Revised Lead and Arsenic Contaminated Soil Closure Report

Olympic View K-8 School
2626 SW 327th Street
Federal Way, Washington

VCP Project ID: NW3305

Prepared for:
Federal Way Public Schools
33330 8th Avenue South
Federal Way, WA 98003

October 30, 2024
PBS Project No. 41519.008

PBS
AN APEX COMPANY
214 E GALER STREET, SUITE 300
SEATTLE, WA 98102
206.233.9639 MAIN
866.727.0140 FAX
PBSUSA.COM

Table of Contents

Supporting Data

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

PBS Engineering and Environmental LLC (PBS) provided remediation oversight and confirmation sampling for arsenic impacted soil at Olympic View K-8 School (the Site). The Site is located at 2626 SW 327th Street in Federal Way, Washington (see Figure 1). The work was completed on behalf of Federal Way Public Schools (FWPS) in conjunction with the redevelopment of the Site as a new school.

2 BACKGROUND

The site is located within the widespread soil contamination plume of the former Asarco smelter operation. The Asarco Company operated a copper smelter in Tacoma from 1890 to 1985. Smelter operations emitted an airborne plume of particulates with arsenic, lead, and other heavy metals that were distributed over a wide region of the Puget Sound. As a result, these metals have been found in near surface soils at concentrations which may pose a threat to human health and/or the environment. The Washington State Department of Ecology's (Ecology's) "Everett and Tacoma Smelter Search" website[1] maps the site as being within a zone of potential arsenic concentrations ranging from 20 milligrams per kilogram (mg/kg) to 40 mg/kg[2]. Thus, the 20 mg/kg to 40 mg/kg range can be considered the "baseline" for arsenic concentrations in near surface soils expected on site.

PBS completed soil characterization sampling at the Site. Soil characterization sampling was conducted in accordance with Ecology's *Tacoma Smelter Plume Model Remedies Guidance* (Smelter Plume Guidance)[3]. The purpose of the soil characterization sampling was to determine if there are areas of elevated arsenic or lead concentrations in shallow soil at the site which would require remediation during redevelopment. Ecology's Guidance defines elevated concentrations as:

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

2.1 Initial Soil Characterization – September 2020

In September 2020, PBS performed initial soil characterization sampling at the site to evaluate concentrations of arsenic and lead in shallow soil at the site. Laboratory analysis of soil characterization samples identified one sample location in Decision Unit 2 (sample ID 2-02) of elevated arsenic concentrations as defined by the Smelter Plume Guidance. Findings of the sampling activities were presented in the *Olympic View Elementary - Arsenic and Lead Soil Sampling Report* dated September 16, 2020 (Appendix A).

2.2 Supplemental Soil Characterization – December 2020

Supplemental sampling was conducted in December 2020 to further assess the extent of arsenic impacted soil in the vicinity of location 2-02. No additional elevated concentrations of arsenic were detected in supplemental soil characterization samples. Detected concentrations of lead and arsenic were below the Model Toxics Control Act (MTCA) Method A cleanup level (CUL) for unrestricted land use. Results of supplemental soil sampling were presented in the *Olympic View Elementary School - Supplemental Arsenic and Lead Soil Sampling Report* dated January 7, 2021 (Appendix A).

[1] https://apps.ecology.wa.gov/dirtalert/
[2] https://fortress.wa.gov/ecy/smeltersearch/
[3] "*Tacoma Smelter Plume Model Remedies Guidance – Sampling and Cleanup of Arsenic and Lead Contaminated Soils*", Washington State Department of Ecology, July 2019, Publication No. 19-19-101.

2.3 Remedial Action Work Plan and VCP Enrollment – March 2021

PBS prepared a *Remedial Action Work Plan for Tacoma Smelter Plume Impacts* (RAWP) for the Site dated March 3, 2021 (Appendix A). The RAWP detailed proposed cleanup actions to be implemented at the Site to address the single area of elevated arsenic concentrations identified by soil characterization. Additionally, the RAWP requested a No Further Action (NFA) likely opinion from Ecology based on the proposed cleanup actions.

The RAWP and associated request for opinion were submitted to Ecology along with a Voluntary Cleanup Program (VCP) enrollment application on March 4, 2021. The Site was accepted into the VCP on April 1, 2021 (Appendix B).

Ecology responded to the RAWP and associated request for opinion in a March 11, 2021, email requesting additional supplemental sampling in the treed areas along the northern and western property boundaries prior to approval of the RAWP.

2.4 Second Supplemental Soil Characterization – March 2021

PBS performed a second supplemental soil characterization event on March 12, 2021, to address Ecology's request for additional soil characterization. The second supplemental soil characterization event did not identify any elevated concentrations of arsenic or lead. Results were presented in the *Olympic View Elementary School – Supplemental Sampling for VCP and Work Plan Review* report dated March 26, 2021. The report again requested a NFA likely opinion from Ecology based on the RAWP and additionally requested soil characterization data.

2.5 NFA Likely Opinion – June 2021

Ecology responded to the request for opinion in a June 10, 2021, opinion letter. The letter offered the following opinions regarding smelter plume impacts:

- Ecology has determined that no further remedial action will likely be necessary at the Property to clean up contamination associated with the Asarco Site.
- Ecology has determined that further remedial action will likely still be necessary elsewhere at the Asarco Site, but no further remediation will be necessary for the Property.

The June 10, 2021, opinion letter is included in Appendix B.

3 SOIL REMEDIATION VIA IMPLEMENTATION OF MODEL REMEDY

Mixing in place was implemented per the RAWP as described below.

3.1 Model Remedy Means and Methods

Mixing in place of soils within remediation areas identified in the work plan was performed with a track-mounted excavator. The excavator bucket was used to mix soils to the prescribed depth as well as laterally with surrounding soils within the mixing interval. Following implementation of the model remedy, PBS established a sampling grid based on the dimensions of the remediation area and prescribed number of confirmation samples as established in the RAWP. Confirmation soil samples were collected from grid centers within each remediation area at the depths specified in Table 1. Samples were collected directly into laboratory provided containers. PBS staff wore new disposable nitrile gloves for the collection of each sample to avoid cross contamination.

In the event that a confirmation soil sample result exceeded the CUL for arsenic or lead, additional mixing in place was performed within that sample grid to a greater depth, and the area was resampled in the same manner described above.

3.2 Model Remedy Implementation

On January 19, 2022, SCI Infrastructure LLC, a subcontractor to Forma Construction (Forma, Site general contractor) performed soil remediation by mixing in place to a depth of 12 inches below ground surface (bgs). Upon completion of soil remediation, PBS laid out a confirmation soil sampling grid within the remediation area and collected confirmation soil samples from 12 inches bgs at grid centers as depicted in Figure 2.

3.3 NFA Opinion – May 2023

Ecology responded to the request for an NFA determination in the May 2023, Contaminated Soil Closure Report via email. The email offered the following opinion regarding smelter plume impacts:

- Ecology will need to review sampling data from the 0 to 6-inch depth to verify that the selected remedy (mixing) reduced the level of arsenic in the soil to below cleanup levels, prior to issuing a No Further Action (NFA) determination.

The September 18, 2024, email is included in Appendix B.

3.4 Supplemental Confirmation Sampling

PBS performed confirmation soil sampling on October 20, 2024, to address Ecology's request for additional sampling data from the 0 to 6-inch depth. PBS collected confirmation soil samples from 0 to 6-inches bgs from the remediation area grid centers as depicted in Figure 2. The supplemental confirmation sampling event did not identify any elevated concentrations of arsenic or lead. Results are presented in Table 1.

4 ANALYTICAL RESULTS

Analytical results for final confirmation soil samples collected from each remediation area grid section indicate that soil remaining in place at the Site does not contain arsenic or lead at concentrations exceeding the MTCA Method A CULs.

The confirmation sample analytical results are summarized in Table 1. Laboratory reports for soil sample analysis are presented as Appendix C.

5 CONCLUSIONS

Soil characterization sampling at the site conducted in 2020 identified one area of elevated arsenic concentrations. Implementation of the model remedy has successfully reduced arsenic concentrations in soil to below the CUL in these areas.

Based on the above conclusions, Ecology's June 10, 2021, opinion letter, and Ecology's September 18, 2024, email, PBS requests a No Further Action (NFA) determination for the site on behalf of FWPS.

6 LIMITATIONS

PBS has prepared this report for use by Federal Way Public Schools. This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the client and PBS.

This study was limited to the tests, locations, and depths, as indicated, to determine the absence or presence of certain contaminants. The Site may have other contamination that was not characterized by this study. The

findings and conclusions of this report are not scientific certainties but, rather, are probabilities based on professional judgment concerning the significance of the data gathered during this investigation. PBS is not able to represent that the site or adjoining land contain no hazardous waste, oil, or other latent conditions beyond that detected or observed by PBS.

Sincerely,
PBS Engineering and Environmental LLC

Digitally signed by Sarah Newport
Date: 2024.11.01 10:09:44 -07'00'

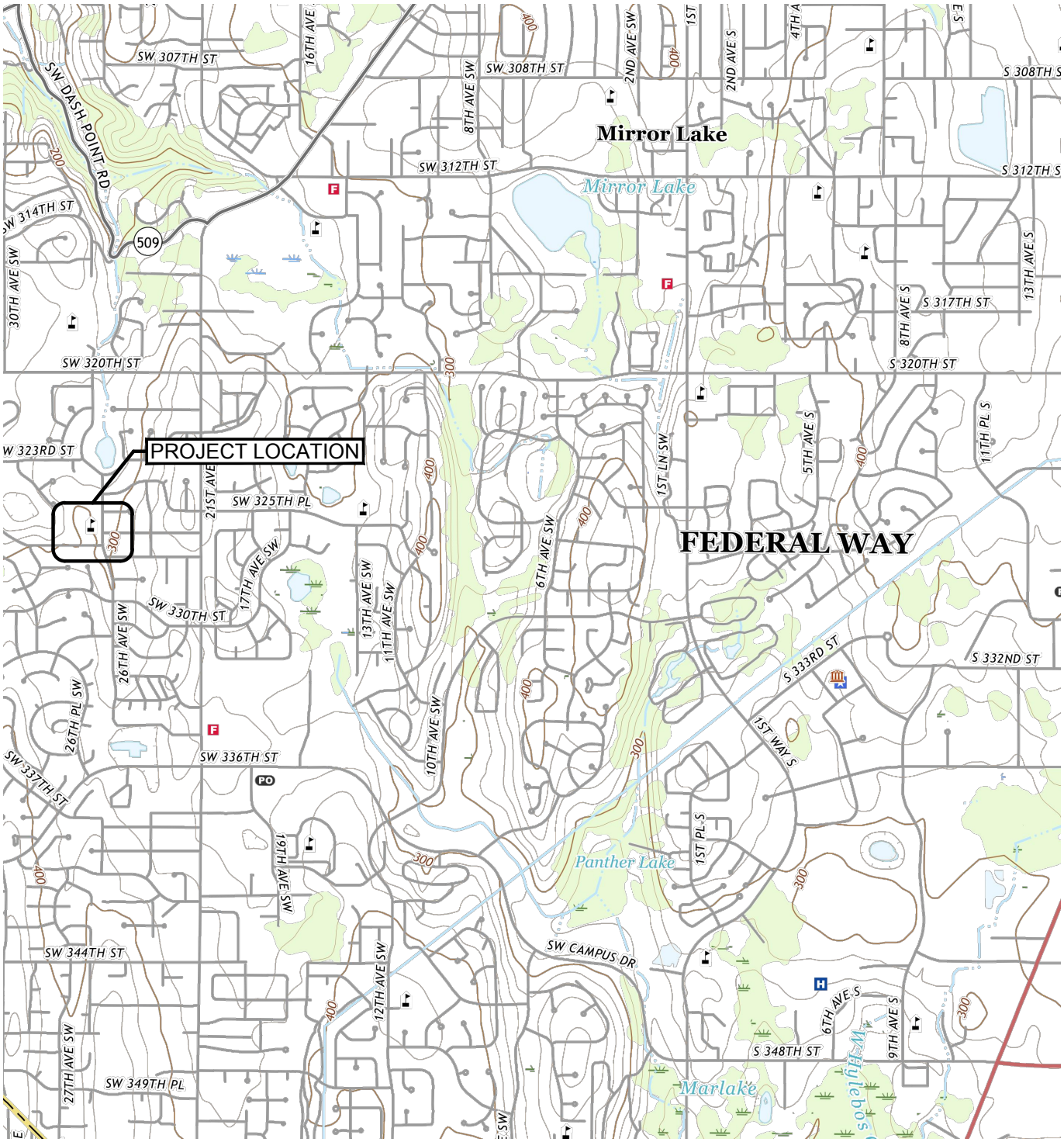
Sarah Newport
Staff Geologist

Melanie L. Young

Digitally signed by Melanie Young
Date: 2024.11.01 13:58:39-07'00'

Melanie Young, PE
Senior Environmental Engineer

Figures



SOURCE: USGS POVERTY BAY, WA QUADRANGLE 2020.

WASHINGTON

SCALE 1" = 2000'

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

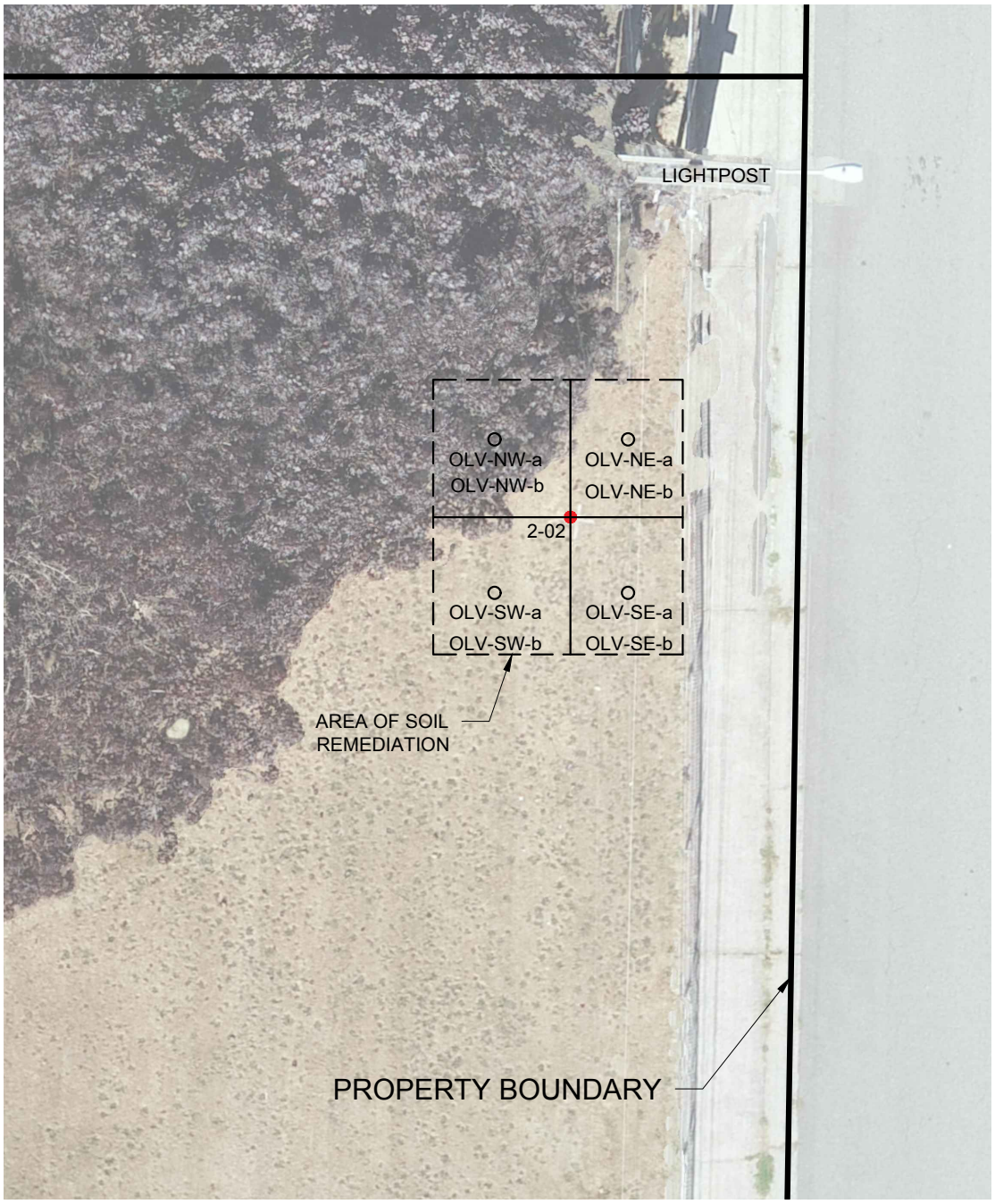
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

VICINITY MAP

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

OCT 2024
41519.008

FIGURE
1



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 2-02	ORIGINAL SAMPLE LOCATIONS WITH ELEVATED ARSENIC CONCENTRATIONS FROM 0-6 INCHES BGS
O OLV-SW-1	REMEDIATION AREA SAMPLE LOCATION

SCALE 1" = 10'

0' 5' 10' 20'

PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

PBS

REMEDIATION AREA & SAMPLE LOCATION MAP

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

OCT 2024
41519.008

FIGURE
2

Tables

TABLE 1

Confirmation Soil Sample Analytical Results

Olympic View K-8 School

2626 SW 327th Street, Federal Way, Washington

PBS Project No. 41519.008

Sample Identification	Sample Depth (inches below original grade)	Metals	
		As	Pb
Cleanup Criteria	**MTCA Method A Cleanup Levels For Soil[a]**	**20**	**250**
Soil Sampling: January 19, 2022		Results in mg/kg	
OLV-NE-a	12	5.30	10.90
OLV-NW-a	12	3.83	7.11
OLV-SE-a	12	3.72	7.26
OLV-SW-a	12	3.37	4.80
Soil Sampling: October 10, 2024		Results in mg/kg	
OLV-NE-b	0-6	7.5	19
OLV-NW-b	0-6	10.0	27
OLV-SE-b	0-6	4.0	12
OLV-SW-b	0-6	6.9	13

Notes:

BOLD indicates concentration exceeding MTCA Method A Cleanup Levels for Soil

Analytical Methods:

Metals analyzed by Environmental Protection Agency Method 6020A

Footnotes:

[a] Washington State Department of Ecology Model Toxics Control Act Method A Cleanup Level for Unrestricted Land Use as established in WAC 173-340-900

Abbreviations & Acronyms:

mg/kg - milligrams per kilogram

As - arsenic

Pb - lead

Appendix A

Soil Characterization Reports and Remedial Action Work Plan

September 16, 2020

Federal Way Public Schools
Capital Projects
1211 S 232nd St
Federal Way, WA 98004
Email: fwpscp18@fwps.org

RE: Olympic View Elementary School – Arsenic and Lead Soil Sampling
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.

On September 1, 2020 PBS performed soil sampling activities to determine the levels of arsenic and lead in shallow soil at OLV in Federal Way, Washington (Figure 1). This report presents the findings of the sampling activities and provides recommendations for regulatory compliance as well as for the handling and management of impacted soils during future redevelopment. The scope of services was presented in the Proposal for Arsenic and Lead Soil Testing (WA31072) by PBS, dated August 17, 2020.

BACKGROUND

OLV is located within the widespread soil contamination plume of the former Asarco smelter operation. The Asarco Company operated a copper smelter in Tacoma from 1890 to 1985. Smelter operations emitted an airborne plume of particulates with arsenic, lead, and other heavy metals that were distributed over a wide region of the Puget Sound. As a result, these metals have been found in near surface soils at concentrations which may pose a threat to human health and/or the environment.

Ecology's Tacoma Smelter Plume Model Remedies Guidance (Smelter Plume Guidance) recommends soil sampling at properties in areas with estimated arsenic levels above the state cleanup level of 20 parts per million (ppm)[1]. Ecology's Dirt Alert website[2] maps the site within an area of predicted arsenic concentrations ranging from 20 to 40 ppm. Thus, the 20 to 40 ppm range can be considered the "baseline" for arsenic concentrations in near surface soils expected on site. Based on the predicted arsenic concentration at the site and the approximate 9.5-acre area of the parcel, the Smelter Plume Guidance recommends samples be collected from a minimum of 44 locations.

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.

[1] *"Tacoma Smelter Plume Model Remedies Guidance: Sampling and cleanup of arsenic and lead contaminated soils"*, Washington State Department of Ecology, July 2019, Publication No. 19-09-101
[2] https://apps.ecology.wa.gov/dirtalert/

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[3]. 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 land use as a school, FWPS has elected to clean up site soils found to be in exceedance of CULs, even if the soils are not defined as elevated per the Smelter Plume Guidance.

CHARACTERIZATION SOIL SAMPLING

On September 1, 2020, fifty-five (55) discrete soil samples were collected from forty-four (44) locations around the building landscaping and playfields of OLV. Following Ecology guidance, the property was divided into two decision units based on current use as playfield or landscaped area. Decision units and sample locations are shown on Figure 2. A summary of the decision units is provided below. The number of samples collected for analysis per decision unit for this project is based on the Smelter Plume Guidance.

Decision Units

Decision Unit ID	Soil disturbance planned?	Number of samples collected (0-6")	Number of samples collected (6-12")	Acres (approximate)	Total Number of Samples
1	unknown	24	6	4.5	30
2	unknown	20	5	5	25

0-6" = Soil samples were collected from the 0-6 inch depth interval
6-12" = Soil samples were collected from the 6-12 inch depth interval

Per the Smelter Plume Guidance, one (1) discrete sample was collected at each sample location from a depth interval of 0 to 6 inches below ground surface (bgs). A second discrete sample was collected at every fourth location from a depth interval of 6 to 12 inches bgs. Sample locations were chosen in a manner that maximized coverage of the decision units and did not contain areas with surface cover or buildings during the sampling activities.

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 6 inches below ground surface at each location. At every fourth location, upon collection of the 0- to 6-inch sample, the hole was advanced to a depth of 12 inches, and a second sample was collected from the 6- to 12-inch depth interval using the same methods described above.

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.

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

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

ANALYTIC RESULTS

Analytical results from soil samples collected on site are below MTCA Method A CULs for arsenic, except for one (1) sample from a single location (Sample ID: 2-02) on the eastern side of Decision Unit 2 adjacent to 26th Avenue SW (See Figure 2). The sample collected from 0 to 6 inches bgs at location 2-02 contained arsenic at a concentration of 53.1 mg/kg. The concentration is both in exceedance of the CUL and considered elevated per the Smelter Plume Guidance. All other sample results for arsenic were below the MTCA Method A cleanup level of 20 mg/kg.

All analytical results for lead from soil samples collected on-site are below the MTCA Method A cleanup level of 250 mg/kg.

Based on the analytical results of soil samples collected on-site, average arsenic and lead concentrations were calculated for each decision unit and are presented below.

Average Concentrations per Decision Unit

Decision Unit ID	Mean Concentration (0-6″)		Mean Concentration (6-12″)	
	As	Pb	As	Pb
1	4.48	22.19	3.20	5.98
2	8.89	20.12	4.59	13.49
MTCA A Cleanup Level	20	250	20	250

(0-6″) (Pb / As) = Average Concentration at the 0 to 6-inch interval for arsenic (As) and lead (Pb) in mg/kg
(6-12″) (Pb / As) = Average Concentration at the 6 to 12-inch interval for arsenic (As) and lead (Pb) in mg/kg

Analytical results from soil samples collected on-site are summarized in Table 1. Figure 2 depicts the decision unit boundaries and the locations where analytical results indicated lead or arsenic concentrations above MTCA Method A CULs. Laboratory reports are provided in Attachment A.

CONCLUSIONS

Based on the analytical results of the soil sampling, and using Ecology's Tacoma Smelter Plume Model Remedy Guidance, June 2019, the following conclusion and recommendations were made regarding the handling and management of project site soils.

Decision Unit 1

No further action is advised within Decision Unit 1 based on the results of soil sampling conducted on September 1, 2020.

Decision Unit 2

Analytical results from the discrete soil sample collected at sample location 2-02 indicated arsenic concentrations are above MTCA Method A CULs and Smelter Plume Guidance elevated levels in the top 6" bgs. A deeper sample was not collected in this location.

Further action will be required to address the arsenic concentrations in soil at the above referenced location and achieve compliance with Ecology regulations. According to Ecology's Model Remedies Guidance, the impacted soil can be managed in-place or removed by excavation. Strategies for management of impacted soil in-place include dilution of arsenic concentrations via mixing of impacted soil with clean imported soil or capping of soil in place with clean soil and a geotextile or a hard cap. Mixing of soils is accepted for arsenic-impacted soil with an average concentration less than 40 ppm. Ecology does not consider capping in-place a permanent remediation strategy given the potential for exposure if the cap is removed. Capping in-place may require annual inspection of the cap's integrity, as well as the filing of an environmental land covenant for the property. Based on average arsenic concentrations within Decision Unit 2 mixing in place is proposed as the preferred model remedy at the site. PBS recommends additional sampling to further delineate the lateral and vertical extents of elevated arsenic concentrations in the vicinity of sample location 2-02.

Remediation of impacted soils can be conducted by the contractor as part of the Olympic View Elementary School Replacement Project under PBS's supervision, but must be completed prior to any grading, excavation or earthwork activities that disturb on-site soil. The construction design and specifications for remediation of the arsenic-impacted soil as part of the Olympic View Elementary School Replacement Project shall incorporate health and safety requirements, methods for soil removal, disposal and confirmation sampling and soil management strategies.

LIMITATIONS

This investigation was conducted to characterize lead and arsenic distributions in shallow soils 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 of 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. The conclusions in this report are not to be considered a legal opinion as the client's duty concerning due diligence relating to potential liabilities in leasing, owning, or purchasing real estate.

PBS ENGINEERING AND ENVIRONMENTAL INC.

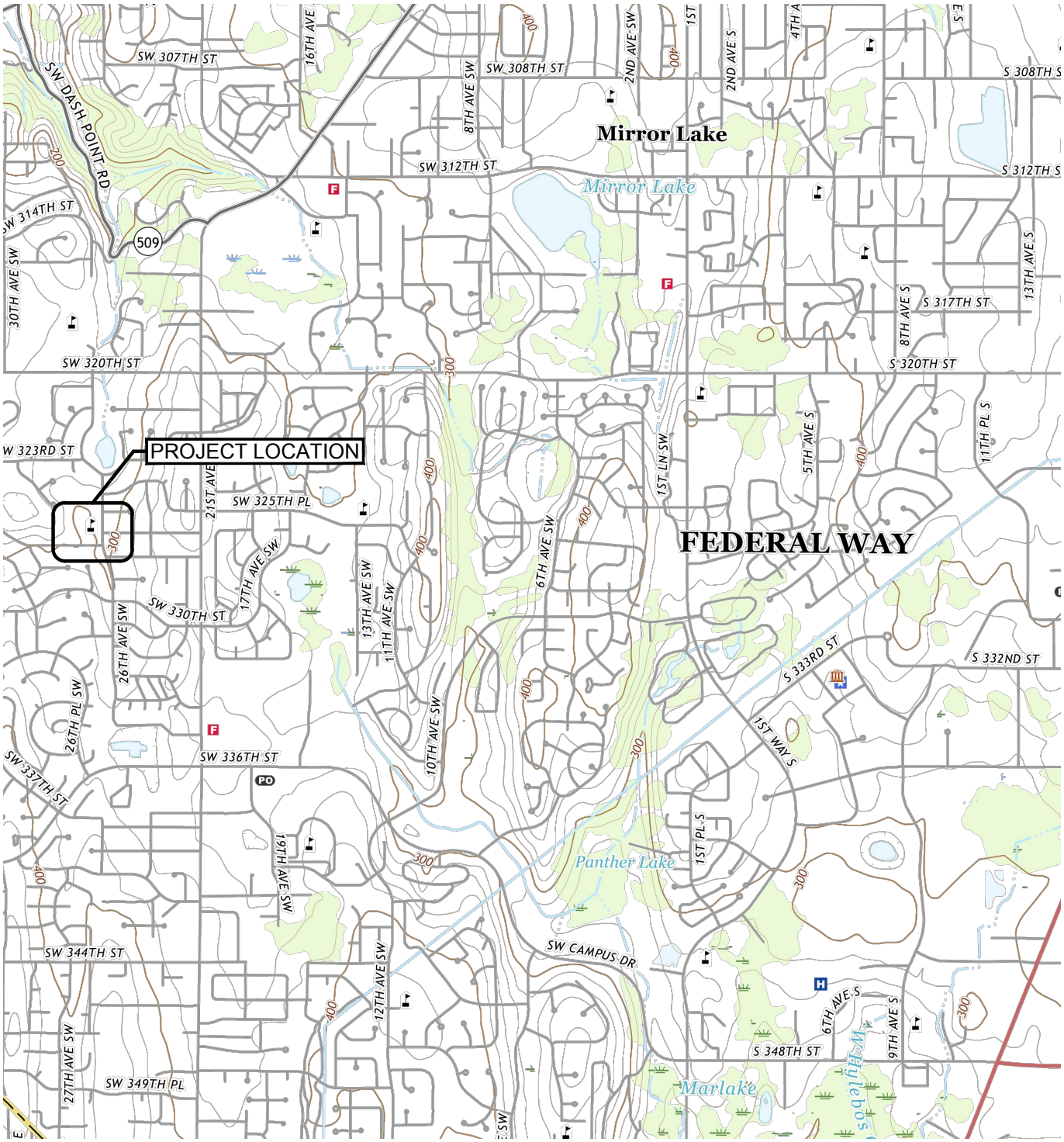
James Welles, LG
Project Geologist

Reviewed By:

Melanie Young, PE
Senior Environmental Engineer

Attachments:
Figure 1: Vicinity Map
Figure 2: Sample Location Map
Table 1: Laboratory Data Summary Table
Attachment A: 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

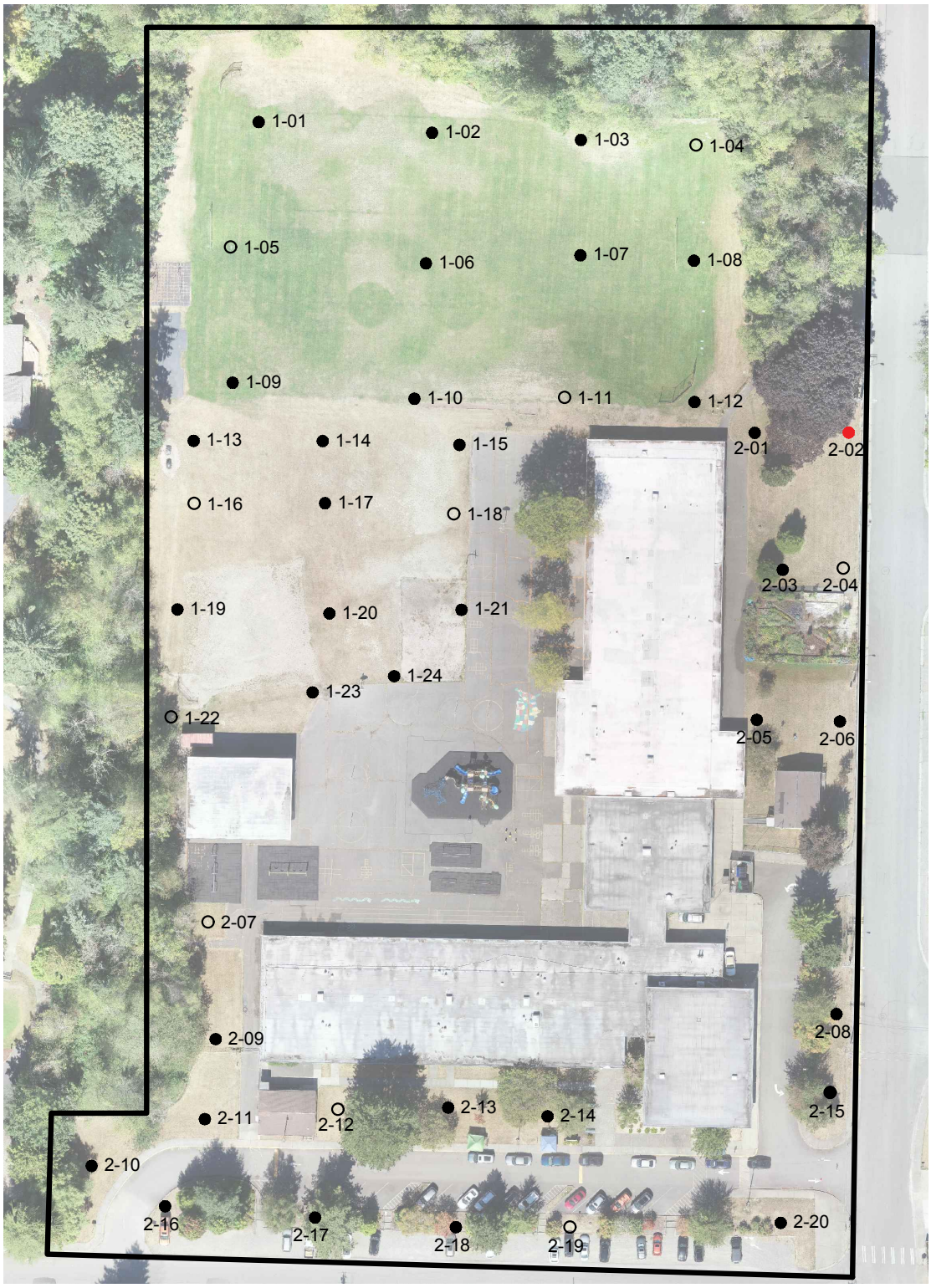
PBS

VICINITY MAP

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

SEP 2020
41519.008

FIGURE
1



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 1-01	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), As/Pb < MTCA
○ 1-04	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6", 6-12"), As/Pb < MTCA
● 2-02	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), As > MTCA

SCALE 1" = 100'

0' 50' 100' 200'

PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

As / Pb SOIL SAMPLE LOCATION MAP

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

SEP 2020
41519.008

FIGURE
2

Tables

TABLE 1
SOIL ANALYTICAL RESULTS
Olympic View Elementary School
2626 SW 327th Street, Federal Way, Washington
PBS Project No. 41519.008

Location	Sample Depth Range inches bgs	Metals	
		Arsenic mg/kg	**Lead** mg/kg
Decision Unit 1			
1-01	0-6	4.34	9.22
1-02	0-6	3.95	9.98
1.03	0-6	3.81	13.4
1-04a	0-6	3.33	7.03
1-05a	0-6	<5	8.63
1-06	0-6	<5	9.16
1-07	0-6	2.90	7.76
1-08	0-6	3.14	7.18
1-09	0-6	3.93	8.35
1-10	0-6	1.81	3.88
1-11a	0-6	3.80	8.28
1-12	0-6	3.51	9.88
1-13	0-6	5.11	12.5
1-14	0-6	5.84	10.8
1-15	0-6	5.67	16.4
1-16a	0-6	3.75	6.47
1-17	0-6	4.14	7.03
1-18a	0-6	16.0	27.9
1-19	0-6	3.08	5.83
1-20	0-6	3.38	6.31
1-21	0-6	<5	231
1-22a	0-6	3.62	7.16
1-23	0-6	6.18	62.1
1-24	0-6	7.22	43.6
Average		4.69	22.49
1-04b	6-12	3.07	8.54
1-05b	6-12	3.41	8.24
1-11b	6-12	2.34	5.83
1-16b	6-12	2.36	2.52
1-18b	6-12	4.35	5.01
1-22b	6-12	4.03	6.34
Average		3.26	6.08
Decision Unit 2			
2-01	0-6	4.1	7.02
2-02	0-6	**53.1**	84.1
2-03	0-6	6.33	9.37
2-04a	0-6	5.35	9.59
2-05	0-6	6.21	14.6
2-06	0-6	4.18	9.65
2-07a	0-6	3.51	10.2
2-08	0-6	3.77	14.5
2-09	0-6	11.6	23.1
2-10	0-6	13.4	23.5
2-11	0-6	9.16	14.4
2-12a	0-6	12.8	25.3
2-13	0-6	16.3	29.6
2-14	0-6	9.38	26.6
2-15a	0-6	4.81	11.5
2-16	0-6	5.20	17.3
2-17	0-6	6.46	17.1
2-18	0-6	4.27	16.3
2-19a	0-6	4.53	46.8
2-20	0-6	4.37	18.9
Average		9.44	21.47
2-04b	6-12	5.25	10.20
2-07b	6-12	3.34	9.05
2-12b	6-12	7.20	14.7
2-15b	6-12	4.54	12.7
2-19b	6-12	4.06	27.2
Average		4.88	14.77
AVERAGE CONCENTRATION FOR SITE		6.37	19.63
Adopted Criteria	**MTCA Method A Cleanup Levels For Soil[a]**	**20**	**250**
	Elevated Concentration[b]	**40**	**500**

Bold - Sample result exceeds adopted criteria

[a] - Washington State Department of Ecology Model Toxics Control Act Method A Cleanup Level for Unrestricted Land Use as established in WAC 173-340-900

[b] - Washington State Department of Ecology Tacoma Smelter Plume Model Remedies Guidance, Sampling and cleanup of arsenic and lead contaminated soils, Publication Number 19-09-101, July 2019.

Abbreviations & Acronyms:
mg/kg - milligrams per kilogram
bgs - below ground surface

January 7, 2021

Mike Kwaske
Federal Way Public Schools
Capital Projects
1211 S 232nd St
Federal Way, WA 98004
Email: mkwaske@fwps.org

RE: Olympic View Elementary School – Supplemental Arsenic and Lead Soil Sampling
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.

This *Supplemental Arsenic and Lead Soil Sampling Report* presents the findings of supplemental sampling performed surrounding locations with arsenic exceedances in December 2020 to delineate the extent of impacted soil. Results of supplemental sampling provide basis for soil requiring remediation. Soil remediation will be outlined in project specifications prepared by PBS and included in the bid package for construction of the new Olympic View Elementary School. The scope of services for supplemental sampling was presented in the Proposal to Provide Additional Soil Sampling, Contract Document Development and Construction Period Services (WA31123) by PBS, dated October 14, 2020.

BACKGROUND

OLV is located within the widespread soil contamination plume of the former Asarco smelter operation. The Asarco Company operated a copper smelter in Tacoma from 1890 to 1985. Smelter operations emitted an airborne plume of particulates with arsenic, lead, and other heavy metals that were distributed over a wide region of the Puget Sound. As a result, these metals have been found in near surface soils at concentrations which may pose a threat to human health and/or the environment.

The Washington State Department of Ecology's (Ecology) *Tacoma Smelter Plume Model Remedies Guidance* (Smelter Plume Guidance) recommends soil sampling at properties in areas with estimated arsenic levels above the state cleanup level of 20 parts per million (ppm)[1]. Ecology's Dirt Alert website[2] maps the site within an area of predicted arsenic concentrations ranging from 20 to 40 ppm. Thus, the 20 to 40 ppm range can be considered the "baseline" for arsenic concentrations in near surface soils expected on site.

Based on the predicted arsenic concentration at the site soil characterization sampling was performed at the site as recommended by the Smelter Plume Guidance.

[1] *"Tacoma Smelter Plume Model Remedies Guidance: Sampling and cleanup of arsenic and lead contaminated soils"*, Washington State Department of Ecology, July 2019, Publication No. 19-09-101
[2] https://apps.ecology.wa.gov/dirtalert/

On September 1, 2020, PBS performed soil sampling activities to determine the levels of arsenic and lead in shallow soil at OLV in Federal Way, Washington. Findings of the sampling activities and recommendations for regulatory compliance of impacted soils were presented in the Olympic View Elementary School Arsenic and Lead Soil Sampling Report dated September 16, 2020[3]. The report identified one location ("2-02") where the detected arsenic concentration exceeded Washington State Department of Ecology's Model Toxics Control Act (MTCA) Method A cleanup level (CUL) criteria for unrestricted land use (see Figure 2). This report presents the results of additional soil samples collected surrounding the exceedance to delineate the extent of impacted soil.

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[4]. 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 land use as a school, FWPS has elected to clean up site soils found to be in exceedance of CULs, even if the soils are not defined as elevated per the Smelter Plume Guidance.

SUPPLEMENTAL SOIL SAMPLING

Supplemental sampling was conducted in December 2020 to further assess the extent of arsenic-contaminated soil surrounding location 2-02.

Three (3) discrete samples were collected from locations 10 feet, 25 feet, and 50 feet to the north, south, and west of location 2-02, and from a location on the site property boundary 8 feet east from location 2-02. The purpose of these samples was to bound the lateral extent of elevated arsenic concentrations surrounding sample location 2-02. The discrete samples were taken at depth intervals of zero to six inches below ground surface (bgs), six to twelve inches bgs, and twelve to eighteen inches bgs, respectively. Samples collected 25 feet and 50 feet from the location and samples collected from six to eighteen inches bgs were submitted to the laboratory on hold pending results of shallower soil samples collected more proximal to the original sample location (2-02). If closer or shallower sample results exceeded cleanup levels, additional samples would have been analyzed to bound the extent of impacted soil. Because the surface sample at the location exceeded the Method A CUL, three (3) discrete

[3] *Olympic View Elementary School – Arsenic and Lead Soil Sampling*, PBS Engineering and Environmental, September 16, 2020.
[4] *"Model Toxics Control Act Regulation and Statute",* Washington State Department of Ecology, 2013 Revision, Publication No. 94-06

samples were collected from that location at depth intervals of six to twelve inches, twelve to eighteen inches, and eighteen and twenty-four inches bgs to bound the vertical extent of impacted soil.

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. In locations of deeper samples, test holes were then advanced to depths of eighteen and twenty-four inches bgs for collection of samples between twelve and eighteen, and eighteen and twenty-four inches bgs, respectively.

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 on site are below the MTCA Method A CULs for arsenic (20 mg/kg) and lead (250 mg/kg), respectively.

CONCLUSIONS

Based on the analytical results of the supplemental soil sampling the following conclusion and recommendations were made regarding the handling and management of project site soils.

While the original location sample result exceeded the MTCA Method A CUL for arsenic and lead, no supplemental sample results exceeded the CUL and average concentrations in the surrounding area did not exceed the Method A CUL. PBS recommends enrollment of the site in the Ecology Voluntary Cleanup Program (VCP) and remediation of the area containing elevated arsenic concentrations. Based on the concentrations detected in the characterization sampling and supplementary sampling, PBS proposes using the Model Remedy of Mixing in Place, as described in Chapter 4 of Ecology's *Tacoma Smelter Plume Model Remedies Guidance*[5]. Mixing involves diluting the concentration of contaminants by mixing the contaminated material with clean soils usually found beneath and surrounding the subject area.

Prior to completing the model remedy, PBS recommends preparation of a Soil Remediation Plan for submittal to and approval by Ecology. The plan will detail remediation methods for soil surrounding sample location 2-02. The area requiring remediation will be depicted graphically in the Soil Remediation Plan and procedures and

[5] *"Tacoma Smelter Plume Model Remedies Guidance: Sampling and cleanup of arsenic and lead contaminated soils",* Washington State Department of Ecology, July 2019, Publication No. 19-09-101

requirements of soil mixing presented project specifications, included in the bid package for construction of the new Olympic View Elementary School.

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.

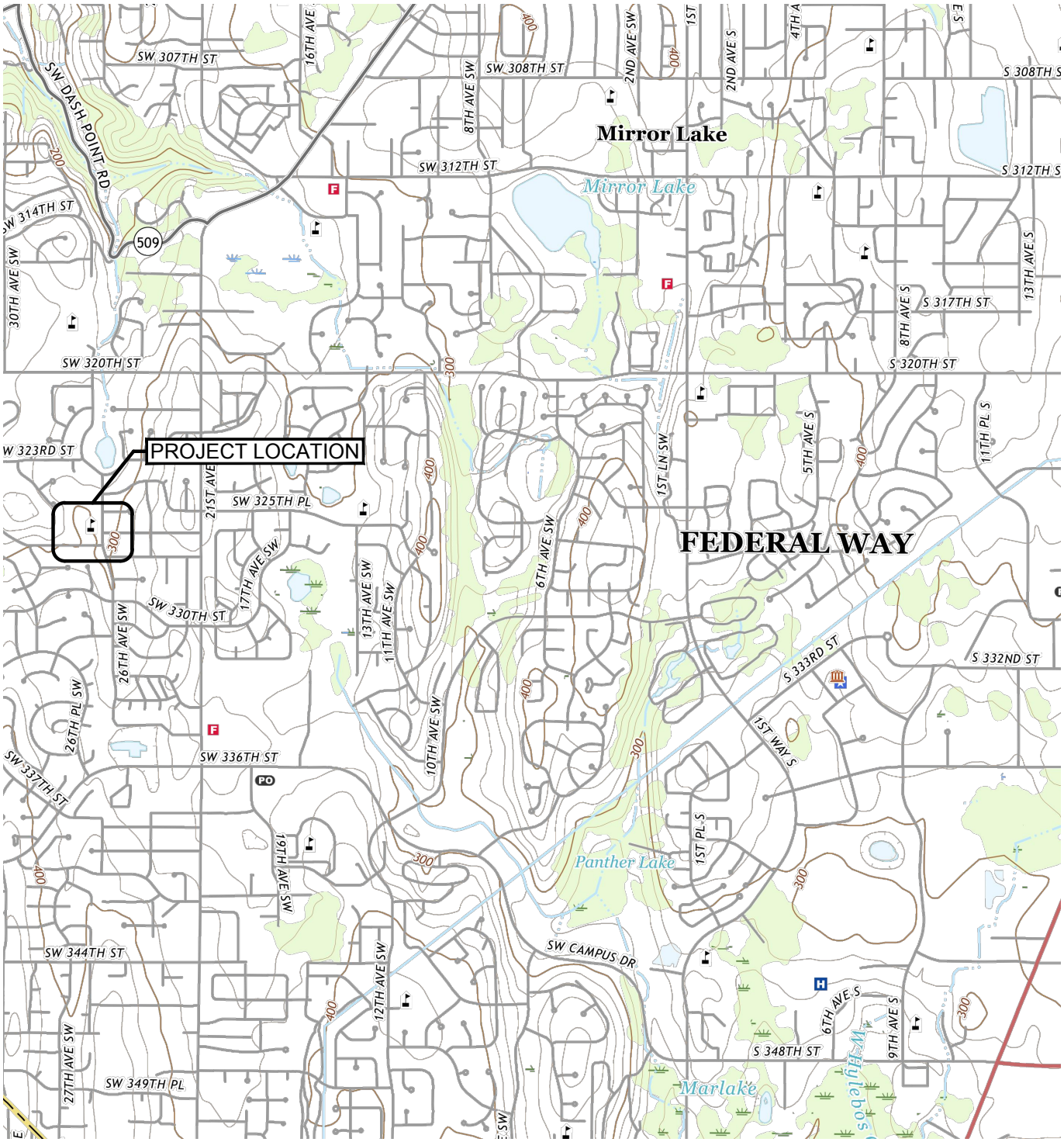
Reviewed By:

Nathan Dickey, LG
Staff Geologist

James Welles, LG
Project Geologist

Attachments:
Figure 1: Vicinity Map
Figure 2: As/Pb Soil Sample Location Map
Figure 3: Supplemental As/Pb Soil Sample Location Map
Table 1: Laboratory Data Summary Table
Attachment A: 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

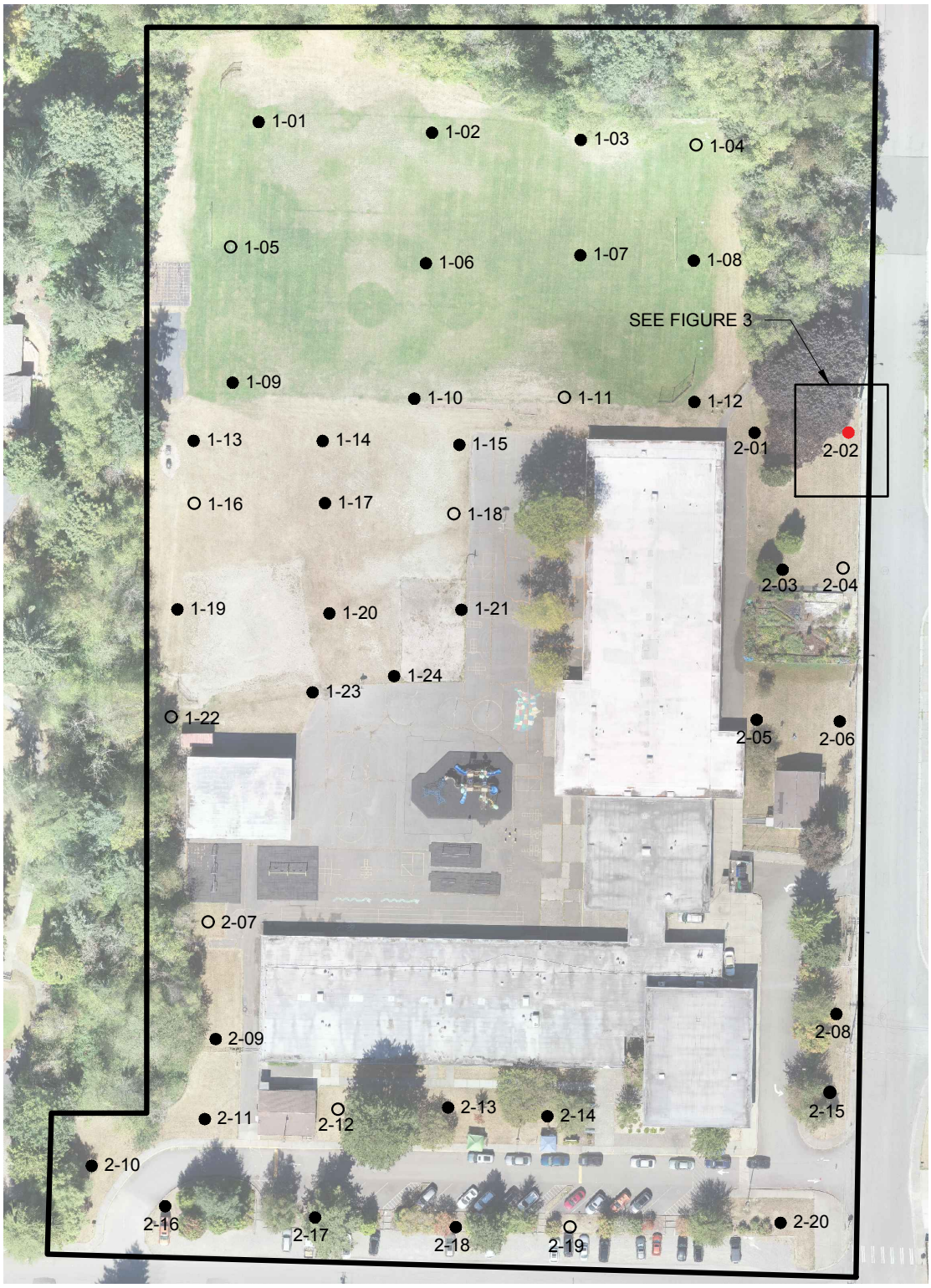
PBS

VICINITY MAP

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

JAN 2021
41519.008

FIGURE
1



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 1-01	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), As/Pb < MTCA
○ 1-04	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6", 6-12"), As/Pb < MTCA
● 2-02	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), As > MTCA

SCALE 1" = 100'

0' 50' 100' 200'

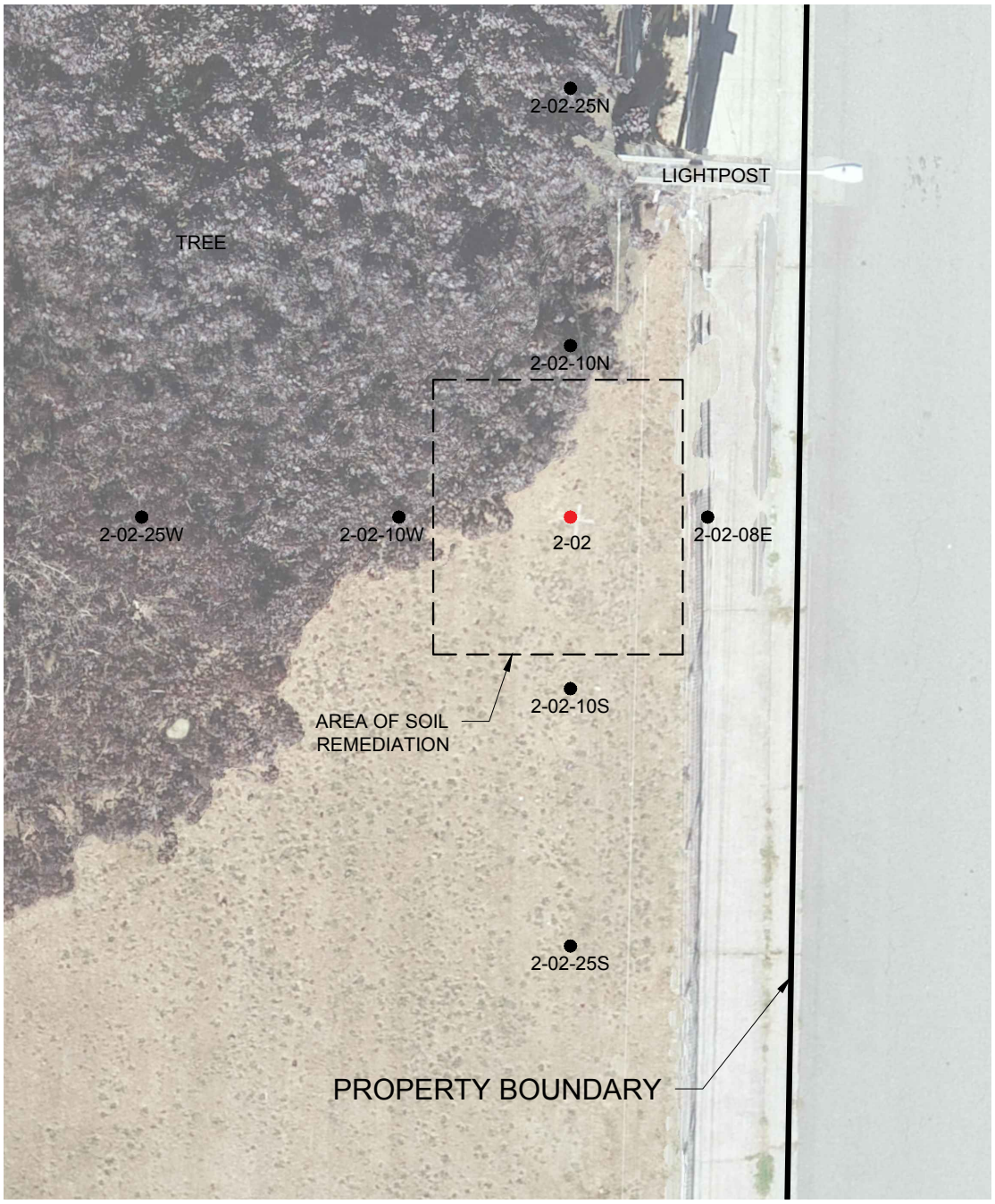
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

As / Pb SOIL SAMPLE LOCATION MAP

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

JAN 2021
41519.008

FIGURE
2



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 2-02-10W	STEP OUT SAMPLE LOCATION WITH ARSENIC AND LEAD CONCENTRATIONS <MTCA METHOD A CLEANUP LEVELS
● 2-02	ORIGINAL SAMPLE LOCATIONS WITH ELEVATED ARSENIC CONCENTRATIONS FROM 0-6 INCHES BGS

SCALE 1" = 10'

0' 5' 10' 20'

PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

PBS

SUPPLEMENTAL As / Pb SOIL SAMPLE LOCATION MAP

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

JAN 2021
41519.008

FIGURE
3

Tables

Table 1 - 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	**MTCA Method A Cleanup Level**	**20**	**250**
Delineation Samples Surrounding Sample 2-02				
2-02-10Na	10 feet north of 2-02	0-6	3.60	6.78
2-02-25Na	25 feet north of 2-02	0-6	5.76	235
2-02-10Wa	10 feet west of 2-02	0-6	4.27	7.59
2-02-25Wa	25 feet west of 2-02	0-6	4.59	7.56
2-02-10Sa	10 feet south of 2-02	0-6	4.20	9.58
2-02-25Sa	25 feet south of 2-02	0-6	3.76	8.58
2-02-08Ea	8 feet east of 2-02	0-6	4.15	23.1
Average			4.3	42.6
2-02b	six inches below 2-02	6-12	4.43	6.54
2-02c	twelve inches below 2-02	12-18	5.38	7.36
Average			4.9	7.0

Arsenic and lead analyzed by US EPA Method 6020
mg/kg - milligrams per kilogram
bgs = below ground surface

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.

---

[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.

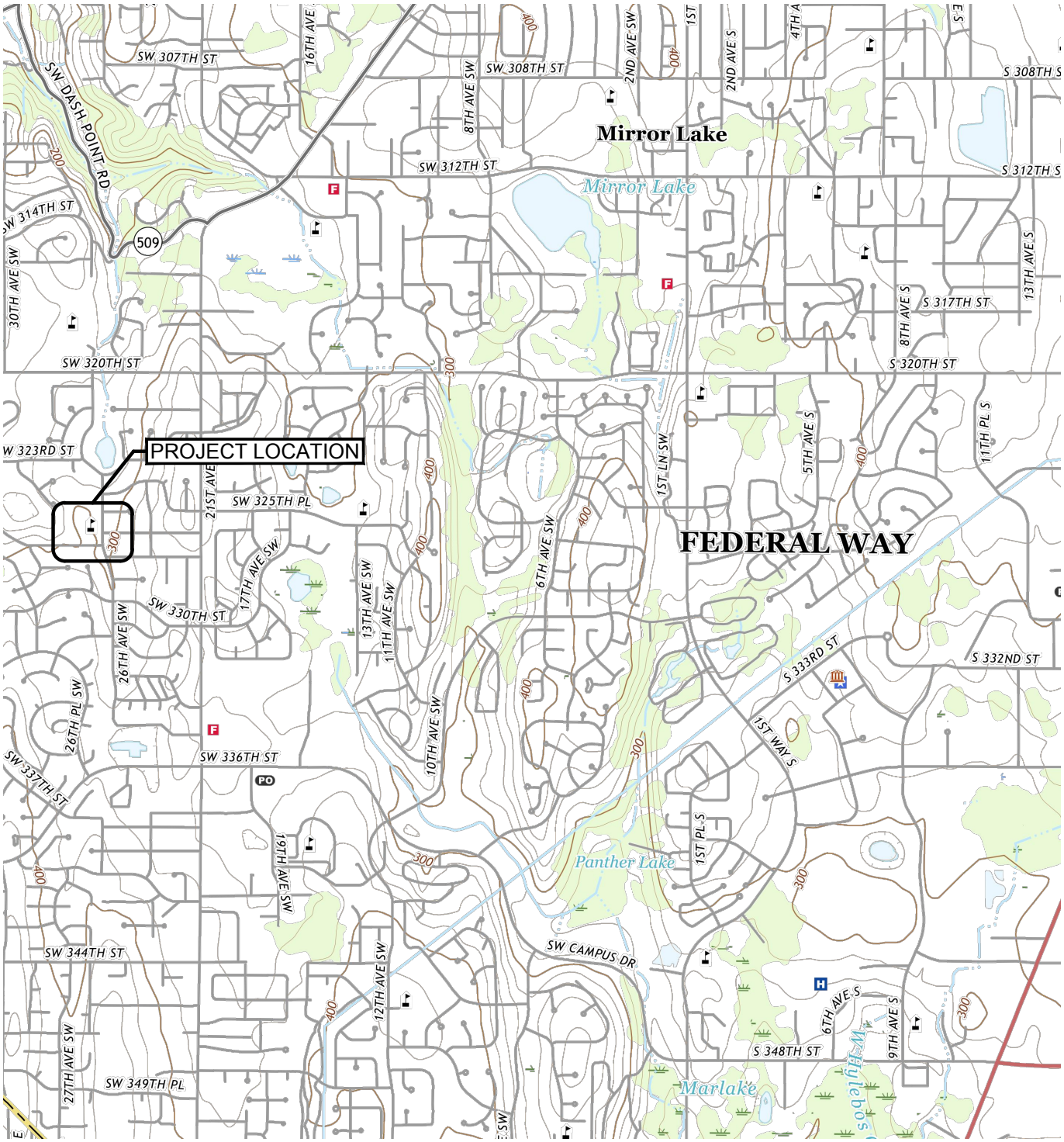
Reviewed By:

James Welles, LG
Project Geologist

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'

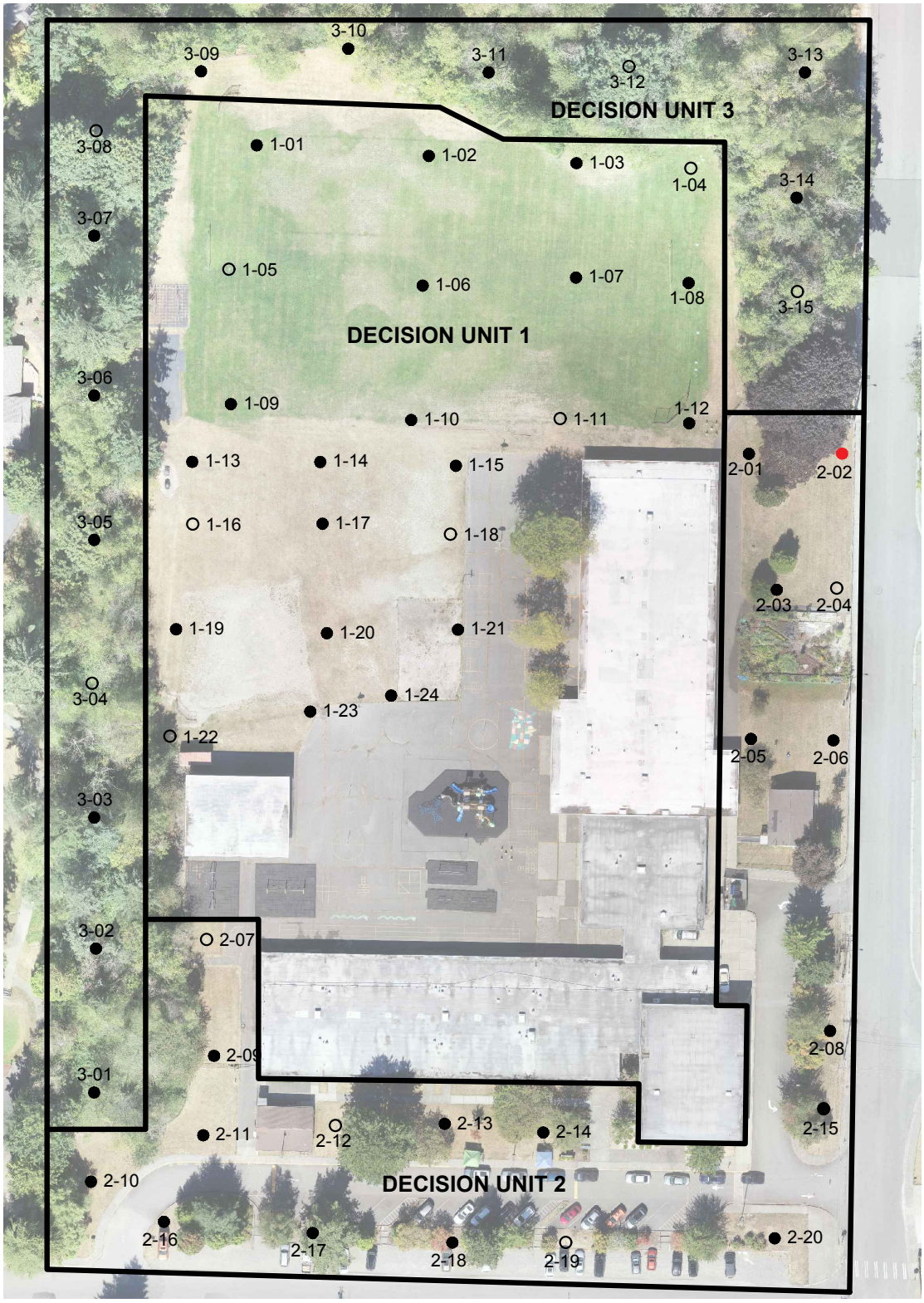
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

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

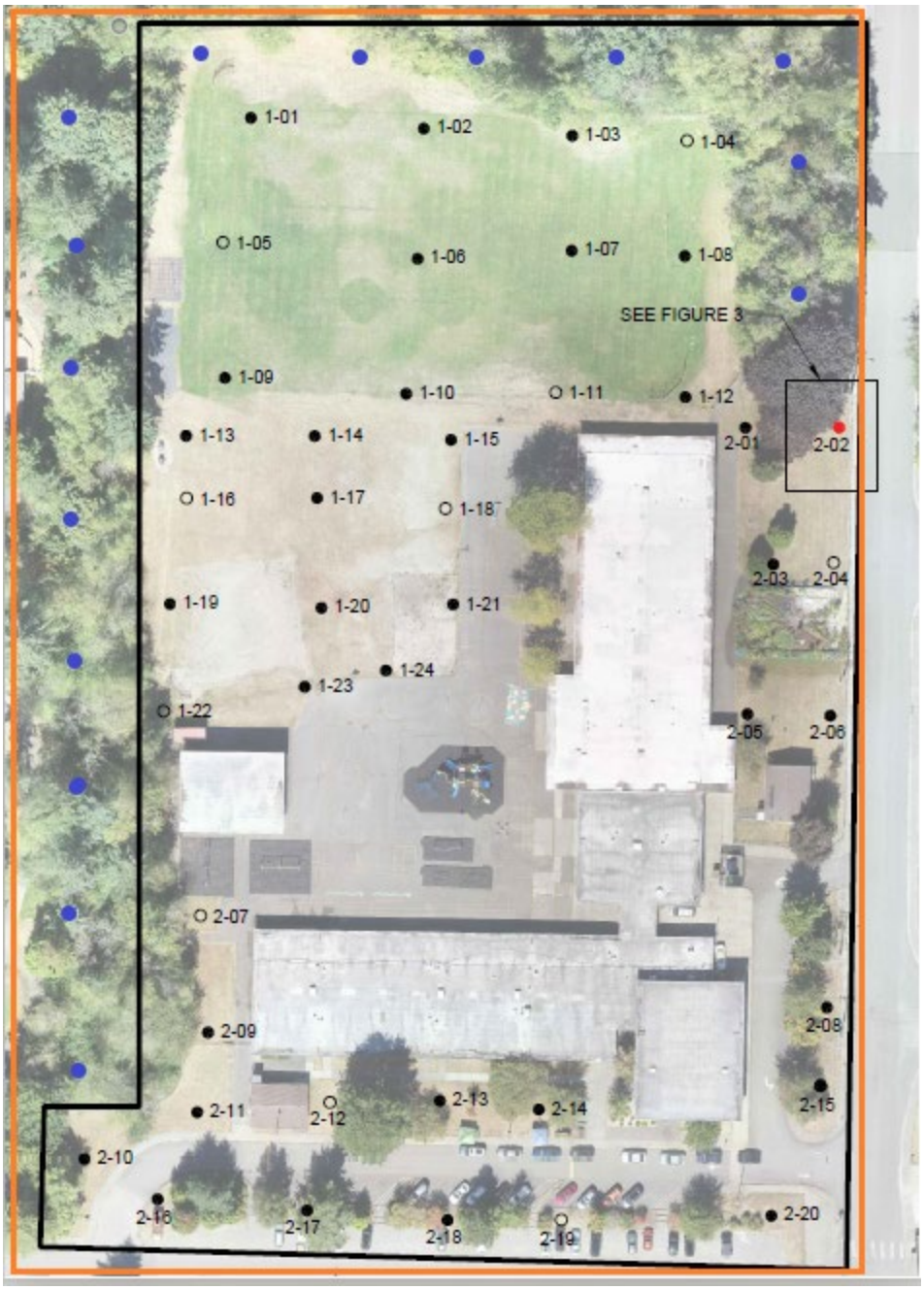
WA Dept of Ecology Email – March 11, 2021

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

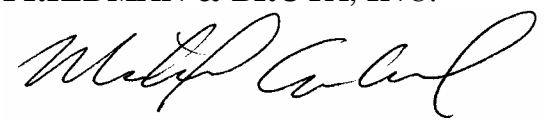
Dear Mr Welles:

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		

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

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		

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

Remedial Action Work Plan for Tacoma Smelter Plume Impacts

Site Name:	Olympic View Elementary School
Site Address:	2626 SW 327th Street, Federal Way, Washington
VCP Project ID:	Not assigned

Prepared for:
Mike Kwaske
Federal Way Public Schools
Capital Projects
33330 8th Avenue South
Federal Way, Washington, 98003

PBS Project No. 41519.008

March 3, 2021

PBS
214 EAST GALER STREET
SUITE 300
SEATTLE, WA 98102
206.233.9639 MAIN
866.727.0140 FAX
PBSUSA.COM

Table of Contents

Supporting Data

FIGURES

Figure 1 – Vicinity Map
Figure 2 – As/Pb Soil Sample Location Map
Figure 3 – Supplemental As/Pb Soil Sample Location Map

APPENDICES

Appendix A – Initial and Supplemental Soil Characterization Reports for Olympic View Elementary School

1 COVER LETTER

March 3, 2021

Eva Barber
Technical Assistance Coordinator
WA Department of Ecology Toxics Cleanup Program – Southwest Regional Office
300 Desmond Drive SE
Lacey, Washington 98503

Site Name:	Olympic View Elementary School
Site Address:	2626 SW 327th Street, Federal Way, WA
VCP Project ID:	Not Assigned

Dear Ms. Barber,

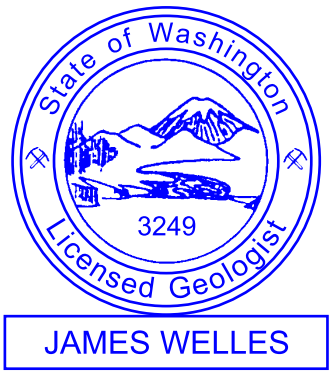
PBS has prepared this Remedial Action Work Plan for Tacoma Smelter Plume Impacts (work plan) for Federal Way Public Schools (FWPS) to address elevated arsenic concentrations in soil at Olympic View Elementary School (site) resulting from the former Tacoma Smelter Plume. The site is located at 2626 SW 327th Street in Federal Way, Washington.

On behalf of FWPS, PBS requests an opinion from Ecology relating to the following questions:

- 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?

It is noted that the NFA Likely opinion letter from Ecology will be necessary to apply for and obtain permits necessary for construction of a new school at the site from the City of Federal Way. It is further noted that upon completion of remediation activities, PBS will submit a report to Ecology detailing the results of remediation and confirmation sampling, and requesting an NFA opinion letter for the site.

Sincerely,
PBS Engineering and Environmental Inc.



James Welles, LG Date
Project Geologist

2 INTRODUCTION

This Remedial Action Work Plan (work plan) was prepared on behalf of Federal Way Public Schools (FWPS) to guide the remediation of arsenic impacted soils at Olympic View Elementary School (the Project / site). The site is located at 2626 SW 327th Street in Federal Way, Washington (see Site Vicinity Map, Figure 1). The work plan is intended to outline the approach and potential actions needed to address the soil contamination at the project site during a planned construction project.

2.1 Project Location

The site consists of one tax lot (King County Assessor Parcel 1321039008) comprising approximately 9.4 acres of land in a residential neighborhood. The Site is bounded to the north and west by residential lots and a golf course, to the east by 26th Avenue SW, and to the south by SW 327th Street. (see Figure 2 – Site Plan).

3 BACKGROUND

3.1 Site History

The site is located within the widespread soil contamination plume of the former Asarco smelter operation. The Asarco Company operated a copper smelter in Tacoma from 1890 to 1985. Smelter operations emitted an airborne plume of particulates with arsenic, lead, and other heavy metals that were distributed over a wide region of the Puget Sound. As a result, these metals have been found in near surface soils at concentrations which may pose a threat to human health and/or the environment.

Ecology's Tacoma Smelter Plume Model Remedies Guidance (Smelter Plume Guidance) recommends soil sampling at properties in areas with estimated arsenic levels above the state cleanup level of 20 parts per million (ppm). Ecology's Dirt Alert website (https://apps.ecology.wa.gov/dirtalert/) maps the site within an area of predicted arsenic concentrations ranging from 20 to 40 ppm. Thus, the 20 to 40 ppm range can be considered the "baseline" for arsenic concentrations in near surface soils expected on site. Based on the predicted arsenic concentration at the site and the approximate 9.4 acre area of the parcel, the Smelter Plume Guidance recommends samples be collected from a minimum of 44 locations.

3.2 Regulatory Criteria

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. Ecology's MTCA Method A cleanup levels (CULs) for unrestricted land use for arsenic and lead are:

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

Per Ecology's Tacoma Smelter Plume Model Remedies Guidance (Smelter Plume Guidance), *"if arsenic or lead levels are elevated for any decision unit on the property, that decision unit needs cleanup."* According to the Smelter Plume Guidance, elevated is defined as:

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

3.3 Initial Soil Characterization – September 2020

In September 2020 PBS performed soil characterization sampling at the site to determine the levels of arsenic and lead in shallow soil. Soil characterization was conducted in accordance with the Smelter Plume Guidance. Findings of the sampling activities were presented in PBS's *Olympic View Elementary School - Arsenic and Lead Soil Sampling Report* dated September 16, 2020 (Appendix A). The report identified one location at the site

where arsenic concentrations are defined as elevated per the Smelter Plume Guidance (See Section 3.2). As such, this location requires remediation to comply with the Smelter Plume Guidance and MTCA.

3.4 Supplemental Soil Characterization – December 2020

In December 2020 PBS performed supplemental soil characterization sampling at the site in the vicinity of the sample location with elevated arsenic concentrations identified in the September 2020 sampling event. The purpose of supplemental sampling was to better define the area of elevated arsenic concentrations surrounding the original sample location. Soil characterization was conducted in accordance with the Smelter Plume Guidance. Findings of the sampling activities were presented in PBS's *Olympic View Elementary School – Supplemental Arsenic and Lead Soil Sampling Report* dated January 7, 2021 (Appendix A). Concentrations of arsenic and lead in soil samples collected surrounding the previously identified area of elevated arsenic were below CULs. As such, the supplemental sampling event was successful at defining the lateral and vertical extents of elevated arsenic concentrations at the site.

3.5 Remediation Goals

FWPS intends to remediate sample locations with elevated concentrations of arsenic or lead as directed by the Smelter Plume Guidance. Based on the intended land use as a school, FWPS has also elected to remediate areas where single sample locations contained concentrations of arsenic or lead exceeding the CUL, even if average concentrations within the decision unit are below the cleanup level, and as such are not defined as "elevated" per the Smelter Plume Guidance.

4 SOIL REMEDIATION PLAN

4.1 Remediation Area

Based on the results of soil characterization sampling conducted at the site, and FWPS's goal of remediating any sample location where soil concentrations exceeded the CUL, one remediation area was identified at the site based on detected arsenic concentrations. The remediation area is presented in Figure 3. A more sophisticated drawing sheet depicting the remediation area will be developed with demolition and construction specifications for the Project upon completion of additional design work. The drawing sheet will include extents of the remediation area in state plane coordinates, and additional notes for the general contractor and earthwork subcontractor.

4.2 Proposed Model Remedy – Mixing in Place

The Smelter Plume Guidance presents four model remedies for arsenic and lead contaminated soils based on concentrations detected at the site. "Mixing in place" has been selected as the model remedy for the site. The Smelter Plume Guidance considers mixing a permanent remedy that is acceptable for sites that meet the following criteria:

- Average (arithmetic mean) arsenic concentrations are less than 40 ppm and average lead concentrations less than 500 ppm
- Contamination is not deeper than 12 inches
- Arsenic and lead levels in deeper soils (12-18" and 18-24") have low enough arsenic and lead levels to dilute surface soils.

Based on soil characterization conducted in 2020, the site meets the above criteria, and mixing in place is considered an acceptable and permanent remediation technique for the site.

4.3 Implementation of Model Remedy

Chapter Four of the Smelter Plume Guidance provides a worksheet to calculate the depth of mixing required to achieve CULs. Because the site surface consists of relatively undisturbed soils, Example B of the worksheet was used to calculate mixing depth for the remediation area. Below is the equation presented in Example B:

$$\frac{\text{(Surface Soil Arsenic Concentration x depth) + (Deeper Soil Arsenic Concentration x depth)}}{\text{Surface depth + deeper depth}}$$

The equation is applied to the remediation area as follows:

Average arsenic concentration in top 6 inches of soil as represented by original sample location 2-02 and supplemental sample locations 2-02-10W, 2-02-10N, 2-02-08E and 2-02-10S is calculated below:

$Arsenic_{(Ave)}$ 0-6 inch = (53.1 ppm + 4.27 ppm + 3.60 ppm + 4.15 ppm + 4.20 ppm) / 5 samples
$Arsenic_{(Ave)}$ 0-6 inch = 13.9 ppm

Average arsenic concentration from 6 – 12 inches as represented by sample 2-02b collected from 6 to 12 inches below ground surface (bgs):

$Arsenic_{(Ave)}$ 6-12 inch = 4.43 ppm

Thus, using the equation from Example B in the Chapter Four worksheet:

$$\frac{Arsenic_{(Ave)}\ \text{Mixed} = (13.9\ \text{ppm} \times 6'') + (4.43\ \text{ppm} \times 6'')}{(6'' + 6'')}$$

$Arsenic_{(Ave)}$ Mixed = 9.2 ppm

Because 9.2 ppm meets the CUL for arsenic, mixing to a depth of 12 inches in Remediation Area 1 is expected to achieve the CUL.

4.4 Means and Methods for Remediation

Means and methods for soil remediation by mixing in place will be determined by the contractor selected by FWPS to perform the remediation, based on project specifications prepared by PBS and presented to the contractor by FWPS in the bid package for the project. Means and methods include equipment to be used, as well as mixing techniques such as mixing in place, piling into rows or stockpiles for mixing and spreading back out, or other methods determined to be efficient and cost effective for the contractor and FWPS. The contractor will be required to follow the health and safety procedures outlined in Section 4.5.

4.5 Protection of Human Health and the Environment During Remediation

The contractor selected by FWPS to perform the remediation of soils at the site will be responsible for the health and safety of its own personnel and employees, as well as that of any subcontractors hired to perform the work. The contractor will follow the requirements of the Washington State Department of Labor and Industries Safety Standards for Arsenic.

Work will be performed with the periodic wetting of soils to prevent the generation of fugitive dust. Wetting of soils will be conducted such that surface runoff of water and/or sediment from the remediation area is

prevented in accordance with the contractor's Construction Storm Water Pollution Prevention Plan specific to the project.

PBS will perform air monitoring at the perimeter of remediation areas while mixing activities are taking place. Air samples will be analyzed for particulate arsenic and lead to ensure that contaminants are not escaping the remediation area during the work.

5 POST-REMOVAL COMPLIANCE SOIL SAMPLING

Chapter Seven of the Smelter Plume Guidance specifies that compliance samples be collected after mixing is complete to determine if mixing worked, and that concentrations of arsenic and/or lead within the remediated area meet CULs. Table 4 in Chapter Seven of the Smelter Plume Guidance presents the number of compliance samples required for each remediation area based on acreage and mapped arsenic concentrations. The number of compliance sample locations required for the remediation area based on the table is presented below:

- [0.1 acres (400 sq ft), mapped arsenic concentration <100 ppm] = 4 sample locations

Following completion of the model remedy (mixing in place), the remediation area will be divided into an evenly spaced grid of four sample location points (as outlined above) in accordance with Chapter Seven of the Smelter Plume Guidance. Soil samples will be collected at each grid point at depth ranges of 0 to 6 inches and 6 to 12 inches in the remediation area. Soil samples will be collected and analyzed following the Smelter Plume Guidance Sampling Process as outlined in Chapter Seven of the guidance. Compliance soil samples will be analyzed for total arsenic and lead by EPA Method 6010/6020 at an Ecology-accredited laboratory.

6 INTERPRETATION OF SAMPLING RESULTS

Concentrations of arsenic and lead in soil samples as determined by laboratory analysis will be compared to arsenic and lead CULs. If all concentrations meet CULs, remediation will be considered complete. If concentrations of either arsenic or lead in compliance samples exceed CULs, the area represented by the compliance samples in exceedance of CULs will be mixed in place to a depth of 6 to 12 inches below the maximum mixing depth achieved in the prior remediation effort. Additional remediation by mixing in place will be conducted following the same procedures outlined in Section 3 and as specified in Chapter 4 of the Smelter Plume Guidance.

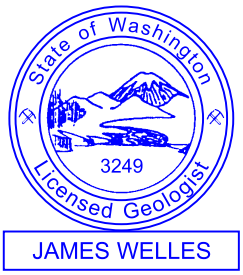
7 REPORTING

Upon completion of the soil removal and compliance sampling, a project completion report will be prepared that documents the specific depths and locations of the mixing of arsenic-impacted soil, locations and results of compliance soil samples, and evaluation of the lab results with respect to cleanup levels. An accompanying narrative will describe the sampling operations, and any deviations to the procedures that occurred. Corrective actions will be identified as needed, and the resolution of any discrepancies will be reported.

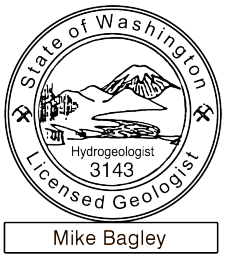
8 LIMITATIONS AND CLOSURE

PBS has prepared this work plan for use by FWPS. FWPS plans to submit a VCP application for the site along with this work plan and request for opinion. It is understood that this report may become available to the public.

Sincerely,
PBS Engineering and Environmental Inc.



James Welles, LG Date
Project Geologist

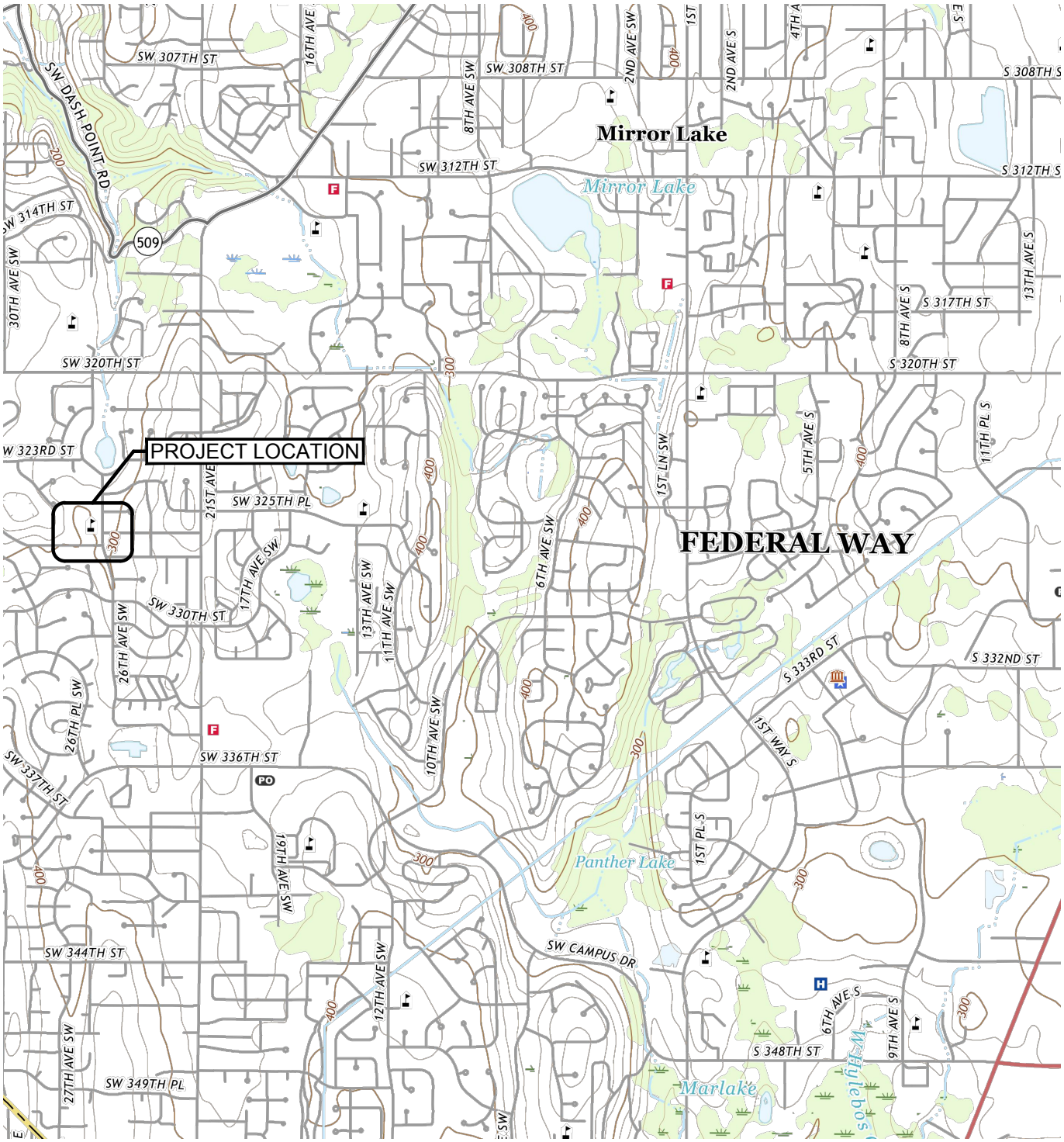


Mike Bagley, LHG Date
Project Hydrogeologist

9 REFERENCES

(WA Dept of Ecology, 2019) *Tacoma Smelter Plume Model Remedies Guidance, Sampling and cleanup of arsenic and lead contaminated soils,* Publication No. 19-09-101 July 2019.

Figures



SOURCE: USGS POVERTY BAY, WA QUADRANGLE 2020.

WASHINGTON

SCALE 1" = 2000'

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

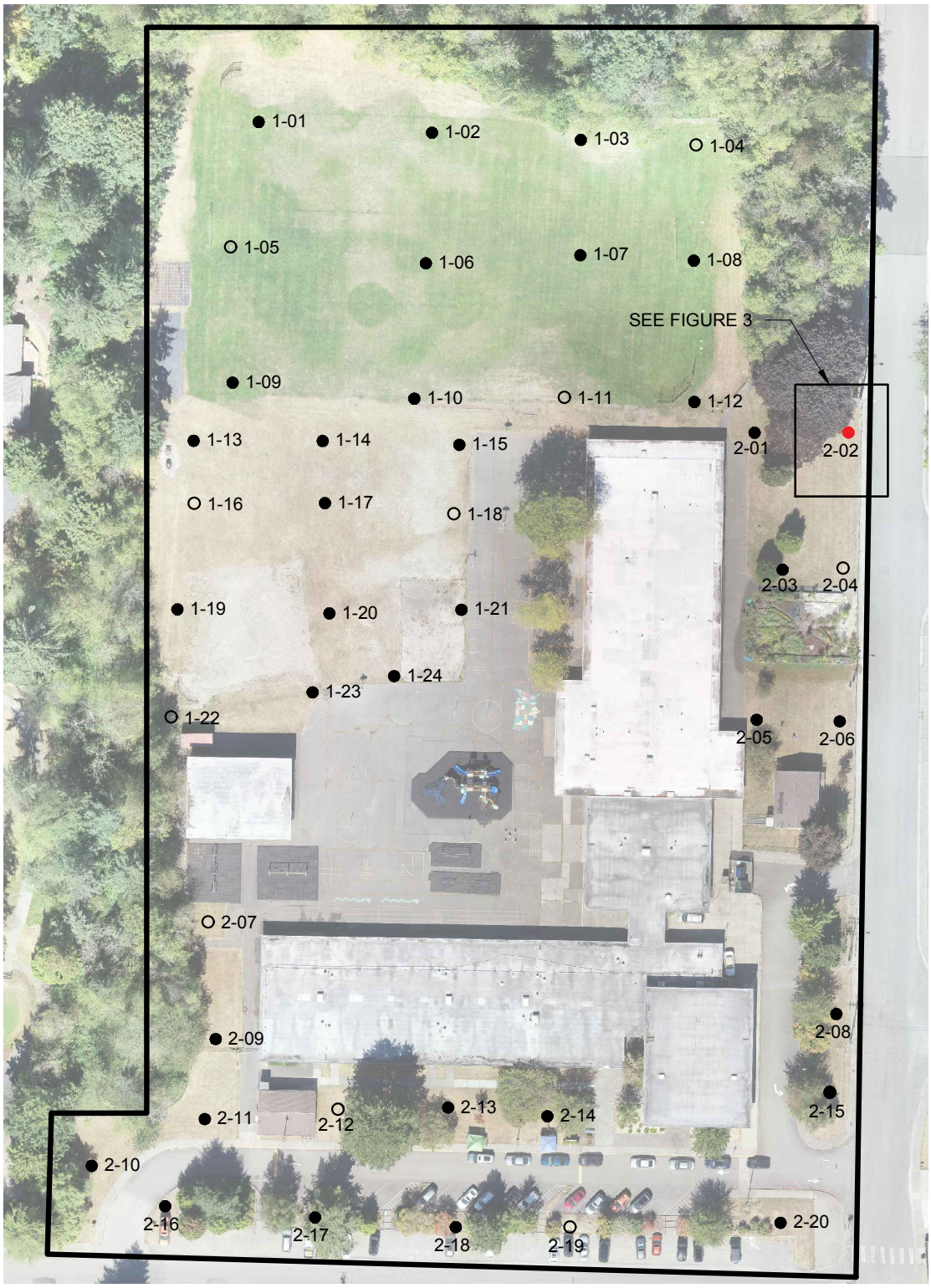
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

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"), As/Pb < MTCA
○ 1-04	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6", 6-12"), As/Pb < MTCA
● 2-02	SOIL SAMPLE LOCATION, DECISION UNIT AND IDENTIFICATION (0-6"), As > MTCA

SCALE 1" = 100'

0' 50' 100' 200'

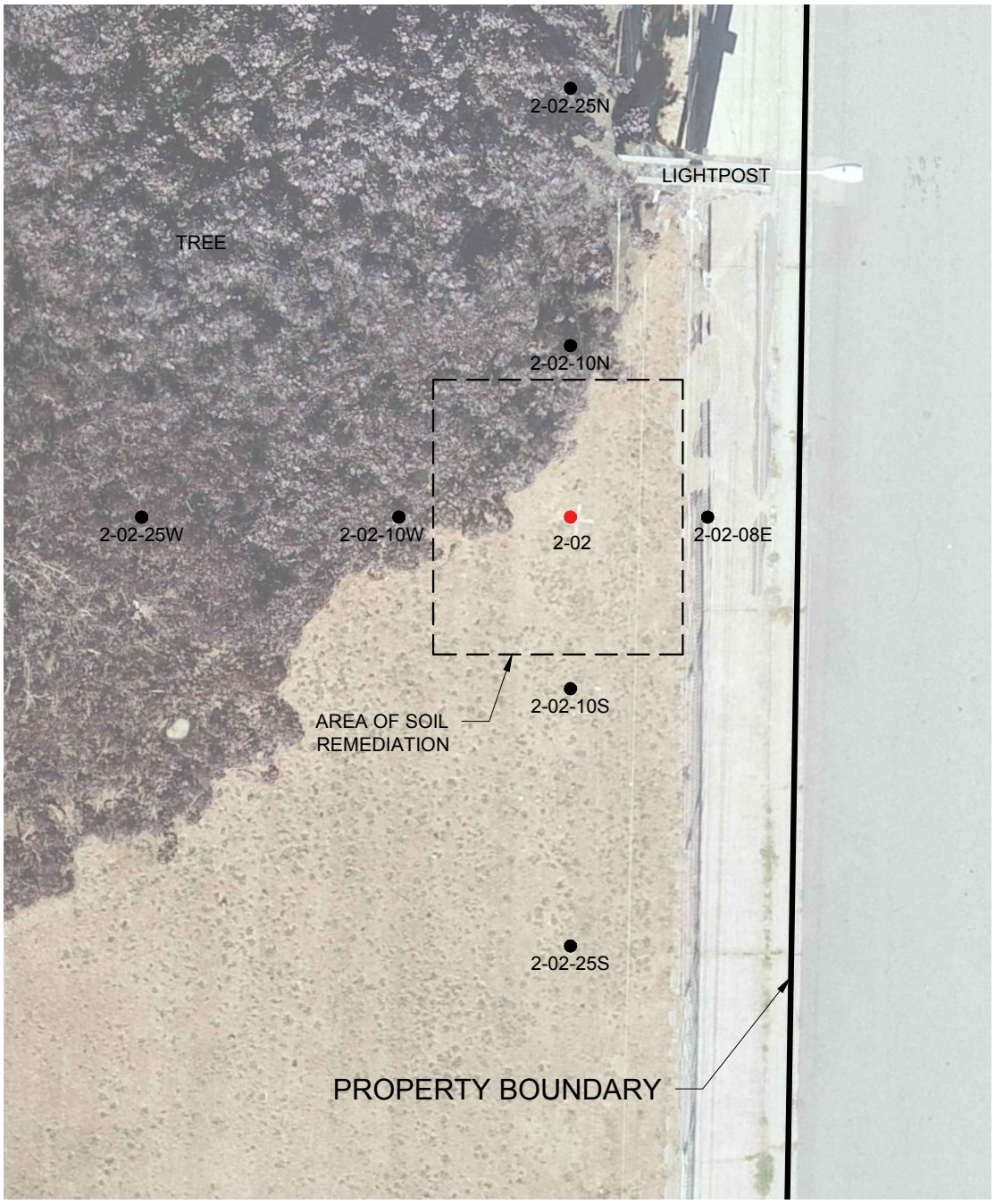
PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

As / Pb SOIL SAMPLE LOCATION MAP

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

MAR 2021
41519.008

FIGURE
2



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● 2-02-10W	STEP OUT SAMPLE LOCATION WITH ARSENIC AND LEAD CONCENTRATIONS <MTCA METHOD A CLEANUP LEVELS
● 2-02	ORIGINAL SAMPLE LOCATIONS WITH ELEVATED ARSENIC CONCENTRATIONS FROM 0-6 INCHES BGS

SCALE 1" = 10'

0' 5' 10' 20'

PREPARED FOR: FEDERAL WAY PUBLIC SCHOOLS

PBS

SUPPLEMENTAL As / Pb SOIL SAMPLE LOCATION MAP

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

MAR 2021
41519.008

FIGURE
3

Appendix B

VCP Acceptance Letter

Ecology Opinion Letter

Ecology Opinion Email

Electronic Copy

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • 360-407-6300
Call 711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 1, 2021

Michael Swartz
Federal Way Public Schools
33330 8th Ave S
Federal Way, WA 98003
mswartz@fwps.org

Re: Acceptance of VCP Application for the following Contaminated Site:

- **Site Name:** Olympic View Elementary Federal Way
- **Site Address:** 2626 SW 327th St, Federal Way, King County, WA 98023
- **Facility/Site ID:** 77894
- **Cleanup Site ID:** 15410
- **VCP Project ID:** NW3305

Dear Michael Swartz:

The Department of Ecology (Ecology) has accepted your application to the Standard process of the Voluntary Cleanup Program (VCP) for the Olympic View Elementary Federal Way facility (Site). We applaud your initiative and welcome your interest in the VCP. This letter provides important information on how we will review your VCP cleanup project (Project) at the Site.

Agreement

We completed and signed your Standard VCP agreement for the project on **March 10, 2021**. This date is the effective date of the agreement. A copy of your signed agreement is enclosed.

Identification Numbers

We have assigned a unique name and number to your Site. This information is listed on the first page of your VCP agreement (enclosed). When contacting us, please reference this information to identify your project.

Communications

Unless otherwise requested, we will communicate directly with your project manager, Michael Swartz, as listed on your VCP application form. If you replace your project manager, or their contact information changes, please submit a completed change of contact form.[1]

We have designated the following site manager to respond to your requests:

Eva Barber
Toxic Cleanup Program, Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Phone: (360) 407-7094
E-mail: eva.barber@ecy.wa.gov

Requests for Written Opinions

In your application, you requested a written opinion on the sufficiency of your Remedial Action Work Plan. We will review your submitted document(s) and expect to provide a written response within approximately 90 days.

Reporting Requirements

When requesting written opinions, you must comply with the following reporting requirements to avoid unnecessary delays in the VCP process:

- **Licensing.** You must submit documents containing geologic and hydrogeologic work and engineering work under the seal of an appropriately licensed professional, as required by chapters 18.220[2] and 18.43[3] RCW.

- **Data Submittal.** You must submit environmental data to our Environmental Information Management (EIM) system.[4] The Toxics Cleanup Program Policy 840[5] describes data submittal requirements. Please visit the EIM Submit Data webpage[6] for data submittal instructions.

---

1 https://fortress.wa.gov/ecy/publications/documents/ecy070218.pdf
2 https://apps.leg.wa.gov/RCW/default.aspx?cite=18.220
3 https://apps.leg.wa.gov/RCW/default.aspx?cite=18.43
4 https://ecology.wa.gov/eim
5 https://fortress.wa.gov/ecy/publications/SummaryPages/1609050.html
6 https://ecology.wa.gov/Research-Data/Data-resources/Environmental-Information-Management-database/EIM-submit-data

Payment

We will send monthly invoices to the billing contact listed in your VCP application form. Payment is due within 30 calendar days of the date of each invoice. Our invoices include a summary of costs incurred, payments received, names of staff billing to the project, and the time spent on the project during the previous month.

If you replace your billing contact or their contact information changes, you must submit a completed change of contact form.

Independent Remedial Action Grants and Cultural Resource Compliance Review

You may qualify for an Independent Remedial Action Grant from Ecology after completing an independent cleanup and receiving a no further action opinion from us. We accept grant applications continuously. Visit our Grants & loans webpage[7] for information about this program and how to apply.

Under Governor's Executive Order 05-05, we may not fund ground-disturbing remedial actions unless we or another state or federal agency consults with the Washington State Department of Archaeology and Historic Preservation and affected Tribes before the remedial actions are performed. The purpose of the consultation is to identify potential impacts on cultural resources.

Under the VCP, you may request that we perform the specified consultation by completing and submitting the project review form.[8] For more information about compliance with Washington's cultural resource laws, see Washington Cultural Resource Regulations: Summary for Independent Cleanup Sites.[9]

Site Listing Notice

We determined that your Site requires remedial action. Therefore, we added your Site to our Confirmed and Suspected Contaminated Sites List,[10] as required by the Model Toxics Control Act (MTCA).[11] We appreciate your cooperation in planning or conducting remedial action at the Site. Moving forward with remedial action does not constitute an admission of guilt or liability. This early notice of site listing is required under WAC 173-340-310(6)(b).[12]

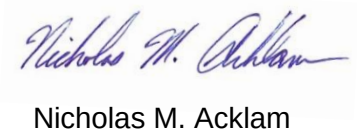
---

7 https://ecology.wa.gov/About-us/How-we-operate/Grants-loans#Apply
8 https://fortress.wa.gov/ecy/publications/documents/ecy070537.pdf
9 https://fortress.wa.gov/ecy/publications/SummaryPages/1909059.html
10 https://apps.ecology.wa.gov/tcpwebreporting/reports/cleanup/contaminated
11 https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Rules-directing-our-cleanup-work/Model-Toxics-Control-Act
12 https://app.leg.wa.gov/wac/default.aspx?cite=173-340-310

Contact Information

We are committed to working with you to reach the prompt and effective cleanup of your Site. If you have any questions, please contact Eva Barber at (360) 407-7094 or eva.barber@ecy.wa.gov.

Sincerely,



Nicholas M. Acklam
VCP Unit Manager
Toxics Cleanup Program
Southwest Regional Office

NMA/tam

Enclosure: Copy of signed Standard VCP Agreement

cc by email: James Welles, PBS Engineering, james.welles@pbsusa.com
Eva Barber, Ecology, eva.barber@ecy.wa.gov
Sonia Fernandez, Ecology, sonia.fernandez@ecy.wa.gov
Ecology Fiscal Office – VCP Budget Analyst
Ecology Site File

Enclosure

Copy of signed Standard VCP Agreement

This page intentionally left blank.

Electronic Copy

VCP AGREEMENT

DEPARTMENT OF ECOLOGY
State of Washington

INSTRUCTIONS: Submit this Agreement (original) to Ecology as part of your Application. Before submitting, enter the Customer's name and the Site's address on the first page and sign the Agreement on the second page. If your Application is accepted, then Ecology will do the following: 1) identify the Site and VCP project in the box below; 2) sign the Agreement; and 3) send you a copy of the completed Agreement.

This document constitutes an Agreement between the State of Washington Department of Ecology (Ecology) and Federal Way Public Schools (Customer) to provide informal site-specific technical consultations under the Voluntary Cleanup Program (VCP) for the Site identified below and associated with the following address:
Olympic View Elementary School - 2626 SW 327th Street, Federal Way, WA .

The purpose of this Agreement is to facilitate independent remedial action at the Site. Ecology is entering into this Agreement under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC. If a term in this Agreement is defined in MTCA or Chapter 173-340 WAC, then that definition shall govern.

Services Provided by Ecology

Upon request, Ecology agrees to provide the Customer informal site-specific technical consultations on the independent remedial actions proposed for or performed at the Site consistent with WAC 173-340-515(5). Those consultations may include assistance in identifying applicable regulatory requirements and opinions on whether the remedial actions proposed for or conducted at the Site meet those requirements.

Ecology may use any appropriate resource to provide the Customer with the requested consultative services. Those resources may include, but shall not be limited to, those of Ecology and the Office of the Attorney General. However, Ecology shall not use independent contractors unless the Customer provides Ecology with prior written authorization.

In accordance with RCW 70.105D.030(1)(i), any opinions provided by Ecology under this Agreement are advisory only and not binding on Ecology. Ecology, the state, and officers and employees of the state are immune from all liability. Furthermore, no cause of action of any nature may arise from any act or omission in providing, or failing to provide, informal advice and assistance under the VCP.

Payment for Services by Customer

The Customer agrees to pay all costs incurred by Ecology in providing the informal site-specific technical consultations requested by the Customer consistent with WAC 173-340-515(6) and 173-340-550(6). Those costs may include the costs incurred by attorneys or independent contractors used by Ecology to provide the requested consultative services. Ecology's hourly costs shall be determined based on the method in WAC 173-340-550(2).

Ecology shall mail the Customer a monthly itemized statement of costs (invoice) by the tenth day of each month (invoice date) that there is a balance on the account. The invoice shall include a summary of the costs incurred, payments received, identity of staff involved, and amount of time staff spent on the project.

The Customer shall pay the required amount by the due date, which shall be thirty (30) calendar days after the invoice date. If payment has not been received by the due date, then Ecology shall withhold

FOR COMPLETION BY ECOLOGY ONLY	**Facility / Site Name:** Olympic View Elementary Federal Way
	Facility / Site No.: 77894
	VCP Project No.: NW3305

any requested opinions and notify the Customer by certified mail that the debt is past due. If payment has not been received within sixty (60) calendar days of the invoice date, then Ecology shall stop all work under the Agreement and may, as appropriate, assign the debt to a collection agency under Chapter 19.16 RCW. The Customer agrees to pay the collection agency fee incurred by Ecology in the course of debt collection.

Reservation of Rights / No Settlement

This Agreement does not constitute a settlement of liability to the state under MTCA. This Agreement also does not protect a liable person from contribution claims by third parties for matters addressed by the Agreement. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). Ecology's signature on this Agreement in no way constitutes a covenant not to sue or a compromise of any Ecology rights or authority.

Ecology reserves all rights under MTCA, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

Effective Date, Modifications, and Severability

The effective date of this Agreement shall be the date on which this Agreement is signed by the Toxics Cleanup Program's Section Manager or delegated representative. This Agreement may be amended by mutual agreement of Ecology and the Customer. Amendments shall be in writing and shall be effective when signed by the Toxics Cleanup Program's Section Manager or delegated representative. If any provision of this Agreement proves to be void, it shall in no way invalidate any other provision of this Agreement.

Termination of Agreement

Either party may terminate this Agreement without cause by sending written notice by U.S. mail to the other party. The effective date of termination shall be the date Ecology sends notice to the Customer or the date Ecology receives notice from the Customer, whichever occurs first. Unless otherwise directed, issuance of a No Further Action opinion, either for the Site as a whole or for a portion of the real property located within the Site, shall constitute notice of termination by Ecology.

Under this Agreement, the Customer is only responsible for costs incurred by Ecology before the effective date of termination. However, termination of this Agreement shall not affect any right Ecology may have to recover its costs under MTCA or any other provision of law.

Representations and Signatures

The undersigned representative of the Customer hereby certifies that he or she is fully authorized to enter into this Agreement and to execute and legally bind the Customer to comply with the Agreement.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Nicholas M. Acklam

Signature

Nicholas M. Acklam *for* Rebecca S. Lawson
Printed Name

Section Manager, Southwest Regional Office
Toxics Cleanup Program *Section*

Date: 03/10/2021

Federal Way Public Schools
Name of Customer

Signature

Michael Swartz
Printed Name of Signatory

Capital Projects Director
Title of Signatory

Date: March 4, 2021

If you need this document in an alternative format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Electronic Copy

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • 360-407-6300
Call 711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

June 10, 2021

Michael Swartz, Capital Projects Director
Federal Way Public Schools
33330 8th Ave S
Federal Way, WA 98003
mswartz@fwps.org

Re: Opinion on the Proposed Cleanup of a Property associated with the Asarco Tacoma Smelter Site

- **Property Name:** Olympic View Elementary Federal Way
- **Property Address:** 2626 SW 327th St, Federal Way, King County, WA 98023
- **Facility/Site ID:** 77894
- **Cleanup Site ID:** 15410
- **VCP Project No.:** NW3305

Dear Michael Swartz:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed independent cleanup of a Property associated with the Asarco Tacoma Smelter Site (Asarco Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA),[1] chapter 70A.305 Revised Code of Washington (RCW).[2]

Issues Presented and Opinion

Ecology has determined that no further remedial action will likely be necessary at the Property to clean up contamination associated with the Asarco Site.

Ecology has determined that further remedial action will likely still be necessary elsewhere at the Asarco Site, but no further remediation will be necessary for the Property.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, chapter 70A.305 RCW, and its implementing regulations, Washington Administrative Code (WAC) chapter 173-340[3] (collectively "substantive requirements of MTCA"). The analysis is provided below.

[1] https://apps.ecology.wa.gov/publications/SummaryPages/9406.html
[2] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305
[3] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340

Description of the Property and the Asarco Site

This opinion applies only to the Property described below within the Asarco Site. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

1. Description of the Property

The Property includes the following tax parcel in King County, which was affected by the Asarco Site and will be addressed by your cleanup:

- 1321039008 (9.42 acres)

Enclosure A includes a legal description of the Property and details of the Property as currently known to Ecology.

2. Description of the Asarco Site

The Asarco Site is defined by the nature and extent of contamination associated with the following releases:

- Arsenic into the Soil
- Lead into the Soil

Those releases have affected more than one parcel of real property, including the parcel identified above.

Enclosure B includes a detailed description and diagram of the Asarco Site, as currently known to Ecology.

3. Identification of Other Sites that may affect the Property

A parcel of real property can be affected by multiple sites. At this time, we have no information that the Property is affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. PBS Engineering and Environmental (PBS), *Olympic View Elementary School – Supplemental Sampling for VCP and Work Plan Review 2626 SW 327th Street, Federal Way, Washington*, March 26, 2021

2. PBS, *Remedial Action Work Plan for Tacoma Smelter Plume Impact Olympic View Elementary School, 2626 SW 327th Street, Federal Way, Washington*, March 3, 2021.

3. PBS, *Supplemental Arsenic and Lead Soil Sampling Report 2626 SW 327th Street, Federal Way, Washington*, January 7, 2021.

4. PBS, *Olympic View Elementary School – Arsenic and Lead Soil Sampling Report*, September 16, 2020.

These documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. Information on viewing these records can be found on Ecology's public records requests web page.[4] Some site documents may be available on Ecology's Cleanup Site Search web page[5].

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

1. Cleanup of the Property located within the Asarco Site.

Ecology has concluded that, upon completion of your proposed cleanup, **no further remedial action** will likely be necessary at the Property to clean up contamination associated with the Asarco Site. That conclusion is based on the following analysis:

a. Characterization of the Asarco Site.

The Asarco Site is described in **Enclosure B**.

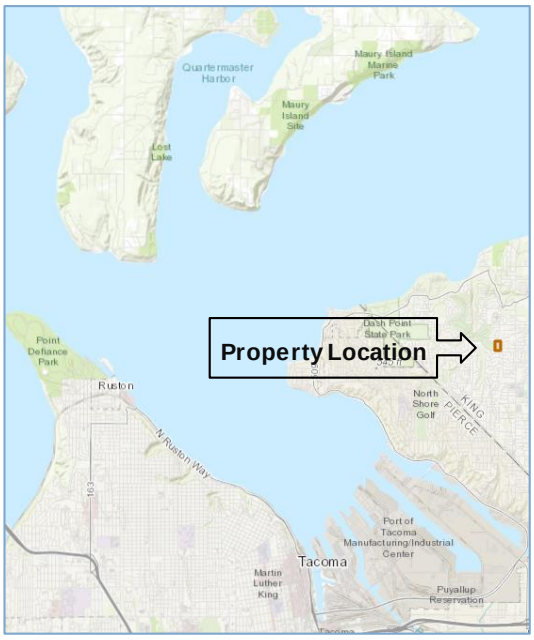


Figure 1. Vicinity map

Olympic View Elementary School property (Property) is located east of the Interstate 5 in a residential area of Federal Way, Washington (Figure 1). The Property is situated on one, 9.42-acre King County parcel. The Property is bordered to the west by Twin Lakes Golf and Country Club, to the south, east, and north by residential developments. Federal Way Public Schools (FWPS) plan to renovate the school and provide additional capacity for students and staff. FWPS plans to construct a new two-story building with a new parking lot, new ADA accessible sidewalks, new playgrounds, and grass playfields. All existing utilities will be relocated. Two acres of existing forested land to the north, west, and northeast will remain forested and undeveloped.

[4] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests.
[5] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=15410.

As part of the planned redevelopment, FWPS contracted PBS to characterize the Tacoma Smelter Plume (TSP) contamination on the Property. On September 1, 2020, PBS collected 55 discrete soil samples from 44 locations on the Property (Figure 2). They collected 44 soil samples from 0 to 6 inches below ground surface (bgs) and 11 soil samples from 6 to 12 inches bgs.

PBS did not sample areas outside of the proposed redevelopment areas, specifically the treed areas in the northern, northeastern, and western parts of the Property. PBS conducted characterization sampling in those areas on March 12, 2021, as requested by Ecology. PBS collected an additional 19 discrete soil samples—fifteen from 0 to 6 inches bgs and four from 6 to 12 inches bgs. PBS depicted those areas as Decision Unit 3 (Figure 2). Altogether, PBS collected 59 samples from 0 to 6 inches bgs and 15 samples from 6 to 12 inches bgs.

PBS submitted all the samples to Friedman & Bruya Inc. laboratory in Seattle, WA for arsenic and lead analysis with Environmental Protection Agency (EPA) Method 6020B.

Ecology sampled children play areas at the school in 2003 as part of the Soil Safety Program (SSP) with Ecology. Ecology collected eight samples from 0 to 2 inches bgs and eight samples from 2 to 6 inches bgs. Arsenic and lead concentrations were below their respective cleanup levels of 20 milligrams per kilogram (mg/kg) for arsenic and 250 mg/kg for lead. Ecology determined that no remedial actions were necessary in the play areas sampled.

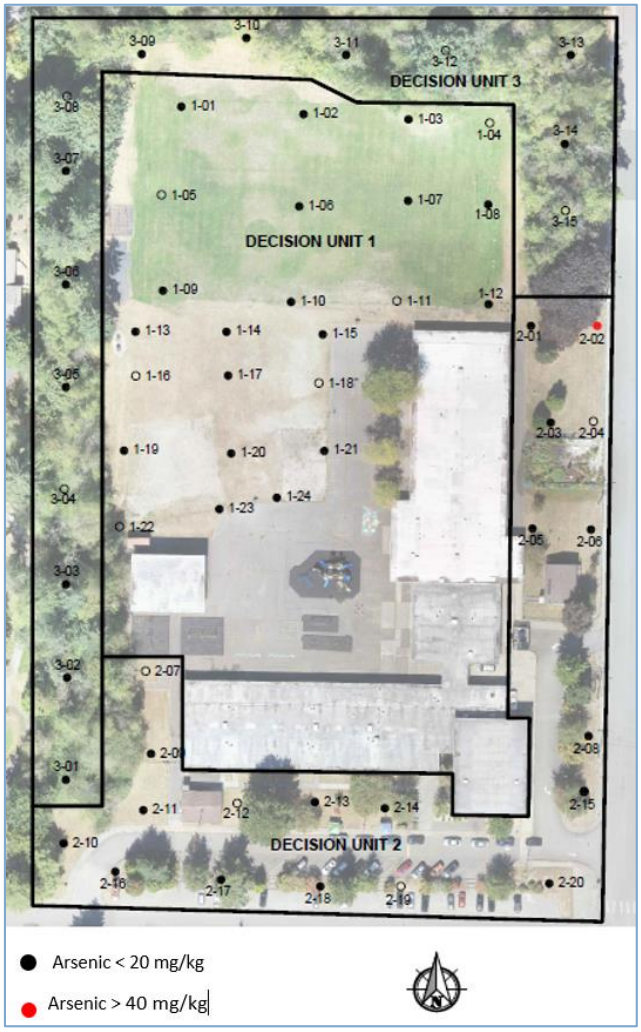


Figure 2. Approximate Locations of Soil Samples

Because the 2003 SSP did not adhere to the TSP Model Remedies Guidance, the results of the 2003 soil sampling were not used in calculating the average concentrations for arsenic and lead on the Property. PBS collected a sufficient number of soil samples to adequately characterize the TSP soil contamination on the Property. For more information about the SSP soil sampling, refer to Enclosure D.

Results of 2020 and 2021 Soil Sampling

Samples collected at 0 to 6 inches bgs: Arsenic exceeded the MTCA Method A cleanup level of 20 mg/kg in three samples with one exceeding the maximum allowable concentration for a single soil sample (40 mg/kg). Arsenic concentrations ranged from 1.81 mg/kg to 53.1 mg/kg. The average arsenic concentration was 7.56 mg/kg. None of the lead concentrations exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 3.88 mg/kg to 231 mg/kg. The average lead concentration was 20.97 mg/kg (Table 1 and Enclosure C).

Samples collected at 6 to 12 inches bgs: One soil sample exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic, but it did not exceed the maximum allowable concentration of 40 mg/kg for a single soil sample for arsenic. The arsenic concentrations ranged from 2.34 mg/kg to 22.80 mg/kg. The average arsenic concentration was 5.3 mg/kg. None of the lead concentrations in this depth interval exceeded the cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 2.52 mg/kg to 50.7 mg/kg. The average lead concentration was 11.89 mg/kg.

Table 1. Summary of the 2020 Characterization Sampling on the Property

	Arsenic (mg/kg)			Lead (mg/kg)		
Depth (inches)	Minimum	Maximum	Average	Minimum	Maximum	Average
0-6	1.81	**53.1**	7.56	3.88	231	20.97
6-12	2.34	**22.80**	5.3	2.52	50.7	11.89
MTCA Cleanup Level		40	20		500	250

Bold values represent concentrations above the MTCA Method A cleanup level; **Bold red** values represent concentrations twice the MTCA Method A cleanup level

In December 2020, PBS conducted supplemental soil sampling to delineate the vertical and horizontal extent of arsenic and lead concentrations in the one area that exceeded twice the cleanup level of 20 mg/kg for arsenic. PBS collected additional samples from 6 to 12 inches bgs, 12 to 18 inches bgs, and 18 to 24 inches bgs, below the sample that exceeded twice the cleanup level for arsenic (Sample 2-02). PBS also collected discrete samples 10 feet, 25 feet, and 50 feet north, south, and west of Sample 2-02 (Figure 3). They collected samples at three depth intervals: 0 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 18 inches bgs.

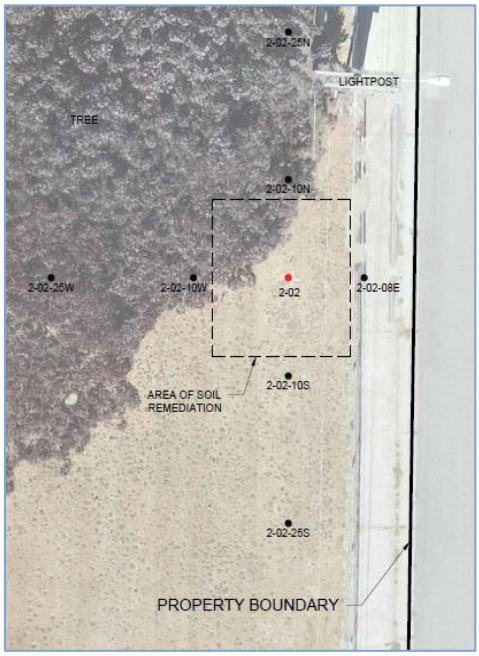


Figure 3. Supplemental Soil Sampling.

Samples collected 24 feet and 50 feet from Sample 2-02 and samples collected from 12 to 18 inches bgs were submitted to the laboratory on hold pending results of shallower and closer soil samples. If shallower or closer (to Sample 2-02) sample results exceeded cleanup levels, additional samples would have been analyzed. PBS submitted the samples to Friedman & Bruya Inc. laboratory in Seattle, Washington for arsenic and lead analysis with EPA Method 6020B.

None of the supplemental samples exceeded the cleanup level of 20 mg/kg for arsenic or the cleanup level of 250 mg/kg for lead (Table 2).

Table 2. Supplemental Soil Sampling

Sample No.	Sample Date	Sample Location	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
2-02-10Na	12/20/2021	10 feet north of 2-02	0-6	3.60	6.78
2-02-25Na	12/20/2021	25 feet north of 2-02	0-6	5.76	235
2-02-10Wa	12/20/2021	10 feet west of 2-02	0-6	4.27	7.59
2-02-25Wa	12/20/2021	25 feet west of 2-02	0-6	4.59	7.56
2-02-10Sa	12/20/2021	10 feet south of 2-02	0-6	4.20	9.58
2-02-25Sa	12/20/2021	25 feet south of 2-02	0-6	3.76	8.58
2-02-08Ea	12/20/2021	8 feet east of 2-02	0-6	4.15	23.1
Average				4.3	42.6
2-02b	12/20/2021	6" below 2-02	6-12	4.43	6.54
2-02c	12/20/2021	12" below 2-02	12-18	5.38	7.36

b. Establishment of Cleanup Standards for the Asarco Site.

Ecology has determined the cleanup levels and points of compliance established for the Asarco Site will likely meet the substantive requirements of MTCA.

As part of the Interim Action Plan for the Asarco Tacoma Smelter Site (June 2012) (IAP), Ecology completed a terrestrial ecological evaluation for properties with only Tacoma Smelter Plume contamination. Ecology determined the MTCA Method A cleanup levels for both arsenic and lead were protective of both human health and the environment. The MTCA Method A cleanup levels for soil are as follows:

- Arsenic is 20 mg/kg.
- Lead is 250 mg/kg.

The IAP determined that the soil and duff cleanup levels are protective of human health and the environment for properties within the Asarco Tacoma Smelter Site are the following:

- Average arsenic detected in the soil is less than 20 mg/kg.
- Average lead detected in the soil is less than 250 mg/kg.

- Duff composite sample is less than 20 mg/kg for arsenic.
- Duff composite sample is less than 250 mg/kg for lead.
- No single soil sample has arsenic above 40 mg/kg.
- No single soil sample has lead above 500 mg/kg.

c. Selection of Cleanup for the Property.

Ecology has determined the cleanup you proposed for the Property will likely meet the substantive requirements of MTCA and the IAP. Your proposed cleanup meets the minimum cleanup requirements and will not exacerbate conditions or preclude reasonable cleanup alternatives elsewhere at the Asarco Site.

Ecology proposed four model remedies in the IAP:

- Excavation and removal.
- Mixing.
- Capping in place.
- Consolidation and capping.

FWPS decided to use mixing on the Property.

Property Cleanup: FWPS will conduct the soil cleanup at the Property in conjunction with its redevelopment. On March 3, 3021, on behalf of FWPS, PBS developed a Cleanup Action Plan (CAP). The CAP described the use of the selected model remedy—mixing as a way to remediate the TSP contamination on the Property. Ecology based this opinion letter on the information provided in this CAP.

The average arsenic concentration on the Property was below the cleanup level of 20 mg/kg. All lead concentrations were below the cleanup level of 250 mg/kg for lead. Only one location on the Property exceed the maximum allowable concentration for a single soil sample for arsenic (40 mg/kg), requiring remediation. Three soil samples exceeded the cleanup level of 20 mg/kg for arsenic in the forested areas, but they did not exceed the maximum allowable concentration of 40 mg/kg for a single soil sample. This forested area is isolated from the school grounds by a chain-link fence and is not accessible to students. No remedial action was needed the forested areas.

The contractor will mix the soil in place to a depth of at least 12 inches bgs in the area where arsenic exceeded twice the cleanup level (40 mg/kg). All the arsenic concentrations in the 6 to 12 inches bgs depth interval were below the cleanup level of 20 mg/kg for arsenic.

Confirmational Sampling: PBS will conduct confirmational sampling following soil mixing in the remedial area. They will divide the remedial area into an evenly spaced grid of four sample locations and collect confirmational soil samples at six-inch depth intervals throughout the mixing depth.

PBS will submit the samples to an analytical laboratory for an analysis of arsenic concentrations. All the lead concentrations were below the cleanup level 250 mg/kg; therefore, no analysis is needed for lead.

If the confirmational soil sampling and analysis shows the average arsenic exceeding 20 mg/kg or any single soil sample exceeding 40 mg/kg, the contractor will conduct additional soil mixing. PBS will conduct additional confirmational sampling and analysis as described above.

As a reminder, in accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840[6] (Data Submittal Requirements), data generated for Independent Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see Ecology's Environmental Information Management (EIM) website.

Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that data generated during on-site activities is submitted pursuant to this policy.

Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination. Please be sure to submit all soil data collected to date, as well as any future data, in this format. Be advised that Ecology requires up to two weeks to process the data once it is received.

2. Cleanup of the Asarco Site as a Whole.

Ecology has concluded that **further remedial action** will still be necessary elsewhere within the ASARCO Site (Asarco Tacoma Smelter Site) upon completion of your proposed cleanup. In other words, while your proposed cleanup may constitute the final action for the Property, it will constitute only an **"interim action"** for the Asarco Site as a whole.

[6] https://fortress.wa.gov/ecy/publications/SummaryPages/1609050.html.

Limitations of the Opinion

1. Opinion does not Settle Liability with the State.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Property. This opinion **does not**:

- Change the boundaries of the Asarco Site.
- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70A.305.040(4)[7].

2. Opinion does not Constitute a Determination of Substantial Equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination.
See RCW 70A.305.080[8] and WAC 173-340-545.[9]

3. Opinion is Limited to Proposed Cleanup.

This letter does not provide an opinion on whether further remedial action will actually be necessary at the Property upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the Voluntary Cleanup Program (VCP).

4. State is Immune from Liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70A.305.170(6).[10]

[7] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.040
[8] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.080
[9] https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-545
[10] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.170

Contact Information

Thank you for choosing to clean up your Property under the VCP. As you conduct your cleanup, please do not hesitate to request additional services. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our: Voluntary Cleanup Program[11] website. If you have any questions about this opinion, please contact me at 360-407-7094 or eva.barber@ecy.wa.gov.

Sincerely,

Eva Barber
Technical Assistance Coordinator
Toxics Cleanup Program
Southwest Regional Office

EB/TM

Enclosures:
A – Legal Description and General Description of the Property
B – Site Description of the Asarco Tacoma Smelter Site
C – Results of the Soil Characterization Sampling on the Property
D – Results of Soil Safety Program Soil Sampling in Play Areas

cc by email: Mike Kwaske, Federal Way Public Schools, mkwaske@fwps.org
James Welles, PBS Engineering and Environmental, james.welles@pbsusa.com
Amy Jankowiak, Ecology, WQ – NWRO, amy.jankowiak@ecy.wa.gov
Mathew Kwartin, Ecology, WQ – NWRO, mathew.kwartin@ecy.wa.gov
Marian Abbett, Ecology, marian.abbett@ecy.wa.gov
Nick Acklam, Ecology, nicholas.acklam@ecy.wa.gov
Ecology Site File

[11] http://www.ecy.wa.gov/vcp.

Enclosure A

Legal Description and General Description of the Property

This page intentionally left blank.

Legal Description of the Property

Parcel 1321039008: E520 FT OF N1/2 OF SE ¼ OF NW ¼ LESS N 150 FT & E520 OF N ½ OF SE ¼ OF NW ¼ LESS CO RD

General Description of the Property

Olympic View Elementary School is located off the Interstate 5 in a residential area of Federal Way, Washington. The Property is situated on one, 9.42-acre King County parcel. The Property is bordered to the west by Twin Lakes Golf and Country Club, to the south, east, and north by residential developments.

The Property 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 in thickness. 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 Property is underlain by Quaternary-aged Till – *compact diamict containing sub-rounded 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 Property 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 Property is expected to be between 5 and 20 feet bgs. Shallow groundwater flow is predicted to follow surface topography, and flow generally to the northwest toward Poverty Bay.

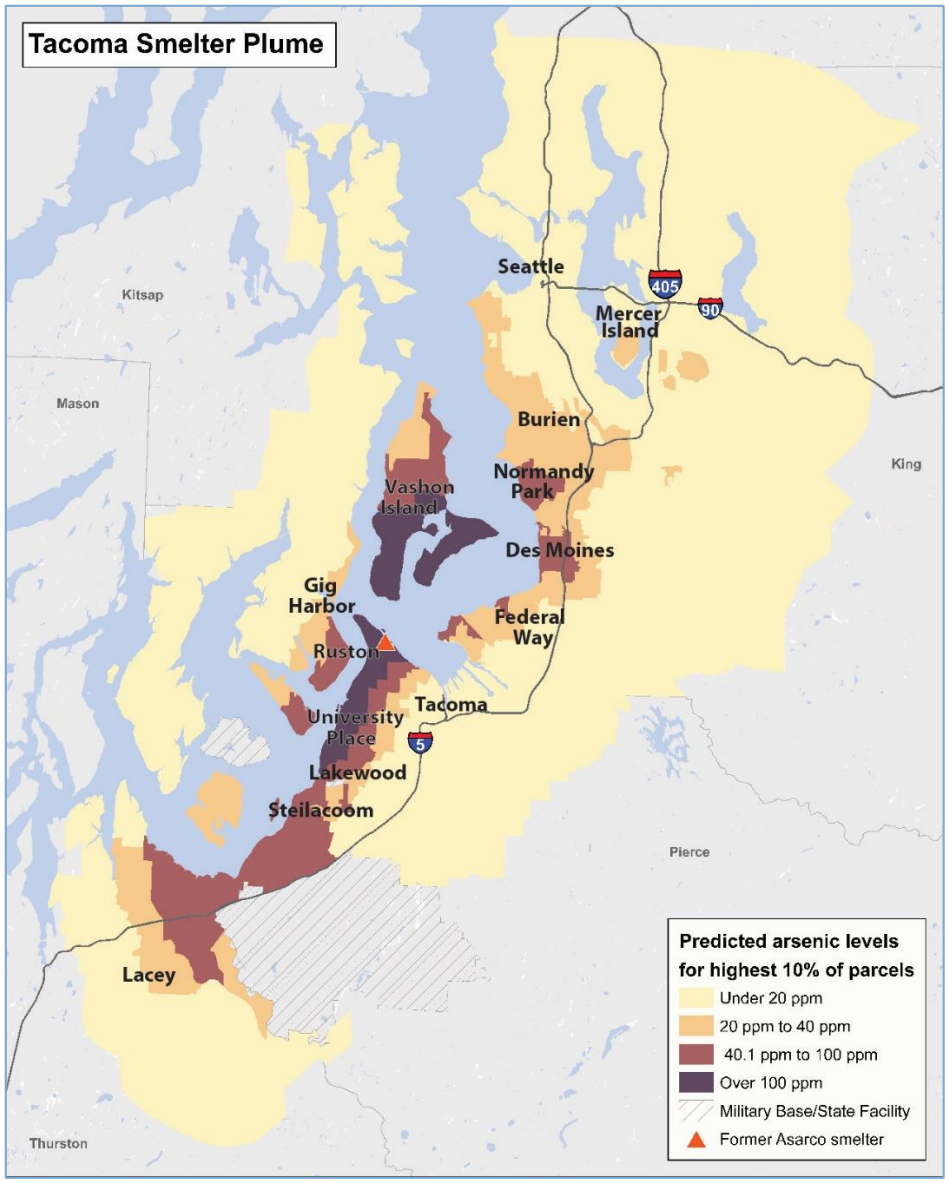
This page intentionally left blank.

Enclosure B

Site Description of the Asarco Tacoma Smelter Site

This page intentionally left blank.

Asarco Tacoma Smelter Site



An interactive color map can be found at: https://dirtalert.info/

For almost 100 years, the Asarco Company operated a copper smelter in Tacoma. Air pollution from the smelter settled on the surface soil over a vast region—more than 1,000 square miles of the Puget Sound basin. Elevated levels of contamination are found as far south as the Nisqually Ridge and as far north as Seattle (West Seattle). Additionally, elevated levels of contamination are found as far west as the Kitsap Peninsula and as far east as Kent and Bellevue. Arsenic, lead, cadmium, and other heavy metals are still in the soil as a result of this pollution. The area has elevated levels of arsenic, lead, and cadmium in the soil due to air emissions from the Asarco smelter.

This page intentionally left blank.

Enclosure C

Results of the Soil Characterization on the Property

This page intentionally left blank.

Results of the 2020 Soil Characterization on the Property

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
1-10	9/1/2020	0-6	1.81	3.88
1-11b	9/1/2020	6-12	2.34	5.83
1-16b	9/1/2020	6-12	2.36	2.52
1-07	9/1/2020	0-6	2.90	7.76
1-04b	9/1/2020	6-12	3.07	8.54
1-19	9/1/2020	0-6	3.08	5.83
1-08	9/1/2020	0-6	3.14	7.18
1-04a	9/1/2020	0-6	3.33	7.03
2-07b	9/1/2020	6-12	3.34	9.05
1-20	9/1/2020	0-6	3.38	6.31
1-05b	9/1/2020	6-12	3.41	8.24
1-12	9/1/2020	0-6	3.51	9.88
2-07a	9/1/2020	0-6	3.51	10.2
1-22a	9/1/2020	0-6	3.62	7.16
1-16a	9/1/2020	0-6	3.75	6.47
2-08	9/1/2020	0-6	3.77	14.5
1-11a	9/1/2020	0-6	3.80	8.28
1.03	9/1/2020	0-6	3.81	13.4
1-09	9/1/2020	0-6	3.93	8.35
1-02	9/1/2020	0-6	3.95	9.98
1-22b	9/1/2020	6-12	4.03	6.34
2-19b	9/1/2020	6-12	4.06	27.2
2-01	9/1/2020	0-6	4.1	7.02
1-17	9/1/2020	0-6	4.14	7.03
2-06	9/1/2020	0-6	4.18	9.65
2-18	9/1/2020	0-6	4.27	16.3
1-01	9/1/2020	0-6	4.34	9.22
1-18b	9/1/2020	6-12	4.35	5.01
2-20	9/1/2020	0-6	4.37	18.9
2-19a	9/1/2020	0-6	4.53	46.8
2-15b	9/1/2020	6-12	4.54	12.7
2-15a	9/1/2020	0-6	4.81	11.5
1-05a	9/1/2020	0-6	5	8.63
1-06	9/1/2020	0-6	5	9.16
1-21	9/1/2020	0-6	5	231
1-13	9/1/2020	0-6	5.11	12.5
2-16	9/1/2020	0-6	5.20	17.3
2-04b	9/1/2020	6-12	5.25	10.20
2-04a	9/1/2020	0-6	5.35	9.59
1-15	9/1/2020	0-6	5.67	16.4

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
1-14	9/1/2020	0-6	5.84	10.8
1-23	9/1/2020	0-6	6.18	62.1
2-05	9/1/2020	0-6	6.21	14.6
2-03	9/1/2020	0-6	6.33	9.37
2-17	9/1/2020	0-6	6.46	17.1
2-12b	9/1/2020	6-12	7.20	14.7
1-24	9/1/2020	0-6	7.22	43.6
2-11	9/1/2020	0-6	9.16	14.4
2-14	9/1/2020	0-6	9.38	26.6
2-09	9/1/2020	0-6	11.6	23.1
2-12a	9/1/2020	0-6	12.8	25.3
2-10	9/1/2020	0-6	13.4	23.5
1-18a	9/1/2020	0-6	16.0	27.9
2-13	9/1/2020	0-6	16.3	29.6
2-02	9/1/2020	0-6	**53.1**	84.1
3-08-12	3/12/2021	6-12	3.14	4.67
3-04-12	3/12/2021	6-12	3.53	4.82
3-04-06	3/12/2021	0-6	3.75	5.46
3-11-06	3/12/2021	0-6	4.04	6.01
3-08-06	3/12/2021	0-6	4.22	6.86
3-14-06	3/12/2021	0-6	4.37	6.01
3-13-06	3/12/2021	0-6	4.98	5.18
3-05-06	3/12/2021	0-6	5.39	6.78
3-06-06	3/12/2021	0-6	5.56	7.45
3-12-12	3/12/2021	6-12	6.10	7.90
3-01-06	3/12/2021	0-6	6.51	19.20
3-10-06	3/12/2021	0-6	7.22	20.80
3-09-06	3/12/2021	0-6	7.33	16.00
3-12-06	3/12/2021	0-6	8.76	9.50
3-03-06	3/12/2021	0-6	12.50	18.70
3-07-06	3/12/2021	0-6	17.70	10.70
3-15-06	3/12/2021	0-6	**21.30**	62.5
3-15-12	3/12/2021	6-12	**22.80**	50.70
3-02-06	3/12/2021	0-6	**30.20**	67

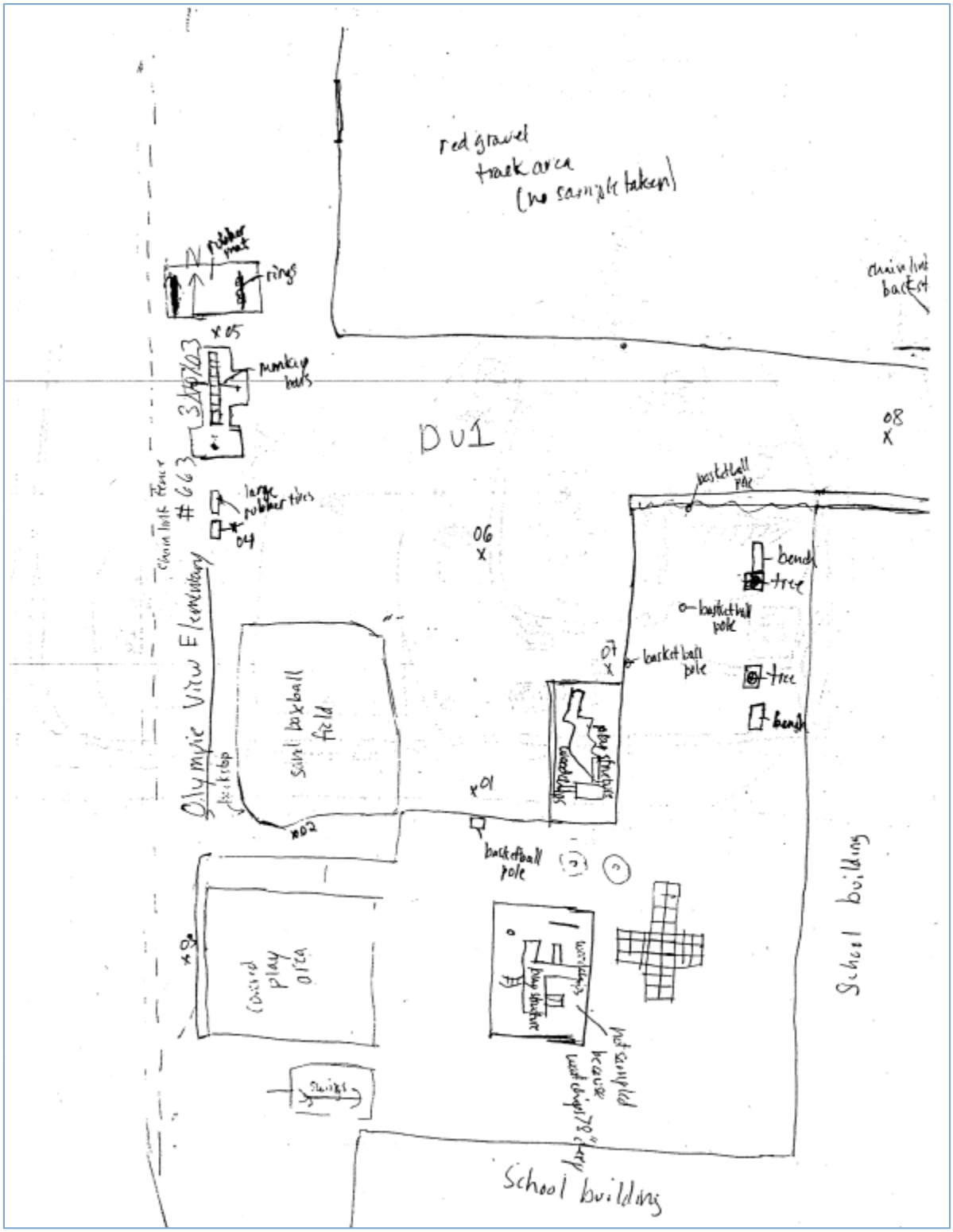
Values in **bold red** represent concentrations that are twice the MTCA Method A cleanup level for unrestricted land use.

Enclosure D

2003 Soil Safety Program Sampling in Play Areas

This page intentionally left blank.

Soil Safety Program Soil Sampling in Play Areas



This page intentionally left blank.

663 Olympic View Elementary

Arsenic Results

	DU 1		DU 2		DU 3	
Boring	0-2	2-6	0-2	2-6	0-2	2-6
1	4.73	2.49				
2	4.56	3.99				
3	5.44	3.98				
4	3.78	7.07				
5	4.90	2.45				
6	4.94	2.54				
7	3.95	3.29				
8	3.62	3.64				
Average	4.49	3.68				
Max	5.44	7.07				

Lead Results

	DU 1		DU 2		DU 3	
Boring	0-2	2-6	0-2	2-6	0-2	2-6
1	16.80	4.55				
2	11.60	6.52				
3	26.80	13.00				
4	6.48	14.40				
5	10.20	3.59				
6	13.40	16.20				
7	12.80	6.41				
8	6.64	7.23				
Average	13.09	8.99				
Max	26.80	16.20				

From: Ison, Diana (ECY) <diso461@ECY.WA.GOV>
Sent: Wednesday, September 18, 2024 10:17 AM
To: Michael Swartz <mswartz@fwps.org>
Cc: Mike Kwaske <mkwaske@fwps.org>; Mayela Perez <maperez@fwps.org>
Subject: RE: Olympic View Elementary School - Ecology's VCP No. NW3305

Hello Michael,

I have also reviewed the Olympic View Elementary School's Final Report.

This project had one elevated arsenic result (Sample 2-02 was 53.1 mg/kg for arsenic) at the 0 to 6-inch soil depth as identified in the Remedial Action Work Plan dated March 3, 2021. According to the final cleanup report, soil was mixed in this area to a depth of 12 inches, and four confirmational samples were collected from the 12-inch depth. Were confirmational samples also collected from the 0 to 6-inch depth? Ecology will need to review sampling data from the 0 to 6-inch depth to verify that the selected remedy (mixing) reduced the level of arsenic in the soil to below cleanup levels, prior to issuing a No Further Action (NFA) determination.

Also, please let me know when all the sampling data for this project has been submitted electronically to our EIM database, so I can request an expedited review of the data. See Environmental Information Management database - Washington State Department of Ecology. The EIM data must be approved by our EIM data coordinators before Ecology can issue a No Further Action determination for this property.

Please reach out with any questions.

Thank you,

Appendix C

Laboratory Reports and Chains-of-Custody for Soil Confirmation Sampling

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 21, 2022

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 January 19, 2022 from the OLV 41519.008.0003, F&BI 201256 project. There are 8 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
c: Natasha Peterson
PBS0121R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 19, 2022 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental OLV 41519.008.0003, F&BI 201256 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
201256 -01	OLV-NE-a
201256 -02	OLV-NW-a
201256 -03	OLV-SE-a
201256 -04	OLV-SW-a

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-NE-a	Client:	PBS Engineering and Environmental
Date Received:	01/19/22	Project:	OLV 41519.008.0003, F&BI 201256
Date Extracted:	01/19/22	Lab ID:	201256-01
Date Analyzed:	01/19/22	Data File:	201256-01.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	5.30
Lead	10.9

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-NW-a	Client:	PBS Engineering and Environmental
Date Received:	01/19/22	Project:	OLV 41519.008.0003, F&BI 201256
Date Extracted:	01/19/22	Lab ID:	201256-02
Date Analyzed:	01/19/22	Data File:	201256-02.120
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.83
Lead	7.11

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-SE-a	Client:	PBS Engineering and Environmental
Date Received:	01/19/22	Project:	OLV 41519.008.0003, F&BI 201256
Date Extracted:	01/19/22	Lab ID:	201256-03
Date Analyzed:	01/19/22	Data File:	201256-03.160
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.72
Lead	7.26

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-SW-a	Client:	PBS Engineering and Environmental
Date Received:	01/19/22	Project:	OLV 41519.008.0003, F&BI 201256
Date Extracted:	01/19/22	Lab ID:	201256-04
Date Analyzed:	01/19/22	Data File:	201256-04.161
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.37
Lead	4.80

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	Not Applicable	Project:	OLV 41519.008.0003, F&BI 201256
Date Extracted:	01/19/22	Lab ID:	I2-44 mb
Date Analyzed:	01/19/22	Data File:	I2-44 mb.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

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

Date of Report: 01/21/22
Date Received: 01/19/22
Project: OLV 41519.008.0003, F&BI 201256

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

Laboratory Code: 201256-01 (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	4.61	81	92	75-125	13
Lead	mg/kg (ppm)	50	9.48	82	93	75-125	13

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	84	80-120
Lead	mg/kg (ppm)	50	89	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.

201256

SAMPLE CHAIN OF CUSTODY

ME 01/19/22

BEI 1 of 1

Report To PBS James Welles, Natasha Peterson

Company PBS Seattle

Address

City, State, ZIP

Phone Email james.welles@pbsusa.com, natasha.peterson"

SAMPLERS (signature)

PROJECT NAME	PO #
OLV	41519.008.003

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH 01/20/22 next day
- 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	Pb Total Lead Metals	As Total Arsenic (6020)			Notes
						ANALYSES REQUESTED											
OLV-NE-a	01	1/19/22	912	S	1								X	X			
OLV-NW-a	02	"	916	S	1								X	X			
OLV-SE-a	03	"	922	S	1								X	X			
OLV-SW-a	04	↓	926	S	1								X	X			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Natasha Peterson	PBS	1/19/22	
Received by:	Nham Pham	FCBI	1/19/22	1115
Relinquished by:				
Received by:		Samples received at 13 °C		

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

October 18, 2024

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

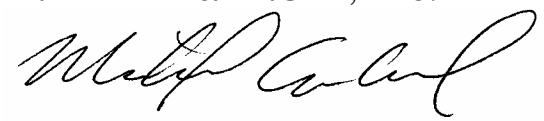
Dear Ms Newport:

Included are the results from the testing of material submitted on October 11, 2024 from the Olympic View Elementary 41519.008, F&BI 410257 project. There are 8 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
c: Josh Trierweiler
PBS1018R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 11, 2024 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental Olympic View Elementary 41519.008, F&BI 410257 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
410257 -01	OLV-SW-b
410257 -02	OLV-SE-b
410257 -03	OLV-NE-b
410257 -04	OLV-NW-b

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-SW-b	Client:	PBS Engineering and Environmental
Date Received:	10/11/24	Project:	41519.008, F&BI 410257
Date Extracted:	10/14/24	Lab ID:	410257-01
Date Analyzed:	10/14/24	Data File:	410257-01.235
Matrix:	Soil	Instrument:	ICPMS3
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.9
Lead	13

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-SE-b	Client:	PBS Engineering and Environmental
Date Received:	10/11/24	Project:	41519.008, F&BI 410257
Date Extracted:	10/14/24	Lab ID:	410257-02
Date Analyzed:	10/14/24	Data File:	410257-02.240
Matrix:	Soil	Instrument:	ICPMS3
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.0
Lead	12

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-NE-b	Client:	PBS Engineering and Environmental
Date Received:	10/11/24	Project:	41519.008, F&BI 410257
Date Extracted:	10/14/24	Lab ID:	410257-03
Date Analyzed:	10/14/24	Data File:	410257-03.241
Matrix:	Soil	Instrument:	ICPMS3
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.5
Lead	19

Analysis For Total Metals By EPA Method 6020B

Client ID:	OLV-NW-b	Client:	PBS Engineering and Environmental
Date Received:	10/11/24	Project:	41519.008, F&BI 410257
Date Extracted:	10/14/24	Lab ID:	410257-04
Date Analyzed:	10/14/24	Data File:	410257-04.242
Matrix:	Soil	Instrument:	ICPMS3
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	10
Lead	27

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	Not Applicable	Project:	41519.008, F&BI 410257
Date Extracted:	10/14/24	Lab ID:	I4-874 mb
Date Analyzed:	10/14/24	Data File:	I4-874 mb.125
Matrix:	Soil	Instrument:	ICPMS3
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

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

Date of Report: 10/18/24
Date Received: 10/11/24
Project: Olympic View Elementary 41519.008, F&BI 410257

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

Laboratory Code: 410254-01 (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	3.09	87 b	85 b	75-125	2 b
Lead	mg/kg (ppm)	50	10.5	149 b	101 b	75-125	38 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	88	80-120
Lead	mg/kg (ppm)	50	92	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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

410257

SAMPLE CHAIN OF CUSTODY

10/11/24 M1

Page # 1 of 1

Report To Sarah Newport
Company PBS Engr
Address 214 E Galer St, Ste 300
City, State, ZIP Seattle, WA 98102
Phone 206.766.7600 Email Sarah.newport@pbsusa.com; josh.friesner@pbsusa.com

SAMPLERS (*signature*)

PROJECT NAME: Olympic View Elementary
PO #: 41519.008

REMARKS
Project specific RLs? - Yes / No

INVOICE TO

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	Pb/As				Notes
OLV-SW-b	01	10/11/24	1320	S	1								X				
OLV-SE-b.	02	↓	1321	↓	↓								X				
OLV-NE-b	03	↓	1322	↓	↓								X				
OLV-NW-b	04	↓	1323		↓								X				

ANALYSES REQUESTED

Samples received at Ø °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	JT	PBS	10/11/24	1415
Received by:	Anh Phan	FBI	10/11/24	14:15
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
5500 4th Ave S.
Seattle WA 98108
(206) 285-8282
office@friedmanandbruya.com

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 410257 CLIENT PBS INITIALS/ DATE: AP 10/11/24

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 0 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☑ Over the Counter ☐ Picked up by F&BI ☐ FedEx/UPS/GSO

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO Initials/ Date: AP 10/11/24
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 0 days

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☑ Yes ☐ No	☐ Not on COC/label
Date Sampled	☑ Yes ☐ No	☐ Not on COC/label
Time Sampled	☑ Yes ☐ No	☐ Not on COC/label
# of Containers	☑ Yes ☐ No	
Relinquished	☑ Yes ☐ No	
Requested analysis	☑ Yes ☐ On Hold	

Other comments (use a separate page if needed)

Air Samples: Were any additional canisters/tubes received? ☑ NA ☐ YES ☐ NO

Number of unused TO15 canisters** _____ **Number of unused TO17 tubes** _____
**Fill out Green manifolds billing sheet