



August 2025
Whatcom Waterway Cleanup in Phase 2 Site Areas



Revised Engineering Design Report: Unit 1C Dredging

Prepared for Port of Bellingham

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TABLE OF CONTENTS

1	Introduction	1
2	Background	2
2.1	Site Background.....	2
2.2	Sediment Cleanup Levels	4
3	Engineering Design	6
3.1	Dredge Prism Design.....	6
3.2	Equipment Selection	7
3.3	Pre-Dredge Coordination	8
3.4	Verifying Dredge Performance	8
3.5	Residuals Management.....	8
3.6	Sediment Offload, Transport, and Disposal	9
3.7	Protection of Cultural Resources.....	9
4	Compliance Monitoring	11
5	Implementation Schedule.....	13
6	References	14

FIGURES

Figure 1	Site Location and Vicinity
Figure 2	Unit 1C Dredging - Plan View
Figure 3	Unit 1C Dredging - Cross-Section A-A'
Figure 4	Unit 1C Dredging - Cross-Section B-B'
Figure 5	Unit 1C Dredging - Cross-Section C-C'

APPENDICES

Appendix A	Best Management Practices
Appendix B	Water Quality Monitoring Plan
Appendix C	Updated Dredge Prism – August 2025

ABBREVIATIONS

µg/kg	micrograms per kilogram
BMP	best management practice
BSL	bioaccumulation screening level
BST	Bellingham Shipping Terminal
CAP	Cleanup Action Plan
cm	centimeter
COC	contaminant of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSL	cleanup screening level
D/F	dioxin/furan
Ecology	Washington State Department of Ecology
GP West	Georgia-Pacific West, Inc.
mg/kg	milligrams per kilogram
MGP	manufactured gas plant
MLLW	mean lower low water
MTCA	Model Toxics Control Act
ng/kg	nanograms per kilogram
PAH	polycyclic aromatic hydrocarbon
Port	Port of Bellingham
RAU	remedial action unit
RMC	residuals management cover
SCO	sediment cleanup objective
SCU	Sediment Cleanup Unit
Site	Whatcom Waterway Site
SMS	Sediment Management Standards
SQAPP	Sampling and Quality Assurance Project Plan
SWAC	surface-weighted average concentration
TEQ	toxic equivalency quotient
WAC	Washington Administrative Code

1 Introduction

This Revised Engineering Design Report (EDR) has been prepared in support of cleanup work to be performed within a portion of Site Unit 1C within the Whatcom Waterway Site (Site). Figure 1 shows the Site location and vicinity along with the location of the planned Unit 1C dredging.

Cleanup of the Site is being performed consistent with the cleanup requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington, as administered by the Washington State Department of Ecology (Ecology) under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC). The cleanup also complies with Sediment Management Standards (SMS; WAC 173-204).

Site cleanup is being performed by the Port of Bellingham (Port) and other cooperating potentially liable parties under Ecology oversight, in accordance with Consent Decree No. 07-2-02257-7 (Ecology 2007a), as amended by the First Amendment to the Consent Decree (Ecology 2011) and the Second Amendment to the Consent Decree (Ecology 2024).

As described in Section 2.1, the cleanup of the Site is being sequenced to address different Site areas. Figure 1 shows the locations of the cleanup completed in Phase 1 Site Areas in 2016 and shows the Phase 2 Site areas that will be cleaned up in the future. The cleanup in Phase 2 Site areas is expected to begin in 2025 or 2026 following completion of design and permitting.

In the interim, sediment dredging will be performed within a portion of Unit 1C (within Phase 2 Site Areas) to address areas where compliance monitoring shows that sloughing of sediment has occurred from underneath the Bellingham Shipping Terminal (BST) pier structure. Timely removal of this sloughed sediment and adjacent high spots will protect against potential vessel-related redistribution of contaminated sediment that could otherwise result in recontamination and will ensure continued navigational safety pending the future cleanup of remaining Phase 2 Site Areas. This expedited sediment removal in Unit 1C is the focus of this EDR.

The original version of this EDR was finalized in November of 2023. A revised version was developed in June of 2024 to incorporate minor modifications to the dredge prism and the area of residuals management cover. A second version (the current EDR) was developed in August of 2025 to incorporate additional modifications to the project schedule and the dredge prism as shown in Appendix C.

Any further changes to this EDR shall be reviewed and approved by Ecology prior to implementation.

2 Background

This section provides additional information regarding the history of the Site and context for this EDR.

2.1 Site Background

The primary contaminants of concern (COCs) at the Site, as determined in the remedial investigation and feasibility study (RI/FS; RETEC 2006), include mercury, phenol, and 4-methylphenol compounds (Ecology 2007a). Other contaminants including polycyclic aromatic hydrocarbon (PAH) compounds are also known to be present.

The Site boundary was defined by the extent of surface and subsurface sediment impacted by mercury discharges from the former Georgia-Pacific West, Inc. (GP West) chlor-alkali plant. GP West wastewater facilities were updated in the 1970s, and the chlor-alkali plant operations were discontinued in 1999. The chlor-alkali plant was subsequently demolished, eliminating the plant as a source of mercury to the Site and to Bellingham Bay.

Sources of phenolic compounds within the Site boundary include wood waste and degradation products from historical log rafting activities and phenolic compounds from pulp and tissue mill wastewater discharges. The pulp and tissue mills have both been discontinued and demolished, eliminating them as potential ongoing sources of these contaminants.

The Port assumed leadership of the Site cleanup in 2005 after purchasing GP West's waterfront properties. Cleanup requirements for the Site are defined in the 2007 Consent Decree between Ecology, the Port, the Washington Department of Natural Resources, the City of Bellingham, and a private party, Meridian Pacific, LLC. The Cleanup Action Plan (CAP) for the Site described in the Consent Decree complies with the requirements of the MTCA (WAC 173-340) and SMS (WAC 173-204) regulations. The Consent Decree was initially executed in 2007 (Ecology 2007a) and was amended in 2011 (Ecology 2011).

The CD includes cleanup levels for the COCs known to be present in Site sediments at the time the Consent Decree was executed. For most COCs, the cleanup levels were developed to be protective of benthic receptors. For mercury, the Consent Decree also included a site-specific sediment cleanup level for mercury that was developed to be protective of human and ecological health considering the potential for mercury bioaccumulation through the consumption of contaminated seafood.

Information regarding the presence and distribution of dioxin/furan (D/F) compounds within the Site was developed as part of the Pre-Remedial Design Investigation work (Anchor QEA 2010) required under the CD. The 2011 First Amendment to the CAP acknowledged the presence of D/Fs within the Site, but Ecology was completing a broader evaluation of D/F compounds throughout Bellingham

Bay and Puget Sound at that time. As a result, the First Amendment anticipated the potential for a future amendment to add D/Fs, pending the outcome of these evaluations (Ecology 2011).

In 2013, Ecology revised the SMS regulations to include a framework to specifically address human health and environmental risks associated with bioaccumulative chemicals. Then, in 2015, Ecology completed a bay-wide evaluation of bioaccumulative chemicals in surface sediment throughout Bellingham Bay. The bay-wide evaluation identified elevated regional background concentrations of carcinogenic polycyclic aromatic hydrocarbon (cPAH) and D/F compounds throughout the inner portions of Bellingham Bay from multiple legacy and ongoing sources (Ecology 2015).

In accordance with the CD, cleanup of the Phase 1 Site Areas was completed in 2016. Post-construction monitoring (Anchor QEA 2018) and 5 years of compliance monitoring have been completed since that time (Anchor QEA 2019, 2020, 2022). Results of monitoring have demonstrated that the cleanup is compliant with cleanup requirements.

Updated cleanup requirements for the Site are defined in the Second Amendment to the Consent Decree (Ecology 2024) and include expediting dredging in a portion of Unit 1C, followed by cleanup of remaining Phase 2 Site Areas:

- **Unit 1C Dredging:** Dredging is to be performed within a portion of Unit 1C (Figures 1 through 5) located at the BST, as amended by the updated dredge prism shown in Appendix C. This removal will address an area where compliance monitoring shows sloughing of sediment has occurred from underneath the BST pier structure. Timely removal of this sloughed sediment and adjacent high spots will protect against potential vessel-related redistribution of contaminated sediment that could otherwise result in recontamination and will ensure continued navigational safety. The extent of work to be performed at this time is limited by the geotechnical characteristics of the steep slopes at the BST and the presence of existing over-water structures. Removal of under-pier sediment will be conducted to the extent practicable considering access limitations posed by the BST dock and shoreline stability concerns. As shown in Figure 3, some contaminated sediment will remain in place on the steep under-pier slopes at BST. The final cleanup of the under-pier area adjacent to BST will be performed as part of the future cleanup of remaining Phase 2 Site Areas. Sediment removed during the Unit 1C dredging described in this EDR will be disposed of at an off-site upland landfill facility. The details of this work are described in Section 3 of this EDR.
- **Cleanup of Remaining Phase 2 Site Areas:** Cleanup of remaining Phase 2 Site Areas will be completed separately following completion of engineering design and permitting. Construction is expected to start in 2027 and will likely require three construction seasons to complete.

2.2 Sediment Cleanup Levels

Sediment cleanup levels and points of compliance were defined in the CAP and Consent Decree (Ecology 2007a) for the Site. These criteria remained unchanged in the First Amendment to the Consent Decree (Ecology 2011) but were expanded in the Second Amendment to the Consent Decree (Ecology 2023). Site cleanup levels and points of compliance include the following:

- **Cleanup Levels for Protection of the Benthic Community:** Sediment cleanup levels for protection of the benthic community (i.e., sediment-dwelling organisms) were established at the Sediment Quality Standards criteria applicable at the time of the Consent Decree. These criteria remain unchanged, but under the updated SMS regulations (Ecology 2013) these values are now referred to as the sediment cleanup objective (SCO) benthic criteria. Compliance with cleanup levels protective of the benthic community is determined using a combination of chemical testing and contingent bioassay testing. Samples that exceed the chemical SCO value but pass bioassay testing are considered to comply with the SCO, consistent with Washington's SMS regulations and associated guidance (Ecology 2021).
- **Cleanup Levels for Protection of Human and Ecological Health:** Site-specific cleanup levels protective of human and ecological health have also been established for bioaccumulative compounds, including mercury, cPAH compounds, and D/F compounds, described as follows:
 - **Mercury:** The site-specific cleanup level (the bioaccumulation screening level or BSL) for mercury was established in the Consent Decree (Ecology 2007a) at a value of 1.2 milligrams per kilogram (mg/kg). Compliance with the BSL is measured on a point-by-point basis.
 - **cPAH Compounds:** Cleanup levels for cPAH compounds were established in the Second Amendment to the Consent Decree (Ecology 2023). For cPAH compounds, the sediment cleanup level was established at 229 micrograms per kilogram (µg/kg) toxic equivalency quotient (TEQ) based on a risk-based SCO value. Compliance with this value is measured on a surface-weighted average concentration (SWAC) basis throughout the Site.
 - **D/F Compounds:** For D/F compounds, the cleanup level was established at 9.8 nanograms per kilogram (ng/kg) TEQ in the Second Amendment to the Consent Decree (Ecology 2023), based on an analysis of what is technically possible to achieve given the presence of ongoing recontamination sources for D/F compounds. Compliance with this cleanup level is measured on a SWAC basis throughout the Site.
- **Sediment points of compliance:** Compliance with the sediment cleanup levels is measured based on the thickness of the sediment biologically active zone. In Bellingham Bay, this thickness is the upper 12 centimeters (cm) of the sediment bed (RETEC 2006; Ecology 2007a). Compliance with cleanup levels protective of the benthic community are measured on a

point-by-point basis, as is compliance with the mercury BSL. Compliance with cleanup levels protective of human and ecological health for cPAH and D/F compounds are measured on a SWAC basis throughout the Site.

3 Engineering Design

This section describes the engineering design for the dredging to be completed in Unit 1C.

3.1 Dredge Prism Design

Figures 2, 3, 4 and 5 illustrate the originally proposed dredge prism. Appendix C documents the updated Berth 1 dredge prism as modified in August of 2025.

The work includes removal of sloughed sediment from the face of the BST pier and under-pier areas and open water dredging within portions of the BST berthing area. The dredge prism was designed based on current sediment bathymetry, current navigation uses at the BST with the potential to redistribute sediments, the geotechnical properties of the sediment, locations, and characteristics of adjacent structures, and the typical precision and accuracy of dredging equipment that will likely be utilized to implement the work.

The extent of planned sediment removal in steep-sloped under-pier areas (Figure 3) is currently limited by the geotechnical characteristics of the slope and the existing over-water structures. Dredging beyond the planned limits would destabilize the slope, resulting in sediment movement and damage to the existing pier, bulkhead and other shoreline structures. Because not all contaminated sediment will be removed, additional remediation work will occur as part of the future cleanup of remaining Phase 2 Site Areas.

The dredge prism includes a neatline elevation of 35.5 feet below mean lower low water (MLLW) for areas offshore of the BST pier-face. The contractor will be provided with a maximum over-dredge allowance below the specified neatline depth. The maximum allowable over-dredge is 3 feet below the neatline elevation. A thicker over-dredge was necessitated by the presence of broken pilings, a boulder and other debris in the dredge footprint that in turn require removal of deeper sediment in selected areas. The dredge prism also includes 4:1 dredge side-slopes in areas offshore of the BST pier-face.

The dredge prism was designed to include removal of material from the under-pier area to the extent practicable at the current time using a combination of passive sloughing and deliberate removal. Material is anticipated to slough into the dredge area once the toe support has been dredged in the adjacent open-water area, and the contractor will be required to remove the sloughed material. When dredging adjacent to the BST structure, the contractor will limit cut thickness to a maximum of 4 feet for each dredge pass, with the intent of initiating a controlled sloughing of under-pier material. Following open-water dredging and removal of sloughed material, targeted removal of remaining under-pier material in the proposed dredge prism will occur to the extent practicable (i.e., to remove material not otherwise removed through passive sloughing). This

will occur using equipment (e.g., barge-mounted excavators) capable of reaching under existing pier structures.

The dredge prism in Berth 1 was updated in June of 2024 and August of 2025 to accommodate slightly higher volumes of material as confirmed in the bathymetric surveys completed following the 2023/24 dredging season and based on the broken pilings and debris encountered during the dredging. Drawings showing the updated dredge prism as approved by project permitting agencies are included in Appendix C.

The total quantity of sediment expected to be removed during the dredging (including overdredge allowance) is up to approximately 30,000 cubic yards. Of this total, approximately 2,000 cubic yards are associated with the June 2024 updated dredge prism and 6,000 cubic yards are associated with the August 2025 updated dredge prism.

Locations of recently collected under-pier sediment sampling data are shown on Figures 2 and 3. As shown in Figure 3, the planned sediment removal will remove some, but not all of the contaminated sediment in the steep under-pier areas adjacent to BST. The thickness of the expected slough layer ranges from about 8-10 feet at the base of the slope to approximately 3-4 feet mid-slope (i.e., in the vicinity of PRDI sediment core VC-18 as shown on Figure 3). Though the sediments with the highest mercury concentrations will be removed and the potential for sediment redistribution and recontamination will be reduced at the completion of the dredging work, sediment quality in the under-pier areas is expected to remain in excess of final cleanup standards at the conclusion of Unit 1C dredging. Post-construction monitoring will be performed in this area (see Section 4 and Figure 2) to document under-pier sediment quality pending additional remedial action as part of the future cleanup of remaining Phase 2 Site Areas.

To minimize water quality impacts, the contractor will be required to make each dredge pass complete with the dredge buckets and will not be allowed to stockpile sediment in the water. The contractor also will not be allowed to level the completed dredge surface by dragging a beam or the dredge bucket.

3.2 Equipment Selection

Dredging work will be conducted using a mechanical dredge. Dredging method selection has considered the following factors:

- Ability of mechanical dredging equipment to meet Project requirements, including compliance with applicable water quality criteria
- Presence of debris within the dredging areas (hydraulic dredging equipment is subject to fouling with such debris)

- Ability of mechanical dredging to achieve higher solids loadings in the dredged materials, without necessitating costly and area-intensive dewatering methods
- Mechanical dredging produces lesser quantities of generated waters, minimizing both risks to receiving waters and the water treatment needs necessary to address those risks.
- Improved availability of equipment and expertise within the Pacific Northwest for mechanical dredging as opposed to hydraulic dredging
- Ability to use mechanical dredging equipment for other Project activities (e.g., residuals management cover [RMC] placement) within the Project

The selected contractor will determine the specific pieces of mechanical dredging equipment required to perform the Project work. It is assumed that the contractor will use dredge derricks and barges or a barge-mounted excavator with a long arm and tugs to conduct sediment removal and handling. The contractor will be required to specify equipment choices and procedures in advance as part of contract submittals. Equipment selection choices will comply with environmental controls and permit requirements and the best management practices (BMPs) listed in Appendix A. The Water Quality Monitoring Plan (Appendix B) will be implemented during dredging to ensure protection of water quality.

3.3 Pre-Dredge Coordination

Following selection of the project contractor, the Port shall provide to Ecology a copy of 1) a contractor-specific dredge, transload and disposal plan, and 2) a contractor-specific spill prevention control and countermeasures (SPCC) plan. These plans must be submitted to Ecology prior to a pre-dredge meeting with the contractor, the Port and Ecology. Dredging shall not begin prior to review and approval of these plans.

3.4 Verifying Dredge Performance

The completeness of dredging will be verified with multi-beam bathymetric progress surveys to be completed following dredging in each area and prior to the placement of RMC material (see Section 3.5). If progress surveys indicate that required elevations have not been met, the contractor will be required to remove additional material.

3.5 Residuals Management

At contaminated sites dredging residuals, the thin veneer of contaminated surface sediments, occur with all types of dredging. The quantity and quality of dredge residuals vary depending on the dredge material properties, the presence of debris, and other factors. Residuals management methods for dredging within Unit 1C were analyzed previously as part of the EDR for Cleanup in Phase 1 Site Areas (Anchor QEA 2015).

Placement of RMC material will be designed to mix with the dredge residuals to produce a sediment surface that meets sediment cleanup levels. A minimum of six inches of clean sand (i.e., RMC material) will be placed to manage anticipated dredge residuals generated by dredging activities in open-water dredging areas including dredging side-slopes. An over-placement allowance of up to 6 inches (total placement of 12 inches) is included as part of the design, and this potential over-placement would provide further reductions in final surface concentrations. RMC placement is not feasible in under-dock areas with steep slopes (sandy materials are not stable on slopes of 2.5H-to-1.0 or steeper).

The total quantity of RMC material to be placed is approximately 5,000 cubic yards. This includes a 700 cubic yard increase associated with the June 2024 updated dredge prism, and a 1,200 cubic yard increase associated with the August 2025 updated dredge prism (Appendix C). The sand will be clean, unused material sourced from a commercial quarry. The sand will be tested prior to use to verify that it complies with the SMS regulations.

The final surface elevation will be surveyed and sediment chemical quality tested following placement of the RMC materials as described in Section 4.

3.6 Sediment Offload, Transport, and Disposal

Dredged sediments will be managed by upland disposal in a permitted Subtitle D landfill. Final transportation to the landfill may occur by rail or truck, depending on the selected landfill facility and the transportation logistics selected by the contractor. Final landfill selection may also affect the allowable moisture content in the sediments to be disposed. Examples of permitted Subtitle D landfills that have historically managed dredged sediments include the Waste Management landfills in Wenatchee, Washington, and Arlington, Oregon, and the Allied Waste facility located in Roosevelt, Washington. Other landfills may be utilized for sediment management, provided they meet Subtitle D permitting requirements.

The contractor will be required to transport dredged sediments from the Waterway to the landfill. The contractor will be responsible for providing an appropriate off-site offload facility and the transportation logistics to move the sediments from the dredging area to the disposal site. The contractor will be required to barge sediments to the designated offload point. Sediment transportation between the offload point and the final disposal site may include truck or rail transportation, or a combination thereof. Sediment transportation and handling will comply with the BMPs listed in Appendix A and applicable permit requirements.

3.7 Protection of Cultural Resources

As noted in Appendix A, the contractor will be required to have an Inadvertent Discovery Plan (IDP) on-site describing the actions to be taken if potential cultural resources (e.g., archaeological artifacts

or human remains) are identified during the dredging. The IDP requirement will be included in the final project specifications.

4 Compliance Monitoring

Compliance monitoring activities to be performed during Unit 1C dredging include protection monitoring and performance monitoring.

Protection monitoring will include implementation of the water quality monitoring plan described in Appendix B. That work will be used to verify that work activities do not adversely impact water quality. The plan includes contingency actions to adjust or stop the work in the event of non-compliance with water quality goals.

Performance monitoring will include both bathymetric surveys and post-construction sediment monitoring, described as follows:

- **Progress Surveys:** Progress bathymetric surveys will be performed within the dredging areas to verify that sediments have been removed to target elevations and to document the extent of sediment removal achieved through sloughing and targeted removal in under-dock areas.
- **Completion Survey:** A bathymetric survey will be performed after the completion of residuals cover placement to document final bathymetric conditions within the work area. To the extent that material removal is required during the second work season, the completion survey will be repeated in Year 2.
- **Post-Construction Sediment Monitoring:** Post-construction monitoring of surface sediments will be performed at the locations shown in Figure 2 within 1 month of construction completion. Samples will be collected by a Van Veen sediment sampler (open water areas) or diver (under-dock areas) from the sediment bioactive zone (0 to 12 cm below mudline) using the methods defined in the existing Sampling and Quality Assurance Project Plan (SQAPP; Anchor QEA 2016). Sampling will include analysis for mercury, semivolatile organic compounds, and D/F compounds. If numeric SCO criteria for benthic protection are exceeded, then contingent bioassay testing may be performed as described in the SQAPP.
 - Assuming that construction of the cleanup in Phase 2 Site areas begins in 2027, only a single round of sediment monitoring will be performed (an additional round of sampling may be required by Ecology to the extent that implementation of the final cleanup is substantially delayed).
 - Sediments in the open-water RMC placement areas are expected to meet Site-specific cleanup standards at the time of sampling.
 - Sediments in the under-dock areas are expected to remain in excess of Site-specific cleanup standards pending additional remedial action as part of implementation of the future cleanup of remaining Phase 2 Site Areas.

The results of protection and performance monitoring will be documented in an As-Built Report to be prepared and submitted to Ecology within 120 days of completion of the work for review and approval.

5 Implementation Schedule

The required implementation schedule is defined in Exhibit C to the Consent Decree, as updated in the Second Amendment to the Consent Decree (Ecology 2024).

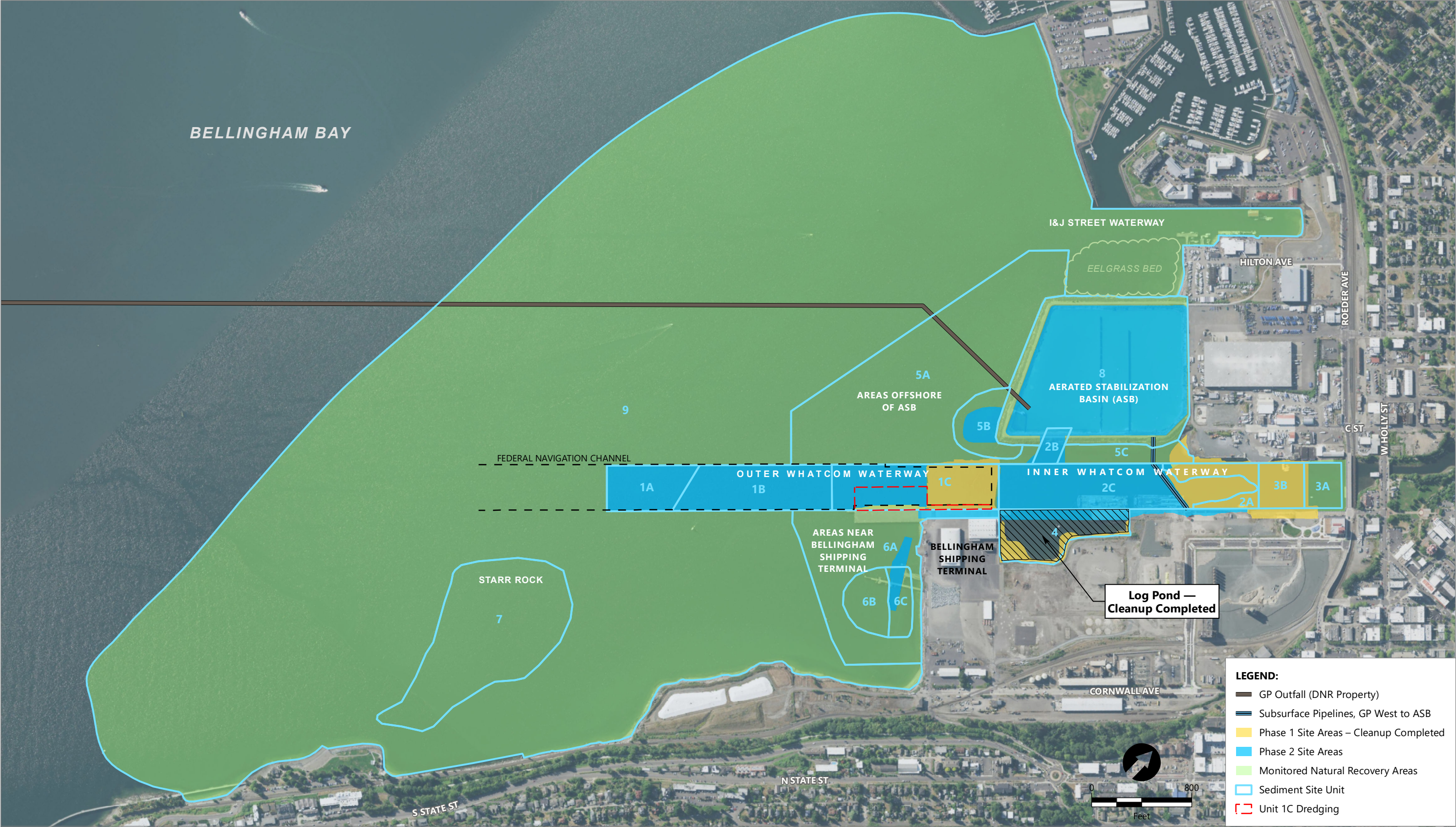
- **Final EDR:** This EDR was initially finalized in November of 2023 after receiving final project permits and final Ecology comments. It was revised in June of 2024 and again in August of 2025 to accommodate minor modifications to the dredge prism and expected material volumes for completion of the work.
- **Begin Construction:** The work was initiated during the 2023/24 dredging season following Ecology approval of the November 2023 EDR. Following approval of this revised EDR, the work will be completed during the 2025/26 dredging season unless Ecology approves an alternate schedule in writing.
- **Submit As-Built Report:** The As-Built Report will be submitted within 120 days of completion of construction activities.

6 References

- Anchor QEA (Anchor QEA, LLC), 2010. *Pre-Remedial Design Investigation Data Report – Whatcom Waterway Cleanup Site*. Prepared for the Port of Bellingham.
- Anchor QEA, 2015. *Final Engineering Design Report – Whatcom Waterway Cleanup in Phase 1 Site Areas*. Prepared for the Port of Bellingham. February 2015.
- Anchor QEA, 2016. *Sampling and Quality Assurance Project Plan for Compliance Monitoring, Whatcom Waterway Cleanup in Phase 1 Site Areas*. Prepared for the Port of Bellingham. March 2016.
- Anchor QEA, 2018. *Final As-Built Report – Whatcom Waterway Cleanup in Phase 1 Site Areas*. Prepared for Port of Bellingham. September 2018.
- Anchor QEA, 2019. *Year 1 Compliance Monitoring Report, Whatcom Waterway Cleanup in Phase 1 Site Areas*. Prepared for the Port of Bellingham. April 2019.
- Anchor QEA, 2020. *Year 3 Monitoring Report*. Whatcom Waterway Cleanup in Phase 1 Site Areas. June 2020.
- Anchor QEA, 2022. *Year 5 Monitoring Report*. Whatcom Waterway Cleanup in Phase 1 Site Areas. April 2022.
- Anchor QEA, 2023. *Engineering Design Report for Unit 1C Dredging*. Whatcom Waterway Cleanup in Phase 2 Site Areas. November 2023.
- Ecology (Washington State Department of Ecology), 2007a. *Consent Decree No. 07-2-022577-7 for the Whatcom Waterway Site* (with Exhibits).
- Ecology, 2007b. *Final Supplemental Environmental Impact Statement for the Cleanup of the Whatcom Waterway Site*.
- Ecology, 2011. First Amendment to the Consent Decree 07-2-022577-7 for the Whatcom Waterway Site (with Exhibits).
- Ecology, 2013. Sediment Management Standards (WAC 173-204). Updated February 2013.
- Ecology, 2015. *Bellingham Bay Regional Background Sediment Characterization Final Data Evaluation and Summary Report*. Publication No. 15-09-044. February 2015.
- Ecology, 2021. *Sediment Cleanup User's Manual (SCUM)*. Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Publication No. 12-09-57. Third Revision December 2021.
- Ecology, 2024. Second Amendment to the Consent Decree 07-2-022577-7 for the Whatcom Waterway Site (with Exhibits). Filed March 2024.

RETEC (The RETEC Group), 2006. *Supplemental Remedial Investigation and Feasibility Study for the Whatcom Waterway Site*. Prepared for the Port of Bellingham.

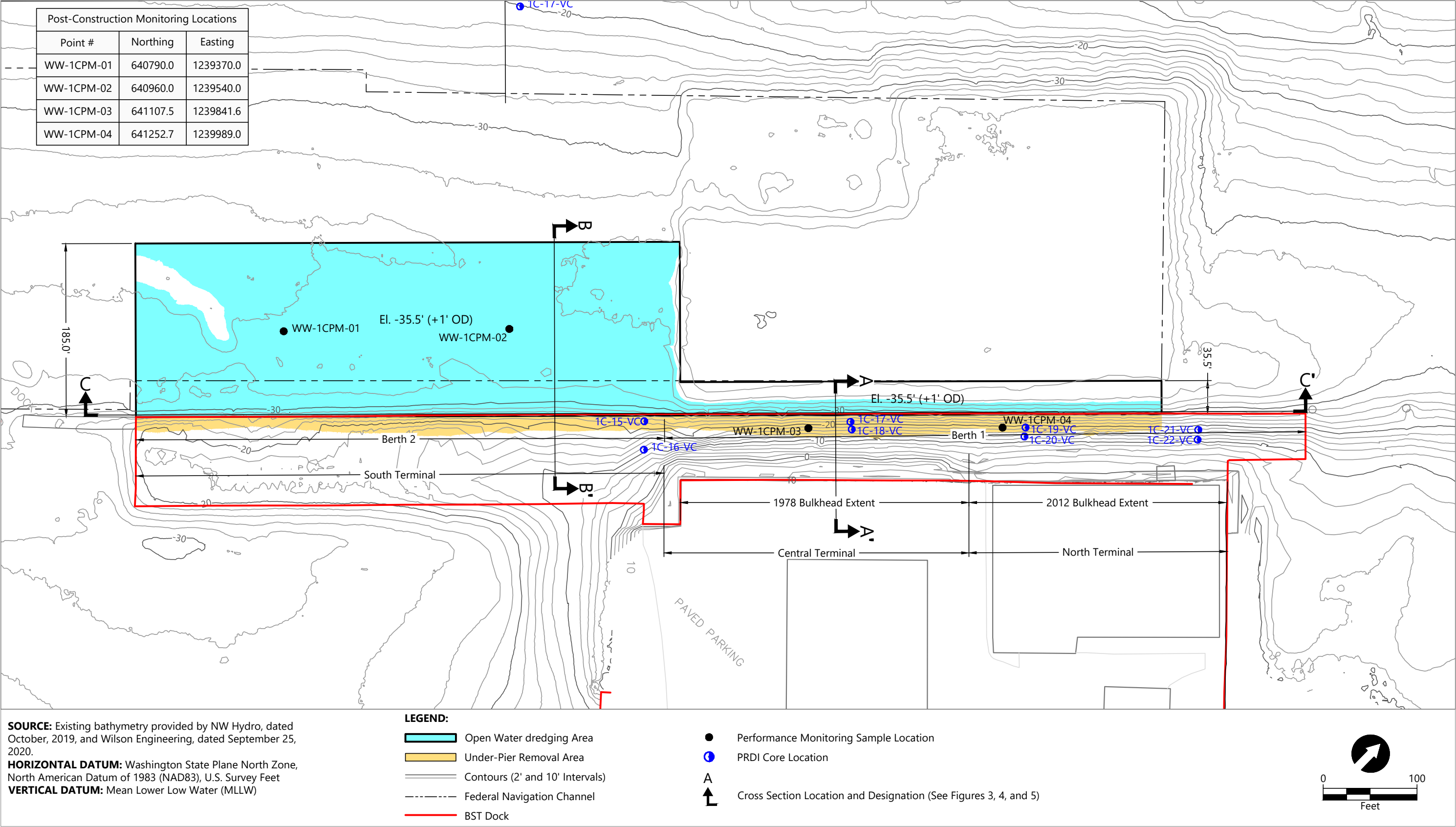
Figures



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Filepath: \\orcas\GIS\Jobs\Port_of_Bellingham_0007\Whatcom_Waterway_Ph2\Maps\EDR\AQ_EDR_1C_Fig1_SiteMap.mxd



Figure 1
Site Location and Vicinity
EDR for Unit 1C Dredging
Whatcom Waterway Site Cleanup



Publish Date: 2023/07/11 1:50 PM | User: dholmer
Filepath: K:\Projects\0007-Port of Bellingham\Whatcom Waterway Phase 2 Cleanup\0007-BST-001 (BST ALT-1).dwg Figure 2



Figure 2
Unit 1C Dredging - Plan View
EDR for Unit 1C Dredging
Whatcom Waterway Cleanup

2019 PRDI Data			
Parameter		Mercury (mg/kg)	Total Dioxin/Furan TEQ (ng/kg)
Location ID	Depth (ft bgs)		
1C-17-VC	0 – 1	0.89	--
1C-17-VC	1 – 2	0.49	--
1C-17-VC	2 – 3	0.38	--
1C-17-VC	3 – 4	0.63	--
1C-17-VC	4 – 5	0.63	--
1C-17-VC	5 – 6	0.70	8.61 J
1C-18-VC	0 – 1	16.60	--
1C-18-VC	1 – 2	63.60	--
1C-18-VC	2 – 3	32.10	--
1C-18-VC	3 – 4	3.57	--
1C-18-VC	4 – 5	1.48	--
1C-18-VC	5 – 6	0.70	128 J

0.89

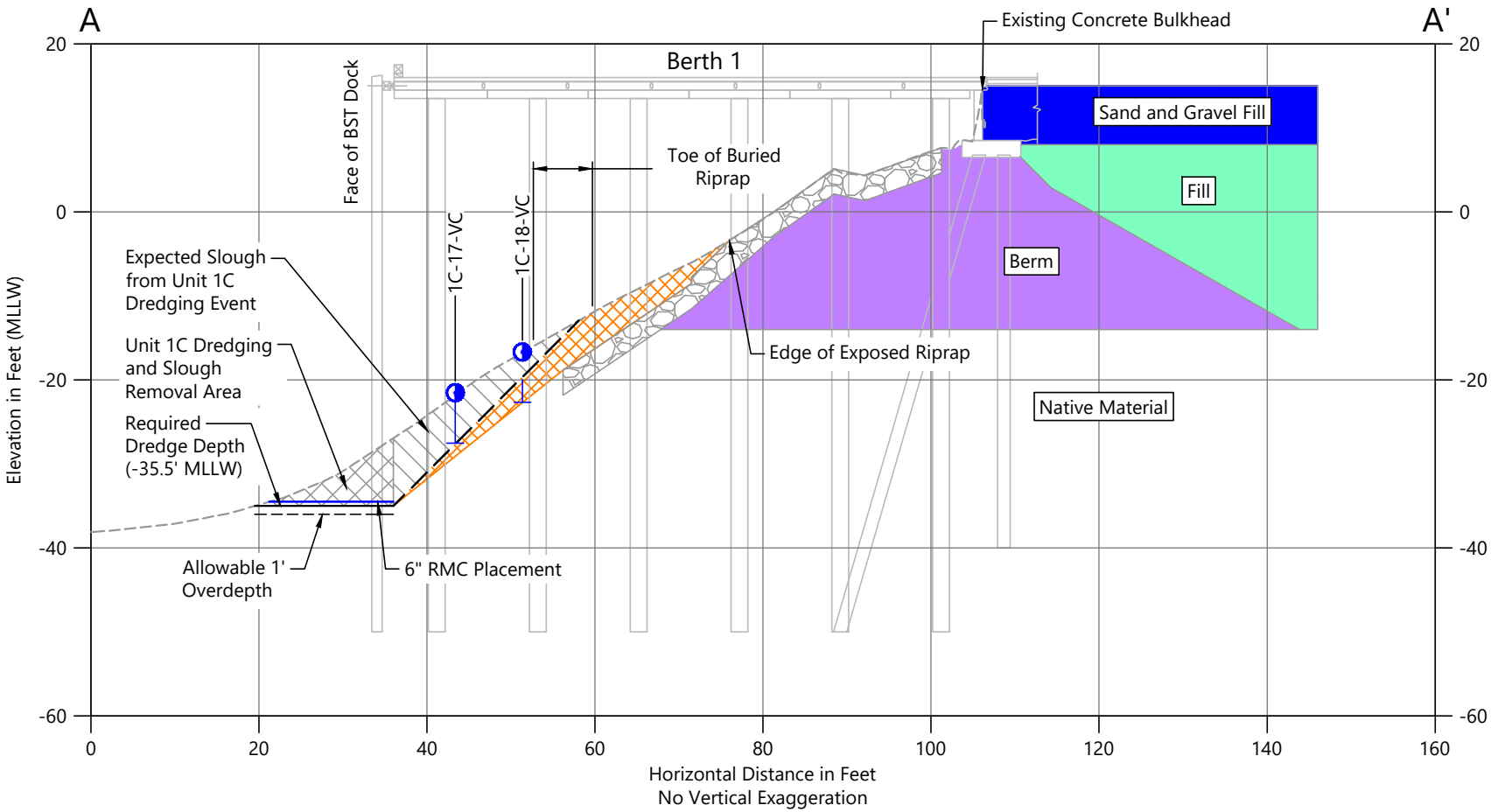
Bold = Detected Work

≤ 0.41 mg/kg Mercury or ≤ 5.0 ng/kg TEQ Dioxin/Furans

≤0.42 to 0.59 mg/kg Mercury or 5.1 to 9.8 ng/kg TEQ Dioxin/Furans

0.60 to 1.20 mg/kg Mercury or ≥ 9.9 ng/kg TEQ Dioxin/Furans

> 1.20 mg/kg Mercury



SOURCE: Existing bathymetry provided by NW Hydro, dated October, 2019, and Wilson Engineering, dated September 25, 2020.
HORIZONTAL DATUM: Washington State Plane North Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)
NOTE: For Highest Observed Water Level (HOWL), NOAA Station No. 9449211 was active from March 30, 1973 to July 21, 1975. Tidal predictions for the area have been higher and lower than those observed.

- LEGEND:**
- Existing Grade
 - Neatline Dredge Cut (-35.5' MLLW)
 - 1' Allowable Overdepth
 - - - - Potential Slough Slope
 - 6" Residual Management Cover Placement

- Future Phase 2 Cleanup Action will Address Residual Contaminated Sediment
- Dredging and Slough Removal Area
- Expected Slough Area
- Existing Riprap (Approximate)
- Core Location and Depth

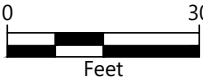
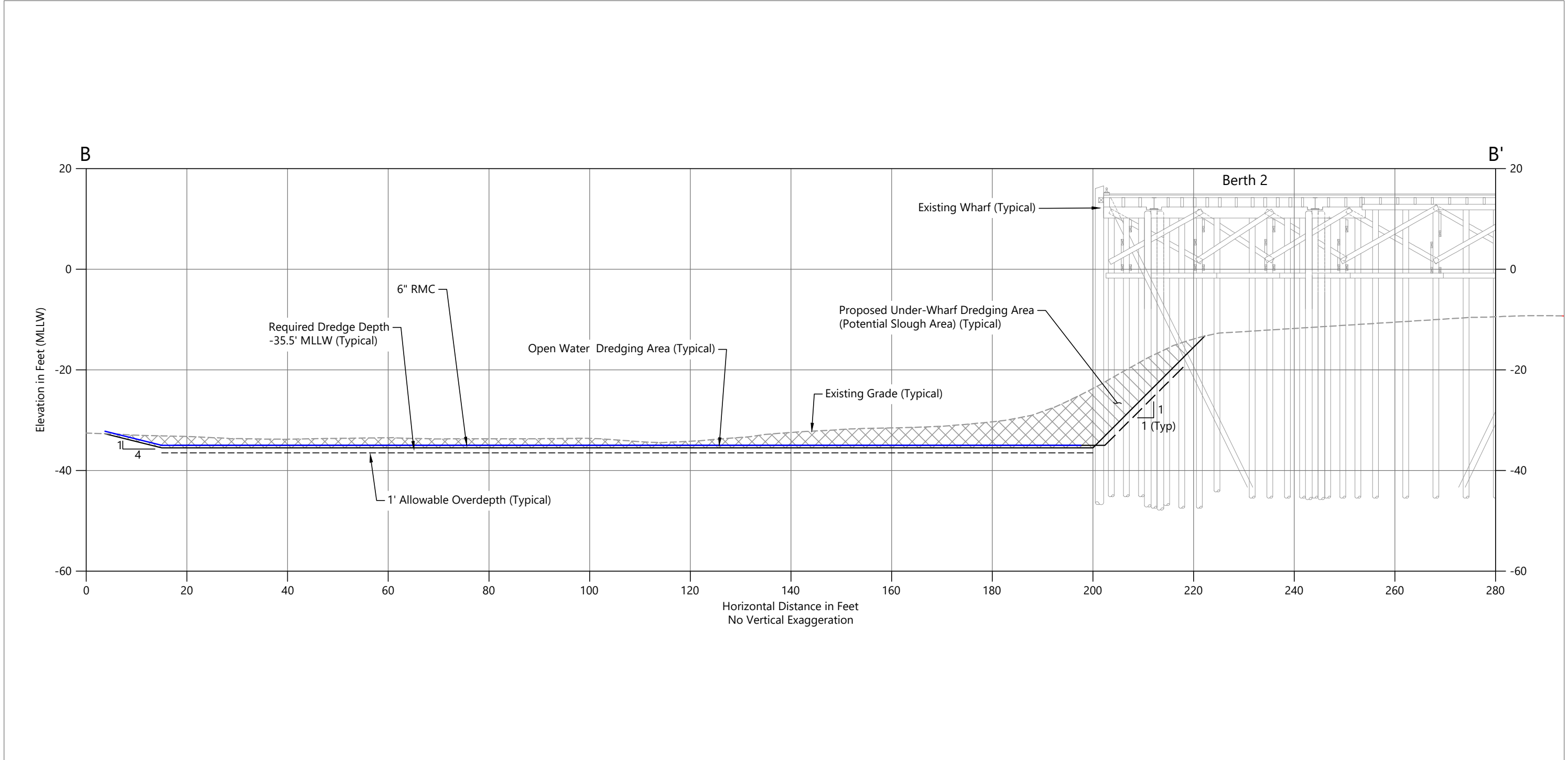


Figure 3
Unit 1C Dredging - Cross Section A-A'

EDR for Unit 1C Dredging
Whatcom Waterway Cleanup



SOURCE: Existing bathymetry provided by Wilson Engineering, dated March 21, 2023. Drawing provided by Moffatt & Nichol.

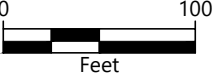
HORIZONTAL DATUM: Washington State Plane North Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet

VERTICAL DATUM: Mean Lower Low Water (MLLW)

NOTE: For Highest Observed Water Level (HOWL), NOAA Station No. 9449211 was active from March 30, 1973 to July 21, 1975. Tidal predictions for the area have been higher and lower than those observed.

LEGEND:

-----	Existing Grade		Dredging and Slough Removal Area
————	Neatline Dredge Cut (-35.5' MLLW)		Expected Slough Area
-----	1' Allowable Overdepth		
- - - -	Potential Slough Slope		
————	6" Residual Management Cover Placement		



0 100
Feet

Publish Date: 2023/07/11 1:50 PM | User: dholmer
Filepath: K:\Projects\0007-Port of Bellingham\Whatcom Waterway Phase 2 Cleanup\0007-BST-001 (BST ALT-1).dwg Figure 4



Figure 4
Unit 1C Dredging - Cross Section B-B'
EDR for Unit 1C Dredging
Whatcom Waterway Cleanup

Appendix A

Best Management Practices

Proposed Best Management Practices

The following best management practices (BMPs) will be employed during implementation of the Unit 1C Dredging.

Notifications

- The WDFW Area Habitat Biologist, the USACE regulatory lead, the Washington State Department of Ecology (Ecology) regulatory lead, and the City regulatory lead for the project shall be notified of the project start date.
- Notice will be provided to the USACE Bellingham Harbor Operations Manager 10 days prior to commencing work within the federally authorized channel.
- If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), the Washington Military Department's Emergency Management Division shall be immediately contacted at 1-800-258-5990.

In-water Work Timing

- In-water work will be performed consistent with the joint regulatory agency-approved fish protection work windows for the Project as determined during the permitting approvals for the Project.

Pre-Dredge Coordination

- Following selection of the project contractor, the Port shall provide to Ecology a copy of 1) a contractor-specific dredge, transload and disposal plan, and 2) a contractor-specific spill prevention control and countermeasures (SPCC) plan. Dredging shall not begin prior to Ecology review and approval of these plans.
- Prior to dredging, a pre-dredge meeting shall be held that includes the contractor, the Port and Ecology.

Water Quality

- Turbidity will be monitored to ensure construction activities are in compliance with Washington State Surface Water Quality Standards (173-201A WAC) and in accordance with the Water Quality Monitoring Plan (Appendix B of the EDR).
- Appropriate BMPs will be employed to minimize sediment loss and turbidity generation during dredging. BMPs may include, but are not limited to, the following:

- Eliminating multiple bites while the bucket is on the seafloor
- No stockpiling of dredged material below the ordinary high water line and mean higher high water line
- No seafloor leveling
- Depending on the results of the water quality monitoring program, enhanced BMPs may also be implemented to further control turbidity. Enhanced BMPs may include, but are not limited to, the following:
 - Slowing the velocity (i.e., increasing the cycle time) of the ascending loaded clamshell bucket through the water column
 - Pausing the dredge bucket near the bottom while descending and near the water line while ascending
 - Placing filter material over the barge scuppers to clear return water
 - Using surface or near-surface silt curtains during dredging operations
- Barges will be managed such that the dredged sediment load does not exceed the capacity of the barge. The load will be placed in the barge to avoid excessive listing.
- All barges handling dredged materials within the site shall have hay bales and/or filter fabric placed over the barge scuppers to help filter suspended sediment from the barge effluent. The contractor shall not allow effluent to overflow or bypass these turbidity controls. If sealed barges are used within the site (rather than using the treatment BMPs), no overflow of untreated water or suspended sediment from the sealed barges shall be permitted within the site.
- Barges leaving the Whatcom Waterway site will be sealed such that no discharge of water or suspended sediment occurs in the receiving waters.
- No petroleum products or other deleterious materials shall enter surface waters.
- Project activities shall not degrade water quality to the detriment of fish life.

Spill Prevention

- Dredge vessel personnel will be trained in hazardous material handling and spill response and will be equipped with appropriate response tools, including absorbent oil booms. If a spill occurs, spill cleanup and containment efforts will begin immediately and will take precedence over normal work.
- The U.S. Coast Guard's Bellingham office will be notified immediately if a spill occurs.
- The dredging contractor will inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks in order to prevent spills into the surface water.

- The contractor shall be responsible for the preparation of a Spill, Prevention, Control, and Countermeasure (SPCC) Plan to be used for the duration of the Project. The SPCC Plan shall be submitted to the Project Engineer and to Ecology prior to the commencement of any construction activities. A copy of the SPCC Plan, and any updates, will be maintained at the work site by the contractor and will include the following:
 - The SPCC Plan shall identify construction planning elements and recognize potential spill sources at the work site. The SPCC Plan shall outline responsive actions in the event of a spill or release and shall describe notification and reporting procedures. The SPCC Plan shall outline contractor management elements such as personnel responsibilities, Project site security, site inspections, and training.
 - The SPCC Plan will outline what measures shall be taken by the contractor to prevent the release or spread of hazardous materials, either found on site and encountered during construction but not identified in contract documents, or any hazardous materials that the contractor stores, uses, or generates on the construction site during construction activities. These items include, but are not limited to, gasoline, oils, and chemicals. Hazardous materials are defined in Revised Code of Washington (RCW) 70.105.010 under "hazardous substance."
 - The contractor shall maintain at the job site the applicable equipment and material designated in the SPCC Plan.

Dredging and RMC Placement

- Mechanical dredging equipment shall be used for the dredging and sediment handling.
- For placement of residual cover the following measures will be observed:
 - Set volume, tonnage, lead line measurements, and bathymetry information or similar will be used to confirm adequate coverage during and following material placement.
 - Imported materials will be pre-tested to confirm suitability and will consist of clean, granular material free of roots, organic material, contaminants, and all other deleterious material.

Material Handling and Disposal

- If required, staging facilities installed for management of dredged materials are intended only for temporary use during the Project. After the Project is completed, these temporary facilities shall be completely removed unless otherwise approved in writing by Ecology.
- Contaminated sediments dredged from the Whatcom Waterway Phase 1 Areas shall be disposed of at an Ecology-approved Subtitle D landfill facility.

Barge Operations

- Barges shall be restricted to tide elevations adequate to prevent grounding of the barge.
- Barge anchors shall not be placed in contaminated sediments unless approved by Ecology.
- Whenever feasible, the barge location shall be fixed through the use of methods that do not disturb contaminated sediments (e.g., mooring dolphins, docks, piers, upland structures, and anchoring in non-contaminated areas). Where these methods are not feasible, spuds may be used. The use of walking spuds shall not be permitted.
- Live boating shall be held to an absolute minimum.
- Motorized vessel operation shall be restricted to tidal elevations adequate to prevent prop scour disturbance to the contaminated sediments.
- Minimal propulsion power shall be used when maneuvering barges or other vessels to prevent prop scour disturbance to the contaminated sediments.

Cultural and Historic Resources

- The contractor shall have an Inadvertent Discovery Plan (IDP) on-site describing the actions to be taken if potential cultural resources (e.g., archaeological artifacts or human remains) are identified during the dredging.
- If any previously unknown historic, cultural, or archeological remains and artifacts are discovered during construction, the Port will immediately notify the USACE District Engineer of what was found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The USACE District Engineer will initiate the federal, tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
- Work will immediately stop and notification will be provided to the USACE District Engineer within 24 hours if, during the course of conducting authorized work, human burials, cultural resources, or historic properties, as identified by the National Historic Preservation Act, are discovered.

Appendix B

Water Quality Monitoring Plan



Water Quality Monitoring Plan

Port of Bellingham: Bellingham Shipping
Terminal Maintenance Dredging

Submitted to Washington State Department of Ecology

Rev #	Issue Date	Originated	Checked	Approved
1	14 April 2022	MN	POB/Ecology	
2	20 April 2022	MN	POB/Ecology	
3	26 April 2022	MN	POB	
4	6 May 2022	MN		





Table of Contents

1. INTRODUCTION	1
1.1 Project Description	1
1.2 Water Quality Criteria	2
2. WATER QUALITY MONITORING PLAN	3
2.1 Monitoring Locations	3
2.2 Monitoring Personnel.....	4
2.3 Documentation and Reporting.....	4
3. Instrumented Monitoring	4
3.1 Instrumented Monitoring Duration	5
3.2 Instrumented Monitoring Method.....	5
3.3 Instrumented Monitoring Depths	5
4. Visual Monitoring	5
5. Contingency Response	6
5.1 Early Warning Radius	6
5.2 Point of Compliance	7
5.3 Distressed or Dying Fish	7
5.4 Discharge of Oil, Fuel, or Chemicals	8
6. Notification	8
7. Modification of Approved WQMP	8
8. Bibliography	9

LIST OF TABLES

Table 1. Water Quality Standards	2
Table 2. Monitoring Parameters, Schedule, Locations, and Depths	3

LIST OF FIGURES

Figure 1. Vicinity Map

Figure 2. Example Monitoring Locations

LIST OF ATTACHMENTS

Attachment A. Example Data Sheet

1. INTRODUCTION

This Water Quality Monitoring Plan (WQMP) was developed on behalf of the Port of Bellingham (Port) in accordance with Washington Department of Ecology (Ecology) consultation regarding the 401 Water Quality Certification (WQC) requirements for water quality monitoring during the proposed maintenance dredging project (project) at the Bellingham Shipping Terminal (BST) in Bellingham, Washington. The project area is shown on Figures 1 through 2 (attached).

The water quality monitoring will be implemented during dredging and Residual Management Cover (RMC) clean sand layer placement on the post-dredge surface. The water quality monitoring will be used to assess the dredging and RMC placement contractor's adherence to permit conditions and federal, state, and local water quality regulations.

The objective of water quality monitoring is to monitor and control releases of suspended sediment, turbidity and sediment associated contaminants¹ during dredging and to ensure compliance with Washington State Water Quality Standards (173-201A WAC). This document describes water quality monitoring parameters, methods, locations, and frequencies; evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during dredging. Any modifications to this WQMP must be reviewed and approved by Ecology.

1.1 Project Description

The Port proposes repairs to the BST including structural upgrades and berth maintenance dredging to maintain the facility in operating condition for the operators and vessels that use the terminal. The structural upgrades are covered by separate permits.

The portion of the project covered by this WQMP includes maintenance dredging at BST Berths 1 and 2. The lack of uniform and sufficient draft in the BST berths due to sloughing from under the wharf has reduced the ability of ships to use the berths. There is an area of accumulated sediment at the toe of Berth 1 (BST-North and BST-Central) that prevents ships from docking directly alongside the wharf face. Proposed maintenance dredging would remove sediment that limits the depth to as little as 26 feet at the dock face of Berth 1. The proposed maintenance dredging will allow ships to berth directly along the face of the dock, improving operational safety and efficiency for loading and unloading cargo by crane. Maintenance dredging of the berths will also allow the facility to serve longer vessels, specifically those with a deadweight of more than 40,000 metric tons and an overall length greater than 600 feet. Such vessels are currently unable to safely use the terminal due to the danger of running aground. Maintenance dredging will correct these deficiencies.

The Port proposes to complete maintenance dredging of the area in front of Berths 1 and 2 to return safe vessel access to the berths. The proposed dredge prism will have a finished dredge elevation of -35.5 feet MLLW (+1 foot allowable overdredge) to accommodate the placement of

¹ The project site is located within the Whatcom Waterway Cleanup Site managed by Ecology.

the 6-inch RMC layer and allow for a final design elevation of -35 feet MLLW for safe vessel access. The dredging will extend up the slope under the wharf to minimize sloughing from future erosion of that slope. Approximately 4,000 cubic yards (cy) will be removed from beneath the wharf. RMC material will not be placed beneath the wharf.

The maintenance dredging will be completed using mechanical (e.g. clamshell) dredging equipment operated from a barge. The proposed maintenance dredging will remove a total of up to approximately 19,000 cy that will be disposed upland at a permitted upland landfill disposal site. A minimum 6-inch layer (approximately 2,000 cy) of clean sand RMC material will be placed after dredging is complete to address the potential presence of contaminated sediment left behind after dredging in accordance with the existing Whatcom Waterway Cleanup Consent Decree. The RMC layer will be placed using clamshell equipment.

1.2 Water Quality Criteria

The designated uses for Bellingham Bay, inclusive of the project site, include primary contact recreation; shellfish harvesting, various water supply uses (domestic, industrial, agricultural, stock, and wildlife habitat); and other miscellaneous uses, such as wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics (WAC 173-201A-602).

Turbidity is the primary water quality parameter of concern based on the proposed project (dredging, upland placement of dredged material, and RMC placement). Table 1 presents the water quality standard for turbidity (WAC 173-201A-210[1][e]). WAC 173-201A-210 (1)(e)(i) provides a temporary area of mixing for turbidity if specific conditions are met. This temporary area of mixing extends 150 feet ("Point of Compliance") from the activity causing the turbidity.

Table 1. Water Quality Standards

Parameter	Water Quality Criterion	
Turbidity	If less than 50 NTU	background turbidity plus 5 NTU
	If greater than 50 NTU	background turbidity plus 10 percent

NTU = nephelometric turbidity unit

Turbidity "Elevation" and "Exceedance" are based on the water quality criteria in Table 1, and defined as summarized below.

- Suspected Elevation = visible turbidity plume observed beyond the 100 ft. Early Warning distance.
- Elevation = Instrument measured and confirmed elevated turbidity (greater than the water quality criterion) between the 100 ft. Early Warning distance and the 150 ft. Point of Compliance distance.
- Potential Exceedance = visual plume and/or preliminary instrument measurement of water quality exceedance at the 150ft. Point of Compliance. A visual plume at the Compliance Boundary will trigger instrumented measurement to confirm the preliminary "potential exceedance".

- Exceedance = confirmed, instrument measured water quality exceedance measured 30 minutes after the Potential Exceedance is observed at the 150 ft. Point of Compliance. A confirmed exceedance triggers immediate (within 2 hours) reporting to Ecology.

2. WATER QUALITY MONITORING PLAN

This section describes the details of the proposed WQMP, including monitoring parameters, schedules, locations, depths, methods and documentation. The key elements of the WQMP are summarized in Table 2 and described in the following sections.

Table 2. Monitoring Parameters, Schedule, Locations, and Depths

Parameter	Measurement Type	Schedule	Location	Depth
Turbidity	Instrumented ³ (Section 3)	Tier 1 - intensive: Twice per day for five days, moving to Tier 2 monitoring if no exceedances/elevations are observed.	- Early Warning Station: 100 ft. from dredging or RMC placement	Each monitoring location should have samples at various depths, using the following as general guidance: – For water less than 5 ft deep, midpoint only – For water between 5-10 ft, top and bottom – For water greater than 10 ft, top, middle and bottom
		Tier 2 – Routine: Twice per day, 2 days/week. Return to Tier 1 monitoring if exceedance is observed. ^{1,2}	-Compliance Station: 150 ft. downstream from dredging or RMC placement - Background Station: 500 ft. from dredging or RMC placement	
	Visual ³ (Section 4)	Visual monitoring will occur anytime that instrumented monitoring is not implemented. If a turbidity plume is observed beyond the 100-ft. early detection radius, instrumented monitoring will be implemented to confirm an elevation and trigger contingency actions (Section 5).	-Early Warning Station: 100 ft. from dredging or RMC placement	Surface

Notes:

1. Exceedance reporting: Initial reporting at 2 hours may be by phone or email, indicating an exceedance occurred. A follow up report within 5 days of the event is also required, and will include information on the exceedance, implemented BMPs, all monitoring results, and what is being done to prevent a repeat.
2. Changes in activity or equipment restarts the intensive/initial phase monitoring sequence, as do extended breaks in activity (>1 week).
3. "Visual only" monitoring should apply whenever instrumented monitoring is not being conducted and should be recorded twice per day during that period. If a plume is observed extending past the Early Warning distance during visual monitoring, then instrumented monitoring will be triggered. If an elevation is confirmed that the Early Warning distance, work will be stopped and changes to methods and/or BMPs will be evaluated to minimize increased turbidity. Sheens will be reported and responded to at all times.

2.1 Monitoring Locations

Turbidity will be monitored at the following locations.

- The 100-foot Early Warning radius from the dredging or RMC placement activity
- The Point of Compliance Station for turbidity is at the compliance radius, 150 feet from the dredging or RMC placement activity

- The Background Station will be positioned outside the area of influence from the dredging or RMC placement activities

2.2 Monitoring Personnel

Monitoring will be completed by dredging contractor personnel, the environmental manager, or a designated water quality technician.

2.3 Documentation and Reporting

The environmental manager will keep a written record of monitoring activities and inspections during both visual and instrumented monitoring.

All water quality monitoring will be recorded on the monitoring form with the following information. An example data sheet is provided as Attachment A.

- Dates and times of dredging or RMC placement
- Sample results (locations, times, and visual observation results or measured turbidities)
- Summary of dredging and RMC placement activities and associated turbidities, and
- Information on exceedance(s), if any, and corrective actions taken to reduce turbidity/prevent future exceedance(s).

These records will be maintained in project files and provided to Ecology, if requested. All sample results will be submitted weekly (via e-mail) to the Ecology federal project coordinator during dredging or RMC placement. If sample results indicate a violation of water quality standards or if conditions of the 401 Water Quality Certification or the WQMP are not being followed, notification shall be made immediately (within 2 hours of confirmed exceedance) to Ecology's federal project coordinator by phone or email. Sampling results and notifications shall be sent to the federal permit manager for this project.

All communication and correspondence with Ecology will occur with the environmental manager. The environmental manager will be responsible for providing Ecology with the necessary notifications and results of the water quality monitoring on a weekly basis and at the conclusion of the monitoring period.

3. Instrumented Monitoring

The frequency of instrumented monitoring will be based on the phase (Tier 1 or Tier 2) of monitoring as follows.

- Tier 1 (intensive phase): Instrumented monitoring twice a day during dredging and RMC placement operations.
 - Monitoring will start 1 hour after dredging or placement begins.
 - Tier 1 monitoring will continue for 5 days/week until 5 consecutive days are recorded without elevations or exceedances at which point monitoring can progress to Tier 2.
- Tier 2 (routine phase): If there are no exceedances of water quality criteria at the Compliance Boundary after five full days of Tier 1 monitoring, then instrumented monitoring will be reduced to the twice-daily measurements two days per week.

- Monitoring will start 1 hour after dredging or placement begins.
- If an elevation is confirmed between the Early Warning distance and the Compliance Boundary, instrumented monitoring measurements will be taken hourly until the turbidity measurements meet water quality criteria. The contingency response and notification procedures will be initiated, as described in Section 5, if any exceedances of water quality criteria are observed at any time during the monitoring program and it is determined that the exceedance is caused by dredging or RMC placement activities rather than an ambient background condition.
- The schedule will revert back to Tier 1/Tier 2 sequential instrumented monitoring after the turbidity returns to acceptable conditions (based on instrumented monitoring, see Section 5, and with approval from Ecology).
- Changes in activity or equipment restarts the intensive/ Tier 1 initial phase monitoring sequence, as do extended breaks in activity (>1 week).

3.1 Instrumented Monitoring Duration

Instrumented monitoring will occur immediately before the start of dredging or RMC placement activities to collect baseline measurements (“background”) outside of the area of mixing. Tier 1/2 instrumented monitoring at the Early Warning and Compliance boundaries will start 1 hour after dredging or placement begins. Monitoring (Tier 1 or Tier 2 instrumented) will continue the duration of dredging and placement activities.

3.2 Instrumented Monitoring Method

Instrumented monitoring will be performed using a portable water quality probe deployed on a winch line from a boat.

3.3 Instrumented Monitoring Depths

Instrumented monitoring for turbidity will be completed at the following locations in the water column.

- For water less than 5 ft. deep: midpoint only
- For water between 5 ft and 10 ft.: top and bottom
- For water greater than 10 ft.: top, midpoint, and bottom

4. Visual Monitoring

Visual monitoring of dredging and RMC placement activities will be ongoing during all dredging and RMC placement work, including on days when instrumented monitoring is implemented as follows.

- “Visual only” monitoring will apply whenever instrumented monitoring is not being conducted, i.e. the work days when Tier 2 (2x/week) instrumented monitoring is not being completed.
- If a plume is observed extending past the Early Warning radius, then instrumented monitoring will be triggered (see Section 5).

- The results of “visual only” monitoring at the Early Warning radius and Compliance Boundary will be recorded twice per day.
- Sheens will be reported and responded to at all times.

If a turbidity plume is observed beyond the 100-foot Early Warning radius during visual monitoring, instrumented turbidity monitoring will be implemented immediately to confirm that water quality measurements are out of compliance with water quality standards and the effectiveness of any supplemental best management practices (BMPs) that may be implemented to control turbidity.

Contingency response actions and agency notifications will be triggered if an elevation or exceedance of water quality standards is indicated by either instrumented and/or visual monitoring. The contingency response and notification plan is provided in Section 5.o.

In general, visual monitoring will be ongoing throughout work. Visual-only monitoring observations will be recorded twice daily and will consist of a visual assessment of compliance with water quality standards at the Early Warning distance and the Compliance Boundary. The contractor or environmental manager will keep a written record (including weather conditions, calibration measurements, photographs, etc.) of monitoring activities and inspections during monitoring. This data will be submitted to Ecology.

5. Contingency Response

Personnel will immediately assess the source of the elevated turbidity in the event of an elevation/exceedance of water quality standards as observed during visual or instrumented monitoring. Personnel will implement operational modifications or other control measures once the elevation or exceedance has been confirmed and the source has been identified to prevent further occurrences and limit additional environmental impact. Instrumented monitoring will continue hourly to confirm the control measures are effective and turbidity at the Point of Compliance has returned to acceptable levels. Contingency monitoring measures, including stop work triggers and notification protocols, are summarized in the following subsections.

5.1 Early Warning Radius

The response to visible plume “elevations” of turbidity at the 100 feet Early Warning distance will result in a tiered response. Observation of a visible plume beyond the 100 ft. Early Warning distance will result in instrumented monitoring to confirm an elevation.

The results of instrumented monitoring will trigger the following follow-up monitoring and contingency actions.

- Measurement passes criteria-> monitoring is complete until next scheduled monitoring event.
- Measurement is an Elevation -> Stop work, wait 30 minutes and remeasure.
 - Measurement passes criteria - > work may continue and monitoring is complete until next scheduled monitoring event.
 - Measurement is a confirmed Elevation:

- Continue work stoppage
- Check existing BMPs
- Potentially implement additional BMPs
- Monitor at 30-to-60-minute intervals to track efficacy of new BMPs until measurements pass criteria.
- If continued Elevations are measured, re-evaluate BMPs and implement new BMPs until Elevations are eliminated.
- Work can be continued and Tier 1 instrumented monitoring will be re-initiated once Elevations are eliminated at the Early Warning distance.

5.2 Point of Compliance

Dredging or RMC placement will immediately be halted if increased turbidity is measured at the Point of Compliance monitoring station(s). The following protocols will then be followed.

- Instrumented measurement passes criteria:
 - Confirm passing measurement at 100 ft. Early Warning distance.
 - Monitoring is complete until next scheduled monitoring event and work can continue.
- Instrument measurement exceeds water quality criteria = Potential Exceedance:
 - Remeasure after 30 minutes (work will be stopped during this period).
 - If no exceedance is measured, confirm at the 100 ft. Early Warning distance. If no exceedance is measured at the Early Warning distance, then monitoring is complete until the next scheduled monitoring.
 - If there is an Exceedance:
 - Continue work stoppage, evaluate dredging/placement methods and BMPS. An extended work stoppage may be necessary to further assess the source of the exceedance, identify effective mitigation measures, and allow the water column to recover.
 - Continue instrumented monitoring hourly until compliance is met or sunset.
 - Report Exceedance to Ecology within 2 hours of confirming the Exceedance.
 - Follow plume downstream to identify extent of exceedance.
 - Implement more stringent BMPS prior to restarting work after compliance is achieved.

5.3 Distressed or Dying Fish

Dredging will immediately stop if distressed or dying fish are observed at the maintenance dredging and RMC placement site and are attributed to site activities. Ecology, the Washington Department of Fish and Wildlife, and the National Marine Fisheries Service will be contacted after dredging/RMC placement is stopped.

The condition of the fish (dead, dying, or erratic behavior); an estimate of the number, species, and size of fish in each condition; and the location of fish relative to construction operations will be noted. Samples will be frozen in secure storage under chain-of-custody for possible agency inspection if any dead listed species are present. Additional fish and water sampling may be conducted at the direction of the resource agencies.

5.4 Discharge of Oil, Fuel, or Chemicals

Dredging/RMC placement will stop and containment and cleanup efforts will begin immediately in the event of a discharge of oil, fuel, or chemicals into state waters. The cleanup efforts will be completed as soon as possible. Dredging/RMC placement may resume only after the source of the spill or leak has been identified and controlled, as long as the work does not interfere with, delay, or hinder the containment and cleanup efforts. Cleanup includes appropriate disposal of any spilled material and cleanup material. The following agencies will be immediately notified.

- Ecology's Spill Response Office at 360/407-6300
- Washington State Emergency Management at 800/258-5990
- National Response Center at 800/424-8802

6. Notification

Project personnel will immediately notify (within 2 hours) the environmental manager or their designee, who will notify the federal permit manager, Laura Inouye (360-515-8213), at Ecology Headquarters Office of any in-water work that is out of compliance with the discharges approved under the Section 401 Water Quality Certification for this project. Immediate notification will be made via phone or email. A detailed written report will be submitted to Ecology within five days or as otherwise specified in the Section 401 Water Quality Certification. The report will include the following information.

- Nature and extent of the water quality exceedance, including detailed visual observations and, if appropriate, field parameter measurements.
- Identification of the likely cause of the exceedance.
- Description of control measures or BMPs implemented to mitigate the exceedance.
- Notifications to agency, including timing and names of agency personnel contacted.
- Documentation that control measures were effective at mitigating the water quality exceedance and stabilizing environmental conditions in the affected area.

7. Modification of Approved WQMP

Any modifications to this WQMP must be reviewed and approved by Ecology.

8. Bibliography

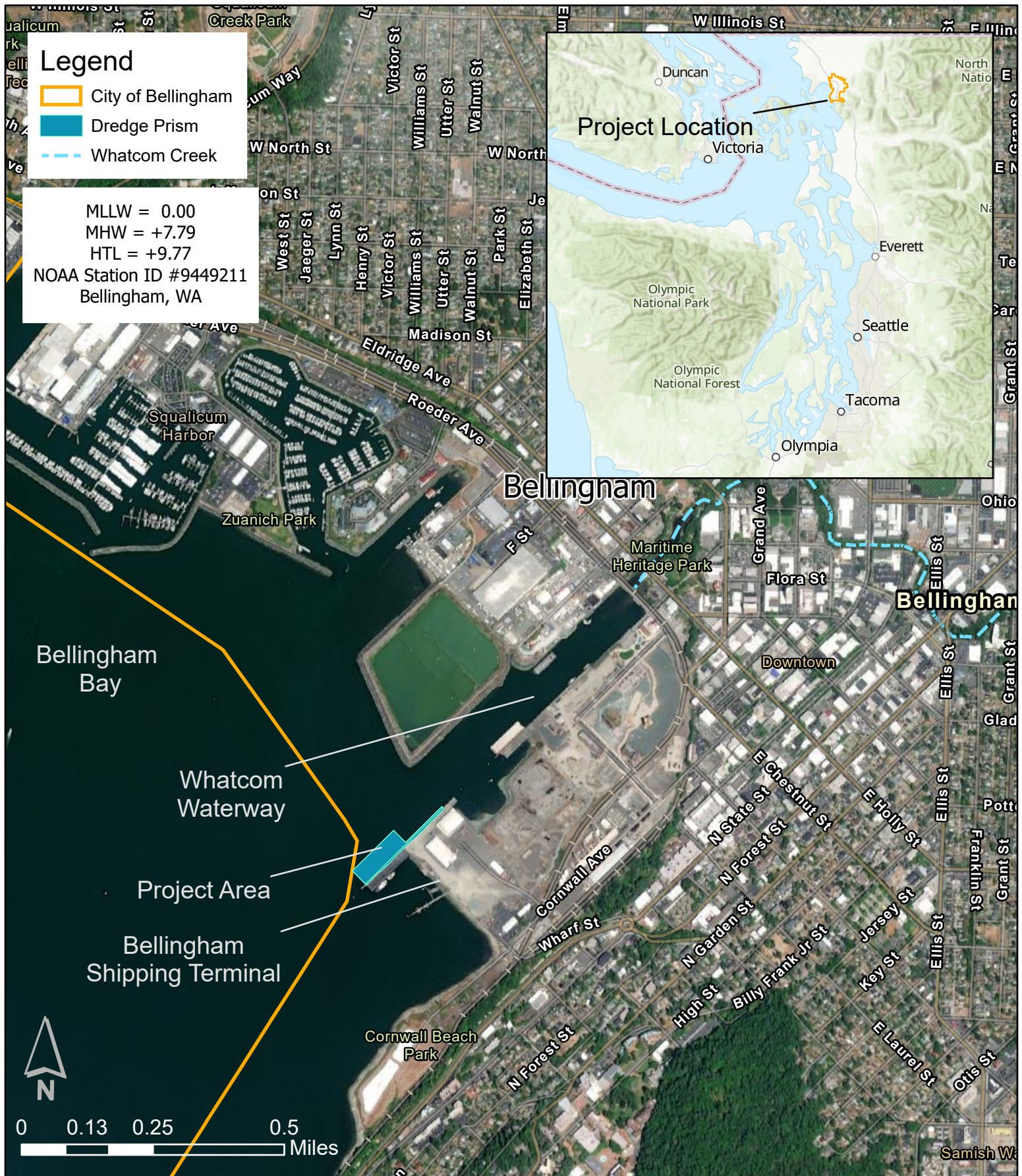
Moffatt & Nichol, 2022. Joint Aquatic Resources Permit Application (JARPA) – Port of Bellingham, Bellingham Shipping Terminal Maintenance Dredging Project.

Washington Department of Ecology, March 2022. Personal Communications (Phone and Email) with 401 WQC Manager, Laura Inouye.

Figures

Figure 1. Vicinity Map

Figure 2. Example Monitoring Locations



Reference: NWS-2022-141
 Applicant: Port of Bellingham
 Adjacent Property Owner: Port of Bellingham

Lat/Long: 48.744979°;122.495209°
 S/T/R: NE S36, T38N R02E

**PORT OF BELLINGHAM
 BELLINGHAM SHIPPING TERMINAL
 BERTHS 1 & 2 -MAINTENANCE DREDGING**

VICINITY MAP
 Water Quality Monitoring Plan

PROPOSED: MAINTENANCE DREDGING
 IN: WHATCOM WATERWAY
 AT: BELLINGHAM
 COUNTY: WHATCOM
 STATE: WASHINGTON

SHEET 1 OF 2 DATE: 04.08.2022

LEGEND

- Dredge Prism
- Example Dredge/Placement Location
- Example Water Quality Monitoring Location
- 500' Minimum Background Example Monitoring Location
- 100' Early Warning Boundary
- 150' Compliance Boundary



Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham
Horizontal Datum: Washington State Plane North Zone, North American Datum of 1983 (NAD83).
U.S. Survey Feet
Vertical Datum: Mean Lower Low Water (MLLW)
Lat/Long: 48.744979°; 122.495209°
S/T/R: NE S36, T38N R02E

PORT OF BELLINGHAM
BELLINGHAM SHIPPING TERMINAL
BERTHS 1 & 2 -MAINTENANCE DREDGING
EXAMPLE MONITORING LOCATIONS
Water Quality Monitoring Plan

PROPOSED: MAINTENANCE DREDGING

IN: WHATCOM WATERWAY

AT: BELLINGHAM

COUNTY: WHATCOM

STATE: WASHINGTON

SHEET 2 OF 2

DATE: 04.08.2022

Attachment A

Example Data Sheet

Water Quality Monitoring Turbidity Data Sheet

Project Name: _____

Ecology Order No.: _____

Corps Reference No.

[illegible]



Appendix C

Updated Dredge Prism – August 2025



Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham

Lat/Long: 48.744979°;122.495209°
S/T/R: NE S36, T38N R02E

**PORT OF BELLINGHAM
BELLINGHAM SHIPPING TERMINAL
BERTHS 1 & 2 -MAINTENANCE DREDGING**

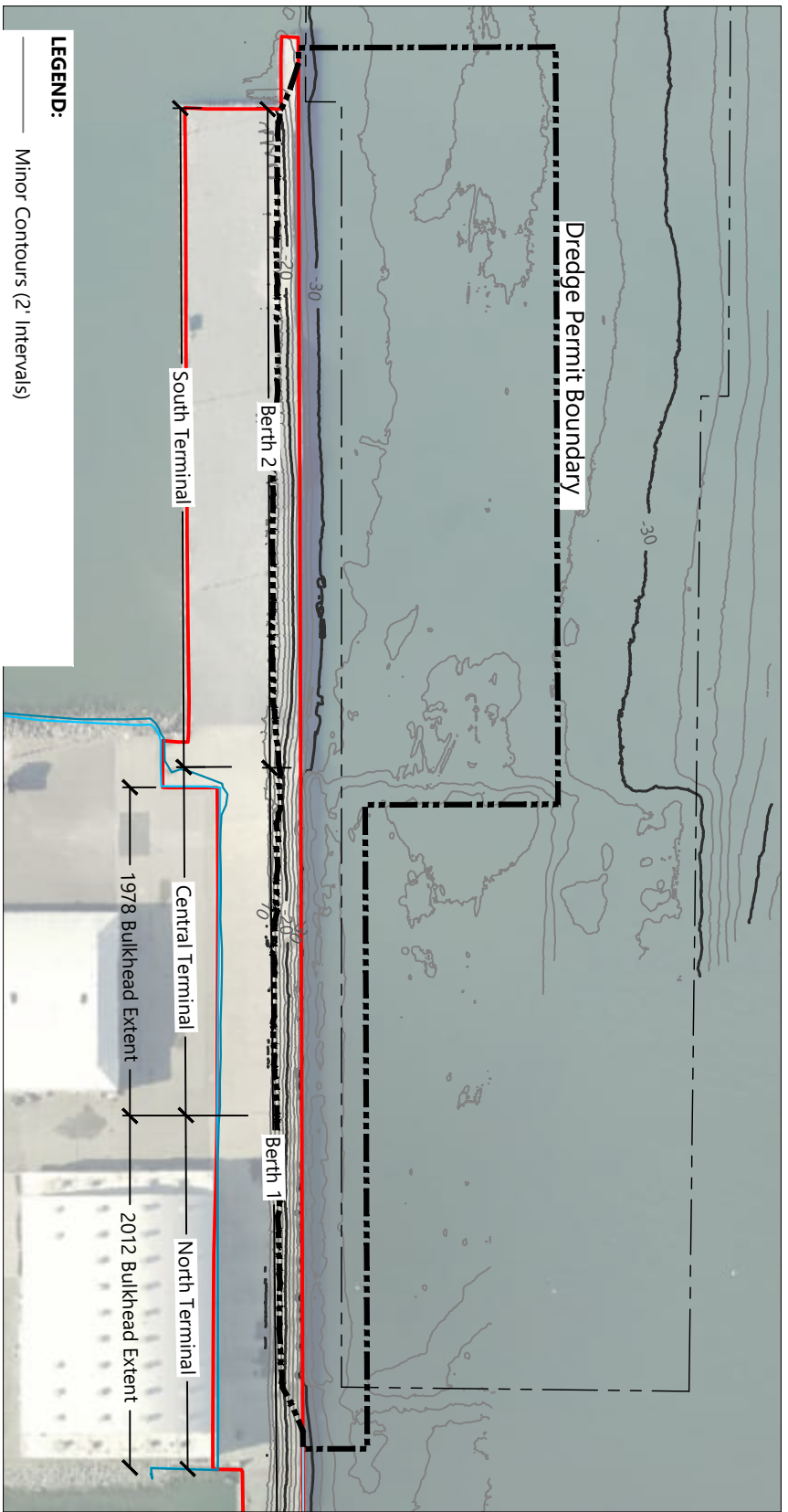
VICINITY MAP

PROPOSED: MAINTENANCE DREDGING

IN: WHATCOM WATERWAY
AT: BELLINGHAM
COUNTY: WHATCOM
STATE: WASHINGTON

SHEET 1 OF 6

DATE: 12.20.2024



SOURCE: Existing bathymetry provided by American Construction and eTrac, dated Feb 14, 2024
HORIZONTAL DATUM: Washington State Plane North Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)
AERIAL: Whatcom County, 2019



**PORT OF BELLINGHAM
 BELLINGHAM SHIPPING TERMINAL
 BERTHS 1 & 2—MAINTENANCE DREDGING**

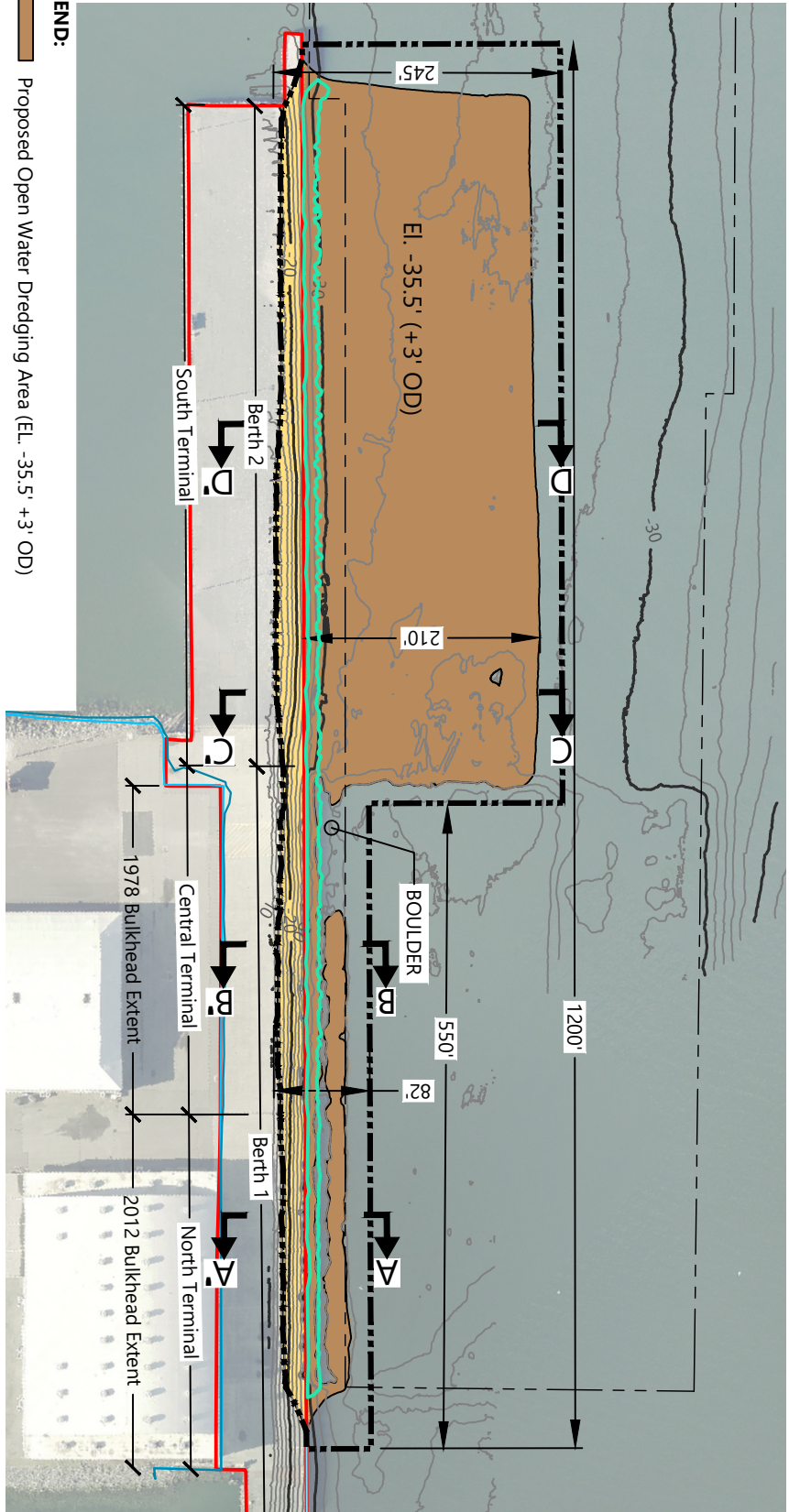
**EXISTING CONDITIONS
 DREDGE AREA**

Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham

Lat/Long: 48.744979°,-122.495209°
S/T/R: NE S36, T38N R02E

PROPOSED: MAINTENANCE DREDGING
IN: WHATCOM WATERWAY
AT: BELLINGHAM
COUNTY: WHATCOM
STATE: WASHINGTON

SHEET 2 OF 6 DATE: 12.20.2024



- LEGEND:**
- Proposed Open Water Dredging Area (EL. -35.5' +3' OD)
 - Proposed Underpier Slope Dredging Area
 - Dredge Permit Boundary
 - Minor Contours (2' Intervals)
 - Major Contours (10' Intervals)
 - Cross Section Location and Designation (see Figures 5 & 6)
 - Debris Area
 - Approximate HTL (+9.77)
 - Approximate MHW (+7.79)
 - Federal Navigation Channel
 - BSI Pier

SOURCE: Existing bathymetry provided by American Construction and eTrac, dated Feb, 14 2024
HORIZONTAL DATUM: Washington State Plane North Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)
AERIAL: Whatcom County, 2019

**PORT OF BELLINGHAM
BELLINGHAM SHIPPING TERMINAL
BERTHS 1 & 2 -MAINTENANCE DREDGING**

**PROPOSED DREDGING
PLAN VIEW**

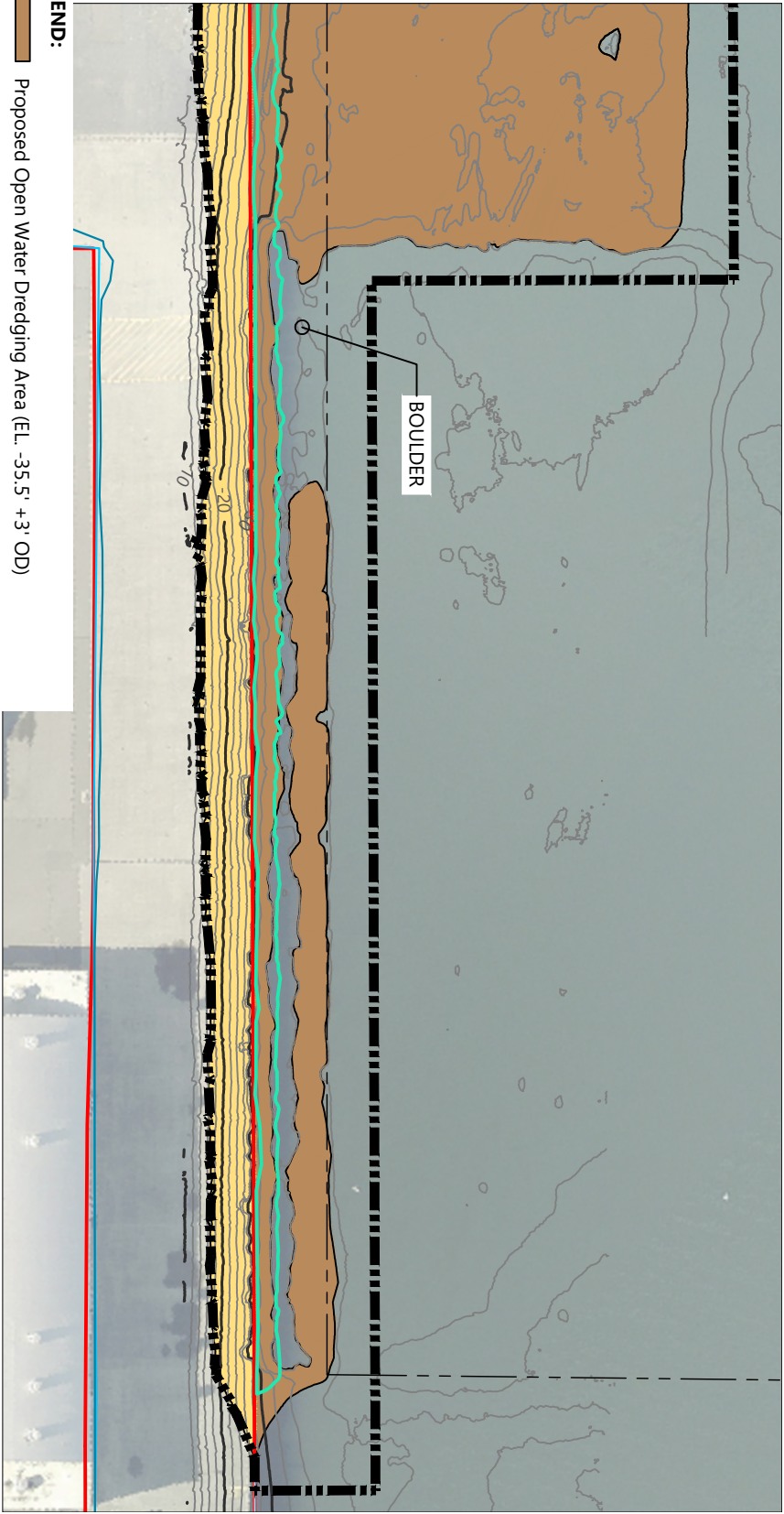
PROPOSED: MAINTENANCE DREDGING
IN: WHATCOM WATERWAY
AT: BELLINGHAM
COUNTY: WHATCOM
STATE: WASHINGTON

SHEET 3 OF 6

DATE: 12.20.2024

Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham

Lat/Long: 48.744979°;-122.495209°
S/T/R: NE S36, T38N R02E



SOURCE: Existing bathymetry provided by American Construction and eTrac, dated Feb, 14 2024
HORIZONTAL DATUM: Washington State Plane North Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)
AERIAL: Whatcom County, 2019



Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham

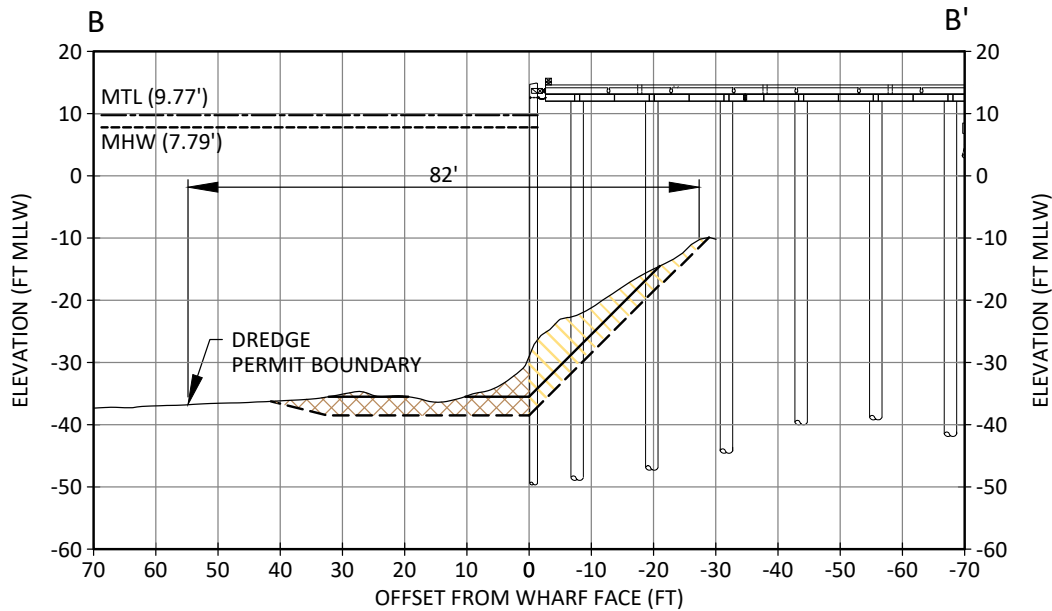
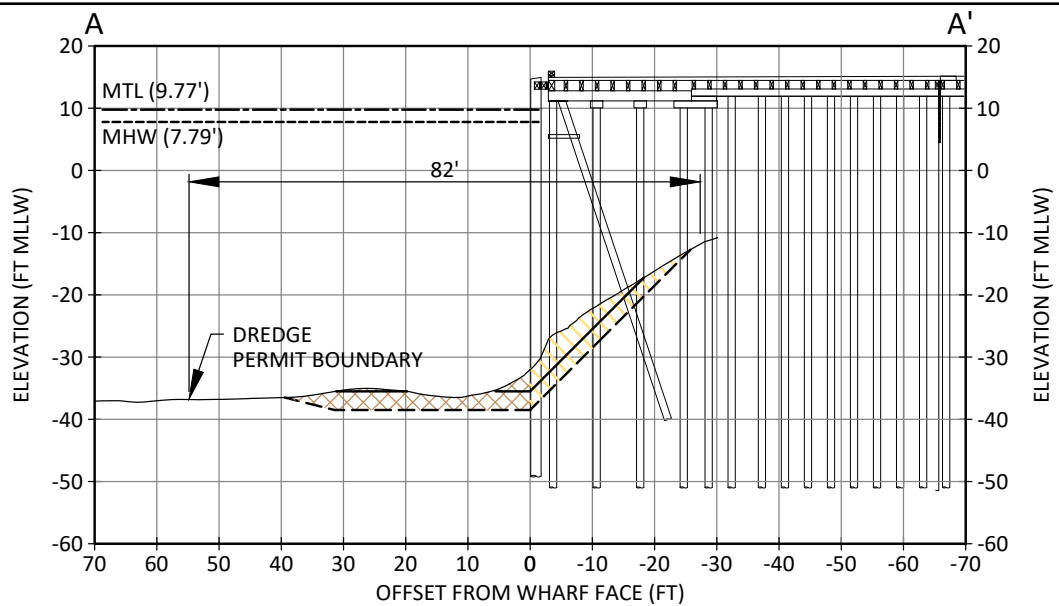
Lat/Long: 48.744979°;-122.495209°
S/T/R: NE S36, T38N R02E

**PORT OF BELLINGHAM
 BELLINGHAM SHIPPING TERMINAL
 BERTHS 1 & 2 -MAINTENANCE DREDGING**

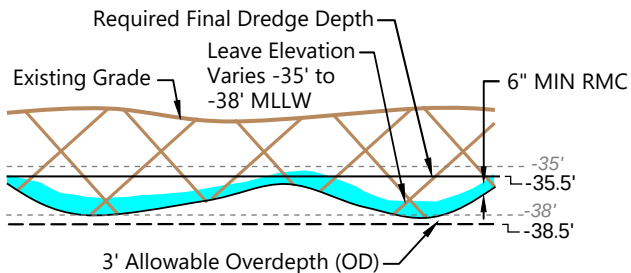
**PROPOSED DREDGING
 BERTH 1 PLAN VIEW**

PROPOSED: MAINTENANCE DREDGING
IN: WHATCOM WATERWAY
AT: BELLINGHAM
COUNTY: WHATCOM
STATE: WASHINGTON

 SHEET 4 OF 6 DATE: 12.20.2024



TYPICAL DETAIL:
(not to scale)



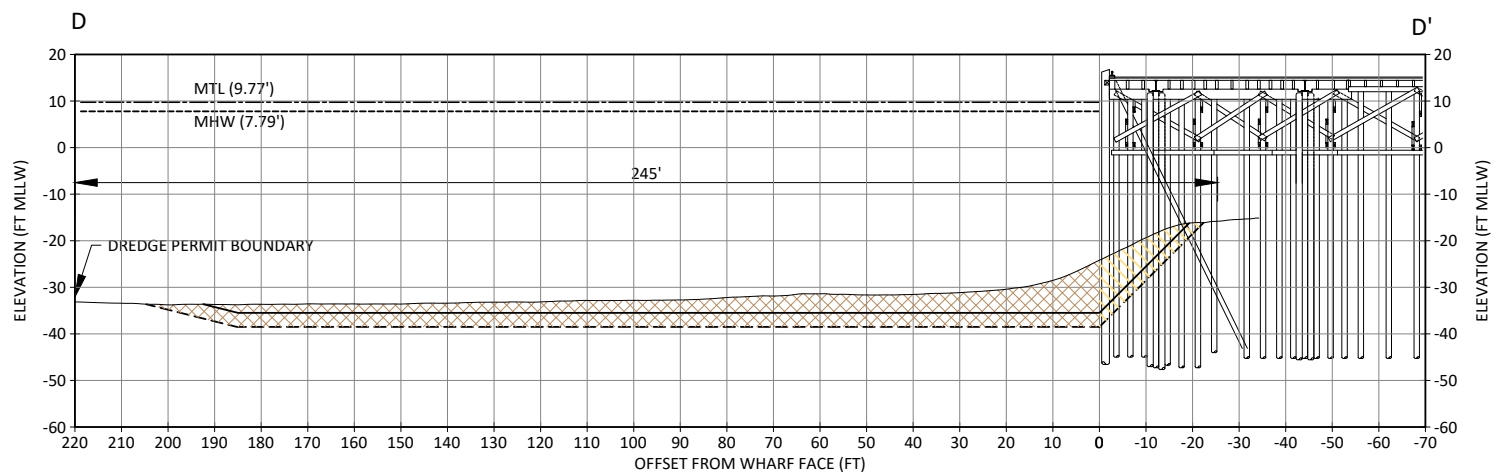
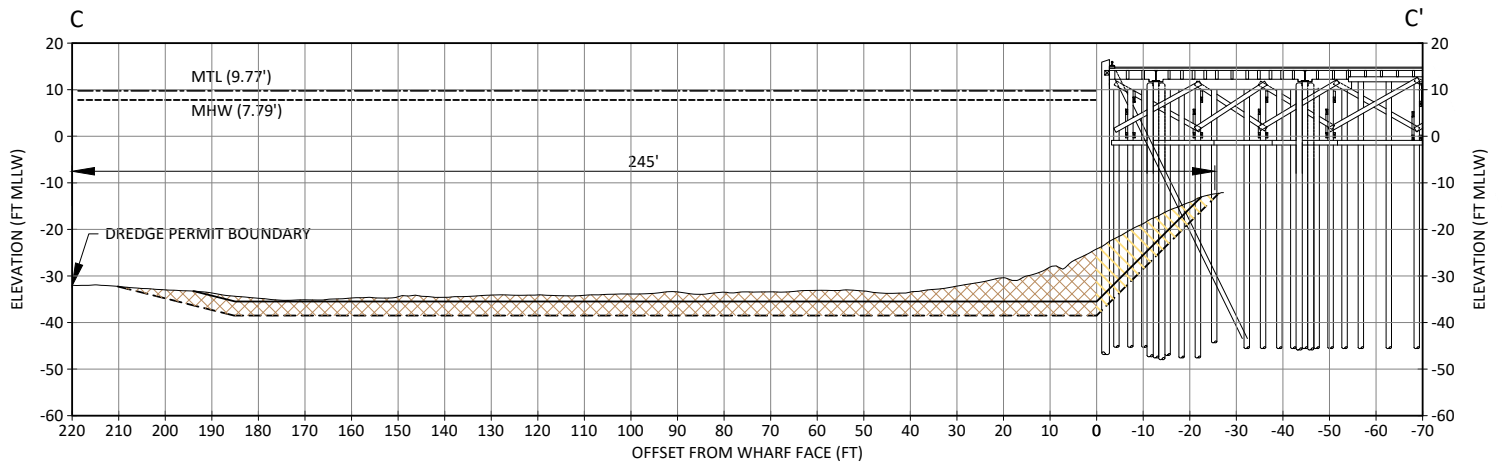
LEGEND:

- Open Water Dredging Area (El. -35.5' + 3' OD)
- Under Pier Slope Dredging Area
- Existing Grade (2/14/24)
- Required Final Dredge Depth
- Allowable Overdepth (OD) (+3')
- Residual Management Cover (RMC) (6" MIN)
- Appx. HTL (+9.77')
- Appx. MHW (+7.79')

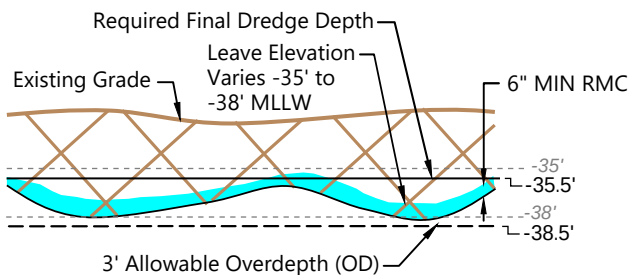
Reference: NWS-2022-141
 Applicant: Port of Bellingham
 Adjacent Property Owner: Port of Bellingham
 Lat/Long: 48.744979°; -122.495209°
 S/T/R: NE S36, T38N R02E

**PORT OF BELLINGHAM
 BELLINGHAM SHIPPING TERMINAL
 BERTHS 1 & 2—MAINTENANCE DREDGING
 PROPOSED MAINTENANCE DREDGING
 BERTH 1 CROSS SECTIONS**

PROPOSED: MAINTENANCE DREDGING
 IN: WHATCOM WATERWAY
 AT: BELLINGHAM
 COUNTY: WHATCOM
 STATE: WASHINGTON
 SHEET 5 OF 6
 DATE: 12.20.2024



TYPICAL DETAIL:
(not to scale)



LEGEND:

- Open Water Dredging Area (El. -35.5' + 3' OD)
- Under Pier Slope Dredging Area
- Existing Grade (2/14/24)
- Required Final Dredge Depth
- Allowable Overdepth (OD) (+3')
- Residual Management Cover (RMC) (6" MIN)
- Appx. HTL (+9.77')
- Appx. MHW (+7.79')

Reference: NWS-2022-141
Applicant: Port of Bellingham
Adjacent Property Owner: Port of Bellingham

Lat/Long: 48.744979°; -122.495209°
S/T/R: NE S36, T38N R02E

**PORT OF BELLINGHAM
 BELLINGHAM SHIPPING TERMINAL
 BERTHS 1 & 2—MAINTENANCE DREDGING
 PROPOSED MAINTENANCE DREDGING
 BERTH 2 CROSS SECTIONS**

PROPOSED: MAINTENANCE DREDGING
IN: WHATCOM WATERWAY
AT: BELLINGHAM
COUNTY: WHATCOM
STATE: WASHINGTON
 SHEET 6 OF 6 DATE: 12.20.2024