Draft Work Plan for
Black Sand Beach Excavation Project
Stevens County, Washington

Prepared for:

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December 18, 2009

This document has been prepared under the supervision of
a registered professional engineer of the State of Washington.

Date Signed: 12-18-09

TABLES

FIGURES

APPENDICES

Acronyms

APN	Assessor Parcel Number
BNSF	Burlington Northern Santa Fe
BSB	Black Sand Beach
CFR	Code of Federal Regulations
CWA	Clean Water Act
DAHP	Washington State Department of Archaeology and Historical Preservation
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
g/cc	grams per cubic centimeter
GPS	Global Positioning System
HEC-RAS	Hydraulic Engineering Center-River Analysis System
HSP	health and safety plan
JARPA	Joint Aquatic Resources Permit Application
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
msl	mean sea level
MTCA	Model Toxics Control Act
Nautilus	Nautilus Environmental, LLC
NAVD 1988	North American Vertical Datum of 1988
N/m^2	Newtons/square meter
NTUs	Nephelometric Turbidity Units
OECD	Organization for Economic Cooperation and Development
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SF	square feet
SWPPP	stormwater pollution prevention plan
TCLP	Toxicity Characteristic Leaching Procedure

Acronyms - Continued

Teck	Teck American Incorporated
USACE	US Army Corps of Engineers
USC	US Code
USCS	Unified Soil Classification System
USGS	US Geological Survey
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources

1.0 INTRODUCTION

1.1 Overview

This Draft Work Plan describes the activities associated with the Black Sand Beach (BSB) Excavation Project. The project consists of two phases: Phase 1 includes activities associated with planning, designing, and permitting; and Phase 2 consists of removing approximately 5,000 cubic yards of granulated slag from a prescribed area in the upland portion of BSB; load-out and transportation of these materials from their point of origin near Northport, Washington to their place of disposition in Trail, British Columbia, Canada; and restoring the affected work area. Activities related to the project will be conducted in a manner that addresses and balances the locally identified recreational value of BSB. The project also will be conducted in a manner that preserves potential cultural resources affected by site activities.

BSB is located on Washington state-owned land identified as parcel number 8000367, in a portion of Section 16 of Township 40 N, Range 41 East in Stevens County records. A general site location map is shown on Figure 1. Teck American Incorporated (Teck) will perform the project in general accordance with the scope of work dated July 13, 2009 (Appendix A), as approved by the Washington State Department of Ecology (Ecology) and more fully described herein.

Teck will further develop this Draft Work Plan in consultation with Ecology, who will coordinate with other agencies and stakeholders, including but not necessarily limited to, the US Environmental Protection Agency (EPA), the US Army Corps of Engineers (USACE), the US Department of Interior, Washington State Department of Natural Resources (WDNR), Washington State Department of Fish and Wildlife (WDFW), Washington State Department of Archaeology and Historical Preservation (DAHP), Stevens County, City of Northport, Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, and the public.

Phase 1 is underway and is expected to be complete in May 2010. The public review of the project under the State Environmental Policy Act (SEPA) is anticipated to take place in December 2009/January 2010 and Teck expects to secure the necessary permits to perform the work in early to mid 2010. Phase 2 is expected to begin in fall 2010, when the water level in the adjacent Upper Columbia River will be at or near its typical seasonal low stage. Construction is anticipated to take approximately three to six weeks, with project close-out activities being completed by the end of 2010. Post excavation monitoring will be conducted following final project close-out to monitor longer-term conditions at BSB.

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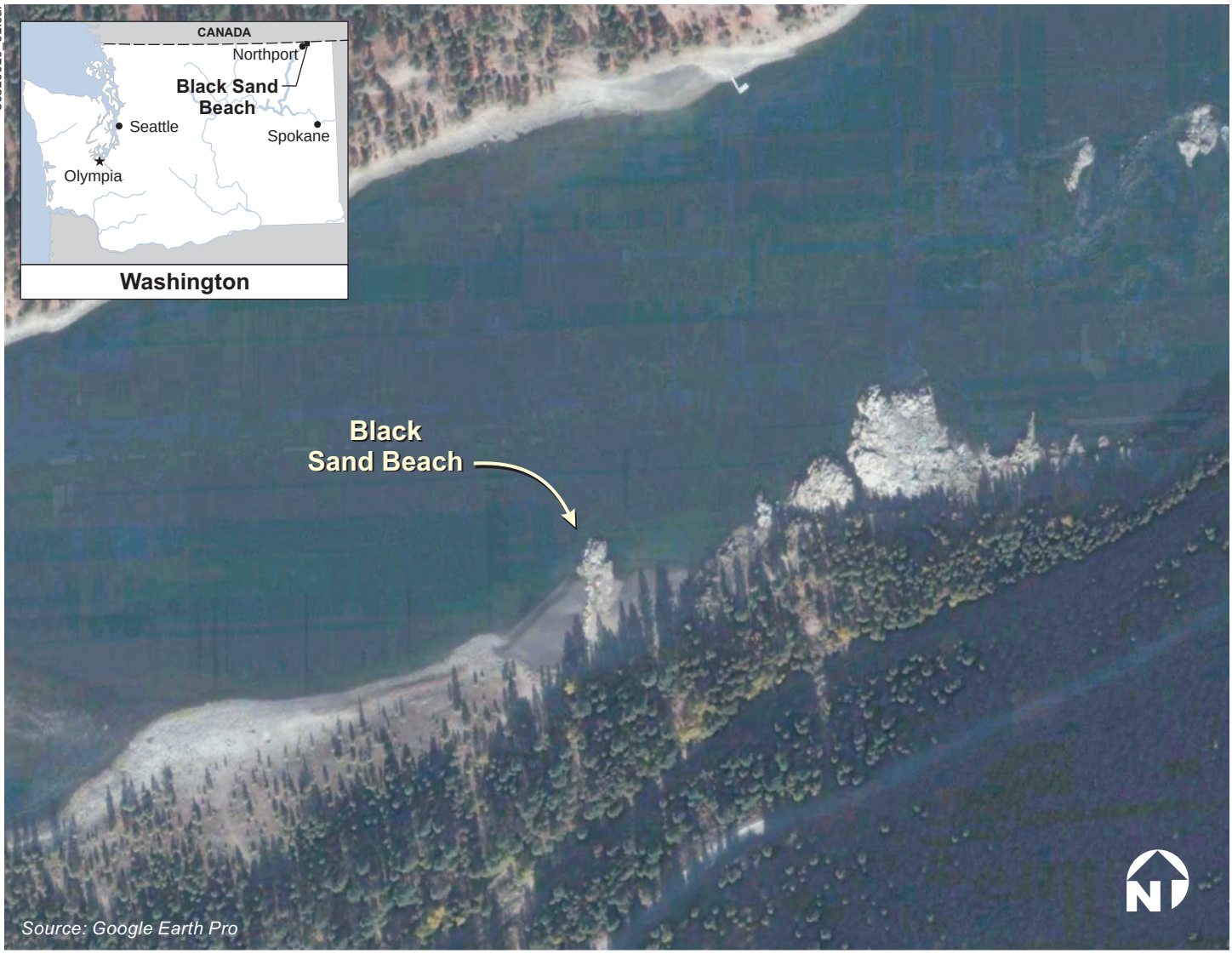

Photos taken 5-22-09.

Figure 1

Black Sand Beach Location and Site Photographs

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Black Sand Beach
Northport, Washington

1.2 Purpose and Objectives

The purpose of the project is to remove granulated slag that has accumulated over time within the upland portion of BSB, where granulated slag is readily visually identifiable and accessible using conventional excavation equipment. The intent is to remove as much granulated slag in the upland BSB beach areas as possible, while not adversely impacting the adjacent river. No open-water dredging or sediment removal in the river will be conducted. The specific project objectives are:

- To the extent practical, remove the majority of granulated slag that has accumulated in the upland portion of BSB, where granulated slag is readily visually identifiable and accessible using conventional excavation equipment (e.g., excavator, loader, and vacuum truck).
- Establish final grades in the affected work area following excavation of the granulated slag to minimize potential disturbance of any known, recognized or suspected cultural resources and to allow continued beach access and function to the public, while minimizing future erosion problems.
- Maintain and promote positive stakeholder relationships by actively supporting and participating in the public participation process as requested by Ecology and the cultural resource coordination process under Ecology guidance.
- Secure all necessary permits and approvals during 2009 and early 2010 so that the construction phase (Phase 2) of the project can begin no later than September 2010, when the water level is low in the river. Permitting and approvals will depend on several outside agency's review schedules.

1.3 Project Ownership and Deliverables

Teck will voluntarily perform the project as a voluntary independent interim action in accordance with the Model Toxics Control Act (MTCA), which is Chapter 173-340 of the Washington Administrative Code (WAC), and with Revised Code of Washington (RCW) 70.105D. Teck will perform the project under the Ecology's Voluntary Cleanup Program (VCP) pursuant to the Interim Action Voluntary Cleanup Program Agreement signed July 13, 2009 (VCP Agreement). Sections 3 and 4 present additional discussion regarding the regulatory setting, goals, and requirements for the voluntary independent interim action.

As described in the VCP Agreement, Teck will be responsible for:

- Obtaining the necessary permits and approvals to perform Phase 2
- Complying with applicable, relevant, and appropriate requirements for conducting the activities described in this Work Plan

Teck will consult with Ecology, who will take the lead in coordinating public participation under SEPA and facilitating cultural resource planning.

Anticipated deliverables that Teck will provide for the project include:

- Draft, revised draft, and final Work Plan
- 30, 60, 90, and 100 percent engineering documents, including "As-Built" documents
- Draft and final SEPA checklist
- Draft and final Cultural Resources Plan
- Joint Aquatic Resources Permit Application (JARPA)
- Permit applications including shoreline permit and access agreements
- Project Close-Out Report
- Post Excavation Monitoring Plan

1.4 Agency Involvement

Per the VCP Agreement, Ecology will be the lead regulatory agency for this project and will be responsible for the following:

- Coordinating and facilitating cultural resource communications, including implementation of State Executive Order 05-05 requirements
- Coordinating and leading SEPA review and public comment
- Coordinating interagency reviews
- Issuing a Construction Stormwater Permit
- Approving the final Work Plan
- Issuing a Notice to Proceed for Phase 2 (construction work)

1.5 Project Organization and Responsibilities

The project organization chart (Figure 2) summarizes the major organizational entities of the project, including direct lines of authority and informal lines of communication.

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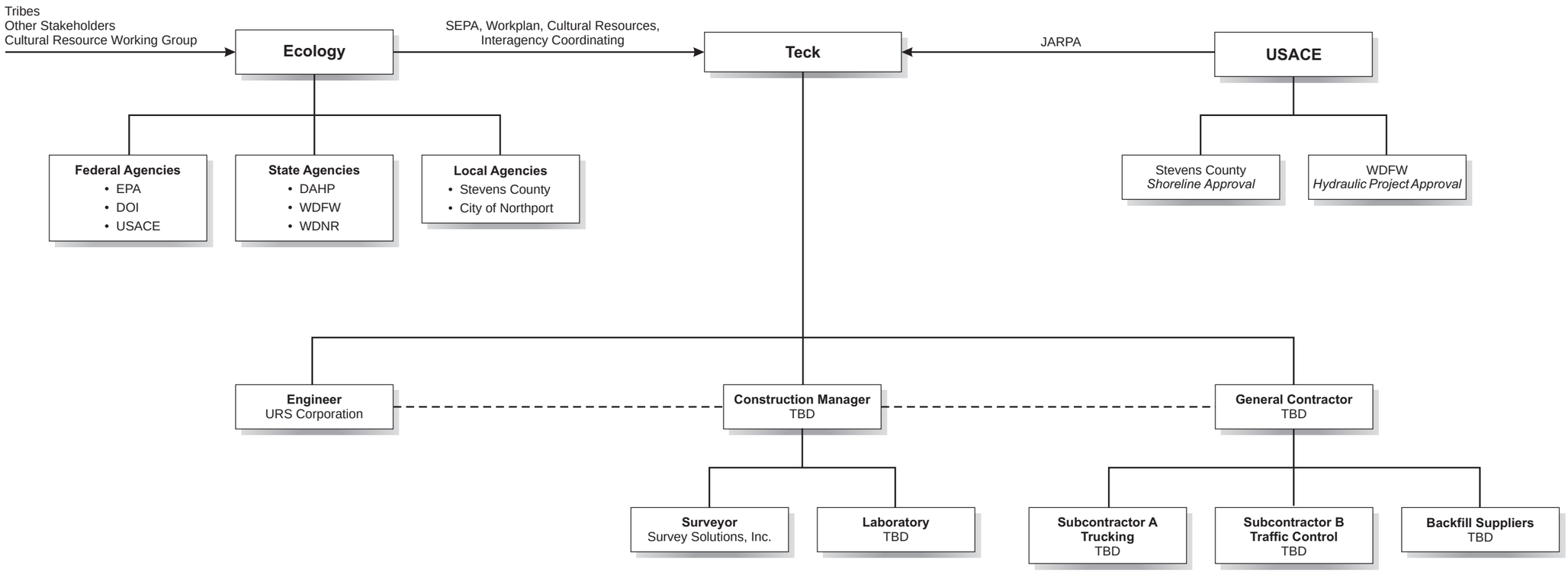

Legend

DAHP	Department of Archaeology and Historic Preservation
DOI	Department of Interior
EPA	Environmental Protection Agency
JARPA	Joint Aquatic Resource Permit Application
SEPA	State Environmental Policy Act
TBD	To Be Determined
WDWF	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources

Job No. 36310019

Figure 2
Organization Chart

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Black Sand Beach
Northport, Washington

The following key elements are depicted in the organizational chart:

- Ecology will be the lead agency for SEPA review and coordinating with WDNR for BSB access. Ecology also will coordinate with Stevens County for land use and shoreline matters; and the public, including the Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians and other interested stakeholders. Teck will assist Ecology, as appropriate, in the public participation process under Ecology's overall direction.
- Teck will be responsible for the primary coordination with USACE for the JARPA application. USACE also will coordinate with Ecology and other agencies during the joint agency review under the JARPA process. The USACE Nationwide 38 Permit is anticipated to be required for this project under the JARPA process and will likely trigger the National Historic Prevention Act of 1966 Section 106 cultural resources requirements. The Section 106 requirements, along with the State Executive Order 05-05 requirements, take into account the effects of the project on potential historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Additional anticipated permits under the JARPA process include: a Shoreline Substantial Development Permit with Stevens County, a Hydraulic Project Approval by WDFW, and a Nationwide 38 permit by USACE.
- Teck will be responsible for meeting the project objectives in accordance with permit conditions and other United States and Canadian legal requirements:
- Teck will coordinate with the WDNR to secure a Forest Practices Permit, Land Use License and a general access approval to conduct construction-related activities.
- URS Corporation will be the planning and engineering consultant for the project and will be responsible for developing the Work Plan, engineering plans, and permitting submittals on behalf of Teck.
- Teck will provide a Construction Manager who will be identified prior to the 90-percent submittals. The Construction Manager will be responsible for implementing the project in accordance with the plans and permits, and for meeting the project's schedule and other contract requirements. The Construction Manager also will be responsible for ensuring that the Contractor implements the safety requirements set forth in the Health and Safety Plan; directing the performance of a final "As-Built" survey by a qualified licensed land surveyor; and performing site environmental monitoring and analytical testing of the imported backfill materials. The Construction Manager will serve as the primary on-site contact during implementation of the work.
- The General Contractor will be responsible for completing the project per the approved plans under the oversight of the Construction Manager. All subcontractors to be used on the project will be pre-approved by Teck.

Table 1 shows a preliminary responsibility assignment matrix. Table 1 describes project participation by roles in completing tasks or deliverables and is intended to clarify roles and responsibilities between Teck and its consultants/contractors, various agencies, and stakeholders. The four key responsibilities in Table 1 are identified and described below:

- ***Responsible:*** those who do the work to achieve the task. There is typically one role with a participation type of *Responsible*, although others can be delegated to assist in the work required.
- ***Accountable (also Approver or Final Approving Authority)***: those who are ultimately accountable for the correct and thorough completion of the deliverable or task, and the one to whom *Responsible* is accountable. In other words, an *Accountable* must sign off (Approve) on work that *Responsible* provides. There must be only one *Accountable* specified for each task or deliverable.
- ***Consulted:*** those whose opinions are sought; and with whom there is two-way communication.
- ***Informed:*** those who are kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there is only one-way communication.

Table 1
Responsibility Assignment Matrix
Black Sand Beach Excavation Project

Code	Task/Deliverable Name	Teck	Ecology	EPA	DOI Department of Interior	ACOE Army Corp. of Engineers	DAHP Department of Archeology and Historic Preservation	DNR Department of Natural Resources	DFW Department of Fish and Wildlife	SPD Stevens County Planning Department	SDPW Stevens County Dept. of Public Works	CTC Confederated Tribes of Colville	STI Spokane Tribe of Indians	BCE BC Environment	CFIA Canadian Food Inspection Agency	BNSF Real Estate	Private Trust
1110	VCP Application	R	A	I	-	-	-	-	-	-	-	-	-	-	-	-	-
1120	SOW document	R	A	I	I	I	I	I	I	I	I	I	I	-	-	-	-
1210	Work Plan	R	A	I	I	C	I	C	I	C	C	I	I	-	-	I	I
1220	SWPPP	R	A	I	I	C	I	C	C	I	I	I	I	-	-	-	-
1230	Health and Safety Plan	R	A	I	I	I	I	I	I	I	I	I	I	-	-	-	-
1240	Cultural Resources Plan	R	C	I	I	I	A	C	I	I	I	C	C	-	-	-	-
1310	SEPA checklist	R	A	I	I	I	C	C	C	C	I	C	C	-	-	I	I
1320	JARPA application	R	C	I	I	A	I	C	C	C	I	I	I	-	-	-	-
1330	Shoreline Permit	R	C	I	I	C	I	C	C	A	C	I	I	-	-	I	I
1340	Grading Permit	R	C	I	I	I	I	C	I	C	A	I	I	-	-	-	-
1350	Truck Haul Approvals	R	C	I	-	-	-	I	-	C	A	I	I	-	-	I	I
1360	Transporation approval U.S.	R	A	I	-	-	-	I	-	I	I	I	I	-	-	-	-
1370	Transportation approval - Canada	R	I	I	-	-	-	-	-	-	-	-	-	C	A	-	-
1410	30-percent design	R	A	I	I	C	I	C	C	C	-	I	I	-	-	-	-
1420	60-percent design	R	A	I	I	C	I	C	I	C	C	I	I	-	-	-	-
1430	90-percent design	R	A	I	I	C	I	C	I	I	I	I	I	-	-	-	-
1510	BNSF Railroad Crossing approval	R	I	I	-	-	-	I	-	-	-	-	-	-	-	A	-
1520	Private Property access approval	R	C	I	-	-	-	-	-	-	-	-	-	-	-	-	A
1530	Truck turnaround and staging approval	R	C	I	-	-	-	-	-	-	A	I	I	-	-	-	-

Notes
A = Accountable (also approver or final approving authority)
those who are ultimately accountable for correct and thorough completion of the deliverable or task, and the one to whom *Responsible* is accountable.
there must be only one *Accountable* specified for each task or d
C = Consulted
those whose opinions are sought; and with whom there is two-way communication
Ecology will lead coordination between the various agencies, including those agencies that will provide final approvals for various tasks or deliverables
I = Informed
those who are kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there will generally be one way communication
R = Responsible
those who do the work to achieve the task. There is typically one role with a participation type of *Responsible,* although others can be delegated to assist in the work required

2.0 BACKGROUND

2.1 Project Location

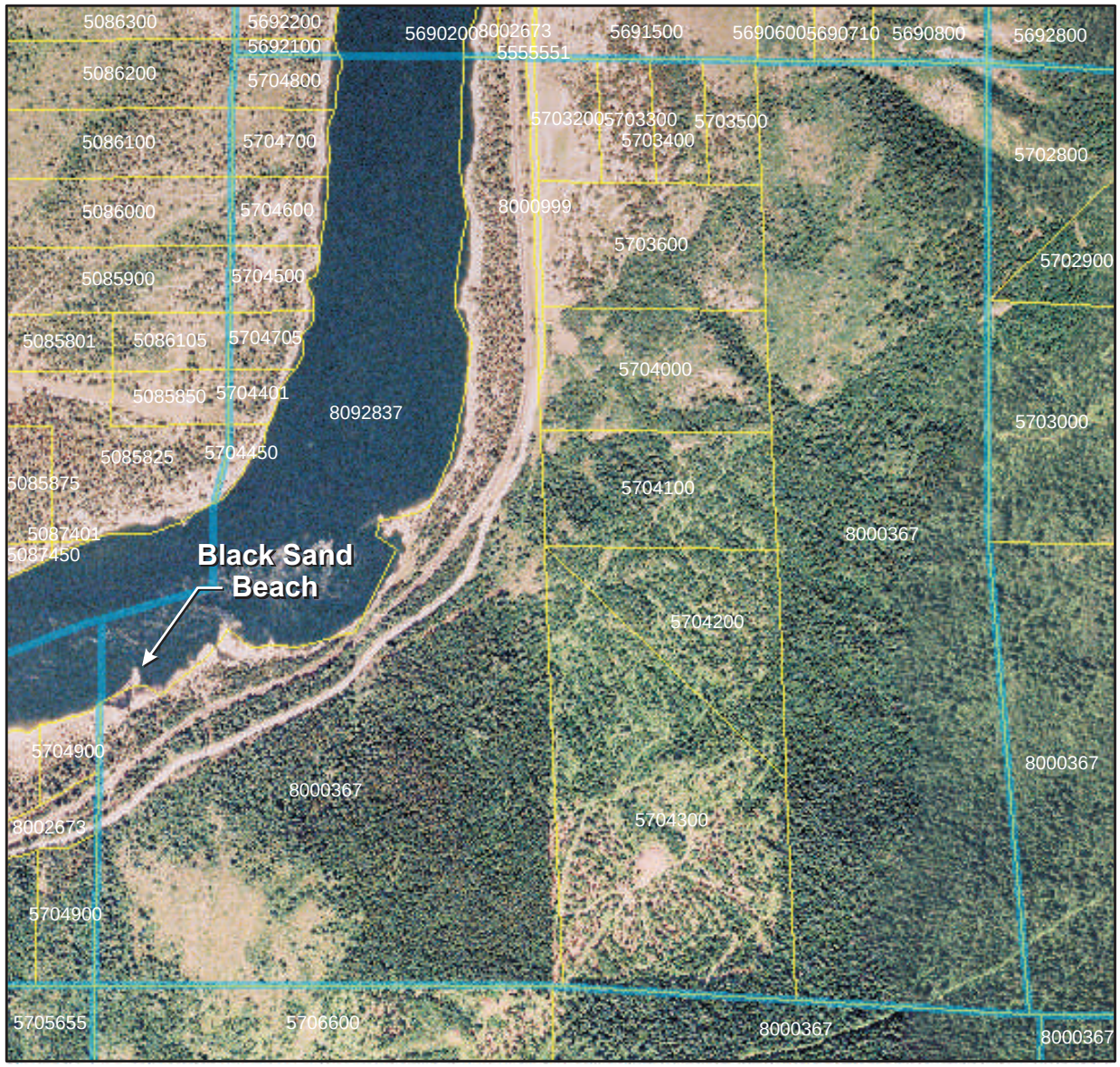
The project is located at BSB in Stevens County, Washington (Figure 1), along the southeastern bank of the upper Columbia River just downstream from US Geological Survey (USGS) gauging station 12399510 (former Columbia River Auxiliary Gage at International Border) at approximately river mile 743. BSB may be accessed by an approximately 800-foot-long unpaved access road that crosses a Burlington Northern Santa Fe (BNSF) private railroad crossing. The access road and railroad crossing are located off the Northport-Waneta Road, about eight miles northeast of Northport, Washington. Stevens County maintains the Northport-Waneta Road, BNSF maintains the railroad crossing, and the access road is the responsibility of the State. Figure 3A is an aerial photograph depicting the township/range/section and parcel map of BSB and the surrounding area, and Figure 3B shows the same information for the truck turn-around parcel, which is owned by Stevens County (Assessor Parcel Number [APN] 8007826), and is located approximately two miles southwest of BSB along the south side of Northport-Waneta Road. Figure 4 shows the latitude and longitude of the project vicinity.

BSB may be further located as follows:

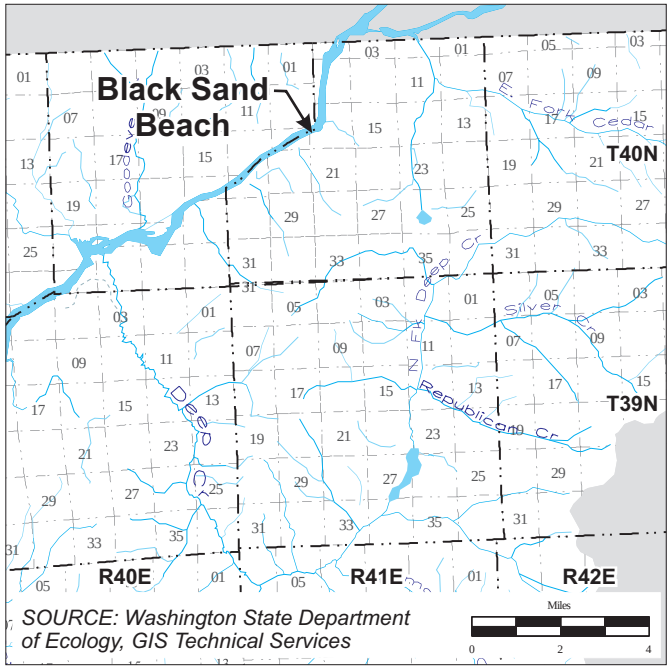
- APN 8000367
- Section 16, Township 40 N, Range 41 E
- Latitude 48°58’48” (48.98°), Longitude 117°38’53” (117.65°).
- USGS river mile 743

BSB is located approximately 113 miles northwest of Spokane, Washington and approximately 2.7 miles southwest of the Waneta Canada-United States border crossing. Directions to BSB from Spokane are as follows:

- Start on N Division Street (US 395 N) and follow it N 62 miles
- At traffic circle, take second exit onto US 395 (10.2 miles)
- Turn right on WA 25 (30.8 miles)
- Continue on WA 25 N (1.2 miles)
- Continue on Center Avenue (WA 25) (0.6 mile) (through Northport)
- Turn right at Northport-Boundary Rd/Northport-Waneta Road (8.1 miles)
- Turn left on unpaved access road and cross railroad tracks (500 feet)
- Continue on unpaved access road to BSB (300 feet)



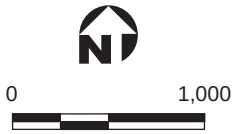
SOURCE: Stevens County Assesor's Office



Township and Range

Stevens County Washington

Township 40 N Range 41 E Section (see grid)



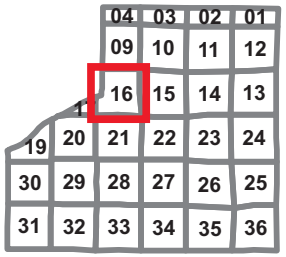


Figure 3A

Parcel Map

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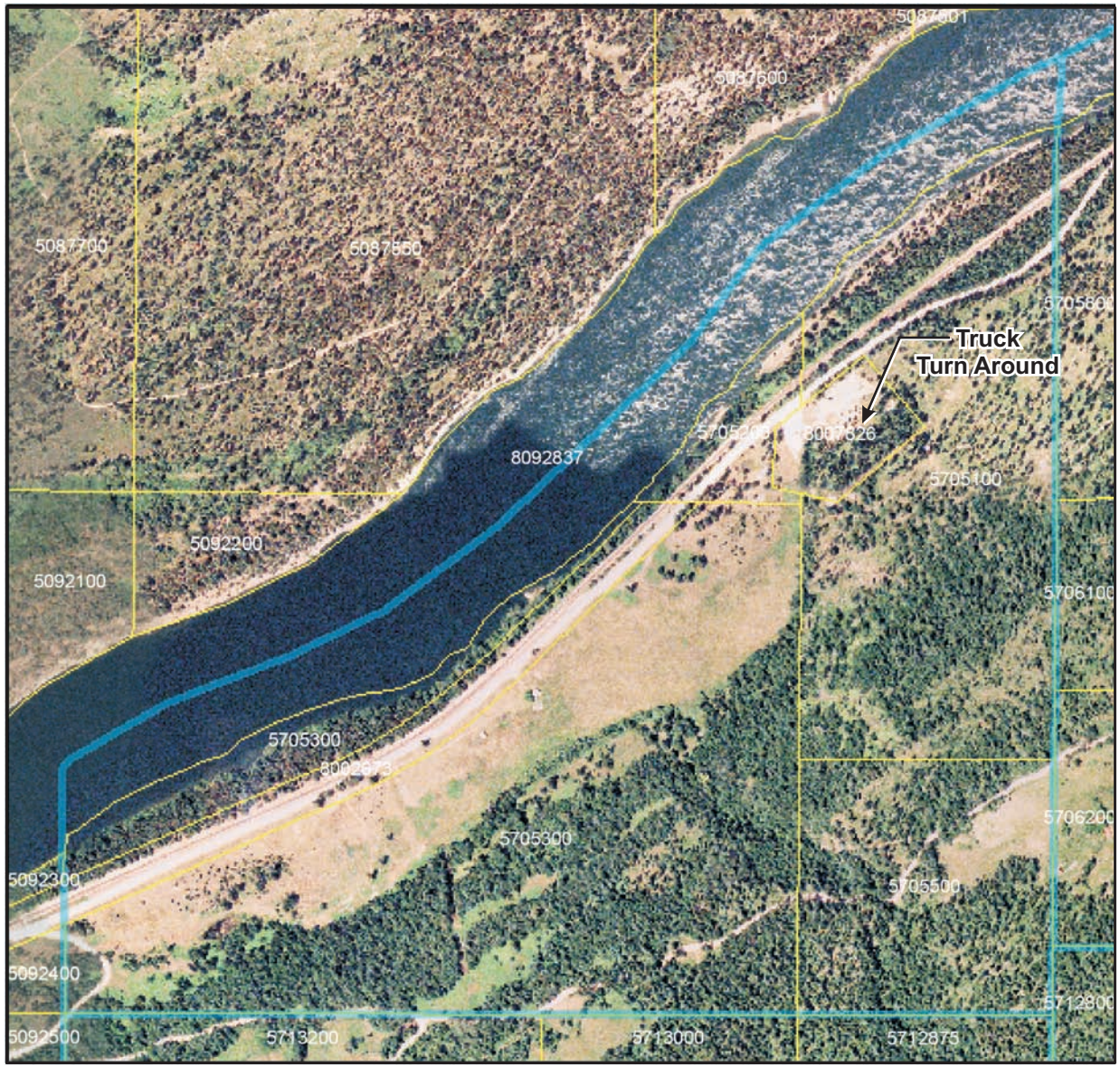
Black Sand Beach
Northport, Washington



SOURCE: Stevens County Assesor's Office

		04	03	02	01
		09	10	11	12
	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Stevens County Washington

Township 40 N Range 41 E Section (see grid)

N

0 1,000

Approximate
Scale in Feet

Figure 3B

Truck Turn Around Parcel

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Black Sand Beach
Northport, Washington

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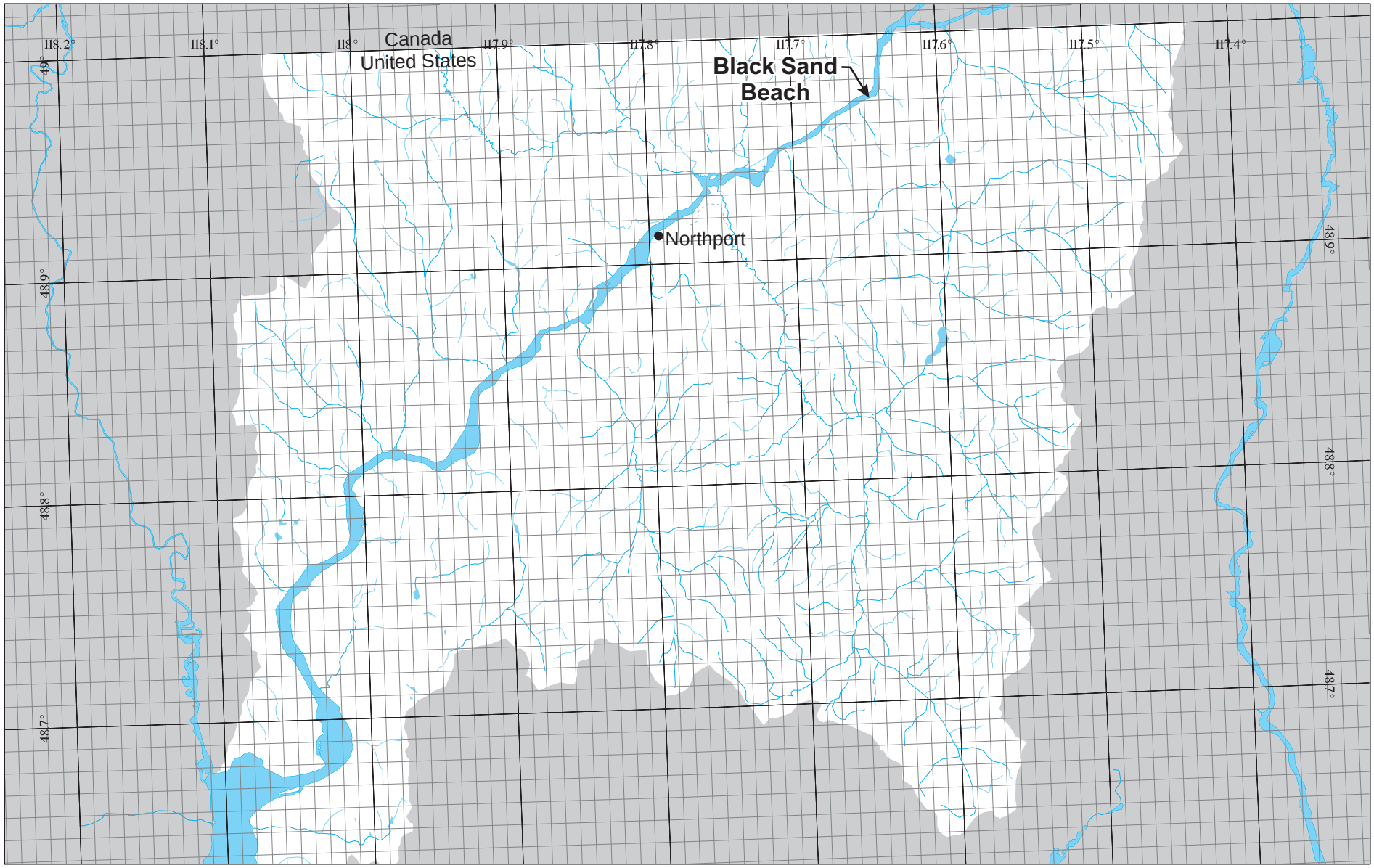

SOURCE: Washington State Department of Ecology, GIS Technical Services

Figure 4

Project Site Latitude and Longitude

Job No. 36310019

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Black Sand Beach
Northport, Washington

2.2 Site Description

Black Sand Beach is the unofficial name of an unofficial locally-recognized beach in the upper reaches of the upper Columbia River. Its name is derived from the granulated slag deposits that have accumulated over time on the southeastern bank of the river. The granulated slag is readily identifiable visually by its characteristic black sand-like appearance.

According to Stevens County records, BSB is owned by the State of Washington within WDNR-managed land (Figure 3A). Though not a formally recognized or managed beach area, BSB is known to be used by local Northport area residents as a familiar recreation/beach area (Ecology 2008). Recorded activities at BSB include swimming/wading, fishing, camping, beach play, and small-scale mineral prospecting.

The identified residents nearest to BSB include several residential properties located approximately 0.4 mile west-southwest of the site along the Northport-Waneta Road. A USGS auxiliary gauging station is located several hundred feet northwest and upriver of the BSB site. A BNSF rail corridor exists between the site and the Northport-Waneta Road. A private crossing of the railroad tracks between BNSF mile marker 137 and 138 provides access to BSB. This corridor contains a single set of tracks that are used periodically to transport railcars between Kettle Falls, Washington and Trail, British Columbia. The Kettle Falls BNSF Roadmaster and Teck will coordinate to maintain safety and to prevent interruption of rail service during construction.

2.3 Surface Conditions

BSB occupies an area of approximately 42,580 square feet (SF). For the purposes of this project, BSB has been divided into four subareas (Figure 5):

- Rock outcropping (8,280 SF)
- Downstream beach (18,510 SF)
- Upstream beach (9,850 SF)
- Middle beach (5,940 SF)

Figure 6 shows the estimated depth of granulated slag in each area (except the rock outcropping area). An approximate ¾-inch diameter piece of rebar was inserted into the granulated slag material at various locations within BSB and the depth of refusal (i.e., "hard surface") was measured. These data were then input into a computer aided design program (Civil 3D by Autodesk) to generate contours of the underlying hard surface and to compute the volume of materials between the ground surface and the hard surface. The materials between the ground surface and the hard surface were assumed to be granulated slag.

Legend

Extent of Proposed Excavation

Source:
Basemap provided by Survey Solutions, Spokane Washington.

NT

0 20 40

SCALE IN FEET

Columbia River

215'±

Edge of Water 1297.1

Rock Outcropping Area
8,280 SF
Estimated Excavation Volume
10 CY's±
Estimated Fill Volume
No Backfill

131'±

Upstream Beach Area
9,850 SF
Estimated Excavation Volume
402 CY's
Estimated Fill Volume
217 CY's

Middle Beach Area
5,940 SF
Estimated Excavation Volume
150 CY's
Estimated Fill Volume
150 CY's

Upstream Beach Area
18,500 SF
Estimated Excavation Volume
4,100 CY's
Estimated Fill Volume
3,381 CY's

Rock Outcrop

Haul Route

Tree Line

Haul Route

Minor Road Improvement

Parcel No.
5704900

Parcel No.
8000367

Burlington Northern Railroad

JOB No. 36310019
P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Work Plan\Figure 5 (Rev Site Plan).dwg
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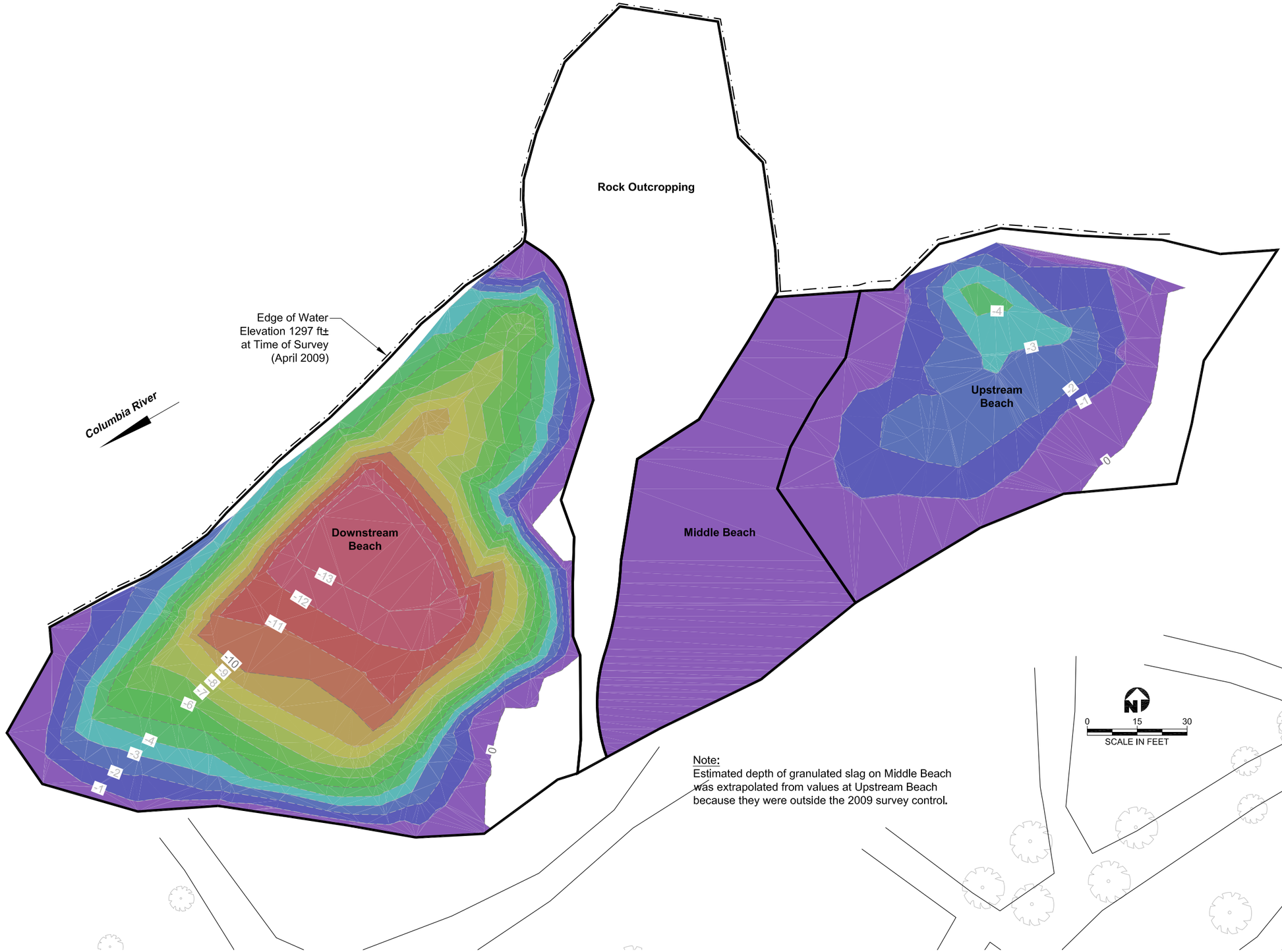
Figure 5

Black Sand Beach Subareas and Proposed Area of Excavation

Black Sand Beach
Northport, Washington



Note:
Estimated depth of granulated slag on Middle Beach was extrapolated from values at Upstream Beach because they were outside the 2009 survey control.

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P:\ACAD\PROJECT\TeckCominco Alaska\Black Sand Beach\SubTasks\Work Plan\Figure 6 - Excavation Depths.dwg
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Figure 6
Estimated Depth of Granulated Slag
Black Sand Beach
Northport, Washington

The estimated volume of granulated slag materials is considered to be appropriately conservative. Sources of uncertainty in the granulated slag volume estimate include interpolation errors, accuracy of surveyed elevation measurements, potential changes in surface topography and water levels from the time of the survey and time of excavation, and measurement uncertainty in establishing the bottom of the granulated slag. Due to these uncertainties, the granulated slag volume estimates should be considered accurate to about plus or minus about 25 percent, which is plus or minus about 1,250 cubic yards for the entire BSB.

The granulated slag volume estimates are based on in-place cubic yards and do not include any bulking factors that account for density differences between in-situ conditions (bank volume) and stockpile conditions (loose volume). Certain soil types "fluff" when excavated, requiring the contractor handle more volume than estimated from in-place volumes. The amount of bulking of excavated soils is expected to be minimal because of the apparent loose nature of granulated slag currently present at BSB.

Appendix B presents photographs of BSB. Each subarea and other surface features are further described below.

2.3.1 Rock Outcropping

A predominant feature of BSB is a north-south trending bedrock outcropping that protrudes into the river. The rock outcropping divides BSB into two approximately equal parts (Figure 5). The eastern half (upstream of the outcropping) consists of the middle and upstream beach areas. The western half is the downstream beach. Based on a limited review of aerial photographs of the site (1998 and 2009), the granulated slag volume appears to have decreased or redistributed itself over the last ten years. Currently, granulated slag is present only on portions of the top of the rock outcropping (Appendix B). This rock outcropping and a series of additional bedrock outcroppings further upstream likely produce the hydrodynamic conditions that allowed the granulated slag to deposit at BSB (Section 2.3.2).

2.3.2 Downstream Beach

The downstream beach is approximately 215 feet long (parallel to the river) and 150 feet wide. This is where the majority of granulated slag is deposited. On behalf of Teck, a topographical elevation survey of BSB was conducted in April 2009. Based on that survey, and the depth probing of the slag described above, the estimated volume of granulated slag on the downstream beach is approximately 4,100 cubic yards. The estimated maximum depth of granulated slag at the downstream beach is approximately 13 feet below the existing grade level (Figure 6). Based on visual observations, the majority of granulated slag at the downstream beach is within a uniform, poorly graded, sandy material, with little gravels and cobbles (visually estimated at less than one percent by volume).

Deposition of the granulated slag in this area is suspected to have occurred as river flow of the Columbia River and its associated suspended particles intercepted the bedrock outcrop between this beach and the upstream beach. The suspended particles included granulated slag discharged

into the Columbia River upstream of the site at Teck's Trail Smelter prior to about 1995. As the river flow and suspended particles encountered the bedrock outcrop, velocities of flow decreased on the downstream side of the outcrop as turbulent flow over and around the outcrop dissipated river flow energy. Deposition of granulated slag occurred in this lower-energy "eddy" environment. Of note is a shallow depression in the upland and upstream portion of this granulated slag deposit. Although it has been reported that this depression is partially the result of recent recreational placer mining, it is likely that some of the lowering of granulated slag in this location is the result of scour that occurs through a saddle in the adjacent bedrock.

River flow vectors and estimated energies upstream and near the site have been estimated by Integral and Parametrix (2007a) and NHC (2007) to evaluate sediment, granulated slag, and chemical of interest transport and accumulation patterns. These estimates were completed using Hydraulic Engineering Center-River Analysis System (HEC-RAS) and other computer models and total shear stress equations. These studies generally describe overall sediment and deposition patterns within the larger upper Columbia River system.

During development of this Work Plan, URS calculated a range of specific erosional forces that are likely present within BSB eddies in order to design a backfill specification. The objective of this analysis was to provide a minimum natural particle size that might be used as backfill as a replacement to the current sand-size granulated slag. The following is a summary of this analysis:

- In the specific depositional environment present at BSB, it is assumed that peak water forces usually do not exceed a certain value that will mobilize and erode the granulated slag material; otherwise the granulated slag would have eroded away from BSB. URS estimated the "critical shear force" that would move and erode a particle of granulated slag using Shield's Incipient Motion Diagram procedure (Mays 2005). For the purposes of this calculation, the granulated slag was assumed to have an average density of 3.2 grams per cubic centimeter (g/cc) and a diameter of about 1 millimeter (NHC 2007, Integral and Parametrix 2007a). Using this procedure, the maximum estimated critical shear force present within the BSB eddy is about 0.7 Newtons/square meter (N/m^2). However, visual observations and aerial photographs of BSB over time suggest that some erosion of the beach has occurred, which also suggests that the replacement material (especially the coarse sand/fine gravel components) also may erode in the future.
- Next, using an iterative process incorporating the Shield's Incipient Motion Diagram procedure, estimated critical shear force from above, and the density of quartz sand of 2.65 g/cc, the diameter of sand particle was estimated that would provide similar erosional resistance as the existing granulated slag (Mays 2005). Using this method, the minimum diameter of natural sand that is equivalent to the granulated slag particle is about 1.2 millimeters.

It should be noted that this method of analysis does not take into account the differences in angularity between the sand and granulated slag or any forces of attraction between the granulated slag particles that would tend to increase its resistance to erosion compared to silica sand. Therefore, the above analysis may tend to underestimate the erosion potential of the beach sand. For this reason, a factor of safety of three was applied to the sand particle, resulting in a design particle size of 3.6 millimeters, which is a coarse sand according to the Unified Soil Classification System (USCS) (ASTM D 2487). Due to varying gradation, it is anticipated that the uppermost replacement beach sand will be a combination of coarse sand and fine gravels, as defined by USCS standards. As described above, there is no guarantee that the use of a coarse sand/fine gravel backfill with a particle size greater or equal to 3.6 millimeters would not eventually erode from the beach. Therefore, if a coarse sand/fine gravel backfill is placed on top of the beach for aesthetic purposes, it is recommended that a courser fill (gravel or cobbles) be placed below the sand layer to maintain the desired grades of BSB, should the sand material eventually erode during high flow conditions of the river. Furthermore, URS recommends that additional cobbles (consistent with other cobble materials in the immediate vicinity of BSB) be placed adjacent to the downstream portion of the rock outcropping to further reduce erosion forces at the downstream section of BSB.

2.3.3 Upstream Beach

The upstream beach is located east of the middle beach and is composed mostly of black, sandy-material containing granulated slag. Similar to the downstream beach, the granulated slag on the upstream beach is uniform, sand-sized materials with little or no gravels and cobbles.

The upstream beach is approximately 130 feet long by 80 feet wide. The estimated volume of granulated slag material on the upstream beach is approximately 400 cubic yards, based on the 2009 topographical survey by Survey Solutions, Inc. The estimated depth of granulated slag material at the upstream beach is approximately zero to four feet below existing grade, with the majority of granulated slag in the uppermost two feet (Figure 6). Except in a localized area adjacent to the river, the granulated slag at the upstream beach appears to be above the surface elevation of the river when the water elevation in the river is low. Depositional environment of the upstream beach is assumed to be similar to the downstream beach, as described above. A low-energy eddy depositional area is also thought to present in this area, protected by the bedrock outcrop located upstream of the upstream beach.

2.3.4 Middle Beach

The middle beach area is located between the rock outcroppings and the upstream beach and is approximately 25 to 80 feet long by about 110 feet wide. Unlike the downstream and upstream beach areas, a relatively large percentage of gravel and cobbles appear on the middle beach (Appendix B). Based on visual observations during a site inspection by David Enos and Paul McCullough of URS on May 22, 2009, the amount of granulated slag at the middle beach appears to be significantly lower than either the upstream or downstream beaches, with amounts

ranging from trace levels (i.e., no visual evidence of granulated slag) to about 20 to 30 percent by volume.

The middle beach likely does not represent a significant depositional area. The granulated slag present is thought to have been deposited in low-energy "micro-eddies" on the downstream sides of gravel and cobble clasts. Several test pits up to approximately four feet deep will be excavated at the middle beach at the initiation of construction activities to assess the conditions and occurrence of granulated slag at depth.

2.3.5 Surface Water

The Columbia River is adjacent to the north portion of BSB. Removal activities described in this Work Plan are proposed to be completed during late summer/early fall low-water stage periods. The ordinary high water mark of the Columbia River in the area of BSB is approximately 1,312 feet above mean sea level (msl). Review of 2009 river stage data from the USGS auxiliary gage near BSB indicates that routine river management and flow control produces an approximate 3-4 foot diurnal change in river stage. Low water typically occurs at a stage of about 1,295 feet above msl. All references to vertical elevations are based on the North American Vertical Datum of 1988 (NAVD 1988) unless otherwise indicated. The portions of BSB that contain granulated slag are submerged during late spring/early summer high water, but are usually above the river level during the remainder of the year.

During the proposed interim action in early September 2010, river water levels are expected to range between an estimated 1,294 and 1,298 feet above msl (National Geodetic Vertical Datum1929) on a daily basis based on USGS Auxiliary Gage data for the same time period in 2009, assuming an auxiliary gage base elevation of 1,202.91 feet above msl. Generally, low water occurs at about 4:00 am and high water occurs at about noon. Additional discussion of surface water flow in the area of BSB is discussed in Section 3.3.2.

2.3.6 Vegetation

No vegetation is present on BSB; while the surrounding area can be characterized by two vegetative zones. The first zone occurs along the shoreline. From the low water line, sand with deposits of rounded cobbles and coarse gravels are present with little to no vegetation. Away from the erosion forces of the river and into the 100-year flood plain, soil substrate transitions to an olive-gray to brown coarse sand and provides a transitional growth media where grasses, scattered low lying forbs and occasional ponderosa pines are present.

As elevation increases, the vegetation transitions to a coniferous Ponderosa Pine (*Pinus Ponderosa*) forest typical of drier climates in northeastern Washington. *Pinus Ponderosa* forests are characteristic "of a short growing season and minimal summer precipitation" (USFS 1973). Ponderosa pines are scattered within the 100-year flood plain and increase in density as elevation increases. Within the flood plain, occasional juniper trees are present, observed locally, for example, on the rock outcrop which separates BSB from the USGS gauging station.

Douglas firs, cottonwoods, aspens and paper birch also are present in the BSB vicinity as the elevation and tree density increases. The understory of the ponderosa forest contains forbs such as service berry, snowberry, bulbous bluegrass, chokecherry and starry false-Soloman's-seal.

2.4 Subsurface Conditions

2.4.1 Regional Geology

The site is located within the upper reach of the Columbia River valley. The Kootenay Arc comprises mountains east of the site. The Kootenay Arc includes remnant coastal plain sedimentary rocks that were accreted to the former western edge of the North American continent during the Jurassic Period, and later intruded by volcanic rocks. Bedrock beneath the BSB area includes metamorphosed Carboniferous to Ordovician sedimentary and volcanic rocks that also were accreted to the western edge of the North American continent. Additional later accretion sequences comprise the Kettle Metamorphic Core Complex and Okanagan Highlands west of the site area. The Columbia thrust fault is located in the general vicinity south of the site.

2.4.2 Local Geology

Two types of natural soils are generally found within the project area, based on observations of soil types exposed at the ground surface at the site. Riverbed granitic gravel and cobble soils are found along the shoreline within the 100-year flood plain and the channel migration zone. These coarse materials are supported in a matrix comprised largely of quartzitic coarse sand. Likely, the course clasts in this soil include fluvially reworked morainal deposits. This soil type is suspected to be present beneath the granulated slag based on its occurrence in the middle beach and along the shoreline downstream of the downstream beach.

Several river terraces compose the upland area of the site inland from the 100-year flood plain. These terraces are composed of relatively poorly graded (well sorted) fine sand, which likely represent glacially derived sand deposited through glacioaeolian or fluvial processes. Sand might be present beneath the granulated slag deposit in addition to coarser river gravel. Because potential cultural resources might exist within sandy soils at the site, special care will be taken to assess the nature of any lower sand deposits beneath the granulated slag and, if found, to minimize disturbance of sandy soil by limiting the depth of excavation and monitoring of excavation activities by a properly qualified professional archeologist.

Bedrock likely underlies both soil types at an unknown depth beneath BSB. A subsurface investigation was not conducted prior to development of this Work Plan. However, an intrusive archaeological survey is proposed to characterize the strata directly below the granulated slag. This investigation may provide further information regarding the strata below the granulated slag, including deeper sand units and/or bedrock.

2.4.3 Groundwater

Groundwater conditions were not explored during preparation of this Work Plan. However, based on our experience with similar sites located adjacent to the Columbia River, near-surface unsaturated groundwater flow is likely toward the river (north) or parallel to the river (west). During high water periods, groundwater flow might flow inland, away from the river, for a short distance as alluvial deposits lining the river bank become saturated. Depth to groundwater likely approximates river water elevations in the area of BSB.

Because the site is adjacent to the Columbia River and is composed of coarse-grained unconsolidated materials, groundwater is expected to enter the remedial excavation when the excavation advances to below river elevation. Also, because of the porous nature of site soils and the limited depth of the excavation, control of groundwater entering the excavation will be impracticable. Granulated slag materials may be excavated below the water line in certain locations using an excavator without dewatering. In such cases, the granulated slag will be temporarily stockpiled within the footprint of the excavation such that free water will drain back to the excavation. Due to its granulated nature, the slag is expected to readily drain in a short period (minutes to hours) following excavation.

2.5 Ownership of Affected Parcels, Easements, and Right-of-Way Considerations

The BSB property (APN 8000367) is owned by the State of Washington. Contact information for the property is as follows:

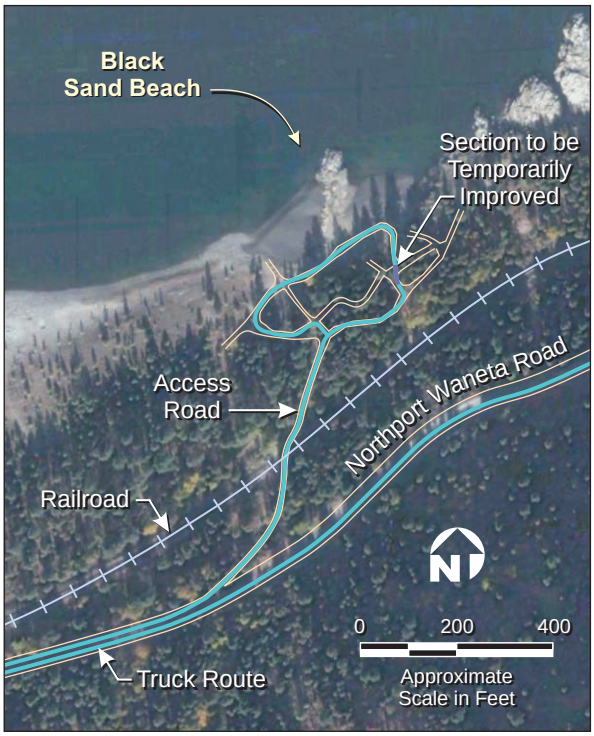
> Washington State Department of Natural Resources, Northeast District
> 225 S. Silke Road
> PO Box 190
> Colville, Washington 99114-0190
> Attn: Arne Johnson

The WDNR, as both a property owner and as the manager of natural resources in the state, has specific requirements for activities described in this Work Plan, including limited timber removal to allow truck access (WAC 222-30), road improvements (WAC 222-24), and other activities. These specific approvals will be obtained through a Forest Practices permit. See Section 3.3 for additional information related to the Forest Practices permit.

Other properties or easements potentially affected by the project include an adjacent private parcel west of BSB (APN 5704900), a BNSF railroad crossing along the unpaved access road leading from the Northport-Waneta Road to BSB (Figure 7), the right-of-way and easement of Stevens County Northport-Waneta Road (former Washington State Highway 251), and the truck turnaround area located west of the site and owned by Stevens County. Although no excavation work will be performed on these other properties, access to them will be required for ingress and egress to BSB or for staging trucks.

36310019_04.cdr

Source: Google Earth Pro



Detail

Driving directions to
600 Bingay Rd, Trail, BC, Canada
15.7 mi – about 31 mins

From Northport Waneta Rd, head northeast on Northport Waneta Rd toward Northport Waneta Rd/Waneta Rd

Entering Canada (British Columbia) 2.7 mi

Continue on HWY 22A 6.9 mi

Turn left at 22A 4.5 mi

Continue on Aldridge Ave 0.7 mi

Turn left at Bingay Rd 0.8 mi

0 2 4

Approximate Scale in Miles

Figure 7
Truck Haul Route

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

At the time of development of the 60% Work Plan, exact property boundaries and rights-of-ways were in the process of being surveyed by a licensed Land Surveyor. This information will be provided on site plans when available.

A permit will be required from BNSF to cross the railroad track at the existing crossing between the Northport-Waneta Road and BSB. Contact information for obtaining the BNSF permit is as follows:

Stauback Global Services
Attn: Permits Department
3017 Lou Menk Dr., Suite 100
Fort Worth, TX 76131-2800
Attn: Tanita Thomas

Teck will obtain permission to access the above-listed properties prior to performing the activities described in this Work Plan.

2.6 Other Considerations

The potential exists for the presence of cultural resources at the site and nearby access and staging areas, at adjacent properties, and at properties associated with the site, such as backfill source gravel quarries. Section 7.3 of this document and the draft Cultural Resources Plan (Appendix G) discusses the measures that will be undertaken to address the potential for significant cultural resources to be present within the BSB Excavation Project area.

The site is used informally as a recreational gathering spot for local residents including families, anglers, hunters, and others. Such recreational uses include picnicking, fishing, swimming, sun-bathing, and small-scale placer mining.

3.0 CLEANUP GOALS AND REQUIREMENTS

The cleanup goal for the project is to remove granulated slag materials from the upland portion of BSB to the maximum extent practical within the project area. As described in Section 4, the proposed removal of granulated slag from BSB is not a final cleanup action but represents an interim action conducted in conformance with the MTCA requirements.

3.1 Proposed Cleanup Goals

Ecology has not established formal cleanup levels for granulated slag material at BSB. The goal is to remove as much granulated slag material as practical based on visual evidence. Visual evidence is sufficient for screening the material, as the granulated slag is readily identifiable by physical appearance (e.g., color). Analytical samples are not necessary to guide the extent of the excavation. The Engineer, in consultation with Ecology, will jointly determine the actual limits of excavation in the field.

Granulated slag-containing materials within the targeted excavation area that may be located below the water line of the river at the time of the excavation and are inaccessible to excavation will be covered with "clean" imported fill. The lower portion of the fill will be composed of cobbles of sufficient size to "armor" any residual granulated slag and serve as an erosional barrier in the unlikely event that river bank erosional processes expose this section of the shoreline in the future.

The available analytical data from BSB granulated slag samples are identified in Table 2. These data are compared, for general advisory/reference purposes only, to Ecology-published criteria based on ecological considerations per WAC 173-340-900, Table 749-2, for unrestricted land use.

3.2 Granulated Slag Removal Performance Standard

Granulated slag will be removed from the BSB property throughout the targeted excavation area (Figure 5). Excavation of granulated slag material will be directed using visual observations by the Construction Manager. Likely there will be areas where the boundary between the granulated slag and natural soil are transitional. In these instances, the Construction Manager will determine the limits of excavation in consultation with Ecology.

Table 2
Comparison of Historic Analytical Results with Ecology List of Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure, Unrestricted Land Use

Parameter	Criteria[1]	Slag Sampling Results[2]	
		South Sample[2]	North Sample[2]
Antimony	—	44.7	30.2
Arsenic	20/95[3]	22.6	18.6
Beryllium	25	1.5	1.1
Cadmium	25	2.6	2.6
Chromium (total)	42	164	119
Copper	100	2620	1740
Lead	220	323	274
Nickel	100	22.0	15.5
Selenium	0.8	2.5	2.5
Silver	—	4.6	3.5
Thallium	—	0.50	0.50
Zinc	270	23000	14600

Notes
All values are parts per million.
1. These criteria refer to the Model Toxics Control Act Cleanup Regulation, WAC 173-340-900, Table 749-2 for unrestricted land use.
2. BSB sediment samples collected in February 2008 by Ecology (Section 5.1.1)
3. Arsenic III is 20 milligrams per kilogram (mg/kg) and Arsenic V is 95 mg/kg

3.3 Applicable Federal, State, and Local Laws and Regulations

This section presents potentially applicable federal, state, and local laws that may affect the project, in accordance with WAC 173-340-710.

3.3.1 Federal Requirements

Potential federal requirements are specified in several statutes, codified in the US Code (USC), and regulations promulgated in the Code of Federal Regulations (CFR). A few of these federal requirements are delegated to Ecology.

3.3.1.1 Stormwater Permit Program (RCW 90.48.260, 40 CFR 122.26, Chapter 173-226 WAC)

The Federal Clean Water Act (CWA), as delegated by the State of Washington to Ecology under RCW 90.48.260, requires that coverage under the general stormwater permit must be obtained for stormwater discharges associated with construction activities disturbing more than one acre. The disturbed area for the project is expected to be greater than one acre. To meet this requirement, the project will obtain coverage under the Washington State General Stormwater Permit for Construction Activities. In addition, a stormwater pollution prevention plan (SWPPP) will be prepared and approved by Ecology before the start of land-disturbing activities. The

SWPPP will describe the best management practices that will be implemented to protect surface water quality.

3.3.1.2 Clean Water Act, Section 404 - Dredge or Fill Requirements Regulations (33 USC 1344[a]–[d], 33 CFR Parts 320-330, 40 CFR 230)

These requirements are potentially applicable to removal actions in or near navigable waters and establish requirements that limit the discharge of dredged or fill material to these waters. The requirements of these regulations will be met by obtaining coverage under a USACE CWA Section 404 Nationwide Permit No. 38, which applies to the "Cleanup of Hazardous and Toxic Waste" and covers "specific activities required to effect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority." To obtain coverage, Teck will complete a JARPA (Section 6.0).

3.3.1.3 Clean Water Act, Section 401, Water Quality Certification (33 USC 1340, WAC 173-225-010)

Section 401 of the Federal Water Pollution Control Act provides that applicants for a license or permit from the federal government relating to any activity which may result in any discharge into the navigable waters shall obtain a certification from the state that the water quality standards will be met. Ecology issues the CWA Section 401 certification. To meet this requirement, Teck will complete a JARPA (Section 6.0).

3.3.2 Washington State and Local Requirements

Chapter 173-340 WAC defines the processes for identifying, investigating, and cleaning up sites where hazardous substances are present, and sets cleanup standards for groundwater, soil, surface water, and air.

In addition to MTCA, potential state requirements are specified in several statutes, codified in the RCW, and regulations promulgated in the WAC. This section describes potentially applicable laws and regulations.

3.3.2.1 State Environmental Policy Act (Chapter 43.21C RCW, Chapter 197-11 WAC)

SEPA is intended to ensure that state and local government officials consider environmental values when making decisions or taking an official action, such as approving this Work Plan. The SEPA process will be coordinated with the Voluntary Cleanup Program action through public notification by Ecology.

3.3.2.2 Washington Water Pollution Control Act (Chapter 90.48 RCW, Chapter 173-201A WAC)

The Water Pollution Control Act provides for the protection of surface water. Chapter 173-201A WAC establishes water quality standards for surface waters of the state. Ecology will consider

these water quality standards when reviewing the JARPA application and issuing the CWA Section 401 Water Quality Certification, as appropriate.

3.3.2.3 Washington Hydraulics Project Approval (Chapter 75.20 RCW, Chapter 220-110 WAC)

This regulation requires WDFW approval for projects that will use, divert, obstruct, or change the natural flow or bed of waters of the state. WDFW typically issues in-stream work windows under the authority of this program. Technical provisions written for freshwater hydraulic projects covered in WAC 220-110-040 through -224 potentially apply to this project and will be further assessed during the permitting phase of the project (see Section 6.0). In consideration of these requirements, no in stream construction will be performed for this project, although construction will occur in the upland area adjacent to the river.

3.3.2.4 Temporary Modification of Water Quality Criteria and Other Requirements to Modify Water Quality Criteria (RCW 90.48, WAC 173-201A-410–450)

WAC Chapters 173-201A-400 through -450 specify requirements for modifying statewide water quality criteria on a site-specific basis. These requirements include establishing short-term water quality modification, variance, site-specific water criteria, and water quality offsets. Construction activity adjacent to surface waters that may unavoidably result in temporary exceedance of the Washington statewide water quality criteria may obtain a Short-term Water Quality Modification. It is anticipated that implementation of the best management practices described in the SWPPP (Appendix E) and the construction sequencing measures (Appendix D) will minimize the need to temporarily modify water quality criteria during construction.

3.3.2.5 Washington State Aquatic Lands Management (RCW 79.90455, Chapter 332-30 WAC)

The State Aquatic Lands Management Laws specify criteria for the management of aquatic lands. These lands are deemed “a finite natural resource of great value and an irreplaceable public heritage” and will be managed to “provide a balance of public benefits for all citizens of the state. State-owned aquatic lands will be managed to meet the following management goals: foster water-dependent uses; ensure environmental protection, encourage direct public use and access, promote production on a continuing basis of renewable resources, allow suitable state aquatic lands to be used for mineral and material production, and generate income from use of aquatic lands in a manner consistent with the above goals.” The regulations specify criteria for management of rivers, including bank stabilization. To meet this requirement, Teck will complete a JARPA (see Section 6.0).

3.3.2.6 Washington State Shoreline Management Act and Stevens County Shoreline Management Master Program (RCW 90.58, WAC 173-27-060, Stevens County Resolution 78-1999)

The Shoreline Management Act and Stevens County Shoreline Management Program require a permit for any development or activity valued at $5000 or more that is located on the water or shoreline area. Shorelines are defined as lakes, including reservoirs, of 20 acres or greater; streams with a mean annual flow of 20 cubic feet per second or greater; marine waters plus an area landward for 200 feet measured on a horizontal plane from the ordinary high water mark; and all associated marshes, bogs, swamps, and river deltas. Floodplains and floodways incorporated into local shoreline master programs also are included. To meet this requirement, Teck will complete a JARPA (see Section 6.0).

3.3.2.7 Washington State Forest Practices Act (RCW 76.09) and Stewardship of Non-industrial Forests and Woodlands (RCW 76.13)

The Forest Practices Act rules are designed to protect public resources such as water quality and fish habitat while maintaining a viable timber industry. This act applies to the BSB voluntary independent interim action because the site is located on state-owned (public) lands, and state-owned resources will be affected by the interim action. For instance, several paths/roads will be improved temporarily to facilitate truck and equipment access and five to ten early to mature second-growth trees may require removal. These activities require a Forest Practices Permit administered by the WDNR. Additional access agreements, fees, and licenses such as a Land Use license, timber harvest fee, and Road Improvement permit may be required.

3.3.2.8 Site Analysis Review (Stevens County)

Stevens County may require a Site Analysis review to ensure that the project meets all the minimum code requirements for new development. The Site Analysis application will be submitted for review to determine the applicability of the following programs:

- ***Special Flood Hazard Area Development Permit (Resolution 78-2003):*** Construction or development within any areas of special flood hazard require a permit. Special flood hazard areas are mapped by the Federal Insurance Administration. "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations located within the area of special flood hazard. Removal action activities that meet the definition of "development" with a special flood hazard area would require a permit. Applicability of this requirement will be reviewed as part of the Site Analysis review process.
- ***Critical Areas Review/Permit (Chapter 13.30 Stevens County Code):*** Development within critical areas or their buffers may require a permit under Chapter 13.30 of the

Stevens County Code. The applicability of this requirement will be reviewed as part of the Site Analysis review process.

3.3.2.9 Traffic Control (Stevens County and British Columbia)

Construction activities such as haul truck operations will require that traffic on the Northport-Waneta Road be directed by flaggers and signage. A Traffic Control Plan will be prepared by Teck or its contractor for review by Stevens County, and flagging activities will be consistent with the Manual on Traffic Control Devices and the Washington State Modifications to the Manual. Additionally, the Contractor will be required to follow all applicable US and Canadian requirements for transporting the granulated slag on both sides of the border (e.g., cargo paperwork, weight restrictions, etc).

3.4 Canadian Laws, Treaties, and Requirements

Since the project includes transportation and disposal of the slag-impacted materials in Trail, British Columbia, certain Canadian laws and requirements will apply. This section discusses these international treaties and agreements that govern the transboundary movement of hazardous and other waste materials.

3.4.1 Export and Import of Hazardous Waste and Hazardous Material Regulations (Section 191), Canadian Environmental Protection Act (1999)

The purpose of the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations adopted under Section 191 of the Canadian Environmental Protection Act (1999) is to protect Canada's environment and the health of Canadians from the risks posed by the transboundary movement of hazardous wastes and hazardous recyclable materials through exports from, imports into, and transit through Canada, and to implement Canada's international obligations. The Regulations are published in the Canada Gazette, Part II on June 1, 2005 and came into force on November 1, 2005. They revoke and replace the former Export and Import of Hazardous Wastes Regulations adopted in 1992 under the authority of the former Canadian Environmental Protection Act. The import of hazardous waste or hazardous recyclable materials across the border is governed by the Canadian Food Inspection Agency and requires an import license.

3.4.2 Transportation of Dangerous Goods Act (SOR/2001-286 of August 1, 2001)

The Transportation of Dangerous Goods Act applies to the handling and transportation of dangerous goods within the Province on highways, as defined in the Motor Vehicle Act and on rail vehicles, notwithstanding anything in the Federal Regulations to the contrary. The Transportation of Dangerous Goods Act requires specific containers, placarding, and manifesting of vehicles transporting certain waste according to its classification. In British Columbia, if a material is a hazardous waste as defined in any number of ways, the carrier needs to have an "LT license," or a license to transport hazardous materials. The existing analytical data (Appendix C)

will be used to characterize the granulated slag for disposal purposes pursuant to Canadian standards. Ecology will be provided with the results of any additional analyses required as part of final project documentation, if applicable.

3.4.3 Canada-USA Agreement on the Transboundary Movement of Hazardous Waste

The Canada-USA Agreement on the Transboundary Movement of Hazardous Waste (including hazardous recyclable materials) came into effect in November 1986 and is renewed every five years unless a Party withdraws. Under this agreement, the two countries are responsible for ensuring that domestic laws and regulations are enforced regarding transportation, storage, treatment, and disposal of transboundary shipments. The waste or recycling classification of the granulated slag material pursuant to Canadian requirements will be further assessed in consultation with Canadian officials in the design phase.

The basic scheme of the Canada-USA Agreement is similar to that of the Basel Convention (Section 3.4.5). It provides for notification to the country of import by the country of export of proposed transboundary hazardous waste shipments (including recyclable materials) covered by the agreement. As with the Basel Convention, the notice may cover an individual shipment or a series of shipments extending over a twelve-month period. Under the agreement, the country of import has thirty days from receipt of notice to respond, indicating its consent (conditional or not) or its objection. If no response is received within that period, the country of import is deemed to have no objection and the export may take place conditional upon compliance with the laws of that country. Shipments of wastes and hazardous recyclable materials require a manifest. The exporter must provide for readmission of exports if returned by the country of import.

3.4.4 The Organization for Economic Cooperation and Development

The Organization for Economic Cooperation and Development (OECD) also has been active in attempting to control the transboundary movements of hazardous wastes and recyclable materials. A 1984 decision by the OECD requires the exporting country to provide adequate and timely information to the importing country. The appropriate authorities in the country of destination then have the option of consenting or objecting to the proposed shipment. OECD Council Decisions are legally binding on all member countries that accept them. There are 29 member countries in the OECD, including Canada and the US. Many, if not all, of the OECD requirements appear to be covered by the Canada-USA Agreement.

3.4.5 Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is an international treaty under the United Nations Environment Program. Notwithstanding the title of the Convention, it covers the final disposal and recycling of hazardous wastes and “other wastes,” the latter defined as household wastes and the residue from

their incineration (Annex II). Recycling of wastes is encompassed within the term disposal for the purposes of the Convention.

The Convention opened for signature on March 22, 1989 and entered into force on May 5, 1992. Over 130 countries and other parties have ratified or otherwise accepted the Convention (Canada ratified in 1992) with the significant exception of the US. The US signed the agreement on March 22, 1990 but has not ratified it.

The Convention requires each party to take appropriate measures to (among other things):

- Reduce the generation of wastes to a minimum, taking into account social, technological and economic aspects
- Locate adequate disposal facilities, to the extent possible, within the generating country
- Reduce the transboundary movement of wastes to a minimum consistent with the environmentally sound and efficient management of such wastes
- Ensure that the transboundary movement of wastes is conducted in a manner that will protect human health and the environment

The Convention places primary responsibility for control of transboundary movements on the exporting country and requires that the exporting country not allow such movements without the written consent of the importing country (i.e., a prior informed consent). It also requires that parties ensure that any export is managed in an environmentally sound manner. The Convention further requires transboundary shipments to be accompanied by a movement document or manifest and provides that the advance notifications of proposed waste shipments may cover multiple shipments during a maximum period of twelve months.

Each shipment must be packaged, labeled, and transported in conformance with generally accepted and recognized international rules and standards. The exporter must provide for readmission of exports if returned by the country of import. Both the exporter and the exporting state must be informed of the receipt and ultimate disposal of the waste. National legislation is to be in place to prevent and punish illegal traffic.

4.0 SELECTED VOLUNTARY INDEPENDENT INTERIM ACTION

4.1 Summary of Selected Interim Action

The voluntary independent interim action described in this Work Plan includes excavating granulated slag at BSB using conventional excavation techniques. Because the granulated slag is visually distinct from native soils at the site, visual observation rather than analytical testing will direct excavation. The determination of when excavation is complete in an area will be determined by the Engineer in consultation with Ecology. This interim action might leave residual granulated slag in place when further removal is problematic. Examples of situations where granulated slag may remain include: where slag is at depth below groundwater levels, when granulated slag is found as a minor component of the matrix, when granulated slag is encountered near cultural resources, or other reasons. Excavated areas will be filled with an imported backfill designed to withstand expected erosional forces, to provide some potential for limited fish habitat along the shoreline, and to provide similar recreational opportunities for future users of the site. The elevation of the replaced beach will be lower than the current beach to minimize potential erosion. Note that there is potential that replaced fill could be eroded in the future, especially if the fill is a sand material.

The interim action described in this Work Plan is a voluntary independent interim action being conducted by Teck under the requirements of MTCA subchapter WAC 173-340-515. A voluntary independent action is generally conducted without formal department oversight or approval and not under an enforcement order, agreed order or consent decree. Teck is conducting the BSB interim action in coordination with Ecology's informal advice and assistance, including technical consultations on the administrative and technical requirements of the MTCA. This consultation with Ecology is voluntary, as described in WAC 173-340-515(5).

No specific numeric cleanup levels or contaminant pathway considerations will be used to guide or direct the limits of excavation. Therefore, there is potential that residual quantities of granulated slag will remain, likely buried at depth beneath clean soil fill.

5.0 DETAILED DESCRIPTION OF SELECTED INTERIM ACTION

5.1 Key Components of Selected Interim Action

Major components of the preferred interim action include:

- Pre-field work preparation, including final characterization of the granulated slag for transportation and disposal, as well as conducting a non-intrusive and intrusive pre-construction archaeological survey to identify potential areas of cultural resource significance so that appropriate mitigation measures can be undertaken to avoid these areas
- Erosion and sediment control and stormwater management
- Excavation, temporary stockpile, load-out, transportation and disposal
- Import of "clean" backfill, backfill placement, and final grading
- Close-out
- Post excavation BSB monitoring

5.1.1 Characterization of Granulated Slag for Transportation and Disposal

In February 2008, Ecology's Eastern Regional Office collected and analyzed granulated slag material samples from BSB to chemically characterize and designate the materials (per Chapter 173-303 WAC) for possible transport and disposal in support of any potential future removal actions (Ecology 2008). Samples of granulated slag were collected from six sample stations using hand auger methods. Depth-specific samples were collected and isolated from several individual auger holes at approximate depths of 0–2 feet, 2–4 feet, and 4–6 feet. In most cases, auger refusal was encountered at depths of 4 feet or less.

Beach samples were placed in gallon-sized zip lock bags, labeled with a unique identifier, and stored in a cooler for transport back to the Ecology office. A subset of the beach samples were used to generate two composite samples designated as "North Composite" and "South Composite." The "North Composite" sample was prepared using approximately equal volumes of beach materials from three subsamples collected in the eastern half of BSB representing the 0–2 foot depth interval. The "South Composite" sample was prepared using approximately equal volumes of beach materials from the three subsamples collected in the western half of BSB, also representing the 0–2 foot depth interval. Figure 8 shows the locations of the discrete samples.

36310019_07.cdr

SOURCE: Washington State Department of Ecology

Figure 8

Black Sand Beach Sediment Sampling Locations

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

The two composite samples were submitted under standard chain of custody protocol to Ecology's Manchester laboratory for Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311-6010) and total metals analysis via inductively coupled plasma mass spectroscopy (Method EPA 200.8). The analytical report is provided in Appendix C.

Table 2 includes analytical results for the two composite samples. Analytical testing results indicate the following (Ecology 2008):

- Neither sample fails any of the TCLP criteria; only low levels of barium, lead, and cadmium were detected in leachates
- Elevated levels of copper and zinc were present in both samples, with the metal concentrations in the "South Composite" sample being consistently higher than concentrations observed in the "North Composite" sample
- These analytical results are generally consistent with other historical analytical results from BSB samples (e.g., USEPA 2006)

In addition to the metals analysis, samples of the granulated slag materials were sent to Nautilus Environmental, LLC (Nautilus) for a dangerous waste characterization using a 96-hour fish bioassay study. This bioassay study used the test organism rainbow trout (*Oncorhynchus mykiss*), following the method described in Ecology Publication 80-12. The BSB granulated slag samples were identified as North Comp A (ground), North 2B, North 3A, South Comp A, South 2A, and South 2C, and were received by the laboratory on March 11, 2008.

A copy of the analytical report for the fish toxicity testing is included in Appendix C. Nautilus reported that there was three percent mortality in the 100 milligrams per liter (mg/L) concentration and no mortality in the 10 mg/L concentration of sample South 2C during the test. There was no mortality in any other sample during the test. Based on these results, the samples do not designate as either dangerous or extremely hazardous wastes (Ecology 2008).

In consideration of the above metals analysis and fish toxicity test results, the granulated slag-material will be considered a non-hazardous/non-dangerous waste for transportation and disposal purposes in the State of Washington.

For purposes of the Canadian requirement, the granulated slag materials will be preliminarily characterized as a Hazardous Recyclable Material by Canadian criteria per the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulation.

The currently available analytical data (Appendix C) and the appropriate paperwork will be provided to the British Columbia Ministry of Environment to inform and facilitate concurrence of the preliminary waste determination by Canadian officials. Additional granulated slag material samples at BSB may be collected, as necessary, to comply with applicable Canadian requirements for transportation and disposal purposes. Teck will notify Ecology of any additional laboratory testing of granulated slag materials that may be required for purposes of waste determination/characterization, and will provide copies of the laboratory analysis results as part of the final project documentation.

5.1.2 Pre-Field Work Preparation

Other pre-field work preparation includes:

- Verify that required permits, approvals, and access agreements are obtained.
- Review results of pre-construction archaeological survey to become familiar with the archeologist's recommendations for construction work and areas that were identified to contain or may contain potential cultural resources.
- Prepare a traffic-control plan.
- Notify One Call Services of intrusive work.
- Perform pre-construction survey, including stake-out of the designated work area.
- Make minor, temporary upgrades to the access road to allow truck access to BSB. Such modifications will be minimized to the extent possible. For instance, fill will be used to fill in ruts and to lessen the access road slope between the flood plain and riverbank. A layer of geotextile fabric will be placed on the native ground surface prior to placement of fill to mark the natural ground surface upon post-construction removal. In addition, five to ten trees will likely require removal to provide trucks with adequate turning radius as they move in and out of the BSB loadout zone.
- Make minor modifications to the railroad crossing, if necessary and requested by BNSF, to allow loaded truck crossing without damage to the rail line.
- Conduct pre-construction meeting with Ecology, Contractors, Engineer, and inspectors.
- Contact upstream dam operators to ascertain whether any unusual water release or storage events are planned during the time of field activities.
- Install temporary construction fencing and signage to restrict access to BSB during construction.
- Mobilize equipment and contractor personnel to the site; set up equipment staging area, decontamination/support zone, and temporary facilities (e.g., portable restrooms, first aid/eye wash station, and personnel/equipment tents).

5.1.3 Erosion and Sediment Control and Stormwater Pollution Prevention Measures

Erosion and sediment control and stormwater pollution control measures will be undertaken to ensure compliance with applicable water quality standards in the adjacent river, as further described in the SWPPP (Appendix E). Erosion and sediment control measures will employ a two-tier approach to ensure adequate protection of the river during construction.

The first tier measures will include installing temporary silt fencing along the shoreline of the river and around upland access and staging areas to prevent sediment-laden runoff from leaving the site, should storm and precipitation events occur during field construction.

The second tier erosion and sediment control measure will include carefully sequencing excavation and backfill placement operations, particularly during excavation and backfill of the parts of BSB adjacent to the Columbia River. This sequencing will include beginning granulated slag excavation along a strip parallel to the shoreline, carefully placing clean backfill within this shoreline excavation, then using this strip as a base for stockpiling clean backfill material for use during the remainder of the construction work. The shoreline stockpile strip of clean backfill will serve as a curtain to prevent stormwater from upland areas from entering the river. Backfill material will be placed in stockpiles, taking into consideration the lateral distribution of the materials, and appropriate setbacks will prevent backfill material from entering the river.

Stormwater monitoring will depend on the applicability of a pending erositivity waiver request. As indicated in the SWPPP (Appendix E), turbidity measurements, which are required by Ecology, will be taken at least hourly during excavation work within ten feet of the shoreline using a calibrated turbidity meter. The turbidity measurements will be compared to baseline turbidity measurements and corrective actions as outlined in Appendix E. Corrective measures will be undertaken in the event that measured turbidity values are greater than five Nephelometric Turbidity Units (NTUs) above baseline values, or if results of monitoring indicate exceedance of state and federal water quality standards. In the event that initial corrective actions are unable to reduce turbidity measurements to acceptable values (i.e., within five NTUs of baseline values), a turbidity curtain will be placed three to ten feet into the river. Additional information pertaining to frequency and monitoring locations is presented in the SWPPP (Appendix E).

Excavated granulated slag will either be loaded directly into trucks or will be temporarily stockpiled at BSB to allow drainage of saturated materials pending load-out and truck transport of the granulated slag material to the Teck facility in Trail, British Columbia, where it will be managed similar to other slag materials at this facility.

A temporary erosion and sediment control plan that illustrates engineering control measures to be implemented for the project is provided in the 60 percent engineering plans (Appendix D). A draft copy of the SWPPP is included as Appendix E.

5.1.4 Excavation, Temporary Stockpile, Load-Out, Transportation, and Disposal

An estimated 5,000 cubic yards (plus or minus 25 percent) of granulated slag material will be excavated from BSB. The area of the prescribed excavation is shown on Figure 5 and in Appendix D.

Excavation and load-out of the granulated slag material at the upstream, downstream, and middle beaches will be performed using conventional excavation equipment, including excavators, loaders, and dump trucks. Granulated slag at the top of the outcropping will be removed using a vacuum truck, sweeping, or other Ecology-approved means. Prior to initiating excavation activities, test pits will be excavated in the upstream, downstream, and middle beaches to verify granulated slag thicknesses and underlying soil conditions. The Engineer, the Cultural Resource Specialist, and/or the professional archaeologist will monitor these test pits. Excavation of

granulated slag will be sequenced to start at the north end of the beach (closest to the water as described above) and progress toward the upland area away from the river. Excavation activities will be monitored by the Engineer and on-site archaeological monitor.

It is anticipated that the construction work will be performed during a six-day work week (Monday through Saturday) and during daylight hours. The construction schedule of selected short-term activities might be adjusted during daylight hours to take advantage of daily fluctuations in river stage and associated changes in groundwater levels. For instance, excavation along the shoreline will be conducted during daily low-river stage conditions. Transport of the granulated slag to Trail, British Columbia must be conducted when the international border crossing is open, which is currently from 9:00 am to 5:00 pm. Excavated slag will be loaded into trucks that will follow existing roadways into the site (Sheet 1, Appendix D).

The proposed truck haul route on State-land will require removal of several trees, limited temporary improvements, and the approval of WDNR. Loadout is expected to occur as close to the granulated slag as possible. Trucks will access the upstream beach and will exit from the downstream beach. A Cultural Resource Specialist visually inspected roads entering and exiting the beach on November 19, 2009 and no cultural resources were identified on the BSB haul roads. An additional cultural resource survey will be undertaken to confirm the findings of the visual survey. In the event that cultural resources are later identified on the proposed haul roads, the truck haul route will be modified or steps will be taken to preserve the cultural resource accordingly.

The proposed haul route eliminates the need for trucks to back up during the loading process. Each truck will be weighed at a level area within the construction site using on-board axle scales to ensure that loads meet applicable weight restrictions. Because the unpaved access road to BSB from Northport-Waneta Road does not allow trucks to turn toward Waneta/Canada, trucks will exit the site toward Northport and use a turn around area located on Stevens County property about two miles southwest of BSB. On-site roads and the turn around area have been surveyed to verify that haul trucks will have the required space to maneuver as described. Modifications to this haul plan, if necessary, will be provided in the 90% Work Plan.

During excavation, construction monitoring personnel will document the depth and width of the excavation. Retail grade hand-held Global Positioning System (GPS) units will be used to document the horizontal location of visual slag observations. Visual slag conditions will be noted at a frequency of not less than once in every 20-foot by 20-foot area of excavation as the excavation progresses. Bottom elevations of excavations will be established using a construction level and a site-specific benchmark if the excavation is safe to enter. If the site safety officer determines the excavation is unsafe, bottom elevations will be estimated using a tape measure. At the conclusion of digging, the excavation boundaries will be measured using a GPS at a frequency of no less than one measurement every 25 feet. Site-specific benchmarks will be tied to the site datum using GPS.

Ecology will be notified once the Engineer believes that sufficient slag has been removed from an area using visual techniques. Ecology will indicate whether additional excavation is necessary. Backfill material will be placed as excavation progresses to minimize open excavations at the site during construction. Approval from Ecology will be obtained prior to placing any backfill material. Section 5.1.7 presents additional information relating to on-site monitoring.

In some cases, granulated slag material may be excavated below the low water line, particularly at the downstream beach where the granulated slag is deepest and most prevalent. Groundwater will accumulate (pond) at the bottom of the excavation if below the water line. Granulated slag material will be excavated below ponded water within the excavation boundary (inland of the shore) to the extent practical without dewatering. However, excavating below the water line may not be desirable because the delineation between slag and native soil will be difficult to observe and there is increased potential to disturb cultural resources that might be present beneath the granulated slag. Saturated granulated slag material excavated from beneath the water line will be placed either on dry slag to free drain or on the upland side of a temporary berm that will be installed adjacent to the excavation such that the water drained from the sediments will flow back into the excavation. If necessary based on encountered conditions, plastic sheeting may be installed along the upland side of the berm to mitigate potential surface water runoff in the affected area.

In areas of the site where direct load-out is not possible, the excavated granulated slag material will be stockpiled temporarily in the vicinity of the excavation, pending load-out and off-site transportation. Plastic sheeting will be placed over inactive stockpiles as further described below. Visual monitoring will be conducted in the immediate area of the excavation and at the entrance/exit of the access road to assess whether land-disturbing activities generate excessive dust. If there is sustained visual evidence of dust for more than 30 seconds, the visual observations will be supplemented with periodic dust measurements using a portable hand-held dust-monitoring instrument. Dust control measures, if required, will include wetting the affected area with water. Ecology will approve the source of the water.

The stockpiles will be covered with plastic sheeting when inactive (e.g., overnight, non-work days, or periods of inactivity greater than about four hours) to minimize potential runoff during storm events or potential wind-blown dust from the lighter native sediments (granulated slag is relatively heavy and is not anticipated to be a dust nuisance). The stockpiles will be inspected at least daily during working hours or at least every 48 hours during non-working days, or as approved by Ecology. Results of the inspections will be documented in the field log. Records shall include, at a minimum, the date and time of the inspection, weather, stockpile location, and a description of any deficiencies noted and corrective actions taken.

The excavated granulated slag materials will be loaded into dump trucks for transportation and disposal at the Teck facility in Trail, British Columbia. The middle beach contains a mixture of granulated slag and coarser materials, such as gravel and cobbles. Likely, the presence of granulated slag within the middle beach will be limited to approximately the upper six inches. If

this is the case, the upper six inches of material (composed of granulated slag, gravel, and cobbles) will be excavated and transported off-site for disposal. If significantly thicker sequences of slag/gravel/cobbles are identified in this area, mechanical screening will separate the granulated slag from coarser materials, with the coarse material being retained on site for reuse as fill. Teck will provide Ecology with information regarding the screening equipment when such information is available from the Contractor.

Prior to leaving the designated BSB area, each truck will be inspected to ensure that there are no loose materials on the tailgate or other areas of the truck; that the tires are clean and will not track excessive dirt or mud; and that the appropriate paperwork is in place for transportation. A cover will be placed over the bed of the truck during transport to contain the granulated slag materials within the truck. For safety reasons, truck drivers will be allowed to exit the truck only in designated areas out of the immediate work zone.

The configuration of the exit from the BSB access road does not allow trucks to turn directly on to northbound Northport-Waneta Road towards Canada (Appendix B). Therefore, the trucks exiting BSB will make a right hand turn from the exit and then turn around at a nearby location alongside the Northport-Waneta Road. Similarly, trucks will enter the BSB access road by making a left hand turn from northbound Northport-Waneta road. Appropriate signage along the Northport-Waneta road and flaggers will be used as defined in the traffic control plan to ensure safe conditions at the entrance/exit location and truck turn-around area. The traffic control plan will be prepared by the Contractor and approved by Stevens County prior to start of construction activities. Figure 7 shows the anticipated truck haul map.

During transportation of the granulated slag material, Teck will have its existing spill response team from their facility in Trail British, Columbia available to respond in the unlikely event of a spill of granulated slag during transport. The spill response team is able to be deployed on either side of the border in the event of a release that requires their services.

5.1.5 Import of "Clean" Backfill, Backfill Placement, and Final Grading

Upon approval from Ecology, the excavated portions of BSB will be backfilled with imported cobbles, gravel, or sand in accordance with the approved design plans. The draft grading plans are included in Appendix D. Table 3 presents the estimated volumes of cut and fill materials for each BSB area.

Table 3
Estimated Cut and Fill Volumes

Area	Area (SF)	Cut (Cu. Yd)	Fill (Cu. Yd.)
Downstream Beach	18,510	4,100	3,380
Upstream Beach	9,850	400	220
Middle Beach	5,940	150	150
Rock Outcropping	8,280	10	0
Total	42,580	4,660	3,750

As indicated in Table 3, the fill volume is less than the cut volume because the high mound of granulated slag materials near the water line will be re-graded with a gentler slope towards the tree line (Appendix D, Sheet 5).

An engineered fill placement strategy will be used to maximize the probability that the replaced material is protective and sustainable in the anticipated river environment during periods of seasonally high river stage and increased flow velocity. The lowest portion of the excavation, particularly at downstream beach locations where granulated slag will likely be under groundwater at the time of excavation, will be backfilled with a material consisting of appropriately sized gravel and cobbles as a basal armoring layer. The thickness of this coarse basal armoring layer will vary depending on its location on the beach, but will typically range from 2 to 5 feet. This material will provide armoring and cover of granulated slag that might be inaccessible due to it being submerged at the time of excavation.

A middle layer of well-graded sandy to cobbly gravel fill will be placed either above native sediments or above the coarse basal armoring layer (where required, as described above). This middle layer will be sized to reduce the potential for erosion and hydraulic transport, will vary in thickness to help reestablish beach grades, and will be used to transition the backfill at the shoreline. This material will be mechanically compacted to generally match durability of beach strands downstream of the site. The upper portion of the backfill will consist of a loose coarse sand/fine gravel to provide for future recreational use of the beach. The characteristics of this coarse sand/fine gravel will be generally designed to withstand the erosional forces expected during high water periods.

During seasonal high flow and high river stage conditions – typically in late spring – BSB often is flooded or inundated for several weeks. Under these conditions, the uppermost fill layer may be subject to hydraulic scouring or erosion. These conditions could remove or redistribute some of the sandy and/or fine gravelly fill material and expose the underlying coarser-grained fill layer. No provisions are in place as part of this interim removal action to replace any surficial fill material that may erode due to these normal seasonal flooding events.

Teck is continuing to evaluate possible commercial borrow source options to meet the replacement fill objectives of this project. Borrow source selection must satisfy material composition, sizing, and cultural resource clearance requirements of the project. Once the source has been confirmed, Teck will provide Ecology with the source of the fill material. Additionally, Teck will provide Ecology with other relevant specifications of the fill materials, including representative asbestos, if necessary, and metals analysis results of the selected coarse sand/fine gravel material (see Appendix C list of metals). Asbestos is considered a potential contaminant in clean backfill because some of the metamorphic rock types in northeast Washington are known to contain asbestiform mineralization and will be analyzed for if the backfill source includes metamorphic rock material. Samples of the coarse sand/fine gravel backfill will be analyzed for metals (see Appendix C list of metal constituents) using inductively coupled plasma mass spectroscopy (Method EPA 200.8). Additionally, the coarse sand/fine gravel will be analyzed for mercury using EPA Method 7471A. The backfill samples will be analyzed at a

frequency consistent with Ecology guidance for clean backfill (Ecology 1994). For 3,000 cubic yards, 12 samples will be required per the guidance document. In addition, backfill will be free of invasive weeds, as documented by the backfill supplier.

Only existing, permitted, commercial aggregate sources will be considered as sources for clean backfill. It is assumed that local Washington State aggregate vendors will be selected to provide backfill material. However, significant efficiencies might be realized if an acceptable source of backfill material is identified in Canada to allow "back-haul" by the trucking contractors. Teck and/or their representatives will ensure that if Canadian aggregate sources are considered, US import, cultural resource, invasive/weed species, and other concerns will be addressed in advance, in consultation with Ecology and other stakeholders.

5.1.6 Site Control

During the construction period, open excavations, heavy equipment operation, loaded and unloaded truck traffic will present safety hazards at the site. To protect public health and safety, site access will be limited during the construction period. This includes off-hour periods such as evenings and non-working days. Only authorized construction, safety, inspection or management personnel will be allowed within the active construction zone. Other individuals with interest in site activities will be allowed on-site on a case-by-case basis in coordination with Ecology and Teck. Because of space limitations and to minimize impacts to non-work areas of the site, only authorized vehicles will be allowed access during the period of construction. The access road leading into the site will be monitored by flaggers stationed at the pull-off from the Northport-Waneta Road during working hours. It is anticipated that construction activities will be conducted six days per week (Monday through Saturday) during daylight hours (approximately 7:00 am to 5:00 pm). The schedule may be modified by the Engineer. During off-hour periods the access road will be barricaded and the site will be guarded by security guards stationed at the site.

5.1.7 Project Close-Out

Project close-out activities include:

- Conducting the final inspection with Ecology
- Conducting a final topographic survey to document "as-built" final grade elevations
- Removing temporary fill material from the access road and re-establishing general pre-construction road conditions to the extent possible
- Demobilizing all equipment, materials, markers, signage, and fences
- Notifying appropriate county personnel (e.g., County Highway Department) and US Border Patrol that construction-related activities at the BSB area are completed
- Preparing a project completion report, including submitting a Post Excavation Performance Monitoring Plan

- Preparing and submitting final photo documentation log
- Preparing and submitting 100 percent record drawings

Completing these activities and submitting the final deliverables identified above will be documented in a Project Close-out Report. At a minimum, this report will include:

- Results of the final inspection, including a brief description of any problems discovered during the final inspection and the resolution of those problems, as necessary
- A detailed description of work conducted in accordance with the Work Plan and engineering plans, and certification by a Washington State-Registered Professional Engineer that the work was performed in accordance with approved plans and specifications
- Water level measurements of the river during site construction work, as measured with a temporary staff gage in the nearshore river area and/or water elevation gage readings from the nearby gauging station
- Explanation of any modifications to the plans and specifications and why these modifications were necessary
- Final 100 percent as-built record drawings, if different from final design drawings previously submitted to Ecology
- Record drawings, including an as-built topographical survey map prepared by a licensed surveyor
- Photo documentation of the work area during performance of the excavation work and following completion of the construction activities
- Copy of final permits and bill of lading for each truck load
- Information on source of any fill material, including location, description of material, and certification or analytical results of chemical composition of metals and invasive plant species

5.1.8 Post-Closeout Beach Monitoring

Within 45 days of completing Phase 2, Teck will prepare and submit to Ecology a Performance Monitoring Plan that outlines annual monitoring activities for re-exposure and/or re-deposition of granulated slag material, as described in the July 13, 2009 VCP Agreement between Ecology and Teck. Annual monitoring will document any changes in site conditions over time (e.g., erosion and/or accretion). Per the VCP Agreement, Teck is not obligated to conduct any additional construction work following completion of Phase 2 activities. However, work might be conducted later under other programs and agreements.

At a minimum, the Performance Monitoring Plan will include the following elements:

- Schedule of monitoring activities: Monitoring is planned to be conducted on an annual basis for a period of five years following implementation of Phase 2 (through 2015), or until such time as an alternative monitoring program is established as part of other work. Annual monitoring will be conducted during the late summer or fall when the river stage is at or near its seasonal low.
- Procedures to visually and photographically assess annual BSB changes and periodic surveys by a licensed land surveyor with a GPS unit.
- Procedures to conduct analytical testing if visual assessment is unable to confirm the presence or absence of granulated slag accumulation.

5.2 Health and Safety

A site-specific health and safety plan (HSP) is provided in Appendix F. Contractors and subcontractors that will implement this Work Plan will be required to either adopt this HSP or prepare a safety plan that is at least as stringent as this HSP. Contractor-provided HSPs, if any, must be approved by Teck and Ecology prior to being adopted for use on the project.

No cell phone coverage is available at the site. Therefore, the Contractor will be required to have at least one satellite phone system for communication in the event of an emergency, or other matters that require phone communication.

The decontamination areas and emergency evacuation route and mustering area will be posted at the site in a conspicuous location, and routinely discussed in the initial site health and safety meeting and routine follow-up tailgate health and safety meetings.

5.3 Field Monitoring

During the course of excavation and backfill operations, the Contractor will be required to perform the following minimal monitoring activities on at least a daily basis:

- Erosion and sediment control measures will be inspected and documented daily during the course of the work to ensure that the engineered erosion and control measures as specified in the plans are in place and functioning properly. Examples include inspections of silt fences and temporary berms (see Appendix E).
- Airborne dust monitoring will be performed by the site safety officer periodically during excavation and fill placement activities. Dust monitoring will mostly consist of visual monitoring. However, the visual observations will be supplemented by measurements using a portable dust monitoring instrument (TSI Model SidePak AM510 or approved equal). A minimum of two readings with the dust monitor will be obtained per work day at the following locations: 1) within 10 feet of the land disturbing activity, 2) at the entrance/exit location to BSB (i.e., the intersection of Northport-Waneta Road and the unpaved access road), and 3) the truck turnaround area. The dust measurements will be

taken while work is being conducted in each area. In the event of elevated readings on the instrument or visual observations of excessive dust, the affected area will be moistened with water and/or the amount of disturbance will be reduced, as appropriate to maintain dust levels below applicable requirements (Appendix F).

- Turbidity monitoring will be conducted as described in the SWPPP.
- Records will be maintained to document the construction activities to be performed during each work day. At a minimum, the documentation will include: 1) weather conditions, 2) a narrative description of the work performed that day, 3) identification of major equipment items used (e.g., excavators, loaders, dump trucks, etc.), 4) names of workers and visitors at the site, 5) summary of any inspections and short description of outcomes, and 6) issues that need to be further addressed.
- A qualified archaeological monitor will be present during excavation activities to monitor the excavation work, as appropriate, to ensure and document in Cultural Resources Daily Reports that the land disturbance associated with the excavation work does not unintentionally adversely affect known or inadvertently discovered cultural resources. A qualified archaeologist also will perform a pre-construction survey to assess the potential likelihood of encountering cultural resources during project activities and that appropriate safeguards are in place to protect these known cultural resources. The archaeologist also will appropriately manage potential inadvertent discoveries of cultural resources during the course of the project.
- Other monitoring and reporting as specified in required permits for the project.

Monitoring records and a copy of the engineering plans (and redlines) will be kept at the site in a designated area (to be confirmed at pre-construction meeting). These records will be readily available to Ecology personnel upon request. The Construction Manager will be responsible for ensuring that the above monitoring records are kept up to date and readily available at the site. A copy of these records will be provided in the close-out documentation at the end of the project.

6.0 PERMITTING DOCUMENTATION PLAN

It is anticipated that the following permits/approvals will be required to perform Phase 2.

- USACE
  - Nationwide Permit 38 (reviewed under JARPA)
- Ecology
  - Work Plan acceptance
  - SEPA determination
  - National Pollutant Discharge Elimination System Construction General Permit
  - CWA Section 401 Water Quality Certification (reviewed under JARPA)
- Washington State Department of Fish and Wildlife
  - Hydraulic Project Approval (reviewed under JARPA)
- Washington State Department of Natural Resources
  - Land Use License
  - Forest Practices Permit
- Stevens County
  - Site Analysis Review
  - Shoreline Substantial Development Permit (reviewed under JARPA)
  - Traffic Control Permit
  - Truck haul plan approval and variances for oversized loads, if applicable (including possible coordination with Washington State Department of Transportation, if required)
  - Flood Hazard Permit (only if work is within designated floodplains)
- Canada
  - Import License

The following measures will be implemented to ensure that the appropriate agencies are consulted prior to starting construction work and to ensure that the appropriate permits and approvals are obtained before Phase 2 activities commence:

- Teck previously submited a preliminary draft Work Plan, preliminary SEPA Checklist and 30 percent engineering plans to Ecology for initial comment and to facilitate early consultation with other agencies and stakeholders.

- Teck will update the Work Plan, engineering plans, and supporting documents based on comments received from Ecology following the interagency review of the preliminary plans.
- Public review and participation will be solicited by Ecology through the SEPA process. Teck will support Ecology as necessary during the public participation process.
- Following public review, the Work Plan, engineering plans, and supporting documents will be finalized.

7.0 ADDITIONAL REQUIREMENTS

7.1 Compliance Monitoring

Requirements of Compliance Monitoring as stated in WAC 173-340-410 include:

- ***Protection monitoring.*** Protection monitoring confirms that human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action as described in the safety and health plan.
- ***Performance monitoring.*** Performance monitoring will document how the interim action has attained cleanup objectives and, if appropriate, remediation levels or other performance standards such as construction quality control measurements or monitoring necessary to demonstrate compliance with a permit.
- ***Confirmational monitoring.*** Confirmational monitoring confirms the long-term effectiveness of the interim action once cleanup standards and, if appropriate, other performance standards have been attained.

Teck will prepare a Performance Monitoring Plan within 45 days of completing Phase 2 and will provide it to Ecology for review. This plan will describe the technical procedures to document the condition of BSB following implementation of the interim action.

It is anticipated that the Performance Monitoring Plan will include annual monitoring of BSB for a maximum of five years (through 2015) following implementation of Phase 2 or until such time as an alternative monitoring program is established as part of other work (Appendix A). As indicated in the scope of work (Appendix A), the BSB monitoring program will consist primarily of visual and photographic surveys of the beach and annual surveys by a licensed land surveyor with a GPS unit. During the course of beach monitoring, Teck may conduct analytical testing to confirm the presence or absence of granulated slag accumulation, if visual observations are not sufficient to make this determination. Results of the annual BSB monitoring will be presented to Ecology within 60 days of conducting the survey. The report will include a cover letter that provides a narrative description of the BSB monitoring activities and supporting documents including:

- Surveyor's report and topographic map
- Photo logs
- Analytical report, chain-of-custody logs, and map showing sample locations (if applicable)

7.2 Sampling and Analysis Plan

No analytical sampling is anticipated for this project. However, in the event that Teck identifies the need to collect beach sediment/soil samples for laboratory chemical analysis, Ecology will be notified in advance and appropriate sampling and analytical approach developed via joint agreement.

7.3 Cultural Resources Plan

On behalf of Teck, a registered professional archaeologist developed a draft Cultural Resources Plan (Appendix G) and associated scope of work to assess the effects of the planned work and seek ways to avoid, minimize or mitigate potential adverse effects on archaeological and cultural resources. The draft Cultural Resources Plan and scope of work includes an:

- Archaeological and Cultural Resources Inventory Plan
- Achaeological and Cultural Resources Monitoring Plan
- Inadvertent Discovery of Cultural Resources Protocol
- Inadvertent Discovery of Human Remains Protocol

To comply with appropriate State and Federal regulations, a registered professional archaeologist (who meets the Secretary of Interior's standards and guidelines for an archaeologist) will complete an archaeological investigation designed to determine the presence or absence of cultural materials in the project area prior to implementing any intrusive project activities. The investigation will address the project's area of potential effect (Figure 9), which will include all areas of excavation, staging, routes of access, and off-site locations with any potential for ground disturbance.

An archaeological monitor will be present during excavation activities at BSB. Procedures have been developed to address potential discoveries, including inadvertent discoveries of cultural materials and human remains. A summary of these procedures are detailed in the Cultural Resources Plan (Appendix G), which is to be followed by all field personnel, including subcontractors, should potential discoveries occur during activities associated with the BSB project.

The draft Cultural Resources Plan will be updated and modified, as appropriate, after the archaeological investigation and after further consultation and coordination with Ecology, DAHP, the Confederated Tribes of Colville Reservation, Spokane Tribe of Indians, and other appropriate Federal, State, and local agencies.

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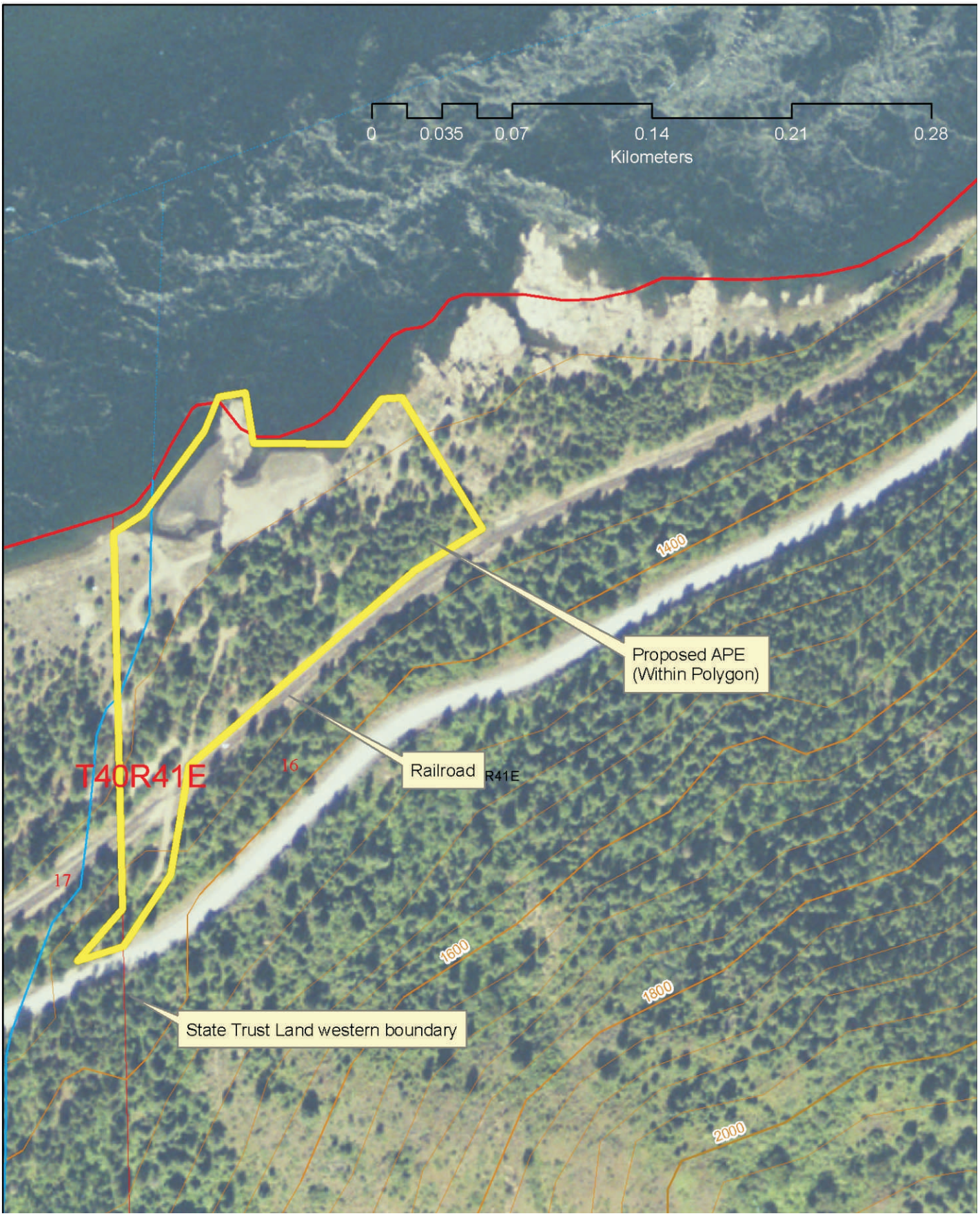

Source: Department of Natural Resources correspondence dated September 25, 2009.

Figure 9

Area of Potential Effect

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

8.0 PRELIMINARY SCHEDULE

Table 4 presents a preliminary milestone schedule for Phase 1 of the project, and Table 5 presents a preliminary milestone schedule for Phase 2.

Table 4
Preliminary Milestone Schedule for Phase 1

Phase 1 Milestone	**Date**
Execute VCP Agreement	July 2009
Conduct preliminary cultural resource meeting	Sept. 2009
Conduct preliminary site meeting with WDNR	Sept. 2009
Finalize 30 percent plans	Nov 2009
Finalize 60 percent plans	Dec 2009
Conduct SEPA public review	Dec 2009/Jan 2010
Conduct public meeting	Jan 2010
Submit JARPA application	Jan 2010
Complete public review	Jan/Feb 2010
Finalize 90 percent plans	March 2010
Obtain final access agreements	April 2010
Obtain JARPA approvals/permits	April 2010
Complete Phase I	**May 2010**

Notes
JARPA – Joint Aquatic Resources Permit Application
SEPA – State Environmental Policy Act
VCP – Voluntary Cleanup Program
WDNR – Washington State Department of Natural Resources

Table 5
Preliminary Milestone Schedule for Phase 2

Phase 2 Milestone	**Date**
Submit Traffic Control Plan to Stevens County	July 2010
Complete pre-construction meeting	August 2010
Complete mobilization and start construction	Sept 2010
Complete construction	Oct 2010
Submit project completion report, performance monitoring plan, and close-out documentation	Dec 2010
Complete Phase II	Dec 2010
Project Complete	**Dec 2010**

9.0 REFERENCES

Ecology – see Washington State Department of Ecology

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APPENDIX A
SCOPE OF WORK DOCUMENT

FINAL SCOPE OF WORK
FOR BLACK SAND BEACH EXCAVATION PROJECT

WORK PLAN, ENGINEERING, AND PERMIT DOCUMENTATION PLAN
EXCAVATION AND OFF-SITE DISPOSAL OF GRANULATED SLAG
BLACK SAND BEACH, UPPER COLUMBIA RIVER
NORTHPORT, WASHINGTON

I. INTRODUCTION

This document establishes the Scope of Work and specific task responsibilities for the Black Sand Beach Excavation Project (Project). The Project consists of Work Plan development and permitting; the removal of approximately 5,000 cubic yards of granulated slag from a prescribed area of the Black Sand Beach; load-out and truck transport of these materials from its point of origin near Northport, Washington to its place of disposition in Trail, British Columbia, Canada; and restoration of the affected work area. The Black Sand Beach is located on state-owned (Washington State Department of Natural Resources) property adjacent to the Upper Columbia River on land identified as parcel number 8000367, in Section 16 of Township 40 N, Range 41 East in Stevens County records. Figure 1 is a site location map with photographs of the Project area. Figure 2 provides a township/range/section and parcel map. Figure 3 provides site latitude and longitude information.

The purpose of the Project is to remove granulated slag that has accumulated over time along the Black Sand Beach of the Upper Columbia River. The Project will be conducted by Teck American Incorporated of Spokane, Washington (Teck), as an Independent Remedial Action in accordance with the Model Toxics Control Act (MTCA), Revised Code of Washington (RCW) 70.105D, and Chapter 173-340 of the Washington Administrative Code (WAC). Teck will complete this Project under a Voluntary Cleanup Agreement (Agreement) with the Washington State Department of Ecology (Ecology).

The Project will be completed in two phases. The first phase includes planning, engineering, and permitting activities. The second phase includes construction and close-out activities. It is anticipated that the first phase of the Project will be performed according to the preliminary schedule set forth in this Scope of Work, and the second phase will be conducted in the fall of 2010. Construction is anticipated to be completed within an approximate three to six week period.

II. PROJECT OBJECTIVES

The objectives of the Project are as follows:

- Remove the majority of granulated slag deposits that have accumulated in the upland portion of the Black Sand Beach, where granulated slag is readily visually identifiable and accessible using conventional excavation equipment (e.g., excavator, loader, and vacuum truck). The areas of the prescribed excavation are shown on Figure 4. No open-water dredging or sediment removal in the river will be conducted for the Project;

- Establish final grades in the affected work area following excavation of the granulated slag to allow continued beach access and function to the public, while minimizing future erosion problems;

- Maintain and promote positive stakeholder relationships by actively supporting and participating in the public participation process as requested by Ecology and the cultural awareness process with Ecology guiding coordination;

- Secure all necessary permits and approvals during 2009 and early 2010 so that the construction phase of the Project can be initiated no later than September 2010 when the water level is low. Permitting and approvals will be dependant on several outside agency's review schedules.

III. PHASE 1 SCOPE OF WORK

Phase 1 consists of planning, engineering, and permitting activities, and includes the following three major tasks.

- Prepare Project Work Plan for Ecology review and approval;
- Prepare engineering plans for submittal to Ecology for review and approval;
- Prepare and submit permit documentation, including a SEPA checklist, JARPA application, and Stevens County permit applications (e.g., a Site Analysis application, Shoreline Master Program [SMP] Substantial Development application, and Grading Permit application);
- Prepare Stormwater Pollution Prevention Plan (SWPPP) and other required documents to obtain a Construction Stormwater permit from Ecology, as required.

The tasks associated with Phase 1 are further described below.

A. WORK PLAN

Teck will prepare a Work Plan for the proposed Project activities. The Work Plan will undergo Ecology review and approval prior to implementation of the proposed work activities. The Work Plan will specify all activities to be conducted during the Project and, at a minimum, will include:

1. A description of proposed work activities to be performed;
2. A summary of applicable chemical laboratory analysis results for the granulated slag, and other relevant information to inform and satisfy transportation and incident planning requirements;
3. A proposed schedule, which adequately accounts for all necessary stakeholder input and communication, public review, and interagency coordination, for submittal of deliverables and implementation of all proposed Work Plan activities;
4. A description of duties, responsibilities, authorities, and qualifications of the personnel involved in performing the work described in the Work Plan;
5. Project organization information and identification of reporting relationships, lines of communication, and authorities;
6. A description of design criteria and performance standards that will be applied to the Project;
7. A list of applicable, relevant and appropriate US and Canadian federal, state, and local legal requirements (ARARs), including an explanation of how they will be incorporated into the design and implementation of the Project, and an assessment of permitting requirements and a plan for satisfying requirements. A completed SEPA checklist will be provided to Ecology;
8. A description of site access agreements required to implement the Work Plan activities;
9. A description of property, utility, right-of-way, topographic, or other site surveys required;
10. A description of special design/implementation problems anticipated and how they will be addressed. This assessment will include special technical issues, access, easements, rights-of-way, transportation including the haul plan and border crossing, utilities, railroad crossing and safety concerns, and logistics issues;
11. A description of construction methods and equipment to be used;
12. A description of procedures for documentation and validation of Work Plan activities.

B. ENGINEERING PLANS

Teck will prepare the following engineering plans in support of the Project.

- Existing Conditions Topographical Plan – this plan will document existing surface conditions, the boundaries of the prescribed excavation, and the estimated thickness of granulated slag within the excavation boundary. The plan will be created from previous surveys performed at the Black Sand Beach by Survey Solutions of Spokane, Washington in 2006 and 2009;

- Excavation Plan and Profiles – these plans will show the limits and volume of the prescribed excavation based on the 2006 and 2009 topographic surveys. For the most part, the excavation plan will be based on the focused 2009 survey and will be supplemented, where appropriate, by the more extensive 2006 survey data;

- Temporary Erosion and Sediment Control Plan – this plan will depict the engineering control measures and identify the best management practices (BMPs) that will be used to prevent/minimize erosion and sedimentation of the adjacent river during construction activities;

- Final Grading and Restoration Plan – this plan will depict the final grade elevations of the affected work area following excavation, placement of imported backfill material, and final restoration of the affected work area. The preferred grading configurations will be presented in all of the design submittals to Ecology. The final preferred alternative will include either:
    - Complete backfill of the upstream beach area and partial backfill of downstream beach area
    - Complete backfill of both beach areas.

Additionally, the final grading and restoration plan will address issues of beach access that will be further developed in the design phase in consultation with the property access owner and under the lead coordination of Ecology.

The engineering plans will be submitted to Ecology beginning at the 30-percent stage to facilitate early resolution of grading, access, and other potential design issues. The 30-percent design will be submitted to Ecology for initial comment and to facilitate early coordination by Ecology with the EPA, Department of Interior, Confederated Tribes of the Colville Reservation, and the Spokane Tribe of Indians. The 30-percent design also will be used by Ecology to initiate dialogue with DNR, Washington Department of Fish and Wildlife, and Cultural Resources working groups. Ecology will involve Teck as necessary or appropriate. After Ecology's initial comments are addressed in the 30-percent design step, a 60-percent design will be prepared by Teck and submitted to Ecology for review and approval. The approved 60-percent design will be submitted to the various permitting agencies for permits/approvals, SEPA, and for obtaining public comment. The 90-percent engineering plans will be submitted to Ecology for review and approval, and upon approval will be issued for construction. 100-percent plans will serve as record drawings and will be presented to Ecology with final documentation for the Project.

C. PRELIMINARY DESIGN MEETING

This Scope of Work is intended to solicit early comments from Ecology on the proposed work scope. Comments on this Scope of Work will be incorporated and/or discussed prior to preparing the draft Work Plan and 30-percent engineering plans. Upon completion and submittal of the draft Work Plan and 30-percent engineering plans to Ecology, Teck will meet with Ecology at the local Ecology office in Spokane, Washington. The objective of this meeting is to identify and allow correction or modification of any problem areas and/or considerations of alternative design concepts before further engineering is completed and before the Work Plan is finalized.

The meeting will address the following:

a. Project expectations and objectives;

b. Public participation and cultural awareness issues;

c. Ecology's preliminary comments regarding Work Plan, Engineering submittal, and SEPA checklist;

d. Description of problems encountered or anticipated that may delay project schedule;

e. Preliminary schedule for permit submittals and construction.

Ecology and Teck will endeavor to meet approximately 10 working days following submittal of the draft Work Plan, SEPA Checklist, and 30-percent engineering plans, or as soon thereafter as is practical.

D. PERMITTING DOCUMENTATION PLAN

Teck will develop a permitting documentation plan for the Project, and will coordinate with Ecology in developing the plan. The purpose of this plan is to ensure that the appropriate agencies are consulted prior to starting construction work and that appropriate permits and approvals are obtained before Phase 2 activities commence. As outlined in the Agreement, Teck is ultimately responsible for meeting all ARARs, including obtaining all necessary U.S. and Canadian federal, state, and local permits and approvals, however, Ecology will facilitate permitting to a certain extent, including acting as lead agency for SEPA review for required state permits.

It is anticipated that, at minimum, the permits and approvals listed below may be required for the Project, along with any submittals like a SEPA checklist required for the permitting agencies' SEPA process. Ecology will review draft versions of the SEPA package and JARPA application prior to finalization.

- U.S. Army Corp. of Engineers
    - Nation Wide Permit 38 (reviewed under JARPA)
- Ecology
    - Work Plan approval and final approval to implement Phase 2
    - Public participation coordination
    - NPDES Construction General Permit
- Washington State Department of Fish and Wildlife (WDFW)
    - Hydraulic Project Approval (reviewed under JARPA)
- Washington State Department of Natural Resources (WDNR)
    - Approval for access to state-owned aquatic land
- Stevens County, WA
    - Site Analysis Review
    - Shoreline Substantial Development Permit (reviewed under JARPA)
    - Grading/excavation permit
    - Truck haul plan approval, and variances for oversized loads, if applicable (including possible coordination with Washington State Department of Transportation, if required)
    - Flood Hazard Permit (only if work is within designated floodplains)
- Canada
    - Import License
    - Other required items

E. CULTURAL RESOURCES PLAN

It is anticipated that permitting may involve cultural resource issues. To facilitate permitting, Teck will prepare a Cultural Resources Plan for submittal to Ecology during the review and comment period for the 30-percent engineering plans. This plan will include, at a minimum, consultation with the "Cultural Resources Team" to assess the likelihood of potentially discovering items of cultural significance in the immediate project work area, as well as measures to be undertaken in the event of the inadvertent discovery of items of potential cultural significance during implementation of Phase 2. Teck will consult and seek guidance from Ecology in developing the Cultural Resources Plan.

F. HEALTH AND SAFETY PLAN

A Site Health and Safety Plan (HSP) will be prepared and submitted to Ecology for review and comment at the 60-percent design submittal to address all field activities conducted during the Project. The HSP will identify construction hazards, safety, and protection from potential off-site impacts. The HSP will be developed in accordance with "Standard Operating Safety Guides", and applicable standards promulgated by the U.S. Occupational Safety and Health Administration including Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120; General Industry Standards, 29 CFR 1910; and the Construction Industry Standards, 29 CFR 1926; and applicable Washington State Department of Labor and Industries requirements. The objective will be to perform work without any Occupational Safety and Health Act (OSHA) or Washington State Department of Labor and Industries safety violations or reportable injuries.

The Site Health and Safety Plan will include at a minimum:

1. Scope and applicability of plan;
2. Identification and responsibilities of key health and safety personnel;
3. Task/operation safety and health risk analysis for each site task and operation, including description of known hazards and risks and procedures for assessing risks;
4. Personnel training requirements;
5. Personal protective equipment to be used;
6. Medical surveillance requirements;
7. Air monitoring requirements, including types and frequency. Description of air monitoring methods to be used if necessary;
8. Site control measures, including communication, site security, and work zone delineation;
9. Decontamination plan for personnel, equipment, and facilities if necessary;
10. Emergency response/contingency plan;
11. Confined space entry procedures if necessary;
12. Spill containment program;
13. Identification of potential construction hazards and precautionary measures to minimize hazards.

IV. PHASE 2 SCOPE OF WORK

Phase 2 consists of the construction phase and includes the following tasks:

- Mobilization and site preparation;
- Excavation; load-out; transport and disposal;
- Backfill Placement, Final Grading, and Site Restoration;
- Conduct milestone and final inspections;
- Prepare and submit Project Completion Report and closeout documentation;
- Prepare and submit Performance Monitoring Plan.

These tasks and deliverables are further described below.

A. MOBILIZATION AND SITE PREPARATION

This task includes:

- Preconstruction site meeting;
- Repairs to access road to allow truck access to the Black Sand Beach and improvements, if any, to the proposed truck turn-around point;
- Mobilization of equipment and workers, including setup of temporary facilities (i.e., trash dumpster, portable restrooms, eyewash station). The equipment will be temporarily stored at the project site location for the duration of the Project;
- Setup of erosion and sediment control measures;
- Installation of appropriate signage consistent with Stevens County Truck Haul Plan, and/or BNSF railroad notification requirements.

The preconstruction meeting will be led by the general contractor and will be held approximately 10 working days prior to mobilizing the equipment and personnel to the site. The purpose of the meeting is to discuss final logistical and coordination details between the construction personnel and field inspectors. In addition to the management team, the preconstruction meeting will include those personnel that will be working at the site on a day to day basis or will be temporarily inspecting the work during the course of the Project and applicable access owners. At a minimum, attendees should include:

- Representative from Teck;
- Contractor superintendent;

- Site health and safety officer;
- Representative from major subcontractors, if any (e.g. trucking firm);
- Representative from Ecology;
- Representative from various inspectors.

The unpaved access road repairs will consist of placing imported gravel or other suitable materials into several large ruts in one portion of the road between the Burlington Northern Santa Fe (BNSF) railroad crossing and the beach. It is estimated that about 100 to 150 tons of crushed rock or gravel would be adequate to sufficiently repair the access road to allow truck access. Based on an inspection of the project site by Teck on May 22, 2009, it is not anticipated that any trees or other vegetation will need to be removed to obtain truck access to the Project site. Minor regrading of the access road will occur, as needed, prior to and during active construction to maintain safe and passable road bed conditions. An approved equipment staging area will be established, with appropriate safeguards and protocols identified for equipment fueling, lubrication and hydraulic line repairs and maintenance, consistent with the SWPPP requirements. A personnel assembly area also will be established in accordance with the Health and Safety Plan in the event of an emergency.

Mobilization will include the delivery of equipment and personnel to the project site. It is anticipated that the equipment will include one or two excavators and loaders, a water truck, and multiple dump trucks. All equipment, except the dump trucks, will be temporarily stored at the Project site, until the construction work is completed. Temporary facilities will include a portable out-house, portable field operations trailer/tents (as applicable), eyewash/first aid station, and closed-top (bear-proof) trash enclosure. It should be noted that cell phone coverage at the project site is poor or non-functional. The contractor shall be required to maintain at least one satellite phone system for emergencies or other urgent matters that require phone communication.

Erosion and sediment control measures will include, at minimum, silt fencing along the shoreline of the river. Stockpiled materials will be covered with plastic sheeting when not actively used to minimize wind blown dust. Due to relatively high density of granulated slag, wind blown transport of the granulated slag is not anticipated to be an issue. If visual evidence of high particulates (e.g., including materials other than slag) is observed, the affected area will be sprayed with potable water from an on-site water truck.

B. EXCAVATION; LOAD-OUT, AND TRUCK TRANSPORT TO TRAIL, B.C.

This task includes:

- Excavate granulated slag to the maximum extent practical using conventional excavation equipment within the prescribed area shown on Figure 4;
- Remove thin layer of granulated slag on the rock outcropping between the two beach areas using a vacuum truck;
- Load granulated slag into dump trucks (size to be determined);
- Soil stockpile management;
- Monitor and control dust;
- Transport materials for disposition at Teck facility in Trail, British Columbia.

The granulated slag will be transported to the Teck facility in Trail, British Columbia, as approved by appropriate Canadian and U.S. authorities. A preliminary truck haul map with driving directions from the Project site to the Trail facility is shown on Figure 5.

The granulated slag will be transported to Trail under an appropriate cargo manifest or shipping papers acceptable for both Canadian and U.S. transport. Truck weight, size constraints, and other potential load restrictions will be further investigated in the planning, engineering, and permitting phase. Teck will utilize its existing Spill Response Team in the unlikely event of a spill of granulated slag during transportation. The spill response team is capable of responding to spills on either side of the border.

C. FINAL GRADING AND SITE RESTORATION

This task includes final grading of the work area in accordance with a grading plan that will be further developed in the subsequent design phase. Sources of imported materials will be investigated during the design phase. Backfill may include the placement of a ribbon/apron of cobble, gravel or sand to facilitate capping and containment along the edge of the low-water-line shoreline fringe.

Imported backfill materials will be tested for metals and other potential constituents including invasive plant species. Records will be kept to document the source and other pertinent information pertaining to the fill material. Fill material, lay down and distribution specifications within the project area will be refined between the 30-percent and 60-percent design phase based on guidance from Ecology.

D. CONDUCT MILESTONE AND FINAL INSPECTIONS

At a minimum, inspections will be sought from Ecology prior to the placement of any backfill material (milestone) and after the affected work area has been re-graded, and before Contractor demobilization. The purpose of the inspection is to ensure that the work is completed in accordance with the approved Project plans, and to the general satisfaction of Ecology. Ecology and Teck will conduct a joint final walk through prior to construction demobilization. The outcome and action items (punch list) of these inspections will be documented, and corrective actions, if any, will be undertaken, as appropriate.

E. PROJECT COMPLETION REPORT AND CLOSEOUT DOCUMENTATION

At the completion of the construction phase, Teck will prepare and submit a Project Completion Report. At a minimum, the report will include:

1. Results of the final inspection, including a brief description of any problems discovered during the final inspection and the resolution of those problems, as necessary;

2. A detailed description of work conducted in accordance with the Work Plan and engineering plans, and certification by an Washington State-Registered Professional Engineer that the work was performed in accordance with all approved plans and specifications. The specifications will be included in the approved engineering plans;

3. Explanation of any modifications to the plans and specifications and why these modifications were necessary;

4. Final 100-percent as-built record drawings, if different from final design drawings previously submitted to Ecology. The record drawings, including a final topographical survey of the Project area, will be prepared by a Washington State licensed land surveyor or licensed civil engineer, as appropriate;

5. Detailed photo-documentation of the work area following completion of the construction activities;

6. Copy of final permits as applicable and transportation manifests or bill of lading documentation for each truck load;

7. Information on source of any fill material, including location, description of material, and certification or analytical results of chemical composition of metals.

F. PERFORMANCE MONITORING PLAN

Following implementation of Phase 2, Teck will prepare and submit to Ecology a Performance Monitoring Plan that outlines how Teck will conduct annual monitoring of the Black Sand Beach to document changing site conditions over time including erosion and/or redeposition in the project site area. The Plan will provide the following: That the monitoring program will primarily consist of visual and photographic surveys of the beach and periodic surveys by a licensed land surveyor with a GPS unit; That, during the course of monitoring, analytical testing may be conducted to confirm the presence or absence of granulated slag accumulation, and; That the monitoring program will be conducted on an annual basis for a maximum of 5 years (through 2015) following implementation of Phase 2 or until such time as an alternative monitoring program is established as part of other work.

V. PRELIMINARY SCHEDULE

A preliminary milestone schedule for Phase 1 and Phase 2 is summarized in the tables below.

Preliminary Milestone Schedule for Phase 1

Phase 1 Milestone	Date
Submit Scope of Work Document to Ecology	06/19/09
Ecology approval of Agreement/Finalize Scope of Work document	07/13/09
Submit Draft Work Plan and preliminary drafts of 30 percent engineering plans to Ecology (includes Topo Plan, Excavation Plan and Profiles, Temporary Erosion and Sediment Control Plan, Final Grading and Restoration Plans)	08/03/09
Obtain preliminary Ecology comments on 30-percent submittal and draft Work Plan	08/17/09
Submit revised Work Plan and revised-draft 30 percent engineering plans to Ecology for approval	08/31/09
Submit preliminary drafts of SEPA checklist and JARPA application to Ecology, along with preliminary drafts of Stevens County permit applications and access request documentation	08/31/09
Submit draft Cultural Resources Plan to Ecology	08/31/09
Receive preliminary Ecology feedback on draft Work Plan, engineering plans, and permit applications	09/10/09
Complete 30 Percent Design Meetings with Ecology	09/14/09
Submit the preferred-action 60 percent design and engineering plans package to Ecology for approval (includes Topo Plan, Excavation Plan and Profiles, Temporary Erosion and Sediment Control Plan/SWPPP, Final Grading and Restoration Plan, H&S Plan)	10/02/09
Submit draft-finals of SEPA checklist, JARPA application to Ecology, and Stevens County permit applications	10/02/09

Preliminary Milestone Schedule for Phase 1, Continued

Phase 1 Milestone	Date
Begin SEPA/MTCA-based public comment period. Issue proposed SEPA determination.	10/09/09
Submit Ecology-approved 60 percent engineering plan and appropriate materials for JARPA and local permit submissions/approvals	10/09/09
Complete public comment and review period	11/09/09
Target date for securing necessary permits	12/14/09
Submit 90 Percent Plans to Ecology	12/20/09
Obtain Ecology approval of 90 Percent Plans	01/08/10
Obtain approvals from access owners	01/15/10
Complete Phase 1	01/30/10

A preliminary milestone schedule for Phase 2 is summarized in the table below.

Preliminary Milestone Schedule for Phase 2

Phase 2 Milestone	Date
Select contractor	07/31/10
Complete pre-construction meeting	08/20/10
Complete mobilization of equipment and crew	09/01/10
Complete excavation, backfill placement, and final restoration/grading (milestone inspections complete)	10/08/10
Submit Project Completion Report, Performance Monitoring Plan and documentations	10/22/10
Obtain opinion letter from Ecology	11/05/10
Project Complete	11/05/10

FIGURES

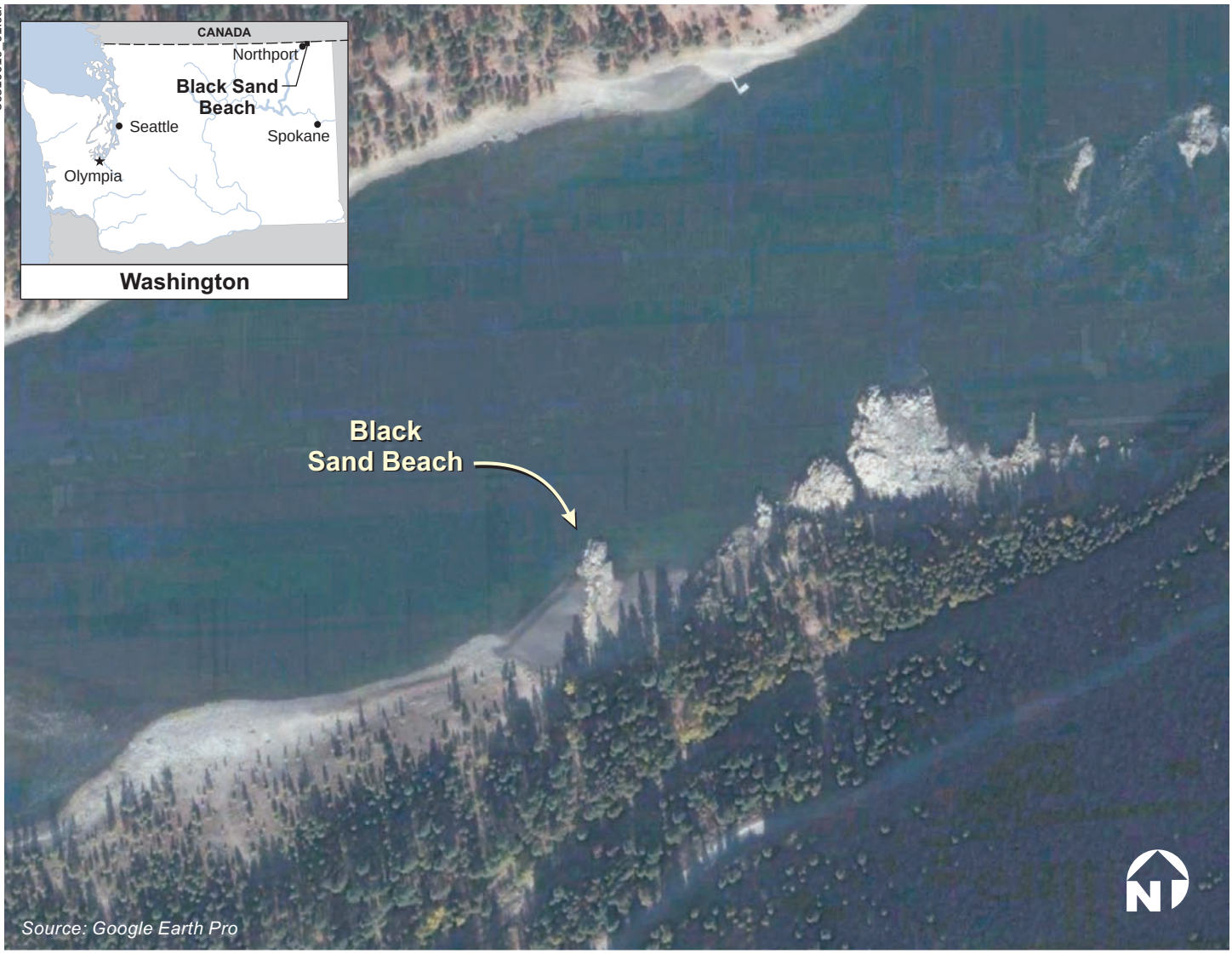


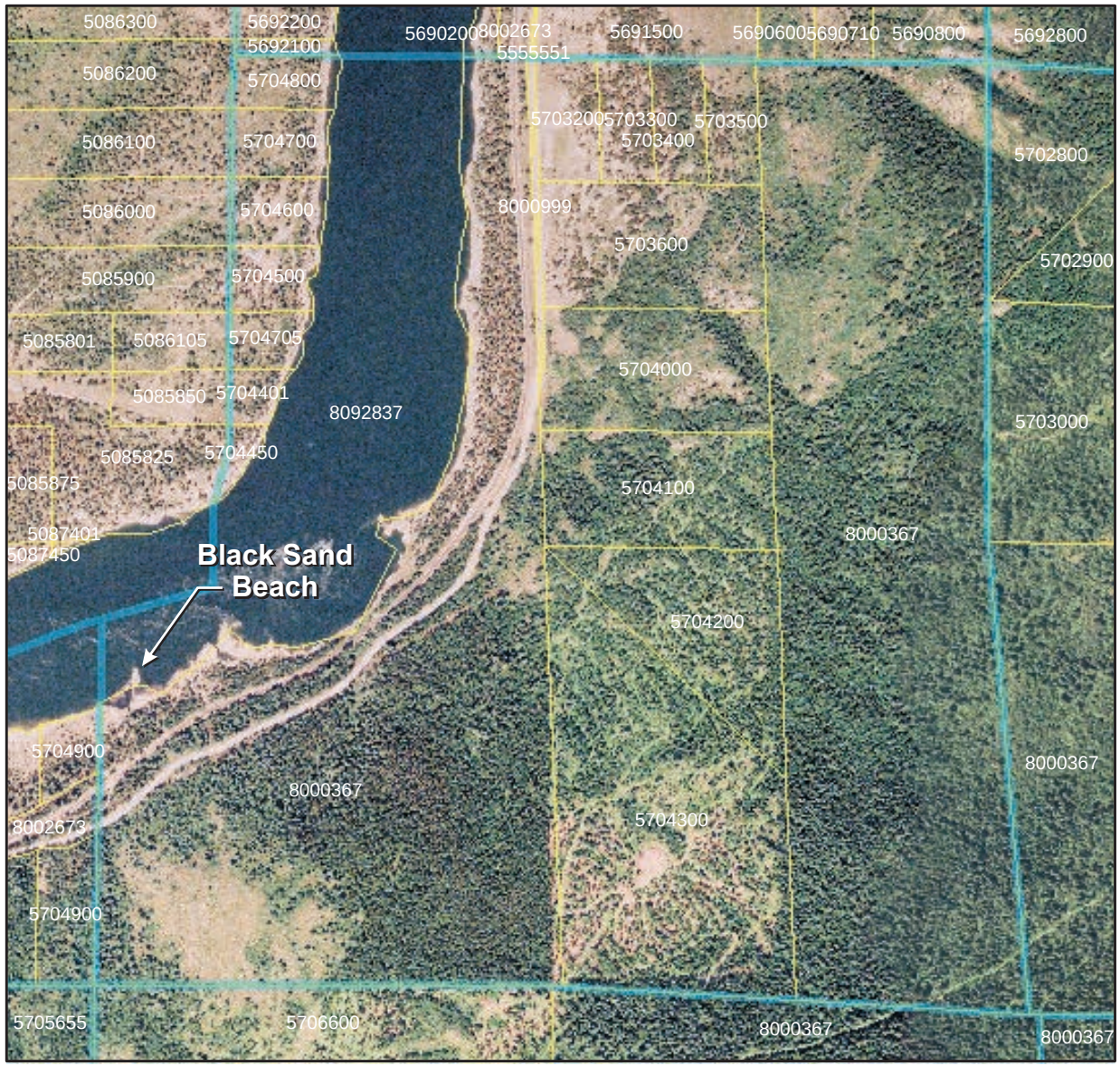
Figure 1

Black Sand Beach Location and Site Photographs

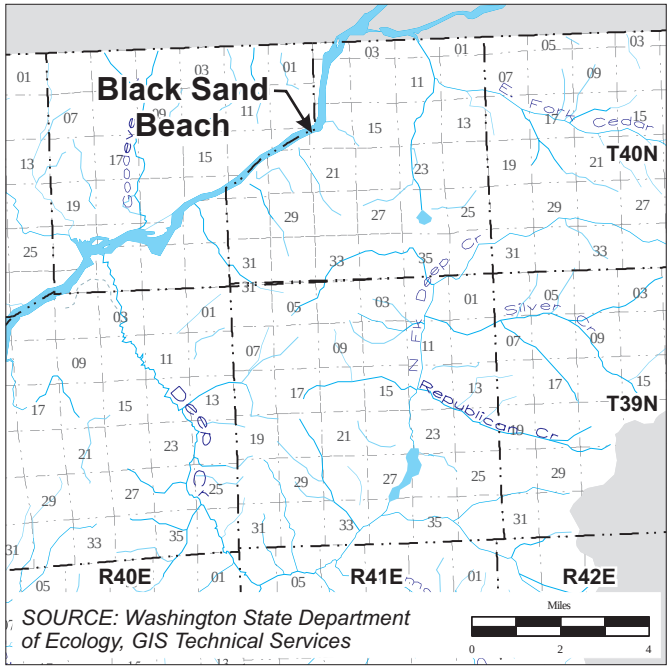
Job No. 36310019

URS

Black Sand Beach
Northport, Washington



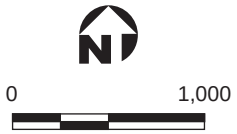
SOURCE: Steven's County Assesor's Office



Township and Range

Stevens County Washington

Township 40 N Range 41 E Section (see grid)



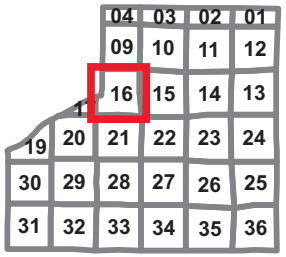


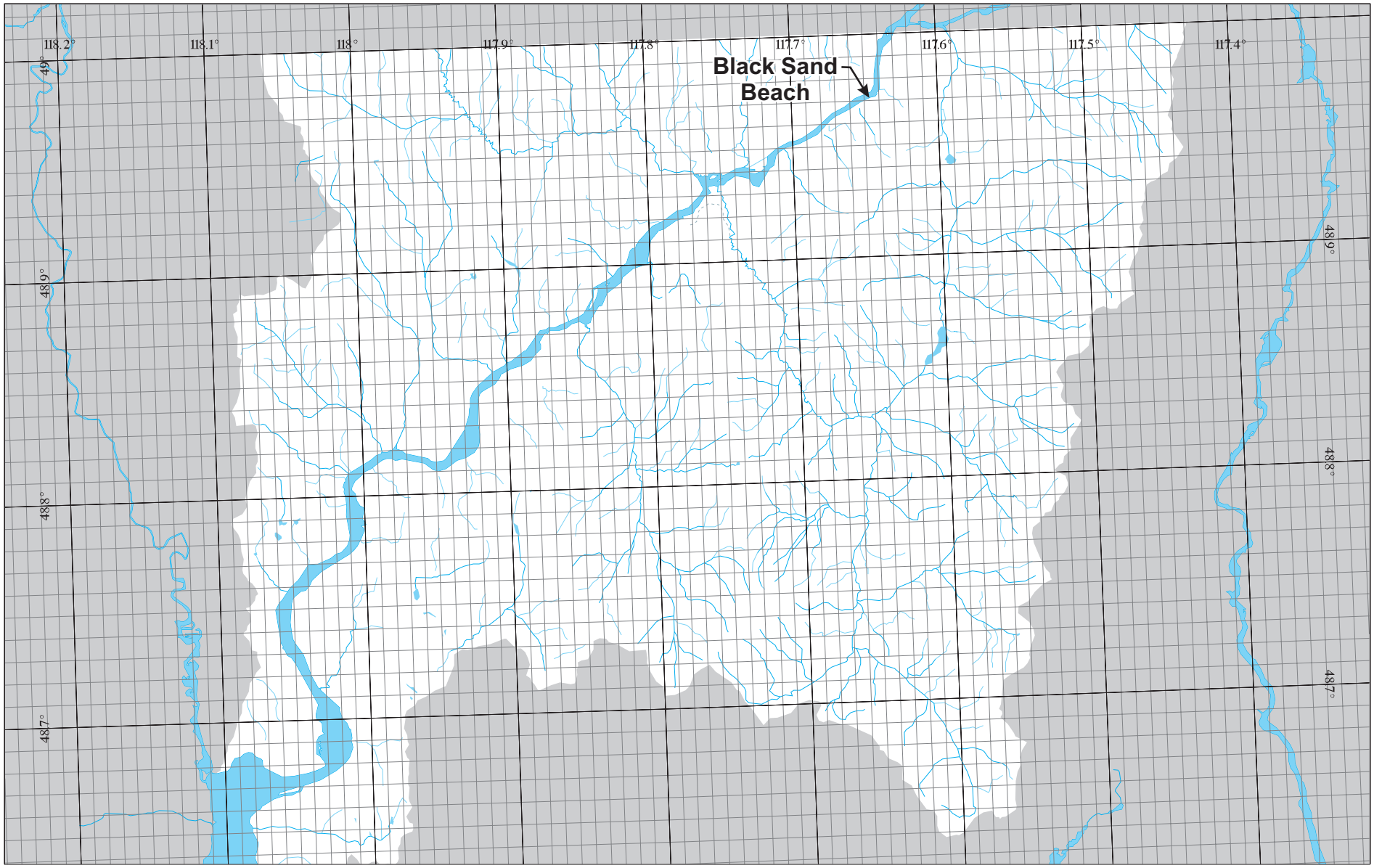
Figure 2

Parcel Map

Job No. 36310019

URS

Black Sand Beach
Northport, Washington



SOURCE: Washington State Department of Ecology, GIS Technical Services

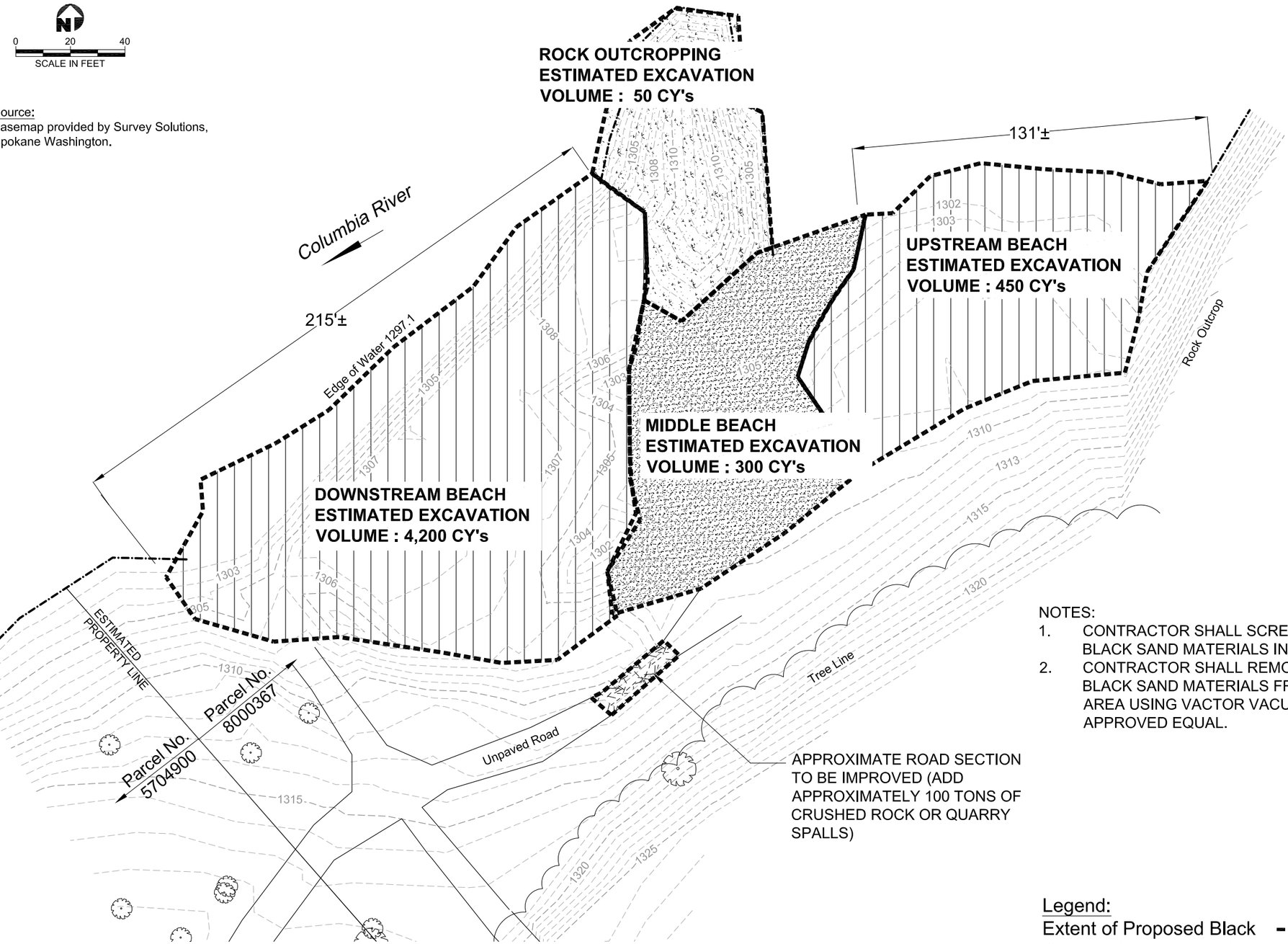
Figure 3

Project Site Latitude and Longitude

Job No. 36310019

URS

Black Sand Beach
Northport, Washington



Source:
Basemap provided by Survey Solutions, Spokane Washington.

NOTES:
1. CONTRACTOR SHALL SCREEN ROCKS FROM BLACK SAND MATERIALS IN MIDDLE BEACH AREA.
2. CONTRACTOR SHALL REMOVE WIND BLOWN BLACK SAND MATERIALS FROM ROCK OUTCROP AREA USING VACTOR VACUUM TRUCK OR APPROVED EQUAL.

Legend:
Extent of Proposed Black Sand Material Excavation ----------

P:\ACAD\PROJECT\TeckCominoAlaska\Black Sand Beach\SubTasks\SOW Memo\Figure 4 (Site Plan).dwg
Mod: 05/29/2009, 16:07 | Plotted: 05/29/2009, 16:10 | Darla_Guerrero

URS

Figure 4

Areas of Proposed Black Sand Material Excavation

Black Sand Beach

36310019_04.cdr

Source: Google Earth Pro

Detail

Driving directions to
600 Bingay Rd, Trail, BC, Canada
15.7 mi – about 31 mins

From Northport Waneta Rd, head northeast on Northport Waneta Rd toward Northport Waneta Rd/Waneta Rd

Entering Canada (British Columbia) 2.7 mi

Continue on HWY 22A 6.9 mi

Turn left at 22A 4.5 mi

Continue on Aldridge Ave 0.7 mi

Turn left at Bingay Rd 0.8 mi

0 2 4

Approximate Scale in Miles

Figure 5
Truck Map

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

APPENDIX B
BLACK SAND BEACH PHOTO LOG

URS

APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No.
1

Direction Photo Taken: 5/22/09

West

Description:

View of downstream beach taken from rock outcropping.

Photo No.
2

Direction Photo Taken: 5/22/09

Southwest

Description:

Rock outcropping and upstream beach.

URS

APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No. **3**

Direction Photo Taken: 5/22/09

Southeast

Description:

Looking east (upgradient) from rock outcropping. Concrete structure is USGS Gauging Station 12399510 (former Columbia River Auxiliary Gauge at International Border).

Photo No. **4**

Direction Photo Taken: 5/22/09

Northeast

Description:

Entrance/exit of Black Sand Beach access road. Note that left hand turn onto Northport-Waneta Road is not feasible under current conditions.

URS

APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No.
5

Direction Photo Taken: 5/22/09

Northeast

Description:

Northport Waneta Road.

Photo No.
6

Direction Photo Taken:

South

Description:

Access road leading away from Black Sand Beach. Note ruts in road that will need improvement before this road is accessible to trucks.

URS

APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No. **7**

Direction Photo Taken: 5/22/09

South

Description:

Access road in need of repair for truck accessibility.

Photo No. **8**

Direction Photo Taken: 5/22/09

South

Description:

Access road leading to Northport-Waneta Road.

URS

APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No.
9

Direction Photo Taken:

South

Description:

Access road in need of repair for truck assessiblity.

Photo No.
10

Direction Photo Taken: 5/22/09

Northeast

Description:

BNSF Railway Company railroad crossing.

URS	APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No. **11**	
Direction Photo Taken: 5/22/09 North	
Description: Middle Beach. Note relatively low visual evidence of granulated slag in this area.	

URS	APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No.
12

Direction Photo Taken: 5/22/09

Northeast

Description:

Access road to private property in foreground.

URS	APPENDIX B: PHOTOGRAPHIC LOG

Teck American Incorporated	**Black Sand Beach Property** Stevens County, Washington	**URS Project No.:** 36310019 **Date:** May 22, 2009

Photo No. **13**	
Direction Photo Taken: 5/22/09 South	
Description: Access road.	

APPENDIX C
ANALYTICAL REPORTS

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard, Washington 98366

Case Narrative

February 28, 2008

Subject: Metals Black Sand Beach Investigation -07

Project No: 111008

Officer: Brendan Dowling

By: Meredith Jones MJ

Summary

Beryllium results were qualified as estimates due to failed continuing calibration verification. One total antimony and lead result was qualified as estimates due to spike failure. Total copper and zinc spike recoveries were reported as not caculated due to high native concentrations of these analytes. Both TCLP barium, cadmium and lead results were qualified as estimates due to contamination in the leach blank. All other sample results were reported without qualification.

All analyses requested were evaluated by established regulatory quality assurance guidelines.

Methods

The laboratory analyzed and/or digested the sample using the following methods: EPA method SW1311-MT for leaching of TCLP elements, SW3010 for the digestion, and SW1311-6010 analysis of TCLP metals. EPA method 200.8 (ICPMS) was used for the digestion and analysis of total trace metals.

Sample Information

The laboratory received the samples on 02/15/08. The temperature of the cooler received was within the proper range of 0°C - 6°C. The samples were received in good condition. Four (4) samples were received and assigned laboratory identification numbers 074005 – 074008.

Holding Times

The laboratory performed all analyses within established EPA holding times.

Calibration

Instrument calibrations and calibration checks were performed in accordance with the appropriate method. The final total beryllium CCV was above acceptance limits due to matrix interference, and the results were qualified as extimates. All other initial and continuing calibration checks were within control limits. ICPMS calibration correlation coefficients were within the acceptance range of 1.000 - 0.995. The instruments were calibrated with NIST traceable standards and verified to be in calibration with a second source NIST traceable standard.

Method Blanks

Two method blanks were analyzed for the TCLP elements. MB05051E1 was the extraction fluid that was processed from the first leaching step and MB05052E2 was a water blank that was added at the hot block digestion step. MB05051E1 had levels of Ba, Cd and Pb that were above the laboratory's reporting limit, but well below regulatory TCLP limits. Since the water blank was not contaminated it is assumed that the contamination did not occur during the digestion procedure.

Sample numbers 074005 and 074006 for Ba, Cd, and Pb are qualified as estimates due to contamination during the leach procedure.

No analytically significant levels of analyte were detected in the other method blanks associated with these samples.

Matrix Spikes

Total copper and Zinc spike recoveries were reported as not calculated. The standard spiking level was insufficient for the elevated concentration of analyte in the source sample. Both antimony spike recoveries were below acceptance limits due to matrix interference and the source sample was qualified as an estimate. One lead spike and both beryllium spikes were above acceptance and the source sample was qualified as an estimate.

All other associated matrix spike recoveries were within the acceptance limits of 75% - 125%.

Replicates

The relative percent difference of the total lead duplicates is outside the acceptance limits. Lead sample number 074008 is qualified as an estimate.

All associated duplicate relative percent differences of samples with concentrations greater than 5 times the reporting limit were within the acceptance range of 0% - 20%.

Laboratory Control Samples

All laboratory control sample recoveries were within the acceptance limits of 85% - 115%.

Internal Standards

All internal standard recoveries were within acceptance limits of 60% - 125%.

Other Quality Assurance Measures and Issues

Total metals' samples were initially prepped using the suggested weight of 1.0g. This prep failed due to a gel formation. Samples were reprepped using 0.10g of sample. Reporting limits were raised accordingly.

U - The analyte was not detected at or above the reported result.

J - The analyte was positively identified. The associated numerical result is an estimate.

NC - Not Calculated

bold - The analyte was present in the sample. (Visual Aid to locate detected compounds on report sheet.)

Please call Dean Momohara at (360) 871-8808 to further discuss this project.

cc: Project File

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Nickel

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/26/08 **Analyte:** Nickel

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**22.0**		mg/Kg dw	02/13/08	02/26/08
08074008		NORTH 2	Sediment/Soil	**15.5**		mg/Kg dw	02/13/08	02/26/08
08074008	LMX1	(matrix spike)		**94**		%	02/13/08	02/26/08
08074008	LMX2	(matrix spike)		**92**		%	02/13/08	02/26/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/26/08
ML08050I1		Lab LCS-	Sediment/Soil	**106**		%		02/26/08

Authorized By: M. Jones Release Date: 2/26/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Silver

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/26/08 **Analyte:** Silver

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**4.6**		mg/Kg dw	02/13/08	02/26/08
08074008		NORTH 2	Sediment/Soil	**3.5**		mg/Kg dw	02/13/08	02/26/08
08074008	LMX1	(matrix spike)		**94**		%	02/13/08	02/26/08
08074008	LMX2	(matrix spike)		**92**		%	02/13/08	02/26/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/26/08
ML08050I1		Lab LCS-	Sediment/Soil	**107**		%		02/26/08

Authorized By: MJ Jones Release Date: 2/26/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Beryllium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Beryllium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**1.5**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**1.1**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**160**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**145**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**95**		%		02/20/08

Authorized By: M. Jam Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**164**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**119**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**106**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**107**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	2.5	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**109**		%		02/20/08

Authorized By: M-Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Copper

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Copper

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**2620**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**1740**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)			NC	%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)			NC	%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**96**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Zinc

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Zinc

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**23000**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**14600**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)			NC	%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)			NC	%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	25	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**110**		%		02/20/08

Authorized By: M Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Arsenic

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Arsenic

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**22.6**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**18.6**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**106**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**104**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**109**		%		02/20/08

Authorized By: M Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Selenium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8
Date Reported: 02/25/08 **Analyte:** Selenium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	2.5	U	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	2.5	U	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**101**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**99**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	2.5	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**111**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Cadmium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Cadmium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**2.6**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**2.6**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**89**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**88**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**104**		%		02/20/08

Authorized By: M. Jarvis Release Date: 2/25/08 Page: 1

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Antimony

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Antimony

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**44.7**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**30.2**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**47**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**55**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	1.0	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**106**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Thallium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Thallium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	0.50	U	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	0.50	U	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**102**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**106**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**101**		%		02/20/08

Authorized By: M. Joan Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Lead

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Lead

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**323**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**274**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**112**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**169**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**103**		%		02/20/08

Authorized By: M. Joan Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Lab ID: MB08051E1 **Method:** 1311-6010

QC Type: Laboratory Method Blank **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**1.96**	
Cadmium	**0.030**	
Chromium	0.0050	U
Lead	**0.29**	
Selenium	0.050	U
Silver	0.010	U

Authorized By: Sara Blumak Release Date: 2/22/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Lab ID: MB08052E1 **Method:** 1311-6010

QC Type: Laboratory Method Blank **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	0.050	U
Cadmium	0.0050	U
Chromium	0.0050	U
Lead	0.050	U
Selenium	0.050	U
Silver	0.010	U

Authorized By: Jim Sikonia Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07
LIMS Project ID: 1110-08
Lab ID: ML08052E1
Method: 1311-6010
QC Type: Laboratory Control Sample
Date Prepared: 02/21/08
Matrix: Waste
Project Officer: Brendan Dowling
Date Analyzed: 02/26/08
Units: %

Analyte	Result	Qualifier
Arsenic	108	
Barium	106	
Cadmium	104	
Chromium	108	
Lead	108	
Selenium	109	
Silver	102	

Authorized By: [signature] Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07
LIMS Project ID: 1110-08

Sample: 08074005
Field ID: SOUTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**2.44**	**J**
Cadmium	**0.0095**	**J**
Chromium	0.0050	U
Lead	**0.26**	**J**
Selenium	0.050	U
Silver	0.010	U

Authorized By: _____ Release Date: 2/28/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: **Black Sand Beach Investigation - 07**
LIMS Project ID: **1110-08**

Sample: **08074006**
Field ID: NORTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**1.97**	**J**
Cadmium	**0.030**	**J**
Chromium	0.0050	U
Lead	**0.29**	**J**
Selenium	0.050	U
Silver	0.010	U

Authorized By: [signature]

Release Date: 2/28/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07
LIMS Project ID: 1110-08

Sample: 08074006 (matrix spike - LMX1)
Field ID: NORTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: % Recovery

Analyte	Result	Qualifier
Arsenic	102	
Barium	92	
Cadmium	92	
Chromium	97	
Lead	94	
Selenium	104	
Silver	93	

Authorized By: Dale Sebrell

Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Sample: 08074006 (matrix spike - LMX2) **Date Collected:** 02/13/08 **Method:** 1311-6010

Field ID: NORTH 1 **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** % Recovery

Analyte	Result	Qualifier
Arsenic	102	
Barium	91	
Cadmium	92	
Chromium	96	
Lead	93	
Selenium	104	
Silver	93	

Authorized By: Pam Sikkema Release Date: 2/27/08

Nautilus Environmental, LLC

RECEIVED
MAR 28 2008
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

Dangerous Waste Characterization

Sample IDs: North Comp. A; North Comp. A (ground); North 2B; North 3A; South Comp. A; South Comp. B; South 2A; South 2C

Report date: March 24, 2008

Submitted to:

Washington State Department of Ecology
4601 N. Monroe St.
Spokane, WA 99205

Washington Laboratory
5009 Pacific Hwy East
Suite 2
Tacoma, WA 98424

1.0 INTRODUCTION

A dangerous waste characterization using the test organism *Oncorhynchus mykiss* (rainbow trout) was conducted on eight samples submitted by Washington State Department of Ecology (WDOE) to Nautilus Environmental. Testing was conducted following the Washington State Department of Ecology Publication 80-12.

2.0 METHODS

The samples, identified as North Comp A, North Comp A (ground), North 2B, North 3A, South Comp A, South Comp B, South 2A, and South 2C, were received in the laboratory on March 11, 2008. Sample North Comp A (ground) was ground in the laboratory using a coffee grinder cleaned to EPA specifications. The test procedure is outlined in Table 1.

Table 1. Summary of Dangerous Waste Characterization Test Conditions

Parameter	Standard Fish Toxicity Test	Standard Fish Toxicity Test
Test number	0803-T035	0803-T050
Samples tested	North Comp A, North Comp A (ground), North 2B, North 3A	South Comp A, South Comp B, South 2A, South 2C
Test initiation date; time	3/15/2008; 1100h	3/20/2008; 1240h
Test termination date; time	3/19/2008; 1115h	3/24/2008; 1140h
Endpoint	Mortality at 96-hours	
Test chamber	10-L glass tank	
Test temperature	12 ± 1°C	
Dilution water	Carbon filtered water	
Test solution volume	8 L	
Test concentrations (mg/L)	100, 10, 0	
Number of organisms/ chamber	10	
Number of replicates	3	
Test organism	*Oncorhynchus mykiss* (rainbow trout)	
Feeding	No feeding during test	
Photoperiod	16 hours light/ 8 hours dark	
Extraction	Rotary agitation (30 +/- 2 rpm) for 18 hours	
Reference Toxicant	Copper sulfate	
Deviations	See Quality Assurance Section	

The test organisms used in the test are outlined in Table 2. Both sets of samples were tested using fish from the same batch received on March 12, 2008.

Table 2. Test organisms (*Oncorhynchus mykiss*)

Test number	0803-T035	0803-T050
Test organism age	40 days post swim-up (hatch date 1/14/08)	45 days post swim-up (hatch date 1/14/08)
Mean weight	0.37 g	0.39 g
Mean length	31 mm	32 mm
Ratio of longest to shortest	1.1	1.1
Loading	0.47 g/L	0.48 g/L
Test organism source	Trout Lodge; Sumner, WA	Trout Lodge; Sumner, WA

3.0 RESULTS

A summary of results for the dangerous waste characterization conducted on samples North Comp A, North Comp. A (ground), North 2B, North 3A, South Comp. A, South Comp. B, South 2A, and South 2C is contained in Table 3.

There was 3 percent mortality in the 100 mg/L concentration and no mortality in the 10 mg/L concentration of sample South 2C during the test. There was no mortality in any other sample during the test. Based on these results, North Comp. A, North Comp. A (ground), North 2B, South Comp. A, South Comp. B, South 2A, and South 2C do not designate as either dangerous or extremely hazardous wastes.

Table 3. Summary of Results

Sample ID	Concentration (mg/L)	Survival (# fish, N=30)	Percent Mortality	Dangerous Waste Designation
Control	0	30	0	NA
North Comp. A	10 100	30 30	0 0	None
North Comp. A	10 100	30 30	0 0	None
North 2B	10 100	30 30	0 0	None
North 3A	10 100	30 25[1]	0 0	None
Control	0	30	0	NA
South Comp. A	10 100	30 30	0 0	None
South Comp. B	10 100	30 30	0 0	None
South 2A	10 100	30 30	0 0	None
South 2C	10 100	29[2] 29	0 3	None

[1] Initial count was 25, see Quality Assurance section for further explanation.

[2] Initial count was 29, see Quality Assurance section for further explanation.

4.0 QUALITY ASSURANCE

One replicate of the 100 mg/L concentration of sample North 3A had 5 fish added instead of 10 at test initiation. As there was no mortality in this sample, this deviation is not expected to have affected the results.

One replicate of the 10 mg/L concentration of sample South 2C had 9 fish added instead of 10 at test initiation. As there was no mortality in the 10 mg/L concentration and only 3 percent mortality in the 100 mg/L concentration of this sample, this deviation is not expected to have affected the results.

Three replicates of the 10 mg/L concentration of sample North Comp. A had super-saturated dissolved oxygen levels at test initiation. As there was no mortality in this sample, this deviation is not expected to have affected the results.

The most recently completed reference toxicant test was initiated March 11, 2008. The LC_{50} of 85.07 µg/L copper was acceptable based on control charting for this laboratory. The coefficient of variation (CV) for the last 20 tests was 39.1 percent, which is considered good by the Biomonitoring Science Advisory Board.

References

Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology Publication # WQ-R-95-80 Revised June 2005.

Biological Testing Methods 80-12 for the Designation of Dangerous Waste. Washington State Department of Ecology Publication #80-12. Revised June 1999.

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard, Washington 98366

Case Narrative

February 28, 2008

Subject: Metals Black Sand Beach Investigation -07

Project No: 111008

Officer: Brendan Dowling

By: Meredith Jones MJ

Summary

Beryllium results were qualified as estimates due to failed continuing calibration verification. One total antimony and lead result was qualified as estimates due to spike failure. Total copper and zinc spike recoveries were reported as not caculated due to high native concentrations of these analytes. Both TCLP barium, cadmium and lead results were qualified as estimates due to contamination in the leach blank. All other sample results were reported without qualification.

All analyses requested were evaluated by established regulatory quality assurance guidelines.

Methods

The laboratory analyzed and/or digested the sample using the following methods: EPA method SW1311-MT for leaching of TCLP elements, SW3010 for the digestion, and SW1311-6010 analysis of TCLP metals. EPA method 200.8 (ICPMS) was used for the digestion and analysis of total trace metals.

Sample Information

The laboratory received the samples on 02/15/08. The temperature of the cooler received was within the proper range of 0°C - 6°C. The samples were received in good condition. Four (4) samples were received and assigned laboratory identification numbers 074005 – 074008.

Holding Times

The laboratory performed all analyses within established EPA holding times.

Calibration

Instrument calibrations and calibration checks were performed in accordance with the appropriate method. The final total beryllium CCV was above acceptance limits due to matrix interference, and the results were qualified as extimates. All other initial and continuing calibration checks were within control limits. ICPMS calibration correlation coefficients were within the acceptance range of 1.000 - 0.995. The instruments were calibrated with NIST traceable standards and verified to be in calibration with a second source NIST traceable standard.

Method Blanks

Two method blanks were analyzed for the TCLP elements. MB05051E1 was the extraction fluid that was processed from the first leaching step and MB05052E2 was a water blank that was added at the hot block digestion step. MB05051E1 had levels of Ba, Cd and Pb that were above the laboratory's reporting limit, but well below regulatory TCLP limits. Since the water blank was not contaminated it is assumed that the contamination did not occur during the digestion procedure.

Sample numbers 074005 and 074006 for Ba, Cd, and Pb are qualified as estimates due to contamination during the leach procedure.

No analytically significant levels of analyte were detected in the other method blanks associated with these samples.

Matrix Spikes

Total copper and Zinc spike recoveries were reported as not calculated. The standard spiking level was insufficient for the elevated concentration of analyte in the source sample. Both antimony spike recoveries were below acceptance limits due to matrix interference and the source sample was qualified as an estimate. One lead spike and both beryllium spikes were above acceptance and the source sample was qualified as an estimate.

All other associated matrix spike recoveries were within the acceptance limits of 75% - 125%.

Replicates

The relative percent difference of the total lead duplicates is outside the acceptance limits. Lead sample number 074008 is qualified as an estimate.

All associated duplicate relative percent differences of samples with concentrations greater than 5 times the reporting limit were within the acceptance range of 0% - 20%.

Laboratory Control Samples

All laboratory control sample recoveries were within the acceptance limits of 85% - 115%.

Internal Standards

All internal standard recoveries were within acceptance limits of 60% - 125%.

Other Quality Assurance Measures and Issues

Total metals' samples were initially prepped using the suggested weight of 1.0g. This prep failed due to a gel formation. Samples were reprepped using 0.10g of sample. Reporting limits were raised accordingly.

U - The analyte was not detected at or above the reported result.

J - The analyte was positively identified. The associated numerical result is an estimate.

NC - Not Calculated

bold - The analyte was present in the sample. (Visual Aid to locate detected compounds on report sheet.)

Please call Dean Momohara at (360) 871-8808 to further discuss this project.

cc: Project File

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Nickel

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/26/08 **Analyte:** Nickel

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**22.0**		mg/Kg dw	02/13/08	02/26/08
08074008		NORTH 2	Sediment/Soil	**15.5**		mg/Kg dw	02/13/08	02/26/08
08074008	LMX1	(matrix spike)		**94**		%	02/13/08	02/26/08
08074008	LMX2	(matrix spike)		**92**		%	02/13/08	02/26/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/26/08
ML08050I1		Lab LCS-	Sediment/Soil	**106**		%		02/26/08

Authorized By: M. Jones Release Date: 2/26/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Silver

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/26/08 **Analyte:** Silver

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**4.6**		mg/Kg dw	02/13/08	02/26/08
08074008		NORTH 2	Sediment/Soil	**3.5**		mg/Kg dw	02/13/08	02/26/08
08074008	LMX1	(matrix spike)		**94**		%	02/13/08	02/26/08
08074008	LMX2	(matrix spike)		**92**		%	02/13/08	02/26/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/26/08
ML08050I1		Lab LCS-	Sediment/Soil	**107**		%		02/26/08

Authorized By: MJ Jones Release Date: 2/26/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Beryllium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Beryllium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**1.5**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**1.1**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**160**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**145**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**95**		%		02/20/08

Authorized By: M. Jam Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**164**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**119**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**106**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**107**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	2.5	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**109**		%		02/20/08

Authorized By: M-Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Copper

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Copper

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**2620**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**1740**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)			NC	%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)			NC	%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**96**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Zinc

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Zinc

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**23000**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**14600**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)			NC	%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)			NC	%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	25	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**110**		%		02/20/08

Authorized By: M Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Arsenic

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Arsenic

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**22.6**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**18.6**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**106**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**104**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**109**		%		02/20/08

Authorized By: M Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Selenium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8
Date Reported: 02/25/08 **Analyte:** Selenium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	2.5	U	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	2.5	U	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**101**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**99**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	2.5	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**111**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Cadmium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Cadmium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**2.6**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**2.6**		mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**89**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**88**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**104**		%		02/20/08

Authorized By: M. Jarvis Release Date: 2/25/08 Page: 1

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Antimony

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Antimony

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**44.7**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**30.2**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**47**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**55**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	1.0	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**106**		%		02/20/08

Authorized By: M. Jones Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Thallium

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Thallium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	0.50	U	mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	0.50	U	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1 (matrix spike)			**102**		%	02/13/08	02/20/08
08074008	LMX2 (matrix spike)			**106**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**101**		%		02/20/08

Authorized By: M. Joan Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Lead

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Project Officer: Brendan Dowling **Method:** EPA200.8

Date Reported: 02/25/08 **Analyte:** Lead

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
08074007		SOUTH 2	Sediment/Soil	**323**		mg/Kg dw	02/13/08	02/20/08
08074008		NORTH 2	Sediment/Soil	**274**	**J**	mg/Kg dw	02/13/08	02/20/08
08074008	LMX1	(matrix spike)		**112**		%	02/13/08	02/20/08
08074008	LMX2	(matrix spike)		**169**		%	02/13/08	02/20/08
MB08050I1		Lab BLNK	Sediment/Soil	0.50	U	mg/Kg dw		02/20/08
ML08050I1		Lab LCS-	Sediment/Soil	**103**		%		02/20/08

Authorized By: M. Joan Release Date: 2/25/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Lab ID: MB08051E1 **Method:** 1311-6010

QC Type: Laboratory Method Blank **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**1.96**	
Cadmium	**0.030**	
Chromium	0.0050	U
Lead	**0.29**	
Selenium	0.050	U
Silver	0.010	U

Authorized By: Sara Blumak Release Date: 2/22/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Lab ID: MB08052E1 **Method:** 1311-6010

QC Type: Laboratory Method Blank **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	0.050	U
Cadmium	0.0050	U
Chromium	0.0050	U
Lead	0.050	U
Selenium	0.050	U
Silver	0.010	U

Authorized By: Jim Sikonia Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: **Black Sand Beach Investigation - 07**
LIMS Project ID: **1110-08**
Lab ID: **ML08052E1**
Method: 1311-6010
QC Type: Laboratory Control Sample
Date Prepared: 02/21/08
Matrix: Waste
Project Officer: Brendan Dowling
Date Analyzed: 02/26/08
Units: %

Analyte	Result	Qualifier
Arsenic	108	
Barium	106	
Cadmium	104	
Chromium	108	
Lead	108	
Selenium	109	
Silver	102	

Authorized By: [signature] Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07
LIMS Project ID: 1110-08

Sample: 08074005
Field ID: SOUTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**2.44**	**J**
Cadmium	**0.0095**	**J**
Chromium	0.0050	U
Lead	**0.26**	**J**
Selenium	0.050	U
Silver	0.010	U

Authorized By: _____ Release Date: 2/28/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: **Black Sand Beach Investigation - 07**
LIMS Project ID: **1110-08**

Sample: **08074006**
Field ID: NORTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: mg/L

Analyte	Result	Qualifier
Arsenic	0.050	U
Barium	**1.97**	**J**
Cadmium	**0.030**	**J**
Chromium	0.0050	U
Lead	**0.29**	**J**
Selenium	0.050	U
Silver	0.010	U

Authorized By: [signature]

Release Date: 2/28/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07
LIMS Project ID: 1110-08

Sample: 08074006 (matrix spike - LMX1)
Field ID: NORTH 1
Project Officer: Brendan Dowling

Date Collected: 02/13/08
Date Prepared: 02/21/08
Date Analyzed: 02/26/08

Method: 1311-6010
Matrix: Waste
Units: % Recovery

Analyte	Result	Qualifier
Arsenic	102	
Barium	92	
Cadmium	92	
Chromium	97	
Lead	94	
Selenium	104	
Silver	93	

Authorized By: Dale Sebrell

Release Date: 2/27/08

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
TCLP metals for ICP analysis

Project Name: Black Sand Beach Investigation - 07 **LIMS Project ID:** 1110-08

Sample: 08074006 (matrix spike - LMX2) **Date Collected:** 02/13/08 **Method:** 1311-6010

Field ID: NORTH 1 **Date Prepared:** 02/21/08 **Matrix:** Waste

Project Officer: Brendan Dowling **Date Analyzed:** 02/26/08 **Units:** % Recovery

Analyte	Result	Qualifier
Arsenic	102	
Barium	91	
Cadmium	92	
Chromium	96	
Lead	93	
Selenium	104	
Silver	93	

Authorized By: Pam Sikkema Release Date: 2/27/08

Nautilus Environmental, LLC

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EASTERN REGIONAL OFFICE

Dangerous Waste Characterization

Sample IDs: North Comp. A; North Comp. A (ground); North 2B; North 3A; South Comp. A; South Comp. B; South 2A; South 2C

Report date: March 24, 2008

Submitted to:

Washington State Department of Ecology
4601 N. Monroe St.
Spokane, WA 99205

Washington Laboratory
5009 Pacific Hwy East
Suite 2
Tacoma, WA 98424

1.0 INTRODUCTION

A dangerous waste characterization using the test organism *Oncorhynchus mykiss* (rainbow trout) was conducted on eight samples submitted by Washington State Department of Ecology (WDOE) to Nautilus Environmental. Testing was conducted following the Washington State Department of Ecology Publication 80-12.

2.0 METHODS

The samples, identified as North Comp A, North Comp A (ground), North 2B, North 3A, South Comp A, South Comp B, South 2A, and South 2C, were received in the laboratory on March 11, 2008. Sample North Comp A (ground) was ground in the laboratory using a coffee grinder cleaned to EPA specifications. The test procedure is outlined in Table 1.

Table 1. Summary of Dangerous Waste Characterization Test Conditions

Parameter	Standard Fish Toxicity Test	Standard Fish Toxicity Test
Test number	0803-T035	0803-T050
Samples tested	North Comp A, North Comp A (ground), North 2B, North 3A	South Comp A, South Comp B, South 2A, South 2C
Test initiation date; time	3/15/2008; 1100h	3/20/2008; 1240h
Test termination date; time	3/19/2008; 1115h	3/24/2008; 1140h
Endpoint	Mortality at 96-hours	
Test chamber	10-L glass tank	
Test temperature	12 ± 1°C	
Dilution water	Carbon filtered water	
Test solution volume	8 L	
Test concentrations (mg/L)	100, 10, 0	
Number of organisms/ chamber	10	
Number of replicates	3	
Test organism	*Oncorhynchus mykiss* (rainbow trout)	
Feeding	No feeding during test	
Photoperiod	16 hours light/ 8 hours dark	
Extraction	Rotary agitation (30 +/- 2 rpm) for 18 hours	
Reference Toxicant	Copper sulfate	
Deviations	See Quality Assurance Section	

The test organisms used in the test are outlined in Table 2. Both sets of samples were tested using fish from the same batch received on March 12, 2008.

Table 2. Test organisms (*Oncorhynchus mykiss*)

Test number	0803-T035	0803-T050
Test organism age	40 days post swim-up (hatch date 1/14/08)	45 days post swim-up (hatch date 1/14/08)
Mean weight	0.37 g	0.39 g
Mean length	31 mm	32 mm
Ratio of longest to shortest	1.1	1.1
Loading	0.47 g/L	0.48 g/L
Test organism source	Trout Lodge; Sumner, WA	Trout Lodge; Sumner, WA

3.0 RESULTS

A summary of results for the dangerous waste characterization conducted on samples North Comp A, North Comp. A (ground), North 2B, North 3A, South Comp. A, South Comp. B, South 2A, and South 2C is contained in Table 3.

There was 3 percent mortality in the 100 mg/L concentration and no mortality in the 10 mg/L concentration of sample South 2C during the test. There was no mortality in any other sample during the test. Based on these results, North Comp. A, North Comp. A (ground), North 2B, South Comp. A, South Comp. B, South 2A, and South 2C do not designate as either dangerous or extremely hazardous wastes.

Table 3. Summary of Results

Sample ID	Concentration (mg/L)	Survival (# fish, N=30)	Percent Mortality	Dangerous Waste Designation
Control	0	30	0	NA
North Comp. A	10 100	30 30	0 0	None
North Comp. A	10 100	30 30	0 0	None
North 2B	10 100	30 30	0 0	None
North 3A	10 100	30 25[1]	0 0	None
Control	0	30	0	NA
South Comp. A	10 100	30 30	0 0	None
South Comp. B	10 100	30 30	0 0	None
South 2A	10 100	30 30	0 0	None
South 2C	10 100	29[2] 29	0 3	None

[1] Initial count was 25, see Quality Assurance section for further explanation.

[2] Initial count was 29, see Quality Assurance section for further explanation.

4.0 QUALITY ASSURANCE

One replicate of the 100 mg/L concentration of sample North 3A had 5 fish added instead of 10 at test initiation. As there was no mortality in this sample, this deviation is not expected to have affected the results.

One replicate of the 10 mg/L concentration of sample South 2C had 9 fish added instead of 10 at test initiation. As there was no mortality in the 10 mg/L concentration and only 3 percent mortality in the 100 mg/L concentration of this sample, this deviation is not expected to have affected the results.

Three replicates of the 10 mg/L concentration of sample North Comp. A had super-saturated dissolved oxygen levels at test initiation. As there was no mortality in this sample, this deviation is not expected to have affected the results.

The most recently completed reference toxicant test was initiated March 11, 2008. The LC_{50} of 85.07 µg/L copper was acceptable based on control charting for this laboratory. The coefficient of variation (CV) for the last 20 tests was 39.1 percent, which is considered good by the Biomonitoring Science Advisory Board.

References

Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology Publication # WQ-R-95-80 Revised June 2005.

Biological Testing Methods 80-12 for the Designation of Dangerous Waste. Washington State Department of Ecology Publication #80-12. Revised June 1999.

Appendix A
Test Data

Dangerous Waste Toxicity Test
Toxicity Test Data Sheet - Washington Laboratory

Client: WDOE
Sample ID: North Comp. A; North Comp. A (ground); North 2B
Test # 0803-T035

Start Date & Time: 3/15/08 1100
End Date & Time: 3/19/08 1115
Test Organism: *Oncorhynchus mykiss*
Test Protocol: **Washington State Department of Ecology Publ. 80-12**

Rep	Conc.	Cont #	Number of Live Organisms					Dissolved Oxygen (mg/L)					pH (units)					Conductivity (umhos/cm)					Temperature (°C)					Percent Survival
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
1	Ø	21	10	10	10	10	10	10.1	9.1	8.4	9.1	7.9	7.39	7.30	7.18	7.06	7.05	49				46	12.3	12.6	12.9	12.0	12.6	100%
2		20	10	10	10	10	10	10.1	9.2	8.8	9.2	8.5	7.48	7.34	7.22	7.20	7.21	48				50						
3		23	10	10	10	10	10	10.2	9.1	8.6	9.0	8.8	7.45	7.22	7.15	7.20	7.11	42				44						
1	10ppm	24	10	10	10	10	10	11.0	8.9	8.4	8.8	7.9	7.44	7.18	7.14	7.12	7.06	41				44	11.6	11.7	11.9	11.6	12.1	100%
2	TD8-043	16	10	10	10	10	10	11.8	9.1	8.2	8.9	8.2	7.43	7.13	7.12	7.08	7.08	49				46						
3	North Comp A	13	10	10	10	10	10	11.8	9.2	8.5	8.9	8.5	7.44	7.17	7.15	7.13	7.13	44				46						
1	100ppm	9	10	10	10	10	10	9.6	8.8	8.4	9.0	8.3	7.46	7.21	7.20	7.22	7.18	51				53	11.8	11.8	12.1	11.7	11.6	100%
2	TD8-043	4	10	10	10	10	10	9.5	8.9	8.4	9.0	8.6	7.45	7.19	7.18	7.20	7.20	48				50						
3	North Comp. A	17	10	10	10	10	10	9.7	8.9	8.4	8.8	8.3	7.46	7.17	7.18	7.15	7.20	46				48						
1	10ppm	27	10	10	10	10	10	10.1	8.9	8.1	8.4	7.9	7.42	7.13	7.07	7.04	7.07	42				44	12.2	12.0	12.2	11.9	11.9	100%
2	TD8-042	6	10	10	10	10	10	9.7	9.0	8.1	8.4	7.6	7.43	7.13	7.09	7.07	7.08	48				50						
3	No. Co. A (Grnd)	5	10	10	10	10	10	9.7	8.5	8.1	8.5	8.0	7.43	7.12	7.10	7.13	7.12	48				50						
1	100ppm	7	10	10	10	10	10	9.7	8.7	8.4	8.5	8.2	7.44	7.17	7.16	7.21	7.14	50				52	12.5	12.3	12.8	12.1	11.9	100%
2	TD8-042	12	10	10	10	10	10	9.8	8.7	8.1	8.3	7.5	7.43	7.13	7.06	7.05	7.06	43				45						
3	No. Co. (Ground)	11	10	10	10	10	10	9.8	8.6	8.1	8.2	7.3	7.43	7.12	7.04	7.09	7.03	44				46						
1	10ppm	18	10	10	10	10	10	9.6	8.5	8.0	8.4	8.3	7.45	7.13	7.09	7.10	7.08	47				49	12.6	12.4	12.9	12.5	12.0	100%
2	TD8-044	19	10	10	10	10	10	9.6	8.5	8.0	8.4	8.2	7.44	7.15	7.12	7.13	7.12	49				50						
3	North 2B	15	10	10	10	10	10	9.6	8.7	8.1	8.7	7.5	7.47	7.15	7.09	7.12	7.09	45				47						
1	100ppm	8	10	10	10	10	10	9.7	8.7	8.4	8.6	7.8	7.47	7.16	7.19	7.15	7.14	50				54	11.7	11.2	11.9	11.1	12.1	100%
2	TD8-044	3	10	10	10	10	10	9.5	8.7	8.2	8.6	7.9	7.46	7.17	7.13	7.16	7.14	49				52						
3	North 2B	1	10	10	10	10	10	9.6	8.6	8.3	8.5	8.1	7.46	7.16	7.14	7.13	7.14	47				52						
Technician Initials			JS	(N)	BP	BP	BP	(N)	(N)	BP	BP	MM																

Sample	Alk. (init.)	Hard. (init.)	Alk. (fin.)	Hard. (fin.)
	(mg/L as CaCO3)			
Control	20	20	24	28
TD8-042 (N) ~~TD8-043~~ 100ppm	28	32	28	32
TD8-043 (N) ~~TD8-044~~ 10ppm	20	(N) ~~20~~ 24	20	24
TD8-044 (N) ~~TD8-045~~ 100ppm	28	20	28	20

Animal Source: Trout Lodge
Date of Hatch: 1/14/08

Test Volume: 8-1
Date Received: 3/12/08
Date of Swim-up: 2/4/08

Weights (g): 33* 33 46 34 37 30 40 41 45 31
Lengths(mm): 30 33 33 31 31 30 32 32 33 29
Length max/min: 1.1

Loading: .4675 g/L

μ = 37.4 Nautilus Environmental
μ = 31.4 Washington Laboratory

5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424
253-922-4296

Sample Description: * See Corrective Action Log, 08-009,

Dangerous Waste Toxicity Test
Toxicity Test Data Sheet - Washington Laboratory

Client: WDOE
Sample ID: North 3A
Test # 0803 - T035

Start Date & Time: 3/15/08 1100
End Date & Time: 3/19/08 1115
Test Organism: *Oncorhynchus mykiss*
Test Protocol: **Washington State Department of Ecology Publ. 80-12**

Rep	Conc.	Cont #	Number of Live Organisms 0	24	48	72	96	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (units) 0	24	48	72	96	Conductivity (umhos/cm) 0	24	48	72	96	Temperature (°C) 0	24	48	72	96	Percent Survival
1	10ppm	26	10	10	10	10	10	9.9	8.7	8.4	8.7	7.9	7.47	7.13	7.18	7.13	7.05	41				45	11.6	11.4	11.4	11.3	12.4	100%
2	T08-045	14	10	10	10	10	10	9.9	8.7	8.3	8.5	8.0	7.45	7.11	7.11	7.11	7.07	43				47						
3	North 3A	10	10	10	10	10	10	9.7	8.6	8.3	8.4	8.0	7.42	7.19	7.12	7.30	7.11	52				54						
1	100ppm	22	10	10	10	10	10	9.7	8.6	8.4	8.4	7.9	7.47	7.19	7.20	7.13	7.14	44				47	11.8	11.6	11.9	11.8	12.0	100%
2	T08-045	25	10	10	10	10	10	9.5	8.7	8.1	8.3	7.5	7.43	7.10	7.13	7.12	7.03	43				46						
3	North 3A	2*	~~10~~ 5	~~10~~ 5	5	5	5	9.7	9.0	8.6	8.6	8.3	7.43	7.30	7.11	7.23	7.19	49				53						
1																												
2																												
3																												
1																												
2																												
3																												
1																												
2																												
3																												
1																												
2																												
3																												
1																												
2																												
3																												
Technician Initials			D	(N)	BP	BP	BP	(N)	(N)	BP	BP	MM																

Sample	Alk. (init.)	Hard. (init.)	Alk. (fin.)	Hard. (fin.)
	(mg/L as CaCO3)			
Control	20	20	24	28
T08-045	28	20	28	20

Animal Source: TROUT LODGE
Date of Hatch: 1/14/08
Test Volume: 8-L
Date Received: 3/12/08
Date of Swim-up: 2/4/08

Weights (g): .33 .33 .46 .38 .37 .30 .40 .41 .45 .31 μ = .374
Lengths(mm): 30 33 33 31 31 30 32 32 33 29 μ = 31.4
Length max/min: 1.1
Loading: .4675 g/L

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424
253-922-4296

Sample Description: * Tank 2 started with only 5 fish. See CA (corrective action) log # 08-010

Dangerous Waste Toxicity Test
Toxicity Test Data Sheet - Washington Laboratory

Client: WDOE
Sample ID: South Comp A, South Comp B, South 2A, South 2C
Test #: 0803-TDSD

Start Date & Time: 3/20/08 1240
End Date & Time: 3/24/08 1140
Test Organism: *Oncorhynchus mykiss*
Test Protocol: **Washington State Department of Ecology Publ. 80-12**

Rep	Conc.	Cont #	Number of Live Organisms					Dissolved Oxygen (mg/L)					pH (units)					Conductivity (umhos/cm)					Temperature (°C)					Percent Survival
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
1	CON	27	10	10	10	10	10	10.5	8.4	8.7	8.2	8.3	7.30	7.12	7.07	7.26	7.13	39				41	11.6	12.8	12.3	12.6	11.6	100%
2		9	10	10	10	10	10	10.2	8.3	8.8	8.7	8.7	7.32	7.16	7.14	7.24	7.21	42				46						
3		1	10	10	10	10	10	10.3	8.4	8.5	8.6	8.6	7.34	7.20	7.13	7.22	7.17	42				45						
1	TDS-046	2	10	10	10	10	10	10.1	8.5	9.0	8.5	8.6	7.36	7.20	7.11	7.22	7.20	41				44	11.7	12.5	11.5	11.6	11.5	100%
2	10ppm	18	10	10	10	10	10	10.4	8.4	8.7	8.8	9.1	7.37	7.18	7.13	7.20	7.21	40				44						
3	South CompA	15	10	10	10	10	10	10.5	8.5	8.4	8.3	8.3	7.39	7.21	7.14	7.19	7.18	39				42						
1	TDS-046	11	10	10	10	10	10	10.1	8.3	8.5	9.1	8.9	7.36	7.19	7.14	7.19	7.17	42				45	11.6	12.5	11.7	11.3	11.4	100%
2	100ppm	25	10	10	10	10	10	10.5	8.9	8.4	8.4	8.8	7.37	7.18	7.12	7.16	7.16	39				41						
3	SouthCompA	21	10	10	10	10	10	10.3	8.5	8.5	8.4	8.6	7.36	7.19	7.13	7.17	7.18	41				45						
1	TDS-047	12	10	10	10	10	10	10.5	8.7	8.7	8.4	8.9	7.40	7.21	7.15	7.15	7.16	39				42	11.6	12.9	11.8	11.4	11.6	100%
2	10ppm	13	10	10	10	10	10	10.5	8.5	8.5	8.9	8.5	7.40	7.20	7.13	7.16	7.18	39				42						
3	SouthCompB	4	10	10	10	10	10	10.4	8.3	8.8	8.2	8.5	7.37	7.16	7.15	7.16	7.15	41				44						
1	TDS-048	5	10	10	10	10	10	10.4	8.8	8.5	8.8	8.6	7.38	7.21	7.16	7.22	7.21	41				44	11.8	13.0	12.3	11.8	12.0	100%
2	100ppm	19	10	10	10	10	10	10.3	8.7	8.8	8.5	8.9	7.38	7.20	7.14	7.22	7.21	41				45						
3	SouthCompB	23	10	10	10	10	10	10.5	8.5	8.1	8.7	8.4	7.39	7.15	7.12	7.14	7.13	39				42						
1	TDS-048	24	10	10	10	10	10	10.2	8.5	8.5	8.2	8.0	7.31	7.10	7.03	7.15	7.11	38				42	11.4	11.5	12.2	11.3	12.5	100%
2	10ppm	6	10	10	10	10	10	10.4	8.4	8.7	8.1	8.4	7.34	7.15	7.12	7.15	7.14	42				46						
3	South 2A	10	10	10	10	10	10	10.0	8.4	8.4	8.3	7.7	7.36	7.19	7.15	7.15	7.16	42				46						
1	TDS-048	3	10	10	10	10	10	10.0	8.8	8.3	8.2	8.3	7.37	7.21	7.14	7.18	7.20	41				45	11.6	11.5	11.6	11.2	12.6	100%
2	100ppm	22	10	10	10	10	10	10.2	9.0	8.3	8.4	8.3	7.36	7.23	7.17	7.19	7.21	42				46						
3	South 2A	16	10	10	10	10	10	10.4	8.9	8.6	8.7	8.4	7.39	7.20	7.16	7.18	7.20	40				44						
Technician Initials			JS	BP	AT	AT	JS	JS	BP	BP	AT	JS																

Sample	Alk. (init.)	Hard. (init.)	Alk. (fin.)	Hard. (fin.)
	(mg/L as CaCO3)			
Control	24	20	20	16
TDS-046	20	24	24	20
TDS-047	28	20	24	20
TDS-048	24	40	24	40

Animal Source: Trout Lodge
Date of Hatch: 1/4/08
Test Volume: 8L
Date Received: 3/12/08
Date of Swim-up: 2/4/08

Weights (g): 0.31 0.36 0.39 0.42 0.49 0.44 0.40 0.36 0.32 0.38
Lengths(mm): 31 31 32 31 33 33 32 31 30 32
Length max/min: 1.1
Loading: .48 g/L

μ = 3.87 Nautilus Environmental
μ = 31.6 Washington Laboratory

5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424
253-922-4296

Sample Description:

Dangerous Waste Toxicity Test
Toxicity Test Data Sheet - Washington Laboratory

Client: WOOE

Sample ID: South Comp A, South Comp B, South 2A, South 2C

Test # 0803-T050

Start Date & Time: 3/20/08 1240

End Date & Time: 3/24/08 1140

Test Organism: *Oncorhynchus mykiss*

Test Protocol: **Washington State Department of Ecology Publ. 80-12**

Rep	Conc.	Cont #	Number of Live Organisms					Dissolved Oxygen (mg/L)					pH (units)					Conductivity (umhos/cm)					Temperature (°C)					Percent Survival
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
1	T08-049	17	~~10~~ 9*	9	9	~~10~~ 9	9	10.5	9.2	8.5	8.8	8.4	7.38	7.23	7.21	7.21	7.23	40				44	11.4	11.8	11.7	11.3	12.2	100%
2	10 ppm	8	10	10	10	10	10	10.2	8.7	8.1	8.0	8.3	7.37	7.22	7.13	7.14	7.16	42				47						
3	South 2C	7	10	10	10	10	10	10.2	8.8	8.4	8.3	8.0	7.37	7.22	7.16	7.15	7.16	42				46						
1	T08-049	26	10	10	10	10	10	10.4	8.8	9.2	8.4	8.4	7.41	7.21	7.18	7.14	7.18	39				43	11.8	12.3	12.0	11.6	12.8	97%
2	100 ppm	20	10	10	10	10	10	10.4	8.4	8.5	8.8	8.3	7.37	7.21	7.16	7.16	7.21	41				46						
3	South 2C	14	10	10	9	9	9	10.6	8.7	8.5	8.0	8.0	7.41	7.21	7.14	7.15	7.14	40				46						
1																												
2																												
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Technician Initials			JD	BP	PT	TT	JD	JD	BP	BP	PT	JD																

Sample	Alk. (init.)	Hard. (init.)	Alk. (fin.)	Hard. (fin.)
	(mg/L as CaCO3)			
Control	24	20	20	16
T08-049	24	20	20	16

Animal Source: Troutlodge

Date of Hatch: 1/14/08

Test Volume: 8L

Date Received: 3/12/08

Date of Swim-up: 2/4/08

Weights (g): .31 .36 .39 .42 .49 .44 .40 .36 .32 .38 μ = .387

Lengths(mm): 31 31 32 31 33 33 32 31 30 32 μ = 31.6

Length max/min: 1.1

Loading: .48g/L

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424
253-922-4296

Sample Description: * Replicate 17 only has 9 fish -

Nautilus Environmental

Corrective Action Log - 2008

Entry No.: 08-009

Date Identified: 3/17/08 **By Whom:** Marie

Problem Description:
NOTE: Please be very specific (i.e. if temperature is out of range, which way and by how much?)!

D.O.'s too high on 3 of the 80-12 tanks at start-up.
D.O. over saturated by 0.5 mg/L in tank #24, & 1.3 mg/L in tanks #16 + 13

Analysis & Resolution:
NOTE: Key points here are: 1) How can the problem be avoided in the future? 2) What action was taken?

1) Meter should be allowed to settle completely or possibly be re-calibrated. If D.O. is still high, tank can be stirred to de-saturate.

Affected Test IDs: WDOE 80-12 3/15/08
TDS-043 Tanks 24, 16, 13

Further action required? Y (N)

Verified By: Andrea Santiago
(Supervisor)

If yes, provide the following information (minimum):

Correction/Action Needed: _____

Date/Time Performed: _____

Performed by: _____

Date all action completed: _____

Verified By: _____
(QA Officer)

Nautilus Environmental

Corrective Action Log - ~~2007~~ 08 ies

Entry No.: ~~07-~~ ies 08 -010

Date Identified: 3/16/08 **By Whom:** Maria

Problem Description:
NOTE: Please be very specific (i.e. if temperature is out of range, which way and by how much?)!

One tank of an 80-12 tank contained only five fish instead of the required ten.

Analysis & Resolution:
NOTE: Key points here are: 1) How can the problem be avoided in the future? 2) What action was taken?

I, Laura Shanks, who added the fish, will doubble check that 10 fish are added to each test chamber. The paperwork for this test reflects the test chamber was initiated with only 5 fish.

Affected Test IDs: WDOE 80-12 test, initiated 3/15/08

Further action required? Y N

Verified By: (Supervisor) [signature]

If yes, provide the following information (minimum):

Correction/Action Needed: ________

Date/Time Performed: ________

Performed by: ________

Date all action completed: ________ **Verified By:** (QA Officer) ________

Appendix B
Reference Toxicant Test
Control Chart and Statistical Summary

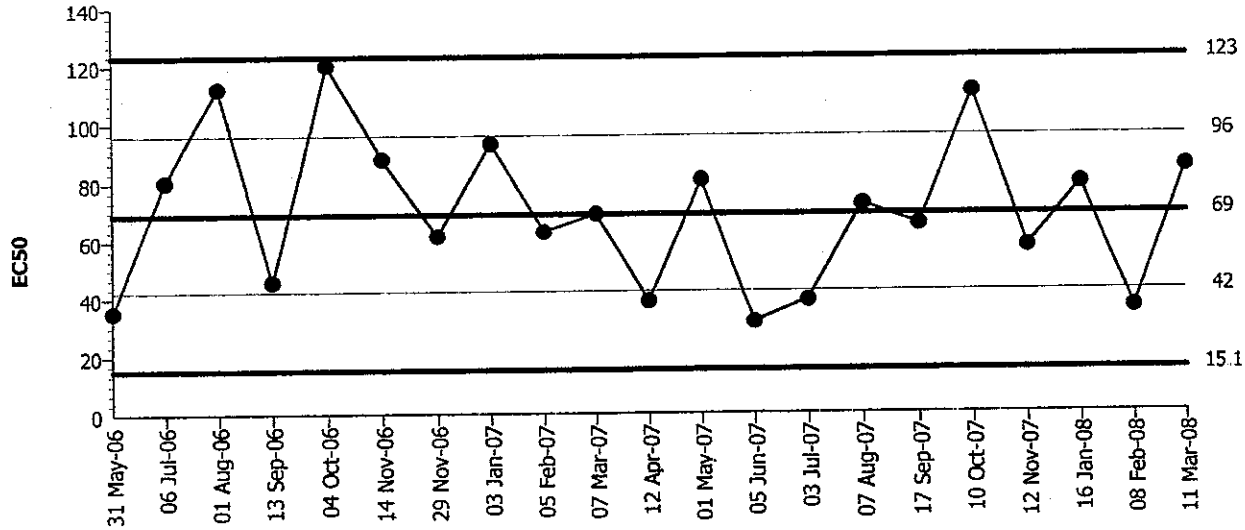
CETIS QC Plot

Report Date: 17 Mar-08 08:49 (1 of 1)

Acute Fish Survival Test — **Nautilus Environmental WA**

Test Type:	Survival (96h)	**Organism:**	Oncorhynchus mykiss (Rainbow Tro	**Material:**	Copper sulfate
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF

Acute Fish Survival Test



Mean:	69.02	**Count:**	20	**-1s Warning Limit:**	42.04	**-2s Action Limit:**	15.06
Sigma:	26.98	**CV:**	39.10%	**+1s Warning Limit:**	96	**+2s Action Limit:**	123

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Link No	Analysis No
1	2006	May	31	35.36	-33.66	-1.248	(-)		19-3457-2633	02-9683-8993
2		Jul	6	80.47	11.45	0.4242			08-0196-2782	16-9690-6989
3		Aug	1	112.2	43.23	1.602	(+)		08-6267-8343	09-7746-6681
4		Sep	13	45.65	-23.37	-0.8663			14-1862-0699	14-4190-4111
5		Oct	4	120.3	51.28	1.901	(+)		05-1640-1733	20-2095-2651
6		Nov	14	88.07	19.05	0.706			11-2573-0594	06-3342-6879
7			29	61.56	-7.463	-0.2766			07-2713-6445	10-5454-1996
8	2007	Jan	3	93.3	24.28	0.9			16-1383-8186	09-5460-8069
9		Feb	5	63	-6.024	-0.2233			02-4511-2417	08-3345-6600
10		Mar	7	69.1	0.07564	0.002804			15-2742-2430	14-0632-0126
11		Apr	12	38.65	-30.37	-1.126	(-)		05-2221-9409	06-5376-8430
12		May	1	80.81	11.79	0.437			07-8440-9066	16-2412-3916
13		Jun	5	31.5	-37.52	-1.391	(-)		04-7226-1595	13-4878-0526
14		Jul	3	38.97	-30.05	-1.114	(-)		09-2201-9419	09-6463-0833
15		Aug	7	72.36	3.343	0.1239			00-2704-2087	10-0764-4900
16		Sep	17	65.31	-3.708	-0.1374			09-6049-9537	19-0516-9479
17		Oct	10	110.9	41.87	1.552	(+)		07-7267-2112	10-4144-5232
18		Nov	12	57.43	-11.59	-0.4294			01-5405-3561	12-3986-4906
19	2008	Jan	16	79.37	10.35	0.3836			04-2972-7948	18-3406-5324
20		Feb	8	36.13	-32.89	-1.219	(-)		18-0745-0448	10-2659-0509
21		Mar	11	85.07	16.05	0.5948			01-5589-5982	15-0144-3175

CETIS Summary Report

Acute Fish Survival Test — **Nautilus Environmental WA**

Test Run No:	15-7154-5566	**Test Type:**	Survival (96h)	**Analyst:**	Meghan Murphy
Start Date:	11 Mar-08 10:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	15 Mar-08 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	96h	**Source:**	Trout Lodge Fish Farm	**Age:**	57d

Sample No:	16-4358-6736	**Code:**	RA031108OM	**Client:**	Reference Toxicant Test
Sample Date:	11 Mar-08 10:45	**Material:**	Copper sulfate	**Project:**	
Receive Date:	15 Mar-08 10:15	**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Point Estimate Summary

Analysis No	Endpoint	Effect-%	Conc-µg/L	95% LCL	95% UCL	Method
15-0144-3175	96h Survival Rate	50	85.1	73.7	98.2	Trimmed Spearman-Kärber

Test Acceptability

Analysis No	Endpoint	Attribute	Test Stat	Acceptability Limits	Overlap	Decision
15-0144-3175	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes acceptability criteria

96h Survival Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
25		3	1	1	1	1	1	0	0	0.0%	0.0%
50		3	0.9	0.863	0.937	0.8	1	0.0183	0.1	11.1%	10.0%
100		3	0.367	0.345	0.388	0.3	0.4	0.0105	0.0577	15.7%	63.3%
200		3	0	0	0	0	0	0	0		100.0%
400		3	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
25		1	1	1
50		1	0.9	0.8
100		0.4	0.3	0.4
200		0	0	0
400		0	0	0

Appendix C
Chain-of-Custody Form

Chain of Custody

Nautilus Environmental

TESTING LOCATION (Please Circle)

California
5550 Morehouse Drive, Suite 150
San Diego, CA 92121
Phone 858.587.7333
Fax 858.587.3961

Washington
5009 Pacific Highway East, Suite 2
Tacoma, WA 98424
Phone 253.922.4296
Fax 253.922.5814

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Date 3/7/08 Page 1 of 1

Sample Collection By:

Report to:

Company	WA State Dept. of Ecology
Address	4601 N. Monroe St.
City/State/Zip	Spokane, WA 99205
Contact	Brendan Dowling
Phone	509/ 329-3611
Email	bdow461@ecy.wa.gov

Invoice To:

Company	WA State Dept. of Ecology
Address	4601 N. Monroe St.
City/State/Zip	Spokane, WA 99205
Contact	Brendan Dowling
Phone	509/ 329-3611
Email	bdow461@ecy.wa.gov

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	WDOE 80-12 Hazardous Waste Characterization using Rainbow Trout only	Receipt Temperature (°C)
1	North Comp. A	3/7/2008		Sediment	8 oz. glass jar	1	# T08-043	X	
2	North Comp. A	3/7/2008		Sediment	8 oz. glass jar	1	THIS SAMPLE ONLY: grind partially prior to toxicity analysis (sample is labeled) # T08-042	X	
3	North 2B	3/7/2008		Sediment	8 oz. glass jar	1	T08-044	X	
4	North 3A	3/7/2008		Sediment	8 oz. glass jar	1	T08-045	X	
5	South Comp. A	3/7/2008		Sediment	8 oz. glass jar	1	T08-046	X	
6	South Comp. B	3/7/2008		Sediment	8 oz. glass jar	1	T08-047	X	
7	South 2A	3/7/2008		Sediment	8 oz. glass jar	1	T08-048	X	
8	South 2C	3/7/2008		Sediment	8 oz. glass jar	1	T08-049	X	
9									
10									

PROJECT INFORMATION

Client:	WA Dept of Ecology
PO No.:	ER-08-0112
Shipped Via:	UPS Ground

SAMPLE RECEIPT

Total No. of Containers	8
Received Good Condition?	Y
Matches Test Schedule?	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)

(Signature) [signature] (Time) 10 AM

(Printed Name) ZACHARY T. HEDGPETH (Date) 3/7/08

(Company) DEPT OF ECOLOGY

RECEIVED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RELINQUISHED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (LABORATORY)

(Signature) [signature] (Time) 1515

(Printed Name) Elizabeth Tobin (Date) 3/11/08

(Company) Nautilus Environmental

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

APPENDIX D
60 PERCENT ENGINEERING PLANS AND SPECIFICATIONS

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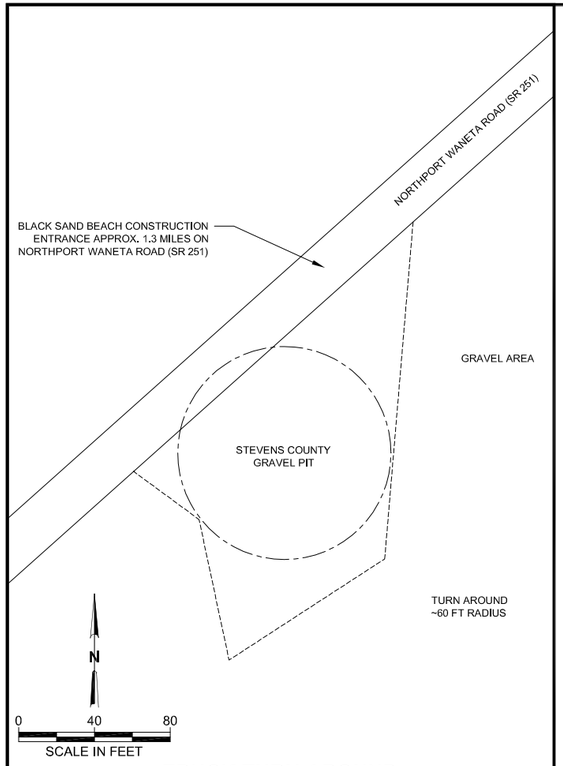
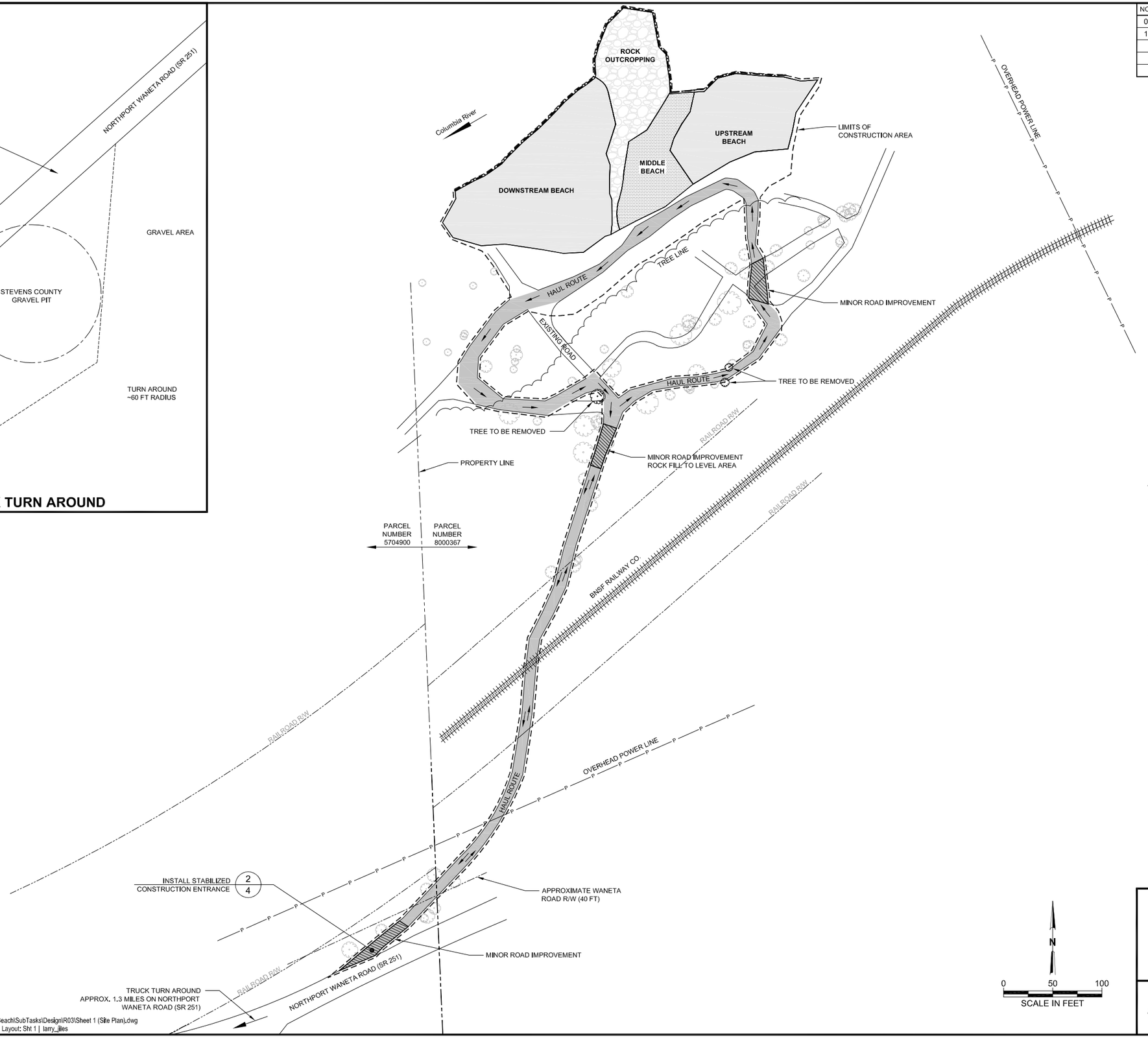
1	12/18/09	PTM	60% SUBMITTAL



TRUCK TURN AROUND



NOTES:

1. ORIGINAL SURVEY CONDUCTED BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON IN DECEMBER 2006 AND APRIL 2009. ADDITIONAL SURVEY WAS PERFORMED OF ACCESS ROADS AND TRUCK TURN AROUND AREA IN NOVEMBER 2009.
2. SURVEYS WERE PERFORMED WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REALTIME KINEMATIC SURVEY PROCEDURES.
3. THE PURPOSE OF THE SURVEYS WERE TO OBTAIN TOPOGRAPHIC DATA AND SITE FEATURES.
4. HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE. VERTICAL DATUM, NAVD 88, BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52 FT. WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD. 3 IN. BRASS CAP IN CEMENT, 745,055.705 FT. NORTH, 2,409,429.512 FT. EAST, ELEV. 1,457.071 FT.

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

EXISTING CONDITIONS
SITE PLAN AND HAUL ROUTE

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET 1 OF 8

DRAWING NO. 1

P:\ACAD\PROJECT\TeckCominoAlaska\Black Sand Beach\SubTasks\Design\R03\Sheet 1 (Site Plan).dwg
Mod: 12/18/2009, 11:25 | Plotted: 12/18/2009, 13:24 | Layout: Sht 1 | larry_iles

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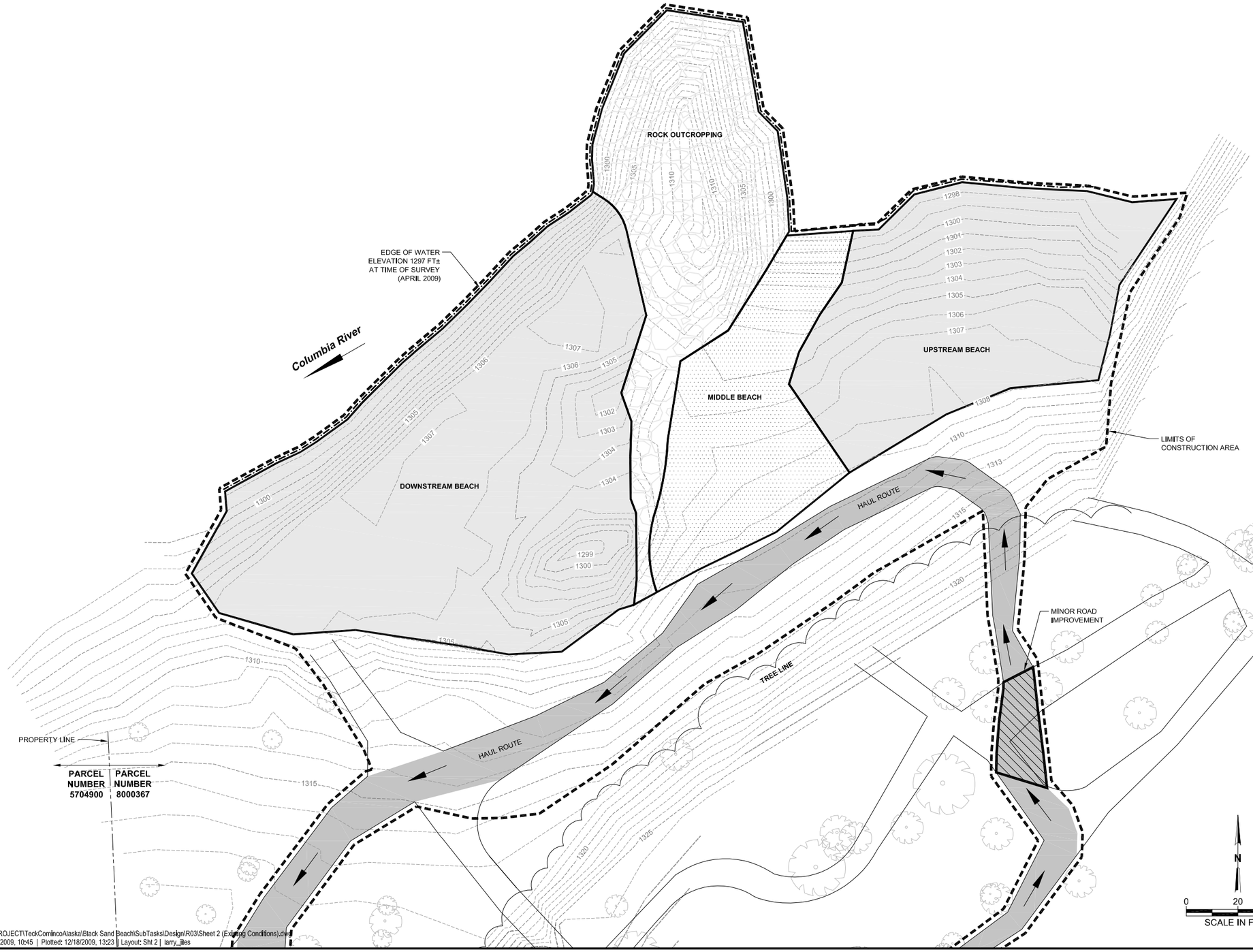

SURVEYOR'S NOTES:

1. ORIGINAL SURVEY CONDUCTED BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON IN DECEMBER 2006 AND APRIL 2009.
2. SURVEY WAS PERFORMED WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REALTIME KINEMATIC SURVEY PROCEDURES.
3. THE PURPOSE OF THE SURVEY WAS TO CONDUCT A TOPOGRAPHIC SURVEY.
4. HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE. VERTICAL DATUM, NAVD 88, BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52 FT. WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD. 3 IN. BRASS CAP IN CEMENT, 745,055.705 FT. NORTH, 2,409,429.512 FT. EAST, ELEV. 1,457.071 FT.

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

EXISTING CONDITIONS

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET 2 OF 8
DRAWING NO. 2

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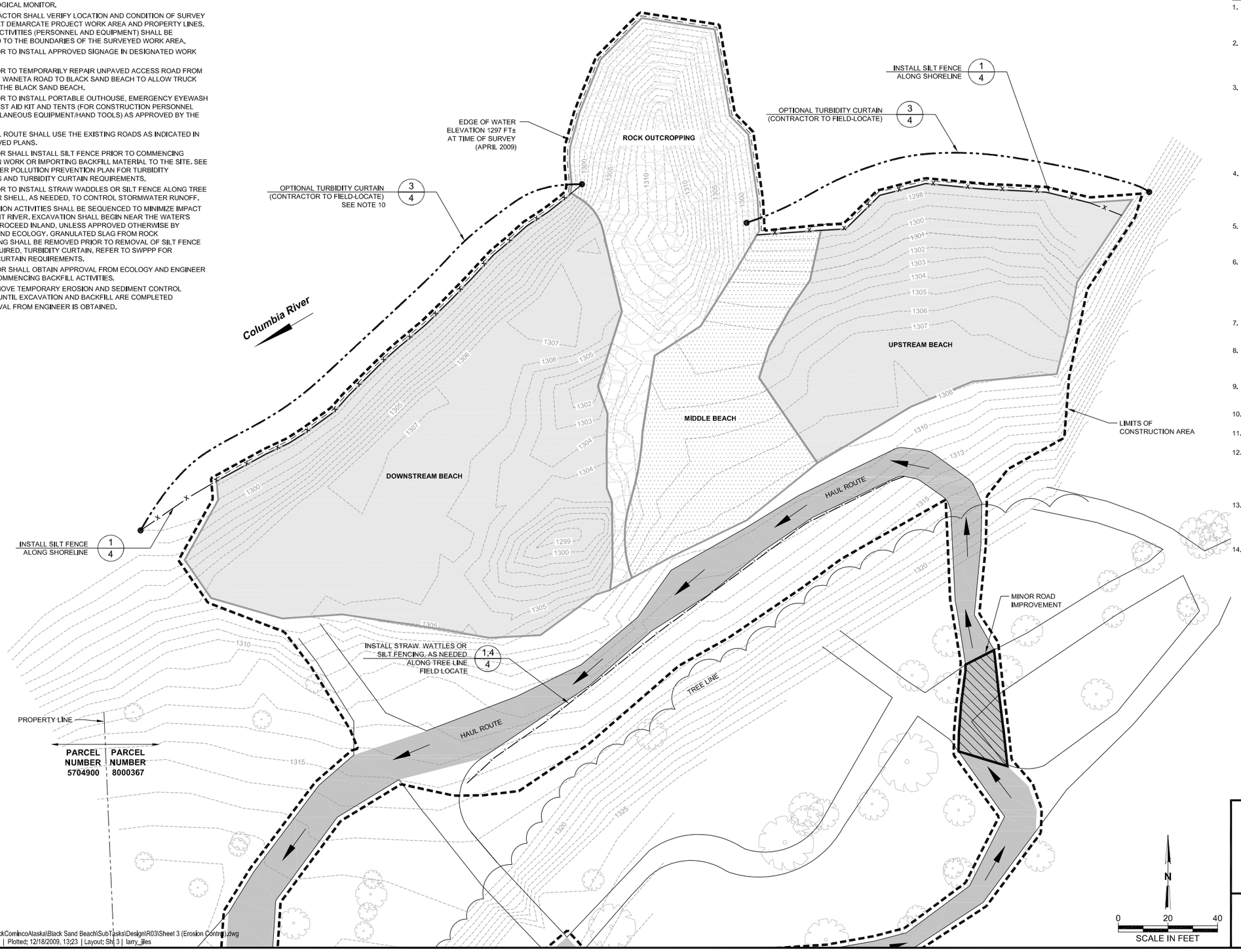
CONSTRUCTION SEQUENCE

1. OBTAIN OR VERIFY ACCESS PERMIT FROM BNSF FOR PRIVATE RAILROAD CROSSING AND SITE ACCESS PERMISSION FROM SITE ACCESS OWNERS. REFER TO VICINITY MAP ON SHEET 1.
2. CONTRACTOR SHALL PERFORM PRE-CONSTRUCTION SURVEY TO STAKE-OUT BOUNDARIES OF PROJECT WORK AREA AND TO IDENTIFY PROPERTY LINES AND/OR EASEMENTS IN THE VICINITY OF THE PROJECT WORK AREA.
3. PRE-CONSTRUCTION MEETING TO BE HELD WITH THE CLIENT, ENGINEER, CONTRACTOR, ECOLOGY, REPRESENTATIVE ACCESS OWNERS AND ARCHAEOLOGICAL MONITOR.
4. THE CONTRACTOR SHALL VERIFY LOCATION AND CONDITION OF SURVEY STAKES THAT DEMARCATE PROJECT WORK AREA AND PROPERTY LINES. ALL WORK ACTIVITIES (PERSONNEL AND EQUIPMENT) SHALL BE RESTRICTED TO THE BOUNDARIES OF THE SURVEYED WORK AREA.
5. CONTRACTOR TO INSTALL APPROVED SIGNAGE IN DESIGNATED WORK AREA.
6. CONTRACTOR TO TEMPORARILY REPAIR UNPAVED ACCESS ROAD FROM NORTHPORT WANETA ROAD TO BLACK SAND BEACH TO ALLOW TRUCK ACCESS TO THE BLACK SAND BEACH.
7. CONTRACTOR TO INSTALL PORTABLE OUTHOUSE, EMERGENCY EYEWASH STATION/FIRST AID KIT AND TENTS (FOR CONSTRUCTION PERSONNEL AND MISCELLANEOUS EQUIPMENT/HAND TOOLS) AS APPROVED BY THE ENGINEER.
8. TRUCK HAUL ROUTE SHALL USE THE EXISTING ROADS AS INDICATED IN THE APPROVED PLANS.
9. CONTRACTOR SHALL INSTALL SILT FENCE PRIOR TO COMMENCING EXCAVATION WORK OR IMPORTING BACKFILL MATERIAL TO THE SITE. SEE STORM WATER POLLUTION PREVENTION PLAN FOR TURBIDITY MONITORING AND TURBIDITY CURTAIN REQUIREMENTS.
10. CONTRACTOR TO INSTALL STRAW WADDLES OR SILT FENCE ALONG TREE LINE BUFFER SHELL, AS NEEDED, TO CONTROL STORMWATER RUNOFF.
11. CONSTRUCTION ACTIVITIES SHALL BE SEQUENCED TO MINIMIZE IMPACT TO ADJACENT RIVER. EXCAVATION SHALL BEGIN NEAR THE WATER'S EDGE AND PROCEED INLAND, UNLESS APPROVED OTHERWISE BY ENGINEER AND ECOLOGY. GRANULATED SLAG FROM ROCK OUTCROPPING SHALL BE REMOVED PRIOR TO REMOVAL OF SILT FENCE AND, IF REQUIRED, TURBIDITY CURTAIN. REFER TO SWPPP FOR TURBIDITY CURTAIN REQUIREMENTS.
12. CONTRACTOR SHALL OBTAIN APPROVAL FROM ECOLOGY AND ENGINEER PRIOR TO COMMENCING BACKFILL ACTIVITIES.
13. DO NOT REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UNTIL EXCAVATION AND BACKFILL ARE COMPLETED AND APPROVAL FROM ENGINEER IS OBTAINED.



NO.	DATE	BY	REVISION DESCRIPTION
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1	12/18/09	PTM	60% SUBMITTAL

EROSION AND SEDIMENTATION CONTROL

1. THE IMPLEMENTATION OF THESE EROSION SEDIMENTATION CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES IN SUCH A MANNER AS TO INSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE COLUMBIA RIVER OR VIOLATE APPLICABLE WATER QUALITY STANDARDS.
3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOLLOWING INSPECTION AFTER STORM EVENTS. ADDITIONALLY, MORE ESC FACILITIES MAY BE REQUIRED FOR SILTATION CONTROL. THEREFORE, DURING THE COURSE OF CONSTRUCTION IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE CONTRACTOR TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES OVER AND ABOVE THE MINIMUM REQUIREMENTS AS MAY BE NEEDED.
4. THE ESC FACILITIES SHALL BE INSPECTED IN THE MORNING FOLLOWING AN OVERNIGHT (NON-WORKING HOUR) RAINFALL EVENT BY THE PERMIT HOLDER/CONTRACTOR AND MAINTAINED AS NECESSARY. IN ADDITION, ALL TEMPORARY SILTATION CONTROLS SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND OR CONSTRUCTION IS COMPLETED.
5. ANY AREAS NEEDING ESC MEASURES AS DETERMINED BY CONTRACTOR, OR CERTIFIED EROSION AND SEDIMENT CONTROL LEAD BUT NOT REQUIRING IMMEDIATE ATTENTION, SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
6. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL INSPECT NORTHPORT WANETA ROAD NEAR CONSTRUCTION ENTRANCE AT LEAST AT THE END OF EACH SHIFT, OR AS OTHERWISE REQUESTED BY THE ENGINEER, AND CLEAN THE ROAD USING SWEEPING OR OTHER APPROVED MEANS IF THERE IS VISUAL EVIDENCE OF DIRT TRACKED ONTO THE ROADWAY.
7. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS OR AS APPROVED BY THE ENGINEER. ENGINEER SHALL COORDINATE WITH ECOLOGY AS APPROPRIATE.
8. EROSION/SEDIMENTATION CONTROLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS IN THE DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL, UNLESS APPROVED OTHERWISE BY ECOLOGY.
9. A COPY OF THE APPROVED EROSION CONTROL PLANS AND SWPPP MUST BE ON THE JOBSITE AT ALL TIMES THROUGH OUT THE CONSTRUCTION PERIOD.
10. TEMPORARY EROSION/SEDIMENTATION CONTROLS SHALL BE INSTALLED AND OPERATED PRIOR TO ANY GRADING OR LAND CLEARING.
11. WHEREVER POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL.
12. ALL CUT AND FILL SLOPES 5:1 (5 FEET HORIZONTAL TO 1 FOOT VERTICAL) OR STEEPER THAT WILL BE LEFT EXPOSED FOR MORE THAN 7 DAYS SHALL BE PROTECTED BY JUTE MATTING, PLASTIC SHEETING, OR OTHER APPROVED STABILIZATION METHODS AND PROVIDE ADEQUATE OFFSITE RUNOFF CONTROL BY INSTALLING SILT FENCING OR STRAW WADDLES ALONG TREE LINE BUFFER ZONE, AS NEEDED.
13. OFF-SITE STREETS MUST BE CLEAN AT ALL TIMES. IF DIRT IS DEPOSITED ON THE PUBLIC STREET, THE STREET SHALL BE CLEANED BY THE CONTRACTOR. ALL VEHICLES SHALL LEAVE THE SITE BY WAY OF THE CONSTRUCTION VEHICLE ENTRANCES AND SHALL BE CLEANED OF MUD PRIOR TO EXITING ONTO THE STREET.
14. CONTRACTOR SHALL CLEAN ENTIRE SITE AFTER CONSTRUCTION SUCH THAT NO PAPERS, TRASH, BRUSH OR ANY OTHER DEPOSITS REMAIN. MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR.

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET 3 OF 8
DRAWING NO. 3

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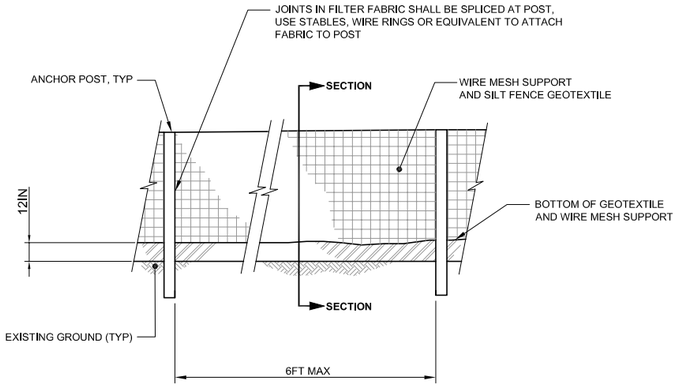
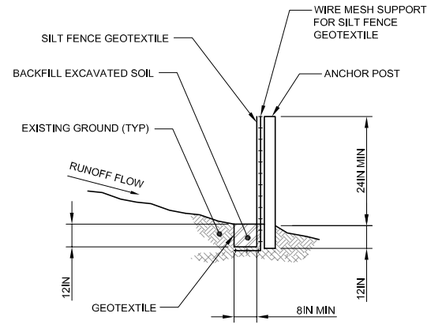
1	12/18/09	PTM	60% SUBMITTAL



ELEVATION

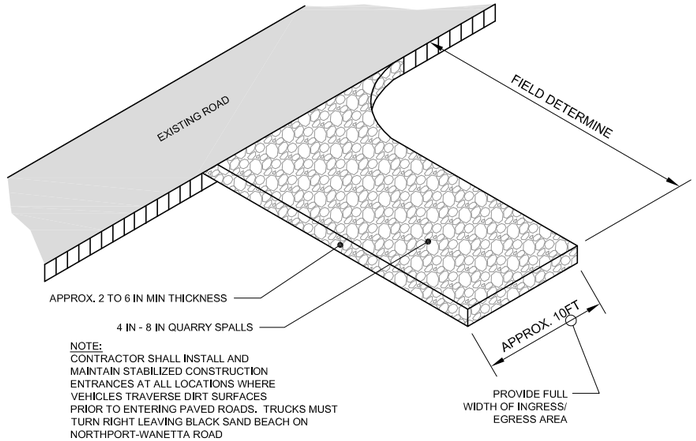


SECTION

TYPICAL SILT FENCE INSTALLATION DETAIL

1
3

SCALE: NTS

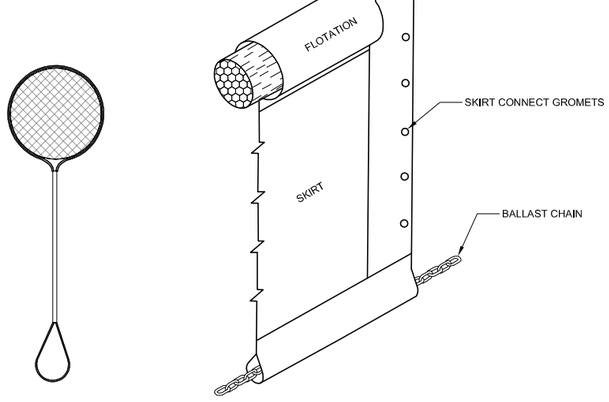


NOTE:
CONTRACTOR SHALL INSTALL AND MAINTAIN STABILIZED CONSTRUCTION ENTRANCES AT ALL LOCATIONS WHERE VEHICLES TRAVERSE DIRT SURFACES PRIOR TO ENTERING PAVED ROADS. TRUCKS MUST TURN RIGHT LEAVING BLACK SAND BEACH ON NORTHPORT-WANETTA ROAD

STABILIZED CONSTRUCTION ENTRANCE DETAIL

2
1

SCALE: NTS

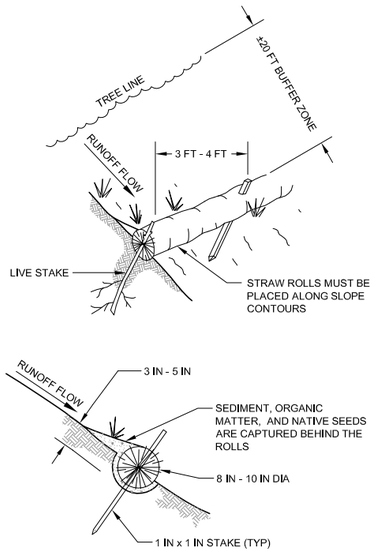


SECTION **ISOMETRIC**

TURBIDITY CURTAIN DETAIL

3
3

SCALE: NTS



NOTE:
STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3 IN x 5 IN DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

STRAW WATTLES DETAIL

4
3

SCALE: NTS

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

EROSION CONTROL DETAILS

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET 4 OF 8

DRAWING NO. 4

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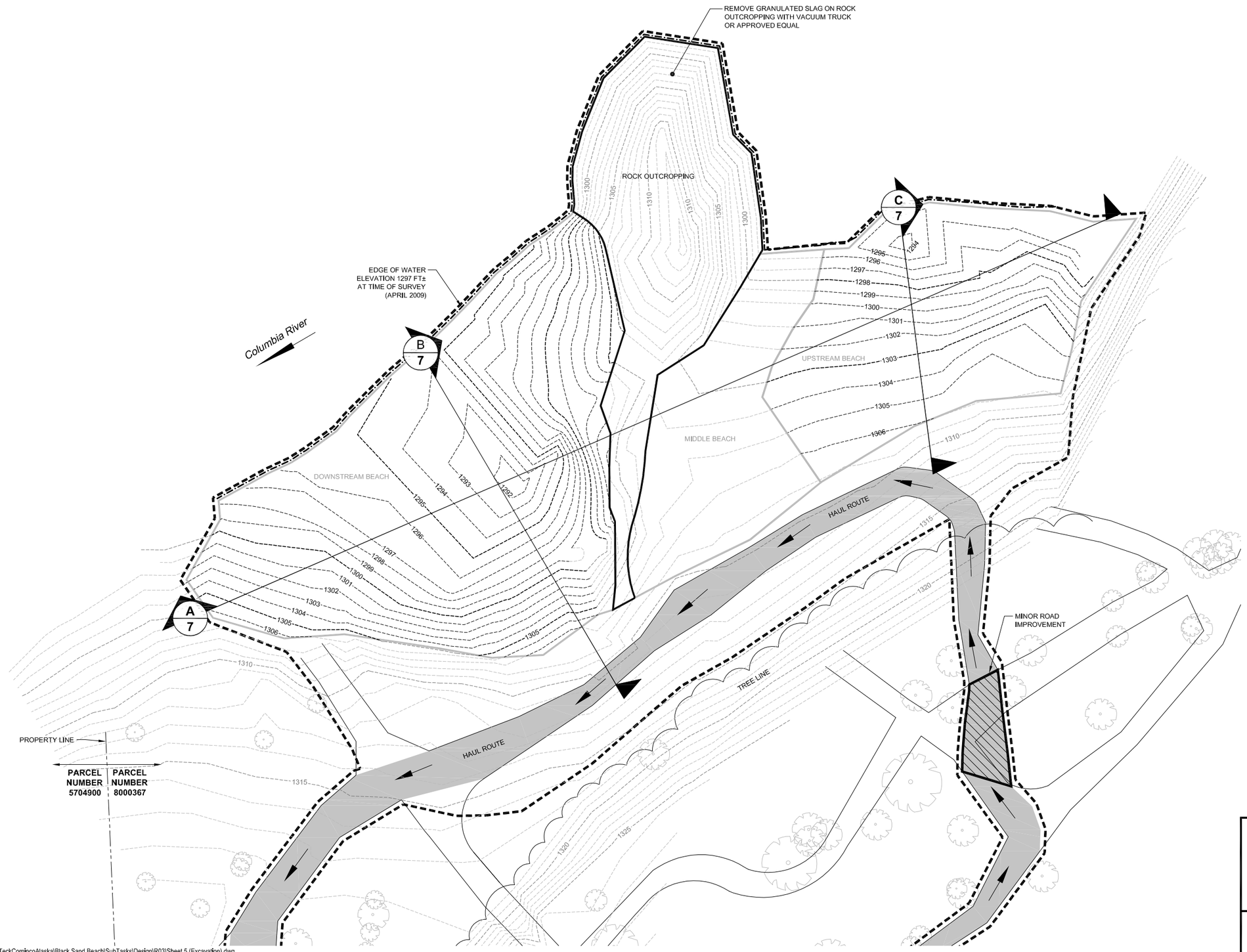

EXCAVATION VOLUMES (ESTIMATED)

UPSTREAM BEACH	400 C.Y
MIDDLE BEACH	150 C.Y
DOWNSTREAM BEACH	4,100 C.Y.
ROCK OUTCROPPING	10 C.Y.

C.Y. = CUBIC YARDS (IN-PLACE VOLUME)

SEE SHEET 6, SITE GRADING PLAN FOR ESTIMATED FILL VOLUMES

NOTE:
HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE, VERTICAL DATUM, NAVD 88, BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52 FT. WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD. 3 IN. BRASS CAP IN CEMENT, 745,055.705 FT. NORTH, 2,409,429.512 FT. EAST, ELEV. 1,457.071 FT.

N

0 20 40

SCALE IN FEET

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

EXCAVATION PLAN

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

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(206) 438-2700

SHEET 5 OF 8

DRAWING NO. 5

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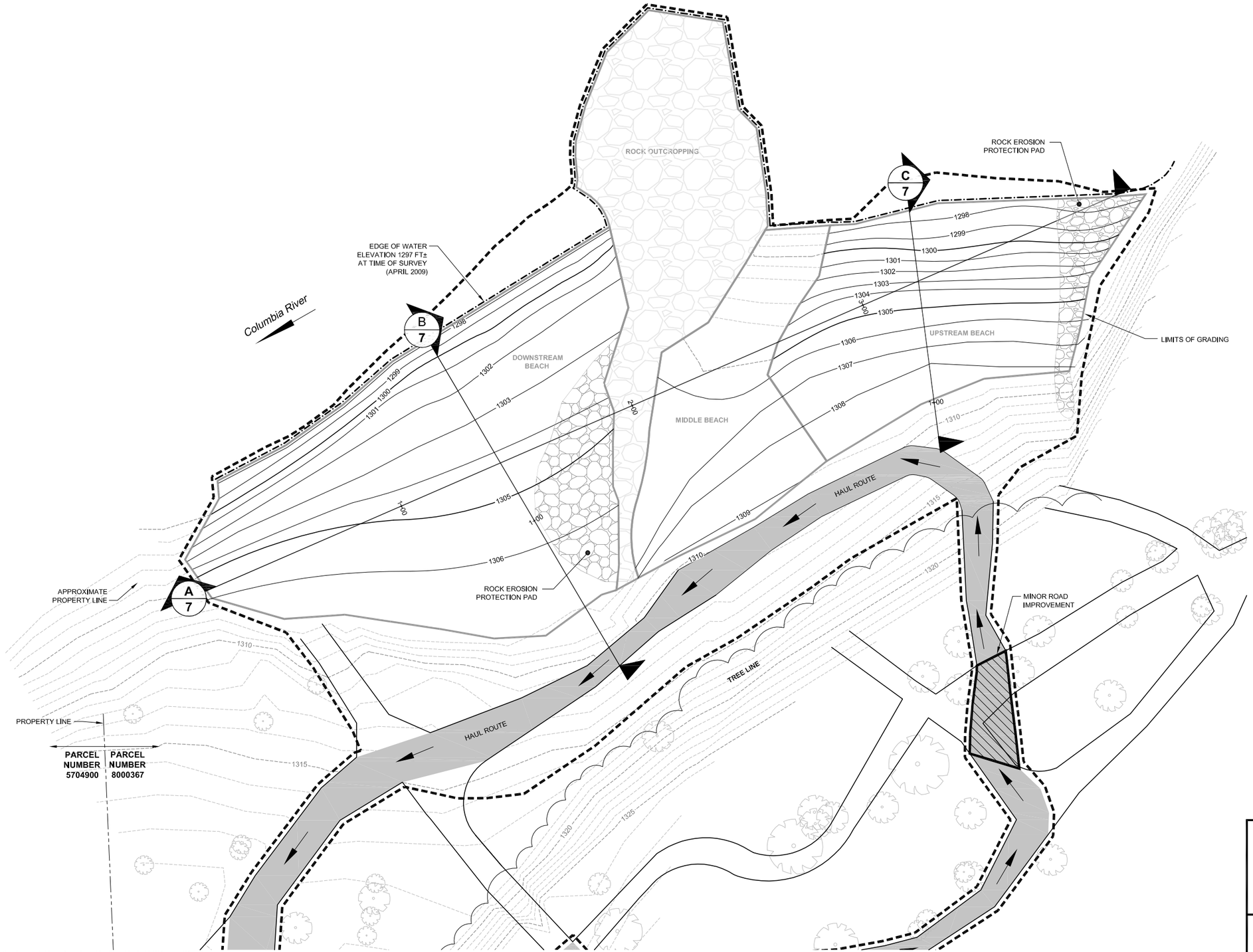

NOTES:

1. BACKFILL MATERIALS SHALL BE DETERMINED IN CONSULTATION WITH ECOLOGY AND SHALL BE APPROVED BY ECOLOGY PRIOR TO BEING TRANSPORTED TO SITE.
2. COARSE SAND/FINE GRAVEL BORROW SOURCE MATERIALS SHALL BE TESTED FOR METALS IN ACCORDANCE WITH TABLE 1 BELOW. METALS (EXCLUDING MERCURY) SHALL BE ANALYZED USING ICP-MS METHODS (EPA 200.8 OR APPROVED EQUAL). MERCURY SHALL BE ANALYZED USING EPA METHOD 7471A OR APPROVED EQUAL. RESULTS OF ANALYSIS SHALL BE PROVIDED TO ECOLOGY FOR REVIEW. SAMPLE RESULTS SHALL MEET APPLICABLE MTCA STANDARDS AS DEFINED IN WAC 173-340 SUBJECT TO AREA SPECIFIC BACKGROUND LEVELS.
3. THE BORROW SOURCE MATERIAL SHALL BE REVIEWED BY A REGISTERED PROFESSIONAL GEOLOGIST. IF THE BORROW MATERIAL IS SUSPECTED TO CONTAIN SERPENTINE MATERIALS, THEN AT LEAST TWO SAMPLES SHALL BE TESTED FOR ASBESTOS USING CALIFORNIA AIR RESOURCES BOARD METHOD (CARB) 435 OR OTHER APPROVED METHOD. IF BORROW MATERIAL IS OBTAINED FROM MULTIPLE SOURCES, THEN TWO ADDITIONAL SAMPLES SHALL BE COLLECTED AND TESTED FOR ASBESTOS FOR EACH ADDITIONAL BORROW SOURCE.
4. BACKFILL MATERIALS SHALL NOT CONTAIN INVASIVE PLANT SPECIES AS DOCUMENTED BY THE BACKFILL SUPPLIER.

TABLE 1

ANALYTICAL FREQUENCY	
CUBIC YARDS OF FILL	MINIMUM # OF SAMPLES
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10+1 FOR EACH ADDITIONAL 500 C.Y.

TABLE 2

LIST OF ANALYTES FOR BACKFILL CERTIFICATION TESTING	
ANTIMONY	MERCURY
ARSENIC	NICKEL
BERYLLIUM	SELENIUM
CADMIUM	SILVER
CHROMIUM	THALLIUM
COPPER	ZINC
LEAD	

FILL VOLUMES (ESTIMATED)

UPSTREAM BEACH	220 C.Y.
MIDDLE BEACH	150 C.Y.
DOWNSTREAM BEACH	3,400 C.Y.
ROCK OUTCROPPING	0 C.Y.

C.Y. = CUBIC YARDS (IN-PLACE VOLUME)

N

0 20 40

SCALE IN FEET

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

SITE GRADING PLAN

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

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1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
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SHEET 6 OF 8

DRAWING NO. 6

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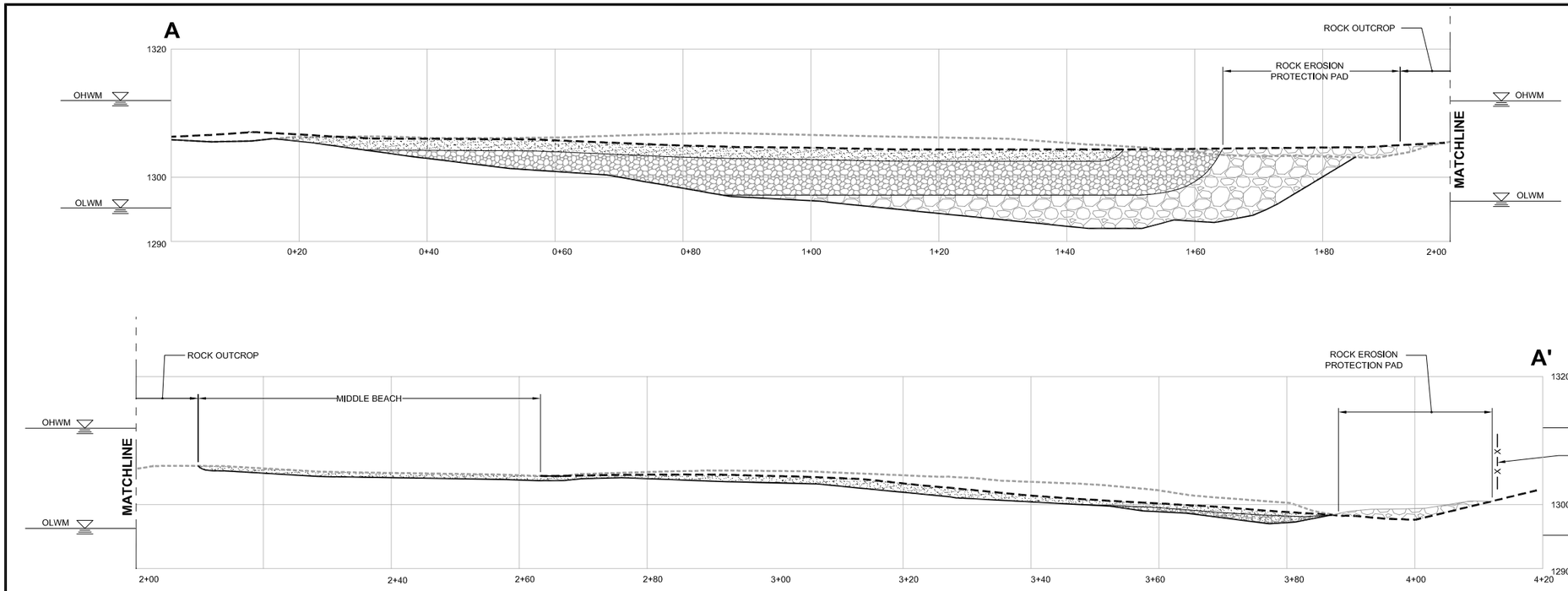

SECTION A
SCALE: AS NOTED
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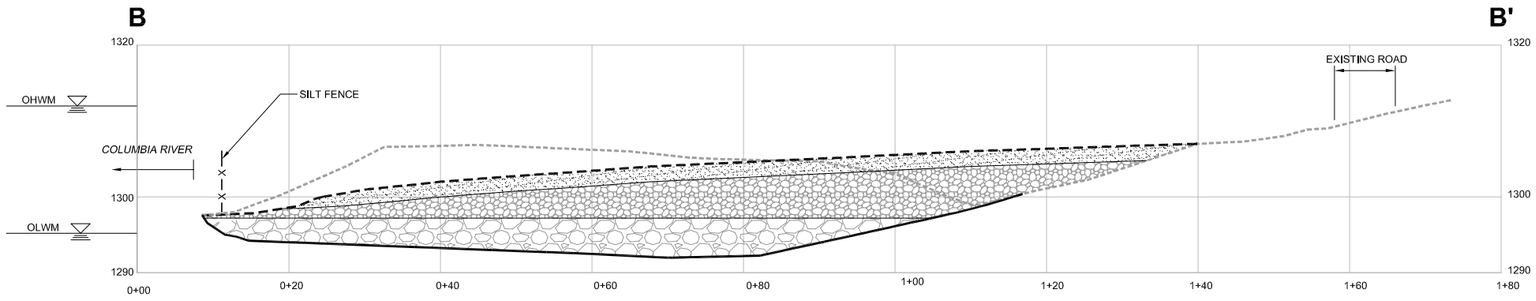

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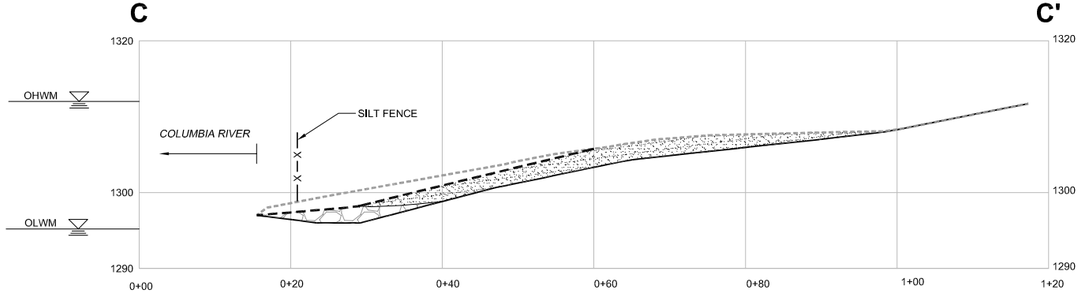

SECTION C
SCALE: AS NOTED
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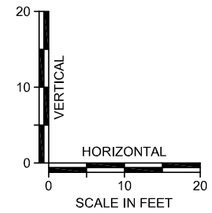
LEGEND
- EXISTING GROUND LINE
- PROPOSED BOTTOM OF EXCAVATION
- PROPOSED FINAL GRADE
- BEACH SAND
- EROSION RESISTANT GRAVEL & COBBLES
- ROCK COVER
- OHWM APPROXIMATE ORDINARY HIGH WATER MARK
- OLWM APPROXIMATE ORDINARY LOW WATER MARK

NOTE:
HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE. VERTICAL DATUM, NAVD 88, BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52 FT. WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD. 3 IN. BRASS CAP IN CEMENT, 745,055.705 FT. NORTH, 2,409,429.512 FT. EAST, ELEV. 1,457.071 FT.



60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

CROSS-SECTIONS

DESIGNED BY: PTM
DRAWN BY: CFS
CHECKED BY: RDE
APPROVED BY: PTM
REVISION: REV 1
DATE: 12/18/09

URS
1501 4TH AVENUE, SUITE 1400
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SHEET 7 OF 8
DRAWING NO. 7

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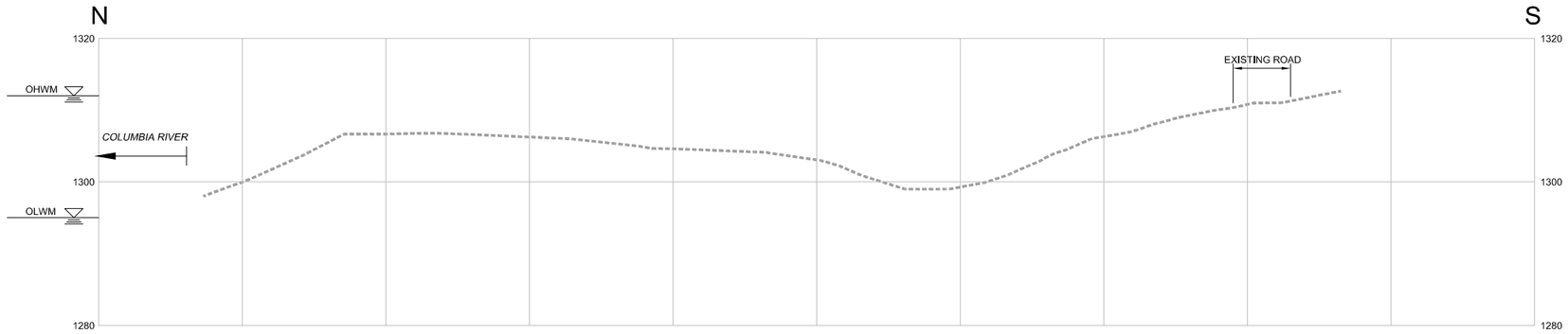
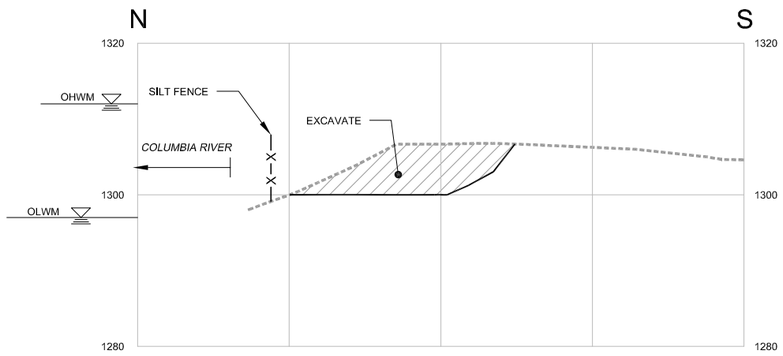
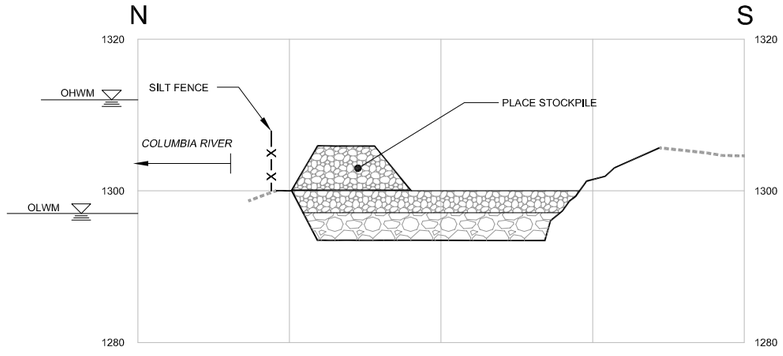
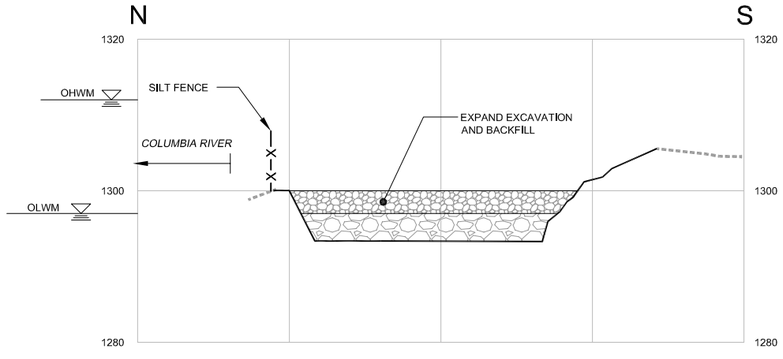
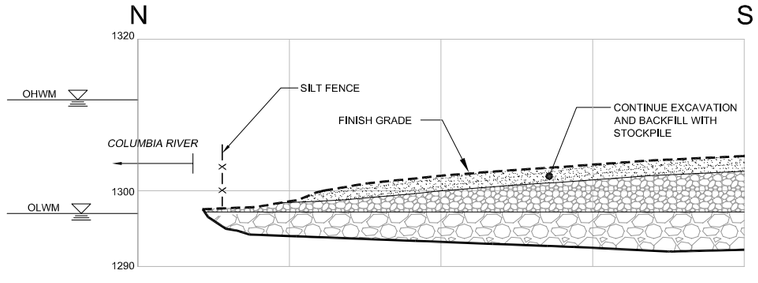


EXISTING CONDITIONS
TYPICAL SECTION THROUGH DOWNSTREAM BEACH







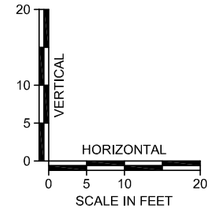


LEGEND

- EXISTING GROUNDLINE
- PROPOSED BOTTOM OF EXCAVATION
- PROPOSED FINAL GRADE
- BEACH SAND
- EROSION RESISTANT GRAVEL & COBBLES
- ROCK COVER
- OHWM — APPROXIMATE ORDINARY HIGH WATER MARK
- OLWM — APPROXIMATE ORDINARY LOW WATER MARK

NOTES:

1. ROCK COVER MATERIAL MAY BE REPLACED BY EROSION RESISTANT GRAVEL AND COBBLES IN AREAS ABOVE THE GROUND WATER TABLE WHEN INSPECTION INDICATES THAT SLAG HAS BEEN REMOVED SUFFICIENTLY.
2. HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE. VERTICAL DATUM, NAVD 88, BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52 FT. WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD, 3 IN. BRASS CAP IN CEMENT, 745,055.705 FT. NORTH, 2,409,429.512 FT. EAST, ELEV. 1,457.071 FT.
3. CONSTRUCTION ACTIVITIES SHALL BE SEQUENCED TO MINIMIZE IMPACT TO ADJACENT RIVER. EXCAVATION SHALL BEGIN NEAR THE WATER'S EDGE AND PROCEED INLAND, UNLESS APPROVED OTHERWISE BY ENGINEER AND ECOLOGY. GRANULATED SLAG FROM ROCK OUTCROPPING SHALL BE REMOVED PRIOR TO REMOVAL OF SILT FENCE AND, IF REQUIRED, TURBIDITY CURTAIN. REFER TO SWPPP FOR TURBIDITY CURTAIN REQUIREMENTS.



60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

TYPICAL PROPOSED EXCAVATION SEQUENCE

DESIGNED BY:	DJH
DRAWN BY:	JK
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 1
DATE:	12/18/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET 8 OF 8
DRAWING NO. 8

P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Design\R03\Sheet 8 (Excavation Sequence).dwg
Mod: 12/18/2009, 11:48 | Plotted: 12/18/2009, 13:28 | Layout: Sht 8 | larry_files

APPENDIX E
DRAFT STORMWATER POLLUTION PREVENTION PLAN

Draft Stormwater Pollution Prevention Plan

For
Black Sand Beach Excavation Project

Prepared For
Eastern Regional Office
North 4601 Monroe
Spokane, WA 99205-1295
509-329-3400

Owner	Engineer	Contractor
Teck American Incorporated	URS Corporation	To be determined
501 North Riverpoint Blvd., Suite 300	1501 4th Ave., Suite 400	
Spokane, WA 99202	Seattle, WA 98101	

Project Site Location
Township 40N, Range 41E, Section 16
Stevens County, Washington

SWPPP Prepared By
URS Corporation
1501 4th Avenue, Suite 1400
Seattle, WA 98101
206-438-2700
Paul T. McCullough, PE

SWPPP Preparation Date
December 18, 2009

Approximate Project Construction Dates
September 1, 2010
October 15, 2010

This document has been prepared under the supervision of
a registered professional engineer of the State of Washington.

Date Signed: 12-18-09

Contents

Contents (Continued)

APPENDICES

1.0 Introduction

URS Corporation prepared this Stormwater Pollution Prevention Plan (SWPPP) on behalf of Teck American Incorporated (Teck) to discuss the best management practices that will be employed during the Black Sand Beach (BSB) Excavation Project. The project consists of removing approximately 5,000 cubic yards of granulated slag materials from a prescribed area in the upland portion of BSB; load-out and transportation of these materials from their point of origin near Northport, Washington to their place of disposition in Trail, British Columbia, Canada; and restoration of the affected work area (Figure 1). Removal of the granular slag is being conducted as a Voluntary Independent Interim Action under the Voluntary Cleanup Program as described in the Model Toxics Contol Act, Washington Administrative Code 173-240. Personnel from the Washington State Department of Ecology (Ecology) Eastern Regional Office Toxic Cleanup Program are expected to be present during site construction.

BSB is located on Washington state-owned land identified as parcel number 8000367, in a portion of Section 16 of Township 40 N, Range 41 East in Stevens County records (Figure 2).

Construction activities associated with the project will include excavation, load-out, off-site transportation of the granulated slag, backfill placement, and establishment of final grades within the affected beach area. Additional information about the project may be found in the November 3, 2009 draft Work Plan for the BSB Excavation Project. The purpose of this SWPPP is to describe the proposed construction activities and temporary and permanent erosion and sediment control measures, pollution prevention measures, inspection/monitoring activities, and recordkeeping that will be implemented during the proposed construction project. The objectives of the SWPPP are to:

- Describe best management practices (BMPs) that will be implemented to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activities
- Prevent violations of surface water quality, ground water quality, or other standards
- Prevent adverse water quality impacts during the construction phase, including impacts on beneficial uses of the receiving water by controlling peak flow rates and volumes of stormwater runoff

This SWPPP was prepared using the Ecology SWPPP template downloaded from the Ecology website on June 1, 2009. This SWPPP was prepared based on the requirements set forth in the Construction Stormwater General Permit, and in the 2004 *Stormwater Management Manual for Eastern Washington*.

2.0 Site Description

2.1 Existing Conditions

"Black Sand Beach" is the unofficial name of a localized beach in the upper reaches of the upper Columbia River in Stevens County, Washington. It is located along the southeastern bank of the Columbia River adjacent to and downstream of the US Geological Survey (USGS) gauging station 12399510 (Columbia River Auxiliary Gage at the International Border) at approximate river mile 743. The site's name is derived from the granulated slag deposits that have accumulated over time along the bank of the river. Reportedly, the source of the granulated slag is historic discharges from a smelter located in Trail, British Columbia, Canada. The granulated slag is visually identifiable by its characteristic black, sand-like, appearance.

According to Stevens County records, the BSB site is owned by the State of Washington within Washington State Department of Natural Resources (WDNR) managed land. Though not a formally recognized or managed beach area, BSB is known to be used by local Northport area residents for recreational activities such as camping, picnicking, fishing, swimming, and recreational-scale mineral prospecting. There are no known critical areas on the site such as high erosion risk areas, wetlands, streams, or steep slopes (potential landslide areas).

The topography of the beach and surrounding area gently slopes northerly from the tree line toward the river.

Runoff from the area generally drains from south to north towards the Columbia River. At the point of discharge, the Columbia River is not listed in the State's Clean Water Act Section 303(d) list.

The affected portion of BSB is unvegetated and occupies an area of approximately 1.1 acres. It is composed of the following four subareas (Figure 3):

- Rock outcropping
- Downstream beach
- Upstream beach
- Middle beach

Unaffected portions of BSB include an upland area inland from the ordinary high water mark (OHWM).

2.1.1 Rock Outcropping

A predominant feature of BSB is a north-south trending bedrock outcropping that protrudes into the river. The rock outcropping divides BSB into two approximately equal parts with an area of approximately 8,280 square feet (Figure 4). The eastern half consists of the middle and upstream

beach areas. The western half is the downstream beach. Granulated slag is present on portions of the top of the rock outcropping with an estimated volume of 10 cubic yards.

2.1.2 Downstream Beach

The downstream beach is approximately 215 feet long (parallel to river) and 150 feet wide with an area of 18,500 square feet. This is where the majority of granulated slag is deposited. On behalf of Teck, Survey Solutions, Inc. conducted a topographic survey in April 2009. Also during this survey, the bottom of the granulated slag was estimated by inserting rebar into the granulated slag materials and measuring the depth of refusal (the inferred bottom of the granulated slag). Based on these data, the volume of granulated slag on the downstream beach was calculated to be approximately 4,100 cubic yards. The estimated maximum depth of granulated slag at the downstream beach is approximately 13 feet below the existing grade level (Figure 4), which is approximately three to five feet below the water level in the river at the time of the survey (approximately 1,297 feet above mean sea level [msl]). Based on visual observations, the majority of granulated slag at the downstream beach is a uniform, poorly graded, black sandy material, with little gravels and cobbles (visually estimated at less than one percent by volume).

2.1.3 Upstream Beach

The upstream beach is located east of the middle beach and is composed mostly of black, sandy-material that is predominantly granulated slag. Similar to the downstream beach, the granulated slag on the upstream beach is uniform, sand-sized materials with little or no gravels and cobbles.

The upstream beach is approximately 130 feet long by 80 feet wide with an area of 9,850 square feet. The estimated volume of granulated slag material on the upstream beach is approximately 400 cubic yards, based on the 2009 survey by Survey Solutions, Inc. The estimated depth of granulated slag material at the upstream beach is up to approximately four feet below existing grade. Except in a localized area adjacent to the river, the granulated slag at the upstream beach appears to be above the surface elevation of the river.

2.1.4 Middle Beach

The middle beach area is located between the rock outcroppings and the upstream beach, and is approximately 25 to 80 feet long by about 110 feet wide with an area of 5,940 square feet. Unlike the downstream and upstream beach areas, a relatively large percentage of gravel and cobbles appear on the middle beach (over 70 percent in some portions based on visual observations). Based on visual observations during a site inspection by URS on May 22, 2009, the amount of granulated slag at the middle beach appears to be significantly lower than either the upstream or downstream beaches, with amounts ranging from trace levels (i.e., no visual evidence of granular slag) to about 20 to 30 percent by volume.

The middle beach area is readily accessible to vehicles via an unpaved access road that runs parallel to the tree line.

2.1.5 Upland Area

The upland area includes an access road/path that extends from the Northport-Waneta Road to the site, several paths that parallel the river along the first river terrace above the shoreline, and at least three paths that descend down the approximately eight-foot-high first terrace to BSB. Soils composing the ground surface in upland area include fine sand underlain by bedrock at a shallow depth. The upland area is vegetated with trees and shrubs common to the area.

2.2 Planned Construction Activities

The planned construction activities consist of excavation and off-site disposal of granulated slag materials that have accumulated on BSB. Excavated areas will be backfilled with clean imported fill materials to establish the final grade of the beach. Ancillary activities include temporary stockpiling of the excavated granulated slag materials at the project site prior to load-out, transportation, and disposal of the granulated slag materials, and temporary improvement of the access road leading to BSB by removing several trees and filling in existing ruts with imported materials to facilitate site access.

Construction activities will include site preparation, installation of erosion and sediment control measures, excavation, stockpile, and load-out of granulated slag material, transportation and off-site disposal of the granulated slag, placement of backfill materials, re-grading the beach, and removal of materials placed in ruts to improve the access road. Section 4.0 provides the schedule and phasing of BMPs during construction.

The duration of the construction activities is anticipated to be three to six weeks. Stormwater pollution control measures will include the installation of straw wattles and/or silt fencing between the upslope side of the excavation and the tree line. This will help prevent off-site runoff from reaching the excavated area and the river. Silt fencing will be installed along the shoreline. Additionally, if visual monitoring of the river in the vicinity of the excavation indicates sustained levels of high turbidity, a turbidity curtain will be placed several feet into the river for added protection. The BMPs described in this SWPPP will help keep soils from being transported into the Columbia River by the construction activities.

The following summarizes details regarding site areas:

- Total affected site area: 1.1 acres
- Percent impervious area before construction (rock outcropping only): 19 %
- Percent impervious area after construction (rock outcropping only): 19 %
- Disturbed area during construction: 1.1 acres
- Disturbed area that is characterized as impervious (limited to rock outcropping, no impervious roads, parking areas, staging areas): 0.19 acre
- Erosivity Index (September 1, 2010 – October 15, 2010) 2.76

An erosivity index factor of 2.76 has been determined for the construction period of 9/1/2010 through 10/15/2010 (http://ei.tamu.edu/cgi-bin/script_db/wwwgrass23). An erosivity index value of 5.0 or less is in compliance with the US Environmental Protection Agency (EPA) standard and qualifies for a construction stormwater permit waiver with Ecology. Therefore, it is not anticipated that a construction stormwater permit will be required for this project. An erosivity waiver will be requested, as appropriate.

3.0 Construction Stormwater BMPs

3.1 The Twelve BMP Elements

For this project, BMPs have been identified to address each of the twelve BMP elements in the 2004 *Stormwater Management Manual for Eastern Washington*. If the Certified Erosion and Sediment Control Lead (CESCL) determines during construction that the designated BMPs are ineffective or inappropriate to satisfy the requirements set forth in the Construction Stormwater General Permit to be issued by Ecology, this plan will be modified accordingly. .

3.1.1 Element #1 – Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Trees that are to be removed, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible. The BMPs relevant to marking the clearing limits that will be applied for this project include:

- Preserving Natural Vegetation (BMP C101)
- Buffer Zones (BMP C102)
- High Visibility Plastic or Metal Fence (BMP C103)

The perimeter of the vegetated upland areas south of the river will be clearly marked in the field with high-visibility fencing or caution tape.

3.1.2 Element #2 – Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized and restricted to designated areas based on cultural resource considerations. Where necessary, access points shall be stabilized to minimize the tracking of soils onto public roads, and wheel washing, street sweeping, and street cleaning shall be employed as necessary to prevent soils from entering state waters or the Northport-Waneta Road drainage areas. All wash wastewater shall be controlled on site. All street-sweeping wastes will be profiled and disposed of appropriately. The specific BMPs related to establishing construction access that will be used on this project include:

- Stabilized Construction Entrance (BMP C105)
- Construction Road/Parking Area Stabilization (BMP C107)

The access road from Northport-Waneta Road to BSB will be used as the construction entrance and access route. The existing road has an area near the beach where minor road repairs will need to be made to allow truck access to BSB. The existing road will be stabilized as needed during the construction phase. Prior to construction, a qualified archeologist will conduct an archeological survey to ensure that areas with identified cultural resources are restricted and that appropriate safeguards are in place to address indentified or potential cultural resources. Access/haul routes will be confined to the areas designated on the haul route plan (Figure 5). Access roads and any temporary road improvements will be conducted in accordance with a WDNR access road permit.

3.1.3 Element #3 – Control Flow Rates

This Core Element does not apply to this project for the following reasons:

- No impervious surface will be installed
- Other than incidental non-point stormwater runoff controlled by other core elements, there is no anticipated or designed flow from construction

3.1.4 Element #4 – Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. The specific BMPs to be used for controlling upland soils on this project include:

- Silt fence (BMP C233)
- Turbidity curtain (if required by the Inspector or Owner's Representative, in coordination with Ecology)
- Straw wattles (BMP C235)
- Materials on hand (BMP C150) may be applicable

In addition, soils (if any) will be removed from paved areas of Northport-Waneta Road manually or using mechanical sweepers, as needed, to minimize tracking of soils on vehicle tires away from the site. If turbidity levels are elevated based on visual observations or the results of turbidity monitoring within 5 feet from the shoreline during construction activity, a turbidity curtain may be installed in the Columbia River along the shoreline to contain the turbidity to within 5 to 10 feet of the shoreline.

3.1.5 Element #5 – Stabilize Soils

Exposed and unworked soils, including stockpiles, shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The specific BMPs for soil stabilization that shall be used on this project include:

- Plastic covering (BMP C123)
- Dust control (BMP C140)

- Materials on hand (BMP C150) may be applicable

Stockpiles will be covered nightly with plastic covering. A water truck will be available as needed to control dust.

3.1.6 Element #6 – Protect Slopes

In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be temporarily covered with plastic sheeting. Stockpiled materials will be stabilized from erosion, protected with sediment trapping measures, such as silt fencing and straw wattles, as appropriate.

3.1.7 Element #7 – Protect Drain Inlets

There are no storm drain inlets near the site that could potentially receive surface runoff from the construction site. No drain inlets exist on site and none are anticipated.

3.1.8 Element #8 – Stabilize Channels and Outlets

There are no channels or outlets near the site that could potentially receive surface runoff from the construction site. No channels or outlets exist on site and none are anticipated.

3.1.9 Element #9 – Control Pollutants

All pollutants, including waste materials that may occur on site, shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well organized, and free of debris. If required, BMPs to be implemented to control specific sources of pollutants are discussed below.

Vehicles, construction equipment, and/or petroleum product storage/dispensing:

- All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills. Quantities of petroleum products stored on site will be limited to the quantity stored in fuel tanks, mechanical equipment reservoirs, and small tanks in service trucks.
- On-site fueling tanks and petroleum product storage containers shall include secondary containment and shall be located upgradient from the OHWM and away from on-site surface water drainage features.
- Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.
- In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.
- In the event of a hydraulic fluid leak or spill, the following measures will be conducted:

- Immediately upon discovery: stop, contain, and clean up all spills.

- Spill containment and cleanup kits will be kept on site in a readily accessible location to be determined by the contractor during construction.

- Contaminated surfaces shall be cleaned immediately following any discharge or spill incident. Contaminated absorbent materials and/or contaminated soils will be placed in appropriate disposal containers and properly disposed off site in accordance with local, state and federal regulations.

- If the spill has reached or may reach groundwater or surface water, Ecology and the local jurisdiction will be notified immediately. Notification must comply with federal spill reporting requirements.

Chemical storage:

- Chemicals stored in the construction areas will conform to the appropriate source control BMPs listed in Chapter 8 of the Ecology *Stormwater Management Manual for Eastern Washington.* Only small quantities of non-petroleum chemicals such as sample containers preservatives, calibration fluids, decontamination fluids, or pint-sized cans of marking paints, may be stored on site.

Excavation and spoils dewatering:

- Dust released from granulated slag excavation will be controlled using dust control measures (BMP C140).

Sanitary wastewater:

- Portable sanitation facilities will be firmly secured, regularly maintained, and emptied when necessary.

Other BMPs will be administered as necessary to address any additional pollutant sources on site.

The project does not require a Spill Prevention, Control, and Countermeasure Plan under the Federal regulations of the Clean Water Act. Additionally, a Construction Stormwater permit is not anticipated to be required because the project qualifies for an erosivity waiver.

3.1.10 Element #10 – Control Dewatering

There will be no dewatering as part of this construction project, other than gravity dewatering (free draining) of soils excavated from below the groundwater line. Saturated soils will be placed in such a manner that the free water drains back into the excavation.

3.1.11 Element #11 – Maintain BMPs

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with the specifications for each particular BMP (Appendix A). Visual monitoring of the BMPs will be conducted daily for stormwater or non-stormwater discharge from the site. If the site becomes inactive, and is temporarily stabilized, the inspection frequency will be reduced to once every month.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed.

3.1.12 Element #12 – Manage the Project

Erosion and sediment control BMPs for this project have been designed based on the following principles:

- Design the project to fit the existing topography, soils, and drainage patterns
- Emphasize erosion control rather than soil control
- Minimize the extent and duration of the area exposed
- Keep runoff velocities low
- Retain soils on site
- Thoroughly monitor site and maintain all erosion and control measures

As this project site is located east of the Cascade Mountain Crest, the project will be managed according to the additional following key project components:

Phasing of Construction

- The construction project is being phased in order to prevent, to the maximum extent practicable, the transport of upland soils from the development site during construction.
- Clearing and grading activities will be conducted only as shown on the Plan Sheets and delineated in the field.

Seasonal Work Limitations

- The local permitting authority may impose a seasonal limitation on site disturbance. This decision may be based on local weather conditions and/or other information including site conditions, the extent and nature of the construction activity, and the proposed erosion and sediment control measures.

- The following activities are exempt from these seasonal limitations:
    - Routine maintenance and necessary repair of erosion and sediment control BMPs
    - Routine maintenance of public facilities or existing utility structures that do not expose the upland soils or result in the removal of the vegetative cover to upland soils
    - Activities where there is 100 percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities

Coordination with Utilities and Other Contractors

No underground utilities have been identified at the site. Only contractors working on the BSB project will be at the site during construction activities. Per standard procedure, One Call will be notified at least 48 hours prior to the start of intrusive field work.

Inspection and Monitoring

- All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function.
- A CESCL will be either on site or on call at all times.
- Visual monitoring and turbidity monitoring will be conducted in the adjacent Columbia River during construction to ensure that turbidity levels in the Columbia River are below Ecology requirements during the construction work (see Section 6).
- Whenever inspection and/or monitoring reveals that the BMPs identified in the this SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, the SWPPP shall be modified, as appropriate, in a timely manner.

Maintenance of the Construction SWPPP

- This SWPPP shall be retained on site or within reasonable access to the site. The SWPPP shall be modified whenever there is a significant change in the design, construction, operation, or maintenance of any BMP.

3.2 Site Specific BMPs

Site specific BMPs are shown on the figures and site plans in Appendix B.

4.0 Construction Phasing and BMP Implementation

The BMP implementation schedule will be driven by the construction schedule. This section provides a sequential list of the proposed construction schedule milestones and the corresponding BMP implementation schedule. The list contains key milestones such as wet season construction.

The BMP implementation schedule is keyed to proposed phases of the construction project, and reflects differences in BMP installations and inspections that relate to wet season construction. The project site is located east of the Cascade Mountain Crest. As such, the dry season is considered to be from July 1 to September 30 and the wet season is considered to be from October 1 to June 30.

Estimate of construction start date:	09 / 01 / 2010
Estimate of construction finish date:	10 / 15 / 2010
Mobilize equipment on site:	09 / 01 / 2010
Mobilize and store all erosion and sediment control and soil stabilization products:	09 / 01 / 2010
Install erosion and sediment control measures:	09 / 03 / 2010
Install stabilized construction entrance:	09 / 03 / 2010
Site excavation begins	09 / 03 / 2010
Site excavation ends	10 / 08 / 2010
Site backfilling begins	09 / 10 / 2010
Wet season starts:	10 / 01 / 2010
Site grading begins:	10 / 01 / 2010
Site inspections and monitoring conducted weekly and for applicable rain events as detailed in Section 6 of this SWPPP:	10 / 01 / 2010
Implement Element #12 BMPs and manage site to minimize upland soil disturbance during the wet season	10 / 01 / 2010
No site work such as grading or excavation planned after:	10 / 13 / 2010
Stabilize site:	10 / 13 / 2010
Remove temporary erosion control measures:	10 / 15 / 2010
De-mobilize:	10 / 15 / 2010

The above schedule is approximate and may be revised. The SWPPP will be amended as appropriate when the final construction schedule is determined.

5.0 Pollution Prevention Team

5.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- ***Certified Erosion and Sediment Control Lead*** – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any erosion and sediment control measures.
- ***Emergency Ecology Contact*** – individual to be contacted at Ecology in case of emergency. Ecology TCP personnel will be on-site during construction and will likely fill this role.
- ***Emergency Owner Contact*** – individual that is the site owner or representative of the site owner, to be contacted in the case of an emergency.
- ***Non-Emergency Ecology Contact*** – individual that is the site owner or representative of the site owner than can be contacted if required.
- ***Monitoring Personnel*** – personnel responsible for conducting water quality monitoring; for most sites this person is also the CESCL.

5.2 Team Members

Names and contact information for those identified as members of the pollution prevention team are provided in the following table.

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead	Darla Guerera	425-753-4307
Emergency Ecology Contact	Chuck Gruenenfelder,	509-329-3439
Emergency Owner Contact	Marko Adzic	509-892-2585
Non-Emergency Ecology Contact	Michael Hibbler	509-329-3568

6.0 Site Inspections and Monitoring

Monitoring includes visual inspections, turbidity monitoring, and documenting the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspection forms
- Stormwater quality monitoring

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book. This SWPPP may function as the site log book if desired, or the forms may be included in a separate site log book. However, if separate, the site log book must be maintained on-site or within reasonable access to the site and must be made available upon request to Ecology or the local jurisdiction.

6.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections will be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. BMP C160 requires that the inspector be a CESCL and have the skills to assess the potential for water quality impacts as a result of the type of construction activities occurring on site, and the knowledge of the appropriate and effective erosion and sediment control measures needed to control the quality of stormwater discharges. Section 5 of this SWPPP provides the name and contact information for the CESCL.

Site inspection will occur in all areas disturbed by construction activities. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of stormwater discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

6.1.1 Site Stormwater Inspection Frequency

Site stormwater inspections will be conducted at least daily during construction and within 24 hours following any discharge from the site during construction work.

6.1.2 Columbia River Inspection and Turbidity Monitoring Frequency

Visual inspections and turbidity monitoring will be conducted within the Columbia River at least hourly during construction within 10 feet from the shoreline. The monitoring frequency will be reduced to every 4 hours during construction activities greater than 10 feet from the shoreline, if approved by the CESCL. Turbidity will be monitored at pre-established locations within 5 feet of the shoreline, as shown in Appendix B (Figure 4). Additional turbidity monitoring locations, if necessary, will be field located based on the location of the construction work at a particular time.

6.1.3 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in Appendix C. Other forms may be used if approved by the Engineer and Ecology. The site inspection log forms may be kept separately from this SWPPP document, but will be maintained on-site or within reasonable access to the site and will be made available to Ecology upon request.

The site inspector will record visual observations and turbidity measurements using a field turbidity meter calibrated in accordance with manufactures instructions. Turbidity will be measured and recorded in units of Nephelometric Turbidy Units (NTUs).

6.2 Stormwater and Columbia River Turbidity Monitoring

The construction site does not discharge to an impaired water body, and is therefore not subject to the general water quality monitoring requirements set forth in the 2005 Construction Stormwater General Permit.

6.2.1 Stomwater Discharge Turbidity Monitoring

If applicable, stormwater that discharges to the Columbia River within the construction area will be identified and monitored during construction activities. If applicable, turbidity analysis will be performed with a calibrated turbidity meter. The results will be recorded in the site log book in NTU's. The benchmark value for turbidity in construction stormwater discharges is 25 NTU. If turbidity measurements are greater than 25 NTU, but less than 250 NTU, the CESCL will:

- Review the SWPPP and make appropriate revisions within 7 days of the discharge that exceeds the benchmark; and

- Fully implement and maintain source control and/or treatment BMPs as soon as possible, but within 10 days of the discharge that exceeded the benchmark; and

- Document BMP implementation in the site log book.

If turbidity values exceed 250 NTU, then the following actions will be undertaken:

- Notify Ecology by phone
- Review the SWPPP and make changes, as appropriate
- Fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, but within 10 days of the discharge that exceeded the benchmark
- Document BMP implementation and maintenance in the site log book
- Continue to sample discharges daily unit:
    - Turbidity is 25 NTU (or lower); or
    - The CESCL has demonstrated compliance with the water quality standard for turbidity:
        - No more than 5 NTU over background turbidity, if background is less than 50 NTU; or
        - No more than 10% over background turbidity, if background is 50 NTU or greater; or
    - The discharge stops or is eliminated.

6.2.2 Columbia River Discharge Turbidity Monitoring

Visual monitoring and turbidity monitoring will be conducted at least hourly during excavation and fill placement activities within 10 feet of the shoreline. Visual monitoring and turbidity monitoring will be conducted at least every 4 hours while construction activities are occurring greater than 10 feet from the shoreline.

The site inspection will keep records of visual observations and turbidity monitoring in the site log book. Turbidity monitoring will be performed within 5 feet of the shoreline using a calibrated turbidity meter and will include monitoring adjacent, upgradient (within 100 feet) and downgradient (within 100 feet) to the construction activity. Baseline turbidity monitoring will be conducted within 5 feet of the shoreline prior to construction activities to establish pre-construction turbidity levels.

If measured turbidity levels are more than 5 NTUs greater than background levels for at least three consecutive measurements taken 5 minutes apart, then a turbidity curtain will be installed within 10 feet of the shoreline within the affected area. If turbidity levels are within 5 NTU's of the baseline values, then no corrective action will be undertaken and routine monitoring will continue.

7.0 Reporting and Recordkeeping

7.1 Recordkeeping

7.1.1 Site Log Book

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book.

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Stormwater quality monitoring

7.1.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this SWPPP, and any other documentation of compliance with permit requirements will be retained during the life of the construction project.

7.1.3 Access to Plans and Records

The SWPPP and site log book will be retained on site or within reasonable access to the site and, upon request, will be made immediately available to Ecology or the local jurisdiction. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing.

7.1.4 Updating the SWPPP

The SWPPP will be modified if it is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination, based on inspection(s), that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

Appendix A – Construction BMPs

7.3.1 Source Control BMPs

BMP C101: Preserving Natural Vegetation Purpose

Purpose: The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use:

- Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.
- As required by jurisdiction.

Design and Installation Specifications: Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

Plants need protection from three kinds of injuries:

- Construction Equipment - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- Grade Changes - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

  When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade. The tile system should be laid out on the original grade leading from a dry well around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

  Lowering the natural ground level can seriously damage trees and shrubs.

The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- Excavations - Protect trees and other plants when excavating for drainfields and power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:
  - Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint.
  - Backfill the trench as soon as possible.
  - Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered are:

- In general, most trees native to Eastern Washington do not readily adjust to major changes in environment and special care should be taken to protect these trees.
- The danger of windthrow increases where dense stands of coniferous trees have been thinned.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir, Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots, and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

Maintenance Standards:

- Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.
- If tree roots have been exposed or injured, “prune” cleanly with an appropriate pruning saw or loppers directly above the damaged roots and recover with native soils.

BMP C102: Buffer Zones

Purpose: An undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities.

Conditions of Use: Natural buffer zones are used along streams, wetlands and other bodies of water that need protection from erosion and sedimentation. Vegetative buffer zones can be used to protect natural swales and can be incorporated into the natural landscaping of an area.

Critical-areas buffer zones should not be used as sediment treatment areas. These areas shall remain completely undisturbed. The jurisdiction may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

Design and Installation Specifications

- Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.
- Leave all unstable steep slopes in natural vegetation.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas. Steel construction fencing is the most effective method in protecting sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the dripline of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause damage from burying and smothering.
- Vegetative buffer zones for streams, lakes or other waterways shall be established by the jurisdiction or other state or federal permits or approvals.

Maintenance Standards:

- Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed.

BMP C103: High Visibility Plastic or Metal Fence

Purpose: Fencing is intended to: (1) restrict clearing to approved limits; (2) prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed; (3) limit construction traffic to designated construction entrances or roads; and, (4) protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use: To establish clearing limits, plastic or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications:

- High visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensile strength shall be 360 lbs./ft. using the ASTM D4595 testing method.
- Metal fences shall be designed and installed according to the manufacturer's specifications.
- Metal fences shall be at least 3 feet high and must be highly visible.
- Fences shall not be wired or stapled to trees.

Maintenance Standards:

- If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Entrance

Purpose: Construction entrances are stabilized to reduce the amount of sediment transported onto paved roads by vehicles or equipment by constructing a stabilized pad of quarry spalls at entrances to construction sites.

Conditions of Use:

- Construction entrances shall be stabilized wherever traffic will be leaving a construction site and traveling on paved roads or other paved areas within 1,000 feet of the site.
- On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation:

- See Figure 7.3.2 for details.
- The surface material shall be 4"-8" quarry spalls. Smaller crushed rock such as base course may be appropriate in some situations but, since it is more likely to be tracked off-site, must be approved by the local jurisdiction.
- A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

Grab Tensile Strength (ASTM D4751)	200 psi min.
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- If site conditions do not warrant the use of geotextile, it is not required.

Maintenance Standards: Quarry spalls (or hog fuel) shall be added if the pad is no longer in accordance with the specifications.

- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump shall be considered. The sediment would then be washed into the sump where it can be controlled.

- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMPs C103 and C104) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

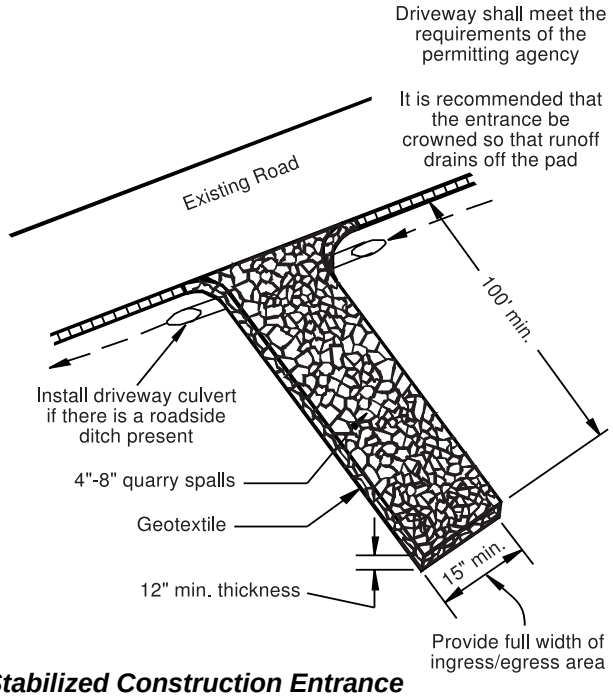


Figure 7.3.2 - Stabilized Construction Entrance

BMP C140: Dust Control

Purpose: Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters. Wind erosion is a significant cause of soil movement from construction sites in Eastern Washington. Although wind erosion can contribute to water quality impacts, dust control is regulated in some areas of Eastern Washington primarily through local air quality authorities. Where such an entity exists, contact the local air quality authority for appropriate and required BMPs for dust control to implement at your project site.

Conditions for Use: In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications:

- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.
- Water applied to construction sites for dust control must not leave the site as surface runoff.
- See also "Techniques for Dust Prevention and Suppression," Ecology Publication Number 96-433, revised April 2002.
- Techniques that can be used for construction projects include:
- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water

alone. This is due to the increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control, especially in eastern Washington. Since the wholesale cost of PAM is about $ 4.00 per pound, this is an extremely cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.

Maintenance Standards:

- Respray area as necessary to keep dust to a minimum. Water applied to construction sites for dust control must not leave the site as surface runoff.

BMP C150: Materials On Hand

Purpose: Quantities of erosion prevention and sediment control materials can be kept on the project site at all times to be used for emergency situations such as unexpected heavy summer rains. Having these materials on-site reduces the time needed to implement BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

Conditions for Use:

- Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible pipe, sandbags, geotextile fabric and steel "T" posts.
- Materials are stockpiled and readily available before any site clearing, grubbing, or earthwork begins. A large contractor or developer could keep a stockpile of materials that are available to be used on several projects.
- If storage space at the project site is at a premium, the contractor could maintain the materials at their office or yard. The office or yard must be less than an hour from the project site.

Design and Installation Specifications: Depending on project type, size, complexity, and length, materials and quantities will vary. A good minimum that will cover numerous situations includes:

Material	Measure	Quantity
Clear Plastic, 6 mil	100 foot roll	1-2
Drainpipe, 6 or 8 inch diameter	25 foot section	4-6
Sandbags, filled	each	25-50
Straw Bales for mulching,	approx. 50# each	10-20
Quarry Spalls	ton	2-4
Washed Gravel	cubic yard	2-4
Geotextile Fabric	100 foot roll	1-2
Catch Basin Inserts	each	2-4
Steel "T" Posts	each	12-24

Maintenance Standards:

- All materials with the exception of the quarry spalls, steel "T" posts, and gravel should be kept covered and out of both sun and rain.
- Re-stock materials used as needed.

BMP C160: Contractor Erosion and Spill Control Lead

Purpose: The Contractor designates at least one person as the responsible representative in charge of erosion and spill control. The designated employee or contact shall be the Contractor Erosion and Spill Control Lead (CESCL) who is responsible for ensuring compliance with all local, State, and Federal erosion and sediment control requirements.

Conditions for Use: A CESCL should be made available on project types that include, but are not limited to, the following:

- Projects with an NPDES and State Waste Discharge Permit for Stormwater Discharges Associated with Construction Activities.
- Heavy construction of roads, bridges, highways, airports, buildings.
- Projects near wetlands and sensitive or critical areas.
- Projects in or over water.

Design and Installation Specifications: The CESCL shall be qualified in construction site erosion and sediment control regulatory requirements and BMPs:

- The CESCL shall have thorough knowledge and understanding of the Construction Stormwater Pollution Prevention Plan (SWPPP) for the project site.
- The CESCL shall have authority to act on behalf of the contractor or developer and shall be available, on call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated CESCL. If the CESCL information is not available during initial SWPPP development, it should be noted in the narrative of the SWPPP. When the CESCL information becomes available to the owner/developer, it must be added to the SWPPP.
- The CESCL shall have up-to-date training and field experience in construction erosion and sediment control practices.
- The CESCL should have a current certificate proving attendance in the "Construction Site Erosion and Sediment Control Certification Course," offered throughout the year by the Associated General Contractors of Washington Education Foundation or a similar course or certification program such as:
    - WSDOT certification in Construction Site Erosion and Sediment Control.
    - Certified Professional in Erosion and Sediment Control (CPESC) offered by the International Erosion Control Association (IECA).

Duties and responsibilities of the CESCL shall include, but are not limited to the following:

- Maintaining permit file on site at all times which includes the SWPPP and any associated permits and plans.

- Directing BMP installation, inspection, maintenance, modification, and removal.
- Availability 24 hours per day, 7 days per week by telephone.
- Updating all project drawings and the Construction SWPPP with changes made.
- Keeping daily logs, and inspection reports. Inspection reports should include:
    - When, where and how BMPs were installed, removed, or modified.
    - Repairs needed or made.
    - Observations of BMP effectiveness and proper placement.
    - Recommendations for improving performance of BMPs.
    - Identify the points where storm water runoff potentially leaves the site, is collected in a surface water conveyance system (i.e., road ditch, storm sewer), and enters receiving waters of the state.
    - If water sheet flows from the site, identify the point at which it becomes concentrated in a collection system.
    - Inspect for SWPPP requirements including BMPs as required to ensure adequacy.
    - Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

BMP C233: Silt Fence

Purpose: Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 7.3.20 for details on silt fence construction.

Conditions of Use:

- Silt fence may be used downslope of all disturbed areas. Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a silt fence, rather than by a sediment pond, is when the area draining to the fence is one acre or less and flow rates are less than 0.5 cfs.
- Silt fences should not be constructed in streams or used in V-shaped ditches. They are not an adequate method of silt control for anything deeper than sheet or overland flow.

Design and Installation Specifications: Drainage area of 1 acre or less or in combination with sediment basin in a larger site.

- Maximum slope steepness (normal (perpendicular) to fence line) 1:1.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- No flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 7.3.10).

Table 7.3.10 Geotextile Standards

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film wovens (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

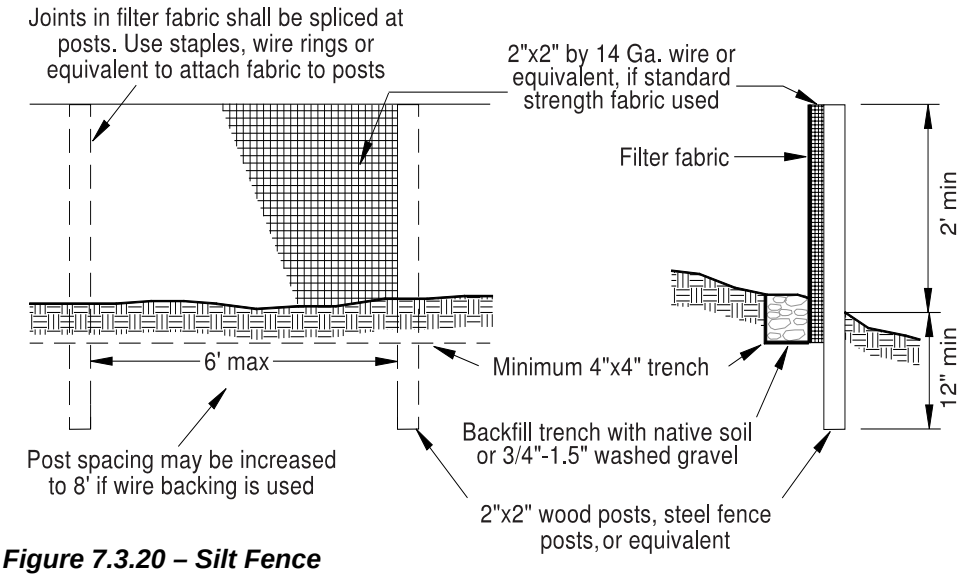


Figure 7.3.20 – Silt Fence

Design and Installation Specifications:

- Standard strength fabrics shall be supported with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- 100 percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- The contractor shall install and maintain temporary silt fences at the locations shown in the Plans. The silt fences shall be constructed in the areas of clearing, grading, or drainage prior to starting those activities. A silt fence shall not be considered temporary if the silt fence must function beyond the life of the contract. The silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- The minimum height of the top of silt fence shall be 2 feet and the maximum height shall be 2½ feet above the original ground surface.
- The geotextile shall be sewn together at the point of manufacture, or at an approved location as determined by the Engineer, to form geotextile lengths as required. All sewn seams shall be located at a support post. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can

demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.

- The geotextile shall be attached on the up-slope side of the posts and support system with staples, wire, or in accordance with the manufacturer's recommendations. The geotextile shall be attached to the posts in a manner that reduces the potential for geotextile tearing at the staples, wire, or other connection device. Silt fence back-up support for the geotextile in the form of a wire or plastic mesh is dependent on the properties of the geotextile selected for use. If wire or plastic back-up mesh is used, the mesh shall be fastened securely to the up-slope of the posts with the geotextile being up-slope of the mesh back-up support.
- The geotextile at the bottom of the fence shall be buried in a trench to a minimum depth of 4 inches below the ground surface. The trench shall be backfilled and the soil tamped in place over the buried portion of the geotextile, such that no flow can pass beneath the fence and scouring can not occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the trench a minimum of 3 inches.
- The fence posts shall be placed or driven a minimum of 18 inches. A minimum depth of 12 inches is allowed if topsoil or other soft subgrade soil is not present and a minimum depth of 18 inches cannot be reached. Fence post depths shall be increased by 6 inches if the fence is located on slopes of 3:1 or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
- Silt fences shall be located on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
- If the fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence. The gravel check dams shall be approximately 1-foot deep at the back of the fence. It shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence. The gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. The gravel check dams shall be located every 10 feet along the fence where the fence must cross contours. The slope of the fence line where contours must be crossed shall not be steeper than 3:1.
- Wood, steel or equivalent posts shall be used. Wood posts shall have minimum dimensions of 2 inches by 2 inches by 3 feet minimum length, and shall be free of defects such as knots, splits, or gouges. Steel posts shall consist of either size No. 6 rebar or larger, ASTM A 120 steel pipe with a

minimum diameter of 1-inch, U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft. or other steel posts having equivalent strength and bending resistance to the post sizes listed. The spacing of the support posts shall be a maximum of 6 feet.

- Fence back-up support, if used, shall consist of steel wire with a maximum mesh spacing of 2 inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to ultraviolet radiation as the geotextile it supports.
- Silt fence installation using the slicing method specification details follow. Refer to Figure 7.3.21 for slicing method details.
- The base of both end posts must be at least 2 to 4 inches above the top of the silt fence fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
- Install posts 3 to 4 feet apart in critical retention areas and 6 to 7 feet apart in standard applications.
- Install posts 24 inches deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.
- Install posts with the nipples facing away from the silt fence fabric.
- Attach the fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. In addition, each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
- Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.
- No more than 24 inches of a 36-inch fabric is allowed above ground level.
- The rope lock system must be used in all ditch check applications.
- The installation should be checked and corrected for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.
- Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips.

Maintenance Standards:

- Any damage shall be repaired immediately.
- If concentrated flows are evident uphill of the fence, they must be intercepted and conveyed to a sediment pond.

- It is important to check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Sediment deposits shall either be removed when the deposit reaches approximately one-third the height of the silt fence, or a second silt fence shall be installed.
- If the filter fabric (geotextile) has deteriorated due to ultraviolet breakdown, it shall be replaced.

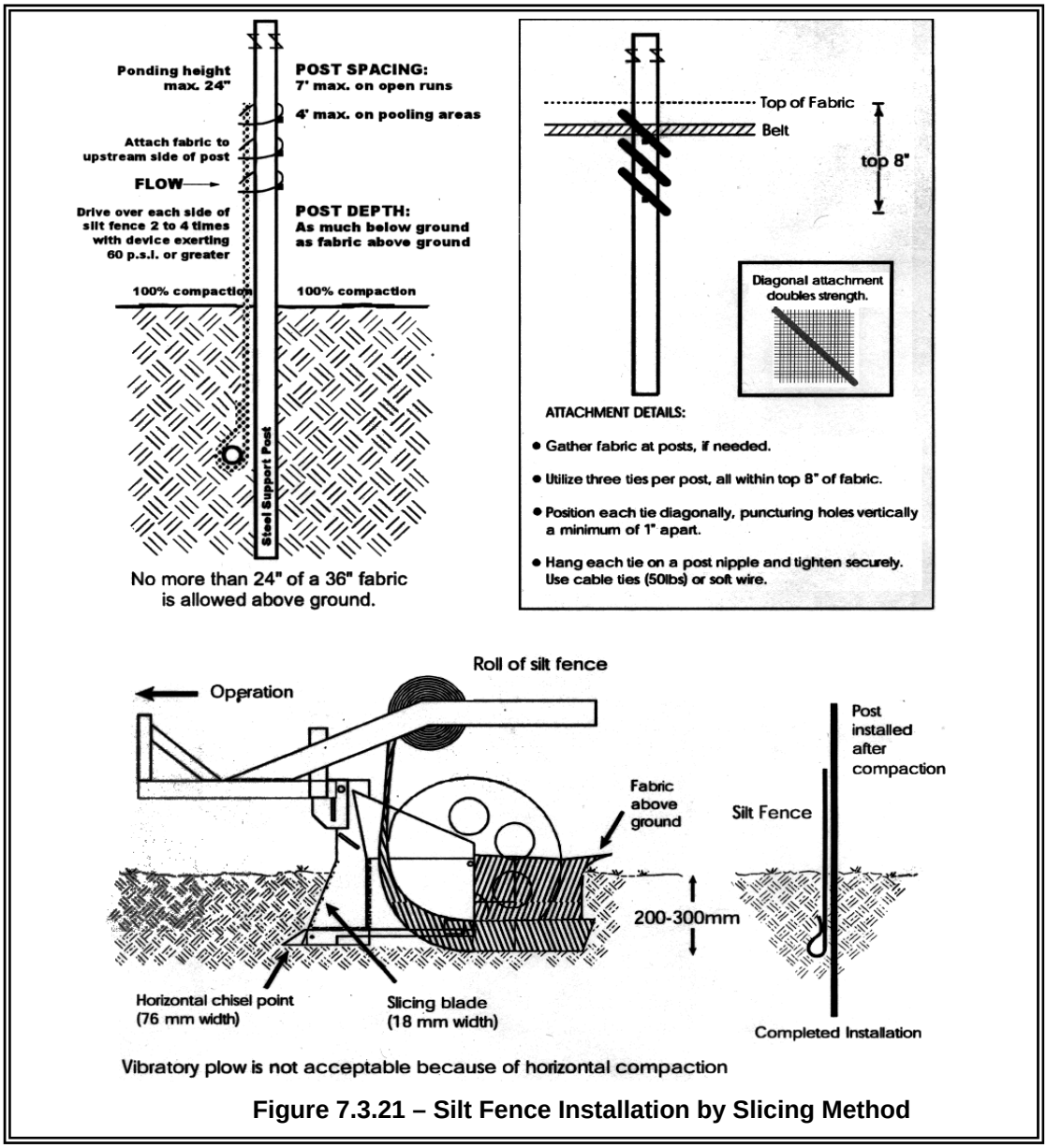


Figure 7.3.21 – Silt Fence Installation by Slicing Method

BMP C235: Straw Wattles

Purpose: Straw wattles are temporary erosion and sediment control barriers consisting of straw that is wrapped in biodegradable tubular plastic or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment. Straw wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length. The wattles are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes. See Figure 7.3.22 for typical construction details.

Conditions of Use:

- Disturbed areas that require immediate erosion protection.
- Exposed soils during the period of short construction delays, or over winter months.
- On slopes requiring stabilization until permanent vegetation can be established.
- Straw wattles are effective for one to two seasons.
- If conditions are appropriate, wattles can be staked to the ground using willow cuttings for added revegetation.
- Rilling can occur beneath wattles if not properly entrenched and water can pass between wattles if not tightly abutted together.

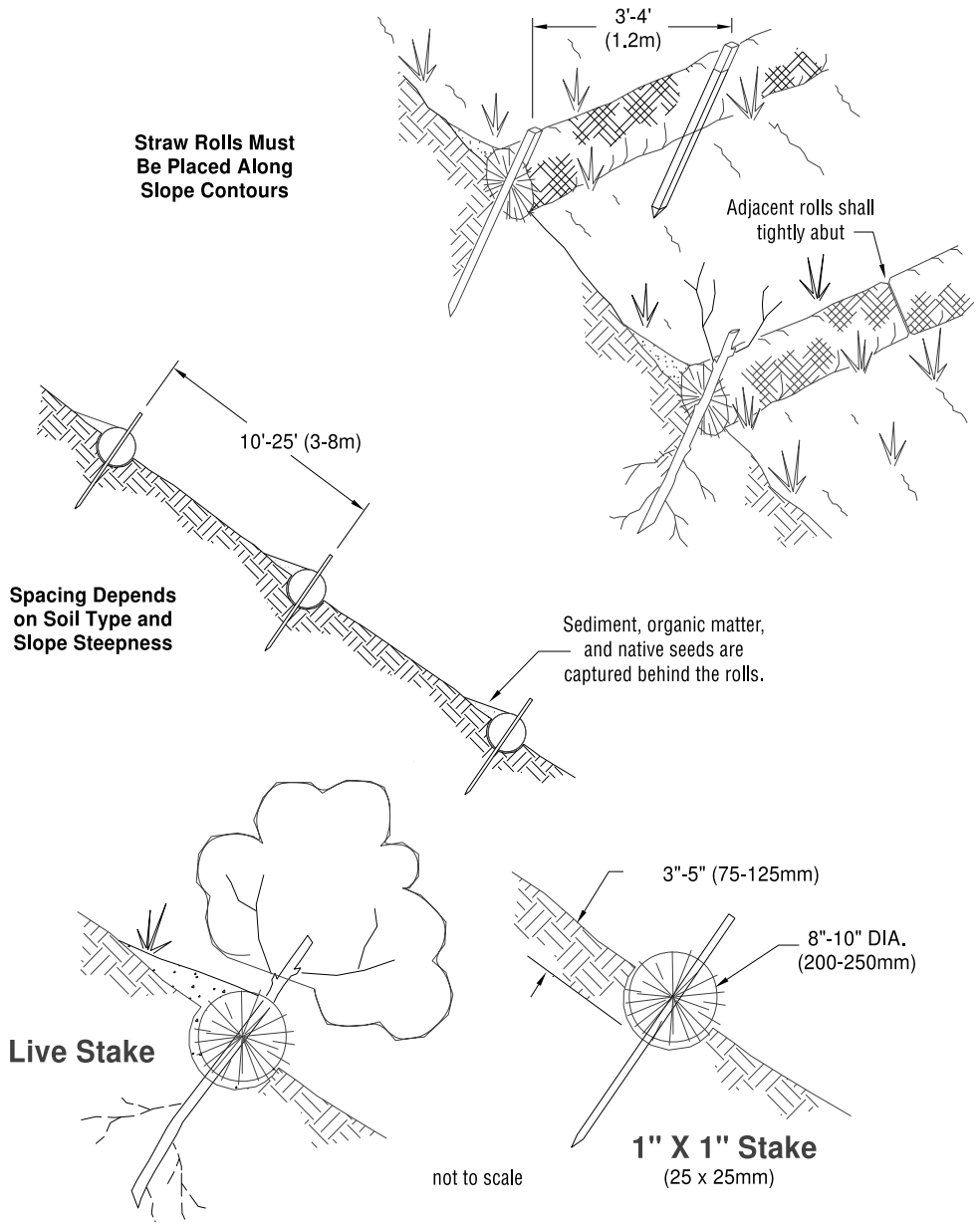
Design Criteria:

- It is critical that wattles are installed perpendicular to the flow direction and parallel to the slope contour.
- Narrow trenches should be dug across the slope on contour to a depth of 3 to 5 inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5 to 7 inches, or ½ to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Excavated material should be spread evenly along the uphill slope and compacted using hand tamping or other methods.
- Construct trenches at contour intervals of 3 to 30 feet apart depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and abut tightly end to end. Do not overlap the ends.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.
- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- At a minimum, wooden stakes should be approximately ¾ x ¾ x 24 inches. Willow cuttings or 3/8-inch rebar can also be used for stakes.

- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.

Maintenance Standards:

- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.
- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.



NOTE:
Straw roll installation requires the placement and secure staking of the roll in a trench, 3"x5" (75-125mm) deep, dug on contour. Runoff must not be allowed to run under or around roll.

Figure 7.3.22 - Straw Wattles

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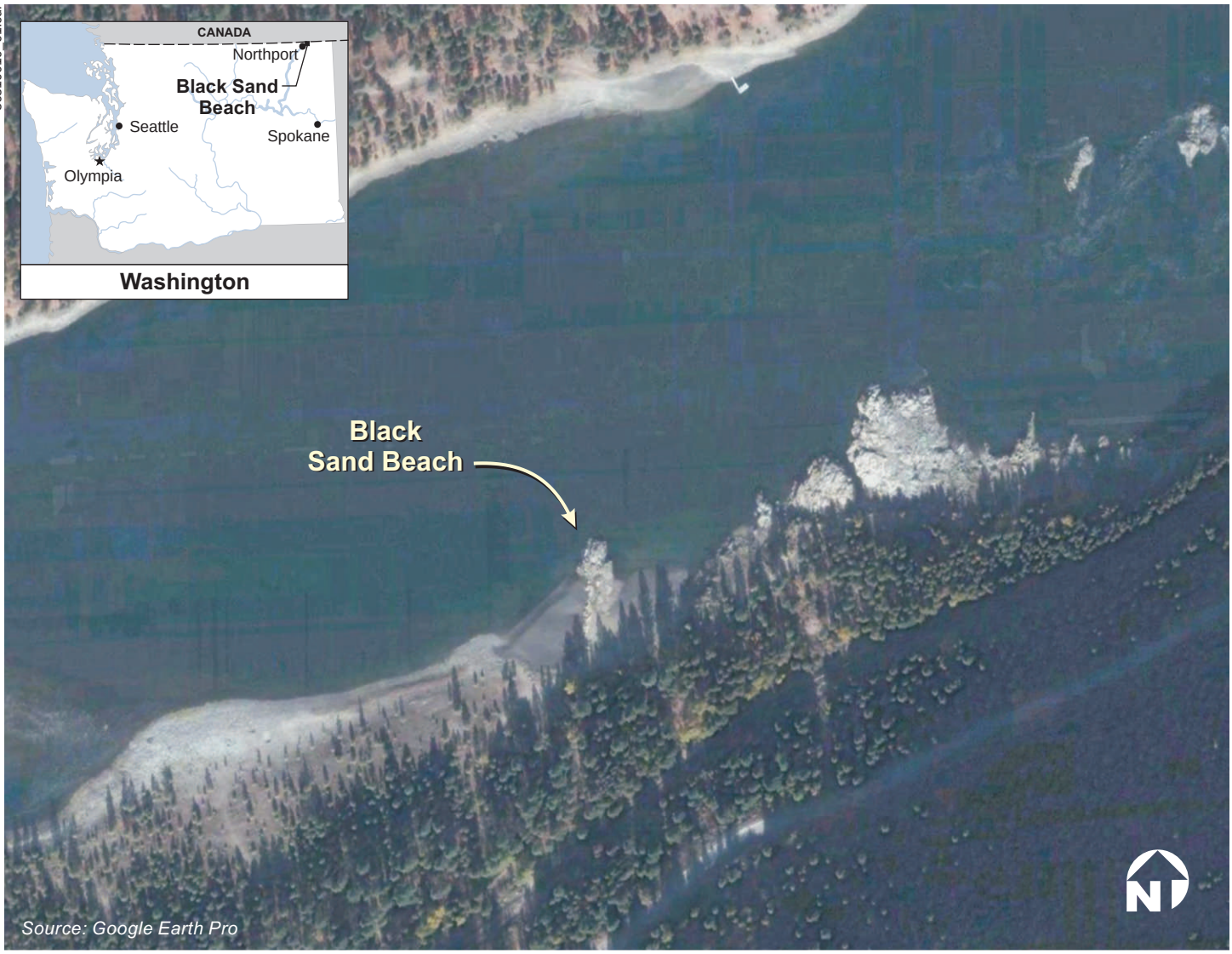


Photos taken 5-22-09.

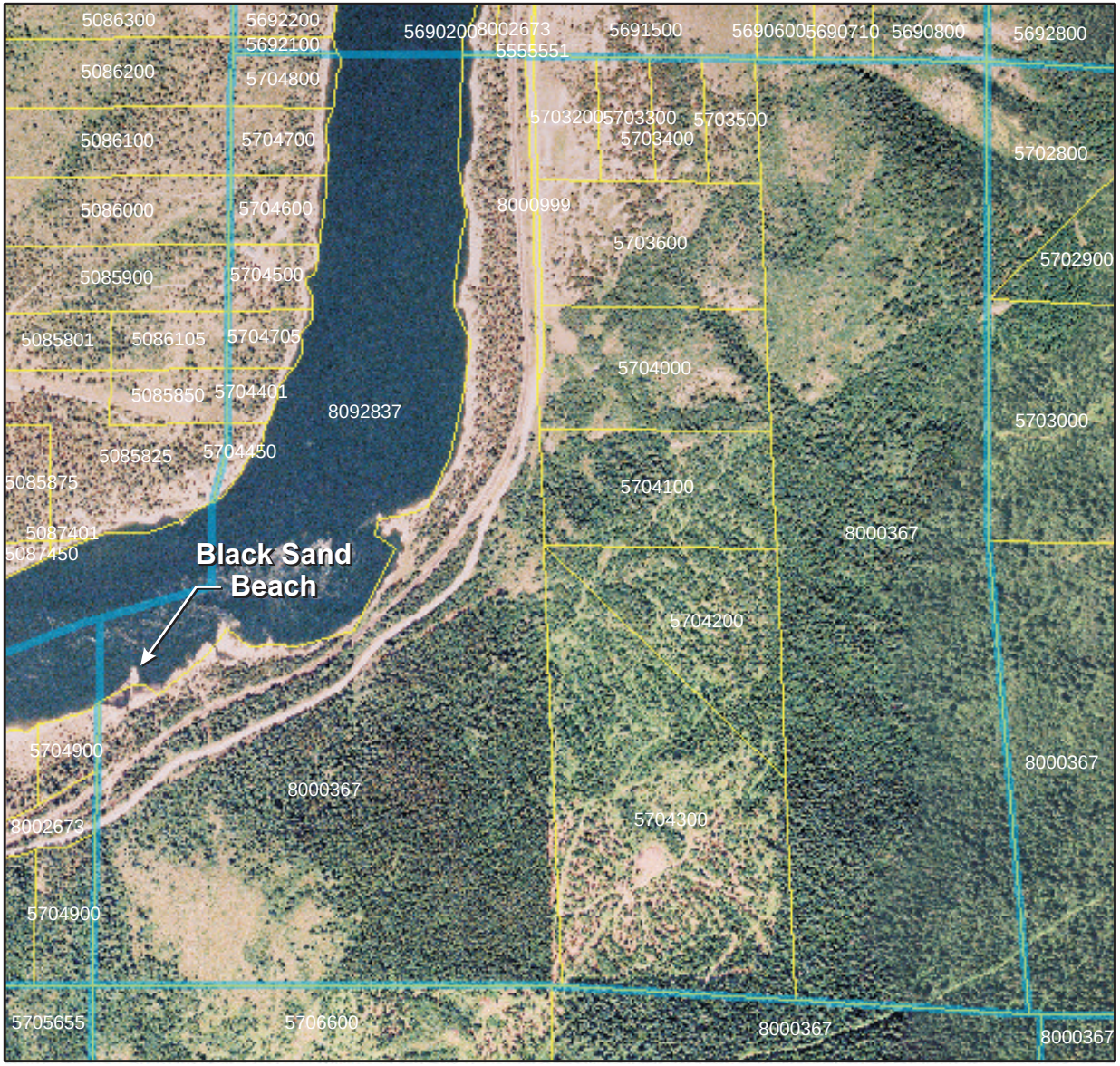
Figure 1

Black Sand Beach Location and Site Photographs

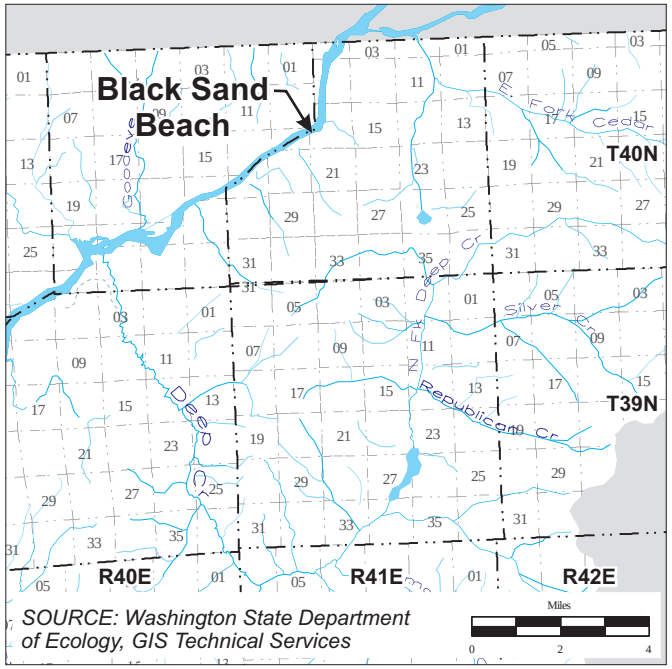
Job No. 36310019

URS

Black Sand Beach
Northport, Washington



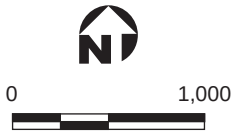
SOURCE: Steven's County Assesor's Office



Township and Range

Stevens County Washington

Township 40 N Range 41 E Section (see grid)



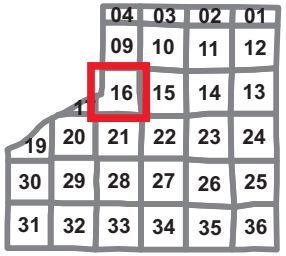


Figure 2

Parcel Map

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

Legend

Extent of Proposed Excavation

Source:
Basemap provided by Survey Solutions, Spokane Washington.

0 20 40
SCALE IN FEET

Columbia River

215'±

Edge of Water 1297.1

Rock Outcropping Area
8,280 SF
Estimated Excavation Volume
10 CY's±
Estimated Fill Volume
No Backfill

131'±

Upstream Beach Area
9,850 SF
Estimated Excavation Volume
402 CY's
Estimated Fill Volume
217 CY's

Middle Beach Area
5,940 SF
Estimated Excavation Volume
150 CY's
Estimated Fill Volume
150 CY's

Upstream Beach Area
18,500 SF
Estimated Excavation Volume
4,100 CY's
Estimated Fill Volume
3,381 CY's

Rock Outcrop

Haul Route

Tree Line

Haul Route

Minor Road Improvement

Parcel No. 5704900

Parcel No. 8000367

Burlington Northern Railroad

JOB No. 36310019
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Figure 3

Black Sand Beach Subareas and Proposed Area of Excavation

Black Sand Beach
Northport, Washington

Legend:
Turbidity Sample Locations.
Locate Within 5 Feet of Shoreline.
Turbidity Monitoring Shall Be Conducted in Accordance With an Ecology-Approved Stormwater Pollution Prevention Plan.

Note:
Estimated depth of granulated slag on Middle Beach was extrapolated from values at Upstream Beach because they were outside the 2009 survey control.

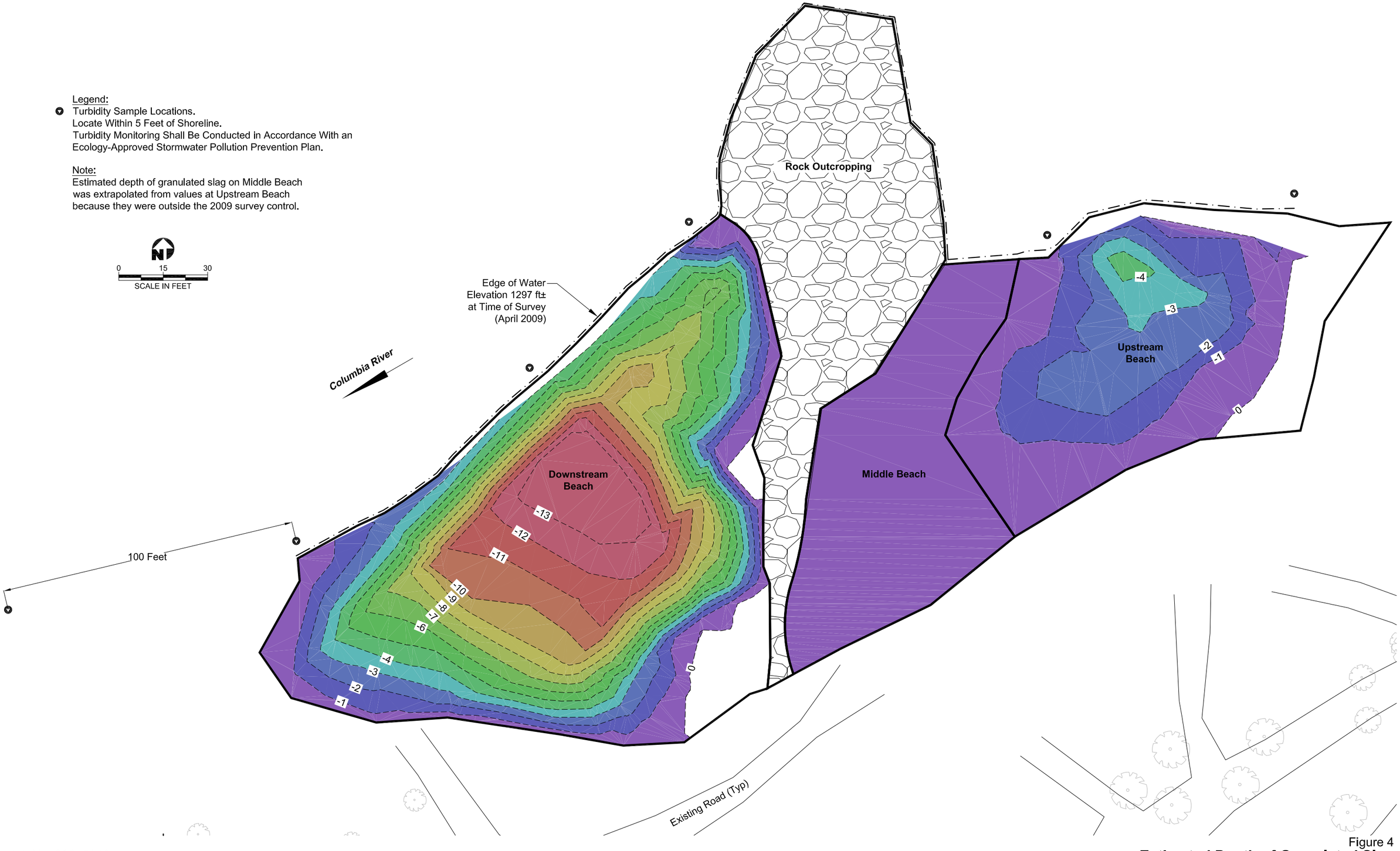

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Figure 4
Estimated Depth of Granulated Slag and Turbidity Monitoring Locations
Black Sand Beach
Northport, Washington

Legend

Extent of Proposed Excavation

Source:
Basemap provided by Survey Solutions, Spokane Washington.

NT

0 20 40

SCALE IN FEET

Columbia River

215'±

Edge of Water 1297.1

Rock Outcropping Area
8,280 SF
Estimated Excavation Volume
10 CY's±
Estimated Fill Volume
No Backfill

131'±

Upstream Beach Area
9,850 SF
Estimated Excavation Volume
402 CY's
Estimated Fill Volume
217 CY's

Middle Beach Area
5,940 SF
Estimated Excavation Volume
150 CY's
Estimated Fill Volume
150 CY's

Upstream Beach Area
18,500 SF
Estimated Excavation Volume
4,100 CY's
Estimated Fill Volume
3,381 CY's

Rock Outcrop

Haul Route

Tree Line

Haul Route

Minor Road Improvement

Parcel No.
5704900

Parcel No.
8000367

Burlington Northern Railroad

JOB No. 36310019
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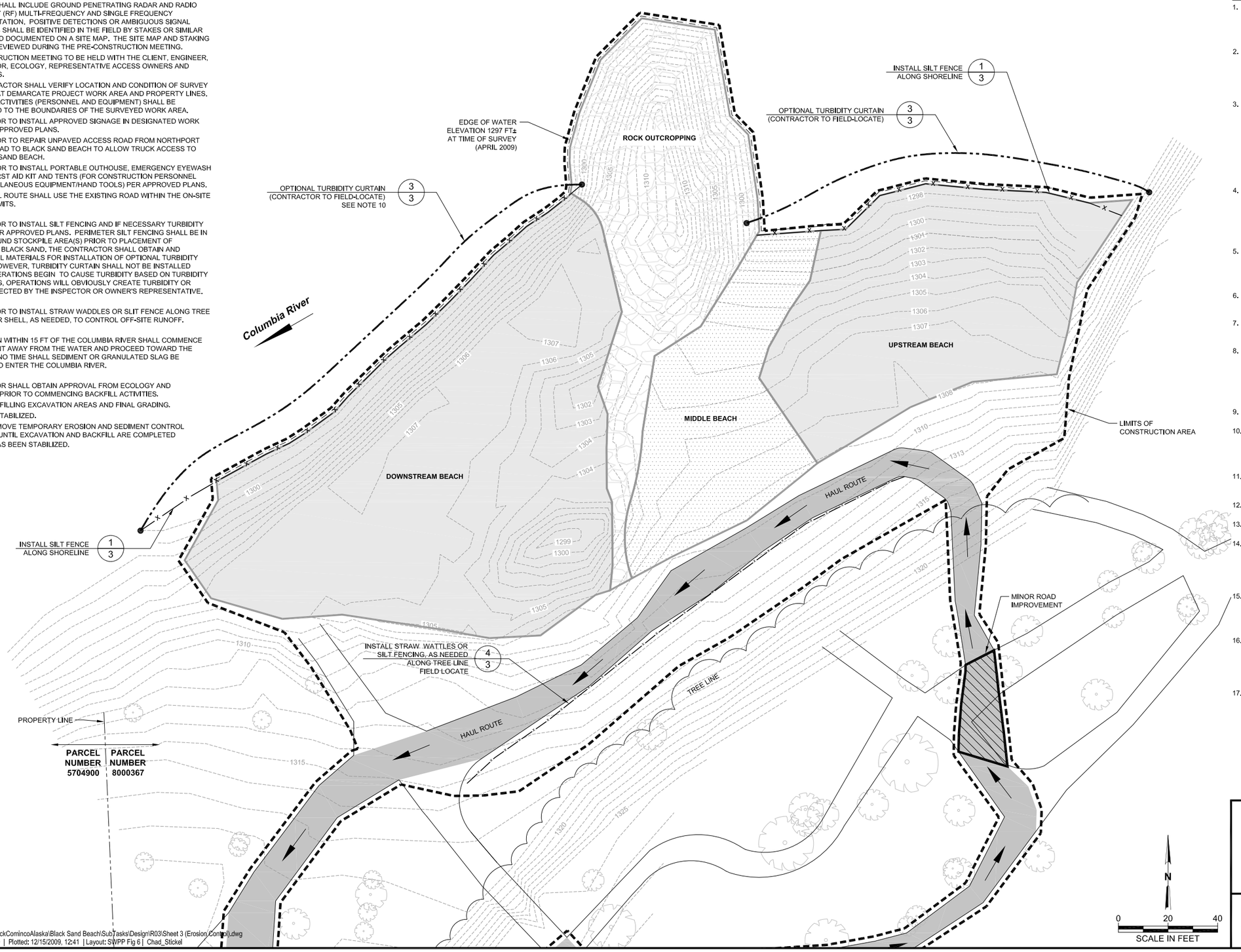
Figure 5

Black Sand Beach Subareas and Proposed Area of Excavation

Black Sand Beach
Northport, Washington

CONSTRUCTION SEQUENCE

1. OBTAIN OR VERIFY ACCESS PERMIT FROM BNSF FOR PRIVATE RAILROAD CROSSING AND SITE ACCESS PERMISSION FROM SITE ACCESS OWNERS. REFER TO VICINITY MAP ON SHEET 1.
2. CONTRACTOR SHALL PERFORM PRE-CONSTRUCTION SURVEY TO STAKE-OUT BOUNDARIES OF PROJECT WORK AREA AND TO IDENTIFY PROPERTY LINES AND/OR EASEMENTS IN THE VICINITY OF THE PROJECT WORK AREA.
3. CONTRACTOR SHALL CONDUCT PRE-CONSTRUCTION UNDERGROUND UTILITY SURVEY WITH A PRIVATE UTILITY LOCATOR. SUBSURFACE METHODS SHALL INCLUDE GROUND PENETRATING RADAR AND RADIO FREQUENCY (RF) MULTI-FREQUENCY AND SINGLE FREQUENCY INSTRUMENTATION. POSITIVE DETECTIONS OR AMBIGUOUS SIGNAL RESPONSES SHALL BE IDENTIFIED IN THE FIELD BY STAKES OR SIMILAR METHOD AND DOCUMENTED ON A SITE MAP. THE SITE MAP AND STAKING SHALL BE REVIEWED DURING THE PRE-CONSTRUCTION MEETING.
4. PRE-CONSTRUCTION MEETING TO BE HELD WITH THE CLIENT, ENGINEER, CONTRACTOR, ECOLOGY, REPRESENTATIVE ACCESS OWNERS AND INSPECTORS.
5. THE CONTRACTOR SHALL VERIFY LOCATION AND CONDITION OF SURVEY STAKES THAT DEMARCATE PROJECT WORK AREA AND PROPERTY LINES. ALL WORK ACTIVITIES (PERSONNEL AND EQUIPMENT) SHALL BE RESTRICTED TO THE BOUNDARIES OF THE SURVEYED WORK AREA.
6. CONTRACTOR TO INSTALL APPROVED SIGNAGE IN DESIGNATED WORK AREA PER APPROVED PLANS.
7. CONTRACTOR TO REPAIR UNPAVED ACCESS ROAD FROM NORTHPORT WANETA ROAD TO BLACK SAND BEACH TO ALLOW TRUCK ACCESS TO THE BLACK SAND BEACH.
8. CONTRACTOR TO INSTALL PORTABLE OUTHOUSE, EMERGENCY EYEWASH STATION/FIRST AID KIT AND TENTS (FOR CONSTRUCTION PERSONNEL AND MISCELLANEOUS EQUIPMENT/HAND TOOLS) PER APPROVED PLANS.
9. TRUCK HAUL ROUTE SHALL USE THE EXISTING ROAD WITHIN THE ON-SITE PROJECT LIMITS.
10. CONTRACTOR TO INSTALL SILT FENCING AND IF NECESSARY TURBIDITY CURTAIN PER APPROVED PLANS. PERIMETER SILT FENCING SHALL BE IN PLACE AROUND STOCKPILE AREA(S) PRIOR TO PLACEMENT OF EXCAVATED BLACK SAND. THE CONTRACTOR SHALL OBTAIN AND MOBILIZE ALL MATERIALS FOR INSTALLATION OF OPTIONAL TURBIDITY CURTAIN; HOWEVER, TURBIDITY CURTAIN SHALL NOT BE INSTALLED UNLESS OPERATIONS BEGIN TO CAUSE TURBIDITY BASED ON TURBIDITY MONITORING, OPERATIONS WILL OBVIOUSLY CREATE TURBIDITY OR UNLESS DIRECTED BY THE INSPECTOR OR OWNER'S REPRESENTATIVE.
11. CONTRACTOR TO INSTALL STRAW WADDLES OR SLIT FENCE ALONG TREE LINE BUFFER SHELL, AS NEEDED, TO CONTROL OFF-SITE RUNOFF.
12. EXCAVATION WITHIN 15 FT OF THE COLUMBIA RIVER SHALL COMMENCE AT THE POINT AWAY FROM THE WATER AND PROCEED TOWARD THE WATER. AT NO TIME SHALL SEDIMENT OR GRANULATED SLAG BE ALLOWED TO ENTER THE COLUMBIA RIVER.
13. CONTRACTOR SHALL OBTAIN APPROVAL FROM ECOLOGY AND INSPECTOR PRIOR TO COMMENCING BACKFILL ACTIVITIES.
14. BEGIN BACKFILLING EXCAVATION AREAS AND FINAL GRADING.
15. KEEP SITE STABILIZED.
16. DO NOT REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UNTIL EXCAVATION AND BACKFILL ARE COMPLETED AND SITE HAS BEEN STABILIZED.



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1	11/2/09	PTM	60% SUBMITTAL
2	12/14/09	PTM	60% SUBMITTAL REV 1

EROSION AND SEDIMENTATION CONTROL

1. THE IMPLEMENTATION OF THESE EROSION SEDIMENTATION CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE PERMIT HOLDER/CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED.
2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES IN SUCH A MANNER AS TO INSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE COLUMBIA RIVER OR VIOLATE APPLICABLE WATER QUALITY STANDARDS, AND MUST BE INSTALLED PRIOR TO ALL OTHER CONSTRUCTION.
3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOLLOWING INSPECTION AFTER STORM EVENTS. ADDITIONALLY, MORE ESC FACILITIES MAY BE REQUIRED FOR SILTATION CONTROL. THEREFORE, DURING THE COURSE OF CONSTRUCTION IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE CONTRACTOR TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES OVER AND ABOVE THE MINIMUM REQUIREMENTS AS MAY BE NEEDED.
4. THE ESC FACILITIES SHALL BE INSPECTED IN THE MORNING FOLLOWING AN OVERNIGHT (NON-WORKING HOUR) RAINFALL EVENT AND BY THE PERMIT HOLDER/CONTRACTOR AND MAINTAINED AS NECESSARY. IN ADDITION, ALL TEMPORARY SILTATION CONTROLS SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR EROSION HAS PASSED.
5. ANY AREA STRIPPED OF VEGETATION, INCLUDING ROADWAY EMBANKMENTS WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF SEVEN CALENDAR (7) DAYS, SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC METHODS (E.G, SEEDING, MULCHING, NETTING, EROSION BLANKETS, ETC.).
6. ANY AREAS NEEDING ESC MEASURES AS DETERMINED BY CONTRACTOR, BUT NOT REQUIRING IMMEDIATE ATTENTION, SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
7. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE PER MONTH OR WITHIN THE 48 HOURS FOLLOWING A STORM EVENT.
8. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL REQUIREMENTS MAY BE REQUIRED BY THE INSPECTOR TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN OF SILT FROM CONSTRUCTION VEHICLES. TRUCKS AND EQUIPMENT SHALL NOT TRACK MUD OR SOIL OUTSIDE OF THE CONSTRUCTION AREA. MUD AND SOIL TRACKED ONTO ROADWAYS SHALL BE REMOVED IMMEDIATELY.
9. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.
10. EROSION/SEDIMENTATION CONTROLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS IN THE DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL, UNLESS APPROVED OTHERWISE BY ECOLOGY.
11. A COPY OF THE APPROVED EROSION CONTROL PLANS MUST BE ON THE JOBSITE AT ALL TIMES THROUGH OUT THE CONSTRUCTION PERIOD.
12. TEMPORARY EROSION/SEDIMENTATION CONTROLS SHALL BE INSTALLED AND OPERATING PRIOR TO ANY GRADING OR LAND CLEARING.
13. WHEREVER POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL.
14. ALL CUT AND FILL SLOPES 5:1 (5 FEET HORIZONTAL TO 1 FOOT VERTICAL) OR STEEPER THAT WILL BE LEFT EXPOSED FOR MORE THAN 7 DAYS SHALL BE PROTECTED BY JUTE MATTING, PLASTIC SHEETING, OR OTHER APPROVED STABILIZATION METHODS AND PROVIDE ADEQUATE OFFSITE RUNOFF CONTROL BY INSTALLING SILT FENCING OR STRAW WADDLES ALONG TREE LINE BUFFER ZONE, AS NEEDED.
15. OFF-SITE STREETS MUST BE CLEAN AT ALL TIMES. IF DIRT IS DEPOSITED ON THE PUBLIC STREET, THE STREET SHALL BE CLEANED BY THE CONTRACTOR. ALL VEHICLES SHALL LEAVE THE SITE BY WAY OF THE CONSTRUCTION VEHICLE ENTRANCES AND SHALL BE CLEANED OF MUD PRIOR TO EXITING ONTO THE STREET.
16. WASHED GRAVEL BACKFILL ADJACENT TO THE FILTER FABRIC FENCES SHALL BE REPLACED AND THE FABRIC CLEANED IF CLOGGED BY SILT. IF ANY PORTION OF THE EROSION/SEDIMENTATION CONTROL ELEMENTS ARE DAMAGED OR NOT FUNCTIONING, OR IF THE CLEARING LIMIT BOUNDARY BECOMES NON-DEFINED, IT SHALL BE REPAIRED IMMEDIATELY.
17. CONTRACTOR SHALL CLEAN ENTIRE SITE AFTER CONSTRUCTION SUCH THAT NO PAPERS, TRASH, BRUSH OR ANY OTHER DEPOSITS REMAIN. MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR.

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

FIGURE 6
TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN

DESIGNED BY:	PTM
DRAWN BY:	CFS
CHECKED BY:	RDE
APPROVED BY:	PTM
REVISION:	REV 3
DATE:	12/14/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET OF 8
DRAWING NO.

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Mod: 12/14/2009, 15:40 | Plotted: 12/15/2009, 12:41 | Layout: SWPP Fig 6 | Chad_Stickel

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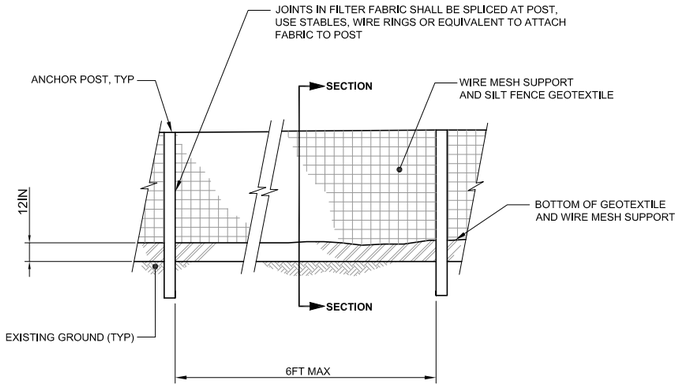
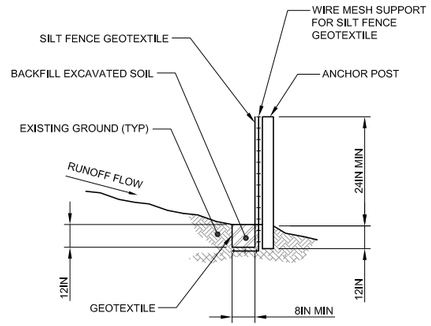
1	11/2/09	PTM	60% SUBMITTAL
2	12/14/09	PTM	60% SUBMITTAL REV 1



ELEVATION



SECTION

TYPICAL SILT FENCE INSTALLATION DETAIL

1 / 2

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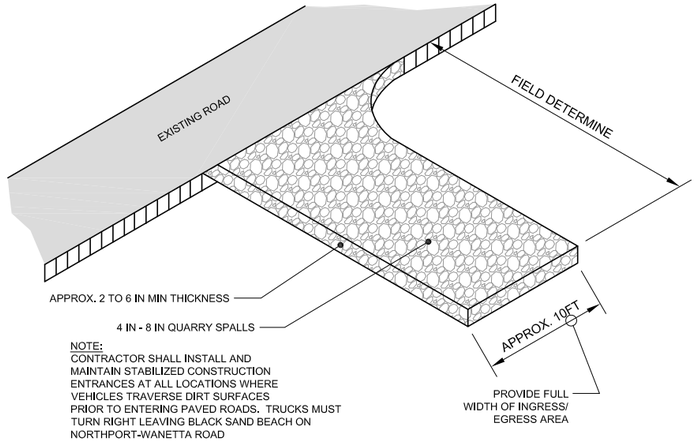
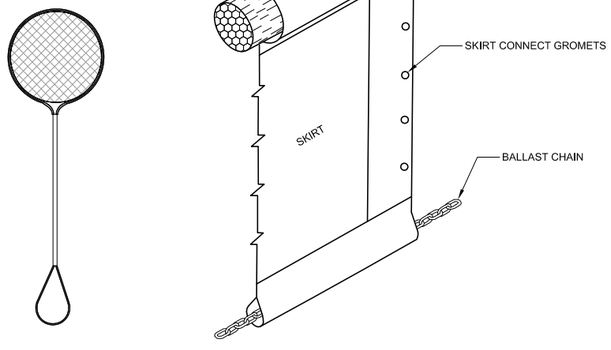


NOTE:
CONTRACTOR SHALL INSTALL AND MAINTAIN STABILIZED CONSTRUCTION ENTRANCES AT ALL LOCATIONS WHERE VEHICLES TRAVERSE DIRT SURFACES PRIOR TO ENTERING PAVED ROADS. TRUCKS MUST TURN RIGHT LEAVING BLACK SAND BEACH ON NORTHPORT-WANETTA ROAD

STABILIZED CONSTRUCTION ENTRANCE DETAIL

2 / 2

SCALE: NTS

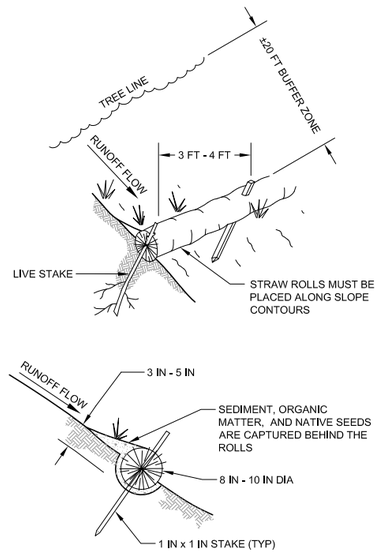


SECTION **ISOMETRIC**

TURBIDITY CURTAIN DETAIL

3 / 2

SCALE: NTS



NOTE:
STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3 IN x 5 IN DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

STRAW WATTLES DETAIL

4 / 2

SCALE: NTS

60% SUBMITTAL
NOT FOR CONSTRUCTION

BLACK SAND BEACH
EXCAVATION PROJECT
STEVENS COUNTY, WASHINGTON

FIGURE 7
EROSION CONTROL DETAILS

DESIGNED BY: PTM
DRAWN BY: CFS
CHECKED BY: RDE
APPROVED BY: PTM
REVISION: REV 3
DATE: 12/14/09

URS
1501 4TH AVENUE, SUITE 1400
SEATTLE, WA 98101-1616
(206) 438-2700

SHEET OF 8

DRAWING NO.

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Appendix B – Figures and Site Plans

Appendix C – Site Inspection Forms and Site Log

Appendix C – Site Inspection Forms and Site Log

The results of each inspection shall be summarized in an inspection report or checklist that is entered into or attached to the site log book. It is suggested that the inspection report or checklist be included in this appendix to keep monitoring and inspection information in one document, but this is optional. However, it is mandatory that this SWPPP and the site inspection forms be kept on site at all times during construction, and that inspections be performed and documented as outlined below.

At a minimum, each inspection report or checklist shall include:

a. Inspection date/times

b. Weather information: general conditions during inspection, approximate amount of precipitation since the last inspection, and approximate amount of precipitation within the last 24 hours.

c. A summary or list of all best management practices (BMPs) that have been implemented, including observations of all erosion/sediment control structures or practices.

d. The following shall be noted:

    i. Locations of BMPs inspected

    ii. Locations of BMPs that need maintenance

    iii. The reason maintenance is needed

    iv. Locations of BMPs that failed to operate as designed or intended

    v. Locations where additional or different BMPs are needed, and the reason(s) why

e. A description of stormwater discharged from the site. The presence of suspended sediment, turbid water, discoloration, and/or oil sheen shall be noted, as applicable.

f. A description of any water quality monitoring performed during inspection, and the results of that monitoring.

g. General comments and notes, including a brief description of any BMP repairs, maintenance, or installations made as a result of the inspection.

h. A statement that, in the judgment of the person conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the Stormwater Pollution Protection Plan and the National Pollutant Discharge Elimination System permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance, as well as a schedule of implementation.

i. Name, title, and signature of person conducting the site inspection; and the following statement: "I certify under penalty of law that this report is true, accurate, and complete, to the best of my knowledge and belief."

When the site inspection indicates that the site is not in compliance with any of the terms or conditions of the National Pollutant Discharge Elimination System permit, the Permittee shall take immediate action(s) to: stop, contain, and clean up the unauthorized discharges, or otherwise stop the noncompliance; correct the problem(s); implement appropriate BMPs, and/or conduct maintenance of existing BMPs; and achieve compliance with all applicable standards and permit conditions. In addition, if the noncompliance causes a threat to human health or the environment, the Permittee shall comply with the Noncompliance Notification requirements in Special Condition S5.F of the permit.

Site Inspection Form

General Information			
Project Name:			
Inspector Name:		**Title:** **CESCL # :**	
Date:		**Time:**	
Inspection Type:	□ After a rain event □ Weekly □ Turbidity/transparency benchmark exceedance □ Other		
Weather			
Precipitation	Since last inspection	In last 24 hours	
Description of General Site Conditions:			

Inspection of BMPs							
Element 1: Mark Clearing Limits							
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP
Element 2: Establish Construction Access							
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 3: Control Flow Rates (NOT APPLICABLE)

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 4: Install Sediment Controls

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 5: Stabilize Soils						
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	
Element 6: Protect Slopes						
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	
BMP:						
Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 7: Protect Drain Inlets (NOT APPLICABLE)

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 8: Stabilize Channels and Outlets

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

BMP:

Location	Inspected Y	Inspected N	Functioning Y	Functioning N	Functioning NIP	Problem/Corrective Action

Element 9: Control Pollutants

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 10: Control Dewatering (NOT APPLICABLE)

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Stormwater Discharges From the Site			
	Observed? Y	N	Problem/Corrective Action
Location			
Turbidity			
Discoloration			
Sheen			
Location			
Turbidity			
Discoloration			
Sheen			

Water Quality Monitoring		
Was any water quality monitoring conducted?	□ Yes	□ No
If water quality monitoring was conducted, record results here:		
If water quality monitoring indicated turbidity 250 NTU or greater; or transparency 6 cm or less, was Ecology notified by phone within 24 hrs?	□ Yes	□ No
If Ecology was notified, indicate the date, time, contact name and phone number below:		
Date:		
Time:		
Contact Name:		
Phone #:		
General Comments and Notes		
Include BMP repairs, maintenance, or installations made as a result of the inspection.		
Were Photos Taken?	□ Yes	□ No
If photos taken, describe photos below:		

APPENDIX F
DRAFT HEALTH AND SAFETY PLAN

Appendix F
Draft Site Safety Plan

Upper Columbia River

Black Sand Beach Excavation Project
Stevens County, Washington

Prepared by: URS Corporation

URS

920 N. Argonne Road
Spokane, Washington 99212

August 3, 2009

Contents

Contents (Continued)

Contents (Continued)

Contents (Continued)

ATTACHMENTS

FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
BBP	Bloodborne Pathogens
CGI	Combustible Gas Indicator
CIH	Certified Industrial Hygienist
CM	Construction Manager
CNS	Central Nervous System
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CM	Construction Manager
DOSH	Washington State Division of Occupational Safety and Health
EAP	Employee Assistance Program
EZ	Exclusion Zone
GFCI	Ground fault circuit interrupters
HSEM	Health, Safety, and Environment Manager
HSMS	Health and Safety Program and Management System
IDLH	Immediately Dangerous to Life and Health
In Situ	In place
JSA	Job Safety Analysis
kV	Kilovolt
L&I	Washington State Department of Labor & Industries
MC	Medical Consultant
MSDS	Material Safety Data Sheets
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PID	Photoionization Detector
PPE	Personal Protective Equipment
ROW	Right-of-Way
SMS	Safety Management Standard (URS)
SOW	Statement of Work
SSO	Site Safety Officer
SSP	Site Safety Plan
SZ	Support Zone
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act

1.0 INTRODUCTION

Disclaimer:

This Health and Safety Plan, and each of its provisions, is applicable only to, and for use only by URS Corporation, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third party contractors on projects where URS is providing engineering, construction management, or similar services, without the express written permission of URS, will be at that party's sole risk, and URS Corporations shall have no responsibility therefore. Please contact your Health and Safety Representative or Regional Health and Safety Manager if you have any questions.

1.1 General

URS Corporation has prepared this Health and Safety Plan for the Black Sand Beach Excavation Project (Project). The Black Sand Beach (BSB), as it is unofficially referred to, is located along the southeastern bank of the Upper Columbia River, just downstream from the United States Geological Survey (USGS) gauging station 12399510 (former Columbia River Auxiliary Gage at International Border) at approximate River Mile 743. The BSB may be further located as follows:

- Assessor Parcel Number (APN) 8000367
- Section 16, Township 40 N, Range 41 E
- Latitude 48°58'48" (48.98°), Longitude 117°38'53" (117.65°).

The purpose of the Project is to remove granulated slag that has accumulated over time within the upland portion of the BSB, where granulated slag is readily identifiable by visual means and accessible using conventional excavation equipment. The intent is to remove as much slag-containing materials in the upland BSB beach areas as possible, while not adversely impacting the adjacent river. No open-water dredging or sediment removal in the river will be conducted for the Project.

This Site Safety Plan (SSP) establishes procedures to help provide a work environment which will protect the health and safety of project personnel, residents, or off-site receptors during pre-construction, construction, and post construction activities occurring in Phase 2 of the Black Sand Beach Excavation Project. A URS safety representative shall review the safety programs of every subcontractor to assure compliance with protocols and procedures set forth in this SSP. In the event that tasks arise that have not been addressed, they will be reviewed and evaluated and safe-operating procedures will be attached to this SSP prior to starting said task.

URS and Teck have high expectations for safety. Any employee on the site has the right to refuse unsafe work and stop work if it is unsafe. URS's safety policy and Teck's expectations are the basis for the program on this site.

1.1.1 URS Health, Safety and Environmental Policy

URS is committed to business practices, operations, and projects that protect people and the environment.

The basis for health, safety, and environmental programs is that accidents causing injuries or illness to personnel or impact on the environment are preventable. It is everyone's obligation to prevent accidents, and all personnel are expected to conduct business in a manner that actively integrates the elements of the URS Health and Safety Program into applicable aspects of URS operations.

The goal of the URS Health and Safety Program is zero accidents; therefore, accident prevention continues to be of paramount importance to the firm. To this end, safety takes precedence over expediency.

URS is committed to compliance with all client health, safety, and environmental requirements as well as to applicable laws and regulations.

URS has established procedures that provide direction on health and safety matters to all employees. These procedures are periodically evaluated in light of current case law, new regulations, and emerging industry practices.

Each manager/supervisor has the responsibility through personal example to create a climate in which everyone shares a concern for his own safety and the safety of his fellow workers.

1.1.2 Teck's Expectations

1. Report to work physically rested and mentally alert.
2. Observe and coach your co-workers to ensure that they work safely.
3. Do not improvise or take short cuts – follow procedures.
4. There is zero tolerance for willful unsafe actions.
5. **Stop all unsafe work.**

1.2 Project Background

Granulated slag from historic smelter discharges from Teck Cominco's Trail, British Columbia operations have accumulated on the BSB. Based on visual observations (the granulated slag materials are easily identifiable by its characteristic black, sand-like, appearance) and a survey performed in 2009, the majority of granulated slag at the BSB is located at the downstream beach, followed by the upstream beach, and to a much lesser extent at the middle beach and top of the rock outcroppings.

Visual estimates suggest that sand-size materials at the upstream and downstream sections of the BSB may contain as much as 70 to 80 percent by volume of granulated slag (Ecology 2008). Based on visual observations, very little (less than 1-percent) river gravel and cobbles are present in the upstream and downstream beaches; the vast majority of materials in these two areas appear to be uniform sand-sized particles. Visual estimates suggest that the slag-containing materials at the middle beach may contain trace amounts (no visible granulated slag) to up to 20 to 30 percent by volume granular slag dispersed with gravel and cobble sized indigenous rocks.

Based on survey data collected in 2009, the estimated quantity of granulated slag materials at the BSB is approximately 4,600 to 5,000 cubic yards, with an estimated 4,200 cubic yards at the downstream beach and 400 cubic yards at the upstream beach, with the remainder on the middle beach or located on top of the rock outcroppings. The maximum depth of granulated slag at the downstream beach is approximately 13 feet. The estimated depth of the slag in the upland portions of the middle and upstream beaches are generally between 0 and 4 feet thick. The granulated slag appears to be generally above the water line in the middle and upstream sections of the beach and below the low water line at the downstream beach.

1.3 Scope of Work

The objectives of the Project are as follows:

- Remove the majority of granulated slag deposits that have accumulated in the upland portion of the Black Sand Beach, where granulated slag is readily visually identifiable and accessible using conventional excavation equipment (e.g., excavator, loader, and vacuum truck);
- Establish final grades in the affected work area following excavation of the granulated slag to allow continued beach access and function to the public, while minimizing future erosion problems;
- Maintain and promote positive stakeholder relationships by actively supporting and participating in the public participation process as requested by Ecology and the cultural awareness process with Ecology guiding coordination;
- Secure all necessary permits and approvals during 2009 and early 2010 so that the construction phase of the Project can be initiated no later than September 2010 when the water level is low in the river. Permitting and approvals will be dependant on several outside agency's review schedules.

Phase 2 site work at the Black Sand Beach Excavation Project site will include the following principle activities:

- Site preparation;

- Erosion and sediment control and stormwater management;
- Excavation, temporary stockpile, load-out, transportation and disposal;
- Import of "clean" backfill, backfill placement, and final grading;
- Close-out (final inspections, demobilization, final survey and report)

1.3.1 Site Preparation

Site preparation includes the following activities:

- Verify required permits, approvals, and access agreements are obtained;
- Perform a subsurface utility survey and notify One Call Services of intrusive work;
- Perform pre-construction survey, including stake-out of the designated work area;
- Make minor repairs to access road (i.e., filling in ruts with imported rock) to allow truck access to BSB;
- Conduct pre-construction meeting with Ecology, Contractors, Engineer, and inspectors;
- Install temporary construction fencing and signage to restrict access to the BSB during construction; and
- Mobilize equipment and contractor personnel to the site, and setup equipment staging area, decontamination/support zone, and temporary facilities (e.g., portable restrooms, first aid/eye wash station, and personnel/equipment tents).

1.3.2 Erosion and Sediment Control and Stormwater Pollution Preventions Measures

Erosion and sediment control and stormwater pollution control measures will be undertaken to ensure compliance with applicable water quality standards in the adjacent river and applicable Construction Stormwater permit requirements. Erosion and sediment control measures will employ a two tier approach to ensure adequate protection of the river during construction.

The first tier measures will include the installation of a temporary silt fence along the shoreline. These silt fence will block materials in the upland area from "sluffing" into the river during excavation. As a permanent measure, a rock curtain/ribbon will be placed along the low water line of the river to facilitate capping of upland deposits below the water line from re-entering the river.

The second tier erosion and sediment control measure will include the installation of a turbidity curtain several feet (5 to 10 feet) into the river. The turbidity curtain will serve to contain localized sediment laden water, if any, to the immediate vicinity of the river. The turbidity

curtain will be installed as an additional precautionary to prevent the uncontrolled release of sediment laden water into the river.

Excavated granulated slag will be temporarily stockpiled at the BSB pending load-out and truck-transport of the granulated slag materials to the Teck facility in Trail, British Columbia, where it will be managed similar to other slag materials at this facility.

A temporary erosion and sediment control plan will be prepared for the Project and approved by Ecology.

1.3.3 Excavation, Temporary Stockpile, Load-Out, Transportation and Disposal

An estimated 5,000 cubic yards of granulated slag materials will be excavated from the BSB.

Excavation and load-out of the granulated slag materials at the upstream, downstream, and middle beach will be performed using conventional excavation equipment, including excavators loaders, and dump trucks. Removal of granulated slag at the top of the outcropping will be performed using a vacuum truck and/or by sweeping. Placement of the backfill material will start before the entire area is excavated to minimize the size of the open excavation. Approval from Ecology will be obtained prior to the placement of any backfill material.

In some cases, excavation of the granulated slag materials will be below the low water line, particularly at the downstream beach where the granulated slag is deepest and most prevalent. Underground water will accumulate (pond) at the bottom of the excavation if below the water line. Excavation of granulated slag materials below the accumulated water within the excavation of the upland portions of the BSB will be conducted to the extent practical, without dewatering. The saturated slag-containing materials will be placed on the upland side of a temporary berm that will be installed adjacent to the excavation such that the water drained from these materials will flow back into the excavation. Based on a "field" determination, plastic sheeting may be installed along the upland side of the berm, as necessary, to mitigate runoff in the affected area.

The excavated granulated slag materials will be temporarily stockpiled in the vicinity of the excavation, pending load-out and off-site transportation. Visual monitoring will be conducted in the immediate area of the excavation and at the entrance/exit of the access road to assess the presence or absence of excessive dust that may be generated from land disturbing activities. The visual observations will be supplemented with periodic dust measurements using a portable hand-held dust monitoring instrument.. Dust control measures, if required, will include wetting the affected area with water. The source of the water will either be the river or a potable water supply (e.g., local fire hydrant), as approved by Ecology.

The stockpiles will be covered with plastic sheeting when not active (e.g., overnight, non-work days, or periods of inactivity greater than about 4 hours) to minimize potential runoff during storm events or potential wind blow dust from the lighter materials (note: granulated slag is relatively heavy and is not anticipated to be a dust nuisance). The stockpiles will be inspected at least daily during working hours or at a period not to exceed 48 hours during non-working days.

Results of the inspections will be documented in the field log. Records shall include, at a minimum, the date and time of the inspection, weather, stockpile location, and a description of any deficiencies noted and corrective actions taken.

The excavated granulated slag materials will be loaded into dump trucks for transportation and disposal at the Teck facility in Trail, British Columbia. Screening on the sand-sized particles that contain the granulated slag from larger cobbles and gravels may be performed in the middle beach area if necessary to consolidate the granulated slag before load-out. No screening is anticipated to be required for the upstream and downstream portions of the BSB, since the majority of materials are uniform sand-size materials. Non-granulated slag materials, such as rocks, cobbles, and gravel that are separated from the granulated slag may be reused at the BSB. Prior to leaving the designated area of the BSB, each truck will be inspected to ensure that there are no loose materials on the tailgate or other areas of the truck; that the tires are clean and will not track dirt or mud; and that the appropriate paperwork is in place for transportation. Truck drivers will only be allowed to exit the truck in designated areas out of the immediate work zone for safety reasons.

The exit from the access road does not allow a safe left hand turn from the BSB to Northport-Waneta Road towards Canada. Therefore, the trucks exiting the BSB will be required to make a right hand turn from the exit and then turn around at a nearby location alongside the Northport-Waneta Road. Similarly, trucks will be restricted from entering the BSB access road by making a left hand turn from Northport-Waneta road. Appropriate signage along the Northport-Waneta road and flaggers will be used as appropriate to ensure safe conditions at the entrance/exit location and truck turn-around area.

As a contingency measure, Teck will make use of its existing spill response team from their facility in Trail British, Columbia to respond in the unlikely event of a spill of granulated slag during transport. The spill response team is able to be deployed on either site of the border in the event of an accident that requires their services.

1.3.4 Import of "Clean" Backfill, Backfill Placement, and Final Grading

Upon approval from Ecology, the affected portions of the BSB will be backfilled with imported cobbles, gravel, or sand in accordance with an approved grading plan. The estimated volumes of cut and fill materials for each area of the BSB is presented below.

Table 1-1
Estimated Cut and Fill Volumes for Black Sand Beach Excavation Project

Area	Area (SF)	Cut (Cu. Yd)	Fill (Cu. Yd.)
Downstream Beach	18,510	4,100	3,900
Upstream Beach	9,850	400	210
Middle Beach	5,940	150	150
Rock Outcropping	8,280	10	0
Total	42,580	4,660	4,120

The source of the fill material will be disclosed to Ecology by Teck once its source has been confirmed. Additionally, Teck will provide Ecology with other relevant specifications of the fill materials, including representative analytical results for metals analysis and confirmation that the materials do not contain invasive plant species. If "clean" certifications are not available from the supplier of the fill material, then up to 10 samples of the backfill materials will be tested for total metals (see Table 2) via ICP-MS (Method EPA 200.8).

The backfill and restoration of the beach will include the placement of a ribbon/apron of cobble and/or gravel to facilitate capping and containment along the edge of the low-water line shoreline fringe, as shown on Sheet 4 of the 30-percent engineering plans.

1.3.5 Project Close-out

Project close-out activities include:

- Conducting final inspection with Ecology;
- Conducting a final topographic survey to document "as-built" final grade elevations;
- Preparing a project completion report, including submittal of a Post Excavation Performance Monitoring Plan;
- Preparing and submitting final photo-documentation log; and
- Preparing and submitting 100-percent record drawings.

Completion of these activities and submittal of the final deliverables identified above will be provided in a Project Close-out Report. At a minimum, this report will include:

- Results of the final inspection, including a brief description of any problems discovered during the final inspection and the resolution of those problems, as necessary;

- A detailed description of work conducted in accordance with the Work Plan and engineering plans, and certification by a Washington State-Registered Professional Engineer that the work was performed in accordance with approved plans and specifications;

- Explanation of any modifications to the plans and specifications and why these modifications were necessary;

- Final 100-percent as-built record drawings, if different from final design drawings previously submitted to Ecology. The record drawings, including an as-built topographical survey map prepared by a licensed surveyor.

- Photo-documentation of the work area during performance of the excavation work and following completion of the construction activities;

- Copy of final permits and transportation manifests for each truck load;

- Information on source of any fill material, including location, description of material, and certification or analytical results of chemical composition of metals and invasive plant species.

2.0 Project Organization And Responsibilities

2.1 General

All on-site personnel will be responsible for complying with the requirements of this SSP. The Project Manager (PM) and the Construction Manager (CM) will be responsible for implementing the SSP and ensuring that its requirements are enforced. Managers will be assisted in this effort by URS health and safety staff.

2.2 Project Manager

The Project Manager (PM) will be responsible for the direction, implementation, and enforcement of the health and safety requirements. Responsibilities of the PM will include:

- Provide project information for the development of the SSP, and ensure that the SSP is prepared and approved.
- Verify the project is performed in a manner consistent with State of Washington Department of Labor & Industry (L&I) and URS standards.
- Monitor compliance with the SSP by URS and contractor personnel.
- Ensure adequate resources are provided to the health and safety staff so that they may carry out their duties.
- Maintain communication with the client.
- Have the authority to determine personnel assignments on this project.
- Have the authority to stop field activities if an imminently dangerous situation exists. The emergency situation will be reviewed immediately with the CM, and Environment Manager (HSEM), and the Site Safety Officer (SSO).
- Responsible for reporting all incidents, including near misses, to the Teck Site Manager within 24 hours.
- Effectively manage change conditions in the field.
- Conduct regular safety observations.

2.3 Construction Manager

The Construction Manager (CM) will be responsible for the daily implementation and enforcement of the SSP, including the following responsibilities:

- Ensure site activities are performed in a manner consistent with the SSP.
- Report health and safety deficiencies to the PM and the SSO, and include a corrective action implementation schedule.
- Ensure site activities are scheduled with adequate personnel and equipment resources to perform scheduled activities safely.
- Ensure adequate communication between work crew personnel and emergency response personnel is available.
- Authorizing a stoppage of field activities if an imminently dangerous situation exists. The emergency situation will be reviewed immediately with the SSO, PM, and the HSEM.
- Maintain communication with work crew and contractors.
- Effectively manage change conditions in the field.
- Conduct regular safety observations.

2.4 Site Safety Officer

The Site Safety Officer (SSO) will have the following responsibilities:

- Maintain safety and air monitoring equipment on-site.
- Perform personal and environmental air monitoring.
- Inspect ongoing site activities, ensuring compliance with the SSP, and reporting any health or safety deficiencies to the PM or CM.
- Interface with the HSEM about on-site implementation of the SSP.
- Report all accidents, incidents, and near misses to the PM and CM.
- Accompany the contractor work crew when working on-site.

- Authorize a stoppage of field activities if an imminently dangerous situation exists. The emergency situation will be reviewed immediately with the CM, PM, and HSEM.
- Conduct personal and perimeter air monitoring in conjunction with the performance of intrusive activities and adjust the level of personal protective equipment as required based on the results.
- Provide emergency care, including first aid and CPR, in cases of injury or illness.
- Ensure proper decontamination procedures are in place.
- Maintain site records for project personnel.
- Effectively manage change conditions in the field
- Conduct regular safety observations

2.5 Safety Operations Manager

The Safety Observation Manager (SOM) will have the following responsibilities

- Provide site safety leadership and audit performance
- Have demonstrated familiarity with the safety program
- Oversee tasks performed by workers
- Stop activities if unsafe conditions exist
- Recognize change (task, staffing, tools, conditions
- Evaluate PPE, tools, equipment
- Evaluate worker pace, ability, and attitude
- Report to SSO and Construction Manager and participate in resolving identified safety concerns and issues

2.6 Health, Safety, and Environment Manager

The URS Health, Safety and Environment Manager (HSEM) is a Certified Industrial Hygienist (CIH) with experience in construction and remediation projects. The HSE Manager will have the following responsibilities:

- Interface with the PM and the SSO about project health and safety-related issues.
- Approve the SSP and any amendments to the SSP.
- Approve revised or new health and safety protocols for site activities.
- Monitor compliance with the SSP.
- Conduct regular health and safety audits during on going site activities, as needed or requested.
- Determine and implement personnel disciplinary actions for safety violations.
- Approve the appointment of the SSO and any replacement SSOs.
- Stop site activities if an imminently dangerous situation exists.
- Remove personnel from the project if their actions endanger their health and safety, or the health and safety of their co-workers. The emergency situation will be reviewed immediately with the PM and SSO.

2.7 Work Crew

The work crew team members will have the following responsibilities:

- Immediately report any unsafe or potentially hazardous conditions to the SSO.
- Report all incidents, accidents, and near misses, no matter how minor they may seem, immediately to the SSO.
- Retain knowledge of information, instructions, and emergency response procedures contained in this SSP.
- Comply with the requirements and procedures set forth in this SSP, and with any future amendments.
- Work safely. Every day on every task.

- Perform only the tasks for which a Job Safety Analysis (JSA) has been prepared, reviewed, and signed by team members.
- Workers have a stop work responsibility to take immediate action to STOP work in cases of IDLH or imminent danger to fellow workers or public-at-large.
- Effectively manage change conditions in the field.
- Conduct regular safety observations.

3.0 OSHA Medical Surveillance and Training Requirements

3.1 Medical Surveillance Requirements

3.1.1 General Medical Surveillance Requirements

All personnel who will be performing work in the exclusion zone (EZ), contamination reduction zone (CRZ), or any other area where potential exposure to contaminants of concern exist must comply with medical surveillance requirements outlined in the Washington State Department of Labor & Industries (L&I) Washington Administrative Code (WAC) 196-843-210 and URS Safety Management Standard (SMS) 24 (*Medical Screening and Surveillance*)

URS medical surveillance requirements meet OSHA and WISHA standards. The medical consultant completing the surveillance must offer an opinion as to the employee's ability to perform the work. The general requirements of the URS Medical Surveillance Program are outlined in URS SMS Form 24-3. The PM and SSO will verify that all site personnel meet applicable WISHA medical surveillance requirements. This shall include all personnel initially assigned to the project, as well as any staff member added after the project start. Personnel terminating employment must be offered an exit examination if they have not received an exam in the previous six months. During any work activities classified as non-HAZWOPER, the medical surveillance may be waived.

3.1.2 Site-Specific Medical Surveillance Requirements

Federal and state regulations for work on hazardous waste (HAZWOPER) sites stipulate a medical surveillance program, including medical examinations, consultations and procedures at a scheduled frequency which are performed or supervised by a licensed physician and without cost to employees (including mileage, gas, bus fare and time spent outside normal work hours). The most likely exposure on this site is to granulated slag. Regulatory limits for Washington State are listed in WAC 296-841 (Respiratory Hazards) and are referred to as Permissible Exposure Limits (PELs), Short-term Exposure Limits (STEL), and Ceiling (C) values.

Beyond the general requirement for HAZWOPER surveillance, the need for substance-specific medical monitoring will be evaluated, but is not anticipated.

It is not anticipated that respiratory protection will be used on this project. Medical concerns with respect to respiratory protection are covered in the HAZWOPER occupational health exam, and the medical clearance letter states if the employee is cleared to wear a respirator. Should respirators become necessary, fit testing and training will be required.

Noise

When noise levels in the employee's work environment equal or exceed an 8-hour time-weighted average of 85 decibels as measured on the A-scale (dBA), annual audiograms will be performed. For URS employees involved in construction activities or management of construction, enrollment in this program will be required if more than 50% of their time is spent in an active construction area.

Heat Stress

Washington State implemented a new regulation for Outdoor Heat Exposure in 2008, which includes air temperature monitoring between May 1st and September 30th, personnel training, and self-monitoring for signs and symptoms of heat stress. URS Safety Management Standard (SMS) 18 requires medical monitoring when chemical protective clothing is worn above 70° F., or above 90° F when normal single layer clothing is worn. This monitoring includes air temperature, body temperature and pulse rate. Action levels for modifying the work-rest cycle are based on these monitoring parameters and are specified in SMS 18 (Attachment A).

Radiation

No exposure to radiation is anticipated during this Project.

3.1.3 URS Medical Consultant

The HSEM, in consultation with the URS Medical Consultant (MC), will administer the medical surveillance program for the Black Sand Beach Excavation Project. The URS MC is Dr. Peter Greaney of WorkCare. The MC will be available for consultation, particularly when questions arise regarding program applicability, additional testing measures, and frequency of examinations. The MC may also confer with local emergency medical facilities as part of the URS Emergency Physician Access Plan. The Emergency Physician Access Plan is designed specifically to obtain the MC's expertise during emergencies related to site work. Both URS employees and local emergency facilities can access the MC using this Plan (Table 10-2, Section 10.0).

3.1.4 Contractor Medical Surveillance Requirements

Contractor personnel performing work in the Exclusion Zone (EZ) or Contaminant Reduction Zone (CRZ) must participate in a medical surveillance program that meets or exceeds the requirements of OSHA/WISHA and this plan. At the time of job assignment, all Contractor site workers must have received a medical surveillance examination in accordance with WAC 296-843-210 at the frequency outlined in Table 4 of that standard. All workers will have had a medical exam within the last 24 months or more frequently. A copy of each Contractor site worker's most recent medical clearance form must be sent to the SSO for review prior to the start of site work and after subsequent medical clearances during the length of the project.

3.1.5 Medical Surveillance Documentation

A copy of each employee's current medical surveillance clearance letter will be kept in the site health and safety files. The clearance letter is a signed document which states that the employee is qualified to work on a hazardous waste site, whether they are capable of wearing respiratory protection (in accordance with 29 CFR 1910.120[f] and WAC 296-843-120) and includes any medical restrictions. Documentation regarding substance-specific medical surveillance, as well as personal and general monitoring for airborne contaminants, noise, radiation and temperature will be maintained as required. Employee notification of exposure results will also be documented.

3.1.6 Accident/Incident Medical Surveillance

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled and encouraged to seek medical attention. All accidents and potential exposures must be reported immediately to the SSO or Construction Manager, who will arrange for the appropriate medical attention. Depending on the type of exposure, it may be critical to perform tests within 24 to 48 hours. The MC will advise the HSEM or SSO on the type(s) of test(s) required to accurately assess exposure effects. See Section 11.4 for time-critical accident/incident reporting guidelines. L&I must be notified within 8 hours of any hospitalization. Within 24 hours of an incident, URS will complete a copy of the URS *Incident/Near Miss Report Form* (URS SMS 49-1).

3.1.7 Drug Free Workplace Policy

URS is committed to a work environment free of substance abuse. URS employees must, as a condition of employment, abide by the terms of the URS Substance Abuse policy. The Company reserves the right to test employees based on reasonable suspicion that the employee may be drug-involved; following workplace accidents or unsafe practices; or as a follow-up procedure when the employee has previously tested positive for drug use or has completed a drug rehabilitation or counseling program.

In addition, URS and Subcontractors will meet Teck's drug testing requirements while performing work on this jobsite. All personnel who enter the premises or perform work on the site will enroll and remain an active participant in a drug testing program which includes initial and random substance and alcohol testing. As a condition of remaining on the jobsite, personnel must consent to searches of vehicles, lockers, desks etc. at the discretion of Teck.

Personnel must obtain the information necessary to determine whether the use of any prescribed or over-the-counter medications may negatively affect their work performance or the ability to perform their job safely.

3.1.8 Fitness for Duty Policy

URS is committed to providing a safe workplace for its employees, clients and others. In order to provide a safe work environment, employees must be fit for work, be able to perform their job duties in a safe, secure, productive, and effective manner, and remain able to do so throughout the entire time they are working. Fit for duty means an individual is in a state (physical, mental, and emotional) that enables them to perform assignments competently and in a manner that does not threaten the health and safety of themselves or others. Fitness for duty expectations can vary with specific job tasks, location and regulatory requirements. Fitness for duty may be affected by significant fatigue, stress, emotional problems, illness, injury, or the effects of drugs and alcohol. Employees who are not fit for duty may present a safety hazard to themselves, to other employees, to the Company, or to the public.

The decision to request a fitness for duty examination (and repeat examinations as necessary) can be made by URS Operations, Health & Safety and Human Resources. The decision will be based on the need to protect the employee and coworkers when there is concern about an employee's ability to perform his or her job safely, based on the observations of a supervisor, manager, or medical personnel. Should URS require a fitness for duty examination, it shall be performed at no expense to the employee and will be performed by an occupational specialist, physician or other medical specialist designated by the Company or Employee Assistance Program (EAP). Employees awaiting a fitness for duty examination may be temporarily relieved of any work duties or may have their work duties modified.

3.2 Training Requirements

3.2.1 General Health and Safety Training

URS believes that improvements to safety performance can be seen through having all workers complete meaningful safety training prior to starting work; and selecting workers with a higher threshold of safety awareness. Therefore, URS developed two key processes to help enhance safety management: the **Site Safety Resourcing (SSR) Process** and the **Subcontractor On-Boarding (On-Boarding) Process**. The SSR Program and On-Boarding process will be utilized by URS for the Black Sand Beach Excavation Project.

All URS and Contractor personnel who will be performing work in an EZ or CRZ at the project site must comply with the training requirements outlined in WAC 296-843-200, OSHA 29 CFR 1910.120(e) and URS SMS 17 (*Hazardous Waste Operations*). The SSO will verify and document that all site personnel meet the applicable L&I training requirements prior to the start of site work. This shall include all personnel initially assigned to the project, as well as any staff member added after the project start who intends to perform work on site. For any work activities classified as non-HAZWOPER, the aforementioned training requirements may be waived. In addition, all site personnel will participate in mandatory site safety resourcing (SSR)

screening in order to assess each worker's safety knowledge. Table 3-1 summarizes the training requirements.

3.2.2 40-Hour Initial Training

All employees must have received, at the time of project assignment, a minimum of 40 hours of initial health and safety training for hazardous waste site operations. Personnel who have not met the requirements for initial training will not be permitted in the EZ or CRZ. A copy of each Contractor site worker's 40-hour training certificate must be sent to the PM for review prior to the start of site work.

In conjunction with 40 hours of initial training, each employee will receive 3 days of directly supervised on-the-job training. This training will address the duties the employee is expected to perform. URS recognizes that there may be site personnel who fall under WISHA's 24-hour training program (e.g. truck operators who do not get out of their trucks), and any decision regarding the applicability of this training will be made by the HSEM.

3.2.3 8-Hour Annual Refresher Training

An 8-hour refresher training course will be taken at a minimum of once per year after the completion of the initial 40 hours of training. At the time of job assignment, all site workers must have received 8 hours of refresher training within the past year. This course is required of all field personnel to maintain their qualification for hazardous waste site work. A copy of each site worker's most recent 8-hour training certificate must be sent to the PM for review prior to the start of site work and must be updated as necessary during the length of the project.

Table 3-1
Training and Medical Requirements for Phase 2 Black Sand Beach Excavation Project

Requirement	All Employees Who Do Field Work at BSB Site	Supervisors (anyone directing other employees) and Safety Officers	Visitors Who Will Enter EZ/CRZ
HAZWOPER 40/24-hr and current 8-hr Refresher	X	X	X
Current Medical Clearance and SAT Program	X	X	X
HAZWOPER 8-hr Supervisor Training		X	
Safety Leadership Training	X[1]	X[1]	
Vehicle Safety Training	X[2]	X[2]	X[2]
First Aid Training		X[3]	
Employee Interview	X		

1) For URS employees and subcontractors who will spend more than 30 consecutive days on the site, *Safety Leadership Training* is required (about 3 hrs).
2) Applicable for employees required to drive as part of the project.
3) On-site supervisors only

Table 3-1 (Continued)
Training and Medical Requirements for Phase 2 Black Sand Beach Excavation Project

Notes: EZ/CRZ – Exclusion Zone/Contamination Reduction Zone
HAZWOPER – Hazardous Waste Operations and Emergency Response
SAT – Substance Abuse Testing

3.2.4 Supervisory Training

In accordance with WAC 296-843-20015 and OSHA 29 CFR 1910.120(e)(3), all on-site management and supervisors directly responsible for site workers, or who supervise employees engaged in hazardous waste operations, will have received training as required by Section 3.2.2 of this SSP. Additionally, all personnel who supervise one or more employees will have received at least eight hours of specialized training on supervising hazardous waste operations prior to the job assignment.

3.2.5 Safety Leadership Training (SLT)

For URS employees and Subcontractors who will spend more than 30-days on the site, ***Safety Leadership Training*** is required. This training is approximately 1.5 hours and may be provided by the SSO, or alternatively by the HSEM. The objective of this training is to define how best to implement onsite safety practices and procedures to create a stronger onsite safety culture will be presented. Key training objectives include:

- Safety Leadership
- Behavior Based Safety Culture
  - TRIR/EMR
  - Safety Programs/Culture
  - Safety Awareness (Mindfulness)
- Safety Systems Implementation
  - HASP/JSA/Briefings
  - Near Miss reporting and investigations
  - Safety Observations
    - -- Level I
    - -- Level II
- Compliance Audits
- Communication and Intervention
  - Recognizing Positive
  - Addressing Negative

- Discipline
- Stop Work
  - Authority
  - Corrective Actions to Resume
  - Documentation

3.2.6 Site Safety Briefing

The SSO, CM, PM, or site superintendents will present daily site safety briefings (i.e., daily tailgate meetings) to project personnel. The purpose of the briefings is to assist personnel in safely conducting the scheduled work activities. The briefings shall include weather-related information, instructions for new operations to be conducted, a review of JSAs, and/or safe work practices. The briefings will also provide an opportunity to identify safety-related performance deficiencies noted during previous days activities or during a safety audit. Attachment 55-2 to URS SMS 55 (***Health and Safety Training***, Attachment A) or equivalent shall be used to record the topics covered and attendance of project staff.

3.2.7 Visitor Training

Visitors must immediately report to the site office for admittance. Visitors who intend to visit the EZ or CRZ must present documentation specified previously in this Section. The SSO will provide site-specific safety training and review current site activities at the project. Visitors entering areas of activity will be required to comply with the provisions of this SSP and any other provision/instruction required in the work area.

3.2.8 First Aid and Cardiopulmonary Resuscitation (CPR) Training

Per WAC 296-155-120, each employer must have available a person or persons holding a valid first-aid certificate. All crew leaders, supervisors or persons in direct charge of one or more employees must have a valid first-aid certificate. The SSO shall also maintain certification for first aid and CPR. At least one individual trained in first aid and CPR shall be available during site activities. First aid and CPR training will be consistent with the requirements of the American Red Cross, National Safety Council, or other nationally recognized organizations. Any person who maintains first aid and CPR training, will have additionally been trained in exposure to bloodborne pathogens in accordance with WAC 296-823 (Bloodborne Pathogens).

3.2.9 Continuing Training

This training is intended to supplement safety leadership training and account for changes on site activities. The HSE Manager or SSO shall develop and implement this training. This training may have one or more of the three following objectives:

- Site related training due to new work, changed conditions or hazard assessments

- Training to further individuals along the path towards Site Safety Supervisor (S3C) Certification, or

- Individual training to improve implementation of site-related processes including JSA development, safety observations, checklist, or audit/assessment tools.

3.3 Certifications

Site Safety Supervisor Certification (S3C) is intended to recognize an individual's ability to perform at the highest levels of safety within the role that the employee is fulfilling. Examples of S3C candidates are PM's, SSO's, and Superintendents. URS' safety programs are intended to mentor and develop the safety skills of our subcontractors. Therefore, the S3C should also be a goal of any subcontractor supervisor/foreman, as well as the subcontractor HSE Manager. Individuals who have completed the S3C process will receive an appropriate and visible badge or sticker to easily identify himself or herself amongst project staff.

3.4 Safety On-Boarding

Safety On-Boarding has two components – the pre-qualification of subcontractor organizations; and the qualification and certification of individuals.

3.4.1 Prequalification

Prequalification of Subcontractor organizations shall be completed in accordance with SMS 46. This includes a review of the recordable incident rate, experience modification rate, OSHA or enforcement agency citations, insurance, and related information. The subcontractor's HSE program, their training programs and documentation, as well as OSHA citations reported on the OSHA web site will be reviewed. The intent is to ensure that the Company's safety performance is accurate and correct as presented by the subcontractor on SMS 46-1.

3.4.2 Site Safety Resourcing

Collectively called the Site Safety Resourcing program, the qualification of individuals requires a thorough assessment of the following categories: each individual's experience, training, safety attitude and leadership capabilities. This 15-30 minute interview process is scripted to standardize the process, and the individual is evaluated against standard descriptions per the SSR Form #2. Personnel that demonstrate the appropriate level of safety awareness will be approved to work on the site. Periodic reviews of an individual's performance in the four categories describe above are conducted at specified intervals. Once an individual has passed the records review, interview, an Authorization to Work (SSR form #4) is completed and entered in the individual's file.

3.4.3 Site Safety Supervisor Certification (S3C)

In addition, personnel who are highly capable will be certified as Site Safety Supervisors (S3Cs). This is a status that we will strive to attain for all URS personnel over time, and we will develop training and mentorship programs to bring personnel who are not at the advanced level up to Site Safety Supervisor status. Requirement for S3Cs include the following:

- Completed HAZWOPER: Basic 40-hour, Current Annual Refresher, 8-hour Supervisor
- Have more than one year of experience similar to the job that is to be performed.
- Complete the Basic Safety Training and passed an associated examination with a score of 80% or higher.
- Complete the Site Safety Training Orientation and passed an associated examination with a score of 100%.
- Have received the URS Safety Leadership Training and passed an associated examination with a score of 80% or higher.
- Laborers, Operators and Craft Personnel must demonstrate the ability to do the following:
  - Perform a Level I Safety Observation
  - Complete a Near Miss Report
  - Review and brief a JSA
  - State how the SSS would recognize and manage change
  - Complete a site audit
  - Describe when Stop Work authority will be exercised and the steps to recovery
- Supervisors, Foreman, Safety Observations Managers, Project Managers, and HSE Manager must demonstrate the ability to do the following:
  - Perform the tasks listed above for Laborers, Operators, and Craft Personnel
  - Perform a Level II Safety Observation
  - Develop and implement a JSA
  - Discuss the challenges in managing change in work assignment or change in the members of the work crew
  - Conduct a root cause investigation of a Near Miss Incident

- Conduct a Safety Briefing for activity involving one or more JSAs
- Demonstrate the ability to train new employees in when Stop Work authority will be exercised and the steps to recovery

3.4.4 On-Boarding Requirements for Subcontractors and Vendors

Subcontractors and vendors are required to complete the On-Boarding process as follows:

Subcontractors and Vendors On Site For 5 Or Less Days

Prequalification
Basic Safety Training
Site Orientation Training
Records confirmation
100% Supervision by a URS SSO, S3C or designee.

Subcontractors On Site For > 5 Day, And < 30 Days In A Year

The above
Site Safety Resourcing with Authorization to Work

Subcontractors On Site > 30 Days In A Year

All of the above
Safety Leadership Training
S3C for Supervisor(s) consideration after 2 months on site.

4.0 Hazard Assessment

4.1 General

The potential hazards associated with the project activities at the Black Sand Beach Excavation Project may potentially include chemical, physical, or biological hazards. The hazards of the project have been evaluated using the URS' Safety Management Standard Checklist (Attachment A). This form has been used as a tool to conduct and document the hazard analysis process, and to identify the hazards that will be specific to the tasks at this project. The hazard assessment in this section is intended to communicate to personnel the hazards and risks associated with activities at the Black Sand Beach Excavation Project site. A task-specific Activity Hazard Analysis (AHA) will also be prepared for all work activities.

4.2 Chemical Hazards

Table 4-1 summarizes the historical maximum detected concentrations for antimony, arsenic, copper, iron, lead, manganese, and uranium in beach deposits along the Upper Columbia River, as identified in the Draft General Site Health and Safety Plan for the Remedial Investigation and Feasibility Study prepared by Integral Consulting Inc. and Parametrix (Integral 2007). This document includes data from slag samples collected over a wider area of the Upper Columbia River and not necessarily the Black Sand Beach. In addition, the table lists the properties of sample preservatives that may be used for the Project (i.e., nitric acid and hydrochloric acid) in the event that analytical samples are collected as part of the Project. Health and safety related information including chemical properties and OSHA's permissible exposure limit (PEL), short-term exposure limit (STEL), and immediately dangerous to life and health (IDLH) level, for these and other chemicals that may be present during field activities are also summarized in the table below.

Table 4-1
Chemical-Specific Information[a]

Chemical of Concern	Maximum Concentration[b]	Matrix	OSHA PEL	OSHA STEL (mg/m^3)	IDLH	Odor Threshold[c]	Carcinogen or Other Hazard
Acetone	Concentrated	Decon.	250 ppm	--	2,500 ppm	Fragrant, mint-like odor	F
Antimony	62.5 mg/kg	Sed.	0.5 mg/m^3	--	50 mg/m^3	--	
Arsenic (inorganic)	74.4 mg/kg	Sed.	0.01 mg/m^3	--	5 mg/m^3	Odorless	Ca, P
Copper	3,290	Sed.	1 mg/m^3	--	100 mg/m^3	Odorless	
Hydrochloric Acid	Concentrated	Pres., decon.	5 ppm (ceiling)	--	50 ppm	Pungent irritating odor	P,R, Cor
Iron[d]	266,000 mg/kg	Sed.	5 mg/m^3	--	100 mg/m^3	Odorless	
Lead	2,760 mg/kg	Sed.	0.05 mg/m^3	--	100 mg/m^3	Odorless	SCa, P
Manganese	4,920 mg/kg	Sed.	1 mg/m^3	5 (ceiling)	500 mg/m^3	--	
Nitric Acid	Concentrated	Pres., decon.	2 ppm	4 ppm	25 ppm	Acrid, suffocating odor	P, R, Cor
Uranium	127 mg/kg	Sed.	0.05 mg/m^3	--	10 mg/m^3	--	Ca

[a]Source: Draft General Site Health and Safety Plan for the Remedial Investigation and Feasibility Study (Integral 2007)
[b]Maximum concentrations reported for metals are based on EPA's 2005 beach sediment sampling results.
[c]Source: NIOSH pocket guide to chemical hazards (NIOSH 2004)
[d]OSHA exposure limits are for iron (Fe) present as oxide dust and fume

Notes:
-- - none established
Ca - carcinogen
Cor -corrosive
Decon. - decontamination
F - flammable
IDLH - immediately dangerous to life and health
mg/kg - milligrams per kilogram
mg/m^3 - milligrams per cubic meter
P - poison
Pres. - preservative
PEL - permissible exposure level
ppm - parts per million
R - reactive
SCa - suspected carcinogen
STEL - short-term exposure limit
Sed. - sediment

Table 4-2 summarizes the chemical characteristics and potential exposure routes.

Table 4-2|
Potential Chemical Exposure Routes

Potential Chemical Exposure Route	Likely	Possible	Unlikely
Inhalation		A	S, N, H
Ingestion		S, N, H, A	
Skin Contact		S. N, H, A	
Eye Contact		S. N, H, A	

Notes:
A - acetone; Stand upwind in a well ventilated area and use chemical resistant gloves and safety goggles when handling acetone. Keep acetone away from ignition sources at all times.
S - Site chemicals
N - nitric acid; Nitric acid is corrosive and reactive. Care should be taken to avoid skin contact. Wear neoprene gloves and safety goggles when handling nitric acid. Keep an eye wash and water nearby when using acids.
H - hydrochloric acid; Hydrochloric acid is corrosive and reactive. Care should be taken to avoid skin contact. Wear neoprene gloves and safety goggles when handling nitric acid. Keep an eye wash and water nearby when using acids.

Table 4-3 summarizes chemical characteristics for the various materials that may be encountered during the Project.

Table 4-3
Chemical Characteristics

	Yes	No
Corrosive	A, H, N	S
Ignitable	A, N, H	S
Reactive	A, H, N	S
Volatile	A	S, N, H
Radioactive		S, N, H, A
Explosive		S, N, H, A
Biological agent		S, N, H, A
Particulates or fibers		S, N, H, A

Notes:
A = acetone; Stand upwind in a well ventilated area and use chemically compatible gloves and safety goggles when handling acetone. Keep acetone away from ignition sources at all times.
S = Site chemical
N = nitric acid; Nitric acid is corrosive and reactive. Care should be taken to avoid skin contact. Wear neoprene gloves and safety goggles when handling nitric acid. Keep an eye wash bottle and water nearby when using acids
H = hydrochloric acid; Hydrochloric acid is corrosive and reactive. Care should be taken to avoid skin contact. Wear neoprene gloves and safety goggles when handling hydrochloric acid. Keep an eye wash bottle and water nearby when using acids

Hazard Communication for Chemicals Brought On-Site

If chemicals are used or brought on-site, a Material Safety Data Sheet (MSDS) must be supplied to the SSO for review prior to bringing the chemical on-site. As necessary, safe handling procedures and PPE will be specified via task-specific Activity Hazard Analysis or Job Safety Analysis. For further information, refer to Attachment A for URS SMS 2 (*Worker Right to Know - Hazard Communication).*

4.3 Physical Hazards

A variety of physical hazards may be present, but these hazards are similar to those associated with any construction project, and they are familiar to most experienced construction site workers. The following information generally summarizes the site physical hazards and associated requirements. As such, all site workers must be trained to recognize these hazards in the course of their work tasks and implement the appropriate measures.

4.3.1 Slipping/Tripping/Puncture Hazards

As with any construction project, uneven work surfaces and other slipping, tripping, or puncture hazards may be present. Working near water may exacerbate the slipping/tripping/puncture hazards present. As much as possible, site workers should avoid walking/working in wet/muddy areas. Steel-toe, sturdy work boots will be required for this project. Proper site housekeeping, removal of trash, and orderly stacking and removal of materials will reduce slipping and tripping hazards. Proper site housekeeping will be the responsibility of all site workers, and the SSO will make regular entries into the health and safety logbook at the end of each shift, indicating the work area is adequately clean and foot traffic routes are being maintained. Regular documented inspections will be completed using URS SMS 21 (*Housekeeping*, Attachment A).

4.3.2 Ladders

One-third of all worker deaths in construction are the result of falling from heights. Many falls occur because ladders are not placed or used safely. Ladder use will comply with WAC 296-876, OSHA 1926.1053 through 1926.1060 and URS SMS 28 (*Portable Ladders*).

Ladders will be inspected daily, prior to use, for damage or wear that renders them unsafe. Inspect all ladders to see that steps or rungs are tight and secure. Confirm that all hardware and fittings are properly and securely attached. Test movable parts to confirm that they operate without binding or without too much free play. Inspect metal and fiberglass ladders for bends, breaks and cracks. Wood ladders are unacceptable on this project. Defective or damaged ladders must be removed from service for said reasons and shall be clearly tagged as "OUT OF SERVICE", destroyed, or transported off-site for repairs.

4.3.3 Contact with Energized Sources

Lockout and tagout (LOTO) procedures shall be followed for all site tasks that involve exposure to uncontrolled sources of energy. Some energy sources to be protected against include:

Electric circuits
Fluid systems (water and liquid product)
Pneumatic systems
Flammable systems (including liquid and gaseous fuels)
Thermal systems (steam)
Gravity systems
Hazardous materials systems
Mechanical equipment maintenance

Utilities

During any site activities that involve work around live utilities, a potential exists for site workers, heavy equipment, or moving vehicles to contact energized sources. Additionally, site workers could come in contact with energized parts of machinery or power tools. Contact with energized sources may result in fire, explosion and/or electrocution. All work performed near electrical sources must be performed consistent with the WISHA electrical safety requirements found in WAC 296-155-426 through 462 (Part I - *Electrical Safety for Construction Work*), 29 CFR 1926 Subpart K and URS SMS 12 (*Electrical Safety*, Attachment A). A licensed electrician must perform any site work involving live electrical systems.

Equipment will not be permitted within a 10-foot radius of overhead power lines with nominal voltage of 50 kilovolts (kV) or less. For energy systems with nominal voltage greater than 50 kV, the distance required will be in accordance with URS SMS 34 (*Utility Clearances and Isolation*).

The CM and SSO will be responsible for identifying live utilities and energized machinery parts prior to the start of each task, and will ensure that live utilities and energized machinery are de-energized or barricaded. Identification of utilities will comply with URS SMS 34. Workers are not permitted to work near electrical power circuits unless the worker is protected against electric shock by de-energizing and grounding the circuit or by guarding or barricading the circuit and providing proper personal protective equipment. Lock-out/tag-out procedures will comply with WAC 296-803 (*Lockout/Tagout*), URS SMS 23 (*Lock-Out and Tag-Out Safety*) and 29 CFR 1910.147.

Powered Equipment

Control efforts for this hazard include requirements that all equipment and power tools used on-site be properly maintained, positioned, guarded, and operated by competent personnel. All electrical circuits and equipment must be installed by licensed electricians and grounded in accordance with the NEC regulations. Ground fault circuit interrupters (GFCIs) are required on

all 120-volt, single phase, 15- and 20-amp outlets in work areas that are not part of the permanent wiring of the building or structure. A GFCI is required when using an extension cord. GFCIs must be tested prior to initial use with a GFCI tester, and periodically thereafter. The frequency of inspection will be determined by the SSO.

Heavy-duty extension cords will be used; flat-type extension cords are not allowed. All extension cords must be the three-wire type, and designed for hard/extra hard usage. Electrical wire or cords passing through work areas must be protected from water and damage. Worn, frayed, or damaged cords and cables shall not be used. Walkways and workspaces will be kept clear of cords and cables to prevent a tripping hazard. Extension cords and cables may not be secured with staples, hung from nails, or otherwise temporarily secured.

In existing installations, changes in the circuit protection (in order to increase the load in excess of the load rating of the circuit wiring) are not allowed. All lamps used in temporary lighting will be protected from accidental contact and breakage via the use of lamp guards. Metal shell and paper-lined lamp holders are not permitted. Fixtures, lamp holders, lamps, receptacles, etc. are not permitted to have live parts (e.g., exposed circuits or wiring). Workers must not have wet hands nor shall they be standing in water while plugging/unplugging energized equipment. Plugs and receptacles will be kept out of water unless they are approved for submersion.

4.3.4 Noise

Noise is a potential hazard associated with the operation of heavy equipment, drilling equipment, power tools, pumps, or generators. As a general rule, site workers will be required to wear hearing protection when working on or near heavy equipment, drilling equipment, power tools, and generators. Noise control and hearing protection requirements will be implemented in accordance with WAC 296-817 and 29 CFR 1910.95. Refer to Attachment A, which includes URS SMS 26 (*Noise and Hearing Conservation*) for noise monitoring and site-specific hearing conservation program guidelines.

High noise operations will be evaluated by the SSO. This will include the evaluation of each job task using screening methods described in URS SMS 26. Where information indicates that an employee's noise exposure exceeds 85 decibels, the SSO will recommend controls to limit employee exposure. These controls may include engineering controls to limit the amount of noise generated by the equipment used on site, shielding/isolation, or the use of hearing protection in the form of plugs or muffs. All requirements will be specified on the AHA (Activity Hazard Analysis) and/or JSA for the task.

4.3.5 Hand and Power Tools

All hand and power tools will be maintained in a safe condition and in good repair. Hand and power tools will be used in accordance with WAC 296-807 (*Portable Power Tools*), 29 CFR 1926, Subpart I and URS SMS 16 (*Hand Tools and Portable Equipment*, Attachment A). Neither URS nor subcontractors will issue/use unsafe tools. All tools will be inspected by the operator before use to ensure safe operating condition prior to each use in accordance with the

manufacturer's instructions. Any tool that fails an inspection will be immediately removed from service and tagged with a "Do Not Use" sign, then destroyed or sent off-site for repair.

Workers using hand and power tools who are exposed to falling, flying, abrasive, or splashing hazards will be required to wear additional PPE. Section 7.0 provides detailed information on specific PPE ensembles, while AHAs provide detailed information on specific activity requirements (Section 5.0). Eye protection, including side-shields, must always be worn when working on-site. Additional eye and face protection, such as safety goggles or face shields, may also be required when working with specific hand and power tools. Workers using tools that may subject their hands to an injury, such as cuts, abrasions, punctures, or burns, will wear protective gloves. Loose/frayed clothes, dangling jewelry, or loose long hair will not be worn when working with power tools.

Electric power-operated tools will be double insulated or grounded, and equipped with an on/off switch. Switches are NOT to be locked in the on position, at any time during use. Electrical powered tools are not to be moved by their cord. Guards must be provided to protect the operator and other nearby workers from hazards such as nip points, rotating parts, flying chips, and sparks. All reciprocating, rotating, and moving parts of tools will be guarded if contact is possible. Removing machine guards is prohibited.

Open-bladed tools are prohibited from use. Cutting tools shall feature shielded blades or other safety design. Open-bladed tools include, but are not limited to:

- Leathermans
- Pocket knives
- Hunting knives
- Axes
- Mallards
- Hatchets
- Utility knives

4.3.6 Manual Lifting

Back injuries are among the most frequent occupational injuries reported by industrial workers. Using proper manual lifting techniques can reduce back injuries such as pulls and disc impairments. Leg muscles are stronger than back muscles, so workers should lift with their legs and not with their back. If the load is too heavy, then do not lift it alone. Lifting is always easier when performed with another person. Manual or mechanical assistance should always be used when it is available, and should be planned based on the load. The maximum weight of items to be lifted by hand is 40 lbs. Refer to URS SMS 069 (*Manual Materials Handling*) for further information.

4.3.7 Thermal Stress

Phase 2 work will be performed during both summer and fall months. Heat stress is a significant potential hazard during the warmer months. The SSO shall implement the provisions stated in URS SMS 018 (*Heat Stress*, Attachment A) which provides detailed information about symptoms, monitoring procedures, prevention, and first aid procedures for heat stress-related illnesses. Heat stress controls will be implemented at 70 °F for workers in chemical protective clothing and 90 °F for workers wearing normal work clothes.

Due to the temperate conditions in Stevens County during the anticipated construction schedule, it is unlikely that local weather conditions will produce an environment that will require restricted work schedules in order to protect employees. The SSO will be observing workers for any potential symptoms of heat stress.

Adaptation of work schedules and training on recognition of heat stress conditions should help prevent heat-related illnesses from occurring. Heat stress prevention controls include:

- Allow workers to become acclimatized to the heat (3 to 6 days);
- Utilize an appropriate work/rest cycle;
- Provide shaded or air-conditioned break areas;
- Provide sun screen to prevent sun burn;
- Provide drinking water and electrolyte-replenishing fluids; and
- Monitor all workers wearing PPE for heat stress with temperature checks (oral or ear canal) in accordance with the URS SMS 018 when temperature dictates and document on SMS Form 18-2 (*Heat Stress Monitoring Record*).

Cold Stress

Cold stress is a danger at low temperatures and when the wind chill factor is low. Cold stress is generally described as a local cooling (frost nip, frostbite, and freezing) or a systemic cooling (hypothermia). URS shall refer to the provisions stated in URS SMS 059 (*Cold Stress*) for injury prevention, symptom identification, and first aid procedures.

Personnel working outdoors in temperatures at or below freezing may be subject to local cooling. Areas of the body that have a high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. The three categories of local cooling include:

- Frost nip, characterized by a blanching or whitening of the skin;

- Frostbite, in which the skin has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient; and

- Freezing, where skin tissue is cold, pale, and solid.

Frost nip and frostbite first aid includes covering the affected area with warmth and retreating to a warm area. Frozen tissue is a ***medical emergency*** and the victim must be transported to the hospital immediately.

General cooling (hypothermia) occurs when exposure to cold reduces body temperature. With prolonged exposure, the body becomes unable to maintain its proper internal temperature. Without treatment, hypothermia will lead to stupor, collapse, and death. The signs and symptoms of mild hypothermia include shivering, numbness, drowsiness, and poor judgment.

Prevention of cold stress is a function of whole body protection. Adequate insulated clothing will be provided to site workers when the air temperature drops below 40 °F. Reduced work periods may be necessary in extreme conditions to allow adequate rest periods in a warm area. Other cold stress prevention controls include:

- Changing clothes when work clothes become wet;

- Avoiding caffeine (which has diuretic and circulatory effects); and

- Suggesting workers drink warm, sweet drinks or soups to increase their caloric intake and reduce the possibility of cold weather dehydration.

4.3.8 Other Weather-Related Hazards

Other weather-related hazards include electrical storms, treacherous weather-related working conditions (e.g., slippery conditions, high winds, etc.), or limited visibility. These hazards correlate with the season in which site activities will occur. Outside work will be suspended during electrical storms. In the event of other adverse weather conditions, the SSO will determine if work can continue without endangering the health and safety of site workers.

4.3.9 Confined Space Entry

The activities currently scheduled at the Black Sand Beach Project are not anticipated to require confined space entry. The information below is provided in the unlikely event that confined space entry is required. A confined space is:

Large enough for personnel entry;
Has limited or restricted means for entry or exit; and
Is not designed for continuous human occupancy;

A permit-required confined space may present one or more potential hazards including hazardous atmospheres, fire/explosion, engulfment, entrapment, electrical, mechanical, or any other serious hazard.

Confined space entry procedures will be implemented in accordance with WAC 296-809 (*Confined Spaces*) 29 CFR 1910.146 and URS SMS 10 (*Confined Space Entry*). A confined space entry program includes:

Complete a URS Confined Space Permit and Procedures for Entry (SMS Form 10-1);
Confined space training for the entry supervisor, entrants, and attendants;
Additional PPE; and
Air monitoring.

Workers involved in confined space entry must be familiar with all hazards, equipment, procedures, and safeguards used during their entry task. Violations of confined space entry practices or procedures may be grounds for disciplinary action up to and including termination or removal from job site.

Excavation and Trenching

The site activities currently scheduled for the Black Sand Beach Excavation Project include the manipulation and shaping of soils, including excavation, backfilling, capping, and general grading. Excavations will be performed in accordance with WAC 296-155-650 through 66411 (Part N – *Excavation, Trenching, and Shoring*) 29 CFR 1926 Subpart P and URS SMS 13 (*Excavation Safety*, Attachment A) whenever personnel is required to enter the excavation. An excavation is any man-made cavity, depression, or penetration. Depending on its depth, width, and the presence of a hazardous atmosphere, an excavation may also be considered to be a confined space. Excavations are defined to include trenching. A trench is a narrow excavation in which the depth is greater than the width, and the width is not greater than 15 feet. Trenches excavated deeper than 4 feet are also considered to be a confined space.

Before starting any excavation, the possibility of the presence of underground pipelines, electric wires, conduits, or vessels containing material under pressure will be investigated using a private utility locate service and One Call. The PM or CM will contact appropriate state and/or local agencies and/or a private utility locate service prior to excavation activities to verify that no underground utilities will be disturbed or damaged. Communications with these agencies will be documented. All surface encumbrances that will create a hazard to workers will be removed or supported.

A "competent person" will be designated for all excavation work performed during this project that requires personnel to enter excavations. An individual meets the requirements of a "competent person" by having completed training in excavation safety contained in the OSHA 510 Construction Safety Training Course (or equivalent). The individual assigned to the role of competent person for this project will have extensive construction experience as well as the ability to identify soil types and the knowledge of required slopes. The competent person will

inspect excavations, adjacent areas, and protective systems (if needed) on the following schedule:

- Daily, before work in or around the excavation begins;
- After every rain storm or other hazard-increasing occurrence; and
- As needed throughout the work shift as conditions change.

If a hazardous condition is noted, all endangered entrants must be immediately removed from the excavation, and all work in the excavation stopped until the necessary corrective actions have been made. Workers are not permitted underneath loads handled by lifting or excavating equipment. Where required, the CM will ensure that flagging or barriers are set up at the excavation area to prevent anyone from falling into the excavation during non-working hours. Barriers will remain in place until the excavation has been backfilled. URS SMS 13 contains two excavation safety checklists that will be used during project activities: SMS Form 13-3 (*Excavation/Trenching Permit*), which is required to be posted at the excavation site and is good for one week, and SMS Form 13-4 (*Daily Excavation/Trench Inspection Report*) which must be completed daily by the competent person.

Heavy Equipment, Drilling Equipment, and Motor Vehicle Operation

Seat belt use is required during all vehicular and heavy equipment operation (passengers included). Only qualified personnel (as determined by documented experience and a practical evaluation of skills) will operate heavy equipment and motor vehicles. Equipment will not be operated in a manner that will endanger persons, property, or the environment. All heavy equipment, drilling equipment, pile driving equipment, and motor vehicles will be operated in accordance with the manufacturer's instructions, portions of WAC 296-255-600 through 630 (Part M – *Motor Vehicles, Mechanized Equipment and Marine Operations*) OSHA 29 CFR 1926 Subpart O, and URS SMS 19 (*Heavy Equipment Operations*, Attachment A). Operators are required to lower all extremities (buckets, attachments) and neutralize equipment whenever they are approached by a fellow team member onsite. The following inspection and repair controls will also be implemented during this project:

- Prior to starting work on a daily basis, all equipment and vehicles will be inspected by the operator using SMS 19-1 (*Daily Heavy Equipment Safety Inspection Checklist*). Records of tests and inspections will be maintained on-site by the SSO.

- Any unsafe/defective equipment or vehicles will be removed from the site or tagged with a "Do Not Operate" sign until repairs can be made.

- Equipment will be shut down and locked and tagged out before maintenance or repairs are permitted.

The following are additional project requirements that will be enforced on this site:

- Contractor shall operate vehicles and other mobile equipment within posted speed limits and only in areas necessary to perform work, and shall observe road blocks and caution signs.
- Contractor shall ensure that vehicles left running are only for the purposes of operating auxiliary equipment or lights, and then only when the driver can ensure the vehicle is secure with the transmission in park or neutral and the parking brake set. If on a slope, the wheels shall be chalked.
- Contractor shall ensure that vehicles will not be driven over unprotected hoses or exposed piping, or extension cords.
- No private vehicles will be allowed on site property (except in designated parking areas) unless prior written approval is obtained from the Engineer.
- Contractors shall enter and exit through the designated pathway.
- Keys to all unattended vehicles and equipment shall be easily accessible to contractor personnel so the vehicles and equipment can be moved as necessary.
- Upon notification of a release of flammable vapors, fire, or other immediate dangers, the contractor shall immediately shut down all sources of ignition under its control. No attempt to start or move vehicles in the area shall be made until all conditions are safe for re-entry.

Flammables, Combustibles, Oxidizers, and Compressed Gases

All flammable or combustible liquids and gases will be stored outdoors, in a well-ventilated area, and away from excessive heat or direct sunlight. Liquids will be stored within an appropriate cabinet or shed. Flammable or combustible liquids and gases will not be stored in areas used for exits, stairways, or aisles. Material that reacts with water will not be stored near flammable or combustible liquids or gases. All sources of ignition are prohibited in these storage areas, including smoking, cutting and welding, hot surfaces, open flames, sparks (static, electrical, and mechanical), and frictional heat.

Handling, storage, and use of flammable or combustible liquids and gases will be in compliance with WAC 296-24-330 (*Flammables and Combustibles*), 29 OSHA CFR 1926.152 and URS SMS 15 (*Flammable/Combustible Liquids and Gases*). URS personnel or the Contractor bringing flammable or combustible liquids or gases on site for use will supply the SSO an MSDS for review and approval prior to the use of the material. SMS Form 15-2 (*Flammable, Combustible, Oxidizer, and Compressed Gas Inspection Checklist*) will be completed by the SSO during the mobilization phase of the project, and then at least monthly thereafter.

Hot Work

No hot work is anticipated to be required for the Black Sand Beach Excavation Project. However, if required, hot work will be performed in accordance with WAC 296-155-25 through 280 (Part D - *Fire Protection and Prevention*), WAC 296-155-400 through 420 (Part H – *Welding and Cutting*), 29 CFR 1926.350 through 1926.354 and SMS 20 (*Hot Work*). Hot work includes oxygen-acetylene welding and cutting, arc welding and cutting, gas metal welding, flux-core welding, propane torches, grinding, blasting, brazing, or any other operation that has the potential to produces sparks.

URS Form 20-1 (*Hot Work Permit*) must be completed by the SSO prior to the start of the work. The SSO will conduct a safety briefing on hot work rules and procedures, and all hot work participants will sign the permit. Hot work will not be performed if there is a possibility of an explosive atmosphere or an oxygen-enriched atmosphere. The CM will designate a person for fire watch duty, who will have access to a properly rated fire extinguisher and will remain on-duty for one-half hour after the hot work is complete. All hot work equipment will be inspected daily, prior to use. If the equipment is found to be defective, it will be removed from the site, or tagged with a "Do Not Use" sign until it is repaired. All welding and cutting personnel will be trained in the safe operation of their equipment.

Fall Hazards

The site activities currently scheduled for the Black Sand Beach Project are not anticipated to include work at elevated locations during site activities. However, if required, OSHA-approved ladders may be used for access to elevated locations. Appropriate fall protection must be provided at unguarded locations greater than 4 feet and when working over dangerous operations. The selection of fall protection equipment will be made by a competent person, and will be based on the type of work being performed; the work environment; the weight, size, and shape of the user; the type and position of the anchorage; and the length of the lanyard. Competent person qualifications and all fall protection equipment will comply with WAC 296-155-245 through 24525 (Part C-1 – *Fall Restraint and Fall Arrest*), 29 CFR 1926.104 and 1926.105 and SMS 40 (*Fall Protection*).

The manufacturer's recommendations will be followed for fitting, using, adjusting, inspecting, testing, and caring for fall protection equipment. A copy of these recommendations will be maintained on-site. Before workers use fall arrest protection devices, they will receive training on the potential fall hazards, and on how to inspect, adjust, use, care, and limitations for the fall protection equipment in accordance with WAC 296-155-24510 and 29 CFR 1926.503. A competent person must conduct fall prevention training. Fall arrest protection must be inspected each day, prior to use, to determine if the device is in safe working condition. If the fall arrest protection equipment is found to be defective, it will be immediately removed from the site and either destroyed or tagged with a "Do Not Use" sign until repaired. Any fall arrest protection equipment actually used in a fall will be immediately removed from the site and discarded.

Lifelines will be secured above the point of operation to a support capable of holding a minimum dead weight of 5,400 pounds per person. Vertical and horizontal lifelines and lanyards will have a minimum tensile strength of 5,000 pounds. Self-retracting lifelines and lanyards must automatically limit the wearer's free fall distance to 2 feet or less, and have a minimum tensile strength of 3,000 pounds. Only one person is allowed per lifeline. The lifeline must be protected against being cut or abraded.

Body harness systems must decelerate and bring the wearer to a complete stop within 42 inches (3 ½ feet), excluding lifeline elongation. When stopping a fall, the body harness system may not produce an arresting force on the wearer of more than ten times the worker's weight, or 1,800 pounds (whichever is lower). The anchorage point for the lanyard should be located above the wearer's body harness attachment. The lanyard will be constructed of at least ½ inch nylon rope, or equivalent, with a maximum length to provide for a fall of no more than 6 feet.

All safety harnesses and lanyard hardware will be drop forged or pressed steel. Surfaces must be smooth and free of sharp edges and must be able to withhold a tensile load of 4,000 pounds without cracking, breaking, or becoming permanently deformed.

Illumination

Site activities will only be conducted during day light hours unless adequate lighting is available. Refer to 29 CFR 1910.120(m) for information on appropriate lighting requirements. Any lighting used will be weatherproof and safe for work in a wet environment.

Traffic Control/Flagging Safety

The Black Sand Beach Excavation Project will require workers to perform activities on and adjacent to active roadways. Due to the potential for collisions between persons and vehicles, all workers will be required to wear orange reflective safety vests. Refer to URS SMS 32 (*Work Zone Traffic Control*, Attachment A) for additional safety requirements including:

- Traffic Control Plans will be written in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) as well as those rules set by City of Northport or Stevens County.
- Flaggers must attend an eight-hour work zone traffic control course as taught by an American Traffic Safety Services Association (ATSSA) certified instructor (or equivalent).
- Use the appropriate devices as outlined in the Site-Specific Traffic Control Plan.
- Require all personnel who are on the roadway or adjacent to the roadway to wear bright orange approved work zone clothing.

4.4 Perimeter Protection Policy

Due to the time, effort and rigorous testing that would be required to install a guardrail system around the edge of the excavation a guardrail system will not be installed for the Black Sand Beach Excavation Project. Instead, the General Contractor will create a limited access zone around the edge of the excavation. The limited access zone is considered the safest method because it eliminates the fall hazard by preventing personnel from working near the edge of the excavation.

The limited access zone will be marked with candlestick barricades and caution tape to be readily identifiable to all employees. The zone will be a minimum of 6 feet in width and extend around all edges of the open excavation that are 4 feet or greater in height from the ground below. Caution Tape will be suspended at a minimum of 3 feet above ground level. The excavation competent person will inspect excavation faces for signs of failure daily or more often as needed to ensure stability of the excavation edges. The limited access zone will progress with the excavation and will be maintained by the Contractor's Site Safety Officer.

In rare instances, personnel may need to work in the limited access zone. Employees will stop work, and contact the SSO. Fall protection consisting of a harness and life line will be required for all work in the limited access zone. Employees must receive prior approval from the SSO to work in the limited access zone and must comply with all fall protection rules and the job safety analysis for the task. A perimeter controlled work zone permit will be issued and the employee working within the perimeter controlled work zone must carry the permit or have it readily available. Employees working in the limited access zone must mark off the work area below to prevent workers below from being struck by falling objects.

Prior to beginning work, employees will be trained on the requirements as set forth in this document for working in the limited access zone. Employees, who fail to comply with the requirements of the limited access zone, will immediately be removed from the site.

4.5 Respiratory Protection

The purpose of this procedure is to protect those employees performing operations for which exposures can not be controlled by use of conventional engineering or administrative controls and prior to establishing a negative air exposure assessment, and to require that respiratory protective equipment is selected, used, maintained, and stored in accordance with acceptable practices.

4.6 Biological Hazards

URS SMS 047 (Biological Hazards, Attachment A) addresses common biological hazard concerns. Site workers may encounter a number of biting or stinging insects during site

activities. Insects that may be present on-site include but are not limited to: bees, wasps, and mosquitoes. The SSO will inform site workers about the potential insect hazards and preventative measures, such as the use of insect repellant. Site workers who have a history of allergic reactions to bee stings should inform the SSO using the Medical Data Sheet completed during the initial site-specific safety training. The SSO will provide first aid treatment in the event of an insect bite or sting (refer to Section 9.11 of this SSP). Those allergic individuals requiring administering of an EpiPen should take measure to ensure ready availability and awareness by fellow workers. All workers should be familiar with the medical emergency response procedure and routes to the hospital and non-emergency occupational health clinic. Other biological hazards include poisonous snakes (rattlesnakes), bears, and other wildlife indigenous to this area.

5.0 Activity Hazard Analyses and Job Safety Analyses

5.1 Activity Hazard Analyses

Activity Hazard Analyses (AHAs) or Job Safety Analyses (JSAs) for each of the tasks scheduled for the activities at the Black Sand Beach Excavation Project site will be prepared in coordination with the Contractor and Construction Manager. Each AHA will be reviewed and discussed by all site workers involved with the specific task prior to the start of the task. The initial AHA review will be documented by the SSO. AHAs may be supplemented by the preparation of task specific JSAs where necessary. If a task is planned for which there is no AHA, then an analysis will be prepared and reviewed by site workers. The project tasks will include:

- Mobilization and site controls set-up
- Excavation of slag containing soils
- Backfill and placement of imported soil
- Site restoration and demobilization

5.2 Job Safety Analyses

Job Safety Analyses (JSAs) will be reviewed and discussed by all site workers involved with the specific task prior to the start of the task. JSA's list the steps to complete a task, the hazards for each step, and the control methods (engineering, administrative, and/or PPE) to complete the task safely. The contractors who perform the work will have the responsibility of providing JSAs to URS prior to their work activities for URS' review and approval. The JSAs will be supplemented and amended as specific job tasks and conditions change making it necessary to update the JSA. If a task is planned for which there is no JSA, then an analysis will be prepared and reviewed by site workers. The project JSA's include (but are not limited to):

- Traffic control
- Heavy equipment operations (including water truck and dust control)
- General site maintenance
- Air monitoring
- Transportation of granulated slag materials
- Personal decontamination
- Vehicle Equipment Repair
- Silt Fence placement and installation
- Water truck and dust control
- Bobcat with sweeper operation
- Install construction fencing

- Unloading materials from flatbed
- Mass Excavation
- Material Handling
- Granulated Slag Material Load Out
- Fueling Equipment
- Granulated Slag Material Removal with Vac Truck

6.0 Site Control Measures

6.1 Site Zones

The tasks at the Black Sand Beach Excavation Project site will be set up based on a three-zone system to control the potential spread of granulated slag. Prior to the start of any activities involving the contaminants of concern, a Support Zone (SZ), a Contamination Reduction Zone (CRZ), and an Exclusion Zone (EZ) will be identified. These zones will be discussed and agreed upon with the Ecology and Teck representatives on site.

Support Zone – A non-contaminated area that will be separated from the EZ by the CRZ. It contains a center for team communications and emergency response. Appropriate sanitary, safety, and support equipment are also located in this zone. Site operations will be controlled from this location. A log will be kept in the SZ of all personnel entering and exiting the site.

Contamination Reduction Zone - Established between the EZ and the SZ, it provides for personnel and portable equipment decontamination. The CRZ will be used for EZ entry and exit, and for donning/removing PPE.

Exclusion Zone - The areas that contain, or are suspected to contain, contaminants of concern will be the EZ. Prior to the start of each task, the EZ "hot line" will be clearly identified using physical marking systems, which may include stanchions, warning tape, jersey barriers, fencing, or other methods. The CM and SSO will determine the appropriate type of physical marking system at the time of zone establishment. Selection will depend on the activity being conducted within the EZ, as well as the potential for the presence of residents in the area. All areas that contain, or are suspected to contain, contaminants of concern will be marked as an EZ. Personnel are not allowed in the EZ without:

- A "buddy"
- Appropriate PPE
- Current OSHA medical authorization
- Current OSHA training certification

6.2 Communications

A satellite phone system will be available on-site for emergency use. No cellular phone services are available at the site or site vicinity. Emergency numbers are posted in Table 9-1, and will be available on site. Work will not be conducted on-site without access to a telephone. Two-way radios may be used for communications between personnel performing site work.

Workers needing to approach heavy equipment may do so only when the equipment operator's attention has been captured, and the equipment lowers the blade or bucket to the ground. Trucks shall be placed in park, or taken out of gear and the parking brake applied. The Operators shall have "eyes on" the worker at all times while approaching or while in proximity to the equipment.

6.3 General Site Rules

- All workers will participate in the daily safety briefing.
- All site workers will wear personal protective equipment as required by the task. Refer to the applicable AHA (Section 5.0) or JSA for task requirements. The site will be considered a hard hat, safety glasses, safety vest and steel-toe boot site at all times. There will be a 100% glove policy for all construction type work. Additional PPE may be required for other tasks.
- The buddy system will be observed at all times. NO ONE is to work alone outside of the unobstructed vision of one or multiple personnel.
- Radio communications is to be business related only. The use of foul language is prohibited.
- Facial hair that interferes with a respirator-to-face seal will not be permitted on site for all workers who are required to wear respiratory protection.
- All site workers who wear corrective lenses will provide their own prescription safety glasses and respirator optical inserts wherever necessary.
- Never enter a confined space (including an excavation or trench) until the SSO confirms the atmosphere is safe and an excavation competent person has deemed the area safe to enter. A confined space entry permit will be required for entry into each permit required confined space. All personnel who enter confined spaces must have documentation of confined space entry training.
- Horseplay will **not** be tolerated.
- Matches and lighters are not permitted in a confined space.
- Proper site housekeeping (including removal of trash and orderly stacking and removal of materials to reduce slipping, tripping, puncture and fire hazards) will be the responsibility of all site personnel on a daily basis.

- The use of fixed open blade knives (FOBK) or other cutting tools is not authorized. Shielded, quick retraction, or other types of safety knives and cutting shears will be provided for the task.

- All site workers will participate in safety observations (Form I) as requested by site management.

- When backing a vehicle with no back-up alarm (e.g. company pickup truck), clear the area visually by walking around the rig, sound the horn twice, and back slowly. This includes the employee parking areas.

6.4 Sanitation

Sanitation facilities will be set up or maintained in accordance with WAC 296-800-230 (*Drinking Water, Bathrooms, Washing Facilities, and Waste Disposal*), CFR 1926.51 and URS SMS 30 (*Sanitation*, Attachment A). Sanitation issues will include the following items:

- Drinking/potable water
- Toilets
- Change rooms
- Eating and drinking areas
- Waste disposal
- Vermin control

SMS Form 30-1 (*Sanitation Inspection Sheet*) will be completed by the SSO during the mobilization phase of the project, and then at least monthly thereafter.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 General

URS SMS Form 29-1 (*Hazard Assessment Certification Form*) has been used as part of the PPE decision-making process for **each** task being performed at the Black Sand Beach Excavation Project site. **Form 29-1 was utilized to decide the initial levels of protection assigned for each task, which are outlined in the Activity Hazard Analysis (AHA) Tables (Section 5.0).** The level of protection worn by site workers will be enforced by the SSO and S3C. Any changes in the level of protection will be documented. Levels of protection less than those designated in the AHA tables in Section 5.0 must first be approved by the HSEM. It is anticipated that most site activities will be performed in Modified Level D protection.

Based on the hazard analysis of the work activities, it appears unlikely that fitted respirators will be required for this project. Therefore, URS has not prepared a site-specific respiratory protection program (RPP). In the event that an RPP is required based on the action levels provided in Section 8.0 or on unforeseen site hazards, work will be stopped on the activities requiring respiratory protection until an RPP can be prepared. The RPP will meet the requirements of WAC 296-842 (*Respirators*), 29 CFR 1910.134 and URS SMS 42 (*Respiratory Protection*, Attachment A).

7.2 Modified Level D Protection

Modified Level D PPE provides minimal protection against chemical hazards, and should not be worn in any area where respiratory protection is required. Level D PPE includes:

- Cotton coveralls or long pants and a shirt with sleeves
- Hard hat
- Safety glasses (meeting ANSI Z-87)
- Steel-toe/steel shank work boots
- Work gloves
- Fluorescent traffic vest (orange)
- Hearing protection (as required by task)

Upgrades in PPE will be required for work in exclusions zone with higher levels of contamination, which will be specified when intrusive work is being completed. Modifications to Level D attire will include boots that can be decontaminated or disposable over-boots, Tyvek outer clothing and chemical resistant gloves.

7.3 Level C Protection

Level C PPE provides a higher level of respiratory and skin protection against chemical hazards. Additionally, if confined space entry is required and if action levels in Section 8.0 are exceeded, an upgrade to Level C respiratory protection may be required. The use of respiratory protection will be in accordance with the URS Respiratory Protection Program (see URS SMS 042). Level C PPE includes the items listed in Section 7.2 above, and may also include a selection of the following items:

- Full-face or ½ mask air-purifying respirator (required) – with P100/OV filter cartridge
- Regular (white) or poly-coated tyvek (yellow)
- Steel-toe/steel-shank work boots and latex over-boots, or chemical resistant steel-toe/steel shank boots
- Inner latex (i.e., surgical) gloves
- Chemical resistant outer gloves
- Seal arm, leg, and zipper joints with tape, as required

7.4 Additional PPE Requirements – Hot Work PPE

Hot work PPE includes:

- Cotton coveralls or long pants and a shirt with long sleeves
- Hard hat
- Steel-toe/steel shank work boots
- Disposable "welding respirator," as required
- Leather gauntlet gloves
- Leather bib apron or leather jacket with long sleeves
- Fluorescent traffic vest (orange)
- Welding goggles with a minimum protective shade of 3-5

Note: All safety glasses, work boots, and hardhats shall be compliant with ANSI standards. Respirators shall be NIOSH-approved.

8.0 Monitoring

8.1 Exposure Monitoring

Dust monitoring using a portable hand held instrument will be conducted prior to work to establish baseline conditions and during intrusive project activities to determine exposure levels. Monitoring will be performed for all categories of potentially exposed personnel (e.g., operator, laborer, etc.), and will be performed in accordance with applicable National Institute of Occupational Safety and Health (NIOSH) sampling methods and compared with Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs). The SSO, in consultation with the HSEM, will use the data from this sampling to determine if additional compound-specific monitoring is required and to determine initial levels of PPE. All personal samples will be collected using the procedure outlined in SMS 43, Personal Monitoring (Industrial Hygiene) and the Industrial Hygiene Monitoring Form (SMS Form 43-1). Results will be shared with the affected employee in writing within 15 days of receipt of the results.

Real-time dust monitoring will be performed daily on all categories of potentially exposed personnel using a digital dust monitor. This data shall be used to make daily decisions regarding changes in PPE or work processes based on the action levels presented below. The SSO, in consultation with the HSEM, may choose to eliminate dust monitoring for those activities which do not produce significant (i.e., less than 1 mg/m^3 or below background, whichever is lower) quantities of dust.

Monitoring and calibration protocols will be performed by an environmental technician under supervision of the SSO and in accordance with the manufacturer's guidelines and the appropriate sampling method. Calibration of dust monitors and flow calibration of personnel monitoring pumps will be performed (at a minimum) before and after each day's use. Calibrations will be recorded in a daily logbook or on daily log sheets, at the SSO's discretion. A copy of each instrument's manual will be kept in the site trailer.

If confined space entry is required, real-time monitoring for combustible gases and oxygen levels will be conducted using a Combustible Gas Indicator (CGI)/Oxygen Level (O_2) Meter or an equivalent four gas meter. The CGI will test for the presence of combustible gases by continuously monitoring the lower explosive limit (LEL) of organic vapors within any confined space prior to and during operations within the space. The O_2 meter will detect an oxygen-deficient or oxygen-enriched atmosphere, and will be used in conjunction with the CGI during confined space activities. Monitoring and calibration protocols will be performed in accordance with the manufacturer's guidelines. Calibration will be performed (at a minimum) prior to each day's use. A copy of each instrument's manual will be kept in the site trailer. The CGI/ O_2 meter will be calibrated using a gas mixture which represents 50% LEL and 15 % oxygen.

8.2 Action Levels

8.2.1 Action Levels for Dust and Lead Particulate

It is possible to estimate the amount of lead in airborne dust (mg/cubic meter of air) based on the highest concentration of lead found in the site sediments (expressed in mg/kg). The following formula will be utilized:

$$EL_{AL} = \frac{(10^6 \text{ mg/kg})\ (\text{EL mg/ m}^3)}{(\text{conc mg/kg})\ (\text{SF})}$$

EL_{AL} = Concentration of total dust in air at which the contaminant of concern would be at its established exposure limit

EL = Exposure limit for the contaminant of concern (PEL or TLV) in mg/ m^3 (PEL for lead = 0.05 mg/m^3)

10^6 = Unit conversion factor

conc = Soil concentration of contaminant of concern in mg/kg

SF = Safety Factor, which depends on the reliability and consistency of data.

A Safety Factor = 4 is often used and will be used for this project.

For lead, the maximum concentration of 2,760 mg/kg was used to calculate an exposure limit of 38.7 mg/m^3 of total dust in the air. By remaining under 38.7 mg/m^3 for total dust, the PEL for lead will not be exceeded during granulated slag material excavation activities.

A targeted total dust Action Level in the working zone will be 4.5 mg/m^3. Airborne dust monitoring may be conducted in the event of sustained visual indications of dust (above 30 seconds) to verify and document the effectiveness of dust suppression measures. Air monitoring for dust may be performed during excavation activities at the perimeter of the property using an upwind/downwind sampling approach.

Periodic dust measurements will be taken in the workers' breathing zone and around the fence line using a portable direct-reading, hand-held dust monitor.

Table 8-1
Total Dust/Pb Action Levels – Black Sand Beach Excavation Project

Meter Response	Action Required
Response <10 mg/m^3 above background	No respiratory protection required
Response ≥10 mg/m^3 *sustained* above background for a 1 to 5 minute period	Initiate or modify existing dust control measures; upgrade to Level "C" respiratory protection until engineering controls can control dust generation.

Note: If concentrations are greater than 2 mg/m3, personal monitoring for lead in accordance with NIOSH method 7082 will be performed.

8.2.2 Action Levels for Combustible Gases and Oxygen

The following table lists the action levels for combustible gases and oxygen in the event of confined space entry at the project.

Table 8-2
CGI/O_2 Meter Action Levels

Meter Response	Action
CGI response < 10 % LEL	Continue normal operations.
CGI response ≥ 10 % and <20 % LEL in the work area	Eliminate all sources of ignition from the work area; implement continuous monitoring.
CGI response ≥ 20 % LEL	Discontinue operations; allow venting.
Oxygen level < 19.5%	Retreat from work area.
Oxygen level > 23.5%	Retreat from work area.

Note: If a retreat becomes necessary, the HSEM will be consulted about upgrading respiratory protection, adding mechanical ventilation, or possible changes in work practices.

8.2.3 Action Levels for VOCs

Volatile Organic Compounds are not expected to be encountered during excavation activities. Therefore, no specific air monitoring will be conducted for VOCs at the site.

8.2.4 Action Levels for Carbon Monoxide

Due to the potential presence of carbon monoxide, a CO monitor will be utilized when there is the potential for CO buildup due to the use of heavy equipment. Therefore, a CGI with a CO sensor will be used to monitor ambient conditions during excavation operations.

Table 8-3
Action Levels for Carbon Monoxide

Analyzer Reading*	Location	Duration	Action	Personal Protective Equipment
<15 ppm	Point of operations/release source point	-----	Perform continuous monitoring	Minimum Level D site ensemble
>20 ppm	OBZ	>1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, evacuate upwind and notify RHSM and CM.	As specified by RHSM

*above background readings
‡Substitute poly-coated Tyvek® if there is potential for contact with liquids (groundwater, mud, etc)
OBZ= Operator's Breathing Zone

Changing levels of protection, implementing or upgrading respiratory protection, or changing work practices is justified when the upper limit of the action level in the breathing zone is sustained for over 1 minute (i.e. a non-transient reading) or at the discretion of the SSO. If a change in protection level is required the SSO will notify the HSEM.

8.2.5 Action Levels for Hydrogen Sulfide

H_2S is not anticipated to be encountered at the site. Therefore, no specific air monitoring for H_2S will be performed during the Project.

8.3 Heat / Cold Stress Monitoring

Due to the environmental conditions (solar load, high humidity and PPE), heat stress could be a major working stress encountered for this project. Drinking liquids will be available at all times.

Heat exhaustion or heat stroke is always a potential personal hazard during field activities. The use of protective clothing in conjunction with environmental conditions and workload can potentially lead to heat related incidents. Site personnel should be able to identify heat stress victims and be knowledgeable of the first aid treatment procedures.

Washington State implemented a new regulation for Outdoor Heat Exposure in 2008, which requires air temperature monitoring between May 1st and September 30th and documented heat stress training for all personnel if temperatures exceed action levels in the standard.

Personnel should replace water salts lost from sweating before they feel thirsty, since thirst is not an accurate indicator of adequate salt and fluid replacement. Drink ample amounts of cool water and/or commercially available liquids (i.e., Gatorade™, PowerAde™, or Quickick™). Sport

drinks should be consumed only during periods of heavy work activities. Use early morning hours for the majority of physically demanding work. Take breaks in cool rest areas, removing protective garments. Consumption of alcoholic beverages prior to or during heat-related work can promote heat-related illnesses.

If heat stress becomes a concern (i.e., ambient dry bulb temperatures exceed 70 °F for personnel in chemical protective clothing and 90 °F for personnel in normal work clothing), the SSO will refer to and implement URS' SMS 18 (*Heat Stress*) and SMS Attachments 18-1 through 18-3. The plan outlines heat stress identification, treatment, prevention, the development of work-rest regimens, and monitoring.

Refer to URS' SMS 18 for a complete heat stress management program. Provided below are requirements to be implemented at this site as a minimum:

Fluid Replacement. Workers should drink 16 ounces of water or electrolyte enriched liquid thirty minutes or less before beginning work in the hot environment.

Provide cool (50-60°F) water (or electrolyte enriched water) and 4 ounce cups for consumption at the work site. Worker must drink 1-2 gallons per day (equals 150 ml every 20 minutes). Provide individual containers for each worker so that each individual can track their consumption or it can be measured by the SSO. Fluid replacement is very important in preventing heat stress illnesses.

Rest Area. A rest area will be provided either outside of the exclusion zone or a special area within the exclusion zone where worker will rest out of the sun with air moving across them and their protective coveralls open from the waist up.

Work Preparation. Workers should avoid alcohol and other stimulants or diuretics while working on this job.

All site workers exhibiting any symptoms of heat stress or who are working at temperatures requiring heat stress observation will have their oral or ear temperature measured at the beginning of the rest period. If the adjusted oral temperature exceeds 99.6 °F, the following work cycle will be shortened by at least one-third while the rest period remains constant. The employee will not be permitted to enter a controlled area or wear impermeable PPE if their temperature exceeds 100.4 °F. Note that temperatures will be obtained prior to personnel drinking water or other fluids.

Cold Stress Monitoring

Refer to URS' SMS 059 for a complete Cold Stress management program. Provided below are requirements to be implemented at this site as a minimum:

- Prevention of cold stress is a function of whole body protection.

- Adequate insulated clothing will be worn when the air temperature drops below 40°F. If exertion causes the body to sweat and clothing to become wet, the wet clothing must be changed, with dry ones. Reduced work periods may be necessary in extreme conditions to allow adequate rest periods in a warm area.
- The SSO will follow procedures identified in URS SMS 059 to determine the ambient air temperature (factoring in wind chill and intensity of work load) and corresponding lengths of the work/warm-up cycles.

9.0 Decontamination

9.1 Contamination Prevention

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination prevention for personnel include:

- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly.
- Make sure all PPE is free of cuts or tears prior to donning. Replace PPE if it becomes cut or torn during work.
- Fasten all closures on suits, covering with tape if necessary.
- Particular care should be taken to protect any skin injuries. If open wounds exist on hands or forearms, handling contaminated materials or samples should be restricted or eliminated.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, gum, chewing tobacco, cosmetics, etc. into potentially contaminated areas.
- Take care to limit the amount of contamination that comes in contact with heavy equipment.
- If contaminated tools are to be placed on non-contaminated equipment for transport, use plastic to keep non-contaminated surfaces clean.

9.2 Personnel Decontamination

A personnel decontamination station will be set up at the exit to the EZ. All personnel exiting the EZ will pass through the decontamination station. To reduce the volume of decontamination water generated, protective clothing will be discarded, instead of cleaned and reused. The generation of decontamination water should be minimized whenever possible. The following eight steps will be taken for personnel decontamination when site personnel exit the EZ through the CRZ. The decontamination set-up is subject to modification by the SSO. Changes in the decontamination set-up will be documented by the SSO in the Health and Safety field log.

Table 9-1
Personnel Decontamination Procedure for Level C PPE

Step	Action
1	Deposit all equipment and tools used in the EZ onto plastic sheeting or into plastic-lined containers.
2	Scrub outer boots and any soiled PPE (i.e., outer gloves, Tyvek) thoroughly with a soapy wash solution and a scrub brush. Rinse off boots and PPE.
3	Remove tape from around boots and sleeves and deposit into plastic-lined drum
4	Remove Tyvek (inside out) and deposit into plastic-lined drum.
5	Remove outer over-boots; deposit into plastic-lined drum.
6	Remove outer gloves; deposit into plastic-lined drum.
7	Remove respirator, remove and discard respirator cartridges, and place face piece in a bucket of respirator sanitizer/cleaner solution. Gently clean with a soft bristle brush, and rinse respirator in warm water. Allow respirator to dry in the SZ.
8	Remove inner gloves (inside out) and deposit into plastic-lined drum.

Equipment and supplies needed for the level C personnel decontamination station include:

- Plastic buckets for glove wash and rinse
- Plastic drum liners
- Plastic sheeting
- Wash tubs for boot wash and rinse
- Detergent/water solution (non-phosphate detergent)
- Respirator sanitizer/cleaner
- Plastic tubs for respirator wash and rinse
- Long-handled soft bristle scrub brushes for boot wash
- Small, soft-bristle scrub brush for respirator wash
- 55-gallon drums or trash cans

Table 9-2
Personnel Decontamination Procedure for Modified Level D PPE

Step	Action
1	Deposit all equipment and tools used in the EZ onto plastic sheeting or into plastic-lined containers.
2	Scrub boots with a soapy wash solution and a scrub brush. Rinse off boots. (Or dispose of over boots)
3	Remove tyvek coveralls.
4	Remove gloves and discard or store for reuse in the CRZ. (Or discard disposable gloves).
5	Clean hands with cleaning solution/gel and wipes.

Equipment and supplies needed for the personnel decontamination station include:

- Plastic buckets for glove wash and rinse
- Plastic drum liners
- Plastic sheeting

- Wash tubs for boot wash and rinse
- Detergent/water solution (non-phosphate detergent)
- Long-handled soft bristle scrub brushes for boot wash
- 55-gallon drums or trash cans

9.3 Equipment Decontamination

A separate equipment decontamination pad will be set up adjacent the EZ. The decontamination pad will be of sufficient size to fully contain any heavy equipment items, which may need to be decontaminated during the project activities, including excavators and dump trucks. All small and large equipment will be decontaminated on this pad.

All equipment and tools will be cleaned prior to site entry to remove grease, oil, dirt, or any other off-site materials. The CM or SSO will make an inspection of the equipment prior to approving the items for use on-site. The CM or SSO will also be responsible for inspecting all items for adequacy of decontamination prior to removal off-site. The inspection will be noted in the CM or SSO's logbook.

The following steps will be taken when decontaminating small equipment:

Table 9-3
Small Equipment Decontamination Procedure

Step	Action
1	Wrap small equipment such as shovels, picks, chisels, hammers, drill augers, etc. in plastic sheeting.
2	Transport the small equipment from the EZ to the decontamination pad.
3	Wash small equipment with pressurized water spray.
4	Scrub small equipment with soapy water, using brushes and a phosphate-free soap.
5	Rinse small equipment with potable water.
6	Place small equipment on clean plastic sheeting and allow equipment to dry.

The following steps will be taken when decontaminating large equipment:

Table 9-4
Large Equipment Decontamination Procedure

Step	Action
1	Drive large equipment such as a backhoe, from the EZ to the decontamination pad.
2	Use shovels or picks to remove obvious or caked on contamination.
3	Wash the heavy equipment with the pressurized water spray.
4	If necessary, scrub excessively soiled spots with soapy water, using brushes and a phosphate-free soap.
5	Rinse large equipment with water.
6	Move heavy equipment onto clean plastic sheeting and allow it to air dry.

9.4 Equipment Decontamination Testing

Throughout the duration of the project, decontamination procedures may need to be tested. Together, the SSO, CM, PM, and S3C will determine sampling protocols, schedule and the equipment necessary to perform testing for petroleum compounds and/or lead before equipment is removed from the site. Once this has been determined, the SSO will develop a JSA that addresses the hazards and mitigations associated with this procedure.

10.0 Emergency Action Plan

10.1 General

When an emergency occurs, decisive action is required. Decisions must often be made immediately and personnel must be ready to immediately respond to an emergency. For this purpose, pre-emergency planning is an essential part of each project's Emergency Action Plan. Pre-emergency planning tasks will be developed and established prior to the start of site work. Pre-emergency planning for the Black Sand Beach Excavation Project includes the following tasks:

- Development and approval of this Emergency Action Plan in accordance with URS SMS 3 (*Emergency Action Plans*, Attachment C);
- Coordination of the Emergency Action Plan with local health and emergency response agencies;
- Training of site workers in appropriate emergency procedures;
- Maintaining emergency response equipment on-site, such as fire extinguishers, first aid supplies, and spill response equipment;
- Conducting an emergency response practice drill during site mobilization and before site activities begin; and
- Modification of the Emergency Action Plan, if necessary, as work progresses.

10.2 Response Priorities

It is expected that URS personnel will provide minimal first line response to all emergencies.

First Priority: Prevent further injury or illness by:

- Protecting response personnel,
- Isolating the scene to authorized personnel only,
- Notifying emergency response personnel, and
- If possible, rescuing any injured parties.

Second Priority: Provide first aid to those persons with life-threatening injuries or illnesses.

Third Priority: Alleviate the immediate hazards by:

- Extinguishing incipient stage fire,
- Reducing chemical releases, or
- Containing any spill.

10.3 Evacuation Routes and Procedures

In a severe emergency, such as a large fire, explosion, or large spill, site evacuation may become necessary. The SSO will be responsible for informing site workers of the anticipated routes of evacuation during the morning safety briefings. The evacuation route and assembly area will take into account the wind direction, topography, and the nature of the incident. Site workers will be advised to move to an upwind location at least 100 yards from any fires and/or releases, and will be advised to continually monitor wind direction for changes. Section 8.0 provides the action levels required for work area evacuation and to activate this Emergency Response Plan.

If moving upwind is not possible without encountering the incident, workers will be advised to move cross wind or downwind to a distance necessary to be out of the path of vapor releases, smoke, odors, or spills. In the event that a site evacuation becomes necessary, the following procedures will be used:

Table 10-1
Site Evacuation Procedures

Step	Action
1	Site workers are notified of an emergency evacuation via verbal command. All site workers will immediately stop work.
2	All site workers evacuate the work area as quickly as possible, and assemble at a location at least 100 yards upwind of the incident, or as instructed during the daily safety briefing.
3	The CM will be responsible for roll call.
4	The CM/SSO will contact emergency response personnel as all site workers are being accounted for during roll call.
5	The CM/SSO will ensure that emergency apparatus have adequate site access.
6	The CM/SSO will ensure that all combustion equipment has been shut down.
7	All site workers assembled at the designated safe evacuation area will wait for further instructions from emergency response personnel.
8	The CM/SSO will contact the Teck representative.

10.4 Emergency Medical Treatment

The local paramedics will administer all emergency medical treatment, other than first aid. Table 10-1 lists site emergency telephone numbers.

Medical emergencies that require medical treatment include:

- Loss of consciousness
- Unexplained chest pain
- Breathing difficulty
- Uncontrolled bleeding
- Fractures
- Suspected internal injuries
- Suspected exposure to chemical/biological hazard
- Second or third degree burns
- Electrocution
- Unexplained change in mental state

All first aid will be administered on-site by the SSO or other Site Supervisor who is certified in CPR and first aid.

All vehicles used to transport injured persons to the off-site medical facility will be provided with directions and a map to the medical facility. Medical Data Sheets (completed during the initial site-specific safety training) will be referenced in an emergency to assist with the treatment of the victim. The SSO or S3C will accompany the victim to the medical facility. Prior to returning to work after a disabling injury/illness or loss of consciousness, the employee must present a medical release from the attending physician to the SSO. The URS Emergency Physician Access Plan, as shown on Table 10-2, may be instituted by the SSO and/or the medical facility when emergency medical advice is required.

10.5 Blood borne Pathogen Prevention

During site activities, workers can potentially be exposed to blood-borne pathogens when rendering first aid or CPR. Avoiding contact with biological agents is the best way to prevent adverse health effects caused by them. Recognition of potential hazards is essential. When avoidance is impractical or impossible, PPE and personal hygiene will be used to prevent adverse effects. Site health and safety briefings will include protective measures to be taken by workers. In addition, the SSO will evaluate the potential for exposure for each job task, advise site workers, and adjust the site briefings accordingly. URS SMS 51 contains detailed information on blood-borne pathogen (BBP) exposure control methods. All personnel trained in first aid/CPR will receive initial and annual BBP prevention training, including information of "universal precautions." A blood-borne pathogen kit will be kept on-site to protect employees from blood-borne diseases.

10.6 Route To Hospital and Route to Clinic

Figure 10-1 includes a route and directions to the nearest clinic. Figure 10-2 includes a route and directions to the nearest hospital. These routes should be discussed in the initial site safety briefing, posted at the job site, and copies present in vehicles that may be used for emergency response.

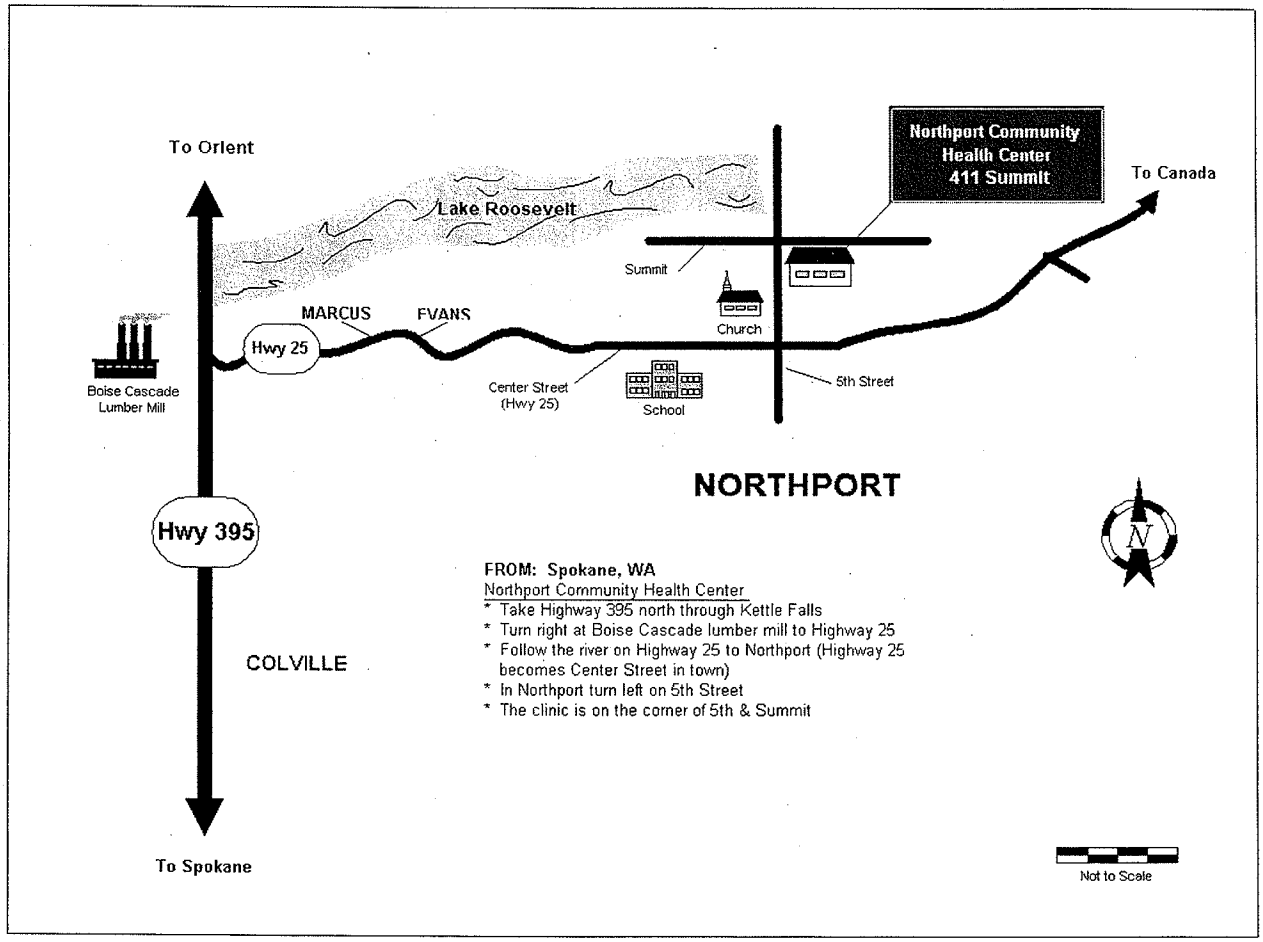
Figure 10-1
Clinic Route Map

ROUTE TO CLINIC

Starting from: A Black Sand Beach, Stevens County, WA

Arriving at: B Northport Community Health Center – Northport, WA
411 Summit/PO Box 178, Northport WA 99157
(T) 509-732-4252

Distance: 8.4 miles **Approximate Travel Time:** 18 min



Directions

1. Start on **Black Sand Beach** - go **800 feet**

2. Turn R on **NORTHPORT-WANETA ROAD towards Northport**- go **.4** mi

3. Turn L on **CENTER AVENUE/WA-25** - go < **0.2** mi

4. Turn R on **4TH STREET** - go **335** ft.

5. Turn L on **SUMMIT AVE.** – go 43 feet

6. Arrive at **411, SUMMIT,** on the L

Figure 10-2
Hospital Route Map

ROUTE TO HOSPITAL

Starting from: A Black Sand Beach, Stevens County

Arriving at: B Mt. Carmel Hospital
982 E. Columbia, Colville, WA
509-684-2561

Distance: 51.1 miles **Approximate Travel Time:** 1 hour 23 mins

Directions

1. Start on **BLACK SAND BEACH** - go **800** ft to Northport Waneta Road

2. Turn R on **NORTHPORT WANETA ROAD**– to Northport; go **8.1** mi

3. Turn L on **CENTER AVE/WA-25** - go **32.6** mi

4. Turn L on **HWY-395 N/W 3RD AVE/US-395/WA-20** - go **9.4** mi

5 **Hwy-395** turns **right** and becomes **N Main St/US-395/WA-20** – go **0.5** mi

5 Turn L on **E. COLUMBIA AVE** - go **0.6** mi

6. Turn R on **S. ALDER ST** - go **187** ft

7. Arrive at **MOUNT CARMEL HOSPITAL – destination on the left**

Table 10-2
Emergency Telephone Numbers

Item	Number
Ambulance:	911
Fire:	911
Police:	911
Call Before You Dig	(800) 424-5555
Hospital: Mount Carmel Hospital	(509) 684-2561
Clinic: Northport Community Health Center	(509) 732-4252
National Spill Response Center	(800) 424-8802
Poison Control Center: Boston, MA	(800) 232-1222
URS Medical Consultant: Workcare – Dr. Peter Greaney	(800) 455-6155

The following people will be notified when an injury has occurred:	
URS Health and Safety Manager: Ms. Jennifer Allen, CIH	Work: (206) 438-2120 Cell: (206) 295-2029
URS Health Services Administrator: Ms. Jeanette Schrimsher, RN	Work: (512) 419-6440 Cell: (512) 656-0203 Toll free: (866) 326-7321
URS Principal-in-Charge: Dave Enos	Cell: (509) 209-0102 Work: (509) 944-3807
URS Project Manager: Paul McCullough	Cell: (425)-301-4875 Work: (206) 438-2231
Construction Manager: TBD	Office: TBD Cell: TBD
Site Safety Officer: TBD	Office: TBD Cell: TBD
Teck Project Manager: Dave Godlewski	Cell: (509) 993-4676 Work: (509) 459-4584

Table 10-3
Medical Emergency Procedures

In the event that any medical emergency arises due to work-related injuries/illnesses, a 24-hour Emergency Physician Access Plan has been established to enable any URS employee to communicate with our Medical Consultant (MC), Dr. Peter Greaney. The following procedure outlines how the plan can be accessed during business hours:	
Step	**Monday through Friday, 6:30 AM - 5:00 PM PST**
1	Contact the URS Medical Consultant at (800) 455-6155.
2	Give the receptionist the following information: a.) You are calling for URS; and b.) This is an emergency call.
The Medical Consultant's staff has been informed how to contact the Medical Consultant designated to provide emergency coverage on that day. *Collect calls will be accepted.* The following procedure outlines how the plan can be accessed during evenings, weekends, and holidays (non-business hours):	
Step	**After Hours, Weekends and Holidays (after 5:00 PM until 6:30 AM PST)**
1	Contact the URS Medical Consultant at (800) 455-6155. An operator from the answering service will answer the telephone.
2	Give the answering service operator the following information: • You are calling for URS; • This is an emergency call; • Give the operator your name; and • Give the operator the telephone number where the Medical Consultant can contact you (including your area code).
3	Verify the operator has written the correct telephone number; do not hang up first.
4	If you do not receive a call back from the Medical Consultant within 15 minutes, place a second call to (800) 455-6155.

Note: The Medical Consultant is located on the East Coast. 1.800.455.6155

10.7 Hazardous Chemical Overexposure

At this time it is anticipated that site personnel will be sufficiently protected through work procedures so as to prevent significant exposure to site chemicals during any of the activities at the Black Sand Beach Excavation Project. Before using any hazardous chemicals onsite, all URS personnel and Contractors will consult the MSDS for proper handling and use instructions. In the event of a hazardous chemical overexposure, the following first aid guidelines should be used:

Table 10-4
First Aid Guidelines

Type of Exposure	First Aid Guidelines
Skin Contact	Skin: Wash/rinse the affected area thoroughly with copious amounts of soap and water.
	Eyes: Eyes should be rinsed for at least 15 minutes following chemical contamination.
	Contact emergency response personnel if required, or transport victim to the hospital.
Inhalation	Move the victim to fresh air.
	Contact emergency response personnel if required, or transport victim to the hospital.
Ingestion	Contact Poison Control Center.
	Contact emergency response personnel, or transport victim to the hospital.

10.8 Small/Incipient Fire

A small fire is defined as a fire that can be extinguished with an available 20-pound type ABC fire extinguisher. An incipient fire is a fire that is small because it has just started. In the event of a small or incipient fire, the following minimum actions will be taken:

- Evacuate nearby site workers from the area, if possible, to an upwind location or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Attempt to extinguish fire using portable fire extinguisher or by smothering.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products.

After the fire has been extinguished, or emergency response personnel have been contacted, notify the PM, CM, HSEM, and Teck's Project Manager.

10.9 Large Fire/Explosion

An explosion, large fire, or a small fire that cannot be extinguished, is beyond the first line capabilities of URS personnel. Professional emergency response personnel would be needed to provide emergency assistance for these types of incidents. In the event of a large fire, explosion, or a small fire that cannot be extinguished, the following minimum actions will be taken:

- Evacuate all site workers from the site, if possible, to an upwind location, or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.

- Perform a quick roll call to account for all site workers.
- Contact the fire department.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products.
- After emergency response personnel have been contacted, notify the PM, CM, HSEM, and Teck's Project Manager.

10.10 Hazardous Chemical Spill or Release

- Hazardous chemical spill or release situations may all be different due to the way the incident occurred, how hazardous the substance may be, and how much has been spilled or released. If a hazardous chemical spill or release occurs, the following steps will be taken:
- Evacuate site personnel, if necessary. Follow the evacuation sequence outlined in Section 9.3.
- Determine the source of leak or release.
- Determine the approximate volume of the leaked or released substance and identify the chemical(s) involved.
- Contact emergency response personnel to inform them of the possible need for assistance.
- Don the appropriate PPE.
- Secure the spread of the spill, if possible, using one of the following methods of containment:
  Patch and plug
  Adsorbent materials such as clay, saw dust, absorbent pillows, sheets, or rolls
  Utilize a dike
  Damming with soil, straw bales, or sand bags
- After the spill/release has been contained, or emergency response personnel have been contacted, notify the PM, CM, HSEM, and Teck's Project Manager.
- A spill or release of a hazardous substance at or above its Reportable Quantity (RQ) will require reporting to the National Spill Response Center (see Table 10-1). See the material's MSDS for the RQ reporting requirements.

10.11 First Aid

At least one person, and preferably two or more, who are trained in first aid must be available at the worksite. The trained first aid responders must have current first aid certificates and be trained in bloodborne pathogen precautions. When a work-related incident results in a non-critical injury/illness, the primary objective is to provide appropriate medical services to diagnose and treat the injury/illness.

Options available to the employee and project management in these situations include the following:

- First aid treatment and/or review by a qualified first aid responder
- First aid treatment and/or review by a qualified first aid responder followed by a referral to the URS Occupational Health Specialist (866-326-7321).

If a site worker is bitten or stung by an insect, the SSO will take the following actions:

Table 10-5
First Aid Procedures for Insect Bite/Sting

Step	First Aid Procedures for Insect Bite/Sting
1	Remove the stinger. Scrape the stinger away from the skin with a fingernail, or use tweezers. If tweezers are used, be sure to grasp the stinger and not the venom sac.
2	Wash the bite/sting area with soap and water.
3	Cover the bite/sting area to keep it clean.
4	Apply an ice pack to the bite/sting area to reduce any pain and swelling.
5	Watch the victim for signals of an allergic reaction.

Emergency response personnel should be contacted in the event of an insect bite or sting:

- If the individual does not know what bit or stung them;
- If the individual has a history of allergic reactions to insect bites or stings (consult the employee's Medical Data Sheet);
- If the individual is bitten or stung on the face or neck; or
- If the individual begins to have difficulty breathing. .

If a site worker is bitten by a tick, mosquito, or snake, or comes into contact with a poisonous plant, the SSO shall refer to SMS 47 (*Biological Hazards*, Appendix A) for information on medical followup. SMS 47 also contains background information and precautionary measures for each of these biological hazards.

10.12 Emergency Equipment and First Aid Requirements

A supply of emergency PPE and equipment will be maintained on-site in sufficient quantities and locations to ensure an adequate supply for all emergency response personnel. All emergency equipment will be fully stocked and readily accessible as needed. Refer to URS SMS 24-9 (Attachment A) for the *Field First Aid Kit Supply List*. The following emergency supplies will be available:

- Industrial first-aid kit (one 16-unit kit that complies with ANSI Z308A for every 25 persons or less)
- Bloodborne pathogen precaution kit with CPR mouth shield
- Instant cold packs
- Stretcher
- Portable emergency eye wash and drenching station
- Fire extinguishers placed in the following locations:
  - In every site storage facility and site office (20-A:120-B:C, maximum distance of 75 feet to an extinguisher)
  - In each piece of heavy equipment (2.5 B:C)
  - In each motor vehicle (2.5-B:C)
  - Adjacent to any flammable/combustible liquid or compressed gas storage area (20-A:120-B:C, one extinguisher located within 10 feet from the entrance, and one located 25-75 feet outside the storage area)
  - Adjacent any fueling area (20-A:120-B:C, maximum travel distance of 75 feet to an extinguisher)
  - Adjacent any active generator pump or air compressor (20-A:120-B:C)
- Coveralls, boot covers, gloves, face shields, etc., as required by project activities

11.0 Site Recordkeeping

11.1 Required Documentation

The following documentation must be kept on-site or readily accessible:

- OSHA Form 300 - Log and Summary of Occupational Injuries and Illnesses;
- Material Safety Data Sheets (MSDSs) for all hazardous chemicals brought on-site by URS and its Contractors;
- Respirator fit test records;
- OSHA-required training records for site workers;
- OSHA-required medical surveillance examination clearance letters for site workers;
- Calibration records for all monitoring equipment;
- Health and safety logbook;
- Copies of any Incident Reports;
- Signed copies of the Site Safety Plan Compliance Agreement (see Section 12.0);
- A completed SMS Checklist;
- A completed Competent Person Assignment Form;
- Medical Data Sheets for all site personnel;
- The Field First Aid Kit Supply List (SMS Form 24-9; posted);
- Any other permits, training records, or documentation required by applicable URS SMS; and

11.2 Training and Recordkeeping Log

Training and recordkeeping information will be maintained with the SSO and will include initial site-specific safety training, basic safety training, on boarding status and documentation, safety leadership training, medical monitoring information and training certifications. All daily safety

briefings, weekly "toolbox" topic training, and visitor training information will also be maintained by the SSO. A record of the training will be documented on a training log, which will include the following information:

- The date;
- Employee's name and social security number or employee number (attendance check); and
- Training topic(s);

11.3 Health and Safety Field Log

The SSO will maintain a logbook or daily safety log on-site in accordance with standard URS procedures. Complete and detailed documentation of site activities is very important. The following information will be recorded on a daily basis:

- Site conditions (e.g., weather);
- Activities being performed;
- Personnel on-site;
- Site visitors;
- Incidents, accidents, and near misses;
- Violations of health and safety procedures; and
- Other significant events.

Site monitoring will also be documented in the health and safety logbook, including the following information:

- Monitoring equipment condition;
- Calibration records;
- Employees and work areas monitored; and
- Monitoring results.

11.4 Incident Reports

Upon receiving a report of an on-site incident, the SSO will investigate the circumstances surrounding the incident. The incident reporting procedure will follow URS SMS 49 (*Injury/Illness/Incident Reporting*). All recordable work-related injuries and illnesses will be recorded on the OSHA 300 Form within six days. Contractors must also meet the requirements of maintaining an OSHA 300 Form. The URS Form 49-1 meets the requirements of OSHA Form 301 (Supplemental Record).

12.0 Site Safety Plan Compliance Agreement

All project personnel, including URS employees, client project staff, URS subcontractors and visitors associated with work at the Black Sand Beach Excavation Project site shall pledge to follow all protocols and procedures in this SSP. In order to document individual agreement with this requirement, all personnel must complete this Site Safety Plan Compliance Agreement. These agreements will be kept in the on-site and will become part of the permanent project record upon completion of site activities.

I, _____ (print name), have read the Site Safety Plan (SSP) for the Black Sand Beach Excavation Project site located in Stevens County, Washington, or I have been verbally advised of its contents. I understand, and I agree to comply with all of its provisions. I understand that I could be prohibited from working on the project, and I may be subject to disciplinary actions for violating any of the health and safety requirements specified in this SSP.

_____	_____
Signature	Date
_____	_____
Company	Employee Number

13.0 Approvals

By their signature, the undersigned certify this Site Safety Plan will be used for the protection of the health and safety of URS personnel, contractors, and visitors during the Black Sand Beach Excavation Project site in Stevens County, Washington.

Signature	**Date**
Mr. Paul McCullough URS Project Manager	
Mr. Dave Enos URS Principal-in-Charge	
Ms. Jennifer Allen CIH URS Health and Safety Manager	

Appendix A

Select Safety Management Standards

Appendix A

APPLICABLE URS SAFETY MANAGEMENT STANDARDS

SMS 001-Inspection By Regulatory Agencies	SMS 030-Sanitation
SMS 002-Hazard Communication (Worker Right-to-Know)	**SMS 032-Work Zone Traffic Control**
SMS 003-Emergency Action Plans	SMS 034-Utility Clearances and Isolation
SMS 004-Accessing Industrial Sites	SMS 036-International Travel Health and Safety
SMS 010-Confined Space Entry	SMS 040-Fall Protection
SMS 013-Excavation Safety	SMS 042-Respiratory Protection
SMS 014-Fire Prevention	SMS 043-Personal Monitoring (Industrial Hygiene)
SMS 015-Flammable/Combustible Liquids and Gases	SMS 046-Subcontractor Health and Safety Requirements
SMS 016-Hand Tools and Portable Equipment	**SMS 047-Biological Hazards**
SMS 017-Hazardous Waste Operations	SMS 048-Hazardous Materials/Dangerous Goods Shipping
SMS 018-Heat Stress	SMS 049-Injury/Illness/Incident Reporting and Notification
SMS 019-Heavy Equipment Operations	SMS 051-Blood borne Pathogens
SMS 020-Hot Work	SMS 055-Health and Safety Training
SMS 021-Housekeeping	SMS 057-Vehicle Safety
SMS 022-Lead in Construction	SMS 064-Hand Safety
SMS 023-Lockout/Tagout	SMS 065-Injury Management
SMS 024-Medical Screening and Surveillance	SMS 066-Incident Investigation
SMS025-New Employee Health, Safety, and Environment Orientation	SMS 072-Behavior Based Safety
SMS 026-Noise and Hearing Conservation	SMS 086-Managing Health, Safety, and Environment-Related Risks
SMS 027-Work Over Water	SMS 088-Signs, Signals, and Barricades
SMS 028-Portable Ladders	SMS 090-Project Security
SMS 029-Personal Protective Equipment	

Note

Safety Management Standards in bold font are included in Attachment A. See URS Health and Safety Website for additional Safety Management Standards.

URS SAFETY MANAGEMENT STANDARD
Excavation

1. Applicability

This standard applies to operations where URS Corporation and subsidiary companies perform trenching and excavation activities, and/or where URS employees are exposed to hazards associated with trenching and excavation activities.

2. Purpose and Scope

The purpose of this standard is to protect personnel from the hazards associated with excavation and trenching activities.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Competent Person

Where potential employee exposure to hazards associated with the excavation (e.g., entrapment, falls greater than 4 feet (1.2 meters), cave-ins, etc.) can reasonably be anticipated, an excavation-competent person must be on site. The excavation-competent person:

1. Has formal documentation of training as an excavation-competent person.
2. Must be physically located at the excavation site at all times while work is in progress.
3. Is responsible for conducting daily inspections of excavations, adjacent areas, and protective systems prior to each shift.
4. Is responsible for inspection after every rainstorm or other potentially hazard-producing event.
5. Must have knowledge of soils and soil classification.
6. Understands design and use of protective systems.
7. Understands the requirements of the applicable regulations.

8. Has authority to stop work and take corrective actions when conditions change.

9. Has the ability to recognize and test hazardous atmospheres.

10. If URS hires a subcontractor to perform excavation or trenching activities, the subcontractor will be required to assign an excavation-competent person to the project. Documentation of this person's qualifications will be maintained in the project safety file.

B. Preliminary Planning

1. Underground and aboveground utilities, adjacent structures or retaining walls, spoil layout, truck routes, and emergency procedures must be identified before work begins.

2. When the excavation or trench approaches the estimated location of underground utilities, the exact location will be determined by methods identified in SMS 034 – Utility Clearance and Isolation.

C. Access/Egress

1. Entry into an excavation or trench should not be made unless absolutely necessary.

2. If personnel enter an excavation or trench that is 4 feet (1.2 meters) deep or more, ladders, steps, ramps, or other safe means of access and egress must be provided, and located at intervals of 25 feet (7.6 meters) or less of lateral travel. If a ladder is used, the ladder must extend 3 feet (0.9 meter) above the original surface of the ground.

3. In excavations and trenches that employees may be required to enter, excavated or other material must be effectively stored and retained at least 2 feet (0.6 meter) or more from the edge of the excavation. As an alternative to this clearance requirement, barriers or other effective retaining devices may be used in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

4. Surface crossing of trenches by personnel or vehicles should not be made unless absolutely necessary. When necessary, the following conditions must be met:

a. Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.

b. Walkways or bridges must have a minimum clear width of 20 inches (50.8 centimeters [cm]), be equipped with standard guardrails, and extend a minimum of 24 inches (61 cm) past the surface edge of the trench.

D. Soil Classification

When sloping, benching, or installed protective systems are used, soil classification of each rock and soil deposit must be classified by a competent person. Soil and rock will be classified as one of the following: stable rock, Type A soil, Type B soil, or Type C soil. The classification will be based on the results of at least one visual analysis and one manual analysis, such as soil plasticity dry strength, thumb penetration, pocket penetrometer, or hand-operated shear vane. In the event that soil classification requires additional technical expertise, the competent person will consult with a registered professional engineer. (See Supplemental Information A – Soil Classification.)

E. Protective Systems

1. Employees in excavations deeper than 4 feet (1.2 meters) must be protected by means of properly designed protective systems.

2. Protective systems for excavations or trenches deeper than 20 feet (6.1 meters) must be designed and stamped by a registered professional engineer.

3. Protective systems must have the capacity to resist all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

   a. Sloping and Benching

   - When personnel are required to work in trenches or excavated areas, all slopes must be excavated to at least the angle of repose, or otherwise safely supported to prevent cave-ins.

   - The determination of the angle of repose and design of the supporting system must be based on careful evaluation of pertinent factors such as: depth of cut;

possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic, or other sources. (See Supplemental Information B – Angles of Repose – Simple Slopes.)

- The slopes and configurations of sloping and benching systems for excavations 4 feet (1.2 meters) to 20 feet (6.1 meters) deep will be selected and constructed by the employer or his designee, and must be in accordance with the following requirements.

- Soil must be analyzed by a competent person to determine the soil or rock type. The maximum allowable slope for each soil or rock type is identified in the table below.

Soil or Rock Type	Maximum Allowable Slope (Horizontal: Vertical)
Stable Rock	Vertical 90°
Type A	¾:1 or 53°
Type B	1:1 or 45°
Type C	1½: 1 or 34°

- Soil classification is not required if 1½:1 (Horizontal:Vertical) or 34° slope is used. If this slope is greater than 1½:1 (Horizontal:Vertical) or 34°, a soil classification must be made. The excavation must comply with one of the following three options.

  - Option I – Maximum allowable slope, and allowable configurations for sloping and benching systems will be determined in accordance with the conditions and requirements in Supplemental Information A – Soil Classification; and Appendix B – Sloping and Benching.

  - Option II – Designs of sloping or benching systems will be selected by using tabulated data based on soil conditions. These tables must be calculated and prepared by a registered professional engineer. The plan must be stamped by a registered professional

engineer, and this information must be documented and filed on site.

- Option III – A registered professional engineer must design the sloping and benching system and stamp the plan. This information must be documented and filed on site.

  Excavations with sloping and benching in excess of 20 feet deep must be designed and stamped by a registered professional engineer.

b. Timber and Aluminum Hydraulic Shoring for Trenches

Designs of support systems, shield system, and other protective systems will be selected and constructed by the employer or their designee, and must be in accordance with one of four options.

- Option I – Designs using Appendices A, C, and D (see 29 Code of Federal Regulations [CFR] 1926 Subpart P). Shoring in trenching will be determined using conditions and requirements of Supplemental Information A – Soil Classification; Appendix C – Timber Shoring; and Appendix D – Aluminum Hydraulic Shoring.

- Option II – Designs of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data will be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer (i.e., trench jacks, hydraulic). This information must be filed on site.

- Option III – Designs using other tabulated data. Designs of support systems, shield systems, or other protective systems will be selected from and be in accordance with tabulated data. This information must be filed on site.

- Option IV – Design by registered professional engineer. Support systems, shield systems, and other protective systems not using Option I, II, or III must be approved and stamped by a registered professional engineer.

c. Alternatives to Timber Shoring

- Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they must be designed, constructed, and maintained in a manner that will provide protection equal to or greater than the sheeting or shoring required for the trench.

- Trench boxes require placement using portable lifting equipment such as backhoes or other tractor-like devices. The job hazard analysis will consider the hazards of lifting and placement of the trench boxes, including the proper use of chains, stability of the mobile equipment, swing radius protection for load, and load rating for the lifting device.

- Trench shields and boxes must either be pre-manufactured with listed load ratings, or designed, stamped, and constructed under the direction of a registered professional engineer.

d. Protective systems designed to protect employees in excavations deeper than 20 feet (6.1 meters) must be designed and stamped by a registered professional engineer.

e. Excavations must be clearly identified and barricaded to keep unauthorized individuals out.

f. Walkways, runways, and sidewalks must be kept clear of excavated material or other obstructions, and no sidewalks should be undermined unless shored to carry a minimum live load of one 125 pounds per square foot.

g. If it is necessary to place heavy objects or operate heavy equipment on a level above and near any excavation, the side of the excavation must be sheet piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

F. Hazardous Atmospheres and Confined Spaces

1. In excavations or trenches greater than 4 feet (1.2 meters) deep where an oxygen deficient (<19.5 percent) or flammable (>10 percent Lower Explosive Limit [LEL]) or other potentially toxic environment could be expected to exist, the atmosphere of the excavation must be monitored before workers enter the excavation. Air monitoring must be conducted before personnel enter an excavation or trench, and then periodically to ensure that the atmosphere remains safe. Monitoring will be conducted at three vertical depths of the excavation to detect potentially stratified gas layers (e.g., propane has a density 1.55 times that of normal air and will accumulate in the lower depths of an open trench).

2. The frequency of air monitoring will be increased if equipment used in or near the excavation or trench may alter the atmosphere where personnel are working. All air monitoring must be documented and maintained in the project safety files.

3. Attended emergency rescue equipment, such as a breathing apparatus, a safety harness and line, basket stretcher, etc., must be readily available where adverse atmospheric conditions may exist or develop in an excavation or trench.

4. Excavations or trenches may qualify as confined spaces. When this occurs, compliance with SMS 010 – Confined Spaces, is required.

G. Water Accumulation

1. Employees will not work in excavations where water is accumulating unless adequate precautions have been taken to protect employees. Personnel must exit excavations and trenches during rainstorms.

2. De-watering equipment must be installed and monitored by a competent person.

3. Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation.

4. Excavations and trenches must be inspected by a competent person after each rain event and before personnel are permitted to re-enter the excavation or trench.

H. Excavation and Trenching Permit

1. An Excavation/Trenching Permit (Attachment 013-1 NA) must be completed prior to all excavation or trenching activities.

2. The Excavation and Trenching Permit must be completed and signed by all applicable parties as indicated on the permit.

3. Excavation and Trenching Permits may be valid for up to 1 week.

I. Daily Inspections

1. Daily inspections must be made (Attachment 013-2 NA) of excavations and trenches. Where potential employee exposure to hazards associated with the excavation (e.g., entrapment, falls greater than 4 feet (1.2 meters), cave-ins, etc.) can reasonably be anticipated, these inspections must be made by a competent person.

2. Inspections must be conducted daily before the start of work, after every rainstorm, after other events that would increase hazards such as snowstorm, thaw, earthquake, or dramatic change in weather, and when fissures, tension crack, sloughing, undercutting, water seepage, bulging at the bottom or other similar conditions occur.

3. If evidence of possible cave-ins or slides is apparent, all work in the excavation or trench must cease until the necessary precautions have been taken to safeguard the personnel.

J. Excavating at Potential MEX/UXO Sites

1. If the project site is suspected of munitions and explosives of concern (MEC) or unexploded ordinance (UXO) contamination, the UXO team will conduct a reconnaissance and MEC/UXO avoidance to provide clear access routes to each site before excavation crews enter the area.

2. MEC/UXO sites with planned excavation activities will not be conducted until a complete plan for the site is prepared and/or approved by the URS UXO Safety Officer. MEC/UXO avoidance

must be conducted during excavation operations on known or suspect MEC/UXO sites (SMS 039).

K. Training/Briefings

1. Conduct and document daily safety briefings for all employees associated with excavation activities. Discuss excavation hazards, protective measures, and work practices that will be applicable to the day's activities.

5. Documentation Summary

The following information will be maintained in the project file:

A. Competent person qualifications.

B. Excavation and Trenching Permit(s).

C. Daily inspections by an excavation-competent person.

D. Air monitoring records.

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Standard Excavations 29 CFR 1926, Subpart P

1. Appendix B, Sloping and Benching
2. Appendix C, Timber Shoring
3. Appendix D, Aluminum Hydraulic Shoring
4. Appendix E, Alternatives to Timber Shoring

B. U.S. OSHA Technical Links – Trenching and Excavation

C. SMS 010 – Confined Space Entry

D. SMS 034 – Utility Clearance and Isolation

E. SMS 039 – Munitions Response / Munitions and Explosives of Concern

F. Attachment 013-1 NA – Excavation/Trenching Permit

G. Attachment 013-2 NA – Daily Excavation/Trench Inspection Form

7. Supplemental Information

A. Soil Classification

B. Angle of Repose – Simple Slopes

"Type A" soils

Cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A.

However, no soil is Type A if:

1. The soil is fissured;
2. The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
3. The soil has been previously disturbed;
4. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V)or greater; or
5. The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" soils

1. Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
2. Granular cohesionless soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
3. Previously disturbed soils except those which would otherwise be classed as Type C soil.
    a. Soil that Dry rock that is not stable; or
    b. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" soils

1. Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less;
2. Granular soils including gravel, sand, and loamy sand;
3. Submerged soil or soil from which water is freely seeping;
4. Submerged rock that is not stable, or
5. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Soil Texture	Visual detection of particle size and general appearance of the soil	Squeezed in hand and pressure released		Soil ribboned between thumb and finger when moist.
		When Air Dry	When Moist	
Sand	Soil has a granular appearance in which the individual grain sizes can be detected. It is free flowing when in a dry condition.	Will not form a cast and will fall apart when pressure is released.	Forms a cast, which will crumble when lightly touched.	Cannot be ribboned.
Sandy Loam	Essentially a granular soil with sufficient silt and clay to make it somewhat coherent. Sand characteristics predominate.	Forms a cast, which readily falls apart when lightly touched.	Forms a cast, which will bear careful handling without breaking.	Cannot be ribboned.
Loam	A uniform mixture of sand, silt and clay. Grading of sand fraction quite uniform from coarse to fine. It is mellow, has somewhat gritty feel, and yet is smooth and slightly plastic.	Forms a cast, which will bear careful handling without breaking.	Forms a cast, which can be handled freely without breaking.	Cannot be ribboned.
Silt Loam	Contains a moderate amount of the finer grades of sand and only a small amount of clay over half of the particles are silt. When dry it may appear quite cloddy which readily can be broken and pulverized to a powder.	Forms a cast, which can be freely handled. Pulverized it has a soft flour-like feel.	Forms a cast, which can be freely handled. When wet, soil runs together and puddles.	It will not ribbon but it has a broken appearance, feels smooth and may be slightly plastic.
Silt	Contains over 80% of silt particles with very little fine sand and clay. When dry, it may be cloddy, readily pulverizes to powder with a soft flour-like feel.	Forms a cast, which can be handled without breaking.	Forms a cast, which can freely be handled. When wet, it readily puddles.	It has a tendency to ribbon with a broken appearance, feels smooth.
Clay Loam	Fine textured soil breaks into hard lumps when dry. Contains more clay than silt loam. Resembles clay in a dry condition; identification is made on physical behavior of moist soil.	Forms a cast which can be handled freely without breaking.	Forms a cast, which can be handled freely without breaking. It can be worked into a dense mass.	Forms a thin ribbon, which readily breaks, barely sustaining its own weight.
Clay	Fine textured soil breaks into very hard lumps when dry. Difficult to pulverize into a soft flour-like powder when dry. Identification based on cohesive properties of the moist soil.	Forms a cast which can be freely handled without breaking.	Forms a cast, which can be handled freely without breaking.	Forms long, thin flexible ribbons. Can be worked into a dense, compact mass. Considerable plasticity.
Organic Soils	Identification based on the high organic content. Muck consists of thoroughly decomposed organic material with considerable amount of mineral soil finely divided with some fibrous remains. When considerable fibrous material is present, it may be classified as peat. The plant remains or sometimes the woody structure can easily be recognized. Soil color ranges from brown to black. They occur in lowlands. In swamps or swales. They have high shrinkage upon drying. Table 1. –Field Method for identification of soil texture			

ANGLE OF REPOSE

FOR SLOPING OF SIDES OF EXCAVATIONS LESS THAN 20 FEET DEEP

Note: Clays, Silts, Loams or Non-Homogenous Soils Require Shoring or Bracing

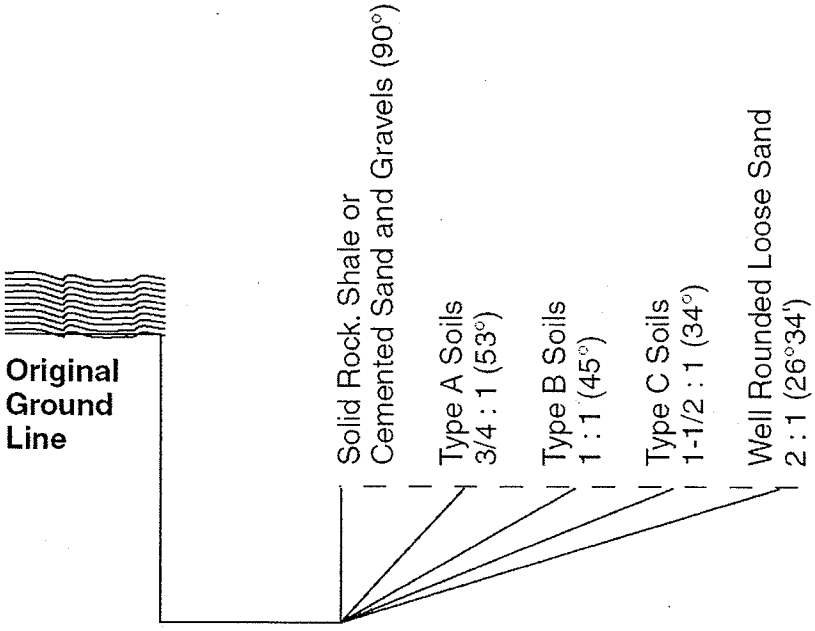
The Presence of Ground Water Requires Special Treatment

Examples*

Type A Soils:
Clay, silt clay, sandy clay clay loam, caliches, and hardpan

Type B Soils:
Angular gravel, silt, silt loam, sandy loam, unstable dry rock

Type C Soils:
Gravel, sand and loamy sand, submerged soil and rock, and layered soils



REFERENCE:
OSHA Safety and Health Standards 1926
Appendix A and B to Subpart P

URS SAFETY MANAGEMENT STANDARD
Heat Stress

1. Applicability

This standard applies to URS Corporation and its subsidiary companies on projects where ambient (not adjusted) temperatures exceed 70 degrees Fahrenheit (°F) (21 degrees Celsius [°C]) for personnel wearing chemical-protective clothing, including semi-permeable or impermeable protective clothing such as Tyvek or Saranex coveralls, and 90°F (32°C) for personnel wearing normal permeable work clothes. Permeable clothing refers to clothes of standard cotton or synthetic materials.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from the effects of heat-related illnesses.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. The project Health and Safety Plan will address heat stress control when temperatures identified in Section 1 of this standard are anticipated. For employees wearing chemical-protective clothing, physiological monitoring (Section J) is the most effective approach, because evaporative cooling capability is limited.

B. Heat stress is influenced by air temperature, radiant heat, and humidity. The Wet Bulb Globe Temperature (WBGT) is a useful index of the environmental contribution to heat stress. Because WBGT is only an index of the environment, the contributions of work demands, clothing, and state of acclimatization must also be accounted for, as described in the following steps.

1. Monitor ambient temperatures and conduct heat stress monitoring in accordance with the project Health and Safety Plan. Revise the heat stress monitoring and controls if there are any reports of discomfort due to heat stress.

2. Monitor temperatures in each unique environment in which workers perform work (e.g., take WBGT measurements inside truck cabs for truck drivers, and take separate WBGT measurements in the outdoor area where field employees work, etc.).

3. Determine if individual workers are acclimatized or un-acclimatized. Full heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Its loss begins when the activity under those heat-stress conditions is discontinued, or when there is a sustained increase in temperatures of 10 °F (5.6 °C) or more, and a noticeable loss occurs after 4 days. A worker can be considered acclimatized for the purpose of this procedure when they have been exposed to the site conditions (including level of activity) for 5 of the last 7 days.

4. Determine the approximate workload of each worker or group of workers. The following examples can be used for comparison:

Table 1
Examples of Activities within Workload Categories

Categories	Example Activities
Resting	Sitting quietly
	Sitting with moderate arm movements
Light	Sitting with moderate arm and leg movements
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work at machine or bench and some walking about
Moderate	Scrubbing in a standing position
	Walking about with moderate lifting or pushing
	Walking on level at 6 Km/hr while carrying 3 Kg weight load
Heavy	Carpenter sawing by hand
	Shoveling dry sand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing or pulling (e.g., pick-and-shovel work)
Very Heavy	Shoveling wet sand

5. Determine the approximate proportion of work within an hour during a typical shift. Typically, the initial work schedule will be 60 minutes of work per hour (100 percent work) with a small break in the morning and afternoon, as appropriate, and a 30-minute lunch break mid-day.

6. Compare the WBGT values measured in 4.B.1 to the screening criteria values in the following table, using the determinations made in 4.B.3 through 4.B.5.

Table 2
SCREENING CRITERIA FOR HEAT STRESS EXPOSURE
(WBGT Values in °F /°C)

Work Cycle	Acclimatized				Unacclimatized			
	Light Work	Mod. Work	Heavy Work	Very Heavy Work	Light Work	Mod. Work	Heavy Work	Very Heavy Work
100% Work (60 min/ hour)	85.1/ 29.5	81.5/ 27.5	78.8/ 26.0	N/A	81.5/ 27.5	77.0/ 25.0	72.5/ 22.5	N/A

a. If the measured WBGT is *less than* the table value, there is little risk of excessive exposure to heat stress, and work can continue. Continue to monitor ambient conditions with the WBGT. However, if there are reports of the symptoms of heat-related disorders, then the analysis of little risk should be reconsidered.

b. If the measured WBGT is *greater than* the table value, institute heat stress controls, including a work-rest cycle, and perform physiological monitoring as described elsewhere in this standard.

c. Because of the physiological strain associated with very heavy work among less fit workers regardless of WBGT, values are not provided in Table 1 for continuous work. Physiological monitoring should always be implemented under these conditions.

d. For workers wearing semi-permeable or impermeable clothing, such as Tyvek or Saranex, the WBGT procedures cannot be used. For these situations, workers should begin physiological monitoring as soon as the temperature in the work area exceeds 70°F (21°C).

C. Physiological Monitoring

Physiological monitoring provides a means to assess the effectiveness of the heat stress controls (training, hydration, work-rest cycles, etc.) that are in place. Based on the results of physiological monitoring and self-assessment, work-rest cycles can be adjusted to more effectively control heat stress by shortening the work period, or to allow for longer work periods if workers are recovering adequately during rest breaks.

1. Perform physiological monitoring as soon as the employee stops working and begins their break (rest). Perform *physiological monitoring at least every hour. Base rest breaks* on the results of the monitoring, workers' self-assessment, and professional judgment.

a. Example 1: If the WBGT is 85°F (29.4°C) or less for acclimatized, light-duty workers, they can work 60 minutes per hour (100 percent work), and they need only take their regularly scheduled breaks.

b. Example 2: If the WBGT is greater than 85°F (29.4°C) for acclimatized, light-duty workers, physiological monitoring must be performed, and workers' work-rest cycles must be adjusted as described below.

2. Have workers assess themselves and their body's reaction to the heat and work conditions (self-assessment), and report any signs or symptoms of heat illness. These can include nausea or dizziness, heat cramps, extreme thirst, or very dark urine.

3. Based on the results of the physiological monitoring and on the workers' self-assessments, the work period may be adjusted as follows:

   a. The work period may be *increased* (generally, by 5- to 10-minutes intervals, up to a maximum of 4 hours) if the results of the first 2 hours of the physiological monitoring and the workers' self-assessments indicate that workers *are* recovering adequately (see below), and on the judgment of the Health and Safety Technician.

   b. The work period *must be decreased* if the results of the physiological monitoring and the workers' self-assessment indicate that workers are NOT recovering adequately (see below).

4. Perform physiological monitoring

   a. The worker or the Health and Safety Technician must measure and record body temperature and pulse rate as described below. Use SMS 018-1 NA – Heat Stress Monitoring Record as a tool.

5. Body Temperature Monitoring

   a. Monitor body temperature to determine if employees are adequately dissipating heat buildup. Ear probe thermometers which are adjusted to oral temperature (aural temperature) are convenient and the preferred method of measurement. Determine work/rest regimen as follows:

      i. Measure oral body temperature at the end of the work period. Oral body temperatures are to be obtained prior to the employee drinking water or other fluids.

ii. If temperature exceeds 99.6°F (37.5°C), shorten the following work period by 1/3 without changing the rest period.

iii. If, at the next rest period, temperature still exceeds 99.6°F (37.5°C), the worker should not be allowed to continue work until repeated temperature measurements are in the acceptable range (i.e., less than 99.6°F). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.

iv. Do not allow a worker to wear impermeable PPE when his/her oral temperature exceeds 100.6°F (38.1°C).

b. Have employees assess themselves and their body's reaction to the heat and work conditions, and report any signs or symptoms of heat stress, including, but not limited to, feeling nauseous or dizzy, skin rash or skin irritation, muscle cramps, weakness or fatigue, extreme thirst, dizziness, blurred vision, headache, or very dark urine.

6. Pulse Rate Monitoring

a. Take the radial (wrist) pulse as early as possible in the rest period and determine the worker's heart rate in beats per minute. The heart rate is determined by counting the pulse for ten seconds and multiplying the number by 6 to get the beats per minute. Record this as P1.

b. Wait 2 minutes and repeat the pulse measurement. Record this as P2.

c. If P1 is greater than or equal to 110 beats per minute (bpm) and if (P1 – P2) is less than or equal to 10 bpm (indicating that workers are not recovering adequately), shorten the next work cycle by 1/3 without changing the rest period.

d. At the next rest period, if P1 is still equal to or greater than 110 bpm, and if (P1 – P2) is still less than or equal to 10 bpm, shorten the following work cycle by 1/3 without changing the rest period.

e. At the third rest period, if P1 is still equal to or greater than 110 bpm and (P1 – P2) is still less than or equal to 10 bpm, the worker should not be allowed to continue work until repeated pulse measurements are in the acceptable range (i.e., P1 is less than 110 bpm and (P1 – P2) is greater than 10 bpm). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.

D. Record monitoring results and worker's self-assessments on Attachment 018-1 NA – Heat Stress Monitoring Record.

E. Investigate the use of auxiliary cooling devices in extreme heat conditions.

F. Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring. Review the information provided in Supplemental Information A.

G. Provide cool water and electrolyte replacement drinks as described in Supplemental Information A.

H. Allow employees who are not accustomed to working in hot environments appropriate time for acclimatization, as described in Supplemental Information A.

I. Provide break areas as described in Supplemental Information A.

5. Documentation Summary

The following information will be maintained in the project file:

A. Heat Stress Monitoring Records

B. Employee Safety Briefing Verification Forms

6. Resources

A. NIOSH – Working in Hot Environments (Publication No. 86-112), 1986

B. NIOSH – Criteria for a Recommended Standard for Occupational Exposures to Hot Environments (Publication No. 86-113), 1986

C. ACGIH – Documentation of the Threshold Limit Values and Biological Indices, 2003

D. AFL-CIO Building Trades Division – Heat Stress in Construction

E. Attachment 018-1 NA – Heat Stress Monitoring Record

7. Supplemental Information

A. Heat Stress Informational Supplement

HEAT RASH

Heat rash (prickly heat) may result from continuous exposure to heat or humid air. It appears as red papules (elevated skin lesion), usually in areas where the clothing is restrictive, and gives rise to a prickly sensation, particularly as sweating increases. It occurs in skin that is persistently wetted by un-evaporated sweat. The papules may become infected unless treated.

First Aid for Heat Rash - To prevent heat rash, shower after work, dry off thoroughly, and put on clean, dry underwear and clothes. Try to stay in a cool place after work. If, in spite of this, you develop heat rash, see your physician.

HEAT CRAMPS

Heavy sweating with inadequate electrolyte replacement causes heat cramps. Signs and symptoms include:

- Muscle spasms.
- Pain in the hands, feet and abdomen.

First Aid for Heat Cramps - Leave the work area, and rest in a cool, shaded place.

Mild heat cramps can be treated by drinking beverages that contain salt or eating salty food. Severe heat cramps are treated with fluids and salts given intravenously.

Once the spasms disappear, you may return to work. Taking adequate breaks and drinking electrolyte replacement drink should prevent the cramps from returning.

HEAT EXHAUSTION

Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, moist skin.
- Heavy sweating.
- Dizziness.
- Nausea.
- Fainting.
- Headache.
- Blurred vision.
- Vomiting.

The key here is that the victim is still sweating, so the cooling system is still working; it's just under severe stress. The body core temperature may be elevated, but not higher than

104°F. It is important to recognize and treat these symptoms as soon as possible, as the transition from heat exhaustion to the very hazardous heat stroke can be quite rapid.

First Aid for Heat Exhaustion – Treatment involves replacing fluids (rehydration) and salts and removing the person from the hot environment. If symptoms are mild, sipping cool, slightly salty beverages every few minutes may be all that is needed. Removing or loosening clothing and applying wet cloths or ice packs to the skin also aid cooling.

HEAT STROKE

Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels, typically at or above 104°F. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot, usually dry skin.
- Lack of or reduced perspiration (lack of perspiration may be masked for those wearing chemical protective clothing since perspiration from earlier in the day will be present).
- Nausea.
- Vomiting.
- Dizziness and confusion.
- Strong, rapid pulse.
- Coma.

First Aid for Heat Stroke - THIS IS A MEDICAL EMERGENCY! SUMMON MEDICAL ASSISTANCE IMMEDIATELY!

While awaiting transportation to the hospital, a person should be wrapped in cold, wet bedding or clothing; immersed in a lake, stream, or cool bathtub; or cooled with ice. At the hospital, body cooling is usually accomplished by removing the clothes and covering the exposed skin with water or ice. To speed evaporation and body cooling, a fan may be used to blow air on the body. Body temperature is measured frequently, often constantly. To avoid overcooling, cooling is stopped when the body temperature is reduced to about 102°F.

HEAT STRESS PREVENTION

The best approach to avoiding heat-related illness is through preventative heat stress management.

Rest areas - A relatively cool, shaded area must be provided for breaks when ambient temperatures exceed 70°F (21°C) and workers are wearing chemical protective clothing (including uncoated Tyvek), or if temperatures exceed 80°F (26°C) and workers are wearing "Level D" coveralls or work clothes. For hazardous waste sites, the rest area should be located in the support zone adjacent to the contamination reduction zone, situated so that part of it is in the decon area so workers can take breaks without going through full decon. If

shade is not available, shaded areas shall be constructed. This same type of canopy can be set up to shade personnel performing various types of work in hot weather.

Liquids - Encourage employees to drink plenty of cool plain water and electrolyte replacement drinks. Supplementing water with cool electrolyte replacement drinks, such as Gatorade, Squench or Quik-kick (drink), is helpful to employees who tend to sweat a lot. Do not use "community cups"; use paper cups. Have workers drink 16 ounces (0.5 liters) of drink before beginning work, such as in the morning and after lunch. At each break, workers should drink 8 to 16 ounces (0.25 to 0.5 liters). Employees should not wait until they are thirsty to drink.

Discourage the use of alcohol during non-working hours, and discourage the intake of coffee during work hours, as these make heat stress control more difficult.

Acclimatization - This is the process by which your body "gets used to" hot work environments. This is achieved by slowly increasing workloads. Start at 50 percent capacity on day one, and increase by 10 percent per day; on day six, you'll be at 100 percent. You don't lose acclimatization over a weekend, but it'll start to decrease after three to four days. If you don't do hot work for a week, the acclimatization is gone. You don't have to do full shift hot work to achieve or retain acclimatization; a minimum of 100 minutes of continuous hot work exposure per day is adequate.

Auxiliary Cooling - Auxiliary cooling is usually obtained by providing workers with a specially-designed vest, which is worn under the protective clothing, but over any underclothing. These vests typically provide cooling via one of two methods: the use of ice or other frozen media, or the use of a vortex cooler. Each method has its advantages and disadvantages.

The frozen media vest requires a means for freezing the media, and the media (usually water or "blue ice") will melt, requiring replacement.

The vortex cooler tends to cool more uniformly. Instead of frozen media, this vest uses the expansion of compressed air to cool the wearer. The drawback is the compressed air requirement, but this is negated when the wearer is already using an airline respirator supplied by a compressor. A vortex cooler should not be supplied from air cylinders, as this will draw down the cylinders rapidly.

Auxiliary cooling should be considered when the following conditions exist:

- Ambient temperature over 80°F (26°C).
- Workers are wearing impermeable garments (i.e., Tyvek, Saranex, Chemrel, etc.).
- It is desirable to have long work shifts with minimum interruption.

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where personnel may encounter noise exposures that may exceed 85 decibels, measured using an A-weighted scale (dBA), as an 8-hour time-weighted average (TWA).

2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Implementation

Implementation of this procedure is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. General

1. The use of hearing protectors is required in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Whenever information indicates that any employee's exposure may equal or exceed an 8-hour TWA of 85 dBA, the project manager or location manager will be responsible for enforcing the proper use of hearing protectors.

2. Implement a hearing conservation program in accordance with 29 Code of Federal Regulations (CFR) 1910.95(c) when applicable. Work not applicable to 29 CFR 1910.95(c) will assess hazards of noise exposure on a task basis, and implement engineering or administrative controls to reduce employee noise exposure.

3. Hearing protectors will be used in the event that administrative or engineering controls are either not effective or not feasible, and the following criteria will be applicable to selection of hearing protection devices.

   a. Require that at least two types of hearing protectors are available to employees free of charge, and that the type of hearing protector is suitable to the task.

b. Require that hearing protectors are used in accordance with manufacturer's specifications to effectively protect hearing.

B. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under the supervision of a URS Health, Safety, and Environment (HSE) Representative.

2. Sound-level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).

C. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered include:

1. Adding or replacing mufflers on motorized equipment.

2. Adding mufflers to air exhausts on pneumatic equipment.

3. Following equipment maintenance procedures to lubricate dry bearings and replace worn or broken components.

4. Isolating loud equipment with barriers.

5. Replacing loud equipment with newer and quieter models.

6. Using caution signs and Hearing Protection Required signs to designate noisy work areas.

7. Installing HPD-dispensing devices at the entrance to noisy work areas.

D. Audiometric Exams

1. Tests

a. Details on the medical surveillance program (including audiometric testing) are included in SMS 024 – Medical Screening and Surveillance.

b. Audiometric tests will be performed by a person meeting the requirements described in 29 CFR 1910.95(g)(3). Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram will be established, against which subsequent audiograms can be compared. Testing to establish a baseline audiogram will be preceded by 14 hours without exposure to noise. Hearing protectors may be used as a substitute for the requirement that a baseline audiogram will be preceded by 14 hours without exposure to workplace noise. The medical surveillance provider will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination. For multi-year projects, an annual audiogram will be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

c. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid, and if there is a standard threshold shift (STS). A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 hertz (Hz) in either ear. If the annual audiogram shows that an employee has suffered an STS, the employer will obtain a retest within 30 days, and consider the results in assessing an STS as the annual audiogram. The audiologist, otolaryngologist, or physician will review problem audiograms, and will determine whether there is a need for further evaluation. If an STS has occurred, the medical surveillance provider will notify the employee within 21 days of the determination.

E. Standard Threshold Shifts

If an employee's test results show a confirmed STS, their hearing protection will be evaluated and refitted, and a medical evaluation may be required.

F. Training

Verify that each employee who must work in a noisy environment is current on required Hearing Conservation Training. Training must include the following topics:

1. The effects of noise on hearing.

2. The purpose of hearing protectors.

3. The advantages and disadvantages of various types of hearing protectors.
4. The attenuation of various types of hearing protection.
5. The selection, fitting, care, and use of hearing protectors.
6. The purpose of audiometric testing.
7. An explanation of the audiometric testing procedure.

5. Documentation Summary

The following documentation will be maintained in the project file:

A. Noise surveys, when applicable.

B. Training records.

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Standard – Occupational Noise Exposure – 29 CFR 1910.95

B. U.S. OSHA Construction Standard – Occupational Noise Exposure – 29 CFR 1926.52 and 1926.101

C. U.S. MSHA – Occupational Noise Exposure 30 CFR 62

D. U.S. FRA – Occupational Noise Exposure 49 CFR 227

E. U.S. OSHA Technical Links – Noise and Hearing Conservation

F. American Industrial Hygiene Association: Protect Yourself from Noise-Induced Hearing Loss

G. National Hearing Conservation Association web site

H. SMS 024 – Medical Screening and Surveillance

URS SAFETY MANAGEMENT STANDARD
Hand Tools and Portable Equipment

1. Applicability

This standard applies to URS Corporation and its subsidiary companies in which hand tools and/or portable powered equipment, including chain saws; brush cutters, powder-actuated tools, and similar high-hazard implements are used.

2. Purpose and Scope

The purpose of this standard is to provide procedures for the safe use and handling of hand tools and portable powered equipment. SMS 064 – Hand Safety provides additional information on the safe use of hand tools.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site or project location.

4. Requirements

A. General

1. Keep hand and power tools in good repair and use them only for the task for which they were designed. Use tools only in accordance with the manufacturer's recommendations.

2. Remove damaged or defective tools from service. Affix a "Do Not Use" tag (or similar) to the tool until repairs are made or the tool is destroyed.

3. Provide employees using hand tools or portable powered equipment with personal protective equipment (PPE) and train employees in the use of PPE required for the operation being undertaken.

4. Keep surfaces and handles clean and free of excess oil and grease to prevent slipping.

5. Do not carry sharp tools in pockets; this practice may cause puncture wounds.

6. Clean tools and return to a suitable toolbox, room, rack, or other storage area upon completion of a job.

7. Before applying pressure, ensure that wrenches have a good bite.

a. Brace yourself by placing your body in the proper position so that that you will not fall in case the tool slips.

b. Make sure hands and fingers have sufficient clearance in the event the tool slips.

c. Always pull on a wrench, never push.

8. When working with tools overhead, place tools in a holding receptacle or secure when not in use to prevent them from falling.

9. Do not leave tools in or on passageways, access ways, walkways, ramps, platforms, stairways, or scaffolds where they can create a tripping hazard.

10. Do not throw tools from place to place or from person to person, or drop tools from heights.

11. Use nonsparking tools in atmospheres with fire or explosive characteristics.

12. Inspect all tools prior to start-up or use to identify any defects.

13. Powered hand tools should not be capable of being locked in the ON position, except as noted elsewhere in this standard.

14. Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.

15. Ensure that all portable powered tools designed to accommodate guards are equipped with such when in use.

16. Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.

17. Do not use cheater pipes.

18. Make provisions to prevent machines from automatically restarting upon restoration of power (see SMS 023 – Lockout and Tagout Safety).

19. Where URS issues tools to its employees, the supervisor is responsible for the safe condition of tools and equipment.

20. Where workers furnish their own tools, their tools must conform to the requirements demanded for safety and efficiency. The supervisor has the responsibility to regularly inspect these tools for defects.

B. Electrical Power Tools

1. Electric-power–operated tools will be either of the approved double-insulated type or grounded in accordance with the National Electric Code.

2. The use of the electric cord for hoisting or lowering electric tools is an unsafe practice and will not be permitted.

3. All handheld powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches (5.1 centimeters) in diameter, disc sanders, belt sanders, reciprocating saws, saber saws, and other similar operating powered tools will be equipped with a momentary contact ON/OFF control and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

4. All other handheld powered tools such as circular saws, chain saws, and percussion tools without positive accessory holding means will be equipped with a constant pressure switch that will shut off the power when the pressure is released (i.e., "dead man" switch).

C. Grinding Tools

1. Inspect work rests and tongue guards for grinders.

   a. Work rest gaps should not exceed ⅛ inch (3 mm).

   b. Tongue guard gaps should not exceed ¼ inch (6 mm).

2. Do not adjust work, guards, or tool rests while the grinding wheel is moving.

3. Inspect the grinding wheel for cracks, chips, defects, or excessive wear. Remove from service if any defects are found.

4. Wear goggles when grinding. A clear full face shield may be worn with the goggles.

5. Do not use the side of a grinding wheel unless the wheel is designed for side grinding.

6. Always stand to the side of the blade, never directly behind it.

7. Use grinding wheels only at their rated speed.

8. Grinding aluminum is prohibited.

9. For operations in the United Kingdom:

    a. No grinding wheels exceeding 55 mm are to be used.

    b. All wheels are to be marked with their safe maximum speed.

    c. Abrasive wheels will be operated only by personnel who have been specifically trained and specified competent by URS.

    d. Abrasive wheels will be operated only by persons specified as competent, under the abrasive wheel regulations.

    e. Abrasive wheels must be operated only if the manufacturer's guard is fitted and they are in good working order.

D. Power Saws

1. Require that circular saws are fitted with blade guards.

2. Inspect each day prior to use. Remove damaged, bent, or cracked saw blades from service immediately.

3. Require that table saws are fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.

4. Require guards that cover the blade to the depth of the teeth on hand-held circular saws. The guard should freely return to the fully closed position when withdrawn from the work surface.

E. Woodworking Machinery

1. Do not leave woodworking tools running when unattended.

2. Keep the operating table and surrounding area clear of debris.

3. Do not use compressed air to remove dust and chips from woodworking machinery.

4. Locate the ON/OFF switch to prevent accidental start-up. The operator must be able to shut off the machine without leaving the workstation. Safety goggles and kickback aprons should be provided for and worn by operators. Respirators or local exhaust ventilation may also be necessary based on the type of material being cut or sanded.

5. Guard planers and joiners to prevent contact with the blades throughout the full length of the cutting area.

6. Ensure that band saw blades are fully enclosed except at the point of operation.

7. Require that swing cut-off saws have a guard completely covering the upper half of the saw.

8. Require that circular cross-cut and rip saws are provided with a hood guard, splitter, and anti-kickback device. The hood should adjust itself automatically to the thickness of and remain in contact with the material being cut. All circular saws will be provided with a hood guard.

9. Ensure that exposed parts of the saw blade under the table are properly guarded.

10. Equip all swing cutoff and radial saws that are drawn across a table with limit stops to prevent the saw from traveling beyond the edge of the table.

11. Hold the material being cut firmly against a back guide or fence and cut with a single, steady pass.

12. Cut green or wet material slowly and with caution. Check all material being cut for nails, hard knots, etc.

13. Use a push stick when:

a. The cutting operation requires the hands of the operator to come close to the blade.

b. Small pieces are being machined.

14. When cutting long stock, provide extension tables and a helper to assist the operator.

15. Adjust saw blades so they clear only the top of the cut.

16. Automatic feed devices should be used whenever feasible.

17. When drills are used:

a. Take care to prevent clothing from being wound around the drill. Wear sleeves buttoned at the wrist or short-sleeved shirts.

b. Clamp or hold down material being drilled to prevent spinning with the drill.

c. If the bit is long enough to pass through the material, provide against damage and injury.

d. Secure magnetic drills with a chain or rope to prevent falling. Label cord connections to prevent unplugging.

18. When sanders are used:

a. Move sanders away from the body.

b. Because dust may create an explosion hazard, guard against open flames and sparks.

F. Pneumatic Tools and Equipment

1. Require that pneumatic tools have:

a. Tool retainers to prevent the tool from being ejected from the barrel during use.

b. Safety clips, chains, tie wires, or other retaining devices to secure connections between tool/hose/compressor to prevent whipping in case of disconnection or failure.

2. Do not lay hose in walkways, on ladders, or in any manner that presents a tripping hazard.

3. Never use compressed air to blow dirt from hands, face, or clothing.

4. Do not use compressed air for cleaning purposes unless the pressure is reduced to 30 pounds per square inch (psi) or less. This rule does not apply for concrete form, mill scale, green cutting, and similar cleaning operations. Proper respiratory, hand, eye, and ear protection must be worn.

5. Never raise or lower a tool by the air hose.

6. Shut off the pressure and exhaust from the line before disconnecting the line from any tool or connection.

G. Powder-Actuated Fastener Tools

1. Use powder-actuated tools that comply with the requirements of the American National Standards Institute (ANSI)/American Society of Safety Engineers (ASSE) Standard A10.3 – 2006 – Powder-Actuated Fastening Systems.

2. Assess local and state regulations governing the use of these tools to ensure compliance.

3. Use only individuals who have been trained by a manufacturer's representative and possess the proper license to operate, repair, service, and handle powder-actuated tools.

4. With each tool, the manufacturer or supplier should furnish a detailed instruction manual covering the application, operation, and maintenance of the tool. The manufacturer's recommendation for size of charge, stud unit, or pin, and for specific application must be followed explicitly by the operator.

5. Keep cartridges or shells in the original containers, in separate metal containers, or in the carrying case provided with the tool, and then stored in locked containers. Keep cartridges of varied charges or forces segregated from each other.

6. Take precaution, as defined by the manufacturer, in the event of a misfire.

7. Provide information from the manufacturer on the safe use, testing, and maintenance of each type of tool in each tool kit.

8. Never use a powder-actuated tool in a flammable or explosive atmosphere.

9. Require the use of goggles or a full face shield as well as safety glasses during operation of powder-actuated tools.

10. Use only tools that are provided with a shield or muzzle guard. This shield or guard should be of a size, design, and material that will effectively confine flying particles and prevent escape of ricocheting studs and pins.

11. Ensure that powder-actuated tools are not able to be fired unless the tool is pressed against the work surface.

12. Always handle powder-actuated tools like firearms, with hands clear of the muzzle and barrel pointed away from all persons, especially when the tool is being closed or assembled after loading.

13. Ensure that the tool is not able to fire if the tool is dropped when loaded.

14. Ensure that firing the tool requires two separate operations, with the firing movement being separate from the motion of bringing the tool to the firing position.

15. Provide signs and barricades when shooting into walls or floors with personnel working on the other side.

16. Never fire into easily pierced or soft substrates or into materials of unknown resistance to piercing. In these situations, there is potential for the fastener to penetrate and pass through, creating a flying projectile hazard. If penetration of these materials is required, the material should be backed with a box of wood or sand al least four inches (10 cm) thick and of adequate area.

17. Do not use powder-actuated tools in reinforced concrete if there is the possibility of striking the rebar.

18. Do not use powder-actuated tools on cast iron, high carbon, heat treated steel, or armor plate, thin slate, marble, glass, live rock, glazed brick or tile, terra cotta, or other brittle substances, or where the composition is unknown.

19. Do not fire studs closer than three inches (7.5 cm) from the edge or corner when being used on brick or concrete. Do not fire studs closer than ½ inches (1.25 cm) from the edge when being used on steel.

20. Never load and leave a powder-actuated tool unattended. It should be loaded only prior to its intended firing. Use only studs or pins specifically designed for the tool.

21. Test tools each day prior to loading by testing safety devices according to the manufacturer's recommended procedure.

22. Inspect, clean, and store powder-actuated tools in a safe place at the end of each day. No tool will be stored loaded. Store tools with the barrels removed or breech open.

23. At the manufacturer's recommended intervals, the tool will be completely dismantled and carefully inspected for wear on the safety devices by a qualified person familiar with the tool. Worn parts will be replaced before the tool is used again. It is recommended that factory-authorized service representatives be utilized for inspection, repair, and parts replacement, where possible.

H. Chain Saws

1. Approval by the HSE manager is required for all use of chain saws.

2. Inspect the saw prior to each use and periodically during daily use.

3. Never cut above chest height.

4. Require that the idle is correctly adjusted on the chain saw. The chain should not move when the saw is in the idle mode.

5. Start cutting only after a clear escape path has been made.

6. Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 meters) while idling.

7. Require applicable protective gear. This will include, but is not limited to:

    a. Logger's safety hat.

    b. Safety glasses and face shield.

    c. Steel-toed boots.

    d. Protective leggings.

    e. Hearing protection.

    f. Work gloves.

8. Inspect saws to ensure that they are fitted with an inertia break and hand guard.

9. *Never* operate a chain saw when fatigued.

10. Do not allow others in the area when chain saws are operated.

11. Make sure there are no nails, wire, or other imbedded material that can cause flying particles.

12. Do not operate a chain saw that is damaged or improperly adjusted, or is not completely and securely assembled. Always keep the teeth sharp and the chain tight. Worn chains should be replaced immediately.

13. Keep all parts of your body away from the saw chain when the engine is running.

14. For all operations, only personnel specifically trained and certified as competent by URS may operate chain saws.

I. Hand-Operated Pressure Equipment

1. Direct pressure equipment such as grease guns, and paint and garden sprayers away from the body and other personnel in the area. The person operating any equipment

such as this, which has a potential for eye injury, must wear protective goggles.

2. The noise produced when using certain types of pressure equipment may require the use of hearing protection.

3. Never allow the nozzle of a pressurized tool to come in contact with any body parts while operating. There is potential for injection of a chemical directly into the user's body, resulting in severe injury or death.

J. Gasoline-Powered Tools

1. Never pour gasoline on hot surfaces.

2. Never fuel around an open flame or while smoking.

3. Shut down the engine before fueling.

4. Provide adequate ventilation when using in enclosed spaces.

5. Use only Underwriters Laboratories (UL) - or FM-approved safety cans to transport flammable liquids. The use of unapproved containers for gasoline is strictly prohibited.

6. Label gasoline containers in compliance with Hazard Communication requirements, indicating the chemical and physical hazards of the product.

K. Inspection

Inspect all hand tools on a regular basis. Immediately remove defective tools from service, and tag or destroy them to prevent further use.

5. Documentation Summary

The following documentation will be maintained in the project file:

A. Site briefings regarding tool use.

B. Records of tools removed from service.

C. Copies of powder-actuated tool licenses (as applicable).

D. Tool inspection documentation.

6. Resources

A. U.S. Occupational Safety and Health Administration (OSHA) Standard – Hand and Portable Power Tools – 29 Code of Federal Regulations (CFR) 1910, Subpart P

B. U.S. OSHA Standard – Construction Tools – Hand and Power – 29 CFR 1926, Subpart I

C. American National Standards Institute (ANSI)/American Society of Safety Engineers (ASSE) Standard A10.3 – 2006 – Powder-Actuated Fastening Systems

D. National Association of Demolition Contractors

E. United Kingdom – 'Provision and Use of Work Equipment' Regulations 1998

F. Australia/New Zealand Standards – Powder-Actuated Handheld Fastening Tools - AS/NZS 1873.1:2003Australian/New Zealand Standards – Hand-held Motor-operated Electric Tools – AS/NZS 60745.1:2003

G. SMS 023 – Lockout and Tagout Safety

H. SMS 064 – Hand Safety

URS SAFETY MANAGEMENT STANDARD
Work Zone Traffic Control

1. Applicability

This standard applies to those activities of URS Corporation and its subsidiary companies involving work performed on roads, highways, and similar areas where motor vehicles may be a hazard, and where URS is responsible for traffic control.

2. Purpose and Scope

This standard is intended to protect personnel from the hazards associated with work performed on or next to highways and roads.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Review the project in the planning phase to determine if any work will be performed on or adjacent to any road that will disrupt normal traffic flow.

B. Where project operations will be performed on or adjacent to roadways, plan work to interfere as little as possible with traffic, and to provide and maintain ingress and egress for all residences and places of business that may be impacted.

C. When required by local regulations or when there is a potential to disrupt traffic, a traffic control plan, in detail appropriate to the complexity of the project, must be prepared by a competent person and understood by all responsible parties before activities begin. Any changes in the traffic control plan should be approved by an official trained in safe traffic control practices.

1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed, and who have the authority to propose and implement corrective measures to eliminate hazardous situations associated with temporary traffic control.

2. Design traffic control plans to meet requirements set forth in Part 6 of the *Manual on Uniform Traffic Control Devices* (MUTCD), as well as those rules set by state, county, and cities in which work is

performed. At a minimum, the plan will include information on the following, as needed:

a. Pedestrian and worker safety;

b. Temporary traffic control elements, including (but not limited to) temporary traffic control zones, advance warning zones, transition areas, activity areas, termination areas, tapers, buffers, detours, etc.;

c. Flagger controls, including high-visibility safety apparel, hand-signaling devices, and flagger procedures;

d. Temporary traffic control zone devices, including (but not limited to) signs, illuminated/flashing panels, warning devices, channelizing devices, drums, barricades, pavement markings; and

e. Temporary traffic control zone activities, including scope of work, duration, location, and portions of the roadway/shoulder affected.

D. Submit the traffic control plan to the applicable road authority for approval.

E. A Worksite Traffic Control Supervisor, certified by the American Traffic Safety Services Association (ATSSA) or an equivalent organization will be responsible for initiating, installing, and maintaining all traffic control devices. The Worksite Traffic Control Supervisor will also directly supervise all project flaggers.

1. Certified flaggers must attend an 8-hour work-zone traffic control course as taught by an ATSSA certified instructor (or equivalent).

F. Execute the traffic control plan developed for the job site.

G. Require all personnel exposed to the risks of moving roadway traffic or construction equipment to wear hardhats, safety glasses, sleeved shirts, long pants, work boots, and the appropriate class of high-visibility safety apparel. Safety apparel background material must be either fluorescent orange-red or fluorescent yellow-green, with accompanying reflective material of orange, yellow, white, silver, or yellow-green, or fluorescent versions of these colors.

H. Wear high-visibility clothing as follows:

1. Class 1 safety apparel (as defined by American National Standards Institute/International Safety Equipment Association [ANSI/ISEA]) for activities that permit the worker:

    a. Full and undivided attention to approaching traffic;

    b. Ample separation between the worker and vehicle traffic; and

    c. Optimum visibility in uncomplicated backgrounds where vehicle and equipment speeds do not exceed 25 miles per hour (mph) (40 kilometers per hours [kph]).

2. Wear Class 2 safety apparel for activities where:

    a. Greater visibility is required due to bad weather;

    b. There are complicated backgrounds;

    c. Employees are performing tasks that draw their attention away from approaching traffic;

    d. Vehicle speeds exceed 25 mph (40 kph); and

    e. Work activities take place closer to the vehicle traffic.

3. Wear class 3 safety apparel for activities where:

    a. Workers are exposed to higher vehicle speeds (generally 50 mph [80 kph] or more) or reduced sight distances;

    b. The worker and vehicle operators have a high task load; and

    c. The worker must be visible through the full range of body motions as a person at a minimum of 1,280 feet (390 meters).

4. Refer to SMS 029 – Personal Protective Equipment, for additional information on high-visibility clothing requirements, including suggested apparel for each class.

F. Perform inspection and maintenance of the Traffic Control devices using Attachment 032-1 NA daily, or at the beginning of each shift.

5. Documentation Summary

The following information will be maintained in the project file:

A. Copies of traffic control plans used on site.

B. Training certificates for Traffic Control Supervisors and flaggers.

C. Inspection records (Attachment 032-1 NA).

6. Resources

A. Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) – 2003 Edition

B. American Traffic Safety Services Association

C. ATTSA Flagger Train-the-Trainer Program

D. ANSI/ISEA 107-2004 – Standard for High-Visibility Safety Apparel

E. SMS 029 – Personal Protective Equipment

I. Attachment 032-1 – Traffic Control Device Inspection Checklist

URS SAFETY MANAGEMENT STANDARD
Biological Hazards

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where job activities are performed primarily in outdoor environments.

2. Purpose and Scope

The purpose of this standard is to provide information that will help eliminate or reduce illnesses and injuries transmitted by plants, insects, animals, and pathogenic agents. Although there are many animals and insects that are potentially harmful to humans (e.g., bees, spiders, bears, and rodents), this standard focuses on six common biological hazards: ticks, poison plants, mosquitoes, snakes, Valley Fever, and water-borne pathogenic agents. Refer to SMS 051 – Bloodborne Pathogens for additional information.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Ticks

1. Precautionary Measures

a. Background information: Ticks do not jump, crawl, or fall onto a person. They are picked up when clothing or hair brushes a leaf or other object the tick is on. Ticks are generally found within 3 feet of the ground. Once picked up, they will crawl until they find a likely site to feed. Often they will find a spot at the back of the knee, near the hairline, behind the ears, or at pressure points where clothing presses against the skin (underwear elastic, belts, neckline). The best way to prevent tick-borne diseases is not to be bitten by a tick. Ticks can carry a number of diseases, including the following:

i. *Lyme Disease* is an infection caused by the corkscrew-shaped bacteria *Borrelia burgdorferi* that is transmitted by the bite of deer tick (ixodes) and western black-legged ticks. The disease occurs in the forested areas of North America, Europe, and Asia. Symptoms that occur within 3 to 30 days following a tick bite include: a spreading 'bulls-eye" rash, fever, fatigue, headache, and joint and muscle aches. Prompt treatment with antibiotics is essential in order to prevent more serious complications that may occur if left untreated.

ii. *Rocky Mountain Spotted Fever* is an infection caused by the bacteria *Rickettsia rickettsii*. The disease occurs in North, Central, and South America. Other Rickettsia organisms cause disease worldwide (Mediterranean, Japan, Africa, North Asia). Symptoms which occur 2-6 days following a tick bite include: fever, nausea, vomiting, diarrhea, rash, muscle and joint pain. The disease is treated with antibiotics.

iii. *Babesiosis* is caused by hemoprotozoan parasites of the genus *Babesia*. It is transmitted by the ixodid tick. The geographic distribution is worldwide. Symptoms include fever, chills, fatigue, muscle aches, and an enlarged spleen and liver. The disease is treated with anti-protozoan drugs.

iv. *Ehrlichiosis* is caused by several bacteria of the genus *Ehrlichiae*. The geographic distribution is global, primarily in temperate regions. Symptoms which occur 5-10 days following a tick bite include fever, headache, fatigue, muscle aches, nausea, vomiting, diarrhea, confusion, and occasionally a rash. The disease is treated with antibiotics.

b. Avoidance of tick habitats

Whenever possible, persons should avoid entering areas that are likely to be infested with ticks, particularly in spring and summer when nymphal ticks feed. Ticks favor a moist, shaded environment, especially that provided by leaf litter and low-lying vegetation in wooded, brushy, or overgrown grassy habitat. Both deer and rodent hosts must be abundant to maintain the life cycle of the tick.

c. Personal Protective Equipment

i. Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing.

ii. Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that ticks cannot crawl up the inside of your pant legs.

iii. Wear a hat, and tie back long hair.

iv. Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing, and will last for several days. Repellents containing DEET (n,n-diethyl-m-toluamide) can be applied to the skin, but will last only a few

hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity.

d. Tick Check

i. Change clothes when you return from an area where ticks may be located.

ii. Shower to wash off any loose ticks.

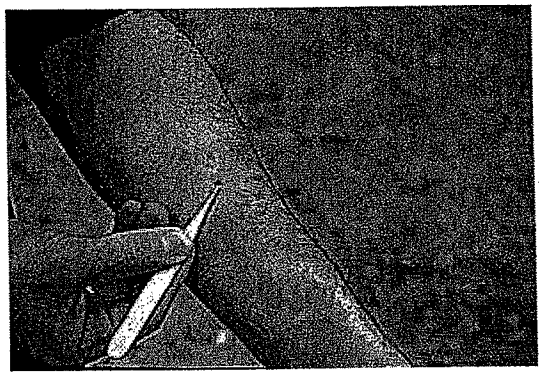
iii. Check your entire body for ticks. Use a hand held or full-length mirror to view all parts of your body.

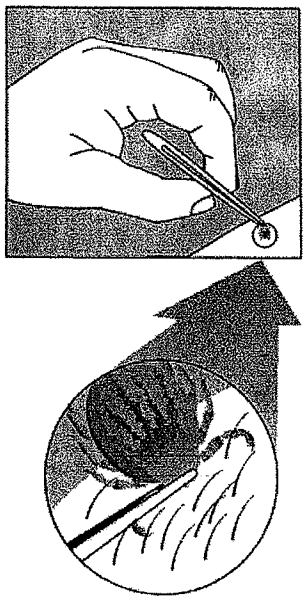
iv. Place clothing worn in tick infested areas into the dryer for at least 30 minutes in order to kill any ticks.

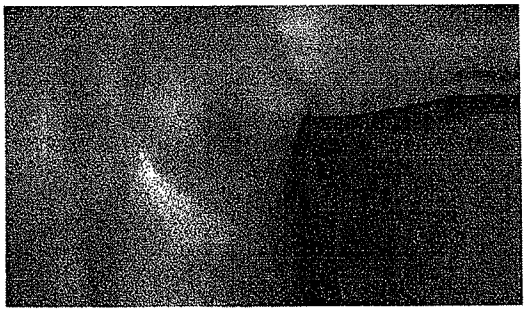
2. Tick Removal

Because it takes several hours of attachment before microorganisms are transmitted from the tick to the host, prompt removal of attached or crawling ticks is an important method of preventing disease. Remember, folklore remedies of tick removal to do not work! Methods such as the use of petroleum jelly or hot matches may actually make matters worse by irritating the tick and stimulating it to release additional saliva or regurgitate gut contents, increasing the chances of transmitting disease.

The best method to remove an attached tick is with a set of fine tipped tweezers.







a. Use fine-tipped tweezers. When possible, avoid removing ticks with bare hands.

b. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with the tweezers.

c. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva and gut contents) may contain infectious organisms.

d. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.

e. Disinfect the tweezers.

f. Save the tick for identification in case you become ill. This may help the doctor make an accurate diagnosis. Place the tick in a vial or plastic zip lock bag and put it in the freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

3. Medical Follow-Up

In most circumstances, medical treatment of persons who only have a tick bite is not recommended. However, individuals who are bitten by a tick should seek medical attention if any signs and symptoms of tick-borne disease develop over the weeks following the tick bite.

B. Poisonous Plants

1. Background Information

Poison ivy and poison oak plants are the most common cause of allergic contact dermatitis in North America. These poisonous plants can be a hazard for many various outdoor activities at work, home, and play. Skin contact with the oleoresins (urushiol) from these plants can cause an itchy, red, oozing, blistered rash in sensitive individuals. Oil content in the plants is highest in the spring and summer; however, the plants are even hazardous in the winter when they have dropped their leaves. There are three types of exposure:

a. Direct contact: An initial skin exposure is necessary to "sensitize" the individual. Subsequent contact in a sensitized person will result in a rash appearing within 4 to 48 hours. Approximately 50 to 70 percent of the population is sensitized. Poison plant dermatitis is usually characterized by areas of linear or streaked patches where branches of the plant brushed the skin.

b. Indirect contact: Skin exposure can happen indirectly. Clothing, shoes, tools, personal protective equipment, and other items can be contaminated with the oils and maintain potency for months.

c. Airborne smoke contact: Never burn poison plants. Droplets of oil can be carried by smoke and enter the respiratory system, causing a severe internal outbreak.

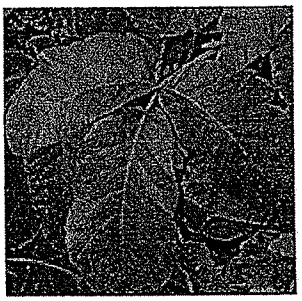
Poison plant rash is not contagious. Skin contact with blister fluid from an affected individual will not cause dermatitis in another sensitized person. Scratching the rash can only spread it to other parts of your body if the oil is still on your skin. After the oil has been washed off or absorbed by the skin, scratching will not spread the rash.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each and are green in the summer and red in the fall. Both plants also have greenish-white flowers and berries that grow in clusters. All parts of these plants are toxic.

Poison Ivy grows as a small plant, vine, and as a shrub. Leaves always consist of three glossy leaflets.

Poison Ivy

Poison Oak grows as a shrub or vine. It has three leaflets that resemble oak leaves.



Eastern Poison Oak

Poison Sumac grows as a woody shrub or small tree from 5 to 25 feet tall. It has 7 to 13 leaves that grow opposite each other with a leaflet at the tip.

Poison Sumac

2. Precautionary Measures

   a. The best approach is to learn to identify the plants and avoid them.

   b. Wear long pants and long sleeves, boots, and gloves.

   c. Barrier skin creams may offer some protection if applied before contact.

   d. Avoid indirect contact with tools, clothing, or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment.

e. If you can wash exposed skin areas within 3 to 5 minutes with cold running water, you may keep the urushiol from penetrating your skin. Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.

3. Medical Follow-Up

Home treatment: Calamine lotion and an oatmeal (1 cup to a tub full of water) bath can help relieve itching. To prevent secondary skin infection, scratching is not helpful, and the finger nails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, read the label and use according to directions.

When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

C. Mosquito-Borne Diseases

1. Background Information

a. Arboviral encephalitis is a viral illness causing inflammation of the brain, and is transmitted to humans by the bite of infected mosquitoes. Globally, there are several strains, including: Eastern equine, Japanese, La Crosse, St. Louis, West Nile, and Western equine encephalitis. Some of the strains have a vaccine. Symptoms of infection are nonspecific and flu-like: fever, headache, and tiredness. Fortunately, only a small proportion of infected people progress to encephalitis. Treatment is supportive, antibiotics are not effective.

b. Malaria is a serious but preventable disease spread by the bite of an infected anopheline mosquito. It is caused by four species of the parasite *Plasmodium (P. falciparum, P. vivax, P. ovale, and P malariae)*. Malaria-risk areas include primarily tropical areas of Central and South America, Africa, India, Southeast Asia, and the Middle East. Symptoms of malaria, which occur 8 days to 1 year after infection, include fever, shaking, chills, headache, muscle ache, tiredness, jaundice, nausea, vomiting, and diarrhea. Malaria can be cured with prescription drugs.

c. Dengue Fever is a potentially life-threatening viral illness transmitted by the bite of the Aedes mosquito, found primarily in urban areas. The

disease is found in most of tropical Asia, the Pacific Islands, Central and South America, and Africa. There are four dengue virus serotypes. Symptoms include sudden onset, high fever, severe headache, joint and muscle pain, rash, nausea, and vomiting. There is no specific treatment and no vaccine.

d. Yellow Fever is a viral disease transmitted between humans by mosquitoes. It occurs only in Africa and South America. There is a vaccine that confers immunity lasting 10 years or more. Symptoms begin 3 to 6 days after the mosquito bite, and include fever, nausea, vomiting, headache, slow pulse, muscle aches, and restlessness. Treatment is symptomatic.

e. West Nile virus is a viral disease transmitted by mosquitoes. It occurs in North America, Europe, Africa, west and central Asia, and the Middle East. There is no vaccine for West Nile virus. Symptoms include nausea, vomiting, and diarrhea.

2. Precautionary Measures

a. Insect Repellent: Use insect repellants that contain DEET. The effect should last about 4 hours. Always use according to label directions. Use only when outdoors, and wash skin after coming indoors. Do not breathe in, swallow, or get into the eyes. Do not put on wounds or broken skin.

b. Protective Clothing: Wear long-sleeved shirts and long pants, especially from dusk to dawn. Avoid going outdoors during these hours.

c. Mosquito netting: Travelers who will not be staying in well-screened or air conditioned rooms should use a pyrethroid-containing flying insect spray in living and sleeping areas during evening and nighttime hours. Sleep under mosquito netting (bed nets) that has been sprayed with permethrin.

d. Malaria prophylaxis medications may be prescribed; however, they do not provide complete protection. The type of medication given depends on the area of travel.

D. Poisonous Snakes

1. Background Information

No single characteristic distinguishes a poisonous snake from a harmless one except the presence of poison fangs and glands. Only in dead specimens can you determine the presence of these fangs and glands without danger. Most poisonous snakes have both neurotoxic and hemotoxic venom; however, one type is dominant and the other is weak.

a. Hemotoxic venom. The folded-fang snakes (fangs can raise to an erect position) have venoms that affect the circulatory system, destroying blood cells, damaging skin tissues, and causing internal hemorrhaging.

b. Neurotoxic venom. The fixed-fang snakes (permanently erect fangs) have venoms that affect the nervous system, making the victim unable to breathe.

c. Poisonous snakes in the Americas: copperhead, coral snake, cottonmouth, and rattlesnake.

d. Poisonous snakes in Europe: adder, viper.

e. Poisonous snakes in Africa and Asia: viper, cobra, adder, green mamba.

f. Poisonous snakes in Australia: copperhead, adder, taipan, tiger snake.

2. Precautionary Measures

Bites occur when you don't hear or see the snake, when you step on them, or when you walk too close to them. Follow these simple rules to reduce the chance of accidental snakebite:

a. Don't put your hands into dark places, such as rock crevices, heavy brush, or hollow logs, without first investigating.

b. Don't step over a fallen tree. Step on the log and look to see if there is a snake resting on the other side.

c. Don't walk through heavy brush or tall grass without looking down. Look where you are walking.

d. Do not pick up any live snake. If you encounter a snake, walk around the snake, giving it plenty of room. A snake can strike half its length.

e. Don't pick up freshly killed snakes without first severing the head. The nervous system may still be active and a dead snake can deliver a bite.

3. Medical Follow-Up

If you are bitten by a snake, the primary goal is to get to a hospital as soon as possible to receive professional medical evaluation, and possible treatment with anti-venom if warranted. Initial first aid should include: Washing the bite with soap and water; immobilizing the bitten area and keeping it lower than the heart. Try to remain calm. If you are unable to reach a hospital within 30 minutes, a bandage, wrapped 2 to 4 inches above the bite, may help slow the venom. The bandage should not cut off blood flow from a vein or artery; make sure the bandage is loose enough that a finger can slip under it.

Research has shown the following to be potentially harmful: DO NOT apply ice, use a tourniquet, or make incisions into the wound.

E. Valley Fever

1. Background Information

Valley Fever is an illness that results from exposure to a fungal spore (*Coccidioides immitis*). It is endemic to the San Joaquin Valley in California, as well as areas of the Southwestern U.S., Mexico, and Central and South America, although it has been found in many other areas. It is particularly associated with arid soils that are not cultivated. Exposure is generally by inhalation of spores, though it may also enter through broken skin. Approximately 2 weeks after inhalation exposure, severe weakness and flu-like symptoms develop; severe pneumonia may occur. It may also affect the brain, bones, and joints causing disability, spinal meningitis, or death. Dermal forms of the infection can form disfiguring fungal lesions.

2. Precautionary Measures

Because it is associated with arid soils, personnel should avoid locations and activities that create dust. Persons at risk of exposure include geologists, surveyors, excavators, archaeologists, etc. Dust suppression methods should be employed and the use of particulate respirators should be considered for areas known to harbor the fungus. At one phase of the fungus' life cycle, cottony, spider-web–like growths may be seen on the soil surface. If observed, these growths must not be disturbed, and work should be relocated if possible.

3. Medical Follow-up

   Approximately 60 percent of exposed persons will not have symptoms. Persons that have been in areas associated with Valley Fever should be alert to the development of flu-like symptoms, fatigue, or skin rashes 2 to 4 weeks later. Valley Fever can be treated with anti-fungal medication. Early treatment is critical, as disseminated forms of the disease can result in chronic disease or death.

F. Pathogenic organisms

1. Background Information

   Employees who perform certain activities, such as disaster response, may be in areas where water-borne pathogens may be present. A partial list of agents includes: E. coli, Hepatitis A, typhoid, and cholera. Chemical hazards and molds and fungus may also be present. Refer to SMS 051– Bloodborne Pathogens for additional information.

2. Precautionary Measures

   All work must be performed within the scope of either a Health and Safety Plan or Safe Work Plan that identifies the task hazards, and specifies appropriate controls. A medical exam and/or inoculations may be required. See SMS 024 – Medical Screening and Surveillance, or contact the Occupational Health Manager for assistance.

   Where contact with water or wet materials may occur, personnel must use protection such as impervious coveralls, boots/waders, faceshields, etc, as specified in the project Health and Safety Plan or Safe Work Plan. Personnel must protect any areas of broken skin, eyes, nose, and mouth from contact with potentially infectious materials, and practice good personal hygiene before eating, drinking, etc.

3. Medical Follow-up

   Medical evaluation and/or an inoculation schedule may be required prior to beginning work. Because early evaluation and treatment is more successful, personnel should be alert to signs and symptoms of possible pathogenic organisms and seek prompt medical evaluation if illness develops or is suspected.

G. Natural disaster relief efforts

1. Natural disaster relief efforts present a variety of hazards, including biological hazards. Biological hazards potentially encountered during relief efforts include mold, sewage-contaminated water, various building materials that may puncture the skin and create various types of infections, and displaced animals and insects. Before work begins, each disaster relief site should be evaluated for the various types of biological hazards that may be encountered. Control measured must be developed to address the biological hazards.

5. Documentation Summary

Complete and distribute a URS Incident Report form 049-1 for all work-related biological exposure incidents.

6. Resources

A. Centers for Disease Control http://www.cdc.gov

B. U. S. Occupational Safety and Health Administration http://www.osha.gov

C. U.S. Food and Drug Administration - Treating and Preventing Venomous Snake Bites
http://www.fda.gov/fdac/features/995_snakes.html

D. ENature – Identify plant and animals hazards in a specific area.
http://enature.com/zipguides/index.asp?choice=poisonous

E. SMS 051 – Bloodborne Pathogens

F. SMS 024 – Medical Screening and Surveillance

G. SMS 049 – Injury / Illness / Incident Reporting & Notifications

H. ORC Pandemic Planning Guide

APPENDIX G
DRAFT CULTURAL RESOURCES PLAN

Appendix G
Draft Cultural Resources Plan

Black Sand Beach Excavation Project
Stevens County, Washington

Prepared by: Michael S. Kelly, RPA

URS

920 N. Argonne Road
Spokane, Washington 99212

December 18, 2009

Contents

Tables

Figures

1.0 INTRODUCTION

This draft Cultural Resources Plan discusses the measures that will be undertaken to address the potential for significant cultural resources to be present within the Black Sand Beach Excavation Project area. The purpose of the project is to remove granulated slag that has accumulated over time within the upland portion of Black Sand Beach, where granulated slag is readily visually identifiable and is accessible using conventional excavation equipment. The intent is to remove as much slag-containing material in the upland Black Sand Beach area as possible, while not adversely affecting the adjacent river.

Teck American Incorporated (Teck) of Spokane, Washington will conduct the project as a voluntary independent interim action in accordance with the Model Toxics Control Act, Revised Code of Washington (RCW) 70.105D, and Chapter 173-340 of the Washington Administrative Code. Teck will complete this project under a Voluntary Cleanup Agreement with the Washington State Department of Ecology (Ecology).

The project will be completed in two phases: the first phase includes planning, engineering, and permitting activities; and the second phase includes construction and close-out activities. The first phase of the project will be conducted from July 2009 through May 2010 and the second phase will be conducted in the fall of 2010. Construction is anticipated to be complete within approximately three to six weeks.

Ecology will be the lead regulatory agency for the project and will be responsible for coordinating interagency reviews with appropriate federal, state, and local agencies. Ecology will take the lead in facilitating public review under the State Environmental Policy Act (SEPA) and coordinating with the Department of Archeology and Historic Preservation (DAHP), the Confederated Tribes of Colville Reservation, Spokane Tribe of Indians, and other interested stakeholders in matters relating to cultural resource issues.

Potentially significant archaeological materials reportedly have been identified in the project vicinity and may be present within the project area itself. To comply with appropriate state and federal regulations, a registered professional archeologist (who meets the Secretary of Interior's standards and guidelines for an archeologist) will complete an archaeological investigation designed to determine the presence or absence of cultural materials in the project area prior to implementing any project activities. The investigation will address the project's area of potential effect (APE) , which will include all areas of excavation, staging, routes of access, and off-site locations with any potential for ground disturbance. Figure G-1 shows the anticipated APE for Black Sand Beach, as provided by Mr. Maurice Major of Washington State Department of Natural Resources (WDNR). Results of this cultural investigation will be used to refine procedures for the removal of slag that will minimize the risk of impact to cultural resources. The rest of this document outlines procedures for handling inadvertent discoveries that will be followed during project activities.

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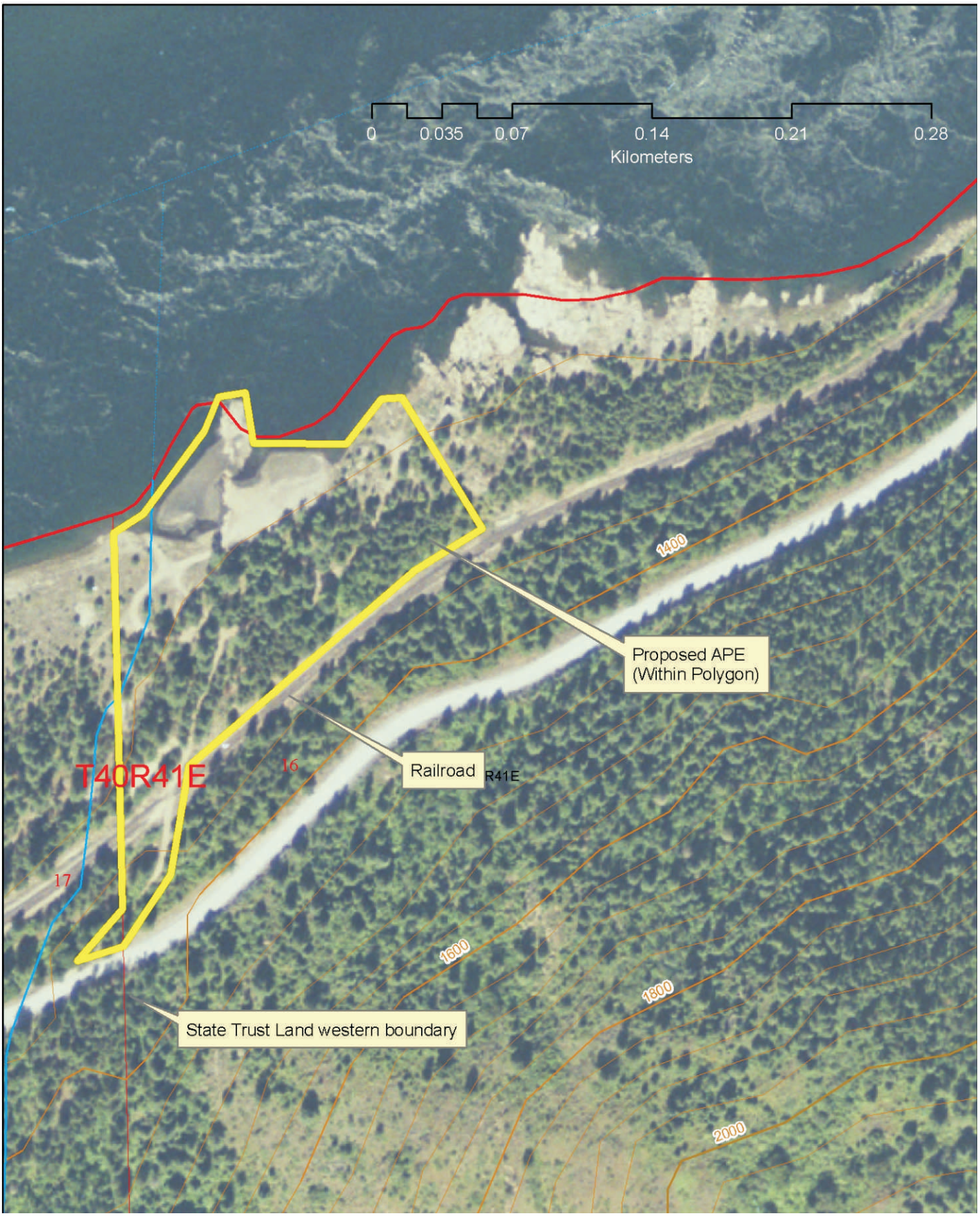

Source: Department of Natural Resources correspondence dated September 25, 2009.

Figure G-1

Area of Potential Effect

Job No. 36310019

URS

Black Sand Beach
Northport, Washington

A registered professional archeologist (who meets the Secretary of Interior's standards and guidelines for an archeologist) will perform an Archeological Inventory Survey (AIS) of the APE (Figure G-1), yielding a report that meets the DAHP's standards for AIS reports. The objective of the AIS is to identify archaeological resources and historic properties located within the project APE that might be considered eligible for nomination to the National Register of Historic Places (NRHP). Archaeological investigations within the APE have been designed to assist with the SEPA and National Environmental Policy Act (NEPA) planning process, as well as with implementation of Section 106 of the National Historic Preservation Act (NHPA), procedures of the Advisory Council on Historic Preservation (36 Code of Federal Regulations [CFR] 800), and Washington State policy requiring inventory and evaluation of cultural resources within potential impact areas. Briefly, these regulations require agencies, before any action (including exchange of lands), to identify cultural resources that may be eligible for the NRHP and that may be affected by that action. The significance of all properties potentially affected by the project must be addressed using established criteria (36 CFR 60.4). The criteria for NRHP eligibility are listed in 36 CFR 60 as follows:

> *The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and*
>
> *(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) That are associated with the lives or persons significant in our past; or*
>
> *(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) That have yielded, or may be likely to yield, information important in prehistory and history.*

If significant (i.e., NRHP-eligible) resources are identified, federal agencies are directed to take prudent and feasible measures to avoid or reduce adverse impacts.

Under the direction of a qualified archeologist, Teck will conduct the proposed project activities under a permit issued by the US Army Corps of Engineers and will comply with Section 106 of the NHPA. Additionally, cultural resource issues will be addressed through the State under the coordination of Ecology through the State Executive Order 05-05 process.

2.0 CULTURAL RESOURCES INVENTORY PLAN

To initiate a determination of potential effects on historic and archaeological resources by proposed project activities, Sarah McDaniel, a qualified URS staff archaeologist, conducted a literature review and record search of records on file with the Washington DAHP in Olympia, Washington for the proposed project area. The literature review was

designed to determine the presence or absence of known historic or archaeological resources. In addition, the lead agency conducted preliminary outreach to applicable Native American tribal representatives, including drafting and submitting letters to the Spokane and Colville Confederated Tribes. These letters requested information on known or potential sites or areas of sacred, ceremonial, or other traditional concern within or adjacent to the project area.

On November 19, 2009, URS archaeologist Michelle Stegner conducted a preliminary reconnaissance of the project area, assisted by Jake Dial under the supervision of Michael Kelly, RPA. This reconnaissance-level survey was conducted so that project archaeological staff could gain a greater familiarity with the designated APE, and to preliminarily assess the potential presence of prehistoric and historic cultural resources within the project area. No subsurface sampling was conducted during this effort, pending additional input from cultural resource stakeholders. The approximately 5-acre APE was examined by walking linear transects spaced at 10-meter intervals. During the course of this investigation, the archeologist examined all exposed ground surfaces, cut banks, and other areas of exposure for the presence of surface or subsurface cultural materials, features, or other evidence of archaeological resources. No evidence of archaeological or cultural resources was identified during the preliminary reconnaissance; however, the potential exists for subsurface deposits of archaeological materials. Therefore, an additional subsurface sampling inventory will be conducted following further consultation and coordination with Ecology, DAHP, the Confederated Tribes of Colville Reservation, Spokane Tribe of Indians, and other appropriate federal, state, and local agencies.

Upon approval, a professional archaeologist will perform an AIS of the APE. The field methodology will include shovel probes or other subsurface testing methods to identify and characterize the boundary between the granulated slag and underlying native sediments, as well as to determine whether cultural deposits are present. In areas of shallow overburden, measuring 50 centimeters (cm) or less in depth, subsurface shovel probing will facilitate examination of undisturbed native soils. If results of other investigation indicate the need to explore deeper, mechanical auguring may be employed elsewhere in the project area in coordination with Ecology, where the depth of overburden exceeds 50 cm and hand excavation is no longer feasible. In all areas, a qualified archeologist will attempt to examine a minimum of one meter of undisturbed native soil.

Subsurface testing will occur at the eastern/upslope edge of the granulated slag deposit and other areas (if any) identified by the qualified archeologist during the AIS. Additional shovel testing will be conducted on the level terrace above the slope (the objective of which is to assess whether archeological/cultural resource sites are present), where impacts may occur due to movement of machinery and parking vehicles during construction work. The river level at the time of the archeological survey will be recorded in relation to a datum such that it can be re-identified once the excavation work commences. In the event that the excavation work is conducted at a substantially lower river level than at the time of the AIS (e.g., more than 50 centimeters), the intervening elevation will be surveyed prior to disturbance.

This draft Cultural Resources Plan and scope of work will be updated and modified, as appropriate, after the archaeological investigation and after further consultation and coordination with Ecology, DAHP, the Confederated Tribes of Colville Reservation, Spokane Tribe of Indians, and other appropriate federal, state, and local agencies.

3.0 CULTURAL RESOURCES MONITORING PLAN

A registered professional archeologist and/or Tribal representatives will be present during construction activities at Black Sand Beach. The archaeological monitor and/or tribal representative following Washington State DAHP procedures will record all prehistoric and historic cultural material discovered during project construction. Site features and artifacts will be photographed and stratigraphic profiles and soil descriptions will be prepared for subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried soils may require further evaluation using hand-excavated test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or interpret complex stratigraphy. A test excavation unit or small trench might be used to determine whether an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance.

Field staff will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level; as well as material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit. Soils excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh. If excavation activities expose human remains (burials, isolated teeth, or bones), the procedures for the discovery of human skeletal materials outlined below will be followed.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with Ecology, the federal agency(s), DAHP, and the affected Tribes.

Within 90 days of concluding fieldwork, a technical report documenting the results of the study will be provided to the Teck Project Sponsor, who will forward the report to Ecology and the Local Programs Archaeologist for review and delivery to the federal agency(or agencies), and the affected Tribe(s). If the presence of archaeological materials is suspected or demonstrated, recommendations for additional evaluation or mitigation will be provided. Findings discussed in the technical report will be used to update and finalize this Cultural Resources Plan, which also will provide procedures for handling inadvertent discoveries.

4.0 PROCEDURES FOR THE INADVERTENT DISCOVERY OF CULTURAL RESOURCES

This section identifies the key responsibilities in the event of a discovery of an item of potential cultural significance during the Black Sand Beach Excavation Project. In the event of a discovery, Teck shall make its best efforts, in accordance with state and federal law, to ensure that its employees and contractors keep the discovery of any found or suspected human remains, other cultural items, or potential historic properties confidential. Appropriate Teck employees and contractors will be required to read and sign a confidentiality statement that specifies procedures to be followed in response to media and public contacts regarding archaeological and other cultural resources. To the extent permitted by law, prior to any release of information, DAHP, Ecology, Teck, and the other consulting parties shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release. In the unanticipated event of a discovery, the following steps shall be taken:

Step 1: Stop Work. If any agency employee, contractor, or subcontractor believes that he or she has uncovered any cultural resource at any point in the project, all work adjacent to the discovery will be stopped. The discovery location will not be left unsecured at any time. The individual making the discovery will immediately contact the Construction Manager and notify him or her of the situation. If the Construction Manager is not immediately available, then the Site Safety Officer will be contacted.

Step 2: Notify Monitor. Immediately following the work stoppage and notification of construction management and/or site safety personnel, the archeological monitor for the project shall be contacted.

Step 3: Notify Project Management and Local Programs Office. The archaeological monitor will first ensure appropriate treatment and protection of the discovery. Following these actions, the Local Programs Archeologist and the other individuals identified in Table G-1 will be notified immediately.

Table G-1
Notification List for Inadvertent Discovery

Name	Agency/Company	Role	Phone
Robert Whitlam	DAHP	DAHP State Archaeologist	Office: 360-586-3080
Maurice Major	WDNR	WDNR Cultural Resources	Office: 360-258-1298
Michael Kelly	URS	Consulting Archaeologist	Cell: 503-475-2426 Office: 503-948-7274
Dave Enos	URS	Principal-in-Charge	Cell: 509-209-0102 Office: 509-944-3807
Paul McCullough	URS	Project Manager	Cell: 425-301-4875 Office: 206-438-2231
Dave Godlewski	Teck	Project Sponsor	Cell: 509-993-4676 Office: 509-459-4584

Special procedures for the treatment of human remains are discussed in detail below, in Section 5.0. As these procedures state, if human remains are encountered, they will be treated with dignity and respect at all times. Remains will be covered immediately with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed. Confidentiality will be a priority and responses to and discoveries of human remains and associated materials will comply with provisions of the Native American Graves Protection and Repatriation Act and its implementing regulations, as well as existing protocols of the Spokane Tribe of Indians and the Colville Confederated Tribes.

5.0 FURTHER CONTACTS AND CONSULTATION

The Archaeological Monitor's responsibilities include:

- ***Protect Find:*** The Archaeological Monitor, in coordination with the Construction Manager, is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.
- ***Direct Construction Elsewhere On Site:*** The Archaeological Monitor, in coordination with the Construction Manager, may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.
- ***Contact Project Archeologist and Local Programs Archeologist:*** If these individuals have not yet been contacted, the Archaeological Monitor will do so.

The Local Programs Archeologist responsibilities include:

- ***Identify Find:*** The Local Programs Archeologist will ensure that a qualified individual examines the find to determine if it is archaeological. If it is determined not to be archaeological, work may proceed with no further delay. If it is determined to be archaeological, the Local Programs Archeologist will continue with notification. If the find may be human remains or funerary objects, the Local Programs Archaeologist will ensure that a qualified individual examines the find.
- ***Notify DAHP:*** The Local Programs Archaeologist will contact the involved federal agency(s) and the DAHP, as indicated in Table G-2.

Table G-2
DAHP and Other Agency Contacts

Name	Agency	Phone	Email
Robert Whitlam	DAHP	360-586-3080	Rob.Whitlam@dahp.wa.gov
Maurice Major	WDNR	360-502-1298	Maurice.Major@dnr.wa.gov

- ***Notify Tribes:*** If the discovery may relate to Native American interests, the Local Programs Archeologist will notify the affected Tribes. Table G-3 identifies Tribes consulted on this project and who may be notified in the event of a discovery.

Table G-3
Native American Tribe Contacts

Tribe	Name	Title	Phone	Email
Confederated Tribes of Colville Reservation	Camille Pleasants	Program Manager, History and Archeology	509-634-2654	camille.pleasants@colvilletribes.com
Spokane Tribe of Indians	Randy Abrahamson	Cultural Resources Coordinator	509-258-4315	randya@spokanetribe.com

6.0 SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Native peoples in the study area consider the graves of their ancestors to be important in both their cultural identity and in defining their relationship with the land. These graves are therefore considered sacred and should be left undisturbed. Should inadvertent disturbance occur, the remains and associated materials ("funerary objects") must be treated with respect and honor. All appropriate federal, state, and Tribal laws, regulations, and procedures regarding burials should be rigorously enforced. In the event that likely or confirmed human remains are encountered, all further sampling or other ground-disturbing activity will cease immediately. In the event of the discovery of human skeletal remains, the archaeological monitor will make the notifications identified in Table G-1. In addition, the following procedure will be implemented.

- ***Notify Law Enforcement Agency or Coroner's Office:*** In addition to the actions described in Sections 3 and 4, the Teck Project Sponsor will immediately notify the local law enforcement agency or coroner's office. The coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP. Table G-4 presents applicable contact information.
- ***Participate in Consultation:*** Per RCW 27.53.030, 68.50, and 68.60, DAHP will have jurisdiction over non-forensic human remains. The Local Programs Archaeologist will participate in consultation.

Table G-4
Law Enforcement and Coroner Contacts

Name	Organization	Role	Phone
David Godlewski	Teck	Teck Public Affairs	509-459-4584
Craig Thayer	Stevens County Sheriff	Sheriff	509-684-5296
Patti Hancock	Stevens County Coroner's Office	Coroner	509-685-0865
Rob Whitlam	DAHP	State Historic Preservation Office	360-586-3080
Chuck Gruenenfelder	Ecology	Ecology Site Manager	509-329-3439

7.0 DOCUMENTATION OF ARCHAELOGICAL MATERIALS

Archaeological materials encountered during construction will be assumed to be eligible for inclusion in the NRHP under Criteria D.

The Local Programs Archaeologist will ensure proper documentation and assessment of any discovered cultural resources in cooperation with the federal agency (agencies), DAHP, affected Tribes, and a contracted consultant (if any).

In the event that cultural resources are discovered during the AIS or subsequent construction work, the appropriate DAHP form will be completed by a professional archaeologist and submitted to DAHP. Significance evaluations and need for additional archaeologist work will be decided in consultation with DAHP, WDNR archaeologist, and Tribal Historical Preservation Officers. Archaeological isolates and sites identified within the APE as a result of the AIS will be treated as previously recorded in relationship to the construction work, and must be covered by Site Protection Plans reviewed by DAHP, the Tribal Historical Preservation Officers, and WDNR archaeologists.

All prehistoric and historic cultural material discovered during the project construction will be treated in the same manner as described above for the pre-construction archaeological investigation. A professional archaeologist will record identified archaeological materials following standard Washington DAHP procedures. Site features and artifacts will be photographed and stratigraphic profiles and soil descriptions will be prepared for subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons and artifacts detected in buried soils may require further evaluation using hand-excavated test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or interpret complex stratigraphy. A test excavation unit or small trench also might be used to determine whether an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. The qualified archeologist will conduct excavations using state-of-the-art techniques for controlling provenience.

Field staff will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level, and material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit.

Soils excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with Ecology, the federal agency (or agencies), DAHP, and the affected Tribes.

Within 90 days of concluding fieldwork (or sooner if possible), a technical report describing any and all monitoring and resultant archaeological excavations will be provided to the Teck Project Sponsor, who will forward the report to Ecology and the Local Programs Archaeologist for review and delivery to the federal agency(s), and the affected Tribe(s).

If assessment activity exposes human remains (burials, isolated teeth, or bones) the process in Section 5 will be followed.

8.0 PROCEEDING WITH CONSTRUCTION

Project construction outside the discovery location may continue while documentation and assessment of the cultural resources proceed. The Local Programs Archaeologist must determine the boundaries of the discovery location. In consultation with Ecology, DAHP and affected Tribe(s), the qualified archeologist and the Local Programs Archaeologist will determine the appropriate level of documentation and treatment of the resource. Ecology will make the final determinations about treatment and documentation.

Construction may continue at the discovery location only after the process outlined in this plan is followed and the Local Programs Archaeologist (in consultation with other agencies) determines that compliance with state and federal laws is complete.

9.0 CONFIDENTIALLY

In accordance with state and federal law, Teck shall make its best efforts to ensure that its employees and contractors keep the discovery of any found or potential cultural resources, human remains, and historic properties confidential. Employees and contractors will be required to read and sign a confidentiality statement that specifies procedures to be followed regarding archaeological and other cultural resources.