March 26, 2021

Eva Barber
Technical Assistance Coordinator
Toxics Cleanup Program
Southwest Regional Office

Email: eva.barber@ecy.wa.gov

RE: Olympic View Elementary School – Supplemental Sampling for VCP and Work Plan Review
2626 SW 327th Street, Federal Way, Washington
PBS Project #41519.008

Federal Way Public Schools (FWPS) contracted PBS Engineering and Environmental Inc. (PBS) to evaluate the potential for arsenic and lead contaminants in near-surface soils at the site of Olympic View Elementary School (OLV) prior to site redevelopment as part of the Olympic View Elementary School Replacement Project (Figure 1).

This letter is in response to an email dated March 11, 2021 from the Washington State Department of Ecology (Ecology) regarding assessment and remediation of Tacoma Smelter Plume impacts to Olympic View Elementary School (Site/Property). The email was sent in response to a Voluntary Cleanup Program (VCP) application and work plan[1] submitted to Ecology for the Property.

BACKGROUND

PBS performed initial[2] and supplemental[3] soil characterization to assess potential Tacoma Smelter Plume impacts to the site in September and December of 2020, respectively. Soil characterization efforts identified one area in the northeast portion of the Site requiring remediation per Ecology's *Tacoma Smelter Plume Model Remedies Guidance*[4] (Smelter Plume Guidance). Based on the soil characterization efforts, PBS prepared the work plan detailing proposed remedial actions at the Site. The work plan was submitted to Ecology along with a VCP application and the following request for opinion:

> *Will Ecology provide a No Further Action (NFA) likely opinion letter to FWPS based on the remediation activities proposed in this work plan for the site?*

Eva Barber (Technical Assistance Coordinator) with Ecology responded to the request for opinion in a March 11, 2021 email. The email stated that supplemental sampling in the treed areas along the northern and western property boundaries was required in order for Ecology to provide the opinion requested in the work plan. The email is included as Attachment A to this letter report.

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[1] *Remedial Action Work Plan for Tacoma Smelter Plume Impacts, Olympic View Elementary School,* PBS Engineering and Environmental, March 3, 2021.
[2] *Olympic View Elementary School – Arsenic and Lead Soil Sampling*, PBS Engineering and Environmental, September 16, 2020.
[3] *Olympic View Elementary School – Supplemental Arsenic and Lead Soil Sampling*, PBS Engineering and Environmental, January 7, 2021.
[4] *Tacoma Smelter Plume Model Remedies Guidance – Sampling and Cleanup of Arsenic and Lead Contaminated Soils,* Washington State Department of Ecology, Publication Number 19-09-101, July 2019.

SITE DESCRIPTION AND GEOLOGY

The site lies within the Puget Lowland, an area characterized by Pleistocene aged glacial stratigraphic sequences resulting from repeated advances of the Cordilleran ice sheet. These sequences consist of unconsolidated glacial, fluvial, and lacustrine sediments. Geophysical investigations have indicated that unconsolidated sediments in the Federal Way area range from 1,200 to 1,600 feet thick. The nearest bedrock exposures are to the south in the Puyallup Valley (ECI, 1991).

According to the Geologic Map of Poverty Bay 7.5' Quadrangle, King and Pierce Counties, Washington, 1:24,000 scale, the site is underlain by Quaternary-aged Till – *Compact diamict containing subrounded to well-rounded clasts in massive, silt- or sand-rich matrix. Glacially transported and deposited. Generally, a few meters to a few tens of meters thick, forming undulatory surface (*USGS, 2004).

The site is generally flat, while the greater area slopes to the northwest towards Poverty Bay of the greater Puget Sound. Based on a review of publicly available well logs depth to groundwater beneath the Site is expected to be between 5 and 20 feet below ground surface. Shallow groundwater flow is predicted to follow surface topography, and flow generally to the northwest toward Poverty Bay.

REGULATORY CRITERIA

Per the Smelter Plume Guidance: "if arsenic or lead levels are elevated for any decision unit on the property, that decision unit needs cleanup." Per the Smelter Plume Guidance, elevated is defined as:

- Average arsenic > 20 ppm, equivalent to milligrams per kilogram (mg/kg) or average lead > 250 ppm; **or**
- Maximum (any one sample) arsenic > 40 ppm or maximum lead > 500 ppm.

Ecology's Model Toxics Control Act (MTCA) has established cleanup levels for arsenic and lead for unrestricted land use that are protective of human health and the environment[5]. Ecology's MTCA Method A cleanup levels (CULs) for unrestricted land use for arsenic and lead are applicable for comparison to any single soil sample concentration. The CULs for arsenic and lead are presented below:

- The CUL for arsenic is 20 milligrams per kilogram (mg/kg)
- The CUL for lead is 250 mg/kg.

Based on the site's land use as a school, FWPS has elected to clean up the majority of soils on the Property found to be in exceedance of CULs, even if the soils are not defined as elevated per the Smelter Plume Guidance. The treed area in question is outside of the main school yard grounds, is isolated from the school area by chain link fencing, and is inaccessible to students. Given the lack potential exposure of students to soils in the treed area, FWPS has elected to use elevated concentrations rather than CULs as cleanup criteria for this portion of the Property (Decision Unit 3), as allowed by the Smelter Plume Guidance.

SUPPLEMENTAL SOIL SAMPLING

The second supplemental soil sampling event was conducted on March 12, 2021 and included collection of soil samples in the treed area as requested in the March 11, 2021 Ecology email. The treed area was designated as a third decision unit (Decision Unit 3) for soil characterization on the Property. This was based on the nature and use of the treed area being distinct from the rest of the Property.

[5] *"Model Toxics Control Act Regulation and Statute",* Washington State Department of Ecology, 2013 Revision, Publication No. 94-06

Discrete soil samples were collected from 15 locations within Decision Unit 3 as requested in the March 11, 2021 email and depicted in Figure 2. The samples were taken at depth intervals of zero to six inches below ground surface (bgs). At every fourth location (25% of all sample locations), a second discrete sample was collected from a depth of six to twelve inches bgs, per the Smelter Plume Guidance.

Soil sample collection started just below any surface cover layer (e.g., sod or grass). A hand spade and a hand auger were used to complete 6-inch deep test holes. A soil sample was collected at a depth of less than six inches below ground surface at each location. The test holes were then advanced to a depth of twelve inches, and a soil sample was collected at a depth between six and twelve inches bgs.

PBS personnel wore disposable nitrile gloves to protect against cross-contamination between samples. Soil retained for analysis was packed into laboratory-provided containers, labeled and transported on ice under chain of custody documentation to Friedman and Bruya, Inc. in Seattle, an Ecology accredited analytical laboratory.

Samples were analyzed for total arsenic and lead using EPA Method 6020. Total arsenic and lead results were reported on a dry weight basis.

ANALYTICAL RESULTS

Detected concentrations of arsenic and lead in supplemental soil samples collected from Decision Unit 3 are not considered "elevated" as defined in the Smelter Plume Guidance.

CONCLUSIONS

Based on the analytical results of the supplemental soil sampling within Decision Unit 3, no additional soil remediation beyond that proposed in the work plan is required by the Smelter Plume Guidance.

With the additional information presented in this letter report, PBS, on the behalf of FWPS, requests that Ecology provide opinion on the original question presented in the work plan:

> *Will Ecology provide a NFA Likely opinion letter to FWPS based on the remediation activities proposed in the work plan?*

LIMITATIONS

This investigation was conducted to characterize lead and arsenic distributions in shallow soils surrounding previously identified arsenic and lead contaminated locations on-site, with a focus on protection of human health and the environment. The data collected in this investigation are not intended for the purposes waste profiling for offsite disposal, or for estimation of volume or tonnage of soil requiring disposal.

PBS has prepared this report for use by FWPS. This report is not intended for use by others without the written consent of the FWPS. Our interpretation of soil conditions in this study was based on field observations and analytical data from the indicated explorations. Regulated substances may exist in portions of the site that were not explored or analyzed.

PBS ENGINEERING AND ENVIRONMENTAL INC.

Digitally signed by James Welles
Date: 2021.03.26 16:24:38 -07'00'

James Welles, LG
Project Geologist

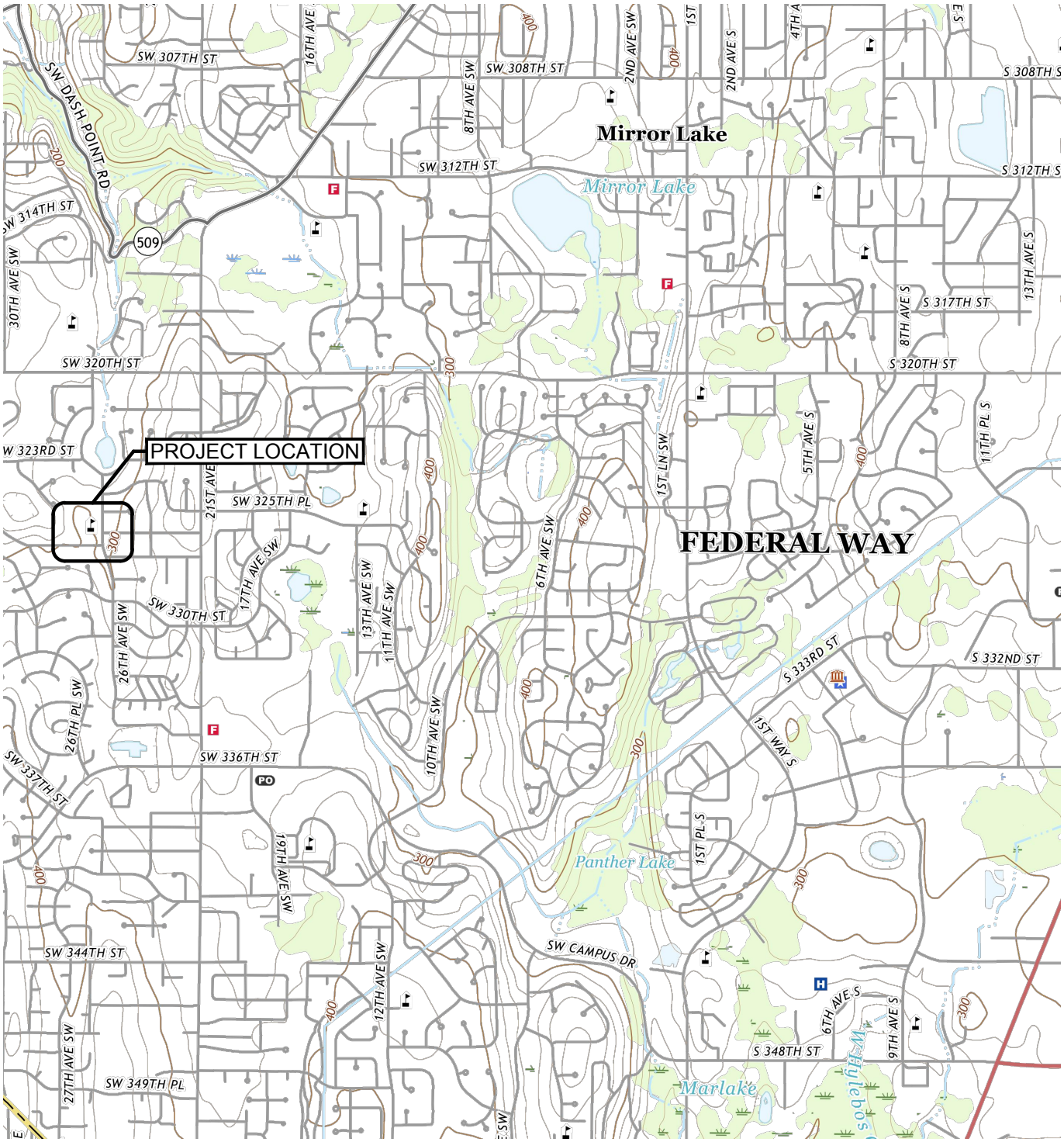
Reviewed By:

Digitally signed by Michael Bagley
Date: 2021.03.26 16:25:41 -07'00'

Michael Bagley, LHG
Project Hydrogeologist

Attachments:
Figure 1: Vicinity Map
Figure 2: As/Pb Soil Sample Location Map
Table 1: Laboratory Data Summary Table for Decision Unit 3
Attachment A: Ecology Email dated March 11, 2021
Attachment B: Laboratory Data

Figures



SOURCE: USGS POVERTY BAY, WA QUADRANGLE 2020.

WASHINGTON

SCALE 1" = 2000'

0' 1,000' 2,000' 4,000'

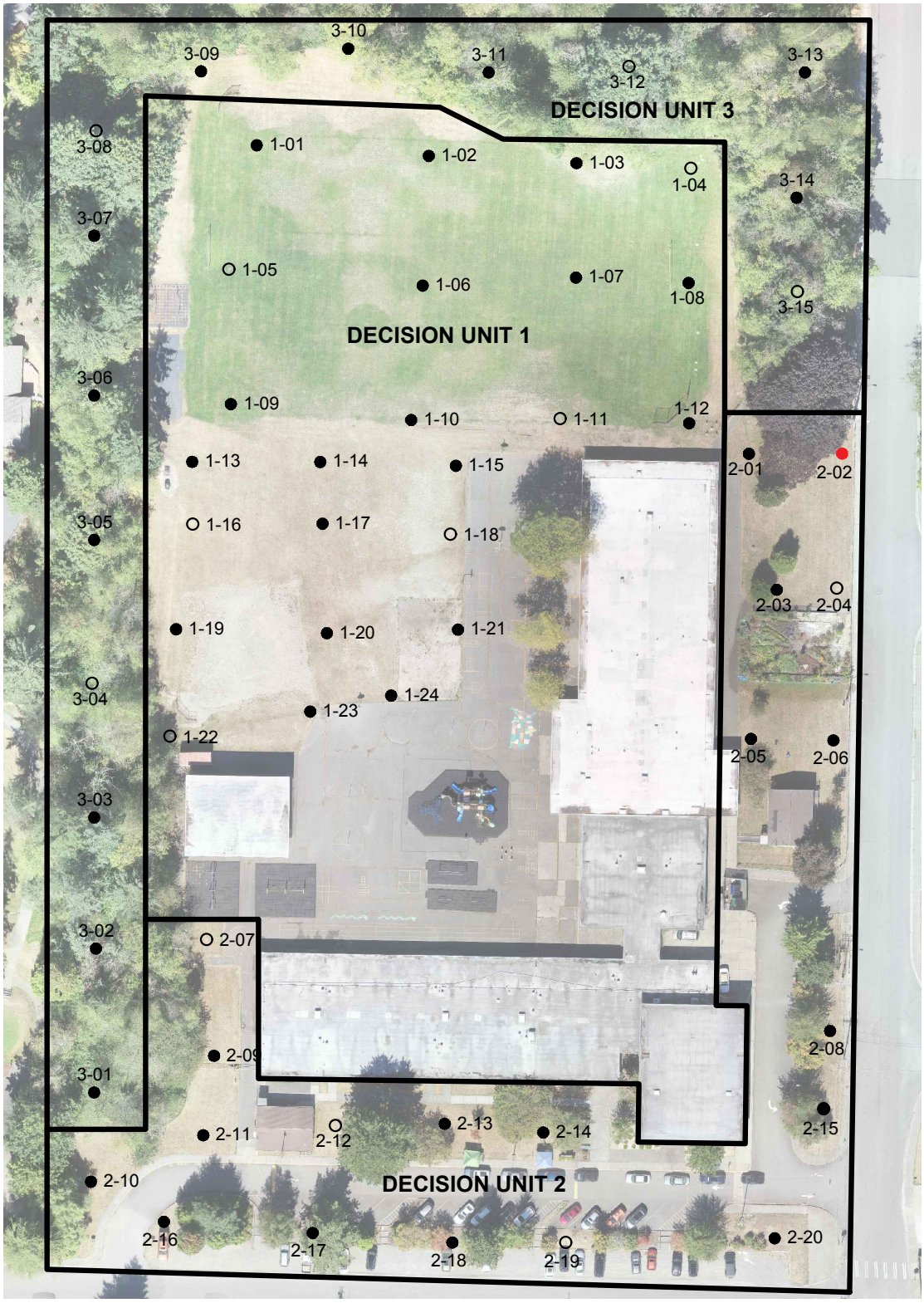
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

VICINITY MAP

OLYMPIC VIEW ELEMENTARY SCHOOL
2626 327TH STREET
FEDERAL WAY, WASHINGTON

MAR 2021
41519.008

FIGURE
1



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 1-01	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6")
○ 1-04	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6", 6-12")
● 2-02	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), RESULTS INDICATE ELEVATED ARSENIC CONCENTRATION

SCALE 1" = 100'

0' 50' 100' 200'

PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

As / Pb SOIL SAMPLE LOCATION MAP

OLYMPIC VIEW ELEMENTARY SCHOOL
2626 SOUTHWEST 327TH STREET
FEDERAL WAY, WASHINGTON

MAR 2021
41519.008

FIGURE
2

Tables

Table 1 - Decision Unit 3 Soil Sample Analytical Results

Site: Olympic View Elementary School
Address: 2626 327th Street, Federal Way, Washington
PBS Project No. 41519.008

Location / Sample Identification	Description	Sample Depth (inches bgs)	Metals	
			Arsenic (mg/kg)	Lead (mg/kg)
	Regulatory Criteria	**Elevated Concentration[a]**	**40**	**500**
Delineation Samples Surrounding Sample 2-02				
3-01-06	0-6 inches bgs	0-6	6.51	19.20
3-02-06	0-6 inches bgs	0-6	30.20	67
3-03-06	0-6 inches bgs	0-6	12.50	18.70
3-04-06	0-6 inches bgs	0-6	3.75	5.46
3-05-06	0-6 inches bgs	0-6	5.39	6.78
3-06-06	0-6 inches bgs	0-6	5.56	7.45
3-07-06	0-6 inches bgs	0-6	17.70	10.70
3-08-06	0-6 inches bgs	0-6	4.22	6.86
3-09-06	0-6 inches bgs	0-6	7.33	16.00
3-10-06	0-6 inches bgs	0-6	7.22	20.80
3-11-06	0-6 inches bgs	0-6	4.04	6.01
3-12-06	0-6 inches bgs	0-6	8.76	9.50
3-13-06	0-6 inches bgs	0-6	4.98	5.18
3-14-06	0-6 inches bgs	0-6	4.37	6.01
3-15-06	0-6 inches bgs	0-6	21.30	62.5
Average			9.6	17.9
3-04-12	6-12 inches	6-12	3.53	4.82
3-08-12	6-12 inches	6-12	3.14	4.67
3-12-12	6-12 inches	6-12	6.10	7.90
3-15-12	6-12 inches	6-12	22.80	50.70
Average			8.9	17.0

Arsenic and lead analyzed by US EPA Method 6020
mg/kg - milligrams per kilogram
bgs = below ground surface
[a] Per WA Dept of Ecology's Tacoma Smelter Plume Model Remedies Guidance, Publication No. 19-09-101

Attachment A

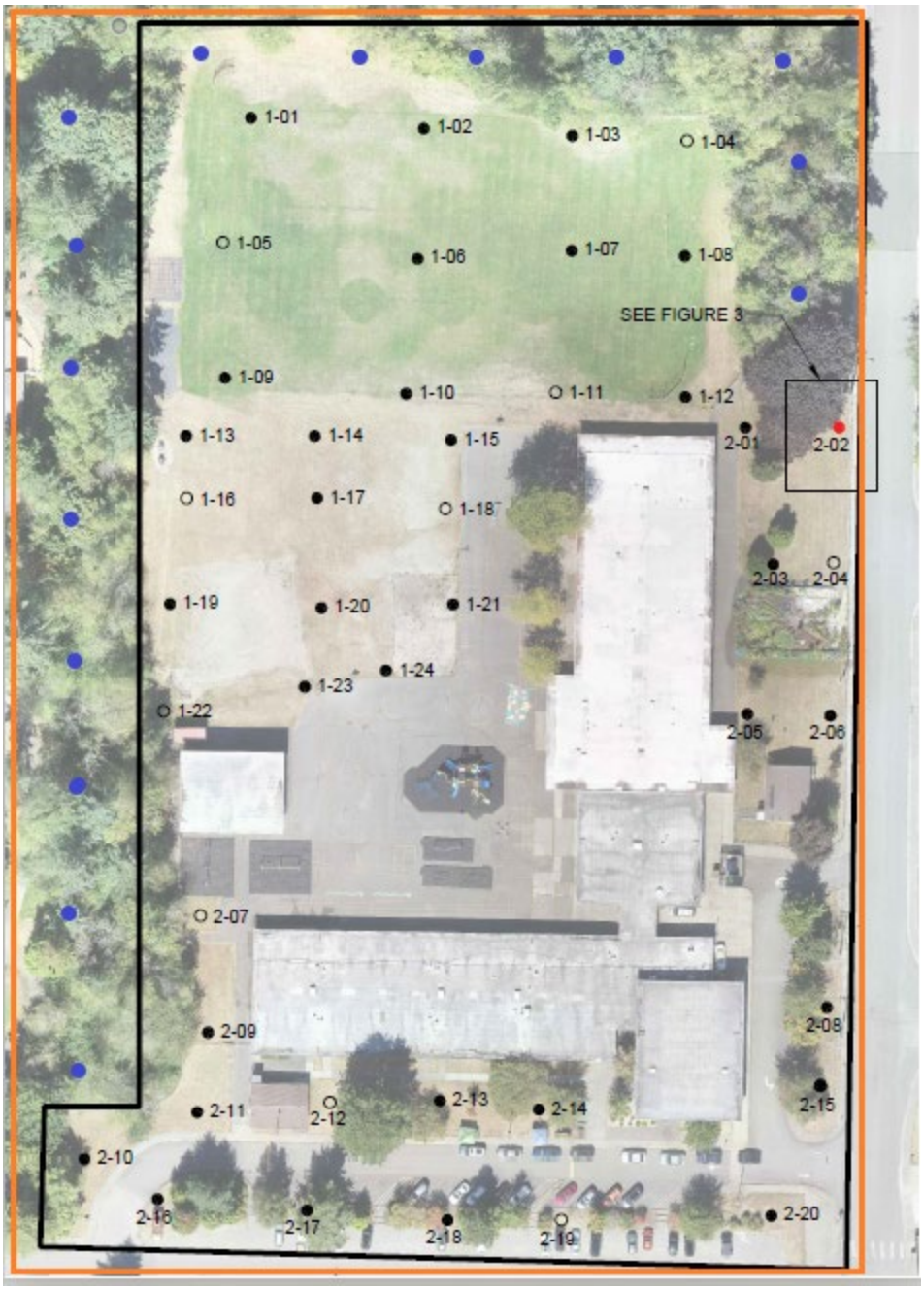
WA Dept of Ecology Email – March 11, 2021

From:	Barber, Eva (ECY)
To:	James Welles
Subject:	RE: VCP Application and Work Plan for Review - Olympic View Elementary School - Federal Way Public School District
Date:	Thursday, March 11, 2021 9:39:23 AM
Attachments:	image002.png

James,

I reviewed the sampling results and the Cleanup Action Plan for the Olympic View Elementary School. The overall sampling looks good and I will be able to issue an opinion letter, however, I need **supplemental sampling in the treed areas**. I understand that the treed areas on the western and northeastern side of the school will not be disturbed, however, they need to be characterized for the Tacoma Smelter Plume contamination because they are within the Property boundary as defined by the legal description and because they are part of the elementary school and will be accessible to school children.

Below is a figure of the current sampling on the Property where dots in black and red represent the samples already collected. The blue dots represent the approximate locations of additional 15 samples that need to be collected at 0 to 6 inches bgs. Also, collect four additional samples at 6 to 12 inches bgs in those areas. Please, let me know if you have any questions. You can also call me.



Eva Barber
Technical Assistance Coordinator
Toxics Cleanup Program, Southwest Regional Office
Washington State Department of Ecology
Cell: 360-999-9593
✉ *eva.barber@ecy.wa.gov*

From: James Welles <James.Welles@pbsusa.com>
Sent: Thursday, March 04, 2021 3:45 PM
To: Fernandez, Sonia (ECY) <sofe461@ECY.WA.GOV>
Cc: Barber, Eva (ECY) <evba461@ECY.WA.GOV>
Subject: VCP Application and Work Plan for Review - Olympic View Elementary School - Federal Way Public School District

Sonia,

Attached are a VCP application, agreement, and checklist for Olympic View Elementary School in Federal Way. Additionally, I've attached a Remedial Action Work Plan for which we are requesting an opinion. This work plan and VCP enrollment are in relation to the cleanup of Tacoma Smelter Plume impacts at the site. As such, I've copied Eva here as well.

Please let me know if you have any questions, or require additional information. Thanks in advance for your time in assisting the district with this matter,

James Welles, LG | Project Geologist | PBS Seattle | (206) 348-6317 (mobile)

Attachment B

Laboratory Report and Chain of Custody Documentation

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 18, 2021

James Welles, Project Manager
PBS Engineering and Environmental, Inc.
214 E. Galer St, Suite 300
Seattle, WA 98102

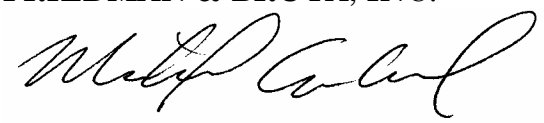
Dear Mr Welles:

Included are the results from the testing of material submitted on March 12, 2021 from the FWPS OLV Soils 41519.008, F&BI 103243 project. There are 23 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PBS0318R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 12, 2021 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental FWPS OLV Soils 41519.008, F&BI 103243 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
103243 -01	3-01-06
103243 -02	3-01-12
103243 -03	3-02-06
103243 -04	3-02-12
103243 -05	3-03-06
103243 -06	3-03-13
103243 -07	3-04-06
103243 -08	3-04-12
103243 -09	3-05-06
103243 -10	3-05-12
103243 -11	3-06-06
103243 -12	3-06-12
103243 -13	3-07-06
103243 -14	3-07-12
103243 -15	3-08-06
103243 -16	3-08-12
103243 -17	3-09-06
103243 -18	3-09-12
103243 -19	3-10-06
103243 -20	3-10-12
103243 -21	3-11-06
103243 -22	3-11-12
103243 -23	3-12-06
103243 -24	3-12-12
103243 -25	3-13-06
103243 -26	3-13-12
103243 -27	3-14-06
103243 -28	3-14-12
103243 -29	3-15-06
103243 -30	3-15-12

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-01-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-01
Date Analyzed:	03/15/21	Data File:	103243-01.096
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.51
Lead	19.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-02-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-03
Date Analyzed:	03/15/21	Data File:	103243-03.099
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	30.2
Lead	66.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-03-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-05
Date Analyzed:	03/15/21	Data File:	103243-05.100
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	12.5
Lead	18.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-04-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-07
Date Analyzed:	03/15/21	Data File:	103243-07.101
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.75
Lead	5.46

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-04-12	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-08
Date Analyzed:	03/15/21	Data File:	103243-08.102
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.53
Lead	4.82

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-05-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-09
Date Analyzed:	03/15/21	Data File:	103243-09.105
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.39
Lead	6.78

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-06-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-11
Date Analyzed:	03/15/21	Data File:	103243-11.106
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.56
Lead	7.45

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-07-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-13
Date Analyzed:	03/15/21	Data File:	103243-13.107
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	17.7
Lead	10.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-08-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-15
Date Analyzed:	03/15/21	Data File:	103243-15.108
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.22
Lead	6.86

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-08-12	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-16
Date Analyzed:	03/15/21	Data File:	103243-16.109
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.14
Lead	4.67

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-09-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-17
Date Analyzed:	03/15/21	Data File:	103243-17.110
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.33
Lead	16.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-10-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-19
Date Analyzed:	03/15/21	Data File:	103243-19.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.22
Lead	20.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-11-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-21
Date Analyzed:	03/15/21	Data File:	103243-21.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.04
Lead	6.01

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-12-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-23
Date Analyzed:	03/15/21	Data File:	103243-23.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	8.76
Lead	9.50

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-12-12	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-24
Date Analyzed:	03/15/21	Data File:	103243-24.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.10
Lead	7.90

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-13-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-25
Date Analyzed:	03/15/21	Data File:	103243-25.117
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.98
Lead	5.18

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-14-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-27
Date Analyzed:	03/15/21	Data File:	103243-27.118
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.37
Lead	6.01

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-15-06	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-29
Date Analyzed:	03/15/21	Data File:	103243-29.119
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	21.3
Lead	62.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	3-15-12	Client:	PBS Engineering and Environmental
Date Received:	03/12/21	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	103243-30
Date Analyzed:	03/15/21	Data File:	103243-30.120
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	22.8
Lead	50.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	Not Applicable	Project:	FWPS OLV Soils 41519.008
Date Extracted:	03/15/21	Lab ID:	I1-166 mb
Date Analyzed:	03/15/21	Data File:	I1-166 mb.089
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Lead	<1

Date of Report: 03/18/21
Date Received: 03/12/21
Project: FWPS OLV Soils 41519.008, F&BI 103243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 103243-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	5.15	118	107	75-125	10
Lead	mg/kg (ppm)	50	15.1	96	89	75-125	8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	96	80-120
Lead	mg/kg (ppm)	50	96	80-120

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

103243

SAMPLE CHAIN OF CUSTODY ME 03/12/21 A. BLY

Page # 1 of 3

Report To James Welles

Company PBS

Address Seattle

City, State, ZIP

Phone Email James.wellesepbsusa.com

SAMPLERS (signature)

PROJECT NAME: FWPS OLV Soils

PO #: 415191,008

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Total Pb/As				Notes
3-01-06	01 A-B	3/12	1030	S	2								X				
3-01-12	02		1032														Hold
3-02-06	03		1044										X				
3-02-12	04		1047														Hold
3-03-06	05		1055										X				
3-03-12	06		1058														Hold
3-04-06	07		1115										X				
3-04-12	08		1120										X				
3-05-06	09		1130										X				
3-05-12	10		1135														Hold

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Dicks	PBS	3/12	1545
Received by:	HONG NGUYEN	FDI	✓	✓
Relinquished by:				
Received by:		Samples received at 17 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

103243

SAMPLE CHAIN OF CUSTODY ME 03/12/21

BI4

Report To J. Welles

Company

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
FLOPS OLV Soils	41519.008
REMARKS	INVOICE TO

TURNAROUND TIME
- ☒ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Total Pb/As				Notes
3-06-06	11 A-B	3/12	1142	S	2								X				
3-06-12	12		1150														Hold
3-07-06	13		1200										X				
3-07-12	14		1202														Hold
3-08-06	15		1210										X				
3-08-12	16		1212										X				
3-09-06	17		1245										X				
3-09-12	18		1248														Hold
3-10-06	19		1300										X				
3-10-12	20		1303														Hold

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Dirksen	PBS	3/12	1545
Received by:	HONG NGUYEN	FBI	✓	✓
Relinquished by:				
Received by:		Samples received at 17 °C		

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Seattle, WA 98119-2029
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103243

SAMPLE CHAIN OF CUSTODY

ME 03/12/21 BIA

Page # 3 of 3

Report To JW

Company

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME	PO #
FWPS OLV Soils	41519.008
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total As/Pb				Notes
						ANALYSES REQUESTED											
3-11-06	21 A B	3/12	1310	S	2								X				
3-11-12	22		1315														Hold
3-12-06	23		1325										X				
3-12-12	24		1327										X				
3-13-06	25		1340										X				
3-13-12	26		1343														Hold
3-14-06	27		1400										X				
3-14-12	28		1402														Hold
3-15-06	29		1430										X				
3-15-12	30		1433										X				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Dickey	PBS	3/12	1545
Received by:	HOA NGUYEN	FBZ	✓	
Relinquished by:				
Received by:		Samples received at 17 °C		

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