REVISED DRAFT
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

Tacoma Metals, Inc. Site

Prepared for: Estate of Sophie Sussman

Project No. 160420 • June 22, 2018

Aspect CONSULTING

earth + water

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PRELIMINARY

DRAFT

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Contents

List of Tables

List of Figures

List of Appendices

Acronyms and Terms

ARAR	Applicable or Relevant and Appropriate Requirements
ARI	Analytical Resources, Inc.
Aspect	Aspect Consulting, LLC
AST	aboveground storage tank
ASTM	American Society of Testing and Materials
BETX	benzene, ethylbenzene, toluene and xylenes
bgs	below ground surface
CAP	Cleanup Action Plan
CCI	CCI Analytical Laboratories, Inc.
CEC	cation exchange capacity
CESC	Certified Erosion and Sediment Control
COC	Contaminant of Concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CPOC	conditional point of compliance
Coke Plant Area	The area of the Site with releases associated with the Coke Plant operations
creosote	contamination that includes a group of chemicals consisting of benzene, toluene, ethylbenzene and total xylenes (BTEX), naphthalenes, polycyclic aromatic hyrdrocarbons (PAHs), and carcinogenic PAHs (cPAHs) in various proportions.
Creosoting Plant Area	The area of the Site with releases associated with the Creosoting Plant operations
CSM	Conceptual Site Model
CUL	Cleanup level
CWA	Clean Water Act
DNAPL	dense non-aqueous phase liquid
Ecology	Washington State Department of Ecology
EODT	EOD Technology, Inc.
EPA	US. Environmental Protection Agency

EPH	Extractable Petroleum Hydrocarbons
ERH	electrical resistance heating
FEMA	Federal Emergency Management Association
Struthers	Garry Struthers Associates, Inc
gpm	gallons per minute
GPS	global positioning system
GRA	General Response Action
ISTD	*In situ* thermal desorption
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams/kilograms
mg/L	milligrams per liter
μg/L	micrograms per liter
MNA	monitored natural attenuation
MSL	mean sea level
MTCA	Model Toxics Control Act
NFA	No Further Action
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
On-Property Area	Those parcels historically used for metals recycling by General Metals of Tacoma and Tacoma Metals, Incorporated (APN 0320032043, 8950000352, and 8950000390)
Off-Property Area	The City of Tacoma 18th Street right-of-way; the International Paper Company parcel (APN 8950000402); and the JJ Port Property, LLC parcel (APN 0320032013).
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PAH	polyaromatic hydrocarbons
PCB	polychlorinated biphenyls
PCE	perchloroethylene

PGG	Pacific Groundwater Group
PLP	potentially liable party
POC	point of compliance
POTW	public-owned treatment works
PQL	practical quantitation limit
PRSC	Puyallup River Side Channel
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
Rosa	Rosa Environmental and Geotechnical Laboratory, L.L.C.
SAP	Sampling Analysis Plan
SEPA	State Environmental Policy Act
SPLP	Synthetic Precipitation Leaching Procedure
SWPPP	Stormwater Pollution Prevention Plan
SWQS	Surface Water Quality Standards
TCLP	Toxicity Characteristic Leaching Procedure
TCU	temporary containment unit
TDS	total dissolved solids
TEE	Terrestrial Ecological Evaluation
TEF	toxic equivalency factor
TNT/DNT	trinitrotoluene/dinitrotoluene
TOC	total organic carbon
TPHs	total petroleum hydrocarbons
TSCA	Toxic Substance and Control Act
USACE	United States Army Corps of Engineers
USDOT	United State Department of Transportation
USCS	Unified Soil Classification System
UST	underground storage tank
UXO	unexploded ordnance

VOC	volatile organic compound
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation
DNR	Washington State Department of Natural Resources

Executive Summary

This updated draft Remedial Investigation and Feasibility Study (RI/FS) report (Report) for the Tacoma Metals Site (Site) describes the nature and extent of contamination and identifies feasible alternatives to implement Site cleanup. This Report is being submitted to the Washington State Department of Ecology (Ecology) in accordance with the Model Toxics Control Act (MTCA) regulations published in Washington Administrative Code (WAC) Chapter 173-340. This Report was prepared by Aspect Consulting LLC (Aspect) on behalf of the Estate of Sophie Sussman under Agreed Order No. DE97-5435 between Ecology and the Estate of Sophie Sussman. This Report updates the previous 2014 Revised Augmented RI/FS (Kennedy/Jenks, 2014) to address Ecology's comments (Ecology, 2016a; Ecology, 2018).

Since 2000, remedial investigations have identified the nature and extent of contamination at the Site, which has a long history of industrial land use. The Site is situated in the Port of Tacoma near the Puyallup River. Creosote-impacted soils and groundwater are associated with industrial activities early in the 20th century. Metals-impacted soils are associated with metals recycling activities during the last half of the 20th century. Interim actions have been conducted to address several areas of contamination, and additional interim actions are planned. This Report presents feasible remediation alternatives that meet all MTCA criteria and address remaining contamination.

Creosote Impacts

The Site was one part of a much larger wood mill facility that started operation in the 1880s. Most areas of the Site contain some thickness of wood fill, including the products and by-products of the wood mill facility operated by St. Paul & Tacoma Lumber Company. The Creosoting Plant operated from approximately 1912 to 1932. Some structures associated with the Creosoting Plant (including for example: the creosote retort and pump room building, the creosote laboratory building, creosote dipping tanks, and creosote storage tanks) were demolished, although several foundations were left in place. Some demolition waste from the Creosoting Plant was used as fill at the Site. When the economics changed, a Coke Plant operated for a period during the 1940s. The Coke Plant structures were adjacent to, but not overlapping with, the Creosoting Plant structures. Some structures associated with the Coke Plant (including for example: the coal bunker, the coke oven battery, and conveyors) were demolished before the property was transferred in the early 1950s, although several foundations were left in place. Some demolition waste from the Coke Plant was used as fill at the Site.

Some areas of the Site are contaminated with releases from operations at the Creosoting Plant and/or the Coke Plant and contain soils and groundwater with concentrations that exceed Site-specific cleanup levels for creosote-related contaminants. Transport and storage of ingredients for, products of, and byproducts or waste from, the lumber mill, the Creosoting Plant, and/or the Coke Plant resulted in releases of contaminants. Transport infrastructure for the lumber mill, creosoting, and coking facilities included rail lines, roadways, conveyors, and pipelines across the Site, based on photographs, maps, and descriptions. Subsurface preferential pathways (including for example: pipelines, demolition waste, wood waste) resulted in movement of one or more creosote-related contaminants from the point of release laterally or vertically. Interim actions to address creosote-impacted soils have been proposed by AECOM on behalf of International Paper Company (AECOM, 2017b). This Report considers these proposed interim actions, although they have not yet been approved by Ecology. This Report also establishes the Site-specific cleanup and remediation levels for chemicals associated with creosote, including benzene, toluene, ethylbenzene, total xylenes, total naphthalenes, total carcinogenic polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons as diesel- and oil-range organics.

Metals Impacts

Shallow metal debris fill is present at the three parcels formerly occupied by Tacoma Metals Inc. (previously owned by Portland Avenue Associates and the Estate of Sophie Sussman, and currently owned by Washington Department of Natural Resources (DNR); referred to as the On-Property area in prior reports and in this report) and used for metals recycling. The former metals recycling facility started operation in the 1950s. Structures included a main warehouse (where the coke oven battery once stood), smaller buildings (including the former “red brick building” associated with coke production), vaults and bunkers, and storage tanks. As part of the interim actions already conducted, aboveground structures were demolished, and demolition waste was disposed at a permitted landfill facility.

Where present, metal debris fill is typically within four feet of ground surface and contains metals at concentrations that exceed Site-specific cleanup standards. In general, excavating lead-impacted soils to cleanup standards will simultaneously address other contaminants, including metals, polychlorinated biphenyls (transformer oil and hydraulic fluid), and total petroleum hydrocarbons as diesel- and oil-range organics.

Preferred Remedial Alternative

The objective of this Report is to provide Ecology and the public with sufficient information regarding the Site to select one of the three remedial alternatives that address impacted soils through *in situ* solidification, and excavation and off-Site disposal. The remedial alternatives include varying amounts of *in situ* solidification of creosote-impacted soils, and varying amounts of metals-impacted soils excavation; two remedial alternatives involve containment of impacted soils and installing an environmental cap with stormwater control. One alternative is considered a “permanent” remedy with maximum *in situ* solidification and/or removal of impacted soils, and no requirement of an environmental cap. All remedial alternatives are protective of human health, wildlife, groundwater, and surface water. All remedial alternatives are consistent with the City of Tacoma’s shoreline management zoning code and future land use as industrial properties with environmental covenants.

Based on MTCA threshold requirements, selection criteria, and evaluation of the Disproportionate Cost Analysis, the preferred remedial alternative is Alternative 2, which includes *in situ* solidification of creosote-impacted soils to 15 feet below ground surface, and a combination of containment and excavation with off-Site disposal of shallow, metals-impacted soils in the On-Property area. The estimated cost for implementing the preferred alternative is $12.2 million, and the expected range in actual costs is between -30 percent and +50 percent of this value, or between $8.5 million and $18.3 million.

For the purposes of this Report, it is understood that International Paper Company intends to implement interim actions to address creosote-impacted materials and other impacts associated with historical releases from their operations to Ecology's satisfaction.

This Report is one step in the cleanup process under MTCA. Following Ecology and public review, the next step in the MTCA cleanup process is to develop the Cleanup Action Plan, which will document the selected remedial alternative.

1 Introduction

This updated draft Remedial Investigation and Feasibility Study (RI/FS) report (Report) presents the results of the RI/FS conducted at the Tacoma Metals site (Site) located in Tacoma, Washington (Figure 1). The RI/FS was performed under the Agreed Order No. DE97-5435 between the Washington State Department of Ecology (Ecology) and Mr. and Mrs. Leslie Sussman and Portland Avenue Associates, LLC, previous land owners for a portion of the Site where metals recycling occurred. Mr. and Mrs. Leslie Sussman are deceased, and Portland Avenue Associates, LLC was dissolved in 2013. Performance on the Agreed Order is being completed by the Estate of Sophie Sussman. The property was escheated to the state of Washington in 2014. Figure 2 shows the Site boundaries, including several parcels. This RI/FS was performed in accordance with Ecology's Model Toxics Control Act (MTCA) regulations published in Washington Administrative Code (WAC) Chapter 173-340 (Ecology, 2013). This Report was organized following the guidance of Ecology RI/FS templates and checklists (Ecology, 2016b; Ecology, 2016c).

The RI identified the nature and extent of contamination at the Site. Contamination occurred during different periods of historical land use, including: releases from Creosoting Plant operations (approximately 1912 to 1932), Coke Plant operations (1940s), and building demolition; and releases from metals recycling operations (1950s to 1999). Figure 3 shows the changes in structures over time. The extent of deeper creosote-impacted soils and groundwater is generally in the vicinity of the Creosoting Plant and the Coke Plant, although transportation of materials during operations, and the use of building demolition waste as fill, may have distributed contaminants at a distance from the structures. The extent of metals-impacted soils generally coincides with the parcels formerly occupied by metals recycling operations.

Due to the complexity of Site history, an extended RI was conducted to address data gaps. Sampling and/or monitoring locations established during the remedial investigation are shown on Figure 4. Each phase of the remedial investigation was conducted under an Ecology-approved work plan, and the data compiled in this Report have been previously presented to Ecology.

Site-specific cleanup standards were developed to protect human health and the environment. The Site soil cleanup levels are protective of human health, ecological receptors (wildlife), and groundwater. The Site groundwater cleanup levels are protective of surface water for drinking water and fish consumption due to the proximity of the Site to the Puyallup River, and the designation of this river as a Class A water supply by the Puyallup Tribe.

Excavation and/or solidification of creosote-impacted soils were proposed as an interim action to limited depths and in limited areas of the Site by International Paper Company (AECOM, 2017b). It is understood that International Paper Company will implement interim actions to address creosote-impacted materials and other impacts associated with releases from the Creosoting Plant operations and the Coke Plant operations to Ecology’s satisfaction.

This Report's feasibility study evaluated three potential remedial alternatives composed of multiple elements, including the following:

- Excavation and/or solidification of creosote-impacted soils;
- Excavation and/or containment of shallow metals-impacted soils; and
- Installation of an environmental cap with stormwater control where shallow metals-impacted soils are contained.

Excavated material will be characterized for potential re-use or off-Site disposal at a permitted facility. Excavation of shallow metals-impacted soils is proposed for three standards:

- Remediation levels protective of human health for an excavation worker, with an environmental cap;
- Cleanup levels protective of human health for an industrial property, with an environmental cap; and
- Cleanup levels protective of human health, ecological receptors (wildlife), and groundwater cleanup levels, without an environmental cap.

The environmental cap and stormwater control system will be maintained as part of the engineered controls and is protective of ecological receptors (as an engineered barrier) and groundwater. Consistent with City of Tacoma (City) zoning and shoreline management, the environmental cap will be limited to the area historically paved, which limits the area of containment. Consistent with City-identified restrictions on the local stormwater system, the environmental cap incorporates a stormwater control system that detains stormwater.

1.1 General Site Information

General site information is available on Ecology's web site. Details for selected Site information are provided below.

- Site Name: Tacoma Metals Site
  - Ecology Facility/Site No.: 1257
  - Ecology Cleanup Site ID No.: 3910
- Site Location: The Site location is shown on the vicinity map (Figure 1) and the Site Map (Figure 2). The Site is located as described below:
  - Southwest of the Puyallup River, near approximately river mile 1.2 to 1.5
  - Within the Port of Tacoma
  - Within the City of Tacoma
  - Within the 98421 zip code
  - Within Pierce County
  - At latitude 47.251 degrees north, and longitude 122.418 degrees east
  - Within Township 20 North, Range 3 East, Section 3

- Site Address: The Site includes several street addresses and Pierce County parcels, grouped below by the current property owner. Parcel area was provided on the Pierce County Assessor's website, as shown on Figure 2.
  - Current Owner: Washington State Department of Natural Resources (DNR)
    - Street address: 1801 East Portland Avenue
Parcel: 8950000390
Area: 3.44 acres
    - Street address: 1919 East Portland Avenue
Parcel: 0320032043
Area: 2.06 acres
    - Street address: 2001 East Portland Avenue
Parcel: 8950000352
Area: 0.33 acres
  - Current Owner: City of Tacoma
    - Street address: 18th Street right of way
Parcel: Not applicable
  - Current Owner: International Paper Company
    - Street address: 1709 East Portland Avenue
Parcel: 8950000402
Area: 0.45 acres
Recent Sales: 7/21/2016 from Simpson Tacoma Land Company
  - Current Owner: JJ Port Property, LLC
    - Street address: 1703 East Portland Avenue
Parcel: 0320032013
Area: 0.65 acres
Recent Sales: 2/8/2007 from Bacon Constance T TTEE
11/16/2006 from PBT Group Inc.
- Site Land Use and Zoning: The historical, current, and anticipated future land use is industrial. The current City of Tacoma zoning for each parcel includes:
  - PMI Port Maritime and Industrial District
  - S-9 Puyallup River (UC)
- Site Boundaries:
  - Northeast: Levee along the Puyallup River, constructed by the Army Corps of Engineers (USACE), and the Puyallup River Side Channel (PSRC), constructed by the City of Tacoma
  - Southeast: Lincoln Avenue
  - Southwest: East Portland Avenue
  - Northwest: Private property

- Contact information for selected parties:
  - Project coordinator for the Estate of Sophie Sussman: Peter Bannister, PE – Aspect Consulting, LLC
    - Address: 305 North Madison Avenue, Bainbridge Island, Washington 98110
    - Phone Number: 206-780-7728
    - Email: pbannister@aspectconsulting.com

Historical remedial investigation has been performed at different portions of the Site, as depicted on Figure 4. The following terminology has been used in previous reports, and will be used herein, to describe the areas of the Site:

- **On-Property:** The three parcels formerly occupied by Tacoma Metals Inc. and used for metals recycling. These parcels were previously owned by Portland Avenue Associates and the Estate of Sophie Sussman and are currently owned by DNR.
- **Off-Property:** That area located northwest of the On-Property area, including: City of Tacoma 18th Street right-of-way; the parcel owned by International Paper Company (previously owned by Simpson Tacoma Land Company); and the parcel owned by JJ Port Property LLC.
- **Creosoting Plant:** The area of the Site with releases associated with the Creosote Plant operations.
- **Coke Plant:** The area of the Site with releases associated with the Coke Plant operations.
- **Levee:** An earthen levee, originally constructed around 1950 by the USACE, sits between the Site and the Puyallup River. In 2005, the Levee was re-routed. Access to the Levee road is provided at the intersection of East Portland Avenue and Lincoln Avenue, southeast of the Site.
- **Puyallup River Side Channel (PRSC):** The area where an estuary and wetland was constructed to the north of the Site in 2005 by the City of Tacoma. The PRSC is separated from the Site by the Levee, which was re-routed in 2005 by the USACE. Previously, the area was covered by a wood waste pile from the Simpson Tacoma Land Company operations. Originally, the PSRC was part of the Puyallup River.

1.2 Land Use History

This section describes the Site land use history. Three distinct phases of active land use were identified for one or more of the properties that now constitute the Site. A fourth phase reflects the period after any industrial activity. The primary land uses (and approximate timeframes) include the following:

- Creosoting Plant (1900s to 1930s);
- Coke Plant (approximately 1943 to 1944);
- Metals Recycling Facility (1950s to 1999); and
- Inactive Land Use (2000 to current).

A photographic record of historical land use is provided in Appendix A. Details of the active land use are provided below.

1.2.1 Creosoting Plant

The Creosoting Plant was operated by the St. Paul & Tacoma Lumber Company, and structures were previously located On- and Off-Property (as shown on Figure 3). The Creosoting Plant was operational from approximately 1912 to 1932, and produced treated wood products, including pilings and railroad ties (for example). The Creosoting Plant structures were constructed on top of wood fill, placed during earlier operation of the lumber mill. The wood fill, observed across the Site, overlies estuarine deltaic deposits.

Creosote includes a group of chemicals consisting of benzene, toluene, ethylbenzene and total xylenes (BTEX), total naphthalenes, polycyclic aromatic hydrocarbons (PAHs), and carcinogenic PAHs (cPAHs) in various proportions. The source and volume of creosote used during Creosote Plant operations was not documented.

The Creosoting Plant structures included two aboveground storage tanks (ASTs) (450,000-gallon and 102,000-gallon), creosote dipping tanks and an overhead crane, a 130-foot-tall treatment retort and pump room, and a 1,500-gallon AST near the retort. The ASTs contained creosote, based on soil sampling results and detailed summaries of facility operations (Kennedy/Jenks, 2014). Rail cars stored and transported creosote-treated wood southeast across the Site. Creosote conveyance piping between the ASTs, the dipping tanks, and the retort was not illustrated on facility maps. Other underground piping (including for example: water supply, industrial waste water, and sanitary sewer) was not illustrated on facility maps.

Other Creosoting Plant structures included a creosote laboratory, overhead tramways, a hog fuel conveyor, several smaller structures, and a wharf. The wharf was located along the Puyallup River, and served the Creosoting Plant as a dock and/or mooring location for product transfer.

Some of the Creosoting Plant structures were demolished prior to construction of the Coke Plant. Approximately 3 to 8 feet of mixed fill material, including demolition waste, was placed over wood fill across the On-Property area.

1.2.2 Coke Plant

During the 1940s, a coke manufacturing facility was operated by Wilkeson Products Company, and structures were centrally located On-Property (as shown on Figure 3). The Coke Plant was operational beginning in 1943 and produced metallurgical coke. The Coke Plant structures were constructed on mixed fill, which includes demolition waste (such as metal, glass, brick, and concrete).

Coal piles were stored On-Property southeast of the Coke Plant. Contaminants leached from stored coal piles by precipitation include a range of contaminants that are relevant to this Site (selenium, arsenic, and lead, for example) (U.S. Environmental Protection Agency (EPA), 1978). The quantity of coal imported to and stored at the Site was not documented. However, photographic evidence shows large volumes (see Appendix A). Coal gas and coal tar (or creosote) are byproducts of the coke manufacturing process. The volume creosote created, used, or disposed of during Coke Plant operations was not documented.

The Coke Plant structures included the coke oven battery, the furnace building, and conveyors for coal and/or coke to the rail spurs and to wharf along the Puyallup River. Some structures associated with the Coke Plant appear to have been related to storage and distribution of coal gas. Coal gas conveyance piping from the coke oven battery to storage tanks or a power generator was not illustrated on facility maps. Other underground piping (including for example: water supply, industrial waste water, and sanitary sewer) was not illustrated on facility maps.

Some of the Coke Plant structures were demolished by the 1950s. Disposal of Coke Plant demolition waste was not documented.

The USACE constructed the Levee around 1950, shifting the course of the Puyallup River. The lumber mill used the area inside the Levee for storing piles of wood waste.

1.2.3 Metals Recycling

The former Tacoma Metals Inc. facility and associated On-Property parcels were used for recycling ferrous and nonferrous metals. In the early 1950s, Mr. Leslie Sussman purchased the On-Property parcels from the federal government. Structures left On-Property included a main warehouse (where the coke oven battery once stood), smaller buildings (including the former “red brick building” associated with coke production), vaults and bunkers, and storage tanks (see Figure 3). The three parcels were occupied by General Metals from the early 1950s to the early 1980s and by Tacoma Metals Inc. from the early 1980s through 1999. By the 1970s, the former Tacoma Metals facility was paved with asphalt, except for the area between the railroad spur and the property line along the Puyallup River. Appendix A provides photographic documentation of the 1992 Ecology inspection.

Metals recycling activities generally included the collection, storage, cutting, shredding, and bundling of various items including, but not limited to, aluminum cans and scrap, wheels, radiators, engine blocks, computer cases, and other scrap metal. Historical metals recycling activities also included dismantling and shredding of automobiles, internal combustion and electric motors, locomotives, and similar products. In one area, lead-acid batteries were dismantled to recycle the lead.

Equipment used as part of the daily recycling operation included gasoline- and diesel-powered vehicles and equipment, as well as mobile and stationary hydraulic processing machinery (balers, shears, etc.). Materials were stored in the main warehouse, in the storage building (constructed during the 1980s), and directly on the ground surface in piles or stacks. Contaminants potentially leaked to ground surface if liquids were released during recycling activities, such as motor oil, coolant, and battery acid. Contaminants potentially leached from recycled materials by precipitation during storage. These contaminants include metals (lead, cadmium, and chromium, for example), total petroleum hydrocarbons[1] (TPHs) as diesel- and oil-range organics, and polychlorinated biphenyls[2] (PCBs).

[1] During the RI, TPHs as diesel- and oil-range organics were analyzed and reported with and/or without silica gel cleanup during separate sampling events. Results from samples analyzed without silica gel cleanup may be biased high due to interference (Ecology, 2016d).
[2] During the RI, PCBs were analyzed and reported one or more of the following: Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, and Arochlor 1260.

The aboveground portions of the former metal recycling structures were demolished as part of interim actions, although most of the asphalt-paved areas and some concrete foundations remain.

1.2.4 Inactive Land Use

Since approximately 2000, after the metals recycling activities ended, the On-Property area has been modified by demolishing buildings, conducting remedial investigation and interim action cleanup activities, and hosting a temporary containment unit for metals-impacted soils from the PRSC. The On-Property Area has otherwise been inactive.

Prior to a focused groundwater investigation in late 2016 (Aspect, 2017a), DNR and the City of Tacoma evicted a homeless encampment that had settled within the fenced On-Property area and cleared vegetation to provide safe access. The homeless encampment also extended to the Off-Property area.

1.3 Site Regulatory and Reporting History

This section describes the identification of the Tacoma Metals Inc. facility as a Site listed by Ecology, and the subsequent regulatory and reporting milestones.

- In 1983, EPA issued a notice of non-compliance to the Tacoma Metals, Inc. facility for failure to conform to Toxic Substance and Control Act (TSCA) regulations associated with electrical transformer handling practices. PCBs had been detected in transformer oil collected during an inspection earlier that year.
- In 1988, EPA ordered a site inspection of the Tacoma Metals Inc. facility under TSCA regulations, and in response to a citizen complaint (Ecology and Environment (E&E), 1988). The stormwater system and surface soils were observed to be contaminated with PCBs, likely sourced by stored electrical transformers and electric motors. Metals contamination was also observed. A cleanup of PCB-impacted materials was conducted in 1989 (Chempro, 1989).
- From 1990 to 1992, environmental investigations were performed of the Tacoma Metals Inc. facility (Hart Crowser, 1990; Morris Environmental Services, 1991, 1992; Pacific Groundwater Group, 1992).
- In 1992, Ecology conducted a Site Hazard Assessment of the Tacoma Metals Inc. facility.
- In 1995, Struthers and Associates, Inc. assessed the stormwater system at the Tacoma Metals, Inc. facility on behalf of the City of Tacoma (Struthers, 1995a).
- In December 1997, Ecology notified Mr. and Mrs. Leslie P. Sussman and Portland Avenue Associates, Inc. that they were identified as potentially liable parties (PLPs) at the Tacoma Metals Inc. Site (Ecology, 1997a; Ecology, 1997b). Other PLPs were Tacoma Metals, Inc. and Schnitzer Steel Industries, Inc.

Ecology provided a draft Agreed Order to Mr. and Mrs. Leslie P. Sussman in January 1998. Kennedy/Jenks prepared a work plan for the RI/FS (Kennedy/Jenks, 1998).

- In 1999, the Tacoma Metals Inc. facility ceased operation, and the associated parcels have since remained vacant.
- On January 11, 2000, Agreed Order No. No. DE97-5435 became effective.
- In 2001, the initial RI/FS (Kennedy/Jenks, 2001) was submitted to Ecology, and confirmed the nature and extent of contamination associated with metals recycling for the former Tacoma Metals Inc. facility, as well as identifying creosote-impacted soils and groundwater and researching potential sources of those impacts. This initial RI/FS report provides valuable information that has been summarized in this Report and is therefore included as Appendix B (electronic format on CD).

Supplemental remedial investigations were conducted to address data gaps identified by Ecology, as described in the following reports:

- Final Letter Report for UXO (Unexploded Ordinance) Investigation Services at the Former Tacoma Metals Site (EODT 2006);
- Supplemental Data Summary Report, Former Tacoma Metals Property (Kennedy/Jenks 2007a);
- Cleanup Level Evaluation, Former Tacoma Metals Facility (Kennedy/Jenks 2007c);
- Summary Report for Treating/Disposal of Lead-Containing Soil Materials, Former Tacoma Metals Site (Kennedy/Jenks 2008a)[3];
- Revised Soil and Groundwater Investigation Results – Data Transmittal, October 2007- April 2008 Investigation, Former Tacoma Metals Facility (Kennedy/Jenks 2008b);
- Response to Ecology Comments, Forensic Evaluation of Hydrocarbons, Former Tacoma Metals Facility (Kennedy/Jenks 2009);
- Terrestrial Ecological Evaluation (TEE), Former Tacoma Metals Facility (Kennedy/Jenks 2010a); and
- Revised Groundwater Investigation Summary, Puyallup River Side Channel Investigation, Former Tacoma Metals Facility (Kennedy/Jenks 2012).

Following the supplemental investigations and reporting, Kennedy/Jenks released an Augmented RI/FS Report to Ecology in 2013, with subsequent report drafts.

- In 2013, the Augmented RI/FS Report (Kennedy/Jenks, 2013) was submitted to Ecology.
- In 2014, the Revised Augmented RI/FS Report (Kennedy/Jenks, 2014) was submitted to Ecology, addressing Ecology comments on the 2013 Augmented RI/FS Report.

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[3] As part of the PRSC project by the City of Tacoma, investigation, remediation, and general construction activities were performed by others as referenced below:
Soil and Groundwater Quality Testing Results, Puyallup River Site Channel and Tacoma Metals Site, Tacoma, Washington (Hart-Crowser 2003).
Remedial Action Construction Report (City of Tacoma 2006).

The 2014 RI/FS report provides valuable information that has been summarized in this Report and is therefore included as Appendix C (electronic format on CD).

In addition, the International Paper Co. submitted a FS Addendum and an Interim Action Work Plan for the Creosoting Plant Area to Ecology.

- In 2015, a FS Addendum (AECOM, 2015) was submitted to Ecology documenting additional investigation of creosote-impacted soils and groundwater in the Creosote Plant Area.
- In May and November 2017, the International Paper Company submitted Interim Action Work Plans (AECOM, 2017a; AECOM, 2017b) to Ecology for addressing some of the creosote-impacted materials at the Site.

1.4 Current and Future Site Use

No structures are currently present on the former Tacoma Metals Inc. property, the 18th Street right-of-way, or the International Paper Company property, and the properties are vacant. Two buildings are located on the JJ Port Property, and the area surrounding the buildings is used for parking vehicles and storing equipment.

In 2015, the City of Tacoma specified the following potential land use and considerations in an email to Kennedy/Jenks excerpted below:

> "Approximate Building Needs:
>
> Building: 4200 square feet roughly 70 by 60 feet; enclosed garage that would be attached that is 170'X60'
>
> Parking: (65) 9'X22' car stalls; (20) 12'X24' Truck Stalls; This would not include whatever access paving that would be required.
>
> Shoreline Information:
>
> The site is largely impacted by critical areas and buffers as further discussed below. There is a process to evaluate development in critical areas, which could result in a larger developable area in exchange for mitigation, etc. but we have not pursued this at this time. Development of the cleanup plan for the site should take these factors into account.
>
> The site is located within the S-9 Puyallup River Shoreline District. The intent of the S-9 Puyallup River Shoreline District is to encourage recreational development of the riverfront, ecological restoration activities that restore historic floodplain processes and functions, while allowing industrial development of adjacent upland areas, and to encourage preservation of Clear Creek, its associated wetlands, and related ecosystems. Permitted industrial uses will develop and operate in a manner that is compatible with shoreline ecological functions.
>
> There is a stream buffer of 150 feet on the site that is measured from the ordinary high water mark (OHWM) of the Puyallup River. In addition, there is a wetland area that is a mitigation site (the Puyallup River Side Channel). As the area is likely a Category I wetland that supports salmonids, an additional buffer of 200 feet would also impact development near this site. This buffer is also measured from the OHWM of the wetland.

Most of the site (all three parcels) lies within a FEMA floodplain and floodway. Floodways restrictions are significant because fill and associated development is not allowed within the mapped floodway area. The floodway area covers a small “sliver” of the site adjacent to the Puyallup River. Additional requirements for development within a floodplain will also apply.

Additional requirements along the Puyallup River will likely include re-vegetating the required buffers upon redevelopment.

Storm Drain Modeling Information:

Modeling of the current development conditions (no future growth) in Mike Urban suggests that the storm sewer in Portland Avenue (from Lincoln Ave north) already surcharges during a 100-yr, 24-hour Type IA event. When additional development (on the Tacoma Metals property and other properties that are undeveloped/underutilized) occurs, the existing issues will get worse. The following alternatives were explored to mitigate the flooding issues.

1. Upsize Downstream Pipes - The pipes downstream of the Tacoma Metals property were upsized to determine how many segments downstream would need to be upsized. The model suggested that every pipe downstream of Tacoma Metals property would need to be upsized up until the connection with the 72-inch main (connection point at MH 6763494) near the Cleveland Way Pump Station. Since these undersized pipes currently run through the Central Treatment Plant and go under/near the railroad in several locations, we would likely be looking for an alternate alignment in Portland Ave/Cleveland Way. Due to the lineal footage of pipes that need to be upsized, this option will likely be cost prohibitive.

2. New Outfall - Another potential solution would be to install a new outfall into the Puyallup River. However, this is unlikely to be a viable option at this time due to the regulatory challenges.

3. Detain Onsite – The Tacoma Metals property could detain flows on-site so that discharge from their site matches pre-developed conditions. Due to the costs/challenges associated with the other two alternatives, this is the recommended alternative.

Overall, we are not seeing that we would really have you do anything different from a cleanup perspective at this time, although this information, particularly the Shoreline restrictions, should be taken into consideration in your cleanup plan development. Detaining the stormwater onsite as currently planned appears to be the best option. If anything, the location of that detention system could potentially be coordinated, and we can discuss that when we meet.”

In a follow-up email in 2016, the City clarified its position on paving and the use of an environmental cap as part of a containment alternative:

“RCW 90.58.580 requires approval from our director and ecology and when I spoke with Rick and he felt that trying to utilize RCW 90.58.590 to reduce the amount of buffer and the shoreline district that extends on the property wasn’t the best approach.

After talking with you I decided I better do a site visit to get a better understanding of how much of this site was already paved. I did that this morning with Mary Henley and found that there are substantial portions of the site that are paved and the much of the vegetated area is in the location of the old buildings that were demolished or is growing up through broken pavement. I also looked through some historical photos.

Because much of the area is still paved, re-paving the site for a cap could be considered a maintenance activity under the City's Shoreline Master Program and would not trigger the requirements that would be required for "new" pavement being placed on the site."

A portion of the Site closest to the Puyallup River is within the buffer identified in the City's Shoreline Master Program. The On-Property area along the fence line near the Levee and PRSC has historically been unpaved and would remain so. The balance of the On-Property area is paved and represents the potential extent of an environmental cap for containment alternatives. The Off-Property area is unpaved, and future land use of those parcels would be subject to the shoreline buffer. Additional discussion of the shoreline buffer as relates to cleanup requirements is provided in Section 4.2.

2 Field Investigations and Cleanup Activities

This section discusses field investigations and cleanup activities. First, a summary of the investigation and cleanup timeline is provided. Then, Site characterization activities are described, followed by a summary of sampling results.

2.1 Investigation and Cleanup Timeline

This section provides descriptions of the investigation and cleanup timeline, and includes activities prior to the remedial investigation in 2000, the initial remedial investigation and feasibility study between 2000 and 2002, and the additional remedial investigation and feasibility study from 2002 through 2017.

2.1.1 Activities prior to Remedial Investigation

This subsection summarizes investigation and cleanup activities prior to 2000. The concentrations reported may not be indicative of current Site conditions since surface soils were extensively disrupted during grading activities that were performed by Tacoma Metals, Inc.

In March 1988, the Tacoma Metals Inc. facility was inspected by representatives of the Environmental Protection Agency (EPA) and Ecology under TSCA. During the inspection, samples were collected of surface soil, surface residue on paved surfaces, catch basin sediment, and storm drain sediment. The storm drains and catch basins were all located on the eastern half of the property. Concentrations of lead, cadmium, chromium, barium, copper, mercury, nickel, and zinc were detected in the soil and sediment samples at concentrations exceeding Ecology's MTCA Method A or C industrial soil cleanup levels (E&E 1988). Concentrations of extractable lead and cadmium, extracted by Toxicity Characteristic Leaching Procedure (TCLP), were detected above designated state dangerous waste levels (WAC 173-303). Elevated concentrations of iron and aluminum were also detected in soil samples.

In addition, PCB concentrations were detected in soil samples collected from an electric motor storage area, behind the main warehouse building near the northern fence line, above the MTCA Method A industrial soil cleanup level. Chempro removed PCB-impacted water from a sump (unreported volume) as well as PCB-impacted asphalt and soils (approximately 79 tons). The extent of the 1988 PCB cleanup is shown on Figure 16B, which provides information on the extent of remaining PCB-impacted soils (see Section 2.3.3.2).

In 1989 and 1990, a Phase I and limited Phase II environmental assessment was conducted of the Tacoma Metals Inc. facility on behalf of potential leasees. Hart-Crowser investigated soil and groundwater conditions in the unpaved area (Hart-Crowser 1990). Elevated concentrations of lead, chromium, cadmium, arsenic, extractable lead, PCBs, cPAHs[4] , and TPHs exceeding applicable MTCA Method A or C industrial soil cleanup levels were detected in test pit soil samples collected from the northern unpaved area of the On-Property area. In addition, elevated lead, chromium, cadmium, extractable lead, and TPH

[4] PAH compounds that are classified by EPA as potentially carcinogenic include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

concentrations were detected in the vicinity of the existing furnace building (Hart-Crowser 1990). TPHs were also present at concentrations above the MTCA Method A industrial soil cleanup levels in soil samples collected from the former location of an underground storage tank (UST) at the eastern end of the main warehouse building (refer to Figure 3). The Hart-Crowser report also identified what appeared to be U.S. Army shells in a limited portion the unpaved area.

In 1991, Morris Environmental Services (Morris) reviewed the findings of Hart-Crowser's 1990 report, visited the Tacoma Metals, Inc. facility, interviewed Tacoma Metals, Inc. personnel, and postulated some possible contaminant sources (Morris 1991). For example, the following possible contaminant sources were described:

- Motor blocks may be a source of TPH concentrations
- Incomplete combustion of lead-acid battery cases may be a possible source of PAH-impacted soils behind the former red brick building location
- Creosote on buried piling may be a possible source of PAH concentrations
- Radiator salvage may be a possible cadmium source

Between August and December 1991, 53 soil samples were collected by Morris and analyzed for total lead (Morris 1992). The samples were collected from the unpaved area along the northern property boundary. Morris indicated that the approximate western extent of lead contamination, but not the eastern extent, was identified during the first sampling event. Three additional sampling events were performed in an unsuccessful attempt to determine the approximate eastern extent of lead contamination in near-surface soil. No attempt was made to identify the northern and southern extents of lead contamination; however, Morris identified the potential existence of lead-impacted soil north of the existing fence line and south of the existing unpaved area.

In 1992, Pacific Groundwater Group (PGG) conducted a groundwater investigation at the Tacoma Metals Inc. facility, including the installation and sampling of eight shallow groundwater monitoring wells (PGG 1992). Gasoline-range TPH compounds were detected in samples collected from two monitoring wells (MW-4 and MW-5) at concentrations above the MTCA Method A groundwater cleanup level of 1.0 milligram per liter (mg/L). In addition, cPAHs were detected in samples collected from wells MW-7 and MW-8 at concentrations exceeding the MTCA Method A groundwater cleanup level of 0.1 micrograms per liter (μg/L).

PGG also performed short-term pump tests on wells screened in the wood debris and deltaic sand units. Hydraulic conductivities of 3.8 to 4.6 feet per day were reported for two wells screened in the wood debris unit (MW-4 and MW-5, respectively), and hydraulic conductivities of 100 to 140 feet per day were reported for wells MW-1 and MW-2 screened in the deltaic sand unit. These results support the assessment of groundwater flow and contaminant transport, discussed in Section 2.2.3.

In 1995, Garry Struthers Associates, Inc. (Struthers) prepared a Drainage Report of the Tacoma Metals Inc. facility for the City of Tacoma Public Works Department (Struthers 1995a). The purpose of the report was to assess surface runoff conditions and address improvements related to surface runoff including, but not limited to, the paved area. Struthers summarized surface drainage conditions as follows:

- Approximately 2.6 acres in the eastern half of the facility drains to an existing catch basin and conveyance storm system that discharges to a municipal storm drain located on the eastern side of Portland Avenue;
- Approximately 2.0 acres in the western half of the facility drains by surface runoff (overland flow) to storm sewers in Portland Avenue or surface water ponds; and
- Approximately 1.3 acres along the northern property boundary is unpaved.

Struthers indicated that there was no additional drainage onto the facility from surrounding properties. Off-Property surface water runoff other than Portland Avenue was not mentioned. There was no apparent drainage from the unpaved area. Struthers indicated that runoff from the facility did not interact with the Puyallup River, which was separated from the facility by the USACE Levee.

Based on the capacity of the existing municipal drain system (15-inch-diameter concrete pipe located along Portland Avenue), Struthers concluded that surface runoff detention would be necessary as part of any drainage improvements. They also indicated that treatment may be necessary for surface runoff quality control, and that Shoreline Permits for the City of Tacoma would be required. Quality control for surface runoff was addressed in detail in Struthers' *Technical Memorandum for Storm Runoff - Best Management Practices* (Struthers 1995b).

2.1.2 Initial RI/FS

The initial RI/FS was performed by Kennedy/Jenks between 2000 and 2001, with most of the field investigation completed during 2000 (Kennedy/Jenks, 2001). The purpose of the RI/FS was to characterize the nature and extent of impacts to environmental media across the former Tacoma Metals Inc. facility (i.e., the On-Property area). Findings from the RI confirmed the results of several investigations performed between 1988 and 1995, prior to the RI/FS. Investigation activities were performed in the On-Property portion of the Creosoting Plant and Coke Plant, but the sources and extent of creosote-impacted soils were not clearly identified. A Site conceptual model was developed, and remediation alternatives were evaluated based on findings of the remedial investigation.

2.1.2.1 Initial Interim Actions

Prior to the initial RI activities, existing structures (excluding one storage building which was subsequently demolished in 2011) and approximately 1,800 feet of railroad track were demolished. The demolished structures included the main warehouse and office building, the red brick building, concrete foundations associated with the former coke oven battery, and various equipment and storage structures. Solid waste materials generated from demolition activities included concrete, brick, glass, metal, wood, and other debris.

Liquid wastes were removed from two vault structures located below or near the red brick building. These vaults were pumped, cleaned, and backfilled with clean imported soil material.

Following collection of surface water samples, all storm lines at the Site were cleaned and waste materials were transported offsite for disposal at a permitted facility.

Waste materials derived from the demolition of Site structures were transported for disposal at permitted facilities. Nonhazardous wastes were transported to Rabanco for landfill disposal. Hazardous waste materials were characterized, and hazardous waste profiles and shipping manifests were prepared. Hazardous waste streams were transported by licensed hazardous materials handlers to permitted facilities for disposal. Disposal of these hazardous waste materials is documented in the 2001 Hazardous Waste Evaluation report submitted to Ecology (Kennedy/Jenks, 2001).

2.1.3 Additional Remedial Investigation

Additional remedial investigation activities were performed between 2002 and 2011. A focused groundwater investigation was conducted in late 2016 and early 2017 (Aspect, 2017a; Aspect, 2017b).

2.1.3.1 Creosoting Plant Area

The source of creosote-impacted soils On-Property was not clearly identified during the initial RI/FS, and the extent of creosote-impacted soils and groundwater was not fully defined. Additional investigation activities were performed by Kennedy/Jenks in phases, beginning in 2002 at On-Property areas with deep soil borings identifying creosote-impacted soils below the water table. Beginning in 2004, additional investigations were performed on the Off-Property area parcels until the extent of impacts (laterally and vertically) related to the Creosoting Plant area was defined to Ecology's satisfaction.

2.1.3.2 Investigation of Potential Unexploded Ordnance

In 1990, Hart-Crowser identified what appeared to be U.S. Army shells in a limited portion of the unpaved area On-Property during a subsurface investigation on behalf of potential leasees (Hart Crowser, 1990). In 1995, the City of Tacoma identified UXO Off-Property.

Following an Ecology-approved Work Plan (Kennedy/Jenks 2006), an investigation of potential UXO was performed along the unpaved margin of the On-Property area by EOD Technology, Inc. (EODT). Eleven test pits were excavated by EODT, and no UXO materials were identified (EODT 2006). In addition, two test pits were excavated in the vicinity of monitoring well MW-8(R) to identify potential sources of light non-aqueous phase liquid (LNAPL) periodically observed in the well. No obvious sources of LNAPL were observed in the two test pits.

2.1.3.3 PRSC and Conditional Point of Compliance Wells

Ecology requested further investigation be performed along the conditional point of compliance (CPOC) adjacent to the PRSC, following review of data summary documents related to the Creosoting Plant Area.

The PRSC investigation was performed between October 2010 and February 2011 (Kennedy/Jenks 2012). The purpose of the investigation was to evaluate groundwater conditions at the southern margin of the PRSC, specifically in the area to the north of Site monitoring well MW-8R, which is located within the Creosoting Plant area (refer to Figure 3). The PRSC investigation also included evaluation of groundwater conditions in several proposed point of compliance (POC) monitoring wells located along the northern margin of the Creosoting Plant Area (refer to Figure 3). The results of the PRSC investigation did not identify impacts to groundwater beyond those previously documented during the Augmented RI (Kennedy/Jenks, 2013).

2.1.3.4 Focused Groundwater Investigation

At Ecology's direction, a focused groundwater investigation was conducted to assess the concentrations of selenium, total chromium, and/or hexavalent chromium, and the thickness of LNAPL at monitoring well MW-8R (Aspect, 2017a; Aspect 2017b). The metals had been previously sampled, but analytical results could not be confidently compared to draft cleanup levels.

Results of the focused groundwater investigation in December 2016 and June 2017 included the following:

- Total selenium was detected in a groundwater sample from one well (MW-20) at a concentration of 5.86 µg/L, above the draft cleanup level of 5 µg/L
- Total chromium was detected in groundwater at concentrations of up to 5.50 µg/L (at MW-20) below the Method A cleanup level of 50 µg/L
- Hexavalent chromium was not detected in the groundwater sample from MW-20 above the reporting limit of 0.20 µg/L
- The LNAPL thickness at MW-8(R) was 0.89 feet on June 22, 2017

These results confirm that hexavalent chromium is not present at the Site, and hexavalent chromium was removed from the list of indicator hazardous substances. Total selenium and total chromium remained on the list of indicator hazardous substances.

2.1.4 Additional Interim Actions

During construction of the PRSC between 2005 and 2007, approximately 3,440 tons of lead-impacted soil material were excavated, temporarily stockpiled and treated On-Property, and subsequently disposed of at a permitted facility. The excavated material contained battery casings and metal debris, and was suspected to have originated from the former Tacoma Metals Inc. facility. Once excavated, the soil material was transported to, and placed in, a lined temporary containment unit (TCU) enclosure On Property. The soil material was treated to reduce the lead concentration to levels below the hazardous waste threshold for disposal purposes. The work was performed under an Ecology-approved Work Plan (Kennedy/Jenks 2007d) and the results of the soil treatment, verification sampling, and disposal activities were reported to Ecology following completion of the project work (Kennedy/Jenks 2008a).

In March 2017, investigation-derived waste (including liquid, soils, and drums) was characterized and disposed of as non-hazardous waste at a permitted landfill facility.

2.2 Site Characterization

This section provides additional detail of the remedial investigations, and the resulting Site characterization.

2.2.1 Sampling and Monitoring

Characterization work performed during the initial RI (Kennedy/Jenks, 2001) included sampling and testing of potentially impacted environmental media (soil, groundwater, and surface water). In addition, the groundwater monitoring network was restored and expanded. This section focuses on describing the scope of sampling and monitoring for different phases of the RI. Sampling results are presented in Section 2.3. The conceptual site model, including potential contaminant sources, is discussed in Section 3.

Kennedy/Jenks conducted and/or supervised the work, except for the recent 2016/2017 focused groundwater investigation conducted by Aspect (Aspect, 2017a; Aspect, 2017b). Soil, reconnaissance groundwater, groundwater, and surface water sampling locations are depicted on Figure 4. Locations shown are based on maps previously provided by Kennedy/Jenks or were horizontally surveyed using global positioning system (GPS) methods during the recent focused groundwater investigation.

2.2.1.1 Test Pit Soil Sampling

The initial RI included excavation of 65 test pit trenches (TP-1 through TP-65) to depths of up to 12 feet below ground surface (bgs), and collection and laboratory analysis of soil samples. Test pits included both grid-based locations for general Site-wide assessment, and additional test pits at specific locations based on historical Site uses, previous investigation results, and grid-based test pit findings.

Test pit sampling was performed between September 27, 2000 and November 15, 2000. Test pits were excavated using a rubber-tired backhoe or trackhoe. Soil samples were collected directly from the test pit sidewalls at shallow depths of less than 3 feet bgs, and from the backhoe bucket at greater depths. Most test pits were excavated to approximately 10 feet bgs, with some as deep as 12 feet bgs.

Test pit soil samples were typically collected at depth intervals of 0 to 1 foot, 2 to 3 feet, 4 to 6 feet, and 6 to 10 feet in each test pit. At each test pit location, the vertical soil sequence from 0 to 10 feet bgs (where excavated to that depth) is represented in soil samples. Soil material was collected in 1-foot increments through the entire depth interval as follows:

- Samples designated as 0-1 foot included composites of material collected from 0 to 1-foot bgs
- Samples designated as 2-3 feet included composites of material collected from 1 to 2 and 2 to 3 feet bgs
- Samples designated as 4-6 feet included composites of material collected from 3 to 4, 4 to 5, and 5 to 6 feet bgs
- Samples designated as 6-10 feet included composites of material collected from 6 to 7, 7 to 8, 8 to 9, and 9 to 10 feet bgs

For each sample, soil material from each applicable depth interval was transferred to a stainless-steel bowl. The soil material was thoroughly mixed using a stainless-steel spoon before being transferred to appropriate laboratory-supplied sample containers. The spoon and mixing bowl were decontaminated prior to each use.

Soil encountered in the test pits was logged in approximate accordance with the Unified Soil Classification System (USCS) by a Kennedy/Jenks geologist. In addition, soil was subjected to field screening tests (i.e., visual inspection, hydrocarbon sheen tests, and headspace screening) to assess the potential for chemical impact. During test pit sampling, information regarding the occurrence and estimated depth of visible chemical impact, if encountered, was recorded on the field log along with the field screening results.

Soil samples collected for chemical analysis were placed in glass sampling jars and submitted to Analytical Resources, Inc. (ARI) of Seattle, Washington under standard chain-of-custody procedures. Soil samples were submitted for a variety of chemical analyses in accordance with the Ecology-approved Work Plan (Kennedy/Jenks, 2006). Specific chemical analyses were dependent upon field observations, field screening results, and the sampling plan described in the Work Plan. Test pit soil analyses typically included:

- TPHs as diesel- and oil- range organics by Ecology Method NWTPH-Dx
- Extractable Petroleum Hydrocarbons (EPHs) by Ecology's TPH Interim Policy methods
- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Resource Conservation and Recovery Act (RCRA) eight total metals plus copper by EPA Methods 6010/7000 series
- PCBs by EPA Method 8082
- PAHs by EPA Method 8270B using gas chromatograph/mass spectrometer with select ion monitoring (GC-MS/SIM)
- Trinitrotoluene/dinitrotoluene (TNT/DNT) by EPA Method 8330

Test pit soil sample analysis was performed using an iterative process. Initially, the uppermost sample (0-1-foot interval) from each test pit was submitted for laboratory analysis. Additionally, specific samples that displayed positive field screening test results (visible staining, chemical odor, high vapor head-space readings) were submitted for laboratory analysis. These samples were analyzed for metals, petroleum hydrocarbons, and/or VOCs. Samples were submitted for PCB analysis from every other test pit location. Deeper samples were analyzed as needed to determine the depth of impacts.

Select soil samples were also analyzed for extractable metals and PAHs using TCLP and Synthetic Precipitation Leaching Procedure (SPLP) methods for use in the chemical fate and transport evaluation, cleanup standard development, and disposal cost estimation for the FS. Analytical results for test pit soil samples are discussed in Section 2.3.

2.2.1.2 Reconnaissance Groundwater Sampling

Reconnaissance groundwater samples were collected from 18 sampling locations (RGW-1 through RGW-18) on May 25 and 26, 2000 (Kennedy/Jenks, 2001). Reconnaissance groundwater samples were collected by installing a sampling line (equipped with a stainless-steel screen sampling tip) to the base of the drilling rods and pushing the drill rods to the approximate depth of shallow groundwater. A sample was collected by pumping groundwater to the surface using a peristaltic pump through dedicated polyethylene tubing.

The groundwater samples were placed in appropriate sample containers (containing preservative as appropriate) provided by the analytical laboratory. Reconnaissance groundwater samples were submitted to CCI Analytical Laboratories, Inc. (CCI) of Everett, Washington under standard chain-of-custody procedures for the following analyses:

- TPHs as gasoline-, diesel-, and oil- range organics by Ecology Methods NWTPH-G and NWTPH-Dx
- VOCs by EPA Method 8260
- RCRA eight dissolved metals by EPA Methods 6010/7000 series
- PCBs by EPA Method 8082
- PAHs by EPA Method 8270B GS-MS/SIM

Reconnaissance groundwater analytical results were used as screening tools to evaluate the need for permanent groundwater monitoring wells. The analyte concentrations in reconnaissance samples were potentially biased high due to the suspended soil particles and may not have been representative of groundwater.

2.2.1.3 Monitoring Well Installation

Six groundwater monitoring wells were installed during the initial RI, including two replacement wells, MW-8(R) and MW-4(R), at locations of previously existing wells that Site tenants had inadvertently destroyed, and four wells at new locations (MW-9 through MW-12). Three of these wells were installed on May 9, 2000, and three were installed on November 10, 2000. Well MW-3, which was inadvertently destroyed by previous Site tenants, was not replaced.

Soil borings for monitoring well installations were drilled using hollow-stem auger drilling techniques. Soil samples were typically collected at 2.5- to 5-feet intervals using a split-spoon drive sampler for laboratory analysis and lithologic logging purposes. Recovered soil samples were logged using the USCS in general accordance with American Society of Testing and Materials (ASTM) Method D 2488. Selected soil samples were submitted to the laboratory for analysis based on field screening results.

Monitoring wells were constructed using 2-inch- (including MW-4(R), MW-8(R), MW-9, and MW-10) or 4-inch- (including MW-11 and MW-12) diameter Schedule 40 polyvinyl chloride (PVC) pipe. Each well consisted of a section of factory-slotted (0.01-inch or 0.02-inch slot size) screen and a section of blank PVC casing above the screened interval. Monitoring wells were completed above-grade using locking steel standpipe well enclosures (including MW-4(R), MW-8(R), and MW-9) or at grade using flush-mount monuments enclosed in 4-inch-high boxes constructed of concrete (including MW-10, MW-11, and MW-12). Protective bollards were installed around the three new aboveground enclosures and around two of the existing wells (including MW-5 and MW-6).

Following well installation, the wells were developed to remove fine-grained sediment placed in the filter pack during well installation. Well development consisted of surging with a vented surge block and over-pumping with a submersible pump in accordance with procedures identified in the Ecology-approved Work Plan (Kennedy/Jenks, 2006).

2.2.1.4 Groundwater Monitoring and Sampling

Groundwater monitoring included the collection and laboratory analysis of groundwater samples from wells located on the Site. Several groundwater monitoring events were conducted at the Site. Five existing monitoring wells (MW-1, MW-2, MW-5, MW-6, and MW-7) were sampled in March 2000. The two replacement monitoring wells, MW-4(R) and MW-8(R), and one new monitoring well, MW-9, were sampled in May 2000. All 11 monitoring wells were sampled in November 2000 and March 2001. Three of the monitoring wells were resampled in May 2001, including MW-8(R), MW-10, and MW-11. Carcinogenic PAH compounds were detected in unfiltered sampled collected from these three wells during previous monitoring events. Samples collected during the May 2001 monitoring event were field filtered prior to cPAH analysis.

Field procedures followed during the groundwater sampling are summarized in the RI Work Plan. Field parameters including temperature, pH, and specific conductivity were monitored during purging of the wells.

Groundwater samples collected during the March, May, and November 2000 and March 2001 monitoring events were analyzed for the following parameters:

- TPHs as gasoline-, diesel-, and oil-range organics by Ecology Methods NWTPH-G and NWTPH-Dx
- VOCs by EPA Method 8260
- RCRA eight total and dissolved metals plus copper by EPA Methods 6010/7000 series
- PCBs by EPA Method 8082
- PAHs by EPA Method 82708 GC-MS/SIM

Samples collected from wells MW-8(R), MW-10, and MW-11 during the May 2001 monitoring event were analyzed only for PAHs and were field filtered to minimize the inclusion of entrained soil particles in the sample.

Groundwater samples collected from select wells during the November 2000 and March 2001 monitoring events were also analyzed for general water quality parameters including sulfate, total dissolved solids (TDS), hardness, iron, manganese, potassium, sodium, calcium, pH, and conductivity.

Groundwater samples were submitted to ARI or CCI for chemical analysis under standard chain-of-custody procedures. Analytical results for groundwater monitoring are discussed in Section 2.3.4.

2.2.1.5 Aquifer Hydraulic Testing

Rising-head slug tests were performed on monitoring wells MW-1, MW-2, MW-5, MW-7, MW-8(R), and MW-9 to provide an approximate estimate of the hydraulic conductivity of the shallow zone. Slug tests were performed by inducing a head (water level surface) fluctuation in the well and monitoring the rate of water level recovery over time. Head fluctuations were induced by submergence and removal of a 5-foot length of solid PVC pipe (slug). Water level changes were monitored by a pressure transducer suspended below the slug and recorded by a data logger. Five rising head tests (removal of the slug and recovery of the water level) were conducted at each well. The downhole slug test equipment was decontaminated prior to use at each well. Slug test results are discussed in Section 2.2.3.

2.2.1.6 Groundwater Level Monitoring

The top-of-well casing elevation relative to mean sea level (MSL) and horizontal location of each monitoring well were surveyed by EarthTech, Inc. of Federal Way, Washington. This information was used in conjunction with water level depth data to assess the direction and magnitude of the hydraulic gradient at the Site.

Groundwater elevation monitoring of each Site well was performed on 31 January 2001, 13 February 2001, and 28 February 2001. Water levels were measured in all Site wells using electronic water level depth probes and converted to elevations using the surveyed top-of-casing elevations discussed above. If LNAPL was present, attempts were made to measure the approximate thickness of the LNAPL. Groundwater elevation monitoring results are discussed in Section 2.2.3.

Continuous groundwater level monitoring was performed in selected on-Site groundwater monitoring wells MW-1, MW-2, MW-5, MW-7, MW-8(R), and MW-9 on 21 and 22 February 2001 to evaluate the range of tidally induced water level fluctuations from the Puyallup River. Monitoring was performed using pressure transducers equipped with battery-powered data loggers. The results of the continuous water level monitoring are discussed in Section 2.2.3.

2.2.1.7 Surface Water Monitoring and Sampling

Surface water monitoring included observing water drainage pathways during rainfall events at the Site and collecting surface water samples at two locations where surface water discharged from the Site (excluding discharges to Lincoln Avenue, which flow into the City of Tacoma storm sewer). Surface water samples were collected on March 13, 2001, and April 29, 2001, after Tacoma Metals vacated the property and the paved surfaces at the Site had been cleaned as part of the RI.

Surface water samples collected during the RI were analyzed for the following parameters:

- TPHs as diesel-, and oil-range organics by Ecology Method NWTPH-Dx
- RCRA eight total and dissolved metals plus copper by EPA Methods 6010/7000 series
- PCBs by EPA Method 8082
- PAHs by EPA Method 82708 GC-MS/SIM

Surface water samples were submitted to ARI for chemical analysis under standard chain-of-custody procedures. Analytical results for surface water monitoring are discussed in Section 2.3.5.

2.2.1.8 Forensic Evaluation of Hydrocarbons

The Forensic Evaluation of Hydrocarbons study (Kennedy/Jenks 2009) was performed between 2007 and 2009 to demonstrate that the impacts to soil and groundwater associated with the Creosoting Plant Area should be evaluated using cleanup standards based on the components of creosote (PAHs, naphthalene, BTEX) rather than petroleum hydrocarbons.

The initial evaluation included forensic analysis of soil and groundwater samples for PAHs and review of previous Site data by Friedman & Bruya, Inc. (FBI) of Seattle, Washington. FBI concluded that the contaminants were indicative of a pyrogenic origin, such as coal-tar creosote, rather than a petrogenic source, such as petroleum hydrocarbon (Kennedy/Jenks 2007b). In response to this report, Ecology provided a letter indicating it did not agree with the FBI's conclusions, and suggested that a gasoline source may have contributed to the observed impacts to soil and groundwater.

In response to Ecology's comments, Kennedy/Jenks prepared a summary of historical Site uses, field observations, and case studies to supplement FBI's separate response to Ecology's comments, and to demonstrate that no potential gasoline sources existed historically at the Creosoting Plant Area (Kennedy/Jenks 2009). Ecology subsequently agreed that establishing cleanup standards for TPHs as gasoline-range organics was not warranted for this Site (Ecology 2009).

The Final Interim Action Work Plan *In situ* Soil Solidification prepared on behalf of International Paper states:

"Concentrations of cPAHs at depths between 3.5 and 32 feet bgs exceed the soil CULs in the B36 Area at some locations... Although petroleum cleanup levels are not appropriate for the B36 Area because hydrocarbon compounds detected at the B36 Area are from a pyrogenic (formed by heat) source rather than a petrogenic (formed by rock) source, they are indicative of the presence of cPAHs. Therefore, for locations where only TPH data are available, exceedances of the TPH MTCA Method A industrial soil cleanup levels are considered indicative of an exceedance of the cPAH cleanup level…

Concentrations of cPAHs exceed the soil CULs at depths between 4 and 31 feet bgs at some locations in the northwestern portion of the Tacoma Metals on-property parcels and the City of Tacoma right-of-way (see Table 2-2 of 2017 AECOM Work Plan). Although petroleum cleanup levels are not appropriate for the media in Area B and Area D impacted by pyrogenic sources, TPH data can indicate the presence of cPAHs. Therefore, for locations where only TPH data is available, exceedances of the TPH MTCA Method A industrial soil cleanup levels are considered indicative of an exceedance of the cPAH cleanup level" (AECOM, 2017b).

2.2.1.9 PRSC Characterization

Work for the PRSC investigation was performed between October 2010 and February 2011 and included sampling and characterization of potentially impacted soil and groundwater, including groundwater from reconnaissance borings and proposed POC monitoring wells, along the southern margin of the PRSC and northern Site boundary. The PRSC investigation was performed at Ecology's request under an Ecology-approved Work Plan (Kennedy/Jenks 2010b).

Work performed for the PRSC investigation included the following:

- Installed three temporary piezometers adjacent to the PRSC (two sampling events)
- Collected reconnaissance groundwater samples from the three piezometers and laboratory analysis of PAHs and BTEX (two sampling events)

- Collected groundwater samples from six proposed POC monitoring wells (MW-19, MW-20, MW-23, MW-26, MW-29, and MW-35) and submitted samples for laboratory analysis of PAHs and BTEX (two sampling events)

Refer to the letter report for the PRSC investigation (Kennedy/Jenks 2012) for additional information.

2.2.1.10 Creosoting Plant Area

Additional investigation work was performed at the Creosoting Plant area, included sampling and characterization of potentially impacted soil and groundwater beyond the limits of test pit investigations. Work was performed in multiple phases at On-Property and Off-Property locations. Deep soil boring (designated B-*) and monitoring well locations associated are shown on Figure 4.

Each phase of work performed at the Creosoting Plant area was performed under an Ecology-approved Work Plan (Kennedy/Jenks, 2006). Subsequent phases of work were performed at Ecology's request based on the results of the previous phase of work. The specific work for each phase varied, but generally included the following elements:

- Advanced direct-push soil borings and collected soil samples and/or reconnaissance groundwater samples for laboratory analysis;
- Installed, developed, and sampled groundwater monitoring wells. Well locations were typically based on the findings of the direct-push soil borings and the findings of preceding investigations;
- Submitted groundwater samples collected from monitoring wells for laboratory analysis;
- Surveyed elevations of new monitoring wells;
- Monitored water levels in new and existing monitoring wells (including all Site wells both On-Property and Off-Property);
- Monitored light and dense non-aqueous phase liquid (LNAPL and DNAPL) in Creosoting Plant Area wells; and
- Evaluated the depth, lithology, and stratigraphy of a silt/clay layer which appears to be acting as a confining layer.

Analyses typically included one or more of the following:

- TPHs as diesel- and oil-range organics[5] by Ecology Method NWTPH-Dx (all media);
- VOCs by EPA Method 8260 (all media, limited number of samples);
- RCRA eight metals (total and/or dissolved) plus copper by EPA 6010/7000 Series methods (groundwater only, limited number of samples);

[5] Although samples collected in the Creosoting Plant Area were analyzed for total petroleum hydrocarbon as gasoline range organics, gasoline-range organics were removed as a COC (Kennedy/Jenks 2009; Ecology 2009a).

- PCBs by EPA Method 8082 (groundwater only, limited number of samples); and
- PAHs or semi-volatile organic compounds (SVOCs) by EPA Method 8270 (all media).

Soil analytical results for the deep borings advanced in and around the Creosoting Plant Area discussed in Section 2.3.3.

2.2.1.11 Focused Groundwater Investigation

A focused groundwater investigation was conducted at several existing wells for selenium and hexavalent chromium, based on Ecology's comments on the Revised Augmented RI/FS (Ecology, 2016a). During low tide on December 8, 2016, monitoring wells MW-4(R), MW-9, MW-19, and MW-20 were sampled using low-flow sampling techniques (Aspect, 2017a). Other monitoring wells along the fenceline near the USACE Levee could not be located. Samples were collected for analysis of:

- Total and dissolved selenium and chromium by EPA Method 200.8/6020A; and
- Hexavalent chromium by EPA Method 7196/SM 3500 Cr B.

Although hexavalent chromium was not detected, laboratory reporting limits (50 µg/L) were greater than the draft cleanup level (10 µg/L) due to interference. To address this data gap, resampling was conducted at the well with the highest total chromium concentration (MW-20 with 5.5 µg/L total chromium) (Aspect, 2017b). During low tide on June 22, 2017, monitoring well MW-20 was re-sampled for analysis of:

- Hexavalent chromium by EPA Method 218.7.

Results of the focused groundwater investigation presented in Section 2.3.4.

2.2.2 Site Geology

This section presents the findings of hydrogeologic investigations performed at the Site.

2.2.2.1 Regional Geologic Setting

The Site is located in the Tacoma tideflats, which are part of the Puyallup River delta. Typical stratigraphy of the Tacoma tideflats includes up to 10 feet of hydraulic fill (dredge) deposits of gravel, sand, silt, and organic debris underlain by silty and sandy deltaic sediments deposited by the Puyallup River. Glacial deposits underlie the Puyallup River sediments. The following descriptions are based on information provided by Hart Crowser (1975).

The uppermost deltaic deposits in the Tacoma tideflats include an upper silt unit and a middle sand unit. The upper silt is composed of tidal marsh deposits and occurs as a surface layer and as interbedded layers within the underlying middle sand unit. The typical thickness of the silty surface layer is several feet to greater than 20 feet, with the thickest sections located in the central part of the delta. The silt layer is generally composed of sandy silt to clay, with silt and clayey silt being most common.

The upper boundary of the middle sand unit occurs at depths of several feet bgs to approximately 25 feet below MSL. The base of the unit is gradational with an underlying silt unit (lower silt) and is encountered at approximately 70 to 100 feet below MSL. Sand material is typically poorly graded and locally silty. The middle sand unit is locally interbedded with silty material.

2.2.2.2 Local Geology

The discussion presented below is based on interpretations by Kennedy/Jenks Consultants' geologists of observations during the RI (Kennedy/Jenks, 2001; Kennedy/Jenks, 2014). On-Property cross-sections (Kennedy/Jenks, 2001) and Off-Property cross-sections (Kennedy/Jenks, 2014) were adapted for this Report. Figure 5 shows the On-Property cross section layout, and Figure 6 shows the Off-Property cross section layout. Figures 7 and 8 show the On-Property cross sections, while Figures 9 and 10 show the Off-Property cross sections. Original cross sections were modified to show the observed water levels, and the observed depths of creosote-related impacts.

Soil materials encountered during the RI activities included sandy and gravelly fill materials (typically with varying quantities of wood, metal, or other debris, characterized further below as a metal debris fill and mixed fill layer, respectively), woody debris with and without matrix material (typically silt and sand), and native materials including sand, silt, and clay. The materials encountered, and their relative stratigraphic positions, are described in more detail below.

The **metal debris fill** layer is present On-Property in the upper portion of the mixed fill unit and is shown as blue hatched areas on Figures 7 and 8. This metal debris fill layer contains abundant (typically 70 to 90 percent) metal, glass, concrete, brick, rubber, and other miscellaneous debris. Interstitial material is typically sand or gravel. The abundance of debris material distinguishes this layer from other portions of the mixed fill unit where debris material is less common. The metal debris fill layer is encountered in the southeastern portion of the On-Property area in the vicinity of a former railroad track, and in the unpaved portion of the On-Property area. The metal debris layer thins toward Portland Avenue.

The **mixed fill** unit is encountered throughout the Site and is shown as orange hatched areas on Figures 7 and 8. The mixed fill unit is called "Primarily gravely and sandy fill material, some silt" on Figures 9 and 10, and extends Off-Property. The mixed fill unit is exposed at the surface or covered by asphalt and several inches of crushed surface top course gravel material. The mixed fill unit is approximately 3 to 9 feet thick and is underlain by fill material that contains abundant wood debris (wood fill unit). The mixed fill unit primarily includes sand and gravel that is typically well graded, although poorly graded sands are locally present on the western portion of the Site. Metal, glass, wood, and other miscellaneous debris are present in the mixed fill unit throughout the Site, most commonly in the metal debris fill layer On-Property.

The **wood fill unit** is encountered throughout the Site and is located stratigraphically below the mixed fill unit, with the upper surface at depths of 0 to 9 feet bgs. The wood fill unit is shown on Figures 7 and 8 as green hatched area and is called "Primarily woody material" on Figures 9 and 10. The wood fill unit is composed of wood waste from the lumber mill. The wood fill unit contains from 80 to 100 percent wood debris, depending on location, with interstitial silt, clay, and sand material. The size and texture of the wood material are highly variable, typically including wood dust, wood chips, wood scrap material, logs, planks, and large timbers. Wood fragments appear to be randomly oriented, although some of the material encountered appears to be vertically oriented pilings and horizontal planks. Interstitial matrix material is variable, but is most typically fine grained and includes silt, clay, and sand.

The wood fill unit thickness observed in test pit excavations was typically 1 to 8 feet, and test pits excavated in the western portion of the On-Property area commonly were terminated in the wood fill unit at depths of 10 to 11 feet bgs. The unit is thickest in the Off-Property area, and soil boring observations indicate that wood fill may extend to depths of up to 18 feet bgs. Where the base of the wood fill unit was identified, it was underlain by apparently native materials including silt, clay, and sand.

Native material was encountered stratigraphically below the wood fill unit, with the upper surface at depths of 7 to 18 feet bgs. The native material is shown on Figures 7 and 8 as red hatched area and is called “Primarily sand and silty sand material” or “Primarily clay, silt, and fine sand material, typically layered” on Figures 9 and 10. The native material appeared to be deltaic and alluvial deposits of various interbedded sands, silts, and clays, with organic plant material.

2.2.2.3 Geotechnical Soil Properties

Four soil samples were collected from the pilot borings for monitoring wells MW-4(R), MW-8(R), and MW-9 and were submitted for geotechnical testing for parameters including vertical hydraulic conductivity (Kv), porosity, and grain size. The samples, which were collected at depths ranging from 0 to 15 feet bgs, were submitted to Rosa Environmental and Geotechnical Laboratory, L.L.C. (Rosa).

The measured vertical hydraulic conductivity ranged from 8.3×10^{-7} to 2.0×10^{-2} centimeters per second (cm/s). The lowest vertical hydraulic conductivity (8.3×10^{-7} cm/s) was measured in a sample collected from boring MW-8(R) at 6 to 6.5 feet bgs. The soil material was sandy silt with clay and contained abundant wood fragments. A sample collected from boring MW-9 at 10.5 to 11 feet bgs had a vertical hydraulic conductivity of 3.2×10^{-5} cm/s and consisted of fine sand with silt and minor gravel and clay. Samples collected from boring MW-9 at 15 to 16 feet bgs and MW-4(R) at 0.5 to 1-foot bgs consisted primarily of medium to fine sand material and had vertical hydraulic conductivities of 3.8×10^{-3} cm/s and 2.0×10^{-2} cm/s, respectively. The sample collected from boring MW-4(R) contained abundant metal, glass, and other debris.

Measured porosity values for the four samples ranged from 0.39 (39 percent) to 0.552 (55.2 percent). Selected soil samples were also analyzed for total organic carbon (TOC) and cation exchange capacity (CEC). The percent of TOC ranged from 0.47 to 16. Measured CEC ranged from 2.4 to 26 milliequivalants/100 grams (meq/100 g), with an average CEC of 10 meq/100 g.

2.2.3 Site Hydrogeology

The current understanding of the Site hydrogeology is based on observations of soil conditions in test pits and soil borings installed throughout the Site, and water elevation monitoring of Site groundwater monitoring wells performed during multiple phases of investigation.

2.2.3.1 Water Level Monitoring

This section discusses the results of periodic water level monitoring used to construct potentiometric surface contour maps, and the results of continuous water level monitoring performed in selected Site wells.

The two most recent Site-wide water level monitoring events were performed in 2006 and 2008, after construction of the PRSC habitat area (Kennedy/Jenks, 2014). Groundwater is tidally influenced, and the water table varies less than approximately 2 feet. Water levels elevations were calculated from the observed depth to water and the measurement point elevation. The water table was generally encountered at approximately 10 feet below ground surface (bgs) On-Property, but the depth to groundwater varies for the Off-Property areas based on differing surface elevations which are generally higher on the 18th Street right-of-way and Simpson Property and lower on the JJ Port Property.

2.2.3.2 Potentiometric Surface Maps

The potentiometric surface is influenced by tidally induced fluctuations in the level of the Puyallup River. The groundwater level data, and surrounding topography, suggest that net groundwater flow is toward the Puyallup River.

Representative groundwater gradient maps for high and low tidal conditions are provided in Figures 11A, 11B, 11C, and 11D, including maps prepared for the two Site-wide water level monitoring events in 2006 and 2008. In general, the water levels near the Creosoting Plant area were stable, whereas other areas of the Site exhibited greater fluctuation in water levels. The direction of the instantaneous hydraulic gradient varies across the Site and is dependent on the tidal cycle. See Figure 12 for Site topography.

2.2.3.3 Groundwater Seepage Velocity and Hydraulic Testing

Estimated groundwater seepage velocities ranged from 10 to 147 feet/year, with an average seepage velocity for all slug test wells of 82 feet/year. Groundwater seepage velocities were estimated during the initial RI based on slug test results, the calculated horizontal hydraulic conductivity values, an average porosity of approximately 0.49 for soil materials in the upper saturated zone, and an average estimated hydraulic gradient of 0.004, based on groundwater elevation monitoring.

Rising-head slug tests were performed at six monitoring wells (MW-1, MW-2, MW-5, MW-7, MW-8(R) and MW-9) at the Site to estimate the approximate hydraulic conductivity of shallow soils. The Bouwer and Rice (1976) method was used to evaluate the slug test data generated from wells installed at the Site. This method is applicable to unconfined aquifers with completely or partially penetrating wells. In general, slug tests are accurate to within one to two orders of magnitude.

Average horizontal hydraulic conductivity values estimated for wells tested ranged from 1.2 x 10^{-3} cm/s at well MW-5 to 1. 7 x 10^{-2} cm/s at wells MW-1 and MW-2. The mean horizontal hydraulic conductivity value (geometric mean) for all tested wells was 6.8 x 10^{-3} cm/s. These values were consistent with those calculated from short-term pump tests, which ranged from 1.3 x 10^{-3} cm/s to 4.9x10^{-2} cm/s (PGG 1992). The average horizontal hydraulic conductivity values were consistent with published values expected for clean sand and silty sand soil types (Freeze and Cherry 1979).

2.2.3.4 Surface Water Monitoring

Surface water flow pathways at the Site were qualitatively observed during rainfall events during the initial RI. Runoff on the southeastern portion of the On-Property area was generally directed toward existing stormwater catch basins, and runoff on the northwestern portion of the On-Property area generally flows off-Site to the northwest. No catch basins were present on the northwestern portion of the Site. Surface water discharged from the Site at several locations along Portland Avenue, and flowed into the City's storm sewer catch basins located in Portland Avenue. Surface water also discharged from the Site at two locations on the southeastern and northwestern property boundaries (Figure 4). The discharge from the northwestern property boundary (SW-1) flowed west into a wide, shallow depression located on the City of Tacoma right of way. The discharge from the southeastern property boundary (SW-2) flowed through a 6-inch-diameter culvert and discharged into a vegetated area on the adjacent property.

Due to the presence of the USACE Levee, surface water runoff from the Site does not discharge toward, or interact with, the Puyallup River. No seep discharges have been identified along the portion of the PRSC bank areas located north of the Site. Based on this fact, Ecology did not require sediment sampling along the Puyallup River.

2.2.4 Additional Field Observations

The following additional conditions and features were observed during the initial RI (Kennedy/Jenks, 2001) activities:

- LNAPL (up to 2 inches thick) was encountered in two test pits (TP-11 and TP-55) and one monitoring well (MW-12) located west of the "red brick building" associated with the Coke Plant, and in two test pits (TP-2 and TP-49) located in the vicinity of the Creosoting Plant. A sheen or film was present on excavation water in four additional test pits (TP-48, TP-51, TP-52, and TP-53) located around the Creosoting Plant.

- Steel pipes with diameters of 3 to 36 inches were encountered in test pits TP-14, TP-55, TP-63, and TP-65. Based on Kennedy/Jenks observations, soils and liquids with petroleum hydrocarbon odor and/or stains were encountered near or below the pipes in the test pits TP-14, TP-55, TP-63, and TP-65. Creosote conveyance piping between the ASTs, the dipping tanks, and the retort was not illustrated on lumber mill or Creosoting Plant facility maps. Coal gas piping was not illustrated on Coke Plant facility maps. Other underground piping (including for example: water supply, industrial waste water, and sanitary sewer) was not illustrated on facility maps. The origins and ends of the pipes are uncertain.

- Battery casings were present in test pit TP-16, located immediately south of the "red brick building". This was consistent with the reported battery disposal areas identified during previous Site investigations (Morris 1991).

- TP-11 contained LNAPL, and was located near a machine shed that contained a hydraulic shear. Hydraulic oil was reportedly removed from the shear prior to removal.

2.3 Sampling Results

This section summarizes remedial investigation sampling results. For clarity, results are first summarized based on timeframe (during the initial remedial investigation, and during the additional remedial investigations), then results are summarized based on environmental media (soil, groundwater, surface water). Last, sample results are summarized with respect to quality assurance and quality control.

2.3.1 Initial Remedial Investigation Findings

The primary contaminants of concern (COCs) identified during the initial RI included metals, PCBs, total cPAHs, total naphthalenes, and TPHs as diesel- and oil-range organics.

The primary COCs associated with the Creosoting Plant operations and the Coke Plant operations included the following chemical components of creosote: BTEX, total naphthalenes, PAHs, and cPAHs in various proportions. Creosote-impacted soils were observed in mixed fill and wood fill, and predominantly near the water table in and around the Creosoting Plant area and the Coke Plant area.

The identified soil impacts related to metals recycling operations occur primarily in the metal debris layer of the mixed fill unit, typically at depths of less than four feet below ground surface. Surface impacts of PCBs or TPHs as diesel- or oil-range organics may have been due to metals recycling operations.

COCs including cPAHs and metals were detected sporadically in groundwater samples collected from monitoring wells located in the On-Property area.

2.3.2 Augmented RI Findings

Based on Kennedy Jenks' Augmented RI findings, the COCs relevant to the characterization of creosote-impacted soil and groundwater at the Site include naphthalene, cPAHs, and BTEX (Kennedy/Jenks 2014). The extent of creosote-impacts was expanded in both soil and groundwater and was more clearly linked with the Creosoting Plant operations and the Coke Plant operations.

The results of the PRSC investigation indicated that COCs from the Creosoting Plant Area did not migrate to the PRSC habitat area (Kennedy/Jenks 2012).

2.3.3 Soil Analytical Results

Soil analytical results summarized below were based on RI activities conducted from 2001 to 2011. To provide context, the observed range in soil concentrations is followed by the Ecological Indicator soil concentrations for protection of wildlife, and the MTCA Method A soil cleanup levels for industrial properties, if provided.

Soil analytical results are organized in tables based on the applicable cleanup standard as follows:

- Table 1 provides results for soil samples collected On-Property, in unpaved areas at shallow depths (less than 6 feet) where the cleanup standard is based on protection of terrestrial ecological receptors (wildlife) and groundwater cleanup levels.

- Table 2 provides results for soil samples collected On-Property, in unpaved areas at depths of more than 6 feet, where the cleanup standard is based on protection of groundwater cleanup levels.
- Table 3 provides results for soil samples collected On-Property, in paved areas where the cleanup standard is based on remediation levels protective of human health for the excavation worker scenario, and an environmental cap addresses protection of ecological receptors and groundwater cleanup levels.
- Table 4 provides results for soil samples collected Off-Property, in unpaved areas at shallow depths (less than 6 feet) where the cleanup standard is based on protection of terrestrial ecological receptors (wildlife) and groundwater cleanup levels.

Development of the draft cleanup levels for soil is described in Section 4.

2.3.3.1 Metals in Soils

Metals were detected in soil samples from locations across the On-Property area.

Arsenic was detected at concentrations ranging from 5 to 100 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 132 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 20 mg/kg.

Barium was detected at concentrations ranging from 27.2 to 4,190 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 102 mg/kg. The MTCA Method A soil cleanup level for industrial properties is not provided for barium.

Cadmium was detected at concentrations ranging from 0.2 to 130 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 14 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 2 mg/kg.

Chromium was detected at concentrations ranging from 0.9 to 2,520 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 67 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 2,000 mg/kg.

Copper was detected at concentrations ranging from 13 to 20,200 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 67 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 2,000 mg/kg.

Lead was detected at concentrations ranging from 6 to 14,700 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 118 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 1,000 mg/kg.

Mercury was detected at concentrations ranging from 0.04 to 77 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 5.5 mg/kg. The MTCA Method A soil cleanup level for industrial properties is 2 mg/kg.

Selenium was detected at concentrations ranging from 5 to 40 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 0.3 mg/kg. The MTCA Method A soil cleanup level for industrial properties is not provided.

Silver was detected at concentrations ranging from 0.3 to 198 mg/kg. Values for silver are not provided for either the Ecological Indicator soil concentration or the MTCA Method A soil cleanup level for industrial properties.

2.3.3.2 PCBs in Soils

PCBs (Aroclors 1242, 1248, 1254, and 1260) were detected at concentrations ranged from 0.14 to 40.11 mg/kg total PCBs, calculated as the sum of individual congeners.[6] The Ecological Indicator soil concentration for protection of wildlife is 0.65 mg/kg. The MTCA Method A soil cleanup level for unrestricted land use is 1 mg/kg, and for industrial properties is 10 mg/kg.

2.3.3.3 PAHs in Soils

Detected PAH compounds included noncarcinogenic PAHs (11 compounds, including naphthalene) and cPAHs (7 compounds).

Naphthalenes were detected in soil at concentrations ranging from 0.06 to 4,101 mg/kg. No Ecological Indicator soil concentration for protection of wildlife is provided for total naphthalenes. The MTCA Method A soil cleanup level for industrial properties is 5 mg/kg.

Total cPAHs concentrations in soil, calculated using the toxic equivalency factors, ranged from 0.002 to 546 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 12 mg/kg total cPAHs. The MTCA Method A soil cleanup level for industrial properties is 2 mg/kg total cPAHs.

2.3.3.4 TPHs in Soils

TPHs in the diesel- and oil- ranges were detected in soil samples collected at the Site.

Diesel-range organics were detected at concentrations of 6.2 to 23,000 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 6,000 mg/kg diesel-range organics. The MTCA Method A soil cleanup level for industrial properties is 2,000 mg/kg diesel-range organics.

Oil-range organics were detected at concentrations of 15 to 12,000 mg/kg. The Ecological Indicator soil concentration for protection of wildlife is 6,000 mg/kg oil-range organics. The MTCA Method A soil cleanup level for industrial properties is 2,000 mg/kg oil-range organics.

2.3.3.5 VOCs in Soils

Individual VOC analytes were detected in soil samples collected at the Site. Analytes related to creosote include benzene, toluene, ethylbenzene, and xylene isomers (BTEX). No Ecological Indicator soil concentrations were provided for BTEX.

Benzene was detected at concentrations ranging from 0.001 to 0.073 mg/kg. The MTCA Method A soil cleanup levels for industrial properties is 0.03 mg/kg.

Toluene was detected at concentrations ranging from 0.004 to 1.8 mg/kg. The MTCA Method A soil cleanup levels for industrial properties is 7 mg/kg.

[6] Where an Aroclor was not detected, a value of one-half the laboratory reporting limit was used.

Ethylbenzene was detected at concentrations ranging from 0.003 to 0.87 mg/kg. The MTCA Method A soil cleanup levels for industrial properties is 6 mg/kg.

Total xylenes were detected at concentrations ranging from 0.29 to 0.29 mg/kg. The MTCA Method A soil cleanup levels for industrial properties is 9 mg/kg.

2.3.3.6 TNT/DNT in Soils

TNT and DNT analytes were not detected above the laboratory reporting limits in five soil samples collected.

2.3.4 Groundwater Analytical Results

To provide context, the range of groundwater concentrations for each analyte is provided along with the MTCA Method A cleanup level groundwater (if available) and the Site-specific draft cleanup levels for groundwater. Table 5 presents all groundwater analytical results. Development of the draft cleanup levels for groundwater are described in Section 4.

2.3.4.1 TPHs in Groundwater

TPHs as gasoline-, diesel-, and oil-range organics were detected in groundwater samples collected from 9 of the 11 monitoring wells. Some samples were prepared with silica gel cleanup to remove false detections of non-petroleum hydrocarbons. Figure 17 shows the extent of TPHs as diesel-range and oil-range organics (DRO/ORO) in groundwater.

Gasoline-range organics were detected in groundwater at concentrations of up to 41.8 mg/L. The MTCA Method A groundwater cleanup level is 800 µg/L (0.8 mg/L) gasoline range organics measured using method NWTPH-G.

Diesel-range organics were detected in groundwater at concentrations of up to 22.1 mg/L. The MTCA Method A groundwater cleanup level is 500 µg/L (0.5 mg/L) diesel-range organics measured using method NWTPH-Dx.

Oil-range organics were detected in groundwater at a concentration of up to 3.1 mg/L. The MTCA Method A groundwater cleanup level is 500 µg/L (0.5 mg/L) motor oil-range organics measured using method NWTPH-Dx.

In comments on the Revised Augmented RI/FS, Ecology directed that groundwater concentrations of diesel- and motor oil-range organics be summed and compared to a cleanup level of 500 µg/L (Ecology, 2016a).

2.3.4.2 VOCs in Groundwater

Twenty VOCs were detected in monitoring well groundwater samples. BTEX compounds were retained as indicator hazardous substances.

Benzene was detected in groundwater at concentrations ranging from 0.6 to 56 µg/L. The MTCA Method A groundwater cleanup level is 5 µg/L for benzene, and the calculated cleanup level is 0.44 µg/L.

Toluene was detected in groundwater at concentrations ranging from 0.4 to 100 µg/L. The MTCA Method A groundwater cleanup level is 1000 µg/L toluene, and the calculated cleanup level is 57 µg/L.

Ethylbenzene was detected in groundwater at concentrations ranging from 0.6 to 280 µg/L. Method A groundwater cleanup level is 700 µg/L ethylbenzene, and the calculated cleanup level is 29 µg/L.

Total xylenes were detected in groundwater at concentrations ranging from 12.8 to 500 µg/L. Method A groundwater cleanup level is 1000 µg/L, and the calculated cleanup level is 80 µg/L.

2.3.4.3 PAHs in Groundwater

Detected PAH compounds included noncarcinogenic PAHs and cPAHs. Noncarcinogenic PAHs include naphthalenes, which is a Site COC. Figure 17 shows the extent of naphthalene and cPAHs in groundwater.

Naphthalene was detected in the groundwater at concentrations ranging from 0.11 to 28,600 µg/L. The MTCA Method A cleanup level is 160 µg/L for total naphthalenes, and the calculated draft groundwater cleanup level is 152 µg/L naphthalenes.

cPAHs were detected in the groundwater samples, including unfiltered and field filtered samples. The MTCA Method A cleanup level is 0.1 total cPAHs, and the Ecology-directed draft groundwater cleanup level is 0.01 µg/L cPAHs, calculated as the total toxic equivalent concentration, and based on the practical quantitation limit.

2.3.4.4 PCBs in Groundwater

PCB Aroclors were not detected in groundwater at concentrations above the laboratory reporting limits (typically 1.0 µg/L, and as low as 0.1 µg/L). One set of results from MW-8(R) on 11/20/2000 showed qualified detections, but the field duplicate showed no detections, and subsequent sampling at this well on 3/6/2001 showed no detections. Table 5-7 from the initial 2001 RI/FS (Kennedy/Jenks, 2001) provides results for sampling during the initial RI/FS. Table 7E in Appendix D of the 2014 RI/FS (Kennedy/Jenks, 2014) provides results for sampling during the Augmented RI/FS. The MTCA Method A cleanup level is 0.1 µg/L total PCBs, and the Ecology-directed groundwater cleanup level is 0.01 µg/L total PCBs, based on the practical quantitation limit.

It is unclear whether the relatively high laboratory reporting limits for PCBs during the remedial investigation were due to analytical limitations or matrix interference. However, documentation for EPA Method 8082 indicates sulfur can cause interferences for PCBs analysis and can be removed during sample preparation.

2.3.4.5 Metals in Groundwater

Metals were detected in groundwater samples from Site monitoring wells. Both total and dissolved metals were analyzed. For the purpose of the RI/FS, and because groundwater cleanup levels were developed for total metals concentrations, the summary below focuses on total metals results.

Total arsenic was detected in groundwater at concentrations ranging from 0.58 µg/L to 5.5 µg/L. The standard background concentration is 5 µg/L total arsenic.

Total barium was detected in groundwater at concentrations ranging from 9 to 102 µg/L. The calculated groundwater cleanup level is 1,000 µg/L total barium.

Total cadmium was detected in groundwater at a concentration of 3 µg/L. The MTCA Method A cleanup level is 5 µg/L, and the calculated groundwater cleanup level is 1.12 µg/L total cadmium.

Total chromium was detected in groundwater at concentrations ranging from 20 to 190 µg/L. The MTCA Method A cleanup level is 50 µg/L for total chromium, and the calculated groundwater cleanup level is 120 µg/L total chromium.

Total copper was detected in groundwater at concentrations ranging from 3 to 20 µg/L. The calculated groundwater cleanup level is 18.8 µg/L total copper.

Total lead was detected in groundwater at concentrations ranging from 6 to 20 µg/L. The MTCA Method A cleanup level is 15 µg/L, and the calculated groundwater cleanup level is 4.62 µg/L total chromium.

Total mercury was detected in groundwater at concentrations ranging up to 0.451 µg/L. The MTCA Method A cleanup level is 2 µg/L, and the calculated groundwater cleanup level is 0.012 µg/L total mercury.

Total selenium was detected in groundwater at concentrations ranging up to 70 µg/L. The calculated groundwater cleanup level is 5 µg/L total selenium.

Total silver was not detected in groundwater. The calculated groundwater cleanup level is 8.8 µg/L total silver.

2.3.4.6 LNAPL and DNAPL

Site cleanup will address LNAPL and DNAPL observed at the Site. LNAPL and DNAPL were identified in the Creosoting Plant Area. Samples of LNAPL from MW-8(R) and DNAPL from MW-28(R) were evaluated by Friedman & Bruya, Inc. of Seattle, Washington and found to contain only creosote product (Kennedy/Jenks 2007b) of a pyrogenic nature. Cross-sections shown on Figures 7 through 10 show the presence of NAPL near the water table, as well as observed NAPL below the water table in the saturated zone.

2.3.4.7 Groundwater Quality Parameters

Groundwater quality parameters provide valuable information on geochemical conditions that may reflect or influence contaminant transport in groundwater. Selected observed values are provided below and discussed later in the context of the conceptual site model.

Dissolved oxygen concentrations in groundwater ranged from 0.2 to 0.32 mg/L, based on measurements using a calibrated field instrument during a sampling event on December 8, 2016 (Aspect, 2017a). These concentrations reflect anaerobic conditions.

Acidity of groundwater as measured by pH ranged from 5.95 to 7.39, based on measurements using a calibrated field instrument during a sampling event on December 8, 2016 (Aspect, 2017a). The groundwater pH was near neutral to slightly acidic.

Hardness was determined in the laboratory and was 180 mg/L on average. Average hardness was used to calculate water quality standards for freshwater organisms for cadmium, chromium, copper, lead, and silver.

2.3.5 Surface Water Analytical Results

Surface water samples were collected in 2001 as a measure of runoff to the City of Tacoma storm drain system. There was and is no direct pathway for runoff from the Site to a surface water body. Below is a summary of results previously presented (Kennedy/Jenks, 2001; Kennedy/Jenks, 2014). To provide context, the range of surface water concentrations for each analyte is provided along with the MTCA Method A cleanup level groundwater or Site-specific draft cleanup levels for groundwater. Development of the draft cleanup levels for groundwater are described in Section 4.

2.3.5.1 TPHs in Surface Water

TPHs as diesel- and oil- range organics were detected at concentrations above the laboratory reporting limits in surface water samples.

Diesel-range organics were detected in surface water at concentrations ranging from 1.8 to 3.2 mg/L. The MTCA Method A groundwater cleanup level is 500 µg/L (0.5 mg/L) diesel-range organics measured using method NWTPH-Dx.

Oil-range organics were detected in surface water at concentrations ranging from 1.4 to 3.2 mg/L. The MTCA Method A groundwater cleanup level is 500 µg/L (0.5 mg/L) motor oil-range organics measured using method NWTPH-Dx.

2.3.5.2 PAHs in Surface Water

PAH compounds were detected in surface water and included cPAHs and noncarcinogenic PAHs. Noncarcinogenic PAHs include naphthalene, which is a Site COC.

Naphthalene was detected at concentrations ranging up to 0.96 µg/L. The calculated draft groundwater cleanup level is 152 µg/L naphthalenes.

Total cPAHs in surface water ranged up to 1.4 µg/L, as the total toxic equivalent concentration. The Ecology-directed draft groundwater cleanup level is 0.01 µg/L cPAHs, calculated as the total toxic equivalent concentration, and based on the practical quantitation limit.

2.3.5.3 PCBs in Surface Water

The total PCB concentrations in surface water ranged from 4.5 to 7.8 µg/L. The Ecology-directed groundwater cleanup level is 0.01 µg/L total PCBs, based on the practical quantitation limit (Ecology, 2016a).

2.3.5.4 Total Metals in Surface Water

Total metals concentrations are listed below.

Total cadmium was detected in both surface water samples at concentrations ranging from 2 to 8 µg/L. Dissolved cadmium was detected in surface water sample SW-2 at concentrations ranging from 5 and 8 µg/L. The calculated groundwater cleanup level is 1.12 µg/L total cadmium.

Total copper was detected in both surface water samples at concentrations ranging from 231 to 2,070 µg/L. Dissolved copper was detected in both surface water samples at concentrations ranging from 90 to 240 µg/L. The calculated groundwater cleanup level is 18.8 µg/L total copper.

Total lead was detected in both surface water samples at concentrations ranging from 250 to 8,090 µg/L. The calculated groundwater cleanup level is 4.62 µg/L total chromium.

Total mercury was detected in both surface water samples at concentrations ranging from 0.3 to 9.4 µg/L. The calculated groundwater cleanup level is 0.012 µg/L total mercury.

Total silver was detected in surface water sample SW-1 collected during the March 2001 monitoring event at a concentration of 6 µg/L. The calculated groundwater cleanup level is 8.8 µg/L total silver.

2.3.6 Quality Assurance/Quality Control

Each Ecology-approved work plan for each remedial investigation incorporated elements of data quality assurance and quality control. Work plans incorporated details on field and laboratory duplicates, matrix spikes, and laboratory control samples appropriate for the scope of work.

Accredited laboratories were contracted to analyze samples, and included:

- Analytical Resources, Inc. of Seattle, WA;
- Rosa Environmental and Geotechnical Laboratory, LLC of Seattle, WA;
- North Creek Analytical of Bothell, WA;
- Laucks Testing Laboratories, Inc. of Seattle, WA;
- CCI Analytical Laboratories, Inc. of Federal Way, WA;
- Friedman & Bruya of Seattle, WA; and
- BSK Associates of Vancouver, WA.

Data validation was conducted at the time of interim reporting. Samples were received at the laboratory in good condition and within holding times, unless noted and qualified. Reporting limits specified in the work plans were met, unless noted. Laboratory qualifiers, if necessary, were provided in a manner consistent with the method and industry standard. Additional data qualifiers were provided and discussed in interim reports, as appropriate.

An analytical database was developed by Aspect for the purposes of this Report. Data sources included Ecology's EIM database and data tables provided in previous RIFS reports (Kennedy/Jenks, 2001; Kennedy/Jenks, 2014). During database development, every effort was made to include all relevant data to define the nature and extent of contamination at the Site.

3 Conceptual Site Model

The conceptual site model (CSM) for the Site is consistent with the land use history, and the nature and extent of contaminant groups (see Figure 13). This section describes the contaminant release, chemical fate and transport, and potential exposure pathways and receptors within the framework of the conceptual site model.

3.1 Contaminant Release

Creosote Plant operations and Coke Plant operations from the early 1900s through approximately 1943, resulted in releases of contaminants identified as BTEX, naphthalenes, PAHs and cPAHs, and TPHs as diesel- and oil-range organics. In addition, metals may have leached from the coal storage piles. Portions of the creosoting plant and coke plant were demolished prior to 1950 and used as fill (mixed fill unit). During the remedial investigation, creosote-related contaminants were generally observed co-located in the Creosoting Plant area, and soil impacts were identified from approximately 3 feet to 30 feet bgs. Observed groundwater impacts included elevated contaminant concentrations, LNAPL in well MW-8R at the water table approximately 10 feet bgs, and DNAPL in well MW-28(R). However, groundwater impacts were not observed at monitoring points P-1, P-2, or P-3 installed in the bank of the PRSC.

Metals recycling activities, from the 1950s to approximately 1999, resulted in releases of contaminants including metals (such as arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, and silver), PCBs, and TPHs as diesel- and oil-range organics. There have been no new releases associated with metals recycling activities since approximately 1999. These contaminants are generally co-located in the metal debris layer of the mixed fill unit across the On-Property area and are several feet above the high-water table. Deeper soil and groundwater impacts of TPHs as oil-range organics in the vicinity of MW-12 appeared related to a former hydraulic sheer used during metals recycling. Other groundwater impacts have been documented. Grading activities prior to the remedial investigation may have transported contaminated soil to the PSRC, which was later excavated and properly disposed of. Other interim actions included excavation of PCB-impacted soil, and cleanout of vaults and stormwater infrastructure.

Steel pipes observed in test pits were identified as potential former pipelines associated with the lumber mill, the Creosoting Plant, the Coke Plant, or other previous facilities. These pipes may be potential preferential pathways for contaminant transport, if not potential sources of contamination.

3.2 Chemical Fate and Transport

This section discusses chemical fate and transport and provides a summary of previous detailed analysis (Kennedy/Jenks, 2001; Kennedy/Jenks, 2014). Chemical fate refers to a chemical's transformation, inter-media transfer, and ultimate disposition in the environment. Transport mechanisms are defined as the physics and chemistry that result in the movement of a chemical from one location to another within environmental media (e.g., from soil to groundwater).

Because the Site is adjacent to the Puyallup River, the fate of the chemicals identified at the Site and the rate at which they may travel to potential receptors are of concern and are factored into development of cleanup levels considered protective of human health and the environment. Chemical fate and transport is also an important consideration in the evaluation of the effectiveness of remedial alternatives. Temporary exposure risks during cleanup activities will be addressed in work plans for those activities.

3.2.1 Unsaturated Soil to Groundwater

Contaminants in the unsaturated soil could potentially be dissolved (or leached) by precipitation infiltration, allowing downward migration toward groundwater. The presence of acid can accelerate metals migration, and the presence of solvents can accelerate creosote migration. There are a number of transport mechanisms that limit the downward migration including, for example, low solubility of contaminants, precipitation of dissolved metals, and adsorption of organic contaminants onto Site soils with high organic content.

The soil cleanup level analysis included protection of groundwater from potential leaching using SPLP laboratory results. The SPLP method synthesizes acid rain passing through a representative soil sample to determine the dissolved concentration that could potentially be transported to groundwater.

3.2.2 Saturated Soil to Groundwater

Contaminants in the saturated zone will dissolve into groundwater. This transport mechanism is dependent on the solubility of the contaminant in water, as well as other complex geochemical reactions.

3.2.3 Groundwater to Surface Water

Once in groundwater, the contaminants could potentially migrate horizontally toward the Puyallup River. However, tidal fluctuations and reducing conditions in groundwater at the Site—among those limiting transport conditions in soil—decrease the effective transport velocity.

The groundwater cleanup level analysis included surface water criteria based on the flow of groundwater to the Puyallup River, which is a potential drinking water source for the Puyallup Tribe.

3.2.4 Soil to Soil Vapor or Atmosphere

VOCs can evaporate and impact soil vapor, and dust can transport contaminants in the atmosphere. Buildings constructed in areas with residual soil vapor concerns typically include vapor mitigation in the design. Inhalation of contaminated dust is typically controlled by covering residually contaminated soil with clean, imported fill and/or pavement. Vapor intrusion screening levels for groundwater (based on 2015 updates by Ecology and included in the CLARC spreadsheet) were greater than Site draft groundwater cleanup levels. Air cleanup levels were not developed based on all remedial alternatives mitigating these potential exposure pathways.

3.2.5 Soil to Surface Water

Contaminants in soil could potentially be dissolved (or leached) by precipitation, allowing runoff toward surface water. Runoff from the Site does not directly enter surface water. Surface water cleanup levels were not developed based on all remedial alternatives treating runoff prior to entering the City’s stormwater system.

3.2.6 Previous Transport Modeling Findings

Analytical models were previously used to simulate contaminant transport in the soil above groundwater, and in the shallow groundwater system (Kennedy/Jenks, 2001). The model simulating downward transport through the soil column showed concentrations reaching groundwater above draft cleanup levels with precipitation infiltration. The model simulating shallow groundwater transport showed little to no mobility. However, Ecology directed groundwater cleanup level analysis to address the potential for surface water exposure.

3.3 Exposure Pathways and Receptors

Exposure pathways and receptors are classified as two groups based on location: On-Site and Off-Site. Exposure pathways mitigated by proposed remedial alternatives are identified.

On-Site receptors include humans (including industrial workers or trespassers) and wildlife with access to the Site that can be potentially exposed to contaminated soil or surface water. Industrial workers could be exposed during future property development activities.

Potential exposure pathways for an industrial worker or a trespasser on Site include ingestion or dermal absorption of contaminants in soil. These on-Site risks may be mitigated by source removal to remediation levels or cleanup levels.

Ecological receptors could include wildlife, and on-Site exposure can occur through ingestion of contaminated soil or surface water, direct contact, or indirect ingestion through bioconcentration in the food chain. These risks may be mitigated by source removal to cleanup levels protective of wildlife, importing clean fill material, and/or installation of an engineered barrier to limit the biologically active zone.

Without remediation, off-Site receptors could include humans and aquatic organisms. The Puyallup River is designated a Class A water supply. Potential exposure routes for contaminants in groundwater originating from the Site and discharging to the Puyallup River include:

- Humans potentially ingesting or dermally absorbing impacted surface water;
- Aquatic organisms potentially ingesting or dermally absorbing impacted surface water; and/or
- Humans potentially consuming impacted aquatic organisms.

These potential off-Site exposure risks were addressed during development of cleanup standards.

4 Cleanup Requirements

This section proposes groundwater and soil cleanup standards for the Site. Cleanup standards consist of:

1) Cleanup levels defined by regulatory numerical criteria (contaminant concentrations) that are protective of human health and the environment[7]; and

2) The point of compliance at which the cleanup levels must be met.

Cleanup standards are contaminant-specific and media-specific and are only proposed for hazardous substances that were determined to be indicator hazardous substances for the Site. The cleanup standards developed in this section are used as the basis for developing media-specific remedial action objectives (RAOs) for the cleanup action in Section 4.4. Final cleanup standards will be selected by Ecology and presented in the Cleanup Action Plan (CAP).

The cleanup level evaluation in this RI/FS included the following:

- Groundwater cleanup levels based on discharge to the Puyallup River, which is a defined as a Class A water source;
- Soil cleanup levels based on terrestrial exposure for protection of wildlife;
- Soil cleanup levels based on protection of groundwater using empirical SPLP results, when available; and
- Soil remediation levels[8] based on the presence of an environmental cap, and human exposure for protection of an excavation worker.

The methods used to calculate draft cleanup levels were based on Ecology guidance and comments (Ecology, 2016a; Ecology, 2018) on the cleanup level evaluation presented in the 2014 RI/FS (Kennedy/Jenks, 2014). Specifically, Ecology comments included updating and incorporating a cumulative risk assessment, assessing the soil remediation levels for an excavation worker, and assuming the groundwater to surface water pathway is complete.

4.1 Groundwater Cleanup Standards

This section proposes Site cleanup levels for groundwater. Groundwater from the Site is not a current drinking water source and is unlikely to be used as a future source of drinking water (Ecology, 2016a). Groundwater at the Site discharges to the Puyallup River, and Site groundwater cleanup standards were developed using MTCA Method C based on protection of surface water at Ecology's direction.

Applicable or relevant and appropriate regulations (ARARs) were considered during groundwater cleanup analysis, and include the following:

[7] For TPHs as diesel- and oil-range organics, the cleanup level is based on preventing the accumulation of free product on the groundwater (see WAC 173-340-747 (10)).
[8] Remediation levels are defined in WAC 173-360-200, and further explained in WAC 173-340-355. For this Site, remediation levels were developed for the alternatives that include soil containment as an element of the proposed cleanup action. Remediation levels, by definition, exceed cleanup levels. Cleanup levels define the soil concentration requiring some form of remediation (e.g., excavation or containment, and institutional controls) to address potential exposure pathways. At this Site, remediation levels define the soil concentration above which removal is proposed, and below which containment is proposed.

- MTCA Method A (table values) and Method B (calculated values) established by WAC 173-340-704 and -705, respectively;
- Ecology's Surface Water Quality Standards (SWQS) established in WAC 173-201A;
- Recommended water quality criteria under the federal National Toxics Rule (NTR), established in 40 CFR § 131.36, and revised for Washington State in 40 CFR § 131.45;
- Recommended water quality criteria under the federal Clean Water Act (CWA) established in 40 CFR § 304a; and
- The Water Quality Standards for the Puyallup Tribe as promulgated under Section 518 of the CWA. The Puyallup River is considered a Class A water supply by the Puyallup Tribe, and is available for potential human consumption, among other uses.

Draft cleanup standards were adjusted to provide a cumulative cancer risk of $1x10^{-5}$, and a cumulative noncancer organ-specific hazard quotient was limited to 1. Where table values were provided for a cancer risk of $1x10^{-6}$, the table value was multiplied by 10 to adjust the cancer risk to $1x10^{-5}$. For surface water criteria, freshwater aquatic life criteria were evaluated, as well as human health criteria for consumption of water and organisms. Criteria for certain metals are hardness dependent and were calculated using equations provided in WAC 173-201A based on an average groundwater hardness of 180 mg/L measured during the RI.

Criteria values were obtained from Ecology's CLARC spreadsheet (last modified July 2015), updated WAC 173-201-240 criteria (last modified August 2016), and updated federal criteria (modified at various dates).

4.1.1 Draft Cleanup Levels for Groundwater

Draft groundwater cleanup levels are presented in Table 6, and have been rounded to two significant figures. Intermediate results of the MTCA Method B analysis for developing the draft groundwater cleanup levels are provided in Table 7, showing the surface water cleanup standards and cumulative risk assessment. Table 5 lists the observed groundwater concentrations, with bold values identifying detected concentrations, and blue-shaded values showing concentrations exceeding groundwater cleanup levels.

An integral component of the groundwater cleanup level analysis was the assignment of Method A cleanup levels for TPH-D and TPH-O (combined), based on Ecology guidance and the cumulative risk assessment for both groundwater and soils cleanup levels. Draft groundwater cleanup levels are summarized below, identifying the controlling cleanup standard.

- TPHs for diesel- and oil-range organics (summed) have a draft cleanup level of 500 µg/L, based on Method A.
- Benzene and toluene have draft cleanup levels of 0.44 and 57µg/L, respectively, based on SWQS for human health consumption of water and organisms. The benzene value was updated in 2017.

- Ethylbenzene has a draft cleanup level of 29 µg/L, based on NTR 40 CFR § 131.45 for human health consumption of water and organisms.
- Total xylenes have a draft cleanup level of 80 µg/L, based on the MTCA Method A table value, and adjusted from 1,600 µg/L for noncancer risk.
- Naphthalene has a draft cleanup level of 152 µg/L, based on the MTCA Method A table value, and adjusted from 160 µg/L for noncancer risk.
- Total cPAHs and total PCBs have the same draft cleanup level, 0.01 µg/L, based on the Practical Quantitation Limit. Total cPAH concentrations have been and will be calculated using toxicity equivalency factors (TEFs).
- Total arsenic has a draft cleanup level of 5 µg/L, based on the standard background level.
- Barium has a draft cleanup level of 1,000 µg/L, based on CWA for human health, consumption of water and organism.
- Dissolved cadmium and dissolved chromium have cleanup levels of 1.12 and 120 µg/L, respectively, based on CWA for aquatic life, freshwater organisms, chronic exposure. Hexavalent chromium was not detected during the focused groundwater investigation (Aspect, 2017b), and is not anticipated to be present in groundwater at the Site.
- Total copper has a cleanup level of 18.8 µg/L based on SWQS for aquatic life, freshwater organisms, chronic exposure.
- Total lead has a cleanup level of 4.6 µg/L based on WQSPT for aquatic life, freshwater organisms, chronic exposure.
- Total mercury has a cleanup level of 0.012 µg/L based on SWQS for aquatic life, freshwater organisms, chronic exposure.
- Dissolved selenium has a cleanup level of 5 µg/L based on SWQS for aquatic life, freshwater organisms, chronic exposure. This criterion was updated by the EPA in June 2016.
- Total silver has a cleanup level of 8.8 µg/L based on CWA for aquatic life, freshwater organisms, acute exposure.
- “Groundwater CULs for copper, lead, mercury, and silver are expressed as the total fraction to protect aquatic life. Aquatic life criteria should strictly be applied in surface water where aquatic life is potentially exposed to the total fraction. Because of the potential effects of TSS in groundwater samples submitted for analysis, in our opinion, the dissolved fraction in groundwater samples should be compared to CULs to identify groundwater exceedances” (Dalton, 2018)

4.1.2 Groundwater Points of Compliance

MTCA defines the point of compliance for groundwater as being throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site (WAC 173-340- 720(8)).

Site groundwater cleanup levels are based on protection of surface water in the Puyallup River. Because the Levee separates the Site from the Puyallup River, compliance with Site cleanup levels has been assessed at conditional points of compliance located along the northern property boundary, closest to the Puyallup River. During cleanup activities, some or all of the remaining points of compliance, including wells MW-2, MW-4(R), MW-9, MW-19, and MW-29, MW-23, MW-26, MW-29, and MW-35, are anticipated to be decommissioned, and the compliance monitoring network will need to be re-established. For the purposes of this revised draft RI/FS, costs are estimated for well decommissioning, well installation, and 15 years of confirmation monitoring.

4.2 Soil Cleanup Standards

This section proposes site remediation levels and cleanup levels for soils that incorporate several factors influencing soil cleanup standards:

- Soil cleanup will be protective of human health, ecological receptors, and groundwater through removal or engineered controls.
- The City of Tacoma shoreline management program includes a shoreline buffer, restricting development (Tacoma Municipal Code 13.10). Where shoreline management restricts engineering controls, impacted soils will be cleaned up to levels protective of human health, ecological wildlife receptors, and groundwater. The shoreline buffer across the Site is shown on Figure 12.
- Where repairs to paved surfaces are allowed under shoreline management code, impacted soils may be contained using an environmental cap to prevent precipitation infiltration. Soils within the containment area will be cleaned up to cleanup levels or remediation levels.
- Where solidification is allowed, impacted soils may be treated using this technology.
- The City of Tacoma stormwater system includes restrictions on water quality and flows (Tacoma Municipal Code 12.08). Stormwater controls will be incorporated into containment remedies.

Both MTCA cleanup levels and chemical-specific ARARs are based on established equations or empirical studies for protection of human health and/or the environment. Applicable or relevant and appropriate regulations (ARARs) were considered during soil cleanup analysis, and include the following:

- MTCA modified Method C analysis, established by WAC 173-340, including:
    - Modified Method C soil cleanup levels[9] for industrial properties (WAC 173-340-745);

[9] All soils within 15 feet of ground surface with concentrations above cleanup levels will be excavated, contained, or solidified/treated.

- Development of remediation levels[10] for industrial properties (WAC 173-340-355), for protection of an excavation worker scenario (Ecology 2016);
- Method A soil cleanup levels for industrial properties (Table 745-1), where Method C values were not available;
- Protection of ecological wildlife receptors (WAC 173-304-749) within the top 6 feet of soil defined as the biologically active zone; and
- Protection of groundwater based on CLARC[11] values for unsaturated soil (at 13 degrees C, if available, or 25 degrees C), and CLARC values for saturated soil).

- Federal standards for PCB remediation waste under TSCA, established by 40 CFR 761.61.

Consistent with modified Method C, draft cleanup standards were adjusted to provide a cumulative cancer risk of less than or equal to 1×10^{-5}, and a cumulative noncancer organ-specific hazard quotient was limited to 1.

Criteria values were obtained from Ecology's CLARC spreadsheet (last modified July 2015), and updated federal criteria (modified June 2009).

As an added level of risk reduction, draft cleanup levels were adjusted downward to match remediation levels, if necessary (e.g. chromium, copper, and selenium). For silver, draft cleanup levels for unpaved areas (based on SPLP results) were adjusted downward to match cleanup levels for paved areas.

4.2.1 Draft Soil Cleanup Levels and Remediation Levels

Draft soil cleanup levels and remediation levels are summarized in Table 8. Intermediate results of the MTCA Modified Method C analysis are provided in Table 9 for developing the draft soil cleanup levels, and Table 10 for developing the draft remediation levels. Tables 1 through 4 list the observed soil concentrations, with bold values identifying detected concentrations, and blue-shaded values showing concentrations exceeding vadose zone groundwater cleanup levels or remediation levels, and boxed values identifying concentrations exceeding the saturated groundwater cleanup levels.

An integral component of the soil cleanup level analysis was the assignment of Method A cleanup levels for TPH-D and TPH-O (combined), based on Ecology guidance and the cumulative risk assessment for both groundwater and soils cleanup levels.

Draft soil cleanup levels and remediation levels are summarized below, identifying the controlling cleanup standard[12].

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[10] All soils within 15 feet of ground surface with concentrations above remediation levels will be excavated or solidified/treated. Where feasible, soils with concentrations below the remediation levels and above the cleanup levels will be contained.
[11] CLARC values were last updated in 2015. Ecology provided new cleanup levels for cPAHs that have not yet been released to the public.
[12] Saturated soil cleanup standards are listed in Table 8, and further discussed in Section 6.

- TPHs for diesel- and oil-range organics (summed) have a draft cleanup level of 2,000 mg/kg throughout the Site, except where cPAH data indicate TPHs may be of a pyrogenic origin[13]. The cleanup level is based on the MTCA Method A cleanup level for industrial properties. The 6,000 mg/kg criterion for protection of wildlife is above the residual saturation value of 2,000 mg/kg.
- Benzene has draft cleanup levels of 0.03 mg/kg in unpaved areas for protection of groundwater, and 6.78 mg/L in paved areas for protection of human health (modified Method C, adjusted for cancer risk). Benzene has a draft remediation level of 6,869 mg/kg, adjusted for cancer risk.
- Toluene has draft cleanup levels of 4.5 mg/kg in unpaved areas for protection of groundwater, and 23,273 mg/kg in paved areas for protection of human health (modified Method C, adjusted for noncancer hazard). Toluene has a remediation level of 185,586 mg/kg, adjusted for noncancer hazard.
- Ethylbenzene has draft cleanup levels of 6 mg/kg in unpaved areas for protection of groundwater, and 29,091 mg/kg in paved areas for protection of human health (modified Method C, adjusted for noncancer hazard). Ethylbenzene has a remediation level of 231,983 mg/kg, adjusted for noncancer hazard.
- Total xylenes have draft cleanup levels of 14.6 mg/kg in unpaved areas for protection of groundwater, and 145,455 mg/kg in paved areas for protection of human health (modified Method C, adjusted for noncancer hazard). Total xylenes have a remediation level of 773,276 mg/kg, adjusted for noncancer hazard.
- Naphthalene has draft cleanup levels of 4.5 mg/kg in unpaved areas for protection of groundwater, and 6,667 mg/kg in paved areas for protection of human health (modified Method C, adjusted for noncancer hazard). Naphthalene has a remediation level of 53,767 mg/kg, adjusted for noncancer hazard.
- Total cPAHs have draft cleanup levels of 3.9 mg/kg in unpaved areas for protection of groundwater, and 18 mg/kg in paved areas for protection of human health (modified Method C, adjusted for cancer risk). Total cPAHs have a remediation level of 18 mg/kg, adjusted for cancer risk and as directed by Ecology.
- In unpaved areas, total PCBs have draft cleanup levels of 0.65 mg/kg in shallow soils for protection of wildlife, and 1 mg/kg in deep soils following the MTCA Method A cleanup level for unrestricted land use (i.e., no cap required). In paved areas, total PCBs have a draft cleanup level of 5 mg/kg, adjusted for cumulative cancer risk, and a draft remediation level of 10 mg/kg, based on the MTCA Method A cleanup level for industrial land use with a cap (which itself is based on TSCA remediation standards (40 CFR 761.61) for high occupancy land use).
- Total arsenic has a draft cleanup level of 10 mg/kg for unpaved areas for protection of groundwater, based on SPLP results. This is less than the 132 mg/kg arsenic standard for protection of wildlife. In paved areas, arsenic has a draft cleanup level of

[13] A forensic analysis of soil and groundwater samples was conducted by Friedman & Bruya, Inc., and they concluded that the contaminants were indicative of a pyrogenic (e.g., coal-tar creosote) origin rather that a petrogenic (e.g., petroleum hydrocarbon) source. See Section 4.1.2 of Appendix C.

13 mg/kg adjusted for cancer risk, and a draft remediation level of 1,100 mg/kg adjusted for cancer risk.

- In unpaved areas, barium has draft cleanup levels of 102 mg/kg in shallow soils for protection of wildlife, and 1,650 mg/kg in deep soils for protection of groundwater. In paved areas, total barium has a draft cleanup level of 1,867 mg/kg, and a draft remediation level of 44,884 mg/kg adjusted for noncancer hazard.
- In unpaved areas, cadmium has draft cleanup levels of 14 mg/kg in shallow soils for protection of wildlife, and 726 mg/kg in deep soils for protection of groundwater based on SPLP results. In paved areas, total cadmium has a draft cleanup level of 773 mg/kg and a draft remediation level of 1,496 mg/kg adjusted for noncancer hazard.
- In unpaved areas, chromium (III) has draft cleanup levels of 67 mg/kg in shallow soils for protection of wildlife, and 25,907 mg/kg in deep soils for protection of groundwater based on SPLP results. In paved areas, chromium (III) has a draft cleanup level and remediation level of 1,000,000 mg/kg adjusted for noncancer hazard.
- In unpaved areas, copper has draft cleanup levels of 217 mg/kg in shallow soils for protection of wildlife, and 53,333 mg/kg in deep soils for protection of human health (modified Method C, adjusted for noncancer hazard). In paved areas, copper has a draft cleanup level of 53,333 mg/kg and a remediation level of 299,224 mg/kg for protection of human health.
- In unpaved areas, lead has a draft cleanup level of 118 mg/kg in shallow soils for protection of wildlife, and 1,601 mg/kg in deep soils for protection of groundwater based on selected SPLP results reflecting the greatest leaching potential. In paved areas, the draft cleanup level is 1,601 mg/kg, and the draft lead remediation level is 2,000 mg/kg, twice the Method A cleanup level of 1,000 mg/kg, as directed by Ecology (Ecology, 2016a).
- In unpaved areas, mercury has draft cleanup levels of 5.5 mg/kg in shallow soils for protection of wildlife, and 13 mg/kg in deep soils for protection of groundwater based on SPLP results. In paved areas, mercury has a draft cleanup level of 13 mg/kg and a draft remediation level of 2,900 mg/kg, based on ODEQ screening levels as directed by Ecology (Ecology, 2016a).
- In unpaved areas, selenium has draft cleanup levels of 0.3 mg/kg in shallow soils for protection of wildlife, and 144 mg/kg in deep soils for protection of groundwater based on SPLP results. In paved areas, total selenium has a draft cleanup level of 5,333 mg/kg adjusted for noncancer hazard, and a remediation level of 11,221 mg/kg adjusted for noncancer hazard.
- In unpaved areas, silver has draft cleanup levels of 1,133 mg/kg for protection of human health (modified Method C, adjusted for noncancer hazard). In paved areas, the draft remediation level for silver is 1,133 mg/kg adjusted for noncancer hazard, and a remediation level of 6,359 mg/kg adjusted for noncancer hazard.

4.2.2 Soil Points of Compliance

The points of compliance for soil cleanup or remediation levels are defined below:

- For protection of wildlife in unpaved areas, soil points of compliance are from ground surface to 6 feet below final grade.
- For protection of human health, direct contact (dermal and ingestion), the soil points of compliance are from ground surface to 15 feet below final grade.
- For protection of groundwater in unpaved areas, vadose zone soil points of compliance are for all soils above the water table.
- For protection of groundwater, saturated zone points of compliance are below the water table.

Soils below the water table are saturated. Mean sea level is 4.45 feet NAVD88 for the tide gage at Tacoma, WA (NOAA Station ID 9446484).

4.2.3 Cleanup Level and Remediation Level Parameters

Cleanup levels were developed following default exposure parameters defined by MTCA modified Method C (WAC 173-340-745 (5)(c)). Remediation levels were determined following Ecology's example for an excavation worker scenario (Ecology, 2016a). Exposure parameters for calculating remediation levels were the same as those used for calculating modified Method C cleanup levels, except for the following:

- Averaging Time, Noncancer:
  - 20 years (modified Method C)
  - 365 days (excavation worker)
- Averaging Time, cancer:
  - 75 years (modified Method C)
  - 70 years (excavation worker)
- Exposure Frequency:
  - 70 percent (modified Method C)
  - 2.5 percent, or 9 days per year (excavation worker)
- Exposure Duration:
  - 20 years (modified Method C)
  - 1 year (excavation worker)
- Soil Ingestion Rate:
  - 50 mg/d (modified Method C)
  - 330 mg/d (excavation worker)

4.3 Areas and Media Requiring Cleanup Evaluation

This section describes the estimated extent of contamination that requires cleanup action evaluation, based on the CSM for the Site discussed in Section 3. For the purposes of this Report, soil concentrations were compared to remediation levels in paved areas, and to cleanup level protective of ecological receptors (wildlife) and groundwater in unpaved areas. Areas of soil and groundwater requiring evaluation are discussed below.

4.3.1 Evaluation for Diesel- and Oil-Range TPHs in Soil

Shallow soils (less than 6 feet deep) with TPH exceedances were observed on the south-eastern portion of the On-Property area and were potentially due to releases during metals recycling operations. Vadose zone soils and saturated soils with TPH exceedances were observed in the Creosoting Plant area and the Coke Plant area. Ecology has determined that TPH cleanup levels are not appropriate for TPH with pyrogenic origins, such as creosote. However, TPH data can indicate the presence of cPAHs in areas of creosote-impacted soils. Therefore, where only TPH data is available in areas to be addressed by Interim Actions, exceedances of the TPH soil cleanup level is considered indicative of an exceedance of the cPAH cleanup level (AECOM, 2017b).

The extent of diesel- and oil-range TPHs exceeding cleanup levels in soil is shown in Figure 14A. Monitoring locations were color-coded based on detections. For each location with an exceedance, labels provide the maximum concentration and corresponding depth range.

The maximum depth of diesel- and oil-range TPHs exceeding cleanup levels in soil is shown on Figure 14B. This figure labels the maximum depth range and concentration. Deeper samples, if collected, were below the draft cleanup level. The extent of TPHs at or below the water table is shown on Figure 14B. For context, the areas of remediation proposed by the International Paper Company are also shown on Figure 14B.

TPHs were observed at or near the water table at TP-10, TP-55, and TP-11, located between the Creosoting Plant and the Coking Plant. Hydrocarbon product was observed inside and below the pipe in TP-55. The potential sources of TPHs to this area include releases during Creosoting Plant operations, Coke Plant operations, and/or metals recycling operations.

Hydrocarbons of a pyrogenic source were observed at or below the water table near the Creosote Plant, and releases during Creosote Plant operations were the likely source of impacts.

The observation of NAPL at MW-8(R) and MW-13 is illustrated on Figure 14B, and this area of impacts appears disconnected from those impacts associated with the Creosoting Plant. However, this area has been identified as requiring remediation for total cPAHs and total naphthalenes.

4.3.2 Evaluation for Total cPAHs and Naphthalene in Soil

One shallow total cPAHs exceedance was observed on the south-eastern portion of the On-Property area. Deep total cPAHs and/or naphthalene exceedances were observed in the Creosoting Plant area.

The extent of total cPAHs and naphthalene exceeding cleanup levels in soil is shown on Figure 15A. Monitoring locations were color-coded based on detections. For each location with one or more exceedances, labels provide the maximum concentration and corresponding depth range by COC.

The depth of total cPAHs and/or naphthalene exceeding cleanup or remediation levels in soil is shown in Figure 15B. This figure labels the maximum depth range and concentration. Draft cleanup levels for total cPAHs and naphthalene depend on location (paved vs. unpaved) and depth. Deeper samples, if collected, were below the draft cleanup level. The extent of total cPAHs and/or total naphthalenes at or below the water table is shown on Figure 15B. For context, the areas of remediation proposed by the International Paper Company are also shown on Figure 15B.

Total cPAHs and total naphthalenes were observed directly below the Creosoting Plant retort at concentrations less than the remediation level and greater than the modified Method C cleanup level. As shown in Figure 14B, this area has been identified as requiring remediation for the cleanup of TPHs and is likely associated with Creosote Plant operations or Coke Plant operations.

4.3.3 Evaluation of TPH, Naphthalene and cPAHs in Groundwater

Creosote-impacted groundwater was observed downgradient of the Creosoting Plant area and the Coke Plant area. Exceedances of groundwater cleanup levels were greatest downgradient of NAPL sources.

Based on the maximum observed concentration, the extent of diesel- and oil-range TPHs, naphthalene, and/or cPAHs detected in groundwater above Site cleanup levels is shown on Figure 14. Monitoring locations were color-coded based on detections. For each location with an exceedance, labels provide the maximum concentration observed.

4.3.4 Evaluation of Total PCBs in Soil

Total PCBs in soil exceeded the remediation level or cleanup level in shallow soils On-Property Area. The extent of total PCBs exceeding soil cleanup levels is shown on Figure 16A. Monitoring locations were color-coded based on detections. For each location with an exceedance, labels provide the maximum concentration and corresponding depth range. In addition, Figure 16A shows the extent of cleanup conducted in 1989 (Chempro, 1989). The PCBs were likely released to ground surface during recycling activities.

In all cases, the maximum depth of total PCBs requiring cleanup was less than or equal to the depth of metals requiring cleanup.

4.3.5 Evaluation of Total Metals in Soil

Total metals exceedances were observed across most of the On-Property area. The potential sources of metals in soils included metals recycling operations, coal stock piles for the Coke Plant, demolition waste from the Creosoting Plant.

The extent of total metals exceeding cleanup levels in soil is shown in Figure 18A. For each location with one or more exceedance, labels provide the maximum concentration and corresponding depth range by metal. At most sampling locations in the unpaved area, several metals were observed at concentrations exceeding the cleanup levels for protection of ecological receptors (wildlife) and groundwater.

Figure 18B shows the maximum depth of metals exceeding cleanup or remediation levels in soil. In all cases, the maximum depth of lead exceedances was equal to or greater than other metals, and Figure 18B labels the maximum depth range and lead concentration. Deeper samples, if collected, were below the draft cleanup levels.

For the purposes of this RI/FS, Figure 18B also shows depth contours for lead exceedances. This information was used to help estimate the volume of lead-impacted soils requiring excavation to meet remediation levels in paved areas, and cleanup levels for protection of ecological receptors (wildlife) and groundwater in unpaved areas.

4.3.6 Evaluation of Total and Dissolved Metals in Groundwater

Metals exceeding draft groundwater cleanup levels were observed in wells located in the On-Property area. Based on the maximum observed concentration, the extent of metals exceedances in groundwater is shown on Figure 19.

Mercury was observed at concentrations that exceeded the groundwater cleanup level, which itself was based on the SWQS for aquatic life, freshwater organisms, chronic exposure. Mercury was observed in groundwater samples from monitoring wells across the On-Property area, indicating there may be a background concentration locally.

4.4 Remedial Action Objectives

RAOs are specific goals to be achieved by remedial alternatives that meet cleanup standards and provide protection of human health and the environment under a specified land use. The RAOs for soil and groundwater consider the applicable exposure pathways for those media (Section 3.3) and provide acceptable concentrations for COCs that are protective of receptors via the potential exposure pathways.

Based on the CSM for the Site (Section 3), RAOs to be addressed in this FS under the industrial land use are as follows:

- **RAO 1**: Prevent potential ingestion/direct contact by human and terrestrial ecological receptors to COCs in soil above proposed soil cleanup levels and remediation levels by removal, treatment, or containment within five years;
- **RAO 2**: Minimize potential transport of COCs in soil to groundwater by source removal, treatment, or containment within five years; and
- **RAO 3**: Prevent potential exposure by human and aquatic receptors to COCs in surface water by minimizing discharge of COCs in groundwater above proposed groundwater cleanup levels. Confirm that COCs in groundwater will meet groundwater cleanup levels within a reasonable timeframe of 20 years.

4.5 Potentially Applicable State and Federal Laws

As introduced with the cleanup standards discussed in Section 4.1, the cleanup action must comply with applicable state and federal laws (WAC 173-40-710(1)). Requirements from state and federal laws that are determined to be legally applicable or relevant and appropriate are collectively referred to as ARARs. Ecology will be responsible for issuing the final approval for the cleanup action, following consultation with other state and local agencies as appropriate. The potentially applicable state and federal laws are discussed below.

4.5.1 MTCA Requirements

The MTCA statute, Chapter 70.105D Revised Code of Washington (RCW), is the primary law that governs cleanup of contaminated sites in the state of Washington. The MTCA cleanup regulation (Chapter 173-340 WAC) specifies criteria for the evaluation and conduct of a cleanup action. It requires that cleanup actions protect human health and the environment, meet environmental standards in other applicable laws, and provide for monitoring to confirm compliance with cleanup levels.

For cleanup actions involving containment of hazardous substances, MTCA has requirements that must be met for the cleanup action to be considered in compliance with soil cleanup standards. These include implementing a compliance monitoring program that is designed to ensure the long-term integrity of the containment system and applying institutional controls where appropriate to the affected areas (WAC 173-340-440).

An important MTCA decision-making document for cleanup actions is the RI/FS. After approving the RI/FS, and after consideration of public comment, Ecology selects a cleanup action and documents the selection in a CAP. Following public review of the CAP, the cleanup process typically moves forward to design, permitting, construction, and compliance monitoring.

4.5.2 Solid and Hazardous Waste Management

The Washington Dangerous Waste Regulations (Chapter 173-303 WAC) applies if dangerous wastes are generated. The U.S. Department of Transportation (USDOT) and Washington State Department of Transportation (WSDOT) regulations regarding transport of hazardous materials (49 CFR Parts 171-180) would apply if regulated material is transported off-Site as part of the cleanup action. Soil contaminated with metals that exceed toxicity characteristic hazardous waste criteria, and is removed from the Site, will be regulated as dangerous waste.

The Washington Solid Waste Handling Standards (Chapter 173-350 WAC) regulate handling, treatment, or off-Site disposal of nonhazardous solid waste.

4.5.3 State Environmental Policy Act (SEPA)

The State Environmental Policy Act (SEPA) (Chapter 197-11 WAC) and the SEPA procedures (Chapter 173-802 WAC) ensure that state and local government officials consider environmental values when making decisions. The SEPA process begins when an application for a permit is submitted to an agency, or an agency proposes to take action such as implementing a MTCA CAP. Completion of a SEPA checklist would be required prior to initiating remedial construction activities.

4.5.4 Construction Stormwater General Permit

If construction-generated dewatering water or stormwater from the cleanup action is discharged to waters of the State of Washington, such discharge would need to comply with requirements of a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit. Ecology administers the federal NPDES program in Washington State. Operators of regulated construction sites discharging to waters of the state are required to:

- Submit a Notice of Intent (NOI) and obtain coverage under the Construction Stormwater General Permit;
- Develop stormwater pollution prevention plan (SWPPP); and
- Implement sediment, erosion, and pollution prevention control measures, including water quality treatment as needed, to comply with the SWPPP.

The permit also requires that site inspections be conducted by a Certified Erosion and Sediment Control Lead (CESCL).

4.5.5 Shoreline Management

The Shoreline Management Act of 1971 (Chapter 13.10 of City Code) requires construction activities within 200 feet of the shoreline to be performed in accordance with applicable City codes. This ARAR applies to site improvements, such as construction of an environmental cap with stormwater controls.

The Site is located within the S-9 Puyallup River Shoreline District. The intent of the S-9 Puyallup River Shoreline District is to encourage recreational development of the riverfront and ecological restoration activities that restore historic floodplain processes and functions, while allowing industrial development of adjacent upland areas. Permitted industrial uses will develop and operate in a manner that is compatible with shoreline ecological functions.

4.5.6 Other Potentially Applicable Regulatory Requirements

Other regulatory requirements that potentially would apply to the cleanup action include the following:

- **Occupational Safety and Health Administration (OSHA)** and **Washington Industrial Safety and Health Act (WISHA)** regulations (29 CFR 1910.120; Chapter 296-62 WAC) governing worker safety during cleanup action. Compliance would be achieved through preparation and implementation of Site-specific health and safety plan(s) with appropriate controls, worker training and certifications, and occupational monitoring.
- **Washington State Water Well Construction Regulations** (Chapter 173-160 WAC) regulating groundwater well installation and decommissioning as part of the cleanup action.
- **The City of Tacoma (City) Special Approved Discharges** permits authorization to discharge to the City's municipal sanitary sewer system, which would be applicable if discharge of construction water is required for the cleanup action. To allow discharge to the City sanitary sewer during the cleanup action, an Authorization would be applied for, and obtained from, the City; the Discharge Authorization includes criteria for compliance including effluent quality criteria to be met prior to discharge, flow quantity limitations (can vary seasonally), and reporting requirements.
- **The City of Tacoma Grading Permit** applies to excavations exceeding 50 cubic yards (cy) and/or 7,000 square feet (sf), and imposes substantive requirements including temporary sedimentation and erosion controls (Tacoma Municipal Code 2.19.030(B)(4).

- **A Construction Stormwater Pollution Prevention Plan (SWPPP)** is required for all projects proposing to 1. Add or replace 2,000 square feet or more of impervious surface; and/or b. Disturb 7,000 square feet or more of land (Tacoma Municipal Code 2.19.030(H)(2).
- **The Archeological and Historical Preservation Act** (16 USCA 496a-1) would be applicable if any subject materials are discovered during grading and excavation activities.

5 Screening of Remedial Technologies

This section identifies and screens remedial technologies that may be effective cleanup action components in satisfying the RAOs defined in Section 4.4. Technology screening considers technical implementability, the RAOs, applicable state and federal laws described in Section 4.5, and Site-specific conditions. The remedial technologies that are retained as a result of this screening process are then used to assemble remedial alternatives in Section 6.

General Response Actions (GRAs) represent categories of remedial technologies that may involve: elimination or destruction of hazardous substances via engineered or natural physical, biological, or chemical processes; reduction in risk of exposure to hazardous substances via engineering or institutional controls; or some combination. The following GRAs were considered to address contamination at the Site:

- **Institutional Controls.** Institutional controls are administrative or engineering measures undertaken to limit or prohibit activities that may interfere with a cleanup action or result in exposure to hazardous substances.
- **Soil Excavation.** Contaminated soils can be excavated and treated ex situ and/or disposed of at an off-Site, permitted disposal facility. *Ex situ* treatment technologies destroy or immobilize contaminants in excavated soils.
- ***In situ* Containment.** *In situ* containment involves confining contaminants in place through placement of physical barriers or hydraulic controls. Containment technologies can be designed to prevent contact with and/or migration of hazardous substances.
- ***In situ* Treatment.** *In situ* treatment technologies can potentially reduce the concentration, mobility, and/or toxicity of hazardous substances. These technologies may rely on physical, biological, and/or chemical mechanisms to transform or destroy the target contaminants.
- **Monitored Natural Attenuation (MNA).** Natural attenuation is the reduction of contaminant concentrations over time through natural processes such as precipitation, sorption, dispersion, and/or biodegradation. Periodic monitoring is performed to ensure that attenuation is occurring at a satisfactory rate, and that protection of receptors is maintained.
- **Groundwater Extraction and Treatment.** Contaminated groundwater can be extracted (e.g., via extraction wells), treated *ex situ*, and discharged under permit to a public-owned treatment works (POTW), to surface water, or discharged under permit to groundwater.

These GRAs and associated remedial technologies that may be applicable to the Site are discussed in the following sections.

5.1 Institutional Controls

Institutional controls (WAC 173-340-440) are administrative or engineered mechanisms for ensuring the long-term performance of cleanup actions. Institutional controls do not physically alter conditions at a cleanup site and do not, or are not intended to, reduce the mobility, toxicity, or volume of contamination at a site as part of the remedial alternative. While not considered a stand-alone remedial technology, institutional controls would be an integral cleanup action component where contaminants exceeding cleanup levels.

Institutional controls involve administrative/legal tools to:

1) Provide notification regarding the presence of contaminated materials;
2) Regulate the disturbance/management of these materials and the cleanup action components; and
3) Provide for long-term care of cleanup actions including long-term monitoring.

Under MTCA, the legal instruments for applying institutional controls are termed environmental covenants and are equivalent to restrictive covenants for a specific property or portion of a property.

Examples of institutional controls include:

- Fences and warning signage to restrict access to the Site, or to specific areas of the Site;
- Deed restrictions such as restrictions on land use, construction, and soil excavation without Ecology approval; and
- Use restrictions and monitoring requirements to prevent disturbance of caps or other engineered controls.

Institutional controls would include periodic reviews by Ecology in accordance with WAC 173-340-420 if soil with COCs above cleanup levels remains on-Site or if conditional points of compliance have been established. In addition, long-term monitoring would be required under WAC 173-340- 360(8) and WAC 173-340-410(c). As an example, annual inspections and repairs (as needed) of any environmental cap would be needed to maintain the integrity of the cap. Institutional controls can be effective and implementable under a wide range of conditions, for all contaminants and media, and generally would apply to the entire Site. Institutional controls are retained as a component for development of remedial alternatives.

5.2 Soil Excavation

Soil excavation involves the physical removal of soils, typically through the use of standard excavation practices and technology. Excavation of contaminated soils combined with treatment and/or off-Site disposal can eliminate the risk of direct contact with contaminated soils and/or prevent contaminant leaching to groundwater.

Soil excavation is retained as a component for development of remedial alternatives. The following technologies were evaluated for treatment and/or disposal of excavated source soils:

- Off-Site soil treatment and disposal;
- On-Site Reuse;

- On-Site Chemical Stabilization; and
- On-Site (*ex situ*) thermal desorption.

5.2.1 Off-Site Treatment/Disposal of Soils

Excavated contaminated soils may be transported to an off-Site, permitted disposal facility. Excavation and off-Site disposal of contaminated soils would address all exposure pathways for all contaminants by permanently removing contaminant sources from the Site. Disposal facilities can accept soil impacted with COCs identified at the Site; however, the type of chemical and its concentration will determine actual offsite disposal requirements and location.

Excavated soils that are contaminated with organic COCs (TPH and PAHs) can potentially be transported to the CADMAN facility (formerly CEMEX) in Everett, Washington, or LRI Landfill in Puyallup, Washington, for treatment and disposal. However, soil containing elevated metals concentrations or large amounts of organic matter or debris is not accepted by either facility, so petroleum-contaminated soils containing these other components would therefore require disposal in a landfill.

Excavated soils that are contaminated with metals would be transported to a permitted offsite landfill for disposal. Soil with metals concentrations that exceed toxicity characteristic TCLP limits is a RCRA-listed hazardous waste and would require disposal at Waste Management Arlington Landfill, in Arlington, Oregon. Metals-contaminated soil above cleanup levels but below TCLP limits would be non-hazardous waste and would require disposal at a landfill permitted to accept RCRA non-hazardous waste.

Contaminated soil excavation and off-Site treatment/disposal is a proven remedial technology and is retained for development of remedial alternatives.

5.2.2 On-Site Reuse

On-Site reuse of excavated soil is considered as a construction option to manage soils at concentrations less than cleanup levels. Excavated soils that are above cleanup levels but below remediation levels could be reused and RAOs would be achieved by a reuse scenario such as placing under an environmental cap. On-Site reuse of soil may be applied to backfill excavation areas or to establish Site restoration subgrades during the cleanup action.

The amount of debris in the contaminated soil may significantly affect the geotechnical suitability and limit the reuse. Reuse may require mechanical processing to remove the debris. The segregated debris would require appropriate handling and likely removal off Site.

On-Site reuse of soils generated during the cleanup action was not retained for development of remedial alternatives because of the limited volumes of suitable soil, and the added complexity of mechanical processing and debris handling and disposal.

5.2.3 On-Site (Ex Situ) Chemical Stabilization

The chemical stabilization of contaminated soils can reduce the leachability of metals through chemical transformation to a less soluble or insoluble state but is not expected to reduce the total metals concentration. Therefore, this technology would apply to excavated soils to reduce TCLP concentrations to below toxicity characteristic hazardous waste criteria and allow off-Site transportation and disposal as non-hazardous waste.

A large body of work exists for chemical stabilization of lead in soils using phosphate-based amendments such as synthetic and natural apatites and hydroxyapatites (Raicevic et al, 2005), phosphate rock (Brown et al., 2005), phosphate-based salts (Cao et al., 2003), diammonium phosphate (McGowen et al., 2001), and phosphoric acid (Scheckel et al., 2005). The phosphate amendments added to contaminated soils reduce the lead mobility in ionic exchange and precipitation of pyromorphite-type minerals which have a very low solubility and bioaccessibility (Scheckel and Ryan, 2003).

Chemical stabilization of metals-contaminated soils on-Site may require construction of a temporary containment unit (TCU) for application. Laboratory treatability testing would be necessary to determine the optimum stabilization reagent and dose and demonstrate the effectiveness at reducing metals leachability. Metals-contaminated soils generated during the Side Channel project were effectively treated using chemical stabilization in 2008. The use of a patented product, MAECTITE®, was used at a 2 percent (by mass) application rate to reduce TCLP lead concentrations below toxicity characteristic threshold allowing for disposal as non-hazardous waste (Kennedy/Jenks. 2008b).

This technology is proven effective at the Site and could reduce handling and disposal requirements of metals-contaminated soils for offsite disposal and is therefore retained for development of remedial alternatives.

5.2.4 On-Site (Ex Situ) Thermal Desorption of Soils

Thermal desorption involves heating contaminated soil to volatilize and recover contaminants in vapor phase for subsequent treatment. *Ex situ* thermal desorption requires that the soil be excavated, segregated based on particle/debris size, and batch loaded into a thermal desorber chamber. The chamber is heated to between 600°F to 1,000°F to evaporate organic contaminants. Advantages of *ex situ* treatment generally include shorter treatment times and more certainty about the uniformity of treatment because of the ability to screen, homogenize, and continuously mix the contaminated soil during thermal treatment.

However, on-Site *ex-situ* treatment would require mobilization of specialized treatment equipment. Thermal desorption would only treat the organic COCs. An interim action is planned to solidify soils impacted with TPH and PAHs (AECOM, 2017b).

Since the technology is not appropriate for metals-contaminated soil, *ex situ* thermal desorption is not retained as a technology for development of remedial alternatives.

5.3 *In situ* Containment Technologies

Capping in the form of clean soil cover and/or hard surfaces such as asphalt can be applied as surface barriers to prevent direct contact exposure to, and erosion of, contaminated soil. Capping with impervious materials can be used to restrict infiltration and thus limit contaminant leaching from vadose zone soils to groundwater. Capping could achieve RAOs in portions of the Site by preventing ingestion/direct contact and minimizing transport of COCs in soil to groundwater.

As discussed in Section 1.4, the future use of the Site includes an asphalt parking lot. This parking lot would comprise the environmental cap and consists of 3 inches of appropriate base material (crushed rock), covered with 2 inches of asphalt binder course, and 2 inches of asphalt wearing course. Capping would require the installation of a stormwater collection system (designed to control surface water runoff) and inspections and repairs (as needed) to maintain the integrity of the cap. As discussed in Section 1.4, the stormwater system would likely require on-Site detention so post-capping flows would not exceed flows under current conditions.

Asphalt is currently present over a large portion of the Site; the existing asphalt can either be removed and crushed to be reused as base material for the new asphalt cover or removed from the site and disposed of at an appropriate facility. Alternatively, if the existing asphalt is a suitable subgrade, it can be left in place and the new asphalt cap constructed.

Any capping required by the cleanup action would need to be periodically inspected and maintained appropriately to ensure its long-term integrity. Capping would require institutional controls using environmental covenants that maintain the performance of the cap.

Capping is retained as a technology for development of remedial alternatives.

5.4 *In situ* Treatment Technologies

In situ treatment technologies involve physical, biological, or chemical mechanisms to transform or destroy the target contaminants and are applicable to soil and groundwater. The following *in situ* treatment technologies were evaluated for development of remedial alternatives:

- Air sparging
- Solidification/stabilization
- Thermal desorption
- Enhanced bioremediation

5.4.1 Air Sparging

The air sparging technology is well demonstrated for treatment of volatile organic contaminants in groundwater and is typically applied by injecting air directly into the saturated zone (also known as “sparge points”) screened below the water table. This technology would primarily be effective for TPH COCs in groundwater – limited treatment of PAHs and metal COCs would be expected with air sparging.

Volatilized contaminants are released through the unsaturated zone and thus air sparging is most often applied in connection with soil vapor extraction to collected contaminated vapors. Air sparging is generally more applicable to the lighter-end TPH constituents (e.g., BTEX) that are readily volatile and less applicable to diesel-range organics and PAHs. Addition of oxygen to the saturated zone via air sparging may also serve to increase the amount of available oxygen in the groundwater that can enhance biodegradation of organic contaminants. Air sparging is not applicable if free product is present. Air sparging requires long-term operation of a mechanical system to be effective.

Air-sparging is not retained for development of remedial alternatives.

5.4.2 Solidification/Stabilization

In situ solidification/stabilization (S/S) is a soil remediation technology that involves physically binding or encapsulating contaminants within a stabilized mass (solidification) and/or inducing chemical reactions with a stabilizing agent to reduce contaminant solubility or mobility (stabilization).

For solidification, the soil is mixed with binders such as Portland cement and water to create a consistency that allows mixing, then allowed to cure to create a stabilized monolith. The solidification design is accomplished through laboratory testing to determine optimum amendment rates to achieve design parameters of compressive strength and hydraulic permeability. Solidification does not reduce the contaminant content of the soil, but exposure potential and leachability are reduced by encapsulating the contaminant mass in a solidified monolith.

In situ S/S is implemented with mixing using standard excavation equipment, large diameter augers, or specialized mixing tools. The volume of target soils increases (bulking) during application due to the addition of materials (primarily water) resulting in volume increases (average bulking of 20 percent by volume) depending on the S/S design. Bulking is an important design parameter evaluated at the treatability testing phase.

In situ S/S is most effective for treatment of large, high-concentration soil source zones (including NAPLs) where other technologies may be ineffective due to source strength, or low-permeability soils making the contaminant mass relatively inaccessible.

In situ S/S is an appropriate technology for source soil impacts associated with the Creosoting Plant area and is retained for development of remedial alternatives.

5.4.3 Thermal Desorption

In situ thermal desorption (ISTD) involves the application of energy to the subsurface to heat impacted soils, promoting desorption and volatilization of organic contaminants. Vapor extraction and control measures, including soil vapor extraction wells and a vapor cap at ground surface, can be used to capture contaminant vapors for *ex-situ* treatment. The two most commonly applied ISTD technologies are electrical resistance heating (ERH) and thermal conductive heating (TCH). ERH uses arrays of electrodes installed throughout the contaminated soil area. Electrical current is applied and resistance to current flow in the soil generates maximum temperatures somewhat above 100°C, producing steam and volatilizing contaminants that are removed and treated.

TCH involves transfer of heat to the subsurface via conduction from steel heater wells. Heating elements are installed within the wells and heat is then transferred through the wells to the surrounding soil. Heater wells typically operate at temperatures up to 900°C, so higher soil temperatures can be achieved than with ERH. The potential for heat damage to existing subsurface utilities is an important consideration.

Similar to *in situ* S/S, this technology is typically considered only for treatment of large, contiguous source soil areas. However, ISTD would not be effective for treatment of metals and is therefore not retained as a technology for development of remedial alternatives.

5.4.4 Enhanced Bioremediation

Bioremediation relies on microorganisms, typically those that occur naturally in the subsurface, to biodegrade organic contaminants. It is commonly applied to remediate petroleum hydrocarbon contamination in saturated soil and groundwater. Naphthalene is readily biodegradable under aerobic conditions but can also biodegrade less efficiently under anaerobic conditions. TPHs with higher molecular weight, including cPAHs, may also be amenable to bioremediation, although a much longer treatment period would be required.

Microorganisms catalyze reactions between electron donors and electron acceptors in groundwater. For example, in aerobic biodegradation of TPHs, the hydrocarbons are the electron donors and oxygen is the electron acceptor. Under anaerobic conditions, nitrate, sulfate, iron, or manganese can serve as electron acceptors for biodegradation.

The growth and activity of naturally occurring aerobic microorganisms in the subsurface can be stimulated or enhanced using oxygen-releasing compounds, ambient air, pure oxygen, hydrogen peroxide, or ozone. Oxygen-releasing compounds include formulations of calcium and magnesium peroxide and calcium oxy-hydroxide, which dissolve and release oxygen at a controlled rate over prolonged periods. These compounds can be injected as a slurry solution, placed as a solid into excavations, or placed in wells as a solid in a retrievable sock. Atmospheric air can be injected into groundwater to increase the concentration of dissolved oxygen.

Alternatively, pure oxygen can be injected using passive infusion technologies. High concentrations of dissolved oxygen can also be achieved by injecting ozone, which is typically produced on-Site via an ozone generator.

Bioremediation is not applicable to metals contamination and is not effective for treating soils in the unsaturated zone. In addition, excavation and off-Site disposal is a much quicker remedy, and is often more cost-effective for soil contamination at relatively shallow depths. Based on these considerations, enhanced bioremediation is not retained for development of remedial alternatives.

5.5 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) of groundwater is a technology that relies on natural attenuation processes to achieve RAOs within a reasonable time frame. MNA requires compliance monitoring to ensure that the anticipated COC concentration reductions occur at an acceptable rate, and that protection of human health and the environment is achieved. If compliance monitoring indicates that MNA is not protective, a contingency action must be considered for implementation.

Contaminants can naturally attenuate in groundwater via a combination of numerous mechanisms including dispersion, dilution, precipitation, sorption, volatilization, and biological and chemical degradation. Inorganic contaminants (metals) in groundwater are subject to attenuation mechanisms that do not rely on degradation or destruction of the contaminant, but rather immobilize the contaminant from transport in groundwater.

Groundwater monitoring conducted at the Site demonstrated MNA was occurring at the Site and the technology is retained for development of remedial alternatives.

5.6 Groundwater Extraction and Treatment

Groundwater extraction (e.g., pumping from wells or trenches) can be performed to dewater excavations, for direct removal of dissolved-phase contaminants, and/or to provide hydraulic containment of a groundwater plume. Extracted groundwater would be treated on-Site and could be reinjected on-Site subject to State Waste Discharge permit requirements, discharged to POTW via sanitary sewer under a Discharge Authorization issued by the City, or potentially discharged into the Puyallup River under an NPDES permit. Each of these options may require different on-Site water treatment requirements to meet permit requirements prior to discharge. Contaminated groundwater can be treated *ex situ* by various methods, including air-stripping or activated carbon for organics, neutralization for pH, and reverse osmosis or ion exchange for metals.

Groundwater extraction at the Site would be challenging at the Site due to high total dissolved solids requiring complex and costly treatment, and significant extraction rates. Further, the groundwater concentrations are relatively low relative to cleanup levels and isolated, thus mass removal would be very low. Groundwater extraction and treatment is not retained for development of remedial alternatives.

5.7 Summary of Retained Technologies

The following technologies are retained for development of remedial alternatives:

- Institutional Controls.
- Soil Excavation, and
  - Off-Site Treatment and Disposal of Soils
  - On-Site (*Ex Situ*) Chemical Stabilization of Soils
- *In situ* Containment (environmental capping)
- *In situ* Solidification/Stabilization
- Monitored Natural Attenuation

6 Remedial Alternatives

The retained remedial technologies have been assembled into three remedial alternatives developed to achieve the RAOs for the Site. This section describes the remedy components for each alternative and how the alternatives would be implemented. Each remedial alternative is considered to meet MTCA threshold requirements (WAC 173-340-360(2)(a)), as detailed in Section 7.2.

The combination of technologies comprising the remedial alternatives presented herein has not changed substantially from the 2014 Revised Augmented RI/FS. This 2018 Report is focused on what remedial elements have changed from the 2014 RI/FS and, more importantly, the evaluation of remedial alternatives using the revised Cleanup Standards (Section 4) which address Ecology comments on the 2014 RI/FS (Ecology, 2016a).

Each of the remedial alternatives includes elements that are required to meet MTCA threshold requirements, which are presented in Section 6.1 as Common Elements. The Common Elements also include a planned Interim Action at the Site, which will be implemented independently of the three remedial alternatives described in this section.

6.1 Common Elements

This section describes remedial elements common to all remedial alternatives and which meet MTCA requirements listed in WAC 173-340-360.

6.1.1 Pre-Design Investigation

A pre-design investigation will be conducted prior to final remediation design. This investigation will refine soil quantities for removal and respective waste classifications with a program of test pits and/or soil probes to supplement existing soil analytical data. The pre-design investigation will confirm whether metals-impacted soils do not extend to the Off-Property area, and what—if any—changes have occurred since soil samples were collected during the initial 2001 RI. For cost-estimating purposes, the scope of pre-design was scaled proportional to the amount of soil to be excavated for each remedial alternative.

Laboratory testing will be conducted to inform waste profiling and disposal acceptance, and potentially reduce costs. In addition to COCs characterization using TCLP methods, it was assumed additional laboratory tests will be conducted as pre-design activities, as discussed below:

1. **Acute Fish Toxicity Test** (Ecology Method 80-12) to determine dangerous waste designation per WAC 173-303-110. The toxicity/bioassay laboratory results will supplement TCLP results to allow RCRA non-hazardous waste designation and disposal.

2. **Chemical Stabilization Treatability Test**. The chemical stabilization of soils using phosphate-based amendments is a demonstrated technology for reducing the leachability of metals and has been proven effective for Site soils (Section 5.2.3). Treatability testing would be conducted using Site soil samples from the planned remedial excavation areas to evaluate the performance of different amendments and application rates at reducing leachability (as TCLP) to below RCRA toxicity

characteristic (TCLP) limits and allowing RCRA non-hazardous waste designation and disposal.

If treatability testing determines that chemical stabilization is applicable, an engineering cost analysis would be conducted to determine if, and what quantity of metals impacted soils would be chemically stabilized on-Site. The outcome of treatability testing and the engineering cost analysis would be incorporated into the remedial design for on-Site chemical stabilization.

6.1.2 In situ Solidification/Stabilization Interim Action

International Paper Company submitted an FS Addendum (AECOM, 2015) to evaluate additional cleanup alternatives for the B36 Area parcel. The FS Addendum evaluated three cleanup alternatives:

1) A revised excavation alternative
2) *In situ* solidification alternative
3) A multi-component alternative consisting of shallow soil excavation, fill placement, and paving with low-permeability asphalt.

International Paper Company submitted a Draft Interim Action Work Plan (AECOM, 2017a; AECOM, 2017b) describing implementation of the *in situ* solidification alternative at the B36 area and, at Ecology's request, two additional locations in the On-Property Area. Additionally, based on Ecology's comments on the Draft Interim Action Work Plan (Ecology, 2017) and Ecology's comments on the Revised Draft Remedial Investigation and Feasibility Study (Ecology, 2018), this remedial element is expanded to include PAH exceedances in these off-Property areas outside the footprint of ISS presented in the Draft Interim Action Work Plan. The expanded footprint of ISS and associated assumptions are presented in the Alternative descriptions below (Section 6.2 – 6.4).

The interim action will be implemented after Ecology approval of a final work plan. For the purposes of this Report, costs for the International Paper Company to implement interim actions are based on estimates provided in the Work Plan (AECOM, 2017b). The final cleanup action will take into consideration all of the previous work at the Site, including the proposed interim action.

6.1.3 Unpaved Portion of the On-Property Area

Cleanup of the unpaved portion of the on-Property area will include *in situ* solidification of soils in selected areas, and excavation and off-Site disposal of soils in other areas. Excavation depths will be based on the following soil cleanup standards:

- Protection of human health
- Protection of ecological receptors (to 6 feet deep)
- Protection of groundwater (vadose soil cleanup standards)

Based on the estimated depth of impacts, approximately 5,000 bank cubic yards (BCY), or 7,500 tons, of impacted soil requires excavation (see Figure 18B). For costing purposes, approximately 25 percent of excavated soils (1,875 tons) are assumed to be profiled for disposal as hazardous waste, based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization. The balance of excavated soils (5,625 tons) are assumed to be profiled for disposal as non-hazardous waste. Site restoration will include backfilling to cap subgrade with imported clean soils.

6.1.4 Off-Site Disposal and Excavation Performance Monitoring

For cost-estimating purposes, it is assumed that soils profiled as hazardous waste will be transported by truck and disposed at the Chemical Waste Management hazardous waste facility in Arlington, Oregon. It is assumed that soils profiled as non-hazardous waste will be transported by truck to the Republic rail transfer station in Seattle and disposed at the Republic landfill facility in Roosevelt, Washington.

Performance monitoring will be conducted after excavation, and prior to backfill, to confirm removal of soils above cleanup standards.

6.1.5 Groundwater Monitoring

Groundwater compliance monitoring will be required at this Site given the *in situ* solidification and containment elements included in the remedial alternatives, following WAC 173-340-410. Existing monitoring wells will be decommissioned prior to implementing the cleanup action. For cost-estimating purposes, it is assumed that 20 wells are decommissioned per WAC 173-160. Following remedial construction, a new monitoring well network will be installed for compliance monitoring. For cost-estimating purposes, it is assumed that 10 resource protection wells are installed per WAC 173-160.

Groundwater performance monitoring will be conducted to evaluate progress of natural attenuation after CAP implementation. This first stage of groundwater monitoring is assumed to be conducted quarterly until cleanup levels have been attained, or until Ecology approves transition to confirmation monitoring. For cost-estimating purposes, it is assumed that groundwater performance monitoring will be conducted with analysis of all COCs for 5 years at 10 monitoring wells.

After 5 years, confirmation monitoring will be conducted annually to demonstrate compliance with cleanup levels. For cost-estimating purposes, it is assumed that groundwater confirmation monitoring will be conducted with analysis of all COCs for 10 years at 10 monitoring wells.

6.1.6 Institutional Controls

An environmental covenant would be recorded with Pierce County Register of Deeds that would prohibit Site activities that could interfere with the integrity of remedial actions or compromise protection of human health and the environment. Specific use restrictions and requirements identified in the environmental covenant would likely include the following:

- Restriction of Site use to industrial property uses as defined by MTCA (WAC 173-340) and low-occupancy as defined by TSCA (40 CFR 761);
- Prohibition on use of groundwater for drinking purposes;
- A requirement to maintain any capping technologies implemented as part of the final cleanup action;

- For future redevelopment activities, any future development that may disturb the paved or capped area of the Site will require Ecology written approval prior to development. Ecology shall review the proposed development and make a fact-specific determination whether the proposal is considered to be a substantial change that requires an amendment to the Cleanup Action Plan or if it is a minor change that can just be documented in writing. Also, Ecology shall review and approve any applicable plans that are needed (for example the construction management plan, worker health and safety plan, and the materials management plan). A construction stormwater general NPDES permit would also likely be required.; and
- Evaluation of vapor intrusion potential and construction of vapor controls beneath future buildings, if needed.

Institutional controls would include a (5-year) periodic review by Ecology if soils containing COCs above cleanup levels remain or if conditional points of compliance are used. The periodic review would evaluate the remedial actions for protectiveness of human health and the environment. Specifically, trends in groundwater concentrations will be compared to cleanup levels to assess restoration timeframe and whether additional actions are warranted.

6.2 Alternative 1 Description

Alternative 1 includes *in situ* solidification of soils in selected areas, excavation and off-Site disposal of soils exceeding cleanup levels with containment of residual soils to protect groundwater in historically paved areas, and excavation and off-Site disposal of soils exceeding cleanup levels in historically unpaved areas. The following remedial elements are included in Alternative 1:

- Common elements (Section 6.1)
- In the paved area On-Property:
    - *In situ* solidification or excavation and off-Site disposal of soils to 15 feet deep that exceed **MTCA modified Method C cleanup levels** for industrial land use. Some areas meeting these cleanup levels may not meet the cleanup levels protective of ecological receptors or groundwater, and containment is required.
        - Assumes 11,500 BCY, or 17,250 tons, of impacted soil requires excavation. This estimated volume is based on having to excavate to soil concentrations meeting the lead cleanup level for industrial land use, and the TPH DRO/ORO extent at or below the water table that is deeper than lead exceedances (Figure 14 B).
        - Assumes 40 percent of excavated soils (6,900 tons) profiled for disposal as hazardous waste, based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization. This proportion of soil profiled as hazardous waste is lower than Alternative 2, and greater than Alternative 3.

        - Assumes 60 percent of excavated soils (10,350 tons) profiled for disposal as non-hazardous waste.

    - Backfilling to subgrade with imported clean soils.

    - Containment and stormwater controls:

        - Assumes asphalt environmental cap and stormwater retention design.

        - Assumes annual cap and stormwater system maintenance.

The total estimated cost to implement Alternative 1 is $13.9 million. Table 11 provides detailed estimated costs for the various elements of Alternative 1. Considering the uncertainties at this stage of the MTCA process, the expected range in actual costs for Alternative 1 is between -30 percent and +50 percent of this value, or between $9.7 million and $20.8 million.

6.3 Alternative 2 Description

Alternative 2 includes *in situ* solidification of soils in selected areas, excavation and off-Site disposal of soils exceeding remediation levels with containment of residual soils for protection of groundwater in historically paved areas, and excavation and off-Site disposal of soils exceeding cleanup levels for protection of groundwater in historically unpaved areas. The following remedial elements are included in Alternative 2:

- Common elements (Section 6.1)

- In the paved area On-Property:

    - *In situ* solidification or excavation and off-Site disposal of soils to 15 feet deep that exceed **MTCA modified Method C remediation levels**, based on excavation worker scenario. Containment is required in areas meeting these remediation levels and not meeting the cleanup levels protective of ecological receptors or groundwater (vadose soil cleanup standard).

        - Assumes 5,000 BCY, or 7,500 tons, of impacted soil requires excavation, based on having to remove soils exceeding lead remediation level across the On-Property Area (see Figure 18B), and the TPH DRO/ORO extent at or below the water table that is deeper than lead exceedances (Figure 14 B).

        - Assumes 50 percent of excavated soils (3,750 tons) profiled for disposal as hazardous waste, based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization. This proportion of soil profiled as hazardous waste is greater than Alternatives 1 and 3.

        - Assumes 50 percent of excavated soils (3,750 tons) profiled for disposal as non-hazardous waste.

    - Backfilling to subgrade with imported clean soils.

    - Containment and stormwater controls:

- Assumes asphalt environmental cap and stormwater retention design.
- Assumes annual cap and stormwater system maintenance.

The estimated cost to implement Alternative 2 is $12.2 million. Table 12 provides detailed estimated costs for the various elements of Alternative 2. Considering the uncertainties at this stage of the MTCA process, the expected range in actual costs for Alternative 2 is between -30 percent and +50 percent of this value, or between $8.5 million and $18.3 million.

6.4 Alternative 3 Description

Alternative 3 includes *in situ* solidification of soils in selected areas, and excavation and off-Site disposal of soils for protection of human health, ecological receptors, and groundwater (vadose and saturated soils cleanup standards), and represents the permanent remedy. The following remedial elements are included in Alternative 3:

- Common elements (Section 6.1)
- In the paved area On-Property:
  - *In situ* solidification or excavation and off-Site disposal of vadose and saturated soils that exceed **MTCA cleanup levels protective of human health, ecological receptors, and groundwater**. Containment is not required.
    - Assumes 23,000 BCY, or 34,950 tons, of impacted soil requires excavation. This estimated volume based on having to excavate to soil concentrations protective of groundwater across the On-Property Area.
    - Assumes 25 percent of excavated soils (8,740 tons) profiled for disposal as hazardous waste, based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization. This proportion of soil profiled as hazardous waste is lower than Alternatives 1 and 2.
    - Assumes 75 percent of excavated soils (26,210 tons) profiled for disposal as non-hazardous waste.
  - Backfilling to subgrade with imported clean soils.

The estimated cost to implement Alternative 3 is $22.1 million. Table 13 provides detailed estimated costs for the various elements of Alternative 3. Considering the uncertainties at this stage of the MTCA process, the expected range in actual costs for Alternative 3 is between -30 percent and +50 percent of this value, or between $15.5 million and $33.2 million.

6.5 Excavation and Disposal Comparison

The three remedial alternatives are compared in Table 14 (below) by the estimated tonnage of soils excavated and disposed of as hazardous and non-hazardous waste. Factors influencing these estimated volumes include the relative cleanup standards and the inferred reliability of available soil sampling data.

Table 14. Remedial Alternatives Comparison by Tonnage of Soils Excavated

	Hazardous	Non-Hazardous	Total
Alternative 1	8,800	16,000	24,800
Alternative 2	5,600	9,400	15,000
Alternative 3	10,600	31,800	42,400

Notes: All quantities in units of tons and rounded to the nearest 100.

7 MTCA Evaluation of Remedial Alternatives

The remedial alternatives described in Section 6 meet the MTCA criteria, as described below.

7.1 MTCA Evaluation Criteria

This section reviews the minimum requirements and procedures for selecting cleanup actions under MTCA (WAC 173-340-360).

7.1.1 MTCA Threshold Requirements

Cleanup actions selected under MTCA must meet four “threshold” requirements identified in WAC 173-340-360(2)(a) to be accepted by Ecology. All cleanup actions must:

1. Protect human health and the environment;
2. Comply with cleanup standards;
3. Comply with applicable state and federal laws; and
4. Provide for compliance monitoring.

7.1.2 MTCA Selection Criteria

When selecting from remedial alternatives that meet the threshold requirements, the following three criteria, identified in WAC 173-340-360(2)(b), must be evaluated:

1. **Use permanent solutions to the maximum extent practicable.** Because containment is an element of two remedial alternatives, a disproportionate cost analysis (DCA) is conducted to assess the extent to which the remedial alternatives address this criterion. The general procedure for conducting a DCA is described in Section 7.1.3.
2. **Provide for a reasonable restoration time frame.** WAC 173-340-360(4)(b) provides a list of factors to be considered in evaluating whether an alternative provides for a reasonable restoration time frame.
3. **Consider public concerns.** Consideration of public concerns is an inherent part of the site cleanup process under MTCA. This Revised Draft RI/FS report will be issued for public review and comment, and Ecology will determine whether changes to the report are needed in response to public comments. Public comment will be addressed at that stage but cannot be addressed in this Report.

7.1.3 MTCA Disproportionate Cost Analysis

A DCA is conducted to determine whether a cleanup action uses permanent solutions to the maximum extent practicable. This is done by evaluating the relative benefits and costs of remedial alternatives. Seven criteria are considered in the evaluation as specified in WAC173-340-360(3)(f):

1. **Protectiveness.** Overall protectiveness of human health and the environment, including the degree to which existing site risks are reduced, time required to reduce the risks and attain cleanup standards, on-site and off-site risks during implementation, and improvement in overall environmental quality.

2. **Permanence.** Degree to which the alternative reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of destroying hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of treatment, and the characteristics and quantity of the treatment residuals.
3. **Cost.** Remedy design, construction, and long-term operation and maintenance (O&M) costs to implement the alternative.
4. **Long-term effectiveness.** Degree of certainty that the alternative will successfully and reliably address contamination that exceeds applicable cleanup levels until cleanup levels are attained, the magnitude of the residual risk with the alternative in place, and the effectiveness of controls to manage treatment residue and remaining wastes.
5. **Short-term risk management.** The risks to human health and the environment during construction and implementation of the alternative, and the effectiveness of measures that will be taken to manage such risks.
6. **Implementability.** Includes consideration of whether the alternative is technically possible; the availability of necessary off-site facilities, services, and materials; administrative and regulatory requirements; scheduling, size, and complexity of the alternative; monitoring requirements; access for construction, operations, and monitoring; and integration with existing facility operations and other current or potential remedial actions.
7. **Consideration of public concerns.** Concerns from individuals, community groups, local governments, tribes, federal and state agencies, and other interested organizations will be addressed by Ecology responding to public comments on this Draft RI/FS report and the subsequent Draft CAP.

The DCA is based on a comparative evaluation of an alternative's cost against the other six criteria (environmental benefits). Per WAC 173-340-360(3)(e)(i), cost is disproportionate to benefits if the incremental cost of an alternative over that of a lower-cost alternative exceeds the incremental degree of benefits achieved by the alternative over that of the lower-cost alternative.

7.2 Evaluation with Respect to MTCA Threshold Requirements

The three remedial alternatives are evaluated for compliance with the MTCA threshold criteria in this section.

7.2.1 Protection of Human Health and the Environment

All three alternatives would be protective of human health and the environment. Protection of human health is provided through source removal to soil cleanup levels protective of an excavation worker (at a minimum), installation of barriers to prevent direct contact, and establishing groundwater cleanup levels based on protection of surface water consumption and aquatic life. Protection of the environment is provided through source removal to soil cleanup levels protective of wildlife.

7.2.2 Compliance with Cleanup Standards

Compliance with cleanup standards for continued industrial use would be achieved in all three alternatives through rigorous confirmation soil sampling during construction, and long-term groundwater compliance monitoring after construction.

7.2.3 Compliance with Applicable State and Federal Laws

The remedial alternatives were specifically developed to comply with the MTCA regulation. Potentially applicable state and federal laws were identified and discussed in Section 4.5 and were a basis of cleanup level development and the remedial alternatives. The remedial alternatives are expected to comply with all applicable state and federal laws because the required engineering design and agency-review process would include steps to ensure compliance. The laws may affect implementation, but they do not have a significant effect on whether a remedial alternative is fundamentally viable. The means of compliance would be documented in the remedial design, remedial action work plan components, and other preconstruction documentation to be prepared during design.

7.2.4 Provisions for Compliance Monitoring

All remedial alternatives would provide for compliance monitoring. Health and safety protocols outlined in a Site-specific health and safety plan (required in all alternatives) would provide protection monitoring. Soil removal remedial alternative elements include performance monitoring to guide excavations and confirm that performance objectives associated with the soil removal actions are met. Groundwater sampling and analysis would provide both performance and confirmation monitoring in all alternatives.

7.2.5 Conclusion Regarding Compliance with Threshold Requirements

Based on the above evaluation, all remedial alternatives would comply with the MTCA threshold criteria and, therefore, are carried forward to the next stage of evaluation.

7.3 Disproportionate Cost Analysis

The disproportionate cost analysis was conducted by determining the incremental cost for incremental benefit, consistent with WAC 173-340-360 (3)(e). The estimated total costs for Alternatives 1, 2, and 3 are $13.9 million, $12.2million, and $22.12 million, respectively.

The remedial alternatives were ranked for benefit according to the MTCA criteria (see Table 15).

1. **Protectiveness.** Alternative 3 ranks highest for protectiveness due to achieving soil cleanup levels that are protective of groundwater. Alternative 2 ranks lowest due to achieving remediation levels based on protection of human health for an excavation worker.

2. **Permanence.** Alternative 3 ranks highest for permanence due to the greatest degree of on-Site source control offered. Alternative 2 ranks lowest due to containment of soils with greater impacts than Alternative 1.

3. **Long-term effectiveness.** Alternative 3 ranks highest for long-term effectiveness due to the greatest likelihood of achieving groundwater cleanup levels. Alternative 2 ranks lowest due to the greatest volume of contained material left on Site.

4. **Short-term risk management.** Alternative 2 ranks highest for short-term risk management due to the lowest volume of soil to be handled. Alternative 3 ranks lowest due to the greatest volume of soil to be handled.
5. **Implementability.** All alternatives will have to address excavation of steel pipes and large timbers observed in test pit explorations. Alternative 2 ranks highest for implementability due to the lowest volume of soil to be handled. Alternative 3 ranks lowest for implementability due to the greatest volume of soil to be handled.
6. **Consideration of public concerns.** All alternatives were equally weighted pending results of the public participation process.

The overall benefit scores for the remedial alternatives were:

- 12 for Alternative 1
- 11 for Alternative 2
- 13 for Alternative 3

The incremental benefit for incremental cost was determined by dividing the overall benefit score by the relative cost (in millions of dollars).

- 12/13.9 = 0.86 for Alternative 1
- 11/12.2 = 0.90 for Alternative 2
- 13/22.1 = 0.59 for Alternative 3

Based on the disproportionate cost analysis, Alternative 2 provides the lowest incremental cost for each incremental benefit. Therefore, Alternative 2 remains the preferred alternative, consistent with previous findings (Kennedy/Jenks, 2001; Kennedy/Jenks, 2014).

7.4 Reasonable Restoration Timeframe Estimate

For the purposes of this Report, a 20-year restoration timeframe was estimated, including 5 years to implement source removal/treatment/containment, 5 years of groundwater performance monitoring, and 10 years of groundwater confirmation monitoring. If the cleanup actions are implemented successfully, contaminant source strength to groundwater will be significantly reduced, if not eliminated.

The restoration timeframe will depend on multiple conditions, including: the post-construction “baseline” groundwater quality, the rates of contaminant back-diffusion from soils with high silt content, the rates of contaminant desorption from soils with high organic content, and changes in on-Site infiltration or groundwater flow patterns due to solidification and/or capping.

8 Preferred Remedial Alternative

Alternative 2 is the preferred remedial alternative and includes the following elements.

- **Pre-Design Investigation and Soil Profiling for Disposal**
  - Refine the extent of impacts, and volume of soil requiring treatment, through soil sample collection and laboratory analysis to supplement existing data;
  - Support waste profiling with bioassay testing; and
  - Support determination of soil stabilization On-Site vs. Off-Site for transport and disposal.
- **Decommissioning Existing Monitoring Wells**
- **In the Creosoting Plant area and the Coke Plant area:**
  - For the purposes of this Report, it is understood that International Paper Company will implement interim actions to address saturated soils impacted by releases from the Creosoting Plant operations and/or the Coke Plant operations to Ecology's satisfaction. Based on the Draft Work Plan (AECOM, 2017b), and the cleanup levels for protection of groundwater (vadose soils cleanup standards) identified in this report, the areas identified for, and potentially requiring, *in situ* solidification is shown on Figure 20. As discussed in Section 6.12, Ecology has indicated that an expanded ISS footprint is necessary to address PAH exceedances.
- **In the unpaved portion of the On-Property area:**
  - Excavation and off-Site disposal of soils with concentrations that exceed the following cleanup levels: protection of human health, protection of ecological receptors (to 6 feet deep), or protection of groundwater (vadose soils cleanup standards). The estimated excavation depth is shown on Figure 20.
    - Assumes 5,000 BCY, or 7,500 tons, of impacted soil requires excavation, based on having to remove all of the volume estimated from available data;
    - Assumes 25 percent of excavated soils (1,875 tons) profiled for disposal as hazardous waste, based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization; and
    - Assumes 75 percent of excavated soils (5,625 tons) profiled for disposal as non-hazardous waste.
  - Backfilling to cap subgrade with imported clean soils.
- **In the paved area On-Property:**

    - Excavation, and off-Site disposal of soils to 15 feet deep that exceed **MTCA modified Method C remediation levels**, based on excavation worker scenario. Some areas meeting these remediation levels may not meet the cleanup levels protective of ecological receptors or groundwater, and containment is required. The estimated excavation depth is shown on Figure 20.
        - Assumes 5,000 BCY, or 7,500 tons, of impacted soil requires excavation, based on having to remove soils exceeding lead remediation level across the On-Property Area (see Figure 18B);
        - Assumes 50 percent of excavated soils (3,750 tons) profiled for disposal as hazardous waste based on comparison of the available data and TCLP values and practical limits of on-Site chemical stabilization; and
        - Assumes 50 percent of excavated soils (3,750 tons) profiled for disposal as non-hazardous waste.
    - Backfilling to subgrade with imported clean soils
    - Containment and stormwater controls
        - Assumes asphalt environmental cap and stormwater retention design; and
        - Assumes annual cap and stormwater system maintenance.
- **Groundwater monitoring network re-installed.** Groundwater will be monitored to demonstrate long-term compliance and performance of remediation elements.
- **Institutional controls incorporated** in environmental covenants to protect remediation elements and prevent exposure.

The estimated cost for implementing Alternative 2 is $12.2 million. The expected range in actual costs is between -30 percent and +50 percent of this value, or between $8.5 million and $18.3 million. Actual costs will be affected by subsurface conditions observed during pre-design investigation and excavation, changes in unit costs, and efficiencies. One example of increasing efficiency to minimize costs would be to avoid redundant remediation in areas where *in situ* soil solidification to address creosote-impacted soils overlaps with excavation of metals-impacted soils and off-Site disposal.

9 Conclusions

The nature and extent of the impacts associated with metals recycling activities at the Site are well understood. A range of alternatives were evaluated for feasibility at the Site. Based on MTCA threshold requirements, selection criteria, and evaluation of the Disproportionate Cost Analysis, Alternative 2 is the preferred remedial alternative for the Site. Alternative 2 is protective of human health, wildlife, groundwater, and surface water and proposes to solidify or excavate and dispose impacted soils. It also includes containment and an environmental cap with stormwater controls. The estimated cost for implementing Alternative 2 is $12.2 million. The expected range in actual costs is between -30 percent and +50 percent of this value, or between $8.5 million and $18.3 million. A cost estimate with greater certainty is anticipated to be provided with the Engineering Design Report, following a pre-design investigation.

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Limitations

Work for this project was performed for the Estate of Sophie Sussman (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

TABLES

Table 1 - Analytical Results, Soils, On-Property Area, Unpaved, Shallow

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		**Location**	B-13	B-13	B-14	B-14	B-15	B-16	B-16	TP-4	TP-4	TP-4	TP-6	TP-6
		Depth range	1 - 3 ft	5 - 6 ft	1 - 2 ft	5 - 6 ft	5 - 6 ft	3 - 4 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft
		Sample Date	11/24/2003	11/24/2003	11/24/2003	11/24/2003	11/24/2003	11/24/2003	11/24/2003	09/27/2000	09/27/2000	09/27/2000	10/04/2000	10/04/2000
		Depth to Water	8.5 ft	8.5 ft	8 ft	8 ft	7.5 ft	9 ft	9 ft					
Chemical Name	**Base Method**	**Unpaved, Shallow Soils**												
Total Petroleum Hydrocarbons (TPHs)														
Gasoline Range Organics	NWTPH-GX		< 5 U	< 5 U	< 5 U	< 13.5 U	< 11.5 U	< 5 U	**51.6**					
Diesel Range Organics	NWTPH-DX		**734**	**114**	**374**	**927**	**266**	< 10 U	**457**	**270**			**190**	
Diesel Range Organics	NWTPH-DXSG		**264**	**41.8**	**178**	**279**	**68.7**	< 10 U	**136**					
Motor Oil Range Organics	NWTPH-DX		**1080**	**159**	**1410**	**1590**	**666**	< 25 U	**642**	**530**			**220**	
Motor Oil Range Organics	NWTPH-DXSG		**551**	**47.1**	**705**	**349**	**217**	< 25 U	**59.6**					
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000	**1814**	**273**	**1784**	**2517**	**932**	< 35 U	**1099**	**800**			**410**	
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000	**815**	**88.9**	**883**	**628**	**285.7**	< 35 U	**195.6**					
Naphthalenes														
Naphthalene	SW8270SIM		**1.44**	**0.218**	**0.713**	**1.63**	**0.421**	**0.0725**	**11**					
Total Naphthalenes	CALC	4.5	**1.44**	**0.218**	**0.713**	**1.63**	**0.421**	**0.0725**	**11**					
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)														
Acenaphthene	SW8270SIM		< 0.2 U	**0.0565**	< 0.2 U	**3.84**	< 0.115 U	**0.022**	**4.05**					
Acenaphthylene	SW8270SIM		**3.19**	**0.896**	**1.44**	**6.74**	< 0.115 U	**0.0178**	**0.208**					
Anthracene	SW8270SIM		**1.91**	**1.32**	**0.699**	**23.3**	**0.13**	**0.0185**	**0.806**					
Benzo(g,h,i)perylene	SW8270SIM		**4.77**	**4.33**	**2.24**	**14.5**	**1.06**	**0.0171**	**0.117**					
Fluoranthene	SW8270SIM		**12.5**	**10.4**	**4.61**	**54.7**	**0.352**	**0.0469**	**1.2**					
Fluorene	SW8270SIM		**0.592**	**0.262**	**0.238**	**4.67**	< 0.115 U	**0.0107**	**2.8**					
Phenanthrene	SW8270SIM		**5.36**	**3.94**	**1.46**	**23.7**	**0.176**	**0.0554**	**3.15**					
Pyrene	SW8270SIM		**11.2**	**17.3**	**3.95**	**71.8**	**0.566**	**0.0391**	**1.26**					
Carcinogenic PAHs (cPAHs)														
Benz(a)anthracene	SW8270SIM		**7.32**	**4.65**	**2.5**	**22.2**	**0.474**	**0.0156**	**0.221**					
Benzo(a)pyrene	SW8270SIM		**6.64**	**5.9**	**2.78**	**22.7**	**1.14**	**0.032**	**0.143**					
Benzo(b)fluoranthene	SW8270SIM		**6.44**	**3.53**	**1.99**	**18.9**	**0.788**	**0.032**	**0.13**					
Benzo(k)fluoranthene	SW8270SIM		**7.79**	**3.72**	**3.33**	**13.4**	**0.941**	**0.0156**	**0.494**					
Chrysene	SW8270SIM		**7.21**	**4.7**	**3.11**	**29.6**	**1.12**	**0.0206**	**0.911**					
Dibenzo(a,h)anthracene	SW8270SIM		**2.17**	**1.09**	**0.966**	**5.18**	**0.329**	< 0.01 U	< 0.1 U					
Indeno(1,2,3-cd)pyrene	SW8270SIM		**4.74**	**3.47**	**2.13**	**13**	**0.711**	**0.0327**	**0.104**					
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**9.5581**	**7.593**	**3.9027**	**30.264**	**1.4755**	**0.042296**	**0.25201**					
Polychlorinated Biphenyls (PCBs) as Aroclors														
Aroclor 1016	SW8082									< 0.037 U	< 0.035 U		< 0.036 U	< 0.035 U
Aroclor 1221	SW8082									< 0.073 U	< 0.071 U		< 0.073 U	< 0.069 U
Aroclor 1232	SW8082									< 0.037 U	< 0.035 U		< 0.036 U	< 0.035 U
Aroclor 1242	SW8082									< 0.037 U	< 0.035 U		< 0.036 U	< 0.035 U
Aroclor 1248	SW8082									**1.1**	**0.39**		**0.11**	**0.018**
Aroclor 1254	SW8082									**4.7**	**1.4**		**0.36**	**0.05**
Aroclor 1260	SW8082									**2.4**	**0.97**		**0.3**	**0.028**
Total PCBs (Sum of Aroclors)	CALC	0.65								**8.3**	**2.85**		**0.86**	**0.183**
Metals														
Arsenic	6010/7000	10.0								**30**			**30**	
Barium	6010/7000	102								**609**			**208**	
Cadmium	6010/7000	14.0								**21.6**	**8**		**5.6**	
Chromium	6010/7000	67								**82**			**92**	
Copper	6010/7000	217								**4650**			**711**	
Lead	6010/7000	118								**1760**	**443**	**160**	**1550**	**54**
Mercury	6010/7000	5.5								**0.55**			**0.5**	
Selenium	6010/7000	0.30								< 10 U			**20**	
Silver	6010/7000	1133								**1.2**			**2.1**	

Table 1 - Analytical Results, Soils, On-Property Area, Unpaved, Shallow

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		Location	TP-6	TP-12	TP-12	TP-13	TP-21	TP-21	TP-21	TP-22	TP-22	TP-22	TP-33	TP-33
		Depth range	4 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft
		Sample Date	10/04/2000	10/05/2000	10/05/2000	10/05/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/12/2000	10/12/2000
		Depth to Water												
Chemical Name	**Base Method**	**Unpaved, Shallow Soils**												
Total Petroleum Hydrocarbons (TPHs)														
Gasoline Range Organics	NWTPH-GX													
Diesel Range Organics	NWTPH-DX			**17**		**27**	**200**	**100**		**60**	**48**		**970**	**420**
Diesel Range Organics	NWTPH-DXSG													
Motor Oil Range Organics	NWTPH-DX			**17**		**59**	**660**	**240**		**250**	**170**		**2000**	**1000**
Motor Oil Range Organics	NWTPH-DXSG													
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**34**		**86**	**860**	**340**		**310**	**218**		**2970**	**1420**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000												
Naphthalenes														
Naphthalene	SW8270SIM												**0.31**	
Total Naphthalenes	CALC	4.5											**0.31**	
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)														
Acenaphthene	SW8270SIM												**0.075**	
Acenaphthylene	SW8270SIM												**0.067**	
Anthracene	SW8270SIM												**0.17**	
Benzo(g,h,i)perylene	SW8270SIM												**0.49**	
Fluoranthene	SW8270SIM												**0.6**	
Fluorene	SW8270SIM												**0.097**	
Phenanthrene	SW8270SIM												**0.51**	
Pyrene	SW8270SIM												**0.94**	
Carcinogenic PAHs (cPAHs)														
Benz(a)anthracene	SW8270SIM												**0.36**	
Benzo(a)pyrene	SW8270SIM												**0.49**	
Benzo(b)fluoranthene	SW8270SIM												**0.46**	
Benzo(k)fluoranthene	SW8270SIM												**0.39**	
Chrysene	SW8270SIM												**0.65**	
Dibenzo(a,h)anthracene	SW8270SIM												**0.12**	
Indeno(1,2,3-cd)pyrene	SW8270SIM												**0.34**	
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9											**0.6635**	
Polychlorinated Biphenyls (PCBs) as Aroclors														
Aroclor 1016	SW8082			< 0.035 U	< 0.034 U	< 0.034 U	< 0.041 U	< 0.04 U		< 0.042 U	< 0.041 U		< 0.037 U	
Aroclor 1221	SW8082			< 0.069 U	< 0.068 U	< 0.069 U	< 0.082 U	< 0.08 U		< 0.083 U	< 0.083 U		< 0.075 U	
Aroclor 1232	SW8082			< 0.035 U	< 0.034 U	< 0.034 U	< 0.041 U	< 0.04 U		< 0.042 U	< 0.041 U		< 0.037 U	
Aroclor 1242	SW8082			< 0.035 U	< 0.034 U	< 0.034 U	< 0.041 U	**0.088**		< 0.042 U	< 0.041 U		< 0.037 U	
Aroclor 1248	SW8082			**0.031**	**0.15**	< 0.034 U	**1.4**	< 0.04 U		**0.43**	**0.52**		**0.52**	
Aroclor 1254	SW8082			**0.063**	**0.43**	**1**	**6.9**	**2.3**		**1.4**	**1.3**		**1.7**	
Aroclor 1260	SW8082			**0.03**	**0.17**	**2**	**5.2**	**1.1**		**0.66**	**0.99**		**1.2**	
Total PCBs (Sum of Aroclors)	CALC	0.65		**0.211**	**0.835**	**3.1**	**13.6**	**3.6**		**2.59**	**2.91**		**3.51**	
Metals														
Arsenic	6010/7000	10.0		< 5 U		< 5 U	**70**	< 300 U		**30**	< 60 U		**40**	
Barium	6010/7000	102		**37.5**		**96**	**1580**	**4190**		**372**	**464**		**3070**	
Cadmium	6010/7000	14.0		**3.3**		**3**	**66**	**130**	< 1 U	**51**	**52**		**89**	
Chromium	6010/7000	67		**19.4**		**49.3**	**574**	**1080**	**42**	**2520**	**913**	**47**	**353**	
Copper	6010/7000	217		**21.3**		**266**	**12800**	**13200**		**13000**	**20200**		**2970**	
Lead	6010/7000	118	**40**	**17**		**167**	**6020**	**7570**	**20**	**3180**	**3690**	**360**	**6470**	**4560**
Mercury	6010/7000	5.5		< 0.04 U		**0.71**	**22.4**	**10.2**		**5.3**	**5.1**		**2.91**	**1.69**
Selenium	6010/7000	0.30		< 5 U		< 5 U	< 30 U	< 300 U		< 30 U	< 60 U		< 30 U	
Silver	6010/7000	1133		< 0.3 U		**1**	**31**	**90**		**36**	**198**		**5**	

Table 1 - Analytical Results, Soils, On-Property Area, Unpaved, Shallow

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		Location	TP-33	TP-38	TP-38	TP-38	TP-39	TP-39	TP-44	TP-45	TP-45	TP-45
		Depth range	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft
		Sample Date	10/12/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/16/2000	10/16/2000	10/16/2000
		Depth to Water										
Chemical Name	**Base Method**	**Unpaved, Shallow Soils**										
Total Petroleum Hydrocarbons (TPHs)												
Gasoline Range Organics	NWTPH-GX											
Diesel Range Organics	NWTPH-DX			**1400**	**68**		**83**		**19**	**450**		
Diesel Range Organics	NWTPH-DXSG											
Motor Oil Range Organics	NWTPH-DX			**2700**	**88**		**350**		**28**	**1100**		
Motor Oil Range Organics	NWTPH-DXSG											
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**4100**	**156**		**433**		**47**	**1550**		
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000										
Naphthalenes												
Naphthalene	SW8270SIM			**0.3**								
Total Naphthalenes	CALC	4.5		**0.3**								
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)												
Acenaphthene	SW8270SIM			**0.59**								
Acenaphthylene	SW8270SIM			**0.24**								
Anthracene	SW8270SIM			**1**								
Benzo(g,h,i)perylene	SW8270SIM			**2**								
Fluoranthene	SW8270SIM			**5.1**								
Fluorene	SW8270SIM			**0.51**								
Phenanthrene	SW8270SIM			**4.2**								
Pyrene	SW8270SIM			**4.9**								
Carcinogenic PAHs (cPAHs)												
Benz(a)anthracene	SW8270SIM			**2.5**								
Benzo(a)pyrene	SW8270SIM			**2.4**								
Benzo(b)fluoranthene	SW8270SIM			**2**								
Benzo(k)fluoranthene	SW8270SIM			**2.1**								
Chrysene	SW8270SIM			**3.2**								
Dibenzo(a,h)anthracene	SW8270SIM			**0.59**								
Indeno(1,2,3-cd)pyrene	SW8270SIM			**2**								
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9		**3.351**								
Polychlorinated Biphenyls (PCBs) as Aroclors												
Aroclor 1016	SW8082						< 0.035 U		< 0.035 U	< 0.46 U	< 0.88 U	
Aroclor 1221	SW8082						< 0.069 U		< 0.07 U	< 0.92 U	< 1.8 U	
Aroclor 1232	SW8082						< 0.035 U		< 0.035 U	< 0.46 U	< 0.88 U	
Aroclor 1242	SW8082						< 0.035 U		< 0.035 U	< 0.46 U	< 0.88 U	
Aroclor 1248	SW8082						< 0.035 U		< 0.035 U	**1.9**	< 0.88 U	
Aroclor 1254	SW8082						**2.7**		< 0.035 U	**12**	**7**	
Aroclor 1260	SW8082						< 0.035 U		< 0.035 U	**9.5**	**4.6**	
Total PCBs (Sum of Aroclors)	CALC	0.65					**2.82**		**0.14**	**24.6**	**14.26**	
Metals												
Arsenic	6010/7000	10.0		**60**			**10**		< 10 U	**100**		
Barium	6010/7000	102		**2710**			**134**		**27.2**	**774**		
Cadmium	6010/7000	14.0		**125**			**16.8**	**10.4**	**0.4**	**30**	**15**	
Chromium	6010/7000	67		**263**			**30**		**17.2**	**368**		
Copper	6010/7000	217		**3320**			**1100**		**21.5**	**3560**		
Lead	6010/7000	118	**10**	**9380**	**70**	**50**	**1040**		**13**	**4060**	**950**	**180**
Mercury	6010/7000	5.5		**14.3**	**0.12**		**0.24**		< 0.05 U	**47**	**16**	
Selenium	6010/7000	0.30		**30**			< 10 U		< 10 U	**30**		
Silver	6010/7000	1133		**6**			< 0.7 U		< 0.6 U	**7**		

Table 1 - Analytical Results, Soils, On-Property Area, Unpaved, Shallow

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		Location Depth range Sample Date Depth to Water
Chemical Name	**Base Method**	**Unpaved, Shallow Soils**
Total Petroleum Hydrocarbons (TPHs)		
Gasoline Range Organics	NWTPH-GX	
Diesel Range Organics	NWTPH-DX	
Diesel Range Organics	NWTPH-DXSG	
Motor Oil Range Organics	NWTPH-DX	
Motor Oil Range Organics	NWTPH-DXSG	
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000
Naphthalenes		
Naphthalene	SW8270SIM	
Total Naphthalenes	CALC	4.5
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)		
Acenaphthene	SW8270SIM	
Acenaphthylene	SW8270SIM	
Anthracene	SW8270SIM	
Benzo(g,h,i)perylene	SW8270SIM	
Fluoranthene	SW8270SIM	
Fluorene	SW8270SIM	
Phenanthrene	SW8270SIM	
Pyrene	SW8270SIM	
Carcinogenic PAHs (cPAHs)		
Benz(a)anthracene	SW8270SIM	
Benzo(a)pyrene	SW8270SIM	
Benzo(b)fluoranthene	SW8270SIM	
Benzo(k)fluoranthene	SW8270SIM	
Chrysene	SW8270SIM	
Dibenzo(a,h)anthracene	SW8270SIM	
Indeno(1,2,3-cd)pyrene	SW8270SIM	
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9
Polychlorinated Biphenyls (PCBs) as Aroclors		
Aroclor 1016	SW8082	
Aroclor 1221	SW8082	
Aroclor 1232	SW8082	
Aroclor 1242	SW8082	
Aroclor 1248	SW8082	
Aroclor 1254	SW8082	
Aroclor 1260	SW8082	
Total PCBs (Sum of Aroclors)	CALC	0.65
Metals		
Arsenic	6010/7000	10.0
Barium	6010/7000	102
Cadmium	6010/7000	14.0
Chromium	6010/7000	67
Copper	6010/7000	217
Lead	6010/7000	118
Mercury	6010/7000	5.5
Selenium	6010/7000	0.30
Silver	6010/7000	1133

Notes:
All table values in units of milligrams per kilogram (mg/kg).
Depth range - indicates reported range of depths for soil sample
Base Method - indicates the laboratory method or calculated value
Depth to Water - indicated reported depth to saturated conditions noted on exploration log
Laboratory Qualifiers
U - indicates not detected at the reporting limit
J - indicates estimated result (typ. below the instrument calibration range)
Formatted Values
Bold - indicates analyte detected (typ. above reporting limit)
Blue - indicates concentration, or reporting limit, exceeded CUL
Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)
Calculated Values
Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)
Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)
Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-3	B-3	B-13	B-14	B-15	B-15	B-16	MW-13	MW-18	MW-18
			Depth range	10 - 10 ft	21.5 - 21.5 ft	14 - 15 ft	9 - 10 ft	7 - 8 ft	10 - 11 ft	10 - 11 ft	17.5 - 17.5 ft	11.5 - 12 ft	21.5 - 21.9 ft
			Sample Date	06/26/2002	06/26/2002	11/24/2003	11/24/2003	11/24/2003	11/24/2003	11/24/2003	06/26/2002	02/27/2003	02/27/2003
			Depth to Water	11 ft	11 ft	8.5 ft	8 ft	7.5 ft	7.5 ft	9 ft	9 ft	11 ft	11 ft
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			**120**	**660**	**469**	**14.5**	< 5 U	< 5 U	**141**	**44**		
Diesel Range Organics	NWTPH-DX					**1680**	**436**	**12.8**	**19.5**	**139**			
Diesel Range Organics	NWTPH-DXSG			**20**	**250**	**1020**	**251**	< 10 U	< 10 U	**72.8**	**130**		
Motor Oil Range Organics	NWTPH-DX					**166**	**298**	< 25 U	**25.7**	**29.4**			
Motor Oil Range Organics	NWTPH-DXSG			< 10 U	**38**	< 98 U	**91.7**	< 25 U	< 25 U	< 25 U	**80**		
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000				**1846**	**734**	**37.8**	**45.2**	**168.4**			
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000		**30**	**288**	**1118**	**342.7**	< 35 U	< 35 U	**97.8**	**210**		
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)													
Benzene	SW8260	0.03	0.0017										
Toluene	SW8260	4.5	0.27										
Ethylbenzene	SW8260	6.0	0.34	**0.059**	< 0.76 U								
m,p-Xylenes	SW8260			**0.13**	< 0.76 U								
o-Xylene	SW8260			**0.16**	< 0.76 U								
Total Xylenes	SW8260	14.6	0.83										
Total Xylenes	CALC	14.6	0.83	**0.29**	< 0.76 U								
Volatile Organic Compounds (VOCs)													
1,1-Dichloroethane	SW8260												
1,1-Dichloroethene	SW8260												
1,2,4-Trimethylbenzene	SW8260			**0.47**	**2.9**								
1,3,5-Trimethylbenzene	SW8260			**0.15**	**0.97**								
2-Butanone	SW8260												
Acetone	SW8260			**0.073**	< 3.8 U								
Chloroform	SW8260												
cis-1,2-Dichloroethene (DCE)	SW8260												
Isopropylbenzene	SW8260			**0.039**	< 0.76 U								
p-Isopropyltoluene	SW8260			**0.094**	**0.48 J**								
Styrene	SW8260												
Tetrachloroethene (PCE)	SW8260												
Trichloroethene (TCE)	SW8260												
Naphthalenes													
1-Methylnaphthalene	SW8270SIM											**73.3**	**517**
2-Methylnaphthalene	SW8270			**1.7**	**10**								
2-Methylnaphthalene	SW8270SIM			**1.8 J**	**11 J**						**3.9**	**25.9**	**759**
Naphthalene	SW8260			**6.8**	**310**								
Naphthalene	SW8270			**5.4**	**24**								
Naphthalene	SW8270SIM			**5.6 J**	**26 J**	**826**	**4.52**	**0.0605**	**0.0167**	**22.3**	**14**	**326**	**1750**
Total Naphthalenes	CALC	4.5	0.24	**7.4 J**	**37 J**	**826**	**4.52**	**0.0605**	**0.0167**	**22.3**	**17.9**	**425.2**	**3026**
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270			**0.9**	**12**								
Acenaphthene	SW8270SIM			**0.7**	**8.3**	**140**	**3.78**	< 0.01 U	**0.0676**	**4.08**	**7.7**	**68.9**	**22.9**
Acenaphthylene	SW8270			< 0.17 U	< 0.077 U								
Acenaphthylene	SW8270SIM			**0.054**	**0.075**	**1.95**	**0.649**	< 0.01 U	**0.0317**	**0.217**	**0.13**	< 0.0299 U	**16.2**
Anthracene	SW8270			< 0.17 U	**2.7**								
Anthracene	SW8270SIM			**0.12**	**2.5**	**60.2**	**3**	< 0.01 U	**0.0584**	**1.15**	**0.17**	**107**	**146**

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-3	B-3	B-13	B-14	B-15	B-15	B-16	MW-13	MW-18	MW-18
			Depth range	10 - 10 ft	21.5 - 21.5 ft	14 - 15 ft	9 - 10 ft	7 - 8 ft	10 - 11 ft	10 - 11 ft	17.5 - 17.5 ft	11.5 - 12 ft	21.5 - 21.9 ft
			Sample Date	06/26/2002	06/26/2002	11/24/2003	11/24/2003	11/24/2003	11/24/2003	11/24/2003	06/26/2002	02/27/2003	02/27/2003
			Depth to Water	11 ft	11 ft	8.5 ft	8 ft	7.5 ft	7.5 ft	9 ft	9 ft	11 ft	11 ft
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**										
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)													
Benzo(g,h,i)perylene	SW8270			< 0.17 U	< 0.077 U								
Benzo(g,h,i)perylene	SW8270SIM			**0.033**	**0.051**	**2.3**	**1.16**	**0.0123**	**0.112**	< 0.2 U	< 0.0086 U	**1.95**	**5.5**
Fluoranthene	SW8270			< 0.17 U	**8.4**								
Fluoranthene	SW8270SIM			**0.15**	**7.4**	**106**	**4.42**	< 0.01 U	**0.0776**	**1.37**	**0.078**	**110**	**371**
Fluorene	SW8270			**0.5**	**13**								
Fluorene	SW8270SIM			**0.39**	**9.2**	**115**	**2.97**	< 0.01 U	**0.0626**	**3.1**	**4.1**	**90.4**	**349**
Phenanthrene	SW8270			**0.39**	**25**								
Phenanthrene	SW8270SIM			**0.39**	**23**	**229**	**5.13**	< 0.01 U	< 0.01 U	**4.73**	**4**	**240**	**976**
Pyrene	SW8270			< 0.17 U	**6.1**								
Pyrene	SW8270SIM			**0.14**	**4.8**	**97.2**	**4.3**	**0.0149**	**0.0759**	**1.41**	**0.054**	**79.6**	**308**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270			< 0.17 U	**1.3**								
Benz(a)anthracene	SW8270SIM			**0.046**	**1.2**	**21.2**	**1.38**	< 0.01 U	**0.0376**	**0.264**	**0.022**	**27.5**	**83.2**
Benzo(a)pyrene	SW8270			< 0.17 U	**0.25**								
Benzo(a)pyrene	SW8270SIM			**0.032**	**0.25**	**6.95**	**1.75**	< 0.01 U	**0.104**	< 0.2 U	**0.01**	**17.9**	**42.8**
Benzo(b)fluoranthene	SW8270			< 0.17 U	**0.32**								
Benzo(b)fluoranthene	SW8270SIM			**0.035**	**0.33**	**7.48**	**1.27**	< 0.01 U	**0.0826**	< 0.2 U	< 0.0086 U	**6.37**	**43.8**
Benzo(k)fluoranthene	SW8270			< 0.17 U	**0.28**								
Benzo(k)fluoranthene	SW8270SIM			**0.037**	**0.26**	**10.7**	**1.16**	**0.0307**	**0.0868**	**0.512**	**0.01**	**7.96**	**42.3**
Chrysene	SW8270			< 0.17 U	**1.1**								
Chrysene	SW8270SIM			**0.059**	**1.1**	**1.98**	**2.25**	**0.0526**	**0.0843**	**1.1**	**0.029**	**27.9**	**75.4**
Dibenzo(a,h)anthracene	SW8270			< 0.17 U	< 0.077 U								
Dibenzo(a,h)anthracene	SW8270SIM			< 0.017 U	**0.028**	**1.18**	**0.403**	< 0.01 U	**0.0384**	< 0.2 U	< 0.0086 U	**1.39**	**3.54**
Indeno(1,2,3-cd)pyrene	SW8270			< 0.17 U	< 0.077 U								
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.033**	**0.059**	**2.22**	**0.994**	**0.0123**	**0.108**	< 0.2 U	< 0.0086 U	**2.1**	**5.25**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	0.19	**0.04854**	**0.4487**	**11.2478**	**2.2932**	**0.011326**	**0.140183**	**0.2186**	**0.01478**	**22.711**	**61.363**
Other Semivolatile Organic Compounds													
4-Methylphenol	SW8270			< 0.17 U	< 0.077 U						< 0.086 U		
Bis(2-ethylhexyl) phthalate	SW8270			**0.27**	**0.69**						**0.13**		
Carbazole	SW8270			< 0.17 U	**3.1**						**2.2**		
Dibenzofuran	SW8270			**0.58**	**9.4**								
Dibenzofuran	SW8270SIM			**0.47**	**7**						**4.8**		
Hexachlorobutadiene	SW8260												
Metals (RCRA 8 + Copper)													
Arsenic	6010/7000	10	0.15										
Barium	6010/7000	1,650	83										
Cadmium	6010/7000	726											
Chromium	6010/7000	25,907	24,007										
Copper	6010/7000	75,778	14										
Lead	6010/7000	1,601	150										
Mercury	6010/7000	13	0.10										
Selenium	6010/7000	233	0.26										
Silver	6010/7000	1133	0.69										

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-19	MW-19	MW-20	TP-4	TP-6	TP-21	TP-22	TP-33	TP-38	TP-45
			Depth range	16 - 18 ft	23.5 - 24 ft	24 - 24.3 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft
			Sample Date	02/27/2003	02/27/2003	02/27/2003	09/27/2000	10/04/2000	10/10/2000	10/10/2000	10/12/2000	10/13/2000	10/16/2000
			Depth to Water	10.5 ft	10.5 ft	11 ft							
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX												
Diesel Range Organics	NWTPH-DX						**67**						
Diesel Range Organics	NWTPH-DXSG												
Motor Oil Range Organics	NWTPH-DX						**31**						
Motor Oil Range Organics	NWTPH-DXSG												
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000					**98**						
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000											
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)													
Benzene	SW8260	0.03	0.0017				< 0.0017 U						
Toluene	SW8260	4.5	0.27				**0.0073**						
Ethylbenzene	SW8260	6.0	0.34				< 0.0017 U						
m,p-Xylenes	SW8260												
o-Xylene	SW8260												
Total Xylenes	SW8260	14.6	0.83				< 0.0034 U						
Total Xylenes	CALC	14.6	0.83										
Volatile Organic Compounds (VOCs)													
1,1-Dichloroethane	SW8260						< 0.0017 U						
1,1-Dichloroethene	SW8260						< 0.0017 U						
1,2,4-Trimethylbenzene	SW8260						< 0.0017 U						
1,3,5-Trimethylbenzene	SW8260						< 0.0017 U						
2-Butanone	SW8260						< 0.0086 U						
Acetone	SW8260						< 0.0086 U						
Chloroform	SW8260						< 0.0017 U						
cis-1,2-Dichloroethene (DCE)	SW8260						< 0.0017 U						
Isopropylbenzene	SW8260						< 0.0017 U						
p-Isopropyltoluene	SW8260						< 0.0017 U						
Styrene	SW8260						< 0.0017 U						
Tetrachloroethene (PCE)	SW8260						< 0.0017 U						
Trichloroethene (TCE)	SW8260						< 0.0017 U						
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			**0.0819**	**0.184**	**0.694**							
2-Methylnaphthalene	SW8270												
2-Methylnaphthalene	SW8270SIM			**0.0787**	< 0.01 U	**0.288**							
Naphthalene	SW8260						**0.0086**						
Naphthalene	SW8270												
Naphthalene	SW8270SIM			**0.0798**	< 0.01 U	**0.631**							
Total Naphthalenes	CALC	4.5	0.24	**0.2404**	**0.204**	**1.613**	**0.0086**						
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270												
Acenaphthene	SW8270SIM			**0.0539**	**0.462**	**0.433**							
Acenaphthylene	SW8270												
Acenaphthylene	SW8270SIM			< 0.01 U	< 0.01 U	**0.0186**							
Anthracene	SW8270												
Anthracene	SW8270SIM			**0.0342**	**0.0267**	**0.0468**							

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-19	MW-19	MW-20	TP-4	TP-6	TP-21	TP-22	TP-33	TP-38	TP-45
			Depth range	16 - 18 ft	23.5 - 24 ft	24 - 24.3 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft	6 - 10 ft
			Sample Date	02/27/2003	02/27/2003	02/27/2003	09/27/2000	10/04/2000	10/10/2000	10/10/2000	10/12/2000	10/13/2000	10/16/2000
			Depth to Water	10.5 ft	10.5 ft	11 ft							
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**										
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)													
Benzo(g,h,i)perylene	SW8270												
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Fluoranthene	SW8270												
Fluoranthene	SW8270SIM			**0.0591**	**0.0117**	**0.0678**							
Fluorene	SW8270												
Fluorene	SW8270SIM			**0.0725**	**0.232**	**0.238**							
Phenanthrene	SW8270												
Phenanthrene	SW8270SIM			**0.194**	**0.123**	**0.226**							
Pyrene	SW8270												
Pyrene	SW8270SIM			< 0.01 U	< 0.01 U	**0.038**							
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270												
Benz(a)anthracene	SW8270SIM			< 0.01 U	**0.0125**	**0.0323**							
Benzo(a)pyrene	SW8270												
Benzo(a)pyrene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Benzo(b)fluoranthene	SW8270												
Benzo(b)fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Benzo(k)fluoranthene	SW8270												
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Chrysene	SW8270												
Chrysene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Dibenzo(a,h)anthracene	SW8270												
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Indeno(1,2,3-cd)pyrene	SW8270												
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U							
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	0.19	< 0.00755 U	**0.0083**	**0.01028**							
Other Semivolatile Organic Compounds													
4-Methylphenol	SW8270												
Bis(2-ethylhexyl) phthalate	SW8270												
Carbazole	SW8270												
Dibenzofuran	SW8270												
Dibenzofuran	SW8270SIM												
Hexachlorobutadiene	SW8260						< 0.0086 U						
Metals (RCRA 8 + Copper)													
Arsenic	6010/7000	10	0.15				< 7 U						
Barium	6010/7000	1,650	83				**60.1**						
Cadmium	6010/7000	726					< 0.3 U						
Chromium	6010/7000	25,907	24,007				**16.9**						
Copper	6010/7000	75,778	14				**24.6**						
Lead	6010/7000	1,601	150				**9**	**60**	**50**	**80**	**70**	**11**	**80**
Mercury	6010/7000	13	0.10				< 0.06 U						
Selenium	6010/7000	233	0.26				< 7 U						
Silver	6010/7000	1133	0.69				< 0.4 U						

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location** **Depth range** **Sample Date** **Depth to Water**
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**
Total Petroleum Hydrocarbons (TPHs)			
Gasoline Range Organics	NWTPH-GX		
Diesel Range Organics	NWTPH-DX		
Diesel Range Organics	NWTPH-DXSG		
Motor Oil Range Organics	NWTPH-DX		
Motor Oil Range Organics	NWTPH-DXSG		
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000	
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000	
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)			
Benzene	SW8260	0.03	0.0017
Toluene	SW8260	4.5	0.27
Ethylbenzene	SW8260	6.0	0.34
m,p-Xylenes	SW8260		
o-Xylene	SW8260		
Total Xylenes	SW8260	14.6	0.83
Total Xylenes	CALC	14.6	0.83
Volatile Organic Compounds (VOCs)			
1,1-Dichloroethane	SW8260		
1,1-Dichloroethene	SW8260		
1,2,4-Trimethylbenzene	SW8260		
1,3,5-Trimethylbenzene	SW8260		
2-Butanone	SW8260		
Acetone	SW8260		
Chloroform	SW8260		
cis-1,2-Dichloroethene (DCE)	SW8260		
Isopropylbenzene	SW8260		
p-Isopropyltoluene	SW8260		
Styrene	SW8260		
Tetrachloroethene (PCE)	SW8260		
Trichloroethene (TCE)	SW8260		
Naphthalenes			
1-Methylnaphthalene	SW8270SIM		
2-Methylnaphthalene	SW8270		
2-Methylnaphthalene	SW8270SIM		
Naphthalene	SW8260		
Naphthalene	SW8270		
Naphthalene	SW8270SIM		
Total Naphthalenes	CALC	4.5	0.24
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)			
Acenaphthene	SW8270		
Acenaphthene	SW8270SIM		
Acenaphthylene	SW8270		
Acenaphthylene	SW8270SIM		
Anthracene	SW8270		
Anthracene	SW8270SIM		

Notes:
All table values in units of milligrams per kilogram (mg/kg).
Depth range - indicates reported range of depths for soil sample
Base Method - indicates the laboratory method or calculated value
Depth to Water - indicated reported depth to saturated conditions noted on exploration log
Laboratory Qualifiers
U - indicates not detected at the reporting limit
J - indicates estimated result (typ. below the instrument calibration range)
Formatted Values
Bold - indicates analyte detected (typ. above reporting limit)
Blue - indicates concentration, or reporting limit, exceeded CUL
Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)
Calculated Values
Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)
Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)
Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 2 - Analytical Results, Soils, On-Property Area, Unpaved, Deep

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		Location Depth range Sample Date Depth to Water	
Chemical Name	**Base Method**	**Unpaved, Deep Soils CUL**	**Saturated Soils Cleanup Level**
Other Noncarcinogenic Polyaromatic Hydrocarbons (PAHs)			
Benzo(g,h,i)perylene	SW8270		
Benzo(g,h,i)perylene	SW8270SIM		
Fluoranthene	SW8270		
Fluoranthene	SW8270SIM		
Fluorene	SW8270		
Fluorene	SW8270SIM		
Phenanthrene	SW8270		
Phenanthrene	SW8270SIM		
Pyrene	SW8270		
Pyrene	SW8270SIM		
Carcinogenic PAHs (cPAHs)			
Benz(a)anthracene	SW8270		
Benz(a)anthracene	SW8270SIM		
Benzo(a)pyrene	SW8270		
Benzo(a)pyrene	SW8270SIM		
Benzo(b)fluoranthene	SW8270		
Benzo(b)fluoranthene	SW8270SIM		
Benzo(k)fluoranthene	SW8270		
Benzo(k)fluoranthene	SW8270SIM		
Chrysene	SW8270		
Chrysene	SW8270SIM		
Dibenzo(a,h)anthracene	SW8270		
Dibenzo(a,h)anthracene	SW8270SIM		
Indeno(1,2,3-cd)pyrene	SW8270		
Indeno(1,2,3-cd)pyrene	SW8270SIM		
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	0.19
Other Semivolatile Organic Compounds			
4-Methylphenol	SW8270		
Bis(2-ethylhexyl) phthalate	SW8270		
Carbazole	SW8270		
Dibenzofuran	SW8270		
Dibenzofuran	SW8270SIM		
Hexachlorobutadiene	SW8260		
Metals (RCRA 8 + Copper)			
Arsenic	6010/7000	10	0.15
Barium	6010/7000	1,650	83
Cadmium	6010/7000	726	
Chromium	6010/7000	25,907	24,007
Copper	6010/7000	75,778	14
Lead	6010/7000	1,601	150
Mercury	6010/7000	13	0.10
Selenium	6010/7000	233	0.26
Silver	6010/7000	1133	0.69

Notes:

All table values in units of milligrams per kilogram (mg/kg).

Depth range - indicates reported range of depths for soil sample

Base Method - indicates the laboratory method or calculated value

Depth to Water - indicated reported depth to saturated conditions noted on exploration log

Laboratory Qualifiers

U - indicates not detected at the reporting limit

J - indicates estimated result (typ. below the instrument calibration range)

Formatted Values

Bold - indicates analyte detected (typ. above reporting limit)

Blue - indicates concentration, or reporting limit, exceeded CUL

Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)

Calculated Values

Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)

Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)

Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)

Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)

Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)

Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-1	B-1	B-1	B-6	B-8	B-8	B-17	B-17	B-17	MW-14	MW-14	MW-14
			Depth range	10.5 - 10.5 ft	20.5 - 20.5 ft	26 - 26 ft	23 - 23.2 ft	23.5 - 24 ft	26.5 - 27 ft	3 - 4 ft	5 - 6 ft	7 - 8 ft	14 - 14.5 ft	22 - 22.3 ft	23.8 - 24 ft
			Sample Date	06/25/2002	06/25/2002	06/25/2002	03/11/2003	03/11/2003	03/11/2003	11/24/2003	11/24/2003	11/24/2003	02/26/2003	02/26/2003	02/26/2003
			Depth to Water	11 ft	11 ft	11 ft	10 ft	10 ft	10 ft	9.5 ft	9.5 ft	9.5 ft	9 ft	9 ft	9 ft
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX			**2900**	**360**	**3300**				< 5 U	< 5 U	< 16.8 U			
Diesel Range Organics	NWTPH-DX									< 10 U	**138**	**361**			
Diesel Range Organics	NWTPH-DXSG			**5500**	**2700**	**7300**				< 10 U	**23.6**	**35.1**			
Motor Oil Range Organics	NWTPH-DX									< 25 U	**768**	**1200**			
Motor Oil Range Organics	NWTPH-DXSG			**2200**	**640**	**1600**				< 25 U	**73.5**	< 84.2 U			
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000								< 35 U	**906**	**1561**			
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000		**7700**	**3340**	**8900**				< 35 U	**97.1**	**119.3**			
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34	< 5.9 U	< 0.31 U	< 0.78 U									
m,p-Xylenes	SW8260			< 5.9 U	< 0.31 U	< 0.78 U									
o-Xylene	SW8260			< 5.9 U	< 0.31 U	< 0.78 U									
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83	< 5.9 U	< 0.31 U	< 0.78 U									
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260			**4.3 J**	**0.45**	**2.1**									
1,3,5-Trimethylbenzene	SW8260			< 5.9 U	< 0.31 U	**0.74 J**									
2-Butanone	SW8260														
Acetone	SW8260			< 29 U	< 1.6 U	< 3.9 U									
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260			< 5.9 U	< 0.31 U	< 0.78 U									
p-Isopropyltoluene	SW8260			**5.2 J**	**0.31**	**0.49 J**									
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM						**645**	**262**	**0.0786**				**2.1**	**36.3**	**14.5**
2-Methylnaphthalene	SW8270			**120**	**39**	**120**									
2-Methylnaphthalene	SW8270SIM			**180 J**	**41 J**	**110 J**	**491**	**8.23**	**0.0761**				**1.85**	**12.4**	**3.88**
Naphthalene	SW8260			**210**	**120**	**420**									
Naphthalene	SW8270			**220**	**94**	**290**									
Naphthalene	SW8270SIM			**300 J**	**110 J**	**300 J**	**1850**	**103**	**0.432**	**0.0258**	**0.353**	**0.535**	**0.98**	**54.1**	**25.8**
Total Naphthalenes	CALC	53,767	0.24	**480 J**	**151 J**	**410 J**	**2986**	**373.23**	**0.5867**	**0.0258**	**0.353**	**0.535**	**4.93**	**102.8**	**44.18**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270			**210**	**66**	**180**									
Acenaphthene	SW8270SIM			**200**	**49**	**130**	**596**	**281**	**0.581**	**0.0179**	**0.11**	**0.205**	**0.224**	**60.5**	**18.4**
Acenaphthylene	SW8270			**9.3**	< 2.6 U	**4.2**									
Acenaphthylene	SW8270SIM			**11**	**1.9**	**4.2**	**5.64**	**3.13**	< 0.01 U	**0.0294**	**0.239**	**0.193**	**0.137**	**0.642**	**1.37**
Anthracene	SW8270			**280**	**68**	**230**									
Anthracene	SW8270SIM			**320**	**60**	**200**	**229**	**49.6**	**0.222**	**0.0143**	**0.63**	**0.273**	**0.102**	**20**	**11.3**
Benzo(g,h,i)perylene	SW8270			**19**	**3.4**	**8.7**									
Benzo(g,h,i)perylene	SW8270SIM			**18**	**3.3**	**7.7**	**5.72**	**2.88**	< 0.01 U	**0.0315**	**0.998**	**0.216**	**0.433**	**0.936**	**1.17**
Fluoranthene	SW8270			**300**	**97**	**190**									
Fluoranthene	SW8270SIM			**290**	**86**	**170**	**570**	**277**	**0.386**	**0.0437**	**2.86**	**0.501**	**0.622**	**61.5**	**25.1**
Fluorene	SW8270			**220**	**76**	**170**									
Fluorene	SW8270SIM			**180**	**54**	**140**	**455**	**239**	**0.617**	**0.0129**	**0.105**	**0.193**	**0.38**	**64.4**	**31.6**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-1	B-1	B-1	B-6	B-8	B-8	B-17	B-17	B-17	MW-14	MW-14	MW-14
			Depth range	10.5 - 10.5 ft	20.5 - 20.5 ft	26 - 26 ft	23 - 23.2 ft	23.5 - 24 ft	26.5 - 27 ft	3 - 4 ft	5 - 6 ft	7 - 8 ft	14 - 14.5 ft	22 - 22.3 ft	23.8 - 24 ft
			Sample Date	06/25/2002	06/25/2002	06/25/2002	03/11/2003	03/11/2003	03/11/2003	11/24/2003	11/24/2003	11/24/2003	02/26/2003	02/26/2003	02/26/2003
			Depth to Water	11 ft	11 ft	11 ft	10 ft	10 ft	10 ft	9.5 ft	9.5 ft	9.5 ft	9 ft	9 ft	9 ft
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270			500	150	420									
Phenanthrene	SW8270SIM			520	140	390	1590	822	1.98	0.0408	0.702	0.421	0.612	179	72.4
Pyrene	SW8270			250	83	170									
Pyrene	SW8270SIM			290	74	160	427	190	0.256	0.043	3.99	0.614	0.922	39.3	14.8
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270			79	19	48									
Benz(a)anthracene	SW8270SIM			79	18	43	128	50.5	0.0165	0.0301	1.65	0.171	0.444	9.43	3.92
Benzo(a)pyrene	SW8270			40	7.8	22									
Benzo(a)pyrene	SW8270SIM			53	8.8	22	65.8	21.1	< 0.01 U	0.0494	1.66	0.25	0.62	3.25	1.88
Benzo(b)fluoranthene	SW8270			41	9.6	25									
Benzo(b)fluoranthene	SW8270SIM			34	7.5	17	30.7	21	< 0.01 U	0.0444	2.35	0.375	0.507	3.41	0.783
Benzo(k)fluoranthene	SW8270			36	7.9	20									
Benzo(k)fluoranthene	SW8270SIM			52	8.9	20	65.8	24.8	< 0.01 U	0.0279	1.36	0.444	0.634	2.44	0.94
Chrysene	SW8270			94	20	59									
Chrysene	SW8270SIM			100	18	51	111	52.1	0.0107	0.0387	2.76	0.774	0.578	8.62	3.41
Dibenzo(a,h)anthracene	SW8270			4.4	< 2.6 U	2.3									
Dibenzo(a,h)anthracene	SW8270SIM			8.1	1.3	4.2	8.28	3.86	< 0.01 U	0.15	0.406	< 0.168 U	< 0.0222 U	0.268	< 0.5 U
Indeno(1,2,3-cd)pyrene	SW8270			18	2.8	9.8									
Indeno(1,2,3-cd)pyrene	SW8270SIM			17	3.4	7.9	18.7	7.91	< 0.01 U	0.0444	0.888	0.182	0.451	0.925	0.862
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19	73.01	12.89	31.72	92.058	32.428	0.008757	0.079467	2.353	0.38334	0.83049	4.9835	2.5896
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270			2.9	< 2.6 U	< 1.2 U									
Bis(2-ethylhexyl) phthalate	SW8270			4.4	< 2.6 U	11									
Carbazole	SW8270			73	34	90									
Dibenzofuran	SW8270			110	35	87									
Dibenzofuran	SW8270SIM			100	27	71									
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082														
Aroclor 1221	SW8082														
Aroclor 1232	SW8082														
Aroclor 1242	SW8082														
Aroclor 1248	SW8082														
Aroclor 1254	SW8082														
Aroclor 1260	SW8082														
Total PCBs (Sum of Aroclors)	CALC	10													
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15												
Barium	6010/7000	44,884	83												
Cadmium	6010/7000	1,496													
Chromium	6010/7000	1,000,000	24,007												
Copper	6010/7000	299,224	14												
Lead	6010/7000	2,000	150												
Mercury	6010/7000	2,900	0.10												
Selenium	6010/7000	11,221	0.26												
Silver	6010/7000	6,359	0.69												

Table 3 - Analytical Results, Soils, On-Property Area, Paved
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-14	MW-15	MW-15	MW-16	MW-16	MW-17	MW-17	MW-21	MW-21	MW-22/B-12	MW-22/B-12	MW-22/B-12
			Depth range	26 - 26.5 ft	11 - 11.5 ft	25 - 26 ft	7.5 - 8 ft	25 - 26 ft	12 - 16 ft	20.5 - 22 ft	20.5 - 21.4 ft	22.5 - 23.3 ft	4 - 5 ft	6.5 - 7.5 ft	9 - 10 ft
			Sample Date	02/26/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	12/01/2003	12/01/2003	12/01/2003
			Depth to Water	9 ft	11 ft	11 ft	10 ft	10 ft	9 ft	9 ft	11 ft	11 ft	7.5 ft	7.5 ft	7.5 ft
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX												**8.84**	**5.18**	**331**
Diesel Range Organics	NWTPH-DX												**1910**	**43**	**1310**
Diesel Range Organics	NWTPH-DXSG												**397**	**21.8**	**866**
Motor Oil Range Organics	NWTPH-DX												**4800**	**64.7**	**317**
Motor Oil Range Organics	NWTPH-DXSG												**1250**	< 25 U	< 125 U
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000											**6710**	**107.7**	**1627**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000											**1647**	**46.8**	**991**
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM			**5.06**	**0.357**	< 0.01 U	**7.26**	< 0.01 U	**0.156**	< 0.01 U	**106**	**1.23**			
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM			**0.746**	**0.293**	< 0.01 U	**9.95**	< 0.01 U	**0.079**	< 0.01 U	**35.5**	**0.389**			
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM			**1.03**	**0.695**	< 0.01 U	**40.1**	< 0.01 U	**0.375**	< 0.01 U	**100**	**0.664**	**3.48**	**0.191**	**3.28**
Total Naphthalenes	CALC	53,767	0.24	**6.836**	**1.345**	< 0.03 U	**57.31**	< 0.03 U	**0.61**	< 0.03 U	**241.5**	**2.283**	**3.48**	**0.191**	**3.28**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM			**1.31**	**0.403**	< 0.01 U	**2.03**	< 0.01 U	**0.371**	< 0.01 U	**456**	**0.788**	**0.953**	**0.0577**	**17.4**
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM			< 0.01 U	**0.0659**	< 0.01 U	**0.297**	< 0.01 U	**0.0571**	< 0.01 U	**1.41**	**0.038**	**11.6**	**0.346**	**0.923**
Anthracene	SW8270														
Anthracene	SW8270SIM			**0.0324**	**0.128**	< 0.01 U	**1.61**	< 0.01 U	**0.254**	< 0.01 U	**283**	**1.05**	**5.72**	**0.457**	**9.96**
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	< 0.0304 U	< 0.01 U	**0.521**	< 0.01 U	**0.0588**	< 0.01 U	**26.6**	**0.0777**	**12.6**	**0.271**	**0.982**
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM			**0.054**	**0.206**	< 0.01 U	**3.66**	**0.0333**	**0.997**	**0.0359**	**978**	**1.3**	**35.3**	**0.129**	**22.3**
Fluorene	SW8270														
Fluorene	SW8270SIM			**0.676**	**0.258**	< 0.01 U	**1.79**	< 0.01 U	**0.306**	< 0.01 U	**639**	**0.876**	**2.42**	< 0.050 U	**14.1**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	MW-14	MW-15	MW-15	MW-16	MW-16	MW-17	MW-17	MW-21	MW-21	MW-22/B-12	MW-22/B-12	MW-22/B-12
			Depth range	26 - 26.5 ft	11 - 11.5 ft	25 - 26 ft	7.5 - 8 ft	25 - 26 ft	12 - 16 ft	20.5 - 22 ft	20.5 - 21.4 ft	22.5 - 23.3 ft	4 - 5 ft	6.5 - 7.5 ft	9 - 10 ft
			Sample Date	02/26/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	02/28/2003	12/01/2003	12/01/2003	12/01/2003
			Depth to Water	9 ft	11 ft	11 ft	10 ft	10 ft	9 ft	9 ft	11 ft	11 ft	7.5 ft	7.5 ft	7.5 ft
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM			**0.322**	**0.585**	< 0.01 U	**5.45**	< 0.01 U	**0.222**	**0.0137**	**1970**	**2.43**	**7.22**	**0.146**	**36.5**
Pyrene	SW8270														
Pyrene	SW8270SIM			**0.0332**	**0.268**	< 0.01 U	**4.19**	< 0.01 U	**0.995**	< 0.01 U	**884**	**1.08**	**23.7**	**0.169**	**19.4**
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM			< 0.01 U	**0.0799**	< 0.01 U	**1.64**	< 0.01 U	**0.146**	< 0.01 U	**170**	**0.312**	**15.9**	**0.0843**	**4.26**
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM			< 0.01 U	**0.0739**	< 0.01 U	**1.14**	< 0.01 U	**0.0874**	< 0.01 U	**59.5**	**0.189**	**19.5**	**0.271**	**2.13**
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM			< 0.01 U	< 0.0304 U	< 0.01 U	**0.864**	< 0.01 U	**0.0185**	< 0.01 U	**59**	**0.129**	**12.7**	**0.177**	**1.28**
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	**0.0319**	< 0.01 U	**1.13**	< 0.01 U	**0.0387**	< 0.01 U	**60.5**	**0.162**	**19**	**0.12**	**2.16**
Chrysene	SW8270														
Chrysene	SW8270SIM			< 0.01 U	**0.0719**	< 0.01 U	**1.56**	< 0.01 U	**0.111**	< 0.01 U	**130**	**0.357**	**17.7**	**0.115**	**3.32**
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	< 0.0304 U	< 0.01 U	< 0.0586 U	< 0.01 U	< 0.0148 U	< 0.01 U	**4.34**	< 0.01 U	**5.83**	**0.0799**	**0.382**
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	< 0.0304 U	< 0.01 U	**0.513**	< 0.01 U	**0.0454**	< 0.01 U	**24.4**	**0.0684**	**12.8**	**0.226**	**0.882**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19	< 0.00755 U	**0.090359**	< 0.00755 U	**1.57323**	< 0.00755 U	**0.11411**	< 0.00755 U	**92.624**	**0.26021**	**26.3**	**0.34087**	**3.0596**
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082														
Aroclor 1221	SW8082														
Aroclor 1232	SW8082														
Aroclor 1242	SW8082														
Aroclor 1248	SW8082														
Aroclor 1254	SW8082														
Aroclor 1260	SW8082														
Total PCBs (Sum of Aroclors)	CALC	10													
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15												
Barium	6010/7000	44,884	83												
Cadmium	6010/7000	1,496													
Chromium	6010/7000	1,000,000	24,007												
Copper	6010/7000	299,224	14												
Lead	6010/7000	2,000	150												
Mercury	6010/7000	2,900	0.10												
Selenium	6010/7000	11,221	0.26												
Silver	6010/7000	6,359	0.69												

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-1	TP-1	TP-1	TP-1	TP-2	TP-2	TP-2	TP-2	TP-3	TP-3	TP-3	TP-5
			Depth range	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft
			Sample Date	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	10/04/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**560**				**130**	**1700**	**2900**	**10000**	**14**	**1300**	**280**	**18**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**1200**				**400**	**1200**	**1700**	**2100**	**26**	**1200**	**240**	**21**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**1760**				**530**	**2900**	**4600**	**12100**	**40**	**2500**	**520**	**39**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017						**0.0036**	**0.058**	**0.073**		< 0.0018 U	< 0.0033 U	
Toluene	SW8260	185600	0.27						**0.12**	**0.85**	**0.43**		**0.83**	**0.008**	
Ethylbenzene	SW8260	232000	0.34						**0.006**	**0.14**	**0.87**		< 0.0018 U	**0.0046**	
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83						**0.0144**	**0.41**	**3.6**		< 0.038 U	**0.027**	
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
1,1-Dichloroethene	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
1,2,4-Trimethylbenzene	SW8260								**0.0071**	**1.4**	**6.2**		< 0.019 U	**0.042**	
1,3,5-Trimethylbenzene	SW8260								**0.003**	**0.52**	**2.8**		< 0.019 U	**0.018**	
2-Butanone	SW8260								**0.047**	**0.12**	**0.11**		**0.073**	**0.027**	
Acetone	SW8260								**0.2 J**	**0.46 J**	**0.94**		**0.53**	**0.2**	
Chloroform	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
cis-1,2-Dichloroethene (DCE)	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
Isopropylbenzene	SW8260								< 0.0012 U	**0.055**	**0.48**		< 0.0018 U	**0.012**	
p-Isopropyltoluene	SW8260								< 0.0012 U	**0.091**	**1.6**		< 0.0018 U	**0.027**	
Styrene	SW8260								**0.0024**	**0.012 J**	< 0.0016 U		< 0.019 U	< 0.0033 U	
Tetrachloroethene (PCE)	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
Trichloroethene (TCE)	SW8260								< 0.0012 U	< 0.0015 U	< 0.0016 U		< 0.0018 U	< 0.0033 U	
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260								**0.12**	**120**	**390**		**0.13**	**0.21**	
Naphthalene	SW8270														
Naphthalene	SW8270SIM										**440**				
Total Naphthalenes	CALC	53,767	0.24						**0.12**	**120**	**440**		**0.13**	**0.21**	
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM										**240**				
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM										**7.1**				
Anthracene	SW8270														
Anthracene	SW8270SIM										**380**				
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM										**34**				
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM										**370**				
Fluorene	SW8270														
Fluorene	SW8270SIM										**200**				

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-1	TP-1	TP-1	TP-1	TP-2	TP-2	TP-2	TP-2	TP-3	TP-3	TP-3	TP-5
			Depth range	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft
			Sample Date	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	09/27/2000	10/04/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM										**460**				
Pyrene	SW8270														
Pyrene	SW8270SIM										**430**				
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM										**140**				
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM										**110**				
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM										**90**				
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM										**110**				
Chrysene	SW8270														
Chrysene	SW8270SIM										**230**				
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM										**17**				
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM										**33**				
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19								**151.3**				
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260								< 0.006 U	< 0.0073 U	< 0.0079 U		< 0.0092 U	< 0.017 U	
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082			< 0.036 U								< 0.035 U			< 0.036 U
Aroclor 1221	SW8082			< 0.073 U								< 0.07 U			< 0.073 U
Aroclor 1232	SW8082			< 0.036 U								< 0.035 U			< 0.036 U
Aroclor 1242	SW8082			< 0.036 U								< 0.035 U			< 0.036 U
Aroclor 1248	SW8082			< 0.036 U								< 0.035 U			< 0.036 U
Aroclor 1254	SW8082			**0.64**								**0.17**			< 0.036 U
Aroclor 1260	SW8082			**0.5**								**0.061**			< 0.036 U
Total PCBs (Sum of Aroclors)	CALC	10		**1.25**								**0.336**			**0.145**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	**40**				< 10 U	< 5 U	< 6 U	< 6 U	< 5 U	**7**	< 10 U	< 5 U
Barium	6010/7000	44,884	83	**290**				**404**	**47.2**	**58.1**	**53.8**	**63.5**	**63.8**	**110**	**59.4**
Cadmium	6010/7000	1,496		**8.5**				**18.2**	< 0.2 U	< 0.2 U	**1.1**	**2.7**	**0.4**	< 0.5 U	< 0.2 U
Chromium	6010/7000	1,000,000	24,007	**76**				**67**	**18.6**	**15.4**	**18.6**	**26.9**	**15.4**	**18**	**59.9**
Copper	6010/7000	299,224	14	**873**				**1090**	**20**	**35.2**	**79.6**	**44.1**	**33.2**	**42.4**	**28**
Lead	6010/7000	2,000	150	**2230**	**120**	**90**	**30**	**831**	**10**	**85**	**72**	**46**	**106**	**93**	**8**
Mercury	6010/7000	2,900	0.10	**1.53**	**0.11**			**0.88**	**0.04**	< 0.06 U	**0.13**	**0.13**	**0.21**	**0.13**	< 0.05 U
Selenium	6010/7000	11,221	0.26	< 10 U				< 10 U	< 5 U	< 6 U	< 6 U	< 5 U	< 7 U	< 10 U	**5**
Silver	6010/7000	6,359	0.69	**1.4**				**0.9**	< 0.3 U	**0.4**	< 0.4 U	< 0.3 U	< 0.4 U	< 0.7 U	**0.4**

Table 3 - Analytical Results, Soils, On-Property Area, Paved
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-5	TP-5	TP-5	TP-7	TP-7	TP-8	TP-8	TP-9	TP-9	TP-9	TP-10	TP-10
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft
			Sample Date	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**81**	**2000**	**23000**	**330**		**440**	**34**	**1900**	**54**	**160**	**64**	**43**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**75**	**2300**	**8600**	**760**		**1200**	**70**	**3000**	**72**	**250**	**260**	**280**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**156**	**4300**	**31600**	**1090**		**1640**	**104**	**4900**	**126**	**410**	**324**	**323**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017			< 0.23 U					< 0.14 U		< 0.007 U		
Toluene	SW8260	185600	0.27			**1.2**					**0.098**		**0.13**		
Ethylbenzene	SW8260	232000	0.34			< 0.23 U					< 0.14 U		< 0.007 U		
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83			< 0.23 U					< 0.14 U		< 0.007 U		
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
1,1-Dichloroethene	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
1,2,4-Trimethylbenzene	SW8260					**0.66**					**0.22**		**0.0068**		
1,3,5-Trimethylbenzene	SW8260					**0.36**					**0.49**		**0.0069**		
2-Butanone	SW8260					< 1.2 U					< 0.7 U		< 0.035 U		
Acetone	SW8260					< 1.2 U					< 0.7 U		< 0.035 U		
Chloroform	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
cis-1,2-Dichloroethene (DCE)	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
Isopropylbenzene	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
p-Isopropyltoluene	SW8260					**0.75**					**0.074**		< 0.007 U		
Styrene	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
Tetrachloroethene (PCE)	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
Trichloroethene (TCE)	SW8260					< 0.23 U					< 0.14 U		< 0.007 U		
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260					**26**					**0.71**		< 0.035 U		
Naphthalene	SW8270														
Naphthalene	SW8270SIM					**41**					**0.35**				
Total Naphthalenes	CALC	53,767	0.24			**41**					**0.35**		< 0.035 U		
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM					**260**					**0.028**				
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM					**19**					**0.014**				
Anthracene	SW8270														
Anthracene	SW8270SIM					**750**					**0.067**				
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM					**39**					**0.17**				
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM					**470**					**0.27**				
Fluorene	SW8270														
Fluorene	SW8270SIM					**360**					**0.028**				

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-5	TP-5	TP-5	TP-7	TP-7	TP-8	TP-8	TP-9	TP-9	TP-9	TP-10	TP-10
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft
			Sample Date	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/04/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM					**750**					**0.16**				
Pyrene	SW8270														
Pyrene	SW8270SIM					**400**					**0.24**				
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM					**130**					**0.15**				
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM					**95**					**0.14**				
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM					**93**					**0.17**				
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM					**80**					**0.12**				
Chrysene	SW8270														
Chrysene	SW8270SIM					**190**					**0.28**				
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM					**16**					**0.035**				
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM					**35**					**0.094**				
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19			**132.3**					**0.1997**				
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260					< 1.2 U					< 0.7 U		< 0.035 U		
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082						< 0.37 U	< 0.036 U			< 0.04 U			< 0.037 U	< 0.037 U
Aroclor 1221	SW8082						< 0.74 U	< 0.071 U			< 0.081 U			< 0.073 U	< 0.074 U
Aroclor 1232	SW8082						< 0.37 U	< 0.036 U			< 0.04 U			< 0.037 U	< 0.037 U
Aroclor 1242	SW8082						< 0.37 U	< 0.036 U			**0.53**			< 0.037 U	< 0.037 U
Aroclor 1248	SW8082						**4.3**	**2.1**			< 0.04 U			**0.56**	< 0.037 U
Aroclor 1254	SW8082						**7.7**	**5.2**			**0.87**			**0.65**	**0.045**
Aroclor 1260	SW8082						**2.7**	**1.9**			**1.1**			**0.29**	< 0.037 U
Total PCBs (Sum of Aroclors)	CALC	10					**0.186**	**9.28**			**2.6**			**1.6**	**0.17**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15		< 6 U	< 10 U	**10**		< 5 U	< 5 U	**40**		< 6 U	< 5 U	
Barium	6010/7000	44,884	83		**67.7**	**52.3**	**697**		**235**	**42.1**	**1990**		**224**	**218**	
Cadmium	6010/7000	1,496			< 0.3 U	< 0.5 U	**12.3**	**9**	**0.9**	**0.3**	**59**		**2.1**	**4.2**	
Chromium	6010/7000	1,000,000	24,007		**38.2**	**24**	**103**		**33.9**	**17.5**	**132**		**24.2**	**49.2**	
Copper	6010/7000	299,224	14		**37.3**	**56.1**	**361**		**41**	**47.8**	**1260**		**59.9**	**217**	
Lead	6010/7000	2,000	150		**56**	**248**	**796**		**31**	**26**	**1960**	**20**	**93**	**460**	
Mercury	6010/7000	2,900	0.10		**0.2**	**0.3**	**0.88**		< 0.05 U	< 0.05 U	**0.9**		< 0.05 U	**0.54**	
Selenium	6010/7000	11,221	0.26		< 6 U	< 10 U	**8**		< 5 U	< 5 U	< 30 U		< 6 U	**7**	
Silver	6010/7000	6,359	0.69		< 0.4 U	< 0.8 U	**1.5**		**0.3**	**0.7**	< 2 U		< 0.4 U	**0.5**	

Table 3 - Analytical Results, Soils, On-Property Area, Paved
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-10	TP-10	TP-11	TP-11	TP-11	TP-11	TP-14	TP-14	TP-14	TP-14	TP-15	TP-16
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft
			Sample Date	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**440**	**1400**	**800**	**440**	**870**	**3900**	< 5.2 U			**48**	**13**	**2600**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**2000**	**8700**	**2400**	**540**	**610**	**8500**	**15**			**110**	**30**	**2500**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**2440**	**10100**	**3200**	**980**	**1480**	**12400**	**20.2**			**158**	**43**	**5100**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017		< 0.15 U										< 0.0091 U
Toluene	SW8260	185600	0.27		**1.8**										**0.72**
Ethylbenzene	SW8260	232000	0.34		< 0.15 U										**0.015**
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83		< 0.15 U										**0.02**
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260				< 0.15 U										< 0.0091 U
1,1-Dichloroethene	SW8260				< 0.15 U										< 0.0091 U
1,2,4-Trimethylbenzene	SW8260				< 0.15 U										**0.09**
1,3,5-Trimethylbenzene	SW8260				< 0.15 U										**0.083**
2-Butanone	SW8260				< 0.77 U										< 0.045 U
Acetone	SW8260				< 0.77 U										**0.14 J**
Chloroform	SW8260				< 0.15 U										< 0.0091 U
cis-1,2-Dichloroethene (DCE)	SW8260				< 0.15 U										< 0.0091 U
Isopropylbenzene	SW8260				< 0.15 U										< 0.0091 U
p-Isopropyltoluene	SW8260				< 0.15 U										**0.044**
Styrene	SW8260				< 0.15 U										< 0.0091 U
Tetrachloroethene (PCE)	SW8260				< 0.15 U										< 0.0091 U
Trichloroethene (TCE)	SW8260				< 0.15 U										< 0.0091 U
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260				< 0.77 U										**0.4**
Naphthalene	SW8270														
Naphthalene	SW8270SIM				**0.011**				**0.7**						**0.99**
Total Naphthalenes	CALC	53,767	0.24		**0.011**				**0.7**						**0.99**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM				**0.023**				**1.6**						**1.8**
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM				**0.0068**				**0.16**						**18**
Anthracene	SW8270														
Anthracene	SW8270SIM				**0.014**				**0.86 J**						**1.8**
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM				**0.041 J**				**0.55**						**3.5**
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM				**0.032 J**				**4.6**						**6.9**
Fluorene	SW8270														
Fluorene	SW8270SIM				**0.014**				**1.4**						**1**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-10	TP-10	TP-11	TP-11	TP-11	TP-11	TP-14	TP-14	TP-14	TP-14	TP-15	TP-16
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft
			Sample Date	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/05/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM				**0.023**				**2.7**						**2.2**
Pyrene	SW8270														
Pyrene	SW8270SIM				**0.018**				**2.8**						**6.2**
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM				**0.02 J**				**1.2**						**3.8**
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM				**0.025**				**0.94**						**7**
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM				**0.036 J**				**1**						**4.5**
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM				**0.023 J**				**0.78**						**5.6**
Chrysene	SW8270														
Chrysene	SW8270SIM				**0.038**				**1.8**						**4.3**
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM				**0.0091 J**				**0.16 J**						**1.4**
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM				**0.018 J**				**0.55**						**3.8**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19		**0.03599 J**				**1.327 J**						**8.953**
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260				< 0.77 U										< 0.045 U
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082					< 0.036 U				< 0.034 U	< 0.037 U			< 0.035 U	< 0.04 U
Aroclor 1221	SW8082					< 0.073 U				< 0.069 U	< 0.073 U			< 0.07 U	< 0.08 U
Aroclor 1232	SW8082					< 0.036 U				< 0.034 U	< 0.037 U			< 0.035 U	< 0.04 U
Aroclor 1242	SW8082					< 0.036 U				< 0.034 U	< 0.037 U			< 0.035 U	< 0.04 U
Aroclor 1248	SW8082					**0.52**				< 0.034 U	**0.098**			< 0.035 U	**1**
Aroclor 1254	SW8082					**1.5**				< 0.034 U	**0.6**			**0.043**	**3.1**
Aroclor 1260	SW8082					**1.1**				< 0.034 U	**0.26**			**0.058**	**4.6**
Total PCBs (Sum of Aroclors)	CALC	10				**3.21**				**0.14**	**1.05**			**0.206**	**11.5**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	< 5 U	< 6 U	< 5 U			< 9 U	< 5 U			< 6 U	< 5 U	**40**
Barium	6010/7000	44,884	83	**61**	**49.5**	**254**			**164**	**41.8**			**84.9**	**42.6**	**999**
Cadmium	6010/7000	1,496		**0.7**	**0.4**	**5.7**			< 0.3 U	< 0.2 U			**2.3**	< 0.2 U	**45**
Chromium	6010/7000	1,000,000	24,007	**32.2**	**28.8**	**54.4**			**18.4**	**22.2**			**35.3**	**32.8**	**105**
Copper	6010/7000	299,224	14	**60.3**	**29.3**	**157**			**31.5**	**13**			**78.6**	**29.4**	**1210**
Lead	6010/7000	2,000	150	**72**	**15**	**202**			**57**	**8**	**560**	**20**	**152**	**79**	**2590**
Mercury	6010/7000	2,900	0.10	**0.07**	< 0.06 U	**0.27**			**0.1**	< 0.05 U			**0.07**	< 0.04 U	**2.19**
Selenium	6010/7000	11,221	0.26	< 5 U	< 6 U	**5**			< 9 U	< 5 U			< 6 U	< 5 U	< 30 U
Silver	6010/7000	6,359	0.69	**0.3**	< 0.4 U	**0.3**			< 0.5 U	< 0.3 U			< 0.4 U	**0.3**	**2**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-16	TP-17	TP-17	TP-17	TP-17	TP-18	TP-19	TP-20	TP-20	TP-20	TP-20	TP-23
			Depth range	2 - 3 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft
			Sample Date	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/11/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**940**	**300**				**55**	**75**	< 5.2 U	**140**			< 5.2 U
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**1400**	**1200**				**160**	**220**	< 10 U	**410**			**17**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**2340**	**1500**				**215**	**295**	< 15.2 U	**550**			**22.2**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM														
Total Naphthalenes	CALC	53,767	0.24												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM														
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM														
Anthracene	SW8270														
Anthracene	SW8270SIM														
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM														
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM														
Fluorene	SW8270														
Fluorene	SW8270SIM														

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-16	TP-17	TP-17	TP-17	TP-17	TP-18	TP-19	TP-20	TP-20	TP-20	TP-20	TP-23
			Depth range	2 - 3 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft
			Sample Date	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/06/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/10/2000	10/11/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM														
Pyrene	SW8270														
Pyrene	SW8270SIM														
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM														
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM														
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM														
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM														
Chrysene	SW8270														
Chrysene	SW8270SIM														
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM														
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM														
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19												
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082				< 0.035 U					< 0.038 U	< 0.035 U	< 0.036 U			< 0.035 U
Aroclor 1221	SW8082				< 0.071 U					< 0.076 U	< 0.07 U	< 0.072 U			< 0.07 U
Aroclor 1232	SW8082				< 0.035 U					< 0.038 U	< 0.035 U	< 0.036 U			< 0.035 U
Aroclor 1242	SW8082				< 0.035 U					< 0.038 U	< 0.035 U	< 0.036 U			< 0.035 U
Aroclor 1248	SW8082				**0.43**					< 0.038 U	< 0.035 U	**0.18**			< 0.035 U
Aroclor 1254	SW8082				**0.67**					**0.057**	**0.02**	**0.97**			**0.019**
Aroclor 1260	SW8082				**1.6**					**0.06**	**0.023**	**0.32**			**0.02**
Total PCBs (Sum of Aroclors)	CALC	10			**2.79**					**0.231**	**0.148**	**1.56**			**0.144**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15		**60**				**8**	**20**	< 6 U	**20**			< 5 U
Barium	6010/7000	44,884	83		**272**				**107**	**111**	**35.9**	**304**			**40.4**
Cadmium	6010/7000	1,496		**68**	**15**				**3.3**	**4**	< 0.2 U	**26.2**	**1**		< 0.2 U
Chromium	6010/7000	1,000,000	24,007		**120**				**26.3**	**46**	**22**	**84**			**25.1**
Copper	6010/7000	299,224	14		**2930**				**451**	**1060**	**17.2**	**6970**			**21.9**
Lead	6010/7000	2,000	150	**8240**	**1470**	**30**	**30**	**20**	**311**	**204**	**6**	**10200**	**540**	**230**	**11**
Mercury	6010/7000	2,900	0.10		**0.4**				**0.88**	**1.35**	< 0.06 U	**0.95**			< 0.04 U
Selenium	6010/7000	11,221	0.26		< 50 U				< 5 U	< 10 U	**6**	< 10 U			< 5 U
Silver	6010/7000	6,359	0.69		< 3 U				**0.9**	**3.4**	< 0.3 U	**2.8**			< 0.3 U

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-23	TP-23	TP-23	TP-24	TP-25	TP-26	TP-26	TP-26	TP-27	TP-27	TP-27	TP-28
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft
			Sample Date	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**260**			**28**	**58**	**6.4**	**120**	**26**	**670**	**120**		**190**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**970**			**130**	**380**	**15**	**470**	**78**	**2200**	**430**		**940**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**1230**			**158**	**438**	**21.4**	**590**	**104**	**2870**	**550**		**1130**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017									< 0.005 U			
Toluene	SW8260	185600	0.27									**0.32**			
Ethylbenzene	SW8260	232000	0.34									< 0.005 U			
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83									< 0.01 U			
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260											< 0.005 U			
1,1-Dichloroethene	SW8260											< 0.005 U			
1,2,4-Trimethylbenzene	SW8260											< 0.005 U			
1,3,5-Trimethylbenzene	SW8260											< 0.005 U			
2-Butanone	SW8260											< 0.025 U			
Acetone	SW8260											< 0.025 U			
Chloroform	SW8260											< 0.005 U			
cis-1,2-Dichloroethene (DCE)	SW8260											< 0.005 U			
Isopropylbenzene	SW8260											< 0.005 U			
p-Isopropyltoluene	SW8260											< 0.005 U			
Styrene	SW8260											< 0.005 U			
Tetrachloroethene (PCE)	SW8260											< 0.005 U			
Trichloroethene (TCE)	SW8260											< 0.005 U			
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260											< 0.025 U			
Naphthalene	SW8270														
Naphthalene	SW8270SIM											**0.08**			
Total Naphthalenes	CALC	53,767	0.24									**0.08**			
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM											**0.011 J**			
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM											**0.025**			
Anthracene	SW8270														
Anthracene	SW8270SIM											**0.034**			
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM											**0.22**			
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM											**0.15**			
Fluorene	SW8270														
Fluorene	SW8270SIM											**0.011**			

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-23	TP-23	TP-23	TP-24	TP-25	TP-26	TP-26	TP-26	TP-27	TP-27	TP-27	TP-28
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft
			Sample Date	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000	10/11/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM											**0.13**			
Pyrene	SW8270														
Pyrene	SW8270SIM											**0.19**			
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM											**0.11**			
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM											**0.14**			
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM											**0.19**			
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM											**0.12**			
Chrysene	SW8270														
Chrysene	SW8270SIM											**0.27**			
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM											**0.048**			
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM											**0.16**			
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19									**0.2055**			
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260											< 0.025 U			
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082							< 0.036 U				< 0.038 U			
Aroclor 1221	SW8082							< 0.072 U				< 0.077 U			
Aroclor 1232	SW8082							< 0.036 U				< 0.038 U			
Aroclor 1242	SW8082							< 0.036 U				< 0.038 U			
Aroclor 1248	SW8082							**0.042**				**0.14**			
Aroclor 1254	SW8082							**0.043**				**0.53**			
Aroclor 1260	SW8082							**0.048**				**0.94**			
Total PCBs (Sum of Aroclors)	CALC	10						**0.223**				**1.7**			
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	**30**			**6**	< 5 U	< 5 U	< 6 U	< 7 U	**40**	< 10 U		**20**
Barium	6010/7000	44,884	83	**376**			**105**	**52.5**	**47.4**	**272**	**80.1**	**261**	**217**		**382**
Cadmium	6010/7000	1,496		**15.3**			**2.3**	**0.3**	**0.3**	**0.2**	< 0.3 U	**8.4**	**6.2**		**16.5**
Chromium	6010/7000	1,000,000	24,007	**127**			**34.3**	**28.4**	**30.3**	**20.8**	**17.3**	**119**	**49**		**91**
Copper	6010/7000	299,224	14	**1560**			**539**	**151**	**21.6**	**40.9**	**31.1**	**806**	**3130**		**789**
Lead	6010/7000	2,000	150	**1190**	**140**	**130**	**438**	**48**	**9**	**17**	**13**	**14700**	**575**		**1430**
Mercury	6010/7000	2,900	0.10	**1.21**	**0.19**		**0.7**	**0.14**	< 0.05 U	< 0.05 U	< 0.06 U	**1.83**	**1.82**	< 0.06 U	**1.56**
Selenium	6010/7000	11,221	0.26	< 10 U			**6**	< 5 U	< 5 U	< 6 U	< 7 U	< 10 U	< 10 U		**10**
Silver	6010/7000	6,359	0.69	**1.4**			**0.5**	< 0.3 U	< 0.3 U	< 0.3 U	< 0.4 U	**1.7**	**1.3**		**1.5**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water	TP-28 2 - 3 ft 10/11/2000	TP-28 4 - 6 ft 10/11/2000	TP-28 6 - 10 ft 10/11/2000	TP-29 0 - 1 ft 10/12/2000	TP-30 0 - 1 ft 10/12/2000	TP-30 2 - 3 ft 10/12/2000	TP-30 4 - 6 ft 10/12/2000	TP-30 6 - 10 ft 10/12/2000	TP-31 0 - 1 ft 10/12/2000	TP-31 2 - 3 ft 10/12/2000	TP-32 0 - 1 ft 10/12/2000	TP-34 0 - 1 ft 10/12/2000
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**930**			**39**	**330**	**700**	**8.5**		**490**	**290**	**450**	**460**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**1000**			**320**	**1800**	**2500**	**15**		**1300**	**610**	**1700**	**1400**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**1930**			**359**	**2130**	**3200**	**23.5**		**1790**	**900**	**2150**	**1860**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017	< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
Toluene	SW8260	185600	0.27	**0.15**					**0.64**			**0.64**	**0.17**	**0.78**	
Ethylbenzene	SW8260	232000	0.34	< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83	< 0.011 U					**0.0164**			< 0.0094 U	**0.0066**	**0.0137**	
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
1,1-Dichloroethene	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
1,2,4-Trimethylbenzene	SW8260			< 0.0055 U					**0.18**			< 0.0047 U	**0.022**	**0.012**	
1,3,5-Trimethylbenzene	SW8260			< 0.0055 U					**0.15**			< 0.0047 U	**0.014**	**0.009**	
2-Butanone	SW8260			< 0.028 U					< 0.024 U			< 0.023 U	< 0.027 U	**0.045**	
Acetone	SW8260			< 0.028 U					**0.13**			**0.092**	**0.076**	**0.3**	
Chloroform	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
cis-1,2-Dichloroethene (DCE)	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
Isopropylbenzene	SW8260			< 0.0055 U					**0.035**			< 0.0047 U	< 0.0055 U	< 0.0051 U	
p-Isopropyltoluene	SW8260			< 0.0055 U					< 0.0048 U			**0.0076**	< 0.0055 U	< 0.0051 U	
Styrene	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
Tetrachloroethene (PCE)	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
Trichloroethene (TCE)	SW8260			< 0.0055 U					< 0.0048 U			< 0.0047 U	< 0.0055 U	< 0.0051 U	
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260			< 0.028 U					< 0.024 U			< 0.023 U	< 0.027 U	< 0.025 U	
Naphthalene	SW8270														
Naphthalene	SW8270SIM								**0.14**						
Total Naphthalenes	CALC	53,767	0.24	< 0.028 U					**0.14**			< 0.023 U	< 0.027 U	< 0.025 U	
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM								**0.053**						
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM								**0.11**						
Anthracene	SW8270														
Anthracene	SW8270SIM								**0.2**						
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM								**0.49**						
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM								**0.84**						
Fluorene	SW8270														
Fluorene	SW8270SIM								**0.091**						

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-28	TP-28	TP-28	TP-29	TP-30	TP-30	TP-30	TP-30	TP-31	TP-31	TP-32	TP-34
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	0 - 1 ft
			Sample Date	10/11/2000	10/11/2000	10/11/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000	10/12/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM								**0.5**						
Pyrene	SW8270														
Pyrene	SW8270SIM								**0.95**						
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM								**0.5**						
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM								**0.52**						
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM								**0.82**						
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM								**0.44**						
Chrysene	SW8270														
Chrysene	SW8270SIM								**1.9**						
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM								**0.12**						
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM								**0.38**						
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19						**0.765**						
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260			< 0.028 U					< 0.024 U			< 0.023 U	< 0.027 U	< 0.025 U	
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082						< 0.036 U					< 0.037 U			< 0.04 U
Aroclor 1221	SW8082						< 0.071 U					< 0.074 U			< 0.08 U
Aroclor 1232	SW8082						< 0.036 U					< 0.037 U			< 0.04 U
Aroclor 1242	SW8082						< 36 U					< 0.037 U			< 0.04 U
Aroclor 1248	SW8082						< 0.036 U					**0.15**			**0.12**
Aroclor 1254	SW8082						< 0.036 U					**0.71**			**0.57**
Aroclor 1260	SW8082						**0.024**					**0.76**			**0.5**
Total PCBs (Sum of Aroclors)	CALC	10					**0.15**					**1.71**			**1.3**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	**20**			**5**	**30**	**20**			< 10 U	< 10 U	**30**	< 10 U
Barium	6010/7000	44,884	83	**444**			**67.9**	**733**	**805**			**558**	**189**	**2010**	**1740**
Cadmium	6010/7000	1,496		**16.5**	< 1 U		**0.2**	**59.5**	**21.2**	< 1 U		**19.3**	**6.4**	**84**	**42**
Chromium	6010/7000	1,000,000	24,007	**88**			**29.7**	**108**	**90**			**58**	**40**	**271**	**92**
Copper	6010/7000	299,224	14	**3000**			**24.6**	**1960**	**540**			**417**	**182**	**3720**	**4030**
Lead	6010/7000	2,000	150	**2340**	< 10 U	**7**	**16**	**2410**	**1110**	< 10 U	**50**	**1040**	**387**	**4470**	**5100**
Mercury	6010/7000	2,900	0.10	**1.12**	< 0.05 U		< 0.04 U	**2.06**	**0.57**			**0.63**	**0.42**	**2.36**	**1.23**
Selenium	6010/7000	11,221	0.26	< 10 U			< 5 U	< 10 U	< 10 U			< 10 U	< 10 U	< 30 U	< 10 U
Silver	6010/7000	6,359	0.69	**1.8**			< 0.3 U	**2.6**	**1.4**			**1**	**0.7**	**3**	**1.6**

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-34	TP-34	TP-34	TP-35	TP-35	TP-35	TP-35	TP-36	TP-36	TP-37	TP-37	TP-37
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft
			Sample Date	10/12/2000	10/12/2000	10/12/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**710**	**59**		**190**				**15**	**280**	**810**	**970**	**60**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**2600**	**160**		**350**				**56**	**220**	**2100**	**2800**	**84**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**3310**	**219**		**540**				**71**	**500**	**2910**	**3770**	**144**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017									< 0.0043 U			
Toluene	SW8260	185600	0.27									**0.084**			
Ethylbenzene	SW8260	232000	0.34									**0.003**			
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83									< 0.0086 U			
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260											< 0.0043 U			
1,1-Dichloroethene	SW8260											< 0.0043 U			
1,2,4-Trimethylbenzene	SW8260											**0.0062**			
1,3,5-Trimethylbenzene	SW8260											**0.01**			
2-Butanone	SW8260											< 0.022 U			
Acetone	SW8260											**0.03 J**			
Chloroform	SW8260											< 0.0043 U			
cis-1,2-Dichloroethene (DCE)	SW8260											< 0.0043 U			
Isopropylbenzene	SW8260											**0.0022**			
p-Isopropyltoluene	SW8260											**0.0074**			
Styrene	SW8260											< 0.0043 U			
Tetrachloroethene (PCE)	SW8260											< 0.0043 U			
Trichloroethene (TCE)	SW8260											< 0.0043 U			
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260											**0.15**			
Naphthalene	SW8270														
Naphthalene	SW8270SIM			**0.95**										**0.3**	
Total Naphthalenes	CALC	53,767	0.24	**0.95**								**0.15**		**0.3**	
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM			**1.9**										**0.078**	
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM			**0.1**										**0.094**	
Anthracene	SW8270														
Anthracene	SW8270SIM			**1.3**										**0.34**	
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM			**0.93**										**1.2**	
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM			**4.7**										**1.9**	
Fluorene	SW8270														
Fluorene	SW8270SIM			**0.91**										**0.2**	

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-34	TP-34	TP-34	TP-35	TP-35	TP-35	TP-35	TP-36	TP-36	TP-37	TP-37	TP-37
			Depth range	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft
			Sample Date	10/12/2000	10/12/2000	10/12/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/13/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM			**4.3**										**1.1**	
Pyrene	SW8270														
Pyrene	SW8270SIM			**4**										**2**	
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM			**1.9**										**0.81**	
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM			**1.3**										**1**	
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM			**2**										**1.1**	
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM			**1.1**										**0.75**	
Chrysene	SW8270														
Chrysene	SW8270SIM			**4.2**										**1.2**	
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM			**0.24**										**0.27**	
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.79**										**0.87**	
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19	**1.945**										**1.392**	
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260											< 0.022 U			
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082			< 0.041 U			< 0.036 U				< 0.037 U		< 0.037 U		
Aroclor 1221	SW8082			< 0.081 U			< 0.073 U				< 0.074 U		< 0.074 U		
Aroclor 1232	SW8082			< 0.041 U			< 0.036 U				< 0.037 U		< 0.037 U		
Aroclor 1242	SW8082			< 0.041 U			< 0.036 U				< 0.037 U		< 0.037 U		
Aroclor 1248	SW8082			**0.11**			< 0.036 U				**0.031**		**0.46**		
Aroclor 1254	SW8082			**0.51**			**0.21**				**0.056**		**1.5**		
Aroclor 1260	SW8082			**0.4**			**0.3**				**0.06**		**1.3**		
Total PCBs (Sum of Aroclors)	CALC	10		**1.12**			**0.619**				**0.24**		**3.35**		
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	**30**			< 10 U				< 10 U	< 10 U	**30**	**20**	
Barium	6010/7000	44,884	83	**1400**			**290**				**54.5**	**31.7**	**979**	**1630**	
Cadmium	6010/7000	1,496		**52**			**8.4**				**0.9**	**0.5**	**26.6**	**24.7**	< 1 U
Chromium	6010/7000	1,000,000	24,007	**91**			**153**				**31**	**19**	**124**	**112**	
Copper	6010/7000	299,224	14	**1570**			**1260**				**39.3**	**25.3**	**625**	**483**	
Lead	6010/7000	2,000	150	**3990**	**1110**	**40**	**4230**	**240**	**30**	**20**	**36**	**15**	**1900**	**1630**	**20**
Mercury	6010/7000	2,900	0.10	**1.08**	< 0.05 U		**0.52**				**0.12**	**0.06**	**4.18**	**2.66**	< 0.05 U
Selenium	6010/7000	11,221	0.26	< 30 U			< 10 U				< 10 U	< 10 U	**10**	< 10 U	
Silver	6010/7000	6,359	0.69	< 2 U			**2.2**				< 0.6 U	< 0.8 U	**1.1**	< 0.6 U	

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-37	TP-40	TP-40	TP-40	TP-41	TP-42	TP-43	TP-43	TP-43	TP-43	TP-46	TP-46
			Depth range	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft
			Sample Date	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX				**1100**	**670**	**100**	< 5.2 U	**42**	**1000**	**1500**	< 5.3 U		**140**	**170**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX				**2300**	**1600**	**230**	**16**	**130**	**2800**	**3400**	< 11 U		**450**	**510**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000			**3400**	**2270**	**330**	**21.2**	**172**	**3800**	**4900**	< 16.3 U		**590**	**680**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM				**0.98**						**0.29**				
Total Naphthalenes	CALC	53,767	0.24		**0.98**						**0.29**				
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM				**0.74**						**0.31**				
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM				**3.8**						**0.34**				
Anthracene	SW8270														
Anthracene	SW8270SIM				**4.7**						**0.83**				
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM				**13**						**1.3**				
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM				**43**						**3.6**				
Fluorene	SW8270														
Fluorene	SW8270SIM				**1.4**						**0.25**				

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-37	TP-40	TP-40	TP-40	TP-41	TP-42	TP-43	TP-43	TP-43	TP-43	TP-46	TP-46
			Depth range	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft
			Sample Date	10/13/2000	10/13/2000	10/13/2000	10/13/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000	10/16/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM				**17**						**2.3**				
Pyrene	SW8270														
Pyrene	SW8270SIM				**51**						**2.6**				
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270				**33**										
Benz(a)anthracene	SW8270SIM										**1.6**				
Benzo(a)pyrene	SW8270				**28**										
Benzo(a)pyrene	SW8270SIM										**1.7**				
Benzo(b)fluoranthene	SW8270				**24**										
Benzo(b)fluoranthene	SW8270SIM										**1.5 J**				
Benzo(k)fluoranthene	SW8270				**23**										
Benzo(k)fluoranthene	SW8270SIM										**1.4**				
Chrysene	SW8270				**41**										
Chrysene	SW8270SIM										**2.2**				
Dibenzo(a,h)anthracene	SW8270				**4.8**										
Dibenzo(a,h)anthracene	SW8270SIM										**0.44**				
Indeno(1,2,3-cd)pyrene	SW8270				**14**										
Indeno(1,2,3-cd)pyrene	SW8270SIM										**1.1**				
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19		**38.29**						**2.326 J**				
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082				< 0.038 U	< 0.038 U		< 0.035 U		< 0.46 U	< 0.47 U	< 0.036 U		< 0.036 U	< 0.038 U
Aroclor 1221	SW8082				< 0.077 U	< 0.076 U		< 0.07 U		< 0.92 U	< 0.93 U	< 0.072 U		< 0.073 U	< 0.076 U
Aroclor 1232	SW8082				< 0.038 U	< 0.038 U		< 0.035 U		< 0.46 U	< 0.47 U	< 0.036 U		< 0.036 U	< 0.038 U
Aroclor 1242	SW8082				< 0.038 U	< 0.038 U		< 0.035 U		< 0.46 U	< 0.47 U	< 0.036 U		< 0.036 U	< 0.038 U
Aroclor 1248	SW8082				**3.7**	**0.6**		< 0.035 U		**2.6**	**1.9**	< 0.036 U		**0.9**	< 0.038 U
Aroclor 1254	SW8082				**18**	**3.2**		**0.049**		**14**	**8.1**	**0.036**		**8.3**	**0.051**
Aroclor 1260	SW8082				**6**	**1.7**		**0.021**		**6.8**	**8.6**	< 0.036 U		**4.3**	< 0.038 U
Total PCBs (Sum of Aroclors)	CALC	10			**27.8**	**5.6**		**0.175**		**23.9**	**19.8**	**0.162**		**13.6**	**0.184**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15		**60**	< 30 U	< 10 U	< 30 U	< 30 U	**90**	**80**			**40**	
Barium	6010/7000	44,884	83		**738**	**851**	**126**	**38**	**78**	**1620**	**1280**			**302**	
Cadmium	6010/7000	1,496			**36**	**40**	**3.7**	< 1 U	**2**	**54**	**46**	< 1 U		**15**	**9**
Chromium	6010/7000	1,000,000	24,007		**670**	**212**	**31**	**39**	**31**	**566**	**259**			**721**	**104**
Copper	6010/7000	299,224	14		**2530**	**1240**	**94**	**20**	**98**	**5620**	**2520**			**1820**	
Lead	6010/7000	2,000	150	**30**	**3700**	**2050**	**192**	**20**	**130**	**9370**	**12300**	**10**	**70**	**2100**	**970**
Mercury	6010/7000	2,900	0.10		**15**	**3.19**	**0.22**	**5.5**	**4.33**	**47**	**21**	< 0.04 U		**10.6**	**2.88**
Selenium	6010/7000	11,221	0.26		< 50 U	< 30 U	< 10 U	< 30 U	< 30 U	< 30 U	< 30 U			< 30 U	
Silver	6010/7000	6,359	0.69		**4**	**3**	< 0.7 U	< 2 U	< 2 U	**6**	**5**			**69**	

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-46	TP-46	TP-47	TP-48	TP-48	TP-49	TP-49	TP-49	TP-49	TP-50	TP-50	TP-51
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	6 - 8.5 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft
			Sample Date	10/16/2000	10/16/2000	10/16/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	11/14/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**1000**	**45**	**6.2**	**130**	**630**	**220**	**29**	**11000**	**14000**	**110**	**39**	**35 J**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**2700**	**150**	< 11 U	**290**	**870**	**1500**	**50**	**4000**	**2900**	**230**	**54**	**100**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**3700**	**195**	**17.2**	**420**	**1500**	**1720**	**79**	**15000**	**16900**	**340**	**93**	**135 J**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017							< 0.0011 U	< 0.009 U	< 0.022 U	**0.0013**	< 0.01 U	
Toluene	SW8260	185600	0.27							**0.0037**	**1.6**	**0.27**	**0.61**	**0.27**	
Ethylbenzene	SW8260	232000	0.34							< 0.0011 U	**0.027**	**0.024**	< 0.0011 U	< 0.0011 U	
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83							< 0.0022 U	**0.078**	**0.142**	< 0.0022 U	< 0.0022 U	
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
1,1-Dichloroethene	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
1,2,4-Trimethylbenzene	SW8260									< 0.0011 U	**0.95**	**0.82**	< 0.0011 U	< 0.0011 U	
1,3,5-Trimethylbenzene	SW8260									< 0.0011 U	**0.58**	**0.49**	< 0.0011 U	< 0.0011 U	
2-Butanone	SW8260									< 0.0057 U	**0.12**	**0.12**	**0.012**	< 0.0056 U	
Acetone	SW8260									< 0.0057 U	**0.51**	**0.53**	**0.094**	**0.049**	
Chloroform	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
cis-1,2-Dichloroethene (DCE)	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
Isopropylbenzene	SW8260									< 0.0011 U	**0.017**	**0.039**	< 0.0011 U	< 0.0011 U	
p-Isopropyltoluene	SW8260									< 0.0011 U	**0.2**	**0.25**	< 0.0011 U	< 0.0011 U	
Styrene	SW8260									< 0.0011 U	< 0.0078 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
Tetrachloroethene (PCE)	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
Trichloroethene (TCE)	SW8260									< 0.0011 U	< 0.009 U	< 0.022 U	< 0.0011 U	< 0.0011 U	
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260									< 0.0057 U	**16**	**8.8**	< 0.0054 U	< 0.0056 U	
Naphthalene	SW8270														
Naphthalene	SW8270SIM			**0.21**								**8.4**			
Total Naphthalenes	CALC	53,767	0.24	**0.21**						< 0.0057 U	**16**	**8.4**	< 0.0054 U	< 0.0056 U	
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM			**0.055**								**440**			
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM			**0.055**								**16**			
Anthracene	SW8270														
Anthracene	SW8270SIM			**0.11**								**250**			
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM			**0.35**								**38**			
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM			**0.62**								**810**			
Fluorene	SW8270														
Fluorene	SW8270SIM			**0.063**								**390**			

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-46	TP-46	TP-47	TP-48	TP-48	TP-49	TP-49	TP-49	TP-49	TP-50	TP-50	TP-51
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	6 - 8.5 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft
			Sample Date	10/16/2000	10/16/2000	10/16/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	10/17/2000	11/14/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM			**0.35**								**1300**			
Pyrene	SW8270														
Pyrene	SW8270SIM			**0.43**								**620**			
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM			**0.25**								**150**			
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM			**0.31 J**								**82**			
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM			**0.3 J**								**73**			
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM			**0.3 J**								**54**			
Chrysene	SW8270														
Chrysene	SW8270SIM			**0.45**								**230**			
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM			**0.094**								**14 J**			
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.2**								**31**			
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19	**0.4289 J**								**116.5 J**			
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260									< 0.0057 U	< 0.045 U	< 0.11 U	< 0.0054 U	< 0.0056 U	
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082					< 0.037 U			< 0.035 U				< 0.036 U	< 0.037 U	< 0.036 U
Aroclor 1221	SW8082					< 0.075 U			< 0.07 U				< 0.071 U	< 0.073 U	< 0.072 U
Aroclor 1232	SW8082					< 0.037 U			< 0.035 U				< 0.036 U	< 0.037 U	< 0.036 U
Aroclor 1242	SW8082					< 0.037 U			< 0.035 U				< 0.036 U	< 0.037 U	< 0.036 U
Aroclor 1248	SW8082					< 0.037 U			< 0.035 U				**0.87**	< 0.037 U	**0.043**
Aroclor 1254	SW8082					< 0.037 U			**0.19**				**5.3**	**0.036**	**0.14**
Aroclor 1260	SW8082					< 0.037 U			**0.13**				**1.3**	< 0.037 U	**0.14**
Total PCBs (Sum of Aroclors)	CALC	10				**0.149**			**0.425**				**7.6**	**0.165**	**0.413**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	**50**		< 30 U	**40**	< 70 U	< 30 U	< 30 U	< 30 U	< 50 U	< 30 U	< 30 U	< 30 U
Barium	6010/7000	44,884	83	**1910**		**33**	**232**	**67**	**71**	**64**	**78**	**51**	**293**	**69**	**73**
Cadmium	6010/7000	1,496		**93**		< 1 U	**8**	< 3 U	**1**	< 1 U	< 1 U	< 2 U	**18**	< 1 U	< 1 U
Chromium	6010/7000	1,000,000	24,007	**93**	**0.9**	**25**	**52**	**18**	**33**	**20**	**15**	**23**	**55**	**44**	**34**
Copper	6010/7000	299,224	14	**1180**		**13**	**588**	**45**	**78**	**20**	**20**	**942**	**1100**	**29**	**61**
Lead	6010/7000	2,000	150	**4320**	**82**	< 10 U	**630**	**40**	**150**	**10**	**150**	**430**	**570**	**150**	**100**
Mercury	6010/7000	2,900	0.10	**0.83**		< 0.05 U	**0.45**	< 0.1 U	**0.13**	< 0.05 U	**0.44**	**0.12**	**0.61**	< 0.05 U	**0.05**
Selenium	6010/7000	11,221	0.26	< 30 U		< 30 U	< 30 U	< 70 U	< 30 U	< 30 U	< 30 U	< 50 U	< 30 U	< 30 U	< 30 U
Silver	6010/7000	6,359	0.69	**2**		< 2 U	< 2 U	< 4 U	< 2 U	< 2 U	< 2 U	< 3 U	< 2 U	< 2 U	< 2 U

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-52	TP-52	TP-52	TP-53	TP-54	TP-55	TP-55	TP-55	TP-55	TP-56	TP-57	TP-57
			Depth range	0 - 1 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft	2 - 3 ft
			Sample Date	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000	11/14/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**86 J**	**240**	**730**	**690 J**	**160 J**	**1700 J**	**2000**	**1700**	**2400**	**16 J**	**2200 J**	**66**
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**440**	**140**	**870**	**700**	**310**	**6300**	**8000**	**6500**	**12000**	**54**	**4700**	**98**
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**526 J**	**380**	**1600**	**1390 J**	**470 J**	**8000 J**	**10000**	**8200**	**14400**	**70 J**	**6900 J**	**164**
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM									< 1.3 U		**0.68**	
Total Naphthalenes	CALC	53,767	0.24									< 1.3 U		**0.68**	
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM											**3.9**		< 0.081 U	
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM											< 1.3 U		< 0.081 U	
Anthracene	SW8270														
Anthracene	SW8270SIM											**1.4**		< 0.081 U	
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM											< 1.3 U		**0.31 J**	
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM											**4.6**		**0.53**	
Fluorene	SW8270														
Fluorene	SW8270SIM											**3.6**		< 0.081 U	

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water	TP-52 0 - 1 ft 11/14/2000	TP-52 4 - 6 ft 11/14/2000	TP-52 6 - 10 ft 11/14/2000	TP-53 0 - 1 ft 11/14/2000	TP-54 0 - 1 ft 11/14/2000	TP-55 0 - 1 ft 11/14/2000	TP-55 2 - 3 ft 11/14/2000	TP-55 4 - 6 ft 11/14/2000	TP-55 6 - 10 ft 11/14/2000	TP-56 0 - 1 ft 11/14/2000	TP-57 0 - 1 ft 11/14/2000	TP-57 2 - 3 ft 11/14/2000
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM											**7**		**0.26**	
Pyrene	SW8270														
Pyrene	SW8270SIM											**3.1**		**0.63**	
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM											< 1.3 U		**0.22**	
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM											< 1.3 U		**0.25**	
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM											< 1.3 U		**0.31 J**	
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM											< 1.3 U		**0.22**	
Chrysene	SW8270														
Chrysene	SW8270SIM											**1.7 J**		**0.32 J**	
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM											< 1.3 U		< 0.081 U	
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM											< 1.3 U		**0.19**	
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19									**0.992 J**		**0.35125 J**	
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082						< 0.035 U		< 0.036 U					**0.71**	
Aroclor 1221	SW8082						< 0.07 U		< 0.073 U					< 0.082 U	
Aroclor 1232	SW8082						< 0.035 U		< 0.036 U					< 0.041 U	
Aroclor 1242	SW8082						< 0.035 U		< 0.036 U					< 0.041 U	
Aroclor 1248	SW8082						< 0.035 U		**0.83**					**1.4**	
Aroclor 1254	SW8082						**0.054**		**3**					**1.2**	
Aroclor 1260	SW8082						**0.046**		**1.5**					**0.29**	
Total PCBs (Sum of Aroclors)	CALC	10					**0.205**		**5.42**					**3.68**	
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	< 20 U			< 30 U	< 30 U	< 30 U				< 30 U	**60**	
Barium	6010/7000	44,884	83	**50**			**63**	**242**	**1080**				**63**	**2740**	
Cadmium	6010/7000	1,496		< 1 U			< 1 U	**8**	**29**	**21.1**			**2**	**70**	**1.7**
Chromium	6010/7000	1,000,000	24,007	**27**			**31**	**48**	**117**				**31**	**145**	
Copper	6010/7000	299,224	14	**38.2**			**40**	**273**	**465**				**88**	**7410**	
Lead	6010/7000	2,000	150	**38**			**20**	**410**	**1750**	**772**	**106**	**70**	**70**	**2710**	**28**
Mercury	6010/7000	2,900	0.10	**0.06**			**0.05**	**0.98**	**0.83**				**0.12**	**0.6**	
Selenium	6010/7000	11,221	0.26	< 20 U			< 30 U	< 30 U	< 30 U				< 30 U	**40**	
Silver	6010/7000	6,359	0.69	< 1 U			< 2 U	< 2 U	< 2 U				< 2 U	< 2 U	

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-57	TP-57	TP-58	TP-58	TP-58	TP-58	TP-59	TP-59	TP-60	TP-60	TP-60	TP-60
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft
			Sample Date	11/14/2000	11/14/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**170**	**88**	**11 J**				**520 J**		**980 J**			
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**200**	**350**	< 10 U				**1200**		**1700**			
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**370**	**438**	**21 J**				**1720 J**		**2680 J**			
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM														
Total Naphthalenes	CALC	53,767	0.24												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM														
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM														
Anthracene	SW8270														
Anthracene	SW8270SIM														
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM														
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM														
Fluorene	SW8270														
Fluorene	SW8270SIM														

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	TP-57	TP-57	TP-58	TP-58	TP-58	TP-58	TP-59	TP-59	TP-60	TP-60	TP-60	TP-60
			Depth range	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft
			Sample Date	11/14/2000	11/14/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM														
Pyrene	SW8270														
Pyrene	SW8270SIM														
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM														
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM														
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM														
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM														
Chrysene	SW8270														
Chrysene	SW8270SIM														
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM														
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM														
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19												
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082									< 0.038 U	< 0.036 U	< 0.93 U	< 0.045 U		
Aroclor 1221	SW8082									< 0.076 U	< 0.072 U	< 1.9 U	< 0.09 U		
Aroclor 1232	SW8082									< 0.038 U	< 0.036 U	< 0.93 U	< 0.045 U		
Aroclor 1242	SW8082									< 0.038 U	< 0.036 U	< 0.93 U	< 0.045 U		
Aroclor 1248	SW8082									**13**	**0.38**	< 0.93 U	**0.12**		
Aroclor 1254	SW8082									**9.8**	**0.55**	**29**	**1.1**		
Aroclor 1260	SW8082									**2.1**	**0.2**	**8.3**	**0.58**		
Total PCBs (Sum of Aroclors)	CALC	10								**25**	**1.22**	**40.11**	**1.913**		
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15			< 30 U	< 30 U			**40**	< 30 U	**50**	< 30 U		
Barium	6010/7000	44,884	83			**45**	**602**			**871**	**194**	**1050**	**1410**		
Cadmium	6010/7000	1,496				< 1 U	**17**	< 0.5 U		**34**	**9**	**30**	**20**	**0.9**	
Chromium	6010/7000	1,000,000	24,007			**29**	**105**			**173**	**35**	**225**	**99**		
Copper	6010/7000	299,224	14			**21**	**2070**			**3010**	**388**	**2330**	**773**		
Lead	6010/7000	2,000	150	**80**	**23**	< 10 U	**2340**	**9**	**70**	**2250**	**350**	**10800**	**3260**	**116**	**49**
Mercury	6010/7000	2,900	0.10			**0.06**	**62**			**1.55**	**0.22**	**77**	**1.41**	**0.08**	
Selenium	6010/7000	11,221	0.26			< 30 U	< 30 U			< 30 U	< 30 U	**40**	< 30 U		
Silver	6010/7000	6,359	0.69			< 2 U	< 2 U			**2**	< 2 U	**2**	< 2 U		

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	TP-61	TP-61	TP-61	TP-62	TP-62	TP-62	TP-63	TP-63	TP-63	TP-63	TP-64	TP-65
			Depth range	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	0 - 1 ft	2 - 3 ft	4 - 6 ft	6 - 10 ft	0 - 1 ft	0 - 1 ft
			Sample Date	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000	11/15/2000
			Depth to Water												
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Total Petroleum Hydrocarbons (TPHs)															
Gasoline Range Organics	NWTPH-GX														
Diesel Range Organics	NWTPH-DX			**3700 J**	**8500 J**	**120**	**320 J**			**340 J**	**860 J**	**240**		**150 J**	< 5.3 U
Diesel Range Organics	NWTPH-DXSG														
Motor Oil Range Organics	NWTPH-DX			**1900**	**2300**	**87**	**910**			**1100**	**2100**	**640**		**330**	< 11 U
Motor Oil Range Organics	NWTPH-DXSG														
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000		**5600 J**	**10800 J**	**207**	**1230 J**			**1440 J**	**2960 J**	**880**		**480 J**	< 16.3 U
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000													
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)															
Benzene	SW8260	6870	0.0017												
Toluene	SW8260	185600	0.27												
Ethylbenzene	SW8260	232000	0.34												
m,p-Xylenes	SW8260														
o-Xylene	SW8260														
Total Xylenes	SW8260	773000	0.83												
Total Xylenes	CALC	773000	0.83												
Other Volatile Organic Compounds															
1,1-Dichloroethane	SW8260														
1,1-Dichloroethene	SW8260														
1,2,4-Trimethylbenzene	SW8260														
1,3,5-Trimethylbenzene	SW8260														
2-Butanone	SW8260														
Acetone	SW8260														
Chloroform	SW8260														
cis-1,2-Dichloroethene (DCE)	SW8260														
Isopropylbenzene	SW8260														
p-Isopropyltoluene	SW8260														
Styrene	SW8260														
Tetrachloroethene (PCE)	SW8260														
Trichloroethene (TCE)	SW8260														
Naphthalenes															
1-Methylnaphthalene	SW8270SIM														
2-Methylnaphthalene	SW8270														
2-Methylnaphthalene	SW8270SIM														
Naphthalene	SW8260														
Naphthalene	SW8270														
Naphthalene	SW8270SIM				**2.8**										
Total Naphthalenes	CALC	53,767	0.24		**2.8**										
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	SW8270														
Acenaphthene	SW8270SIM				**0.68 J**										
Acenaphthylene	SW8270														
Acenaphthylene	SW8270SIM				**0.67**										
Anthracene	SW8270														
Anthracene	SW8270SIM				**2.5 J**										
Benzo(g,h,i)perylene	SW8270														
Benzo(g,h,i)perylene	SW8270SIM				**1.1**										
Fluoranthene	SW8270														
Fluoranthene	SW8270SIM				**9.3**										
Fluorene	SW8270														
Fluorene	SW8270SIM				**1.7**										

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water	TP-61 0 - 1 ft 11/15/2000	TP-61 2 - 3 ft 11/15/2000	TP-61 4 - 6 ft 11/15/2000	TP-62 0 - 1 ft 11/15/2000	TP-62 2 - 3 ft 11/15/2000	TP-62 4 - 6 ft 11/15/2000	TP-63 0 - 1 ft 11/15/2000	TP-63 2 - 3 ft 11/15/2000	TP-63 4 - 6 ft 11/15/2000	TP-63 6 - 10 ft 11/15/2000	TP-64 0 - 1 ft 11/15/2000	TP-65 0 - 1 ft 11/15/2000
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**												
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)															
Phenanthrene	SW8270														
Phenanthrene	SW8270SIM				**7.2**										
Pyrene	SW8270														
Pyrene	SW8270SIM				**7.8**										
Carcinogenic PAHs (cPAHs)															
Benz(a)anthracene	SW8270														
Benz(a)anthracene	SW8270SIM				**4.1**										
Benzo(a)pyrene	SW8270														
Benzo(a)pyrene	SW8270SIM				**2.9**										
Benzo(b)fluoranthene	SW8270														
Benzo(b)fluoranthene	SW8270SIM				**2.9**										
Benzo(k)fluoranthene	SW8270														
Benzo(k)fluoranthene	SW8270SIM				**2.7**										
Chrysene	SW8270														
Chrysene	SW8270SIM				**4.9**										
Dibenzo(a,h)anthracene	SW8270														
Dibenzo(a,h)anthracene	SW8270SIM				**0.61 J**										
Indeno(1,2,3-cd)pyrene	SW8270														
Indeno(1,2,3-cd)pyrene	SW8270SIM				**1.6**										
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19		**4.14 J**										
Other Semivolatile Organic Compounds															
4-Methylphenol	SW8270														
Bis(2-ethylhexyl) phthalate	SW8270														
Carbazole	SW8270														
Dibenzofuran	SW8270														
Dibenzofuran	SW8270SIM														
Hexachlorobutadiene	SW8260														
Polychlorinated Biphenyls (PCBs) as Aroclors															
Aroclor 1016	SW8082			< 0.036 U						< 0.036 U					< 0.036 U
Aroclor 1221	SW8082			< 0.072 U						< 0.072 U					< 0.071 U
Aroclor 1232	SW8082			< 0.036 U						< 0.036 U					< 0.036 U
Aroclor 1242	SW8082			< 0.036 U						< 0.036 U					< 0.036 U
Aroclor 1248	SW8082			**0.71**						**0.33**					< 0.036 U
Aroclor 1254	SW8082			**1.9**						**2.6**					**0.02**
Aroclor 1260	SW8082			**0.83**						**0.35**					< 0.036 U
Total PCBs (Sum of Aroclors)	CALC	10		**3.53**						**3.37**					**0.146**
Metals (RCRA 8 + Copper)															
Arsenic	6010/7000	1,122	0.15	< 30 U	< 30 U		< 30 U	< 30 U		< 30 U	< 30 U			< 30 U	< 30 U
Barium	6010/7000	44,884	83	**377**	**352**		**201**	**265**		**584**	**637**			**163**	**58**
Cadmium	6010/7000	1,496		**10**	**1**		**5**	**11**	< 0.5 U	**38**	**50**	**0.7**		**5**	< 1 U
Chromium	6010/7000	1,000,000	24,007	**53**	**25**		**72**	**283**		**61**	**64**			**31**	**28**
Copper	6010/7000	299,224	14	**356**	**40**		**208**	**407**		**304**	**299**			**459**	**19**
Lead	6010/7000	2,000	150	**4180**	**80**		**420**	**800**		**700**	**1800**	**123**	**102**	**450**	< 10 U
Mercury	6010/7000	2,900	0.10	**0.76**	**0.23**		**0.92**	**2.05**	< 0.04 U	**0.37**	**0.24**			**0.98**	**0.05**
Selenium	6010/7000	11,221	0.26	< 30 U	< 30 U		< 30 U	< 30 U		< 30 U	**30**			< 30 U	< 30 U
Silver	6010/7000	6,359	0.69	< 2 U	< 2 U		**2**	< 2 U		< 2 U	< 2 U			< 2 U	< 2 U

Table 3 - Analytical Results, Soils, On-Property Area, Paved
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**
Total Petroleum Hydrocarbons (TPHs)			
Gasoline Range Organics	NWTPH-GX		
Diesel Range Organics	NWTPH-DX		
Diesel Range Organics	NWTPH-DXSG		
Motor Oil Range Organics	NWTPH-DX		
Motor Oil Range Organics	NWTPH-DXSG		
Total Diesel and Oil Range Organics	NWTPH-DX CALC	2000	
Total Diesel and Oil Range Organics	NWTPH-DXSG CALC	2000	
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)			
Benzene	SW8260	6870	0.0017
Toluene	SW8260	185600	0.27
Ethylbenzene	SW8260	232000	0.34
m,p-Xylenes	SW8260		
o-Xylene	SW8260		
Total Xylenes	SW8260	773000	0.83
Total Xylenes	CALC	773000	0.83
Other Volatile Organic Compounds			
1,1-Dichloroethane	SW8260		
1,1-Dichloroethene	SW8260		
1,2,4-Trimethylbenzene	SW8260		
1,3,5-Trimethylbenzene	SW8260		
2-Butanone	SW8260		
Acetone	SW8260		
Chloroform	SW8260		
cis-1,2-Dichloroethene (DCE)	SW8260		
Isopropylbenzene	SW8260		
p-Isopropyltoluene	SW8260		
Styrene	SW8260		
Tetrachloroethene (PCE)	SW8260		
Trichloroethene (TCE)	SW8260		
Naphthalenes			
1-Methylnaphthalene	SW8270SIM		
2-Methylnaphthalene	SW8270		
2-Methylnaphthalene	SW8270SIM		
Naphthalene	SW8260		
Naphthalene	SW8270		
Naphthalene	SW8270SIM		
Total Naphthalenes	CALC	53,767	0.24
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthene	SW8270		
Acenaphthene	SW8270SIM		
Acenaphthylene	SW8270		
Acenaphthylene	SW8270SIM		
Anthracene	SW8270		
Anthracene	SW8270SIM		
Benzo(g,h,i)perylene	SW8270		
Benzo(g,h,i)perylene	SW8270SIM		
Fluoranthene	SW8270		
Fluoranthene	SW8270SIM		
Fluorene	SW8270		
Fluorene	SW8270SIM		

Notes:
All table values in units of milligrams per kilogram (mg/kg).
Depth range - indicates reported range of depths for soil sample
Base Method - indicates the laboratory method or calculated value
Depth to Water - indicated reported depth to saturated conditions noted on exploration log
Laboratory Qualifiers
U - indicates not detected at the reporting limit
J - indicates estimated result (typ. below the instrument calibration range)
Formatted Values
Bold - indicates analyte detected (typ. above reporting limit)
Blue - indicates concentration, or reporting limit, exceeded CUL
Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)
Calculated Values
Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)
Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)
Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 3 - Analytical Results, Soils, On-Property Area, Paved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water
Chemical Name	**Base Method**	**Paved Soils Remediation Level**	**Saturated Soils Cleanup Level**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)			
Phenanthrene	SW8270		
Phenanthrene	SW8270SIM		
Pyrene	SW8270		
Pyrene	SW8270SIM		
Carcinogenic PAHs (cPAHs)			
Benz(a)anthracene	SW8270		
Benz(a)anthracene	SW8270SIM		
Benzo(a)pyrene	SW8270		
Benzo(a)pyrene	SW8270SIM		
Benzo(b)fluoranthene	SW8270		
Benzo(b)fluoranthene	SW8270SIM		
Benzo(k)fluoranthene	SW8270		
Benzo(k)fluoranthene	SW8270SIM		
Chrysene	SW8270		
Chrysene	SW8270SIM		
Dibenzo(a,h)anthracene	SW8270		
Dibenzo(a,h)anthracene	SW8270SIM		
Indeno(1,2,3-cd)pyrene	SW8270		
Indeno(1,2,3-cd)pyrene	SW8270SIM		
Total cPAHs TEC (ND = 1/2 RDL)	CALC	18	0.19
Other Semivolatile Organic Compounds			
4-Methylphenol	SW8270		
Bis(2-ethylhexyl) phthalate	SW8270		
Carbazole	SW8270		
Dibenzofuran	SW8270		
Dibenzofuran	SW8270SIM		
Hexachlorobutadiene	SW8260		
Polychlorinated Biphenyls (PCBs) as Aroclors			
Aroclor 1016	SW8082		
Aroclor 1221	SW8082		
Aroclor 1232	SW8082		
Aroclor 1242	SW8082		
Aroclor 1248	SW8082		
Aroclor 1254	SW8082		
Aroclor 1260	SW8082		
Total PCBs (Sum of Aroclors)	CALC	10	
Metals (RCRA 8 + Copper)			
Arsenic	6010/7000	1,122	0.15
Barium	6010/7000	44,884	83
Cadmium	6010/7000	1,496	
Chromium	6010/7000	1,000,000	24,007
Copper	6010/7000	299,224	14
Lead	6010/7000	2,000	150
Mercury	6010/7000	2,900	0.10
Selenium	6010/7000	11,221	0.26
Silver	6010/7000	6,359	0.69

Notes:

All table values in units of milligrams per kilogram (mg/kg).

Depth range - indicates reported range of depths for soil sample

Base Method - indicates the laboratory method or calculated value

Depth to Water - indicated reported depth to saturated conditions noted on exploration log

Laboratory Qualifiers

U - indicates not detected at the reporting limit

J - indicates estimated result (typ. below the instrument calibration range)

Formatted Values

Bold - indicates analyte detected (typ. above reporting limit)

Blue - indicates concentration, or reporting limit, exceeded CUL

Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)

Calculated Values

Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)

Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)

Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)

Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)

Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)

Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-18	B-18	B-18	B-19	B-19	B-19	B-20	B-20	B-20	B-21
			Depth range	6 - 6.5 ft	12 - 13 ft	24 - 25 ft	9 - 10 ft	14 - 15 ft	21 - 22 ft	7 - 8 ft	10 - 11 ft	19 - 20 ft	8 - 9 ft
			Sample Date	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/10/2004	03/11/2004
			Depth to Water	8 ft	8 ft	8 ft	12 ft	12 ft	12 ft	8 ft	8 ft	8 ft	8 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 5 U	< 5 U	< 5 U	**554**	**19.5**	**2500**	**26.9**	**430**	**1270**	**33.1**
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			**19**	**18.3**	< 10 U	**180**	**15.1**	**5990**	< 20.4 U	**38.1**	**36.3**	**30.6**
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG			< 25 U	**32.6**	< 25 U	**28**	< 25 U	**680**	< 51 U	< 25 U	< 25 U	**38.2**
Motor Oil Range Organics	NWTPH-IDSG												
Total TPHs as DRO/ORO	CALC	2000		**44**	**50.9**	< 35 U	**208**	**40.1**	**6670**	< 71.4 U	**63.1**	**61.3**	**68.8**
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			**0.0521**	**0.262**	**2.84**	**3.66**	**0.411**	**360**	< 0.204 U	**6.01**	**1.39**	**0.389**
2-Methylnaphthalene	SW8270SIM			**0.0612**	**0.376**	**0.728**	**3.1**	**0.672**	**642**	< 0.204 U	**2.92**	**2.92**	**0.299**
Naphthalene	SW8270SIM			**0.0872**	**0.873**	**0.332**	**8.66**	**0.375**	**1160**	**0.235**	**17.2**	**7.89**	**0.402**
Total Naphthalenes	CALC	4.5	**0.24**	**0.2005**	**1.511**	**3.9**	**15.42**	**1.458**	**2162**	**0.643**	**26.13**	**12.2**	**1.09**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			< 0.01 U	**0.841**	**1.92**	**2.37**	**0.348**	**384**	< 0.204 U	**3.32**	**1.22**	**0.284**
Acenaphthylene	SW8270SIM			< 0.01 U	**0.221**	< 0.01 U	**0.0809**	**0.0105**	< 10.3 U	< 0.204 U	**0.0734**	< 0.01 U	**0.0267**
Anthracene	SW8270SIM			< 0.01 U	**1.25**	**0.0126**	**0.304**	**0.12**	**148**	< 0.204 U	**0.702**	**1.33**	**0.146**
Benzo(g,h,i)perylene	SW8270SIM			**0.013**	**0.812**	< 0.01 U	**0.107**	**0.0158**	**16.1**	< 0.204 U	**0.0683**	**0.015**	**0.0701**
Fluoranthene	SW8270SIM			**0.0182**	**4.75**	< 0.01 U	**0.411**	**0.193**	**362**	< 0.204 U	**1.2**	**1.61**	**0.276**
Fluorene	SW8270SIM			**0.0143**	**0.817**	**0.702**	**1.13**	**0.6**	**341**	< 0.204 U	**1.71**	**3.89**	**0.222**
Phenanthrene	SW8270SIM			**0.0482**	**6.41**	**0.264**	**1.18**	**0.784**	**920**	< 0.204 U	**2.4**	**5.23**	**0.407**
Pyrene	SW8270SIM			**0.0273**	**5.52**	< 0.01 U	**0.377**	**0.131**	**301**	< 0.204 U	**0.958**	**1.22**	**0.24**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**0.0208**	**2.23**	< 0.01 U	**0.189**	**0.0482**	**87.2**	< 0.204 U	**0.259**	**0.228**	**0.104**
Benzo(a)pyrene	SW8270SIM			**0.0286**	**1.74**	< 0.01 U	**0.186**	**0.043**	**48.3**	< 0.204 U	**0.166**	**0.075**	**0.118**
Benzo(b)fluoranthene	SW8270SIM			**0.0521**	**2.1**	< 0.01 U	**0.194**	**0.057**	**68.6**	< 0.204 U	**0.192**	**0.0967**	**0.181**
Benzo(k)fluoranthene	SW8270SIM			**0.0299**	**0.597**	< 0.01 U	**0.0939**	**0.0245**	**25.4**	< 0.204 U	**0.0557**	**0.0533**	**0.0709**
Chrysene	SW8270SIM			**0.0325**	**2.02**	< 0.01 U	**0.142**	**0.0412**	**76.2**	< 0.204 U	**0.206**	**0.144**	**0.146**
Dibenzo(a,h)anthracene	SW8270SIM			**0.0456**	**0.319**	< 0.01 U	**0.0678**	**0.0324**	**31.3**	< 0.204 U	**0.0544**	**0.0317**	**0.0488**
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.0156**	**0.867**	< 0.01 U	**0.115**	**0.0167**	**15.2**	< 0.204 U	**0.0633**	**0.0175**	**0.0732**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**0.0453**	**2.37**	< 0.00755 U	**0.253**	**0.0613**	**71.8**	< 0.15402 U	**0.231**	**0.119**	**0.167**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-21	B-21	B-22	B-22	B-22	B-23	B-23	B-23	B-24	B-24
			Depth range	13 - 15 ft	18 - 19 ft	6 - 7 ft	11 - 12 ft	19 - 20 ft	6.5 - 7.5 ft	9 - 10 ft	18 - 20 ft	9 - 10 ft	15 - 16 ft
			Sample Date	03/11/2004	03/11/2004	03/11/2004	03/11/2004	03/11/2004	03/11/2004	03/11/2004	03/11/2004	03/23/2005	03/23/2005
			Depth to Water	8 ft	8 ft	8 ft	8 ft	8 ft	7.5 ft	7.5 ft	7.5 ft	14 ft	14 ft
Chemical Name	Base Method	Unpaved, Vadose Soils CUL	Saturated Soils Cleanup										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 5 U	66.7	< 11.7 U	21.5	63	7.43	235	13.9	< 5 U	309
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			< 10 U	474	98.6	241	56.1	49.9	3010	< 10 U	< 10 U	409
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG			< 25 U	43.9	79.9	63.5	< 25 U	< 25 U	912	< 25 U	< 25 U	< 250 U
Motor Oil Range Organics	NWTPH-IDSG												
Total TPHs as DRO/ORO	CALC	2000		< 35 U	517.9	178.5	304.5	81.1	74.9	3922	< 35 U	< 35 U	659
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			0.598	22	0.373	0.828	0.637	< 0.1 U	0.801	< 0.1 U	< 0.01 U	45.3
2-Methylnaphthalene	SW8270SIM			0.238	32.6	0.56	0.563	< 0.1 U	< 0.1 U	0.925	< 0.1 U	< 0.01 U	62.6
Naphthalene	SW8270SIM			0.234	45.2	0.731	0.918	< 0.1 U	0.12	1.78	< 0.1 U	< 0.01 U	50.9
Total Naphthalenes	CALC	4.5	0.24	1.07	99.8	1.664	2.309	0.837	0.32	3.506	< 0.3 U	< 0.03 U	158.8
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			0.55	29.5	0.326	1.26	8.62	< 0.1 U	1.73	0.174	< 0.01 U	23.3
Acenaphthylene	SW8270SIM			< 0.01 U	0.346	2.04	0.282	0.136	< 0.1 U	1.07	< 0.1 U	< 0.01 U	0.363
Anthracene	SW8270SIM			0.0361	11.3	2.77	2.33	4.61	< 0.1 U	5.82	< 0.1 U	< 0.01 U	6.76
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	0.659	5.01	0.798	0.187	< 0.1 U	20.4	< 0.1 U	0.0216	< 0.33 U
Fluoranthene	SW8270SIM			0.0205	29.5	2.92	5.87	14.3	< 0.1 U	27	0.105	0.0162	9.13
Fluorene	SW8270SIM			0.507	28.9	0.575	1.87	11.6	< 0.1 U	1.25	< 0.1 U	< 0.01 U	16.8
Phenanthrene	SW8270SIM			0.554	73.7	1.24	5.15	33.6	< 0.1 U	3.58	0.131	0.0215	32.4
Pyrene	SW8270SIM			0.0238	24	4.17	3.92	8.8	< 0.1 U	21.5	< 0.1 U	0.0127	7.5
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			< 0.01 U	6.93	3.4	1.99	2.06	< 0.1 U	12.8	< 0.1 U	< 0.01 U	1.41
Benzo(a)pyrene	SW8270SIM			< 0.01 U	3.51	8.26	1.34	0.679	< 0.1 U	15.8	0.122	0.0143	0.501
Benzo(b)fluoranthene	SW8270SIM			< 0.01 U	5	9.09	1.55	0.959	< 0.1 U	16.2	0.226	0.0239	0.366
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	2.72	3.64	0.319	0.34	< 0.1 U	7.69	< 0.1 U	0.0299	0.383
Chrysene	SW8270SIM			< 0.01 U	4.1	4.68	1.77	1.71	< 0.1 U	23	< 0.1 U	0.028	1.27
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	0.317	1.87	0.299	0.314	< 0.1 U	< 0.266 U	< 0.1 U	< 0.01 U	< 0.33 U
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	0.711	5.05	0.961	0.195	< 0.1 U	17.6	< 0.1 U	0.0174	< 0.33 U
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	0.19	< 0.00755 U	5.12	10.6	1.87	1.08	< 0.0755 U	21.5	0.165	0.023	0.763

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-24	B-25	B-25	B-26	B-26	B-26	B-27	B-27	B-27	B-28
			Depth range	30.5 - 31.5 ft	14 - 15 ft	30 - 31 ft	6.5 - 7.5 ft	18 - 19 ft	25 - 26 ft	7 - 8 ft	22 - 23 ft	24.5 - 25.5 ft	6 - 7 ft
			Sample Date	03/23/2005	03/23/2005	03/23/2005	03/24/2005	03/24/2005	03/24/2005	03/23/2005	03/23/2005	03/23/2005	03/24/2005
			Depth to Water	14 ft	13 ft	13 ft	15 ft	15 ft	15 ft	10 ft	10 ft	10 ft	10 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 5 U	< 5 U	**83.8**	< 5 U	< 5 U	**69.6**	< 5 U	< 5 U	**2720**	< 5 U
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			**22.3**	**16.9**	**9790**	**162**	**801**	**142**	**92.3**	**68.7**	**8750**	**686**
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG			< 25 U	< 25 U	**1570**	**268**	**173**	< 25 U	**258**	< 25 U	< 1940 U	**1620**
Motor Oil Range Organics	NWTPH-IDSG												
Total TPHs as DRO/ORO	CALC	2000		**47.3**	**41.9**	**11360**	**430**	**974**	**167**	**350.3**	**93.7**	**10690**	**2306**
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			**0.606**	**0.609**	**97.5**	**0.0366**	**5.57**	**3.07**	**0.123**	**0.541**	**437**	< 0.33 U
2-Methylnaphthalene	SW8270SIM			**0.38**	**0.0166**	**162**	**0.0616**	**1.4**	**5.79**	**0.181**	**0.7**	**872**	< 0.33 U
Naphthalene	SW8270SIM			**0.239**	**0.344**	**25.7**	**0.181**	**7.63**	**13.7**	**0.091**	**0.561**	**2410**	< 0.33 U
Total Naphthalenes	CALC	4.5	**0.24**	**1.225**	**0.9696**	**285.2**	**0.2792**	**14.6**	**22.56**	**0.395**	**1.802**	**3719**	< 0.99 U
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			**1.86**	**0.498**	**126**	**0.0122**	**19.4**	**3.82**	**0.16**	**0.571**	**597**	< 0.33 U
Acenaphthylene	SW8270SIM			< 0.05 U	< 0.01 U	< 1.65 U	**0.0427**	**1.23**	< 0.33 U	**0.0692**	< 0.01 U	**15.5**	< 0.33 U
Anthracene	SW8270SIM			**0.629**	**0.0145**	**58.2**	**0.0384**	**64.1**	**1.18**	**0.165**	**0.0771**	**163**	< 0.33 U
Benzo(g,h,i)perylene	SW8270SIM			< 0.05 U	< 0.01 U	**7.29**	**0.0397**	**7.75**	< 0.33 U	**0.272**	< 0.01 U	**11.2**	**0.344**
Fluoranthene	SW8270SIM			**1.72**	**0.0186**	**148**	**0.25**	**137**	**2.69**	**0.513**	**0.0623**	**626**	**0.543**
Fluorene	SW8270SIM			**2.08**	**0.17**	**108**	**0.0152**	**33.4**	**3.67**	**0.135**	**0.728**	**638**	< 0.33 U
Phenanthrene	SW8270SIM			**4.59**	**0.0388**	**361**	**0.217**	**178**	**9.6**	**0.493**	**1.65**	**1790**	< 0.33 U
Pyrene	SW8270SIM			**1.28**	**0.0209**	**134**	**0.228**	**101**	**2.18**	**0.587**	**0.0308**	**450**	**0.952**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**0.264**	< 0.01 U	**36.9**	**0.0595**	**34.6**	**0.539**	**0.3**	< 0.01 U	**102**	**0.711**
Benzo(a)pyrene	SW8270SIM			**0.0951**	< 0.01 U	**21.1**	**0.0668**	**20.3**	< 0.33 U	**0.409**	< 0.01 U	**37.3**	**1.58**
Benzo(b)fluoranthene	SW8270SIM			**0.118**	< 0.01 U	**15.6**	**0.116**	**15.9**	< 0.33 U	**0.447**	< 0.01 U	**33.1**	**0.759**
Benzo(k)fluoranthene	SW8270SIM			**0.151**	**0.0203**	**17.9**	**0.0939**	**17.1**	< 0.33 U	**0.471**	< 0.01 U	**34**	**0.883**
Chrysene	SW8270SIM			**0.262**	**0.019**	**35.5**	**0.148**	**48.7**	**0.531**	**0.505**	< 0.01 U	**92.8**	**1.05**
Dibenzo(a,h)anthracene	SW8270SIM			< 0.05 U	< 0.01 U	**3.11**	**0.0131**	**3.44**	< 0.33 U	**0.112**	< 0.01 U	**4.86**	< 0.33 U
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.05 U	< 0.01 U	**6.64**	**0.0341**	**7.9**	< 0.33 U	**0.253**	< 0.01 U	**10.8**	**1.04**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**0.156**	**0.009**	**29.5**	**0.100**	**28.9**	**0.290**	**0.572**	< 0.00755 U	**56.7**	**1.95**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-28	B-28	B-29	B-29	B-29	B-30	B-30	B-30	B-31	B-31
			Depth range	11 - 12 ft	23.5 - 24.5 ft	6.5 - 7.5 ft	11 - 12 ft	22.5 - 23.5 ft	5.5 - 6.5 ft	11 - 12 ft	22 - 23 ft	6 - 7 ft	19 - 20 ft
			Sample Date	03/24/2005	03/24/2005	03/23/2005	03/23/2005	03/23/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005
			Depth to Water	10 ft	10 ft	8.5 ft	8.5 ft	8.5 ft	10 ft	10 ft	10 ft	11 ft	11 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			**28.6**	**172**	< 5 U	< 5 U	**1420**	< 10.6 U	< 5 U	**14.4**	< 5 U	**24.7**
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			**24.7**	**238**	**61.5**	**291**	**3920**	< 21.1 U	**25.2**	**159**	**163**	**1140**
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG			< 25 U	< 49.3 U	**116**	**217**	< 1000 U	< 52.9 U	< 25 U	< 49 U	**229**	**162**
Motor Oil Range Organics	NWTPH-IDSG												
Total TPHs as DRO/ORO	CALC	2000		**49.7**	**287.3**	**177.5**	**508**	**4920**	< 74 U	**50.2**	**208**	**392**	**1302**
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			**0.623**	**13.4**	**0.0706**	**1.15**	**114**	< 0.0211 U	**0.0468**	**5.97**	< 0.33 U	**22.9**
2-Methylnaphthalene	SW8270SIM			**0.229**	**20.1**	< 0.33 U	**0.711**	**168**	< 0.0211 U	**0.0572**	**5.25**	< 0.33 U	**2.1**
Naphthalene	SW8270SIM			**1.16**	**33.5**	< 0.33 U	**1.2**	**415**	**0.0297**	**0.188**	< 0.643 U	< 0.33 U	**9.29**
Total Naphthalenes	CALC	4.5	**0.24**	**2.012**	**67**	**0.7306**	**3.061**	**697**	**0.0719**	**0.292**	**11.863**	< 0.99 U	**34.29**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			**0.518**	**23.7**	< 0.33 U	**3.06**	**123**	< 0.0211 U	**0.029**	**14.9**	< 0.33 U	**50.6**
Acenaphthylene	SW8270SIM			**0.0153**	< 0.656 U	< 0.33 U	**0.536**	< 6.51 U	< 0.0211 U	**0.0181**	< 0.643 U	**0.351**	**1.27**
Anthracene	SW8270SIM			**0.0784**	**7**	< 0.33 U	**12.9**	**45.7**	**0.0447**	**0.0285**	**13.7**	**1.19**	**66.4**
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	< 0.656 U	**0.576**	**2.57**	< 6.51 U	**0.0361**	< 0.01 U	**0.763**	**4.53**	**3.37**
Fluoranthene	SW8270SIM			**0.106**	**30**	**0.57**	**7.53**	**134**	**0.0914**	**0.0612**	**22**	**2.87**	**101**
Fluorene	SW8270SIM			**0.161**	**29.2**	< 0.33 U	**2.8**	**138**	< 0.0211 U	**0.0363**	**15.8**	< 0.33 U	**58.9**
Phenanthrene	SW8270SIM			**0.18**	**85.7**	< 0.33 U	**5.2**	**376**	**0.0552**	**0.0869**	**47.5**	**0.734**	**215**
Pyrene	SW8270SIM			**0.0831**	**16.7**	**1.04**	**7.31**	**97.3**	**0.0972**	**0.0344**	**16.5**	**5.02**	**80.8**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**0.0182**	**3.91**	**0.723**	**4.33**	**25.1**	**0.0423**	**0.0154**	**4.47**	**3.69**	**19.2**
Benzo(a)pyrene	SW8270SIM			**0.0153**	**0.824**	**0.832**	**4.79**	**8.18**	**0.0383**	**0.0119**	**2.2**	**6.37**	**10.6**
Benzo(b)fluoranthene	SW8270SIM			**0.0134**	**0.915**	**0.896**	**3.57**	**7.83**	**0.0533**	**0.0125**	**1.72**	**5.85**	**8.02**
Benzo(k)fluoranthene	SW8270SIM			**0.0229**	**0.858**	**0.657**	**3.57**	**7.32**	**0.0652**	**0.0249**	**1.82**	**4.65**	**8.36**
Chrysene	SW8270SIM			**0.0248**	**3.53**	**1.17**	**7.1**	**23.2**	**0.0689**	**0.0244**	**4.26**	**7.16**	**18.1**
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	< 0.656 U	< 0.33 U	**0.808**	< 6.51 U	< 0.0211 U	< 0.01 U	< 0.643 U	**1.53**	**1.7**
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	< 0.656 U	**0.52**	**2.11**	< 6.51 U	**0.0298**	< 0.01 U	**0.698**	**3.84**	**3.44**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**0.0220**	**1.49**	**1.14**	**6.30**	**13.1**	**0.0591**	**0.0184**	**3.15**	**8.40**	**14.9**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-31	B-32	B-32	B-32	B-33	B-33	B-33	B-37	B-37	B-37
			Depth range	24 - 25 ft	6 - 7 ft	11 - 12 ft	19 - 20 ft	6 - 7 ft	18 - 19 ft	20.5 - 21.5 ft	5 - 6 ft	14 - 15 ft	21 - 22 ft
			Sample Date	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	10/29/2007	10/29/2007	10/29/2007
			Depth to Water	11 ft	8 ft	8 ft	8 ft	10 ft	10 ft	10 ft	9.5 ft	9.5 ft	9.5 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			**50.8**	< 5 U	< 10.4 U	**28.6**	< 5 U	< 5 U	< 5 U	< 2 U	< 2 U	< 2 U
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			**213**	**14.2**	**112**	**3650**	**16.3**	< 10 U	< 10 U	< 50 U	< 50 U	< 50 U
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG			**30.5**	< 25 U	**119**	**1310**	< 25 U	< 25 U	< 25 U			
Motor Oil Range Organics	NWTPH-IDSG										< 250 U	< 250 U	< 250 U
Total TPHs as DRO/ORO	CALC	2000		**243.5**	**39.2**	**231**	**4960**	**41.3**	< 35 U	< 35 U	< 300 U	< 300 U	< 300 U
Naphthalenes													
1-Methylnaphthalene	SW8270SIM			**4.91**	**0.0356**	**0.144**	**31.1**	**0.0683**	**0.0381**	**0.0593**			
2-Methylnaphthalene	SW8270SIM			**7.77**	**0.03**	**0.0947**	**25.3**	**0.0492**	**0.0151**	< 0.01 U			
Naphthalene	SW8270SIM			**17.7**	**0.0741**	**0.327**	**8.27**	**0.0454**	< 0.01 U	< 0.01 U	**0.02**	< 0.01 U	< 0.01 U
Total Naphthalenes	CALC	4.5	**0.24**	**30.38**	**0.1397**	**0.5657**	**64.67**	**0.1629**	**0.0632**	**0.0793**	**0.02**	< 0.01 U	< 0.01 U
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			**8.3**	**0.0909**	**0.193**	**83.2**	< 0.01 U	**0.0876**	**0.408**	< 0.01 U	**0.08**	**0.032**
Acenaphthylene	SW8270SIM			**0.36**	< 0.01 U	**0.0521**	< 6.56 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Anthracene	SW8270SIM			**4.31**	**0.0262**	**0.157**	**255**	**0.0124**	**0.0244**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(g,h,i)perylene	SW8270SIM			**0.577**	**0.0222**	**0.934**	**82.3**	**0.0162**	< 0.01 U	< 0.01 U	**0.013**	< 0.01 U	< 0.01 U
Fluoranthene	SW8270SIM			**11.5**	**0.0653**	**0.362**	**1000**	**0.0293**	**0.0269**	< 0.01 U	**0.016**	< 0.01 U	< 0.01 U
Fluorene	SW8270SIM			**7.31**	**0.0542**	**0.102**	**43.7**	< 0.01 U	**0.0986**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Phenanthrene	SW8270SIM			**26.2**	**0.0634**	**0.463**	**755**	**0.0702**	**0.0547**	< 0.01 U	**0.011**	< 0.01 U	< 0.01 U
Pyrene	SW8270SIM			**10.2**	**0.0366**	**0.411**	**813**	**0.0279**	**0.0164**	< 0.01 U	**0.016**	< 0.01 U	< 0.01 U
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**2.72**	**0.0156**	**0.171**	**279**	**0.0211**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(a)pyrene	SW8270SIM			**1.69**	**0.0184**	**0.241**	**202**	**0.0227**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(b)fluoranthene	SW8270SIM			**1.3**	**0.024**	**0.35**	**153**	**0.0243**	< 0.01 U	< 0.01 U	**0.018**	< 0.01 U	< 0.01 U
Benzo(k)fluoranthene	SW8270SIM			**1.35**	**0.0345**	**0.248**	**170**	**0.034**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Chrysene	SW8270SIM			**2.93**	**0.0273**	**0.369**	**318**	**0.0323**	< 0.01 U	< 0.01 U	**0.016**	< 0.01 U	< 0.01 U
Dibenzo(a,h)anthracene	SW8270SIM			< 0.33 U	< 0.01 U	**0.099**	**32.2**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.542**	**0.0166**	**0.371**	**76.2**	**0.0144**	< 0.01 U	< 0.01 U	**0.011**	< 0.01 U	< 0.01 U
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**2.33**	**0.0282**	**71.8**	**276**	**0.0329**	< 0.00755 U	< 0.00755 U	**0.0096**	< 0.00755 U	< 0.00755 U

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-38	B-38	B-38	B-39	B-39	B-39	B-40	B-40	B-40	B-41
			Depth range	5 - 6 ft	14.5 - 15.5 ft	22.5 - 23.5 ft	5.5 - 6.5 ft	10 - 11 ft	21 - 22 ft	6.5 - 7.5 ft	14 - 15 ft	21.5 - 22.5 ft	7 - 8 ft
			Sample Date	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/30/2007
			Depth to Water	9 ft	9 ft	9 ft	10 ft	10 ft	10 ft	9 ft	9 ft	9 ft	9.5 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			< 50 U	< 50 U	< 50 U	**120**	< 50 U	**200**	< 50 U	< 50 U	< 50 U	< 50 U
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG												
Motor Oil Range Organics	NWTPH-IDSG			< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U
Total TPHs as DRO/ORO	CALC	2000		< 300 U	< 300 U	< 300 U	**370**	< 300 U	**450**	< 300 U	< 300 U	< 300 U	< 300 U
Naphthalenes													
1-Methylnaphthalene	SW8270SIM												
2-Methylnaphthalene	SW8270SIM												
Naphthalene	SW8270SIM			**0.015**	< 0.01 U	< 0.01 U	**1.8**	**0.24**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Total Naphthalenes	CALC	4.5	**0.24**	**0.015**	< 0.01 U	< 0.01 U	**1.8**	**0.24**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			< 0.01 U	**0.1**	**0.41**	**0.51**	**1.1**	**0.38**	< 0.01 U	**0.011**	< 0.01 U	< 0.01 U
Acenaphthylene	SW8270SIM			**0.011**	< 0.01 U	< 0.01 U	**0.12**	< 0.01 U	**0.08**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Anthracene	SW8270SIM			**0.04**	**0.033**	**0.015**	**0.61**	**0.47**	**2.6**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(g,h,i)perylene	SW8270SIM			**0.095**	< 0.01 U	< 0.01 U	**0.83**	< 0.01 U	**1.4**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Fluoranthene	SW8270SIM			**0.21**	**0.049**	**0.017**	**1.2**	**1.3**	**18**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Fluorene	SW8270SIM			< 0.01 U	**0.089**	< 0.01 U	**0.39**	**1.3**	**0.39**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Phenanthrene	SW8270SIM			**0.034**	**0.13**	**0.06**	**1.3**	**1.9**	**1.8**	**0.019**	< 0.01 U	< 0.01 U	< 0.01 U
Pyrene	SW8270SIM			**0.44**	**0.027**	**0.028**	**1.1**	**0.77**	**15**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**0.18**	< 0.01 U	< 0.01 U	**0.99**	**0.019**	**6.7**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(a)pyrene	SW8270SIM			**0.24**	< 0.01 U	< 0.01 U	**1.3**	< 0.01 U	**4.2**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(b)fluoranthene	SW8270SIM			**0.33**	< 0.01 U	< 0.01 U	**2**	< 0.01 U	**5**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Benzo(k)fluoranthene	SW8270SIM			**0.13**	< 0.01 U	< 0.01 U	**0.62**	< 0.01 U	**1.4**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Chrysene	SW8270SIM			**0.27**	< 0.01 U	< 0.01 U	**1.7**	**0.012**	**9.4**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Dibenzo(a,h)anthracene	SW8270SIM			**0.022**	< 0.01 U	< 0.01 U	**0.24**	< 0.01 U	**0.54**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.12**	< 0.01 U	< 0.01 U	**1**	< 0.01 U	**1.9**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**0.321**	< 0.00755 U	< 0.00755 U	**1.80**	**0.009**	**5.85**	< 0.00755 U	< 0.00755 U	< 0.00755 U	< 0.00755 U

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-41	B-41	B-42	B-42	B-42	B-43	B-43	B-43	B-43	B-44
			Depth range	11 - 12 ft	24.5 - 25.5 ft	5 - 6 ft	22 - 23 ft	24.5 - 25.5 ft	6 - 7 ft	14.5 - 15.5 ft	28.5 - 29.5 ft	34.5 - 35.5 ft	2 - 3 ft
			Sample Date	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007
			Depth to Water	9.5 ft	9.5 ft	9 ft	9 ft	9 ft	10 ft	10 ft	10 ft	10 ft	8 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	**130**	< 50 U	< 50 U	**69**	< 50 U
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG												
Motor Oil Range Organics	NWTPH-IDSG			< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U
Total TPHs as DRO/ORO	CALC	2000		< 300 U	< 300 U	< 300 U	< 300 U	< 300 U	**380**	< 300 U	< 300 U	**319**	< 300 U
Naphthalenes													
1-Methylnaphthalene	SW8270SIM												
2-Methylnaphthalene	SW8270SIM												
Naphthalene	SW8270SIM			< 0.01 U	< 0.01 U	**0.028**	< 0.01 U	< 0.01 U	**0.028**	**0.26**	**0.91**	**0.43**	**0.045**
Total Naphthalenes	CALC	4.5	**0.24**	< 0.01 U	< 0.01 U	**0.028**	< 0.01 U	< 0.01 U	**0.028**	**0.26**	**0.91**	**0.43**	**0.045**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	**1.3**	< 0.01 U	**0.015**	**0.033**	**1.4**	**1**	< 0.01 U
Acenaphthylene	SW8270SIM			< 0.01 U	< 0.01 U	**0.012**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.076**
Anthracene	SW8270SIM			< 0.01 U	< 0.01 U	**0.032**	< 0.01 U	< 0.01 U	**0.014**	< 0.01 U	**0.11**	**0.078**	**0.083**
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	< 0.01 U	**0.14**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.43**
Fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	**0.067**	< 0.01 U	< 0.01 U	**0.026**	< 0.01 U	**0.14**	**0.12**	**0.23**
Fluorene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.017**	**0.012**	**0.98**	**0.63**	**0.01**
Phenanthrene	SW8270SIM			< 0.01 U	< 0.01 U	**0.052**	**0.015**	< 0.01 U	**0.11**	**0.012**	**1.5**	**0.33**	**0.077**
Pyrene	SW8270SIM			< 0.01 U	< 0.01 U	**0.089**	< 0.01 U	< 0.01 U	**0.027**	< 0.01 U	**0.062**	**0.053**	**0.4**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			< 0.01 U	< 0.01 U	**0.11**	< 0.01 U	< 0.01 U	**0.024**	< 0.01 U	< 0.01 U	< 0.01 U	**0.36**
Benzo(a)pyrene	SW8270SIM			< 0.01 U	< 0.01 U	**0.25**	< 0.01 U	< 0.01 U	**0.01**	< 0.01 U	< 0.01 U	< 0.01 U	**0.73**
Benzo(b)fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	**0.36**	< 0.01 U	< 0.01 U	**0.013**	< 0.01 U	< 0.01 U	< 0.01 U	**0.96**
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	**0.12**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.25**
Chrysene	SW8270SIM			< 0.01 U	< 0.01 U	**0.23**	< 0.01 U	< 0.01 U	**0.036**	< 0.01 U	< 0.01 U	< 0.01 U	**0.67**
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	< 0.01 U	**0.04**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.14**
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	< 0.01 U	**0.17 J**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.49**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	< 0.00755 U	< 0.00755 U	**0.33 J**	< 0.00755 U	< 0.00755 U	**0.0156**	< 0.00755 U	< 0.00755 U	< 0.00755 U	**0.96**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			**Location**	B-44	B-44	B-45	B-45	B-45	B-46	B-46	B-46	B-47	B-47
			Depth range	14 - 15 ft	31.5 - 32.5 ft	6 - 7 ft	11 - 12 ft	21 - 22 ft	6 - 7 ft	13 - 14 ft	21 - 22 ft	6 - 7 ft	13 - 14 ft
			Sample Date	10/31/2007	10/31/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007
			Depth to Water	8 ft	8 ft	8 ft	8 ft	8 ft	8 ft	8 ft	8 ft	8 ft	8 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Diesel Range Organics	NWTPH-DX												
Diesel Range Organics	NWTPH-DXSG			< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	**100**	< 50 U	**78**	< 50 U
Motor Oil Range Organics	NWTPH-DX												
Motor Oil Range Organics	NWTPH-DXSG												
Motor Oil Range Organics	NWTPH-IDSG			< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U	< 250 U
Total TPHs as DRO/ORO	CALC	2000		< 300 U	< 300 U	< 300 U	< 300 U	< 300 U	< 300 U	**350**	< 300 U	**428**	< 300 U
Naphthalenes													
1-Methylnaphthalene	SW8270SIM												
2-Methylnaphthalene	SW8270SIM												
Naphthalene	SW8270SIM			< 0.01 U	**0.052**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.022**	< 0.01 U	**0.038**	< 0.01 U
Total Naphthalenes	CALC	4.5	**0.24**	< 0.01 U	**0.052**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.022**	< 0.01 U	**0.038**	< 0.01 U
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			< 0.01 U	**0.55**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Acenaphthylene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.046**	< 0.01 U
Anthracene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.08**	< 0.01 U
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.34**	< 0.01 U
Fluoranthene	SW8270SIM			**0.016**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.049**	< 0.01 U	**0.27**	**0.023**
Fluorene	SW8270SIM			< 0.01 U	**0.23**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.016**	< 0.01 U
Phenanthrene	SW8270SIM			**0.01**	**0.081**	< 0.01 U	< 0.01 U	< 0.01 U	**0.015**	**0.085**	< 0.01 U	**0.15**	**0.02**
Pyrene	SW8270SIM			**0.023**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.045**	< 0.01 U	**0.47**	**0.022**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			**0.015**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.011**	< 0.01 U	**0.37**	**0.011**
Benzo(a)pyrene	SW8270SIM			**0.014**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.014**	< 0.01 U	**0.62**	< 0.01 U
Benzo(b)fluoranthene	SW8270SIM			**0.015**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.019**	< 0.01 U	**0.81**	**0.011**
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.22**	< 0.01 U
Chrysene	SW8270SIM			**0.013**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.024**	< 0.01 U	**0.73**	**0.013**
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.095**	< 0.01 U
Indeno(1,2,3-cd)pyrene	SW8270SIM			**0.01**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.011**	< 0.01 U	**0.36**	< 0.01 U
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	**0.0191**	< 0.00755 U	< 0.00755 U	< 0.00755 U	< 0.00755 U	< 0.00755 U	**0.0193**	< 0.00755 U	**0.813**	**0.00883**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-47	MW-29/B-34	MW-29/B-34	MW-29/B-34	MW-30/B-35	MW-30/B-35	MW-30/B-35	MW-31/B-36	MW-31/B-36	MW-31/B-36
			Depth range	30.5 - 31.5 ft	7 - 8 ft	18 - 19 ft	30 - 31 ft	6 - 7 ft	32 - 33 ft	39 - 40 ft	8 - 10 ft	23 - 24 ft	31 - 32 ft
			Sample Date	10/31/2007	02/15/2006	02/15/2006	02/15/2006	02/15/2006	02/15/2006	02/15/2006	02/15/2006	02/15/2006	02/15/2006
			Depth to Water	8 ft	10 ft	10 ft	10 ft	9 ft	9 ft	9 ft	10 ft	10 ft	10 ft
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**										
Total Petroleum Hydrocarbons (TPHs)													
Gasoline Range Organics	NWTPH-GX			< 2 U	< 12 U	< 5.98 U	< 5.22 U	< 7.75 U	**25.8**	< 5.23 U	**1110**	**164**	**464**
Diesel Range Organics	NWTPH-DX				**58.6**	< 13.7 U	**18.5**	**19.5**	**18.6**	**16.4**	**1060**	**14900**	**8830**
Diesel Range Organics	NWTPH-DXSG			< 50 U									
Motor Oil Range Organics	NWTPH-DX				**305**	< 34.3 U	< 31.1 U	**138**	< 29.5 U	< 29.2 U	**1690**	< 3100 U	< 1210 U
Motor Oil Range Organics	NWTPH-DXSG												
Motor Oil Range Organics	NWTPH-IDSG			< 250 U									
Total TPHs as DRO/ORO	CALC	2000		< 300 U	**363.6**	< 48 U	**49.6**	**157.5**	**48.1**	**45.6**	**2750**	**18000**	**10040**
Naphthalenes													
1-Methylnaphthalene	SW8270SIM				< 0.118 U	< 0.014 U	**0.282**	< 0.148 U	**1.02**	**0.363**	< 7.59 U	**819**	**501**
2-Methylnaphthalene	SW8270SIM				< 0.118 U	< 0.014 U	< 0.0127 U	< 0.148 U	**0.89**	**0.17**	< 7.59 U	< 25.1 U	**88.2**
Naphthalene	SW8270SIM			< 0.01 U	< 0.118 U	**0.00992 J**	**0.0539**	**0.0504 J**	**1.93**	**0.658**	**1.62 J**	**204**	**296**
Total Naphthalenes	CALC	4.5	**0.24**	< 0.01 U	< 0.354 U	**0.03792 J**	**0.3486**	**0.3464 J**	**3.84**	**1.191**	**16.8 J**	**1048.1**	**885.2**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	SW8270SIM			< 0.01 U	< 0.118 U	**0.188**	**0.589**	< 0.148 U	**1.34**	**1**	**16.9**	**1600**	**1490**
Acenaphthylene	SW8270SIM			< 0.01 U	< 0.118 U	< 0.014 U	< 0.0127 U	**0.0385 J**	< 0.0588 U	< 0.06 U	< 7.59 U	< 25.1 U	**22.1 J**
Anthracene	SW8270SIM			< 0.01 U	< 0.118 U	< 0.014 U	**0.354**	**0.086 J**	**0.163**	**0.132**	**20**	**417**	**2540**
Benzo(g,h,i)perylene	SW8270SIM			< 0.01 U	**0.244**	**0.00814 J**	< 0.0127 U	**0.513**	< 0.0588 U	< 0.06 U	**26**	**60.3**	**50.4**
Fluoranthene	SW8270SIM			< 0.01 U	**1.12**	**0.0369**	**0.534**	**0.247**	**0.241**	**0.291**	**103**	**1690**	**1560**
Fluorene	SW8270SIM			< 0.01 U	< 0.118 U	**0.0297**	**0.569**	< 0.148 U	**1.08**	**0.725**	< 7.59 U	**1290**	**1570**
Phenanthrene	SW8270SIM			< 0.01 U	**0.401**	**0.0221**	**1.02**	**0.122 J**	**1.47**	**1.08**	**19.1**	**3580 J**	**4050**
Pyrene	SW8270SIM			< 0.01 U	**0.671**	**0.0293**	**0.328**	**0.274**	**0.105**	**0.122**	**136**	**1550**	**1150**
Carcinogenic PAHs (cPAHs)													
Benz(a)anthracene	SW8270SIM			< 0.01 U	**0.448**	**0.0217**	**0.0284**	**0.332**	< 0.0588 U	< 0.06 U	**71.7**	**403**	**296**
Benzo(a)pyrene	SW8270SIM			< 0.01 U	**0.491**	**0.0158**	**0.0102 J**	**0.755**	< 0.0588 U	< 0.06 U	**88.8**	**271**	**151**
Benzo(b)fluoranthene	SW8270SIM			< 0.01 U	**0.474**	**0.0217**	**0.00491 J**	**0.752**	< 0.0588 U	< 0.06 U	**73.2**	**215**	**145**
Benzo(k)fluoranthene	SW8270SIM			< 0.01 U	**0.481**	**0.0225**	**0.00169 J**	**0.631**	< 0.0588 U	< 0.06 U	**78**	**245**	**135**
Chrysene	SW8270SIM			< 0.01 U	**0.519**	**0.03**	**0.0154**	**0.993**	< 0.0588 U	< 0.06 U	**114**	**281**	**507**
Dibenzo(a,h)anthracene	SW8270SIM			< 0.01 U	**0.229**	**0.0154**	< 0.0127 U	**0.343**	< 0.0588 U	< 0.06 U	**22.1**	**58.3**	**97.7**
Indeno(1,2,3-cd)pyrene	SW8270SIM			< 0.01 U	**0.33**	**0.0215**	< 0.0127 U	**0.55**	< 0.0588 U	< 0.06 U	**31.7**	**82.7**	**101**
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**	< 0.00755 U	**0.692**	**0.0264**	**0.0151 J**	**1.026**	< 0.044394 U	< 0.0453 U	**117.6**	**374**	**234**

Table 4 - Analytical Results, Soils, Off-Property Area, Unpaved

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Depth range Sample Date Depth to Water
Chemical Name	**Base Method**	**Unpaved, Vadose Soils CUL**	**Saturated Soils Cleanup**
Total Petroleum Hydrocarbons (TPHs)			
Gasoline Range Organics	NWTPH-GX		
Diesel Range Organics	NWTPH-DX		
Diesel Range Organics	NWTPH-DXSG		
Motor Oil Range Organics	NWTPH-DX		
Motor Oil Range Organics	NWTPH-DXSG		
Motor Oil Range Organics	NWTPH-IDSG		
Total TPHs as DRO/ORO	CALC	2000	
Naphthalenes			
1-Methylnaphthalene	SW8270SIM		
2-Methylnaphthalene	SW8270SIM		
Naphthalene	SW8270SIM		
Total Naphthalenes	CALC	4.5	**0.24**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthene	SW8270SIM		
Acenaphthylene	SW8270SIM		
Anthracene	SW8270SIM		
Benzo(g,h,i)perylene	SW8270SIM		
Fluoranthene	SW8270SIM		
Fluorene	SW8270SIM		
Phenanthrene	SW8270SIM		
Pyrene	SW8270SIM		
Carcinogenic PAHs (cPAHs)			
Benz(a)anthracene	SW8270SIM		
Benzo(a)pyrene	SW8270SIM		
Benzo(b)fluoranthene	SW8270SIM		
Benzo(k)fluoranthene	SW8270SIM		
Chrysene	SW8270SIM		
Dibenzo(a,h)anthracene	SW8270SIM		
Indeno(1,2,3-cd)pyrene	SW8270SIM		
Total cPAHs TEC (ND = 1/2 RDL)	CALC	3.9	**0.19**

Notes:
All table values in units of milligrams per kilogram (mg/kg).
Depth range - indicates reported range of depths for soil sample
Base Method - indicates the laboratory method or calculated value
Depth to Water - indicated reported depth to saturated conditions noted on exploration log
Laboratory Qualifiers
- U - indicates not detected at the reporting limit
- J - indicates estimated result (typ. below the instrument calibration range)

Formatted Values
- Bold - indicates analyte detected (typ. above reporting limit)
- Blue - indicates concentration, or reporting limit, exceeded CUL
- Box - indicated concentration exceeds Saturated Soils CUL (shown for only saturated soils with detected concentrations)

Calculated Values
- Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
- Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
- Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
- Total Naphthalenes and Total cPAHs TEC calculated using Method SW8270SIM results, if available, or Method SW8270.

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-18	B-19	B-20	B-21	B-22	B-23	B-24	B-25	B-26	B-27	B-28	B-29	B-30	B-31	B-32	B-33	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
			Sample Date	03/10/2004	03/10/2004	03/10/2004	03/11/2004	03/11/2004	03/11/2004	03/23/2005	03/23/2005	03/24/2005	03/23/2005	03/24/2005	03/23/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	12/29/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		2910	12600	22500	9820	2410	523	354	1270	134	8160	2780	6710	227	10400	< 50 U	537	< 50 U	< 250 U	< 250 U			
Diesel Range Organics	NWTPH-DX	T																		< 250 U	< 250 U	< 250 U			
Diesel Range Organics	NWTPH-DXSG	T		1280	4930	12200	5490	4210	321	1880	3800	637	6130	2810	3140	399	22100	664	639						
Motor Oil Range Organics	NWTPH-DX	T																		< 500 U	< 500 U	< 500 U			
Motor Oil Range Organics	NWTPH-DXSG	T		< 500 U	< 500 U	632	< 500 U	< 500 U	< 500 U	< 500 U	< 581 U	< 500 U	< 685 U	< 500 U	< 602 U	< 500 U	3100	< 500 U	< 500 U						
Motor Oil Range Organics	NWTPH-IDSG	T																							
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500																	< 750 U	< 750 U	< 750 U			
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500	1780	5430	12832	5990	4710	821	2380	4381	1137	6815	3310	3742	899	25200	1164	1139						
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44																	< 5 U	< 0.2 U	< 1 U			
Toluene	SW8260	T	57																	< 5 U	< 0.2 U	< 1 U			
Ethylbenzene	SW8260	T	29																	< 5 U	< 0.2 U	< 1 U			
m,p-Xylenes	SW8260	T																							
o-Xylene	SW8260	T																							
Total Xylenes	SW8260	T	80																	< 15 U	< 0.6 U	< 2 U			
Total Xylenes (ND = 1 RL)	CALC	T	80																						
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
1,2,4-Trimethylbenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
1,3,5-Trimethylbenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
1,4-Dichlorobenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
Acetone	SW8260	T																		< 150 U	1.8	< 5 U			
Carbon Disulfide	SW8260	T																			< 0.2 U	< 1 U			
Chlorobenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
Isopropylbenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
Methylene Chloride	SW8260	T																		< 5 U	< 0.3 U	< 2 U			
n-Butylbenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
n-Propylbenzene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
p-Isopropyltoluene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
Styrene	SW8260	T																		< 5 U	< 0.2 U	< 1 U			
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D																							
1-Methylnaphthalene	SW8270SIM	D																							
1-Methylnaphthalene	SW8270	T																							
1-Methylnaphthalene	SW8270SIM	T		275	< 500 U	< 1000 U	< 500 U	< 200 U	66.1	20.6	175	19.8	338	224	237	35.9	2270	29.3	73.5						
2-Methylnaphthalene	SW8270	D																							
2-Methylnaphthalene	SW8270SIM	D																							
2-Methylnaphthalene	SW8270	T																							
2-Methylnaphthalene	SW8270SIM	T		214	1200	3430	805	456	33.9	13.3	203	5.59	462	199	322	15.7	3340	15.1	5.76						
Naphthalene	SW8270	D																							
Naphthalene	SW8270SIM	D																							
Naphthalene	SW8260	T																		< 5 U	< 0.5 U	< 5 U			
Naphthalene	SW8270	T																							
Naphthalene	SW8270SIM	T		36	5870	22900	4330	1100	74	2.98	39.8	17.7	4310	1070	2730	3.33	17400	6.83	1.52	< 0.02 U	0.09 J	< 0.1 U			
Total Naphthalenes (ND = 1 RL)	CALC	D	152																						
Total Naphthalenes (ND = 1 RL)	CALC	T	152	525	7570	27330	5635	1756	174	37	418	43	5110	1493	3289	55	23010	51	81	0.02	0.09	0.1			
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D																							
Acenaphthene	SW8270SIM	D																							
Acenaphthene	SW8270	T																							
Acenaphthene	SW8270SIM	T		159	692	1810	554	866	76.9	45.9	171	48.3	243	185	224	60.6	3120	59.5	108	0.09	0.26	0.22			
Acenaphthylene	SW8270	D																							
Acenaphthylene	SW8270SIM	D																							
Acenaphthylene	SW8270	T																							
Acenaphthylene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	290	27.9	< 0.5 U	1.54	1.18	5.15	< 10 U	4.43	0.98	206	1.39	1.21	< 0.02 U	< 0.1 U	< 0.1 U			
Anthracene	SW8270	D																							
Anthracene	SW8270SIM	D																							
Anthracene	SW8270	T																							
Anthracene	SW8270SIM	T		26.5	< 500 U	< 1000 U	712	250	3	9.25	24.2	13.7	7.42	12.6	15.2	2.84	1370	14.9	1.11	< 0.02 U	< 0.1 U	< 0.1 U			
Benzo(g,h,i)perylene	SW8270	D																							
Benzo(g,h,i)perylene	SW8270SIM	D																							
Benzo(g,h,i)perylene	SW8270	T																							
Benzo(g,h,i)perylene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	< 0.1 U	< 0.5 U	1.54	1.18	< 1 U	< 10 U	< 1 U	< 0.5 U	285	3.37	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Fluoranthene	SW8270	D																							
Fluoranthene	SW8270SIM	D																							
Fluoranthene	SW8270	T																							
Fluoranthene	SW8270SIM	T		< 10 U	< 500 U	1080	< 500 U	826	5.07	29	75.6	21.5	20.6	23.3	24.5	5.29	4170	60.4	0.505	< 0.02 U	< 0.1 U	< 0.1 U			
Fluorene	SW8270	D																							
Fluorene	SW8270SIM	D																							
Fluorene	SW8270	T																							
Fluorene	SW8270SIM	T		52.8	< 500 U	1220	< 500 U	630	33.8	39.7	103	34.2	120	109	121	18.5	2480	18.2	18.1	< 0.02 U	< 0.1 U	< 0.1 U			

Table 5 - Analytical Results, Groundwater, Site Summary
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	B-18	B-19	B-20	B-21	B-22	B-23	B-24	B-25	B-26	B-27	B-28	B-29	B-30	B-31	B-32	B-33	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
			Sample Date	03/10/2004	03/10/2004	03/10/2004	03/11/2004	03/11/2004	03/11/2004	03/23/2005	03/23/2005	03/24/2005	03/23/2005	03/24/2005	03/23/2005	03/24/2005	03/24/2005	03/24/2005	03/24/2005	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	12/29/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D																							
Phenanthrene	SW8270SIM	D																							
Phenanthrene	SW8270	T																							
Phenanthrene	SW8270SIM	T		**23.9**	< 500 U	**3440**	**644**	**1790**	**30.1**	**83.2**	**229**	**51.8**	**115**	**121**	**122**	**18.7**	**8590**	**61.3**	**2.42**	**0.03**	**0.09 J**	< 0.1 U			
Pyrene	SW8270	D																							
Pyrene	SW8270SIM	D																							
Pyrene	SW8270	T																							
Pyrene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	**635**	**3.4**	**20.1**	**60.2**	**18**	**11.4**	**20.6**	**17.4**	**4.71**	**3390**	**52.8**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D																							
Benz(a)anthracene	SW8270SIM	D																							
Benz(a)anthracene	SW8270	T																							
Benz(a)anthracene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.306**	**3.52**	**9.89**	**3.92**	**2.06**	< 10 U	**2.83**	**0.882**	**1090**	**11.3**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Benzo(a)pyrene	SW8270	D																							
Benzo(a)pyrene	SW8270SIM	D																							
Benzo(a)pyrene	SW8270	T																							
Benzo(a)pyrene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.122**	**1.11**	**3.96**	**2.65**	< 1 U	< 10 U	< 1 U	< 0.5 U	**654**	**8.12**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Benzo(b)fluoranthene	SW8270	D																							
Benzo(b)fluoranthene	SW8270SIM	D																							
Benzo(b)fluoranthene	SW8270	T																							
Benzo(b)fluoranthene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.0906**	**1.39**	**7.03**	**3.53**	**2.06**	< 10 U	< 1 U	**1.08**	**510**	**8.71**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Benzo(k)fluoranthene	SW8270	D																							
Benzo(k)fluoranthene	SW8270SIM	D																							
Benzo(k)fluoranthene	SW8270	T																							
Benzo(k)fluoranthene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.103**	**2.48**	**8.13**	**2.16**	**1.03**	< 10 U	< 1 U	**0.686**	**519**	**8.22**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Chrysene	SW8270	D																							
Chrysene	SW8270SIM	D																							
Chrysene	SW8270	T																							
Chrysene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.253**	**3.26**	**12.3**	**6.86**	**5.98**	< 10 U	**2.93**	**2.75**	**928**	**12.7**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Dibenzo(a,h)anthracene	SW8270	D																							
Dibenzo(a,h)anthracene	SW8270SIM	D																							
Dibenzo(a,h)anthracene	SW8270	T																							
Dibenzo(a,h)anthracene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.018**	< 0.5 U	< 1 U	**0.784**	< 1 U	< 10 U	< 1 U	< 0.5 U	**100**	**1.39**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Indeno(1,2,3-cd)pyrene	SW8270	D																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D																							
Indeno(1,2,3-cd)pyrene	SW8270	T																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 10 U	< 500 U	< 1000 U	< 500 U	< 200 U	**0.0372**	< 0.5 U	**1.32**	**1.08**	< 1 U	< 10 U	< 1 U	< 0.5 U	**246**	**2.67**	< 0.5 U	< 0.02 U	< 0.1 U	< 0.1 U			
Total cPAHs TEC	CALC	D	0.01																						
Total cPAHs TEC	CALC	T	0.01	< 7.55 U	< 377.5 U	< 755 U	< 377.5 U	< 151 U	**0.18001**	**1.9316**	**6.77**	**3.866**	**1.1748**	< 7.55 U	**1.0123**	**0.5923**	**909.78**	**11.476**	< 0.3775 U	< 0.0151 U	< 0.0755 U	< 0.0755 U			
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5																		< 50 U	< 50 U			**0.945 J**
Arsenic		T	5																	< 5 U	< 50 U	< 50 U		**0.69**	
Barium		D																			**19**	**14**			**19.6**
Barium		T																		**12**	**9**	**13**		**20.7**	
Cadmium		D	1.12																		< 2 U	< 2 U			< 1 U
Cadmium		T	1.12																	< 5 U	< 2 U	< 2 U		< 1 U	
Chromium		D	120																		< 5 U	< 5 U			**24.8**
Chromium		T	120																	**30**	< 5 U	< 5 U		**5.05**	
Chromium (VI)		D																							
Chromium (VI)		T																							
Copper		D	9																		< 2 U	< 2 U			< 1 U
Copper		T	9																		**11**	< 2 U		**1.41 J**	
Lead		D	4.62																		< 20 U	< 20 U	**0.304**		< 1 U
Lead		T	4.62																	< 4 U	< 20 U	< 20 U		**0.51 J**	
Mercury		D	0.012																		< 0.1 U	< 0.1 U			**0.195 J**
Mercury		T	0.012																	< 0.2 U	< 0.1 U	< 0.1 U		**0.179 J**	
Selenium		D	5																		< 50 U	< 50 U			**2.38**
Selenium		T	5																	< 50 U	< 50 U	< 50 U		**2.24**	
Silver		D	8.8																		< 3 U	< 3 U			< 1 U
Silver		T	8.8																	< 7 U	< 3 U	< 3 U		< 1 U	

Table 5 - Analytical Results, Groundwater, Site Summary
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-2	MW-2	MW-2	MW-2	MW-2	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-5	MW-5	MW-5	MW-5	MW-5	MW-6	MW-6	MW-6	MW-6	MW-6
			Sample Date	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	05/11/2000	11/20/2000	11/20/2000	03/05/2001	10/30/2001	12/29/2003	12/08/2016	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		< 50 U	< 250 U	< 250 U				< 250 U		< 250 U				< 50 U	< 250 U	< 250 U			< 50 U	< 250 U	< 250 U		
Diesel Range Organics	NWTPH-DX	T		< 250 U	< 250 U	< 250 U			**420**	**560**		**670**				< 250 U	**620**	**760**			< 250 U	**1200**	**1000**		
Diesel Range Organics	NWTPH-DXSG	T																							
Motor Oil Range Organics	NWTPH-DX	T		< 500 U	< 500 U	< 500 U			< 500 U	< 500 U		< 500 U				< 500 U	< 500 U	< 500 U			< 500 U	< 500 U	< 500 U		
Motor Oil Range Organics	NWTPH-DXSG	T																							
Motor Oil Range Organics	NWTPH-IDSG	T																							
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500	< 750 U	< 750 U	< 750 U			**920**	**1060**		**1170**				< 750 U	**1120**	**1260**			< 750 U	**1700**	**1500**		
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500																						
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44	< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
Toluene	SW8260	T	57	< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
Ethylbenzene	SW8260	T	29	< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
m,p-Xylenes	SW8260	T																							
o-Xylene	SW8260	T																							
Total Xylenes	SW8260	T	80	< 15 U	< 0.6 U	< 2 U			< 6 U	< 2 U		< 2 U				< 15 U	< 0.6 U	< 2 U			< 15 U	< 0.6 U	< 2 U		
Total Xylenes (ND = 1 RL)	CALC	T	80																						
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T		< 5 U	**0.2**	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
1,2,4-Trimethylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
1,3,5-Trimethylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
1,4-Dichlorobenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	**0.4**	< 1 U		
Acetone	SW8260	T		< 150 U	< 1 U	< 5 U			< 20 U	< 5 U		< 5 U				< 150 U	**1.7**	< 5 U			< 150 U	**1.3**	< 5 U		
Carbon Disulfide	SW8260	T			< 0.2 U	< 1 U				< 1 U		< 1 U					< 0.2 U	< 1 U				**0.3**	< 1 U		
Chlorobenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			**36**	**72**	**88**		
Isopropylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
Methylene Chloride	SW8260	T		< 5 U	< 0.3 U	< 2 U			< 2 U	< 2 U		< 2 U				< 5 U	< 0.3 U	< 2 U			< 5 U	< 0.3 U	< 2 U		
n-Butylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
n-Propylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
p-Isopropyltoluene	SW8260	T		< 5 U	< 0.2 U	< 1 U			**5**	**10**		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
Styrene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 1 U		< 1 U				< 5 U	< 0.2 U	< 1 U			< 5 U	< 0.2 U	< 1 U		
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D																							
1-Methylnaphthalene	SW8270SIM	D																							
1-Methylnaphthalene	SW8270	T																							
1-Methylnaphthalene	SW8270SIM	T																							
2-Methylnaphthalene	SW8270	D																							
2-Methylnaphthalene	SW8270SIM	D																							
2-Methylnaphthalene	SW8270	T																							
2-Methylnaphthalene	SW8270SIM	T																							
Naphthalene	SW8270	D																							
Naphthalene	SW8270SIM	D																							
Naphthalene	SW8260	T		< 5 U	< 0.5 U	< 5 U			< 2 U	< 5 U		< 5 U				< 5 U	< 0.5 U	< 5 U			< 5 U	< 5 U	< 5 U		
Naphthalene	SW8270	T																							
Naphthalene	SW8270SIM	T		< 0.02 U	**0.08 J**	< 0.1 U			< 0.02 U		**2.4**	**0.13**				< 0.02 U	**0.4**	< 0.1 U			**0.17**	**0.12**	**0.1**		
Total Naphthalenes (ND = 1 RL)	CALC	D	152																						
Total Naphthalenes (ND = 1 RL)	CALC	T	152	0.02	**0.08**	0.1			0.02		**2.4**	**0.13**				0.02	**0.4**	0.1			**0.17**	**0.12**	**0.1**		
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D																							
Acenaphthene	SW8270SIM	D																							
Acenaphthene	SW8270	T																							
Acenaphthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.3**		**0.54**	**0.34**				< 0.02 U	**0.06 J**	< 0.1 U			**0.02**	**0.09 J**	**0.15**		
Acenaphthylene	SW8270	D																							
Acenaphthylene	SW8270SIM	D																							
Acenaphthylene	SW8270	T																							
Acenaphthylene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Anthracene	SW8270	D																							
Anthracene	SW8270SIM	D																							
Anthracene	SW8270	T																							
Anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		**0.05 J**	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Benzo(g,h,i)perylene	SW8270	D																							
Benzo(g,h,i)perylene	SW8270SIM	D																							
Benzo(g,h,i)perylene	SW8270	T																							
Benzo(g,h,i)perylene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Fluoranthene	SW8270	D																							
Fluoranthene	SW8270SIM	D																							
Fluoranthene	SW8270	T																							
Fluoranthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.04**		**0.1**	**0.1**				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Fluorene	SW8270	D																							
Fluorene	SW8270SIM	D																							
Fluorene	SW8270	T																							
Fluorene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.05**		**0.17**	**0.08 J**				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-2	MW-2	MW-2	MW-2	MW-2	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-4R	MW-5	MW-5	MW-5	MW-5	MW-5	MW-6	MW-6	MW-6	MW-6	MW-6
			Sample Date	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	05/11/2000	11/20/2000	11/20/2000	03/05/2001	10/30/2001	12/29/2003	12/08/2016	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	03/14/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D																							
Phenanthrene	SW8270SIM	D																							
Phenanthrene	SW8270	T																							
Phenanthrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		**0.21**	**0.1**				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Pyrene	SW8270	D																							
Pyrene	SW8270SIM	D																							
Pyrene	SW8270	T																							
Pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.02**		**0.06 J**	**0.06 J**				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D																							
Benz(a)anthracene	SW8270SIM	D																							
Benz(a)anthracene	SW8270	T																							
Benz(a)anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Benzo(a)pyrene	SW8270	D																							
Benzo(a)pyrene	SW8270SIM	D																							
Benzo(a)pyrene	SW8270	T																							
Benzo(a)pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Benzo(b)fluoranthene	SW8270	D																							
Benzo(b)fluoranthene	SW8270SIM	D																							
Benzo(b)fluoranthene	SW8270	T																							
Benzo(b)fluoranthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Benzo(k)fluoranthene	SW8270	D																							
Benzo(k)fluoranthene	SW8270SIM	D																							
Benzo(k)fluoranthene	SW8270	T																							
Benzo(k)fluoranthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Chrysene	SW8270	D																							
Chrysene	SW8270SIM	D																							
Chrysene	SW8270	T																							
Chrysene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Dibenzo(a,h)anthracene	SW8270	D																							
Dibenzo(a,h)anthracene	SW8270SIM	D																							
Dibenzo(a,h)anthracene	SW8270	T																							
Dibenzo(a,h)anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Indeno(1,2,3-cd)pyrene	SW8270	D																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D																							
Indeno(1,2,3-cd)pyrene	SW8270	T																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U		< 0.1 U	< 0.1 U				< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U	< 0.1 U		
Total cPAHs TEC	CALC	D	0.01																						
Total cPAHs TEC	CALC	T	0.01	< 0.0151 U	< 0.0755 U	< 0.0755 U			< 0.0151 U		< 0.0755 U	< 0.0755 U				< 0.0151 U	< 0.0755 U	< 0.0755 U			< 0.0151 U	< 0.0755 U	< 0.0755 U		
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5		< 50 U	< 50 U		**1.79**			< 50 U	< 50 U		**0.9 J**			< 50 U	< 50 U		**0.58**		< 50 U	< 50 U		**4.7**
Arsenic		T	5	< 5 U	< 50 U	< 50 U		< 1 U	< 5 U	< 50 U		< 50 U		**1.22**		< 5 U	< 50 U	< 50 U		< 1 U	< 5 U	< 50 U	< 50 U		**5.33**
Barium		D			**11**	**10**		**12.2**			**13**	**10**		**20.6**			**35**	**21**		**21.2**		**34**	**22**		**54.8**
Barium		T		**5**	**28**	**13**		**11.8**	**8**	**12**		**14**		**20.5**		**18**	**2**	**21**		**21.2**	**24**	**3**	**22**		**56.8**
Cadmium		D	1.12		< 2 U	< 2 U		< 1 U			< 2 U	< 2 U		< 1 U			< 2 U	< 2 U		< 1 U		< 2 U	< 2 U		< 1 U
Cadmium		T	1.12	< 5 U	< 2 U	< 2 U		< 1 U	< 5 U	< 2 U		< 2 U		< 1 U		< 5 U	< 2 U	< 2 U		< 1 U	< 5 U	< 2 U	**3**		< 1 U
Chromium		D	120		< 5 U	< 5 U		**6.77**			< 5 U	< 5 U		**26.2**			< 5 U	< 5 U		**32.4**		< 5 U	< 5 U		**30.4**
Chromium		T	120	**190**	< 5 U	< 5 U		**0.96 J**	< 10 U	< 5 U		< 5 U		**2.5**	**1.48**	**30**	< 5 U	< 5 U		**1.72**	**70**	< 5 U	< 5 U		**2.14**
Chromium (VI)		D																							
Chromium (VI)		T													< 50 U										
Copper		D	9		< 2 U	< 2 U		< 1 U			< 2 U	< 2 U		**1.48**			< 2 U	< 2 U		< 1 U		< 2 U	< 2 U		< 1 U
Copper		T	9		**20**	< 2 U		**0.76 J**		< 2 U		**8**		**2.25 J**			**4**	**3**		**3.16 J**		**5**	< 2 U		**2.69 J**
Lead		D	4.62		< 20 U	< 20 U	**0.269**	**0.68 J**			< 20 U	< 20 U	**0.199**	**0.955 J**			< 20 U	< 20 U	**0.292**	< 1 U		< 20 U	< 20 U	**0.383**	< 1 U
Lead		T	4.62	< 4 U	< 20 U	< 20 U		**0.64 J**	**20**	< 20 U		< 20 U		**1.34**		< 4 U	< 20 U	< 20 U		**2.44**	< 4 U	< 20 U	< 20 U		**1.81**
Mercury		D	0.012		< 0.1 U	< 0.1 U		**0.136 J**			< 0.1 U	< 0.1 U		< 0.2 U			< 0.1 U	< 0.1 U		< 0.2 U		< 0.1 U	< 0.1 U		< 0.2 U
Mercury		T	0.012	< 0.2 U	< 0.1 U	< 0.1 U		**0.149 J**	< 0.2 U	< 0.1 U		< 0.1 U		**0.102 J**		< 0.2 U	< 0.1 U	< 0.1 U		**0.149 J**	< 0.2 U	< 0.1 U	< 0.1 U		< 0.2 U
Selenium		D	5		< 50 U	< 50 U		5			< 50 U	< 50 U		**2.24**	< 1 U		< 50 U	< 50 U		**1.2 J**		< 50 U	< 50 U		3.28
Selenium		T	5	< 50 U	< 50 U	< 50 U		3.91	< 50 U	< 50 U		< 50 U		**2.31**	< 1 U	< 50 U	< 50 U	< 50 U		**2.22**	< 50 U	< 50 U	< 50 U		3.67
Silver		D	8.8		< 3 U	< 3 U		< 1 U			< 3 U	< 3 U		< 1 U			< 3 U	< 3 U		< 1 U		< 3 U	< 3 U		< 1 U
Silver		T	8.8	< 7 U	< 3 U	< 3 U		< 1 U	< 7 U	< 3 U		< 3 U		< 1 U		< 7 U	< 3 U	< 3 U		< 1 U	< 7 U	< 3 U	< 3 U		< 1 U

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-7	MW-7	MW-7	MW-7	MW-7	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-9	MW-9	MW-9	MW-9	MW-9	MW-9	MW-10
			Sample Date	03/14/2000	11/21/2000	03/06/2001	10/30/2001	12/29/2003	05/12/2000	11/20/2000	12/05/2000	03/06/2001	05/14/2001	10/30/2001	12/02/2003	12/26/2003	02/24/2006	03/06/2008	05/11/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	12/08/2016	11/20/2000
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		< 50 U	< 250 U	< 250 U				**30000**		**39000**			**32600**		**41800**	**17000**		< 250 U	< 250 U				**420**
Diesel Range Organics	NWTPH-DX	T		< 250 U	**440**	**330**			**4100**	**4000**		**3800**			**6120**		**8.1**		< 250 U	**520**	**630**				**1300**
Diesel Range Organics	NWTPH-DXSG	T													**3140**			**9900**							
Motor Oil Range Organics	NWTPH-DX	T		< 500 U	< 500 U	< 500 U			< 500 U	< 500 U		< 500 U			< 500 U		< 2.6 U		< 500 U	< 500 U	< 500 U				< 500 U
Motor Oil Range Organics	NWTPH-DXSG	T													< 500 U										
Motor Oil Range Organics	NWTPH-IDSG	T																< 270 U							
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500	< 750 U	**940**	**830**			**4600**	**4500**		**4300**			**6620**		**10.7**		< 750 U	**1020**	**1130**				**1800**
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500												**3640**			**10170**							
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44	< 5 U	< 0.2 U	< 1 U			**23**	**25**		**25**							< 2 U	< 0.2 U	< 1 U				**0.6**
Toluene	SW8260	T	57	< 5 U	< 0.2 U	< 1 U			**47**	**100**		**70**							< 2 U	< 0.2 U	< 1 U				**0.4**
Ethylbenzene	SW8260	T	29	< 5 U	< 0.2 U	< 1 U			**220**	**280**		**190**							< 2 U	**1.8**	< 1 U				**0.6**
m,p-Xylenes	SW8260	T																							
o-Xylene	SW8260	T																							
Total Xylenes	SW8260	T	80	< 15 U	< 0.6 U	< 2 U			**880**	**1680**		**1070**							< 6 U	**2.4**	< 2 U				**2.1**
Total Xylenes (ND = 1 RL)	CALC	T	80																						
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 0.2 U		< 10 U							< 2 U	< 0.2 U	< 1 U				< 0.2 U
1,2,4-Trimethylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	**540**		**430**							< 2 U	**1.5**	< 1 U				**1.8**
1,3,5-Trimethylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			**120**	**180**		**150**							< 2 U	**0.2**	< 1 U				**0.6**
1,4-Dichlorobenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 0.2 U		< 10 U							< 2 U	< 0.2 U	< 1 U				< 0.2 U
Acetone	SW8260	T		< 150 U	**1.1**	< 5 U			< 20 U	**4.5**		< 50 U							< 20 U	< 1 U	< 5 U				**1.5**
Carbon Disulfide	SW8260	T			< 0.2 U	< 1 U				< 0.2 U		< 10 U								< 0.2 U	< 1 U				< 0.2 U
Chlorobenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	< 0.2 U		< 10 U							**16**	**11**	**19**				< 0.2 U
Isopropylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			**58**	**59**		**44**							< 2 U	**0.4**	< 1 U				**0.9**
Methylene Chloride	SW8260	T		< 5 U	< 0.3 U	< 2 U			< 2 U	< 0.3 U		< 20 U							< 2 U	< 0.3 U	< 2 U				< 0.3 U
n-Butylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			**10**	**12 J**		< 10 U							< 2 U	< 0.2 U	< 1 U				< 0.2 U
n-Propylbenzene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 2 U	**12**		< 10 U							< 2 U	< 0.2 U	< 1 U				**0.3**
p-Isopropyltoluene	SW8260	T		< 5 U	< 0.2 U	< 1 U			**38**	**45**		**34**							< 2 U	< 0.2 U	< 1 U				**5.8**
Styrene	SW8260	T		< 5 U	< 0.2 U	< 1 U			< 20 U	< 0.2 U		< 10 U							< 2 U	< 0.2 U	< 1 U				< 0.2 U
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D																							
1-Methylnaphthalene	SW8270SIM	D													**498**		**107**								
1-Methylnaphthalene	SW8270	T																							
1-Methylnaphthalene	SW8270SIM	T													**775**		**883**								
2-Methylnaphthalene	SW8270	D																							
2-Methylnaphthalene	SW8270SIM	D													**709**		**56.7**								
2-Methylnaphthalene	SW8270	T																							
2-Methylnaphthalene	SW8270SIM	T													**1170**		**1420**								
Naphthalene	SW8270	D																							
Naphthalene	SW8270SIM	D										**4900**		**6770**		**2370**	**2900**							
Naphthalene	SW8260	T		< 5 U	< 0.5 U	< 5 U			**2000**	**8500**		**6000**							< 2 U	**43**	**6**				**96**
Naphthalene	SW8270	T																							
Naphthalene	SW8270SIM	T		< 0.02 U	**0.19**	**0.12**			**6200**	**6200**		**4500**			**8710**		**6810**	**3600**	**0.07**	**28**	**4.9**				**63**
Total Naphthalenes (ND = 1 RL)	CALC	D	152										**4900**		**7977**		**2534**	**2900**							
Total Naphthalenes (ND = 1 RL)	CALC	T	152	0.02	**0.19**	**0.12**			**6200**	**6200**		**4500**			**10655**		**9113**	**3600**	**0.07**	**28**	**4.9**				**63**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D																							
Acenaphthene	SW8270SIM	D										**140**		**177**		**28.6**	**140**							
Acenaphthene	SW8270	T																							
Acenaphthene	SW8270SIM	T		**0.25**	**0.79**	**0.72**			**130**	**220**		**210**			**278**		**280**	**170**	**0.46**	**3.9**	**1.4**				**96**
Acenaphthylene	SW8270	D																							
Acenaphthylene	SW8270SIM	D										**2.8**		**12.9**		< 23.8 U	**3.8**							
Acenaphthylene	SW8270	T																							
Acenaphthylene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**2.1**	**3**		**3.6 J**			**11.1**		**12.4 J**	**5.9**	< 0.02 U	< 0.1 U	< 0.1 U				**0.44**
Anthracene	SW8270	D																							
Anthracene	SW8270SIM	D										**2.7**		**15.9**		< 23.8 U	**3.7**							
Anthracene	SW8270	T																							
Anthracene	SW8270SIM	T		**0.03**	**0.13**	**0.13**			**38**	**5.2**		**5**			**21.3**		**31**	**7.1**	**0.07**	**0.15**	**0.2**				**8**
Benzo(g,h,i)perylene	SW8270	D																							
Benzo(g,h,i)perylene	SW8270SIM	D										< 0.1 U		**0.114**		< 23.8 U	< 0.02 U							
Benzo(g,h,i)perylene	SW8270	T																							
Benzo(g,h,i)perylene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U		< 0.1 U			**0.394**		< 23.8 U	< 0.2 U	< 0.02 U	< 0.1 U	< 0.1 U				**0.11**
Fluoranthene	SW8270	D																							
Fluoranthene	SW8270SIM	D										**1.1**		**16**		< 0.595 U	**3.5**							
Fluoranthene	SW8270	T																							
Fluoranthene	SW8270SIM	T		**0.08**	**0.26**	**0.2**			**3.9**	**6.2**		**5.4**			**23**		**38.6**	**6.7**	**0.12**	**0.32**	**0.4**				**10**
Fluorene	SW8270	D																							
Fluorene	SW8270SIM	D										< 50 U		**80.8**		< 23.8 U	**59**							
Fluorene	SW8270	T																							
Fluorene	SW8270SIM	T		**0.11**	**0.28**	**0.28**			**68**	**100**		**88**			**139**		**146**	**71**	**0.06**	**1.1**	**0.37**				**50**

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-7	MW-7	MW-7	MW-7	MW-7	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-8R	MW-9	MW-9	MW-9	MW-9	MW-9	MW-9	MW-10
			Sample Date	03/14/2000	11/21/2000	03/06/2001	10/30/2001	12/29/2003	05/12/2000	11/20/2000	12/05/2000	03/06/2001	05/14/2001	10/30/2001	12/02/2003	12/26/2003	02/24/2006	03/06/2008	05/11/2000	11/21/2000	03/05/2001	10/30/2001	12/29/2003	12/08/2016	11/20/2000
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D																							
Phenanthrene	SW8270SIM	D											< 50 U		**61.5**		< 23.8 U	**44**							
Phenanthrene	SW8270	T																							
Phenanthrene	SW8270SIM	T		< 0.02 U	**0.06 J**	**0.06 J**			**50**	**70**		**60**			**126**		**188**	**55**	**0.15**	**0.77**	**0.6**				**66**
Pyrene	SW8270	D																							
Pyrene	SW8270SIM	D											**0.57**		**11.1**		< 23.8 U	**2.1**							
Pyrene	SW8270	T																							
Pyrene	SW8270SIM	T		**0.05**	**0.16**	**0.13**			**2.5**	**2.9**		**3**			**16**		**24.8**	**4.2**	**0.1**	**0.22**	**0.3**				**7.9**
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D																							
Benz(a)anthracene	SW8270SIM	D											< 0.1 U		**0.71**		< 0.595 U	**0.072**							
Benz(a)anthracene	SW8270	T																							
Benz(a)anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.3**	**0.19**		**0.29**			**3.09**		**6**	**0.59**	< 0.02 U	< 0.1 U	< 0.1 U				**0.7**
Benzo(a)pyrene	SW8270	D																							
Benzo(a)pyrene	SW8270SIM	D											< 0.1 U		**0.292**		< 0.595 U	< 0.02 U							
Benzo(a)pyrene	SW8270	T																							
Benzo(a)pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.06**	< 0.1 U		**0.06 J**			**1.11**		**2.48**	< 0.2 U	< 0.02 U	< 0.1 U	< 0.1 U				**0.28**
Benzo(b)fluoranthene	SW8270	D																							
Benzo(b)fluoranthene	SW8270SIM	D											< 0.1 U		**0.277**		< 0.595 U	< 0.02 U							
Benzo(b)fluoranthene	SW8270	T																							
Benzo(b)fluoranthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.05**	< 0.1 U		**0.06 J**			**0.841**		**2.12**	**0.24**	< 0.02 U	< 0.1 U	< 0.1 U				**0.27**
Benzo(k)fluoranthene	SW8270	D																							
Benzo(k)fluoranthene	SW8270SIM	D											< 0.1 U		**0.219**		< 0.595 U	< 0.02 U							
Benzo(k)fluoranthene	SW8270	T																							
Benzo(k)fluoranthene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.06**	< 0.1 U		**0.05 J**			**0.885**		**2.52**	< 0.2 U	< 0.02 U	< 0.1 U	< 0.1 U				**0.21**
Chrysene	SW8270	D																							
Chrysene	SW8270SIM	D											< 0.1 U		**0.646**		< 0.595 U	**0.072**							
Chrysene	SW8270	T																							
Chrysene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			**0.32**	**0.18**		**0.21 J**			**2.9**		**6.52**	**0.56**	< 0.02 U	< 0.1 U	< 0.1 U				**0.59**
Dibenzo(a,h)anthracene	SW8270	D																							
Dibenzo(a,h)anthracene	SW8270SIM	D											< 0.1 U		**0.0635**		< 0.595 U	< 0.02 U							
Dibenzo(a,h)anthracene	SW8270	T																							
Dibenzo(a,h)anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U		< 0.1 U			**0.186**		< 1.19 U	< 0.2 U	< 0.02 U	< 0.1 U	< 0.1 U				< 0.1 U
Indeno(1,2,3-cd)pyrene	SW8270	D																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D											< 0.1 U		**0.126**		< 23.8 U	< 0.02 U							
Indeno(1,2,3-cd)pyrene	SW8270	T																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U	< 0.1 U			< 0.02 U	< 0.1 U		< 0.1 U			**0.363**		< 23.8 U	< 0.2 U	< 0.02 U	< 0.1 U	< 0.1 U				**0.11**
Total cPAHs TEC	CALC	D	0.01										< 0.0755 U		**0.43801**		< 1.609475 U	**0.02192**							
Total cPAHs TEC	CALC	T	0.01	< 0.0151 U	< 0.0755 U	< 0.0755 U			**0.1062**	**0.0908**		**0.1121 J**			**1.6755**		< 4.86	**0.2186**	< 0.0151 U	< 0.0755 U	< 0.0755 U				**0.4199**
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5		< 50 U	< 50 U		< 1 U		< 50 U		< 50 U				**2.18**				< 50 U	< 50 U		**3.49**		< 50 U
Arsenic		T	5	< 5 U	< 50 U	< 50 U		< 1 U		< 50 U	< 5 U	< 50 U				< 1 U			< 5 U	< 50 U	< 50 U		**5.5**		< 50 U
Barium		D			**39**	**34**		**31.9**		**15**		**19**				**27.4**				**102**	**97**		**123**		**12**
Barium		T		**23**	**31**	**34**		**35.6**	**15**	**13**		**15**				**32.1**			**17**	**16**	**90**		**140**		**10**
Cadmium		D	1.12		< 2 U	< 2 U		< 1 U		< 2 U		< 2 U				< 1 U				< 2 U	< 2 U		< 1 U		< 2 U
Cadmium		T	1.12	< 5 U	< 2 U	< 2 U		< 1 U	< 5 U	< 2 U		< 2 U				< 1 U			< 5 U	< 2 U	< 2 U		< 1 U		< 2 U
Chromium		D	120		< 5 U	< 5 U		**23.4**		< 5 U		< 5 U				**15.7**				< 5 U	< 5 U		**30.7**		< 5 U
Chromium		T	120	**20**	< 5 U	< 5 U		**0.895 J**	< 10 U	< 5 U		< 5 U				**3.85**			< 10 U	< 5 U	< 5 U		**1.95**	**1.97**	< 5 U
Chromium (VI)		D																							
Chromium (VI)		T																						< 50 U	
Copper		D	9		**3**	< 2 U		< 1 U		< 2 U		< 2 U				< 1 U				< 2 U	< 2 U		**0.755 J**		< 2 U
Copper		T	9		**8**	< 2 U		**1.88 J**		**2**		< 2 U				**1.89**				< 2 U	< 2 U		**0.83 J**		**3**
Lead		D	4.62		< 20 U	< 20 U	**0.249**	< 1 U		< 20 U		< 2 U		**0.231**		< 1 U				< 20 U	< 20 U	**0.226**	**0.6 J**		< 20 U
Lead		T	4.62	< 4 U	< 20 U	< 20 U		**0.91 J**	**6**	< 20 U		< 20 U				**0.515 J**			**6**	< 20 U	< 20 U		< 1 U		< 20 U
Mercury		D	0.012		< 0.1 U	< 0.1 U		**0.182 J**		< 0.1 U		< 0.1 U				< 0.2 U				< 0.1 U	< 0.1 U		< 0.2 U		< 0.1 U
Mercury		T	0.012	< 0.2 U	< 0.1 U	< 0.1 U		< 0.2 U	< 0.2 U	< 0.1 U		< 0.1 U				**0.215**			< 0.2 U	< 0.1 U	< 0.1 U		**0.258**		< 0.1 U
Selenium		D	5		< 50 U	< 50 U		< 2 U		< 50 U		< 50 U				< 2 U				**70**	< 50 U		**11.5**	**2.08**	< 50 U
Selenium		T	5	< 50 U	< 50 U	< 50 U		**1.02 J**	< 50 U	< 50 U		< 50 U				< 2 U			< 50 U	< 50 U	< 50 U		**10.5**	**1.69**	< 50 U
Silver		D	8.8		< 3 U	< 3 U		< 1 U		< 3 U		< 3 U				< 1 U				< 3 U	< 3 U		< 1 U		< 3 U
Silver		T	8.8	< 7 U	< 3 U	< 3 U		< 1 U	< 7 U	< 3 U		< 3 U				< 1 U			< 7 U	< 3 U	< 3 U		< 1 U		< 3 U

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12	MW-12	MW-13	MW-13
			Sample Date	03/06/2001	05/14/2001	10/30/2001	12/03/2003	12/23/2003	02/23/2006	03/06/2008	11/20/2000	03/06/2001	05/14/2001	10/30/2001	12/02/2003	12/26/2003	02/23/2006	03/04/2008	11/20/2000	03/06/2001	10/30/2001	12/02/2003	12/22/2003	08/05/2002	12/02/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		**390**			**87.6**		**124**	**490**	**1900**	**2500**			**436**		**221**	**270**	< 250 U	< 250 U		< 50 U		**1000**	**93.5**
Diesel Range Organics	NWTPH-DX	T		**1100**			**806**		**799**		**3600**	**3100**			**2650**		**1910**		**640**	**1000**		**1400**			**445**
Diesel Range Organics	NWTPH-DXSG	T					**281**			**4300**					**1510**			**1100**				< 250 U		**760**	< 250 U
Motor Oil Range Organics	NWTPH-DX	T		< 500 U			< 500 U		< 532 U		< 500 U	< 500 U			< 500 U		< 562 U		< 500 U	**1400**		**634**			< 500 U
Motor Oil Range Organics	NWTPH-DXSG	T					< 500 U								< 500 U							< 500 U		< 500 U	< 500 U
Motor Oil Range Organics	NWTPH-IDSG	T								< 250 U								< 250 U							
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500	**1600**			**1306**		**1331**		**4100**	**3600**			**3150**		**2472**		**1140**	**2400**		**2034**			**945**
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500				**781**			**4550**					**2010**			**1350**				< 750 U		**1260**	< 750 U
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44	**1.2**							**1.5**	< 5 U							< 1 U	< 1 U				**7**	
Toluene	SW8260	T	57	< 1 U							**1.4**	< 5 U							< 1 U	< 1 U					
Ethylbenzene	SW8260	T	29	< 1 U							**6.6**	**7.6**							< 1 U	< 1 U				**1.6**	
m,p-Xylenes	SW8260	T																							
o-Xylene	SW8260	T																							
Total Xylenes	SW8260	T	80	**1.6**							**12.5**	**12.1**							< 2 U	< 2 U				**2.8**	
Total Xylenes (ND = 1 RL)	CALC	T	80																						
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
1,2,4-Trimethylbenzene	SW8260	T		**1**							**17**	**14**							< 1 U	< 1 U				**2**	
1,3,5-Trimethylbenzene	SW8260	T		< 1 U							**6**	< 5 U							< 1 U	< 1 U				**1**	
1,4-Dichlorobenzene	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
Acetone	SW8260	T		< 5 U							**3.7**	< 25 U							< 5 U	< 5 U				**14**	
Carbon Disulfide	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
Chlorobenzene	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
Isopropylbenzene	SW8260	T		< 1 U							**3.8**	< 5 U							< 1 U	< 1 U				**3.3**	
Methylene Chloride	SW8260	T		< 2 U							< 0.3 U	< 10 U							< 2 U	< 2 U					
n-Butylbenzene	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
n-Propylbenzene	SW8260	T		< 1 U							**2.2**	< 5 U							< 1 U	< 1 U					
p-Isopropyltoluene	SW8260	T		< 1 U							**14**	**28**							**4.5**	< 1 U				**12**	
Styrene	SW8260	T		< 1 U							< 0.2 U	< 5 U							< 1 U	< 1 U					
Vinyl Chloride	SW8260	T																						**6.2**	
Naphthalenes																									
1-Methylnaphthalene	SW8270	D																							
1-Methylnaphthalene	SW8270SIM	D					**10.2**		**0.753**						**43.1**		**3.86**					**0.347**			**2.13**
1-Methylnaphthalene	SW8270	T																							
1-Methylnaphthalene	SW8270SIM	T					**23.5**		**8.47**						**131**		**58.4**					**0.202**			**3.49**
2-Methylnaphthalene	SW8270	D																							
2-Methylnaphthalene	SW8270SIM	D					**2.58**		**0.114 J**						**44.7**		**0.114**					< 0.1 U			**0.128**
2-Methylnaphthalene	SW8270	T																						**3.2**	
2-Methylnaphthalene	SW8270SIM	T					**25.1**		**0.158**						**2.58**		< 0.109 U					< 0.1 U		**5.6**	**0.147**
Naphthalene	SW8270	D																							
Naphthalene	SW8270SIM	D			**3.7**		**6.68**		**1.37**	**1.3**			**0.28**		**41.7**		**1.49**	**13**				**1**			**1.01**
Naphthalene	SW8260	T		**29**							**1100**	**550**							**11**	< 5 U				**18**	
Naphthalene	SW8270	T																						**8.4**	
Naphthalene	SW8270SIM	T		**7**			**6.55**		**3.38**	**1.6**	**0.46 J**	**280**			**89.3**		**5.47**	**18**	**1.3**	**2.1**		**1.07**		**11**	**1.27**
Total Naphthalenes (ND = 1 RL)	CALC	D	152		**3.7**		**19**		**2.2**	**1.3**			**0.28**		**130**		**5.5**	**13**				**1.4**			**3.3**
Total Naphthalenes (ND = 1 RL)	CALC	T	152	**7**			**55**		**12**	**1.6**	**0.46**	**280**			**223**		**64**	**18**	**1.3**	**2.1**		**1.4**		**17**	**4.9**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D																							
Acenaphthene	SW8270SIM	D			**18**		**14.6**		**0.828**	**31**			**0.23**		**35.9**		**2.73**	**98**				**0.544**			**1.71**
Acenaphthene	SW8270	T																						**15**	
Acenaphthene	SW8270SIM	T		**68**			**44.9**		**28.1**	**34**	**340**	**210**			**147**		**72.4**	**120**	**2.3**	**2**		**0.826**		**17**	**3.57**
Acenaphthylene	SW8270	D																							
Acenaphthylene	SW8270SIM	D			< 0.1 U		**0.214**		< 0.116 U	**0.24**			< 0.1 U		**0.564**		**0.159**	**0.55**				< 0.1 U			< 0.1 U
Acenaphthylene	SW8270	T																							
Acenaphthylene	SW8270SIM	T		**0.86 J**			**1.44**		**0.238**	< 1 U	**2.4**	**2.2 J**			**1.74**		**0.878**	**0.84**	< 0.1 U	< 0.1 U		< 0.1 U		**0.35 J**	< 0.1 U
Anthracene	SW8270	D																							
Anthracene	SW8270SIM	D			**1.4**		**1.45**		**0.598**	**3.8**			**0.11**		**6.07**		**2.12**	**12**				**0.637**			**0.26**
Anthracene	SW8270	T																							
Anthracene	SW8270SIM	T		**6.9**			**5.67**		**2.87**	**3.2**	**26**	**16**			**21**		**14.7**	**16**	**0.14**	**0.13**		**0.634**		**0.65**	**0.43**
Benzo(g,h,i)perylene	SW8270	D																							
Benzo(g,h,i)perylene	SW8270SIM	D			< 0.1 U		< 0.1 U		< 0.116 U	**0.031**			< 0.1 U		**0.213**		< 0.114 U	**0.063**				< 0.1 U			< 0.1 U
Benzo(g,h,i)perylene	SW8270	T																							
Benzo(g,h,i)perylene	SW8270SIM	T		**0.31**			< 0.1 U		< 0.118 U	**0.032**	**0.75**	**0.26**			< 0.1 U		< 0.109 U	< 2 U	< 0.1 U	< 0.1 U		< 0.1 U		< 0.11 U	< 0.1 U
Fluoranthene	SW8270	D																							
Fluoranthene	SW8270SIM	D			**1.2**		**0.747**		**0.537**	**5.5**			< 0.1 U		**4.8**		**3.02**	**13**				**0.181**			< 0.1 U
Fluoranthene	SW8270	T																							
Fluoranthene	SW8270SIM	T		**8.5**			**9.52**		**4.52**	**6.1**	**38**	**18**			**18.2**		**17**	**15**	**0.24**	**0.18**		< 0.1 U		**0.52**	**0.253**
Fluorene	SW8270	D																							
Fluorene	SW8270SIM	D			**9.9**		**0.695**		**0.193**	**16**			< 0.1 U		**3.15**		**0.507**	**73**				**0.118**			< 0.1 U
Fluorene	SW8270	T																						**5.1**	
Fluorene	SW8270SIM	T		**36**			**27.8**		**14**	**18**	**190**	**140**			**108**		**53**	**84**	**0.83**	**0.82**		**0.223**		**6.2**	**1.44**

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12	MW-12	MW-13	MW-13
			Sample Date	03/06/2001	05/14/2001	10/30/2001	12/03/2003	12/23/2003	02/23/2006	03/06/2008	11/20/2000	03/06/2001	05/14/2001	10/30/2001	12/02/2003	12/26/2003	02/23/2006	03/04/2008	11/20/2000	03/06/2001	10/30/2001	12/02/2003	12/22/2003	08/05/2002	12/02/2003
Chemical Name	Base Method	Fraction	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D																							
Phenanthrene	SW8270SIM	D			9.9		1.5		0.684	17			< 0.1 U		8.09		3.13	79				0.364			< 0.1 U
Phenanthrene	SW8270	T																						2.9	
Phenanthrene	SW8270SIM	T		46			47.1		14.3	18	230	170			131		60.5	87	0.25	0.11		< 0.1 U		3	0.773
Pyrene	SW8270	D																							
Pyrene	SW8270SIM	D			0.76		0.561		0.428	3.7			< 0.1 U		3.81		2.38	8.3				0.11			< 0.1 U
Pyrene	SW8270	T																							
Pyrene	SW8270SIM	T		8.9			6.38		2.91	4.1	30	18			13.6		10.7	10	0.14	0.11		< 0.1 U		0.42	0.147
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D																							
Benz(a)anthracene	SW8270SIM	D			0.11		0.164		0.105 J	0.4			< 0.1 U		0.892		0.455	0.5				0.0389			< 0.01 U
Benz(a)anthracene	SW8270	T																							
Benz(a)anthracene	SW8270SIM	T		1.4			0.533		0.32	0.41	4.8	1.8			0.851		0.739	0.68	< 0.1 U	< 0.1 U		< 0.01 U		0.05 J	0.0439
Benzo(a)pyrene	SW8270	D																							
Benzo(a)pyrene	SW8270SIM	D			< 0.1 U		0.0787		< 0.116 U	0.18			< 0.1 U		0.442		0.125	0.18				< 0.01 U			< 0.01 U
Benzo(a)pyrene	SW8270	T																							
Benzo(a)pyrene	SW8270SIM	T		0.71			0.11		0.104 J	0.16	1.8	0.65			0.226		0.159	< 0.2 U	< 0.1 U	< 0.1 U		< 0.01 U		< 0.11 U	< 0.01 U
Benzo(b)fluoranthene	SW8270	D																							
Benzo(b)fluoranthene	SW8270SIM	D			< 0.1 U		0.0753		< 0.116 U	0.21			< 0.1 U		0.387		0.148	0.22				< 0.01 U			< 0.01 U
Benzo(b)fluoranthene	SW8270	T																							
Benzo(b)fluoranthene	SW8270SIM	T		0.56			0.109		0.0988 J	0.21	1.8	0.52			0.209		0.137	0.23	< 0.1 U	< 0.1 U		< 0.01 U		< 0.11 U	0.0175
Benzo(k)fluoranthene	SW8270	D																							
Benzo(k)fluoranthene	SW8270SIM	D			< 0.1 U		0.0398		< 0.116 U	0.09			< 0.1 U		0.347		0.145	0.089				< 0.01 U			< 0.01 U
Benzo(k)fluoranthene	SW8270	T																							
Benzo(k)fluoranthene	SW8270SIM	T		0.63			0.0772		0.0941 J	0.069	1.5	0.51			0.169		0.161	< 0.2 U	< 0.1 U	< 0.1 U		< 0.01 U		< 0.11 U	0.0186
Chrysene	SW8270	D																							
Chrysene	SW8270SIM	D			< 0.1 U		0.114		0.0953 J	0.37			< 0.1 U		0.925		0.45	0.39				0.024			< 0.01 U
Chrysene	SW8270	T																							
Chrysene	SW8270SIM	T		1.2			0.403		0.353	0.37	4 J	1.1			0.615		0.678	0.48	< 0.1 U	< 0.1 U		< 0.01 U		0.05 J	0.0308
Dibenzo(a,h)anthracene	SW8270	D																							
Dibenzo(a,h)anthracene	SW8270SIM	D			< 0.1 U		0.0168		< 0.116 U	< 0.02 U			< 0.1 U		0.128		< 0.114 U	< 0 U				< 0.01 U			< 0.01 U
Dibenzo(a,h)anthracene	SW8270	T																							
Dibenzo(a,h)anthracene	SW8270SIM	T		0.09 J			0.0118		< 0.118 U	< 0.02 U	0.23	0.07 J			0.0661		< 0.109 U	< 0.2 U	< 0.1 U	< 0.1 U		< 0.01 U		< 0.11 U	< 0.01 U
Indeno(1,2,3-cd)pyrene	SW8270	D																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D			< 0.1 U		0.032		< 0.116 U	0.037			< 0.1 U		0.185		< 0.114 U	0.068				< 0.01 U			< 0.01 U
Indeno(1,2,3-cd)pyrene	SW8270	T																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		0.26			0.0292		< 0.118 U	0.035	0.72	0.23			0.119		< 0.109 U	< 0.2 U	< 0.1 U	< 0.1 U		< 0.01 U		< 0.11 U	< 0.01 U
Total cPAHs TEC	CALC	D	0.01		0.0815		0.11263		0.092653 J	0.2584			< 0.0755 U		0.64515		0.2157	0.2716				0.01113			< 0.00755 U
Total cPAHs TEC	CALC	T	0.01	1.016 J			0.19005		0.17062 J	0.2371	2.745 J	0.974 J			0.37356		0.28038	0.2258	< 0.0755 U	< 0.0755 U		< 0.00755 U		0.0825 J	0.014308
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																						< 1.1 U	
Aroclor 1221	SW8082	T																						< 2.2 U	
Aroclor 1232	SW8082	T																						< 1.1 U	
Aroclor 1242	SW8082	T																						< 1.1 U	
Aroclor 1248	SW8082	T																						< 1.1 U	
Aroclor 1254	SW8082	T																						< 1.1 U	
Aroclor 1260	SW8082	T																						< 1.1 U	
Total PCBs	CALC	T	0.01																					8.8	
Metals																									
Arsenic		D	5	< 50 U				< 1 U			< 50 U	< 50 U				1.11			< 50 U	< 50 U			0.605 J	1.1	
Arsenic		T	5	< 50 U				0.78 J			< 50 U	< 50 U				< 1 U			< 50 U	< 50 U			0.665 J	1.1	
Barium		D		11				6.58			10	9				29.1			35	33			19.6	23	
Barium		T		9				7.44			9	8				31.5			3	31			20.5	26	
Cadmium		D	1.12	< 2 U				< 1 U			< 2 U	< 2 U				< 1 U			< 2 U	< 2 U			< 1 U	< 2 U	
Cadmium		T	1.12	< 2 U				< 1 U			< 2 U	< 2 U				< 1 U			< 2 U	< 2 U			< 1 U	< 2 U	
Chromium		D	120	< 5 U				9.53			< 5 U	< 5 U				14			< 5 U	< 5 U			10.3	8	
Chromium		T	120	< 5 U				2.07			< 5 U	< 5 U				3.2			< 5 U	< 5 U			< 1 U	9	
Chromium (VI)		D																							
Chromium (VI)		T																							
Copper		D	9	< 2 U				0.98 J			< 2 U	< 2 U				1.52			< 2 U	< 2 U			< 1 U	< 2 U	
Copper		T	9	4				7.76			3	< 2 U				28.9			< 2 U	< 2 U			1.38	3	
Lead		D	4.62	< 20 U		0.246		0.545 J			< 20 U	< 20 U		0.413		1.93			< 20 U	< 20 U	0.303		0.505 J	< 1 U	
Lead		T	4.62	< 20 U				3.05			< 20 U	< 20 U				40.8			< 20 U	< 20 U			0.605 J	3	
Mercury		D	0.012	< 0.1 U				< 0.2 U			< 0.1 U	< 0.1 U				< 0.2 U			< 0.1 U	< 0.1 U			< 0.2 U	0.1	
Mercury		T	0.012	< 0.1 U				< 0.2 U			< 0.1 U	< 0.1 U				< 0.2 U			< 0.1 U	< 0.1 U			< 0.2 U	< 0.1 U	
Selenium		D	5	< 50 U				< 2 U			< 50 U	< 50 U				< 2 U			< 50 U	< 50 U			< 2 U	0.9	
Selenium		T	5	< 50 U				< 2 U			< 50 U	< 50 U				< 2 U			< 50 U	< 50 U			1.52 J	0.7	
Silver		D	8.8	< 3 U				< 1 U			< 3 U	< 3 U				< 1 U			< 3 U	< 3 U			< 1 U	< 3 U	
Silver		T	8.8	< 3 U				< 1 U			< 3 U	< 3 U				< 1 U			< 3 U	< 3 U			< 1 U	< 3 U	

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-13	MW-14	MW-14	MW-14	MW-14	MW-14	MW-15	MW-15	MW-15	MW-15	MW-15	MW-16	MW-16	MW-16	MW-16	MW-16	MW-17	MW-17	MW-17	MW-17	MW-17	MW-18
			Sample Date	12/22/2003	03/11/2003	12/01/2003	12/23/2003	02/23/2006	03/05/2008	03/11/2003	12/01/2003	12/29/2003	02/23/2006	03/04/2008	03/10/2003	12/01/2003	12/29/2003	02/23/2006	03/05/2008	03/10/2003	12/01/2003	12/23/2003	02/23/2006	03/05/2008	03/10/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T			**253**	**72.9**		< 50 U	< 100 U	< 50 U	< 50 U		< 50 U	< 100 U	< 50 U	< 50 U		< 50 U	< 100 U	< 50 U	< 50 U		< 50 U	< 100 U	**23800**
Diesel Range Organics	NWTPH-DX	T				**1110**		**859**			**877**		**903**			**455**		**495**			**311**		**429**		
Diesel Range Organics	NWTPH-DXSG	T			**2060**	< 250 U			**71**	**884**	< 250 U			< 50 U	**3100**	< 250 U			< 50 U	**810**	< 250 U			< 50 U	**7430**
Motor Oil Range Organics	NWTPH-DX	T				< 500 U		< 562 U			< 500 U		< 568 U			< 500 U		< 562 U			< 500 U		< 526 U		
Motor Oil Range Organics	NWTPH-DXSG	T			< 500 U	< 500 U				< 500 U	< 500 U				< 500 U	< 500 U				< 500 U	< 500 U				< 500 U
Motor Oil Range Organics	NWTPH-IDSG	T							< 250 U					< 250 U					< 250 U					< 250 U	
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500			**1610**		**1421**			**1377**		**1471**			**955**		**1057**			**811**		**955**		
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500		**2560**	< 750 U			**321**	**1384**	< 750 U			< 300 U	**3600**	< 750 U			< 300 U	**1310**	< 750 U			< 300 U	**7930**
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44		< 10 U					< 0.2 U					< 0.2 U					< 0.2 U					< 100 U
Toluene	SW8260	T	57		< 10 U					< 0.2 U					< 0.2 U					**0.448**					< 100 U
Ethylbenzene	SW8260	T	29		< 10 U					< 0.2 U					< 0.2 U					< 0.2 U					**246**
m,p-Xylenes	SW8260	T			< 10 U					< 0.5 U					< 0.5 U					< 0.5 U					**325**
o-Xylene	SW8260	T			< 10 U					< 0.25 U					< 0.25 U					< 0.25 U					**175**
Total Xylenes	SW8260	T	80																						
Total Xylenes (ND = 1 RL)	CALC	T	80		20					0.75					0.75					0.75					**500**
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T																							
1,2,4-Trimethylbenzene	SW8260	T			< 10 U					< 0.2 U					< 0.2 U					< 0.2 U					**353**
1,3,5-Trimethylbenzene	SW8260	T			< 10 U					< 0.5 U					< 0.5 U					< 0.5 U					**114**
1,4-Dichlorobenzene	SW8260	T																							
Acetone	SW8260	T																							
Carbon Disulfide	SW8260	T																							
Chlorobenzene	SW8260	T																							
Isopropylbenzene	SW8260	T			< 10 U					< 0.5 U					< 0.5 U					< 0.5 U					< 100 U
Methylene Chloride	SW8260	T																							
n-Butylbenzene	SW8260	T																							
n-Propylbenzene	SW8260	T			< 10 U					< 0.5 U					< 0.5 U					< 0.5 U					< 100 U
p-Isopropyltoluene	SW8260	T			< 10 U					**5.65**					< 0.2 U					**5.7**					< 100 U
Styrene	SW8260	T																							
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D						**1.68**										**0.0706 J**							
1-Methylnaphthalene	SW8270SIM	D			**10**	**2.28**				**0.205**	< 0.1 U		**0.216**		< 0.1 U	< 0.1 U				< 0.1 U	**0.113**		**0.0989 J**		**184**
1-Methylnaphthalene	SW8270	T											**0.41**					< 0.114 U					**0.264 J**		
1-Methylnaphthalene	SW8270SIM	T			**60.7**	**6.65**		**3.64**		**0.569**	**0.176**				**0.447**	< 0.1 U				< 0.5 U	< 0.1 U				**914**
2-Methylnaphthalene	SW8270	D						**0.139**										< 0.112 U							
2-Methylnaphthalene	SW8270SIM	D			< 1 U	< 0.1 U				**0.206**	< 0.1 U		**0.0565 J**		< 0.1 U	< 0.1 U				< 0.1 U	< 0.1 U		**0.0607 J**		**127**
2-Methylnaphthalene	SW8270	T			< 10 U					< 10 U			< 0.116 U		< 10 U			< 0.114 U		< 10 U			< 0.575 U		**1240 J**
2-Methylnaphthalene	SW8270SIM	T			**8.87**	**0.83**		**0.326**		< 0.1 U	< 0.1 U				**0.149**	< 0.1 U				< 0.5 U	< 0.1 U				**1060**
Naphthalene	SW8270	D						**1.02**										**0.236**							
Naphthalene	SW8270SIM	D			**66.4**	**4.35**			**0.18**	**1.72**	**0.186**		**0.334**	**0.036**	**0.194**	< 0.1 U			**0.026**	**0.157**	**0.195**		**0.366**	**0.21**	**4990**
Naphthalene	SW8260	T			**120**					< 0.5 U					**1.26**					**1.19**					**10600**
Naphthalene	SW8270	T			**109**					< 10 U			**0.0636 J**		< 10 U			**0.0233 J**		< 10 U			**0.18 J**		**11900**
Naphthalene	SW8270SIM	T			**28.3**	**10.1**		**1.11**	**0.26**	**0.235**	< 0.1 U			**0.036**	**0.877**	< 0.1 U			**0.023**	**0.793**	**0.346**			**0.24**	**9840 J**
Total Naphthalenes (ND = 1 RL)	CALC	D	152		**77**	**6.7**		**2.8**	**0.18**	**2.1**	**0.4**		0.6065	**0.036**	**0.39**	0.3		**0.4**	**0.026**	**0.36**	**0.41**		**0.5**	**0.21**	**5301**
Total Naphthalenes (ND = 1 RL)	CALC	T	152		**98**	**18**		**5.1**	**0.26**	**0.9**	**0.4**		**0.590**	**0.036**	**1.5**	0.3		**0.251**	**0.023**	**1.8**	**0.55**		**1.0**	**0.24**	**11814**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D						**2.06**					**0.635**					**0.201**							
Acenaphthene	SW8270SIM	D			**13.3**	**4.75**			**8.2**	**0.244**	**0.13**			**3**	< 0.1 U	< 0.1 U			**0.48**	**0.229**	**1.43**		**0.211**	**5.6**	**72.9**
Acenaphthene	SW8270	T			**63.6**					< 10 U			**2.63**		< 10 U			**0.28**		< 10 U			**5.05**		**416 J**
Acenaphthene	SW8270SIM	T			**39.5**	**23.1**		**9.54**	**10**	**4.35**	**3.74**			**3.5**	**1.07**	**0.238**			**0.57**	**4.62**	**0.437**			**6.2**	**410**
Acenaphthylene	SW8270	D						< 0.116 U										< 0.112 U							
Acenaphthylene	SW8270SIM	D			< 1 U	< 0.1 U			**0.071**	< 0.1 U	< 0.1 U		< 0.118 U	**0.023**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		< 0.112 U	**0.046**	< 10 U
Acenaphthylene	SW8270	T											**0.0502 J**					< 0.114 U					< 0.575 U		
Acenaphthylene	SW8270SIM	T			**0.654**	**0.327**		**0.115**		< 0.1 U	< 0.1 U			**0.025**	< 0.1 U	< 0.1 U			< 0 U	< 0.5 U	< 0.1 U			**0.047**	< 10 U
Anthracene	SW8270	D						**0.299**										**0.186**							
Anthracene	SW8270SIM	D			< 1 U	**0.676**			**0.35**	**0.157**	**0.29**		**0.146**	**0.12**	< 0.1 U	**0.321**			< 0 U	< 0.1 U	**0.132**		**0.142**	**0.32**	< 10 U
Anthracene	SW8270	T			< 10 U					< 10 U			**0.279**		< 10 U			**0.172**		< 10 U			**0.297 J**		**16.8**
Anthracene	SW8270SIM	T			**8.13**	**2.28**		**0.566**	**0.45**	**0.373**	**0.381**			**0.17**	**0.426**	**0.286**			< 0 U	< 0.5 U	**0.136**			**0.39**	< 10 U
Benzo(g,h,i)perylene	SW8270	D						< 0.116 U										< 0.112 U							
Benzo(g,h,i)perylene	SW8270SIM	D			< 1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		< 0.118 U	< 0 U	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		< 0.112 U	< 0 U	< 10 U
Benzo(g,h,i)perylene	SW8270	T											< 0.116 U					< 0.114 U					< 0.575 U		
Benzo(g,h,i)perylene	SW8270SIM	T			**0.154**	< 0.1 U		< 0.115 U	< 0 U	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U			< 0 U	< 0.5 U	< 0.1 U			< 0 U	< 10 U
Fluoranthene	SW8270	D						**0.402**										**0.249**							
Fluoranthene	SW8270SIM	D			< 1 U	**0.184**			**1**	< 0.1 U	< 0.1 U		**0.334**	**0.31**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		**0.519**	**0.71**	< 10 U
Fluoranthene	SW8270	T			**13.5**					< 10 U			**0.235**		< 10 U			< 0.114 U		< 10 U			**0.83**		**12.1**
Fluoranthene	SW8270SIM	T			**13.5**	**5.05**		**1.26**	**1.3**	**0.294**	**0.287**			**0.36**	**0.781**	< 0.1 U			< 0 U	**1.05**	< 0.1 U			**0.77**	**11.8**
Fluorene	SW8270	D						**0.222**										**0.0506 J**							
Fluorene	SW8270SIM	D			< 1 U	< 0.1 U			**3.4**	< 0.1 U	< 0.1 U		**0.113 J**	**1.6**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		**0.0854 J**	**2.6**	< 10 U
Fluorene	SW8270	T			< 10 U					< 10 U			**1.22**		< 10 U			< 0.114 U		< 10 U			**2.64**		**173 J**
Fluorene	SW8270SIM	T			**19**	**10.6**		**3.71**	**4.1**	**2.08**	**1.62**			**1.8**	**0.924**	< 0.1 U			< 0 U	**1.76**	< 0.1 U			**2.8**	**171**

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)

Chemical Name	Base Method	Fraction	GW CUL	MW-13 12/22/2003	MW-14 03/11/2003	MW-14 12/01/2003	MW-14 12/23/2003	MW-14 02/23/2006	MW-14 03/05/2008	MW-15 03/11/2003	MW-15 12/01/2003	MW-15 12/29/2003	MW-15 02/23/2006	MW-15 03/04/2008	MW-16 03/10/2003	MW-16 12/01/2003	MW-16 12/29/2003	MW-16 02/23/2006	MW-16 03/05/2008	MW-17 03/10/2003	MW-17 12/01/2003	MW-17 12/23/2003	MW-17 02/23/2006	MW-17 03/05/2008	MW-18 03/10/2003
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D						**1.23**										**0.6**							
Phenanthrene	SW8270SIM	D			< 1 U	**0.111**			**2.4**	**0.143**	< 0.1 U		**0.842**	**0.27**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		**0.888**	**0.25**	< 10 U
Phenanthrene	SW8270	T			**87.4**					< 10 U			**0.0899 J**		< 10 U			< 0.114 U		< 10 U			**0.388 J**		**137**
Phenanthrene	SW8270SIM	T			**8.27**	**14.6**		**1.84**	**2.8**	**0.255**	< 0.1 U			**0.28**	**2.8**	< 0.1 U			< 0 U	**0.992**	< 0.1 U			**0.25**	**157**
Pyrene	SW8270	D						**0.363**										**0.199**							
Pyrene	SW8270SIM	D			< 1 U	**0.126**			**0.68**	< 0.1 U	< 0.1 U		**0.24**	**0.19**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U	< 0.1 U		**0.369**	**0.46**	< 10 U
Pyrene	SW8270	T			< 10 U					< 10 U			**0.188**		< 10 U			< 0.114 U		< 10 U			**0.615**		**12.7**
Pyrene	SW8270SIM	T			**7.35**	**3.08**		**0.786**	**0.84**	**0.157**	**0.167**			**0.23**	**0.572**	< 0.1 U			< 0 U	**0.693**	< 0.1 U			**0.51**	< 10 U
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D						< 0.0116 U										< 0.0112 U							
Benz(a)anthracene	SW8270SIM	D			< 0.1 U	**0.0624**			**0.052**	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	**0.0335**		**0.0494 J**	**0.042**	< 1 U
Benz(a)anthracene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Benz(a)anthracene	SW8270SIM	T			**1.1**	**0.446**		**0.11 J**	**0.067**	< 0.1 U	< 0.01 U			**0.026**	**0.131**	< 0.01 U			< 0 U	< 0.05 U	**0.0297**			**0.049**	< 10 U
Benzo(a)pyrene	SW8270	D						< 0.0116 U										< 0.0112 U							
Benzo(a)pyrene	SW8270SIM	D			< 0.1 U	**0.0185**			< 0 U	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U		< 0.112 U	< 0 U	< 1 U
Benzo(a)pyrene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Benzo(a)pyrene	SW8270SIM	T			**0.385**	**0.148**		**0.046 J**	< 0 U	< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.05 U	< 0.01 U			< 0 U	< 10 U
Benzo(b)fluoranthene	SW8270	D						< 0.0116 U										< 0.0112 U							
Benzo(b)fluoranthene	SW8270SIM	D			< 0.1 U	**0.0154**			< 0 U	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	**0.0163**		< 0.112 U	< 0 U	< 1 U
Benzo(b)fluoranthene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Benzo(b)fluoranthene	SW8270SIM	T			**0.308**	**0.144**		< 0.115 U	< 0 U	< 0.1 U	< 0.01 U			**0.021**	< 0.01 U	< 0.01 U			< 0 U	< 0.05 U	< 0.01 U			< 0 U	< 10 U
Benzo(k)fluoranthene	SW8270	D						< 0.0116 U										< 0.0112 U							
Benzo(k)fluoranthene	SW8270SIM	D			< 0.1 U	**0.0161**			< 0 U	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	**0.014**		< 0.112 U	< 0 U	< 1 U
Benzo(k)fluoranthene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Benzo(k)fluoranthene	SW8270SIM	T			**0.423**	**0.118**		**0.0437 J**	< 0 U	< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.05 U	< 0.01 U			< 0 U	< 10 U
Chrysene	SW8270	D						< 0.0116 U										< 0.0112 U							
Chrysene	SW8270SIM	D			< 0.1 U	**0.0536**			**0.049**	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	**0.0207**		**0.0517 J**	**0.032**	< 1 U
Chrysene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Chrysene	SW8270SIM	T			**1.08**	**0.395**		**0.115**	**0.065**	< 0.1 U	< 0.01 U			**0.027**	**0.0812**	< 0.01 U			< 0 U	< 0.05 U	**0.0157**			**0.043**	< 10 U
Dibenzo(a,h)anthracene	SW8270	D						< 0.0116 U										< 0.0112 U							
Dibenzo(a,h)anthracene	SW8270SIM	D			< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U		< 0.112 U	< 0 U	< 1 U
Dibenzo(a,h)anthracene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Dibenzo(a,h)anthracene	SW8270SIM	T			< 0.1 U	**0.0705**		< 0.115 U	< 0 U	< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.05 U	< 0.01 U			< 0 U	< 10 U
Indeno(1,2,3-cd)pyrene	SW8270	D						< 0.0116 U										< 0.0112 U							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D			< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U		< 0.118 U	< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U		< 0.112 U	< 0 U	< 1 U
Indeno(1,2,3-cd)pyrene	SW8270	T											< 0.0116 U					< 0.0114 U					< 0.0575 U		
Indeno(1,2,3-cd)pyrene	SW8270SIM	T			**0.135**	**0.109**		< 0.115 U	< 0 U	< 0.1 U	< 0.01 U			< 0 U	< 0.01 U	< 0.01 U			< 0 U	< 0.05 U	< 0.01 U			< 0 U	< 10 U
Total cPAHs TEC	CALC	D	0.01		< 0.0755 U	**0.029426**		< 0.008758 U	**0.00569**	< 0.00755 U	< 0.00755 U		< 0.08909 U	< 0 U	< 0.00755 U	< 0.00755 U		< 0.008456 U	< 0 U	< 0.00755 U	**0.012587**		**0.083857 J**	**0.00452**	< 0.755 U
Total cPAHs TEC	CALC	T	0.01		**0.5974**	**0.2407**		**0.07977 J**	**0.00735**	< 0.0755 U	< 0.00755 U		< 0.008758 U	**0.00497**	**0.020912**	< 0.00755 U		< 0.008607 U	< 0 U	< 0.03775 U	**0.010127**		< 0.0434125 U	**0.00533**	< 7.55 U
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5	**2.13**			**0.6 J**					**0.845 J**					**0.605 J**					< 1 U			
Arsenic		T	5	**3.17**			< 1 U					**1.59**					**1.05**					< 1 U			
Barium		D		**13**			**8.03**					**28.8**					**8.51**					**23.4**			
Barium		T		**13.5**			**8.77**					**31.1**					**8.14**					**23.9**			
Cadmium		D	1.12	< 1 U			< 1 U					< 1 U					< 1 U					< 1 U			
Cadmium		T	1.12	< 1 U			< 1 U					< 1 U					< 1 U					< 1 U			
Chromium		D	120	**15.3**			**15.6**					**20.8**					**22.7**					**13.1**			
Chromium		T	120	**6.9**			**3.99**					**0.815 J**					**2.48**					**2.24**			
Chromium (VI)		D																							
Chromium (VI)		T																							
Copper		D	9	**0.89 J**			< 1 U					**1.04**					< 1 U					< 1 U			
Copper		T	9	**4.94**			**2**					**7.23 J**					**0.925 J**					**3.06**			
Lead		D	4.62	< 1 U			< 1 U					**0.93 J**					**0.7 J**					< 1 U			
Lead		T	4.62	**1.26**			**0.785 J**					**1.95**					**0.665 J**					**0.65 J**			
Mercury		D	0.012	< 0.2 U			**0.182 J**					< 0.2 U					**0.297**					< 0.2 U			
Mercury		T	0.012	< 0.2 U			< 0.2 U					< 0.2 U					< 0.2 U					< 0.2 U			
Selenium		D	5	< 2 U			**1.47 J**					**1.67 J**					**1.3 J**					< 2 U			
Selenium		T	5	**2.54**			**1.52 J**					< 2 U					< 2 U					< 2 U			
Silver		D	8.8	< 1 U			< 1 U					< 1 U					< 1 U					< 1 U			
Silver		T	8.8	< 1 U			< 1 U					< 1 U					< 1 U					< 1 U			

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-18	MW-18	MW-18	MW-18	MW-18	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-21	MW-21
			Sample Date	12/03/2003	12/22/2003	03/31/2004	02/24/2006	03/06/2008	03/10/2003	12/02/2003	12/29/2003	02/24/2006	03/04/2008	10/21/2010	12/08/2016	03/10/2003	12/02/2003	12/22/2003	02/24/2006	03/06/2008	10/21/2010	12/08/2016	06/22/2017	03/11/2003	12/03/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		16100		23400	20800	6500	< 50 U	< 50 U		< 250 U	< 100 U			1800	1560		3770	1600				2910	1990
Diesel Range Organics	NWTPH-DX	T		5090			2.35			433		< 0.272 U					2340		1.7						3840
Diesel Range Organics	NWTPH-DXSG	T		2110		3360		9500	965	< 250 U			< 50 U			3050	879			2100				3650	1570
Motor Oil Range Organics	NWTPH-DX	T		609			< 0.521 U			< 500 U		< 0.543 U					< 500 U		< 0.51 U						600
Motor Oil Range Organics	NWTPH-DXSG	T		< 500 U		< 500 U			< 500 U	< 500 U						< 500 U	< 500 U							< 500 U	< 500 U
Motor Oil Range Organics	NWTPH-IDSG	T						< 250 U					< 250 U							< 250 U					
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500	5699			2.871			933		< 0.815 U					2840		2.21						4440
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500	2610		3860		9750	1465	< 750 U			< 300 U			3550	1379			2350				4150	2070
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44						< 0.2 U					< 0.35 U		3.29					3.6			< 100 U	
Toluene	SW8260	T	57						< 0.2 U					< 1 U		< 1 U					< 1 U			< 100 U	
Ethylbenzene	SW8260	T	29						< 0.2 U					< 1 U		11.8					3			< 100 U	
m,p-Xylenes	SW8260	T							< 0.5 U					< 2 U		12.2					< 2 U			< 100 U	
o-Xylene	SW8260	T							< 0.25 U					< 1 U		3.97					3.7			< 100 U	
Total Xylenes	SW8260	T	80																						
Total Xylenes (ND = 1 RL)	CALC	T	80						0.75					3		16.17					5.7			200	
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T																							
1,2,4-Trimethylbenzene	SW8260	T							< 0.2 U							6.55								< 100 U	
1,3,5-Trimethylbenzene	SW8260	T							< 0.5 U							< 1 U								< 100 U	
1,4-Dichlorobenzene	SW8260	T																							
Acetone	SW8260	T																							
Carbon Disulfide	SW8260	T																							
Chlorobenzene	SW8260	T																							
Isopropylbenzene	SW8260	T							< 0.5 U							15.4								< 100 U	
Methylene Chloride	SW8260	T																							
n-Butylbenzene	SW8260	T																							
n-Propylbenzene	SW8260	T							< 0.5 U							3.96								< 100 U	
p-Isopropyltoluene	SW8260	T							1.89							6.73								< 100 U	
Styrene	SW8260	T																							
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D										0.3													
1-Methylnaphthalene	SW8270SIM	D		649		305	143		< 0.1 U	< 0.1 U						190	37.3		186					201	51.8
1-Methylnaphthalene	SW8270	T										0.722													
1-Methylnaphthalene	SW8270SIM	T		729		646	334		0.182	0.12						265 J	213		282					413	483
2-Methylnaphthalene	SW8270	D										0.13													
2-Methylnaphthalene	SW8270SIM	D		692		217	94.9		< 0.1 U	< 0.1 U						156	9.06		140					59.2	5.87
2-Methylnaphthalene	SW8270	T							< 10 U			0.0308 J				218								167	
2-Methylnaphthalene	SW8270SIM	T		2.73		684	210		< 0.1 U	< 0.1 U						214 J	164		268					192	174
Naphthalene	SW8270	D										0.629													
Naphthalene	SW8270SIM	D		6690		5360	6280	4400	< 0.1 U	0.27			0.042	0.02 J		24.3	3.76		658	5.8	6.2			1290	241
Naphthalene	SW8260	T							< 0.5 U							31.7								2040	
Naphthalene	SW8270	T							< 10 U			0.0569 J				< 10 U								1600	
Naphthalene	SW8270SIM	T		5970		7490	7650	5800	< 0.1 U	< 0.1 U			< 0 U	0.01 J		27.9	13.6		734	7.1	7.4 J			1740	678
Total Naphthalenes (ND = 1 RL)	CALC	D	152	8031		5882	6518	4400	0.3	0.47		1.1	0.042	0.02		370	50		984	5.8	6.2			1550	299
Total Naphthalenes (ND = 1 RL)	CALC	T	152	6702		8820	8194	5800	0.38	0.32		0.81	0	0.01		507	391		1284	7.1	7			2345	1335
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D										0.282													
Acenaphthene	SW8270SIM	D		142		142	84.3	160	< 0.1 U	< 0.1 U			0.14	0.41		104	18.1		92.7	150	190			157	29.9
Acenaphthene	SW8270	T							< 10 U			1.07				187								< 500 U	
Acenaphthene	SW8270SIM	T		244		347	198	180	1.08	0.417			0.17	0.1 J		183	145		166	160	210			328	206
Acenaphthylene	SW8270	D										< 0.119 U													
Acenaphthylene	SW8270SIM	D		1.5		0.654	0.831	1.2	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U		< 5 U	0.106		< 22.7 U	0.77	< 0.1 U			< 50 U	0.425
Acenaphthylene	SW8270	T										< 0.118 U													
Acenaphthylene	SW8270SIM	T		2.96		2.08	2.34	1.4	< 0.1 U	< 0.1 U			< 0 U	< 0.1 UJ		63.9	< 0.1 U		< 23 U	0.75	< 0.1 UJ			1.88	2.54
Anthracene	SW8270	D										0.0753 J													
Anthracene	SW8270SIM	D		< 1 U		< 0.1 U	0.236 J	8	< 0.1 U	0.141			< 0 U	< 0.1 U		< 5 U	0.107		< 22.7 U	3.4	3.7			< 50 U	2.24
Anthracene	SW8270	T							< 10 U			0.0784 J				< 10 U								22.5	
Anthracene	SW8270SIM	T		11.1		11.6	12.1	9.3	< 0.1 U	0.136			< 0 U	< 0.1 UJ		< 0.5 U	3.49		< 23 U	3.4	4.8 J			43.3	18.1
Benzo(g,h,i)perylene	SW8270	D										< 0.119 U													
Benzo(g,h,i)perylene	SW8270SIM	D		< 1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U		< 5 U	< 0.1 U		< 22.7 U	< 0.02 U	< 0.1 U			< 50 U	< 0.1 U
Benzo(g,h,i)perylene	SW8270	T										< 0.118 U													
Benzo(g,h,i)perylene	SW8270SIM	T		< 1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.1 U	< 0.1 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.1 U		< 23 U	0.02 J	< 0.1 U			< 0.1 U	0.462
Fluoranthene	SW8270	D										0.124													
Fluoranthene	SW8270SIM	D		< 1 U		< 0.1 U	0.315 J	6.3	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U		< 5 U	< 0.1 U		< 0.568 U	1.9	1.9			< 50 U	1.1
Fluoranthene	SW8270	T							< 10 U			< 0.118 U				< 10 U								20	
Fluoranthene	SW8270SIM	T		5.81		6.29	8.19	7.7	< 0.1 U	< 0.1 U			< 0 U	< 0.1 UJ		4.12	2.85		< 0.575 U	1.9	1.9 J			19.6	25.5
Fluorene	SW8270	D										0.0479 J													
Fluorene	SW8270SIM	D		9.86		6.85	3.51	78	< 0.1 U	< 0.1 U			< 0 U	0.04 J		28.6	0.103		< 22.7 U	75	96			< 50 U	0.651
Fluorene	SW8270	T							< 10 U			0.103 J				96.3								< 10 U	
Fluorene	SW8270SIM	T		83.7		148	106	84	0.208	< 0.1 U			< 0 U	0.04 J		95.1	68.3		71.7	82	100			169	77.5

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-18	MW-18	MW-18	MW-18	MW-18	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-21	MW-21
			Sample Date	12/03/2003	12/22/2003	03/31/2004	02/24/2006	03/06/2008	03/10/2003	12/02/2003	12/29/2003	02/24/2006	03/04/2008	10/21/2010	12/08/2016	03/10/2003	12/02/2003	12/22/2003	02/24/2006	03/06/2008	10/21/2010	12/08/2016	06/22/2017	03/11/2003	12/03/2003
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D										**0.123**													
Phenanthrene	SW8270SIM	D		< 1 U		**0.558**	**0.371 J**	**87**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U		< 5 U	**0.231**		< 22.7 U	**66**	**80**			< 50 U	**1.99**
Phenanthrene	SW8270	T							< 10 U			< 0.118 U				**99.9**								**179**	
Phenanthrene	SW8270SIM	T		**121**		**124**	**113**	**88**	< 0.1 U	< 0.1 U			< 0 U	**0.02 J**		**88.8**	**62.9**		**55.2**	**68**	**92**			**192**	**139**
Pyrene	SW8270	D										**0.145**													
Pyrene	SW8270SIM	D		< 1 U		< 0.1 U	**0.247 J**	**3.3**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 U		< 5 U	< 0.1 U		< 22.7 U	**0.86**	**0.76**			< 50 U	**0.79**
Pyrene	SW8270	T							< 10 U			< 0.118 U				< 10 U								**14.3**	
Pyrene	SW8270SIM	T		**3.74**		**3.46**	**4.65**	**4.3 E**	< 0.1 U	< 0.1 U			< 0 U	< 0.1 UJ		**1.96**	**1.3**		< 23 U	**0.88**	**0.81 J**			**11.7**	**17.7**
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D										< 0.0119 U													
Benz(a)anthracene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	**0.048**	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	**0.222**
Benz(a)anthracene	SW8270	T										< 0.0118 U													
Benz(a)anthracene	SW8270SIM	T		**0.192**		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	**0.0415**		< 0.575 U	**0.02 J**	**1.1 J**			**0.981**	**2.52**
Benzo(a)pyrene	SW8270	D										< 0.0119 U													
Benzo(a)pyrene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	**0.0891**
Benzo(a)pyrene	SW8270	T										< 0.0118 U													
Benzo(a)pyrene	SW8270SIM	T		< 0.1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.01 U		< 0.575 U	**0.02 J**	< 0.1 U			**0.212**	**1.25**
Benzo(b)fluoranthene	SW8270	D										< 0.0119 U													
Benzo(b)fluoranthene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	**0.065**
Benzo(b)fluoranthene	SW8270	T										< 0.0118 U													
Benzo(b)fluoranthene	SW8270SIM	T		< 0.1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.01 U		< 0.575 U	**0.02 J**	< 0.1 U			**0.154**	**1.16**
Benzo(k)fluoranthene	SW8270	D										< 0.0119 U													
Benzo(k)fluoranthene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	**0.0708**
Benzo(k)fluoranthene	SW8270	T										< 0.0118 U													
Benzo(k)fluoranthene	SW8270SIM	T		< 0.1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.01 U		< 0.575 U	**0.02 J**	< 0.1 U			**0.212**	**0.999**
Chrysene	SW8270	D										< 0.0119 U													
Chrysene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	**0.036**	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	**0.174**
Chrysene	SW8270	T										< 0.0118 U													
Chrysene	SW8270SIM	T		**0.162**		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	**0.01 J**		< 0.5 U	**0.0255**		< 0.575 U	**0.02 J**	< 0.1 U			**0.654**	**2.04**
Dibenzo(a,h)anthracene	SW8270	D										< 0.0119 U													
Dibenzo(a,h)anthracene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 0.568 U	< 0.02 U	< 0.1 U			< 5 U	< 0.01 U
Dibenzo(a,h)anthracene	SW8270	T										< 0.0118 U													
Dibenzo(a,h)anthracene	SW8270SIM	T		< 0.1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.01 U		< 0.575 U	**0.02 J**	< 0.1 U			< 0.1 U	**0.231**
Indeno(1,2,3-cd)pyrene	SW8270	D										< 0.0119 U													
Indeno(1,2,3-cd)pyrene	SW8270SIM	D		< 0.1 U		< 0.1 U	< 0.562 U	< 0.02 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 U		< 0.5 U	< 0.01 U		< 22.7 U	< 0.02 U	< 0.1 U			< 5 U	**0.0231**
Indeno(1,2,3-cd)pyrene	SW8270	T										< 0.0118 U													
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 0.1 U		< 0.1 U	< 0.581 U	< 0.2 U	< 0.01 U	< 0.01 U			< 0 U	< 0.1 UJ		< 0.5 U	< 0.01 U		< 23 U	**0.02 J**	< 0.1 U			< 0.1 U	**0.424**
Total cPAHs TEC	CALC	D	0.01	< 0.0755 U		< 0.0755 U	< 0.42431 U	**0.01916**	< 0.00755 U	< 0.00755 U		< 0.0089845 U	< 0 U	< 0.0755 U		< 0.3775 U	< 0.00755 U		< 1.53544 U	< 0.0151 U	< 0.0755 U			< 3.775 U	**0.12943**
Total cPAHs TEC	CALC	T	0.01	**0.09082**		< 0.0755 U	< 0.438655 U	< 0.151 U	< 0.00755 U	< 0.00755 U		< 0.008909 U	< 0 U	**0.0751 J**		< 0.3775 U	**0.011405**		< 1.555375 U	**0.0302 J**	**0.1805 J**			**0.36324**	**1.8038**
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5		**1.59**						**1.3**							**2.85**							
Arsenic		T	5		**1.39**						< 1 U							**3.65**							
Barium		D			**24.3**						**21.4**							**8.84**							
Barium		T			**25.5**						**23.5**							**7.96**							
Cadmium		D	1.12		< 1 U						< 1 U							< 1 U							
Cadmium		T	1.12		< 1 U						< 1 U							< 1 U							
Chromium		D	120		**19.3**						**25.3**							**26.4**							
Chromium		T	120		**2.73**						**6.12**				**3.74**			**14.2**				**5.5**			
Chromium (VI)		D																					< 0.2 U		
Chromium (VI)		T													< 50 U							< 50 U			
Copper		D	9		< 1 U						< 1.23 U							< 1 U							
Copper		T	9		**0.88 J**						**14.5**							**0.73 J**							
Lead		D	4.62		< 1 U						**0.95 J**							< 1 U							
Lead		T	4.62		< 1 U						**8.7**							< 1 U							
Mercury		D	0.012		< 0.2 U						**0.451**							< 0.2 U							
Mercury		T	0.012		< 0.2 U						**0.16 J**							< 0.2 U							
Selenium		D	5		< 2 U						**1.76 J**				< 1 U			**6.11**				3.99			
Selenium		T	5		**2**						**1.27 J**				< 1 U			**10.1**				**5.86**			
Silver		D	8.8		< 1 U						< 1 U							< 1 U							
Silver		T	8.8		< 1 U						< 1 U							< 1 U							

Table 5 - Analytical Results, Groundwater, Site Summary
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-21	MW-21	MW-21	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22D	MW-22D	MW-23	MW-23	MW-23	MW-23	MW-23	MW-24	MW-24	MW-24	MW-25	MW-25
			Sample Date	12/23/2003	02/23/2006	03/07/2008	12/03/2003	12/03/2003	12/23/2003	12/23/2003	02/23/2006	02/23/2006	03/07/2008	12/03/2003	12/03/2003	03/31/2004	02/24/2006	03/11/2008	10/21/2010	02/22/2011	03/31/2004	02/24/2006	03/12/2008	03/31/2004	02/24/2006
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T			**2690**	**1400**	**7150**					**4560**	**3300**	**7010**		**6350**	**5030**	**3100**			**13900**	**736**	**330**	**577**	**262**
Diesel Range Organics	NWTPH-DX	T			**4740**		**4040**					**2950**		**4040**			**2330**					**479**			**300**
Diesel Range Organics	NWTPH-DXSG	T				**2900**	**1860**						**220**	**1840**		**3270**		**3100**			**4690**		**450**	**460**	
Motor Oil Range Organics	NWTPH-DX	T			**694**		< 500 U					< 532 U		< 500 U			< 510 U					< 515 U			< 485 U
Motor Oil Range Organics	NWTPH-DXSG	T					< 500 U							< 500 U		< 500 U					< 500 U			< 500 U	
Motor Oil Range Organics	NWTPH-IDSG	T				< 250 U							< 250 U					< 250 U					< 250 U		
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500		**5434**		**4540**					**3482**		**4540**			**2840**					**994**			**785**
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500			**3150**	**2360**						**470**	**2340**		**3770**		**3350**			**5190**		**700**	**960**	
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44																**56**	**53**					
Toluene	SW8260	T	57																**1.4**	**1.2**					
Ethylbenzene	SW8260	T	29																**56**	**52**					
m,p-Xylenes	SW8260	T																	**11**	**9.1**					
o-Xylene	SW8260	T																	**11**	**9.6**					
Total Xylenes	SW8260	T	80																						
Total Xylenes (ND = 1 RL)	CALC	T	80																**22**	**18.7**					
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T																							
1,2,4-Trimethylbenzene	SW8260	T																							
1,3,5-Trimethylbenzene	SW8260	T																							
1,4-Dichlorobenzene	SW8260	T																							
Acetone	SW8260	T																							
Carbon Disulfide	SW8260	T																							
Chlorobenzene	SW8260	T																							
Isopropylbenzene	SW8260	T																							
Methylene Chloride	SW8260	T																							
n-Butylbenzene	SW8260	T																							
n-Propylbenzene	SW8260	T																							
p-Isopropyltoluene	SW8260	T																							
Styrene	SW8260	T																							
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D																							
1-Methylnaphthalene	SW8270SIM	D			**30.8**			**120**			**36.1**				**682**	**252**	**31.4**				**221**	**2.62**		**10.4**	**1.53**
1-Methylnaphthalene	SW8270	T																							
1-Methylnaphthalene	SW8270SIM	T			**264**		**732**					**334**		**729**		**449**	**287**				**558**	**25.7**		**56.1**	**27.9**
2-Methylnaphthalene	SW8270	D																							
2-Methylnaphthalene	SW8270SIM	D			**1.63**			**28**			**4.36**				**845**	**248**	**5.68**				**183**	**0.703**		**0.654**	**0.0943 J**
2-Methylnaphthalene	SW8270	T																							
2-Methylnaphthalene	SW8270SIM	T			**31**		**904**					**197**		**921**		**488**	**219**				**868**	**11.6**		**6.56**	**1.29**
Naphthalene	SW8270	D																							
Naphthalene	SW8270SIM	D			**202**	**560**		**752**			**301**		**990**		**1970**	**742**	**191**	**26**	**54**	**44**	**4240**	**18**	**18**	**1.6**	**0.536**
Naphthalene	SW8260	T																							
Naphthalene	SW8270	T																							
Naphthalene	SW8270SIM	T			**139**	**730**	**1940**					**883**	**1200**	**2170**		**972**	**799**	**32**	**59.178**	**50**	**6600**	**133**	**19**	**1.34**	**0.64**
Total Naphthalenes (ND = 1 RL)	CALC	D	152		**234**	**560**		**900**			**341**		**990**		**3497**	**1242**	**228**	**26**	**54**	**44**	**4644**	**21**	**18**	**13**	**2**
Total Naphthalenes (ND = 1 RL)	CALC	T	152		**434**	**730**	**3576**					**1414**	**1200**	**3820**		**1909**	**1305**	**32**	**59**	**50**	**8026**	**170**	**19**	**64**	**30**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D																							
Acenaphthene	SW8270SIM	D			**17**	**180**		**33.4**			**13.4**		**170**		**184**	**177**	**14.7**	**130**	**170**	**150**	**103**	**1.79**	**40**	**10.5**	**1.23**
Acenaphthene	SW8270	T																							
Acenaphthene	SW8270SIM	T			**207**	**230**	**249**					**213**	**210**	**240**		**381**	**199**	**150**	**170**	**160**	**392**	**35.1**	**42**	**65.7**	**43.3 E**
Acenaphthylene	SW8270	D																							
Acenaphthylene	SW8270SIM	D			**0.215**	**1.1 E**		**0.579**			**0.106 J**		**1.3**		**3.02**	**0.311**	< 0.115 U	**0.74**	< 0.1 UJ	**0.92**	**1.33**	< 0.108 U	**0.41**	< 0.1 U	< 0.115 U
Acenaphthylene	SW8270	T																							
Acenaphthylene	SW8270SIM	T			**1.6**	**1.4**	**3.62**					**1.79**	**1.5**	**3.77**		**1.33**	**1.2**	**0.9**	**0.0031 J**	**0.91**	**6.29**	**0.294**	**0.44**	< 0.1 U	**0.208**
Anthracene	SW8270	D																							
Anthracene	SW8270SIM	D			**1.63**	**9.5**		**1.38**			**0.499**		**13**		**1.74**	**2.29**	**0.159**	**4.5**	**5.1 J**	**4.2**	**0.827**	**0.185**	**3.6**	**0.786**	**0.17**
Anthracene	SW8270	T																							
Anthracene	SW8270SIM	T			**12.6**	**14**	**15.2**					**12.3**	**16**	**14.9**		**14.8**	**5.67**	**5.5**	**4.6**	**4.7**	**20.7**	**2.82**	**4**	**0.838**	**0.229**
Benzo(g,h,i)perylene	SW8270	D																							
Benzo(g,h,i)perylene	SW8270SIM	D			< 0.105 U	**0.021**		< 0.1 U			< 0.112 U		< 0.02 U		< 0.1 U	< 0.1 U	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	< 0.1 U	< 0.108 U	< 0.02 U	< 0.1 U	< 0.115 U
Benzo(g,h,i)perylene	SW8270	T																							
Benzo(g,h,i)perylene	SW8270SIM	T			**0.0744 J**	< 0.2 U	< 0.1 U					< 0.114 U	< 0.02 U	< 1 U		< 0.1 U	< 0.114 U	< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U	< 0.112 U	< 0.02 U	< 0.1 U	< 0.105 U
Fluoranthene	SW8270	D																							
Fluoranthene	SW8270SIM	D			**1.53**	**14**		**0.863**			**0.616**		**11**		**0.764**	**2.72**	**0.262**	**7**	**6.3 J**	**4.9**	**0.808**	**0.249**	**7.1**	< 0.1 U	**0.159**
Fluoranthene	SW8270	T																							
Fluoranthene	SW8270SIM	T			**16.3**	**20**	**12**					**12.6**	**13**	**11.5**		**17.3**	**7.75**	**8.3**	**5.9**	**6.6**	**17.1**	**5.89**	**7.4**	< 0.1 U	**0.0589 J**
Fluorene	SW8270	D																							
Fluorene	SW8270SIM	D			**1.18**	**100**		**0.843**			**0.209**		**95**		**48.1**	**32.8**	< 0.115 U	**49**	**59**	**48**	**2.48**	**0.14**	**22**	**0.888**	**0.0644 J**
Fluorene	SW8270	T																							
Fluorene	SW8270SIM	T			**116**	**120**	**85.4**					**110**	**110**	**77.3**		**137**	**72.7**	**56**	**56**	**60**	**168**	**18.4**	**23**	**11.4**	**5.79**

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-21	MW-21	MW-21	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22D	MW-22D	MW-23	MW-23	MW-23	MW-23	MW-23	MW-24	MW-24	MW-24	MW-25	MW-25
			Sample Date	12/23/2003	02/23/2006	03/07/2008	12/03/2003	12/03/2003	12/23/2003	12/23/2003	02/23/2006	02/23/2006	03/07/2008	12/03/2003	12/03/2003	03/31/2004	02/24/2006	03/11/2008	10/21/2010	02/22/2011	03/31/2004	02/24/2006	03/12/2008	03/31/2004	02/24/2006
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D																							
Phenanthrene	SW8270SIM	D			2.77	120		1.81			0.91		99		5.9	30.2	0.292	48	50	34	3.4	0.312	2.2	< 0.1 U	0.163
Phenanthrene	SW8270	T																							
Phenanthrene	SW8270SIM	T			130	150	125					110	110	116		135	72.6	52	51	54	168	13.6	2.1	0.744	0.446
Pyrene	SW8270	D																							
Pyrene	SW8270SIM	D			1.2	9.5		0.622			0.463		6.9		0.581	1.42	0.195	5	3.9 J	2.9	0.538	0.189	5	< 0.1 U	0.113 J
Pyrene	SW8270	T																							
Pyrene	SW8270SIM	T			10.4	14	7.65					7.37	8	7.42		9.75	4.07	5.1	3.7	3.7	12.2	3.51	4.8	< 0.1 U	0.0379 J
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D																							
Benz(a)anthracene	SW8270SIM	D			0.274	0.52		0.144			0.0966 J		0.36		0.19	< 0.1 U	0.0391 J	0.22	0.2 J	< 0.025 U	< 0.1 U	0.0344 J	0.31	< 0.01 U	< 0.115 U
Benz(a)anthracene	SW8270	T																							
Benz(a)anthracene	SW8270SIM	T			0.93	1.3	0.521					0.455	0.49	0.498		0.577	0.2	0.32	1.4 J	0.28	0.8	0.272	0.42	< 0.01 U	< 0.105 U
Benzo(a)pyrene	SW8270	D																							
Benzo(a)pyrene	SW8270SIM	D			0.109	0.13		0.0665			< 0.112 U		0.079		0.0536	< 0.1 U	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	< 0.1 U	< 0.108 U	0.023	< 0.01 U	< 0.115 U
Benzo(a)pyrene	SW8270	T																							
Benzo(a)pyrene	SW8270SIM	T			0.291	0.5	0.117					0.102 J	0.094	0.134		< 0.1 U	< 0.114 U	0.022	0.015 J	< 0.025 U	< 0.1 U	< 0.112 U	0.043	< 0.01 U	< 0.105 U
Benzo(b)fluoranthene	SW8270	D																							
Benzo(b)fluoranthene	SW8270SIM	D			0.101 J	0.18		0.0562			< 0.112 U		0.099		0.0489	0.194	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	0.231	< 0.108 U	0.038	< 0.01 U	< 0.115 U
Benzo(b)fluoranthene	SW8270	T																							
Benzo(b)fluoranthene	SW8270SIM	T			0.249	0.66	0.0863					0.0955 J	0.13	0.103		0.327	< 0.114 U	0.031	0.02 J	0.029	0.419	< 0.112 U	0.061	< 0.01 U	< 0.105 U
Benzo(k)fluoranthene	SW8270	D																							
Benzo(k)fluoranthene	SW8270SIM	D			0.105	0.055		0.0421			< 0.112 U		0.036		0.0212	< 0.1 U	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	< 0.1 U	< 0.108 U	< 0.02 U	< 0.01 U	< 0.115 U
Benzo(k)fluoranthene	SW8270	T																							
Benzo(k)fluoranthene	SW8270SIM	T			0.279	0.26	0.0996					0.105 J	0.041	< 0.1 U		< 0.1 U	< 0.114 U	< 0.02 U	< 0.1 U	0.036	0.152	< 0.112 U	0.025	< 0.01 U	< 0.105 U
Chrysene	SW8270	D																							
Chrysene	SW8270SIM	D			0.28	0.39		0.121			0.0989 J		0.35		0.105	< 0.1 U	0.0391 J	0.21	0.17 J	< 0.025 U	< 0.1 U	0.0301 J	0.31	< 0.01 U	< 0.115 U
Chrysene	SW8270	T																							
Chrysene	SW8270SIM	T			0.877	1	0.443					0.505	0.47	0.41		0.442	0.214	0.3	0.26	0.21	0.667	0.288	0.34	< 0.01 U	< 0.105 U
Dibenzo(a,h)anthracene	SW8270	D																							
Dibenzo(a,h)anthracene	SW8270SIM	D			< 0.105 U	< 0.02 U		< 0.01 U			< 0.112 U		< 0.02 U		< 0.01 U	< 0.1 U	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	< 0.1 U	< 0.108 U	< 0.02 U	< 0.01 U	< 0.115 U
Dibenzo(a,h)anthracene	SW8270	T																							
Dibenzo(a,h)anthracene	SW8270SIM	T			0.667	< 0.2 U	0.0123					< 0.114 U	< 0.02 U	< 0.1 U		< 0.1 U	< 0.114 U	< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U	< 0.112 U	< 0.02 U	< 0.01 U	< 0.105 U
Indeno(1,2,3-cd)pyrene	SW8270	D																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	D			< 0.105 U	0.028		0.0169			< 0.112 U		< 0.02 U		0.0149	< 0.1 U	< 0.115 U	< 0.02 U	< 0.1 UJ	< 0.025 U	< 0.1 U	< 0.108 U	< 0.02 U	< 0.01 U	< 0.115 U
Indeno(1,2,3-cd)pyrene	SW8270	T																							
Indeno(1,2,3-cd)pyrene	SW8270SIM	T			0.0744 J	< 0.2 U	0.0303					< 0.114 U	< 0.02 U	< 0.1 U		< 0.1 U	< 0.114 U	< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U	< 0.112 U	< 0.02 U	< 0.01 U	< 0.105 U
Total cPAHs TEC	CALC	D	0.01		0.1703 J	0.2132		0.09413			0.089049 J		0.134		0.08265	0.0899	0.084801 J	0.0381	0.0917 J	< 0.018875 U	0.0936	0.079341 J	0.0639	< 0.00755 U	< 0.086825 U
Total cPAHs TEC	CALC	T	0.01		0.51971 J	0.752	0.19638					0.184 J	0.1668	0.2132		0.15982	0.10194	0.0631	0.1746 J	0.0516	0.20377	0.10848	0.099	< 0.00755 U	< 0.079275 U
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5	< 1 U						< 1 U															
Arsenic		T	5	1.03					1.61																
Barium		D		28.9						18.8															
Barium		T		29.5					19.6																
Cadmium		D	1.12	< 1 U						< 1 U															
Cadmium		T	1.12	< 1 U					< 1 U																
Chromium		D	120	12.4						15.5															
Chromium		T	120	1.31					1.21																
Chromium (VI)		D																							
Chromium (VI)		T																							
Copper		D	9	< 1 U						< 1 U															
Copper		T	9	3.11					2.36																
Lead		D	4.62	< 1 U						< 1 U															
Lead		T	4.62	1.61					0.91 J																
Mercury		D	0.012	< 0.2 U						0.191 J															
Mercury		T	0.012	< 0.2 U					< 0.2 U																
Selenium		D	5	< 2 U						< 2 U															
Selenium		T	5	< 2 U					< 2 U																
Silver		D	8.8	< 1 U						< 1 U															
Silver		T	8.8	< 1 U					< 1 U																

Table 5 - Analytical Results, Groundwater, Site Summary
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-25	MW-26	MW-26	MW-26	MW-26	MW-26	MW-27	MW-27	MW-27	MW-28	MW-28R	MW-28R	MW-29/B-34	MW-29/B-34	MW-29/B-34	MW-30/B-35	MW-30/B-35	MW-31/B-36	MW-31/B-36	MW-32	MW-33	MW-34
			Sample Date	03/12/2008	04/07/2005	02/22/2006	03/11/2008	10/21/2010	02/22/2011	04/07/2005	02/22/2006	03/12/2008	04/07/2005	02/22/2006	03/13/2008	02/22/2006	03/11/2008	10/21/2010	02/22/2006	03/07/2008	02/22/2006	03/13/2008	03/12/2008	03/13/2008	03/13/2008
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Total Petroleum Hydrocarbons (TPHs)																									
Gasoline Range Organics	NWTPH-GX	T		**300**	**2310**	**1370**	**320**			< 50 U	< 50 U	< 100 U	**190**	**10400**	**640**	**323**	**220**		**586**	**2600**	**446**	**200**	**210**	< 100 U	< 100 U
Diesel Range Organics	NWTPH-DX	T				**1650**					< 278 U			**245**		**816**			**253**		**272**				
Diesel Range Organics	NWTPH-DXSG	T		**420**	**1780**		**860**			< 250 U		**140**	**1150**		**3400**		**390**			**4400**		**1800**	**180**	< 50 U	< 50 U
Motor Oil Range Organics	NWTPH-DX	T				< 526 U					< 556 U			< 490 U		< 521 U			< 505 U		< 543 U				
Motor Oil Range Organics	NWTPH-DXSG	T			< 500 U					< 500 U			< 500 U												
Motor Oil Range Organics	NWTPH-IDSG	T		< 250 U			< 250 U					< 250 U			< 250 U		< 250 U			< 250 U		< 250 U	< 250 U	< 250 U	< 250 U
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500			**2176**					< 834 U			**735**		**1337**			**758**		**815**				
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500	**670**	**2280**		**1110**			< 750 U		**390**	**1650**		**3650**		**640**			**4650**		**2050**	**430**	< 300 U	< 300 U
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																									
Benzene	SW8260	T	0.44					< 0.35 U	< 0.35 U									< 0.35 U							
Toluene	SW8260	T	57					< 1 U	< 1 U									< 1 U							
Ethylbenzene	SW8260	T	29					**1.1**	< 1 U									< 1 U							
m,p-Xylenes	SW8260	T						< 2 U	< 2 U									< 2 U							
o-Xylene	SW8260	T						< 1 U	< 1 U									< 1 U							
Total Xylenes	SW8260	T	80																						
Total Xylenes (ND = 1 RL)	CALC	T	80					3	3									3							
Other Volatile Organic Compounds																									
1,1-Dichloroethane	SW8260	T																							
1,2,4-Trimethylbenzene	SW8260	T																							
1,3,5-Trimethylbenzene	SW8260	T																							
1,4-Dichlorobenzene	SW8260	T																							
Acetone	SW8260	T																							
Carbon Disulfide	SW8260	T																							
Chlorobenzene	SW8260	T																							
Isopropylbenzene	SW8260	T																							
Methylene Chloride	SW8260	T																							
n-Butylbenzene	SW8260	T																							
n-Propylbenzene	SW8260	T																							
p-Isopropyltoluene	SW8260	T																							
Styrene	SW8260	T																							
Vinyl Chloride	SW8260	T																							
Naphthalenes																									
1-Methylnaphthalene	SW8270	D				**5.9**					**0.365**					**2.61**			**9.38**		**85.3**				
1-Methylnaphthalene	SW8270SIM	D			**99.1**					**0.177**			**33.5**	**260**											
1-Methylnaphthalene	SW8270	T									**0.522**														
1-Methylnaphthalene	SW8270SIM	T			**169**	**81.9**				**0.596**			**81.6**	**488**		**41**			**171**		**140**				
2-Methylnaphthalene	SW8270	D				**0.736**					**0.0821 J**					**0.0916 J**			**1.32**		**12.3**				
2-Methylnaphthalene	SW8270SIM	D			**65.4**					< 0.1 U			**2**	**233**											
2-Methylnaphthalene	SW8270	T									**0.0677 J**														
2-Methylnaphthalene	SW8270SIM	T			**169**	**79.6**				**0.159**			**6.09**	**574**		**6.6**			**43.4**		**16.9**				
Naphthalene	SW8270	D				**125**					**2.05**					**0.507**			**3.59**		**61.7**				
Naphthalene	SW8270SIM	D		**0.21**	**990**		**74**	**120 E**	**44**	**1.33**		**0.22**	**14.8**	**4260**	**160**		**0.34**	**0.39**		**630**		**0.56**	**0.12**	**0.041**	< 0.02 U
Naphthalene	SW8260	T																							
Naphthalene	SW8270	T									**1.64**					**2.14**									
Naphthalene	SW8270SIM	T		**0.29**	**987**	**501**	**91**	**140**	**47**	**1.58**		**0.26**	**23.1**	**5900**	**370**		**0.46**	**0.25**	**8.13**	**790**	**57.5**	< 2 U	**0.16**	**0.036**	< 0.02 U
Total Naphthalenes (ND = 1 RL)	CALC	D	152	**0.21**	**1155**	**132**	**74**	**120**	**44**	**1.6**	**2.5**	**0.22**	**50**	**4753**	**160**	**3.2**	**0.34**	**0.39**	**14**	**630**	**159**	**0.56**	**0.12**	**0.041**	0.02
Total Naphthalenes (ND = 1 RL)	CALC	T	152	**0.29**	**1325**	**663**	**91**	**140**	**47**	**2.3**	**2.2**	**0.26**	**111**	**6962**	**370**	**48**	**0.46**	**0.25**	**223**	**790**	**214**	2	**0.16**	**0.036**	0.02
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Acenaphthene	SW8270	D				**3.23**					**1.71**					**1.84**			**8.06**		**71.3**				
Acenaphthene	SW8270SIM	D		**68**	**80.6**		**66**	**60**	**62**	**0.352**		**25**	**39.6**	**184**	**170**		**29**	**37**		**330**		**170**	**9.8**	**3**	< 0.02 U
Acenaphthene	SW8270	T									**14.2**														
Acenaphthene	SW8270SIM	T		**83**	**179**	**129**	**77**	**67**	**69**	**12.7**		**28**	**126**	**439**	**200**	**66.6**	**31**	**43**	**225**	**390**	**211**	**190**	**12**	**2.8**	< 0.02 U
Acenaphthylene	SW8270	D				< 0.114 U					**0.0927 J**					< 0.111 U			**0.00916**		< 0.114 U				
Acenaphthylene	SW8270SIM	D		**0.25**	< 0.1 U		**0.37**	**0.62 J**	**0.51**	< 0.1 U		**0.18**	**0.538**	**11.4**	**1.4**		**0.28**	< 0.1 U		**1.9**		**0.91**	**0.026**	< 0.02 U	< 0.02 U
Acenaphthylene	SW8270	T				< 0.12 U					< 0.118 U					**0.745**			< 0.11 U						
Acenaphthylene	SW8270SIM	T		**0.3**	< 0.1 U		**0.48**	< 0.1 U	**0.33**	< 0.1 U		**0.2**	< 0.1 U	**28**	< 2 U		**0.32**	< 0.1 UJ		**1.8**	**1.42**	< 2 U	< 0.02 U	< 0.02 U	< 0.02 U
Anthracene	SW8270	D				**0.253**					**1.15**					**0.271**			**0.652**		**1.01**				
Anthracene	SW8270SIM	D		**0.096**	**0.443**		**2.7**	**3.5 J**	**3.5**	**0.198**		< 0.02 U	**0.617**	**1.41 J**	**11**		**3**	**3.3**		< 10 U		**12**	< 0.02 U	**0.11**	< 0.02 U
Anthracene	SW8270	T				**4.62**					**2.33**								**1.94**						
Anthracene	SW8270SIM	T		**0.14**	**10.9**		**4.1**	**3.6**	**3**	**1.26**		< 0.02 U	**11.5**	**32.1**	**13**	**7.81**	**4.1**	**3.5**		**4**	**16.3**	**14**	< 0.02 U	**0.18**	< 0.02 U
Benzo(g,h,i)perylene	SW8270	D				< 0.114 U					< 0.116 U					< 0.111 U			< 0.109 U		< 0.114 U				
Benzo(g,h,i)perylene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	< 0.02 U		< 0.02 U	< 0.1 U		< 0.02 U		< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(g,h,i)perylene	SW8270	T				< 0.12 U					< 0.118 U					**0.0222 J**			< 0.11 U						
Benzo(g,h,i)perylene	SW8270SIM	T		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**2.2**	**0.026**		< 0.02 U	< 0.1 UJ		< 0.02 U	**0.551 J**	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Fluoranthene	SW8270	D				**0.0717 J**					**0.0695 J**					**0.0962 J**			**1.25**		**1.99**				
Fluoranthene	SW8270SIM	D		**0.12**	**0.621**		< 10 U	**7 J**	**6.3**	**0.133**		**2**	**0.508**	**0.527 J**	**18**		**5.6**	**5.2**		< 10 U		**19**	< 0.02 U	**0.41**	< 0.02 U
Fluoranthene	SW8270	T									**2.53**								**1.07**						
Fluoranthene	SW8270SIM	T		**0.13**	**15.9**	**10.3**	< 10 U	**7.1**	**8.2**	**2**		**2.1**	**15.3**	**68.4**	**22**	**8.16**	**6**	**5.4**		**2.9**	**44.6**	**22**	< 0.02 U	**0.38**	< 0.02 U
Fluorene	SW8270	D				**0.048 J**					< 0.116 U					**0.0468 J**			**2.84**		**4.14**				
Fluorene	SW8270SIM	D		**13**	**2.72**		**42**	**39**	**38**	< 0.1 U		**9**	**4.84**	**8**	**92**		**12**	**12**		**120**		**90**	**0.021**	**0.054**	< 0.02 U
Fluorene	SW8270	T									**7.45**														
Fluorene	SW8270SIM	T		**15**	**127**	**84.7**	**48**	**38**	**42**	**7.69**		**10**	**66.4**	**197**	**100**	**31.6**	**12**	**12**	**65.3**	**140**	**80.3**	**98**	**0.026**	**0.051**	< 0.02 U

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location Sample Date	MW-25 03/12/2008	MW-26 04/07/2005	MW-26 02/22/2006	MW-26 03/11/2008	MW-26 10/21/2010	MW-26 02/22/2011	MW-27 04/07/2005	MW-27 02/22/2006	MW-27 03/12/2008	MW-28 04/07/2005	MW-28R 02/22/2006	MW-28R 03/13/2008	MW-29/B-34 02/22/2006	MW-29/B-34 03/11/2008	MW-29/B-34 10/21/2010	MW-30/B-35 02/22/2006	MW-30/B-35 03/07/2008	MW-31/B-36 02/22/2006	MW-31/B-36 03/13/2008	MW-32 03/12/2008	MW-33 03/13/2008	MW-34 03/13/2008
Chemical Name	**Base Method**	**Fraction**	GW CUL																						
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)																									
Phenanthrene	SW8270	D				**0.11 J**					**0.0794 J**					**0.114**			**5.51**		**3.34**				
Phenanthrene	SW8270SIM	D		**1**	**0.922**		**42**	**36**	**32**	< 0.1 U		**0.92**	**0.708**	**1.19 J**	**120**		**14**	**13**		**49**		**110**	< 0.02 U	**0.43**	< 0.02 U
Phenanthrene	SW8270	T									**0.28**														
Phenanthrene	SW8270SIM	T		**1.1**	**134**	**76.9**	**47**	**40**	**35**	**0.748**		**1.1**	**105**	**275**	**130**	**46.2**	**15**	**14**	**24.9**	**56**	**99.7**	**110**	**0.034**	**0.39**	< 0.02 U
Pyrene	SW8270	D				**0.0542 J**					**0.0547 J**					**0.0635 J**			**0.965**		**1.97**				
Pyrene	SW8270SIM	D		**0.078**	**0.46**		**4.2**	**3.2**	**3.7**	**0.118**		**1.2**	**0.362**	< 2.2 U	**11**		**3.5**	**3.2**		< 10 U		**13**	< 0.02 U	**0.46**	< 0.02 U
Pyrene	SW8270	T									**1.7**								**0.724**						
Pyrene	SW8270SIM	T		**0.087**	**8.49**	**4.66**	**4.7**	**3.7**	**3.6**	**1.36**		**1.3**	**9.23**	**48**	**14**	**4.76**	**3.7**	**3.3**		**1.9**	**29.5**	**15**	< 0.02 U	**0.43**	< 0.02 U
Carcinogenic PAHs (cPAHs)																									
Benz(a)anthracene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			**0.134**		**0.336**				
Benz(a)anthracene	SW8270SIM	D		< 0.02 U	**0.122**		**0.12**	**0.12**	**0.11**	< 0.1 U		**0.047**	**0.14**	< 2.2 U	**0.49**		**0.18**	**0.16**		< 0.2 U		**0.57**	< 0.02 U	< 0.02 U	< 0.02 U
Benz(a)anthracene	SW8270	T				**0.157**					< 0.0118 U					**0.392**			< 0.011 U						
Benz(a)anthracene	SW8270SIM	T		< 0.02 U	**0.602**		**0.16**	**0.16**	**0.12**	**0.105**		**0.066**	**0.48**	**11**	**0.77**		**0.26**	**0.23 J**		< 0.2 U	**3.87**	**0.77**	< 0.02 U	**0.031**	< 0.02 U
Benzo(a)pyrene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			**0.0267**		**0.105**				
Benzo(a)pyrene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	**0.067**		< 0.02 U	**0.01 J**		< 0.02 U		**0.082**	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(a)pyrene	SW8270	T				< 0.012 U					< 0.0118 U					**0.0698**			< 0.011 U						
Benzo(a)pyrene	SW8270SIM	T		< 0.02 U	**0.127**		< 0.02 U	**0.01 J**	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**6.51**	**0.17**		**0.048**	**0.04 J**		< 0.02 U	**1.83**	**0.11**	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(b)fluoranthene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			**0.0558**		**0.16**				
Benzo(b)fluoranthene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	**0.069**		< 0.02 U	**0.01 J**		< 0.02 U		**0.1**	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(b)fluoranthene	SW8270	T				**0.0327**					< 0.0118 U					**0.0951**			< 0.011 U						
Benzo(b)fluoranthene	SW8270SIM	T		< 0.02 U	**0.121**		**0.026**	**0.03 J**	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**5.58**	**0.21**		**0.057**	**0.05 J**		< 0.02 U	**1.3**	**0.15**	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(k)fluoranthene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			**0.017**		**0.0795**				
Benzo(k)fluoranthene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	**0.035**		< 0.02 U	< 0.1 U		< 0.02 U		**0.038**	< 0.02 U	< 0.02 U	< 0.02 U
Benzo(k)fluoranthene	SW8270	T				**0.0142**					< 0.0118 U					**0.0387**			< 0.011 U						
Benzo(k)fluoranthene	SW8270SIM	T		< 0.02 U	**0.437**		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**6.02**	**0.077**		**0.025**	**0.02 J**		< 0.02 U	**1.96**	**0.052**	< 0.02 U	< 0.02 U	< 0.02 U
Chrysene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			**0.0853**		**0.187**				
Chrysene	SW8270SIM	D		< 0.02 U	**0.109**		**0.11**	**0.09 J**	**0.089**	< 0.1 U		**0.035**	< 0.1 U	< 2.2 U	**0.36**		**0.18**	**0.14**		< 0.2 U		**0.37**	< 0.02 U	**0.032**	< 0.02 U
Chrysene	SW8270	T				**0.103**					< 0.0118 U					**0.265**			< 0.011 U						
Chrysene	SW8270SIM	T		< 0.02 U	**0.61**		**0.15**	**0.13**	**0.094**	< 0.1 U		**0.061**	**0.447**	**10.6**	**0.56**		**0.25**	**0.2 J**		< 0.2 U	**3.76**	**0.46**	< 0.02 U	**0.04**	< 0.02 U
Dibenzo(a,h)anthracene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			< 0.0109 U		< 0.0114 U				
Dibenzo(a,h)anthracene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	< 0.02 U		< 0.02 U	< 0.1 U		< 0.02 U		< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Dibenzo(a,h)anthracene	SW8270	T				< 0.012 U					< 0.0118 U					< 0.01 U			< 0.011 U						
Dibenzo(a,h)anthracene	SW8270SIM	T		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**6.79**	< 0.02 U		< 0.02 U	< 0.1 UJ		< 0.02 U	**3.27**	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Indeno(1,2,3-cd)pyrene	SW8270	D				< 0.0114 U					< 0.0116 U					< 0.0111 U			< 0.0109 U		< 0.0114 U				
Indeno(1,2,3-cd)pyrene	SW8270SIM	D		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	< 2.2 U	< 0.02 U		< 0.02 U	< 0.1 U		< 0.02 U		< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Indeno(1,2,3-cd)pyrene	SW8270	T				< 0.012 U					< 0.0118 U					**0.0641**			< 0.011 U						
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 0.02 U	< 0.1 U		< 0.02 U	< 0.1 U	< 0.025 U	< 0.1 U		< 0.02 U	< 0.1 U	**1.89**	**0.036**		< 0.02 U	< 0.1 UJ		< 0.02 U	**0.472 J**	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U
Total cPAHs TEC	CALC	D	0.01	< 0.0151 U	**0.08329**	< 0.008607 U	**0.0271**	**0.0829 J**	**0.02939**	< 0.0755 U	< 0.008758 U	**0.01905**	**0.0845**	< 1.661 U	**0.132**	< 0.0083805 U	**0.0338**	**0.0434 J**	**0.049323**	< 0.025 U	**0.16556**	**0.1585**	< 0.0151 U	**0.01532**	< 0.0151 U
Total cPAHs TEC	CALC	T	0.01	< 0.0151 U	**0.2591**	**0.02862**	**0.0331**	**0.0453 J**	**0.03044**	**0.081**	< 0.008909 U	**0.02121**	**0.12247**	**9.744**	**0.2859**	**0.13194**	**0.0867**	**0.082 J**	< 0.008305 U	< 0.025 U	**2.9548 J**	**0.2138**	< 0.0151 U	**0.0175**	< 0.0151 U
Polychlorinated Biphenyls (PCBs) as Aroclors																									
Aroclor 1016	SW8082	T																							
Aroclor 1221	SW8082	T																							
Aroclor 1232	SW8082	T																							
Aroclor 1242	SW8082	T																							
Aroclor 1248	SW8082	T																							
Aroclor 1254	SW8082	T																							
Aroclor 1260	SW8082	T																							
Total PCBs	CALC	T	0.01																						
Metals																									
Arsenic		D	5																						
Arsenic		T	5																						
Barium		D																							
Barium		T																							
Cadmium		D	1.12																						
Cadmium		T	1.12																						
Chromium		D	120																						
Chromium		T	120																						
Chromium (VI)		D																							
Chromium (VI)		T																							
Copper		D	9																						
Copper		T	9																						
Lead		D	4.62																						
Lead		T	4.62																						
Mercury		D	0.012																						
Mercury		T	0.012																						
Selenium		D	5																						
Selenium		T	5																						
Silver		D	8.8																						
Silver		T	8.8																						

Table 5 - Analytical Results, Groundwater, Site Summary

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)			Location	MW-35	MW-35	MW-35
			Sample Date	03/14/2008	10/21/2010	10/22/2010
Chemical Name	**Base Method**	**Fraction**	GW CUL			
Total Petroleum Hydrocarbons (TPHs)						
Gasoline Range Organics	NWTPH-GX	T		< 100 U		
Diesel Range Organics	NWTPH-DX	T				
Diesel Range Organics	NWTPH-DXSG	T		< 50 U		
Motor Oil Range Organics	NWTPH-DX	T				
Motor Oil Range Organics	NWTPH-DXSG	T				
Motor Oil Range Organics	NWTPH-IDSG	T		< 250 U		
Total TPHs as DRO/ORO	NWTPH-DX CALC	T	500			
Total TPHs as DRO/ORO	NWTPH-DXSG CALC	T	500	< 300 U		
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)						
Benzene	SW8260	T	0.44		< 0.35 U	
Toluene	SW8260	T	57		< 1 U	
Ethylbenzene	SW8260	T	29		< 1 U	
m,p-Xylenes	SW8260	T			< 2 U	
o-Xylene	SW8260	T			< 1 U	
Total Xylenes	SW8260	T	80			
Total Xylenes (ND = 1 RL)	CALC	T	80		3	
Other Volatile Organic Compounds						
1,1-Dichloroethane	SW8260	T				
1,2,4-Trimethylbenzene	SW8260	T				
1,3,5-Trimethylbenzene	SW8260	T				
1,4-Dichlorobenzene	SW8260	T				
Acetone	SW8260	T				
Carbon Disulfide	SW8260	T				
Chlorobenzene	SW8260	T				
Isopropylbenzene	SW8260	T				
Methylene Chloride	SW8260	T				
n-Butylbenzene	SW8260	T				
n-Propylbenzene	SW8260	T				
p-Isopropyltoluene	SW8260	T				
Styrene	SW8260	T				
Vinyl Chloride	SW8260	T				
Naphthalenes						
1-Methylnaphthalene	SW8270	D				
1-Methylnaphthalene	SW8270SIM	D				
1-Methylnaphthalene	SW8270	T				
1-Methylnaphthalene	SW8270SIM	T				
2-Methylnaphthalene	SW8270	D				
2-Methylnaphthalene	SW8270SIM	D				
2-Methylnaphthalene	SW8270	T				
2-Methylnaphthalene	SW8270SIM	T				
Naphthalene	SW8270	D				
Naphthalene	SW8270SIM	D		**0.053**		**0.01 J**
Naphthalene	SW8260	T				
Naphthalene	SW8270	T				
Naphthalene	SW8270SIM	T		**0.059**		**0.02 J**
Total Naphthalenes (ND = 1 RL)	CALC	D	152	**0.053**		**0.01**
Total Naphthalenes (ND = 1 RL)	CALC	T	152	**0.059**		**0.02**
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	SW8270	D				
Acenaphthene	SW8270SIM	D		**0.13**		< 0.1 U
Acenaphthene	SW8270	T				
Acenaphthene	SW8270SIM	T		**0.15**		**0.02 J**
Acenaphthylene	SW8270	D				
Acenaphthylene	SW8270SIM	D		< 0.02 U		< 0.1 U
Acenaphthylene	SW8270	T				
Acenaphthylene	SW8270SIM	T		< 0.02 U		< 0.1 U
Anthracene	SW8270	D				
Anthracene	SW8270SIM	D		< 0.02 U		< 0.1 U
Anthracene	SW8270	T				
Anthracene	SW8270SIM	T		< 0.02 U		< 0.1 U
Benzo(g,h,i)perylene	SW8270	D				
Benzo(g,h,i)perylene	SW8270SIM	D		< 0.02 U		< 0.1 U
Benzo(g,h,i)perylene	SW8270	T				
Benzo(g,h,i)perylene	SW8270SIM	T		< 0.02 U		< 0.1 U
Fluoranthene	SW8270	D				
Fluoranthene	SW8270SIM	D		< 0.02 U		< 0.1 U
Fluoranthene	SW8270	T				
Fluoranthene	SW8270SIM	T		< 0.02 U		< 0.1 U
Fluorene	SW8270	D				
Fluorene	SW8270SIM	D		< 0.02 U		< 0.1 U
Fluorene	SW8270	T				
Fluorene	SW8270SIM	T		< 0.02 U		**0.03 J**

Notes:
All table values in units of micrograms per liter (μg/L)
Base Method - indicates the laboratory method or calculated value
Fraction - T indicates total fraction; D indicates dissolved fraction (filtered)
GW CUL - indicates the groundwater cleanup level
Laboratory Qualifiers
U - indicates not detected at the reporting limit
J - indicates estimated result (typ. below the instrument calibration range)
E - indicates estimated result (typ. above the instrument calibration range)
Formatted Values
Blue - indicates concentration, or reporting limit, exceeded CUL
Bold - indicates analyte detected (typ. above reporting limit)
Calculated Values
Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)
Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)

Table 5 - Analytical Results, Groundwater, Site Summary
Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

(Notes provided on last page)		Location		MW-35	MW-35	MW-35
		Sample Date		03/14/2008	10/21/2010	10/22/2010
Chemical Name	**Base Method**	**Fraction**	GW CUL			
Other Noncarcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)						
Phenanthrene	SW8270	D				
Phenanthrene	SW8270SIM	D		< 0.02 U		**0.01 J**
Phenanthrene	SW8270	T				
Phenanthrene	SW8270SIM	T		< 0.02 U		**0.02 J**
Pyrene	SW8270	D				
Pyrene	SW8270SIM	D		**0.037**		**0.09 J**
Pyrene	SW8270	T				
Pyrene	SW8270SIM	T		**0.041**		**0.11**
Carcinogenic PAHs (cPAHs)						
Benz(a)anthracene	SW8270	D				
Benz(a)anthracene	SW8270SIM	D		< 0.02 U		< 0.1 U
Benz(a)anthracene	SW8270	T				
Benz(a)anthracene	SW8270SIM	T		< 0.02 U		< 0.1 U
Benzo(a)pyrene	SW8270	D				
Benzo(a)pyrene	SW8270SIM	D		< 0.02 U		< 0.1 U
Benzo(a)pyrene	SW8270	T				
Benzo(a)pyrene	SW8270SIM	T		< 0.02 U		< 0.1 U
Benzo(b)fluoranthene	SW8270	D				
Benzo(b)fluoranthene	SW8270SIM	D		< 0.02 U		< 0.1 U
Benzo(b)fluoranthene	SW8270	T				
Benzo(b)fluoranthene	SW8270SIM	T		< 0.02 U		< 0.1 U
Benzo(k)fluoranthene	SW8270	D				
Benzo(k)fluoranthene	SW8270SIM	D		< 0.02 U		< 0.1 U
Benzo(k)fluoranthene	SW8270	T				
Benzo(k)fluoranthene	SW8270SIM	T		< 0.02 U		< 0.1 U
Chrysene	SW8270	D				
Chrysene	SW8270SIM	D		< 0.02 U		**0.01 J**
Chrysene	SW8270	T				
Chrysene	SW8270SIM	T		< 0.02 U		< 0.1 U
Dibenzo(a,h)anthracene	SW8270	D				
Dibenzo(a,h)anthracene	SW8270SIM	D		< 0.02 U		< 0.1 U
Dibenzo(a,h)anthracene	SW8270	T				
Dibenzo(a,h)anthracene	SW8270SIM	T		< 0.02 U		< 0.1 U
Indeno(1,2,3-cd)pyrene	SW8270	D				
Indeno(1,2,3-cd)pyrene	SW8270SIM	D		< 0.02 U		< 0.1 U
Indeno(1,2,3-cd)pyrene	SW8270	T				
Indeno(1,2,3-cd)pyrene	SW8270SIM	T		< 0.02 U		< 0.1 U
Total cPAHs TEC	CALC	D	0.01	< 0.0151 U		**0.0751 J**
Total cPAHs TEC	CALC	T	0.01	< 0.0151 U		< 0.0755 U
Polychlorinated Biphenyls (PCBs) as Aroclors						
Aroclor 1016	SW8082	T				
Aroclor 1221	SW8082	T				
Aroclor 1232	SW8082	T				
Aroclor 1242	SW8082	T				
Aroclor 1248	SW8082	T				
Aroclor 1254	SW8082	T				
Aroclor 1260	SW8082	T				
Total PCBs	CALC	T	0.01			
Metals						
Arsenic		D	5			
Arsenic		T	5			
Barium		D				
Barium		T				
Cadmium		D	1.12			
Cadmium		T	1.12			
Chromium		D	120			
Chromium		T	120			
Chromium (VI)		D				
Chromium (VI)		T				
Copper		D	9			
Copper		T	9			
Lead		D	4.62			
Lead		T	4.62			
Mercury		D	0.012			
Mercury		T	0.012			
Selenium		D	5			
Selenium		T	5			
Silver		D	8.8			
Silver		T	8.8			

Notes:
All table values in units of micrograms per liter (μg/L)
Base Method - indicates the laboratory method or calculated value
Fraction - T indicates total fraction; D indicates dissolved fraction (filtered)
GW CUL - indicates the groundwater cleanup level
Laboratory Qualifiers
U - indicates not detected at the reporting limit
J - indicates estimated result (typ. below the instrument calibration range)
E - indicates estimated result (typ. above the instrument calibration range)
Formatted Values
Blue - indicates concentration, or reporting limit, exceeded CUL
Bold - indicates analyte detected (typ. above reporting limit)
Calculated Values
Total TPHs as DRO/ORO - sum of Diesel Range Organics and Oil Range Organics (1x reporting limit for results with U flag)
Total Xylenes - sum of m,p-Xylenes and o-Xylene (1 x reporting limit for results with U flag)
Total Naphthalenes - sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (1 x reporting limit for results with U flag)
Total cPAHs TEC - toxic equivalent concentration of cPAHs (1/2 x reporting limit for results with U flag)
Total PCBs - sum of Aroclors (1x reporting limit for results with U flag)

Table 6 - Draft Groundwater Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Ground Water Criteria				Surface Water Criteria							
		Method A	Method B		Maximum Contaminant Level	Method B		Aquatic Life Fresh/Acute			Aquatic Life Fresh/Chronic		
CLARC name	Alias		Noncancer	Cancer		Noncancer	Cancer	WAC 173-201A	CWA §304	NTR 40 CFR 131	WAC 173-201A	CWA §304	NTR 40 CFR 131
Total Petroleum Hydrocarbons (TPHs)													
tph, heavy oils	TPHs as DRO/ORO	500	---	---	---	---	---	---	---	---	---	---	---
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)													
Benzene	Benzene	5	32	0.8	5	1,994	227	---	---	---	---	---	---
Toluene	Toluene	1,000	640	---	1,000	18,855	---	---	---	---	---	---	---
Ethylbenzene	Ethylbenzene	700	800	---	700	6,823	---	---	---	---	---	---	---
Xylenes	Total Xylenes	1,000	1,600	---	10,000	---	---	---	---	---	---	---	---
Naphthalenes													
Naphthalene	Total Naphthalenes	160	160	---	---	4,714	---	---	---	---	---	---	---
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)													
Benzo[a]pyrene	Total cPAHs TEC	0.1	---	0.3	0.2	---	7.1	---	---	---	---	---	---
Polychlorinated Biphenyls (PCBs)													
Polychlorinated biphenyls (PCBs)	Total PCBs	0.1	---	0.044	0.5	---	0.001	2	---	---	0.014	0.014	0.14
Metals (RCRA 8 + Copper)													
Arsenic, inorganic	Arsenic	5	4.8	0.058	10	17.7	0.98	360	340	360	190	150	190
barium and compounds	Barium	---	3,200	---	2,000	---	---	---	---	---	---	---	---
cadmium (potable groundwater and surface water)	Cadmium	5	8	---	5	---	---	7	3.1	7.0	1.59	1.12	1.59
chromium(III)	Chromium (III)	50	24,000	---	100	243,056	---	888	922	888	288	120	288
Copper	Copper	---	640	---	1,300	2,880	---	30	Biotic Ligand	30	18.8	Biotic Ligand	18.8
Lead	Lead	15	---	---	15	---	---	122	122	122	4.7	4.7	4.7
Mercury	Mercury	2	---	---	2	---	---	2.1	1.4	2.1	0.012	0.77	0.012
selenium and compounds	Selenium	---	80	---	50	2,701	---	20	---	20	5	---	5
Silver	Silver	---	80	---	---	25,926	---	9.5	8.8	9.5	---	---	---

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Notes:
All values in units of micrograms per liter (ug/L).
MTCA table values provided in CLARC spreadsheet, July 2015, or by Ecology.
WAC 173-201A reflects values or results of equations provided in "Water Quality Standards for Surface Waters of Washington State" provided in Table 240
CWA §304 reflects values or results of equations provided in "National Recommended Aquatic Life Criteria table"
NTR 40 CFR 131 reflects values or results of equations provided in "Revision of certain Federal water quality criteria applicable to Washington"
"---" indicates value not provided.

Table 6 - Draft Groundwater Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Surface Water Criteria				Groundwater Cleanup Levels		
		Human Health Water + Organism			Water Quality Standards of the Puyallup Tribe	Preliminary	Final	Basis
CLARC name	Alias	WAC 173-201A	CWA §304	NTR 40 CFR 131				
Total Petroleum Hydrocarbons (TPHs)								
tph, heavy oils	TPHs as DRO/ORO	---	---	---	---	500	500	GW Method A
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX								
Benzene	Benzene	0.44	22	12	1.2	0.44	0.44	WAC 173-201A, HH water & org
Toluene	Toluene	180	57	72	680	57	57	WAC 173-201A, HH water & org
Ethylbenzene	Ethylbenzene	200	68	29	310	29	29	NTR 40 CFR 131.45
Xylenes	Total Xylenes	---	---	---	---	1,600	80	GW Method B
Naphthalenes								
Naphthalene	Total Naphthalenes	---	---	---	---	160	152	GW Method B
Carcinogenic Polyaromatic Hydrocarbons (cPAHs								
Benzo[a]pyrene	Total cPAHs TEC	0.021	0.0057	0.0042	0.0042	0.01	0.01	Practical Quantitation Limit (PQL)
Polychlorinated Biphenyls (PCBs)								
Polychlorinated biphenyls (PCBs)	Total PCBs	0.0017	0.000064	0.00017	0.000308	0.01	0.01	Practical Quantitation Limit (PQL)
Metals (RCRA 8 + Copper)								
Arsenic, inorganic	Arsenic	10	0.018	0.018	0.018	5	5	GW background, Method A
barium and compounds	Barium	---	1,000	---	---	1,000	1,000	CWA 304a, HH water & org
cadmium (potable groundwater and surface water)	Cadmium	---	---	---	---	1.12	1.12	CWA 304a, Aq fresh, chronic (hardness correction)
chromium(III)	Chromium (III)	---	---	---	---	120	120	CWA 304a, Aq fresh, chronic (hardness correction)
Copper	Copper	1,300	---	---	---	18.8	18.8	WAC 173-201A, Aq fresh, chronic (hardness correction)
Lead	Lead	---	---	---	4.62	4.62	4.62	WQSPT
Mercury	Mercury	0.14	---	0.14	0.14	0.012	0.012	WAC 173-201A, Aq fresh, chronic
selenium and compounds	Selenium	120	170	---	---	5	5	WAC 173-201A, Aq fresh, chronic
Silver	Silver	---	---	---	---	8.8	8.8	CWA 304a, Aq fresh, acute (hardness correction)

Notes:
All values in units of micrograms per liter (ug/L).
MTCA table values provided in CLARC spreadsheet, July 2015, or by Ecology.
WAC 173-201A reflects values or results of equations provided in "Water Quality Standards for Surface Waters of Washington State" provided in Table 240
CWA §304 reflects values or results of equations provided in "National Recommended Aquatic Life Criteria table"
NTR 40 CFR 131 reflects values or results of equations provided in "Revision of certain Federal water quality criteria applicable to Washington"
"---" indicates value not provided.

Table 7 - Method B Analysis for Groundwater Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Preliminary Cleanup Levels		Preliminary CULs, Adjustment for Cancer Risk				
		Preliminary Cleanup Level	Basis	Lowest of Method B GW or SW	Cancer Risk at Preliminary CUL	Adjustment Multiplier	CUL Adjusted for Cancer Risk	Cancer Risk at Adjusted CUL
CLARC name	Alias	(ug/L)		(ug/L)	(unitless)	(unitless)	(ug/L)	(unitless)
Total Petroleum Hydrocarbons (TPHs)								
tph, heavy oils	TPHs as DRO/ORO	500	GW Method A	NA				
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)								
Benzene	Benzene	0.44	WAC 173-201A, HH water & org	0.795	5.5E-07	1.00	0.44	5.5E-07
Toluene	Toluene	57	WAC 173-201A, HH water & org	NA				
Ethylbenzene	Ethylbenzene	29	NTR 40 CFR 131.45	NA				
Xylenes	Total Xylenes	1600	GW Method B	NA				
Naphthalenes								
Naphthalene	Total Naphthalenes	160	GW Method B	NA				
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)								
Benzo[a]pyrene	Total cPAHs TEC	0.01	Practical Quantitation Limit (PQL)	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)								
Polychlorinated biphenyls (PCBs)	Total PCBs	0.01	Practical Quantitation Limit (PQL)	NA	NA	NA	NA	NA
Metals (RCRA 8 + Copper)								
Arsenic, inorganic	Arsenic	5	GW background, Method A	NA	NA	NA	NA	NA
barium and compounds	Barium	1000	CWA 304a, HH water & org	NA				
cadmium (potable groundwater and surface water)	Cadmium	1.12	CWA 304a, Aq fresh, chronic (hardness correction)	NA				
chromium(III)	Chromium (III)	120	CWA 304a, Aq fresh, chronic (hardness correction)	NA				
Copper	Copper	18.8	WAC 173-201A, Aq fresh, chronic (hardness correction)	NA				
Lead	Lead	4.62	WQSPT	NA				
Mercury	Mercury	0.012	WAC 173-201A, Aq fresh, chronic	NA				
selenium and compounds	Selenium	5	WAC 173-201A, Aq fresh, chronic	NA				
Silver	Silver	8.8	CWA 304a, Aq fresh, acute (hardness correction)	NA				
						Total Additional Lifetime Cancer Risk:		5.5E-07

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Notes:

Preliminary cleanup level and basis and Method B values provided on Table 6.

Where Method B values are not available, cancer risk and/or noncancer hazard listed as "NA".

Where the cleanup level is based on Practical Quantitation Limit (PQL) or background, cancer risk and noncancer hazard listed as "NA".

Table 7 - Method B Analysis for Groundwater Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Preliminary CULs, Adjustment for Noncancer Hazard						Target Organ Specific Hazard Index									Final Groundwater Cleanup Levels
CLARC name	Alias	Lowest of Method B GW or SW (ug/L)	Noncancer Hazard at Preliminary CUL (unitless)	Adjustment Multiplier (unitless)	CUL Adjusted for Noncancer Hazard (ug/L)	Noncancer Hazard at CUL (unitless)	Target Organ/System	Body weight	Immune	Kidney	Liver	Nervous	Dermal	Cardio-vascular	Gastro-intestinal	Hemato-logical	(ug/L)
Total Petroleum Hydrocarbons (TPHs)																	
tph, heavy oils	TPHs as DRO/ORO	NA					NA										500
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)																	
Benzene	Benzene	32	0.014	1.00	0.44	0.014	Immune		0.01								0.44
Toluene	Toluene	640	0.089	1.00	57	0.089	Kidney			0.09							57
Ethylbenzene	Ethylbenzene	800	0.036	1.00	29	0.036	Liver, Kidney			0.04	0.04						29
Xylenes	Total Xylenes	1600	1.000	0.05	80	0.050	Body weight	0.05									80
Naphthalenes																	
Naphthalene	Total Naphthalenes	160	1.000	0.95	152	0.950	Body weight	0.95									152
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)																	
Benzo[a]pyrene	Total cPAHs TEC	NA					NA										0.01
Polychlorinated Biphenyls (PCBs)																	
Polychlorinated biphenyls (PCBs)	Total PCBs	NA					NA										0.01
Metals (RCRA 8 + Copper)																	
Arsenic, inorganic	Arsenic	NA	NA	NA	NA	NA	Dermal, cardiovascular										5
barium and compounds	Barium	3200	0.313	1.00	1000	0.313	Kidney			0.31							1000
cadmium (potable groundwater and surface water)	Cadmium	8	0.140	1.00	8	0.140	Kidney			0.02							1.12
chromium(III)	Chromium (III)	24000	0.005	1.00	24000	0.005	None										120
Copper	Copper	640	0.029	1.00	640	0.029	Gastrointestinal				0						18.8
Lead	Lead	NA					NA										4.6
Mercury	Mercury	NA					NA										0.012
selenium and compounds	Selenium	80	0.063	1.00	80	0.063	Dermal, hematologic, nervous			0			0			0	5
Silver	Silver	80	0.111	1.00	80	0.111	Dermal						0.01				8.8
							Total Target Organ Specific Hazard Index:	1	0.01	0.46	0.04	0	0.02	0	0	0	

Notes:

Preliminary cleanup level and basis and Method B values provided on Table 6.

Where Method B values are not available, cancer risk and/or noncancer hazard listed as "NA".

Where the cleanup level is based on Practical Quantitation Limit (PQL) or background, cancer risk and noncancer hazard listed as "NA".

Table 8 - Draft Soil Cleanup Levels and Remediation Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Soil Criteria						Soil Cleanup Levels, Unpaved Areas			
		Method A Unrestricted Land Use	Method A for Industrial Properties	Ecological Indicator Soil Concentrations	Vadose Soil Protective of Groundwater	Saturated Soil Protective of Groundwater	Site-specific SPLP Results	Shallow Soils (to 6 feet)		Deep Soils (6 to 15 feet)	
								Final CUL	Basis	Final CUL	Basis
CLARC name	Alias	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		(mg/kg)	
Total Petroleum Hydrocarbons (TPHs)											
tph, heavy oils	TPHs as DRO/ORO	2,000	2,000	---	---	---	---	2,000	MTCA Method A Unrestricted	2,000	MTCA Method A Unrestricted
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)											
Benzene	Benzene	0.03	0.03	---	0.03	0.0017	---	0.03	Standard 3-Phase	0.03	Standard 3-Phase
Toluene	Toluene	7	7	---	4.5	0.27	---	4.5	Standard 3-Phase	4.5	Standard 3-Phase
Ethylbenzene	Ethylbenzene	6	6	---	6.0	0.34	---	6.0	Standard 3-Phase	6.0	Standard 3-Phase
Xylenes	Total Xylenes	9	9	---	14.6	0.83	---	14.6	Standard 3-Phase	14.6	Standard 3-Phase
Naphthalenes											
Naphthalene	Total Naphthalenes	5	5	---	4.5	0.24	---	4.5	Standard 3-Phase	4.5	Standard 3-Phase
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)											
Benzo[a]pyrene	Total cPAHs TEC	0.1	2	12	3.9	0.19	---	3.9	Standard 3-Phase	3.9	Standard 3-Phase
Polychlorinated Biphenyls (PCBs)											
Polychlorinated biphenyls (PCBs)	Total PCBs	1	10	0.65	---	---	---	0.65	Wildlife	1	MTCA Method A Unrestricted
Metals (RCRA 8 + Copper)											
Arsenic, inorganic	Arsenic	20	20	132	2.9	0.15	10	10	SPLP results	10	SPLP results
barium and compounds	Barium	---	---	102	1,650	83	---	102	Wildlife	1,650	Standard 3-Phase
cadmium (soil and nonpotable surface water)	Cadmium	2	2	14	---	---	726	14	Wildlife	726	SPLP results
chromium(III)	Chromium (III)	2,000	2,000	67	480,000	24,007	25,907	67	Wildlife	25,907	SPLP results
Copper	Copper	---	---	217	284	14	75,778	217	Wildlife	53,333	Modified Method C
Lead	Lead	250	1,000	118	3,000	150	1,601	118	Wildlife	1,601	SPLP results
Mercury	Mercury	2	2	5.5	2.1	0.10	13	5.5	Wildlife	13	SPLP results
selenium and compounds	Selenium	---	---	0.30	5.2	0.26	233	0.3	Wildlife	233	SPLP results
Silver	Silver	---	---	---	13.6	0.69	59,527	1133	MTCA Mod. Method C CUL	1133	MTCA Mod. Method C CUL

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Notes:
MTCA table values provided in CLARC spreadsheet, July 2015, or by Ecology.
Ecological Indicator Soil Concentrations for Protection of Wildlife
Soil Protective of Groundwater for vadose zone soils @ 13 degrees C, if available (@ 25 degrees C, otherwise)
Site-specific SPLP results reflect corresponding groundwater cleanup levels and maximum leaching potential
"---" indicates value not provided.

Table 8 - Draft Soil Cleanup Levels and Remediation Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

		Soil Cleanup Levels, Paved Areas			Soil Remediation Levels, Paved Areas		
		Modified Method C			Modified Method C, Excavation Worker Scenario		
Contaminant of Concern		Preliminary	Final CUL	Basis	Preliminary	Final REL	Basis
CLARC name	Alias	(mg/kg)	(mg/kg)		(mg/kg)	(mg/kg)	
Total Petroleum Hydrocarbons (TPHs)							
tph, heavy oils	TPHs as DRO/ORO	2,000	2,000	Method A Unrestricted	2,000	2,000	MTCA Method A Unrestricted
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)							
Benzene	Benzene	1,355	6.78	Adjusted for cumulative cancer risk	34,346	6,869	Adjusted for cumulative cancer risk
Toluene	Toluene	116,364	23,273	Adjusted for noncarcinogenic effect	618,621	185,586	Adjusted for noncarcinogenic effect
Ethylbenzene	Ethylbenzene	145,455	29,091	Adjusted for noncarcinogenic effect	773,276	231,983	Adjusted for noncarcinogenic effect
Xylenes	Total Xylenes	290,909	145,455	Adjusted for noncarcinogenic effect	1,546,552	773,276	Adjusted for noncarcinogenic effect
Naphthalenes							
Naphthalene	Total Naphthalenes	13,333	6,667	Adjusted for noncarcinogenic effect	107,534	53,767	Adjusted for noncarcinogenic effect
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)							
Benzo[a]pyrene	Total cPAHs TEC	104	18.0	Adjusted for cumulative cancer risk	1,613	18	Adjusted for cumulative cancer risk
Polychlorinated Biphenyls (PCBs)							
Polychlorinated biphenyls (PCBs)	Total PCBs	13	5	Adjusted for cumulative cancer risk	25	10	MTCA Method A Industrial
Metals (RCRA 8 + Copper)							
Arsenic, inorganic	Arsenic	33	13	Adjusted for cumulative cancer risk	2,244	1,122	Adjusted for cumulative cancer risk
barium and compounds	Barium	266,667	1,867	Adjusted for noncarcinogenic effect	1,496,121	44,884	Adjusted for noncarcinogenic effect
cadmium (soil and nonpotable surface water)	Cadmium	1,333	773	Adjusted for noncarcinogenic effect	7,481	1,496	Adjusted for noncarcinogenic effect
chromium(III)	Chromium (III)	2,000,000	1,000,000	Adjusted to real value	11,220,905	1,000,000	Adjusted to real value
Copper	Copper	53,333	53,333	Modified Method C	299,224	299,224	Adjusted for noncarcinogenic effect
Lead	Lead	1,601	1,601	SPLP results	2,000	2,000	2x the Method A Industrial
Mercury	Mercury	13	13	SPLP results	2,900	2,900	ODEQ Risk Based Screening Levels
selenium and compounds	Selenium	6,667	5,333	Adjusted for noncarcinogenic effect	37,403	11,221	Adjusted for noncarcinogenic effect
Silver	Silver	6,667	1,133	Adjusted for noncarcinogenic effect	37,403	6,359	Adjusted for noncarcinogenic effect

Notes:
MTCA table values provided in CLARC spreadsheet, July 2015, or by Ecology.
Ecological Indicator Soil Concentrations for Protection of Wildlife
Soil Protective of Groundwater for vadose zone soils @ 13 degrees C, if available (@ 25 degrees C, otherwise)
Site-specific SPLP results reflect corresponding groundwater cleanup levels and maximum leaching potential

Table 9 - Modified Method C Analysis for Soil Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Soil Exposure Parameters				Preliminary CULs, Unadjusted Formula Values							Preliminary CULs, Adjustment for Cancer Risk			
		Oral Reference Dose	Oral Carcinogenic Potency Factor	Gastrointestinal Absorption Conversion Factor	Dermal Absorption Fraction	Incidental Soil Ingestion	Incidental Soil Dermal Contact	Combined	Incidental Soil Ingestion	Incidental Soil Dermal Contact	Combined	Preliminary CUL	Cancer Risk at Preliminary CUL	Adjustment Multiplier	CUL Adjusted for Cancer Risk	Cancer Risk at Adjusted CUL
		RfDo	CFPo	GI	ABS	Noncancer	Noncancer	Noncancer	Cancer	Cancer	Cancer					
CLARC Name	Alias	(mg/kg-day)	(kg-day/mg)	(unitless)	(unitless)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(unitless)	(unitless)	(mg/kg)	(unitless)
Total Petroleum Hydrocarbons (TPHs)																
tph, heavy oils	TPHs as DRO/ORO	---	---	0.2	0.01							2,000	NA			
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)																
Benzene	Benzene	0.004	0.055	0.8	0.0005	8,000	1,280,000	7,950	1,364	218,182	1,355	1,355	1.00E-05	0.005	6.78	5.00E-08
Toluene	Toluene	0.08	---	0.8	0.03	160,000	426,667	116,364				116,364	NA			
Ethylbenzene	Ethylbenzene	0.1	---	0.8	0.03	200,000	533,333	145,455				145,455	NA			
Xylenes	Total Xylenes	0.2	---	0.8	0.03	400,000	1,066,667	290,909				290,909	NA			
Naphthalenes																
Naphthalene	Total Naphthalenes	0.02	---	0.5	0.1	40,000	20,000	13,333				13,333	NA			
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)																
Benzo[a]pyrene	Total cPAHs TEC	0.0003	1	0.5	0.1	600	300	200	312	156	104	104	1.00E-05	0.17	18.0	1.73E-06
Polychlorinated Biphenyls (PCBs)																
Polychlorinated biphenyls (PCBs)	Total PCBs	---	2	0.5	0.1				38	19	13	13	1.00E-05	0.40	5	4.00E-06
Metals (RCRA 8 + Copper)																
Arsenic, inorganic	Arsenic	0.0003	1.5	0.2	0.01	600	1,200	400	50	100	33	33	1.00E-05	0.40	13	4.00E-06
barium and compounds	Barium	0.2	---	0.2	0.01	400,000	800,000	266,667				266,667	NA			
cadmium (soil and nonpotable surface water)	Cadmium	0.001	---	0.2	0.01	2,000	4,000	1,333				1,333	NA			
chromium(III)	Chromium (III)	1.5	---	0.2	0.01	3,000,000	6,000,000	2,000,000				2,000,000	NA			
Copper	Copper	0.04	---	0.2	0.01	80,000	160,000	53,333				53,333	NA			
Lead	Lead	---	---	0.2	0.01								NA			
Mercury	Mercury	---	---	0.2	0.01								NA			
selenium and compounds	Selenium	0.005	---	0.2	0.01	10,000	20,000	6,667				6,667	NA			
Silver	Silver	0.005	---	0.2	0.01	10,000	20,000	6,667				6,667	NA			
														Total Additional Lifetime Cancer Risk:		9.8E-06

Continued on next page

Notes:
This table applies to Alternative 1 described in the text.
Unadjusted formula values based on MTCA Equations 745-4 and 745-5.
"---" indicates value not provided.
Where soil exposure parameter values are not available, cancer risk and/or noncancer hazard listed as "NA".

Table 9 - Modified Method C Analysis for Soil Cleanup Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Preliminary CULs, Adjustment for Noncancer Hazard															Final Soil Cleanup Levels
		Hazard for Prelim. CUL or CUL Adj. for Cancer Risk	Adjustment Multiplier	CUL Adjusted for Noncancer Hazard	Noncancer Hazard at Adjusted CUL	Target Organ/System	Target Organ Specific Hazard Index										
							Body weight	Immune System	Kidney	Liver	Nervous	Dermal	Cardio-vascular	Develop-mental	Gastro-intestinal	Hemato-logical	
CLARC Name	Alias	(unitless)	(unitless)	(mg/kg)	(unitless)												(mg/kg)
Total Petroleum Hydrocarbons (TPHs)																	
tph, heavy oils	TPHs as DRO/ORO	NA				NA											2,000
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)																	
Benzene	Benzene	9E-04	1.00	6.78	0.0009	Immune		9E-04									6.78
Toluene	Toluene	1.0	0.20	23,273	0.20	Kidney			0.20								23,273
Ethylbenzene	Ethylbenzene	1.0	0.20	29,091	0.20	Liver, Kidney			0.20	0.20							29,091
Xylenes	Total Xylenes	1.0	0.50	145,455	0.50	Body weight	0.50										145,455
Naphthalenes																	
Naphthalene	Total Naphthalenes	1.0	0.50	6,667	0.50	Body weight	0.50										6,667
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)																	
Benzo[a]pyrene	Total cPAHs TEC	0.1	1.00	18	0.09	Developmental, immune, nervous		0.09			0.09			0.09			18.0
Polychlorinated Biphenyls (PCBs)																	
Polychlorinated biphenyls (PCBs)	Total PCBs	NA				NA											5
Metals (RCRA 8 + Copper)																	
Arsenic, inorganic	Arsenic	0.03	1.00	13	0.03	Dermal, cardiovascular						0.03	0.03				13
barium and compounds	Barium	1.00	0.01	1,867	0.01	Kidney			0.01								1,867
cadmium (soil and nonpotable surface water)	Cadmium	1.00	0.58	773	0.58	Kidney			0.58								773
chromium(III)	Chromium (III)	1.00	0.50	1,000,000	0.50	None											1,000,000
Copper	Copper	1.00	1.00	53,333	1.00	Gastrointestinal									1.00		53,333
Lead	Lead		NA			NA											1,601
Mercury	Mercury		NA			NA											13
selenium and compounds	Selenium	1.00	0.80	5,333	0.80	Dermal, hematologic, nervous					0.80	0.80				0.80	5,333
Silver	Silver	1.00	0.17	1,133	0.17	Dermal						0.17					1,133
						Total Target Organ Specific Hazard Index:	1.00	0.09	0.99	0.20	0.89	1.00	0.03	0.09	1.00	0.80	

Notes:
This table applies to Alternative 1 described in the text.
Unadjusted formula values based on MTCA Equations 745-4 and 745-5.
Where soil exposure parameter values are not available, cancer risk and/or noncancer hazard listed as "NA".

Table 10 - Modified Method C Analysis for Soil Remediation Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Soil Exposure Parameters				Preliminary RELs, Unadjusted Formula Values							Preliminary RELs, Adjustment for Cancer Risk			
		Oral Reference Dose	Oral Carcinogenic Potency Factor	Gastrointestinal Absorption Conversion Factor	Dermal Absorption Fraction	Incidental Soil Ingestion	Incidental Soil Dermal Contact	Combined	Incidental Soil Ingestion	Incidental Soil Dermal Contact	Combined	Preliminary REL	Cancer Risk at Preliminary REL	Adjustment Multiplier	REL Adjusted for Cancer Risk	Cancer Risk at Adjusted REL
		RfDo	CFPo	GI	ABS	Noncancer	Noncancer	Noncancer	Cancer	Cancer	Cancer					
CLARC Name	Alias	(mg/kg-day)	(kg-day/mg)	(unitless)	(unitless)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(unitless)	(unitless)	(mg/kg)	(unitless)
Total Petroleum Hydrocarbons (TPHs)																
tph, heavy oils	TPHs as DRO/ORO	---	---	0.2	0.01							2,000	NA			
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)																
Benzene	Benzene	0.004	0.055	0.8	0.0005	34,411	18,352,413	34,346	109,489	58,394,041	109,284	34,346	3.1E-06	0.200	6,869	6.3E-07
Toluene	Toluene	0.08	---	0.8	0.03	688,215	6,117,471	618,621				618,621	NA			
Ethylbenzene	Ethylbenzene	0.1	---	0.8	0.03	860,269	7,646,839	773,276				773,276	NA			
Xylenes	Total Xylenes	0.2	---	0.8	0.03	1,720,539	15,293,678	1,546,552				1,546,552	NA			
Naphthalenes																
Naphthalene	Total Naphthalenes	0.02	---	0.5	0.1	172,054	286,756	107,534				107,534	NA			
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)																
Benzo[a]pyrene	Total cPAHs TEC	0.0003	1	0.5	0.1	2,581	4,301	1,613	25,077	41,796	15,673	1,613	1.0E-06	0.011	18	1.1E-08
Polychlorinated Biphenyls (PCBs)																
Polychlorinated biphenyls (PCBs)	Total PCBs	---	2	0.5	0.1				3,011	5,018	1,882	25	1.3E-07	0.400	10	5E-08
Metals (RCRA 8 + Copper)																
Arsenic, inorganic	Arsenic	0.0003	1.5	0.2	0.01	2,581	17,205	2,244	4,015	26,764	3,491	2,244	6.4E-06	0.500	1,122	3.2E-06
barium and compounds	Barium	0.2	---	0.2	0.01	1,720,539	11,470,258	1,496,121				1,496,121	NA			
cadmium (soil and nonpotable surface water)	Cadmium	0.001	---	0.2	0.01	8,603	57,351	7,481				7,481	NA			
chromium(III)	Chromium (III)	1.5	---	0.2	0.01	12,904,040	86,026,936	11,220,905				11,220,905	NA			
Copper	Copper	0.04	---	0.2	0.01	344,108	2,294,052	299,224				299,224	NA			
Lead	Lead	---	---	0.2	0.01							2,000	NA			
Mercury	Mercury	---	---	0.2	0.01							2,900	NA			
selenium and compounds	Selenium	0.005	---	0.2	0.01	43,013	286,756	37,403				37,403	NA			
Silver	Silver	0.005	---	0.2	0.01	43,013	286,756	37,403				37,403	NA			
															Total Additional Lifetime Cancer Risk:	3.9E-06

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Notes:
This table applies to Alternative 2 described in the text.
Unadjusted formula values based on MTCA Equations 745-4 and 745-5 for excavation worker (EF = 9 days/year, SIR = 330 mg/d, AT (cancer) = 70 years), following Ecology direction.
"---" indicates value not provided.
Where soil exposure parameter values are not available, cancer risk and/or noncancer hazard listed as "NA".

Table 10 - Modified Method C Analysis for Soil Remediation Levels

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Contaminant of Concern		Preliminary RELs, Adjustment for Noncancer Hazard					Target Organ Specific Hazard Index										Final Soil Remediation Levels
CLARC Name	Alias	Noncancer Hazard for Prelim. REL (Cancer) (unitless)	Adjustment Multiplier (unitless)	REL Adjusted for Noncancer Hazard (mg/kg)	Noncancer Hazard at Adjusted REL (unitless)	Target Organ/System	Body weight	Immune System	Kidney	Liver	Nervous	Dermal	Cardio-vascular	Develop-mental	Gastro-intestinal	Hemato-logical	(mg/kg)
Total Petroleum Hydrocarbons (TPHs)																	
tph, heavy oils	TPHs as DRO/ORO	NA				NA											2,000
Benzene, Ethylbenzene, Toluene, Xylenes (BTEX)																	
Benzene	Benzene	2E-01	1.00	6869.27	0.2000	Immune		2E-01									6,869
Toluene	Toluene	1.0	0.30	185,586	0.30	Kidney			0.30								185,586
Ethylbenzene	Ethylbenzene	1.0	0.30	231,983	0.30	Liver, Kidney			0.30	0.30							231,983
Xylenes	Total Xylenes	1.0	0.50	773,276	0.50	Body weight	0.50										773,276
Naphthalenes																	
Naphthalene	Total Naphthalenes	1.0	0.50	53,767	0.50	Body weight	0.50										53,767
Carcinogenic Polyaromatic Hydrocarbons (cPAHs)																	
Benzo[a]pyrene	Total cPAHs TEC	0.0	1.00	18	0.01	Developmental, immune, nervous		0.01			0.01			0.01			18
Polychlorinated Biphenyls (PCBs)																	
Polychlorinated biphenyls (PCBs)	Total PCBs	NA				NA											10
Metals (RCRA 8 + Copper)																	
Arsenic, inorganic	Arsenic	0.50	1.00	1,122	0.50	Dermal, cardiovascular						0.50	0.50				1,122
barium and compounds	Barium	1.00	0.03	44,884	0.03	Kidney			0.03								44,884
cadmium (soil and nonpotable surface water)	Cadmium	1.00	0.20	1,496	0.20	Kidney			0.20								1,496
chromium(III)	Chromium (III)	1.00	0.09	1,000,000	0.09	None											1,000,000
Copper	Copper	1.00	1.00	299,224	1.00	Gastrointestinal									1.00		299,224
Lead	Lead		NA			NA											2,000
Mercury	Mercury		NA			NA											2,900
selenium and compounds	Selenium	1.00	0.30	11,221	0.30	Dermal, hematologic, nervous					0.30	0.30				0.30	11,221
Silver	Silver	1.00	0.17	6,359	0.17	Dermal						0.17					6,359
						Total Target Organ Specific Hazard Index:	1.00	0.21	0.83	0.30	0.31	0.97	0.50	0.01	1.00	0.30	

Notes:

This table applies to Alternative 2 described in the text.

Unadjusted formula values based on MTCA Equations 745-4 and 745-5 for excavation worker (EF = 9 days/year, SIR = 330 mg/d, AT (cancer) = 70 years), following Ecology direction.

Where soil exposure parameter values are not available, cancer risk and/or noncancer hazard listed as "NA".

Table 11 - Alternative 1 Cost Estimate

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Cost Estimate Accuracy:	FS Screening Level (+50/-30 percent)	
Key Assumptions and Quantities:	1.5 ton/BCY	soil density
	25%	Assumed quantity of unpaved area characterized as hazardous
	40%	Assumed quantity of paved area characterized as hazardous
	10 hrs	Round-trip time to Arlington, OR
	2 hrs	Round-trip time to Republic transfer station in Seattle

CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Total Cost	Notes
In Situ Solidification/Stabilization Interim Action					
Alternative 2 - ISS Total Capital Costs	1	LS	$ 5,074,000	$ 5,074,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Additional ISS - B-36 Area[1]	1,100	CY	$ 428	$ 471,000	
Additional ISS - Area B[2]	1,300	CY	$ 366	$ 476,000	
Soil Transportation - Hazardous	138	hrs	$ 145	$ 19,938	Assumes transport to Arlington, OR
Soil Disposal - Hazardous[3]	413	tons	$ 200	$ 82,500	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	83	hrs	$ 145	$ 11,963	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous[3]	1,238	tons	$ 47	$ 58,163	Disposal at Republic Roosevelt Landfill
			Subtotal	**$ 6,194,000**	
Pre-Design Investigation and Soil Profiling					
Design Investigation	1	LS	$ 150,000	$ 150,000	Investigation to refine extent and collect soil profiling data
Acute Fish Toxicity Test	1	LS	$ 15,000	$ 15,000	Includes cost of work plan, sample collection, and laboratory costs
Chemical Stabilization Treatability Testing	1	LS	$ 35,000	$ 35,000	Includes cost of work plan, sample collection, and laboratory costs
			Subtotal	**$ 200,000**	
Groundwater Monitoring					
Well Abandonment	1	LS	$ 10,000	$ 10,000	
Compliance Well Installation	10	wells	$ 2,500	$ 25,000	Wells to be installed after remedial construction.
			Subtotal	**$ 35,000**	
Institutional Controls					
Legal fees	1	LS	$ 20,000	$ 20,000	
Technical and administrative support	1	LS	$ 15,000	$ 15,000	
			Subtotal	**$ 35,000**	
Unpaved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ 25,000	$ 25,000	
Soil excavation	5,000	BCY	$ 7.25	$ 36,250	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	625	hrs	$ 145	$ 90,625	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	1,875	tons	$ 200	$ 375,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	375	hrs	$ 145	$ 54,375	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	5,625	tons	$ 47	$ 264,375	Disposal at Republic Roosevelt Landfill
Import, place and compact borrow fill	5,000	BCY	$ 18	$ 90,000	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 38,425	
			Subtotal	**$ 999,000**	
Paved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ -	$ -	Assume same mobilization as unpaved area removal
Soil excavation (to cleanup levels, with environmental cap)	11,500	BCY	$ 7.25	$ 83,375	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	2,300	hrs	$ 145	$ 333,500	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	6,900	tons	$ 200	$ 1,380,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	690	hrs	$ 145	$ 100,050	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	10,350	tons	$ 47	$ 486,450	Disposal at Republic Rooselvelt Landfill
Import, place and compact borrow fill	11,500	BCY	$ 18	$ 207,000	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 104,615	
			Subtotal	**$ 2,720,000**	
Environmental Cap and Stormwater Controls					
Base Course	192,000	SF	$ 0.51	$ 97,920	Crushed 3/4" stone, compacted to 3" deep (RS Means) - Line# 32112320050
Asphalt Binder Course	192,000	SF	$ 1.07	$ 205,440	2" Thick (RS Means) - Line# 321216130120
Asphalt Wearing Course	192,000	SF	$ 1.21	$ 232,320	2" Thick (RS Means) - Line# 321216130380
Stormwater Controls (design and construction)	1	LS	$ 264,000	$ 264,000	
Construction Management and Reporting	10%			$ 79,968	
			Subtotal	**$ 880,000**	
			Capital Costs Subtotal	**$ 11,063,000**	
			Contingency (20%)[4]	**$ 2,212,600**	
			Total Capital Costs	**$13,300,000**	

O&M COSTS - Net Present Value[5]

Item	Annual Freq	Unit Cost	Annual Cost	NPV Cost	Notes
Groundwater Monitoring					
Performance Monitoring and Reporting, Years 1 and 2	4	$ 10,000	$ 40,000	$ 78,235	Quarterly monitoring frequency
Performance Monitoring and Reporting, Years 3 - 5	2	$ 10,000	$ 20,000	$ 55,699	Semi-annual monitoring frequency
Confirmation Monitoring and Reporting, Years 6 -15	1	$ 10,000	$ 10,000	$ 85,610	Annual monitoring frequency
			Subtotal	**$ 220,000**	
Environmental Cap and Stormwater Controls O&M					
Environmental Cap Maintenance	1	$ 1,000	$ 1,000	$ 24,016	
Stormwater Control Maintenance	1	$ 1,000	$ 1,000	$ 24,016	
			Subtotal	**$ 48,000**	
In Situ Solidification/Stabilization Interim Action[6]					
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 294,000	$ 294,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 41,000	$ 41,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
			Subtotal	**$ 335,000**	
Professional Services (as percent of Periodic O&M costs)					
Project administration		10%		$ 26,800	
			Total O&M Costs - Net Present Value	**$629,800**	
			TOTAL ESTIMATED COST	**$13,900,000**	

Notes:

1 - Additional areas that exceed PAH cleanup levels to be addressed with an expanded ISS footprint based on Ecology's September 19, 2017 comments on the Draft Interim Action Work Plan. The first additional area expands the B36 area to address the PAH exceedances at B-29 - an additional area of 2,700 square feet and a treatment depth of 4 to 15 feet bgs. The B36 Area ISS direct capital cost in the AECOM Draft Interim Action Work Plan was divided by the soil volume to derive a unit cost of $428/cubic yard of soil as a basis of costing this additional area.

2 - Additional areas that exceed PAH cleanup levels to be addressed with an expanded ISS footprint based on Ecology's September 19, 2017 comments on the Draft Interim Action Work Plan. The second additional area expands the Area B ISS footprint to address the PAH exceedances at B-23, B-22, B-19, and B-20 in Area B - an additional area of 3,200 square feet and a treatment depth of 4 to 15 ft bgs. The Area B ISS direct capital cost in the AECOM Draft Interim Action Work Plan was divided by the soil volume to derive a unit cost of $366/cubic yard of soil as a basis of costing this additional area.

3 - The Draft Interim Action Work Plan identifies 1,100 CY of metals and PCB contamiated soil to be placed in a temporary containment unit. Consistent with the remedial technology for others metals contaminated soil - this soil would be characterized and disposed off-property. The assumptions regarding the waste characterization and costs are consistent with those assumed for removal and disposal of other metals-contaminated soils in this remedial alternative.

4 - Contingency costs include miscellaneous costs not currently itemized due to the current (preliminary) stage of design development, as well as costs to address unanticipated conditions encountered during

5 - A discount rate of 1.5% was assumed based on 2016 real treasury rates for net present value estimate.

6 - Total O&M Costs as presented in Draft Interim Action Work Plan. Net present value calculated using a presumed interest rate of 3%.

Table 12 - Alternative 2 Cost Estimate

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Cost Estimate Accuracy:	FS Screening Level (+50/-30 percent)		
Key Assumptions and Quantities:	1.5	ton/BCY	soil density
	25%		Assumed quantity of unpaved area characterized as hazardous
	50%		Assumed quantity of paved area characterized as hazardous
	10	hrs	Round-trip time to Arlington, OR
	2	hrs	Round-trip time to Republic transfer station in Seattle

CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Total Cost	Notes
In Situ Solidification/Stabilization Interim Action					
Alternative 2 - ISS Total Capital Costs	1	LS	$ 5,074,000	$ 5,074,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Additional ISS - B-36 Area[1]	1,100	CY	$ 428	$ 471,000	
Additional ISS - Area B[2]	1,300	CY	$ 366	$ 476,000	
Soil Transportation - Hazardous	138	hrs	$ 145	$ 19,938	Assumes transport to Arlington, OR
Soil Disposal - Hazardous[3]	413	tons	$ 200	$ 82,500	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	83	hrs	$ 145	$ 11,963	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous[3]	1,238	tons	$ 47	$ 58,163	Disposal at Republic Roosevelt Landfill
			Subtotal	**$ 6,194,000**	
Pre-Design Investigation and Soil Profiling					
Design Investigation	1	LS	$ 100,000	$ 100,000	Investigation to refine extent and collect soil profiling data
Acute Fish Toxicity Test	1	LS	$ 15,000	$ 15,000	Includes cost of work plan, sample collection, and laboratory costs
Chemical Stabilization Treatability Testing	1	LS	$ 35,000	$ 35,000	Includes cost of work plan, sample collection, and laboratory costs
			Subtotal	**$ 150,000**	
Groundwater Monitoring					
Well Abandonment	1	LS	$ 10,000	$ 10,000	
Compliance Well Installation	10	wells	$ 2,500	$ 25,000	Wells to be installed after remedial construction.
			Subtotal	**$ 35,000**	
Institutional Controls					
Legal fees	1	LS	$ 20,000	$ 20,000	
Technical and administrative support	1	LS	$ 15,000	$ 15,000	
			Subtotal	**$ 35,000**	
Unpaved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ 25,000	$ 25,000	
Soil excavation	5,000	BCY	$ 7.25	$ 36,250	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	625	hrs	$ 145	$ 90,625	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	1,875	tons	$ 200	$ 375,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	375	hrs	$ 145	$ 54,375	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	5,625	tons	$ 47	$ 264,375	Disposal at Republic Roosevelt Landfill
Import, place and compact borrow fill	5,000	BCY	$ 18	$ 90,000	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 38,425	
			Subtotal	**$ 999,000**	
Paved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ -	$ -	Assume same mobilization as unpaved area removal
Soil excavation (to remediation levels)	5,000	BCY	$ 7.25	$ 36,250	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	1,250	hrs	$ 145	$ 181,250	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	3,750	tons	$ 200	$ 750,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	250	hrs	$ 145	$ 36,250	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	3,750	tons	$ 47	$ 176,250	Disposal at Republic Rooselvelt Landfill
Import, place and compact borrow fill	5,000	BCY	$ 18	$ 90,000	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 51,800	
			Subtotal	**$ 1,347,000**	
Environmental Cap and Stormwater Controls					
Base Course	192,000	SF	$ 0.51	$ 97,920	Crushed 3/4" stone, compacted to 3" deep (RS Means) - Line# 32112320050
Asphalt Binder Course	192,000	SF	$ 1.07	$ 205,440	2" Thick (RS Means) - Line# 321216130120
Asphalt Wearing Course	192,000	SF	$ 1.21	$ 232,320	2" Thick (RS Means) - Line# 321216130380
Stormwater Controls (design and construction)	1	LS	$ 264,000	$ 264,000	
Construction Management and Reporting	10%			$ 79,968	
			Subtotal	**$ 880,000**	
			Capital Costs Subtotal	**$ 9,640,000**	
			Contingency (20%)[4]	**$ 1,928,000**	
			Total Capital Costs	**$11,600,000**	

O&M COSTS - Net Present Value[5]

Item	Annual Freq.	Unit Cost	Annual Cost	NPV Cost	Notes
Groundwater Monitoring					
Performance Monitoring and Reporting, Years 1 and 2	4	$ 10,000	$ 40,000	$ 78,235	Quarterly monitoring frequency
Performance Monitoring and Reporting, Years 3 - 5	2	$ 10,000	$ 20,000	$ 55,699	Semi-annual monitoring frequency
Confirmation Monitoring and Reporting, Years 6 -15	1	$ 10,000	$ 10,000	$ 85,610	Annual monitoring frequency
			Subtotal	**$ 220,000**	
Environmental Cap and Stormwater Controls O&M					
Environmental Cap Maintenance	1	$ 1,000	$ 1,000	$ 24,016	
Stormwater Control Maintenance	1	$ 1,000	$ 1,000	$ 24,016	
			Subtotal	**$ 48,000**	
In Situ Solidification/Stabilization Interim Action[6]					
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 294,000	$ 294,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 41,000	$ 41,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
			Subtotal	**$ 335,000**	
Professional Services (as percent of Periodic O&M costs)					
Project administration		10%		$ 26,800	
			Total O&M Costs - Net Present Value	**$ 629,800**	
			TOTAL ESTIMATED COST	**$12,200,000**	

Notes:

1 - Additional areas that exceed PAH cleanup levels to be addressed with an expanded ISS footprint based on Ecology's September 19, 2017 comments on the Draft Interim Action Work Plan. The first additional area expands the B36 area to address the PAH exceedances at B-29 - an additional area of 2,700 square feet and a treatment depth of 4 to 15 feet bgs. The B36 Area ISS direct capital cost in the AECOM Draft Interim Action Work Plan was divided by the soil volume to derive a unit cost of $428/cubic yard of soil as a basis of costing this additional area.

2 - Additional areas that exceed PAH cleanup levels to be addressed with an expanded ISS footprint based on Ecology's September 19, 2017 comments on the Draft Interim Action Work Plan. The second additional area expands the Area B ISS footprint to address the PAH exceedances at B-23, B-22, B-19, and B-20 in Area B - an additional area of 3,200 square feet and a treatment depth of 4 to 15 ft bgs. The Area B ISS direct capital cost in the AECOM Draft Interim Action Work Plan was divided by the soil volume to derive a unit cost of $366/cubic yard of soil as a basis of costing this additional area.

3 - The Draft Interim Action Work Plan identifies 1,100 CY of metals and PCB contamianted soil to be placed in a temporary containment unit. Consistent with the remedial technology for others metals contaminated soil - this soil would be characterized and disposed off-property. The assumptions regarding the waste characterization and costs are consistent with those assumed for removal and disposal of other metals-contaminated soils in this remedial alternative.

4 - Contingency costs include miscellaneous costs not currently itemized due to the current (preliminary) stage of design development, as well as costs to address unanticipated conditions encountered during

5 - A discount rate of 1.5% was assumed based on 2016 real treasury rates for net present value estimate.

6 - Total O&M Costs as presented in Draft Interim Action Work Plan. Net present value calculated using a presumed interest rate of 3%.

Table 13 - Alternative 3 Cost Estimate

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

Cost Estimate Accuracy:	FS Screening Level (+50/-30 percent)		
Key Assumptions and Quantities:	1.5	ton/BCY	soil density
	25%		Assumed quantity of unpaved area characterized as hazardous
	25%		Assumed quantity of paved area characterized as hazardous
	10	hrs	Round-trip time to Arlington, OR
	2	hrs	Round-trip time to Republic transfer station in Seattle

CAPITAL COSTS

Item	Quantity	Unit	Unit Cost	Total Cost	Notes
In Situ Solidification/Stabilization Interim Action					
Alternative 2 - ISS Total Capital Costs	1	LS	$ 5,074,000	$ 5,074,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Additional ISS - B-36 Area and Right of Way[1]	16,200	CY	$ 428	$ 6,934,000	
Soil Transportation - Hazardous	138	hrs	$ 145	$ 19,938	Assumes transport to Arlington, OR
Soil Disposal - Hazardous[2]	413	tons	$ 200	$ 82,500	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	83	hrs	$ 145	$ 11,963	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous[3]	1,238	tons	$ 47	$ 58,163	Disposal at Republic Roosevelt Landfill
			Subtotal	**$ 12,181,000**	
Pre-Design Investigation and Soil Profiling					
Design Investigation	1	LS	$ 200,000	$ 200,000	Investigation to refine extent and collect soil profiling data
Acute Fish Toxicity Test	1	LS	$ 15,000	$ 15,000	Includes cost of work plan, sample collection, and laboratory costs
Chemical Stabilization Treatability Testing	1	LS	$ 35,000	$ 35,000	Includes cost of work plan, sample collection, and laboratory costs
			Subtotal	**$ 250,000**	
Groundwater Monitoring					
Well Abandonment	1	LS	$ 10,000	$ 10,000	
Compliance Well Installation	10	wells	$ 2,500	$ 25,000	Wells to be installed after remedial construction.
			Subtotal	**$ 35,000**	
Institutional Controls					
Legal fees	1	LS	$ 20,000	$ 20,000	
Technical and administrative support	1	LS	$ 15,000	$ 15,000	
			Subtotal	**$ 35,000**	
Unpaved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ 25,000	$ 25,000	
Soil excavation	5,000	BCY	$ 7.25	$ 36,250	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	625	hrs	$ 145	$ 90,625	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	1,875	tons	$ 200	$ 375,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	375	hrs	$ 145	$ 54,375	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	5,625	tons	$ 47	$ 264,375	Disposal at Republic Roosevelt Landfill
Import, place and compact borrow fill	5,000	BCY	$ 18	$ 90,000	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 38,425	
			Subtotal	**$ 999,000**	
Paved Areas - Removal and Disposal					
Mobilization/demobilization	1	LS	$ -	$ -	Assume same mobilization as unpaved area removal
Soil excavation (to cleanup levels, without environmental cap)	23,300	BCY	$ 7.25	$ 168,925	(RS Means; 1-4' deep, 1/2 CY bucket)
Soil Transportation - Hazardous	2,913	hrs	$ 145	$ 422,433	Assumes transport to Arlington, OR
Soil Disposal - Hazardous	8,740	tons	$ 200	$ 1,748,000	Disposal at WM Arlington Landfill
Soil Transportation - Non- Hazardous, Non-Dangerous	1,747	hrs	$ 145	$ 253,363	Assumes transport to Republic transfer station in Seattle
Soil Disposal - Non-Hazardous, Non-Dangerous	26,210	tons	$ 47	$ 1,231,870	Disposal at Republic Rooselvelt Landfill
Import, place and compact borrow fill	23,300	BCY	$ 18	$ 419,400	
Performance Monitoring	1	LS	$ 25,000	$ 25,000	
Construction Management and Reporting	4%			$ 170,760	
			Subtotal	**$ 4,440,000**	
			Capital Costs Subtotal	**$ 17,940,000**	
			Contingency (20%)[3]	**$ 3,588,000**	
			Total Capital Costs	**$21,500,000**	

O&M COSTS - Net Present Value[4]

Item	Annual Freq.	Unit Cost	Annual Cost	NPV Cost	Notes
Groundwater Monitoring					
Performance Monitoring and Reporting, Years 1 and 2	4	$ 10,000	$ 40,000	$ 78,235	Quarterly monitoring frequency
Performance Monitoring and Reporting, Years 3 - 5	2	$ 10,000	$ 20,000	$ 55,699	Semi-annual monitoring frequency
Confirmation Monitoring and Reporting, Years 6 -15	1	$ 10,000	$ 10,000	$ 85,610	Annual monitoring frequency
			Subtotal	**$ 220,000**	
In Situ Solidification/Stabilization Interim Action[5]					
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 294,000	$ 294,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
Alternative 2 B36 Area Total O&M Costs	1 LS		$ 41,000	$ 41,000	Interim Action; Costs as presented in Work Plan (AECOM, 2017b)
			Subtotal	**$ 335,000**	
Professional Services (as percent of Periodic O&M costs)					
Project administration		10%		$ 22,000	
			Total O&M Costs - Net Present Value	**$ 577,000**	
			TOTAL ESTIMATED COST	**$ 22,100,000**	

Notes:

1.5% discount rate for NPV analysis based on 2016 real treasury rates

1 - Additional areas that exceed PAH cleanup levels to be addressed with an expanded ISS footprint based on Ecology's September 19, 2017 comments on the Draft Interim Action Work Plan. The first additional area expands the B36 area to address the PAH exceedances at B-36 to depths of 32 feet - an additional volume of 5,700 CY. The second additional area encompasses PAH exceedances in the 18th street right of way, estimated to be 12,900 square feet to an average depth of 22 feet, or an estimated volume of 10,500 CY.

2 - The Draft Interim Action Work Plan identifies 1,100 CY of metals and PCB contamianted soil to be placed in a temporary containment unit. Consistent with the remedial technology for others metals contaminated soil - this soil would be characterized and disposed off-property. The assumptions regarding the waste characterization and costs are consistent with those assumed for removal and disposal of other metals-contaminated soils in this remedial alternative.

3 - Contingency costs include miscellaneous costs not currently itemized due to the current (preliminary) stage of design development, as well as costs to address unanticipated conditions encountered during

4 - A discount rate of 1.5% was assumed based on 2016 real treasury rates for net present value estimate.

5 - Total O&M Costs as presented in Draft Interim Action Work Plan. Net present value calculated using a presumed interest rate of 3%.

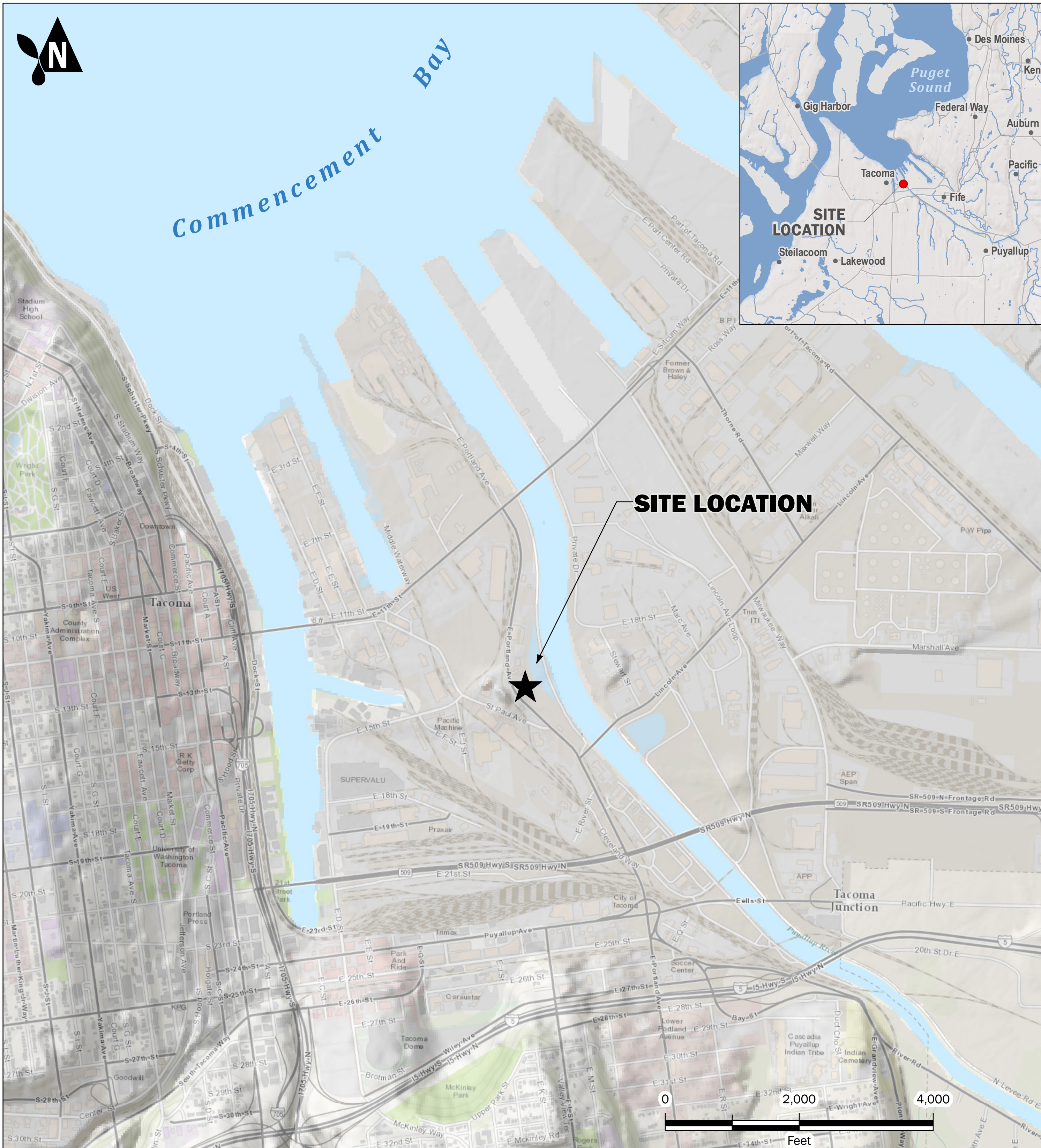
Table 15 - Disproportionate Cost Analysis

Project No. 160420, Tacoma Metals, Inc. Site, Tacoma, Washington

	Alternative 1	Alternative 2	Alternative 3
Remediation in Unpaved Areas:	Excavation for Protection of Groundwater	Excavation for Protection of Groundwater	Excavation for Protection of Groundwater
Remediation in Paved Areas:	Excavation and Containment	Excavation and Containment	Excavation, Only
Paved Area Soil Cleanup Standard:	Mod. Method C Cleanup Levels	Mod. Method C Remediation Levels	Protection of Groundwater
Disproportionate Cost Criteria			
Protectiveness	2	1	3
Permanence	2	1	3
Long-term Effectiveness	2	1	3
Short-term Risk Management	2	3	1
Implementability	2	3	1
Consideration of Public Concerns	2	2	2
Total Benefit Score	**12**	**11**	**13**
Total Estimated Cost	**$13,900,000**	**$12,200,000**	**$22,100,000**
Benefit/Cost Ratio	**0.86**	**0.90**	**0.59**

Note:
Alternatives were ranked for each disproportionate cost criterion.
The total benefit score was the unweighted sum of the individual rankings.

FIGURES



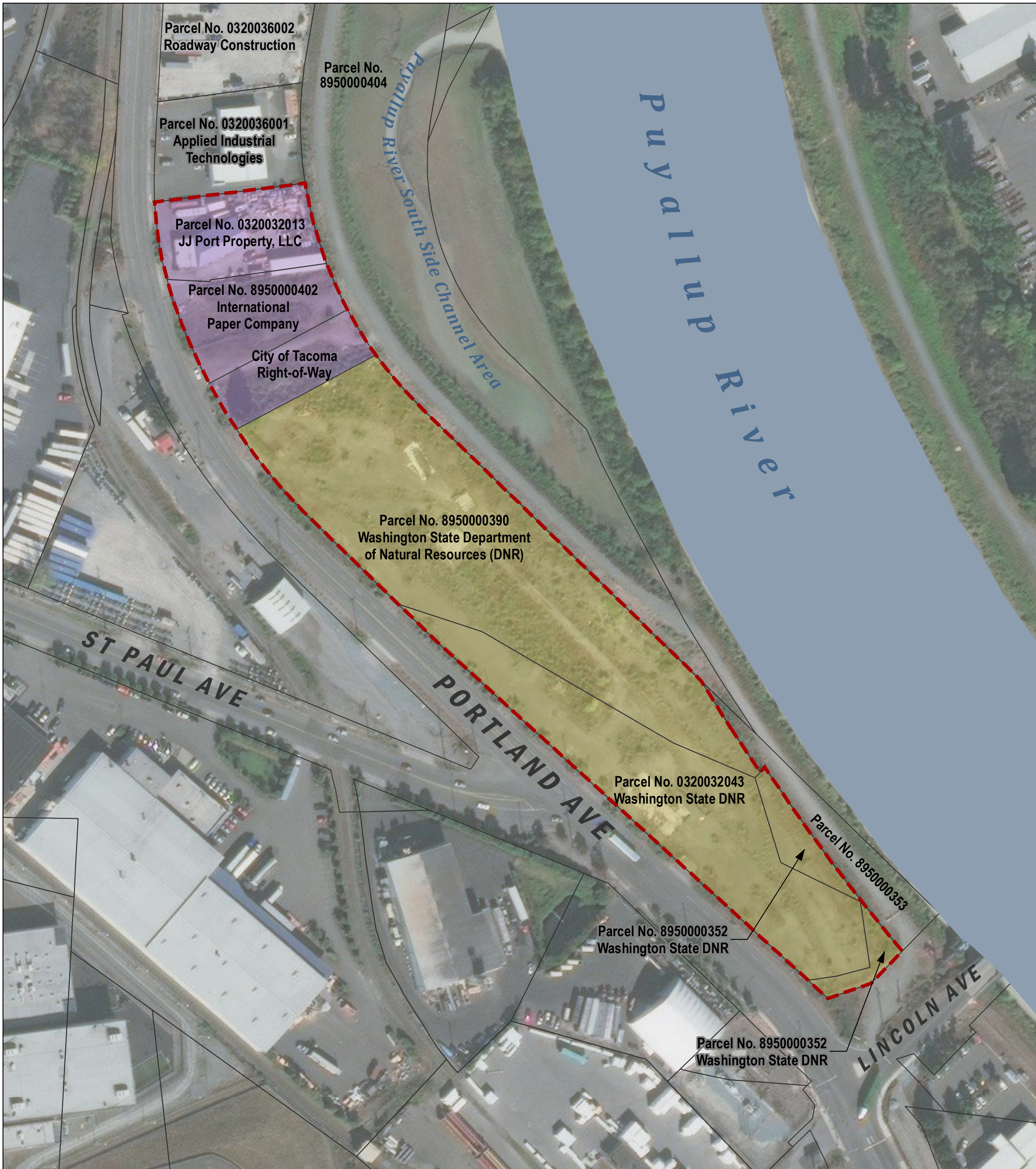
Site Location Map

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	OCT-2017	BY: ACG / EAC	FIGURE NO.
	PROJECT NO. 160420-03	REVISED BY: - - -	1

GIS Path: T:\projects_8\Sussman_160420\Delivered\RevisedDraftRI\01 Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 10/18/2017 || User: ecrumbaker || Print Date: 10/18/2017

Basemap Layer Credits || Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



GIS Path: T:\projects_8\Sussman_160420\Delivered\RevisedDraftRI\02 Site Map and Tax Parcels.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 12/1/2017 || User: ecrumbaker || Print Date: 12/1/2017

On-Property Area
Off-Property Area
Pierce County Parcel
Site Boundary

0 200 400
Feet

N

Site Map and Tax Parcels

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

DEC-2017	BY: ACG / EAC	FIGURE NO. 2
PROJECT NO. 160420-03	REVISED BY: ACG	

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Historic Structure

Historic Unpaved Area

Existing Structure

Site Boundary

Pierce County Parcels

0 100 200

Feet

Historical Operations

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: - - -	3

GIS Path: T:\projects_8\Sussman_160420\Delivered\DraftFinalRI\03 Historical Operations.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 2/27/2018 || User: ecrumbaker || Print Date: 2/27/2018

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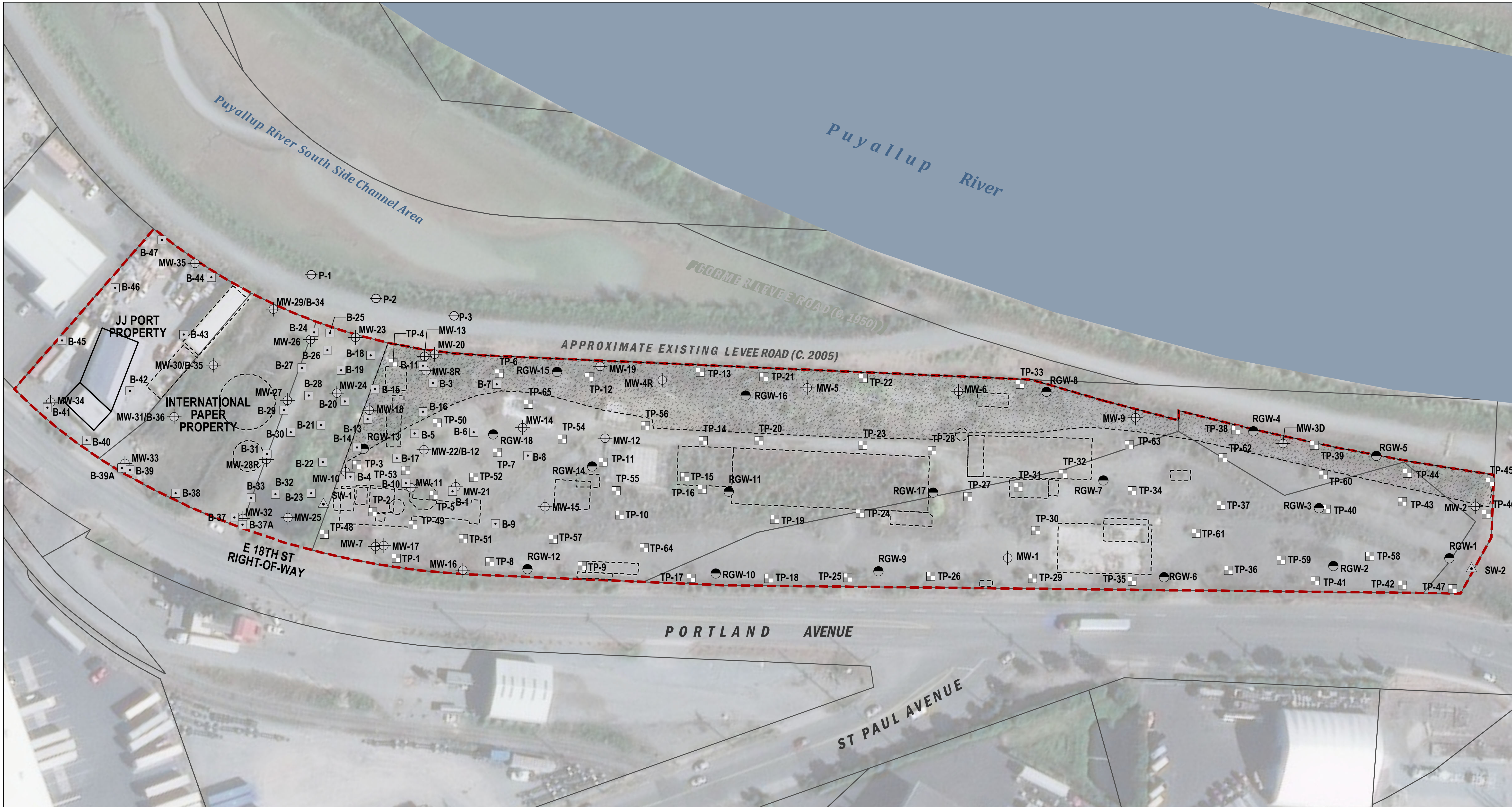

Monitoring Well
Piezometer
Reconnaissance Groundwater Sample
Soil Boring
Surface Water
Test Pit
Historic Structure
Historic Unpaved Area
Existing Structure
Site Boundary
Pierce County Parcels

0 100 200
Feet

Remedial Investigation Locations

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

MAY-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: ACG	4

GIS Path: T:\projects_8\Sussman_160420\Delivered\FinalRI\04 Remedial Investigation Locations.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 5/30/2018 || User: ecrumbaker || Print Date: 5/30/2018

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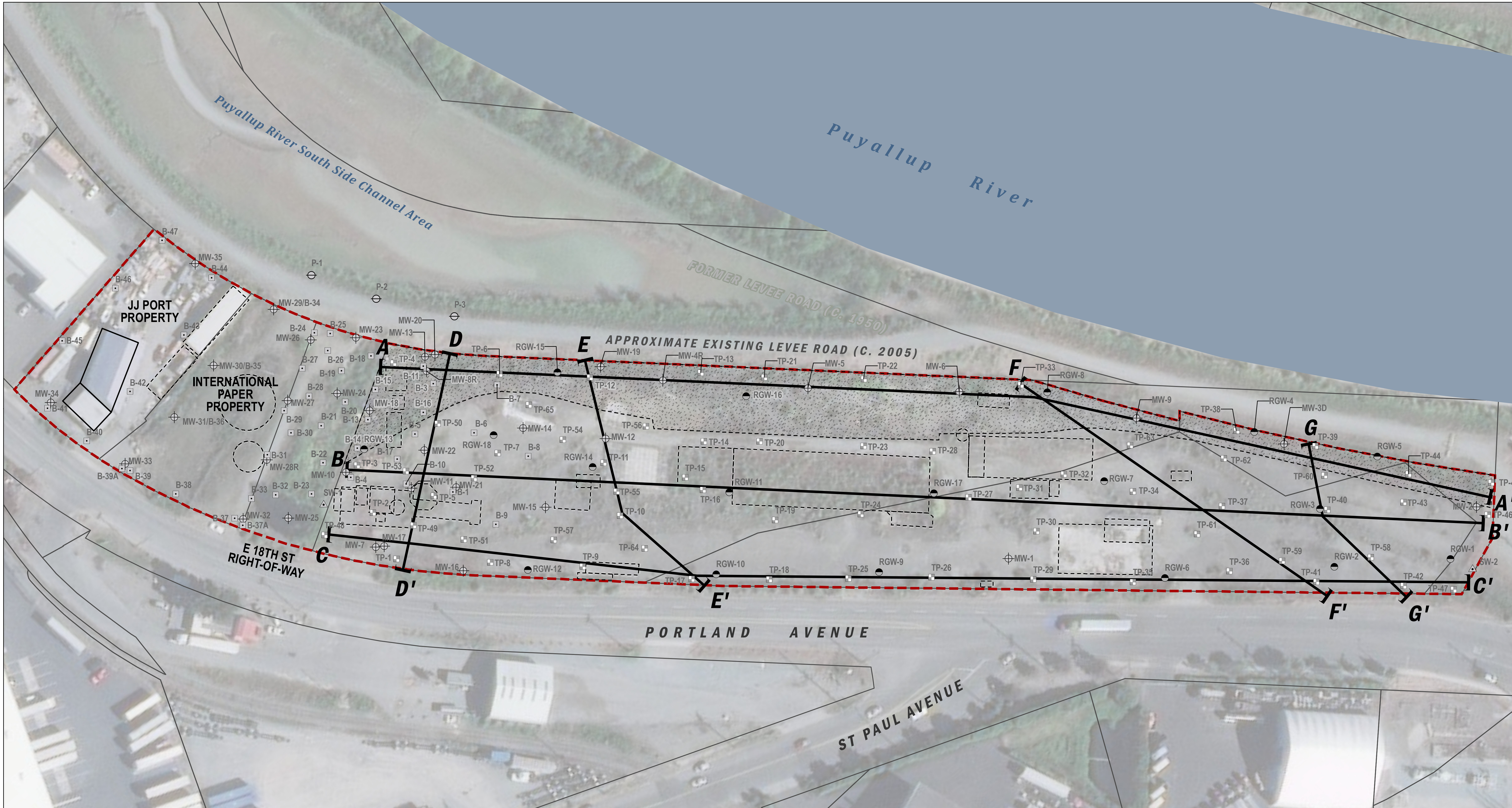


Cross Section
Monitoring Well
Piezometer
Reconnaissance Groundwater Sample
Soil Boring
Surface Water
Test Pit
Historic Structure
Historic Unpaved Area
Existing Structure
Site Boundary
Pierce County Parcels

0 100 200
Feet

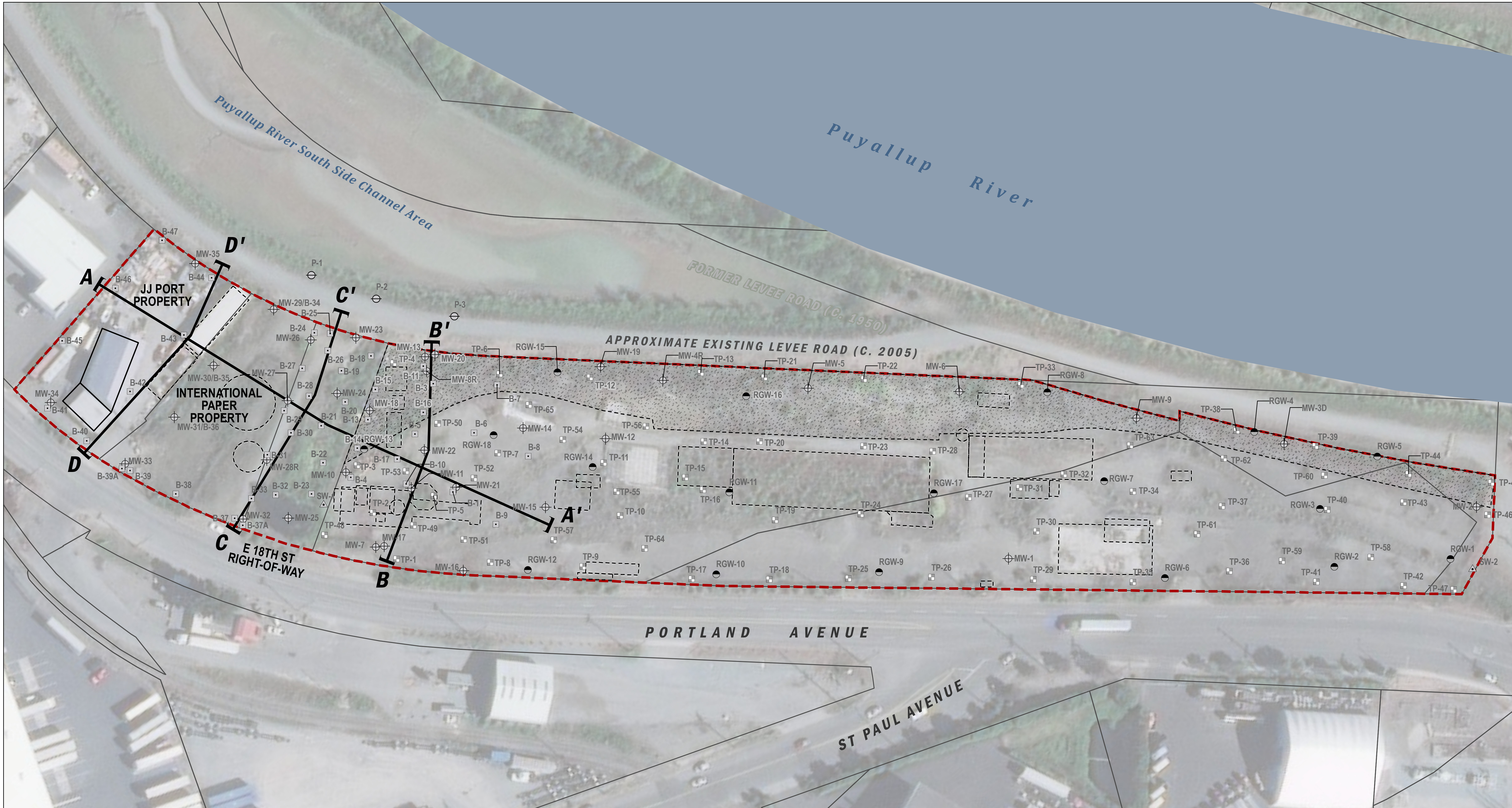
On-Property Cross Section Layout

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	FEB-2018	BY: ACG / EAC	FIGURE NO. 5
	PROJECT NO. 160420-03	REVISED BY: ACG	

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Delivered\DraftFinalRI\05 On Property Cross Section Layout.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 2/27/2018 || User: ecrumbaker || Print Date: 2/27/2018



Cross Section
Monitoring Well
Piezometer
Reconnaissance Groundwater Sample
Soil Boring
Surface Water
Test Pit
Historic Structure
Historic Unpaved Area
Existing Structure
Site Boundary
Pierce County Parcels

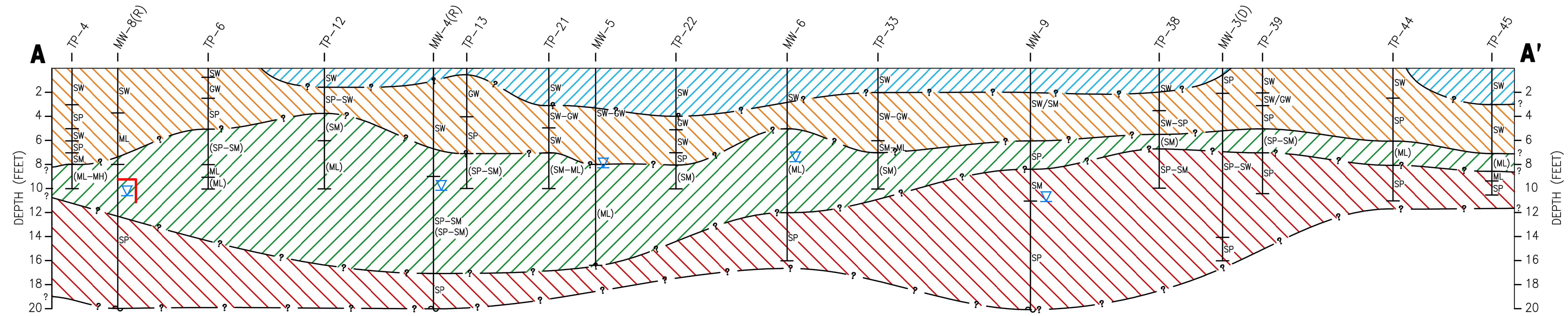
0 100 200
Feet

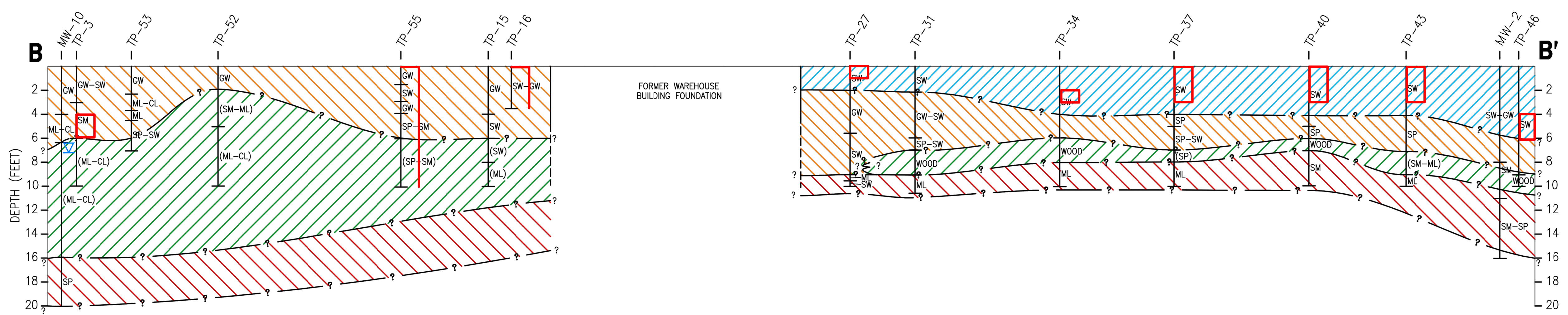
Off-Property Cross Section Layout

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.	
PROJECT NO. 160420-03	REVISED BY: - - -	6	





METAL DEBRIS FILL – ABUNDANT MIXED METAL AND OTHER DEBRIS WITH SOIL MATRIX. DEBRIS INCLUDES CABLE, WIRE, SHEET METAL, SPRINGS, MACHINE PARTS, SCRAP METAL, RUBBER, GLASS, BRICK, CONCRETE, AND OTHER MATERIAL. MATRIX MATERIAL IS TYPICALLY SAND AND GRAVEL MIXTURE.

MIXED FILL – VARIABLE FILL MATERIAL TYPICALLY INCLUDING WELL GRADED SAND AND GRAVEL, POORLY GRADED SAND, SILTY SAND AND GRAVEL, AND SOME SILT AND CLAY. COMMONLY CONTAINS SOME METAL, GLASS, BRICK, CONCRETE, AND OTHER DEBRIS.

WOOD FILL – MIXED WOOD DEBRIS INCLUDES LOGS, BOARDS, BARK, CHIPS, WOOD DUST, PLANKS, AND PILINGS. MATRIX MATERIAL INCLUDES MEDIUM TO FINE, SAND, SILT, AND CLAY MIXTURES. MATRIX CONTENT IS TYPICALLY 0–20%.

NATIVE MATERIAL – APPARENTLY NATIVE DELTAIC AND ALLUVIAL DEPOSITS INCLUDING CLAYEY SANDY SILT WITH ORGANIC PLANT MATERIAL, AND POORLY GRADED SAND WITH FINE GRAVEL MATERIAL.

Water Level Depth at High Tide on 1/31/2001

Observed Hydrocarbon Impacts

USCS SOIL CLASSIFICATION

SP	POORLY–GRADED SAND
SW	WELL–GRADED SAND
GW	WELL–GRADED GRAVEL
ML	SILT
SM	SILTY SAND
CL	LEAN CLAY

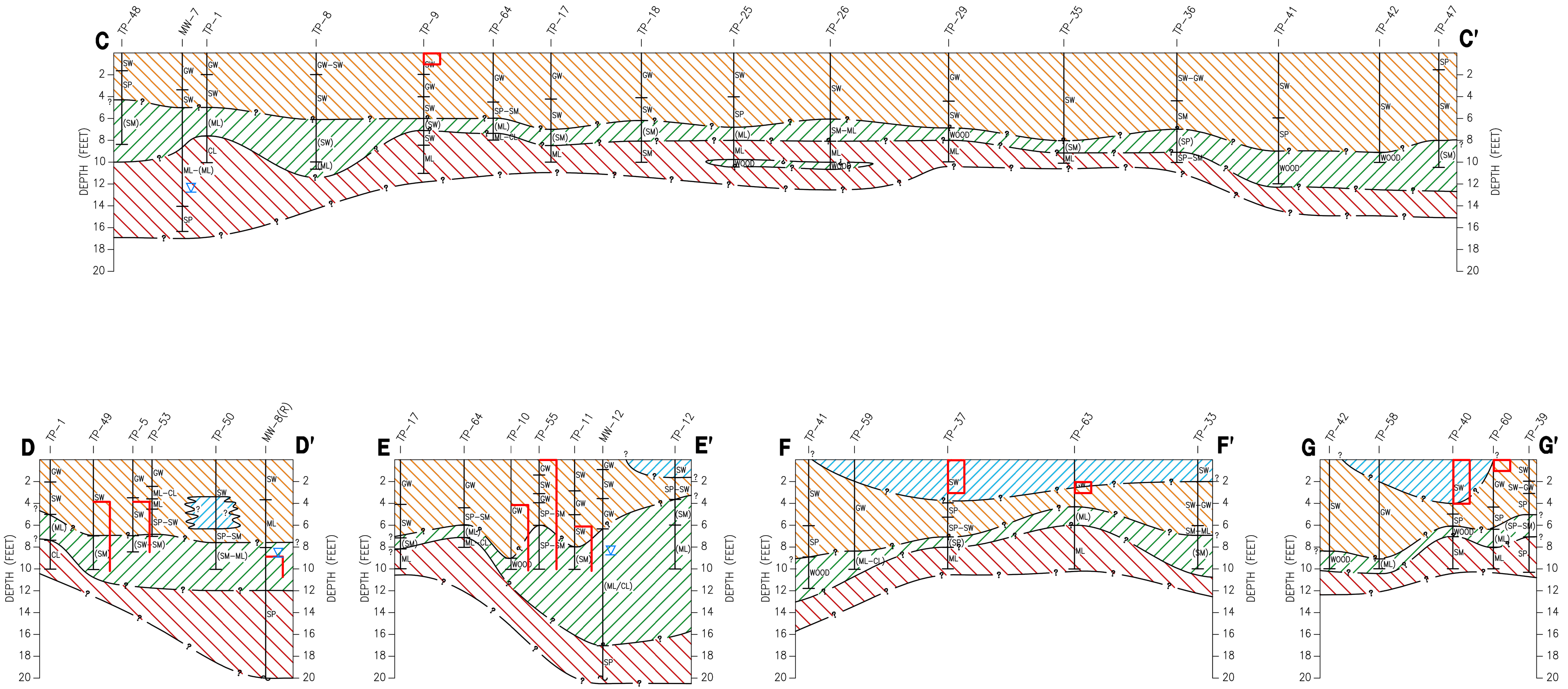
0 50 100
HORIZONTAL SCALE: 1=100

0 5 10
VERTICAL SCALE: 1=10

VERTICAL EXAGGERATION 10x

On-Property Cross Sections A-A' and B-B'
Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING | Feb-2018 | BY: PSB/SCC | FIGURE NO. 7
PROJECT NO. 160420-03 | REVISED BY: -



METAL DEBRIS FILL – ABUNDANT MIXED METAL AND OTHER DEBRIS WITH SOIL MATRIX. DEBRIS INCLUDES CABLE, WIRE, SHEET METAL, SPRINGS, MACHINE PARTS, SCRAP METAL, RUBBER, GLASS, BRICK, CONCRETE, AND OTHER MATERIAL. MATRIX MATERIAL IS TYPICALLY SAND AND GRAVEL MIXTURE.

MIXED FILL – VARIABLE FILL MATERIAL TYPICALLY INCLUDING WELL GRADED SAND AND GRAVEL, POORLY GRADED SAND, SILTY SAND AND GRAVEL, AND SOME SILT AND CLAY. COMMONLY CONTAINS SOME METAL, GLASS, BRICK, CONCRETE, AND OTHER DEBRIS.

WOOD FILL – MIXED WOOD DEBRIS INCLUDES LOGS, BOARDS, BARK, CHIPS, WOOD DUST, PLANKS, AND PILINGS. MATRIX MATERIAL INCLUDES MEDIUM TO FINE, SAND, SILT, AND CLAY MIXTURES. MATRIX CONTENT IS TYPICALLY 0–20%.

NATIVE MATERIAL – APPARENTLY NATIVE DELTAIC AND ALLUVIAL DEPOSITS INCLUDING CLAYEY SANDY SILT WITH ORGANIC PLANT MATERIAL, AND POORLY GRADED SAND WITH FINE GRAVEL MATERIAL.

Water Level Depth at High Tide on 1/31/2001

Observed Hydrocarbon Impacts

USCS SOIL CLASSIFICATION

SP	POORLY-GRADED SAND
SW	WELL-GRADED SAND
GW	WELL-GRADED GRAVEL
ML	SILT
SM	SILTY SAND
CL	LEAN CLAY

0 50 100

HORIZONTAL SCALE: 1=100

0 5 10

VERTICAL SCALE: 1=10

VERTICAL EXAGGERATION 10x

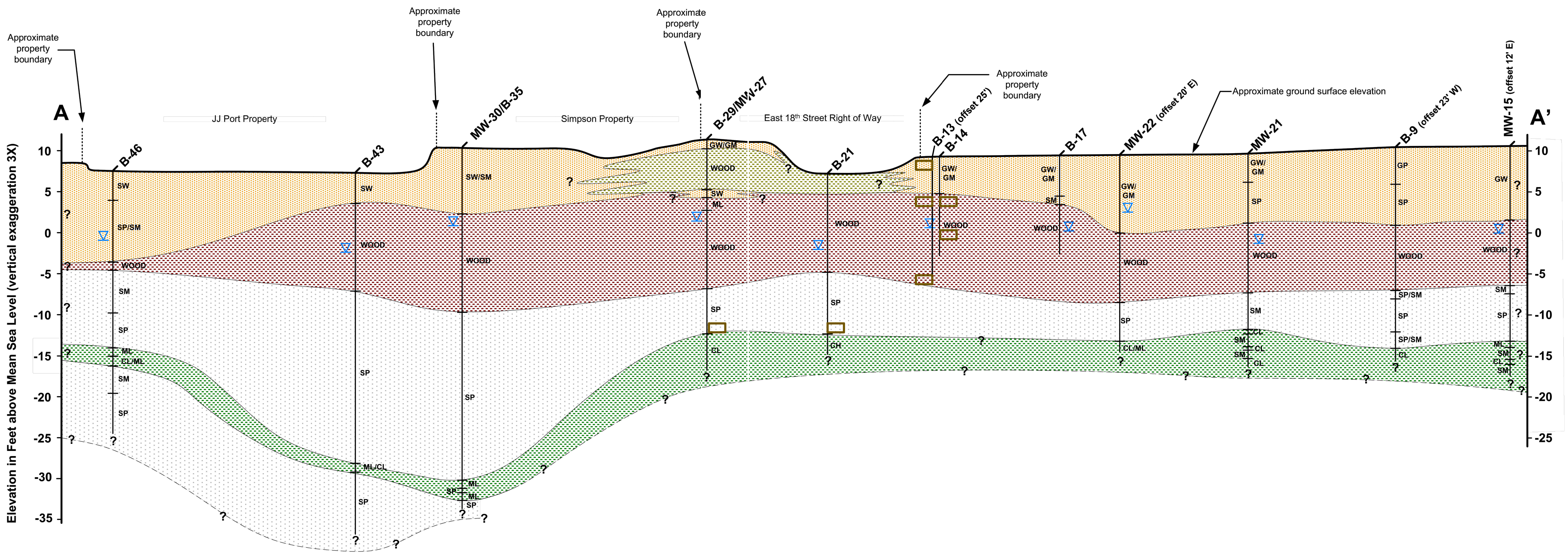
On-Property Cross Sections
C-C', D-D', E-E', F-F' and G-G'

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

Feb-2018	BY: PSB/SCC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: -	8

CAD Path: Q:\Tacoma Metals\160420 Revised Draft RI-FS\2018-02 Cross Sections\160420-CCDDEEFFGG.dwg 11x17 Landscape || Date Saved: Feb 23, 2018 3:32pm || User: scudd



LEGEND:

- Primarily gravely and sandy fill material, some silt
- Primarily woody material (wood chips with no evident matrix)
- Primarily woody material (woody material typically with sand, silt, and/or clay matrix)
- Primarily sand and silty sand material
- Primarily clay, silt, and fine sand material, typically layered
- Water Level Depth at High Tide on 1/31/2001
- Observed Hydrocarbon Impacts

NOTES:

1. All locations and depths are approximate.
2. Offset directions indicate the offset of the boring from the cross section line.

Source: Soil and Groundwater Investigation Results - Data Transmittal; October 2007-April 2008 Investigation (Kennedy/Jenks Consultants 2008)

Approximate Horizontal Scale in Feet (0, 20, 40)

Approximate Vertical Scale in Feet (0, 5, 10)

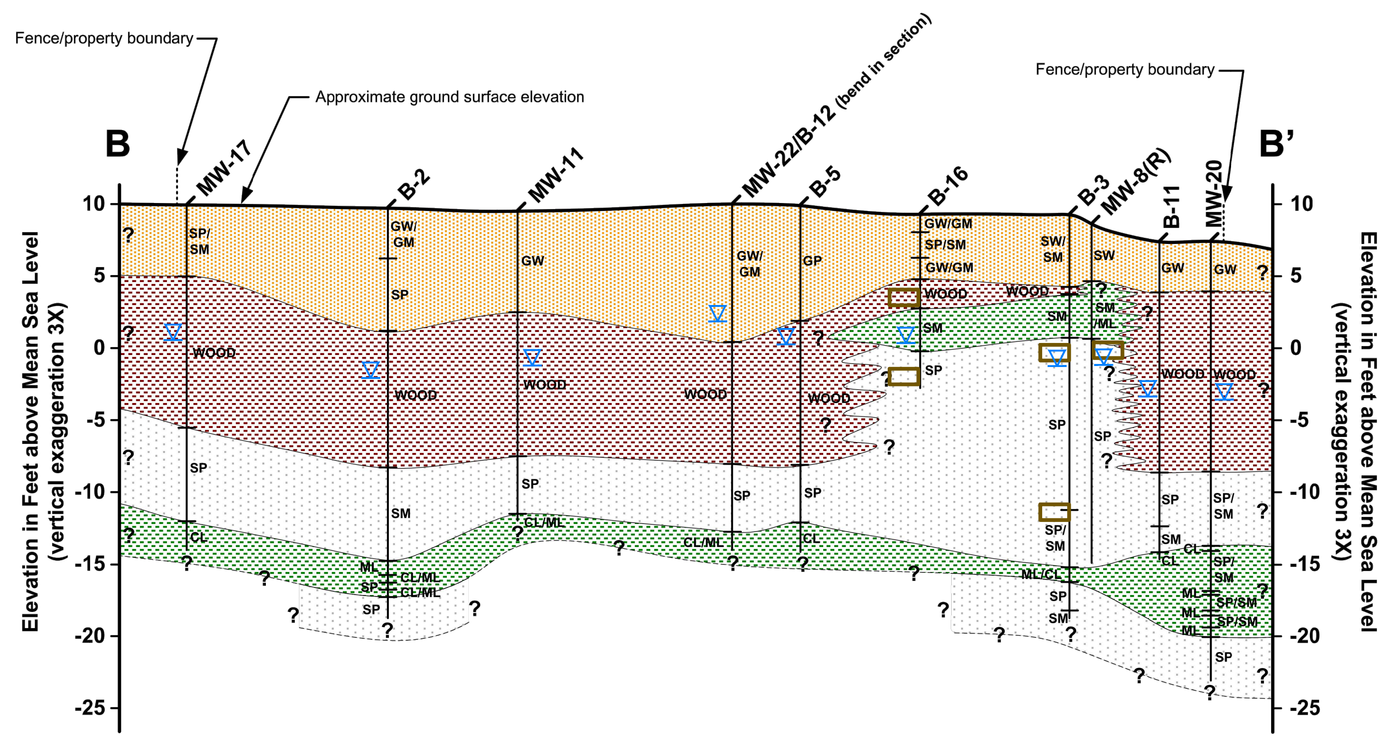
Off-Property Cross Section A-A'

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

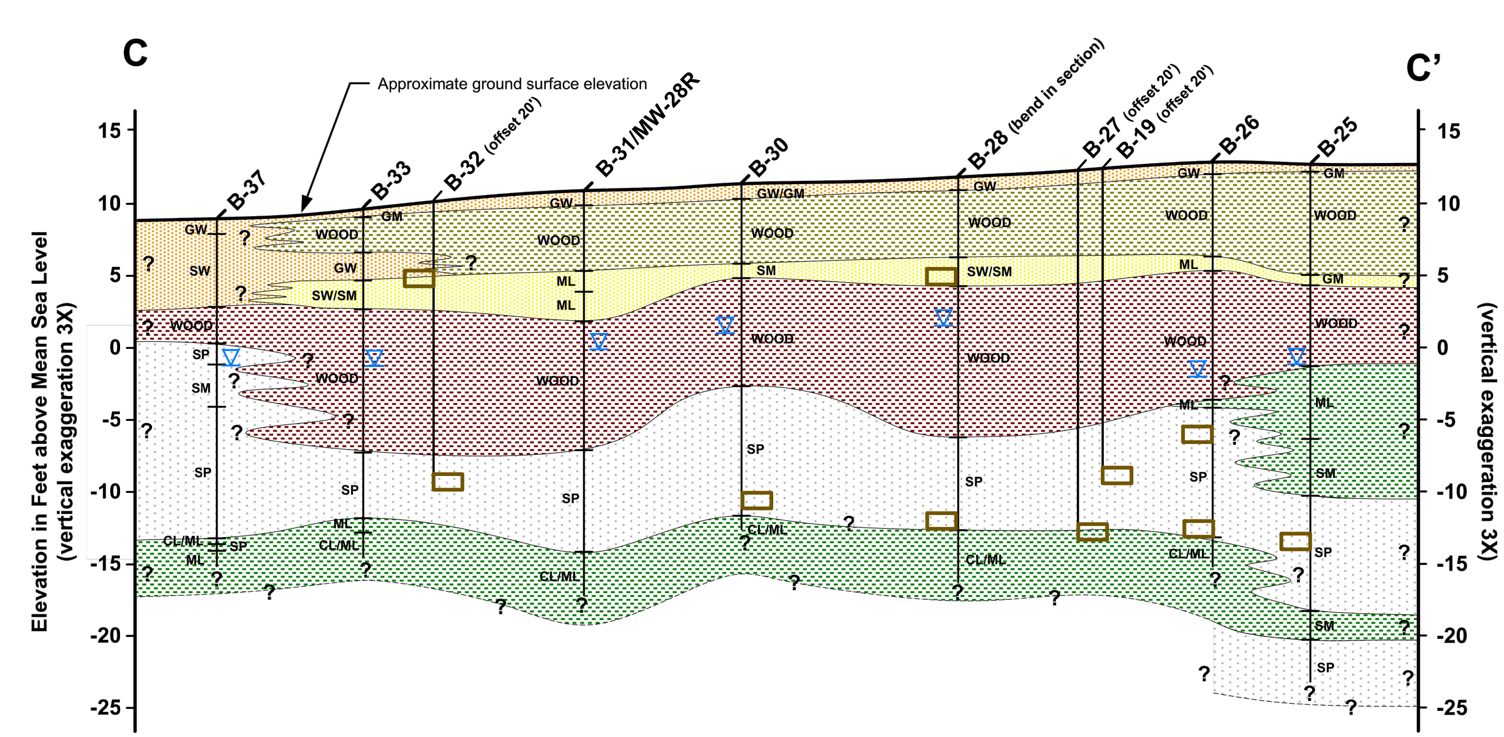
Aspect CONSULTING	Feb-2018	BY: PSB/SCC	FIGURE NO. 9
	PROJECT NO. 160420-03	REVISED BY: -	

CAD Path: Q:\Tacoma Metals\160420 Revised Draft RI-FS\2018-02 Cross Sections\160420-AA Off-Property.dwg 11x17 Landscape || Date Saved: Feb 07, 2018 1:25pm || User: scudd

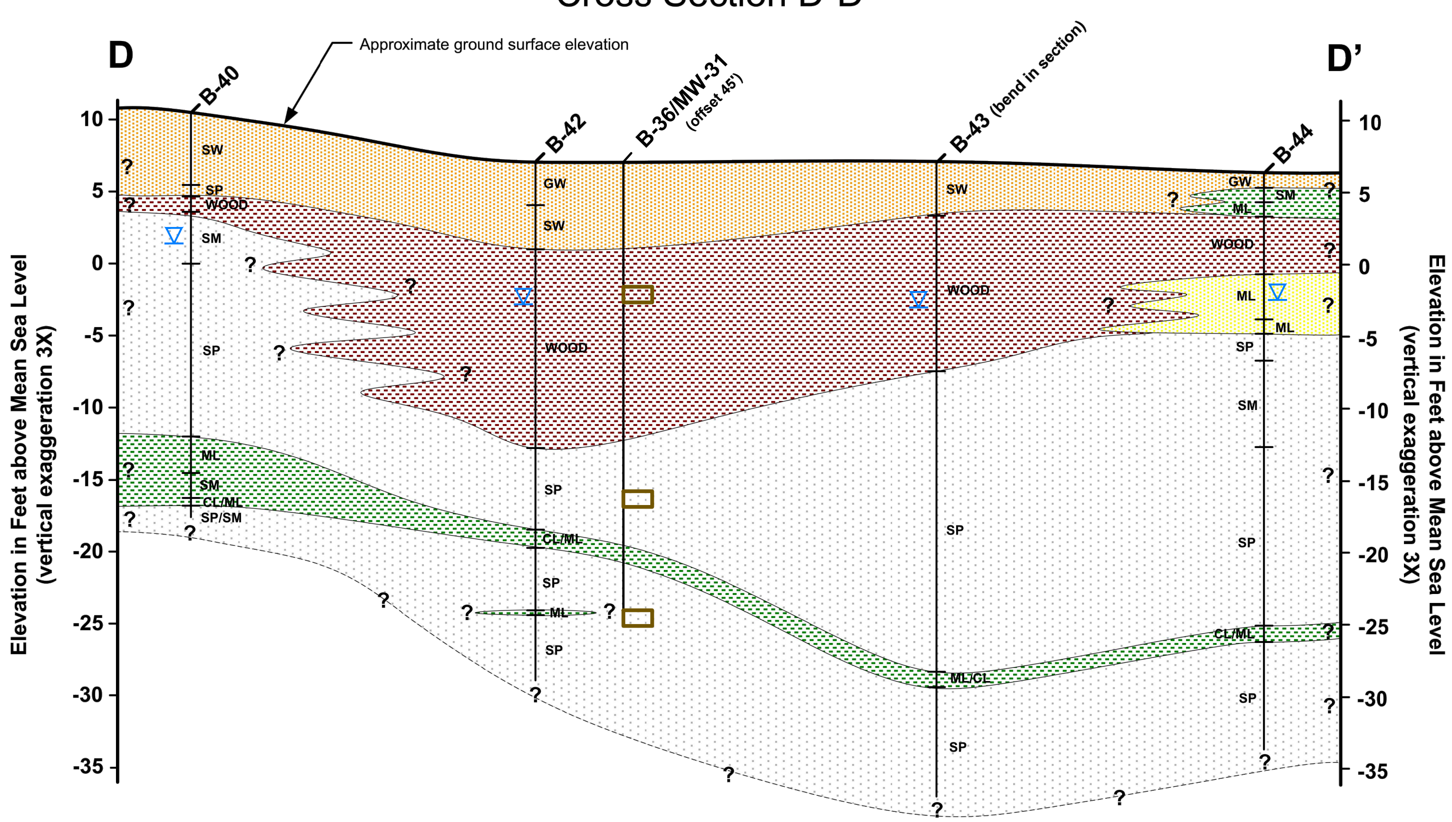
Cross Section B-B'



Cross Section C-C'



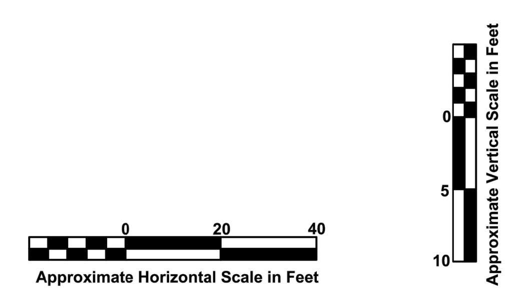
Cross Section D-D'



LEGEND:

- Primarily gravely and sandy fill material, some silt
- Primarily woody material (wood chips with no evident matrix)
- Primarily silty material mixed with sand and gravel, some woody material
- Primarily woody material (woody material typically with sand, silt, and/or clay matrix)
- Primarily sand and silty sand material
- Primarily clay, silt, and fine sand material, typically layered
- Water Level Depth at High Tide on 1/31/2001
- Observed Hydrocarbon Impacts

Note: All locations and depths are approximate.

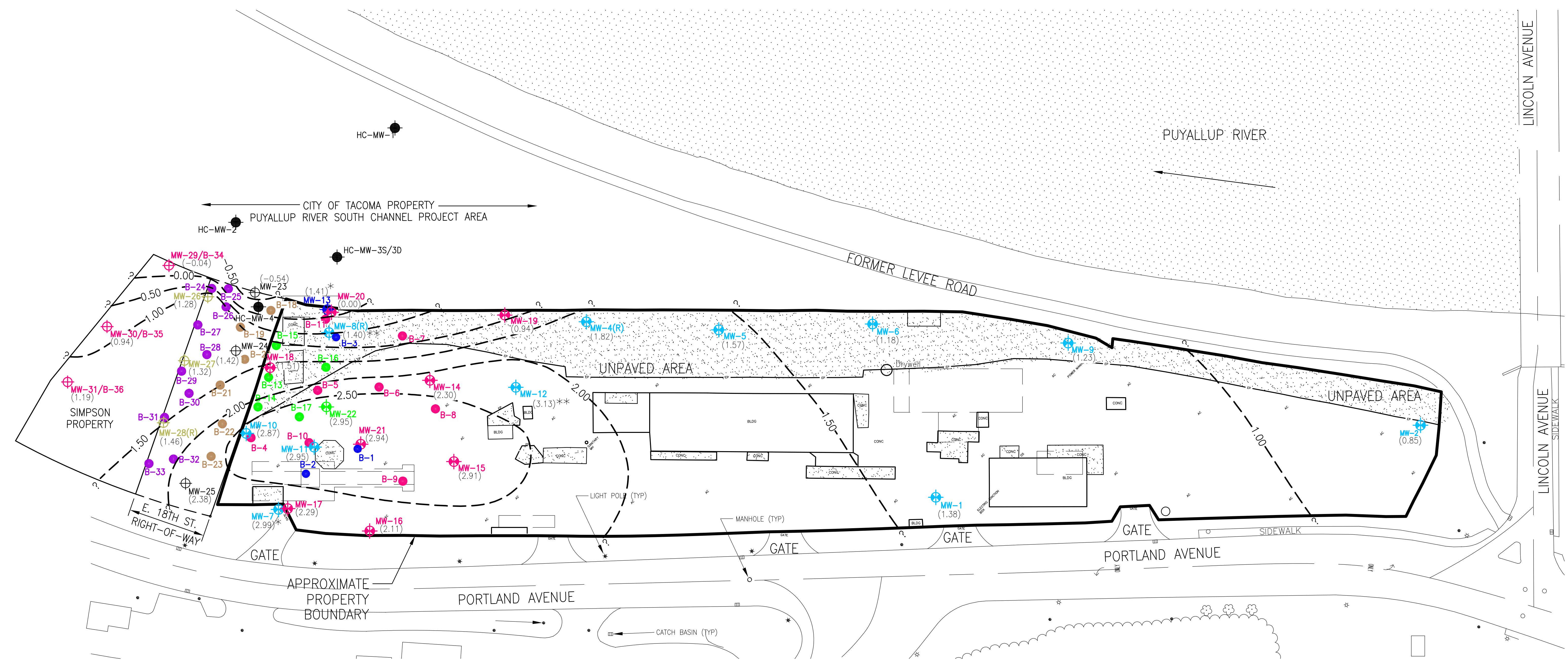


Source: Soil and Groundwater Investigation Results - Data Transmittal; October 2007-April 2008 Investigation (Kennedy/Jenks Consultants 2008)

Off-Property Cross Sections B-B', C-C' and D-D'

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	Feb-2018	BY: PSB/SCC	FIGURE NO.
	PROJECT NO. 160420-03	REVISED BY: -	10



LEGEND:

- MW-29/B-34 — OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
- MW-26 — OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
- B-24 — OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
- MW-23 — OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
- B-18 — OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
- MW-12 — MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000–2001)
- MW-13 — MONITORING WELL LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
- MW-14 — MONITORING WELL LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
- MW-22 — MONITORING WELL LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
- HC-MW-4 — FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
- B-1 — HOLLOW-STEM AUGER BORING LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
- B-4 — GEOPROBE BORING LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
- B-12 — GEOPROBE BORING LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- (1.32) — GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
- 2.50 — POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.50 FEET.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 18 APRIL 2006 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED

N

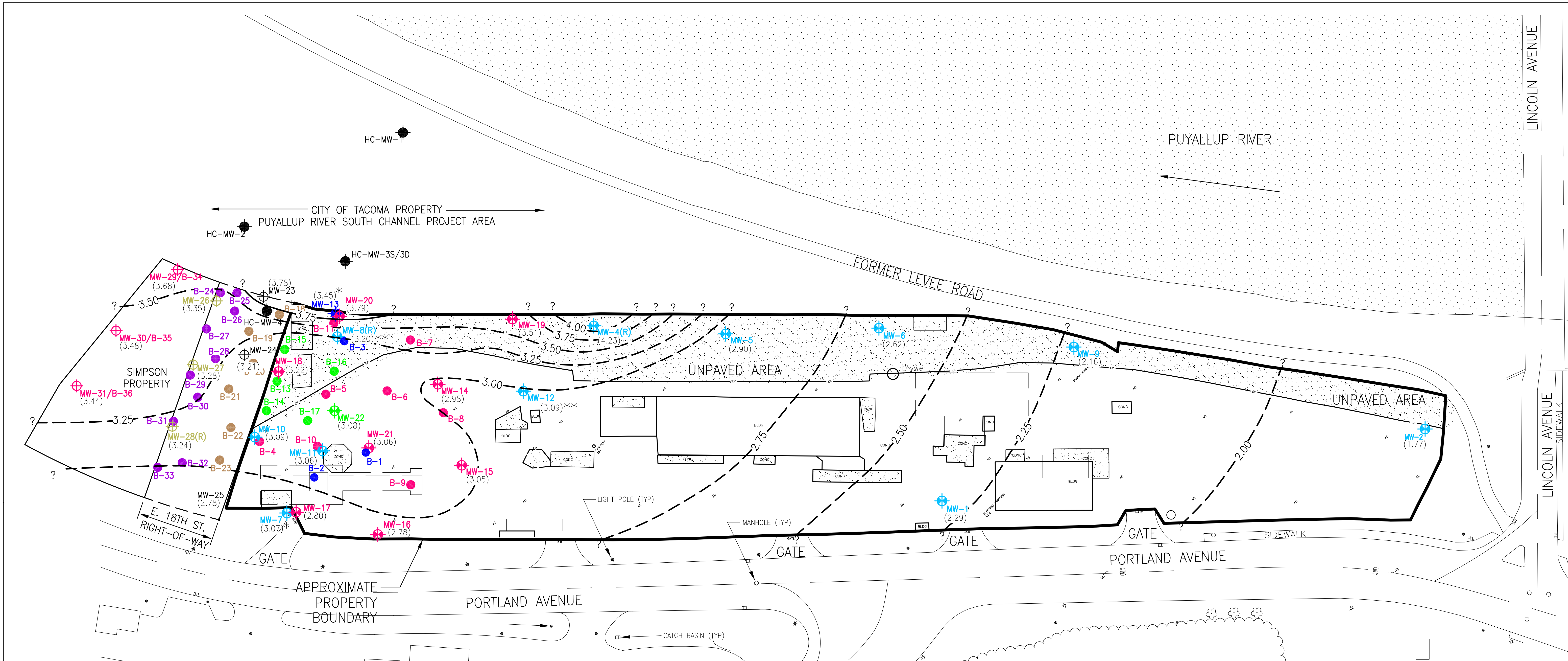
0 50 100
SCALE: 1=100

Source: Supplemental Data Summary Report (Kennedy/Jenks Consultants 2007a)

Potentiometric Surface Contour Map Low Tide – 18 April 2006

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	NOV-2017	BY: ACG / EAC	FIGURE NO.
	PROJECT NO. 160420-03	REVISED BY: - - -	**11A**



LEGEND:

MW-29/B-34	OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
MW-26	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
B-24	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
MW-23	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
B-18	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
MW-12	MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000-2001)
MW-13	MONITORING WELL LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
MW-14	MONITORING WELL LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
MW-22	MONITORING WELL LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
HC-MW-4	FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
B-1	HOLLOW-STEM AUGER BORING LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
B-4	GEOPROBE BORING LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
B-12	GEOPROBE BORING LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(2.29)	GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
2.25	POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.25 FEET.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 18 APRIL 2006 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED

N

0 50 100

SCALE: 1=100

Source: Supplemental Data Summary Report (Kennedy/Jenks Consultants 2007a)

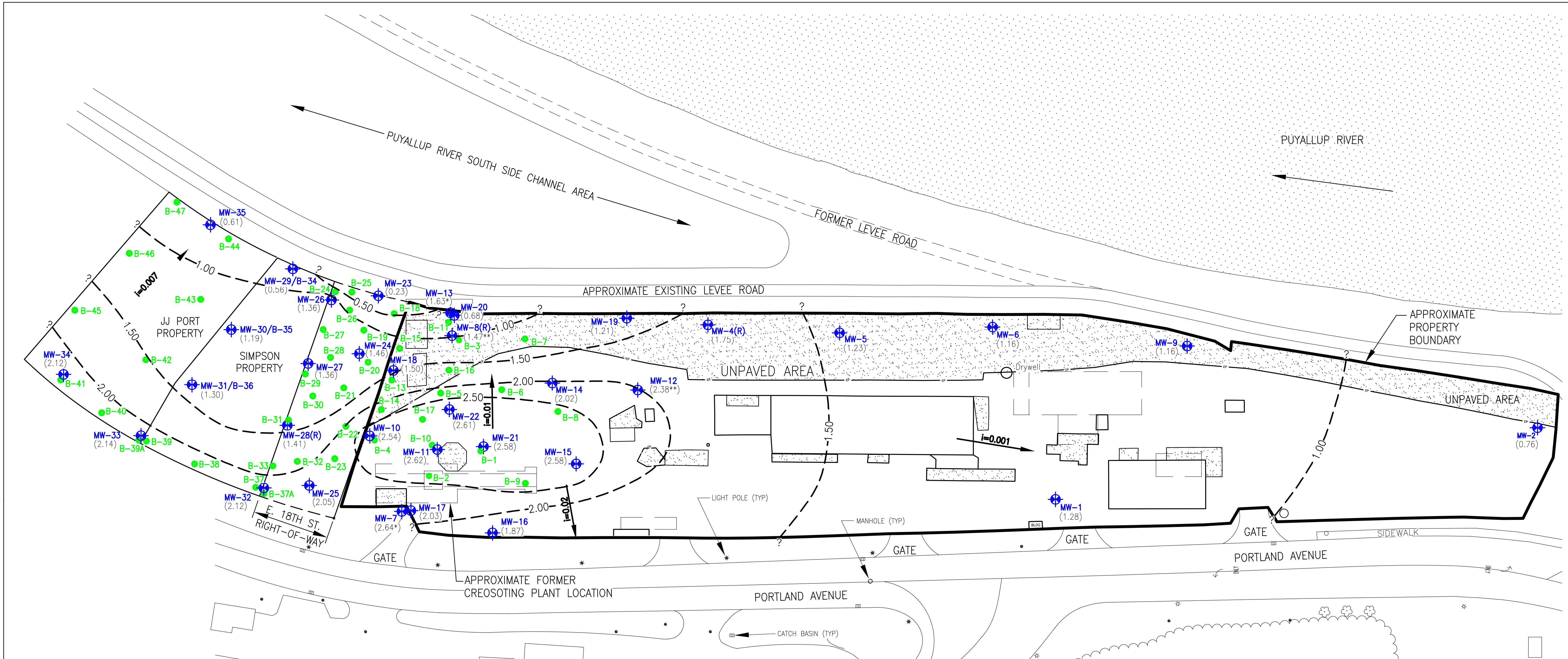
Potentiometric Surface Contour Map High Tide – 18 April 2006

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

NOV-2017	BY: ACG / EAC		FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: ---		11B

GIS Path: T:\projects_8\Sussman_160420\Delivered\RevisedDraftRI\11B Potentiometric Surface Contour Map High Tide - 18 April 2006_Template.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 11/14/2017 || User: ecrumbaker || Print Date: 11/14/2017



LEGEND:

B-1	SOIL BORING LOCATION
MW-26	MONITORING WELL LOCATION
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(1.32)	GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
2.50	POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.50 FEET.
i=0.004	APPROXIMATE GROUNDWATER GRADIENT DIRECTION AND MAGINTUDE (FEET PER FOOT)

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 11 APRIL 2008 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON THE PRESENCE OF LNAPL.

Source: Soil and Groundwater Investigation Results – Data Transmittal; October 2007-April 2008 Investigation (Kennedy/Jenks Consultants 2008)

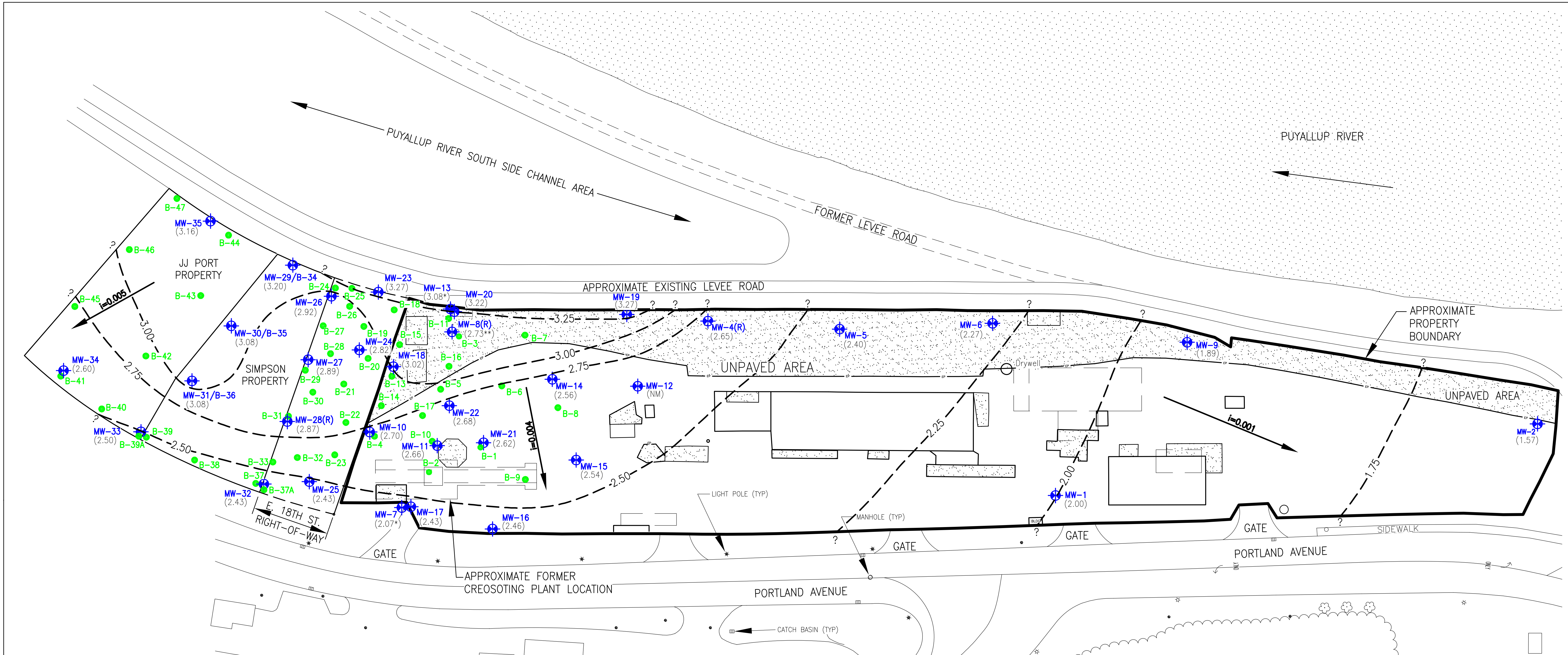
Potentiometric Surface Contour Map
Low Tide – 11 April 2008

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

NOV-2017	BY: ACG / EAC	FIGURE NO.	
PROJECT NO. 160420-03	REVISED BY: - - -	11C	

GIS Path: T:\projects_8\Sussman_160420\Delivered\RevisedDraftRI\11C Potentiometric Surface Contour Map Low Tide - 11 April 2008_Template.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 11/14/2017 || User: ecrumbaker || Print Date: 11/14/2017



LEGEND:

- B-1 SOIL BORING LOCATION
- MW-26 MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- (1.32) GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
- 2.50 POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.25 FEET.
- i=0.004 APPROXIMATE GROUNDWATER GRADIENT DIRECTION AND MAGINTUDE (FEET PER FOOT)

NOTES:

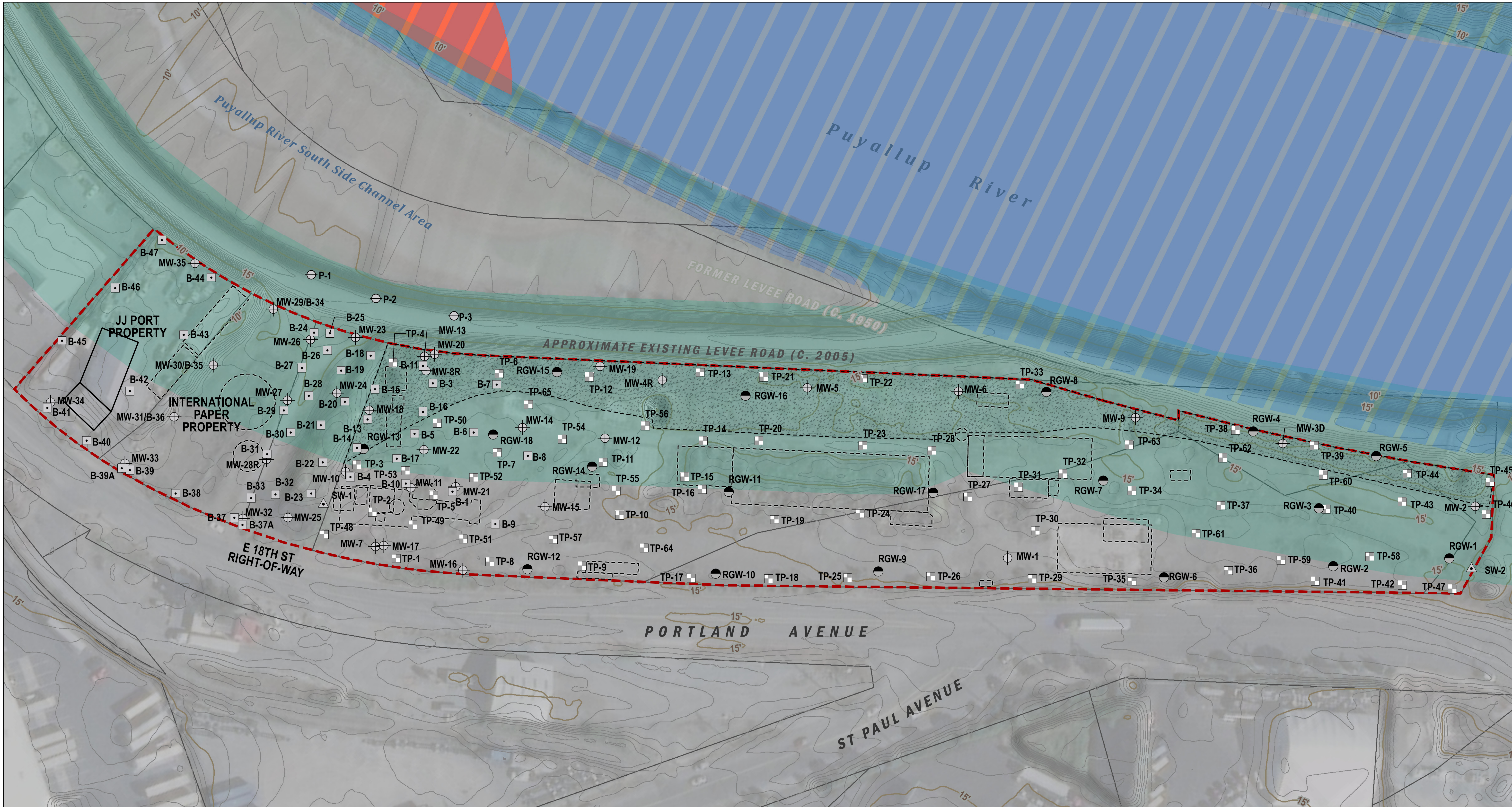
1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 11 APRIL 2008 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON THE PRESENCE OF LNAPL.
6. NM INDICATES THAT THE WATER LEVEL WAS NOT MEASURED.

Source: Soil and Groundwater Investigation Results – Data Transmittal; October 2007-April 2008 Investigation (Kennedy/Jenks Consultants 2008)

Potentiometric Surface Contour Map High Tide – 11 April 2008

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	NOV-2017 PROJECT NO. 160420-03	BY: ACG / EAC REVISED BY: ---	FIGURE NO. 11D



Land Use Designation of Shoreline (City of Tacoma)
Erosion Hazard Areas
Regulated Floodplain
5-ft LiDAR Contour (Pierce County, 2010)
0.5-ft LiDAR Contour (Pierce County, 2010)
Monitoring Well
Piezometer
Reconnaissance Groundwater Sample
Soil Boring
Surface Water
Test Pit
Historic Structure
Historic Unpaved Area
Existing Structure
Site Boundary
Pierce County Parcels

0 100 200
Feet

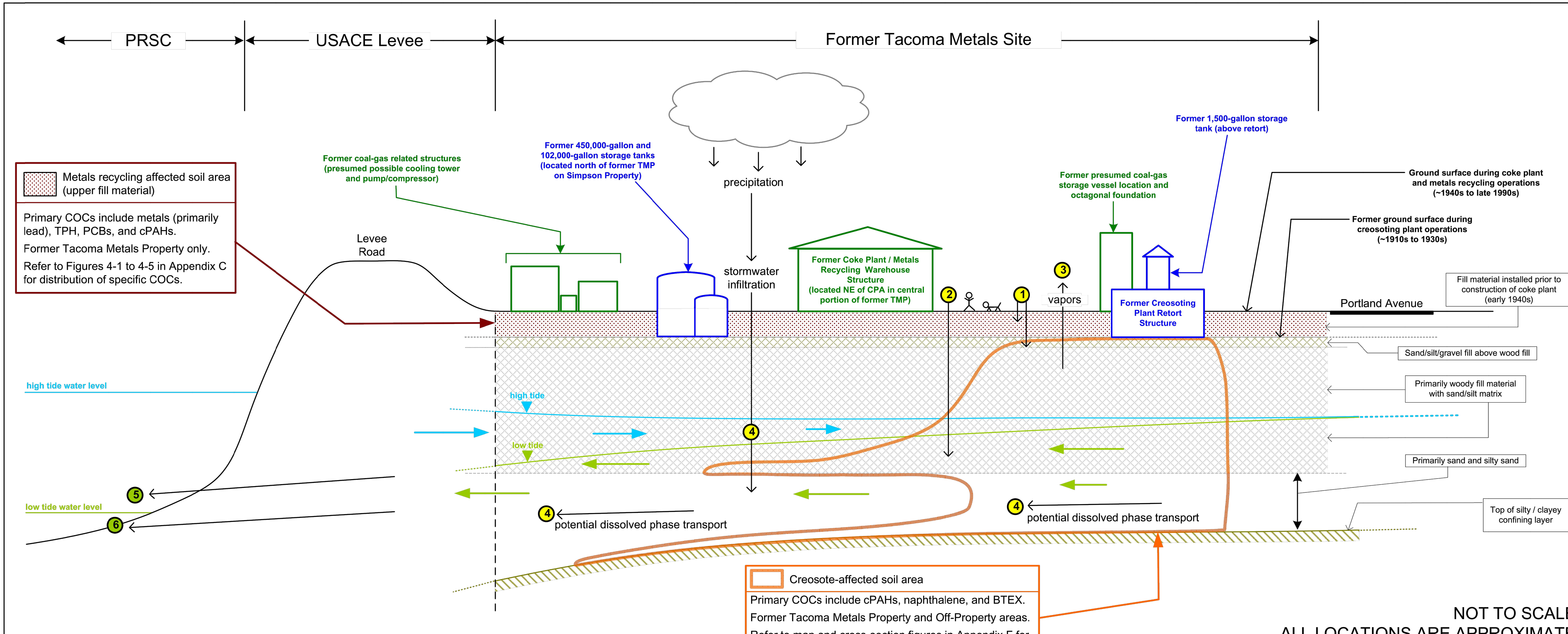
Site Topography

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING	FEB-2018	BY: ACG / EAC	FIGURE NO.
	PROJECT NO. 160420-03	REVISED BY: ACG	12

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Delivered\Draft\FinalRI\12 Site Topography.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 2/27/2018 || User: ecumbaker || Print Date: 2/27/2018



Source: Tacoma Metals Revised Augmented RI-FS, Kennedy/Jenks Consultants 2014.

Summary of Potential Exposure Pathways

	Potential Pathway	Potential Receptors	Exposure Scenarios
1	Direct Contact Soil	Workers, Ecological Receptors	Possible direct contact/ingestion by workers doing invasive work; direct contact/ ingestion by wildlife.
2	Direct Contact Groundwater	Workers	Possible direct contact by workers doing invasive work; ingestion pathway incomplete because shallow groundwater is not a potable water source.
3	Vapor Inhalation	Workers	Possible inhalation by workers; vapor migration upward through unpaved surfaces and possibly through building foudations/slabs.
4	Soil to Groundwater Leaching	Aquatic Organisms in PRSC	Infiltration of stormwater through unpaved site surfaces; transport toward PRSC. Infiltration pathway will be eliminated by cleanup action.
5	Groundwater to Surface Water	Aquatic Organisms in PRSC	Incomplete Pathway. Groundwater discharge to surface water in PRSC; possible ingestion by aquatic organisms; possible ingestion or aquatic organisms by recreational users.
6	Groundwater to Sediment	Aquatic Organisms in PRSC	Incomplete Pathway. Groundwater discharge through to sediment in PRSC; possible ingestion by aquatic organisms; possible ingestion by aquatic organisms; possible ingestion or aquatic organisms by recreational users.

Legend:

- Shallow groundwater gradient (high tide)
- Shallow groundwater gradient (low tide)
- Shallow groundwater potentiometric surface (high tide)
- Shallow groundwater potentiometric surface (low tide)
- 1 Potential exposure pathways (complete) (summarized in table)
- 5 Potential exposure pathways (incomplete) (summarized in table)
- Former creosoting plant features (generalized approximate locations)
- Former coke plant and coal gas features (generalized approximate locations)

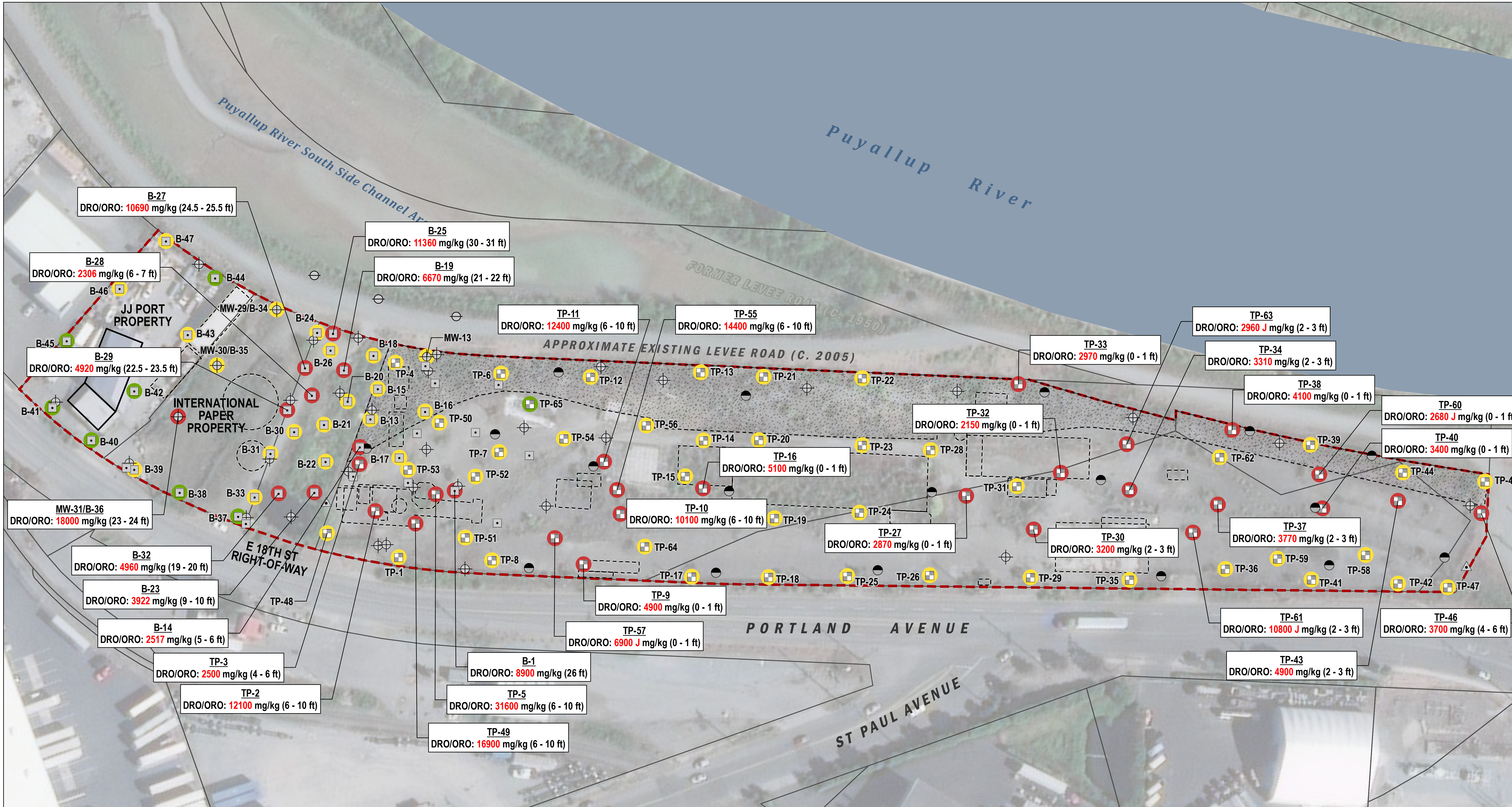
Acronyms:

BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes
COCs – Contaminants of Concern
CPA – Creosoting Plant Area
cPAHs – Carcinogenic Polycylclic Aromatic Hydrocarbons
PCBs – Polychlorinated Biphenyls
PRSC – Puyallup River Side Channel
TMP – Tacoma Metals Property
TPH – Total Petroleum Hydrocarbons
USACE – United States Army Corps of Engineers

Generalized Conceptual Site Model
Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

Feb-2018	BY: PSB/SCC	FIGURE NO.	13
PROJECT NO. 160420-03	REVISED BY: -		



Location Name

B-1
DRO/ORO: 8900 mg/kg (26 ft)

Result

Depth

Monitoring Well

Piezometer

Reconnaissance Groundwater Sample

Soil Boring

Surface Water

Test Pit

TPH DRO/ORO Not Detected.

TPH DRO/ORO Detected at Concentrations Less than the Cleanup Level.

TPH DRO/ORO Detected at Concentrations Greater than the Cleanup Level.

Historic Structure

Historic Unpaved Area

Existing Structure

Site Boundary

Pierce County Parcels

0 100 200

Feet

Note: Only results that exceed cleanup levels are shown. The result posted is from the sample depth where the maximum concentration was observed.

Extent of TPH Exceedances in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: ACG	14A

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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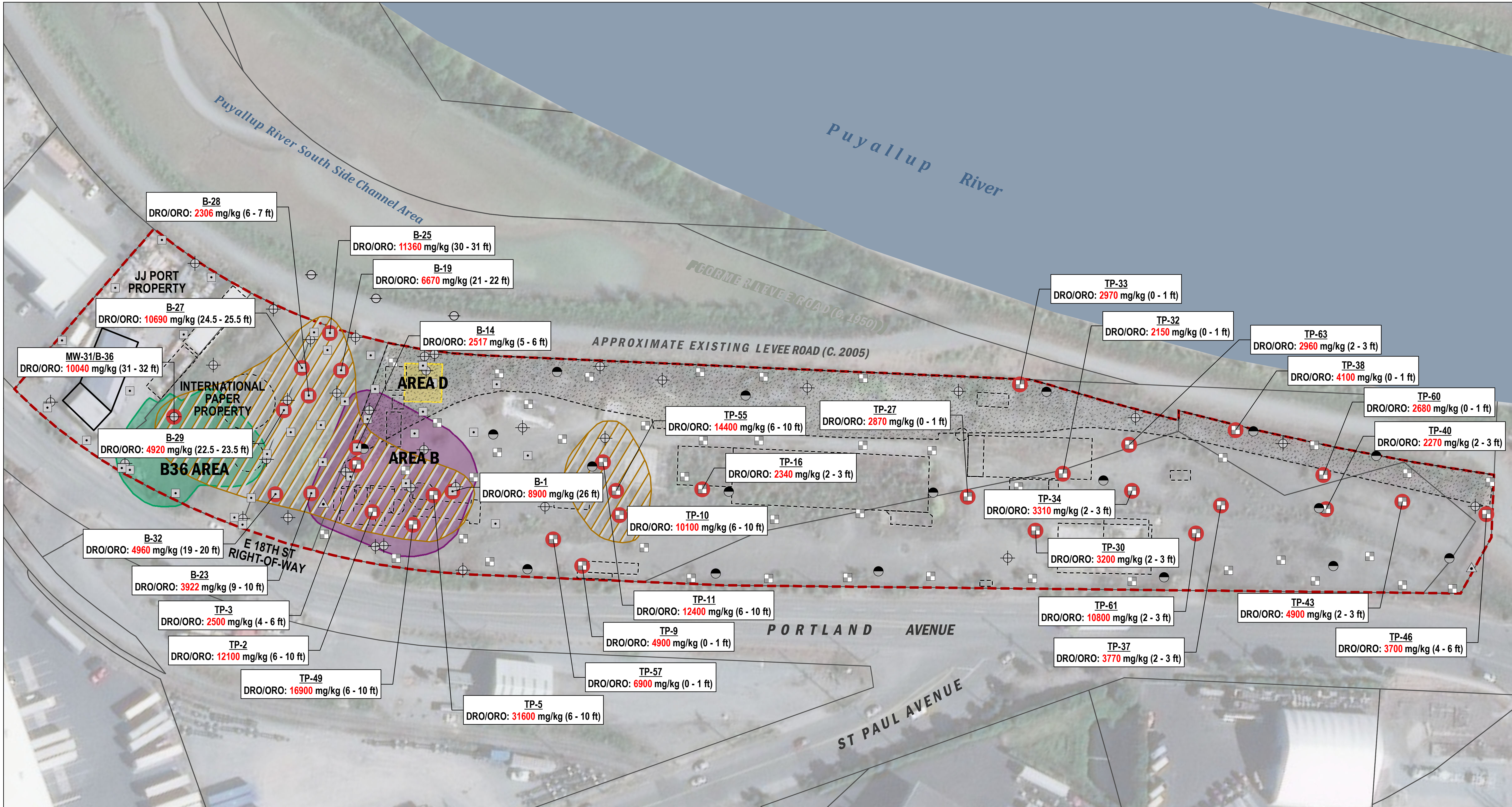


Location Name
TP-5
DRO/ORO: 31600 mg/kg (6 - 10 ft)
Result
Maximum Depth

Note: The result posted is from maximum sample depth that exceeded proposed cleanup levels.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- TPH DRO/ORO Detected at Concentrations Greater than the Cleanup Level.
- TPH DRO/ORO Extent at or Below Water Table
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels

Interim Action Areas (AECOM, 2017)

- Area B In Situ Solidification
- Area D In Situ Solidification
- B36 Area In Situ Solidification

0 100 200
Feet

Source: AECOM. Final Interim Action Work Plan In Situ Soil Solidification. November 17, 2017.

Depth of TPH Exceedances in Soil

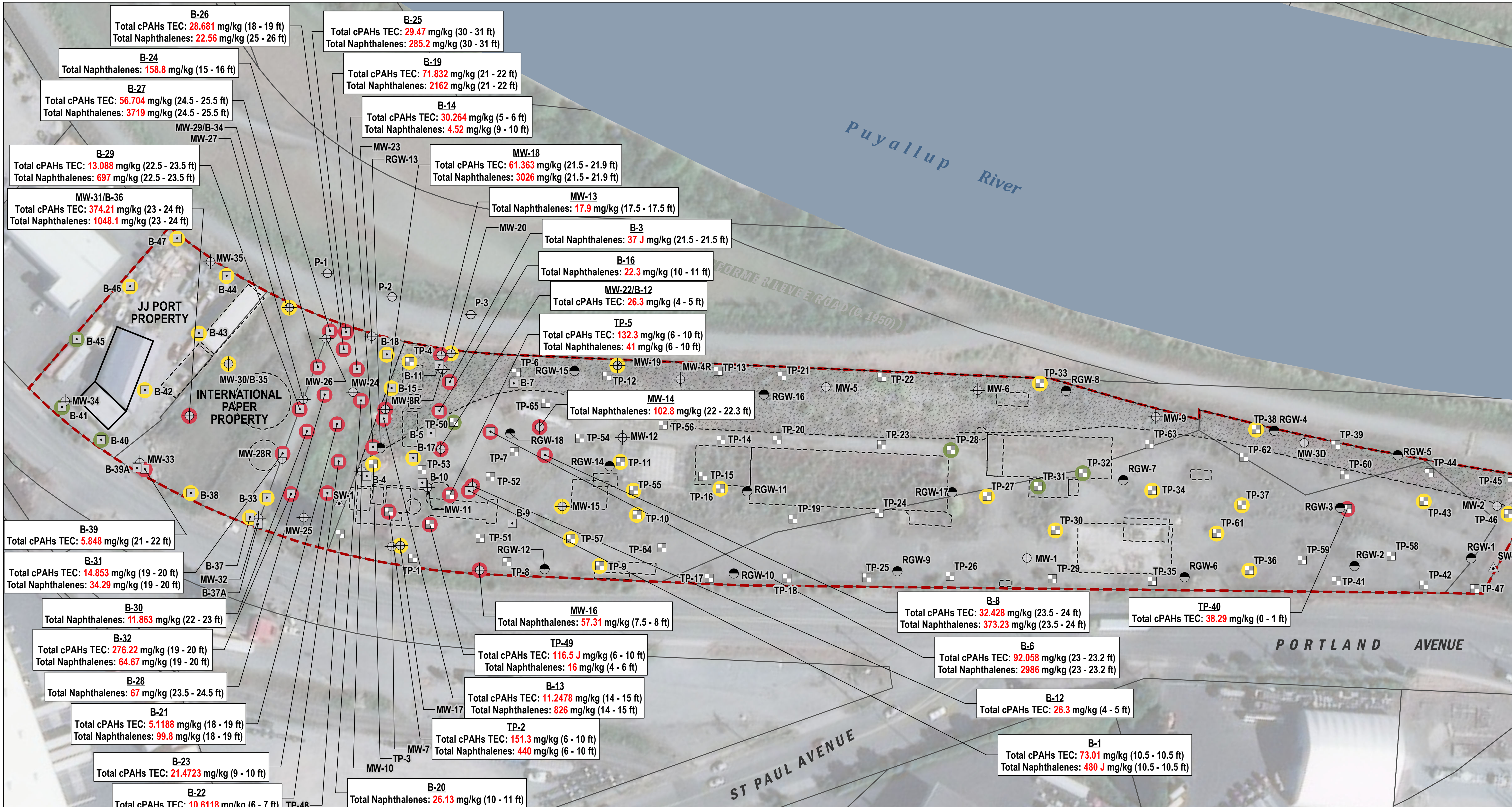
Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

MAY-2018	BY: ACG / EAC	FIGURE NO.	
PROJECT NO. 160420-03	REVISED BY: ACG	14B	

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Delivered\FinalRI\14B Depth of TPH Exceedances in Soil.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 5/25/2018 || User: ecrumbaker || Print Date: 5/25/2018



Location Name

B-23
Total cPAHs TEQ: 21.5 mg/kg (9 - 10 ft)

Result

Depth

Note: Only results that exceed cleanup levels are shown. The result posted is from the sample depth where the maximum concentration was observed.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Total cPAHs and Naphthalene Not Detected.
- Total cPAHs and Naphthalene Detected at Concentrations Less than the Cleanup Level.
- Total cPAHs and/or Naphthalene Detected at Concentrations Greater than the Cleanup Level.
- Historic Unpaved Area
- Historic Structure
- Existing Structure
- Site Boundary
- Pierce County Parcels

0 100 200

Feet

Extent of Total cPAHs and Naphthalene Exceedances in Soil

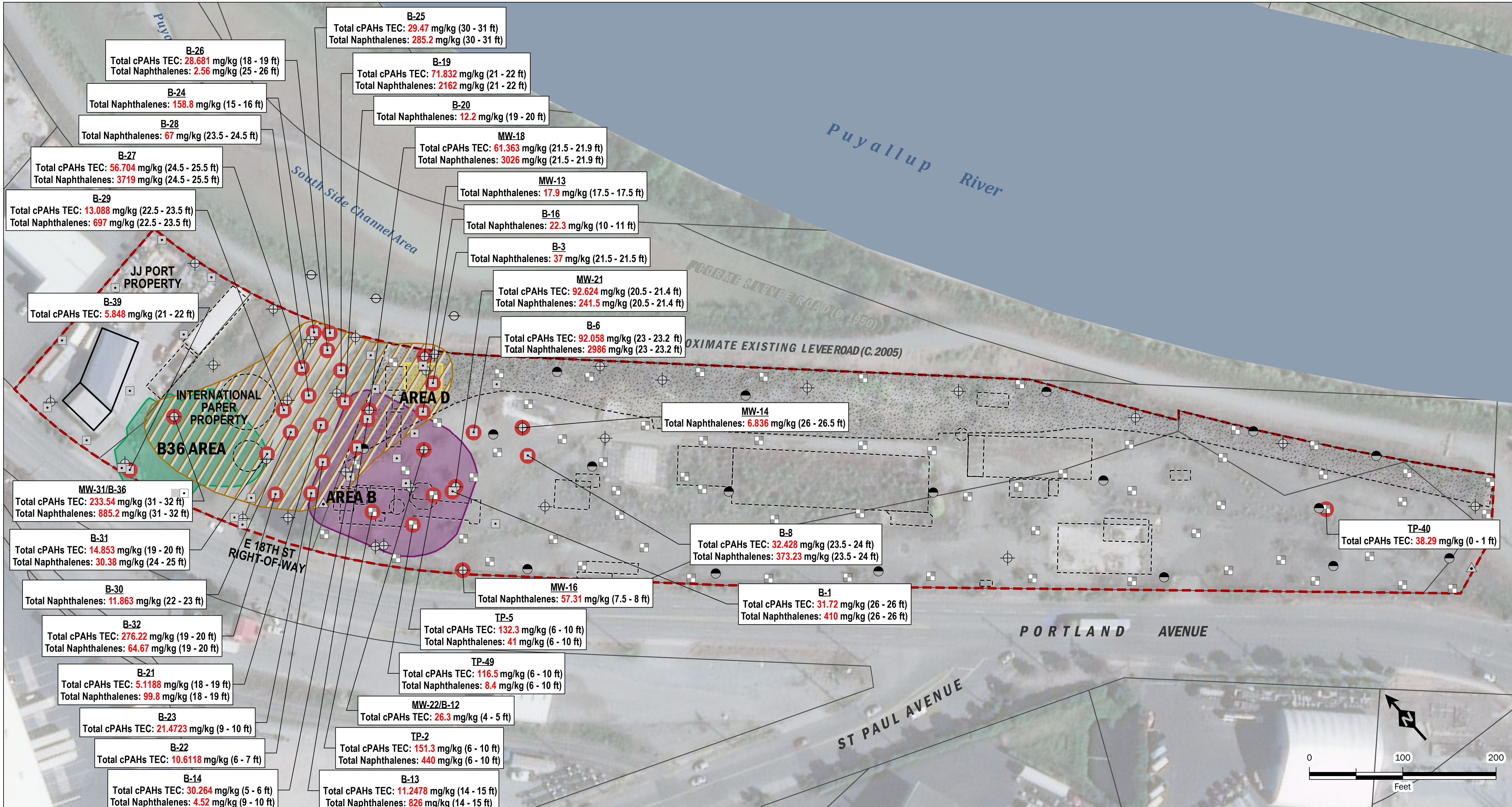
Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

MAY-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: RAP	15A

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Deliverables\FinalRI\15A Extent of Total cPAHs and Naphthalene Exceedances in Soil.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 5/30/2018 || User: ecurnbaker || Print Date: 5/30/2018



Location Name

B-21
Total Naphthalenes: 99.8 mg/kg (18 - 19 ft)

Result

Maximum Depth

Note: The result posted is from maximum sample depth that exceeded proposed cleanup levels.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Total cPAHs and Naphthalene Detected at Concentrations Greater than the Cleanup Level.
- Total cPAHs and Naphthalene Extent at or Below Water Table
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels

Interim Action Areas (AECOM, 2017)

- Area B In Situ Solidification
- Area D In Situ Solidification
- B36 Area In Situ Solidification

Source: AECOM. Final Interim Action Work Plan In Situ Soil Solidification. November 17, 2017.

Depth of Total cPAHs and Naphthalene Exceedances in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

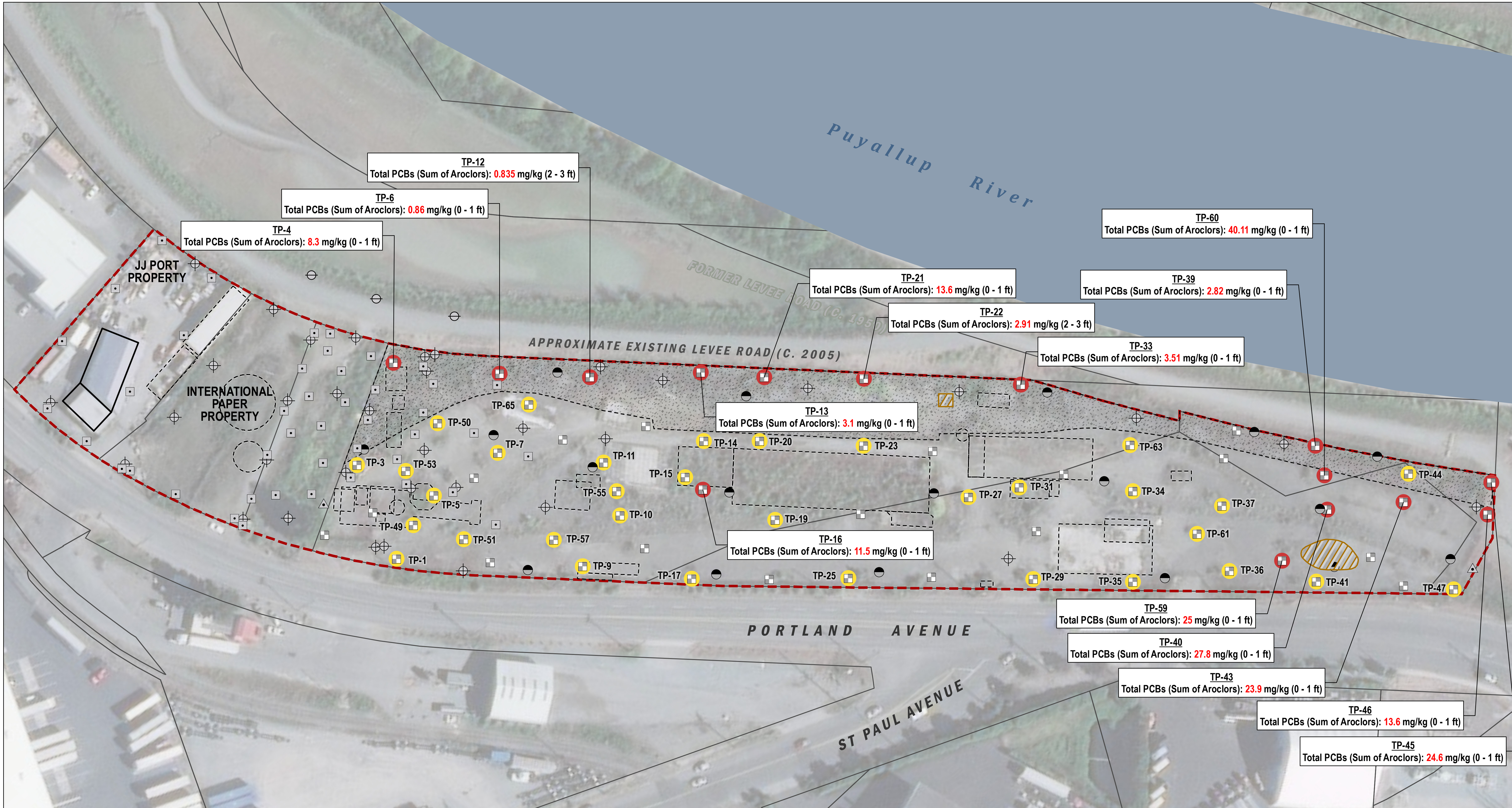
Aspect CONSULTING

JUN-2018	BY: ACG / EAC	FIGURE NO.	15B
PROJECT NO. 160420-03	REVISED BY: RAP		

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Delivered\FinalRI\15B Depth of Total cPAHs and Naphthalene Exceedances in Soil.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 6/6/2018 || User: ecrumbaker || Print Date: 6/6/2018

P



GIS Path: T:\projects_8\Sussman_160420\Delivered\DraftFinalRI\16A Extent of Total PCBs in Soil.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 2/27/2018 || User: ecrumbaker || Print Date: 2/27/2018

Location Name
TP-12
Total PCBs (Sum of Aroclors):
0.835 mg/kg (2 - 3 ft)
Result
Depth

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Total PCBs Detected at Concentrations Less than the Cleanup Level.
- Total PCBs Detected at Concentrations Greater than the Cleanup Level.
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels
- 1989 Cleanup Extent

Note: Only results that exceed cleanup levels are shown. The result posted is from the sample depth where the maximum concentration was observed.

0 100 200
Feet

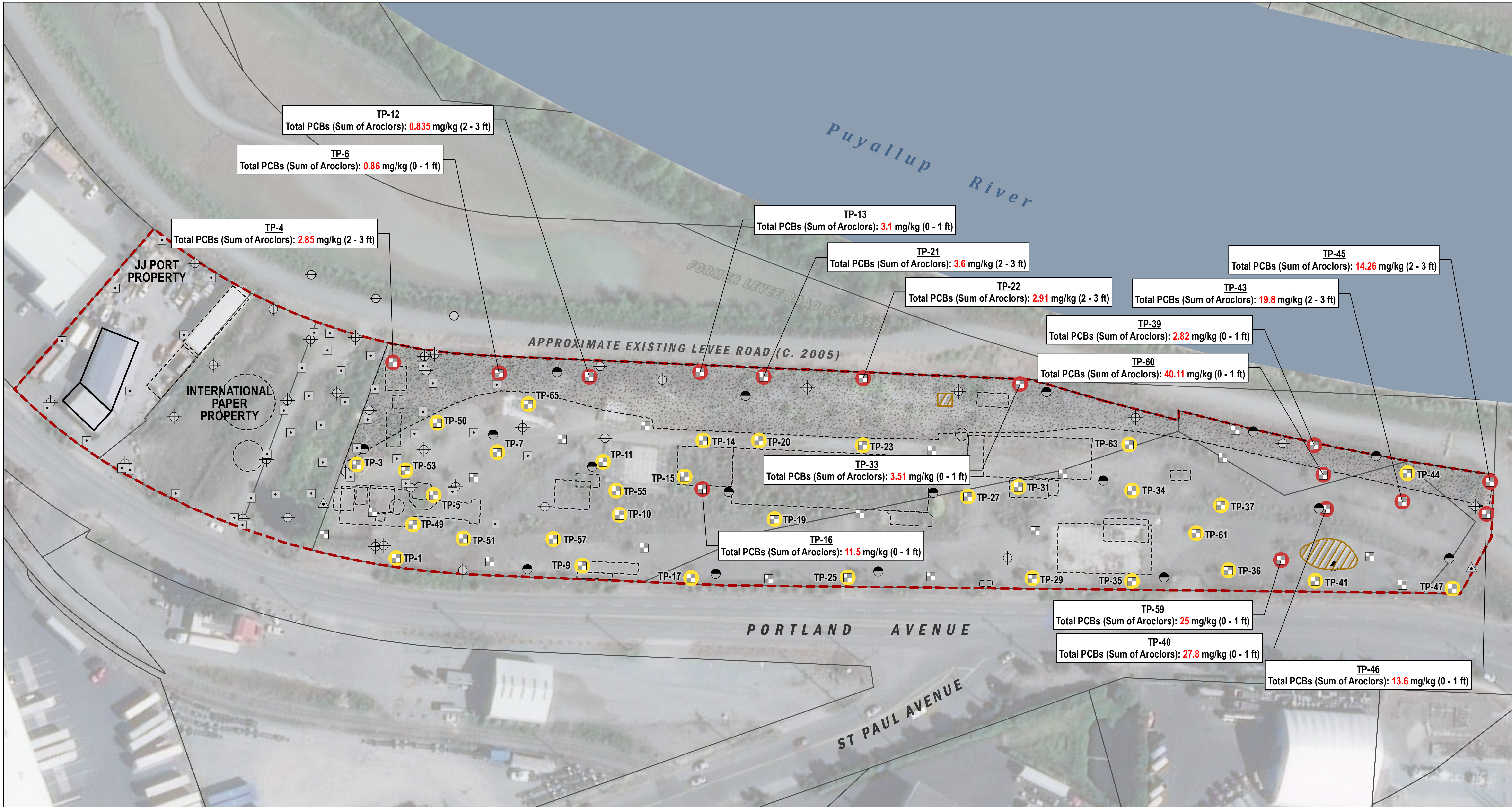
Extent of Total PCBs in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: ACG	16A

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



GIS Path: T:\projects_8\Sussman_160420\Delivered\DraftFinalRI\16B Depth of Total PCBs in Soil.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 2/27/2018 || User: ecrumbaker || Print Date: 2/27/2018

Location Name

TP-12
Total PCBs (Sum of Aroclors):
0.835 mg/kg (2 - 3 ft)

Result

Depth

Note: The result posted is from maximum sample depth that exceeded proposed cleanup levels.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Total PCBs Detected at Concentrations Less than the Cleanup Level.
- Total PCBs Detected at Concentrations Greater than the Cleanup Level.
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels
- 1989 Cleanup Extent

0 100 200

Feet

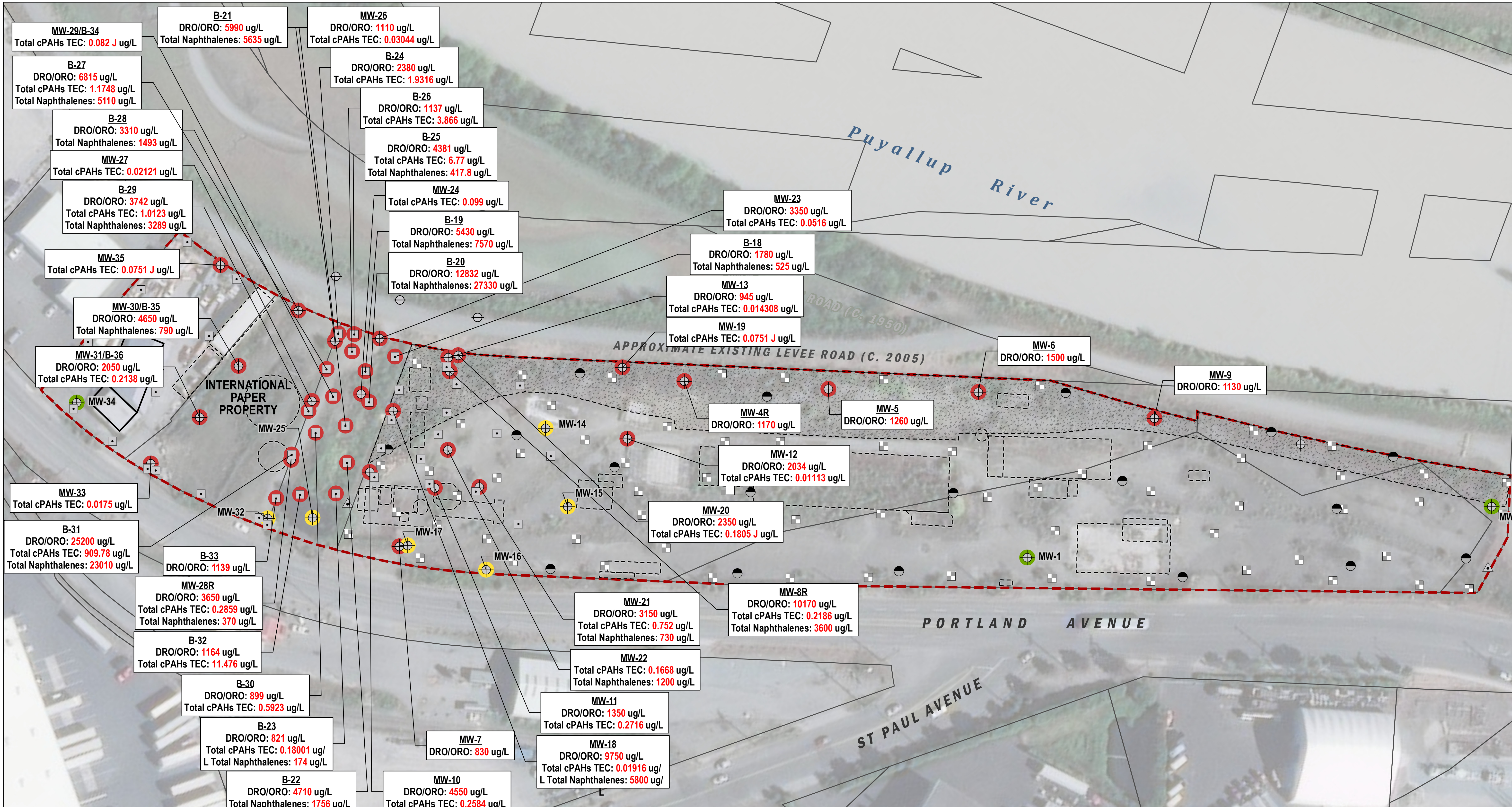
Depth of Total PCBs Exceedences in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: ACG	16B

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Location Name

MW-33
Total cPAHs TEC: 0.0175 ug/L

Result

Note: Only results that exceed cleanup levels are shown. The result posted is from the sample depth where the maximum concentration was observed.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- TPH DRO/ORO, Total cPAHs, Napthalene, and cPAHs Not Detected.
- TPH DRO/ORO, Total cPAHs, Napthalene, and/or cPAHs Detected at Concentrations Less than the Cleanup Level.
- TPH DRO/ORO, Total cPAHs, Napthalene, and/or cPAHs Detected at Concentrations Greater than the Cleanup Level.
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels

0 100 200
Feet

Extent of TPH, Napthalene and cPAHs in Groundwater

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING | FEB-2018 | BY: ACG / EAC | FIGURE NO. 17
PROJECT NO. 160420-03 | REVISED BY: RAP

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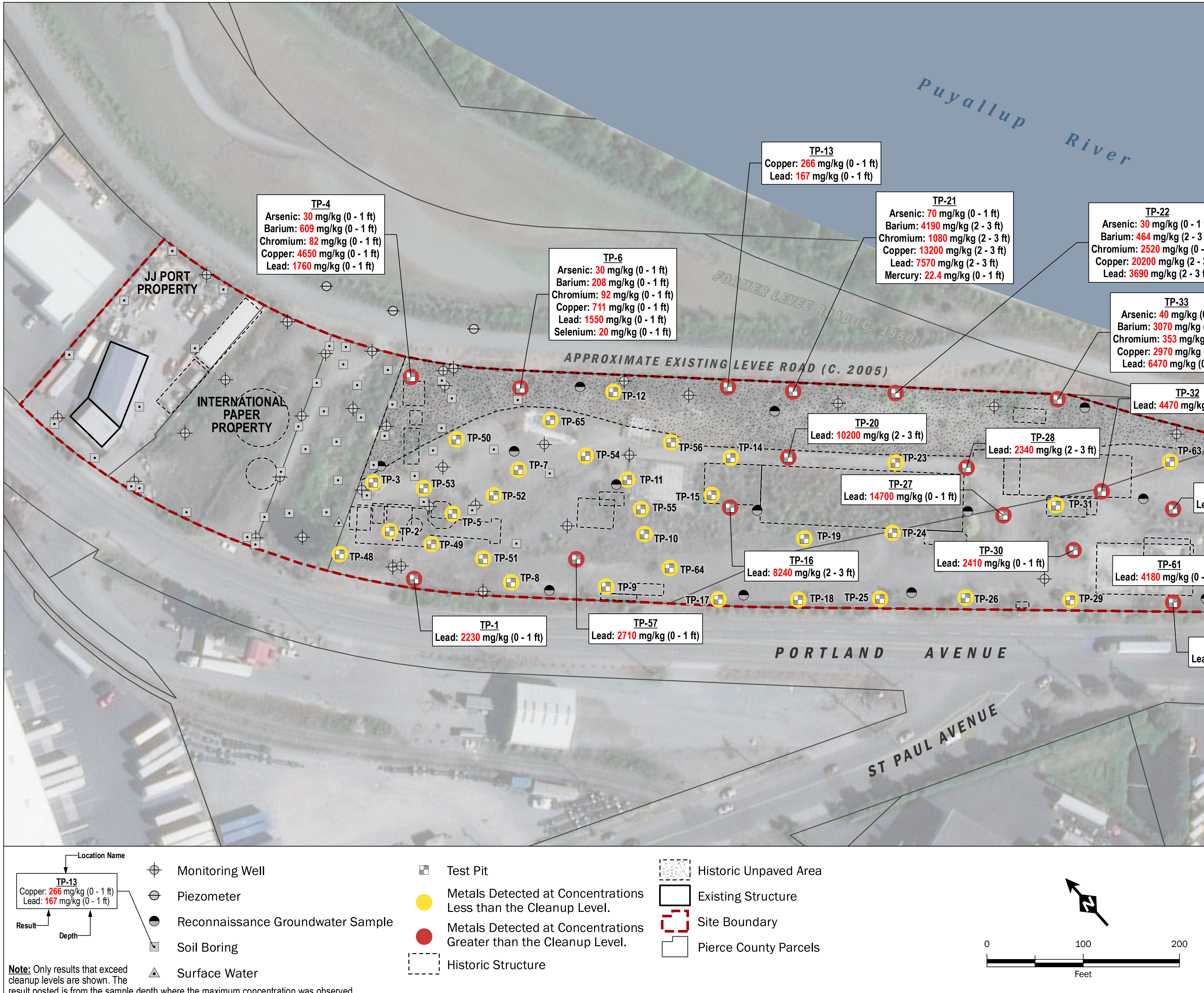
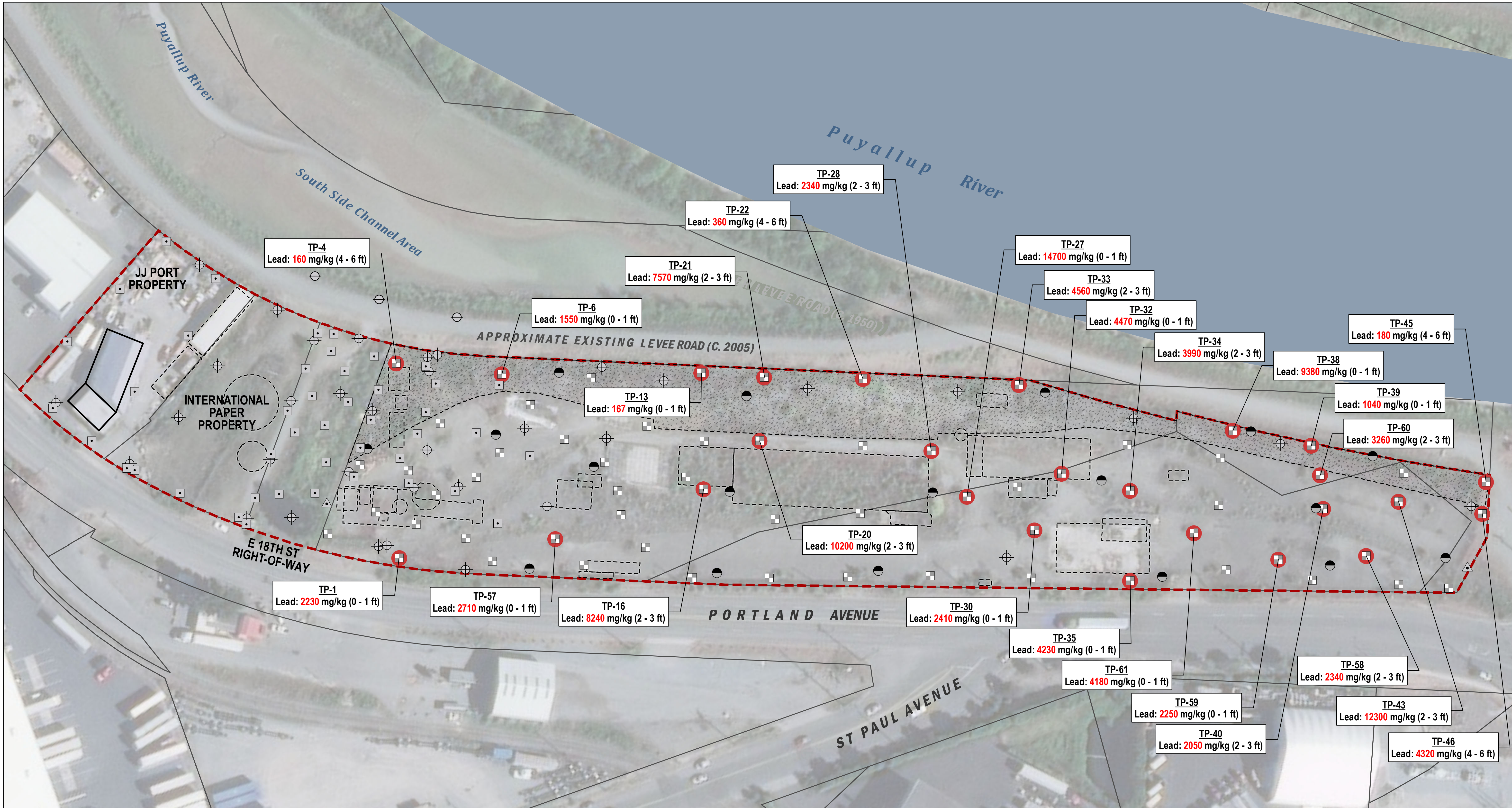


Extent of Metals Exceedances in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: RAP	18A



Location Name
TP-30
Lead: 2410 mg/kg (0 - 1 ft)
Result
Depth

Note: The result posted is from maximum sample depth that exceeded proposed cleanup levels.

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Metals Detected at Concentrations Greater than the Cleanup Level
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels

0 100 200
Feet

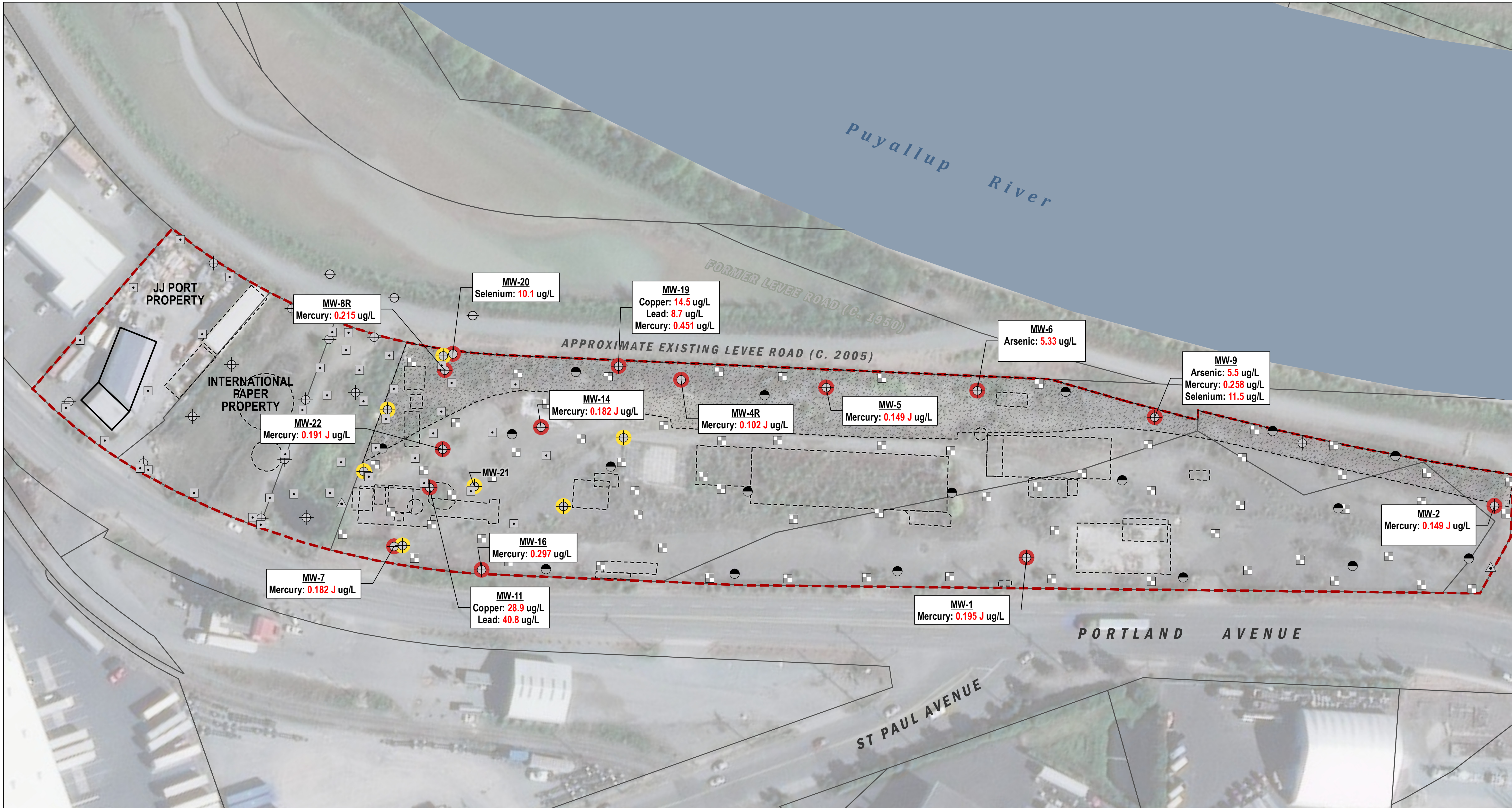
Depth of Metals Exceedances in Soil

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

MAY-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: RAP	18B

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Location Name

MW-1
Mercury: 0.179 J ug/L

Result

- Monitoring Well
- Piezometer
- Reconnaissance Groundwater Sample
- Soil Boring
- Surface Water
- Test Pit
- Metals Detected at Concentrations Less than the Cleanup Level.
- Metals Detected at Concentrations Greater than the Cleanup Level.
- Historic Structure
- Historic Unpaved Area
- Existing Structure
- Site Boundary
- Pierce County Parcels

Note: Only results that exceed cleanup levels are shown. The result posted is from the sample depth where the maximum concentration was observed.

0 100 200
Feet

Extent of Metals in Groundwater

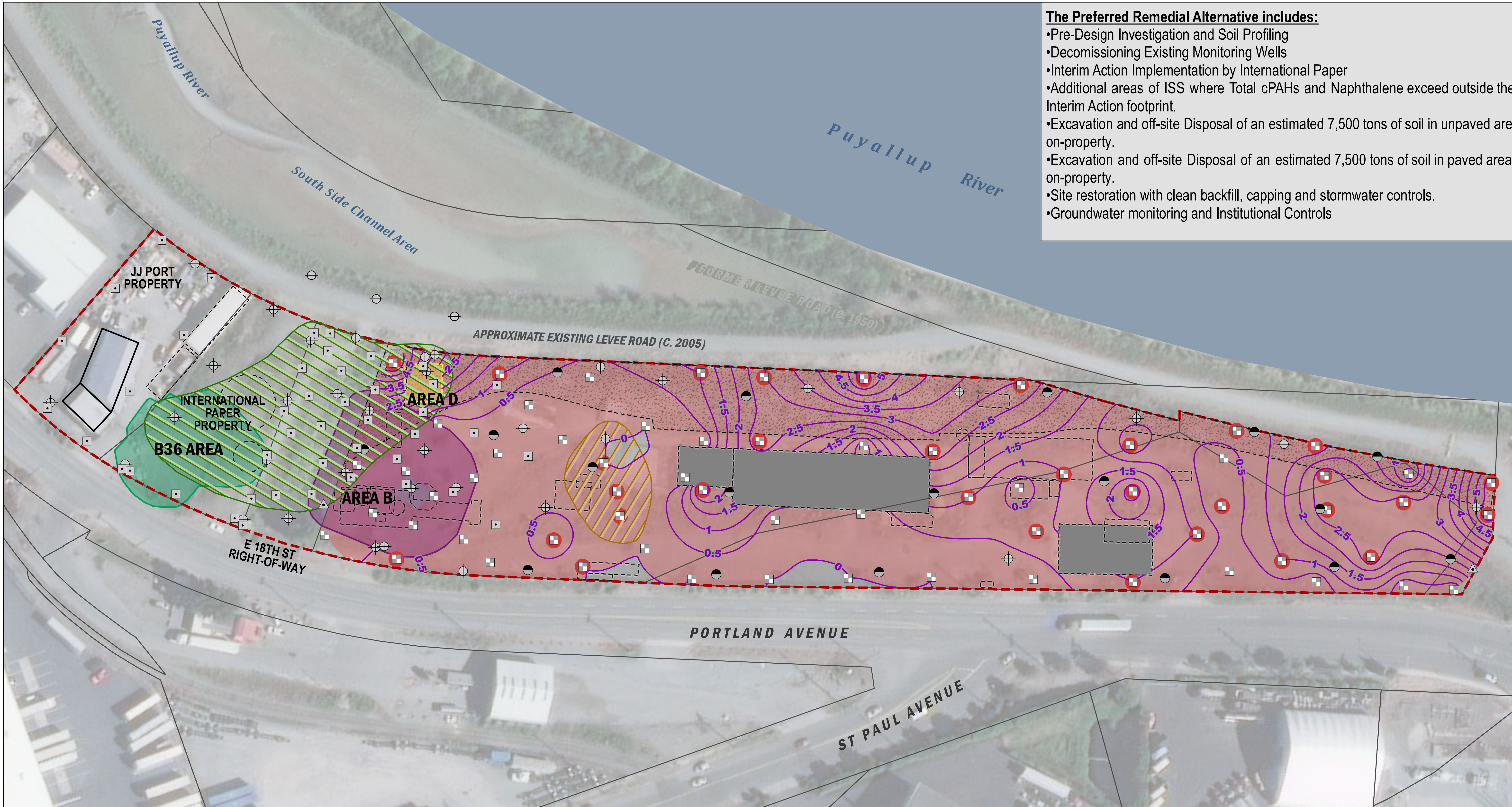
Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

Aspect CONSULTING

FEB-2018	BY: ACG / EAC	FIGURE NO.
PROJECT NO. 160420-03	REVISED BY: RAP	19

Basemap Layer Credits || Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

GIS Path: T:\projects_8\Sussman_160420\Delivered\DraftFinalRI\19 Extent of Metals in Groundwater.mxd || Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet || Date Saved: 2/27/2018 || User: ecrumbaker || Print Date: 2/27/2018



The Preferred Remedial Alternative includes:

- Pre-Design Investigation and Soil Profiling
- Decomissioning Existing Monitoring Wells
- Interim Action Implementation by International Paper
- Additional areas of ISS where Total cPAHs and Naphthalene exceed outside the Interim Action footprint.
- Excavation and off-site Disposal of an estimated 7,500 tons of soil in unpaved area on-property.
- Excavation and off-site Disposal of an estimated 7,500 tons of soil in paved area on-property.
- Site restoration with clean backfill, capping and stormwater controls.
- Groundwater monitoring and Institutional Controls

Monitoring Well
Piezometer
Reconnaissance Groundwater Sample
Soil Boring
Surface Water
Test Pit
Metals and/or DRO/ORO Detected at Concentrations Greater than the Cleanup Level
Estimated Excavation Depth (0.5' contours)
Total cPAHs and Naphthalene Extent at or Below Water Table
TPH DRO/ORO Extent at or Below Water Table
Historic Unpaved Area
Historic Structure
Existing Structure
Pierce County Parcels
Area of Soil to Remove
No Soil to Remove
Site Boundary

Interim Action Areas (AECOM, 2017)

Area B In Situ Solidification
Area D In Situ Solidification
B36 Area In Situ Solidification

Source: AECOM. Final Interim Action Work Plan In Situ Soil Solidification. November 17, 2017.

Preferred Remedial Alternative

Revised Draft Remedial Investigation/Feasibility Study
Tacoma Metals, Inc. Site
Tacoma, Washington

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JUN-2018	BY: ACG / EAC	FIGURE NO. 20
PROJECT NO. 160420-03	REVISED BY: RAP	