APPENDIX D

CARTY LAKE BANK USE PLAN

CARTY LAKE BANK USE PLAN

ADDENDUM TO THE JOINT AQUATIC RESOURCES PERMIT APPLICATION NO. NWS-2013-1209

CARTY LAKE REMEDIAL ACTION
111 W DIVISION STREET
RIDGEFIELD, WASHINGTON

Prepared for
PORT OF RIDGEFIELD
RIDGEFIELD, WA
October 22, 2014
Project No. 9003.01.40

Prepared by
Maul Foster & Alongi, Inc.
400 E Mill Plain Blvd., Suite 400, Vancouver WA 98660

MAUL
FOSTER
ALONGI

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FOLLOWING PLAN:

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On behalf of the Port of Ridgefield (Port), Maul Foster & Alongi, Inc. has prepared this draft bank use plan as a supplement to the Carty Lake Remedial Action Joint Aquatic Resources Permit Application No. NWS-2013-1209 (JARPA) submitted to the U.S. Army Corps of Engineers (COE). The purpose of the remedial action is to address historical contamination of sediment in the southern end of Carty Lake in the U.S. Fish and Wildlife Service (USFWS) Ridgefield National Wildlife Refuge (RNWR). Carty Lake is located north of the former Pacific Wood Treating Co. (PWT) site in Ridgefield, Washington (see Figure 1). PWT operated a wood-treating facility from 1964 to 1993 at the Port's Lake River Industrial Site (LRIS) (now known as Miller's Landing), and cleanup actions have been conducted at the LRIS since 2000. The remedial action in Carty Lake required by the Washington State Department of Ecology (Ecology) addresses unacceptable risks to ecological receptors and includes excavating contaminated sediment, placing clean sand to contain residual contamination, stabilizing a failing treated-wood retaining wall, and vegetating the wetland and upland banks with native plants (see Attachment 1 to the JARPA for a more detailed project description).

Two types of impacts to the wetland resulting from the remedial action are identified:

- Short-term, temporary impacts to 1.2 acres[1] of wetland will result from sediment excavation. Sediment removal will result in construction impacts to benthic populations and vegetation.
- Permanent impacts to up to 0.23 acre[2] of wetland will result from the construction of bank stabilization and remediation elements.

Short-term, temporary impacts will be mitigated by 1.2[3] acres of revegetation and maintenance in the excavation area. The draft Carty Lake mitigation plan addresses the short-term, temporary impacts and describes mitigation objectives, mitigation site selection, and monitoring and maintenance requirements for on-site mitigation. The mitigation plan is provided as an addendum to the JARPA.

Permanent impacts will be mitigated by the purchase of mitigation credits. This bank use plan describes off-site mitigation to compensate for wetland filling in Carty Lake. The purpose of the bank use plan is to provide permit decisionmakers with sufficient information to decide whether project applicants have:

- Avoided and minimized wetland impacts to the extent practicable
- Provided sufficient compensation for unavoidable wetland impacts by proposing to purchase or transfer credits from a specific wetland mitigation bank

The bank use plan is prepared consistent with the Guidance Paper *Using Credits from Wetland Mitigation Banks: Guidance to Applicants on Submittal Contents for Bank Use Plans* (Interagency Review

[1] The area of short-term, temporary impacts is approximate and does not include areas that will be excavated and permanently covered by bank stabilization elements. These permanent impacts will be addressed by the bank use plan.

[2] The acreage includes contingency as described in the JARPA. Permanent impacts may therefore be less.

[3] The area of mitigation planting will be equivalent to the final short-term, temporary impact area.

Team for Washington State, 2009). The Interagency Review Team includes standing members representing the COE, the U.S. Environmental Protection Agency, and Ecology.

1. PROJECT OVERVIEW

Carty Lake is a 52-acre lake in the RNWR near Lake River and is a unit of the National Wildlife Refuge System. The project site, located in the southern end of Carty Lake, encompasses approximately 8.6 acres, including 4.7 acres of wetland habitat (see Figure 2).

The Carty Lake project description (Attachment 1 to the JARPA) details the remedial action construction plans. Project components resulting in short-term, temporary impacts from sediment excavation and associated on-site mitigation are addressed in the Carty Lake mitigation plan. A brief overview of project components resulting in permanent impacts of up to 0.23 acre of wetland is provided below (see Figure 2).

A portion of the Port's property is separated from the southern portion of Carty Lake by a treated wooden soldier pile and lagging bulkhead. This bulkhead, shown in Figure 2, is approximately 1,800 feet long and between 7 and 10 feet tall. Portions of this bulkhead have begun to fail, and failure of the wall could result in release of contamination into Carty Lake. Remedial construction therefore includes a permanent transition from the grades on the Port's property to the RNWR in the form of constructed earthen embankments against the existing southern and eastern walls of the bulkhead. The embankments will functionally replace the existing bulkhead.

The eastern embankment was designed at a slope no greater than 2.5:1 to avoid wetland encroachment. The southern embankment will be constructed at a nominal 2:1 slope to minimize the embankment footprint in the wetland (up to 0.23 acre). The embankments are designed to permanently stabilize the soils behind the bulkhead, resist erosion from stormwater and wave action (where applicable), and provide transitional and upland habitat. The embankment replaces steep, unstable slopes with moderate, stable, protected slopes.

The embankments will generally consist of common borrow or structural fill and topsoil fill. The foundation of the embankments will be keyed into the existing grade and placed on geotextile to provide strength to the underlying soft sediment and soil that remain following sediment excavation activities. The embankments will be constructed so that the interior will consist of common or structural fill with an outer layer of topsoil approximately 18 inches thick. Turf reinforcement mat may be placed on the topsoil to protect against erosion during high-water events, as well as against erosion from stormwater. The turf reinforcement mat would extend down under a portion of the rock keyway for additional anchoring. The toe of the southern embankment slope will be protected from erosion through the addition of a 3:1 rounded-rock fish mix layer. The topsoil and fish mix will be vegetated with native plants (see the Carty Lake mitigation plan).

2. EXISTING SITE CONDITIONS

The Carty Lake project description (Attachment 1 to the JARPA) details existing site conditions. Site ecological and physical characteristics are provided in the biological evaluation (Attachment 2 to the JARPA) and the wetland delineation (Attachment 3 to the JARPA). A brief overview is provided below.

The project site is zoned parks/open space. The topography of the site generally consists of gently rolling terrain, with elevations ranging from 7 feet to 34 feet National Geodetic Vertical Datum of 1929/1947. A bathymetric and topographic survey of Carty Lake was conducted to inform the remedy design. These contours are provided in Attachment 1 to the JARPA.

Hydrodynamics and grain size distribution indicate that Carty Lake features a low-energy, depositional environment. Percent fines in Carty Lake are uniformly high, generally over 75 percent. Carty Lake's hydraulic exchange with other surface water bodies is limited to events involving unusually high water. Water fluctuations are generally muted, with increases and decreases occurring gradually because there is no direct connection with the Columbia River. Water levels in Carty Lake range from 3 to 10 feet, varying seasonally, while the project site in the southern end is underwater or seasonally inundated. A confining layer composed of clay that restricts vertical movement of water has been identified.

Soils onsite are mapped as Sauvie silt loam, 3 to 8 percent slopes (SmB), according to Natural Resource Conservation Service (NRCS) Web Soil Survey Data. Sauvie silt loam soils are moderately well drained soils formed from alluvium and found on flood plains. Mapped on-site soils are classified as non-hydric by the NRCS. Metals (arsenic and chromium), pentachlorophenol, and dioxins/furans are present in site sediment. Percent total fines (silt and clay) generally dominate the particle size distribution, ranging from 56 to 93 percent in surface samples. Total organic carbon in surface samples ranged from 1.3 to 5.4 percent. Total organic carbon generally decreases with depth.

2.1. HABITAT

Oregon ash (*Fraxinus latifolia*), black cottonwood (*Populus trichocarpa*), and several willow species (*Salix spp.*) compose the vast majority of the canopy cover in forested habitat of the RNWR. The understory is typical of lower Columbia River floodplain habitats, with nettles (*Urtica dioica*), red-osier dogwood (*Cornus sericea*), and nonnative Himalayan blackberry providing the bulk of the shrub and forb layer. Remnant stands of western red cedar (*Thuja plicata*) and Douglas fir (*Pseudotsuga menziesii*) occur on the highest portions of the Carty Unit, with species such as snowberry (*Symphoricarpos albus*) and Himalayan blackberry dominating the understory. Oregon white oak (*Quercus garryana*) woodlands (Washington State priority designated habitat) occur to the east and north of Carty Lake, but not near the project area at the southern end of Carty Lake.

Virtually all of the grasslands in the RNWR have been impacted by past agricultural activities, including row crop and field crop production and grazing. Near Carty Lake, nonnative reed canary grass is ubiquitous and generally dominates the shoreline, forming dense monocultures.

The National Wetlands Inventory (using the Cowardin classification system) classifies much of Carty Lake as a lacustrine, limnetic, unconsolidated bottom, permanently tidal (L1UBV). The southern portion of the lake is classified as palustrine, emergent, and persistent (PEM1); the western side is subdesignated as temporarily (PEM1A) or seasonally flooded (PEM1C); and the eastern side is subdesignated as temporary-tidal (PEM1S). Washington State priority designated palustrine aquatic habitats are present within 0.15 mile of the project area. Because Carty Lake lacks a consistent connection with the Columbia River system, the lake's functionality has been reduced, particularly with respect to anadromous fish rearing habitat and native mussel beds. As with similar wetlands on the RNWR, water quality and aquatic plants have been negatively impacted by introduced carp. The

southern end of Carty Lake is submerged for most of the year and is intermittently exposed during dry summer months. Aquatic plants, including wapato (*Sagittaria latifolia*), occur in the lake, and the fringe wetland is dominated by nonnative, invasive reed canary grass.

A wetland delineation and Wetland Rating Form for Western Washington were completed for the project area at the southern end of Carty Lake in 2013. The project site is rated as a Category II lake fringe wetland, using the hydrogeomorphic classification. The wetland boundary is shown in Figure 2. The assessment found that water quality functions scored high, with the vegetation exceeding 33 feet in width and herbaceous plants covering more than 90 percent of the area. The hydrologic functions scored low, receiving 4 out of the possible 12 for lake fringe. The wetland scored 25 out of 48 in habitat functions, based on the high species diversity and complex habitat structure. However, species evenness is relatively low, with reed canary grass widespread. In addition, the standard wetland rating system is limited in its application to this site because it does not account for contamination impacts in scoring habitat quality. Carty Lake is not designated as federal critical habitat and is not on the 303(d) water quality impairment list.

Areas of the site to the south and east and above the wetland boundary are characterized by steep slopes overgrown primarily with nonnative vegetation (e.g., Himalayan blackberry). A portion of the Port's property is separated from the southern portion of Carty Lake by a treated wooden soldier pile and lagging bulkhead. Portions of the bulkhead have begun to fail. Failure of the wall could result in release of contamination into Carty Lake.

2.2. WILDLIFE AND SPECIES OF CONCERN

Waterfowl are abundant at the RNWR during fall, winter, and spring. Abundant wintering species include Canada geese, cackling geese, tundra swan, mallard, American wigeon, gadwall, northern shoveler, northern pintail, and green-winged teal. The RNWR also attracts significant numbers of diving ducks, largely ring-necked duck, lesser scaup, and bufflehead. Several species of duck nest on the RNWR in limited numbers, including wood duck, mallard, blue-winged teal, and cinnamon teal. Carty Lake also provides habitat for warm water fish such as introduced carp (*Cyprinidaceous spp.*) and largescale sucker (*Catostomus macrocheilus*); waterbirds such as the great blue heron (*Ardea herodias*) and common egret (*A. alba*); and aquatic mammals such as beaver (*Castor canadensis*), mink (*Mustela vison*), and nutria (*Myocastor coypus*).

The Columbian white-tailed deer (*Odocoileus virginianus leucurus*) is federally designated as endangered and historically occurred in Clark County. Columbian white-tailed deer were recently transplanted from Julia Butler Hansen National Wildlife Refuge to the RNWR and are present in the Carty Unit. Other federally designated species are not known to occur in or near the project area. Because Carty Lake does not maintain connectivity with Gee Creek (a 4th order tributary of the Columbia River located north and east of Carty Lake) or the Columbia River, federally listed anadromous species are unlikely to utilize Carty Lake; in addition, the proposed project would be conducted "in the dry." In the Blackwater Island Research Natural Area (located in the Carty Unit), there are three sites where the federally listed threatened plant water howellia (*Howellia aquatilis*) is known to occur; however, the Natural Area is more than 1 mile north of the project area.

3. AVOIDANCE AND MINIMIZATION OF WETLAND IMPACTS

The process of avoiding and minimizing adverse impacts to the maximum extent practicable is fundamental to the mitigation sequencing process. Avoidance and minimization of impacts are incorporated into the project design, which has been overseen by Ecology and coordinated with the USFWS.

Wetland impact avoidance measures include:

- The in-water remedial investigation used a sample-intensive methodology in consultation with the USFWS to ensure that only areas exceeding cleanup levels would be excavated. Areas with sediments that did not exceed cleanup levels are therefore avoided and are not disturbed unnecessarily.
- Bank stabilization along the eastern side of the wetland was redesigned from a 3:1 soil slope to a 2.5:1 (minimum) slope to avoid wetland encroachment.
- A spill prevention and pollution control plan will be implemented during construction, along with erosion- and sediment-control best management practices, to avoid potential impacts to water quality.

Wetland impact minimization measures include:

- Bank stabilization on the southern side of the wetland is designed at a 2:1 slope. This slope was selected as the preferred alternative among several design options because it minimizes encroachment into the wetland.[4] Other evaluated stabilization designs (e.g., 3:1 slope, ecology blocks) would result in greater encroachment.
- The sediment area will be dewatered before excavation. Construction in the dry allows the use of conventional excavation equipment and minimizes the disturbance of adjacent sediments and wetlands.
- The sediment excavation area will be functionally isolated (using sandbags or placement of a temporary isolation berm) from wetland habitat to the north, thereby minimizing impacts outside the work area.

Note that the following on-site mitigation measures, described in the Carty Lake mitigation plan, will be conducted during or following remediation construction to account for short-term, temporary impacts to the sediment excavation area:

- Invasive species control. At the request of the USFWS, the final depth of Carty Lake in the mitigation area will be at least 6 inches deeper than the current condition to inhibit the growth of reed canary grass (*Phalaris arundinacea*). The deepening will be equivalent to the acreage of short-term, temporary, construction-related impacts.

[4] A retaining wall structure (to replace the southern wall) was evaluated in collaboration with USFWS in an effort to minimize impact to the wetland; however, the structure was considered impractical because of significant challenges in managing contaminated soil that is contained behind the existing soldier pile wall, as well as because of cost.

- Native wetland plantings. The mitigation area will be planted with native species suited to the post-remedy elevations, enhancing habitat quality. The acreage of native wetland plantings will be equivalent to the acreage of short-term, temporary, construction-related impacts.

In addition to on-site mitigation in the excavation area, the wetland surrounding the mitigation area will be revegetated with native species, providing separation from surrounding nonnative species that may encroach on the mitigation area. The proposed bank stabilization slopes are designed to contain upland (i.e., on the LRIS) subsurface soil contamination and will also be planted with a diverse palette of native plants. These measures will increase both the area and the quality of transition habitat between the wetland and the surrounding uplands.

4. UNAVOIDABLE WETLAND IMPACTS

Short-term temporary wetland impacts are unavoidable because the remediation effort is proposed within the wetland. These impacts will be addressed by on-site mitigation (see the Carty Lake mitigation plan). Permanent wetland impacts are unavoidable because the proposed bank stabilization to contain contaminants behind the failing bulkhead cannot be designed effectively to avoid the wetland.

A total of up to 0.23 acre of wetland will be brought above existing grade (i.e., permanently filled) to stabilize the bank (see Figure 2). Note that the area estimate includes contingency and is likely to be less. The lower (northern) portion of the fill area will consist of a 3:1 rounded-rock fish mix slope.[5] The upper portion of the fill area will consist of a 2:1 common borrow or structural fill and topsoil fill slope. This slope extends beyond the wetland boundary to the top of the existing bulkhead.

Short-term temporary wetland impacts and permanent wetland impacts are presented in the table below.

Table. Expected Impacts to Wetlands

Wetland Area (acres)	Permanently Filled Wetland Area (acres)	Temporarily Impacted Wetland Area (acres)	Indirect Impact Area (acres)	Cowardin Classification	Ecology Rating	Local Jurisdiction Rating	HGM Classification
4.7	0.23	1.2	0.00	PEM	II	2	Lake-fringe

5. IMPACTED WETLAND FUNCTIONS

A small area in the southernmost part of the wetland will be permanently impacted. Wetland functions will be lost in this area but the larger wetland will be relatively unaffected. The adjacent wetland to the north, where short-term temporary impacts are proposed, will be remediated through contaminated sediment removal and native plantings, and the overall functioning of the wetland is

[5] Rounded-rock fish mix covered with clean sand will be placed north of the fill area below existing grade. On-site mitigation accounts for short-term, temporary impacts to this area (see the Carty Lake mitigation plan).

expected to improve. Wetland functions are not expected to be lost as a result of filling. The following functions may be altered:

- Water Quality. The permanently-impacted wetland area will lose all function as a wetland but the fill is necessary to protect the greater wetland. The fill area is part of a bank designed to contain upland subsurface soil contamination and reduce the potential for future water quality impacts. Contaminated sediment removal in and to the north of the fill area reduces the potential for water quality impacts throughout the watershed.
- Hydrology. The wetland will remain hydraulically connected with Carty Lake. Slightly smaller less area will be available to store water; however, filling is not expected to significantly alter current hydrology (e.g., seasonal inundation will continue).
- Habitat. The permanently-impacted wetland area sediments are currently contaminated. This wetland habitat will be lost but the proposed bank stabilization will provide enhance the larger wetland. Adjacent wetland habitat to the north will be rehabilitated, and overall habitat functioning of the wetland is expected to improve. Habitat is currently severely degraded, as sediment conditions are not protective of benthic and wetland species that rely on benthos (e.g., wetland biota may bioaccumulate contaminants). The wetland will remain part of a large, protected landscape (the RNWR) featuring multiple wetland and upland habitats and associated wildlife. The fill area and surrounding areas will be vegetated with native species, providing suitable habitat for wildlife and separation from surrounding nonnative species (e.g., reed canary grass) that may encroach on the wetland. Upland plantings and bank stabilization will increase both the area and the quality of transition habitat between the wetland and the surrounding uplands.

6. MITIGATION SELECTION AND JUSTIFICATION

To mitigate permanent impacts to the wetland, the purchase of mitigation credits from the Columbia River Mitigation Bank (CRMB) is proposed. The bank site is located in a portion of section 17, and a portion of section 20, township 2 north, range 1 east, Willamette Meridian, City of Vancouver, Clark County, Washington. The property is owned by the Port of Vancouver and the site encompasses approximately 153.86 acres. The project site is located in the service area of the CRMB (see Figure E-1 in the CRMB Mitigation Banking Instrument [MBI] document [Port of Vancouver, 2009]), and the bank has indicated that mitigation credits are available for purchase.

As stated in its December 31, 2013, information request letter, the COE considers mitigation banking the environmentally preferable form of compensatory mitigation in many cases, because it involves consolidating compensatory mitigation projects while providing financial assurances and scientific expertise to reduce temporal losses of functions and uncertainty over mitigation success. The following points further justify use of the CRMB:

- Affected wetland functions related to sediment excavation are addressed through on-site mitigation (e.g., native wetland plantings); see the Carty Lake mitigation plan. The proposed bank stabilization component of the project does not affect critical wetland functions, indicating that off-site mitigation is appropriate.

- The bank site includes PEM wetland habitat located at the fringe of Vancouver Lake, which drains into Lake River (see Figures A-1 and A-3 in the CRMB MBI [Port of Vancouver, 2009]). PEM lake fringe wetland habitat is present at the project site, and both sites are part of the Columbia River's floodplain. Therefore, mitigation at the bank site would provide functional lift for similar wetland habitat in a shared watershed.
- The primary ecological goals of bank site mitigation include wetland creation and creation and enhancement of wildlife habitat structure and function (Port of Vancouver, 2009). These goals correspond directly with the proposed loss of wetland habitat at the project site.

7. WETLAND TYPES AND FUNCTIONS PROVIDED AT THE BANK SITE

The wetland types and functions provided at the bank site correspond with the wetland types and functions affected by the proposed project. Credits from the CRMB will therefore provide adequate mitigation for proposed project impacts. Wetland types, setting, and functioning are discussed below; applicable information for the bank site is sourced from the CRMB MBI (Port of Vancouver, 2009).

7.1. WETLAND TYPES AND SETTING

The bank site is approximately 153.86 acres. Based on the Cowardin classification system, most of the site wetlands are PEM (69.27 acres), with approximately 10.34 acres of palustrine aquatic bed, approximately 1.94 acres of existing palustrine scrub-shrub, and approximately 6.16 acres of palustrine forested wetland area.[6] Based on hydrogeomorphic classification, the site meets the definition of depressional outflow and also has characteristics of other hydrogeomorphic classes, including lake fringe wetland. Therefore, wetland types at the bank site coincide with the PEM, lake fringe wetland found at the project site.

The bank and project sites share a common landscape setting. Both sites are located on the north side of the Columbia River, in its floodplain. The floodplain is located in a rain zone and has subsurface water flow patterns that are influenced by groundwater discharge from the adjacent upland units and that recharge from the river surface waters; geologic deposits consisting primarily of relatively recent river alluvium (sand and silt); and a riverine floodplain and valley walls formed by fluvial action of the river. In addition, both sites share connectivity with a larger, protected landscape. The bank site is adjacent to the Vancouver Wildlife Area to the north and west, while the project site is located in the RNWR. These areas are managed as waterfowl and sandhill crane habitat. The primary wildlife communities using these areas are water or wetland-related species; waterfowl are abundant and diverse, as are shorebirds and marsh birds.

7.2. WETLAND FUNCTIONS

Generally, all functions related to water quality, hydrology, and habitat are expected to increase as a result of mitigation at the bank site:

- Water Quality. Functions related to water quality, such as sediment removal, nutrient removal, and removal of toxics and organics are anticipated to increase, both because of increased vegetated species roughness and structure, and because of the additional vegetated

[6] Baseline conditions prior to wetland creation.

wetland area that will be flooded and remain aerobic. Increase of water quality functioning corresponds with the potential reduction of water quality functions in the project site fill area due to loss of wetland vegetation.[7]

- Hydrology. Hydrological functional lift at the bank site is expected. Excavation to create 25.5 acres of new wetland area will increase the site's capacity to store surface water, and may therefore provide additional baseflow support, as well as contribute to groundwater recharge. Existing wetland hydrology will be maintained on the rest of the site. Wetland hydrology creation accounts for the small area of wetland water storage loss in the project site fill area.

- Habitat. Habitat functions for which functional lift is expected at the bank site include habitat suitability; invertebrate, amphibian, and mammal habitat; native plant richness; and food web support. Approximately 25.5 acres of palustrine forested and scrub-shrub mosaic wetland will be created at the bank site by converting upland (grading the site). Wetland creation accounts for loss of wetland in the project area. Following grading, the entire bank site will be planted with native vegetation to develop a mosaic of forested, shrub, emergent, and aquatic bed wetlands. This includes 9.72 acres of PEM wetland that will be enhanced with native tree, shrub, and emergent species. Nonnative invasive species will be controlled and monitored within the bank site, ensuring establishment and persistence of native vegetation. The native vegetation will provide higher-quality habitat and more support of habitat for associated species than is currently present at the nonnative-vegetation-dominated PEM project site fill area. In addition, mitigation at the bank site includes installed habitat features such as brush piles, cavity trees, and nest boxes, further enhancing habitat functions relative to the habitat functions provided in the project site fill area.

8. WETLAND FUNCTIONS NOT PROVIDED AT THE BANK SITE

Project construction is designed to provide environmental benefit to the Carty Lake wetland and associated wildlife. No wetland functions will be lost because of project construction, and changes to wetland functioning are designed for ecological benefit. On-site mitigation consisting of native plantings and nonnative invasive species control (removal and wetland deepening) will be conducted to account for short-term, temporary impacts to the sediment excavation area, as described in the Carty Lake mitigation plan. The permanent fill of a small area of PEM, lake fringe wetland will be fully compensated for by the bank mitigation, which includes creation of wetland habitat and enhancement of PEM wetlands as goals to offset loss of wetlands elsewhere.

9. MITIGATION CREDITS

The CRMB MBI (Table E-1) depicts the number of bank credits typically required to compensate for each unit of aquatic resource permanent loss (Port of Vancouver, 2009). A 1.2:1 credit to debit mitigation ratio is specified for Category II wetlands. This mitigation ratio was used to calculate the total number of bank credits needed to compensate for the project impacts. It is proposed that 0.28 CRMB bank credit will compensate for the up to 0.23 acre of permanent fill.

[7] Note that native vegetation suited to the post-construction grade will be planted in the fill area.

10. CREDIT PURCHASE

Purchase and transfer of credits are anticipated upon issuance of the COE Nationwide No. 38 permit for project activities. Purchase is contingent on credit availability. The CRMB has indicated that sufficient credits are currently available, and it is likely that adequate credits will be available when permitting is expected to be completed. However, credits will not be reserved until the Nationwide No. 38 permit is issued. Note that the Port of Vancouver holds right of refusal and can exercise the option to purchase nonreserved credits at any time. Proof of purchase and/or transfer of credits will be submitted to the COE before project implementation.

LIMITATIONS

The services undertaken in completing this plan were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This plan is solely for the use and information of our client unless otherwise noted. Any reliance on this plan by a third party is at such party's sole risk.

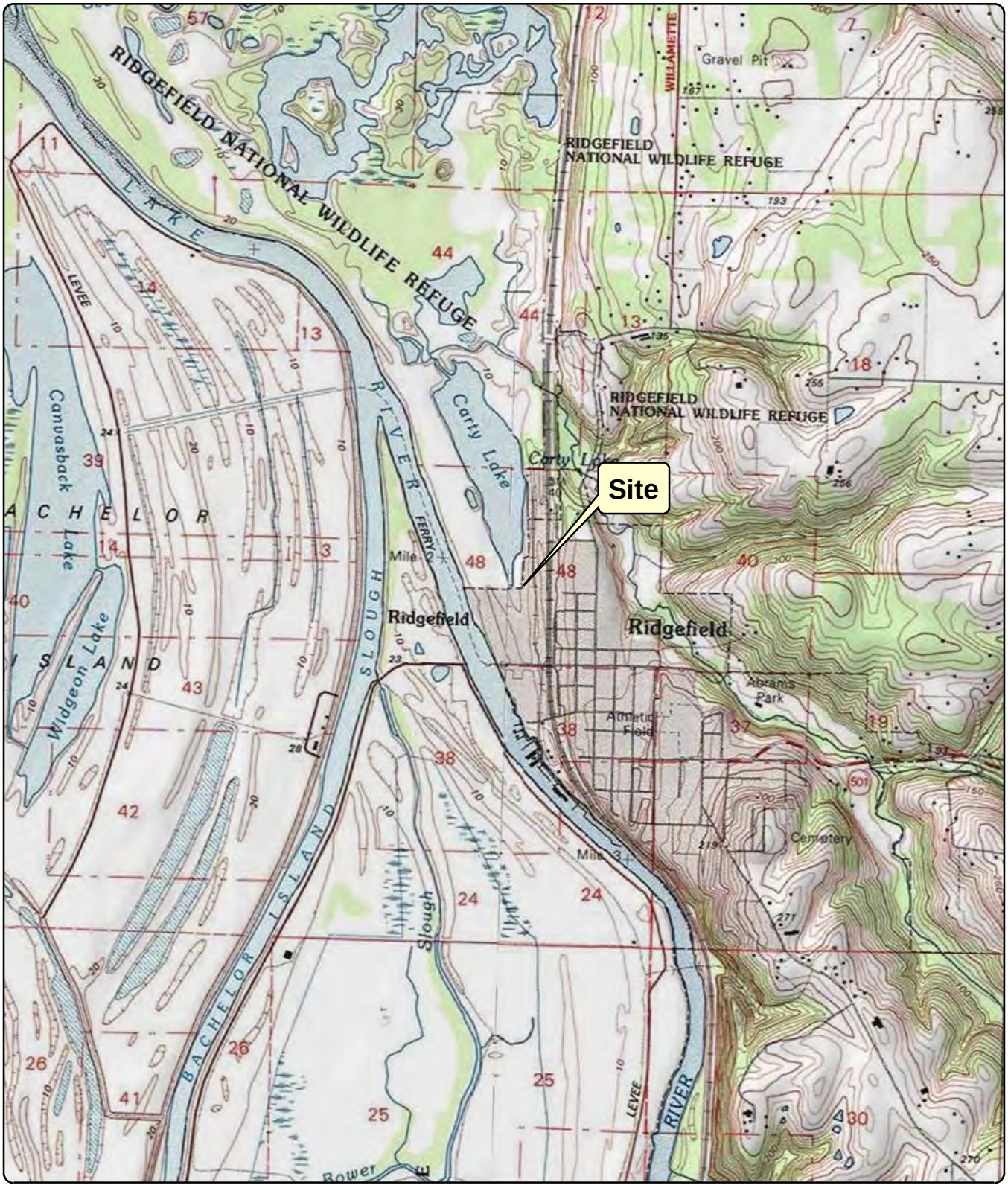
Opinions and recommendations contained in this plan apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

REFERENCES

Interagency Review Team for Washington State. 2009. Guidance paper, using credits from wetland mitigation banks: guidance to applicants on submittal contents for bank use plans. February 19.

Port of Vancouver. 2009. Columbia River wetland mitigation bank, mitigation banking instrument. Prepared by Clark County Mitigation Partners LLC and Ecological Land Services. December 15.

FIGURES



Source: Topographic Quadrangle obtained from ArcGIS Online Services/NGS-USGS TOPO! US Geological Survey (1999)
7.5-minute topographic quadrangle: Ridgefield

REFERENCE:

APPLICANT: Port of Ridgefield

ADJACENT PROPERTY OWNERS:
Multiple. See JARPA

LOCATION: 111 West Division St. Ridgefield, WA 98642

LAT/LONG: 45.822 N / -122.751 W

PAGE #4 OF #10 DATE: 09/20/2013

PROPOSED PROJECT: Carty Lake Remedial Action

IN: Carty Lake
NEAR/AT: Ridgefield
COUNTY: Clark
STATE: Washington

Figure 1
Site Location

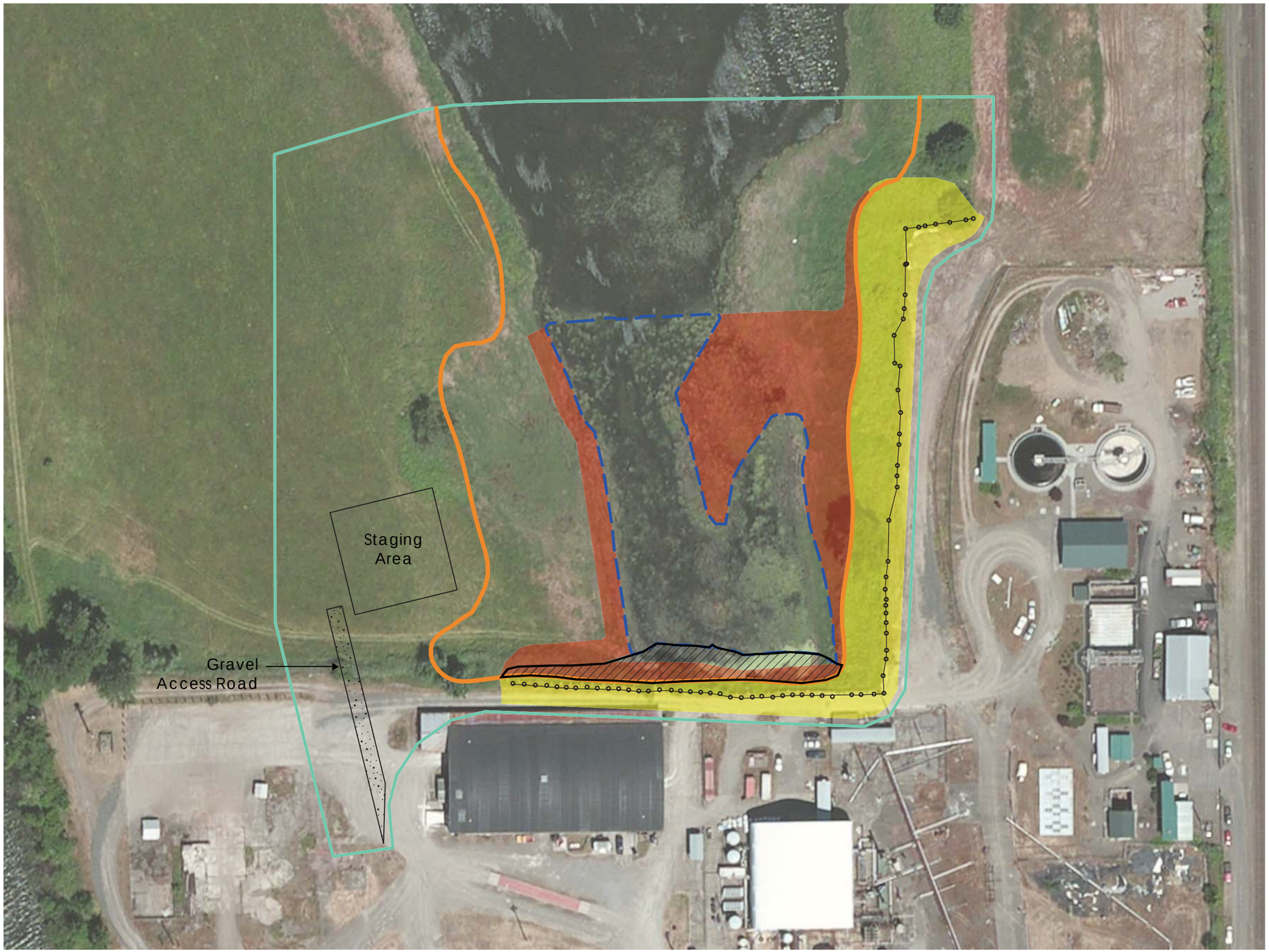
Former PWT Site
Ridgefield, Washington

Township 4N, Range 1W, W.M Section 24

0 1,000 2,000
Feet

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\9003.01 Port of Ridgefield\40\Projects\06\JARPA\Carty Lake\Fig1_Site_Location.mxd
Print Date: 1/30/2014
Approved By: J. King
Produced By: jschane
Project: 9003.01.20



LEGEND

- Site Boundary
  8.6 ACRES
- Wetland Boundary
  4.7 ACRES
- Mitigation Site
  1.2 ACRES
- Existing Bulkhead
- Current Wetland Areas Adjacent to Mitigation Area 0.94 ACRES
- Wetland Fringe and Upland Bank
  0.93 ACRES
- Wetland Mitigation Banking
  Up to 0.23 ACRES

0 100 200
Feet

SITE OVERVIEW
CARTY LAKE
PORT OF RIDGEFIELD
RIDGEFIELD, WASHINGTON

FIGURE
2

MFA JOB #:	9003.01.40
ISSUE DATE:	01/29/2014
CHECKED:	J. ELLIOT
DRAWN:	C.RILEY

MAUL FOSTER ALONGI
2001 NW 19TH AVENUE, SUITE 200
PORTLAND, OR 97209
PHONE: 971.544.2139
www.maulfoster.com

APPENDIX E

LETTER REPORT RE: GEOTECHNICAL ENGINEERING SERVICES MILLER'S LANDING ON THE RIDGEFIELD WATERFRONT BY GEODESIGN, INC.

GEODESIGN INC

January 21, 2014

Port of Ridgefield
c/o Maul Foster & Alongi, Inc.
2001 NW 19th Avenue, Suite 200
Portland, OR 97209

Attention: Mr. Josh Elliott

Letter Report
Geotechnical Engineering Services
Miller's Landing on the Ridgefield Waterfront
Ridgefield, Washington
GeoDesign Project: PortRdgfld-1-01-03

INTRODUCTION

GeoDesign, Inc. has prepared this letter report to address select geotechnical aspects associated with the upcoming remediation work at the Miller's Landing on the Ridgefield Waterfront in Ridgefield, Washington.

Based on correspondence with Maul Foster & Alongi, Inc. (MFA), we understand that the remedial action is planned for Lake River and Carty Lake along Miller's Landing. The remediation at Lake River will include dredging an existing portion of river channel sediments and placing a geotextile fabric or grid, erosion-resistant fish mix (round rock), and ENR sand. The maximum dredge depth will be approximately 3 feet and the maximum depth of new fill will be less than 5 feet. We understand that dredging will occur adjacent to the existing pump house in the northern portion of the site.

The remediation along Carty Lake will include stabilizing the existing bulkhead retaining wall and dredging along Carty Lake. The wall currently consists of driven wood piles to an unknown depth and dilapidated timber lagging, which is moderately to severely deformed in numerous locations along the wall. The stabilization will include placing structurally compacted fill at a maximum slope of 2 horizontal to 1 vertical (H:V) against the bulkhead. According to MFA, the maximum vertical fill thickness that will be constructed as part of the stabilization work will be up to 10 feet. An aerial photograph showing the Miller's Landing development and remediation areas are shown on Figure 1.

MFA has requested that GeoDesign evaluate the global stability of planned work along Lake River, including the potential impacts to the existing pump house. In addition, MFA has requested settlement estimates as a result of the proposed fills at both the Lake River and Carty Lake remediation sites.

SITE HISTORY

The approximately 40-acre site was previously occupied by a timber processing and wood-treatment facility. Between 2010 and the present the existing structures at the site were demolished and environmental remediation was completed at the site. Portions of remediation included placement of a 2- to 3-foot-thick soil cap and some re-shaping of the slopes along Lake River.

LAKE RIVER REMEDIATION

SOIL CONDITIONS

Our current scope of work did not include completing geotechnical explorations along the remediation area. MFA provided borings logs for explorations completed near the top of the slopes that lead to Lake River and some very shallow in-water borings (approximately 2 feet deep). The provided logs were generally for environmental purposes, and very limited geotechnical laboratory testing was completed on samples collected during the borings. Based on a review of the logs, the soil conditions near the river generally consist of very soft to soft silt with variable amounts of sand to a depth of approximately 40 feet below ground surface (BGS). Below approximately 40 feet BGS is medium dense to dense sand or gravel. We understand that no deep boring information is available within the river channel.

GLOBAL STABILITY ANALYSIS

We evaluated the stability of the proposed remediation along Lake River by analyzing two critical sections provided by MFA. The critical sections were located at MFA Stations 7+85 and 19+00. The configurations of the stations are shown in Attachment A. These stations correspond to the areas where the greatest dredging and fills are to be placed.

We modeled the stability of the critical sections using the program Slope/W by Geo-Slope International, Ltd. The Slope/W program performs two-dimensional limiting equilibrium analysis to compute slope stability. The factor of safety against slope failure is simplistically defined as the ratio of the forces resisting slope movement (e.g., soil strength, soil mass, etc.) to the forces driving slope movement (e.g., soil weight, water pressure). The program predicts the location and geometry of "critical failures planes." Critical failure planes are the zones with the lowest factors of safety. A factor of safety less than 1.0 infers that the model is not in equilibrium and slope movement is likely to occur. Jurisdictional factor of safety requirements were unknown at the time of this letter report. Based on the U.S. Army Corps of Engineers Manual EM 1110-2-1913, the required factors of safety for the long-term, temporary, and rapid drawdown conditions are 1.4, 1.3, and 1.0 to 1.2, respectively. EM 1110-2-1913 does not specifically comment on the required factor of safety for seismic conditions, but a standard typically is referenced 1.1.

Based on the information provided by MFA, our experience at the site, and our understanding of soft soils in marine environments, we completed global stability of the critical sections using the soil parameters shown on the Slope/W output files. Our analysis used a very conservative friction angle of 22 degrees for the soft alluvial soils. In addition, we did not include the medium dense to dense sand and gravel layer in our analysis to consider a worst case scenario soil condition. Our analysis also conservatively assumed that the water level was at the ordinary high water elevation of 14 feet and the rapid drawdown analyses assumed maximum high to low tide elevation change of 4 feet (water elevation drop from elevation 14 feet to elevation 10 feet). Our analysis also assumed that structures will not be present within 50 feet of the top of the slope leading to Lake River as described by MFA.

As part of our analysis we evaluated to the global stability for the following scenarios: existing condition, existing condition after rapid drawdown, temporary condition after dredging, temporary condition after dredging during rapid drawdown, permanent condition, permanent condition during rapid drawdrown, and permanent condition during a seismic event. A seismic coefficient of 0.15 g (one-half the site peak ground acceleration of 0.30) was used for the seismic condition. The results of our analysis are shown in Attachment B and are summarized in Table 1. Figure 1 shows the approximate locations of critical sections.

Table 1. Global Stability Results for Lake River Remediation

Station	Global Stability Factor of Safety						
	Existing Condition		Temporary Condition		Permanent Condition		
	OHW	Rapid Drawdown	OHW	Rapid Drawdown	OHW	Rapid Drawdown	Seismic
7+85	1.65	1.22	1.52	1.16	1.84	1.20	1.15
19+00	1.68	1.17	1.65	1.18	1.76	1.2	1.19

OHW: ordinary high water

As shown in Attachment B and Table 1, the results of our analysis indicate that resulting factors of safety are greater than the generally accepted values described above even when using the very conservative design assumptions. In addition, the proposed remediation work will generally increase the stability of the existing slopes.

While our analysis indicates that the proposed remediation is stable for the deep-seated cases, there is possibility that smaller surficial "pop-outs" could occur as a result wave action, water flow, or erosion. If these surficial slides occur, they should be minor and should be repaired to maintain the overall stability of the slope.

Pump House

Based on the remediation plans provided by MFA, approximately 1 foot of dredging will occur directly adjacent to the pump house located in Lake River in the northern portion of the site. Once the dredging is complete, ENR sand will replace the removed material. We understand that

the pump house is supported by wood piling, but the size and depth of the piling is unknown. Based on the available boring information provided by MFA and our experience with driven piles in marine environments, we anticipate that the piles were driven through the upper soft silt and loose sand and to a depth of 40 to 60 feet BGS in relatively dense bearing sand. Due to the age of the pump house, we have assumed that the bearing stratum to which the piles driven to is suitable.

We anticipate that the approximately 1 foot of dredge material that will be removed adjacent to the pump house as part of the remediation work will consist of recent alluvial deposits that are soft and provide very little axial and lateral support for the existing piling. In addition, due to the age of the pump house and because dredging has not occurred on Lake River for quite some time, it is very likely that 1 foot of dredge material was deposited after construction of the pump house. Furthermore, our temporary stability analysis for up to 3 feet of dredging indicates that the dredge cuts will be stable. Based on the discussion above, it is our opinion that the proposed dredging adjacent to the pump house, if completed as planned, will not negatively impact the pile foundations for the structure.

SETTLEMENT ANALYSIS

Loading from the proposed ENR sand and fish mix will result in consolidation settlement of the underlying native soils. The maximum fill thicknesses will generally range from 2 to 5 feet along Lake River. As discussed above, MFA provided boring logs for predominately environmental explorations; however, geotechnical laboratory testing to determine the compressibility of the soft alluvial soils was not completed as part of this work. Therefore, it is difficult to accurately predict the settlement associated with the planned fills. Based on our experience with soft soil in marine environments, we anticipate that the upper 40 feet of soft alluvial soils will have a modified compression index between 0.16 and 0.22. In addition, because the soils are alluvially deposited, we anticipate that the over-consolidation ratio of the material is approximately 1.0. We anticipate that the medium dense sand and gravel below the soft alluvial soils will be relatively incompressible.

We completed a settlement analysis based on the soil parameters above and plans provided by MFA to determine a range of settlements associated with the proposed fills at the site. Table 2 provides the results of our analysis.

Table 2. Predicted Settlements Associated with Proposed Lake River Remediation Fills

Fill Thickness (feet)	Possible Range Settlement (inches)
2	4 to 6
3	8 to 12
4	12 to 18
5	18 to 24

Because of the presence of soft, compressible soils beneath the remediation fills at Lake River, considerable settlements result from the planned fills. We anticipate that a portion of the

settlement will occur relatively quickly after placing the material; however, due to the fine-grained nature of much of the upper soft alluvial soils, primary settlement may require between three and five months following placement of the fills. We recommend that MFA and the contractor be prepared to place greater volumes of ENR sand and fish mix than shown in the plans to account for the fill-induced settlements. We note that our predicted settlements are based on assumptions and should be used as rough estimates. We do not recommend using the settlements described in Table 2 for bidding purposes.

CARTY LAKE REMEDIATION

GENERAL

We understand that the remediation along Carty Lake will consist of placing embankment stabilization against the existing bulkhead wall and up to 2 feet of sediment excavation near the north end of Miller's Landing. The existing bulkhead wall consists of a dilapidated timber pile and lagging wall. The bulkhead is approximately 850 feet long with a maximum exposed height of 10 to 15 feet. We anticipate the timber piles have been driven to refusal on dense gravel between elevations of 6.0 and -11 feet. The embankment stabilization will consist of up to 10 feet (vertical) of structural fill placed at a maximum slope of 2H:1V. Fish mix will be placed at the bottom of the slope to protect the embankment stabilization and a thin lift of ENR sand will be placed on top of the structural fill.

SOIL CONDITIONS

Similar to Lake River, GeoDesign did not complete explorations as part our scope of work and MFA provided boring logs from previous environmental investigations in the vicinity of the Carty Lake remediation area. Geotechnical laboratory testing was not completed on samples collect in the borings. Based on a review of the borings, the soil conditions consist of soft alluvial soils underlain by dense sand and gravel. The approximate gravel and sand contact varies across the bulkhead wall between elevations of approximately 6 and -11 feet.

SETTLEMENT ANALYSIS

We completed a settlement analysis similar to the one described in the "Lake River Remediation" section of this report. Our analysis was based on plans provided by MFA and the soil conditions described above. Due to the lack of laboratory testing, we assumed a modified compression index range of 0.16 to 0.22 and the soils were normally consolidated. Due to the variability of the thickness of the soft alluvial soils along the bulkhead stability areas (7 to 23 feet), there could be large variations in the settlements as a result of the proposed fills. Based on our analysis, Table 3 presents possible settlements for varying fill thicknesses.

Table 3. Predicted Settlements Associated with Proposed Lake River Remediation Fills

Fill Thickness (feet)	Possible Range Settlement (inches)
2	2 to 6
5	8 to 28
10	12 to 30

As described in the "Lake River Remediation" section of this report, we anticipate that a portion of the settlement will occur relatively quickly during construction and additional structural fill material may be necessary to meet the planned grades. The remainder of the primary settlement should occur within three to five months after the fills have been placed. If the grades are unacceptable after primary settlement has completed, additional fill and grading may be required. We note that our predicted settlements are based on assumptions and should be used as rough estimates. We do not recommend using the settlements described in Table 3 for bidding purposes.

STRUCTURAL FILL

Provided that the material is generally consistent with the specifications provided in Washington Standard Specifications for Road, Bridge, and Municipal Construction (2012) 9-03.14(3) – Borrow Material and properly moisture conditioned, a variety of material could be used as structural fill for the bulkhead stabilization. However, we recommend that any material within keyways, below the ordinary high water in Carty Lake, or below groundwater consist of granular material with less than 5 percent fines. In addition, we recommend that a subgrade separation fabric be placed between the existing fine-grained soils and the structural fill to prevent soil migration into the soft alluvial soils.

Structural fill should be placed lifts with a maximum uncompacted thickness of 8 to 12 inches and compacted to at least 95 percent of the maximum dry density as determined by AASHTO T-180. If the structural fill material is variable, it may be necessary to evaluate compaction based on proofrolling with a loaded dump truck.

Due to the likely presence of wet subgrades, we recommend that the initial lift of fill be approximately 18 inches in thickness and compacted without vibratory action. In addition, in locations where fills are to be placed on slopes steeper than 5H:1V, level benches should be cut into the existing sloping surfaces. The benches should be a minimum of 10 feet wide or the width of the compaction equipment, whichever is wider.

Based on conversations with MFA, we understand that the fish mix gravel and ENR sand are to conform to environmental and U.S. Fish and Wildlife standards. These materials should be placed and compacted in accordance with the appropriate jurisdictional and agency standards.

♦ ♦ ♦

We appreciate the opportunity to be of continued service to you. Please contact us of you have questions or require additional information.

Sincerely,

GeoDesign, Inc.

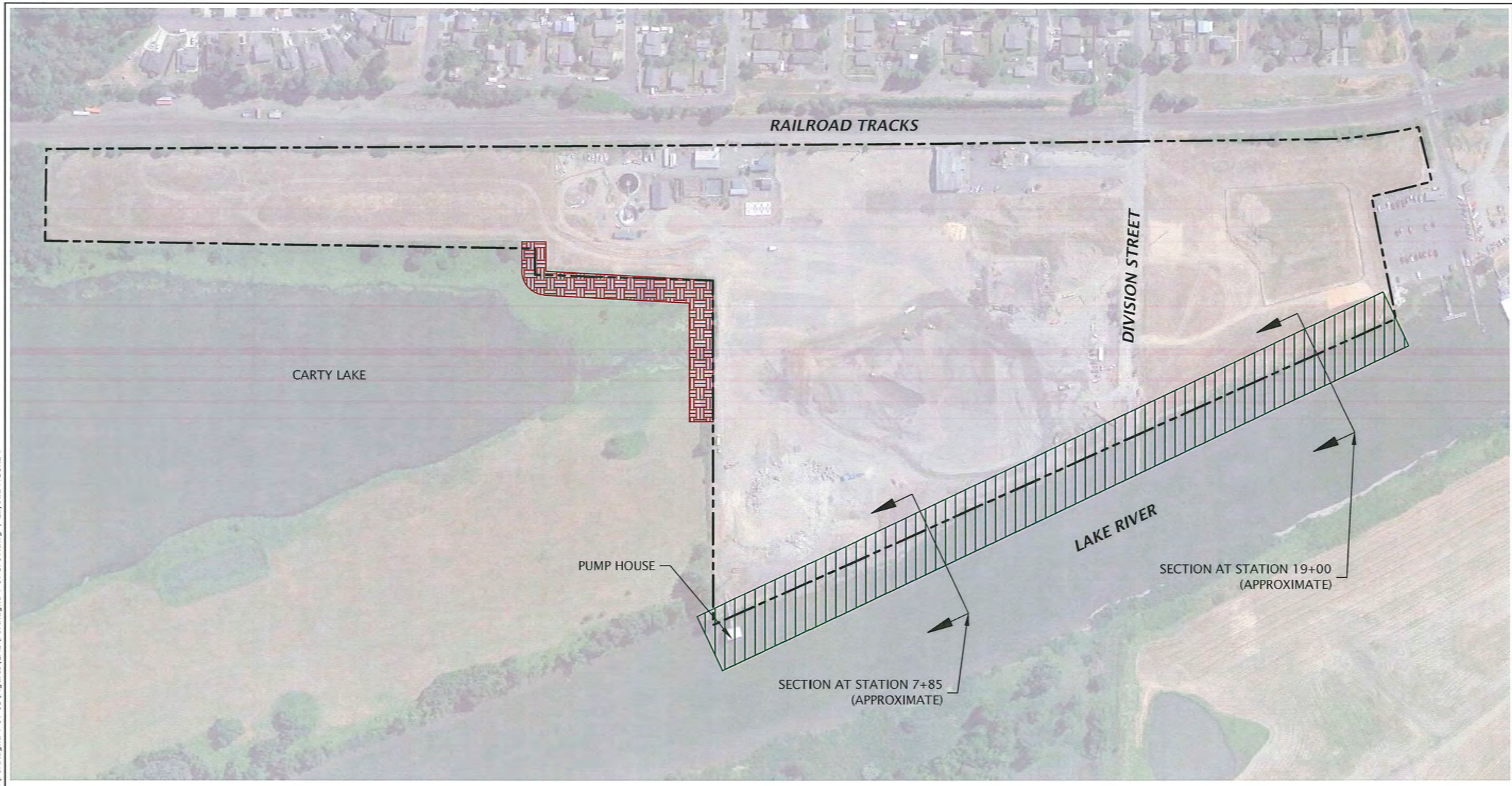
Nick Paveglio, P.E.
Senior Project Manager

Signed 01/21/2014

George Saunders, P.E.
Principal Engineer

NNP:GPS:kt
Attachments
One copy submitted (via email only)
Document ID: PortRdgfld-1-01-03-012114-geolr-Lake_River_and_Carty_Lake.docx

FIGURES



LEGEND:

- MILLER'S LANDING BOUNDARY (APPROXIMATE)
- LAKE RIVER REMEDIATION AREA (APPROXIMATE)
- BULKHEAD STABILIZATION AREA (APPROXIMATE)
- CROSS SECTION LOCATION

N

0 250 500

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, JANUARY 16, 2014

SITE PLAN

MILLER'S LANDING ON THE RIDGEFIELD WATERFRONT
RIDGEFIELD, WA

FIGURE 1

PORTRDGFLD-1-01-03

JANUARY 2014

GEODESIGN INC
14300 NE 20th Avenue - Suite D-102-362
Vancouver WA 98686
Off 360.693.8416 Fax 360.693.8426

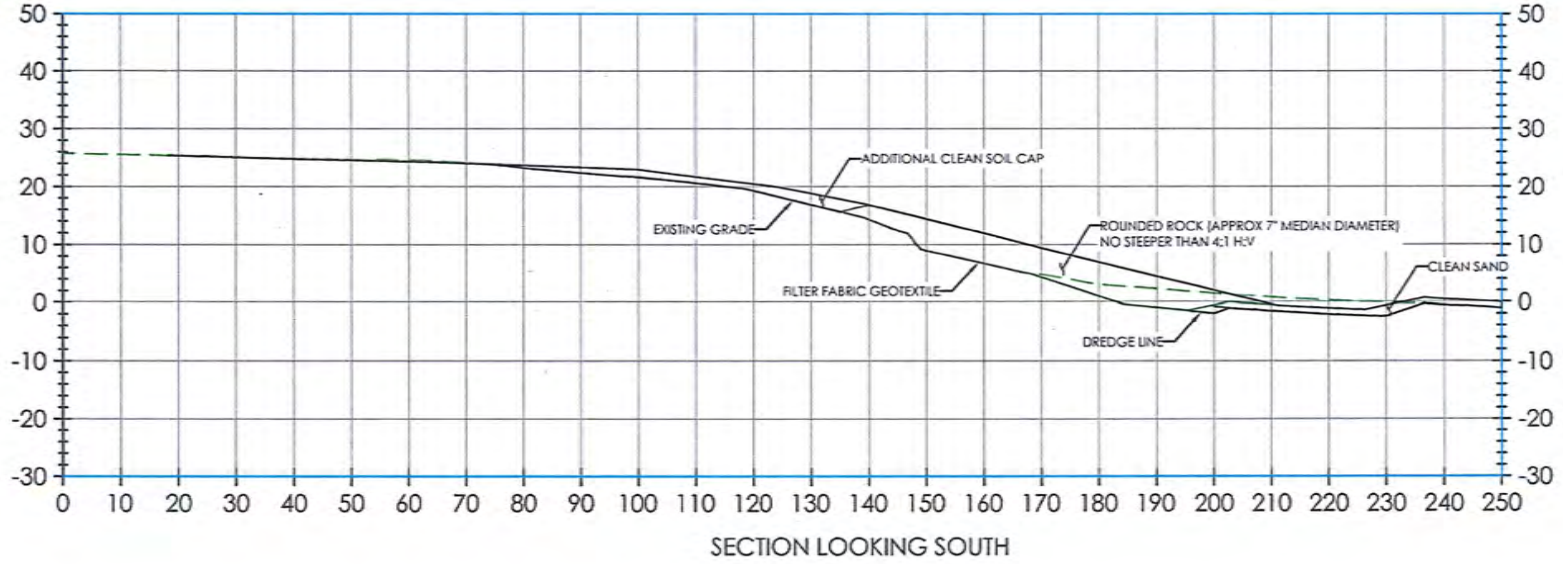
Printed By: aday | Print Date: 1/21/2014 8:13:26 AM
File Name: J:\M-R\PortRdgfld\PortRdgfld-1\PortRdgfld-1-01\PortRdgfld-1-01-03\Figures\CAD\PortRdgfld-1-01-SP01.dwg | Layout: FIGURE 1

ATTACHMENT A

ATTACHMENT A

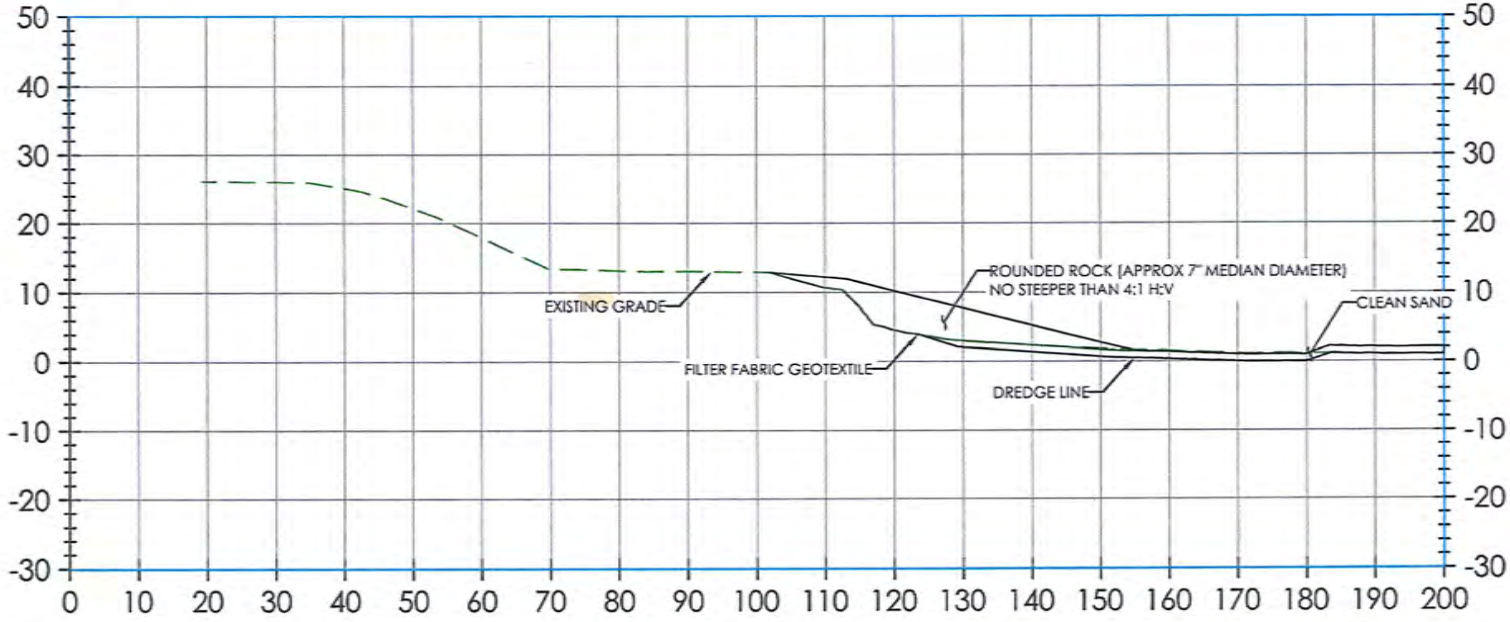
This attachment includes critical Sections 7+85 and 19+00 that were used in our slope stability analysis. The sections were provided by MFA.

STA: 7+85



SECTION LOOKING SOUTH

STA: 19+00



SECTION LOOKING SOUTH

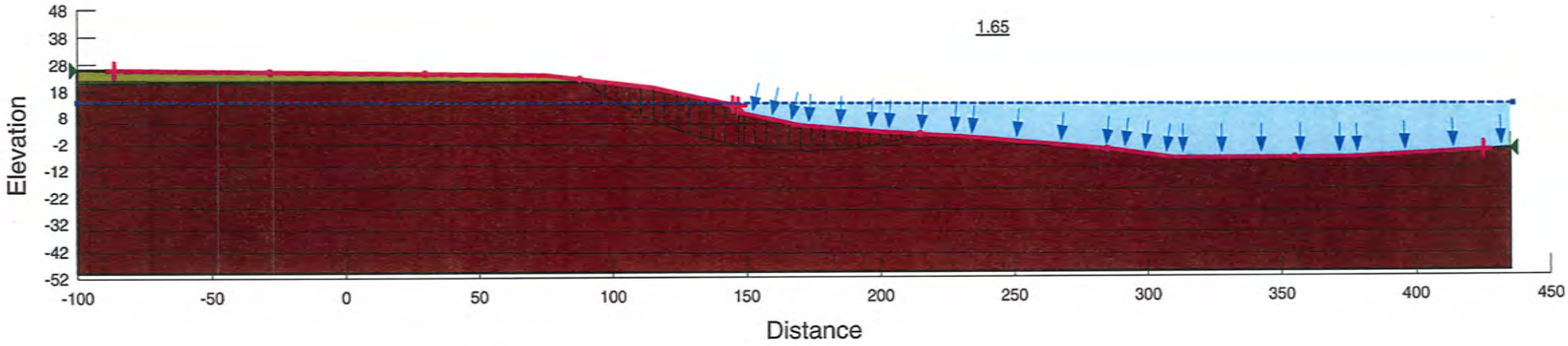
ATTACHMENT B

ATTACHMENT B

This attachment contains the Slope/W outputs for the stability analysis completed at Sections 7+85 and 19+00 along Lake River.

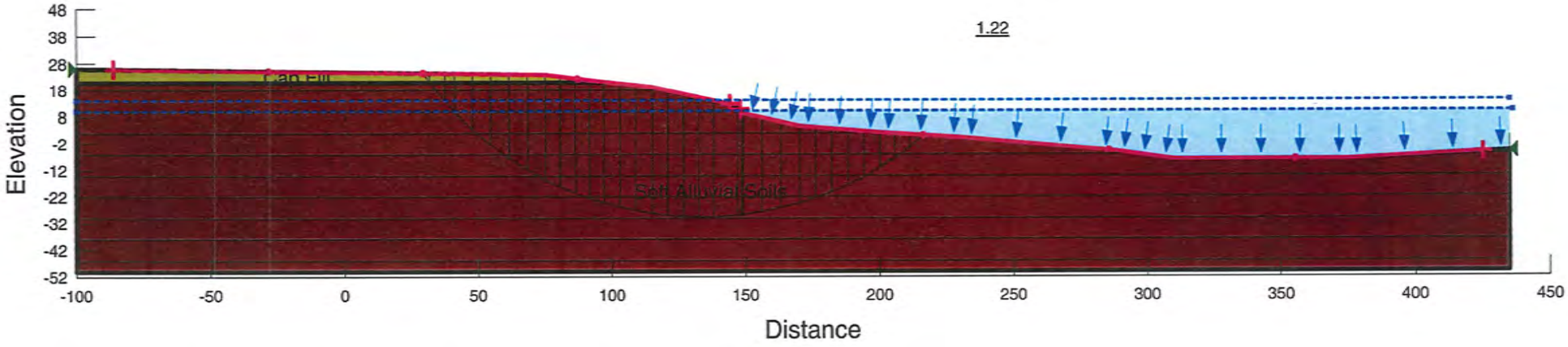
Lake River Remediation
Critical Section at 7+85
Existing Condition - OHW

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 °
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 °



Lake River Remediation
Critical Section at 7+85
Existing Condition - Rapid Drawdown

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 600 psf Total Phi: 0 ° Piezometric Line After Drawdown: 1
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 ° Total Cohesion: 250 psf Total Phi: 0 ° Piezometric Line After Drawdown: 1



Lake River Remediation
Critical Section at 7+85
Temporary Condition - OHW

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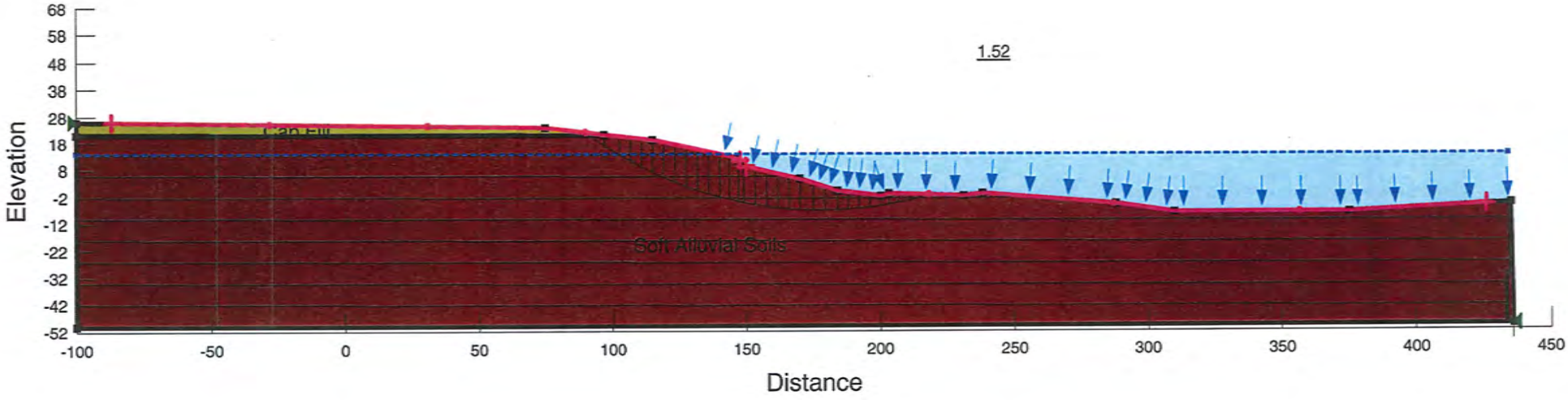
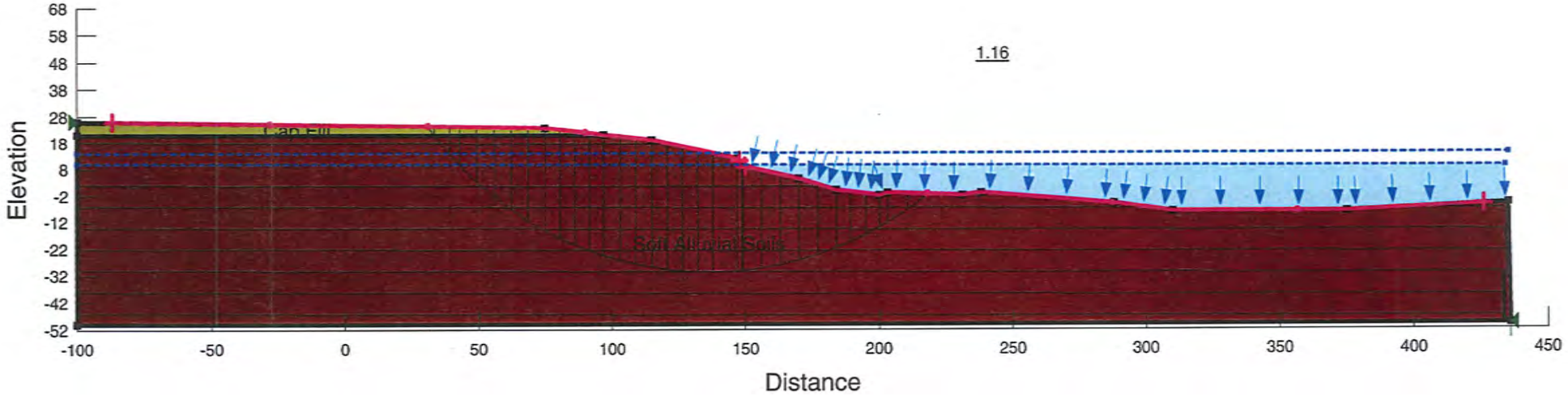
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 °



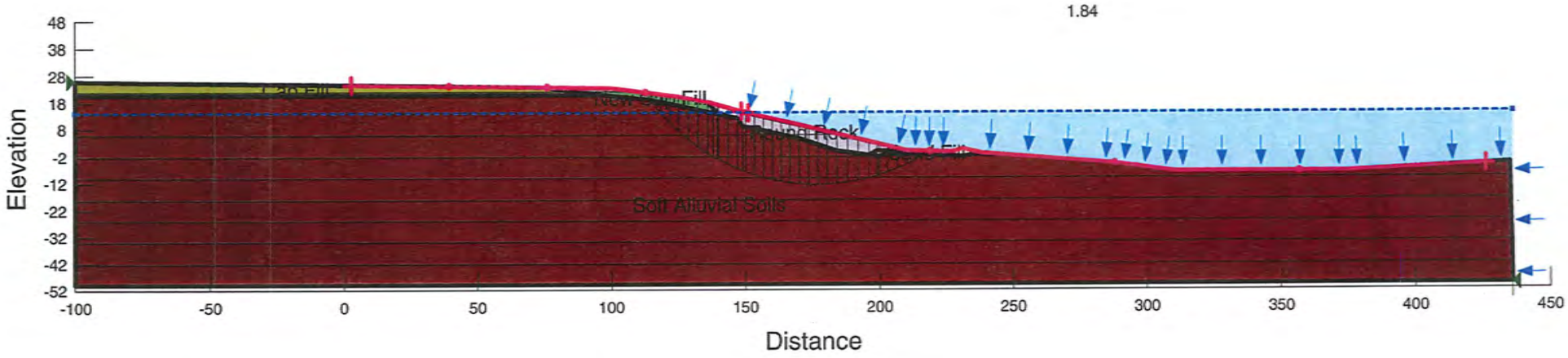
Lake River Remediation
Critical Section at 7+85
Temporary Condition - Rapid Drawdown

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 600 psf Total Phi: 0 ° Piezometric Line After Drawdown: 1
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 ° Total Cohesion: 250 psf Total Phi: 0 ° Piezometric Line After Drawdown: 1



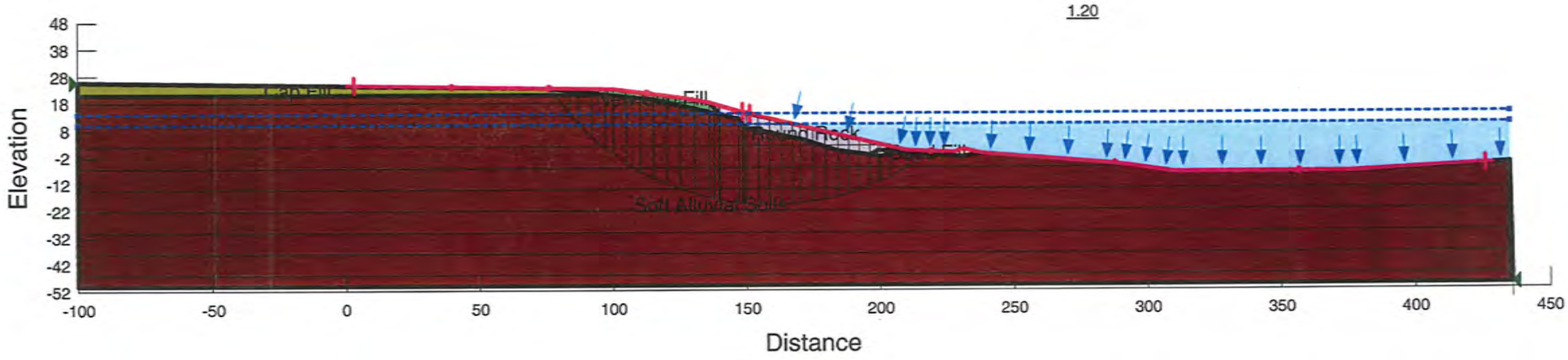
Lake River Remediation
Critical Section at 7+85
Permanent Condition - OHW

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 °
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 °
Name: New Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 °
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 °



Lake River Remediation
Critical Section at 7+85
Permanent Condition -Rapid Drawdown

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 600 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 ° Total Cohesion: 250 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
Name: New Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 1,000 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 ° Total Cohesion: 1 psf Total Phi: 27 ° Piezometric Line After Drawdown: 2
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 ° Total Cohesion: 1 psf Total Phi: 31 ° Piezometric Line After Drawdown: 2



Lake River Remediation
Critical Section at 7+85
Permanent & Seismic Condition - OHW

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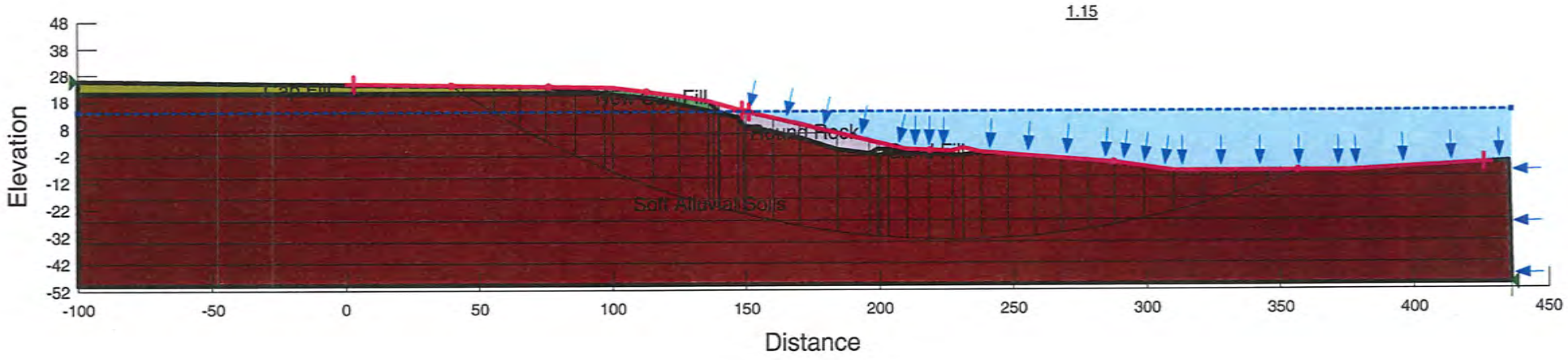
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 100 psf Phi': 25 °
Name: New Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 °
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 °



Lake River Remediation
Critical Section at 19+00
Existing Condition - OHW

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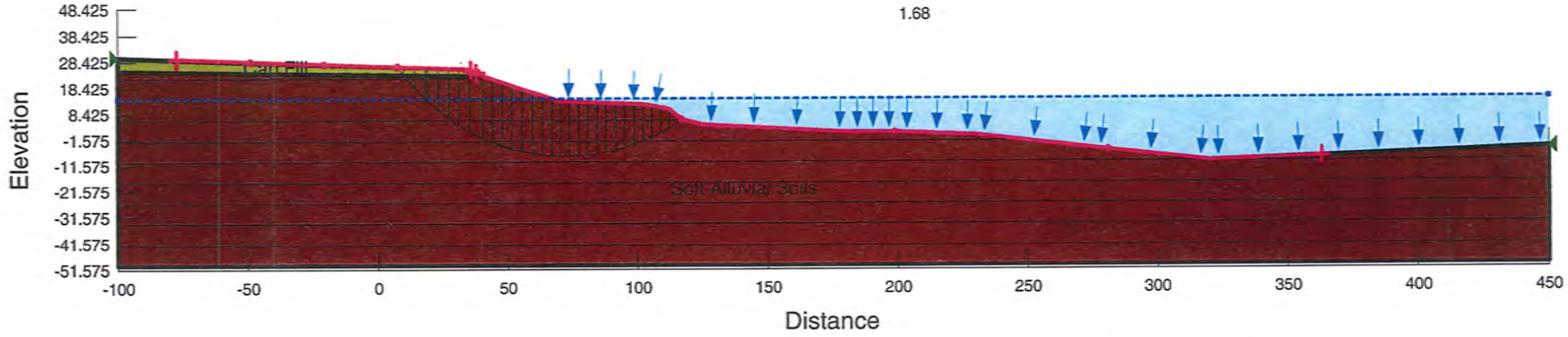

Lake River Remediation
Critical Section at - 19+00
Existing Condition - Rapid Drawdown

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 600 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
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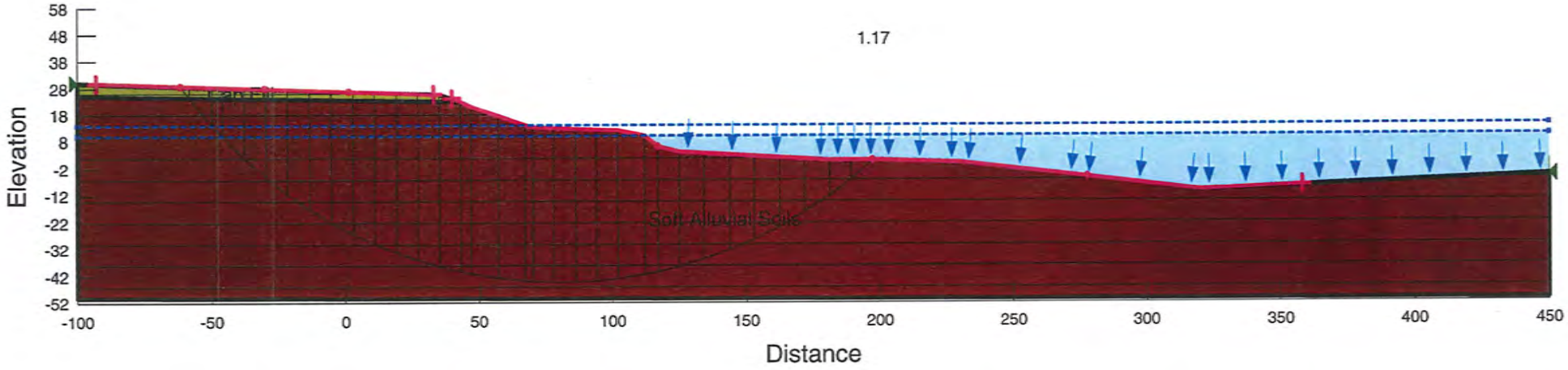

Lake River Remediation
Critical Section at - 19+00
Temporary Condition - OHW

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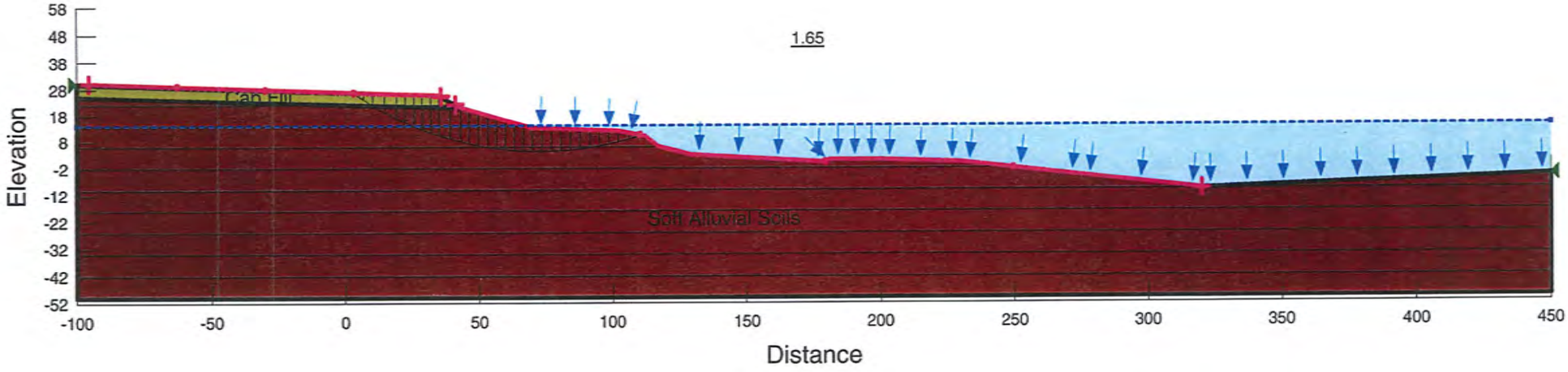
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 °



Lake River Remediation
Critical Section at - 19+00
Temporary Condition - Rapid Drawdown

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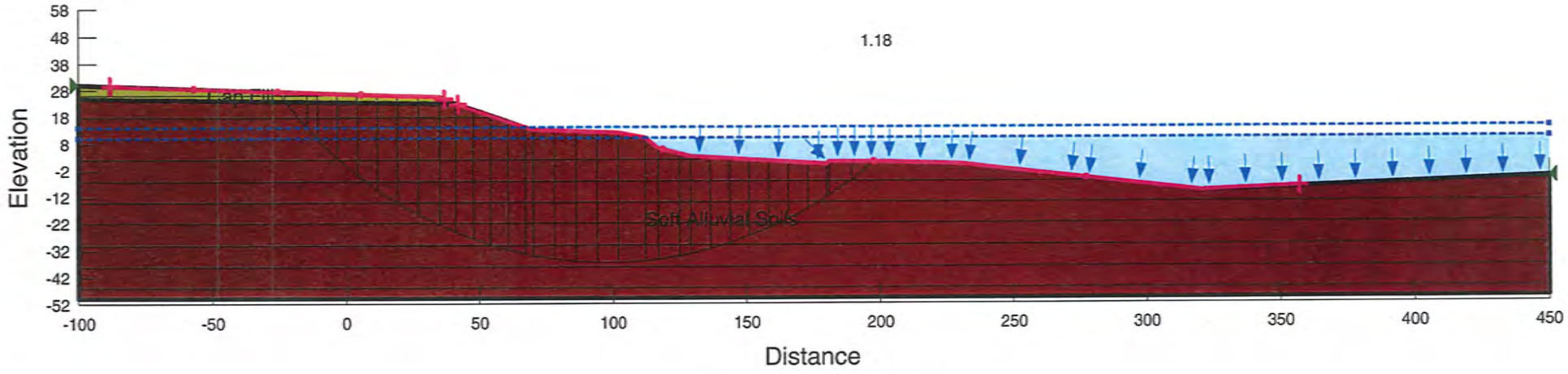
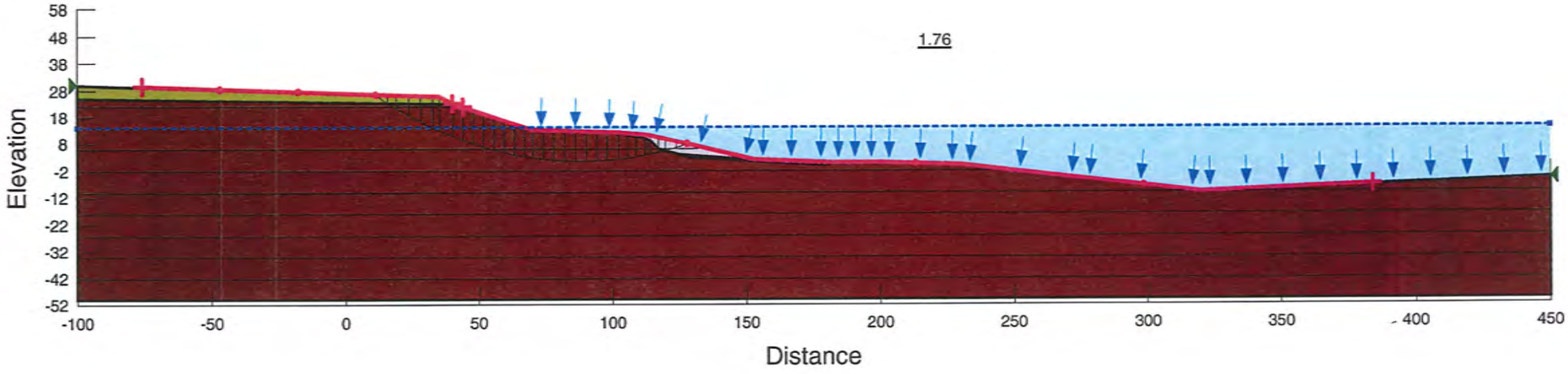
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 ° Total Cohesion: 250 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2



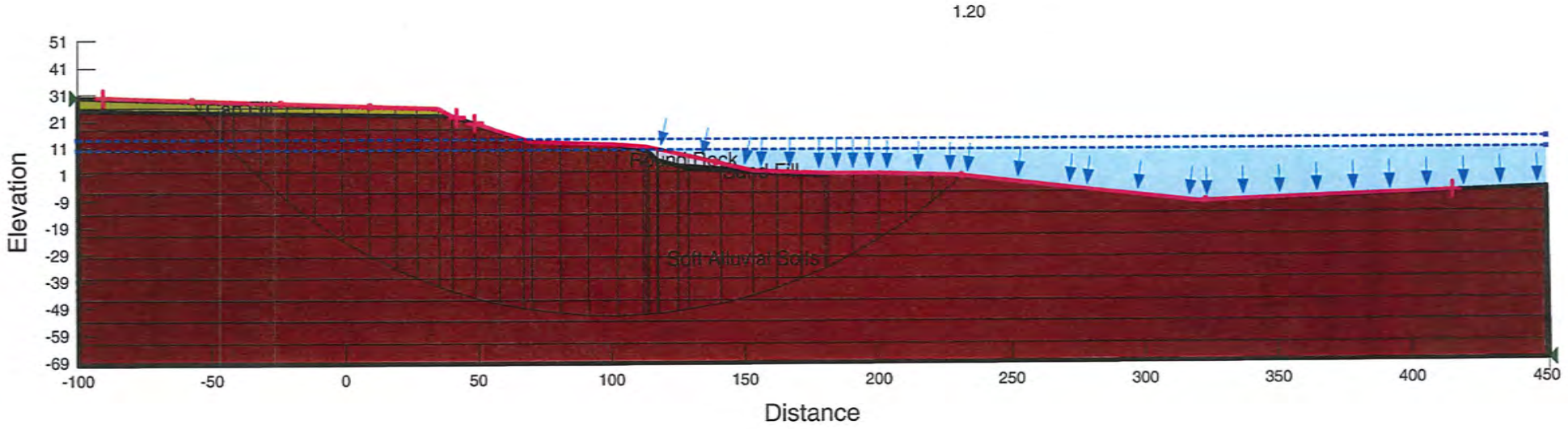
Lake River Remediation
Critical Section at 19+00
Permanent Condition - OHW

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 °
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 °
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 °



Lake River Remediation
Critical Section at 19+00
Permanent Condition - Rapid Drawdown

Name: Cap Fill Unit Weight: 110 pcf Cohesion': 25 psf Phi': 30 ° Total Cohesion: 600 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 0 psf Phi': 22 ° Total Cohesion: 250 psf Total Phi: 0 ° Piezometric Line After Drawdown: 2
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 ° Total Cohesion: 1 psf Total Phi: 27 ° Piezometric Line After Drawdown: 2
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 ° Total Cohesion: 1 psf Total Phi: 31 ° Piezometric Line After Drawdown: 2



Lake River Remediation
Critical Section at 19+00
Permanent & Seismic Condition - OHW

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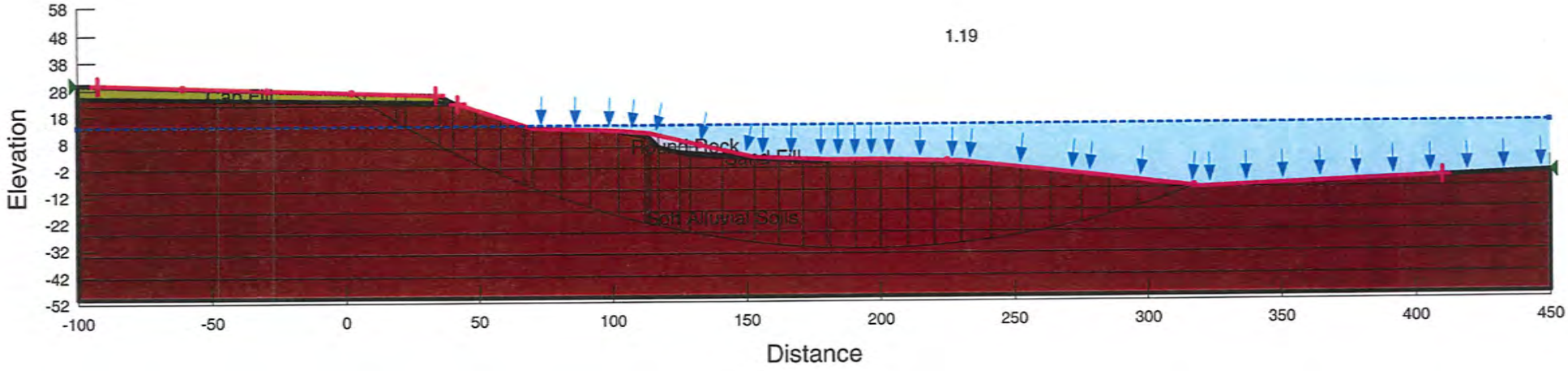
Name: Soft Alluvial Soils Unit Weight: 100 pcf Cohesion': 100 psf Phi': 25 °
Name: Round Rock Unit Weight: 125 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand Fill Unit Weight: 100 pcf Cohesion': 0 psf Phi': 32 °



APPENDIX F

CONSTRUCTION QUALITY ASSURANCE PLAN FOR THE CARTY LAKE SEDIMENT REMEDY PROJECT.

CONSTRUCTION QUALITY ASSURANCE PLAN

CARTY LAKE SEDIMENT REMEDY PROJECT

Prepared for
PORT OF RIDGEFIELD
RIDGEFIELD, WASHINGTON
October 22, 2014
Project No. 9003.01.40

MAUL FOSTER ALONGI

Prepared by
Maul Foster & Alongi, Inc.
400 E Mill Plain Blvd., Suite 400, Vancouver WA 98660

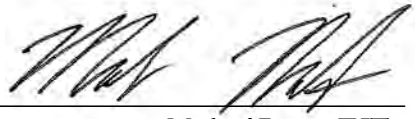
CONSTRUCTION QUALITY ASSURANCE PLAN

CARTY LAKE SEDIMENT REMEDY PROJECT

The material and data in this plan were prepared under the supervision and direction of the undersigned.

MAUL FOSTER & ALONGI, INC.

Joshua Elliott, PE
Project Engineer



Michael Reiter, EIT
Staff Engineer

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ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CAP	Cleanup Action Plan
the Contractor	construction contractor
CQA	construction quality assurance
CQAP	construction quality assurance plan
CQC	construction quality control
Ecology	Washington State Department of Ecology
EDR	Draft Engineering Design Report
EPP	environmental protection plan
ESC	erosion and sediment control
HMA	hot mix asphalt
LGP	low ground pressure
MFA	Maul Foster & Alongi, Inc.
NPDES	National Pollutant Discharge Elimination System
the Port	Port of Ridgefield
PWT	Pacific Wood Treating Co.
QA	quality assurance
QC	quality control
RFI	Request for Information
SWPPP	stormwater pollution prevention plan

1 INTRODUCTION

This construction quality assurance plan (CQAP) was prepared on behalf of the Port of Ridgefield (the Port) to ensure that the Carty Lake Sediment Remedy is constructed to fulfill the requirements of the Cleanup Action Plan (CAP) (Washington State Department of Ecology [Ecology], 2013) and that the remedy meets or exceeds all performance standards, design criteria, plans, and specifications.

The purpose of this remedial action is to address the presence of chemicals above screening criteria, remediation levels, and/or cleanup levels; these chemicals include chlorinated dibenzo-p-dioxins and dibenzofurans, pentachlorophenol, and metals (arsenic and chromium) in sediment found in the southern portion of Carty Lake.

The in-water remedy consists of removing sediment within the sediment excavation prism via mechanical sediment excavation and placement of an approximately 1-foot-thick, clean sand layer. Additional in-water cleanup components include the following:

- A temporary isolation barrier will be installed to facilitate dewatering of the sediment excavation area.
- Best management practices (BMPs) for water quality will be implemented during work; these will include operational controls, excavation methods, and construction dewatering (as required). Any water removed from the construction area will be treated for turbidity and organic compounds before it is discharged to surface water.
- Excavated material will be disposed of as nonhazardous waste at a Subtitle D landfill facility.
- A long-term institutional control on fish consumption to protect human health.

Upland actions will include the following:

- Access improvements, e.g., clearing and grubbing, construction of a permanent access ramp from the Port's property to the Carty Unit, and construction of a staging area
- Construction of an earth and rock embankment to permanently stabilize the soils behind the existing treated-wood bulkhead, which has begun to fail
- Paving of a portion of the Cell 2 hard trail on Port property

1.1 Construction Quality Assurance Plan Scope and Purpose

In describing the scope and purpose of this CQAP, it is important to define and understand the differences between construction quality assurance (CQA) and construction quality control (CQC),

both of which are widely recognized as important factors in overall quality management for remedial actions. The following are general definitions:

- CQC is a planned system of inspections performed by the construction contractor (the Contractor) that are used to directly monitor and control the quality of a construction project. CQC refers to measures taken by the Contractor to determine compliance with the requirements for materials and workmanship as stated in the plans and specifications for the project.
- CQA is a planned system of activities that provides the Port and Ecology assurance that a project is constructed as specified in the design. CQA may include inspections, verifications, audits, and evaluations of materials and workmanship as necessary to determine and document construction quality. CQA refers to measures taken by the Port, or its representatives, to assess if the Contractor is complying with the plans and specifications for a project. CQA checks are performed independently of CQC actions, but they frequently complement one another.

This CQAP describes the CQA necessary to ensure that proper construction techniques and procedures are used during construction of the Carty Lake Sediment Remedy. The CQAP contains the procedures for verifying that the materials used and the installations of those materials comply with the construction drawings and technical specifications.

Construction requirements are established by the plans and specifications and are outlined in this document only as they pertain to quality assurance. The criteria for acceptance will be as defined in the plans and specifications. This CQAP does not establish procedures for controlling or guiding the operations of the manufacturer of materials or the Contractor, nor does it relieve them of their contractual responsibility to set up the necessary procedures and controls within their organizations to produce the quality of work called for in the plans and specifications. This CQAP is not intended to function as or to replace the Contractor's internal quality controls.

2 RESPONSIBILITIES AND AUTHORITIES

This section provides the project team organizational structure, responsibilities, and lines of authority. Project activities will be performed within the framework of the organization and functions presented in this section. The organizational structure is presented in the attached figure. Contact information for key project individuals is provided in Table 2-1.

2.1 Washington State Department of Ecology

Ecology administers the overall cleanup of the former Pacific Wood Treating Co. (PWT) site and is the lead agency for remedial actions completed by the Port. Ecology will review and authorize the project design, as well as this CQAP. Ecology may participate in preconstruction site walks and prefinal inspections. Ecology will also review the final completion report for the project.

Craig Rankine is the Ecology project manager for the former PWT site. Mr. Rankine is based in Ecology's field office in Vancouver, Washington. Joyce Mercuri is the sediment project manager for the Carty Lake Remedial Action. Ms. Mercuri is based in Ecology's Southwest Regional Office in Lacey, Washington.

2.2 Port of Ridgefield

Under the November 5, 2013, Consent Decree No. 13-2-03830-1 between Ecology and the Port, the Port is responsible for implementing the CAP to remediate the former PWT site. The Port's Director of Operations is Laurie Olin, who is responsible for overall cleanup management and administration. Ms. Olin will administer the contract and will issue payment for approved work. The Port contracts directly with Maul Foster & Alongi, Inc. (MFA), which serves as the Design Engineer for the project. The Port will also contract with a geotechnical consultant, independent from MFA, which will provide inspection services for certain earthwork activities.

2.2.1 Design Engineer

As the Design Engineer, MFA will provide CQA during construction. MFA developed the design, provided the bid documents, and helped to coordinate the bidding and award process. MFA will provide construction observation and will implement the CQA program described in this CQAP. Activities identified in the project specifications as being completed by the Design Engineer will be completed or coordinated by MFA. MFA will keep the Port and Ecology apprised of the status of the construction work.

MFA's project manager for the Port's sediment projects is Madi Novak. Ms. Novak is the primary contact for the Port and provides overall project direction to the MFA team. The MFA engineering manager for construction oversight is Joshua Elliott, PE. The engineering manager is responsible for all aspects of implementation of project-specific assignments.

The MFA CQA officer is Michael Reiter, EIT. The CQA officer will be on site during the construction work to oversee field activities. The CQA officer will be the main point of contact for the Contractor.

Specific responsibilities of the Design Engineer during construction include the following:

- Preconstruction Meeting: MFA will coordinate and attend the preconstruction meeting with the Port and the Contractor.
- Weekly Meetings: MFA will attend weekly meetings with the Port and the Contractor.
- Stakeholder Coordination: As required, MFA will coordinate with other project stakeholders (i.e., Ecology, U.S. Fish and Wildlife Service, and Tribes) regarding periodic site visits, meetings, and reporting.
- Construction Observation and Quality Assurance (QA): Through the implementation of the CQA measures described in this plan, MFA will ensure that the construction work conforms to the construction documents. MFA will witness the Contractor's quality

control (QC) program, including any field testing completed by the Contractor. MFA will implement the QA testing and measurements specified in this plan, and will verify that materials delivered to the job site are in accordance with construction documents before they are used. In addition, MFA will observe site practices such as dust-control and stormwater- and erosion-control BMPs to confirm that they are in accordance with the Contractor-supplied environmental protection plan (EPP) and erosion and sediment control (ESC) plan.

- Analytical Testing: MFA will coordinate sampling and testing of proposed fill materials. MFA will interpret the results and provide final approval of material that is imported to the site and incorporated into completed work.
- Water Quality Monitoring: MFA will perform sampling and will coordinate testing of water discharged from the site in accordance with the specifications. MFA will interpret the analytical results and coordinate with Ecology to obtain approval for discharge or information concerning require additional treatment.
- Submittals and Shop Drawing Review: MFA will review submittals and shop drawings and approve them or take other actions, as appropriate. MFA will evaluate consistency with construction documents. MFA will work with the Contractor to track the submittal schedules and maintain records of the submittals.
- Requests for Information (RFIs) Responses: MFA will receive, track, and respond to all RFIs that are submitted by the Contractor.
- Evaluation of Substitutions: MFA will evaluate Contractor-requested substitutions.
- Change Orders and Work Change Directives: MFA will work with the Port and the Contractor, as necessary, to evaluate and negotiate change order requests and to prepare work change directives, as necessary, to resolve issues that develop during construction.
- Daily Field Notes: MFA will prepare daily field notes that document observations and project status. The MFA on-site CQA officer will include the following minimum information in the daily notes: weather, Contractor/Subcontractor personnel that are on site, equipment utilized, construction activities being performed, samples collected, field test results, and construction issues (if any).
- Photographic Documentation: MFA will photographically document the construction progress, project milestones, and key design components. The photographs will be logged and included in the completion report.
- Record Drawings: Throughout construction, MFA will maintain a set of redline drawings to document project revisions. These redline drawings will be used for comparison to the Contractor as-built drawings and will ultimately be used to prepare record drawings for the project. MFA will produce the record drawings required for submittal with the completion report.
- Evaluation of Payment Applications: MFA will review Contractor applications for payment to evaluate whether they are in alignment with construction progress.

- Inspections: MFA will coordinate and attend the prefinal and final inspections.
- Completion Report: MFA will receive and review all closeout materials from the Contractor and will prepare a completion report, including final record drawings.

2.3 Construction Contractor Responsibilities

The Contractor must perform regular QC tasks required by the project specifications. Various work plans prepared by the Contractor and approved by the Design Engineer will provide additional details on Contractor personnel responsibilities and lines of authority. In general, the Contractor is responsible for implementation of the project in strict compliance with the plans and specifications.

The Contractor will be responsible for selecting the appropriately accredited laboratories to perform the physical testing required by the project. Laboratory responsibilities are contained in the project specifications.

3 QUALITY ASSURANCE PROCEDURES

This section explains the CQA aspects of the project. It identifies the construction activities that require monitoring and establishes the procedures for monitoring each activity. Performance standards and acceptance criteria have been established by MFA in the project specifications. The performance standards and inspection activities are detailed in this section. The attached Table 3-1 describes specific CQA activities and provides the reference to the appropriate project specifications for each activity. CQA forms that will be used by the on-site CQA officer are included as Appendix A. CQA forms will be completed daily during critical operations, such as the excavation of contaminated sediments, to keep continuous documentation of materials and workmanship.

3.1 Mobilization, Demobilization, and Temporary Facilities

MFA will visually observe the Contractor's mobilizations, demobilizations, and temporary facilities during the course of construction to verify compliance with the plans and specifications.

3.2 Site Environmental Protection: Dust and Erosion and Sediment Control Installation, Monitoring, and Maintenance

The Contractor is required by the contract documents to protect human health and the environment, including the implementation of dust control and an ESC plan. The Contractor must maintain required BMPs throughout the duration of the construction project, as required by the specifications. The Contractor is wholly responsible for site protection measures, including the preparation and implementation of the Contractor's approved EPP, BMP inspection and maintenance, and fugitive-dust control.

3.2.1 Erosion and Sediment Control Best Management Practices

Section 01 57 13 of the specifications requires the installation of erosion-control BMPs and requires that the Contractor comply with the minimum requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. The specifications also require that the Contractor's EPP include an ESC plan.

MFA prepared a stormwater pollution prevention plan (SWPPP) as part of the application process for coverage under the NPDES Construction General Permit. This SWPPP addresses stormwater management techniques for both the Carty Lake Sediment Remedy Project and the Lake River Sediment Remedy Project. The Port has provided this SWPPP to the Contractor – the Contractor has adopted the SWPPP in lieu of a Contractor-generated ESC plan.

The CQA officer will visually verify that required BMPs are in place as described in Section 01 57 13 of the specifications, as shown on the plans, and as required by the SWPPP. Anticipated ESC BMPs include, but are not limited to, the following: silt fence; stabilized construction entrances; temporary access roads; above-ground, closed-loop wheel wash; inlet protection; clean soil stockpile liner and cover; and the temporary isolation barrier.

The Contractor is required to inspect erosion-control BMPs during the course of construction to ensure that they are properly installed and are functioning adequately, in accordance with the plans, specifications, and the SWPPP. MFA will monitor the Contractor's erosion control maintenance efforts. MFA is not responsible for BMPs, but deficiencies noted will be forwarded to the Contractor for remedy. If, at any time, MFA determines that the Contractor is not implementing the specified BMPs, or if the installed BMPs are not adequately controlling erosion, MFA will direct the Contractor to stop work until necessary protections are in place. No additional time or compensation will be granted for work stoppage resulting from inadequate BMPs.

3.2.2 Water Quality Monitoring

The required water quality monitoring is detailed in the Carty Lake Draft Engineering Design Report (EDR) (MFA, 2014). MFA's CQA officer will perform ongoing visual monitoring of Carty Lake for sediment discharge emanating from the temporary isolation barrier and will notify the Contractor if any discharge is observed. MFA's CQA officer will also provide monitoring of the water quality of any treated-water discharge to surface water, in accordance with the EDR and Section 01 57 19 of the specifications.

If the treated-water discharge fails to meet the water quality criteria, the discharge will be stopped immediately and will remain suspended until the water is brought into compliance, as confirmed by MFA. If a significant sediment discharge is emanating from the temporary isolation barrier, construction activities in the vicinity will be suspended immediately and will remain suspended until a remedy is executed, as confirmed by MFA.

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 and spills), immediate notification shall be made to both of the following:

- **Washington State Military Department Emergency Management Division**, 800-258-5990

- **Anne Friesz, Assistant Regional Habitat Program Manager**, 360-903-6764

3.2.3 Dust Monitoring and Control

The Contractor is responsible for dust control (water application) during construction, in accordance with Sections 01 57 13 and 01 15 19 of the project specifications. The Contractor is required to water or otherwise treat dust-generating surfaces as often as necessary to prevent visible dust during construction, and must submit a written air pollution control plan for dust control (as part of the EPP) to MFA for review before beginning construction. MFA's on-site CQA officer will visually monitor fugitive dust through the construction process and will notify the Contractor upon observation of significant visible dust.

3.3 Suitability of Imported Material

The plans require the import of a variety of fill materials necessary for construction. The Design Engineer will coordinate analytical testing of the imported topsoil, structural fill, and clean sand. Analytical results will be screened against the levels in Section 35 42 00 of the specifications. The Contractor is responsible for ensuring that the fill materials meet the physical and chemical requirements of Section 35 42 00 of the specifications.

3.4 Clearing and Grubbing

Section 31 11 00 of the specifications sets forth the requirements for clearing and grubbing of the site to prescribed limits. MFA's on-site CQA officer will visually monitor Contractor efforts and will document when the site is sufficiently cleared and grubbed to plan extents. MFA's on-site CQA officer will periodically check truck tickets to verify that refuse materials generated from clearing and grubbing operations are disposed of in accordance with Section 31 11 00 of the specifications.

3.5 Demolition and Debris Removal

The plans and Section 02 41 00 of the specifications describe the requirements for the removal and disposal of pilings, pipe, debris, and other structures that are known to exist or that may be encountered during the work. MFA's on-site CQA officer will visually monitor the Contractor's demolition efforts and verify that structures and debris are removed as described in Section 02 41 00 of the specifications. If debris is stored on site before disposal, MFA's on-site CQA officer will document the location and means of storage and will verify compliance with Section 02 41 00 of the specifications. MFA's on-site CQA officer will periodically check truck tickets to ensure that waste is being disposed of at an appropriate Ecology-approved, Resource Conservation and Recovery Act subtitle D landfill or a recycling facility previously approved by MFA.

3.6 Temporary and Permanent Access Improvements

The plans require the construction of a permanent refuge access road, as well as temporary access roads and entrances to the remedy area and a staging area for materials and equipment. Specification Sections 35 42 00 and 31 05 19 describe the material specifications and workmanship requirements for the placement of gravel and filter fabric (respectively) required for construction. MFA will review the appropriate product data submittals for compliance with the specifications, and the on-site CQA officer visually verify and document that materials delivered to the site match the approved submittals. MFA's on-site CQA officer will visually monitor Contractor efforts during construction of access improvements and will verify, with a handheld tape, that the minimum gravel thicknesses described on the plans are achieved. In addition, the CQA officer will document Contractor compaction efforts and will verify, through visual monitoring and an electronic level, that materials are placed to the grades and locations specified in the plans and specifications.

Daily, during refuge access road construction, the CQA officer will complete the Refuge Access Road CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. The geotechnical consultant will be brought to the site to provide compaction testing of the permanent refuge access road prior to Engineer acceptance

3.7 Excavation and Stockpiling of Existing Clean Soil Cap

The plans and Section 31 00 00 of the specifications describe the requirements for the excavation of the existing clean soil cap in the upland sediment handling area and stockpiling of the material adjacent to the excavation. MFA's on-site CQA officer will visually monitor Contractor potholing efforts before excavation to verify existing cap thicknesses and document the results. MFA's on-site CQA officer will visually monitor the excavation efforts and will verify that soil from below the demarcation fabric is segregated from soil above the fabric at all times, in accordance with the specifications.

If at any time the CQA officer determines that contaminated and clean materials have been mixed, the CQA officer will delineate and document the quantity and location of material, and the entire quantity shall be assumed contaminated. The material will be mixed into the subgrade of the sediment-handling area or disposed of off site in a permitted landfill facility approved by MFA. The CQA officer will document any such instances.

MFA's on-site CQA officer will visually monitor the embankment of clean soil cap material at the stockpile location shown on the plans, and will document that this material is placed on plastic sheeting, compacted in accordance with Section 31 00 00 of the specifications, and covered in accordance with the details shown on the plans. The CQA officer will measure side slopes of the stockpile with an electronic level and document that the material is placed within the maximum grades specified on the plans. The CQA officer will also document stockpile maintenance performed by the Contractor in accordance with Section 01 57 13 of the specifications.

Daily, during the excavation and stockpiling of clean soil cap activities, the CQA officer will complete the Excavation and Stockpiling of Clean Soil Cap CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications.

3.8 Construction of Upland Sediment-Handling Area

The plans detail the required grading of contaminated subgrade and construction of a graveled, upland sediment-handling area on top of the contaminated subgrade. MFA's on-site CQA officer will visually monitor the grading of the subgrade and document when the subgrade is in general accordance with the plans. A survey of the subgrade will be performed and compared against the design before the Contractor places gravel on the subgrade surface.

Specifications Section 35 42 00 describes the material specifications and workmanship requirements for the placement of gravel. MFA will review the appropriate product data submittals for compliance with the specifications, and the on-site CQA officer will visually verify and document that gravel delivered to the site matches the approved submittals. MFA's on-site CQA officer will visually monitor Contractor efforts and will verify, with a handheld tape, that the minimum gravel thicknesses described on the plans are achieved.

Daily, during construction of the upland sediment-handling area, the CQA officer will complete the Upland Staging and Sediment-Handling Area CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications.

3.9 Sediment Excavation and Handling

Section 35 23 15 of the specifications describes detailed requirements for the excavation of contaminated sediments from Carty Lake, as well as subsequent handling and disposal. Before the start of sediment excavation operations, MFA will review all Contractor work plan submittals required by Section 35 23 15 of the specifications for compliance with the contract and design intent. During the work, MFA's on-site CQA officer will periodically compare the Contractor methodology with the approved work plans to ensure conformance. If at any time the Contractor's means and methods do not conform to those approved by MFA, the CQA officer will stop the work until the appropriate work plan is resubmitted or the Contractor performs the work in an approved manner.

MFA's on-site CQA officer will visually monitor sediment excavation activities on a continuous basis to verify compliance with Section 35 23 15 of the specifications. The CQA officer will visually verify that the work is performed in the dry, that all equipment in the excavation area is low ground pressure (LGP) type, that contaminated sediment is not tracked onto finished neat line excavation grade, and that trucks are loaded over a plastic liner. The CQA officer will periodically verify that trucks transporting contaminated sediment are lined with a disposable plastic liner and will check truck tickets to verify that sediments are being disposed of at an approved landfill. Each day on which sediment excavation activities take place, the CQA officer will complete the Sediment Excavation CQA Form (see Appendix A) to document that all workmanship is in compliance with the plans and specifications.

After excavation activities have been completed, a survey of the post-excavation surface will be performed. MFA will review the survey and compare it to the design before the Contractor can begin placing clean soil. After all sediment excavation has been completed, the CQA officer will

document that all workmanship is in compliance with the plans and specifications and that clean soil placement activities can begin.

As detailed in Section 35 23 15 of the specifications, excavated sediments must be dewatered of free liquid before transport for disposal. MFA's on-site CQA officer will periodically examine trucks as they are being loaded to ensure that excavated sediments are free of liquid. The CQA officer will require the Contractor to further amend sediments that contain excessive moisture.

If at any time the CQA officer determines that the Contractor is out of compliance with the plans and specifications, the CQA officer will stop the work immediately until the issue is remediated to the satisfaction of the Design Engineer. The CQA officer will perform a final inspection and will document completion of sediment excavation work before placement of clean sand or embankment fill. The subgrade surface will be visually inspected for general conformance with the lines and grades shown on the plans, and to ensure that there is a smooth finished surface free of protrusions that has not been impacted by surrounding contaminated sediments.

There is a possibility that archaeologically significant resources will be discovered during sediment excavation operations. An Archaeological Monitoring and Inadvertent Discovery Plan for the Carty Lake Remedial Action was prepared for the site by WillametteCRA, and has been included as Appendix B. In the case of an inadvertent archaeological discovery, the CQA officer will verify that the Contractor complies with the steps set forth in this plan.

3.10 Placement of Fill in Remedy Area

Section 35 42 00 of the specifications describes detailed requirements for the material properties and placement of various fill materials (clean sand, fish mix rock, clean structural fill, and topsoil) to construct a clean sand layer over the excavated sediment and to construct an embankment to protect and stabilize an existing bulkhead. Section 31 05 19 describes the material specifications and workmanship requirements for the placement of filter fabric required for construction of the embankment. MFA will review the appropriate geotextile and fill material submittals for compliance with the specifications, and the CQA officer will document that materials delivered to the site match approved submittals. In addition, MFA will independently analyze samples of clean sand, topsoil, and structural fill provided by the Contractor in accordance with the screening criteria described in Section 35 42 00 of the specifications before any fill placement takes place.

MFA will review all Contractor work plan submittals required by Section 35 42 00 of the specifications for compliance with the contract and design intent before fill placement is conducted in the remedy area. MFA's on-site CQA officer will visually monitor fill placement activities on a continuous basis to verify compliance with Section 35 42 00 of the specifications. The CQA officer will visually verify (and with a handheld tape, when applicable) that materials are placed to the minimum thickness described on the plans, that all equipment in the placement area is LGP type, and that the Contractor's methods are in conformance with approved work plans.

Each day on which clean sand placement activities take place, the CQA officer will complete a Clean Sand Placement CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. The CQA officer will perform a final inspection and

will document completion of clean sand placement work before construction of the stabilization embankment.

Before import of fish mix rock, MFA will visit the source of the fish mix rock and visually inspect the material for compliance with the specifications. After this inspection, the CQA officer will complete the Fish Mix Rock Material Source CQA Form (see Appendix A) to document that the proposed material is acceptable. During construction of the stabilization embankment, MFA will visually compare fish mix rock delivered to the site with a sample stockpile of compliant material to ensure ongoing compliance with the specifications. Daily, during fish mix rock placement, the CQA officer will complete a Fish Mix Rock Placement CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. The CQA officer will verify, with a handheld tape, that fish mix rock is placed to the minimum dimensions required by the plans and that the rock is placed without damaging underlying fabrics.

Each day on which placement of structural fill is conducted, the CQA officer will complete a Structural Fill Placement CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. During structural fill placement activities, in situ moisture-density test results will be obtained by the Port's geotechnical consultant or proof rolls will be observed by the geotechnical consultant. The test results will be recorded by MFA and reviewed to ensure that the minimum compaction described in the plans and specifications is achieved.

Each day on which placement of topsoil overlay takes place, the CQA officer will complete a Topsoil Overlay Placement CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. The CQA officer will verify, with a handheld tape, that topsoil is placed to the minimum thicknesses required by the plans and that the final surface is track walked two times.

If at any time the CQA officer determines that the Contractor is out of compliance with the plans and specifications, the CQA officer will stop the work immediately until the issue is remediated to the satisfaction of the Design Engineer.

3.11 Paving

The existing gravel trail surrounding Carty Lake is required to be paved with hot mix asphalt (HMA). Section 32 12 16 of the specifications provides requirements for asphalt paving operations, and the plans show required cross sections and grades. Prior to paving, MFA will review the Contractor's job mix formula and will check for conformance with the specifications. MFA's on-site CQA officer will verify that the subgrade is adequately graded for paving operations, and that it is in general accordance with the lines and grades shown on the plans. While paving is under way, the CQA officer will verify that the HMA is placed to achieve the lines and grades called for on the plans. The CQA officer will verify, with a handheld tape, that the HMA is placed to the minimum compacted thickness shown on the plans. Daily, during paving operations, the CQA officer will complete the Paving CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. The Port's geotechnical consultant will be on site during paving activities to perform compaction testing of the subgrade and the paved surface.

MFA's on-site CQA officer will coordinate with the geotechnical consultant to verify that compaction required by the specifications is achieved.

3.12 Geotextile Installation

Various geotextiles are required for construction of portions of the work, including the stabilization embankment, the clean soil cap stockpile, and the refuge access road. Section 31 05 19 of the specifications describes the material specifications and workmanship requirements for the placement of all geotextiles required for the project. Each day on which geotextiles are being placed, the CQA officer will complete a Geotextile Installation CQA Form (see Appendix A) to document that materials and workmanship are in compliance with the plans and specifications. During installation, the CQA officer will visually verify that surfaces are smooth and free of objects that could damage the geotextile, and that minimum overlaps of geotextiles are achieved.

4 FIELD CHANGES

All design and field change requests from the Contractor must be made to MFA in writing in the form of an RFI. Change requests will be provided by MFA to the Port for review if requested by the Port. At the Port's direction, MFA will review changes to ensure that they conform to the performance standards and the design intent, are consistent with cleanup objectives, and are protective of human health and the environment. If the change request is approved, MFA will provide approval of the change to the Contractor in the form of a Change Order, in accordance with Part V, Section G-35 of the Contract.

4.1 Changes Authorized by Port

Upon review of Contractor-submitted RFIs or at any time necessary, the Port may authorize changes in the work. These changes will be authorized by Change Order consistent with the processes described in Part V, Section G-35 of the Contract.

4.2 Problem Identification and Corrective Measures

A problem is defined as material or workmanship that does not meet the requirements of the plans or specifications for the project, or as any obvious defect in material or workmanship. Upon identification of a problem, MFA will note the following information in the daily field notes and include pertinent information on the working as-built marked drawings with as much detail as possible, including the following:

- A location and applicable area or volume of the problem
- Description of the problem with sufficient detail and supporting sketches or photographic information to describe the problem

- When and by whom the problem was located, with reference to applicable inspections or a daily summary report
- Corrective measure(s) taken by Contractor
- Entity and person approving any corrective measure(s)

4.3 Problem or Work Deficiency Meetings

A special meeting will be held if and when a problem or deficiency is present or is likely to occur. At a minimum, the meeting shall be attended by MFA, the Contractor, and applicable subcontractors. Others, including the Port, may also attend at the request of MFA. The purpose of the meeting is to resolve the problem as expediently as possible by:

- Defining and discussing the problem or deficiency
- Reviewing alternative solutions
- Implementing an action plan to resolve the problem or deficiency

The meeting will be documented by MFA, and minutes will be distributed to the Port, the Contractor, and other appropriate parties within three days of the meeting.

5 QUALITY ASSURANCE AND QUALITY CONTROL DOCUMENTATION

During construction, MFA will be responsible for all CQA documents. This includes a copy of the project construction drawings, technical specifications, CQAP, submittals, plans, daily field notes, and reports. Duplicate digital records will be kept to avoid the loss of valuable information that would occur if the originals were destroyed. Field forms to be used by the CQA team are included in Appendix A.

5.1 Submittals

The submittal process is described in detail in Section 01 33 00 Submittal Procedures. The Contractor's QC reports, weekly status reports, record data, final field report, and all other submittal items will be submitted to MFA's on-site CQA officer. Submittals are classified as:

- SD-00: Bid Submittal
- SD-01: Preconstruction Submittal
- SD-02: Construction Submittal
- SD-03: Post-construction Submittal

MFA will review submittals from the Contractor for compliance with the plans and specifications. Submittal review codes will be used to indicate approval, revision requirements, and rejection. The code status will be tracked by MFA on the project submittal tracking form. MFA will coordinate communication of code status with the Port and the Contractor. The coding will be as follows:

- A—Reviewed No Exceptions
- B—Reviewed Exceptions Noted
- C—Revise and Resubmit
- D—Rejected

5.2 Inspections

Critical components of the work will be inspected by the on-site CQA officer before the Contractor is allowed to proceed. Inspections are described in detail in Section 3 and listed in Table 3-1.

5.2.1 Inspection of Materials

All materials, equipment, and/or supplies that arrive at the site will be visually inspected to ensure that the products are as ordered or as specified, and any deviations will be relayed to the Contractor and the Port immediately. As materials are received, they will be documented in the daily field notes and checked against approved material submittals. This documentation will be included with other inspection documentation for the purposes of completing the final completion report.

5.3 Inspection and Testing Records

All observations, results of field tests, and results of laboratory tests performed on or off site will be recorded in a suitable manner. Recorded observations may be in the form of notes, charts, sketches, photographs, or any combination thereof. As a minimum, the inspection documentation will include the following information:

- Description or title of the inspection activity with the date on which the activity was inspected
- Location of the inspection activity or location from which the sample was obtained
- Type of inspection activity and procedure used
- Recorded observation or test data
- Results of the inspection activity (e.g., pass/fail); comparison with specification requirements
- Personnel involved in the inspection besides the individual preparing the data sheet
- Signature of the CQA officer, accompanied by the date

In addition to Contractor-supplied documentation, MFA will generate daily field notes, weekly reports to Ecology, and a remedial action completion report, as described in the next section.

5.4 Final Reporting

The Port anticipates providing a completion report to Ecology within 90 days of demobilization of equipment from the site. In the report, the MFA project manager and the engineer of record registered in the State of Washington will state that the project has been constructed consistent with the design and specifications, as modified (if applicable), and the remedial action is complete consistent with the CAP (Ecology, 2013). The completion report will summarize the activities of the project and document all aspects of the QA program. At a minimum, the following information will be contained in the report:

- Copies of all QA/QC documentation
- A narrative describing the project's construction
- A description of all construction issues that arose and how they were resolved
- A description of any change orders
- A description of any changes from the plans and specifications
- A statement that the project has been constructed in substantial compliance with the plans, specifications, and related documents

LIMITATIONS

The services undertaken in completing this plan were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This plan is solely for the use and information of our client unless otherwise noted. Any reliance on this plan by a third party is at such party's sole risk.

Opinions and recommendations contained in this plan apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

REFERENCES

Ecology. 2013. Cleanup action plan, former Pacific Wood Treating Co. site. Washington State Department of Ecology. November 5.

MFA. 2014. Draft Carty Lake engineering design report. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. May 12.

TABLES

Table 2-1
Contact List
Carty Lake Sediment Remedy Project
Port of Ridgefield
Ridgefield, Washington

Contact Name	Title	Company	E-mail	Telephone	Cell Phone
Mr. Craig Rankine	Ecology Project Manager	Ecology	cran461@ecy.wa.gov	360.690.4795	N/A
Ms. Joyce Mercuri	Ecology Sediment Project Manager	Ecology	jmer461@ecy.wa.gov	360.407.6260	N/A
Ms. Laurie Olin	Director of Operations	Port	lolin@portridgefield.org	360.887.3873	N/A
Ms. Madi Novak	Project Manager	MFA	mnovak@maulfoster.com	503.501.5212	971.227.1060
Mr. Josh Elliott	Engineering Manager	MFA	jelliott@maulfoster.com	971.544.2139	503.953.6067
Mr. Mike Reiter	On-site CQA Officer	MFA	mreiter@maulfoster.com	360.433.0243	503.915.8169
Mr. Nathan Cutler	Contractor Project Manager	Strider Construction Co., Inc.	nathanc@striderconstruction.com	360.380.1234	360.739.2729

NOTES:
CQA = construction quality assurance.
Ecology = Washington State Department of Ecology.
MFA = Maul Foster & Alongi, Inc.
N/A = not applicable.
Port = Port of Ridgefield.

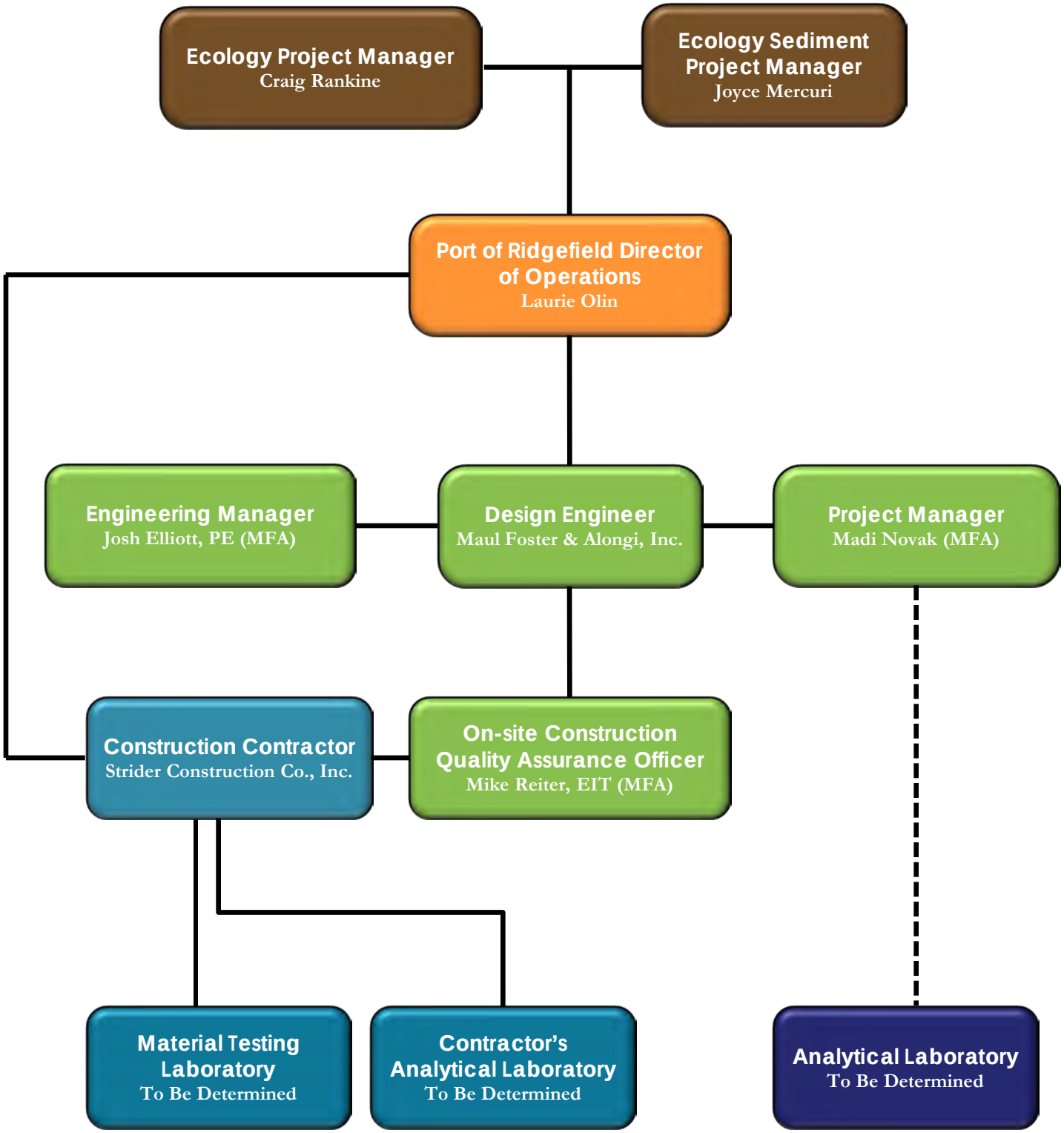
Table 3-1
CQA Activities
Carty Lake Sediment Remedy Project
Port of Ridgefield
Ridgefield, Washington

CQA Activity	Sequencing	Specification Reference	Plan Reference	Documentation Method
ESC BMP Verification	Before ground-disturbing work begins	01 57 13	C2.0.0 - C2.1.2	Construction Daily Report
Visual Turbidity Monitoring	Daily	01 57 19	N/A	Construction Daily Report
Water Quality Monitoring	Daily (turbidity), twice during first week of treated discharge (benzo(a)pyrene & PCP)	01 57 19	N/A	Construction Daily Report
Fugitive Dust Monitoring	Daily	01 57 19	N/A	Construction Daily Report
Clearing and Grubbing Verification	Daily, during clearing and grubbing operations	31 11 00	N/A	Construction Daily Report
Demolition and Debris Removal Verification	Daily, during demolition operations	02 22 40	C5.0	Construction Daily Report
Refuge Access Road Verification	Daily, during roadway construction	31 00 00	C6.3.0 - C6.3.1	Refuge Access Road CQA Form
Removal and Stockpile of Clean Soil Cap Verification	Daily, during cap removal operations	31 00 00	C3.2 - C3.3	Excavation & Stockpile of Clean Soil Cap CQA Form
Upland Sediment Handling Area Verification	Daily, during area construction	31 00 00	C3.4	Upland Staging & Sediment Handling Area CQA Form
Daily Sediment Excavation Inspection	Daily, during excavation operations	35 23 15	C5.1	Daily Sediment Excavation CQA Form
Clean Sand Placement Inspection	Daily, during placement operations	35 42 00	C6.0	Clean Sand Placement CQA Form
Structural Fill Placement Inspection	Daily, during embankment operations	35 42 00	C6.0 - C6.2.2	Structural Fill Placement CQA Form
Topsoil Overlay Placement Inspection	Daily, during placement operations	35 42 00	C6.0 - C6.2.3	Topsoil Overlay Placement CQA Form
Fish Mix Rock Placement Verification	Daily, during placement operations	35 42 00	C6.0 - C6.2.4	Fish Mix Rock Placement CQA Form
Geotextile Verification—Filter Fabric for Refuge Access Road	Daily, during geotextile installation	31 05 19	C6.3.1	Geotextile Installation CQA Form
Geotextile Verification—Filter Fabric for Stabilization Embankment	Daily, during geotextile installation	32 05 19	C6.0 - C6.2.2	Geotextile Installation CQA Form
Geotextile Verification—Liner for Clean Soil Cap Stockpile	Daily, during geotextile installation	33 05 19	C2.1.0	Geotextile Installation CQA Form
Geotextile Verification—Cover for Clean Soil Cap Stockpile	Daily, during geotextile installation	34 05 19	C2.1.0	Geotextile Installation CQA Form
Fish Mix Rock Material Source Inspection	Before material acceptance	35 42 00	N/A	Fish Mix Rock Material Source CQA Form
Paving Verification	Daily, during paving operations	32 12 16	C6.3.2	Paving CQA Form

NOTES:
Specifications are referred to by basic reference only.
BMP = best management practice.
CQA = construction quality assurance.
ESC = erosion and sediment control.
N/A = not applicable.
PCP = pentachlorophenol.

FIGURE

Figure
Organization Chart
Carty Lake Sediment Remedy Project
Port of Ridgefield
Ridgefield, Washington



APPENDIX A

CQA FORMS

MAUL FOSTER ALONGI

Clean Sand Placement CQA Form

Form Number: CSP-MMDDYY-MBR
Date:
Weather:
CQA Official:
South Embankment Approximate Stationing:
East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Has the clean sand been sampled and analyzed in accordance with specifications, and approved by MFA for use?	
	Has the clean sand been placed to the minimum thickness required by the plans (1')? Has any material placed outside the tolerances described in the specifications been documented or removed?	
	Has the clean sand been placed up to the plan-view extents shown on the plans?	
	Has compost been amended into the top 4 inches of the sand layer, as described in the specifications?	
	Has the clean sand been placed to generally conform with the grades and contours shown on the plans?	

Comments:

CONSTRUCTION DAILY REPORT
Carty Lake Sediment Remedy Project

Daily Report Number:	CLSR-072814-MBR		
Date:	7/28/2014		
Weather:	AM: Partly Cloudy		
	PM: Sunny		
Temperature:	Min:		
	Max:		
24hr Precipitation:		**Dust Conditions:**	Light
Completed by:	Mike Reiter, EIT	**Number of Contractor Employees**	
Contractor:		Supervisory / Operators / Laborers	

MAUL FOSTER ALONG
400 E. Mill Plain Boulevard, Ste. 400
Vancouver, WA 98665
360-694-2691

Work Performed Today

Location	Sub Location	Description of Work	Time Started	Time Ended
Upland Area	Upland Staging and Sediment Handling Area	Placement of Crushed Surfacing		
Remedy Area	Carty Lake	Sediment Excavation and Handlin		

CQA Officers on site: MBR

Additional Remarks:

Visual Turbidity Monitoring

Time	Turbidity Conditions	Remarks
8:00 AM		
12:00 PM		
4:00 PM		

Inspections and Tests

Inspection/Test Type	Location	Form No.

Additional Remarks:

Daily Report Number:	CLSR-072814-MBR		
Date:	7/28/2014	**Completed by:**	Mike Reiter, EIT

Subcontractors Onsite

Company Name:	**Work Area**	**Employees**
JL Storedahl & Sons		

Additional Remarks:

Visitors

Time	**Name(s)**	**Agency/Company**	**Remarks**

Additional Remarks:

Verbal Communications with Contractor

Time	**Name(s)**	**Remarks**	**Action Item?**

Additional Remarks:

CONSTRUCTION DAILY REPORT
Carty Lake Sediment Remedy Project

Daily Report Number:	CLSR-072814-MBR		
Date:	7/28/2014	**Completed by:**	Mike Reiter, EIT

Equipment Onsite

Contractor	Equipment	Quantity	Used Today?	Hours Used

Construction Issues Tracking

Location	Description	Resolution	Action Item?

Additional Remarks:

CQA Officer Signature	**Date**	**Project Manager Review**
	7/28/2014	

Daily Report Number:	CLSR-072814-MBR		
Date:	7/28/2014	**Completed by:**	Mike Reiter, EIT

Photos

Photo 1: Crushed rock placed on roadway

Photo 2: Lake River and shoreline

MAUL FOSTER ALONGI

Excavation and Stockpiling of Clean Soil Cap CQA Form

Form Number: ESCSC-MMDDYY-MBR
Date:
Weather:
CQA Official:
Location:

Procedure	Task	Verification
Monitoring	Has the clean soil cap been removed to the extents shown on the drawings, down to the existing demarcation fabric?	
	Was the subgrade surveyed and approved by MFA, prior to gravel placement?	
	Has the existing demarcation fabric been completely cut away and disposed of in accordance with the specifications?	
	Has material from below the demarcation fabric been completely segregated from material above the demarcation fabric?	
	Has the clean soil cap material been embanked into a stockpile in general accordance with the location shown on the plans?	
	Has the clean soil cap material been embanked on a liner, with sides not exceeding a 2:1 slope?	
	Has the clean soil embankment been covered in accordance with the plans and specifications?	

Comments:

MAUL FOSTER ALONGI

Fish Mix Rock Material Source CQA Form

Form Number: FMRSI-MMDDYY-MBR
Date:
Weather:
CQA Official:

Procedure	Task	Verification
Monitoring	Does the rock appear to be washed, clean, and free of roots, large organic material, contaminants, and other deleterious or objectionable material?	
	Does the rock appear to be well-graded, rounded to subangular gravel/cobble?	
	Does the rock appear to be 100% (by mass) less than 10-inch diameter and 10% (by mass) less than 3/4-inch diameter?	
	Does it appear that more than 20% of the rocks contain hairline cracks (cracks with a width greater than 0.1 mm) that are continuous for one-third the dimensions of at least two sides of the rock?	
	Has a written, notarized certification from the landowner of the source describing historical contamination been supplied to MFA in accordance with the specifications?	

Comments:

MAUL FOSTER ALONGI

Fish Mix Rock Placement CQA Form

Form Number: FMRP-MMDDYY-MBR
Date:
Weather:
CQA Official:
South Embankment Approximate Stationing:
East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Was the fish mix from the source previously inspected by MFA and approved for use? Does the fish mix appear to match the gradation of the sample provided by the Contractor?	
	Was the structural fill approved by MFA prior to placement of fish rock?	
	Has the fish mix rock been placed in a manner that will not cause segregation of the stone sizes, and such that the sediment subgrade was not significantly penetrated or disrupted?	
	Has the fish mix rock been placed to no more than 150% of the thickness specified on the drawings?	
	Has the embankment cross section been constructed to the general grades (3:1, 4:1, etc.) shown on the drawings?	
	Has the grade break been generally constructed at elevation 12.00 (NGVD 29/47)?	

Comments:

MAUL FOSTER ALONGI

Geotextile Installation CQA

Form Number: GI-MMDDYY-MBR
Date:
Weather:
CQA Official:
Geotextile Type: Stockpile Liner
Location:

Procedure	Task	Verification
Monitoring	Does the subgrade surface appear to be clean, smooth, at an appropriate moisture content, and free of protruding or sharp objects that could damage the geotextile?	
	Is the geotextile laid flat and smooth, with the minimum required overlap (12" for the stockpile cover, 6" for the stockpile liner and embankment filter fabric)?	
	Are the placement and coverage adequate and in conformance with the drawings?	
	Is the geotextile properly secured with adequate ballast to allow for material placement without undesirable movement of the geotextile?	
	Is the geotextile anchored as shown on the drawings?	

Comments:

MAUL FOSTER ALONGI

Paving CQA Form

Form Number: PI-MMDDYY-MBR
Date:
Weather:
CQA Official:

Procedure	Task	Verification
Monitoring	Has the existing gravel been removed as required by the plans?	
	Has the subgrade been shaped to conform to the grades and sections shown on the plans? Has the subgrade been compacted and verified by the geotechnical subconsultant?	
	Has crushed rock been placed to the minimum thickness shown on the plans (6") and compacted as required by the specifications?	
	Has the HMA been placed to the minimum thickness required by the plans (2.5") and compacted and verified by the geotechnical subconsultant as required by the specifications?	
	Is the finished asphalt surface free of cracking and other surface irregularities?	
	Are all reports generated by the geotechnical consultant attached to this form?	
	Does the final grade generally conform to the cross sections and grades shown on the plans?	

Comments:

MAUL FOSTER ALONGI

Refuge Access Road CQA Form

Form Number: RARI-MMDDYY-MBR
Date:
Weather:
CQA Official:
Stationing:

Procedure	Task	Verification
	Has the subgrade been shaped to conform to the grades and sections shown on the plans? Has the subgrade been compacted to 95% of the maximum density and verified by the geotechnical consultant?	
	Has the filter fabric been inspected and approved by MFA in accordance with the CQAP?	
	Was the fabric placed in general accordance with the cross sections shown on the drawings (including the 6" minimum overlap)?	
	Has crushed rock been placed to the minimum thickness shown on the plans (8") and compacted to 95% of maximum density, as required by the specifications and verified by the geotechnical consultant?	
	Are all applicable reports prepared by the geotechnical consultant attached to this form?	
	Does the final grade generally conform to the cross sections and grades shown on the plans?	

Comments:

MAUL FOSTER ALONGI

Daily Sediment Excavation Inspection CQA Form

Form Number: DSE-MMDDYY-MBR
Date:
Weather:
CQA Official:
South Embankment Approximate Stationing:
East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Has any contaminated sediment been tracked onto finished neatline surfaces?	
	Is the subgrade surface in general conformance with the lines and grades shown on the plans?	
	Is the subgrade surface smooth and free from protrusions, mounds, or dips?	
	Has all excavated sediment been loaded over a plastic liner into a lined truck bed and disposed of at an approved, Subtitle D landfill facility or transported to the sediment-handling area for disposal at a later date, or temporarily stockpiled in the excavation area with MFA's approval?	

Comments:

MAUL FOSTER ALONGI

Structural Fill Placement CQA Form

Form Number: SFP-MMDDYY-MBR
Date:
Weather:
CQA Official:
South Embankment Approximate Stationing:
East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Has the structural fill been sampled and analyzed in accordance with specifications, and approved by MFA for use? Does material placed below the OHW (El. +12 ft) contain less than 5% material passing the No. 200 sieve?	
	Was the filter fabric inspected and approved by MFA in accordance with the CQAP?	
	Has the structural fill been placed in uncompacted lifts of 12 inches maximum?	
	Has the structural fill been compacted to 95% of the maximum dry density as determined by AASHTO T-180 (modified proctor), or has a proof roll been performed and accepted by the geotechnical engineer?	
	Has the embankment cross section been constructed to the general grades (2.5:1, 3:1, 4:1, etc.) shown on the drawings?	
	Has the grade break been generally constructed at elevation 12.00 (NGVD 29/47)?	
	Has the keyway been constructed to the minimum dimensions shown on the drawings?	

Comments:

MAUL FOSTER ALONGI

Topsoil Overlay Placement CQA Form

Form Number: TOP-MMDDYY-MBR
Date:
Weather:
CQA Official:
South Embankment Approximate Stationing:
East Embankment Approximate Stationing:

Procedure	Task	Verification
Monitoring	Has the topsoil been sampled and analyzed in accordance with the specifications, and approved by MFA for use? Is it free from ice or mud, as required by the specifications?	
	Was the structural fill placement approved by MFA prior to topsoil placement?	
	Was the ground thawed, not excessively wet, and not in a condition detrimental to the work before topsoil placement?	
	Has the topsoil been evenly spread, and have all large clods, hard lumps, and rocks larger than 3 inches in diameter been removed and disposed of?	
	Has the topsoil been placed to the minimum thickness required by the drawings (18")?	
	Has the embankment cross section been constructed to the general grades (2.5:1, 2:1, etc.) shown on the drawings?	
	Has the grade break been generally constructed at elevation 12.00 (NGVD 29/47)?	
	Has the final surface been track walked with two passes, as required by the specifications?	

Comments:

MAUL FOSTER ALONGI

Upland Staging and Sediment-Handling Area Inspection CQA Form

Form Number: USSHA-MMDDYY-MBR
Date:
Weather:
CQA Official:
Location:

Procedure	Task	Verification
Monitoring	Was the upland contaminated subgrade surveyed and approved by MFA before any gravel placement?	
	Has the ballast been placed to the minimum required depth of 6"?	
	Has the crushed surfacing course been placed to the minimum required depth of 2"?	

Comments:

APPENDIX B

INADVERTENT DISCOVERY PLAN

Lake River Industrial Site
Final Archaeological Monitoring and Inadvertent Discovery Plan for the Carty Lake Remedial Action

1. Introduction

The former Pacific Wood Treating Company (PWT) operated a wood-treating facility from 1964 to 1993 at the Port of Ridgefield's (Port) Lake River Industrial Site (LRIS). The LRIS location is in Sections 13 and 24, Township 4 North, Range 1 West, Willamette Meridian, in Ridgefield, Washington. Operation of the facility led to deposits of hazardous substances (i.e., wood-treating-related chemicals) in nearby Lake River and Carty Lake. The proposed cleanup action for Carty Lake consists of mechanical excavation and a limited residuals cap in the southern portion of the lake.

The proposed cleanup actions involve coordination among one state and one federal agencies. The Washington Department of Ecology (Ecology) is the lead State agency for the cleanup under the Washington Model Toxics Control Act. Carty Lake is located in the Ridgefield National Wildlife Refuge; cleanup actions in Carty Lake would therefore require approval of the U.S. Fish and Wildlife Service (USFWS) and obtaining a Section 404 permit from the U.S. Army Corps of Engineers (USACE) under the Clean Water Act. Given the involvement of the two federal agencies, the proposed cleanup actions are subject to the provisions of the National Historic Preservation Act (NHPA) and its implementing regulations (36CFR800). As Carty Lake is on federal land, it is also subject to the provisions of the Antiquities Act, the Archaeological Resources Protection Act (ARPA), and the Native American Graves and Protection Act (NAGPRA) and their implementing regulations (43 CFR 7 and 43 CFR 10, respectively for ARPA and NAGPRA). In addition, the USFWS has internal policies and procedures for addressing cultural resources on its lands (614 FW 4 and 614 FW 5). The Washington Department of Archaeology and Historic Preservation (DAHP) has the lead responsibility for ensuring compliance with State laws that protect archaeological resources and Indian graves in Washington (RCW 25-48, 27.44, 27-53, and 68.60).

The area of potential effects (APE) for the proposed cleanup actions is approximately 5.5 acres in and around the southern tip of Carty Lake.

One precontact archaeological site has been identified in the immediate vicinity of the Carty Lake area, 45CL4 (Figures 1 and 2). Site 45CL4 was first recorded in 1948 (Smith and Hudziak 1948) and has been the subject several systematic field investigations since the 1970s (Abramowitz 1980:53; Bourdeau 2004:21; Minor and Toepel 1984:4, 42; Reese et al. 2012:3, 6; Ross and Starkey 1975:21; Saul 1976). Most of these studies addressed only that portion of the site that is presently situated on the Ridgefield National Wildlife Refuge. The site boundaries were extended to the south of the refuge and into the former PWT location only recently (Reese et al. 2012). Site 45CL4 has been subject in the past and continues to be subject to considerable erosion, with artifacts present on the beach at both sites.

In 2013, WillametteCRA conducted a cultural resources survey for accessible areas of the proposed Carty Lake remedy area and locations of ground disturbance associated with the proposed excavation. The area was generally characterized by very poor surface visibility. The survey therefore included excavation of 19 subsurface probes. The only cultural resource identified in the field investigation was a red cryptocrystalline silica (CCS), early core reduction flake with cortex encountered in a probe. This archaeological isolate was recommended to not be a significant resource (Gilmour et al. 2013).

1.1. Agency and Tribal Consultation and Coordination

Agency and Tribal consultation was conducted; documentation is provided in Attachment A.

1.2. Previous Archaeology

Presented below is a summary of the available information on the two sites that have been previously documented within the Carty Lake area and immediate vicinity. Figures 1 and 2 provide an overview of site locations; Figure 3 presents more details on the extent of previous archaeological studies at 45CL4.

1.2.1. Site 45CL4

Site 45CL4 was first recorded in 1948, when it was reported to have been a "large site" based primarily on informant statements but was also recommended as "not worthwhile to dig further" (Smith and Hudziak 1948). No further work is known to have been undertaken at the site until the mid-1970s, when the site was revisited and proposed as the location of the Quath-la-potle ("Cathlapotle" is now the preferred spelling) village visited by Lewis and Clark in 1806. An effort was undertaken to place 45CL4 on the National Register of Historic Places because of this association (Saul 1976). Objections were raised to the attribution of the site as Cathlapotle. To better determine the character of the 45CL4 deposits, the University of Washington conducted the first professional excavations at the site. Those excavations indicated evidence of intensive occupation, and the report concluded that the site "*could*" (italics in original) represent a village and was "probably Quathlapotle" (Abramowitz 1980:50-52).

The question of whether 45CL4 was Cathlapotle thus remained unclear. In 1984, excavations conducted by Minor and Toepel determined that the site consisted of a series of small campsites occupied as early as circa AD 30-60 but with occupation intensifying after circa AD 1200 and continuing into the era of Euroamerican contact (Minor and Toepel 1985:76-80). Minor and Toepel were the first researchers to establish that 45CL4 is likely where members of the Lewis and Clark Expedition camped on the evening of March 29, 1806, after visiting Cathlapotle (Minor and Toepel 1985:19). Their research thus resolved that the site was not Cathlapotle. Lewis and Clark (Moulton 1991:30) described their campsite as "where the nativs [sic] make a portage of their Canoes and

Wappato [sic] roots to and from a large pond at a Short distance." The "large pond" is likely to have been Carty Lake, and 45CL4 has become known as the "Wapato Portage" site (Bourdeau 2004).

No further fieldwork was undertaken at 45CL4 until 1999, when the USFWS and US Geological Survey conducted a magnetometer survey, subsurface coring, and backhoe trenching to address a proposed bank stabilization project following severe erosion in the northern site area during the 1996 winter flood. This study provided more information on the evolution of the site landscape (Bourdeau 2004).

The most recent fieldwork at 45CL4 was in 2012, when Archaeological Investigations Northwest monitored regrading of the upland portion of the PWT site. Archaeological deposits were encountered during the regrading, which led to excavation of four trenches to identify site boundaries within the upland PWT area to minimize or avoid further disturbance of the deposits. This discovery led to formal extension of the southern boundary of 45CL4, the first time the site has been documented outside the Ridgefield National Wildlife Refuge. Radiocarbon dates from the 2012 field investigations indicated the southern portion of the site was occupied between circa 200-300 years ago (Reese et al. 2013).

Major erosion has occurred and continues to occur at 45CL4. The first formal recording of this site in 1948 characterized the site as badly affected by "much erosion by river," and an informant at the time stated that when steamers passed on the river by the site in the early 1900s artifacts would be exposed as their wakes eroded the banks (Smith and Hudziak 1948). Major erosion of site deposits has been noted in almost every subsequent visit and field study at the site (Abramowitz 1980:53; Bourdeau 2004:21; Minor and Toepel 1984:4, 42; Reese et al. 2012:3, 6; Ross and Starkey 1975:21; Saul 1976). Artifacts observed on the beach over the past 64 years have included fire-cracked rock, lithic debitage, complete and fragmentary projectile points, hammerstones, cobble choppers, a maul, and other tools or tool fragments.

There appears to be some confusion regarding the possible presence of burials at 45CL4. There are informant reports of burials at the nearby site of 45CL1(Abramowitz 1980:34; Ross and Starkey 1975:10), which has been confirmed as the location of the Cathlapotle village. There are, however, no direct references to burials at 45CL4 other than Ross and Starkey (1975:19) state that the burials at 45CL1 might be associated with 45CL4. However, this statement was based on the assumption at the time that 45CL4 was the Cathlapotle village site. The DAHP records on WISAARD list the site as a cemetery and state that burials and human remains have been reported at the site. None of the available reports, other than those cited above, make any reference to burials or remains at the site.

Site 45CL4 is listed on the National Register of Historic Places as a contributing resource in the Vancouver Lakes Archaeological District.

1.2.2. Site 45CL286H

This site was recorded during the 1979 University of Washington fieldwork on the Ridgefield National Wildlife Refuge. It is an extensive scatter of historic-period debris that appears to date to the mid- to late nineteenth century. The archaeological deposits extend along the eastern edge of Carty Lake and some materials may extend into lake itself. The site may be associated with a Carty family residence near the southeast shore of Carty Lake in the late 1800s (Abramowitz 1980:39; Abramowitz and Larson 1979). No archaeological investigations are known to have been undertaken at this site since it was recorded in 1979.

2. Proposed Cleanup Actions

2.1. Carty Lake

Proposed cleanup actions for Carty Lake consist of the following four elements:

1. Mechanical excavation of sediments exceeding remediation levels in the southern portion of the lake. The excavation area would be isolated from the rest of Carty Lake and construction would be conducted "in the dry." Excavated material will be placed in trucks for land transport as nonhazardous material waste to a Subtitle D landfill facility.
2. Placement of a limited residuals cap in the southern portion of the lake, which would consist of an approximately 1foot-thick clean sand layer.
3. Construction of a berm on the Carty Lake side of an existing bulkhead to stabilize the bank.
4. Planting of the excavation and clean sand area and the berm with native species.

The proposed excavation and sand cap area in Carty Lake and the proposed berm are indicated in Figures 4 and 5.

In addition to the cleanup action in the lake, it will be necessary to improve access to southern Carty Lake, which would probably include clearing and grubbing and construction of a staging area.

3. Archaeological Monitoring

Based on current information, the cleanup actions proposed at this time would not impact significant archaeological resources.

As described above, WillametteCRA conducted a survey of the current Carty Lake project area in 2013. The only evidence of archaeological or historical resources was one artifact documented in

a subsurface probe. Given the potential for encountering additional artifacts in the excavation in Carty Lake, agencies and Tribes have requested that the excavation activity be monitored by a qualified archaeologist. Tribal monitors may also monitor the excavation activity. The monitoring will be undertaken within the framework of procedures defined below.

The following procedures have been developed to address potential inadvertent discoveries of archaeological objects and sites and Indian and historic graves and human remains to ensure compliance with the relevant federal and Washington archaeological and cultural resource laws and regulations (36 CFR 800, especially 36 CFR 800.13; RCW 27.44, 27.53, and 68.60 and Washington Administrative Code [WAC] 25-48) for cleanup actions on non-federal lands. These procedures would also address inadvertent discoveries of archaeological resources, burials, or human remains during cleanup-related activities on the Ridgefield National Wildlife Refuge to ensure compliance with the NHPA, ARPA, and NAGPRA and their implementing regulations (36 CFR 800, 43 CFR 7, and 43 CFR 10, respectively).

3.1. Professional Archaeologist On-Site: Carty Lake Cleanup

The Port will retain the services of a professional archaeologist as defined in RCW 27.53.030(8) and who also meets the Professional Qualifications Standards of the Secretary of the Interior's Standards and Guidelines in Archaeology and Historic Preservation. The archaeologist will provide on-site monitoring during all activity associated with cleanup actions that would involve potential disturbance of native soils. The archaeological monitor will coordinate his or her monitoring actions with Tribal monitors who may also be present.

3.2. Carty Lake Cleanup

Field studies to determine if archaeological resources present in areas in which cleanup actions are proposed at Carty Lake were conducted in 2013. The only resource identified was a piece of lithic debitage. However it should be assumed that archaeological monitoring of the excavation and berm construction will be required. Monitoring of the excavation will employ the following procedures. The archaeological monitor would inspect excavated sediments as they are deposited in trucks prior to transport to the disposal facility. Upon discovery of a suspected archaeological object or other evidence of an archaeological resource, the archaeological monitor—at his/her discretion—may temporarily halt the excavation activity. The objective of this halting is to allow the archaeologist to confirm and/or make a preliminary assessment of the discovery. Precontact artifacts or possible precontact artifacts encountered during excavation activity will be recovered and their locations or approximate locations documented in fieldnotes, maps, and photographs. Modern debris would be noted but not collected.

The archaeological monitor will also observe all ground-disturbing activity associated with construction of the berm. Upon discovery of a suspected archaeological object or archaeological

site, the monitoring archaeologist—at his/her discretion—may slow or halt the excavation or other ground-disturbing activities. The objective of this slowing or halting of ground-disturbing activity is to allow the archaeologist to confirm and/or make a preliminary assessment of the discovery.

Should the monitoring archaeologist determine that a possible intact cultural resource has been encountered, he or she may direct the immediate cessation of all ground-disturbing activity in the vicinity of the discovery. The monitor will promptly notify the USFWS of the discovery. The USFWS will promptly notify the appropriate Tribes, the USACE, and the DAHP of the find. The monitor and the USFWS will coordinate to determine when and where work can continue. The USFWS, in consultation with other appropriate agencies and Tribes will make the decision whether any finds are significant resources. Contact information is provided in Attachment B

At the request of the monitoring archaeologist, the Port will assist in securing access to the location of the discovery and take appropriate measures to protect the location of the discovery from rain, stormwater, and other possible disturbances.

In the event that likely or confirmed human remains are encountered, the monitoring archaeologist will be responsible for immediately notifying the USFWS. The USFWS will then be responsible for implementing the requirements of 43 CFR 10.4. All activity must cease that may cause further disturbance to those remains and the area of the find must be secured and protected from further disturbance and exposure to rain, wind, etc. The remains should not be touched, moved, or further disturbed. Any further ground-disturbing activity in the vicinity of the vicinity may not proceed without authorization from the USFWS.

3.2.1. Other Actions

Artifacts associated with 45CL4 are present on the beach within the area proposed for bank stabilization. Prior to placement of the armor, the Port will retain the services of a professional archaeologist to systematically map the distribution of artifacts on the beach within the area to be armored. Temporally and functionally diagnostic artifacts, sacred objects, and objects of cultural patrimony will be collected. The disposition of these artifacts will be determined in consultation with the USACE, DAHP, and the Tribes.

4. Confidentiality

The Port shall make its best efforts, in accordance with state law, to ensure that its personnel and contractors keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential. Contractors and agency personnel are prohibited from contacting the media or any third party or otherwise sharing information regarding the discovery

with any member of the public, and to immediately notify the Port and direct any inquiry from the media or public. Prior to any release, the Port, the USFWS, the USACE, and the Tribes shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release, to the extent permitted by law.

5. References

Abramowitz, Alan
1980 *Cultural Resources Assessment of the Carty Unit, Ridgefield Wildlife Refuge, Clark County, Washington.* Prepared by the Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Seattle. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon, under contract number 14-16-0001-7917S. On file, Washington DAHP, Olympia.

Abramowitz, Alan, and L. L. Larson
1979 Cultural Resources Site Survey Record for Site 45-CL-286H. On file, Washington DAHP, Olympia

Bourdeau, Alex
2004 *Geologically Complex; The Flood Plain of the Lower Columbia River, Results of Research in Support of the Wapato Portage (45CL4) Cutbank Stabilization Project. Ridgefield National Wildlife Refuge, Clark County, Washington.* U.S. Fish and Wildlife Service, Sherwood, Oregon.

Gilmour, Daniel, Caitlin A. Wichlacz, Michael A. Daniels, and David V. Ellis
2013 *Cultural Resources Survey Report for the Proposed Carty Lake Remedial Action, Clark County, Washington*. WillametteCRA Report 12-35. Prepared for the Port of Ridgefield and the U.S. Fish and Wildlife Service.

Minor, Rick, and Kathryn Toepel
1984 *Archaeological Investigations at 45-CL-4, Ridgefield National Wildlife Refuge, Ridgefield, Washington.* Report No 37. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon, under contract number FWS No. 14-16-0001-84082. On file, Washington DAHP, Olympia, Washington.

Moulton, Gary E. (editor).
1991 *The Journals of the Lewis and Clark Expedition*. Volume 7. University of Nebraska Press, Lincoln, Nebraska and London.

Reese, Jo, Kristen A. Fuld, Michele Punke, and Vemon J. Veysey
2013 *Archaeological Monitoring of the Port of Ridgefield's Millers' Landing Project, Cell 2 Area, Clark County, Washington*. Archaeological Investigations Northwest Report No. 3061. Submitted to the Port of Ridgefield.

Ross, Lester A., and Judy Starkey
1975 Archaeological Survey of Lower Lake River and Bachelor Island Slough, Clark County, Washington. Oregon Archaeological Society, Portland.

Saul, Susan
1976 National Register of Historic Places Property Photograph Forrn. Quathlapotl Village, CL4. National Park Service, Washington, D.C.

Smith, Clarence, and Robert Hudziak
1948 University of Washington Archaeological Field Form, Site Survey Form, CL4. University of Washington, Seattle.

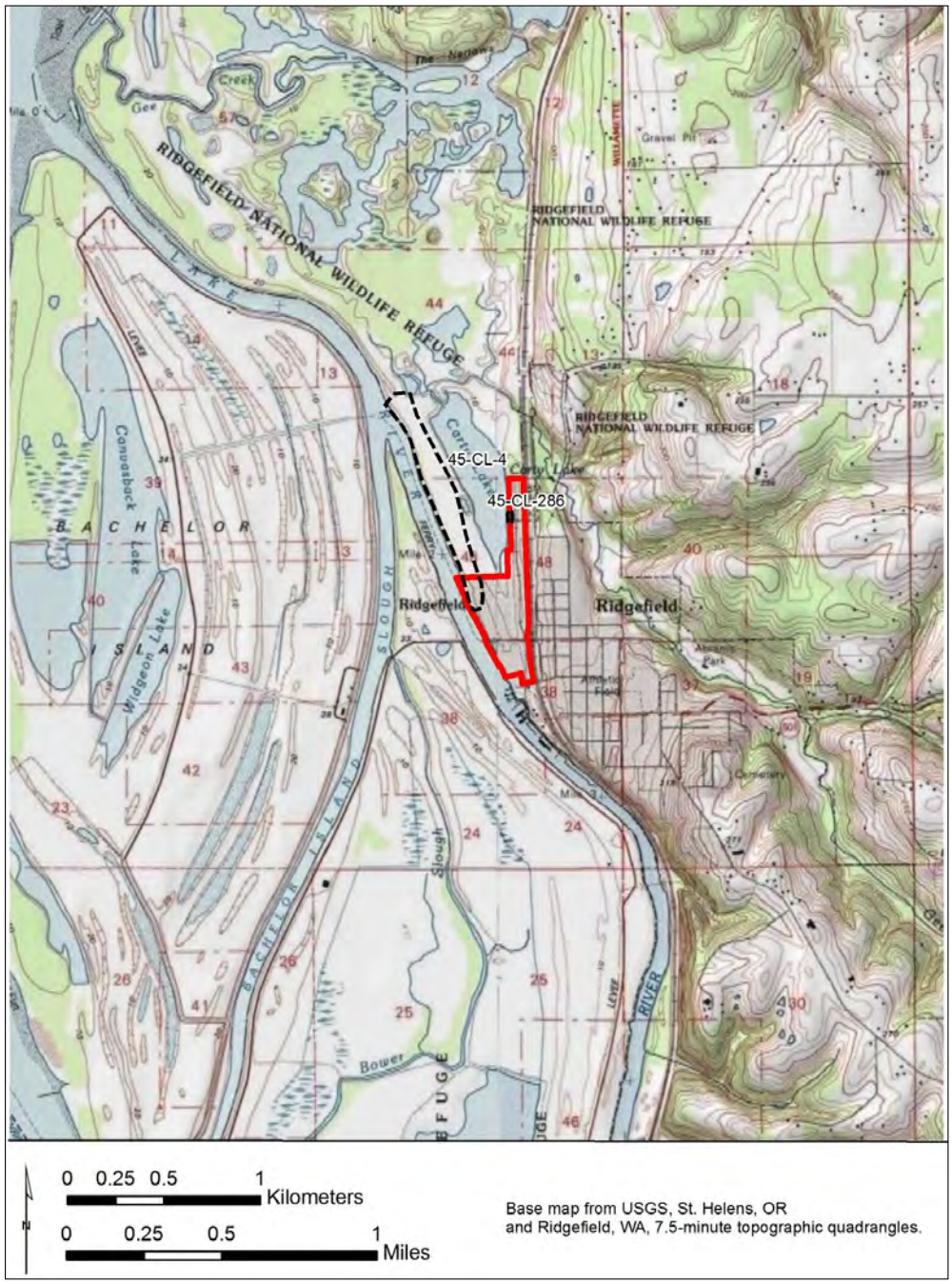


Figure 1. Location of LRIS-Carty Lake project area.

Figure 2. Locations of previously recorded archaeological sites in the Carty Lake area.

Figure 3. Previous archaeological investigations in the Carty Lake area.

Figure 4. Maximum extent of the Carty Lake dredge area.

Figure 5. Proposed location of berm construction and associated features at Carty Lake.

Attachment A

Agency and Tribal Consultation Documentation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
20555 SW Gerda Lane
Sherwood, Oregon, 97140
Phone: (503) 625-4377 FAX: (503) 625-4887

In Reply Refer To:
NWRS/DNCR/CRT

16 June 2014

Memorandum

To: Christopher Lapp, Project Leader,
Ridgefield NWR

From: Nick Valentine
NWRS/NCR/Cultural Resources Team

Subject: Section 106 Compliance: **Carty Lake Remediation**

Thank you for requesting our assistance in fulfilling the U.S. Fish and Wildlife Service's (Service) Section 106 compliance responsibilities for the Carty Lake Remedial Action Project, Pacific Wood Treating Sediment Cleanup Project being conducted by the Washington Department of Ecology (WADOE) in cooperation with the Port of Ridgefield, US Army Corps of Engineers (ACOE), and the US Fish and Wildlife Service (USFWS)..

This project is located in Clark County, in T4N, R1W, Sections 13 and 24.

Cultural resource consultation was completed on 12 June 2014.
Full compliance will be achieved with the completion of the project and associated archaeological monitoring efforts discussed below.

Undertaking and Area of Potential Effects:
The Service is working with the Port of Ridgefield, ACOE, WADOE, and Washington Department of Fish and Wildlife to effect remediation of contaminates that have migrated from the former Pacific Wood Treatment Company(PWT). The Project will require construction of a temporary berm across Carty Lake to allow for dewatering of the contaminated portion, excavation of the contaminated soil, placement of a clean sand cap, enhancement of an existing bulkhead separating the Refuge property from the former PWT property and construction staging area.

The Area of Potential Effects (APE) is approximately five and one half (5.5) acres in and around the southern tip of Carty Lake (Figure 1). Soil removal will occur over one and one half (1.5) acres. The archaeological site 45CL4, also known as Wapato Portage is reported to the immediate west of the APE.

Tribal Consultation
The remediation of contaminates from the Pacific Wood Treatment Plant has been in the planning process for several years. Various meeting to discuss the process have occurred with Native American tribes present. The latest general project meeting was held on June 5, 2013. No comments regarding cultural resources have been provided directly to FWS. Indirect and informal comments about the proximity to known resources and the potential for new discovery have been received. None of the early meetings specifically addressed Section 106 of the National Historic Preservation Act (NHPA).

Copies of the professional archaeological survey report were supplied to the tribal chairs and cultural resource professionals of the Cowlitz Indian Tribe, Confederated Tribes of Grand Ronde and the Yakama Nation on January 27, 2014.

A letter offering Government to Government consultations specific to NHPA were sent out on April 15, 2014 to the Cowlitz Indian Tribe, Confederated Tribes of Grand Ronde and the Yakama Nation. Briece Edwards of the Confederated Tribes of Grand Ronde requested additional information. He was supplied with the IDP and the survey report on May 1, 2014. On June 1, 2014 dAVe Burlingame requested a site visit during the week of June 16, 2014. Arrangements are being made for the site visit.

DAHP Consultation
The FWS is requesting that the WA DAHP concur that isolate 12-35-1-IF is *not eligible* for listing on the NRHP and that the project activities in the APE as described above will therefore have a "No Historic Properties Effected" outcome. Further FWS stipulates that activities will be monitored by a professional archaeologist and a IDP will be in place.

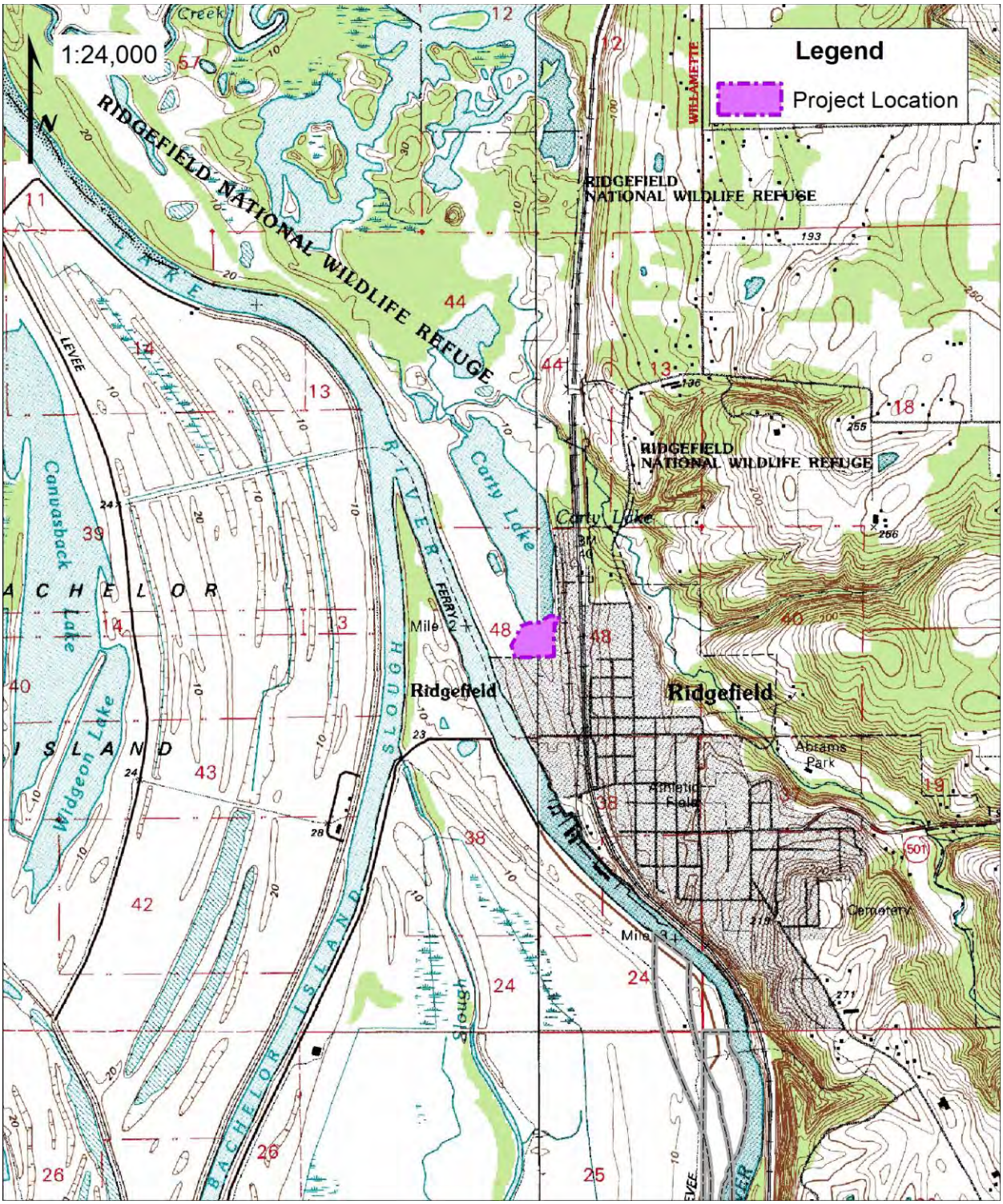
Monitoring
Following the consultations with SHPO the Service will have a professional archaeologist, one that meets the Secretary of Interior Standards for Historic Preservation, on site to recognize if and when a buried archaeological site is discovered during construction.

Should a discovery be made all work in the immediate vicinity will cease. The archaeologist will review the find and determine a buffer zone. The buffer zone will vary with the nature of the find, the location and the specific action occurring, but will be sufficient to protect the find from further disturbance. The archaeologist will contact consulting parties and otherwise begin to implement the Inadvertent Discovery Plan.

Attachment:
DAHP Response letter
APE Map

Carty Lake Remedial Action. Ridgefield, NWR

Area of Potential Effects



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

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

June 12, 2014

Mr. Anan Raymond
US Fish & Wildlife Service
20555 Gerda Lane
Sherwood, Oregon 97140

Re: Carty Lake Remedial Action Project
Log No: 092512-03-USFWS

Dear Mr. Raymond:

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Carty Lake Remedial Action Project within the Ridgefield National Wildlife Refuge, Clark County, Washington.

We concur with the determination of No Adverse Effect and the stipulation for professional archaeological monitoring. Please provide the monitoring report when available.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and the concerned tribes and this department notified

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

Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: *rob.whitlam@dahp.wa.gov*

Attachment B

Contact Information for Inadvertent Discovery Plan

Name	Affiliation	Phone
Laurie Olin	Operations Director Port of Ridgefield	360-887-3873
Josh Elliot	Construction Engineering Manager - MFA	503-953-6067
Connor Lamb	Construction Engineering Manager - MFA	360-977-8056
Lance Lundquist	Archaeologist USACE-Seattle	206 764-6909
Nick Valentine	Archaeologist USFWS	503 625-4377
Rob Whitlam Guy Tasa	State Archaeologist State Physical Anthropologist DAHP	360 586-3080 360 586-3534
	Clark County Sheriff's Dept	360 397-2211
Dennis J. Wickham, M.D.	Clark County Medical Examiner	360 397-8405
Kate Valdez Johnson Meninick	Tribal Historic Preservation Officer Cultural Resources Program Manager Yakama Nation	509 985-7596 509 685-7203
Dave Burlingame Nathan Reynolds	Cultural Resources Director Ethnoecologist Cowlitz Tribe	360 577-6962 360 577-8140
Briece Edwards	Archaeologist Grand Ronde Tribe	503 879-2084
Ray Gardner	Tribal Council Chair Chinook Indian Nation	360 875-6670