US Army Corps of Engineers
Portland District

PUBLIC NOTICE
for PERMIT APPLICATION

Issue Date: July 16, 2010
Expiration Date: August 15, 2010
Corps of Engineers Action ID: NWP-2007-832
30 Day Notice Oregon Department of State Lands Number: 44953 RF

Interested parties are hereby notified that an application has been received for a Department of the Army permit for certain work in waters of the United States, as described below and shown on the attached plan.

Comments: Comments on the described work should reference the U.S. Army Corps of Engineers number shown above and should reach this office no later than the above expiration date of this Public Notice to become part of the record and be considered in the decision. Comments should be mailed to the following address:

U.S. Army Corps of Engineers
ATTN: CENWP-OP-GP (McMillan)
P.O. Box 2946
Portland, Oregon 97208-2946

Applicant: Port of Newport
Attn: Mr. Don Mann, General Manager
600 SE Bay Boulevard
Newport, OR 97365

Location: The project is located on the north side of the Yaquina Bay (Bay) and estuary, Yaquina River Mile (RM) 2.2, in Newport, Lincoln County, Oregon (Section 9, Township 11 South, Range 11 West). The dredged material disposal site is located on the north side of the Bay (RM 2.5) on McLean Point, east of the project area, in Newport, Oregon (Section 9, Township 11 South, Range 11 West). The mitigation area is located on the south side of the Bay (RM 1.5) in Newport, Oregon (Section 8, Township 11 South, Range 11 West).

Project Description: The renovation of the International Terminal (Terminal) includes the full remediation of two ships [S.S. C.W. Pasley (Pasley) and S.S. Francois Hennebique (Hennebique)], the complete removal of the Pasley from the Bay, the removal of a portion of the upper deck of the Hennebique, the demolition of existing structures (in-water as well as upland), the installation of a permanent bulkhead wall around the bow of the Hennebique, the construction of two new docks (east and west dock), as well as the construction of a new Port of Newport (Port) building and warehouse. Dredging and excavation will be conducted to provide appropriate depths for large commercial fishing ships and Newport's distant-water fishing fleet. Riprap will be used for slope stabilization. Typical construction equipment will include: excavators, backhoes, compactors, dump trucks, barges, and dredging equipment.

The Port will conduct the project in three phases over four years. Phases I and II will utilize the existing construction budget, while Phase III will utilize value engineered dollars discovered from Phases I and II, or from additional funding sources. Project elements are described in greater detail below. The anticipated project schedule appears in Table 1, below. Proposed project impacts to waters of the U.S. and increase in aquatic habitat are summarized in Table 2, below.

Table 1. Implementation Schedule. [Construction of the upland facilities will begin during summer 2010. The in-water work will be completed during the Oregon Department of Fish and Wildlife-recommended in-water work period (IWWP) from November 1 – February 15. It is anticipated that construction will be completed by spring 2014.]

Construction Activity	Month(s)
PHASE I	
2010/2011	
Construct new Terminal office building and warehouse	June 2010 – November 2010
Repair and upgrade existing timber fishing dock to ensure safe, continued use during construction of the west dock	July 2010 – December 2010
Construct permanent bulkhead wall behind the Pasley	August 2010 – September 2010
Perform soil stabilization of the upland area behind the Pasley and the Hennebique	September 2010 – October 2010
Construct the temporary sheet pile wall around the Pasley	November 2010 – December 2010
Dredge at the west end of the proposed west dock	November 2010 – February 2011
Demolish Terminal office building and warehouse	November 2010 – December 2010
Demolish high timber dock	December 2010
Remediation and demolition of the Pasley and the remediation of the Hennebique	January 2011 – August 2011
2011/2012	
Installation of the pier piles and west dock	August 2011 – January 2012
PHASE II	
Construct permanent bulkhead wall at the bow of the Hennebique and remove a portion of the upper deck of the bow	November 2011
Dredge remaining area at east end of Pasley and in front of the Hennebique	November 2011 – February 2012
Demolish a portion of the roll-on/roll-off (RO-RO) dock	November 2011 – December 2011
Placement of fill behind the bulkhead wall for stabilization of the bow of the Hennebique	November 2011 – January 2012
Removal of the sheet pile wall around the Pasley	January 2012 – February 2012
Install fender piles at the bow of the Hennebique	January 2012 – February 2012
PHASE III	
Demolish the remainder of the RO-RO dock	November 2012
Drive new piles through the east dock	November 2012 – January 2013
Installation of center dock piles	December 2012 – January 2013
2012/2013	
Install fender piles at east dock	January 2013 – February 2013
Installation of the mooring dolphin piles	January 2013 – February 2013
Construct new east dock over the existing timber fishing dock	February 2013 – October 2013
Construct the deck over the center dock	August 2013 – October 2013
2013/2014	
Remove existing wood pier from below the existing timber fishing dock	November 2013 – February 2014

Table 2. Project Removal and Fill Volumes. [Includes both estuarine restoration and impacts resulting from the project. The project results in a net gain in subtidal, estuarine habitat and an overall reduction in dock area; a minor impact to eelgrass (0.03 acre) would result from the placement of riprap to protect the west dock structure.]				
REMOVAL OF STRUCTURES AND S.S. PASLEY				
Activity	**Square feet (ac)**		**Volume (cubic yards)**	
	Fill	**Removal**	**Fill**	**Removal**
East Dock	--	485*	--	--
RORO dock	--	75*	--	--
High Timber Dock	--	96*	--	--
Removal of the Pasley	--	12,000**	--	18,400**
Total	--	**12,000 (0.28 ac)**	--	**18,400**
PLACEMENT OF PILES/ STRUCTURES				
East Dock, Center Dock, West Dock, Fender and Dolphin Piles	439*	--	--	--
Permanent bulkhead wall within water column	2,100	--	2,100	--
Total	**2,100 (0.05 ac)**	--	**2,100**	--
IMPACTS TO WATERS (PERMANENT)				
Dredging (Behind Temp. Sheet Pile Wall)	--	25,400	--	11,000
Dredging (Outside of Temp. Sheet Pile Wall)	--	23,700	--	4,400***
Potential Over-dredging (to address contaminated sediment within dredging area and for potential fill for cap over contaminated area)	--	1,700	150	300
Removal of Riprap	--	1,413	--	157
Placement of Riprap	17,300	--	2,400	--
West end Stormwater Outfall Pipe	124	135	5	5
East end Stormwater Outfall Pipe	181	216	7	8
Total	**17,605 0.40 (ac)**	**52,564 (1.21 ac)**	**2,562**	**15,870**
* - Overwater structure area from the removal or installation of a dock surface, not fill; typically, removal of overwater structures is considered beneficial to juvenile salmon. ** - Removal of the Pasley will result in the restoration of estuarine habitat in the Bay. Approximately 0.28 acre of intertidal and subtidal estuary, and approximately 18,400 cubic yards (cy) of estuarine water column, will be restored. *** - Approximately 0.54 acre of subtidal estuarine habitat will be dredged; no habitat conversion will occur as a result of the dredging.				

IN WATER WORK AND FACILITIES:

Repairing and Upgrading Existing Timber Fishing Dock (East Dock): Repairs to the existing timber fishing dock (east dock) will occur in Phase I. Repairs to the dock are necessary to ensure the dock remains serviceable during remediation and demolition activities, as well as during construction of the west dock. The dock's deck will be covered in plywood for additional structural support, allowing heavy equipment operations on the deck. Currently, steel sheets on the deck are used to service the fishing fleet. The sheets will be rearranged and additional sheets brought in as necessary, to continue providing service to the fishing fleet. Small areas of the timber deck will be removed and replaced, as the addition of plywood will not provide enough structural support. This work will be done by hand, using a forklift to handle materials if necessary. This action does not require in-water work. A containment system will be installed under the dock structure to prevent debris from entering the Bay.

<u>Constructing a Permanent Bulkhead Wall:</u> A permanent bulkhead will be constructed behind (i.e. north of) the Pasley. Once the entire project is complete, this wall will serve as a bulkhead in front of the new west dock as well as providing support for the Hennebique. The permanent bulkhead wall will be approximately 632-feet long.

The bulkhead wall will be extended to the east in front of the Hennebique's bow at the start of the 2011 IWWP. Once the upper portion of the bow is removed (described below), the bulkhead wall will provide stabilization for the new center dock. This will provide a stable area that will be graded and paved to match the existing adjacent upland elevation.

<u>Dredging and Disposal of Materials:</u>

- *Dredging Dimensions:* The construction of the new west dock requires dredging inside the temporary sheet pile wall. Approximately 11,000 cubic yards (cy) of material will be excavated from 0.60 acres. Excavation will occur once remediation and demolition of the Pasley has been completed.

  The construction of the new west dock requires dredging outside of the temporary sheet pile wall during Phase 1. Approximately 4,400 cy of material will be dredged from 0.54 acres from the west end of the dock. Dredging at the east end of the dock will occur during Phase II.

- *Dredged Material Composition:* Dredged material was characterized using methods found in the 2009 *Sediment Evaluation Framework for the Pacific Northwest* (SEF). The SEF is a regional guidance manual that is used to determine the suitability of dredged material for unconfined, aquatic placement; it can also be used to evaluate the suitability of the post-dredge surface for unconfined, aquatic exposure. Even though in-water placement is not proposed for this project, the sediment quality data can be used to determine upland disposal options under the Oregon Department of Environmental Quality's (DEQ's) Solid Waste Program.

  Fines in the dredge prism ranged from 22.0% to 58.5% (sands and coarser particles ranged from 41% to 74%). Approximately 600 cy of sediment beneath the high timber (west) dock contained several different polycyclic aromatic hydrocarbons (PAHs) at levels above the SEF marine screening levels for benthic toxicity. It is likely that the source of these PAHs is the creosote-treated pilings located in the immediate vicinity of the sampling locations. The concentrations for dioxins and furans were also at levels of concern at this location. The remaining 3,800 cy of dredged material was determined to be suitable for unconfined, aquatic disposal per the SEF guidance. Refer to the interagency technical memorandum, dated May 19, 2010 (Exhibit A): "Project Review Group (PRG) review of the *Sediment Characterization Report* (SCR), *Port of Newport International Terminal, Newport, Oregon*; dredged material and new surface material (NSM) suitability determinations for the Port of Newport's project (NWP-2007-832)."

Once the Pasley is removed, underlying sediments will be sampled for contamination, and a sediment characterization report will be submitted to the Corps.

- *Dredging Methods:* Dredging inside the temporary sheet pile wall will be conducted by an excavator or a crane with a clamshell bucket. Dredging outside of the temporary sheet pile wall would be conducted using two methods. Dredged material that is unsuitable for unconfined, aquatic placement per the 2009 *Sediment Evaluation Framework for the Pacific Northwest* (SEF) would be dredged mechanically using a crane equipped with a sealed clamshell bucket. Dredged material that is suitable for unconfined, aquatic placement per the SEF guidance would be dredged hydraulically with a pipeline dredge equipped with a cutterhead.

- *Dredged Material Placement:* The Port will place the dredged materials at McLean Point, which is to the east of the Terminal. Clean, uncontaminated materials will be trucked or piped to McLean Point. The Port will apply for a clean fill determination from DEQ based on the sediment characterization results from sampling in the proposed dredging area. A DEQ Solid Waste Letter of Authorization (SWLA) will be obtained for any upland placement of dredge materials.

- *Maintenance Dredging:* Maintenance dredging is not included in the proposed action, however, the effects of this activity will be evaluated in the cumulative impacts analysis. Based on sediment transport modeling contracted by the Port, the design sedimentation rate for Terminal dredging area is 0.2 feet per year. Over the dredge area, this would yield approximately 190 cubic yards per year. As such, maintenance dredging every 10 years, with a volume of 2,000 cubic yards will likely be necessary to maintain adequate depths at the Terminal. Sedimentation and maintenance dredging requirements will likely be reduced over time due to natural stabilization and adjustment processes.

<u>Placement of Riprap:</u> Following the geotechnical recommendation, riprap will be used to protect cut and fill slopes steeper than 10H:1V within the zone of tidal fluctuation and wave action. Riprap will also be used to protect the subtidal slopes steeper than 2.5H:1V, and riprap is proposed to protect the 2H:1V slope on the west end of the project. Riprap in these areas will consist of a 1-foot thick filter blanket under a 3-foot thick layer of Class II riprap.

Riprap will also be used to protect the 2.25H:1V slope at the toe of the permanent sheet pile wall under the west dock to ensure long-term stability of the wall. This riprap layer will consist of a 1-foot thick filter blanket under a 2-foot thick layer of Class II riprap. The new riprap will be keyed-in for stabilization.

Compensatory Mitigation for Riprap Placement: Eelgrass beds (including *Zostera marina* and *Z. japonica*) are located within the nearshore area to the west of the International Terminal. The extent of eelgrass was documented, extending to an elevation of -8 feet NAVD. The total permanent impact to eelgrass from the renovation of the Terminal and the placement of riprap will be 0.03 acres.

The importance of eelgrass beds and the critical functions they provide are well documented. The Port focused on three key functions that eelgrass beds provide: fish and wildlife habitat, biogeochemical cycling, and sediment trapping and habitat stabilization. The overall goal of the mitigation plan is to provide a net gain of these functions in the Yaquina estuary. The specific goals are to restore 0.09 acres of eelgrass habitat in a mitigation area designated as Mitigation Area A, which is the Port's current dredge disposal site near the South Beach Marina. The Port's mitigation proposal appears in Exhibit B.

If a permit is issued, the Corps will determine what is appropriate and practicable compensatory mitigation. The amount of compensatory mitigation required shall be commensurate with the anticipated impacts of the project.

Demolition of the High Timber (West) Dock: The high timber (west) dock will be removed in Phase I, during the 2010/2011 in-water work period (IWWP). Piles will then be removed using a crane, equipped with a vibratory extractor. The crane will be mounted on a barge or on land, depending on the pile location. If piles cannot be completely removed, they will be cut off at the mud line. Ninety treated timber piles will be removed. Netting will be placed under the dock to prevent material from entering the Bay.

Remediation and Demolition of the Pasley and the Hennebique: Remediation of both ships will occur in Phase I. Environmental remedial measures common to both the Pasley and Hennebique will consist of the following:

1. Removal and disposal of petroleum free product.
2. Removal, treatment, and surface water discharge of petroleum impacted water.
3. Removal and disposal of impacted solid materials and petroleum residuals from compartments.
4. Abatement of asbestos-containing material.
5. Surface cleaning of interior concrete walls exhibiting petroleum residuals as heavy surficial coating on concrete and/or staining within the pores of the concrete.
6. Construction oversight by DEQ to evaluate and manage suspected materials encountered during remediation activities.

- *Dewatering the Pasley and the Hennebique:* Contaminated water has been identified within the compartments of both ships. Removal, treatment, and discharge are required as part of the remediation process. Contaminated water will be removed from the ships' compartments, treated, and then discharged into the Bay. The discharge of treated water to the Bay will be conducted under individual NPDES permit number 102991, dated 15 January 2010.

- *Pasley*: The removal of the Pasley is anticipated to take approximately eight months and require concrete and mechanical demolition, as well as the removal of contaminants (described above). The ship has a history of movement (rolling) towards the Bay over the years, as well as stress cracks in the hull. The concrete hull will be demolished and removed for upland processing. The processed concrete will be used as backfill for the Hennebique stabilization process and/or general fill. In addition, solid material (i.e., substrate) beneath the Pasley will require removal to establish the desired finished grade beneath the newly constructed dock. The demolition of the Pasley will be conducted in stages, ensuring that potential contaminates do not enter the Bay or the surrounding environment:

  Stage 1: Initial remediation of hazardous contaminants and removal of the ship operating systems
  Stage 2: Ship demolition above elevation 0' NAVD
  Stage 3: Ship demolition below elevation 0' NAVD
  Stage 4: Secondary remediation of remaining hazardous contaminants, removal of remaining ship operating systems, and excavation of material under the Pasley.

- *Hennebique*: Parts of the Hennebique's holds are filled with ballast sand and water. The contamination on board the Hennebique will be removed in phases. Prior to the demolition of the deck of the ship's bow, contaminants that are already accessible, such as exposed asbestos pipe insulation, will be removed. At the completion of the project, it is anticipated that DEQ will issue a no further action (NFA) letter for the site.

Installation of Piles: Installation of the piles will occur in Phases I, II, and III, during the 2010/2011, 2011/2012, and 2012/2013 IWWPs. Phase I includes the installation of piles for the new west dock; Phase II includes the installation of piles for the fender piles at the bow of the Hennebique; Phase III includes the installation of piles for the east dock, the center dock, and the mooring dolphin. The construction of the new west dock, center dock, east dock and dolphin will require a total of 240 new steel piles. All new docks will be supported by 18-inch diameter piles. Fenders will also be 18 inch diameter piles. Corners will be 24-inch diameter piles. Table 3 shows the number of piles to be placed during each phase and within which IWW period.

Table 3. Pile Installation for the Docks and Dolphin, by Project Phase.

Construction Activity	Number of Piles	Phase	IWW Period
Construct West Dock	87	Phase I	2010/2011
Install fender piles at bow of Hennebique	9	Phase II	2011/2012
Construct East Dock	124	Phase III	2012/2013
Construct Center Dock and Dolphin	20	Phase III	2012/2013
Total	**240**		

Piles will be installed using a land-based crane and vibratory hammer. If the land-based crane cannot reach the pile locations, installation will occur using a barge mounted crane and vibratory hammer. The barge will be stabilized with temporary spud piles. A steel template will be used to support and align the permanent piles during installation. The template will consist of both vertical and horizontal H-piles, and will be installed using a vibratory hammer. Once the piles are installed, the steel template will be removed. Once pile installation is complete, concrete pile caps will be installed, locking all piles together.

Funding to construct the center dock may not be available during the Phase III 2012/2013 IWW period. As such, it may be necessary to install its piles at the west end of the east dock, when the east dock is constructed. These piles would then be removed and reinstalled to support the new center dock at a later date.

Impact hammers will be used if it is determined that vibratory hammers cannot install the piles or to proof the piles. Bubble curtains may be used in conjunction with the impact hammer, as determined through consultation with the National Marine Fisheries Service (NMFS). The sound produced by impact hammering will be minimized by using the heaviest feasible hammer combined with the shortest feasible strike.

The use of steel piles will require the installation of an impressed current cathodic protection system (ICCP) to protect the piles against corrosion. Refer to Oregon Department of Environmental Quality's (DEQ's) memo addressing this issue in Exhibit C.

Construction of the West Dock: Construction of the west dock will occur in Phase I after the temporary sheet pile wall is in place. The west dock will be constructed with pre-cast concrete slabs, which will be placed using a land-based crane. Once the concrete slabs are in place, a 6-inch concrete slab will be placed on top, creating a level, uniform working surface. Construction of this dock may require the use of a barge to place piles. If necessary, a vibratory or impact hammer would be mounted on a barge, and the piles will be installed by reaching over the temporary sheet pile wall.

Demolition of the RO-RO dock: The demolition of the RO-RO dock will occur during Phase II and Phase III (during the 2011/2012 IWWP). The RO-RO dock will be removed using a hydraulic concrete breaker mounted on an excavator. The excavator will be located on the dock during demolition activities. The concrete deck is approximately 5 feet thick, and will be removed from the top down, using a saw cutter. Water used for saw cutting will be fully contained and will be treated prior to entering the Bay. Once the dock is removed, 70 steel piles will be extracted using a crane and vibratory hammer. Piles that cannot be extracted will be cut off at the mud line.

A containment system, such as netting, will be installed under the dock structure to prevent debris from entering the Bay.

Construction of the East Dock and Removal of the Timber Fishing Dock: The construction of the east dock will occur during Phase III (the 2012/2013 IWWP). The construction of the new dock will occur prior to demolition of the timber dock, so that the existing dock provides support and a form for the new concrete dock. Prior to construction, piles will be driven through the existing dock.

The timber dock in the pile location will be removed by hand, and piles will then be vibrated into place using a vibratory hammer. Once the piles are in place, a layer of plywood will be placed on the deck to provide support and form for the new concrete deck, and to prevent the concrete from falling though the existing structure. The concrete for the new dock will be poured into place in two sections, over the plywood, in typical slab-on-grade construction. Additional shoring will be installed at each pile to support the pile caps that will tie the dock together.

The timber fishing dock will be removed in Phase III, during the 2013/2014 IWWP. The dock will be removed by cutting the deck into sections that can be lifted out by a crane working from upland. Once the deck has been removed, 453 treated timber piles will be removed. The complete removal of the piles is expected to create voids in the Bay bottom, which could be detrimental to the construction of the new dock. As such, the piles will be cut off at the mud line, and lifted out of the water by a crane. A containment system will be installed under the dock structure to prevent debris from entering the Bay.

Construction of the Center Dock: Construction of the center dock will occur in Phase III, during the 2012/2013 IWWP. The center dock will be constructed with pre-cast concrete slabs, which will be placed using a land based crane. Once the concrete slabs are in place, a 6-inch concrete slab will be placed on top, creating a level, uniform working surface. Construction of this dock will require a vibratory hammer mounted on a barge to vibrate the piles into place.

TEMPORARY IN-WATER WORK:

Containment (Temporary Sheet Pile Wall) Installation around Pasley: Installation of the temporary sheet pile wall will occur in Phase I during the 2010/2011 IWWP. The installation of a temporary sheet pile wall in front of the Pasley will ensure the ship's remediation and demolition are isolated from the Bay. Installation of the temporary sheet pile wall will be accomplished by using a vibratory hammer mounted on a crawler crane or a barge, as necessary. The crane will lift the sheet piles, setting them in place by using a temporary steel template to get them in the correct position. The sheet pile will then be vibrated into place. The sheet pile wall will be driven into the solid siltstone layer at the bottom of the Bay or to refusal to provide a tight cell.

The sheet pile wall will remain in place for one year. During the second IWWP (2011/2012) the sheet pile wall will be removed using a pile extractor mounted on a crawler working from the shore, reaching over the new dock, or on a barge, whichever is necessary for removal. The sheets will be placed on a barge during removal from the water.

Dewatering Behind the Sheet Pile Wall: Dewatering will not occur until the Pasley has been fully remediated. The ship's hull will be sealed and used as an additional water barrier while remediation and removal of potential contaminants are taking place, ensuring there is an additional safeguard to the Bay from potential contamination.

After the interior of the ship has been remediated, the area behind the sheet pile wall will be dewatered. Dewatering will occur in stages, so that the ship remains stable. Dewatering will allow demolition of the Pasley when dry, as well as the installation of the walers to further stabilize the temporary sheet pile wall. Dewatering will be accomplished by electric submersible pumps that will pump the water directly back into the Bay. The water will not be treated unless a visual sheen is observed on the water surface. When the dewatering occurs, the Pasley will be fully remediated, so contamination from oil will not occur.

However, if a sheen is observed, the water will be pumped through the same treatment system used to dewater the inside of the Pasley (discussed above), as required under the DEQ NPDES permit. Once the area behind the sheet pile wall has been dewatered (to approximately -24 feet NAVD 88), the final cleanup of sediments beneath the Pasley and in front of the dock will begin.

Once the Pasley has been remediated and demolished, the area behind the sheet pile wall will be excavated (discussed above) and the piles for the new west dock will be placed (discussed above). After excavating and pile placement this area will be flooded. Flooding will occur by selectively turning off the electric pumps and allowing water to seep between the sheet pile walls. Should this process prove too slow, electronic submersible pumps will slowly pump water from the Bay into the area behind the sheet pile wall. The pump will have a fish screen that will be installed, operated, and maintained according to the NMFS fish screen criteria (NMFS 2008). NMFS will be consulted prior to the selection of the specific screen to ensure that it meets the required criteria. Once this area is equalized with the tide, the sheet pile walls will be removed.

STORMWATER MANAGEMENT:

Stormwater currently generated at the terminal is not treated prior to entering the Bay. Stormwater sheet flows across the site into one of three culverts. An 18-inch outfall is located along the western side of the site north of the Pasley; no changes to the outfall structure are proposed. Four culverts are located east of the Hennebique: two 18-inch outfalls, a 12-inch outfall, and a 24-inch outfall. The eastern-most 18-inch outfall will be abandoned; no changes to the remaining three outfalls are proposed.

The proposed stormwater treatment system will treat all new areas of impervious surface, and stormwater runoff from the new docks. Stormwater will be directed into catch basins and piped through sediment manholes, into one of two Contech® Stormwater Quality Vaults for treatment. A stormwater vault will be located west of the Pasley footprint, and a second vault will be located east of the Hennebique. Stormwater flowing out of the vaults will discharge directly into the Bay, through two new outfalls with tidegates. One outfall is on at the west end and the other is on the east end. The outfall on the west end will be 10 inches and the east one will be 18-inches. The tide gates are designed to close and seal as the Bay tide rises, preventing Bay water from entering the storm system.

UPLAND WORK AND FACILITIES:

Bulkhead Wall: The area north of the Pasley is landlocked; as such, the installation of the permanent bulkhead wall in this location can be started prior to the 2010/2011 IWWP (scheduled for August and September, 2010). The wall will be constructed using a vibratory hammer mounted on a crawler crane. The crane will lift the sheet piles, setting them in place by using a temporary steel template to get them in the correct position. The sheet pile will then be vibrated into place. The permanent bulkhead wall will connect to the temporary sheet pile wall (described below and to be installed during the 2010/2011 IWWP), which will surround the Pasley, allowing remediation and demolition activities to take place under dry conditions.

Soil Stabilization: Geotechnical investigations conducted for the Port determined that soils beneath the site could liquefy during a major earthquake, causing significant soil settlement and lateral ground displacement toward the Bay. To prevent liquefaction, soils solidification will occur during Phase I.

Approximately 27,000 square feet of area behind the Pasley, and approximately 12,500 square feet of area behind the Hennebique will be stabilized. Soil stabilization will occur after the permanent bulkhead wall is in place but prior to the placement of the temporary in-water sheet pile wall.

Purpose: The purpose of the Port of Newport's proposed project is to renovate an existing facility in Newport, Oregon, to support international fishing fleet and deep-draft vessel operations.

Drawing(s): 32 drawings labeled "NWP-2007-832" and Exhibits A through C

Additional Information: Additional information may be obtained from Mr. James M. McMillan, Sr. Regulatory Project Manager, U.S. Army Corps of Engineers by telephone at 503.808.4376, or by email at james.m.mcmillan@usace.army.mil.

Authority: This permit will be issued or denied under the following:

Section 10, Rivers and Harbors Act 1899 (33 U.S.C. 403), for work in or affecting navigable waters of the United States.

AND

Section 404, Clean Water Act (33 U.S.C. 1344), for discharge of dredged or fill material into waters of the United States.

Water Quality Certification: A permit for the described work will not be issued until certification, as required under Section 401 of the Clean Water Act (P.L. 95-217), has been received or is waived from the certifying state. Attached is the state's notice advertising the request for certification.

Section 404(b)(1) Evaluation: The impact of the activity on the public interest will be evaluated in accordance with the Environmental Protection Agency guidelines pursuant to Section 404(b)(1) of the Clean Water Act.

Coastal Zone Management Act Certification: A permit for the described work will not be issued until the state has concurred with the applicant's certification that the described activity affecting land or water uses in the Coastal Zone complies with the State Coastal Zone

Management Program. Section 307(c)(3) of the Coastal Zone Management Act of 1972, as amended by 16 U.S.C. 1456(c)(3) requires the applicant to provide a Certification of Consistency statement. If the state fails to concur or object to the certification statement within six months, state concurrence shall be conclusively presumed. Attached to this Public Notice is a notice of application for Certification of Consistency with the State's Coastal Zone Management Program.

Public Hearing: Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

Endangered Species: Preliminary determinations indicate that the proposed activity may affect three species protected under the Federal Endangered Species Act (ESA). The project will require formal consultation with the National Marine Fisheries Services (NMFS). A detailed description of the potential effects to listed species is included in a Biological Assessment (BA) that was submitted to the Corps. The listed species are as follows:

- Oregon Coast coho salmon (*Oncorhynchus kisutch*) – Threatened
- Southern distinct population segment of green sturgeon (*Acipenser medirostris*) - Threatened
- Southern distinct population segment of eulachon (*Thaleichthys pacificus*) - Threatened

The Corps initiated consultation under Section 7 of the Endangered Species Act of 1973 (87 Stat. 844) on June 30, 2010. A permit for the proposed activity will not be issued until the consultation process is completed.

Cultural Resources: An initial evaluation of the proposed project area indicates that the Terminal site was filled approximately 60 years ago. All the surfaces are manmade and no cultural artifacts are expected.

This notice has been provided to the State Historic Preservation Office, interested Native American Indian Tribes, and other interested parties. If you have information pertaining to cultural resources within the permit area, please provide this information to the Corps project manager (identified on page 1 of this notice) to assist in a complete evaluation of potential affects.

Evaluation: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the described activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the described activity, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the described activity will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Additional Requirements: State law requires that leases, easements, or permits be obtained for certain works or activity in the described waters. These State requirements must be met, where applicable, and a Department of the Army permit must be obtained before any work within the applicable Statutory Authority, previously indicated, may be accomplished. Other local governmental agencies may also have ordinances or requirements, which must be satisfied before the work is accomplished.

PUBLIC NOTICE
Oregon Department of Environmental Quality (DEQ)
Water Quality 401 Certification

Corps of Engineers Action ID Number: NWP-2007-832 Notice Issued: July 16, 2010
Oregon Division of State Lands Number: 44953 RF Written Comments Due: August 15, 2010

WHO IS THE APPLICANT:
Port of Newport
Attn: Don Mann
600 SE Bay Boulevard
Newport, OR 97365

LOCATION OF CERTIFICATION ACTIVITY: See attached U.S. Army Corps of Engineers public notice

WHAT IS PROPOSED: See attached U.S. Army Corps of Engineers public notice on the proposed project

NEED FOR CERTIFICATION: Section 401 of the Federal Clean Water Act requires applicants for Federal permits or licenses to provide the Federal agency a water quality certification from the State of Oregon if the proposed activity may result in a discharge to waters of the state.

DESCRIPTION OF DISCHARGES: See attached U.S. Army Corps of Engineers public notice on the proposed project.

WHERE TO FIND DOCUMENTS: Documents and materials related to water quality issues as a result of the proposal are available for examination and copying at Oregon Department of Environmental Quality, 401 Water Quality Certification Coordinator, Northwest Region, 2020 S.W. 4th Avenue, Portland, Oregon 97201-4953. Other project materials are available by contacting the Corps per the attached public notice.

While not required, scheduling an appointment will ensure that water quality documents are readily accessible during your visit. To schedule an appointment please call DEQ Water Quality at Northwest Region at (503) 229-5552.

Any questions on the water quality certification process may be addressed to the 401 Program Coordinator at (503) 229-6030 or toll free within Oregon at (800) 452-4011. People with hearing impairments may call DEQ’s TTY at (503) 229-6993.

PUBLIC PARTICIPATION:

Public Hearing: Oregon Administrative Rule (OAR) 340-48-0032 (2) states that " The Corps provides public notice of and opportunity to comment on the applications, including the application for certification, provided that the department (DEQ), in its discretion, may provide additional opportunity for public comment, including public hearing."

Written comments:
Written comments on project elements related to water quality must be received at the Oregon Department of Environmental Quality by 5 p.m. on the date specified in the upper right section on page one of this notice. Written comments may be emailed, mailed or faxed as described below:

Email - 401publiccomments@deq.state.or.us

Mail - Oregon Department of Environmental Quality, Northwest Region
2020 S.W. 4th Avenue
Portland, Oregon 97201-4953
Attn: 401 Water Quality Certification Coordinator

Fax - (503) 229-6957

People wishing to send comments via e-mail should send them in Microsoft Word (through version 7.0), WordPerfect (through version 6.x) or plain text format. Otherwise, due to conversion difficulties, DEQ recommends that comments be mailed in hard copy.

WHAT HAPPENS NEXT: DEQ will review and consider all comments received during the public comment period. Following this review, certification of the proposal may be issued as proposed, issued with conditions, or denied. You will be notified of DEQ's final decision if you submit comments during the comment period. Otherwise, if you wish to receive notification, please call or write DEQ at the above address.

ACCESSIBILITY INFORMATION: This publication is available in alternate format (e.g. large print, Braille) upon request. Please contact DEQ Office of Communications and Outreach at (503) 229-5317 or toll free within Oregon at 1-800-452-4011 to request an alternate format. People with a hearing impairment can receive help by calling DEQ's TTY at (503) 229-6993.

PUBLIC NOTICE
OREGON COASTAL MANAGEMENT PROGRAM
CONSISTENCY CERTIFICATION

Date: July 16, 2010

Corps of Engineers Action ID Number: NWP-2007-832
Oregon Department of State Lands Number: 44953 RF

Notification

For projects subject to coastal zone review, notice is hereby given that the project is being reviewed by the Department of Land Conservation and Development (DLCD) as provided in Section 307(c) of the Coastal Zone Management Act. The applicant believes that the activities described in the attached materials would comply with and be conducted in a manner consistent with the Oregon Coastal Management Program. Project information can be made available for inspection at DLCD's Salem office.

DLCD is hereby soliciting public comments on the proposed project's consistency with the Oregon Coastal Management Program. Written comments may be submitted to DLCD, 635 Capital St. NE, Suite 200, Salem, OR 97301-2540, attention consistency review specialist. Any comments must be received by DLCD on or before the comment deadline listed in the federal notice. For further information, you may call DLCD at (503) 373-0050, ext. 250.

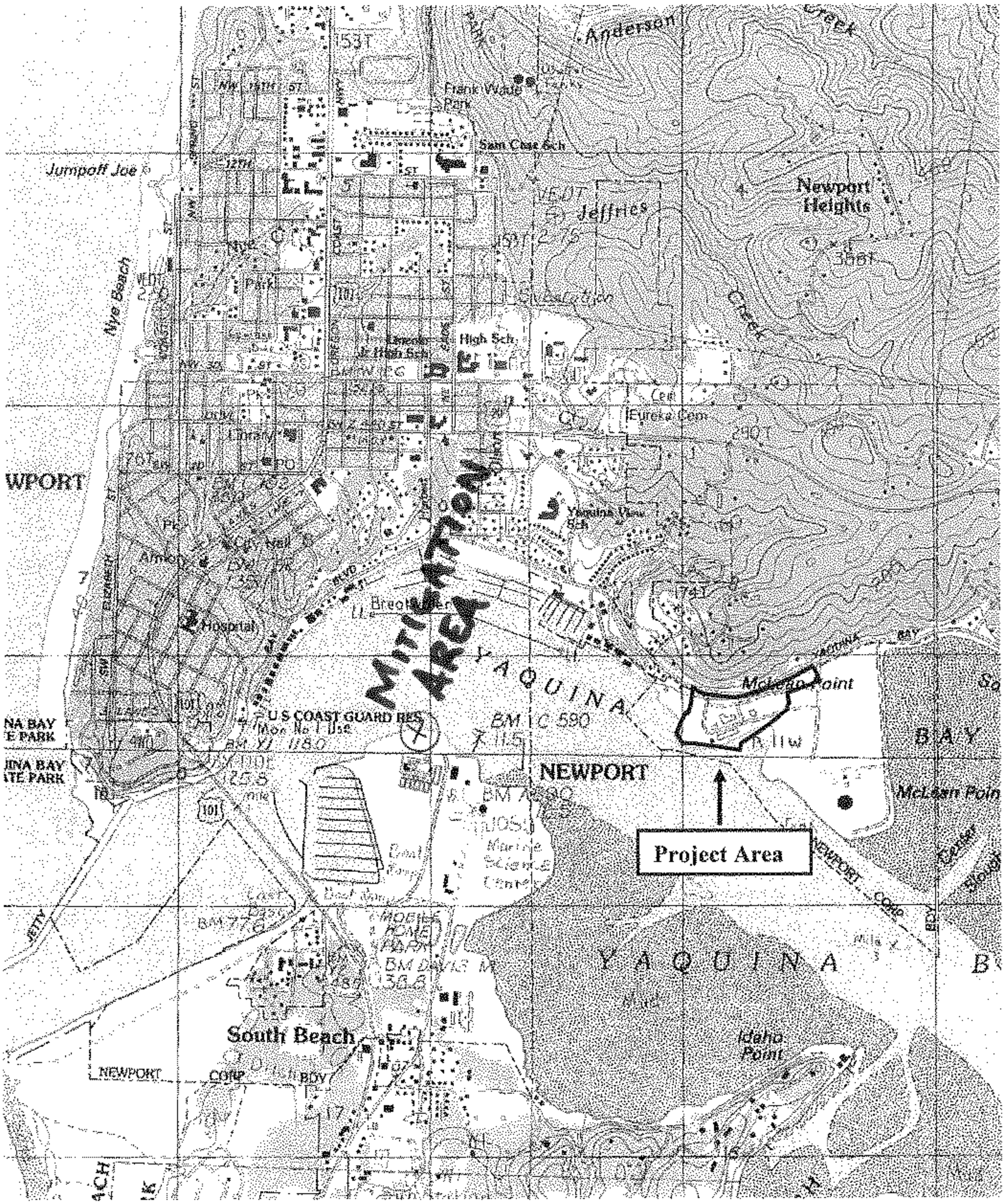
REVIEW CRITERIA

Comments should address consistency with the applicable elements of the Oregon Coastal Management Program. These elements include:

$ Acknowledged Local Comprehensive Plans & Implementing Ordinances
$ Statewide Planning Goals
$ Applicable State Authorities (e.g. Removal-Fill Law and Oregon Water Quality Standards)

INCONSISTENT?

If you believe this project is inconsistent with the Oregon Coastal Management Program, your comments to DLCD should explain why you believe the project is inconsistent and should identify the Oregon Coastal Management Program element(s) in question. You should also describe how the project could be modified, if possible, to make it consistent with the Oregon Coastal Management Program.



04/29/10

4540

Location and general topography of the Port of Newport International Terminal in Newport, Oregon (USGS Newport North, OR quadrangle).

FIGURE 1

Pacific Habitat Services, Inc.

5/7/10

4540

FIGURE 3

Aerial photo showing existing conditions at the International Terminal renovation project in Newport, Oregon.

Pacific Habitat Services, Inc.

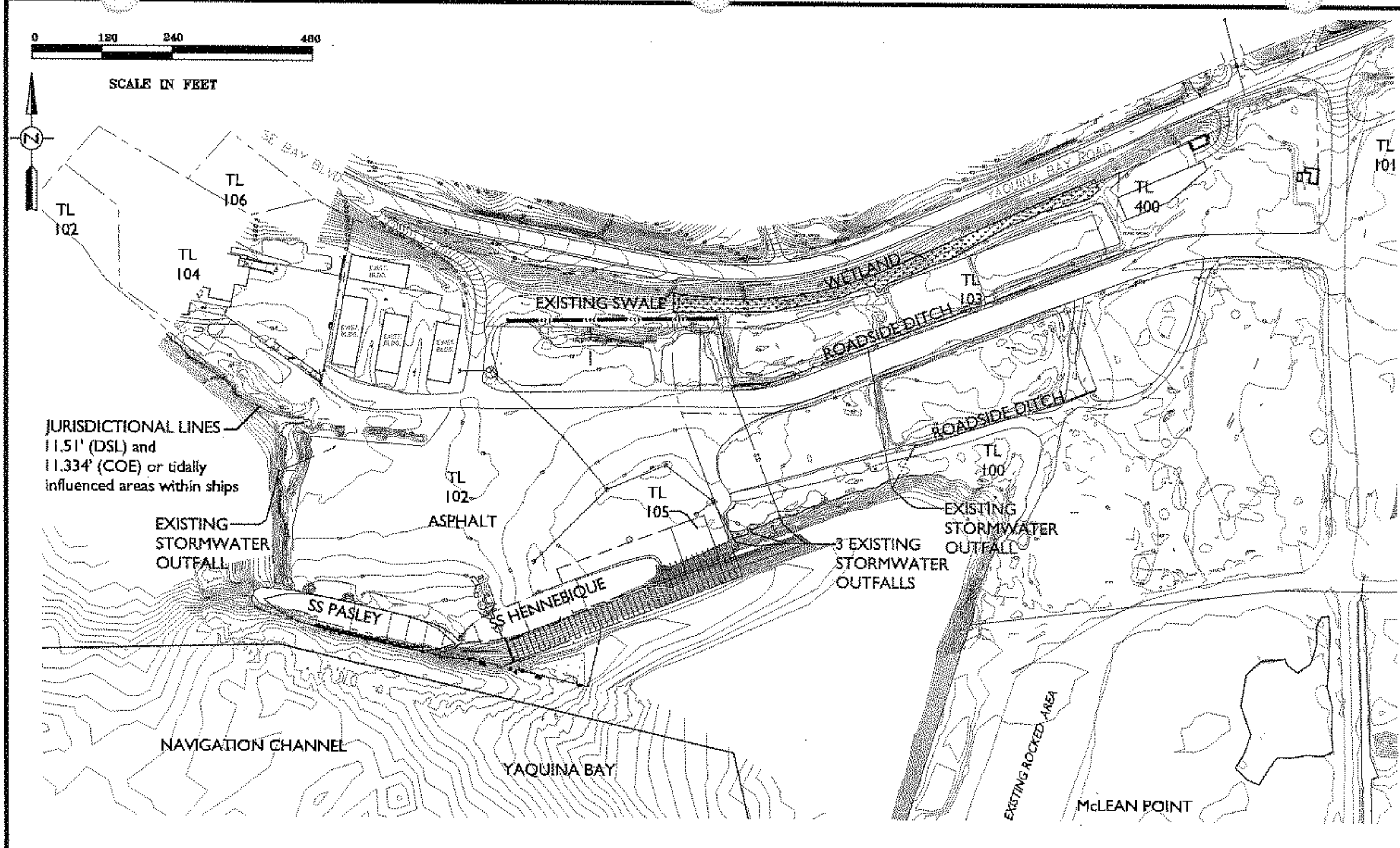


FIGURE 4A

Overview of existing conditions at the proposed renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

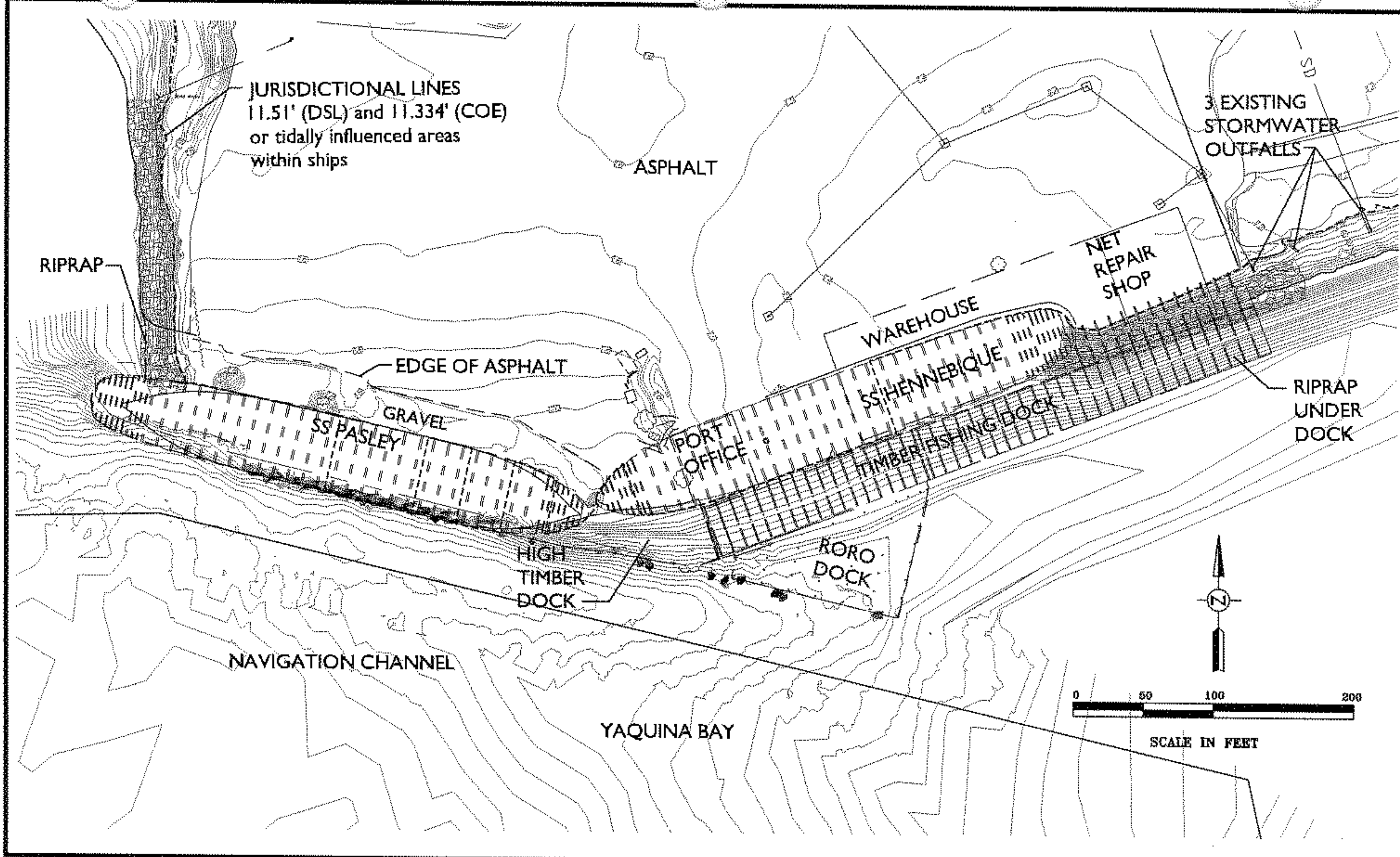


FIGURE 4B

Existing conditions at the proposed renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

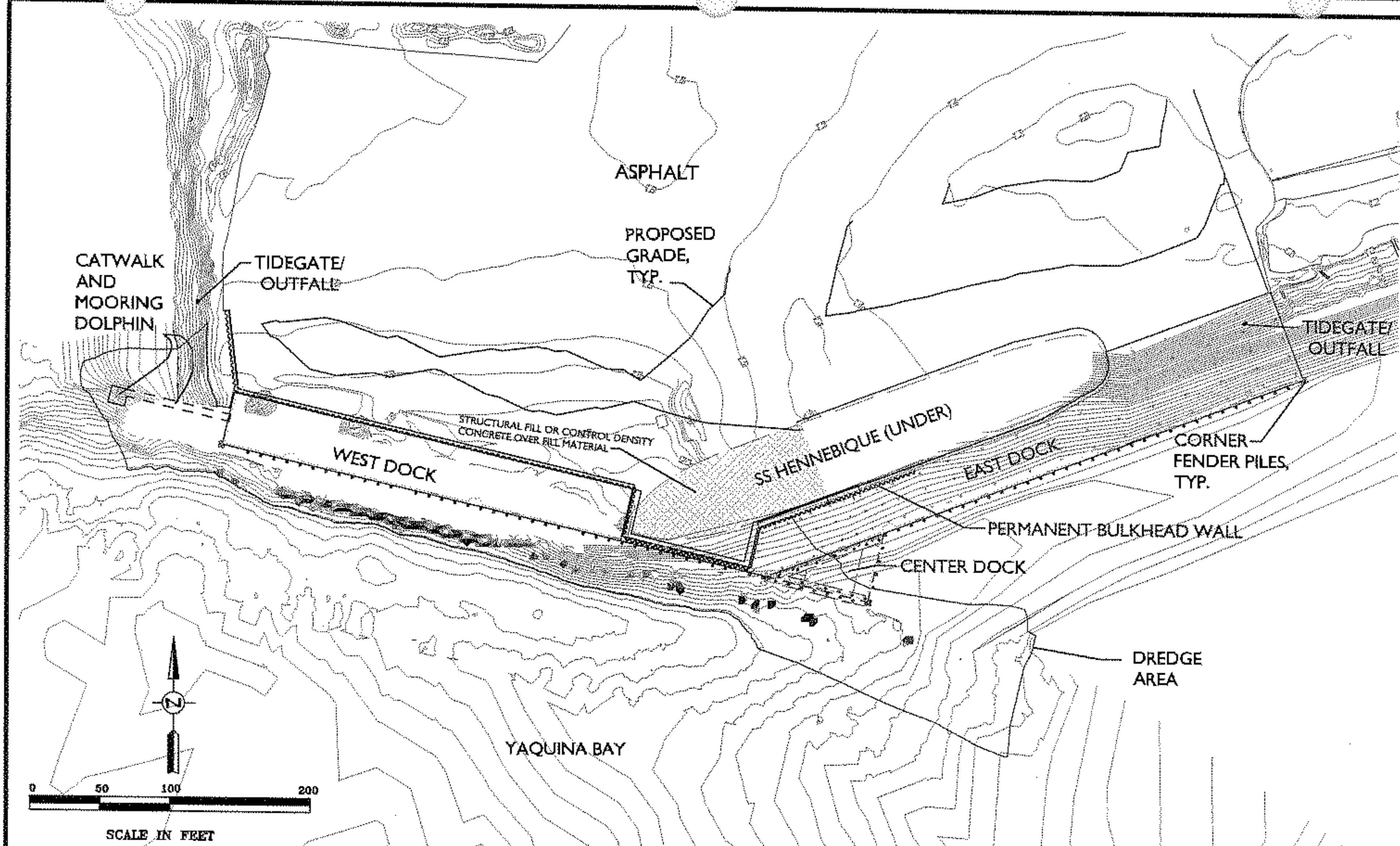
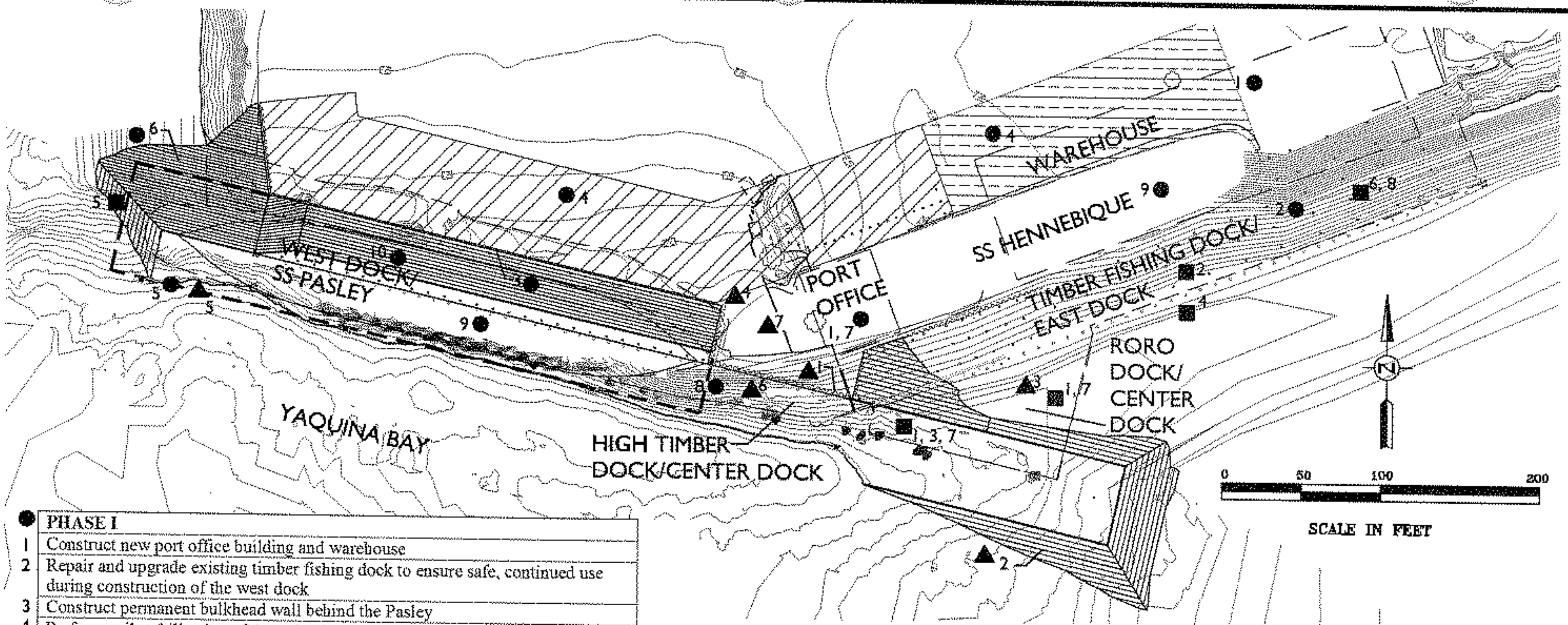


FIGURE 5A

Proposed site plan at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.



	PHASE I
1	Construct new port office building and warehouse
2	Repair and upgrade existing timber fishing dock to ensure safe, continued use during construction of the west dock
3	Construct permanent bulkhead wall behind the Pasley
4	Perform soil stabilization of the upland area behind the Pasley and Hennebique
5	Construct temporary sheet pile wall around the Pasley
6	Dredge at the west end of the proposed west dock
7	Demolish port office building and warehouse
8	Demolition of the high timber dock
9	Remediation and demolition of the Pasley and remediation of the Hennebique
10	Installation of the pier piles and west dock

	PHASE II
1	Construct permanent bulkhead wall at the bow of the Hennebique
2	Dredge remaining area at east end of Pasley and in front of the Hennebique
3	Demolish a portion of the RORO dock
4	Placement of fill behind the bulkhead wall for stabilization of the bow of the Hennebique
5	Removal of the sheet pile wall around the Pasley
6	Install fender piles at the bow of the Hennebique
7	Remove a portion of the upper deck of the Hennebique

	PHASE III
1	Demolish the remainder of the RORO dock
2	Drive new piles through the east dock
3	Installation of center dock piles
4	Install fender piles at east dock
5	Installation of the mooring dolphin piles
6	Construct new east dock over the existing timber fishing dock
7	Construct the center dock
8	Remove existing wood pier from below fishing dock

FIGURE 5B

Phasing of construction at the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

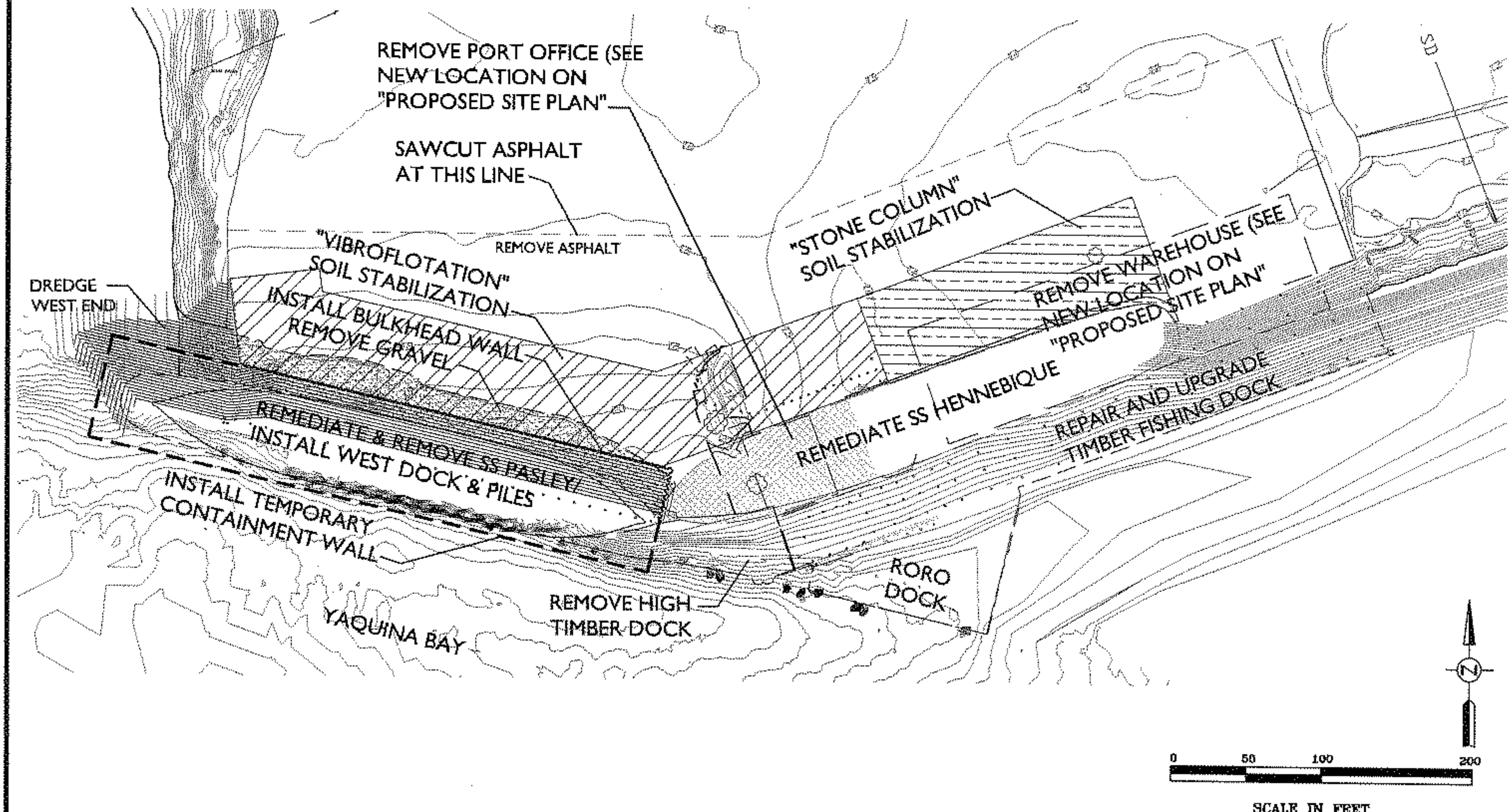


FIGURE 5C

Phase 1 dock and ship demolition plan for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

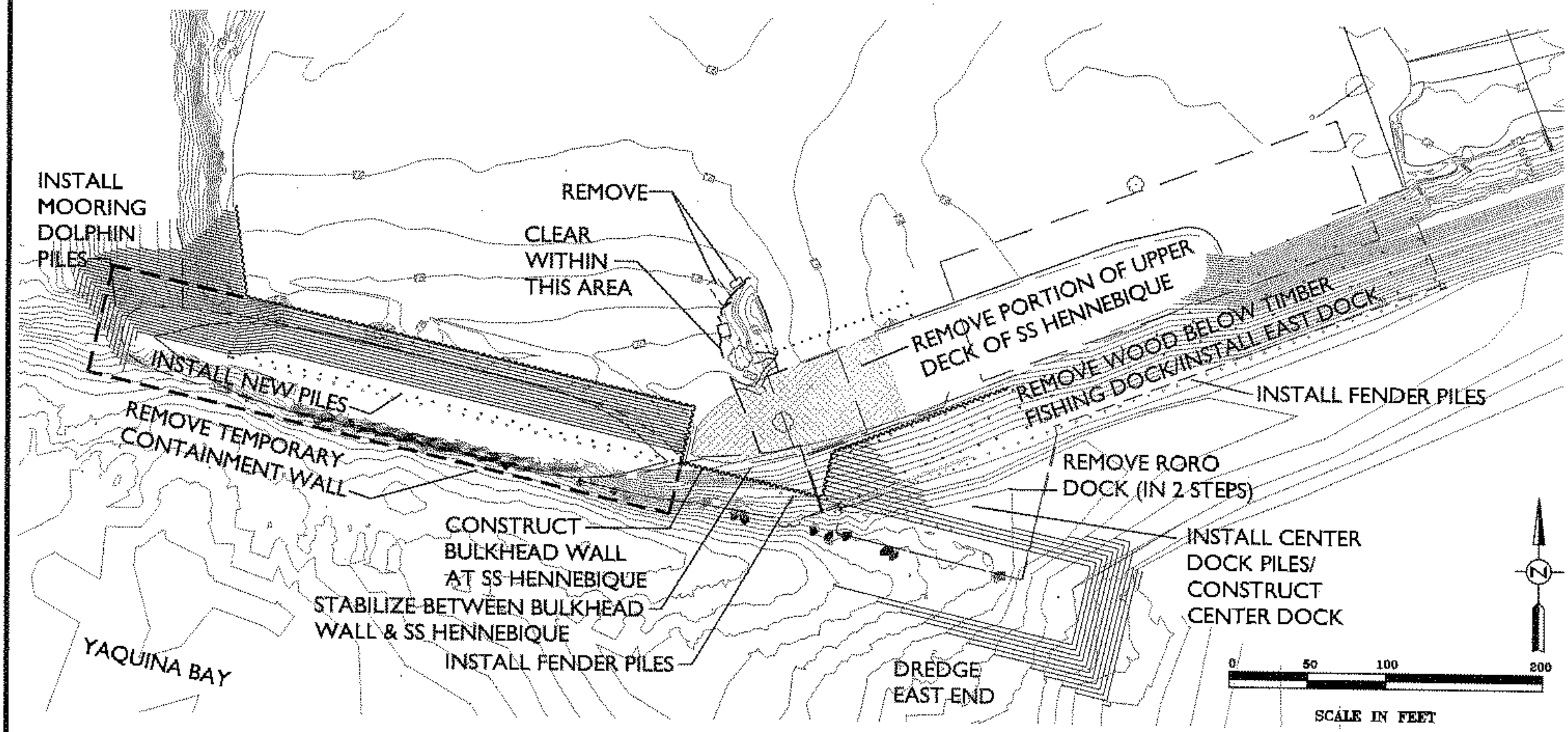


FIGURE 5D

Phase 2 & phase 3 dock and ship demolition plan for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

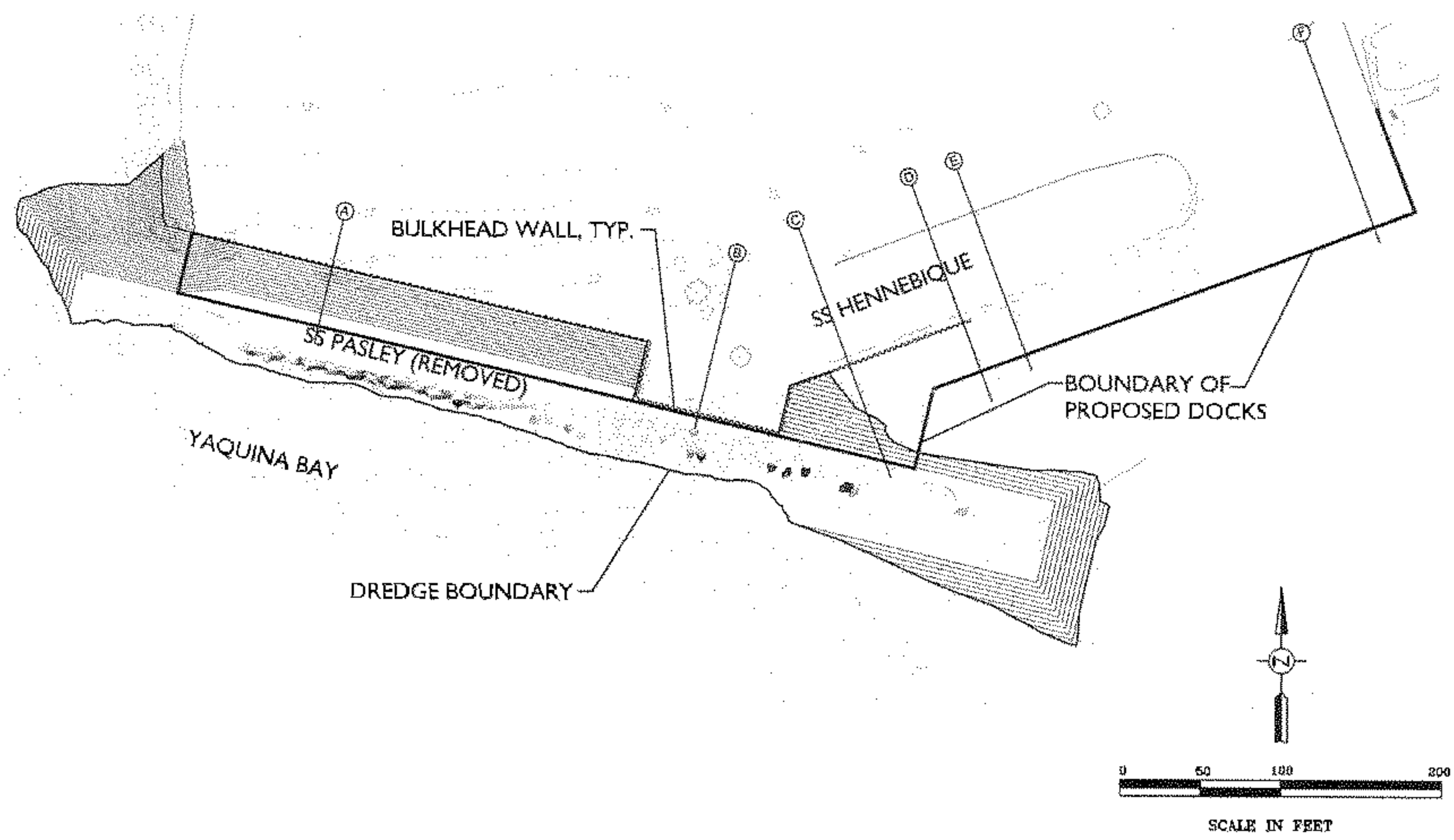
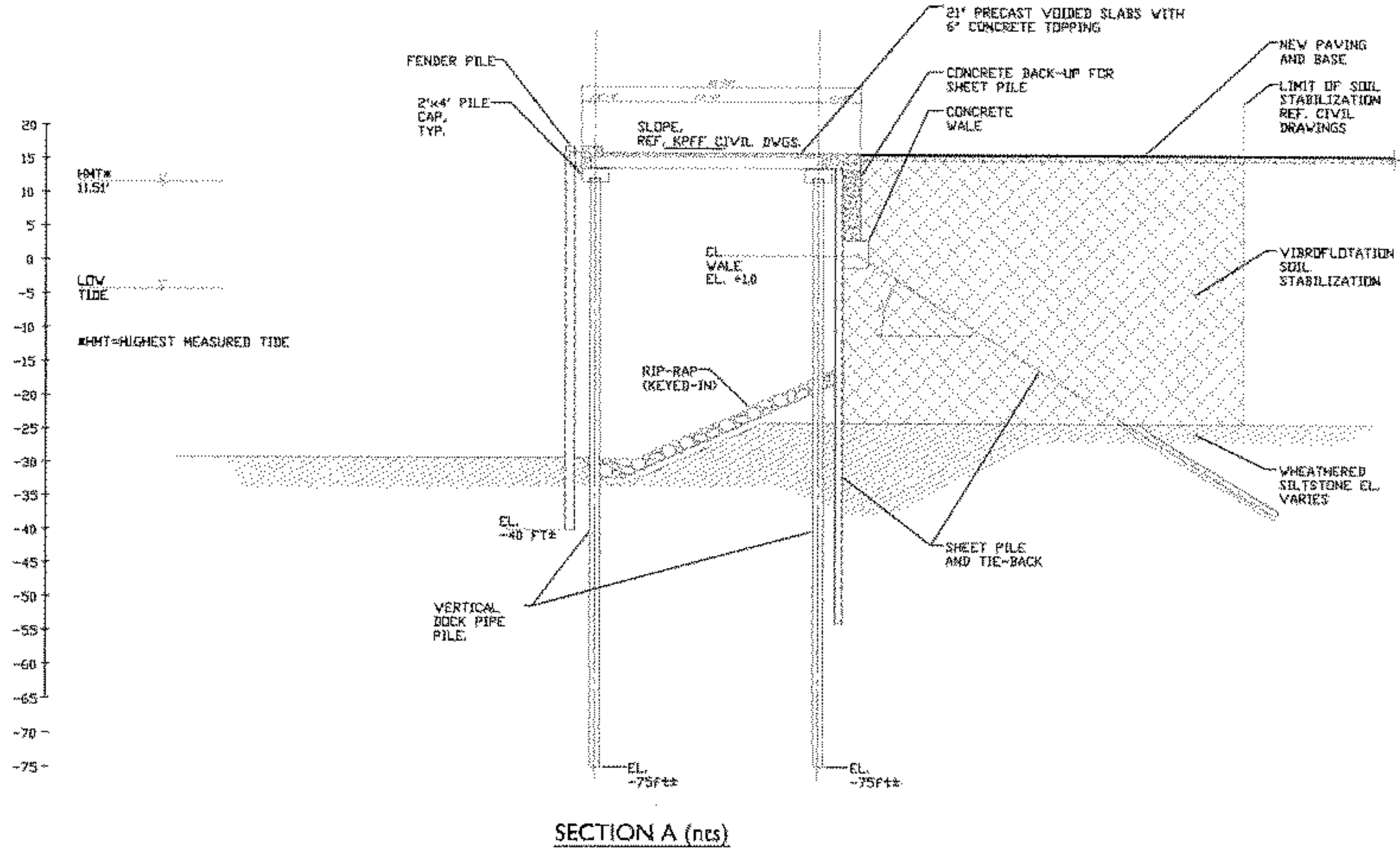


FIGURE 5E

Location of cross-sections through SS Pasley, SS Hennebique, and new docks for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.



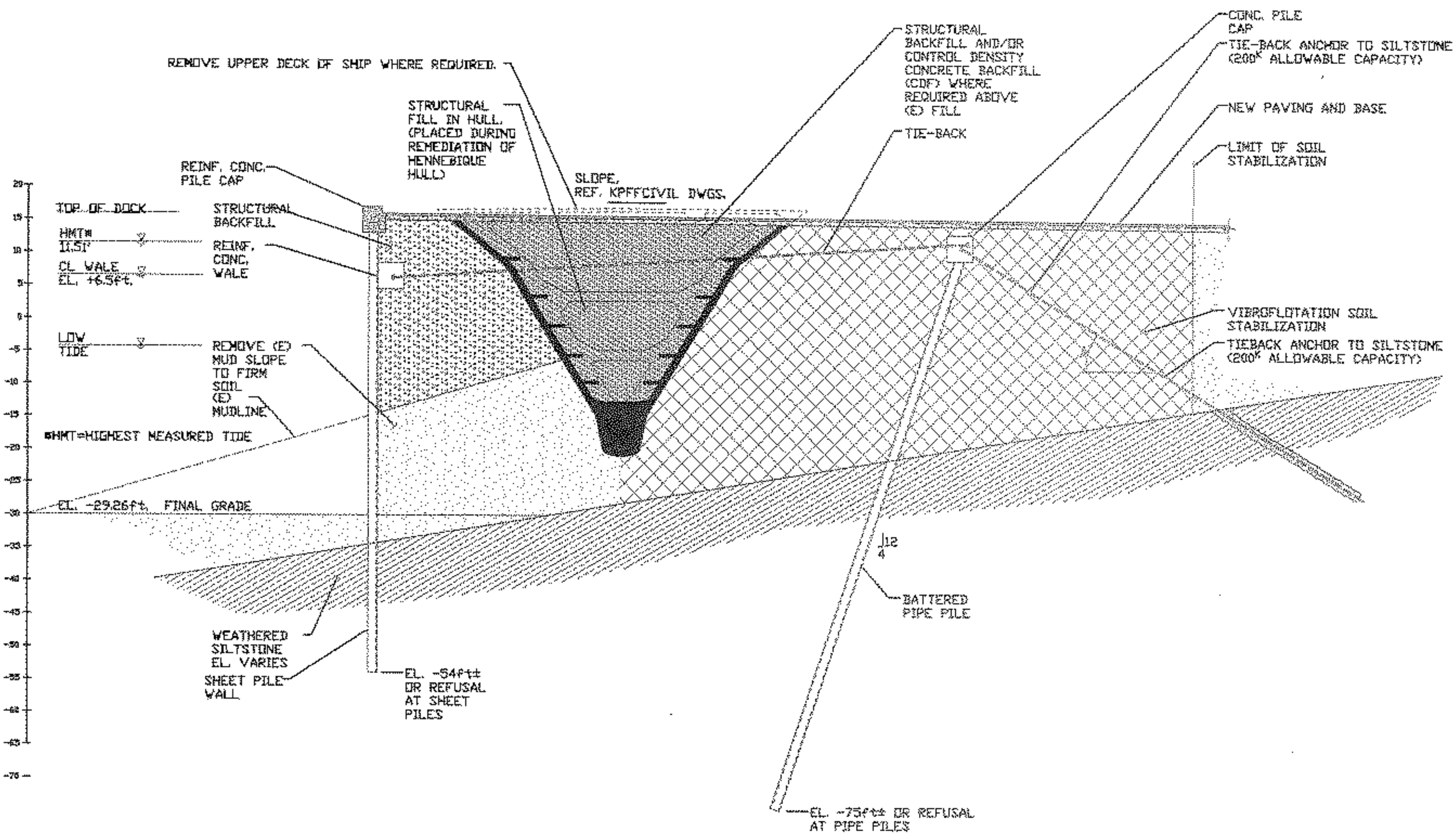
SECTION A (nts)

FIGURE 5F

Cross-section through SS Pasley and new dock for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.



SECTION B (nts)

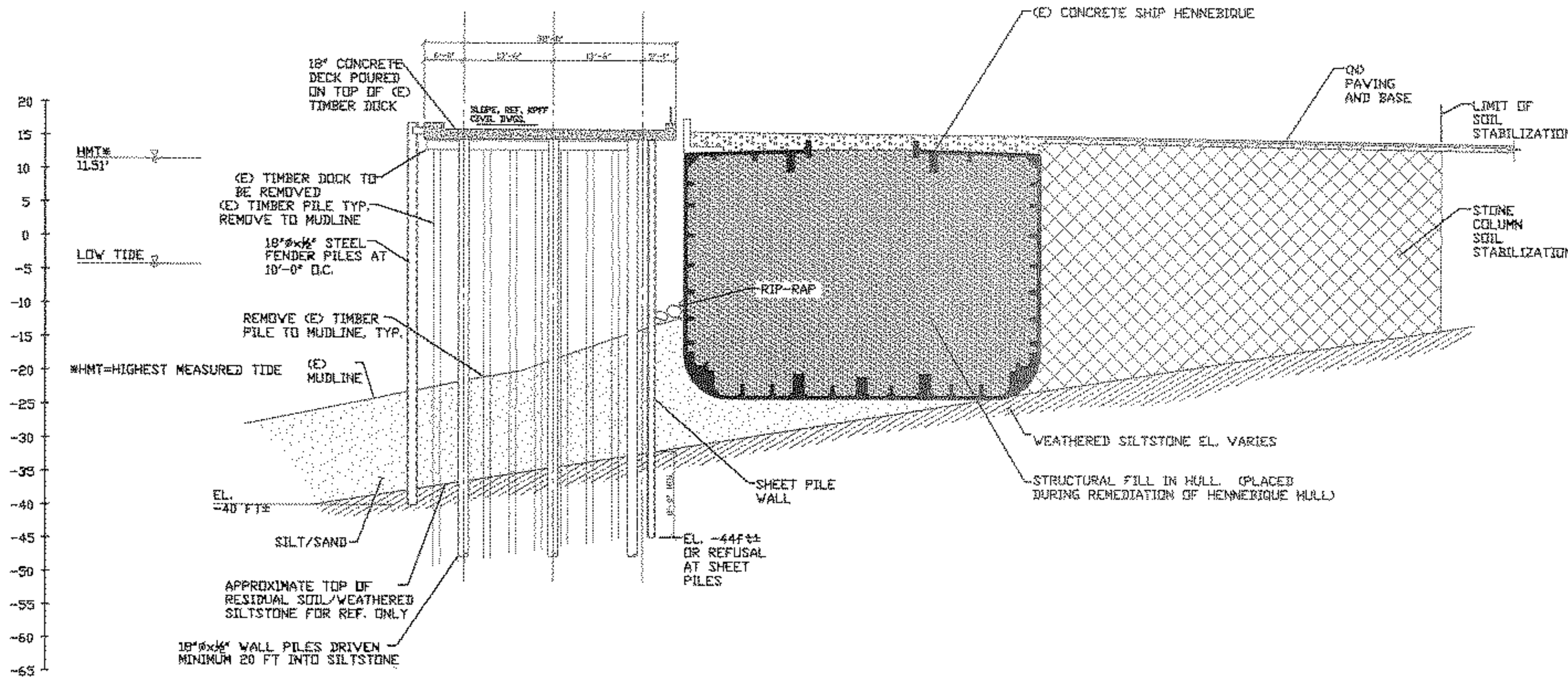
FIGURE 5G

Cross-section through the bow of SS Hennebique and sheet pile wall for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See Figure 5H for detail of fill surface.

4540
5/20/10

Pacific Habitat Services, Inc.

TYPICAL X-SECTION



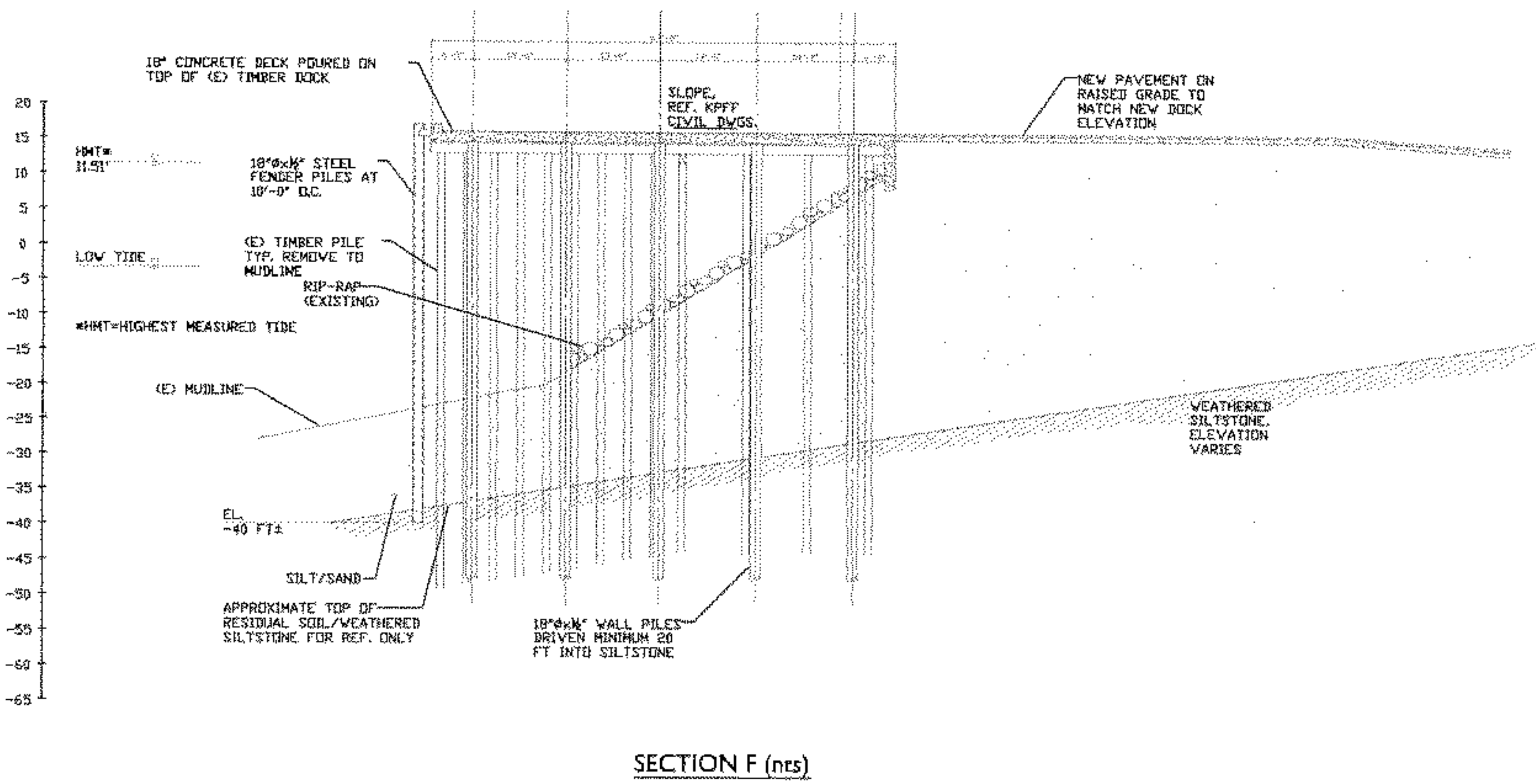
SECTION D (nts)

FIGURE 5J

Cross-section through SS Hennebique and new dock for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.



SECTION F (nts)

FIGURE 5L

Cross-section through east dock for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

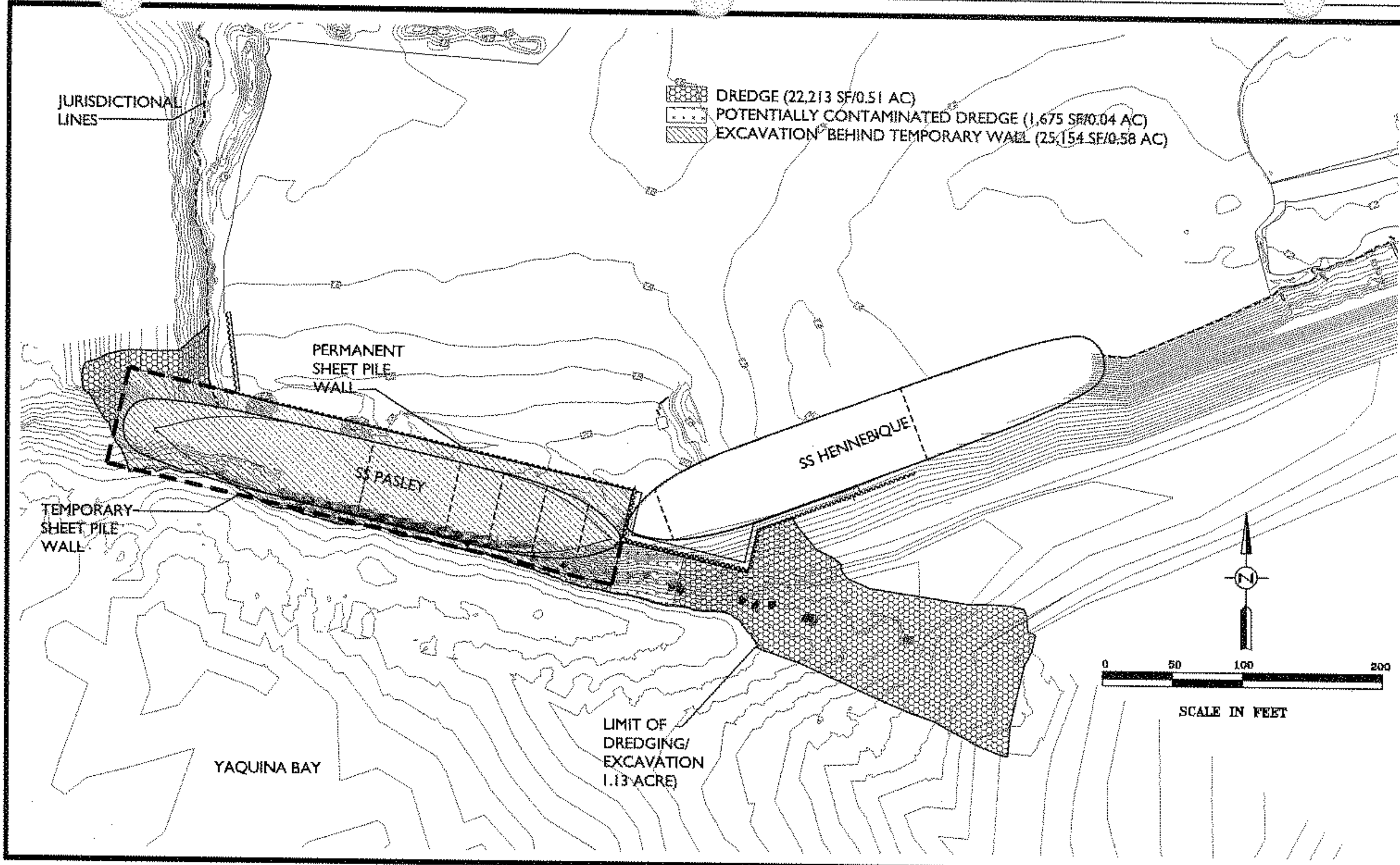


FIGURE 6

Dredge and excavation limits at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

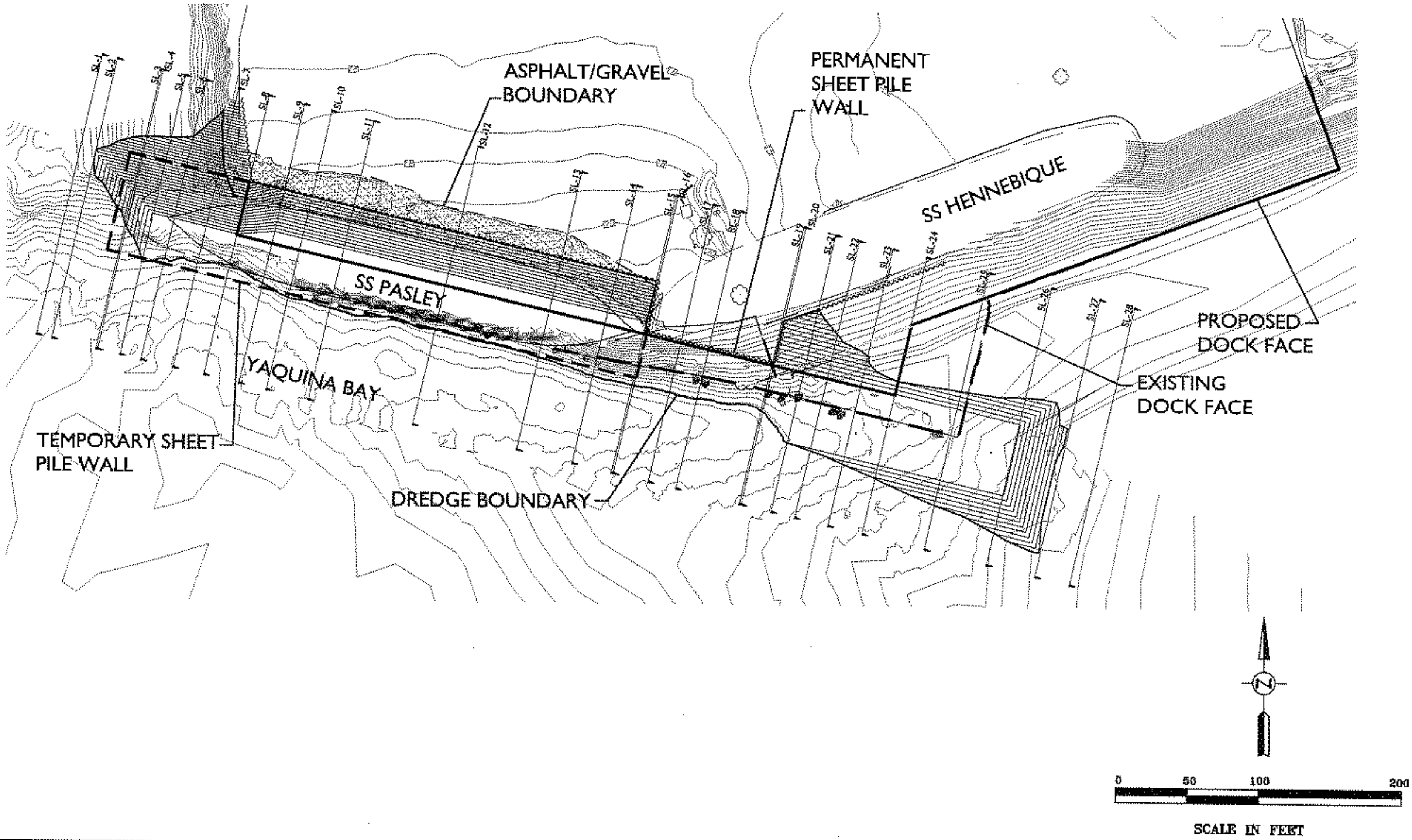


FIGURE 6A

Location of cross-sections through SS Pasley and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

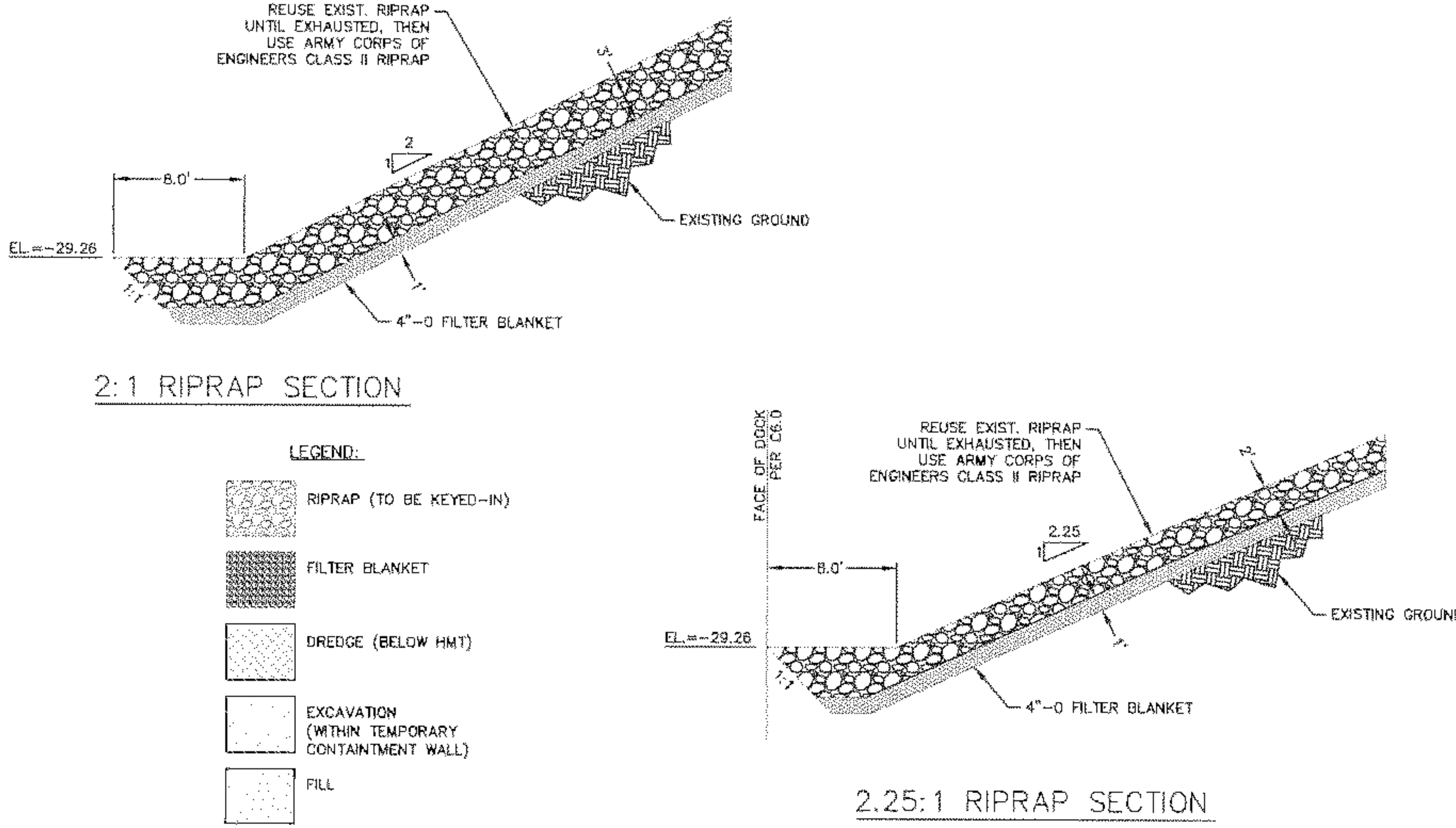


FIGURE 6B

Typical riprap cross-sections and cross-section legend for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See Figures 6C through 6I for cross-sections.

4540
5/20/10

Pacific Habitat Services, Inc.

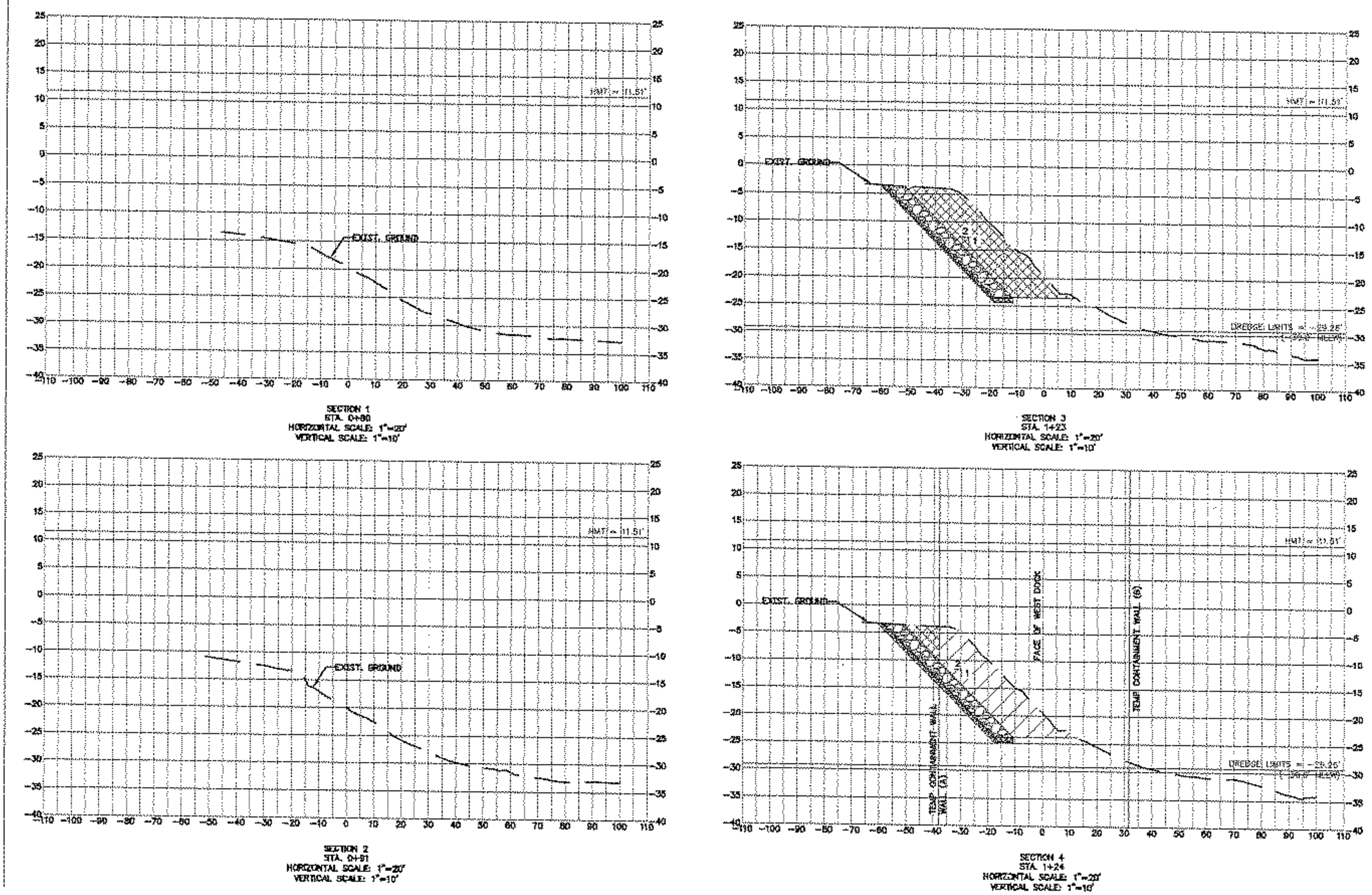


FIGURE 6C

Cross—sections through SS Pasley and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

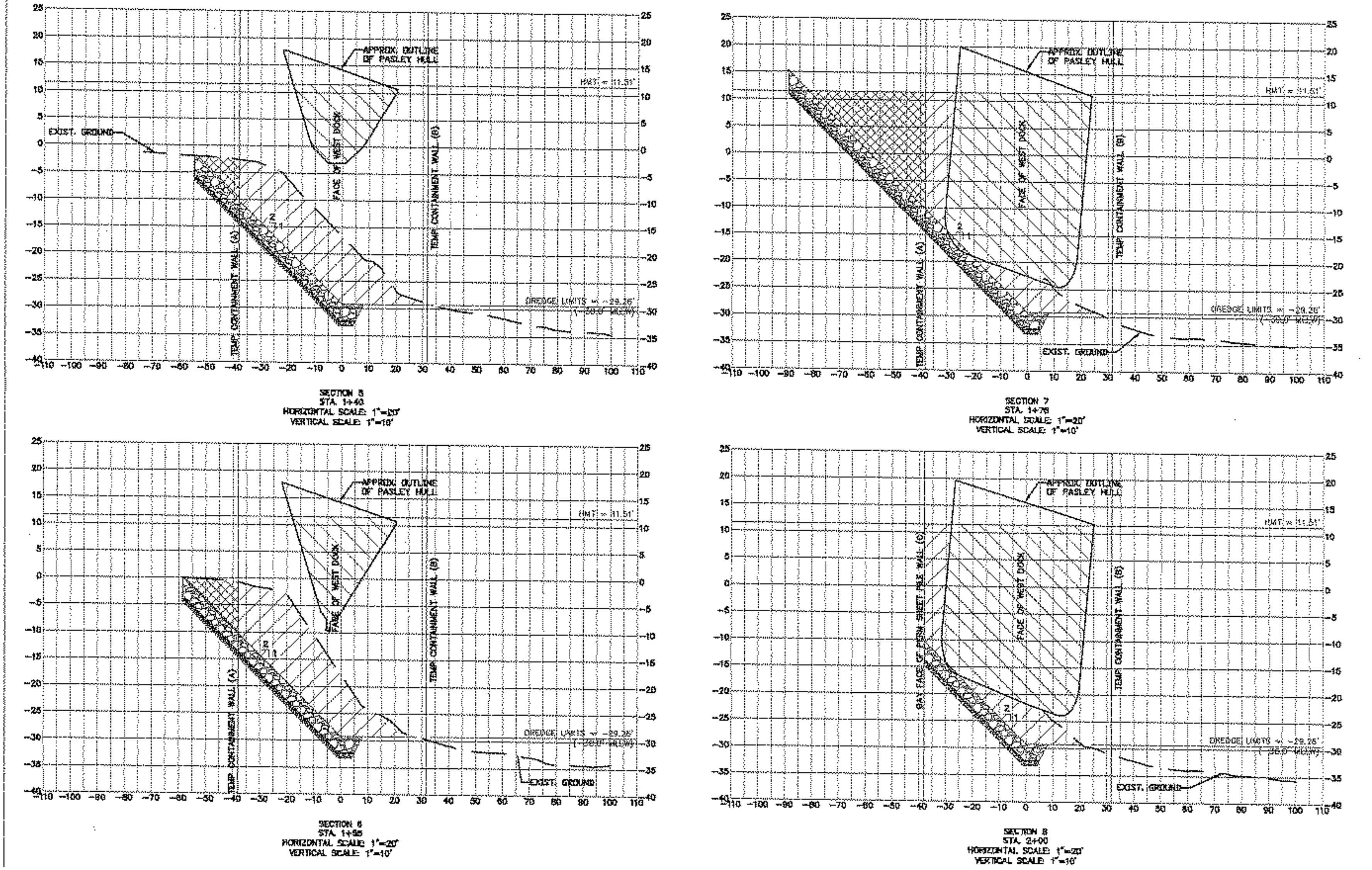


FIGURE 6D

Cross-sections through SS Pasley and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

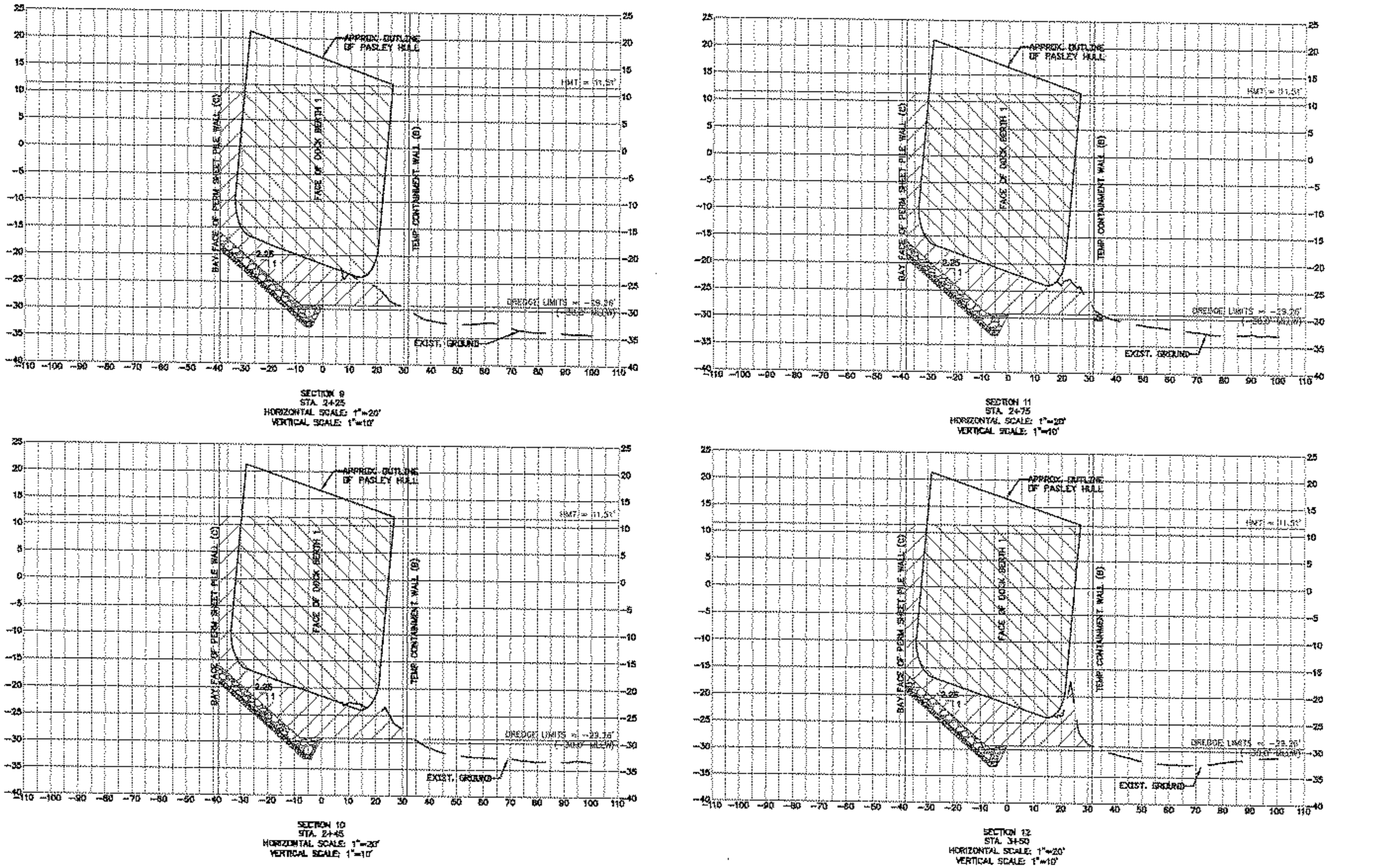


FIGURE 6E

Cross–sections through SS Pasley and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

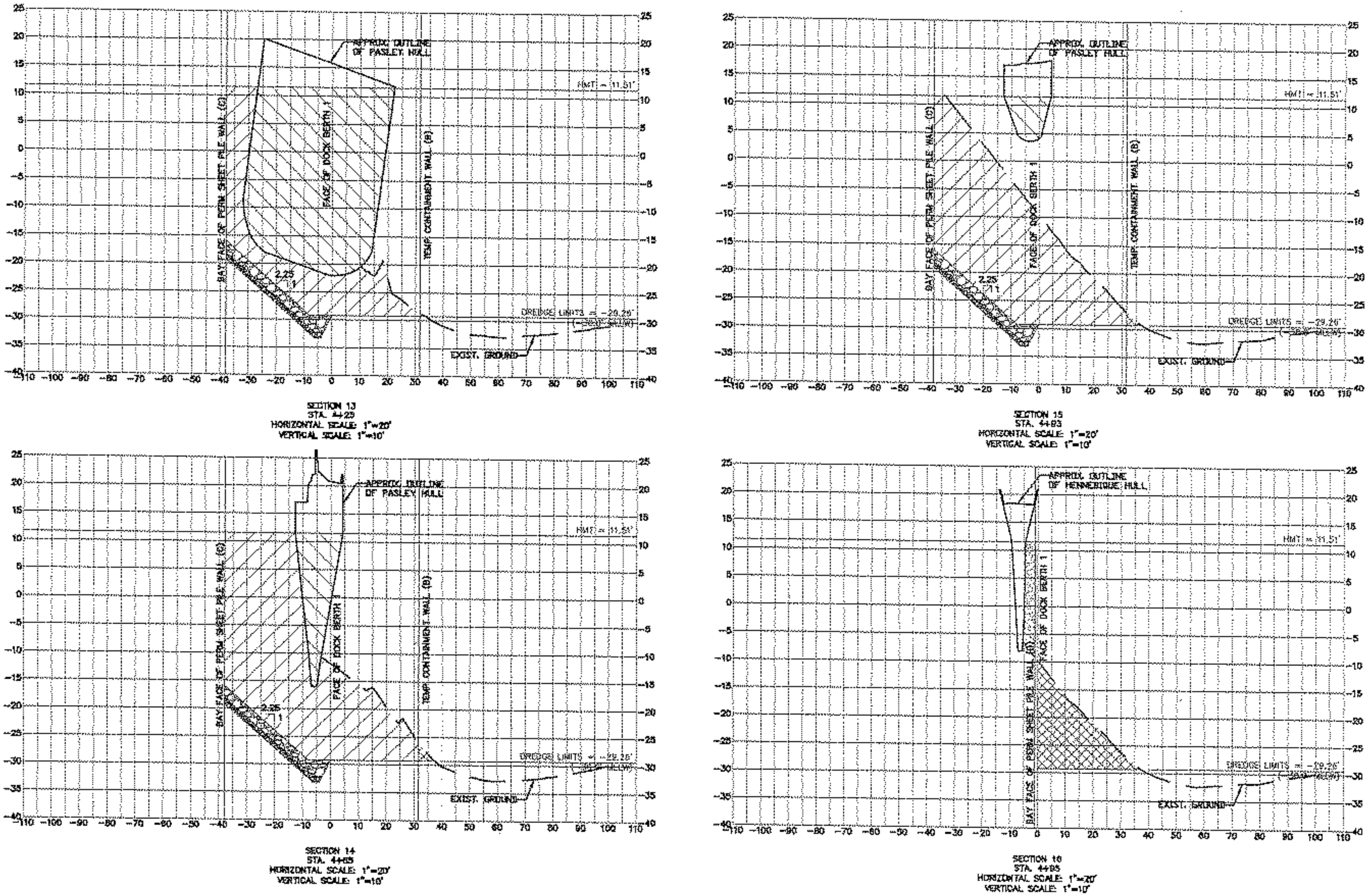


FIGURE 6F

Cross–sections through SS Pasley, SS Hennebique, and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

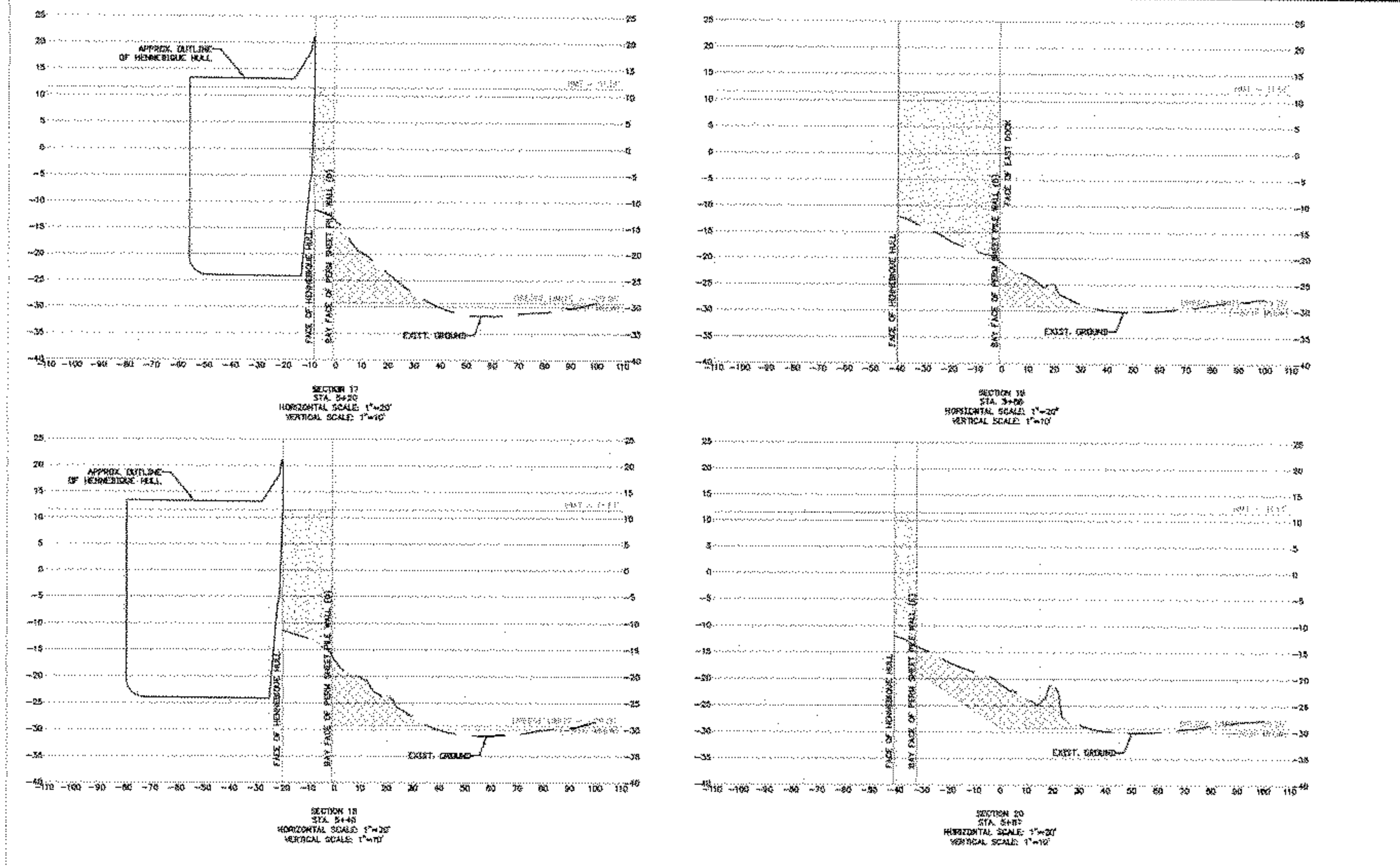


FIGURE 6G

Cross-sections through SS Hennebique and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See Figure 6B for legend.

4540
5/20/10

Pacific Habitat Services, Inc.

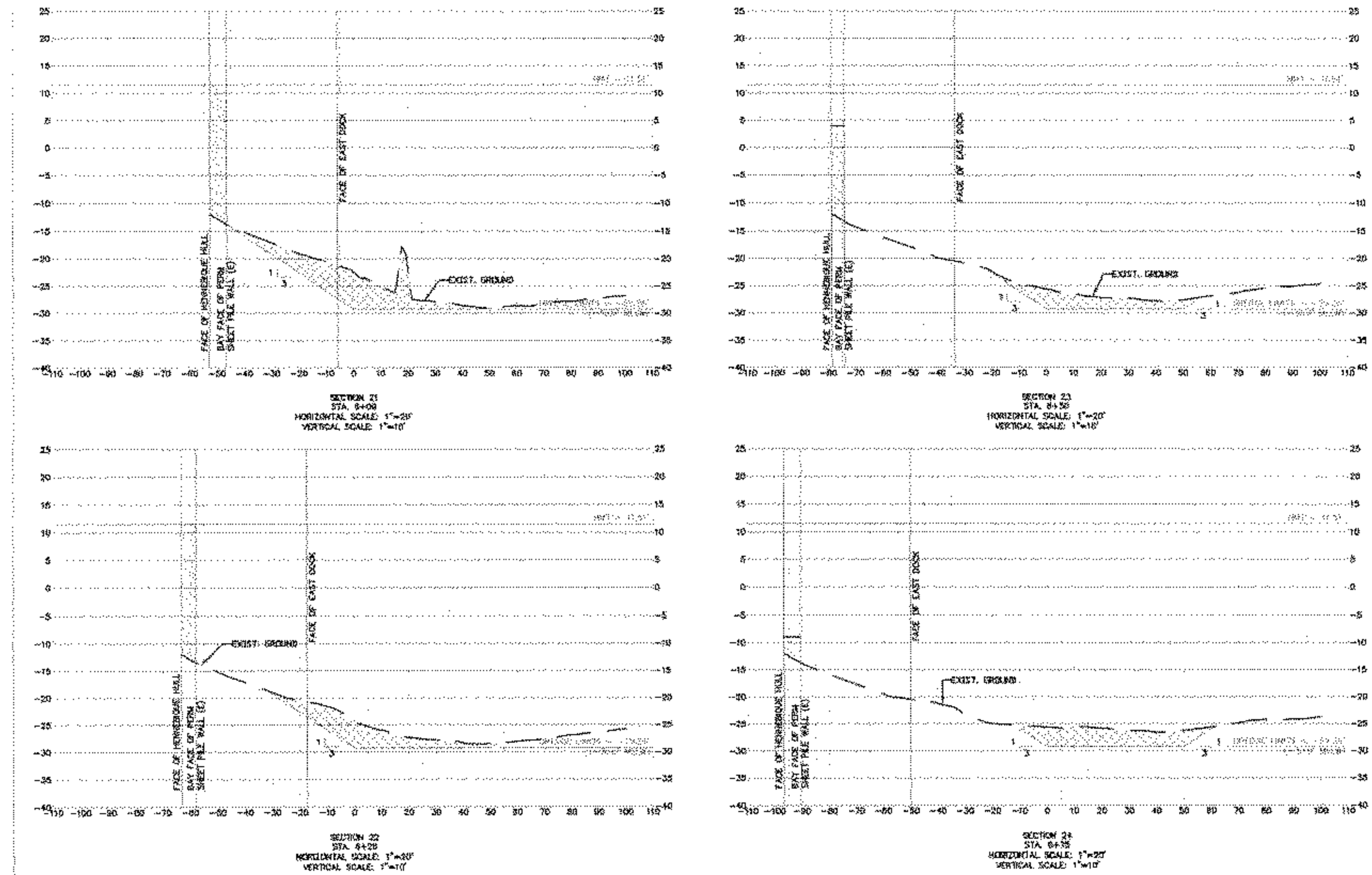


FIGURE 6H

Cross-sections through SS Hennebique and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See Figure 6B for legend.

4540
5/20/10

Pacific Habitat Services, Inc.

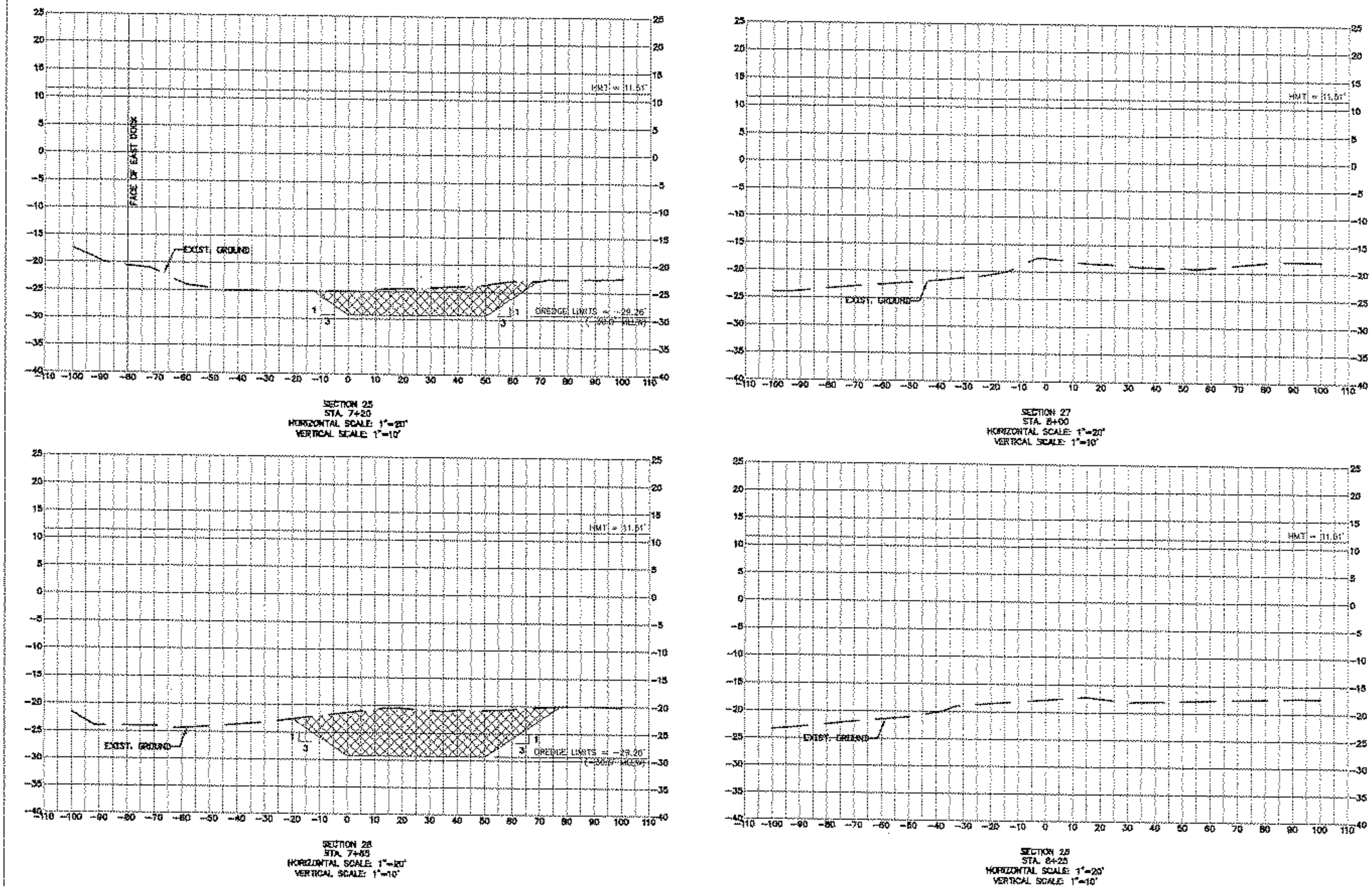


FIGURE 6

Cross-sections through East Dock and dredging for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

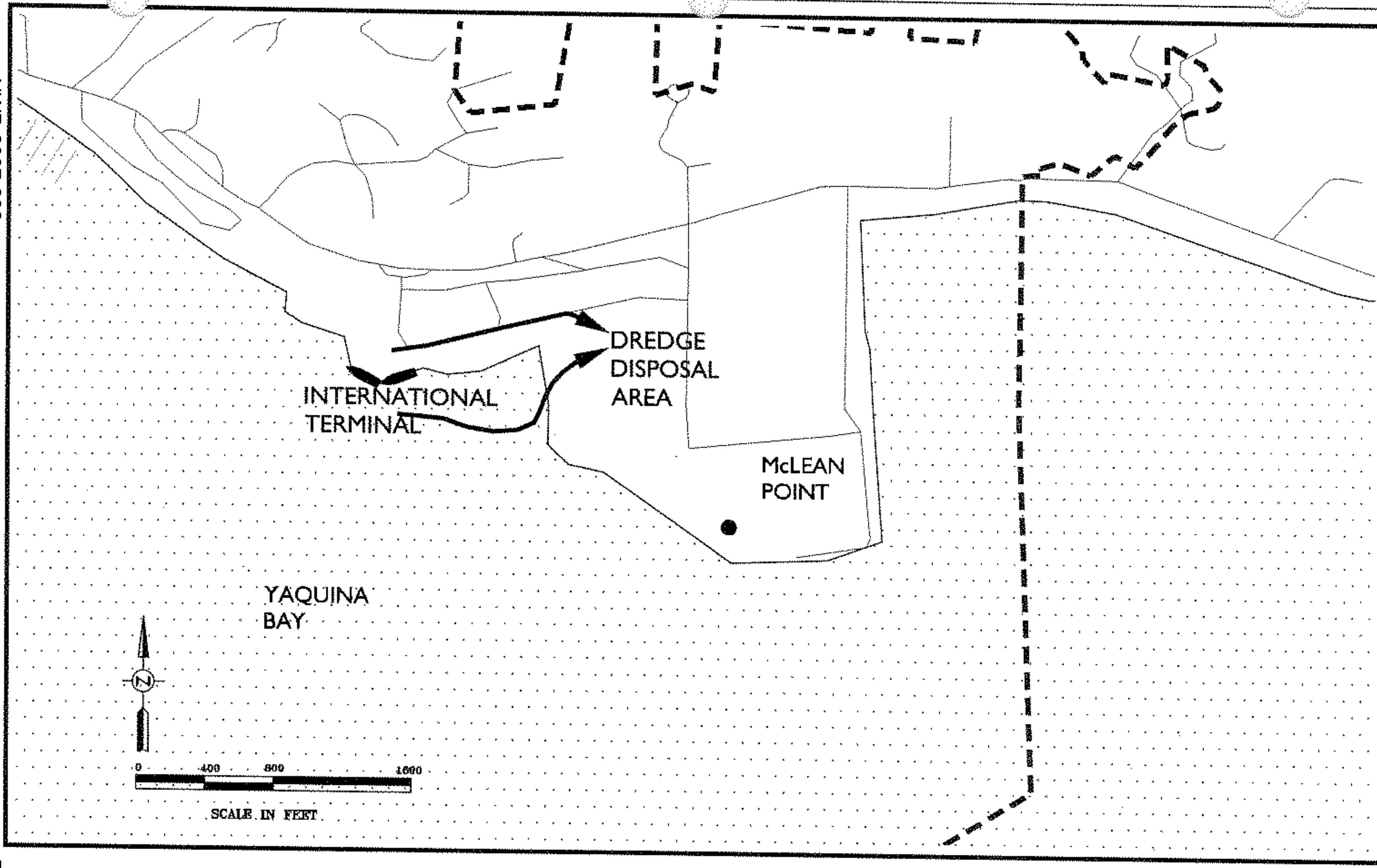
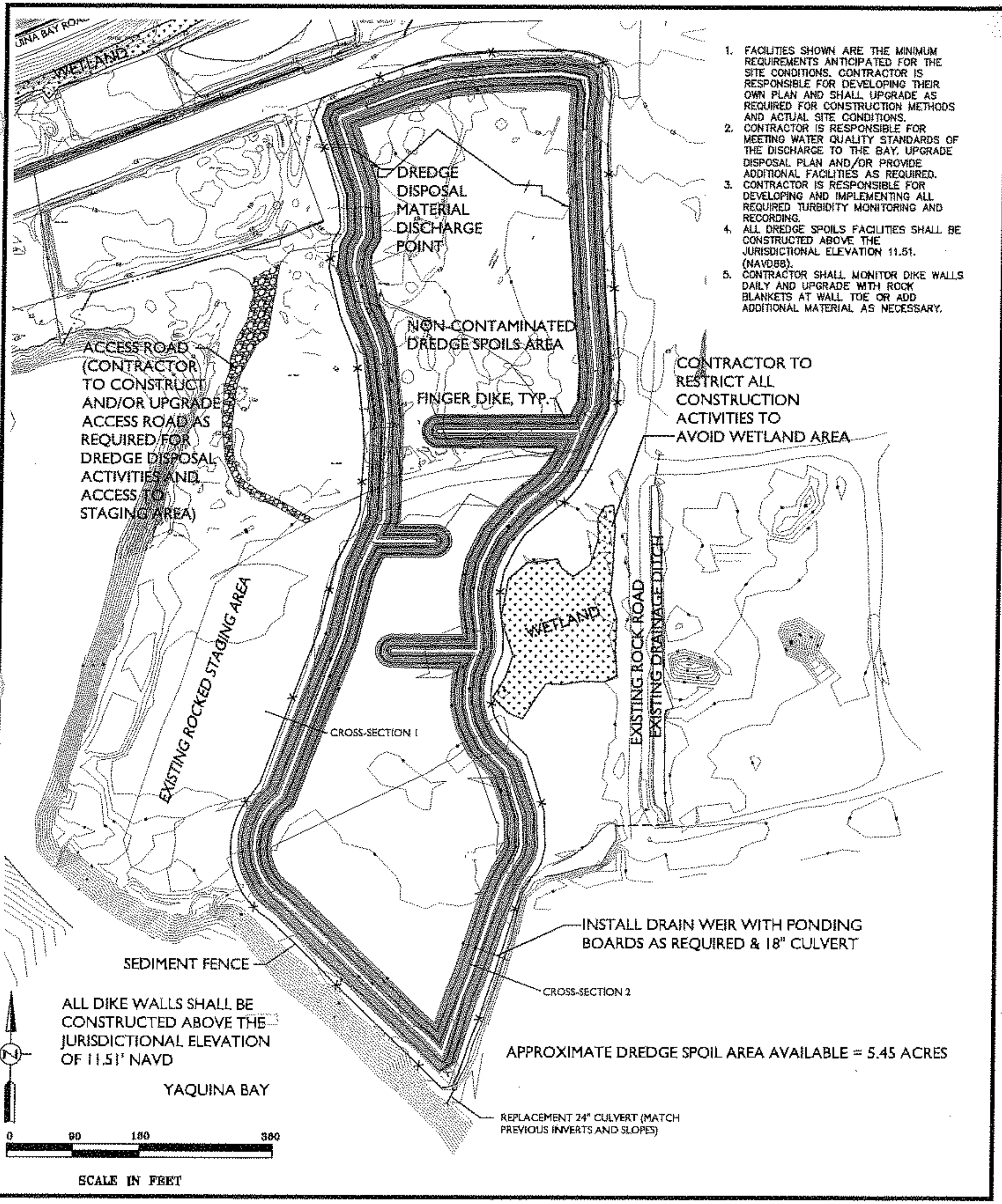


FIGURE 6J

Dredge disposal for the proposed renovation of the International Terminal in Newport, Oregon.

4540
5/20/10

Pacific Habitat Services, Inc.



5/20/10
4540

Proposed site plan at the dredge spoil disposal site for the proposed renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

FIGURE 6L

PHS Pacific Habitat Services, Inc.

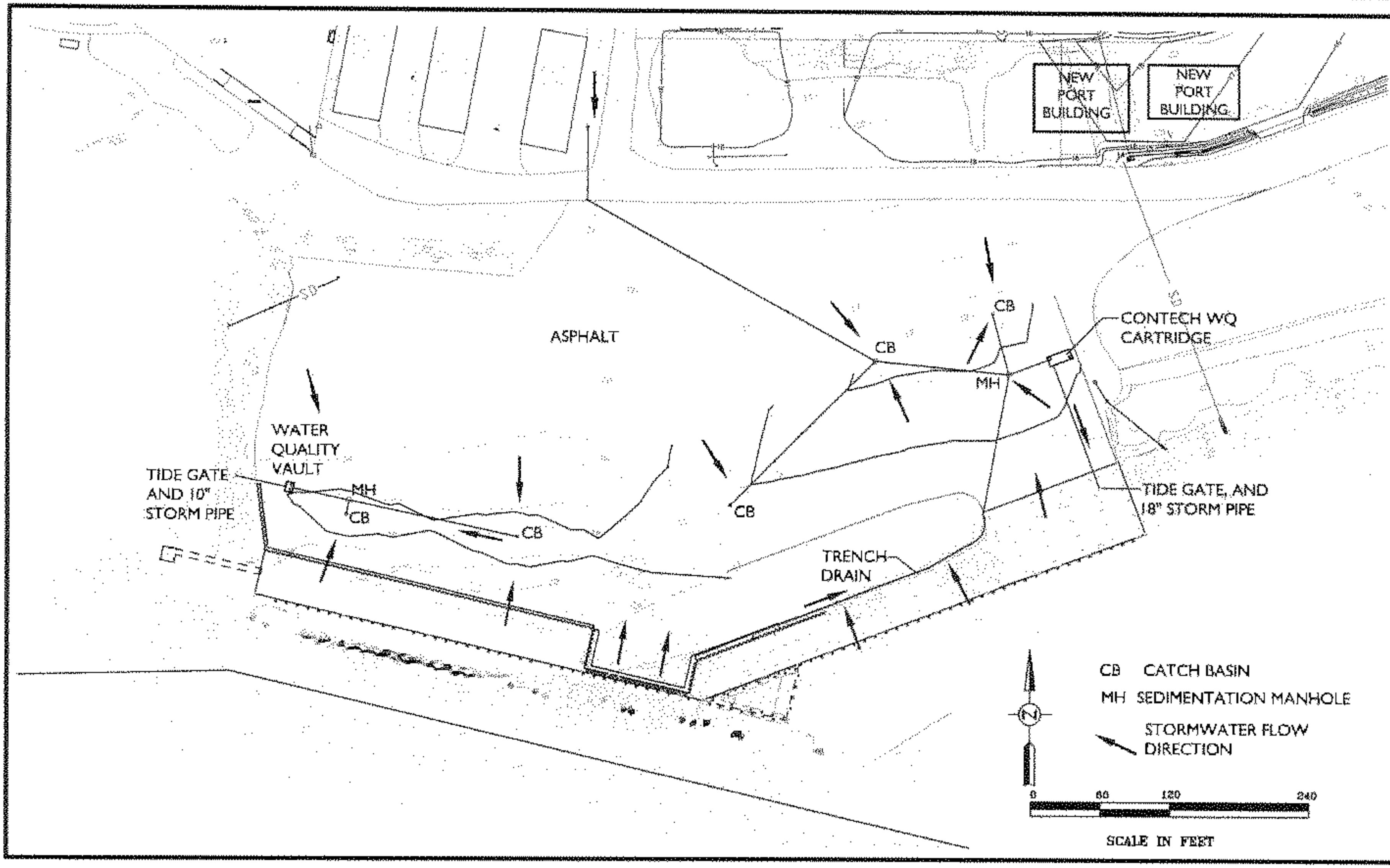
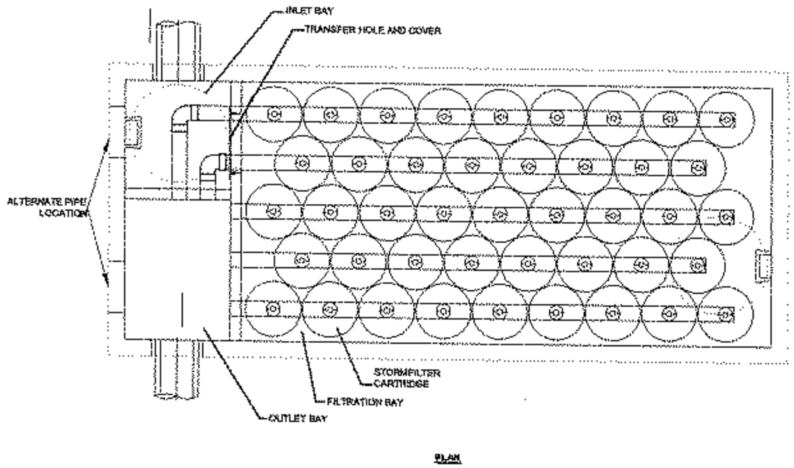


FIGURE 8

Proposed stormwater plan at the renovation of the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See Figure 8A for detail of the WQ vault and Figure 8B for detail of WQ cartridge. There will be no additional pavement resulting from the new Port buildings.

4540
5/20/10

Pacific Habitat Services, Inc.



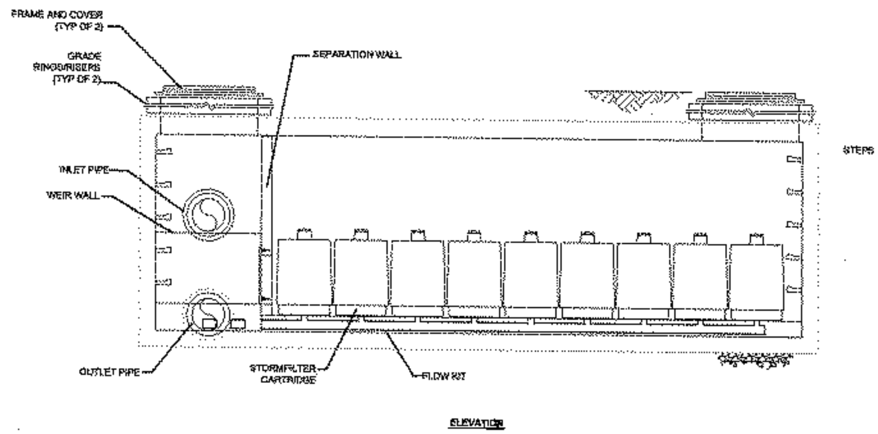
STORMFILTER DESIGN TABLE

CONTECH STORMWATER SOLUTIONS. — StormFilter

- THE STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT CFS.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY CONTECH STORMWATER SOLUTIONS UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	27"		18"		12"	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	3.05'		2.3'		1.8'	
TREATMENT BY MEDIA SURFACE AREA	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.



PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 37 SECONDS.
SPECIFIC FLOW RATE SHALL BE 2 GPM/SF (MAXIMUM). SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE 8 GPM/CF OF MEDIA (MAXIMUM).

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.contech-cpi.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. STRUCTURE SHALL MEET AASHTO H-20 LOAD RATING AND CASTINGS SHALL MEET AASHTO H-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.

INSTALLATION NOTES
1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
6. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

StormFilter

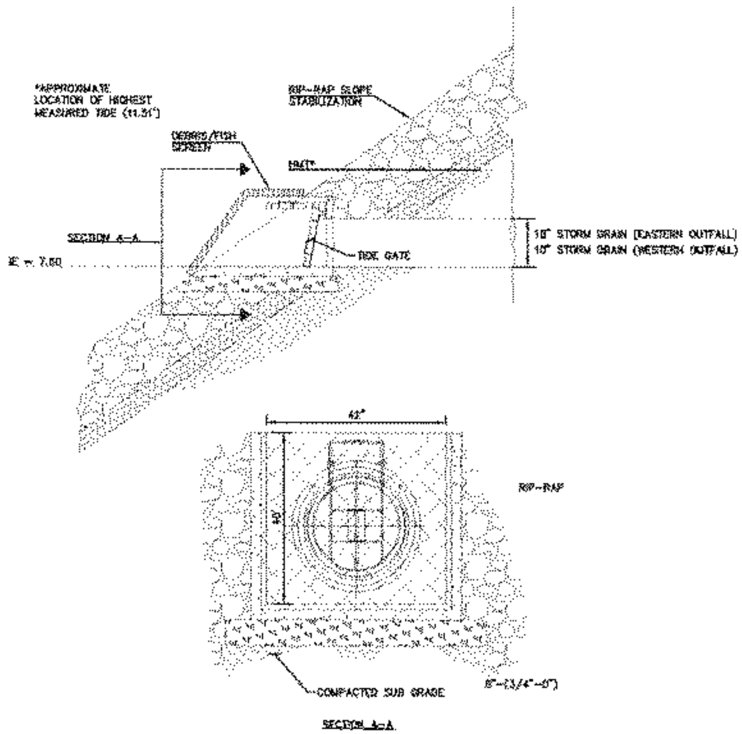
FIGURE 8B

Stormwater details at the proposed renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

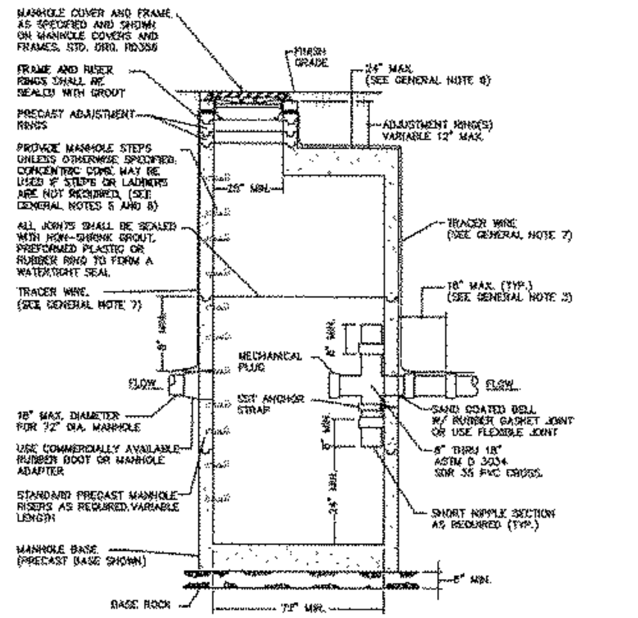
PHS



NOTES:

1. TIDE GATE SHALL BE WATERMEN F-10 DRAINAGE GATE OR APPROVED EQUAL, WITH STAINLESS STEEL LINKS AND BOLTS.

TIDE GATE



GENERAL NOTES:

1. ALL PRECAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 72". MAXIMUM PIPE DIAMETER 18".
3. ALL CONNECTING PIPES SHALL HAVE A FLEXIBLE, GASKETTED, AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL.
4. SEE ODOT STD. DRG. RD344 FOR MANHOLE BASE SECTION.
5. SEE ODOT STD. DRG. RD338 FOR MANHOLE STEPS DETAILS.
6. ADJUST 24" MAX.
7. SEE ODOT STD. DRG. RD339 FOR TRACER WIRE DETAILS.
8. LADDER WITH NOTCHED SAFETY RAIL AND REMOVABLE EXTENSION IS REQD. FOR MANHOLES WITH DEPTHS BETWEEN 24'-0" AND 60'-0".

STORM SEWER SEDIMENTATION MANHOLE

FIGURE 8C

Stormwater details at the proposed renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

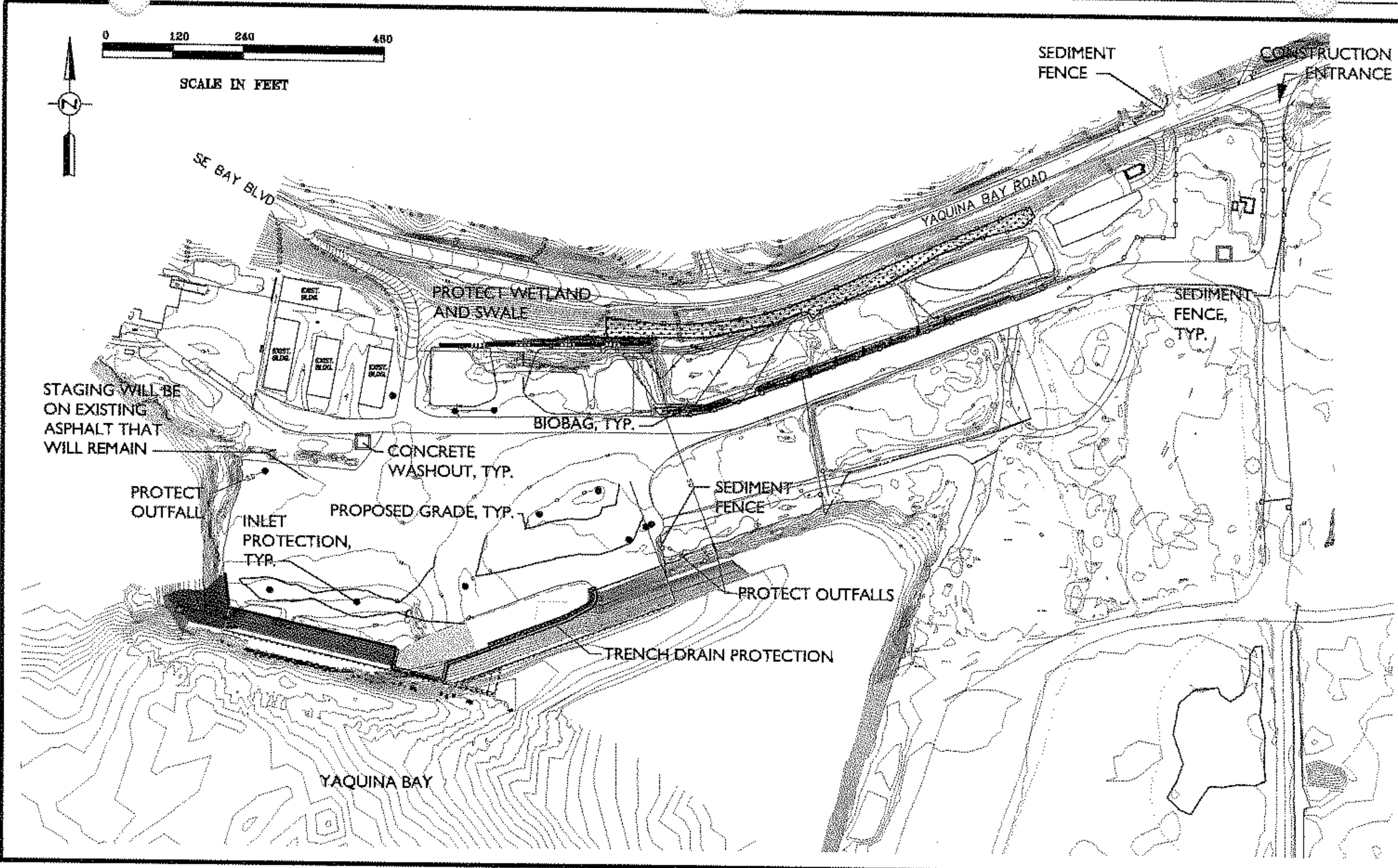


FIGURE 9

Overview of erosion control plan at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

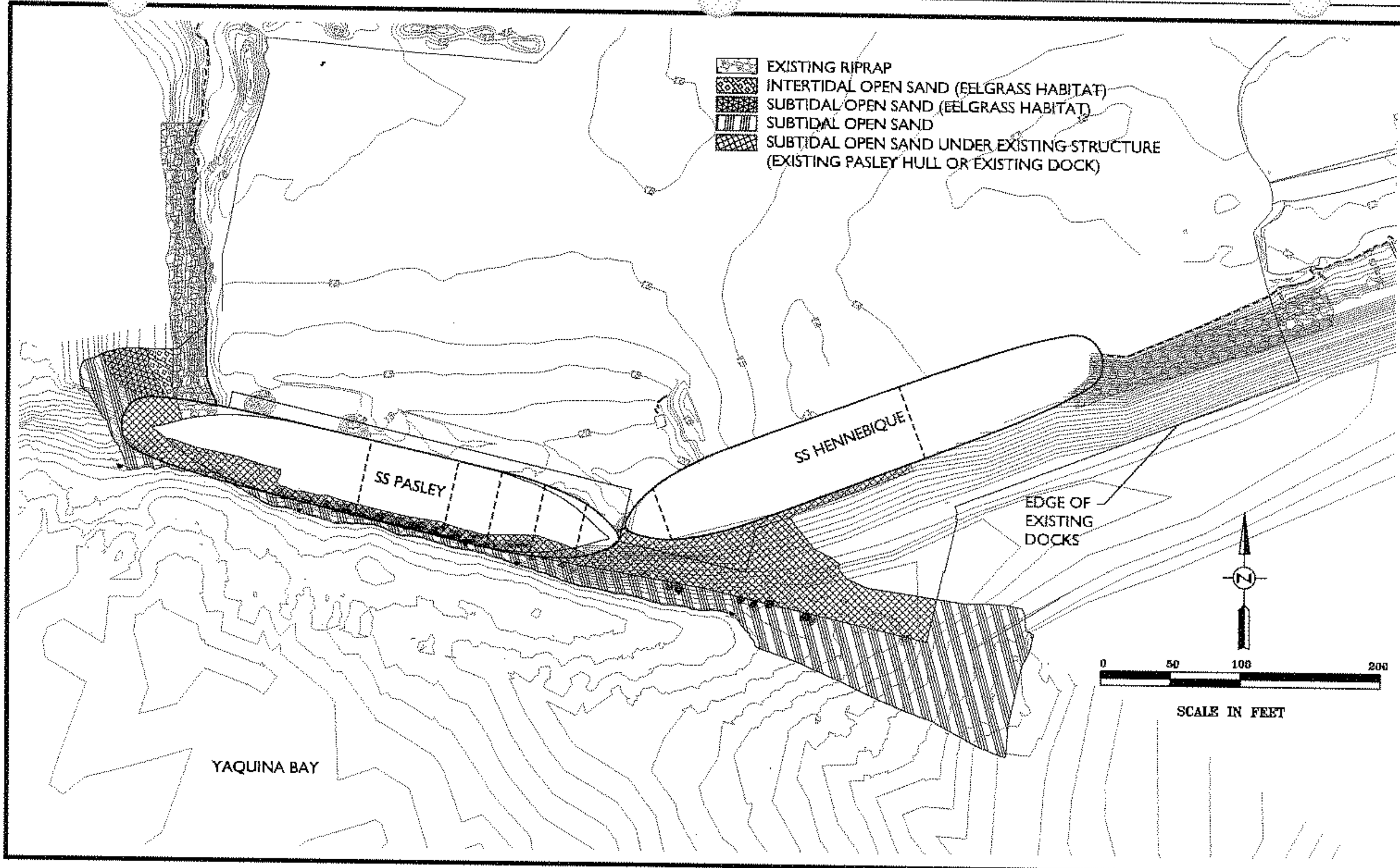


FIGURE 10

Existing habitat areas at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

PHS

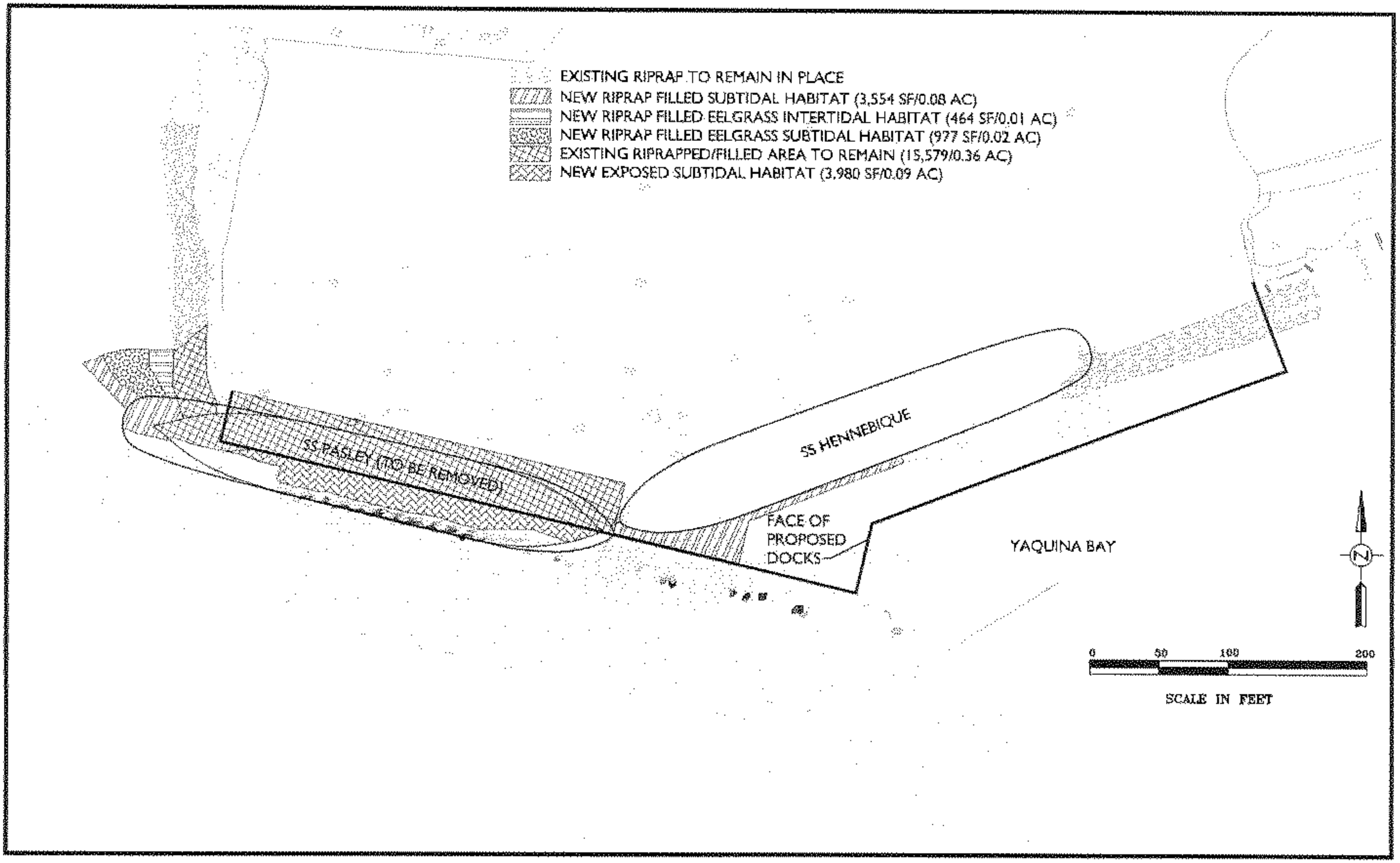


FIGURE 10A

Gains and losses of intertidal and subtidal substrate at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

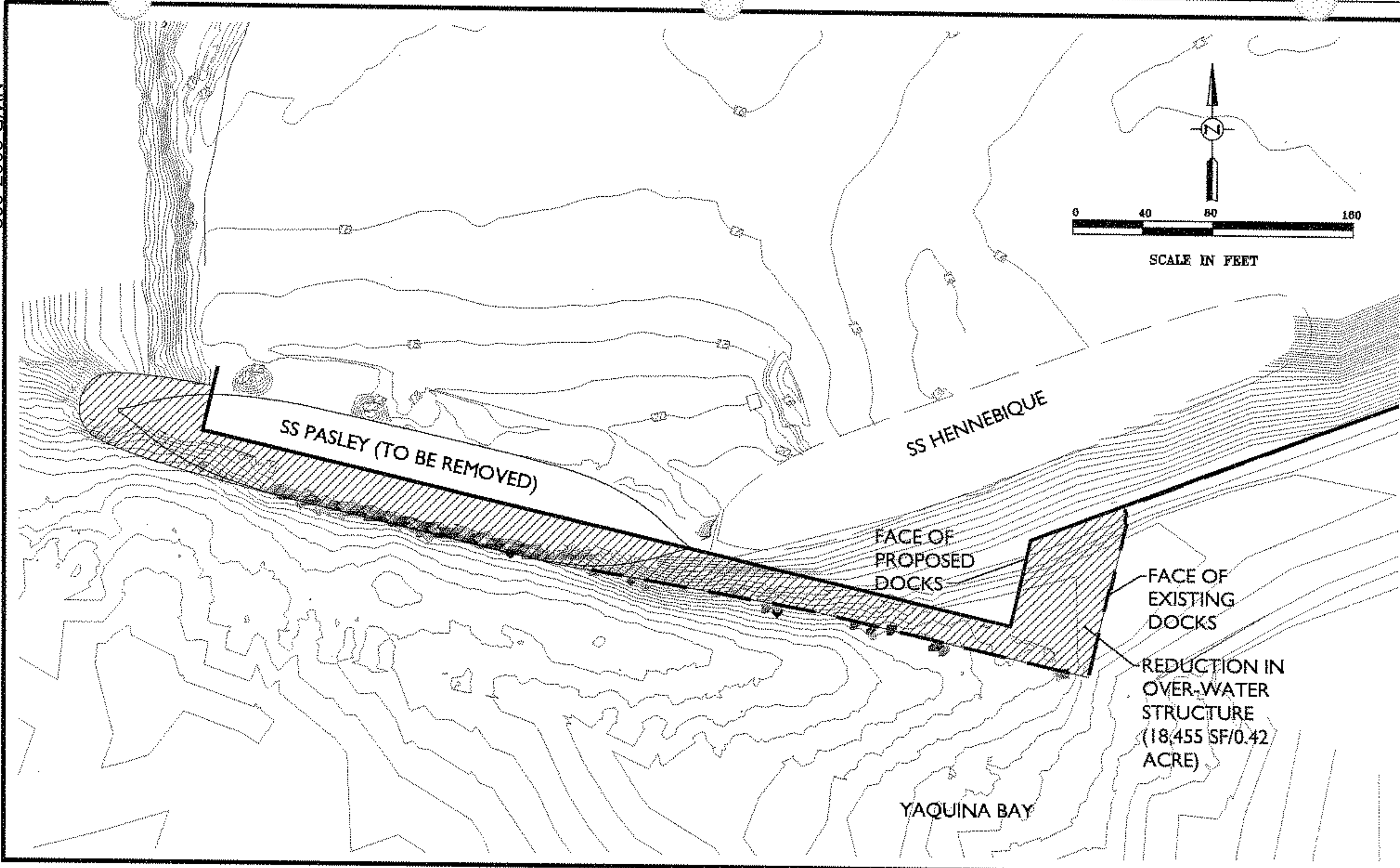


FIGURE 10C

Reduction of over–water structure at the renovation of the International Terminal in Newport, Oregon. Base map provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

CENWP-OD-G May 19, 2010

Memorandum (Revised): for Portland District Regulatory Branch

Subject: Project Review Group (PRG) review of the *Sediment Characterization Report* (SCR), *Port of Newport International Terminal, Newport, Oregon*; dredged material and new surface material (NSM) suitability determinations for the Port of Newport's project (NWP-2007-832).

Reviewers: The following summary reflects the consensus determination of the Portland District Project Review Group (PRG) agencies (U.S. Army Corps of Engineers, Environmental Protection Agency, National Marine Fisheries Service, Washington Department of Ecology, and Oregon Department of Environmental Quality) regarding the consistency of the SCR with the 2009 *Sediment Evaluation Framework for the Pacific Northwest* (SEF). James McMillan (Corps), Dan Gambetta (NMFS), Peter Anderson (Oregon DEQ), and Jonathan Freedman (EPA) reviewed the SCR for consistency with the SEF guidance. Washington Department of Ecology and the U.S. Fish and Wildlife Service did not review the SCR.

Prepared by: James M. McMillan (CENWP-OD-G)

Project Authorities: Section 10 of the Rivers and Harbors Act, Sections 401 and 404 of the Clean Water Act, Section 7 of the Endangered Species Act, Section 305 of the Magnuson-Stevens Act, et al.

Project Description: The sediment characterized by the Port includes material in front of the S.S. Pasley that would be dredged to achieve an operational depth of -30' (below MLLW) plus 1 foot of advanced maintenance. The applicant would remove up to 6,500 cubic yards (CY) from the dredge areas identified in the SCR. As described in the Sampling and Analysis Plan (SAP), the greatest amount of dredging would occur just immediately off the bow of the ships towards the bay.

The approximate dredge volumes associated with DMMU PON-1 can be broken out as follows:

- The volume associated with sampling location PON 1-1 is 1,200 CY
- The volume associated with sampling locations PON 1-4, PON 1-5, and PON 1-6 is 4,700 CY
- Sampling location PON 1-3 is virtually volumeless and is designed to measure the effects of driving the sheet piling.

This sediment characterization report does not cover sediments beneath the S.S. Pasley or the S.S. Hennebique; the applicant proposes to remove the Pasley when they receive a permit from the Corps. When the Pasley is removed, the sediments beneath the ship would be characterized and the results provided in a subsequent report. The Pasley would be removed after a sheet pile wall was erected to isolate the ship demolition from the bay. There is currently no plan to remove the Hennebique, and it will be remediated in place. However, sediments from beneath the Hennebique would be sampled and characterized in a manner similar to the Pasley if it were ever removed in the future.

<u>Dredging Method:</u> Due to the occurrence of contaminants above SEF marine screening levels (SLs) in the dredge prism, the applicant will likely use a crane with a clamshell (environmental) bucket to conduct the dredging.

<u>Transport/ Disposal Description:</u> Dredged material will likely be transported to McLean Point by barge, and offloaded to a confined, upland disposal facility. Management options for interstitial water at the disposal site have not yet been defined; the proposed project was in pre-application consultation with the Corps at the time of this review.

Management Area Ranking/ Recency: The PRG has assigned a "High" management area rank to the project. The PRG initially assessed a "Moderate" management area rank for the project, but the occurrence of several contaminants above marine SLs (in both the dredge prism and the NSM) warrants that the project be moved to the highest rank. Sediment characterization data from high-ranked sites may be used for two years before additional testing is required.

Sampling and Analysis Summary: Four sediment cores (PON 1-1, PON 1-4, PON 1-5, and PON 1-6) and one grab sediment sample (PON 1-3) were collected from Yaquina Bay near the Port of Newport International Terminal. Sediment samples were collected with a Vibracore and grab sampler. Due to subsurface debris (rock, wood, etc.), samples were collected within approximately 5 to 45 ft. of the planned locations. Core PON 1-2 (which represented approximately 10 CY) could not be recovered due to the rocky subsurface material encountered.

Sediment sampling results from the December 2009 sampling event showed high concentrations of dioxins in the dredge prism material at sampling location PON 1-4 as well as polynuclear aromatic hydrocarbons (PAHs) that exceed the SEF marine SLs in the new surface material at sampling location PON 1-4. The Port of Newport elected to conduct additional sediment sampling in the vicinity of sampling location PON 1-4 in order to confirm and delineate the detections of dioxins/furans and PAHs. Five additional sediment cores were collected in the vicinity of PON 1-4. One sediment core, PON 1-4A, was advanced and collected as close as reasonably possible to the previous PON 1-4 sampling location in order to confirm the prior detections were not anomalous. Four additional sediment cores were collected; two immediately adjacent to the PON 1-4 location (PON 1-4B and PON 1-4C), one approximately 20 ft to the east of PON 1-4 (PON 1-4D), and one approximately 40 ft east of PON 1-4 (PON 1-4E).

DP CMP1 was used to characterize the dredge prism off of the stern of the Pasley. Samples DP 1-4 and 1-4A, and composite sample DP CMP3 (a composite of dredge prism material from cores PON 1-4 and PON 1-6) were used to characterize the dredge prism off of the bow of the Pasley. NSM samples were taken from each core and analyzed separately.

All samples were analyzed for conventionals and the following SEF CoCs:

- Metals (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc)
- Semivolatile organic compounds (SVOCs; including phenols, PAHs, phthalates, chlorinated hydrocarbons, and miscellaneous compounds)
- Pesticides
- Polychlorinated biphenyls
- Tributyltin (chemical of special occurrence)
- Dioxins/Furans (chemical of special occurrence)
- Total Petroleum Hydrocarbons (chemical of special occurrence)
- Conventionals (total organic carbon, total solids including total volatile solids, ammonia, sulfides, grain size)

Results:

Grain Size (Dredge Prism and NSM): Fines in the dredge prism ranged from 22.0% to 58.5% (sands and coarser particles ranged from 41% to 74%). Fines in the NSM ranged from 23.8% to 58.6% (sands and coarser particles ranged from 41.4% to 76.2%).

Dredge Prism Chemistry: The analytical results of the dredge prism characterized by sample DP CMP1 (off of the stern of the Pasley) did not show exceedences of the SEF marine SLs.

The analytical results of the material characterized by sample Grab 1-3 (off of the starboard side of the Pasley) did not show exceedances of SEF marine SLs.

The analytical results of the dredge prism characterized by samples DP 1-4 and 1-4A, and by DP CMP3 (off of the bow of the Pasley) had several detections (below SEF marine SLs). Dioxin and furan congeners in sample DP 1-4 occurred at concentrations that are of concern to the PRG agencies (Dioxin TEQ for DP 1-4 = 209 pg/g). The currently accepted levels of dioxin for marine systems were developed for the Puget Sound: 1) 2,3,7,8-TCDD = 5.0 pg/g, and 2) dioxin TEQ = 15 pg/g. However, the composite sample DP CMP3 and the confirmation sample DP1-4A indicate that the high measured concentrations of dioxin in DP 1-4 are only indicative of a small volume of dredged material; dioxin contamination is likely limited to those areas directly next to the adjacent dock structure.

NSM Chemistry: The analytical results of the NSM characterized by sample NSM 1-1 did not show exceedences of the SEF marine SLs.

The analytical results of the new surface material samples collected from sampling location PON 1-4 showed exceedances of the SEF marine SLs for several PAHs. It is likely that the source of these PAHs is the creosote-treated pilings located in the immediate vicinity of the sampling locations. The total toxicity equivalent (TEQ) concentrations for dioxins and furans were also at levels of concern for the PRG agencies at sample location PON 1-4.

An additional sample was collected and analyzed for PAHs approximately 20 ft to the east (PON 1-4D) of sampling location PON 1-4, the results of which showed no exceedances of SEF marine SLs.

Based on these results, it appears that the contaminated NSM is limited to the area between sampling locations PON 1-4 and PON 1-4D and the area beneath the wood dock structure where pilings are located.

Dredged Material and NSM Suitability Determination

Suitability Determination (Dredged Material): As stated above, the dredged material will go to an upland, confined disposal site. Determining the suitability of the material for upland placement is outside of the purview of the SEF. The Port should coordinate with Oregon DEQ to ensure that dredged material has been adequately characterized per the requirements of that agency. However, a dredged material suitability determination for the International Terminal project is provided in the event that the Port proposes unconfined, aquatic disposal of the dredged material.

The dredged material characterized by sample DP 1-1 is suitable for unconfined, in-water placement without additional testing.

Sediment characterized by sample Grab 1-3 does not contain contaminants at levels above the SEF marine screening levels. Sediment that would be resuspended by the installation of the containment sheet pile wall does not contain contaminants at levels of concern.

The dredged material characterized by samples DP 1-4 and DP 1-4A indicate that dioxin is at levels of concern in the dredge area directly abutting the dock structure. Dredged material in this location is not suitable for unconfined, in-water placement without further characterization (bioaccumulation studies). Dredged material from core PON 1-4D to the southeastern extent of the dredge prism is suitable for unconfined, in-water placement without additional testing.

Suitability Determination (New Surface Material): The NSM characterized by sample NSM 1-1 is suitable for unconfined, aquatic exposure without additional testing.

The NSM characterized by sample NSM 1-4 is not suitable for unconfined, aquatic exposure without additional biological testing. Sediment characterization results indicate that several PAHs exceed the SEF marine SLs. Dioxin was detected in the NSM 1-4 sample, but the total dioxin TEQ was below 15 pg/g, and dioxin concentrations would decrease if the area off of the bow of the Pasley was dredged.

The applicant has acknowledged that the NSM around core PON 1-4 will require special handling and management. Management options include overdredging and/or capping. A conservative estimate of 600 CY was calculated as the additional volume that would be required to overdredge down to an elevation of -35 ft. MLLW. Based on the test pile installation in the vicinity of the Port's International Terminal, a siltstone stratum is present at approximately -32 ft. MLLW at core PON 1-4. It is unlikely that contamination would be found below this siltstone layer.

Contact: If you have questions regarding the content of this memorandum, please contact James McMillan (PRG Lead) by telephone at (503) 808.4376 or by email at james.m.mcmillan@usace.army.mil.

- *No encapsulation of most of the Hennebique* -- only the upper portion of the deck and side walls (approximately three feet) of the Hennebique will be removed (upper deck) and the remaining portion of the ship will remain open to the Bay. This ensures that the Bay is preserved and that the ship can easily be removed in the future, should funding become available. The ship will be allowed to disintegrate over time. As the ship is completely remediated, the inert material will not harm the estuary.

- *Full remediation of both ships* – although there are currently no plans to remove the Hennebique, the ship will be completely remediated. Unlike Alternative 2, which described remediating only the accessible portions of the ships, the remediation plan for the preferred alternative ensures there will be no possibility of future leaks into the Bay.

- *No 60-foot long dock extension* – the proposed design included a 90-foot gap between the cargo dock and the fishing dock. The gap would have potentially limited the marketability of the cargo dock to shipping lines as larger ships could not have used the Terminal. To address this concern the Port proposed a 60 foot dock extension to the dock's west end. This would create a 350-foot long cargo dock, while Port searched for additional funding to remove the Hennebique and close the gap. The additional cost of this alternative for the 350 foot dock would be approximately $165,000. It would have required additional riprap, additional dredging, and an overwater structure that could provide habitat for predatory fish. The Port reviewed this option and based on concerns about its potential impacts to the Bay it was dropped from consideration.

- *Reduced riprap* – The western-most dredged slope utilizes a thicker layer of riprap in order to steepen it to a 2H:1V slope. A steeper slope minimizes impacts to eelgrass by shortening the slope, and therefore the area of required riprap.

  The dredged slope under the proposed west dock was steepened to a 2.25H:1V to allow for the entire riprap slope to be pulled under the dock, thereby leaving more square feet of bay bottom open to the water column (i.e. open sand). Slopes at either end of the dredged area, and those at the east end of the Pasley, were flattened to 3H:1V to eliminate the need for riprap. The riprap toe was narrowed from 10-feet to 8-feet to lessen the amount of riprap required.

- *Removal of wooden dock and piles* – the "fishermen's dock" or wooden dock on the east side of the Terminal would have eventually rotted and fallen into the Bay. As the dock is made of pretreated wood, the agencies wanted it removed to ensure there was no threat of contamination

- *Installation of piles using vibratory methods* – The piles could be driven using an impact hammer. However, impact hammers produce noise at levels that can be harmful or fatal to fish and marine mammals. To reduce potential impacts to fish or marine mammals, all piles will be installed using vibratory hammers, when possible.

Description of resources in project area:

Describe the existing **physical and biological characteristics** of the wetland/waterway site by area and type of resource (Use separate sheets and photos, if necessary).

For wetlands, include, as applicable:

The Newport International Terminal site is located on the north shore of Yaquina Bay in the City of Newport, Oregon. The portions of the bay immediately adjacent to the project site include the Port of Newport's moorage basins, the dredged waterfront in the Newport urban area, and the Terminal facilities at McLean Point. This portion of Yaquina Bay is used intensively for shallow and medium draft navigation, moorage of small and large boats, and recreation (shore and boat fishing, clamming, and beach combing). Other significant uses include the Terminal operation, research activities, and a U.S. Coast Guard Station. The shoreline and aquatic areas are significantly altered with riprap, bulkheads, piers and wharves, piling, and floating docks, and by dredging and other activities. The action area, itself, includes areas of deepwater and navigation channel. The bay is maintained as a deepwater port by the U.S. Army Corps of Engineers. The elevation of the navigation channel in the immediate vicinity of the action area is approximately -35 feet. The Oregon Department of Land Conservation and Development (DLCD) has classified Yaquina Bay as a Deep Draft Development Estuary. The Yaquina River Estuary Plan calls for management of the area to provide for public, commercial, and industrial uses, including navigation, marinas, aquaculture, and aggregate extraction.

The Yaquina River drains an area of approximately 253 square miles, and originates in the Coast Range near the boundary of Benton and Lincoln counties. The Yaquina River flows generally southwest, past the City of Toledo and into Yaquina Bay before reaching the Pacific Ocean at Newport. The Yaquina River watershed is largely undeveloped. Land use within the watershed is approximately 87 percent forest land, approximately four percent crop land, approximately two percent range land, and approximately seven percent in miscellaneous uses. Approximately 72 percent of the basin is in private ownership. Much of the upper watershed is owned by large timber companies. Logging is a major activity in the basin, and wood products processing plants are located in Toledo and Eddyville. Livestock grazing and crop production occur on the relatively flat valley floors of the Yaquina River and its major tributaries. The economy of the lower watershed is based largely on fishing, seafood processing, forest products export, and tourism.

The Yaquina estuary encompasses approximately 3.2 square miles and is the fourth largest estuary in Oregon (excluding the Columbia). The estuary includes approximately 1,353 acres of wetlands, including approximately 819 acres of tidal marshes and approximately 534 acres of mud flats. Large eelgrass beds are present in the lower and middle portions of the estuary. These resources are important contributors to primary production and provide nurseries, breeding grounds, critical habitats, and nesting areas for numerous organisms. The estuary is mapped as essential habitat for migratory salmon and is an important stop over and resting area for numerous species of waterfowl and shorebirds (ODEQ *et al.* 2005).

Yaquina Bay is designated as essential salmonid habitat. The aquatic habitat at the project site consists of developed dock facilities, a small area of eelgrass bed, and deepwater estuarine habitat. The action area lacks natural bank slopes, and freshwater and saltwater wetlands.

Existing Shoreline Habitat: The existing dock facilities provide substrate and habitat for numerous organisms. Dive surveys of the Pasley and Hennebique in July 2007 (Northwest Underwater Construction 2007) documented numerous marine species using the submerged and intertidal areas of the ship hulls and dock piles. Surfaces were used by encrusting algae; barnacles; numerous species of anemones, including plumose anemones (*Metridium senile*); bryozoans; sponges; limpets; mussels; sea stars, including ochre star (*Pisaster ochraceus*), slime star (*Pteraster tesselatus*), blood star (*Henricia* sp.), sunflower star (*Pycnopodia helianthoides*), and morning sun star (*Solaster dawsoni*); and crabs, including Dungeness crab (*Cancer magister*) and red rock crab (*C. productus*). Nudibranch egg ribbons were also observed on pilings. Several fish were documented in the dive videos, although visibility precluded identification of most fish. Fish identified in the videos include cabezon (*Scorpaenichthys marmoratus*), rockfish (*Sebastes* sp.), and sculpins. A rough visual estimate of light-colored anemone density on pilings ranged from seven organisms per square foot at 5 feet above the mudline to more than 20 organisms per square foot at 25 feet above the mudline. Densities of other organisms (i.e., taxa of a color other than white) were not apparent in the videos due to poor visibility.

Substrates near the ship hulls were documented in the dive surveys (Northwest Underwater Construction 2007). Substrates next to the hull of the Hennebique (below the concrete dock) were three to four inches of mud with no rock. At approximately 10 feet from the hull, mud increased to eight to ten inches, with no rock. At the bow of the ship, rocks were apparent, with one- to two-inch rock near the hull and eight-to ten-inch rock approximately ten feet from the hull. Substrates near the Pasley consisted of silt with 0.75- to six-inch rock. Some small riprap was present near the rudder. There was no apparent leafy algal growth; algae appeared limited to encrusting species. A geotechnical report determined substrates in the project area to be interbedded deposits of marine silts and sands that underlie deposited upland fill; these substrates likely mantle the mudline beneath the docks (GRI 2008).

Eelgrass Bed: A small eelgrass bed is present within the construction area of the proposed project. The bed is sparsely vegetated and is located in the intertidal and subtidal zones between an elevation of -8.0 feet and up to a lower limit of the existing riprap shoreline in the northwestern portion of the area to be dredged. The total area of the eelgrass bed within the construction area is approximately 0.03 acre.

Eelgrass beds are important habitats for fishes, shrimps, crabs, and waterfowl. The roots and rhizomes form a mat that stabilizes otherwise unconsolidated sandy mud substrate. The leaves float to the surface, slowing the flow of water, which results in the trapping of sediment in the eelgrass bed. The eelgrass leaves provide a substrate for the attachment of epiphytic plants and animals, and the rhizome mat provides habitat for invertebrates such as polychaete worms, brittle stars and ribbon worms. The eelgrass beds provide foraging habitat and cover for juvenile fish, such as English sole (*Parophrys vetulus*), starry flounder (*Platichthys stellatus*) and salmonid smolts, and spawning habitat for species such as Pacific herring (*Clupea pallasi*). Eelgrass has been designated as "Essential Fish Habitat" for juvenile salmonids. Juveniles utilize eelgrass beds for cover and forage as they move from freshwater to the ocean. Adult and juvenile Dungeness crabs can be abundant in eelgrass beds, as can sand shrimp (*Crangon* spp.). Eelgrass is eaten by a variety of waterfowl, and it forms a primary component, along with sea lettuce (*Ulva* spp.), of the brant's (*Branta bernicla*) diet. Much of the plant's biomass is not eaten directly by herbivores. Instead, detritus from the decaying eelgrass is suspended in the water column and becomes food for filter and deposit feeders. Because of the small size of the eelgrass bed and the sparseness of the vegetation within this area, the eelgrass bed within the project area provides fewer habitat functions than larger and more densely vegetated eelgrass beds elsewhere in the estuary.

Open Water Habitat: The existing Terminal facility is located immediately adjacent to the edge of the Yaquina River thalweg, with an average water depth of approximately 35 feet at high tide. This deepwater estuarine environment is an important habitat for a variety of organisms. The proximity of upstream eelgrass beds and mudflats to the thalweg of the river, in combination with the tidal saltwater inflows and freshwater river discharges, make the deepwater habitats in the vicinity of the project site a rich, diverse and productive environment (Dan Avery, pers. comm.). The deepwater habitat adjacent to the existing Terminal provides important habitat for a variety of species, and all estuarine fish and invertebrates species documented in deepwater habitats in the lower Yaquina estuary are presumed to occur within the water column of the action area, at least on occasion.

Deepwater estuarine habitat is critical to estuary dependent marine species as well as to anadromous salmonids transitioning between freshwater and saltwater. Deepwater estuarine habitat is also important to the production of forage fish. Native species that use deep water habitat in the estuary include fall Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon, steelhead (*Oncorhynchus mykiss*), chum salmon (*Oncorhynchus keta*), sea-run cutthroat trout (*Oncorhynchus clarkii*), topsmelt (*Atherinops affinis*), Pacific herring, longfin smelt (*Spirinchus thaleichthys*), surf smelt (*Hypomesus pretiosus*), Northern anchovy (*Engraulis mordax*), lingcod (*Ophiodon elongatus*), eulachon (*Thaleichthys pacificus*), starry flounder, English sole, Pacific staghorn sculpin (*Leptocottus armatus*), various gobies, Pacific sand lance (*Ammodytes hexapterus*), shiner sea perch (*Cymatogaster aggregata*), threespine stickleback (*Gasterosteus aculeatus*), Pacific tomcod (*Microgadus proximus*), white sturgeon (*Acipenser transmontanus*) and green sturgeon (Emmett *et al.* 1991). Dungeness crab, bay shrimp (*Crangon franciscorum*), gaper and cockle clams (*Tresus capax* and *Clinocardium nuttali*) also occur in Yaquina Bay's deep water habitats.

Deepwater habitat associated with river channels has been identified as critical rearing habitat for larger juvenile salmonids (Fresh *et al.*, 2005). Meyers found juvenile fall Chinook in the Yaquina estuary feeding primarily on larval fish (Northern anchovy, whitebait smelt, Pacific herring, shiner perch, surf smelt), larval crabs and larval shrimp in the Yaquina River channel. As juvenile salmon grow, they become more vulnerable to predators in shallow water habitat, and deepwater habitats provides better opportunities to elude predators. Deepwater habitat in the Yaquina estuary is heavily utilized by Chinook and chum salmon, both of which exhibit extended periods of estuarine rearing. Data from ORNHIC (2009) and ODFW (2003) indicate that coho, fall Chinook, and coastal cutthroat trout occur in the bay seasonally.

The Yaquina estuary provides critical spawning and rearing habitat for a variety of forage fish, including Pacific herring, Northern anchovy, longfin smelt, whitebait smelt, and surf smelt. Pacific herring spawn in the shallow waters of the tidal flats and larvae begin rearing in the estuary. Pacific herring are selective pelagic plankton feeders and during low tide cycles they are concentrated in deepwater habitats of the lower estuary. In marine waters, species such as Pacific herring, anchovies and smelt are food for commercial fish such as hake, salmon, rockfish, halibut, and lingcod. In Yaquina Bay, forage fish are prey for California sea lions (*Zalophus californicus*), harbor seals (*Phoca vitulina*), brown pelicans (*Pelecanus occidentalis*) and many other species.

Various studies have documented the biota of Yaquina Bay, but few are specific to the area of the proposed construction. In 42 bi-weekly trawls at ten stations in Yaquina Bay in 1967 and 1968, De Ben *et al.* (1990) documented at least 62 species of finfish and epibenthic crustaceans in the Yaquina estuary, with the highest diversity and abundance in the lower estuary. Based on this sampling, they concluded that the abundance and diversity of fish and crustaceans in Yaquina Bay is highest in summer and lowest in winter. Throughout the estuary, they found English sole, Pacific snake blenny (*Lumpenus sagitta*), and shiner sea perch to be the three most abundant fishes and sand shrimp (*Crangon* spp.), Dungeness crabs, and mysids (*Neomysis mercedis*) to be the three most abundant crustaceans. The 2002–2005 Oregon State University Marine Team ichthyofauna survey of Yaquina Bay (Gallagher *et al.* 2006) documented the following aquatic species (in order of abundance) near the project area: silverside sp., English sole, tubesnout (*Aulorhynchus flavidus*), Dungeness crab, juvenile rockfish, speckled sanddab (*Citharichthys stigmaeus*), and starry flounder. The sampling site (at approximately river mile 1.5), which include similar habitat to that at the International Terminal, had the lowest species diversity of five sites sampled between the mouth of the bay and river mile 8.4. Seasonal abundance recorded during this sampling effort was lowest during April to May, August, and November to December. Investigations performed by the United States Environmental Protection Agency (EPA), Western Ecology Division (WED) identified more than 168 species of macroinvertebrates in the estuary, with diversity and biomass greatest in the lower estuary. WED found polychaetes to comprise the most numerous macroinvertebrate taxa, but ghost shrimp (*Neotrypaea californiensis*) and mud shrimp (*Upogebia pugettensis*) to dominate the infaunal biomass (Brown *et al.* 2007).

*Describe the existing **navigation, fishing and recreational** use of the waterway or wetland.**

Fishing, boating, kayaking, clamming, crabbing, and other recreational activities occur throughout Yaquina Bay. The renovation of the Terminal will not affect these activities.

Site Restoration/Rehabilitation:

- *For temporary disturbance of soils and/or vegetation in waterways, wetlands or riparian areas, please discuss how you will restore the site after construction including any monitoring, if necessary**

There will be no temporary impacts; as such, site restoration or rehabilitation is not required.

Mitigation

*Describe the reasonably expected adverse effects of the development of this project and how the effects will be mitigated.**

- *For permanent impact to wetlands, complete and attach a Compensatory Wetland Mitigation (CWM) Plan. (See OAR 141-085-0705 for plan requirements)**
- *For permanent impact to waters other than wetlands, complete and attach a Compensatory Mitigation (CM) plan (See OAR 141-085-0765 for plan requirements)**
- *For permanent impact to estuarine wetlands, you must submit a CWM plan.**

The construction of the International Terminal will unavoidably impact eelgrass growing in the intertidal (i.e. between +11.5 feet and -2.4 feet NAVD 88) and subtidal zones (i.e. below -2.40 feet NAVD). The loss of eelgrass will be from the placement of riprap to stabilize the newly excavated shoreline. There will also be impacts to the water column, though these will be more than offset by the removal of the Pasley.

A summary of the losses and an overview of the mitigation for each regulated resource are included below:

Eelgrass: Eelgrass beds (including *Zostera marina* and *Z. japonica*) are located within the nearshore area to the west of the International Terminal. The extent of eelgrass observed by underwater video equipment was documented to extend to an elevation of -8 feet NAVD.

Losses: The total permanent impact to eelgrass from the renovation of the International Terminal and the placement of riprap will be 0.03 acres.

Proposed Mitigation: The importance of Eelgrass beds and the critical functions they provide are well documented (Fonseca *et al.*, 1998; Thom *et al.*, 2003; Kentula and DeWitt, 2003). We focused on three important functions that eelgrass beds provide: fish and wildlife habitat, biogeochemical cycling, and sediment trapping and habitat stabilization. The overall goal of the mitigation plan is to provide a net gain of these functions in the Yaquina estuary. The specific goals are to restore 0.09 acres of eelgrass habitat in a mitigation area designated as Mitigation Area A, which is the Port's current dredge disposal site near the South Beach Marina.

Within Yaquina Bay, *Z. marina* can be found in three distinct tidal zones: 1) a permanent bed of perennials in the lower intertidal and subtidal zones <0.0 m mean lower low water (MLLW); 2) an intertidal transition zone (0.0 m to +0.5 m above MLLW) consisting of perennial patches and annual shoots; and 3) an upper intertidal zone (+0.5 m to +1.5 m above MLLW) consisting of only annual shoots (Bayer 1979). Within Mitigation Area A the mitigation plan is to restore the lower intertidal zone and lower transition zone, allowing conditions conducive for the growth of perennial eelgrass beds.

Historic aerial photographs show a change in sediment deposition following the construction of a road into the Bay. The 1939 aerial photograph shows the deposition of sand either side of the road. The 1968 aerial clearly shows that the placement of fill material in the vicinity of the dredge disposal area. This fill accelerated in the decade that followed.

The mitigation goals will be achieved by implementing the following objectives: remove fill within the existing shoreline to restore a daily tidal cycle.

A summary of the mitigation area, which is designated as Mitigation Area A (Mitigation Area B and C will compensate for impacts to eelgrass from the proposed NOAA MOC-P project), is as follows:

- Mitigation Area A is located in the northern half of a dredge materials area managed by the Port. The majority of this area will be excavated to sufficient depths (lowest depth of -4 feet NAVD) to ensure sufficient tidal exchange and wave action to flush sand, silts and macroalgae out of the mitigation area. Mitigation Area A will restore approximately 1.88 acres of eelgrass habitat from the dredge and enhance approximately 0.68 acres of nearshore habitat will be excavated to remove the non-native *Z. japonica*, provide better habitat for the native *Z. marina*, and ensure that the adjacent restoration area will have sufficient flow velocities to flush sediment and to better support native eelgrass beds.

Water column: The water column of Yaquina Bay provides habitat for a variety of native fish, including Chinook salmon, coho salmon, steelhead, chum salmon, sea-run cutthroat trout, topsmelt, Pacific herring, longfin smelt, surf smelt, northern anchovy, lingcod, eulachon, starry flounder, English sole, Pacific staghorn sculpin, various gobies, Pacific sand lance, shiner sea perch, threespine stickleback, Pacific tomcod, white sturgeon, and green sturgeon (Emmett *et al.* 1991).

Losses: The construction of the new Terminal will require piles for the new dock, as well as fender piles and dolphin piles. These piles will occupy 524 cubic yards of the Bay's water column (as measured from below the highest measured tide).

The construction of the NOAA MOC-P will require the construction of piles for a wharf, two access piers, fender piles, and three dolphins. As there is insufficient mitigation at the MOC-P, the renovation of the

International Terminal will provide the balance. The amount of mitigation required for MOC-P is 1,978 cubic yards.

Mitigation: The construction of the Terminal will require the removal of piles for three docks (Timber fishing dock, high timber dock, and the RORO dock). The removal of the piles associated with these structures totals 658 cubic yards within the water column. The removal of the Pasley will remove approximately 18,400 cubic yards from the water column.

The removal of the piles and in-water structures for the Terminal and the removal of the Pasley (18,400 cy), totals 19,424 cubic yards of water column. The net gain in water column is 15,102.

The removal of the piles and the Pasley reduces the need for further mitigation for water column impacts. As discussed above, the renovation of the International Terminal is scheduled to start in the 2010 in-water work period, with the removal of the ship in 2011.

Over-water structures: The construction of the new docks will decrease the amount of over-water structure at the Terminal. Once the high timber dock and the RORO dock are removed, there will be a net reduction of 18,455 square feet (0.42 acre) of water column shading due to over-water structures.

Mitigation Summary

The table below lists the proposed losses in gains from proposed impacts and mitigation when the Terminal is renovated.

Table 3 Proposed losses and gains in the habitats proposed to be impacted by the renovation of the Terminal

Habitat Type	Loss (acres or cubic yards)	Proposed mitigation	Net Gain (acres or cubic yards)
Eelgrass bed	0.03	Restoration	0.09*
Water column	524	Restoration (removal of existing structures)	15,102

*The eelgrass restoration area is 2.13 acres in size, which compensates for 0.03 acres of eelgrass impact at the Terminal project

Eelgrass Mitigation Site Selection

To compensate for the 0.03 acres of permanent loss of eelgrass habitat associated with the construction of the International Terminal and the proposed NOAA MOC-P facility, the Port is proposing to restore eelgrass beds. The mitigation area was selected after a lengthy search for mitigation opportunities within Yaquina Bay. PHS biologists conducted the search for suitable eelgrass mitigation sites with the advice of Dan Avery, Oregon Department of Fish and Wildlife, and Dr. Steve Rumrill, Oregon Department of State Lands. The search occurred from a boat and also from access along the shoreline. The entire shoreline of the Bay was investigated.

Site selection is of paramount importance for eelgrass mitigation. Numerous eelgrass mitigation projects have been conducted throughout the world and many have not succeeded. We focused our search for suitable mitigation sites on areas where eelgrass beds could be restored and not just enhanced. Although eelgrass beds have been successfully enhanced in other estuaries, the functional gain realized from restoring beds is obviously far greater. As defined in this plan, eelgrass restoration involves the physical removal of manmade fill along the shoreline to create conditions suitable to support a healthy eelgrass bed.

Eelgrass requires specific conditions to grow. These include specific depth ranges (+3 to -8.0 ft MLLW), light availability (minimum PAR of 300 uM m^{-2} s^{-1} for 3 hrs day^{-1} during spring and summer), substratum composition (medium to fine sands, sandy-mud, gravel with 0.5 to 15.0% organic content and low sediment sulfide toxicity), temperature (optimal 7 to 12 °C; tolerate 4 to 24 °C), salinity (optimal 20 to 34 ppt; tolerate 3 to 35 ppt), inorganic nutrient concentrations (tolerate C:N:P ratio of 500:20:1), and exposure to waves and currents (minimum 3 cm s^{-1} to maximum 80 cm s^{-1}; burst velocities up to 180 cm s^{-1}) (Rumrill, 2010).

The search for mitigation was limited to an area extending upstream of Sallys Bend to just downstream of the Highway 101 Bridge. This range ensures that any functions that are lost from the impacts to eelgrass habitat are replaced locally. The area upstream of Sallys Bend has lower salinities that will likely not support eelgrass growth. Areas of tidal flats, such as Sallys Bend, were found to provide less than ideal native eelgrass habitat due to higher concentrations of fine sediment and higher elevations. The tidal flats only support native eelgrass at their margins, where sediments contain coarser fractions and where the surface elevations are lower.

Another location investigated for mitigation potential is McLean Point, just downstream of Sallys Bend. This area provides an opportunity to remove a portion of the shoreline and create an eelgrass bed; however, the size of the eelgrass bed would be relatively small and the velocities in the area are not ideal. In order to make the site a success, it was determined that it would need to be protected from strong currents as this site is close to the thalweg of the river and also from waves that likely exceed the threshold considered ideal for eelgrass. At sustained high current velocities eelgrass is less likely to form a contiguous bed and if successful it is often patchier in its distribution (Department of Fisheries and Oceans, 2009)

Downstream of the International Terminal and near the Embarcadero Hotel is an area along the shore that has potential opportunities for eelgrass growth. However, the width of the eelgrass bed in this area would be very narrow and may be adversely affected by discharge from a freshwater stream that flows into the Bay at this location. No other suitable locations in this area were identified.

Removal of the breakwater at the Port's South Beach Marina would likely have increased sediment deposition within the marina and may have adversely affected the existing eelgrass beds located further upstream. Downstream from the marina, steep banks and existing adjacent commercial land uses precluded locating mitigation areas near the Highway 101 Bridge.

Another opportunity that was investigated was the removal of the riprap foundation of the Oregon State University (OSU) dock to the east of the proposed MOC-P facility. Not only does the riprap preclude eelgrass growth, but it hinders juvenile salmonid migration. However, removing the riprap and replacing it with an over-water structure would have meant the dock could not have been used by OSU for an extended period. In addition to the high cost of this option, the area under the dock may not have provided the ideal light conditions that are required for healthy eelgrass growth.

Other mitigation opportunities in the Bay were limited to enhancing existing eelgrass beds. As stated above, although this method has proven to be successful in other estuaries, our focus was on locations where eelgrass could be restored.

After carefully reviewing all of the sites throughout the Bay, the preferred location was determined to be the existing dredge materials site located to the west of the proposed MOC-P facility (Mitigation Area A). The site is in close proximity to a relatively large eelgrass bed that will ideally colonize the mitigation area by rhizomatous growth and through seed dispersal. Grading plans prepared for the area was modeled by Coast and Harbor, Inc. to determine the hydrodynamics of the mitigation area. The model results and subsequent discussions with engineers from Coast and Harbor confirmed that conditions conducive to the restoration of viable eelgrass beds are present at the mitigation area.

Mitigation Area A, the dredge materials site, has been used by the Port and the Corps of Engineers for decades. Historically, the dredge materials site and the proposed location of the MOC-P facility to the east were part of the Bay. However, starting in the 1960s, as evident on historic aerial photographs, the area began to be filled. The dredge materials site first appears in aerial photographs in 1978. The site currently accepts materials from the maintenance dredging of the South Beach Marina and other dredging projects in the Bay. Riprap protects the shoreline in front of the dredge material site from erosion. A boring at the eastern edge of the materials site showed a profile of mostly medium to fine-grained sand to a depth of 15 feet below ground surface (nearly 0 feet NAVD). Another boring excavated to five-feet below the ground surface in front of the dredge materials site also showed predominantly fine-grained sand with organics. The dominant vegetation on the dredge materials site is European beachgrass (*Ammophila arenaria*).

(1) CWM Plan Content. CWM Plan detail shall be commensurate with the size and complexity of the proposed mitigation. A CWM plan for permittee responsible CWM (on-site or off-site) shall include the sections listed below.

(a) CWM plan overview, including:

(A) CWM ecological goals and objectives;

Eelgrass

The goals will be achieved by implementing the following objectives: remove fill from an area of existing shoreline to restore a daily tidal cycle; excavate approximately two feet of upper intertidal zone to enhance hydrology, and transplant native eelgrass into the restoration and enhancement area to create the complex habitat structure associated with healthy eelgrass beds.

(B) The CWM concept in general terms including a description of how the plan, when implemented, will replace the functions and values of the impacted non-tidal wetland or tidal waters;

The mitigation area includes a restoration component, where the existing shoreline will be excavated to expose the area to a daily tidal cycle, and an enhancement component, where the area will be excavated to improve hydrology.

Mitigation Area A is located in the northern half of a dredge spoils area managed by the Port on the south side of the Bay at the proposed location of MOC-P. The majority of this area will be excavated to sufficient depths (lowest depth of -4 feet NAVD) to ensure sufficient tidal exchange and wave action to flush sand, silts and macroalgae out of the mitigation area.

The enhancement portion will lower the existing upper transition and upper intertidal area to depths sufficient to achieve lower intertidal transition and lower intertidal. The enhancement area contains the non-native *Z. japonica*, unvegetated tidal flat and higher stands of annual *Z. marina*. The intertidal area will be lowered to create conditions more conducive to perennial *Z. marina* and less hospitable to *Z. japonica*. The enhancement of the area is also necessary to ensure adequate tidal exchange within the restoration area.

The mitigation area (restoration and enhancement) will be planted with native eelgrass. Much of the eelgrass may come from plants taken from the areas to be dredged for MOC-P. Additional plants will come from Sallys Bend and will be harvested in the summer of 2011. Seed will also be collected during the summer of 2010 and sown in Mitigation Area A.

Once the plants have become established, they will likely first be colonized by epibenthic and epiphytic invertebrates and later with infauna. Rhizomatous growth will bind the substrate ensuring the stable habitat structure used by many species of fish and invertebrates. Once established, the functioning eelgrass beds will ensure there will be a net increase in the three functions described in this mitigation plan.

Mitigation Area A

Most of Mitigation Area A will be graded to be between 0 feet and -3 feet NAVD (Mean lower low water is at -0.74 feet NAVD and subtidal habitat begins at -2.4 feet NAVD). A channel flowing through the center of the mitigation area will be at -4 feet NAVD. From the west, the channel will begin along the South Beach Marina breakwater, where it will intersect an existing channel. The channel will have a depth of -2 feet NAVD. To the east, the channel will intercept depths at -4 feet NAVD to the northeast of the mitigation area in the existing tidal flat. This central channel and the lower depths of the opening (at 0 feet NAVD) ensure the mitigation area will receive sufficient tidal flushing.

This grading plan has been modeled by Coast and Harbor and shows that water velocities in the mitigation area remain in excess of 0.1 feet per second for most of the tidal cycle. The water velocities suggest they will be comparable to velocities seen within the existing eelgrass areas north of the mitigation area. The flow regime ensures sufficient daily tidal exchange, so that very fine sand (0.18 mm) is not likely to be deposited within the mitigation area. Silt (0.02 mm) may be deposited, but according to the modeling it will be removed by direct wind-waves propagating from the north. The fetch from the north is short. Modeled waves have a significant wave height of 1.1 feet and a spectral peak period of 2 seconds.

To ensure shoreline stability and to dampen wave breaking at the margins of Mitigation Area A, a gravel beach is proposed along its south and east edges. Currently, much of the existing shoreline in front of the proposed MOC-P facility is armored with rock revetment to protect the shoreline from erosion. Within the proposed mitigation area, wave energy during high tide conditions would be sufficient to move sand-size sediment at the mitigation site shoreline if it were not protected. The gravel beach will extend from +3.0 feet NAVD to +4.5 feet NAVD with a flat bench 11 feet wide at elevation +4.5 created by riprap. The riprap will be covered by 6-inches of beach gravel.

The CHE modeling of depth-averaged water velocities for Mitigation Area A indicates velocities in excess of 0.3 feet per second for portions of the tidal cycle greater than 44 minutes. These velocity durations are longer than the less than 17 minute transit time for the approximately 300 feet to the open estuary. Since these velocities occur for tidal elevations between 5.0 and 8.0 feet NAVD, macroalgae accumulations can be expected on the gravel beach at the periphery of the mitigation site above the higher eelgrass elevations at 3.0 feet NAVD. Aside from the water velocity simulations of Coast and Harbor, water velocity measurements within the Yaquina are quite limited. However, water velocities within the large eelgrass beds at Sallys Bend are likely similar to those expected to occur in Mitigation Area A.

Excavation of Mitigation Area A will be started prior to the start of the in-water work period, though the riprap and existing shoreline will be left in place to ensure there is no direct connection to the Bay until November 1.

Aerial exposure of the substrate before the mitigation area is ready for eelgrass installation may allow oxidation of reduced organics. Once the majority of the area is excavated, the substrate of the mitigation area could be amended if needed prior to the installation of eelgrass. The composition of soil materials at the finished grade is not well known, but is expected to be fine sand with some intermixed organic matter. If necessary, amendment with a small amount of ferric oxide will keep sulfide toxicity within the substrate to a minimum.

As fresh water influx could pose a problem for eelgrass bed establishment, the project team changed the discharge location of future stormwater to ensure that flow is redirected away from the mitigation area.

Excavation of the mitigation area will be from a land-based excavator. Turbidity will be monitored visually during excavation. If turbidity above background levels is observed, the in-water work causing the turbidity will cease until corrective actions are taken. Such corrective actions may include the installation of a turbidity curtain around the excavation area. Installation of the turbidity curtain would require the installation of 10- to 12-inch H piles or 12-inch cylindrical piles spaced approximately 30 feet apart. These piles would be installed with a vibratory hammer.

(C) Mitigation site acreage by method(s) of mitigation proposed (restoration, creation and enhancement) and by proposed HGM and Cowardin classification for each method; and

Mitigation at Mitigation Area A will be a combination of restoration and enhancement, as follows:

Summary of the mitigation area			
Mitigation Method	**Acres**	**Mitigation HGM Class/Subclass**	**Mitigation Cowardin System/Class**
Restoration	1.88/0.09*	ESTUARINE FRINGE	E2AB
Enhancement	0.53	ESTUARINE FRINGE	E2AB
Total	**2.41**		

* 0.09 acres of restoration will compensate for the impacts at the Terminal

(D) Summary of proposed net losses and gains of wetland or tidal waters functions and values.

Eelgrass beds are an important estuarine resource and perform critical functions; however, the standard methods of assessing wetland functions in Oregon (e.g. HGM, ORWAP) are not appropriate for eelgrass beds. As such, we have qualitatively assessed the functional losses and gains expected from the proposed project based on three dominant functions that eelgrass beds perform. An eelgrass bed provides a structured ecosystem in a relatively unstructured one. This structure forms the basis for three main functions which are described below: fish and wildlife habitat, sediment trapping and habitat stabilization, and biogeochemical cycling.

Fish and Wildlife Habitat: Eelgrass beds provide a variety of microhabitats. Habitat niches are on the leaf and stem surfaces, on the sediment within the eelgrass bed, and in the water above and below the leaf canopy (Kikuchi and Peres, 1977). The leaves and stems provide the physical structure and habitat for epiphytic plants and animals, which provide food for other invertebrates, larval and juvenile fish, and birds. The refuge and protection afforded by the leaves results in a greater population of crustaceans and fish than in adjacent unvegetated areas (Department of Fisheries and Oceans, 2009). The physical protection provided by the leaves also protects animals from sunlight and desiccation during low tides (Thayer et al, 1978).

Nearly all of the anadromous fish species found along the Pacific coast use eelgrass as a nursery area. The habitat functions of eelgrass are important for many fish, including salmonid smolts spending their summers in the estuary before going out to sea. Juvenile salmonids often spend extensive time within the beds prior to entering the ocean. Fish move into the beds to feed and avoid predation during high tides and leave during low tides. Day-night migration is also thought to occur (Thayer et al, 1978). The eelgrass canopy provides protection from predators and a ready source of small invertebrates for food.

Most of the seining surveys for fish within Yaquina Bay have been within eelgrass beds. The 1978 Myers thesis on salmonid populations within the Bay recorded the stomach contents of coho smolts within the eelgrass beds in the shallow water beach seine areas in the vicinity of the proposed MOC-P dock (Myers, 1978). The majority of the diet consisted of anchovy (*Engraulis mordax*), surf smelt (*Hypomesus pretiosus*), and sand lance (*Ammodytes hexapterus*). These marine taxa spend seasonal portions of their larval stages in eelgrass beds. Other data sources for estuarine smolts further from the Pacific Ocean suggest that gammarid amphipods such as *Corophium* spp. may constitute an appreciable fraction of the smolt diet. In late winter and early spring in the Bay, Pacific herring regularly spawn in eelgrass beds, laying their water-hardened eggs on the eelgrass leaf (Hart 1973).

Eelgrass habitat is considered to be an important resource supporting migratory birds during critical life stages (e.g. migratory periods). Waterfowl, such as black brant geese, feed directly on the plants. Other species feed on the plants and the epiphytic growth which lives on the leaf surface.

Losses/Gains: The direct impacts to eelgrass from the proposed Terminal renovation project will ensure that there will be a loss of fish and wildlife habitat within the 2010/2011 in-water work period. Only a small area of existing eelgrass bed will be impacted. In addition, eelgrass will be temporarily lost when the enhancement area is excavated to improve its hydrology and to ensure good hydrology within the restoration area. Although the area contain non-native eelgrass, which is not desirable, it does provide much of the important habitat structure of eelgrass beds (though its narrower leaves provide less surface area than native eelgrass) and consequently performs a fish and wildlife habitat function.

To minimize the temporal loss of this function, the majority of Mitigation Area A will be excavated prior to the start of the in-water work period. Excavation of the dredge spoil site during the summer will allow the interior portions of the mitigation area to fill with brackish water and begin the process of soil stabilization. The site will be excavated behind the riprap seawall to the required grades. This will ensure there is no direct contact with the Bay, allowing the work to be completed outside of the in-water work period.

Once the in-water work period begins, the barrier between the Bay and Mitigation Area A will be removed and the area will flood. The excavation will include the enhancement areas to the north of the restoration site.

The newly excavated area will likely first colonize with epibenthic invertebrates. Once the area has been planted, the physical habitat (structure) will be created for epiphytes and macroinvertebrates. Due to the fact that the mitigation site is in the lower intertidal, it will quickly be used by fish and when established will serve as herring spawning sites.

Although there will be a temporal loss of habitat while the restoration area becomes established, the restoration of 0.09 acres of estuary (at a 3:1 replacement ratio) will ensure there will be a net increase in fish and wildlife habitat.

Sediment trapping and habitat stabilization: Eelgrass beds trap sediment and stabilize habitat (Wyllie Echeverria and Rutten 1989). Eelgrass beds have been shown to slow water velocities from tidal currents and wave action. Fonseca *et al.* (1983) recorded velocity profiles within the water column in dense eelgrass beds, in eelgrass patches, and in unvegetated areas adjacent to eelgrass beds. These measurements clearly showed significant differences in local hydrodynamics affecting sediment transport within the eelgrass beds. The slowing of water by eelgrass effectively reduces water motion within the leaf canopy. This allows incoming and resident particulate matter to settle to the bottom. Anecdotal evidence for its geomorphic effects comes from the mass eelgrass wasting disease die-off caused by the slime mold (*Labyrinthula zosterae*) infection in the early 1930s. This die-off decimated many populations throughout the northern hemisphere, resulting in major shoreline erosion in many areas.

Losses/Gains: As described above, there will be a temporal loss of habitat function until eelgrass becomes established. Obviously, sediment trapping and habitat stabilization will only function when eelgrass provides the necessary structure. When fully realized, however, the restoration area will ensure the mitigation plan will provide a net improvement of these functions within the estuary. In addition, the enhancement of existing eelgrass beds will create conditions conducive for perennial eelgrass and unsuitable for non-native eelgrass (which has narrower leaves) and annual eelgrass that grows higher in the intertidal zone. As such, not only will there be an increase in overall area within the Bay, but there will be a shift to perennial eelgrass that improves this habitat function.

Biogeochemical cycling: The substrate heterogeneity both from eelgrass roots and burrowing crustaceans plays an important role in biogeochemical cycling within the substrate of the eelgrass bed, both in inorganic carbon transport and in movement of dissolved nitrogen and phosphate through the substrate. The heterogeneity is also known to have effects on the concentration of sulfide (Goodman, 1995). The cycling of roots and rhizomes forms a substrate in eelgrass beds that is exploited by benthic invertebrates, some of which are unique to eelgrass ecosystems.

Eelgrass is an important primary producer in the estuary. The photosynthetically fixed energy follows two different pathways: 1) direct grazing of eelgrass leaves, or, 2) the utilization of the detritus produced from decaying eelgrass (Phillips, 2003). Eelgrass has considerable turnover of biomass during the growing season. New leaves are grown and die every few weeks through the spring and summer. Leaves grow at rates typically 5 mm/day, but growth rates of over 10 mm/day have been measured under favorable circumstances (Aioi *et al* 1981). This essential function may be an adaptation to the rapid biofouling of leaf surfaces by various estuarine epiphytes. The plant litter with its rapid ecosystem assimilation is an important ecosystem function. Bacteria, worms, and crabs feed on this material locally and then pass it up to other animals in the food web.

Of the two pathways within the eelgrass ecosystem, the detrital pathway is the most important (Phillips, 2003). Bacteria form the basis of the food web. As leaves age they release both particulate and dissolved carbon and organic matter, both of which are assimilated by bacteria. The bacteria are consumed by larger organisms, which are then consumed by larger organisms. The production of detritus and promotion of sedimentation provides organic matter for nutrient cycling. Epiphytic algae on eelgrass leaves fix nitrogen, which adds to the nutrient pool. Eelgrass assimilates nutrients from the sediments, transporting them through the plant and releasing them into the water column through the leaves, thus acting as a nutrient pump. Eelgrass leaves and their epiphytes pick up water column nutrients (Zieman, 1982).

Eelgrass beds can oxygenate water and transform nutrients. The presence of the eelgrass canopy changes vertical transport of nutrients and carbon dioxide within the eelgrass beds. This allows water within the eelgrass beds to be clearer than water over unvegetated sediments, thus improving water quality for resident plants and animals (Fonseca, 1988).

Losses/Gains: As with the other two functions described above, there will be a temporal loss of this function while the eelgrass bed becomes established. In the long term, the larger physical area (at a greater than 3:1 replacement ratio) and the likely higher functioning perennial form of eelgrass will ensure there is a net functional gain within the estuary. Bacterial growth will begin almost immediately within the planted mitigation area and with it the genesis of the detrital pathway. Eelgrass leaves will quickly turnover and bacteria, worms, and crabs will feed on the material. As such, nutrients will be transferred to other animals higher in the food web.

(b) CWM site ownership and location information:

(A) CWM site ownership information (name, address, phone). If this is different from the applicant, copies of legal agreements granting permission to conduct the CWM and willingness of the property owner to provide long-term protection are required;

Port of Newport
Attn: Don Mann
600 SE Bay Boulevard
Newport, OR 97365
(541) 265-7758

Oregon Department of State Lands
775 Summer St. NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200

(B) Legal description (Township, Range, Quarter and Quarter-quarter Section and tax lot or lots); and

Township 11 South, Range 11 West, Section 17. Tax map 11S 11W 17 (Tax lot not available)

(C) CWM site location shown on a USGS or similar map showing the CWM site location relative to the impacted site, longitude and latitude, physical address, if any (e.g., 512 Elm Street), and road milepost (e.g., mp 25.21).

A site location map is shown on the attached Figure 11.

(c) A description of how the proposed CWM addresses each of the principal objectives for CWM as defined in OAR 141-085-0680.

- Replace the functions lost at the removal-fill site: There will be a temporal loss of functions from the placement of riprap; however, the mitigation plan includes a greater than 3:1 ratio of replacement. The focus of the mitigation plan is the restoration of habitat (i.e. the removal of fill material that has been in place for more than 40 years). The removal of this material and the enhancement of the adjacent intertidal area will ensure there will be a long term net functional gain.

- Enhance, restore or create tidal areas that are self-sustaining and minimize long-term maintenance needs: The project will restore eelgrass habitat at a 3:1 replacement ratio and will enhance existing tidal flats to support the growth of perennial eelgrass. While it is true that eelgrass mitigation has a varied success rate (Thom *et al.* 2008), the mitigation area was selected and designed to reduce the likelihood of failure. Coast and Harbor have conducted hydrodynamics and sediment transport modeling of the site and have assisted in the design of the grading plan. Based on their modeling and knowledge of the Bay, the mitigation area will not receive a net increase in sediment deposition. This results in the mitigation area being self-sustaining and requiring minimal long term maintenance.

- Ensure the siting of CWM in ecologically suitable locations: The location of the eelgrass mitigation area was thoroughly investigated. Essentially all of the shoreline of the Bay (within the defined limits of our search) was checked for appropriate or practicable conditions to create a functioning eelgrass mitigation area. The mitigation area was selected because its is the most ecologically well-suited area and has the highest chance of success of anywhere we reviewed around the Bay.

- Minimize temporal loss of tidal waters and their functions and values: Most of Mitigation Area A will be excavated prior to the start of the in-water work period (though it will not be physically connected to the Bay until the in-water work period begins). This will minimize the temporal loss of functions that will occur when a portion of the eelgrass bed is lost from dredging and before eelgrass becomes established within the mitigation area. Eelgrass plugs will be collected during the summer 2010 and raised in seawater tanks at the Oregon Coast Aquarium or transplanted to a holding area along the nearshore by the OSU dock or to the west of MOC-P. These will be transplanted into the mitigation area during the summer of 2011. Eelgrass seed will be collected and sown in Mitigation Area A this summer for later germination when the area is connected to the Bay. Eelgrass shoots will be transplanted into the mitigation area as soon as possible to ensure that temporal losses are minimized.

(d) CWM site existing conditions, including the following, as applicable.

(A) If wetlands or tidal waters exist on the CWM site, then the following information be provided:

(i) A wetland determination/delineation report pursuant to OAR 141-090 for existing wetlands on the CWM site (or for tidal waters, any wetlands above highest measured tide elevation), as necessary to confirm acreage of proposed CWM;

The limit of State jurisdiction is established by the highest measured tide at +11.51 feet NAVD 88. It is shown on Figure 11 and 11A No wetlands exist within the project area.

(ii) Identification of HGM and Cowardin class(es) and subclass(es) of all wetlands and tidal waters present within the CWM site;

The Cowardin classification for the eelgrass beds is E2AB (estuarine, intertidal, aquatic bed), and the HGM class is Estuarine Fringe.

(iii) A general description of the existing and proposed water source, duration and frequency of inundation or saturation, and depth of surface water for wetlands or tidal waters on the CWM site. This information shall include identification of any water rights necessary to sustain the intended functions. Evidence that the water right has either been secured or is not required shall be documented in the first year mitigation monitoring report; and

The mitigation area will function as a part of the estuary and be exposed to a daily tidal cycle. The majority of the area was designed be at the lower intertidal zone.

Most of Mitigation Area A will be graded to be between 0 feet and -3 feet NAVD (Mean lower low water is at -0.74 feet NAVD and subtidal habitat begins at -2.4 feet NAVD). A channel flowing through the center of the mitigation area will be at -4 feet NAVD. From the west, the channel will begin along the South Beach Marina breakwater, where it will intersect an existing channel. The channel will have a depth of -2 feet NAVD. To the east, the channel will intercept depths at -4 feet NAVD to the northeast of the mitigation area in the existing tidal flat. This central channel and the lower depths of the opening (at 0 feet NAVD) ensure the mitigation area will receive sufficient tidal flushing.

This grading plan has been modeled by Coast and Harbor and shows that water velocities in the mitigation area remain in excess of 0.1 feet per second for most of the tidal cycle. The water velocities suggest they will be comparable to velocities seen within the existing eelgrass areas north of the mitigation area. The flow regime ensures sufficient daily tidal exchange, so that very fine sand (0.18 mm) is not likely to be deposited within the mitigation area. Silt (0.02 mm) may be deposited, but according to the modeling it will be removed by direct wind-waves propagating from the north. The fetch from the north is short. Modeled waves have a significant wave height of 1.1 feet and a spectral peak period of 2 seconds.

In addition, algal masses, which can be expected to occur within the sheltered environs of the mitigation site, will also be flushed away by wave action. Accumulation of algal material is likely to be short-lived and restricted to the unvegetated margins of the mitigation area. The design of Mitigation A evolved after the modeling and discussions with Coast and Harbor.

To ensure shoreline stability and to dampen wave breaking at the margins of Mitigation Area A, a gravel beach is proposed along its south and east edges. Currently, much of the existing shoreline in front of the proposed MOC-P facility is armored with rock revetment to protect the shoreline from erosion. Within the proposed mitigation area, wave energy during high tide conditions would be sufficient to move sand-size sediment at the mitigation site shoreline if it were not protected. The gravel beach will extend from +3 feet NAVD to +8 feet NAVD at a 5:1 slope.

Excavation of Mitigation Area A will be started prior to the start of the in-water work period. A physical barrier will be left between the interior of the mitigation area and the Bay. Aerial exposure of the soil material before the site is ready for eelgrass installation may allow oxidation of reduced organics within the soil. Once the majority of the area is excavated, the surface soils of the mitigation area could be amended if needed prior to the installation of eelgrass. The composition of soil materials at the finished grade is not well known, but is expected to be fine sand with some intermixed organic matter. Amendment with a small amount of ferric oxide may keep sulfide toxicity within the substrate to a minimum.

Fresh surface water influx could pose a problem for eelgrass bed establishment. The empty regions within the existing eelgrass beds north of the dredge spoil pile seem to correlate with the stormwater discharges along the east side of the present dredge spoil pile. As such, the project team changed the design of the stormwater plan so that flow is redirected away from the mitigation area.

(iv) Plans that involve enhancement shall include identification of the cause(s) of degradation and how the plan will reverse it and sustain the reversal.

As stated above, the upper intertidal zone (+0.5 m to +1.5 m above MLLW) consists of only annual eelgrass shoots (Bayer 1979). It is also the only area where the non-native *Z. japonica* grows. Boese and Robbins (2008) found that seasonal shoot density at the margins of permanent eelgrass beds in the Bay, which grow in the transition and lower intertidal zones, were only approximately one-third of the permanent bed densities. Their study also indicated that desiccation is a controlling factor in the upper intertidal, as is erosion and macroalgal blooms.

Eelgrass growth in the lower transition and lower intertidal zones are healthier than eelgrass beds at higher elevations. As such, the mitigation area will be excavated to lower depths to facilitate the growth of healthy native eelgrass beds. The mitigation area is not expected to fill in with sediment, thereby ensuring they will stay at lower elevations.

(B) A description of the major plant communities and their relative distribution, including the abundance of exotic species within the CWM site and associated buffers.

The restoration portion of Mitigation Area A is a dredge spoils pile dominated by European beachgrass. All enhancement area contains a mix of *Z. marina* and *Z. japonica*.

(C) Approximate location of all water features (e.g., wetlands, streams, lakes) within 500 feet of the CWM site.

Figure 11 shows the existing conditions of the project site. No wetlands are located within 500 feet of the site. The site borders Yaquina Bay.

(D) Any known CWM site constraints or limitations.

Site constraints include avoiding impacts to adjacent eelgrass beds growing at lower elevations when the site is excavated. Following the site's excavation, the limitation could be on the amount of donor material available at other sites throughout the Bay. Care will be taken to take less than 10% of the plants at any one site.

(E) Plans for CWM by means of restoration shall include documentation sufficient to demonstrate that the site was formerly, but is not currently, a wetland or tidal water.

Historic aerial photographs show a change in sediment deposition following the construction of a road into the Bay. A 1939 aerial photograph shows the deposition of sand either side of the road. A 1968 aerial clearly shows that the placement of fill material in the vicinity of the mitigation area. This fill accelerated in the decade that followed. The mitigation area is located in an area that was filled.

(e) A functions and values assessment. A summary of the assessment shall be placed in the body of the CWM plan, and supporting data sheets or assessment model outputs shall be placed in an appendix of the CWM Plan.

As stated above, the standard methods of assessing wetland functions in Oregon (e.g. HGM, ORWAP) are not appropriate for eelgrass beds. A qualitative assessment of the functional losses and gains expected from the proposed project are discussed above. The three main functions described include: fish and wildlife habitat, sediment trapping and habitat stabilization, and biogeochemical cycling.

(f) CWM drawings and specifications, including:

(A) Proposed construction schedule;

The proposed construction and planting schedule is listed below:

Implementation Component	Task	Timeline
Construction of Mitigation Area A	Excavating – leaving strip, so there is no contact with Bay	Summer 2010
Sow seed in Mitigation Area A	Collect seed from nearshore eelgrass bed and sow into mitigation area	Summer 2010
Collect eelgrass shoots	Collect eelgrass shoots from eelgrass bed to be dredged and transplant into holding area and/or tanks at Oregon Coast Aquarium; collect seed at the eelgrass bed in front of the proposed MOC-P facility	Summer 2010
Construction of the remainder of Mitigation Area A	Remove strip of land at A and connect to Bay	In-water work period 2010
Survey	Conduct as-built survey	Within 60 days of grading.
Transplant eelgrass*	Plant eelgrass from holding site and/ or tanks at Oregon Coast Aquarium; also transplant from donor site at Sallys Bend (to be identified)	Summer 2011
Transplant eelgrass	Transplant if needed from donor site at Sallys Bend (to be identified)	Summer 2012
Transplant eelgrass	Transplant if needed from donor site at Sallys Bend (to be identified)	Summer 2013

*The monitoring period will extend for 10 years after the planting is completed. If several growing seasons are required to obtain sufficient donor materials for transplants, the monitoring period will be extended accordingly.

(B) Scaled site plan(s) showing CWM project boundaries, existing and proposed wetland or tidal waters boundaries, restoration, creation and enhancement areas, buffers, existing and proposed contours, cross section locations, construction access location and staging areas;

See Figures 11 through 11 C

(C) Scaled cross sections showing existing and proposed contours and proposed water depths;

Figure 11A and 11B show the cross-section through the mitigation area.

(D) Plant list for each Cowardin and HGM class at the CWM site (include scientific names and wetland indicator status);

Native eelgrass will be the only plant transplanted into the mitigation area. The mitigation area will eventually support perennial eelgrass beds. It is anticipated that there will be die-off and that replanting will be required. The tentative planting schedule is as follows:

Summer 2010:	Salvage eelgrass from the proposed dredging area at the MOC-P site and transplant into holding area at the Oregon Coast Aquarium; collect seed at the eelgrass bed in front of the proposed MOC-P facility
Summer 2011	Plant eelgrass from holding site and/ or tanks at Oregon Coast Aquarium; also transplant from donor site at Sallys Bend (to be identified)
Summer 2012	Transplant if needed from donor site at Sallys Bend (to be identified)
Summer 2013	Transplant if needed from donor site at Sallys Bend (to be identified)

In the summer of 2010, seeds will be collected and sown into Mitigation Area A. Bare root eelgrass plugs may also be salvaged from the areas to be dredged and placed in a holding area at the Oregon Coast Aquarium or near the OSU dock or to the west of the proposed MOC-P. The plugs will be transplanted into the mitigation area during the summer of 2011.

Additional eelgrass plugs from donor sites will also be transplanted into the mitigation area during the summers of 2011, and if necessary 2012 and 2013. One of several methods will be used to transplant eelgrass plants from a donor site or the salvage area. The descriptions of the methods are taken from Rumrill (2010).

Transplant of bare-root plants: This method requires digging the eelgrass plants from the donor site and rinsing off the mud and fine sediments. During the summer of 2010, this method can only work if a good "holding" area can be found (as the mitigation area will not yet be constructed). This method can be used in subsequent years to transplant eelgrass from donor sites into the mitigation area.

This method revolves around creating Eelgrass Planting Units (EPU), which are clusters of 2 to 5 plants bound together with biodegradable string or thin wire and which are placed in cool Bay water. Each EPU is placed into a narrow hole at the mitigation site spaced 0.5 to 1.0 m apart in a straight line. The EPU is secured into the sediment with a wire anchor, a wooden stake or a metal washer. As eelgrass will grow from rhizomatous growth, the goal of the transplant is to achieve approximately 50% of the density at the donor site.

Transplant of intact sod plugs: This method relies on removing intact sod plugs at the salvage site (where dredging will occur) and being moved to a "holding" area. Each sod plug contains between 10 and 20 eelgrass plants and is dug deep enough to retain the rhizomes. The sod plug is placed into a tub containing Bay water. The benefit of this method is that it keeps the rhizomes intact and connected to several plants. The tub is then moved to the mitigation area and placed into a hole approximately 8" x 8" x 6" deep. The plugs are anchored using small stakes. The key is making sure the plug is stable. The plugs are placed approximately one meter apart in a checkerboard pattern. Rhizomatous expansion of a sod plug planting can be expected to be 0.5 meters per year under ideal conditions (Boese 2009).

Seeding from net bags: Eelgrass seeds will be collected during the summer of 2010 from the salvage site. Seed production within the existing eelgrass populations occurs through the summer with nearly mature seed spathes available for harvest by September. Germination studies (Oorth *et al.* 2000) seem to indicate that germination is not very dependent on salinity, but may require an anoxic substrate environment. Growth of the seedlings after germination requires an environment without a high concentration of hydrogen sulfide, so that artificial alteration of oxygen concentration may be ill-advised. The substrate redox regime of the freshly excavated Mitigation Area A is difficult to predict, but may have enough fines and redox buffering to foster germination of the seeds.

The seeds will be collected by hand. Several hundred seeds will be placed into nylon mesh bags, which will be anchored to the sediment at Mitigation Area A. The seeds will soak within the mitigation area and be slowly released. Unfortunately, there is no guarantee this method, which has never been used in an Oregon estuary, will work.

(E) Schematic of any proposed water control structures; and

No water control structures will be used within the mitigation area.

(F) For CWM sites involving tidal waters, plan views and cross-sections shall show relevant tidal elevations relative to mean lower low water (MLLW) using the nearest local tidal datum. The elevation of MLLW shall be referenced to the North American Vertical Datum 1988 (NAVD88).

Figures 11 and 11A illustrates the mitigation area and its spatial relationship to MLLW.

(g) Proposed CWM performance standards. The applicant may propose to use applicable pre-defined performance standards as approved by the Department, or may provide CWM site-specific performance standards that:

(A) Address the proposed ecological goals and objectives for the CWM;
(B) Are objective and measurable; and
(C) Provide a timeline for achievement of each performance standard.

The overall goal of the mitigation plan is to achieve a net gain of the functions that eelgrass beds provide in the Yaquina estuary. This will be achieved through the successful restoration and enhancement of the mitigation area.

To achieve the project goals the following will be performed:

<u>Eelgrass</u>

Grading:

- Mitigation Area A will be graded as depicted on Figure 11A. Its lowest depths will be at -4 feet NAVD. It will gently slope to the north up to a maximum elevation of 0 feet NAVD. An area of 2.04 acres will be restored and 0.63 acres will be enhanced.

Planting:

- In the summer of 2010, seeds will be collected and sown into Mitigation Area A. Bare root eelgrass plugs will be salvaged from the areas to be dredged and placed in saltwater tanks at the Oregon Coast Aquarium or a holding area near the OSU dock or to the west of the proposed NOAA MOC-P. They will be transplanted into the mitigation area during the summer of 2011. Sod plugs will be salvaged from a donor site during the summer of 2011 and immediately transplanted into the mitigation area.

- Additional eelgrass plugs will be transplanted into the mitigation area during the summers of 2011 and if necessary 2012.

Performance Standards and Success Criteria

Thom *et al* (2008) noted that criteria used to evaluate the performance of eelgrass restoration projects needs to be simple and easily quantifiable. They also concluded that "We, as yet, cannot predict accurately the final stable density of a planted bed given a set of environmental conditions." Fonseca *et al* (1998) found that habitat functions of eelgrass beds, such as animal abundance, taxonomic composition, complexity of the eelgrass canopy, and macroalgal abundance, could be related to the coverage and persistence of eelgrass plants at the restoration site. Some die-back of the transplanted eelgrass plants is expected during the first two years from the stress of transplanting; however this is followed by coalescence of the transplants into a larger eelgrass bed after 5 to 8 years (S. Rumrill, pers. comm.).

Given this, we propose the following performance standards and success criteria:

- The mitigation areas will be considered successful when the number of eelgrass shoots has exceeded the number present within the impact area as measured on July 12, 2010.
- To determine the number of shoots within the affected eelgrass beds, an assay will be conducted during a low tide on July 12, 2010. A random array of approximately 100 points within the existing eelgrass beds within the nearshore areas of the MOC-P site will be located with GPS. A count of all shoots will be conducted at each point using a 0.25 meter^2 quadrat. A photograph of each quadrat will also be recorded. The distribution of shoot count numbers within the assayed area will be used to estimate the total number of eelgrass shoots within the proposed impact area.

(h) A description of the proposed financial security instrument. The Department will determine the amount of security required. A final financial security instrument will be required prior to permit issuance unless otherwise approved by the Department.

The Port will provide financial security for the project as required by OAR 141-085-0176.

(i) A monitoring plan including specific methods, timing, monitoring plot locations, and photo-documentation locations.

Annual monitoring will occur over a ten-year period beginning the first July after the site is constructed and occurring every July throughout the monitoring period. The monitoring will take into account any natural perturbations observed at other eelgrass beds within Yaquina Bay. Monitoring reports will be prepared annually for ten years. The Port is responsible for all monitoring and maintenance of the mitigation site.

A series of transects will be used to assess eelgrass growth within each mitigation area. Quadrats of 0.25 meter^2 will be used to assess the shoot density along each transect at 15 foot intervals.

Qualitative monitoring of each donor bed will be conducted for three years after eelgrass has been harvested. As only 10% of each bed will be harvested, and the harvested areas will be no closer than one meter, and that regeneration is expected to occur, it is likely that it will be difficult to determine exactly where eelgrass has been harvested after the second year. A photographic record will be recorded along transects established at each donor site.

The tidal water velocities may be relatively low enough in the upper portion (above +0.5 feet NAVD) of Mitigation Area A that non-native *Z. japonica* may become established. By mid-July, when the native eelgrass is easily distinguished from *Z. japonica*, the non-native eelgrass will be removed and placed above the highest tide line (i.e. in a location where it will die).

Also within Mitigation A, sediment accretion or erosion will be monitored by placement of a sediment marker within each of the monitoring transects. Vertical markers with vitreous enamel elevation markings will be firmly placed in the deepest portion of each transect and the elevation of the sediment surface will be noted during each monitoring period. Sea level rise will be determined from the NOAA records for the South Beach station.

Photographs of each of the monitoring quadrats within all three sites will be taken during each of the monitoring periods and used to assess the algal cover along each quadrat.

Water velocities are difficult to measure in a meaningful temporal window within an estuarine environment and will not be measured.

(j) A long-term maintenance plan describing:

(A) How the applicant anticipates providing for maintenance of the CWM site beyond the monitoring period to ensure its sustainability (e.g., maintenance of any water control structures, weed management, prescribed burning, and vandalism repair);

The sequence for implementing corrective actions will be as follows:

- Observe – The Port will transplant eelgrass into the mitigation area during the summer of 2011, but will monitor the progress of mitigation for two years before deciding to take any corrective actions; This is based on observations, such as Thom *et al* (2008) who noted that a decline in eelgrass density following the first year after planting was followed by an increase in eelgrass density. Annual reports will be sent to the agencies and in consultation with NMFS, DSL, ODFW, and the Corps, a decision of whether to implement corrective action(s) will be made at the end of the second year.
- Implement corrective action(s) – If monitoring shows that eelgrass is not surviving and reaching the performance standard, an assessment of the rate of sediment deposition, water velocities, and macroalgae accumulation will be made. Corrective actions could include recontouring the mitigation area, which may prolong the monitoring period, or changing the method or the timing of eelgrass planting.
- As recommended in Thom *et al* (2008), the Port may consider changing performance standards/constructing a new mitigation area – if after implementing all corrective actions the mitigation area is still not meeting success criteria. The Port will investigate whether other locations within the Bay could support eelgrass. Alternately, in coordination with NMFS, DSL, ODFW, and the Corps, the Port could alter the success criteria to match the conditions of the mitigation area.

(B) Expected long-term ownership of the CWM site and the anticipated responsible party or parties for long-term maintenance; and

The Port Commission will either adopt a long term management plan that will stipulate maintenance activities, responsible parties, and a funding source or a third party steward (as yet to be identified) will be awarded an endowment to manage the mitigation area.

(C) How the maintenance activities are anticipated to be funded.

The Port will finance all maintenance activities through a performance bond or endowment.

(k) The CWM plan shall identify the long-term protection instrument for the CWM site in accordance with OAR 141-085-0695.

The mitigation area will be protected by a conservation easement.

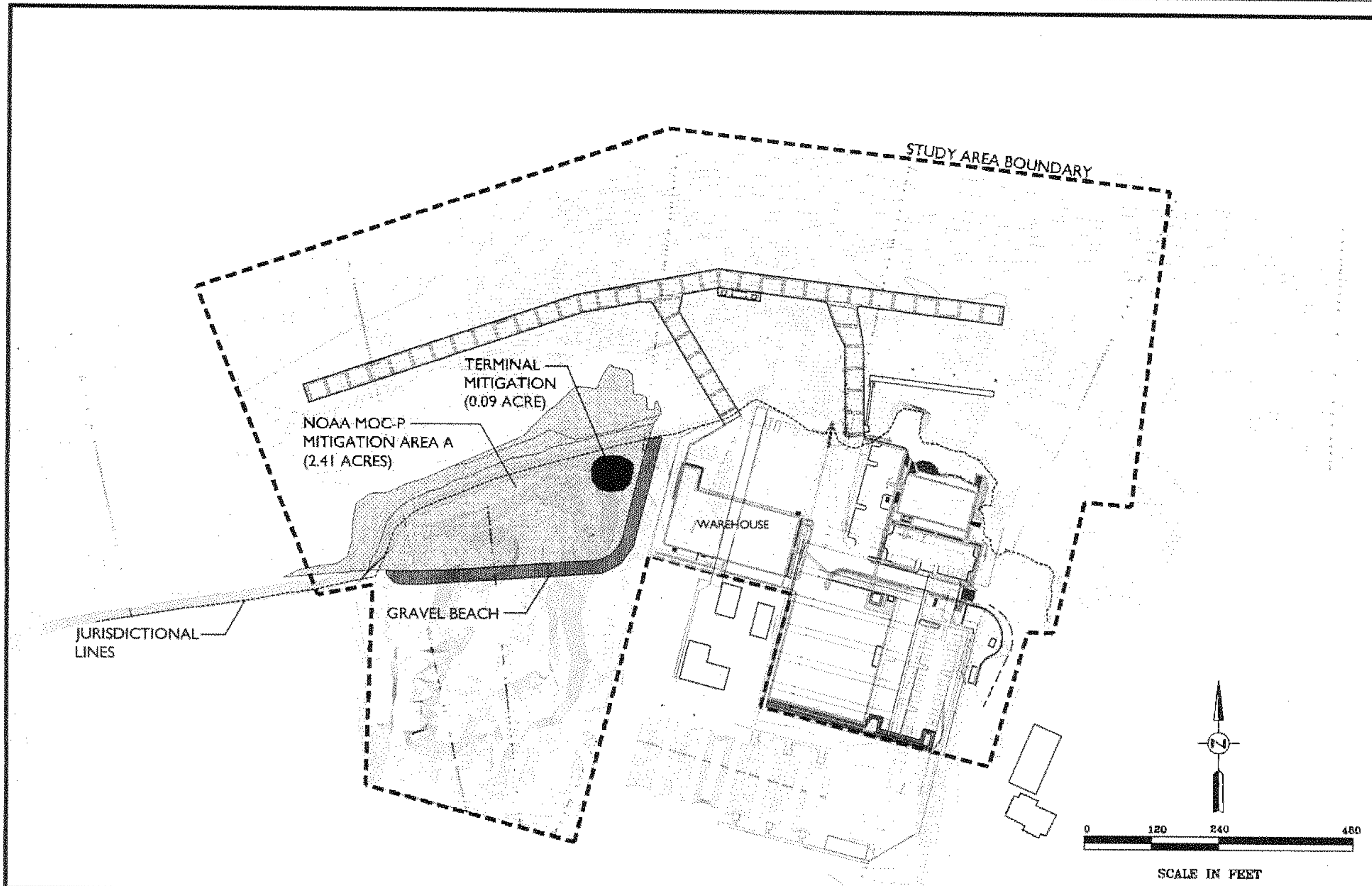


FIGURE 11

Proposed mitigation area at the NOAA Marine Operations Center—Pacific for eelgrass impacts at the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

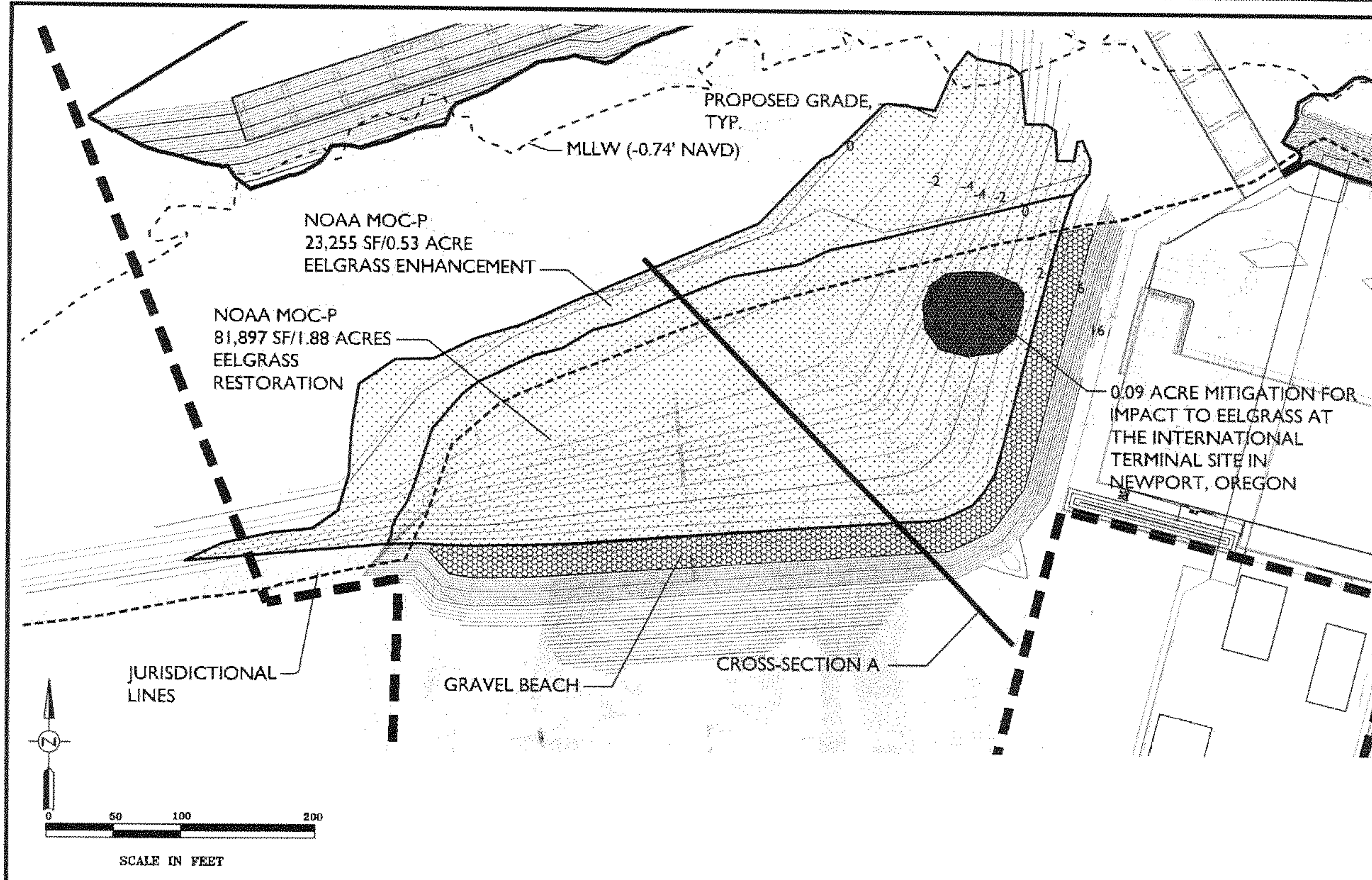


FIGURE 11A

Detail of eelgrass mitigation area at the NOAA Marine Operations Center—Pacific for eelgrass impacts at the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010. See cross—section A on Figure 11B.

4540
5/20/10

Pacific Habitat Services, Inc.

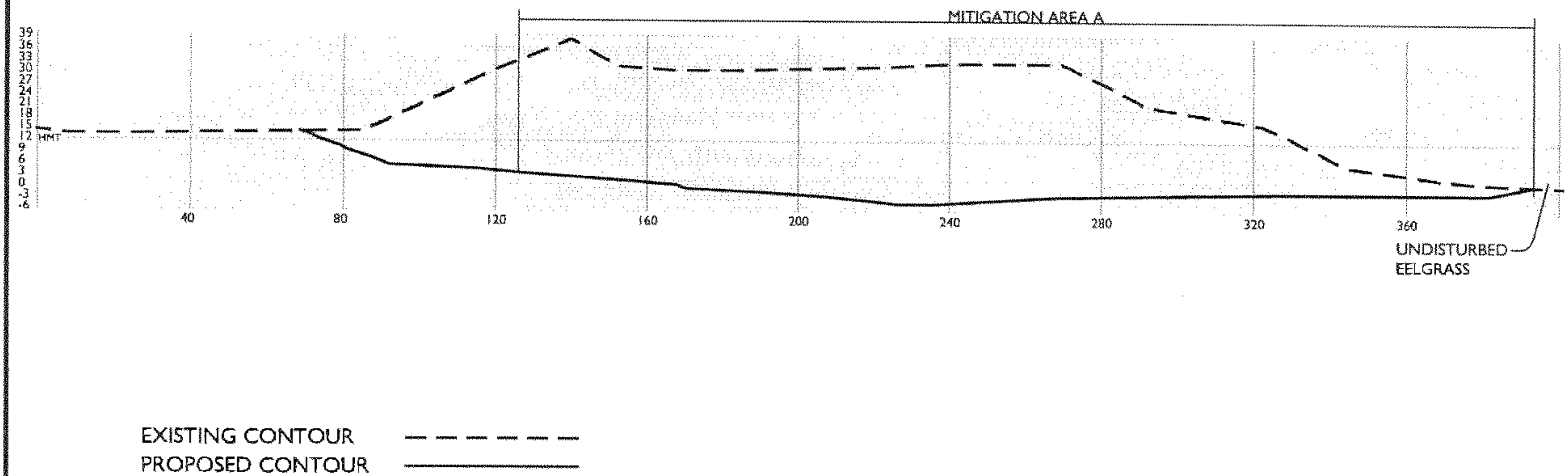


FIGURE 11B

Cross-section of mitigation grading at mitigation area A at the NOAA Marine Operations Center-Pacific for eelgrass impacts at the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

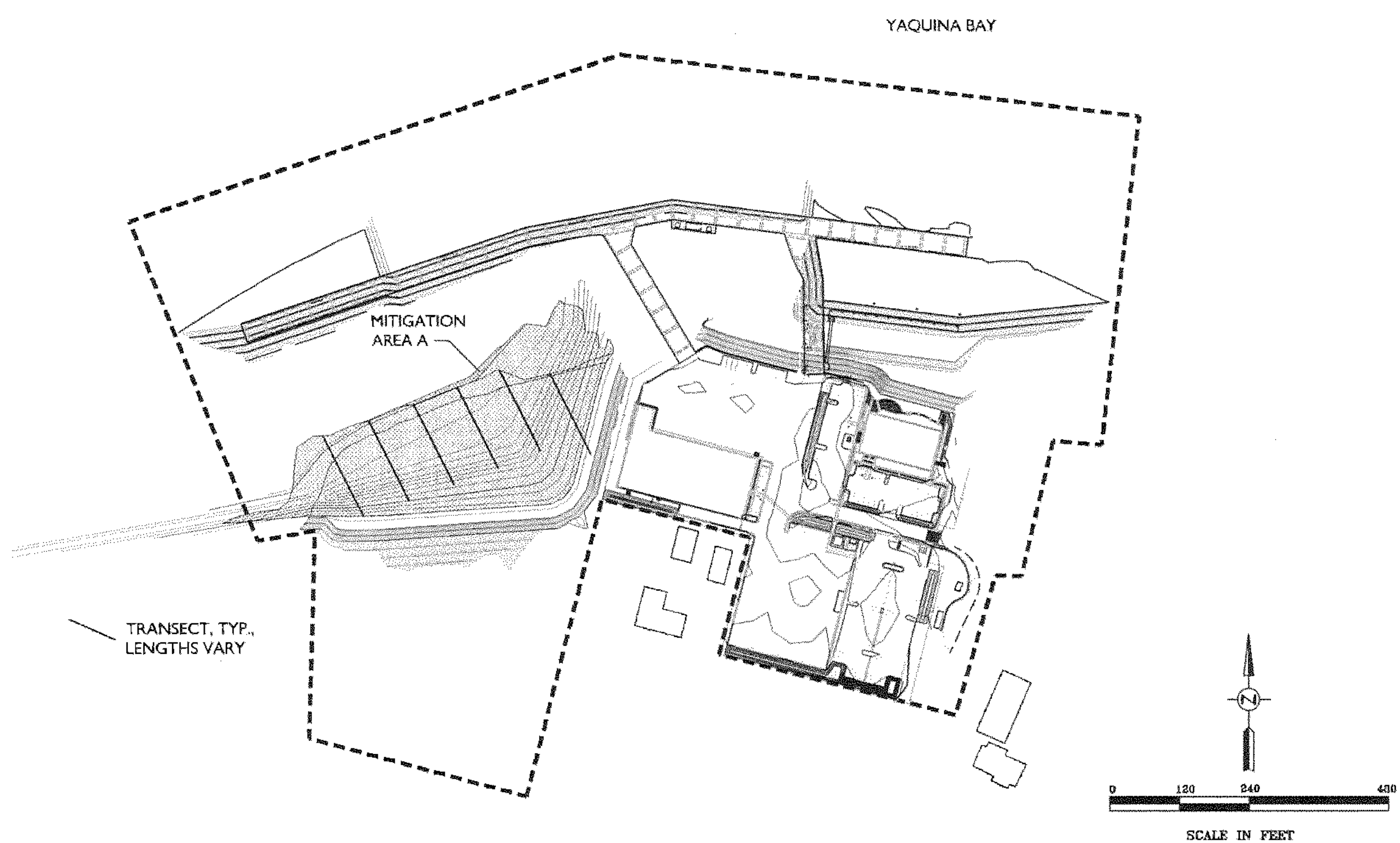


FIGURE 11C

Location of monitoring transects in mitigation area A at the NOAA Marine Operations Center–Pacific for eelgrass impacts at the International Terminal in Newport, Oregon. Provided by KPFF Consulting Engineers, 2010.

4540
5/20/10

Pacific Habitat Services, Inc.

State of Oregon
Department of Environmental Quality — Memorandum

To: NOAA Fleet and International Terminal Team

Date: DRAFT

From: Bill Mason, RG

Subject: Chlorine-Produced Oxidants

The Port of Newport and the National Oceanic and Atmospheric Administration (NOAA) are planning to construct docks in Yaquina Bay. Both docks will include piers that require cathodic protection to prevent them from corroding. Staff from DEQ's 401 Water Quality Certification program have asked me to evaluate whether the proposed Impressed Current Cathodic Protection (ICCP) control could create Chlorine-Produced Oxidants or release metals in sufficient quantities to adversely affect water quality or aquatic organisms near each dock. This memo summarizes my findings.

Impressed Current Cathodic Protection

Cathodic protection is a technique to control the corrosion of a metal surface. It works by placing an easily corroded metal like zinc or aluminum ("anode") in contact with the metal to be protected ("cathode") so that the anode is preferentially cousumed (sacrificed), thus keeping the protected structure from corroding. Cathodic protection systems are most commonly used to protect steel, water or fuel pipelines and storage tanks, steel pier piles, ships, offshore oil platforms and onshore oil well casings.

ICCP is a form of cathodic protection that does not use a sacrificial anode, but instead uses high silicon cast iron, graphite, mixed metal oxide, platinum or niobium anodes connected to a direct current (DC) power source. The DC power provides similar corrosion protection ("electrochemical potential") as a sacrificial anode, but because of this power input, the anode is not consumed. In this case, the anodes proposed for the two docks are coated with a ceramic material ("mixed metal oxide") and will not appreciably be consumed over the life of the dock. Therefore, additional levels of metals will not enter the water column due to operation of the proposed ICCP system.

Chlorine-Produced Oxidants

Industrial chlorine typically is manufactured by passing an electric current through a pure sodium chloride water solution (electrolysis). Similarly, passing current through an ICCP system immersed in a complex solution like seawater will create chlorine, but it will produce other compounds[1] as well. These substances are commonly called Chlorine-Produced Oxidants (CPO) when associated with brackish or seawater.

Because they are highly reactive, these oxidants are usually short-lived in natural systems. The general CPO reactions begin when chlorine is generated by electrolysis in seawater. The chlorine then reacts with water to form hypochlorous acid and the hypochlorite ion. These two compounds, along with the chlorine, are referred to as free chlorine. Free chlorine, the standard disinfection agent used in water treatment facilities, undergoes four important types of reactions in natural waters (EPA, 1999):

1. Oxidation of reduced substances (e.g., dissolved organic carbon, certain iron species) and subsequent conversion to chloride;
2. Reaction with ammonia and organic amines to form chloramines, collectively called combined chlorine;
3. Reaction with bromide to form hypobromous acid and hypobromite, called free bromine; and

[1] In saline waters, the chemicals are comprised predominantly of hypochlorous and hypobromous acids, hypochlorite and hypobromite, chloro- and bromo-organics, chloride, bromide, chloramines, and bromamines.

4. Reaction with organics to form chloro-organics. Free bromine reacts in a manner similar to free chlorine, oxidizing reduced substances or forming bromamines (combined bromine) or bromo-organics.

Most common analytical methods for quantifying CPO measure the sum of all free and combined chlorine and bromine in solution, but do not measure the individual compouuds that make up the CPOs.

CPO Concentrations Expected from ICCP Systems

In 1999, EPA produced a technical development document to evaluate the various discharges associated with Department of Defeuse vessels (EPA, 1999). As a part of their evaluation of the discharges associated the SEAWOLF class submarine propulsor layup ICCP system, they used average decay rates to estimate the resultant CPO concentration and mass loading. The resulting concentration and mass loading converge to steady-state values of 18 µg/L CPO per event, respectively, in the propulsor's enclosed volume of water after ten hours of system operation.

They compared these calculated concentrations to a set of propulsor CPO field data measured in the enclosed water of the propulsor over a 52 day period. The CPO concentration was less than 40 µg/L (EPA, 1999) This is in general agreement with the 18 µg/L estimated from the previous CPO decay calculation. EPA then used the larger of the two estimates (40 µg/L) for any subsequent calculations.

CPO Fate

Strong oxidizers like chlorine and CPOs decay rapidly in natural systems, with observed decay half-lives of between1 and 100 minutes (e.g., EPA, 1999; Madec et al., 1985; Richardson et al., 1981; and Sansone and Kearney, 1984). In most cases, however, the majority of CPO will disappear within an hour of being added to seawater (EPA, 1999). The oxidants are consumed in reactions with naturally occurring organic material in seawater to produce more stable (and less toxic) compounds such as bromoform (also known as tribromomethane).

EPA (1999) estimated that using average decay estimates (i.e., 25% first stage decay after one minute, 50% second stage decay per hour) provides a 98.8% reduction in CPO for the 12 hour duration of a tidal excursion.

Assuming a worst case concentration of 40 µg/L as described in the previous section, the likely CPO concentration will be less than 0.5 µg/L (40 x [1 – 0.988]) during slack tide. This decay calculation does not include any dilution due to mixing, which would decrease the concentration even more (to below detection limits).

CPO Toxicity

The following published toxicity results concentrations are relevant to this evaluation:

1. Eleven species of saltwater fish had acute[2] values ranging from 37 µg/L to 270 µg/L, with a species mean acute value of 47 µg/L for coho salmon (VDH, 2001);
2. The most stringent chronic[3] toxicity value for state (Florida)Water Quality Criteria is 7.5 µg/L (EPA, 1999);
3. However, a recent European risk assessment that evaluated the quality of the research used in developing toxicity values for sodium hypochlorite (ECB, 2007) concludes that the 28-day No Observed Effects Level for fish fry is 40 µg/L.

---

[2] "Acute toxicity" means a lethal or severe adverse sublethal effect (for example, immobilization of a daphnid) to an organism exposed to a toxic substance for a relatively short period of time. Acute toxicity is measured by short-term bioassays, generally of 48 or 96 hour duration.

[3] "Chronic toxicity" means death or other adverse impacts that affect the growth, survival, or reproductive success of an organism or its progeny after a relatively long exposure period to toxic substances. Chronic toxicity is measured using intermediate-term or long-term bioassays.

Summary

As requested, I've evaluated whether the proposed ICCP control could create CPOs or release metals in sufficient quantities to adversely affect water quality or aquatic organisms near each dock. As a part of my evaluation, I reviewed the literature itemized in the references section below, but I've only included the highlights from that review in this memo.

My conclusions are that based on our understanding of the fate of CPOs and ICCP anodes, it is unlikely that the ICCP system will create CPOs or release metals in sufficient quantities to exceed any relevant state or federal water-quality criteria.

References

Agus, E., Voutchkov, N., & Sedlak, D. L. (2009). Disinfection by-products and their potential impact on the quality of water produced by desalination systems: A literature review. Desalination, 237(1-3), 214-237.

Allonier, A., Khalanski, M., Camel, V., & Bermond, A. (1999). Characterization of chlorination by-products in cooling effluents of coastal nuclear power stations. Marine Pollution Bulletin, 38(12), 1232-1241.

Cal EPA. (2006). Total residual chlorine and chlorine-produced oxidants policy of California (draft). California Environmental Protection Agency, State Water Resources Control Board, Division of Water Quality. Accessed on December 4, 2009: http://www.swrcb.ca.gov/water_issues/programs/state_implementation_policy/docs/chlorine_policy_dfrt_063006_accept.pdf

EPA and DoD. 1999. Phase I Uniform National Discharge Standards for Vessels of the Armed Forces: Technical Development Document. US Environmental Protection Agency, Office of Water, Washington, DC. EPA 821-R-99-001.

European Union Risk Assessment Report. 2007. Sodium Hypochlorite, CAS No: 7681-52-9, EINECS No: 231-668-3. Final report, November 2007. Accessed on December 4, 2009: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhypochloritereport045.pdf

Jenner, H. A., Taylor, C. J. L., Van Donk, M., & Khalanski, M. (1997). Chlorination by-products in chlorinated cooling water of some european coastal power stations. Marine Environmental Research, 43(4), 279-293.

Katayose, M., Yoshida, K., Achiwa, N., & Eguchi, M. (2007). Safety of electrolyzed seawater for use in aquaculture. Aquaculture, 264(1-4), 119-129.

Key, P. B., & Scott, G. I. (1986). Lethal and sublethal effects of chlorine, phenol, and chlorine-phenol mixtures on the mud crab, panopeus herbstii. Environmental Health Perspectives, Vol. 69, 307-312.

Kristiansen, N. K., Aune, K. T., FrØshaug, M., Becher, G., & Lundanes, E. (1996). Determination of halogenated acetic acids in chlorinated sea water and drinking water produced offshore. Water Research, 30(9), 2155-2159.

Kristiansen, N. K., Frøshaug, M., Aune, K. T., Becher, G., & Lundanes, E. (1994). Identification of halogenated compounds in chlorinated seawater and drinking water produced offshore using n-pentane extraction and open-loop stripping technique. Environmental Science and Technology, 28(9), 1669-1673.

Madec, C., Trebern, B., & Courtot-Coupez, J. (1985). COMPORTEMENT DES ACIDES AMINES DISSOUS DU MILIEU MARIN APRES INJECTION DE CHLORE. Water Research, 19(9), 1171-1178.

Middaugh, DP; Burnett, LE; Couch, JA. (1980). Toxicological and Physiological Responses of the Fish, Leiostomus xanthurus , Exposed to Chlorine Produced Oxidants. Estuaries. Vol. 3, no. 2, pp. 132-141.

Norton Corrosion Limited, (2009). Proposed Cathodic Protection Systems, Yaquina Bay, Oregon. November 24, 2009.

Richardson, L. B., Burton, D. T., Helz, G. R., & Rhoderick, J. C. (1981). Residual oxidant decay and bromate formation in chlorinated and ozonated seawater. Water Research, 15(9), 1067-1074.

Robertus, J. (2006). Comments on Draft Statewide Chorine [sic] and CPO Policy. Accessed on December 4, 2009: http://www.swrcb.ca.gov/water_issues/programs/state_implementation_policy/docs/comments/chlorine/john_robertus.pdf

Sahli, B.P. (2001). Chlorine. Virginia Department of Health Division of Health Hazards Control, Richmond, Virginia, USA. Accessed on December 4, 2009: http://www.vdh.virginia.gov/epidemiology/DEE/PublicHealthToxicology/documents/pdf/chlorine.PDF

Sansone, F. J. & Kearney, T. J. (1984) Chlorination kinetics of surface and deep tropical seawater. In: Water Chlorination: Chemistry, Environmental Impact and Health Effects, Vol. 5, Robert L. Jolley, Editor. Lewis Publishers, Chelsea, MI. pp. 755-762.

USEPA (1984). Ambient Water Quality Criteria for Chlorine. EPA 440/5-84-030. January 1985.

Wan, M. T., Van Aggelen, G., Cheng, W., & Watts, R. G. (2000). Acute toxicity of chlorine-produced oxidants (CPO) to the marine invertebrates amphiporeia virginiana and eohaustorius washingtonianus. Bulletin of Environmental Contamination and Toxicology, 64(2), 205-212.

Wan, M. T., Watts, R. G., & Cheng, W. (2000). Acute toxicity of inorganic chloramines to daphnia magna in two types of dilution water. Bulletin of Environmental Contamination and Toxicology, 65(2), 147-152.