

SUBJECT: ADDENDUM TO THE DETERMINATION OF THE SUITABILITY OF SEDIMENTS PROPOSED TO BE MAINTENANCED DREDGED FROM TOKE POINT ENTRANCE CHANNEL AND TOKELAND MARINA, WILLAPA BAY (NWS-2008-164-DO) FOR OPEN-WATER UNCONFINED DISPOSAL USING FLOW-LANE DISPOSAL IN WILLAPA BAY AS EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT.

1. The purpose of this addendum to the 24 January 2007 suitability determination (SDM: http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/Tokepoint_Entrance-Tokeland_marina-sdm.pdf) is to increase the maintenance dredging volume from 62,846 cy to 65,000 cy, and to authorize the disposal of the suitable material proposed to be dredged by hydraulic suction dredge, with pipeline discharge of the finer grained sediments by “flow lane” disposal, and evaluate the suitability for placement of the coarser sediments on the beach adjacent to the marina as shown in **Figures 1** (vicinity map) and **2**. This change to the initial SDM reflects the consensus determination of the Agencies that comprise the regional Dredged Material Management Program (DMMP) for the State of Washington. The agencies include the Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency.

2. Relevant dates for regulatory tracking purposed are included in Table 1.

Table 1. Regulatory Tracking Information and Dates

FEDERAL PUBLIC NOTICE	CENWS-TS-NS-28
SAP submittal date:	May 10,2006
SAP Approval letter date:	June 8, 2006
Sampling date(s):	August 16, 2006 October 17, 2006 (Willapa Bay reference station WBS7-A)
Sediment data characterization report submittal date:	January 16, 2007
Initial suitability determination	January 24, 2007
DAIS Tracking Number	TPETM-1-B-F-235
Recency Determination Date: Low (Tokepoint Entrance) = 7 years Low-Moderate (Tokeland Marina) = 7 years	August 2013

3. The small volume increase from 62,846 cy to 65,000 cy is acceptable given the testing conducted, which included 2 dredged material management units (DMMUs) within the low-moderate ranked Marina, with up to 40,000 cy per DMMU authorized, and the single DMMU

within the Low ranked Federal Entrance Channel, which could accommodate a volume up to 60,000 cy.

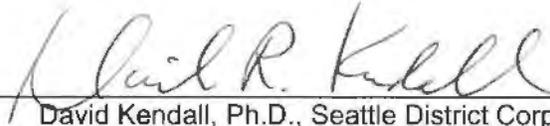
4. The open-water dispersive disposal alternative selected by the Port of Willapa includes “flow lane” disposal of fine material to be dredged with the small suction dredge. This alternative is generally used for dispersive disposal within the Columbia River, but has not been previously reviewed or authorized in Willapa bay by the DMMP. A simulation of “flow lane” disposal of fine grained material using the Corp’s DREDGE model evaluated total suspended solids (TSS), and estimated the TSS to be approximately 85 mg/L at 240 ft from the pipeline, and that the plume would meet the background (e.g., 19 mg/L) at a distance of approximately 1,000 ft from the discharge point (**Attachment 1**). All the material tested meets the dispersive disposal guidelines and the DMMP agencies authorize the use of “flow lane” disposal at the proposed site (**Figure 2**) for this dredging cycle using best-professional-judgment (BPJ). However, the DMMP agencies will have to formally review and approve this disposal alternative under NEPA/SEPA, before authorizing its use in DMMP as a routine disposal alternative.
5. The testing data evaluated in 24 January SDM authorized beneficial use of all the material at an appropriate beneficial use site at Cape Shoalwater, and the proposed beneficial use site for the coarser sandy material has now been moved to the beach adjacent to the marina, as depicted in **Figure 2**. A letter of support for this beneficial use alternative from the Shoalwater Bay Indian Tribe is provided as **Attachment 2**. The DMMP agencies approve the location change adjacent to the Marina as an appropriate beneficial use.
6. This memorandum documents the suitability of material proposed for dredging from the Toke Point Entrance Channel and Tokeland Marina for either open-water disposal at the designated “flow lane disposal” site, or at the designated beneficial use site adjacent to the Marina. However, this suitability determination does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process. 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.

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Concur:

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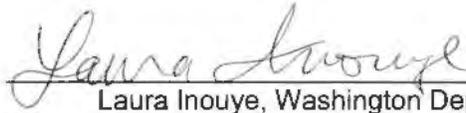
Date



David Kendall, Ph.D., Seattle District Corps of Engineers

03/05/09

Date



Laura Inouye, Washington Department of Ecology

3/5/09

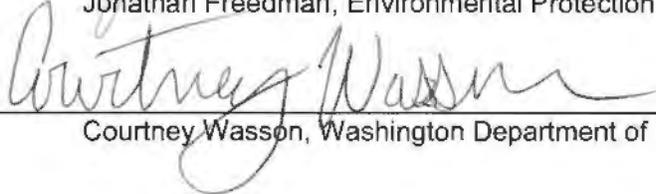
Date



Jonathan Freedman, Environmental Protection Agency, Region 10

3/5/09

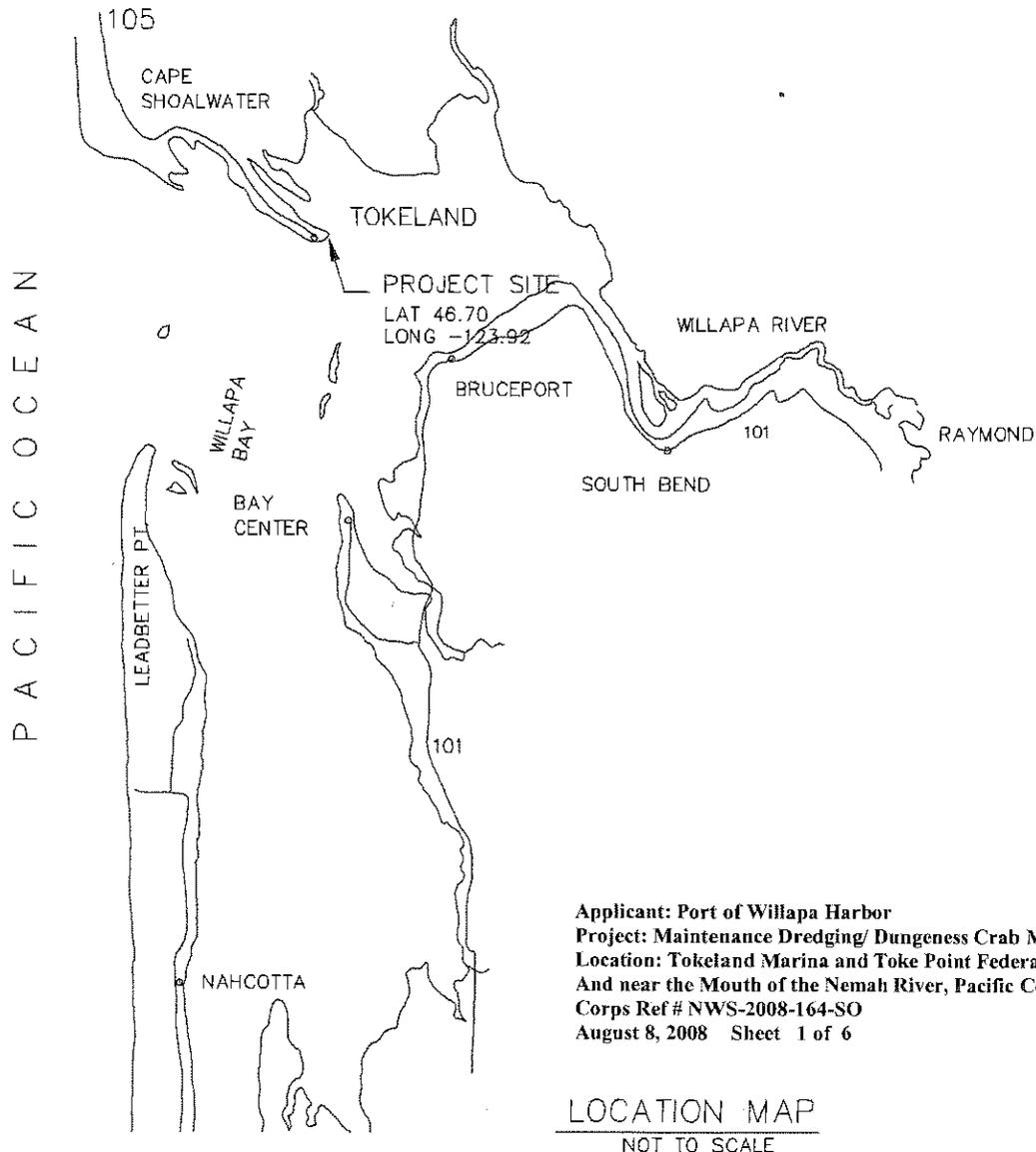
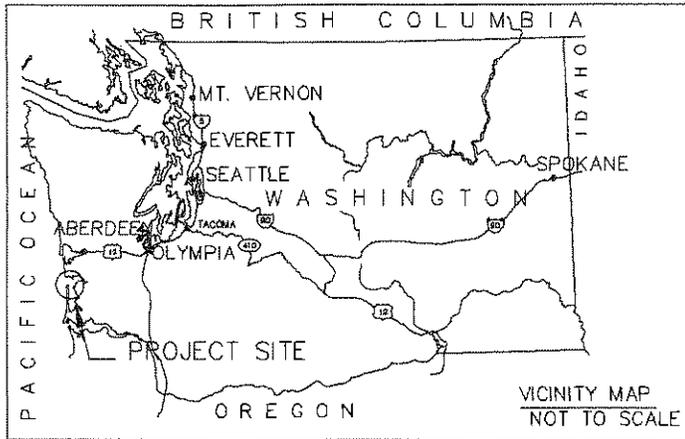
Date



Courtney Wasson, Washington Department of Natural Resources

Copies Furnished:

Ron Wilcox, Regulatory Project Manager
Hiram Arden, Federal Project Manager
Ms. Rebecca Chaffee, Toke Point Marina Manager
Jonathan Freedman, EPA
Laura Inouye, Ecology
Helen Pressley, Ecology
Courtney Wasson, DNR
DMMO File



Applicant: Port of Willapa Harbor
Project: Maintenance Dredging/ Dungeness Crab Mitigation
Location: Tokeland Marina and Toke Point Federal Entrance Channel
 And near the Mouth of the Nemah River, Pacific County, Wa
Corps Ref # NWS-2008-164-SO
August 8, 2008 Sheet 1 of 6

LOCATION MAP
 NOT TO SCALE

PURPOSE: NAVIGATION CHANNEL & MARINA DREDGING & DISPOSAL

DATUM: MLLW

ADJACENT PROPERTY OWNERS:

PORT OF WILLAPA HARBOR
 WA DEPARTMENT OF NATURAL RESOURCES

TOKELAND

VICINITY MAP

APPLICATION BY: PORT OF WILLAPA HARBOR

PROPOSED: PROPOSED MAINTENANCE DREDGING

IN: WILLAPA BAY

AT: TOKELAND

COUNTY: PACIFIC COUNTY

Figure 1

DATE: [REDACTED]



Technical Memorandum

Willapa Harbor Flow Lane Disposal Summary of DREDGE Simulations

Coast & Harbor Engineering, Inc. (CHE) conducted an analysis of the mixing zone at the proposed flow lane disposal site for placement by hydraulic dredge the dredged material from Tokeland Marina, Willapa Harbor. In support of the mixing zone analysis, upon recommendations from Washington Department of Ecology (WA DOE) the U.S. Army Corps of Engineers (U.S. COE) “DREDGE” model was used to calculate suspended sediment concentration (TSS) dynamics at a flow lane disposal site. This model (DREDGE) was developed at the University of Utah by Dr. Donald Hayes and Chung-Hwan Je (Hayes and Je, 2000) and is contained in the U.S. Army Corps of Engineers Automated Dredging and Disposal Alternatives Management System (ADDAMS). The model calculates TSS concentrations in a turbidity plume extending away from a dredging site. Sub-modules allow for specification of dredge-specific parameters, ambient conditions, and site-specific sediment properties.

Modeling was conducted using the input data and assumptions as follows:

- A 10-inch hydraulic pipeline dredge will be used for the dredging and pumping slurry through a 10-inch diameter pipeline.
- Placement of dredged material through the discharge pipeline would occur at the depth of approximately 24 ft MLLW.
- The ambient current velocity was set at approximately 2.5 ft/sec. Please note that higher ambient velocity corresponds to a larger dilution (mixing) zone, and vice versa, a smaller velocity corresponds to a smaller dilution zone. Typical current velocities at the project site were estimated, based on previous U.S. COE and USGS studies at approximately 1.5-2 ft/sec (See CHE Technical Memorandum Sediment Transport and Disposal Analysis - Tokeland Marina, September, 2007). In order to assure that the modeling results produce conservative estimates, a slightly higher than typical velocity of 2.5 ft/sec was used for the analysis.
- Sediment was assumed to be primarily fine-grained material, mostly silt. Simulations were conducted with various sediment sizes from 70 microns (0.07 mm) to 20 microns (0.02 mm).
- In-situ dry density for the sediment was assumed to be 700 kg/m³ (DREDGE model manual recommendations).
- The sediment re-suspension rate was assumed to equal dredged slurry concentration at the discharge pipeline. Typical hydraulic dredge slurry consists of 10% sediment and 90% water. This corresponds to 100 G/L of TSS.

- Dispersion coefficients were set at 10,000 cm²/sec in the lateral direction and 10 cm²/sec in the vertical direction (DREDGE model manual recommendations).

Results of DREDGE model simulations are presented in Figures 1 and 2. The figures present the decrease in TSS concentration with a position downstream of the disposal operations.

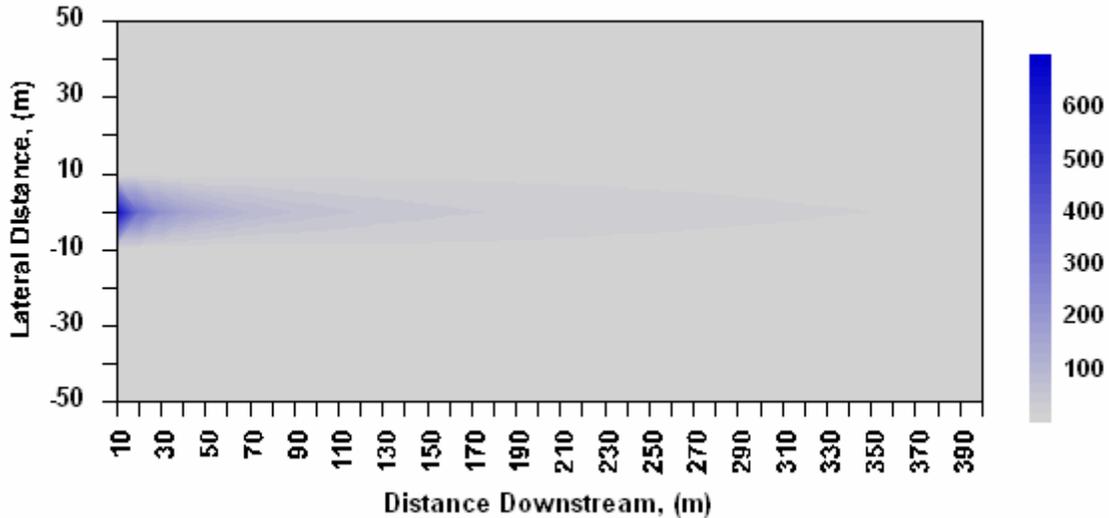


Figure 1. Willapa Harbor, Flow Lane Disposal Site, Plan view of DREDGE modeling results

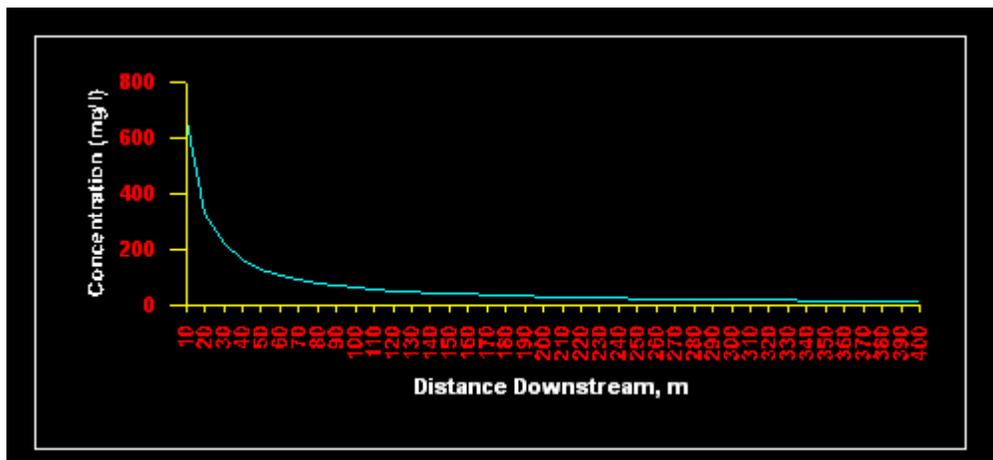


Figure 2. Willapa Harbor, Flow Lane Disposal Site, Longitudinal section of DREDGE modeling results

Figure 1 shows the plan view of suspended sediment (TSS) distribution downstream from the discharge point (discharge pipeline) in color format. Blue color indicates a higher level of TSS. The figure shows maximum turbidity in close proximity to the pipeline. This turbidity reduces with the distance downstream from the discharge point. The figure also shows maximum turbidity along the centerline of the modeled area. Figure 2 is a longitudinal

section along the centerline of the modeling area. The figure shows the change of suspended sediment concentration with the distance from the pipeline, starting from 10 meters away of the discharge point. The figure shows intensive reduction of turbidity at the first 100-130 meters (300-400 ft) from the pipeline. Further turbidity reduction continues at a slower rate.

In order to determine compliance with the background conditions, we have used the historical measured suspended sediment concentration data, provided by WA DOE. These data were collected during the period 1973-1990 and were provided to CHE as an excel file¹. The measurements of total solid concentration for the period 1989-1990 are selected for the analysis. During this period (1989-1990) a total of 14 measurements of TSS were reported. The measured data are shown in Figure 3.

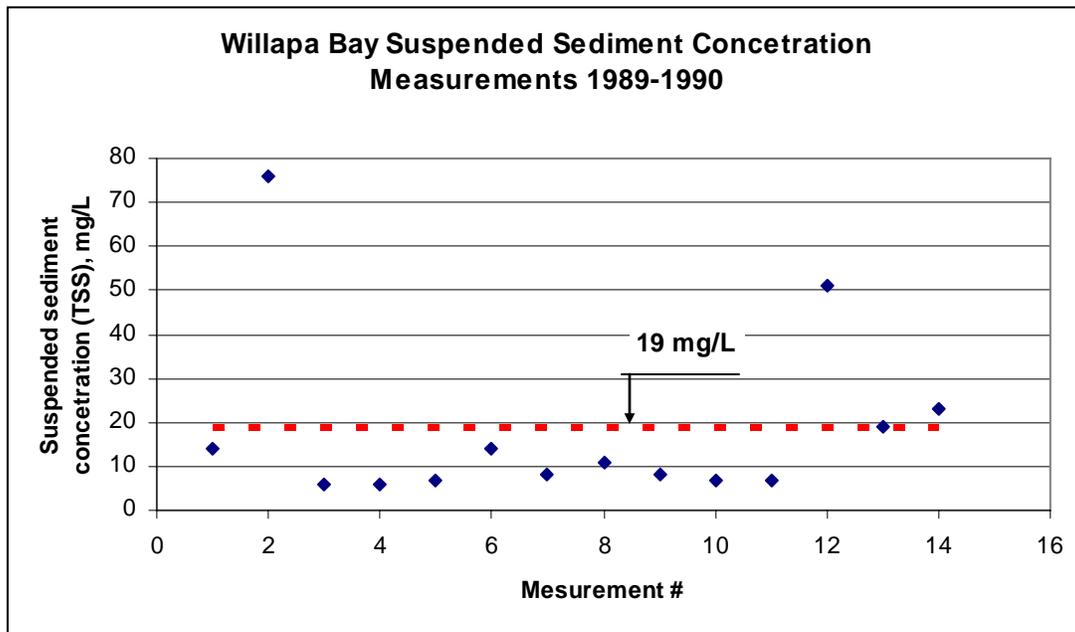


Figure 3. Willapa Bay measurements of suspended sediment concentration

One may notice that the data on Figure 2 are spread in a significant range from 78 mg/L to 7 mg/L. An average value from these measurements was computed and is plotted on the figure as a red dashed line. The averaged value of TSS from 14 measurements is estimated at approximately 19mg/L. This value is used further as a background condition for the flow lane disposal site.

Figure 4 is a zoomed-in version of Figure 2. The figure shows in more detail a change of TSS with distance. Please note that distance in this figure is in feet. The figure shows that at 240 ft from the pipeline suspended sediment concentration is approximately 85 mg/L. The red-dashed line on the figure is an estimated background of TSS for Willapa Harbor (see above). The figure shows that plume initiated by the pipeline meets the background

¹ Methodology of measurements as well as sea conditions during measurements is not known. Some earlier measurement data (1973-1989) are presented in NTU and some in TSS (1989-1990). It appears that the data were measured sporadically in time and space.

conditions (19mg/L) at the distance of approximately 1,000 ft from the discharge point. This distance (1,000 ft) is recommended as a mixing zone for the dredging and dredged material disposal operations for the flow lane disposal site.

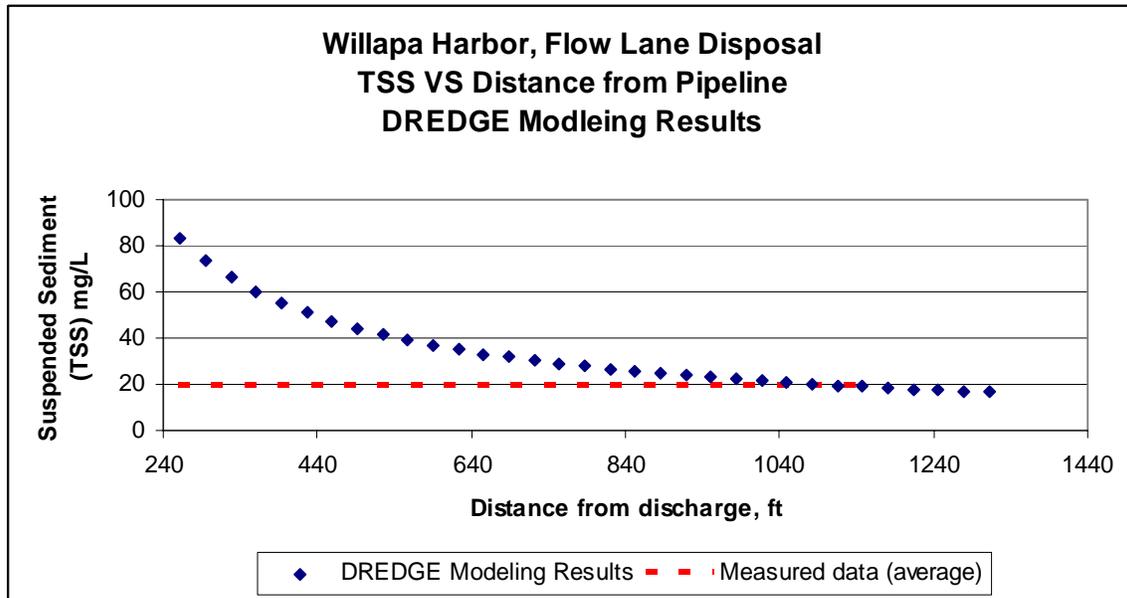
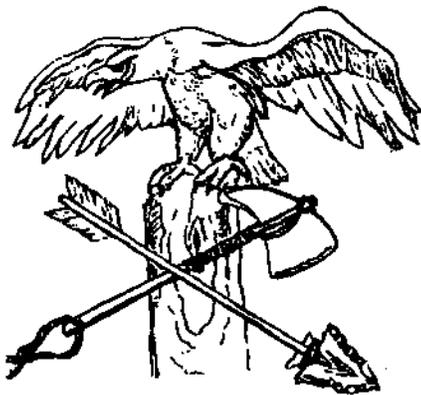


Figure 4. Willapa Harbor, Flow Lane Disposal Site, Longitudinal section of DREDGE modeling results, zoomed in



SHOALWATER BAY INDIAN TRIBE

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February 19, 2009

Ms. Rebecca Chaffee
Manager
Port of Willapa Harbor
1725 Ocean Avenue
Raymond, WA 98577

Dear Ms. Chaffee:

Please accept this letter of support of the Willapa Harbor Tokeland Marina Project. Your proposed project of dredging 45,500cy from the Marina and 17,400cy from the federally maintained Toke Point Entrance Channel is much needed as both of these areas experience substantial sedimentation. This project will also help increase opportunities to commercially develop the Port's properties surrounding the Marina.

Furthermore, disposing of the dredged material in the locations you have proposed may potentially benefit shoreline protection in the vicinity of the Marina. Additionally, from an environmental standpoint, the Tribe is pleased to see that these materials will be returned to the local littoral system.

Sincerely,

Charlene Nelson
Tribal Chair