

MEMORANDUM FOR RECORD**23 April 2007**

SUBJECT: SUITABILITY DETERMINATION ON THE DREDGED MATERIAL PROPOSED FOR MAINTENANCE DREDGING AT THE OAK HARBOR MUNICIPAL MARINA, OAK HARBOR, WASHINGTON FOR DISPOSAL AT A DMMP OPEN-WATER DISPOSAL SITE, AS EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT.

1. **Introduction.** The following summary reflects the consensus suitability determination of the Agencies that comprise the regional Dredged Material Management Program (DMMP) for the State of Washington on the proposed maintenance dredged material at the Oak Harbor Municipal Marina Project. The agencies include the Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency. The agencies are charged with determining the suitability of the proposed 206,000 cy of dredged material from the Oak Harbor Marina Project in Oak Harbor, Whidbey Island, Washington for open-water disposal at a DMMP non-dispersive or dispersive site and/or for beneficial use at an appropriate beneficial use site.
2. **Background.** The City of Oak Harbor owns and operates the Oak Harbor Marina, which was constructed in the early 1970s. Maintenance dredging is proposed because of silting within the marina limiting the navigation slip usage. Several floats routinely ground at low tides. A portion of the marina within the currently proposed dredging area (e.g., current surface DMMUs C8, C9, and C10, and subsurface C12) underwent a DMMP characterization in 1996 (6 February 1997 SDM) and was subsequently dredged in 1998-1999. All the material (27,000 cy) was found to be suitable by the DMMP.
3. **Project and Regulatory Tracking Summary.** Table 1 documents the regulatory tracking information and dates for the testing conducted.
4. **Table 1. Project and Regulatory Summary**

USACE PERMIT APPLICATION NUMBER	
Project Ranking	Moderate
Proposed dredging volume	206,000 cubic yards
Proposed dredging depths	-9 ft MLLW area -12 ft MLLW area -14 ft MLLW area
SAP SUBMITTAL DATE:	November 17, 2006
SAP Approval letter date:	December 6, 2006
Sampling date(s):	January 3-6, 2007
Sediment data characterization report submittal date:	April 18, 2007
DAIS Tracking Number	OHMMD-1-A-F-237
Recency Determination Date: Moderate rank = 5 years	January 2012

5. **Project Ranking and Sampling Requirements.** This project was ranked “Moderate” for testing purposes by the DMMP program based on its location and marina activities (MPR, 1988). The sampling and analysis plan (SAP) was submitted to the DMMP for review on November 17, 2006 (Hart Crowser, 2006), and approved by the DMMP agencies on December 6, 2006, subject to making minor changes requested by the DMMP agencies. The Contractor, Hart Crowser responded in December 12, 2006 letter with the additional information requested and response to SAP review comments (Attachment 1). The sediment characterization of the 206,000 cy project followed the “Moderate” sampling guidelines:

- Maximum volume of sediment represented by each field sample = 4,000 cy.
- Maximum volume of sediment represented by each analysis in the upper 4 feet of the dredging prism (surface: 16,000 cy)
- Maximum volume of sediment represented by each analysis in the subsurface (>4 ft) of the dredging prism (subsurface: 24,000 cy)

6. **Sampling.** Sampling took place between January 3-6, 2007 using a Mini-Vibe Vibracoring device, and core samples were collected at 40 sampling locations, with all sample locations surveyed using an on-board differential global position system (DGPS) with an accuracy of + 3 meters (see Figures 1-5). Four samples were composited for each of the 10 surface dredged material management units (DMMUs), and six samples were composited for each of the 2 subsurface DMMUs. Table 2 provides the sampling and compositing strategy for all 12 DMMUs.

Table 2. Sediment Sample Compositing Scheme.

Composited DMMU ID:	Core Sampling Sections
C1 (Surface)	1-1A, 1-2A, 1-3A, 1-4A
C2 (Surface)	2-1A, 2-2A, 2-3A, 2-4A
C3 (Surface)	3-1A, 3-2A, 3-3A, 3-4A
C4 (Surface)	4-1A, 4-2A, 4-3A, 4-4A
C5 (Surface)	5-1A, 5-2A, 5-3A, 5-4A
C6 (Surface)	6-1A, 6-2A, 6-3A, 6-4A
C7 (Surface)	7-1A, 7-2A, 7-3A, 7-4A
C8 (Surface)	8-1A, 8-2A, 8-3A, 8-4A
C9 (Surface)	9-1A, 9-2A, 9-3A, 9-4A
C10 (Surface)	10-1A, 10-2A, 10-3A, 10-4A
C11 (Subsurface)	1-1B, 1-3B, 2-2B, 3-2B, 4-2B, 5-2B
C12 (Subsurface)	5-4B, 6-1B, 7-2B, 8-3B, 9-3B, 10-4B

1/ See Figures 4 and 5 for sample locations

7. **Chemical Analysis.** The approved sampling and analysis plan was followed and quality control guidance specified by the PSEP and DMMP programs were met, and the data were considered sufficient and acceptable for regulatory decision-making under the DMMP program.

Table 3 provides a complete DMMU specific analysis summary for all 12 DMMUs. The sediment conventional analysis characteristics show that the sediments are predominately silt and clay with a total fines content ranging from a low of 82.0% (C11) to a high of 97.3 % (C2). The chemical results indicate there is no detected or detection limit exceedances of chemical-of-concern screening levels, including TBT. Based on these chemical testing results, biological effects testing was not required to make a determination about open-water suitability.

8. **Beneficial Use Analysis.** Although the proposed project has not proposed a beneficial use as an alternative to open-water-disposal, the DMMP now do this comparative analysis as routine part of the suitability determination, so that the proposed dredged material can be evaluated for an appropriate beneficial use project. This analysis showed (see Table 3) that there were no exceedances (detected or nondetected) of Sediment Quality Standards (SQS) . Therefore this material would be suitable for an appropriate in-water beneficial uses project in the marine environment.
 9. **Suitability Determination.** This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Oak Harbor Municipal Marina Project for unconfined-open water disposal at either a dispersive or non-dispersive DMMP disposal site. The results of the DMMP characterization showed that all 206,000 cy of material is suitable for unconfined-open-water disposal at either a DMMP dispersive or non-dispersive disposal site. The material would also be suitable for an appropriate in-water beneficial use project in the marine environment.
 10. This memorandum affirms the suitability of the sediment proposed for dredging at the Oak Harbor Municipal Marina Project for disposal at either a DMMP dispersive or non-dispersive disposal site. 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

May 2, 2007

Date

David R. Kendall

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

May 2 2007

Date

Jonathan Freedman

Jonathan Freedman, Environmental Protection Agency

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Laura Inouye, Washington Department of Ecology

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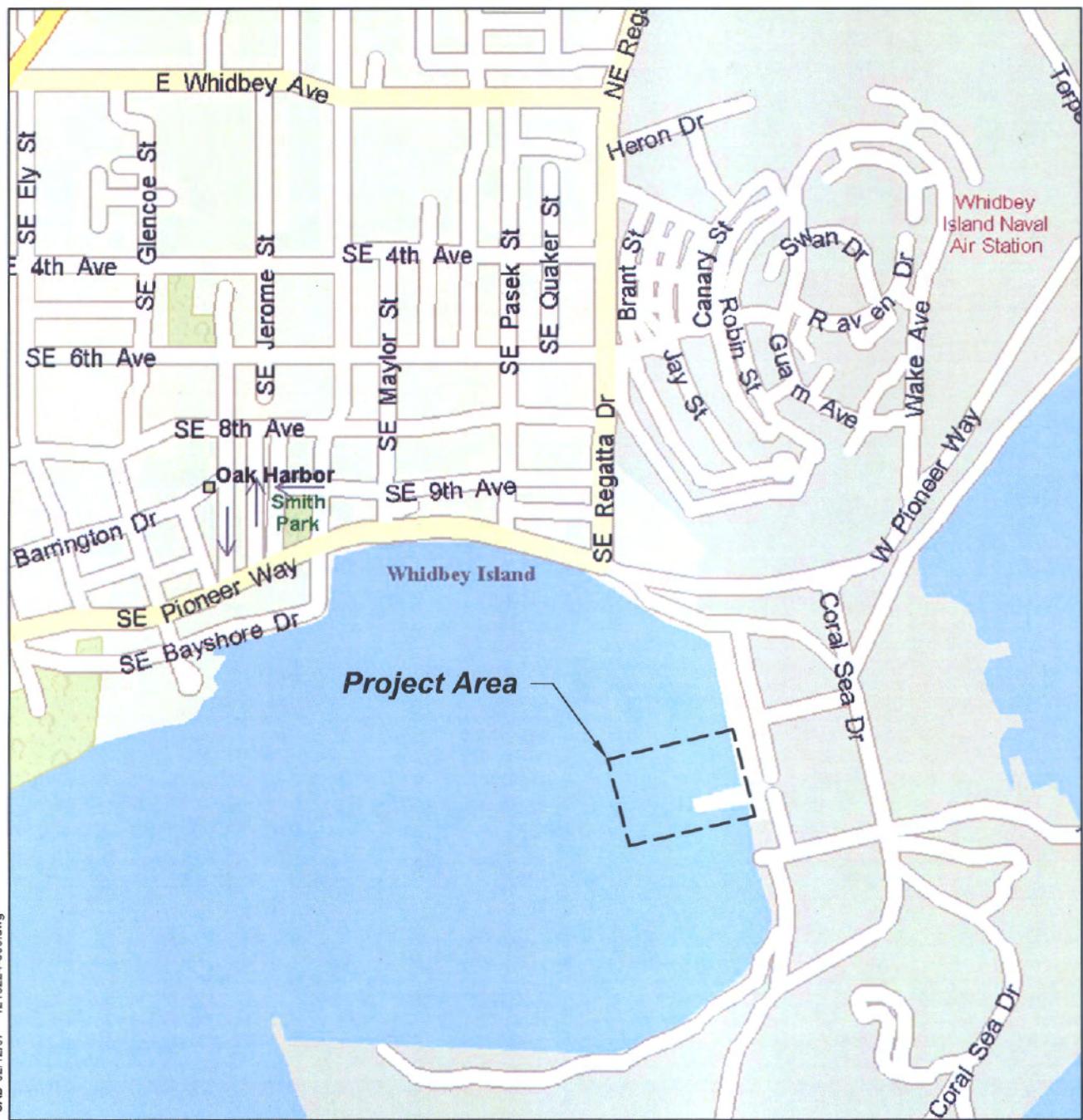
Jonathan Freedman, EPA

Laura Inouye, Ecology

Courtney Wasson, DNR

DMMO File

Vicinity Map



Source: Base map prepared from Microsoft Streets and Trips, 2005.



0 1000 2000
Scale in Feet

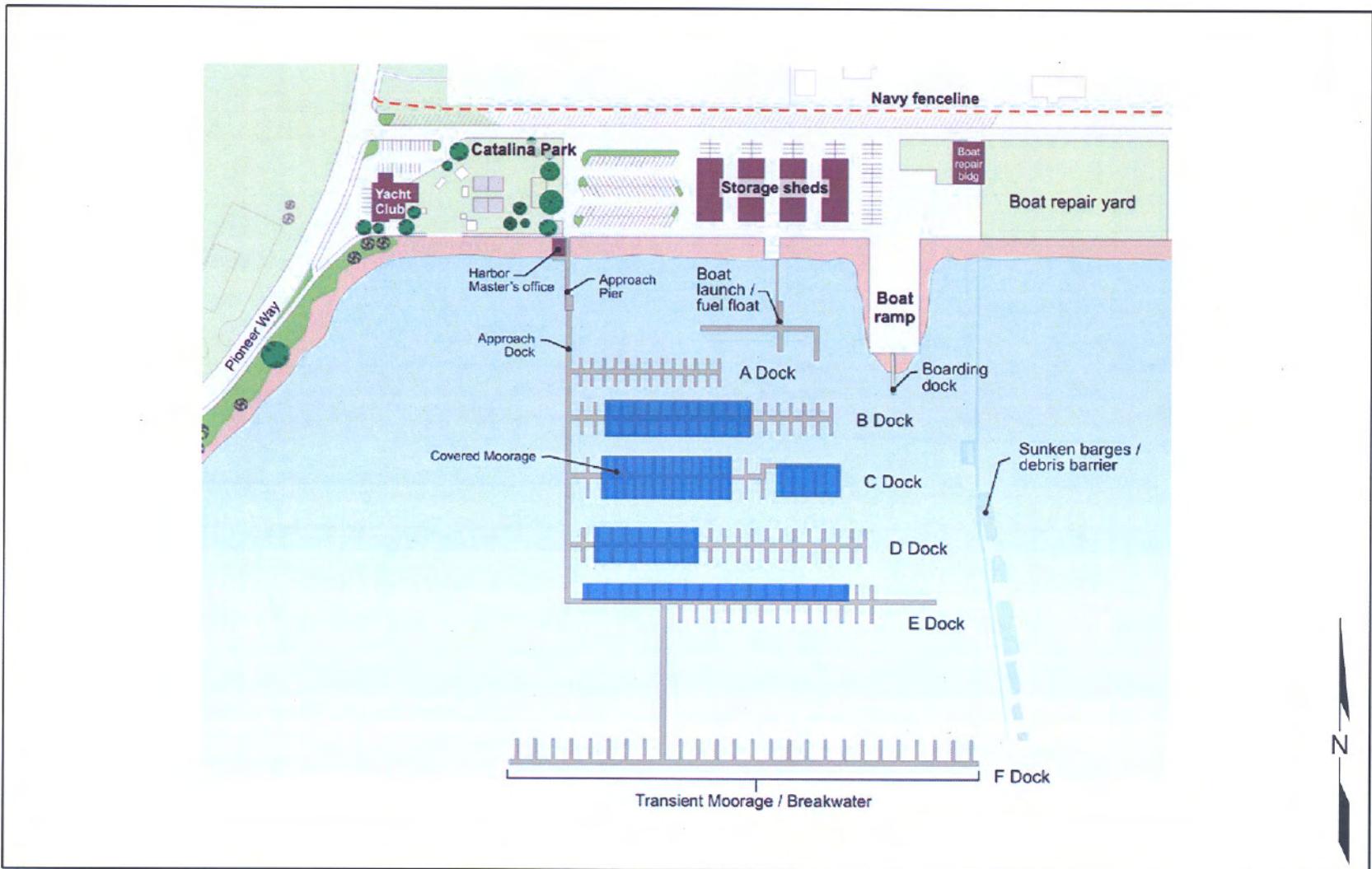
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Figure 1

Site Plan

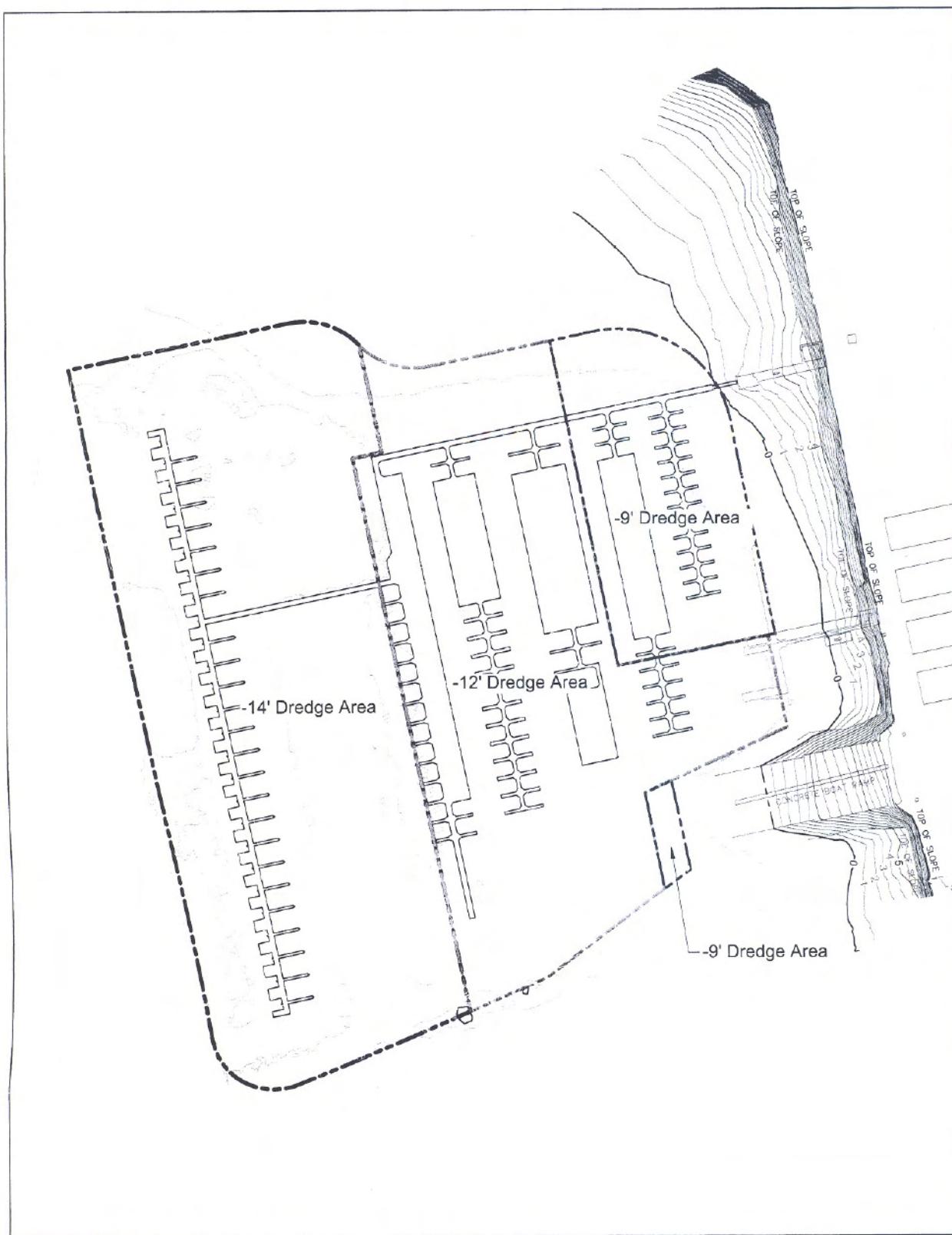


0 300 600
Scale in Feet

EAL 02/12/07 121324-007/dwg

Figure 2

Current Bathymetry and Planned Dredge Areas
Oak Harbor Dredging Project



Source: Base map prepared from electronic files provided by PND 11/09/06.

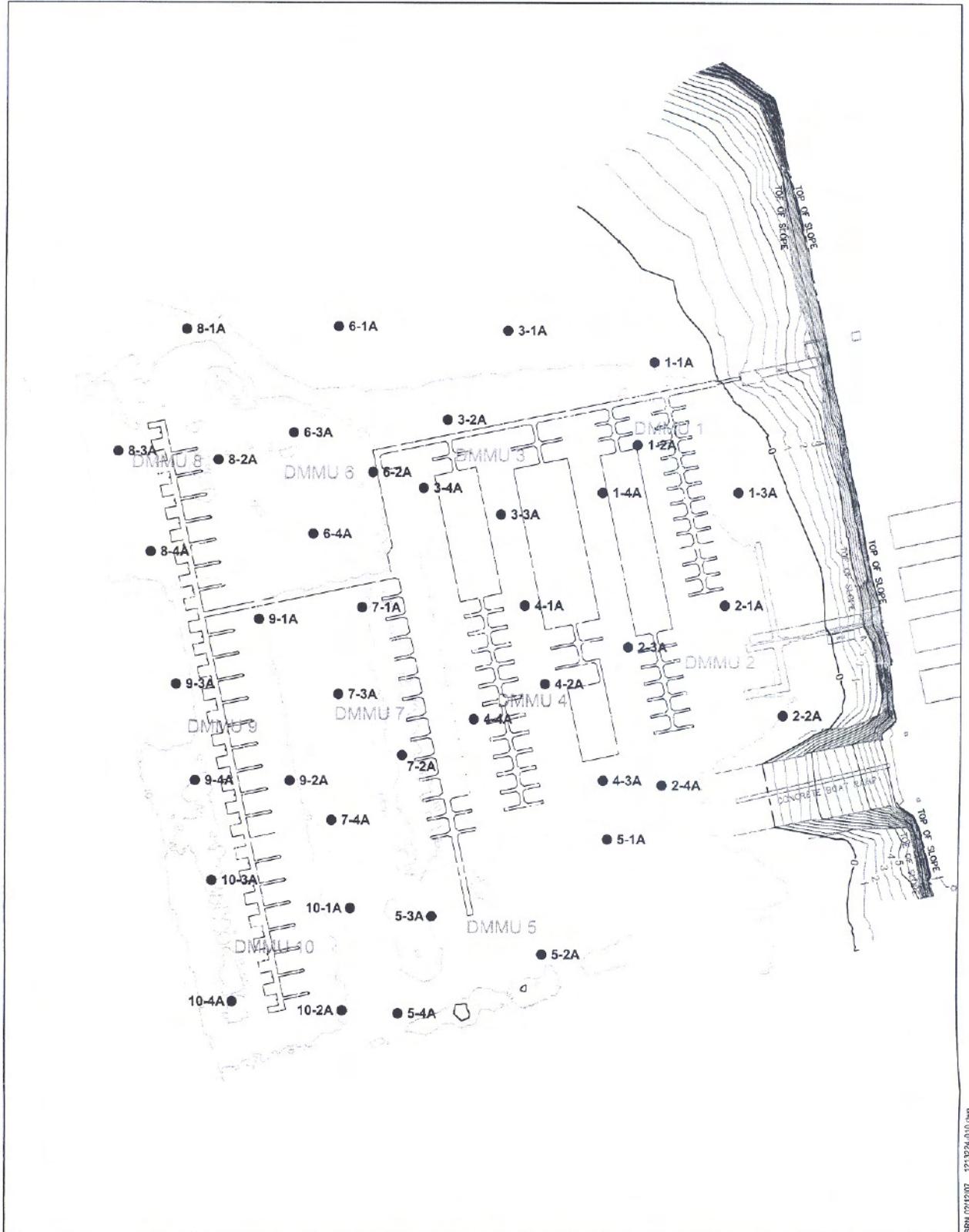
Property Line

- - - - - 14' Dredge Area Boundary (Toe of Slope)
- - - - - 12' Dredge Area Boundary (Toe of Slope)
- - - - - 9' Dredge Area Boundary (Toe of Slope)
- - - - - Bathymetry Contours

0 150 300
Scale in Feet

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Surface DMMU and Core Location Plan Oak Harbor Dredging Project



Source: Base map prepared from electronic files provided by PND 11/09/06. (Coordinate System: HPGN Washington State Plane North, US Foot.)

Property Line

Bathymetry Elevation Contour in Feet

Surface DMMU Boundary (Extent of Dredging)

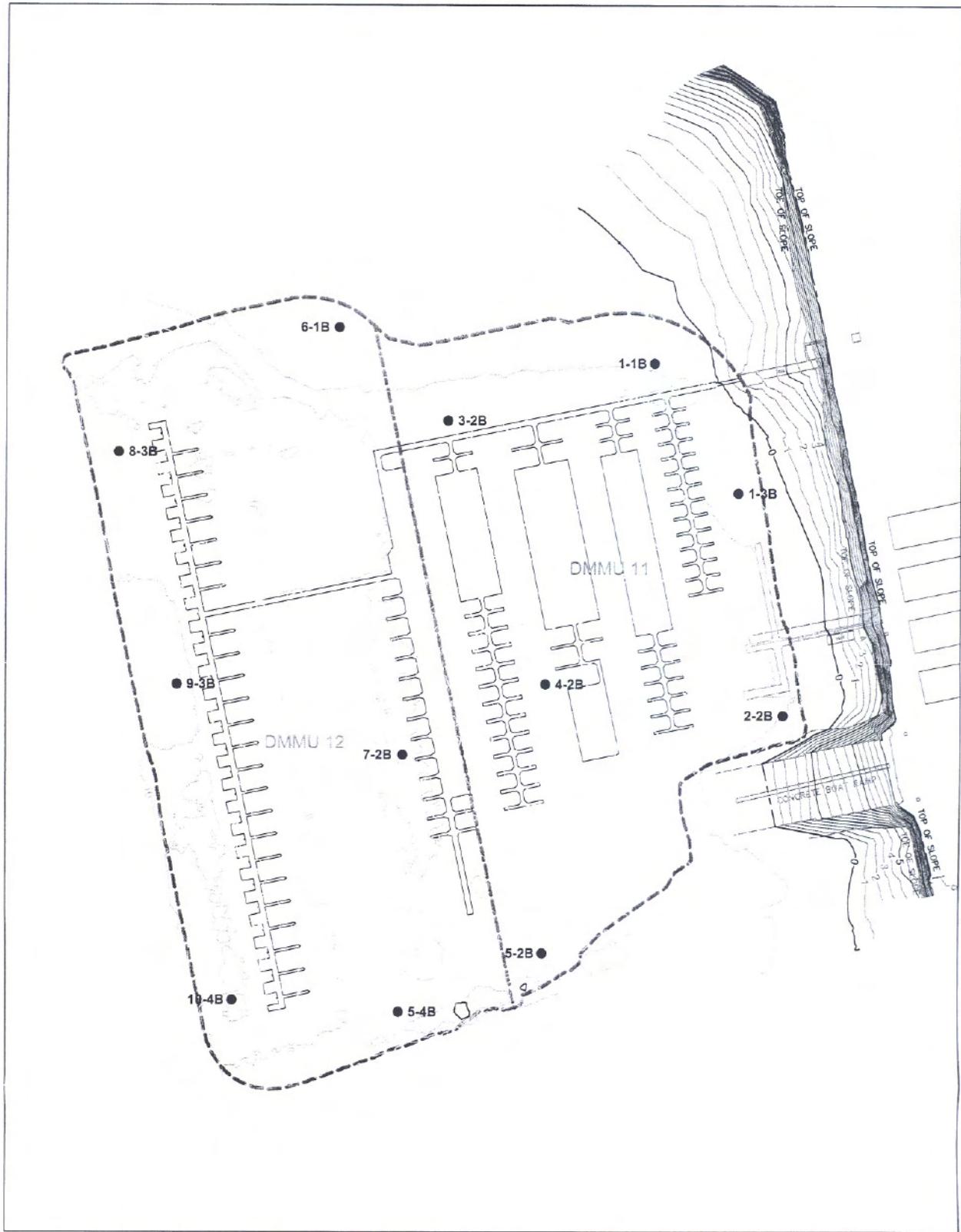
DMMU 2 Surface DMMU Number

● 1-1A Surface Core Location and Number

0 150 300
Scale in Feet

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Figure 4
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Subsurface DMMU and Core Location Plan
Oak Harbor Dredging Project



Source: Base map prepared from electronic files provided by PND 11/09/06.

Property Line

— 10 — Bathymetry Elevation Contour in Feet

— - - Subsurface DMMU Boundary (Extent of Dredging)

DMMU 11 Subsurface DMMU Number

● 1-1B Subsurface Core Location and Number

0 150 300
Scale in Feet

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Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME									DMMU-C1 (0-4 ft)			DMMU-C2 (0-4 ft)			DMMU-C3 (0-4 ft)			DMMU-C4 (0-4 ft)		
	DMMP				SMS				dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	
Antimony	mg/kg	150		200	mg/kg			9.0		uj	10.0		uj	8.0		uj	9.0		uj	
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93	9.0		uj	10.0		uj	8.0		uj	9.0		uj	
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7	0.60			0.80			0.70			0.7			
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270	48.6			58.0			49.5			57.7			
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390	39.6			46.6			37.5			42.7			
Lead	mg/kg	450	975	1,200	mg/kg	450	530	10.0			13.0			9.0			11.0			
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59	0.090			0.200			0.10			0.10			
Nickel	mg/kg	140	370	370	mg/kg	--	--	44.0			52.0			45.0			52.0			
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1	0.50		u	0.60		u	0.50		u	0.50		u	
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960	75.0			88.0			71.0			84			
Tributyltin (porewater as Tin)	ug/L	0.15	0.15		ug/L	0.05		0.019		u	0.021			0.019		u	0.019		u	
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62	3.37	u	
Acenaphthylene	ug/kg	560		1,300	mg/kg-OC	66	66	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62	3.37	u	
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62	3.37	u	
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
Phenanthrene	ug/kg	1,500		21,000	mg/kg-OC	100	480	62	2.0	u	44.0	2.57	j	62	4.49	u	62	3.37	u	
Anthracene	ug/kg	960		13,000	mg/kg-OC	220	1,200	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
2-Methylnaphthalene	ug/kg	670		1,900	mg/kg-OC	38	64	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780	62	2.0	u	44.0	2.57	j	62	4.49	u	62	3.37	u	
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200	34	2.2	j	72	4.21		62	4.49	u	60	6.52	j	
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400	110	7.1		210	12.28		83	12.0		170	18.48		
Benzo(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270	62	2.0	u	57	3.33	j	62	4.49	u	62	3.37	u	
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460	54	3.5	j	110	6.43		35	5.1	j	68	7.39		
Benzofluoranthenes (b+k)	ug/kg	3,200		9,900	mg/kg-OC	230	450	105	6.8		188.0	10.99		51	7.4	j	132	14.35		
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210	62	2.0	u	62.0	3.63		62	4.49	u	33	3.59	j	
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88	62	2.0	u	39.0	2.28	j	62	4.49	u	62	3.37	u	
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33	6.2	0.4		9.8	0.57		6.2	0.45	u	6.2	0.67		
Benzo(g,h,i)perylene	ug/kg	670		3,200	mg/kg-OC	31	78	62	2.0	u	46.0	2.69	j	62	4.49	u	62	3.37	u	
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300	303	9.8		784.0	45.8		169	24.5		463	50.3		
1,3-Dichlorobenzene	ug/kg	170		-	mg/kg-OC			6.2		u	6.2		u	6.2	0.45	u	6.2	0.34	u	
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
Hexachlorobenzene (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3	0.99	0.03	u	0.98	0.03	u	0.98	0.07	u	0.98	0.05	u	
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53	53	10.0	0.6		7.4	0.43		602	43.6	u	6.2	0.34	u	
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62.0	3.37	u	
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62.0	3.37	u	
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64	28.0	0.9	u	33.0	0.96	u	28.0	2.03	u	28.0	1.52	u	
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62.0	3.37	u	
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500	62.0	2.0	u	62.0	1.81	u	62.0	4.49	u	62.0	3.37	u	
Phenol	ug/kg	420		1,200	mg/kg	420	1,200	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
2-Methylphenol	ug/kg	63		77	mg/kg	63	63	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
4-Methylphenol	ug/kg	670		3,600	mg/kg	670	670	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
2,4-Dimethylphenol	ug/kg	29		210	mg/kg	29	29	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
Pentachlorophenol	ug/kg	400	504	690	mg/kg	360	690	31.0	1.0	u	36.0	2.11	u	31	2.2	u	31	1.68	u	
Benzyl alcohol	ug/kg	57		870	mg/kg	57	73	31.0	1.0	u	31.0	0.91	u	31	2.25	u	31	1.68	u	
Benzoic acid	ug/kg	650		760	mg/kg	650	650	620.0	20.0	u	620.0	18.13	u	620	44.9	u	620	33.70	u	
Dibenzofuran	ug/kg	540		1,700		15	58	62.0	2.0	u	62.0	1.81	u	62	4.49	u	62	3.37	u	
Hexachloroethane	ug/kg	1,400		14,000	mg/kg			62.0		u	62.0		u	62	4.49	u	62	3.37	u	
Hexachlorobutadiene	ug/kg	29		270	mg/kg	3.9	6.2	6.2	0.2	u	6.2	0.18	u	6	0.45	u	6.2	0.34	u	
N-Nitrosodiphenylamine	ug/kg	28		130	mg/kg	11	11	6.2	0.2	u	6.2	0.18	u	6.2	0.45	u	6.2	0.34	u	
Trichloroethene	ug/kg	160		1,600				7.8		u	7.4		u	7.4		u	8.2		u	

Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME									DMMU-C1 (0-4 ft)			DMMU-C2 (0-4 ft)			DMMU-C3 (0-4 ft)			DMMU-C4 (0-4 ft)		
	DMMP				SMS				dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	
Tetrachloroethene	ug/kg	57		210					1.6	u	1.5	u	1.5	u	1.6	u	1.6	u		
Ethylbenzene	ug/kg	10		50					1.6	u	1.5	u	1.5	u	1.6	u	1.6	u		
Total Zylene (sum of o-,m-,p-)	ug/kg	40		160					1.6	u	1.5	u	1.5	u	1.6	u	1.6	u		
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69					2.0	u	2.0	u	2.0	u	2.0	u	2.0	u		
Aldrin	ug/kg	10		-					0.99	u	1.0	u	0.98	u	0.98	u	0.98	u		
Chlordane (alpha)	ug/kg	10	37	-					0.99	u	1.0	u	0.98	u	0.98	u	0.98	u		
Dieldrin	ug/kg	10							2.0	u	2.0	u	2.0	u	2.0	u	2.0	u		
Heptachlor	ug/kg	10		-					0.99	u	1.0	u	0.98	u	0.98	u	0.98	u		
Gamma-BHC (Lindane)	ug/kg	10		-					0.99	u	1.0	u	0.98	u	0.98	u	0.98	u		
Total PCBs	ug/kg	130	38***	3,100	mg/kg-OC	12	65	20.0	0.65	u	20.0	0.58	u	19.0	1.4	u	20.0	1.1	u	
Total Solids	%							53.0		47.6		57.0		52.2						
Total Volatile Solids	%							4.5		5.03		3.7		4.29						
Total Organic Carbon	%							1.55		1.71		0.69		0.92						
Total Ammonia	mg/kg							83.3		81.80		37.8		38						
Total Sulfides	mg/kg							417.0		427.0		238		318						
Gravel	%							0.3		0		0.1		0						
Sand	%							11.9		2.5		16.0		3.9						
Silt	%							56.9		61.6		56.3		61.5						
Clay	%							30.9		35.7		27.5		34.6						
Fines (percent silt + clay)	%							87.8		97.3		83.8		96.1						
Eohaustorius estuarium hits:																				
Mytilus galloprovincialis hits:																				
Neanthes arenaceodentata hits:																				
Bioassay Determination: (Pass/Fail)								NP		NP		NP		NP						
BTs exceeded:								NO		NO		NO		NO						
Bioaccumulation conducted:								NO		NO		NO		NO						
Bioaccumulation Determination:								NO		NO		NO		NO						
ML Rule exceeded:								NO		NO		NO		NO						
PSDDA Determination/SMS BU Determination:								Suitable	Suitable BU	Suitable	Suitable BU	Suitable	Suitable BU	Suitable	Suitable	Suitable BU	Suitable	Suitable BU		
DMMU Volume:	cy							15,840		15,840		15,840		15,840		15,840		15,840		
Rank (L, LM, M, H):								M		M		M		M		M		M		
Number cores/composited analysis (DMMU)								4		4		4		4		4		4		
Maximum core sampling depth								8		8		10		5		5		5		
Mean core sampling depth	ft							5.5		4.75		6.5		5.0		5.0		5.0		
DMMU ID:								DMMU-C1			DMMU-C2			DMMU-C3			DMMU-C4			

Legend:

SL / SQS = Screening Level or Sediment Quality Standard exceedance

Suitable - UCOWD/BU = Suitable for UCOWD & Beneficial Use

Unsuitable (B) = Unsuitable without toxicity Testing

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

U = Undetected at the method detection limit

J = Estimate

NP = Not performed

TOC normalized (* 1/2 dL for U)

Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME									DMMU-C5 (0-4 ft)			DMMU-C6 (0-4 ft)			DMMU-C7 (0-4 ft)			DMMU-C8 (0-4 ft)			DMMU-C9 (0-4 ft)		
	DMMP				SMS				dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS
Antimony	mg/kg	150		200	mg/kg			8.0	uj	8.0	uj	9.0	uj	8.0	uj	9.0	uj	9.0	uj	9.0	uj	9.0	uj
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93	8.0	uj	8.0	uj	9.0	uj	8.0	uj	9.0	uj	8.0	uj	9.0	uj	9.0	uj
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7	0.60		0.6		0.60		0.6		0.60		0.6		0.60		0.60	
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270	51.5		48.1		47.6		48.8		53.7							
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390	37.2		33.8		33.3		20.6		38.5							
Lead	mg/kg	450	975	1,200	mg/kg	450	530	8.0		6.0		7.0		6.0		8.0		6.0		8.0		6.0	
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59	0.08		0.12		0.012		0.06		uj	0.08						
Nickel	mg/kg	140	370	370	mg/kg	--	--	47.0		42.0		43.0		45.0									49.0
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1	0.50	u	0.50	u	0.50	u	0.50	u	0.50	u	0.50	u	0.50	u	0.50	
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960	71.0		62		66.0		61		76.0							
Tributyltin (porewater as Tin)	ug/L	0.15	0.15		ug/L	0.05		0.019	u	0.019	u	0.019	u	0.019	u	0.019	u	0.019	u	0.019	u	0.019	
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	5.32	u	
Acenaphthylene	ug/kg	560		1,300	mg/kg-OC	66	66	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	5.32	u	
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	2.79	u	
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	5.32	u	
Phenanthrene	ug/kg	1,500		21,000	mg/kg-OC	100	480	61	2.35	u	62	4.43	u	46	4.79	j	62	5.04	u	61	5.32	u	
Anthracene	ug/kg	960		13,000	mg/kg-OC	220	1,200	61	2.35	u	62	4.43	u	43	4.48	j	62	5.04	u	61	0.58	u	
2-Methylnaphthalene	ug/kg	670		1,900	mg/kg-OC	38	64	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	5.32	u	
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780	61	2.35	u	62	4.43	u	89	9.27	j	62	5.04	u	62	12.13	u	
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200	34	2.6	j	62	4.43	u	150	15.6		62	5.04	u	40	1.1	j	
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400	99	7.6		69	9.86		260	27.1		62	5.04	u	67	1.1		
Benzo(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270	61	2.35	u	62	4.43	u	59	6.15	j	62	5.04	u	61	0.53	u	
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460	41	3.2	j	62	4.43	u	95	9.90		62	5.04	u	61	0.53	u	
Benzofluoranthenes (b+k)	ug/kg	3,200		9,900	mg/kg-OC	230	450	60	4.6	j	62	4.43	u	104	10.8		62	5.04	u	32	0.2	j	
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210	61	2.35	u	62	4.43	u	41	4.27	j	62	5.04	u	61	0.53	u	
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	5.32	u	
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33	6.1	0.23	u	62	0.44	u	6.2	0.32	u	6.2	0.50	u	6.7	10.6		
Benzo(g,h,i)perylene	ug/kg	670		3,200	mg/kg-OC	31	78	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	0.53	u	
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300	234	18.0		69	9.86		709	73.9		62	5.04	u	139	7.5		
1,3-Dichlorobenzene	ug/kg	170	-		mg/kg-OC			6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	5.32	u	
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	5.32	u	
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	2.44	u	
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	5.32	u	
Hexachlorobenzene (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3	0.98	0.04	u	0.98	0.07	u	0.98	0.05	u	1.0	0.08	u	1.0	0.53	u	
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53	53	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	6.46	u	
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110	61.0	2.35	u	62.0	4.43	u	62.0	3.23	u	62.0	5.04	u	61.0	2.62	u	
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700	61.0	2.35	u	62.0	4.43	u	51.0	2.66	u	62.0	5.04	u	61.0	53.23	u	
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64	26.0	1.00	u	6.2	0.44	u	26.0	1.35	u	26.0	2.11	u	6.1	5.32	u	
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78	61.0	2.35	u	62.0	4.43	u	62.0	3.23	u	62.0	5.04	u	43.0	5.32	u	
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500	61.0	2.35	u	62.0	4.43	u	62.0	3.23	u	62.0	5.04	u	61.0	0.53	u	
Phenol	ug/kg	420		1,200	mg/kg	420	1,200	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	0.53	u	
2-Methylphenol	ug/kg	63		77	mg/kg	63	63	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	28	0.61		
4-Methylphenol	ug/kg	670		3,600	mg/kg	670	670	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	0.12	u	
2,4-Dimethylphenol	ug/kg	29		210	mg/kg	29	29	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	0.12	u	
Pentachlorophenol	ug/kg	400	504	690	mg/kg	360	690	31	1.2	u	58	4.14	u	31	1.61	u	31	2.52	u	74	0.12	u	
Benzyl alcohol	ug/kg	57		870	mg/kg	57	73	31	1.19	u	31	2.21	u	31	1.61	u	31	2.52	u	30	0.17	u	
Benzoic acid	ug/kg	650		760	mg/kg	650	650	610	23.5	u	620	44.3	u	620	32.29	u	620	50.41	u	610	0.09	u	
Dibenzofuran	ug/kg	540		1,700		15	58	61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	0.09	u	
Hexachloroethane	ug/kg	1,400		14,000	mg/kg			61	2.35	u	62	4.43	u	62	3.23	u	62	5.04	u	61	0.17	u	
Hexachlorobutadiene	ug/kg	29		270	mg/kg	3.9	6.2	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	0.09	u	
N-Nitrosodiphenylamine	ug/kg	28		130	mg/kg	11	11	6.1	0.23	u	6.2	0.44	u	6.2	0.32	u	6.2	0.50	u	6.1	0.09	u	
Trichloroethene	ug/kg	160		1,600				7.2	u	6.3	u	7.3	u	7.2	u	7.0	u						

Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME									DMMU-C5 (0-4 ft)			DMMU-C6 (0-4 ft)			DMMU-C7 (0-4 ft)			DMMU-C8 (0-4 ft)			DMMU-C9 (0-4 ft)		
	DMMP				SMS				dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ									
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS
Tetrachloroethene	ug/kg	57		210					1.4		u	1.2		u	1.4		u	1.4		u	1.4		u
Ethylbenzene	ug/kg	10		50					1.4		u	1.2		u	1.4		u	1.4		u	1.4		u
Total Zylene (sum of o-,m-,p-)	ug/kg	40		160					1.4		u	1.2		u	1.4		u	1.4		u	1.4		u
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69					2.0		u	2.0		u									
Aldrin	ug/kg	10		-					0.98		u	0.98		u	0.98		u	1.0		u	1.0		u
Chlordane (alpha)	ug/kg	10	37	-					0.98		u	0.98		u	0.98		u	1.0		u	1.0		u
Dieldrin	ug/kg	10							2.0		u	2.0		u									
Heptachlor	ug/kg	10		-					0.98		u	0.98		u	0.98		u	1.0		u	1.0		u
Gamma-BHC (Lindane)	ug/kg	10		-					0.98		u	0.98		u	0.98		u	1.0		u	1.0		u
Total PCBs	ug/kg	130	38***	3,100	mg/kg-OC	12	65	20.0	0.77	u	19.0	1.4	u	20.0	1.04	u	20.0	1.6	u	20.0	1.7	u	
Total Solids	%							54.3			59.2			57.3			60.4			54.9			
Total Volatile Solids	%							4.0			3.75			3.6			2.95			3.6			
Total Organic Carbon	%							1.30			0.7			0.96			0.615			0.573			
Total Ammonia	mg/kg							36			54			60			47			27.4			
Total Sulfides	mg/kg							247			61.4			548			623			336			
Gravel	%							0.1			1.9			1.8			0.2			0.1			
Sand	%							10.2			13.0			15.2			6.8			5.3			
Silt	%							55.6			57.4			58.4			66.7			56.5			
Clay	%							34.1			27.6			24.6			26.3			38.1			
Fines (percent silt + clay)	%							89.7			85.0			83.0			93.0			94.6			
Eohaustorius estuarium hits:																							
Mytilus galloprovincialis hits:																							
Neanthes arenaceodentata hits:																							
Bioassay Determination: (Pass/Fail)								NP			NP			NP			NP			NP			
BTs exceeded:								NO			NO			NO			NO			NO			
Bioaccumulation conducted:								NO			NO			NO			NO			NO			
Bioaccumulation Determination:								NO			NO			NO			NO			NO			
ML Rule exceeded:								NO			NO			NO			NO			NO			
PSDDA Determination/SMS BU Determination:								Suitable	Suitable BU		Suitable	Suitable BU		Suitable	Suitable BU		Suitable	Suitable BU		Suitable	Suitable BU		
DMMU Volume:	cy							15,840			15,840			15,840			15,840			15,840			
Rank (L, LM, M, H):								M			M			M			M			M			
Number cores/composited analysis (DMMU)								4			4			4			4			4			
Maximum core sampling depth								9			12.5			5			7			5			
Mean core sampling depth	ft							6.5			6.375			5.0			5.5			5.0			
DMMU ID:									DMMU-C5			DMMU-C6			DMMU-C7			DMMU-C8			DMMU-C9		

Legend:

SL / SQS = Screening Level or Sediment Quality Standard exceedance

Suitable - UCOWD/BU = Suitable for UCOWD & Beneficial Use

Unsuitable (B) = Unsuitable without toxicity Testing

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

U = Undetected at the method detection limit

J = Estimate

NP = Not performed

TOC normalized (* 1/2 dL for U)

Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME							DMMU-C10 (0-4 ft)		DMMU-C11 (subsurf)		DMMU-C12 (subsurf)		Totals:		
	DMMP			SMS			dry wgt	mg/kg-OC	VO	dry wgt	mg/kg-OC	VO			
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS		
Antimony	mg/kg	150		200	mg/kg			9.0		uj	8.0		uj	7.0	uj
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93	9.0		uj	8.0		uj	7.0	uj
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7	0.7			0.50			0.4	
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270	62.6			49.3			38.1	
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390	45.9			32.2			22.1	
Lead	mg/kg	450	975	1,200	mg/kg	450	530	10.0			9.0			3.0	u
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59	0.08			0.08			0.05	u
Nickel	mg/kg	140	370	370	mg/kg	--	--	55.0			44.0			35.0	
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1	0.60		u	0.50		u	0.40	u
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960	83			66.4			46	
Tributyltin (porewater as Tin)	ug/L	0.15	0.15		ug/L	0.05		0.019		u	0.019		u	0.019	u
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170	61	3.12	u	61	2.77	u	62	10.8 u
Acenaphthylene	ug/kg	560		1,300	mg/kg-OC	66	66	61	3.12	u	61	2.77	u	62	10.8 u
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57	61	3.12	u	61	2.77	u	62	10.8 u
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79	61	3.12	u	61	2.77	u	62	10.8 u
Phenanthrene	ug/kg	1,500		21,000	mg/kg-OC	100	480	61	3.12	u	61	2.77	u	62	10.8 u
Anthracene	ug/kg	960		13,000	mg/kg-OC	220	1,200	61	3.12	u	61	2.77	u	62	10.8 u
2-Methylnaphthalene	ug/kg	670		1,900	mg/kg-OC	38	64	61	3.12	u	61	2.77	u	62	10.8 u
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780	61	3.12	u	61	2.77	u	62	10.8 u
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200	61	3.12	u	32	2.91	j	62	10.8 u
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400	64	6.54		82	7.45		62	10.8 u
Benzo(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270	61	3.12	u	61	2.77	u	62	10.8 u
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460	61	3.12	u	34	3.09	j	62	10.8 u
Benzo[fluoranthenes (b+k)]	ug/kg	3,200		9,900	mg/kg-OC	230	450	61	3.12	u	37	3.36	j	62	10.8 u
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210	61	3.12	u	61	2.77	u	62	10.8 u
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88	61	3.12	u	61	2.77	u	62	10.8 u
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Benzo(g,h,i)perylene	ug/kg	670		3,200	mg/kg-OC	31	78	61	3.12	u	61	2.77	u	62	10.8 u
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300	64	6.54		185	16.8		62	10.8 u
1,3-Dichlorobenzene	ug/kg	170		-	mg/kg-OC			6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Hexachlorobenzene (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3	0.99	0.05	u	0.97	0.04	u	0.95	0.2 u
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53	53	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110	61.0	3.12	u	61.0	2.77	u	62.0	10.8 u
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700	61.0	3.12	u	61.0	2.77	u	62.0	10.8 u
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78	61.0	3.12	u	61.0	2.77	u	62.0	10.8 u
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500	61.0	3.12	u	61.0	2.77	u	62.0	10.8 u
Phenol	ug/kg	420		1,200	mg/kg	420	1,200	61.0	3.12	u	61	2.77	u	62	10.8 u
2-Methylphenol	ug/kg	63		77	mg/kg	63	63	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
4-Methylphenol	ug/kg	670		3,600	mg/kg	670	670	61	3.12	u	61	2.77	u	62	10.8 u
2,4-Dimethylphenol	ug/kg	29		210	mg/kg	29	29	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Pentachlorophenol	ug/kg	400	504	690	mg/kg	360	690	58	2.96	u	34	3.09		58	10.1 u
Benzyl alcohol	ug/kg	57		870	mg/kg	57	73	31	1.58	u	31	1.41	u	31	5.4 u
Benzoic acid	ug/kg	650		760	mg/kg	650	650	610	31.15	u	610	27.73	u	620	107.6 u
Dibenzofuran	ug/kg	540		1,700		15	58	61	3.12	u	61	2.77	u	62	10.8 u
Hexachloroethane	ug/kg	1,400		14,000	mg/kg			61	3.12	u	61	2.77	u	62	10.8 u
Hexachlorobutadiene	ug/kg	29		270	mg/kg	3.9	6.2	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
N-Nitrosodiphenylamine	ug/kg	28		130	mg/kg	11	11	6.1	0.31	u	6.1	0.28	u	6.2	1.1 u
Trichloroethene	ug/kg	160		1,600				5.9		u	6.1		u	5.0	u

Table 3. Oak Harbor Municipal Marina DMMP Characterization Summary

CHEMICAL NAME							DMMU-C10 (0-4 ft)		DMMU-C11 (subsurf)		DMMU-C12 (subsurf)		Totals:			
	DMMP			SMS			dry wgt	mg/kg-OC	VQ	dry wgt	mg/kg-OC	VQ				
	Units	SL	BT	ML	Units	SQS	CSL	DMMP/SMS	SMS	DMMP/SMS	SMS	DMMP/SMS	SMS			
Tetrachloroethene	ug/kg	57		210				1.2	u	1.2	u	1.0	u			
Ethylbenzene	ug/kg	10		50				1.2	u	1.2	u	1.0	u			
Total Zylene (sum of o-,m-,p-)	ug/kg	40		160				1.2	u	1.2	u	1.0	u			
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69				2.0	u	2.0	u	1.9	u			
Aldrin	ug/kg	10		-				0.99	u	0.97	u	0.95	u			
Chlordane (alpha)	ug/kg	10	37	-				0.99	u	0.97	u	0.95	u			
Dieldrin	ug/kg	10						2.0	u	2.0	u	1.9	u			
Heptachlor	ug/kg	10		-				0.99	u	0.97	u	0.95	u			
Gamma-BHC (Lindane)	ug/kg	10		-				0.99	u	0.97	u	0.95	u			
Total PCBs	ug/kg	130	38***	3,100	mg/kg-OC	12	65	20.0	1.02	u	20.0	0.9	u	19.0	3.3	u
Total Solids	%							52.1		61.9		71.0				
Total Volatile Solids	%									4.06		3.65		2.02		
Total Organic Carbon	%										0.979		1.10		0.288	
Total Ammonia	mg/kg										28.9		75		23.3	
Total Sulfides	mg/kg										50.8		226		38	
Gravel	%							0.3		0.9		1.2				
Sand	%							2.9		17.2		15.8				
Silt	%							58.8		55.7		62.7				
Clay	%							38.2		26.3		20.2				
Fines (percent silt + clay)	%							97.0		82.0		82.9				
Eohaustorius estuarinus hits:																
Mytilus galloprovincialis hits:																
Neanthes arenaceodentata hits:																
Bioassay Determination: (Pass/Fail)								NP		NP		NP				
BTs exceeded:								NO		NO		NO				
Bioaccumulation conducted:								NO		NO		NO				
Bioaccumulation Determination:																
ML Rule exceeded:								NO		NO		NO				
PSDDA Determination/SMS BU Determination:								Suitable	Suitable BU	Suitable	Suitable BU	Suitable	Suitable BU			
DMMU Volume:	cy							15,840		23,800		23,800				206,000
Rank (L, LM, M, H):								M		M		M				
Number cores/composited analysis (DMMU)								4		6		6				
Maximum core sampling depth								5.0		13		15				
Mean core sampling depth	ft							5.0		6.75		7.75				
DMMU ID:									DMMU-C10	DMMU-C11	DMMU-C12					

Legend:

SL / SQS = Screening Level or Sediment Quality Standard exceedance

Suitable - UCOWD/BU = Suitable for UCOWD & Beneficial Use

Unsuitable (B) = Unsuitable without toxicity Testing

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

U = Undetected at the method detection limit

J = Estimate

NP = Not performed

TOC normalized (* 1/2 dL for U)



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PND, INCORPORATED
SEATTLE

MEMORANDUM

DATE: December 12, 2006

TO: David Kendall, Ph.D.
Chief, Dredged Material Management Office

FROM: Roger McGinnis, Hart Crowser, Inc.

RE: *Jon H for R. McGinnis*
Oak Harbor Municipal Marina DMMP SAP Review Comments
12132-24

This memorandum constitutes responses to Dredged Material Management Program (DMMP) comments dated December 6, 2006 on the draft Sampling and Analysis Plan (SAP) for maintenance dredging at the Oak Harbor Municipal Marina.

These responses to comments are incorporated into the SAP by reference.

DMMP REVIEW COMMENTS

- 1. Page 2, Site History. Why is there no reference to the 1996 DMMP characterization of the Oak Harbor Marina? The DMMP records show a dredging project (application # 199700550) of 27,000 cy was characterized and permitted with two dredged material management units. The suitability determination date 6 February 1997 found all 27,000 cy suitable for unconfined-open-water disposal, and the project was ranked moderate for testing purposes. I have not been able to verify whether dredging at the marina ever took place. Please clarify the site history relative to this issue.*

The basin was originally dredged and a large concrete launch and retrieval ramp were constructed by the Navy as part of the former seaplane base. We believe the last Navy dredging was completed around 1942. Exact final extents of Navy dredging are unknown, but the existing marina was constructed within the previous Navy basin.

A DMMP characterization was performed in 1996 and material was found suitable for unconfined-open-water disposal in 1997 (application # 199700550). In 1998-1999 the referenced material was dredged as part of the relocation and extension of "F" dock (Waveguard floating wave barrier with integral 40' slips). This work would have been located along the western (offshore) edge of the



currently proposed project extents (area included within current surface DMMU's 8, 9, & 10, offshore sub-surface DMMU, proposed -14' dredge area).

To the best of our current knowledge this is the extent of historic dredging which has taken place within the proposed project area.

2. *Page 3, Site History, second paragraph. The discussion of the temporary relocation of F Dock to accomplish "badly needed dredging". The SAP does not review this dredging. Was this the critical dredging associated with the DMMP characterization referenced in 1 above? The text on page 2 states that no maintenance dredging has occurred since the early to mid-1940s. Please clarify what the dredging history is for this project. It is very confusing as written.*

See response to Comment 1, above.

3. *Page 3, fifth paragraph, last sentence. The property adjacent to the Marina, now leased by Mariners Haven, is stated to be used as a boat repair yard. Please specify what kind of boat repairs or activities are conducted at this location.*

Mariners Haven performs minor maintenance and repairs including engine overall, primarily on small to mid-size pleasure craft. No in-water or over-water work is performed at the facility. All maintenance and repairs are performed in their shop and adjacent upland area.

4. *Page 20, paragraph 8.3. The text should be modified to state than an amphipod species will be selected based on the sediment grain size characteristics measured. For the most part the likely primary species for consideration would be Eohaustorius estuarius, although Rhepoxynius abronius and Ampelisca abdita are also currently listed as alternative species, that may be used for testing after approval from the DMMP/DMMO.*

The comment is accepted and will be incorporated into the SAP by reference.

5. *Page 1, first paragraph. The sediment larval test will involve selection of an appropriate bivalve (*Mytilus galloprovincialis*) or echinoderm (*Dendraster excentricus*) species.*

The comment is accepted and will be incorporated into the SAP by reference. (Because of interbreeding between *M. galloprovincialis* and *M. trossulus* in the project area, we would prefer to refer to the mussel as *Mytilus* sp.).