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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Southwest Region Office
PO Box 47775 • Olympia, WA 98504-7775 • 360-407-6300

December 14, 2022

Rob Rice
Summit Land Development LLC
1868 State Avenue NE
Olympia, WA 98506
rob@robricehomes.com

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

- **Property Name:** Steilacoom Bluff
- **Property Address:** No address on file; Olympia, Thurston County, WA 98513
- **Facility/Site ID:** 99997127
- **Cleanup Site ID:** 16612
- **VCP Project No.:** SW1773

Dear Rob Rice:

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).

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[2] (collectively "substantive requirements of MTCA"). The analysis is provided below.

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

Property and Asarco Site Descriptions

This opinion applies only to the Property described below within 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. Property Description

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

- 21818340000 (40 acres)

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

2. Asarco Site Description

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. Terra Associates (Terra), *Tacoma Smelter Plume Assessment Steilacoom Bluff Thurston County Parcel No. 21818340000, Thurston County, Washington*, March 11, 2021.

2. Arthur Buchan (Ecology), *Results of Steilacoom Ridge II Development Net Environmental Benefit Analysis*, August 5, 2016.

You can request these documents by filing a records request.[3] For help making a request, contact the Public Records Officer at publicrecordsofficer@ecy.wa.gov or call 360-407-6040. Before making a request, check whether the documents are available on Ecology's Cleanup Site Search web page.[4]

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**.

Steilacoom Bluff property (Property) is located south of Interstate 5 in a residential area of Lacey, Washington (Figure 1). The Property is situated on one, 40- acre Thurston County parcel. The Property is located above the crest of an approximately 15- to 200-foot high, east-facing steep slope that forms the western margin of the McAlister Creek drainage, known as McAlister Bluff. Residential developments border the Property to the west, McAlister Bluff to the east, future residential development to the north, and undeveloped land to the south.

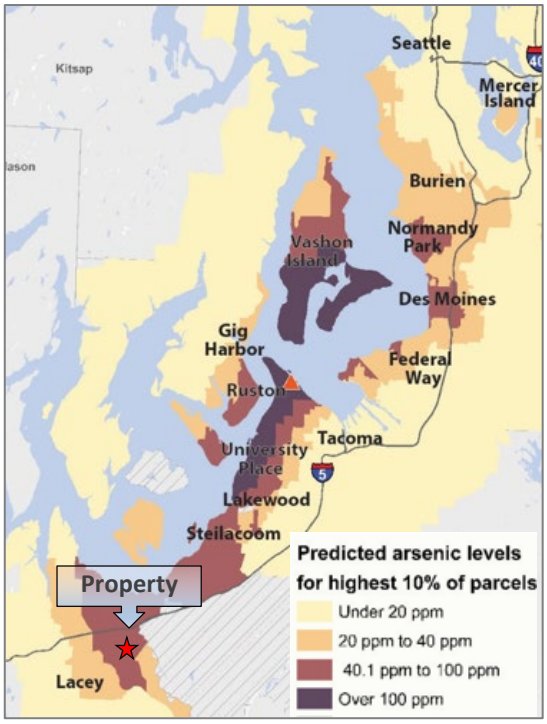

Figure 1. Vicinity Map

[3] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests
[4] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=16612

The Property is currently undeveloped and covered with native trees and understory (Figure 2). For more information about the Property, refer to Enclosure A.

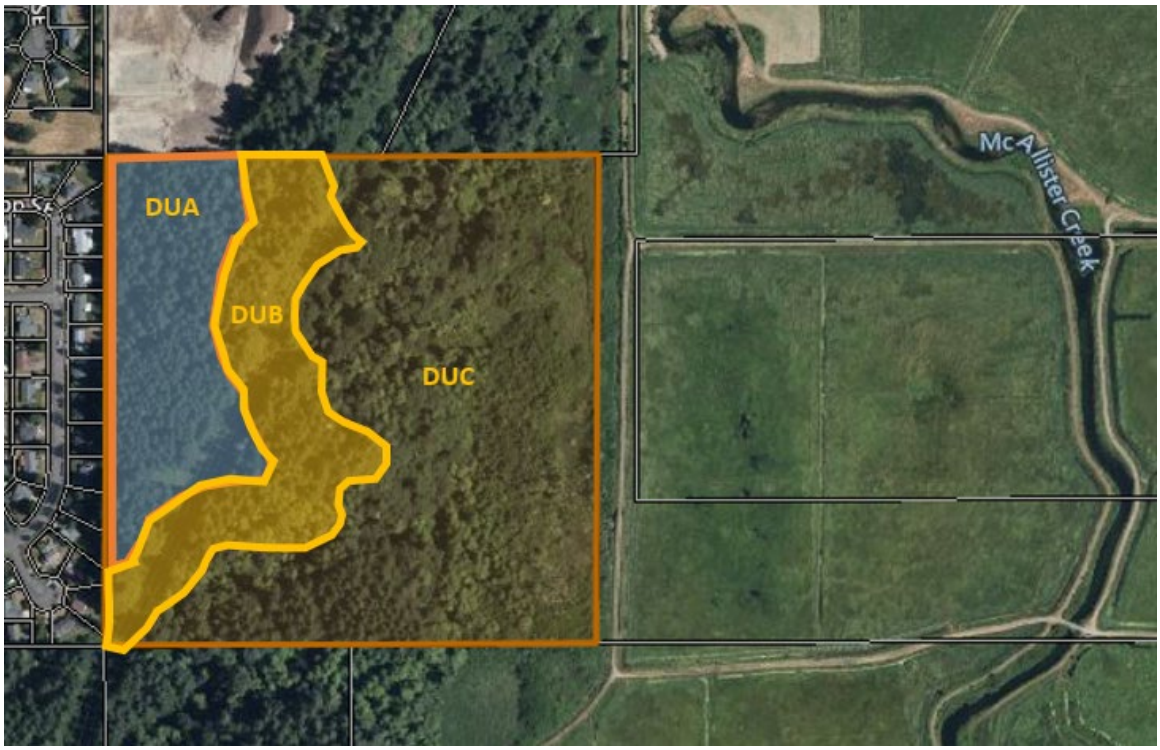

Figure 2. Aerial Map of the Property

Rob Rice Homes (Rice) plans to develop a portion of this Property into 29 single-family houses with associated parking, landscaping, and utilities. As part of the planned development, Rice contracted Terra to characterize the Tacoma Smelter Plume (TSP) contamination on the Property. Terra divided the Property into three decisions units (DUs) based on the topography and the future use of the three areas (Figure 3):

- **DUA –** Residential development with associated stormwater management area will be located on the eastern part of the Property. This unit is approximately seven acres.
- **DUB –** Bluff setback area along the top of the bluff overlooknig the Nisqually River. This unit is located between DUA and DUC. This area will not be developed and will remain forested. The area covers approximately seven acres.
- **DUC –** McAllister Bluff area in the eastern part of the Property. This area, covering approximately 26 acres, is steeply sloped, descending to the Nisqually River flood plain. This area will remain undeveloped.

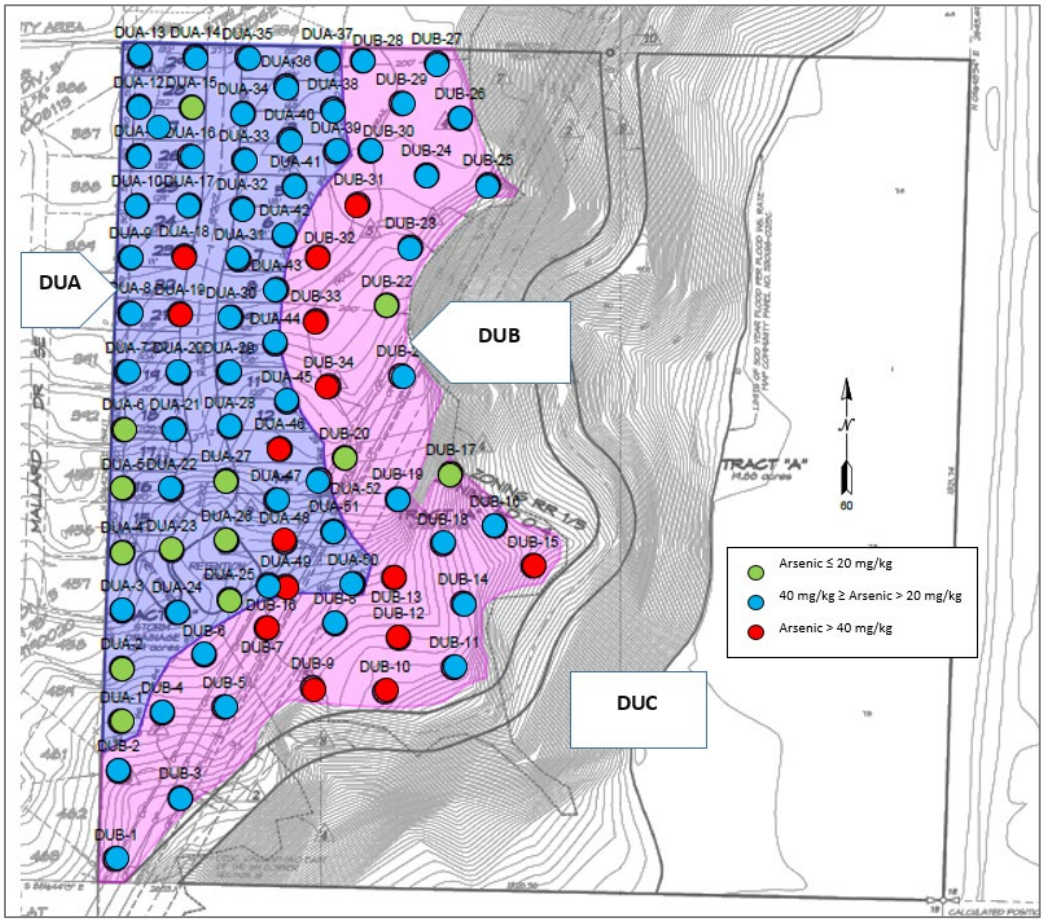

Figure 3. Approximate Locations of Characterization Samples

Terra conducted characterization sampling on the Property on December 29, 2020. Terra collected soil samples from two decision units, DUA and DUB. Terra did not sample DUC because of two reasons. First, this area is very steep and not safe to sample. Second, this area will not be developed and will be managed by institutional controls, such as an environmental covenant, fencing, and Dirt Alert signs. The assumption is that the contamination pattern in DUC is similar to the contamination pattern in DUB.

Terra conducted characterization sampling in the two units as follows:

DUA – Terra collected 64 soil samples from 52 locations. They collected 52 soil samples from 0 to 6 inches below ground surface (bgs) and 12 samples from 6 to 12 inches bgs (Figure 3). Terra also collected eight, six-point composite duff samples from DUA.

DUB – Terra collected 114 soil samples from 35 locations. They collected 35 samples from 0 to 6 inches bgs and 35 samples from 6 to 12 inches bgs. Additionally, they collected 35 samples from 12 to 24 inches bgs and 9 samples from 24 to 36 inches bgs for the Terrestrial Ecological Evaluation (TEE). Terra also collected 10, six-point composite duff samples.

Terra submitted all the samples to OnSite Environmental Inc. laboratory in Redmond, Washington for arsenic and lead analysis with Environmental Protection Agency (EPA) Method 6020B.

Soil Sampling Results

Table 1 displays the characterization sampling summary on the Property. **Enclosure C** contains the comprehensive results of the characterization sampling on the Property.

DUA

Samples collected from 0 to 6 inches bgs: Arsenic exceeded the MTCA Method A cleanup level of 20 milligrams per kilogram (mg/kg) in 41 samples (Figure 3). Five samples exceeded the maximum allowable concentration for a single soil sample or twice the cleanup level for arsenic (40 mg/kg). The arsenic concentrations ranged from 4.5 mg/kg to 49 mg/kg. The average arsenic concentration was 26.1 mg/kg. None of the samples exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 5.6 mg/kg to 75 mg/kg. The average lead concentration was 34.1 mg/kg.

Samples collected from 6 to 12 inches bgs: None of the samples exceeded the cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 5.8 mg/kg to 12 mg/kg. The average arsenic concentration was 8.6 mg/kg. None of the lead concentrations in this depth interval exceeded the cleanup level of 250 mg/kg. Lead concentrations ranged from 6.5 mg/kg to 14 mg/kg. The average lead concentration was 9.6 mg/kg.

Duff: Four samples exceeded the cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 2 mg/kg to 34 mg/kg. The average arsenic concentration was 15 mg/kg. None of the lead concentrations exceeded the cleanup level of 250 mg/kg. Lead concentrations ranged from 2.9 mg/kg to 70 mg/kg. The average lead concentration was 35.1 mg/kg.

Table 1. Summary of the Characterization Sampling on the Property

DU	Depth (inches)	Arsenic (mg/kg)			Lead (mg/kg)		
		Minimum	Maximum	Average	Minimum	Maximum	Average
DUA	0-6	4.5	**49**	**26.1**	5.6	75	34.1
	6-12	5.8	12	8.6	6.5	14	9.6
	Duff	2	**34**	15	2.9	70	35.1
DUB	0-6	13	**61**	**33**	16	64	39
	6-12	5.3	**22**	9.2	5.8	20	9.4
	12-24	3.8	9.5	6	4.4	9.7	6.5
	24-36	4	7	5.8	3.5	7.8	5.9
	Duff	3.6	17	10.9	14	64	43
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.

DUB

Samples collected from 0 to 6 inches bgs: Arsenic exceeded the MTCA Method A cleanup level of 20 mg/kg in 32 samples. Eleven samples exceeded the maximum allowable concentration for a single soil sample for arsenic (40 mg/kg). The arsenic concentrations ranged from 13 mg/kg to 61 mg/kg. The average arsenic concentration was 33 mg/kg. None of the samples exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 16 mg/kg to 64 mg/kg. The average lead concentration was 39 mg/kg.

Samples collected from 6 to 12 inches bgs: Two samples exceeded the cleanup level of 20 mg/kg for arsenic, but they did not exceed the maximum allowable concentrations for a single soil sample of 40 mg/kg for arsenic. The arsenic concentrations ranged from 5.3 mg/kg to 22 mg/kg. The average arsenic concentration was 9.2 mg/kg. None of the lead concentrations exceeded the cleanup level of 250 mg/kg. Lead concentrations ranged from 5.8 mg/kg to 20 mg/kg. The average lead concentration was 9.4 mg/kg.

Samples collected from 12 to 24 inches bgs: None of the samples exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 3.8 mg/kg to 9.5 mg/kg. The average arsenic concentration was 6 mg/kg. None of the samples exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 4.4 mg/kg to 9.7 mg/kg. The average lead concentration was 6.5 mg/kg.

Samples collected from 24 to 36 inches bgs: None of the samples exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 4 mg/kg to 7 mg/kg. The average arsenic concentration was 5.8 mg/kg. None of the samples exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 3.5 mg/kg to 7.8 mg/kg. The average lead concentration was 5.9 mg/kg.

Duff: None of the samples exceeded the cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 3.6 mg/kg to 17 mg/kg. The average arsenic concentration was 10.9 mg/kg. None of the lead concentrations exceeded the cleanup level of 250 mg/kg. Lead concentrations ranged from 14 mg/kg to 64 mg/kg. The average lead concentration was 43 mg/kg.

Ecology calculated a Depth-Weighted Receptor Exposure Adjustment calculation for TEE using the data from the additional depth intervals in DUB. Table 2 displays the results of the calculation. All the adjusted lead concentrations were below the cleanup level of 250 mg/kg. Two of the adjusted arsenic concentrations exceeded the cleanup level of 20 mg/kg for arsenic but were determined not to exceed the acceptable risk levels.

Table 2. Depth-Weighted Exposure Adjustment Calculation

Sample #	**Sample Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)	**Depth Weighted Receptor Adjustment**	**Adjusted Arsenic** (mg/kg)	**Adjusted Lead Level** (mg/kg)	**Arsenic Final Receptor Adjusted Value** (mg/kg)	**Lead Final Receptor Adjusted Value** (mg/kg)
33	0 to 6	46	50	0.3	13.8	15		
	6 to 12	21	19	0.55	11.55	10.45		
	12 to 24	6.3	6.4	0.1	0.63	0.64		
	24 to 36	5.1	4.5	0.05	0.255	0.225		
							26.2	26.3
9	0 to 6	47	41	0.3	14.1	12.3		
	6 to 12	8	7.2	0.55	4.4	3.96		
	12 to 24	9.5	8.4	0.1	0.95	0.84		
	24 to 36	7	6.6	0.05	0.35	0.33		
							19.8	17.4
13	0 to 6	50	48	0.3	15	14.4		
	6 to 12	8.2	7.1	0.55	4.51	3.905		
	12 to 24	5.5	5.7	0.1	0.55	0.57		
	24 to 36	6.9	6.4	0.05	0.345	0.32		
							20.4	19.2
5	0 to 6	33	32	0.3	9.9	9.6		
	6 to 12	10	9	0.55	5.5	4.95		
	12 to 24	5.7	6.7	0.1	0.57	0.67		
	24 to 36	5.1	5.6	0.05	0.255	0.28		
							16.2	15.5

Bold values represent concentrations above the MTCA Method A cleanup level.

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.

Rice decided to use mixing on the Property.

Property Cleanup: Rice will conduct the cleanup on the Property in conjunction with its development. On March 11, 2021, on behalf of Rice, Terra developed a Cleanup Action Plan (CAP) for the Property. The CAP described the use of the selected model remedy: soil mixing in DUA and institutional controls in DUB and DUC as a way to remediate the TSP contamination on the Property. Ecology based this opinion letter on the information provided in this CAP.

The Property cleanup will proceed as follows:

- **DUA –** This area will become residential housing is approximately seven acres. Rice will remediate DUA by mixing soil in place to a depth of at least 12 inches bgs. They will mix the duff with the soil. Ecology agreed to this deviation because only four out of 14 duff samples slightly exceeded the cleanup level of 20 mg/kg and the extensive soil mixing that will occur in this unit in preparation for development. Prior to soil mixing, the contractor will remove all the trees and vegetation from DUA. They will inspect the tree roots and shake them if necessary to ensure the removal of the contaminated soil. They will dispose of the vegetation to a regular yard waste disposal facility.

- **DUB and DUC –** These are the two areas with steep slopes, mature and native vegetation. These units will remain forested and un-remediated. Eleven samples exceeded twice the cleanup level of 20 mg/kg for arsenic in DUB. The average arsenic concentration was also above the cleanup level.

For the protection of habitat and wildlife in DUB and DUC: Ecology extended the findings of the Net Environmental Benefit Analysis (NEBA) conducted for Steilacoom Ridge II property in 2016 to this Property. The eastern part of the Steilacoom Ridge II property is also a part of the McAllister Bluff area. Only one parcel to the north of the Property separates the two properties. After conducting a site visit to the Property, Ecology concluded that there is no visible separation between this and the Steilacoom Ridge II property, therefore the habitat and wildlife composition deemed to be the same on both properties.

Ecology conducted a site visit to the Steilacoom Ridge II property and determined the steep bluff area as Especially Valuable Habitat (EVH). Assessed as EVH, this area could use NEBA to weigh the benefits of active cleanup versus leaving it un-remediated. Typical soil remediation involves disturbance to soil and removal of vegetation.

Removing valuable habitat is likely to cause significant ecological damage and it would take decades to recover. For the Steilacoom Ridge II property, Ecology determined that leaving the bluff area un-remediated would benefit the habitat more than actively remediating it. Steilacoom Ridge received a No Further Action (NFA) determination in 2022 under a Voluntary Cleanup Program (VCP) agreement SW1532.

Only two of the final depth-weighted concentrations of arsenic and lead exceeded the cleanup level of 20 mg/kg for arsenic on the Property, indicating that leaving the habitat un-remediated will not cause significant harm to the wildlife and habitat. Ecology determined that leaving the bluff area (DUB and DUC) un-remediated would benefit the habitat more than active remediation.

For the protection of human life in DUB and DUC: Rice will implement institutional and engineering controls:

- They will install a fence separating DUB from DUA. Ecology will inspect the installed fence prior to the issuance of an NFA determination.

- Install at least three Dirt Alert signs by the fence separating DU1 from DU2 according to Ecology's specifications. Ecology will inspect the installed fence and the signs prior to the issuance of an NFA.

- File an environmental covenant with the appropriate local jurisdiction. Send a copy of the draft covenant to the local jurisdiction with Ecology's contact information. The covenant will include restriction on intrusive activities in areas where arsenic and lead concentrations remain above their respective MTCA cleanup levels in DUB. Ecology will review the draft covenant. Ecology will not approve the covenant unless the local jurisdiction has been consulted. Upon Ecology's approval, obtain the signatures of all grantors of the covenant.

    - Upon Ecology's approval, obtain the signatures of all grantors of the covenant.

    - Submit the signed covenant to Ecology for signatures as the grantee.

    - Record the signed covenant in every county where the real property subject to the covenant is located. For detailed recording instructions, please refer to chapter 65.04 RCW.

    - Return the original signed and recorded covenant to Ecology and a copy to each person who signed the covenant or holding a recorded interest in the subject property.

Confirmational Sampling

The consultant will collect confirmational samples following soil mixing in DUA. They will collect soil samples at six-inch depth intervals throughout the mixing depth in accordance with the methodology outlined in the 2019 Tacoma Smelter Plume Model Remedies Guidance.[5] They will submit the samples to an analytical laboratory for arsenic and lead analysis.

If any of the samples exceeds twice the cleanup level of 20 mg/kg for arsenic or 250 mg/kg for lead or if the average concentrations exceed 20 mg/kg for arsenic or 250 mg/kg for lead, the contractor will conduct additional round of soil mixing. The consultant will resample the mixed areas 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 Monitoring (EIM) database web page.[7].

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 an NFA determination. Please be sure to submit all soil data collected to date, as well as any future data, in this format.

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.

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[5] https://apps.ecology.wa.gov/publications/SummaryPages/1909101.html
[6] https://apps.ecology.wa.gov/publications/SummaryPages/1609050.html.
[7] http://www.ecy.wa.gov/eim

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).

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 and WAC 173-340-545.

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.

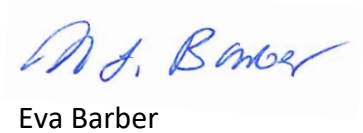
The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70A.305.170(6).

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 web page.[8] If you have any questions about this opinion, please contact me at 360-999-9593 or eva.barber@ecy.wa.gov.

Sincerely,



Eva Barber
Technical Assistance Coordinator
Toxics Cleanup Program
Southwest Region Office

EB/tm

Enclosures: A – Legal and General Property Descriptions
B –Asarco Tacoma Smelter Site Description
C – Property Soil Characterization Results

cc by email: Ron Buckholt, Thurston County, ron.buckholt@co.thurston.wa.us
Marian Abbett, Ecology, marian.abbett@ecy.wa.gov
Jerome Lambiotte, Ecology, jerome.lambiotte@ecy.wa.gov
Ecology Site File

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

Enclosure A

Legal and General Property Descriptions

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Legal Property Description

Parcel 21818340000: Abbreviated Legal: 18-18-1E SE-SW

General Property Description

The Property is located on the eastern edge of a plateau above the crest of an approximately 15- to 200-foot high, east-facing steep slope that forms the western margin of the McAllister Creek Drainage. McAllister Creek flows to the north about 1,700 feet east of the slope. A tributary of McAllister Creek named Little McAllister Creek flows within a steep-sided ravine that generally borders the western portion of the southern Property margin. After exiting the ravine, the creek generally follows a northerly path along the toe of the steep east-facing slope to its confluence with McAllister Creek about 650 feet north of the northwestern Property corner.

The steep slope areas are identified as McAllister Bluff in Chapter 24.15.020 of the Thurston County Code (TCC). The preliminary plat plan shows the planned development area set back at least 200 feet from the crest of the steep slope areas. Topography is relatively flat in the northern approximately 400 feet of the site and slopes gently to moderately down to the south-southeast in the central and southern portions of the Property. Property elevations range between about elevation 230 at the northwestern site corner and about elevation 170 to 180 at the southern site margin.

Surface gradients typically range from about 2 percent in the relatively flat northern portion of the Property to about 7 to 13 percent in the central and southern areas, with localized areas as steep as 20 percent in the south-central portion of the Property. Surface gradients generally slope down to the southeast between the Property and the steep slope crest at inclinations between about 8 and 13 percent. The steep slope attendant to the Little McAllister Creek ravine south of the site is about 110 feet high with surface inclinations of about 50 to 60 percent. The east-facing steep slope ranges in height from about 140 feet to about 210 feet south to north, with slope inclinations typically ranging between about 55 and 70 percent and localized slope areas of about 70 to 80 percent.

The Geologic Map of the Lacey 7.5-minute Quadrangle, Thurston County, Washington by Robert L. Logan, Timothy J. Walsh, Henry W. Schasse, and Michael Polenz (2003) shows the Property soils mapped as Vashon till (Qgt). However, based on the soil conditions we observed, it is our opinion that these soils would be better classified as Vashon recessional outwash (Qgo), which is mapped approximately 1,200 feet south-southeast of the project Property.

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Enclosure B

Asarco Tacoma Smelter Site Description

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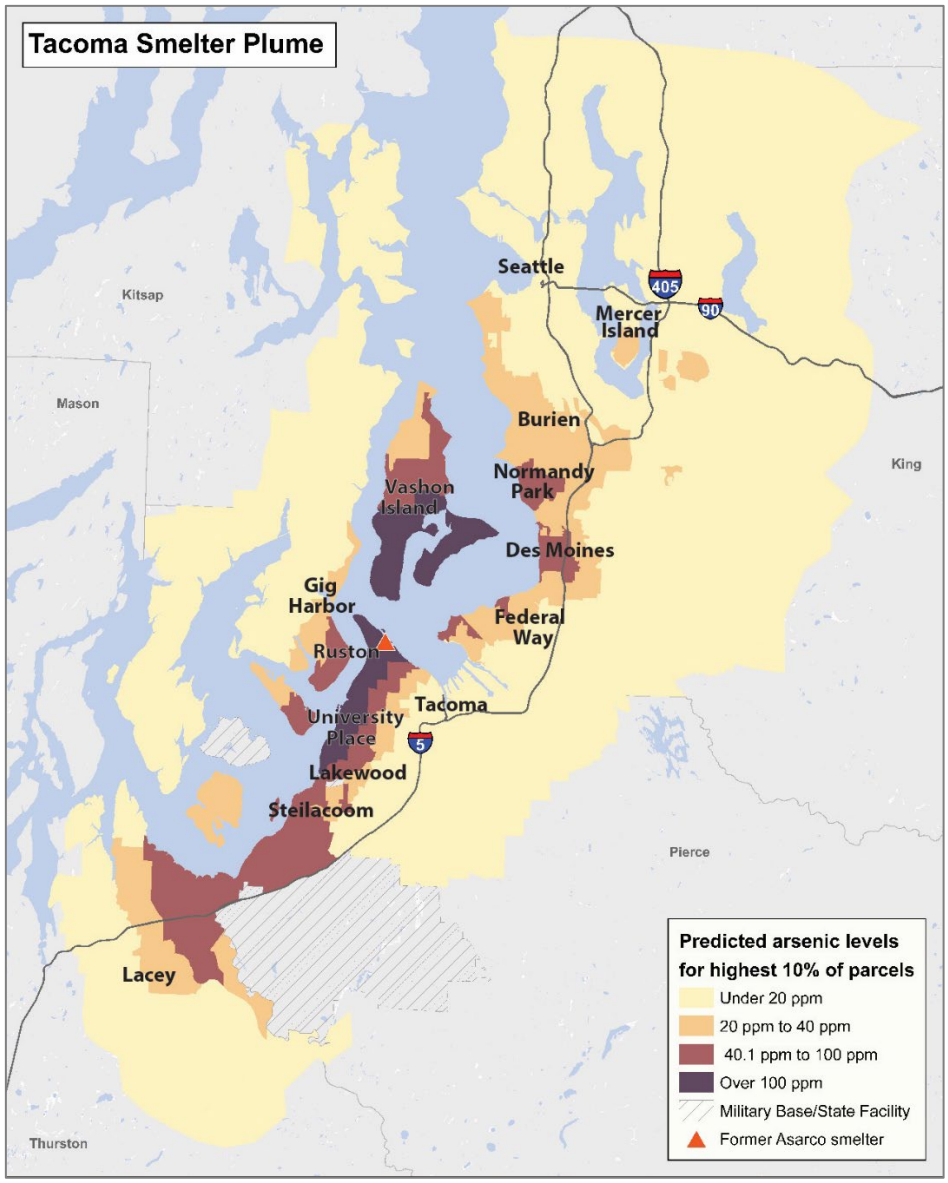
Asarco Tacoma Smelter Site



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.

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Enclosure C

Property Soil Characterization Results

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Characterization Sampling Results

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUA4	12/29/2020	0-6	4.5	5.6
DUA2	12/29/2020	0-6	4.6	5.6
DUA6	12/29/2020	0-6	5.5	6.4
DUA25a	12/29/2020	0-6	9.9	12
DUA23	12/29/2020	0-6	10	12
DUA26	12/29/2020	0-6	11	13
DUA27	12/29/2020	0-6	11	14
DUA5a	12/29/2020	0-6	19	40
DUA52	12/29/2020	0-6	20	20
DUA15	12/29/2020	0-6	20	24
DUA1a	12/29/2020	0-6	20	47
DUA51	12/29/2020	0-6	**21**	21
DUA28	12/29/2020	0-6	**21**	32
DUA3	12/29/2020	0-6	**21**	47
DUA35	12/29/2020	0-6	**22**	19
DUA36	12/29/2020	0-6	**22**	19
DUA50	12/29/2020	0-6	**22**	21
DUA16	12/29/2020	0-6	**22**	23
DUA45a	12/29/2020	0-6	**22**	31
DUA44	12/29/2020	0-6	**22**	32
DUA37a	12/29/2020	0-6	**23**	16
DUA47	12/29/2020	0-6	**23**	31
DUA8	12/29/2020	0-6	**24**	22
DUA38	12/29/2020	0-6	**25**	18
DUA11	12/29/2020	0-6	**25**	29
DUA42	12/29/2020	0-6	**25**	29
DUA29a	12/29/2020	0-6	**25**	37
DUA32	12/29/2020	0-6	**25**	38
DUA43	12/29/2020	0-6	**26**	29
DUA7	12/29/2020	0-6	**27**	27
DUA9a	12/29/2020	0-6	**29**	30
DUA14	12/29/2020	0-6	**29**	34
DUA20	12/29/2020	0-6	**29**	43
DUA24	12/29/2020	0-6	**29**	45
DUA22	12/29/2020	0-6	**30**	43
DUA13a	12/29/2020	0-6	**31**	31
DUA41a	12/29/2020	0-6	**31**	34

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUA33a	12/29/2020	0-6	**31**	46
DUA10	12/29/2020	0-6	**32**	31
DUA12	12/29/2020	0-6	**32**	31
DUA21a	12/29/2020	0-6	**32**	50
DUA40	12/29/2020	0-6	**33**	37
DUA31	12/29/2020	0-6	**34**	48
DUA39	12/29/2020	0-6	**35**	39
DUA30	12/29/2020	0-6	**39**	55
DUA34	12/29/2020	0-6	**40**	54
DUA17a	12/29/2020	0-6	**40**	60
DUA49a	12/29/2020	0-6	**41**	73
DUA48	12/29/2020	0-6	**42**	66
DUA18	12/29/2020	0-6	**43**	64
DUA46	12/29/2020	0-6	**48**	75
DUA19	12/29/2020	0-6	**49**	66
DUA1b	12/29/2020	6-12	5.8	6.5
DUA5b	12/29/2020	6-12	5.9	7.2
DUA25b	12/29/2020	6-12	6.0	6.8
DUA21b	12/29/2020	6-12	6.2	7.3
DUA29b	12/29/2020	6-12	7.7	8.0
DUA13b	12/29/2020	6-12	8.7	8.7
DUA49b	12/29/2020	6-12	9.1	12.0
DUA33b	12/29/2020	6-12	9.9	12
DUA37b	12/29/2020	6-12	10.0	9.0
DUA41b	12/29/2020	6-12	10.0	9.8
DUA17b	12/29/2020	6-12	10	12
DUA45b	12/29/2020	6-12	11.0	14
DUA9b	12/29/2020	6-12	12	11
DUA Duff3	12/29/2020	surface	2	5.4
DUA Duff5	12/29/2020	surface	2.8	9.8
DUA Duff6	12/29/2020	surface	3.3	19
DUA Duff7	12/29/2020	surface	3.7	14
DUA Duff4	12/29/2020	surface	5.2	22
DUA Duff1	12/29/2020	surface	9.8	2.9
DUA Duff10	12/29/2020	surface	14	37
DUA Duff11	12/29/2020	surface	14	48
DUA Duff12	12/29/2020	surface	15	47
DUA Duff14	12/29/2020	surface	17	60
DUA Duff15	12/29/2020	surface	20	61
DUA Duff9	12/29/2020	surface	**22**	60

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUA Duff13	12/29/2020	surface	**24**	64
DUA Duff2	12/29/2020	surface	**31**	5.7
DUA Duff8	12/29/2020	surface	**34**	70
DUB22a	12/29/2020	0-6	13	16
DUB17a	12/29/2020	0-6	15	18
DUB20a	12/29/2020	0-6	16	18
DUB16a	12/29/2020	0-6	**21**	31
DUB21a	12/29/2020	0-6	**21**	31
DUB2a	12/29/2020	0-6	**22**	33
DUB30a	12/29/2020	0-6	**22**	34
DUB23a	12/29/2020	0-6	**23**	34
DUB19a	12/29/2020	0-6	**23**	35
DUB26a	12/29/2020	0-6	**23**	38
DUB4a	12/29/2020	0-6	**24**	33
DUB27a	12/29/2020	0-6	**25**	30
DUB18a	12/29/2020	0-6	**25**	34
DUB1a	12/29/2020	0-6	**25**	35
DUB25a	12/29/2020	0-6	**25**	36
DUB29a	12/29/2020	0-6	**27**	34
DUB24a	12/29/2020	0-6	**27**	35
DUB28a	12/29/2020	0-6	**31**	36
DUB6a	12/29/2020	0-6	**32**	35
DUB5a	12/29/2020	0-6	**33**	32
DUB8a	12/29/2020	0-6	**33**	34
DUB3a	12/29/2020	0-6	**34**	37
DUB14a	12/29/2020	0-6	**34**	55
DUB11a	12/29/2020	0-6	**36**	57
DUB7a	12/29/2020	0-6	**42**	50
DUB10a	12/29/2020	0-6	**45**	44
DUB33a	12/29/2020	0-6	**46**	50
DUB9a	12/29/2020	0-6	**47**	41
DUB12a	12/29/2020	0-6	**50**	48
DUB12a	12/29/2020	0-6	**50**	48
DUB13a	12/29/2020	0-6	**50**	48
DUB32a	12/29/2020	0-6	**53**	50
DUB15a	12/29/2020	0-6	**56**	53
DUB31a	12/29/2020	0-6	**57**	54
DUB34a	12/29/2020	0-6	**61**	64
DUB4b	12/29/2020	6-12	5.3	6.5
DUB17b	12/29/2020	6-12	5.6	6.7

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUB18b	12/29/2020	6-12	5.6	7.3
DUB19b	12/29/2020	6-12	5.6	7.4
DUB22b	12/29/2020	6-12	5.8	5.8
DUB20b	12/29/2020	6-12	5.8	6.3
DUB23b	12/29/2020	6-12	5.8	7
DUB21b	12/29/2020	6-12	6.1	7.5
DUB16b	12/29/2020	6-12	6.3	7.3
DUB26b	12/29/2020	6-12	6.3	7.7
DUB27b	12/29/2020	6-12	6.3	7.7
DUB24b	12/29/2020	6-12	6.4	6.9
DUB25b	12/29/2020	6-12	6.5	8
DUB10b	12/29/2020	6-12	6.9	7.1
DUB1b	12/29/2020	6-12	7	7.7
DUB29b	12/29/2020	6-12	7	8
DUB12b	12/29/2020	6-12	7.4	7
DUB12b	12/29/2020	6-12	7.4	7
DUB2b	12/29/2020	6-12	7.4	8.3
DUB9b	12/29/2020	6-12	8	7.2
DUB8b	12/29/2020	6-12	8.1	7.6
DUB13b	12/29/2020	6-12	8.2	7.1
DUB15b	12/29/2020	6-12	8.3	8.6
DUB28b	12/29/2020	6-12	8.7	9.3
DUB34b	12/29/2020	6-12	9.3	9
DUB3b	12/29/2020	6-12	9.7	9.6
DUB5b	12/29/2020	6-12	10	9
DUB6b	12/29/2020	6-12	10	9.1
DUB7b	12/29/2020	6-12	10	12
DUB14b	12/29/2020	6-12	13	14
DUB11b	12/29/2020	6-12	15	15
DUB31b	12/29/2020	6-12	20	16
DUB32b	12/29/2020	6-12	20	18
DUB33b	12/29/2020	6-12	**21**	19
DUB30b	12/29/2020	6-12	**22**	20
DUB3c	12/29/2020	12-24	3.8	4.6
DUB17c	12/29/2020	12-24	4.1	4.6
DUB22c	12/29/2020	12-24	4.3	4.4
DUB2c	12/29/2020	12-24	4.3	5.4
DUB28c	12/29/2020	12-24	4.9	4.4
DUB4c	12/29/2020	12-24	4.9	5.7
DUB20c	12/29/2020	12-24	5	5.1

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUB1c	12/29/2020	12-24	5.1	5.8
DUB24c	12/29/2020	12-24	5.3	4.5
DUB29c	12/29/2020	12-24	5.3	5.5
DUB25c	12/29/2020	12-24	5.3	5.7
DUB21c	12/29/2020	12-24	5.4	6.7
DUB34c	12/29/2020	12-24	5.5	4.8
DUB13c	12/29/2020	12-24	5.5	5.7
DUB10c	12/29/2020	12-24	5.5	6.3
DUB26c	12/29/2020	12-24	5.7	6.5
DUB5c	12/29/2020	12-24	5.7	6.7
DUB16c	12/29/2020	12-24	5.9	7.3
DUB23c	12/29/2020	12-24	6	6.9
DUB19c	12/29/2020	12-24	6	7.4
DUB33c	12/29/2020	12-24	6.3	6.4
DUB8c	12/29/2020	12-24	6.4	6.6
DUB7c	12/29/2020	12-24	6.4	7.7
DUB27c	12/29/2020	12-24	6.5	6.6
DUB18c	12/29/2020	12-24	6.5	7.6
DUB31c	12/29/2020	12-24	7	6.5
DUB6c	12/29/2020	12-24	7	7.4
DUB12c	12/29/2020	12-24	7	7.4
DUB12c	12/29/2020	12-24	7	7.4
DUB15c	12/29/2020	12-24	7	8.3
DUB32c	12/29/2020	12-24	7.1	7.4
DUB30c	12/29/2020	12-24	7.4	7.3
DUB11c	12/29/2020	12-24	8.3	9.3
DUB14c	12/29/2020	12-24	8.4	9.7
DUB9c	12/29/2020	12-24	9.5	8.4
DUB17d	12/29/2020	24-36	4	3.5
DUB1d	12/29/2020	24-36	3.9	4.4
DUB33d	12/29/2020	24-36	5.1	4.5
DUB5d	12/29/2020	24-36	5.1	5.6
DUB13d	12/29/2020	24-36	6.9	6.4
DUB9d	12/29/2020	24-36	7	6.6
DUB25d	12/29/2020	24-36	5.6	6.7
DUB29d	12/29/2020	24-36	5.7	7.1
DUB21d	12/29/2020	24-36	7	8
DUBDuff6	12/29/2020	surface	3.6	14
DUBDuff5	12/29/2020	surface	4.2	14
DUBDuff1	12/29/2020	surface	6.7	24

Sample ID	**Sample Date**	**Depth** (inches)	**Arsenic** (mg/kg)	**Lead** (mg/kg)
DUBDuff8	12/29/2020	surface	11	53
DUBDuff4	12/29/2020	surface	11	55
DUBDuff9	12/29/2020	surface	13	38
DUBDuff2	12/29/2020	surface	13	64
DUBDuff7	12/29/2020	surface	14	54
DUBDuff3	12/29/2020	surface	15	63
DUBDuff10	12/29/2020	surface	17	55

Bold values represent concentrations above the MTCA Method A cleanup level for unrestricted land use.

Bold red values represent concentrations that are twice the MTCA Method A cleanup level for unrestricted land use.