

using *Ampelisca abdita*, the sediment larval test, using *Mytilus galloprovincialis*, and the *Neanthes* 20-day growth test. Tests were conducted according to PSEP (1995), as modified by the DMMP program.

7. Reference sediment for use in the bioassays was collected from Carr Inlet. Amphipod organisms were obtained from Brezina and Associates, and were collected from Tomales Bay CA. Control sediment for the amphipod bioassay was obtained from La Jolla Shore Beach CA. *Mytilus galloprovincialis* organisms were obtained from Carlsbad Aquafarms Carlsbad, CA. *Neanthes* organisms were obtained from Dr. Don Reish, Long Beach California.
8. Bioassay results are listed in Table 2. No hits were observed in the bioassays. The amphipod bioassay failed to meet performance criteria for the control sediment (79 percent survival). All other test parameters were acceptable, and survival, when compared to reference, met the criteria for passing the bioassay.
9. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were generally followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program. Based on the results of the chemical testing, the consensus determination of the DMMP agencies is that 7000 cubic yards of material from the Delta Marine dredging project are suitable for open-water disposal at either a dispersive or nondispersive site.
10. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open water disposal site or for beneficial use. It 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 and public input, and after an alternatives analysis is done under section 404 (b) 1 of the Clean Water Act.

**Delta Marine Industries
Duwamish Waterway**

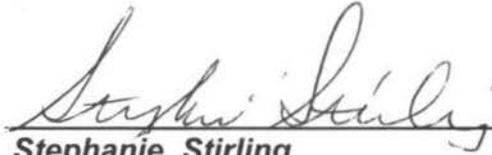
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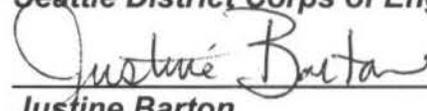
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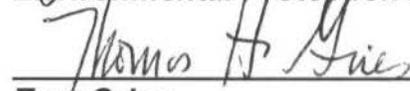
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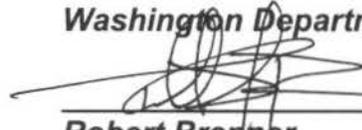
Stephanie Stirling
Seattle District Corps of Engineers



Justine Barton
Environmental Protection Agency, Region 10



Tom Gries
Washington Department of Ecology



Robert Brenner
WA Department of Natural Resources

Copies Furnished:

EPA/Justine Barton
DOE/Tom Gries
DNR/Robert Brenner
CENWS/OD-RG
Dr. Mark Johns/AMEC

Table 1. Sampling and Compositing Plan

DMMU	Sample Station	Sample Interval
DMMU 1A	S-1	No recovery
	S-2	0 to 3 ft 10 in
	S-3	0 to 3 ft 10 in
	S-4	0 to 4 ft
DMMU2A	S-5	0 to 4 ft
	S-6	0 to 4 ft
	S-7	0 to 4 ft
	S-8	0 to 4 ft
DMMU1-2B	S-4	4 ft to 5 ft 2 in
	S-5	4 ft to 5 ft 8 in
	S-6	4 ft to 5 ft 6 in
	S-7	4 ft to 5 ft 10 in
	S-8	4 ft to 6 ft

Table 2. Summary of chemical and biological testing results

		DMMU ID:	1A	2A	1-2B
		Rank:	H	H	H
	Units		Conc.	Conc	Conc
Total Solids	%		53.7	50.2	66.5
Total Volatile Solids	%		6.6	7.5	4.4
Total Organic Carbon	%		2.2	2.2	2.3
Total Ammonia	mg/kg		7.1	100.0	100.0
Total Sulfides	mg/kg		2,200	3,400	450
Gravel	%			0.6	1.4
Sand	%		22.7	35.2	67.6
Silt	%		61.9	55.7	25.9
Clay	%		10.4	12.5	5.1
Fines (percent silt + clay)	%		72.3	68.2	31.0
preferred reference match:	%				
Ampelisca abdita hits					
Mytilus galloprovincialis hits:					
Neanthes arenaceodentata hits:					
Bioassay Determination: (P/F)			P	P	P
BTs exceeded:			no	no	no
PSDDA Determination:			P	P	P
DMMU Volume:	cy		2,450	2,450	2,100
DMMU ID:			1A	2A	1-2B

Table 3. Solid Phase Bioassay Results Summary

Dredged Material Management Units (DMMU)	Amphipod Mortality, % (<i>Ampelisca</i>)	Sediment Larval Test ¹ (<i>Mytilus galloprovincialis</i>)		20-day <i>Neanthes</i> growth, mg-ind-day (% reference), mortality %	DMMU Suitability	
		Mort+Abnor %	Abnormality %		ND	D
Control	21 (QA/QC failure)	26	8.9	initial wgt=0.6 mg-individual 1.00 (\pm 0.04 SD) mortality = 0%	NA	
Carr Inlet	10	9	7.2	0.96 (\pm 0.13 SD) mortality = 8%	NA	
DMMU 1-A	76	33	12.3	0.98 (100%)^B mortality = 0%	yes	yes
DMMU 2-A	69	37	6.9	0.73 (76%)^B mortality = 12%	yes	yes
Positive Control (LC50/EC50) TEST	CdCl ₂ (mg/L) 0.89	CdCl ₂ (mg/L) 11.6	--	CdCl ₂ (mg/L) 8.83		
DAIS (Mean \pm SD)	(0.49 \pm 0.42 DAIS)	(10.1 \pm 6.5 DAIS for <i>Mytilus</i>)		(12.5 \pm 5.4 DAIS)		

Legend: ND = Nondispersive site suitability; D = Dispersive site suitability; B = Suitable for either nondispersive or dispersive site disposal. NA = not applicable; NT = not tested; SD = Standard Deviation

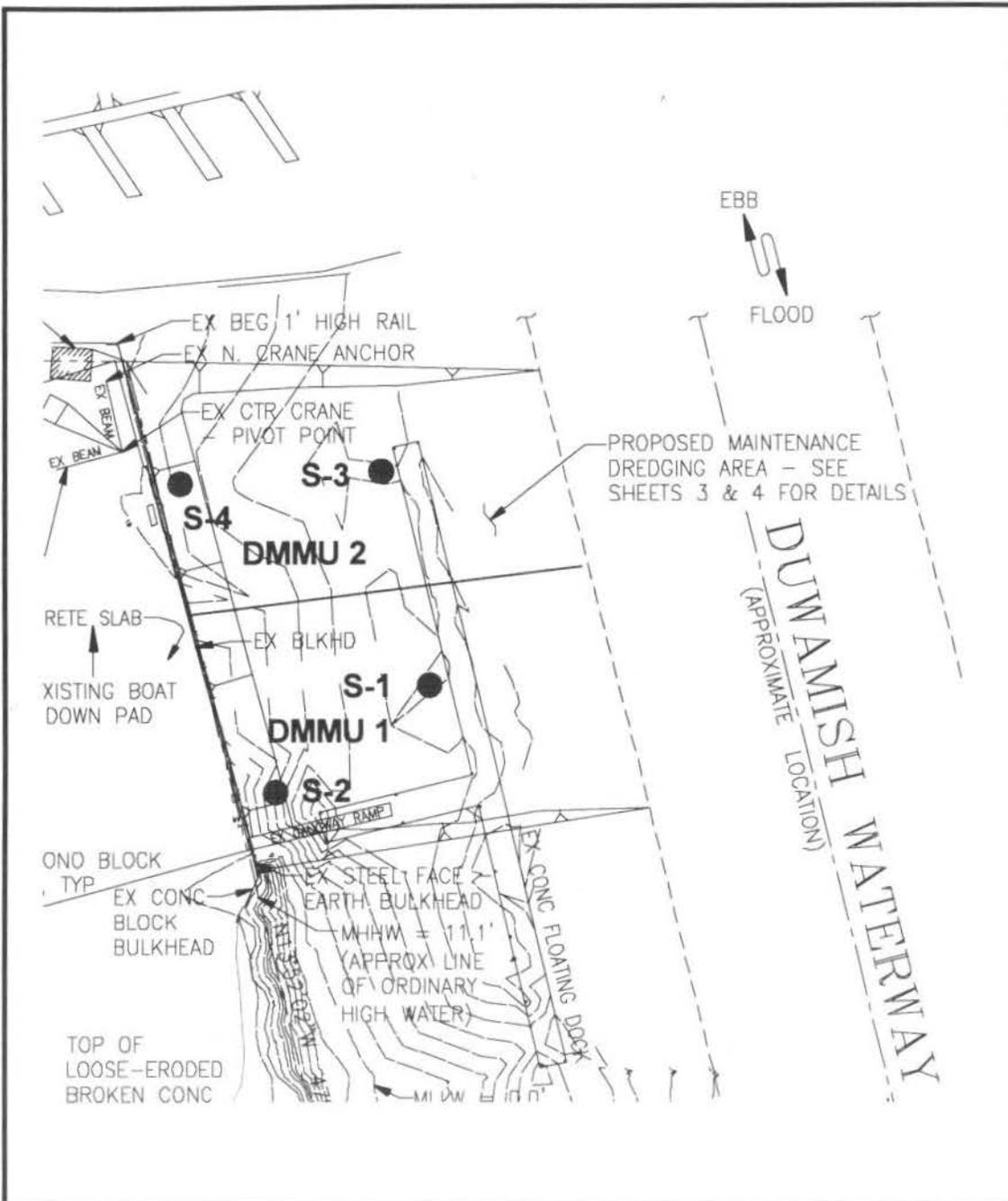


Figure 4
Surface and Subsurface Core Locations and Composite Locations
Delta Marine Industries Site (Duwamish Waterway, Seattle, WA)