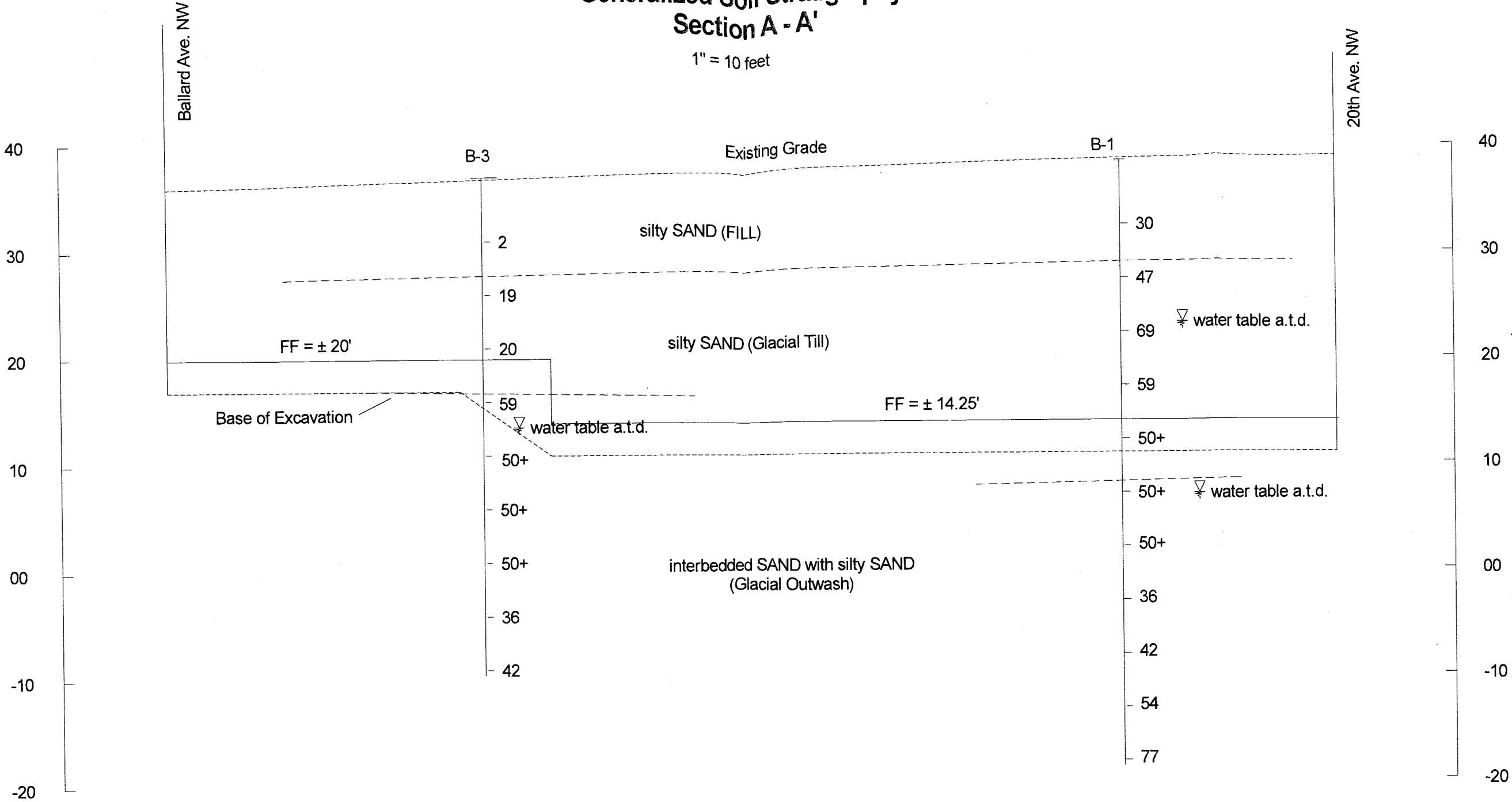
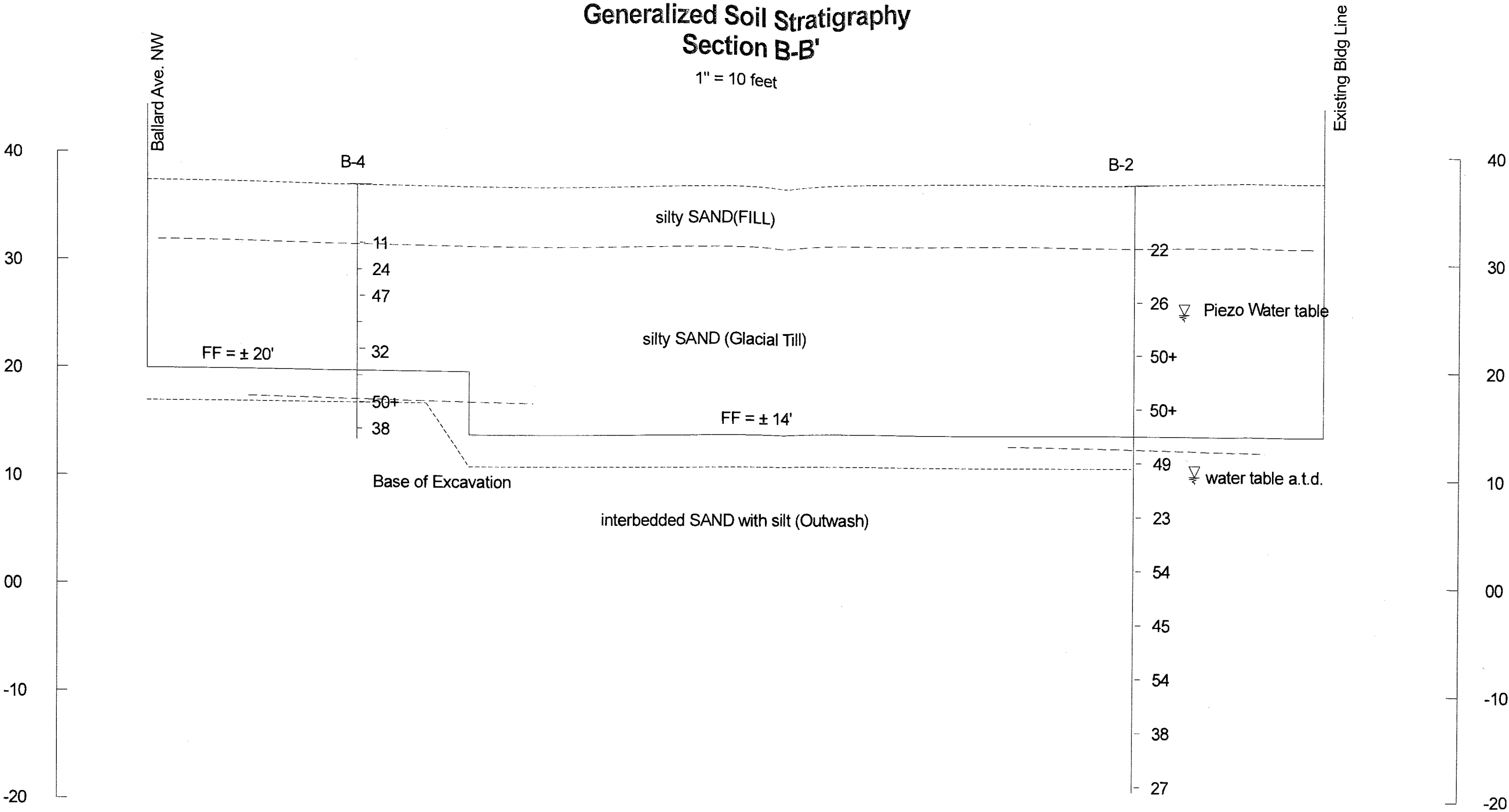


Figure 3

Generalized Soil Stratigraphy Section B-B'

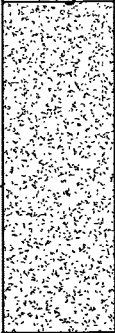

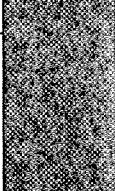





1" = 10 feet



Boring Log B-1

5-14-2007

Elevation = ± 39'

Log	Soil Description	Depth	Sample	SPT	
	Med. Dense, brown, silty SAND with organics; contains broken glass, brick (FILL)	5'	S-1	11-15-15	
	Brown, SAND with trace silt; trace gravel; moist	10'	S-2	16-21-26	m.c. = 10.1%
	Gray-brown, SAND with silt; trace gravel; contains occ. silt seam(SM, 22.6% silt)	15'	S-3	24-32-37	▽ 15' a.t.d. m.c. = 11.5%
	Gray-brown, SAND with silt; trace gravel; contains silty SAND seams; wet	20'	S-4	19-26-33	m.c. = 9.8%
	Gray, silty SAND with trace gravel; occ. silt seams	25'	S-5	21-50/6"	m.c. = 16.1%
	Very dense, gray, poorly graded SAND with silt and silty SAND; wet -pebbly gravel at 32'	30'	S-6	50/6"	m.c. = 13.1% ▽ 31' a.t.d. estimated
	Poorly graded SAND and pebbly gravel; wet; -driller added water after about 6" heave	35'	S-7	12-34-50/4"	
	8" coarse SAND; 6" silty SAND; wet	40'	S-8	2-19-17	
		45'			

Boring Log B-1

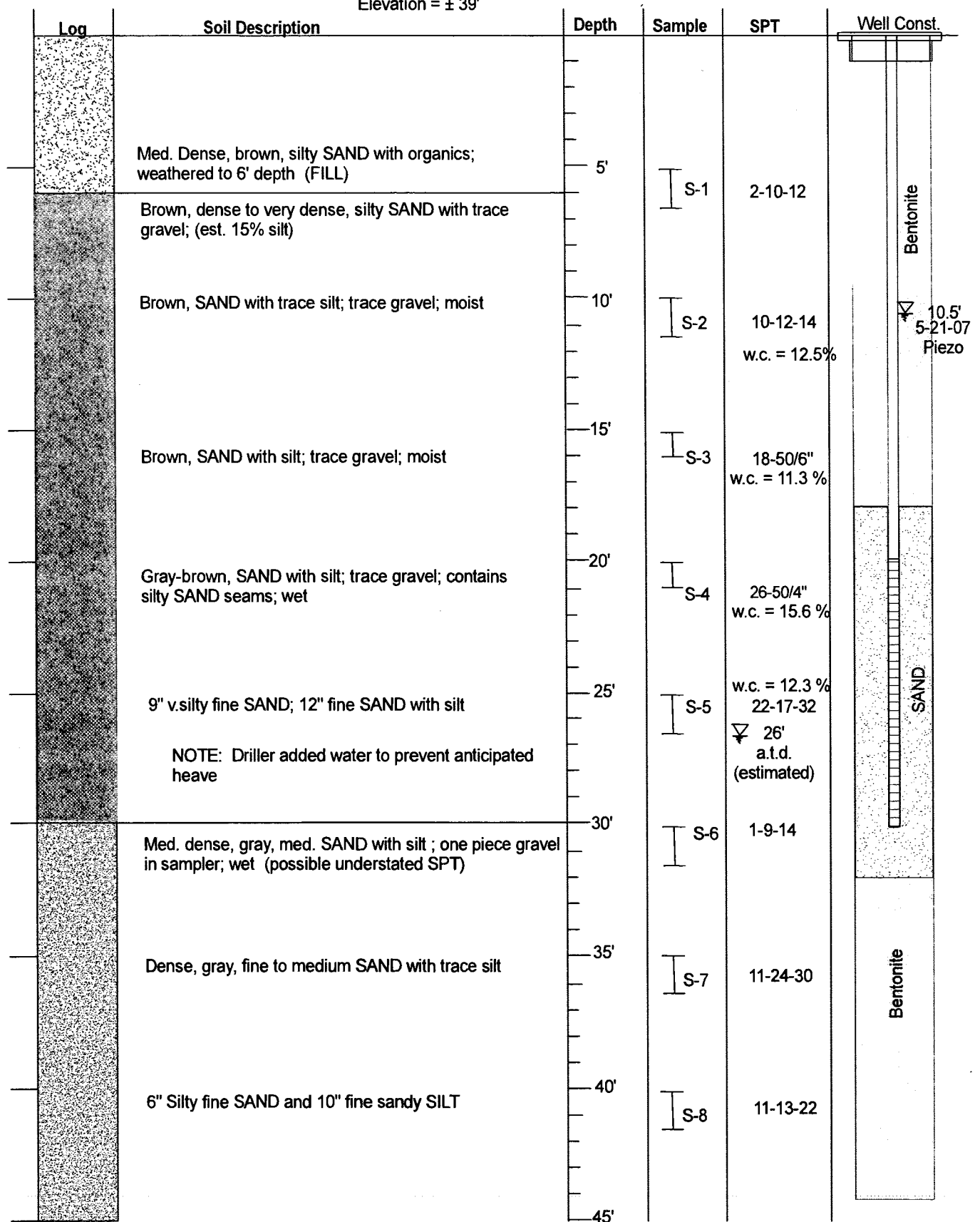
5-14-2007

(Sheet 2 of 2)

Log	Soil Description	Depth	Sample	SPT
	NOTE: Driller is washing out some of the samples too much in dealing with heave; blows might be understated 40 to 50 feet depth	40'		
	Poorly graded SAND and silty SAND; layered	45'	S-9	4-16-26
	Very dense, gray, SAND with silt; silty SAND in tip	50'	S-10	3-20-34
	Very dense, gray, SAND with silt; occ. gravel and poorly graded SAND layers	55'	S-11	14-38-39
	Bottom of Boring at 56.5 feet Water encountered at \pm 15 feet during drilling	60'		
	Driller filled hole with bentonite chips	65'		
		70'		
		75'		
		80'		
		85'		

Boring Log B-2

5-14-2007



Boring Log B-2

5-14-2007

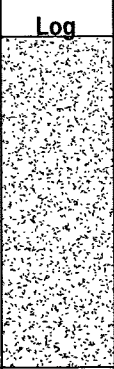

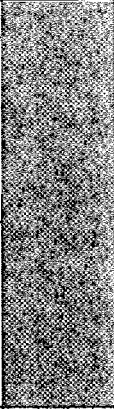








(Sheet 2 of 2)

Log	Soil Description	Depth	Sample	SPT
		40'		
	Poorly graded SAND with interbedded SILT; ± 6" beds	45'	S-9	7-25-29
	Dense, poorly graded SAND with occ. gravel	50'	S-10	3-15-23
	Poorly grade SAND	55'	S-11	3-12-15
	Bottom of Boring at 56.5 feet			
	Constructed well	60'		
	0-20' 2" solid PVC pipe			
	20' - 30' slotted PVC pipe			
	0' - 18' Bentonite	65'		
	18' - 32' SAND			
	32' - 44' Bentonite plug			
		70'		
		75'		
		80'		
		85'		

Boring Log B-3

5-15-2007

Elevation = \pm 37'

Log	Soil Description	Depth	Sample	SPT	
	Organic rich topsoil and gray clay in tailings (FILL)				
	No Recovery	5'		0-0-2	
	Med. dense, gray-brown, silty SAND with trace clay; wet	10'		7-10-9	w.c. = 17.4%
	Med. dense, gray-brown silty SAND with SAND beds	15'		7-11-9	w.c. = 17.9%
	Dense, gray brown, SAND with trace silt; some silt seams	20'		19-26-33	w.c. = 12.5%
					▽ 23' a.t.d.
	SAND with silt -driller added water	25'		21-50/6"	
	SAND with silt (SM, 24% silt)	30'		50/6"	w.c. = 9.9%
	SAND with silt	35'		12-34-50/4"	
	Poorly graded SAND (8' of heave after sampling)	40'		2-19-17	
		45'			

Boring Log B-3

5-15-2007

(Sheet 2 of 2)

Log	Soil Description	Depth	Sample	SPT
	NOTE: after sampling sand heaved in auger and plugged rods (8' heave); blows likely understated at 40 depth.	40'		
	Poorly graded SAND with silt; occ. gravel	45'	S-9	4-16-26
	Bottom of Boring at 46.5 feet Water encountered at ± 23 feet during drilling			
	Driller filled hole with bentonite chips	50'		
		55'		
		60'		
		65'		
		70'		
		75'		
		80'		
		85'		

Boring Log B-4

Elevation = $\pm 38'$

Log	Soil Description	Depth	Sample	SPT
	Loose, brown, silty SAND with organics; contains debris (FILL)			
		5'	S-1	5-6-5
	Med. dense, brown, silty SAND		S-2	10-12-12
	Med. dense, gray-brown, silty SAND with mottled streaks; moist			
	V. dense, gray brown, silty fine SAND with trace gravel	10'	S-3	13-23-34
	Dense, SAND with silt; wet -driller added water	15'	S-4	12-16-16
	-added drilling mud	20'	S-5	10-50/6"
	12" poorly graded SAND 3" gray silty SAND in tip		S-6	21-18-20
	Poorly graded SAND; 8" silty SAND in tip			
	Bottom of Boring at 24 feet depth	25'		
		30'		
		35'		
		40'	S-8	
		45'		

▽ 20' a.t.d. (estimated)

APPENDIX B

ANALYTICAL LABORATORY REPORTS



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

May 7, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1205-020

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on May 2, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read 'DB', with a long horizontal flourish extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: May 7, 2012
Samples Submitted: May 2, 2012
Laboratory Reference: 1205-020
Project: 6552

Case Narrative

Samples were collected on May 2, 2012 and received by the laboratory on May 2, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatograms for samples 3A and 102 are similar to mineral spirits.

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

Date of Report: May 7, 2012
 Samples Submitted: May 2, 2012
 Laboratory Reference: 1205-020
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	3A					
Laboratory ID:	05-020-01					
Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Toluene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
m,p-Xylene	4.2	1.0	EPA 8021	5-3-12	5-3-12	
o-Xylene	ND	5.0	EPA 8021	5-3-12	5-3-12	U1
Gasoline	1900	100	NWTPH-Gx	5-3-12	5-3-12	Z
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	89	73-121				
Client ID:	102					
Laboratory ID:	05-020-02					
Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Toluene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
m,p-Xylene	4.8	1.0	EPA 8021	5-3-12	5-3-12	
o-Xylene	ND	5.0	EPA 8021	5-3-12	5-3-12	U1
Gasoline	1700	200	NWTPH-Gx	5-3-12	5-3-12	Z
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	96	73-121				

Date of Report: May 7, 2012
 Samples Submitted: May 2, 2012
 Laboratory Reference: 1205-020
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0503A1					
Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Toluene	ND	1.0	EPA 8021	5-3-12	5-3-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-3-12	5-3-12	
m,p-Xylene	ND	1.0	EPA 8021	5-3-12	5-3-12	
o-Xylene	ND	5.0	EPA 8021	5-3-12	5-3-12	
Gasoline	ND	100	NWTPH-Gx	5-3-12	5-3-12	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	98	73-121				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-020-02							
	ORIG	DUP						
Benzene	ND	ND	NA	NA	NA	NA	NA	30
Toluene	ND	ND	NA	NA	NA	NA	NA	30
Ethyl Benzene	ND	ND	NA	NA	NA	NA	NA	30
m,p-Xylene	4.78	4.28	NA	NA	NA	NA	11	30
o-Xylene	ND	ND	NA	NA	NA	NA	NA	30
Gasoline	1710	1440	NA	NA	NA	NA	19	30
Surrogate:								
Fluorobenzene				96	95	73-121		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.

ND - Not Detected at PQL

PQL - Practical Quantitation Limit



RPD - Relative Percent Difference



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	Signature	Company	Date	Time	Comments/Special instructions
Relinquished		TAI	5/2/12	1610	Weight by volume
Received		Onsite	5-2-12	1610	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date	Reviewed/Date		Chromatograms with final report <input type="checkbox"/>		



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

May 16, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1205-063

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on May 8, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal stroke extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: May 16, 2012
Samples Submitted: May 8, 2012
Laboratory Reference: 1205-063
Project: 6552

Case Narrative

Samples were collected on May 8, 2012 and received by the laboratory on May 8, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatogram for sample 102 is similar to mineral spirits.

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

Date of Report: May 16, 2012
 Samples Submitted: May 8, 2012
 Laboratory Reference: 1205-063
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	102					
Laboratory ID:	05-063-01					
Benzene	ND	1.0	EPA 8021	5-9-12	5-9-12	
Toluene	ND	1.0	EPA 8021	5-9-12	5-9-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-9-12	5-9-12	
m,p-Xylene	3.4	1.0	EPA 8021	5-9-12	5-9-12	
o-Xylene	ND	5.0	EPA 8021	5-9-12	5-9-12	
Gasoline	2100	200	NWTPH-Gx	5-9-12	5-9-12	Z
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	96	73-121				

Date of Report: May 16, 2012
 Samples Submitted: May 8, 2012
 Laboratory Reference: 1205-063
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0509A1					
Benzene	ND	1.0	EPA 8021	5-9-12	5-9-12	
Toluene	ND	1.0	EPA 8021	5-9-12	5-9-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-9-12	5-9-12	
m,p-Xylene	ND	1.0	EPA 8021	5-9-12	5-9-12	
o-Xylene	ND	5.0	EPA 8021	5-9-12	5-9-12	
Gasoline	ND	100	NWTPH-Gx	5-9-12	5-9-12	
Surrogate:	Percent Recovery Control Limits					
Fluorobenzene	103	73-121				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	05-063-01									
	ORIG	DUP								
Benzene	ND	ND	NA	NA		NA	NA	NA	30	
Toluene	ND	ND	NA	NA		NA	NA	NA	30	
Ethyl Benzene	ND	ND	NA	NA		NA	NA	NA	30	
m,p-Xylene	3.45	3.44	NA	NA		NA	NA	0	30	
o-Xylene	ND	ND	NA	NA		NA	NA	NA	30	
Gasoline	2060	2050	NA	NA		NA	NA	0	30	
Surrogate:										
Fluorobenzene						96	101	73-121		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference



Page 1 of 1

[illegible]



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May 30, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1205-217

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on May 22, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read 'DB', with a long horizontal stroke extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: May 30, 2012
Samples Submitted: May 22, 2012
Laboratory Reference: 1205-217
Project: 6552

Case Narrative

Samples were collected on May 22, 2012 and received by the laboratory on May 22, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatogram for sample 102 is similar to mineral spirits.

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

Date of Report: May 30, 2012
 Samples Submitted: May 22, 2012
 Laboratory Reference: 1205-217
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	102					
Laboratory ID:	05-217-01					
Benzene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Toluene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-24-12	5-24-12	
m,p-Xylene	3.3	1.0	EPA 8021	5-24-12	5-24-12	
o-Xylene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Gasoline	2000	100	NWTPH-Gx	5-24-12	5-24-12	Z
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	89	73-121				

Date of Report: May 30, 2012
 Samples Submitted: May 22, 2012
 Laboratory Reference: 1205-217
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0524A1					
Benzene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Toluene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-24-12	5-24-12	
m,p-Xylene	ND	1.0	EPA 8021	5-24-12	5-24-12	
o-Xylene	ND	1.0	EPA 8021	5-24-12	5-24-12	
Gasoline	ND	100	NWTPH-Gx	5-24-12	5-24-12	
Surrogate:	Percent Recovery		Control Limits			
Fluorobenzene	93		73-121			

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-217-01							
	ORIG	DUP						
Benzene	ND	ND	NA	NA	NA	NA	30	
Toluene	ND	ND	NA	NA	NA	NA	30	
Ethyl Benzene	ND	ND	NA	NA	NA	NA	30	
m,p-Xylene	3.30	3.30	NA	NA	NA	0	30	
o-Xylene	ND	ND	NA	NA	NA	NA	30	
Gasoline	1980	1930	NA	NA	NA	3	30	
Surrogate:								
Fluorobenzene			89 94		73-121			



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference



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Page 1 of 1

Company:	Terra Associates
Project Number:	6552
Project Name:	
Project Manager:	Chuck Lie
Sampled by:	Nicolas R. Hoffman

[illegible]



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June 6, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1205-265

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on May 29, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal stroke extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: June 6, 2012
Samples Submitted: May 29, 2012
Laboratory Reference: 1205-265
Project: 6552

Case Narrative

Samples were collected on May 29, 2012 and received by the laboratory on May 29, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatogram for sample 102 is similar to mineral spirits.

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

Date of Report: June 6, 2012
 Samples Submitted: May 29, 2012
 Laboratory Reference: 1205-265
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	102					
Laboratory ID:	05-265-01					
Benzene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Toluene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-31-12	5-31-12	
m,p-Xylene	3.2	1.0	EPA 8021	5-31-12	5-31-12	
o-Xylene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Gasoline	2200	200	NWTPH-Gx	5-31-12	5-31-12	Z
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	96	73-121				

Date of Report: June 6, 2012
 Samples Submitted: May 29, 2012
 Laboratory Reference: 1205-265
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0531A1					
Benzene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Toluene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Ethyl Benzene	ND	1.0	EPA 8021	5-31-12	5-31-12	
m,p-Xylene	ND	1.0	EPA 8021	5-31-12	5-31-12	
o-Xylene	ND	1.0	EPA 8021	5-31-12	5-31-12	
Gasoline	ND	100	NWTPH-Gx	5-31-12	5-31-12	
Surrogate:	Percent Recovery Control Limits					
Fluorobenzene	95	73-121				
Laboratory ID:	MB0601A2					
Gasoline	ND	100	NWTPH-Gx	6-1-12	6-1-12	
Surrogate:	Percent Recovery Control Limits					
Fluorobenzene	89	73-121				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-265-01							
	ORIG	DUP						
Benzene	ND	ND	NA	NA	NA	NA	NA	30
Toluene	ND	ND	NA	NA	NA	NA	NA	30
Ethyl Benzene	ND	ND	NA	NA	NA	NA	NA	30
m,p-Xylene	3.20	3.20	NA	NA	NA	NA	0	30
o-Xylene	ND	ND	NA	NA	NA	NA	NA	30
Gasoline	2230	1790	NA	NA	NA	NA	22	30
Surrogate:								
Fluorobenzene				96	94	73-121		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.

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





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Page 1 of 1

Company:	Terra Associates
Project Number:	6552
Project Name:	
Project Manager:	Chuck Liv
Sampled by:	Nicholas Bluffman

[illegible]

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		WAT	5/29/12	12:15	Report results waight by volume
Received			5/29/12	12:15	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date	Reviewed/Date				Chromatograms with final report <input type="checkbox"/>



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

June 19, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1206-103

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on June 14, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "DB", followed by a long horizontal stroke that extends to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: June 19, 2012
Samples Submitted: June 14, 2012
Laboratory Reference: 1206-103
Project: 6552

Case Narrative

Samples were collected on June 14, 2012 and received by the laboratory on June 14, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatogram for sample 102 is similar to mineral spirits with diesel.

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

Date of Report: June 19, 2012
 Samples Submitted: June 14, 2012
 Laboratory Reference: 1206-103
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	102					
Laboratory ID:	06-103-01					
Benzene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Toluene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Ethyl Benzene	ND	1.0	EPA 8021	6-15-12	6-15-12	
m,p-Xylene	2.3	1.0	EPA 8021	6-15-12	6-15-12	
o-Xylene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Gasoline	1700	100	NWTPH-Gx	6-15-12	6-15-12	Z
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	92	71-116				

Date of Report: June 19, 2012
 Samples Submitted: June 14, 2012
 Laboratory Reference: 1206-103
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0615A1					
Benzene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Toluene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Ethyl Benzene	ND	1.0	EPA 8021	6-15-12	6-15-12	
m,p-Xylene	ND	1.0	EPA 8021	6-15-12	6-15-12	
o-Xylene	ND	1.0	EPA 8021	6-15-12	6-15-12	
Gasoline	ND	100	NWTPH-Gx	6-15-12	6-15-12	
Surrogate:	Percent Recovery Control Limits					
Fluorobenzene	91	71-116				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	06-103-01									
	ORIG	DUP								
Benzene	ND	ND	NA	NA		NA	NA	NA	30	
Toluene	ND	ND	NA	NA		NA	NA	NA	30	
Ethyl Benzene	ND	ND	NA	NA		NA	NA	NA	30	
m,p-Xylene	2.30	2.20	NA	NA		NA	NA	4	30	
o-Xylene	ND	ND	NA	NA		NA	NA	NA	30	
Gasoline	1680	1700	NA	NA		NA	NA	1	30	
Surrogate:										
Fluorobenzene						92	92	71-116		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits with diesel.

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



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Page 1 of 1

Company:		Project Number:		Project Name:		Project Manager:		Sampled by:														
Terra Associates		6552				Chuck Lie		Nicolas R. Hoffman														
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270C/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1631	% Moisture
1	102	6/14/12	7:30	Air	1	X																
Relinquished		Signature		Company		Date		Time		Comments/Special Instructions												
Received		Signature		Company		Date		Time		Comments/Special Instructions												
Relinquished		Signature		Company		Date		Time		Comments/Special Instructions												
Received		Signature		Company		Date		Time		Comments/Special Instructions												
Relinquished		Signature		Company		Date		Time		Comments/Special Instructions												
Received		Signature		Company		Date		Time		Comments/Special Instructions												
Reviewed/Date		Reviewed/Date		Chromatograms with final report <input type="checkbox"/>																		



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June 21, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1206-120

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on June 18, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "DB", followed by a horizontal line extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: June 21, 2012
Samples Submitted: June 18, 2012
Laboratory Reference: 1206-120
Project: 6552

Case Narrative

Samples were collected on June 18, 2012 and received by the laboratory on June 18, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX Analysis

The chromatogram for sample 101-103 is similar to mineral spirits.

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

Date of Report: June 21, 2012
 Samples Submitted: June 18, 2012
 Laboratory Reference: 1206-120
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	101-103					
Laboratory ID:	06-120-01					
Benzene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Toluene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Ethyl Benzene	ND	1.0	EPA 8021	6-19-12	6-19-12	
m,p-Xylene	3.7	1.0	EPA 8021	6-19-12	6-19-12	
o-Xylene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Gasoline	2300	200	NWTPH-Gx	6-19-12	6-19-12	Z
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	98	71-116				

Date of Report: June 21, 2012
 Samples Submitted: June 18, 2012
 Laboratory Reference: 1206-120
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0619A1					
Benzene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Toluene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Ethyl Benzene	ND	1.0	EPA 8021	6-19-12	6-19-12	
m,p-Xylene	ND	1.0	EPA 8021	6-19-12	6-19-12	
o-Xylene	ND	1.0	EPA 8021	6-19-12	6-19-12	
Gasoline	ND	100	NWTPH-Gx	6-19-12	6-19-12	
Surrogate:	Percent Recovery Control Limits					
Fluorobenzene	95	71-116				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	06-120-01									
	ORIG	DUP								
Benzene	ND	ND	NA	NA		NA	NA	NA	30	
Toluene	ND	ND	NA	NA		NA	NA	NA	30	
Ethyl Benzene	ND	ND	NA	NA		NA	NA	NA	30	
m,p-Xylene	3.70	3.40	NA	NA		NA	NA	8	30	
o-Xylene	ND	ND	NA	NA		NA	NA	NA	30	
Gasoline	2270	2270	NA	NA		NA	NA	0	30	
Surrogate:										
Fluorobenzene						98	95	71-116		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.

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





Chain of Custody

Page 1 of 1

Company:	Terra Associates
Project Number:	6552
Project Name:	
Project Manager:	Chuck Lie
Sampled by:	Nicholas R. Hoffman

[illegible]

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		TAI	6/18/12	10:40	
Received		OSE	6/18/12	1040	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date	Reviewed/Date		Chromatograms with final report <input type="checkbox"/>		



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July 31, 2012

Chuck Lie
Terra Associates, Inc.
12525 Willows Road, Suite 101
Kirkland, WA 98034

Re: Analytical Data for Project 6552
Laboratory Reference No. 1207-210

Dear Chuck:

Enclosed are the analytical results and associated quality control data for samples submitted on July 26, 2012.

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

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

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal flourish extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: July 31, 2012
Samples Submitted: July 26, 2012
Laboratory Reference: 1207-210
Project: 6552

Case Narrative

Samples were collected on July 26, 2012 and received by the laboratory on July 26, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH Gx/BTEX (air) Analysis

The chromatogram for sample 101-103 is similar to mineral spirits.

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

Date of Report: July 31, 2012
 Samples Submitted: July 26, 2012
 Laboratory Reference: 1207-210
 Project: 6552

NWTPH-Gx/BTEX

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	101-103					
Laboratory ID:	07-210-01					
Benzene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Toluene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Ethyl Benzene	ND	1.0	EPA 8021	7-27-12	7-27-12	
m,p-Xylene	2.9	1.0	EPA 8021	7-27-12	7-27-12	
o-Xylene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Gasoline	1700	100	NWTPH-Gx	7-27-12	7-27-12	Z
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	101	71-116				

Date of Report: July 31, 2012
 Samples Submitted: July 26, 2012
 Laboratory Reference: 1207-210
 Project: 6552

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Air
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0727A1					
Benzene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Toluene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Ethyl Benzene	ND	1.0	EPA 8021	7-27-12	7-27-12	
m,p-Xylene	ND	1.0	EPA 8021	7-27-12	7-27-12	
o-Xylene	ND	1.0	EPA 8021	7-27-12	7-27-12	
Gasoline	ND	100	NWTPH-Gx	7-27-12	7-27-12	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	105	71-116				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-210-01							
	ORIG	DUP						
Benzene	ND	ND	NA	NA	NA	NA	30	
Toluene	ND	ND	NA	NA	NA	NA	30	
Ethyl Benzene	ND	ND	NA	NA	NA	NA	30	
m,p-Xylene	2.90	2.60	NA	NA	NA	11	30	
o-Xylene	ND	ND	NA	NA	NA	NA	30	
Gasoline	1700	1670	NA	NA	NA	2	30	Z
Surrogate:								
Fluorobenzene				101	105	71-116		



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z - The sample chromatogram is similar to mineral spirits.
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference



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[illegible]

Signature	Company	Date	Time	Comments/Special instructions
Relinquished	TAI	7/26/12	13:56	
Received	ASITP	7/26/12	13:58	
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date	Reviewed/Date	Chromatograms with final report <input type="checkbox"/>		