

MEMORANDUM FOR RECORD

July 22, 2015

**SUBJECT:** SUPPLEMENTAL DETERMINATION REGARDING THE SUITABILITY/UNSUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE SALMON BAY MARINA (NWS-2012-1261) FOR UNCONFINED OPEN-WATER DISPOSAL AT THE ELLIOTT BAY OPEN-WATER SITE.

1. **Introduction.** This memorandum supplements the Dredged Material Management Program (DMMP) suitability determination for Salmon Bay Marina, dated November 19, 2012, and reflects the consensus determination of the DMMP agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability/unsuitability of 11,888 cubic yards (cy) of dredged material from the Salmon Bay Marina for disposal at the Elliott Bay open-water site.
2. **Background.** In the original suitability determination (Attachment 1), the DMMP agencies determined that the soft layer of black silt that had accumulated over the area proposed for dredging was unsuitable for open-water disposal. The dense native material underlying the silt was determined to be suitable for open-water disposal.

In consultation with the DMMP agencies, Hart Crowser and PND Engineers developed a plan in 2012 to separate suitable from unsuitable material. The plan was based on the vibracore logs and physical testing data available at the time and included removal of the upper 1.5 feet of sediment over the entire project footprint, with disposal in an upland disposal facility. To ensure that all the contaminated material would be removed, the DMMP agencies required an additional 1-foot vertical buffer be included when separating suitable from unsuitable material. That meant that 2.5 feet of material would need to be removed over the entire project footprint and taken to an upland disposal facility. The total volume of material in the top 2.5-foot dredge lift was 3,563 cubic yards. The remainder of the project material, a volume of 8,337 cubic yards, would be disposed of at the Elliott Bay open-water disposal site (note: the total volume calculated in 2012 was 11,900 cy).

In 2014, additional physical surveys of the dredging area were conducted in order to provide higher-resolution mapping of the thickness of the silt layer and potentially decrease the volume of sediment requiring upland disposal. Data from the physical surveys and the DMMP agencies' supplemental suitability determination based on that data are the subjects of this memorandum.

3. **Physical Survey Results.** Physical surveys were conducted at Salmon Bay Marina by Gravity Consulting in June 2014 (Gravity, 2014a; Attachment 2) and November 2014 (Gravity, 2014b; Attachment 3). The results were summarized in a technical memorandum by Dalton, Olmsted and Fuglevand (DOF, 2015; Attachment 4). The June 2014 survey included physical probing and bathymetric data collection. Physical probing was conducted at over 300 locations across the site utilizing a GPS receiver mounted on an aluminum probe. In order to calculate the thickness and volume of the contaminated layer of silt, elevations of both the surface of the silt and the interface between the silt and underlying native material needed to be measured. To measure the surface elevation of the silt layer (i.e. the mudline elevation), a disk was attached to the end of the probe to prevent penetration of the probe into the silt. The soft sediment probe locations are shown in Figure

1 of Attachment 4. The bare probe, with disk removed, was used to penetrate the soft silt and locate the interface between the silt layer and the underlying hard native sediment. The hard sediment probe locations are shown in Figure 2 of Attachment 4. Elevation data collected in this way enabled the mapping of the thickness of the silt layer over the majority of the dredging area.

Physical probing along the northeast side of the dredge footprint was not possible because the water was deeper than the length of the probe. In November 2014, Gravity Consulting conducted an acoustic sub-bottom profiling survey in this deeper water. The survey was successful in differentiating between the surface of the silt layer and the interface between silt and native material in this area. The resulting data were used to supplement the probe survey, allowing DOF to generate contours for the surface of the silt (Attachment 4, Figure 3) and the interface between silt and native material (Attachment 4, Figure 4). An isopach showing the thickness of the silt layer (Attachment 4, Figure 5) was derived by subtracting the hard surface elevations from the soft surface elevations. A typical cross-section is shown in Attachment 4, Figure 6.

The thickness of soft sediment was less than a foot across approximately 54% of the site, and between one and two feet across approximately 42% of the site. Thicker deposits were present in small areas, with approximately 3.9% of the site having between two and three feet of silt, and only about 0.1% of the site having three or more feet (DOF, 2015). PND Engineers used Civil3D modeling to estimate the thickness of the silt layer, calculating an average of 1.5 ft (PND, 2015).

4. **Proposed Dredging Design.** DOF presented a precision-dredging approach for separation of silt and native material to the DMMP agencies at a meeting on December 4, 2014. The approach included dividing the dredging area into a grid (Attachment 4, Figure 7), with each grid cell representing a dredge bite. Each cell would be dredged to an elevation that would be at or below the interface of the silt and native material, typically in a single pass of the dredge. The contaminated sediment would be loaded on a barge and hauled to a transloading site for transport to a landfill. To account for dredging equipment tolerances, DOF proposed setting the design elevation of the precision dredge 4 inches deeper than the deepest extent of silt in each grid cell (Attachment 4, Figure 8). This methodology was used recently in the Duwamish Waterway to successfully remove contaminated material at the CERCLA-identified early action cleanup site at Boeing Plant 2. The precision dredging would be Phase 1 of the project.

Following removal of the contaminated silt layer, a post-dredge bathymetric survey would be conducted to verify that required depths had been achieved throughout the project area. The required depth is the interface between silt and native material. Once verified, the uncontaminated native material would be dredged and placed in a bottom-dump barge for disposal at the Elliott Bay open-water site. Dredging of the uncontaminated native material would constitute Phase 2.

5. **Volume Estimate.** At Boeing Plant 2, the dredge plan specified a precision-dredge design elevation 6 inches deeper than the deepest extent of contaminated material in each grid cell, rather than the 4 inches proposed by DOF. After consultation with the DMMP agencies, PND Engineers agreed to use a 6-inch offset in the precision-dredge design for Salmon Bay Marina as well.

Using the physical survey data from Gravity Consulting, PND Engineers calculated the volume of material in the precision-dredge prism (PND, 2015; Attachment 5). Including the 6-inch offset described previously, the volume of material slated for upland disposal was estimated to be 2,553

cubic yards. The volume of the underlying native material (to the full design depth of -17 ft OHW, plus 1 foot of overdepth) was calculated to be 9,335 cubic yards. The total dredging volume calculated by PND Engineers was 11,888 cubic yards.

6. **Amended Suitability Determination.** The DMMP agencies have determined that the dredging approach proposed by DOF is technically acceptable as long as a minimum offset of 6 inches is used to ensure complete removal of the contaminated silt layer during Phase 1. This material is unsuitable for open-water disposal and must be disposed upland. The volume of silt plus 6-inch offset is 2,553 cubic yards. The estimated 9,335 cubic yards of uncontaminated native material slated to be dredged in Phase 2 is suitable for disposal at the open-water site in Elliott Bay.

*This amended suitability determination is contingent on the ability of the dredging contractor to carry out the dredging plan proposed by DOF. The dredging quality control plan developed for this project must include sufficient detail for the DMMP agencies to evaluate the adequacy of the dredging plan and the ability of the dredging contractor to carry out the plan.*

*A pre-dredge meeting with DNR, Ecology, EPA and the Corps of Engineers is required at least 7 days prior to dredging. A dredging and disposal quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 14 days prior to the pre-dredge meeting. The quality control plan must clearly show how the dredging contractor will execute the plan proposed by DOF to separate the contaminated silt layer from the underlying native material. Dredging, positioning, de-watering, transloading and disposal will all need to be addressed with enough detail to provide assurance to the agencies that the dredge plan will be properly implemented. The unsuitable material must be completely dredged and removed before the native material may be dredged and taken to the Elliott Bay site. A bathymetric survey will be required after the contaminated silt layer has been dredged to verify that the unsuitable material has been completely removed. The quality control plan should also include contingency measures in the event that remnants of the silt layer are encountered during dredging of the suitable material.*

*A DNR site-use authorization (SUA) must be acquired for open-water disposal. Disposal at the Elliott Bay site must be by bottom-dump barge. A section 401 water quality certification (WQC) is also required. The applicant must coordinate directly with DNR and Ecology regarding the timing of document submittal under the SUA and WQC.*

This suitability determination does **not** constitute final agency approval of the project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

7. **References.**

DMMP, 2012. *Determination Regarding the Suitability/Unsuitability of Proposed Dredged Material from the Salmon Bay Marina for Unconfined Open-Water Disposal at the Elliott Bay Open-Water Site.* Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program Agencies. November 19, 2012.

DOF, 2015. *Additional Dredge Material Characterization, Salmon Bay Marina*. Technical Memorandum prepared by Dalton, Olmsted and Fuglevand for PND Engineers. February 11, 2015.

Gravity, 2014a. *Salmon Bay Marina Sediment Probe Survey Description Memorandum*. Technical Memorandum prepared by Gravity Consulting, LLC for Hart Crowser. July 6, 2014

Gravity, 2014b. *Salmon Bay Marina, Sub-Bottom Profiler Survey*. Technical Memorandum prepared by Gravity Consulting, LLC for Hart Crowser. November 2014.

PND, 2015. *Salmon Bay Marina – Revised Dredge Estimate*. Technical Memorandum prepared by PND Engineers for Salmon Bay Marina. April 9, 2015; revised July 14, 2015.

8. Agency Signatures.

signed copy on file in DMMO - Seattle District office;  
attachments available upon request

Concur:

\_\_\_\_\_  
Date                      David Fox, P.E. - Seattle District Corps of Engineers

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Date                      Justine Barton - Environmental Protection Agency

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Date                      Laura Inouye, Ph.D. - Washington Department of Ecology

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Date                      Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories  
Seattle District Regulatory  
Roger McGinnis – Hart Crowser  
Chris Wiest – PND Engineers  
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