

TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

June 5, 2023
Project No. T-8832-1

DRAFT

Mr. Wes Giesbrecht
Atlin Investments
P.O. Box 791
Mercer Island, Washington 98040

Subject: Tacoma Smelter Plume Site Assessment
Saintfield Property
7414-78th Avenue Southeast
Mercer Island, Washington
King County Tax Parcel 2524049075

Dear Mr. Giesbrecht:

We have completed our assessment of the project site for impacts from the Tacoma Smelter Plume.

We understand that the current project involves the development of the site into a new 4-lot short plat for the construction of single-family residences. The site covers 1.58 acres.

SCOPE OF WORK

We followed the procedures described in Ecology Publication 19-09-101, Asarco Tacoma Smelter Site-Model Remedies Plan for the Tacoma Smelter Plume.

To determine the actual levels of arsenic, we divided the site into two Decision Units. These Decision Units are based upon historical land use and proposed land use.

The Decision Units consist of the following:

Decision Unit	Predominant land cover	Proposed land use	Acreage
DU-A	Lawn and Driveway	Redeveloped	0.58
DU-B	Forest	Redeveloped	1.0

In Decision Unit A, soil samples were collected for lead and arsenic analysis at a total of 11 locations. We sampled the upper six inches of soil at all locations. At one-fourth of the locations, we sampled from 6- to 12-inches-deep. No significant amounts of duff were observed in Decision Unit A

In Decision Unit B, soil samples were collected for lead and arsenic analysis at a total of 16 locations. We sampled the upper six inches of soil at all locations. At one-fourth of the locations, we sampled from 6- to 12-inches-deep. Two composite duff samples were collected from Decision Unit B.

PROJECT DESCRIPTION

The project site consists of a 1.58-acre tax parcel located at 7414 78th Avenue Southeast, on the southern portion of Mercer Island.

Roughly the western one-third of the parcel is covered by a single-family residence, gravel driveways, grass lawn, and ornamental landscaping. The western two-thirds of the parcel is covered by forest consisting of a mixture of deciduous and evergreen trees with a moderately thick understory.

The approximate location of the property is shown in Figure 1. Figure 2 is a Sample Location Plan showing existing site conditions.

The soils observed in subsurface explorations for our prior geotechnical study generally consist of a thin layer of topsoil overlying glacial deposits consisting primarily of silty sand with gravel. The upper approximately four to five feet of the native soils are typically medium dense weathered glacial till, and overly dense to very dense unweathered glacial till.

The *Geologic Map of Mercer Island, Washington*, by K.G. Troost and A.P. Wisher (2006) shows the site soils mapped as Vashon till (Qvt). The dense to very dense, cemented soils observed in our subsurface explorations are generally consistent with this geologic map unit.

Based on available topographic information, our field observations, and our local experience, groundwater will have a general flow direction towards the west. No shallow perched groundwater was found in the five test pits advanced as part of our prior geotechnical study. Local variations in groundwater gradients will occur as a result of man-made features, such as drainage ditches, sewers, and roads. The topography of the parcel slopes gently to the west with about 30 feet of overall relief.

INITIAL SAMPLING

Soil sampling was conducted on May 16, 2023. For the sampling event, samples were obtained from a grid pattern superimposed on each of the two decision units for the site. Sample locations were offset around the existing residence and gravel driveway present within Decision Unit A. Soil was sampled at a total of 27 locations. Two composite duff samples, comprised of six subsamples each, were collected from Decision Unit B. A total of 35 individual samples were analyzed for lead and arsenic. Sampling proceeded in general accordance with Ecology Publication 19-09-101.

The sample locations are presented in Figure 2 attached to this report.

The samples were placed into laboratory prepared glassware. Chain of custody protocols were followed for all samples. At the lab, the samples were prepared for analysis by sieving the samples through a 2mm (US No. 10) sieve to remove gravel. The test results for all samples are attached in Appendix A.

SAMPLE RESULTS

The results of the current sampling are presented on Tables 1 and 2 attached to this report.

Decision Unit A (DU-A)

DU-A was comprised of disturbed ground that has been cleared in the past. As shown on Table 1, arsenic concentrations range from 8.5 to 81 mg/kg in the 0- to 6-inch interval. The average arsenic concentration in the 0- to 6-inch interval is 18.6 mg/kg. Arsenic was not detected at the laboratory practical quantitation limits (PQLs) in any of the samples collected from 6-12 inches in DU-A. The average arsenic concentration for DU-A at both depths is below the MTCA Method A cleanup level of 20 mg/kg. The lead levels in the soil samples ranged from 9.8 to 77 mg/kg in the 0- to 6 inch interval. The average lead level in the 0 to 6-inch depth is 30.2 mg/kg. Lead was not detected in the samples collected from 6- to 12 inches at the laboratory PQLs. The average lead levels for both depths in DU-A are below the MTCA Method A cleanup level of 250 mg/kg.

Decision Unit B (DU-B)

DU-B was comprised primarily of undisturbed ground. As shown on Table 2A, arsenic concentrations ranged from 2.9 to 18 mg/kg. The average concentration of arsenic in the 0- to 6-inch interval is 11.47 mg/kg. The average arsenic concentration in the 6- to 12-inch depth is 5.1 mg/kg. The average arsenic for both depths in DU-B were below the MTCA Method A cleanup value of 20 mg/kg. Lead concentrations in soil samples in DU-B ranged from 6.8 to 59 mg/kg. The average lead concentration in the 0- to 6-inch depth is 31.8 mg/kg. The average lead level in the 6- to 12-inch depth is 14.12 mg/kg. The average lead levels for both depths in DU-B are all below the MTCA Method A cleanup level of 250 mg/kg.

Mr. Wes Giesbrecht
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The concentrations of arsenic in the composite duff samples ranged from 12 to 16 mg/kg with an average concentration of 14 mg/kg. The levels of lead ranged from 38 to 55 mg/kg with an average concentration of 46.5 mg/kg.

DISCUSSION

Decision Unit A (DU-A)

Based on the levels of arsenic in the upper 0 to 6-inch levels documented in Table 1, it is our opinion the DU-A portion of the site qualifies for the soil mixing option discussed in the TSP Model Remedies Guidance, Ecology Publication 12-09-086A.

Sample A-9, at the 0 to 6-inch interval, was the only sample collected containing elevated arsenic. It is our understanding that a large tree will be retained in the vicinity of sample location A-9. Mixing, using traditional heavy equipment, may not be feasible in this area to protect the existing root structure of the tree. Mixing in this area can be achieved by raking in clean import material with the existing soil using hand tools.

Confirmation sampling for mixed soil areas will need to be conducted at the same frequency utilized for the initial sample grid in Decision Unit A.

Decision Unit B (DU-B)

Based on the testing discussed above and documented in Tables 2 and 2A, it is our opinion that no special procedures are needed in DU-B.

General

Following the guidelines established in Ecology Publication 19-09-101, no elevated arsenic or lead related to the TSP was identified in either of the two Decision Units except for the 0 to 6-inch sample collected in DU-A at location A-9 (81 mg/kg arsenic). The average concentrations of arsenic and lead in both depth intervals and duff are all below the applicable MTCA Method A cleanup levels of 20 mg/kg and 250 kg, respectively. Per the guidance provided in the above noted Ecology publication, the concentration of arsenic in sample A-9 is more than twice the cleanup value and is considered elevated.

For imported samples that do not have a documented clean source, a minimum of three composite samples should be taken from each stockpile. Each composite sample should consist of three subsamples.

We can work with your grading contractor to review their proposed means and methods, verify that the field blending depths are sufficient, and to provide field sampling services to obtain the specified number of final confirmation samples to verify the blending was successful.

Mr. Wes Giesbrecht
June 5, 2023

LIMITATIONS

The findings, conclusions, and recommendations presented in this report are our professional opinions based on our documented site observations, our review of current Ecology guidelines, our recent local experience, and the analytical testing summarized in this report. Other information related to past site uses or current site conditions may exist.

If further information on the site becomes available, Terra Associates, Inc. should review the information, as it may affect our conclusions.

We prepared our conclusions and recommendations in general accordance with current guidance from Ecology and generally accepted local professional engineering practices in use at this time. We make no other warranty, either expressed, or implied. This letter is the copyrighted property of Terra Associates, Inc. and is for the specific application to the Saintfield Property project in Mercer Island, Washington. This letter is for the exclusive use of Atlin Investments and their authorized representatives.

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

Sincerely yours,
TERRA ASSOCIATES, INC.

DRAFT

Nick Hoffman, L.G.
Senior Project Geologist
Environmental Professional

Attachments: Table 1 – Analytical Test Result Summary DU-A
Table 2A and 2B – Analytical Test Result Summary-DU-B
Figure 1 – Vicinity Map
Figure 2 – Sample Location Sketch
Appendix A – Analytical Test Report

Table 1
Decision Unit A
Analytical Test Result Summary

Sample Location	Depth (inches)	As (mg/kg)	Pb (mg/kg)
A-1	0-6	18	48
A-2	0-6	12	24
A-3	0-6	16	46
A-4	0-6	9.3	22
	6-12	2.8U	5.6U
A-5	0-6	13	27
A-6	0-6	11	9.8
A-7	0-6	16	23
A-8	0-6	8.5	18
	6-12	3.1U	6.2U
A-9	0-6	81	77
A-10	0-6	8.5	22
A-11	0-6	11	20
<i>Average Arsenic 0-6"</i>		<i>18.6</i>	<i>30.6</i>
<i>Average Arsenic 6-12"</i>		<i>2.95</i>	<i>5.9</i>
MTCA Method A		20	250

Notes: U modifier indicates analyte not detected as the laboratory practical quantitation Limit (PQL).

All samples analyzed utilizing method EPA 6010D.

All units are in milligrams per kilogram (mg/kg).

Shaded cells exceed MTCA Method A cleanup value.

All depths are in inches below existing grade.

Values in italics are average values.

Table 2A
Decision Unit B
Analytical Test Result Summary

Sample Location	Depth (inches)	As (mg/kg)	Pb (mg/kg)
B-1	0-6	18	55
B-2	0-6	11	13
B-3	0-6	5.6	7.2
B-4	0-6	17	42
	6-12	3.4U	6.8U
B-5	0-6	14	42
B-6	0-6	5.2	13
B-7	0-6	3.5	12
B-8	0-6	13	37
	6-12	3.1U	6.9
B-9	0-6	7.8	16
B-10	0-6	17	59
B-11	0-6	17	57
B-12	0-6	10	30
	6-12	11	32
B-13	0-6	3.2U	12
B-14	0-6	18	43
B-15	0-6	11	32
B-16	0-6	12	39
	6-12	2.9U	11
<i>Average Arsenic 0-6"</i>		<i>11.5</i>	<i>31.8</i>
<i>Average Arsenic 6-12"</i>		<i>5.1</i>	<i>14.2</i>
MTCA Method A		20	250

Notes: U modifier indicates analyte not detected as the laboratory practical quantitation Limit (PQL).

All samples analyzed utilizing method EPA 6010D.

All units are in milligrams per kilogram (mg/kg).

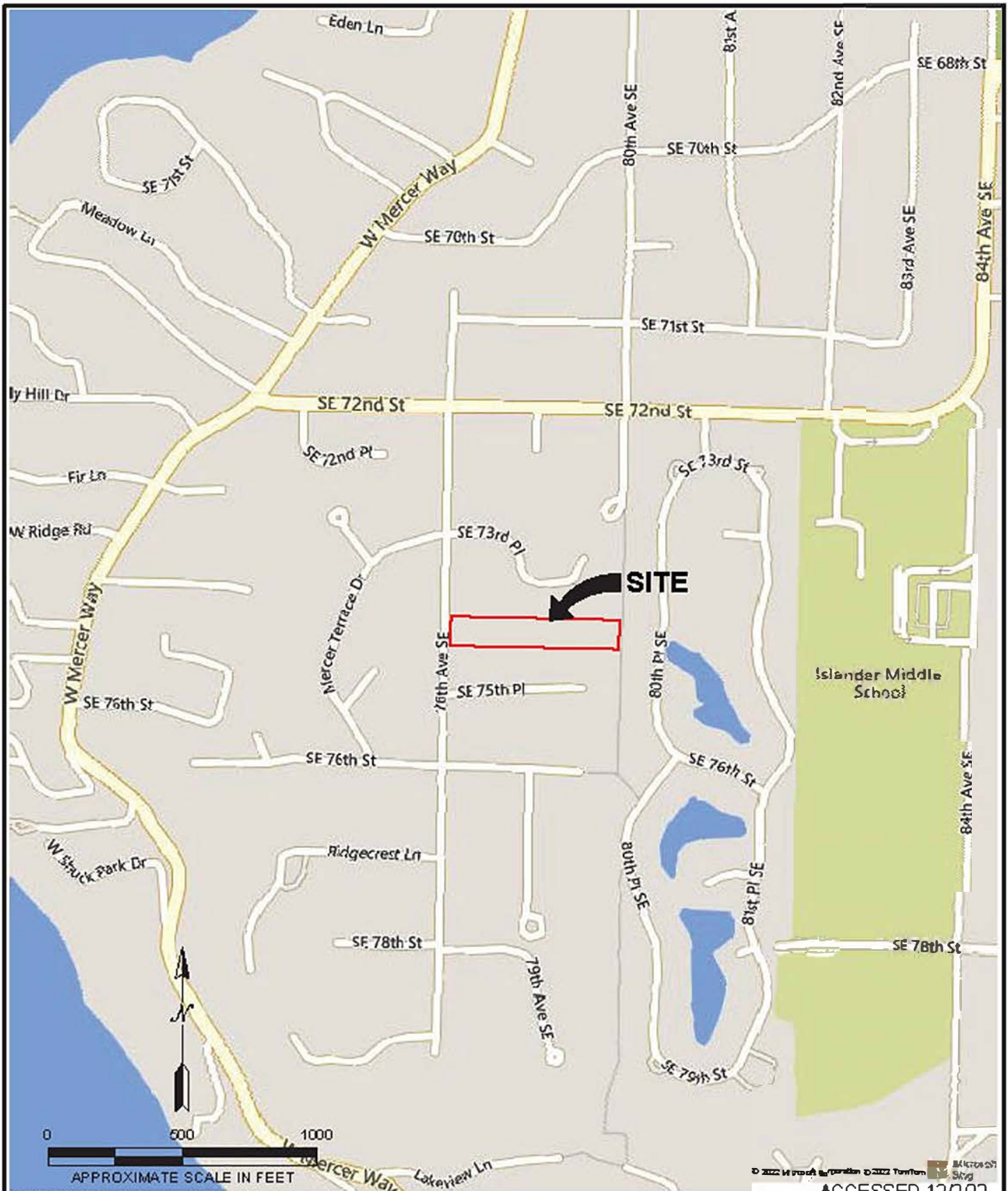
All depths are in inches below existing grade.

Values in italics are average values.

Table 2B
Duff
Decision Unit B

Sample Location	Arsenic	Lead
B Duff-1	16	55
B Duff-2	12	38
<i>Average</i>	14	46.5
MTCA	20	250

Notes: All depths are in inches below existing grades.
All sample results are in mg/kg.
Shaded cells exceed MTCA Method A cleanup value.
Values in Italics are average values.



REFERENCE: <https://www.bing.com/maps>

ACCESSSED 12/2/22



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 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

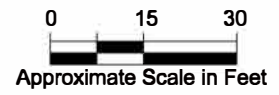
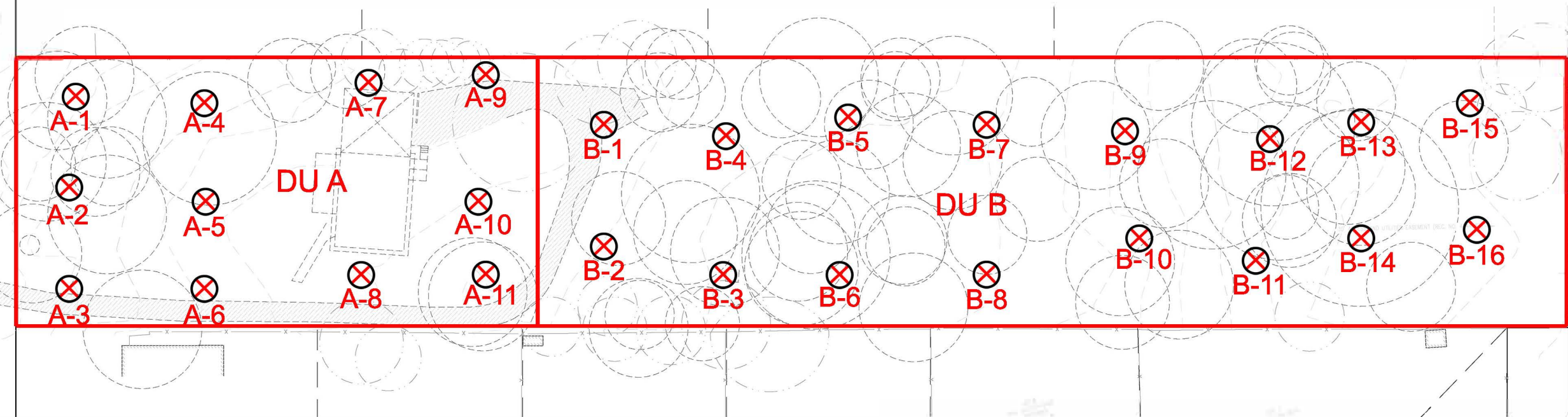
VICINITY MAP
 78TH AVENUE SHORT PLAT
 MERCER ISLAND, WASHINGTON

Proj. No. T-8832-1 Date: JUNE 2023

Figure 1



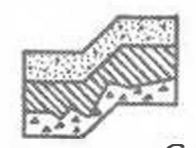
78th Avenue Southeast



KEY

 Approximate Sample Location

NOTE:
THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.



TERRA ASSOCIATES

Geotechnical Consultants

**SAMPLE LOCATION PLAN
SAINTFIELD PROPERTY
MERCER ISLAND, WASHINGTON**

Proj. No. T-8832-1 | Date JUNE 2023 | Figure 2

APPENDIX A

ANALYTICAL TEST REPORT



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

May 25, 2023

Nick Hoffman
Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Re: Analytical Data for Project 8832-1
Laboratory Reference No. 2305-170

Dear Nick:

Enclosed are the analytical results and associated quality control data for samples submitted on May 16, 2023.

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



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

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: May 25, 2023
Samples Submitted: May 16, 2023
Laboratory Reference: 2305-170
Project: 8832-1

Case Narrative

Samples were collected on May 16, 2023 and received by the laboratory on May 16, 2023. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Total Metals EPA 6010D Analysis

Samples were sieved through a 2mm sieve prior to digestion and percent moisture determination.

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 25, 2023
 Samples Submitted: May 16, 2023
 Laboratory Reference: 2305-170
 Project: 8832-1

**TOTAL METALS
 EPA 6010D**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	A-1 0-6"					
Laboratory ID:	05-170-01					
Arsenic	18	3.4	EPA 6010D	5-22-23	5-22-23	
Lead	48	6.9	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-2 0-6"					
Laboratory ID:	05-170-02					
Arsenic	12	3.3	EPA 6010D	5-22-23	5-22-23	
Lead	24	6.5	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-3 0-6"					
Laboratory ID:	05-170-03					
Arsenic	16	4.0	EPA 6010D	5-22-23	5-22-23	
Lead	46	8.0	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-4 0-6"					
Laboratory ID:	05-170-04					
Arsenic	9.3	3.0	EPA 6010D	5-22-23	5-22-23	
Lead	22	6.0	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-4 6-12"					
Laboratory ID:	05-170-05					
Arsenic	ND	2.8	EPA 6010D	5-22-23	5-22-23	
Lead	ND	5.6	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-5 0-6"					
Laboratory ID:	05-170-06					
Arsenic	13	3.2	EPA 6010D	5-22-23	5-22-23	
Lead	27	6.3	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-6 0-6"					
Laboratory ID:	05-170-07					
Arsenic	11	3.0	EPA 6010D	5-22-23	5-22-23	
Lead	9.8	6.1	EPA 6010D	5-22-23	5-22-23	



Date of Report: May 25, 2023
 Samples Submitted: May 16, 2023
 Laboratory Reference: 2305-170
 Project: 8832-1

**TOTAL METALS
 EPA 6010D**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	A-7 0-6"					
Laboratory ID:	05-170-08					
Arsenic	16	2.9	EPA 6010D	5-22-23	5-22-23	
Lead	23	5.9	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-8 0-6"					
Laboratory ID:	05-170-09					
Arsenic	8.5	3.1	EPA 6010D	5-22-23	5-22-23	
Lead	18	6.3	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-8 6-12"					
Laboratory ID:	05-170-10					
Arsenic	ND	3.1	EPA 6010D	5-22-23	5-22-23	
Lead	ND	6.2	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-9 0-6"					
Laboratory ID:	05-170-11					
Arsenic	81	3.5	EPA 6010D	5-22-23	5-22-23	
Lead	77	7.1	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-10 0-6"					
Laboratory ID:	05-170-12					
Arsenic	8.5	3.3	EPA 6010D	5-22-23	5-22-23	
Lead	22	6.7	EPA 6010D	5-22-23	5-22-23	

Client ID:	A-11 0-6"					
Laboratory ID:	05-170-13					
Arsenic	11	3.4	EPA 6010D	5-22-23	5-22-23	
Lead	20	6.8	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-1 0-6"					
Laboratory ID:	05-170-14					
Arsenic	18	3.7	EPA 6010D	5-22-23	5-22-23	
Lead	55	7.5	EPA 6010D	5-22-23	5-22-23	



Date of Report: May 25, 2023
 Samples Submitted: May 16, 2023
 Laboratory Reference: 2305-170
 Project: 8832-1

**TOTAL METALS
 EPA 6010D**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	B-2 0-6"					
Laboratory ID:	05-170-15					
Arsenic	11	3.1	EPA 6010D	5-22-23	5-22-23	
Lead	13	6.2	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-3 0-6"					
Laboratory ID:	05-170-16					
Arsenic	5.6	3.3	EPA 6010D	5-22-23	5-22-23	
Lead	7.2	6.5	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-4 0-6"					
Laboratory ID:	05-170-17					
Arsenic	17	3.5	EPA 6010D	5-22-23	5-22-23	
Lead	42	6.9	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-4 6-12"					
Laboratory ID:	05-170-18					
Arsenic	ND	3.4	EPA 6010D	5-22-23	5-22-23	
Lead	ND	6.8	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-5 0-6"					
Laboratory ID:	05-170-19					
Arsenic	14	5.0	EPA 6010D	5-22-23	5-22-23	
Lead	42	10	EPA 6010D	5-22-23	5-22-23	

Client ID:	B-6 0-6"					
Laboratory ID:	05-170-20					
Arsenic	5.2	3.4	EPA 6010D	5-23-23	5-24-23	
Lead	13	6.8	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-7 0-6"					
Laboratory ID:	05-170-21					
Arsenic	3.5	3.2	EPA 6010D	5-23-23	5-24-23	
Lead	12	6.3	EPA 6010D	5-23-23	5-24-23	



Date of Report: May 25, 2023
 Samples Submitted: May 16, 2023
 Laboratory Reference: 2305-170
 Project: 8832-1

**TOTAL METALS
 EPA 6010D**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	B-8 0-6"					
Laboratory ID:	05-170-22					
Arsenic	13	3.3	EPA 6010D	5-23-23	5-24-23	
Lead	37	6.7	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-8 6-12"					
Laboratory ID:	05-170-23					
Arsenic	ND	3.1	EPA 6010D	5-23-23	5-24-23	
Lead	6.9	6.1	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-9 0-6"					
Laboratory ID:	05-170-24					
Arsenic	7.8	3.0	EPA 6010D	5-23-23	5-24-23	
Lead	16	6.0	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-10 0-6"					
Laboratory ID:	05-170-25					
Arsenic	17	3.3	EPA 6010D	5-23-23	5-24-23	
Lead	59	6.6	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-11 0-6"					
Laboratory ID:	05-170-26					
Arsenic	17	3.6	EPA 6010D	5-23-23	5-24-23	
Lead	57	7.1	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-12 0-6"					
Laboratory ID:	05-170-27					
Arsenic	10	3.4	EPA 6010D	5-23-23	5-24-23	
Lead	30	6.9	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-12 6-12"					
Laboratory ID:	05-170-28					
Arsenic	11	3.2	EPA 6010D	5-23-23	5-24-23	
Lead	32	6.3	EPA 6010D	5-23-23	5-24-23	



Date of Report: May 25, 2023
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**TOTAL METALS
 EPA 6010D**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	B-13 0-6"					
Laboratory ID:	05-170-29					
Arsenic	ND	3.2	EPA 6010D	5-23-23	5-24-23	
Lead	12	6.4	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-14 0-6"					
Laboratory ID:	05-170-30					
Arsenic	18	3.1	EPA 6010D	5-23-23	5-24-23	
Lead	43	6.2	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-15 0-6"					
Laboratory ID:	05-170-31					
Arsenic	11	3.1	EPA 6010D	5-23-23	5-24-23	
Lead	32	6.3	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-16 0-6"					
Laboratory ID:	05-170-32					
Arsenic	12	3.3	EPA 6010D	5-23-23	5-24-23	
Lead	39	6.6	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-16 6-12"					
Laboratory ID:	05-170-33					
Arsenic	ND	2.9	EPA 6010D	5-23-23	5-24-23	
Lead	11	5.9	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-Duff1					
Laboratory ID:	05-170-34					
Arsenic	16	3.8	EPA 6010D	5-23-23	5-24-23	
Lead	55	7.6	EPA 6010D	5-23-23	5-24-23	

Client ID:	B-Duff2					
Laboratory ID:	05-170-35					
Arsenic	12	2.9	EPA 6010D	5-23-23	5-24-23	
Lead	38	5.9	EPA 6010D	5-23-23	5-24-23	



Date of Report: May 25, 2023
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**TOTAL METALS
 EPA 6010D
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0522SM1					
Arsenic	ND	2.5	EPA 6010D	5-22-23	5-22-23	
Lead	ND	5.0	EPA 6010D	5-22-23	5-22-23	
METHOD BLANK						
Laboratory ID:	MB0523SM3					
Arsenic	ND	2.5	EPA 6010D	5-23-23	5-24-23	
Lead	ND	5.0	EPA 6010D	5-23-23	5-24-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-170-01							
	ORIG	DUP						
Arsenic	13.1	14.2	NA	NA	NA	NA	8	20
Lead	34.9	35.2	NA	NA	NA	NA	1	20
DUPLICATE								
Laboratory ID:	05-170-20							
	ORIG	DUP						
Arsenic	3.87	3.37	NA	NA	NA	NA	14	20
Lead	9.90	10.4	NA	NA	NA	NA	4	20

MATRIX SPIKES

Laboratory ID:	05-170-01									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	107	105	100	100	13.1	93	92	75-125	2	20
Lead	275	270	250	250	34.9	96	94	75-125	2	20
MATRIX SPIKES										
Laboratory ID:	05-170-20									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	87.8	86.9	100	100	3.87	84	83	75-125	1	20
Lead	245	243	250	250	9.90	94	93	75-125	1	20



Date of Report: May 25, 2023
 Samples Submitted: May 16, 2023
 Laboratory Reference: 2305-170
 Project: 8832-1

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
A-1 0-6"	05-170-01	27	5-19-23
A-2 0-6"	05-170-02	24	5-19-23
A-3 0-6"	05-170-03	37	5-19-23
A-4 0-6"	05-170-04	16	5-19-23
A-4 6-12"	05-170-05	11	5-19-23
A-5 0-6"	05-170-06	21	5-19-23
A-6 0-6"	05-170-07	18	5-19-23
A-7 0-6"	05-170-08	15	5-19-23
A-8 0-6"	05-170-09	20	5-19-23
A-8 6-12"	05-170-10	19	5-19-23
A-9 0-6"	05-170-11	29	5-19-23
A-10 0-6"	05-170-12	25	5-19-23
A-11 0-6"	05-170-13	27	5-19-23
B-1 0-6"	05-170-14	33	5-19-23
B-2 0-6"	05-170-15	20	5-19-23
B-3 0-6"	05-170-16	23	5-19-23
B-4 0-6"	05-170-17	28	5-19-23
B-4 6-12"	05-170-18	26	5-19-23
B-5 0-6"	05-170-19	50	5-19-23
B-6 0-6"	05-170-20	26	5-19-23
B-7 0-6"	05-170-21	21	5-19-23
B-8 0-6"	05-170-22	25	5-19-23
B-8 6-12"	05-170-23	18	5-19-23
B-9 0-6"	05-170-24	17	5-19-23
B-10 0-6"	05-170-25	24	5-22-23
B-11 0-6"	05-170-26	30	5-22-23
B-12 0-6"	05-170-27	27	5-22-23



Date of Report: May 25, 2023
Samples Submitted: May 16, 2023
Laboratory Reference: 2305-170
Project: 8832-1

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
B-12 6-12"	05-170-28	21	5-22-23
B-13 0-6"	05-170-29	22	5-22-23
B-14 0-6"	05-170-30	20	5-22-23
B-15 0-6"	05-170-31	20	5-22-23
B-16 0-6"	05-170-32	24	5-22-23
B-16 6-12"	05-170-33	15	5-22-23
B-Duff1	05-170-34	34	5-22-23
B-Duff2	05-170-35	15	5-22-23





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.
 - X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.
 - X2 - Sample extract treated with a silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference



Chain of Custody

Company: **TERRA ASSOCIATES INC. (TAI)**

Project Number: **8832-1**

Project Name:

Project Manager: **NICK HOFFMAN**

Sampled by: **MAX PRICE**

Turnaround Request (in working days)

(Check One)

Same Day 1 Day

2 Days 3 Days

Standard (7 Days)

_____ (other)

Laboratory Number: **05-170**

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	A-1 0-6"	5/16/23	940	S	1
2	A-2 0-6"		950		
3	A-3 0-6"		955		
4	A-4 0-6"		1005		
5	A-4 6-12"		1010		
6	A-5 0-6"		1015		
7	A-6 0-6"		1020		
8	A-7 0-6"		1025		
9	A-8 0-6"		1035		
10	A-8 6-12"		1040		

NWTPH-HCID	NWTPH-Gv/BTEX (802) <input type="checkbox"/> 8260 <input type="checkbox"/>	NWTPH-Gx	NWTPH-Dx (SG Clean-up) <input type="checkbox"/>	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	% Moisture
																	X
																	X

Signature	Company	Date	Time	Comments/Special Instructions	
<i>Max Price</i>	TAI	5/16/23	1440	KING CO. PROTOCOLS	
<i>Nick Hoffman</i>	O&E	5/16/23	1440		
Reviewed/Date				Reviewed/Date	Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>

Data Package: Standard Level III Level IV

Chain of Custody

Company: **TERRA ASSOCIATES INC (TAI)**

Project Number: **8832-1**

Project Name:

Project Manager: **NICK HOFFMAN**

Sampled by: **MAX PRICE**

Turnaround Request (in working days)

(Check One)

Same Day 1 Day

2 Days 3 Days

Standard (7 Days)

_____ (other)

Laboratory Number: 05-170

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
11	A-9 0-6"	5/16/23	1050	S	1
12	A-10 0-6"	↓	1055	↓	↓
13	A-11 0-6"	↓	1100	↓	↓
14	B-1 0-6"	↓	1110	↓	↓
15	B-2 0-6"	↓	1120	↓	↓
16	B-3 0-6"	↓	1125	↓	↓
17	B-4 0-6"	↓	1135	↓	↓
18	B-4 6-12"	↓	1140	↓	↓
19	B-5 0-6"	↓	1150	↓	↓
20	B-6 0-6"	↓	1155	↓	↓

NWTPH-HCID	NWTPH-Gx/BTEX (8021 <input type="checkbox"/> 8260 <input type="checkbox"/>)	NWTPH-Gx	NWTPH-Dx (SG Clean-up <input type="checkbox"/>)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Arsenic + Lead	% Moisture
																	X	X

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	<i>Max Price</i>	TAI	5/16/23	1440	KING CO. PROTOCOLS
Received	<i>Nichelle Bohner</i>	OSE	5/16/23	1440	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date		Reviewed/Date			Data Package: Standard <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/>
					Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>

Chain of Custody

Company: **TERRA ASSOCIATES INC (TAI)**

Project Number: **8832-1**

Project Name:

Project Manager: **NICK HOFFMAN**

Sampled by: **MAX PRICE**

Turnaround Request (in working days)

(Check One)

Same Day 1 Day

2 Days 3 Days

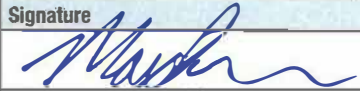

Standard (7 Days)

_____ (other)

Laboratory Number: 05-170

Lab ID	Sample Identification	Date		Matrix	Number of Containers
		Sampled	Time Sampled		
21	B-7 0-6"	5/16/23	1205	S	1
22	B-8 0-6"		1215		
23	B-8 6-12"		1220		
24	B-9 0-6"		1230		
25	B-10 0-6"		1235		
26	B-11 0-6"		1250		
27	B-12 0-6"		1255		
28	B-12 6-12"		1300		
29	B-13 0-6"		1310		
30	B-14 0-6"		1320		

NWTPH-HCID	NWTPH-Gx/BTEX (8021) <input type="checkbox"/> 8260 <input type="checkbox"/>	NWTPH-Gx	NWTPH-Dx (SG Clean-up) <input type="checkbox"/>	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total FCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	% Moisture	
																	X	X

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		TAI	5/16/23	1440	KING Co. PROTOCOLS
Received		OSE	5/16/23	1440	
Relinquished					
Received					
Relinquished					
Received					Data Package: Standard <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/>
Reviewed/Date		Reviewed/Date			Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>

Chain of Custody

Company: **TERRA ASSOCIATES Inc (TAI)**
 Project Number: **8832-1**
 Project Name:
 Project Manager: **NICK HOFFMAN**
 Sampled by: **MAX PRICE**

Turnaround Request (in working days)
 (Check One)
 Same Day 1 Day
 2 Days 3 Days
 Standard (7 Days)
 _____ (other)

Laboratory Number: **05-170**

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
31	B-15 0-6"	5/16/23	1325	S	1
32	B-16 0-6"		1335		
33	B-16 6-12"		1345		
34	B-Duff 1		1355		
35	B-Duff 2	↓	1400	↓	↓

NWTPH-HCID	NWTPH-GV/BTEX (802) <input type="checkbox"/> 8260 <input type="checkbox"/>	NWTPH-Gx	NWTPH-Dx (SG Clean-up) <input type="checkbox"/>	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	% Moisture
																	X

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	<i>[Signature]</i>	TAI	5/16/23	1440	KING CO. PROTOCOLS
Received	<i>Nichelle [Signature]</i>	OSIE	5/16/23	1440	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date		Reviewed/Date			Data Package: Standard <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/> Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>