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TECHNICAL MEMORANDUM

Date: June 30, 2016

To: Nancy Stachey, City of Seattle – FAS, Property Management

From: Bruce Carpenter, Herrera Environmental Consultants

Subject: Waterway #20 Upland Soil Sampling

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Introduction

Waterway #20 (WW20) is located on Lake Union west of Gas Works Park in Seattle, Washington. The property is presently owned by the State of Washington Department of Natural Resources (DNR) and used by Seattle Police Department Harbor Patrol (HP). Use of the property by HP must be authorized by DNR pursuant to the terms and conditions of DNR's "Waterway Use Permit" (Permit) in accordance with Chapter 79.120 of the Revised Code of

Washington (RCW). One of the Permit conditions is for the City of Seattle to provide DNR with sediment-sampling data for the filled portion of WW20.

Herrera Environmental Consultants, Inc. (Herrera) conducted upland sediment (soil) sampling at Waterway #20 (WW20) in Seattle, Washington (Figure 1). The work was conducted for the City of Seattle, Department of Finance and Administrative Services (FAS) under Agreement FAS-2015-060.

Methods

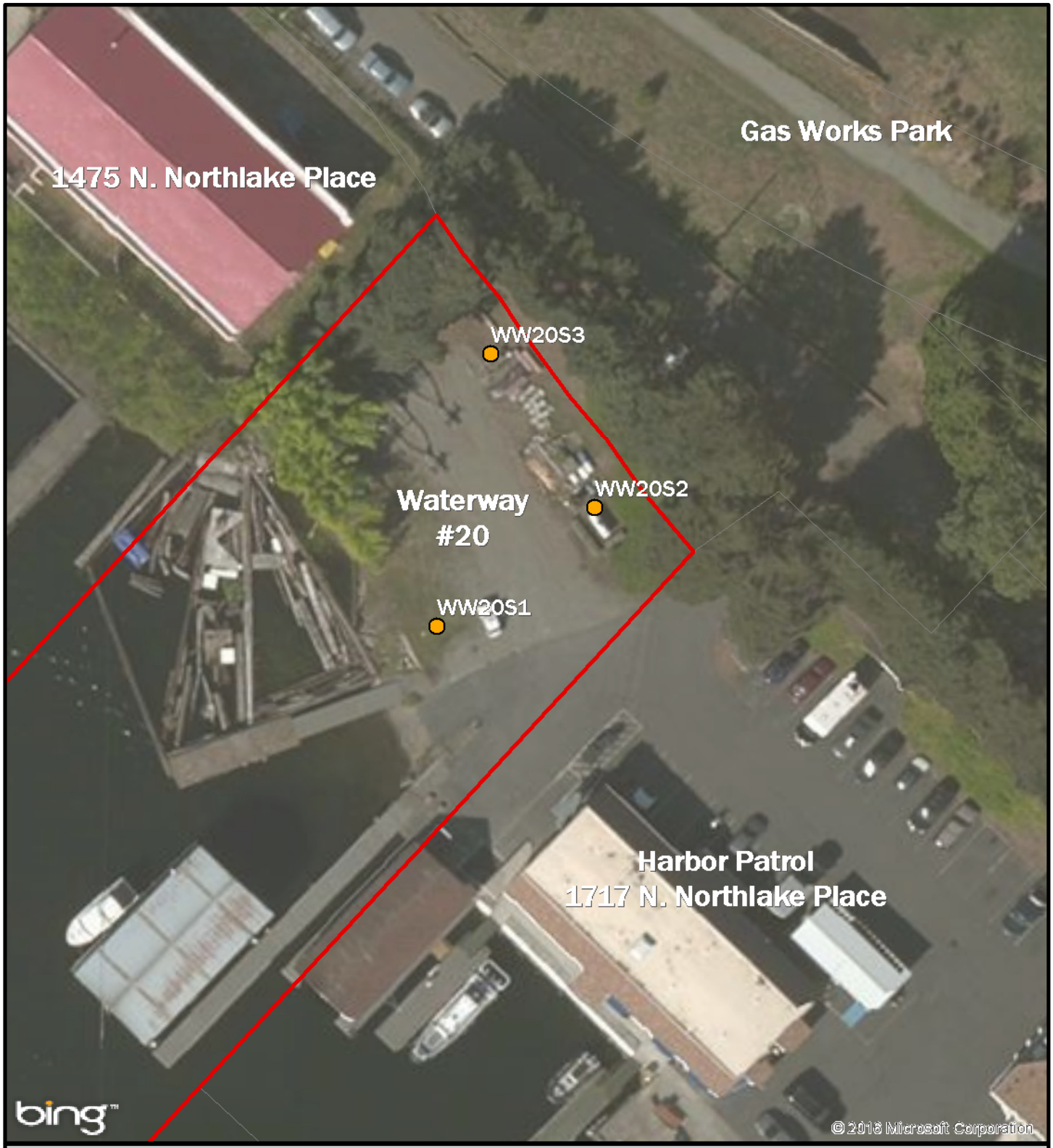
A Herrera representative performed the soil sampling on April 7, 2016. Samples were collected from three locations in the upland portion of the property at a depth of approximately 6 inches below the ground surface (Figure 1). These sample locations were selected during a site reconnaissance and were approved by DNR prior to sampling. The site is currently used to store concrete moorings and boat trailers, and there were no surficial indications of stained soil or chemical release at the site. Therefore, the three sample locations were selected to provide spatial distribution across the active portion of the property.

The soil samples were collected by first removing the top 6 inches of material with a shovel. A stainless steel spoon was then used to partially fill a stainless steel mixing bowl with soil from a depth of 6 inches. All spoons and bowls were decontaminated prior to use. The soil was homogenized and coarse materials larger than 0.25 inch in diameter were removed. The samples were transferred from the bowl directly into jars provided by the analytical laboratory. Pre-weighed sample vials were filled directly from the soil sampling locations and not from the homogenized samples to comply with the method requirements for sampling the following volatile organic compounds: gasoline-range total petroleum hydrocarbons (TPH-Gx) and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Each sample was uniquely labeled, denoting the sample identification number and depth, and date and time sampled. Samples were then placed into a chilled cooler for storage prior to delivery to the laboratory.

The samples were couriered to Onsite Analytical Laboratory in Redmond, Washington, and analyzed for the following parameters:

- Gasoline-range total petroleum hydrocarbons and BTEX according to Method NWTPH-Gx/BTEX
- Lube oil-range TPH and diesel-range TPH according to Method NWTPH-Dx
- Polycyclic aromatic hydrocarbons (PAHs) according to US EPA Method 8270D/SIM (low-level)
- Polychlorinated biphenyls (PCBs) according to US EPA Method 8082
- Total Model Toxics Control Act (MTCA) metals (arsenic, cadmium, chromium, lead, and mercury) according to US EPA Methods 6010C and 7471B



Legend

- Waterway #20 upland soil sample location
- Waterway #20 parcel
- Parcel

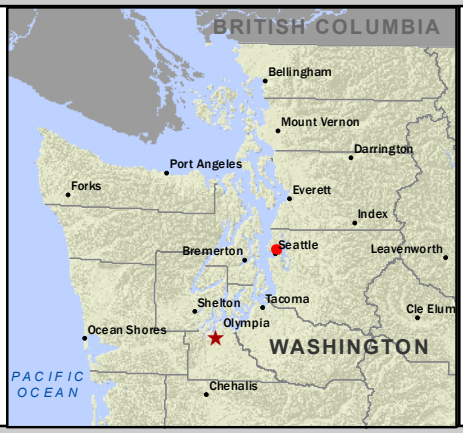


Figure 1.
Upland Soil Sample Locations at Waterway #20, Seattle, Washington.

N

0 20 40 80 Feet

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Results

A gravelly surface layer was underlain by brown sandy silt at each location, and there were some brick fragments and glass at location WW20S3. Photographic documentation of the sampling locations is provided in Appendix A. A summary of analytical results is provided in Table 1 and the analytical laboratory report is provided in Appendix B. A data quality assurance review was conducted and is provided in Appendix C; all of the data were determined to be acceptable for use based on this review.

A summary of the analytical results is provided below:

- No gasoline-range TPH, BTEX, diesel-range TPH, PCBs, arsenic, cadmium, or mercury were detected in any of the samples.
- Lube oil-range TPH was detected at all three locations at concentrations ranging from 960 to 1,400 milligrams per kilogram (mg/kg). None of the results exceeded the MTCA Method A cleanup criterion of 2,000 mg/kg for lube oil-range TPH.
- Chromium was detected at all three locations at concentrations ranging from 24 to 37 mg/kg, which were all well below the MTCA method A cleanup criterion of 2,000 mg/kg. Lead was detected at all three locations at concentrations ranging from 29 to 48 mg/kg, which were all well below MTCA method A cleanup criterion for unrestricted land use of 250 mg/kg.
- PAHs were detected at all three locations and total carcinogenic PAHs (cPAHs) concentration ranged from 0.122 to 1.74 mg/kg. All three samples exceeded the MTCA Method A cleanup criterion of 0.1 mg/kg for unrestricted land use, but were less than the cleanup criterion of 2.0 mg/kg for industrial properties.
- Location WW20S2 exhibited a much higher cPAH concentration (1.74 mg/kg) than the other two locations (0.122 and 0.236 mg/kg). The source of the elevated PAH concentrations at location WW20S2 is unknown.

Table 1. Analytical Results (mg/kg) of Soil Samples Collected at Waterway #20, Seattle, Washington, on April 7, 2016.

Analytical Parameters	Sample Identification			MTCA Cleanup Level
	WW20S1	WW20S2	WW20S3	
Diesel-Range Organics	ND (240)	ND (180)	ND (220)	2,000 [a,b]
Lube Oil-Range Organics	1,400	960	1,200	2,000[a,b]
Gasoline-Range Organics	ND (5.6)	ND (5.6)	ND (6.0)	100[a,b]
Benzene	ND (0.020)	ND (0.020)	ND (0.020)	0.030[a b]
Toluene	ND (0.056)	ND (0.056)	ND (0.060)	7[a,b]
Ethylbenzene	ND (0.056)	ND (0.056)	ND (0.060)	6[a,b]
Total Xylenes	ND (0.056)	ND (0.056)	ND (0.060)	9[a,b]
Polycyclic Aromatic Hydrocarbons				
Naphthalene	0.031	0.088	0.060	5[a,b,d]
2-Methylnaphthalene	0.016	ND (0.073)	0.032	5[a, b,d]
1-Methylnaphthalene	ND (0.014)	0.076	0.023	5[a, b,d]
Acenaphthylene	0.029	0.29	0.068	–
Acenaphthene	ND (0.014)	0.15	ND (0.0073)	4,800[c]
Fluorene	ND (0.014)	0.31	0.012	3,200[c]
Phenanthrene	0.087	2.7	0.15	–
Anthracene	0.024	0.78	0.054	24,000[c]
Fluoranthrene	0.11	3.0	0.22	3,200[c]
Pyrene	0.15	3.5	0.26	0.1[a]/2.0[b]
Benzo[a]anthracene	0.048	**1.1**	0.092	0.1[a]/2.0[b]
Chrysene	0.077	ND (0.020)	ND (0.020)	0.1[a]/2.0[b]
Benzo[b]fluoranthene	**0.10**	**1.5**	**0.23**	0.1[a]/2.0[b]
Benzo[j,k]fluoranthene	0.028	**0.50**	0.057	0.1[a]/2.0[b]
Benzo[a]pyrene	0.091	**1.3**	**0.17**	0.1[a]/2.0[b]
Indeno[1,2,3-c,d]pyrene	**0.10**	**1.0**	**0.23**	–
Dibenz[a,h]anthracene	0.024	**0.19**	0.036	0.1[a]/2.0[b]
Benzo[g,h,i]perylene	0.23	1.2	0.32	–
Total cPAH[e]	**0.122**	**1.74**	**0.236**	0.1[a]/2.0[b]
Total PCBs	ND (0.053)	ND (0.055)	ND (0.055)	1[a,f]/10[b,f]
Metals				
Arsenic	ND (11)	ND (11)	ND (11)	20[a,b]
Cadmium	ND (0.53)	ND (0.55)	ND (0.55)	2[a,b]
Chromium	34	24	37	2,000[a]
Lead	29	45	48	250[a]/*1,000*[b]
Mercury	ND (0.26)	ND (0.27)	ND (0.27)	2[a,b]

[a] MTCA method A cleanup criteria (unrestricted land use).

[b] MTCA method A cleanup criteria (industrial properties).

[c] MTCA method B cleanup criteria (direct contact).

[d] Sum of naphthalenes may not exceed 5 milligrams per kilogram (mg/kg).

[e] Total cPAH based on toxic equivalency factor (TEF).

[f] Sum of all PCBs may not exceed 1 mg/kg (unrestricted land use) and 10 mg/kg (industrial properties).

Values reported in mg/kg dry weight basis.

Values exceeding MTCA method A cleanup criteria (unrestricted land use) are shown in **bold** face type.

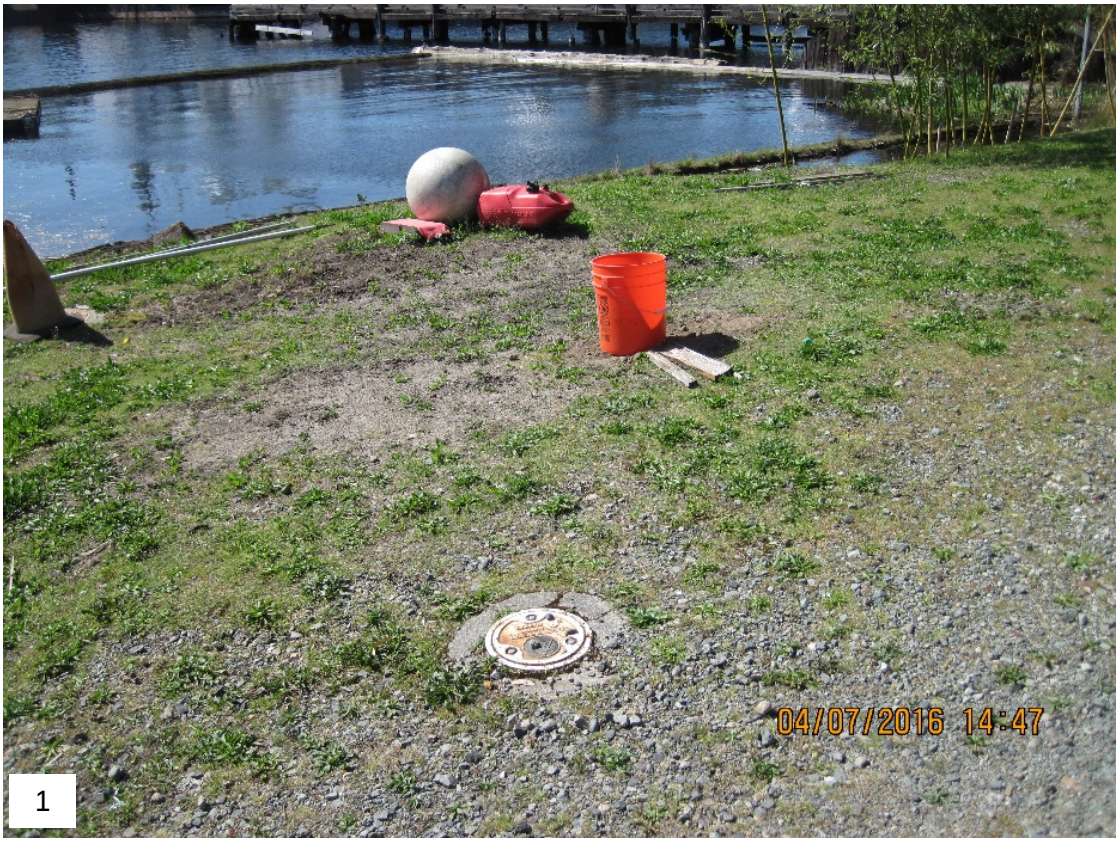
ND – Constituent not detected (detection limit).

APPENDIX A

Photographic Log

WATERWAY #20 SOIL SAMPLING PHOTOGRAPH LOG

Photo Number	Photo Description
1	Soil sample location WW20S1 at orange bucket, looking southwest
2	Soil sample location WW20S2 at orange bucket, looking north
3	Soil sample location WW20S3 at orange bucket, looking northwest
4	Looking southwest across site from soil sample location WW2020S3



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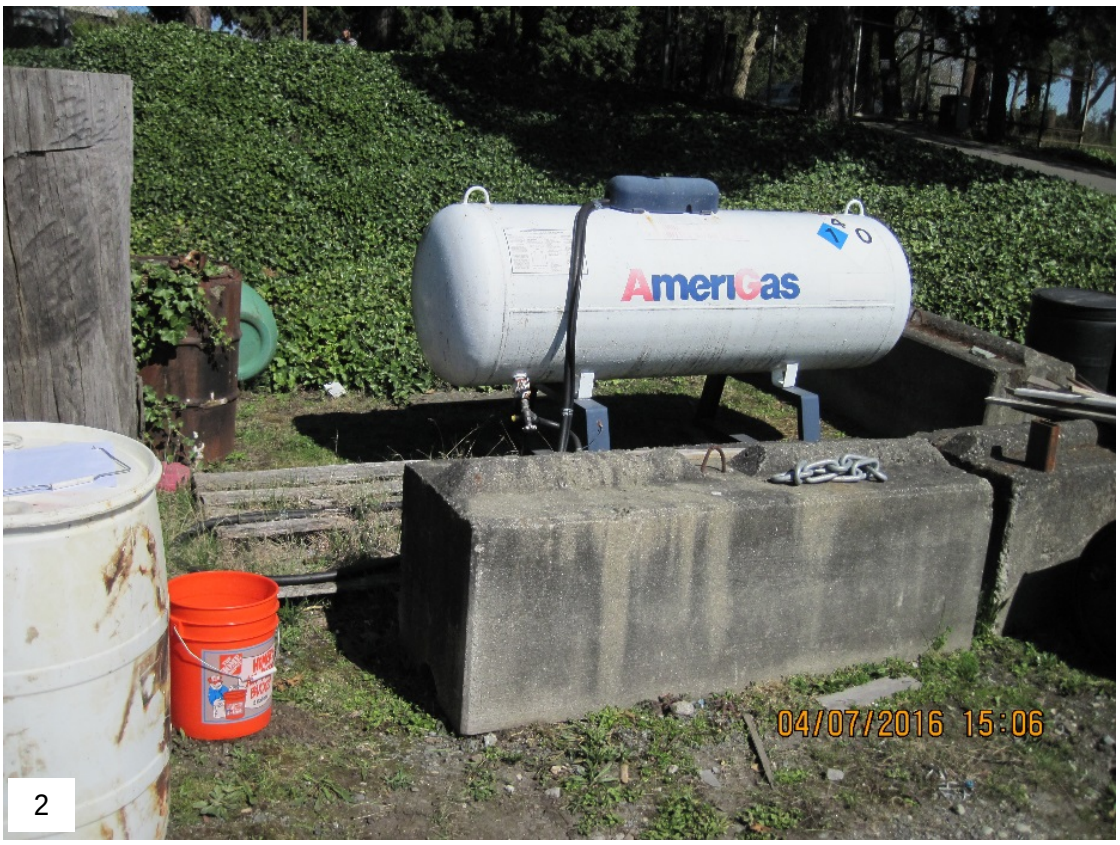

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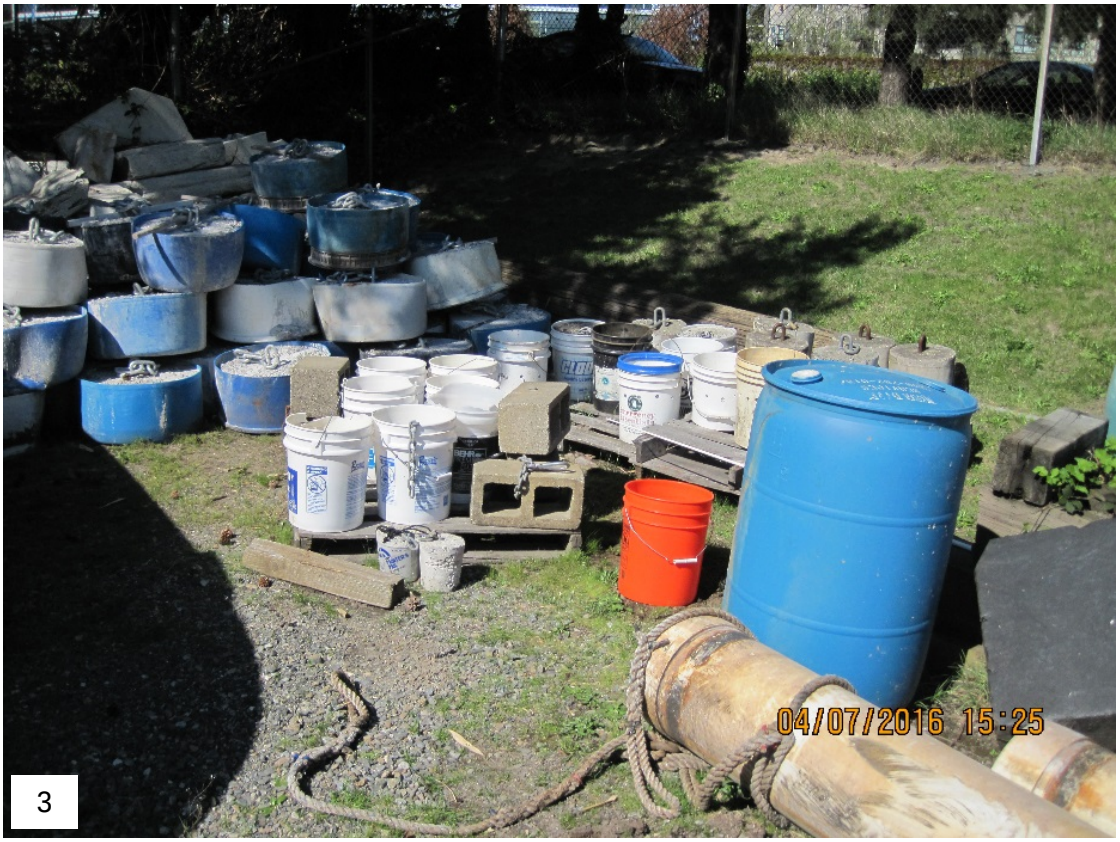
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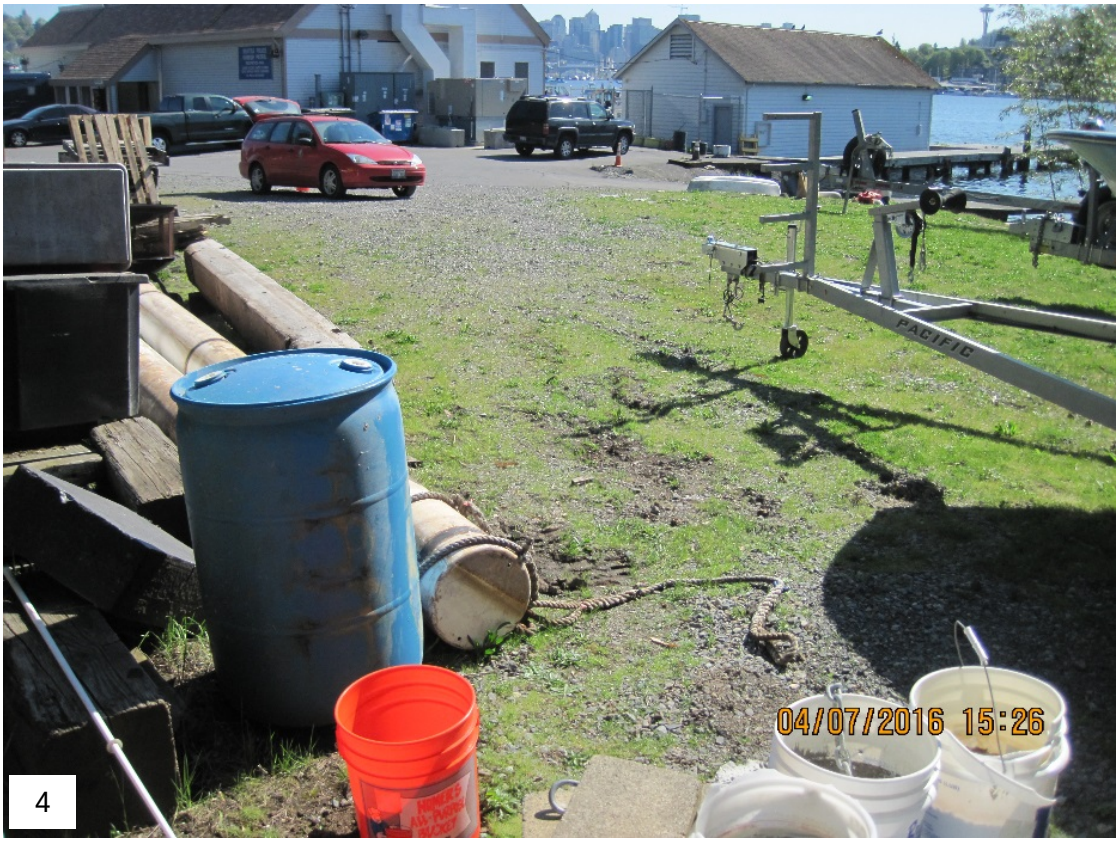
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APPENDIX B

Analytical Laboratory Report

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

April 14, 2016

Bruce Carpenter
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 15-06211-000/001-001
Laboratory Reference No. 1604-072

Dear Bruce:

Enclosed are the analytical results and associated quality control data for samples submitted on April 8, 2016.

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,

David Baumeister
Project Manager

Enclosures

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

Case Narrative

Samples were collected on April 7, 2016 and received by the laboratory on April 8, 2016. 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.

NWTPH Gx/BTEX Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

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: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S1**					
Laboratory ID:	04-072-01					
Benzene	**ND**	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
o-Xylene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
Gasoline	**ND**	5.6	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*68-129*				
Client ID:	**WW20S2**					
Laboratory ID:	04-072-02					
Benzene	**ND**	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
o-Xylene	**ND**	0.056	EPA 8021B	4-8-16	4-8-16	
Gasoline	**ND**	5.6	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*68-129*				
Client ID:	**WW20S3**					
Laboratory ID:	04-072-03					
Benzene	**ND**	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	**ND**	0.060	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	**ND**	0.060	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	**ND**	0.060	EPA 8021B	4-8-16	4-8-16	
o-Xylene	**ND**	0.060	EPA 8021B	4-8-16	4-8-16	
Gasoline	**ND**	6.0	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*68-129*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0408S2					
Benzene	**ND**	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	**ND**	0.050	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-8-16	4-8-16	
o-Xylene	**ND**	0.050	EPA 8021B	4-8-16	4-8-16	
Gasoline	**ND**	5.0	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*68-129*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-060-05										
	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	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*95*	*96*	*68-129*			
SPIKE BLANKS											
Laboratory ID:	SB0408S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**1.02**	**1.05**	1.00	1.00		**102**	**105**	76-124	3	17	
Toluene	**1.03**	**1.06**	1.00	1.00		**103**	**106**	78-124	3	16	
Ethyl Benzene	**1.03**	**1.05**	1.00	1.00		**103**	**105**	77-123	2	17	
m,p-Xylene	**1.03**	**1.05**	1.00	1.00		**103**	**105**	78-124	2	17	
o-Xylene	**1.03**	**1.07**	1.00	1.00		**103**	**107**	76-123	4	18	
Surrogate:											
Fluorobenzene						*91*	*94*	*68-129*			

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S1**					
Laboratory ID:	04-072-01					
Diesel Range Organics	**ND**	240	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil	**1400**	260	NWTPH-Dx	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*107*	*50-150*				
Client ID:	**WW20S2**					
Laboratory ID:	04-072-02					
Diesel Range Organics	**ND**	180	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil Range Organics	**960**	270	NWTPH-Dx	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*101*	*50-150*				
Client ID:	**WW20S3**					
Laboratory ID:	04-072-03					
Diesel Range Organics	**ND**	220	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil	**1200**	270	NWTPH-Dx	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*103*	*50-150*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

NWTPH-Dx
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0411S1					
Diesel Range Organics	**ND**	25	NWTPH-Dx	4-11-16	4-11-16	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*106*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-072-03										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	U1
Lube Oil	**1090**	**819**	NA	NA		NA		NA	28	NA	
Surrogate:											
o-Terphenyl						*103*	*107*	*50-150*			

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S1**					
Laboratory ID:	04-072-01					
Naphthalene	**0.031**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	**0.016**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	**ND**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	**0.029**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	**ND**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	**ND**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	**0.087**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	**0.024**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	**0.11**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	**0.15**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	**0.048**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	**0.077**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	**0.10**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	**0.028**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	**0.091**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	**0.10**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	**0.024**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	**0.23**	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*52*	*32 - 115*				
Pyrene-d10	*58*	*30 - 124*				
Terphenyl-d14	*64*	*30 - 117*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S2**					
Laboratory ID:	04-072-02					
Naphthalene	**0.088**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	**ND**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	**0.076**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	**0.15**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	**0.29**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	**0.31**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	**2.7**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	**0.78**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	**3.0**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	**3.5**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	**1.1**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	**1.3**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	**1.5**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	**0.50**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	**1.3**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	**1.0**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	**0.19**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	**1.2**	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*58*	*32 - 115*				
Pyrene-d10	*75*	*30 - 124*				
Terphenyl-d14	*86*	*30 - 117*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S3**					
Laboratory ID:	04-072-03					
Naphthalene	**0.060**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	**0.032**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	**0.023**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	**0.068**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	**ND**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	**0.012**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	**0.15**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	**0.054**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	**0.22**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	**0.26**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	**0.092**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	**0.13**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	**0.23**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	**0.057**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	**0.17**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	**0.23**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	**0.036**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	**0.32**	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*72*	*32 - 115*				
Pyrene-d10	*80*	*30 - 124*				
Terphenyl-d14	*84*	*30 - 117*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0411S2					
Naphthalene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Acenaphthylene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Acenaphthene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Fluorene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Phenanthrene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Anthracene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Fluoranthene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Pyrene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[a]anthracene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Chrysene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[b]fluoranthene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo(j,k)fluoranthene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[a]pyrene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Dibenz[a,h]anthracene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[g,h,i]perylene	**ND**	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*91*	*32 - 115*				
Pyrene-d10	*96*	*30 - 124*				
Terphenyl-d14	*97*	*30 - 117*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0411S2									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.0681**	**0.0629**	0.0833	0.0833	82	76	61 - 112	8	15	
Acenaphthylene	**0.0854**	**0.0800**	0.0833	0.0833	103	96	65 - 116	7	15	
Acenaphthene	**0.0719**	**0.0667**	0.0833	0.0833	86	80	62 - 116	8	13	
Fluorene	**0.0779**	**0.0712**	0.0833	0.0833	94	85	60 - 115	9	15	
Phenanthrene	**0.0683**	**0.0638**	0.0833	0.0833	82	77	54 - 114	7	15	
Anthracene	**0.0970**	**0.0885**	0.0833	0.0833	116	106	70 - 140	9	15	
Fluoranthene	**0.0793**	**0.0723**	0.0833	0.0833	95	87	60 - 118	9	15	
Pyrene	**0.0775**	**0.0707**	0.0833	0.0833	93	85	65 - 115	9	15	
Benzo[a]anthracene	**0.0749**	**0.0710**	0.0833	0.0833	90	85	59 - 129	5	15	
Chrysene	**0.0761**	**0.0715**	0.0833	0.0833	91	86	60 - 122	6	15	
Benzo[b]fluoranthene	**0.0915**	**0.0859**	0.0833	0.0833	110	103	53 - 124	6	17	
Benzo(j,k)fluoranthene	**0.0872**	**0.0804**	0.0833	0.0833	105	97	58 - 124	8	16	
Benzo[a]pyrene	**0.0843**	**0.0783**	0.0833	0.0833	101	94	62 - 127	7	15	
Indeno(1,2,3-c,d)pyrene	**0.0810**	**0.0750**	0.0833	0.0833	97	90	60 - 120	8	15	
Dibenz[a,h]anthracene	**0.0919**	**0.0858**	0.0833	0.0833	110	103	60 - 117	7	15	
Benzo[g,h,i]perylene	**0.0847**	**0.0786**	0.0833	0.0833	102	94	63 - 117	7	15	
Surrogate:										
2-Fluorobiphenyl					*88*	*81*	*32 - 115*			
Pyrene-d10					*94*	*86*	*30 - 124*			
Terphenyl-d14					*94*	*87*	*30 - 117*			

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PCBs
EPA 8082A

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WW20S1**					
Laboratory ID:	04-072-01					
Aroclor 1016	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	**ND**	0.053	EPA 8082A	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*70*	*50-139*				
Client ID:	**WW20S2**					
Laboratory ID:	04-072-02					
Aroclor 1016	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*50-139*				
Client ID:	**WW20S3**					
Laboratory ID:	04-072-03					
Aroclor 1016	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	**ND**	0.055	EPA 8082A	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*70*	*50-139*				

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

PCBs EPA 8082A
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0411S2					
Aroclor 1016	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	**ND**	0.050	EPA 8082A	4-11-16	4-11-16	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*94*	*50-139*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	04-072-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.383**	**0.394**	0.500	0.500	ND	**77**	**79**	49-133	3	17	
Surrogate:											
DCB						*74*	*78*	*50-139*			

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-072-01					
Client ID:	**WW20S1**					
Arsenic	**ND**	11	6010C	4-13-16	4-13-16	
Cadmium	**ND**	0.53	6010C	4-13-16	4-13-16	
Chromium	**34**	0.53	6010C	4-13-16	4-13-16	
Lead	**29**	5.3	6010C	4-13-16	4-13-16	
Mercury	**ND**	0.26	7471B	4-13-16	4-13-16	
Lab ID:	04-072-02					
Client ID:	**WW20S2**					
Arsenic	**ND**	11	6010C	4-13-16	4-13-16	
Cadmium	**ND**	0.55	6010C	4-13-16	4-13-16	
Chromium	**24**	0.55	6010C	4-13-16	4-13-16	
Lead	**45**	5.5	6010C	4-13-16	4-13-16	
Mercury	**ND**	0.27	7471B	4-13-16	4-13-16	
Lab ID:	04-072-03					
Client ID:	**WW20S3**					
Arsenic	**ND**	11	6010C	4-13-16	4-13-16	
Cadmium	**ND**	0.55	6010C	4-13-16	4-13-16	
Chromium	**37**	0.55	6010C	4-13-16	4-13-16	
Lead	**48**	5.5	6010C	4-13-16	4-13-16	
Mercury	**ND**	0.27	7471B	4-13-16	4-13-16	

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0413SM1

Analyte	Method	Result	PQL
Arsenic	6010C	**ND**	10
Cadmium	6010C	**ND**	0.50
Chromium	6010C	**ND**	0.50
Lead	6010C	**ND**	5.0

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL MERCURY
EPA 7471B
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-13-16
Date Analyzed:	4-13-16
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0413S1

Analyte	Method	Result	PQL
Mercury	7471B	**ND**	0.25

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 04-090-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	10	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**29.0**	**32.3**	11	0.50	
Lead	**13.3**	**7.05**	61	5.0	C

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL MERCURY
EPA 7471B
DUPLICATE QUALITY CONTROL

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 04-072-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.25	

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL METALS
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 04-090-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**92.4**	92	**92.0**	92	0	
Cadmium	50.0	**47.7**	95	**47.9**	96	0	
Chromium	100	**121**	92	**121**	92	0	
Lead	250	**235**	89	**233**	88	1	

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

TOTAL MERCURY
EPA 7471B
MS/MSD QUALITY CONTROL

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 04-072-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	0.500	**0.537**	107	**0.515**	103	4	

Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

% MOISTURE

Date Analyzed: 4-11-16

Client ID	Lab ID	% Moisture
WW20S1	04-072-01	5
WW20S2	04-072-02	9
WW20S3	04-072-03	9

OnSite Environmental Inc.

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.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, 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.

Z -

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

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Herrera Environmental
Project Number: 15-06211-000/001-001
Project Name: WW#20
Project Manager: Bruce Carpenter
Sampled by: Bruce Carpenter

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 04-072

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 8270D/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) 1664	% Moisture
1	WW2051	4/7/16	1415	S	2		X		X				X	X					X			X
2	WW2052	↓	1435	S	2		X		X				X	X					X			X
3	WW2053	↓	1455	S	2		X		X				X	X					X			X

	Signature	Company	Date	Time
Relinquished	Bruce A. Carpenter	Herrera Environmental	4/8/16	8 30
Received		ORE	4/8/16	1120
Relinquished				
Received				
Relinquished				
Received				

Comments/Special Instructions: Sent via Courier

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

APPENDIX C

Data Quality Assurance Review

Herrera Environmental Consultants, Inc.

Memorandum

To	Project File 15-06211-000
From	Gina Catarra, Herrera Environmental Consultants
Date	May 6, 2016
Subject	Data Quality Assurance Review of the Waterway 20 Upland Soil Data

This memorandum presents a review of data quality for 3 soil samples collected for the Waterway 20 upland soil site on April 7th, 2016. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx methods
- Benzene, ethylbenzene, toluene, and xylenes (BTEX) by EPA method 8021B
- Polycyclic aromatic hydrocarbons (PAHs) by EPA method 8270D/SIM
- Polychlorinated biphenyls (PCBs) by EPA method 8082A
- Total metals (arsenic, cadmium, chromium, lead, and mercury) by EPA methods 6010C and 7471B.

Results for the following samples were validated.

Sample ID	Date Collected	Matrix	Analyses
WW20S1	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals
WW20S2	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals
WW20S3	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established by the laboratory and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required method holding times. The laboratory report was complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits were reasonable for the methods, with the exception noted below. No data were qualified based on laboratory reporting limits.

The reporting limits for diesel range organics (DRO) were elevated due to matrix interferences.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Blank spike/blank spike duplicate (BS/BSD) samples were analyzed with project samples for NWTPH-Gx/BTEX and PAH analyses at the required frequency. The percent recovery values for all compounds met the criteria established by the laboratory or method, as applicable.

Surrogate Analysis—Acceptable

Surrogate compounds were added to all samples for NWTPH-Gx/BTEX (fluorobenzene), NWTPH-Dx (o-terphenyl), and PAHs (2-fluorobiphenyl, pyrene-d10, and terphenyl-d14), and PCB (DCB) analyses. The percent recovery values for all surrogate compounds met the criteria established by the laboratory or method, as applicable.

Matrix Spike Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed for PCBs (sample WW20S1) and total metals (batch and WW20S3). The percent recovery values for PCBs (77 and 79 percent) and total metals (ranging from 88 to 107 percent) met the control limits (49 to 133 percent for PCBs, and 75 to 125 percent for total metals) established by the laboratory.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed for NWTPH-Gx/BTEX (batch sample), NWTPH-Dx (sample WW20S3), and total metals (batch sample and WW20S3); matrix spike duplicates were analyzed for PCBs (WW20S1) and for total metals (batch sample and WW20S3). The relative

percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. The relative percent difference (RPD) values or difference values met the control limits established by the laboratory.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA National Functional Guidelines for Inorganic Superfund Data Review* (USEPA 2014).

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ The material was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

R The data are unusable. (Note: analyte may or may not be present.)

References

USEPA. 2014. National functional guidelines for inorganic superfund data review. US Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, D.C. (EPA-540-R-013-001).