



FINAL (REVISION 2)–AMENDMENT TO THE INTERIM ACTION WORK PLAN ROADWAY UTILITY INFRASTRUCTURE PROJECT

Boise Cascade Mill Site/
Interstate 82 Exit 33A Yakima City Landfill Site
Yakima, Washington

March 31, 2026

Prepared for
City of Yakima

**Final (Revision 2)–Amendment to the IAWP Roadway Utility
Infrastructure Project
Boise Cascade Mill Site/
Interstate 82 Exit 33A Yakima City Landfill Site
Yakima, Washington**

This document was prepared by, or under the direct supervision of, the undersigned, whose seal is affixed below.

Name: Piper Roelen, PE
WA/No. 41509

Date: March 31, 2026



Document prepared by:



Primary Author

Shane Kostka, LG

Document reviewed by:



Quality Reviewer

Piper Roelen, PE

Date: March 31, 2026
Project No.: 1148009.030
File path: \\edmdata01\projects\1148\009.030\R\IAWP Amendment Update\Landau_Final(Rev2) Amendment to IAWP_033126.docx
Project Coordinator: LJL/TAC

This page intentionally left blank.

TABLE OF CONTENTS

	Page
List of Abbreviations and Acronyms	v
1.0 Introduction	1-1
1.1 Assumptions and Definitions.....	1-3
1.2 Mill Site and Landfill Site Description and Background.....	1-4
1.3 Roadway Project Background	1-5
1.4 Purpose of Current Phase of Roadway Construction (Interim Action Work).....	1-6
2.0 Description of planned Interim Action activities	2-1
3.0 Existing Site Conditions	3-1
3.1 Existing Conditions—Landfill Site	3-1
3.1.1 Pre- and Post-Construction Groundwater Monitoring.....	3-1
3.2 Existing Conditions—Mill Site (Roadway Alignment).....	3-2
3.2.1 Known Areas of Contamination	3-3
3.2.1.1 Log Yard Shop Area (AOC 19).....	3-4
3.2.1.2 Small Log Sawmill (AOC 12) and Mill Transformers (AOC 10)	3-4
3.2.2 Other Potential Contaminants of Concern	3-5
4.0 Design and Construction Requirements	4-1
4.1 Landfill Gas Migration Mitigation.....	4-2
4.2 Excavated Materials Management.....	4-2
4.2.1 Management of Known Contaminated Soil.....	4-2
4.2.2 Management of Previously Unidentified Dangerous or Hazardous Waste.....	4-3
4.2.3 Segregation of Clean Fill from Remaining Contaminated Soil	4-3
4.2.4 Management of Municipal Solid Waste	4-3
4.3 Water Management	4-3
4.3.1 Stormwater Management.....	4-3
4.3.2 Groundwater Management	4-4
4.4 Integration of Interim Action Design Elements into Roadway Project Designs	4-4
5.0 Integration with Final Remedy.....	5-1
6.0 Compliance Monitoring	6-1
6.1 Protection Monitoring.....	6-1
6.2 Performance Monitoring.....	6-1
6.3 Confirmation Monitoring	6-1
7.0 Reporting.....	7-1
8.0 Use of This Report.....	8-1
9.0 References	9-1

FIGURES

Figure	Title
1	Vicinity Map
2	Site Diagram—Yakima Landfill Site and Mill Site
3	Project Boundaries
4	Mill Site Transportation Corridor Locations Above pCULs
5	Mill Site Transportation Corridor Sampling Locations and Cross Sections
6	Cross Section A-A'
7	Cross Section B-B'

APPENDICES

Appendix	Title
A	Sampling and Analysis Plan
B	Excavated Materials Management Plan
C	Project Design Documents
	C-1 Water and Sewer Typical Sections (HLA Exhibit)
	C-2 Sewer Main Project Alignment and Proposed Geotechnical Drilling Locations
D	Preliminary Cleanup Levels
	D-1 Yakima Landfill Site (Ecology Memorandum—September 2024)
	D-2 Mill Site (RI PCUL Tables and Ecology Letter—February 2026)
E	Subsurface Testing for the Yakima East-West Corridor Project (Drayton Archaeology)
F	Inadvertent Discovery Plan
G	Health and Safety Plan

LIST OF ABBREVIATIONS AND ACRONYMS

AO	agreed order
AOC	area of concern
APN	assessor’s parcel number
BaP	benzo(a)pyrene
bgs	below ground surface
BNSF	BNSF Railway
City	City of Yakima, Washington
COC	contaminant of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSID	cleanup site identification
cy	cubic yards
Ecology	Washington State Department of Ecology
EMMP	excavated materials management plan
FSID	facility site identification
ft	foot/feet
H:V	horizontal to vertical
HASP	health and safety plan
HLA	HLA Engineering and Land Surveying, Inc.
I-82	Interstate 82
IA	interim action
IAWP	interim action work plan
IDP	inadvertent discovery plan
Landau	Landau Associates, Inc.
Landfill Site	Interstate 82 Exit 33A Yakima City Landfill Site
LFG	landfill gas
MFA	Maul Foster Alongi, Inc.
mg/kg	milligrams per kilogram
Mill Site	Boise Cascade Mill Site excluding Landfill Site
MSW	municipal solid waste
MTCA	Model Toxics Control Act
PAH	polycyclic aromatic hydrocarbon
pCUL	preliminary cleanup level
PLP	potentially liable person
PQL	practical quantitation limit
RI	remedial investigation
ROW	right-of-way
SAP	sampling and analysis plan
TEQ	toxicity equivalence
TPH	total petroleum hydrocarbons
TPH-D	diesel-range total petroleum hydrocarbons
TPH-G	diesel-range total petroleum hydrocarbons
TPH-O	oil-range total petroleum hydrocarbons
WAC	Washington Administrative Code

This page intentionally left blank.

1.0 INTRODUCTION

This Amendment to the Interim Action (IA) Work Plan (IAWP Amendment) for the Yakima Landfill/Boise Cascade Mill Site was prepared by Landau Associates, Inc. (Landau) on behalf of the City of Yakima (City) and provides final updates and amendments to the original IAWP submitted to the Washington State Department of Ecology (Ecology) in July 2019 (Landau 2019).¹ Pursuant to Section VII of Agreed Order (AO) No. DE 15861 for the Interstate 82 Exit 33A Yakima City Landfill Site (“Landfill Site”; Facility Site ID [FSID] 1927; Cleanup Site ID [CSID] 3853) and AO No. DE 13959 for the Boise Cascade Mill Site (“Mill Site”; Ecology FSID 450; CSID 12095), collectively referred to as the “Site” (Figure 1), Ecology has authorized completion of the roadway project through the Mill Site and the former Landfill Site through approval of an IAWP (Landau 2019). This IAWP Amendment, has been prepared in accordance with Ecology’s May 4, 2023 Letter Amendment of Agreed Order DE 15861—Interstate 82 Exit 33A Landfill City Landfill (Ecology 2023a) and Ecology’s May 4, 2023 Planned Utility Corridor through the Bravo Company Boulevard (aka East-West Corridor) Right-of-Way Interim Action letter (Ecology 2023c) for installation of utility infrastructure associated with the roadway project at the Site. An updated Sampling and Analysis Plan (SAP) is included in this IAWP Amendment as Appendix A. The IA work described herein is being performed solely as a result of the roadway construction project. The AO does not require the IA work to be completed but authorizes the City to execute the elements of the IAWP (and the IAWP Amendment).

The Landfill Site is a former City municipal solid waste (MSW) landfill located at the southern end of the Boise Cascade Mill Site. The area of the Boise Cascade Mill Site excludes and is generally north of the Landfill Site (Figure 2). Roadway construction activities completed to date within the Landfill Site have included excavation of MSW and wood debris within the roadway project right-of-way (ROW)/construction easement, backfilling of the excavated area with clean imported fill, and construction of a vertical low-permeability soil landfill gas (LFG) barrier around the City-owned ROW on the Landfill Site (Figure 3).

The purpose of this IAWP Amendment is to supplement the IAWP with updated Site conditions and specific utility infrastructure installation project information, and document the planned removal, management, and disposal of wood debris, MSW, and known contaminated media, identified in the Revised Draft Remedial Investigation (RI) Report (Barr 2021b) and other applicable documents, that are located within the project boundaries (within the ROW).

Consistent with the requirements outlined in Ecology’s Letter Amendment of Agreed Order DE 15861 – Interstate 82 Exit 33A Landfill City Landfill (Ecology 2023a), this IAWP Amendment:

1. Explains how the IA work, as described in the IAWP and this IAWP Amendment, will not foreclose reasonable alternatives for the cleanup (consistent with Washington Administrative

¹ This Final (Revision 1) IAWP Amendment addresses Ecology comments on the June and September 2023 and July 2025 versions. The September 2023 draft IAWP Amendment updated the June 2023 version based on comments provided by Ecology in July 2023 (Ecology 2023d). The primary reason for preparation of this Final IAWP Amendment is to include and incorporate Ecology’s updated preliminary cleanup levels (Appendix D) into the IAWP and sampling and analysis plan (SAP; Appendix A) and provide applicable updates to known Site conditions and roadway project details.

Code [WAC] 173-340-430[3][b]) at the Landfill Site or Mill Site (Sections 1.0, 1.4, 4.0, and 5.0) and will not exacerbate existing Site conditions through the removal of hazardous substances (e.g., excavation of contaminated soil will not adversely impact groundwater quality).

2. Includes the Mill Site potentially liable persons (PLPs) as a member of the Project Team (Appendix A; Section 3.1).
3. Discusses coordination and correspondence with the Mill Site PLPs (Section 3.2).
4. Outlines the mechanism for providing technical documentation from the City’s engineer of record that is necessary to confirm that the IA will not adversely impact existing Site conditions or preclude potential cleanup alternatives for the Landfill Site and Mill Site (Sections 4.0 and 4.4).
5. Provides that the Mill Site PLPs engineer of record will receive a copy of the plans and specifications for the IA work and will be given the opportunity to review and comment prior to commencing the IA (Section 3.2, Appendix A; Section 3.1).

The above-noted requirements are addressed in the sections referenced with the relevant requirement explicitly stated in the applicable section(s).

The Mill Site Revised Draft RI Report (Barr 2021b) identifies the areas where contaminated soil is present and is expected to be encountered during the installation of the roadway utilities at the Mill Site. The Transportation Corridor Wood Debris and Landfill Gas Investigation Report (Landau 2018) also identifies where wood debris is likely to be encountered as well as levels of methane in and around the roadway corridor. This IAWP Amendment provides plans and guidance on the management of MSW, contaminated soil, and wood debris; as well as provides plans for LFG mitigation measures, and direction for the management of methane risks during construction to mitigate potential explosive gas hazards and protect worker and public health and safety.

This IAWP Amendment also confirms that project-related construction will not foreclose reasonable alternatives for cleanup at the Landfill Site or Mill Site and will not exacerbate existing Site conditions.

To this end, this IAWP Amendment presents:

- Existing Site conditions within the roadway ROW at the Landfill Site and Mill Site over which the City plans to construct the utility infrastructure (Section 3).
- Existing Site conditions at the eastern edge of the Landfill Site where the City plans to construct a sanitary sewer main (to be installed in anticipation of future development).
- Design and construction information for the overall utility infrastructure construction project, including LFG mitigation measures (Section 4).
- A description of known contamination present within the portion of the roadway project ROW located on the Mill Site.
- A brief description of excavated materials management including procedures for managing known and unanticipated contaminated soil, MSW, and wood debris encountered during construction activities. Detailed procedures for excavated materials management are outlined in the excavated materials management plan (EMMP; Appendix B).

- Waste characterization measures should unexpected contamination be encountered during construction (Section 4.2.2).

1.1 Assumptions and Definitions

The City adopts the following assumptions and definitions for the purposes of this IAWP Amendment:

- The IA work described herein is being performed solely as a result of the roadway construction project.
- Materials excavated from the Site as part of the roadway project will be managed in accordance with the Model Toxics Control Act (MTCA; WAC Chapter 173-340) and other applicable regulatory requirements.
- The term “wood debris” used in this report includes wood chips, bark, logs, saw dust, whole or scrap milled or unmilled wood and lumber, and other general log yard material that has not been chemically treated or preserved. Wood debris is not a solid waste, hazardous waste, or dangerous waste. So long as any wood debris excavated from the roadway project site is not impacted by other hazardous substances or petroleum products, wood debris may be disposed of or beneficially recycled, composted, or reused without restriction, consistent with Ecology disposal guidance.
- The term “municipal solid waste” or “MSW” used in this report includes typical household waste materials such as product packaging, grass clippings, furniture, clothing, bottles, cans, food scraps, newspapers, appliances, consumer electronics, and batteries; as well as non-hazardous building materials/construction debris such as bricks, concrete and mortar rubble, roofing and siding materials, flooring materials, painted wood/lumber scraps, glass, sheetrock and wall board, and scrap metal. So long as any MSW excavated from the Landfill Site is not impacted by other hazardous substances, petroleum products, or hazardous or dangerous wastes, MSW will be managed and disposed as a solid waste at an appropriately permitted Subtitle D landfill.
- Preliminary cleanup levels (pCULs) for potential pollutants are established using MTCA Method B. The pCULs are set at applicable MTCA Method A or Method B cleanup levels, unless the level is below the natural background concentration or laboratory practical quantitation limit (PQL); if the natural background concentration or the PQL is higher than the cleanup level, the PCUL is set at the higher of natural background value or the PQL. The pCULs are preliminary values and may not be representative of final approved cleanup levels (in the final MTCA-compliant cleanup action plan).
- The terms “hazardous waste” and “dangerous waste” used in this report are waste materials that are listed or characteristic wastes as defined under Resource Conservation and Recovery Act (40 Code of Federal Regulations 260/261) or Washington State Dangerous Waste (Chapter 173-303 WAC) regulations. There are no known hazardous or dangerous wastes present in the roadway ROW or proposed utility corridors; however, there is a possibility that hazardous or dangerous waste could be present and encountered during roadway utility construction. If encountered, hazardous/dangerous wastes will be managed in accordance with MTCA and characterized and disposed of at an appropriately permitted Subtitle C landfill.
- Landfill gas is a complex mixture of gases generated by the microbial biodegradation of organic material within a landfill. LFG typically consists of approximately 40 to 60 percent methane, with the remainder being composed mostly of carbon dioxide. LFG also includes a range of other

trace gases including vinyl chloride and other volatile organic compounds. Because it is impracticable to distinguish methane generated from decaying wood debris from methane generated by MSW, the term “landfill gas” or “LFG” used in this report includes both the methane (and any other gaseous decay products) generated by the MSW and the methane generated by biodegradation of wood debris.

- Any soil, wood debris, or MSW that is determined to contain petroleum or other contaminants at concentrations above pCULs will be managed in accordance with MTCA and disposed of at an appropriately permitted Subtitle D or C landfill based on applicable waste characterization.

1.2 Mill Site and Landfill Site Description and Background

This IAWP Amendment is submitted as part of the City’s roadway infrastructure project. The project includes construction of roadway utility infrastructure within the excavated portion of the Landfill Site as well as north of the Landfill Site along an east-west corridor that crosses a portion of the former Mill Site operations area, and construction of sewer infrastructure in an alignment along the eastern edge of the Landfill Site, running parallel and to the west of Interstate 82 (I-82; Figure 3). A BNSF Railway (BNSF)-owned ROW with railroad tracks runs in an east-west orientation through the middle of the Site. Utilities associated with the roadway construction project are planned to be installed within two MTCA cleanup areas, the “Landfill Site” and the “Mill Site,” as described below.

Interstate 82 Exit 33A Yakima City Landfill Site (FSID 1927; CSID 3853)

The City operated a municipal landfill between approximately 1963 and 1970 within the footprint of the Boise Cascade Mill Site. As part of landfill operations, MSW was placed in a former log pond that originally occupied the south end of the Boise Cascade Mill Site. When landfill operations ceased, the MSW was covered and the area brought to grade with a mixture of fill soil and wood debris (bark, wood chips, discarded logs, and other log yard material). The landfill parcel area was then used until 2010 for log storage, including temporary log storage and log-chipping operations by the tenant of the landfill parcel, Yakima Resources. The Landfill Site is defined by the extent of the MSW, including the extent of contamination associated with potential releases from the former landfill. The former landfill covers an area of approximately 33 acres and is located across portions of three parcels, including most of the approximately 38-acre landfill parcel (Yakima County Assessor’s Parcel No. [APN] 19131841001; owned by OfficeMax, Inc.), the southeast corner of the approximately 15.5-acre plywood mill parcel (APN 19131842001; owned by the LeeLynn, Inc. and Wiley Mt., Inc.), and an area adjacent to I-82 that is owned and maintained by the Washington State Department of Transportation. The IA described herein and other cleanup activities on the Landfill Site are currently being conducted under AO No. DE 15861, executed between Ecology and the City, and effective on July 9, 2018.

Boise Cascade Mill Site (FSID 450; CSID 12095)

The Mill Site consists of the rest of the Boise Cascade Mill Site, primarily located north of the railroad tracks, but also includes most of the former plywood mill parcel to the south of the tracks (northwest of the Landfill Site). The Boise Cascade Mill Site includes 21 parcels, totaling approximately 207 acres in size, adjacent to the west of I-82. BNSF railroad tracks run east-west, bisecting the Boise Cascade Mill Site. LeeLynn, Inc. and Wiley Mt., Inc. own 19 of the parcels. Two parcels are owned by OfficeMax

Corporation (Office Depot)—the landfill parcel located south of the railroad tracks and a triangular-shaped parcel (known as the “Triangle Parcel”) located immediately north of the railroad tracks. A Revised Draft RI Report for the Mill Site was completed on August 20, 2021 (Barr 2021b) and an addendum incorporating Ecology’s comments to the Revised Draft RI was completed in November 2021 (Barr 2021a) under AO No. DE 13959, effective on February 17, 2017, executed between Ecology; OfficeMax Corporation; Dunollie Enterprises, LLC; LeeLynn, Inc.; Wiley Mt., Inc.; and Yakima Resources, LLC (Yakima Resources). Additionally, per a letter from Ecology, Ecology has provided an opinion that the Mill Site also “extends east beyond the east side of Interstate 82” (discussed further in Section 3.2). Due to its ownership of the property east of I-82 and its involvement with the East-West Corridor project, Yakima County has also been named as a PLP for the Mill Site (Ecology 2024). The parties to AO No. DE 13959 and Yakima County are collectively referred to as “Mill Site PLPs” herein.

1.3 Roadway Project Background

A general roadway project background description is provided in the IAWP. The following provides an update to the roadway background, primarily summarizing roadway construction activities completed since preparation of the IAWP.

In 2020 and 2021, MSW and wood debris were excavated from below the portion of the roadway that crosses the Landfill Site and wood debris was excavated from the portion of the roadway crossing the Mill Site between the Landfill Site and railroad ROW to the depth of underlying native material. The City and its design team determined that this construction method was required for geotechnical purposes. Complete debris removal minimizes the potential for roadway settlement due to natural biodegradation of the wood debris and MSW, and facilitates installation of utilities beneath the roadway as deep as 20 feet (ft) below the existing ground surface.

The excavation of the MSW/wood debris was generally sloped at a maximum 2:1 (horizontal:vertical) incline with the toe of the slope situated approximately at the ROW limits to allow for excavation of MSW and wood debris beneath the entire width of the roadway prism/ROW. The excavation was backfilled with clean imported fill. Because construction of the roadway corridor (low-permeability cap) will potentially affect LFG ventilation, migration, or exposure, a vertical low-permeability soil LFG barrier was constructed, extending from the underlying native soil at the base of the excavation slope to the final grade of backfill on either side of the roadway alignment as well as outside the extents of MSW at the termini of the excavation. The LFG barrier was constructed with an in-place hydraulic conductivity equal to or less than 1×10^{-6} centimeters per second to reduce LFG migration below the roadway.² Following installation of utility infrastructure, the paved infrastructure of the roadway alignment will be constructed as shown in the IAWP. The roadway alignment and limits of MSW and wood debris excavation, as well as the alignment of the low-permeability wall, are shown on Figure 3.

² The original LFG barrier design included in the IAWP consisted of a membrane to be placed on the slopes of the roadway fill prism with an underlying LFG collection and venting system. The design was changed to the vertical low-permeability soil wall as documented in a letter to Ecology (Landau 2020) and acknowledged by Ecology (Ecology 2020). Landau also notified Ecology of a minor modification to the barrier wall design related to the width of installation in a subsequent letter (Landau 2021a).

The MSW/wood debris excavation resulted in an approximate 25 percent reduction in MSW and wood debris for the entire former Landfill Site, and reduction of wood debris from sections of the Mill Site. This action did not foreclose any reasonable remedial technologies that may be evaluated or selected for the final cleanup action.

1.4 Purpose of Current Phase of Roadway Construction (Interim Action Work)

During this phase of the roadway project, utilities will be installed/constructed in a portion of the Mill Site known to contain wood debris and contaminated soil. Additionally, the utility construction through the clean fill placed in the ROW on the Landfill Site will require penetrating the low-permeability LFG barrier wall at the north and south ends of the prior IA roadway excavation. Design and construction of sewer main infrastructure along the eastern edge of the Landfill Site will also require drilling geotechnical borings and excavating through areas known to contain MSW and may require penetrating the low-permeability LFG barrier, depending on the final alignment.

This IAWP Amendment complies with WAC 173-340-430 and the AOs for the Landfill Site and the Mill Site. Implementation of this IAWP Amendment will mitigate health and safety risks for roadway construction and maintenance workers and the general public from LFG, potential exacerbation of contamination in groundwater, and unintentional or unauthorized release or disposal of dangerous or solid waste. This IAWP Amendment documents the features of the utility infrastructure design and construction procedures that address or account for:

- Sealing any penetrations into/through the low-permeability wall to prevent LFG migration along utility corridors/lines that intersect/penetrate the wall
- Observing and conducting excavation and grading in areas of known soil contamination, MSW, and accumulated wood debris such that solid waste, known contaminated materials, or previously unidentified dangerous waste or other dangerous materials that may be encountered during construction are properly identified, characterized, managed, and disposed of in accordance with applicable, relevant, and appropriate requirements, including local, state, and federal health and safety, disposal, and cleanup laws and regulations.

In accordance with the Ecology requirements outlined in Section 1.0,

1. The IAWP Amendment elaborates in detail on how the IA, as described in the IAWP and this IAWP Amendment, will not interfere with or foreclose reasonable alternatives for cleanup at the Landfill Site or Mill Site and will not exacerbate existing Site conditions.

This IAWP Amendment documents that the IA complements or supplements the final cleanup work, should any be required, and will not foreclose reasonable alternative for final cleanup of the Landfill Site or Mill Site pursuant to MTCA [WAC 173-340-430(3)(b)].

While these design and construction requirements are not required by MTCA, they will provide Ecology with necessary information to ensure that the MTCA cleanup and contamination, to the extent any is encountered at the Landfill Site and Mill Site during construction, will be removed and will not be exacerbated or the extent expanded in soil or groundwater by the utility corridor construction.

2.0 DESCRIPTION OF PLANNED INTERIM ACTION ACTIVITIES

A description of the complete roadway project IA is included in the IAWP. The following provides descriptions specific to the next planned phase of work, primarily the construction of a utility corridor through the roadway prism on the Mill Site and Landfill Site and construction of sewer infrastructure along the eastern edge of the Landfill Site.

Based on current construction designs, utility infrastructure within the roadway prism will primarily be installed from Bravo Company Boulevard, south of the Landfill Site, to the existing street system at East H Street and 7th Avenue, northwest of the Landfill Site and west of the Mill Site. Additional utilities will be installed south of the Landfill Site from Bravo Company Boulevard to the I-82 off-ramp, west of I-82 (Figure 3); this part of the construction is not within the Landfill Site or Mill Site and is, therefore, not part of the IA. No utility infrastructure is planned to be installed east of I-82 at this time. Utility infrastructure within the roadway prism will include construction of storm drainage, sewer mains, and potable water and irrigation mains as deep as 20 ft below the existing ground surface. Utilities installed within the previously excavated portions of the Landfill Site and Mill Site will be constructed in clean fill that was imported for backfill of the excavation. The remainder of the utilities within the roadway prism will be installed in “undisturbed” areas of the Mill Site (outside the limits of the Landfill Site).

Appendix C-1 provides typical cross sections of the utility trenching planned for utilities installed within the ROW.³

In preparation for the eventual completion of the east-west corridor roadway system, sewer infrastructure is planned to be installed in advance of roadway construction activities along the eastern edge of the Landfill Site. The sewer line will run parallel to I-82, extending from south of the Landfill Site, through the east end and to the northeast corner of the Landfill Site, and may include a horizontal boring under the BNSF railroad tracks (pending approval to extend the north end of the sewer main to the southern end of the Mill Site that will be hooked into future phases of this specific sewer project (not included in this current phase of the interim action). If extended under the tracks, the north end of this sewer line will not extend into the Mill Site settling pond area of concern (AOC). The sewer infrastructure installed along the eastern edge of the Landfill Site will include removal of all wood debris and MSW to the depth of the underlying native material and replacing with clean pipe bedding material and structural fill. The final alignment and design of the sewer corridor and its proximity to the I-82 property boundary will determine the extent of wood debris and MSW that will be excavated eastern edge of the Landfill Site. This initial section of the sewer line and the conceptual alignment for future phases of the sewer infrastructure project north of the Landfill Site (on the Mill Site) are shown in Appendix C-2.

³ Note that the construction means and methods for the utility trenching will be determined by the construction contractor (e.g., trenches may be sloped or trench boxes may be used to maintain vertical trench walls). The construction contractor will provide the City with their construction means and methods prior to finalizing to allow comments from the City to be incorporated into the means and methods.

As part of the design process for the sewer infrastructure project, the City plans to conduct geotechnical investigation activities (geotechnical borings) and cultural resources evaluation activities (test pits) along the sewer alignment to the east of the Landfill Site. If allowable by Ecology, geotechnical borings and cultural resource test pits will also be installed at locations along the future conceptual alignment within the Mill Site (Appendix C-2). Based on the findings from the Mill Site RI, none of the proposed boring locations are in areas where contamination has been identified. However, an environmental professional will observe geotechnical drilling and cultural resource test pit excavation activities and will screen soils for evidence of contamination. Additionally, investigation-derived waste (e.g., soil cores from the borings and decontamination water) generated during drilling and test pit excavation spoils where field-screening evidence of contamination has been observed will be sampled and analyzed consistent with the procedures in the SAP (Appendix A). Investigation-derived waste and contaminated soil will be disposed of, as appropriate, based on the laboratory analytical results.

Areas of known contaminated soil and pockets of wood debris are present within the portion of the roadway utility project ROW located on the Mill Site. Contaminated soil within the ROW will be excavated to the full depth of contamination. Wood debris within the roadway prism will be excavated to the depth of the underlying native soil. All excavated materials will be managed in accordance with the EMMP (Appendix B) and will be replaced with compacted clean structural fill or pipe bedding material to minimize the potential for settlement of the future roadway and accommodate utility infrastructure. Where wood debris, MSW, or contaminated soil are present, the utility trenches represented in Appendix B will be extended in depth to allow removal of all wood debris, contaminated soil, or MSW beneath and/or between the planned utility trenches.

The existing low-permeability wall around the ROW through the Landfill Site is designed to prevent potential migration of LFG from and generated by adjacent MSW into the roadway prism. The low-permeability wall will minimize the potential for the accumulation of LFG in the subsurface beneath low-permeability roadway surfaces that could inhibit natural ventilation and/or result in uncontrolled lateral migration, which could occur through higher-permeability fill materials (e.g., gravel backfill in utility corridors). Because construction of the utility corridors may require penetrating the LFG barrier, the penetrations through the wall will be sealed around utility lines to prevent LFG migration along utility corridors/lines that intersect/penetrate the low-permeability wall. The LFG barrier was constructed to protect future utility roadway worker health and safety, not for MTCA-related cleanup purposes. The LFG migration barrier will not be considered a precedent for final cleanup options at the Landfill Site and will not exacerbate existing conditions or interfere with or foreclose reasonable alternatives for cleanup at the Landfill Site.

3.0 EXISTING SITE CONDITIONS

The following summarizes known existing conditions at the portions of the Landfill Site and Mill Site where construction of utility infrastructure will occur.

3.1 Existing Conditions–Landfill Site

In 2020 and 2021, City-directed MSW and wood debris removal activities within the roadway project ROW/construction easement were completed. Approximately 144,334 tons of MSW deposited at the Landfill Site during the landfill’s active operational years and 39,756 tons of wood debris associated with the historical mill activities were excavated from the roadway prism. In addition to the removal of MSW and wood debris, approximately 550 tons of petroleum hydrocarbon-contaminated native soil encountered beneath the MSW/wood debris excavation were also removed and disposed of off Site at a Subtitle D landfill. The excavation was backfilled with common borrow and a vertical low-permeability soil LFG barrier was constructed from the underlying native soil to the final grade of backfill around the perimeter of the excavation. Therefore, no known or significant soil contamination remains at the City-owned ROW within the limits of the 2020-2021 roadway IA excavation.

The subsurface conditions at the eastern edge of the Landfill Site are generally characterized by the presence of buried wood debris associated with historical mill activities overlying MSW deposited at the Landfill Site during the landfill’s active operational years. Extensive soil and groundwater investigations have been conducted to evaluate the presence (or absence), magnitude, and extent of a wide variety of contaminants of concern (COCs) at the Landfill Site. The results of these investigations are provided in the Landfill Site Supplemental RI Report (Landau 2015), Transportation Corridor Wood Debris and Landfill Gas Investigation technical memorandum (Landau 2018), and Pre-Construction Groundwater Monitoring Data Report (Landau 2021b), and the IA Progress Report (Landau 2025).

The excavation and removal of MSW and wood debris is anticipated to mitigate or reduce impacts to Landfill Site groundwater and LFG through large-scale removal of organic and putrescible materials and contaminated soil above or in contact with the groundwater in the roadway prism. Additionally, the eventual roadway surface and stormwater management system construction will aid in the control of stormwater that may otherwise infiltrate through the MSW and wood debris adjacent to the roadway prism.

In September 2024, Ecology issued an Updated pCULs Memorandum for the Landfill Site (Appendix D), which provided revised pCULs and guidance for COCs at the Landfill Site. The pCULs for the Landfill Site and Mill Site are discussed further in Section 2.1.7 of the SAP (Appendix A).

3.1.1 Pre- and Post-Construction Groundwater Monitoring

As part of the IA, Landau conducted pre- and post- construction groundwater quality monitoring to evaluate potential changes in groundwater quality following completion of the environmental-related portions of roadway construction activities. Groundwater monitoring included the collection of groundwater samples from monitoring wells on and in the vicinity of the Landfill Site and from select

monitoring wells on the Mill Site. During post-construction groundwater monitoring, groundwater samples were collected during the high- and low-water seasons, which are predominantly driven by the irrigation season in the Yakima River valley. A discussion of groundwater monitoring methods and results from pre- and post-construction groundwater monitoring is included within the IA Progress Report. The progress report also provides a description of updated Site conditions based on these monitoring events and based on comparison of Site data to Ecology’s updated pCULs (Appendix D).

3.2 Existing Conditions–Mill Site (Roadway Alignment)

Numerous previous investigations have been conducted at the Mill Site, including in the southern end (within and proximate to the roadway alignment), much of which is summarized in the Supplemental RI Investigation Report (Landau 2015) and the Mill Site Revised Draft RI Report (Barr 2021b). An LFG and wood debris evaluation conducted by Landau (2018) also included investigation activities along the ROW in the southern end of the Mill Site.

In conjunction with the City-directed MSW/wood debris excavation at the Landfill Site, wood debris was excavated from the portion of the roadway ROW crossing the Mill Site between the Landfill Site and railroad ROW to the underlying native material.

The planned utility installation in the remainder of the Mill Site (generally north of the railroad tracks) will be completed in areas that were not excavated during Landfill Site roadway excavation activities. Subsurface conditions are generally characterized by the presence of dense silty sands and gravels along the portion of the roadway alignment located on the Mill Site. It is also noteworthy that a layer of large-size concrete debris and boulders exists under approximately 250 linear feet of the alignment, approximately midway between the railroad tracks and the northernmost roundabout, and extends from the ground surface to more than 13 ft deep in some places. Known pockets of wood debris are also known to be present within the project ROW on the Mill Site. Based on data from investigations conducted by Landau and others, there may be as much as 38,000 bank cubic yards (cy) of wood debris in the ROW.

The western portion of the roadway alignment passes through areas of historical wood mill buildings, where known areas of soil contamination that exceed the Mill Site pCULs are present and likely related to historical Mill Site operations (Figure 4). Additionally, investigations have been completed and data collected at the former Plywood Mill area of the Mill Site located adjacent to the northwest of the Landfill Site (south of the railroad tracks), which have identified groundwater contamination that has the potential to migrate beneath portions of the roadway alignment. The north end of the sewer infrastructure described herein will not extend to the Mill Site settling pond (AOC 8).

In February 2023, Ecology issued a letter regarding historical uses at the Mill Site and identified an area east of I-82, the Mill Site, and the Landfill Site (Yakima County Parcel Nos. 191318-11002 and 191318-41002) that was also used for log storage. The letter required that the Mill Site PLPs identify mill activities, contaminants and sources, and the nature and extent of contamination on these parcels (Ecology 2023b). In 2024 Maul Foster Alongi, Inc. (MFA) completed a draft Initial Investigation Report on behalf of Yakima County for an environmental investigation completed on the parcels identified by

Ecology (MFA 2024). During its investigation, MFA identified areas of wood waste up to 13 ft deep and identified concentrations of gasoline- and oil-range total petroleum hydrocarbons (TPH-G and TPH-O, respectively), metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), phthalates, and volatile organic compounds in soil in exceedance of preliminary screening levels developed for use during the investigation (MFA 2024). Because the area is outside the project boundaries defined within the IAWP (Figure 3) and because there are no currently planned utilities within this area, the results of MFA's investigation or any subsequent investigation work performed by Yakima County or the Mill Site PLPs are not discussed further in this document.

On February 11, 2026, Ecology issued a Development of Preliminary Cleanup Levels memorandum, which provided pCULs for the Yakima County East-West Corridor roadway project (Ecology 2026a) and issued an updated pCUL table based on Mill Site PLP comments on February 24, 2026 (Ecology 2026b). Ecology has indicated that the pCULs for the Mill Site should be considered the most stringent of the pCUL values developed for the Mill Site in the Revised Draft RI Report for the Mill Site (Barr 2021b) and those developed by Ecology for the property east of I-82.

In accordance with the Ecology requirements outlined in Section 1.0:

- This IAWP Amendment discusses coordination and correspondence with the Boise Cascade Mill Site PLPs.
- Provides that the Mill Site engineer of record will receive a copy of the plans and specifications for the IA work and will be given the opportunity to review and comment prior to commencing the IA.

This IAWP Amendment documents that planned excavation activities conducted at the Mill Site will be coordinated with Mill Site PLPs, including:

- Notifying Mill Site PLPs prior to excavating in known or suspected areas of contamination
- Notifying Mill Site PLPs of the presence of any unanticipated contaminated material
- Providing Mill Site PLPs with any analytical results from confirmation or characterization samples collected from known or unanticipated areas of contamination
- Providing Mill Site PLPs with approximate volumes of contaminated soil and wood debris excavated from the Mill Site
- Providing Mill Site PLPs with utility infrastructure plans and specifications and construction means and methods for review and comment.

3.2.1 Known Areas of Contamination

AOCs and associated known areas of contamination exceeding Mill Site pCULs that have been identified by Mill Site investigations and are present within the project boundaries (Figure 3) are shown in plan view on Figures 4 and 5 and cross-sectional view on Figures 6 and 7. These areas are summarized in the following sections.

3.2.1.1 Log Yard Shop Area (AOC 19)

The log yard shop area (AOC 19) is proximate to the north of the railroad tracks. Based on soil samples collected from two shallow test pits (Landau 2018) and four soil borings (Barr 2021b), known contamination in this portion of the Mill Site within the ROW is described below.

- Total petroleum hydrocarbons (TPH) in the oil range (TPH-O) were detected above PCULs at concentrations as high as 14,000 milligrams per kilogram (mg/kg) within approximately 2 ft below ground surface (bgs) in an area of the roadway alignment proximate to the north of the railroad tracks. TPH-O was detected above PCULs in two of those soil borings at approximately 5 to 7 ft bgs at concentrations as high as 9,290 mg/kg and in one of the soil borings at 12 ft bgs at a concentration of 840 mg/kg. Detections of TPH-O were reported above PCULs at a concentration of 1,100 mg/kg from 0 to 2 ft bgs in one additional soil boring located approximately 10 ft west of the ROW. The Mill Site PCUL for TPH-O is 460 mg/kg.
- TPH in the gasoline range (TPH-G) was detected at concentrations above PCULs at approximately 0 to 2 ft bgs in two soil borings and was detected above PCULs in one soil boring at approximately 5 to 7 ft bgs. The maximum detected concentration of TPH in the gasoline range in soil was 244 mg/kg. The Mill Site PCUL for TPH in the gasoline range is 30 mg/kg.
- Bis(2-ethylhexyl)phthalate, a semivolatile organic compound, was detected in one soil boring above PCULs from approximately 0 to 2 ft bgs at a concentration of 0.970 mg/kg. The Mill Site PCUL for bis(2-ethylhexyl)phthalate is 0.445 mg/kg.
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were detected in multiple soil samples from borings at concentrations below the Mill Site PCUL. In accordance with Ecology Implementation Memorandum #10 (Ecology 2015), the benzo(a)pyrene (BaP) toxicity equivalence (TEQ) concentration was calculated using one-half the detection limit for cPAHs when there was a detection of any cPAH in the sample. The BaP TEQ concentration in one soil sample collected from 0 to 2 ft bgs within the ROW exceeded the Mill Site PCUL of 0.190 mg/kg. The BaP TEQ concentration exceeded the Mill Site PCUL in an additional soil sample collected from 5 to 7 ft bgs, approximately 10 ft west of the ROW.

Based on data from these investigation locations and other nearby test pits and soil borings with no evidence of contamination, there may be as much as 7,600 bank cy of contaminated soil in the ROW.

3.2.1.2 Small Log Sawmill (AOC 12) and Mill Transformers (AOC 10)

The small log sawmill (AOC 12) and mill transformer area (AOC 10) is near the ROW northernmost roundabout and is located at the southern extent of a historical log pond. Test pits completed in the area have documented minimal wood debris present in the subsurface. Based on the results of soil samples collected from two soil borings (Barr 2021b), known contamination in this area is described below.

- TPH-O was detected above PCULs at concentrations as high as 2,660 mg/kg within approximately 2 ft bgs from the area of the proposed northernmost roundabout. TPH-O was detected above PCULs in one of those soil borings at a concentration of 1,040 mg/kg at 9 to 10 ft bgs. A detection of TPH-O was reported from 6 to 8 ft bgs at a concentration of 1,560 mg/kg in one additional soil boring located within the ROW, northwest of the roundabout.

Based on data from these investigation locations and other nearby soil borings with no evidence of contamination, there may be as much as 12,300 bank cy of contaminated soil in the ROW.

3.2.2 Other Potential Contaminants of Concern

Based on the Revised Draft RI Report Yakima Mill Site (aka Boise Cascade Mill Site; Barr 2021b), other suspected or potential COCs within the roadway alignment may include the following:

- Decomposing wood debris at the Mill Site generating methane. Methane detected in soil gas monitoring wells where only buried wood debris is located (i.e., north of the railroad tracks and outside of the MSW landfill boundaries) has been measured at concentrations up to 19.1 percent by volume.
- Dissolved metals are also present in groundwater at the Mill Site due to reducing conditions associated with groundwater contact with and leaching of organic materials from wood debris located at the Mill Site. Similar to the Landfill Site, the primary metals of concern in groundwater are arsenic, iron, and manganese.
- TPH in the diesel and oil ranges (TPH-D/O) has been detected in groundwater in the vicinity of the former plywood mill area at the Mill Site, located adjacent to the northwest of the Landfill Site (south of the railroad tracks). Based on groundwater data from monitoring wells, dissolved-phase TPH D/O may have migrated beneath the roadway corridor in the area east of the former plywood mill and south of the railroad tracks.

4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

Construction of the roadway corridor utilities within the ROW on the Mill Site will require trenching and removing all wood debris from below the utility corridor to the depth of the underlying native material. To ensure that no future remedial actions are precluded by installation of the utility corridor, this work will also require excavating known and unanticipated contaminated soil to the full depth of contamination within the ROW. Following the excavation of known or unanticipated contaminated soil, a physical barrier will be placed between clean backfill in the excavated area from any potentially contaminated soil remaining outside of the utility corridor. Drawings showing the depths and locations of utilities to be installed are provided in the City’s Bravo Company Boulevard Water and Sewer Plan and Profile (not included with this report). The excavation will be backfilled with clean imported fill.

Construction of sewer infrastructure along the eastern edge of the Landfill Site will include removal of wood debris and MSW to the depth of the underlying native material from the western extent of the sewer corridor to the eastern extent of MSW (eastern edge of the Landfill Site).

The utility installation plans and specifications will incorporate designs and plans to:

- Seal utility lines and trenches that intersect/penetrate the low-permeability wall to prevent LFG migration along utility corridors/lines.
- Properly manage and dispose of known contaminated soil, MSW, and wood debris removed during excavation for utility construction; and characterize, manage, and dispose of previously unidentified contaminated soil and hazardous or dangerous waste, if encountered during construction.
- Segregate areas of known and unanticipated contaminated soil excavated within the utility corridor from any potentially contaminated soil remaining outside of the utility corridor.

In accordance with the Ecology requirements outlined in Section 1.0:

- The IAWP Amendment elaborates in detail on how the IA, as described in the IAWP and this IAWP Amendment, will not interfere with or foreclose reasonable alternatives for cleanup at the Landfill Site or Mill Site and will not exacerbate existing Site conditions.

This IAWP Amendment confirms that each of these components will be compatible with the final remedy selected for the Landfill Site and Mill Site.

In accordance with the Ecology requirements outlined in Section 1.0:

- The IAWP Amendment outlines the mechanism for providing technical documentation from the City landfill engineer of record that is necessary to confirm that the IA will not adversely impact existing Site conditions or preclude potential cleanup alternatives for the Landfill Site and Mill Site.

This IAWP Amendment confirms that the project plans and specifications from the City’s engineer will be provided to Ecology by the City when the plans have been finalized. Water and sewer typical sections provided by HLA Engineering and Land Surveying (HLA) are included as Appendix C-1.

4.1 Landfill Gas Migration Mitigation

The LFG migration barrier around the ROW through the Landfill Site was designed to prevent potential migration of LFG from and generated by adjacent biodegradable materials (i.e., MSW and wood debris) into the roadway prism. This will minimize the potential for accumulation of LFG in the subsurface beneath low-permeability roadway surfaces that could inhibit natural ventilation and/or result in uncontrolled lateral migration, which could occur through higher-permeability fill materials (e.g., gravel backfill in utility corridors). LFG will not be generated below the portion of the roadway excavated in 2020 and 2021. Installation of utility corridors will require penetrating the LFG low-permeability wall south of the BNSF ROW and in the southern portion of the Landfill Site.

Any penetrations into the low-permeability wall will be sealed to prevent LFG migration along utility corridors/lines that intersect/penetrate the wall and trench dams will be installed to prevent offsite migration of LFG through utility corridors. Seals will be created by installing trench dams at the low-permeability barrier wall alignment that are constructed of the same type of soil as the original barrier wall, or comparable material with hydraulic conductivity equal to or lower than the existing barrier wall.

4.2 Excavated Materials Management

Materials excavated from the utility project areas as part of the roadway project will be managed in accordance with MTCA and other applicable regulatory requirements. Excavated materials management details for contaminated soil, MSW, and wood debris are provided in the EMMP (Appendix B) and the SAP (Appendix A).

Any excavated material that is determined to contain petroleum or other contaminants at concentrations above applicable regulatory limits will be managed, in accordance with MTCA and the EMMP (Appendix B) to prevent spreading contamination outside the project boundaries, and disposed of at an appropriately permitted Subtitle D or C landfill based on applicable waste characterization.

Excavated MSW and wood debris may be segregated for disposal if separate disposal and recycling facilities are used for each material. Excavated MSW must be disposed of at a Subtitle D-permitted disposal facility. If appropriately characterized, wood debris may be segregated for disposal and transported to a permitted wood material recycling or composting facility. If required by the disposal facility (i.e., if existing sampling data are not sufficient for facility characterization, profiling, and acceptance criteria), soil and wood debris may be stockpiled on Site and sampled for waste or recycling characterization analysis prior to disposal or recycling.

4.2.1 Management of Known Contaminated Soil

As outlined in Section 3.2, utilities will be installed in known areas of contamination at the Mill Site. Contaminated and potentially contaminated materials will be identified and managed in accordance with the EMMP (Appendix B) and characterized in accordance with the SAP (Appendix A). Contaminated soil under the utility corridor will be excavated to the full depth of contamination and a plastic sheeting barrier will be installed to segregate clean backfill within the utility corridor from remaining contaminated soil outside of the utility corridor.

4.2.2 Management of Previously Unidentified Dangerous or Hazardous Waste

There is a potential for unexpected waste materials or contaminated soil to be encountered during drilling and excavation activities. If potentially dangerous, hazardous, or otherwise regulated waste materials are encountered during utility construction, these materials will need to be properly characterized for protection of worker health and safety and to determine proper materials management and disposal requirements.

The EMMP (Appendix B) and SAP (Appendix A) address recognition of known and unanticipated contamination and characterization of contamination, as well as issues related to excavated materials and associated stormwater handling and disposal.

4.2.3 Segregation of Clean Fill from Remaining Contaminated Soil

In areas where contamination is removed from the utility corridor/alignment and the excavation is backfilled with clean fill, the clean fill will be segregated from the contaminated soil remaining in place outside of the utility corridor excavation. This segregation will consist of a plastic sheeting barrier that will be installed along the walls or slopes of the utility corridor trench to prevent migration of contamination into clean fill.

4.2.4 Management of Municipal Solid Waste

Sewer design investigation borings and utility infrastructure will be installed in areas of the Landfill Site known to contain MSW at thicknesses of up to 15 ft, with an average thickness of approximately 10 ft. The MSW consists of organic-putrescible material (food, garden, and animal waste), organic non-putrescible waste (paper, wood, textiles, leather, plastic, rubber, paints, and sludge), and inorganic materials (metals, glass, ceramics, soil, ash, concrete, etc.). In general, drilling spoils and excavated material may be segregated based on physical/visual characteristics into soil, MSW, and wood debris. The EMMP (Appendix B) addresses management of MSW.

4.3 Water Management

Based on the nature of the utility corridor project, management of contaminated stormwater and groundwater is not anticipated to be necessary during construction. The subsections below are provided in the unlikely event that water management becomes necessary but will not be specifically included in the project designs and specifications.

4.3.1 Stormwater Management

Precipitation occurring during construction is expected to infiltrate into the subsurface. However, during construction, stormwater-related controls must be considered including obtaining and complying with the conditions of a Construction Stormwater General Permit, which may involve preparing applicable stormwater management plans and providing temporary erosion and sediment controls for excavation and grading areas to prevent potential migration of stormwater runoff and sediment. Stormwater

accumulated or collected in trenches/excavations will be contained as necessary, sampled, and treated as needed prior to discharge to the City’s sanitary or storm sewer system, depending on the permit conditions.

4.3.2 Groundwater Management

Groundwater is not anticipated to be encountered during construction of the utility corridor. However, if groundwater is encountered during construction, the contractor should be aware of general groundwater conditions in the roadway project area, which includes the presence of dissolved metals (primarily arsenic, iron, and manganese). Additionally, as indicated in Section 3.2, prior investigations have identified TPH-D/O in groundwater in the vicinity of the former plywood mill area, which may have migrated east from the former plywood mill area and beneath the roadway corridor in the area immediately south of the railroad tracks. Collected groundwater will be contained as necessary, sampled, and treated as needed prior to discharge to the City’s sanitary or storm sewer system, depending on the permit conditions.

4.4 Integration of Interim Action Design Elements into Roadway Project Designs

Landau has been working and will continue to work closely with the City and its design team to integrate the requirements and conceptual designs presented in this IAWP Amendment into the roadway design package, including requirements that the construction means and methods not adversely impact current Site conditions or preclude future cleanup alternatives. This includes working on the following elements for inclusion/integration into the roadway design package:

- Preparation of bid and construction-ready designs and specifications for the specific IA design elements described above, including protection of the LFG migration barrier during utility corridor construction.
- Identification of stormwater permitting and management/treatment requirements, including erosion and sediment control measures.
- Identification of groundwater management/treatment requirements if encountered during construction.
- Identification of specific applicable and appropriately permitted waste disposal facilities to be contracted for disposal of materials excavated from the roadway ROW, as necessary.
- The Washington State Department of Archaeology and Historic Preservation may require that ground-disturbing activities be monitored by an archaeologist for evidence of cultural resources. Any cultural resource monitoring will be done in accordance with applicable regulations. Previous archaeological testing within the roadway corridor indicated that “There were no archaeological or cultural resources that would rise to the level of Historic Property located during this latest round of work. Therefore, it appears that the original assessment that a determination of No Historic Properties Affected should remain” (Appendix E). However, additional cultural resource investigation activities will be conducted in areas of the Site described in this IAWP Amendment that are outside previous archaeological testing areas (Section 2.0) to confirm the absence of archaeological or cultural resources. Additionally, an

Inadvertent Discovery Plan has been developed (Appendix F) for the roadway utility contractor, sewer contractor, and geotechnical engineering contractor to follow when performing subgrade excavation and utility construction activities and geotechnical drilling activities.

In accordance with the Ecology requirements outlined in Section 1.0:

- The IAWP Amendment outlines the mechanism for providing technical documentation from the City landfill engineer of record that is necessary to confirm that the IA will not adversely impact existing Site conditions or preclude potential cleanup alternatives for the Landfill Site and Mill Site.

This IAWP Amendment confirms that the requirements and design elements outlined herein will be incorporated into construction plans (which will be provided to Ecology when finalized), provided to contractors, and carried out (or modified as necessary) in consultation with appropriate parties, regulators, and stakeholders. The work will commence contingent on National Environmental Policy Act approval and the City or its construction contractor securing the necessary federal, state, and local permits. The City will provide Ecology copies of the permits and/or a list of permits obtained or applied for upon request. The City will provide Ecology with a detailed construction schedule for the utility infrastructure construction work prior to commencing construction.

5.0 INTEGRATION WITH FINAL REMEDY

In accordance with the Ecology requirements outlined in Section 1.0:

- The IAWP Amendment elaborates in detail on how the IA work, as described in the IAWP and this IAWP Amendment, will not interfere with or foreclose reasonable alternatives for cleanup at the Landfill Site or Mill Site and will not exacerbate existing Site conditions.

This IAWP Amendment confirms that the IA will allow for the final selected remedies for the Landfill Site and Mill Site to be complementary or supplementary to the IA. By removing contaminated soil, MSW, and wood debris to the full depth they are encountered in utility excavations, the utility infrastructure installed as part of the roadway project will not foreclose reasonable alternatives for the final selected remedy for the Landfill Site and the Mill Site. The feasibility studies for the Landfill and Mill Sites have not been prepared, so the final remedy is currently unknown.

6.0 COMPLIANCE MONITORING

Compliance monitoring will be conducted to confirm the effectiveness of the IA-related work. Compliance monitoring consisting of protection, performance, and confirmation monitoring is required for the project. To the extent the project implicates any permitting or other relevant or applicable regulatory requirements including or beyond what is discussed below, the City will comply through its AO process with Ecology.

6.1 Protection Monitoring

Worker health and safety will be addressed through a project health and safety plan (HASP). The requirements for a project HASP will be included in the project construction documents, and the contractor will prepare the HASP to protect workers from exposure to hazardous materials during construction. The HASP will address potential physical and chemical hazards associated with construction of roadway utility infrastructure at the Landfill Site and Mill Site.

Because the IA includes extensive excavation in areas known to contain wood debris, MSW, LFG, and contaminated soil and groundwater, screening during construction for potential chemical exposure will need to be conducted. This will include use of a photoionization detector and an intrinsically safe multi-gas meter to screen for volatile organic compounds, methane, and hydrogen sulfide during construction. The HASP will address screening frequency and methods and include screening levels at which engineering controls and/or elevated personal protective equipment will be required.

Oversight and protection monitoring performed by Landau during IA activities will be conducted under a Site-specific HASP (Appendix G). Other contractors performing work associated with the IA will prepare their own HASPs.

6.2 Performance Monitoring

Performance monitoring will consist of construction quality assurance monitoring to confirm that the IA is completed according to the IA design drawings and specifications, and proper excavated materials management is conducted to confirm that contaminated and uncontaminated soil, MSW, and wood debris are properly handled and disposed of. Areas of known contamination and associated chemical concentrations in soil, groundwater, and wood debris outlined in Section 3.2 will be used to provide information on potential COCs in the excavated media that would require characterization analysis. Previously unidentified contaminated materials encountered during construction will be sampled and analyzed in accordance with the procedures included in the SAP (Appendix A) to characterize the type of contamination encountered. Ecology will be notified if previously unidentified dangerous or hazardous waste is encountered. Excavated material will be managed in accordance with the EMMP (Appendix B).

6.3 Confirmation Monitoring

Confirmation monitoring will consist of sampling soil at the utility corridor limits (excavation base and/or sidewalls) in areas where contaminated soil is removed to document the conditions of soil remaining outside the excavation limits. The location and density of sampling will depend on the extent of the

contaminated soil removed from any given area of the utility corridor and the construction methods of the contractor performing the work. For example, if trench boxes are used, sidewall sample collection may not be possible; the depth and accessibility of the trenches may also determine the method of sampling (e.g., direction from trench bottom or from excavator bucket). If possible, at least one bottom sample and one sidewall sample will be collected from each discrete area of contaminated soil removal.

Sampling procedures are detailed in the SAP provided in Appendix A.

7.0 REPORTING

In accordance with the Letter Amendment of Agreed Order DE 15861 - Interstate 82 Exit 33A Landfill City Landfill (Ecology 2023a), the City will prepare a second Interim Action Progress Report after completion of the utility corridor construction project documenting IA work associated with this IAWP Amendment. Once the IA work (i.e., all roadway construction elements) has been completed in full, the information presented in all the Interim Action Progress Reports shall be incorporated into a final Interim Action Completion Report, the requirements of which are included in the IAWP.

The second Interim Action Progress Report will include, as applicable:

- A written summary of IA construction activities.
- A summary of deviations from the IAWP and/or IAWP Addendum.
- As-built drawings identifying the limits of excavation of MSW, wood debris, and removal of contaminated soil or any other identified contaminated materials.
- As-built drawings of the location and details of trench dams where utilities penetrated the original LFG migration barrier.
- Selected photographs of IA construction activities and infrastructure installation.
- Copies of construction and performance monitoring and inspection results.
- Copies of analytical laboratory reports (and tabulated data summaries) for any applicable performance or confirmation sampling results.
- Waste disposal documentation, including:
 - Bills of lading
 - Waste manifests
 - Weight tickets
 - Estimates of total MSW, wood debris, and contaminated soil volumes removed for offsite disposal
 - Estimates of groundwater volumes treated and discharged during construction activities.

If necessary, the Interim Action Progress Report will be modified and finalized after applicable review and approval by Ecology.

8.0 USE OF THIS REPORT

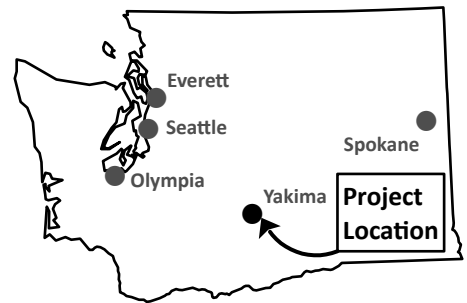
This Amendment Memorandum to the IAWP Addendum has been prepared for the exclusive use of the City of Yakima and Washington State Department of Ecology for specific application to the Interstate 82 Exit 33A Yakima City Landfill Site and Boise Cascade Mill Site roadway utility infrastructure project. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user’s sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

9.0 REFERENCES

- Barr. 2021a. Addendum to August 2021 Revised Draft Remedial Investigation Report: Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. November 15.
- Barr. 2021b. Revised Draft Remedial Investigation Report, Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. August.
- Ecology. 2015. Implementation Memorandum #10: Evaluating the Human Health Toxicity of Carcinogenic PAHs Using Toxicity Equivalency Factors. Publication No. 15-09-049. Toxics Cleanup Program, Washington State Department of Ecology. April 20.
<https://apps.ecology.wa.gov/publications/documents/1509049.pdf>.
- Ecology. 2020. Letter: Change to Conceptual Landfill Gas Barrier Design: Site Name: Interstate 82 Exit 33A Yakima City Landfill, Site Address: 805 North 7th Street, Yakima, Facility/Site ID No.: 1927, Cleanup Site ID No.: 3853, Agreed Order: DE 15861. From Frank Winslow, Washington State Department of Ecology, to Piper Roelen, Landau Associates, Inc. April 21.
- Ecology. 2023a. Letter: Letter Amendment of Agreed Order DE 15861 - Interstate 82 Exit 33A Landfill City Landfill; Site Name: Interstate 82 Exit 33A Yakima City Landfill; Site Address: 805 North 7th Street, Yakima; Facility Site ID No.: 1927; Cleanup Site ID No.: 3853; Agreed Order No. DE 15861. From Jennifer Lind, Toxics Cleanup Program, Washington State Department of Ecology, to Bill Preston, City of Yakima. May 4.
- Ecology. 2023b. Letter: New Information – Log yard historical use on east side of I-82: Site Name: Boise Cascade Mill, Site Address: 805 N 7th Street, Yakima, Facility/Site ID No.: 450, Cleanup Site ID No.: 12095, Agreed Order No.: DE 13959. From John Zinza, Toxics Cleanup Program, Washington State Department of Ecology, to Allan Gebhard, Barr Engineering. February 27.
- Ecology. 2023c. Letter: Planned Utility Corridor through the Bravo Company Boulevard (aka East-West Corridor) Right-of-Way Interim Action; Site Name: Boise Cascade Mill; Site Address: 805 North 7th Street, Yakima; Facility Site ID No.: 450; Cleanup Site ID No.: 12095; Agreed Order No. DE 13959. From John Zinza, Toxics Cleanup Program, Washington State Department of Ecology, to Bill Preston, City of Yakima. May 4.
- Ecology. 2023d. “Re: Ecology’s Initial Comments.” From Jennifer Lind, Toxics Cleanup Program, Washington State Department of Ecology, to Piper Roelen, Landau Associates. July 26.
- Ecology. 2024. Letter: Re: Final Determination of Liability for Release of Hazardous Substances at the following Contaminated Site: Site Name: Boise Cascade Mill, Site Address: 805 N 7th Street, Yakima, Facility/Site ID: 450, Cleanup Site ID: 12095, Assessor’s Parcel #'s: 191318-11002 & 191318-41002. From Valerie Bound, Washington State Department of Ecology, to Matt Pietrusiewicz, PE, Yakima County Roads. November 25.
- Ecology. 2026a. Memorandum: Yakima County East-West Corridor Roadway Project, Development of Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site. From Arthur Buchan, Toxicologist Toxics Cleanup Program – Central Region Office, Washington State Department of Ecology, to John Zinza PE, Cleanup Project Manager (Boise Cascade Mill Site) Toxics Cleanup Program - Central Region Office. February 11.

- Ecology. 2026b. Excel File: 20260224_CUL Matrix-130_FCR (02-24-26). Washington State Department of Ecology. February 24.
- Landau. 2015. Agency Review Draft: Supplemental Remedial Investigation Report, Closed City of Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. September 29.
- Landau. 2018. Technical Memorandum: Transportation Corridor Wood Debris and Landfill Gas Investigation, Former Boise Cascade Mill Site and Closed City of Yakima Landfill Site, Yakima, Washington, Facility/Site No. 1927. Landau Associates, Inc. September 12.
- Landau. 2019. Final (Revision 1): Interim Action Work Plan—Roadway Project, Closed City of Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. July 29.
- Landau. 2020. Letter: Approval of Change to Conceptual Landfill Gas Barrier Design, Interim Action Work Plan for Closed City of Yakima Landfill Site Roadway Project, Agreed Order No. DE 15861. From Piper Roelen, Landau Associates, Inc., to Frank Winslow, Washington State Department of Ecology. April 1.
- Landau. 2021a. Letter: Notification of Change to Landfill Gas Barrier Design, Interim Action Work Plan Implementation—City of Yakima Landfill Site Roadway Project, Agreed Order No. DE 15861. From Piper Roelen, Landau Associates, Inc., to Jennifer Lind, Washington State Department of Ecology. May 18.
- Landau. 2021b. Technical Memorandum: Pre-Construction Groundwater Monitoring Data Report, Interim Action—Roadway Project, Closed City of Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. February 16.
- Landau. 2025. Interim Action Progress Report, Closed Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. July 7.
- MFA. 2024. Draft Initial Investigation Report, East-West Corridor Roadway, Yakima, Washington. Maul Foster & Algoni, Inc. August 28.

G:\Projects\1148\009\030\034\AWP Amendment Memo.aprx 1/21/2026 BPadgett



Data Source: Esri.

Boise Cascade Mill Site/
 Closed City of Yakima
 Landfill Site
 Yakima, Washington

Vicinity Map

Figure
1



G:\Projects\11481009\0201\AWP Addendum\F02 SiteDiagram.mxd 7/29/2025

Legend

- Yakima Landfill Site Boundary (AO No. DE 15862)
- Yakima Mill Site Boundary (AO No. DE 13959)
- Tax Parcels and Parcel Site Number (191318-XXXXX)

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Scale in Feet

Data Source: Yakima County GIS; Google Earth Pro.

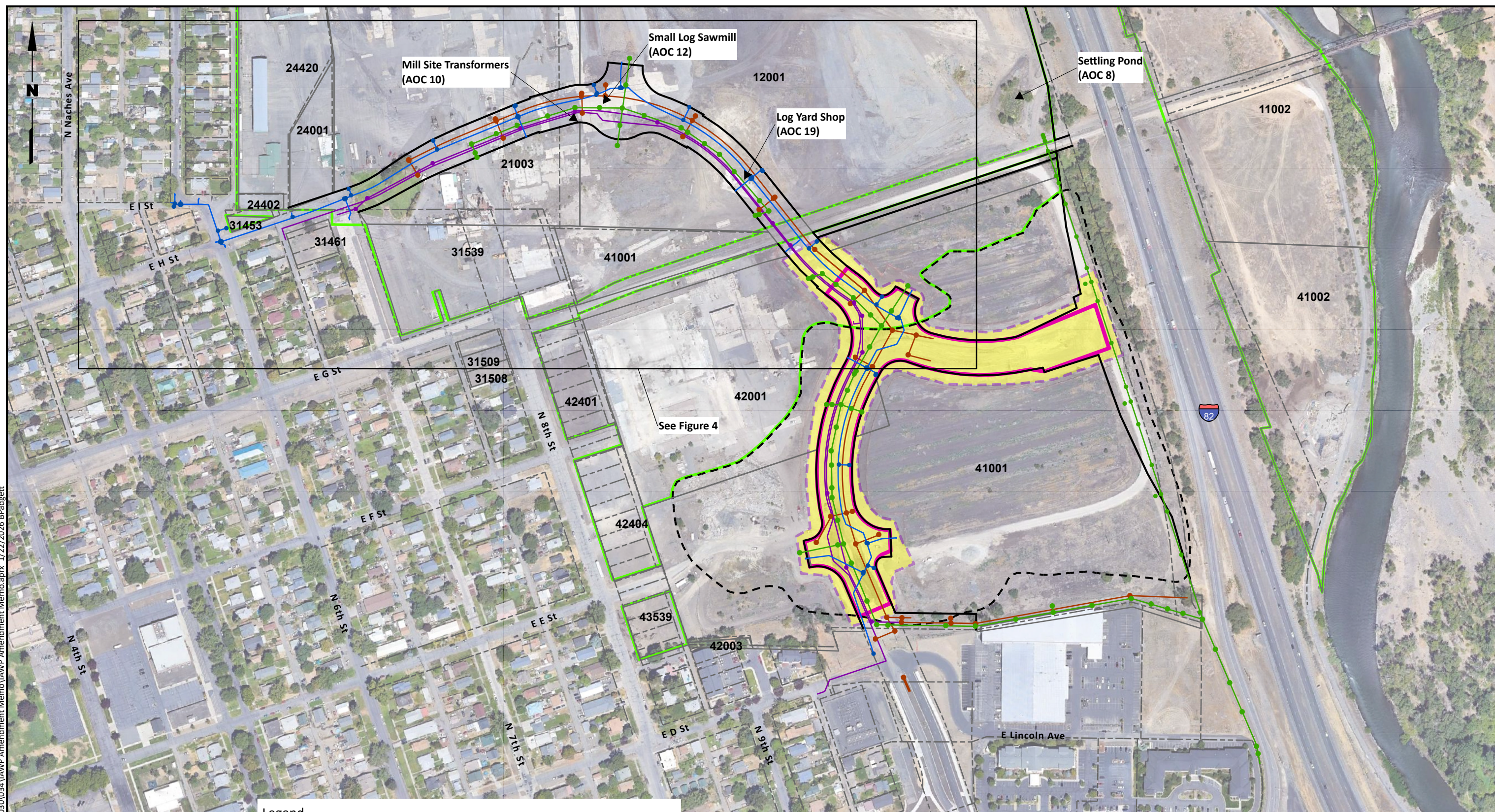
Boise Cascade Mill Site/
Closed City of Yakima
Landfill Site
Yakima, Washington

Site Diagram
Yakima Landfill Site and Mill Site

Figure
2

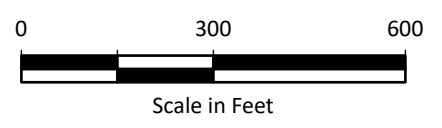


G:\Projects\1148\009\030\034\AWP Amendment\Memo\AWP Amendment Memo.aprx 1/22/2026 BPdgett



Note
 1. AOC = Area of Concern
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

- Legend**
- Existing Right of Way
 - New Right of Way
 - New Storm Sewer
 - New Irrigation
 - New Sewer
 - New Water
 - ▭ Yakima Mill Site Boundary (AO No. DE 13959)
 - ▭ Municipal Landfill Extent
 - ▭ Approximate Completed Roadway
 - ▭ Prism Excavation Area
 - ▭ Low Permeability Wall
 - ▭ Tax Parcels and Parcel Site Number (191318-XXXXX)



Data Source: HLA Engineering and Land Surveying, Inc; Lochner Engineering; Yakima County GIS; Esri World Imagery.

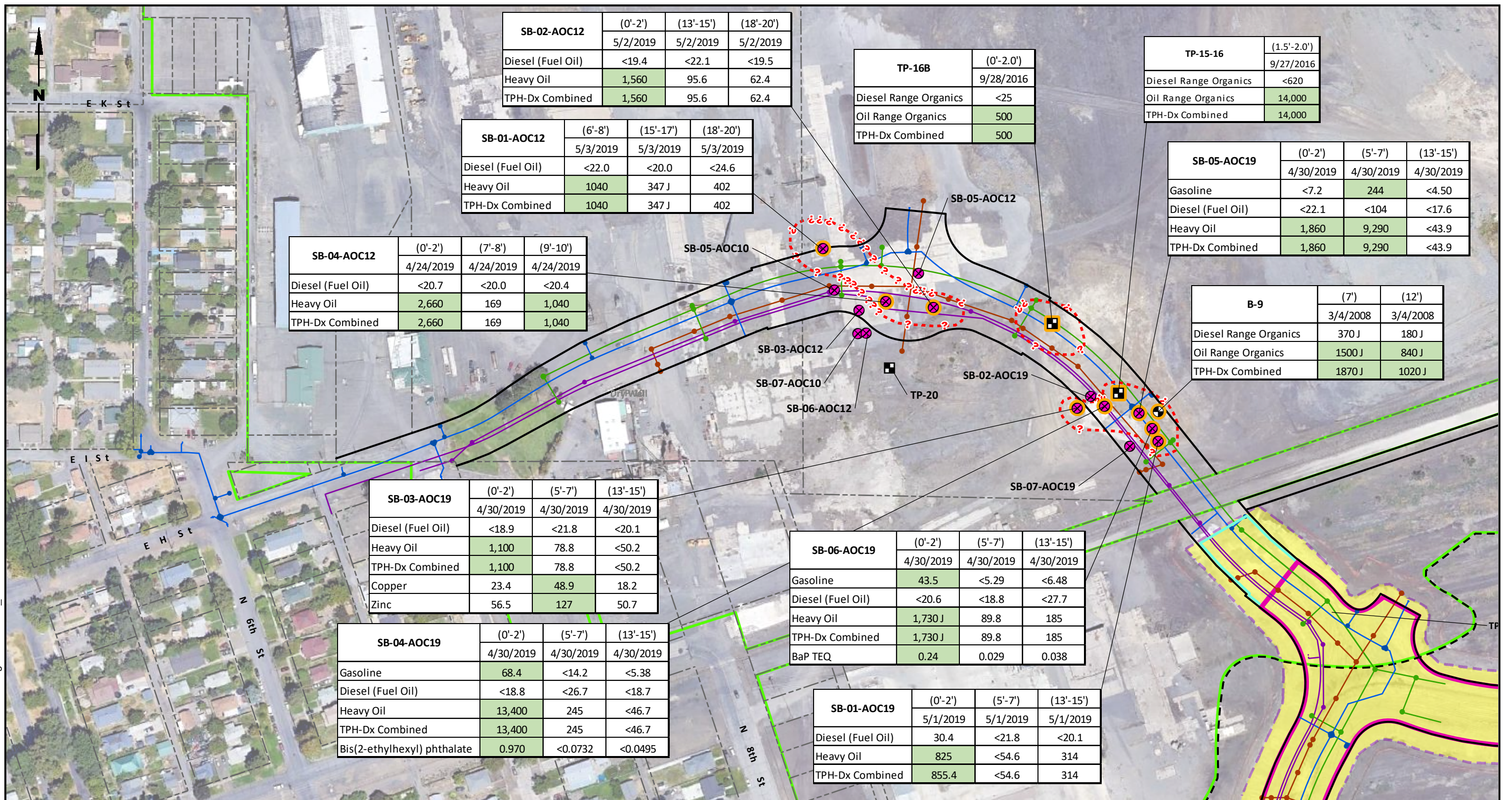


Boise Cascade Mill Site/
 Closed City of Yakima
 Landfill Site
 Yakima, Washington

Project Boundaries

Figure
3

G:\Projects\1148\009\020\IWP Addendum\F04 TargetAreaWS16_WS09.mxd 8/31/2023



SB-02-AOC12	(0'-2')	(13'-15')	(18'-20')
	5/2/2019	5/2/2019	5/2/2019
Diesel (Fuel Oil)	<19.4	<22.1	<19.5
Heavy Oil	1,560	95.6	62.4
TPH-Dx Combined	1,560	95.6	62.4

TP-16B	(0'-2.0')
	9/28/2016
Diesel Range Organics	<25
Oil Range Organics	500
TPH-Dx Combined	500

TP-15-16	(1.5'-2.0')
	9/27/2016
Diesel Range Organics	<620
Oil Range Organics	14,000
TPH-Dx Combined	14,000

SB-01-AOC12	(6'-8')	(15'-17')	(18'-20')
	5/3/2019	5/3/2019	5/3/2019
Diesel (Fuel Oil)	<22.0	<20.0	<24.6
Heavy Oil	1040	347 J	402
TPH-Dx Combined	1040	347 J	402

SB-05-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	<7.2	244	<4.50
Diesel (Fuel Oil)	<22.1	<104	<17.6
Heavy Oil	1,860	9,290	<43.9
TPH-Dx Combined	1,860	9,290	<43.9

SB-04-AOC12	(0'-2')	(7'-8')	(9'-10')
	4/24/2019	4/24/2019	4/24/2019
Diesel (Fuel Oil)	<20.7	<20.0	<20.4
Heavy Oil	2,660	169	1,040
TPH-Dx Combined	2,660	169	1,040

B-9	(7')	(12')
	3/4/2008	3/4/2008
Diesel Range Organics	370 J	180 J
Oil Range Organics	1500 J	840 J
TPH-Dx Combined	1870 J	1020 J

SB-03-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Diesel (Fuel Oil)	<18.9	<21.8	<20.1
Heavy Oil	1,100	78.8	<50.2
TPH-Dx Combined	1,100	78.8	<50.2
Copper	23.4	48.9	18.2
Zinc	56.5	127	50.7

SB-06-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	43.5	<5.29	<6.48
Diesel (Fuel Oil)	<20.6	<18.8	<27.7
Heavy Oil	1,730 J	89.8	185
TPH-Dx Combined	1,730 J	89.8	185
BaP TEQ	0.24	0.029	0.038

SB-04-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	68.4	<14.2	<5.38
Diesel (Fuel Oil)	<18.8	<26.7	<18.7
Heavy Oil	13,400	245	<46.7
TPH-Dx Combined	13,400	245	<46.7
Bis(2-ethylhexyl) phthalate	0.970	<0.0732	<0.0495

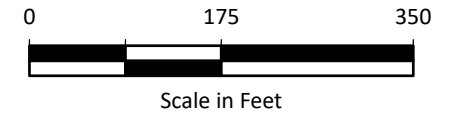
SB-01-AOC19	(0'-2')	(5'-7')	(13'-15')
	5/1/2019	5/1/2019	5/1/2019
Diesel (Fuel Oil)	30.4	<21.8	<20.1
Heavy Oil	825	<54.6	314
TPH-Dx Combined	855.4	<54.6	314

Legend

- ⊕ Soil Boring (Others)
- ⊞ Test Pit (Landau)
- ⊗ Soil Bore (Others)
- Results above PCUL
- Existing Right of Way
- New Right of Way
- New Storm Sewer
- New Irrigation
- New Sewer
- New Water
- ⬜ Municipal Landfill Extent
- ⬜ Approximate Completed Roadway
- ⬜ Prism Excavation Area
- ⬜ Yakima Mill Site Boundary (AO No. DE 13959)
- ⬜ Approximate Extent of Soil Concentrations above Preliminary Cleanup Levels
- ⬜ Low Permeability Wall
- ⬜ Double Lined Plastic Barrier

Notes

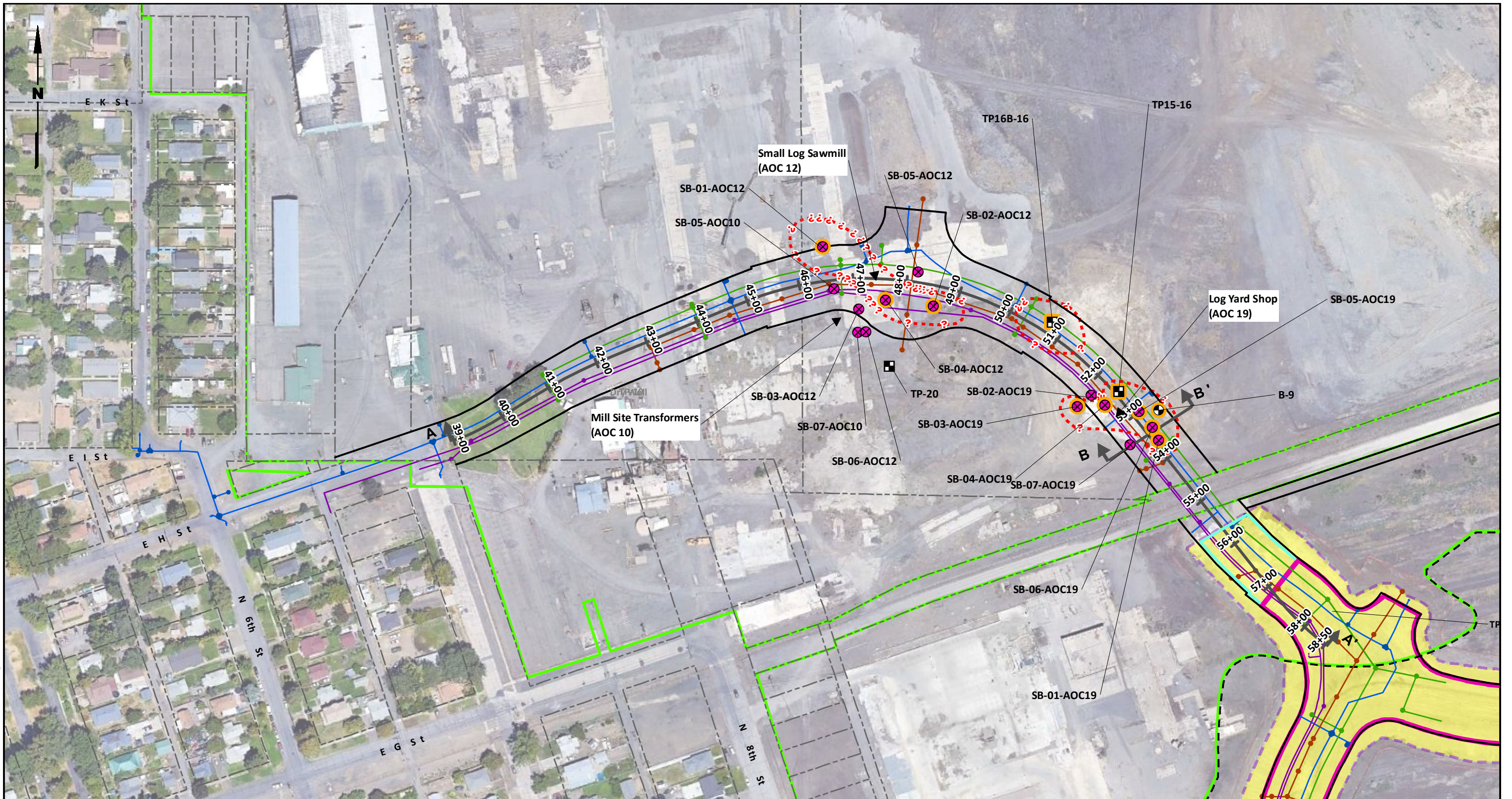
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Data Source: Barr; HLA Engineering and Land Surveying, Inc; Lochner Engineering; Esri World Imagery.

Boise Cascade Mill Site/ Closed City of Yakima Landfill Site Yakima, Washington	Mill Site Transportation Corridor Locations above PCULs	Figure 4
--	--	--------------------

G:\Projects\1148\009\020\IAWP Addendum\F05 TargetAreaCrossSection.mxd 8/31/2023

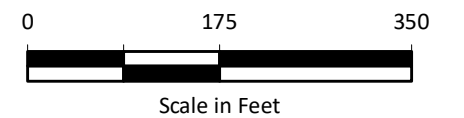


Legend

- ⊕ Soil Boring (Others)
- ⊠ Test Pit (Landau)
- ⊗ Soil Bore (Others)
- Results above PCUL
- Existing Right of Way
- New Right of Way
- New Storm Sewer
- New Irrigation
- New Sewer
- New Water
- ⊠ Municipal Landfill Extent
- ↔ Cross Section Location and Designation
- ▭ Approximate Completed Roadway Prism Excavation Area
- ▭ Yakima Mill Site Boundary (AO No. DE 13959)
- ⋯ Approximate Extent of Soil Concentrations above Preliminary Cleanup Levels
- ▭ Low Permeability Wall
- Double Lined Plastic Barrier

Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. AOC = Area of Concern.



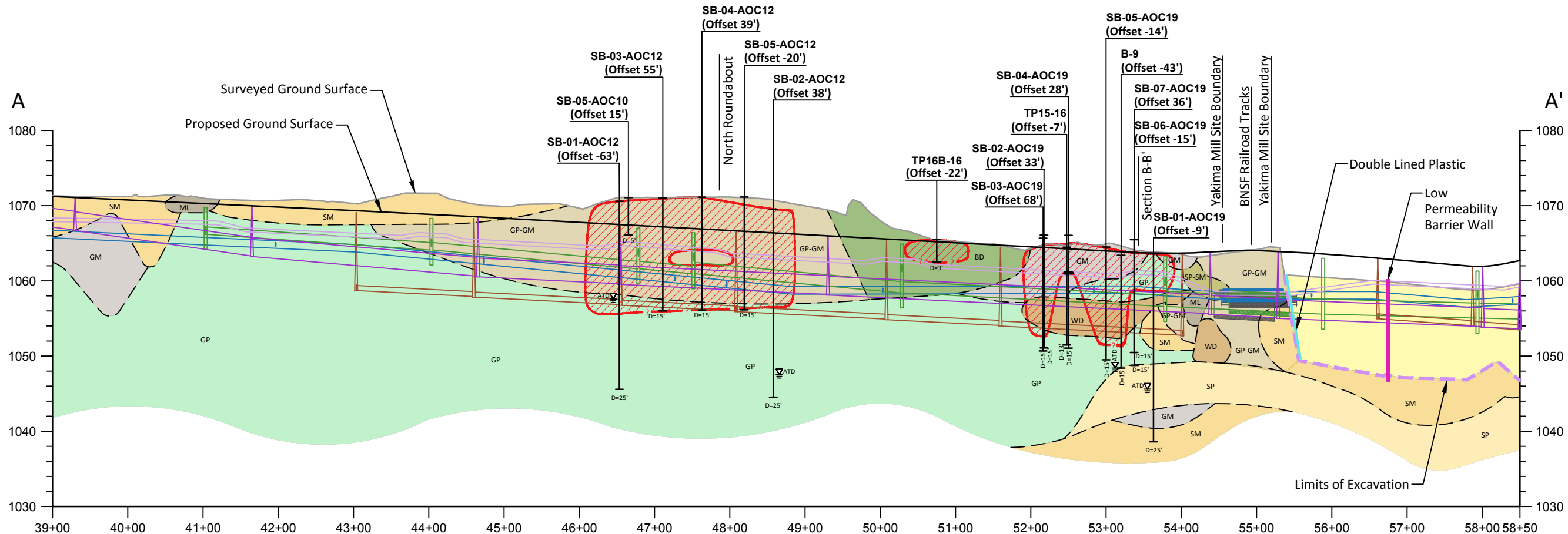
Data Source: Barr; HLA Engineering and Land Surveying, Inc; Lochner Engineering; Esri World Imagery.

Boise Cascade Mill Site/
Closed City of Yakima
Landfill Site
Yakima, Washington

**Mill Site Transportation Corridor
Sampling Locations and Cross Sections**

Figure
5

Landau Associates | G:\Projects\1148\009\020\AWP Addendum\F06 F07 Xseca.dwg | 8/31/2023 12:15 PM | ezick

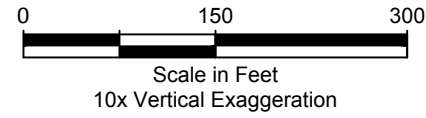


Geologic Profile A-A'

Horizontal Scale in Feet: 1"=50'
Vertical Scale in Feet: 1"=5'

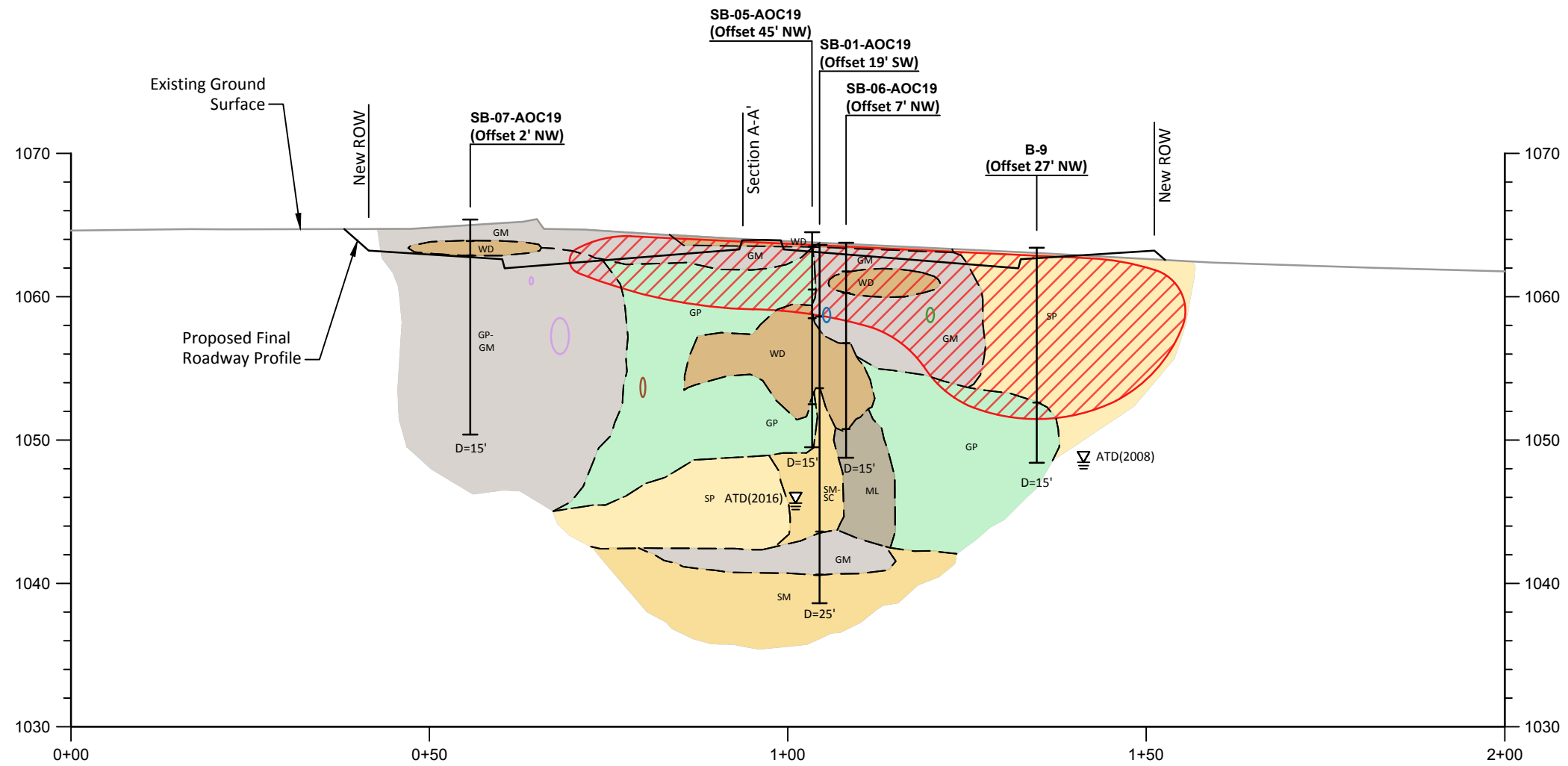
Legend

- | | | | |
|--|---------------------------------------|--|--|
| | WD (wood debris) | | Approximate Groundwater Surface at Time of Exploration (September 2016) |
| | SP (clean sand) | | New 8" PVC Sewer Main |
| | SM (sand with fines) | | New 12" Storm Drain |
| | SP-SM | | New 12" Water Main |
| | BD (large concrete debris & boulders) | | New 30" Irrigation Main |
| | GP (clean gravel) | | New 6" Irrigation Main |
| | GM (gravel with fines) | | Double Lined Plastic |
| | GM-GP | | Approximate Extent of Soil Concentrations Above Preliminary Cleanup Levels |
| | ML (silt and sand) | | Low Permeability Wall |
| | | | Approximate Completed Roadway Prism Excavation Area |



Source: Yakima County GIS; SLR, URS, Parametrix 2008, Boise 1985.



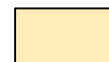

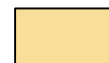

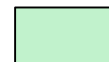






Landau Associates | G:\Projects\1148\009\020\AWP Addendum\F06 F07 XsecA XsecB.dwg | 9/8/2023 12:57 PM | ezick

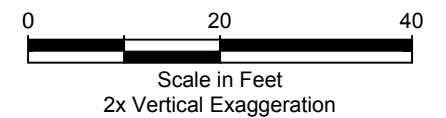


Geologic Profile B-B'

Horizontal Scale in Feet: 1"=20'
Vertical Scale in Feet: 1"=10'

Legend

- | | |
|--|--|
|  WD (wood debris) |  Approximate Groundwater Surface at Time of Exploration (Year) |
|  SP (clean sand) |  New 8" PVC Sewer Main |
|  SM (sand with fines) |  New 12" Storm Drain |
|  GP (clean gravel) |  New 12" Water Main |
|  GM (gravel with fines) |  New 30" Irrigation Main |
|  ML (silt and sand) |  New 6" Irrigation Main |
| |  Approximate Extent of Soil Concentrations Above Preliminary Cleanup Levels |



Source: Yakima County GIS; SLR, URS, Parametrix 2008, Boise 1985.

Closed City of Yakima Landfill Site Yakima, Washington	Cross Section B-B'	Figure 7
--	---------------------------	---------------------

Sampling and Analysis Plan



SAMPLING AND ANALYSIS PLAN

Boise Cascade Mill Site/Interstate 82 Exit 33A
Yakima City Landfill Site
Yakima, Washington

March 31, 2026

Prepared for
City of Yakima

TABLE OF CONTENTS

	Page
List of Abbreviations and Acronyms	iii
1.0 Introduction	1-1
2.0 Sampling Procedures	2-1
2.1 Waste Characterization	2-1
2.1.1 Stockpile Characterization Sampling.....	2-1
2.1.2 Excavation Sample Collection Procedures.....	2-2
2.1.3 Potential Asbestos Sample Collection Procedures	2-3
2.1.4 Water Sample Collection Procedures.....	2-3
2.1.5 Laboratory Analysis for Waste Characterization	2-4
2.1.6 Stormwater/Groundwater/Dewatering Fluid Laboratory Analysis.....	2-5
2.1.7 Preliminary Cleanup Levels.....	2-5
2.2 Landfill Gas Monitoring/Sampling.....	2-5
2.2.1 Landfill Gas Measurements	2-5
2.2.2 Landfill Gas Sampling	2-6
3.0 Quality Assurance and Quality Control.....	3-1
3.1 Project Team Organization and Responsibilities.....	3-1
3.2 Quality Assurance Objectives	3-1
3.3 Field and Laboratory Quality Control Procedures.....	3-2
3.3.1 Blind Field Duplicates	3-2
3.3.2 Field Trip Blanks	3-2
3.3.3 Laboratory Matrix Spike/Matrix Spike Duplicate.....	3-3
3.3.4 Laboratory Duplicates	3-3
3.3.5 Laboratory Method Blanks	3-3
3.3.6 Laboratory Control Sample.....	3-3
3.3.7 Surrogate Spikes.....	3-3
3.4 Laboratory Quality Assurance/Quality Control	3-3
3.5 Corrective Actions	3-3
3.6 Data Verification and Validation	3-5
3.7 Data Management Procedures	3-6
4.0 Equipment Decontamination.....	4-1
4.1 Sampling Equipment	4-1
4.2 Heavy Equipment	4-1
5.0 Use of This Plan.....	5-1
6.0 References	6-1

TABLES

Table	Title
1	Soil (Unsaturated) pCULs—Landfill Site
2	Soil (Saturated) pCULs—Landfill Site
3	Groundwater pCULs—Landfill Site
4	Soil pCULs and COPCs—Mill Site
5	Groundwater (Drinking Water) pCULs and COPCs—Mill Site

LIST OF ABBREVIATIONS AND ACRONYMS

ACM.....	asbestos-containing material
City	City of Yakima, Washington
COPC	contaminant of potential concern
DAHP	Department of Archaeology and Historic Preservation
Ecology.....	Washington State Department of Ecology
EPA	US Environmental Protection Agency
IA	interim action
IAWP	Interim Action Work Plan
IDW	investigation-derived waste
Landau.....	Landau Associates, Inc.
Landfill Site.....	Interstate 82 Exit 33A Yakima City Landfill Site
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LFG	landfill gas
Mill Site	Boise Cascade Mill Site excluding Landfill Site
MS/MSD.....	matrix spike/matrix spike duplicate
MSW.....	municipal solid waste
MTCA.....	Model Toxics Control Act
NWTPH-Dx	Northwest TPH extended-range diesel analytical method
NWTPH-Gx	Northwest TPH extended-range gasoline analytical method
PCB.....	polychlorinated biphenyl
pCUL.....	preliminary cleanup level
PLP.....	potentially liable person
PQL.....	practical quantitation limit
QA/QC.....	quality assurance/quality control
RCRA.....	Resource Conservation and Recovery Act
ROW	right-of-way
RPD.....	relative percent difference
SAP	sampling and analysis plan
SVOC.....	semivolatile organic compound
TAT	turnaround times
TCLP.....	toxicity characteristic leachate procedure
TPH.....	total petroleum hydrocarbon
VOC	volatile organic compound
WAC	Washington Administrative Code

This page intentionally left blank.

1.0 INTRODUCTION

This sampling and analysis plan (SAP), prepared by Landau Associates, Inc. (Landau), describes the procedures for conducting performance and confirmation sampling field activities related to design and construction of the utility infrastructure at the Interstate 82 Exit 33A Yakima City Landfill Site (Landfill Site) and Boise Cascade Mill Site (Mill Site). The sections of the utility infrastructure project area that cross both the Landfill Site and the Mill Site are collectively referred to as the “Site” in this document. This SAP is an appendix to the Amendment to the Interim Action (IA) Work Plan (IAWP Amendment) and is intended to be used in conjunction with both the original IAWP and associated attachments (Landau 2019) and the IAWP Amendment, not as a standalone document.

The primary objective of this SAP is to provide sampling and analysis procedures and methodologies for the IA consistent with accepted procedures such that the data collected will be adequate and representative for use in:

- Characterizing for disposal of soil, municipal solid waste (MSW), and wood debris drilled or excavated for construction of the roadway utilities
- Conducting landfill gas (LFG) monitoring and sampling to confirm the effectiveness of the LFG mitigation system
- Confirming that stormwater and groundwater accumulating in the utility corridor excavation is managed appropriately.

This SAP was prepared consistent with the requirements of Washington Administrative Code (WAC) 173-340-820. It provides field, sampling, and analytical procedures to be used during roadway utility construction, as needed.

Although not identified during previous Site investigation activities, if archaeological resources are discovered during field activities described in the IAWP Amendment, the procedures provided in the project inadvertent discovery plan (Appendix F to the IAWP Amendment) will be followed. Work will be stopped immediately and the Washington State Department of Ecology (Ecology), the Washington State Department of Archaeology and Historic Preservation (DAHP), the City of Yakima (City), and the appropriate Tribes’ Cultural Resources Departments will be notified by the close of business on the day of discovery. A licensed archaeologist will inspect the Site and document the discovery, provide a professionally documented site form, and report to the above-listed parties. In the event of an inadvertent discovery of human remains, work will be immediately halted in the discovery area, the remains will be covered and secured against further disturbance, and the Yakima Police Department and Yakima County Medical Examiner will be immediately contacted, along with the DAHP physical anthropologist and authorized Tribal representatives. A treatment plan by a licensed archaeologist would then be developed in consultation with the above-listed parties consistent with Chapters 27.44 and 27.53 of the Revised Code of Washington and implemented according to Chapter 25-48 WAC.

2.0 SAMPLING PROCEDURES

The following subsections describe confirmation and performance monitoring procedures for construction of the roadway alignment utilities. As detailed in the IAWP Amendment, performance monitoring will consist of collection and analysis of samples of soil, MSW, and wood debris excavated during construction for the purposes of characterization and/or identification of unanticipated contamination. Confirmation monitoring will consist of monitoring for LFG within soil vapor monitoring wells installed within the roadway prism, and may include air sampling within utility vaults associated with the roadway alignment. Field activities will be performed in accordance with a Site-specific health and safety plan.

2.1 Waste Characterization

Construction of roadway utilities will include excavation and removal of wood debris below the roadway to the depth of the underlying native material, excavating all known and unanticipated contaminated soil within the right-of-way (ROW), and excavation and removal of MSW and wood debris to the depth of the underlying native soil along the eastern edge of the Landfill Site. Soil overlying or intermingled with the MSW and wood debris will also be removed and disposed of as part of the construction activities. Materials may be segregated as needed for management and disposal and stockpiled for characterization if unanticipated or unidentified contamination is discovered and/or as otherwise required by the receiving disposal or recycling facilities.

Waste characterization sample analytical results for waste materials that will be disposed of off Site will be compared to applicable disposal facility acceptance criteria and applicable solid waste and state/federal dangerous/hazardous waste regulatory criteria to determine applicable waste management and disposal requirements. Where potentially contaminated soils are to remain on Site (e.g., at the edge of the roadway excavation limits), a plastic sheeting barrier will be installed to segregate clean backfill within the utility corridor from any remaining contaminated soil outside of the ROW.

Investigation-derived waste (IDW) will also be generated from geotechnical drilling activities related to design of the sewer main project long the east side of the Landfill Site and the conceptual alignment for future phases of the sewer project on the Mill Site. IDW soil and decontamination water will be stored in drums on the Site until characterization is completed and disposal at an appropriate disposal facility is arranged.

2.1.1 Stockpile Characterization Sampling

Characterization of stockpile samples to determine appropriate management and disposal requirements will consist of collection and analysis of three-point composite samples from locations within the stockpile that are representative of the stockpiled material. Samples will be collected using hand-auger techniques, and will consist of material from within the interior of the stockpile. A description of the material characteristics will be recorded. Logs and other large pieces of wood debris will be separated

out from the stockpile and will not be sampled unless field observations indicate the potential presence of wood preservatives (e.g., creosote or pentachlorophenol).

At each composite sub-sampling location, a discrete material sample will be collected from the interior of the stockpile. Larger-sized material (gravel/wood/debris greater than approximately ¼- to ½-inch diameter) will be removed by hand-sorting and the samples placed in the appropriate laboratory-supplied containers. Material for samples to be analyzed for non-volatile constituents will be placed in a decontaminated stainless-steel bowl, composited, and homogenized.

The stockpile samples will be labeled using the following format:

“stockpile number-material (i.e., wood or soil)-date (mmddyyyy).”

For example, a sample of soil collected from stockpile 2 on September 26, 2025 will be labeled “SP2-SOIL-09262025.”

The number of composite samples to be collected from a stockpile for characterization purposes is dependent on the size of the stockpile. Field personnel will map the stockpile and record measurements. The table below will be used as a guide to determine sampling frequency.

Cubic Yards	No. of Composite Samples (a)
0–100	3
101–500	5
501–1,000	7
1,001–2,000	10
>2,000	10, plus 1 for each additional 500 cubic yards

- (a) Each composite sample will consist of material collected from three discrete locations within the stockpile.

2.1.2 Excavation Sample Collection Procedures

Where contaminant characterization/delineation or confirmation samples need to be taken from within the excavation limits, soil/MSW/wood debris samples will be collected from the base of the roadway excavation at selected locations within the affected area or at the limits of removed material. Excavation sidewall samples in areas of known contamination outside of the utility corridor excavation may be collected (depending on the Contractor’s method of construction; e.g., if trench boxes are used, sidewall samples cannot be collected), but sidewalls or other samples of soil outside of the ROW on the Mill Site are not anticipated to be collected.

Where excavations are safe for access, a shallow hole will be hand-dug at each sampling location using decontaminated hand implements, including stainless-steel spoons and steel shovels, picks, and similar equipment. The sidewall surface of the hand-dug hole will be scraped to expose a fresh surface for sample collection. Soil will be collected using a decontaminated stainless-steel spoon, placed in a decontaminated stainless-steel bowl, homogenized, and transferred to the appropriate sample containers. If the excavation is not safe for human entry, samples may be collected by other means, such as out of the excavator bucket.

Material larger than approximately ¼ inch will be removed from the sample prior to placing the soil in the sample container. Soil testing for possible volatile organic compound (VOC) or total petroleum hydrocarbon (TPH) contamination will not be homogenized, but rather sampled using US Environmental Protection Agency (EPA) Method 5035 and placed directly into laboratory-provided vials with appropriate preservatives.

The samples will be labeled using the following format:

“Approximate stationing/coordinates/location-material (i.e., wood or soil)-depth range of sample collection-date (mmddyyyy).”

For example, a sample of soil collected from the western sidewall of the excavation at roadway corridor station 305+25 from 5.5 to 6 feet below ground surface (bgs) on September 26, 2025 will be labeled “STA305+25-WSIDEWALL-SOIL-5.5to6-09262025.”

2.1.3 Potential Asbestos Sample Collection Procedures

If necessary, samples of potential asbestos-containing material (ACM) will be collected only by individuals certified as Asbestos Hazard Emergency Response Act Building Inspectors. The Building Inspectors will collect samples using a clean knife, chisel, or coring tool to penetrate all layers of the material. At least 1 teaspoon of the material will be collected for analysis and placed in a laboratory-provided bag labeled with the location and sample identification. Prior to sampling potentially friable materials, the Building Inspector will don an air-purifying half-face respirator fitted with P-100 cartridges and wet the sampling area with distilled water.

The samples will be labeled using the following format:

“Approximate stationing/coordinates/location-PACM
(to connote that the sample is potential ACM)-depth range of sample collection-date
(mmddyyyy).”

For example, a sample of material collected from the western sidewall of the excavation at roadway corridor station 305+25 from 5.5 to 6 feet bgs on September 26, 2018 will be labeled “STA305+25-WSIDEWALL-PACM-5.5to6-09262018.”

2.1.4 Water Sample Collection Procedures

Representative water samples will be collected, as needed, to characterize potentially contaminated water encountered during construction activities (e.g., stormwater or surface water runoff within an excavation, groundwater collected from excavations/trenches or from monitoring wells, dewatering fluids). Water samples will be collected directly into the appropriate laboratory-supplied sample containers, using a disposable bailer, or using peristaltic pump and disposable polyethylene tubing, as appropriate. Samples from a dewatering fluids treatment system will be collected from a sample port downstream of the final treatment vessel. Samples collected directly from the excavation for metals analyses will be field-filtered using an in-line 0.45 micron filter, and samples collected for TPH or

semivolatile organic compound (SVOC) analysis will be centrifuged at the laboratory prior to testing. Samples collected from a dewatering treatment system will not require filtration.

2.1.5 Laboratory Analysis for Waste Characterization

If needed, stockpile and other waste characterization samples and IDW samples will be sent to a laboratory for analysis for constituents typically required by waste disposal facilities and for analytes detected in samples collected from locations near the roadway or sewer project alignment during previous investigations, where available. Wood debris will generally not be analyzed for waste characterization except if necessary for acceptance by a recycling or disposal facility, when intermingled with soil and/or MSW, and/or if field observations indicate the presence of wood preservatives (i.e., creosote) or impacts of other contaminants (e.g., petroleum products).

Each waste characterization sample will be analyzed for the following:

- Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) by EPA Method 6010C/7470A.
- If total metals concentrations exceed RCRA toxicity characteristic leachate procedure (TCLP) trigger concentrations (i.e., values 20 times higher than RCRA hazardous waste concentration limits), samples will also be analyzed by the EPA TCLP Method 1311 to determine if the waste must be managed as a hazardous waste (Washington dangerous waste).

Samples displaying indications of contamination based on visual or olfactory field observations and/or samples collected from material excavated from areas previously sampled and identified as being contaminated may be analyzed for one or more of the following, depending on field-screening (see Sections 3.1 and 6.1 of Appendix C of the IAWP [Excavated Materials Management Plan]) results:

- Diesel- and oil-range TPH by the Northwest TPH extended-range diesel analytical method (NWTPH-Dx)
- Gasoline-range TPH by the Northwest TPH extended-range gasoline analytical method (NWTPH-Gx)
- VOCs by EPA Method 8269
- SVOCs by EPA Method 8270
- Pesticides/herbicides by EPA Method 8081
- Polychlorinated biphenyls (PCBs) by EPA Method 8082
- Asbestos by polarized light microscopy with dispersion staining by EPA Method 600/R-93/116.

Samples found to contain oil-range TPH by the NWTPH-Dx method will also be analyzed for:

- PCBs by EPA Method 8082.

The samples will typically be run with 5-day turnaround times (TATs) given sufficient lay-down area for the stockpiles. Faster TATs may be requested if the stockpile(s) removal needs to be expedited.

2.1.6 Stormwater/Groundwater/Dewatering Fluid Laboratory Analysis

If necessary, samples of stormwater, groundwater, or dewatering fluids collected from excavations, trenches, or dewatering systems and/or from the treatment system will be analyzed for constituents specified by the appropriate permit, which is likely to include, but may not be limited to:

- Diesel- and oil-range TPH by NWTPH-Dx
- Gasoline-range TPH by NWTPH-Gx
- VOCs by EPA Method 8269.

Ecology may also have specific sampling and analysis requirements for groundwater if evidence of a release (e.g., sheet/liquid-phase product in groundwater) is discovered. Additional sampling may also be necessary if stormwater or groundwater is suspected of being contaminated (see Section 4.0 of Appendix C of the IAWP [Excavated Materials Management Plan]).

2.1.7 Preliminary Cleanup Levels

Confirmation sampling results will be compared to applicable Site preliminary cleanup levels (pCULs) as defined in the IAWP Amendment and provided in Tables 1 through 5 of the SAP, or other applicable Model Toxics Control Act (MTCA) and state and federal requirements. The pCULs may also be used to identify areas, contaminants, and/or conditions that may require further investigation.

Soil and groundwater contaminants of potential concern (COPCs) and pCULs for the Landfill Site were developed in cooperation between the City/Landau and Ecology. A memorandum outlining COPCs and pCULs for the Landfill Site on was issued by Ecology in September 2024 (Ecology 2024; Appendix D to the IAWP Amendment); applicable pCULs for unsaturated soil, saturated soil, and groundwater for the Landfill Site are included as Tables 1, 2, and 3, respectively. Soil and groundwater COPCs and pCULs for the Mill Site have been developed in cooperation with the Mill Site potential liable persons (PLPs) and Ecology as documented in the Mill Site RI (Barr 2021) and in a memorandum issued by Ecology in February 2026 for the associated property east of I-82 (Ecology 2026); applicable pCULs for soil and groundwater for the Mill Site are included in Tables 4 and 5. The pCULs are set at the applicable MTCA Method A or Method B cleanup level. Note that these pCULs are preliminary values established for the Landfill Site and Mill Site and are subject to change pending final approved cleanup levels for each of the sites in their respective final cleanup action plans.

2.2 Landfill Gas Monitoring/Sampling

Confirmation sampling will include collecting monitoring data using field instruments from LFG monitoring wells, and potentially in utility vaults, installed within the roadway alignment.

2.2.1 Landfill Gas Measurements

LFG measurements from soil vapor monitoring wells (and possibly utility vaults) installed within the roadway ROW will be collected during conditions of falling barometric pressure. Prior to collecting the LFG measurements from a well, field personnel will purge a minimum of 10 casing volumes of soil vapor

from the probe using a Landtec GEM 5000 (or similar) LFG analyzer. During well purging, LFG drawn from the well casings will be analyzed for methane, oxygen, carbon dioxide, and balance gases to evaluate the potential migration of LFG into the roadway prism from LFG and/or wood debris remaining outside the limits of excavation. Field personnel will record readings at the time when gas concentrations demonstrate stability after 10 casing volumes are purged. This survey of LFG conditions will occur at each of the newly installed LFG monitoring wells.

The accuracy of the LFG field analyzer will be checked daily and the unit will be calibrated, as necessary. If the readings are outside of the manufacturer's recommendations, the unit will be calibrated in the field in accordance with the manufacturer's recommended procedures.

2.2.2 Landfill Gas Sampling

In addition to the data collected using the portable LFG analyzer, samples of LFG will be collected from LFG monitoring wells during sampling events conducted one and three months following completion of the roadway construction project (and potentially as required by Ecology, thereafter, as part of a long-term monitoring plan for the Site associated with a final cleanup action plan). The samples will be collected into certified-clean 6-liter stainless-steel Silonite canisters. The samples will be collected over an 8-hour period using a flow-control valve to prevent overdraw. The duration of sampling will help to capture temporal variability in discharge rates.

The samples will be submitted to an accredited laboratory for analysis for VOCs by EPA Compendium Method TO-15.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

This section describes the quality assurance/quality control (QA/QC) procedures in support of roadway construction. This section describes the project team organization and responsibilities, the QA objectives, laboratory analytical methods, QA/QC requirements and corrective actions for this project.

3.1 Project Team Organization and Responsibilities

The project team organizational structure was developed based on the requirements of the field and laboratory activities. The key positions/contractors and associated responsibilities are described below.

- Consultant Project Manager (Landau): Responsible for implementation of all aspects of the project plans. Specific responsibilities include overseeing that all technical procedures are followed, reporting of deviations from the project plans to the City, communicating and coordinating with Mill Site PLPs, and overseeing that data collected will satisfy the QA objectives.
- Analytical Laboratory: Responsible for providing sample bottles, performing chemical analyses per the SAP, and reporting of data as required by the SAP.
- Field Sampling Personnel (Landau): Responsible for implementing sampling procedures as specified in the project plans, and notifying the consultant project manager of any deviations from the project plans.
- City of Yakima: Responsible for providing and coordinating access for excavation activities within the City-owned ROW at the Landfill Site and at the Mill Site.

Additionally, in accordance with the Ecology requirements that:

1. the Boise Cascade Mill Site PLPs are listed as a member of the project team
2. the Mill Site engineer of record will receive a copy of the plans and specifications for the IA work and will be given the opportunity to review and comment prior to commencing the IA as outlined in Ecology's Letter Amendment of Agreed Order DE 15861 – Interstate 82 Exit 33A Landfill City Landfill (Ecology 2023), the Mill Site PLPs will review and comment (as applicable) on construction means and methods, provide consultation, as necessary, for issues related to the Mill Site Agreed Order, data from the remedial investigation, or data and consultation as otherwise applicable to work that directly or indirectly affects the Mill Site.

3.2 Quality Assurance Objectives

The QA objectives for this project are to develop and implement procedures that will ensure collection of representative data of known, acceptable, and defensible quality. The data quality parameters used to assess the acceptability of the data are representativeness, comparability, precision, accuracy, bias, and completeness, as described below.

- Representativeness expresses the degree to which data accurately and precisely represent an actual condition or characteristic of a population. Representativeness can be achieved by selecting appropriate sampling locations and by using appropriate sampling methods.

- Comparability expresses the confidence with which one data set can be evaluated in relation to another data set. For this work, comparability of data will be established through the use of standard analytical methodologies with analytical limits of quantitation that can meet screening-level criteria to the extent practicable and by using standard reporting formats.
- Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average values. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples and/or through laboratory control sample/laboratory control sample duplicate (LCS/LCSD) samples for organic analysis and through laboratory duplicate samples for inorganic analyses. The quantitative relative percent difference (RPD) for laboratory duplicates, MS/MSD, and field duplicates will be used to assess sampling and analytical precision.
- Accuracy is an expression of the degree to which a measured or computed value represents the true value. Field accuracy is controlled by adherence to sample collection procedures as outlined in this SAP.
- Bias is the systematic or persistent distortion of a measured process that causes errors in one direction. Bias of the laboratory results will be evaluated based on analysis of method blanks and matrix spike samples.
- Completeness is a measure of the proportion of data obtained from a task sampling plan that is determined to be valid. It is calculated as the number of valid data points divided by the total number of data points requested.

3.3 Field and Laboratory Quality Control Procedures

Field and analytical laboratory QC samples will be collected to evaluate data precision, accuracy, representativeness, completeness, bias, and comparability of the analytical results for the Site characterization. The QC samples and the frequency at which they will be collected and/or analyzed are described below.

3.3.1 Blind Field Duplicates

A blind field duplicate will be collected at a frequency of at least 1 per 20 waste characterization samples per chemical analysis, and not less than one field duplicate. The blind field duplicate will consist of a split sample collected at a single sampling location, after homogenization of the sample; blind field duplicates for volatiles samples (if collected) will not be homogenized. Blind field duplicate results will be used to evaluate data precision. Acceptance criteria for blind field duplicate samples are 35 percent RPD for soil.

3.3.2 Field Trip Blanks

A laboratory-supplied trip blank will be analyzed for volatile analyses (if needed) to evaluate whether cross-contamination between samples occurs during sample transport. The trip blank will be stored with all volatile sample containers throughout the field investigation until samples are delivered to the laboratory.

3.3.3 Laboratory Matrix Spike/Matrix Spike Duplicate

A minimum of one laboratory MS/MSD sample will be analyzed per 20 samples, or one MS/MSD sample per batch of samples if fewer than 20 samples will be analyzed. These analyses will be performed to provide information on accuracy and to verify that extraction and concentration levels are acceptable. The laboratory spikes will follow EPA guidance for MS and MSD samples.

3.3.4 Laboratory Duplicates

A minimum of one laboratory duplicate sample per 20 samples, or one laboratory duplicate sample per batch of samples if fewer than 20 samples are contained in a batch, will be analyzed. These analyses will be performed to provide information on the precision of chemical analyses. The laboratory duplicates will follow EPA guidance in the analytical method.

3.3.5 Laboratory Method Blanks

A minimum of one laboratory method blank per 20 samples, one every 12 hours, or one per batch of samples analyzed (if fewer than 20 samples are contained in a batch) will be analyzed for all parameters to assess possible laboratory contamination. Method blanks will contain all reagents used for analysis. The generation and analysis of additional method, reagent, and glassware blanks may be necessary to verify that laboratory procedures do not contaminate samples.

3.3.6 Laboratory Control Sample

A minimum of one LCS per 20 samples, or one LCS per sample batch if fewer than 20 samples are contained in a batch, will be analyzed for all parameters.

3.3.7 Surrogate Spikes

All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined by the analytical methods.

3.4 Laboratory Quality Assurance/Quality Control

QA/QC for chemical testing includes laboratory instrument and analytical method QA/QC. Instrument QA/QC monitors the performance of the instrument and method QA/QC monitors the performance of sample preparation procedures. The analytical laboratory will be responsible for instrument and method QA/QC.

When an instrument or method control limit is exceeded, the laboratory will contact the project manager immediately. The laboratory will be responsible for correcting the problem and will reanalyze the samples within the sample holding time if sample reanalysis is appropriate.

3.5 Corrective Actions

Corrective actions will be needed for two categories of non-conformance:

- Deviations from the methods or QA requirements established in this document

- Equipment or analytical malfunctions.

Corrective action procedures to be implemented based on detection of unacceptable data are developed on a case-by-case basis. Such actions may include one or more of the following:

- Altering procedures in the field or laboratory
- Using a different batch of sample containers
- Performing an audit of field or laboratory procedures
- Reanalyzing samples (if holding times allow)
- Resampling and analyzing
- Evaluating sampling and analytical procedures to determine possible causes of the discrepancies
- Accepting the data without action, acknowledging the level of uncertainty
- Rejecting the data as unusable.

During field operations and sampling procedures, the field personnel will be responsible for conducting and reporting required corrective actions. A description of any action taken will be entered in the daily field notebook. The project manager will be consulted immediately if field conditions are such that conformance with this SAP is not possible.

During laboratory analysis, the laboratory QA officer will be responsible for taking required corrective actions in response to equipment malfunctions. If an analysis does not meet the data quality objectives outlined, corrective action will follow the guidelines in the noted EPA analytical methods and the EPA guidelines for data validation for organics and inorganics analyses (EPA 1999, 2004). At a minimum, the laboratory will be responsible for monitoring the following:

- Calibration check compounds must be within performance criteria specified in the EPA method or corrective action must be taken prior to initiation of sample analysis. No analyses may be performed until these criteria are met.
- Before processing any samples, the analyst should demonstrate, through analysis of a reagent blank, that interferences from the analytical system, glassware, and reagents are within acceptable limits. Each time a set of samples is extracted or there is a change in reagents, a reagent blank should be processed as a safeguard against chronic laboratory contamination. The blank samples should be carried through all stages of the sample preparation and measurement steps.
- Method blanks should, in general, be below instrument detection limits. If contaminants are present, then the source of contamination must be investigated, corrective action taken and documented, and all samples associated with a contaminated blank reanalyzed. If, upon reanalysis, blanks do not meet these requirements, Landau will be notified immediately to discuss whether analyses may proceed.
- Surrogate spike analysis must be within the specified range for recovery limits for each analytical method used or corrective action must be taken and documented. Corrective action includes: 1) reviewing calculations, 2) checking surrogate solutions, 3) checking internal standards, and 4) checking instrument performance. Subsequent action could include

recalculating the data and/or reanalyzing the sample if any of the above-described checks reveal a problem. If the problem is determined to be caused by matrix interference, reanalysis may be waived if so directed following consultation with Landau. If the problem cannot be corrected through reanalysis, the laboratory will notify Landau prior to data submittal so that additional corrective action can be taken, if appropriate.

- If the recovery of a surrogate compound in the method blank is outside the recovery limits, the blank will be reanalyzed along with all samples associated with that blank. If the surrogate recovery is still outside the limits, Landau will be notified immediately to discuss whether analyses may proceed.
- If quantitation limits or matrix spike control limits cannot be met for a sample, Landau will be notified immediately to discuss the corrective action required.
- If holding times are exceeded, all positive and undetected results may need to be qualified as estimated concentrations. If holding times are grossly exceeded, Landau may determine the data to be unusable.

If analytical conditions are such that non-conformance is indicated, Landau will be notified as soon as possible so that any additional corrective actions can be taken. The laboratory project manager will then document the corrective action by a memorandum submitted to Landau. A narrative describing the anomaly; the steps taken to identify and correct the anomaly; and any recalculation, reanalyses, or re-extractions will be submitted with the data package in the form of a cover letter.

3.6 Data Verification and Validation

All Site characterization data will be verified and validated to determine whether the results are acceptable and meet the quality objectives. Prior to submitting a laboratory report, the laboratory will verify that all the data are consistent, correct, and complete, with no errors or omissions.

Validation of the data will be performed by Landau following the guidelines in the appropriate sections of the EPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (EPA 1999, 2004) and will include evaluations of the following:

- Chain-of-custody records
- Holding times
- Laboratory method blanks
- Surrogate recoveries
- Laboratory MS/MSD
- Blank spikes/LCS
- Laboratory duplicates
- Corrective action records
- Completeness
- Overall assessment of data quality.

In the event that a portion of the data is outside the data quality objective limits or the EPA guidance (EPA 1999, 2004), or sample collection and/or documentation practices are deficient, corrective action(s) will be initiated. Corrective action will be determined by the field coordinator and Landau's QA officer in consultation with the Landau project/task manager and may include any of the following:

- Rejection of the data and resampling
- Qualification of the data
- Modified field and/or laboratory procedures.

Data qualification arising from data validation activities will be described in the data validation report, rather than in individual corrective action reports.

3.7 Data Management Procedures

All laboratory analytical results, including QC data, will be submitted electronically to Landau. Electronic formats will include a scanned PDF of the original laboratory data package and comma-separated value files that will be downloaded directly to an Excel® spreadsheet and/or to the project database. The laboratory data package should include a case narrative along with analytical and QC results. Following validation of the data, any qualifiers will be added to the Excel spreadsheets and project database. All survey data will be provided electronically in a format that can be downloaded into an Excel spreadsheet. All field data will be entered into an Excel spreadsheet and verified to determine all entered data are correct and without omissions and errors.

4.0 EQUIPMENT DECONTAMINATION

The decontamination procedures described below are to be used by field personnel to clean sampling and related field equipment. Deviation from these procedures will be documented in field records.

4.1 Sampling Equipment

Sampling equipment (e.g., stainless-steel bowls, stainless-steel spoons, hand-auger equipment, etc.) will be cleaned using a three-step process, as follows:

- 1) Scrub surfaces of equipment that would be in contact with the sample with brushes using an Alconox® solution
- 2) Rinse and scrub equipment with clean tap water
- 3) Rinse equipment a final time with de-ionized water to remove tap water impurities.

Decontamination of reusable sampling devices will occur between each sample collection.

4.2 Heavy Equipment

Excavation equipment should be “dry broomed” to remove the substantial accumulated debris on the excavation bucket between excavations. Direct-push/probe equipment (e.g., the environmental or geotechnical probe rigs and drilling equipment that is used downhole, or that contacts material and equipment going downhole) will be cleaned by a hot-water, high-pressure wash before each use and at completion of the project. Potable tap water will be used as the cleansing agent.

5.0 USE OF THIS PLAN

This Sampling and Analysis Plan has been prepared for the exclusive use of the City of Yakima and the Washington State Department of Ecology for specific application to the Interstate 82 Exit 33A Yakima City Landfill Site and Boise Cascade Mill Site roadway utility infrastructure project and sewer infrastructure project. Reliance on this report by third parties, or others who do not have a contractual relationship with the City or Landau on this project is at their sole risk. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

6.0 REFERENCES

- Barr. 2021. Revised Draft Remedial Investigation Report, Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. August.
- Ecology. 2023. Letter: Letter Amendment of Agreed Order DE 15861 - Interstate 82 Exit 33A Landfill City Landfill; Site Name: Interstate 82 Exit 33A Yakima City Landfill; Site Address: 805 North 7th Street, Yakima; Facility Site ID No.: 1927; Cleanup Site ID No.: 3853; Agreed Order No. DE 15861. From Jennifer Lind, Toxics Cleanup Program, Washington State Department of Ecology, to Bill Preston, City of Yakima. May 4.
- Ecology. 2024. Memorandum: Re: Interstate 82 Exit 33A Yakima City Landfill – Updated Preliminary Cleanup Level Memorandum, Site Name: Interstate 82 Exit 33A Yakima City Landfill, Site Address: 805 N. 7th Street, Yakima, Facility/Site ID No.: 1927, Cleanup Site ID No.: 3853, Agreed Order No.: DE 15861. From Jennifer Lind, Washington State Department of Ecology, to Bill Preston, City of Yakima. September 30.
- Ecology. 2025. Memorandum: Yakima County East-West Corridor Roadway Project, Development of Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site. Washington State Department of Ecology. December 4.
- Ecology. 2026a. Memorandum: Yakima County East-West Corridor Roadway Project, Development of Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site. From Arthur Buchan, Toxicologist Toxics Cleanup Program – Central Region Office, Washington State Department of Ecology, to John Zinza PE, Cleanup Project Manager (Boise Cascade Mill Site) Toxics Cleanup Program - Central Region Office. February 11.
- EPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. US Environmental Protection Agency. October.
- EPA. 2004. Final: USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. US Environmental Protection Agency. October.
https://wipp.energy.gov/Library/Information_Repository_A/Supplemental_Information/2019/References/U.S.%20EPA,%202004.%20Inorganic%20Data%20Review.pdf.
- Landau. 2019. Final (Revision 1): Interim Action Work Plan - Roadway Project, Closed City of Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. July 29.

Table 1
Soil (Unsaturated) pCULs—Landfill Site
Yakima City Landfill Site
Yakima, Washington

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Unsat	Soil Method B Protection of Surface Water (mg/kg) - Unsat	Final Protective H.H. Value (mg/kg)	TEE Value (mg/kg)	Final Protective Value (mg/kg)	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final PQL (mg/kg)	Natural Background	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COPC?
Master CLARC Spreadsheet Column	A	P	Q and R	Based on 3-Phase Model Results	Based on 3-Phase Model Results		Search Table 749-2			Guidance for TPH		Natural Background Metals			
Gasoline	x	1.00E+02	x	x	x	1.00E+02	2.00E+02	1.00E+02	3.00E+00	5.00E+00	5.00E+00	x	1.00E+02	1.40E+01	n
Diesel + HO	x	2.00E+03	x	x	x	2.00E+03	4.60E+02	4.60E+02	2.50E+01	2.50E+01	2.50E+01	x	4.60E+02	1.29E+03	y
Acenaphthene	83-32-9	x	4.80E+03	Empirical	Empirical	4.80E+03	x	4.80E+03	2.00E-02	4.35E-02	4.35E-02	x	4.80E+03	2.20E-02	n
Acenaphthylene	x	x	x	x	x	x	x	x	2.00E-02	6.70E-02	6.70E-02	x	x	8.10E-02	n
Acetone	67-64-1	x	7.20E+04	Empirical	Empirical	7.20E+04	x	7.20E+04	5.00E-02	1.50E-02	1.50E-02	x	7.20E+04	2.80E-01	n
Aldrin	309-00-2	x	5.90E-02	Empirical	Empirical	5.90E-02	1.70E-01	5.90E-02	1.00E-02	1.35E-03	1.35E-03	x	5.90E-02	9.40E-03	n
Anthracene	120-12-7	x	2.40E+04	Empirical	Empirical	2.40E+04	x	2.40E+04	1.00E-01	4.35E-02	4.35E-02	x	2.40E+04	2.80E-02	n
Benzo(G,H)Perylene	x	x	x	x	x	x	x	x	1.00E-01	4.60E-02	4.60E-02	x	x	x	n
Bis(2-Ethylhexyl)Phthalate	117-81-7	x	7.10E+01	1.33E+01	1.00E-01	1.00E-01	x	1.00E-01	1.00E-02	1.19E-01	1.19E-01	x	1.19E-01	8.20E-01	y
Chlorobenzene	108-90-7	x	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	1.00E-02	2.00E-03	2.00E-03	x	1.60E+03	ND	n
Chloroform	67-66-3	x	3.20E+01	Empirical	Empirical	3.20E+01	x	3.20E+01	1.00E-02	2.00E-03	2.00E-03	x	3.20E+01	ND	n
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	1.30E-02	2.10E-04	2.10E-04	x	2.10E-04	2.50E-01	3.30E-01	3.30E-01	x	3.30E-01	ND	n
2,4-Dichlorophenol	120-83-2	x	2.40E+02	Empirical	Empirical	2.40E+02	x	2.40E+02	5.00E-01	2.15E-01	2.15E-01	x	2.40E+02	ND	n
Fluoranthene	206-44-0	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	2.50E-01	n
Fluorene	86-73-7	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	ND	n
1-Methylnaphthalene	90-12-0	x	3.40E+01	Empirical	Empirical	3.40E+01	x	3.40E+01	2.00E-02	5.00E-01	5.00E-01	x	3.40E+01	6.10E-02	n
2-Methylnaphthalene	91-57-6	x	3.20E+02	Empirical	Empirical	3.20E+02	x	3.20E+02	2.00E-02	5.00E-01	5.00E-01	x	3.20E+02	9.50E-02	n
3-Methylphenol	x	x	x	x	x	x	x	x	x	x	x	x	x	4.00E-01	n
Naphthalene	91-20-3	5.00E+00	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	2.00E-02	5.00E-01	5.00E-01	x	1.60E+03	2.50E-01	n
N-Nitrosodiphenylamine	86-30-6	x	2.00E+02	1.00E+00	3.50E-02	3.50E-02	x	3.50E-02	1.00E-01	5.00E-02	1.00E-01	x	1.00E-01	1.10E-01	y
Aroclor 1016	12674-11-2	x	5.60E+00	x	x	5.60E+00	x	5.60E+00	1.00E-01	4.00E-02	4.00E-02	x	5.60E+00	ND	n
Aroclor 1254	11097-69-1	x	5.00E-01	Empirical	Empirical	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	9.90E-03	n
Aroclor 1260	11096-82-5	x	5.00E-01	x	x	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	5.70E-03	n
Total PCBs (Aroclors)	1336-36-3	1.00E+00	5.00E-01	x	x	1.00E+00	2.00E+00	1.00E+00	x	4.00E-02	4.00E-02	x	1.00E+00	2.80E-02	n
Pentachlorophenol	87-86-5	x	2.50E+00	x	x	2.50E+00	1.10E+01	2.50E+00	1.00E-01	1.85E-01	1.85E-01	x	2.50E+00	ND	n
Phenanthrene	x	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	1.00E-01	5.00E-02	5.00E-02	x	2.40E+03	x	n
Pyrene	129-00-0	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	2.00E-01	2.00E-02	2.00E-02	x	2.40E+03	1.70E-01	n
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	5.60E-01	1.30E-03	1.30E-03	x	1.30E-03	1.00E-01	5.00E-02	5.00E-02	x	5.00E-02	ND	n
Vinyl Chloride	75-01-4	x	6.70E-01	1.72E-03	1.20E-04	1.20E-04	x	1.20E-04	1.00E-02	2.00E-03	2.00E-03	x	2.00E-03	1.00E-03	n
cPAHs															
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	3.90E+00	3.10E-04	3.10E-04	3.00E+01	3.10E-04	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	7.30E-02	n
Benzo(a)anthracene	56-55-3	x	x	x	Empirical	x	x	Empirical	2.00E-02	5.00E-02	5.00E-02	x	x	9.90E-02	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	1.10E-01	n
Benzo(k)fluoranthene	207-08-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	4.60E-02	n
Chrysene	218-01-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.30E-02	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.40E-02	n
cPAH Total	x	1.00E-01	1.90E-01	3.90E+00	3.10E-04	3.10E-04	x	3.10E-04	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	1.00E-01	n
Metals (mg/L)															
Arsenic	7440-38-2	2.00E+01	6.70E-01	2.90E+00	2.90E+00	2.90E+00	9.50E+01	2.90E+00	1.00E+00	4.50E+00	4.50E+00	2.00E+01	2.00E+01	5.40E+00	n
Barium	7440-39-3	x	1.60E+04	Empirical	Empirical	1.60E+04	1.25E+03	3.30E+00	5.00E-01	3.00E-01	3.00E-01	x	1.25E+03	1.90E+02	n
Cadmium	7440-43-9a	2.00E+00	8.00E+01	Empirical	Empirical	8.00E+01	2.50E+01	2.50E+01	5.00E-01	1.00E-01	1.00E-01	1.00E+00	2.50E+01	1.30E+00	n
Chromium III	16065-83-1	2.00E+03	1.20E+05	Empirical	Empirical	1.20E+05	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Chromium (Total)	7440-47-3	x	x	x	x	x	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Iron	7439-89-6	x	5.60E+04	1.51E+02	5.04E+02	1.51E+02	x	1.51E+02	5.00E+01	5.00E+00	5.00E+00	5.15E+04	5.15E+04	4.00E+04	n
Lead	7439-92-1	2.50E+02	x	Empirical	Empirical	2.50E+02	2.20E+02	2.20E+02	5.00E-01	1.00E-01	1.00E-01	1.70E+01	2.20E+02	1.90E+02	n
Magnesium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Manganese	7439-96-5a	x	3.70E+03	6.52E+01	6.52E+01	6.52E+01	x	6.52E+01	5.00E-01	1.00E-01	1.00E-01	1.10E+03	1.10E+03	6.80E+02	n
Mercury	7439-97-6	2.00E+00	x	Empirical	Empirical	2.00E+00	9.00E+00	2.00E+00	2.00E-02	2.00E-02	2.00E-02	7.00E-02	2.00E+00	2.30E-01	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Pesticides															
4,4'-DDD	72-54-8	x	4.20E+00	Empirical	Empirical	4.20E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	4.50E-02	n
4,4'-DDE	72-55-9	x	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	2.20E-02	n
4,4'-DDT	50-29-3	3.00E+00	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	3.50E+00	n
Endosulfan II (beta)	33213-65-9	x	x	x	x	x	x	x	1.00E-02	2.65E-03	2.65E-03	x	x	x	n
Endosulfan sulfate	1031-07-8	x	4.80E+02	1.90E+01	1.80E+00	1.80E+00	x	1.80E+00	1.00E-02	2.65E-03	2.65E-03	x	1.80E+00	5.30E-03	n

Note:
 Table provided by the Washington State Department of Ecology.
 Ecology, 2024. Letter: Re: Interstate 82 Exit 33A Yakima City Landfill – Updated Preliminary Cleanup Level Memorandum, Site Name: Interstate 82 Exit 33A Yakima City Landfill, Site Address: 805 N. 7th Street, Yakima, Facility/Site ID No.: 1927, Cleanup Site ID No.: 3853, Agreed Order No.: DE 15861. From Jennifer Lind, Washington State Department of Ecology, to Bill Preston, City of Yakima, September 30.

Table 2
Soil (Saturated) pCULs—Landfill Site
Yakima City Landfill Site
Yakima, Washington

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Sat	Soil Method B Protection of Surface Water (mg/kg) - Sat	Final Protective H.H. Value (mg/kg)	TEE Value (mg/kg)	Final Protective Value (mg/kg)	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final PQL (mg/kg)	Natural Background	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COPC?
Master CLARC Spreadsheet Column	A	P	Q and R	Based on 3-Phase Model Results	Based on 3-Phase Model Results		Search Table 749-2			Guidance for TPH		Natural Background Metals			
Gasoline	x	1.00E+02	x	x	x	1.00E+02	2.00E+02	1.00E+02	3.00E+00	5.00E+00	5.00E+00	x	1.00E+02	1.40E+01	n
Diesel + HO	x	2.00E+03	x	x	x	2.00E+03	4.60E+02	4.60E+02	2.50E+01	2.50E+01	2.50E+01	x	4.60E+02	1.29E+03	y
Acenaphthene	83-32-9	x	4.80E+03	Empirical	Empirical	4.80E+03	x	4.80E+03	2.00E-02	4.35E-02	4.35E-02	x	4.80E+03	2.20E-02	n
Acenaphthylene	x	x	x	Empirical	Empirical	x	x	x	2.00E-02	6.70E-02	6.70E-02	x	x	8.10E-02	n
Acetone	67-64-1	x	7.20E+04	Empirical	Empirical	7.20E+04	x	7.20E+04	5.00E-02	1.50E-02	1.50E-02	x	7.20E+04	2.80E-01	n
Aldrin	309-00-2	x	5.90E-02	Empirical	Empirical	5.90E-02	1.70E-01	5.90E-02	1.00E-02	1.35E-03	1.35E-03	x	5.90E-02	9.40E-03	n
Anthracene	120-12-7	x	2.40E+04	Empirical	Empirical	2.40E+04	x	2.40E+04	1.00E-01	4.35E-02	4.35E-02	x	2.40E+04	2.80E-02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	x	x	x	1.00E-01	4.60E-02	4.60E-02	x	x	x	n
Bis(2-Ethylhexyl)Phthalate	117-81-7	x	7.10E+01	6.68E-01	5.00E-03	5.00E-03	x	5.00E-03	1.00E-02	1.19E-01	1.19E-01	x	1.19E-01	8.20E-01	y
Chlorobenzene	108-90-7	x	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	1.00E-02	2.00E-03	2.00E-03	x	1.60E+03	ND	n
Chloroform	67-66-3	x	3.20E+01	Empirical	Empirical	3.20E+01	x	3.20E+01	1.00E-02	3.20E-03	2.00E-03	x	3.20E+01	ND	n
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	6.80E-04	1.10E-05	1.10E-05	x	1.10E-05	2.50E-01	3.30E-01	3.30E-01	x	3.30E-01	ND	n
2,4-Dichlorophenol	120-83-2	x	2.40E+02	Empirical	Empirical	2.40E+02	x	2.40E+02	5.00E-01	2.15E-01	2.15E-01	x	2.40E+02	ND	n
Fluoranthene	206-44-0	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	2.50E-01	n
Fluorene	86-73-7	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	ND	n
1-Methylnaphthalene	90-12-0	x	3.40E+01	Empirical	Empirical	3.40E+01	x	3.40E+01	2.00E-02	5.00E-01	5.00E-01	x	3.40E+01	6.10E-02	n
2-Methylnaphthalene	91-57-6	x	3.20E+02	Empirical	Empirical	3.20E+02	x	3.20E+02	2.00E-02	5.00E-01	5.00E-01	x	3.20E+02	9.50E-02	n
3-Methylphenol	x	x	x	x	x	x	x	x	x	x	x	x	x	4.00E-01	n
Naphthalene	91-20-3	5.00E+00	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	2.00E-02	5.00E-01	5.00E-01	x	1.60E+03	2.50E-01	n
N-Nitrosodiphenylamine	86-30-6	x	2.00E+02	5.20E-02	1.80E-03	1.80E-03	x	1.80E-03	1.00E-01	1.00E-01	1.00E-01	x	1.00E-01	1.10E-01	y
Aroclor 1016	12674-11-2	x	5.60E+00	x	x	5.60E+00	x	5.60E+00	1.00E-01	4.00E-02	4.00E-02	x	5.60E+00	ND	n
Aroclor 1254	11097-69-1	x	5.00E-01	Empirical	Empirical	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	9.90E-03	n
Aroclor 1260	11096-82-5	x	5.00E-01	x	x	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	5.70E-03	n
Total PCBs (Aroclors)	1336-36-3	1.00E+00	5.00E-01	x	x	1.00E+00	2.00E+00	1.00E+00	x	4.00E-02	4.00E-02	x	1.00E+00	2.80E-02	n
Pentachlorophenol	87-86-5	x	2.50E+00	x	x	2.50E+00	1.10E+01	2.50E+00	1.00E-01	1.85E-01	1.85E-01	x	2.50E+00	ND	n
Phenanthrene	x	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	1.00E-01	5.00E-02	5.00E-02	x	2.40E+03	x	n
Pyrene	129-00-0	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	2.00E-01	2.00E-02	2.00E-02	x	2.40E+03	1.70E-01	n
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	2.90E-02	7.00E-05	3.40E+01	x	7.00E-05	1.00E-01	5.00E-02	5.00E-02	x	5.00E-02	ND	n
Vinyl Chloride	75-01-4	x	6.70E-01	9.00E-05	6.20E-06	6.20E-06	x	6.20E-06	1.00E-02	2.00E-03	2.00E-03	x	2.00E-03	1.00E-03	n
cPAHs															
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	1.90E-01	1.60E-05	1.60E-05	3.00E+01	1.60E-05	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	7.30E-02	n
Benzo(a)anthracene	56-55-3	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	9.90E-02	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	1.20E-02	1.10E-01	n
Benzo(k)fluoranthene	207-08-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	4.60E-02	n
Chrysene	218-01-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.30E-02	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.40E-02	n
cPAH Total	x	1.00E-01	1.90E-01	1.90E-01	1.60E-05	1.60E-05	x	1.60E-05	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	1.00E-01	n
Metals (mg/L)															
Arsenic	7440-38-2	2.00E+01	6.70E-01	1.50E-01	1.50E-01	1.50E-01	9.50E+01	1.50E-01	1.00E+00	4.50E+00	4.50E+00	2.00E+01	2.00E+01	5.40E+00	n
Barium	7440-39-3	x	1.60E+04	Empirical	Empirical	1.60E+04	1.25E+03	1.25E+03	5.00E-01	3.00E-01	3.00E-01	x	1.25E+03	1.90E+02	n
Cadmium	7440-43-9a	2.00E+00	8.00E+01	Empirical	Empirical	8.00E+01	2.50E+01	2.50E+01	5.00E-01	1.00E-01	1.00E-01	1.00E+00	2.50E+01	1.30E+00	n
Chromium III	16065-83-1	2.00E+03	1.20E+05	Empirical	Empirical	1.20E+05	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Chromium (Total)	7440-47-3	x	x	x	x	x	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Iron	7439-89-6	x	5.60E+04	7.59E+00	2.53E+01	7.59E+00	x	7.59E+00	5.00E+01	5.00E+00	5.00E+00	5.15E+04	5.15E+04	4.00E+04	n
Lead	7439-92-1	2.50E+02	x	Empirical	Empirical	2.50E+02	2.20E+02	2.20E+02	5.00E-01	1.00E-01	1.00E-01	1.70E+01	2.20E+02	1.90E+02	n
Magnesium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Manganese	7439-96-5a	x	3.70E+03	3.26E+00	3.26E+00	3.26E+00	x	3.26E+00	5.00E-01	1.00E-01	1.00E-01	1.10E+03	1.10E+03	6.80E+02	n
Mercury	7439-97-6	2.00E+00	x	Empirical	Empirical	2.00E+00	9.00E+00	2.00E+00	2.00E-02	2.00E-02	2.00E-02	7.00E-02	2.00E+00	2.30E-01	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Pesticides															
4,4'-DDD	72-54-8	x	4.20E+00	Empirical	Empirical	4.20E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	4.50E-02	n
4,4'-DDE	72-55-9	x	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	2.20E-02	n
4,4'-DDT	50-29-3	3.00E+00	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	3.20E-02	n
Endosulfan II (beta)	33213-65-9	x	x	x	Empirical	x	x	x	1.00E-02	2.65E-03	2.65E-03	x	x	x	n
Endosulfan sulfate	1031-07-8	x	4.80E+02	9.70E-01	9.10E-02	9.10E-02	x	9.10E-02	1.00E-02	2.65E-03	2.65E-03	x	9.10E-02	5.30E-03	n

Note:

Table provided by the Washington State Department of Ecology.

Ecology. 2024. Letter: Re: Interstate 82 Exit 33A Yakima City Landfill – Updated Preliminary Cleanup Level Memorandum, Site Name: Interstate 82 Exit 33A Yakima City Landfill, Site Address: 805 N. 7th Street, Yakima, Facility/Site ID No.: 1927, Cleanup Site ID No.: 3853, Agreed Order No.: DE 15861. From Jennifer Lind, Washington State Department of Ecology, to Bill Preston, City of Yakima. September 30.

Table 3
Groundwater pCULs—Landfill Site
Yakima City Landfill Site
Yakima, Washington

Analyte	CAS	H.H. GW Method A (ug/L)	H.H. GW Method B (ug/L)	Final Protective Value (ug/L)	Natural Background	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?
Master CLARC Spreadsheet Column	A	AC	AM				Guidance for TPH				
Diesel + HO	x	5.00E+02	x	5.00E+02	x	1.30E+02	2.50E+02	2.50E+02	5.00E+02	9.70E+02	y
Acenaphthene	83-32-9	x	4.80E+02	4.80E+02	x	2.00E-02	5.00E-02	5.00E-02	4.80E+02	1.60E-01	n
Anthracene	120-12-7	x	2.40E+03	2.40E+03	x	2.00E-02	5.00E-02	5.00E-02	2.40E+03	3.60E-02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	2.00E-02	3.50E-03	3.50E-03	x	2.00E-02	n
Bis(2-Ethylhexyl)Phthalate	117-81-7	x	6.00E+00	6.00E+00	x	2.00E+00	3.00E+00	3.00E+00	6.00E+00	8.10E+01	y
Chlorobenzene	108-90-7	x	1.00E+02	1.00E+02	x	2.00E+00	5.50E-02	5.50E-02	1.00E+02	3.00E+00	n
Chloroform	67-66-3	x	1.41E+01	1.41E+01	x	2.00E+00	5.20E-02	5.20E-02	1.41E+01	5.70E-01	n
3,3'-Dichlorobenzidine	91-94-1	x	1.94E-01	1.94E-01	x	2.00E+00	x	2.00E+00	2.00E+00	<2.00E+00	n
2,4-Dichlorophenol	120-83-2	x	4.80E+01	4.80E+01	x	2.00E+00	x	2.00E+00	4.80E+01	4.00E+00	n
Fluoranthene	206-44-0	x	6.40E+02	6.40E+02	x	2.00E-02	5.00E-02	5.00E-02	6.40E+02	2.00E-02	n
Fluorene	86-73-7	x	3.20E+02	3.20E+02	x	2.00E-02	5.00E-02	5.00E-02	3.20E+02	1.80E-02	n
1-Methylnaphthalene	90-12-0	x	1.51E+00	1.51E+00	x	2.00E-02	1.00E+00	1.00E+00	1.51E+00	2.20E-01	n
2-Methylnaphthalene	91-57-6	x	3.20E+01	3.20E+01	x	2.00E-02	1.00E+00	1.00E+00	3.20E+01	1.10E-01	n
3-Methylphenol	x	x	x	x	x	2.00E+00	x	2.00E+00	x	1.10E+02	n
Naphthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	x	2.00E-02	1.00E+00	1.00E+00	1.60E+02	1.30E-01	n
N-Nitrosodiphenylamine	86-30-6	x	1.79E+01	1.79E+01	x	2.00E+00	x	2.00E+00	1.79E+01	5.80E+00	n
Aroclor 1016	12674-11-2	x	5.60E-01	5.60E-01	x	1.00E-01	1.00E-01	1.00E-01	5.60E-01	ND	n
Aroclor 1254	11097-69-1	x	2.19E-02	2.19E-02	x	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Aroclor 1260	11096-82-5	x	2.19E-02	2.19E-02	x	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Total PCBs (Aroclors)	1336-36-3	1.00E-01	2.19E-01	2.19E-01	x	x	1.00E-01	1.00E-01	2.19E-01	7.30E-02	n
Pentachlorophenol	87-86-5	x	1.00E+00	1.00E+00	x	5.00E-01	6.00E-02	6.00E-02	1.00E+00	2.20E-01	n
Phenanthrene (use pyrene as surr.)	x	x	2.40E+02	2.40E+02	x	2.00E-02	5.00E-02	5.00E-02	2.40E+02	3.10E-02	n
Pyrene	129-00-0	x	2.40E+02	2.40E+02	x	2.00E-02	5.00E-02	5.00E-02	2.40E+02	1.30E-01	n
1,2,4-Trichlorobenzene	120-82-1	x	1.51E+01	1.51E+01	x	2.00E+00	3.90E-02	3.90E-02	1.51E+01	9.40E-01	n
Vinyl Chloride	75-01-4	2.00E-01	2.92E-01	2.92E-01	x	3.10E-02	6.00E-02	6.00E-02	2.92E-01	3.90E-01	y
cPAHs											
Benzo(a)pyrene	50-32-8	1.00E-01	2.00E-01	2.00E-01	x	2.00E-02	2.00E-02	2.00E-02	2.00E-01	ND	n
Benzo(a)anthracene	56-55-3	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	8.30E-02	n
Benzo(k)fluoranthene	207-08-9	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	1.90E-02	n
Chrysene	218-01-9	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
cPAH Total (TEQ)	x	1.00E-01	2.00E-01	2.00E-01	x	2.00E-02	2.00E-02	2.00E-02	2.00E-01	8.00E-03	n
Metals (mg/L)											
Arsenic	7440-38-2	5.00E+00	5.00E+00	5.00E+00	6.00E+00	5.00E-01	5.00E-01	5.00E-01	6.00E+00	9.20E+00	y
Barium	7440-39-3	x	2.00E+03	2.00E+03	x	6.25E-01	6.25E-01	6.25E-01	2.00E+03	1.40E+02	n
Chromium III	16065-83-1	x	2.40E+04	2.40E+04	x	2.00E-01	2.00E-01	2.00E-01	2.40E+04	1.50E+01	n
Chromium (Total)	7440-47-3	5.00E+01	x	5.00E+01	x	2.00E-01	2.00E-01	2.00E-01	5.00E+01	1.50E+01	n
Iron	7439-89-6	x	3.00E+02	3.00E+02	x	2.05E+00	2.05E+00	2.05E+00	3.00E+02	5.70E+04	y
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	x	1.00E-01	1.00E-01	1.00E-01	1.50E+01	2.10E+00	n
Magnesium	x	x	x	x	x	x	5.00E+01	5.00E+01	x	3.30E+04	n
Manganese	7439-96-5a	x	5.00E+01	5.00E+01	x	1.03E+00	1.03E+00	1.03E+00	5.00E+01	5.70E+03	y
Mercury	7439-97-6	2.00E+00	2.00E+00	2.00E+00	x	6.00E-03	6.00E-03	6.00E-03	2.00E+00	ND	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	2.00E+04	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	1.40E+05	n
Pesticides											
4,4'-DDD	72-54-8	x	3.65E-01	3.65E-01	x	2.50E-03	2.00E-03	2.50E-03	3.65E-01	1.50E-01	n
4,4'-DDT	50-29-3	3.00E-01	2.57E-01	3.00E-01	x	3.00E-03	2.00E-03	3.00E-03	3.00E-01	9.00E-02	n
Endosulfan II (beta)	33213-65-9	x	x	x	x	2.50E-03	2.50E-03	2.50E-03	x	6.80E-02	n

Note:

Table provided by the Washington State Department of Ecology.

Ecology, 2024. Letter: Re: Interstate 82 Exit 33A Yakima City Landfill – Updated Preliminary Cleanup Level Memorandum, Site Name: Interstate 82 Exit 33A Yakima City Landfill, Site Address: 805 N. 7th Street, Yakima, Facility/Site ID No.: 1927, Cleanup Site ID No.: 3853, Agreed Order No.: DE 15861. From Jennifer Lind, Washington State Department of Ecology, to Bill Preston, City of Yakima. September 30.

Table 4
Soil pCULs and COPCs - Mill Site
Yakima Mill Site
Yakima, Washington

Analyte	CAS	Mill PCUL (mg/kg)	East-West PCUL (mg/kg)	PCUL ⁽¹⁾ (mg/kg)	COPC ⁽²⁾
TPH-Gx (gasoline-extended range) - Benzene Present	--	3.00E+01	1.20E+02	3.00E+01	y
TPH-Dx (diesel and heavy-oil ranges combined)	--	4.60E+02	2.60E+02	2.60E+02	y
Acenaphthene	83-32-9	--	4.35E-02	4.35E-02	n
Acetone	67-64-1	7.20E+04	--	7.20E+04	n
Anthracene	120-12-7	--	4.35E-02	4.35E-02	n
Benzene	71-43-2	1.80E+01	5.00E-03	5.00E-03	n
Bis(2-ethylhexyl)phthalate	117-81-7	4.45E-01	1.90E-01	1.90E-01	y
Butyl benzyl phthalate	85-68-7	5.30E+02	2.00E-01	2.00E-01	n
Carbon tetrachloride	56-23-5	1.40E+01	--	1.40E+01	n
Chlorobenzene	108-90-7	--	2.00E-03	2.00E-03	n
Chloroform	67-66-3	3.20E+01	2.00E-03	2.00E-03	n
4,4'-DDD	72-54-8	--	1.70E-02	1.70E-02	n
4,4'-DDT	50-29-3	--	2.00E-03	2.00E-03	n
1,2 Dibromethane (EDB)	106-93-4	5.00E-01	--	5.00E-01	n
1,2 Dichloroethane (EDC)	107-06-2	1.10E+01	--	1.10E+01	n
3,3'-Dichlorobenzidine	91-94-1	--	3.30E-01	3.30E-01	n
2,4-Dichlorophenol	120-83-2	--	2.15E-01	2.15E-01	n
Ethylbenzene	100-41-4	8.00E+03	5.89E-03	5.89E-03	n
Fluoranthene	206-44-0	--	2.96E-01	2.96E-01	n
Fluorene	86-73-7	--	1.60E-02	1.60E-02	n
Methyl ethyl ketone (2-Butanone)	78-93-3	4.80E+04	--	4.80E+04	n
Methyl tertiary butyl ether (MTBE)	1634-04-4	5.60E+02	--	5.60E+02	n
Methylene chloride	75-09-2	9.40E+01	--	9.40E+01	n
1-Methylnaphthalene	90-12-0	--	5.00E-01	5.00E-01	n
2-Methylnaphthalene	91-57-6	--	5.00E-01	5.00E-01	n
Naphthalene	91-20-3	1.60E+03	2.40E-01	2.40E-01	n
N-Nitrosodiphenylamine	86-30-6	--	7.00E-02	7.00E-02	n
Pentachlorophenol	87-86-5	4.10E-02	1.25E-01	4.10E-02	y
Phenanthrene (use pyrene as a surrogate)	129-00-0	--	1.60E+01	1.60E+01	n
Tetrachloroethylene (PCE)	127-18-4	4.80E+02	2.80E-03	2.80E-03	n
Toluene	108-88-3	6.40E+03	2.26E-02	2.26E-02	n
Total PCBs	1336-36-3	--	1.70E-02	1.70E-02	n
1,2,3-Trichlorobenzene	87-61-6	--	1.10E-02	1.10E-02	n
1,2,4-Trichlorobenzene	120-82-1	--	3.00E-02	3.00E-02	n
Trichloroethylene (TCE)	79-01-6	1.20E+01	--	1.20E+01	n
Vinyl Chloride	75-01-4	6.70E-01	2.00E-03	2.00E-03	n
Xylenes	1330-20-7	1.60E+04	2.96E-02	2.96E-02	n
cPAHs					
Benzo(a)anthracene	56-55-3	--	5.00E-02	--	n
Benzo(a)pyrene	50-32-8	1.90E-01	5.00E-02	5.00E-02	y
Benzo(b)fluoranthene	205-99-2	--	5.00E-02	--	n
Benzo(k)fluoranthene	207-08-9	--	5.00E-02	--	n
Chrysene	218-01-9	--	5.00E-02	--	n
Dibenz(a,h)anthracene	53-70-3	--	8.95E-02	--	n
Indeno(1,2,3-cd)pyrene	193-39-5	--	9.76E-02	--	n
cPAH TEQ	--	1.90E-01	1.00E-01	1.00E-01	y

Table 4
Soil pCULs and COPCs - Mill Site
Yakima Mill Site
Yakima, Washington

Analyte	CAS	Mill PCUL (mg/kg)	East-West PCUL (mg/kg)	PCUL ⁽¹⁾ (mg/kg)	COPC ⁽²⁾
Metals (mg/kg)					
Arsenic	7440-38-2	2.00E+01	7.00E+00	7.00E+00	y
Barium	7440-39-3	--	2.55E+02	2.55E+02	n
Cadmium	7440-43-9	1.00E+00	2.55E+02	1.00E+00	y
Chromium III	16065-83-1	--	4.20E+01	4.20E+01	n
Chromium VI	18540-29-9	4.20E+01	--	4.20E+01	n
Total Chromium	7440-47-3	--	4.20E+01	4.20E+01	n
Copper	7440-50-8	3.60E+01	3.60E+01	3.60E+01	y
Iron	7439-89-6	5.60E+04	5.15E+04	5.15E+04	n
Lead	7439-92-1	2.20E+02	1.70E+01	1.70E+01	y
Manganese	7439-96-5	3.70E+03	1.10E+03	1.10E+03	n
Mercury	7439-97-6	--	7.00E-02	7.00E-02	n
Nickel	7440-02-0	6.78E+01	4.60E+01	4.60E+01	n
Selenium	7782-49-2	--	3.00E+00	3.00E+00	n
Silver	7440-22-4	4.00E+02	6.10E-01	6.10E-01	n
Zinc	7440-66-6	1.24E+02	8.60E+01	8.60E+01	y

Notes:

(1) Most stringent pCUL between Barr 2021 and Ecology 2025.

(2) As indicated in Barr 2021 and Ecology 2025.

-- = not applicable

Abbreviations and Acronyms:

CAS = Chemical Abstracts Service

COPC = contaminant of potential concern

cPAH = carcinogenic polycyclic aromatic hydrocarbon

mg/kg = milligrams per kilogram

n = no

PCUL = preliminary cleanup level

y = yes

References:

Barr. 2021. Revised Draft Remedial Investigation Report, Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. August.

Ecology. 2026. Memorandum: Yakima County East-West Corridor Roadway Project, Development of Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site. Washington State Department of Ecology. February 11.

Table 5
Groundwater (Drinking Water) pCULs and COPCs - Mill Site
Yakima Mill Site
Yakima, Washington

Analyte	CAS	Mill PCUL (µg/L)	East-West PCUL (µg/L)	PCUL ⁽¹⁾ (µg/L)	COPC ⁽²⁾
TPH-Gx (gasoline-extended range) - Benzene Present	--	8.00E+02	1.00E+03	8.00E+02	n
TPH-Dx (diesel and heavy-oil ranges combined)	--	5.00E+02	5.00E+02	5.00E+02	y
Acenaphthene	83-32-9	--	4.80E+02	4.80E+02	n
Acetone	67-64-1	7.20E+03	--	7.20E+03	n
Anthracene	120-12-7	--	2.40E+03	2.40E+03	n
Benzene	71-43-2	5.00E+00	5.00E+00	5.00E+00	n
Bis(2-ethylhexyl)phthalate	117-81-7	6.00E+00	6.00E+00	6.00E+00	n
Butyl benzyl phthalate	85-68-7	4.61E+01	4.61E+01	4.61E+01	n
Carbon tetrachloride	56-23-5	5.00E+00	--	5.00E+00	n
Chlorobenzene	108-90-7	--	1.00E+02	1.00E+02	n
Chloroform	67-66-3	1.41E+01	1.41E+01	1.41E+01	n
4,4'-DDD	72-54-8	--	3.65E-01	3.65E-01	n
4,4'-DDT	50-29-3	--	2.57E-01	2.57E-01	n
1,2 Dibromomethane (EDB)	106-93-4	5.00E-02	--	5.00E-02	n
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	--	5.00E+00	n
3,3'-Dichlorobenzidine	91-94-1	--	2.00E+00	2.00E+00	n
2,4-Dichlorophenol	120-83-2	--	4.80E+01	4.80E+01	n
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	7.00E+02	n
Fluoranthene	206-44-0	--	6.40E+02	6.40E+02	n
Fluorene	86-73-7	--	3.20E+02	3.20E+02	n
Methyl ethyl ketone (2-Butanone)	78-93-3	--	--	--	n
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.43E+01	--	2.43E+01	n
Methylene chloride	75-09-2	5.00E+00	--	5.00E+00	n
1-Methylnaphthalene	90-12-0	--	8.58E-01	8.58E-01	n
2-Methylnaphthalene	91-57-6	--	3.20E+01	3.20E+01	n
Naphthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	n
N-Nitrosodiphenylamine	86-30-6	--	1.79E+01	1.79E+01	n
Pentachlorophenol	87-86-5	1.00E+00	1.00E+00	1.00E+00	n
Phenanthrene (use pyrene as a surrogate)	129-00-0	--	2.40E+02	2.40E+02	n
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	5.00E+00	n
Toluene	108-88-3	1.00E+03	6.40E+02	6.40E+02	n
Total PCBs	1336-36-3	--	2.19E-01	2.19E-01	n
1,2,3-Trichlorobenzene	87-61-6	--	6.40E+00	6.40E+00	n
1,2,4-Trichlorobenzene	120-82-1	--	1.51E+01	1.51E+01	n
Trichloroethylene (TCE)	79-01-6	5.00E+00	--	5.00E+00	n
Vinyl Chloride	75-01-4	1.00E+00	1.00E+00	1.00E+00	n
Xylenes	1330-20-7	1.60E+03	1.60E+03	1.60E+03	n

Table 5
Groundwater (Drinking Water) pCULs and COPCs - Mill Site
Yakima Mill Site
Yakima, Washington

Analyte	CAS	Mill PCUL (µg/L)	East-West PCUL (µg/L)	PCUL ⁽¹⁾ (µg/L)	COPC ⁽²⁾
cPAHs					
Benzo(a)anthracene	56-55-3	--	--	--	n
Benzo(a)pyrene	50-32-8	2.00E-01	2.00E-01	2.00E-01	n
Benzo(b)fluoranthene	205-99-2	--	--	--	n
Benzo(k)fluoranthene	207-08-9	--	--	--	n
Chrysene	218-01-9	--	--	--	n
Dibenz(a,h)anthracene	53-70-3	--	--	--	n
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	n
cPAH TEQ	--	2.00E-01	2.00E-01	2.00E-01	n
Metals					
Arsenic	7440-38-2	5.00E+00	7.00E+00	5.00E+00	y
Barium	7440-39-3	--	2.00E+03	2.00E+03	n
Cadmium	7440-43-9	5.00E+00	5.00E+00	5.00E+00	n
Chromium III	16065-83-1	--	2.40E+04	2.40E+04	n
Chromium VI	18540-29-9	5.00E+01	--	5.00E+01	n
Total Chromium	7440-47-3	5.00E+01	1.00E+02	5.00E+01	n
Copper	7440-50-8	6.40E+02	6.40E+02	6.40E+02	n
Iron	7439-89-6	--	3.00E+02	3.00E+02	n
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	n
Manganese	7439-96-5	--	5.00E+01	5.00E+01	n
Mercury	7439-97-6	--	2.00E+00	2.00E+00	n
Nickel	7440-02-0	1.00E+02	3.20E+02	1.00E+02	n
Selenium	7782-49-2	--	5.00E+01	5.00E+01	n
Silver	7440-22-4	8.00E+01	8.00E+01	8.00E+01	n
Zinc	7440-66-6	4.80E+03	4.80E+03	4.80E+03	n

Notes:

(1) Most stringent pCUL between Barr 2021 and Ecology 2025.

(2) As indicated in Barr 2021 and Ecology 2025.

-- = not applicable

Abbreviations and Acronyms:

µg/L = micrograms per liter

CAS = Chemical Abstracts Service

COPC = contaminant of potential concern

cPAH = carcinogenic polycyclic aromatic hydrocarbon

n = no

PCUL = preliminary cleanup level

y = yes

References:

Barr. 2021. Revised Draft Remedial Investigation Report, Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. August.

Ecology. 2026. Memorandum: Yakima County East-West Corridor Roadway Project, Development of Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site. Washington State Department of Ecology. February 11.

Excavated Materials Management Plan



EXCAVATED MATERIALS MANAGEMENT PLAN

Boise Cascade Mill Site/
Interstate 82 Exit 33A Yakima City Landfill Site
Yakima, Washington

July 28, 2025

Prepared for
City of Yakima

TABLE OF CONTENTS

	Page
List of Abbreviations and Acronyms	ii
1.0 Introduction	1-1
2.0 Known and Suspected Contamination.....	2-1
2.1 Landfill Site	2-1
2.2 Mill Site.....	2-2
3.0 Recognizing Contamination	3-1
3.1 Unanticipated Contamination	3-1
4.0 Recognizing Potentially Contaminated Groundwater and Stormwater	4-1
5.0 Managing Known or Unanticipated Contaminated Material	5-1
6.0 Material Screening and Characterization	6-1
6.1 Field Screening of Potentially Contaminated Materials.....	6-1
6.2 Potentially Contaminated Materials Characterization.....	6-2
6.3 Management of Contaminated or Potentially Contaminated Materials.....	6-2
6.3.1 Plan for Instructing Workers.....	6-2
6.3.2 Excavation.....	6-2
6.3.3 Stockpiling.....	6-3
6.3.4 Waste Characterization	6-3
6.3.5 Loading	6-3
6.3.6 Transport	6-3
6.3.7 Disposal Facilities	6-4
7.0 Notifications and Reporting.....	7-1
8.0 Use of This Plan.....	8-1
9.0 References	9-1

FIGURES

Figure	Title
1	Vicinity Map
2	Project Boundaries
3	Mill Site Transportation Corridor Locations Above pCULs
4	Soil Management Decision Logic Flow Chart

LIST OF ABBREVIATIONS AND ACRONYMS

ACM.....	asbestos-containing material
AHERA	Asbestos Hazard Emergency Response Act
AOC	area of concern
bgs.....	below ground surface
City	City of Yakima
CSID	cleanup site identification
DAHP	Washington State Department of Archaeology and Historic Preservation
Ecology	Washington State Department of Ecology
EMMP.....	Excavated Materials Management Plan
FSID	facility site identification
ft.....	foot/feet
IAWP	Interim Action Work Plan
Landau.....	Landau Associates, Inc.
Landfill Site.....	Interstate 82 Exit 33A Yakima City Landfill Site
Mill Site	Boise Cascade Mill Site excluding Landfill Site
mm	millimeter
MSW.....	municipal solid waste
PAH.....	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PID.....	photoionization detector
RCW.....	Revised Code of Washington
RI	remedial investigation
ROW	right-of-way
SAP	Sampling and Analysis Plan
SVOC.....	semivolatile organic compound
SWPPP.....	stormwater pollution prevention plan
TPH.....	total petroleum hydrocarbons
TPH D/O	diesel-range/oil-range TPH
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION

The purpose of this Excavated Materials Management Plan (EMMP) is to outline the approach and procedures for managing known and unanticipated contaminated soil, municipal solid waste (MSW), and wood debris encountered during construction activities, and for management of stormwater and groundwater entering the excavation during activities associated with construction of utility infrastructure associated with the roadway project at the closed Interstate 82 Exit 33A Yakima City Landfill Site (“Landfill Site”; Facility Site ID [FSID] 1927; Cleanup Site ID [CSID] 3853) and Boise Cascade Mill Site (“Mill Site”; Ecology FSID 450; CSID 12095), collectively referred to as the “Site,” located in Yakima, Washington (Figure B-1). This EMMP was developed by Landau Associates, Inc. (Landau) for use by the City of Yakima (City) and its contractors during the utility infrastructure construction at the Site (Figure B-2). This document addresses recognition of known and unanticipated contamination and characterization of contamination, as well as issues related to excavated materials and stormwater handling and disposal. This EMMP is an appendix to the Updated Amendment Memorandum to the Interim Action Work Plan (IAWP Amendment) and is intended to be used in conjunction with both the original IAWP and associated attachments (Landau 2019) and the IAWP Amendment, not as a standalone document.

2.0 KNOWN AND SUSPECTED CONTAMINATION

During this phase of the roadway project, utilities will be installed/constructed within the roadway alignment, including a portion of the Mill Site known to contain wood debris and contaminated soil. Construction of sewer infrastructure along the eastern edge of the Landfill Site will require excavating through areas known to contain MSW. The following sections summarize the contaminants, waste materials, and other debris that may be encountered in soil or groundwater at various areas within the Landfill Site and Mill Site.

It should be clearly understood that decomposing MSW and wood debris at the Site continue to generate methane at the Site at concentrations in and above the explosive limits. The presence of methane (and other landfill gases) is a health and safety risk that must be appropriately managed by the contractor, but is not the focus of this document.

2.1 Landfill Site

In 2020 and 2021, City-directed MSW and wood debris removal activities within the roadway project right-of-way (ROW)/construction easement were completed. The excavation was backfilled with common borrow and a vertical low-permeability soil landfill gas barrier was constructed from the underlying native soil to the final grade of backfill around the perimeter of the excavation. Therefore, no known or significant MSW or soil contamination is expected to be encountered within the City-owned ROW limits of the 2020-2021 roadway interim action excavation. Subsurface conditions at the rest of the Landfill Site are generally characterized by the presence of MSW deposited during the landfill's active years and buried wood debris (on both the Mill Site and Landfill Site) associated with the historical mill activities. These materials have been mixed with Site soil over the years through excavation and regrading.

MSW on the Landfill Site is known to be present at thicknesses of up to 15 feet (ft), with an average thickness of approximately 10 ft; the top of the MSW occurs from approximately 2 to 12 ft below ground surface (bgs), and the bottom of the MSW occurs from approximately 5 to 19.5 ft bgs. The MSW consists of organic-putrescible material (food, garden, and animal waste), organic non-putrescible waste (paper, wood, textiles, leather, plastic, rubber, paints, and sludge), and inorganic materials (metals, glass, ceramics, soil, ash, concrete, etc.).

Extensive sampling of soil/MSW and groundwater at the Landfill Site indicates that a wide variety of contaminants are present. Although the main contaminants of concern/indicator hazardous substances at the Site are limited to methane and vinyl chloride in landfill gas, and dissolved metals (arsenic, iron, and manganese) in groundwater, other contaminants have been detected at low levels and are potentially present in the MSW including:

- Petroleum hydrocarbons
- Metals including arsenic, barium, cadmium, chromium (III), iron, lead, manganese, mercury, silver, sodium, hexavalent chromium, and selenium
- Pesticides

- Polychlorinated biphenyls (PCBs)
- Volatile organic compounds (VOCs)
- Semivolatile organic compounds (SVOCs)
- Polycyclic aromatic hydrocarbons (PAHs).

Therefore, it should be expected that low-level contamination is present in the MSW and potentially in soil and wood debris that comes in contact with MSW. Excavated MSW materials will be treated as a solid waste and sampled, as required by the applicable disposal facility, for waste characterization as described in the Sampling and Analysis Plan (SAP) included as Appendix A of the final IAWP Amendment.

Discrete contamination or other potential contaminant sources that have more specialized management and disposal requirements (such as free product hydrocarbons or solvents; industrial wastes such as drums, tanks, transformers, batteries, and cement kiln dust/lime wastes; chemically treated wood products such as creosote-treated poles or railroad ties and chemical pressure-treated lumber; and/or other regulated materials that may be a health and safety risk such as friable asbestos-containing material [ACM]) have not been encountered or identified in prior explorations at the Landfill Site. Although unlikely, these types of materials may be present and encountered during construction and may require special procedures for identification and management (see Section 3.1).

2.2 Mill Site

Subsurface conditions at the Mill Site are generally characterized by the presence of buried wood debris along the eastern end of the portion of the roadway alignment located on the Mill Site in the historical log pond areas. Excavated wood debris from the Mill Site and Landfill Site may be recycled at an appropriate composting facility, contingent upon sampling results demonstrating that it is not contaminated with Site contaminants of concern. Alternately, wood debris can be managed and disposed of in the same manner as MSW.

Other areas of known or suspected contamination at the Mill Site that may require special characterization, management, and disposal include:

- The presence of total petroleum hydrocarbons (TPH) in the diesel and oil range (TPH-D/O) has been identified in shallow soil (at some locations within approximately 2 ft of ground surface) at the Mill Site Log Yard Shop, Small Log Sawmill, and Mill Transformers areas of concern (AOCs).
- Chromium (unspeciated) and PAHs have been identified in a limited number of soil samples in the area around the former Boiler House AOC; however, the nature and extent have not been determined. PCBs and mineral oil may also be present in this area due to the former presence of electrical capacitors in the Boiler House and other oil-filled transformers in this area.
- Dissolved metals are also present in groundwater at the Mill Site due to reducing conditions associated with groundwater contact with and leaching of organic materials from wood debris located at the Mill Site. Similar to the Landfill Site, the primary metals of concern are arsenic, iron, and manganese. The western portion of the roadway alignment passes through areas of historical wood mill buildings, where some suspected areas of contamination exist related to historical Site operations. Additionally, investigations at the former Plywood Mill area of the Mill

Site located adjacent to the northwest of the Landfill Site (south of the railroad tracks) have identified groundwater contamination that may have migrated beneath portions of the roadway alignment.

- TPH-D/O have been detected in groundwater in the vicinity of the former plywood mill area; based on groundwater data from monitoring wells, dissolved-phase TPH-D/O may have migrated beneath the roadway corridor in the area east of the former plywood mill of the south of the railroad tracks.

Discrete contamination or other potential contaminant sources that have more specialized management and disposal requirements (such as petroleum hydrocarbons, solvents, industrial wastes from drums or tanks, chemically treated wood products such as creosote-treated poles or railroad ties and chemical pressure-treated lumber, and/or other regulated materials that may be a health and safety risk such as friable ACM) have not been encountered or identified in prior explorations at the Mill Site. Although unlikely, these types of materials may be present and encountered during construction and may require special procedures for identification and management (see Section 3.1).

3.0 RECOGNIZING CONTAMINATION

Roadway construction activities are currently planned in areas of known landfill debris (Landfill Site) and former industrial (wood/plywood mill) facilities and operations areas (Mill Site) and could result in the discovery of unanticipated contamination associated with previously unknown/undiscovered waste materials. Landfill debris at the Site has been generally characterized as MSW, but there is the potential for industrial wastes to be present and/or hazardous household wastes such as, but not limited to, oils, pesticides, paint thinners, storage drums, transformers, batteries, and asbestos-containing demolition debris. Construction field personnel must be aware of the known contamination associated with MSW and understand how to recognize other potentially contaminated materials at the Site. This EMMP should be implemented during all intrusive work at the Site to maintain work zone health and safety and to mitigate further impact to the environment if known or unanticipated contamination is encountered.

3.1 Unanticipated Contamination

The portion of the Landfill Site that was not excavated during the 2020-2021 roadway interim action excavation has generally been found to consist primarily of MSW and wood debris. The Mill Site consists of former mill facilities and processing areas and wood debris deposition areas in former log pond areas. For the purposes of this EMMP, unanticipated contamination can be determined using knowledge of historical Site operations and activities [as documented in the Landfill Site Supplemental Remedial Investigation (RI) Report (Landau 2015), Transportation Corridor Wood Debris and Landfill Gas Investigation technical memorandum (Landau 2018), Pre-Construction Groundwater Monitoring Data Report , and Revised Draft Remedial Investigation Report (Barr 2021)]; physical observations; and field-screening equipment and procedures. Physical observations include use of the visual and olfactory senses. Field-screening equipment may include instrumentation such explosive gas meters, organic vapor meters, and dust meters. Contamination has previously been associated with the following materials and conditions at the Site:

- **Petroleum Hydrocarbons:** Petroleum hydrocarbon products, such as gasoline, diesel, and motor oil. Low levels of petroleum hydrocarbon contamination are known to be present in MSW at the Site. However, hydrocarbon contamination may be present in soil separate from MSW, and pockets of gross contamination associated with dumped drums or tanks may be present that will require additional characterization and special handling and disposal. Contamination may be present in soil, MSW, or wood debris and typically exhibits one or more of the following characteristics: iridescent sheen; black, oily, tarry, or greasy appearance; petroleum (gas, diesel, motor oil, kerosene) odor; and dark staining in soil.
- **Solvents:** Industrial or commercial chemical solvents have commonly been used in the past for cleaning and degreasing metal parts. No significant solvent contamination has been identified at the Site, but could be encountered in containers or discrete pockets of contamination. Solvent contamination may be present in soil, MSW, or wood debris and typically exhibits the following characteristics: clear liquid with a sweet chemical odor.
- **Buried Debris:** MSW at the Site contains organic wastes (household refuse) and inorganic materials such as metals, glass, ceramics, soil, ash, and concrete that may be household wastes or construction/demolition debris. Other buried materials may also be encountered in areas of

buried wood debris or historical industrial operations areas. While these have not been encountered in explorations at the Site, construction/demolition/industrial debris could include materials such as metal drums, burnt wood, creosote-impregnated wood piles/poles or railroad ties, chemically pressure-treated wood, and/or friable ACM:

- Creosote-impregnated wood piles/poles or railroad ties exhibit a strong “mothball” odor and are typically darker in color, or possibly have a tar-like coating.
- Chemically pressure-treated wood often has a greenish coloration and indentation patterns from the pressure-treating process. Pentachlorophenol (PCP), a commonly used historical wood-treating insecticide/fungicide, may appear as clear or white to dark grayish-brown solid crystalline beads or flakes with a sweet gasoline- or benzene-like odor.
- Friable ACM, such as pipe wrap, boiler insulation, and “popcorn” ceiling texture, is often white and fibrous and can be easily reduced to powder by hand when dry.
- **Industrial Wastes:** Waste materials originating from industrial sites/processes have not been encountered in explorations at the Site, but if present could consist of drums or tanks of waste chemicals or petroleum products, PCB-containing transformer reservoirs or debris, PAHs, and/or lime wastes/cement kiln dust. PCB-containing transformers are typically metal and cylindrical with electrical connections, some of which are lined with heat sink plates. Damaged, undrained transformers may leak oils that are dark amber or black in color. PAHs may be encountered in the form of tar, creosote, or other dark-stained areas (potentially in discarded containers or associated with treated wood piles/poles or railroad ties). Lime wastes/cement kiln dusts are typically light gray and flaky or powdery and exhibit a slight “fishy” odor. Cement kiln dust may be consolidated in a mass that has the appearance of a light gray/off-white clay material that exhibits a brittle, flaky character when broken up.
- **Other:** The listed items above are not meant to be exhaustive and construction personnel should be diligent in looking for any materials and excavated materials that may be encountered that appear or behave differently from typical MSW, wood debris, and soil. If any chemical or other unidentifiable odors, viscous or odd-colored liquids, odd-appearing or colored powders/dusts/crystals, or discarded industrial-type equipment or containers are encountered, these materials should be assumed to be potentially contaminated and dealt with cautiously and safely. Potential metals-contaminated soil may also be encountered that may not have any physically observable evidence of contamination and may require special screening techniques or sampling and laboratory analysis (see Section 6.1).

If the materials or conditions noted above are observed during construction activities, work is to be suspended within the affected area and Landau and the City shall be notified immediately. Similar procedures are to be followed if other indications of potential contamination, such as material with an unusual appearance or odor, are observed during excavation activities.

4.0 RECOGNIZING POTENTIALLY CONTAMINATED GROUNDWATER AND STORMWATER

Groundwater at the Site is known to be contaminated with dissolved metals related to leaching of organic materials from MSW and/or the reducing conditions associated with degradation of MSW and wood debris. The depth to groundwater varies, but some areas of excavation will extend to depths that are likely to intersect the groundwater interface. If necessary for excavation activities, groundwater control in these areas may be conducted through dewatering well points and/or sumps. Groundwater generated through dewatering will likely require treatment prior to discharge to the City's sanitary or storm sewer system in accordance with applicable permit conditions and requirements.

Stormwater that comes in contact with contaminated soils and/or MSW can become contaminated either by suspension of contaminated particles or by solution of chemicals and, therefore, accumulated or collected stormwater may also be treated as a contaminated material. Procedures for containment, characterization, and disposal of potentially contaminated stormwater will be the same as the procedures listed in Section 6.0 for other potentially contaminated materials.

Implementation of a project-specific stormwater pollution prevention plan (SWPPP) may also be necessary as required under a Construction Stormwater General Permit. Administering stormwater best management practices and erosion and sediment control procedures may be necessary to minimize the accumulation of potentially contaminated stormwater. If necessary, a project-specific SWPPP will be prepared separately by the City or construction contractor in adherence with the applicable construction-related permits and regulations.

5.0 MANAGING KNOWN OR UNANTICIPATED CONTAMINATED MATERIAL

All excavation and associated subsurface activities that place workers in contact with potentially contaminated material should be conducted by workers who have proper Occupational Safety and Health Administration and Washington Industrial Safety and Health Act training and certification for working at a hazardous waste site. All work conducted by the contractor related to the excavation and handling of potentially contaminated materials should be conducted under a contractor-prepared Site-specific health and safety plan prepared in accordance with Code of Federal Regulations 29.1926.120 and approved by the City.

When unanticipated or unidentified materials (other than general MSW and wood debris) are encountered, the procedures shown on Figure B-4 and detailed below may be used as a guide for decision-making:

- 1) If the material encountered is unanticipated or unidentified, work will cease in this area, as needed, to avoid disturbing the affected material and the construction contractor will notify the appropriate City personnel. The construction contractor will follow the material handling guidelines listed in Section 6.0.
- 2) If warranted, the City will notify Landau of the conditions and, if warranted, an environmental professional from Landau will visit the Site to evaluate the environmental conditions and determine appropriate notification procedures to the Washington State Department of Ecology (Ecology) or other applicable regulatory agency.
- 3) Landau will consult with Ecology to determine appropriate next steps for characterization. Based on existing data, field observations, and Ecology approval, Landau will collect analytical samples and submit them for appropriate laboratory analysis.
- 4) Once the nature of the material (e.g., whether it is contaminated by regulated substances) is appropriately identified, the affected material may be stockpiled (if the material is soil, MSW, and/or wood debris) separately from stockpiles of other excavated materials and tested to determine waste profiling at the direction of the City. Affected groundwater or stormwater should be contained in place or in appropriate containers to minimize contamination of other clean materials. If applicable, it may also be routed to the dewatering treatment system for appropriate treatment and discharge.
- 5) As warranted, a Landau environmental professional will conduct material screening and characterization (Section 6.0), and collect samples for waste characterization purposes, as well as possibly delineate the extent of the affected area within the planned limits of the excavation. The material will be analyzed (as necessary) and results will be reported to the City in a timely manner to minimize work delays.
- 6) Material (soil, MSW, wood debris, groundwater, or stormwater) that is determined to be uncontaminated (i.e., contaminant concentrations below regulatory screening levels or limits, or does not otherwise represent a risk to human health or the environment) will be left in place or disposed of along with other like excavated materials.

- 7) Excavated material and/or containerized water that is determined to be contaminated and requires removal will be profiled by Landau on behalf of the City for appropriate disposal at an appropriate waste disposal/treatment facility.
- 8) Once an appropriate disposal method is determined and the waste profile is accepted by the selected waste disposal/treatment facility, the soil, groundwater, or stormwater can be transported to the selected facility for treatment or disposal under the appropriate waste hauling bill of lading or manifest. The facility will be notified in advance of the approximate quantity and type of material being transported. All disposal facilities should provide the City with the appropriate paperwork to document the quantity and type of material received and the disposal method.
- 9) Once the contaminated material is removed, confirmation samples will be collected, if requested by the City or Ecology, from the previously affected area by a Landau representative to document the soil quality at the limits of the contaminated material excavation.
- 10) The City will notify the contractor when work can resume in the previously affected area.

6.0 MATERIAL SCREENING AND CHARACTERIZATION

This section describes the procedures that may be used by environmental professionals to field-screen and characterize potentially contaminated materials at the Site.

6.1 Field Screening of Potentially Contaminated Materials

The following field-screening methods may be used by the environmental professional to evaluate potentially contaminated materials:

- Petroleum sheen testing
- Chemical vapor screening with a photoionization detector (PID) or similar equipment
- Comparison of material to previously contaminated materials encountered at the Site, as listed in Section 2.0.

Sheen testing can be conducted on material that exhibits evidence of petroleum hydrocarbon contamination, if encountered. The sheen test is conducted by placing a representative sample of the soil in a clear glass jar with tap water. The jar will be agitated and the amount of sheen (light, medium, or heavy) will be observed and recorded. The judgment of the environmental professional will be used to determine if suspect soil is likely contaminated with petroleum hydrocarbons based on sheen testing. Materials exhibiting petroleum sheen will be considered contaminated, unless laboratory testing demonstrates otherwise.

If needed, screening with the PID can be conducted on materials exhibiting a petroleum or chemical odor to determine if VOCs are present. Field screening with a PID is conducted by placing a representative sample of the soil in a sealed plastic bag. The bag and soil will be agitated, allowed to stand for 5 minutes, and then a headspace reading will be taken of vapor in the bag using the PID. A sustained reading above background or ambient conditions will be used as a general indication of potential VOC contamination. The PID will be calibrated on a daily basis using a standard of 100 parts per million of isobutylene. The PID will be equipped with a 10.6 electron volt lamp, which is capable of detecting most common aromatic and aliphatic hydrocarbon compounds. Other field-screening equipment, such as explosive gas meters or dust meters, will be used as appropriate depending on the observed nature of the contaminant and/or other field-screening results.

Areas of known or potential metals-contaminated soil are also present on the Mill Site area (see Figure B-3); these areas may not have any physically observable evidence of contamination and may require special screening techniques, such as field test kits, or sampling and laboratory analysis. Where identified and delineated by the Mill Site RI or as otherwise applicable, this type of screening/sampling during construction will be conducted by Landau.

Suspect material screening may be conducted in the area of possible unidentified contamination and used to assist in delineating the extent of contamination to the planned limits of the excavations and to inform stockpiling decisions. Should previously unidentified contaminated material be excavated and stockpiled, the screening will generally be conducted for approximately every 20 loose cubic yards of

excavated material from the area. The frequency of field screening may be more or less, as needed, depending on the conditions encountered and whether there are varying material types and levels of impact. Field-screening results will be recorded in a field report.

6.2 Potentially Contaminated Material Characterization

After appropriate identification procedures have been completed as identified above, newly discovered contaminated material should be stockpiled separately from other excavated materials (i.e., MSW, wood debris, and soil) to reduce the potential for cross-contamination. Samples will be collected, as necessary, by the environmental professional to further evaluate and characterize whether potentially contaminated materials, oil, and/or water, as identified during field screening, should be classified as contaminated and, if contaminated, to profile and determine appropriate disposition of the contaminated material. Sampling will be conducted in accordance with the SAP.

Characterization samples will be tested consistent with the type of potential contamination recognized in the field (e.g., motor oil-range hydrocarbons, paint thinners). The testing protocol will be consistent with the requirements of the destination waste disposal/treatment facility. Samples of potential ACM will be collected only by individuals certified as Asbestos Hazard Emergency Response Act (AHERA) Building Inspectors.

Sample analytical results will be compared with appropriate regulatory criteria to determine whether a material is contaminated and/or requires special handling and disposal.

6.3 Management of Contaminated or Potentially Contaminated Materials

This section provides information about how excavated soil, MSW, and wood debris can be handled by the construction contractor. Guidelines and general information about the handling of excavated soil, MSW, and wood debris are provided in this section.

6.3.1 Plan for Instructing Workers

Excavation supervisors and workers should be provided with training and other information from this EMMP about the nature of hazardous substances in the soil they are excavating and how to identify suspect soil (Section 3.0). These personnel should be provided with the authority to stop excavation operations and request direction and assistance in evaluating materials that appear to be contaminated.

6.3.2 Excavation

Excavation should be conducted with the appropriate hydraulic excavating equipment. A smooth-edged bucket should be used when excavating potentially contaminated materials, as applicable. Based on field measurements in areas where methane is known or likely to be present in MSW and/or wood debris, the excavation may need to be ventilated with fans to prevent a potential accumulation of methane above its lower explosive limit of 5 percent by volume.

Suspect or positively identified ACM should not be disturbed and should be covered in place, immediately upon discovery, with plastic sheeting to prevent a potential fiber release. The material should then be properly contained and disposed of as soon as possible by appropriately trained and certified asbestos-mitigation professionals.

6.3.3 Stockpiling

Excavated soil, MSW, and wood debris may be segregated for waste characterization as needed prior to transport to appropriate disposal facilities. Stockpiled materials that have been determined to be contaminated through field screening or testing should be placed on minimum 10-millimeter (mm) plastic sheeting and bermed around the edges with sand bags or hay bales to prevent run-on and run-off of stormwater. The stockpiles should also be covered with minimum 6-mm plastic sheeting when not being actively worked or loaded. The cover plastic can be weighted or secured by appropriate means and seams sealed to prevent tearing or removal by weather. The environmental professional may need access to stockpiles for sampling or other activities. An inventory of stockpiled materials should be kept by the contractor. Soil in stockpiles will be removed and disposed of or reused based on the results of analytical testing, as appropriate. Contaminated soil in stockpiles should be removed from the Site within 90 days of placement.

6.3.4 Waste Characterization

Previous waste characterization sampling results using the toxicity characteristic leaching procedure for metals and VOCs did not indicate that Site MSW would be considered a Dangerous Waste under Chapter 173-303 of the Washington Administrative Code (WAC). However, soil/excavated materials with contaminant concentrations above regulatory limits or exhibiting evidence of contamination, and stockpiled or other potentially contaminated material from anywhere at the Site, may need to be sampled for waste characterization analysis in accordance with applicable regulations, procedures identified in the SAP, and the individual disposal facility acceptance criteria (if different from the SAP) prior to transport and disposal.

6.3.5 Loading

Excavated material will generally be directly loaded into trucks for transport to export destination sites to the extent possible. The moisture and consistency of soil should be monitored to ensure that the loaded soils are in a condition suitable to prevent spills during transit to stockpile locations or other destination areas.

6.3.6 Transport

Excavated material transport to offsite locations should be monitored to ensure that the cargo is fully contained, covered, and protected in transit, in compliance with local, state, and federal transportation requirements. In general, truck and trailer combinations are suitable for this type of hauling operation.

6.3.7 Disposal Facilities

Profiling, manifesting, and testing requirements are generally similar for all solid waste disposal facilities. Sufficient generator information and representative sample analytical data are needed to properly characterize the material. Each facility's permit has site-specific restrictions on the types of waste that can be accepted, which is addressed in the profiling process. Bills of lading are used to document non-dangerous waste disposal. Hazardous waste manifests are used to transport and document dangerous waste disposal.

7.0 NOTIFICATIONS AND REPORTING

If unanticipated environmental conditions are encountered during construction activities, the City should be notified by the contractor immediately, and the findings, resulting actions implemented, and remaining Site conditions documented for the project files and for reporting to the applicable regulatory agencies, if warranted and required under local, state, and federal regulations.¹ The documentation may be prepared in focused technical memoranda, or other appropriate formats depending on the location of the affected area, the nature and extent of contamination, actions taken, and regulatory requirements.

Although not identified during previous Site investigation activities, if archaeological resources are discovered, work will be stopped immediately and Ecology, the Washington State Department of Archaeology and Historic Preservation (DAHP), the City, and the appropriate Tribes' Cultural Resources Department will be notified by the close of business on the day of discovery. A licensed archaeologist will inspect the Site and document the discovery, provide a professionally documented site form, and report to the above-listed parties. In the event of an inadvertent discovery of human remains, work will be immediately halted in the discovery area, the remains will be covered and secured against further disturbance, and the Yakima Police Department and Yakima County Medical Examiner will be immediately contacted, along with the DAHP Physical Anthropologist and authorized Tribal representatives. A treatment plan by a licensed archaeologist would then be developed in consultation with the above-listed parties consistent with Revised Code of Washington (RCW) 27.44 and RCW 27.53 and implemented according to Chapter 25-48 WAC.

¹ See spill reporting requirements in Washington: <https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue/Report-a-spill>.

8.0 USE OF THIS PLAN

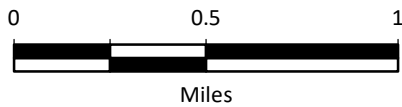
This Excavated Materials Management Plan has been prepared for the exclusive use of the City of Yakima and the Washington State Department of Ecology for specific application to the Interstate 82 Exit 33A Yakima City Landfill Site and Boise Cascade Mill Site roadway utility infrastructure project. Reliance on this report by third parties, or others who do not have a contractual relationship with the City or Landau on this project is at their sole risk. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

9.0 REFERENCES

- Barr. 2021. Revised Draft Remedial Investigation Report, Yakima Mill Site (aka Boise Cascade Mill Site), 805 North 7th Street, Yakima, Washington 98901. Barr Engineering Co. August.
- Landau. 2015. Agency Review Draft: Supplemental Remedial Investigation Report, Closed City of Yakima Landfill Site, Yakima, Washington. Landau Associates, Inc. September 29.
- Landau. 2018. Technical Memorandum: Transportation Corridor Wood Debris and Landfill Gas Investigation, Former Boise Cascade Mill Site and Closed City of Yakima Landfill Site, Yakima, Washington, Facility/Site No. 1927. Landau Associates, Inc. September 12.



G:\Projects\1148\009\020\IAWP Addendum\F01 Vicinity Map.mxd 6/1/2023

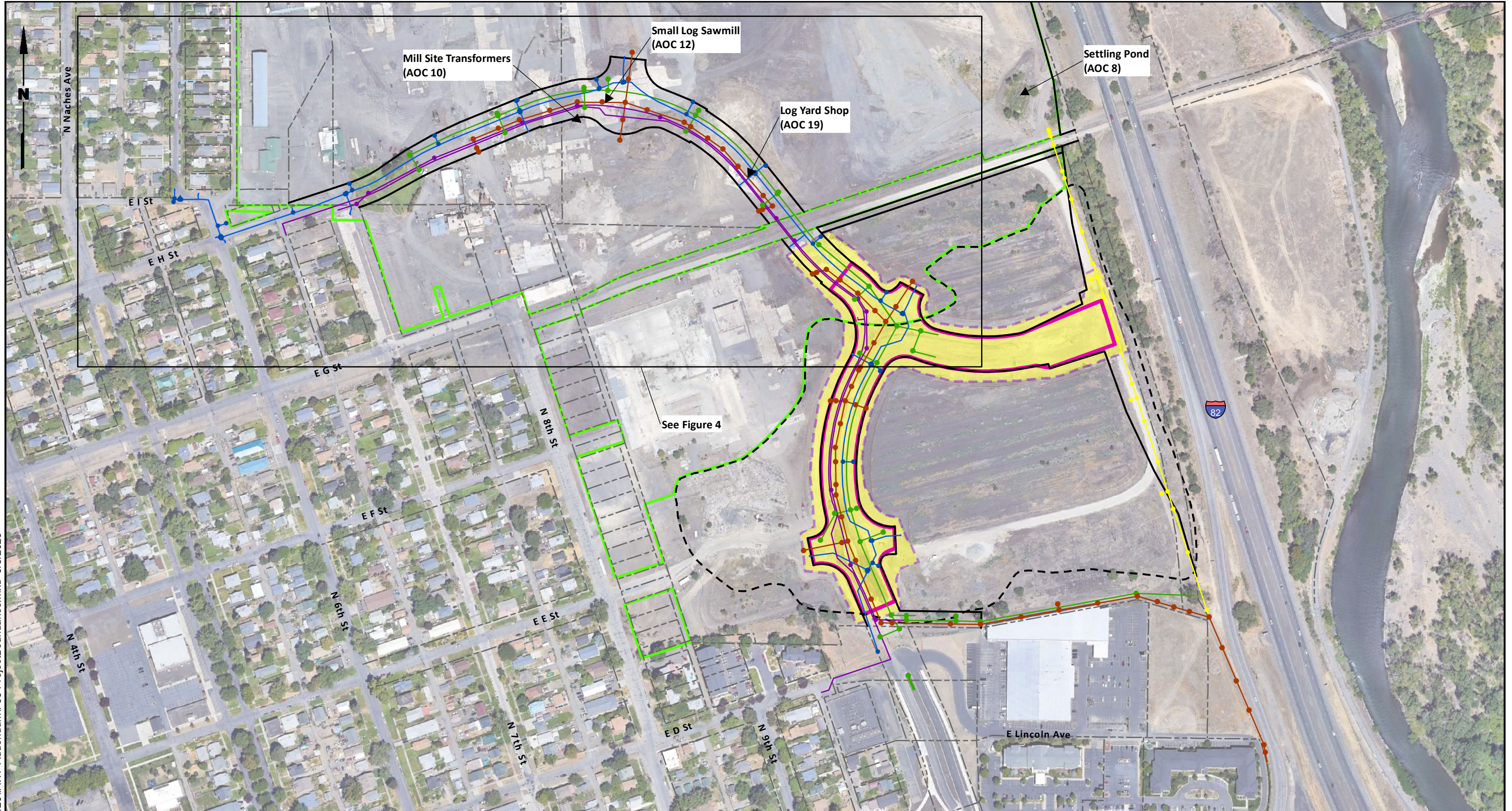


Data Source: Esri.

Boise Cascade Mill Site/
Closed City of Yakima
Landfill Site
Yakima, Washington

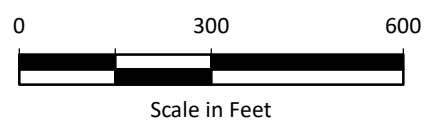
Vicinity Map

Figure
1



Notes
 1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
 2. AOC = Area of Concern

Legend	
--- Existing Right of Way	--- Approximate Location of Phase 1 Sanitary Sewer Line
— New Right of Way	--- Municipal Landfill Extent
--- New Storm Sewer	--- Yakima Mill Site Boundary (AO No. DE 13959)
--- New Irrigation	--- Approximate Completed Roadway
--- New Sewer	--- Prism Excavation Area
--- New Water	--- Low Permeability Wall



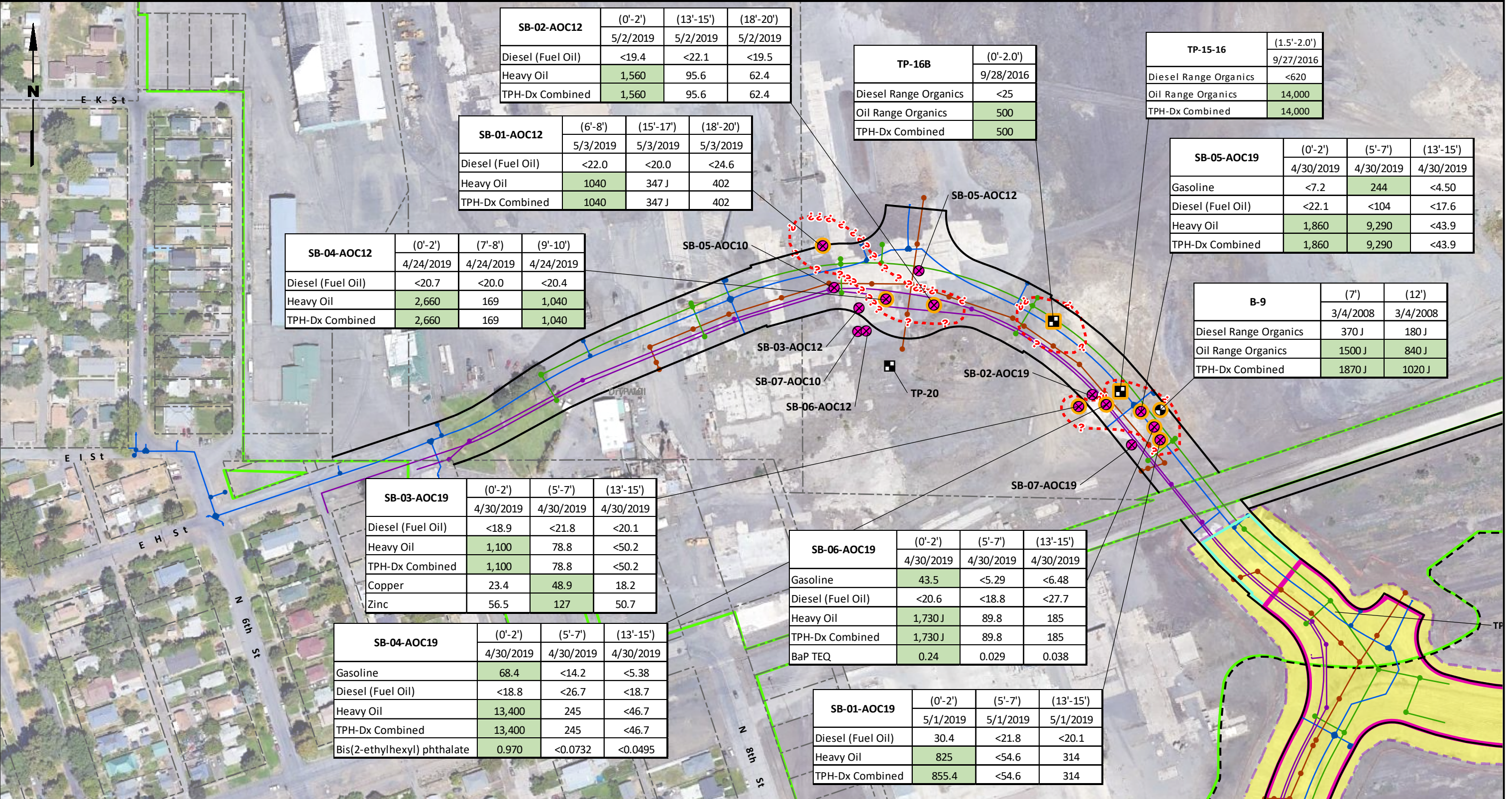
Data Source: HLA Engineering and Land Surveying, Inc; Lochner Engineering; Yakima County GIS; Esri World Imagery.

Boise Cascade Mill Site/ Closed City of Yakima Landfill Site Yakima, Washington	Project Boundaries	Figure 2
--	---------------------------	--------------------

G:\Projects\1148\009\020\IAMP Addendum\F03 ProjectBoundaries.mxd 9/8/2023



G:\Projects\1148\009\020\IWP Addendum\F04 TargetAreaWS16_WS09.mxd 8/31/2023



SB-02-AOC12	(0'-2')	(13'-15')	(18'-20')
	5/2/2019	5/2/2019	5/2/2019
Diesel (Fuel Oil)	<19.4	<22.1	<19.5
Heavy Oil	1,560	95.6	62.4
TPH-Dx Combined	1,560	95.6	62.4

TP-16B	(0'-2.0')
	9/28/2016
Diesel Range Organics	<25
Oil Range Organics	500
TPH-Dx Combined	500

TP-15-16	(1.5'-2.0')
	9/27/2016
Diesel Range Organics	<620
Oil Range Organics	14,000
TPH-Dx Combined	14,000

SB-01-AOC12	(6'-8')	(15'-17')	(18'-20')
	5/3/2019	5/3/2019	5/3/2019
Diesel (Fuel Oil)	<22.0	<20.0	<24.6
Heavy Oil	1040	347 J	402
TPH-Dx Combined	1040	347 J	402

SB-05-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	<7.2	244	<4.50
Diesel (Fuel Oil)	<22.1	<104	<17.6
Heavy Oil	1,860	9,290	<43.9
TPH-Dx Combined	1,860	9,290	<43.9

SB-04-AOC12	(0'-2')	(7'-8')	(9'-10')
	4/24/2019	4/24/2019	4/24/2019
Diesel (Fuel Oil)	<20.7	<20.0	<20.4
Heavy Oil	2,660	169	1,040
TPH-Dx Combined	2,660	169	1,040

B-9	(7')	(12')
	3/4/2008	3/4/2008
Diesel Range Organics	370 J	180 J
Oil Range Organics	1500 J	840 J
TPH-Dx Combined	1870 J	1020 J

SB-03-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Diesel (Fuel Oil)	<18.9	<21.8	<20.1
Heavy Oil	1,100	78.8	<50.2
TPH-Dx Combined	1,100	78.8	<50.2
Copper	23.4	48.9	18.2
Zinc	56.5	127	50.7

SB-06-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	43.5	<5.29	<6.48
Diesel (Fuel Oil)	<20.6	<18.8	<27.7
Heavy Oil	1,730 J	89.8	185
TPH-Dx Combined	1,730 J	89.8	185
BaP TEQ	0.24	0.029	0.038

SB-04-AOC19	(0'-2')	(5'-7')	(13'-15')
	4/30/2019	4/30/2019	4/30/2019
Gasoline	68.4	<14.2	<5.38
Diesel (Fuel Oil)	<18.8	<26.7	<18.7
Heavy Oil	13,400	245	<46.7
TPH-Dx Combined	13,400	245	<46.7
Bis(2-ethylhexyl) phthalate	0.970	<0.0732	<0.0495

SB-01-AOC19	(0'-2')	(5'-7')	(13'-15')
	5/1/2019	5/1/2019	5/1/2019
Diesel (Fuel Oil)	30.4	<21.8	<20.1
Heavy Oil	825	<54.6	314
TPH-Dx Combined	855.4	<54.6	314

Legend

- ⊕ Soil Boring (Others)
- ⊞ Test Pit (Landau)
- ⊗ Soil Bore (Others)
- Results above PCUL
- Existing Right of Way
- New Right of Way
- New Storm Sewer
- New Irrigation
- New Sewer
- New Water
- ⊞ Municipal Landfill Extent
- ⊞ Approximate Completed Roadway
- ⊞ Prism Excavation Area
- ⊞ Yakima Mill Site Boundary (AO No. DE 13959)
- ⊞ Approximate Extent of Soil Concentrations above Preliminary Cleanup Levels
- ⊞ Low Permeability Wall
- ⊞ Double Lined Plastic Barrier

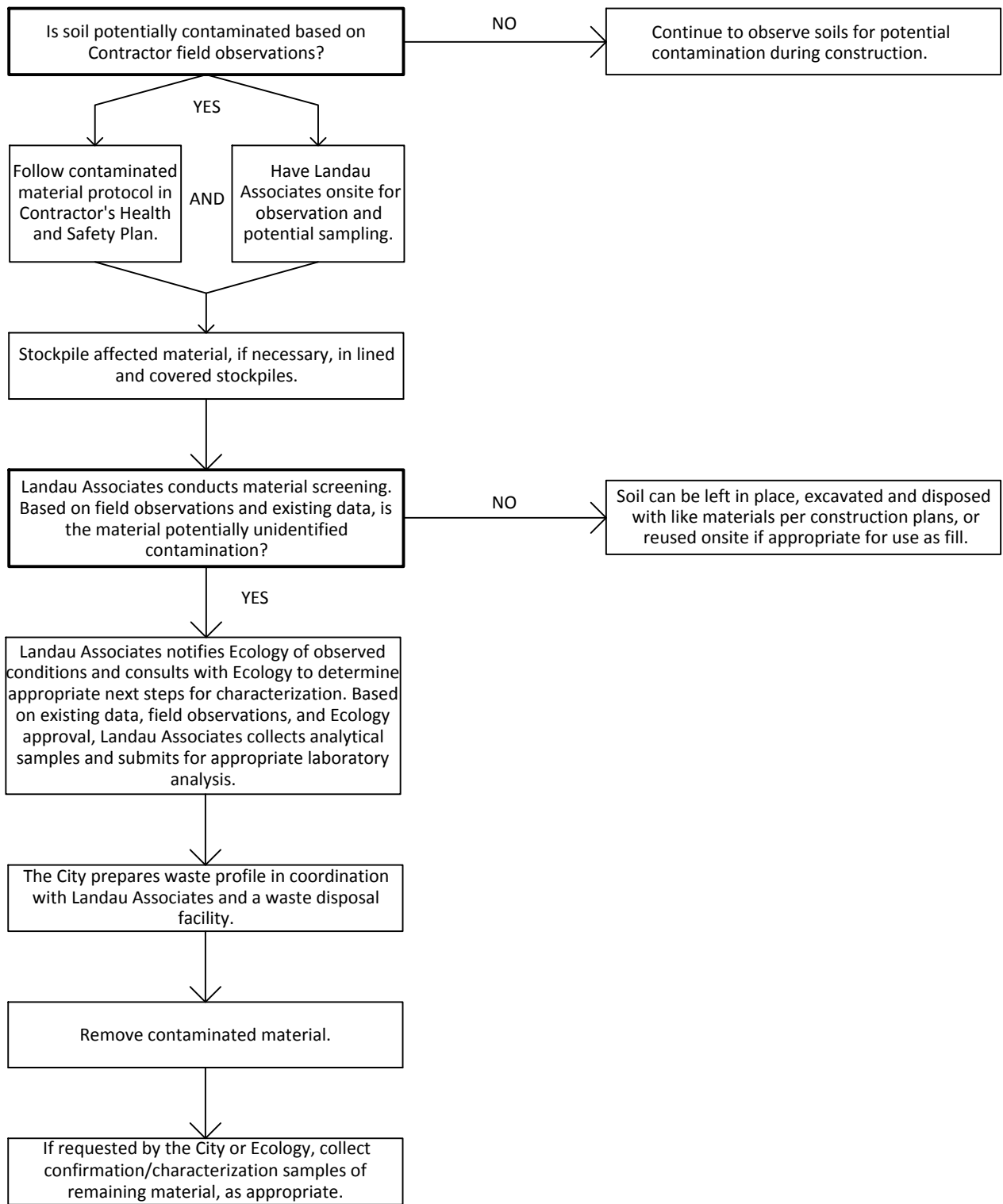
Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Barr; HLA Engineering and Land Surveying, Inc; Lochner Engineering; Esri World Imagery.

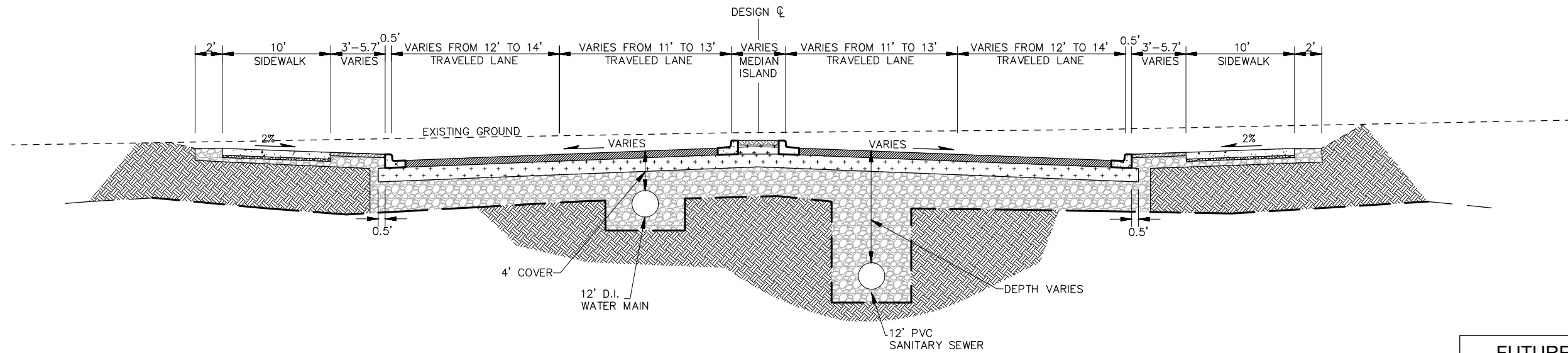
Boise Cascade Mill Site/ Closed City of Yakima Landfill Site Yakima, Washington	Mill Site Transportation Corridor Locations Above pCULs	Figure 3
--	---	--------------------





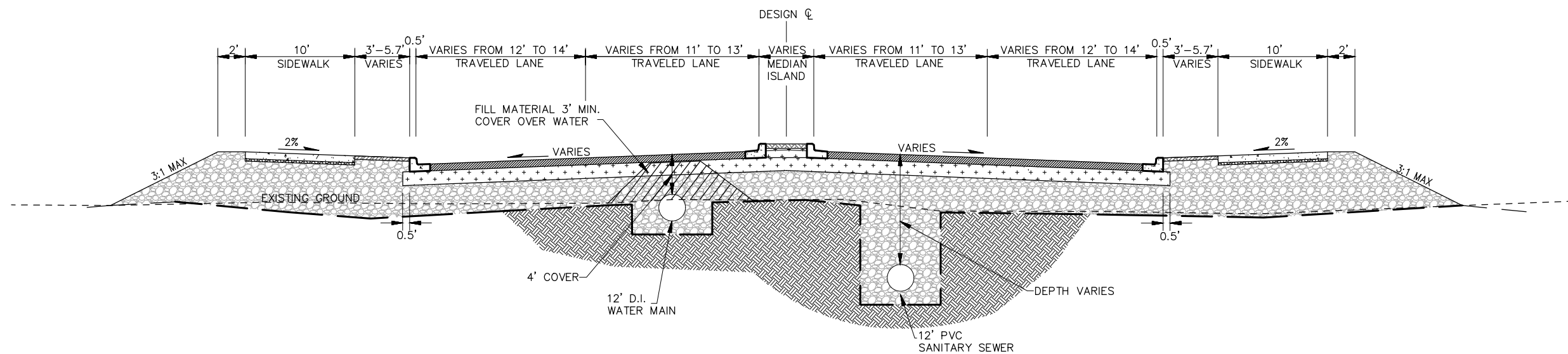
Project Design Documents

Water and Sewer Typical Sections (HLA Exhibit)



FUTURE ROADWAY SHOWN FOR REFERENCE.

Bravo Company Blvd. - Section 1 (CUT)
NORTH OF RR TRACKS



Bravo Company Blvd. - Section 2 (FILL)
SOUTH OF RR TRACKS



2803 River Road
Yakima, WA 98902
509.966.7000
Fax 509.965.3800
www.hlacivil.com

CITY PROJECT NO. 2337

REVISION	DATE

JOB NUMBER: 11062A	DATE: 5-10-23
FILE NAMES:	
DRAWING: SHEETS-WS.dwg	
PLAN: 11062.dwg	
PROFILE: 11062.dwg	
DESIGNED BY: ENTERED BY:	TDA CHC

CITY OF YAKIMA
BRAVO COMPANY BOULEVARD PHASE 2
WATER & SEWER PLANS

WATER AND SEWER TYPICAL SECTIONS

EXHIBIT
SHEET
1 OF 1

Sewer Main Project Alignment and Proposed Geotechnical Drilling Locations



Appendix C-2
Sewer Main Project Alignment
and Proposed Geotechnical
Boring Locations

Approximate Extent of Municipal Solid Waste (Landfill Site)	Leakage from River Intake	Historical Log Pond Extent
Yakima Mill Site Boundary	Fruitvale Wasteway	Background Aerial Imagery Source: NearMap (August 2019)
Historical Site Feature	North First Lateral Drain	0 450 900 Feet
Sewer Main Project (IA)	Future Sewer (conceptual)	Proposed Geotechnical Drilling Areas
	Spring Diversion Ditch	

SITE LAYOUT
Revised Draft RI Report
Yakima Mill Site
Yakima, WA

FIGURE 4

Preliminary Cleanup Levels

**Yakima Landfill Site
(Ecology Memorandum—September 2024)**



Interstate 82 Exit 33A Yakima City Landfill Updated Preliminary Cleanup Levels

To: Jennifer Lind
Site Manager
Toxics Cleanup Program
Central Regional Office

From: Arthur Buchan
Toxicologist
Toxics Cleanup Program
Central Regional Office

Date: September 30, 2024

Background and Scope

This memorandum summarizes the preliminary cleanup levels (PCULs) for hazardous substances and mixtures that have been tested for at the Interstate 82 Exit 33A Yakima City Landfill Cleanup Site. Please note that this is an update and supersedes the September 22, 2023 Memorandum: “Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels” (Ecology, 2023), where more recent sampling and information has allowed us this update. Additional clarifications referenced can be found in the following documents:

- “Interstate 82 Exit 33A Yakima City Landfill: Response and Resolution to Comments Regarding Groundwater and Surface Water PCULs” (Ecology, 2024).
- “Interstate 82 Exit 33A Yakima City Landfill: Discussion of Changes and Responses to Comments Regarding Unsaturated and Saturated Soil PCULs” (Ecology, 2024).

This memorandum describes the process under the Model Toxics Control Act (MTCA) (Ecology, 2013) for determining these values and provides preliminary recommendations that can be used as a tool for site-specific decision-making. Actual cleanup levels at individual sites will depend on additional site-specific factors that are beyond the scope of this memorandum.

MTCA Methods for Establishing Cleanup Levels

Method A, Method B, and Method C may be used for establishing cleanup levels at sites. It is recommended that Method B (with the use of some Method A Values – when available) is used at the Interstate 82 Exit 33A Yakima City Landfill Cleanup Site because:

- Numerous individual contaminants and mixtures have been investigated at the site; and
- Pathways potentially exist for soil, groundwater, and surface water; and
- Specifically, Ecology uses the following general guidelines for mixing methods:
 - When using Method A, the site must be considered a simple site or routine cleanup and there must not be multiple chemicals without Method A table values;
 - When using Method B, Method A cleanup levels may be used but not Method C cleanup levels.
 - Method B is intended for all other sites.
- While each medium must be evaluated separately using criteria applicable to that medium, it has not been established that any medium within any of the sites qualify to use Method C.

Groundwater Preliminary Cleanup Levels

In general, WAC 173-340-720¹ requires that groundwater cleanup levels be set at concentrations that protect for drinking water beneficial uses unless the groundwater qualifies as nonpotable. A determination of whether the groundwater qualifies as nonpotable must be made on a site-specific basis, based on the criteria in WAC 173-340-720(2). However, at the site referred to in this memo, it is assumed that the groundwater shall be protected for drinking water beneficial use.

WAC 173-340-720 also requires groundwater cleanup levels to be protective of surface water beneficial uses unless it can be demonstrated that the hazardous substances in the groundwater are not likely to reach surface water. The exposure pathway of concern is the discharge of contaminated groundwater into the surface water and the protection of aquatic organisms living in that surface water and sediment, and persons that consume those organisms. This can occur directly through migration and seepage of the groundwater into the surface water and sorption onto the sediments, or indirectly through groundwater intercepted by ditches, foundation drains, utility corridors, and stormwater systems (including pipes, which typically are not water-tight), that then drain to surface water. It can also occur through temporary construction dewatering systems that discharge to storm drains that then discharge either directly or indirectly to surface water. It is this pathway that is the focus of this memorandum.

For the groundwater to surface water exposure pathway, WAC 173-340-720 requires that the methods specified in WAC 173-340-730² for establishing surface water cleanup levels be used to develop groundwater cleanup levels protective of surface water.

¹ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-720>

² <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-730>

Surface Water Preliminary Cleanup Levels

In general, WAC 173-340-730 requires surface water cleanup levels to be protective of aquatic organisms, and persons that consume these organisms (Ecology, 2005). More specifically, it requires surface water cleanup levels to be at least as stringent as:

- Applicable state and federal laws;
- Concentrations protective of wildlife, fish, and other aquatic life;
- Concentrations protective of human health (such as through consumption of fish); and
- Drinking water, for surface waters classified as suitable for domestic water supply under water quality law.

In addition, both WAC 173-340-720(1)(c) and 730(1)(d) require cleanup levels that do not directly or indirectly cause violations of cleanup standards in other media, including the sediment cleanup standards. And, if a conditional point of compliance is used, WAC 173-340-720(8)(d) requires groundwater discharges not result in violations of sediment cleanup levels published in Chapter 173-204 WAC.³

If multiple chemicals with similar toxic effects on human health are present at a site, these concentrations may need to be further adjusted so that the additive risk does not exceed the acceptable thresholds in the rule (hazard index ≤ 1 and cancer risk $\leq 1 \times 10^{-5}$). These adjustments will need to be made on a site-specific basis. This adjustment for additive risk does not need to be made for contaminants with cleanup levels controlled by protection of the environment (wildlife, fish, and other aquatic life). Rather, if multiple chemicals are present, it may be appropriate to otherwise account for additive risk by, for example, conducting bioassays with the groundwater (Ecology, 1993), to determine if the combined effect is an environmental concern.

Point of Compliance (Groundwater and Surface Water)

The Point of Compliance in groundwater is:

- Throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site; and the standard point of compliance is,
 - The point or points where the groundwater cleanup levels must be attained at the site to be in compliance with groundwater cleanup standards. Groundwater cleanup levels shall be attained in all groundwaters from the point of compliance to the outer boundary of the hazardous substance plume. This means that the Point of Compliance for groundwater is all wells within the characterized area.

³ <https://apps.leg.wa.gov/wac/default.aspx?cite=173-204>

The Point of Compliance for surface water is:

- The point or points at which hazardous substances are released to the surface waters of the state; and
- The point at which hazardous substances are released to the surface water as a result of groundwater flows; no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels. Demonstration of compliance may be at the point at which there is a discharge to the surface water, or at the nearest groundwater well (or soil erosion) to the surface water.
- There are two possible results if surface water is located on or directly adjacent to the site:
 - Result (1): There is no contamination reaching the surface water (check wells and soil near the surface water):
 - Eliminate the surface water pathway in the remedial investigation. Use your groundwater cleanup level (i.e., drinking water) throughout the site.
 - Result (2): There is contamination reaching the surface water (check wells and soil near the surface water):
 - Retain the surface water pathway in the remedial investigation. Use the more stringent cleanup level (groundwater vs. surface water) throughout the site (or as close as practicable to the source of contamination if a conditional point of compliance is approved by Ecology).

As a result of the Point of Compliance for groundwater and surface water, it is important to be sure that the wells are properly placed, so that any contamination that reaches the surface water (down-gradient from the contamination) may be documented in the remedial investigation.

Establishing Preliminary Cleanup Levels for Groundwater

Under Method B, WAC 173-340-730(4) (b) requires that groundwater cleanup levels to be at least as stringent as all of the following:

- Maximum contaminant levels established under the Safe Drinking Water Act and published in 40 C.F.R. 141; and
- Maximum contaminant level goals for noncarcinogens established under the Safe Drinking Water Act and published in 40 C.F.R. 141; and
- Maximum contaminant levels established by the state board of health and published in Chapter 246-290 WAC.⁴

⁴ <https://apps.leg.wa.gov/WAC/default.aspx?cite=246-290>

- Concentrations in groundwater must be protective of surface water beneficial use unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site.

Under WAC 173-340-720(7)(b), when a cleanup level is based on the applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) or a hazard index of one (1) at the site.

Based on the pathways and contaminants that were tested onsite, the following hazardous substances are considered Contaminants of Potential Concern (COPC) with the associated Preliminary Cleanup Levels (PCULs) for groundwater (see Table 1):

Table 1: Contaminants of Potential Concern in Groundwater – Protective of Drinking Water (ug/L).

Hazardous Substance	Preliminary Cleanup Level (ug/L)	Highest Value Detected (ug/L)	Based on Location
Diesel + Heavy Oil	5.00E+02	9.70E+02	MW-106
Bis(2-Ethylhexyl)Phthalate	6.00E+00	8.10E+01	MW-106
Vinyl Chloride	2.92E-01	3.90E-01	MW-106
Arsenic	6.00E+00	9.20E+00	MW-106
Iron	3.00E+02	5.70E+04	MW-106
Manganese	5.00E+01	5.70E+03	MW-106

Establishing Preliminary Cleanup Levels for Surface Water

Under Method B, WAC 173-340-730(3) (b) requires surface water cleanup levels to be at least as stringent as all of the following:

- Concentrations established under applicable state and federal laws (ARARs) including:
 - Water quality criteria published in the water quality standards for surface waters of the state of Washington, Chapter 173-201A WAC;⁵
 - Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published under section 304 of the Clean Water Act *unless it can be demonstrated that such criteria are not relevant and appropriate for a specific surface water body or hazardous substance*; and
 - National Toxics Rule (40 C.F.R. Part 131).

⁵ <https://app.leg.wa.gov/wac/default.aspx?cite=173-201A>

- For substances for which environmental effects-based concentrations have not been established under applicable state or federal laws, concentrations that are estimated to result in no adverse effects on the protection and propagation of wildlife, fish, and other aquatic life.
- For substances for which sufficiently protective, health-based criteria or standards have not been established under state and federal laws, concentrations that protect human health as determined using the formulae in the rule.
- Potable water cleanup levels, for surface waters classified as suitable for use as a domestic water supply under chapter 173-201A WAC.

In addition, under WAC 173-340-730(5)(b), when a cleanup level is based on the applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) or a hazard index of one (1) at the site.

Based on the pathways and contaminants that were tested onsite, the following hazardous substances are considered Contaminants of Potential Concern (COPC) with the associated Preliminary Cleanup Levels (PCULs) for groundwater protective of surface water beneficial uses (see Table 2):

Table 2: Contaminants of Potential Concern in Groundwater – Protective of Surface Water Beneficial Uses (ug/L).

Hazardous Substance	Preliminary Cleanup Level (ug/L)	Highest Value Detected (ug/L)	Based on Location
Bis(2-Ethylhexyl)Phthalate	3.00E+00	8.10E+01	MW-106
N-Nitrosodiphenylamine	2.00E+00	5.80E+00	MW-106
1,2,4-Trichlorobenzene	1.00E-01	9.40E-01	MW-8
Arsenic	6.00E+00	9.20E+00	MW-106
Iron	1.00E+03	5.70E+04	MW-106
Manganese	5.00E+01	5.70E+03	MW-106

Based on the above conceptual framework, Table 3 and Table 4 present contaminant concentrations in groundwater (human health) and groundwater discharging to surface water (human health and freshwater aquatic organisms), that would be expected to be protective.

Please note that these values have been adjusted for the practical quantitation limits and natural background concentrations for groundwater and Surface Water as required by WAC 173-340-720(7) (c) and 730(5) (c) when establishing cleanup standards, should that be necessary.

Table 3: Preliminary Cleanup Levels (PCULs) for Groundwater Protective of Drinking Water for Selected Contaminants at the Interstate 82 Exit 33A Yakima City Landfill Site.

Analyte	CAS	H.H. GW Method A (ug/L)	H.H. GW Method B (ug/L)	Final Protective Value (ug/L)	Natural Background	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?
Master CLARC Spreadsheet Column		AC	AM				Guidance for TPH				
Diesel + HO	x	5.00E+02	x	5.00E+02	x	1.30E+02	2.50E+02	2.50E+02	5.00E+02	9.70E+02	y
Acenaphthene	83-32-9	x	4.80E+02	4.80E+02	x	2.00E-02	5.00E-02	5.00E-02	4.80E+02	1.60E-01	n
Anthracene	120-12-7	x	2.40E+03	2.40E+03	x	2.00E-02	5.00E-02	5.00E-02	2.40E+03	3.60E-02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	2.00E-02	3.50E-03	3.50E-03	x	2.00E-02	n
Bis(2-Ethylhexyl)Phthalate	117-81-7	x	6.00E+00	6.00E+00	x	2.00E+00	3.00E+00	3.00E+00	6.00E+00	8.10E+01	y
Chlorobenzene	108-90-7	x	1.00E+02	1.00E+02	x	2.00E+00	5.50E-02	5.50E-02	1.00E+02	3.00E+00	n
Chloroform	67-66-3	x	1.41E+01	1.41E+01	x	2.00E+00	5.20E-02	5.20E-02	1.41E+01	5.70E-01	n
3,3'-Dichlorobenzidine	91-94-1	x	1.94E-01	1.94E-01	x	2.00E+00	x	2.00E+00	2.00E+00	<2.00E+00	n
2,4-Dichlorophenol	120-83-2	x	4.80E+01	4.80E+01	x	2.00E+00	x	2.00E+00	4.80E+01	4.00E+00	n
Fluoranthene	206-44-0	x	6.40E+02	6.40E+02	x	2.00E-02	5.00E-02	5.00E-02	6.40E+02	2.00E-02	n
Fluorene	86-73-7	x	3.20E+02	3.20E+02	x	2.00E-02	5.00E-02	5.00E-02	3.20E+02	1.80E-02	n
1-Methylnaphthalene	90-12-0	x	1.51E+00	1.51E+00	x	2.00E-02	1.00E+00	1.00E+00	1.51E+00	2.20E-01	n
2-Methylnaphthalene	91-57-6	x	3.20E+01	3.20E+01	x	2.00E-02	1.00E+00	1.00E+00	3.20E+01	1.10E-01	n
3-Methylphenol	x	x	x	x	x	2.00E+00	x	2.00E+00	x	1.10E+02	n
Naphthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	x	2.00E-02	1.00E+00	1.00E+00	1.60E+02	1.30E-01	n
N-Nitrosodiphenylamine	86-30-6	x	1.79E+01	1.79E+01	x	2.00E+00	x	2.00E+00	1.79E+01	5.80E+00	n
Aroclor 1016	12674-11-2	x	5.60E-01	5.60E-01	x	1.00E-01	1.00E-01	1.00E-01	5.60E-01	ND	n
Aroclor 1254	11097-69-1	x	2.19E-02	2.19E-02	x	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Aroclor 1260	11096-82-5	x	2.19E-02	2.19E-02	x	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Total PCBs (Aroclors)	1336-36-3	1.00E-01	2.19E-01	2.19E-01	x	x	1.00E-01	1.00E-01	2.19E-01	7.30E-02	n
Pentachlorophenol	87-86-5	x	1.00E+00	1.00E+00	x	5.00E-01	6.00E-02	6.00E-02	1.00E+00	2.20E-01	n
Phenanthrene (use pyrene as surr.)	x	x	2.40E+02	2.40E+02	x	2.00E-02	5.00E-02	5.00E-02	2.40E+02	3.10E-02	n
Pyrene	129-00-0	x	2.40E+02	2.40E+02	x	2.00E-02	5.00E-02	5.00E-02	2.40E+02	1.30E-01	n
1,2,4-Trichlorobenzene	120-82-1	x	1.51E+01	1.51E+01	x	2.00E+00	3.90E-02	3.90E-02	1.51E+01	9.40E-01	n
Vinyl Chloride	75-01-4	2.00E-01	2.92E-01	2.92E-01	x	3.10E-02	6.00E-02	6.00E-02	2.92E-01	3.90E-01	y
cPAHs											
Benzo(a)pyrene	50-32-8	1.00E-01	2.00E-01	2.00E-01	x	2.00E-02	2.00E-02	2.00E-02	2.00E-01	ND	n
Benzo(a)anthracene	56-55-3	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	8.30E-02	n
Benzo(k)fluoranthene	207-08-9	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	1.90E-02	n
Chrysene	218-01-9	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	x	2.00E-02	2.00E-02	2.00E-02	x	ND	n
cPAH Total (TEQ)	x	1.00E-01	2.00E-01	2.00E-01	x	2.00E-02	2.00E-02	2.00E-02	2.00E-01	8.00E-03	n
Metals (mg/L)											
Arsenic	7440-38-2	5.00E+00	5.00E+00	5.00E+00	6.00E+00	5.00E-01	5.00E-01	5.00E-01	6.00E+00	9.20E+00	y
Barium	7440-39-3	x	2.00E+03	2.00E+03	x	6.25E-01	6.25E-01	6.25E-01	2.00E+03	1.40E+02	n
Chromium III	16065-83-1	x	2.40E+04	2.40E+04	x	2.00E-01	2.00E-01	2.00E-01	2.40E+04	1.50E+01	n
Chromium (Total)	7440-47-3	5.00E+01	x	5.00E+01	x	2.00E-01	2.00E-01	2.00E-01	5.00E+01	1.50E+01	n
Iron	7439-89-6	x	3.00E+02	3.00E+02	x	2.05E+00	2.05E+00	2.05E+00	3.00E+02	5.70E+04	y
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	x	1.00E-01	1.00E-01	1.00E-01	1.50E+01	2.10E+00	n
Magnesium	x	x	x	x	x	x	5.00E+01	5.00E+01	x	3.30E+04	n
Manganese	7439-96-5a	x	5.00E+01	5.00E+01	x	1.03E+00	1.03E+00	1.03E+00	5.00E+01	5.70E+03	y
Mercury	7439-97-6	2.00E+00	2.00E+00	2.00E+00	x	6.00E-03	6.00E-03	6.00E-03	2.00E+00	ND	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	2.00E+04	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	1.40E+05	n
Pesticides											
4,4'-DDD	72-54-8	x	3.65E-01	3.65E-01	x	2.50E-03	2.00E-03	2.50E-03	3.65E-01	1.50E-01	n
4,4'-DDT	50-29-3	3.00E-01	2.57E-01	3.00E-01	x	3.00E-03	2.00E-03	3.00E-03	3.00E-01	9.00E-02	n
Endosulfan II (beta)	33213-65-9	x	x	x	x	2.50E-03	2.50E-03	2.50E-03	x	6.80E-02	n

Table 4: Preliminary Cleanup Levels (PCULs) for Groundwater Protective of Surface Water Beneficial Uses for Selected Contaminants at the Interstate 82 Exit 33A Yakima City Landfill Site.

Analyte	CAS	H.H. SW Method B (ug/L)	H.H. SW ARAR (ug/L)	Final Human Health (ug/L)	Eco. SW ARAR (ug/L)	Other Eco (ug/L)	Final Eco. (ug/L)	Final Protective Value (ug/L)	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?
Master CLARIC Spreadsheet Column	A	AP and AQ	AX to AZ or BE to BG		AI to AW or BA to BD	RAIS (other Eco.)				Guidance for TPH				
Diesel + HO	x	5.00E-02	x	5.00E+02	x	3.00E+03	3.00E-03	5.00E+02	1.30E+02	2.50E-02	2.50E+02	5.00E+02	9.70E+02	n
Acenaphthene	83-32-9	6.40E-02	3.00E+01	3.00E+01	x	2.30E+01	2.30E-01	2.30E+01	2.00E-02	5.00E-02	5.00E-02	2.30E+01	1.60E-01	n
Anthracene	120-12-7	2.60E+04	1.00E-02	1.00E+02	x	3.00E-01	3.00E-01	3.00E-01	2.00E-02	5.00E-02	5.00E-02	3.00E-01	3.60E-02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	x	x	x	2.00E-02	3.50E-03	3.50E-03	x	2.00E-02	n
Bis(2-Ethylhexyl)Phthalate	117-81-7	3.60E+00	4.50E-02	4.50E-02	x	7.00E+00	7.00E+00	4.50E-02	2.00E+00	3.00E+00	3.00E+00	3.00E+00	8.10E+01	y
Chlorobenzene	108-90-7	5.00E+03	1.00E-02	1.00E-02	x	6.40E+01	6.40E-01	6.40E+01	2.00E+00	5.50E-02	5.50E-02	6.40E+01	3.00E+00	n
Chloroform	67-66-3	5.60E+01	6.00E+01	5.60E+01	x	8.90E+02	8.90E-02	5.60E+01	2.00E+00	5.20E-02	5.20E-02	5.60E+01	2.20E+01	n
3,3'-Dichlorobenzidine	91-84-1	4.60E-02	3.10E-03	3.10E-03	x	1.05E+02	1.05E-02	3.10E-03	2.00E+00	x	2.00E+00	2.00E+00	1.30E+01	n
2,4-Dichlorophenol	120-83-2	1.90E-02	1.00E+01	1.00E+01	x	8.50E+01	8.50E-01	1.00E+01	2.00E+00	x	2.00E+00	1.00E+01	4.00E+00	n
Fluoranthene	206-44-0	9.00E+01	6.00E+00	6.00E+00	x	6.16E+00	6.16E+00	6.00E+00	2.00E-02	5.00E-02	5.00E-02	6.00E+00	2.00E-02	n
Fluorene	86-73-7	3.50E+03	1.00E+01	1.00E+01	x	1.10E+01	1.10E-01	1.00E+01	2.00E-02	5.00E-02	5.00E-02	1.00E+01	1.80E-02	n
1-Methylnaphthalene	90-12-0	x	x	x	x	2.10E+00	2.10E-00	2.10E+00	2.00E-02	1.00E+00	1.00E+00	2.10E+00	2.20E-01	n
2-Methylnaphthalene	91-57-6	x	x	x	x	1.30E+02	1.30E-02	1.30E+02	2.00E-02	1.00E+00	1.00E+00	1.30E+02	1.10E-01	n
3-Methylphenol	x	x	x	x	x	x	x	x	2.00E+00	x	2.00E+00	x	1.10E+02	n
Naphthalene	91-20-3	4.90E+03	x	4.90E+03	x	4.90E+02	4.90E-02	4.90E+02	2.00E-02	1.00E+00	1.00E+00	4.90E+02	1.30E-01	n
N-Nitrosodiphenylamine	86-30-6	9.70E+00	6.20E-01	6.20E-01	x	5.80E+02	5.80E-02	6.20E-01	2.00E+00	x	2.00E+00	2.00E+00	5.80E+00	y
Aroclor 1016	12674-11-2	3.00E-03	x	3.00E-03	x	7.40E-05	7.40E-05	7.40E-05	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Aroclor 1254	11097-69-1	1.00E-04	x	1.00E-04	x	7.40E-05	7.40E-05	7.40E-05	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Aroclor 1260	11096-82-5	x	x	x	x	7.40E-05	7.40E-05	7.40E-05	1.00E-01	1.00E-01	1.00E-01	1.00E-01	ND	n
Total PCBs (Aroclors)	1336-36-3	1.00E-04	7.00E-06	7.00E-06	1.40E-02	1.40E-02	1.40E-02	7.00E-06	x	1.00E-01	1.00E-01	1.00E-01	7.30E-02	n
Pentachlorophenol	87-86-5	1.50E+00	2.00E-03	2.00E-03	1.30E+01	1.30E+01	1.30E+01	2.00E-03	1.30E-01	6.00E-02	1.30E-01	1.30E-01	ND	n
Phenanthrene (use pyrene as surr.)	x	2.60E+03	8.00E+00	8.00E+00	x	3.00E+01	3.00E-01	8.00E+00	2.00E-02	5.00E-02	5.00E-02	8.00E+00	3.10E-02	n
Pyrene	129-00-0	2.60E+03	8.00E+00	8.00E+00	x	7.00E+00	7.00E-00	8.00E+00	2.00E-02	5.00E-02	5.00E-02	8.00E+00	1.30E-01	n
1,2,4-Trichlorobenzene	120-82-1	2.00E+00	3.60E-02	3.60E-02	x	5.10E+01	5.10E-01	3.60E-02	1.00E-01	3.90E-02	1.00E-01	1.00E-01	9.4E-01	y
Vinyl Chloride	75-01-4	3.70E+00	2.00E-02	2.00E-02	x	5.63E+03	5.63E-03	2.00E-02	3.10E-02	6.00E-02	6.00E-02	6.00E-02	3.90E-01	y
cPAHs														
Benzo(a)pyrene	50-32-8	3.50E-02	1.60E-05	1.60E-05	x	1.40E-02	1.40E-02	1.60E-05	2.00E-02	2.00E-02	2.00E-02	2.00E-02	ND	n
Benzo(a)anthracene	56-55-3	x	1.60E-04	1.60E-04	x	3.46E+01	3.46E-01	1.60E-04	2.00E-02	2.00E-02	2.00E-02	2.00E-02	ND	n
Benzo(b)fluoranthene	205-99-2	x	1.60E-04	1.60E-04	x	x	x	1.60E-04	2.00E-02	2.00E-02	2.00E-02	2.00E-02	8.30E-02	n
Benzo(k)fluoranthene	207-08-9	x	1.60E-03	1.60E-03	x	x	x	1.60E-03	2.00E-02	2.00E-02	2.00E-02	2.00E-02	1.90E-02	n
Chrysene	218-01-9	x	1.60E-02	1.60E-02	x	7.00E+00	7.00E+00	1.60E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02	ND	n
Dibenz(a,h)anthracene	53-70-3	x	1.60E-05	1.60E-05	x	5.00E+00	5.00E+00	1.60E-05	2.00E-02	2.00E-02	2.00E-02	2.00E-02	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	1.60E-04	1.60E-04	x	x	x	1.60E-04	2.00E-02	2.00E-02	2.00E-02	2.00E-02	ND	n
cPAH Total (TEQ)	x	3.50E-02	1.60E-05	1.60E-05	x	1.40E-02	1.40E-02	1.60E-05	2.00E-02	2.00E-02	2.00E-02	2.00E-02	8.00E-03	n
Metals (mg/L)														
Arsenic	7440-38-2	9.80E-02	1.80E-02	1.80E-02	1.50E+02	5.00E+00	5.00E+00	1.80E-02	1.00E+00	5.00E-01	5.00E-01	6.00E+00	9.20E+00	y
Barium	7440-39-3	x	1.00E+03	1.00E+03	x	2.20E+02	2.20E+02	4.00E+00	1.00E+00	6.25E-01	6.25E-01	2.20E+02	1.40E+02	n
Chromium III	16065-83-1	2.40E+05	x	2.40E+05	7.40E+01	7.40E+01	7.40E+01	7.40E+01	2.00E+00	2.00E-01	2.00E-01	7.40E+01	1.50E+01	n
Chromium (Total)	7440-47-3	x	x	x	x	1.01E+02	1.01E+02	1.01E+02	2.00E+00	2.00E-01	2.00E-01	1.01E+02	1.50E+01	n
Iron	7439-89-6	x	x	x	1.00E+03	1.00E+03	1.00E+03	1.00E+03	5.00E+01	2.05E+00	2.05E+00	1.00E+03	5.70E+04	y
Lead	7439-92-1	x	x	x	2.50E+00	2.50E+00	2.50E+00	2.50E+00	1.00E+00	1.00E-01	1.00E-01	2.50E+00	2.10E+00	n
Magnesium	x	x	x	x	x	x	x	x	5.00E+01	x	5.00E+01	x	3.30E+04	n
Manganese	7439-96-5a	x	5.00E+01	5.00E+01	x	1.20E+02	1.20E+02	5.00E+01	2.00E+00	1.03E+00	1.03E+00	5.00E+01	5.70E+03	y
Mercury	7439-97-6	x	x	x	1.20E-02	1.20E-02	1.20E-02	1.20E-02	2.00E-01	6.00E-03	6.00E-03	1.20E-02	ND	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	x	x	x	2.00E+04	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	x	x	x	1.40E+05	n
Pesticides														
4,4'-DDD	72-54-8	5.00E-04	7.90E-06	7.90E-06	x	1.10E-02	1.10E-02	7.90E-06	5.00E-03	5.00E-03	5.00E-03	5.00E-03	1.50E-01	n
4,4'-DDT	50-29-3	3.60E-04	1.20E-06	1.20E-06	1.00E-03	1.00E-03	1.00E-03	1.20E-06	5.00E-03	5.00E-03	5.00E-03	5.00E-03	9.00E-02	n
Endosulfan II (beta)	33213-65-9	x	9.70E+00	9.70E+00	5.60E-02	5.60E-02	5.60E-02	5.60E-02	x	2.50E-03	2.50E-03	5.60E-02	6.80E-03	n

Soil Preliminary Cleanup Levels

In general, WAC 173-340-740⁶ requires that soil cleanup levels be set at concentrations that:

- Eliminate or substantially reduce the potential for food chain contamination; and
- Eliminate or substantially reduce the potential for damage to soils or biota in the soils which could impair the use of soils for agriculture or silviculture purposes; and
- Protect the potential health risk posed by dust at a site; and
- Protect the groundwater at a site; and
- Protect nearby surface waters from the site; and
- Eliminate or minimize the potential for vapors in building or structures.

To meet these requirements for soil, preliminary concentrations have been established based on the protection of:

- Human health (direct contact); and
- Terrestrial Ecological Receptors; and
- Soil protective of groundwater (highest beneficial use); and
- Soil protective of groundwater with transport to surface water (highest beneficial use).

Note that protective values have been adjusted for the practical quantitation limits and natural background concentrations for soil as required by WAC 173-340-740(5) (c) when establishing cleanup standards, should that be necessary.

In addition, if multiple chemicals with similar toxic effects on human health are present at a site, these concentrations may need to be further adjusted so that the additive risk does not exceed the acceptable thresholds in the rule (hazard index ≤ 1 and cancer risk $\leq 1 \times 10^{-5}$). These adjustments will need to be made on a site-specific basis. This adjustment for additive risk does not need to be made for contaminants with cleanup levels controlled by protection of the environment (terrestrial ecological receptors). Rather, if multiple chemicals are present, it may be appropriate to otherwise account for additive risk by, for example, conducting bioassays with the soil, to determine if the combined effect is an environmental concern.

Point of Compliance (Soil)

The Point of Compliance for soil is:

- For soil cleanup levels based on the protection of groundwater, the point of compliance shall be established in the soils throughout the site; and

⁶ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-740>

- For soil cleanup levels based on protection from vapors, the point of compliance shall be established in the soils throughout the site from the ground surface to the uppermost groundwater saturated zone (e.g., from the ground surface to the uppermost water table); and
- For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities; and
- For soil cleanup levels based on ecological receptors, the standard point of compliance is set from the ground surface to fifteen feet below the ground surface. The department may approve a conditional point of compliance set at the biologically active zone with placement of an institutional control to prevent excavation of deeper soil.

Establishing Preliminary Cleanup Levels for Soil

In general, standard Method B soil cleanup levels shall be at least as stringent as the following:

- Concentrations established under applicable state and federal laws; and
- Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490⁷ through 7494; and
- For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health as determined by evaluating the following exposure pathways:
 - Ground water protection; and
 - Soil direct contact; and
 - Soil vapors

It is assumed that soil vapors are not a pathway at this site.

Terrestrial Ecological Receptors

Protective values for terrestrial ecological receptors were established under the assumption that a Simplified terrestrial ecological evaluation (Simplified TEE) would meet the requirements at this site. Protective concentrations were obtained from Table 749-2 of MTCA.

⁷ <https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-7490>

Soil Protective of Groundwater and Soil Protective of Groundwater with Transport to Surface Water – Both Saturated and Unsaturated Conditions

Soil values that are protective of groundwater, and soil protective of groundwater with transport to surface water were calculated using the fixed parameter three-phase partitioning model found in WAC 173-340-747⁸ are included in Table 11 (unsaturated conditions) and Table 12 (saturated conditions). Both saturated and unsaturated conditions were assumed for in the calculations to allow for site-specific decision-making. Note: Conditions at the site made differentiating between unsaturated and saturated soil samples difficult. The same maximum concentration was used for both Tables 11 and 12.

PCULs established earlier for groundwater (Table 3) and surface water (Table 4) were used as the cleanup level to be met – these cleanup levels were based on protection of the highest beneficial use with and upward adjustment to take into account natural background or practical quantitation limits, where applicable. Note: Where “Empirical” is listed in the row, it has been assumed that an empirical demonstration, based on groundwater quality data, indicates that the contaminant is not reaching the groundwater/surface water at values above what is considered protective.

The Cleanup Levels and Risk Calculation (CLARC)⁹ Tool was used to derive the following chemical-specific parameters:

- Hcc = Henry’s Law Constant @ 13^o C (dimensionless); and
- Kd = Distribution Coefficient (L/kg); and
- Koc = Soil organic carbon-water partitioning coefficient (ml/g).

Equation 747-1 was used to derive the following default parameters:

- UCF = Unit conversion factor (1 mg/1,000 ug); and
- DF = Dilution fraction (dimensionless – 20 for unsaturated, 1 for saturated); and
- θ_w = Water-filled soil porosity (ml water/ml soil – 0.3 for unsaturated, 0.43 for saturated); and
- θ_a = Air-filled soil porosity (ml air/ml soil – 0.13 for unsaturated, 0 for saturated); and
- P_b = Dry soil bulk density (1.5 kg/L).

Soil Protective of Direct Contact

Soil that is protective of direct contact is based on concentrations that are estimated to result in no acute or chronic noncarcinogenic toxic effects on human health using a hazard quotient of one (1) and concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one million (1×10^{-6}).

⁸ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-747>

⁹ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-clean-up-tools/clarc>

Equations 740-1 and 740-2 (MTCA) and the associated default assumptions shall be used to calculate the concentration for direct contact with contaminated soil.

Based on the pathways and contaminants that were tested onsite, hazardous substances are considered Contaminants of Potential Concern (COPC) with the associated Preliminary Cleanup Levels (PCULs) for soil (assuming both unsaturated and saturated conditions) in Tables 7 and 8. Tables 11 and 12 include the matrix for which determinations were derived.

Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors TEFs (Ecology, 2015).

A method that can be used to evaluate the potential for cPAH mixtures in soil to impact groundwater is to convert the cPAH mixture to an equivalent concentration of benzo(a)pyrene that accounts for both the toxicity and mobility of the individual cPAH compounds relative to benzo(a)pyrene (see Equation 1 and Tables 5 and 6).

Under this method, the mobility of a cPAH relative to benzo(a)pyrene can be approximated by dividing the Koc for benzo(a)pyrene by the Koc for the cPAH of interest. This “relative mobility factor” can then be used to assess the mobility of individual cPAHs and cPAH mixtures. The calculation to convert the chemical concentrations in a cPAH mixture to an equivalent concentration of benzo(a)pyrene that factors in both the toxicity and leaching mobility of the individual cPAHs can be expressed mathematically as follows. For notation purposes, the result is referred here as the “total toxic mobility equivalent concentration” or “Total TMEQ.”

Equation 1: Total Toxic Mobility Equivalent Concentration (Total TMEQ).

Total TMEQ = $\sum C_n * TEF_n * RMF_n$	
<u>Where:</u>	
Total TMEQ	= Total Toxic Mobility Equivalent Concentration
C_n	= Concentration of the individual cPAH in the mixture
TEF_n	= Toxic equivalency factor for the individual cPAH in the mixture (from Table 1)
RMF_n	= Relative mobility factor for the individual cPAH in the mixture (from Table 2)

Table 5: Toxicity Equivalency Factors (TEFs) for the minimum required carcinogenic polycyclic aromatic hydrocarbons under WAC 173-340-708(e) (from Table 708-2 in WAC 173-340-900).

CAS Number	cPAH	TEF (Unitless)
50-32-8	Benzo(a)pyrene	1
56-55-3	Benzo(a)anthracene	0.1
205-99-2	Benzo(b)fluoranthene	0.1
207-08-9	Benzo(k)fluoranthene	0.1
218-01-9	Chrysene	0.01
53-70-3	Dibenz(a,h)anthracene	0.1
193-39-5	Indeno(1,2,3-cd)pyrene	0.1

Table 6: Relative mobility factors for the minimum required carcinogenic polycyclic aromatic hydrocarbons under WAC 173-340-708(e).

CAS #	cPAH	Koc ⁶	Relative Mobility Factor
50-32-8	Benzo(a)pyrene	968,774	1.00
56-55-3	Benzo(a)anthracene	357,537	2.71
205-99-2	Benzo(b) fluoranthene	1,230,000	0.79
207-08-9	Benzo(k) fluoranthene	1,230,000	0.79
218-01-9	Chrysene	398,000	2.43
53-70-3	Dibenz(a,h)anthracene	1,789,101	0.54
207-08-9	Indeno(1,2,3-cd)pyrene	3,470,000	0.28
Koc = Organic carbon – water partitioning coefficient			
Relative mobility factor = Benzo(a)pyrene Koc / cPAH Koc			

The following steps describe how to determine the Total TMEQ for mixtures of cPAHs, and how to use this value to evaluate compliance:

1. Analyze the sample to determine the concentration of each cPAH.
2. Multiply each cPAH concentration in the sample by its corresponding TEF from Table 5 (above) and its corresponding relative mobility factor from Table 6 (above). This calculates a toxic mobility equivalent concentration (TMEQ) for each cPAH.
3. Add the products in Step 2 to obtain the Total TMEQ for the cPAH mixture.
4. Either look up or calculate a cleanup level for benzo(a)pyrene that is protective of groundwater through the leaching pathway.
5. To evaluate compliance for the sample, compare the Total TMEQ for the cPAH mixture with the soil concentration protective of groundwater for benzo(a)pyrene.

See Tables 9 and 10 for site-specific calculations.

Table 7: Contaminants of Potential Concern in Soil (mg/kg), based on Unsaturated Conditions.

Hazardous Substance	Preliminary Cleanup Level (mg/kg)	Highest Value Detected (mg/kg)	Pathway	Based on Location
Diesel + Heavy Oil	4.60E+02	1.29E+03	Upland Ecological Risk	MW-107
Bis(2-Ethylhexyl)Phthalate	1.19E-01	8.20E-01	Soil Protective of Groundwater Soil Protective of Surface Water Upward Adjusted to PQL	MW-106
N-Nitrosodiphenylamine	1.00E-01	1.10E-01	Soil Protective of Surface Water Upward Adjusted to PQL	MW-106

Table 8: Contaminants of Potential Concern in Soil (mg/kg), based on Saturated Conditions.

Hazardous Substance	Preliminary Cleanup Level (mg/kg)	Highest Value Detected (mg/kg)	Pathway	Based on Location
Diesel + Heavy Oil	4.60E+02	1.29E+03	Upland Ecological Risk	MW-107
Bis(2-Ethylhexyl)Phthalate	1.19E-01	8.20E-01	Soil Protective of Groundwater Soil Protective of Surface Water Upward Adjusted to PQL	MW-106
N-Nitrosodiphenylamine	1.00E-01	1.10E-01	Soil Protective of Surface Water Upward Adjusted to PQL	MW-106

Table 9: Total Toxic Mobility Equivalent Concentration (Total TMEQ) for Specific Site Samples.

Sample #	MW-104									
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?			
Ecology IM #10 Method 2										
cPAHs										
Benzo(a)pyrene	50-32-8	1	1.00E+00	2.20E-02	2.20E-02					
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	2.10E-02	5.69E-03					
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	3.00E-02	2.37E-03					
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	1.00E-02	7.90E-04					
Chrysene	218-01-9	0.01	2.43E+00	1.00E-02	2.43E-04					
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00					
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	1.00E-02	2.80E-04					
Sum				1.03E-01	3.14E-02	1.90E-01	N	Vadose	Soil>	GW
					3.14E-02	1.90E-01	N	Saturated	Soil>	GW
					3.14E-02	5.00E-02	N	Vadose	Soil>	GW>SW
					3.14E-02	5.00E-02	N	Saturated	Soil>	GW>SW
Sample #										
MW-105										
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?			
Ecology IM #10 Method 2										
cPAHs										
Benzo(a)pyrene	50-32-8	1	1.00E+00	7.10E-02	7.10E-02					
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	9.90E-02	2.68E-02					
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	1.10E-01	8.69E-03					
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	3.10E-02	2.45E-03					
Chrysene	218-01-9	0.01	2.43E+00	6.30E-02	1.53E-03					
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00					
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	3.80E-02	1.06E-03					
Sum				4.12E-01	1.12E-01	1.90E-01	N	Vadose	Soil>	GW
					1.12E-01	1.90E-01	N	Saturated	Soil>	GW
					1.12E-01	5.00E-02	Y	Vadose	Soil>	GW>SW
					1.12E-01	5.00E-02	Y	Saturated	Soil>	GW>SW
Sample #										
MW-106										
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?			
Ecology IM #10 Method 2										
cPAHs										
Benzo(a)pyrene	50-32-8	1	1.00E+00	1.00E-02	1.00E-02					
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	1.00E-02	2.71E-03					
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	2.10E-02	1.66E-03					
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	1.00E-02	7.90E-04					
Chrysene	218-01-9	0.01	2.43E+00	1.00E-02	2.43E-04					
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00					
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	1.00E-02	2.80E-04					
Sum				7.10E-02	1.57E-02	1.90E-01	N	Vadose	Soil>	GW
					1.57E-02	1.90E-01	N	Saturated	Soil>	GW
					1.57E-02	5.00E-02	N	Vadose	Soil>	GW>SW
					1.57E-02	5.00E-02	N	Saturated	Soil>	GW>SW

Table 10: Total Toxic Mobility Equivalent Concentration (Total TMEQ) for Specific Site Samples.

Sample #	MW-108											
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?					
Ecology IM #10 Method 2												
Benzo(a)pyrene Koc/cPAH Koc												
cPAHs												
Benzo(a)pyrene	50-32-8	1	1.00E+00	1.00E-02	1.00E-02	1.90E-01	N	Vadose	Soil>	GW		
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	5.20E-02	1.41E-02	1.90E-01	N	Saturated	Soil>	GW		
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	1.00E-02	7.90E-04	5.00E-02	N	Vadose	Soil>	GW> SW		
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	1.00E-02	7.90E-04	5.00E-02	N	Vadose	Soil>	GW> SW		
Chrysene	218-01-9	0.01	2.43E+00	1.00E-02	2.43E-04	5.00E-02	N	Saturated	Soil>	GW> SW		
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00							
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	1.00E-02	2.80E-04							
Sum				1.02E-01	2.62E-02	1.90E-01	N					
					2.62E-02	1.90E-01	N	Saturated	Soil>	GW		
					2.62E-02	5.00E-02	N	Vadose	Soil>	GW> SW		
					2.62E-02	5.00E-02	N	Saturated	Soil>	GW> SW		
Sample #												
MW-109												
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?					
Ecology IM #10 Method 2												
Benzo(a)pyrene Koc/cPAH Koc												
cPAHs												
Benzo(a)pyrene	50-32-8	1	1.00E+00	1.00E-02	1.00E-02	1.90E-01	N	Vadose	Soil>	GW		
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	1.00E-02	2.71E-03	1.90E-01	N	Saturated	Soil>	GW		
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	1.00E-02	7.90E-04	5.00E-02	N	Vadose	Soil>	GW> SW		
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	2.10E-02	1.66E-03	5.00E-02	N	Vadose	Soil>	GW> SW		
Chrysene	218-01-9	0.01	2.43E+00	2.40E-02	5.83E-04	5.00E-02	N	Saturated	Soil>	GW> SW		
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00							
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	1.00E-02	2.80E-04							
Sum				8.50E-02	1.60E-02	1.90E-01	N	Vadose	Soil>	GW		
					1.60E-02	1.90E-01	N	Saturated	Soil>	GW		
					1.60E-02	5.00E-02	N	Vadose	Soil>	GW> SW		
					1.60E-02	5.00E-02	N	Saturated	Soil>	GW> SW		
Sample #												
GP-23												
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?					
Ecology IM #10 Method 2												
Benzo(a)pyrene Koc/cPAH Koc												
cPAHs												
Benzo(a)pyrene	50-32-8	1	1.00E+00	3.50E-02	3.50E-02	1.90E-01	N	Vadose	Soil>	GW		
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	4.40E-02	1.19E-02	1.90E-01	N	Saturated	Soil>	GW		
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	8.80E-02	6.95E-03	5.00E-02	Y	Vadose	Soil>	GW> SW		
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	1.00E-02	7.90E-04	5.00E-02	Y	Vadose	Soil>	GW> SW		
Chrysene	218-01-9	0.01	2.43E+00	4.50E-02	1.09E-03	5.00E-02	Y	Saturated	Soil>	GW> SW		
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00							
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	2.70E-02	7.56E-04							
Sum				2.49E-01	5.65E-02	1.90E-01	N	Vadose	Soil>	GW		
					5.65E-02	1.90E-01	N	Saturated	Soil>	GW		
					5.65E-02	5.00E-02	Y	Vadose	Soil>	GW> SW		
					5.65E-02	5.00E-02	Y	Saturated	Soil>	GW> SW		
Sample #												
GP-26												
Analyte	CAS	TEF	Relative Mobility Factor	Measured Soil Concentration (mg/kg)	TMEQ (Total)	Soil CUL (mg/kg)	COPC?					
Ecology IM #10 Method 2												
Benzo(a)pyrene Koc/cPAH Koc												
cPAHs												
Benzo(a)pyrene	50-32-8	1	1.00E+00	1.00E-02	1.00E-02	1.90E-01	N	Vadose	Soil>	GW		
Benzo(a)anthracene	56-55-3	0.1	2.71E+00	2.90E-02	7.86E-03	1.90E-01	N	Saturated	Soil>	GW		
Benzo(b)fluoranthene	205-99-2	0.1	7.90E-01	3.70E-02	2.92E-03	5.00E-02	N	Vadose	Soil>	GW> SW		
Benzo(k)fluoranthene	207-08-9	0.1	7.90E-01	1.00E-02	7.90E-04	5.00E-02	N	Vadose	Soil>	GW> SW		
Chrysene	218-01-9	0.01	2.43E+00	1.00E-02	2.43E-04	5.00E-02	N	Saturated	Soil>	GW> SW		
Dibenz(a,h)anthracene	53-70-3	0.1	5.40E-01	0.00E+00	0.00E+00							
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	2.80E-01	1.00E-02	2.80E-04							
Sum				1.06E-01	2.21E-02	1.90E-01	N	Vadose	Soil>	GW		
					2.21E-02	1.90E-01	N	Saturated	Soil>	GW		
					2.21E-02	5.00E-02	N	Vadose	Soil>	GW> SW		
					2.21E-02	5.00E-02	N	Saturated	Soil>	GW> SW		

Notes: 1. Sample locations GP-23 and GP-26 are located up-gradient of the Landfill Site on the adjacent Boise Cascade Mill Cleanup Site (FSID: 450, CSID: 12095), and therefore have been eliminated as a contributing source of COPCs.

2. An empirical demonstration was used to demonstrate soil TMEQ concentrations at MW-105 have not caused groundwater and surface water PCULs to be exceeded.

Table 11: Soil concentrations determined to be protective of human health and ecological receptors based on a site-specific pathway analysis (assumed unsaturated conditions for the leaching model).

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Unsat	Soil Method B Protection of Surface Water (mg/kg) - Unsat	Final Protective H.H. Value (mg/kg)	TEE Value (mg/kg)	Final Protective Value (mg/kg)	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final POL (mg/kg)	Natural Background	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COPC?
Minor CLARC Spreadsheet Column															
Gasoline	x	1.00E+02	x	x	x	1.00E+02	2.00E+02	1.00E+02	3.00E+00	5.00E+00	5.00E+00	x	1.00E+02	1.40E+01	n
Diesel + HD	x	2.00E+03	x	x	x	2.00E+03	4.60E+02	4.60E+02	2.50E+01	2.50E+01	2.50E+01	x	4.60E+02	1.25E+03	y
Acenaphthene	83-32-9	x	4.80E+03	Empirical	Empirical	4.80E+03	x	4.80E+03	2.00E+02	4.35E+02	4.35E+02	x	4.80E+03	2.20E+02	n
Acenaphthylene	x	x	x	x	x	x	x	x	2.00E+02	6.70E+02	6.70E+02	x	x	8.10E+02	n
Acetone	67-64-1	x	7.20E+04	Empirical	Empirical	7.20E+04	x	7.20E+04	5.00E+02	1.50E+02	1.50E+02	x	7.20E+04	2.80E+01	n
Aldrin	309-00-2	x	5.90E+02	Empirical	Empirical	5.90E+02	1.70E+01	5.90E+02	1.00E+02	1.35E+03	1.35E+03	x	5.90E+02	9.40E+03	n
Anthracene	120-12-7	x	2.40E+04	Empirical	Empirical	2.40E+04	x	2.40E+04	1.00E+01	4.35E+02	4.35E+02	x	2.40E+04	2.80E+02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	x	x	x	1.00E+01	4.60E+02	4.60E+02	x	x	x	n
Bis(2-Ethylhexyl)Phthalate	117-81-2	x	1.00E+01	1.00E+01	1.00E+01	1.00E+01	x	1.00E+01	1.00E+02	1.19E+01	1.19E+01	x	1.19E+01	8.20E+01	y
Chlorobenzene	108-90-7	x	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	1.00E+02	2.00E+03	2.00E+03	x	1.60E+03	ND	n
Chloroform	67-68-3	x	3.20E+01	Empirical	Empirical	3.20E+01	x	3.20E+01	1.00E+02	2.00E+03	2.00E+03	x	3.20E+01	ND	n
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	1.30E+02	2.10E+04	2.10E+04	x	2.10E+04	2.50E+01	3.30E+01	3.30E+01	x	3.30E+01	ND	n
2,4-Dichlorophenol	120-83-2	x	2.40E+02	Empirical	Empirical	2.40E+02	x	2.40E+02	5.00E+01	2.15E+01	2.15E+01	x	2.40E+02	ND	n
Fluoranthene	206-44-0	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E+02	5.00E+03	5.00E+03	x	3.20E+03	2.50E+01	n
Fluorene	86-73-7	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E+02	5.00E+03	5.00E+03	x	3.20E+03	ND	n
1-Methylnaphthalene	90-12-0	x	3.40E+01	Empirical	Empirical	3.40E+01	x	3.40E+01	2.00E+02	5.00E+01	5.00E+01	x	3.40E+01	6.10E+02	n
2-Methylnaphthalene	91-57-6	x	3.20E+02	Empirical	Empirical	3.20E+02	x	3.20E+02	2.00E+02	5.00E+01	5.00E+01	x	3.20E+02	9.50E+02	n
3-Methylphenol	x	x	x	x	x	x	x	x	x	x	x	x	x	4.00E+01	n
Naphthalene	91-20-3	5.00E+00	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	2.00E+02	5.00E+01	5.00E+01	x	1.60E+03	2.50E+01	n
N-Nitrosodiphenylamine	86-30-6	x	2.00E+02	1.00E+00	3.50E+02	3.50E+02	x	3.50E+02	1.00E+01	5.00E+02	1.00E+01	x	1.00E+01	1.10E+01	y
Aroclor 1016	12674-11-2	x	5.60E+00	x	x	5.60E+00	x	5.60E+00	1.00E+01	4.00E+02	4.00E+02	x	5.60E+00	ND	n
Aroclor 1254	11097-69-1	x	5.00E+01	Empirical	Empirical	5.00E+01	x	5.00E+01	1.00E+01	4.00E+02	4.00E+02	x	5.00E+01	9.90E+03	n
Aroclor 1260	11096-82-5	x	5.00E+01	x	x	5.00E+01	x	5.00E+01	1.00E+01	4.00E+02	4.00E+02	x	5.00E+01	5.70E+03	n
Total PCBs (Aroclors)	1336-36-3	1.00E+00	5.00E+01	x	x	1.00E+00	2.00E+00	1.00E+00	x	4.00E+02	4.00E+02	x	1.00E+00	2.80E+02	n
Pentachlorophenol	87-86-5	x	2.50E+00	x	x	2.50E+00	1.10E+01	2.50E+00	1.00E+01	1.85E+01	1.85E+01	x	2.50E+00	ND	n
Phenanthrene	x	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	1.00E+01	5.00E+02	5.00E+02	x	2.40E+03	x	n
Pyrene	129-00-0	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	2.00E+01	2.00E+02	2.00E+02	x	2.40E+03	1.70E+01	n
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	5.60E+01	1.30E+03	1.30E+03	x	1.30E+03	1.00E+01	5.00E+02	5.00E+02	x	5.00E+02	ND	n
Vinyl Chloride	75-01-4	x	6.70E-01	1.72E-03	1.20E-04	1.20E-04	x	1.20E-04	1.00E+02	2.00E+03	2.00E+03	x	2.00E+03	1.00E+03	n
cPAHs															
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	3.90E+00	3.10E-04	3.10E-04	3.00E+01	3.10E-04	2.00E+02	5.00E+02	5.00E+02	x	5.00E+02	7.30E+02	n
Benzo(a)anthracene	56-55-3	x	x	x	Empirical	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	9.90E+02	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	1.10E+01	n
Benzo(k)fluoranthene	207-08-9	x	x	x	Empirical	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	4.60E+02	n
Chrysene	218-01-9	x	x	x	Empirical	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	6.30E+02	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	Empirical	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	Empirical	x	x	x	2.00E+02	5.00E+02	5.00E+02	x	x	6.40E+02	n
cPAH Total	x	1.00E-01	1.90E-01	3.90E+00	3.10E-04	3.10E-04	x	3.10E-04	2.00E+02	5.00E+02	5.00E+02	x	5.00E+02	1.00E+01	n
Metals (mg/L)															
Arsenic	7440-38-2	2.00E+01	6.70E-01	2.90E+00	2.90E+00	2.90E+00	9.50E+01	2.90E+00	1.00E+00	4.50E+00	4.50E+00	2.00E+01	2.00E+01	5.40E+00	n
Barium	7440-39-3	x	1.60E+04	Empirical	Empirical	1.60E+04	1.25E+03	3.30E+00	5.00E+01	3.00E+01	3.00E+01	x	1.25E+03	1.90E+02	n
Cadmium	7440-43-8a	2.00E+00	8.00E+01	Empirical	Empirical	8.00E+01	2.50E+01	2.50E+01	5.00E+01	1.00E+01	1.00E+01	1.00E+00	2.50E+01	1.30E+00	n
Chromium III	10369-83-1	2.00E+03	1.20E+05	Empirical	Empirical	1.20E+05	4.20E+01	4.20E+01	9.00E+01	5.00E+01	5.00E+01	4.20E+01	4.20E+01	4.10E+01	n
Chromium (Total)	7440-47-3	x	x	x	x	x	4.20E+01	4.20E+01	5.00E+01	5.00E+01	5.00E+01	4.20E+01	4.20E+01	4.10E+01	n
Iron	7439-89-6	x	5.60E+04	1.51E+02	5.04E+02	5.04E+02	1.51E+02	1.51E+02	5.00E+01	5.00E+00	5.00E+00	5.15E+04	5.15E+04	4.00E+04	n
Lead	7439-92-1	2.50E+02	x	Empirical	Empirical	2.50E+02	2.20E+02	2.20E+02	5.00E+01	1.00E+01	1.00E+01	1.70E+01	2.20E+02	1.90E+02	n
Magnesium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Manganese	7439-96-5a	x	3.70E+03	6.52E+01	6.52E+01	6.52E+01	x	6.52E+01	5.00E+01	1.00E+01	1.00E+01	1.10E+03	1.10E+03	6.80E+02	n
Mercury	7439-97-6	2.00E+00	x	Empirical	Empirical	2.00E+00	9.00E+00	2.00E+00	2.00E+02	2.00E+02	2.00E+02	7.00E+02	2.00E+00	2.30E+01	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Pesticides															
4,4'-DDD	72-54-8	x	4.20E+00	Empirical	Empirical	4.20E+00	1.00E+00	1.00E+00	1.00E+02	2.65E+03	2.65E+03	x	1.00E+00	4.50E+02	n
4,4'-DDE	72-55-9	x	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E+02	2.65E+03	2.65E+03	x	1.00E+00	2.20E+02	n
4,4'-DDT	50-29-3	3.00E+00	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E+02	2.65E+03	2.65E+03	x	1.00E+00	3.50E+00	n
Endosulfan II (beta)	33213-65-9	x	x	x	x	x	x	x	1.00E+02	2.65E+03	2.65E+03	x	x	x	n
Endosulfan sulfate	1031-07-8	x	4.80E+02	1.90E+01	1.80E+00	1.80E+00	x	1.80E+00	1.00E+02	2.65E+03	2.65E+03	x	1.80E+00	5.30E+03	n

Note: See Tables 9 and 10 – Based on the TMEQ Calculations and Tables 9 and 10 (leaching to soil), Benzo(b)fluoranthene has been eliminated as a COPC for this site.

Table 12: Soil concentrations determined to be protective of human health and ecological receptors based on a site-specific pathway analysis (assumed saturated conditions for the leaching model).

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Sat	Soil Method B Protection of Surface Water (mg/kg) - Sat	Final Protective H.H. Value (mg/kg)	TEE Value (mg/kg)	Final Protective Value (mg/kg)	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final POL (mg/kg)	Natural Background	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COPC?
Minors CI/RG Spreadsheet Column	x	1.00E+02	Q and R	Based on 3-Phase Model Results	Based on 3-Phase Model Results	Final Value (mg/kg)	Search Table 749-2	Final Protective Value (mg/kg)	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final POL (mg/kg)	Natural Background Metals	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COPC?
Gasoline	x	2.00E+03	x	x	x	1.00E-02	2.00E-02	1.00E-02	3.00E+00	5.00E+00	5.00E+00	x	1.00E-02	1.40E+01	n
Diesel + HO	x	2.00E+03	x	x	x	2.00E+03	4.60E+02	4.60E+02	2.50E+01	2.50E+01	2.50E+01	x	4.60E+02	1.29E+03	y
Acenaphthene	83-32-9	x	4.80E+03	Empirical	Empirical	4.80E+03	x	4.80E+03	2.00E-02	4.35E-02	4.35E-02	x	4.80E+03	2.20E-02	n
Acenaphthylene	x	x	x	Empirical	Empirical	x	x	x	2.00E-02	6.70E-02	6.70E-02	x	x	8.10E-02	n
Acetone	67-64-1	x	7.20E+04	Empirical	Empirical	7.20E+04	x	7.20E+04	5.00E-02	1.50E-02	1.50E-02	x	7.20E+04	2.80E-01	n
Aldrin	309-00-2	x	5.90E-02	Empirical	Empirical	5.90E-02	1.70E-01	5.90E-02	1.00E-02	1.35E-03	1.35E-03	x	5.90E-02	9.40E-03	n
Anthracene	120-12-7	x	2.40E+04	Empirical	Empirical	2.40E+04	x	2.40E+04	1.00E-01	4.35E-02	4.35E-02	x	2.40E+04	2.80E-02	n
Benzo(G,H,I)Perylene	x	x	x	x	x	x	x	x	1.00E-01	4.60E-02	4.60E-02	x	x	x	y
Bis(2-Ethylhexyl)Phthalate	117-81-7	x	7.10E+01	6.90E-01	5.00E-03	5.00E-03	x	5.00E-03	1.00E-02	1.19E-01	1.19E-01	x	1.19E-01	8.20E-01	y
Chlorobenzene	108-90-7	x	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	1.00E-02	2.00E-03	2.00E-03	x	1.60E+03	ND	n
Chloroform	67-66-3	x	3.20E+01	Empirical	Empirical	3.20E+01	x	3.20E+01	1.00E-02	2.00E-03	2.00E-03	x	3.20E+01	ND	n
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	6.80E-04	1.10E-05	1.10E-05	x	1.10E-05	2.50E-01	3.30E-01	3.30E-01	x	3.30E-01	ND	n
2,4-Dichlorophenol	120-83-2	x	2.40E+02	Empirical	Empirical	2.40E+02	x	2.40E+02	5.00E-01	2.15E-01	2.15E-01	x	2.40E+02	ND	n
Fluoranthene	206-44-0	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	2.50E-01	n
Fluorene	86-73-7	x	3.20E+03	Empirical	Empirical	3.20E+03	x	3.20E+03	2.00E-02	5.00E-03	5.00E-03	x	3.20E+03	ND	n
1-Methylnaphthalene	90-12-0	x	3.40E+01	Empirical	Empirical	3.40E+01	x	3.40E+01	2.00E-02	5.00E-01	5.00E-01	x	3.40E+01	6.10E-02	n
2-Methylnaphthalene	91-57-6	x	3.20E+02	Empirical	Empirical	3.20E+02	x	3.20E+02	2.00E-02	5.00E-01	5.00E-01	x	3.20E+02	9.50E-02	n
5-Methylphenol	x	x	x	x	x	x	x	x	x	x	x	x	x	4.00E-01	n
Naphthalene	91-20-3	5.00E+00	1.60E+03	Empirical	Empirical	1.60E+03	x	1.60E+03	2.00E-02	5.00E-01	5.00E-01	x	1.60E+03	2.50E-01	n
N-Nitrosodiphenylamine	86-30-6	x	2.00E+02	5.20E-02	1.80E-03	1.80E-03	x	1.80E-03	1.00E-01	1.00E-01	1.00E-01	x	1.80E-03	1.10E-01	y
Aracolor 1016	12674-11-2	x	5.60E+00	x	x	5.60E+00	x	5.60E+00	1.00E-01	4.00E-02	4.00E-02	x	5.60E+00	ND	n
Aracolor 1254	11097-69-1	x	5.00E-01	Empirical	Empirical	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	9.90E-03	n
Aracolor 1260	11096-82-5	x	5.00E-01	x	x	5.00E-01	x	5.00E-01	1.00E-01	4.00E-02	4.00E-02	x	5.00E-01	5.70E-03	n
Total PCBs (Aracolors)	1336-36-3	1.00E+00	5.00E-01	x	x	1.00E+00	2.00E+00	1.00E+00	x	4.00E-02	4.00E-02	x	1.00E+00	2.80E-02	n
Pentachlorophenol	87-86-5	x	2.50E+00	x	x	2.50E+00	1.10E+01	2.50E+00	1.00E-01	1.85E-01	1.85E-01	x	2.50E+00	ND	n
Phenanthrene	x	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	1.00E-01	5.00E-02	5.00E-02	x	2.40E+03	x	n
Pyrene	129-00-0	x	2.40E+03	Empirical	Empirical	2.40E+03	x	2.40E+03	2.00E-01	2.00E-02	2.00E-02	x	2.40E+03	1.70E-01	n
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	2.90E-02	7.00E-05	3.40E+01	x	7.00E-05	1.00E-01	5.00E-02	5.00E-02	x	5.00E-02	ND	n
Vinyl Chloride	75-01-4	x	6.70E-01	9.00E-05	6.20E-06	6.20E-06	x	6.20E-06	1.00E-02	2.00E-03	2.00E-03	x	2.00E-03	1.00E-03	n
cPAHs															
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	1.90E-01	1.60E-05	1.60E-05	3.00E+01	1.60E-05	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	7.30E-02	n
Benzo(a)anthracene	56-55-3	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	9.90E-02	n
Benzo(b)fluoranthene	205-99-2	x	x	x	x	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	1.20E-02	1.10E-01	n
Benzo(k)fluoranthene	207-08-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	4.60E-02	n
Chrysene	218-01-9	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.30E-02	n
Dibenz(a,h)anthracene	53-70-3	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	ND	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	Empirical	x	x	x	2.00E-02	5.00E-02	5.00E-02	x	x	6.40E-02	n
cPAH Total	x	1.00E-01	1.90E-01	1.90E-01	1.60E-05	1.60E-05	x	1.60E-05	2.00E-02	5.00E-02	5.00E-02	x	5.00E-02	1.00E-01	n
Metals (mg/L)															
Arsenic	7440-38-2	2.00E+01	6.70E-01	1.50E-01	1.50E-01	1.50E-01	9.50E+01	1.50E-01	1.00E+00	4.50E+00	4.50E+00	2.00E+01	2.00E+01	5.40E+00	n
Barium	7440-39-3	x	1.60E+04	Empirical	Empirical	1.60E+04	1.25E+03	1.25E+03	5.00E-01	3.00E-01	3.00E-01	x	1.25E+03	1.90E+02	n
Cadmium	7440-43-9a	2.00E+00	8.00E+01	Empirical	Empirical	8.00E+01	2.50E+01	2.50E+01	5.00E-01	1.00E-01	1.00E-01	1.00E+00	2.50E+01	1.30E+00	n
Chromium III	16905-83-1	2.00E+03	1.20E+05	Empirical	Empirical	1.20E+05	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Chromium (Total)	7440-47-3	x	x	x	x	x	4.20E+01	4.20E+01	5.00E-01	5.00E-01	5.00E-01	4.20E+01	4.20E+01	4.10E+01	n
Iron	7439-89-6	x	5.60E+04	7.59E+00	2.53E+01	7.59E+00	5.00E+01	7.59E+00	5.00E+01	5.00E+00	5.00E+00	5.15E+04	5.15E+04	4.00E+04	n
Lead	7439-92-1	2.50E+02	x	Empirical	Empirical	2.50E+02	2.20E+02	2.20E+02	5.00E-01	1.00E-01	1.00E-01	1.70E+01	2.20E+02	1.90E+02	n
Magnesium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Manganese	7439-96-5a	x	3.70E+03	3.26E+00	3.26E+00	3.26E+00	x	3.26E+00	5.00E-01	1.00E-01	1.00E-01	1.10E+03	1.10E+03	6.80E+02	n
Mercury	7439-97-6	2.00E+00	x	Empirical	Empirical	2.00E+00	9.00E+00	2.00E+00	2.00E-02	2.00E-02	2.00E-02	7.00E-02	2.00E+00	2.30E-01	n
Potassium	7440-09-7	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Sodium	7440-23-5	x	x	x	x	x	x	x	x	x	x	x	x	x	n
Pesticides															
4,4'-DDD	72-54-8	x	4.20E+00	Empirical	Empirical	4.20E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	4.50E-02	n
4,4'-DDE	72-55-9	x	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	2.20E-02	n
4,4'-DDT	50-29-3	3.00E+00	2.90E+00	Empirical	Empirical	2.90E+00	1.00E+00	1.00E+00	1.00E-02	2.65E-03	2.65E-03	x	1.00E+00	3.20E-02	n
Endosulfan II (beta)	33213-65-9	x	x	x	Empirical	x	x	x	1.00E-02	2.65E-03	2.65E-03	x	x	x	n
Endosulfan sulfate	1031-07-8	x	4.80E+02	9.70E-01	9.10E-02	9.10E-02	x	9.10E-02	1.00E-02	2.65E-03	2.65E-03	x	9.10E-02	5.30E-03	n

Note: See Tables 9 and 10 – Based on the TMEQ Calculations and Tables 9 and 10 (leaching to soil), Benzo(b)fluoranthene has been eliminated as a COPC for this site.

REFERENCES

- Ecology. (2001). "Concise Explanatory Statement for the Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC." Olympia, WA: Washington State Department of Ecology. Publication No. 01-09-043.¹⁰
- Ecology. (2005). "Focus on Developing Surface Water Cleanup Standards Under the Model Toxics Control Act." Olympia, WA: Washington State Department of Ecology. Publication No. 01-09-050.¹¹
- Ecology. (2013). "Model Toxics Control Act Statute and Regulation." Olympia, WA: Washington State Department of Ecology. Publication No. 94-06.¹²
- Ecology. (2015). "Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs)." Olympia, WA: Washington State Department of Ecology. Publication No. 15-09-049.¹³
- Ecology. (2023). Memorandum to file: "Interstate 82 Exit 33A Yakima City Landfill Preliminary Cleanup Levels."¹⁴ Washington State Department of Ecology.
- Ecology. (2024). Memorandum to file: "Interstate 82 Exit 33A Yakima City Landfill: Response and Resolution to Comments Regarding Groundwater and Surface Water PCULs."¹⁵ Washington State Department of Ecology.
- Ecology. (2024). Memorandum to file: "Interstate 82 Exit 33A Yakima City Landfill: Discussion of Changes and Responses to Comments Regarding Unsaturated and Saturated Soil PCULs."¹⁶ Washington State Department of Ecology.
- Risk Assessment Information System. (2020). Visit the website.¹⁷

¹⁰ <https://apps.ecology.wa.gov/publications/SummaryPages/0109043.html>

¹¹ <https://apps.ecology.wa.gov/publications/SummaryPages/0109050.html>

¹² <https://apps.ecology.wa.gov/publications/SummaryPages/9406.html>

¹³ <https://apps.ecology.wa.gov/publications/SummaryPages/1509049.html>

¹⁴ <https://apps.ecology.wa.gov/cleanupsearch/document/130578>

¹⁵ <https://apps.ecology.wa.gov/cleanupsearch/document/145161>

¹⁶ <https://apps.ecology.wa.gov/cleanupsearch/document/145726>

¹⁷ https://rais.ornl.gov/tools/eco_search.php

**Mill Site
(RI PCUL Tables and Ecology Letter—February 2026)**

Table 3
PCULs and COPCs - Soil
Remedial Investigation Report
Yakima Mill Site

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg)	Method B Protection of Surface Water (mg/kg)	Simplified TEE Unrestricted (mg/kg)	Agreed upon PQL (mg/kg)	Natural Background (mg/kg)	PCUL (mg/kg)	Highest Recorded Value (mg/kg) ¹	COPC?	Basis for PCUL?	Notes (2)
TPH-Gx (gasoline-extended range) - Benzene Present	x	3.00E+01	x	3.00E+01	3.00E+01	2.00E+02	5.00E+00	x	3.00E+01	1.80E+02	y	Method A	
TPH-Dx (diesel and heavy-oil ranges combined)	x	2.00E+03	x	2.00E+03	2.00E+03	4.60E+02	2.50E+01	x	4.60E+02	2.89E+04	y	Method A, TEE	
Acetone	67-64-1	x	7.20E+04	2.89E+01	x	x	5.00E-01	x	7.20E+04	ND	n		
Benzene	71-43-2	3.00E-02	1.80E+01	2.74E-02	5.47E-02	x	2.35E-02	x	1.80E+01	1.52E-01	n		
Bis(2-ethylhexyl)phthalate	117-81-7	x	7.10E+01	1.33E+01	1.11E+00	x	5.30E-02	x	4.45E-01	1.26E+00	y	Soil>GW>SW	
Butyl benzyl phthalate	85-68-7	x	5.30E+02	1.28E+01	1.70E-01	x	5.20E-02	x	5.30E+02	2.41E-01	n		
Carbon tetrachloride	56-23-5	x	1.40E+01	4.16E-02	8.33E-03	x	5.00E-02	x	1.40E+01	ND	n		
Chloroform	67-66-3	x	3.20E+01	7.36E-02	3.13E-01	x	2.21E-02	x	3.20E+01	1.57E-01	n		
1,2 Dibromethane (EDB)	106-93-4	5.00E-03	5.00E-01	2.67E-04	x	x	5.00E-03	x	5.00E-01	ND	n		
1,2 Dichloroethane (EDC)	107-06-2	x	1.10E+01	2.40E-02	4.27E-02	x	2.00E-02	x	1.10E+01	ND	n		
Ethylbenzene	100-41-4	6.00E+00	8.00E+03	5.85E+00	1.00E-01	x	2.92E-02	x	8.00E+03	6.10E+00	n		
Methyl ethyl ketone (2-Butanone)	78-93-3	x	4.80E+04	x	x	x	5.00E-02	x	4.80E+04	ND	n		
Methyl tertiary butyl ether (MTBE)	1634-04-4	x	5.60E+02	1.03E-01	x	x	5.00E-02	x	5.60E+02	ND	n		
Methylene chloride	75-09-2	2.00E-02	9.40E+01	2.15E-02	4.30E-02	x	5.00E-02	x	9.40E+01	ND	n		
Napthalene	91-20-3	5.00E+00	1.60E+03	4.45E+00	1.36E+02	x	4.23E-02	x	1.60E+03	1.08E+01	n		
Pentachlorophenol	87-86-5	x	2.50E+00	1.58E-02	1.58E-03	1.10E+01	4.10E-02	x	4.10E-02	1.27E-01	y	Method B, Soil>GW>SW	
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	4.80E+02	4.99E-02	2.40E-02	x	5.00E-02	x	4.80E+02	4.95E-02	n		
Toluene	108-88-3	7.00E+00	6.40E+03	7.06E+00	3.74E-01	x	2.23E-02	x	6.40E+03	2.35E+01	n		
Trichloroethylene (TCE)	79-01-6	3.00E-02	1.20E+01	3.15E-02	6.29E-03	x	5.00E-02	x	1.20E+01	ND	n		
Vinyl Chloride	75-01-4	x	6.70E-01	5.77E-03	5.77E-03	x	5.00E-02	x	6.70E-01	ND	n		
Xylenes	1330-20-7	9.00E+00	1.60E+04	1.42E+01	5.07E-01	x	5.91E-02	x	1.60E+04	1.49E-01	n		
cPAHs													
Benzo(a)anthracene	56-55-3	x	x	x	7.16E-01	x	5.00E-02	x	x	1.08E+01	n		
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	3.88E+00	1.42E-01	3.00E+01	5.00E-02	x	1.90E-01	1.02E+01	y	Method B	Empirical Demonstration for Soil>GW>SW
Benzo(b)fluoranthene	205-99-2	x	x	x	2.46E+00	x	5.00E-02	x	x	8.05E+00	n	Soil>GW>SW	Empirical Demonstration for Soil>GW>SW
Benzo(k)fluoranthene	207-08-9	x	x	x	7.87E-01	x	5.00E-02	x	x	6.48E+00	n		
Chrysene	218-01-9	x	x	x	7.96E-01	x	5.00E-02	x	x	1.06E+01	n		
Dibenz(a,h)anthracene	53-70-3	x	x	x	7.52E-02	x	5.00E-02	x	x	1.53E+00	n	Soil>GW>SW	Empirical Demonstration for Soil>GW>SW
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	6.94E+00	x	5.00E-02	x	x	2.79E+00	n		
BaP TEQ	x	1.00E-01	1.90E-01	3.88E+00	1.42E-01	x	5.00E-02	x	1.90E-01	1.30E+01	y	Method B	Empirical Demonstration for Soil>GW>SW
Metals (mg/kg)													
Arsenic	7440-38-2	2.00E+01	6.70E-01	2.92E+00	1.46E+00	2.00E+01	3.22E-01	2.00E+01	2.00E+01	2.92E+01	y	Nat. Background	
Cadmium	7440-43-9a	2.00E+00	8.00E+01	6.90E-01	9.94E-02	2.50E+01	1.72E-01	1.00E+00	1.00E+00	4.15E+00	y	Nat. Background	
Chromium VI	18540-29-9	1.90E+01	2.40E+02	1.92E+01	3.84E+00	4.20E+01	5.51E-01	4.20E+01	4.20E+01	6.70E-01	n		
Total Chromium	7440-47-3	x	x	x	x	4.20E+01	5.00E-01	4.20E+01	x	x	n		
Copper	7440-50-8	x	3.20E+03	2.84E+02	4.88E+00	1.00E+02	2.57E-01	3.60E+01	3.60E+01	9.75E+01	y	Nat. Background	
Iron	7439-89-6	x	5.60E+04	x	x	x	5.00E+00	5.15E+04	5.60E+04	x	n		
Lead	7439-92-1	2.50E+02	x	3.00E+03	5.00E+02	2.20E+02	2.57E-01	1.70E+01	2.20E+02	1.87E+03	y	Method A, Soil>GW>SW, TEE	
Manganese	7439-96-5a	x	3.70E+03	x	x	x	1.00E-01	1.10E+03	3.70E+03	x	n		
Nickel	7440-02-0	x	1.60E+03	1.30E+02	6.78E+01	1.00E+02	6.44E-01	4.60E+01	6.78E+01	3.65E+01	n		
Silver	7440-22-4	x	4.00E+02	1.36E+01	5.44E-01	x	8.69E-02	x	4.00E+02	9.98E-01	n		
Zinc	7440-66-6	x	2.40E+04	5.97E+03	1.24E+02	2.70E+02	6.44E-01	8.60E+01	1.24E+02	5.61E+02	y	Soil>GW>SW, TEE	

Notes:

1 Potential false positive values based on blank data validation procedures are excluded.

2 If wells between contamination and surface water are clean, then the empirical data has demonstrated that the Soil>GW>SW pathway is incomplete.

Table 4
PCULs and COPCs - Groundwater to Drinking Water
Remedial Investigation Report
Yakima Mill Site

Analyte	CAS	H.H. GW Method A (ug/L)	H.H. GW Method B (ug/L)	Final Protective Value (ug/L)	Agreed Upon PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L) ¹	COPC ?	Basis for PCUL ?	Notes
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	x	8.00E+02	2.50E+02	8.00E+02	<50	n		
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	x	5.00E+02	2.50E+02	5.00E+02	8.76E+05	y	MTCA A	Applies to all GW wells
Acetone	67-64-1	x	7.20E+03	7.20E+03	1.00E+00	7.20E+03	6.28E+00	n		
Benzene	71-43-2	5.00E+00	5.00E+00	5.00E+00	1.00E+00	5.00E+00	8.19E-02	n		
Bis(2-ethylhexyl)phthalate	117-81-7	x	6.00E+00	6.00E+00	5.00E-01	6.00E+00	7.38E-01	n		
Butyl benzyl phthalate	85-68-7	x	4.61E+01	4.61E+01	2.00E-01	4.61E+01	<0.612	n		
Carbon tetrachloride	56-23-5	x	5.00E+00	5.00E+00	1.00E+00	5.00E+00	<.625	n		
Chloroform	67-66-3	x	1.41E+01	1.41E+01	1.00E+00	1.41E+01	2.19E+00	n		
1,2 Dibromethane (EDB)	106-93-4	1.00E-02	5.00E-02	5.00E-02	1.00E-02	5.00E-02	<0.0861	n		
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	4.81E+00	5.00E+00	1.00E+00	5.00E+00	<0.0831	n		
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	7.00E+02	1.00E+00	7.00E+02	<1	n		
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	x	1.00E+00	x	<5	n		
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.00E+01	2.43E+01	2.43E+01	1.00E+00	2.43E+01	<1	n		
Methylene chloride	75-09-2	5.00E+00	5.00E+00	5.00E+00	1.00E+00	5.00E+00	<1	n		
Napthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	1.00E+00	1.60E+02	6.34E-01	n		
Pentachlorophenol	87-86-5	x	1.00E+00	1.00E+00	1.00E-01	1.00E+00	8.09E-01	n		
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	5.00E+00	1.00E+00	5.00E+00	<1	n		
Toluene	108-88-3	1.00E+03	6.40E+02	1.00E+03	1.00E+00	1.00E+03	3.27E+00	n		
Trichloroethylene (TCE)	79-01-6	5.00E+00	4.00E+00	5.00E+00	1.00E+00	5.00E+00	<0.5	n		
Vinyl Chloride	75-01-4	2.00E-01	2.92E-01	2.92E-01	1.00E+00	1.00E+00	1.49E-02	n		
Xylenes	1330-20-7	1.00E+03	1.60E+03	1.60E+03	1.00E+00	1.60E+03	<1	n		
cPAHs										
Benzo(a)anthracene	56-55-3	x	x	x	1.00E-01	x	<0.102	n		
Benzo(a)pyrene	50-32-8	1.00E-01	2.00E-01	2.00E-01	7.30E-03	2.00E-01	1.05E-02	n		
Benzo(b)fluoranthene	205-99-2	x	x	x	1.00E-01	x	2.35E-01	n		
Benzo(k)fluoranthene	207-08-9	x	x	x	3.20E-02	x	<0.0315	n		
Chrysene	218-01-9	x	x	x	1.00E-01	x	<0.102	n		
Dibenz(a,h)anthracene	53-70-3	x	x	x	2.10E-03	x	2.48E-03	n		
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	1.00E-01	x	<0.102	n		
BaP TEQ	x	1.00E-01	2.00E-01	2.00E-01	7.30E-03	2.00E-01	2.87E-02	n		
Metals										
Arsenic	7440-38-2	5.00E+00	5.00E+00	5.00E+00	2.50E+00	5.00E+00	1.12E+01	y	MTCA A; MTCA B	Applies to all GW wells
Cadmium	7440-43-9a	5.00E+00	5.00E+00	5.00E+00	2.00E-01	5.00E+00	1.02E+00	n		
Chromium VI	18540-29-9	5.00E+01	4.80E+01	5.00E+01	1.00E+00	5.00E+01	x	n		
Total Chromium	7440-47-3	5.00E+01	x	5.00E+01	1.00E+00	5.00E+01	1.74E+01	n		
Copper	7440-50-8	x	6.40E+02	6.40E+02	5.00E-01	6.40E+02	1.95E+02	n		
Iron	7439-89-6	x	x	x	1.00E+03	x	5.60E+04	x		
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	1.00E+00	1.50E+01	9.36E+00	n		
Manganese	7439-96-5a	x	x	x	2.00E+01	x	5.93E+03	x		
Nickel	7440-02-0	x	1.00E+02	1.00E+02	2.00E+00	1.00E+02	8.83E+01	n		
Silver	7440-22-4	x	8.00E+01	8.00E+01	2.00E-01	8.00E+01	1.60E+00	n		
Zinc	7440-66-6	x	4.80E+03	4.80E+03	3.50E+00	4.80E+03	1.31E+02	n		

Notes:

¹ Potential false positive values based on blank data validation procedures are excluded.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

1250 W Alder St • Union Gap, WA 98903-0009 • (509) 575-2490

March 23, 2021

Allan Gebhard
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435

RE: Comments on DRAFT Remedial Investigation (RI) for Boise Cascade Mill Site

- Site Name: Boise Cascade Mill
- Site Address: 805 North 7th Street, Yakima
- Facility/Site ID: 450
- Cleanup Site ID: 12095

Dear Allan Gebhard:

The Department of Ecology has reviewed the DRAFT Remedial Investigation (RI) for the Boise Cascade Mill Site and has the following comments. They are identified below by RI section for ease of reference. Please address all comments in your next submittal.

Introduction:

Add preliminary cleanup levels (PCULs) and contaminants of potential concern (COPCs) for surface water. Revise as necessary to include all identified COPCs for the Site. Separate grab sample data results from monitoring well sample data results in the table on page 14. Add surface water to the list on page 15. Also, ensure the sediments term is used properly (see comments under 3.2.3 for more detail).

Section 2 – Site Description and Background

Please add all Potentially Liable Persons (PLPs), including the City of Yakima.

2.1 Site History

Please reflect the recent parcel transfers to the City of Yakima in this section.



2.2 Land Use

Please describe how precipitation flows across the surface of the Site and clearly identify any sheet flow outlets.

2.3 Previous investigations

Numerous fires have taken place on the Site. As environmentally significant events, please provide dates and note that no sampling was conducted for PFAS/dioxins and furans after these fires.

2.4 Areas of concern

Areas of concern (AOCs) were developed for the RI work plan to assist with the sampling effort at the site, and were never intended to be “stand alone” areas of concern within the larger site for nature and extent of contamination purposes. Please identify any data gaps, update figures and data to show contamination across the entire site rather than by AOCs, especially since many of the AOCs have overlapping borders.

Section 3

3.2.1 Test Pits and Borings

Test pit samples, second bullet point: sampling interval has data gaps from 10 to 15 feet below ground surface (bgs). Additional samples will be needed for AOC 11. Clarify if the additional sample collected from 8-10 feet bgs was ever analyzed.

3.2.3 Pond Bottom and Ditch Bottoms

Throughout this document, pond bottoms and ditch bottoms are alternatively referred to as sediment samples. Sediments are managed under the Sediment Management Standards (SMS), and are a specific subset of saturated soil samples. Please maintain consistency when naming sample media and remove references to sediments as necessary.

First paragraph – Please identify a table or figure where detailed information is located for sampling depths, etc., instead of just referring to the sample log.

Ponds – Please describe the type of riprap present by material, such as woody debris, or concrete chunks. Estimate the volume of water in the Recycle Pond at the time of the sampling and identify whether or not this is a typical volume or if the volume changes due to irrigation pressures on the Yakima River.

Cite figures for all sampling locations referred to in text.

3.2.4 Groundwater

Please describe the alternative sample to FPP-MW-1. Detail any analysis performed on the black oily substance. Please discuss plans to decommission this well and relocate it for future sampling events.

Please describe the rationale for shorter screen lengths in MW-9A and MW-25. Clarify if the sampling interval in Table 1 is the approximate sampling point or the actual saturated screened interval at each well.

3.2.5 Surface Water

Please describe in detail how you plan to assess the water elevations at the river and compare them to the water elevations of the ponds to determine groundwater.

3.2.6 New soil gas wells

Please add any calculations used to extrapolate sampling results based on volumes of differing screen length and diameters in the soil gas wells.

Existing Soil Gas Wells

Identify the wells where volume was resampled after 48 hours.

Section 4

Section 4.2 Hydrology

The Site is located adjacent to the Yakima River – please revise this paragraph to reflect this fact and include additional details, including the length of the current shoreline boundaries and point discharges to the river.

Identify all outfalls (point source discharges) into the Yakima River from the various ditches running throughout the site on a single figure. Identify on a figure the areas where the Fruitvale wasteway daylights, as well as its outfall. Please explain the statement and identify outfalls that were related to the irrigation system and surface water intakes during active log yard operations. Insert discussion regarding the fact that water from the settling ponds was allowed to infiltrate into the soils during active log yard operations.

Describe as precisely as possible how the Yakima River elevation changes seasonally due to irrigation practice.

Discuss the significance of the steep elevation drop in wells between monitoring events.

Please estimate volumes of water in ponds on site, and the change in volume, if any, reflected by irrigation practices.

Section 4.4 Hydrogeology

Expand your discussion of characteristics that control flow in the deeper units, and how you would describe the characteristics of the deeper aquifer. Describe what you mean between “shallow” and “deeper” units by using depths below ground surface.

Update figures to provide any potential confining layers to pertinent cross sections and figures as necessary.

Section 5 – Updated Conceptual Site Model (CSM)

The team has had many conversations regarding the CSM since this draft was delivered to Ecology. Please rewrite the entire section to reflect current understanding of the CSM. Be consistent with the use of the word sediment throughout the report; sediment means something very specific to the State of Washington. Additional areas of hydrocarbon contamination have been identified; please provide updated figures.

5.2.3 Groundwater –surface water.

Groundwater discharge has the potential to affect surface water all along the eastern edge of the site, not just down gradient. Please revise accordingly.

5.2.4 Soil Vapor

Halogenated volatile organic compound (HVOC) vapors were detected at the Site during test pit construction for the proposed roadway.

If vapors were detected in soils above any portion of the Boise Cascade Mill site, additional investigation of HVOC sources may be necessary. This is a potential data gap.

5.3 Preliminary cleanup levels

Through a series of meetings in late 2020, Ecology and the PLPs generated a spreadsheet that details PCULs. The spreadsheet contains agreed upon PCULs and information to verify that the various pathways to receptors are current.

The spreadsheet is attached to this letter; please refer to it for Ecology's comments on the PCULs. Ecology realizes that cleanup levels may be further refined during the feasibility study and that this is a preliminary list.

5.3.4 Vapor

Methane was detected at potentially explosive concentrations in the soil gas at various locations on the site. Although MTCA does not have an established default cleanup level for methane in soil gas, any soil gas detected that has the potential for explosivity should be carefully evaluated before further site investigation work is continued. Plans for fieldwork while dealing with potentially explosive vapors must be submitted and approved by Ecology prior to any additional field work.

5.4.1 Soil

Please revise this section based on the values in the PCUL spreadsheet.

5.4.2 Groundwater to Drinking Water Pathway

Please revise this section based on the values in the PCUL spreadsheet

5.4.3 Groundwater to Surface Water Pathway

Please revise this section based on the values in the PCUL spreadsheet

Section 6 – RI results

Areas of concern were used for the RI work plan and were intended to assist field personnel during sampling activities. The data resulting from the field activities should be viewed holistically across the entire site. Please revise this section accordingly to assist the feasibility study and cleanup action. The following are additional comments on the draft RI language:

- Please include a short paragraph generally describing site conditions (depths to groundwater, soil types, sensitive areas, etc.) that encompass the entirety of the Site.
- As previously discussed, please use the term sediments properly.
- Validated data results from previous investigations should be differentiated in some way from the data that was collected specifically according to the approved work plan for this RI.

- Appendices I-2 and I-3 must differentiate between historical data and data collected specifically according to the approved work plan for this RI. Please use the results in the PCUL spreadsheet to revise any draft statements if necessary.
- All data should be analyzed with reference to Site boundaries, and not areas of concern boundaries. This RI should clearly illustrate the extent of contamination found throughout the entire Site. Please revise figures and tables as necessary. Maintain consistency of terminology throughout the document. The draft document compares either “reporting limits” or “PCULs” within the same areas of concern. PCOCs for the entire site are included on the PCUL spreadsheet,

6.2 North First Lateral Drain

Please discuss the importance of organic carbon content calculations for this section of the RI.

6.3 Equipment Boneyard

Total Petroleum Hydrocarbons (TPHs) are generically referred to throughout the document. For clarity, be specific about which fraction (TPH-Gx, TPH-Dx and Heavy Oil) you are discussing at any given time. Data gaps exist where samples were not collected throughout the 15-foot soil depth that is regulated by MTCA.

6.4 Dry Kiln

Any sample, which could not be completed throughout the 15-foot regulated soil column, is considered a data gap.

6.5 Kiln Ponds

Ponds throughout the Site are considered surface water, not groundwater. See MTCA definitions for clarification and revise. Identify the depths at sample locations.

North Kiln Pond

This section contains data gaps and discussions of TPH in general. See comment on Section 6.3 and revise. Clarify if the sample from temporary well TW-01-AOC5 is a grab groundwater sample or a surface water sample. Identify depth(s) at which groundwater was encountered.

South Kiln Pond

Identify whether metal samples were collected at the groundwater –surface water interface. Add detail to this section that explains the assertion that groundwater flow is temporally variable.

6.7 Recycle Pond

Be specific about which sediment core sampling technology was used to collect samples. Be consistent in your discussion of soil versus sediment samples to avoid confusion. Support your assertion of false positive results. For clarity, provide linear measurements from the recycle pond to MW-05. Instead of referring to distinct wells to discuss potential contaminants of concern (page 35, last paragraph), use a holistic site approach to defining nature and extent of contamination. Support all assertions that data collected is not acceptable.

6.8 Settling Pond

Describe your technique to differentiate between pond bottom material and soil material for samples collected. Discuss the difference between soils and sediments for the Settling Pond.

6.9 Fruitvale Wasteway

Include the definition of organic soils that you are relying upon, and describe what laboratory methods were used to aid in your identification of organic soils. Please discuss how you differentiated between the collection of “impacted” versus “non-impacted” soils during the sampling events.

6.1.5 Paint, Machine and Storage Shed

Collection of soil samples that do not extend to 15 feet below ground surface in test pits are considered data gaps. Even though the duplicate sample from TW-01-AOC15 contains concentrations above the PCUL for copper for the surface water pathway, provide details on why this sample was or was not retained.

6.1.6 Fuel Distribution System

Fuel Lines

Detail the depth below ground surface that fuel lines are generally located.

6.1.9 Log Yard Shop

Provide evidence to support the statement that certain exceedances in groundwater samples are not related to former (or current) Site operations.

6.2.5 Sitewide groundwater

Original figures provided in the draft document limit the extent of groundwater contamination to AOC extents. All figures depicting the extent of groundwater contamination must be holistic and encompass the entire site. Provide evidence for your statement that groundwater at monitoring well MW-20 does not flow under any Site areas of interest before reaching the well. Provide a figure that details the groundwater chemistry (both laboratory and field sampled) throughout the Site (ORP, pH, temperature, percent oxygen, etc.) for each quarterly sampling event.

Groundwater Summary

Using the PCUL spreadsheet, revise assertions made in the summary to reflect site conditions. For example, cPAH TEQs are potential surface water contaminants of concern. In addition, discuss how potential false positives were identified and whether or not they are included in the data analysis.

6.26 Sitewide Methane

Provide site figures for each monitoring event, differentiating where UEL and LEL concentrations for methane are located on the figures.

Section 7 – RI summary

Please discuss all data in terms of nature and extent throughout the entire Site instead of using the areas of concern to delineate.

7.2 Groundwater – Drinking Water

MTCA uses the terminology “leaching pathway” to represent areas of drinking water that may be impacted by contamination. Please revise this discussion based on the PCUL spreadsheet. For example, the surface water pathway for some contaminants has not been determined to be incomplete, and must be addressed in some way for the feasibility study (FS). Provide more details regarding any empirical demonstration used to determine pathways.

7.5 and 7.6 AOCs closed out during RI, and included in FS

As stated previously, all data must be considered throughout the entire site before any areas of concern can be included or eliminated.

Section 8 – Recommendations

Ecology believes it is appropriate to proceed with the FS. However, data gaps have been identified throughout the draft RI. Ecology looks forward to further discussion on how and when to fill these data gaps.

8.1 Feasibility Study Scoping

Due to the size and complexity of contamination at this Site, Ecology will be requesting a full FS instead of a technical memo. We look forward to collaborating on approaches to fulfill this requirement. Further discussion of edits regarding initial screening of alternatives and the FS schedule are premature, and should be removed from the draft RI for addition to the FS at a later date. This RI is specifically intended to answer the question of nature and extent of contamination at the Site.

Tables

General Comments:

Please use sediments appropriately as discussed previously.

Please update all tables with PCULs from the Ecology provided spreadsheet.

Table 2: Please include a column detailing the change in water levels from previous sampling events.

Table 3: Please update this table.

Table 7: Please use Leaching Pathway instead of the phrase Drinking Water in the table description.

Table 8: Clarify the title of the table-current description is confusing. Separate samples by creating an additional table for the surface water sampling results.

Figures

General comments

For draft RI review purposes, Ecology requested additional figures to delineate nature and extent of contamination. Those figures were provided.

Please identify all surface water intakes and outfalls on a separate figure encompassing the entire site.

Allan Gebhard
Barr Engineering Company
March 23, 2021
Page 10

Update all figures using Ecology provided PCUL tables. Cross check all legends on figures for completeness. Replace/remove AOC separate figures with Site wide figures depicting lateral and vertical extent of contaminants of concern.

Figure containing groundwater field measurements:

Provide a directional arrow for groundwater flow on all figures.

Cross sectional figures:

The legend contains a monitoring well screen that only appears in one well in the figure. Ecology is not certain what the grey lined boxes around other wells is meant to depict – please update figure for clarity. Cross section F-F' includes a greyed in box at TP-02-AOC11 that does not have a corresponding legend-please clarify.

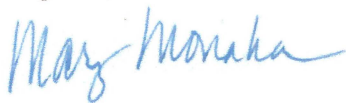
Update CSM cross section based on previous comments.

Figure 34: Please calculate volumes of log yard material (necessary for FS and draft Corrective Action Plan) and add to figure. Clearly define areal extent of metals contamination on figure.

Figure 38: Define area of potential methane LEL exceedances with a border

Thank you for all your efforts and hard work. We appreciate your commitment as we move this Site forward. Please feel free to contact me by phone at 509-454-7840 or 509-571-6661 or by email at Mary.Monahan@ecy.wa.gov with any questions or concerns.

Regards,



Mary Monahan
Project Manager
Toxics Cleanup Program
Central Regional Office

Enclosure: PCUL and COPC List

By certified mail: 7014 3490 0001 5526 4670

cc: Derek Threet, Attorney General's Office, Ecology Division

Analyte	CAS	H.H. GW Method A (ug/L)	H.H. GW Method B (ug/L)	Final Protective Value (ug/L)	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?	Note
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	x	8.00E+02	5.00E+01	2.50E+02	2.50E+02	8.00E+02	<50	n	
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	x	5.00E+02	2.50E+02	2.50E+02	2.50E+02	5.00E+02	8.03E+05	y	Check Well Placement
Acetone	67-64-1	x	7.20E+03	7.20E+03	5.00E+00	1.00E+00	1.00E+00	7.20E+03	6.28E+00	n	
Benzene	71-43-2	5.00E+00	5.00E+00	5.00E+00	1.00E-02	1.00E+00	1.00E+00	5.00E+00	8.19E-02	n	
Bis(2-ethylhexyl)phthalate	117-81-7	x	6.00E+00	6.00E+00	5.00E-01	2.00E-01	2.00E-01	6.00E+00	9.50E-01	n	
Butyl benzyl phthalate	85-68-7	x	4.61E+01	4.61E+01	6.10E-01	2.00E-01	2.00E-01	4.61E+01	<0.61	n	
Carbon tetrachloride	56-23-5	x	5.00E+00	5.00E+00	6.25E-01	1.00E+00	1.00E+00	5.00E+00	<.625	n	
Chloroform	67-66-3	x	1.41E+01	1.41E+01	1.00E+00	1.00E+00	1.00E+00	1.41E+01	2.19E+00	n	
1,2 Dibromethane (EDB)	106-93-4	1.00E-02	5.00E-02	5.00E-02	1.00E-02	1.00E-02	1.00E-02	5.00E-02	<0.01	n	
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	4.81E+00	5.00E+00	1.00E-02	1.00E+00	1.00E+00	5.00E+00	<0.01	n	
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	7.00E+02	1.00E+00	1.00E+00	1.00E+00	7.00E+02	<1	n	
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	<5	n	
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.00E+01	2.43E+01	2.43E+01	1.00E+00	1.00E+00	1.00E+00	2.43E+01	<1	n	
Methylene chloride	75-09-2	5.00E+00	5.00E+00	5.00E+00	1.00E+00	1.00E+00	1.00E+00	5.00E+00	<1	n	
Napthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	1.00E-01	1.00E+00	1.00E+00	1.60E+02	6.34E-01	n	
Pentachlorophenol	87-86-5	x	1.00E+00	1.00E+00	1.00E-01	6.00E-02	6.00E-02	1.00E+00	8.09E-01	n	
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	5.00E+00	1.00E+00	1.00E+00	1.00E+00	5.00E+00	<1	n	
Toluene	108-88-3	1.00E+03	6.40E+02	1.00E+03	1.00E+00	1.00E+00	1.00E+00	1.00E+03	3.27E+00	n	
Trichloroethylene (TCE)	79-01-6	5.00E+00	4.00E+00	5.00E+00	5.00E-01	1.00E+00	1.00E+00	5.00E+00	<0.5	n	
Vinyl Chloride	75-01-4	2.00E-01	2.92E-01	2.92E-01	1.00E-01	1.00E+00	1.00E+00	1.00E+00	1.49E-02	n	
Xylenes	1330-20-7	1.00E+03	1.60E+03	1.60E+03	1.00E+00	1.00E+00	1.00E+00	1.60E+03	<1	n	
cPAHs											
Benzo(a)anthracene	56-55-3	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Benzo(a)pyrene	50-32-8	1.00E-01	2.00E-01	2.00E-01	7.30E-03	2.00E-02	2.00E-02	2.00E-01	1.05E-02	n	
Benzo(b)fluoranthene	205-99-2	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	2.35E-01	n	
Benzo(k)fluoranthene	207-08-9	x	x	x	3.20E-02	2.00E-02	2.00E-02	x	<0.032	n	
Chrysene	218-01-9	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Dibenz(a,h)anthracene	53-70-3	x	x	x	2.10E-03	2.00E-02	2.00E-02	x	3.36E-03	n	
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Total Toxicity Equivalent (1) Concentration (TEQ)	x	1.00E-01	2.00E-01	2.00E-01		1.40E-01	2.00E-02	2.00E-01	3.43E-02	n	
Metals (mg/L)											
Arsenic	7440-38-2	5.00E+00	5.00E+00	5.00E+00	2.50E-03	5.00E-01	5.00E-01	5.00E+00	1.11E-02	n	
Cadmium	7440-43-9a	5.00E+00	5.00E+00	5.00E+00	2.00E-04	1.00E-01	1.00E-01	5.00E+00	1.02E-03	n	
Chromium VI	18540-29-9	5.00E+01	4.80E+01	5.00E+01		5.00E-01	5.00E-01	5.00E+01		x	
Total Chromium	7440-47-3	5.00E+01	x	5.00E+01	1.00E-03	5.00E-01	5.00E-01	5.00E+01	1.74E-02	n	
Copper	7440-50-8	x	6.40E+02	6.40E+02	5.00E-04	1.00E-01	1.00E-01	6.40E+02	1.11E-01	n	
Iron	7439-89-6	x	x	x	1.00E+00	2.00E+01	2.00E+01	x	5.41E+01	x	
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	1.00E-03	1.00E-01	1.00E-01	1.50E+01	6.08E-03	n	
Manganese	7439-96-5a	x	x	x	2.00E-02	1.00E-01	1.00E-01	x	5.93E+00	x	
Nickel	7440-02-0	x	1.00E+02	1.00E+02	2.00E-03	1.00E-01	1.00E-01	1.00E+02	8.83E-02	n	
Silver	7440-22-4	x	8.00E+01	8.00E+01	2.00E-04	1.00E-01	1.00E-01	8.00E+01	6.81E-04	n	
Zinc	7440-66-6	x	4.80E+03	4.80E+03	3.50E-03	5.00E+00	5.00E+00	4.80E+03	1.31E-01	n	

Analyte	CAS	H.H. SW Method B (ug/L)	H.H. SW ARAR (ug/L)	H.H. SW Eco (ug/L)	Final Protective Value (ug/L)	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	x	1.00E+03	8.00E+02	5.00E+01	2.50E+02	2.50E+02	8.00E+02	<50	n
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	x	3.00E+03	5.00E+02	2.50E+02	2.50E+02	2.50E+02	5.00E+02	8.03E+05	y
Acetone	67-64-1	x	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	6.28E+00	x
Benzene	71-43-2	2.30E+01	4.40E+01	1.00E+01	1.00E+01	1.00E-02	1.00E+00	1.00E+00	1.00E+01	8.19E-02	n
Bis(2-ethylhexyl)phthalate	117-81-7	3.60E+00	4.50E-02	x	4.50E-02	5.00E-01	2.00E-01	2.00E-01	2.00E-01	9.50E-01	y
Butyl benzyl phthalate	85-68-7	8.20E+00	1.30E-02	x	1.30E-02	6.10E-01	2.00E-01	6.10E-01	6.10E-01	<0.61	n
Carbon tetrachloride	56-23-5	4.90E+00	2.00E-01	x	2.00E-01	6.25E-01	1.00E+00	1.00E+00	1.00E+00	<.625	n
Chloroform	67-66-3	5.60E+01	6.00E+01	x	6.00E+01	1.00E+00	1.00E+00	1.00E+00	6.00E+01	2.19E+00	n
1,2 Dibromethane (EDB)	106-93-4	x	x	x	x	1.00E-02	1.00E-02	1.00E-02	x	<0.01	x
1,2 Dichloroethane (EDC)	107-06-2	5.90E+01	8.90E+00	x	8.90E+00	1.00E-02	1.00E+00	1.00E+00	8.90E+00	<0.01	n
Ethylbenzene	100-41-4	6.90E+03	2.90E+01	1.20E+01	1.20E+01	1.00E+00	1.00E+00	1.00E+00	1.20E+01	<1	n
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	<5	x
Methyl tertiary butyl ether (MTBE)	1634-04-4	x	x	x	x	1.00E+00	1.00E+00	1.00E+00	x	<1	x
Methylene chloride	75-09-2	5.90E+02	1.00E+01	x	1.00E+01	1.00E+00	1.00E+00	1.00E+00	1.00E+01	<1	n
Napthalene	91-20-3	4.90E+03	x	x	4.90E+03	1.00E-01	1.00E+00	1.00E+00	4.90E+03	6.34E-01	n
Pentachlorophenol	87-86-5	1.50E+00	2.00E-03	1.30E+01	2.00E-03	1.00E-01	6.00E-02	6.00E-02	6.00E-02	8.09E-01	y
Tetrachloroethylene (PCE)	127-18-4	1.00E+02	2.40E+00	x	2.40E+00	1.00E+00	1.00E+00	1.00E+00	2.40E+00	<1	n
Toluene	108-88-3	1.90E+04	5.70E+01	5.30E+01	5.30E+01	1.00E+00	1.00E+00	1.00E+00	5.30E+01	3.27E+00	n
Trichloroethylene (TCE)	79-01-6	4.90E+00	3.00E-01	x	3.00E-01	5.00E-01	1.00E+00	1.00E+00	1.00E+00	<0.5	n
Vinyl Chloride	75-01-4	3.70E+00	2.00E-02	x	2.00E-02	1.00E-01	1.00E+00	1.00E+00	1.00E+00	1.49E-02	n
Xylenes	1330-20-7	x	x	5.70E+01	5.70E+01	1.00E+00	1.00E+00	1.00E+00	5.70E+01	<1	n
cPAHs											
Benzo(a)anthracene	56-55-3	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Benzo(a)pyrene	50-32-8	3.50E-02	1.60E-05	x	1.60E-05	7.30E-03	2.00E-02	2.00E-02	2.00E-02	1.05E-02	n
Benzo(b)fluoranthene	205-99-2	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	2.35E-01	n
Benzo(k)fluoranthene	207-08-9	x	1.60E-03	x	1.60E-03	3.20E-02	2.00E-02	2.00E-02	2.00E-02	<0.032	n
Chrysene	218-01-9	x	1.60E-02	x	1.60E-02	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Dibenz(a,h)anthracene	53-70-3	x	1.60E-05	x	1.60E-05	2.10E-03	2.00E-02	2.00E-02	2.00E-02	3.36E-03	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Total Toxicity Equivalent (1) Concentration (TEQ)	x	3.50E-02	1.60E-05	x	1.60E-05		1.40E-01	2.00E-02	2.00E-02	3.43E-02	y
Metals (mg/kg)											
Arsenic	7440-38-2	9.80E-02	1.80E-02	1.50E+02	1.80E-02	2.50E-03	5.00E-01	5.00E-01	5.00E-01	1.11E-02	n
Cadmium	7440-43-9a	x	x	7.20E-01	7.20E-01	2.00E-04	1.00E-01	1.00E-01	7.20E-01	1.02E-03	n
Chromium VI	18540-29-9	4.90E+02	x	1.00E+01	1.00E+01	x	5.00E-01	5.00E-01	1.00E+01	x	n
Total Chromium	7440-47-3	x	x	x	x	1.00E-03	5.00E-01	5.00E-01	x	1.74E-02	n
Copper	7440-50-8	2.90E+03	1.30E+03	1.10E+01	1.10E+01	5.00E-04	1.00E-01	1.00E-01	1.10E+01	1.11E-01	n
Iron	7439-89-6	x	1.00E+03	1.00E+03	1.00E+03	1.00E+00	2.00E+01	2.00E+01	1.00E+03	5.41E+01	n
Lead	7439-92-1	x	x	2.50E+00	2.50E+00	1.00E-03	1.00E-01	1.00E-01	2.50E+00	6.08E-03	n
Manganese	7439-96-5a	x	5.00E+01	x	5.00E+01	2.00E-02	1.00E-01	1.00E-01	5.00E+01	5.93E+00	n
Nickel	7440-02-0	1.10E+03	8.00E+01	5.20E+01	5.20E+01	2.00E-03	1.00E-01	1.00E-01	5.20E+01	8.83E-02	n
Silver	7440-22-4	2.60E+04	x	3.20E+00	3.20E+00	2.00E-04	1.00E-01	1.00E-01	3.20E+00	6.81E-04	n
Zinc	7440-66-6	1.70E+04	2.30E+03	1.00E+02	1.00E+02	3.50E-03	5.00E+00	5.00E+00	1.00E+02	1.31E-01	n

3-Phase Model - Soil protective of groundwater/surface water	
Groundwater Cleanup Level (µg/Liter)	1.00E+02
Units Conversion (1 mg/1000 µg)	1.00E-03
Dilution Factor - Saturated Zone (1)	2.00E+01
Distribution Coefficient Kd (Liters/kg)	6.20E+01
Water-filled Soil Porosity - Saturated (ml water/ml soil)	3.00E-01
Air-filled Soil Porosity Saturated (ml air/ml soil)	1.30E-01
Henry's Law Constant - Hcc - dimensionless	0.00E+00
Dry Soil Bulk Density (kg/Liter)	1.50E+00
Soil Cleanup Level Protective of Groundwater - Saturated (mg/kg)	1.24E+02
Unsaturated Conditions	

Analyte	CAS	GW PCUL (ug/L)	SW PCUL (ug/L)	HCC @ 13° C (no unit)	Koc (L/Kg)	Kd (L/Kg)
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	8.00E+02	x	x	x
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	5.00E+02	x	x	x
Acetone	67-64-1	7.20E+03	x	9.68E-04	5.75E-01	5.75E-04
Benzene	71-43-2	5.00E+00	1.00E+01	1.33E-01	6.20E+01	6.20E-02
Bis(2-ethylhexyl)phthalate	117-81-7	6.00E+00	2.00E-01	6.56E-07	1.11E+05	1.11E+02
Butyl benzyl phthalate	85-68-7	4.61E+01	6.10E-01	1.11E-05	1.37E+04	1.37E+01
Carbon tetrachloride	56-23-5	5.00E+00	1.00E+00	7.42E-01	1.52E+02	1.52E-01
Chloroform	67-66-3	1.41E+01	6.00E+01	9.15E-02	5.30E+01	5.30E-02
1,2 Dibromethane (EDB)	106-93-4	5.00E-02	x	1.54E-02	6.60E+01	6.60E-02
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	8.90E+00	2.28E-02	3.80E+01	3.80E-02
Ethylbenzene	100-41-4	7.00E+02	1.20E+01	1.62E-01	2.04E+02	2.04E-01
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	1.31E-03	x	x
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.43E+01	x	1.59E-02	1.09E+01	1.09E-02
Methylene chloride	75-09-2	5.00E+00	1.00E+01	5.67E-02	1.00E+01	1.00E-02
Napthalene	91-20-3	1.60E+02	4.90E+03	8.24E-03	1.19E+03	1.19E+00
Pentachlorophenol	87-86-5	1.00E+00	6.00E-02	2.10E-07	5.92E+02	5.92E-01
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	2.40E+00	3.98E-01	2.65E+02	2.65E-01
Toluene	108-88-3	1.00E+03	5.30E+01	1.48E-01	1.40E+02	1.40E-01
Trichloroethylene (TCE)	79-01-6	5.00E+00	1.00E+00	2.39E-01	9.40E+01	9.40E-02
Vinyl Chloride	75-01-4	1.00E+00	1.00E+00	8.07E-01	1.86E+01	1.86E-02
Xylenes	1330-20-7	1.60E+03	5.70E+01	1.38E-01	2.33E+02	2.33E-01
cPAHs						
Benzo(a)anthracene	56-55-3	x	2.00E-02	1.37E-04	3.58E+05	3.58E+02
Benzo(a)pyrene	50-32-8	2.00E-01	2.00E-02	6.39E-06	9.69E+05	9.69E+02
Benzo(b)fluoranthene	205-99-2	x	2.00E-02	7.73E-04	1.23E+06	1.23E+03
Benzo(k)fluoranthene	207-08-9	x	2.00E-02	5.13E-06	1.23E+06	1.23E+03
Chrysene	218-01-9	x	2.00E-02	7.13E-04	3.98E+05	3.98E+02
Dibenz(a,h)anthracene	53-70-3	x	2.00E-02	6.03E-07	1.79E+06	1.79E+03
Indeno(1,2,3-cd)pyrene	193-39-5	x	2.00E-02	8.40E-06	3.47E+06	3.47E+03
Total Toxicity Equivalent (1) Concentration (TEQ)	x	2.00E-01	2.00E-02	6.39E-06	9.69E+05	9.69E+02
Metals (mg/kg)						
Arsenic	7440-38-2	5.00E+00	5.00E-01	0.00E+00	x	2.90E+01
Cadmium	7440-43-9a	5.00E+00	7.20E-01	0.00E+00	x	6.70E+00
Chromium VI	18540-29-9	5.00E+01	1.00E+01	0.00E+00	x	1.90E+01
Total Chromium	7440-47-3	5.00E+01	x	x	x	x
Copper	7440-50-8	6.40E+02	1.10E+01	0.00E+00	x	2.20E+01
Iron	7439-89-6	x	1.00E+03	0.00E+00	x	x
Lead	7439-92-1	1.50E+01	2.50E+00	0.00E+00	x	1.00E+04
Manganese	7439-96-5a	x	5.00E+01	0.00E+00	x	x
Nickel	7440-02-0	1.00E+02	5.20E+01	0.00E+00	x	6.50E+01
Silver	7440-22-4	8.00E+01	3.20E+00	0.00E+00	x	8.30E+00
Zinc	7440-66-6	4.80E+03	1.00E+02	0.00E+00	x	6.20E+01

Soil Protective of GW (mg/kg)	Soil Protective of SW (mg/kg)
3.00E+01	3.00E+01
2.00E+03	2.00E+03
2.89E+01	x
2.74E-02	5.47E-02
1.33E+01	4.45E-01
1.28E+01	1.70E-01
4.16E-02	8.33E-03
7.36E-02	3.13E-01
2.67E-04	x
2.40E-02	4.27E-02
5.85E+00	1.00E-01
x	x
1.03E-01	x
2.15E-02	4.30E-02
4.45E+00	1.36E+02
1.58E-02	9.50E-04
4.99E-02	2.40E-02
7.06E+00	3.74E-01
3.15E-02	6.29E-03
5.77E-03	5.77E-03
1.42E+01	5.07E-01
x	1.43E-01
3.88E+00	3.88E-01
x	4.92E-01
x	4.92E-01
x	1.59E-01
x	7.16E-01
x	1.39E+00
3.88E+00	3.88E-01
2.92E+00	2.92E-01
6.90E-01	9.94E-02
1.92E+01	3.84E+00
x	x
2.84E+02	4.88E+00
x	x
3.00E+03	5.00E+02
x	x
1.30E+02	6.78E+01
1.36E+01	5.44E-01
5.97E+03	1.24E+02

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg)	Method B Protection of Surface Water (mg/kg)	Simplified TEE Unrestricted (mg/kg)	Consultant Reporting Limit (mg/kg)	Ecology Reporting Limit (mg/kg)	Agreed upon PQL (mg/kg)	Natural Background (mg/kg)	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COC?	Based on?
TPH-Gx (gasoline-extended range) - Benzene Present	x	3.00E+01	x	3.00E+01	3.00E+01	2.00E+02	5.89E+00	5.00E+00	5.00E+00	x	3.00E+01	1.80E+02	y	H.H.
TPH-Dx (diesel and heavy-oil ranges combined)	x	2.00E+03	x	2.00E+03	2.00E+03	4.60E+02	2.48E+01	2.50E+01	2.50E+01	x	4.60E+02	2.86E+04	y	TEE
Acetone	67-64-1	x	7.20E+04	2.89E+01	x	x	5.00E-01	1.00E-01	5.00E-01	x	7.20E+04	ND	n	
Benzene	71-43-2	3.00E-02	1.80E+01	2.74E-02	5.47E-02	x	2.35E-02	5.00E-03	2.35E-02	x	1.80E+01	1.52E-01	n	
Bis(2-ethylhexyl)phthalate	117-81-7	x	7.10E+01	1.33E+01	4.45E-01	x	5.30E-02	5.00E-02	5.30E-02	x	4.45E-01	1.26E+00	y	Soil>GW>SW
Butyl benzyl phthalate	85-68-7	x	5.30E+02	1.28E+01	1.70E-01	x	5.20E-02	5.00E-02	5.20E-02	x	5.30E+02	2.41E-01	n	
Carbon tetrachloride	56-23-5	x	1.40E+01	4.16E-02	8.33E-03	x	5.00E-02	1.00E-03	5.00E-02	x	1.40E+01	ND	n	
Chloroform	67-66-3	x	3.20E+01	7.36E-02	3.13E-01	x	2.21E-02	1.00E-03	2.21E-02	x	3.20E+01	1.57E-01	n	
1,2 Dibromomethane (EDB)	106-93-4	5.00E-03	5.00E-01	2.67E-04	x	x	5.00E-03	1.00E-03	5.00E-03	x	5.00E-01	ND	n	
1,2 Dichloroethane (EDC)	107-06-2	x	1.10E+01	2.40E-02	4.27E-02	x	2.00E-02	1.00E-03	2.00E-02	x	1.10E+01	ND	n	
Ethylbenzene	100-41-4	6.00E+00	8.00E+03	5.85E+00	1.00E-01	x	2.92E-02	5.00E-03	2.92E-02	x	8.00E+03	6.10E+00	n	
Methyl ethyl ketone (2-Butanone)	78-93-3	x	4.80E+04	x	x	x	5.00E-02	1.00E-03	5.00E-02	x	4.80E+04	ND	n	
Methyl tertiary butyl ether (MTBE)	1634-04-4	x	5.60E+02	1.03E-01	x	x	5.00E-02	1.00E-03	5.00E-02	x	5.60E+02	ND	n	
Methylene chloride	75-09-2	2.00E-02	9.40E+01	2.15E-02	4.30E-02	x	5.00E-02	1.00E-03	5.00E-02	x	9.40E+01	ND	n	
Napthalene	91-20-3	5.00E+00	1.60E+03	4.45E+00	1.36E+02	x	4.23E-02	5.00E-01	4.23E-02	x	1.60E+03	ND	n	
Pentachlorophenol	87-86-5	x	2.50E+00	1.58E-02	9.50E-04	1.10E+01	4.10E-02	1.60E-02	4.10E-02	x	4.10E-02	ND	n	
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	4.80E+02	4.99E-02	2.40E-02	x	5.00E-02	1.00E-03	5.00E-02	x	4.80E+02	ND	n	
Toluene	108-88-3	7.00E+00	6.40E+03	7.06E+00	3.74E-01	x	2.23E-02	5.00E-03	2.23E-02	x	6.40E+03	2.35E+01	n	
Trichloroethylene (TCE)	79-01-6	3.00E-02	1.20E+01	3.15E-02	6.29E-03	x	5.00E-02	1.00E-03	5.00E-02	x	1.20E+01	ND	n	
Vinyl Chloride	75-01-4	x	6.70E-01	5.77E-03	5.77E-03	x	5.00E-02	1.00E-03	5.00E-02	x	6.70E-01	ND	n	
Xylenes	1330-20-7	9.00E+00	1.60E+04	1.42E+01	5.07E-01	x	5.91E-02	5.00E-03	5.91E-02	x	1.60E+04	1.71E-01	n	
cPAHs														
Benzo(a)anthracene	56-55-3	x	x	x	1.43E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	1.08E+01	n	
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	3.88E+00	3.88E-01	3.00E+01	4.22E-02	5.00E-02	5.00E-02	x	1.90E-01	1.02E+01	y	H.H
Benzo(b)fluoranthene	205-99-2	x	x	x	4.92E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	8.05E+00	n	
Benzo(k)fluoranthene	207-08-9	x	x	x	4.92E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	ND	n	
Chrysene	218-01-9	x	x	x	1.59E-01	x	4.22E-02	5.00E-02	5.00E-02	x	x	1.06E+01	n	
Dibenz(a,h)anthracene	53-70-3	x	x	x	7.16E-01	x	4.26E-02	5.00E-02	5.00E-02	x	x	1.53E-01	n	
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	1.39E+00	x	4.32E-02	5.00E-02	5.00E-02	x	x	2.79E-01	n	
Total Toxicity Equivalent (1) Concentration (TEQ)	x	1.00E-01	1.90E-01	3.88E+00	3.88E-01	x		5.00E-02	5.00E-02	x	1.90E-01	1.30E+01	y	H.H
Metals (mg/kg)														
Arsenic	7440-38-2	2.00E+01	6.70E-01	2.92E+00	2.92E-01	2.00E+01	3.22E-01	1.00E-01	3.22E-01	2.00E+01	2.00E+01	2.92E+01	y	N.B.
Cadmium	7440-43-9a	2.00E+00	8.00E+01	6.90E-01	9.94E-02	2.50E+01	1.72E-01	1.00E-01	1.72E-01	1.00E+00	2.50E+01	4.15E+00	n	
Chromium VI	18540-29-9	1.90E+01	2.40E+02	1.92E+01	3.84E+00	4.20E+01	5.51E-01	5.00E-01	5.51E-01	4.20E+01	4.20E+01	5.80E-01	n	
Total Chromium	7440-47-3	x	x	x	x	4.20E+01	x	5.00E-01	5.00E-01	4.20E+01	x	ND	n	
Copper	7440-50-8	x	3.20E+03	2.84E+02	4.88E+00	1.00E+02	2.57E-01	1.00E-01	2.57E-01	3.60E+01	1.00E+02	9.75E+01	n	
Iron	7439-89-6	x	5.60E+04	x	x	x	x	5.00E+00	5.00E+00	5.15E+04	5.60E+04	ND	n	
Lead	7439-92-1	2.50E+02	x	3.00E+03	5.00E+02	2.20E+02	2.57E-01	1.00E-01	2.57E-01	1.70E+01	2.20E+02	1.87E+03	y	TEE
Manganese	7439-96-5a	x	3.70E+03	x	x	x	x	1.00E-01	1.00E-01	1.10E+03	3.70E+03	ND	n	
Nickel	7440-02-0	x	1.60E+03	1.30E+02	6.78E+01	1.00E+02	6.44E-01	1.00E-01	6.44E-01	4.60E+01	1.00E+02	3.60E+01	n	
Silver	7440-22-4	x	4.00E+02	1.36E+01	5.44E-01	x	8.69E-02	1.00E-01	8.69E-02	x	4.00E+02	5.06E-01	n	
Zinc	7440-66-6	x	2.40E+04	5.97E+03	1.24E+02	2.70E+02	6.44E-01	5.00E+00	6.44E-01	8.60E+01	2.70E+02	5.61E+02	y	TEE

Additional Contaminants Not Detected	
Analyte	CAS
PCBs	
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4
Herbicides	
2,4,5-TP (Silvex)	93-72-1
2,4,5-Trichlorophenoxyacetic Acid	93-76-5
2,4-D	94-75-7
2,4-DB	94-82-6
3,5-Dichlorobenzoic Acid	51-36-5
4-Nitrophenol	100-02-7
Acifluorfen	62476-59-9
Bentazone	25057-89-0
Chloramben	133-90-4
Dalapon	75-99-0
DCPA Acid (Dacthal)	1861-32-1
Dicamba	1918-00-9
Dichloroprop	120-36-5
Dinoseb (DNBP)	88-85-7
MCPA	94-74-6
MCPP	93-65-2
Picloram	2/1/1918
Pesticides	
4',4-DDD	72-54-8
4',4-DDE	72-55-9
4,4-DDT	50-29-3
a-BHC	319-84-6
Aldrin	309-00-2
b-BHC	319-85-7
Chlordane, cis (alpha)	5103-71-9
Chlordane, gamma	12789-03-6
d-BHC	319-86-8
Dieldrin	60-57-1
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan Sulfate	1031-07-8
Endrin	72-20-8
Endrin Aldehyde	7421-93-4
Endrin Ketone	53494-70-5
g-BHC	58-89-9
Heptachlor	76-44-8
Heptachlor Epoxide	1024-57-3
Methoxychlor	72-43-5
Toxaphene	8001-35-2



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Central Region Office
1250 West Alder St., Union Gap, WA 98903-0009 • 509-575-2490

Memorandum

To: John Zinza PE, Cleanup Project Manager (Boise Cascade Mill Site)
Toxics Cleanup Program - Central Region Office

From: Arthur Buchan, Toxicologist
Toxics Cleanup Program – Central Region Office

Cc: Jennifer Lind, Cleanup Project Manager (Interstate 82 Exit 33A - Yakima
Landfill Site)
Toxics Cleanup Program - Central Region Office

Date: February 11, 2026

RE: Yakima County East-West Corridor Roadway Project, Development of
Preliminary Cleanup Levels (PCULs). Boise Cascade Mill Site

Background and Scope

This memorandum represents comments from the Washington State Department of Ecology, Toxics Cleanup Program (TCP) regarding the development of Preliminary Cleanup Levels (PCULs) for the Yakima County East-West Corridor Roadway Project (E-W Corridor) portion^{1,2} of the following MTCA cleanup site:

Boise Cascade Mill (Site)³

¹ The E-W Corridor is a portion of the BCM Cleanup Site that is being cleaned up by the County in anticipation of a large infrastructure project. We are referring to it as the E-W Corridor to avoid confusion with the larger BCM Site that is being cleaned up under Agreed Order (AO) DE-13959. The bulk of the BCM Site is located on the west side of I-82. The E-W Corridor is located on the east side of I-82 and includes any contamination under I-82 that may be encountered during construction of an underpass. Any contamination remaining in the vicinity of the E-W Corridor after the County's cleanup actions are complete under and in accordance with the anticipated de minimis consent decree will remain the responsibility of the BCM PLP s under the AO.

² The E-W Corridor is primarily located on Yakima County parcels 191318-11002, and 191318-41002. The extents of the E-W Corridor in relation to the Boise Cascade Mill Site is expected to be established in a de minimis consent decree.

³ The Boise Cascade Mill site is adjacent to the Interstate 82 Exit 33A Yakima City Landfill site; CSID 3853; and FSID 1927.

Facility site identification (FSID) # 450

Cleanup site identification (CSID) # 12095

The comments provided are in effort to help complete the Remedial Investigation (RI) limited to the E-W Corridor, which is intended to investigate the nature and extent of any contamination found on the E-W Corridor. Note: It does not appear that sampling results for the E-W Corridor portion of the Site have been downloaded into Ecology's EIM database. As a result, there may be data-gaps in the literature reviewed for the Site in this memorandum. Literature reviewed for this memorandum includes:

- 1) Barr Inc. (2021). Revised Draft Remedial Investigation Report: Yakima Mill Site (aka Boise Cascade Mill Site). Prepared for OfficeMax Incorporated, LeeLynn, Inc. & Wiley Mt., Inc., Yakima Resources, LLC, Dunollie Enterprises, LLC. Agreed Order No. DE 13959, Facility Site ID 450, Cleanup Site ID 12095.
- 2) Maul, Foster, and Alongi. (2024). Initial Investigation Report: East-West Corridor Roadway. Yakima, Washington.
- 3) Ecology. (2024). Memorandum: Ecology Comments on 1st Draft Environmental Assessment Work Plan East-West Corridor Project.
- 4) Shannon and Wilson. (2023). Geotechnical Engineering and Environmental Report: Cascade Mill Parkway, Phase 3.

Important considerations, assumptions, and limitations to note on this memorandum:

1. The formal cleanup sites listed below are directly adjacent to, and upgradient from the E-W Corridor Project from a Hydro-geologic perspective. Meaning, groundwater flows from the direction of the parts of the formal cleanup sites west of I-82 towards the E-W Corridor:
 - a. Boise Cascade Mill Cleanup Site (portion on the west side of Interstate 82): CSID 12095, FSID 450; and
 - b. Interstate 82 Exit 33A Yakima City Landfill Cleanup Site⁴: CSID 3853, FSID 1927.
2. Ecology previously requested sampling for specific contaminants that were detected directly adjacent to, and/or upgradient from the East-West Corridor Project from a Hydro-geologic perspective (Ecology, 2024). Those contaminants have been included in this memorandum with assumed complete pathways from Soil to Groundwater (GW) to Surface Water (SW), as described in this memorandum.
3. Empirical demonstrations and highest detected values (provided by the PLP/Consultant may change the PCULs listed.

⁴ The Interstate 82 Exit 33A Yakima City Landfill Cleanup Site (aka Landfill) is another cleanup Site located west of I-82 and generally situated at the southeast corner of the BCM Site.

4. Establishing compliance with GW and SW cleanup standards - The preliminary GW data shows very few detections, but additional monitoring will be necessary to demonstrate this remains consistent with GW table fluctuations over time. The frequency and number of future monitoring events should be discussed with the Ecology Cleanup Project Manager.
5. When evaluating the potential for cPAH mixtures in the soil to impact groundwater pathway, both the toxicity and mobility of the individual cPAHs must be considered when determining compliance. Refer to Ecology Implementation Memorandum #10, Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs) (Publication No. 15-09-049⁵) for a list of method options.
6. Ecology Method Reporting Limits (MRLs)/Practical Quantitation Limits (PQLs) are draft subject to revision based on information from Ecology Manchester Laboratory.
7. Ecology has not received a Conceptual Site Model for this specific project).

MTCA Methods for Establishing Cleanup Levels at sites:

In brief summary Method A, Method B, and Method C may be used for establishing cleanup levels at sites as follows:

- Specifically, Ecology uses the following general guidelines for mixing methods:
 - When using Method A, the site must be considered a simple site or routine cleanup and there must not be multiple chemicals without Method A table values;
 - When using Method B, Method A cleanup levels may be used but not Method C cleanup levels.
 - Method B is intended for all other sites.
- While each medium must be evaluated separately using criteria applicable to that medium, it has not been established that any medium within any of the sites qualifies to use Method C.

MTCA Method B was used to establish preliminary cleanup levels for the E-W Corridor because:

- Numerous individual contaminants and mixtures have been investigated at the Site; and
- Pathways potentially exist for soil, groundwater, surface water, and sediments.

Groundwater Preliminary Cleanup Levels

In general, WAC 173-340-720 requires that groundwater cleanup levels be set at concentrations that protect for drinking water beneficial uses, unless the groundwater qualifies as nonpotable. A determination of whether the groundwater qualifies as

⁵ <https://apps.ecology.wa.gov/publications/documents/1509049.pdf>

nonpotable must be made on a site-specific basis, based on the criteria in WAC 173-340-720(2). However, for this Site, it is assumed that the groundwater shall be protected for drinking water beneficial use.

WAC 173-340-720 also requires groundwater cleanup levels to be protective of surface water beneficial uses unless it can be demonstrated that the hazardous substances in the groundwater are not likely to reach surface water. The exposure pathway of concern is the discharge of contaminated groundwater into the surface water and for the protection of drinking water purposes, aquatic organisms living in that surface water and sediment, and persons that consume those organisms. This can occur directly through current or future excavations (i.e. construction activities), migration and seepage of the groundwater into the surface water and sorption onto the sediments, or indirectly through groundwater intercepted by ditches, foundation drains, utility corridors, and stormwater systems (including pipes, which typically are not water-tight), that then drain to surface water. It can also occur through temporary construction dewatering systems that discharge to storm drains that then discharge either directly or indirectly to surface water.

For the groundwater to surface water exposure pathway, WAC 173-340-720 requires that the methods specified in WAC 173-340-730 for establishing surface water cleanup levels be used to develop groundwater cleanup levels protective of surface water.

Surface Water Preliminary Cleanup Levels

In general, WAC 173-340-730 requires surface water cleanup levels to be protective based on estimates of highest beneficial use and reasonable maximum exposure expected to occur under both current and potential future site use. This includes protection of aquatic organisms, and persons that consume these organisms (Ecology, 2005). More specifically, it requires surface water cleanup levels to be at least as stringent as:

- Applicable state and federal laws;
- Concentrations protective of wildlife, fish, and other aquatic life;
- Concentrations protective of human health (such as through consumption of fish); and
- Drinking water, for surface waters classified as suitable for domestic water supply under water quality law.

In addition, both WAC 173-340-720(1)(c) and 730(1)(d) require cleanup levels that do not directly or indirectly cause violations of cleanup standards in other media, including the sediment cleanup standards. And, if a conditional point of compliance is used, WAC 173-340-720(8)(d) requires groundwater discharges not result in violations of sediment cleanup levels published in Chapter 173-204 WAC.

Note: If multiple chemicals with similar toxic effects on human health are present at a site, these concentrations may need to be further adjusted so that the additive risk does not exceed the acceptable thresholds in the rule (hazard index ≤ 1 and cancer risk $\leq 1 \times 10^{-5}$). These adjustments will need to be made on a site-specific basis. This adjustment for additive risk does not need to be made for contaminants with cleanup levels controlled by

protection of the environment (wildlife, fish, and other aquatic life). Rather, if multiple chemicals are present, it may be appropriate to otherwise account for additive risk by, for example, conducting bioassays with the groundwater, to determine if the combined effect is an environmental concern.

Point of Compliance (Groundwater and Surface Water)

The Point of Compliance in groundwater is:

- Throughout the Site:
 - The Site includes the East-West Corridor portion of the above mentioned MTCA cleanup site – FSID # 450, CSID # 12095) from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the Site; and
- The Standard Point of Compliance is:
 - The point or points where the groundwater cleanup levels must be attained at the site to be in compliance with groundwater cleanup standards. Groundwater cleanup levels shall be attained in all groundwaters from the point of compliance to the outer boundary of the hazardous substance plume. This means that the Point of Compliance for groundwater is all wells within the characterized area.

The Point of Compliance for surface water is:

- The point or points at which hazardous substances are released to the surface waters of the state; and
- The point at which hazardous substances are released to the surface water as a result of groundwater flows, no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels. The point of compliance is the point at which there is a discharge to the surface water at the nearest groundwater well (or soil erosion) to the surface water.
- There are two possible results if surface water is located on or directly adjacent to the site⁶:
 - Result (1): There is no contamination reaching the surface water (check wells and soil near the surface water):
 - Eliminate the surface water pathway in the remedial investigation. Use your groundwater cleanup level (i.e., drinking water) throughout the site.
 - Result (2): There is contamination reaching the surface water (check wells and soil near the surface water):

⁶ At the time of this memo, not enough information about the fate and transport of contamination has been collected to determine contamination has not reached surface water; therefore, the more stringent cleanup levels will be used (Result (2)).

- Retain the surface water pathway in the remedial investigation. Use the more stringent cleanup level (groundwater vs. surface water) throughout the site.

Important: Well construction and Placement: As a result of the Point of Compliance for groundwater and surface water, it is important to be sure that the wells are properly placed and constructed, so that any contamination that reaches the surface water (down-gradient from the contamination) may be documented in the remedial investigation.

Establishing Preliminary Cleanup Levels for Groundwater

Under Method B, WAC 173-340-720(4) (b) requires that groundwater cleanup levels to be at least as stringent as all of the following:

- Maximum contaminant levels established under the Safe Drinking Water Act and published in 40 C.F.R. 141; and
- Maximum contaminant level goals for noncarcinogens established under the Safe Drinking Water Act and published in 40 C.F.R. 141; and
- Maximum contaminant levels established by the state board of health and published in chapter 246-290 WAC.
- Concentrations in groundwater must be protective of surface water beneficial use unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site.

In addition, under WAC 173-340-720(7)(b), when a cleanup level is based on the applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) or a hazard index of one (1) at the site (See Appendix A: Figure 1).

Establishing Preliminary Cleanup Levels for Surface Water

Under Method B, WAC 173-340-730(3) (b) requires surface water cleanup levels to be at least as stringent as all of the following:

- Concentrations established under applicable state and federal laws (ARARs) including:
 - Water quality criteria published in the water quality standards for surface waters of the state of Washington, chapter 173-201A WAC;
 - Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published under section 304 of the Clean Water Act *unless it can be demonstrated that such criteria are not relevant and appropriate for a specific surface water body or hazardous substance*; and
 - National Toxics Rule (40 C.F.R. Part 131).

- For substances for which environmental effects-based concentrations have not been established under applicable state or federal laws, concentrations that are estimated to result in no adverse effects on the protection and propagation of wildlife, fish, and other aquatic life.
- For substances for which sufficiently protective, health-based criteria or standards have not been established under state and federal laws, concentrations that protect human health as determined using the formulae in the rule. Note: For the purposes of this project, a Fish Consumption Rate of 130 grams/day was proposed by Ecology and was used in MTCA Equations 730-1 (non-carcinogens) and 730-2 (carcinogens).
- Potable water cleanup levels, for surface waters classified as suitable for use as a domestic water supply under chapter 173-201A WAC.

In addition, under WAC 173-340-730(5)(b), when a cleanup level is based on the applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) or a hazard index of one (1) at the site (See Appendix A: Figure 2).

Soil Preliminary Cleanup Levels

In general, WAC 173-340-740 requires that soil cleanup levels be set at concentrations that:

- Eliminate or substantially reduce the potential for food chain contamination; and
- Eliminate or substantially reduce the potential for damage to soils or biota in the soils which could impair the use of soils for agriculture or silviculture purposes; and
- Protect the potential health risk posed by dust at a site; and
- Protect the groundwater at a site; and
- Protect nearby surface waters from the site; and
- Eliminate or minimize the potential for vapors in building or structures.

To meet these requirements for soil, preliminary concentrations have been established based on the protection of:

- Human health (direct contact); and
- Terrestrial Ecological Receptors; and
- Soil protective of groundwater (highest beneficial use); and
- Soil protective of groundwater with transport to surface water (highest beneficial use).

Note that protective values have been adjusted for the practical quantitation limits and natural background concentrations for soil as required by WAC 173-340-740(5) (c) when establishing cleanup standards.

In addition, if multiple chemicals with similar toxic effects on human health are present at a site, these concentrations may need to be further adjusted so that the additive risk does not exceed the acceptable thresholds in the rule (hazard index ≤ 1 and cancer risk $\leq 1 \times 10^{-5}$). These adjustments will need to be made on a site-specific basis. This adjustment for additive risk does not need to be made for contaminants with cleanup levels controlled by protection of the environment (terrestrial ecological receptors). Rather, if multiple chemicals are present, it may be appropriate to otherwise account for additive risk by, for example, conducting bioassays with the soil, to determine if the combined effect is an environmental concern.

Point of Compliance (Soil)

The Point of Compliance for soil is:

- For soil cleanup levels based on the protection of groundwater, the point of compliance shall be established in the soils throughout the site; and
- For soil cleanup levels based on protection from vapors, the point of compliance shall be established in the soils throughout the site from the ground surface to the uppermost ground water saturated zone (e.g., from the ground surface to the uppermost water table); and
- For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities; and
- For soil cleanup levels based on ecological receptors, the standard point of compliance is set from the ground surface to fifteen feet below the ground surface. The department may approve a conditional point of compliance set at the biologically active zone with placement of an institutional control to prevent excavation of deeper soil.

Terrestrial Ecological Receptors

Protective values for terrestrial ecological receptors should be established under the assumption that a Site-Specific Terrestrial Ecological Evaluation (TEE) would meet the requirements at this site. Table 749-3 of MTCA may be used to develop screening levels for contaminants. Any contaminants found at the site (not included in Table 749-3) may use a literature review to develop screening levels based on protective concentrations.

It was determined that a Site-Specific TEE would be most appropriate at this location based on Priority Habitat and Species. Priority Habitat and Species found within the Polygon include:

- Dolly Varden/Bull Trout found in the Yakima River;
- Rainbow Trout found in the Yakima River;
- Chinook (Spring, Summer, Fall) found in the Yakima River;

- Steelhead (Summer) found in the Yakima River;
- Coho found in the Yakima River;
- Freshwater Forested/Shrub Wetland;
- Shrubsteppe;
- Sharp-tailed Snake.

See Appendix A: Figure 3 for WDFW Priority Species Map;

See Appendix A: Figure 4 for protective values and literature sources for ecological receptors.

Soil Protective of Groundwater and Soil Protective of Groundwater with Transport to Surface Water – Assumed Saturated Conditions for this Environmental Assessment

Soil values that are protective of groundwater, and soil protective of groundwater with transport to surface water should be calculated using the fixed parameter three-phase partitioning model found in WAC 173-340-747. Saturated conditions were used in the calculations for this Preliminary Cleanup Level Development Memorandum.

PCULs established should be based on protection of the highest beneficial use with and upward adjustment to take into account natural background or practical quantitation limits, where applicable.

The Cleanup Levels and Risk Calculation (CLARC)⁷ Tool was used to derive the following chemical specific parameters:

- Hcc = Henry's Law Constant @ 13° C (dimensionless); and
- Kd = Distribution Coefficient (L/kg); and
- Koc = Soil organic carbon-water partitioning coefficient (ml/g).

Equation 747-1 was used to derive the following default parameters:

- UCF = Unit conversion factor (1 mg/1,000 ug); and
- DF = Dilution faction (dimensionless – 1 for saturated); and
- Θ_w = Water-filled soil porosity (ml water/ml soil – 0.43 for saturated); and
- Θ_a = Air-filled soil porosity (ml air/ml soil – 0.0 for saturated); and
- P_b = Dry soil bulk density (1.5 kg/L).

Note: Soil protective of groundwater values were derived directly from CLARC. Soil protective of groundwater with transport to surface water were calculated using the three-phase model (See Appendix A: Figure 5).

Soil Protective of Direct Contact

Soil that is considered protective of direct contact is based on concentrations that are estimated to result in no acute or chronic noncarcinogenic toxic effects on human health using a hazard quotient of one (1) and concentrations for which the upper bound on the

⁷ <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/clarc>

estimated excess cancer risk is less than or equal to one in one million (1×10^{-6}). Equations 740-1 and 740-2 (MTCA) and the associated default assumptions shall be used to calculate the concentration for direct contact with contaminated soil.

Establishing Preliminary Cleanup Levels for Soil

In general, standard Method B soil cleanup levels shall be at least as stringent as the following:

- Concentrations established under applicable state and federal laws; and
- Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through 7494; and
- For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health as determined by evaluating the following exposure pathways:
 - Ground water protection; and
 - Soil direct contact; and
 - Soil vapors

It is assumed that soil vapors are not a pathway at this site (See Appendix A: Figure 6).

Establishing Preliminary Cleanup Levels for Sediments

The establishment of Preliminary Cleanup Levels for Sediment must comply with the requirements of chapter 173-204 WAC. In general, the sediment cleanup standards require the Sediment Cleanup Objective (SCO) risk-based concentration (for this project) to be the lowest of:

- Freshwater Benthic SCO (WAC 173-204-563);
- Human Risk 10^{-6} , $HQ \leq 1$ (WAC 173-204-561);
- Higher Trophic Level Risk (WAC 173-204-564); and
- Applicable Laws under WAC 173-204-560(3) and WAC 173-204-505(2).

Then, the risk-based SCO is upward adjusted to be the highest of:

- Natural Background;
- Risk Based Concentration; and
- Practical Quantitation Limit.

In order to meet these site-specific requirements, the PCUL was based on the lowest of the:

- Freshwater Benthic Criteria found in WAC 173-204-563 (Table VI)
- The SMS Lower Tier Human Health Direct Contact SCO:
 - Sediment Ingestion/Direct Contact, Cancer

SMS SCUM II, Equation 9-1 (sediment ingestion / direct contact, cancer)			
$RBC-SED-C = \frac{ACR \times BW \times AT_c}{EF \times ED \times \left[\left(\frac{IR \times AB \times CPF_o}{UCF} \right) + \left(\frac{SA \times AF \times ABS \times CPF_d}{UCF} \right) \right]}$			

General Parameters		
RBC-SED-C	Risk-based concentration, sediment, cancer	mg/kg
ACR	Acceptable cancer risk level	unitless
AB	Gastrointestinal absorption fraction	unitless
CPF _o	Oral cancer potency factor	(mg/kg-day) ⁻¹
UCF	Unit conversion factor	mg/kg
ABS	Dermal absorption factor	unitless
CPF _d	Dermal cancer potency factor	(mg/kg-day) ⁻¹

Scenario-Specific Parameters		
BW	Average body weight over exposure duration	kg
AT _c	Averaging time (cancer)	days
EF	Exposure frequency	days/year
ED	Exposure duration	years
IR	Sediment ingestion rate	mg/day
SA	Skin surface area	cm ² /day
AF	Sediment-to-skin adherence factor	mg/cm ² -day
Intermediate Calculations		
ISDIF _{1c}	Intermediate sediment intake factor 1, cancer	mg
ISDIF ₂	Intermediate sediment intake factor 2	mg/day

- Sediment Ingestion/Direct Contact, Non-Cancer

SMS SCUM II, Equation 9-2 (sediment ingestion / direct contact, noncancer)

$$RBC-SED-N = \frac{HQ \times BW \times ATn}{EF \times ED \times \left[\left(\frac{IR \times AB}{RfDo \times UCF} \right) + \left(\frac{SA \times AF \times ABS}{RfDd \times UCF} \right) \right]}$$

General Parameters

RBC-SED-N	Risk-based concentration, sediment, noncancer	mg/kg
HQ	Hazard quotient	unitless
AB	Gastrointestinal absorption fraction	unitless
RfDo	Oral reference dose	mg/kg-day
UCF	Unit conversion factor	mg/kg
ABS	Dermal absorption factor	unitless
RfDd	Dermal reference dose	mg/kg-day

Scenario-Specific Parameters

BW	Average body weight over exposure duration	kg
ATn	Averaging time (noncancer)	days
EF	Exposure frequency	days/year
ED	Exposure duration	years
IR	Sediment ingestion rate	mg/day
SA	Skin surface area	cm ² /day
AF	Sediment-to-skin adherence factor	mg/cm ² -day

Intermediate Calculations

ISDIF1n	Intermediate sediment intake factor 1, noncancer	mg
ISDIF2	Intermediate sediment intake factor 2	mg/day

The Risk-Based Values were then upward adjusted to either a Freshwater Natural Background or PQL (based on SCUM II – Ecology Pub # 12-09-057).

Please Note: Seafood Consumption for Sediments was not evaluated due to lack of site-specific BSAF.

(See Appendix A: Figure 7).

Ecology TCP Memorandum: E-W Corridor Development of PCULs

Site: Boise Cascade Mill

February 11, 2026

Appendix A: Figures

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

East/West Corridor								
FSID # 450								
CSID # 12095								
GW Regulation								
GW Guidance								
Analyte	CAS	Target Value for Leaching Model (ug/L)	Final H.H. Protective Value	Natural Background	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)
Master CLARC Spreadsheet Column	A	AN				Guidance for TPH		
MTCR Table 830-1								
TPH- Gx (Gasoline)	x	1.00E+03	1.00E+03	x	x	5.00E+01	5.00E+01	1.00E+03
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	5.00E+02	5.00E+02	x	x	2.50E+02	2.50E+02	5.00E+02
Acenaphthene	83-32-9	4.80E+02	4.80E+02	x	x	5.00E-02	5.00E-02	4.80E+02
Anthracene	120-12-7	2.40E+03	2.40E+03	x	x	5.00E-02	5.00E-02	2.40E+03
Benzene	71-43-2	5.00E+00	5.00E+00	x	x	1.00E+00	1.00E+00	5.00E+00
Bis(2-ethylhexyl)phthalate	117-81-7	6.00E+00	6.00E+00	x	x	5.00E-01	5.00E-01	6.00E+00
Butyl benzyl phthalate (BBP)	85-68-7	4.61E+01	4.61E+01	x	x	2.00E-01	2.00E-01	4.61E+01
Chlorobenzene	108-90-7	1.00E+02	1.00E+02	x	x	1.00E+00	1.00E+00	1.00E+02
Chloroform	67-66-3	1.41E+01	1.41E+01	x	x	1.00E+00	1.00E+00	1.41E+01
4,4'-DDD	72-54-8	3.65E-01	3.65E-01	x	x	2.50E-03	2.50E-03	3.65E-01
4,4'-DDT	50-29-3	2.57E-01	2.57E-01	x	x	2.50E-03	2.50E-03	2.57E-01
3,3'-Dichlorobenzidine	91-94-1	1.94E-01	1.94E-01	x	x	2.00E+00	2.00E+00	2.00E+00
2,4-Dichlorophenol	120-83-2	4.80E+01	4.80E+01	x	x	2.00E+00	2.00E+00	4.80E+01
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	x	x	1.00E+00	1.00E+00	7.00E+02
Fluoranthene	206-44-0	6.40E+02	6.40E+02	x	x	5.00E-02	5.00E-02	6.40E+02
Fluorene	86-73-7	3.20E+02	3.20E+02	x	x	5.00E-02	5.00E-02	3.20E+02
1-Methylnaphthalene	90-12-0	8.58E-01	8.58E-01	x	x	5.00E-02	5.00E-02	8.58E-01
2-Methylnaphthalene	91-57-6	3.20E+01	3.20E+01	x	x	5.00E-02	5.00E-02	3.20E+01
N-Nitrosodiphenylamine	1116-54-7	1.79E+01	1.79E+01	x	x	2.00E+00	2.00E+00	1.79E+01
Naphthalene	91-20-3	1.60E+02	1.60E+02	x	x	1.00E+00	1.00E+00	1.60E+02
Toluene	108-88-3	6.40E+02	6.40E+02	x	x	1.00E+00	1.00E+00	6.40E+02
Total PCBs	1336-36-3	2.19E-01	2.19E-01	x	x	1.00E-02	1.00E-02	2.19E-01
Pentachlorophenol	87-86-5	1.00E+00	1.00E+00	x	x	6.00E-02	6.00E-02	1.00E+00
Phenanthrene (use pyrene as a surrogate)	129-00-0	2.40E+02	2.40E+02	x	x	5.00E-02	5.00E-02	2.40E+02
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	x	x	1.00E+00	1.00E+00	5.00E+00
1,2,3-Trichlorobenzene	87-61-6	6.40E+00	6.40E+00	x	x	1.00E+00	1.00E+00	6.40E+00
1,2,4-Trichlorobenzene	120-82-1	1.51E+01	1.51E+01	x	x	1.00E+00	1.00E+00	1.51E+01
Vinyl Chloride	75-01-4	2.92E-01	2.92E-01	x	x	1.00E+00	1.00E+00	1.00E+00
Total Xylenes	1330-20-7	1.60E+03	1.60E+03	x	x	1.00E+00	1.00E+00	1.60E+03
cPAHs								
Benzo(a)anthracene	56-55-3	x	x	x	x	5.00E-02	5.00E-02	x
Benzo(a)pyrene	50-32-8	2.00E-01	2.00E-01	x	x	5.00E-02	5.00E-02	2.00E-01
Benzo(b)fluoranthene	205-99-2	x	x	x	x	5.00E-02	5.00E-02	x
Benzo(k)fluoranthene	207-08-9	x	x	x	x	5.00E-02	5.00E-02	x
Chrysene	218-01-9	x	x	x	x	5.00E-02	5.00E-02	x
Dibenzo(a,h)anthracene	53-70-3	x	x	x	x	5.00E-02	5.00E-02	x
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	x	5.00E-02	5.00E-02	x
cPAH TEQ	x	2.00E-01	2.00E-01	x	x	5.00E-02	5.00E-02	2.00E-01
Metals								
Arsenic	7440-38-2	5.00E+00	5.00E+00	7.00E+00	x	5.00E-01	5.00E-01	7.00E+00
Barium	7440-39-3	2.00E+03	2.00E+03	x	x	6.25E-01	6.25E-01	2.00E+03
Cadmium	7440-43-9	5.00E+00	5.00E+00	x	x	1.00E-01	1.00E-01	5.00E+00
Chromium III	16065-83-1	2.40E+04	2.40E+04	x	x	2.00E-01	2.00E-01	2.40E+04
Chromium (Total)	7440-47-3	1.00E+02	1.00E+02	x	x	5.00E-01	5.00E-01	1.00E+02
Copper	7440-50-8	6.40E+02	6.40E+02	x	x	5.00E-01	5.00E-01	6.40E+02
Iron	7439-89-6	3.00E+02	3.00E+02	x	x	2.05E+00	2.05E+00	3.00E+02
Lead	7439-92-1	1.50E+01	1.50E+01	x	x	1.00E-01	1.00E-01	1.50E+01
Manganese	7439-96-5	5.00E+01	5.00E+01	x	x	1.03E+00	1.03E+00	5.00E+01
Mercury	7439-97-6	2.00E+00	2.00E+00	x	x	6.00E-03	6.00E-03	2.00E+00
Nickel	7440-02-0	3.20E+02	3.20E+02	x	x	5.00E-01	5.00E-01	3.20E+02
Selenium	7782-49-2	5.00E+01	5.00E+01	x	x	5.00E-01	5.00E-01	5.00E+01
Silver	7440-22-4	8.00E+01	8.00E+01	x	x	5.00E-01	5.00E-01	8.00E+01
Zinc	7440-66-6	4.80E+03	4.80E+03	x	x	5.00E+00	5.00E+00	4.80E+03

Figure 1: Calculation of Preliminary Cleanup Levels for Groundwater.

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

EastWest Corridor													
FSID # 450													
CSID # 12095													
SW Regulation													
SW Guidance													
Analyte	CAS	Method B Non-Cancer	Method B Cancer	Lowest ARAR	H.H. Protective Value	Aquatic Life ARAR (Fresh)	Aquatic Life Lit. (Fresh)	A.L. Final Protective Value	Final Protective Value	Consultant MRL	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)
Master CLARC Spreadsheet Column	A	BI					AU through AX				Guidance for TPH		
MTCA Table 830-1													
TPH- Gx (Gasoline)	x	1.00E+03	1.00E+03	x	1.00E+03	x	1.00E+03	1.00E+03	1.00E+03	x	5.00E+01	5.00E+01	1.00E+03
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	5.00E+02	5.00E+02	x	5.00E+02	x	3.00E+03	3.00E+03	5.00E+02	x	2.50E+02	2.50E+02	5.00E+02
Acenaphthene	83-32-9	2.67E+02	x	3.00E+01	3.00E+01	x	5.80E+00	5.80E+00	5.80E+00	x	5.00E-02	5.00E-02	5.80E+00
Anthracene	120-12-7	1.08E+04	x	1.00E+02	1.00E+02	x	1.20E-02	1.20E-02	1.20E-02	x	5.00E-02	5.00E-02	5.00E-02
Benzene	71-43-2	8.28E+02	9.41E+00	4.40E-01	4.40E-01	x	1.00E+01	1.00E+01	4.40E-01	x	1.00E+00	1.00E+00	1.00E+00
Bis(2-ethylhexyl)phthalate	117-81-7	1.66E+02	1.48E+00	3.20E-01	3.20E-01	x	8.00E+00	8.00E+00	3.20E-01	x	5.00E-01	5.00E-01	5.00E-01
Butyl benzyl phthalate (BBP)	85-68-7	5.20E+02	3.42E+00	1.30E-02	1.30E-02	x	x	x	1.30E-02	x	2.00E-01	2.00E-01	2.00E-01
Chlorobenzene	108-90-7	2.09E+03	x	1.00E+02	1.00E+02	x	1.30E+00	1.30E+00	1.30E+00	x	1.00E+00	1.00E+00	1.30E+00
Chloroform	67-66-3	2.87E+03	2.32E+01	6.00E+01	2.32E+01	x	1.80E+00	1.80E+00	1.80E+00	x	1.00E+00	1.00E+00	1.80E+00
4,4'-DDD	72-54-8	1.00E-02	2.09E-04	7.90E-06	7.90E-06	x	x	x	7.90E-06	x	2.50E-03	2.50E-03	2.50E-03
4,4'-DDT	50-29-3	1.00E-02	1.48E-04	1.20E-06	1.20E-06	x	1.00E-03	x	1.20E-06	x	2.50E-03	2.50E-03	2.50E-03
3,3'-Dichlorobenzidine	91-94-1	x	1.92E-02	3.10E-03	3.10E-03	x	4.50E+00	4.50E+00	3.10E-03	x	2.00E+00	2.00E+00	2.00E+00
2,4-Dichlorophenol	120-83-2	7.94E+01	x	1.00E+01	1.00E+01	x	1.10E+01	1.10E+01	1.00E+01	x	2.00E+00	2.00E+00	1.00E+01
Ethylbenzene	100-41-4	2.87E+03	x	2.90E+01	2.90E+01	x	1.20E+01	1.20E+01	1.20E+01	x	1.00E+00	1.00E+00	1.20E+01
Fluoranthene	206-44-0	3.75E+01	x	6.00E+00	6.00E+00	x	6.16E+00	6.16E+00	6.00E+00	x	5.00E-02	5.00E-02	6.00E+00
Fluorene	86-73-7	1.44E+03	x	1.00E+01	1.00E+01	x	2.00E+00	2.00E+00	2.00E+00	x	5.00E-02	5.00E-02	2.00E+00
1-Methylnaphthalene	90-12-0	x	x	x	0.00E+00	x	6.10E+00	6.10E+00	0.00E+00	x	5.00E-02	5.00E-02	5.00E-02
2-Methylnaphthalene	91-57-6	x	x	x	0.00E+00	x	4.70E+00	4.70E+00	0.00E+00	x	5.00E-02	5.00E-02	5.00E-02
N-Nitrosodiphenylamine	86-30-6	x	7.07E-03	x	7.07E-03	x	1.17E-02	1.17E-02	7.07E-03	x	2.00E+00	2.00E+00	2.00E+00
Naphthalene	91-20-3	2.05E+03	x	6.20E-01	6.20E-01	x	x	x	6.20E-01	x	1.00E+00	1.00E+00	1.00E+00
Toluene	108-88-3	8.05E+03	x	7.00E-06	7.00E-06	x	5.30E+01	5.30E+01	7.00E-06	x	1.00E+00	1.00E+00	1.00E+00
Total PCBs	1336-36-3	x	4.31E-05	2.00E-03	4.31E-05	x	1.40E-02	x	4.31E-05	x	1.00E-02	1.00E-02	1.00E-02
Pentachlorophenol	87-86-5	4.90E+02	6.12E-01	8.00E+00	6.12E-01	x	5.40E+00	x	6.12E-01	x	6.00E-02	6.00E-02	6.12E-01
Phenanthrene (use pyrene as a surrogate)	129-00-0	1.08E+03	x	2.40E+00	2.40E+00	x	2.50E-02	2.50E-02	2.50E-02	x	5.00E-02	5.00E-02	5.00E-02
Tetrachloroethylene (PCE)	127-18-4	2.08E+02	4.14E+01	5.70E+01	4.14E+01	x	x	x	4.14E+01	x	1.00E+00	1.00E+00	4.14E+01
1,2,3-Trichlorobenzene	87-61-6	x	x	x	0.00E+00	x	8.00E+00	8.00E+00	0.00E+00	x	1.00E+00	1.00E+00	1.00E+00
1,2,4-Trichlorobenzene	120-82-1	9.45E+01	8.14E-01	3.60E-02	3.60E-02	x	5.15E+01	5.15E+01	3.60E-02	x	1.00E+00	1.00E+00	1.00E+00
Vinyl Chloride	75-01-4	2.76E+03	1.53E+00	2.00E-02	2.00E-02	x	9.30E+02	9.30E+02	2.00E-02	x	1.00E+00	1.00E+00	1.00E+00
Total Xylenes	1330-20-7	x	x	x	0.00E+00	x	5.70E+01	5.70E+01	5.70E+01	x	1.00E+00	1.00E+00	5.70E+01
cPAHs													
Benzo(a)anthracene	56-55-3	x	x	1.60E-04	1.60E-04	x	1.80E-02	1.80E-02	1.60E-04	x	5.00E-02	5.00E-02	5.00E-02
Benzo(a)pyrene	50-32-8	1.08E+01	8.97E-02	1.60E-05	1.60E-05	x	6.00E-02	6.00E-02	1.60E-05	x	5.00E-02	5.00E-02	5.00E-02
Benzo(b)fluoranthene	205-99-2	x	x	1.60E-04	1.60E-04	x	2.60E+00	2.60E+00	1.60E-04	x	5.00E-02	5.00E-02	5.00E-02
Benzo(k)fluoranthene	207-08-9	x	x	1.60E-02	1.60E-02	x	6.00E-02	6.00E-02	1.60E-02	x	5.00E-02	5.00E-02	5.00E-02
Chrysene	218-01-9	x	x	1.60E-03	1.60E-03	x	4.70E+00	4.70E+00	1.60E-03	x	5.00E-02	5.00E-02	5.00E-02
Dibenzo(a,h)anthracene	53-70-3	x	x	1.60E-05	1.60E-05	x	1.00E-02	1.00E-02	1.60E-05	x	5.00E-02	5.00E-02	5.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	1.60E-04	1.60E-04	x	1.20E-02	1.20E-02	1.60E-04	x	5.00E-02	5.00E-02	5.00E-02
cPAH TEQ	x	1.08E+01	8.97E-02	1.60E-05	1.60E-05	x	x	x	1.60E-05	x	5.00E-02	5.00E-02	5.00E-02
Metals													
Arsenic	7440-38-2	1.47E+00	1.91E-03	1.80E-02	1.91E-03	x	1.30E+02	1.30E+02	1.91E-03	x	5.00E-01	5.00E-01	5.00E-01
Barium	7440-39-3	x	x	1.00E+03	1.00E+03	x	3.90E+00	3.90E+00	3.90E+00	x	6.25E+01	6.25E+01	3.90E+00
Cadmium	7440-43-9	8.41E+00	x	x	8.41E+00	x	4.20E-01	4.20E-01	4.20E-01	x	1.00E-01	1.00E-01	4.20E-01
Chromium III	16065-83-1	1.01E+05	x	x	1.01E+05	x	6.10E+01	6.10E+01	6.10E+01	x	2.00E-01	2.00E-01	6.10E+01
Chromium (Total)	7440-47-3	x	x	x	0.00E+00	x	7.40E+01	7.40E+01	0.00E+00	x	5.00E-01	5.00E-01	5.00E-01
Copper	7440-50-8	1.20E+03	x	1.30E+03	1.20E+03	x	1.20E+00	1.20E+00	1.20E+00	x	5.00E-01	5.00E-01	1.20E+00
Iron	7439-89-6	x	x	x	0.00E+00	x	1.00E+03	1.00E+03	0.00E+00	x	2.05E+00	2.05E+00	2.05E+00
Lead	7439-92-1	x	x	x	0.00E+00	x	2.50E+00	2.50E+00	0.00E+00	x	1.00E-01	1.00E-01	1.00E-01
Manganese	7439-96-5	x	x	5.00E+01	5.00E+01	x	x	x	5.00E+01	x	1.03E+00	1.03E+00	5.00E+01
Mercury	7439-97-6	x	x	x	0.00E+00	x	1.20E-02	1.20E-02	0.00E+00	x	6.00E-03	6.00E-03	6.00E-03
Nickel	7440-02-0	4.58E+02	x	8.00E+01	8.00E+01	x	1.10E+01	1.10E+01	1.10E+01	x	5.00E-01	5.00E-01	1.10E+01
Selenium	7782-49-2	1.12E+03	x	6.00E+01	6.00E+01	x	1.50E+00	1.50E+00	1.50E+00	x	5.00E-01	5.00E-01	1.50E+00
Silver	7440-22-4	1.08E+04	x	x	1.08E+04	x	9.10E-01	9.10E-01	9.10E-01	x	5.00E-01	5.00E-01	9.10E-01
Zinc	7440-66-6	6.87E+03	x	1.00E+03	1.00E+03	x	2.40E+01	2.40E+01	2.40E+01	x	5.00E+00	5.00E+00	2.40E+01

Figure 2: Calculation of Preliminary Cleanup Levels for Surface Water.

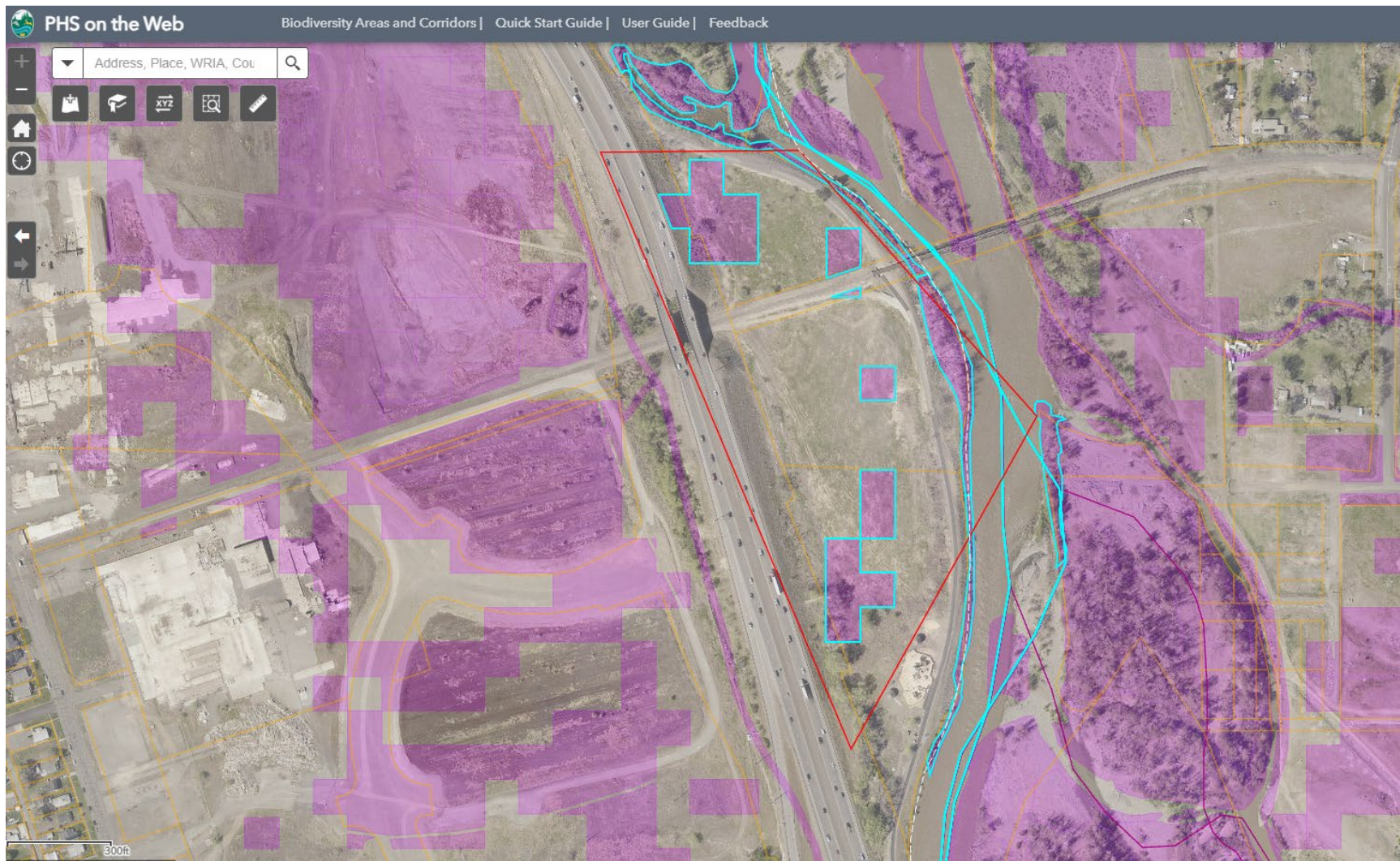


Figure 3: Shaded Areas Indicate Priority Habitat and Species Located within the Area of Interest.

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

East/West Corridor					
FSID # 450					
CSID # 12095					
Soil Regulation					
Soil Guidance					
Analyte	CAS	Site Specific TEE (Table 749-3 Value)	Site Specific TEE (Other Lit Value)	Fianl Protective TEE Value	Citation
Master CLARC Spreadsheet Column					
A					
MTCA Table 830-1					
TPH- Gx (Gasoline)	x	1.20E+02		1.20E+02	
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	2.60E+02		2.60E+02	
Acenaphthene	83-32-9	2.00E+01		2.00E+01	
Anthracene	120-12-7		2.90E+01	2.90E+01	Eco-SSL
Benzene	71-43-2		3.80E+01	3.80E+01	LANL No Effect
Bis(2-ethylhexyl)phthalate	117-81-7		2.00E-02	2.00E-02	LANL No Effect
Butyl benzyl phthalate	85-68-7		9.00E+01	9.00E+01	LANL No Effect
Chlorobenzene	108-90-7	4.00E+01		4.00E+01	
Chloroform	67-66-3		8.20E+00	8.20E+00	LANL No Effect
4,4'-DDD	72-54-8	7.50E-01		7.50E-01	
4,4'-DDT	50-29-3	7.50E-01		7.50E-01	
3,3'-Dichlorobenzidine	91-94-1		3.00E-02	3.00E-02	EPA Region IV
2,4-Dichlorophenol	120-83-2		5.00E-02	5.00E-02	EPA Region IV
Ethylbenzene	100-41-4		2.70E-01	2.70E-01	EPA Region IV
Fluoranthene	206-44-0		1.10E+00	1.10E+00	Eco-SSL
Fluorene	86-73-7	3.00E+01		3.00E+01	
1-Methylnaphthalene	90-12-0		2.90E+01	2.90E+01	Eco-SSL
2-Methylnaphthalene	91-57-6		2.90E+01	2.90E+01	Eco-SSL
Naphthalene	91-20-3		2.90E+01	2.90E+01	Eco-SSL
N-Nitrosodiphenylamine	1116-54-7	2.00E+01		2.00E+01	
Total PCBs	1336-36-3	6.50E-01		6.50E-01	
Pentachlorophenol	87-86-5	3.00E+00		3.00E+00	
Phenanthrene (use pyrene as a surrogate)	129-00-0		2.90E+01	2.90E+01	Eco-SSL
Tetrachloroethylene (PCE)	127-18-4		1.80E-01	1.80E-01	LANL No Effect
Toluene	108-88-3		2.30E+01	2.30E+01	LANL No Effect
1,2,4-Trichlorobenzene	120-82-1		2.70E-01	2.70E-01	LANL No Effect
Vinyl Chloride	75-01-4		1.20E-01	1.20E-01	LANL No Effect
Total Xylenes	1330-20-7		1.40E+00	1.40E+00	LANL No Effect
cPAHs					
Benzo(a)anthracene	56-55-3		1.10E+00	1.10E+00	Eco-SSL
Benzo(a)pyrene	50-32-8	1.20E+01		1.20E+01	
Benzo(b)fluoranthene	205-99-2		1.10E+00	1.10E+00	Eco-SSL
Benzo(k)fluoranthene	207-08-9		1.10E+00	1.10E+00	Eco-SSL
Dibenzo(a,h)anthracene	53-70-3		1.10E+00	1.10E+00	Eco-SSL
Indeno(1,2,3-cd)pyrene	193-39-5		1.10E+00	1.10E+00	Eco-SSL
cPAH TEQ	x	N/A	N/A	N/A	
Metals					
Arsenic	7440-38-2	1.00E+01		1.00E+01	
Barium	7440-39-3	1.02E+02		1.02E+02	
Cadmium	7440-43-9	4.00E+00		4.00E+00	
Chromium III	16065-83-1		2.60E+01	2.60E+01	Eco-SSL
Chromium (Total)	7440-47-3	4.20E+01		4.20E+01	
Copper	7440-50-8	5.00E+01		5.00E+01	
Iron	7439-89-6		5.15E+04	5.15E+04	Yakima basin background
Lead	7439-92-1	5.00E+01		5.00E+01	
Manganese	7439-96-5	1.10E+03		1.10E+03	
Mercury	7439-97-6	1.00E-01		1.00E-01	
Zinc	7440-66-6	8.60E+01		8.60E+01	

Figure 4: Site Specific TEE Values with References.

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

3-Phase Model - Soil protective of groundwater/surface water		Analyte	CAS	S.W. Protection (ug/L)	Hcc @ 13°	Kd	Soil Protective of S.W. (mg/kg)
		TPH- Gx (Gasoline)	x	1.00E+03	x	x	x
SW Protection (µg/Liter)	5.70E+01	TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	5.00E+02	x	x	x
Units Conversion (1 mg/1000 µg)	0.001	Acenaphthene	83-32-9	5.80E+00	2.50E-03	4.90E+00	3.01E-02
Dilution Factor - Saturated Zone (1)	1	Anthracene	120-12-7	5.00E-02	6.51E-04	2.35E+01	1.19E-03
Distribution Coefficient Kd (Liters/kg)	2.33E-01	Benzene	71-43-2	1.00E+00	1.34E-01	6.20E-02	3.49E-04
Water-filled Soil Porosity - Saturated (0.43 ml water/ml soil)	0.43	Bis(2-ethylhexyl)phthalate	117-81-7	5.00E-01	2.34E-06	1.11E+02	5.57E-02
Air-filled Soil Porosity Saturated (0 ml air/ml soil)	0	Butyl benzyl phthalate	85-68-7	2.00E-01	1.47E-05	1.37E+01	2.81E-03
Henry's Law Constant - Hcc - dimensionless	1.41E-01	Chlorobenzene	108-90-7	1.30E+00	6.63E-02	2.24E-01	6.64E-04
Dry Soil Bulk Density (1.5 kg/Liter)	1.5	Chloroform	67-66-3	1.80E+00	9.17E-02	5.30E-02	6.11E-04
Soil Cleanup Level Protective of Groundwater - Saturated (mg/kg)	2.96E-02	4,4'-DDD	72-54-8	2.50E-03	x	4.58E+01	x
		4,4'-DDT	50-29-3	2.50E-03	1.28E-04	6.78E+02	1.70E-03
		3,3'-Dichlorobenzidine	91-94-1	2.00E+00	x	3.19E+00	x
		2,4-Dichlorophenol	120-83-2	1.00E+01	7.46E-05	1.47E-01	4.34E-03
Saturated Conditions		Ethylbenzene	100-41-4	1.20E+01	1.64E-01	2.04E-01	5.89E-03
		Fluoranthene	206-44-0	6.00E+00	9.14E-05	4.91E+01	2.96E-01
		Fluorene	86-73-7	2.00E+00	1.23E-03	7.71E+00	1.60E-02
		1-Methylnaphthalene	90-12-0	5.00E-02	8.16E-03	2.53E+00	1.41E-04
		2-Methylnaphthalene	91-57-6	5.00E-02	7.00E-03	2.48E+00	1.38E-04
		Naphthalene	91-20-3	2.00E+00	8.32E-03	1.19E+00	2.96E-03
		N-Nitrosodiphenylamine	86-30-6	1.00E+00	x	2.63E+00	x
		Total PCBs	1336-36-3	1.00E+00	x	7.81E+01	x
		PCE	127-18-4	1.00E-02	3.84E-01	2.65E-01	5.52E-06
		Pentachlorophenol	87-86-5	6.12E-01	x	5.92E-01	x
		Phenanthrene (use pyrene as a surrogate)	129-00-0	5.00E-02	1.15E-04	6.80E+01	3.41E-03
		Toluene	108-88-3	4.14E+01	1.49E-01	1.40E-01	1.76E-02
		1,2,3-Trichlorobenzene	87-61-6	1.00E+00	5.11E-02	1.38E+00	1.30E-02
		1,2,4-Trichlorobenzene	120-82-1	1.00E+00	2.37E-02	1.66E+00	1.95E-03
		Vinyl Chloride	75-01-4	1.00E+00	8.50E-01	2.17E-02	3.08E-04
		Total Xylenes	1330-20-7	5.70E+01	1.41E-01	2.33E-01	2.96E-02
		cPAHs					
		Benzo(a)anthracene	56-55-3	5.00E-02	9.60E-05	3.58E+02	1.79E-02
		Benzo(a)pyrene	50-32-8	5.00E-02	3.61E-06	9.69E+02	4.85E-02
		Benzo(b)fluoranthene	205-99-2	5.00E-02	6.04E-06	5.99E+02	3.00E-02
		Benzo(k)fluoranthene	207-08-9	5.00E-02	4.28E-06	5.87E+02	2.94E-02
		Chrysene	218-01-9	5.00E-02	3.87E-05	1.81E+02	9.04E-03
		Dibenzo(a,h)anthracene	53-70-3	5.00E-02	7.45E-07	1.79E+03	8.95E-02
		Indeno(1,2,3-cd)pyrene	193-39-5	5.00E-02	2.09E-06	1.95E+03	9.76E-02
		cPAH TEQ	x	5.00E-02	x	x	x
		Metals					
		Arsenic	7440-38-2	5.00E-01	0.00E+00	2.90E+01	1.46E-02
		Barium	7440-39-3	3.90E+00	0.00E+00	4.10E+01	1.61E-01
		Cadmium	7440-43-9	4.20E-01	0.00E+00	6.70E+00	2.93E-03
		Chromium III	7440-47-3	6.10E+01	0.00E+00	1.00E+03	6.10E+01
		Chromium (Total)	16065-83-1	5.00E-01	0.00E+00	1.00E+03	5.00E-01
		Copper	7440-50-8	1.20E+00	0.00E+00	2.20E+01	2.67E-02
		Iron	7439-89-6	2.05E+00	0.00E+00	2.50E+01	5.18E-02
		Lead	7439-92-1	1.00E-01	0.00E+00	1.00E+04	1.00E+00
		Manganese	7439-96-5	5.00E+01	0.00E+00	6.50E+01	3.26E+00
		Mercury	7439-97-6	6.00E-03	1.66E-01	5.20E+01	3.14E-04
		Nickel	7440-02-0	1.10E+01	0.00E+00	6.50E+01	7.20E-01
		Selenium	7782-49-2	1.50E+00	0.00E+00	5.00E+00	7.90E-03
		Silver	7440-22-4	9.10E-01	0.00E+00	8.30E+00	1.50E-03
		Zinc	7440-66-6	2.40E+01	0.00E+00	6.20E+01	1.49E+00

Figure 5: Three phase Model for Surface Water Assuming Saturated Conditions.

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

EastWest Corridor															
FSID # 459															
CSID # 12085															
Soil Regulation															
Soil Guidance															
Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Sat	Soil Method B Protection of SW (mg/kg) - Sat	Final Protective V.H. Value (mg/kg)	Site Specific TEE (Table 749-3 Value)	Site Specific TEE (Other Lit Value)	Final Protective TEE Value	Final H.H. and TEE Protective Value	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final PQL (mg/kg)	Natural Background	PCUL (mg/kg)
Master CLARC Spreadsheet Column															
Guidance for TPH															
Natural Background Metals															
MTCA Table 836-1															
TPH- Gx (Gasoline)	x	1.00E+03	x	x	x	1.00E+03	1.20E+02	x	1.20E+02	1.20E+02	x	5.00E+00	5.00E+00	x	1.20E+02
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	2.00E+03	x	x	x	2.00E+03	2.60E+02	x	2.60E+02	2.60E+02	x	2.50E+01	2.50E+01	x	2.60E+02
Acenaphthene	83-32-9	x	4.80E+03	2.50E+00	3.01E-02	3.01E-02	2.00E+01	x	2.00E+01	3.01E-02	x	4.35E-02	4.35E-02	x	4.35E-02
Anthracene	120-12-7	x	2.40E+04	5.70E+01	1.19E-03	1.19E-03	2.90E+01	x	2.90E+01	1.19E-03	x	4.35E-02	4.35E-02	x	4.35E-02
Benzene	71-43-2	3.00E-02	x	1.80E-01	1.70E-03	3.49E-04	3.49E-04	x	3.80E-01	3.90E-01	x	5.00E-03	5.00E-03	x	5.00E-03
Bis(2-ethylhexyl)phthalate	117-81-7	x	7.10E+01	6.70E-01	5.57E-02	5.57E-02	2.00E-02	x	2.00E-02	2.00E-02	x	1.19E-01	1.19E-01	x	1.19E-01
Butyl benzyl phthalate	85-68-7	x	5.30E+02	6.50E-01	2.81E-03	2.81E-03	9.00E+01	x	9.00E+01	2.81E-03	x	2.00E-01	2.00E-01	x	2.00E-01
Chlorobenzene	108-90-7	x	1.60E+03	5.10E-02	6.64E-04	6.64E-04	4.00E+01	x	4.00E+01	6.64E-04	x	2.00E-03	2.00E-03	x	2.00E-03
Chloroform	67-66-3	x	3.20E+01	4.80E-03	6.11E-04	6.11E-04	8.20E+00	x	8.20E+00	6.11E-04	x	2.00E-03	2.00E-03	x	2.00E-03
4,4'-DDD	72-54-8	x	4.20E+00	1.70E-02	1.70E-02	1.70E-02	7.50E-01	x	7.50E-01	1.70E-02	x	2.50E-04	2.50E-04	x	1.70E-02
4,4'-DDT	50-59-3	3.00E+00	x	2.30E+00	1.70E-01	1.70E-01	7.50E-01	x	7.50E-01	1.70E-01	x	2.00E-03	2.00E-03	x	2.00E-03
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	6.80E-04	6.80E-04	6.80E-04	3.00E-02	x	3.00E-02	6.80E-04	x	3.30E-01	3.30E-01	x	3.30E-01
2,4-Dichlorophenol	120-83-2	x	2.40E+02	2.10E-02	4.34E-03	4.34E-03	5.00E-02	x	5.00E-02	2.10E-02	x	2.15E-01	2.15E-01	x	2.15E-01
Ethylbenzene	100-41-4	6.00E+00	x	8.00E+03	3.40E-01	5.89E-03	5.89E-03	x	2.70E-01	5.89E-03	x	1.00E-03	1.00E-03	x	5.89E-03
Fluoranthene	206-44-0	x	3.20E+03	3.20E+03	2.96E-01	2.96E-01	1.10E+00	x	1.10E+00	2.96E-01	x	5.00E-03	5.00E-03	x	2.96E-01
Fluorene	86-12-7	x	3.20E+03	2.80E+00	1.60E-02	1.60E-02	3.00E+01	x	3.00E+01	1.60E-02	x	5.00E-03	5.00E-03	x	1.60E-02
1-Methylnaphthalene	90-12-0	x	2.00E+01	2.40E-03	1.41E-04	1.41E-04	2.90E+01	x	2.90E+01	1.41E-04	x	5.00E-01	5.00E-01	x	5.00E-01
2-Methylnaphthalene	91-57-6	x	3.20E+02	8.80E-02	1.38E-04	1.38E-04	2.90E+01	x	2.90E+01	1.38E-04	x	5.00E-01	5.00E-01	x	5.00E-01
Naphthalene	91-20-3	5.00E+00	x	1.60E+03	2.40E-01	2.96E-03	2.96E-03	x	2.90E+01	2.96E-03	x	1.00E-03	1.00E-03	x	2.96E-03
N-Nitrosodiphenylamine	86-30-6	x	3.60E-01	9.00E-06	9.00E-06	9.00E-06	2.00E+01	x	2.00E+01	9.00E-06	x	7.00E-02	7.00E-02	x	7.00E-02
Total PCBs	1336-36-3	1.00E+00	x	3.00E-01	1.70E-02	1.70E-02	6.30E-01	x	6.30E-01	1.70E-02	x	2.50E-04	2.50E-04	x	1.70E-02
Pentachlorophenol	87-86-5	x	2.80E+00	8.80E-04	5.52E-06	5.52E-06	3.00E+00	x	3.00E+00	5.52E-06	x	1.25E-01	1.25E-01	x	1.25E-01
Phenanthrene (use pyrene as a surrogate)	129-00-0	x	2.40E+03	1.80E-01	1.60E-01	1.60E-01	2.90E+01	x	2.90E+01	1.60E-01	x	2.00E-02	2.00E-02	x	1.60E-01
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	x	4.80E+02	2.80E-03	3.41E-03	2.80E-03	x	1.80E-01	1.80E-01	x	1.00E-03	1.00E-03	x	2.80E-03
Toluene	108-88-3	7.00E+00	x	6.40E+03	2.70E-01	1.76E-02	1.76E-02	x	2.30E+01	1.76E-02	x	1.00E-03	1.00E-03	x	1.76E-02
1,2,3-Trichlorobenzene	87-61-6	x	6.40E+01	1.10E-02	1.30E-02	1.10E-02	2.00E+01	x	2.00E+01	1.10E-02	x	1.00E-03	1.00E-03	x	1.10E-02
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	2.90E-02	1.95E-03	1.95E-03	3.20E+01	x	3.20E+01	1.95E-03	x	3.00E-02	3.00E-02	x	3.00E-02
Vinyl Chloride	75-01-4	x	6.70E-01	9.00E-05	3.08E-04	9.00E-05	1.20E-01	x	1.20E-01	9.00E-05	x	2.00E-03	2.00E-03	x	2.00E-03
Total Xylenes	1330-20-7	9.00E+00	x	1.60E+04	8.30E-01	2.96E-02	2.96E-02	x	1.40E+00	1.40E+00	x	2.96E-02	2.96E-02	x	2.96E-02
CPAHs															
Benzo(a)anthracene	56-55-3	x	x	x	x	1.79E-02	1.79E-02	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	5.00E-02
Benzo(a)pyrene	50-32-8	1.00E-01	x	1.90E-01	1.90E-01	4.85E-02	4.85E-02	x	1.20E+01	1.20E+01	x	5.00E-02	5.00E-02	x	5.00E-02
Benzo(b)fluoranthene	205-99-2	x	x	x	x	3.00E-02	3.00E-02	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	5.00E-02
Chrysene	218-01-9	x	x	x	x	2.94E-02	2.94E-02	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	5.00E-02
Benzo(k)fluoranthene	207-08-9	x	x	x	x	9.04E-03	9.04E-03	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	5.00E-02
Dibenzo(a,h)anthracene	53-70-3	x	x	x	x	8.95E-02	8.95E-02	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	8.95E-02
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	x	9.76E-02	9.76E-02	x	1.10E+00	1.10E+00	x	5.00E-02	5.00E-02	x	9.76E-02
CPAH TEQ	x	1.00E-01	x	1.90E-01	1.90E-01	1.90E-01	1.90E-01	x	1.00E-01	N/A	N/A	1.00E-01	1.00E-01	x	5.00E-02
Metals															
Arsenic	7440-38-2	2.00E+01	x	3.10E-02	1.50E-01	1.46E-02	1.46E-02	x	1.00E+01	1.46E-02	x	2.50E+00	2.50E+00	x	7.00E+00
Barium	7440-39-3	x	1.60E+04	8.30E+01	1.61E-01	1.61E-01	1.02E+02	x	1.02E+02	1.61E-01	x	3.00E-01	3.00E-01	x	2.55E+02
Cadmium	7440-43-9	2.00E+00	x	8.00E+01	3.50E-02	2.93E-03	2.93E-03	x	4.00E+00	2.93E-03	x	1.00E-01	1.00E-01	x	1.00E+00
Chromium III	16085-83-1	2.00E+03	x	1.20E+05	1.00E+02	6.10E+01	6.10E+01	x	2.60E+01	2.60E+01	x	5.00E-01	5.00E-01	x	4.20E+01
Chromium (Total)	7440-47-3	x	x	x	x	5.00E-01	5.00E-01	x	4.20E+01	5.00E-01	x	5.00E-01	5.00E-01	x	4.20E+01
Copper	7440-50-8	x	3.20E+03	1.40E+01	2.67E-02	2.67E-02	5.00E+01	x	5.00E+01	2.67E-02	x	5.00E-01	5.00E-01	x	3.60E+01
Iron	7439-89-6	x	5.60E+04	7.60E+00	5.18E-02	5.18E-02	5.15E+04	x	5.15E+04	5.18E-02	x	5.00E+00	5.00E+00	x	5.15E+04
Lead	7439-92-1	2.50E+02	x	1.00E+01	1.00E+01	1.00E+01	1.00E+01	x	5.00E+01	1.00E+01	x	1.00E-01	1.00E-01	x	1.00E+01
Manganese	7439-96-5	x	3.70E+03	3.30E+00	3.26E+00	3.26E+00	1.10E+03	x	1.10E+03	3.26E+00	x	1.00E-01	1.00E-01	x	1.10E+03
Mercury	7439-97-6	2.00E+00	x	1.00E-01	3.14E-04	3.14E-04	1.00E-01	x	1.00E-01	3.14E-04	x	2.00E-02	2.00E-02	x	7.00E-02
Nickel	7440-32-9	x	1.80E+03	2.10E+01	7.20E-01	7.20E-01	3.00E+01	x	3.00E+01	7.20E-01	x	9.00E-01	9.00E-01	x	4.60E+01
Selenium	7782-49-2	x	4.00E+02	2.80E-01	7.90E-03	7.90E-03	3.00E-01	x	3.00E-01	7.90E-03	x	3.00E+00	3.00E+00	x	7.80E-01
Silver	7440-22-4	x	4.00E+02	6.90E-01	1.50E-03	1.50E-03	2.00E+00	x	2.00E+00	1.50E-03	x	3.00E-01	3.00E-01	x	6.10E-01
Zinc	7440-66-6	x	2.40E+04	3.00E+02	1.49E+00	1.49E+00	8.60E-01	x	8.60E-01	1.49E+00	x	5.00E+00	5.00E+00	x	8.60E+01

Figure 6: Calculation of Preliminary Cleanup Levels for Soil.

Ecology TCP Memorandum: E-W Corridor Development of PCULs
 Site: Boise Cascade Mill
 February 11, 2026

East/West Corridor										
FSID # 450										
CSID # 12095										
Analyte	CAS	Bioaccumulative SedDetFW	Benthic Criterion for Sed Data Eval Point by Point Sed # 3	SD-1 SMS Lower Tier Human Health Dir. Contact SCO SWAC SedDetFW	SD-2 SMS Lower Tier Seafood Consumption SCO SWAC SedDetFW	Overall Protection	SD-4 Freshwater Natural Background Param	SD-5 PQL SedDetFW	PCUL	
TPH- Gx (Gasoline)		x	no	x	x	x	x	x	na	
TPH-Dx (Diesel and Heavy Oil Ranges Combined)		x	no	x	x	x	x	3.75E+01	3.75E+01	
Acenaphthene	83-32-9	no	no	x	x	x	x	5.00E-03	5.00E-03	
Anthracene	120-12-7	no	no	x	x	x	x	5.00E-03	5.00E-03	
Benzene	71-43-2	no	no	x	x	x	x	4.10E-03	4.10E-03	
Bis(2-ethylhexyl)phthalate	117-81-7	no	5.00E-01	x	x	5.00E-01	na	1.19E-01	5.00E-01	
Butyl benzyl phthalate	85-68-7	no	no	x	x	x	x	8.10E-02	8.10E-02	
Chlorobenzene	108-90-7	no	no	x	x	x	x	x	x	
Chloroform	67-66-3	no	no	x	x	x	x	x	x	
4,4'-DDD	72-54-8	YES	3.10E-01	5.50E+00		PQL	3.10E-01	na	3.10E-01	
4,4'-DDT	50-29-3	YES	1.00E-01	6.29E+00		PQL	1.00E-01	na	1.00E-01	
3,3'-Dichlorobenzidine	91-94-1	no	no	x	x	x	x	x	x	
2,4-Dichlorophenol	120-83-2	no	no	x	x	x	x	x	x	
Ethylbenzene	100-41-4	no	no	x	x	x	x	6.60E-03	6.60E-03	
Fluoranthene	206-44-0	YES	x	7.57E+03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	
Fluorene	86-73-7	no	no	x	x	x	x	5.00E-03	5.00E-03	
1-Methylnaphthalene	90-12-0	no	no	x	x	x	x	x	x	
2-Methylnaphthalene	91-57-6	no	no	x	x	x	x	7.00E-03	7.00E-03	
Naphthalene	91-20-3	no	no	x	x	x	x	6.00E-03	6.00E-03	
N-Nitrosodiphenylamine	1116-54-7	no	no	x	x	x	x	x	x	
Total PCBs	1336-36-3	YES	1.10E-01	5.42E-01	1.20E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02	
Pentachlorophenol	87-86-5	YES	1.20E+00	1.81E+00	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	
Phenanthrene (use pyrene as a surrogate)	129-00-0	YES	x	5.68E+03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	
Tetrachloroethylene (PCE)	127-18-4	no	no	x	x	x	x	6.60E-03	6.60E-03	
Toluene	108-88-3	no	no	x	x	x	x	x	x	
1,2,3-Trichlorobenzene	87-61-6	no	no	x	x	x	x	6.80E-02	6.80E-02	
1,2,4-Trichlorobenzene	120-82-1	no	no	x	x	x	x	6.80E-02	6.80E-02	
Vinyl Chloride	75-01-4	no	no	x	x	x	x	x	x	
Total Xylenes	1330-20-7	no	no	x	x	x	x	x	x	
oPAHs										
Benzo(a)anthracene	56-55-3	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Benzo(a)pyrene	50-32-8	YES	x	1.19E-01	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Benzo(b)fluoranthene	205-99-2	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Chrysene	218-01-9	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Benzo(k)fluoranthene	207-08-9	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Dibenzo(a,h)anthracene	53-70-3	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
Indeno(1,2,3-cd)pyrene	193-39-5	YES	x	x	9.00E-03	9.00E-03	x	9.00E-03	9.00E-03	
oPAH TEQ		x	YES	x	1.19E-01	2.10E-02	2.10E-02	2.10E-02	9.00E-03	2.10E-02
Metals										
Arsenic	7440-38-2	YES	1.40E+01	6.69E-02	7.30E+00	6.69E-02	7.30E+00	3.00E-01	7.30E+00	
Barium	7440-39-3	no	no	x	x	x	x	2.50E+02	x	
Cadmium	7440-43-9	YES	2.10E+00	2.24E+02	7.70E-01	7.70E-01	7.70E-01	7.00E-02	7.70E-01	
Chromium III	16065-83-1	no	no	x	x	x	x	x	x	
Chromium (Total)	7440-47-3	no	no	7.20E+01	x	7.20E+01	4.80E+01	2.00E-01	7.20E+01	
Copper	7440-50-8	no	no	4.00E+02	x	4.00E+02	3.60E+01	1.00E-01	4.00E+02	
Iron	7439-89-6	no	no	x	x	x	x	3.60E+04	x	
Lead	7439-92-1	YES	3.60E+02	x	2.10E+01	2.10E+01	2.10E+01	1.00E-01	2.10E+01	
Manganese	7439-96-5	no	no	x	x	x	x	1.10E+03	x	
Mercury	7439-97-6	YES	6.60E-01	x	7.00E-02	7.00E-02	7.00E-02	2.00E-02	7.00E-02	
Nickel	7440-02-0	no	no	2.60E+01	x	2.60E+01	4.80E+01	2.00E-01	4.80E+01	
Selenium	7782-49-2	YES	1.10E+01	1.22E+03	7.80E-01	7.80E-01	7.80E-01	1.00E-01	7.80E-01	
Silver	7440-22-4	no	no	5.70E-01	x	5.70E-01	2.40E-01	1.00E-01	5.70E-01	
Zinc	7440-66-6	no	no	3.20E+03	x	3.20E+03	8.50E+01	1.00E+00	3.20E+03	

Figure 7: Calculation of Preliminary Cleanup Levels for Sediments

East/West Corridor
 FSID # 450
 CSID # 12095

GW Regulation											
GW Guidance											
Analyte	CAS	Target Value for Leaching Model (ug/L)	Final H.H. Protective Value	Natural Background	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Detected Value	Flag	COPC ?
Master CLARC Spreadsheet Column	A	AN				Guidance for TPH			Based on Stage 1 Investigation		
MTCA Table 830-1									(Min-2 Events) - See Sampling Tab		
TPH- Gx (Gasoline)	x	1.00E+03	1.00E+03	x	x	5.00E+01	5.00E+01	1.00E+03			
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	5.00E+02	5.00E+02	x	x	2.50E+02	2.50E+02	5.00E+02			
Acenaphthene	83-32-9	4.80E+02	4.80E+02	x	x	5.00E-02	5.00E-02	4.80E+02			
Anthracene	120-12-7	2.40E+03	2.40E+03	x	x	5.00E-02	5.00E-02	2.40E+03			
Benzene	71-43-2	5.00E+00	5.00E+00	x	x	1.00E+00	1.00E+00	5.00E+00			
Bis(2-ethylhexyl)phthalate	117-81-7	6.00E+00	6.00E+00	x	x	5.00E-01	5.00E-01	6.00E+00			
Butyl benzyl phthalate (BBP)	85-68-7	4.61E+01	4.61E+01	x	x	2.00E-01	2.00E-01	4.61E+01			
Chlorobenzene	108-90-7	1.00E+02	1.00E+02	x	x	1.00E+00	1.00E+00	1.00E+02			
Chloroform	67-66-3	1.41E+01	1.41E+01	x	x	1.00E+00	1.00E+00	1.41E+01			
4,4'-DDD	72-54-8	3.65E-01	3.65E-01	x	x	2.50E-03	2.50E-03	3.65E-01			
4,4'-DDT	50-29-3	2.57E-01	2.57E-01	x	x	2.50E-03	2.50E-03	2.57E-01			
3,3'-Dichlorobenzidine	91-94-1	1.94E-01	1.94E-01	x	x	2.00E+00	2.00E+00	2.00E+00			
2,4-Dichlorophenol	120-83-2	4.80E+01	4.80E+01	x	x	2.00E+00	2.00E+00	4.80E+01			
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	x	x	1.00E+00	1.00E+00	7.00E+02			
Fluoranthene	206-44-0	6.40E+02	6.40E+02	x	x	5.00E-02	5.00E-02	6.40E+02			
Fluorene	86-73-7	3.20E+02	3.20E+02	x	x	5.00E-02	5.00E-02	3.20E+02			
1-Methylnaphthalene	90-12-0	8.58E-01	8.58E-01	x	x	5.00E-02	5.00E-02	8.58E-01			
2-Methylnaphthalene	91-57-6	3.20E+01	3.20E+01	x	x	5.00E-02	5.00E-02	3.20E+01			
N-Nitrosodiphenylamine	86-30-6	1.79E+01	1.79E+01	x	x	2.00E+00	2.00E+00	1.79E+01			
Naphthalene	91-20-3	1.60E+02	1.60E+02	x	x	1.00E+00	1.00E+00	1.60E+02			
Toluene	108-88-3	6.40E+02	6.40E+02	x	x	1.00E+00	1.00E+00	6.40E+02			
Total PCBs	1336-36-3	2.19E-01	2.19E-01	x	x	1.00E-02	1.00E-02	2.19E-01			
Pentachlorophenol	87-86-5	1.00E+00	1.00E+00	x	x	6.00E-02	6.00E-02	1.00E+00			
Phenanthrene (use pyrene as a surrogate)	129-00-0	2.40E+02	2.40E+02	x	x	5.00E-02	5.00E-02	2.40E+02			
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	x	x	1.00E+00	1.00E+00	5.00E+00			
1,2,3-Trichlorobenzene	87-61-6	6.40E+00	6.40E+00	x	x	1.00E+00	1.00E+00	6.40E+00			
1,2,4-Trichlorobenzene	120-82-1	1.51E+01	1.51E+01	x	x	1.00E+00	1.00E+00	1.51E+01			
Vinyl Chloride	75-01-4	2.92E-01	2.92E-01	x	x	1.00E+00	1.00E+00	1.00E+00			
Total Xylenes	1330-20-7	1.60E+03	1.60E+03	x	x	1.00E+00	1.00E+00	1.60E+03			
cPAHs											
Benzo(a)anthracene	56-55-3	x	x	x	x	5.00E-02	5.00E-02	x			
Benzo(a)pyrene	50-32-8	2.00E-01	2.00E-01	x	x	5.00E-02	5.00E-02	2.00E-01			
Benzo(b)fluoranthene	205-99-2	x	x	x	x	5.00E-02	5.00E-02	x			
Benzo(k)fluoranthene	207-08-9	x	x	x	x	5.00E-02	5.00E-02	x			
Chrysene	218-01-9	x	x	x	x	5.00E-02	5.00E-02	x			
Dibenzo(a,h)anthracene	53-70-3	x	x	x	x	5.00E-02	5.00E-02	x			
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	x	5.00E-02	5.00E-02	x			
cPAH TEQ	x	2.00E-01	2.00E-01	x	x	5.00E-02	5.00E-02	2.00E-01			
Metals											
Arsenic	7440-38-2	5.00E+00	5.00E+00	7.00E+00	x	5.00E-01	5.00E-01	7.00E+00			
Barium	7440-39-3	2.00E+03	2.00E+03	x	x	6.25E-01	6.25E-01	2.00E+03			
Cadmium	7440-43-9	5.00E+00	5.00E+00	x	x	1.00E-01	1.00E-01	5.00E+00			
Chromium III	16065-83-1	2.40E+04	2.40E+04	x	x	2.00E-01	2.00E-01	2.40E+04			
Chromium (Total)	7440-47-3	1.00E+02	1.00E+02	x	x	5.00E-01	5.00E-01	1.00E+02			
Copper	7440-50-8	6.40E+02	6.40E+02	x	x	5.00E-01	5.00E-01	6.40E+02			
Iron	7439-89-6	3.00E+02	3.00E+02	x	x	2.05E+00	2.05E+00	3.00E+02			
Lead	7439-92-1	1.50E+01	1.50E+01	x	x	1.00E-01	1.00E-01	1.50E+01			
Manganese	7439-96-5	5.00E+01	5.00E+01	x	x	1.03E+00	1.03E+00	5.00E+01			
Mercury	7439-97-6	2.00E+00	2.00E+00	x	x	6.00E-03	6.00E-03	2.00E+00			
Nickel	7440-02-0	3.20E+02	3.20E+02	x	x	5.00E-01	5.00E-01	3.20E+02			
Selenium	7782-49-2	5.00E+01	5.00E+01	x	x	5.00E-01	5.00E-01	5.00E+01			
Silver	7440-22-4	8.00E+01	8.00E+01	x	x	5.00E-01	5.00E-01	8.00E+01			
Zinc	7440-66-6	4.80E+03	4.80E+03	x	x	5.00E+00	5.00E+00	4.80E+03			

East/West Corridor																			
FSID # 450																			
CSID # 12095																			
Soil Regulation																			
Soil Guidance																			
Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg) - Sat	Soil Method B Protection of SW (mg/kg) - Sat	Final Protective H.H. Value (mg/kg)	Site Specific TEE (Table 749-3 Value)	Site Specific TEE (Other Lit Value)	Final Protective TEE Value	Final H.H. and TEE Protective Value	Consultant MRL (mg/kg)	Ecology MRL (mg/kg)	Final PQL (mg/kg)	Natural Background	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	Flag?	COPC?	Soil Sampling Event
	A	Q	R and S	X								Guidance for TPH		Natural Background Metals				Based on Complete Leaching Pathways	
MTCA Table 830-1																			
TPH-Gx (Gasoline)	x	1.00E+03	x	x	x	1.00E+03	1.20E+02	x	1.20E+02	1.20E+02	x	5.00E+00	5.00E+00	x	1.20E+02				
TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	2.00E+03	x	x	x	2.00E+03	2.60E+02	x	2.60E+02	2.60E+02	x	2.60E+01	2.60E+01	x	2.60E+02				
Acenaphthene	83-32-9	x	4.80E+03	2.50E+00	3.01E-02	3.01E-02	2.00E+01	x	2.00E+01	3.01E-02	x	4.35E-02	4.35E-02	x	4.35E-02				
Anthracene	120-12-7	x	2.40E+04	5.70E+01	1.19E-03	1.19E-03	x	2.90E+01	2.90E+01	1.19E-03	x	4.35E-02	4.35E-02	x	4.35E-02				
Benzene	71-43-2	3.00E-02	1.80E+01	1.70E-03	3.49E-04	3.49E-04	x	3.80E+01	3.80E+01	3.49E-04	x	5.00E-03	5.00E-03	x	5.00E-03				
Bis(2-ethylhexyl)phthalate	117-81-7	x	7.10E+01	6.70E-01	5.57E-02	5.57E-02	x	2.00E-02	2.00E-02	2.00E-02	x	1.19E-01	1.19E-01	x	1.19E-01				
Butyl benzyl phthalate	85-68-7	x	5.30E+02	6.50E-01	2.81E-03	2.81E-03	x	9.00E+01	9.00E+01	2.81E-03	x	2.00E-01	2.00E-01	x	2.00E-01				
Chlorobenzene	108-90-7	x	1.60E+03	5.10E-02	6.64E-04	6.64E-04	4.00E+01	x	4.00E+01	6.64E-04	x	2.00E-03	2.00E-03	x	2.00E-03				
Chloroform	67-66-3	x	3.20E+01	4.80E-03	6.11E-04	6.11E-04	x	8.20E+00	8.20E+00	6.11E-04	x	2.00E-03	2.00E-03	x	2.00E-03				
4,4'-DDD	72-54-8	x	4.20E+00	1.70E-02	1.70E-02	1.70E-02	7.50E-01	x	7.50E-01	1.70E-02	x	2.50E-04	2.50E-04	x	1.70E-02				
4,4'-DDT	50-29-3	3.00E+00	2.90E+00	1.70E-03	1.70E-03	1.70E-03	7.50E-01	x	7.50E-01	1.70E-03	x	2.00E-03	2.00E-03	x	2.00E-03				
3,3'-Dichlorobenzidine	91-94-1	x	2.20E+00	6.80E-04	6.80E-04	6.80E-04	x	3.00E-02	3.00E-02	6.80E-04	x	3.30E-01	3.30E-01	x	3.30E-01				
2,4-Dichlorophenol	120-83-2	x	2.40E+02	2.10E-02	4.34E-03	4.34E-03	x	5.00E-02	5.00E-02	4.34E-03	x	2.15E-01	2.15E-01	x	2.15E-01				
Ethylbenzene	100-41-4	6.00E+00	8.00E+02	3.40E-01	5.89E-03	5.89E-03	x	2.70E-01	2.70E-01	5.89E-03	x	1.00E-03	1.00E-03	x	5.89E-03				
Fluoranthene	206-44-0	x	3.20E+03	3.20E+01	2.96E-01	2.96E-01	x	1.10E+00	1.10E+00	2.96E-01	x	5.00E-03	5.00E-03	x	2.96E-01				
Fluorene	86-73-7	x	3.20E+03	2.60E+00	1.60E-02	1.60E-02	3.00E+01	x	3.00E+01	1.60E-02	x	5.00E-03	5.00E-03	x	1.60E-02				
1-Methylnaphthalene	90-12-0	x	2.00E+01	2.40E-03	1.41E-04	1.41E-04	x	2.90E+01	2.90E+01	1.41E-04	x	5.00E-01	5.00E-01	x	5.00E-01				
2-Methylnaphthalene	91-57-6	x	3.20E+02	8.80E-02	1.38E-04	1.38E-04	x	2.90E+01	2.90E+01	1.38E-04	x	5.00E-01	5.00E-01	x	5.00E-01				
Naphthalene	91-20-3	5.00E+00	1.60E+03	2.40E-01	3.03E+00	2.40E-01	x	2.90E+01	2.90E+01	2.40E-01	x	1.00E-03	1.00E-03	x	2.40E-01				
N-Nitrosodiphenylamine	86-30-6	x	3.60E+01	9.00E-06	9.00E-06	9.00E-06	2.00E+01	x	2.00E+01	9.00E-06	x	7.00E-02	7.00E-02	x	7.00E-02				
Total PCBs	1336-36-3	1.00E+00	5.00E-01	1.70E-02	1.70E-02	1.70E-02	6.50E-01	x	6.50E-01	1.70E-02	x	2.50E-04	2.50E-04	x	1.70E-02				
Pentachlorophenol	87-86-5	x	2.50E+00	8.80E-04	5.52E-06	5.52E-06	3.00E+00	x	3.00E+00	5.52E-06	x	1.25E-01	1.25E-01	x	1.25E-01				
Phenanthrene (use pyrene as a surrogate)	129-00-0	x	2.40E+03	1.60E+01	1.60E+01	1.60E+01	x	2.90E+01	2.90E+01	1.60E+01	x	2.00E-02	2.00E-02	x	1.60E+01				
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	4.80E+02	2.80E-03	3.41E-03	2.80E-03	x	1.80E-01	1.80E-01	2.80E-03	x	1.00E-03	1.00E-03	x	2.80E-03				
Toluene	108-88-3	7.00E+00	6.40E+03	2.70E-01	2.26E-02	2.26E-02	x	2.30E+01	2.30E+01	2.26E-02	x	1.00E-03	1.00E-03	x	2.26E-02				
1,2,3-Trichlorobenzene	87-61-6	x	6.40E+01	1.10E-02	1.30E-02	1.10E-02	2.00E+01	x	2.00E+01	1.10E-02	x	1.00E-03	1.00E-03	x	1.10E-02				
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	2.90E-02	1.95E-03	1.95E-03	x	2.70E-01	2.70E-01	1.95E-03	x	3.00E-02	3.00E-02	x	3.00E-02				
Vinyl Chloride	75-01-4	x	6.70E-01	9.00E-05	3.08E-04	9.00E-05	x	1.20E-01	1.20E-01	9.00E-05	x	2.00E-03	2.00E-03	x	2.00E-03				
Total Xylenes	1330-20-7	9.00E+00	1.60E+04	8.30E-01	2.96E-02	2.96E-02	x	1.40E+00	1.40E+00	2.96E-02	x	1.00E-03	1.00E-03	x	2.96E-02				
cPAHs																			
Benzo(a)anthracene	56-55-3	x	1.90E-01	1.90E-01	1.79E-02	1.79E-02	x	1.10E+00	1.10E+00	1.79E-02	x	5.00E-02	5.00E-02	x	5.00E-02				
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	1.90E-01	4.85E-02	4.85E-02	1.20E+01	x	1.20E+01	4.85E-02	x	5.00E-02	5.00E-02	x	5.00E-02				
Benzo(b)fluoranthene	205-99-2	x	3.00E-02	3.00E-02	3.00E-02	3.00E-02	x	1.10E+00	1.10E+00	3.00E-02	x	5.00E-02	5.00E-02	x	5.00E-02				
Chrysene	218-01-9	x	2.94E-02	2.94E-02	2.94E-02	2.94E-02	x	1.10E+00	1.10E+00	2.94E-02	x	5.00E-02	5.00E-02	x	5.00E-02				
Benzo(k)fluoranthene	207-08-9	x	9.04E-03	9.04E-03	9.04E-03	9.04E-03	x	1.10E+00	1.10E+00	9.04E-03	x	5.00E-02	5.00E-02	x	5.00E-02				
Dibenzo(a,h)anthracene	53-70-3	x	8.95E-02	8.95E-02	8.95E-02	8.95E-02	x	1.10E+00	1.10E+00	8.95E-02	x	5.00E-02	5.00E-02	x	8.95E-02				
Indeno(1,2,3-cd)pyrene	193-39-5	x	9.76E-02	9.76E-02	9.76E-02	9.76E-02	x	1.10E+00	1.10E+00	9.76E-02	x	5.00E-02	5.00E-02	x	9.76E-02				
cPAH TEQ	x	1.00E-01	1.90E-01	1.90E-01	1.90E-01	1.90E-01	N/A	N/A	N/A	1.00E-01	x	5.00E-02	5.00E-02	x	1.00E-01				
Metals																			
Arsenic	7440-38-2	2.00E+01	3.10E-02	1.50E-01	1.46E-02	1.46E-02	1.00E+01	x	1.00E+01	1.46E-02	x	2.50E+00	2.50E+00	7.00E+00	7.00E+00				
Barium	7440-39-3	x	1.60E+04	8.30E+01	1.61E-01	1.61E-01	1.02E+02	x	1.02E+02	1.61E-01	x	3.00E-01	3.00E-01	2.55E+02	2.55E+02				
Cadmium	7440-43-9	2.00E+00	8.00E+01	3.50E-02	2.93E-03	2.93E-03	4.00E+00	x	4.00E+00	2.93E-03	x	1.00E-01	1.00E-01	1.00E+00	1.00E+00				
Chromium III	16065-83-1	2.00E+03	1.20E+05	1.00E-02	6.10E+01	6.10E+01	x	2.60E+01	2.60E+01	6.10E+01	x	5.00E-01	5.00E-01	4.20E+01	4.20E+01				
Chromium (Total)	7440-47-3	x	x	x	5.00E-01	5.00E-01	4.20E+01	x	4.20E+01	5.00E-01	x	5.00E-01	5.00E-01	4.20E+01	4.20E+01				
Copper	7440-50-8	x	3.20E+03	1.40E+01	2.67E-02	2.67E-02	5.00E+01	x	5.00E+01	2.67E-02	x	5.00E-01	5.00E-01	3.60E+01	3.60E+01				
Iron	7439-89-6	x	5.60E+04	7.60E+00	5.18E-02	5.18E-02	x	5.15E+04	5.15E+04	5.18E-02	x	5.00E+00	5.00E+00	5.15E+04	5.15E+04				
Lead	7439-92-1	2.50E+02	1.50E+01	1.00E+00	1.00E+00	1.00E+00	5.00E+01	x	5.00E+01	1.00E+00	x	1.00E-01	1.00E-01	1.70E+01	1.70E+01				
Manganese	7439-96-5	x	3.70E+03	3.30E+00	3.26E+00	3.26E+00	1.10E+03	x	1.10E+03	3.26E+00	x	1.00E-01	1.00E-01	1.10E+03	1.10E+03				
Mercury	7439-97-6	2.00E+00	x	1.00E-01	3.14E-04	3.14E-04	1.00E-01	x	1.00E-01	3.14E-04	x	2.00E-02	2.00E-02	7.00E-02	7.00E-02				
Nickel	7440-02-0	x	1.60E+03	2.10E+01	7.20E-01	7.20E-01	3.00E+01	x	3.00E+01	7.20E-01	x	9.00E-01	9.00E-01	4.60E+01	4.60E+01				
Selenium	7782-49-2	x	4.00E+02	2.60E-01	7.90E-03	7.90E-03	3.00E-01	x	3.00E-01	7.90E-03	x	3.00E+00	3.00E+00	7.80E-01	3.00E+00				
Silver	7440-22-4	x	4.00E+02	6.90E-01	1.50E-03	1.50E-03	2.00E+00	x	2.00E+00	1.50E-03	x	3.00E-01	3.00E-01	6.10E-01	6.10E-01				
Zinc	7440-66-6	x	2.40E+04	3.00E+02	1.49E+00	1.49E+00	8.60E+01	x	8.60E+01	1.49E+00	x	5.00E+00	5.00E+00	8.60E+01	8.60E+01				

Subsurface Testing for the Yakima East-West Corridor Project (Drayton Archaeology)



DRAYTON ARCHAEOLOGY

March 2, 2020
Drayton Project: 0713A

Ross Widener
Widener & Associates
10108 32nd Avenue West, Suite D
Everett, Washington 98204

Re: Subsurface Testing for the Yakima East-West Corridor Project, Yakima, Yakima County, Washington

Mr. Widener,

Pursuant to ongoing consultation, this present letter is intended to address requested subsurface testing for the Yakima East-West Corridor Project located in Yakima, Yakima County, Washington. This letter is intended to provide an update that will eventually be used to supplement the final report.

The Yakima East-West Corridor Project intends to construct a new road corridor to connect Yakima with Terrace Heights. The project is ongoing and Drayton Archaeology (Drayton) has conducted a previous cultural resource survey in 2013. The project is subject to Section 106 and the defined area of potential effects (APE) includes non-federal and federal lands. Prior to the initiation of conducting the subsurface testing, Drayton presented our proposed methodologies to the Washington State Department of Transportation (WSDOT) (dated August 16, 2019 [updated October 17, 2019]) for areas not located on federal property (Baldwin 2019); and, for areas within the APE located on federal property, Drayton prepared an Antiquities Act (AA) permit with the Bureau of Reclamation (BOR) (submitted September 4, 2109, Attachment A). The proposed subsurface testing strategy for this project was targeted to the footprint of construction and included monitoring of mechanically-excavated trenches and manual excavation of shovel probes. There were no archaeological or cultural resources that would rise to the level of Historic Property located during this latest round of work. It appears that the original assessment that a determination of No Historic Properties Affected should remain.

PROJECT INFORMATION

The Yakima East-West Corridor Project is located within the city of Yakima and the Terrace Heights neighborhood in unincorporated Yakima County in Sections 13, 17 and 18 of Township 13 North and Range 19 East as well as Section 13 of Township 13 North and Range 18 East (Figure 1 - 2). Land within the project area is owned by various private, local, state and federal agencies. East of the Yakima River, the upland areas are largely owned by the United States Bureau of Reclamation, riparian areas are owned by WSDOT, and the several residential properties throughout are privately owned. West of the Yakima River, most of the land included in the project area is comprised of City of Yakima ROW or privately owned properties.

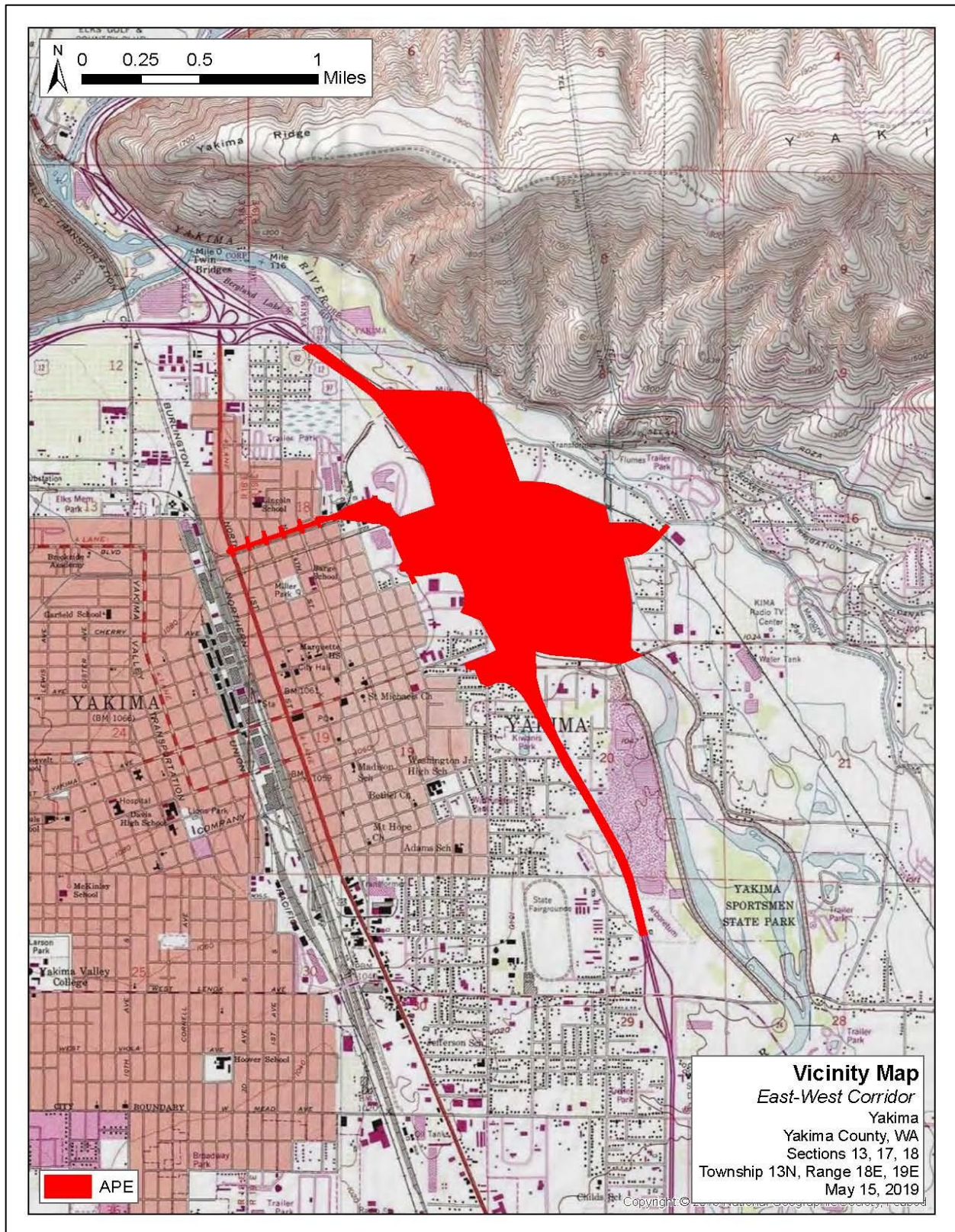


Figure 1. Portion of the USGS (1985) Yakima East, WA 7.5-minute quadrangle maps detailing the APE for the Yakima East-West Corridor Project (courtesy of Widener and Associates).

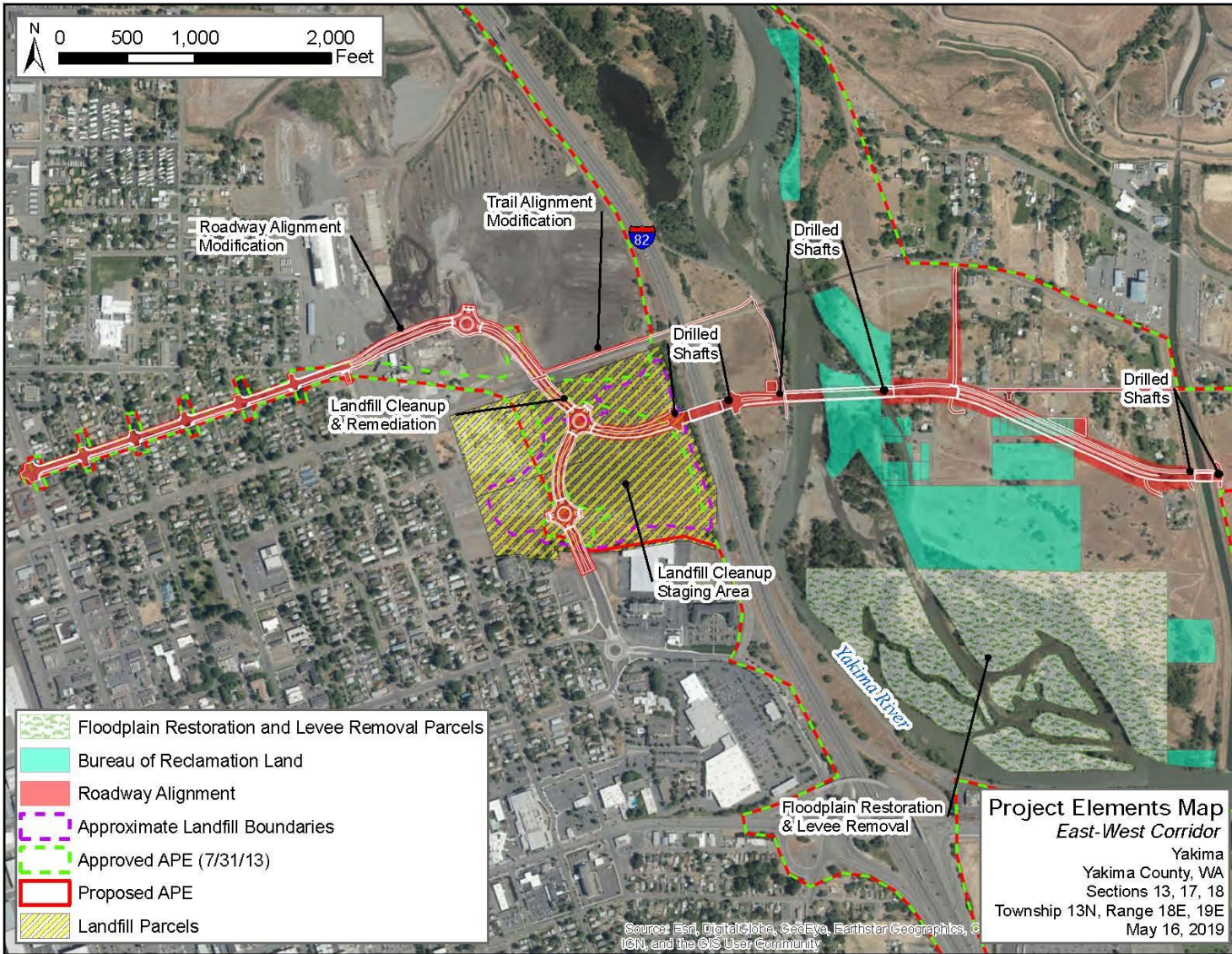


Figure 2. Detail of the proposed footprint of construction for the Yakima East-West Corridor Project (courtesy of Widener and Associates).

The APE for this project has been defined by WSDOT, Local Programs Division, on behalf of the County and Federal Highways Administration (FHWA). Attachment B includes the APE and consultation documentation. The APE has been modified several times over the course of the planning stages for this project. The most recent APE, dated May 16, 2019 was concurred upon by the DAHP on May 30, 2019. The following is the project description from the May 16, 2019 APE letter that has been slightly modified by Drayton for consistency:

APE Modifications

The following modifications to the existing APE (2013) are being proposed for this APE revision. Numbering corresponds to numbers on the APE Map.

1. The roadway alignment west of the Yakima River has changed since the previous APE was approved. General roadway excavation will reach no more than 10 feet below the ground surface.
2. The closed Yakima Landfill site is located at the southern end of the former Boise Cascade Mill and Plywood Facility. The proposed roadway alignment will pass through the Yakima Landfill site so cleanup and remediation is necessary. The site will be excavated down to the native soils (~20 feet) to a minimum width of the roadway alignment. Municipal solid waste (MSW) and wood debris will be excavated from the landfill. The extra area necessary for this APE will be used as staging areas to segregate MSW and wood debris and test them for waste or recycling characterization before moving them to the appropriate disposal site. This is necessary because wood debris maybe recycled while most MSW will have to be taken to a Subtitle D-permitted disposal facility.
3. A section of the shared-use path has moved to head east-west adjacent to the railway tracks to connect to the existing Yakima Greenway trail. Excavation for the trail will reach no more than 6 feet below the ground surface.

Anticipated depth of construction for this project ranges depending on the activity (Figure 3). General roadway construction will reach no more than 10 feet below the ground surface. Drilled shafts for bridge abutments will reach [approximately] 80 feet for the Yakima River bridge and [approximately] 60 feet for the bridges over the [Roza Division Wasteway No. 2] and I-82. Excavation for the Yakima Greenway trail extension will reach no more than six feet below the ground surface. Cleanup and remediation at the Yakima Landfill site will excavate down to the native soil to an anticipated depth of 20 feet maximum. Excavation for the river restoration and levee work are anticipated to reach six feet and no more than 10 feet below the ground surface.

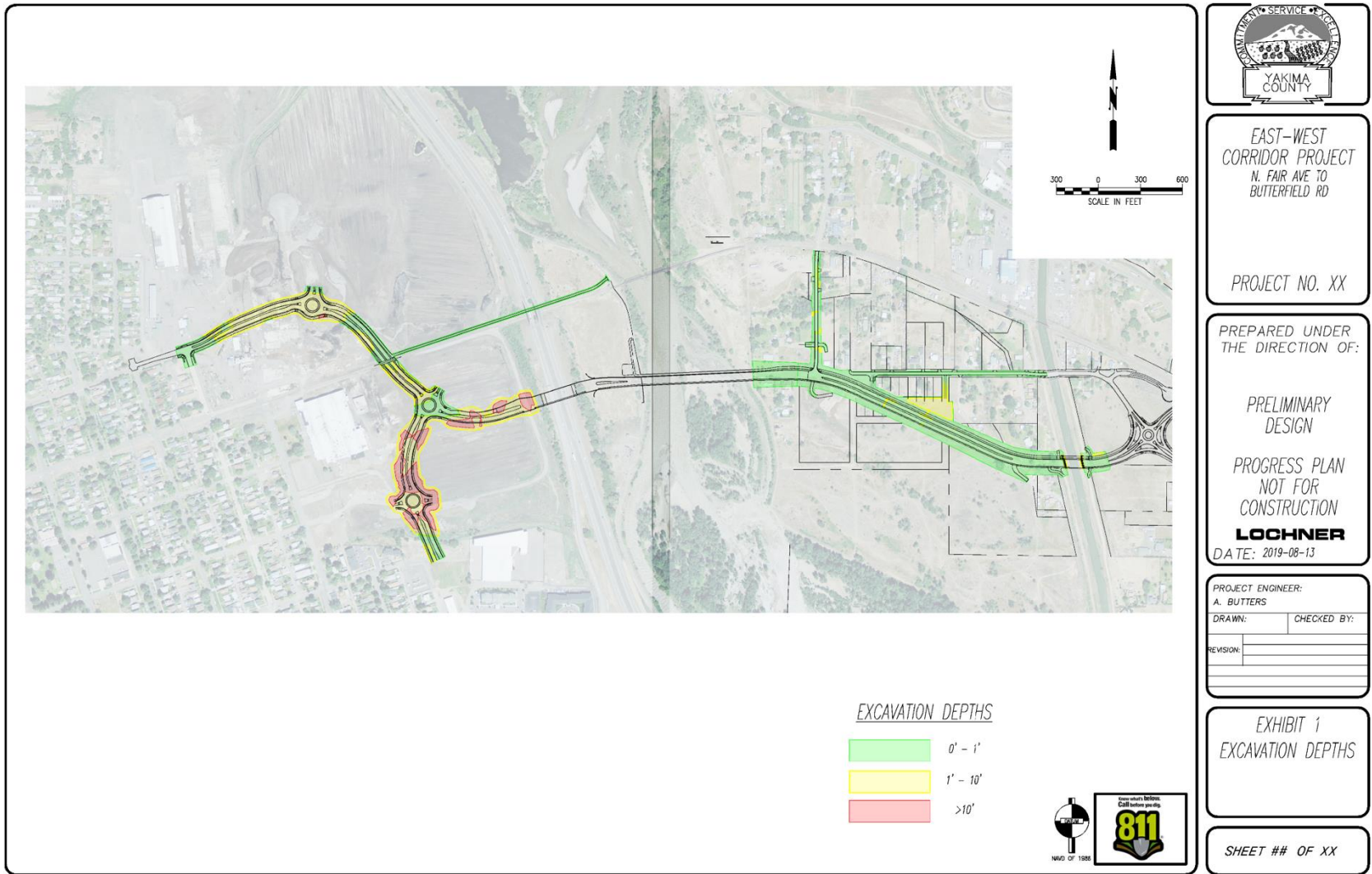


Figure 3. Detail of proposed depth of construction throughout the footprint of construction for the Yakima East-West Corridor Project (courtesy of Widener and Associates).

REGULATORY

This project is subject to Section 106 of the National Historic Preservation Act (NHPA), as amended, and the implementing regulations in 36 CFR Part 800. Section 106 requires federal agencies take into account the effects of their undertakings on historic properties. A historic property is typically aged 50 years or older and is defined in 36 CFR part 800.16(l)(1), as follows:

... any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

The procedures under Section 106 generally require the federal agency involved in the undertaking to identify the APE, inventory any historic properties that may be located within the APE, and determine if the identified historic properties located within the APE may be eligible to be listed in or eligible for listing in the NRHP. An APE is defined in 36 CFR 800.16(d), as follows:

... the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

If NRHP eligible historic properties are identified within the APE then potential adverse effects to the historic properties must be assessed, and a resolution of adverse effects recommended. Under Section 106, the responsible federal agency must, at minimum, consult with and seek comment from the State Historic Preservation Officer (SHPO) and/or the Tribal Historic Preservation Officer (THPO), as applicable, and consult with any affected or potentially affected Native American Tribe(s).

CONSULTATION

On September 12, 2019, Jon Shellenberger, Yakama Nation Archaeologist, provided comments to WSDOT that were passed to Drayton, regarding the proposed survey methodology for non-federal areas of the APE. Comments from the Yakama Nation included:

- 1) Survey intervals should be at 5-10 meters;
- 2) Probes should be at 10-meter intervals, not 30;
- 3) 1/8" hardwire should be used not 1/4";
- 4) Artifacts will not be bagged and placed back in the ground;

- 5) A GPS with submeter accuracy will be used to plot shovel probe locations;
- 6) There needs to be a protocol for encountering human remains; and,
- 7) I believe I have also asked for resumes of field staff.

Drayton responded to the comments from the Yakama Nation in an email dated October 2, 2019. On October 21, 2019, on behalf of WSDOT, Drayton emailed Johnson Meninick and Jon Shellenberger from the Yakama Nation that we would be conducting archaeological trenching and they were invited to attend. Drayton did not receive a response to this email.

METHODOLOGY

Subsurface testing for this project included archaeological monitoring during exploratory trench excavation and manual excavation of shovel probes. The following excerpts detail our proposed subsurface testing methodology for trench excavation and excavating shovel probes as provided in Baldwin (2019) and our AA permit:

Trenches are proposed for those areas where excavation is planned to extend beyond the achievable depths of shovel probes. These areas are in the western portion of the APE where [the Yakima Landfill and Cascade Lumber Company mill were formerly located]. Trenches will be excavated to depths that reach native soil or to a minimum of 10-feet below the present surface. Soil profiles will be recorded to determine the depths of native soils (as apparent).

Shovel probes will be excavated to depths pursuant to soil conditions and content. They will be of a standard, [approximately] 40-centimeter (cm) diameter and maximum depth of [approximately] 100 cm (again, based on content). Standard [0.25-inch] screen in standing rocker screens will be used to screen materials. Any artifacts recovered will be recorded, bagged, and reburied in the GPS recorded probe from which they came.

RESULTS

Archaeological monitoring during trench excavations was conducted by Drayton archaeologists Jennifer Chambers and Jeffrey Hillstrom on October 24, 2019 and again by Jeffrey Hillstrom on October 25, 2019. Weather conditions were seasonably warm and sunny during this time. Excavations for the project were conducted by Jeff Walker of Ken Leingang Excavating using a John Deere backhoe. Frank Winslow of the Department of Ecology was also present on October 24, 2019. Brittany McManus of Landau Associates and Kyle Ames of Fulcrum Environmental Consulting were present both days.

Trench excavation was isolated to the western half of the APE. The western half of the APE is characterized by the remnants of the former Cascade Lumber Company mill. Much of this area is

covered with discarded piles of rocks, gravels, concrete, bark and other wood debris, and other scrap materials that have been stored and/or discarded on site for over a decade (Photos 1-2).

At the time of testing, the proposed trench locations were staked and flagged. A total of 12 trenches were excavated (Figure 4). Two of the 14 proposed trenches were skipped as it was realized in the field that they centered on large concrete pads. Trench location were slightly adjusted in the field to accommodate conditions that were previously unknown. Trenches were sized approximately 3.5 feet wide by 14-feet long (107- by 426-centimeter [cm]). Depth of excavation extended to a depth of at least 10 feet (304 cm) below the ground surface (bgs). Further details regarding the deposits encountered during trench excavation are provided in Appendix A.



Photo 1. Overview of the former mill site located on the west side of the APE, view southeast.



Photo 2. Overview of the former mill site located on the west side of the APE, view north

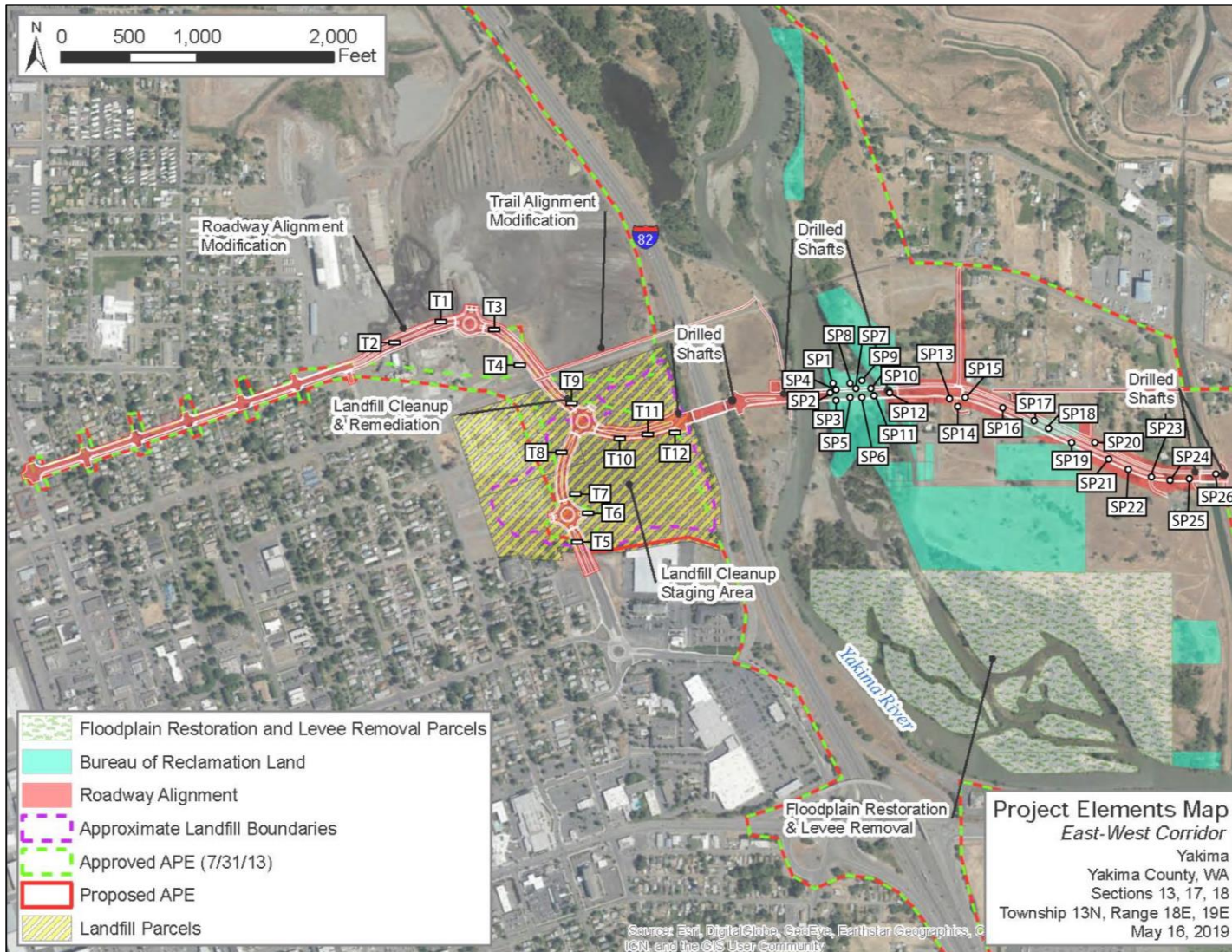


Figure 4. Aerial image illustrating the footprint of construction and the location of the trenches (T) and shovel probes (SP) excavated across the APE (courtesy of Widener and Associates and adapted by Drayton).

Subsurface deposits encountered during trenching on the west half of the APE largely consisted of extremely cobbly sands and sandy loams (Photo 3). At several locations, the upper soil stratum contained high concentrations of woody debris; in one pit, large sawn sections of logs were observed (Photo 4). Considering the history of the location for use as a lumber mill / log storage between 1903 and 2006, these deposits were expected. No other materials associated with the mill were encountered.



Photo 3. Detail of sediment profile from T1, located on the west half of the APE.



Photo 4. Woody debris including sawn log segments observed in T9, located on the west half of the APE.

In six of the eight excavated trenches (T5, T7, T8, T10, T11) landfill refuse deposits were observed. The refuse, which consisted of typical household garbage such as plastic, paper, glass, lawn clippings, etcetera, was generally exposed between 61 – 168 cmbgs and averaged about 10 ft thick (Photos 5 - 7). Below the refuse deposits was a stratum of dark gray gravelly sand. The encountered refuse deposits were identified in an area documented as previously used by the mill as a pond and later, by the city, as a municipal landfill from around 1963 until 1972.



Photo 5. Landfill refuse deposit observed in T11, located on the west half of the APE.



Photo 6. Newspaper dated November 15, 1964 from T8, located on the west half of the APE.



Photo 7. An assortment of glass encountered from T11 on the west half of the APE.

Subsurface testing occurred by way of manual excavation of shovel probes. Shovel probes were excavated by Jeffery Hillstrom on October 23, 2019 during clear and warm weather conditions and December 6, 2019 during clear and cold weather conditions.

A total of 26 SPs were excavated within the proposed alignment on the eastern half of the APE (SP1 – SP26). Here, the APE is largely characterized by the neighboring residential properties and roadways along the majority of the APE (Photo 8); the river extends along the western boundary of the eastern portion of the APE (Photo 9). Encountered subsurface deposits in the eastern half of the APE consisted primarily of fine to coarse sands with high gravel content nearest the river and sandy loams atop gravels and cobbles in the areas inland (Photos 10 - 11). No evidence of cultural materials and/or deposits were encountered during shovel probe testing. Further details regarding the SPs are provided in Appendix A.



Photo 8. Overview of the east half of the APE inland of the Yakima River, view east.



Photo 9. Overview of the east half of the APE nearest the Yakima River.



Photo 10. Example of subsurface deposits encountered near the Yakima River in the east half of the APE.



Photo 11. Detail of the subsurface deposits encountered inland of the Yakima River on the east half of the APE.

CONCLUSIONS

Drayton conducted subsurface testing within the footprint of construction for the Yakima East-West Corridor Project. Subsurface testing consisted of monitoring 12 excavation trenches on the west side of the APE and excavating 26 shovel probes on the east side of the APE. No cultural materials and/or deposits were identified on the east side of the APE. Wood debris and refuse were identified on the west side of the APE in the location of the previously recorded Cascade Lumber Company Mill (ca. 1903-2006). The area was also used as a municipal landfill from around 1963 until 1972 and refuse was observed below the ground surface. Considering the landfill was most recently in use less than 50 years ago no further archaeological oversight appears warranted. Since there is no deposit of material associated with the mill or landfill that is over the 50-year age threshold, they were not recorded as archaeological sites. Drayton recommends that this information is incorporated to the final reporting for the Yakima East-West Corridor Project.

REFERENCES

Baldwin, Garth L.

2019 RE: Yakima E-W Corridor Methodology. Drayton Archaeology letter prepared for Trent DeBoer, Local Agency Archaeologist, WSDOT. On file with Drayton Archaeology, Blaine.

Doncaster, Kelsey

2019 SUBJECT: Yakima County East-West Corridor Alignment Project Revised Area of Potential Effect (APE). United States Department of the Interior Bureau of Reclamation, Columbia-Cascades Area Office letter addressed to Trent DeBoer, WSDOT. On file with Drayton Archaeology, Blaine.

United States Geological Survey (USGS)

1985 *Yakima East Quadrangle, Washington*. 1:24,000. 7.5-Minute Series. USGS, Washington, D.C.

APPENDIX A: SUBSURFACE TESTING DATA

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
T1		
0-7	Asphalt	Negative
7-40	Grayish brown sandy loam, very high gravel content with many pebbles and boulders	Negative
40-55	Gray sand and crushed gravel	Negative
55-305	Grayish brown sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
T2		
0-40	Gray silty sandy loam, high gravel content	Negative
40-150	Dark brown fine sandy loam, very low gravel content	Negative
150-245	Grayish brown sand, very high gravel content with many pebbles, cobbles, and boulders	Negative
T3		
0-10	Asphalt	Negative
10-30	Gray sand and crushed gravel	Negative
30-45	Yellowish brown sandy loam, very high gravel content with many pebbles and cobbles	Negative
45-110	Grayish brown loamy sand, high gravel content with many pebbles, cobbles, and boulders	Negative
110-320	Dark gray sand, high gravel content with many pebbles, cobbles, and boulders	Negative
T4		
0-60	Dark yellowish-brown sandy loam, high gravel content with many pebbles and cobbles	Negative
60-75	Dark grayish brown sandy loam, high gravel content with many pebbles and cobbles	Negative
75-120	Very dark brown sandy loam, high gravel content with many pebbles and cobbles, woody debris; drain rock and old pipe from 90-120 cm	Plastic pipe
120-290	Dark gray sand, high gravel content with many cobbles	Negative
290-335	Dark gray sand, high gravel content, high concentration of woody debris	Negative
T5		
0-91	Brown sandy loam, high gravel content with many pebbles and cobbles	Negative
91-122	Dark grayish brown clayey sand, high gravel content with many cobbles	Negative
122-427	Landfill refuse	Refuse
427-457	Dark gray silty sand	Negative
T6		
0-30	Dark brown sandy loam, moderate to high gravel content with many pebbles and cobbles	Negative
30-61	Mixed brown and gray silty sand, very high gravel content with many pebbles and cobbles	Negative

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
61-152	Dark grayish brown silty sand, very high gravel content with many pebbles and cobbles	Negative
152-427	Dark gray sand, high gravel content with many pebbles and cobbles	Negative

T7		
0-91	Dark brown sandy loam, moderate to high gravel content with many pebbles and cobbles	Negative
91-168	Dark gray sandy loam, high gravel content with many cobbles	Negative
168-457	Landfill refuse	Refuse
T8		
0-61	Dark brown sandy silt loam, high gravel content with many pebbles and cobbles, some woody debris	Negative
61-122	Dark gray loamy sand, high gravel content with many cobbles	Negative
122-427	Landfill refuse	Refuse
T9		
0-61	Dark brown sandy silt loam, high gravel content with many pebbles and cobbles, woody debris	Negative
61-122	High concentrations of woody debris	Negative
122-168	Dark gray loamy sand, high gravel content with many pebbles and cobbles	Negative
168-335	Dark brown sandy loam, high concentrations of woody debris	Negative
T10		
0-61	Dark brown sandy silt loam, high gravel content with many pebbles and cobbles, woody debris	Negative
61-137	Dark gray loamy sand, high gravel content with many pebbles and cobbles	Negative
137-427	Landfill refuse	Refuse
T11		
0-46	Dark brown sandy silt loam, high gravel content with many pebbles and cobbles, woody debris	Negative
46-61	Dark gray loamy sand, high gravel content with many pebbles and cobbles	Negative
61-335	Landfill refuse	Refuse
T12		
0-46	Brown loamy sand, high gravel content with many pebbles and cobbles	Negative
46-61	Grayish brown sand, high gravel content with many pebbles and cobbles	Negative
61-213	Landfill refuse	Refuse
213-243	Dark gray loamy sand, high gravel content with many cobbles	Negative
SP1		
0-56	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	2 brown glass bottle fragments at ~15 cm
Notes: boulder impasse		

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
SP2		
0-50	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Brown glass bottle fragment at ~40 cm
Notes: boulder impasse		

SP3		
0-61	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP4		
0-50	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP5		
0-41	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP6		
0-52	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP7		
0-15	Boulders and cobbles	Negative
15-62	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
SP8		
0-60	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP9		
0-53	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP10		
0-40	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP11		

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
0-50	Dark grayish brown fine to coarse sand, extremely high gravel content with many pebbles, cobbles, and boulders	Negative
Notes: boulder impasse		
SP12		
0-4	Matted grass and roots in grayish brown fine sandy loam	Negative
4-28	Brown fine sandy loam, high gravel content with mostly rounded pebbles and cobbles, few subangular coarse grained volcanic cobbles	Brown and clear bottle glass fragments, bottle caps
28-35	Light grayish brown moderately coarse sand lens	Negative
35-41	Brown fine sandy loam, high gravel content with mostly rounded pebbles, cobbles and boulders	Negative
41-74	Coarse brown and dark grayish brown sand, high gravel content with many rounded and subrounded pebbles and cobbles	Negative
SP13		
0-2	Matted grass and roots in grayish brown fine sandy loam	Negative
2-11	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles and cobbles	Green bottle glass fragment
11-12	Light gray fine sand lens	Negative
12-30	Grayish brown fine sandy loam	Negative
30-43	Dark grayish brown coarse sand, high gravel content with mostly subrounded pebbles	Negative
43-60	Grayish brown fine sandy loam	Negative
60-72	Dark grayish brown coarse sand, high gravel content with mostly subrounded pebbles	Negative
72-85	Grayish brown fine sandy loam with orangish brown oxidation mottling	Negative
85-100	Dark gray coarse sand, very high gravel content with mostly subrounded pebbles and cobbles	Negative
SP14		
0-2	Matted grass and roots in grayish brown fine sandy loam	Negative
2-35	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
35-48	Dark grayish brown coarse sand, high gravel content with mostly subrounded pebbles	Negative
48-59	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles and cobbles	Negative
59-74	Dark grayish brown coarse sand, high gravel content with mostly subrounded pebbles	Negative
74-90	Grayish brown fine sandy loam with orangish brown oxidation mottling, moderate gravel content with mostly subrounded pebbles and cobbles	Negative

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
90-100	Dark grayish brown coarse sand, high gravel content with mostly subrounded pebbles and cobbles	Negative
SP15		
0-2	Matted grass and roots in grayish brown fine sandy loam	Negative
2-37	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles and cobbles	Negative
37-69	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles and cobbles	Negative
Notes: boulder impasse		
SP16		
0-2	Matted grass and roots in grayish brown fine sandy loam	Negative
2-30	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
30-55	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles, cobbles and boulders	Negative
55-71	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
Notes: probe undermined/collapsed from extremely gravelly third stratum		
SP17		
0-3	Matted grass and roots in grayish brown fine sandy loam	Negative
3-26	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
26-70	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles and cobbles	Negative
Notes: probe undermined/collapsed from extremely gravelly third stratum		
SP18		
0-2	Matted grass and roots in grayish brown fine sandy loam	Negative
2-41	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
41-62	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles and cobbles	Negative
Notes: probe undermined/collapsed from extremely gravelly third stratum		
SP19		
0-2	Matted grass and roots in brown fine sandy loam	Negative
2-60	Brown fine sandy loam	Negative
60-100	Grayish brown fine sand with orangish brown oxidation mottling	Negative
SP20		
0-3	Matted grass and roots in grayish brown fine sandy loam	Negative
3-46	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
46-66	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles, cobbles and boulders	Negative

DEPTH BELOW SURFACE (CM)	SEDIMENT DESCRIPTION	RESULTS
Notes: boulder impasse		
SP21		
0-1	Matted grass and roots in grayish brown fine sandy loam	Negative
1-69	Light brown fine sandy loam	Negative
69-79	Light grayish brown fine sand with orangish brown oxidation mottling	Negative
SP22		
0-1	Matted grass and roots in grayish brown fine sandy loam	Negative
1-51	Light brown fine sandy loam	Negative
51-67	Light brown fine sandy loam, high gravel content with mostly subrounded pebbles, cobbles and boulders	Negative
Notes: boulder impasse		
SP23		
0-1	Matted grass and roots in grayish brown fine sandy loam	Negative
1-15	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
15-42	Dark grayish brown coarse sand, extremely high gravel content with mostly subrounded pebbles, cobbles and boulders	Negative
Notes: boulder impasse		
SP24		
0-5	Matted grass and roots in grayish brown fine sandy loam	Negative
5-21	Grayish brown fine sandy loam, moderate gravel content with mostly subrounded pebbles, cobbles and boulders	Negative
21-55	Light grayish brown loam with orange oxidation mottling	Negative
SP25		
0-2	Matted grass and roots in brown fine sandy loam	Negative
2-38	Brown sandy loam, extremely high gravel content with mostly subrounded pebbles, cobbles and boulders	Negative
Notes: boulder impasse		
SP26		
0-2	Matted grass and roots in brown fine sandy loam	Negative
2-15	Brown sandy loam, moderate gravel content with mostly subrounded pebbles	Negative
15-26	Dark gray coarse sand	Negative
26-70	Light brown silt loam with orangish brown oxidation mottling	Negative
70-100	Dark grayish brown coarse sand	Negative

ATTACHMENT A: BLM AMERICAN ANTIQUITIES ACT PERMIT.

Please use this number when referring to this permit


DI Form 1991 (Rev Sept 2004)
OMB No. 1024-0037

No.: PNRO U19-004.001

United States Department of the Interior
PERMIT FOR ARCHEOLOGICAL INVESTIGATIONS

To conduct archeological work on Department of the Interior lands and Indian lands under the authority of:

- The Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm) and its regulations (43 CFR 7).
- The Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225, 16 U.S.C. 431-433) and its regulations (43 CFR 3).
- Supplemental regulations (25 CFR 262) pertaining to Indian lands.
- Bureau-specific statutory and/or regulatory authority: _____

1. Permit issued to: Drayton Archeological Research		2. Under application dated: 9/4/2019	
3. Address PO Box 782 Blaine WA 98231		4. Telephone number(s): 360-739-3921	
		5. E-mail address(es): garth@draytonarcheology.com	
6. Name of Permit Administrator: Garth L. Baldwin Telephone number(s): 360-739-3921 Email address(es): garth@draytonarcheology.com		7. Name of Principal Investigator(s): Garth L. Baldwin Telephone number(s): 360-739-3921 Email address(es): garth@draytonarcheology.com	
8. Name of Field Director(s) authorized to carry out field projects Jennifer L. Chambers		Telephone number(s): 360-222-8038 Email address(es): jennifer@draytonarcheology.com	
9. Activity authorized Non-Collection Survey/Recordation and Limited Testing in connection with cultural resource consulting services.			
10. On lands described as follows: Project lands administered by the U.S. Bureau of Reclamation's Columbia-Cascades Area Office for the Roza Division of the Yakima Project/Yakima River Basin Enhancement Project west of Roza Wasteway No. 2 to the Yakima River.			
11. During the duration of the project From: September 17, 2019 To: December 31, 2019			
12. Name and address of the curatorial facility in which collections, records, data, photographs, and other documents resulting from work under this permit shall be deposited for permanent preservation on behalf of the United States Government. N/A – Non-collection permit.			
13. Permittee is required to observe the listed standard permit conditions and the special permit conditions attached to this permit.			
14. Signature and title of approving official  ACTING AREA MANAGER		15. Date 9/9/2019	

15. Standard Permit Conditions

- a. This permit is subject to all applicable provisions of 43 CFR Part 3, 43 CFR 7, and 25 CFR 262, and applicable departmental and bureau policies and procedures, which are made a part hereof.
- b. The permittee and this permit are subject to all other Federal, State, and local laws and regulations applicable to the public lands and resources.
- c. This permit shall not be exclusive in character, and shall not affect the ability of the land managing bureau to use, lease or permit the use of lands subject to this permit for any purpose.
- d. This permit may not be assigned.
- e. This permit may be suspended or terminated for breach of any condition or for management purposes at the discretion of the approving official, upon written notice.
- f. This permit is issued for the term specified in 11 above.
- g. The permittee shall obtain all other required permit(s) to conduct the specified project.
- h. Archeological project design, literature review, development of the regional historic context framework, site evaluation, and recommendations for subsequent investigations must be developed with direct involvement of an archeologist who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation; fieldwork must be generally overseen by an individual who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation.
- i. Permittee shall immediately request that the approving official (14. above) make a modification to accommodate any change in an essential condition of the permit, including individuals named and the nature, location, purpose, and time of authorized work, and shall without delay notify the approving official of any other changes affecting the permit or regarding information submitted as part of the application for the permit. Failure to do so may result in permit suspension or revocation.
- j. Permittee may request permit extension, in writing, at any time prior to expiration of the term of the permit, specifying a limited, definite amount of time required to complete permitted work.
- k. Any correspondence about this permit or work conducted under its authority must cite the permit number. Any publication of results of work conducted under the authority of this permit must cite the approving bureau and the permit number.
- l. Permittee shall submit a copy of any published journal article and any published or unpublished report, paper, and manuscript resulting from the permitted work (apart from those required in items q. and s., below), to the approving official and the appropriate official of the approved curatorial facility (item 12 above).
- m. Prior to beginning any fieldwork under the authority of this permit, the permittee, following the affected bureau's policies and procedures, shall contact the Area Office Manager responsible for administering the lands involved to obtain further instructions.
- n. Permittee may request a review, in writing to the official concerned, of any disputed decision regarding inclusion of specific terms and conditions or the modification, suspension, or revocation of this permit, setting out reasons for believing that the decision should be reconsidered.
- o. Permittee shall not be released from requirements of this permit until all outstanding obligations have been satisfied, whether or not the term of the permit has expired. Permittee may be subject to civil penalties for violation of any term or condition of this permit.
- p. Permittee shall submit a clean, edited draft final report to the agency official for review to insure conformance with standards, guidelines, regulations, and all stipulations of the permit. The schedule for submitting the draft shall be determined by the agency official.
- q. Permittee shall submit a final report to the approving official not later than 90 days after completion of fieldwork. Where a fieldwork episode involved only minor work and/or minor findings, a final report may be submitted in place of the preliminary report. If the size or nature of fieldwork merits, the approving official may authorize a longer timeframe for the submission of the final report as specified in Special Permit Condition q.
- r. The permittee agrees to keep the specific location of sensitive resources confidential. Sensitive resources include threatened species, endangered species, and rare species, archeological sites, caves, fossil sites, minerals, commercially valuable resources, and sacred ceremonial sites.
- s. Permittee shall deposit all artifacts, samples and collections, as applicable, and original or clear copies of all records, data, photographs, and other documents, resulting from work conducted under this permit, with the curatorial facility named in item 12, above, not later than 90 days after the date the final report is submitted to the approving official. Not later than 180 days after the final report is submitted, permittee shall provide the approving official with a catalog and evaluation of all materials deposited with the curatorial facility, including the facility's accession and/or catalog numbers.

15. Standard Permit Conditions (continued)

- t. Permittee shall provide the approving official with a confirmation that museum collections described in v. above were deposited with the approved curatorial facility, signed by an authorized curatorial facility official, stating the date materials were deposited, and the type, number and condition of the collected museum objects deposited at the facility.
- u. Permittee shall not disclose archaeological site location information, collected under the authority of this permit, to any other entity, public or private, at any time, except with the specific approval of the Federal permitting agency. The permittee shall not publish, in printed format, on the internet, on film, or through other methods, without the approving official's prior permission, any locational or other identifying archeological site information that could compromise the Government's protection and management of archeological sites.
- v. For excavations, permittee shall consult the OSHA excavation standards which are contained in 29 CFR §1926.650, §1926.651 and §1926.652. For questions regarding these standards contact the local area OSHA office, OSHA at 1-800-321-OSHA, or the OSHA website at <http://www.osha.gov>.
- w. Special permit conditions attached to this permit are made a part hereof.

16. Special Permit Conditions

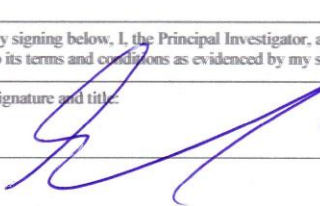
- a. Permittee shall allow the approving official and bureau field officials, or their representatives, full access to the work area specified in this permit at any time the permittee is in the field, for purposes of examining the work area and any recovered materials and related records.
- b. Permittee shall cease work upon discovering any human remains and shall immediately notify the approving official or bureau field official. Work in the vicinity of the discovery may not resume until the authorized official has given permission.
- c. Permittee shall backfill all subsurface test exposures and excavation units as soon as possible after recording the results and shall restore them as closely as reasonable to the original contour.
- d. Permittee shall not use mechanized equipment in designated, proposed, or potential wilderness areas unless authorized by the agency official or a designee in additional specific conditions associated with this permit.
- e. Permittee shall take precautions to protect livestock, wildlife, the public, or other users of the public lands from accidental injury in any excavation unit.
- f. Permittee shall not conduct any flint knapping or lithic replication experiments at any archeological site, aboriginal quarry source, or non-site location that might be mistaken for an archeological site as a result of such experiments.
- g. Permittee shall perform the fieldwork authorized in this permit in a way that does not impede or interfere with other legitimate uses of the public lands, except when the authorized officer specifically provides otherwise.
- h. Permittee shall restrict vehicular activity to existing roads and trails unless the authorized officer provides otherwise.
- i. Permittee shall keep disturbance to the minimum area consistent with the nature and purpose of the fieldwork.
- j. Permittee shall not cut or otherwise damage living trees unless the authorized officer gives permission.
- k. Permittee shall take precautions at all times to prevent wildfire. Permittee shall be held responsible for suppression costs for any fires on public lands caused by the permittee's negligence. Permittee may not burn debris without the authorized officer's specific permission.
- l. Permittee shall conduct all operations in such a manner as to prevent or minimize scarring and erosion of the land, pollution of the water resources, and damage to the watershed.
- m. Permittee shall not disturb resource management facilities within the permit area, such as fences, reservoirs, and other improvements, without the authorized officer's approval. Where disturbance is necessary, permittee shall return the facility to its prior condition, as determined by the authorized officer.
- n. Permittee shall remove temporary stakes and/or flagging, which the permittee has installed, upon completion of fieldwork.
- o. Permittee shall clean all camp and work areas before leaving the permit area. Permittee shall take precautions to prevent littering or pollution on public lands, waterways, and adjoining properties. Refuse shall be carried out and deposited in approved disposal areas.
- p. Permittee shall submit the preliminary report within 30 days of completion of any episode of fieldwork.
- q. Permittee shall submit progress reports every 2 months over the duration of the project if needed.

Special Permit Conditions Continuation Sheet

- r. Permittee shall submit to the Reclamation Area Manager legible, complete applicable Washington Department of Archaeology and Historic Preservation (DAHP) State Inventory Forms, cultural resource photograph logs, and cultural resource project records with required maps and attachments within the timeframe established under the fieldwork authorization. These records shall not be bound and shall be separate from the fieldwork reports.
- s. Reports must meet DAHP requirements and comply with Reclamation standards for scientific integrity.
- t. Permittee shall ensure that cultural resource site record data resulting from work conducted under this permit is entered into the automated Washington Cultural Resource Database (WISAARD) not later than 90 days after completion of fieldwork.
- u. If the permittee suspects on the basis of odor, soil staining, or the presence of abandoned containers that an area may be contaminated with environmentally hazardous materials, the permittee shall stay clear of that area to avoid potentially harmful exposure. Within one day of the discovery, the permittee shall report the location and nature of the suspected contamination to the Reclamation Manager having jurisdiction over the lands involved.
- v. Site data and maps shall not be transmitted to the project sponsor or to the general public. Project sponsors should receive a letter or report that contains limited or abbreviated site descriptions only. All references to site features and artifacts shall be omitted. Any maps provided to the project sponsor should only indicate the relationship of undertaking boundaries or project routes to cultural property outlines; features or artifact locations will not be shown.

By signing below, I, the Principal Investigator, acknowledge that I have read and understand the Permit for Archeological Investigations and agree to its terms and conditions as evidenced by my signature below and initiation of work or other activities under the authority of this permit.

Signature and title:



Principal / President

Date:

9/10/19

Paperwork Reduction Act and Estimated Burden Statement: This information is being collected pursuant to 16 U.S.C. 470cc and 470mm, to provide the necessary facts to enable the Federal land manager (1) to evaluate the applicant's professional qualifications and organizational capability to conduct the proposed archeological work; (2) to determine whether the proposed work would be in the public interest; (3) to verify the adequacy of arrangements for permanent curatorial preservation, as United States property, of specimens and records resulting from the proposed work; (4) to ensure that the proposed activities would not be inconsistent with any management plan applicable to the public lands involved; (5) to provide the necessary information needed to complete the Secretary's Report to Congress on Federal Archeology Programs; and (6) to allow the National Park Service to evaluate Federal archeological protection programs and assess compliance with the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470). Submission of the information is required before the applicant may enjoy the benefit of using publicly owned archeological resources. To conduct such activities without a permit is punishable by felony-level criminal penalties, civil penalties, and forfeiture of property. A federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average one hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Departmental Consulting Archeologist; NPS; 1849 C Street, NW (2275); Washington, DC 20240-0001.

ATTACHMENT B: APE AND CONSULTATION DOCUMENTATION

Widener & Associates

1902 120th PL. SE. STE 202 Everett, WA 98208

Transportation & Environmental Planning

Tel (425) 332-3961

Washington State Department of Transportation
Local Programs
South Central Region
Attn: Bill Preston
2809 Rudkin Rd
Union Gap, WA

May 16, 2019

Area of Potential Effect (APE) Revision Memorandum

East-West Corridor Project

Yakima, WA

Dear Bill Preston,

The purpose of this memo is to revise the existing area of potential effect (APE) for the East-West Corridor project in Yakima. Since the existing concurrence, the roadway alignment has shifted, a section of the shared-use path has been moved, and there is need for additional land for the cleanup and remediation of the City of Yakima Landfill site (see maps in Appendix A).

Project Description

Yakima County is proposing to construct an East-West Corridor in Yakima County, Washington from H Street on the west side of Interstate 82 (I-82) in the city of Yakima to the eastern terminus at the Roza Canal in the community of Terrace Heights. This corridor is part of a larger transportation corridor that will eventually connect Fruitvale Boulevard in western Yakima to 57th Street in Terrace Heights. The East-West Corridor project will involve improvements to existing roadways; the building of new connections and roundabouts; non-motorized facilities including: sidewalks, Americans with Disabilities Act (ADA) ramps, crosswalks, and a shared-use path that will connect to the Yakima Greenway trail; and construction of four bridges: one over I-82, one over the Yakima River, and a vehicular and pedestrian bridge over the Roza Canal. The bridge over I-82 will eventually become a new interchange in a separate project. Right-of-way acquisition will be necessary to complete the project. The proposed roadway alignment will pass through the Yakima Landfill site so cleanup and remediation is necessary. This project will also involve restoration and levee work along the Yakima River floodplain including removal and/or setback of levees and floodplain habitat restoration. Restoration work will include the placement of woody debris, floodplain grading, revegetation and channel excavation. The corridor will be constructed in phases with construction of the earliest phases set to begin in 2020. The proposed project is located within Sections 17 and 18 of Township 13 North and Range 19 East as well as Section 13 of Township 13 North and Range 18 East. The project is located within Yakima, WA and the Terrace Heights neighborhood in unincorporated Yakima County.

General roadway construction will reach no more than 10 feet below the ground surface. Excavation for the floodplain habitat work is anticipated to reach no more than 10 feet below the ground surface. Cleanup and remediation at the Yakima Landfill site will excavate down to the

native soil to a depth of 20 feet maximum. Drilled shafts for bridge abutments remain as the deepest excavation reaching ~80 feet for the Yakima River bridge and ~60 feet for the bridges over the Roza Canal and I-82.

Currently the existing Yakima Avenue/Terrace Heights Drive route provides the only direct connection between the City of Yakima and the neighborhood of Terrace Heights. Current and projected population growth in Terrace Heights is expected to result in increasing congestion and delays along this route. The proposed East-West Corridor would consist of a 5-lane roadway that would improve vehicular and pedestrian access between Yakima and Terrace Heights. This new corridor is necessary as right-of-way (ROW) constraints along the existing Yakima Avenue/Terrace Heights Drive route prevent widening of the existing roadway.

Section 106 Consultation History

Section 106 consultation began with an APE (dated 9/12/12) being submitted on September 19, 2012. This APE included the area for the first roadway alignment from North 1st Street and East H Street to Keys Road and Butterfield Road. It also included the floodplain habitat restoration and levee removal area. This APE received concurrence from the Department of Archaeology & Historic Preservation (DAHP) State Historic Preservation Officer (SHPO) on October 9, 2012. See Appendix B for the APE submittal and SHPO concurrence letter.

The current approved APE (dated 7/1/13) was submitted on July 2, 2013. The roadway alignment was revised for this APE including changing the eastern terminus to Butterfield Road and Marsh Road. The roadway alignment west of the Yakima River was moved slightly north. Additional area was added north and south for modifications to I-82 between the State Route 12 (SR12) interchange and just north of the Nob Hill Boulevard interchange. Proposed improvements included Collector/Distributor (C/D) roads to be added on both sides of I-82, auxiliary lanes to be added from the C/D roads to the Nob Hill interchange and US 12 interchange, and a new interchange. The current APE received concurrence from the DAHP SHPO on July 31, 2013 and from the Confederated Tribes and Bands of the Yakama Nation on July 25, 2013. See Appendix C for the APE submittal and both concurrence letters.

APE Modifications

The following modifications to the existing APE (2013) are being proposed for this APE revision. Numbering corresponds to numbers on the APE Map (Appendix A).

1. The roadway alignment west of the Yakima River has changed since the previous APE was approved. General roadway excavation will reach no more than 10 feet below the ground surface.
2. The closed Yakima Landfill site is located at the southern end of the former Boise Cascade Mill and Plywood Facility. The proposed roadway alignment will pass through the Yakima Landfill site so cleanup and remediation is necessary. The site will be excavated down to the native soils (~20 feet) to a minimum width of the roadway alignment. Municipal solid waste (MSW) and wood debris will be excavated from the landfill. The extra area necessary for this APE will be used as staging areas to segregate MSW and wood debris and test them for waste or recycling characterization before moving them to the appropriate disposal site. This is necessary because wood debris may

be recycled while most MSW will have to be taken to a Subtitle D-permitted disposal facility.

3. A section of the shared-use path has moved to head east-west adjacent to the railway tracks to connect to the existing Yakima Greenway trail. Excavation for the trail will reach no more than 6 feet below the ground surface.

DAHP WISAARD Review

A search of the DAHP's Washington Information System for Architectural & Archaeological Records Data (WISAARD) shows that there are no properties listed on the National Register of Historic Places (NRHP) within the project's APE or adjacent to it. There are many properties within or adjacent to the APE that have been recorded Historic Property Inventories (HPIs). Only three of these sites have been determined eligible for the NRHP: the Burlington Northern Santa Fe Railroad, the Y-9 Levee, and the Roza Canal.

Conclusion

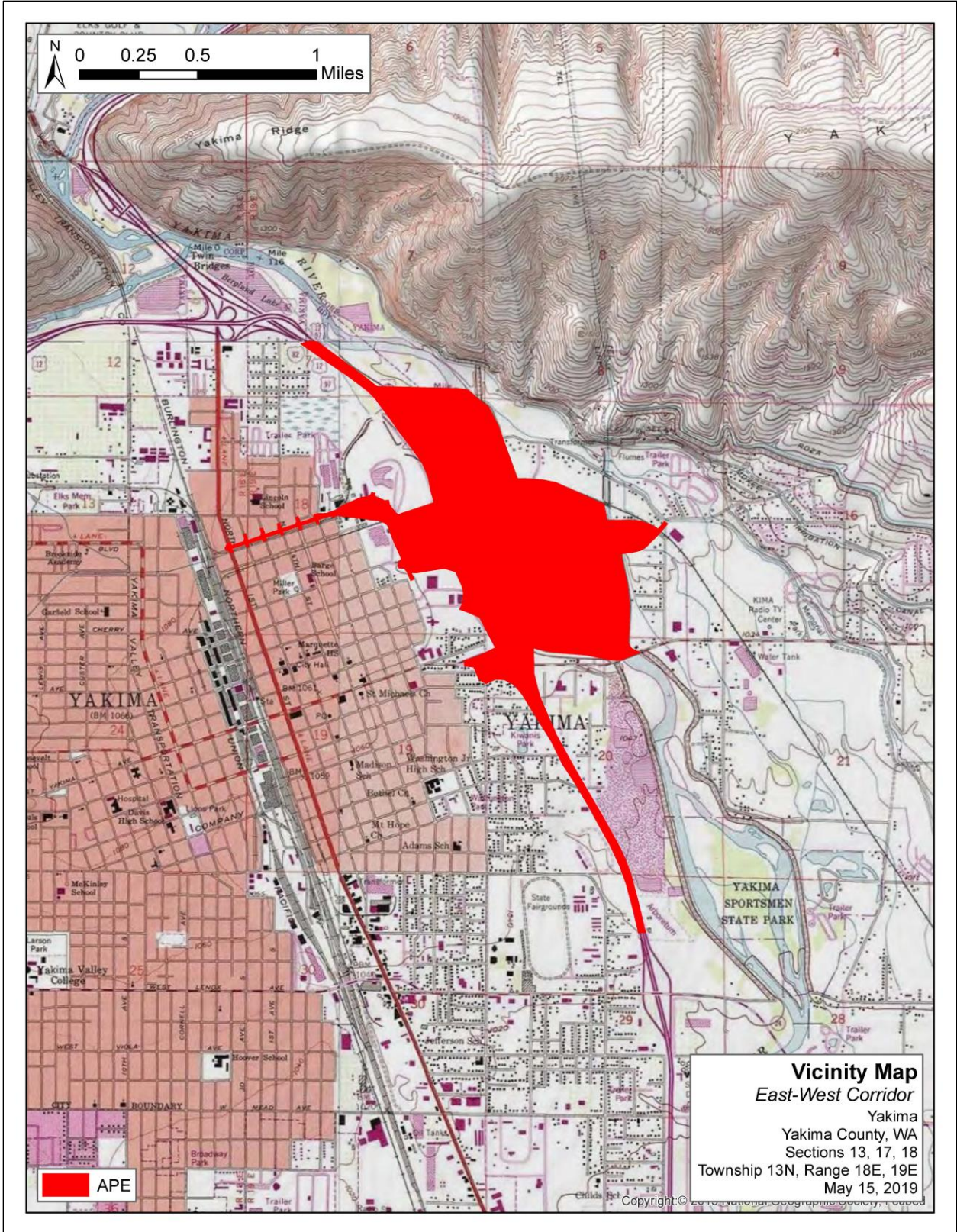
On behalf of the City of Yakima and Yakima County, we request your assistance in obtaining approval for the revised APE for the proposed project. As stated above, additional area is required for a revision to the roadway and shared-use path alignment, and for the cleanup and remediation of the City of Yakima Landfill site. Should you have any questions, please contact me at (425) 332-3961 or at rwidener@prodigy.net.

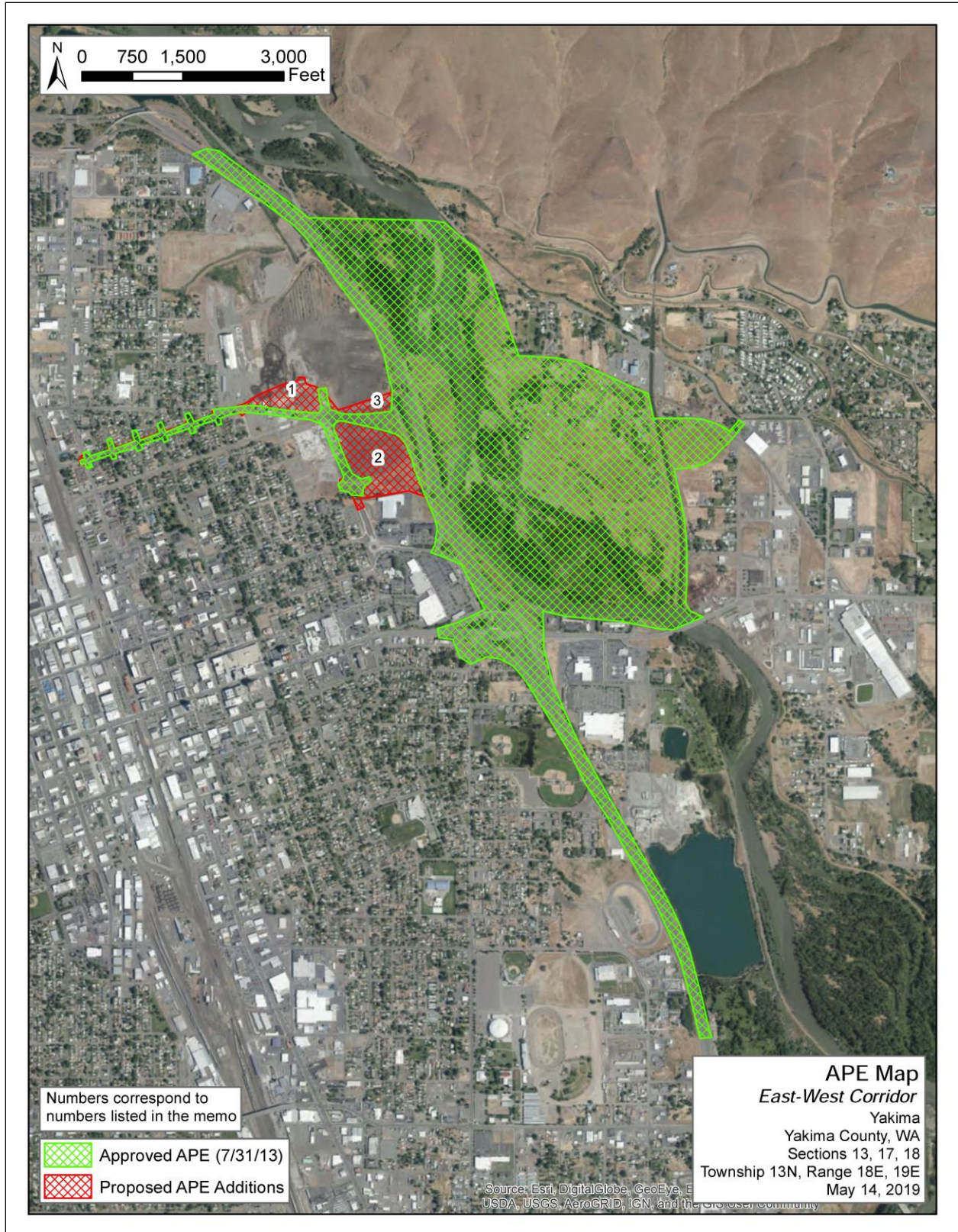
Sincerely,

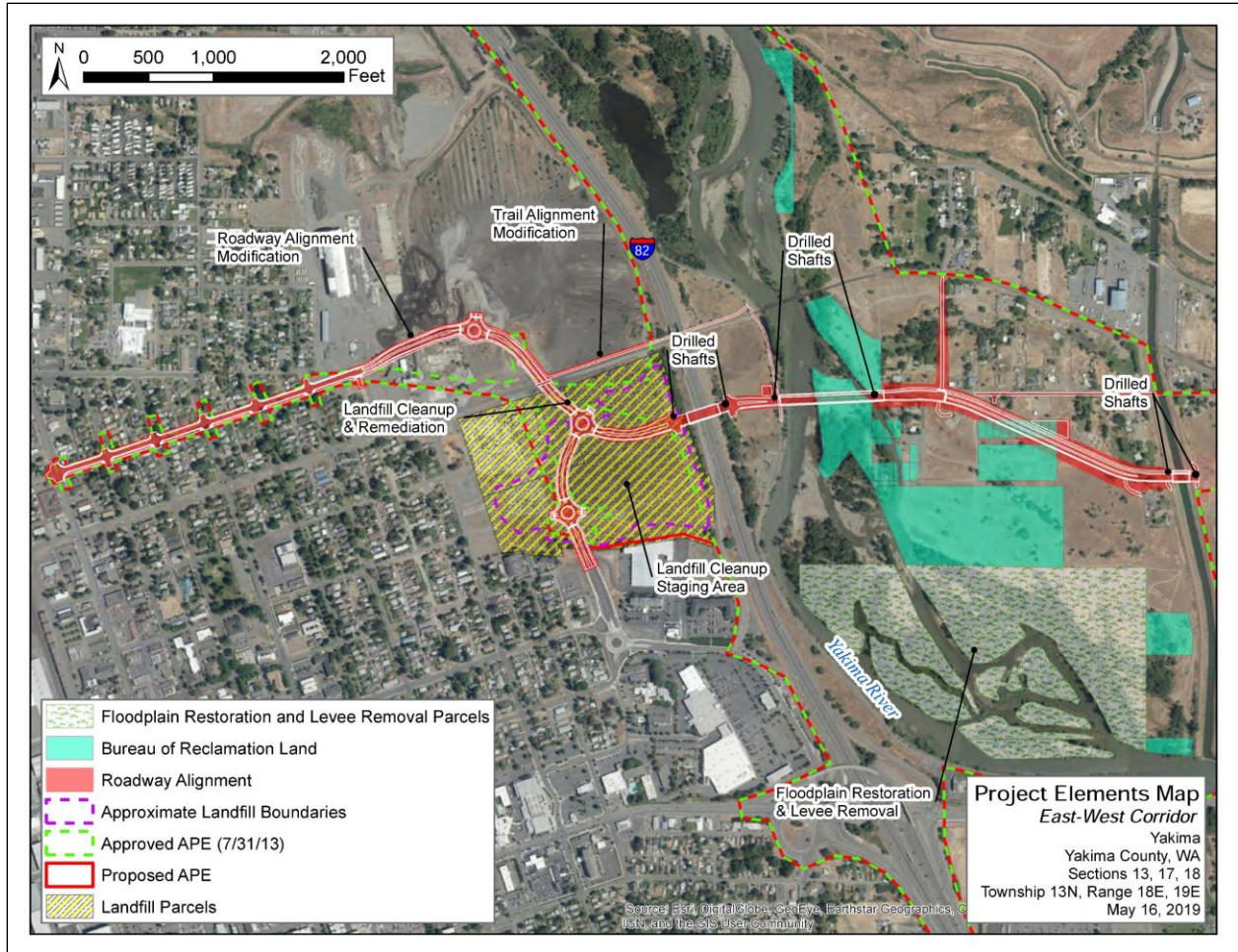


Ross Widener
Widener & Associates

Appendix A: APE Maps







Appendix B: 2012 APE Packet

September 12, 2012

Roger Arms
WSDOT South Central Region
PO Box 12560
Yakima, WA 98909-2560

East-West Corridor Alignment Project
Yakima County, WA

Dear Roger,

Yakima County is proposing to construct a new corridor connecting the City of Yakima with the neighborhood of Terrace Heights. The project will consist of constructing a 2-mile roadway that will utilize the existing roadway network at multiple points. Additional work will include habitat restoration and the removal and/or setback of segments of existing levees along the Yakima River.

The western terminus of the proposed alignment is the existing intersection of H Street and North 1st Street within the City of Yakima. The corridor will continue eastward across the Yakima River. The corridor's eastern terminus will be located at Butterfield Road and create a four-way intersection with Butterfield Road and Marsh Road within Terrace Heights. The project is located in the legal geographical description of Township 13N; Ranges 18E and 19E; Sections 13, 17, and 18. Refer to the attached vicinity map.

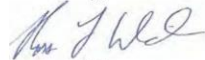
Work for the proposed east-west alignment would involve a new vehicular bridge crossing the Yakima River that would be constructed approximately 100 feet south of the Columbia Basin railroad bridge crossing. Other work involves the widening of H Street, a new bridge across the Roza Canal, stormwater drainage facilities, and the relocation and installation of utilities. This new corridor will provide an alternative east – west route, connecting the City of Yakima and the Terrace Heights neighborhood. It will help relieve congestion and delays facing the growing population of Terrace Heights.

For roadway construction, an average excavation depth of 4 to 10 feet will be required. A depth of 60 to 80 feet is required for the installation of new drill shafts for the proposed Yakima River bridge foundations. From the western terminus at the existing intersection of East H Street/North 1st Street to the old Cascade mill site, the road will be widened to 3 lanes. East of the mill, the road will consist of 5 lanes. Right-of-way acquisition will be required including some residences which will be acquired in their entirety in accordance with the Uniform Relocation Assistance Act of 1971.

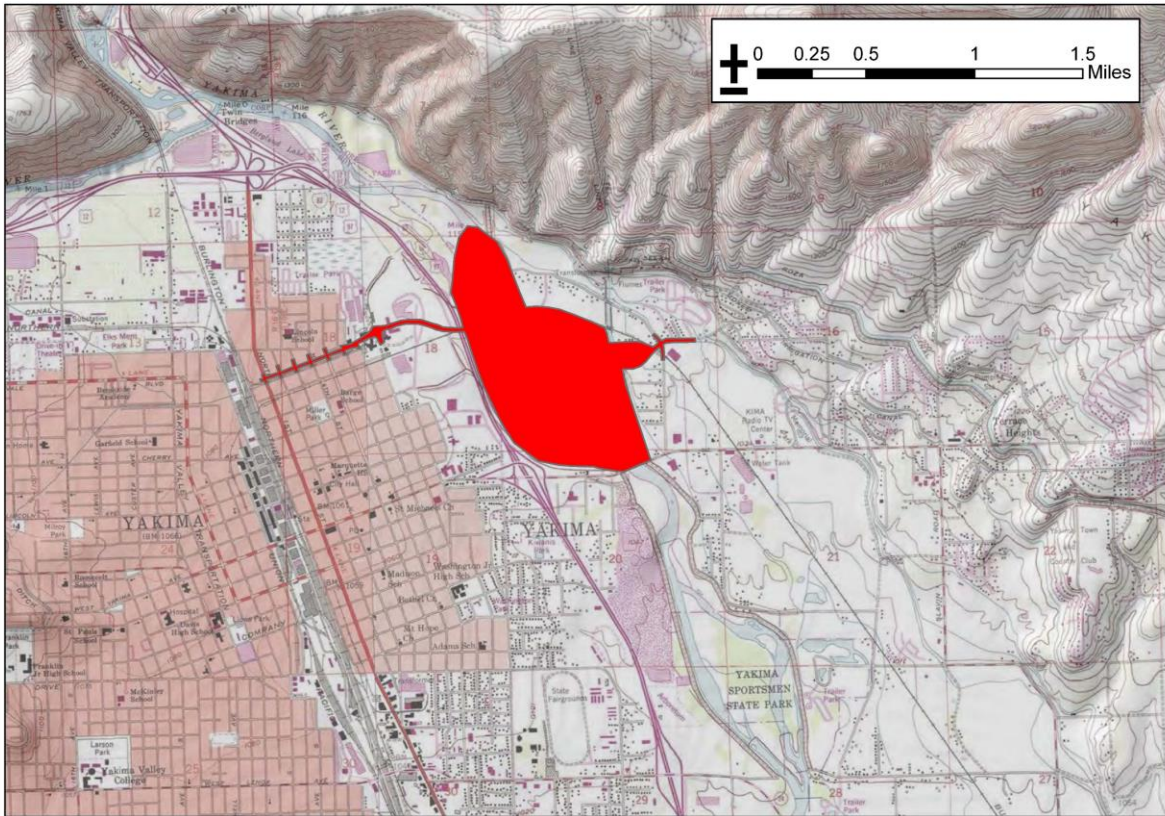
In addition to the proposed roadway, river restoration and levee work is proposed along the Yakima River floodplain from approximately River Mile (RM) 113.2 to RM 115.3. This work would include the removal and/or setback of levees and habitat restoration within the floodplain such as placement of woody debris, revegetation, and channel excavation. Maximum excavation depths for this part of the project are anticipated to reach 6 feet.

The attached APE map shows the areas that may be affected as a result of project activities. Upon a search of the Department of Archaeology and Historic Preservation's WISAARD database, no cultural or historic register properties were identified within the limits of the proposed APE. On behalf of Yakima County, we request your assistance in approving the APE for this project. Should you have any questions please contact me at (425) 503-3629 or at rwidener@prodigy.net.

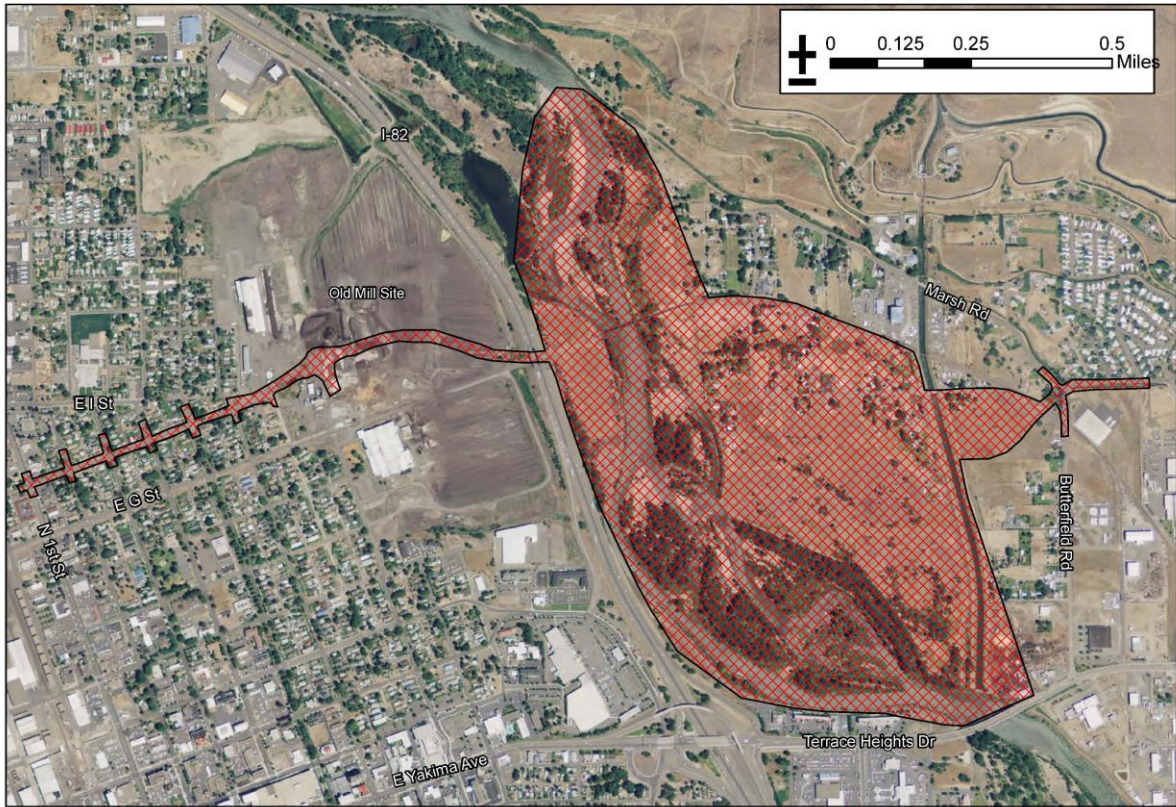
Sincerely,



Ross Widener
Widener & Associates



Vicinity Map
East-West Corridor Alignment
Yakima County
September 12, 2012



APE Map
East-West Corridor Alignment
Yakima County
September 12, 2012



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

Hwys & Local Programs

October 9, 2012

OCT 10 2012

Olympia, WA

Mr. Trent de Boer
WSDOT, Highways & Local Programs
PO Box 47390
Olympia, WA 98504-7390

In future correspondence please refer to:
Log: 100912-01-FHWA
Property: East-West Corridor Alignment, Fed Aid TBA
Re: Archaeology - APE Concur

Dear Mr. de Boer:

We have reviewed the materials forwarded to our office for the East-West Corridor Alignment project. Thank you for your description of the area of potential effect (APE) for the project. We concur with the definition of the APE. We look forward to the results of your cultural resources survey efforts, your consultation with the concerned tribes, and receiving the survey report. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. Also, please note that DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD or electronically. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



Appendix C: 2013 APE Packet

July 1, 2013

Roger Arms
WSDOT South Central Region
PO Box 12560
Yakima, WA 98909-2560

East-West Corridor Alignment
Yakima County, WA

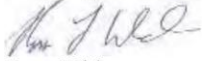
Dear Roger,

Yakima County is proposing to revise the previously approved APE for the East-West Corridor. The previously approved APE included the 2-mile corridor beginning at the intersection of H Street and North 1st Street within the City of Yakima and ending at the Butterfield Road/Marsh Road intersection within Terrace Heights. Project activities included a new vehicular bridge crossing the Yakima River approximately 550-750 feet south of the Columbia Basin railroad bridge crossing, widening of H Street, a new bridge across Roza Canal, stormwater drainage facilities, and the relocation and installation of utilities. The new vehicular bridge over the Yakima River would require a depth of 60 to 80 feet for drilled shafts. The new corridor will consist of 5 lanes. The APE also included river restoration and levee work along the Yakima River floodplain from approximately River Mile (RM) 113.2 to RM 115.3. Restoration efforts would include placement of woody debris, revegetation, and channel excavation. Maximum excavation depths for that part of the project are anticipated to reach 6 feet.

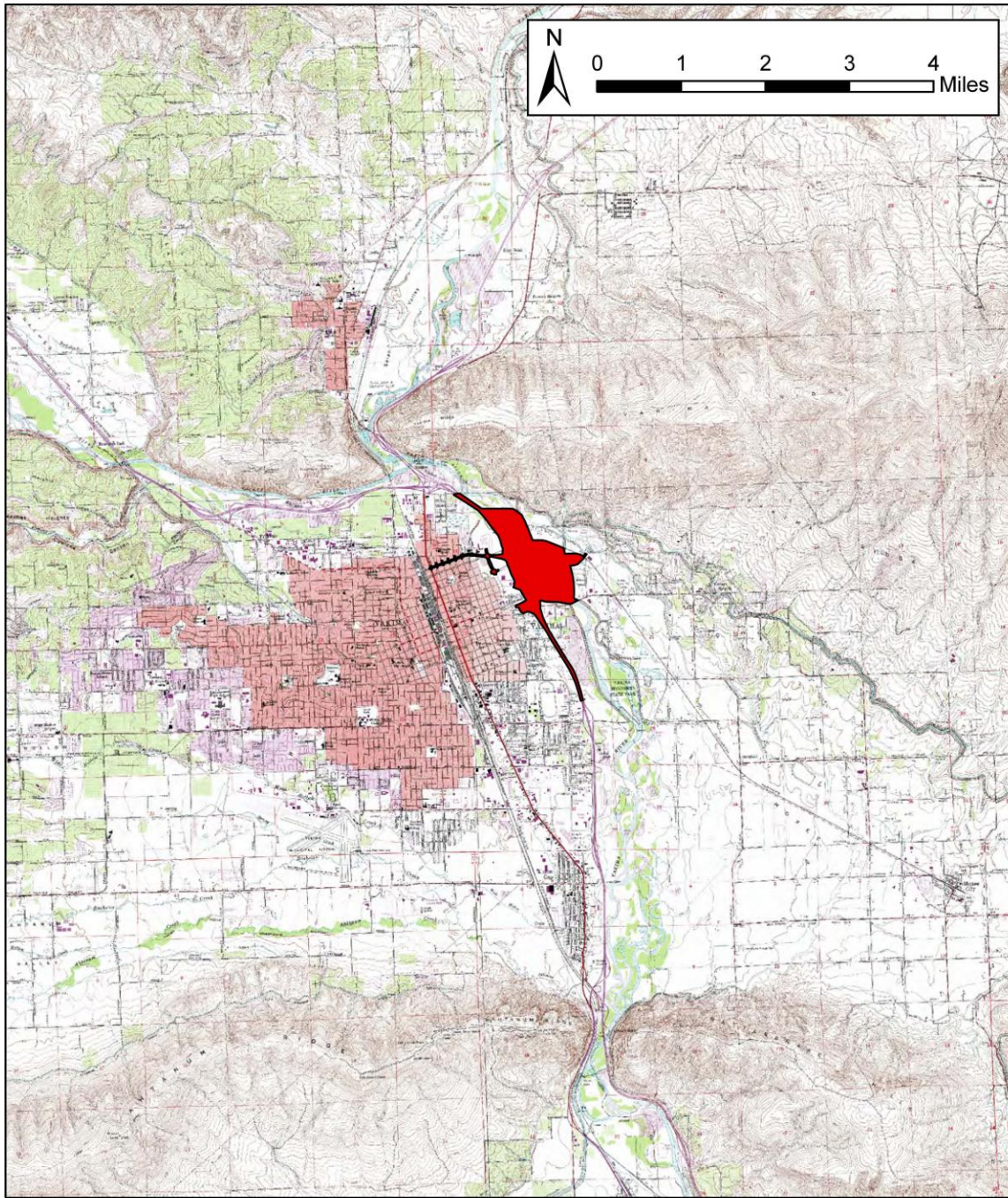
The revised APE will include the same work as previously approved. Additional work will include modifications to Interstate 82 between the SR12 interchange and just north of the Nob Hill Blvd interchange. Collector/Distributor (C/D) roads will be added on both sides of I-82 from just north of the existing railroad overpass to south of the Yakima Avenue Interchange. Auxiliary lanes will also be added from the C/D roads south to the Nob Hill Interchange ramps and north to the US 12 Interchange ramps. A new interchange will be constructed to tie into the new east-west corridor near East G Street. Improvements will be made to the existing interchanges at East Yakima Avenue. Modifications would include road widening, and striping. The revised APE will be within Sections 12 and 13 of Range 18 East, Township 13 North; and Sections 7, 17, 18, 19, 20, and 29 of Range 19 East, Township 13 North. Please refer to the attached vicinity map. Project area impacts are shown in the attached APE map.

Upon a search of the Department of Archaeology and Historic Preservation's WISAARD database, no cultural or historic register properties were identified within the revised APE. On behalf of Yakima County, we request your assistance in approving the revised APE for this project. Should you have any questions please contact me at 425-503-3629.

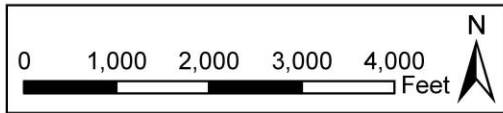
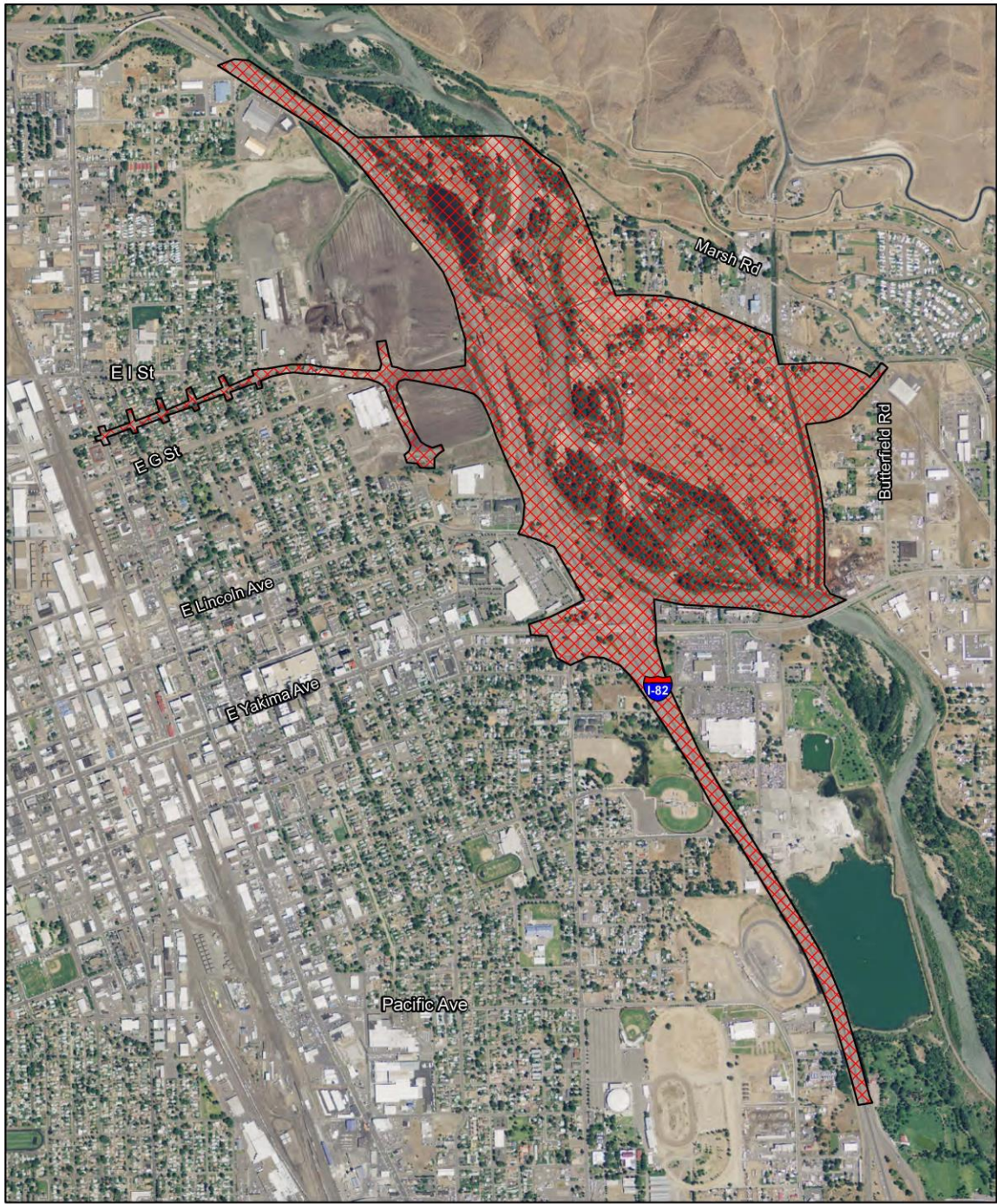
Sincerely,

A handwritten signature in dark ink, appearing to read "Ross Widener". The signature is written in a cursive style with a large initial "R".

Ross Widener
Widener & Associates



Vicinity Map
East-West Corridor
Yakima County
July 1, 2013



APE Map
East-West Corridor
Yakima County
July 1, 2013



Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

7/25/13

July 12th, 2013

DEPT OF TRANS

JUL 25 2013

SCR MAILROOM

Trent de Boer
Washington State Department of Transportation
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504

Subject: Yakima County's East-West Corridor Project

Dear Mr. de Boer,

Thank you for contacting the Yakama Nation Cultural Resource Program (CRP) regarding the project listed above. The project is located within the Ceded Lands of the Yakama Nation, the legal rights to which were established by the Treaty of 1855 (12 Stat. 9), between the Yakama Nation and the United States Government. The Treaty set forth that the Yakama Nation shall retain the rights to resources upon these lands and, therefore, it is with the assistance and backing of the United States Federal Government that Yakama Nation claims authority to protect traditional resources.

Yakama Nation Cultural Resources Program (CRP) staff have reviewed the revised APE for Yakima County's East-West Corridor Alignment project. The APE lies within an area of high risk for encountering cultural resources according to the Washington State DAHP predictive model. The APE is also in proximity to a known ethnographic Yakama village location. The Yakama Nation requests a cultural resources survey be completed for the entire project APE by a professional archaeologist who meets the minimum standards set forth by the Department of the Interior. The Yakama Nation also requests a copy of the survey report upon completion.

If you have any questions, please do not hesitate to contact me or Tribal Archaeologists Jessica Lally at ext 4766 (Jessica@yakama.com) or Ian Gray at ext 4609 (grayi@yakama.com) if you have any questions regarding the above.

Sincerely,

Johnson Meninick, Program Manager
Cultural Resources Program
509-865-5121 ext. 4737

CC: Honorable Harry Smiskin, Yakama Tribal Chairperson
Liana Liu, FHWA Area Engineer Washington NC and SC Regions
Roger Arms, South Central Region Local Programs Engineer
Rob Whitlam, DAHP Washington State Archaeologist



Allyson Brooks Ph.D., Director
State Historic Preservation Officer

July 30, 2013

Hwys & Local Programs
JUL 31 2013
Olympia, WA

Mr. Trent de Boer
WSDOT, Highways & Local Programs
PO Box 47390
Olympia, WA 98504-7390

In future correspondence please refer to:
Log: 100912-01-FHWA
Property: East-West Corridor Alignment, Fed Aid TBA
Re: Archaeology – Revised APE Concur

Dear Mr. de Boer:

We have reviewed the materials forwarded to our office for the East-West Corridor Alignment project. Thank you for your description of the revised area of potential effect (APE) for the project. We concur with the definition of the revised APE. We look forward to the results of your cultural resources survey efforts, your consultation with the concerned tribes, and receiving the survey report. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. Also, please note that DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD or electronically. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov

State of Washington • Department of Archaeology & Historic Preservation
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov



Inadvertent Discovery Plan



INADVERTENT DISCOVERY PLAN PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit <https://ecology.wa.gov/accessibility>. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s):

Location:

Project Lead/Organization:

County:

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. **Always assume these are live and never touch or move.**
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact

Name:

Organization:

Phone:

Email:

Alternate Contact

Name:

Organization:

Phone:

Email:

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager

Name:

Program:

Phone:

Email:

Alternate or Cultural Resource Contact

Name:

Program:

Phone:

Email:

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe:	Tribe:
Name:	Name:
Title:	Title:
Phone:	Phone:
Email:	Email:
Tribe:	Tribe:
Name:	Name:
Title:	Title:
Phone:	Phone:
Email:	Email:

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:

Agency:

Name:

Title:

Phone:

Email:

State Agency:

Agency:

Name:

Title:

Phone:

Email:

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under **Stop-Protect-Notify**. For specific instructions on how to handle a human remains discovery, see: [RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions](#).

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist

Guy.Tasa@dahp.wa.gov

(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

Enter contact information below (required):

- Local Medical Examiner or Coroner name and phone:

 - Local Law Enforcement main name and phone:

 - Local Non-Emergency phone number (911 if without a non-emergency number):
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
 3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
 4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- Per [RCW 27.44.055](#), [RCW 68.50](#), and [RCW 68.60](#), DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in [RCW 27.44.055](#), [RCW 68.50](#), and [RCW 68.60](#).
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law [RCW 27.53](#) and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below

surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP's inadvertent discovery language website.

[Ecology's IDP Video](https://www.youtube.com/watch?v=ioX-4cXfbDY) (<https://www.youtube.com/watch?v=ioX-4cXfbDY>)

Informational Resources

[DAH P \(https://dahp.wa.gov\)](https://dahp.wa.gov)

[Washington State Archeology \(DAH P 2003\)](https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

[\(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf\)](https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

[Association of Washington Archaeologists \(https://www.archaeologyinwashington.com\)](https://www.archaeologyinwashington.com)

Potentially Interested Tribes

[Interactive Map of Tribes by Area](https://dahp.wa.gov/archaeology/tribal-consultation-information)

[\(https://dahp.wa.gov/archaeology/tribal-consultation-information\)](https://dahp.wa.gov/archaeology/tribal-consultation-information)

[WSDOT Tribal Contact Website](https://wsdot.wa.gov/tribal/TribalContacts.htm)

[\(https://wsdot.wa.gov/tribal/TribalContacts.htm\)](https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Implement the IDP if you see...

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.



Stone artifacts from Oregon.



Stone artifacts from Washington.



Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see...

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.



Above: Fishing Weight - credit [CRITFC Treaty Fishing Rights website](#).



Artifacts from unknown locations (left and right images).



Implement the IDP if you see...

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (‘dentalium’) or tusk.



Upper Left: Bone Awls from Oregon.

Upper Center: Bone Wedge from California.

Upper Right: Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.

Above: Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.



Implement the IDP if you see...

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.



Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry.*



Implement the IDP if you see...

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- “Unusual” accumulations of rock (especially fire-cracked rock).
- “Unusual” shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a “layer cake” appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the “unusual” or out of place (for example, rock piles in areas with otherwise few rocks).



Shell Midden pocket in modern fill discovered in sewer trench.



Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.



Hearth excavated near Hamilton, WA.

Implement the IDP if you see...

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.



Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*



Implement the IDP if you see...

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.



Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*



Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*



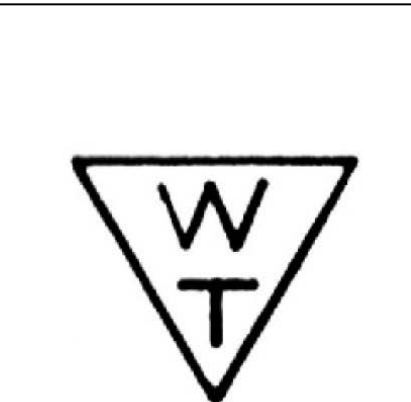
Implement the IDP if you see...

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.



Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).



Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see...

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.



Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

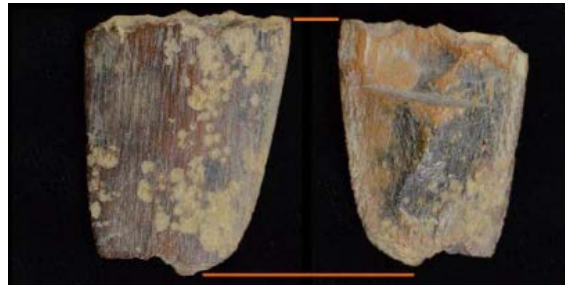
Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.



Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: Read the plan!

Health and Safety Plan

**WORK LOCATION PERSONNEL PROTECTION
AND SAFETY EVALUATION FORM**

**Attach Pertinent Documents/Data
Fill in Blanks As Appropriate**

Job No.:	<u>1148009.030</u>	Attachments:	<u></u>
Prepared by:	<u>Piper Roelen</u>	Reviewed by:	<u>Christine Kimmel</u>
Date:	<u>September 15, 2024</u>	Date:	<u>September 21, 2024</u>
Revised by:	<u>Piper Roelen – January 29, 2026</u>		

A. WORK LOCATION DESCRIPTION

1. **Project Name:** Closed City of Yakima Landfill Site (Landfill Site) and Boise Cascade Mill Site (Mill Site) – Collectively “Site”
2. **Location:** Yakima, Washington
3. **Anticipated Activities:** Collection of groundwater samples from monitoring wells, oversight of geotechnical borings and cultural resource test pits, oversight of excavations for installation of underground utilities, collection of stockpiles soil samples and investigation-derived waste characterization samples.
4. **Size:** Approximately 240 acres - overall Site (including Landfill Site and Mill Site)
5. **Surrounding Population:** Residential, industrial, and commercial
6. **Buildings/Homes/Industry:** The Site consists of the closed City of Yakima municipal solid waste landfill and the former Boise Cascade Mill Site. A variety of existing buildings (used for administration and management of current tenant operations) and remnants of various former building foundations and slabs are present across the Site. An active railroad line runs east-west through the Site.
7. **Topography:** Level with a slight downward gradient to the east, increasing with proximity to the Yakima River. Interstate 82 borders the Site to the east and is situated on an elevated road grade.
8. **Anticipated Weather:** Variable weather, wind, rain, sun; average temperature 40-90°F
9. **Unusual Features:** Boise Cascade closed mill operations in 2006 but continued to store and chip logs until 2010. Prior to 1972, a former mill log pond was filled with municipal solid waste (MSW) by the City of Yakima (the area that managed MSW is the Site) and wood debris from later mill operations. Other log ponds were located north of the railroad tracks that were also filled with wood debris. The former landfill’s surface consists of a combination of asphalt and gravel but is predominantly covered in wood

debris. Underlying fill soils (sandy silt or silty gravel) area exposed in areas near the former log storage operations.

- 10. Site History:** The City of Yakima operated an unlined MSW landfill at the southern part of the Mill Site between 1963 and approximately 1972. From 2008 to 2025, a remedial investigation and other associated investigations were completed at the Site, including collection and analysis of soil, groundwater, soil vapor, and surface water samples. A remedial investigation has also been completed on the Mill Site.

In general, the Site contaminants of potential concern that may be encountered during work may include total petroleum hydrocarbons [TPH; diesel-, and motor oil-range constituents (TPH-D and TPH-O, respectively)], volatile organic compounds (VOCs) such as vinyl chloride, Semi-Volatile Organic Compounds (SVOCs) such as Bis(2-ethylhexyl)phthalate and pentachlorophenol, polychlorinated biphenyls (PCBs), and metals. Methane gas has been detected above the lower explosive limit (LEL) in soil vapor samples from the former landfill and the areas of wood waste in the former Mill Site. Hydrogen sulfide, a highly toxic and flammable gas, may potentially be present in areas of exposed and/or decomposing refuse/wood waste.

B. HAZARD DESCRIPTION

1. **Background Review:** Complete Partial

If partial, why?

2. **Hazardous Level:** B C D Unknown

Justification: Existing data regarding site conditions

3. **Types of Hazards:** (Attach additional sheets as necessary)

- A. Chemical Inhalation Explosive
 Biological Ingestion O2 Def. Skin Contact

Describe: Exposure to chemical hazards including TPH, VOCs, SVOCs, metals, and landfill gases (e.g., methane, carbon dioxide, and hydrogen sulfide). Nitrile gloves will be worn.

- B. Physical Cold Stress Noise Heat Stress Other

Describe: Potential trip and fall hazardous associated with working in areas with demolition debris will be minimized where possible. Potential weather stress associated with working outside during the various months of the year. Potential water hazard while working along the Yakima River. Wear a life jacket if there is a potential of falling in the river, and work in teams.

- C. Radiation

Describe:

4. Nature of Hazards:

- Air Describe: Exposure to VOCs, methane gas, hydrogen sulfide gas, and TPH is possible. Exposure to windblown dust with impacts from metals, PCBs, pesticides, and polycyclic aromatic hydrocarbons (PAHs) is possible.
- Soil Describe: Direct contact exposure to metals, VOCs, SVOCs, and TPH is possible during drilling and excavating activities.
- Surface Water Describe: Small ponds and areas of limited standing water are present at the Site; no surface water sampling is currently scheduled. Groundwater sampling may occur next to the Yakima River, which has the potential to change depth and flow speed suddenly.
- Groundwater Describe: Exposure to chemicals of concern (metals, VOCs, SVOCs, and TPH) in groundwater is possible. Nitrile gloves will be worn when handling groundwater samples and equipment.
- Other Describe:

5. Chemical Contaminants of Concern N/A

Contaminant	PEL (ppm)	I.D.L.H. (ppm)	Source/Quantity Characteristics	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
Total Petroleum Hydrocarbons	100 (as petroleum distillates)	400 (as petroleum distillates)	Historical GW max conc. = 2.6 ppm; soil max conc. = 57,000 mg/kg	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes, nose, throat; nausea; dizziness; headache; dry cracked skin	Visual, PID meter
Metals (Arsenic)	0.002 mg/m ³	5.0 mg/m ³	Present in groundwater (max conc. = 12.1 ppb)	Inhalation, eye contact, dermal contact	Skin and mucous membrane irritation; respiration irritation (potential occupational carcinogen)	Dust Control
Volatile Organic Compounds (Benzene)	1.0	500	Possibly present in soil and groundwater at unknown concentrations	Inhalation, ingestion, dermal contact	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait (carcinogen)	PID
Methane	10% LEL	N/A	Present in subsurface (max conc. = 77.7 % by volume)	Inhalation	Asphyxiant	Explosivity Meter
Hydrogen Sulfide	10	100	Possibly present in subsurface	Inhalation	Irritated eyes/respiratory system, apnea, coma, convulsions, dizziness, headache	Explosivity Meter
PAHs [Benzo(a) pyrene]	0.1 mg/m ³	80 mg/m ³	Possibly present in subsurface	Inhalation, eye contact, dermal contact	Dermatitis, bronchitis (potential carcinogen)	Dust Control

6. Physical Hazards of Concern N/A

Hazard	Description	Location	Procedures Used to Monitor Hazard
Heavy equipment	Drill rigs, excavators	Work Area	Alert observation of surroundings, equipment operations, backup alarms. Maintain visual contact with equipment operators. Maintain safe distance from equipment and associated swing radii. Use of reflective vest and cones to increase visibility.
On Site vehicle and bike traffic	Vehicle and bike traffic traveling along surrounding roads	Roads and paths where wells are located	Alert observation of surroundings. Use of reflective vest and cones to increase visibility.
Slips, trips, and falls	Ground surface potentially obscured by demolition debris and overgrown plants	Work area	Alert observation of surroundings. Clear ground surface in sampling areas.
Groundwater sampling	Lifting, slip/trip, and pinch points	Work Area	Use proper lifting techniques. Be aware of surroundings and variations in ground surface. Keep fingers out of tight areas that could result in pinch points. Allow wells to vent for 1-2 minutes prior to groundwater level measurements or sampling activities.
Weather Illnesses	Heat or cold related illnesses	Work Area	Have drinking water accessible, wear appropriate clothing (light for heat, warm for cold), wear sunscreen protection, avoid caffeine, and take short breaks as needed.

Travel to and from site

Operating motor vehicle in traffic on highways and rural roads

To and from site and Landau Associates office

Operate motor vehicle while well rested and physically able to drive safely. Conduct pre-trip vehicle inspection, all vehicles to be maintained and in good working order. Obey all traffic laws, including no cell phone use while driving. Secure all cargo properly to avoid shifting. Allow sufficient time for travel to site at safe speeds. Engage emergency brake when parking vehicles. Establish planned route prior to departure.

7. **Work Location Instrument Readings** N/A

Location: _____

Percent O₂: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O₂: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O₂: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O₂: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

8. **Hazards Expected In Preparation For Work Assignment** N/A

Describe:

C. PERSONAL PROTECTIVE EQUIPMENT

1. Level of Protection

A B C D

Location/Activity: While conducting groundwater and soil sampling activities at the Site.

A B C D

Location/Activity: Upgrade to Level C PPE if ambient air quality results meet target concentrations (see Attachment A).

2. Protective Equipment (specify probable quantity required)

Respirator N/A

- SCBA, Airline
 Full-Face Respirator
 Half-Face Respirator (Cart. organic vapor) (Only if upgrade to Level C per Attachment A)

- Escape mask
 None
 Other:
 Other:

Head & Eye N/A

- Hard Hat: When Site tenants are using heavy equipment near LAI work space.
 Goggles
 Face Shield
 Safety Eyeglasses
 Other:

Foot Protection N/A

- Neoprene Safety Boots with Steel Toe/Shank
 Disposable Overboots
 Other: Steel-toed boots

Clothing N/A

- Fully Encapsulating Suit
 Chemically Resistant Splash Suit
 Apron, Specify:
 Tyvek Coverall (Only if upgrade to Level C)
 Saranex Coverall
 Safety Vest
 Other:

Hand Protection N/A

- Undergloves; Type:
 Gloves; Type: Nitrile
 Overgloves; Type:
 None
 Other:

3. **Monitoring Equipment** N/A; CGI PID O² Meter FID Rad Survey Other Detector Tubes (optional)Type:**D. DECONTAMINATION****PERSONAL DECONTAMINATION** Required Not Required***If required, describe:***

Wash hands and face with water and soap before each break. Minimize hand to mouth actions while onsite.

EQUIPMENT DECONTAMINATION Required Not Required***If required, describe and list equipment:***

Downhole equipment will be decontaminated between monitoring well locations. Non-dedicated sampling equipment will be decontaminated between wells using a three-step process:

- Remove visual contamination and wash with a mixture of Alconox soap and tap water
- Rinse with tap water
- Rinse with de-ionized water

E. PERSONNEL

	Name	Work Location Title/Task	Medical Current	Fit Test Current
1.	Shane Kostka	Associate Geologist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2.	Dan Gray	Senior Staff Geologist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3.	Weston Boardman	Senior Staff GIT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4.			<input type="checkbox"/>	<input type="checkbox"/>
5.			<input type="checkbox"/>	<input type="checkbox"/>
6.			<input type="checkbox"/>	<input type="checkbox"/>
7.			<input type="checkbox"/>	<input type="checkbox"/>

Site Safety Coordinator: Shane Kostka

F. ACTIVITIES COVERED UNDER THIS PLAN

Task No.	Description	Preliminary Schedule
1	Groundwater sampling	TBD
2	Groundwater level measurements	TBD
3	Groundwater sampling	TBD
4	Groundwater level measurements	TBD
5	Geotechnical drilling oversight and soil screening/sampling	2026
6	Cultural resource test pit excavation	2026
7	Utility corridor excavation and soil screening/sampling	2026-2027

G. SUBCONTRACTOR'S HEALTH AND SAFETY PROGRAM EVALUATION

N/A

Name and Address of Subcontractor: TBD

EVALUATION CRITERIA

Item	Adequate	Inadequate	Comments
Medical Surveillance Program	<input type="checkbox"/>	<input type="checkbox"/>	
Personal Protective Equipment Availability	<input type="checkbox"/>	<input type="checkbox"/>	
Onsite Monitoring Equipment Availability	<input type="checkbox"/>	<input type="checkbox"/>	
Safe Working Procedures Specification	<input type="checkbox"/>	<input type="checkbox"/>	
Training Protocols	<input type="checkbox"/>	<input type="checkbox"/>	
Ancillary Support Procedures (if any)	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency Procedures	<input type="checkbox"/>	<input type="checkbox"/>	
Evacuation Procedures Contingency Plan	<input type="checkbox"/>	<input type="checkbox"/>	
Decontamination Procedures Equipment	<input type="checkbox"/>	<input type="checkbox"/>	
Decontamination Procedures Personnel	<input type="checkbox"/>	<input type="checkbox"/>	

GENERAL HEALTH AND SAFETY PROGRAM EVALUATION: Adequate Inadequate

Additional Comments:

Evaluation Conducted By: _____

Date: _____

EMERGENCY FACILITIES AND NUMBERS

Hospital: MultiCare Yakima Memorial Hospital
2811 Tieton Dr, Yakima, WA 98902
Emergency: 911

Directions: Attachment B

Telephone: (509) 575-5000

Emergency Transportation Systems (Fire, Police, Ambulance) – 911

Emergency Routes – Map (Attachment B)

Emergency Contacts:

	Phone	Email
Piper Roelen, PE	425-503-6784 (cell)	proelen@landauinc.com
Christine Kimmel	206-786-3801 (cell)	ckimmel@landauinc.com


In the event of an emergency, do the following:

1. Call for help as soon as possible. Call 911. Give the following information:
 - WHERE the emergency is – use cross streets or landmarks
 - PHONE NUMBER you are calling from
 - WHAT HAPPENED – type of injury
 - WHAT is being done for the victim(s)
 - YOU HANG UP LAST – let the person you called hang up first.

2. If the victim can be moved, paramedics will transport to the hospital. If the injury or exposure is not life-threatening, decontaminate the individual first. If decontamination is not feasible, wrap the individual in a blanket or sheet of plastic prior to transport.

**HEALTH AND SAFETY PLAN
APPROVAL/SIGN OFF FORM**

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Shane Kostka Site Safety Coordinator	 Signature	9/13/2024 Date
Christine Kimmel Landau Health and Safety Manager	 Signature	9/21/2024 Date
Piper Roelen Project Manager	 Signature	1/29/2026 Date

Personnel Health and Safety Briefing Conducted By:

Name	Signature	Date

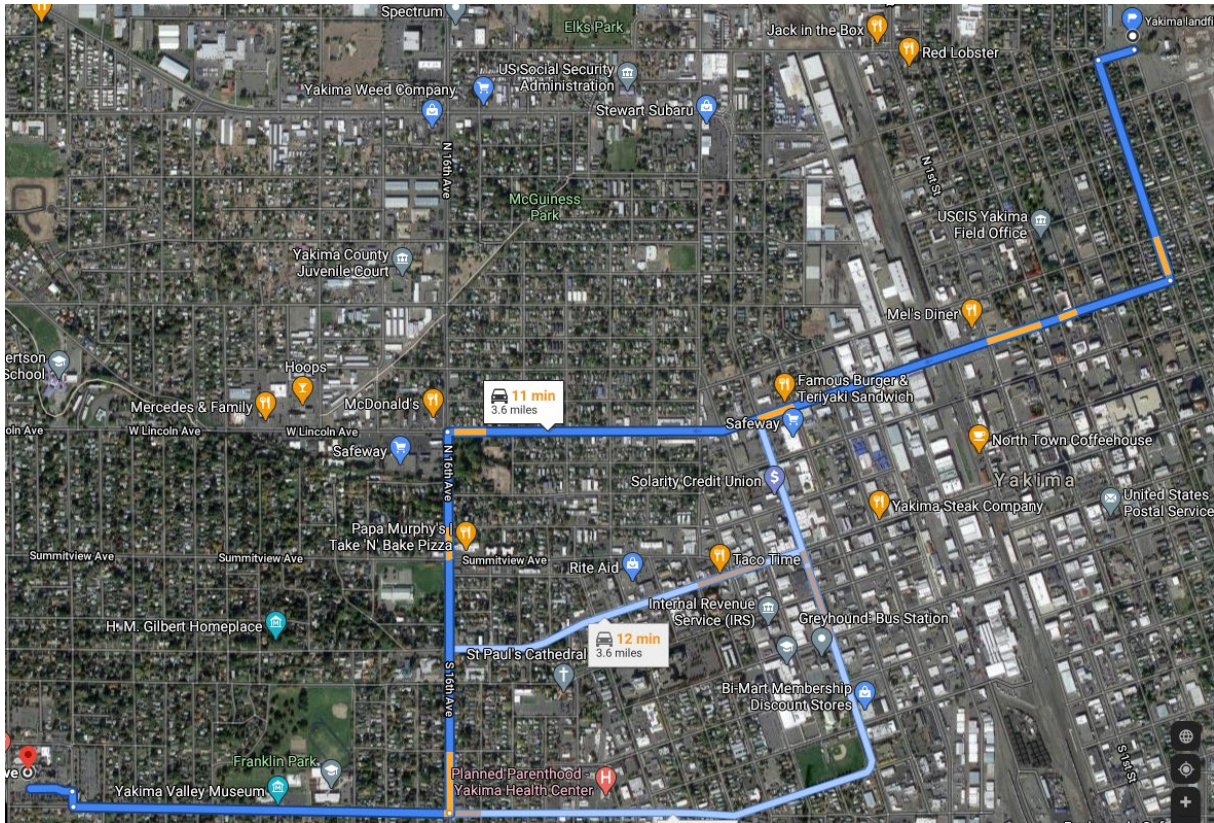
ATTACHMENT A

ACTION LEVELS FOR RESPIRATORY PROTECTION

Monitoring Parameter	Reading	Level of Protection
Organic Vapor Compounds	PID >10 ppm in breathing zone for more than 15 minutes or >35 ppm for momentary peak.	Upgrade to Level C-half face respirator with organic vapor/HEPA cartridge.
	PID>10 and <100 ppm	Stop work until ambient conditions return to background. Proceed with Level C.
	PID >100 ppm	Stop work, contact H&S Manager and install engineering controls.
Methane	>5%LEL	Stop work, allow levels to return to background, verify electrical grounding of equipment, and saturate work area.
	>10% LEL (0.5 % CH ₄)	Evacuate area and call H&S Manager.

ATTACHMENT B

MAP AND DIRECTIONS TO HOSPITAL



1. Head west on E H St toward N 6th St
 2. Turn left onto N 6th St
 3. Turn right onto E Lincoln Ave
 4. Turn left onto N 16th Ave
 5. Turn right onto W Tieton Dr
 6. Turn right onto S 28th Ave
 7. Turn left and destination will be on the right
- Total distance: 3.6 mi – about 11 mins

MultiCare Yakima Memorial Hospital Emergency Department
 2811 Tieton Drive, Yakima, Washington 98902
 Emergency: 911