

East-West Corridor Roadway Project: Development of Preliminary Cleanup Levels (PCULs)

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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 East-West Corridor portion of the following MTCA cleanup site:

Boise Cascade Mill
FSID # 450
CSID # 12095

The comments provided are an effort to help complete the Remedial Investigation (RI), which is intended to investigate the nature and extent of any contamination found on site. Note: It does not appear that sampling results for the East-West Corridor portion of the Boise Cascade 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; and
 - a. Subsequent memorandums associated with the Remedial Investigation Report.
- 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.

It is important to note that:

1. The formal cleanup sites listed below are directly adjacent to, and upgradient from the East-West Corridor Roadway Project from a Hydro-geologic perspective. Meaning, groundwater flows from the direction of the formal cleanup sites towards the East-West Corridor Roadway Project:
 - a. Boise Cascade Mill Cleanup Site: CSID 12095, FSID 450, and
 - b. Interstate 82 Exit 33A Yakima City Landfill Cleanup Site: 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 to Surface Water, as described in this memorandum.
3. Empirical demonstrations and the highest detected values (provided by the PLP/Consultant may change the PCULs listed.
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 that this remains consistent with GW table fluctuations over time. The frequency and number of future monitoring events should be discussed with the Ecology Site Manager.
5. When evaluating the potential for cPAH mixtures in soil to impact groundwater, 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. 15-09-049) for a list of method options.
6. Ecology MRL's/PQL's are draft subject to revision based on information from Ecology Manchester Laboratory.

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 is used at the East-West Corridor Project because:

- Numerous individual contaminants and mixtures have been investigated at the site, and
- Pathways potentially exist for soil, groundwater, surface water, and sediments; 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 qualifies to use Method C.

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 nonpotable must be made on a site-specific basis, based on the criteria in WAC 173-340-720(2). However, for this Environmental Assessment 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 for the protection of drinking water purposes, aquatic organisms living in that surface water and sediment, and persons who 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 the 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 is described as 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 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.

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 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 the 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.
- 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 buildings 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
- 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.

Terrestrial Ecological Receptors

Protective values for terrestrial ecological receptors should be established under the assumption that a Site-Specific 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 assumed for this Environmental Assessment.

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

The Cleanup Levels and Risk Calculation (CLARC) 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 factor (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 was 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 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:
 - Groundwater 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).

Appendix A: Figures

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			
MTCA 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	3.13E-02	3.13E-02	x	x	2.00E+00	2.00E+00	2.00E+00	
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	
1,2,4-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	
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.

Analyte	CAS	H.H. Target 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	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	x	3.00E+03	3.00E+03	5.00E+02	x	2.50E+02	2.50E+02	5.00E+02
Acenaphthene	83-32-9	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	1.00E+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	4.40E-01	x	1.00E+01	1.00E+01	4.40E-01	x	1.00E+00	1.00E+00	1.00E+01
Bis(2-ethylhexyl)phthalate	117-81-7	4.50E-02	x	8.00E+00	8.00E+00	4.50E-02	x	5.00E-01	5.00E-01	5.00E-01
Butyl benzyl phthalate (BBP)	85-68-7	1.30E-02	x	x	x	1.30E-02	x	2.00E-01	2.00E-01	2.00E-01
Chlorobenzene	108-90-7	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	6.00E+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	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	1.20E-06	1.00E-03	x	1.00E-03	1.20E-06	x	2.50E-03	2.50E-03	2.50E-03
3,3'-Dichlorobenzidine	91-94-1	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	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	1.20E+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	6.00E+00	x	4.00E-02	4.00E-02	4.00E-02	x	5.00E-02	5.00E-02	5.00E-02
Fluorene	86-73-7	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	6.10E+00	6.10E+00	6.10E+00	x	5.00E-02	5.00E-02	6.10E+00
2-Methylnaphthalene	91-57-6	x	x	4.70E+00	4.70E+00	4.70E+00	x	5.00E-02	5.00E-02	4.70E+00
N-Nitrosodiphenylamine	1116-54-7	x	x	1.17E+02	1.17E+02	1.17E+02	x	2.00E+00	2.00E+00	1.17E+02
Naphthalene	91-20-3	4.94E+03	x	x	x	4.94E+03	x	1.00E+00	1.00E+00	4.94E+03
Toluene	108-88-3	5.30E+01	x	5.30E+01	5.30E+01	5.30E+01	x	1.00E+00	1.00E+00	5.30E+01
Total PCBs	1336-36-3	7.00E-06	1.40E-02	x	1.40E-02	7.00E-06	x	1.00E-02	1.00E-02	1.00E-02
Pentachlorophenol	87-86-5	2.00E-03	5.40E+00	x	5.40E+00	2.00E-03	x	6.00E-02	6.00E-02	6.00E-02
Phenanthrene (use pyrene as a surrogate)	129-00-0	8.00E+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	2.40E+00	x	x	x	2.40E+00	x	1.00E+00	1.00E+00	2.40E+00
1,2,4-Trichlorobenzene	120-82-1	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	2.00E-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	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	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	1.60E-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	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	1.60E-03	x	6.00E-02	6.00E-02	1.60E-03	x	5.00E-02	5.00E-02	5.00E-02
Chrysene	218-01-9	1.60E-02	x	4.70E+00	4.70E+00	1.60E-02	x	5.00E-02	5.00E-02	5.00E-02
Dibenzo(a,h)anthracene	53-70-3	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	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	1.60E-05	x	x	x	1.60E-05	x	5.00E-02	5.00E-02	5.00E-02
Metals										
Arsenic	7440-38-2	5.00E+00	1.30E+02	x	1.30E+02	5.00E+00	x	5.00E-01	5.00E-01	5.00E+00
Barium	7440-39-3	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	4.20E-01	4.20E-01	x	4.20E-01	4.20E-01	x	1.00E-01	1.00E-01	4.20E-01
Chromium III	16065-83-1	2.40E+05	6.10E+01	x	6.10E+01	6.10E+01	x	2.00E-01	2.00E-01	6.10E+01
Chromium (Total)	7440-47-3	x	x	7.40E+01	7.40E+01	7.40E+01	x	5.00E-01	5.00E-01	7.40E+01
Copper	7440-50-8	1.30E+03	1.20E+00	x	1.20E+00	1.20E+00	x	5.00E-01	5.00E-01	1.20E+00
Iron	7439-89-6	x	1.00E+03	x	1.00E+03	1.00E+03	x	2.05E+00	2.05E+00	1.00E+03
Lead	7439-92-1	x	2.50E+00	x	2.50E+00	2.50E+00	x	1.00E-01	1.00E-01	2.50E+00
Manganese	7439-96-5	5.00E+01	x	x	x	5.00E+01	x	1.03E+00	1.03E+00	5.00E+01
Mercury	7439-97-6	x	1.20E-02	x	1.20E-02	1.20E-02	x	6.00E-03	6.00E-03	1.20E-02
Zinc	7440-66-6	x	2.40E+01	x	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.

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	207-98-9		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.

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)
SW Protection (µg/Liter)	2.50E-02	TPH- Gx (Gasoline)	x	1.00E+03	x	x	x
Units Conversion (1 mg/1000 µg)	0.001	TPH-Dx (Diesel and Heavy Oil Ranges Combined)	x	5.00E+02	x	x	x
Dilution Factor - Saturated Zone (1)	1	Acenaphthene	83-32-9	5.80E+00	2.50E-03	4.90E+00	3.01E-02
Distribution Coefficient Kd (Liters/kg)	6.80E+01	Anthracene	120-12-7	1.20E-02	6.51E-04	2.35E+01	2.85E-04
Water-filled Soil Porosity - Saturated (0.43 ml water/ml soil)	0.43	Benzene	71-43-2	4.40E-01	1.34E-01	6.20E-02	1.53E-04
Air-filled Soil Porosity Saturated (0 ml air/ml soil)	0	Bis(2-ethylhexyl)phthalate	117-81-7	4.50E-02	2.34E-06	1.11E+02	5.01E-03
Henry's Law Constant - Hcc - dimensionless	1.15E-04	Butyl benzyl phthalate	85-68-7	1.30E-02	1.47E-05	1.37E+01	1.82E-04
Dry Soil Bulk Density (1.5 kg/Liter)	1.5	Chlorobenzene	108-90-7	1.30E+00	6.63E-02	2.24E-01	6.64E-04
Soil Cleanup Level Protective of Groundwater - Saturated (mg/kg)	0.001706967	Chloroform	67-66-3	1.80E+00	9.17E-02	5.30E-02	6.11E-04
		4,4'-DDD	72-54-8	7.90E-06	x	4.58E+01	x
		4,4'-DDT	50-29-3	1.20E-06	1.28E-04	6.78E+02	8.14E-07
		3,3'-Dichlorobenzidine	91-94-1	3.10E-03	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	4.00E-02	9.14E-05	4.91E+01	1.98E-03
		Fluorene	86-73-7	2.00E+00	1.23E-03	7.71E+00	1.60E-02
		1-Methylnaphthalene	90-12-0	6.10E+00	8.16E-03	2.53E+00	1.72E-02
		2-Methylnaphthalene	91-57-6	4.70E+00	7.00E-03	2.48E+00	1.30E-02
		Naphthalene	91-20-3	4.94E+03	8.32E-03	1.19E+00	7.30E+00
		N-Nitrosodiphenylamine	86-30-6	1.17E+02	x	2.63E+00	x
		Total PCBs	1336-36-3	7.00E-06	x	7.81E+01	x
		PCE	127-18-4	2.40E+00	3.84E-01	2.65E-01	1.32E-03
		Pentachlorophenol	87-86-5	2.00E-03	x	5.92E-01	x
		Phenanthrene (use pyrene as a surrogate)	129-00-0	2.50E-02	1.15E-04	6.80E+01	1.71E-03
		Toluene	108-88-3	5.30E+01	1.49E-01	1.40E-01	2.26E-02
		1,2,4-Trichlorobenzene	120-82-1	3.60E-02	2.37E-02	1.66E+00	7.00E-05
		Vinyl Chloride	75-01-4	2.00E-02	8.50E-01	2.17E-02	6.17E-06
		Total Xylenes	1330-20-7	5.70E+01	1.41E-01	2.33E-01	2.96E-02
		cPAHs					
		Benzo(a)anthracene	56-55-3	1.60E-04	9.60E-05	3.58E+02	5.73E-05
		Benzo(a)pyrene	50-32-8	1.60E-05	3.61E-06	9.69E+02	1.55E-05
		Benzo(b)fluoranthene	205-99-2	1.60E-04	6.04E-06	5.99E+02	9.59E-05
		Benzo(k)fluoranthene	207-08-9	1.60E-03	4.28E-06	5.87E+02	9.40E-04
		Chrysene	218-01-9	1.60E-02	3.87E-05	1.81E+02	2.89E-03
		Dibenzo(a,h)anthracene	53-70-3	1.60E-05	7.45E-07	1.79E+03	2.86E-05
		Indeno(1,2,3-cd)pyrene	193-39-5	1.60E-04	2.09E-06	1.95E+03	3.12E-04
		cPAH TEQ	x	1.60E-05	x	x	x
		Metals					
		Arsenic	7440-38-2	5.00E+00	0.00E+00	2.90E+01	1.46E-01
		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	7.40E+01	0.00E+00	1.00E+03	7.40E+01
		Copper	7440-50-8	1.20E+00	0.00E+00	2.20E+01	2.67E-02
		Iron	7439-89-6	1.00E+03	0.00E+00	2.50E+01	2.53E+01
		Lead	7439-92-1	2.50E+00	0.00E+00	1.00E+04	2.50E+01
		Manganese	7439-96-5	5.00E+01	0.00E+00	6.50E+01	3.26E+00
		Mercury	7439-97-6	1.20E-02	1.66E-01	5.20E+01	6.27E-04
		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.

East/West Corridor															
FSID # 450															
CSID # 12995															
Soil Remediation															
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)
	A	Q	R and S	X								Guidance for TPH		Natural Background Metals	
MTCR Table 930-1															
TPH - G ₁ (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	2.90E+01	x	4.35E-02	4.35E-02	x	4.35E-02
Anthracene	120-12-7	x	2.40E+04	5.70E+01	2.85E-04	2.85E-04	x	2.90E+01	2.90E+01	2.85E-04	x	4.35E-02	4.35E-02	x	4.35E-02
Benzene	71-43-2	3.00E-02	1.80E+01	1.70E-03	x	1.70E-03	x	3.80E+01	3.80E+01	1.70E-03	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	5.01E-03	5.01E-03	x	2.00E-02	2.00E-02	5.01E-03	x	1.19E-01	1.19E-01	x	1.19E-01
Butylbenzyl phthalate	85-68-7	x	5.30E+02	6.50E-01	6.50E-01	6.50E-01	x	9.00E+01	9.00E+01	6.50E-01	x	2.00E-01	2.00E-01	x	6.50E-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	1.00E-03	1.00E-03	x	1.00E-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	1.00E-03	1.00E-03	x	1.00E-03
4,4'-DDD	72-54-8	x	4.20E+00	1.70E-02	x	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-01	8.14E-07	8.14E-07	7.50E-01	x	7.50E-01	8.14E-07	x	5.00E-04	5.00E-04	x	5.00E-04
1,3-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+03	3.40E-01	x	3.40E-01	x	2.70E-01	2.70E-01	2.70E-01	x	1.00E-03	1.00E-03	x	2.70E-01
Fluoranthene	206-44-0	x	3.20E+03	3.20E+01	1.98E-03	1.98E-03	x	1.10E+00	1.10E+00	1.98E-03	x	5.00E-03	5.00E-03	x	5.00E-03
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	1.72E-02	1.72E-02	x	2.90E+01	2.90E+01	1.72E-02	x	5.00E-01	5.00E-01	x	5.00E-01
2-Methylnaphthalene	91-57-6	x	3.20E+02	8.90E-02	1.30E-02	1.30E-02	x	2.90E+01	2.90E+01	1.30E-02	x	5.00E-01	5.00E-01	x	5.00E-01
Naphthalene	91-20-3	5.00E+00	1.60E+03	2.40E-01	x	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	1116-54-7	x	3.60E-01	9.00E-06	x	9.00E-06	2.00E+01	x	2.00E+01	9.00E-06	x	5.00E-02	5.00E-02	x	5.00E-02
Total PCBs	1336-36-3	1.00E+00	5.00E-01	1.70E-02	x	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	x	8.80E-04	3.00E+00	x	3.00E+00	8.80E-04	x	1.60E-02	1.60E-02	x	1.60E-02
Phenanthrene (use pyrene as a surrogate)	129-00-0	x	2.40E+03	1.80E+01	x	1.80E+01	x	2.90E+01	2.90E+01	1.80E+01	x	2.00E-02	2.00E-02	x	1.80E+01
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	4.90E-02	2.80E-03	1.71E-03	1.71E-03	x	1.80E-01	1.80E-01	1.71E-03	x	1.00E-03	1.00E-03	x	1.71E-03
Toluene	108-88-3	7.00E+00	6.40E+03	2.70E-01	x	2.70E-01	x	2.30E+01	2.30E+01	2.70E-01	x	1.00E-03	1.00E-03	x	2.70E-01
1,2,4-Trichlorobenzene	120-82-1	x	3.40E+01	2.90E-02	7.00E-05	7.00E-05	x	2.70E-01	2.70E-01	7.00E-05	x	1.00E-03	1.00E-03	x	1.00E-03
Vinyl Chloride	75-01-4	x	6.70E-01	9.00E-05	6.17E-06	6.17E-06	x	1.20E-01	1.20E-01	6.17E-06	x	1.00E-03	1.00E-03	x	1.00E-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															
Benzofluoranthene	56-55-3	x	x	x	5.73E-05	5.73E-05	x	1.10E+00	1.10E+00	5.73E-05	x	5.00E-02	5.00E-02	x	5.00E-02
Benzofluoranthene	50-32-8	1.00E-01	1.90E-01	1.90E-01	1.55E-05	1.55E-05	1.20E+01	x	1.20E+01	1.55E-05	x	5.00E-02	5.00E-02	x	5.00E-02
Benzofluoranthene	205-99-2	x	x	x	9.59E-05	9.59E-05	x	1.10E+00	1.10E+00	9.59E-05	x	5.00E-02	5.00E-02	x	5.00E-02
Chrysene	218-01-9	x	x	x	9.40E-04	9.40E-04	x	1.10E+00	1.10E+00	9.40E-04	x	5.00E-02	5.00E-02	x	5.00E-02
Benzofluoranthene	207-08-9	x	x	x	2.89E-03	2.89E-03	x	1.10E+00	1.10E+00	2.89E-03	x	5.00E-02	5.00E-02	x	5.00E-02
Dibenzofluoranthene	53-70-3	x	x	x	2.86E-05	2.86E-05	x	1.10E+00	1.10E+00	2.86E-05	x	5.00E-02	5.00E-02	x	5.00E-02
Indeno(1,2,3-cd)pyrene	193-38-5	x	x	x	3.12E-04	3.12E-04	x	1.10E+00	1.10E+00	3.12E-04	x	5.00E-02	5.00E-02	x	5.00E-02
cPAH TEQ	x	1.00E-01	1.90E-01	1.90E-01	x	1.55E-05	N/A	N/A	N/A	1.55E-05	x	5.00E-02	5.00E-02	x	5.00E-02
Metals															
Arsenic	7440-38-2	2.00E+01	3.10E-02	1.50E-01	1.46E-01	3.10E-02	1.00E+01	x	1.00E+01	3.10E-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	x	3.00E-01
Cadmium	7440-43-9	2.00E+03	3.50E-02	2.93E-03	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	2.60E+01	x	5.00E-01	5.00E-01	4.20E+01	4.20E+01
Chromium (Total)	7440-47-3	x	x	x	7.40E+01	7.40E+01	4.20E+01	x	4.20E+01	4.20E+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	2.53E+01	7.60E+00	x	5.15E+04	5.15E+04	7.60E+00	x	5.00E+00	5.00E+00	5.15E+04	5.15E+04
Lead	7439-92-1	2.50E+02	x	1.50E+01	1.50E+01	1.50E+01	2.50E+01	x	2.50E+01	1.50E+01	x	1.00E-01	1.00E-01	1.70E+01	1.70E+01
Manganese	7439-96-5	x	3.70E+03	3.30E+00	3.30E+00	3.30E+00	1.10E+03	x	1.10E+03	3.30E+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	6.27E-04	6.27E-04	1.00E-01	x	1.00E-01	6.27E-04	x	2.00E-02	2.00E-02	7.00E-02	7.00E-02
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

Figure 6: Calculation of Preliminary Cleanup Levels for Soil