Final Engineering Design Report

Irondale Iron and Steel Plant
Irondale, Washington

for
Washington State Department of Ecology

May 1, 2012

GeoEngineers
Earth Science + Technology

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Four copies submitted (one copy also submitted electronically)

GEOENGINEERS

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1.0 INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) has prepared this Engineering Design Report (EDR) for the planned cleanup action at the Former Irondale Iron and Steel Plant Site (Site, also known as Irondale Beach Park) in Irondale, Washington. This EDR also discusses the planned habitat restoration between the north end of the Site and the Washington Department of Fish and Wildlife (WDFW) Chimacum Creek restoration site, located on neighboring property to the north. The Site is a 13-acre property located at 526 Moore Street in the town of Irondale, latitude 48°2' 38" N longitude 122° 45' 60" W, approximately 5 miles south of Port Townsend, Washington (see Vicinity Map, Figure 1). From 1881 to 1919, iron and steel were produced intermittently at the Site by various owners. Steel plant operations during this time resulted in metals, carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and/or petroleum contamination of soil, sediment and/or groundwater. The Site is owned by Jefferson County and is currently used as an undeveloped day-use park (Irondale Beach Park). It is bounded by Port Townsend Bay to the east, residential properties to the south, southwest and northwest, and parklands to the north. The Site includes both upland and aquatic land. The boundaries of the Site are shown on the Site Plan (Figure 2).

The Site is formally identified by the Washington State Department of Ecology (Ecology) databases as facility Site No. 95275518. This EDR was prepared to meet to the requirements of the Washington State Model Toxics Control Cleanup Act (MTCA), administered by the Washington State Department of Ecology (Ecology) through the MTCA rules, Chapter 173-340 of the Washington Administrative Code (WAC). The Site is located on property owned by Jefferson County but the cleanup action is being conducted by Ecology.

In 1919 the iron and steel plant production closed and an incomplete cleanup effort left slag[1] and other debris present at the Site. Previous environmental investigations performed at the Site have identified contamination in localized areas. Irondale Beach Park, which includes the Site, has been identified as a high-priority cleanup area as part of Washington's Puget Sound Initiative, which is intended to protect and restore the Puget Sound and Hood Canal ecosystem health by 2020. To address contamination at the Site, a Remedial Investigation/Feasibility Study (RI/FS; GeoEngineers, 2009a) and a Cleanup Action Plan (CAP; GeoEngineers, 2009b) have been prepared.

The primary objective of this EDR is to describe the plans and procedures for cleanup of the Site. A Compliance Monitoring Plan describing the performance and confirmational monitoring to be performed to verify the effectiveness of the cleanup action is included as Section 7.0 of this document. The major project elements discussed in this EDR include:

- Site Description and Background
- Cleanup requirements
- General description of cleanup action

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[1] Slag refers to a waste material from the steel making process. It is a mixture of metal oxides, limestone and other impurities from the smelting process. It is found on the Site as loose, small to medium-sized rock-like pieces and in larger mounds or heaps.

- Permits
- Site preparation
- Soil excavation and disposal
- Soil capping
- Site restoration
- Compliance Monitoring
- Quality assurance/quality control (QA/QC)
- Schedule and reporting

2.0 BACKGROUND INFORMATION

2.1. Historical Operation and Site Use

Industrial activities took place at the Site from 1881 through 1919. The iron and steel plant produced the first batch of iron in 1881, and the steel production plant was operational beginning in 1909. The Irondale Iron and Steel Plant consisted of a blast furnace and cast house, steel production building (including three open-hearth furnaces and a steel rolling mill), boiler plant, eight charcoal kilns (also referred to as beehive kilns), miscellaneous support buildings (raw material warehouses, power house, machine shop, engine shop, and other supporting buildings), a 600-foot wharf and a 6,000-barrel aboveground storage tank (AST) for fuel oil. At its peak in 1910, the steel plant produced more than 700 tons of steel per day and employed 600 workers. The plant was closed in 1911 and was reopened between 1917 and 1919 because of the demand for steel during World War I. The estimated locations of former structures associated with the iron and steel plant are shown in Figure 2.

Since 1919, no other waste-generating industry has used the Site. From the mid-1970s until 1999, the beach area east of the former iron and steel plant was used as log storage for the Port Townsend Paper Company. A review of the history of the Site and potentially liable parties by Ecology (Ecology, 2007a) states that Cotton Engineering and Shipbuilding Corporation, later known as the Cotton Family Limited Partnership, owned the property from 1943 until December 30, 2002, when the property was sold to Jefferson County. Jefferson County bought the property to use as a recreational area and has operated the Site as Irondale Beach Park since that time.

2.2. Current and Future Land Use

The current land use of the Site is that of Irondale Beach Park. The anticipated future land use is expected to remain as public park space. The Site is part of the Irondale National Historic District designated by the National Park Service and is also listed in the Washington State Heritage Register and the National Park Service Historic American Engineering Record. Preservation of historic Site components is expected to continue following completion of the cleanup action.

2.3. Summary of Environmental Conditions

The extent and nature of contamination was investigated in the upland and sediment portions of the Site through several phases of study between 2007 and 2009. Figure 3 shows the locations of environmental samples collected during the recent remedial investigation (RI) activities at the Site. Figure 4 presents the location of terrestrial ecological evaluation samples collected at the site. The results from these studies show that on portions of the Site soil, sediment, and/or groundwater contain concentrations of arsenic, copper, iron, lead, nickel, zinc, cPAHs and petroleum hydrocarbons that pose a potential risk to human health and the environment. The greatest concentrations of metals are associated with debris and industrial process waste (slag) generally concentrated in areas around the former steel production building and the former power house complex (that is, the power house, engine house, boiler house, blast furnace/cast house, and stock house buildings and the hot stoves). Petroleum hydrocarbon contamination is associated with the former 6,000-barrel AST located on the southeastern portion of the Site.

2.3.1. Sediment

Intertidal sediment is defined as sediment between mean lower low water (MLLW; see Figure 3) and mean higher high water (MHHW). In the areas east of the former AST (toward Port Townsend Bay) and south of the Slag Outcrop, the near-shore surface sediments are generally medium to coarse sand with shell fragments, bricks and occasional slag. Sediments located farther bay-ward (into deeper water) generally consist of silty fine to medium sand with occasional shells and bricks. The surface sediment closer to the Slag Outcrop consist of coarse slag with sand and shell fragments, while surface sediment at the southernmost RI sediment sample location consist of brick and slag cobbles with medium to coarse sand and shells. Surface sediments north of the former wharf generally consist of fine to medium sand with silt, shell fragments, and slag. Fill was identified in four of five intertidal borings that were drilled offshore, to depths ranging from four to seven feet below the mudline. No fill was observed in the fifth intertidal boring.

Subtidal sediment is defined as sediment below MLLW (see Figure 3). Subtidal sediments consist primarily of fine sand with silt with some shell debris, organic matter, and a slight to moderate sulfide odor. Sand generally constituted 52 to 72 percent of the subtidal sediment samples.

SUMMARY OF SEDIMENT CONTAMINANTS

There were no Sediment Management Standards (SMS) analytes detected at concentrations greater than the SMS criteria in the bioactive zone of 0 to 4 inches below the intertidal or subtidal sediment mudline. However, cPAHs (benzo(a)pyrene and chrysene), were detected at one intertidal sediment location (SED02; at a depth of 4 to 18 inches) at concentrations greater than dry weight sediment screening criteria. Also, 2,4-dimethylphenol was detected at concentrations greater than SMS criteria at locations SED18 and SED20 (at depths of 5 and 1.5 feet, respectively).

Thirty-four sediment samples were obtained during the RI and analyzed for diesel- and oil-range hydrocarbons. The concentrations ranged from not detected to 15,700 mg/kg (sum of diesel- and heavy oil-range petroleum hydrocarbons). The petroleum hydrocarbons identified in these samples was characterized by the analytical laboratory as “extremely” and “very” weathered oil, similar to that detected in soil tested from upland soil samples obtained closer to the former AST. Based on chromatographs from the analytical tests, Ecology’s chemist identified the oil as heavy oil-range petroleum hydrocarbons. This description of the oil is consistent with oil identified in the upland and consistent with the historic uses at the Site. In addition, Hart Crowser obtained two sediment samples in 1996, Ecology obtained three sediment samples in 2005, and Jefferson County obtained 36 sediment samples (from 12 locations) in 2007.

Petroleum hydrocarbon exceedances of the bioassay sediment screening level of 136 mg/kg are shown in Figure 5. The bioassay sediment screening level was derived by SAIC based on bioassays conducted on intertidal sediment samples. Petroleum-contaminated sediment appears to be located at depths from 5- to 12-feet below the mudline and extends from the shoreline east of the former AST to approximately 50 feet seaward of the shoreline bank.

2.3.2. Soil

The Site is underlain by a combination of fill and native soil. The fill varies in thickness from zero to approximately 15 feet and is present along all of the near-shore area and beneath former building areas (details of the composition of the fill are outlined below). Most of the upper foot or more of the Site has been disturbed by the prior industrial activities. Native soils underlie the fill and consist of unconsolidated landslide deposits (DNR, 2005). Native soil encountered in explorations consisted of loose gray to brown sand with varying amounts of silt, shell fragments and gravel. Native soil exposed in the steeper portion of the Site consist of loose sand and silt. A thin layer of topsoil and/or forest duff covers most of the upland portion of the Site.

The fill material encountered beneath the Site is described below; although not all types are present everywhere. Listed in order of decreasing depth, from the ground surface, they are:

- Bricks and brick fragments from the former structures. These materials are found around most of the former buildings and the area where the charcoal kilns were located. Brick fragments are also common along the beach below the former kilns and on several of the paths through the park. A layer of charcoal is present near the surface in the former kiln area.
- Loose grey sand with gravel and shell fragments with occasional chips of wood and coke fragments. Along the near-shore area where logs were formerly stored, there is a layer of woody material at the surface of the ground and/or mixed in with the granular material.
- Loose sand with slag and building debris, including some areas that are entirely slag. This fill layer was identified in most of the Site seaward of the former steel production building and former power house complex.

GENERAL

Metals (arsenic, copper, iron, lead, nickel and zinc), cPAHs, and heavy-oil range petroleum hydrocarbons were detected in soil at concentrations greater than cleanup levels established for the Site (GeoEngineers, 2009a). Figures 5 and 6 present the limits of upland soil exceeding cleanup levels and the basis for the extent of the upland soil cleanup action.

PETROLEUM HYDROCARBONS AND CPAHS

Heavy oil exceedances were limited to the area in the upland (near the former AST) and extending seaward into the intertidal area. Oil-contaminated soil appears to be located at depths from 3- to 12-feet below ground surface (bgs) and extends from near the south side of the former AST to approximately 50 feet seaward of the shoreline bank.

cPAHs were detected at concentrations greater than preliminary cleanup levels near the former AST and at one sample location at the former Power House Complex. The exceedances near the former AST are likely associated with heavy oil that was also identified in these samples. cPAH concentrations at these three locations ranged from 54 to 590 micrograms per kilogram (µg/kg).

METALS

Arsenic, copper, iron, nickel, lead and zinc were each detected at concentrations greater than cleanup levels in at least one soil sample. Metals exceedances are located in four general areas of the Site:

- Former Steel Production Building: Metals (arsenic, copper, iron and nickel) were detected at concentrations greater than cleanup levels in soil samples obtained between 0.5 and 2 feet bgs. Metals concentrations in soil samples obtained from depths of 3 to 5 feet bgs at these locations were less the soil screening levels, indicating that metals contamination at the former steel production building may be limited to the top few feet of fill material.
- Former Power House Complex: Metals (arsenic, copper, iron, lead, nickel and zinc) were detected at concentrations greater than cleanup levels in soil samples obtained between 0.5 and 3 feet bgs. The vertical extent of metals contamination was not defined at two of three sample locations with exceedances; therefore, the excavation alternative evaluated in the FS assumed removal of soil to a depth of 6-feet (the conditional point of compliance for terrestrial ecological receptors).
- TP08 (seaward of AST) Vicinity: Metals (arsenic, copper, iron and zinc) were detected at concentrations greater than cleanup levels in soil samples obtained between 0.5 and 6 feet bgs. The vertical extent of metals contamination was not defined at all locations with exceedances; therefore, the excavation alternative evaluated in the FS assumed removal of soil to a depth of 6-feet (the conditional point of compliance for terrestrial ecological receptors).
- Slag Outcrop: Metals (arsenic, copper, iron and nickel) were detected at concentrations greater than cleanup levels in one of two slag samples obtained from the slag outcrop. Because the metals in the slag are not expected to be readily bioavailable (that is, the slag is in a rock-like form that will limit ingestion and dermal contact with metals in the slag), these elevated metals concentrations do not indicate an immediate concern to human health and the environment. Therefore, this area was not identified in the FS as an area requiring remedial action; however, the slag outcrop will be removed as part of shoreline restoration activities.

2.3.3. Groundwater

Static groundwater measurements obtained in monitoring wells MW02 through MW05 in December 2007 and January 2009 indicate that shallow groundwater occurs about 4 to 6 feet bgs in the near-shore area. These measurements were obtained during both falling and rising tidal cycles, but do not represent conditions during extreme high or low tides. Groundwater levels near Port Townsend Bay may be higher or lower during these tides. Groundwater occurs in both fill material and native sediments.

As expected based on the site topography and confirmed through the groundwater monitoring results, groundwater flows from the upland to the east toward Port Townsend Bay, discharging in the intertidal area. It should be noted that the monitoring well data are not representative of steeper (western) portions of the upland because monitoring wells were not installed in these areas. However, it is reasonable to assume that groundwater flows from these higher elevation areas toward the Bay.

Precipitation is the main source of recharge to groundwater at the Site. Other sources of recharge may include septic drainage fields and stormwater/irrigation runoff related to residences located upgradient of the Site.

There are no groundwater supply wells located on, or within ½ mile of, the Site, and groundwater is not a current source of drinking water. Groundwater beneath the Site satisfies the criteria in MTCA (WAC 173-340-720) for classification as non-potable groundwater (see GeoEngineers, 2009a for additional details).

Groundwater samples obtained from monitoring wells MW02 through MW05 were analyzed for total and dissolved metals (arsenic, copper, iron, lead, nickel and zinc), petroleum hydrocarbons and PAHs. Petroleum hydrocarbons were detected at concentrations greater than cleanup levels in MW02, which is located near the former AST and in the area where high concentrations of petroleum hydrocarbons were identified in soil. Groundwater in MW02 also contained evidence of free product in the form of droplets of oil and heavy sheen on the purge water extracted during sampling. Combined diesel- and oil-range hydrocarbon concentrations in samples obtained from MW02 ranged from 1.1 to 3.5 milligrams per liter (mg/L)[2]. The MTCA Method A screening criterion is 0.5 mg/L. Diesel- and/or oil-range hydrocarbons were not detected in samples from the other monitoring wells or from the direct-push borings. Dissolved copper and nickel were detected at concentrations greater than preliminary cleanup levels in samples obtained from monitoring wells MW02 and MW03. cPAHs were detected at concentrations greater than the cleanup level in monitoring well MW02, where elevated petroleum hydrocarbons were also detected.

2.3.4. Surface Water

A surface water drainage exists along the northern boundary of the Site (Figure 2). This drainage enters the Site near the northwestern site boundary and discharges through a metal culvert on the beach near the northeastern corner of the Site. The length of the portion of the drainage that is located on the Site is about 500 feet. The drainage is about 10 to 20 feet wide and has a dense cover of vegetation. The sources of water contributing to this drainage are not known, although one property owner stated it was “spring fed.” The drainage course extends from the housing area upslope of the Site.

Two surface water samples, one upstream and one downstream from within the surface water drainage ditch along the north Site boundary, were analyzed for total and dissolved metals. Arsenic and copper were detected at concentrations greater than preliminary cleanup levels. However, the total and dissolved metal concentrations were similar in the downstream sample and

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[2] Duplicate samples from this well had non-detectable (<0.50 mg/L) petroleum hydrocarbons.

the upstream sample; indicating that contamination at the Site is not impacting water in the surface drainage. With the exception of iron, the concentrations of metals identified in the surface water samples are similar to the concentrations identified in the groundwater sample obtained from the closest monitoring well (MW04). Groundwater elevation data suggest that groundwater and surface water in the drainage are hydrologically connected in the vicinity of MW04.

2.4. Critical Areas

The Site is partially encompassed within the boundaries of the Irondale National Historic District, which was listed in the National Register of Historic Places in 1983 because of the significance of the iron and steel plant to the development of the iron and steel industry on the west coast in the 1800s and early 1900s (NRHP 2010). Several Washington State laws and regulations address heritage resources of the Irondale Iron and Steel Plant. Under the provisions of the State Environmental Policy Act (SEPA), Ecology has prepared an Environmental Checklist, in which it acknowledged that the project was located within the Irondale Historic District. In 2009, Ecology issued a Determination of Nonsignificance (DNS) for the cleanup action construction. In 2011, Ecology prepared an Addendum to the Environmental Checklist and issued a revised DNS to include restoring the remaining portions of the park property between the remediation areas and the WDFW Chimacum Creek restoration site to the north.

A Condition Assessment of the Site was performed by Northwest Archaeological Associates, Inc. in 2010 in anticipation of cleanup action construction. A Condition Assessment is completed to evaluate cultural resources and historic features. The Condition Assessment report is included as Appendix A of this EDR. The Condition Assessment determined that the general condition of the Site and the condition of significant historic features have not been degraded since the Historic American Engineering Record (HAER) survey performed in 1983 in support of historic registration. Erosion occurring along the shoreline has had the greatest effect on historic features, particularly charcoal kiln foundations located along the shoreline. The Condition Assessment concluded that the degraded condition of Site features does not detract from the characteristics of the Site that contribute to the eligibility of the historic District as a whole (NWAA 2011a).

3.0 CLEANUP REQUIRMENTS

The MTCA cleanup regulations provide that a cleanup action must comply with cleanup levels for identified contaminants of potential concern (COPCs), points of compliance, and applicable or relevant and appropriate requirements (ARARs) based on federal and state laws (WAC 173-340-710). The Site cleanup levels, points of compliance, and ARARs for the selected cleanup remedy are briefly summarized in the following sections.

3.1. Cleanup Action Objectives

This section presents cleanup action objectives (CAOs), applicable regulatory requirements for the cleanup action, and a screening evaluation of general response actions and remediation technologies that are potentially applicable to the Site.

CAOs consist of chemical- and medium-specific (soil, water, air, biology) goals for protecting human health and the environment. The CAOs specify the media and contaminants of interest, potential exposure routes and receptors, and proposed cleanup goals. The CAOs for these areas are presented below.

3.1.1. Soil and Groundwater (Uplands)

The objective of the proposed uplands cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by hazardous substances in soil and groundwater in accordance with the MTCA Cleanup Regulation (WAC 173-340) and other applicable regulatory requirements (Ecology, 2007b). Specifically, the objective of the uplands cleanup is to mitigate risks associated with the following potential exposure routes and receptors:

- Contact (dermal, incidental ingestion, or inhalation) by visitors, workers (including excavation workers), and other Site users with hazardous substances in soil;
- Contact (incidental ingestion) by terrestrial wildlife with hazardous substances in soil;
- Contact by terrestrial plants and soil biota and/or food-web exposure to hazardous substances in soil;
- Contact (dermal) by visitors, workers (including excavation workers), and other site users with hazardous substances in groundwater,
- Contact by terrestrial plants (via root uptake) to hazardous substances in groundwater; and
- Exposure by aquatic organisms to hazardous substances in soil that erodes, or groundwater that migrates, to the marine environment.

The cleanup goal for the uplands areas is to mitigate these risks by meeting the soil and groundwater cleanup standards identified below in Section 3.2.

3.1.2. Sediment (Marine Area)

The objective of the proposed marine area cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by Site-related hazardous substances in marine sediment in accordance with the MTCA Cleanup Regulation (WAC 173-340), SMS regulations (WAC 173-204) and other applicable regulatory requirements. Specifically, the objective of the Marine Area cleanup is to mitigate risks associated with the following potential exposure routes and receptors:

- Exposure of benthic organisms to Site-related hazardous substances in the biologically active zone of sediment (the upper 10 centimeters (cm) below the mudline);
- Ingestion by aquatic organisms of benthic organisms contaminated by Site-related hazardous substances in sediment;
- Contact (dermal) by Site visitors with hazardous substances in sediment; and
- Ingestion by Site visitors of marine organisms contaminated by Site-related hazardous substances in sediment.

The cleanup goal for the marine area is to mitigate these risks by meeting the sediment groundwater cleanup standards identified below in Section 3.2.

3.2. Cleanup Standards

Cleanup standards consist of: 1) cleanup levels that are protective of human health and the environment, and 2) the point of compliance at which the cleanup levels must be met. Preliminary site-specific cleanup standards were developed in the RI and adopted during preparation of the FS for the purpose of developing the cleanup action objectives (CAOs) described above for the Site. The final site-specific cleanup standards described below were developed in the CAP.

Site-specific cleanup levels for soil that are protective of human health and terrestrial ecological receptors, and cleanup levels for groundwater that are protective of marine surface water, were developed in accordance with MTCA requirements. Under MTCA, the point of compliance is the point or location on a site where the cleanup levels must be attained. The sections below describe the proposed cleanup levels and points of compliance for soil, groundwater, and sediment. A summary of the proposed cleanup levels is presented in Table 1.

3.2.1. Soil

Based on existing and future land use as a Jefferson County Park the Site is considered to be "unrestricted" (a.k.a. residential) with regard to MTCA exposure evaluations. Accordingly, Method B cleanup levels apply to the human health exposure pathway for soil beneath the upland portion of the Site.

The standard point of compliance (upper 15 feet) is considered applicable to prevent exposure by direct contact to Site soil, as defined in WAC 173-340-740(6)(d).

For potential terrestrial ecological exposures, MTCA regulations allow a conditional point of compliance to be established from the ground surface to 6 feet bgs (the biologically active zone according to MTCA default assumptions), provided institutional controls are used to prevent excavation of deeper soil [WAC 173-340-7490(4)(a)]. Accordingly, in areas of the Site where potential ecological exposures are a concern, and where appropriate institutional controls can be implemented, a conditional point of compliance for soil concentrations protective of terrestrial ecological receptors will be used throughout the soil column from the ground surface to 6 feet bgs.

3.2.2. Groundwater

The highest beneficial use of groundwater beneath the Site is based on the protection of surface water resources (Port Townsend Bay), as specified in WAC 173-340-720. Therefore, groundwater beneath the site is subject to the surface water standards. Because the groundwater cleanup levels are based on protection of marine surface water and not protection of groundwater as drinking water and as provided for in WAC 173-340-720(8)(i), the proposed conditional point of compliance for the groundwater cleanup levels is the point or points where groundwater flows into Port Townsend Bay.

In general, the most conservative (lowest) published numerical values selected from available state and federal surface water criteria as outlined in WAC 173-340-730(3) were selected as the cleanup level.

3.2.3. Sediment

Sediment cleanup levels were developed according to MTCA and SMS requirements and direction provided by Ecology. Two SMS criteria are promulgated by Ecology (WAC 173-204-320). These include the Sediment Quality Standard (SQS), the concentration below which effects to benthos are unlikely, and the cleanup screening level (CSL), the concentration above which more than minor adverse biological effects may be expected. The SQS and CSL values have been developed for a suite of chemicals that includes metals, PAHs and other semivolatile organic compounds (SVOCs), PCBs, and ionizable organic compounds (select phenols, benzyl alcohol, and benzoic acid). The SQS are the most stringent SMS criteria and were used as sediment cleanup levels for the SMS constituents detected in sediment at the Site.

There is no promulgated SMS criterion for petroleum hydrocarbons in sediment. Therefore, SAIC developed a site specific cleanup level of 136 mg/kg for total petroleum hydrocarbons based on sediment bioassays (see Appendix D of the RI).

For marine sediments potentially affected by Site-related hazardous substances, the point of compliance for protection of the environment is surface sediments within the biologically active aquatic zone, represented by samples collected across the top 10 cm (i.e., 0 to 4 inches) below the mudline. Since erosion may remove shallow sediment over time, effectively moving the bottom of the biologically active zone deeper compared to current conditions, Ecology determined that the vertical point of compliance in areas with petroleum hydrocarbons should be the vertical extent of sediment with diesel- and oil-range hydrocarbon concentrations greater than the cleanup level of 136 mg/kg.

4.0 REGULATORY REQUIREMENTS

The cleanup action will be performed by Ecology pursuant to MTCA. Therefore, the cleanup action is exempt from the procedural requirements of certain laws and all local permits (WAC 173-340-710[9][b]). However, the cleanup action must comply with the substantive requirements of these laws and permits. Permits and substantive requirements applicable to the cleanup action are discussed in the following Sections.

4.1. Solid and Hazardous Waste Management

The Washington State Dangerous Waste Regulations (WAC 173-303) will apply to Washington-defined dangerous wastes generated during the cleanup action. Based on evaluation of the soil analytical data generated during the RI/FS, there is a potential to generate dangerous waste during the cleanup action.

Washington State regulates two types of dangerous waste based on the dangerous waste “criteria” published in WAC 173-303-100. These are “toxic” dangerous wastes and “persistent” dangerous wastes. The Dangerous Waste Regulations also require that contaminants present at the Site be evaluated for the toxicity “characteristic” if they are included on the toxicity characteristic list (WAC 173-303-090[8]). A contaminant has the potential to designate as a dangerous waste if its concentration in soil is greater than 20 times[3] the associated toxicity characteristic threshold listed in WAC 173-303-090(8). For example, the lead threshold is 5 mg/l therefore 20 times that threshold is 100 mg/kg.

Samples analyzed during the RI indicated several exceedance of the 20-times value for several metals in soil and slag material at the Site. Several samples of soil and slag with elevated metals concentrations were also analyzed for arsenic and lead by the toxicity characteristic leaching procedure (TCLP) to determine the leachability of the metals and to evaluate waste disposal options. Arsenic and lead were not detected in leachate from any of the TCLP analyses, indicating that the arsenic and lead present in soil and slag are generally not leachable and will not affect waste disposal procedures by requiring handling as dangerous waste. However, during the cleanup action, stockpile samples may require additional TCLP analyses by the receiving landfill due to the elevated metals concentrations. Any soil determined to fail TCLP limits and require designation as a dangerous waste will be managed in accordance with Washington State Dangerous Waste Regulations. This will include segregating the dangerous waste soil from other soil and temporarily stockpiling the dangerous waste soil on Site prior to permitted landfill disposal.

4.2. State Environmental Policy Act

The State Environmental Policy Act (SEPA) (Revised Code of Washington [RCW] 43.21C; WAC 197-11) and the SEPA procedures (WAC 173-802) are intended to ensure that state and local government officials consider environmental values when making decisions. Ecology is the lead SEPA agency for the cleanup action and has completed a SEPA checklist and checklist addendum. In 2009, Ecology issued a DNS for the cleanup action construction. In 2011, Ecology issued a revised DNS to include restoring the remaining portions of the park property between the remediation areas and the WDFW Chimacum Creek restoration site to the north.

A copy of the SEPA checklists and the 2009 DNS and the 2011 revised DNS are provided in Appendix B.

4.3. Washington Shoreline Management Act

The Washington Shoreline Management Act (RCW 90.58) and its implementing regulations establish requirements for substantial developments occurring within water areas of the state or within 200 feet of the shoreline. According to Shoreline Management Act regulations, local shoreline management plans and requirements are adopted under the State regulations, creating an enforceable State law. The Site cleanup action will comply with Jefferson County's substantive requirements, but a shoreline permit will not be required in accordance with WAC 173-340-710(9)(b)(vi) .

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[3] This is referred to as the "20-times rule" and is described in a September 21, 1992 EPA letter titled "Calculation of TCLP Concentrations from Total Concentrations". This reference is available at http://yosemite.epa.gov/osw/rcra.nsf/ea6e50dc6214725285256bf00063269d/95e9e57b91ea2e9f8525670f006c0acd!OpenDocument

4.4. Washington Hydraulic Code

The Washington Hydraulic Code (WAC 220-110) establishes regulations for the construction of any hydraulic project or the performance of any work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh water of the State. The code requires that a Hydraulic Project Approval (HPA) permit (administered by WDFW) be obtained for any activity that could adversely affect fisheries and water resources. Although an HPA permit is not required for the planned cleanup action, an HPA permit was obtained due to the planned habitat restoration between the remediation areas and the WDFW Chimacum Creek restoration site to the north. The HPA substantive requirements are detailed in Appendix C. The permit requirements specify that project work below the ordinary high water mark may only occur from July 15 through October 14 of any year for the protection of migrating juvenile salmonids and sand lance spawning beds.

4.5. Water Quality Management

The Clean Water Act (CWA) is the primary Federal law for protecting water quality from pollution. The CWA regulations provide requirements for the discharge of fill material to waters of the United States. Section 404 of the CWA requires that permits be obtained from the USACE for discharges of excavated or fill material into waters of the United States. Section 10 of the Rivers and Harbors Act requires permits for work in navigable waters. Ecology submitted a Joint Aquatic Resources Permit Application (JARPA) to USACE for the Section 404 or Section 10 permit on June 24, 2011. The USACE issued a Nation Wide Permit #38 Cleanup of Hazardous and Toxic Waste on March 16, 2012. The USACE NWP#38 and associated attachments are included in Appendix C.

In addition to the Federal CWA, water quality is regulated by Ecology under the State Water Quality Act (RCW 90.48). Section 401 of the Federal CWA requires the State to certify that Federal permits are consistent with State water quality standards. State and Federal standards for marine waters specified in the Section 401 Water Quality Certification will apply to discharges to surface water during sediment excavation.

The selected contractor will be responsible for preparing and submitting a Notice of Intent for coverage under the State of Washington Construction Storm Water General Permit (CSWGP) that governs collection, handling, and discharge of storm water and construction water during construction activities. In accordance with the CSWGP, the contractor will also be required to prepare a stormwater pollution prevention plan (SWPPP) to be reviewed and approved by Ecology. See section 5.1.5.2 for more details on the SWPPP.

4.6. Archaeological and Historical Preservation

The National Historic Preservation Act (Section 106) and the Federal Archaeological and Historical Preservation Act (16 USCA 496a-1) will be applicable to the cleanup action construction due to the historic significance of the former Irondale Iron and Steel Plant. A Condition Assessment was prepared for the Site that documents the remaining historic features (NWA 2011a). This assessment was included in the USACE permit application and is provided in Appendix A of this report for reference. In addition, a Cultural Resources Assessment (CRA) report was prepared for the Site (Appendix D). The CRA report outlines expected project effects and a recommended program of mitigation, including a Monitoring and Discovery Plan (NWA 2011b).

The State of Washington Department of Archaeology and Historic Preservation (DAHP) issued an Archaeological Excavation Permit that covers monitoring of vegetation removal and capping in the upland area of the Site. This permit (No. 2011-43) outlines special conditions to be followed and is included in Appendix C. Special conditions include following protocols in the November 10, 2011 permit application and the March 21, 2012 Monitoring and Discovery Plan (Appendix D).

4.7. Other Applicable Regulatory Requirements

The following is a list of other applicable regulatory requirements for the cleanup action:

- **Air Emissions –** Applicable for site grading or excavation work that could generate airborne dust. Controls will be implemented during construction (e.g., wetting or covering exposed soils and stockpiles), as necessary, to meet Northwest Clean Air Agency substantive restrictions on off-site transport of airborne particulates. Sections 5.1.5 of this report describe air emissions controls in greater detail.
- **City Noise Ordinance Requirements –** Construction activities will be carried out in a manner consistent with the state environmental noise standards (WAC 173-60).
- **Health and Safety –** Cleanup-related construction activities will be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the Federal Occupational Safety and Health Act (29 CFR 1910, 1926). The associated regulations include requirements that workers are to be protected from exposure to harmful concentrations of contaminants.
- **Minimum Standards for Construction and Maintenance of Wells** – Groundwater monitoring wells in remedial excavation areas will be decommissioned prior to excavating soil. In addition, monitoring wells will be installed as part of the post-construction confirmational monitoring plan (see Section 7.0). Existing monitoring wells within the remedial excavation areas will be decommissioned, and any new monitoring wells will be constructed, in accordance with the requirements of WAC 173-160.

Jefferson County building and construction permits, including demolition, grading, and drainage approvals, are not required because of the MTCA permit exemption; however, the substantive requirements of the permits must be met.

5.0 CLEANUP ACTION

The cleanup action consists of excavation and off-site disposal of upland soil and near-shore sediment containing COC concentrations (petroleum hydrocarbons, metals and/or cPAHs) above Site-specific cleanup levels, capping contaminated upland soil, and restoring the shoreline along the entire Site. This section also discusses the planned habitat restoration between the north end of the Site and the WDFW Chimacum Creek restoration site to the north. This section provides a summary of the cleanup action objectives, cleanup standards, and a general description of the proposed cleanup action. The remedial design drawings are presented in Appendix E.

The cleanup action will consist of the following activities:

- Implementation of erosion control, Site protection measures, and security measures.
- Clearing and grubbing vegetated areas as necessary for access and to perform cleanup action construction.
- Abandoning monitoring wells located within proposed areas of excavation and/or grading.
- Demolition of the existing 6,000-barrel open concrete tank and disposal of associated debris.
- Excavation of upland soil along the shoreline that contain COC concentrations greater than Site-specific cleanup levels.
- Excavation of marine sediment along the shoreline that contain COC concentrations greater than Site-specific cleanup levels.
- Excavation of slag material in areas outside of remedial excavations to facilitate shoreline habitat restoration.
- Grading shoreline areas outside of the remedial excavations to reduce the slope of the shoreline, add additional beach area, and facilitate habitat restoration.
- Stockpiling and transport of excavated contaminated soils for disposal at an off-site, permitted facility.
- Management of surface water, stormwater, and groundwater, as necessary, during excavation activities.
- Collection of verification soil samples from the base and sidewalls of the excavations for laboratory analysis.
- Backfilling the excavation with clean beach sand generated by shoreline grading or with imported structural fill.
- Installing a multi-component environmental cap in two upland areas with surface soil exceeding site-specific cleanup levels. Soil cap construction will consist of placement of a geotextile under a layer of beach sand fill generated by shoreline grading, topped with topsoil planting mix for revegetation.
- For restoration purposes, remove all or a portion of four kilns prior to excavation and replace the kilns after excavation has been completed. The kilns to be removed and replaced are identified in the CRA report (Appendix D). This work to be completed under the oversight of an archaeologist.
- For restoration purposes, placement of large wood debris (LWD) along newly defined ordinary high water (OHW) line on Site, including Jefferson County property and the WDFW property to the north.
- For restoration purposes, planting of various grasses, groundcovers, and shrubs within newly graded backshore areas and upland cap areas.
- Installation of previously decommissioned monitoring wells and completion of confirmational groundwater monitoring to verify the reduction of COC concentrations in shallow groundwater as a result of the contaminated soil (source) removal.

The objective of the cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by petroleum hydrocarbons and metals in upland soil and marine sediment at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements.

5.1. Mobilization and Site Preparation

Mobilization and site preparation will consist of transporting construction equipment and materials to the Site and constructing temporary controls and facilities necessary to begin construction activities. Site preparation and mobilization activities are expected to occur concurrently and generally will consist of the following:

- Establishing necessary traffic controls, security controls, and Site entrance/exit points;
- Installing temporary personnel facilities including office, sanitation, and decontamination facilities;
- Installing erosion control measures;
- Establishing temporary access and haul routes through the Site and staging and laydown areas for clean and contaminated materials generated during excavation;
- Establishing drainage controls for construction stormwater and installing temporary re-routes for drainage swales located within the shoreline grading area;
- Clearing and grubbing excavation and capping areas as well as access and haul routes, as necessary;
- Demolishing the 6,000-barrel concrete open top tank; and
- Abandoning monitoring wells located within areas of excavation and grading.

Specific mobilization and site preparation issues are addressed in the following sections.

5.1.1. Hours of Operation

Work associated with the cleanup action will be performed during hours allowed by Jefferson County municipal code. Allowable work hours are 7:00 a.m. to 7:00 p.m. Exceptions to the allowable work hours may be made for work to be performed during low-tide periods. A variance will be required for work outside of the allowable hours.

5.1.2. Construction Access

The primary Site access is at the east terminus of East Moore Street at the existing public access parking lot. A private gravel/rock driveway enters the Site from the public parking area. Other access to the Site may be developed from Hadlock Avenue from the west if required to deliver materials to upland capping areas. Where necessary, access points will be stabilized (using quarry spalls or other relevant material) to minimize the tracking of sediment. Street sweeping and street cleaning will be employed, as necessary, to prevent sediment from being tracked onto surrounding roadways and/or from entering state waters.

5.1.3. Construction Staging Area

The limited open space at the Site will require staging in multiple locations through the project duration. Likely staging areas consist of the area between the Site access driveway and the shoreline, and small areas west of the access driveway. These staging areas are expected to be used by the contractor for placement of construction trailers, contractor vehicle parking, storage of supplies and material management containment areas. Contractor parking and/or staging will be prohibited in the public access parking area at the end of East Moore Street.

5.1.4. Materials Management Areas

Materials management areas will be constructed in the vicinity of the grading and remedial excavation areas for temporary storage of graded beach sand and contaminated soil and sediment generated during Site Work. Stockpile containment areas will be constructed to prevent environmental releases resulting from soil and water losses from the stockpiled material. The stockpile containments will be constructed of Ecology blocks and lined with an impermeable barrier. Stockpiled materials will be covered and secured from wind, rain, and other disturbances as appropriate to control erosion and dust.

Some of the soil and sediment may be excavated wet, in which case the excavated material will be placed in a stockpile so that soil can dewater/drain prior to off-site disposal. Excess water from the stockpile areas will be managed. Water will be removed and temporarily stored on Site in portable tanks, and sampled to determine disposal requirements, as necessary. Wastewater will be treated as necessary prior to disposal and/or releasing to vegetated areas south and west of the project area.

Stockpiling procedures are described in greater detail in Sections 5.2.2.

5.1.5. Temporary Site Controls

Temporary site controls will include site access control, traffic control, erosion control/stormwater pollution prevention, and dust and noise control.

5.1.5.1. SITE ACCESS CONTROL

Site access will be controlled in general accordance with the construction phasing and traffic control plans included in the project contract documents. Prior to the start of work, the Contractor will be responsible for providing and installing temporary Site fencing, barricades, signage, and other traffic control devices necessary for cordoning off the work area.

Temporary fencing, barricades, and traffic control flaggers will be used to control access to construction work areas. The fencing and other traffic control measures will remain in place for the duration of the project.

Vehicles will enter and leave the Site via East Moore Street, which will provide the primary route for project-related vehicles.

5.1.5.2. EROSION CONTROL/STORMWATER POLLUTION PREVENTION

The selected contractor for the project will be responsible for applying for coverage under the Washington State CSWGP. Storm water management will be performed in accordance with the requirements of the CSWGP. The selected contractor shall prepare a stormwater pollution prevention plan (SWPPP) to be reviewed and approved by Ecology. Best management practices (BMPs) will be used to control erosion during excavation and backfilling activities. BMPs will be implemented consistent with the State Department of Ecology Stormwater Management Manual for Western Washington. Erosion control procedures are detailed in the project contract documents and depicted in Appendix E. Proposed project elements designed to prevent stormwater pollution include:

- Erosion of exposed soil will be controlled.
- Materials that could contribute pollutants to stormwater will be contained.
- Stockpiled soil and sediment/beach sand will be covered and secured from wind, rain, and other disturbances as appropriate to control erosion and dust.
- Soil and silt will be prevented from entering storm drains through the use of silt fencing, silt dikes, storm drain inlet protection, catch basin silt barriers, fabric filter fences, straw bales, interceptor swales, wattle and rock check dams, and/or similar BMPs.
- Access points will be stabilized using quarry spalls or other relevant material to minimize the tracking of sediment onto roads.
- Street sweeping and street cleaning will be employed, as necessary, to remove sediment from East Moore Street.

5.1.5.3. DUST AND NOISE CONTROL

Site grading and excavation work could generate airborne dust. Engineering controls will be used during construction (e.g., wetting or covering exposed soil and stockpiles), as necessary, to meet Northwest Clean Air Agency substantive restrictions on off-site transport of airborne particulates. In addition, street sweeping will be performed, as necessary, in areas where construction traffic mixes with general vehicular traffic.

Construction noise will be generated by a variety of construction equipment, including truck engines, generators and other small engines, and earthmoving equipment. Construction noise will be limited to daytime hours and is not expected to create adverse impacts due to the lack of sensitive noise receptors in the area. Construction activities will be carried out in a manner consistent with Jefferson County municipal code and State environmental noise standards. Allowable work hours are 7:00 a.m. to 7:00 p.m. A variance will be required for work outside of these hours. Noise monitoring will be conducted if required by Jefferson County.

5.1.6. Demolition

5.1.6.1. CLEAR AND GRUB VEGETATED/FORESTED AREAS

Vegetated/forested areas will be cleared and grubbed to the extent required to complete remedial excavation and capping at the Site, including construction of temporary access and/or haul routes. Trees and vegetation will be maintained and preserved to the extent practicable. Other trees and vegetation removed from the Site will be salvaged and chipped on site for reuse as mulch to top dress planting areas during restoration work. Trees and vegetation will be removed from the Site in a manner that minimizes contact with contaminated soils. Stumps and root bases in contact with contaminated soil will be disposed of with the associated contaminated soil.

5.1.6.2. DEBRIS REMOVAL/RELOCATION

Debris encountered during Site work and requiring removal to complete excavation and grading activities will be set aside for observation and documentation by an archeological resources specialist due to the potential association with historic steel and iron production activities. Debris determined to have no archeological significance and suitable for disposal will be stockpiled and transported off-site to an appropriate disposal facility.

5.1.6.3. DEMOLISH CONCRETE TANK

The existing 6,000 barrel open-top concrete tank located on the Site will be demolished to complete remedial excavation and shoreline grading work. Demolished debris from the tank will be transported from the Site to an appropriate construction debris receiving facility.

5.1.6.4. MONITORING WELL ABANDONMENT

Monitoring wells MW2, MW3, and MW4, located within the extent of remedial excavation and shoreline grading, will be decommissioned by a Washington-licensed driller in accordance with Ecology requirements (WAC 173-160-460) prior to any excavation activities.

Monitoring well MW5 is located outside of the remedial excavation limits and will be protected during the construction activities.

5.2. Contaminated Soil and Sediment Excavation

This section describes planned soil excavation activities, including the excavation approach and methods, soil segregation and stockpiling, construction dewatering, verification sampling, and backfilling and compaction. Site work will include remedial excavation of approximately 5,600 in-place cubic yards of contaminated soil from upland areas (above MHHW) and 2,300 in-place cubic yards of contaminated sediment from marine areas of the Site (below MHHW). The actual quantities of excavated soil and sediment may be greater or less than this estimate based on the results of verification sampling at the excavation limits (see Sections 5.2.4).

5.2.1. Excavation Approach and Methods

Contaminated soil and sediment will be excavated in three general areas of the Site: upland soil (above MHHW) south of the 6,000 barrel concrete tank; upland soil north of the concrete tank; and marine sediment below MHHW (Figures 5 and 6). Soil and sediment excavation will be performed using commonly available excavation methods. Excavation procedures will include the following:

- Soil excavation will generally be conducted to the horizontal and vertical limits presented in Sheets C1.0 through C1.5 of the Contract Drawings included in Appendix E.
- Overburden soil will be excavated as needed to gain access to underlying contaminated soil. The excavations will be completed in a manner that allows segregation and reuse of clean overburden soil.
- Field screening (headspace organic vapor screening, water sheen screening, and visual observation) will be performed by a geologist, environmental scientist, or engineer as soil excavation proceeds, to help determine when to collect verification samples. The preliminary limits of excavation will be determined by the results of field screening. Once the preliminary

limits are reached, verification soil samples will be collected for laboratory analysis from the excavation sidewalls and base as discussed in Section 5.2.4.

- If the initial verification samples collected from the excavation base indicate that further vertical excavation is necessary to achieve soil cleanup levels, additional excavation will be performed until subsequent verification samples obtained from the excavation base indicate that complete removal of contamination has been achieved.
- If the initial verification samples collected from the excavation sidewalls indicate that further lateral excavation is necessary to achieve soil cleanup levels, additional excavation will be performed until subsequent verification samples obtained from the excavation sidewalls indicate that clean limits have been achieved. The exception to this is the eastern (water-ward) boundary of the sediment excavation area. This area is currently defined by existing sample data that will serve as passing verification samples, thus pre-defining the eastern limits of sediment excavation.

5.2.2. Soil Segregation and Stockpiling

Segregation and stockpiling of excavated soil will be conducted on Site and as close as practicable to the remedial excavation areas. Soil will be segregated for stockpiling as follows:

- Shallow overburden soil expected to not exceed cleanup levels, and which is deemed geotechnically suitable for reuse on site as backfill, will be temporarily stockpiled and sampled to confirm that contaminant concentrations are below the soil cleanup levels listed in Table 1. Details regarding stockpile sampling for chemical characterization are discussed in Section 5.3.
- Soil known to contain contaminant concentrations exceeding cleanup levels based on previous sampling data will be stockpiled separately, sampled for disposal characterization as required by the selected disposal facility and transported off-site for disposal at a permitted facility.

Stockpiled soil will be covered and secured from wind, rain, and other disturbances as appropriate to control erosion and dust.

5.2.3. Construction Dewatering and Wastewater Disposal

Excavation of wet soil and sediment is expected to be necessary in the tidal environment of the excavation areas. Excavated soil containing free liquids and would not be expected to pass a standard paint filter test (EPA Method 9095B paint filter free liquids test) required for transport and disposal will be stockpiled within or alongside the excavation and allowed to drain into the excavation.

As a contingency, construction dewatering may be required to maintain a dry excavation, to the extent possible, to reduce the water content of excavated soil and to enable verification sampling. Due to the level of hydrocarbon contamination present in some of the excavation areas, the potential for sheen or free product in groundwater will be considered during construction. During excavation in wet conditions, water with a sheen or free product will be removed from the excavation using vacuum methods and adsorbent materials (adsorbent socks, pads, etc.) will be placed in the excavation to adsorb hydrocarbons released by excavation. Water collected during dewatering will be either directly transported off-site for disposal at a suitable permitted disposal facility.

The Contractor will also be responsible for collection of water in soil stockpiling areas. In the event that heavy rains occur during project activities, attempts will be made to collect accumulated surface water within the project area. Collected wastewater will be analyzed for total petroleum hydrocarbons and metals. Based on chemical analytical results of the wastewater samples, wastewater will be treated as necessary for discharge on Site or transported from the Site for permitted disposal. Waste water discharged on Site will be released south and west of the remedial excavation area.

5.2.4. Verification Sampling

Verification sampling will involve collecting soil samples from the base and sidewalls of the remedial excavation areas to verify that cleanup levels have been achieved and to document concentrations of contaminants remaining at the Site. The only locations not requiring verification samples are the eastern boundaries of the marine sediment excavation areas. The existing sediment data that was used as the basis for delineating eastern (water-ward) extent of the sediment excavation areas will serve as the verification samples for the limits of excavation. Verification sampling will consist of the following steps:

- Discrete samples will be obtained from the limits of the remedial excavations at the sampling density described in Section 7.2.
- The verification soil samples will be analyzed on a short turnaround basis to assess compliance with site-specific cleanup levels (Table 1) and minimize contractor standby time.

5.2.5. Backfilling and Compaction

The contractor will survey the excavation area prior to any backfilling for the purpose of developing as-built drawings and to compute pay volumes. The contractor will also survey the excavation area following placement of backfill for the purpose of post-construction reporting. Remedial excavations will be backfilled and compacted to surface grade with clean and suitable materials. Stockpiled overburden soil with suitable physical and chemical characteristics will be reused as backfill to the extent possible. The majority of the material used for backfilling the remedial excavations will be obtained through grading activities outside of the remedial excavation areas. Grading planned on the shoreline north of the remedial excavations, including proposed grading on the WDFW property to the north, will generate significant quantities of clean, suitable material to be used as backfill. Reuse of overburden soil will be dependent on the results of chemical characterization sampling as described in Section 5.3.

Imported fill will be used to supplement clean overburden and other reclaimed material if necessary. The contractor will provide verification that all imported granular fill materials have been tested and certified to be free of contaminants at concentrations above the soil cleanup levels listed in Table 1. The source for the fill material will be documented in the construction completion report for the project.

5.3. Chemical Characterization of Excavated Soil and Sediment for Disposal or Reuse

Excavated soil and sediment will be characterized for disposal or on-site reuse as required by MTCA and Washington State Dangerous Waste regulations and the selected disposal facility. Where possible, existing soil analytical data will be used to characterize contaminated soil for disposal. This approach will allow excavated contaminated soil to be transported directly to the disposal facility without further characterization. Stockpile sampling is expected to be required for the majority of excavated material.

Where stockpile characterization sampling is necessary, stockpile sampling will be performed at a frequency consistent with Table 1 of Ecology's *Guidance for Remediation of Petroleum Contaminated Soils* (Ecology, 1995), as follows:

Cubic Yards of Soil	Minimum Number of Samples
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards

Discrete samples will be collected from various zones and/or depth horizons within the stockpiles as the stockpiles are being constructed to obtain spatially representative samples of the stockpiled material. The stockpile samples will be collected from locations that are generally representative of the soils and where field screening indicates contamination may be present. If field screening does not indicate potential contamination, the stockpile will be divided into sections and each section will be sampled. To evaluate whether stockpiled overburden soil can be reused on site as backfill, the stockpile samples will be analyzed for the Site indicator hazardous substances and the results will be compared to the cleanup levels listed in Table 1.

5.4. Upland Environmental Capping

Soil at the former power house complex and the former steel production building (Figure 2) is impacted with metals at concentrations exceeding Site-specific cleanup levels. During the RI/FS the remedy selected to address contaminated soil in these areas was placement of a multi-component soil cap. Capping was determined to be the best combination of effectiveness, cost, and lack of short-term impacts relative to removal and disposal alternatives.

The two upland capping areas total approximately 1.5 acres. Cap materials will generally consist of permeable geotextile designed for soil separation, clean sandy soil generated during excavation and grading for shoreline restoration, and topsoil for a planting substrate. Cap construction will generally consist of the following steps:

- Clearing and grubbing vegetation within cap areas. Larger trees may be allowed to remain in place if determined to be health and not impacted by site contaminants;

- Placement of approximately 6 to 12 inches of sand on the cleared ground surface as a leveling layer;
- Placement of geotextile separation layer;
- Placement of 2-foot thick cap using fill generated by shoreline restoration grading;
- Placement of a 1-foot layer of topsoil as a planting substrate;
- Planting shallow-rooted native ground covers and small shrubs within the cap area.

Cap construction is detailed in the project contract documents, and are depicted in Sheets C2.0 through C2.2 and L1.0 through L1.2 included in Appendix E.

5.5. Site Restoration

This section outlines the planned restoration activities proposed for the Site where remedial excavation has occurred and/or where beach restoration will occur. Restoration activities will consist of restoring utilities affected by construction, grading and planting areas of remedial excavation and capping, and grading, planting, and installation of LWD of the shoreline outside the remedial excavation areas. Site grading and planting plans are detailed in the project contract documents, and are depicted in Sheets C3.0 through C3.10 and L1.0 through L1.2 included in Appendix F.

5.5.1. Utilities

Utilities are not present within the remedial excavation or capping areas at the Site. However, two storm water drainage swales are located within the area of proposed shoreline grading and restoration, one at the north end of the Jefferson County property and one located on the WDFW property. Each of the drainage swales are fed by corrugated metal culverts that are outside of the proposed limits of grading. The drainage swales will be re-graded along with the surrounding shoreline to allow storm water flow to be restored to original conditions.

5.5.2. Surface Restoration

Following completion of remedial excavation backfilling, the final surfaces will be graded to achieve a more gradual slope and a net increase of beach area along the shoreline, relative to existing conditions. The ordinary high water (OHW) line of approximately 10.5-foot elevation will be drawn back (extended landward) by a distance ranging from approximately 20 to 50 feet relative to the current OHW alignment. The shoreline and a portion of uplands north of the remedial excavation areas, extending onto the adjacent WDFW property, will also be re-graded to achieve a consistent intertidal slope. The WDFW property will be graded and restored from the southern boundary north to the southern extent of the Chimicum Creek shoreline restoration project previously completed by WDFW.

In graded or excavated areas along the shoreline, the ground surface below the proposed new OHW will be surfaced with reclaimed beach sand generated from shoreline grading. The proposed new OHW line will be armored with large woody debris (LWD) along the entire Site, including where grading extends north onto the WDFW property. LWD is an important element to armor and protect the beach and decrease inland shoreline erosion. Disturbed areas upland of the proposed OHW will be backfilled to 1-foot below final grade with reclaimed beach sand and topped with 1-foot of imported topsoil to the proposed final grade.

Areas disturbed by remedial excavation, capped, or re-graded for shoreline restoration will be planted as necessary to restore or improve vegetation and wildlife habitat. Generally, areas along the shoreline upland from the proposed new OHW will be planted with dune grasses, short groundcovers, and short shrubs. Upland soil cap areas will be planted with groundcovers and short shrubs that will stabilize the surface of the cap material.

6.0 INSTITUTIONAL CONTROLS (RESTRICTIVE COVENANTS)

The site-wide cleanup action is expected to leave some contaminated soil in place in the upland areas where capping is the remedial action, as well as in excavation areas that may leave contamination below 6 feet below ground surface. Although residual contamination in soil below 6 feet bgs is deep enough to not pose current risks to human health and terrestrial ecological receptors, future development within areas of remaining contaminated soil could potentially generate conditions requiring appropriate safe handling procedures, stormwater controls, and consideration of disposal options for the contaminants of concerned and concentrations encountered.

The anticipated locations where contaminated soil will be left in place following completion of cleanup action activities addressed in this EDR include the following:

- **Upland Cap Area –** Contaminated soil in the upper area of the Site (on top of the bluff near historic mill and power house activities) has been determined through the analysis outlined in the FS to be most effectively addressed by isolating the soil under a cap. Soil exceeding Site cleanup levels will remain in place below a geotextile separation layer and a layer of clean soil.
- **Shoreline Metals-Contaminated Soil Excavation Area –** The cleanup objective for metals-contaminated upland soil near the shoreline areas is to remove contaminated soil within 6 feet bgs that exceed cleanup levels. There are areas of soil contamination (metals) below 6 feet bgs that are expected to be left in place. These areas are either currently underneath a 6-foot column of clean soil, or will be below 6 feet of clean backfill following soil removal in the upper 6 feet.

Restrictive covenants will be required for the portions of the Site where complete removal of soil exceeding cleanup/remediation levels will not be achieved. The covenants will restrict future development and will identify specific contaminated soil locations, depths, and approximate volumes that will require special management if disturbed, unless the soil contamination is removed at a later time. This information will be included in the construction completion report. The covenants also will require that soil management plans be developed prior to performing any future invasive work in areas of remaining contaminated soil. A draft restrictive covenant is included in Appendix F.

The areas of residual contaminated soil will be documented with the results of post-excavation verification sampling, and will continue to be addressed through restrictive covenants and confirmational/long-term monitoring. The restrictive covenants will be finalized and recorded after site restoration activities are completed.

7.0 COMPLIANCE MONITORING

Compliance monitoring will be implemented in accordance with WAC 173-340-410. The three types of compliance monitoring to be performed include:

- **Protection Monitoring** to confirm that human health and the environment are adequately protected during the construction phase of the cleanup action.
- **Performance Monitoring** to confirm that the cleanup action has attained cleanup standards.
- **Confirmational Monitoring** to confirm the long-term effectiveness of the cleanup action.

The objectives of compliance monitoring are to protect human health and the environment during the cleanup action (protection monitoring), verify that cleanup standards have been achieved (performance monitoring), and confirm the long-term effectiveness of the cleanup action (confirmational monitoring). Compliance monitoring activities are described in the following subsections.

7.1. Protection Monitoring

Human health and the environment will be protected during the cleanup action through the use of worker health and safety measures and environmental protection measures designed to protect air and surface water quality.

7.1.1. Worker Health and Safety

Cleanup-related construction activities will be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the Federal Occupational Safety and Health Act (29 CFR 1910, 1926). These regulations include requirements that workers are to be protected from exposure to contaminants and that excavations are to be properly shored. The selected cleanup action contractor will prepare and implement a HASP covering its work activities. Within contaminated areas, workers will be required to have current hazardous waste operations and emergency response (HAZWOPER) training. Earthwork associated with known or potentially contaminated materials will be conducted in accordance with the contractor's HASP.

7.1.2. Environmental Protection

Environmental protection measures will include dust control measures and surface water quality control measures.

7.1.2.1. AIR EMISSIONS AND DUST CONTROL

Short-term air emissions are expected to be limited to engine exhaust from trucks, earthmoving equipment, and other construction-related vehicles and equipment. In addition, site grading or excavation work could generate airborne dust. Dust control measures will be implemented by the contractor as discussed in Section 5.1.5.

7.1.2.2. SURFACE WATER QUALITY CONTROL

Surface water quality control measures will be implemented by the contractor as discussed in Section 5.2.3. As mentioned in Section 5.1.5.2, the contractor will develop a stormwater pollution prevention plan. The contractor will inspect and maintain the stormwater management, erosion and sediment control, and spill prevention and control BMPs associated with the work.

7.2. Performance Monitoring

Performance monitoring will be conducted to verify that the cleanup action attains soil and sediment cleanup standards established for the Site. This section describes performance monitoring methods including verification of excavation elevations, verification sampling, and chemical characterization of soil verification samples.

7.2.1. Verification of Excavation Elevations

Performance monitoring following soil excavation will initially include topographic surveys to verify that excavation area has achieved the required cut elevations. Surveys will also be performed upon completion of backfilling activities to verify conformance with the design backfill elevations.

7.2.2. Verification Sampling

Once required cut elevations have been verified at each upland remedial excavation area, soil samples will be obtained from the limits of the excavation to verify that the cleanup levels listed in Table 1 have been achieved and/or to document contaminant concentrations remaining in place at depth. Soil verification sampling will be conducted as follows:

- Remedial excavation will proceed laterally until cleanup levels are achieved on the excavation sidewalls. With the exception of the eastern (water-ward) boundary of the sediment excavation areas, sidewall samples will be collected at a frequency of one sample per 40 linear feet of sidewall. The eastern boundary of the sediment excavation is pre-defined by the existing sampling data and does not require additional verification sampling. If the perimeter of the excavation is less than 40 feet, a minimum of four sidewall samples will be obtained (i.e., one sample per sidewall assuming a four-sided excavation).
- Collect discrete samples from the base of the remedial excavation areas at a rate of approximately one soil sample per 625 square feet of excavation base. If sampling is to be performed in an excavation area less than 625 square feet, a minimum of one base sample will be obtained.
- Collect samples using a clean stainless steel spoon/trowel or directly by hands using a fresh and clean pair of nitrile gloves either from the excavation equipment (i.e., backhoe or excavator) or from the excavated surfaces. Samples obtained from backhoe or excavator buckets will be from the center of the bucket or from an area of soil that the surface of the bucket has not touched. Collected samples will be transferred into clean sample containers provided by the analytical laboratory. Sampling equipment (if used) will be decontaminated prior to sample collection at each location. Decontamination procedures are described in the QAPP (Appendix G). Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection as described in the QAPP (Appendix G).

- Visually classify the soils in accordance with American Society for Testing and Materials (ASTM) Method D 2488 and record soil descriptions and other relevant field screening details (e.g., staining, debris, odors, etc.) in the field log. Soil classifications and field screening data for the final limits of excavation will be used to develop excavation logs to document completion of excavation and conditions remaining on site. Field screening procedures are presented in Section 6.2.2 of the QAPP (Appendix G).
- Soil verification samples will be analyzed only for those constituents known to exceed soil cleanup levels at each remedial excavation area based on existing analytical data. The samples will be analyzed on a short turnaround basis to allow timely decision-making regarding the need for further excavation to achieve cleanup levels.
- If base verification sample results exceed Site cleanup levels, additional excavation will be performed to remove soil represented by the exceedances. Following each additional excavation, one or more verification samples will be obtained from the base of the extended excavation, as appropriate, to verify that the cleanup levels have been achieved. The lateral limits of the over-excavation will be extended to the limit of the excavation unit established by the control points and/or to clean verification sample locations. On completion of the over-excavation discrete samples will be collected from the base at a rate of approximately one soil sample per 625 square feet.
- Soil samples obtained during the RI and the 2011 data gap investigation (GeoEngineers, 2011) will be used as verification samples for areas requiring a cap: the former power house complex and the former steel production building areas.

7.3. Confirmational (Post-Construction) Monitoring

Confirmational monitoring will be performed after the Site cleanup action is completed to evaluate the post-construction effectiveness of the cleanup action. This section describes confirmational groundwater monitoring for the Site.

7.3.1. Groundwater Monitoring

Confirmational groundwater monitoring will be performed quarterly for a minimum of one year after the cleanup action is completed to evaluate the long-term effectiveness of the cleanup action, with respect to protection of groundwater. The four consecutive quarterly monitoring events will be initiated after cleanup and site restoration activities are completed.

A network of groundwater monitoring wells will be established at the Site, as approved by Ecology. The groundwater monitoring wells will be sampled for the constituents of potential concern identified in Site soils, including dissolved metals, diesel- and heavy oil-range hydrocarbons, and cPAHs. The monitoring well network will include existing and new monitoring wells to be installed after cleanup activities are completed. Both shoreline and inland area wells will be monitored. New monitoring wells will be installed at locations selected in consultation with Ecology, and will be constructed in accordance with the requirements of WAC 173-160.

Results of the groundwater monitoring will be reviewed by Ecology to determine if the confirmational monitoring objectives have been met. If one or more of the hazardous indicator substances are detected at concentrations exceeding the Site cleanup levels, additional compliance groundwater monitoring may be completed, at the approval of Ecology. If additional compliance groundwater monitoring is necessary based on the results of the four quarterly events, sampling frequency and groundwater hazardous indicator substances will be determined based on discussions between the Port and Ecology.

7.3.2. Upland Cap Monitoring

Upland cap monitoring will be performed annually for a minimum of 3 years after the cleanup action is completed to evaluate the long-term stability and effectiveness of the cap. The cap area will be visually inspected to determine if cap material has eroded or if the cap has otherwise been compromised. Details of cap monitoring will be presented in a long-term monitoring plan included with the construction completion report.

8.0 CONTINGENCIES PLAN

The planned performance monitoring will ensure that contaminated soil and sediment is removed from the Site. Four consecutive quarters of confirmational (long-term) groundwater monitoring will be completed following the cleanup action to ensure that groundwater cleanup standards have been achieved for the Site. Groundwater monitoring will be completed to verify the reduction of COC concentrations in shallow groundwater as a result of the contaminated soil (source) removal. If COCs are detected above cleanup levels in groundwater after an initial four quarters of confirmational groundwater monitoring, semi-annual groundwater monitoring will be conducted as appropriate. If groundwater samples continue to exceed the cleanup levels without abating, additional actions will be considered and implemented as approved by Ecology.

A detailed contingencies plan for the Site will be prepared and submitted with the construction completion report after cleanup and site restoration activities are completed.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

This section describes general QA/QC procedures to be implemented during the cleanup action, including contractor quality control, construction monitoring and field documentation, and analytical QA/QC. Details regarding analytical QA/QC are presented in the Quality Assurance Project Plan (QAPP), included as Appendix G of this report.

9.1. Contractor Quality Control

The contractor will be required to prepare a construction quality assurance plan before commencing work. This plan will include construction plans for each of the primary elements of work, as well as a quality control plan. The quality control plan will address the following:

- General requirements;
- Quality control organization;
- Documentation of methods and procedures;
- Requirements for corrective action when QC and/or acceptance criteria are not met; and

- Any additional elements that the contractor deems necessary to adequately control construction processes required by the contract.

The contractor will maintain QC records. These records will include evidence that the required inspections or tests have been performed, including the type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed corrective action; and corrective actions taken.

In addition to the contractor's construction quality assurance plan, Ecology will perform general oversight of the contractor's activities.

9.2. Construction Monitoring and Field Documentation

Construction monitoring will be performed by Ecology and its representatives. A comprehensive record of field activities will be maintained. Field documentation for this project will include field notes, field forms, field reports, and chain-of-custody forms for samples submitted for analytical testing. The field documentation will record construction, sampling, and monitoring activities, sampling personnel, and weather conditions, as well as decisions, corrective actions, and/or modifications to the project plans and procedures discussed in this report.

9.3. Analytical QA/QC

Analytical QA/QC is described in the QAPP (Appendix G). The QAPP describes soil and groundwater sampling, analysis, and QC procedures that will be implemented to produce chemical and field data that are representative, valid, and accurate for use in evaluating the effectiveness of the cleanup action.

10.0 SCHEDULE

Pending permit approvals, cleanup-related construction work is scheduled to occur in Summer 2012 (fish window is from July 16 through October 14, 2012) and is estimated to occur over a period of approximately 2 months.

11.0 REPORTING

The following reports will be prepared to document the cleanup action:

- **Construction Completion Report.** Upon completion of cleanup-related construction activities, a construction completion report summarizing the cleanup activities and results of performance monitoring will be prepared in accordance with WAC 173-340-400. Waste manifests, contaminated soil disposal receipts, and as-built drawings will be included in the construction completion report. A contingencies plan also will be submitted with the report. A draft version of the construction completion report will be submitted to Ecology for review and comment prior to finalization.
- **Confirmational Groundwater Monitoring Report.** A report summarizing the results of confirmational groundwater monitoring will be prepared upon completion of the four quarterly groundwater monitoring events.

Compliance monitoring data generated during the cleanup action will be provided to Ecology in the electronic format required by Ecology's Environmental Information Management Policy 840.

12.0 REFERENCES

GeoEngineers, Inc., 2009a. "Revised Draft Remedial Investigation/Feasibility Study, Irondale Iron and Steel Plant, Irondale, Washington," GEI File No. 0504-42-00, August 2009.

GeoEngineers, Inc., 2009b. "Revised Draft Cleanup Action Plan, Irondale Iron and Steel Plant, Irondale, Washington." GEI File No. 0504-042-00, August 2009.

GeoEngineers, Inc., 2011. "Data Gap Investigation Summary Letter Report, Former Power House Complex and Steel Production Building Areas, Irondale Iron and Steel Plant, Irondale, Washington." GEI File No. 0504-042-01, June 2011.

National Register of Historic Places (NRHP), National Register of Historic Places Districts in Jefferson County, Washington State. Accessed December 2010 online at: www.nationalregisterofhistoricplaces.com/wa/Jefferson/districts.html

Northwest Archeological Associates (NWAA). Condition Assessment of the Irondale Iron and Steel Plant, Jefferson County, Washington, April 2011a.

Northwest Archeological Associates (NWAA). Cultural Resources Assessment for the Irondale Iron and Steel Plant (45JE358) Historic District (DT128) Remediation and Restoration Project, Jefferson County, Washington, August 2011b (Appendix A updated March 21, 2012).

Washington Department of Natural Resources (DNR), 2005. Dr. Jerry F. Franklin. et al. Definition and inventory of Old Growth Forest on DNR State Managed Lands. http://www.dnr.wa.gov/Publications/lm_ess_westside_oldgrowth_rpt.pdf (Accessed April 3, 2009) Washington State Department of Natural Resources.

Washington State Department of Ecology, 2007a. Summary of PLP Search and Site History Memorandum to project file by Steve Teel, February 13, 2007.

Washington State Department of Ecology, 2007b. Model Toxics Control Act Statute and Regulation, MTCA Cleanup Regulation, Chapter 173-340 WAC. Publication No. 94-06. Revised November 2007.

13.0 LIMITATIONS

We have prepared this Engineering Design Report for use by Ecology during the cleanup action at the Former Irondale Iron and Steel Plant Site. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

TABLES

Table 1

Overview of Cleanup Levels and Points of Compliance
Engineering Design Report

Irondale Iron and Steel Plant

Irondale, Washington

Constituent	Cleanup Level and Media		
	Soil (mg/kg)	**Groundwater (ug/l)[1]**	**Sediment (mg/kg)**
Arsenic	18	Not a groundwater COC	Not a sediment COC
Copper	70	2.4	Not a sediment COC
Iron	58,700	Not a groundwater COC	Not a sediment COC
Lead	120	Not a groundwater COC	Not a sediment COC
Nickel	48	8.2	Not a sediment COC
Zinc	160	Not a groundwater COC	Not a sediment COC
cPAHs	0.137	0.018	Not a sediment COC
Benzo(a)pyrene	see cPAHs	see cPAHs	1.6
Chrysene	see cPAHs	see cPAHs	1.4
2,4-Dimethylphenol	Not a soil COC	Not a groundwater COC	0.029
TPH	136	500	136
Point of Compliance based on MTCA	Upper 6 feet (ecological) and Upper 15 feet (human health)[2]	Point of entry to Port Townsend Bay	Biologic active zone and vertical extent of TPH to 136 mg/kg

Notes:

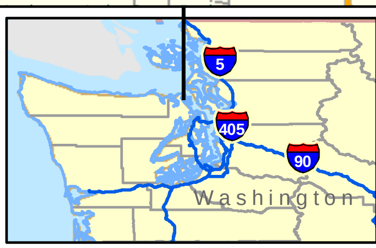
[1] Groundwater cleanup levels are the most conservative (lowest) published numerical values selected from available state and federal surface water criteria as outlined in WAC 173-340-730(3).

[2] The point of compliance for soil is 6 feet for terrestrial ecological receptors and 15 feet for human health receptors. The terrestrial ecological receptor point of compliance is being applied at the TP08 Vicinity, while the human health point of compliance is being applied at the Former AST Area.

mg/kg = milligrams per kilogram

ug/L = micrograms per liter

FIGURES



N
W E
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2,000 0 2,000

Feet

Data Sources: ESRI Data & Maps, Street Maps 2005.
Chimacum Creek Tidelands location obtained from "Health Consultation. Evaluation of Selected Metals in Irondale Beach Park and Chimacum Creek Tidelands Shell Fish." Irondale, Jefferson County, Washington. Agency for Toxic Substances and Disease Registry. July 28, 2008.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

Irondale Iron and Steel Plant
Irondale, Washington

GeoEngineers

Figure 1

Office: SEA Path: W:\Seattle\Projects\0\0504042\GIS\050404201 T400 F1 VM.mxd Map Revised: June 28, 2011 AMM

Legend

- Site Boundary
- Former Structures
- Approximate Mean Lower Low Water (MLLW)
- Approximate Extent of Slag Outcrop

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Monitoring well was not constructed at DD01 PC Draft RI/FS Work Plan (GeoEngineers, 2007A; i.e. MW01 does not exist).

Reference: Aerial photo (April 2003) from Jefferson County (http:maps.co.jefferson.wa.us, accessed May 2007). Former structures from "Environmental Assessment, Log Chipping Facility, Irondale, Washington" (Hart Crowser, 1996).

Site Plan

Irondale Iron and Steel Plant
Irondale, Washington

GeoEngineers

Figure 2

P:\0504042\01\CAD\EDR Figures\0504042-01 EDR Fig 2.dwg\TAB:Fig 2 modified by tmichaud on Jun 29, 2011 - 17:03

Legend

- DP01 — Direct-Push Boring Location and ID
- TP40 — Soil Sample Location and ID
- SLAG1 — Slag Sample Location and ID
- SED104 — Sediment Sample Location and ID
- SW1 — Surface Water Sample Location and ID
- MW3 — Monitoring Well Location and ID
- Approximate Mean Lower Low Water (MLLW)
- Site Boundary
- Former Structures
- Approximate Extent of Slag Outcrop

Notes

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Reference: Aerial photo (April 2003) from Jefferson County (http:maps.co.jefferson.wa.us, accessed May 2007). Former structures from "Environmental Assessment, Log Chipping Facility, Irondale, Washington" (Hart Crowser, 1996).

RI Sample Locations

Irondale Iron and Steel Plant
Irondale, Washington

GEOENGINEERS

Figure 3

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Legend

- Soil Biota Bioassay (TPH) Soil Sample Location
- Plant and Soil Biota Bioassay (Metals) Soil Sample Location
- Arsenic (III/V) Speciation Soil Sample Location
- Co-located Soil / Plant Sample Location
- Co-located Soil / Earthworm Sample Location
- DP01 Direct-Push Boring Location and ID
- TP40 Soil Sample Location and ID
- Site Boundary
- Former Structures
- Approximate Extent of Slag Outcrop

100 0 100

FEET

Notes

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Reference: Aerial photo (April 2003) from Jefferson County (http:maps.co.jefferson.wa.us, accessed May 2007). Former structures from "Environmental Assessment, Log Chipping Facility, Irondale, Washington" (Hart Crowser, 1996).

Terrestrial Ecological Evaluation Sample Lcoations

Irondale Iron and Steel Plant
Irondale, Washington

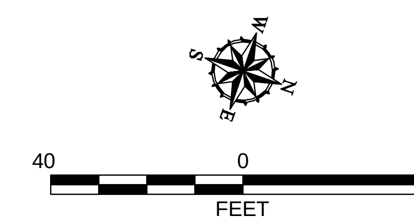
GEOENGINEERS

Figure 4

P:\0504042\01\CAD\EDR Figures\0504042-01 EDR Fig 4.dwg\TAB:Fig 4 modified by tmichaud on Jun 29, 2011 - 17:13

Legend

- RI Soil Sample Location
- RI Sediment Sample Location
- Previous Soil Sample Location
- Previous Sediment Sample Location
- Approximate Mean Lower Low Water (MLLW)
- Site Boundary
- Former Structures
- Sample location with one or more sample result(s) greater than soil/sediment screening level of 2,000 mg/Kg
- Sample location with one or more sample result(s) greater than sediment screening level of 136 mg/Kg, but less than 2,000 mg/Kg
- Areas Requiring Remedial Action (Total TPH >136 mg/Kg) - (dashes indicate extent is inferred)



Notes

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Reference: Aerial photo (April 2003) from Jefferson County (http:maps.co.jefferson.wa.us, accessed May 2007). Former structures from "Environmental Assessment, Log Chipping Facility, Irondale, Washington" (Hart Crowser, 1996).

Former AST TPH Areas Requiring Remedial Action

Irondale Iron and Steel Plant
Irondale, Washington

GeoEngineers

Figure 5

Legend

- TP-44 Data Gap Investigation Soil Sample Location
- RI Soil Sample Location
- RI Slag Sample Location
- Pre-RI Slag Sample Location
- Pre-RI Soil Sample Location
- Site Boundary
- Former Structures
- Sample location with one or more sample result(s) greater than human health or TEE soil screening levels
- Upland Area Requiring Remedial Action
- Approximate Extent of Slag Outcrop
- Approximate Top of Bluff

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. The locations of former structures are from a GPS survey conducted in December 2010. The location of select structures was confirmed by a professional survey conducted by Clark Land Office, PLLC in January 2011.

Reference: Aerial photo from i-Cubed Nationwide Prime. Former Structures from Northwest Archaeological Associates, Inc. (received February 4, 2011).

Metals - Impacted Areas Requiring Remedial Action

Irondale Iron and Steel Plant
Irondale, Washington

GEOENGINEERS

Figure 6

P:\0504042\01\CAD\EDR FIGURES\0504042-01 EDR FIG 6.DWG\TAB:FIG X MODIFIED BY TMICHAUD ON JUN 30, 2011 - 10:57

APPENDIX A
Condition Assessment of the Irondale Iron and Steel Plant

CONDITION ASSESSMENT OF THE

IRONDALE IRON AND STEEL PLANT,

JEFFERSON COUNTY, WASHINGTON

Redacted

[redacted]

April 19, 2011

NWAA Report Number WA10-100

NORTHWEST ARCHAEOLOGICAL ASSOCIATES
SEATTLE, WASHINGTON

CONDITION ASSESSMENT OF THE IRONDALE IRON AND STEEL PLANT, JEFFERSON COUNTY, WASHINGTON

Report Prepared for

Washington State Department of Ecology

and

Science Applications International Corporation
18912 North Creek Parkway #101
Bothell, WA 98011

By

Ross Smith, MA
Northwest Archaeological Associates
5418 20th Avenue NW, Suite 200
Seattle, WA 98107

April 19, 2011

NWAA Report Number WA10-100

CULTURAL RESOURCES REPORT COVER SHEET

Author: Ross Smith

Title of Report: Condition Assessment of the Irondale Iron and Steel Plant, Jefferson County, Washington.

Date of Report: April 19, 2011

County (ies): Jefferson [redacted]

CD Submitted? ☒ Yes ☐ No PDF of Report? ☒ Historic Property Export Files? ☐

Archaeological Site(s)/Isolate(s) Found or Amended? ☒ Yes ☐ No

TCP(s) Found? ☐ Yes ☒ No

Replace a Draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit Requirement? ☐ Yes # ___ ☒ No

DAHP Archaeological Site #:
45JE358

ABSTRACT

The Washington State Department of Ecology, in cooperation with Jefferson County Public works, is seeking to remediate contamination at the site of the former Irondale Iron and Steel Plant. The remains of the Irondale Iron and Steel Plant are included within the Irondale National Historic District based on their association with the development of the early iron and steel production industries on the west coast, however, archaeological features and deposits at this site were not recorded. In 2010, Northwest Archaeological Associates, Inc. (NWAA) conducted a condition assessment of the remains of the Irondale Iron and Steel Plant and prepared an archaeological site form that documents the current condition of the historic properties within this portion of the historic district. A total of 69 historic archaeological features were recorded during the condition assessment and NWAA archaeologists relocated nearly all of the features documented in the 1983. In addition, they also recorded a poured cement slab that once supported the Weighing House, and a series of pilings and milled timbers associated with the wharf, charcoal and coke warehouse, bulkheads and cribbing within the intertidal zone along the waterfront. It is likely that additional structural elements and historic debris associated with the wharf complex, and other components of the working waterfront at Irondale are located in the subtidal zone east of the current project area. Although a combination of natural processes and human activities have affected the physical condition of some portions of the Irondale Iron and Steel plant in the 27 years since these properties were documented, this site, and it’s components continue to contribute to the eligibility of Irondale Historic District.

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INTRODUCTION

Jefferson County Public Works is seeking to develop a county park at the site of the former Irondale Iron and Steel Plant, an historic property listed on the National Register of Historic Places (NRHP). The Washington State Department of Ecology (DOE) and Science Applications International Corporation (SAIC) is assisting Jefferson County Public Works in remediating contamination originating from the operation of the Irondale Iron and Steel Plant in the late 1800s and early 1900s. Northwest Archaeological Associates (NWAA) was contracted to conduct a conditions assessment of the remnants of the Irondale Iron and Steel Plant facilities and assist DOE and SAIC in permitting to allow additional contaminant testing. NWAA will also develop a treatment plan to govern proposed remediation actions and a cultural resources management plan. This report describes the natural and cultural setting of the vicinity, and the methods and results of the conditions assessment of the plant.

Project Location and Description

The Irondale Iron and Steel Plant is located on a 13 acre parcel [redacted] in northeast Jefferson County, Washington within the boundaries of the Irondale townsite (Figure 1). The property was acquired by Jefferson County in 2002 for use as a county park (Madrona Planning 2004). The Irondale Iron and Steel Plant was partially encompassed within the boundaries of the Irondale National Historic District. This historic district was listed in the NRHP in 1983 because of its association with the development of the iron and steel production industry on the west coast of North America in the late 1800s and early 1900s (NRHP 2010). Following this acquisition the DOE and SAIC contracted GeoEngineers to conduct a remedial investigation of metal and hydrocarbon contamination on the property (Morton et al. 2009). Concentrations of contaminants were identified in sediment samples at several locations, including within the footprint of the former Steel Production Building and the Power House Complex, and around an above ground fuel storage tank (AST) located along the shoreline (Figure 2).

Development of a county park on this property will require remediation of contaminants identified in the soil, surface water and underlying sediments associated with particular components of the iron and steel plant activity areas. At a minimum, remediation will include the complete removal of hydrocarbon contaminated sediments in both upland and intertidal areas around the AST and installation of a soil cap to prevent direct exposure to contaminated sediment in the Power House Complex and Steel Production Building areas. Additional activities, including shoreline restoration involving the removal of slag and other fill, regrading of beach and back-shore zones, and vegetation replanting are also envisioned following contaminant remediation. Historic features and associated archaeological deposits located at, or near proposed remediation and habitat restoration locations will be affected by these activities.

Regulatory Setting

Several Washington State laws and regulations address heritage resources of the Irondale Iron and Steel Plant. The Archaeological Sites and Resources Act (RCW 27.53) declares the State's interest in the conservation, preservation and protection of Washington's archaeological resources and prohibits disturbance or excavation of historic or prehistoric archaeological resources on state or private land without a permit issued by the Washington State Department of Archaeology and Historic Preservation

(DAHP). The Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing a Native American or historic grave. The Archaeological Site Public Disclosure Exemption (RCW 42.56.300) states that records, maps, or other information identifying the location of archaeological sites are exempt from disclosure in order to avoid looting or depredation of such sites.

Under the provisions of the State Environmental Policy Act (SEPA), the DOE prepared an Environmental Checklist, in which it acknowledged that the project was located within the Irondale Historic District and proposed to conduct a Cultural Resources Assessment to identify historic resources within the project area and to reduce or control impacts to these resources through the development of a Treatment Plan in consultation with the DAHP and other concerned parties. In 2009, the DOE issued a Determination of Nonsignificance for the Irondale remediation project.

The project will also be subject to the provisions of the National Historic Preservation Act of 1966, as amended (NHPA) if federal funding or permits are required in the future. The act and its implementing regulation under Section 106 (36 CFR 800) require the involved federal agency to identify and assess the effects of undertakings on significant heritage resources, and to consult with other to find acceptable ways to avoid or mitigate adverse effects.

PROJECT BACKGROUND

The project area encompasses approximately 13 acres in both upland and coastal areas along Port Townsend Bay. The 1856 U.S. Coast Survey map of the coastline south of Chimacum Creek depicts a narrow beach backed by a steep bluff. Near the mouth of Chimacum Creek the beach widened and formed a long spit on the south side of the mouth of the creek. The present landscape was produced by the excavation and grading of the uplands and filling of tidelands below the bluff. The eastern, nearshore portion of the project area lies at an elevation approximately 12 feet above mean sea level (AMSL) and the ground surface in this area is relatively level. The western, inland portion of the project area is marked by a steep bluff that rises from between 70 and 100 feet AMSL, and is interspersed with level terraces and uneven terrain. The remnants of the Irondale Iron and Steel Plant are situated on level terraces approximately 20 feet below the crest of the bluff and along the waterfront. Soils in the upland portions of the project area consist of gravelly and sandy loam formed in glacial drift and outwash sediments (NRCS 2011) and sediments along the shoreline are composed of fill dredged from the adjacent intertidal and subtidal zones along the waterfront in the early 1900s. Historic photographs of the Irondale Iron and Steel Plant show that the property was completely stripped of vegetation while the plant was in operation; grasses and mixed herbs presently cover the low-lying areas in the eastern portions of the project area and alder, maple and scattered Douglas fir, with a thick understory of shrubs, Himalayan Blackberry vines, and forest duff cover the upland areas.

Pre-contact and Ethnographic-Period Native American History

The project area is located within the Chemakum traditional territory, which extended from the mouth of Hood Canal to Port Discovery Bay (Elmendorf 1990). At contact, the Chemakum were a small group whose language was similar to Quileute. When the Chemakum signed the Treaty of Point No Point in 1855 they were assigned to the Skokomish Reservation, however, few of the Chemakum moved to the Skokomish Reservation and by the early twentieth century the Chemakum appear to have been assimilated into the neighboring Clallam and Twana communities (Elmendorf 1990). [redacted]

[redacted] Ethnographers who conducted interviews with Native peoples around the mouth of Hood Canal and Port Townsend Bay in the late 1800s reported that a single village [redacted] was located at the head of Hadlock Bay and that the village was surrounded by a stockade (Elmendorf 1990), [redacted]

Historical Development of the Irondale Iron and Steel Plant

Iron Production at Irondale (1880-1909)

Following the discovery of bog iron ore in the Chimacum Valley in the 1870s, James Hones, E. L. Canby, H. L. Blanchard and Samuel Hadlock formed the Puget Sound Iron Company in 1879 and initiated the start of the iron-making industry in Washington Territory. In return for the right to mine ore from the Chimacum Valley deposits, the Puget Sound Iron Company agreed to build it's iron production facility in Jefferson County along the shoreline south of the mouth of Chimacum Creek (Britton and Britton 1983). In 1880 the townsite of Irondale was established and the Puget Sound Iron Company began to build its first blast furnace using locally-sourced rock obtained along the shoreline. A wharf that was large enough to accommodate ocean-going vessels was also built along the shoreline east of the blast furnace and an ore roasting and crushing facility was constructed at the west end of the wharf at the base of the slope below the blast furnace (Britton and Britton 1983).

The firebrick lining on the first blast furnace melted in 1881, the furnace was rebuilt in 1882, the brick promptly melted again in 1883, and the plant was remodeled and modernized in 1884. During the modernization, a new stove, boilers and blowing engine were added in small buildings set around the blast furnace and casting house. When the Iron Plant was first built, the blast furnace was fueled with wood charcoal that was produced offsite and shipped to the plant (Britton and Britton 1983). In an effort to improve the efficiency of iron production, during the 1884 refit, 20 circular charcoal kilns were erected along the waterfront south of the wharf. Each kiln measured 30 feet in diameter, was 30 feet tall, and were constructed of bricks bound in wrought iron and plastered with concrete (Shedd 1902). In 1901 a sawmill, log splitting machine and a conveyor system designed to transport the wood from the mills into the kilns was added to the charcoal production facility (Britton and Britton 1983; Shedd 1902). The sawmill was likely built along the shoreline east of the charcoal kilns in order to reduce the costs of transporting logs to the charcoal production facility. At least one warehouse was also built on piers along the waterfront to store the finished charcoal. In 1910 the company switched from using wood charcoal to coke to fuel the blast furnace. This decision was likely influenced by the increasing availability of coke, the reduced efficiency of using wood charcoal to fuel the blast furnace and the costs associated with producing wood charcoal at Irondale. The Irondale Iron Plant operated sporadically from 1885 through 1888, producing an average of less than 3,000 tons of pig iron annually, and was unexpectedly shut down at the end of 1889 (Britton and Britton 1983:7).

In 1900 east coast iron and steel making experts began to examine the potential for producing steel from pig iron produced at the existing facilities at Irondale. In 1901 Homer H. Swaney formed the Pacific Steel Company and bought the Irondale plant. By July 1901, the Pacific Steel Company had completed general repairs, made improvements to the blast furnace and constructed an iron testing laboratory, a new hot stove, and boiler (Britton and Britton 1983). In addition, Swaney began to acquire leases to ore

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claims on Texada Island (British Columbia) and at Hamilton in Skagit County and limestone was obtained from Roche Harbor in the San Juan Islands. In December 1901, the Irondale blast furnace was blown in and for the next year the Irondale Iron Plant produced 50 tons of pig iron per day. Since no other blast furnaces were operating on the west coast at this time, the pig iron produced at Irondale was shipped to destinations along the west coast from southern California to Alaska. In January 1903, the Irondale Iron Plant was closed down while Swaney reorganized his company and prepared to branch out into steel production. During the shut down, Swaney continued to acquire and stockpile raw materials and in August 1903 the company began to expand the Irondale plant. He also secured property along the shoreline in West Seattle to build a steel plant and acquired a schooner to transport pig iron produced at Irondale to the proposed Seattle steel plant (Britton and Britton 1983). The Seattle Iron and Steel Company's expansion into steel production was cut short in January 1904 when the steamer *Clallam* sank in the Strait of Juan de Fuca and Swaney drowned. Following Swaney's death, the Irondale plant was placed in receivership and remained closed until September 1906 when it was purchased at a receiver's auction by James A. Moore, a Seattle capitalist and owner of a large investment company. Moore immediately set about to modernize the Irondale iron production facility and in January 1907 work began on enlarging the blast furnace and constructing a new hot stove. A shortage of labor prompted Moore to hire a large Japanese work force. A series of accidents and subsequent repairs to the blast furnace delayed iron production until October 1907, however, shortages of charcoal forced the shut down of the blast furnace by the end of the year. In 1908 Moore sought investor funding to expand into steel production and formed the Irondale Steel Company to take over the iron production facilities at Irondale.

Rise and Fall of the Irondale Steel Industry (1909-1919)

In 1909 Moore filed a plat for the Irondale Townsite and his crews began construction of the steel production plant on a gently sloping area northwest of the Iron Casting House. To accommodate the construction of the Steel Production Building, an area measuring over 350 feet long by 170 feet wide was graded and leveled. The foundations for the open hearth furnaces and casting aisle located on the south end of the steel plant were excavated over 15 feet below surface. A continuous concrete retaining wall and foundations for the smokestacks were poured along the south wall of the steel plant foundation. North of this, the foundations of the open hearth furnace, casting pits and reheat furnaces for each of the rolling mills were built from brick and mortar. In addition, workers also began construction of new auxiliary facilities and refurbished some existing buildings. They poured new concrete foundations for the existing power house and installed six additional boilers to provide power to the steel plant (Figure 3). An 1800 horsepower Corliss steam engine (Figure 4), reportedly the largest ever shipped to the Pacific Coast at that time, was also installed within the steel plant building to provide power to the 22-inch rolling mills (Britton and Britton 1983).

The high costs associated with producing and using charcoal to fuel the blast furnace, combined with the shortage of charcoal at the end of 1907 and the increasing availability of coke from Pierce County mines prompted Moore to switch to coke to fuel the blast furnace and to buy oil for the open hearth furnaces. The coke was obtained from coal mines near Ashford, Washington (approximately 55 miles east of Tacoma) and was shipped from Tacoma by barge. The first loads of coke were delivered during the shutdown in 1908, and the coke was stored in one of the covered waterfront buildings south of the pier that had formerly held charcoal. The charcoal kilns along the south end of the waterfront were demolished sometime between the beginning of 1908 and the end of 1909, and an above ground oil

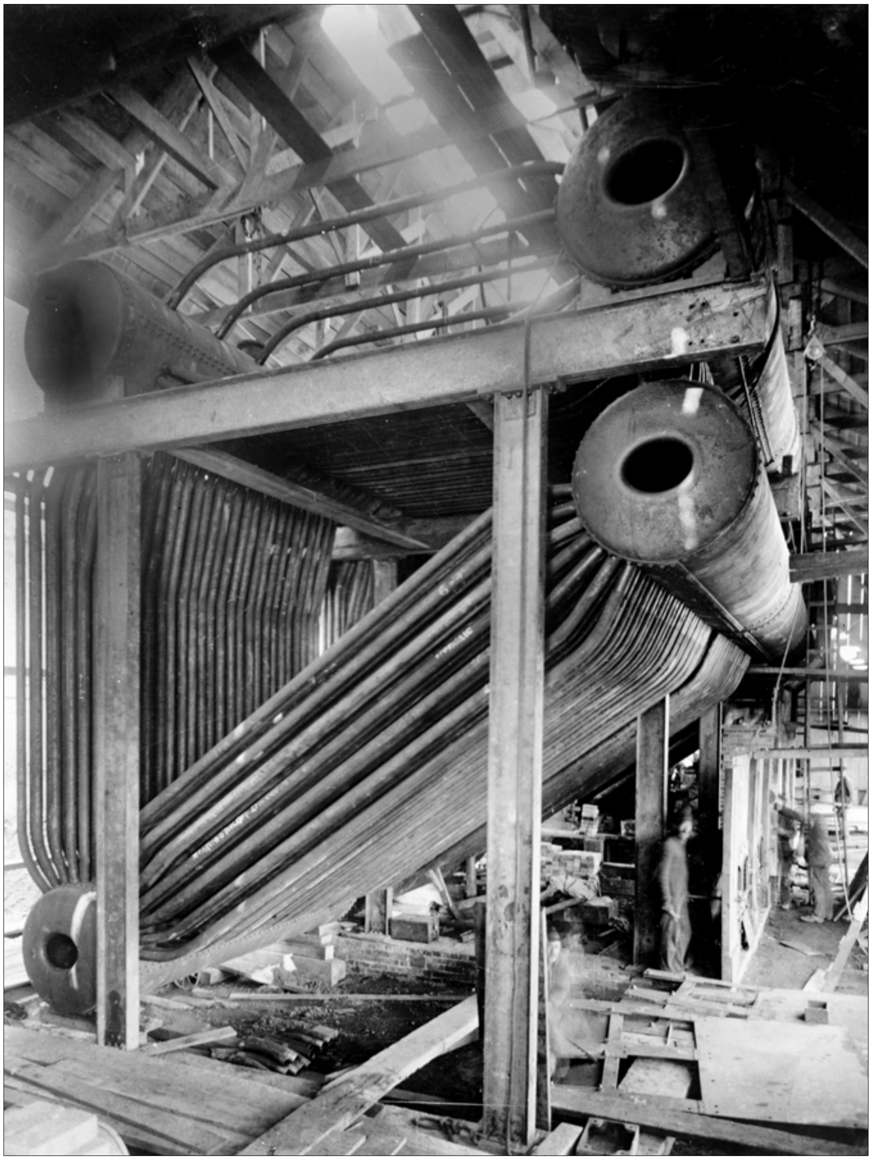

Figure 3. Steel Plant boilers under construction in the Boiler Plant, 1909.

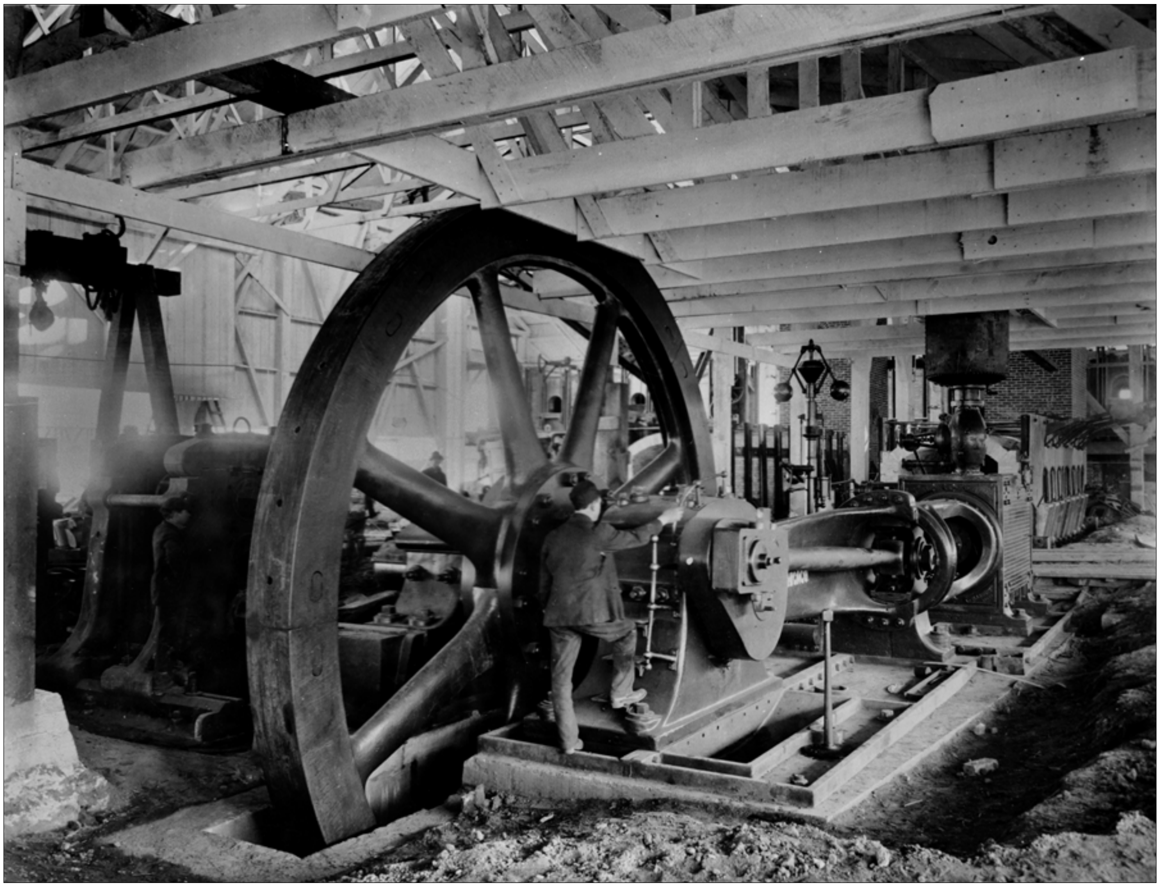

Figure 4. Overview of the 1800 horsepower Corliss steam engine and flywheel for the 22-inch Rolling Mill, 1910.

storage tank with a capacity of 6,000 barrels was built at the base of the bluff south of the Stock House. The first fuel oil shipment arrived from California in the spring of 1910 (Britton and Britton 1983).

While work proceeded on the steel plant, the company also proposed to fill upwards of 100 acres of tidelands to accommodate the expansion and increasing need for waterfront storage yards for raw materials and finished products. An extensive piling and timber crib structure was erected along the east side of the proposed fill area and the dredger *Tacoma* proceeded to fill the tidelands between the north end of the plant and mouth of Chimacum Creek. The open hearth furnaces and foundations for the rolling mills were completed by the end of March 1910, the equipment was installed and the first batch of Irondale steel was turned out on May 26, 1910. In the fall of 1910, Moore reorganized the Irondale Steel Company into the Western Steel Corporation (Britton and Britton 1983).

Following the completion of the steel production lines, work crews overhauled and enlarged the wharf and extended the narrow gauge rail lines from the wharf along grades to the Steel Production Buildings, the Iron Casting House and associated support facilities to facilitate the transport of raw materials and finished products between the waterfront and production lines. Beginning in the summer of 1910, the iron foundry began production of iron for tool and machinery parts from the plant and began to build a stockpile of pig iron for the steel production lines (Britton and Britton 1983).

Steel production reached an all time high in the winter of 1910 and by the spring of 1911 Moore had secured large orders for steel for use in major construction projects in many western states. The large steel orders and the continued expansion of the Irondale steel production plant masked the fact that the Western Steel Corporation was heavily in debt. In October 1911, the Metropolitan Trust Company of New York, one of the largest holders of Western Steel Corporation debt, filed a petition for the involuntary bankruptcy of the corporation and the Irondale plant was shut down for the duration of the ensuing court case (Britton and Britton 1983). In April 1913, ownership of Western Steel Corporation's holdings at Irondale was transferred to the Metropolitan Trust Company and by January of 1914, Metropolitan had finalized the sale of the Irondale plant to the Pacific Coast Steel Company of Seattle. In the months following the sale, workers from Pacific Coast Steel disassembled and relocated the Irondale steel plant to Seattle. Two fires swept through Irondale's nearly vacant business district in October and December of 1914 and by the end of the following year only 200 residents remained at Irondale. The rise in pig iron prices that accompanied the start of World War I prompted the Pacific Coast Steel Company to reopen the Irondale iron production facilities in 1917, and for the next two years Pacific Coast Steel used pig iron produced at Irondale in its Youngstown steel production plant in Seattle (Britton and Britton 1983). When the supply of raw materials at Irondale was exhausted in February of 1919, Pacific Coast Steel closed Irondale plant for the last time. By the end of 1919, the remaining iron production facilities had been torn down and the associated machinery was sold for scrap.

Previous Cultural Resource Investigations

In 1983 the Irondale Historic District was inventoried and nominated for the National Register of Historic Places (Stalheim 1983). This District includes the remnants of the Irondale Iron and Steel Plant, four houses built for company officials and the Irondale Jail (Britton and Britton 1983). The Irondale Historic District is significant because of its association with the early history of west coast iron and steel production (Stalheim 1983). In addition, the remnants of the iron and steel production facilities may provide important information regarding the development and operation of this plant during the late 1800s and early 1900s. The Irondale Historic District includes intact and demolished brick and mortar, and concrete foundation elements and other structural remnants of the Irondale Iron and Steel plant and associated docks and facilities. Historic American Engineering Records (HAER) document the condition of numerous historic building foundations at the Irondale Iron and Steel Plant in 1983 (Britton and Britton 1983). The HAER investigation did not characterize the historic subsurface deposits and an archaeological site form was not prepared. NWAA archaeologists made a reconnaissance visit of the project area prior to the survey. Local residents reported that coastal erosion, management actions and visitor use, including the collection of scrap metal and other materials by salvagers, have impacted the Irondale Iron and Steel Plant, however, the present condition of historic properties within this portion of the District has not been formally assessed. The nearest extant buildings within the District are over 200 feet west of the Iron and Steel Plant and will not be affected by the proposed excavation.

Two archaeological investigations have been completed within and immediately adjacent to the present project area. Archaeological testing completed by Willis (2005) within the Chimacum Creek restoration area on the property parcel between the Irondale Iron and Steel property and Chimacum Creek identified isolated Native American artifacts associated with intact beach sand deposits located below historic fill deposits (Willis and Sharley 2005:17). These artifacts were interpreted as evidence of the village illustrated at the mouth of Chimacum Creek in 1856 by the U.S. Coast Survey and the Smithsonian Trinomial number 45JE277 was assigned to the site (Willis 2005). The southern extent of this site was not found by the survey or observed in subsequent monitoring (Sharley 2006a). In addition to the pre-contact and early historic Native American site, an alignment of pilings (45JE289) was also recorded north of the present project area during monitoring of fill removal and shoreline restoration activities (Sharley 2006b).

METHODS

Ross Smith, NWAA project archaeologist, reviewed existing documentation of archaeological resources within and adjacent to the current project area and conducted an initial site visit on December 14, 2010. From December 28 through 30th, Ross Smith and Yonara Carrilho conducted a surface survey of the project area. Using existing HAER records, including feature descriptions, illustrations and photographs, they relocated and assessed the current condition of the previously recorded Irondale Iron and Steel Plant features. They also collected low error GPS coordinates at many of the features to improve the accuracy of GIS maps of the feature locations. The locations of the HAER overview photos were established and new photographs were taken. In addition, features that were not described during the 1983 survey were photographed, mapped and described. No subsurface investigations were undertaken.

RESULTS

Iron and Steel Plant Components, Activity Areas and Associated Features

Pedestrian survey of the project area revealed the remains of at least six buildings and 69 associated features involved in the operation of the Irondale Iron and Steel Plant (Figure 5, Table 1). An archaeological site form describing these features was submitted to the DAHP and the site number 45JE358 was assigned to the remnants of the Irondale Iron and Steel Plant (See Appendix B). While four of the features described in 1983 could not be relocated, an additional 17 features that were not identified during the 1983 survey were described in 2010. The following sections describe each of the identified plant components and its associated features.

Stock House, Blast Furnace and Iron Casting House

According to historic photos, the Stock House was along the shoreline at the west end of the wharf and the Blast Furnace and Iron Casting House were built on a terrace midway up the bluff. Iron ore, limestone flux and charcoal or coke were mixed in the Stock House and transported to the Blast Furnace via an elevator and bridge.

The poured concrete foundation of a water tank was located near the southeast corner of the Stock House and a small portion of the masonry foundation that supported one of the hot stoves was identified during the 1983 survey. While one of the hot stove foundations was relocated in 2010, no additional features associated with the Blast Furnace, Casting House or Stock House, including the water tank foundation described in 1983, were identified during the 2010 survey.

Bricks, both whole and fragmentary, as well as slag and other historic debris were found around the Blast Furnace, Casting House and Hot Stoves locations. Foundation elements associated with these buildings are present at the Hot Stoves and may be present beneath the rubble and historic debris at the

Table 1. Irondale Iron and Steel Plant Facilities Identified During the 2010 Survey

PLANT COMPONENT	POSSIBLE FEATURES	SURVEYED FEATURES	RECORDED 1983	RECORDED 2010	PHYSICAL INTEGRITY*	THREAT(S)/ TIMEFRAME
Iron Cast House (1881-1919)	Blast Furnace	Rubble Pile	X	X	Poor	Brick and Scrap Metal Scavenging/Immediate and Long Term
	Hot Stoves	Foundation L	X	X	Fair	Looting (Brick Scavenging)/Short
	Building Foundations	-	-	-	-	-
	Casting Troughs	-	-	-	-	-
	Cinder Conveyor	-	-	-	-	-
Engine House (? - 1919)	Machinery Foundations	Blower Engine Foundation A	X	X	Fair	Looting (Scrap Metal Scavenging)/Short
		Foundation B	X	X	Good	Weathering/Long
		Foundation H	X	X	Good	Weathering/Long
Electric Power House (? - 1919)	Machinery Foundations	Foundation C	X	X	Good	Weathering/Long
		Foundation D	X	X	Good	Weathering/Long
		Foundation E	X	X	Good	Weathering/Long
		Foundation F	X	X	Good	Weathering/Long
		Foundation G	X	X	Good	Weathering/Long
Boiler House (? - 1919)	Unknown	Foundation I	X	-	Unknown	Unknown
	Unknown	Foundation J	X	-	Unknown	Unknown
Unknown Building	Unknown	Foundation K	X	-	Unknown	Unknown
Machine Shop	Building Foundations	-	-	-	-	-
	Machinery Foundations	-	-	-	-	-
Blacksmith Shop	Building Foundations	-	-	-	-	-
	Forge	-	-	-	-	-
Pipe Fitter Shop	Building Foundations	-	-	-	-	-
	Machinery Foundations	-	-	-	-	-
Steel Production Building (1909-1914)	Charging Aisle	Smokestack Base (3)	X	X	Good	Vandalism/Short Weathering/Long
		Regenerator Area Foundations (7)	X	X	Fair	Vandalism/Short Weathering/Long
	Open-hearth Furnace Area	Open Hearth Furnace Foundations (11)	X	X	Fair	Weathering/Long Vegetation (Root Penetration)/Long Term
		Ingot Pouring Aisle Foundations	X	X	Fair	Weathering/Long Vegetation (Root Penetration)/Long Term
(1910-1914)	Electric Crane	Base of Crane	X	X	Good	Weathering/Long
(1910-1914)		Continuous Reheat Furnace Foundation	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
		Unidentified Foundation #1	X	X	Good	Weathering/Long Vegetation (Root Penetration)/Long Term
		Lifting Table (2)	X	X	Good	Weathering/Long Vegetation (Root Penetration)/Long Term
(1910-1914)	22-inch Mill	Corliss Engine Base	X	X	Fair	Vegetation (Root Penetration)/Short Term
		Mill Pit	X	X	Good	Weathering/Long
		Flywheel Pit	X	X	Good	Weathering/Long

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Table 1. Irondale Iron and Steel Plant Facilities Identified During the 2010 Survey

PLANT COMPONENT	POSSIBLE FEATURES	SURVEYED FEATURES	RECORDED		PHYSICAL INTEGRITY*	THREAT(S)/ TIMEFRAME
			1983	2010		
		22-inch Mill Foundation	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
(1910-1914)	Rolling Mill Complex (Western Portion)	Billet Shears	X	X	Fair	Weathering/Long Vegetation (Root Penetration)/Long Term
		14-inch Rolling Mill	X	X	Fair	Weathering/Long Vegetation (Root Penetration)/Long Term
		Flywheel Pit	X	X	Good	Weathering/Long
(1910-1914)	Rolling Mill Complex (Eastern Portion)	Conveyor (to Cooling Bed)	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
		Cooling Bed	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
		Corliss Engine Base	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
		9-inch Rolling Mill	X	X	Fair	Vegetation (Root Penetration)/Short Term Weathering/Long
	Northwest Corner of Plant	Unidentified Foundation #2	X	X	Fair	Weathering (Ice, Vegetation Growth)/Long
		Unidentified Foundation #3	X	X	Fair	Weathering/Long
		Unidentified Foundation #4	X	X	Fair	Weathering/Long
Stock House	Building Foundation	-	-	-	-	-
	Elevator	-	-	-	-	-
	Ore Conveyor	-	-	-	-	-
	Bridge	-	-	-	-	-
	Water Tank	Foundation Wall	X	-	Unknown	Unknown
6000 Barrel Above Ground Fuel Tank (1909-1919)	Steel-Lined Concrete Tank Walls	Concrete Tank Walls	X	X	Fair	Vandalism/Short
Scrap Shears	Foundation	-	-	-	-	-
Skull Cracker	Foundation	-	-	-	-	-
Working Waterfront	Wharf	Piling Alignments	-	X	Fair	Coastal Erosion/Decomposition /Long
	Weigh House	Concrete Foundation	-	X	Fair	Coastal Erosion/Long Term
Charcoal Production Facilities (1884-1910)	Bulkhead	Wood Pilings and Planking	-	X	Fair	Coastal Erosion/Short Term
	Charcoal Colliery (Reportedly 20 Kilns in 2 Lines)	Pilings (Feature 1)	-	X	Good	Coastal Erosion/Immediate
		Kiln Foundation (Feature 2)	-	X	Poor	Coastal Erosion/Immediate
		Kiln Foundation (Feature 3)	-	X	Poor	Coastal Erosion/Immediate
		Kiln Foundation (Feature 4)	-	X	Poor	Coastal Erosion/Immediate

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Table 1. Irondale Iron and Steel Plant Facilities Identified During the 2010 Survey

PLANT COMPONENT	POSSIBLE FEATURES	SURVEYED FEATURES	RECORDED		PHYSICAL INTEGRITY*	THREAT(S)/ TIMEFRAME
			1983	2010		
		Kiln Foundation (Feature 5)	-	X	Poor	Coastal Erosion/Immediate
		Kiln Foundation (Feature 6)	-	X	Fair	Coastal Erosion/Immediate
		Kiln Foundation (Feature 7)	-	X	Fair	Coastal Erosion/Immediate
		Kiln Foundation (Feature 8)	-	X	Good	Coastal Erosion/Short Term
	Charcoal/Coke Storage Warehouse	Piling Alignments	-	X	Fair	Coastal Erosion/Decomposition /Long
Tideland Fill 1881- ca. 1918	Slag Disposal Area	Stratified Slag Deposits Welded Slag Deposit	-	X	Good	Coastal Erosion/Long Term (Welded/Partially Welded - very resistant to erosion)
	Bulkhead	Horizontal Logs and Timbers	-	X	Fair	Coastal Erosion/Decomposition /Long
Tideland Fill (1910)	Sediment Retaining Wall	Wood Pilings and Planking	-	X	Fair	Coastal Erosion/Short Term
		Dredge Sediment Deposit	-	X	Fair	Coastal Erosion/Short Term
Vessel Remains	-	Vessel Hull Fragment	-	X	Poor	Coastal Erosion/Short Term

*Good = Shows no evidence of noticeable deterioration by natural forces and/or human activities
Fair = Shows evidence of deterioration by natural forces and/or human activities
Poor = Shows evidence of severe deterioration by natural forces and/or human activities
Unknown = Feature/Site was not relocated during the 2010 survey.

Blast Furnace. In addition, the hillslope west of the Stock House appears to be very unstable and mass wasting of the hillside may have covered portions of the Stock House foundation as well as the adjacent water tank foundation since it was recorded in 1983.

Engine House and Electric Power House

The Engine House and Electric Power House were both in a long open building south of the Blast Furnace and Iron Casting House. Three foundations (Foundations A, B and H) from the Engine House were found at the north end of the building footprint and five concrete foundations (Foundations C-G) were relocated at the site of the Electric Power House at the south end of the building footprint (Figure 6). The most prominent of these features is the Blower Engine base and flywheel pits (Foundation A) in the northwest corner of the structure (JCHS 2005a). The Blower Engine base is composed of masonry bricks and the flywheel pits are masonry lined. Four large bolts, each measuring three inches in diameter and at least 8 feet in length are between the two flywheel pits (Figure 7). Two other foundations (Foundation B and H) were also relocated on the west and south sides of the Engine House. The arrangement of foundation features (Foundations C-G) within the Electric Power House footprint closely matches the arrangement of machinery shown in a 1910 photograph of this activity area (Figure 8).

With the exception of the Blower Engine foundation, comparison with the 1983 photographs showed that the physical integrity of all of the features identified within the Engine House and Electric Power House had not changed since they were recorded (See Appendix A-1 through 3). When the Blower Engine base and flywheel pits were recorded in 1983, the brick and mortar masonry base of the foundation was crumbling and the bolts that anchored the Blower Engine to the masonry base were all bent to the west, most likely during the removal of the Blower Engine. Damage to brick and mortar

Figure 7. Overview, 1983, of the Engine House and Electric Power House areas (Britton and Britton 1983: Photograph 2.

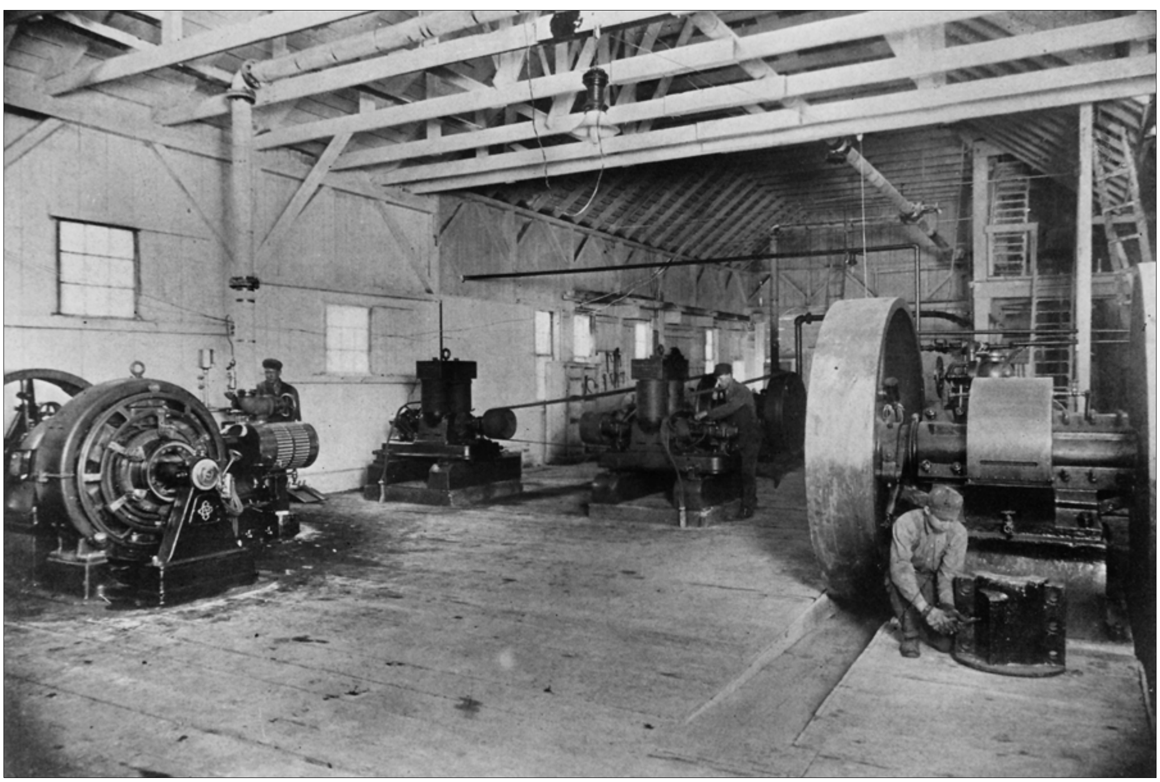

Figure 8. Machinery within the Irondale Electric Power House and adjoining Engine House (Britton and Britton 1983: Photograph 27).

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lining of the west flywheel pit and a saw cut mark near the center of the southwest bolt observed in 2010 indicate that looters, likely seeking scrap metal from around the site, had unsuccessfully attempted to remove all or a section of the southwest bolt (Figure 9). The surface in the southern half of the Engine House and Electric Power House footprint is covered with a dense layer of invasive English ivy that completely obscures the Electric Power House features (See Appendix A-1)

Boiler House

According to historic photographs, the Boiler House was constructed adjoining the north side of the Engine House and contained a bank of three boilers (JCHS 2005b). A small section of a brick and mortar masonry foundation (Feature I) was recorded in 1983, however, this feature was not relocated during the 2010 field survey.

Pipe Fitter's Shop, Machine Shop, and Blacksmith Shop

Historic photographs of the Iron and Steel Plant show a series of small buildings west of the Power House Complex and Iron Casting House that are described as a Pipe Fitter's Shop, Machine Shop and Blacksmith Shop (Unknown 1910:52). Another building, of unknown function, was north of the Casting House prior to 1910. This building is most clearly visible in a 1909 photograph taken during the construction of the open hearth furnaces in the Steel Production Building (Figure 10). Surface reconnaissance conducted in 1983 and in 2010 failed to identify any traces of these structures.

Onsite Charcoal Production Facilities

The remains of seven of the original twenty charcoal kilns were located along the shoreline during the 2010 survey. These features were not described during the 1983 HAER project. When the charcoal production facilities were completed, the kilns appear to have been built in two rows with an estimated 13 set in the east row, and the remaining kilns placed as space allowed on the west side of the first row. Historic photographs of the charcoal production facilities suggest that wood was transported along a piling-supported walkway that ran between the two rows of kilns and was fed into the kilns via hatches near the top (JCHS 2005c). After the load was fired, the finished charcoal was removed through doors located at the base (Figure 11). At least one warehouse appears to have been built on piers along the waterfront to store the finished charcoal. When the above ground portions of the charcoal kilns were demolished to increase the size of the waterfront storage yard, it appears that much of the demolition debris was pushed into the intertidal area and at least seven of the kiln foundations were left in place. Mass wasting along the bluff may be obscuring portions of the west line of charcoal kiln foundations.

Above Ground Fuel Storage Tank

The outer, concrete wall of the 6,000 barrel above ground fuel storage tank installed in 1910 is present at the base of the hillslope along the shoreline. This tank was constructed with steel reinforced concrete and was originally lined with steel. A small hole has been punched in the east side of tank near the base of the concrete wall to prevent rainwater from collecting in the tank. Between 1983 and 2010 an 8 foot section of the concrete wall on the northeast side was removed, presumably to allow access. The inside walls of the concrete tank are now covered with graffiti. This tank was constructed in an area that once housed several charcoal kilns and it is possible that the foundations of these or other charcoal production facilities may be present beneath the above ground storage tank.

Figure 9. Overview of the Blower Engine base, view to the east. Note the recently broken bricks at the base of the masonry wall. Inset shows a partial saw cut mark near the center of the bolt.

Figure 10. Overview of construction of the open hearth furnaces in the Steel Production Building, ca. 1909 (Britton and Britton 1983: Photograph 28).

Figure 11. Overview of the Irondale charcoal kilns, view to the northwest (Britton and Britton 1983: Photograph 24).

Steel Production Building

The Steel Production Building was a sprawling complex that extended at least 300 feet (North to South) by almost 190 feet (East to West) (Figure 12). This building was divided into at least seven activity areas in which different steps in the steel making process were performed. The Charging Aisle, located on the south end of the structure was where iron, flux and scrap steel were fed into three open hearth furnaces. The molten steel was removed from the furnaces and shaped into ingots along the Ingot Pouring Aisle. The ingots were reheated in a continuous reheat furnace before being run through a 22-inch Rolling Mill. A 14-inch Rolling mill and 9-inch Rolling Mill were subsequently used to further reduce the size of the steel and the finished steel bars were left to cool on three different cooling beds. All of the features identified in the remains of the Steel Production Building during the 1983 HAER project were relocated during the 2010 survey.

Charging Aisle, Open-Hearth Furnace and Ingot Pouring Aisle

The boundaries of the Charging Aisle, Open-hearth Furnace, and Ingot Pouring Aisle areas are defined by a continuous pour concrete retaining wall that also marks the south end of the Steel Production Building, and the masonry foundations along the north side of the Ingot-Pouring Aisle. Although the superstructure of the Open-Hearth Furnace was removed when the building was demolished, the foundations that supported the furnace facilities are mostly still visible. Beginning at the south side of this area, three large smokestack foundations area present along the south side of a tall concrete retaining wall. Each is marked by a round vertical shaft that terminates approximately fifteen feet below top of the foundation in a clean-out hole accessible through the south wall of the Steel Plant Building foundation. A series of thirteen masonry piers supported the Charging Aisle, and sixteen brick and

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mortar masonry piers supported the weight of three open hearth furnaces. Only seven of the Charging Aisle piers and eleven of the Open Hearth Furnace foundations remain standing and several of these have been tagged with graffiti (Figure 13). Comparison of the 1983 and 2010 overviews (See Appendix A- 4 and 5) reveals little change in the physical integrity of the concrete, and brick and mortar foundations in this section of the plant. While almost half of the Ingot Pouring Aisle foundation walls remain intact, portions of the footings in the east, central and west sections have collapsed.

Rolling Mills, Shears and Cooling Bed

The masonry foundations that define the extent of the 22-inch Rolling Mill and the Billet Shears are largely intact, however the masonry foundations of the Corliss Engine Base were pushed apart by tree roots in the years since they were recorded in 1983. The prominent concrete-lined mill pit, lifting table pits, and flywheel pit remain open and the walls of these features are stable (See Appendix A-6 through 8). Similarly, the concrete and masonry features within the 14- and 9-inch rolling mill complex in the northeast corner of the Steel Production Building area are largely unchanged since they were recorded in 1983 (See Appendix A-9 through 11). The brick and mortar masonry walls along the edges of the Cooling Bed are intact, however, the eastern sections of this structure are heavily overgrown with maple trees and other vegetation.

Waterfront Features

The Irondale Iron and Steel Plant relied on its waterfront location to move raw materials to the plant and to transport finished products to distant markets. When the Irondale Iron Plant was built in 1881, a simple pier supporting a narrow gauge rail was sufficient to provide for plant operations, however, the

Figure 13. Overview of the charging aisle and open hearth furnace foundations, view to the north.

[redacted] [redacted]

waterfront was modified as the plant increased it production capacity and expanded into steel production. For example, the addition of onsite charcoal production required additional square footage along the waterfront; the increasing capacity of the blast furnace required larger stockpiles of raw materials and storage areas for finished products; and the larger ocean-going vessels needed to transport raw materials and finished products required appropriate loading and unloading facilities. These needs were met through bulkhead construction, filling of the tidelands and the construction of storage warehouses and a series of piers and wharves.

Tideland Filling Features

A series of three features related to the development of the Irondale Iron and Steel Plant facilities along the shoreline were identified within the intertidal zone during the 2010 survey. None of these features were described in the 1983 HAER report. Historic photographs taken of the Irondale waterfront the late 1800s and early 1900s illustrate different episodes in the development of this portion of the plant, clarify the sequence of tideland filling and the function of the various features associated with these episodes.

Charcoal Production Facilities Bulkhead (1884-1910)

Between 1884 and 1910 a bulkhead composed of vertical piling and stacked horizontal planks and logs extended along the Irondale waterfront from the south end of the charcoal kilns to the north side of the Irondale Iron Plant wharf. A photograph of the southern portion of the Irondale waterfront in 1901 shows that cobble and boulder size ballast rock was used to further armor the seaward side of the bulkhead (Figure 11). Inspection of the intertidal zone east of the charcoal kiln foundations revealed the remnants of an alignment of vertical wood pilings and horizontal and vertical wood planks (Figures 14 and 15) that marks the eastern extent of the bulkhead built on the seaward side of the charcoal kilns.

Slag Disposal Area

Slag generated by the Irondale blast furnace was gradually used to fill an area south of the wharf. In preparation for filling this area, a stacked log bulkhead was built directly south of the wharf and both granulated and coarse-grained slag material, as well as other production waste was dumped at this location. The slag disposal area and stacked log bulkhead are visible in the bottom left corner of at 1901 photograph of the west end of the wharf (Figure 16). Cross sections of the uppermost slag deposits exhibit cross-bedding representing discreet episodes of deposition (Figure 17) as slag was periodically removed from the blast furnace during its operation. Along the east edge of the granulated slag deposits, NWAA archaeologists mapped horizontal logs and the remains of vertical pilings partially buried in intertidal sediments that are the remains of the log bulkhead that defined the eastern extent of the slag disposal area (Figure 18).

1910 Tideland Fill Area and Associated Features

In March 1910, the Western Steel Corporation proposed to fill a 1300 foot strip of tidelands north of the Irondale wharf and contracted the dredger *Tacoma* to complete the project. In preparation for the dredging and filling, cribbing built with rows of vertical pilings, milled timber cross members, horizontally stacked timbers, and buried deadman pilings and logs was installed along the east side of the proposed fill area to contain the dredge sediments. (JCHS 2005d, 2005f). During a series of low tides the remnants of between two and five rows of vertical pilings braced with milled timber cross members and backed

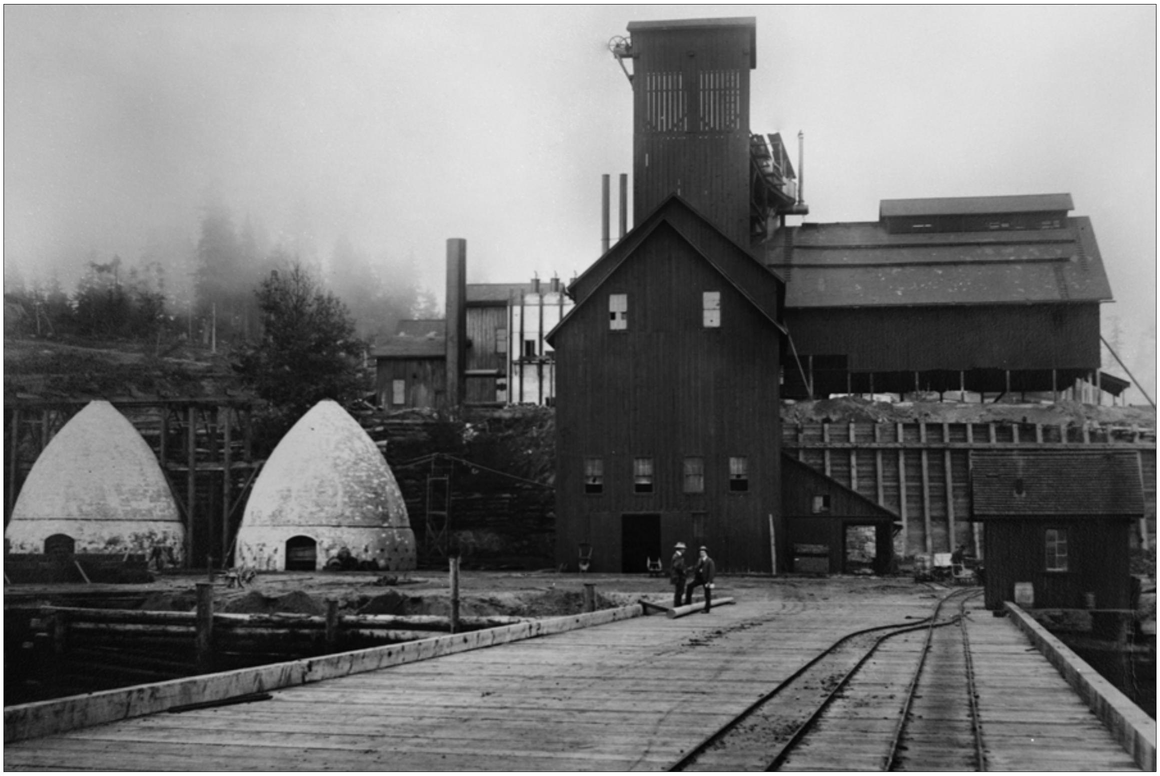

Figure 16. Overview of the Irondale Iron Plant from the wharf, 1901 (Curtis 1901a).

Figure 17. Cross-bedded slag deposits exposed in an erosion profile on the south side of the slag fill area.

Figure 18. Overview of the slag disposal area, view to the southwest. Note the horizontal logs exposed in the sand east of the welded slag deposits.

with horizontally stacked timbers were recorded along an alignment extending over 425 feet (130 meters) north of the remains of the wharf and beyond the northern boundary of the current project area. This feature marks the eastern boundary of the 1910 fill area (Figure 5).

Waterfront Wharves and Warehouses

A single wharf with a short frontage and hopper for loading rail cars was built along the waterfront when the Irondale Iron Plant was built in 1881 (JCHS 2005e). A Weigh House with scales to measure the weight of incoming ore, scrap metal and flux was also situated at the west end of the wharf. During the 1910 expansion of the Irondale waterfront, the wharf was rebuilt and extended to 600 feet with a frontage of 400 feet. Narrow gauge rail lines were extended along the frontage to facilitate the unloading of ocean-going steam ships. After 1910, ore was offloaded from steamships into a series of hoppers set along the face of the wharf and was then measured out into narrow gauge rail cars that hauled the ore to the Stock House. In addition to supporting the plant operations, the Irondale wharf was the landing point for passenger ferries such as the *Chippewa*, and *SS Hyak* (JCHS 2004, 2010). Historic photos show additional narrow piers and covered structures set on pilings over the tidelands perpendicular to the shoreline south of the main wharf (Figure 19). The southernmost structure may have housed the sawmill and log splitting machinery used to prepare wood for the charcoal kilns and the northern structure was a charcoal, and later, coke storage warehouse (Unknown 1910:52). An inclined ramp visible in one of the historic photographs that appears to link the waterfront to the walkways between the row of charcoal kilns may represent a conveyor that was added in 1901 to improve the

Figure 19. The Irondale Iron Plant and company housing, 1901. (Curtis 1901b).

efficiency of charcoal production. A concrete slab foundation measuring 20 feet long (North/South) by 11 feet wide (East/West) that supported the Weigh House and alignments of pilings that mark the western end of the Irondale wharf were recorded in the intertidal zone north of the slag deposits (Figure 5). Alignments of pilings in the intertidal zone south of the slag deposit appear to mark the location of the charcoal/coke storage warehouse east of the charcoal kilns and later above ground fuel storage tank (Figure 5). Examination of the intertidal zone further south did not reveal evidence of the second covered structure or additional piling supported piers or ramps.

Gridirons

In addition to the waterfront wharves and warehouses, the designers of the Irondale Iron and Steel Plant envisioned two loading/unloading areas for barges along the waterfront and a gridiron for maintaining company owned barges and scows (Unknown 1910:52). The barge loading gridirons were proposed on the north and south sides of the wharf and the maintenance gridiron was situated along the shoreline south of the Charcoal/Coke Storage Warehouse. A photograph of the Irondale waterfront after the construction of the Steel Production Building in 1910 shows at least one of the gridirons for repairing or unloading barges along the south side of the Irondale wharf (JCHS 2005g), and other gridirons may have been built on either side of the coke storage warehouse visible on the left side of the photograph. It is unclear whether the gridiron along the face of the filled waterfront north of the Irondale wharf was ever constructed. The survey revealed little evidence of these gridirons; horizontal beams exposed near the top of the intertidal zone north of the remains of the bulkhead and south of the slag deposits (Figure 14)

[redacted]

may represent part of the barge repair grid or foundation cribbing for some associated structures built between the bulkhead and the coke storage warehouse.

Vessel Remains

Examination of an air photo taken in 1976 at low tide revealed parallel alignments of wood timbers immediately south of the slag disposal area (Figure 20). Inspection of this portion of the intertidal zone revealed milled and planed timbers with square iron nails and spikes representing the remains of a small section of a flat bottom barge or scow hull (Figure 21).

[redacted]

[redacted]

DISCUSSION

Threats to Historic Resources

Identified threats to historic resources at the Irondale Iron and Steel Plant site include looting, vandalism and natural processes. Local informants reported that scrap metal salvagers have regularly visited the site of the Irondale Iron and Steel Plant to gather scrap iron and steel from around the building foundations and the intertidal zone where it is washing out of fill deposits along the waterfront. In addition, evidence of looting, such as recent excavation around sheet metal exposed on the surface near the north side of the Iron Casting House, and damage to the foundation and bolts that once held the blower engine in place within the Power House Complex indicate that visitors to the site are actively seeking scrap metal to sell. Vertical surfaces on concrete and brick and mortar foundations within the footprint of the Steel Production Building and the walls of the AST have been tagged with painted graffiti. In addition, natural processes, such as coastal erosion, mass wasting, vegetation growth and freeze/thaw cycles have also affected the physical integrity of some of the features at the Irondale Iron and Steel Plant site. Fresh erosion scarps at the high water line indicate that erosion is occurring during storms and high tide cycles. Comparisons between the high water line visible in the 1976 air photo and low error GPS measurements taken in 2010 indicate that a maximum of 65 to 85 feet (19-26 meters) of the waterfront have eroded over the last 34 years (Figure 20). This erosion has exposed and undermined the remains of at least five of the southernmost charcoal kilns and, if left unchecked, will damage the two charcoal kiln foundations located along the shoreline immediately south of the AST. Mass wasting along the bluff edge also appears to have obscured and possibly damaged the foundations of the Boiler House located east of the Steel Production Building, as well as the Stockhouse and adjacent water tank east of the Iron Cast House and Power House Complex. Vegetation growth on or adjacent to foundation features, particularly the physical process of root intrusion and chemical weathering, has destabilized some of the brick and mortar foundation features at this site. In addition, freeze/thaw expansion of water around the surfaces of brick and mortar features that comprise many of the steel

[redacted] [redacted]

Figure 21. Overview of barge hull section in the intertidal zone southwest of the slag disposal area, view to the south.

plant foundations are slowly degrading the exposed surface of bricks and loosening the mortar that holds them together (Figure 22).

Condition of Irondale Iron and Steel Plant Features and Deposits

In general the physical integrity of nearly all of the features described during the 1983 HAER survey has not changed. While visitor impacts (e.g. graffiti and looting) have damaged some of the features, these activities have not altered the character of features or their ability to convey the general layout and function of the various facilities involved in iron and steel production at Irondale. The greatest impacts that were identified during the 2010 survey involved features that were not recorded during the HAER survey. Erosion occurring along the shoreline has exposed and undermined at least one quarter of the charcoal kiln foundations that were once present at this site and continued erosion threatens to destroy two additional foundation features. While the integrity of these features has been diminished (and on an individual basis it could be argued that less than 50% of the known features remain intact) the condition of these features does not detract from the characteristics of the site that contribute to the eligibility of the historic district as a whole.

Since no subsurface testing was undertaken in the course of this survey the integrity of archaeological deposits at the Irondale Iron and Steel Plant was not directly assessed. Sediment profiles exposed by coastal erosion along the shoreline suggest, however, that architectural debris generated by the demolition and renovation of the blast furnace and other facilities, as well as the waste products of iron and steel production were used to fill and level portions of the site area along the shoreline. In some

[redacted] [redacted]

Figure 22. The west side of a brick and mortar masonry foundation at Unidentified Foundation Feature #2, west side of Steel Production Building.

cases it appears that these deposits are stratified and that they may contain archaeological materials that could contribute new information regarding the construction, maintenance and operation of the iron and steel production facilities during its various periods of operation.

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2005c Overview of the Irondale charcoal kilns from the south side of the Stock House, view to the southeast, undated photograph. JCHS Image Number 2005.71.6.
2005d Overview of newly filled tidelands north of the Irondale wharf, 1910. JCHS Image Number 2005.71.56.
2005e Overview of the Irondale pier and railcar loading area, 1899. JCHS Image Number 2005.71.45.
2005f Overview of the piling and timber cribbing around the perimeter of the tideland reclaimation area north of the Irondale wharf, 1910. JCHS Image Number 2005.71.2.
2005g Overview of the Irondale Iron and Steel Plant from a barge moored at the end of the wharf. JCHS Image Number 2005.71.63.
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APPENDIX A: 1983/2010 Feature Comparison Photos

Iron Plant Site, Overview of Power House Complex and Hot Stove Foundation.

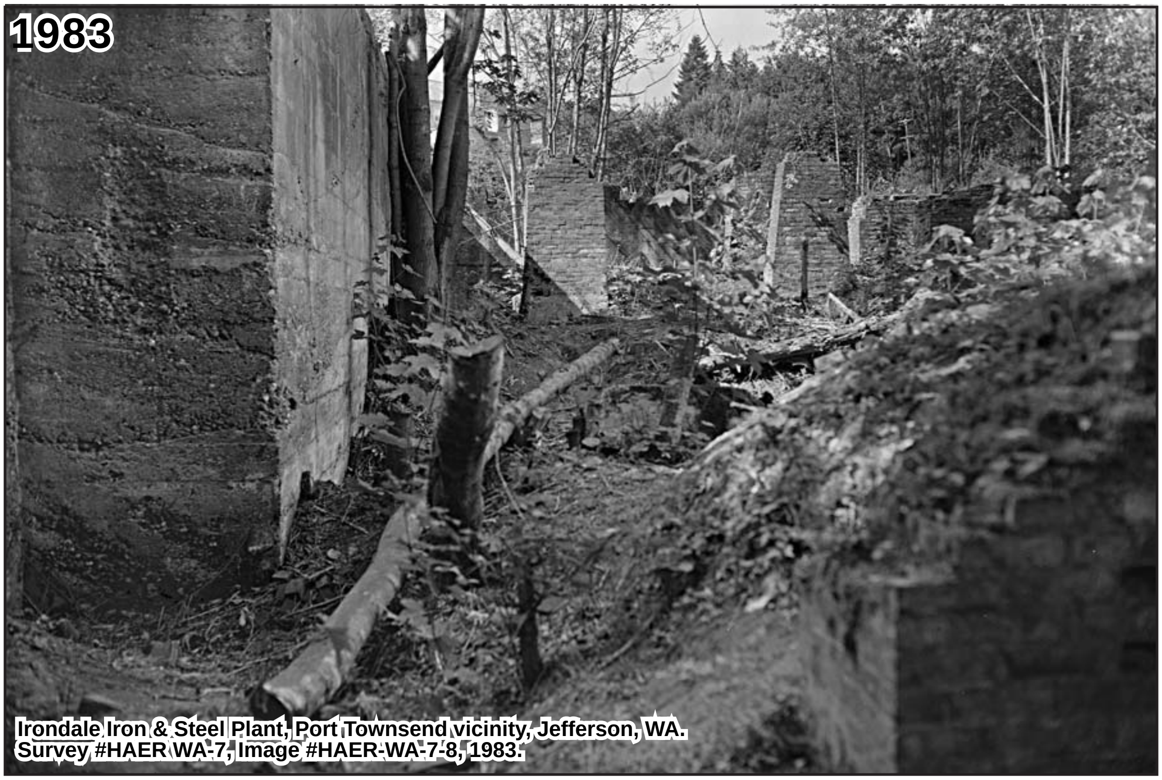
Iron Plant Site, Blowing Engine Foundation and Overview of Power House Complex.

Iron Plant Site, Blowing Engine Foundation.

Steel Plant Site, view to North.

Irondale Iron & Steel Plant, Port Townsend vicinity, Jefferson, WA.
Survey #HAER WA-7, Image #HAER-WA-7-6, 1983.

Steel Plant Site (View to West) Inside Open Hearth Furnace Foundation



Steel Plant Site, 22-inch Rolling Mill Foundation (View to West)

Steel Plant Site, Fly Wheel Pit Foundation for 22-inch Rolling Mill

Steel Plant Site, Fly Wheel Pit Foundation for 22-inch Rolling Mill

Irondale Iron & Steel Plant, Port Townsend vicinity, Jefferson, WA.
Survey #HAER WA-7, Image #HAER-WA-7-11, 1983.

14-inch Rolling Mill Fly Wheel Pit Foundation.

Steel Plant Site, 9-inch Rolling Mill Foundation, view to the west.

Steel Plant Site, Foundations east of 14-inch Rolling Mill Flywheel Pit.

Officer’s Houses Overlooking Steel Plant.

Irondale Iron & Steel Plant, Port Townsend vicinity, Jefferson, WA.
Survey #HAER WA-19, Image #HAER-WA-7-11, 1983.

APPENDIX B: Site Record

Appendix B
State Environmental Policy Act (SEPA) Documentation

WAC 197-11-960 Environmental checklist.

ENVIRONMENTAL CHECKLIST

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

Former Irondale Iron and Steel Plant

The Former Irondale Iron and Steel Plant (Site) produced iron and/or steel intermittently from 1881 to 1919. Previous investigations show that past steel plant operations resulted in the contamination of soil, sediment, and groundwater at levels that exceed the Model Toxics Control Act (MTCA) cleanup standards for total petroleum hydrocarbons (TPH) and metals.

Due to its location on Puget Sound, the site is designated as a Puget Sound Initiative cleanup site. Jefferson County Public Works has been named as a Potentially Liable Person (PLP) for the site. However, because of the county's limited financial resources, Ecology prepared the Remedial Investigation/Feasibility Study (RI/FS) Report and draft Cleanup Action Plan (CAP) for the site. When funding becomes available, Ecology intends to implement the CAP.

2. Name of applicant: Toxics Cleanup Program, Southwest Regional Office, Washington State Department of Ecology

3. Address and phone number of applicant and contact person:

Steve Teel
Washington State Department of Ecology
Toxics Cleanup Program
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775
(360) 407-6247

4. Date checklist prepared: December 7, 2009
5. Agency requesting checklist: Washington State Department of Ecology
6. Proposed timing or schedule (including phasing, if applicable): Cleanup work will begin when funding becomes available. Currently, it is not known when such funds will be available.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Revised Draft Cleanup Action Plan, Irondale Iron and Steel Plant, Irondale, Washington, Ecology Facility/Site No. 95275518, Prepared by GeoEngineers for the Washington State Department of Ecology, August 31, 2009.

Revised Draft Remedial Investigation/Feasibility Study Report, Irondale Iron and Steel Plant, Irondale, Washington, Ecology Facility/Site No. 95275518, Volumes I and II, Prepared by GeoEngineers for the Washington State Department of Ecology, August 13, 2009.

Health Consultation: Evaluation of Selected Metals in Irondale Beach Park and Chimacum Creek Tidelands Shellfish, Irondale, Jefferson County, Washington, Prepared by Washington State Department of Health, July 28, 2008.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No.

10. List any government approvals or permits that will be needed for your proposal, if known.

Laws and regulations addressing permits or federal, state, or local requirements that Ecology believes may be applicable at the time are listed below. This list may not include all pertinent laws and regulations. Work performed shall be in accordance within the substantive requirements of any applicable law or regulation.

1. Chapter 90.48 RCW (State Water Pollution Control Act) and Chapter 173-220 WAC (National Pollutant Discharge Elimination System (NPDES) Permit Program Regulations).
2. Chapter 70.105D RCW (Model Toxics Control Act), and Chapter 173-340 WAC (MTCA Regulations).
3. Chapter 70.105 RCW (Washington State Hazardous Waste Management Act), and Chapter 173-303 WAC (State Dangerous Waste Regulations).
4. Chapter 173-160 RCW (Minimum Standards for Construction and Maintenance of Wells).
5. Chapter 43.21C RCW (State Environmental Policy Act), and Chapter 197-11 WAC (State Environmental Policy Act Rules).
6. Washington Industrial Safety and Health Act (WISHA).
8. Applicable Jefferson County Codes.

Additional activities that need to take place prior to implementing the cleanup actions:

- The anticipated cleanup action qualifies for a U.S. Army Corps of Engineers (Corps) Nationwide Permit 38 (NWP 38). Nevertheless, federal consultation under the Endangered Species Act, Section 401 Water Quality Certification, and other substantive requirements must still be met by the cleanup action. Ecology will be responsible for issuing the final approval for the cleanup action, following consultation with other state and local regulators. The Corps will separately be responsible for issuing approval of the project under NWP 38, following Endangered Species Act consultation with the federal Natural Resource Trustees, and also incorporating Ecology's 401 Water Quality Certification.

- Because the proposed project area is part of the Irondale Historic District identified on the National Register of Historic Places, a Cultural Resources Assessment will need to be performed and a Monitoring and Treatment Plan will need to be prepared prior to implementing cleanup actions that cause disturbance to the land. Additionally, a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP) will be needed for the field work portions of the Cultural Resources Assessment. Input will also be requested from local Tribes regarding both the cultural resources assessment and cultural resources monitoring during remedial activities, with cultural resource protocols being developed considering Tribal input.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Based on the comparative analysis performed in the Feasibility Study, the proposed Site cleanup is a combination of upland soil excavation, marine sediment removal, and upland soil capping to achieve cleanup goals at the Site. Briefly, the cleanup includes:

1. Complete removal of TPH and metals contaminated soil at the former AST area and the area in the vicinity of sample location TP-08. Soil that exceeds cleanup levels in the vicinity of these areas would be excavated to the extent practicable.
2. Installation of a permeable geotextile and soil cap to prevent direct exposure to contaminated soil in the Power House Complex and Steel Production Building areas.
3. Perform site restoration tasks including restoring excavation areas to original conditions; planting soil cap areas for use as public park space; and remove slag material in the slag outcrop area along the shoreline to allow restoration of the shoreline.
4. The contaminated sediment will be addressed by excavating or dredging to the extent required to achieve cleanup goals in conjunction with the excavation activities at the former AST area. The sediment impacted with TPH above the ecological-based cleanup level will be removed to the extent practicable.
5. Upland excavation areas will be backfilled with clean imported fill to restore original Site topography, features, and surfaces. Shoreline removal areas will be backfilled with clean imported fill of grain size appropriate for the marine environment, using a habitat substrate surface material.
6. Installation of a monitoring well network and monitor groundwater quarterly for at least one year.

The total volume of uplands soil that will be excavated is approximately 8,750 tons. This tonnage estimate includes an assumption of 20 percent expansion above in-place volume and 1.6 tons per cubic yard of soil. The total volume of sediments that will be excavated or dredged is approximately 2,500 tons. This tonnage estimate includes an assumption of 20 percent expansion above in-place volume and 1.6 tons per cubic yard of sediment. The sediment impacted with TPH above the ecological-based cleanup level will be removed to the extent practicable.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
The Former Irondale Iron and Steel Plant is generally located at 526 Moore Street in the unincorporated town of Irondale, about 5 miles south of Port Townsend. It is located adjacent to Port Townsend Bay and encompasses about 13 acres of upland property and about 1,000 feet of shoreline. See Attachment 1, Figures 1 and 2 for a vicinity map and site plan.

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other . . . . . .**Flat beach area with steep coastal bluff**

b. What is the steepest slope on the site (approximate percent slope)?
37%

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.
The Site is underlain by a combination of fill and native soil. The fill varies in thickness from zero to approximately 15 feet and is present along all of the near-shore area and beneath former building areas. Most of the upper foot or more of the Site has been disturbed by the prior industrial activities. Native soils underlie the fill and consist of unconsolidated landslide deposits. Native soil encountered in explorations consisted of loose gray to brown sand with varying amounts of silt, shell fragments and gravel. Native sediments exposed in the steeper portion of the Site consist of loose sand and silt. A thin layer of topsoil and/or forest duff covers most of the upland portion of the Site.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Unconsolidated landslide deposits (see above).

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
See above Section A.11. Depth of excavation in the AST area will be approximately 11 feet below ground surface (bgs), as feasible. Depth of excavation in the TP-08 area will be approximately six feet bgs, as feasible. Upland areas will be backfilled with clean imported fill. Shoreline removal areas will be backfilled with clean imported fill of grain size appropriate for the marine environment, using a habitat substrate surface material.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Erosion control measures will be implemented by the Contractor to ensure compliance with local and state government regulations.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
Silt fences, catch basin blocks, and use of other materials such as straw bales as needed.

a. **Air**

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.
At completion, the project will not result in result in emissions to the air. There is a potential for dust generation during excavation of soil and during placement of upland fill. Standard construction dust control practices will be implemented during these activities. Also, particulate matter may be generated from diesel engine non-road equipment during construction.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
Dust will be controlled with water trucks if needed. Contractors will be required to use ultra low sulfur diesel fuel in off-road equipment and instructed to turn off construction equipment when not in use.

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The Site is located adjacent to Port Townsend Bay and includes upland and beach areas. Elevations at the Site range from sea level to about 100 feet above sea level. The Site includes approximately 13 acres of upland property and 1,000 feet of shoreline.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Yes. See Attachment 1, Figure 14.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Shoreline removal areas will be backfilled with clean imported fill of grain size appropriate for the marine environment, using a habitat substrate surface material. The total volume of sediments that will be excavated or dredged is approximately 2,500 tons. This tonnage estimate includes an assumption of 20 percent expansion above in-place volume and 1.6 tons per cubic yard of sediment. The sediment impacted with TPH above the ecological-based cleanup level will be removed to the extent practicable.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

The nearshore area lies within the 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

Construction dewatering may be necessary in areas where the excavation depth will be below groundwater. Dewatering effluent will be contained and will either be treated on-site or will be transported off-site for treatment.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The current use of the Site is as a beach/upland park. At completion, the Site use will remain the same. Currently stormwater enters surface water by sheet flow. No new stormwater management facilities will be constructed as part of the cleanup action. During construction/soil excavation, silt fences, catch basin blocks, and other materials such as straw bales will be used as needed. A Construction Stormwater Pollution Prevention Plan will be prepared by the contractor and approved by Ecology before construction begins.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Debris could enter Port Townsend Bay during construction. A containment boom and silt curtains will prevent debris from floating out of the immediate area.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

All work will be conducted within the approved timing windows for listed species in this area of Puget Sound. An emergency spill kit will be located on Site and promptly used for the cleanup of accidental spills. Also, a containment boom and silt curtains will be deployed during construction/excavation activities as needed.

4. **Plants**

a. Check or circle types of vegetation found on the site:

x——— deciduous tree: **red alder, big leaf maple, Scouler's willow**

x——— evergreen tree: **Douglas fir, western red cedar, Western Hemlock**

x——— shrubs: **Indian plum, elderberry, Himalayan blackberry**

x——— grass: **Orchard grass, colonial bentgrass, purple clover, common plantain, bird's-foot-trefoil, vetch**

———— pasture

———— crop or grain

x——— wet soil plants: **stinging nettle, salmonberry**

———— water plants:

x——— other types of vegetation: **Pacific ninebark, Oregon grape, snowberry, swordfern**

b. What kind and amount of vegetation will be removed or altered?

Upland plants will only be removed as needed to excavate contaminated soil areas, place geomembrane fill. See Attachment 1, Figure 14 for locations. Also, plants may need to be removed to construct temporary roads for construction equipment access to the above areas.

c. List threatened or endangered species known to be on or near the site.

The Washington Department of Natural Resources (DNR) has conducted a plant survey. The Golden Paintbrush was identified within ½ mile of the Site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Disturbed areas will be replanted with native species.

5. **Animals**

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: American crow, black-capped chickadee, barn swallow, and Rufus Hummingbird species were observed. Site habitat likely supports other species also such as raptors, woodpeckers, herons, and songbirds. A great blue heron rookery was identified by Washington State

Department of Fish and Wildlife in 2008. However, this rookery was not observed during the habitat survey that was conducted in 2009.

mammals: None were observed. However, the Site habitat likely supports blacktail deer, raccoon, and Douglas squirrel.

fish: Hood Canal summer chum, fall chum, Coho salmon, cutthroat trout, steelhead, and shellfish (littleneck clams, butter clams, horse clams, and eastern softshell clams).

b. List any threatened or endangered species known to be on or near the site.

Priority Habitat and Species (PHS) information were obtained from the Washington Department of Fish and Wildlife (DFW). According to the DFW, a Heron Rookery was identified at the west most corner of the Site. However, this rookery was not observed during the habitat assessment that was performed during the remedial investigation. Forage Fish Spawning Areas were also identified along the Irondale beach front up to the Chimacum Creek beach front. Chimacum Creek was also identified as a National Wetland Inventory (NWI) area. These are the only areas that show up in the PHS and NWI surveys within ½ mile of the site.

c. Is the site part of a migration route? If so, explain.

The project site is located within the Pacific Flyway, which is flight corridor for migrating waterfowl and other avian fauna. The Pacific Flyway extends south from Alaska to Mexico and South America.

e. Proposed measures to preserve or enhance wildlife, if any:

Trees to remain within or near construction areas will be protected with temporary tree protection fencing. An emergency spill kit will be located on Site and promptly used for the cleanup of accidental spills. Creosote-treated pilings and associated materials that are removed will be taken to an upland facility approved for this type of material.

The project will ultimately enhance wildlife habitat by enhancing habitat quality within the environmental cleanup areas through the removal of contamination and wood debris, restoration of natural topography in the beach area, and vegetation restoration in the uplands.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

None.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Equipment used in construction/excavation will meet applicable efficiency and emissions standards.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

The purpose of the project is to remove and reduce exposure to toxic chemicals to acceptable levels.

1) Describe special emergency services that might be required.

There are no unusual risks associated with this proposal. All personnel will be required to read and abide by the Site Safety Plan. Emergency medical contact numbers and directions to the nearest hospital will be listed in the plan and posted at the Site during construction.

2) Proposed measures to reduce or control environmental health hazards, if any:

The purpose of the project is to remove and reduce exposure to toxic chemicals to acceptable levels. The Site Safety Plan will list requirements for worker protection during contaminated soil excavation and removal.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

There are no known sources of noise in the area that will affect the proposed project..

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

There will be some noise during construction/excavation. Generally, noise will come from heavy equipment operation. Louder noises (such as during the emplacement of temporary sheet pile walls) will be temporary and of short duration. Construction will be limited to hours between 7 a.m. and 7 p.m. seven days a week.

3) Proposed measures to reduce or control noise impacts, if any:

Construction will take place between 7 a.m. and 7 p.m. seven days a week. No unusual noise impacts are anticipated that would require further control measures.

8. Land and shoreline use

a. What is the current use of the site and adjacent properties?

The Site is currently maintained by Jefferson County Parks and Recreation as a park and recreational area. Adjacent properties are residential, wildlife habitat (Chimacum Creek Estuary), and undeveloped.

b. Has the site been used for agriculture? If so, describe.

No.

c. Describe any structures on the site.

None. However, some former building foundations and walls are present.

d. Will any structures be demolished? If so, what?

Excavation of upland soil in the location of the former AST may require demolition of portions of the AST concrete walls and base to achieve complete removal of contaminated soil. However, due to the historic nature of the structures at the Site, any excavation activities that impact existing building foundations and structures will require coordination with the Washington Department of Archeology and Historic Preservation (DAHP). Demolition of the AST would be completed to the extent required to achieve contaminant removal and to ensure remaining components are structurally sound.

e. What is the current zoning classification of the site?

Currently the site is zoned rural residential.

f. What is the current comprehensive plan designation of the site?
The current comprehensive plan designation is P, Public. (Reference 2005 Comprehensive Plan Land Use Designations Map on County Website)

g. If applicable, what is the current shoreline master program designation of the site?
The Site is currently designated as **Urban** by the Shoreline Master Program.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
Jefferson County Code has classified the site as a 'Critical Area' because it is on the shoreline.

i. Approximately how many people would reside or work in the completed project?

None.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

There will be no change to current land use.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

No structures are being built.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Not applicable.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

There are designated recreation opportunities including beach access areas, trails, hand boat launch, fishing, bird watching, picnicking, hiking, walking, and creek access areas adjacent to the site to the north. There are informal recreational opportunities located adjacent to the site to the south of the site including hiking, fishing, bird watching, and bicycling.

b. Would the proposed project displace any existing recreational uses? If so, describe.

Yes the project will temporarily displace a very busy Jefferson County park that is designated for passive uses such as walking, hiking, bird watching, picnicking, beach access, and historical interpretation. After the project is completed, the Site will be restored to a condition that makes is usable for passive recreational purposes again.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Public education and outreach, press releases, and signage will be used to indicate the Site is closed to recreation and to educate the public on other areas that are available with similar recreational opportunities nearby.

13. **Historic and cultural preservation**

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

The proposed project area is part of the Irondale Historic District identified on the National Register of Historic Places.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

In addition to the Site's identification on the National Register of Historic Places, the Site may contain Tribal cultural resources.

c. Proposed measures to reduce or control impacts, if any:

A Cultural Resources Assessment will need to be performed and a Monitoring and Treatment Plan will need to be prepared prior to implementing cleanup actions that cause disturbance to the land. Additionally, a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP) will be needed for the field work portions of the Cultural Resources Assessment. Input will also be requested from local Tribes regarding both the cultural resources assessment and cultural resources monitoring during remedial activities, with cultural resource protocols being developed considering Tribal input. Any excavation activities that impact existing building foundations and structures will require coordination with the DAHP.

14. **Transportation**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Site access is via Moore Street.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The Site is not currently served by public transit. The nearest transit stop is approximately 0.5 miles away.

c. How many parking spaces would the completed project have? How many would the project eliminate?

No parking spaces will be added or eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No new roads or streets, or improvements to existing roads or streets will be made.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

None.

g. Proposed measures to reduce or control transportation impacts, if any:

None.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

The project will not result in an increased need for public services.

b. Proposed measures to reduce or control direct impacts on public services, if any.

None.

16. **Utilities**

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

No utilities are currently available at the Site.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

None.

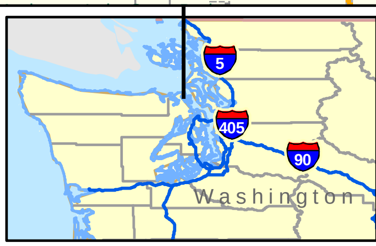
C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: SS Teal

Date Submitted: 12/7/09

ATTACHMENT 1



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Data Sources: ESRI Data & Maps, Street Maps 2005.
Chimacum Creek Tidelands location and Irondale Beach Park Tidelands location obtained from "Health Consultation. Evaluation of Selected Metals in Irondale Beach Park and Chimacum Creek Tidelands Shell Fish." Irondale, Jefferson County, Washington. Agency for Toxic Substances and Disease Registry. July 28, 2008.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

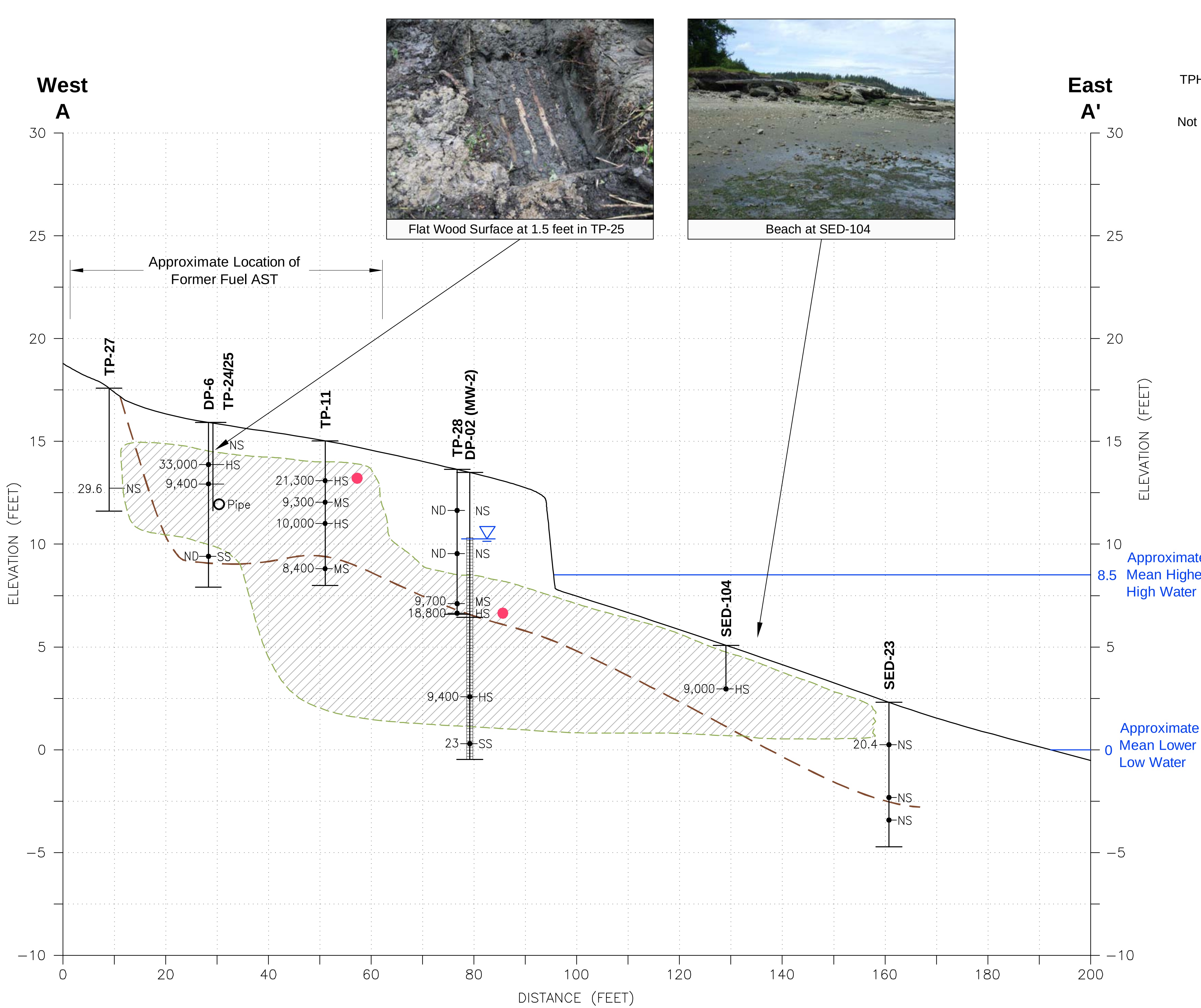
Vicinity Map

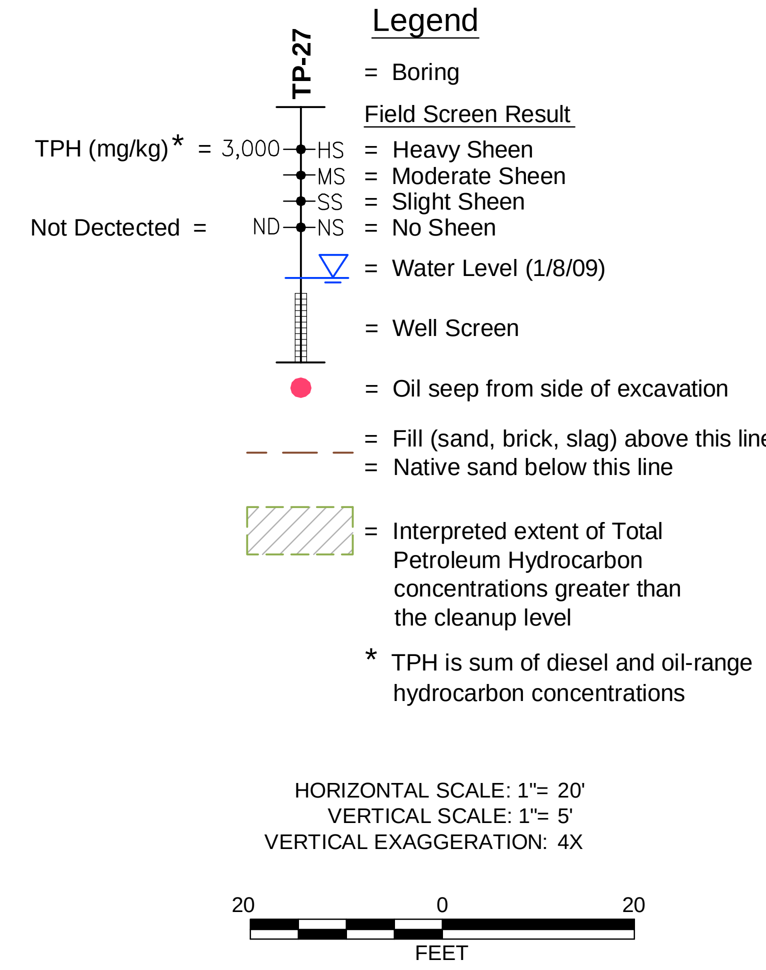
Irondale Iron and Steel Plant
Irondale, Washington

GEOENGINEERS

Figure 1

Office: SEA Path: P:\0\0504042\00\GIS\050404200 FIG-1-082009.mxd Map Revised: August 20, 2009





Notes

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.
3. MLLW Tidal Datum, MLLW=0' Converted from NGVD 29.

Cross Section from AST through Beach

State of Washington Department of Ecology
Irondale, Washington

GEOENGINEERS

Figure 9

Site Plan

Irondale Iron and Steel Plant
Irondale, Washington

GEOENGINEERS

Figure 2

Reference: Aerial photo (April 2003) from Jefferson County (http:maps.co.jefferson.wa.us, accessed May 2007).
Former structures from Hart Crowser (1996).
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for infomation purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Map Revised: August 20, 2009
Path: P:\0\0504042\00\GIS\050404200_FIG-2-082009.mxd
Office:SEA

WAC 197-11-970 Determination of Nonsignificance (DNS).

DETERMINATION OF NONSIGNIFICANCE

Description of proposal: The Former Irondale Iron and Steel Plant (Site) produced iron and/or steel intermittently from 1881 to 1919. Previous investigations show that past steel plant operations resulted in the contamination of soil, sediment, and groundwater at levels that exceed the Model Toxics Control Act (MTCA) cleanup standards for total petroleum hydrocarbons (TPH) and metals.

Due to its location on Puget Sound, the site is designated as a Puget Sound Initiative cleanup site. Jefferson County Public Works has been named as a Potentially Liable Person (PLP) for the site. However, because of the county's limited financial resources, Ecology prepared the Remedial Investigation/Feasibility Study (RI/FS) Report and draft Cleanup Action Plan (CAP) for the site. When funding becomes available, Ecology intends to implement the CAP.

Proponent: Washington State Department of Ecology, Toxics Cleanup Program, Southwest Regional Office

Location of proposal, including street address, if any: The Former Irondale Iron and Steel Plant is generally located at 526 Moore Street in the unincorporated town of Irondale, about 5 miles south of Port Townsend.

Lead agency: Washington State Department of Ecology

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

☐ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

☒ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by January 22, 2010.

Responsible official: Rebecca S. Lawson, P.E., LHG

Position/title: Washington State Department of Ecology, Southwest Regional Office, Section Manager.

Phone: (360) 407-6241

Address: P.O. Box 47775, Olympia, WA 98504-7775

Date 12/14/09 Signature Rebecca S. Lawson

ADDENDUM TO ENVIRONMENTAL CHECKLIST

Date of Addendum	May 24, 2011
Date of original checklist prepared:	December 7, 2009
Name of project:	Former Irondale Iron and Steel Plant
Name of applicant and contact:	Toxics Cleanup Program, Southwest Regional Office, Washington State Department of Ecology, Steve Teel
Dates of original comment period:	December 14, 2009 to January 22, 2010

Description of change: Additional habitat restoration work will be performed to create a continuous shoreline from the environmental remediation area at the southern end of the park to the previously conducted Washington Department of Fish and Wildlife, Chimacum Creek beach restoration project to the north (Figure 1). Cleaning-up toxic sites and restoring habitat at the same time make efficient and effective use of state and local resources. The proposed shoreline restoration will occur north of the remediation area along the existing upland fill pad. Restoration will include removal of fill from the existing shoreline, placement of Large Woody Debris (LWD) and creation of a backshore habitat area. Removing the historic fill pad along the shoreline north of the remediation area will create a more natural beach slope angle, reducing erosion of the fill pad into the upper intertidal area. An LWD berm will be created at the Ordinary High Water Mark (OHWM) by placing logs and rootwads at the transition between upper intertidal and the backshore habitat areas. The backshore habitat area will be created at OHWM by excavating historic fill, augmenting substrate with clean sand (if needed), placing scattered LWD and re-vegetating the area with American dunegrass (*Leymus mollis*).

Within the restoration area, the backshore habitat will transition to the existing grass lawn to maintain a portion of the upland recreation area of the park. The small drainage near the northern end of the county property will be restored by removing invasive species and re-vegetating with native shrub and tree species. Invasive species will also be removed from the shoreline throughout the project area and native shrub and tree species will be installed south of the above ground storage tank location.

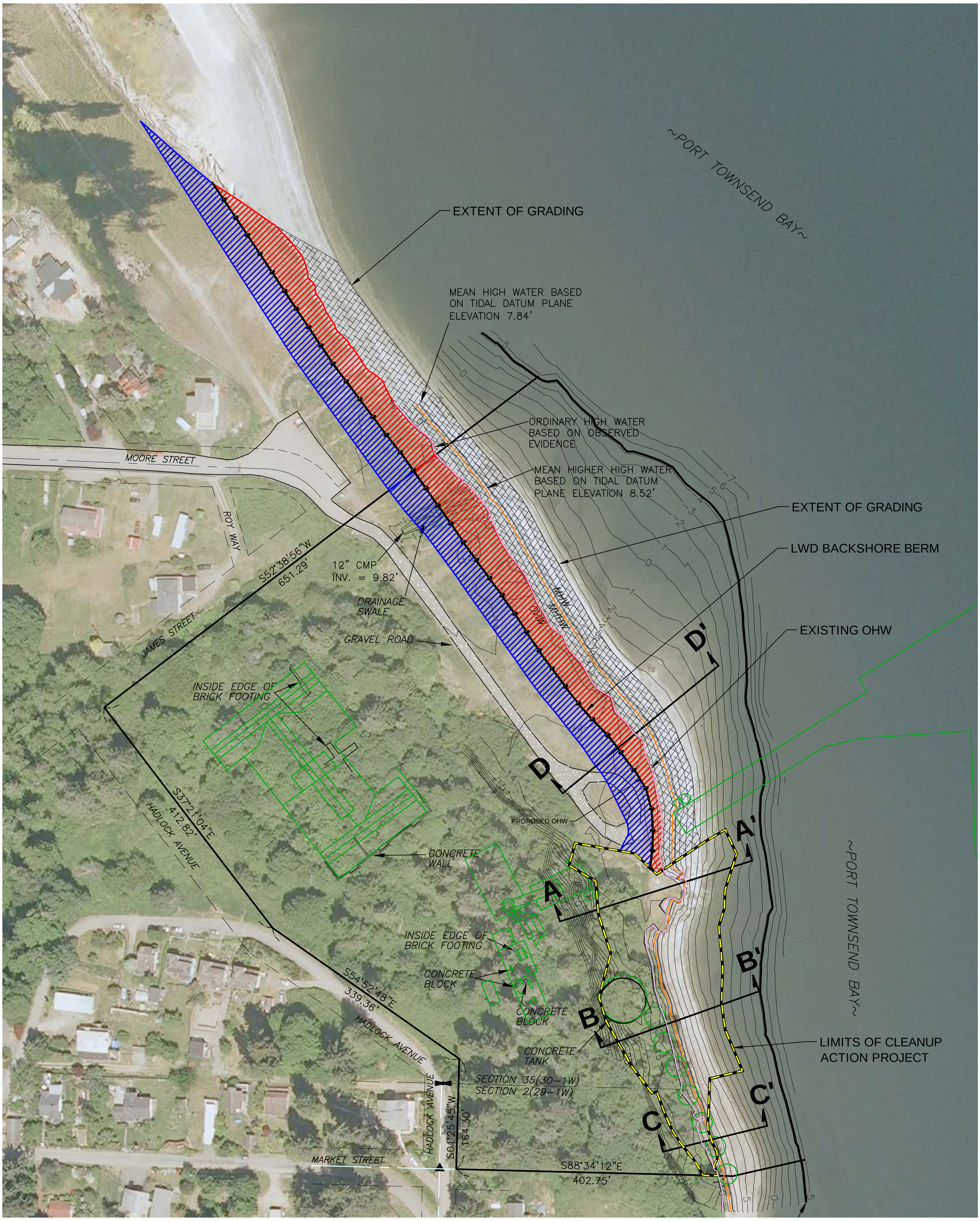
The proposed remediation and restoration activities will provide long-term benefits for fish, and avian species that utilize the site, including salmonids, forage fish, great blue heron, and other species. The restoration will improve spawning habitat for forage fish in the upper intertidal zone throughout the project area. Direct benefits to listed salmonids will include availability of additional prey base as well as creation of additional foraging habitat. The restoration actions will restore intertidal and shoreline habitats. Approximately 56,100 sq. ft. (1.29 ac) of new intertidal habitat and 71,700 sq. ft. (1.65 ac) of new backshore habitat will be created by excavating the existing fill pad. No aquatic habitat will be lost as a result of the proposed project.

SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: SSTeel

Date Submitted: 5/24/11



Legend

A A	Cross-section location
	Ordinary High Water
	Mean Higher High Water
	Mean High Water
	LWD Backshore Berm
	Proposed Beach Creation
	Proposed Backshore Planting
	Proposed Extent of Site Grading

N W E S

150 0 150

FEET

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Survey provided by Clark Land Office dated February 4, 2011.

Site Plan

Irondale Iron and Steel Plant
Irondale, Washington

GEOENGINEERS

Figure 1

P:\0504042\01\CAD\SHEET\CONCEPTUAL SITE PLANS AND X-SECTIONS\0504042\01 CONCEPTUAL SITE PLAN RESTORATION ONLY.DWG\TAB:SITE PLAN MODIFIED BY TMICHAUD ON MAY 24, 2011 - 15:02

WAC 197-11-970 Determination of Nonsignificance (DNS).

REVISED DETERMINATION OF NONSIGNIFICANCE

Original Description of proposal: The Former Irondale Iron and Steel Plant (Site) produced iron and/or steel intermittently from 1881 to 1919. Previous investigations show that past steel plant operations resulted in the contamination of soil, sediment, and groundwater at levels that exceed the Model Toxics Control Act (MTCA) cleanup standards for total petroleum hydrocarbons (TPH) and metals.

Due to its location on Puget Sound, the Site is designated as a Puget Sound Initiative cleanup site. Jefferson County Public Works has been named as a Potentially Liable Person (PLP) for the Site. However, because of the county's limited financial resources, Ecology prepared the Remedial Investigation/Feasibility Study (RI/FS) Report and draft Cleanup Action Plan (CAP) for the Site. When funding becomes available, Ecology intends to implement the CAP.

Description of revision: The original DNS was signed on December 14, 2009 and a comment period was held from December 14, 2009 to January 22, 2010. The description is being revised to include additional habitat restoration work that would not otherwise occur. Cleaning up toxic sites and restoring habitat at the same time make efficient and effective use of state and local resources. The previous proposal also included some restoration because the remedial activities will disturb portions of the intertidal and shoreline zones. However, the remaining portions of the park property between the remediation areas and the Washington State Department of Fish and Wildlife (WDFW) Chimacum Creek restoration site also present opportunities for significant habitat restoration. This area contains large amounts of fill that are rapidly eroding into Port Townsend Bay. By removing this fill, the upper intertidal habitat will be restored and a more stable backshore dune habitat will be created. To maximize the overall benefits of the project, the entire stretch of shoreline was added into the restoration design from the southern edge of the Jefferson County property to the southern end of the WDFW Chimacum Creek restoration site.

The proposed remediation and restoration activities will provide long-term benefits for fish, and avian species that utilize the Site, including salmonids, forage fish, great blue heron, and other species. The restoration will improve spawning habitat for forage fish in the upper intertidal zone throughout the project area. Direct benefits to listed salmonids will include availability of additional prey base as well as creation of additional foraging habitat. Approximately 56,100 sq. ft. (1.29 ac) of new intertidal habitat and 71,700 sq. ft. (1.65 ac) of new backshore habitat will be created by excavating the existing fill pad. No aquatic habitat will be lost as a result of the proposed project.

Proponent: Washington State Department of Ecology, Toxics Cleanup Program, Southwest Regional Office

Location of proposal, including street address, if any: The Former Irondale Iron and Steel Plant is generally located at 526 Moore Street in the unincorporated town of Irondale, about 5 miles south of Port Townsend.

Lead agency: Washington State Department of Ecology

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☒ There is no comment period for this revised DNS.

☐ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

☐ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below.

Responsible official: Rebecca S. Lawson, P.E., LHG

Position/title: Washington State Department of Ecology, Southwest Regional Office, Section Manager.

Phone: (360) 407-6241

Address: P.O. Box 47775, Olympia, WA 98504-7775

Date 5/25/2011 Signature Rebecca S. Lawson

APPENDIX C
Permits

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

Regulatory Branch

MAR 16 2012

Mr. Steve Teel
Washington Department of Ecology
PO Box 47775
Lacey, Washington 98504

Reference: NWS-2011-604
WA Dept of Ecology-Irondale Cleanup

Dear Mr. Teel:

We have reviewed your application to remove contaminated beach material and restore the beach and upland area as described in the permit application dated June 27, 2011, in Port Townsend Bay at Irondale, Jefferson County, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 38, Cleanup of Hazardous and Toxic Waste (Federal Register, March 12, 2007, Vol. 72, No. 47), authorizes your proposal as depicted on the enclosed drawings dated April 25, 2011. In order for this NWP authorization to be valid, you must ensure the work is performed in accordance with the enclosed *Nationwide Permit 38, Terms and Conditions* and the following special conditions:

For compliance with the Endangered Species Act:

a. You must implement and abide by the Endangered Species Act (ESA) requirements and/or agreements set forth in the *Biological Evaluation, Essential Fish Habitat Evaluation, Irondale Iron and Steel Plant Site Cleanup*, dated June 28, 2011, in their entirety. The U.S. Fish and Wildlife Service (USFWS) concurred with a finding of "may affect, not likely to adversely affect" based on this document on 27 September 2011 (USFWS Reference Number 13410-2011-I-0402). The National Marine Fisheries Service (NMFS) concurred with a finding of "may affect, not likely to adversely affect" based on this document on 24 August 2011 (NMFS Reference Number 2011/03646). Both agencies will be informed of this permit issuance. Failure to comply with the commitments made in this document constitutes non-compliance with the ESA and your U.S. Army Corps of Engineers permit. The USFWS/NMFS is the appropriate authority to determine compliance with ESA.

b. In order to meet the requirements of the Endangered Species Act and for the protection of Puget Sound Chinook and steelhead and Coastal/Puget Sound bull trout, the permittee may conduct the authorized activities from July 16 through February 15 in any year this permit is valid. The permittee shall not conduct work authorized by this permit from February 16 through July 15 in any year this permit is valid.

c. Sand lance may be spawning in the project area during the allowed work window. In order to meet the requirements of the Endangered Species Act and for the protection of sand lance, prior to construction, the applicant must have a qualified biologist confirm, in writing, that no surf smelt are spawning in the area prior to starting work. If a Washington Department of Fish and Wildlife (WDFW) Habitat Biologist has volunteered to conduct a survey as part of the Hydraulic Project Approval, this survey may be submitted to the U.S. Army Corps of Engineers (Corps). The letter or memorandum from the qualified biologist must include the date of the inspection, the surf smelt findings, and must be provided to the Corps, Seattle District, Regulatory Branch, FAX (206) 764-6602, prior to construction. Address the letter or memorandum to Jess Jordan and include the reference number NWS-2011-604. If the qualified biologist or confirms that no surf smelt are spawning in the project area, the permittee has one week from the date of the inspection to complete all work below mean higher high water.

For compliance with the National Historic Preservation Act:

d. A professional archaeologist must be on-site to monitor for the presence of archaeological resources during all ground disturbing construction activities within the Irondale iron and steel cleanup site. Within 2 months of permit issuance and prior to construction, an archaeological monitoring plan must be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch. Ground disturbing construction activities shall not begin until you receive written approval of the archaeological monitoring plan from the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch.

e. If human remains, historic resources, or archaeological resources are encountered during construction, all ground disturbing activities shall cease in the immediate area and you shall immediately (within one business day of discovery) notify the U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch. You shall perform any work required by the Corps in accordance with Section 106 of the National Historic Preservation Act and Corps regulations.

Please note that Seattle District Nationwide Permit Regional General Condition 5, Cultural Resources and Human Burials, found in the *Nationwide Permit Terms and Conditions* enclosure, details procedures should an inadvertent discovery occur. You must ensure that you comply with this condition during the construction of your project.

The authorized work complies with the Washington State Department of Ecology's (Ecology) Water Quality Certification and the Coastal Zone Management Act requirements for this NWP. No further coordination with Ecology is required.

We have reviewed your project pursuant to the requirements of the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act in regards to Essential Fish Habitat (EFH). We have determined that this project complies with the requirements of the NWP National General Condition regarding ESA and will not adversely affect EFH.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked on March 18, 2012. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before March 18, 2012, you will have until March 18, 2013, to complete the activity under the present terms and conditions of this NWP.

You are cautioned that any change in project location or plans will require that you submit a copy of the revised plans to this office and obtain our approval before you begin work. Please note that we may need to reinitiate Endangered Species Act Section 7 consultation with the National Marine Fisheries Service and/or U.S. Fish and Wildlife Service in order to authorize any work not already included in the enclosed plans. Deviating from the approved plans could result in the assessment of criminal or civil penalties. Civil administrative penalties are described in the enclosure *Clean Water Act Class I Administrative Penalties*.

Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit* form. Thank you for your cooperation during the permit process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form and information about our program is available on our website at http://www.nws.usace.army.mil/ select Regulatory, Regulatory / Permits. If you have any questions, please contact me at dale.j.jordan@usace.army.mil or by phone at (206) 439-4536.

Sincerely,

Jess Jordan, Project Manager
Regulatory Branch

Enclosures

US Army Corps of Engineers ®
Seattle District

NATIONWIDE PERMIT 38
Terms and Conditions

Effective Date: September 10, 2007

In addition to any special condition that may be required on a case-by-case basis by the District Engineer, the following terms and conditions must be met, as applicable, for a Nationwide Permit 38 authorization to be valid in Washington State.

A. DESCRIPTION OF AUTHORIZED ACTIVITIES

38. Cleanup of Hazardous and Toxic Waste. 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. Court ordered remedial action plans or related settlements are also authorized by this NWP. This NWP does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity. (See general condition 27.) (Sections 10 and 404)

Note: Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act.

B. CORPS NATIONAL GENERAL CONDITIONS FOR ALL NWPs

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable

date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

15. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

16. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

17. Endangered Species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. (c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have “no effect” on listed species or critical habitat, or until Section 7 consultation has been completed. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs. (e) Authorization of an activity by a NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal “takes” of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their World Wide Web pages at *http://www.fws.gov/* and *http://www.noaa.gov/fisheries.html* respectively.

18. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of

Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed. (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

19. Designated Critical Resource Waters. Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered. (d) For losses of streams or other

open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment. (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs. (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan. (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

23. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

24. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

25. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

____

(Transferee)

____

(Date)

26. Compliance Certification. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include: (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions; (b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

27. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity: (1) Until notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) If 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.); (4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate; (5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the

PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. (2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination. (5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) District Engineer's Decision: In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

28. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

C. Corps Seattle District Regional General Conditions

1. Aquatic Resources Requiring Special Protection. The following restrictions apply to activities in Washington State requiring Department of the Army authorization:

(a) Activities resulting in a loss of waters of the United States in a mature forested wetland, bog, bog-like wetland, aspen-dominated wetland, or alkali wetland are not authorized by NWP, except the following NWPs:

NWP 3 – Maintenance
NWP 20 – Oil Spill Cleanup
NWP 32 – Completed Enforcement Actions
NWP 38 – Cleanup of Hazardous and Toxic Waste
NWP 47 – Pipeline Safety Program Designated Time Sensitive Inspections and Repairs

(b) For activities in or affecting a mature forested wetland, bog, bog-like wetland, wetland in a dunal system along the Washington coast, vernal pool, aspen-dominated wetland, alkali wetland, camas prairie wetland, or marine water with eelgrass beds (except for NWP 48) *and not prohibited by the preceding general regional condition 1.a.*, the permittee must submit a pre-construction notification to the District Engineer in accordance with Nationwide Permit General Condition 27 (Pre-Construction Notification).

2. Access. You must allow representatives of this office to inspect the authorized activity at any time deemed necessary to ensure that the work is being, or has been, accomplished in accordance with the terms and conditions of your permit.

3. Commencement Bay. Activities requiring Department of the Army authorization and located in the Commencement Bay Study Area are not authorized by the following NWPs:

NWP 12 – Utility Line Activities (substations)
NWP 13 – Bank Stabilization
NWP 14 – Linear Transportation Projects
NWP 23 – Approved Categorical Exclusions
NWP 29 – Residential Developments
NWP 39 – Commercial and Institutional Developments
NWP 40 – Agricultural Activities
NWP 41 – Reshaping Existing Drainage Ditches
NWP 42 – Recreational Facilities
NWP 43 – Stormwater Management Facilities

4. Bank Stabilization. All bank stabilization projects require pre-construction notification to the District Engineer in accordance with Nationwide Permit General Condition 27 (Pre-Construction Notification). Each notification must include a planting plan using native riparian plant species unless the applicant demonstrates that a planting plan is

not appropriate or not practicable. Each notification must also include the following information, except as waived by the District Engineer:

(a) Need for the work, including the cause of the erosion and the threat posed to structures, infrastructure, and/or public safety.

(b) Current and expected post-project sediment movement and deposition patterns in and near the project area.

(c) Current and expected post-project habitat conditions, including the presence of fish, wildlife and plant species in the project area.

(d) Demonstration that the proposed project incorporates the least environmentally damaging practicable bank protection methods. These methods include, but are not limited to, the use of bioengineering, biotechnical design, root wads, large woody debris, native plantings, and beach nourishment in certain circumstances. If rock must be used due to site erosion conditions, explain how the bank stabilization structure incorporates elements beneficial to fish.

(e) Assessment of the likely impact of the proposed work on upstream, downstream and cross-stream properties (at a minimum the area assessed should extend from the nearest upstream bend to the nearest downstream bend of the watercourse). Discuss the methodology used for determining effects.

NOTE: Information on designing bank stabilization projects can be found in the Washington Department of Fish and Wildlife's *Integrated Streambank Protection Guidelines* (*http://www.wdfw.wa.gov/hab/ahg/ispgdoc.htm*); King County's *Reconnaissance Assessment of the State of the Nearshore Ecosystem* (*http://dnr.metrokc.gov/wlr/watersheds/puget/nearshore/sonr.htm*); and three technical (white) papers – *Marine and Estuarine Shoreline Modification Issues*, *Ecological Issues in Floodplains and Riparian Corridors*, and *Over-Water Structures: Marine, Freshwater, and Treated Wood Issues* (*http://wdfw.wa.gov/hab/ahg/ahgwhite.htm*).

5. Cultural Resources and Human Burials. Permittees must immediately stop work and notify the District Engineer within 24 hours if, during the course of conducting authorized work, human burials, cultural resources, or historic properties, as identified by the National Historic Preservation Act, are discovered and may be affected by the work. Failure to stop work in the area of discovery until the Corps can comply with the provisions of 33 CFR 325 Appendix C, the National Historic Preservation Act, and other pertinent laws and regulations could result in a violation of state and federal laws. Violators are subject to civil and criminal penalties.

6. Essential Fish Habitat. An activity which may adversely affect essential fish habitat, as identified under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), may not be authorized by NWP until essential fish habitat requirements have been met by the applicant and the Corps. Non-federal permittees shall notify the District Engineer if essential fish habitat may be affected by, or is in the vicinity of, a proposed activity and shall not begin work until notified by the District Engineer that the requirements of the essential fish habitat provisions of the MSA have been satisfied and the activity is authorized. The notification must identify the type(s) of essential fish habitat (i.e., Pacific salmon, groundfish, and/or coastal-pelagic species) managed by a Fishery Management Plan that may be affected. Information about essential fish habitat is available at *http://www.nwr.noaa.gov/*

7. Vegetation Protection and Restoration. Permittees must clearly mark all construction area boundaries before beginning work and minimize the removal of native vegetation in riparian areas and wetlands to the maximum extent practicable. Areas subject to temporary vegetation removal in wetlands or riparian areas during construction shall be replanted with appropriate native species by the end of the first planting season following the disturbance except as waived by the District Engineer.

D. Corps Regional Specific Conditions for this NWP: None

E. State 401 Certification General Conditions

1. For in-water construction activities. Individual 401 review is required under this condition for projects or activities authorized under NWPs that will cause, or be likely to cause or contribute to an exceedence of a State water quality standard (WAC 173-201A) or sediment management standard (WAC 173-204).
State water quality standards can be located on Ecology's website: http://www.ecy.wa.gov/programs/wq/swqs/.

Sediment management standards can be located on Ecology's website:
http://www.ecy.wa.gov/biblio/wac173204.html.
Information is also available by contacting Ecology's Federal Permit staff.

2. Projects or Activities Discharging to Impaired Waters. Individual 401 review is required by this condition for projects or activities authorized under NWPs if the project or activity may result in further exceedences of a specific parameter the waterbody is listed for on the state's list of impaired waterbodies (the 303(d) list).
The current 303(d) listed waterbodies can be identified using search tools available on Ecology's website: *http://www.ecy.wa.gov/programs/wq/303d/2002/2002-index.html* or by contacting Ecology's Federal Permit staff.

3**.** Notification. For projects or activities that will require individual 401 review, applicants must provide Ecology with the written documentation provided to the Corps (as described in Corps Nationwide Permit General Condition 27, Pre-Construction Notification), including, when applicable:

(a) A description of the project, including site plans, project purpose, direct and indirect adverse environmental effects the project would cause, any other Department of the Army permits used or intended to be used to authorize any part of the proposed project or any related activity.

(b) Delineation of special aquatic sites and other waters of the United States. Wetland delineations must be prepared in accordance with the current method required by the Corps and shall include Ecology's Wetland Rating form. *Note: Forms are available at Ecology's Wetlands website:*
http://www.ecy.wa.gov/programs/sea/wetlands/index.html or by contacting Ecology's Federal Permit staff.

(c) Coastal Zone Management Program "Certification of Consistency" Form if the project is located within a coastal county (Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom counties).
Note: Forms are available at the Army Corps of Engineers website: http://www.nws.usace.army.mil
or by contacting Ecology's Federal Permit staff.

(d) Other applicable requirements of Corps Nationwide Permit General Condition 27, Corps Regional Conditions, or notification conditions of the applicable NWP.

Ecology's review time shall not begin until the applicable documents noted above have been provided to Ecology and Ecology has received a copy of the final Nationwide Permit verification letter from the Corps.

4. Aquatic resources requiring special protection. Certain aquatic resources are unique, difficult-to-replace components of the aquatic environment in Washington State. Activities that would affect these resources must be avoided to the greatest extent possible. Compensating for adverse impacts to high value aquatic resources is typically difficult, prohibitively expensive, and may not be possible in some landscape settings.
Individual 401 review is required for activities in or affecting the following aquatic resources (and not prohibited by Regional Condition 1), except for:

NWP 20 – Oil Spill Cleanup
NWP 32 – Completed Enforcement Actions
NWP 38 – Cleanup of Hazardous Waste
NWP 47 – Pipeline Safety Program Repair

(a) Wetlands with special characteristics (as defined in the Washington State Wetland Rating Systems for western and eastern Washington, Ecology Publication #s04-06-025 and #04-06-015):

- estuarine wetlands
- Natural Heritage wetlands
- Bogs
- old-growth and mature forested wetlands
- wetlands in coastal lagoons
- interdunal wetlands
- vernal pools
- alkali wetlands

(b) Bog-like wetlands, aspen-dominated wetlands, camas prairie wetlands, and marine water with eelgrass beds (except for NWP 48).
(c) Category I wetlands
(d) Category II wetlands with a habitat score >29 points.

5. Mitigation. 401 Certification is based on adequate compensatory mitigation being provided for wetland and other water quality-related impacts of projects or activities authorized under the NWP Program.
Mitigation plans submitted for Ecology review and approval shall be based on the guidance provided in Wetland Mitigation in Washington State, Parts 1 and 2 (Ecology Publication #s06-06-011a and #06-06-011b) and shall, at a minimum, include the following:
(a) A description of the measures taken to avoid and minimize impacts to wetlands and other waters of the U.S.
(b) The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded)
(c) The rationale for the mitigation site that was selected
(d) The goals and objectives of the compensatory mitigation project
(e) How the mitigation project will be accomplished, including proposed performance standards for measuring success and the proposed buffer widths
(f) How it will be maintained and monitored to assess progress towards goals and objectives. Monitoring will generally be required for a minimum of five years. For forested and scrub-shrub wetlands, 10 years of monitoring will often be necessary.
(g) How the compensatory mitigation site will be legally protected for the long-term.

Refer to Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Ecology Publication #06-06-011b) for guidance on developing mitigation plans.
Ecology encourages the use of alternative mitigation approaches, including advance mitigation and other programmatic approaches, such as mitigation banks and programmatic mitigation areas at the local level. If you are interested in proposing use of an alternative mitigation approach, consult with the appropriate Ecology regional staff person. (see *http://www.ecy.wa.gov/programs/sea/wetlands/contacts.htm*)
For information on the state wetland mitigation banking program go to:
http://www.ecy.wa.gov/programs/sea/wetlands/mitigation/banking/index.html

6. Temporary Fills. Individual 401 review is required for any project or activity with temporary fill in wetlands or other waters of the State for more than 90 days, unless the applicant has received written approval from Ecology.

7. Mill Creek Special Area Management Plan. This condition applies to all NWPs within the boundaries described in the Mill Creek Special Area Management Plan (SAMP), King County, Washington, dated April 2000 (SAMP). The boundaries of the SAMP encompass all sub-basins and tributaries drained by Algona Creek, Auburn Creek, Bingaman Creek, Midway Creek, Mill Creek, and Mullen Slough. The area is bounded roughly on the south by 8th Avenue N in Algona and 4th Street NE in Auburn, on the east and north by the Ordinary High Water Mark of the Green River, and on the west by the plateau that parallels Interstate 5 above the Green River valley.

Individual 401 review is required for projects or activities authorized under the NWPs unless:
(a) The project or activity will result in fill-related impacts to only wetlands designated as developable under Alternative #8, as shown on Figure 4-8 of the SAMP.
(b) Compensatory mitigation for such impacts is onsite and/or within the areas designated on Figure 3-3, "Maximum Areas for Restoration by Target Habitat Type," in the SAMP Aquatic Resources Restoration Plan (April 2000).
(c) Mitigation plans comply with the requirements of the SAMP and, in general, with the guidance in the interagency Wetland Mitigation in Washington State (March 2006; Ecology publications #06-06-011a and #06-06-011b). Note: You can download the SAMP and Aquatic Resources Restoration Plan at *http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=Mill_Creek_SAMP*.

8. State Certification for PCNs not receiving 45-day response. In the event the U.S. Army Corps of Engineers does not respond to a complete pre-construction notification within 45 days, the applicant must contact Ecology for Individual 401 review.

F. State 401 Certification Specific Conditions for this NWP

Certified, subject to conditions. Individual 401 review is required for projects or activities authorized under this NWP if the project or activity is not authorized though a Model Toxics Control Act (MTCA) order or a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) order.

G. EPA 401 Certification General Conditions

In order for any NWP authorization to be valid in Washington State, permittees must comply with all applicable 401 Certification general conditions. EPA 401 Certification general conditions apply to all NWP authorizations involving Section 404 activities on Native American Indian Tribal lands (excluding the tribal lands of the Chehalis Tribes, Port Gamble S'Klallum Tribe, Kalispel Tribe, Makah Indian Tribe, Puyallup Tribe, Spokane Tribe, and Tulalip Tribe) and Federal land with exclusive jurisdiction within Washington State.

A. Special Aquatic Sites. Any activities in the following types of wetlands and waters of the U.S. will need to apply for an individual 401 certification: Mature forested wetlands; bogs; bog-like wetlands; wetlands in dunal systems along the Washington coast; vernal pools; aspen-dominated wetlands; alkali wetlands; camas prairie wetlands; salt marshes; or marine water with eelgrass beds.

B. Soil Erosion and Sediment Controls. An individual 401 certification is based on the project or activity meeting established turbidity levels. EPA will be using as guidance the state of Washington's water quality standards [WAC 173-201a] and sediment quality standards [WAC 173-204]. Projects or activities that are expected to exceed these levels or that do exceed these levels will require an individual 401 certification.

C. Compliance with Stormwater Provisions. Individual 401 certification is required for projects or activities not designed in accordance with Ecology's most recent stormwater manual or Ecology approved equivalent manual.

D. Compliance with requirements of the National Pollutant Discharge Elimination System. For projects and activities requiring coverage under an NPDES permit, certification is based on compliance with the requirements of that permit. Projects and activities not in compliance with NPDES requirements will require individual 401 certification.

E. Projects or Activities Discharging to Impaired Waters. Individual 401 certification is required for projects or activities authorized under NWPs if the project will discharge to a waterbody on the list of impaired waterbodies (the 303(d) List) *and* the discharge may result in further exceedence of a specific parameter the waterbody is listed for.

EPA may issue 401 certification for projects or activities that would result in further exceedence or impairment if mitigation is provided that would result in a net decrease in listed contaminants or less impairment in the waterbody. This determination would be made during individual 401 certification review.

F. Notification. For projects requiring individual 401 certification, applicants must provide EPA with the same documentation provided to the Corps (as described in Corps National General Condition 27, Pre-Construction Notification), including, when applicable:

(a) A description of the project, including site plans, project purpose, direct and indirect adverse environmental effects the project would cause, any other U.S. Department of the Army permits used or intended to be used to authorize any part of the proposed project or any related activity.

(b) Delineation of special aquatic sites and other waters of the United States. Wetland delineations must be prepared in accordance with the current method required by the Corps.

(c) A statement describing how the mitigation requirement will be satisfied. A conceptual or detailed mitigation or restoration plan may be submitted.

(d) Other applicable requirements of Corps National General Condition 27, Corps Regional Conditions, or notification conditions of the applicable NWP.

A request for individual 401 review is not complete until EPA receives the applicable documents noted above and EPA has received a copy of the final authorization letter from the Corps providing coverage for a proposed project or activity under the NWP Program.

G. Mitigation. An individual 401 certification is based on adequate compensatory mitigation being provided for wetland and other water quality-related impacts of projects or activities authorized under the NWP Program. Mitigation plans submitted shall be based on the Joint Agency guidance provided in *Wetland Mitigation in Washington State, Parts 1 and 2* (Ecology Publication #06-06-011a and #06-06-011b) and shall, at a minimum, include the following:

1. A description of the measures taken to avoid and minimize impacts to wetlands and other waters of the U.S.
2. The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded).
3. The rationale for the mitigation site that was selected.
4. The goals and objectives of the compensatory mitigation project.
5. How the mitigation project will be accomplished, including proposed performance standards for measuring success and the proposed buffer widths.
6. How it will be maintained and monitored to assess progress towards goals and objectives. Monitoring will generally be required for a minimum of five years. For forested and scrub-shrub wetlands, 10 years of monitoring will often be necessary.
7. How the compensatory mitigation site will be legally protected for the long-term.

H. Temporary Fills. An individual 401 certification is required for any activity where temporary fill will remain in wetlands or other waterbodies for more than 90 days. The 90 day period begins when filling activity starts in the wetland or other waterbody.

H. EPA 401 Certification Specific Conditions for this NWP

Partially denied without prejudice. Individual 401 review is required for projects authorized under this NWP if the project or activities are not part of an EPA ordered cleanup.

I. Spokane Tribe of Indians 401 Certification General Conditions

Specific to the Reservation and the Tribal Water Quality Standards, the applicant must comply with the following when there could be a discharge to waters of the Spokane Indian Reservation:

1. The applicant shall be responsible for achieving compliance with the Spokane Tribal Water Quality Standards.

2. The applicant shall submit copies of applications materials to the Spokane Tribal Water Control Board for review and approval at the same time they are submitted to Army Corps of Engineers and prior to any disturbance activities.

3. The applicant shall comply with all Spokane Tribal Integrated Resource Management Plan (IRMP) guidelines for land use activities and disturbances.

4. The applicant shall allow the Tribal Water Control board and Interdisciplinary Team to inspect the area in question and adopt recommendations made throughout its operation.

5. Monitoring of the discharge shall occur at a level indicated by EPA and the Tribe, are subject to change, and shall be submitted to both entities.

J. Tribal 401 Certification Specific Conditions for this NWP

Denied without prejudice by the Chehalis, Kalispel, Makah, Port Gamble S'Klallum, Puyallup, and Tulalip tribes. Certified subject to general conditions by the Spokane Tribe.

K. CZM Consistency Response Specific Conditions for this NWP

Concur, subject to the following condition:

1. Where individual 401 review is triggered, an individual CZM Consistency Response must be obtained for projects located within the 15 coastal counties. A "Certification of Consistency" form must be submitted in accordance with State General Condition 3 (Notification).

L. ADDITIONAL LIMITATIONS ON THE USE OF NWPs

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

Chelsea S. Voss

From:	Jordan, Jess NWS <Dale.J.Jordan@usace.army.mil>
Sent:	Tuesday, March 20, 2012 12:56 PM
To:	Teel, Steve (ECY)
Cc:	Joe Callaghan; Neil Morton; Christopher L. Bailey; Chris Miss; Jessie Piper; Rose, Scott (ECY)
Subject:	RE: Request for clarification of permit requirements (UNCLASSIFIED)
Importance:	High
Follow Up Flag:	Follow up
Flag Status:	Flagged

Classification: UNCLASSIFIED
Caveats: NONE

Steve,

1. Permit was authorized per the JARPA drawings dated November 4, 2011. You are fine there. I talked with admin and they mistakenly entered in the April date.

2. Yes what you stated in point #2 is acceptable under the permit.

3. Yes the Monitoring and Discovery (M&D) Plan was acceptable (based on a
1/10/12 e-mail from Lance Lundquist to Steve Teel, cc: Jess Jordan). No additional modifications to the M&D Plan are needed. You should have the SHPO concurrence letter. The tribal concurrence letters we will retain as to keep and Foiable information from getting out there. In other words we just need to follow the plan that was established....submit monitoring and discovery report to us, and we will share with the tribes who wanted to see it. In there are any inadvertent discoveries contact Lance immediately and he will coordinate with the Tribes.

4. The permit expiration date is march 18 2012 but since you are working on implementing the project you have until March 18, 2013 for all work conducted within the Corps jurisdiction. Meaning this permit allows construction for the summer of 2012 but all work must be completed by March 18 2013 (as work windows allow).

Call or email if you need further clarification.

Thanks,

Jess Jordan
Biologist
U.S. Army Corps of Engineers
Seattle District-Regulatory Branch
4735 E. Marginal Way South, Seattle, WA, 98124
206-439-4536
Dale.J.Jordan@usace.army.mil

-----Original Message-----
From: Teel, Steve (ECY) [mailto:STEE461@ECY.WA.GOV]
Sent: Tuesday, March 20, 2012 12:09 PM
To: Jordan, Jess NWS
Cc: Joe Callaghan; Neil Morton (nmorton@geoengineers.com); Christopher L.
Bailey; Chris Miss; Jessie Piper; Rose, Scott (ECY)

Subject: Request for clarification of permit requirements

Jess -
Thank you for sending us the Corps permit on Friday, March 16, 2012. We have reviewed the permit letter and have a few questions for clarification of the permit requirements.

1. The first paragraph of the permit letter references JARPA drawings dated April 25, 2011. We made several small changes to the drawings during the consultation process and sent you, via email on November 4, 2011, revised JARPA drawings dated November 4, 2011. Although the changes are minor, we would like to make sure the permit covers the most recent drawings, which are included with this email.
2. Item c, in the ESA section of the letter, states the need to perform and document sandlance spawning surveys before conducting work below MHHW. We requested last fall for the option to work below MHHW between October 15 and February 15, which is outside the sandlance work window, to allow construction during 2011 season. Since the work will now start at the beginning of the fish window (July 16, 2012), we anticipate that all work below MHHW will be completed before October 15, 2012 and therefore it is our interpretation that spawning surveys will not be required. If work below MHHW is needed after October 15, 2012, we will perform and document sandlance spawning surveys before conducting work below MHHW. This is consistent with the NMFS consultation letter dated August 17, 2012. Please confirm that this is acceptable under the permit.
3. Item d, in the NHPA section of the letter, doesn't reference the state and federal NHPA consultations or the Cultural Resources Assessment report or the Monitoring and Discovery Plan. It was our understanding that the Monitoring and Discovery (M&D) Plan was acceptable (based on a 1/10/12 e-mail from Lance Lundquist to Steve Teel, cc: Jess Jordan). If additional modifications to the M&D Plan are needed, please provide additional clarification of what is needed to finalize it. Please also provide the copies of the consultation letters or any other findings of the Corps archeologists for our file.
4. Please confirm that this permit allows construction for the summer of 2012 and is good for one year with an expiration date of March 18, 2013 for all work conducted within the Corps jurisdiction. There have been previous e-mail correspondence (for example, see 8/11/11 e-mail from Lance Lundquist to Steve Teel and Jess Jordan) and telephone conversations that discuss which portions of the project will be within the Corps jurisdiction (and which are under State jurisdiction), but this is not mentioned in the March 16 permit letter. Could you also clarify/confirm the portions of the project that are within the Corps jurisdiction for the permit approval?

Thank you for moving the project forward and finalizing the Corps permit. We know you have a heavy workload!
We are excited to implement this beneficial project and appreciate the Corps help.
Thank you,
Steve

Steve Teel, LHG
Site Manager/Hydrogeologist
Washington State Department of Ecology
Toxics Cleanup Program, Southwest Regional Office
P.O. Box 47775
Lacey, WA 98504-7775
Phone (360) 407-6247
steve.teel@ecy.wa.gov

Street Address: 300 Desmond Drive, Lacey, WA 98503
Fax (360) 407-6305

Classification: UNCLASSIFIED
Caveats: NONE

Chelsea S. Voss

From:	Teel, Steve (ECY) <STEE461@ECY.WA.GOV>
Sent:	Tuesday, January 10, 2012 2:05 PM
To:	Lundquist, Lance NWS
Cc:	Neil Morton; Jessie Piper
Subject:	RE: Irondale (UNCLASSIFIED)
Follow Up Flag:	Follow up
Flag Status:	Flagged

Lance -
Thanks for the update and for all of your help!
Steve

Steve Teel, LHG
Site Manager/Hydrogeologist
Washington State Department of Ecology
Toxics Cleanup Program, Southwest Regional Office
P.O. Box 47775
Lacey, WA 98504-7775
Phone (360) 407-6247
steve.teel@ecy.wa.gov
Street Address: 300 Desmond Drive, Lacey, WA 98503
Fax (360) 407-6305

-----Original Message-----
From: Lundquist, Lance NWS [mailto:Lance.A.Lundquist@usace.army.mil]
Sent: Tuesday, January 10, 2012 1:49 PM
To: Teel, Steve (ECY)
Cc: Jordan, Jess NWS
Subject: Irondale (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

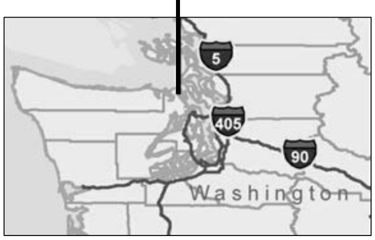
Steve,

I received your status update call today. I completed Section 106 on 12/29/11; my part is done. You will need to monitor per the monitoring plan, of course.

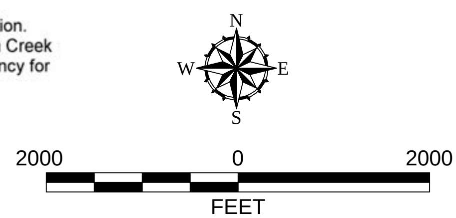
Lance

Lance Lundquist, Archaeologist
Environmental & Cultural Resources Branch
US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle WA 98124
(206) 764-6909
lance.a.lundquist@usace.army.mil

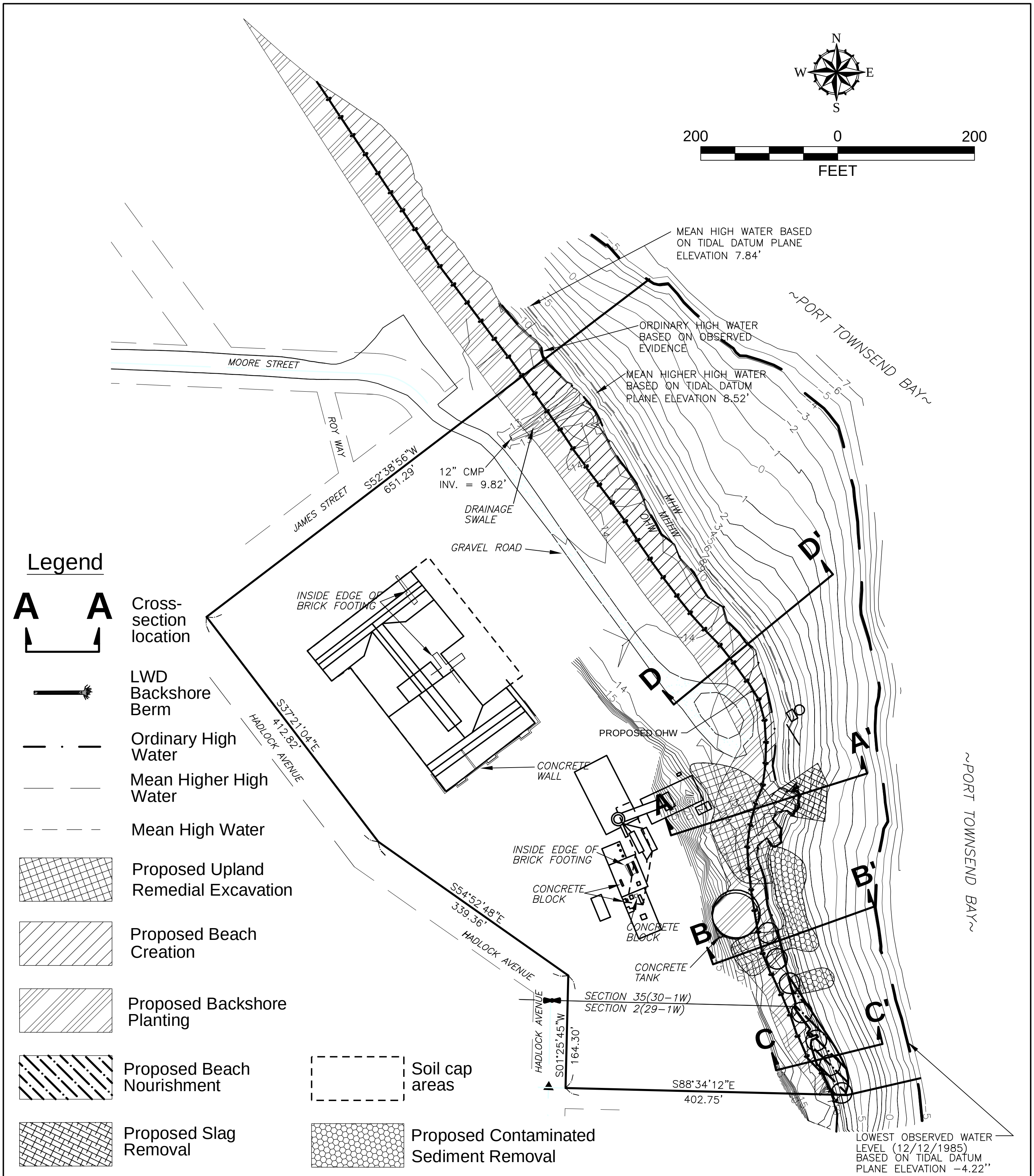
Classification: UNCLASSIFIED



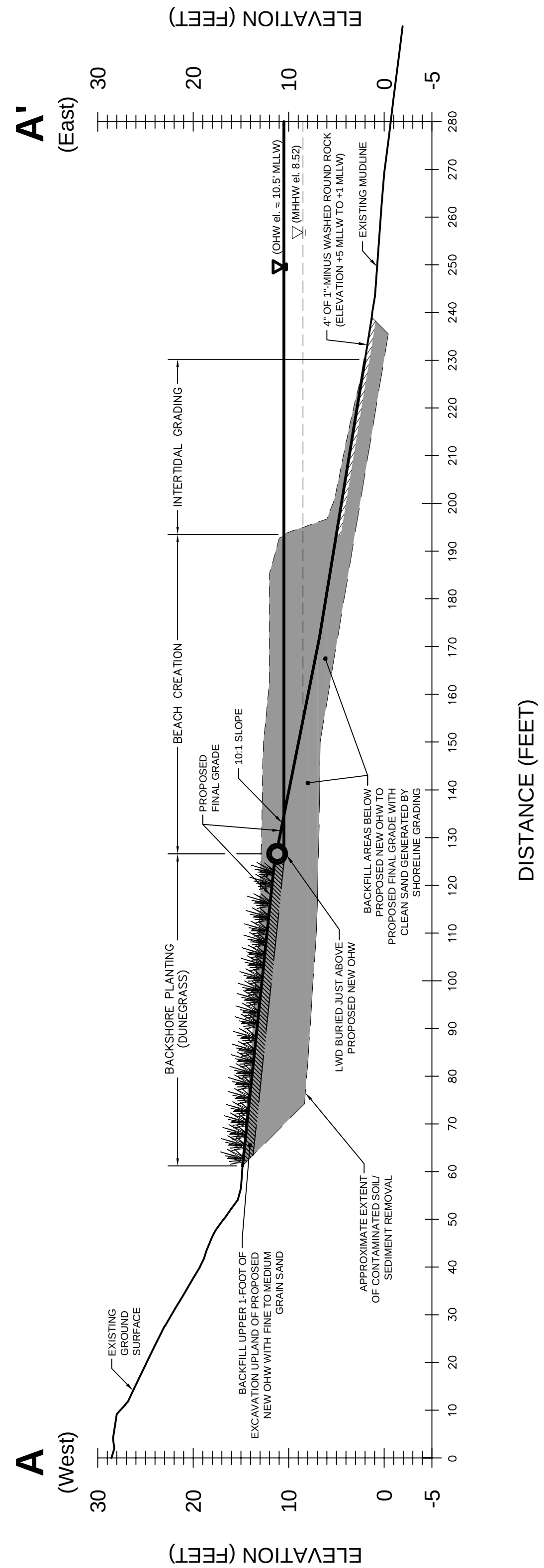
Data Sources: ESRI Data & Maps, Street Maps 2005.
Chimacum Creek Tidelands location obtained from "Health Consultation. Evaluation of Selected Metals in Irondale Beach Park and Chimacum Creek Tidelands Shell Fish." Irondale, Jefferson County, Washington. Agency for Toxic Substances and Disease Registry. July 28, 2008.



PURPOSE: DEPARTMENT OF ECOLOGY IRONDALE ENVIRONMENTAL CLEANUP AND HABITAT RESTORATION ACTIONS	VICINITY MAP	PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT
ADJACENT PROPERTY OWNERS:	LATITUDE: 48.04453 N LONGITUDE: -122.76828W	CITY OF: IRONDALE COUNTY OF: JEFFERSON STATE OF: WASHINGTON
SEE ATTACHMENT C FOR ALL ADJOINING PROPERTY OWNERS	SECTION, TOWNSHIP, RANGE: T 30N, R1W, SEC 35 AND T29N, R1W, SEC 2 IRONDALE IRON AND STEEL PLANT IRONDALE, WASHINGTON 98339	APPLICATION BY: WASHINGTON DEPARTMENT OF ECOLOGY SHEET: 1 OF 6 DATE: NOV. 4, 2011



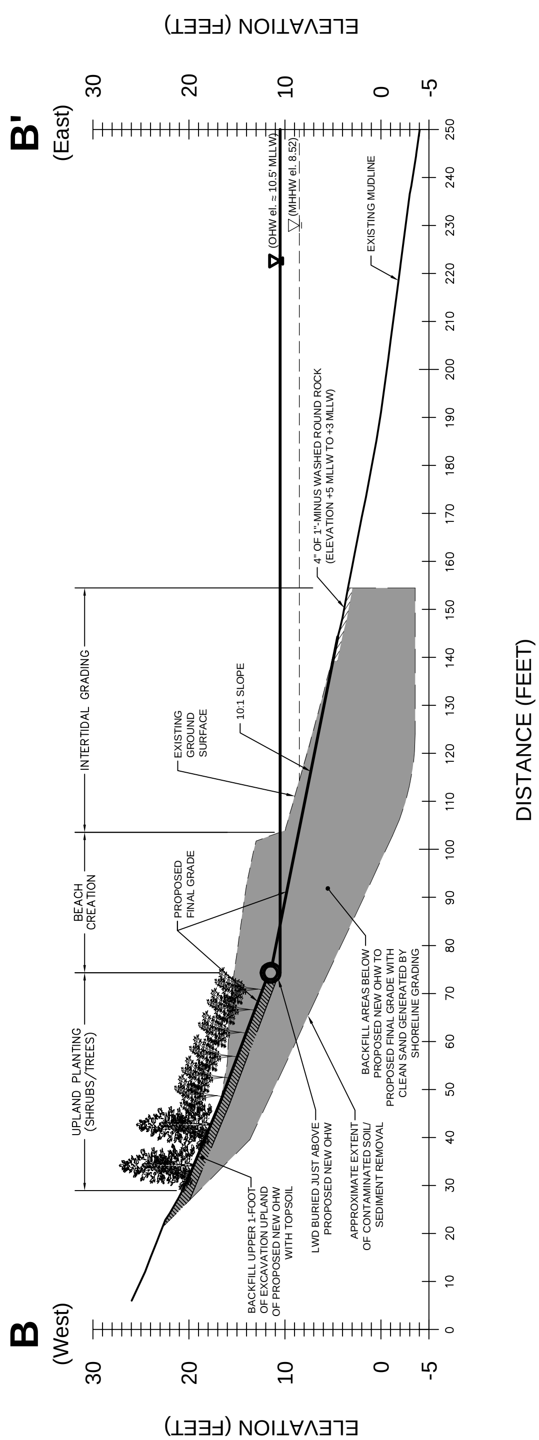
PURPOSE: DEPARTMENT OF ECOLOGY IRONDALE ENVIRONMENTAL CLEANUP AND HABITAT RESTORATION ACTIONS	SITE PLAN LATITUDE: 48.04453 N LONGITUDE: -122.76828W	PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT
ADJACENT PROPERTY OWNERS: SEE ATTACHMENT C FOR ALL ADJOINING PROPERTY OWNERS	SECTION, TOWNSHIP, RANGE: T 30N, R1W, SEC 35 AND T29N, R1W, SEC 2 IRONDALE IRON AND STEEL PLANT IRONDALE, WASHINGTON 98339	CITY OF: IRONDALE COUNTY OF: JEFFERSON STATE OF: WASHINGTON APPLICATION BY: WASHINGTON DEPARTMENT OF ECOLOGY SHEET: 2 OF 6 DATE: NOV. 4, 2011



HORIZONTAL SCALE: 1"= 40'
VERTICAL SCALE: 1"= 20'
VERTICAL EXAGGERATION: 2x

40 0 40
FEET

PURPOSE:	SECTION A-A'	PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT
DEPARTMENT OF ECOLOGY IRONDALE ENVIRONMENTAL CLEANUP AND HABITAT RESTORATION ACTIONS	LATITUDE: 48.04453 N LONGITUDE: -122.76828W	CITY OF: IRONDALE COUNTY OF: JEFFERSON STATE OF: WASHINGTON
ADJACENT PROPERTY OWNERS:	SECTION, TOWNSHIP, RANGE: T 30N, R1W, SEC 35 AND T29N, R1W, SEC 2	APPLICATION BY: WASHINGTON DEPARTMENT OF ECOLOGY
SEE ATTACHMENT C FOR ALL ADJOINING PROPERTY OWNERS	IRONDALE IRON AND STEEL PLANT IRONDALE, WASHINGTON 98339	SHEET: 3 OF 6 DATE: NOV. 4, 2011



HORIZONTAL SCALE: 1"= 40'
VERTICAL SCALE: 1"= 20'
VERTICAL EXAGGERATION: 2x

40 0 40
FEET

PURPOSE:

DEPARTMENT OF ECOLOGY
IRONDALE ENVIRONMENTAL
CLEANUP AND HABITAT
RESTORATION ACTIONS

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT C FOR ALL
ADJOINING PROPERTY OWNERS

SECTION B-B'

LATITUDE: 48.04453 N
LONGITUDE: -122.76828W

SECTION, TOWNSHIP, RANGE:
T 30N, R1W, SEC 35 AND T29N,
R1W, SEC 2

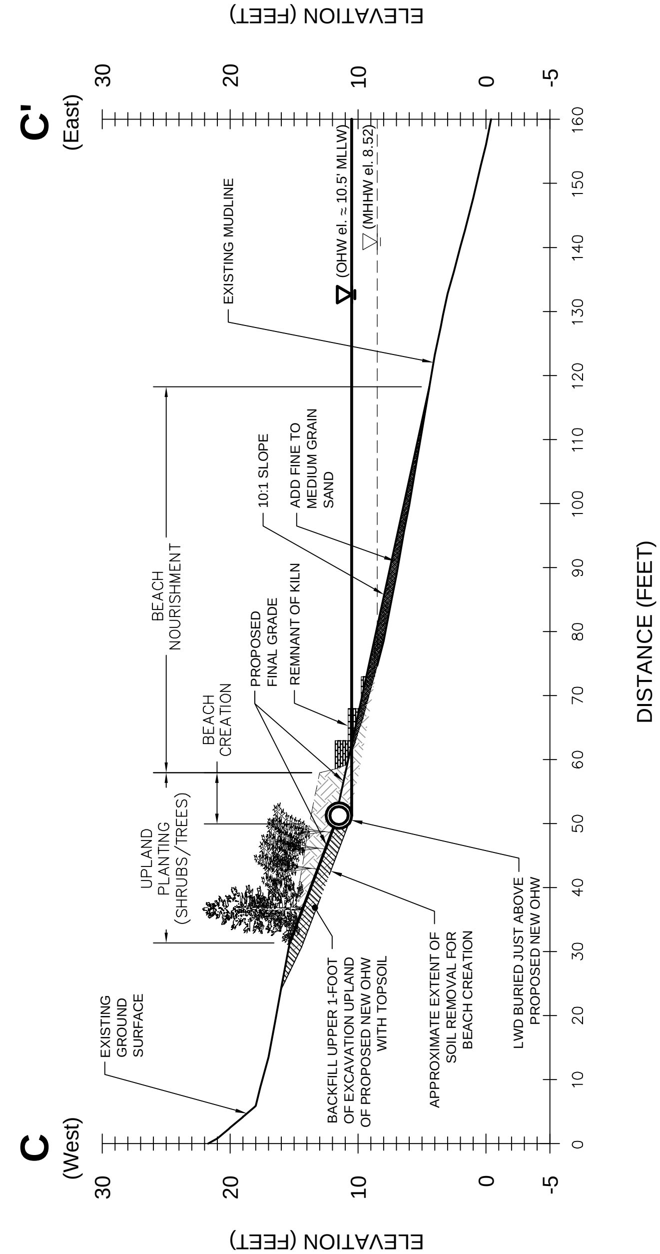
IRONDALE IRON AND STEEL PLANT
IRONDALE, WASHINGTON 98339

PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT

CITY OF: IRONDALE
COUNTY OF: JEFFERSON
STATE OF: WASHINGTON

APPLICATION BY:
WASHINGTON DEPARTMENT OF ECOLOGY

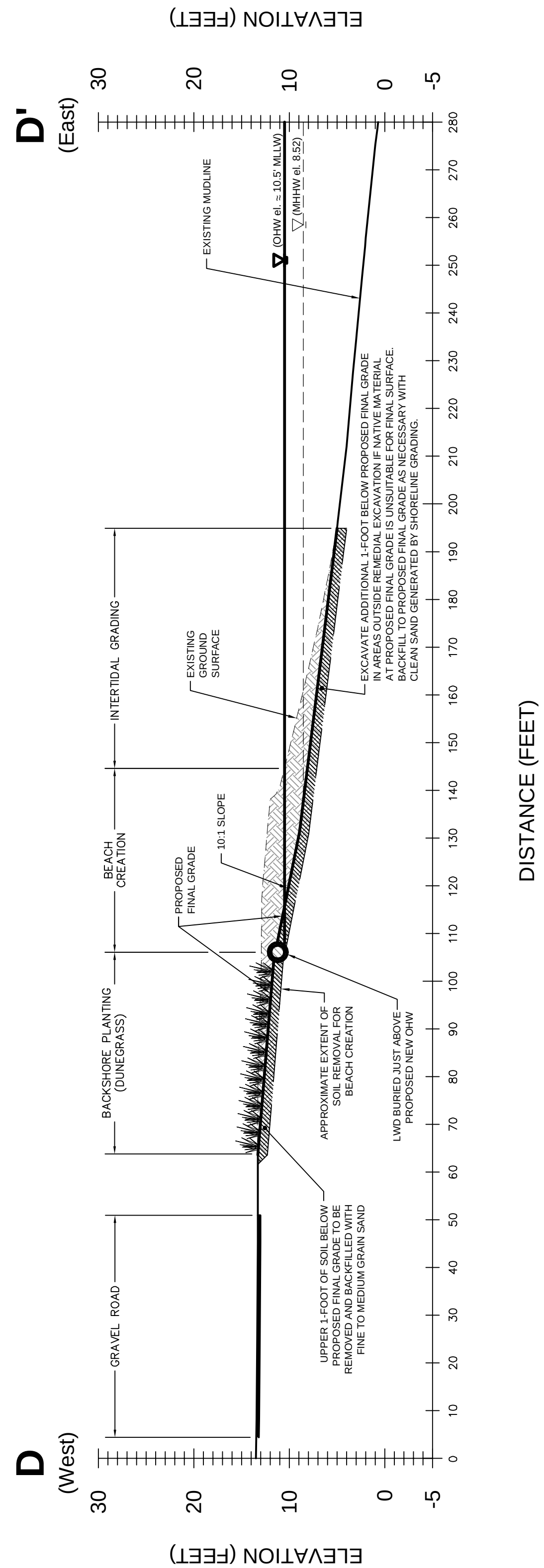
SHEET: 4 OF 6 DATE: NOV. 4, 2011



HORIZONTAL SCALE: 1"= 30'
VERTICAL SCALE: 1"= 15'
VERTICAL EXAGGERATION: 2x

30 0 30
FEET

PURPOSE: DEPARTMENT OF ECOLOGY IRONDALE ENVIRONMENTAL CLEANUP AND HABITAT RESTORATION ACTIONS ADJACENT PROPERTY OWNERS: SEE ATTACHMENT C FOR ALL ADJOINING PROPERTY OWNERS	SECTION C-C' LATITUDE: 48.04453 N LONGITUDE: -122.76828W SECTION, TOWNSHIP, RANGE: T 30N, R1W, SEC 35 AND T29N, R1W, SEC 2 IRONDALE IRON AND STEEL PLANT IRONDALE, WASHINGTON 98339	PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT CITY OF: IRONDALE COUNTY OF: JEFFERSON STATE OF: WASHINGTON APPLICATION BY: WASHINGTON DEPARTMENT OF ECOLOGY SHEET: 5 OF 6 DATE: NOV. 4, 2011



HORIZONTAL SCALE: 1"= 40'
VERTICAL SCALE: 1"= 20'
VERTICAL EXAGGERATION: 2x

40 0 40
FEET

PURPOSE: DEPARTMENT OF ECOLOGY IRONDALE ENVIRONMENTAL CLEANUP AND HABITAT RESTORATION ACTIONS ADJACENT PROPERTY OWNERS: SEE ATTACHMENT C FOR ALL ADJOINING PROPERTY OWNERS	SECTION D-D' LATITUDE: 48.04453 N LONGITUDE: -122.76828W SECTION, TOWNSHIP, RANGE: T 30N, R1W, SEC 35 AND T29N, R1W, SEC 2 IRONDALE IRON AND STEEL PLANT IRONDALE, WASHINGTON 98339	PURPOSE: IRONDALE REMEDIATION AND RESTORATION PROJECT CITY OF: IRONDALE COUNTY OF: JEFFERSON STATE OF: WASHINGTON APPLICATION BY: WASHINGTON DEPARTMENT OF ECOLOGY SHEET: 6 OF 6 DATE: NOV. 4, 2011

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, Washington 98115

NMFS Tracking No:
2011/03646

August 17, 2011

Michelle Walker
Regulatory Branch Chief
Corps of Engineers, Seattle District
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Irondale shoreline remediation and restoration project, Irondale, Jefferson County, Washington (5th Field HUC: 1711001908, Chimacum Creek-Frontal Port Ludlow; WRIA 17, Quilcene/Snow)

Attn: Jess Jordan

Dear Ms. Walker:

This correspondence is in response to your request for consultation under the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

Endangered Species Act

The National Marine Fisheries Service (NMFS) reviewed your request for informal consultation for the effects of the above-named project on Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha*); PS steelhead (*O. mykiss*); the Puget Sound/Georgia Basin (PS/GB) distinct population segments (DPS) of bocaccio (*Sebastes paucispinis*), yelloweye rockfish (*S. ruberrimus*), and canary rockfish (*S. pinniger*); and Southern Resident (SR) killer whales (*Orcinus orca*). You also requested concurrence with your determination that the project is "not likely to adversely affect" the separate critical habitats designated for PS Chinook salmon and SR killer whales. This consultation will also assess the effects of the project on Hood Canal summer-run (HCSR) chum salmon (*O. keta*), which may occur in the action area, and the critical habitat designated for HCSR chum salmon. The NMFS determined that the project would have no effect on PS/GB bocaccio, yelloweye rockfish, or canary rockfish, nor on the SR killer whale or its critical habitat. These species are not addressed in this consultation. This consultation with the US Army Corps of Engineers (COE) is conducted under section 7(a)(2) of the ESA, and its implementing regulations, 50 CFR Part 402.

According to the Biological Evaluation (BE), received August 12, 2011, the COE proposes to issue a permit to the Washington State Department of Ecology (Ecology) to undertake beach remediation along the shoreline of Irondale Beach Park in Jefferson County, Washington. General remediation activities will include (1) removal and disposal of contaminated sediments from shoreline and adjacent upland sites, (2) removal and disposal of slag, an industrial waste, from the beach, (3) installation of geotextiles, clean soil, and native vegetation on the upland areas, (4) installation of native substrates on the shoreline areas, (5) grading the shoreline areas, and (6) creation of a berm comprised of anchored large woody debris located at ordinary high water mark.

The project objective is to remove contaminated sediments from the marine environment and improve beach structure for native productivity. The project will result in a sloped beach comprised of native substrates and a riparian area with native trees, shrubs, and herbaceous plants.

Conservation measures are incorporated into the project design to avoid or minimize the effects of construction on ESA-listed species and their habitat. Such conservation measures include conducting the work (1) during a time of year when ESA-listed salmonids would occur at very low densities if at all in the action area, (2) during low tides to prevent equipment from entering the water, and (3) isolating the work area from marine waters by either installing a sheet pile between the project site and the low tide level during low tide, or using a series of anchored silt curtains with oil containment booms. Additional best management practices will be applied to contain any potential erosion from upland areas and to prevent chemical spills during construction.

The general in-water work window for salmonids is July 16 to March 1 in Port Townsend Bay. Ecology plans to conduct all intertidal work between mid-July and mid-October to avoid effects on forage fish during their spawning season. However, should additional time be needed for the work, Ecology will conduct forage fish spawning surveys to determine whether to complete the work within the salmonid work window or to hold additional work for the salmonid/forage fish work window in the coming year, thus avoiding construction effects on the prey base for salmonids.

The NMFS determined the action area to include the area where actual work will occur, plus a 300-foot radius in marine waters because this is the area in which the project may temporarily elevate turbidity. All other project effects would be contained within this area.

Species Determinations

Puget Sound Chinook Salmon
Puget Sound Steelhead
Hood Canal Summer-Run Chum Salmon

The NMFS analyzed the potential effects of the project on PS Chinook salmon, PS steelhead, and HCSR chum salmon and determined that they will be discountable, insignificant, and beneficial.

The direct effects of the project on ESA-listed salmonids will be discountable because construction will occur during a time of year when juveniles of these species are extremely unlikely to occur in the action area. Although individual adults of these species may occur in the action area, it is extremely unlikely that they would occupy the action area, and they would not be obligate to the shallow nearshore environment. The action area contains potential forage fish spawning habitat, according to the Washington Department of Fish and Wildlife, which means that forage fish spawning has not been documented within the action area. To avoid direct effects of the project on this important salmonid prey base, Ecology will conduct surveys if work is needed during the forage fish spawning season, which occurs within the above dates. Work will stop to avoid construction effects on spawning forage fish. Therefore, the project will avoid direct effects on ESA-listed salmonids and their prey base.

The direct effects of the project on ESA-listed salmonids in the action area will be further discountable because the project does not require any in-water work. The lowest elevation of excavation is above the mean lower low water level. All equipment will remain out of the water. The only project activity that may occur in marine waters is the placement of a silt curtain with an oil containment boom to contain the direct effects in a localized area. If project managers decide to isolate the project area using a sheet pile wall, this will be installed in the dry during low tide.

The direct effects of the project on ESA-listed salmonids in the action area will also be insignificant because the project will disturb beach sediments in a manner that may elevate turbidity to a minor degree over a highly localized area. This effect will persist during project activities on the shoreline, though it will be minimized during low tide because the project site will be in the dry at those times and beach sediments have a low percentage of silts. Water quality is likely to return to baseline conditions or be slightly enhanced based on the removal of contaminants and the short duration of elevated turbidity.

The indirect effects of the project on ESA-listed salmonids will be beneficial because the project will remove contaminants from the action area and the project will result in a sloped beach stabilized by large wood with native vegetation in the riparian and upland environment. Each of these project effects will provide enhanced habitat quality to the nearshore marine environment.

Based on this reasoning, the NFMS concurs with the COE's determination of "may affect, not likely to adversely affect" PS Chinook salmon, PS steelhead, and HCSR chum salmon.

Critical Habitat

Puget Sound Chinook Salmon Critical Habitat
Hood Canal Summer Run Chum Salmon Critical Habitat

The NMFS designated critical habitat for the HCSR chum salmon and PS Chinook salmon evolutionarily significant units on September 2, 2005 (70 FR 52630). The primary constituent element (PCE) of critical habitat for each species in the action area is:

> Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders.

The NMFS analyzed the potential effects of the project on the nearshore marine PCE described above. The project may marginally reduce water quality in the action area during construction through temporary and localized disturbance of sediments that may result in minor increases to suspended sediments in the water column. Elevated amounts of suspended sediments increase turbidity, and decrease the fitness of the habitat for juveniles of the species named above. However, these effects are likely to be extremely minor in intensity, highly localized, and short-term in duration. The indirect effects of the project on the nearshore marine PCE will be beneficial because the project will remove contaminated sediments and anthropogenic debris from the action area. In addition, the project will result in a sloped beach comprised of natural substrates stabilized by anchored large woody debris and shaded by natural vegetation. The project will increase the amount of native vegetation in the uplands and riparian areas and the project will decrease the amount of invasive vegetation in those areas. Therefore, the habitat structure of the nearshore marine PCE is likely to be enhanced by project activities.

Based on this reasoning, NMFS concurs with your determination that the project "may affect, but is not likely to adversely affect" the designated critical habitats of HCSR chum salmon and PS Chinook salmon in the action area.

This concludes informal consultation pursuant to the regulations implementing the ESA at 50 CFR 402.10. The COE must reinitiate this ESA consultation if (1) new information reveals effects of the action that may affect listed species in a way not previously considered; (2) the action is modified in a manner that causes an effect to the listed species or critical habitat that was not previously considered; or (3) an additional species is listed or critical habitat designated, that may be affected by the identified action.

Magnuson-Stevens Fishery Conservation and Management Act

Federal agencies are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat (EFH). The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NMFS is required to provide the federal action agency with EFH conservation recommendations (MSA section 305(b)(4)(A)).

The proposed action and action area are described in this letter and in the BE. The action area includes habitat which has been designated as EFH for various life stages of the Pacific groundfish and West Coast salmon fishery management units. The project may adversely affect EFH through temporary elevation of turbidity resulting from construction activities disturbing shoreline sediments.

Essential Fish Habitat Conservation Recommendations: Because the conservation measures that were included as part of the proposed action to address ESA concerns are also adequate to avoid, minimize, or otherwise offset potential adverse effects to EFH , conservation recommendations pursuant to MSA (section 306(b)(4)(A)) are not necessary. Since NMFS is not providing conservation recommendations at this time, no 30-day response from the COE is required (MSA section 305(b)(4)(B)).

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, the COE will need to reinitiate consultation in accordance with the implementing regulations for EFH at 50 CFR 600.920(1).

Thank you for your effort to protect ESA-listed species and EFH. If you have any questions, please contact Marty Acker at (360) 534-9336 or via email at Marty.Acker@noaa.gov.

Sincerely,

William W. Stelle, Jr.
Regional Administrator.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

In Reply Refer To:
13410-2011-I-0402

SEP 27 2011

GeoEngineers

SEP 29 2011

Routing Joe

File

Michelle Walker, Chief Regulatory Branch
Seattle District, Corps of Engineers
ATTN: Regulatory Branch (Jordan)
P.O. Box 3755
Seattle, Washington 98124-3755

Dear Ms. Walker:

Subject: Washington Department of Ecology; Irondale Iron and Steel Plant Site Cleanup (Corps. No. NWS-2011-604)

This is in response to your letter dated August 5, 2011, and enclosed Biological Evaluation for the Irondale Iron and Steel Plant Cleanup Project (project). The Washington Department of Ecology (Ecology) proposes to conduct remedial cleanup and restoration actions at the former steel plant site. The project is located in the nearshore environment of the current Irondale Beach Park at the southwestern end of Port Townsend Bay in Jefferson County, Washington (Townships 29N and 30N, Range 01W, Sections 2 and 35). Your letter requests our concurrence with your determination of "may affect, not likely to adversely affect" for the Coastal/Puget Sound bull trout (*Salvelinus confluentus*) and marbled murrelet (*Brachyramphus marmoratus*). We received your letter and Biological Evaluation in our office on August 12, 2011. This informal consultation has been conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Project Description

Contaminants are currently leaching from upland areas of the site into Port Townsend Bay. The state is proposing to remove contaminated sediments and restore the marine shoreline as part of a Washington State Model Toxics Control Act cleanup action and to create and enhance available shoreline and intertidal habitats. Ecology will restore and stabilize exposed shoreline banks, excavate and dispose of contaminated soils, excavate and install a geotextile and soil cap across several upland areas, remove slag material from the beach, and revegetate the area. Other possible work includes fencing physical hazards in the upland area. Restoration will create about 56,100 ft^2 of new intertidal habitat and about 71,700 ft^2 of backshore habitat. The small drainage near the northern end of the county property will be restored by removing invasive species and revegetating with native shrubs and trees. Invasive species will be removed from the shoreline throughout the project area. Native shrubs and trees will be planted south of the above-ground storage tank.

Ecology anticipates the project will require one construction season to complete. In-water work will be conducted between July 16 and mid-October. If more time is needed, a forage fish spawning survey will be conducted to confirm the absence of forage fish eggs before extending the in-water work through February 15, at the latest.

The proposed work includes the following elements:

1. Excavate fill from the existing shoreline north of the slag outcrop, along the eroding, historic upland fill pad. Shoreline will be excavated to a depth of seven to ten feet. Contaminated material will be transported off-site to an approved upland disposal facility. Clean material will be reused on site as backfill for the upland excavations.
2. Create a large woody debris berm at the ordinary high water mark by placing logs and rootwads at the transition between upper intertidal and the backshore habitat area.
3. Demolish concrete tank structure. Excavate contaminated soil, slag, and sediment along the southern shoreline. Use clean stockpiled material from the northern restoration grading as backfill.
4. Excavate slag outcrop and grade clean areas.
5. Clear and excavate upland area for capping. Site preparation may require removal of some vegetation. Upland area will be excavated to a depth of six to eleven ft.
6. Cap upland area with permeable geotextile and top dress with an approximately two-foot thick layer of clean stockpiled material.
7. Construct shoreline restoration components, including placing large woody debris, import and place backshore topsoil, and plant upland and backshore with native vegetation. The restored shoreline will tie into Washington Department of Fish and Wildlife's 2006 Chimacum Creek beach restoration project to the north.
8. Place beach nourishment at southern end of the project area to transition the shoreline slope restoration and preserve the remnants of the historic brick kilns currently located below the ordinary high water mark.

Conservation Measures

The proposed project will result in increased noise and sediment during construction activities, but the disturbance will be temporary. As part of the proposed project, the following conservation measures will be implemented to minimize construction noise, potential of spills, control turbidity and contaminants, and protect sensitive habitats:

1. Silt fencing, wattle dams, and erosion control mats may be used to control erosion.
2. Sheet piling, silt curtains, debris booms, and oil-absorbent booms may be used during in-water construction to minimize turbidity. Any sheet pile used will be installed with a vibratory pile driver.

3. All construction equipment will be cleaned and inspected before arriving at project site to ensure that no leaks are present and the equipment is functioning properly. All construction-related debris and waste material will be cleaned up daily, before the incoming tide reaches it. Work will be conducted during low tide whenever possible to reduce resuspension of sediments and contaminants. For work that requires longer than one tide cycle, a sheet pile wall or anchored silt curtains will be placed around the work area.
4. No underwater work or impact pile driving will be conducted.

Determination

Based on the information provided in your Memorandum for the Services, the Biological Evaluation, and responses to additional questions, we have concluded that effects to the federally listed bull trout and marbled murrelet associated with the proposed project would be insignificant or discountable. Therefore, we concur with your "may affect, not likely to adversely affect" determination for bull trout and marbled murrelet. Specifically, our concurrence is based on the following rationale:

Bull Trout

There are no documented bull trout occurrences in the vicinity of the proposed project. Based on our knowledge of bull trout use of the marine waters in Puget Sound, the likelihood of bull trout being present in Port Townsend Bay is extremely low, especially during the proposed in-water work window (July 15 to February 15). However, the marine nearshore areas of Port Townsend Bay adjacent to the project site support eelgrass (*Zostera ssp.*) and spawning habitat for forage fish, the latter being primary prey for bull trout in the marine environment.

The project will result in short term impacts and reduction of documented sand lance (*Ammodytes hexapterus)* spawning habitat. If work in the intertidal zone is not complete by October 14, a forage fish spawning survey will be conducted to confirm the absence of forage fish eggs before extending the in-water work window. The restoration actions and project design include placement of suitable substrate material to restore and create new areas for forage fish spawning. Although there will be a short term reduction in forage fish spawning areas, the project is expected to result in long term beneficial effects.

Removing the slag outcropping and other debris along the beach will remove barriers and improve fish migration along the shoreline. Restoring the upper intertidal area and creating 56,100 ft^2 of new intertidal habitat will increase forage fish spawning habitat.

Because there are no documented occurrences of bull trout in the project area, the action area is not a linkage corridor between rivers that support bull trout, and intertidal work will be conducted during the time of year when few bull trout are in the marine environment, the likelihood of exposure of bull trout to project-related activities is considered discountable.

Marbled Murrelet

Because the project will not impact potential marbled murrelet nesting habitat and is more than one mile from suitable nesting habitat, effects to nesting marbled murrelets are considered discountable.

Marbled murrelets have been documented foraging in the marine environment of the project area. The most precise information comes from boat surveys conducted by the U.S. Forest Service, Pacific Northwest Research Laboratory to determine population size and trends under the Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program. The Washington Department of Fish and Wildlife, in cooperation with the Puget Sound Ambient Monitoring Program, also conducts aerial surveys for seabirds in Puget Sound. Based on the data from these monitoring programs, the U.S. Fish and Wildlife Service expects that marbled murrelets will be in project area year-round at moderate densities.

The restoration actions and project design include placement of suitable substrate material to restore and create new areas for forage fish spawning. Although there will be a short term impacts to forage fish habitat, the project is expected to result in long term beneficial effects to marbled murrelet prey resources. Construction-related activities may result in elevated in-air sound and disturbance above ambient levels, but no in-water work will be conducted and no impact hammers will be used during project activities. The proposed project will be conducted during daylight hours and no construction-related noise will occur during the morning and dusk foraging periods (during the marbled murrelet nesting season). Because we do not expect a measurable effect to prey resources or marbled murrelet behavior associated with construction-related activities, effects to marbled murrelets are considered insignificant.

This concludes informal consultation pursuant to the regulations implementing the Endangered SpeciesAct (50 CFR 402.13). This project should be reanalyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation. The project should also be reanalyzed if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or a new species is listed or critical habitat is designated that may be affected by this project.

If you have any questions about this letter or our joint responsibilities under the Endangered Species Act, please contact Lisa Wood at (360) 753-4371 or Martha Jensen at (360) 753-9000, of this office.

Sincerely,

Martha L Jensen

for Ken S. Berg, Manager
Washington Fish and Wildlife Office

cc:
WDOE, Lacey, WA (S. Teel)
WDOE, Seattle, WA (R. Padgett)
GeoEngineers, Inc., (J. Callaghan)

LITERATURE CITED

WDFW (Washington State Department of Fish and Wildlife). 2009a. SalmonScape interactive mapping tool. Available at: http://wdfw.wa.gov/mapping/salmonscape/index.html.

WDFW (Washington State Department of Fish and Wildlife). 2009b. Priority Habitat and Species database. Available at: http://wdfw.wa.gov/mapping/phs/

Washington Department of FISH and WILDLIFE

HYDRAULIC PROJECT APPROVAL

RCW 77.55.021 - See appeal process at end of HPA

Coastal
48 Devonshire Road
Montesano, WA 98563
(360) 249-4628

Issue Date: July 26, 2011
Project Expiration Date: March 14, 2013

Control Number: 123879-2
FPA/Public Notice #: N/A

11 JUL 29 AM 10:30

PERMITTEE	AUTHORIZED AGENT OR CONTRACTOR
Washington State Department of Ecology	GeoEngineers Inc
ATTENTION: Steve Teel	ATTENTION: Joseph Callaghan
P.O. Box 47775	1101 S Fawcett Ave Ste 200
Olympia, WA 98504-7775	Tacoma, WA 98402
360-407-6247	253-383-4940
Fax: 360-407-6205	Fax: 253-383-4923

Project Name: Irondale Environmental Remediation & Habitat Rest.

Project Description: Environmental remediation and habitat restoration at the Irondale Beach Park site (location of the former Irondale Iron and Steel Plant).

PROVISIONS

1. Work below the ordinary high water line shall not occur from February 15 through July 14 of any year for the protection of migrating juvenile salmonids.

2. Work below the ordinary high water line shall not occur from October 15 through December 31 and from January 1 through March 1 of any year for the protection of Pacific sand lance spawning beds except that area including and south of the slag outcrop to the property boundary (remediation area).

3. Work shall be accomplished per plans and specifications approved by the Washington Department of Fish and Wildlife entitled Cross Section from AST through Beach and dated April 25, 2011, except as modified by this Hydraulic Project Approval. A copy of these plans shall be available on site during construction.

4. All manmade debris on the beach shall be removed and disposed of upland such that it does not enter waters of the state.

5. Beach area depressions created during project activities shall be reshaped to preproject beach level upon project completion.

6. Project activities shall not occur when the project area, including the work corridor is inundated by tidal waters.

7. Excavated materials containing silt, clay, or other fine grained soil shall not be stockpiled below the ordinary high water line.

8. If sand, gravel, and other coarse excavated material is to be temporarily placed where it will come into contact with tidal waters, this material shall be covered with filter fabric and adequately secured to prevent erosion and/or potential entrainment of fish.

9. All excavated or stockpiled material shall be removed from the beach within 72 hours of bulkhead construction. Upon removal of the excavated material, the beach shall immediately be returned to the preproject natural grade.

10. Project activities shall be conducted to minimize siltation of the beach area and bed.

11. If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), immediate notification shall be made to the Washington Military Department's Emergency Management Division at 1-800-258-5990, and to the Area Habitat Biologist listed below.

12. All debris or deleterious material resulting from construction shall be removed from the beach area and bed and prevented from entering waters of the state.

13. No petroleum products or other deleterious materials shall enter surface waters.

14. Wood treated with preservatives, trash, waste, or other deleterious materials shall not be burned below the ordinary high water line. Limited burning of untreated wood or similar material may be allowed at or above the mean higher high water line.

15. Project activities shall not degrade water quality to the detriment of fish life.

PROJECT LOCATIONS

Location #1 Irondale Beach Park

WORK START: July 27, 2011				WORK END: February 14, 2013		
WRIA: 17.9090		Waterbody: Wria 17 Marine			Tributary to: Puget Sound	
1/4 SEC:	Section:	Township:	Range:	Latitude:	Longitude:	County:
SE 1/4	35	30 N	01 W	N 48.04453	W 122.76828	Jefferson

Location #1 Driving Directions

Jefferson county side of Hood Canal Bridge, turn right on WA 19 north, Beaver Valley Raod-11.6 miles turn right at Irondate Road 0.8 miles, turnleft at 4th street, 0.2 iles take second riht at Moore St. 0.2 miles site at end orfroad, gravel parking lot

Washington Department of FISH and WILDLIFE

HYDRAULIC PROJECT APPROVAL

RCW 77.55.021 - See appeal process at end of HPA

Coastal
48 Devonshire Road
Montesano, WA 98563
(360) 249-4628

Issue Date: July 26, 2011 Control Number: 123879-2
Project Expiration Date: March 14, 2013 FPA/Public Notice #: N/A

Location #2 Irondale Beach Park

WORK START: July 27, 2011					WORK END: February 14, 2013	
WRIA: 17.9090	Waterbody: Wria 17 Marine				Tributary to: Puget Sound	
1/4 SEC: NE 1/4	Section: 02	Township: 29 N	Range: 01 W	Latitude: N 48.04453	Longitude: W 122.76828	County: Jefferson
Location #2 Driving Directions						

APPLY TO ALL HYDRAULIC PROJECT APPROVALS

This Hydraulic Project Approval pertains only to those requirements of the Washington State Hydraulic Code, specifically Chapter 77.55 RCW (formerly RCW 77.20). Additional authorization from other public agencies may be necessary for this project. The person(s) to whom this Hydraulic Project Approval is issued is responsible for applying for and obtaining any additional authorization from other public agencies (local, state and/or federal) that may be necessary for this project.

This Hydraulic Project Approval shall be available on the job site at all times and all its provisions followed by the person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work.

This Hydraulic Project Approval does not authorize trespass.

The person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work may be held liable for any loss or damage to fish life or fish habitat that results from failure to comply with the provisions of this Hydraulic Project Approval.

Failure to comply with the provisions of this Hydraulic Project Approval could result in a civil penalty of up to one hundred dollars per day and/or a gross misdemeanor charge, possibly punishable by fine and/or imprisonment.

All Hydraulic Project Approvals issued under RCW 77.55.021 are subject to additional restrictions, conditions, or revocation if the Department of Fish and Wildlife determines that changed conditions require such action. The person(s) to whom this Hydraulic Project Approval is issued has the right to appeal those decisions. Procedures for filing appeals are listed below.

Requests for any change to an unexpired HPA must be made in writing. Requests for new HPAs must be made by submitting a new complete application. Send your requests to the department by: mail to the Washington Department of Fish and Wildlife, Habitat Program, 600 Capitol Way North, Olympia, Washington 98501-1091; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor.

APPEALS INFORMATION

If you wish to appeal the issuance, denial, conditioning, or modification of a Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW) recommends that you first contact the department employee who issued or denied the HPA to discuss your concerns. Such a discussion may resolve your concerns without the need for further appeal action. If you proceed with an appeal, you may request an informal or formal appeal. WDFW encourages you to take advantage of the informal appeal process before initiating a formal appeal. The informal appeal process includes a review by department management of the HPA or denial and often resolves issues faster and with less legal complexity than the formal appeal process. If the informal appeal process does not resolve your concerns, you may advance your appeal to the formal process. You may contact the HPA Appeals Coordinator at (360) 902-2260 for more information.

A. INFORMAL APPEALS: WAC 220-110-340 is the rule describing how to request an informal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete informal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request an informal appeal of that action. You must send your request to WDFW by mail to the Washington Department of Fish and Wildlife HPA Appeals Coordinator, 600 Capitol Way North, Olympia, Washington 98501-1091; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. WDFW must receive your request within 30 days from the date you receive notice of the decision. If you agree, and you applied for the HPA, resolution of the appeal may be facilitated through an informal conference with the WDFW employee responsible for the decision and a supervisor. If a resolution is not reached through the informal conference, or you are not the person who applied for the HPA, the HPA Appeals Coordinator or designee will conduct an informal hearing and recommend a decision to the Director or designee. If you are not satisfied with the results of the informal appeal, you may file a request for a formal appeal.

B. FORMAL APPEALS: WAC 220-110-350 is the rule describing how to request a formal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete formal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request a formal appeal of that action. You must send your request for a formal appeal to the clerk of the Pollution Control Hearings Boards and serve a copy on WDFW within 30 days from the date you receive notice of the decision. You may serve WDFW by mail to the Washington Department of Fish and Wildlife HPA Appeals Coordinator, 600 Capitol Way North, Olympia, Washington 98501-1091; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, you may request a formal appeal within 30 days from the date you receive the Director's or designee's written decision in response to the informal appeal.

C. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS: If there is no timely request for an appeal, the WDFW action shall be final and unappealable.

ENFORCEMENT: Sergeant Henry (28) P2

Habitat Biologist Margie Schirato	360-427-2179	Margaret Schirato	for Director WDFW

CC:

STATE OF WASHINGTON
DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION
1063 S. Capitol Way, Suite 106 ◦ Olympia, Washington 98501
Mailing address: PO Box 48343 ◦ Olympia, Washington 98504-8343
(360) 586-3065 ◦ Fax Number (360) 586-3067 ◦ Website: www.dahp.wa.gov

February 15, 2012

Mr. Steve Teel
Site Manager/Hydrogeologist
Toxics Clean-Up Program
Department of Ecology
PO Box 47775
Lacey, WA 98504-7775

Chris Miss
NWAA/SWCA
5418 20th Avenue NW, Ste 200
Seattle, WA 98107

Dear Mr. Teel and Ms. Miss:

I have reviewed the application you submitted for archaeological work at 45DT00128. It is my intention to grant the permit application for excavations at 45DT00128. Please take note of the Special Conditions on the permit.

If you feel aggrieved by this decision you may request an administrative hearing within twenty-one days after receipt of this notice. Your request should be sent to the address listed below.

Director
Department of Archaeology and Historic Preservation
PO Box 48343
Olympia, WA 98504-8343

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343

ARCHAEOLOGICAL EXCAVATION PERMIT
NO: 2011-43

Archaeological sites:	45DT128, 45JE358
Individual Responsible for carrying out the terms and conditions of the permit:	Steve Teel Department of Ecology
Individual responsible for field investigations:	Chris Miss NWAA/SWCA
Nature of work:	Monitoring of vegetation removal and capping
Repository in which collected records and data shall be deposited:	Burke Museum
Date fieldwork to begin:	**Upon receipt, but notify DAHP and Tribes via email before starting**
Date fieldwork shall end:	October 31, 2012
Period of analysis:	Concurrent through December 31, 2012
Date final report due:	December 31, 2012 Per WAC 25-48-041, if the report is late, a Notice of Violation will be issued & a $5000 penalty assessed

Special Conditions:

- Follow protocols stated in permit application of 11/10/11 & Monitoring and Discovery Plan dated 9/26/11
- If pre-contact deposits or artifacts are observed, stop work in that area, secure the area, and notify Tribes and DAHP for further consultation
- Artifacts can be temporarily stored at NWAA/SWCA until July 15, 2013 if needed; if no other curation/interpretation agreements have been reached between DAHP, Jefferson County Parks and other parties, artifacts will be curated at the Burke Museum
- Submit updated site form with report
- Report must meet DAHP's Survey and Inventory Standards
- Append catalog & BetaAnalytic sheets to report, reference permit number
- If human remains are encountered, stop work, secure the area, notify the county coroner, sheriff, DAHP, & affected Tribes per RCW 27.44.055
- Please note County Coroner is Scott W. Rosecrans.

Issued this 15th day of February 2012.

Stephenie Kramer
Assistant State Archaeologist

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION
Protect the Past, Shape the Future

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

February 15, 2012

Mr. Matthew Tyler, Manager
Jefferson County
Parks & Recreation
623 Sheridan Street
Port Townsend, WA 98368

Dear Mr. Tyler:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

Thank you for your comments. We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

In the future, when Jefferson County Parks and Recreation begins planning and developing the property for the county park, DAHP would like to be afforded the opportunity to comment on the treatment, vision, goals, and development themes and site plans. DAHP also recommends the Jefferson County Historical Society be involved in the planning. In addition, depending upon your plans, DAHP will want to advise Jefferson County on whether or not a DAHP permit will be required for any alterations to the archaeological site and National Register Property.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss
William Tennant

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

February 15, 2012

Mr. Steve Denton
Program Manager
Burke Museum
University of Washington
Box 353010
Seattle, WA 98195-3010

Dear Mr. Denton:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
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February 15, 2012

Dr. Josh Wisniewski
Tribal Anthropologist/Archaeologist
Port Gamble S'Klallam Tribe
31912 Little Boston Road NE
Kingston, WA 98346

Dear Dr. Wisniewski:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. Thank you for your comments. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 15, 2012

Ms. Stacie Hoskins
Planning Manager
Jefferson County Planning
621 Sheridan Street
Port Townsend, WA 98368

Dear Ms. Hoskins:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 15, 2012

Ms. Kris Miller, THPO
Skokomish Tribe
Cultural Resources
80 N. Tribal Center Road
Skokomish, WA 98584

Dear Ms. Miller:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

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

February 15, 2012

Mr. Chris Morganroth
Quileute Tribe
Cultural Resources
PO Box 279
La Push, WA 98350

Dear Mr. Morganroth:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION
1063 S. Capitol Way, Suite 106 ◦ Olympia, Washington 98501
Mailing address: PO Box 48343 ◦ Olympia, Washington 98504-8343
(360) 586-3065 ◦ Fax Number (360) 586-3067 ◦ Website: www.dahp.wa.gov

February 15, 2012

Mr. Lance Lundquist
Archaeologist
US Army Corps of Engineers
Environmental and Cultural Resoruces Branch
PO Box 3755
Seattle WA 98124-3755

Dear Mr. Lundquist:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. Thank You for your comments. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 15, 2012

Mr. Bill White
Archaeologist
Lower Elwha Klallam Tribe
2851 Lower Elwha Road
Port Angeles, WA 98363

Dear Mr. White:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

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

February 15, 2012

Mr. William L. Tennent, Director
Jefferson County Historical Society
540 Water Street
Port Townsend, Washington 98368

Dear Mr. Tennent:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 ◦ Olympia, Washington 98501
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(360) 586-3065 ◦ Fax Number (360) 586-3067 ◦ Website: www.dahp.wa.gov

February 15, 2012

Mr. Greg Griffith
Deputy State Historic Preservation Officer
Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504-8343

Dear Mr. Griffith:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

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

February 15, 2012

Mr. Dennis Lewarch
Tribal Historic Preservation Officer
Suquamish Tribe
Cultural Resources
PO Box 498
18490 Suquamish Way
Suquamish, Washington 98392

Dear Mr. Lewarch:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION
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Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 15, 2012

Mr. Alexander Gall
Senior Archaeologist
Archaeological Services of Clark County
2464 NE Stapleton Road, # 3
Vancouver, WA 98661

Dear Mr. Gall:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

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

February 15, 2012

Ms. Jackie Ferry
Archaeologist
Samish Indian Nation
Cultural Resources
PO Box 217
Anacortes, WA 98221

Dear Ms. Ferry:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

STATE OF WASHINGTON
DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 15, 2012

Mr. Gideon Cauffman
Cultural Resources Special/Enrollment Officer
Jamestown S'Klallam Tribe
1033 Old Blyn Highway
Sequim, WA 98382

Dear Mr. Cauffman:

I had previously provided you with a proposed archaeological excavation permit application from Mr. Steve Teel for excavations at site 45DT00128 and requested your review and comment.

We have reviewed the comment letters for the proposed permit. It is my intention to grant the permit application for excavations at 45DT00128. A copy of the permit is enclosed for your reference.

Please feel free to contact me at (360) 586-3083 if you have any questions.

Sincerely,

Stephenie Kramer

Stephenie Kramer
Assistant State Archaeologist
(360) 586-3083
Email: stephenie.kramer@dahp.wa.gov

Enclosure

cc: Steve Teel
Chris Miss

Appendix D
Cultural Resources Assessment/Monitoring and Discovery Plan

CULTURAL RESOURCES ASSESSMENT
FOR THE
IRONDALE IRON AND STEEL PLANT (45JE358) HISTORIC DISTRICT (DT128) REMEDIATION AND RESTORATION PROJECT
JEFFERSON COUNTY, WASHINGTON

REDACTED

August 26, 2011

Report Number 21578

NORTHWEST ARCHAEOLOGICAL ASSOCIATES/SWCA.
SEATTLE, WASHINGTON

CULTURAL RESOURCES ASSESSMENT
FOR THE
IRONDALE IRON AND STEEL PLANT (45JE358) HISTORIC DISTRICT (DT 128) REMEDIATION AND RESTORATION PROJECT
JEFFERSON COUNTY, WASHINGTON

Report Prepared for

GeoEngineers
Washington Department of Ecology
&
U.S. Corps of Engineers

By

Jessie Piper

August 26, 2011

Report Number 21578

REDACTED

Northwest Archaeological Associates / SWCA
5418 - 20th Avenue NW, Suite 200
Seattle, Washington 98107

CULTURAL RESOURCES REPORT COVER SHEET

Author: Jessie Piper

Title of Report: Cultural Resources Assessment for the Irondale Iron and Steel Plant (45JE358) Historic District (DT128) Remediation and Restoration Project,

Date of Report: August 26, 2011

County(ies): Jefferson

Section: 35 Township: 30N Range: 1 W
Section: 2 Township: 29N Range: 1 W
Quad: Port Townsend South Acres: ~23

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Export Files submitted? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☒ Yes ☐ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☒ Yes ☐ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

DAHP Archaeological Site #:
45JE358
DT128

ABSTRACT

Jefferson County Public Works plans to develop a county park at the site of the former Irondale Iron and Steel Plant, an historic property, 45JE358, listed on the National Register of Historic Places (NRHP) that operated from 1881 until 1919. The DOE is currently assisting Jefferson County Public Works in cleanup of the site, which contains waste material and debris left from the steel making process. In addition to DOE cleanup efforts, restoration work will be carried out along the shoreline forming the western boundary of the project in order to enhance fish habitat and restore other environmental values. The remediation and restorations efforts must be completed prior to development of the park. Northwest Archaeological Associates, Inc. (NWAA), which previously conducted a conditions assessment of the remnants of the Irondale Iron and Steel Plant facilities, has identified potential adverse effects to components of the historic district from the cleanup action and proposed measures to avoid or mitigate these effects. Due to the depth of fill in the project area, no adverse effects to pre-contact resources are anticipated.

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INTRODUCTION

Jefferson County Public Works plans to develop a county park at the site of the former Irondale Iron and Steel Plant, an historic property, 45JE358, listed on the National Register of Historic Places (NRHP) that operated from 1881 until 1919 (Figures 1 and 2). An incomplete cleanup of the iron and steel plant in 1919 left waste material and debris from the steel making process on site, contaminating localized areas that have been identified by the Washington State Department of Ecology (DOE) through a series investigations (GeoEngineers 2009 a, 2009b, 2011). The objective of the cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by petroleum hydrocarbons and metals in upland soil and marine sediment at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements (GeoEngineers 2011b).

In addition to DOE cleanup efforts, restoration work will be carried out along the shoreline forming the western boundary of the project in order to enhance fish habitat and restore other environmental values. The remediation and restorations efforts must be completed prior to development of the park. Northwest Archaeological Associates, Inc. (NWAA) previously conducted a conditions assessment of the remnants of the Irondale Iron and Steel Plant facilities to assist the DOE in the permitting process that was required to allow additional contaminant testing (Smith 2011b, c).

Project Location

The Irondale Iron and Steel Plant is located on an 11 acre parcel in Section 35 of Township 30 North, Range 1 West and Section 2 of Township 29 North, Range 1 West, Willamette Meridian, in Southeast Jefferson County within the boundaries of Irondale townsite (Figure 1). The Irondale Iron and Steel Plant, designated archaeological site 45JE358, is the primary component of the Irondale Iron and Steel Plant Historic District (DT128). The historic district was determined eligible for the National Register of Historic Places (NRHP) in 1983 because of its association with the development of the iron and steel production industry on the west coast of North America in the late 1800s and early 1900s (NRHP 2010). It is also listed on the Washington State heritage register and the National Park Service Historic Engineering Record (Britton and Britton 1983).

Regulatory Context

The shoreline portion of the project will be carried out under a U.S. Army Corps of Engineers (ACE) Joint Aquatic Resources Permit (JARPA). Because of the federal permit, the project will be subject to the National Historic Preservation Act (NHPA),1966, as amended. Section 106 of the National Historic Preservation Act (NHPA) requires agencies to identify and assess the effects of federally permitted or approved undertakings on historic resources, archaeological sites, and traditional cultural properties (TCPs), and to consult with others to find acceptable ways to avoid or mitigate adverse effects. The process concludes with issuance of an agreement document that stipulates the agreed upon measures to reach these goals.

For the purposes of this report, terminology associated with Section 106 of the NHPA will be used for consistency, although upland portions of the project will be subject to State rather than Federal legislation and oversight.

Figure 1. General location.

Figure 2. Irondale Iron and Steel Plant Historic District project area.

National Register of Historic Places and Adverse Effects

Eligible properties, like the Irondale Historic District, must possess integrity, defined as the ability to convey its significance. The seven aspects of integrity include location, design, setting, materials, workmanship, feeling, and association (National Park Service, 1991, 1997). Measuring resource integrity requires an understanding the district's "character-defining features," meaning those features that best convey the significant historic property's association with the particular historic theme or event. Identification of character defining features is also central to assessing the affect of a proposed action on a significant historic resource.

The Irondale Historic District is an important concentration of resources united historically and by plan and physical development that is significant because of its association with the early history of West Coast iron and steel production (Stalheim 1983a). In addition, the remnants of the iron and steel production facilities, 45JE358 may provide important information regarding the development and operation during the late 1800s and early 1900s, making the site important for the archaeological data potential that it represents.

PROJECT BACKGROUND

The Irondale Historic District encompasses approximately 13 acres in both upland and coastal settings along Port Townsend Bay that have been shaped by historic industrial processes. The 1856 U.S. Coast Survey map of the coastline south of Chimacum Creek, drawn before industrial development of Irondale began in the 1880s, depicts a narrow beach backed by a steep bluff that was later occupied by the iron and steel plant. North of the plant site, the beach widened and formed a long spit on the south side of the mouth of Chimacum Creek (Figure 3). During the development of the Irondale Iron and Steel Plant in the late 1800s and early 1900s, upland areas were excavated and graded to prepare for construction of the buildings and production equipment, and a portion of the intertidal area was filled with dredge spoils to accommodate expansion of storage and loading facilities along the shoreline. The eastern, shoreward portion of the Irondale Iron and Steel Plant presently lies at an elevation approximately 12 feet above mean sea level (AMSL) and the ground surface in this area is relatively level. The western, inland portion of the project area is marked by a steep bluff that rises to between 70 and 100 feet AMSL. The remains of the Irondale Iron and Steel Plant are situated below the crest of the bluff (Figure 4).

Vashon outwash is exposed along the shoreline south of the project area and glaciolacustrine deposits compose the upland west of a narrow beach (Schasse and Slaughter 2005). The bluffs are dissected by creeks that have incised ravines and now drain into the Puget Sound. During historic development of the beach, the bluffs were cut back and the spoils were used to widen and elongate the beach. Today, the beach is mapped by geologists as artificial fill (Schasse and Slaughter 2005). Geotechnical investigations carried out for the project, along with geoarchaeological investigations at the north end, show that fill varies between 5 and 15 feet thick (Morton et al. 2009; Willis 2005). A small, unnamed creek that once flowed across the beach has been channelized and runs through a culvert. Any alluvial fan associated with the creek is buried by the fill in the central portion of the project area. The original narrow beach in the project area was not part of the tidal flat at the mouth of Chimacum Creek. The tidal marsh formed as a result of deposition from the creek and did not reach the project area.

Historic photographs of the Irondale Iron and Steel Plant show that the property was completely stripped of vegetation while the plant was in operation; grasses and mixed herbs presently

This image has been redacted.

Figure 3. U.S. Coastal Survey map, 1856, showing Irondale project area and village to north.

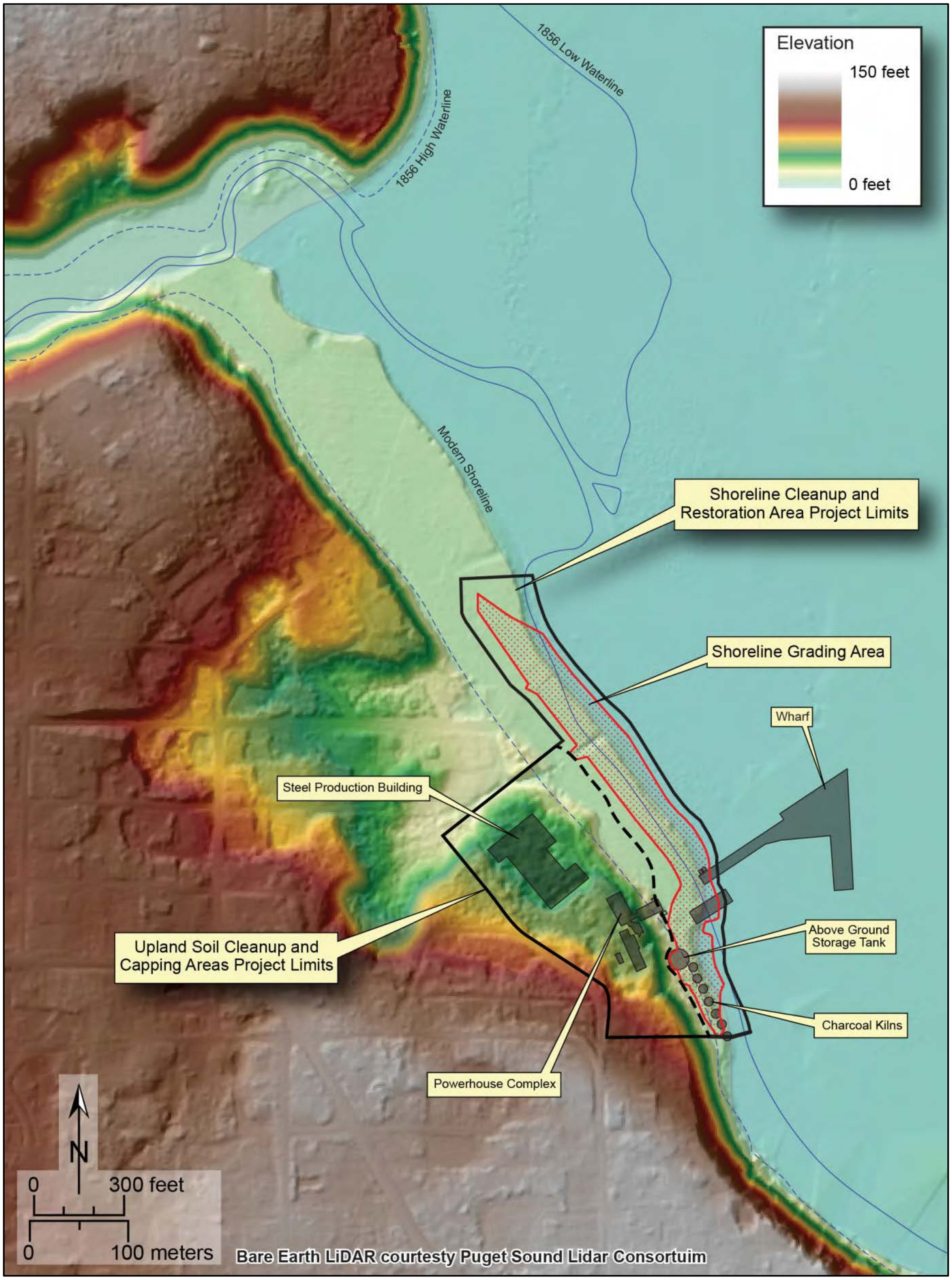

Figure 4. Profile of bluff in project area.

cover the low-lying areas in the eastern portions of the project area and alder, maple and scattered Douglas fir, with a thick understory of shrubs, Himalayan Blackberry vines, and forest duff cover the upland areas.

Native Americans in the Project Vicinity

The project area is located within the Chemakum traditional territory, which extended from the mouth of Hood Canal to Port Discovery Bay (Elmendorf 1990). At contact, the Chemakum were a small group whose language was similar to Quileute, people associated with the Pacific Coast south of Cape Flattery. At the time of contact, these groups were separated by the Makah and the Clallam (Castile 1985; Eels1996), an indication that the Chemakum language may have been more widespread in the past (Elmendorf 1990).

A large village, *Tsets-i-bus* was reported to be a village in the vicinity of [redacted] and a gathering place for area groups. The village, said to be surrounded by a stockade, was variously said to be [redacted] (Castile 1985; Eels 1996; Elmendorf 1990). Remains of a village at [redacted] were associated with Clallam people, including Lahanim, also called Prince of Wales and a son of the great Clallam leader Chetzemoka. A final Clallam potlatch was held at the village in 1891 (Hansen and Stump 1974 cf Willis 2005).

The Chemakum were described as hostile and involved in skirmishes with surrounding groups. Eels and Elmendorf describe a raid on a Chemakum stockade village (Castile 1985; Eels 1996; Elmendorf 1990). Warfare, along with epidemics such as smallpox that decimated the native population, took its toll. In 1877 the group counted 90 people, but by 1887 apparently only 10 remained (Gibbs 1877; Castile 1985).

The 1856 U.S. Coast Survey that mapped the Port Townsend Bay and Hadlock Bay areas, showed a village situated at [redacted]. The map shows a cluster of linear and circular structures seemingly surrounded by a fence-like boundary, possibly a stockade (Figure 3). By 1859, when Swan visited [redacted] area, he saw an active sawmill on the site and gave no account of a village (Swan 1971). Historic photos from the early part of the 20th century show five Native Americans, the Hicks family, later identified as Suquamish, at [redacted] where small houses can be seen in the background (Torka's Studio 1914)

Native people in the Port Townsend Bay area would have followed a seasonal pattern of resource gathering that combined fishing, inland hunting and gathering (Blukis-Onat 1976; Elmendorf 1990). Villages like the one at [redacted] were situated close to fisheries resources which in the Puget Sound region included all five species of salmon, as well trout, halibut, flounder, herring, sturgeon, dogfish, and rockfish available in the surrounding waters (Blukis Onat 1976). Like other Northwest groups, the Chemakum made use of ocean-going canoes to explore the surrounding coastline and bays, engaged in fishing and in gathering littoral resources such as clams, mussels, oysters, scallops, and other shellfish. Black tail deer, black bear, elk, river otter, raccoon, mountain beaver and hare, provided furs, skins, and food. Waterfowl were also important sources of food and down. While the village was the primary occupation site, throughout the food-gathering round, small temporary camps were made in inland areas when berries, nuts, and other useful plants came into season.

When the Chemakum signed the Treaty of Point No Point in 1855 they were assigned to the Skokomish Reservation, however, few of the Chemakum moved to the Skokomish Reservation and by the early twentieth century the Chemakum appear to have been assimilated into the neighboring Clallam and Twana communities (Elmendorf 1990; Ruby and Brown 1992). The 1856 U.S. Coast Survey map of Port Townsend and Admiralty Inlet shows the location of an Indian Village [redacted]. Ethnographers who conducted interviews with Native peoples around the mouth of Hood Canal and Port Townsend Bay in the late 1800s reported that a single village named C'ic'abus was located [redacted] and that the village was surrounded by a stockade (Elmendorf 1990), however, it is unclear whether this place name described the village at [redacted]. Historic photographs indicate that Native Americans continued to inhabit coastal areas around [redacted] into the early twentieth century.

Historic Development of the Irondale Iron and Steel Plant

Following the discovery of bog iron in the Chimacum Valley in the 1870s, the Puget Sound Iron Company initiated the start of the iron-making industry in the Washington Territory by developing the townsite of Irondale and building blast furnace and associated facilities to process the iron ore (Britton and Britton 1983). The Irondale Iron Plant operated sporadically in the 1880s and was unexpected shut down at the end of 1889. In 1901, the plant was reopened by the Pacific Steel Company, which expanded the production capacity of the original plant and prepared to produce steel. Following the death of the Pacific Steel Company owner, the plant was closed again in 1904. In 1906, the plant was acquired by the owner of a large investment company who set about modernizing the iron production facilities and expanding into steel production. Beginning in 1909, the Steel Production Plant was constructed northwest of the original Powerhouse and Iron Casting facilities. Construction of the Steel Production Building and equipment required extensive excavation to prepare the grade for the poured concrete and masonry foundations that supported the superstructure, furnaces, and rolling mills required to produce the finished steel.

While work proceeded on the steel plant, the Irondale Steel Company hired a dredger to fill upwards of 100 acres of tidelands along the waterfront from the Irondale plant to the mouth of Chimacum Creek to serve as a waterfront storage yard for raw materials and finished products. The Irondale Steel Company was reorganized into the Western Steel Corporation in 1910 and steel production peaked that winter, however, in October 1911 one of the largest holders of Western Steel Corporation debt filed a petition for the involuntary bankruptcy of the corporation and the Irondale Iron and Steel Plant was forced to shut down again. In January 1914, the Irondale Plant was sold to the Pacific Coast Steel Company, which disassembled the steel production equipment and relocated them to its Youngstown Steel Plant in Seattle. The Irondale Iron Plant was reopened briefly at the beginning of World War I to produce pig iron, however, in 1919, when its raw material supplies were exhausted, the Irondale Iron Plant was shut down for the final time, the remaining facilities were demolished, and the associated machinery was sold for scrap.

Previous Investigations

The project is within the boundaries of the Irondale Iron and Steel Plant site (45JE358, the major component of the Irondale Historic District (DT128), which is listed on the National Register of Historic Places (Smith 2011a; Stalheim 1983a), and. The project [redacted] of an ethnohistoric Native American village recorded as 45JE277 at [redacted]

Archaeological testing completed by Willis (2005) for fill removal and restoration of Washington Department of Fish and Wildlife lands between [redacted] identified isolated Native

American artifacts in historic fill and beach sand deposits (Figure 5). The artifacts, now grouped as 45JE285 and 45JE286, were determined to have been deposited by wave action and did not represent activity in an occupation or village site. The artifacts are small, water-worn lithic flakes, one of which was found in levels where bottle glass also appeared. They were found in comingled fill and beach sand and in an underlying layer of beach sands that contained fragments of shell and gravel indicating it may actually be hydraulic dredge fill. Monitoring for completion of the restoration project identified two east-west rows of pilings (45JE289) [redacted]. No additional cultural resources were found during monitoring (Sharley 2006a, b) (Figure 5).

Another identified site, the Irondale Jail (45JE103), a component of the Historic District, is located north of the Iron and Steel Plant and outside of the current project area. It was constructed in 1911 and when recorded in the 1980s, it was found to be in a dilapidated condition (Stalheim 1983b). In 2006 a riprap bulkhead was placed below the slope to provide protection for the site.

In 2010, Northwest Archaeological Associates, Inc. (NWAA) conducted a conditions assessment of the remains of the Irondale Iron and Steel Plant and prepared an archaeological site form for the property (Smith 2011a, 2011b). The site form was updated during archaeological monitoring of contaminant sampling (Smith 2011c). A total of 69 historic archaeological features were recorded during the conditions assessment and NWAA archaeologists relocated nearly all of the features documented in the 1983 (Figure 6). In addition, they also recorded a poured cement slab that once supported the Weighing House, and a series of pilings and milled timbers associated with the wharf, charcoal and coke warehouse, bulkheads and cribbing within the intertidal zone along the waterfront. It is likely that additional structural elements and historic debris associated with the wharf complex, and other components of the working waterfront at Irondale are located in the subtidal zone. Although a combination of natural processes and human activities have affected the physical condition of some portions of the Irondale Iron and Steel plant in the 27 years since these properties were initially documented, these components continue to contribute to the eligibility of the Irondale Historic District.

Iron and Steel Plant Components, Activity Areas and Associated Features

Pedestrian survey of the project area revealed the remains of at least six buildings and 69 associated features involved in the operation of the Irondale Iron and Steel Plant (Figure 6, Table 1). An archaeological site form describing these features was submitted to the DAHP and the site number 45JE358 was assigned to the remnants of the Irondale Iron and Steel Plant (See Appendix B). While four of the features described in 1983 could not be relocated, an additional 17 features that were not identified during the 1983 survey were described in 2010. The following sections describe each of the identified plant components and its associated features.

Stock House, Blast Furnace and Iron Casting House

According to historic photos, the Stock House was along the shoreline at the west end of the wharf and the Blast Furnace and Iron Casting House were built on a terrace midway up the bluff. Iron ore, limestone flux and charcoal or coke were mixed in the Stock House and transported to the Blast Furnace via an elevator and bridge.

The poured concrete foundation of a water tank was located near the southeast corner of the Stock House and a small portion of the masonry foundation that supported one of the hot stoves

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Figure 5. Project area and WDFW project testing area.

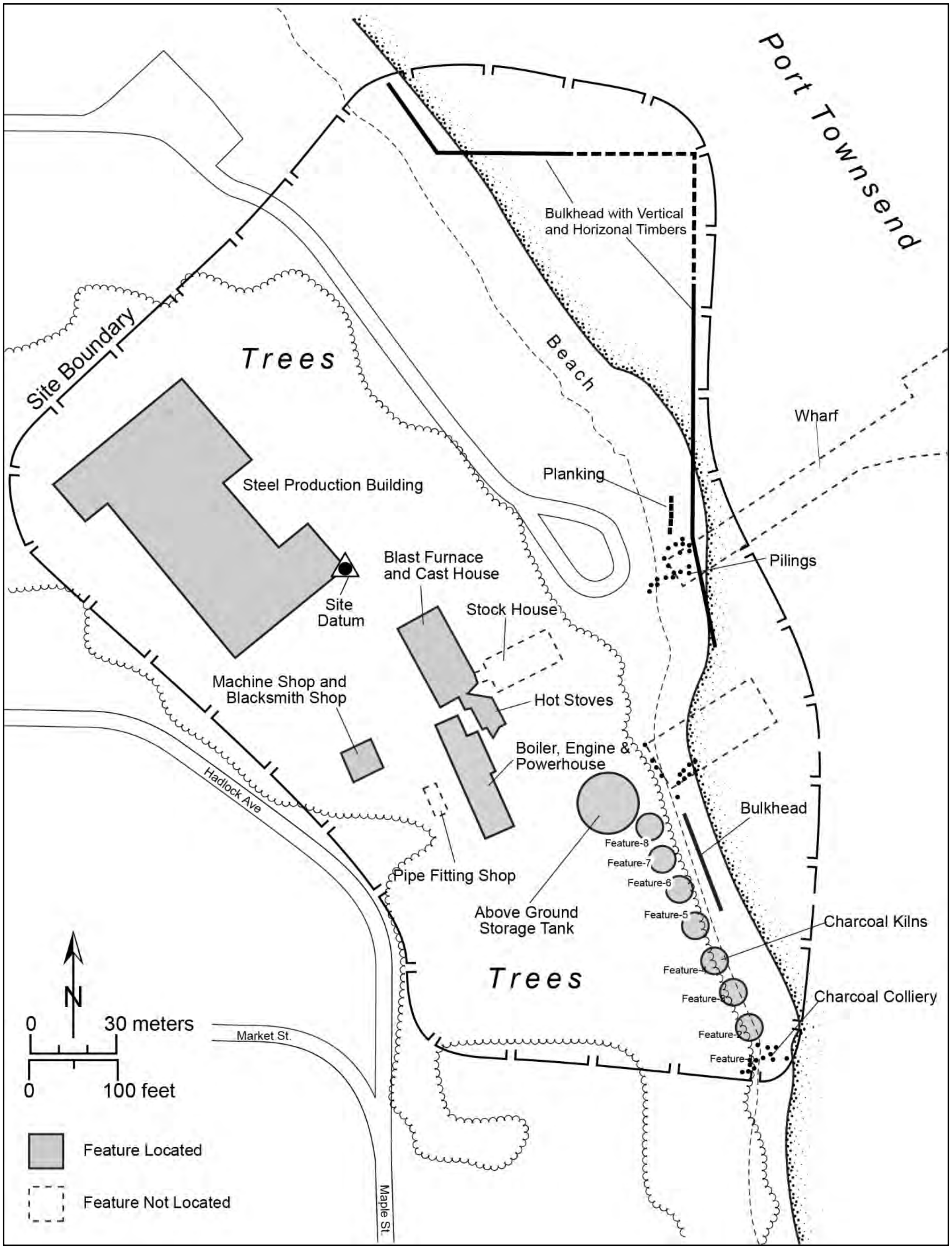

Figure 6. Irondale Iron and Steel Plant Historic District conditions in 2010.

Table 1. Adverse Effects to Irondale Iron and Steel Plant Resources

PLANT COMPONENT	IDENTIFIED /POSSIBLE FEATURES	SURVEYED FEATURES	RECORDED 1983*	RECORDED 2010	POTENTIAL EFFECTS
Iron Cast House (1881-1919)	Blast Furnace	Rubble Pile	X	X	Grubbing , capping
	Hot Stoves	Foundation L	X	X	Grubbing, capping
	Building Foundations	-	-	-	?
	Casting Troughs	-	-	-	?
	Cinder Conveyor	-	-	-	?
Engine House (? - 1919)	Machinery Foundations	Blower Engine Foundation A	X	X	Grubbing, capping
		Foundation B	X	X	Grubbing, capping
		Foundation H	X	X	Grubbing, capping
Electric Power House (? - 1919)	Machinery Foundations	Foundation C	X	X	Grubbing, capping
		Foundation D	X	X	Grubbing, capping
		Foundation E	X	X	Grubbing, capping
		Foundation F	X	X	Grubbing, capping
		Foundation G	X	X	Grubbing, capping
Boiler House (? - 1919)	Unknown	Foundation I	X	-	Grubbing, capping
	Unknown	Foundation J	X	-	Grubbing, capping
Unknown Building	Unknown	Foundation K	X	-	?
Machine Shop	Building Foundations	-	-	-	No planned actions in this area
	Machinery Foundations	-	-	-	No planned actions in this area
Blacksmith Shop	Building Foundations	-	-	-	No planned actions in this area
	Forge	-	-	-	No planned actions in this area
Pipe Fitter Shop	Building Foundations	-	-	-	No planned actions in this area
	Machinery Foundations	-	-	-	No planned actions in this area
Steel Production Building (1909-1914)	Charging Aisle	Smokestack Base (3)	X	X	Grubbing, capping
		Regenerator Area Foundations (7)	X	X	Grubbing, capping
(1910-1914)	Open-hearth Furnace Area	Open Hearth Furnace Foundations (11)	X	X	Grubbing, capping
		Ingot Pouring Aisle Foundations	X	X	Grubbing, capping
(1910-1914)	Electric Crane	Base of Crane	X	X	Grubbing, capping
		Continuous Reheat Furnace Foundation	X	X	Grubbing, capping
		Unidentified Foundation #1	X	X	Grubbing, capping
		Lifting Table (2)	X	X	Grubbing, capping
(1910-1914)	22-inch Mill	Corliss Engine Base	X	X	Grubbing, capping
		Mill Pit	X	X	Grubbing, capping
		Flywheel Pit	X	X	Grubbing, capping
		22-inch Mill Foundation	X	X	Grubbing, capping
(1910-1914)	Rolling Mill Complex (Western Portion)	Billet Shears	X	X	Grubbing, capping
		14-inch Rolling Mill	X	X	Grubbing, capping
		Flywheel Pit	X	X	Grubbing, capping
(1910-1914)	Rolling Mill Complex (Eastern Portion)	Conveyor (to Cooling Bed)	X	X	Grubbing, capping
		Cooling Bed	X	X	Grubbing, capping
		Corliss Engine Base	X	X	Grubbing, capping

Table 1. Adverse Effects to Irondale Iron and Steel Plant Resources

PLANT COMPONENT	IDENTIFIED /POSSIBLE FEATURES	SURVEYED FEATURES	RECORDED 1983*	RECORDED 2010	POTENTIAL EFFECTS
		9-inch Rolling Mill	X	X	Grubbing, capping
	Northwest Corner of Plant	Unidentified Foundation #2	X	X	Grubbing, capping
		Unidentified Foundation #3	X	X	Grubbing, capping
		Unidentified Foundation #4	X	X	Grubbing, capping
Stock House	Building Foundation	-	-	-	No effect
	Elevator	-	-	-	No effect
	Ore Conveyor	-	-	-	No effect
	Bridge	-	-	-	No effect
	Water Tank	Foundation Wall	X	-	No effect
Above Ground Fuel Tank (1909-1919)	Steel-Lined Concrete Tank Walls	Concrete Tank Walls	X	X	Demolition
Scrap Shears	Foundation	-	-	-	Grading, grubbing, capping
Skull Cracker	Foundation	-	-	-	Grading, grubbing, capping
Working Waterfront	Wharf	Piling Alignments	-	X	Excavation, fill, grading
	Weigh House	Concrete Foundation	-	X	Excavation, fill, grading
Charcoal Production Facilities (1884-1910)	Bulkhead	Wood Pilings and Planking	-	X	Excavation, fill, grading
	Charcoal Colliery (Reportedly 20 Kilns in 2 Lines)	Pilings (Feature 1)	-	X	No action in this area
		Kiln Foundation (Feature 2)	-	X	Partial fill, grading
		Kiln Foundation (Feature 3)	-	X	Partial fill, grading
		Kiln Foundation (Feature 4)	-	X	Partial fill, grading
		Kiln Foundation (Feature 5)	-	X	Partial excavation , fill, grading
		Kiln Foundation (Feature 6)	-	X	Excavation, grading
		Kiln Foundation (Feature 7)	-	X	Excavation, grading
		Kiln Foundation (Feature 8)	-	X	Excavation, grading
	Charcoal/Coke Storage Warehouse	Piling Alignments	-	X	Excavation, slag removal
Tideland Fill 1881- ca. 1918	Slag Disposal Area	Stratified Slag Deposits Welded Slag Deposit	-	X	Excavation, grading, fill
	Bulkhead	Horizontal Logs and Timbers	-	X	Excavation, grading, fill
Tideland Fill (1910)	Sediment Retaining Wall	Wood Pilings and Planking	-	X	Excavation, grading, fill
		Dredge Sediment Deposit	-	X	Excavation, grading, fill
Vessel Remains	-	Vessel Hull Fragment	-	X	Excavation, grading, fill

* HAER (Britton and Britton 1983)

was identified during the 1983 survey. While one of the hot stove foundations was relocated in 2010, no additional features associated with the Blast Furnace, Casting House or Stock House, including the water tank foundation described in 1983, were identified during the 2010 survey.

Bricks, both whole and fragmentary, as well as slag and other historic debris were found around the Blast Furnace, Casting House and Hot Stoves locations. Foundation elements associated with these buildings are present at the Hot Stoves and may be present beneath the rubble and historic debris at the Blast Furnace. In addition, the hillslope west of the Stock House appears to be very unstable and mass wasting of the hillside may have covered portions of the Stock House foundation as well as the adjacent water tank foundation since it was recorded in 1983.

Engine House and Electric Power House

The Engine House and Electric Power House were both in a long open building south of the Blast Furnace and Iron Casting House. Three foundations (Foundations A, B and H) from the Engine House were found at the north end of the building footprint and five concrete foundations (Foundations C-G) were relocated at the site of the Electric Power House at the south end of the building footprint. The most prominent of these features is the Blower Engine base and flywheel pits (Foundation A) in the northwest corner of the structure (JCHS 2005). The Blower Engine base is composed of masonry bricks and the flywheel pits are masonry lined. Four large bolts, each measuring three inches in diameter and at least 8 feet in length are between the two flywheel pits. Two other foundations (Foundation B and H) were also relocated on the west and south sides of the Engine House. The arrangement of foundation features (Foundations C-G) within the Electric Power House footprint closely matches the arrangement of machinery shown in a 1910 photograph of this activity area.

With the exception of the Blower Engine foundation, comparison with the 1983 photographs showed that the physical integrity of all of the features identified within the Engine House and Electric Power House had not changed since they were recorded. When the Blower Engine base and flywheel pits were recorded in 1983, the brick and mortar masonry base of the foundation was crumbling and the bolts that anchored the Blower Engine to the masonry base were all bent to the west, most likely during the removal of the Blower Engine. Damage to brick and mortar lining of the west flywheel pit and a saw cut mark near the center of the southwest bolt observed in 2010 indicate that looters, likely seeking scrap metal from around the site, had unsuccessfully attempted to remove all or a section of the southwest bolt. The surface in the southern half of the Engine House and Electric Power House footprint is covered with a dense layer of invasive English ivy that completely obscures the Electric Power House features.

Boiler House

According to historic photographs, the Boiler House was constructed adjoining the north side of the Engine House and contained a bank of three boilers (JCHS 2005b). A small section of a brick and mortar masonry foundation (Feature I) was recorded in 1983, however, this feature was not relocated during the 2010 field survey.

Pipe Fitter's Shop, Machine Shop, and Blacksmith Shop

Historic photographs of the Iron and Steel Plant show a series of small buildings west of the Power House Complex and Iron Casting House that are described as a Pipe Fitter's Shop, Machine Shop and Blacksmith Shop (Unknown 1910:52). Another building, of unknown function, was north of the Casting House prior to 1910. This building is most clearly visible in a 1909 photograph taken during the construction of the open hearth furnaces in the Steel Production Building. Surface reconnaissance conducted in 1983 and in 2010 failed to identify any traces of these structures.

Onsite Charcoal Production Facilities

The remains of seven of the original twenty charcoal kilns were located along the shoreline during the 2010 survey. These features were not described during the 1983 HAER project. When the charcoal production facilities were completed, the kilns appear to have been built in two rows with an estimated 13 set in the east row, and the remaining kilns placed as space allowed on the west side of the first row. Historic photographs of the charcoal production facilities suggest that wood was transported along a piling-supported walkway that ran between the two rows of kilns and was fed into the kilns via hatches near the top (JCHS 2005c). After the load was fired, the finished charcoal was removed through doors located at the base. At least one warehouse appears to have been built on piers along the waterfront to store the finished charcoal. When the above ground portions of the charcoal kilns were demolished to increase the size of the waterfront storage yard, it appears that much of the demolition debris was pushed into the intertidal area and at least seven of the kiln foundations were left in place. Mass wasting along the bluff may be obscuring portions of the west line of charcoal kiln foundations.

Above Ground Fuel Storage Tank

The outer, concrete wall of the 6,000 barrel above ground fuel storage tank installed in 1910 is present at the base of the hillslope along the shoreline. This tank was constructed with steel reinforced concrete and was originally lined with steel. A small hole has been punched in the east side of tank near the base of the concrete wall to prevent rainwater from collecting in the tank. Between 1983 and 2010 an 8 foot section of the concrete wall on the northeast side was removed, presumably to allow access. The inside walls of the concrete tank are now covered with graffiti. This tank was constructed in an area that once housed several charcoal kilns and it is possible that the foundations of these or other charcoal production facilities may be present beneath the above ground storage tank.

Steel Production Building

The Steel Production Building was a sprawling complex that extended at least 300 feet (North to South) by almost 190 feet (East to West). This building was divided into at least seven activity areas in which different steps in the steel making process were performed. The Charging Aisle, located on the south end of the structure was where iron, flux and scrap steel were fed into three open hearth furnaces. The molten steel was removed from the furnaces and shaped into ingots along the Ingot Pouring Aisle. The ingots were reheated in a continuous reheat furnace before being run through a 22-inch Rolling Mill. A 14-inch Rolling mill and 9-inch Rolling Mill were subsequently used to further reduce the size of the steel and the finished steel bars were left to cool on three different cooling beds. All of the features identified in the remains of the Steel Production Building during the 1983 HAER project were relocated during the 2010 survey.

Charging Aisle, Open-Hearth Furnace and Ingot Pouring Aisle

The boundaries of the Charging Aisle, Open-hearth Furnace, and Ingot Pouring Aisle areas are defined by a continuous pour concrete retaining wall that also marks the south end of the Steel Production Building, and the masonry foundations along the north side of the Ingot-Pouring Aisle. Although the superstructure of the Open-Hearth Furnace was removed when the building was demolished, the foundations that supported the furnace facilities are mostly still visible. Beginning at the south side of this area, three large smokestack foundations area present along the south side of a tall concrete retaining wall. Each is marked by a round vertical shaft that terminates approximately fifteen feet below top of the foundation in a clean-out hole accessible through the south wall of the Steel Plant Building foundation. A series of thirteen masonry piers supported the Charging Aisle, and sixteen brick and mortar masonry piers supported the weight of three open hearth furnaces. Only seven of the Charging Aisle piers and eleven of the Open Hearth Furnace foundations remain standing and several of these have been tagged with graffiti. Comparison of the 1983 and 2010 overviews reveals little change in the physical integrity of the concrete, and brick and mortar foundations in this section of the plant. While almost half of the Ingot Pouring Aisle foundation walls remain intact, portions of the footings in the east, central and west sections have collapsed.

Rolling Mills, Shears and Cooling Bed

The masonry foundations that define the extent of the 22-inch Rolling Mill and the Billet Shears are largely intact, however the masonry foundations of the Corliss Engine Base were pushed apart by tree roots in the years since they were recorded in 1983. The prominent concrete-lined mill pit, lifting table pits, and flywheel pit remain open and the walls of these features are stable. Similarly, the concrete and masonry features within the 14- and 9-inch rolling mill complex in the northeast corner of the Steel Production Building area are largely unchanged since they were recorded in 1983. The brick and mortar masonry walls along the edges of the Cooling Bed are intact, however, the eastern sections of this structure are heavily overgrown with maple trees and other vegetation.

Waterfront Features

The Irondale Iron and Steel Plant relied on its waterfront location to move raw materials to the plant and to transport finished products to distant markets. When the Irondale Iron Plant was built in 1881, a simple pier supporting a narrow gauge rail was sufficient to provide for plant operations, however, the waterfront was modified as the plant increased it production capacity and expanded into steel production. For example, the addition of onsite charcoal production required additional square footage along the waterfront; the increasing capacity of the blast furnace required larger stockpiles of raw materials and storage areas for finished products; and the larger ocean-going vessels needed to transport raw materials and finished products required appropriate loading and unloading facilities. These needs were met through bulkhead construction, filling of the tidelands and the construction of storage warehouses and a series of piers and wharves.

Tideland Filling Features

A series of three features related to the development of the Irondale Iron and Steel Plant facilities along the shoreline were identified within the intertidal zone during the 2010 survey. None of these features were described in the 1983 HAER report. Historic photographs taken of the Irondale waterfront the late 1800s and early 1900s illustrate different episodes in the development of this portion of the plant, clarify the sequence of tideland filling and the function of the various features associated with these episodes.

Charcoal Production Facilities Bulkhead (1884-1910)

Between 1884 and 1910 a bulkhead composed of vertical piling and stacked horizontal planks and logs extended along the Irondale waterfront from the south end of the charcoal kilns to the north side of the Irondale Iron Plant wharf. A photograph of the southern portion of the Irondale waterfront in 1901 shows that cobble and boulder size ballast rock was used to further armor the seaward side of the bulkhead. Inspection of the intertidal zone east of the charcoal kiln foundations revealed the remnants of an alignment of vertical wood pilings and horizontal and vertical wood planks that marks the eastern extent of the bulkhead built on the seaward side of the charcoal kilns.

Slag Disposal Area

Slag generated by the Irondale blast furnace was gradually used to fill an area south of the wharf. In preparation for filling this area, a stacked log bulkhead was built directly south of the wharf and both granulated and coarse-grained slag material, as well as other production waste was dumped at this location. The slag disposal area and stacked log bulkhead are visible in the bottom left corner of at 1901 photograph of the west end of the wharf. Cross sections of the uppermost slag deposits exhibit cross-bedding representing discreet episodes of deposition as slag was periodically removed from the blast furnace during its operation. Along the east edge of the granulated slag deposits, NWAA archaeologists mapped horizontal logs and the remains of vertical pilings partially buried in intertidal sediments that are the remains of the log bulkhead that defined the eastern extent of the slag disposal area.

1910 Tideland Fill Area and Associated Features

In March 1910, the Western Steel Corporation proposed to fill a 1300 foot strip of tidelands north of the Irondale wharf and contracted the dredger Tacoma to complete the project. In preparation for the dredging and filling, cribbing built with rows of vertical pilings, milled timber cross members, horizontally stacked timbers, and buried deadman pilings and logs was installed along the east side of the proposed fill area to contain the dredge sediments. (JCHS 2005d, 2005f). During a series of low tides the remnants of between two and five rows of vertical pilings braced with milled timber cross members and backed with horizontally stacked timbers were recorded along an alignment extending over 425 feet (130 meters) north of the remains of the wharf and beyond the northern boundary of the current project area. This feature marks the eastern boundary of the 1910 fill area.

Waterfront Wharves and Warehouses

A single wharf with a short frontage and hopper for loading rail cars was built along the waterfront when the Irondale Iron Plant was built in 1881 (JCHS 2005e). A Weigh House with scales to measure the weight of incoming ore, scrap metal and flux was also situated at the west end of the wharf. During the 1910 expansion of the Irondale waterfront, the wharf was rebuilt and extended to 600 feet with a frontage of 400 feet. Narrow gauge rail lines were extended along the frontage to facilitate the unloading of ocean-going steam ships. After 1910, ore was offloaded from steamships into a series of hoppers set along the face of the wharf and was then measured out into narrow gauge rail cars that hauled the ore to the Stock House. In addition to supporting the plant operations, the Irondale wharf was the landing point for passenger ferries such as the *Chippewa*, and *SS Hyak* (JCHS 2004, 2010). Historic photos show additional narrow piers and covered structures set on pilings over the tidelands perpendicular to the shoreline south of the main wharf. The southernmost structure may have housed the sawmill and log splitting machinery used to prepare wood for the charcoal kilns and the northern structure was a charcoal, and later, coke storage warehouse (Unknown 1910:52). An inclined ramp visible in one of the historic photographs that appears to link the waterfront to the walkways between the row of charcoal kilns may represent a conveyor that was added in 1901 to improve the efficiency of charcoal production. A concrete slab foundation measuring 20 feet long (North/South) by 11 feet wide (East/West) that supported the Weigh House and alignments of pilings that mark the western end of the Irondale wharf were recorded in the intertidal zone north of the slag deposits. Alignments of pilings in the intertidal zone south of the slag deposit appear to mark the location of the charcoal/coke storage warehouse east of the charcoal kilns and later above ground fuel storage tank. Examination of the intertidal zone further south did not reveal evidence of the second covered structure or additional piling supported piers or ramps.

Gridirons

In addition to the waterfront wharves and warehouses, the designers of the Irondale Iron and Steel Plant envisioned two loading/unloading areas for barges along the waterfront and a gridiron for maintaining company owned barges and scows (Unknown 1910:52). The barge loading gridirons were proposed on the north and south sides of the wharf and the maintenance gridiron was situated along the shoreline south of the Charcoal/Coke Storage Warehouse. A photograph of the Irondale waterfront after the construction of the Steel Production Building in 1910 shows at least one of the gridirons for repairing or unloading barges along the south side of the Irondale wharf (JCHS 2005g), and other gridirons may have been built on either side of the coke storage warehouse visible on the left side of the photograph. It is unclear whether the gridiron along the face of the filled waterfront north of the Irondale wharf was ever constructed. The survey revealed little evidence of these gridirons; horizontal beams exposed near the top of the intertidal zone north of the remains of the bulkhead and south of the slag deposits may represent part of the barge repair grid or foundation cribbing for some associated structures built between the bulkhead and the coke storage warehouse.

Vessel Remains

Examination of an air photo taken in 1976 at low tide revealed parallel alignments of wood timbers immediately south of the slag disposal area. Inspection of this portion of the intertidal zone revealed milled and planed timbers with square iron nails and spikes representing the remains of a small section of a flat bottom barge or scow hull.

Subtidal Historic Features and Debris Scatters

In addition to the features identified in the intertidal zone, divers who have visited subtidal portions of the Irondale waterfront report extensive concentrations of pilings and dispersed artifact scatters over 500 feet east of the current shoreline that are likely associated with the main wharf at the Irondale Iron and Steel Plant. Additional piling alignments and debris scatters may also be found further south offshore from the charcoal production facilities.

PROPOSED ACTIONS

The objective of the cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by petroleum hydrocarbons and metals in upland soil and marine sediment at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements. Details of the clean up tasks are described in the *Draft Engineering Design Report Irondale Iron and Steel Plant Irondale, Washington for Washington State Department of Ecology* (June 30, 2011) (GeoEngineers 2011b).

The remediation and restoration work will consist of tasks related to four general categories of activities: Mobilization and Site Preparation, Contaminated Soil and Sediment Excavation, Upland Environmental Capping, and Site Restoration.

Mobilization and Site Preparation

Mobilization and site preparation will consist of transporting construction equipment and materials to the site and constructing temporary controls and facilities necessary to begin construction activities. The primary access is at the east terminus of East Moore Street at an existing public access parking lot. Other access may be developed from Hadlock Avenue from the west if required for delivery of materials to the upland capping areas. Where necessary access points will be stabilized using quarry spalls or other suitable materials to minimize sediment tracking. Other related activities include designation of a construction staging area and materials management areas. Site preparation will include clearing and grubbing vegetated/forested areas in preparation for capping, debris removal, and demolition of an existing above ground concrete tank.

Contaminated Soil and Sediment Excavation

Contaminated soil and sediment will be excavated in three general areas of the Site: upland soil above the ordinary high water mark (OHW) south of the 6,000 barrel above ground concrete tank; upland soil north of the concrete tank; and marine sediment below OHW. Overburden soil will be excavated as needed to gain access to underlying contaminated soil. The excavations will be completed in a manner that allows segregation and reuse of clean overburden soil. The preliminary limits of excavation will be determined by the results of field screening. Once the preliminary limits are reached, verification soil samples will be collected for laboratory analysis from the excavation sidewalls and base. Additional excavation and sampling will be performed until complete removal of contamination has been achieved. Once excavation is completed, the area will be backfilled and compacted to create a finished surface.

Upland Environmental Capping

Upland capping will cover the power house complex and former steel production building areas (Figure 7). Vegetation will be cleared from these areas with larger trees allowed to remain in place if determined to be healthy and not impacted by site contaminants. Approximately 6 to 12 inches of sand would be placed on the cleared ground surface as a leveling layer and separated from the 2-foot thick cap by a geotextile fabric. A final 1-foot layer of topsoil would be placed as a planting substrate.

Shoreline Remediation and Restoration

Following completion of remedial excavation of the bank in the southern portion of the project, the shoreline and the adjacent uplands will be re-graded to create a more gradual and consistent intertidal slope and a net increase of beach along the shoreline. Grading will reach a maximum depth of 3-4 feet, with the greatest amount of fill being removed at the current OHW, extending the intertidal zone landward between 20-50 feet. The new OHW area will be surfaced with reclaimed sandy fill from shoreline grading, and then armored with large woody debris to protect the beach and decrease inland erosion. Areas disturbed by remedial excavation, capping, or regrading for shoreline restoration will be planted to restore of improve vegetation and wildlife habitat. Invasive species will be removed from the shoreline and native tree and shrub species will be installed south of the above-ground storage tank location. A small drainage near the northern end of the property will be restored by removing invasive species and planting with native shrub and tree species. Utilities affected by construction, grading, and planting will be restored.

PROJECT EFFECTS

Under the National Historic Preservation Act, the criteria of adverse effect are applied to determine if adverse effects to historic properties are likely to occur. The Criteria of Adverse Effect consist of 1) an adverse effect is found where an undertaking may alter the characteristics of a historic property that qualify it for inclusion on the National Register; or 2) diminish the integrity of the property's location, design, setting, material, workmanship, feeling, or association. An adverse effect can arise from natural forces, poor land management practices, or from visitor impact, looting, or vandalism in areas of public use. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative (36 CFR Sec. 800.5(1)(1).

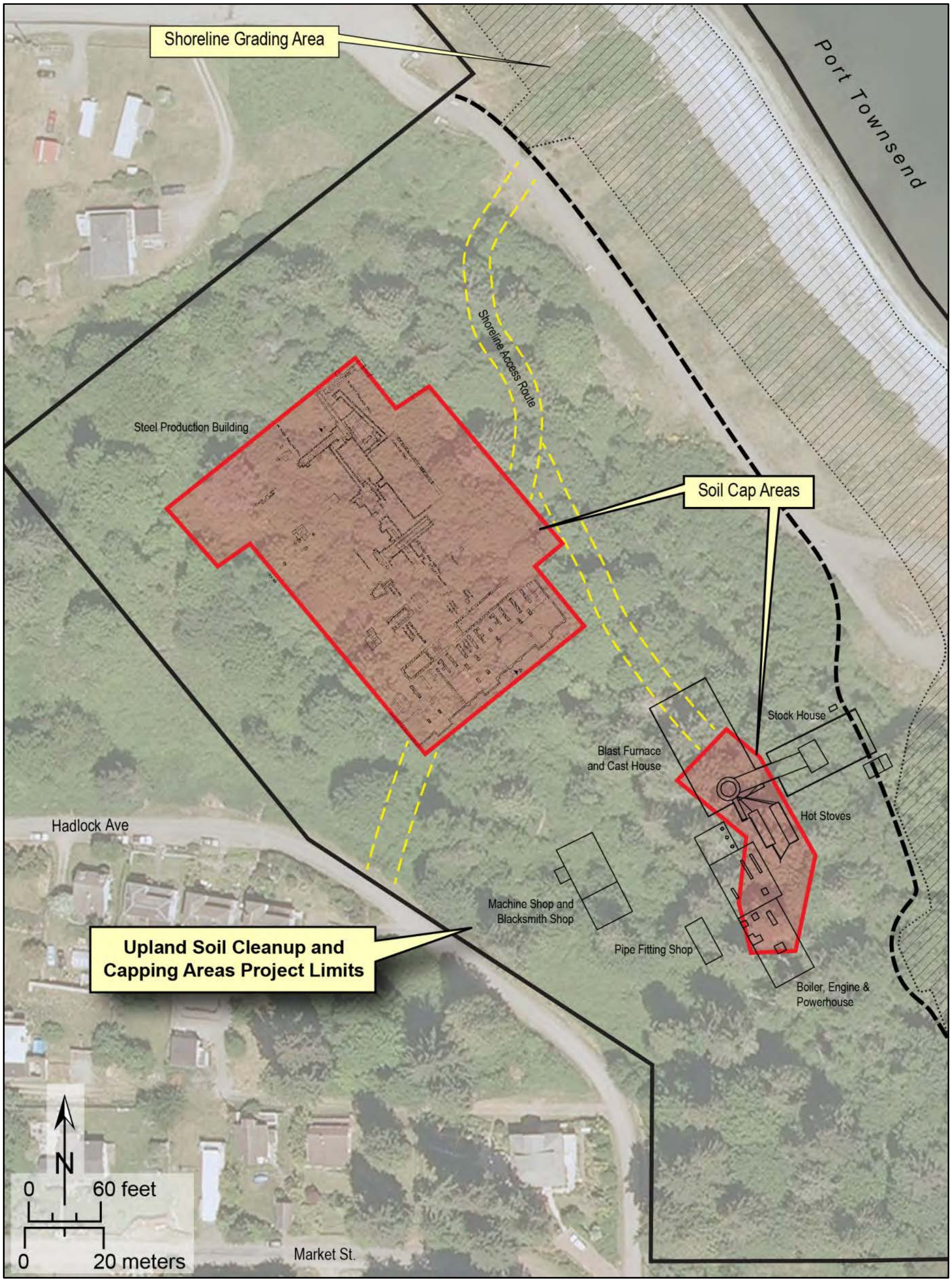

Figure 7. Upland soil cleanup and capping areas.

Ground disturbance related to excavation of contaminated sediments and slag removal, and shoreline grading, would adversely affect the Irondale Historic District (DT 128) and the Irondale Iron and Steel Plant site (45JE358) by removing, damaging, or obscuring features that contribute to National Register eligibility of the historic district. Construction would have positive benefits as well by reducing or ending shoreline erosion and providing an opportunity to identify additional features that are either obscured by vegetation or buried, e.g., the Machine, Blacksmith, and Pipe Fitting shops in the upland, additional kilns south of the above ground tank, or the pads for the Scrap Shears and Skull Cracker in the intertidal zone (Figure 6).

Excavation of slag and contaminated sediments and subsequent restoration would have the greatest potential to adversely affect historic district components. The above ground tank would be removed and excavation of adjacent sediment and slag may damage evidence of additional kilns or encounter evidence of additional activities in contaminated deposits. Remains of the existing kilns in this area, Features 5-8, would be disturbed (Figures 8 and 9).

Backfilling and environmental capping would damage the integrity of the historic district by removing features of the steel production complex and powerhouse building from view, reducing or eliminating the visual identification of their internal structures and spatial relationships. In the shoreline area, placement or excavation of fill would expose or obscure historic features, such as remains of bulwark structures and wharf pilings. Grading to compact the final surface would pose a threat to resources along the slope between the uplands and the intertidal area and along the shoreline potentially intersecting additional elements of known features and possibly damaging undocumented features or artifacts. Grubbing and clearing and preparation of haul routes have the potential to damage the architectural characteristics and materials of the known foundations.

No adverse effects to pre-contact resources are anticipated from the project due to the depth of fill in the shoreline work area and low potential for human occupation throughout the Holocene. The original shoreline in the project area was a narrow strip of beach below a steep bluff, much of which was sub-tidal and the rest intertidal (Figure 4). The narrow beach would not have been a favorable location for human occupation. In general, Puget Sound experienced sea-level rise during the Holocene and inundation was further intensified by tectonic subsidence along fault lines. The project area is less than 1 mile west of the South Whidbey Island Fault Zone and experienced such subsidence (Schasse and Slaughter 2005).

During the early 1900s, fill was placed on the beach below the bluff to extend the shoreline outward to provide additional staging and storage room for iron and steel plant operations. According to historic accounts, a cribbing structure was built along the base of the bluff, and fill was placed along the shoreline all the way to Chimacum Creek (Smith 2011b:22) (Figure 10) resulting in formation of an artificial bench beyond the original tidal zone (Figure 3). This artificial surface extends north into the “fill recruitment bench” on Washington Department of Fish and Wildlife (WDFW) lands, the area of archaeological testing in 2005 prior to beach restoration that has since been completed (Willis 2005) (Figure 5; Figures 11, 12, 13).

Geotechnical testing carried out for the Irondale cleanup project shows that the average depth of the fill in the bench area is seven feet (Morton et al. 2009). Removal of fill by grading will take place north of the sediment remediation and slag removal areas (Figure 2). Shoreline grading will remove some fill material and blend the Irondale beach into the completed WDFW project to join the restoration project areas and even out the shoreline slope. It is not expected to expose native sediments, nor encounter pre-contact cultural deposits.

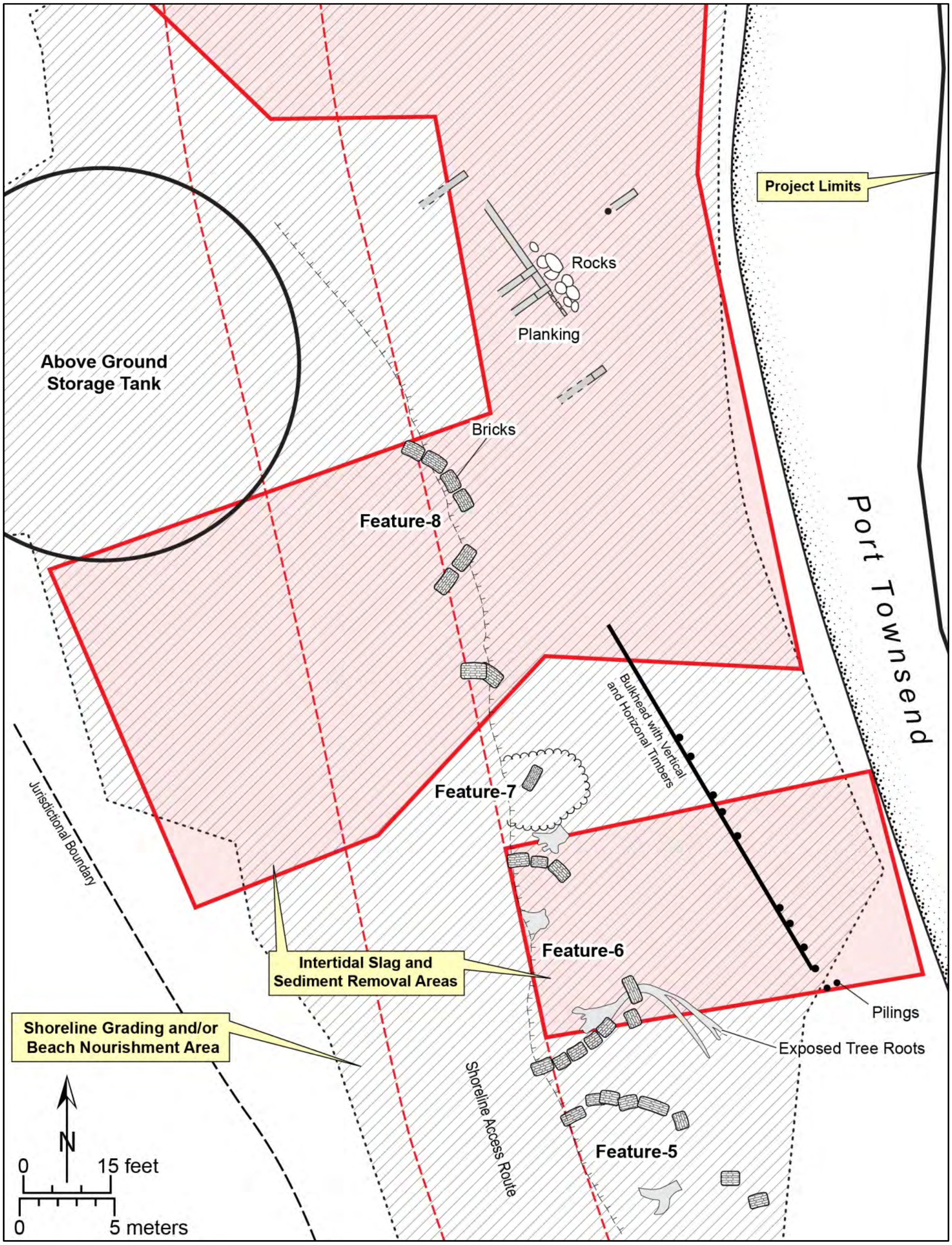

Figure 8. Charcoal kilns in area of contaminated soil and slag removal.

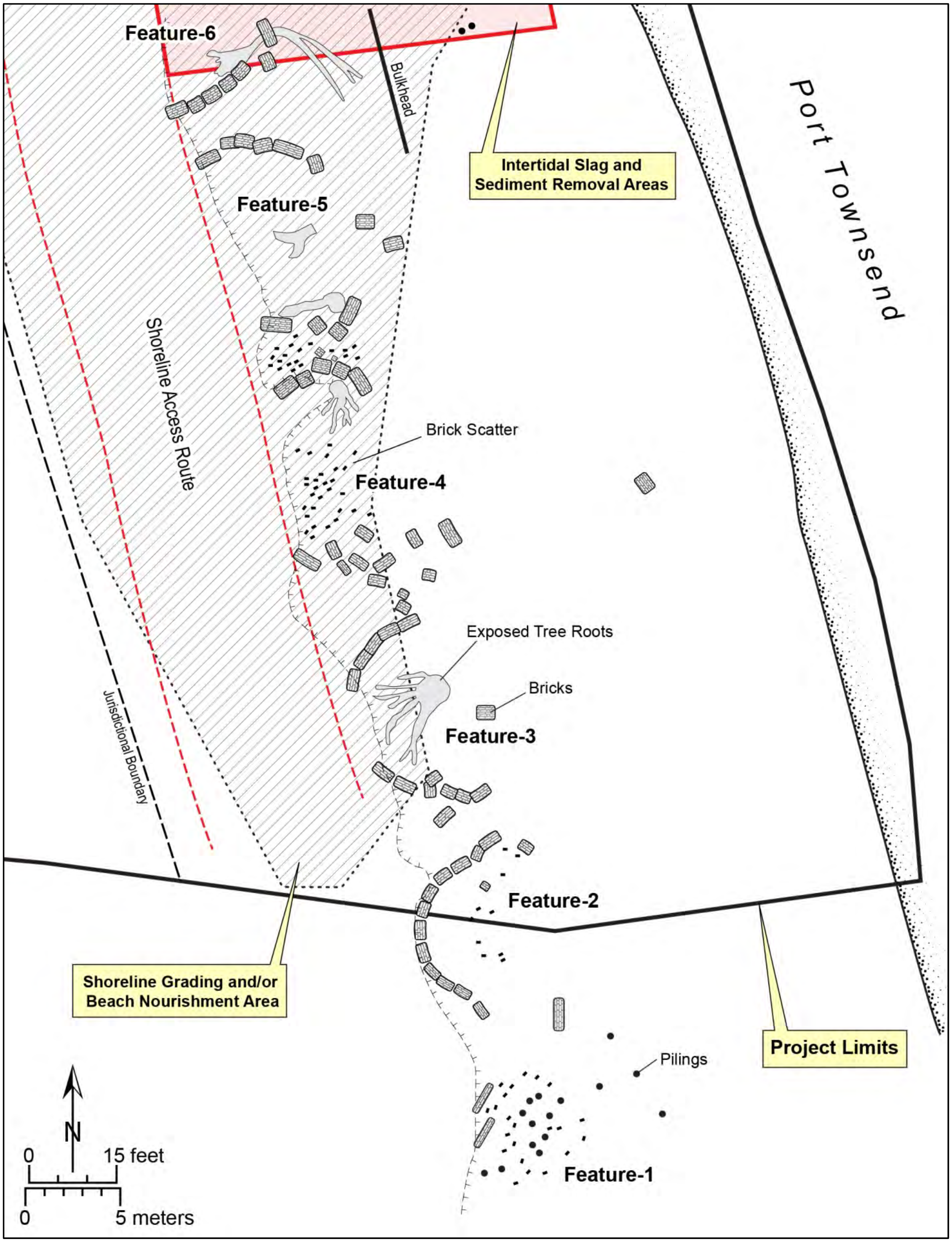

Figure 9. Charcoal kiln in area of contaminated soil and slag removal.

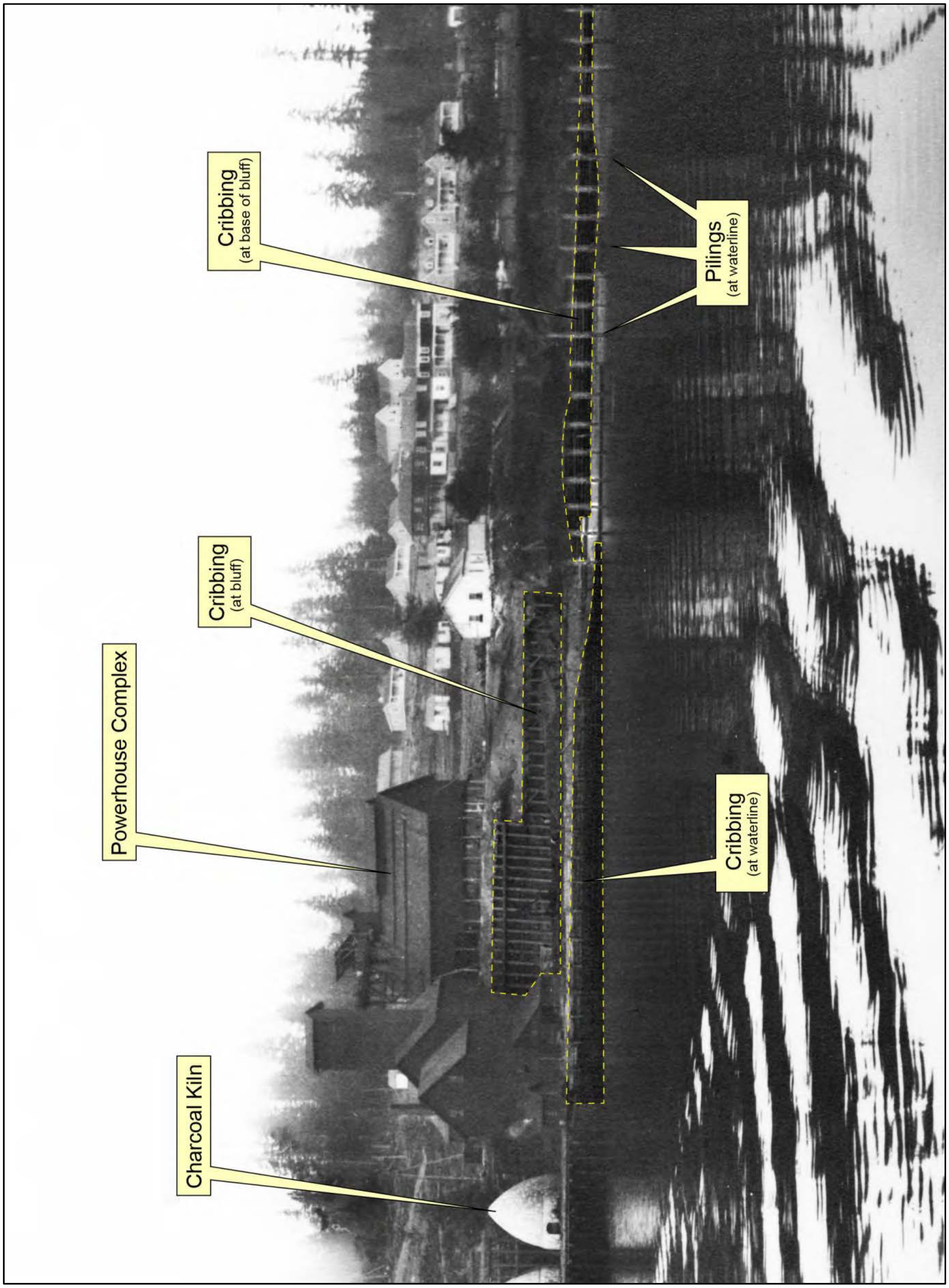

Figure 10. Cribbing under construction during filling process. (A. Curtis 433).

Figure 11. WDFW restoration project north of Irondale, in 2001 before restoration work, and in 2006 after restoration work.

Figure 12. WDFW restoration project north of Irondale, in 2001 before restoration work, and in 2006 after restoration work.

Figure 13. WDFW restoration project north of Irondale, in 2001 before restoration work, and in 2006 after restoration work.

RECOMMENDATIONS

As currently designed, effects from project construction are unavoidable, although some actions can be performed in a way that minimizes them. For others, onsite documentation before and during construction is recommended. And finally a program of mitigation is recommended for those adverse effects that cannot be avoided.

Pre-construction Documentation

Prior to any construction within the shoreline area, NWAA recommends completion of documentation of features identified in 2010. This includes recording the remains of a sunken vessel in the intertidal area as well) total station documentation of the bulkhead, warehouse piers/foundation.

NWAA recommends that prior to any work in the intertidal sediment and slag removal area, archaeologists thoroughly document the remains of charcoal kilns Features 5 through 8 (Figure 8 and 9) in the sediment and slag removal area, and then remove the northern portion of Feature 5 and all of Features 6-8, with the goal of replacing them on the new surface once work is completed.

Monitoring During Construction

To avoid or minimize damage to known or unrecorded features, a qualified archaeologist should monitor vegetation grubbing; excavation of contaminated soil and sediment and removal of slag deposits; removal of the above-ground concrete storage tank; and infilling and capping to minimize adverse impacts to project features. The archaeologist should also monitor grading that will be used to form the final slope and project surface between the upland and shoreline areas to assure avoiding damage to known and undiscovered features such as walls, foundations, bulwark sections, and pilings. The monitor will record and evaluate any features or artifacts exposed during project construction.

Damage from grubbing and clearing of vegetation can be minimized by confining access to existing routes and generally avoiding use of machinery in areas where district features are visible either in the form of standing remains or outlines and depressions that may contain subsurface resources. Within historic features, particularly within building remains, removal of vegetation should proceed with small machinery or by hand in order to avoid damaging foundation walls and other internal structures. Roots should be cut, not pulled, as they may be intertwined or imbedded in foundations and other structures. At all times, equipment should be used with caution around the historic district features, with outside direction used when backing up in close proximity to structures that could be damaged. Once grubbing and clearing of vegetation has been completed and prior to commencing the next construction activities, a qualified archaeologist should examine the exposed area to document and evaluate any newly exposed resources as well as any debris encountered during site preparation.

Once work has been completed in the intertidal sediment and slag removal area, archaeologists should replace remains of the charcoal kilns (Features 5-8) that were removed prior to construction on the surface to preserve their locations and alignment. Removal of the above ground concrete storage tank should also be monitored as remains of additional kilns or other resources may be in the area and will need to be documented.

NWAA recommends that the archaeologist also monitor backfilling and capping to minimize burial of features. The project should consider methods of capping and filling that retain the outlines of features such as tops of foundations, internal divisions and structures, visible walls and timbers, and remaining depressions and surface markers that would help to convey a sense of the form and function of the features and their relationships.

All archaeological monitoring for the Irondale cleanup work should be carried out by a professional archaeologist under the auspices of the Archaeological Monitoring and Discovery Plan (Appendix A). The plan will provide guidance for project personnel by defining communication roles, monitoring protocols, and protocols to be followed in the inadvertent discovery of archaeological or human remains.

Mitigation for Continuing and Long-term Effects to the Historic District

In addition to the above measures, NWAA recommends a mitigation program that includes ongoing adverse effects to the district that were observed during the 2010 conditions investigation (Smith 2011b). The conditions assessment report described other ongoing effects that will have long-term implications for the integrity of the historic district (Smith 2010)(Table 1). These include

- Vandalism
- Looting/scavenging (bricks or scrap metal)
- Effects of weathering
- Vegetation (penetration by roots)
- Mass wasting of hillside
- Coastal erosion

In order to protect the historic district from potential long-term or cumulative adverse effects, NWAA recommends the development of an HPMP by Jefferson County in consultation with DOE, the Corps, the Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, and the Suquamish Tribe, and other interested parties. The plan should include programmatic measures that address actions related to the future development of the park as well as the management needs related to continuing and long-term adverse effects identified in conditions assessment, including vandalism, looting/scavenging (brick and scrap metal), vegetation (root penetration), mass wasting, and coastal erosion. It should also include a protocol for inadvertent discovery to guide project personnel of actions to be taken in the event that cultural resources are identified during the course of any future activities within the historic district.

Additional recommended mitigation measures include a project to search and catalog Irondale-related documents and photographs at the Jefferson County Historical Society Archives. Jefferson County might also solicit other archival materials from the public. These records and photos should be digitized for use in public history projects and should be addressed in HPMP .

Public history projects might take the form of onsite interpretation, an Irondale website, a brochure or book about the historic town and plant, and public lectures. Interpretation should include information of the historic of the town of Irondale, the Irondale Iron and Steel Plant, and should include a component related to Native American presence in the area.

Details of the interpretive program should be considered as part of development of the park and as part of a public outreach program related to preservation of the historic district in consultation with DAHP, the representative Jefferson County Historical Museum, affected tribes, and other interested parties, as well as the public.

To complete identification of other elements of the historic district, NWAA recommends that data recovery be completed, including survey of the underwater portion of the project identified in 2010. The Ironwood Jail and remaining houses should be documented to complete the HABS record. Archaeological investigation of areas within and near the historic plant and former townsite, as well as historic building recording and evaluation within the existing town of Irondale, would provide more interpretive context for the historic district and enhance understanding of its relationship to development of the town of Irondale.

CONCLUSION

Some elements of the environmental cleanup and restoration project would have adverse effects to the Irondale Iron and Steel Plant Historic District through damage or destruction to its components. To minimize and mitigate for these effects, NWAA recommends pre-construction documentation, monitoring and documentation during construction, and a mitigation program for ongoing adverse effects to the historic district. Pre-construction mitigation would complete documentation of the historic district, including those components identified in 2010 field survey Smith 2011b). Long-term mitigation recommendations include those proposed for ongoing effects that were observed during the 2010 conditions monitoring investigation.

NWAA recommends monitoring during construction for all ground disturbing activities, including grubbing and clearing, excavation, capping, and grading. Any newly discovered resources will be documented. The project engineering design plan calls for debris encountered during site preparation work to be set aside for observation and documentation by a qualified archaeologist. All construction monitoring should be done by a professional archaeologist under the auspices of the project Monitoring and Discovery Plan to be finalized in consultation between the Corps, DOE, DAHP and the Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, the Lower Elwha Tribe, the Skokomish Tribe, and the Suquamish Tribe.

The DOE and ACE should continue to inform the Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, and the Suquamish Tribe on the project and to coordinate with Jefferson County

The ACE has jurisdiction over the shoreline portion of the project. To complete the federal process, the Corps will need to conclude a Memorandum of Agreement (MOA) with DAHP ensuring the state concurs with the determination of adverse effects and measures recommended to resolve them.

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APPENDIX A: MONITORING AND DISCOVERY PLAN

CULTURAL RESOURCES MONITORING AND DISCOVERY PLAN FOR THE IRONDALE IRON AND STEEL PLAN HISTORIC DISTRICT REMEDIATION AND RESTORATION PROJECT, JEFFERSON COUNTY, WASHINGTON

Report Prepared for

Washington Department of Ecology
&
U.S. Army Corps of Engineers, Seattle District

By

Northwest Archaeological Associates / SWCA

March 21, 2012

CONTAINS CONFIDENTIAL INFORMATION – NOT FOR GENERAL DISTRIBUTION

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INTRODUCTION

Jefferson County Public Works plans to develop a county park in the future at the site of the Irondale Iron and Steel Plant site (45JE358), the major component of the Irondale Historic District (DT128), which is listed on the National Register of Historic Places and operated from 1881 until 1919 (Figure 1; Figure 2). (Smith 2011a; Stalheim 1983a). An incomplete cleanup of the iron and steel plant in 1919 left waste material and debris from the steel making process on site, contaminating localized areas that have been identified by Washington State Department of Ecology (DOE) through a series of investigations (GeoEngineers 2009 a, 2009b, 2011).

To assist Jefferson County Public Works in cleanup of the site, DOE is planning to carry out environmental remediation in the Iron and Steel Plant area. In addition to DOE cleanup efforts, restoration work will be carried out along the shoreline forming the western boundary of the project in order to enhance fish habitat and restore other environmental values. The objective of DOE's cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by petroleum hydrocarbons and metals in upland soil and marine sediment at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements (GeoEngineers 2011b). The remediation and restorations efforts must be completed prior to development of the park.

Northwest Archaeological Associates, Inc. (NWAA) previously conducted a conditions assessment of the remnants of the Irondale Iron and Steel Plant facilities to assist the DOE in the permitting process that was required to allow additional contaminant testing (Smith 2011) and to conduct a cultural resources assessment of the proposed DOE project (Piper 2011).

The purpose of this Monitoring and Discovery Plan is to provide a coordinated program among federal, state, tribal and city governments to avoid adverse effects to cultural resources resulting from the implementation of the DOE remediation and restoration. Northwest Archaeological Associates/SWCA Environmental Associates (NWAA) was retained to develop this plan to monitor construction activities carried out for the DOE cleanup project.

Project Location and Description

The Irondale Iron and Steel Plant (45JE358) is located on an 11 acre parcel in Section 35 of Township 30 North, Range 1 West and Section 2 of Township 29 North, Range 1 West, Willamette Meridian, in Southeast Jefferson County within the boundaries of Irondale townsite (Figure 1). The Irondale Iron and Steel Plant was partially encompassed within the boundaries of the Irondale Historic District. The historic district was found eligible for the National Register of Historic Places (NRHP) in 1983 because of its association with the development of the iron and steel production industry on the west coast of North America in the late 1800s and early 1900s (NRHP 2010). It is also listed on the Washington State heritage register and the Nairtonal Park Service Historic Engineering Record (Britton and Britton 1983).

The property was acquired by Jefferson County in 2002 for use as a county park (Madrona Planning 2004). Following this acquisition, the DOE and SAIC contracted GeoEngineers to conduct remedial investigation of metal and hydrocarbon contamination on the property (GeoEngineers 2009 a, 2009b, 2011, Morton et al. 2009). Concentrations of contaminants were identified in sediment samples at several locations, including within the footprint of the former Steel Production Building and the Power House Complex in the uplands area of the project, and around an above ground fuel storage tank (AST) located near the shoreline.

Before the property can be developed as a county park, the property will require remediation of contaminants identified in the soil, surface water and underlying sediments associated with particular components of the iron and steel plant activity areas. Several remediation options were considered, resulting in selection of the current remediation plan.

Regulatory Setting

The cleanup area is partially encompassed within the boundaries of the Irondale National Historic District, listed on the National Register of Historic Places in 1983 because of the significance of the iron and steel plant to development of the iron and steel industry on the west coast in the 1800s and early 1900s (NRHP 2010).

The shoreline portion of the project will be carried out under a Corps of Engineers Joint Aquatic Resources Permit (JARPA). Because of the federal permit, the project will be subject to the National Historic Preservation Act (NHPA), 1966, as amended. Section 106 of the National Historic Preservation Act (NHPA) requires agencies to identify and assess the effects of federally permitted or approved undertakings on historic resources, archaeological sites, and traditional cultural properties (TCPs), and to consult with others to find acceptable ways to avoid or mitigate adverse effects. Resources protected under Section 106 are those listed, or eligible for listing, in the National Register of Historic Places (NRHP). Eligible properties must be at least 50 years old, possess integrity of physical characteristics, and meet at least one of four criteria of significance. Historic properties may include archaeological sites, buildings, structures, districts, traditional cultural properties, or objects.

For the purposes of this report, terminology of the Section 106 of the NHPA will be used for consistency, although the non-Corps (uplands) portion of the project is not subject to the federal jurisdiction. The term “adverse effect” used for the Corps portion of the project will also be used to refer to impacts from project actions in the uplands portion.

Archaeological Background and Potential for Discovery

The project is within the Irondale Iron and Steel Plant Historic District, where components, activity areas and associated features related to steel production in the late 1800 to early 1900s have been identified (Smith 2011a). Historic documents and descriptions of the plant, along with HAER documentation completed in 1983, show that other remains may be present within project fill in the intertidal zone or obscured by vegetation in adjacent uplands. In addition, later structures may obscure the remains or earlier plant features. Remains of known resources as well as other historic remains and artifacts could be exposed by ground disturbing activities during the remediation and restoration project.

Due to the presence of contaminated soils, archaeological testing was not conducted in the remediation area and the use of construction monitoring was therefore recommended to avoid or minimize adverse effects associated with the potential exposure or damage to elements of the historic district during project construction. Mapping of known features and activity areas of the former iron and steel plant provides an overview of where remains might be expected, including areas in the around the charcoal kilns and the former bulkhead and pier (Figure 3) (Britton and Britton 1983; Smith 2011a, b; Piper 2011).

Due to the disturbance that occurred in the project area during construction and operation of the iron and steel plant, which included placement of deep layers of fill over the original narrow intertidal beach, the potential for encountering pre-contact resources is considered extremely low.

Identification of Cultural Resources

As a general policy, and as far as practically feasible, all cultural resources, pre-contact and historical, and buried human remains, will be avoided and actively protected in place with the exception of those elements scheduled for removal. Collection of artifacts by employees, construction personnel, or others with access to the construction zone is prohibited. Typical markers of pre-contact activity include discarded shell, fire-modified rock, animal bone, lithic debitage, flaked or ground stone and bone tools, cordage, fibers, burned earth, charcoal, ash, and exotic rocks and minerals.

Markers of historical period activity (prior to the 1960s) may include milled lumber, masonry features, concrete, glass, ceramic, brick, metal fragments or other evidence of early historic occupation and industry. In those instances where modification of the project to accommodate avoidance of an archaeological resource is not possible, the resource in question will be treated in the manner described below.

Briefing

Prior to construction, the *Monitoring Coordinator* will brief the *Construction Supervisor* and construction crew members on cultural resource issues. The briefing will include information on the legal context of cultural resources protection and on the pre-contact, ethnographic, and historic cultural resources likely to be present in the construction area. The primary goals of this briefing are to familiarize construction personnel with the procedures to be followed in the event there is discovery of cultural material (see below), and to provide contact protocols and information to construction supervisors

Personnel Qualifications and Chain of Communications

This monitoring plan establishes policies, describes the pre-construction briefing, states responsibilities and chain of command, and provides procedures to ensure that any cultural resources or human remains encountered during construction are properly identified and appropriately treated. Contact information for the personnel referenced in the following sections is provided at the back of this plan.

The *Monitor* will communicate with the onsite *Construction Supervisor* to make general requests about equipment movement. The *Monitor* will also need to communicate with excavation equipment operators to stop excavation or modify excavation, but will notify the *Construction Supervisor* prior to communicating excavation procedures directly to the equipment operator.

The DOE *Project Coordinator (Project Coordinator)* will insure that the provisions of this document are carried out, and the *Supervising Professional Archaeologist* will report to the *Project Coordinator*. The *Supervising Professional Archaeologist's* designated *Monitoring Coordinator* will schedule the monitoring activities. (A minimum of 48 hours notification of the need for a monitor is required if monitoring becomes intermittent as construction progresses.) The archaeological monitor will be present whenever ground-disturbing construction activities occur within sensitive areas.

The *Monitor* will have the authority to temporarily halt construction while examining possible discoveries, and will also be responsible for notifying the DOE *Project Coordinator* and *Construction Superintendent* immediately of any discoveries, as well as for notifying the Construction Supervisor when activity can be resumed. The DOE *Project Coordinator* is then responsible for notifying the appropriate officials including the US Army Corps of Engineers, Department of Archaeology and Historic Preservation (DAHP), and if necessary, the and the

Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, and the Suquamish Tribe, and the Jefferson County Coroner. The *Monitor* will be responsible for maintaining daily work records and documentation of any discoveries.

UNMONITORED DISCOVERY

If for any reason an archaeologist is not on site during construction of the DOE Remediation and Restoration project and suspected archaeological deposits, human remains, or isolated artifacts are discovered, it will be the responsibility of the applicable *Construction Supervisor* to alert the *on-site DOE Representative* or the DOE *Project Coordinator* of any potential cultural resource discovery. The DOE *Project Coordinator* will proceed with the steps outlined in the section above.

Collection of any archaeological materials by employees, construction personnel or others with access to the project is prohibited by federal law

MONITORED DISCOVERY

An archaeologist will monitor construction excavation during the following activities in the sensitive areas as identified in the cultural resources assessment (Piper 2011) where historic elements of the project may be exposed. The purpose of observation is to identify archaeological resources and to assess the significance of resources in a rapid, cost-effective manner.

General

The *Monitor* will ensure that all construction equipment is used with caution at all time around the historic district features and that access is confined to existing routes.

Vegetation Clearing

Prior to construction, the *Monitor* will observe vegetation grubbing and removal to insure that the use of machinery is avoided in areas where district features are visible either in the form of standing remains or outlines and depressions that may contain subsurface resources. The Monitor will specifically ensure that caution is used in and adjacent to building remains, with removal of vegetation proceeding with small machinery or by hand in order to avoid damaging foundation walls and other internal structures; and that roots are cut, not pulled, as they may be intertwined or imbedded in foundations and other structures.

Once grubbing and clearing of vegetation has been completed and prior to commencing the next construction activities, a qualified archaeologist will examine the exposed area to document and evaluate any newly exposed resources as well as any debris encountered during site preparation.

Capping and Backfilling of Features

The Monitor will be present during capping and backfilling to ensure that whenever possible construction personnel are using methods of capping and filling that retain the outlines of features such as tops of foundations, internal divisions and structures, visible walls and timbers, and remaining depressions and surface markers that would help to convey a sense of the form and function of the features and their relationships.

Excavation of contaminated sediments and removal of slag deposits

The archaeologist will monitor excavation of contaminated sediments and removal of slag deposits in the intertidal area to avoid damage to fragile remains such as bulkhead timbers and pilings. This includes removal of sediments in area of charcoal kilns. Remains are to be preserved in-situ by backfilling and replacing them where possible.

NWAA has recommended archaeologist fully document kiln features in this area (the northern portion of Feature 5 and all of Features 6-8) prior to the construction activity. The location of kiln features will be recorded with GPS and drawings; kiln elements will be numbered and marked on a corresponding key map, and removed for storage in protected location until completion of this portion of the project, at which time an archaeologist will supervise their replacement with use of the recorded information. Note that remains may be fragile, and at a minimum outlines or representations can be placed on the surface to mark their locations in order to preserve location and spatial information for interpretive potential in the future. If subsurface portions of the kilns are exposed during sediment and slag removal, the archaeologist will record them to the degree possible given the contaminated nature of the deposits.

Removal of Above-Ground Concrete Storage Tank

The archaeologist will monitor removal of above-ground concrete storage tank in the area of the kilns to avoid damage to subsurface remains of kilns no longer represented by surface remains that may be present beside and beneath the tank. If remains are discovered, they will be documented prior to commencing work and where possible, representations can be placed on the surface to mark their locations in order to preserve location and spatial information.

Shoreline Filling and Grading

The archaeologist will monitor shoreline filling and grading to avoid damage to intertidal resources by heavy machinery and obscuring of features by infilling. Wherever possible, as guided by the Monitor, full burial of these features will be avoided, leaving some portion or outline to convey their relation to the historic area. Any newly exposed features will be recorded prior to re-commending work.

The Monitor will:

- Examine cleared and graded surfaces exposed by grading or in auger spoils to identify any previously undocumented pre-contact or historical period archaeological materials. The *Monitor* will observe construction equipment work from multiple perspectives around and in front of working equipment, requiring close communication with construction supervisors and equipment operator.
- Examine excavation spoils, if the material is placed on the ground prior to removal. Note that such examination will be limited due to the contaminated nature of the project area.
- Identify buffer areas around archaeological sites or project features that must be avoided until evaluation is completed (Attachment 1).

Discovery Procedures

The *Archaeological Monitor* will ensure that every reasonable effort is made to protect and record archaeological resources affected by the project. The Monitor will be positioned to have a clear view of surfaces exposed by excavation and spoils piles while adhering to the project safety protocols.

Cultural Resources

There is some potential for historical archaeological materials to be those encountered within fill. These materials will be documented and may be collected at the discretion of the archaeologist, as they may be important for the study of Irondale history. There is little expectation for finding pre-contact materials, with the possible exception of lithic isolates that have been incorporated in the fill. It is expected that project activity will be confined to filled surfaces; however, in the event that the project encounters native surface at any time during the project, it will be inspected for archaeological materials. If pre-contact artifacts or midden is encountered within this context, the archaeologist will follow the procedures outlined in step 1 below for finding of significant or potentially significant archaeological resources.

The Monitor will document the discovery of pre-contact and historical archaeological materials during construction activities within the project area. Documentation will include stratigraphic profiles, photographs, sketches and measurements, as appropriate.

In instances where archaeological resources are encountered during the project, but additional project effects to the resource are not anticipated, the project may continue elsewhere while cultural resource documentation and assessment proceed.

When necessary, the Monitor will ask the *Construction Supervisor* to request equipment operators to modify construction excavation procedures to provide exposures of subsurface stratigraphy in order to confirm the presence of resources in an area. Work will be stopped in an area sufficient to assess resources discovered. No screening of materials will be conducted due to the presence of contaminated soils. To the degree possible, depending on project requirements for sediment removal in a given area, any newly exposed elements of the historic district will be buried in place.

1. If intact archaeological resources are identified during construction, the *Monitor* will inform the *Construction Supervisor.* The *Construction Supervisor* will halt activity in the area of discovery large enough to ensure the integrity of the find is not compromised. The *Construction Supervisor* will contact the DO*E Project Coordinator*.
2. DOE *Project Coordinator* will contact the USACE, DAHP, and the affected tribes within one (1) working day.
3. DOE shall arrange for the parties, including the *Supervising Professional Archaeologist,* to conduct a joint viewing of the discovery within forty-eight (48) hours of the notification, or, if that is not feasible, at the earliest time thereafter.
4. The USACE shall consult with DOE, DAHP, and affected tribes on treatment of the discovery. Resumption of work in the area of the discovery will be consistent with the results of the consultation.

Human Remains

In accordance with RCW. 27.44, RCW 68.60, and RCW 68.50, if any construction activity exposes anything that appears to be human remains, either burials or isolated teeth or bones, or other mortuary items, construction in the vicinity of the find will halt and the following protocol shall be used:

1. All persons shall immediately halt ground-disturbing activities around the discovery and it shall be secured with a perimeter of not less than thirty (30) feet (Area of Discovery).
2. The *Supervising Professional Archaeologist* will immediately notify the *DOE Project Coordinator*.
3. Upon receiving notice, the DO*E Project Coordinator* shall immediately notify the appropriate County Coroner, who will take jurisdiction over the human skeletal remains and make a determination whether those remains are forensic (RCW 27.44; 68:50; 68:60). Contemporaneous with notifying local law enforcement and the Coroner, the DO*E Project Coordinator* shall also notify the USACE, Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, and the Suquamish Tribe, and DAHP of the discovery.
4. If the Coroner determines the remains are non-forensic, the DAHP will take jurisdiction over the remains. (RCW 27.44; 68:50; 68:60). The State Physical Anthropologist will make a determination if the remains are Indian or non-Indian and report that finding to the affected parties (RCW 27.44; 68:50; 68:60).
5. The DAHP will handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.
6. The USACE as the federal agency will handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.
7. The Monitor will prepare a final report that describes the discovery, notification of concerned parties, steps taken in response to the discovery, and the final disposition of the remains.

CONFIDENTIALITY

All parties recognize that archaeological properties are of a sensitive nature, and sites where cultural resources are discovered can become targets of vandalism and illegal removal activities.

All parties shall keep and maintain as confidential all information regarding any discovered cultural resources, particularly the location of known or suspected archaeological property, and exempt all such information from public disclosure consistent with RCW 42.56.300 and the NHPA. All information indicating the location of known suspected archaeological properties from this Project shall be turned over to DAHP. While any party is in possession of this confidential information, such party shall limit access to these records to authorized persons with a need to know the information.

All parties shall ensure that its personnel, contractors, and permittees keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential, including but not limited to, refraining such persons from contacting the media or any third party or otherwise sharing information regarding the discovery with any member of the public. All parties shall require its personnel, contractors, and permittees to immediately notify DOE of any inquiry from the media or public.

REPORTING

The archaeological firm monitoring the project will prepare a letter report documenting the results of the archaeological monitoring within 60 days of the conclusion of monitoring activities. The report will include the following elements, and will be provided to the USACE:

- Inventory of cultural resources results, if any;
- Analysis of cultural resources, including a discussion of the integrity of the resources and determination of whether a resource is eligible for inclusion on the National Register of Historic Places or the Washington Heritage Register

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2011c *Monitoring Report for Contaminant Sampling at the Irondale Iron and Steel Plant (45JE358), Irondale Historic District (DT128), Jefferson County, Washington.* Prepared for the Washington State Department of Archaeology and Historic Preservation, Olympia, WA.

CONTACTS

Washington Department of Ecology:
Steve Teel, Project Coordinator .... (360) 407-6247

Jefferson County Coroner:
Juelie Dalzell, Coroner .... (360) 385-9180

Jefferson County Sheriff
Tony Hernandez .... (360) 385-3831

Non-Emergency 24 hour .... (360) 428-3211

Construction Contractor:
xxx, Project Manager .... TBD

Construction Supervisor TBD

US Army Corps of Engineers, Seattle District:
Lance Lundquist, Archaeologist .... (206) 764-6909

Jamestown S'Klallam Tribe:
Kathleen Duncan, Cultural Resources 360-681-4638

Port Gamble S'Klallam Tribe:
Marie Hebert, Cultural Resources .... (360)-297-2646 ext. 241

Suquamish Tribe:
Dennis Lewarch, Tribal Archaeologist .... (360) 394-8529

Department of Archaeology and Historic Preservation:
Dr. Allyson Brooks, State Historic Preservation Officer .... (360) 586-3066

Dr. Rob Whitlam, State Archaeologist .... (360) 586-3080

Stephenie Kramer, Assistant State Archaeologist .... (360) 586-3083

Dr. Guy Tasa, State Physical Anthropologist .... (360) 586-3534

Northwest Archaeological Associates/SWCA Environmental Consultants:
Christian J. Miss, Supervising Professional Archaeologist..(206) 781-1909

Mike Shong, Monitor / Monitoring Coordinator ....(206 781-1909

Figure 1. Project limits.

Figure 2. Irondale Iron and Steel Plant work areas.

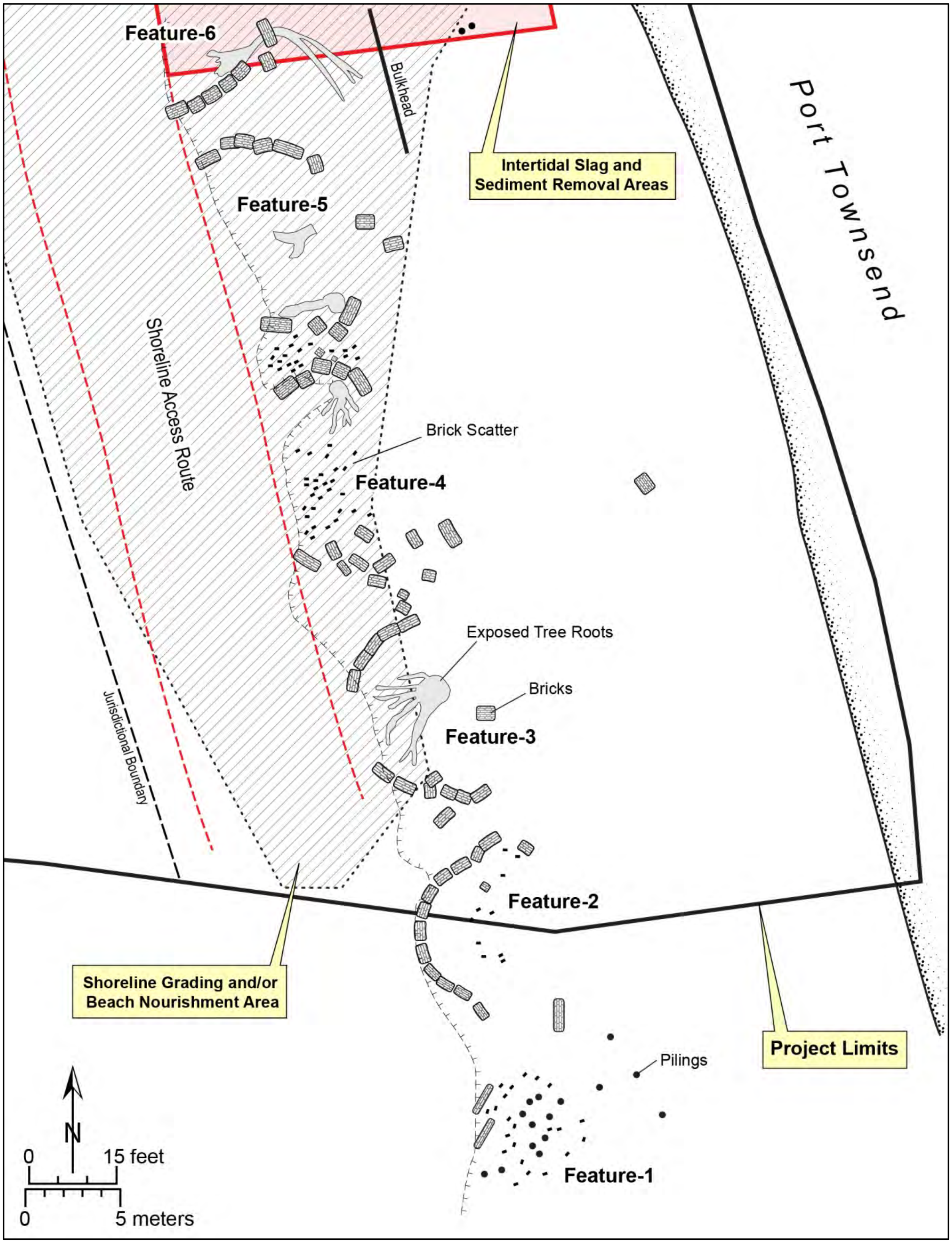

Figure 3. Irondale Iron and Steel Plant charcoal kiln features south of soil and slag removal.

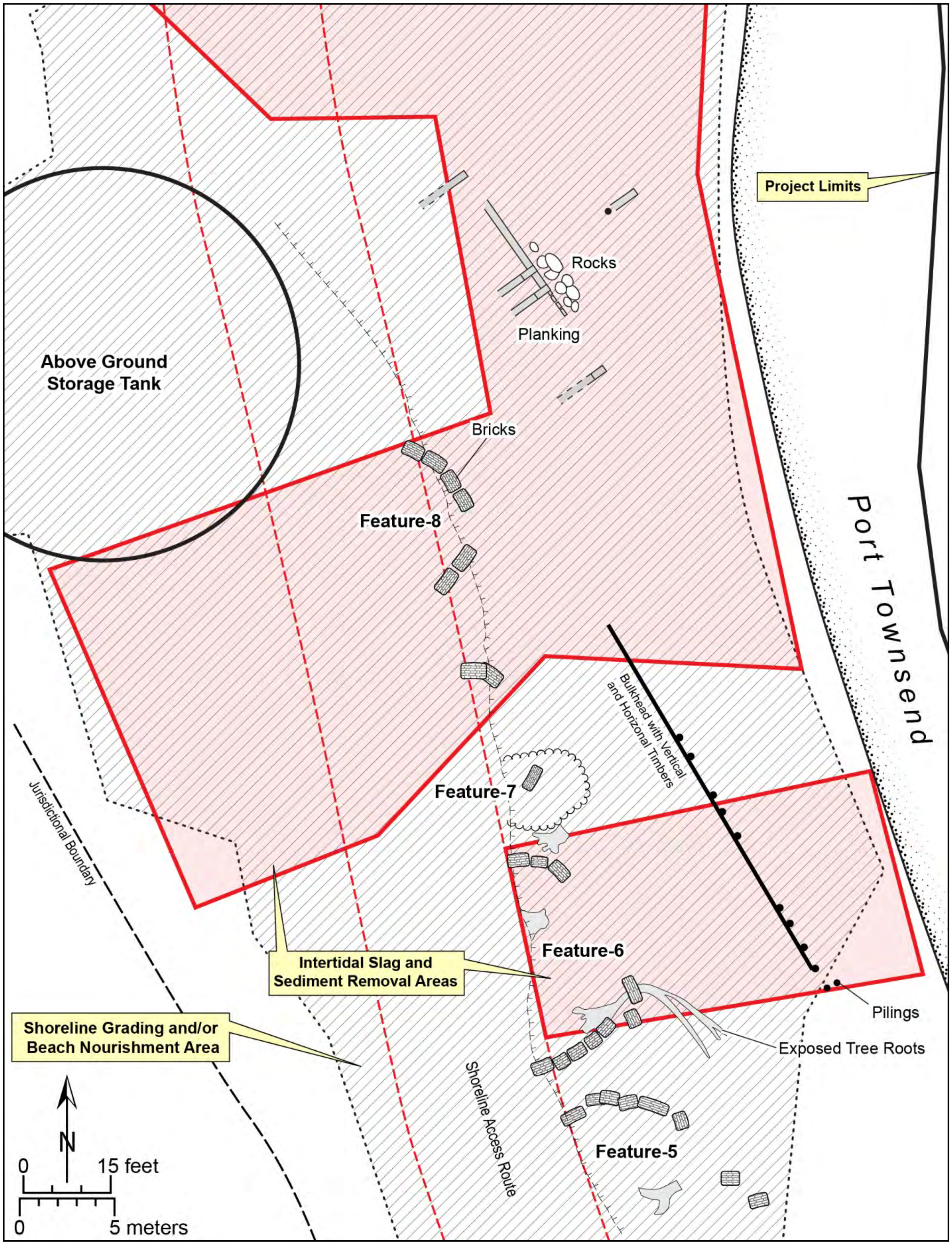

Figure 4. Charcoal kiln Features 5-8 in area of contaminated soil and slag removal.

APPENDIX B: SITE RECORD 45JE358 FORM AND HAER

Appendix Redacted

APPENDIX E
Remedial Design Drawings
(Bound Separately)

WASHINGTON STATE DEPARTMENT OF ECOLOGY

IRONDALE IRON AND STEEL PLANT CLEANUP ACTION

SEC 2, T29N, R01W AND SEC 35, T30N, R01W

VICINITY MAP

SCALE: 1"=1000'

N

GRAPHIC SCALE

1000 0 1000

FEET

No. SHEET TITLE

No.	SHEET TITLE
G1.0	COVER SHEET
G1.1	PROJECT OVERVIEW
G1.2	PROJECT OVERVIEW PHOTOS
G1.3	GENERAL SYMBOLS AND LEGEND
G1.4	CONTRACTOR PHASING AND ACCESS CONTROL PLAN
G1.5	EROSION CONTROL PLAN
G1.6	EROSION CONTROL DETAILS
G1.7	SITE DEMOLITION PLAN
C1.0	REMEDIAL EXCAVATION PLAN
C1.1-C1.2	REMEDIAL EXCAVATION DETAILS
C1.3-C1.5	REMEDIAL EXCAVATION SECTIONS
C2.0	REMEDIAL CAPPING PLAN
C2.1-C2.2	REMEDIAL CAPPING DETAILS
C3.0	SHORELINE GRADING PLAN
C3.1-C3.3	SHORELINE GRADING DETAILS
C3.4-C3.10	SHORELINE GRADING SECTIONS
L1.0	LANDSCAPING AND RESTORATION PLAN
L1.1-L1.3	LANDSCAPE AND RESTORATION DETAILS
L1.4	LANDSCAPE AND RESTORATION SECTIONS

SITE MAP

SCALE: 1"=4000'

N

GRAPHIC SCALE

4000 0 4000

FEET

NOTES:

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE.
2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT. GEOENGINEERS, INC. CANNOT GUARANTEE THE ACCURACY AND CONTENT OF ELECTRONIC FILES. THE MASTER FILE IS STORED BY GEOENGINEERS, INC. AND WILL SERVE AS THE OFFICIAL RECORD OF THIS COMMUNICATION.

REFERENCE:

Reference: ESRI Data & Maps, Street Maps 2005.

IRONDALE WASHINGTON

(LAT. 48° 02' 38"N LONG. 122° 46' 01"W)

TIDAL INFORMATION

MEAN HIGHER HIGH WATER (MHHW)= 3.52'

MEAN LOWER LOW WATER (MLLW)= 0.0'

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Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

COVER SHEET

DRAWN:	TJM	PROJECT NO.:	50404201
DESIGN:	CLB	SCALE:	N.T.S.
CHECKED:	DAC	DATE:	8/31/11
SHEET NO.	G1.0		

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OVERVIEW PLAN

SCALE: 1"=100'

100 0 100
FEET

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PROJECT SUMMARY

- ESTABLISH SURVEY CONTROLS AND DEMARCATE OHW.
- INSTALL NECESSARY TEMPORARY CONTROLS AND FEATURES FOR HEALTH AND SAFETY, EROSION CONTROL, SITE SECURITY, AND TO MEET PERMIT REQUIREMENTS.
- CLEAR AND GRUB VEGETATION AS NEEDED TO ACCESS WORK AREAS.
- ABANDON MONITORING WELLS IN ACCORDANCE WITH ECOLOGY REQUIREMENTS IN AREAS TO BE EXCAVATED AND GRADED.
- DEMOLISH THE 6,000 BARREL CONCRETE OPEN-TOP FUEL TANK AND DISPOSE OF DEBRIS.
- EXCAVATE AND GRADE SHORELINE ON JEFFERSON COUNTY PROPERTY AND WDFW PROPERTY SHORELINE OUTSIDE OF REMEDIAL EXCAVATION AREAS TO REDUCE SHORELINE SLOPE, CREATE ADDITIONAL INTERTIDAL BEACH AREA, FACILITATE HABITAT RESTORATION, AND GENERATE BACKFILL MATERIAL FOR REMEDIAL EXCAVATION AREAS.
- EXCAVATE AND DISPOSE OF UPLAND (ABOVE OHW) SOIL CONTAINING PETROLEUM HYDROCARBONS ABOVE SITE SPECIFIC CLEANUP LEVELS TO DEPTHS OF APPROXIMATELY 3 TO 14 FEET BELOW GROUND SURFACE.
- EXCAVATE AND DISPOSE OF UPLAND SOIL CONTAINING METALS ABOVE SITE SPECIFIC CLEANUP LEVELS TO DEPTHS OF APPROXIMATELY 6 FEET BELOW GROUND SURFACE.
- EXCAVATE AND DISPOSE OF MARINE SEDIMENTS (BELOW OHW) CONTAINING PETROLEUM HYDROCARBONS ABOVE SITE SPECIFIC CLEANUP LEVELS TO DEPTHS OF APPROXIMATELY 3 TO 11 FEET BELOW MUDLINE.
- BACKFILL REMEDIAL EXCAVATIONS WITH CLEAN SOIL/SEDIMENT GENERATED BY SHORELINE GRADING OUTSIDE OF THE REMEDIAL EXCAVATION AREAS AND GRADE SHORELINE TO ACHIEVE NEW SLOPE.
- INSTALL A MULTI-COMPONENT ENVIRONMENTAL CAP IN TWO AREAS WITH UPLAND SOIL EXCEEDING SITE SPECIFIC CLEANUP LEVELS.
- PLACE LARGE WOODY DEBRIS ALONG THE NEWLY DEFINED OHW.
- PLACE TOPSOIL OR AMEND SANDY BACKFILL IN THE GRADED BACKSHORE AREA UPLAND OF NEWLY DEFINED OHW TO PROVIDE PLANTING SUBSTRATE FOR DUNE GRASSES AND SMALL SHRUBS.
- PLANT DUNE GRASSES, GROUND COVERS, AND SMALL SHRUBS IN THE BACKSHORE AREA AND IN THE ENVIRONMENTAL CAP AREA.

LEGEND

- - -OHW- - - **Current Ordinary High Water (OHW) (Approximately 10.5 feet MLLW)**

Limits of Remedial Excavation

Limits of Contaminated Soil Capping

Limits of Shoreline Grading to Facilitate Restoration

P3 **Direction of Photograph**
Photograph Number (See sheet G1.2)

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Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

PROJECT OVERVIEW

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DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. G1.1	

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P-1 VIEW SOUTH AT SLAG OUTCROP.

P-2 VIEW NORTH FROM AT OUTCROP.

P-3 VIEW NORTH AT REMEDIAL EXCAVATION AREA.

P-4 VIEW WEST AT REMEDIAL EXCAVATION AREA, SHOWING CONCRETE TANK.

P-5 VIEW OF CAPPING AREA.

P-6 VIEW INSIDE STEEL PRODUCTION BUILDING TO BE CAPPED.

P-7 VIEW NORTHWEST ALONG SHORELINE NORTH OF SLAG OUTCROP.

P-8 VIEW SOUTH ALONG SHORELINE SOUTH OF CLEANUP EXCAVATION AREAS.

P-9 VIEW SOUTHEAST ALONG SHORELINE AT NORTH END OF WDFW GRADING AND RESTORATION AREA.

P-10 VIEW WEST FROM SHORELINE AT DRAINAGE SWALE IN WDFW GRADING AND RESTORATION AREA.

P-11 VIEW OF CONCRETE TANK WALL.

P-12 VIEW SOUTHEAST ALONG SHORELINE OF GRADING AND RESTORATION AREA NORTH OF SLAG OUTCROP.

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Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

PROJECT OVERVIEW PHOTOS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NTS
CHECKED: DAC	DATE: 8/31/11
SHEET NO. G1.2	

100-PERCENT DESIGN

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TITLES

GRAPHIC SCALE

100 0 100 FEET

NORTH

N

SECTION/ELEVATION LETER OR DETAIL/VIEW NUMBER

SHEET NUMBER WHERE DRAWN

PLAN TITLE

SCALE: 1"=40'

SEE 1/S-4 FOR ADDITIONAL INFO

TEXT NOTATION

SECTION / ELEVATION TITLE

C

C-1

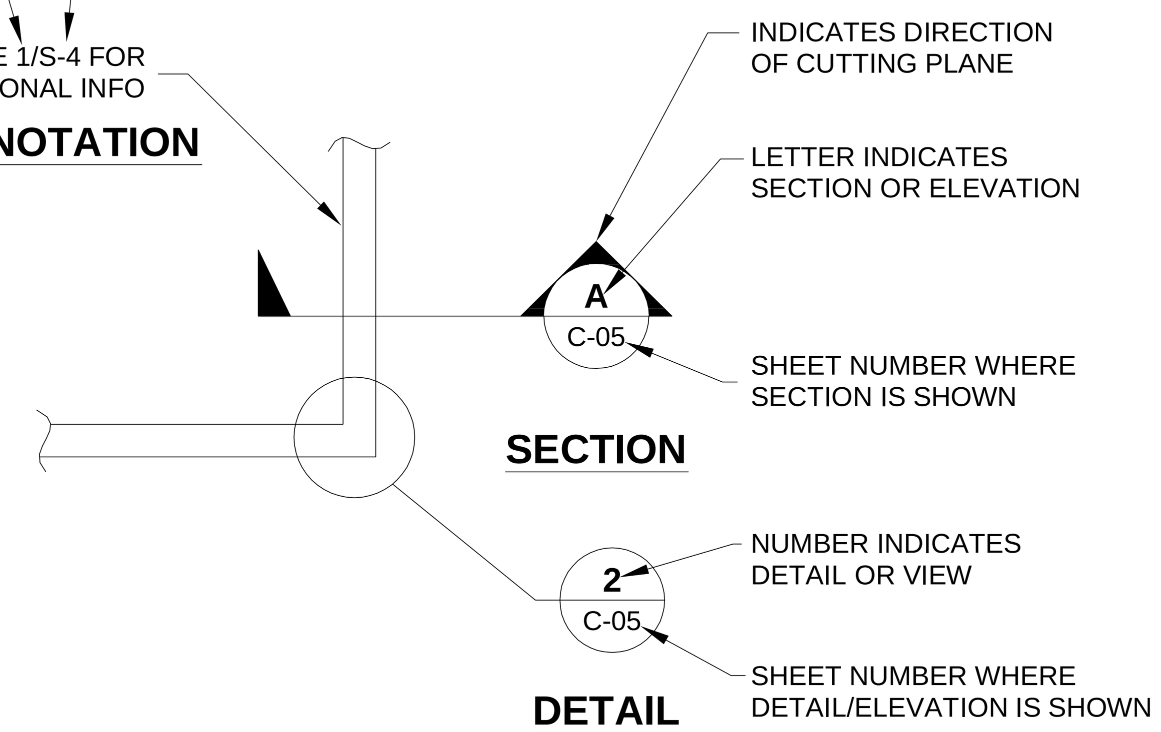
SCALE: 1"=40'

DETAIL / VIEW TITLE

1

C-1

SCALE: 1"=40'



SECTION/ELEVATION/DETAIL/VIEW LABELS

SECTION/ELEVATION/DETAIL/VIEW IDENTIFIERS

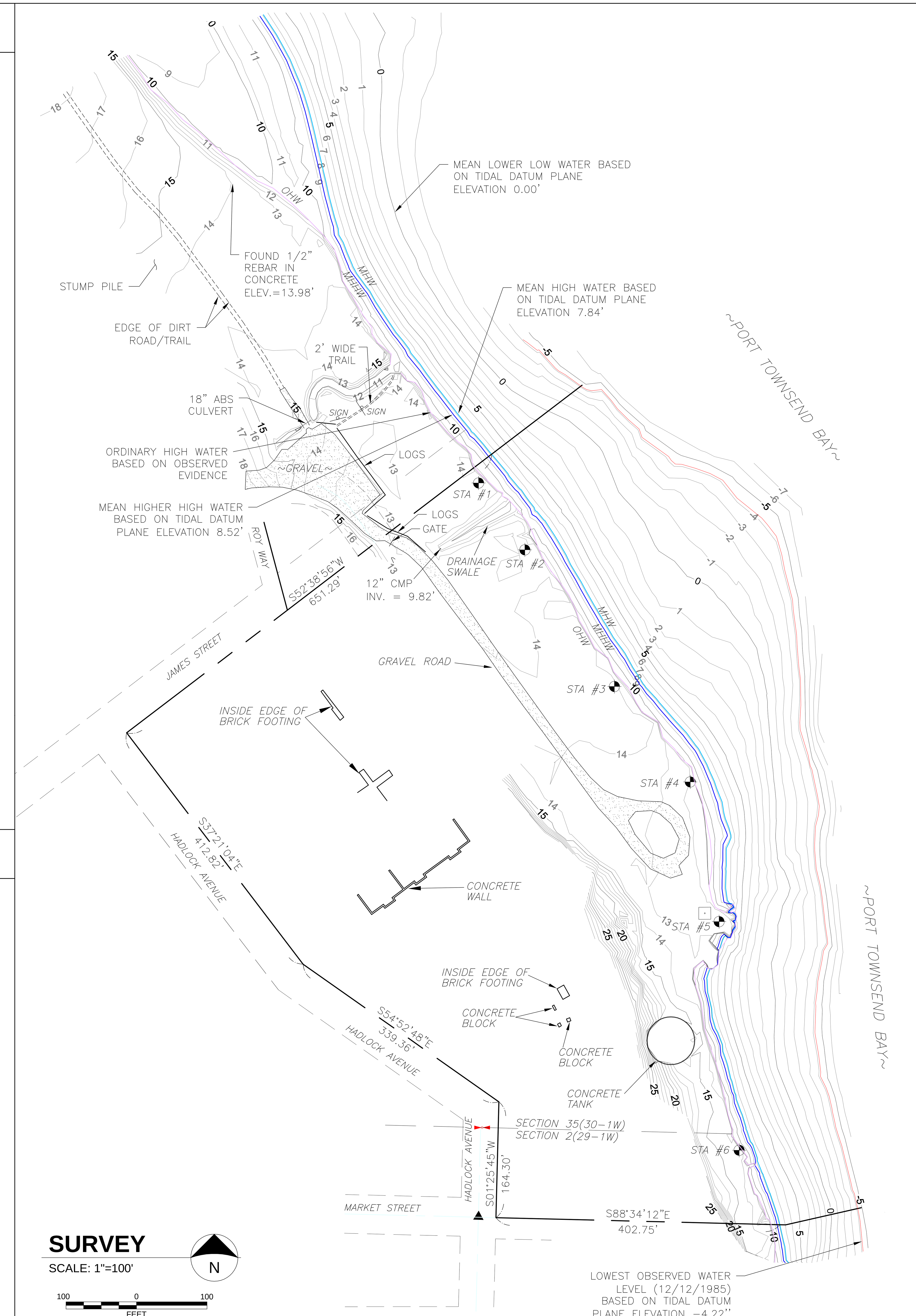
TIDAL INFORMATION

TIDAL DATUM PLANE - PORT TOWNSEND, ADMIRALTY INLET

MEAN HIGHER HIGH WATER: (MHHW) ....8.52 FT.
MEAN HIGH WATER: (MHW) ....7.84 FT.
MEAN (HALF) TIDE LEVEL: (MSL) ....5.00 FT.
MEAN SEA LEVEL: (MSL) ....4.99 FT.
MEAN LOW WATER: (MLW) ....2.49 FT.
MEAN LOWER LOW WATER: (MLLW) ....0.00 FT.
LOWER RECORDED TIDE: (ELW) ....-4.22 FT.

DATUM INFORMATION

1. SURVEY PREFORMED BY CLARK LAND OFFICE OF SEQUIM, WA.
2. THIS SURVEY WAS PERFORMED BY FIELD TRAVERSE METHODS USING A 5 SECOND TOPCON GTS-235W TOTAL STATION, TOPCON GR-3 RTK GPS RECEIVER AND STEEL TAPE.
3. HORIZONTAL DATUM IS THE WASHINGTON COORDINATE SYSTEM, NORTH ZONE (NAD83/86) BASED ON THE FOLLOWING LOCAL GPS CONTROL STATIONS: JEFFERSON COUNTY CONTRL STATION #9153 AND #9166 BY EAGLE GPS CORPORATION (1991) FOR ADDITIONAL INFORMATION AND SECTION SUBDIVISION DATA, SEE VOL. 24 OF SURVEYS, PAGE 60 AND VOL. 8 OF SURVEYS, PGS 108 AND 109, RECORDS OF JEFFERSON COUNTY, WASHINGTON.
4. VERTICAL DATUM IS BASED ON TIDAL BENCH MARK 944 4900 D, STAMPED "4900 D 1990". ELEVATION 17.26' MLLW.
5. ELEVATIONS AT REFERENCE STATIONS 1-6
   STATION 1= ELEV. 13.32' MLLW - NORTHING= 386946.8142, EASTING= 1167340.8901
   STATION 2= ELEV. 14.04' MLLW - NORTHING= 386851.9931, EASTING= 1167406.5114
   STATION 3= ELEV. 14.22' MLLW - NORTHING= 386658.1981, EASTING= 1167533.5532
   STATION 4= ELEV. 12.00' MLLW - NORTHING= 386522.8472, EASTING= 1167641.0498
   STATION 5= ELEV. 12.45' MLLW - NORTHING= 386324.6977, EASTING= 1167681.9609
   STATION 6= ELEV. 14.44' MLLW - NORTHING= 386000.4351, EASTING= 1167710.4352



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100-PERCENT DESIGN

GEOENGINEERS
Plaza 600 Building
600 Stewart Street, Suite 1700
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CHRISTOPHER LEWIS BAILEY, STATE OF WASHINGTON, 39963 REGISTERED PROFESSIONAL ENGINEER 5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

GENERAL SYMBOLS AND LEGEND

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NTS
CHECKED: DAC	DATE: 8/31/11
SHEET NO. G1.3	

CONSTRUCTION PHASING AND ACCESS CONTROL PLAN

SCALE: 1"=100'

100 0 100
FEET

N

NOTES

1. GENERAL VEHICLE ROUTE TO AND FROM THE SITE IS BY EAST MOORE STREET.
2. CONTRACTOR SHALL NOT TRACK MATERIAL FROM THE SITE ONTO EAST MOORE STREET.
3. CONTRACTOR SHALL MAINTAIN FULL PUBLIC USE OF PUBLIC PARKING AREA AND SHORELINE PUBLIC ACCESS THROUGH THE DURATION OF CONSTRUCTION ACTIVITIES.
4. CONTRACTOR SHALL MAINTAIN A SECURE SITE PERIMETER FENCE AT ALL TIMES DURING CONSTRUCTION. TEMPORARY FENCING SHALL BE INSTALLED AS FAR WATERWARD AS PRACTICAL TO RESTRICT ACCESS. FENCING SHALL INCLUDE SIGNAGE NOTIFYING PUBLIC OF SITE HAZARDS. LOCKABLE GATES SHALL BE INSTALLED AS NECESSARY TO PROVIDE VEHICLE AND PERSONELL ACCESS.
5. CONTRACTOR SHALL STOCKPILE AND STAGE ALL EQUIPMENT, SUPPLIES, AND MATERIALS WITHIN THE PROJECT LIMITS. CONTRACTOR SHALL COORDINATE TRUCK TRAFFIC ROUTING WITHIN THE SITE WITH STOCKPILE AND EXCAVATION LOCATIONS DURING ALL STAGES OF CONSTRUCTION. IMPORTED OR EXCAVATED MATERIALS SHALL NOT BE STOCKPILED BELOW OHW.
6. CONTRACTOR SHALL LOCATE AND CONSTRUCT TEMPORARY ACCESS ROUTES ON THE SITE AS NEEDED TO ACCESS WORK AREAS. TEMPORARY ACCESS ROUTES SHALL BE APPROVED BY ECOLOGY'S REPRESENTATIVE PRIOR TO CONSTRUCTION. TEMPORARY ACCESS ROUTES SHOWN ON SHEET REPRESENT POTENTIAL LOCATIONS ONLY. SEE SHEET G1.5 AND G1.6 FOR ACCESS ROUTE CONSTRUCTION REQUIREMENTS.
7. ALL WORK WITHIN AND ACCESS TO AREAS BELOW OHW AND NORTH OF SLAG OUTCROP MUST BE COMPLETED BEFORE OCTOBER 15, 2011 IN ACCORDANCE WITH WDFW HPA.

LEGEND

- OHW — ORDINARY HIGH WATER (OHW)
- CONSTRUCTION HAUL ROUTE
- POTENTIAL TEMPORARY ACCESS ROUTE
- REMEDIAL EXCAVATION AREA
- CAPPING AREA
- POTENTIAL CONTRACTOR STAGING AREA
- TEMPORARY FENCE (BY CONTRACTOR)
- SHORELINE GRADING AND RESTORATION AREA

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Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

CONSTRUCTION PHASING
AND ACCESS CONTROL PLAN

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
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SHEET NO. G1.4	

100-PERCENT DESIGN

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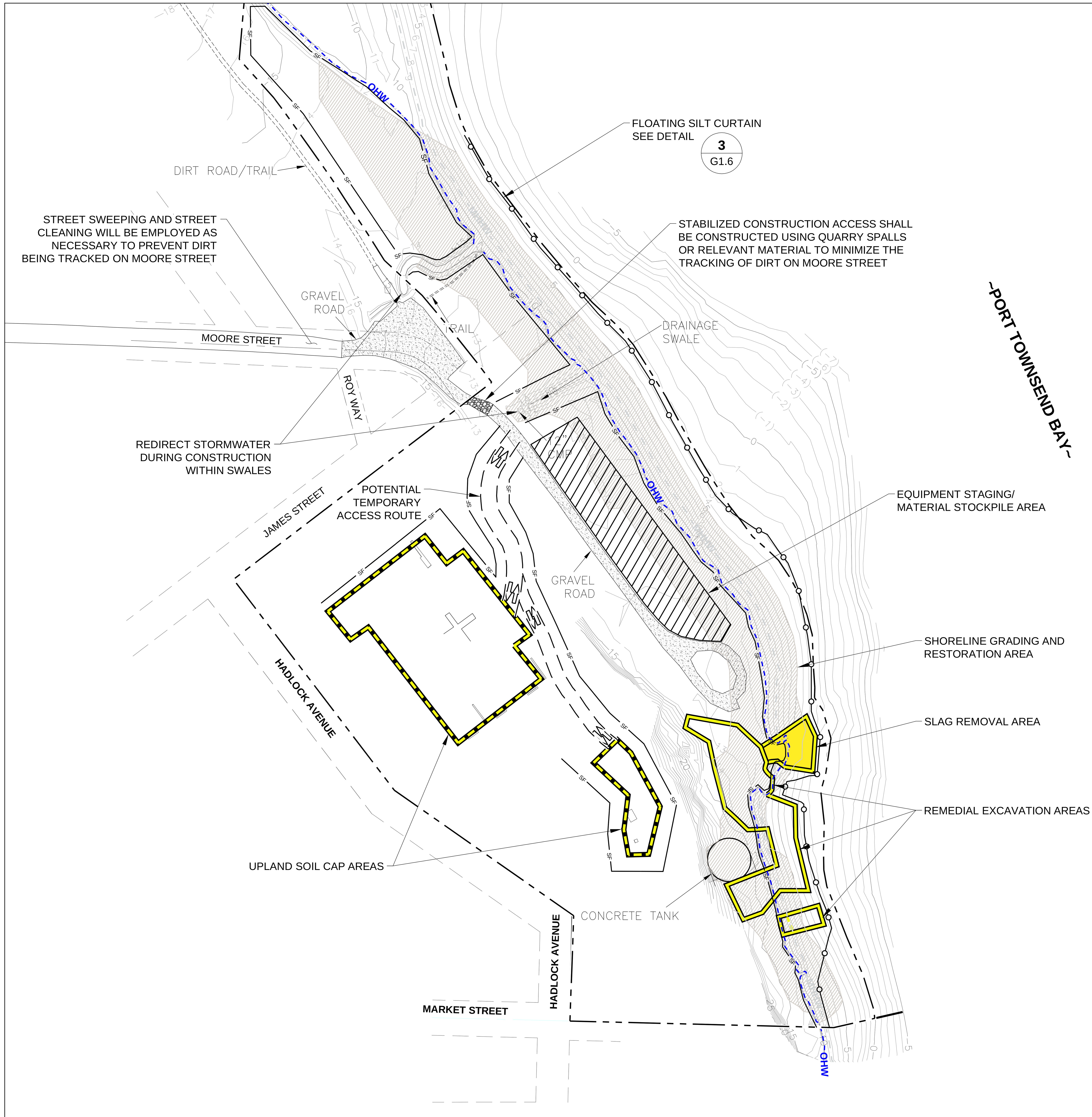

EROSION CONTROL PLAN

SCALE: 1"=100'

100 0 100
FEET

N

NOTES

1. CONTRACTORS WILL BE REQUIRED TO OBTAIN A CONSTRUCTION STORMWATER GENERAL PERMIT (CSWGP), AND ADHERE TO ALL REQUIREMENTS OF PERMIT.
2. CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) TO BE REVIEWED AND APPROVED BY ECOLOGY.
3. BEST MANAGEMENT PRACTICES (BMPS) FOR TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) AND STORMWATER MANAGEMENT TO BE DETAILED IN SWPPP AND EMPLOYED DURING CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION AND MAINTENANCE OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AS REQUIRED IN THE CSWGP AND SWPPP.
5. CONTRACTOR SHALL IMPLEMENT ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES REQUIRED DURING ALL CONSTRUCTION ACTIVITIES, INCLUDING BUT NOT LIMITED TO:
   a. MAINTAIN ON HAND ALL EQUIPMENT AND MATERIALS REQUIRED TO IMPLEMENT TESC MEASURES
   b. CLEARING LIMITS SHALL BE MARKED PRIOR TO INITIATING CONSTRUCTION ACTIVITIES AND MAINTAINED THROUGH THE DURATION OF CONSTRUCTION
   c. CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES IF CONDITIONS ARE DRY AND THERE IS RISK OF WIND TRANSPORTING DUST FROM DISTURBED SURFACES
   d. INSTALL SILT FENCE AND/OR STRAW WATTLES AS APPLICABLE FOR SEDIMENT CONTROL. SEE SHEET G1.6 FOR EROSION AND SEDIMENT CONTROL DETAILS
   e. CONTRACTOR SHALL MAINTAIN A FLOATING SILT CURTAIN AROUND THE PERIMETER OF THE WORK AREA AT ALL TIMES DURING ALL WORK BELOW OHW. ACTIVITIES BELOW OHW IN THE VICINITY OF THE REMEDIAL EXCAVATION AREAS REQUIRES USE OF A FLOATING OIL-ABSORBING BOOM IN ADDITION TO THE FLOATING SILT CURTAIN TO PREVENT RELEASE OF FLOATING HYDROCARBON SHEEN.
   f. CONTRACTOR SHALL REMOVE ANY FLOATING OIL, SHEEN, OR DEBRIS WITHIN WORK AREA ON A DAILY BASIS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RETRIEVAL AND DISPOSAL OF ANY FLOATING OIL, SHEEN OR DEBRIS FROM THE WORK AREA AND ANY DAMAGES RESULTING FROM THE LOSS.
   g. AS APPROVED BY OWNER, UNPAVED AREAS USED AS ACCESS POINTS SHALL BE STABILIZED USING QUARRY SPALLS OR OTHER RELEVANT MATERIAL TO MINIMIZE THE TRACKING OF SEDIMENT ONTO ADJACENT ROADS.
   h. TO THE EXTENT PRACTICAL, OFFSITE SURFACE FLOWS ENTERING THE SITE SHALL BE REDIRECTED TO ADJACENT VEGETATED AREAS TO ALLOW INFILTRATION.
   i. ALL TEMPORARY STOCKPILE CONTAINMENT AREAS SHALL BE CONSTRUCTED AND MAINTAINED AS SHOWN ON SHEET G1.6.
   j. CONTRACTOR SHALL INSPECT TESC BMPS DAILY AND IMMEDIATELY PERFORM ANY REQUIRED MAINTENANCE OR REPAIRS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION
   k. CONTRACTOR SHALL UPGRADE THE TESC BMPS AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE AND WILL BE MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS.
6. CONTRACTOR SHALL MAINTAIN STOCKPILES FOR REMEDIAL EXCAVATION SOIL AND SEDIMENT SEPARATE FROM STOCKPILES FOR POTENTIAL BACKFILL MATERIAL TO PREVENT CROSS-CONTAMINATION.
7. STREET SWEEPING AND STREET CLEANING SHALL BE EMPLOYED BY CONTRACTOR TO PREVENT SEDIMENT FROM BEING TRACKED OFF SITE. VISUAL MONITORING OF THE BMPS WILL BE CONDUCTED BY THE CONTRACTOR'S SITE CESCL INSPECTOR AT LEAST ONCE EVERY CALENDAR WEEK AND WITHIN 24 HOURS OF ANY RAINFALL EVENT THAT CAUSES A DISCHARGE FROM THE SITE. THE CESCL INSPECTOR SHALL EVALUATE AND DOCUMENT THE EFFECTIVENESS OF THE INSTALLED BMPS AND DETERMINE IF IT IS NECESSARY TO REPAIR, REPLACE, OR ADD ANY OF THE BMPS TO IMPROVE THE QUALITY OF STORMWATER DISCHARGES. IF THE SITE BECOMES INACTIVE AND IS TEMPORARILY STABILIZED, THE INSPECTION FREQUENCY WILL BE REDUCED TO ONCE EVERY MONTH.
8. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT WEEKLY REPORTS TO ECOLOGY SUMMARYIZING THE MEASURES TAKEN TO MEET CONDITIONS DESCRIBED IN SWPPP. CONTRACTOR SHALL SUBMIT A COPY OF ALL REPORTS TO ECOLOGY.
9. CONTRACTOR SHALL REMOVE TESC BMPS WITHIN 30 DAYS AFTER THE FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. DISTURBED SOIL RESULTING FROM REMOVAL OF BMPS OR VEGETATION WILL BE PERMANENTLY STABILIZED.

LEGEND

PROJECT LIMITS

SF — SILT FENCE / STRAW WATTLES

FLOATING SILT CURTAIN

POTENTIAL TEMPORARY ACCESS ROUTE (BY CONTRACTOR)

LIMITS OF SOIL CAP

LIMITS OF REMEDIAL EXCAVATION

SHORELINE GRADING AND RESTORATION AREA

P:\0\0504042\01\CAD\SHEET\CLEANUP ACTION SHEETS\0504042-01 SHEET G1.5 EROSION CONTROL PLAN.DWG\TAB:LAYOUT1 MODIFIED BY TMICHAUD ON MAY 02, 2012 - 15:43

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STATE OF WASHINGTON
39963
REGISTERED
PROFESSIONAL ENGINEER
5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

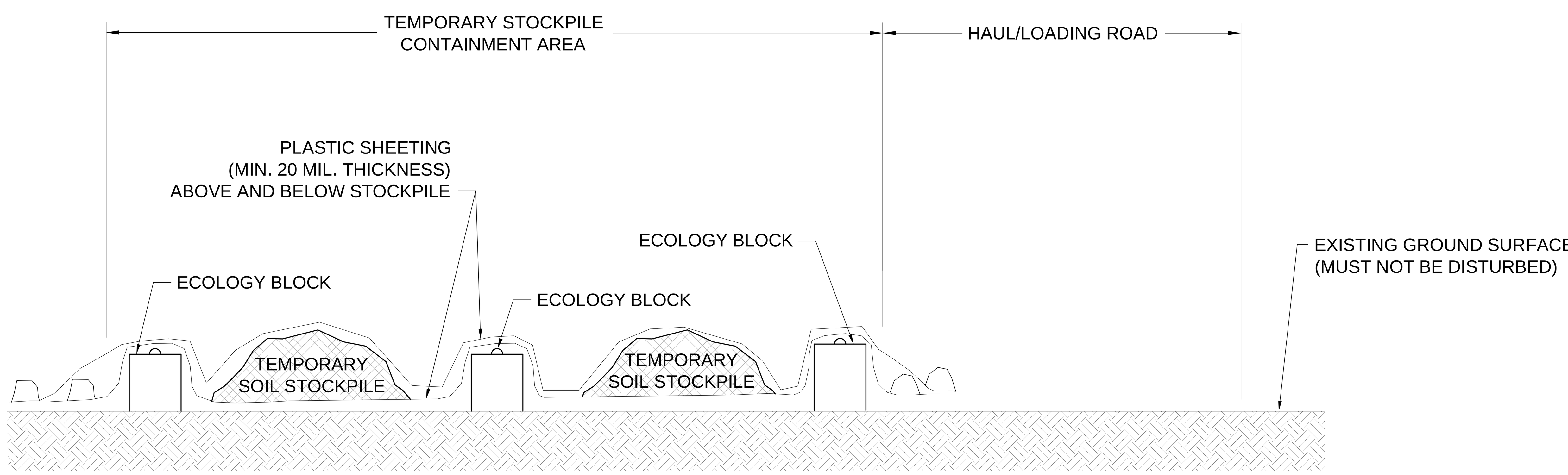
EROSION CONTROL PLAN

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	G1.5

100-PERCENT DESIGN

NOTES

1. CONTRACTORS WILL BE REQUIRED TO OBTAIN COVERAGE UNDER THE WASHINGTON STATE CONSTRUCTION STORMWATER GENERAL PERMIT (CSWGP), AND ADHERE TO ALL PERMIT REQUIREMENTS.
2. CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) TO BE REVIEWED AND APPROVED BY ECOLOGY.
3. BEST MANAGEMENT PRACTICES (BMPS) FOR TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) AND STORMWATER MANAGEMENT TO BE DETAILED IN CONTRACTOR'S SWPPP AND EMPLOYED DURING CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AS DESCRIBED IN THE CONTRACTOR'S SWPPP AND AS REQUIRED BY THE CSWGP.
5. CONTRACTOR SHALL IMPLEMENT ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES REQUIRED DURING ALL CONSTRUCTION ACTIVITIES, INCLUDING BUT NOT LIMITED TO:
   a. MAINTAIN ON HAND, ALL EQUIPMENT AND MATERIALS REQUIRED TO IMPLEMENT TESC MEASURES
   b. CLEARING LIMITS SHALL BE MARKED PRIOR TO INITIATING CONSTRUCTION ACTIVITIES AND MAINTAINED THROUGH THE DURATION OF CONSTRUCTION
   c. CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES IF CONDITIONS ARE DRY AND THERE IS RISK OF WIND TRANSPORTING DUST FROM DISTURBED SURFACES
   d. INSTALL SILT FENCE AND/OR WATTLES AS APPLICABLE FOR SEDIMENT CONTROL. SEE SHEET G1.6 FOR EROSION AND SEDIMENT CONTROL DETAILS
   e. CONTRACTOR SHALL MAINTAIN A FLOATING SILT CURTAIN AROUND THE PERIMETER OF THE WORK AREA AT ALL TIMES DURING ALL WORK BELOW MHHW. ACTIVITIES BELOW OHW IN THE VICINITY OF THE REMEDIAL EXCAVATION AREAS REQUIRES USE OF A FLOATING OIL-ABSORBING BOOM IN ADDITION TO THE FLOATING SILT CURTAIN TO PREVENT RELEASE OF FLOATING HYDROCARBON SHEEN.
   f. CONTRACTOR SHALL REMOVE ANY FLOATING OIL, SHEEN, OR DEBRIS WITHIN WORK AREA ON A DAILY BASIS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RETRIEVAL AND DISPOSAL OF ANY FLOATING OIL, SHEEN OR DEBRIS FROM THE WORK AREA AND ANY DAMAGES RESULTING FROM THE LOSS.
   g. AS APPROVED BY OWNER, UNPAVED AREAS USED BY CONTRACTOR SHALL BE STABILIZED USING QUARRY SPALLS OR OTHER RELEVANT MATERIAL TO MINIMIZE THE TRACKING OF SEDIMENT ONTO ADJACENT ROADS.
   h. TO THE EXTENT PRACTICAL, OFFSITE SURFACE FLOWS ENTERING THE SITE SHALL BE REDIRECTED TO ADJACENT VEGETATED AREAS TO ALLOW INFILTRATION.
   i. ALL TEMPORARY STOCKPILE CONTAINMENT AREAS SHALL BE CONSTRUCTED AND MAINTAINED AS SHOWN ON SHEET G1.6.
   j. CONTRACTOR SHALL INSPECT TESC MEASURES DAILY AND IMMEDIATELY PERFORM ANY REQUIRED MAINTENANCE OR REPAIRS AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION
   k. CONTRACTOR SHALL MODIFY THE TESC MEASURES AS NEEDED TO ENSURE PROTECTION DURING STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. CONTRACTOR SHALL MAINTAIN STOCKPILES FOR REMEDIAL EXCAVATION SOIL AND SEDIMENT SEPARATE FROM STOCKPILES FOR BACKFILL MATERIAL TO PREVENT CROSS-CONTAMINATION.
7. STREET SWEEPING AND STREET CLEANING SHALL BE EMPLOYED BY CONTRACTOR TO PREVENT SEDIMENT FROM BEING TRACKED OFF SITE. VISUAL MONITORING OF THE BMPS WILL BE CONDUCTED BY THE CONTRACTOR'S SITE CESCL INSPECTOR AT LEAST ONCE EVERY CALENDAR WEEK AND WITHIN 24 HOURS OF ANY RAINFALL EVENT THAT CAUSES A DISCHARGE FROM THE SITE. THE CESCL INSPECTOR SHALL EVALUATE AND DOCUMENT THE EFFECTIVENESS OF THE INSTALLED BMPS AND DETERMINE IF IT IS NECESSARY TO REPAIR, REPLACE, OR ADD ANY OF THE BMPS TO IMPROVE THE QUALITY OF STORMWATER DISCHARGES. IF THE SITE BECOMES INACTIVE AND IS TEMPORARILY STABILIZED, THE INSPECTION FREQUENCY WILL BE REDUCED TO ONCE EVERY MONTH.
8. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT WEEKLY REPORTS TO ECOLOGY SUMMARIZING THE MEASURES TAKEN TO MEET CONDITIONS DESCRIBED IN SWPPP. CONTRACTOR SHALL SUBMIT A COPY OF ALL REPORTS TO ECOLOGY.
9. CONTRACTOR SHALL REMOVE TESC BMPS WITHIN 30 DAYS AFTER THE FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. DISTURBED SOIL RESULTING FROM REMOVAL OF BMPS OR VEGETATION SHALL BE STABILIZIED AND RESTORED.

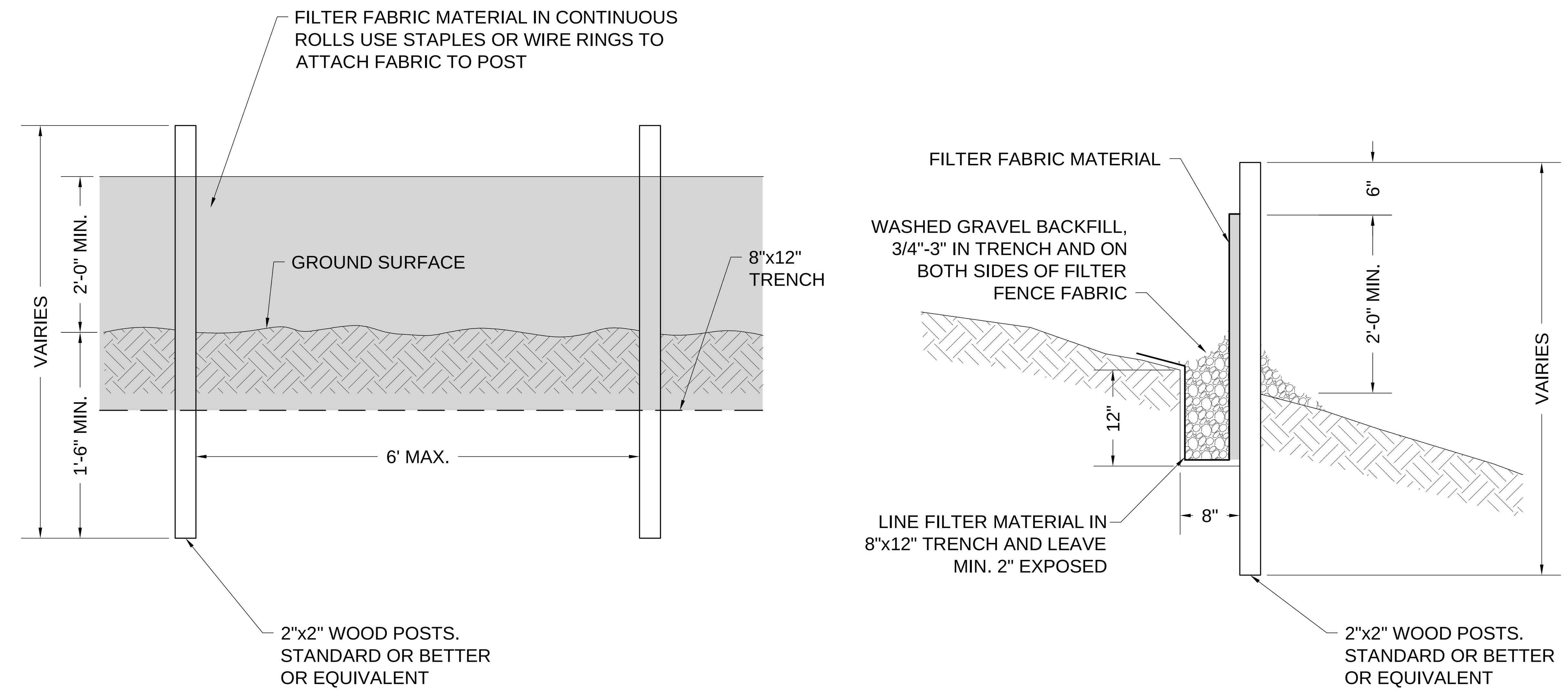


CROSS-SECTION

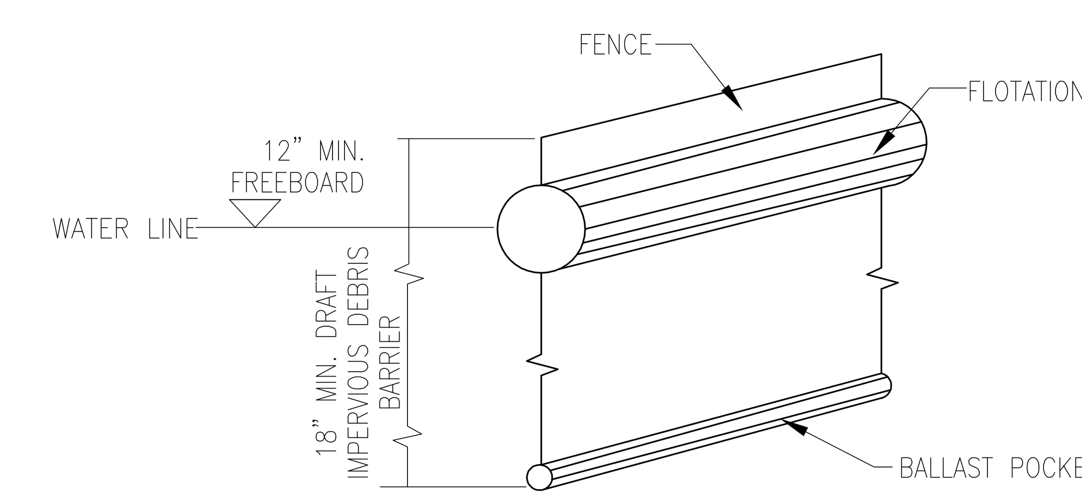
NOTES:

1. STOCKPILED SOIL WILL BE COVERED AND SECURED AT ALL TIMES EXCEPT DURING ACTIVE SOIL LOADING AND UNLOADING.
2. EROSION CONTROL MEASURES, AS DESCRIBED ON SHEET G1.5 SHALL BE IN PLACE AT ALL TIMES DURING USE OF STOCKPILE AREAS.
3. WATER COLLECTED WITHIN THE STOCKPILE AREAS MUST BE CONTAINED AND NO RELEASE OF WATER FROM THE STOCKPILE AREAS SHALL BE PERMITTED. CONTRACTOR SHALL REMOVE WATER WITHIN THE STOCKPILE AREAS BY PUMPING TO A CONTAINMENT VESSEL FOR ANALYSIS TO DETERMINE PROPER DISPOSAL. CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF COLLECTED WATER IN THE STOCKPILE AREA.

TEMPORARY STOCKPILE CONTAINMENT AREA DETAIL 1 / -
NOT TO SCALE



SILT FENCE DETAIL 2 / G1.5
NOT TO SCALE



FLOATING SILT CURTAIN 3 / G1.5
NTS

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CHRISTOPHER LEWIS BAILEY STATE OF WASHINGTON 39963 REGISTERED PROFESSIONAL ENGINEER 5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

EROSION CONTROL DETAILS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NTS
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	G1.6

100-PERCENT DESIGN

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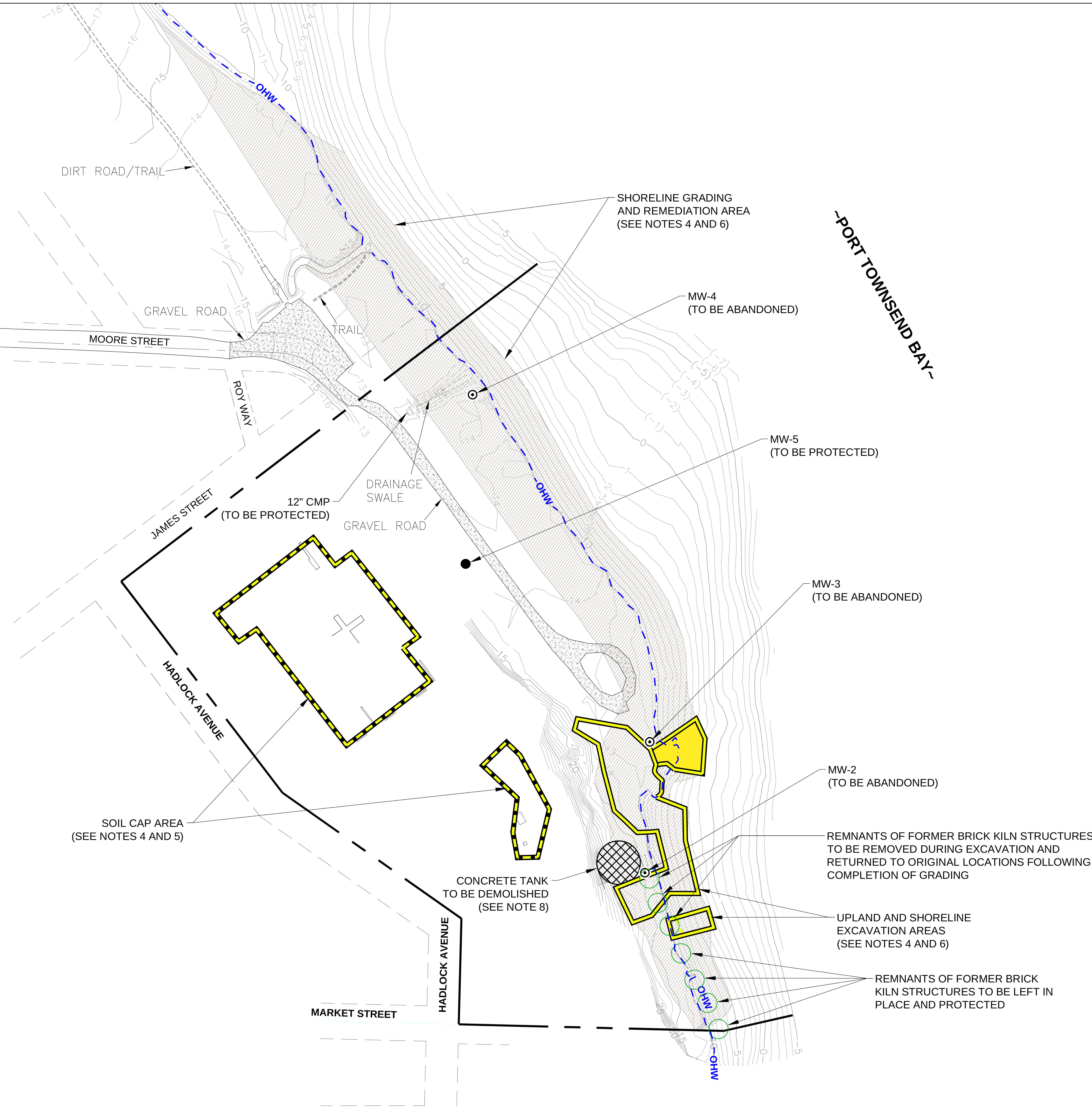

SITE DEMOLITION PLAN

SCALE: 1"=100'

100 0 100
FEET

N

NOTES

1. ALL SITE DEMOLITION REQUIRED TO COMPLETE CONTRACT WORK IS RESPONSIBILITY OF CONTRACTOR.
2. UNLESS OTHERWISE NOTED, ALL ITEMS MARKED FOR DEMOLITION AND/OR REMOVAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PER THE SPECIFICATIONS.
3. MONITORING WELLS MW-2, MW-3, AND MW-4 LOCATED WITHIN REMEDIAL EXCAVATION AND SHORELINE GRADING AREAS SHALL BE ABANDONED IN ACCORDANCE WITH WASHINGTON DEPARTMENT OF ECOLOGY REQUIREMENTS (WAC 173-160-381).
4. CONTRACTOR SHALL CLEAR AND GRUB VEGETATION AS NECESSARY TO CONSTRUCT TEMPORARY ACCESS ROUTES ON THE SITE AND INSTALL TESC BMPS. TEMPORARY ACCESS ROUTES SHALL BE APPROVED BY ECOLOGY'S REPRESENTATIVE PRIOR TO CLEARING AND GRUBBING.
5. CONTRACTOR SHALL CLEAR AND GRUB VEGETATION WITHIN LIMITS OF UPLAND SOIL CAP AREAS AS REQUIRED TO CONSTRUCT SOIL CAP PER SHEET C2.0 AND SPECIFICATIONS.
6. CONTRACTOR SHALL CLEAR AND GRUB VEGETATION WITHIN LIMITS OF REMEDIAL EXCAVATION AREAS AND SHORELINE GRADING AREAS AS REQUIRED TO PERFORM EXCAVATION AND GRADING PER SHEETS C1.0 AND C3.0 AND THE SPECIFICATIONS. ADDITIONAL AREA OUTSIDE THE EXCAVATION AND GRADING LIMITS MAY BE CLEARED AND GRUBBED TO ACCOMMODATE EQUIPMENT AND AND/OR MATERIAL STAGING, PER APPROVAL OF ECOLOGY'S REPRESENTATIVE.
7. SUBGRADE VEGETATION (ROOTBALLS, ETC.) REMOVED FROM WITHIN THE LIMITS OF REMEDIAL EXCAVATION AREAS SHALL BE DISPOSED OF WITH CONTAMINATED SOILS. SUBGRADE VEGETATION REMOVED FROM OUTSIDE THE LIMITS OF REMEDIAL EXCAVATION SHALL BE CLEANED OF SOIL TO THE EXTENT PRACTICAL AND STOCKPILED ON SITE FOR DISPOSAL AS WOOD WASTE OR USED ON SITE DURING RESTORATION.
8. CONTRACTOR SHALL DEMOLISH THE CONCRETE TANK, INCLUDING WALLS AND FLOOR, AND DISPOSE OF ANY DEBRIS GENERATED BY THE DEMOLITION. THE WEST SIDE OF THE TANK THAT IS PARTLY BELOW GRADE SHALL BE DEMOLISHED, STABILIZED, AND BACKFILLED IN A MANNER THAT WILL PREVENT COLLAPSE OF THE SOIL AGAINST THE TANK.
9. REMNANT FOUNDATIONS OF FORMER BRICK KILNS SHALL BE LEFT IN PLACE AND PROTECTED DURING CONSTRUCTION (SOUTH OF LIMITS OF REMEDIAL EXCAVATIONS) OR MOVED TO A NEARBY LOCATION TO BE RELOCATED FOLLOWING COMPLETION OF GRADING ACTIVITIES.

LEGEND

- LIMITS OF SOIL CAP
- LIMITS OF REMEDIAL EXCAVATION
- LIMITS SHORELINE GRADING AND RESTORATION
- MONITORING WELL TO BE ABANDONED
- MONITORING WELL TO BE PROTECTED
- CONCRETE TANK TO BE DEMOLISHED
- APPROXIMATE LOCATION OF BRICK KILN STRUCTURE

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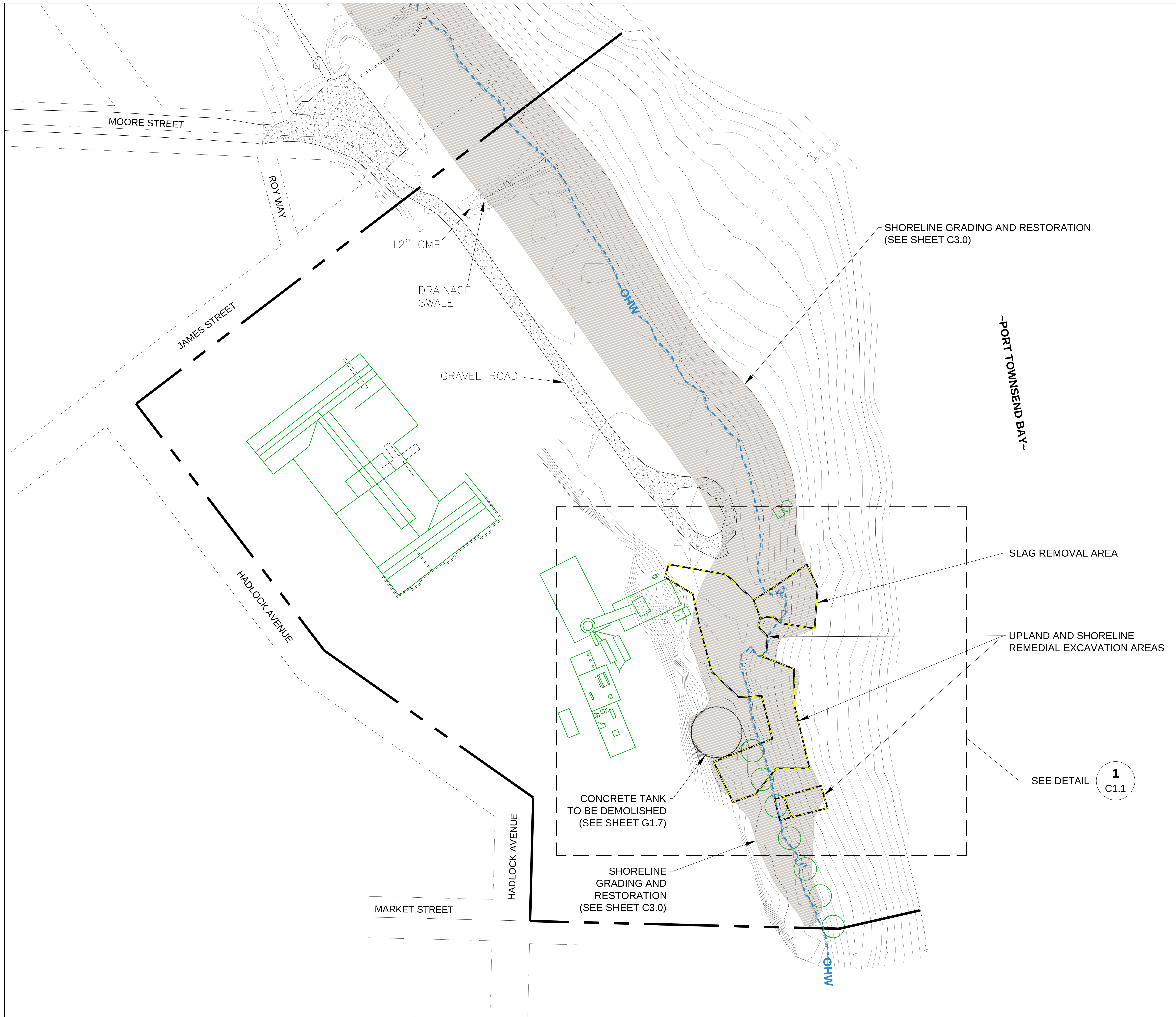
SITE DEMOLITION PLAN

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	G1.7

100-PERCENT DESIGN



REMEDIAL EXCAVATION PLAN

SCALE: 1"=80'

80 0 80
FEET

N

CONTAMINATED SOIL AND SEDIMENT REMOVAL NOTES

1. CONTRACTOR SHALL PREPARE A REMEDIAL EXCAVATION PLAN TO BE SUBMITTED TO ECOLOGY FOR APPROVAL. THE REMEDIAL EXCAVATION PLAN SHALL OUTLINE PROPOSED PROCEDURES FOR EXCAVATION OF CONTAMINATED UPLAND SOIL AND MARINE SEDIMENT, INCLUDING: METHODS FOR MAINTAINING STABLE SIDEWALLS; METHODS FOR DEWATERING IN-PLACE OR EXCAVATED SOIL AND SEDIMENT, IF NECESSARY; METHODS FOR REMOVING CONTAMINATED SEDIMENTS TO THE EXTENT PRESENTED IN THE CONTRACT DRAWINGS; METHODS FOR EXCAVATING CONTAMINATED UPLAND SOIL; METHODS FOR MAINTAINING UPLAND EXCAVATIONS OPEN TO ALLOW CONFIRMATION SAMPLING; AND METHODS TO PREVENT CROSS-CONTAMINATION OF CLEAN BACKFILL BY CONTAMINATED MEDIA. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF ANY PROPOSED SHORING AND/OR DEWATERING SYSTEMS.
2. ALL MONITORING WELLS WITHIN EXCAVATION AREAS SHALL BE ABANDONED IN ACCORDANCE WITH WASHINGTON DEPARTMENT OF ECOLOGY REQUIREMENTS (WAC 173-160-381).
3. ALL CONSTRUCTION VEHICLE INGRESS AND EGRESS SHALL BE PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION PHASING/TRAFFIC CONTROL PLANS ON DRAWING G1.3.
4. CONTRACTOR MUST ADHERE TO ALL TERMS AND CONDITIONS SPECIFIED IN THE USACE NATIONWIDE PERMIT 38 FOR THE PROJECT.
5. THE CONTRACTOR SHALL PERFORM IN-WATER WORK (BELOW OHW) ONLY DURING THE PERIODS OF JULY 16 THROUGH OCTOBER 14, 2012.
6. EXCAVATION OF CONTAMINATED MARINE SEDIMENT BELOW OHW SHALL NOT OCCUR WHEN THE IMMEDIATE WORK AREA IS INUNDATED BY TIDAL WATERS. CONTINUED WORK AS TIDE RISES IS ALLOWED IF BEHIND SHORING THAT LIMITS INFILTRATION OF TIDE WATERS AND PREVENTS RELEASE OF CONSTRUCTION WATER DIRECTLY TO TIDE WATER .
7. WATER QUALITY SHALL BE MAINTAINED TO WITHIN PROJECT PERMIT LIMITS AT ALL TIMES. CONTRACTOR SHALL UTILIZE BEST MANAGEMENT PRACTICES TO MINIMIZE TURBIDITY AND CONTAIN TURBID WATERS, SHEEN, AND DEBRIS WITHIN THE WORK AREA.
8. WORK IN THE INTERTIDAL ZONE WILL TAKE PLACE, WHENEVER POSSIBLE, AROUND THE TIDE CYCLE AND BE PERFORMED WHILE THE SITE IS EXPOSED. FOR WORK THAT REQUIRES LONGER THAN ONE LOW TIDE CYCLE, MEASURES WILL BE TAKEN TO CONTAIN SEDIMENTS (SHEET-PILE CONTAINMENT WALL, ANCHORED SILT CURTAIN, OR EQUIVALENT) .
9. VESSEL SPECIFICATIONS, NAVIGATION, AND MOORAGE SHALL BE COMPLETED IN ACCORDANCE WITH ALL U.S. COAST GUARD, STATE, AND LOCAL REGULATIONS, AND CONTRACTOR'S VESSEL MANAGEMENT PLAN.
10. EXTENT OF CONTAMINATED SOIL AND SEDIMENT AND ESTIMATED LIMITS OF REMEDIAL EXCAVATION ARE BASED ON REGULATORY REQUIREMENTS AND THE EXISTING CHEMICAL ANALYTICAL AND FIELD SCREENING DATA FOR SOIL COLLECTED AT THE SAMPLE LOCATIONS SHOWN ON DRAWING. CONTRACTOR SHALL EXCAVATE SOIL AND SEDIMENT FROM THE DESIGNATED AREAS AS DIRECTED BY ECOLOGY'S REPRESENTATIVE BASED ON FIELD SCREENING AND CHEMICAL ANALYTICAL RESULTS. THE FINAL QUANTITY OF CONTAMINATED SOIL AND/OR SEDIMENT REMOVED, DISPOSED OF, AND REPLACED WITH BACKFILL MAY BE MORE OR LESS THAN THE QUANTITY ASSUMED IN THE RESPECTIVE LUMP SUM BASE BID ITEMS.
11. SEE CROSS SECTIONS ON DRAWINGS C1.3 THROUGH C1.5 FOR APPROXIMATE VERTICAL EXTENT OF CONTAMINATED SOIL.
12. REMEDIAL EXCAVATION BELOW OHW AND DEEPER THAN 3-FEET BELOW ORIGINAL MUDLINE SHALL UTILIZE APPROVED SHORING METHODS TO ACHIEVE PROPER STABLE SIDEWALL SLOPES AND TO PREVENT TIDE WATER FROM INUNDATING THE EXCAVATION. SHEET PILE SHORING, OR EQUIVALENT, SHALL BE DESIGNED BY CONTRACTOR AND INSTALLED IN A MANNER THAT PREVENTS COLLAPSE OF EXCAVATION SIDEWALLS OR SHORING COMPONENTS, LIMITS INUNDATION OF TIDE WATERS DURING HIGH TIDE PERIODS, AND LIMITS GROUNDWATER FLOW INTO THE EXCAVATION FROM THE UPLAND SIDE OF THE CONTAMINATED SEDIMENT EXCAVATION AREA. SHEET PILE, OR EQUIVALENT SHORING COMPONENTS INSTALLED BELOW OHW, MUST BE DRIVEN DURING PERIODS OF LOW TIDE SUCH THAT SHEET PILE IS DRIVEN DIRECTLY INTO EXPOSED SEDIMENT AND NOT THROUGH TIDE WATER. SHEET PILE, OR EQUIVALENT SHORING COMPONENTS INSTALLED BELOW OHW, MUST BE DRIVEN USING A VIBRATORY HAMMER AS PER PERMITS .
13. THE CONTRACTOR SHALL MAINTAIN EXCAVATION BASES OPEN AND ACCESSIBLE, INCLUDING UPLAND SOIL AND MARINE SEDIMENT EXCAVATION AREAS, TO ALLOW ECOLOGY'S REPRESENTATIVE TO COLLECT EXCAVATION LIMIT VERIFICATION SAMPLES. FINAL VERTICAL LIMITS OF EXCAVATION WILL BE DICTATED BY CHEMICAL ANALYTICAL RESULTS OF BASE VERIFICATION SAMPLING AND THE EXCAVATION BASE MUST BE MAINTAINED OPEN UNTIL CHEMICAL ANALYTICAL VERIFICATION IS COMPLETED. ECOLOGY WILL CONTRACT WITH A MOBILE LABORATORY TO PERFORM SAME-DAY PETROLEUM HYDROCARBON CHEMICAL ANALYSIS OF VERIFICATION SAMPLES COLLECTED FROM THE BASE AND SIDEWALLS OF MARINE SEDIMENT EXCAVATION AREAS AND THE UPLAND SOIL EXCAVATION AREAS SOUTH OF THE CONCRETE TANK STRUCTURE. UPLAND EXCAVATION AREAS NORTH OF THE CONCRETE TANK REQUIRING VERIFICATION SAMPLES TO BE ANALYZED FOR METALS WILL BE SUBMITTED TO AN OFF-SITE ANALYTICAL LABORATORY FOR EXPEDITED ANALYSIS.
14. ALL EXCAVATION ACTIVITIES WILL BE MONITORED BY ECOLOGY-CONTRACTED ARCHEOLOGICAL RESOURCES SPECIALIST IN ACCORDANCE WITH THE CULTURAL RESOURCES MONITORING AND DISCOVERY PLAN. DISCOVERY OF POTENTIAL ARTIFACTS MAY RESULT IN TEMPORARY WORK STOPPAGES.
15. REMNANTS OF FORMER BRICK KILN STRUCTURES LOCATED OUTSIDE OF REMEDIAL EXCAVATIONS SHALL BE LEFT IN PLACE AND PROTECTED. REMNANTS OF FORMER BRICK KILN STRUCTURES WITHIN REMEDIAL EXCAVATIONS SHALL BE REMOVED PRIOR TO EXCAVATION IN A MANNER THAT LIMITS FURTHER DAMAGE, STORED ON SITE AND PROTECTED DURING EXCAVATION, AND RETURNED TO ORIGINAL LOCATIONS FOLLOWING COMPLETION OF FINAL GRADING
16. AREAS USED TO TEMPORARILY STOCKPILE EXCAVATED SOIL SHALL BE LOCATED WITHIN THE PROJECT LIMITS AT A LOCATION APPROVED BY ECOLOGY'S REPRESENTATIVE. EXCAVATED SOIL SHALL BE STOCKPILED AS SHOWN ON DRAWING G1.6. STOCKPILE CHARACTERIZATION TO BE COMPLETED BY OWNER. STOCKPILES MUST BE MAINTAINED DURING CONFIRMATORY TESTING PERIOD(S).
17. SOIL DETERMINED TO BE CONTAMINATED SHALL BE DISPOSED OF OFF-SITE IN ACCORDANCE WITH RCRA AND MTCA REQUIREMENTS.
18. DISPOSAL FACILITIES SHALL BE APPROVED BY ECOLOGY PRIOR TO USE. SOIL TRANSPORTATION TRUCKS AND TRAILERS SHALL BE COVERED DURING ALL OFF-SITE HAULING.
19. SEE SHEETS C3.0 THROUGH C3.8 FOR DETAILS REGARDING BACKFILL MATERIALS AND GRADES.
20. USE OF STOCKPILED MATERIAL AS EXCAVATION BACKFILL (SEE SHEET C3.0) OR AS CAP MATERIAL (SEE SHEET C2.0) TO BE DIRECTED BY OWNER BASED ON CHEMICAL TESTING RESULTS.
21. DISTURBED SURFACES SHALL BE RESTORED IN ACCORDANCE WITH THE SHORELINE GRADING PLAN OUTLINED ON SHEETS C3.0 THROUGH C3.6 AND THE LANDSCAPE RESTORATION PLANS OUTLINED ON SHEETS L1.0 THROUGH L1.3.

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5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action

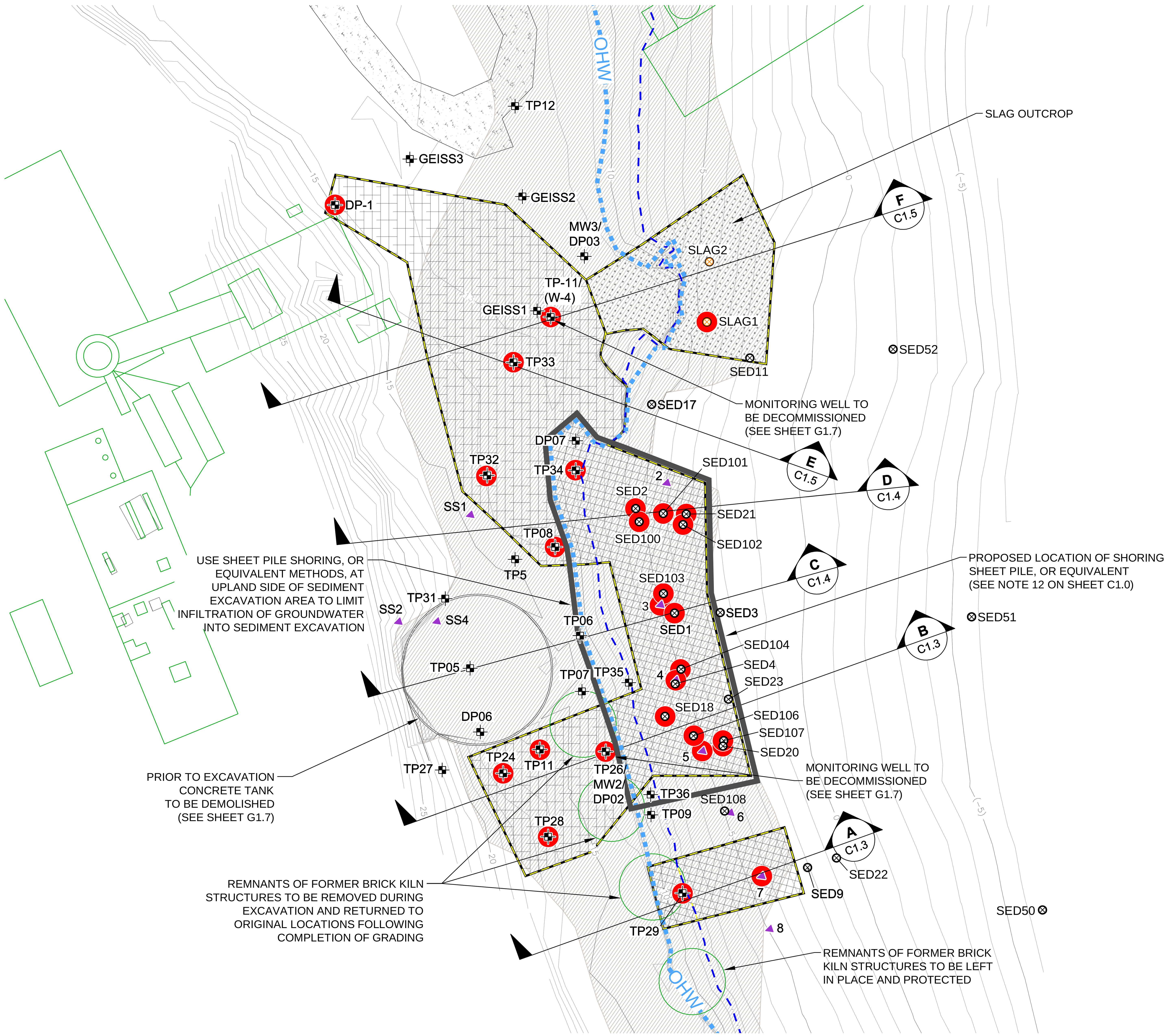
Washington State Department of Ecology

REMEDIAL EXCAVATION PLAN

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: 1"=80'
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	C1.0

100-PERCENT DESIGN

P:\0\0504042\01\CAD\SHEET\CLEANUP ACTION SHEETS\0504042-01 SHEET C1.1 REMEDIAL EXCAVATION DETAILS.DWG\TAB:LAYOUT1 MODIFIED BY TMICHAUD ON MAY 02, 2012 - 15:54



REMEDIAL EXCAVATION LEGEND

- REMEDIAL INVESTIGATION SOIL SAMPLE LOCATION
- PREVIOUS SEDIMENT SAMPLE LOCATION
- REMEDIAL INVESTIGATION SEDIMENT SAMPLE LOCATION
- SLAG SAMPLE LOCATION
- SAMPLE LOCATION EXCEEDING SOIL OR SEDIMENT CLEANUP LEVELS
- OHW — ORDINARY HIGH WATER (OHW)
- ESTIMATED LIMITS OF REMEDIAL EXCAVATION
- PROPOSED LOCATION OF SHEET PILE, OR EQUIVALENT SHORING TO FACILITATE EXCAVATION OF CONTAMINATED SEDIMENT
- CONTAMINATED MARINE SEDIMENT EXCAVATION AREA (BELOW OHW)
- CONTAMINATED UPLAND SOIL EXCAVATION AREA (ABOVE OHW)
- SHORELINE GRADING AND RESTORATION AREA (SEE SHEET C3.0)
- APPROXIMATE LOCATION OF BRICK KILN FOUNDATION REMNANTS, TO BE PRESERVED AND/OR MOVED.
- CONCRETE TANK TO BE DEMOLISHED (SEE SHEET G1.7)

CROSS-SECTION LEGEND

- ESTIMATED LIMITS OF REMEDIAL EXCAVATION
- SOIL REMOVAL FOR BEACH LOCATION
- CONTAMINATED MARINE SEDIMENT EXCAVATION
- CONTAMINATED UPLAND SOIL EXCAVATION
- SAMPLE INTERVAL WHERE SITE CONTAMINANTS WERE EITHER NOT DETECTED OR WERE DETECTED BELOW RESPECTIVE CLEANUP LEVELS
- SAMPLE INTERVAL WHERE SITE CONTAMINANTS WERE DETECTED AT CONCENTRATIONS ABOVE RESPECTIVE CLEANUP LEVELS

TPH	TOTAL PETROLEUM HYDROCARBONS
As	ARSENIC
Cu	COPPER
Fe	IRON
Pb	LEAD
Zn	ZINC

REMEDIAL EXCAVATION DETAILS 1 C1.0

SCALE: 1"=30'

GRAPHIC SCALE

30 0 30

FEET

N

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REMEDIATION EXCAVATION DETAILS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
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SHEET NO. C1.1	

RESERVED

THIS SHEET INTENTIONALLY LEFT BLANK

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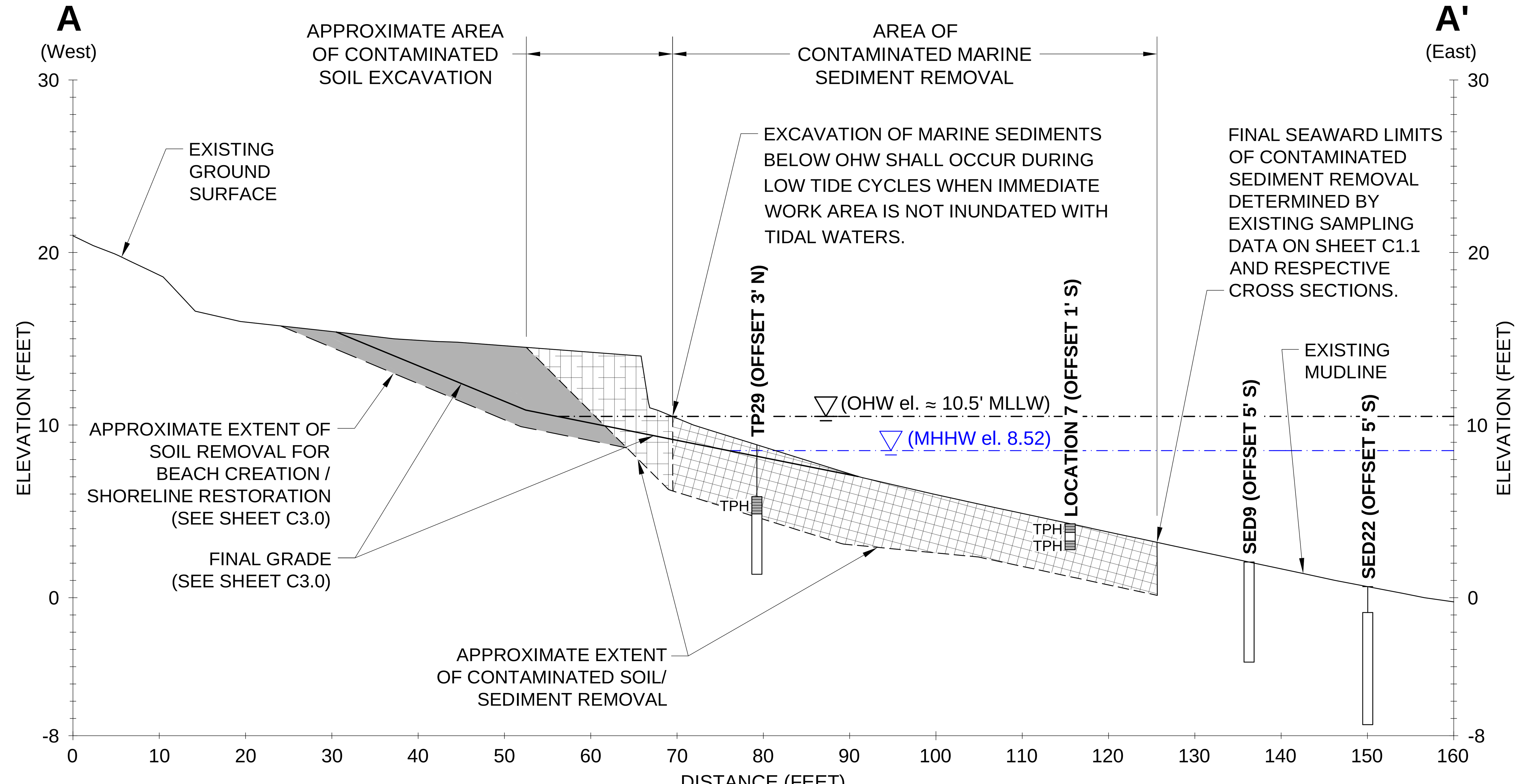
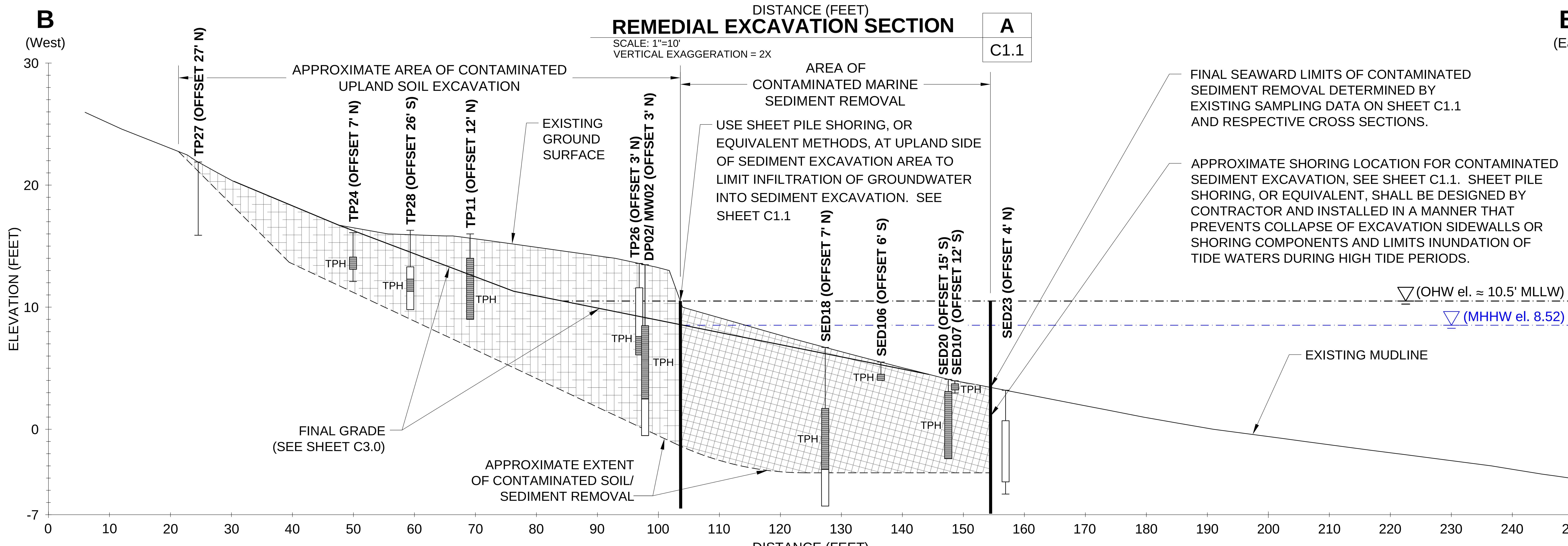
DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C1.2	

100-PERCENT DESIGN



REMEDIAL EXCAVATION SECTION A C1.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X



REMEDIAL EXCAVATION SECTION B C1.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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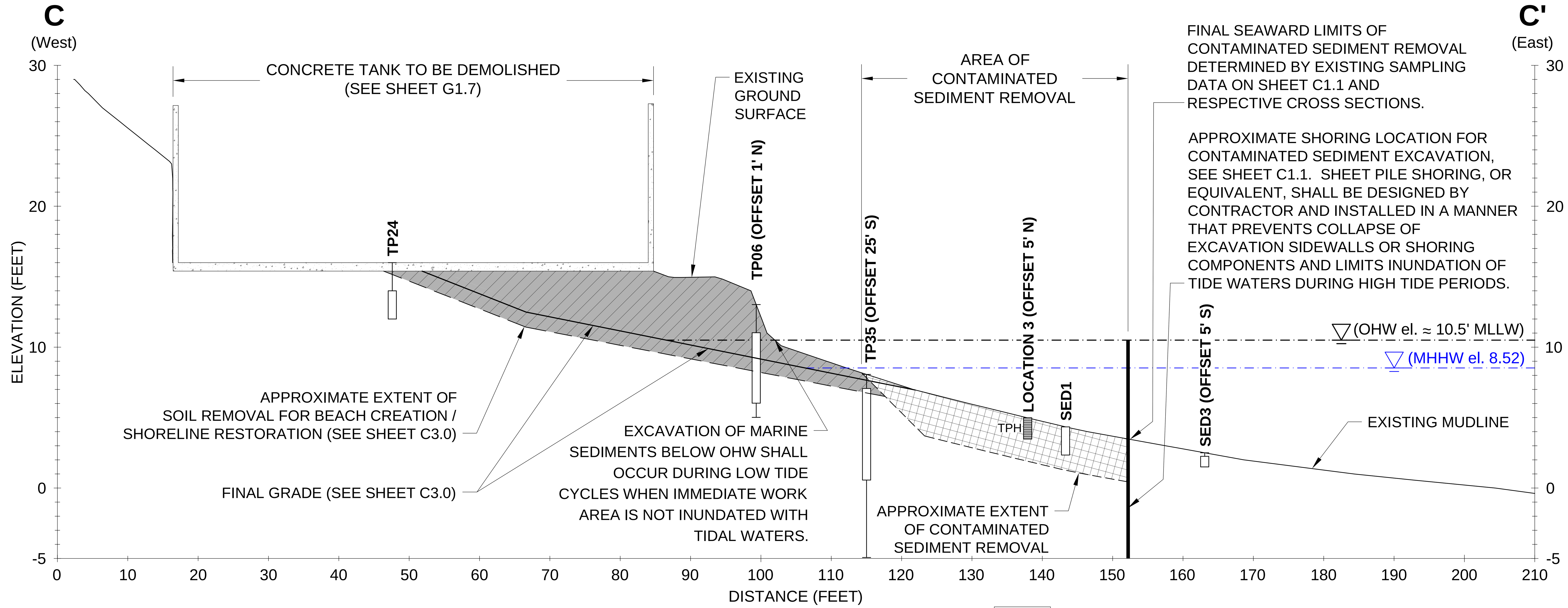
REMEDIAL EXCAVATION SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	C1.3

100-PERCENT DESIGN



REMEDIAL EXCAVATION SECTION C / C1.1

SCALE: 1"=10'
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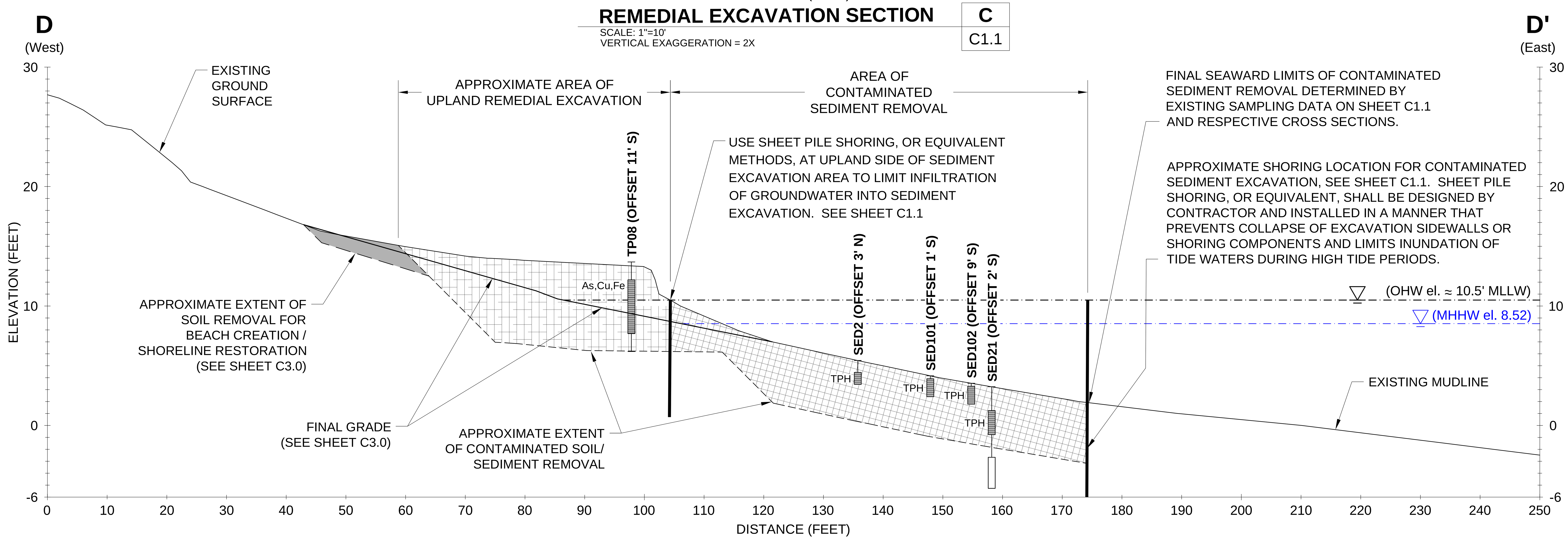

REMEDIAL EXCAVATION SECTION D / C1.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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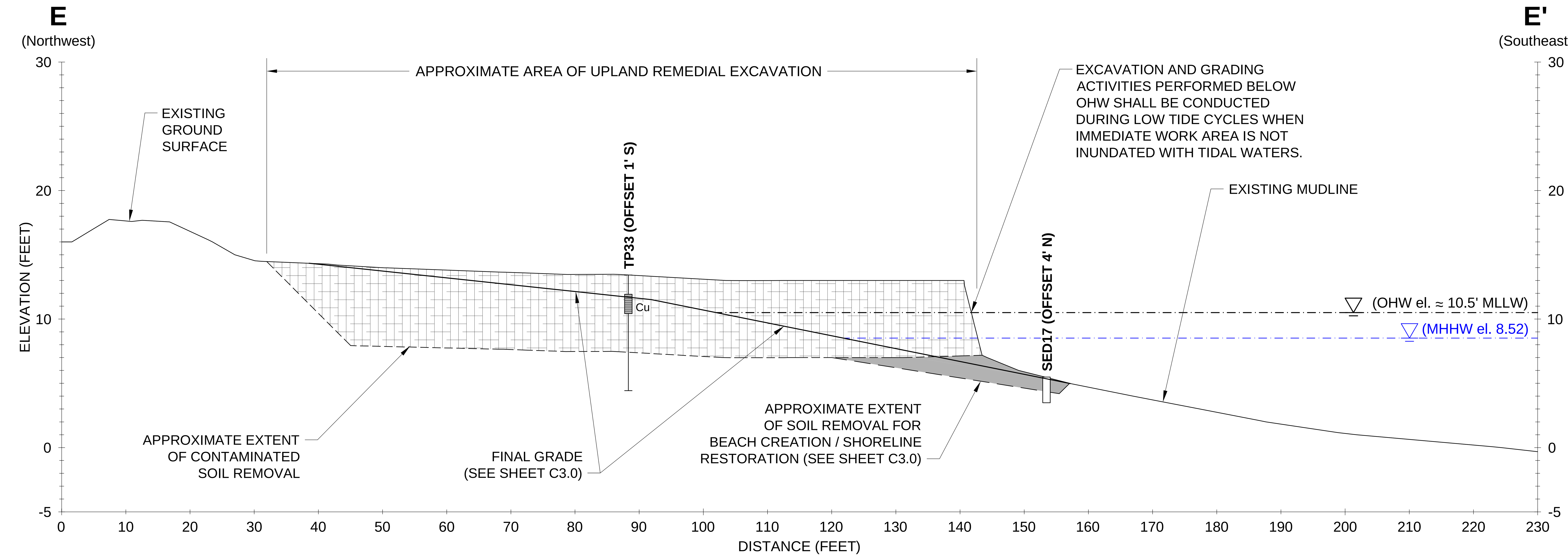
REMEDIAL EXCAVATION SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	C1.4

100-PERCENT DESIGN



REMEDIAL EXCAVATION SECTION E / C1.1
SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

REMEDIAL EXCAVATION SECTION F / C1.1
SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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REMEDIAL EXCAVATION SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
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SHEET NO.	C1.5

100-PERCENT DESIGN

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REMEDIAL CAPPING PLAN

SCALE: 1"=80'

80 0 80
FEET

N

NOTES

1. CONTRACTOR SHALL COMPLETE CLEARING AND GRUBBING AS NECESSARY TO ACCESS CAP AREAS AND PLACE CAP MATERIALS.
2. A 6 TO 12-INCH BEDDING LAYER OF CLEAN SANDY SOIL GENERATED BY SHORELINE GRADING ACTIVITIES SHALL BE PLACED ON CLEARED GROUND SURFACE TO PROVIDE LEVEL BASE FOR GEOTEXTILE.
3. GEOTEXTILE SHALL MEET WSDOT STANDARD SPECIFICATIONS 9-33.2, TABLE 3 FOR SEPERATION USE. INSTALLATION OF GEOTEXTILE SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS 2-12.3.
4. CAP MATERIAL SHALL CONSIST OF CLEAN SANDY SOIL GENERATED BY SHORELINE GRADING ACTIVITIES AT THE SITE, AS AVAILABLE. ADDITIONAL CAP MATERIAL, IF REQUIRED SHALL CONSIST OF CLEAN STRUCTURAL FILL AS DESCRIBED IN THE SPECIFICATIONS.
5. CAP MATERIAL SHALL BE PLACED IN TWO (2) 1-FOOT LIFTS AND LIGHTLY COMPACTED (ROLLED) BETWEEN LIFTS.
6. A 1-FOOT LIFT OF PLANTING SUBSTRATE SHALL BE PLACED ABOVE 2-FOOT THICK CAP. PLANTING SUBSTRATE SHALL BE IMPORTED TOPSOIL MEETING SPECIFICATIONS FOR PLANTING. ALTERNATIVELY, CONTRACTOR GENERATE SUBSTRATE ON SITE BY MIXING IMPORTED SOIL AMENDMENTS WITH CLEAN SANDY SOIL GENERATED BY SHORELINE GRADING TO ACHIEVE PLANTING SUBSTRATE SPECIFICATIONS.
7. HISTORIC CONCRETE STRUCTURES, FOUNDATIONS, AND OTHER OBSTRUCTIONS WITHIN CAP AREAS SHALL BE LEFT IN PLACE AND WORKED AROUND AS SHOWN ON SHEET C2.2, DETAIL 2.
8. CAP EDGES SHALL BE COMPLETED BY TAPERING CAP EDGE AT 2H:1V SLOPE AS SHOWN ON SHEET C2.2.
9. CAP EDGES LOCATED AGAINST STRUCTURES (CONCRETE WALL, ETC.) SHALL BE COMPLETED AS DESCRIBED FOR CAPPING AGAINST OBSTRUCTIONS, AS SHOWN ON SHEET C2.2, DETAIL 2.
10. PLANTING OF CAP SHALL BE AS DIRECTED BY SHEETS L1.0 THROUGH L1.2.

LEGEND

Limits of Environmental Cap Construction

Approximate Location of Historic Iron and Steel Mill Components and Structures

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DESIGN:	CLB	SCALE:	1"=80'
CHECKED:	DAC	DATE:	8/31/11
SHEET NO.	C2.0		

100-PERCENT DESIGN

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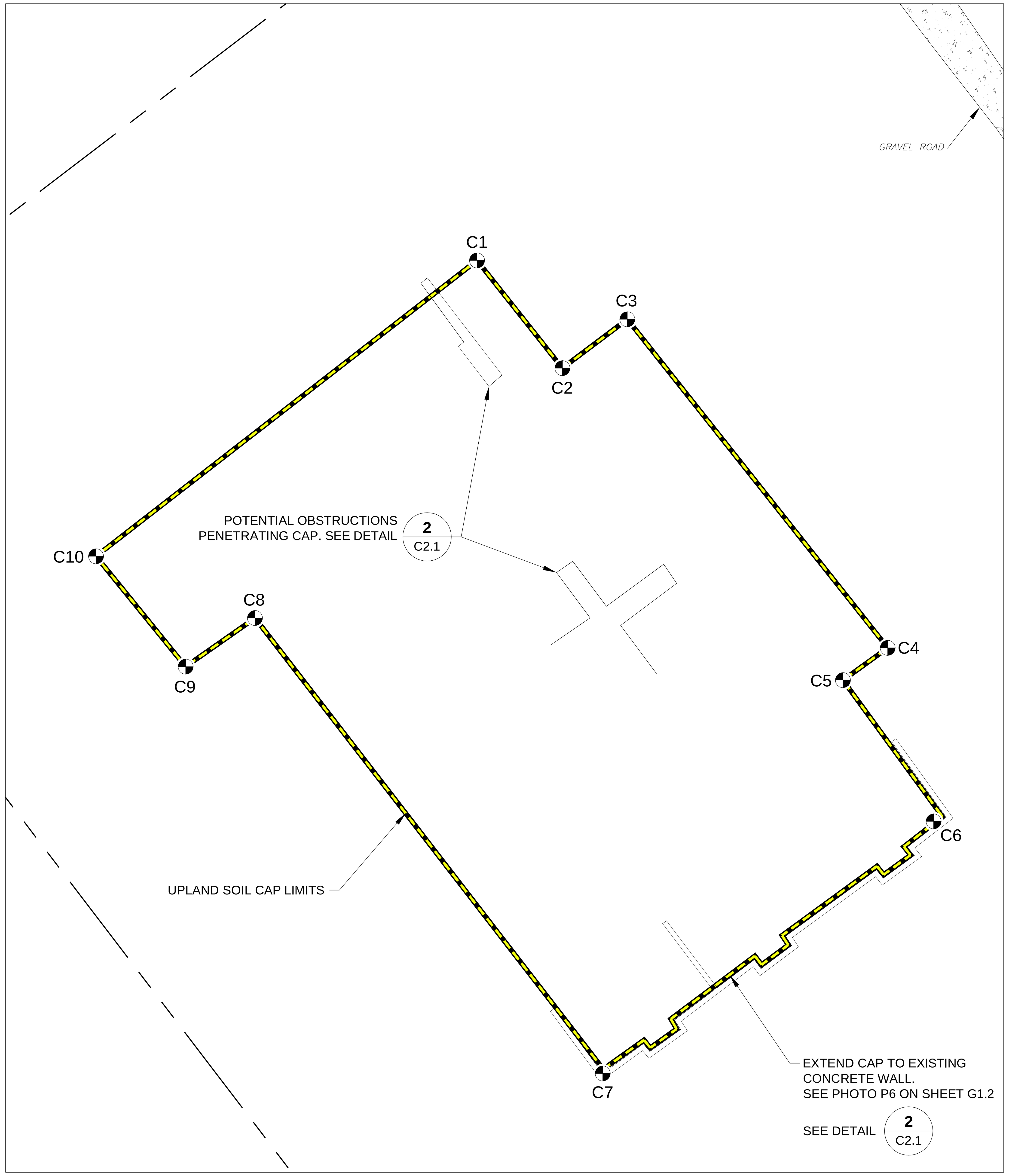

REMEDIAL CAPPING DETAILS 1 C2.0

SCALE: 1"=30'

GRAPHIC SCALE N

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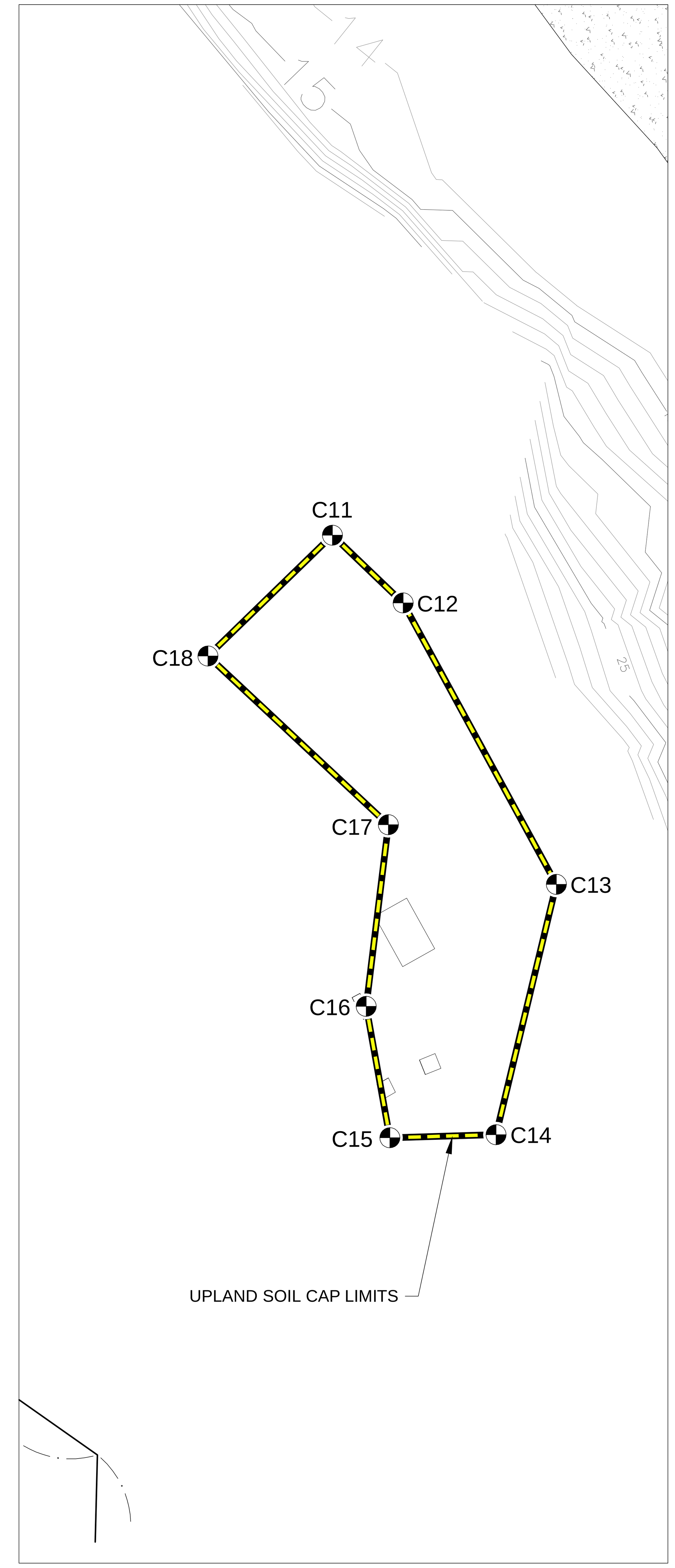
FEET



REMEDIAL CAPPING DETAILS 2 C2.0

SCALE: 1"=30'

GRAPHIC SCALE N

30 0 30
FEET

Cap Control Point Coordinates				
Point No.	Northing	Easting	Longitude	Latitude
C1	386660.2129	1167139.7104	W-122° 46' 06.02"	N048° 02' 37.32"
C2	386617.4709	1167173.5844	W-122° 46' 05.51"	N048° 02' 36.90"
C3	386636.8405	1167199.3698	W-122° 46' 05.14"	N048° 02' 37.10"
C4	386506.4570	1167302.7017	W-122° 46' 03.57"	N048° 02' 35.84"
C5	386493.6373	1167284.9481	W-122° 46' 03.82"	N048° 02' 35.71"
C6	386437.5812	1167320.9209	W-122° 46' 03.27"	N048° 02' 35.16
C7	386337.5480	1167189.5920	W-122° 46' 05.17"	N048° 02' 34.14"
C8	386518.2813	1167051.5876	W-122° 46' 07.27"	N048° 02' 35.89"
C9	386499.0158	1167024.0572	W-122° 46' 07.66"	N048° 02' 35.70"
C10	386542.7989	1166988.5052	W-122° 46' 08.20"	N048° 02' 36.12"
C11	386342.7677	1167439.5564	W-122° 46' 01.49"	N048° 02' 34.26"
C12	386322.5991	1167460.5991	W-122° 46' 01.18"	N048° 02' 34.06"
C13	386238.8670	1167506.1994	W-122° 46' 00.47"	N048° 02' 33.25"
C14	386164.3819	1167488.2669	W-122° 46' 00.71"	N048° 02' 32.51"
C15	386163.4601	1167456.6599	W-122° 46' 01.17"	N048° 02' 32.49"
C16	386202.5492	1167449.6154	W-122° 46' 01.29"	N048° 02' 32.88"
C17	386256.5999	1167456.2110	W-122° 46' 01.22"	N048° 02' 33.41"
C18	386306.8008	1167402.5289	W-122° 46' 02.02"	N048° 02' 33.89"

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REMEDIATION CAPPING DETAILS

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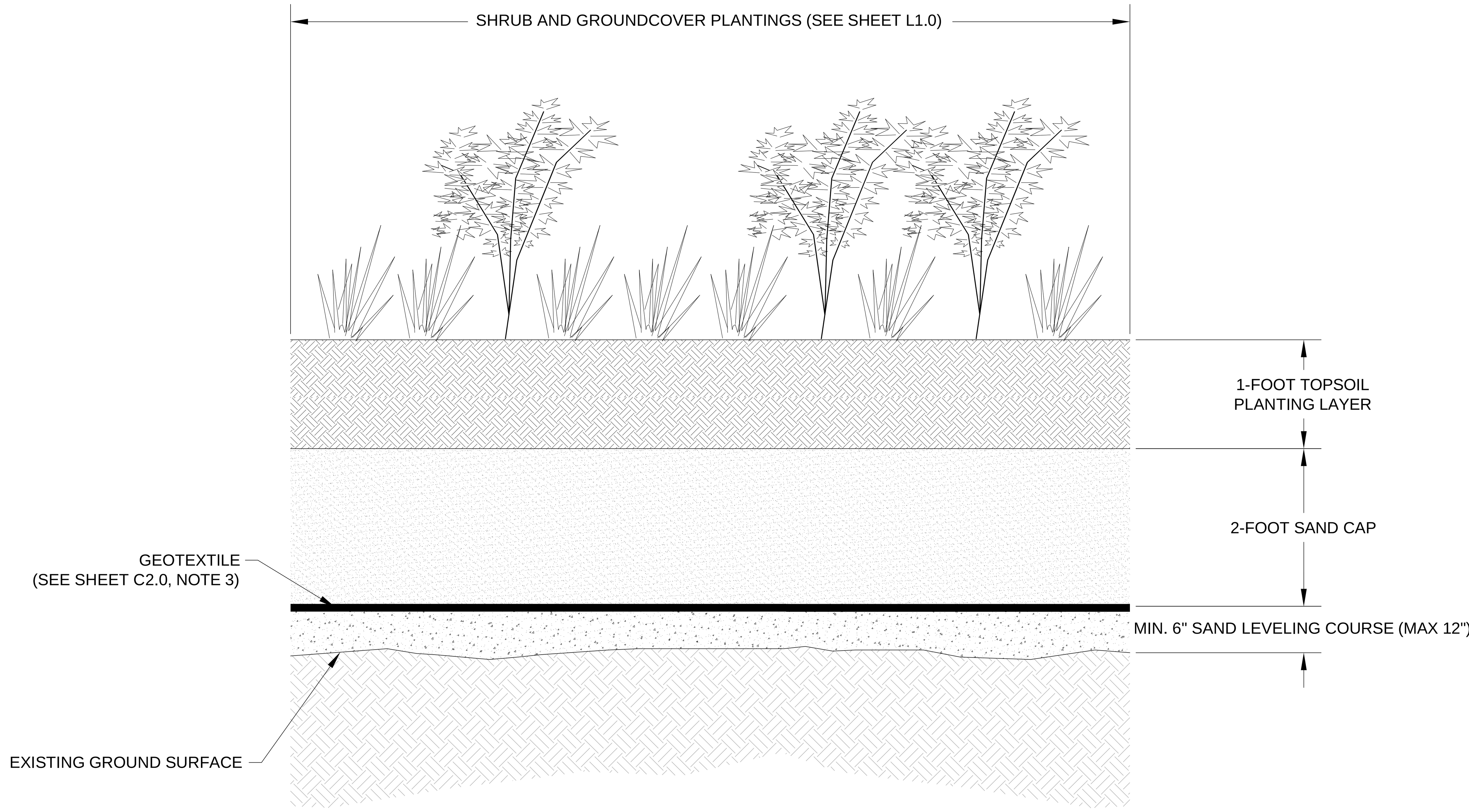
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C2.1	

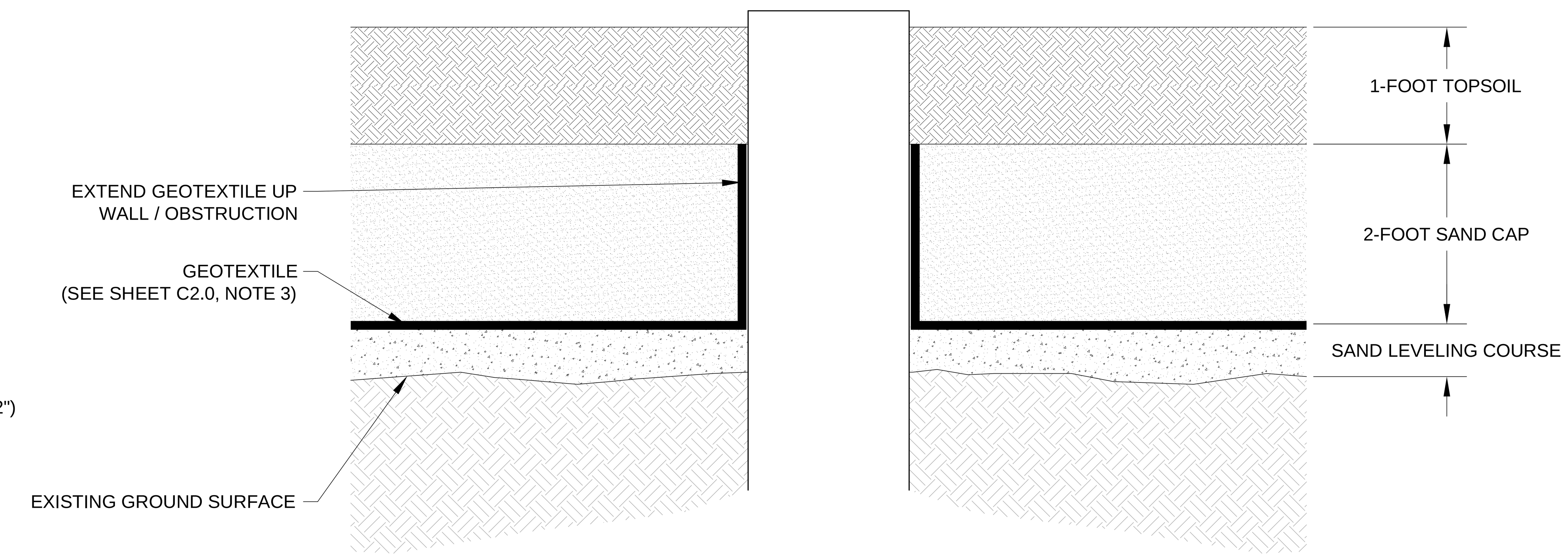
100-PERCENT DESIGN

P:\0\0504042\01\CAD\SHEET\Cleanup Action Sheets\0504042-01 Sheet C2.1_2 Remedial Capping Details.dwg\TAB:C2.1 modified by tmichaud on May 02, 2012 - 16:02



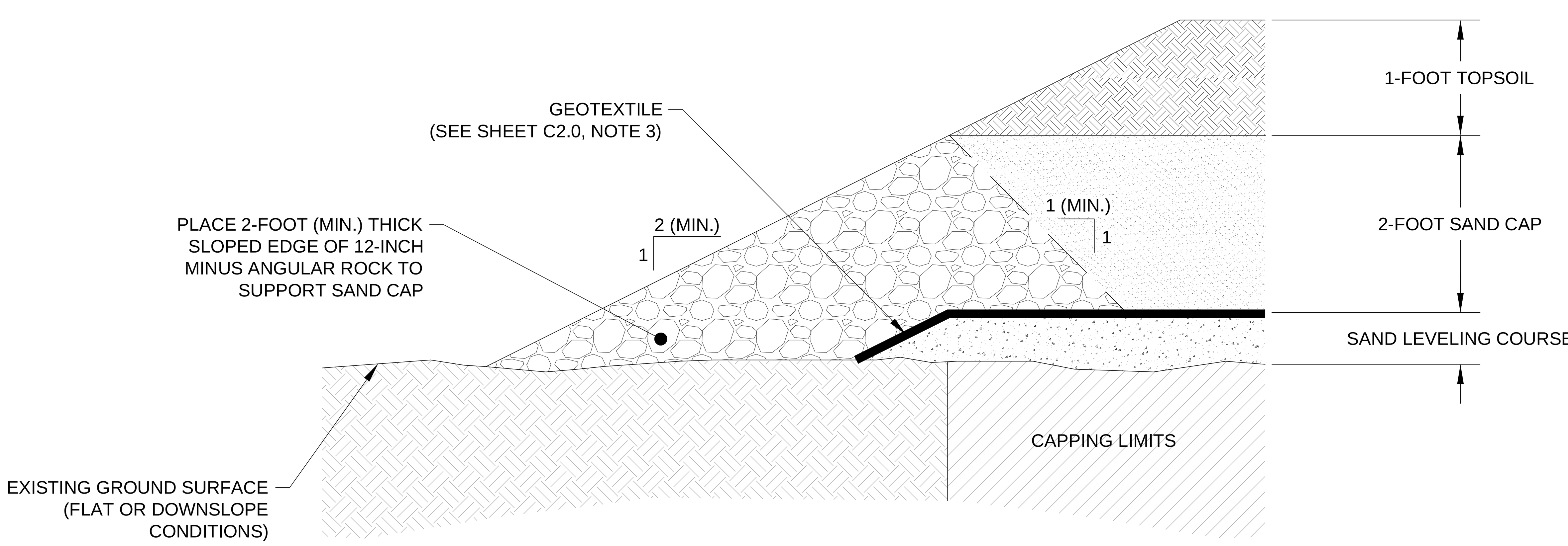
TYPICAL UPLAND SOIL CAP CROSS-SECTION 1 C2.1

NTS



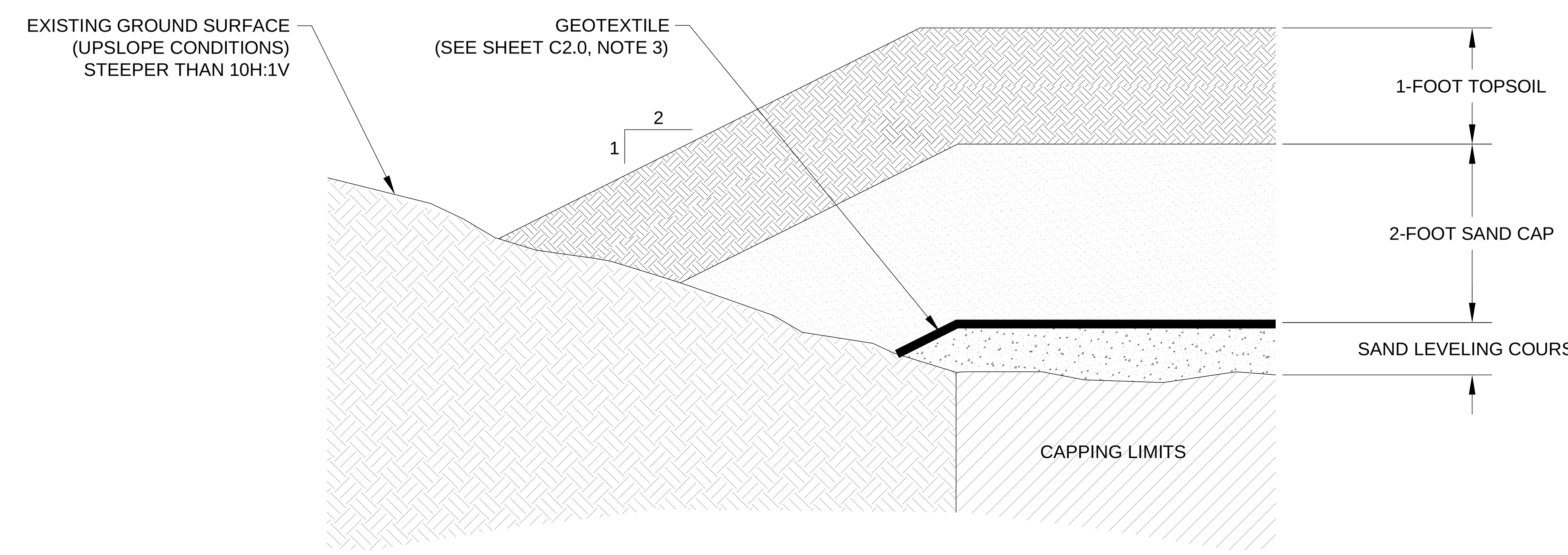
TYPICAL UPLAND SOIL CAP OBSTRUCTION DETAIL 2 C2.1

NTS



TYPICAL UPLAND SOIL CAP EDGE CROSS-SECTION (FLAT OR DOWNSLOPE) 3 C2.1

NTS



TYPICAL UPLAND SOIL CAP EDGE CROSS-SECTION (UPSLOPE SURFACES) 4 C2.1

NTS

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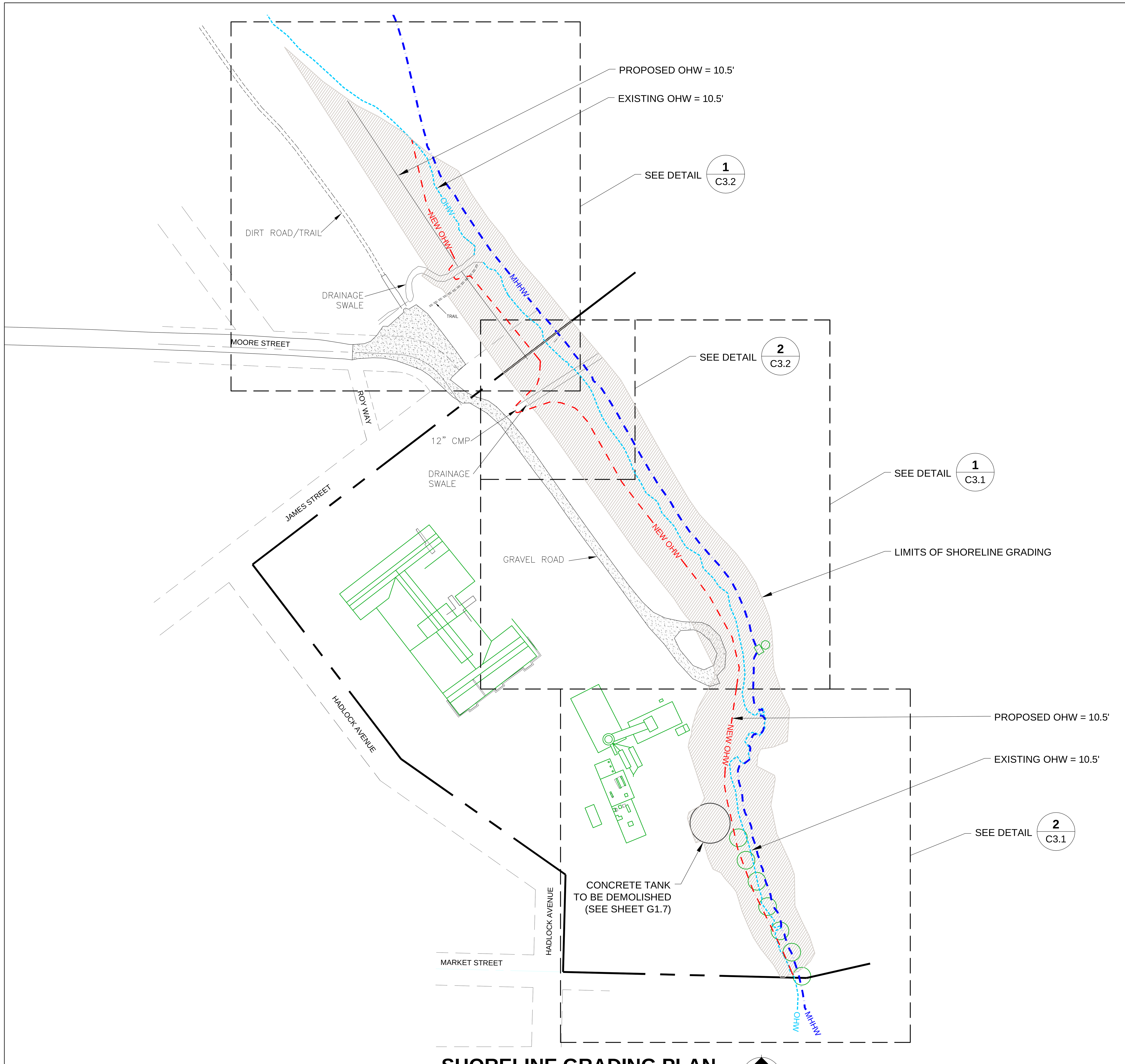
REMEDIATION CAPPING DETAILS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C2.2	

P:\0\0504042\01\CAD\SHEET\Cleanup Action Sheets\0504042-01 Sheet C2.1_2 Remedial Capping Details.dwg\TAB:C2.2 modified by tmichaud on May 02, 2012 - 16:01



SHORELINE GRADING PLAN

SCALE: 1"=100'

100 0 100
FEET

N

NOTES

1. CONTRACTOR SHALL GRADE UPLAND SURFACE SOIL AND MARINE SEDIMENT WITHIN LIMITS SHOWN TO ACHIEVE PROPOSED GRADES AS SHOWN ON SHEETS C3.2 THROUGH C3.10.
2. ALL CONSTRUCTION VEHICLE INGRESS AND EGRESS SHALL BE PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION PHASING/TRAFFIC CONTROL PLANS ON DRAWING G1.3.
3. CONTRACTOR MUST ADHERE TO ALL TERMS AND CONDITIONS SPECIFIED IN THE USACE NATIONWIDE PERMIT 38 FOR THE PROJECT.
4. THE CONTRACTOR SHALL PERFORM IN-WATER WORK (BELOW OHW) ONLY DURING THE PERIODS OF JULY 16 THROUGH OCTOBER 14, 2012.
5. EXCAVATION OF CONTAMINATED MARINE SEDIMENT BELOW OHW SHALL NOT OCCUR WHEN THE IMMEDIATE WORK AREA IS INUNDATED BY TIDAL WATERS. CONTINUED WORK AS TIDE RISES IS ALLOWED IF BEHIND SHORING THAT LIMITS INFILTRATION OF TIDE WATERS AND PREVENTS RELEASE OF CONSTRUCTION WATER DIRECTLY TO TIDE WATER.
6. WATER QUALITY SHALL BE MAINTAINED TO WITHIN PROJECT PERMIT LIMITS AT ALL TIMES. CONTRACTOR SHALL UTILIZE BEST MANAGEMENT PRACTICES TO MINIMIZE TURBIDITY AND CONTAIN TURBID WATERS, SHEEN, AND DEBRIS WITHIN THE WORK AREA.
7. WORK IN THE INTERTIDAL ZONE WILL TAKE PLACE, WHENEVER POSSIBLE, AROUND THE TIDE CYCLE AND BE PERFORMED WHILE THE SITE IS EXPOSED. FOR WORK OUTSIDE AREAS OF CONTAMINATED SEDIMENT THAT REQUIRES LONGER THAN ONE LOW TIDE CYCLE, AN ANCHORED SILT CURTAIN WILL BE USED TO CONTAIN SEDIMENTS. FOR AREAS WHERE CONTAMINATED SEDIMENT IS EXCAVATED BEHIND SHORING, AS PRESENTED ON SHEET C1.1, BACKFILL OF THE CONTAMINATED SEDIMENT EXCAVATIONS SHALL BE COMPLETED PRIOR TO REMOVING SHORING.
8. VESSEL SPECIFICATIONS, NAVIGATION, AND MOORAGE SHALL BE COMPLETED IN ACCORDANCE WITH ALL U.S. COAST GUARD, STATE, AND LOCAL REGULATIONS, AND CONTRACTOR'S VESSEL MANAGEMENT PLAN.
9. AREAS WITH MATERIAL TO BE REMOVED FOR SHORELINE GRADING PURPOSES ONLY, OUTSIDE OF REMEDIAL EXCAVATION AREAS, SHALL BE GRADED TO PROPOSED FINAL GRADE SHOWN ON DRAWINGS AND MADE ACCESSIBLE TO ECOLOGY'S REPRESENTATIVE TO DETERMINE IF NATIVE MATERIAL AT GRADE IS SUITABLE AS FINAL SURFACE MATERIAL. IF NATIVE MATERIAL AT PROPOSED FINAL GRADE IS UNSUITABLE, CONTRACTOR SHALL EXCAVATE AN ADDITIONAL 1-FOOT OF MATERIAL BELOW PROPOSED FINAL GRADE.
10. ALL EXCAVATION ACTIVITIES WILL BE MONITORED BY ECOLOGY-CONTRACTED ARCHEOLOGICAL RESOURCES SPECIALIST IN ACCORDANCE WITH THE CULTURAL RESOURCES MONITORING AND DISCOVERY PLAN. DISCOVERY OF POTENTIAL ARTIFACTS MAY RESULT IN TEMPORARY WORK STOPPAGES.
11. SOIL AND SEDIMENT EXCAVATED OUTSIDE OF REMEDIAL EXCAVATION AREAS WILL BE STOCKPILED ON SITE AND USED FOR BACKFILLING REMEDIAL EXCAVATIONS AND AS UPLAND CAP MATERIAL. MATERIAL EXCAVATED OUTSIDE OF REMEDIAL EXCAVATIONS SHALL BE STOCKPILED SEPERATELY FROM POTENTIALLY CONTAMINATED SOIL AND SEDIMENT FROM REMEDIAL EXCAVATION AREAS. ALL STOCKPILED MATERIAL WILL BE SAMPLED FOR VERIFICATION OF CONTAMINANT CONCENTRATIONS BY ECOLOGY'S REPRESENTATIVE.
12. STOCKPILED MATERIAL WILL BE EVALUATED BY ECOLOGY'S REPRESENTATIVE FOR SUITABILITY FOR BACKFILL USE PRIOR TO APPROVAL FOR USE AS BACKFILL.
13. SHORELINE EXCAVATION IN AREAS NORTH OF SLAG OUTCROP SHALL BE PERFORMED PRIOR TO OR CONCURRENT WITH REMEDIAL EXCAVATION (SHEET C1.0) AND ENVIRONMENTAL CAPPING (SHEET C2.0) TO ENSURE AVAILABILITY OF BACKFILL AND CAP MATERIAL.
14. DRAINAGE SWALE LOCATED AT NORTH END OF JEFFERSON COUNTY PROPERTY (SHEET C3.2, DETAIL 2) SHALL BE REGRADED PER THE LINES PRESENTED ON THE DRAWINGS, WITHOUT ALTERING THE 12-INCH CMP CULVERT.
15. REMEDIAL EXCAVATION AREAS WATER-WARD OF PROPOSED NEW OHW SHALL BE BACKFILLED TO PROPOSED FINAL GRADE WITH VERIFIED CLEAN AND SUITABLE SAND BACKFILL MATERIAL GENERATED ON SITE. REMEDIAL EXCAVATION AREAS ABOVE PROPOSED NEW OHW SHALL BE BACKFILLED TO 1-FOOT BELOW PROPOSED FINAL GRADE WITH VERIFIED CLEAN BACKFILL MATERIAL GENERATED ON SITE.
16. THE UPPER 1-FOOT OF ALL EXCAVATION AREAS ABOVE PROPOSED NEW OHW SHALL BE BACKFILLED TO PROPOSED FINAL GRADE WITH TOPSOIL MEETING SPECIFICATIONS FOR PLANTING.
17. AREA WITHIN 6,000 BARREL OPEN TOP CONCRETE TANK SHALL BE BACKFILLED CONCURRENT WITH DEMOLITION (SEE SHEET G1.7) TO THE EXTENT POSSIBLE TO PREVENT COLLAPSE OF NATIVE SOIL AGAINST THE WALL OF THE TANK.
18. LARGE WOODY DEBRIS SHALL BE PLACED ALONG THE PROPOSED NEW OHW IN ACCORDANCE WITH THE LANDSCAPE AND RESTORATION PLAN DRAWING L1.0.
19. GRAVEL TURNAROUND AT SOUTHERN END OF EXISTING ACCESS ROAD SHALL BE REMOVED AS NEEDED TO ACHIEVE GRADING AND RESTORED IN ACCORDANCE WITH THE LANDSCAPE AND RESTORATION PLAN DRAWING L1.0.

LEGEND

Concrete Tank to be Removed

Approximate location of Historic Kiln

Approximate Location of new OHW

Limits of Shoreline Grading for Restoration

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NO.	DATE	BY	REVISION
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Irondale Iron and Steel Plant Cleanup Action

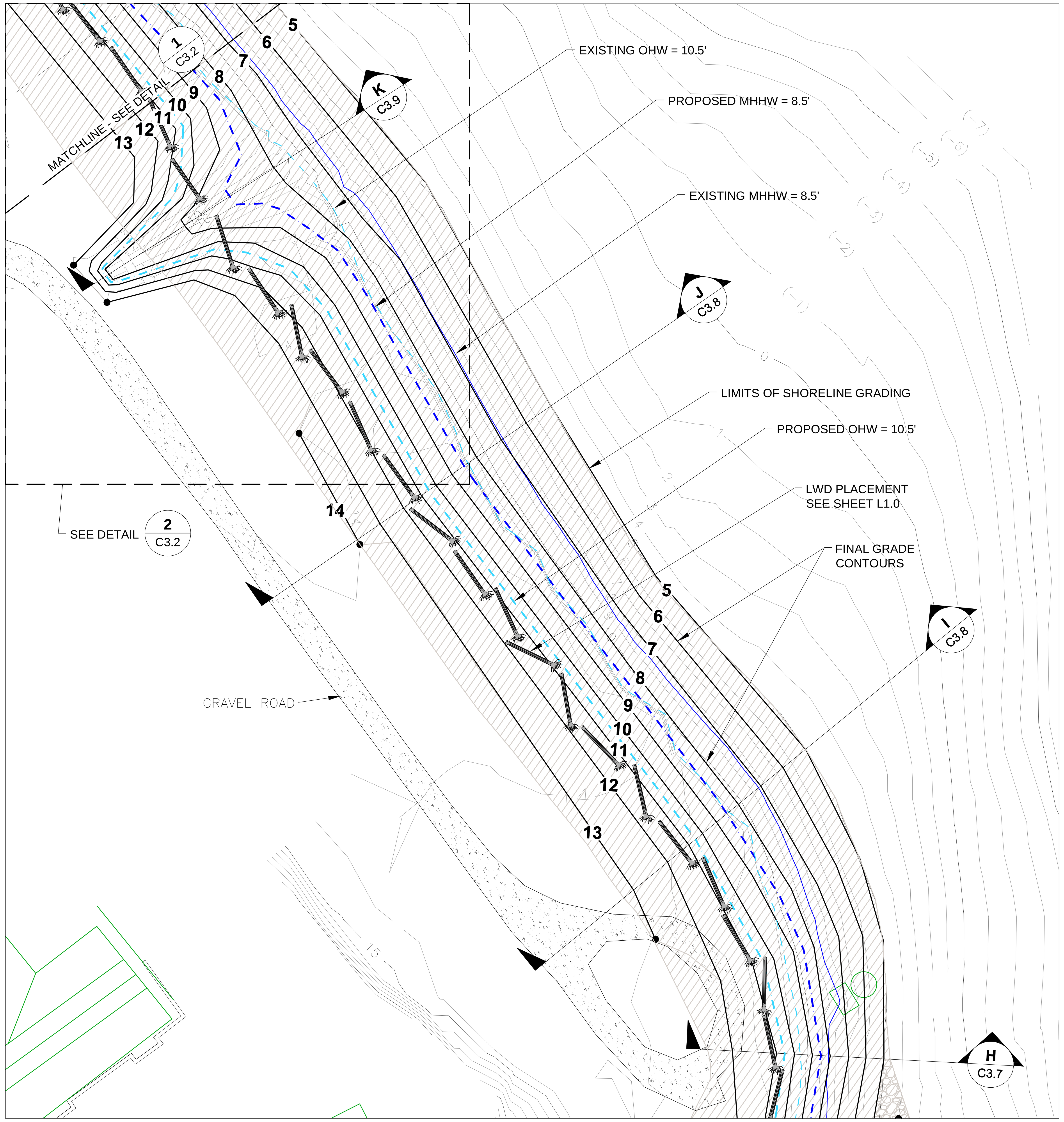
Washington State Department of Ecology

SHORELINE GRADING PLAN

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: 1"=80'
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	C3.0

100-PERCENT DESIGN

P:\0\0504042\01\CAD\SHEET\Cleanup Action Sheets\0504042-01 Sheet C3.0 Shoreline Grading Plan.dwg\TAB:Layout1 modified by tmichaud on May 02, 2012 - 16:03

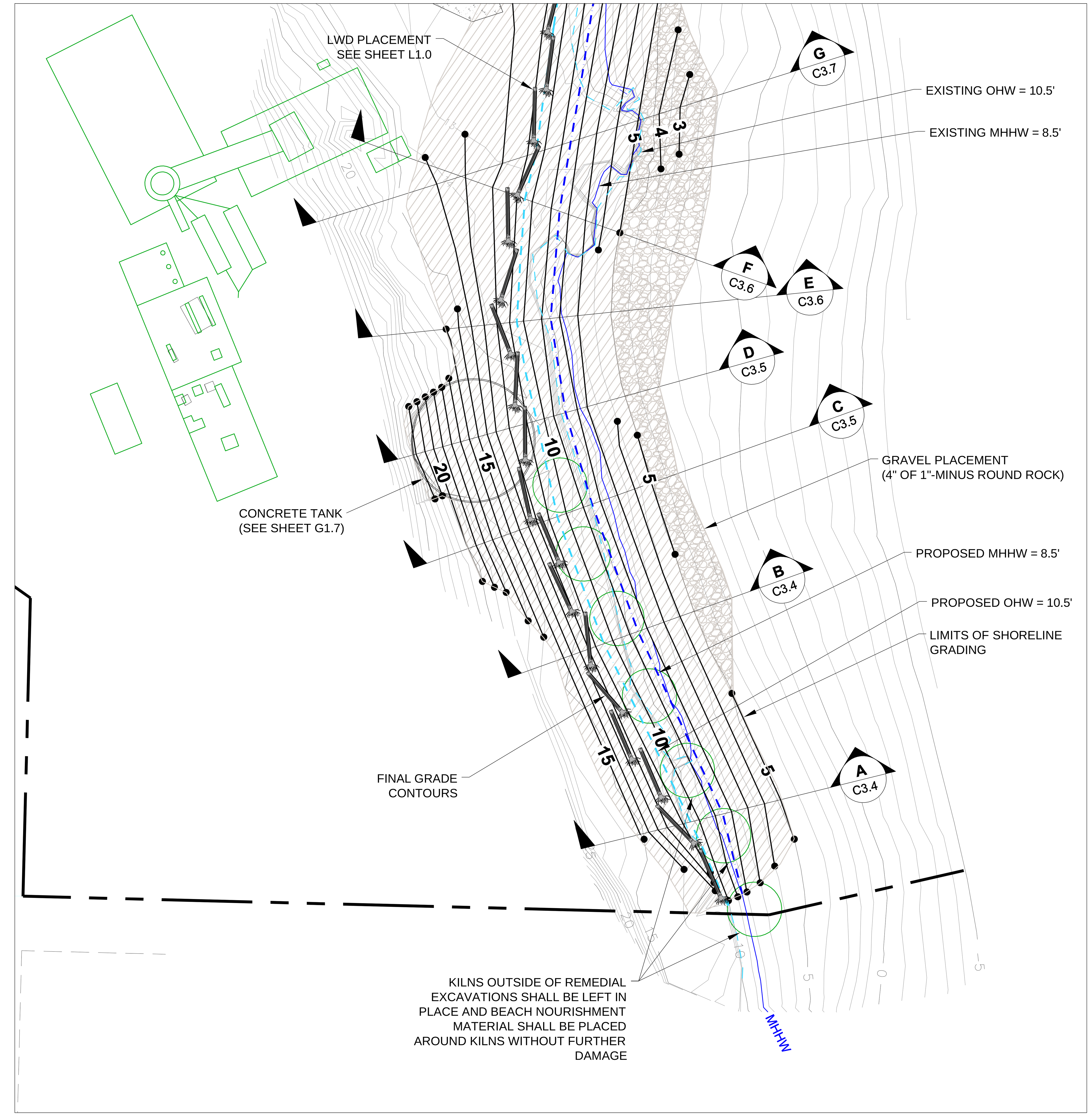


NORTH SHORELINE GRADING DETAILS 1 C3.0

SCALE: 1"=40'

GRAPHIC SCALE N

40 0 40 FEET



SOUTH SHORELINE GRADING DETAILS 2 C3.0

SCALE: 1"=40'

GRAPHIC SCALE N

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SHORELINE GRADING DETAILS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: 1"=40'
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.1	

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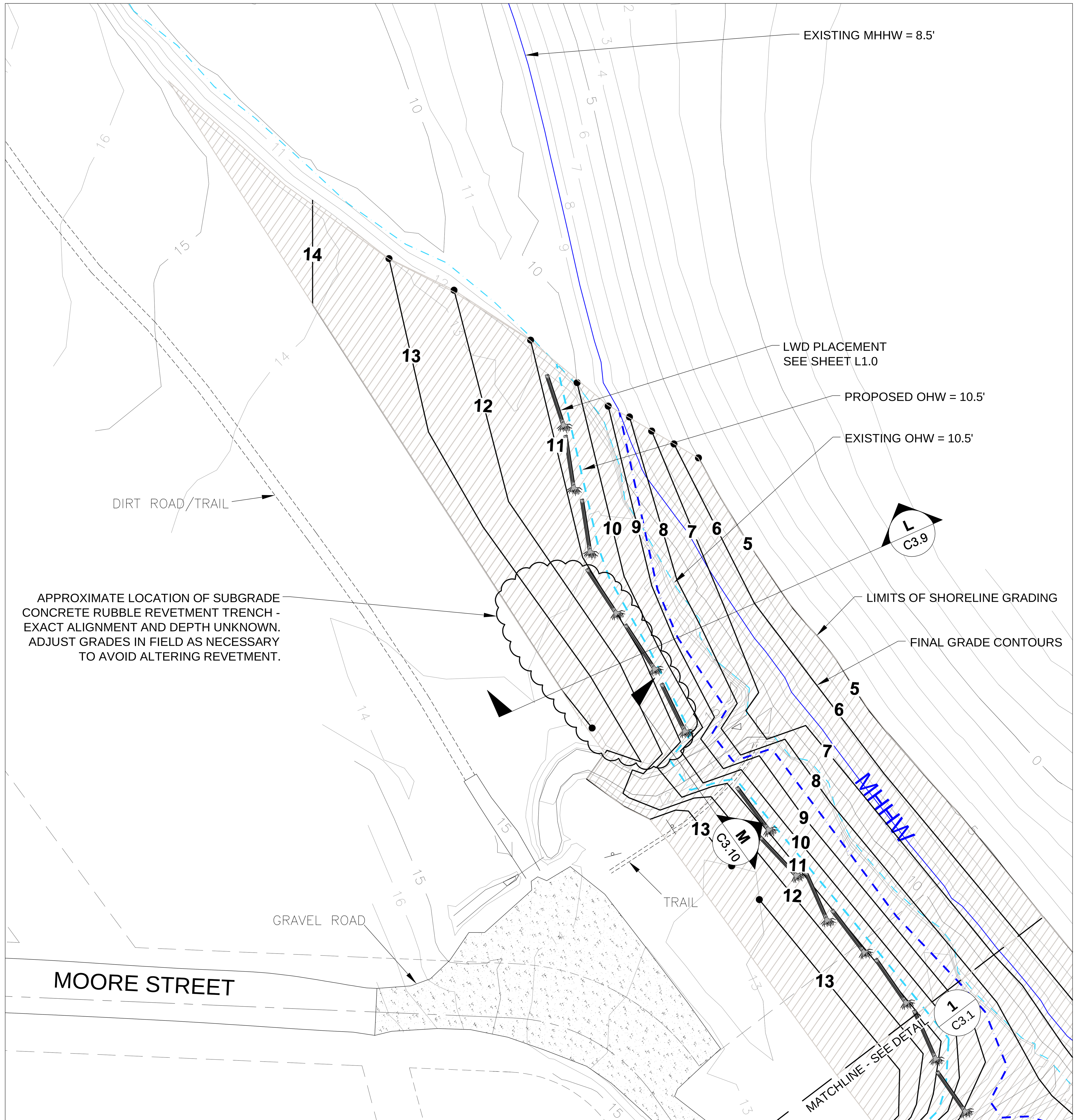
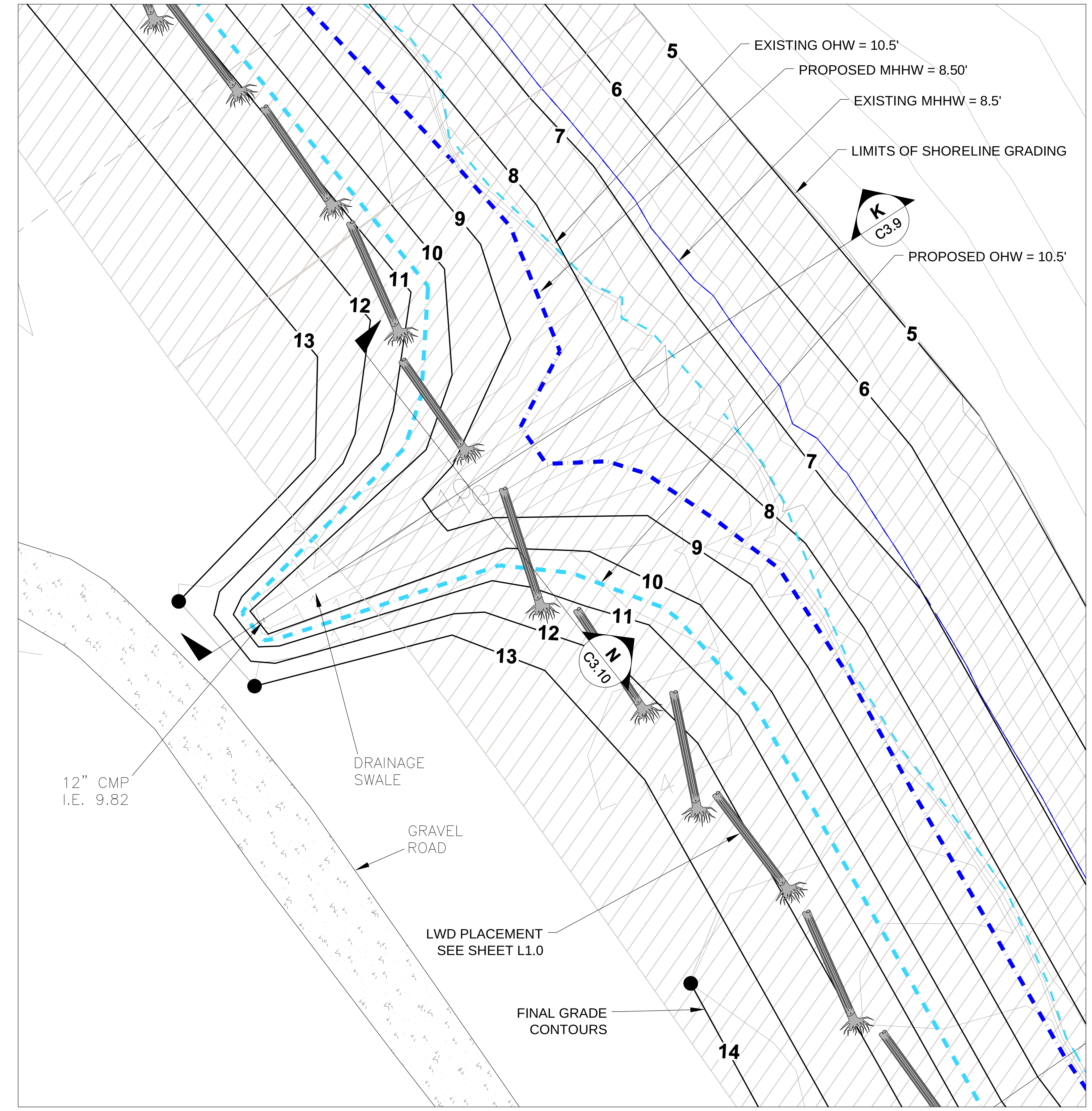


WDFW PROPERTY SHORELINE GRADING DETAIL 1 C3.0

SCALE: 1"=40'

GRAPHIC SCALE N

40 0 40 FEET



DRAINAGE SWALE GRADING DETAILS 2 C3.0

SCALE: 1"=20'

GRAPHIC SCALE N

20 0 20 FEET

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SHORELINE GRADING DETAILS

DRAWN:	TJM	PROJECT NO.:	0504042-01
DESIGN:	CLB	SCALE:	
CHECKED:	DAC	DATE:	8/31/11
SHEET NO.			C3.2

100-PERCENT DESIGN

RESERVED

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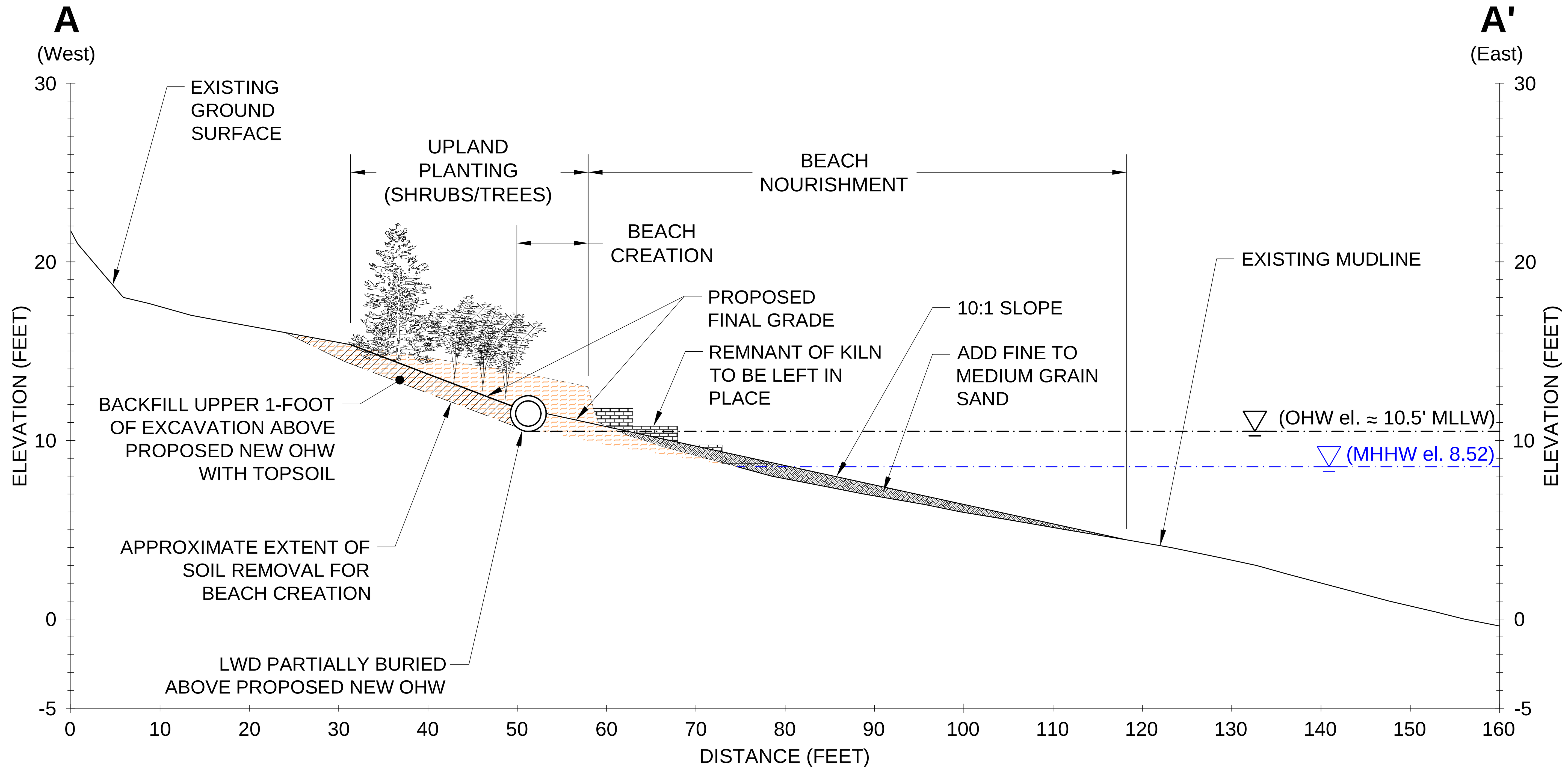
Ecology Project

SHORELINE GRADING DETAILS

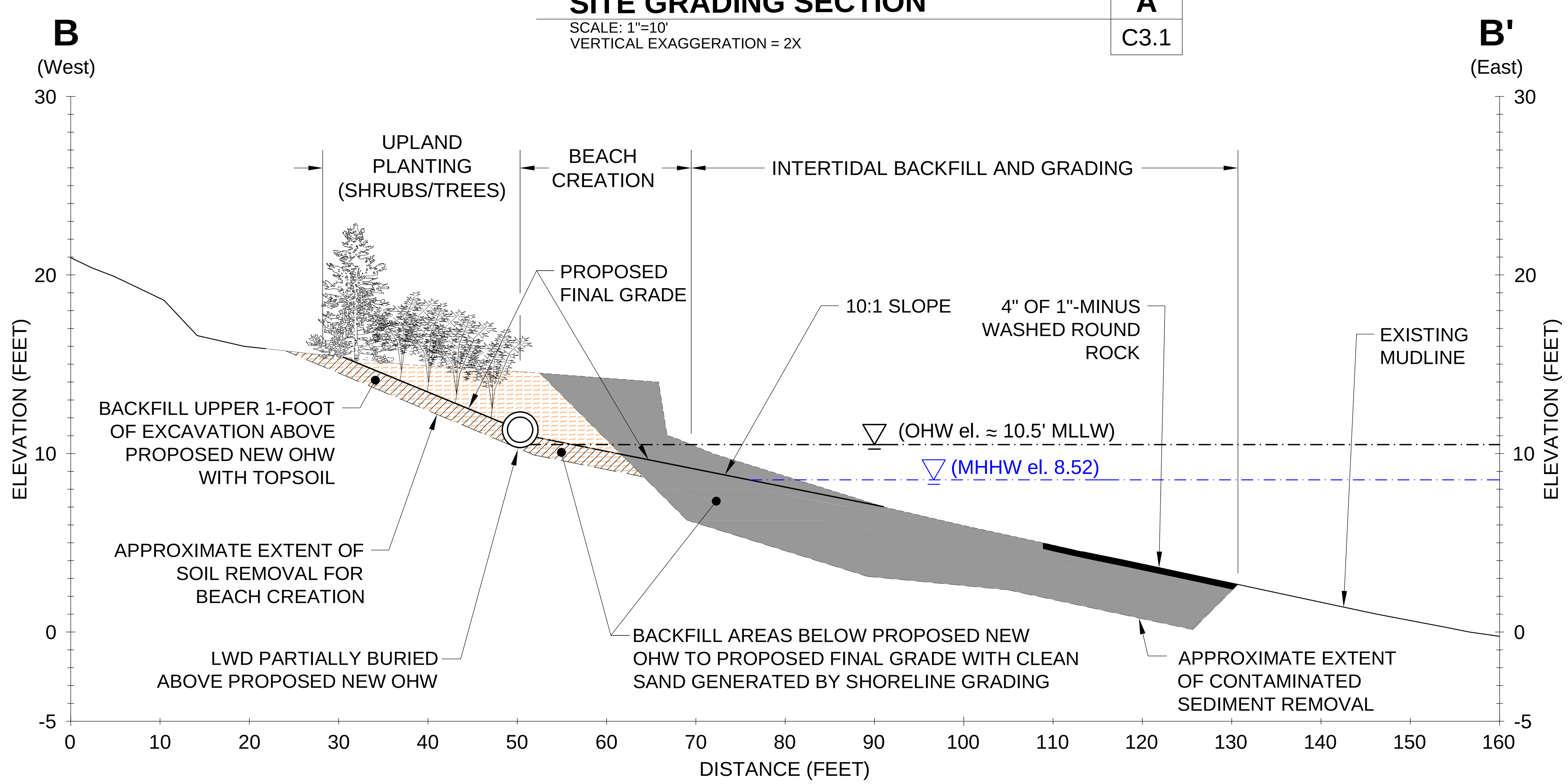
DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED:	DATE: 8/31/11
SHEET NO. C3.3	

100-PERCENT DESIGN



SITE GRADING SECTION | A / C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X



SITE GRADING SECTION | B / C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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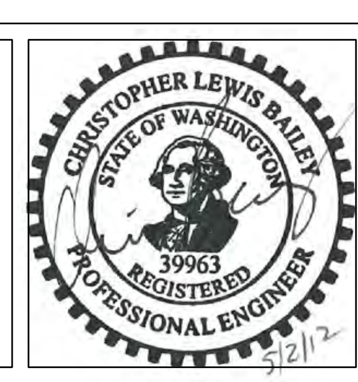

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SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.4	

100-PERCENT DESIGN

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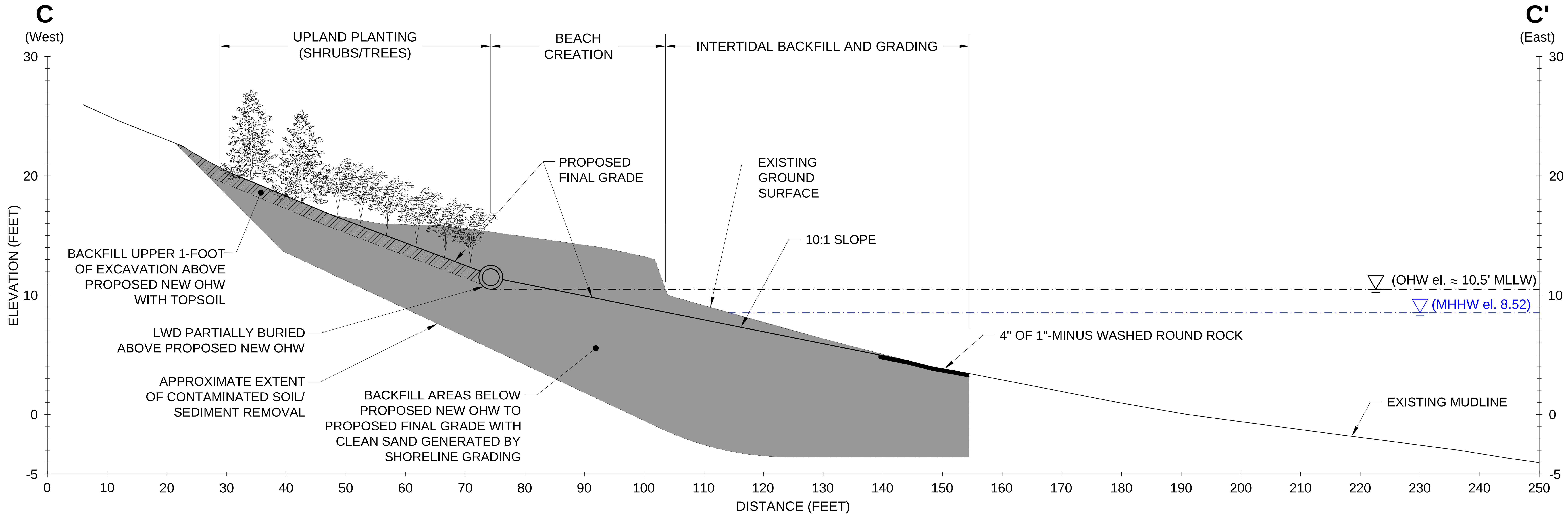
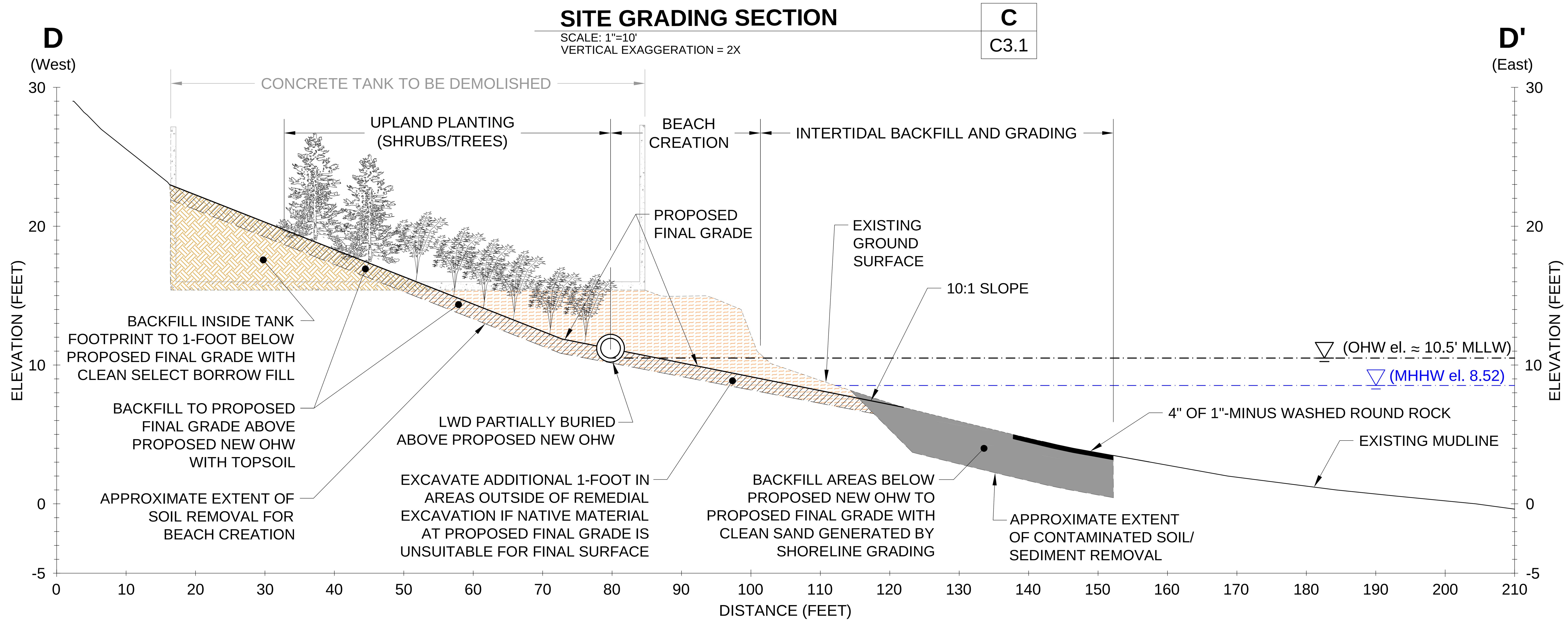


SITE GRADING SECTION C
SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X
C3.1



SITE GRADING SECTION D
SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X
C3.1

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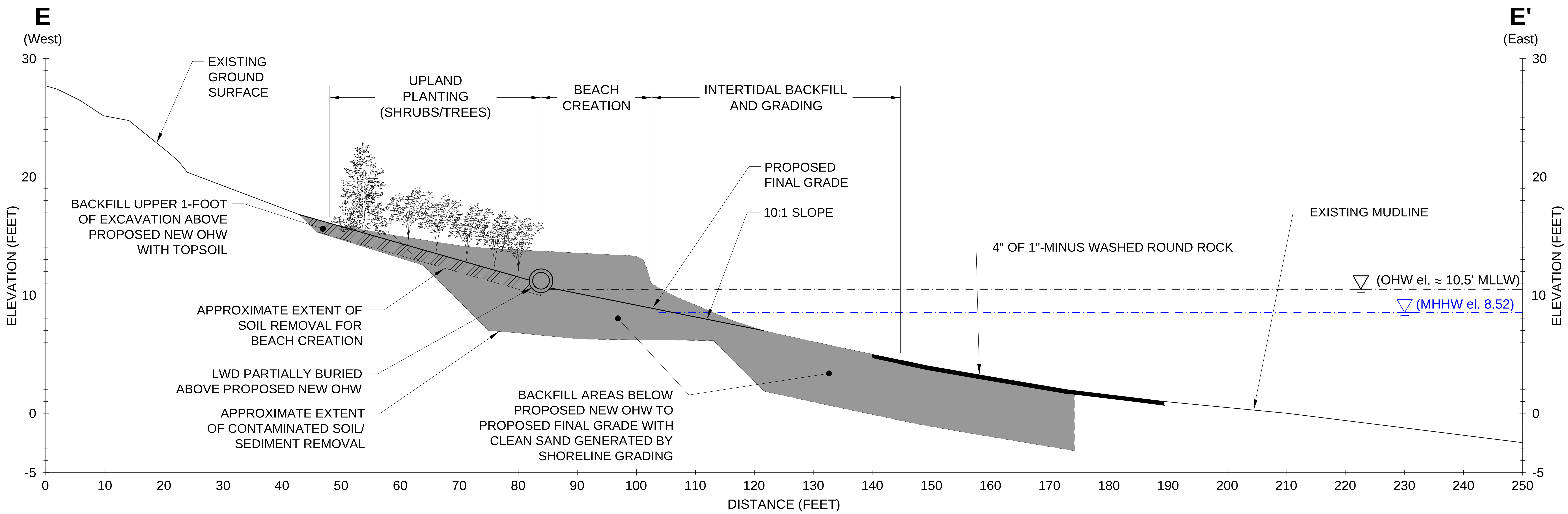
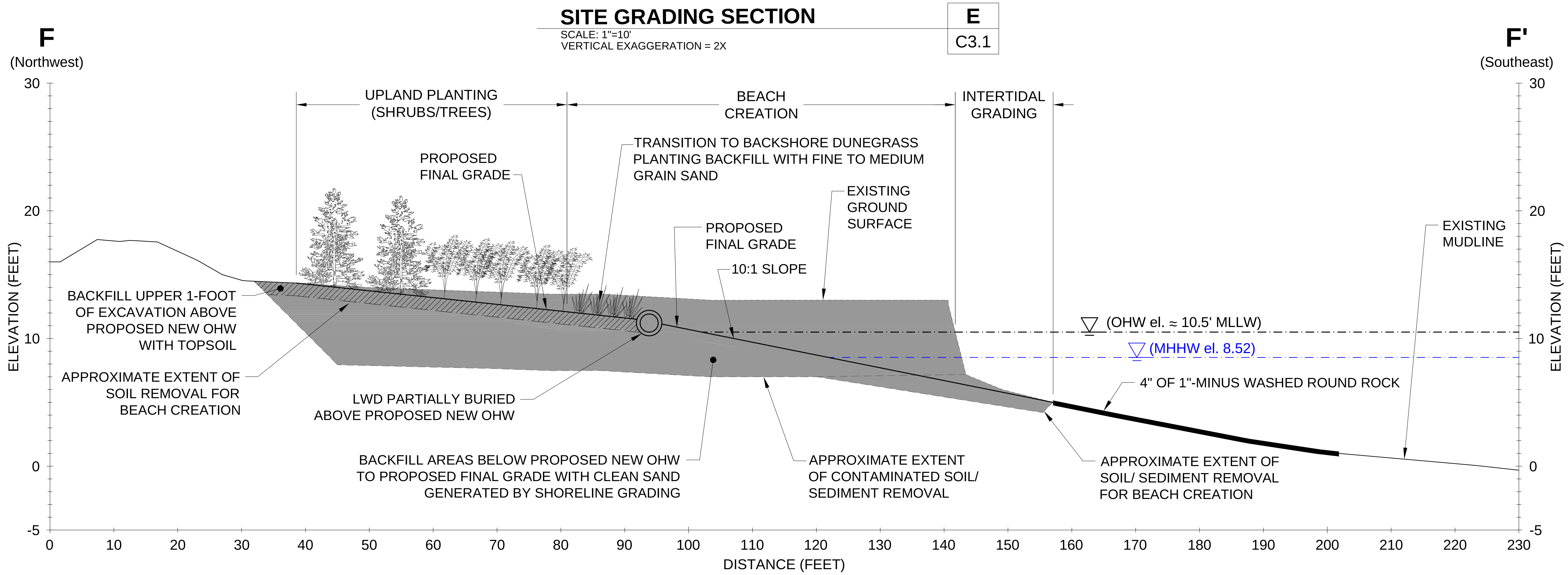
SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.5	



SITE GRADING SECTION | E / C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X



SITE GRADING SECTION | F / C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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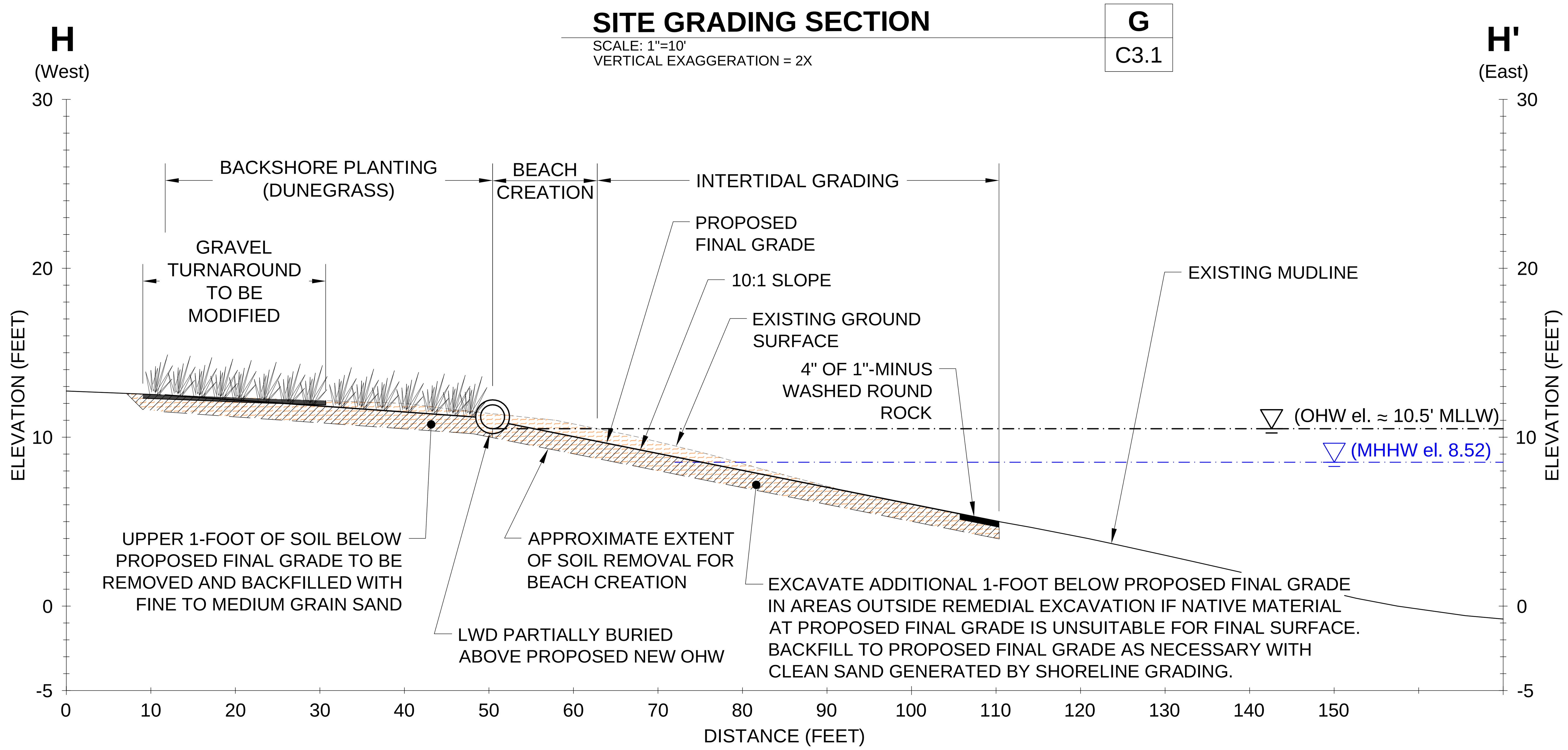
SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	C3.6

SITE GRADING SECTION

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

G
C3.1



SITE GRADING SECTION

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

H
C3.1

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SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.7	

SITE GRADING SECTION I C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

SITE GRADING SECTION J C3.1

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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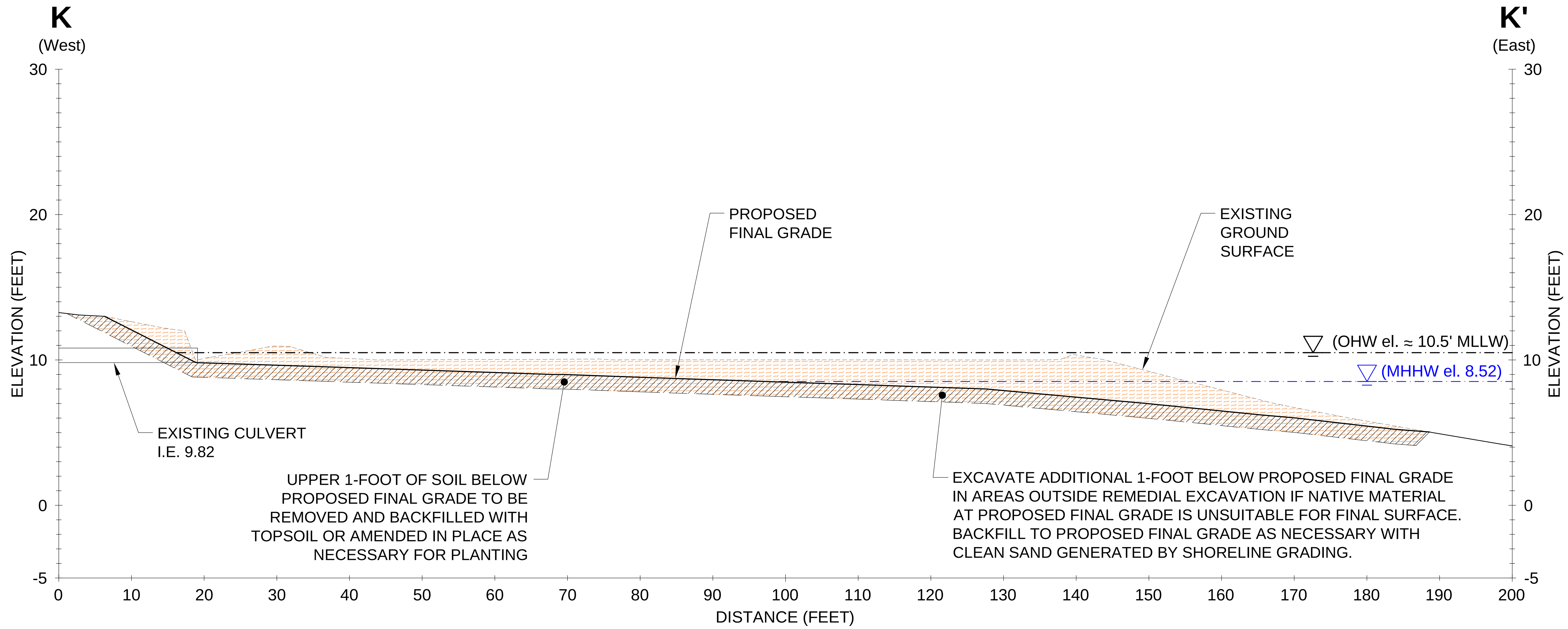
SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.8	

100-PERCENT DESIGN



SITE GRADING SECTION K / C3.2

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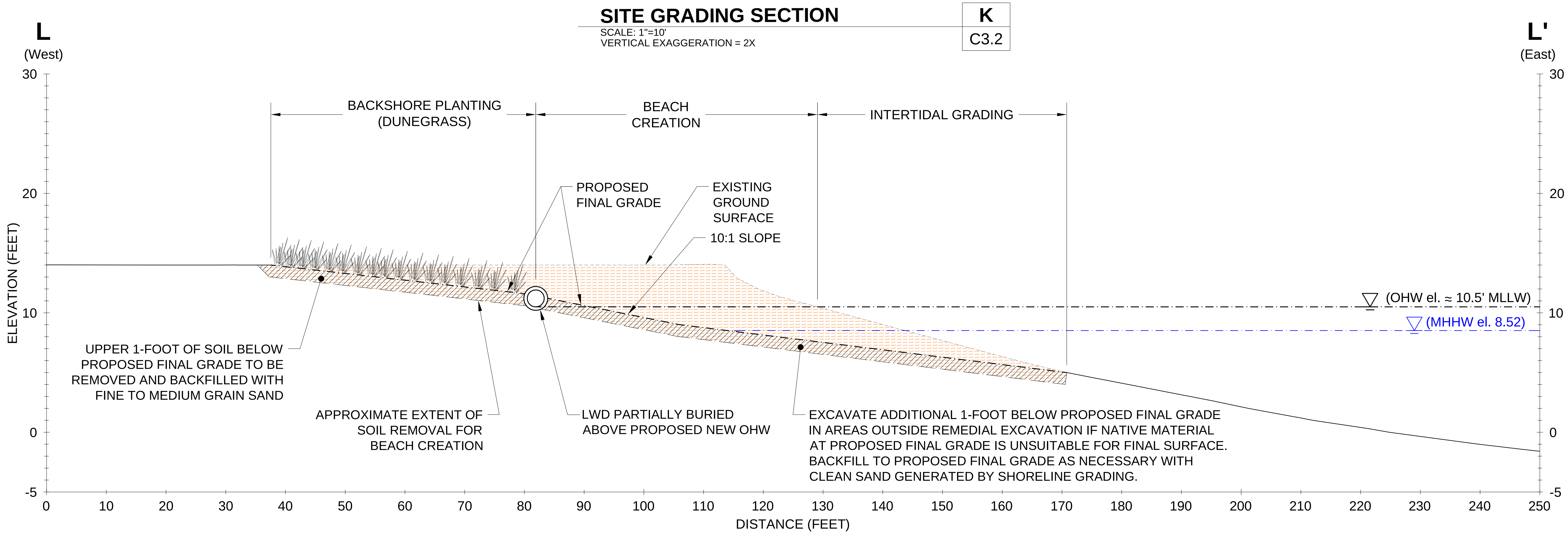
VERTICAL EXAGGERATION = 2X



SITE GRADING SECTION L / C3.2

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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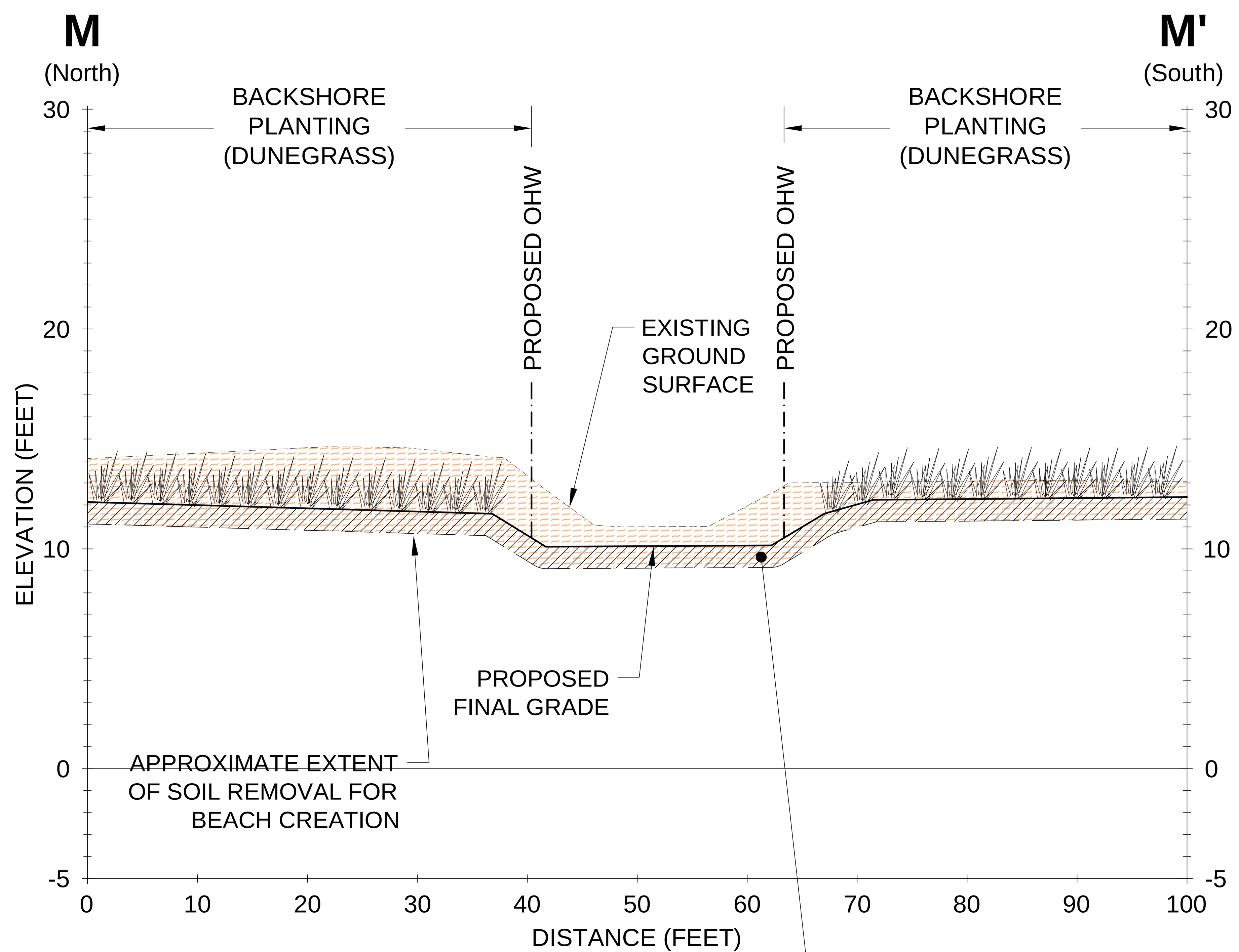
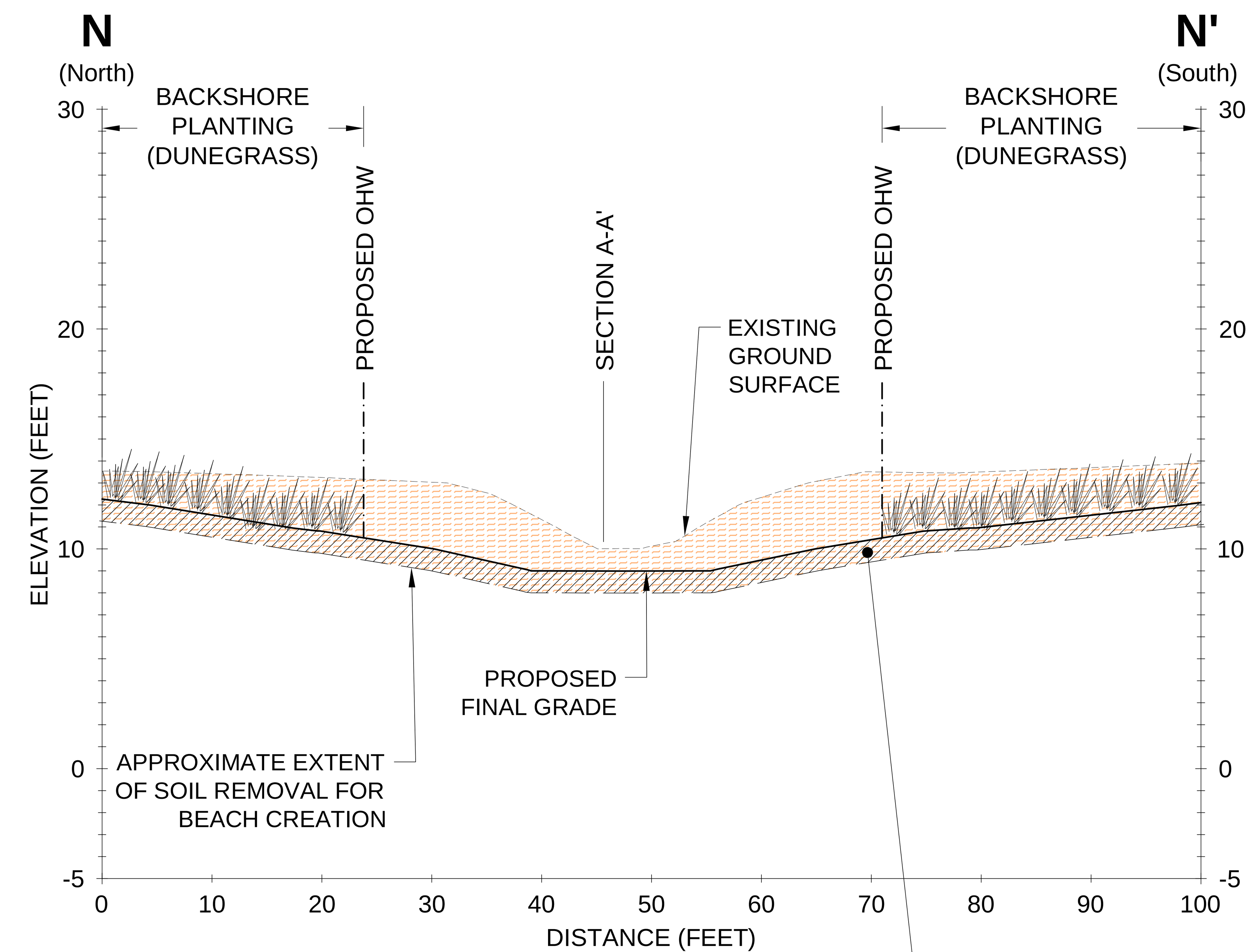
SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.9	

100-PERCENT DESIGN



EXCAVATE ADDITIONAL 1-FOOT BELOW PROPOSED FINAL GRADE IN AREAS OUTSIDE REMEDIAL EXCAVATION IF NATIVE MATERIAL AT PROPOSED FINAL GRADE IS UNSUITABLE FOR FINAL SURFACE. BACKFILL TO PROPOSED FINAL GRADE AS NECESSARY WITH CLEAN SAND GENERATED BY SHORELINE GRADING.



EXCAVATE ADDITIONAL 1-FOOT BELOW PROPOSED FINAL GRADE IN AREAS OUTSIDE REMEDIAL EXCAVATION IF NATIVE MATERIAL AT PROPOSED FINAL GRADE IS UNSUITABLE FOR FINAL SURFACE. BACKFILL TO PROPOSED FINAL GRADE AS NECESSARY WITH CLEAN SAND GENERATED BY SHORELINE GRADING.

SITE GRADING SECTION

M / C3.2

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

SITE GRADING SECTION

N / C3.2

SCALE: 1"=10'
VERTICAL EXAGGERATION = 2X

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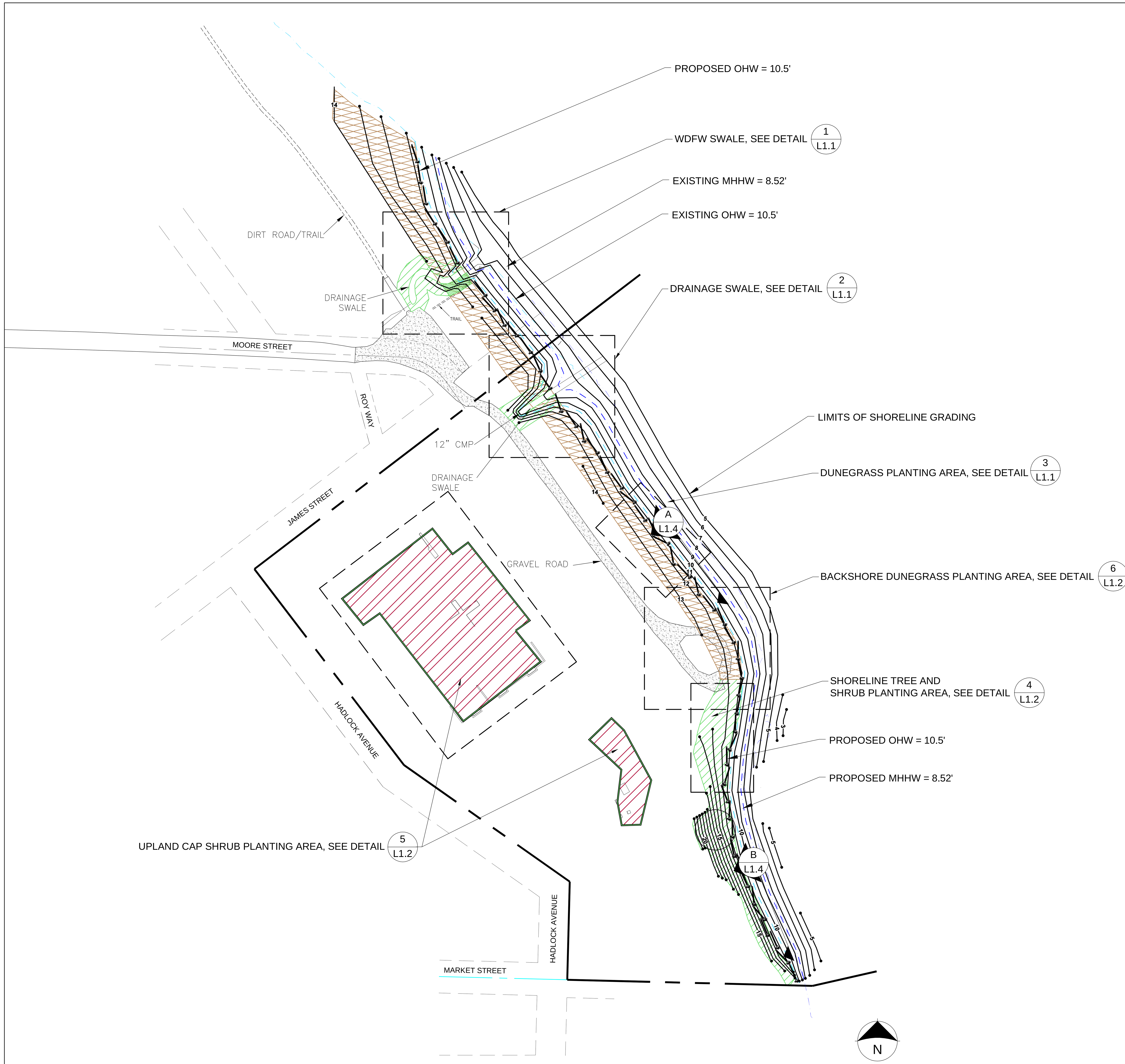
SITE GRADING SECTIONS

DRAWN: TJM	PROJECT NO.: 50404201
DESIGN: CLB	SCALE:
CHECKED: DAC	DATE: 8/31/11
SHEET NO. C3.10	

100-PERCENT DESIGN



PLANTING PLAN 1 P1.0
SCALE: 1"=100'

PLANTING NOTES

1. NO PLANTING SHALL BE PREFORMED PRIOR TO APPROVAL OF GRADING BY ECOLOGY. PLANTING LAYOUT TO BE APPROVED BY ECOLOGY.
2. FOR BACKSHORE DUNEGRASS PLANTING AREAS, SUBSTRATE SHOULD BE CLEAN, FINE TO MEDIUM GRAIN SAND OR SUITABLE NATIVE MATERIAL.
3. DUNEGRASS, TREE AND SHRUB PLANTINGS SHOULD BE SPACED ACCORDING TO ON-CENTER SPACINGS PROVIDED IN SHEET P1.1.
4. DUNEGRASS MAY BE SALVAGED FROM PROJECT AREA WITH APPROVAL OF LANDOWNER AND PROJECT BIOLOGIST.
5. A MINIMUM OF 4 INCHES OF ORGANIC MULCH IS REQUIRED AT THE BASE OF ALL TREES AND SHRUBS.
6. ADD UP TO ONE-FOOT OF TOPSOIL IN TREE AND SHRUB PLANTING AREAS. THE TOP 18" OF SUBSTRATE SHOULD BE A MIX OF SAND AND TOPSOIL (ONE THIRD SAND AND TWO THIRDS TOPSOIL.)
7. PLANT SUBSTITUTIONS SHALL BE APPROVED BY THE PROJECT BIOLOGIST.
8. PLANTS SHALL BE MAINTAINED BY CONTRACTOR AS NECESSARY, INCLUDING REGULAR WATERING DURING THE FIRST TWO YEARS.
9. IF SIGNS OF STRESS ARE OBSERVED, ADDITIONAL MEASURES SHOULD BE TAKEN TO INCREASE PLANT SURVIVAL.
10. PLANTING SUCCESS WILL BE DETERMINED BY THE PROJECT BIOLOGIST. IF SURVIVAL RATE IS LESS THAN 100% IN THE FIRST YEAR, THE CONTRACTOR WILL BE REQUIRED TO REPLANT DEAD PLANTS.

LEGEND

- BACKSHORE DUNEGRASS PLANTING AREA
- SHORELINE TREE AND SHRUB PLANTING AREA
- UPLAND CAP SHRUB PLANTING AREA
- LARGE WOODY DEBRIS (AT PROPOSED NEW OHW)
- FINAL GRADE CONTOURS
- PROPOSED MHHW

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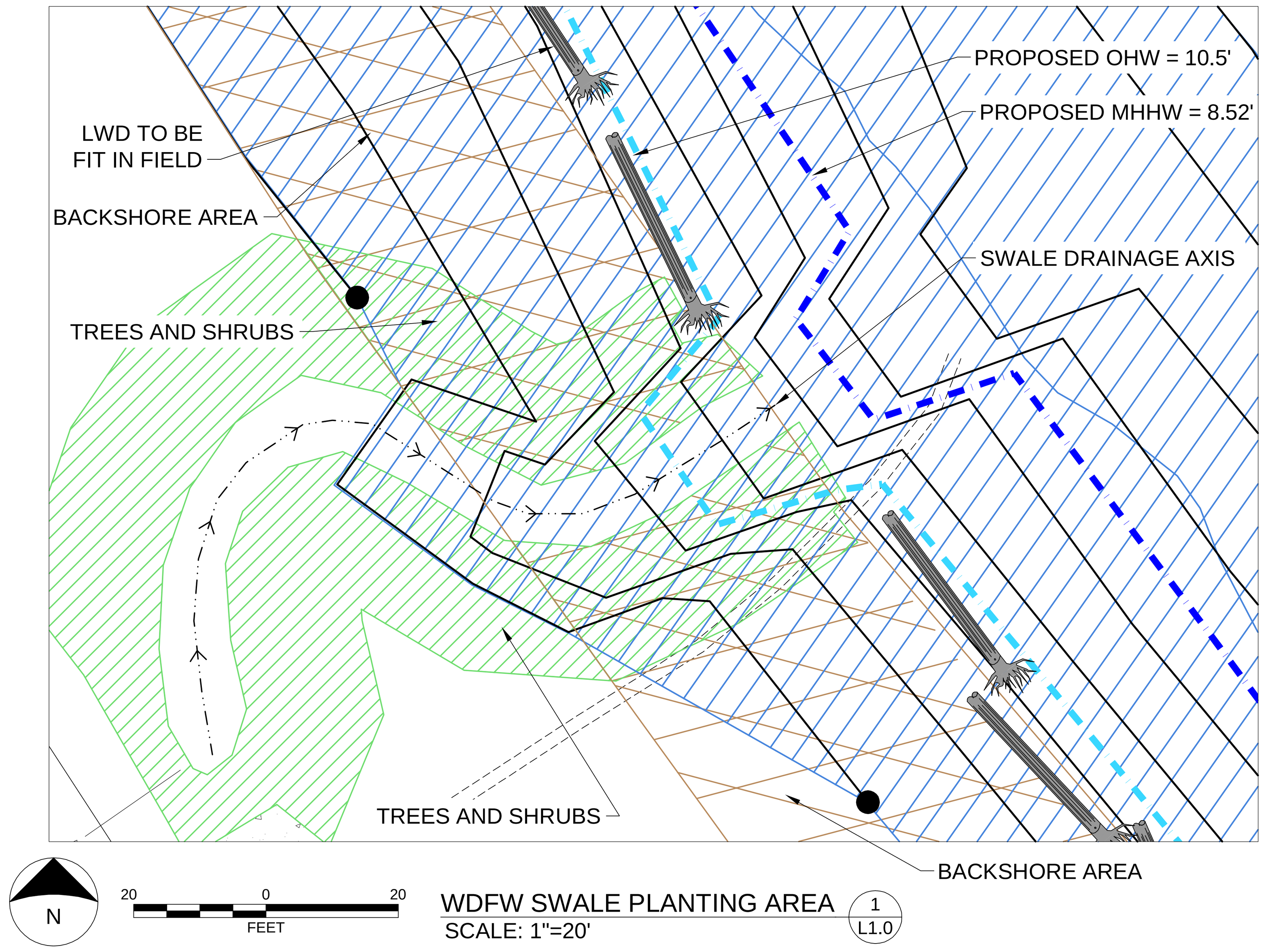
LANDSCAPING AND RESTORATION PLAN

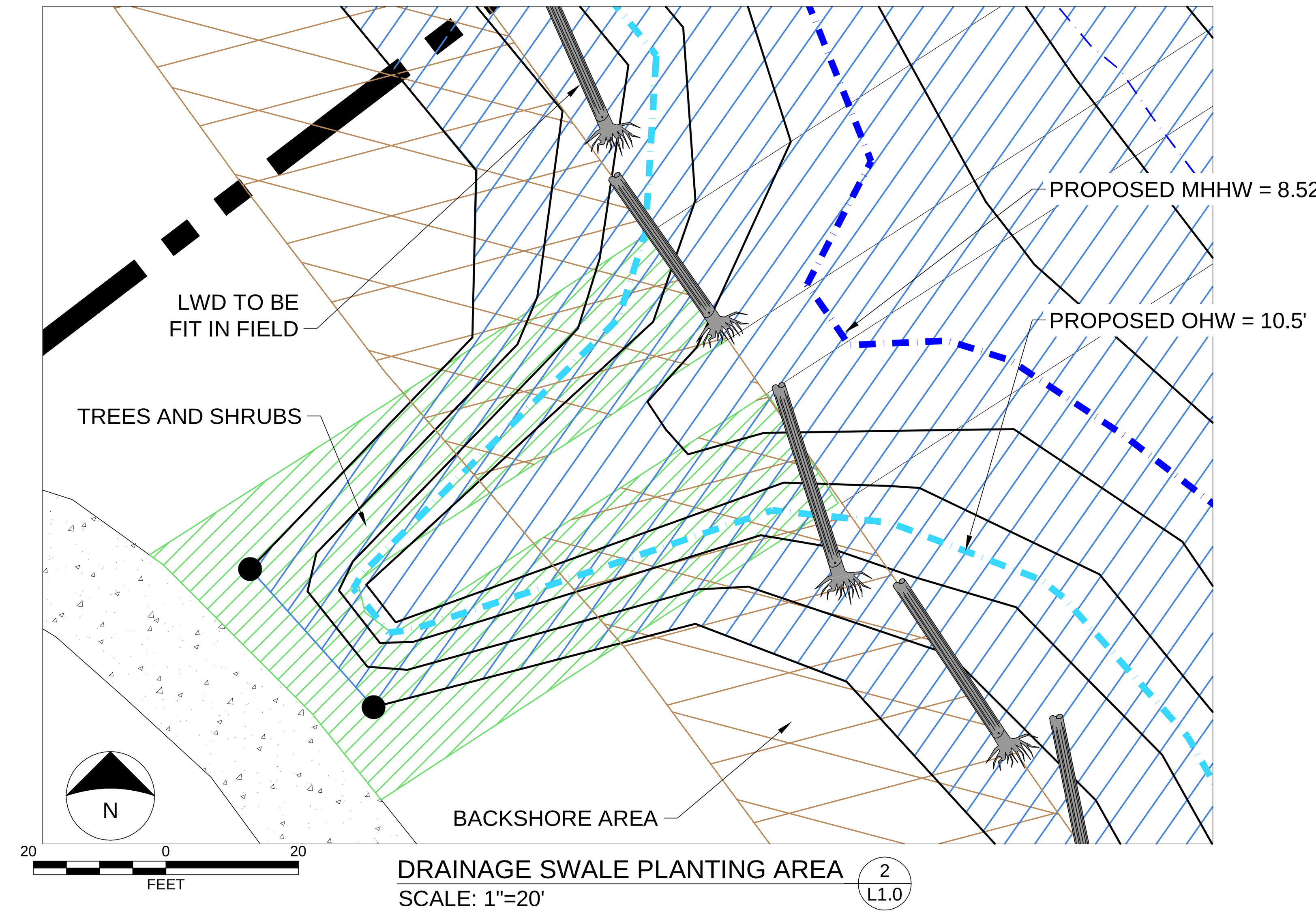
DRAWN: MGF	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NOTED
CHECKED: DAC	DATE: 8/31/11
SHEET NO. L1.0	

100-PERCENT DESIGN

P:\0\0504042\01\CAD\SHEET\CLEANUP ACTION SHEETS\0504042-01 SHEET L1.0 PLANTING PLAN OVERVIEW.DWG\TAB:L1.0 MODIFIED BY TMICHAUD ON MAY 02, 2012 - 15:46



WDFW SWALE PLANTING AREA (1 / L1.0)
SCALE: 1"=20'



DRAINAGE SWALE PLANTING AREA (2 / L1.0)
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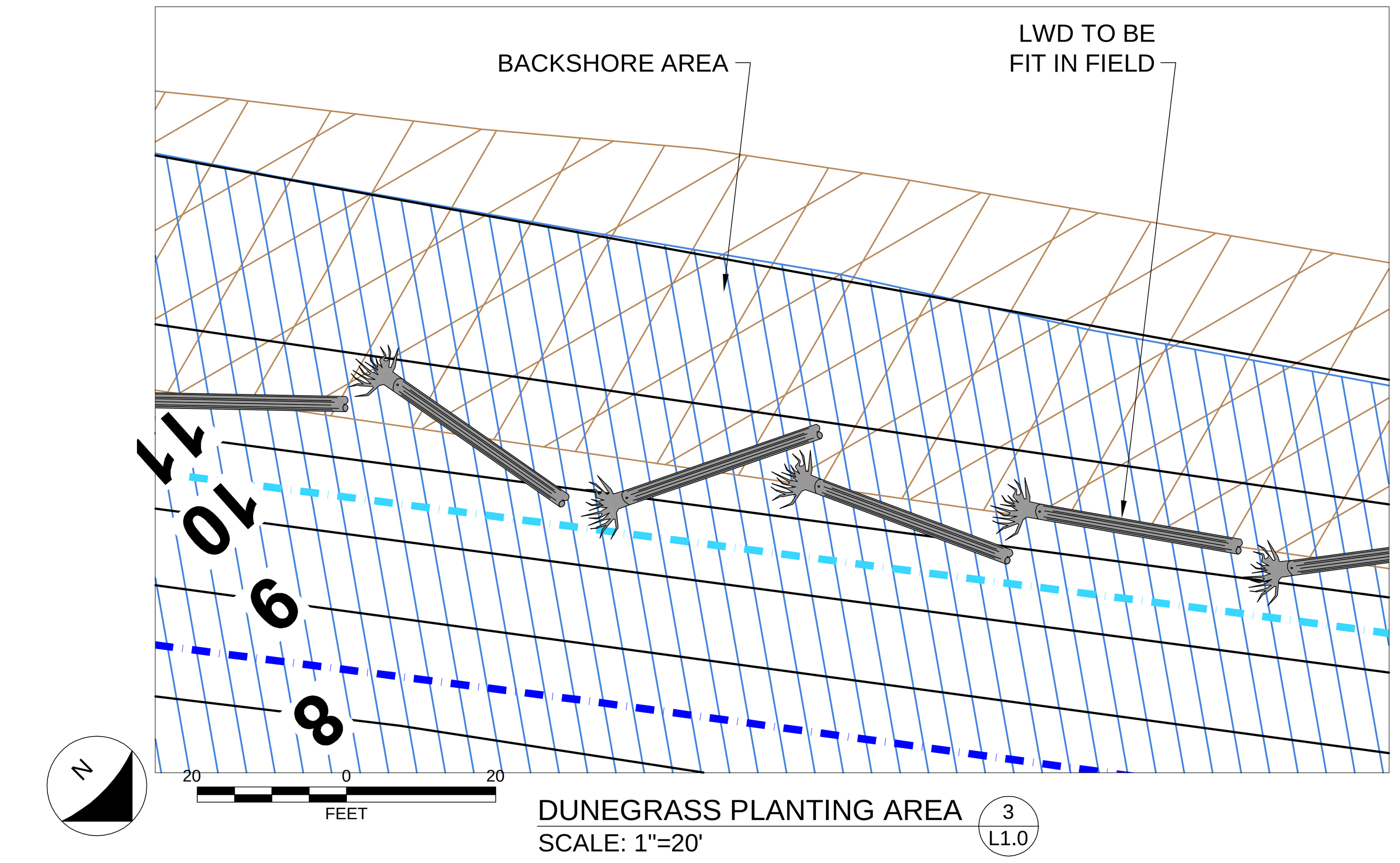

DUNEGRASS PLANTING AREA (3 / L1.0)
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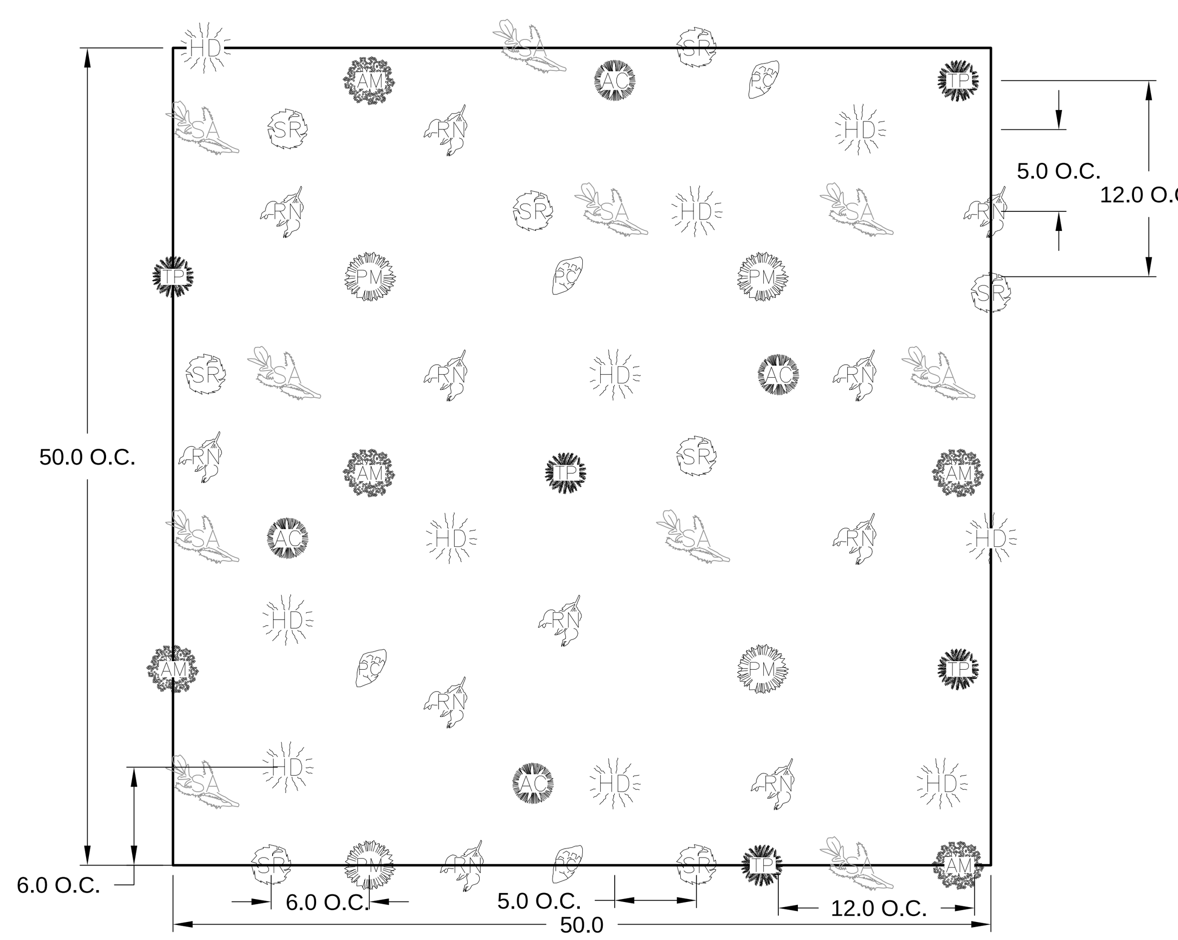
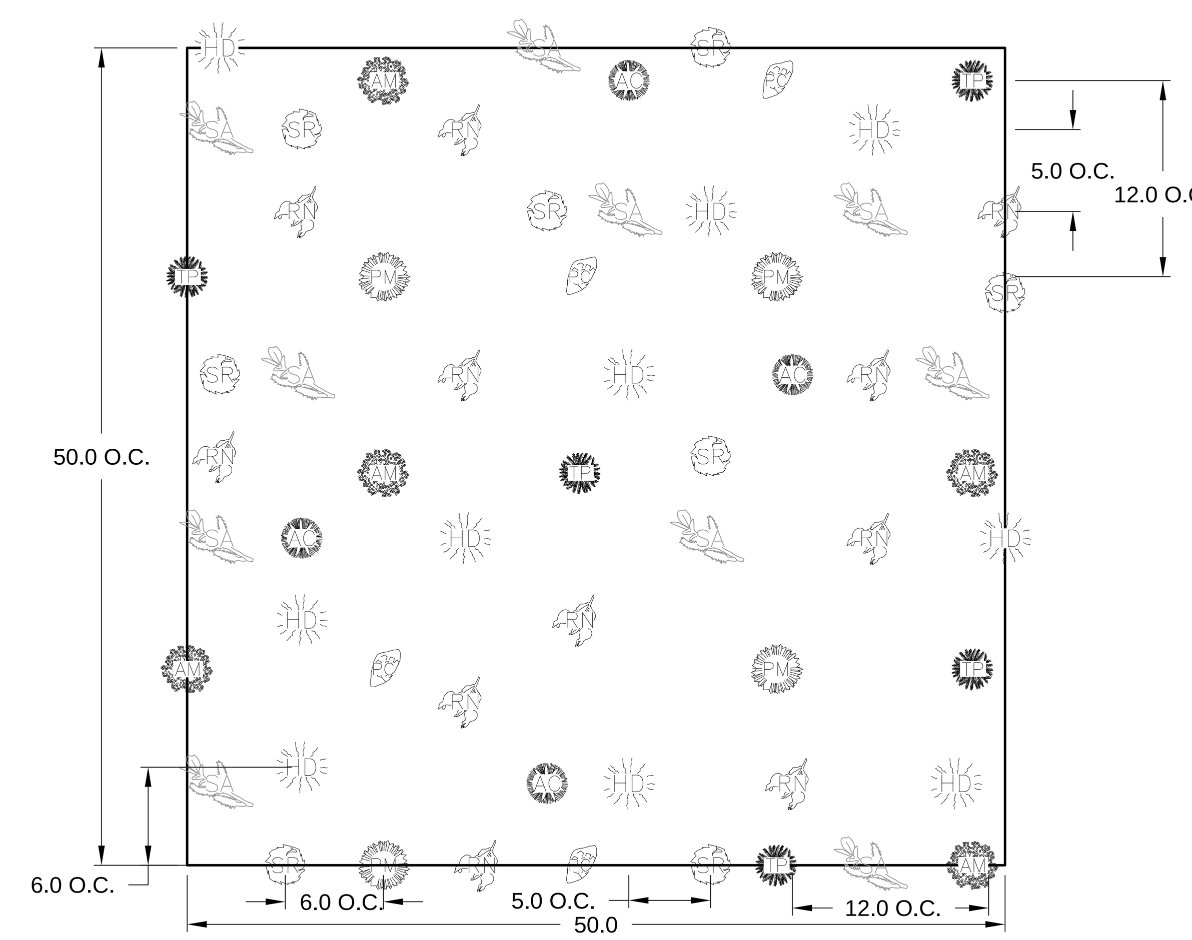


TREE AND SHRUB PLANTING AREA TYPICAL LAYOUT
SCALE: 1"=10'

TYPICAL TREE & SHRUB PLANTING ZONE TABLE

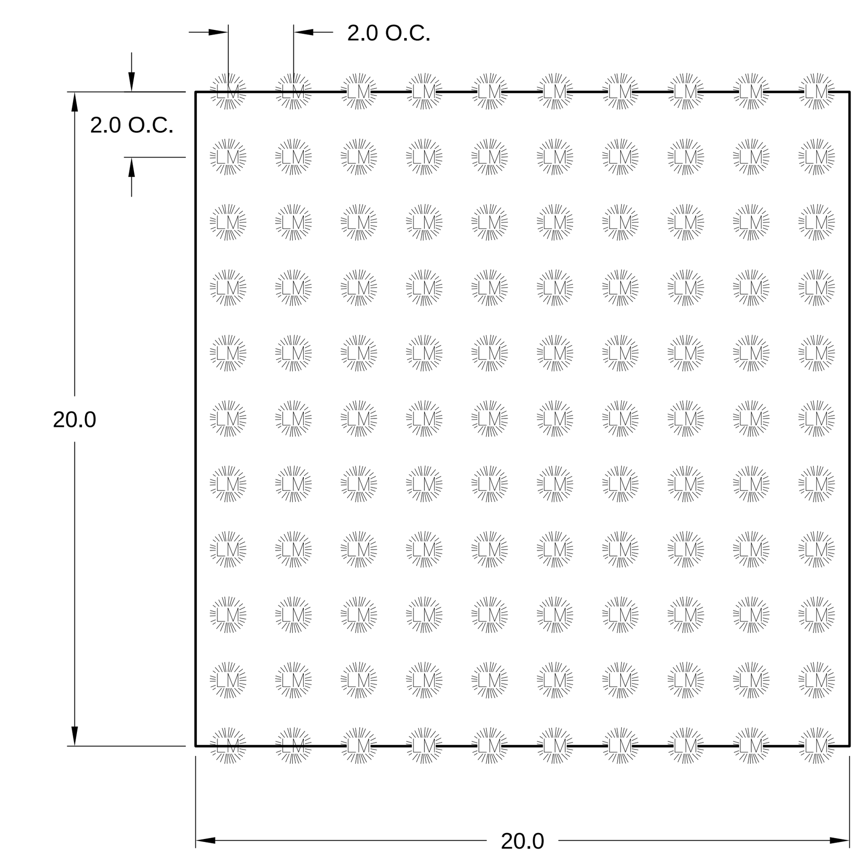
Symbol	Plant Species		Quantity	On Center Spacing (ft)
	Scientific Name	Common Name		
TYPICAL TREES				
	Pseudotsuga menziesii	Douglas fir	31	12
	Pinus contorta	Shore pine	31	12
	Thuja plicata	Western red cedar	46	12
	Acer macrophyllum	Big-leaf maple	46	12
TYPICAL SHRUBS				
	Rosa nutkana	Nootka Rose	262	5
	Holodiscus discolor	Oceanspray	175	5
	Acer circinatum	Vine maple	61	6
	Sambucus racemosa	Red elderberry	121	6
	Smyphoricarpos albus	Snowberry	175	5



TREE AND SHRUB PLANTING AREA TYPICAL LAYOUT
SCALE: 1"=10'

TYPICAL TREE & SHRUB PLANTING ZONE TABLE

Symbol	Plant Species		Quantity	On Center Spacing (ft)
	Scientific Name	Common Name		
TYPICAL TREES				
	Pseudotsuga menziesii	Douglas fir	31	12
	Pinus contorta	Shore pine	31	12
	Thuja plicata	Western red cedar	46	12
	Acer macrophyllum	Big-leaf maple	46	12
TYPICAL SHRUBS				
	Rosa nutkana	Nootka Rose	262	5
	Holodiscus discolor	Oceanspray	175	5
	Acer circinatum	Vine maple	61	6
	Sambucus racemosa	Red elderberry	121	6
	Smyphoricarpos albus	Snowberry	175	5



DUNEGRASS PLANTING AREA TYPICAL LAYOUT
SCALE: 1"=5'

TYPICAL DUNEGRASS PLANTING ZONE TABLE

Symbol	Plant Species		Quantity	On Center Spacing (ft)
	Scientific Name	Common Name		
	Leymus Mollis	Dunegrass	10890	2

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F: 206-728-2731

CHRISTOPHER LEWIS BAILEY, STATE OF WASHINGTON, 39963 REGISTERED PROFESSIONAL ENGINEER 5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action
Washington State Department of Ecology

LANDSCAPE AND RESTORATION DETAILS

DRAWN: CMV	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NOTED
CHECKED: DAC	DATE: 8/31/11
SHEET NO. L1.1	

100-PERCENT DESIGN

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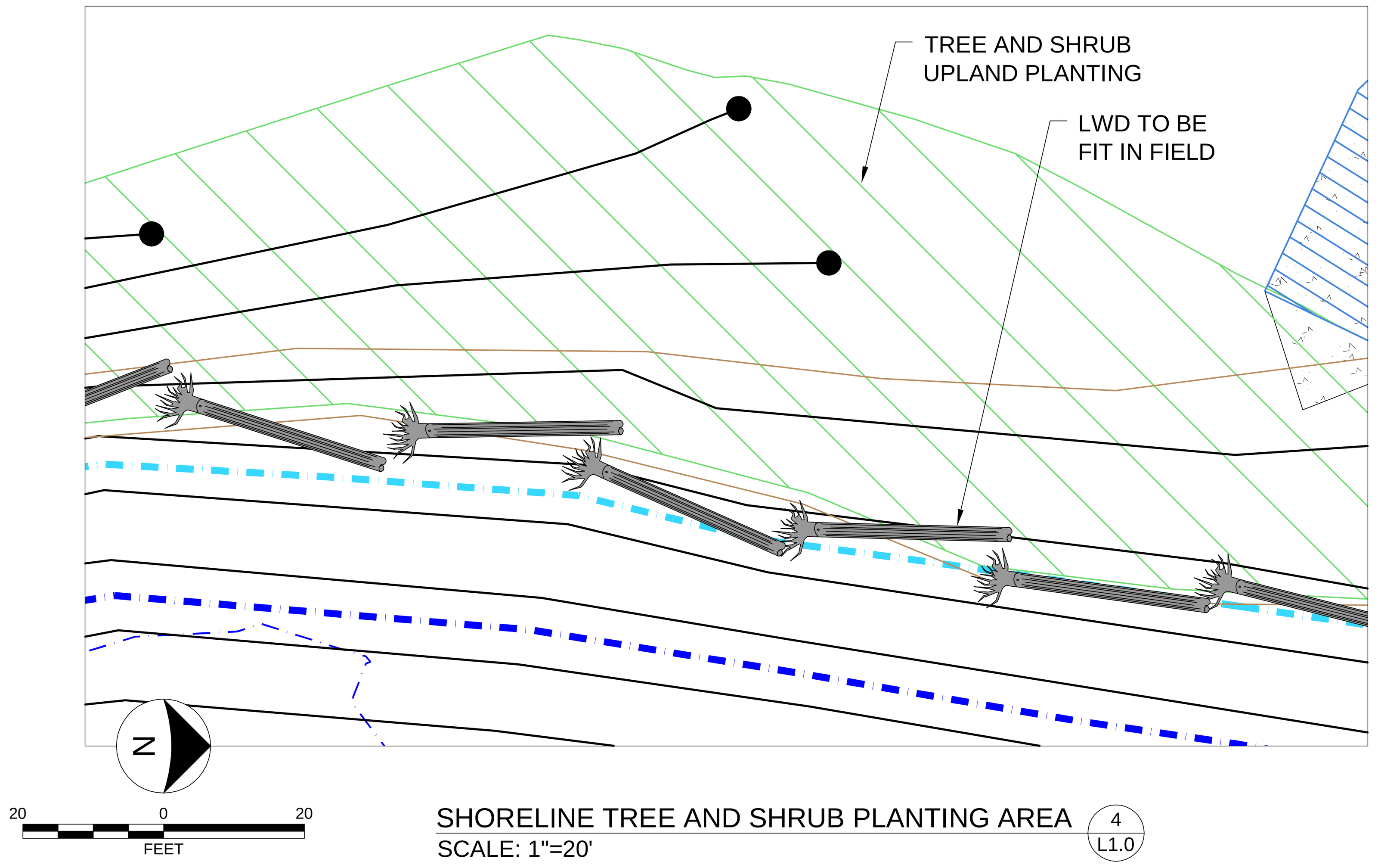
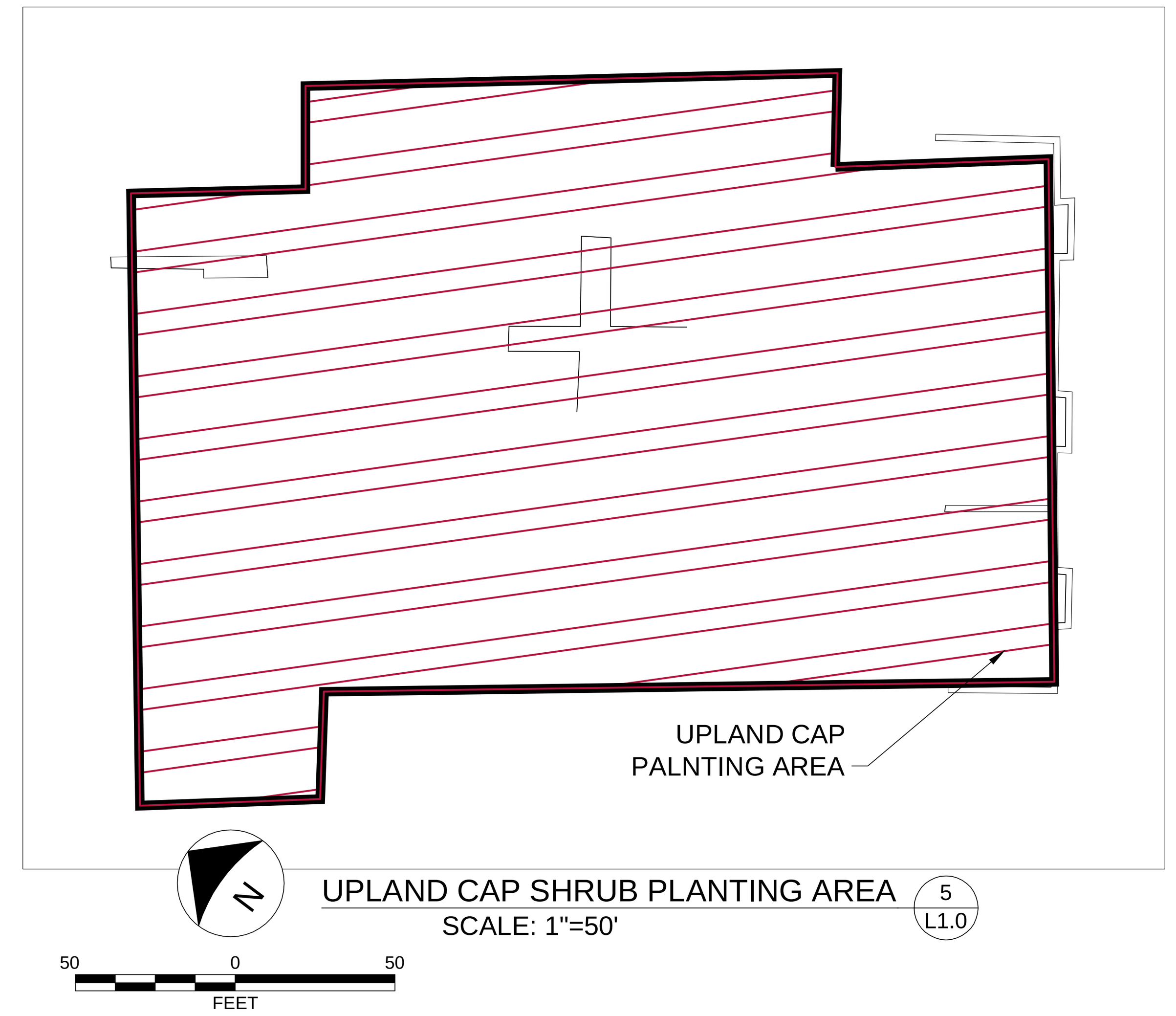
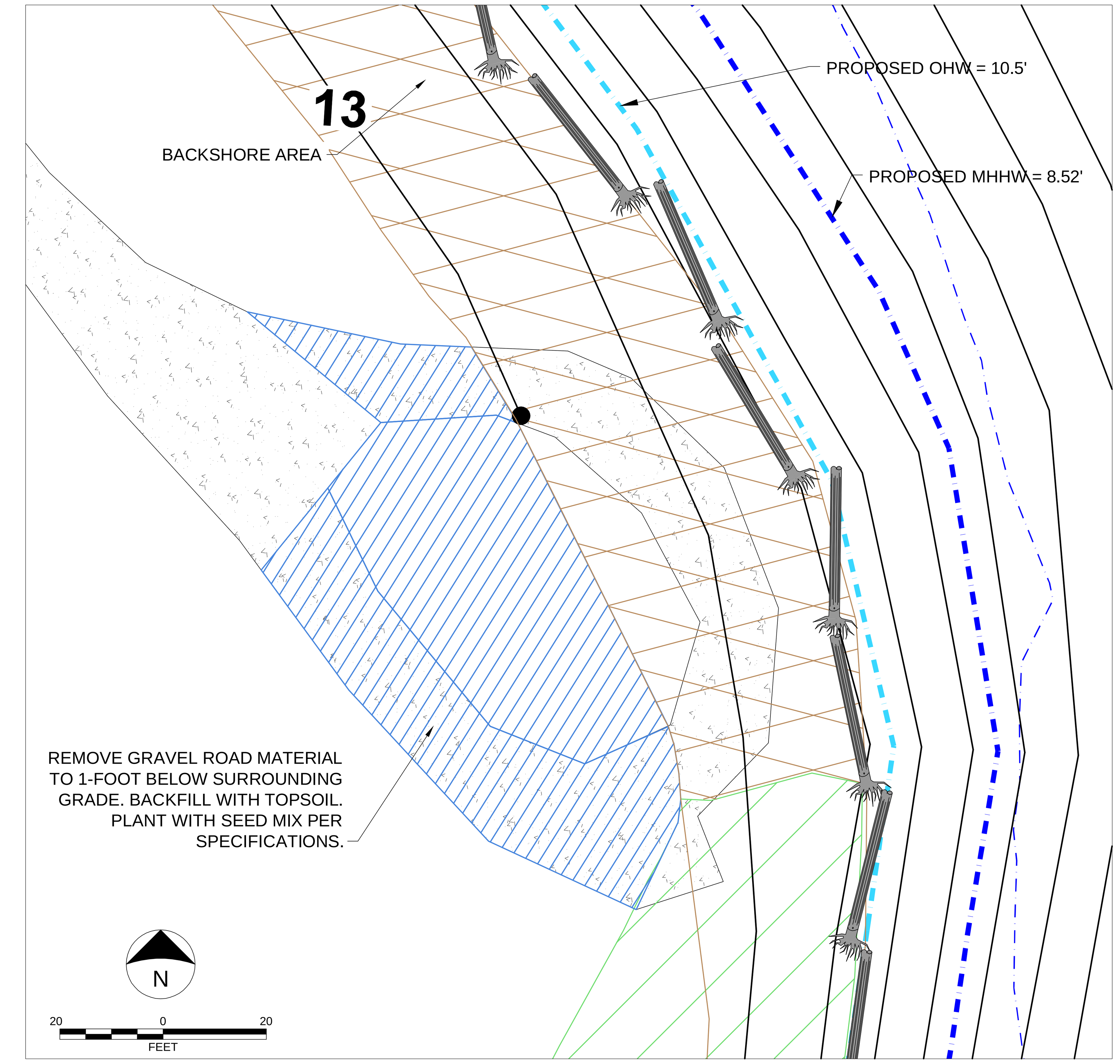


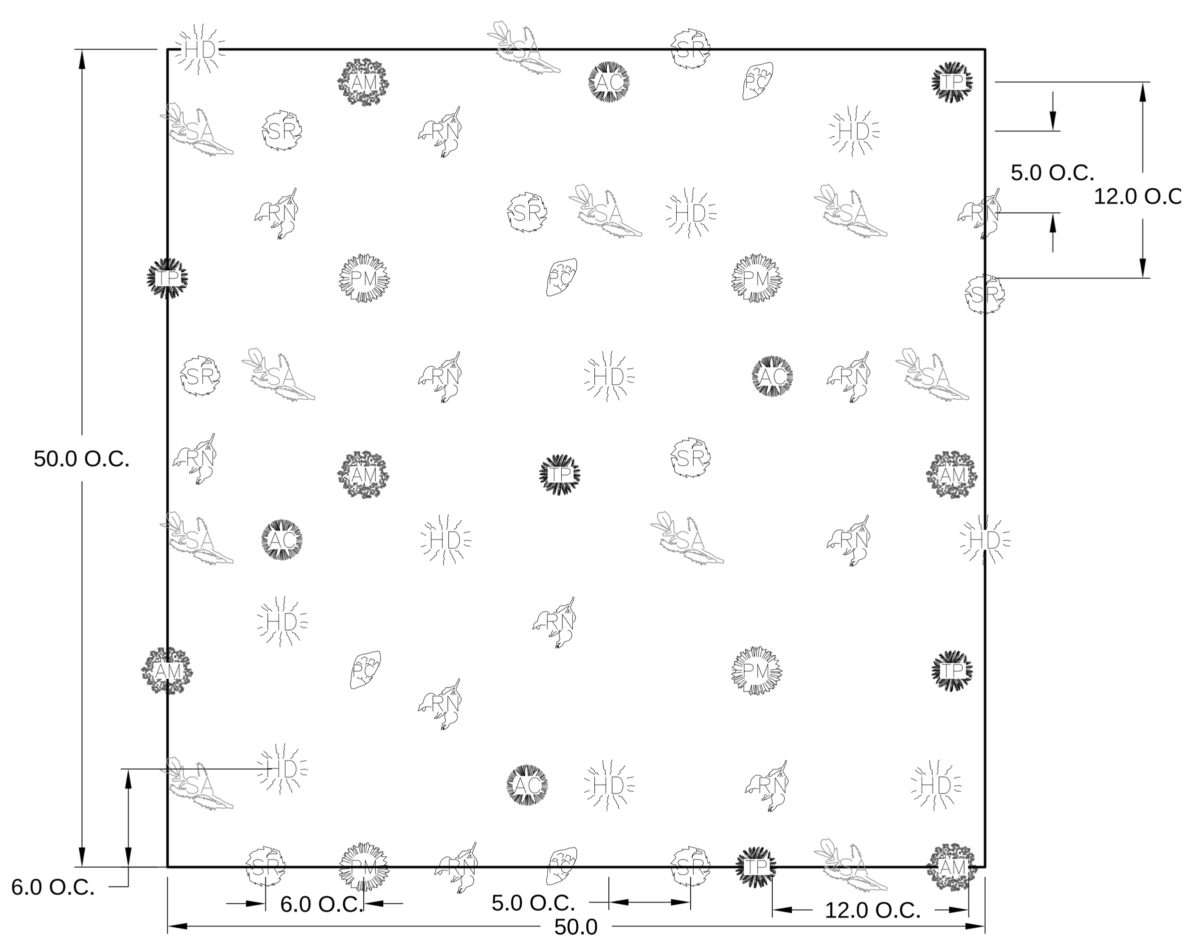
SHORELINE TREE AND SHRUB PLANTING AREA 4 L1.0
SCALE: 1"=20'



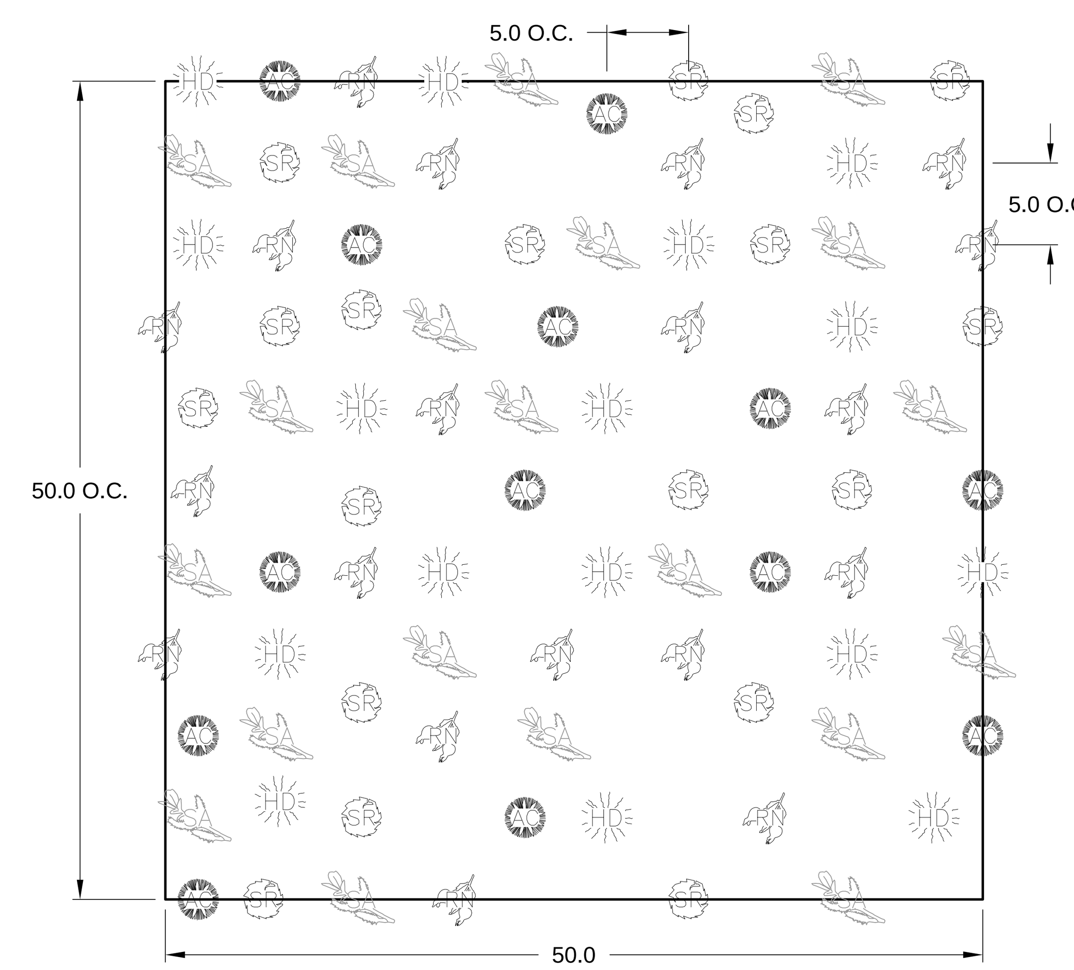
UPLAND CAP SHRUB PLANTING AREA 5 L1.0
SCALE: 1"=50'



ACCESS ROAD RESTORATION DETAIL PLANTING AREA 6 L1.0
SCALE: 1"=20'



SHORELINE TREE AND SHRUB PLANTING AREA TYPICAL LAYOUT
SCALE: 1"=10'



UPLAND CAP SHRUB PLANTING AREA TYPICAL LAYOUT
SCALE: 1"=10'

TYPICAL TREE & SHRUB PLANTING ZONE TABLE

Symbol	Plant Species		Quantity	On Center Spacing (ft)
	Scientific Name	Common Name		
TYPICAL TREES				
	Pseudotsuga menziesii	Douglas fir	31	12
	Pinus contorta	Shore pine	31	12
	Thuja plicata	Western red cedar	46	12
	Acer macrophyllum	Big-leaf maple	46	12
TYPICAL SHRUBS				
	Rosa nutkana	Nootka Rose	262	5
	Holodiscus discolor	Oceanspray	175	5
	Acer circinatum	Vine maple	61	6
	Sambucus racemosa	Red elderberry	121	6
	Smyphoricarpos albus	Snowberry	175	5

TYPICAL SHRUB PLANTING ZONE TABLE

Symbol	Plant Species		Quantity	On Center Spacing (ft)
	Scientific Name	Common Name		
TYPICAL SHRUBS				
	Rosa nutkana	Nootka Rose	262	5
	Holodiscus discolor	Oceanspray	175	5
	Acer circinatum	Vine maple	61	6
	Sambucus racemosa	Red elderberry	121	6
	Smyphoricarpos albus	Snowberry	175	5

EROSION CONTROL SEED MIX

Variety of Seed in Mixture	Percent by Weight (%)	Minimum Percent Pure Seed (%)	Minimum Percent Germination (%)
Red Creeping Fescue	40	98	90
Perennial Ryegrass	40	98	90
White Sweetclover (Melilotus Alba)	10	98	90
Highland Colonial Bentgrass	10	98	90

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CHRISTOPHER LEWIS BAILEY
STATE OF WASHINGTON
39963
REGISTERED PROFESSIONAL ENGINEER
5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action
Washington State Department of Ecology

LANDSCAPE AND RESTORATION DETAILS

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DESIGN: CLB	SCALE: NOTED
CHECKED: DAC	DATE: 8/31/11
SHEET NO. L1.2	

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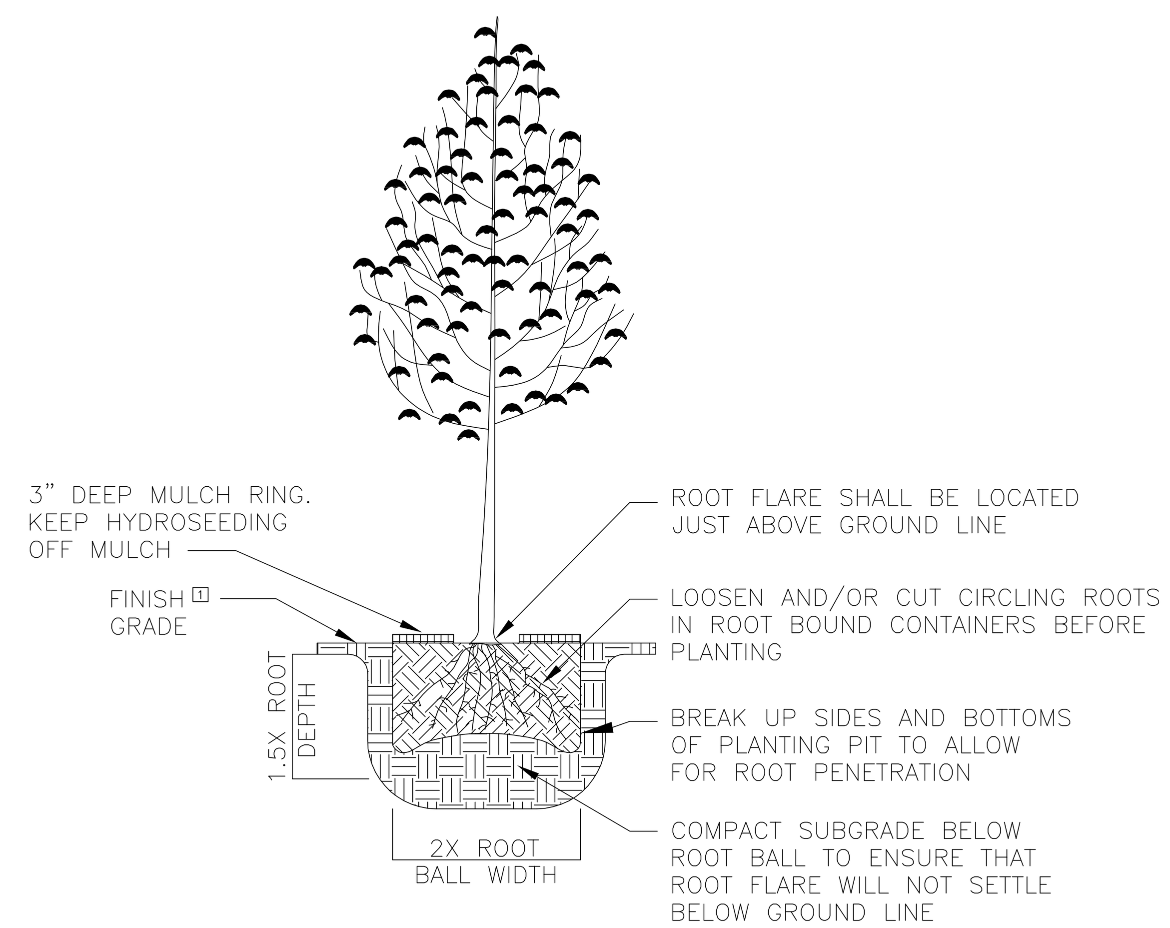
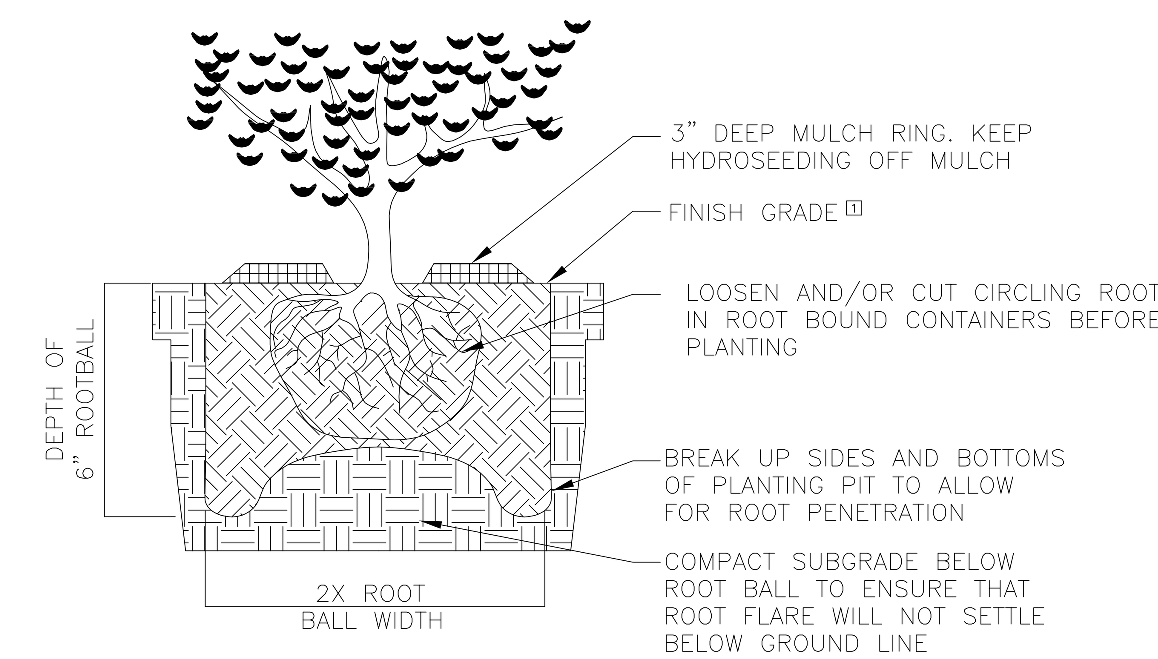
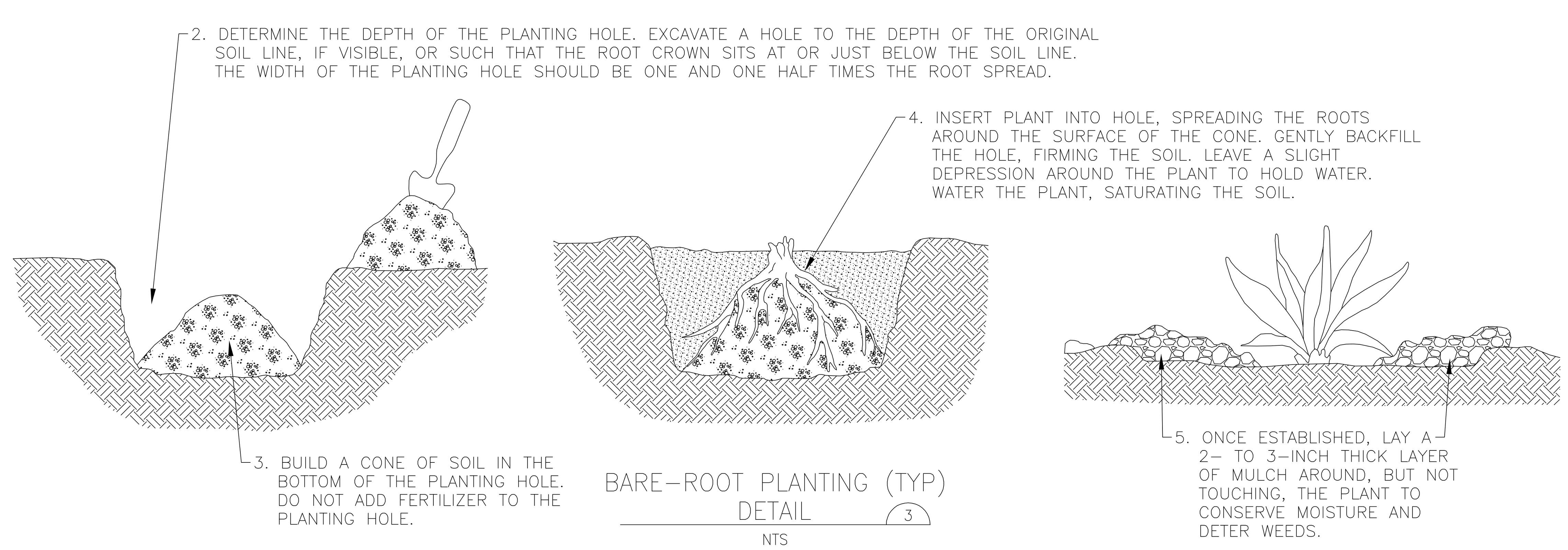


TREE PLANTING (TYP) DETAIL 1
NTS



SHRUB PLANTING (TYP) DETAIL 2
NTS

1. REMOVE PLANTS FROM THEIR PACKING MATERIAL AND PRUNE OFF DAMAGED OR EXTRA LONG ROOTS. SOAK THE ROOTS IN A PAIL OF WARM WATER SET IN THE SHADE FOR 3–6 HOURS.



BARE–ROOT PLANTING (TYP) DETAIL 3
NTS

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PROFESSIONAL ENGINEER
5/2/12

NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID

Irondale Iron and Steel Plant Cleanup Action

Washington State Department of Ecology

PLANTING PLAN DETAILS

DRAWN: CMV	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NOTED
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	L1.3

100-PERCENT DESIGN

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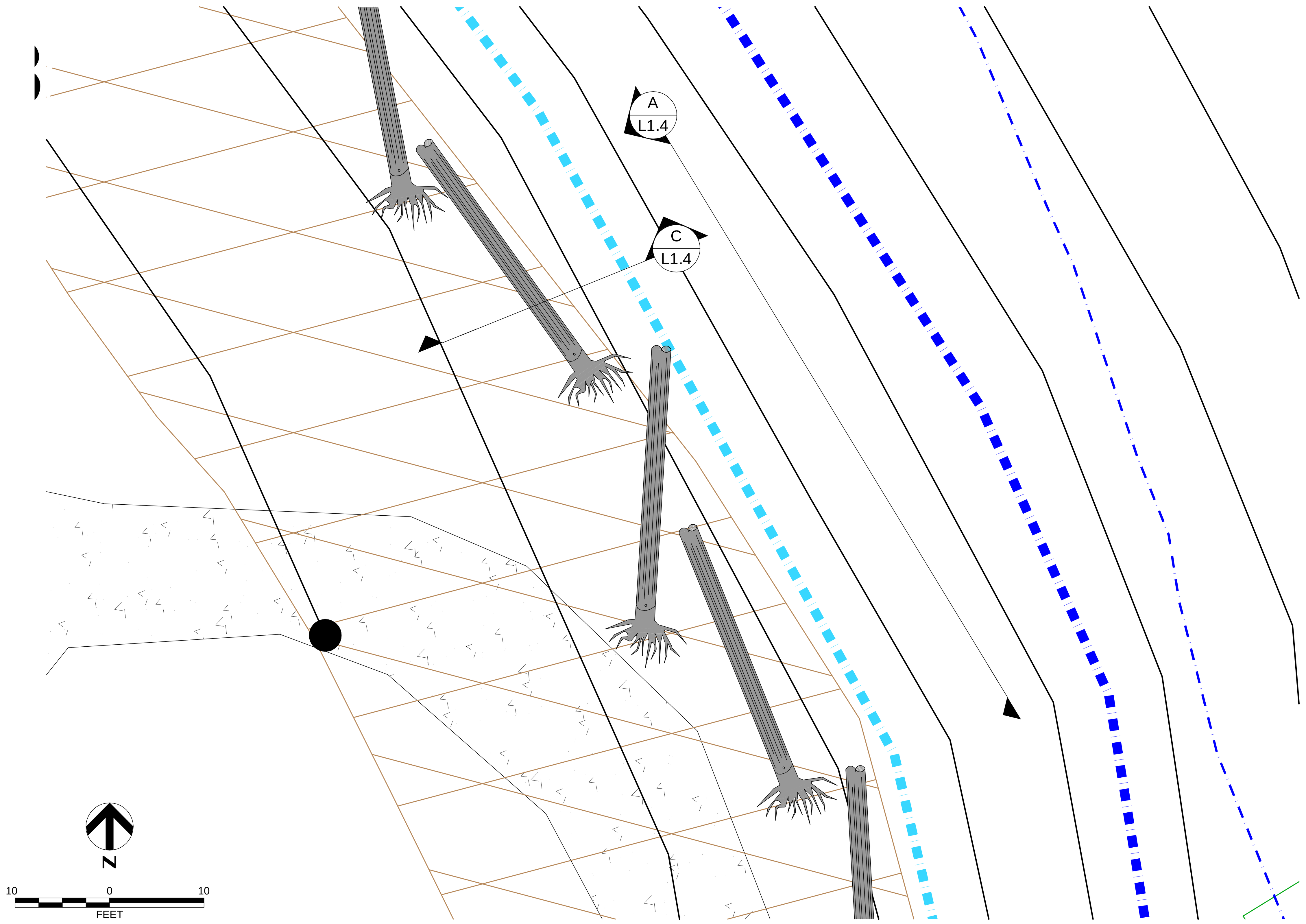
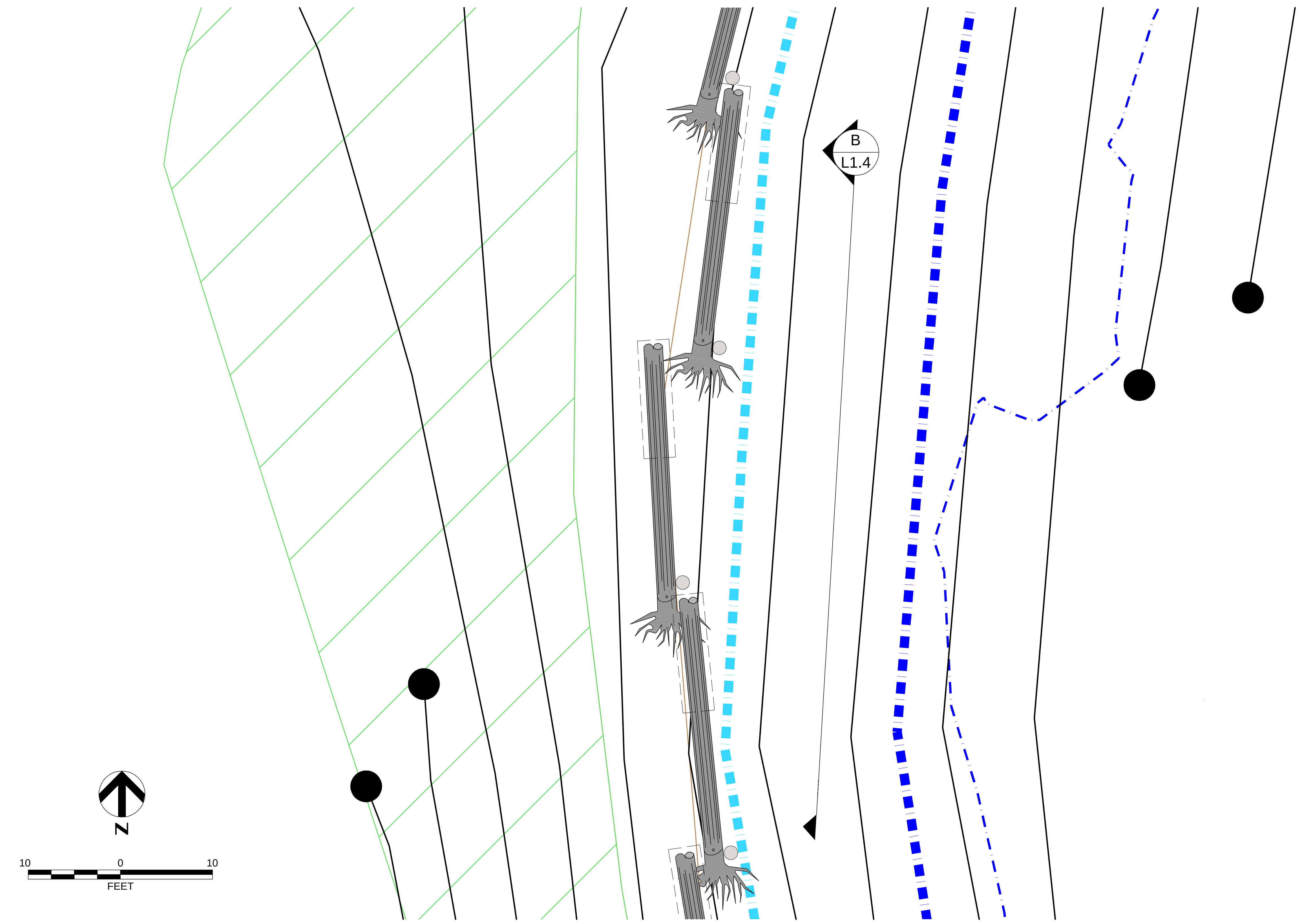
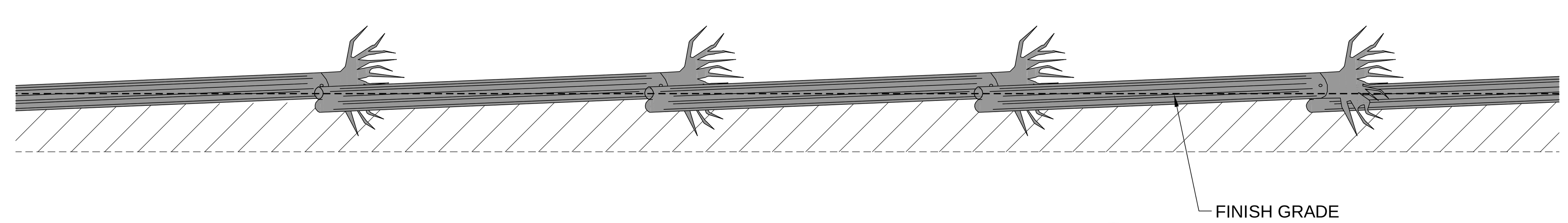


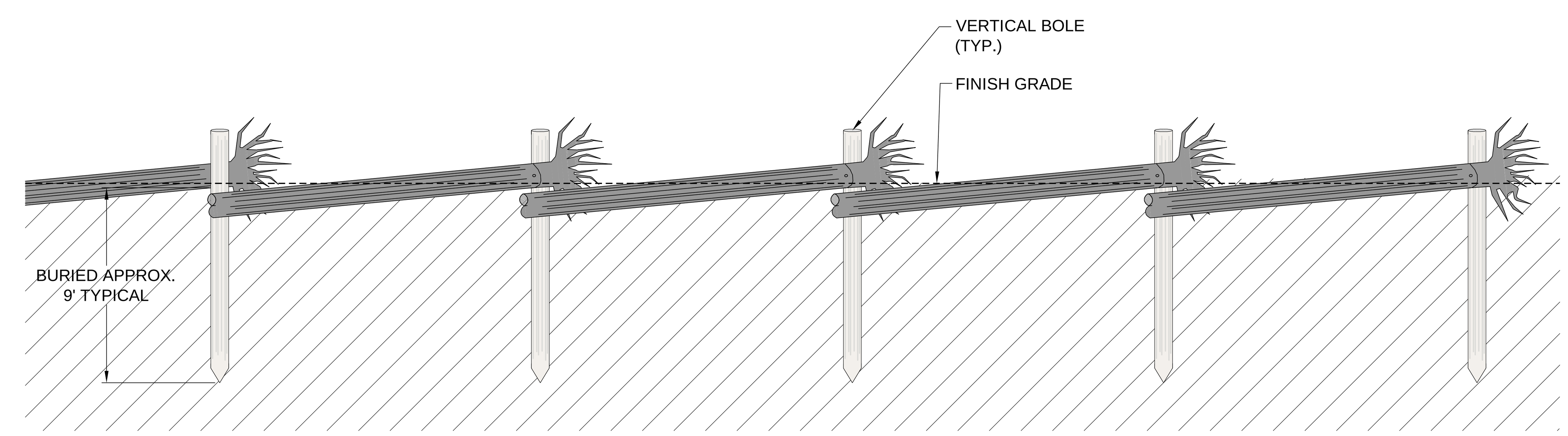
BACKSHORE DUNEGRASS (RESTORATION) LWD PLAN (A / L1.0)



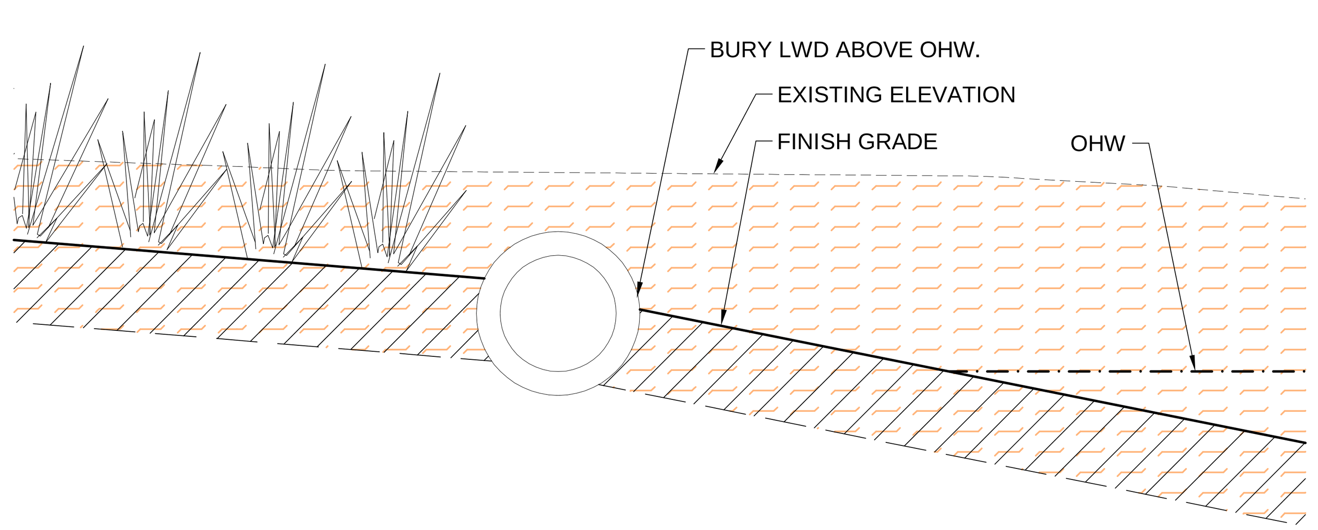
UPLAND PLANTING (REMEDIATION) AREA LWD PLAN (B / L1.0)



BACKSHORE DUNEGRASS (RESTORATION) LWD SECTION (A / L1.4)



UPLAND PLANTING (REMEDIATION) AREA LWD SECTION (B / L1.4)



BACKSHORE DUNEGRASS (RESTORATION) LWD SECTION (C / L1.4)
N.T.S.

LEGEND

- BACKSHORE DUNEGRASS PLANTING AREA
- SHORELINE TREE AND SHRUB PLANTING AREA
- BURIED END OF LWD
- LARGE WOODY DEBRIS (AT PROPOSED NEW OHW)
- PROPOSED MHHW

NOTES

1. ROOTBALLS SHOWN FOR ILLUSTRATION PURPOSES.
2. LWD SHOULD BE CONIFEROUS SPECIES WITH OR WITHOUT ROOTBALLS ATTACHED.
3. LWD IN RESTORATION AREA (NORTH OF SLAG OUTCROP) WILL NOT BE ANCHORED AND SHALL BE BURIED ABOVE OHW.
4. LWD IN REMEDIATION AREA (SOUTH OF SLAG OUTCROP) SHOULD BE PARTIALLY BURIED WITH ROOTBALL OR CUT END EXPOSED.
5. LWD IN REMEDIATION AREA WILL BE SECURED WITH 8-10" VERTICAL BOLES POSITIONED AT EXPOSED END OF LWD.
6. FINAL LOCATION AND POSITION OF LWD WILL BE IDENTIFIED IN THE FIELD DURING CONSTRUCTION.

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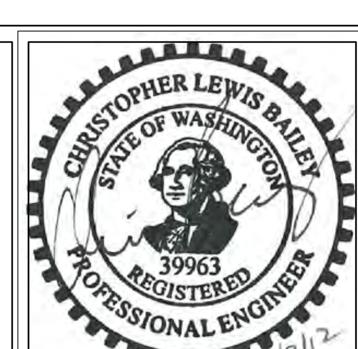
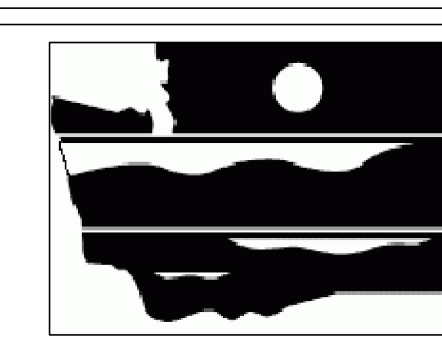
600 Stewart Street, Suite 1700
Seattle WA 98101
P: 206-728-2674
F: 206-728-2731



NO.	DATE	BY	REVISION
1	3/23/12	CLB	UPDATE DRAWINGS FOR 2012 RE-BID



Irondale Iron and Steel Plant Cleanup Action
Washington State Department of Ecology

PLANTING PLANS AND SECTIONS

DRAWN: CMV	PROJECT NO.: 50404201
DESIGN: CLB	SCALE: NOTED
CHECKED: DAC	DATE: 8/31/11
SHEET NO.	L1.4

100-PERCENT DESIGN

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APPENDIX F
Example Restrictive Covenant Documentation

Model Restrictive (Environmental) Covenant

After Recording Return to:

____

Department of Ecology
[fill in regional address]

Environmental Covenant

Grantor: **[land owner]**
Grantee: State of Washington, Department of Ecology
Legal: **[fill in brief legal description]**
Tax Parcel Nos.: **[fill in]**
Cross Reference: **[if amendment, recording number of original covenant]**

Grantor, **[land owner]**, hereby binds Grantor, its successors and assigns to the land use restrictions identified herein and grants such other rights under this environmental covenant (hereafter "Covenant") made this day of ____________, 200__ in favor of the State of Washington Department of Ecology (Ecology). Ecology shall have full right of enforcement of the rights conveyed under this Covenant pursuant to the Model Toxics Control Act, RCW 70.105D.030(1)(g), and the Uniform Environmental Covenants Act, 2007 Wash. Laws ch. 104, sec. 12.

This Declaration of Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by [NAME OF PROPERTY OWNER], its successors and assigns, and the State of Washington Department of Ecology, its successors and assigns (hereafter "Ecology").

A remedial action (hereafter "Remedial Action") occurred at the property that is the subject of this Covenant. The Remedial Action conducted at the property is described in the following document[s]:

[INSERT THE DATE AND TITLE FOR CLEANUP ACTION PLAN and other documents as applicable].

These documents are on file at Ecology's [Insert Office Location] Office.

+++++++Select the appropriate scenario for the property+++++++

SCENARIO 1:

This Covenant is required because the Remedial Action resulted in residual concentrations of [SPECIFICALLY LIST SUBSTANCE(S)] which exceed the Model Toxics Control Act Method [LIST APPLICABLE METHOD] Cleanup Level(s) for [SOIL, GROUNDWATER, ETC.] established under WAC 173-340-____.

++++and/or++++

SCENARIO 2:

This Restrictive Covenant is required because a conditional point of compliance has been established for [SOIL, GROUNDWATER, ETC.].SCENARIO 3:

If the Remedial Action does not fit within Scenarios 1 and/or 2 and you believe that the property still needs a Restrictive Covenant, contact the AG's office.

++

The undersigned, [NAME OF PROPERTY OWNER], is the fee owner of real property (hereafter "Property") in the County of [NAME OF COUNTY], State of Washington, that is subject to this Covenant. The Property is legally described [AS FOLLOWS: (insert legal description language)] -or- [IN ATTACHMENT A OF THIS COVENANT AND MADE A PART HEREOF BY REFERENCE (attach document containing legal description)].

[NAME OF PROPERTY OWNER] makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1. (This Section must describe with particularity the restrictions to be placed on the property.)

1. If the property was remediated to industrial soil cleanup standards, then use the following sentence: "The Property shall be used only for traditional industrial uses, as described in RCW 70.105D.020(23) and defined in and allowed under the [CITY -or- COUNTY] of [_________________'s] zoning regulations codified in the [OFFICIAL NAME OF ZONING REGULATION] as of the date of this Restrictive Covenant."

2. If the groundwater contains hazardous substances above cleanup levels, then use the following sentence: "No groundwater may be taken for [LIST THE PROHIBITED USES, E.G., DOMESTIC, AGRICULTURAL, OR ANY USE] from the Property."

3. If the soil contains hazardous substances above cleanup levels, then describe prohibited activities as follows:

a. For contaminated soil under a structure use the following sentence: "A portion of the Property contains [SPECIFICALLY LIST SUBSTANCE(S)] contaminated soil located [SPECIFICALLY DESCRIBE WHERE THE SOIL IS LOCATED, I.E., UNDER THE SOUTHEAST PORTION OF BUILDING 10]. The Owner shall not alter, modify, or remove the existing structure[s] in any manner that may result in the release or exposure to the environment of that contaminated soil or create a new exposure pathway without prior written approval from Ecology."

b. Example language for contaminated soil under a cap: "Any activity on the Property that may result in the release or exposure to the environment of the contaminated soil that was contained as part of the Remedial Action, or create a new exposure pathway, is prohibited. Some examples of activities that are prohibited in the capped areas include: drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork."

<u>Section 2</u>. Any activity on the Property that may interfere with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

<u>Section 3</u>. Any activity on the Property that may result in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

<u>Section 4</u>. The Owner of the property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 5. The Owner must restrict leases to uses and activities consistent with the Covenant and notify all lessees of the restrictions on the use of the Property.

Section 6. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 7. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect remedial actions conducted at the property, to determine compliance with this Covenant, and to inspect records that are related to the Remedial Action.

Section 8. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs.

[NAME OF GRANTOR]

____
[Name of Signatory]
[Title]

Dated: __________________

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

____
[Name of Person Acknowledging Receipt]
[Title]

Dated: __________________

[INDIVIDUAL ACKNOWLEDGMENT]

STATE OF ____________________
COUNTY OF __________________

On this ______ day of __________________, 20__, I certify that ______________ personally appeared before me, and acknowledged that **he/she** is the individual described herein and who executed the within and foregoing instrument and signed the same at **his/her** free and voluntary act and deed for the uses and purposes therein mentioned.

____
Notary Public in and for the State of Washington, residing at ______________.
My appointment expires______________.

[CORPORATE ACKNOWLEDGMENT]

STATE OF ____________________
COUNTY OF __________________

On this ______ day of __________________, 20__, I certify that ______________ personally appeared before me, acknowledged that **he/she** is the ____________________ of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that **he/she** was authorized to execute said instrument for said corporation.

____
Notary Public in and for the State of Washington, residing at _______________.
My appointment expires_______________.

[REPRESENTATIVE ACKNOWLEDGEMENT]

STATE OF ____________________
COUNTY OF __________________

On this ______ day of __________________, 20__, I certify that ______________ ______ personally appeared before me, acknowledged that **he/she** signed this instrument, on oath stated that **he/she** was authorized to execute this instrument, and acknowledged it as the

__________________________ [type of authority] of ________________________ [name of party being represented] to be the free and voluntary act and deed of such party for the uses and purposes mentioned in the instrument.

____
Notary Public in and for the State of
Washington, residing at _____________.
My appointment expires _____________.

Exhibit A
Legal Description

APPENDIX G
Quality Assurance Project Plan

Quality Assurance Project Plan (QAPP)

Irondale Iron and Steel Plant Remedial Action
Irondale, Washington

for
Washington State Department of Ecology

May 1, 2012

GEOENGINEERS

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Quality Assurance Project Plan (QAPP)
Irondale Iron and Steel Plant Remedial Action
Irondale, Washington

File No. 504-042-02

May 1, 2012

Approved By:

Signature: Date: May 1, 2012

David A. Cook, LG, CPG, Principal, GeoEngineers

Signature: Date: May 1, 2012

Neil F. Morton, Project Manager, GeoEngineers

Signature: Date: May 1, 2012

Chris Bailey, PE, Project Engineer, GeoEngineers

Signature: Date: May 1, 2012

Mark J. Lybeer, Quality Assurance Leader, GeoEngineers

NFM:DAC:csv

GEOENGINEERS

DISTRIBUTION LIST

Steve Teel
Washington State Department of Ecology
Toxics Cleanup Program
300 Desmond Drive
Lacey, Washington 98504
360.407.6247
stee461@ecy.wa.gov

Table of Contents

LIST OF TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was developed for the performance and compliance monitoring sampling and analysis activities to be performed at the Former Irondale Iron and Steel Plant (Site, also known as Irondale Beach Park) in Irondale, Washington. This QAPP serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into the performance and compliance monitoring sampling and analysis activities. The QAPP presents the objectives, procedures, organization, and specific QA and QC activities designed to achieve data quality goals established for the project. Environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and that meet established objectives. QA/QC procedures will be implemented so that the precision, accuracy, representativeness, completeness and comparability (PARCC) of the data generated meet the specified data quality objectives.

The U.S. Environmental Protection Agency (EPA) defines quality assurance and quality control as follows:

> "Quality assurance/quality control measures are those activities you undertake to demonstrate the accuracy (how close to the real result you are) and precision (how reproducible your results are) of your monitoring. Quality Assurance (QA) generally refers to a broad plan for maintaining quality in all aspects of a program. This plan should describe how you will undertake your monitoring effort: proper documentation of all your procedures, training of volunteers, study design, data management and analysis, and specific quality control measures. Quality Control (QC) consists of the steps you will take to determine the validity of specific sampling and analytical procedures."

The cleanup action is being conducted by the Washington State Department of Ecology (Ecology). The objectives of the cleanup action are discussed in the Revised Draft Cleanup Action Plant (CAP) and the Engineering Design Report (EDR). Sampling procedures are outlined in the EDR (Section 7 – Compliance Monitoring). A separate site-specific Health and Safety Plan (HASP) will be used for field oversight activities.

The QAPP was prepared following the EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5), Guidance for Quality Assurance Project Plans (USEPA, 2002), EPAs Contract Laboratory Program (USEPA, 2004) and guidelines and Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology, 2004).

2.0 BACKGROUND

2.1. Problem Definition

From 1881 to 1919, iron and steel were produced intermittently at the Site by various owners. Steel plant operations during this time resulted in arsenic, copper, iron, lead, nickel, zinc, carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and/or petroleum contamination of soil, sediment and/or groundwater at concentrations that pose a potential risk to human health and the environment. The greatest concentrations of metals are associated with debris and industrial process waste (slag) generally concentrated in areas around the former steel production building and the former power house complex (that is, the power house, engine house, boiler house, blast furnace/cast house, and stock house buildings and the hot stoves). Petroleum hydrocarbon contamination is associated with the former 6,000-barrel AST located on the southeastern portion of the Site.

The objective of the cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by petroleum hydrocarbons, metals and/or cPAHs in soil, sediment, and groundwater at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements necessary to facilitate this cleanup action.

Although not anticipated, because an appropriate number of characterization soil samples have been tested, it is possible that additional stockpile sampling may be required to characterize excavated soil and sediment prior to disposal.

Performance monitoring will be conducted to verify that the cleanup action attains soil and sediment cleanup standards established for the Site and/or to document contaminant concentrations remaining in place at depth that will be capped.

Confirmational groundwater monitoring will be performed quarterly for a minimum of one year after the cleanup action is completed to evaluate the long-term effectiveness of the cleanup action, with respect to protection of groundwater. The four consecutive quarterly monitoring events will be initiated after cleanup and site restoration activities are completed.

2.2. Site Description

The Site is a 13-acre property located at 526 Moore Street in the town of Irondale, latitude 48°2' 38" N longitude 122° 45' 60" W, approximately 5 miles south of Port Townsend, Washington.

The Site is owned by Jefferson County and is currently used as an undeveloped day-use park (Irondale Beach Park). It is bounded by Port Townsend Bay to the east, residential properties to the south, southwest and northwest, and parklands to the north. The anticipated future land use is expected to remain as public park space. The Site is part of the Irondale National Historic District designated by the National Park Service and is also listed in the Washington State Heritage Register and the National Park Service Historic American Engineering Record. Preservation of historic Site components is expected to continue following completion of the cleanup action.

2.3. Site History

Industrial activities took place at the Site from 1881 through 1919. The iron and steel plant produced the first batch of iron in 1881, and the steel production plant was operational beginning in 1909. The Irondale Iron and Steel Plant consisted of a blast furnace and cast house, steel production building (including three open-hearth furnaces and a steel rolling mill), boiler plant, six charcoal kilns (also referred to as beehive kilns), miscellaneous support buildings (raw material warehouses, power house, machine shop, engine shop, and other supporting buildings), a 600-foot wharf and a 6,000-barrel aboveground storage tank (AST) for fuel oil. At its peak in 1910, the steel plant produced more than 700 tons of steel per day and employed 600 workers. The plant was closed in 1911 and was reopened between 1917 and 1919 because of the demand for steel during World War I.

Since 1919, no other waste-generating industry has used the Site. From the mid-1970s until 1999, the beach area east of the former iron and steel plant was used as log storage for the Port Townsend Paper Company. A review of the history of the Site and potentially liable parties by Ecology (Ecology, 2007a) states that Cotton Engineering and Shipbuilding Corporation, later known as the Cotton Family Limited Partnership, owned the property from 1943 until December 30, 2002, when the property was sold to Jefferson County. Jefferson County bought the property to use as a recreational area and has operated the Site as Irondale Beach Park since that time.

2.4. Project Description and Schedule

The cleanup action consists of excavation and off-site disposal of upland soil and near-shore sediment containing COC concentrations (petroleum hydrocarbons, metals and/or cPAHs) above Site-specific cleanup levels, capping contaminated upland soil, and restoring the shoreline along the entire Site.

Sampling and analysis at the Site may be performed to characterize the excavated soil and sediment for disposal or reuse. Verification sampling and analyses will be performed and will involve collecting soil/sediment samples from the base and sidewalls of the remedial excavation areas to verify that cleanup levels have been achieved and to document concentrations of contaminants remaining at the Site. Confirmational (post-construction) groundwater monitoring will be performed quarterly for a minimum of one year after the cleanup action is completed to evaluate the long-term effectiveness of the cleanup action, with respect to protection of groundwater. The four consecutive quarterly monitoring events will be initiated after cleanup and site restoration activities are completed.

Selected samples will be submitted for chemical analysis to an Ecology-approved analytical laboratory for one or more of the following:

- Metals (arsenic, copper, iron, lead, nickel and zinc) by EPA Method 6000 series.
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270-SIM.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.
- TCLP Metals (arsenic and lead) by EPA Method 1311

The cleanup action is estimated to be completed in the summer of 2012.

3.0 PROJECT MANAGMENT

3.1. Project Organization and Responsibilities

Descriptions of the responsibilities, lines of authority and communication for the key positions providing quality assurance and quality control are shown in Figure 3-1. The project organization facilitates the efficient production of project work, allows for an independent quality review, and permits resolution of any QA issues.

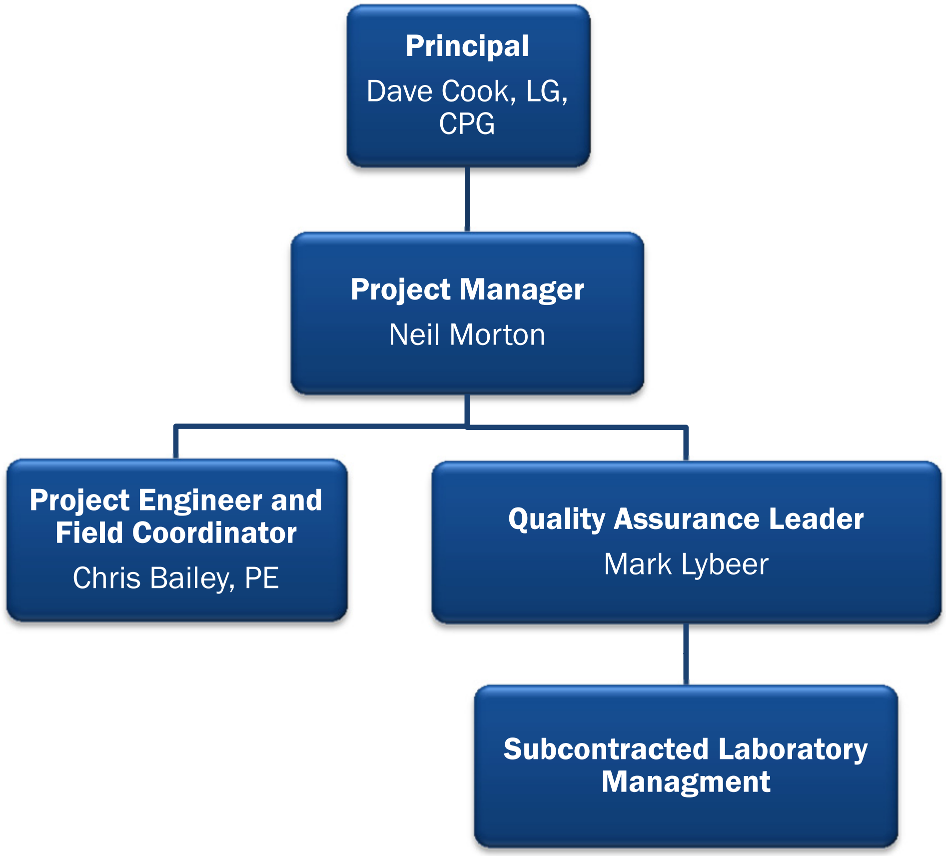

Figure 3-1. Project Organization Chart

3.1.1. Project Leadership and Management

Dave Cook (206.239.3229) is a Principal Geologist and is the Principal-in-Charge. The Principal–in-Charge is responsible to Ecology for fulfilling contractual and administrative control of the project. The Principal-in-Charge's duties include defining the project approach and tasks, selecting project team members and establishing budgets and schedules. The Principal-in-Charge also will provide technical reviews of all documents for QC purposes.

Neil Morton (206.239.3238) is a Senior Toxicologist and is the Project Manager for cleanup action activities at the Site. The Project Manager's duties consist of implementing the project approach and tasks, overseeing project team members during performance of project tasks, adhering to and communicating the status of budgets and schedules to the Principal-in-Charge, providing technical oversight, and providing overall production and review of project deliverables.

3.1.2. Field Coordinator

Chris Bailey (206.239.3246) is a Senior Environmental Engineer and will be the Field Coordinator for cleanup action activities at the Site. The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Provides technical direction to the field staff.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the collection of field data and submittal of samples for laboratory analysis.
- Assures that field information is correctly and completely reported.
- Implements and oversees field sampling in accordance with project plans.
- Supervises field personnel.
- Coordinates work with on-site subcontractors.
- Schedules sample shipment with the analytical laboratory.
- Monitors that appropriate sampling, testing, and measurement procedures are followed.
- Coordinates the transfer of field data, sample tracking forms, and log books to the Project Manager for data reduction and validation.
- Participates in QA corrective actions as required.

3.1.3. Quality Assurance Leader

Mark Lybeer (206.239.3227) is a Senior Chemist and is the QA Leader and is responsible for coordinating QA/QC activities as they relate to chemical analytical data. Specific responsibilities include the following:

- Serves as the official contact for laboratory data QA concerns.
- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective.
- Maintains the authority to implement corrective actions as necessary.
- Reviews and approves the laboratory QA Plan.
- Evaluates the laboratory's final QA report for any condition that adversely impacts data generation.
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that correct quality control checks are implemented.
- Monitors laboratory compliance with data quality requirements.

3.1.4. Laboratory Management

An Ecology-approved analytical laboratory will provide laboratory analytical services for the project. The approved laboratory will designate a Laboratory's QA Coordinator for the project.

The subcontracted laboratories conducting sample analyses for this project are required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensure implementation of the QA Plan.

- Serve as the laboratory point of contact.
- Activate corrective action for out-of-control events.
- Issue the final QA/QC report.
- Administer QA sample analysis.
- Ensure that the laboratory Method Reporting Limits (MRLs) are equal to or less than the Site-specific cleanup levels.
- Comply with the specifications established in the project plans as related to laboratory services.
- Participate in QA audits and compliance inspections.

3.2. Health and Safety

A Site-specific health and safety plan (HASP) will be used for field oversight activities. The Field Coordinator will be responsible for implementing the HASP during sampling activities. The Project Manager will discuss health and safety issues with the Field Coordinator on a routine basis during the completion of field activities.

The Field Coordinator will terminate any work activities that do not comply with the HASP. Companies providing services for this project on a subcontracted basis will be responsible for developing and implementing their own HASP.

4.0 QUALITY OBJECTIVES AND CRITERIA

The quality assurance objective for technical data is to collect environmental monitoring data of known, acceptable, and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (bias, detection limits, precision, accuracy and completeness) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with the data quality factors are summarized in Table C-1 and are discussed below.

4.1. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Although results reported near the MDL provide insight to Site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL), which is typically demonstrated with the lowest point of a linear calibration. The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

The reporting limits for Site Chemicals of Potential Concern (COPCs) are presented in Table C-2 for soil/sediment and Table C-3 for groundwater. These reporting limits were obtained from an Ecology-certified laboratory. The reporting limits presented in Tables C-2 and C-3 are the laboratory PQLs that are considered target reporting limits (TRLs) because several factors may influence final reporting limits. First, moisture and other physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize Site conditions.

4.2. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for soil/sediment and water samples. This value is calculated by:

$$RPD(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} X\ 100,$$

Where

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA, 1999; USEPA, 2004) that address criteria exceedances and courses of action. Project RPD goals for all analyses are 35 percent for water samples and 50 percent for soil/sediment samples, unless the primary and duplicate sample results are less than 5 times the MRL, in which case RPD goals will not apply for data quality assessment purposes.

4.3. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported values versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

For this project, accuracy will be expressed as the percent recovery of a known surrogate spike, matrix spike, or laboratory control sample (blank spike), concentration:

$$Recovery\,(\%) = \frac{Spiked\ Result - Unspiked\ Result}{Known\ Spike\ Concentration}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (USEPA, 1999; USEPA, 2004) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes, and laboratory control spikes are found in Table C-1 of this QAPP.

4.4. Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the actual Site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP and this QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative.

Only representative data will be used in subsequent data reduction, validation, and reporting activities.

4.5. Completeness

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

$$\text{Completeness} = \frac{\text{number of valid measurements}}{\text{total number of data points planned}} \times 100$$

4.6. Comparability

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

4.7. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents may have volatilized from the sample or degraded. Results for that analysis would be qualified as estimated to indicate that the reported results may be lower than actual Site conditions. Holding times are presented in Table C-4.

4.8. Blanks

According to the *National Functional Guidelines for Organic Data Review* (USEPA, 2008), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)." Trip blanks are not planned because volatile compounds are not expected to be present. Method blanks are created during sample preparation and follow samples throughout the analysis process.

Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Data Review* (USEPA, 2008) and professional judgment.

4.9. Special Training Requirements/Certification

The Superfund Amendments and Reauthorization Act of 1986 required the Secretary of Labor to issue regulations providing health and safety standards and guidelines for workers engaged in hazardous waste operations. Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.120) require training to provide employees with the knowledge and skills necessary to enable them to perform their jobs safely and with minimum risk to their personal health. All sampling personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet OSHA regulations.

5.0 DOCUMENTATION AND RECORDS

5.1. Field observations

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs. The field logs will be prepared on field report forms or in a bound logbook. Entries in the field logs and associated sample documentation forms will be made in waterproof ink, and corrections will consist of line-out deletions that are initialed and dated. Individual logbooks will become part of the project files at the conclusion of the field work.

At a minimum, the following information will be recorded during the collection of each sample.

- Sample location and description
- Site or sampling area sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or discrete
- Sample matrix (soil/sediment or water)
- Type of sampling equipment used
- Field instrument (e.g., PID) readings
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.)
- Preliminary sample descriptions (e.g., lithologies, field screening results)
- Sample preservation
- Sample transport/shipping arrangements
- Name of recipient laboratory

In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling.

- Sampling team members
- Time of arrival/entry on Site and time of Site departure
- Other personnel present at the Site

- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel
- Deviations from sampling plans, QAPP procedures, and HASP
- Changes in field personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any field instruments used

The handling, use, and maintenance of field log books are the Field Coordinator's responsibility.

5.2. Analytical chemistry records

Laboratories will be responsible for internal checks on data reporting and will correct errors identified during the QA review. All laboratories must be accredited by Ecology for the required analytical methods. Close contact will be maintained with the laboratories to resolve any quality control problems in a timely manner. The laboratories will be required to provide the following:

- **Project narrative –** This summary, in the form of a cover letter, will present any problems encountered during any aspect of analysis. The summary will include, but not be limited to, a discussion of QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered by the laboratory, and their resolutions, will be documented in the project narrative.
- **Records –** Legible copies of the chain-of-custody (COC) forms will be provided as part of the data package. This documentation will include the time of receipt and the condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample results –** The data package will summarize the results for each sample analyzed. The summary will include the following information, as applicable:
    - Field sample identification code and the corresponding laboratory identification code
    - Sample matrix
    - Date of sample extraction/digestion
    - Date and time of analysis
    - Weight and/or volume used for analysis
    - Final dilution volumes or concentration factor for the sample
    - Total solids in the samples
    - Identification of the instruments used for analysis
    - MDLs and RLs
    - All data qualifiers and their definitions
- **QA/QC summaries –** These summaries will contain the results of all QA/QC procedures. Each QA/QC sample analysis will be documented with the same information as that required for the sample results (see above). The laboratory will make no recovery or blank corrections. The required summaries are listed below.

- The calibration data summary will contain the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent standard deviation (%RSD), RPDs, and retention time for each analyte will be listed, as appropriate. Results for standards analyzed at the RL to determine instrument sensitivity will be reported.
- The internal standard area summary will report the internal standard areas, as appropriate.
- The method blank analysis summary will report the method blank analysis associated with each sample and the concentrations of all compounds of interest identified in these blanks.
- The surrogate spike recovery summary will report all surrogate spike recovery data for organic analyses. The names and concentrations of all compounds added, percent recoveries, and QC limits will be listed.
- The matrix spike (MS) recovery summary will report the MS or MS duplicate (MSD) recovery data for analyses, as appropriate. The names and concentrations of all compounds added, percent recoveries, and QC limits will be included in the data package. The RPD for all MS/MSD analyses will be reported.
- The laboratory replicate summary will report the RPD for all laboratory replicate analyses. The QC limits for each compound or analyte will be listed.
- The laboratory control sample (LCS) analysis summary will report the results of the analyses of the LCS. The QC limits for each compound or analyte will be included in the data package.
- The relative retention time summary will report the relative retention times for the primary and confirmational columns of each analyte detected in the samples, as appropriate.

EQuIS four-file format electronic data deliverables will be obtained from the laboratory and data will be submitted into Ecology's Environmental Information Management (EIM) system after data quality assessments are completed.

5.3. Data reduction

Data reduction is the process by which original data are converted or reduced to a specified format or unit to facilitate the analysis of the data. For example, a final analytical concentration may need to be calculated from a diluted sample result. Data reduction requires that all aspects of sample preparation that could affect the test result, such as sample volume analyzed or dilutions required, be taken into account in the final result. The laboratory personnel will reduce the analytical data for review by the Quality Assurance Leader and Project Manager.

During chemical analysis, samples are occasionally diluted after the initial analysis if the estimated concentration curve for one or more of the target analytes is above the calibration curve. In these instances, concentrations from the initial analysis will be identified as the "best result" for all target analytes other than the chemical(s) that was originally above the calibration range. The "best result" for this qualified analyte(s) will be taken from the diluted sample.

6.0 DATA GENERATION AND ACQUISITION

6.1. Sample Process Design

As required in the revised Draft Cleanup Action Plan (CAP; GeoEngineers 2009), soil and sediment samples will be collected from the base and sidewalls of the proposed removal areas to confirm that Site cleanup levels have been achieved. In addition, the CAP requires the collection of post-construction groundwater samples from a network of new monitoring wells to verify that the soil removal is protective of groundwater. Soil/sediment and groundwater sampling will be conducted by GeoEngineers' field personnel. Table C-2 and C-3 summarizes the chemical analyses to be performed for soil samples and groundwater samples respectively.

6.1.1. Soil Verification Sampling

Soil/sediment verification samples will be collected by GeoEngineers' field personnel from the base and/or sidewalls of the remedial excavation to confirm the completeness of the contamination removal. Verification sample procedures and sample frequencies are described in Section 7 of the Engineering Design Report (GeoEngineers, 2012).

6.1.2. Groundwater Monitoring

Following the completion of Cleanup Action, groundwater samples will be obtained from the Site to evaluate the long-term effectiveness of the cleanup action. The CAP established that the monitoring wells will be installed along the shoreline of the Site. The monitoring wells will be sampled and analyzed for contaminant concentrations as well as indicators of natural attenuation during at least four quarterly events to demonstrate that groundwater impacts have been addressed. Long-term groundwater monitoring may be necessary if initial groundwater monitoring indicates the potential for contaminant transfer from remaining contaminated soil to groundwater over time.

6.2. Sample Methods

6.2.1. Sampling Equipment and Decontamination Procedures

Soil samples will be collected using excavation equipment (i.e., backhoe or excavator) and/or hand tools including stainless steel spoons and stainless steel mixing bowls. Groundwater samples will be collected from monitoring wells using low-flow sampling procedures.

Reusable sampling equipment that comes in contact with soil/sediment or groundwater will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

1. Washing with a brush and non-phosphate detergent solution (e.g., Liqui-Nox and distilled water),
2. Rinsing with distilled water, and
3. Wrapping or covering the decontaminated equipment with aluminum foil. Field personnel will limit cross-contamination by changing gloves between sampling locations.

Wash water used to decontaminate the reusable sampling equipment will be collected and stored on-site in 55-gallon drums.

6.2.2. Field Screening Procedures

The potential presence of petroleum and/or volatile organics contamination in soil samples will be evaluated using field screening techniques. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. In addition, screening results will be used as a basis for selecting soil samples for chemical analysis. The following screening methods will be used: (1) visual screening; (2) water sheen screening; and (3) headspace vapor screening.

6.2.2.1. VISUAL SCREENING

The soil will be observed for unusual color and/or staining indicative of possible contamination.

6.2.2.2. WATER SHEEN SCREENING

Water sheen screening involves placing a portion of the soil sample in a pan containing distilled water, and observing the water surface for signs of sheen. This is a relatively sensitive, qualitative field screening method that can help identify the presence or absence of petroleum hydrocarbons and other contaminants, sometimes at concentrations lower than regulatory cleanup guidelines. The following sheen classifications will be used:

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface.
Slight Sheen	(SS)	Light, colorless, dull sheen; spotty to globular; spread is irregular, not rapid; sheen dissipates rapidly; areas of no sheen remain.
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; globular to stringy; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface.
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; stringy; spread is rapid; entire water surface may be covered with sheen; sheen flows off the sample.

6.2.2.3. HEADSPACE VAPOR SCREENING

This is a semi-quantitative field screening method that can help identify the presence or absence of volatile organic compounds (VOCs) in soil samples. A portion of the soil sample will be placed in a resealable plastic bag. The bag will then be sealed capturing air in the bag. The bag is then shaken gently to expose the soil to the air trapped in the bag. The bag will remain closed for approximately 5 minutes at ambient temperature before the headspace vapors are measured. Vapors present within the sample bag's headspace will be measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag, taking care not to clog the probe with soil. The maximum PID reading (in parts per million [ppm]) and the ambient air temperature will be recorded on the field log for each sample. The PID will be calibrated to 100 ppm isobutylene each day prior to soil sampling. No soil sample used for headspace screening will be submitted to the laboratory for chemical analysis.

6.2.3. Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling, and documentation. Soil, sediment, and groundwater samples will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table C-4.

Sample containers will be labeled with the following information at the time of sample collection:

- Project name and number
- Type of sample preservative used (where applicable)
- Sample name, which will include a reference to date and sampling depth (if applicable)
- Date and time of collection

The sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between sample containers/labels, field log books, and chain-of-custody (COC) forms.

6.3. Sample Handling and Custody

6.3.1. Sample Storage

Samples will be placed in a cooler with ice after they are collected. The objective of the cold storage will be to attain a sample temperature of 2 to 6 degrees Celsius. Holding times (Table C-4) will be observed during sample storage.

6.3.2. Sample Shipment

Samples will be transported and delivered to the analytical laboratory in the sample coolers. The samples will either be transported by field personnel, laboratory personnel, or by courier service. The Field Coordinator will ensure that the cooler has been properly secured using clear plastic tape and custody seals.

6.3.3. Chain-of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are collected until the samples have been received by the courier service or laboratory personnel. A COC form will be completed for each group of samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number;
- Sample identification numbers;
- Date and time of sampling;
- Sample matrix (soil/sediment and groundwater), preservative, and number of containers for each sample;
- Analyses to be performed;
- Names of sampling personnel;

- Project manager name and contact information including phone number; and
- Shipping information including shipping container number, if applicable.

The original COC form will be signed by a member of the field team. Field personnel will retain copies and place the original and remaining copies in a plastic bag. The plastic bag containing the COC form will be placed in the cooler before sealing the cooler for transport to the laboratory.

6.3.4. Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include, at a minimum, the analyst's name or initials, time, and date.

6.4. Analytical Methods

The methods of chemical analysis are identified in Table C-2 and C-3. All methods selected represent standard methods used for the analysis of these analytes in soil, sediment, and groundwater. The laboratory project manager will determine the remedy to be used if the project RLs cannot be attained, in consultation with GeoEngineers Quality Assurance Leader.

6.5. Quality Control

Table C-5 summarizes the types and frequency of QC samples to be analyzed, including both field QC and laboratory QC samples.

6.5.1. Field Quality Control

Field QC samples serve as a control and check mechanism to monitor the consistency of field sampling methods and the potential influence of off-site factors on project samples. Table C-5 summarizes the types and frequency of field QC samples to be analyzed and the following sections discuss field QC samples.

6.5.1.1. FIELD DUPLICATES

Field duplicates serve as a measure for precision. Under ideal field conditions, field duplicates (sometimes referred to as splits), are created by thoroughly mixing a volume of the sample matrix, placing aliquots of the mixed sample in separate containers, and identifying one of the aliquots as the primary sample and the other as the duplicate sample. Field duplicates measure the precision and consistency of laboratory analytical procedures and methods, as well as the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected for every ten soil and groundwater sample collected.

6.5.1.2. TRIP BLANKS

Trip blanks are not planned because volatile compounds have not been detected at the Site and are not expected to be present.

6.5.1.3. EQUIPMENT RINSATE BLANKS

Equipment rinsate blanks will be used to evaluate the effectiveness of decontamination procedures for preventing possible cross-contamination of project samples. Rinsate samples will be collected by slowly pouring distilled water over decontaminated sampling equipment and collecting the rinse water in appropriate sample containers for analysis.

A minimum of one equipment rinsate blank will be collected for every day of soil or groundwater sampling if reusable equipment are used for sampling. At least one equipment rinsate blank will be collected for every 20 soil samples collected.

6.5.2. Laboratory Quality Control

Laboratory QC procedures will be evaluated through a formal data quality assessment process. The analytical laboratory will follow standard analytical method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method blanks
- Internal standards
- Instrument calibrations
- Matrix spike/matrix spike duplicates (MS/MSD)
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Laboratory replicates or duplicates
- Surrogate/Labeled compounds

6.5.2.1. LABORATORY BLANKS

Laboratory procedures utilize several types of blanks, but the most commonly used blanks for QC monitoring are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process, or reagent (contaminant-free) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. If a substance is detected in a method blank, then one (or more) of the following occurred:

- Sample containers, measurement equipment, and/or analytical instruments were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. If target analytes are detected in method blanks, data validation guidelines assist in determining which substances in project samples are considered “real,” and which ones are attributable to the analytical process. Furthermore, the guidelines state, “. . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example.”

6.5.2.2. CALIBRATIONS

Several types of instrument calibrations are used, depending on the analytical method, to assess the linearity of the calibration curve and assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations, and continuing calibration verification.

6.5.2.3. MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH can affect the results for semivolatile organic compounds. Or, the presence of a particular compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high levels of related substances in the sample. A matrix spike is evaluated by spiking a project sample with a known amount of one or more of the target analytes, ideally at a concentration that is 5 to 10 times higher than the sample result. A percent recovery is then calculated by subtracting the un-spiked sample result from the spiked sample result, dividing by the known concentration of the spike, and multiplying by 100.

MS/MSD samples will be analyzed at a frequency of one MS/MSD per analytical batch. The samples for the MS/MSD analyses should be collected from a boring or sampling location that is believed to have only low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for the MS/MSD analyses as required by the laboratory.

6.5.2.4. LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATES (LCS/LCSD)

Also known as blanks spikes, laboratory control samples (LCS) are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared sample medium, and a percent recovery of the spiked substances is calculated. The primary difference between LCS and MS samples is that the LCS uses a contaminant-free sample medium. For example, reagent water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance.

6.5.2.5. LABORATORY REPLICATES/DUPLICATES

Laboratories utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process and most commonly consist of a second analysis on the extracted media.

6.5.2.6. SURROGATES/LABELED COMPOUNDS

Surrogate spikes are used to verify proper extraction procedures and the accuracy of the analytical instrument. Surrogates are substances with characteristics similar to the target analytes. A known concentration of surrogate is added to the project sample and passed through the instrument and the percent recovery is calculated. Each surrogate used has acceptance limits (i.e., an acceptable range) for percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified acceptance limits, a possibility of false positives exist, although non-detect results are considered accurate.

6.6. Instrument Testing, Inspection and Maintenance

The field coordinator will be responsible for overseeing the testing, inspection, and maintenance of all field equipment. The laboratory project manager will be responsible for laboratory equipment testing, inspection, and maintenance requirements. The calibration methods used in calibrating the analytical instrumentation are described in the following section.

6.7. Instrument Calibration and Frequency

6.7.1. Field Instrumentation

Field instrument calibration and calibration checks facilitate accurate and reliable field measurements. The calibration of field instruments used on the project will be checked and adjusted as necessary in general accordance with the manufacturer's recommendations. Methods and intervals of calibration checks and instrument maintenance will be based on the type of instrument, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration check frequencies are described below.

The calibration of the PID used for headspace vapor screening will be checked at the start of each day it is used. If necessary (based on the calibration check results), the instrument will be calibrated in general accordance with the manufacturer's specifications. Calibration check and calibration results will be recorded in the field logbook.

6.7.2. Laboratory Instrumentation

For chemical analytical testing, calibration procedures will be performed in general accordance with the analytical methods used and the laboratory's SOPs. Calibration documentation will be retained at the laboratory.

All instrument calibrations and their appropriate chemical standards are to comply with the specific methods within EPA SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, 3rd Edition, December 1996 and the Laboratory SOPs. Calibration documentation, initial (ICALs) and continuing (CCALs), will be retained at the Laboratory.

6.8. Inspection of Supplies and Consumables

Supplies and consumables for the field sampling effort will be inspected upon delivery and accepted if the condition of the supplies is satisfactory. For example, jars will be inspected to ensure that they are the correct size and quantity and were not damaged in shipment.

6.9. Data Management

Laboratories will report data in formatted hardcopy and digital formats. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, data qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and quantitation limits. Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) requirements will be established by GeoEngineers, Inc. with the contract laboratory. The laboratory will send final analytical testing results to the Project Manager.

Chromatograms will be provided for samples analyzed using Ecology Method NWTPH-Dx. The laboratory will assure that the full height of all peaks appear on the chromatograms and that the same horizontal time scale is used to allow for comparisons to other chromatograms.

7.0 ASSESSMENT AND OVERSIGHT

7.1. Assessment and Response Actions

7.1.1. Review of Field Documentation and Laboratory Receipt Information

Documentation of field sampling data will be reviewed periodically for conformance with project QC requirements described in this QAPP. At a minimum, field documentation will be checked for proper documentation of the following:

- Sample collection information (date, time, location, matrices, etc.);
- Field instruments used and calibration data;
- Sample collection protocol;
- Sample containers, preservation, and volume;
- Field QC samples collected at the frequency specified;
- COC protocols; and
- Sample shipment information.

Sample receipt forms provided by the laboratory will be reviewed for QC exceptions. The final laboratory data package will describe (in the case narrative) the effects that any identified QC exceptions have on data quality. The laboratory will review transcribed sample collection and receipt information for correctness prior to delivering the final data package.

7.1.2. Response Actions for Field Sampling

The Field Coordinator, or a designee, will be responsible for correcting equipment malfunctions throughout the field sampling effort and resolving situations in the field that may result in nonconformance or noncompliance with the QAPP. All corrective measures will be documented in the field logbook.

7.1.3. Corrective Action for Laboratory Analyses

Laboratories are required to comply with their current written standard operating procedures. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data to the laboratory project manager. A narrative describing the anomaly, the steps taken to identify and correct it, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package.

8.0 DATA VALIDATION AND USABILITY

8.1. Data Review, Verification and Validation

The data validation and usability elements of the QAPP as detailed below address the QA/QC activities that occur after data collection and/or data generation is complete. Implementation of these elements ensures that the data conform to the specified criteria and will achieve the project objectives

The data are not considered final until validated. All data, including laboratory and field QC sample results, will be summarized in a data validation report. The data validation report will focus on data that did not meet the MQOs specified in Table C-1. The data validation reports will be included as an appendix to the Construction Completion Report and the Confirmation Groundwater Monitoring Report. These reports will also describe any deviations from this QAPP and actions taken to address those deviations.

Level 2A laboratory data packages will be obtained for the analyses of Diesel- and Heavy Oil-range Hydrocarbons and Metals. Level 2B laboratory data packages will be obtained for analyses of Polycyclic Aromatic Hydrocarbons. These data will be reviewed for the following QC parameters, as applicable:

- Holding times and sample preservation
- Method blanks
- MS/MSD analyses
- LCS/LCSD analyses
- Surrogate spikes
- Field/Lab duplicates
- Calibrations (Initial and Continuing)
- Internal Standards
- Instrument Tunes

In addition to these QC parameters, other documentation such as sample receipt forms and case narratives will be reviewed to evaluate laboratory QA/QC.

8.2. Verification and Validation Methods

Hard-copy laboratory reports will be method detection limit (MDL)-generated providing the analysis-specific information including final sample analytical results, reportable field and laboratory QA/QC analytical results, MDLs and MRLs. The laboratory data will also be reported via electronic media using the tabular outputting capabilities of standard software formats.

The term “reporting limit” will be used interchangeably with “quantitation limit” to mean the lowest concentration at which an analyte can be quantified subject to the quality control criteria of the analytical method. These terms are different from “MDL,” which refers to the lowest concentration that the analytical method can ideally detect.

Data validation qualifiers including “U,” “J,”, and “R” will be used following the reported laboratory results to explain data quality issues affecting the laboratory data to the data user. These qualifiers are explained as follows:

- “U” indicates that a compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit, which is corrected for dilution and percent moisture.
- “J” indicates that a compound was detected below the reporting limit and the value is estimated or the value was estimated by the validator because the of instrument bias reasons.
- If any target analytes are found in a laboratory method blank, it will be regarded as blank contamination. In these cases, the result of a given analyte in the method blank will be compared to any positive result of the same analyte in the associated field samples. If a field sample result is less than five times (ten times for common laboratory contaminants like acetone, phthalates, etc.) the result that is reported in the method blank, the result will be considered blank contamination. Accordingly, the result will be qualified as not-detected “U” at the elevated reporting limit.
- If there are two analyses reported by the laboratory for one sample (as in the case of dilutions), the validator will make a decision as to which analysis to use in the final assessment. As there should be only one reported result per analyte for a given sample, any extraneous results will be qualified as not-reportable “R” and will not be used.

8.3. Reconciliation with User Requirements

A data quality assessment will be conducted by the project Quality Assessment Leader to identify cases where the projects MQOs were not met.

9.0 REFERENCES

GeoEngineers, Inc., "Revised Draft Cleanup Action Plan, Irondale Iron and Steel Plant, Irondale, Washington." GEI File No. 0504-042-00, August 2009.

GeoEngineers, Inc., “Final Engineering Design Report, Irondale Iron and Steel Plant, Irondale, Washington.” GEI File No. 0504-042-01, dated April 17, 2012.

U.S. Environmental Protection Agency (USEPA). “USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,” EPA-540-R-08-01. June 2008.

U.S. Environmental Protection Agency (USEPA). “Guidance for Quality Assurance Project Plans, EPA QA/R-5,” EPA-240/R-02/009, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated December 2002.

U.S. Environmental Protection Agency (USEPA). "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA 540-R-04-004, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated October 2004.

Washington State Department of Ecology (Ecology), "Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies," 04-03-030, dated July 2004.

TABLE C-1

MEASUREMENT QUALITY OBJECTIVES

QUALITY ASSURANCE PROJECT PLAN

FORMER IRONDALE IRON AND STEEL PLANT
IRONDALE, WASHINGTON

Laboratory Analysis	Reference Method	Laboratory Control Sample (LCS) %R Limits[1,2]		Matrix Spike - %R Limits[2]		SS %R Limits[1,2,3]	MS Duplicate Samples or Lab Duplicate RPD Limits[4]		Field Duplicate Samples RPD Limits[4]	
		Soil/Solids	Water	Soil/Solids	Water	Soil/Solids/Water	Soil/Solids	Water	Soil/Solids	Water
Diesel- and Motor oil-range Hydrocarbons	Ecology NWTPH-Dx with acid/silica gel cleanup	50%-150%	50%-150%	NA	NA	50%-150%	≤40%	≤40%	≤50%	≤35%
PAHs	EPA 8270/SIM	70%-130%	70%-130%	70%-130%	70%-130%	70%-130%	≤30%	≤30%	≤50%	≤35%
Total Metals	EPA 6020 Series	80%-120%	80%-120%	75%-125%	75%-125%	NA	≤20%	≤20%	≤50%	≤35%

Notes:

Method numbers refer to EPA SW-846 Analytical Methods or Washington State Department of Ecology (Ecology) recommended analytical methods.

[1]Recovery ranges are estimates. Actual ranges will be provided by the laboratory when contracted.

[2]Percent recovery limits are expressed as ranges based on laboratory control limits. Limits will vary for individual analytes.

[3]Individual surrogate recoveries are compound-specific

[4]RPD control limits are only applicable if the primary and duplicate sample concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the primary and duplicate samples must be 2X the MRL for soils/sediments and 1X the MRL for

[5]Metals to be analyzed include arsenic, copper, iron, lead, nickel, and zinc.

mg/kg = Milligrams per kilogram

ug/kg = Micrograms per kilogram

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

LCS = Laboratory control sample

SS = Surrogate standards

RPD = Relative percent difference

RSD = Relative standard deviation

MS = Matrix spike

NA = Not applicable

TABLE C-2

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR SOIL AND SEDIMENT SAMPLES

QUALITY ASSURANCE PROJECT PLAN

FORMER IRONDALE IRON AND STEEL PLANT

IRONDALE, WASHINGTON

Analyte	Analytical Method	Practical Quantitation Limit (PQL)	Method Detection Limits (MDL)
Metals (mg/kg)			
Arsenic	EPA 6020	0.1	0.0266
Copper	EPA 6020	0.2	0.0093
Iron	EPA 6020	5.5	2.000
Lead	EPA 6020	0.2	0.0075
Nickel	EPA 6020	0.1	0.0110
Zinc	EPA 6020	0.4	0.0121
Petroleum Hydrocarbons (mg/kg)			
Diesel-range	Ecology NWTPH-Dx with acid/silica gel cleanup	25	19
Heavy oil-range	Ecology NWTPH-Dx with acid/silica gel cleanup	50	19
PAHs (mg/kg)			
1-Methylnaphthalene	EPA 8270D-SIM	0.0500	0.000546
2-Methylnaphthalene	EPA 8270D-SIM	0.0500	0.000959
Acenaphthene	EPA 8270D-SIM	0.0500	0.000959
Acenaphthylene	EPA 8270D-SIM	0.0500	0.000592
Benzo[g,h,i]perylene	EPA 8270D-SIM	0.0500	0.006490
Fluoranthene	EPA 8270D-SIM	0.0500	0.002370
Fluorene	EPA 8270D-SIM	0.0500	0.000846
Naphthalene	EPA 8270D-SIM	0.0500	0.000339
Phenanthrene	EPA 8270D-SIM	0.0500	0.002680
Pyrene	EPA 8270D-SIM	0.0500	0.002310
Benzo[a]anthracene	EPA 8270D-SIM	0.0500	0.002960
Benzo[a]pyrene	EPA 8270D-SIM	0.0500	0.005950
Benzo[b]fluoranthene	EPA 8270D-SIM	0.0500	0.005050
Benzo[k]fluoranthene	EPA 8270D-SIM	0.0500	0.005160
Chrysene	EPA 8270D-SIM	0.0500	0.001950
Dibenz[a,h]anthracene	EPA 8270D-SIM	0.0500	0.007360
Indeno[1,2,3-c,d]pyrene	EPA 8270D-SIM	0.0500	0.007360
2,4-Dimethylphenol (mg/kg)	EPA 8270D-SIM	0.0290	0.0200

Notes:

EPA = U.S. Environmental Protection Agency

PAH = Polycyclic aromatic hydrocarbon

SIM = Selective ion monitoring

mg/kg = Milligrams per kilogram

TABLE C-3

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR WATER SAMPLES

QUALITY ASSURANCE PROJECT PLAN

FORMER IRONDALE IRON AND STEEL PLANT

IRONDALE, WASHINGTON

Analyte	Analytical Method	Practical Quantitation Limit (PQL)	Method Detection Limits (MDL)
Metals (µg/L)			
Arsenic	EOA 200.8	1	0.266
Copper	EOA 200.8	0.5	0.093
Iron	EOA 200.8	100	20
Lead	EOA 200.8	1	0.075
Nickel	EOA 200.8	0.5	0.11
Zinc	EOA 200.8	1.5	0.121
Petroleum Hydrocarbons (mg/L)			
Diesel-range	Ecology NWTPH-Dx with acid/silica gel cleanup	0.25	0.190
Heavy oil-range	Ecology NWTPH-Dx with acid/silica gel cleanup	0.40	0.190
PAHs (µg/L)			
1-Methylnaphthalene	EPA 8270D-SIM	0.1	0.00226
2-Methylnaphthalene	EPA 8270D-SIM	0.1	0.00384
Acenaphthene	EPA 8270D-SIM	0.1	0.03840
Acenaphthylene	EPA 8270D-SIM	0.1	0.02370
Anthracene	EPA 8270D-SIM	0.1	0.00880
Benzo[g,h,i]perylene	EPA 8270D-SIM	0.1	0.02600
Fluoranthene	EPA 8270D-SIM	0.1	0.00948
Fluorene	EPA 8270D-SIM	0.1	0.00339
Naphthalene	EPA 8270D-SIM	0.1	0.00135
Phenanthrene	EPA 8270D-SIM	0.1	0.01070
Pyrene	EPA 8270D-SIM	0.1	0.00925
Benzo[a]anthracene	EPA 8270D-SIM	0.01	0.00972
Benzo[a]pyrene	EPA 8270D-SIM	0.01	0.00980
Benzo[b]fluoranthene	EPA 8270D-SIM	0.01	0.00773
Benzo[k]fluoranthene	EPA 8270D-SIM	0.01	0.00824
Chrysene	EPA 8270D-SIM	0.01	0.00659
Dibenz[a,h]anthracene	EPA 8270D-SIM	0.01	0.00886
Indeno[1,2,3-c,d]pyrene	EPA 8270D-SIM	0.01	0.00851

Notes:

EPA = U.S. Environmental Protection Agency

PAH = Polycyclic aromatic hydrocarbon

SIM = Selective ion monitoring

mg/L = Milligrams per liter

µg/L = Micrograms per liter

TABLE C-4

TEST METHODS, SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

QUALITY ASSURANCE PROJECT PLAN

FORMER IRONDALE IRON AND STEEL PLANT
IRONDALE, WASHINGTON

Analysis	Method	Soil/Solids				Groundwater			
		Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times[1]	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times[1]
Diesel- and Oil-Range Hydrocarbons	Ecology NWTPH-Dx with acid/silica gel cleanup	100 g	4 oz glass wide-mouth with Teflon-lined lid	Cool 4°C	14 days to extraction, 40 days from extraction to analysis	1 L	1 liter amber glass with Teflon-lined lid	Cool 4°C, HCl to pH < 2	14 days to extraction 40 days from extraction to analysis
PAHs	EPA 8270/SIM	100 g	4 oz glass wide mouth with Teflon-lined lid	Cool 4°C	7 days to extraction, 40 days from extraction to analysis	2 L	1 liter amber glass with Teflon-lined lid	Cool 4°C	14 days to extraction 40 days from extraction to analysis
Metals[2]	EPA 6020	100 g	4 oz glass wide mouth with Teflon-lined lid	Cool 4°C	180 days	500 mL	1 L poly bottle	HNO_3 - pH<2 (Dissolved metals preserved after filtration)	180 days

Notes:

[1]Holding times are based on elapsed time from date of collection.
[2]Metals to be analyzed include arsenic, copper, iron, lead, nickel, and zinc.

PAH = Polycyclic aromatic hydrocarbon
HCl = Hydrochloric acid
HNO_3 = Nitric acid
oz = Ounce
mL = Milliliter
L = Liter
g = Gram

TABLE C-5

QUALITY CONTROL SAMPLES - TYPE AND FREQUENCY
QUALITY ASSURANCE PROJECT PLAN
FORMER IRONDALE IRON AND STEEL PLANT
IRONDALE, WASHINGTON

Parameter	Field QC		Laboratory QC			
	Field Duplicates	**Trip Blanks**	**Method Blanks**	**LCS**	**MS / MSD**	**Lab Duplicates**
Diesel and Heavy Oil-Range Hydrocarbons	1/10 groundwater/soil/solids samples	NA	1/batch	1/batch	NA	1/batch
PAHs	1/10 groundwater/soil/solids samples	NA	1/batch	1/batch	1 set/batch	NA
Metals	1/10 groundwater/soil/solids samples	NA	1/batch	1/batch	1 set/batch	1/batch

Notes:

An analytical lot or batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/MSD (or MS and lab duplicate). No more than 20 field samples can be contained in one batch.

QC = Quality control

LCS = Laboratory control sample

MS = Matrix spike sample

MSD = Matrix spike duplicate sample

VOCs = Volatile organic compounds

PAH = Polycyclic aromatic hydrocarbon

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