CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD May 21, 2012

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE PORT OF BROWNSVILLE MARINA, BROWNSVILLE, KITSAP COUNTY EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UNCONFINED OPEN-WATER DISPOSAL AT THE ELLIOTT BAY NONDISPERSIVE SITE.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the suitability of up to 17,500 cubic yards (cy) of dredged material from the Port of Brownsville Marina for open-water disposal at the Elliott Bay nondispersive site.

2. Background. The project site is located on property owned by the Port of Brownsville in Kitsap County on Port Orchard Bay in Puget Sound (Figure 1). The Brownsville Port District was formed in 1920 and in the early 1970s the docks were expanded and a breakwater was built creating the basic marina configuration that currently exists. There is no known history of industrial use of the site. A suitability determination memorandum (DMMP, 1993) was prepared for removal of approximately 10,000 cy of maintenance dredging material from the marina. Analysis for 58 chemicals of concern revealed no concentrations above screening levels and the sediment was approved for open-water disposal.

3. Project Summary. Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	Moderate
Proposed dredging volume	17,500 cubic yards
Proposed dredging depth	-10 feet MLLW (including 1-foot of overdepth)
1st draft SAP received	September 6, 2011
Comments provided on 1st draft SAP	September 17, 2011
2nd draft SAP received	October 17, 2011
Comments provided on 2nd draft SAP	October 19, 2011
Final SAP received	November 8, 2011
SAP approved	November 9, 2011
Sampling dates	November 30 – December 1, 2011
Draft data report received	March 22, 2012
Comments provided on draft report	March 30, 2012
Final data report received	April 27, 2012

DAIS Tracking number	BROWN-1-A-F-323
USACE Permit Application Number	NWS-2011-411
Recency Determination (moderate = 5 years)	December 2016

4. Project Ranking and Sampling Requirements. This project was ranked "moderate" by the DMMP agencies according to the guidelines set out in the User's Manual for marinas. In a moderate-ranked area the number of samples and analyses are calculated using the following guidelines (DMMP, 2008a):
    - Maximum volume of sediment represented by each field sample = 4,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 16,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 24,000 cubic yards

    This project involves dredging in two areas. Maintenance dredging of 13,000 cy of material from the surface within the existing marina, forming DMMU 1, is represented by a composite of six sediment cores. An additional dredging prism for marina expansion includes 4,500 cy of material to a depth of -10 ft (MLLW). Dredging in this area will require removal of more than 4 ft of sediment to reach the design depth of -9 ft MLLW (plus 1-foot of overdepth), which would typically be divided into a surface and sub-surface DMMU. However, due to the low volume in the expansion dredging prism the DMMP agencies agreed that the surface and sub-surface material could be composited together as a single management unit, thus forming DMMU 2.

5. Sampling. Sampling took place November 30 - December 1, 2011 using a Vibracore sampler. Deviations from the DMMP-approved SAP are noted below. Coordinates of the sampling locations are in Table 2 and a map of the project area with sampling locations and DMMU outlines is shown in Figure 2.

Table 2. Sampling Coordinates (NAD83) and Compositing Information

DMMU	Volume (cy)	Sampling Location	Longitude	Latitude	Core interval (ft. MLLW)
1	13,000	M1	-122.61537°	47.65205°	7.3 - 10.3
		M2	-122.61529°	47.65161°	7.7 - 9.7
		M3	-122.61481°	47.65156°	8.1 - 10.1
		M4	-122.61463°	47.65124°	8.6 - 10.6
		M5	-122.61512°	47.65230°	2.4 - 6.4
		M6	-122.61556°	47.65103°	5 - 8
2	4,500	E1	-122.61423°	47.65303°	3.9 - 12.9

The sampling location for DMMU 2, E1, was moved approximately 62 ft from the target sampling location due to difficulty positioning the vessel during sampling, but was still located within the dredge footprint for DMMU 2. The sampling location for station M4 was moved approximately 25 feet from the target sampling location due to human error in counting which boat slip was noted on the target map. This station was still located within the dredge prism of DMMU 1. The DMMP agencies agreed that these changes did not compromise the representativeness of the samples.

There were significant deviations from the DMMP-approved SAP in the way cores were composited (Table 3). Cores M5 and M6 had insufficient depth to characterize DMMU 1, such that sediment composited in the z-samples should have been in the surface samples. Cores M3 and M4 had excessive penetration, such that sediments from the 1-2 foot stratum below the z-sample were composited into the z-sample. Thus, the z-samples for DMMU 1 were a combination of sediments characterizing the dredge prism and sediments characterizing the z-sample. For DMMU 2, the sampling location was moved into deeper water without adjusting the depth of compositing, resulting in the sediments characterizing the z-sample being composited with the surface sample.

After reviewing the deviations from the approved SAP, the DMMP agencies concluded that although these changes have the potential to bias the results, the results of the chemical analysis, discussed below, indicate there was no significant difference between the dredged material and the z-samples. Therefore, the DMMP agencies accepted the collected data as representative of the dredged material.

Table 3. Deviations from Approved Compositing Scheme.

DMMU	Volume (cy)	Core	Surface		Z-sample	
			Target core interval (ft. MLLW)	Actual core interval (ft. MLLW)	Target core interval (ft. MLLW)	Actual core interval (ft. MLLW)
1	13,000	M1	7.3 - 10	7.3 - 10.3	10-12	10.3 – 12.1
		M2	7.7 -10	7.7 - 9.7	10-12	9.7 – 12.1
		M3	8.1 - 10	8.1 - 10.1	10-12	10.1 – 13.8
		M4	8.6 - 10	8.6 - 10.6	10-12	10.6 – 13.9
		M5	2.4 - 10	2.4 - 6.4	10-12	6.4 – 7.6
		M6	5 - 10	5 - 8	10-12	8 – 10.3
2	4,500	E1	3.9 - 10	3.9 - 12.9	10-12	12.9 – 13.3

6. Chemical Analysis. The analysis portion of the approved sampling and analysis plan (MSA, 2011) was followed, with the exceptions noted below, and quality control guidelines specified by the DMMP program were generally met.

The sediment conventional and chemistry results can be found in Table 4. The grain-size data show that the proposed dredged material is sand to silty sand, with a very small clay fraction. The fine fraction (silt + clay) ranged from 7 to 39 percent. The total organic carbon concentration ranged from 0.29 to 0.96 percent.

The chemical results indicated that there were no detected exceedances of screening levels for the standard DMMP chemicals of concern (DMMP, 2011). However, the requirement that reporting limits be below the screening level (SL) was not met for the following constituents: the reporting limit for selenium was above the bioaccumulation trigger (BT) for DMMU 2, the reporting limits for benzoic acid and hexachlorobutadiene were above the SL for DMMU 1, and the reporting limit for 2,4-dimethylphenol was above the SL for both DMMU 1 and DMMU 2. None of these compounds were detected in any of the samples at the method detection limits, which were all well below the

SLs and BTs. Therefore, DMMP agencies determined that these chemicals were not likely to be present above the screening levels in these samples and agreed there was no need to conduct bioassays.

Dioxins were also analyzed, with concentrations ranging from 0.93 to 2.24 parts per trillion (pptr) toxicity equivalents (TEQ, with undetects = ½ detection limit). Dioxin results are shown in Table 5.

7. Sediment Exposed by Dredging. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 1995) or the State's antidegradation standard (DMMP, 2008b). For this project, z-samples were taken and analyzed from the two-foot stratum (approximately -10 to -12 feet MLLW) that will be exposed by dredging.

   A comparison of the analytical results from the z-samples to SQS was first attempted. However, the organic carbon content of both z-samples (0.485 and 0.087 percent for DMMUs 1 and 2 respectively) was below the threshold of 0.5 percent that the Department of Ecology recommends for carbon-normalization. Therefore, comparison of z-samples with SQS was not conducted. Instead, the DMMP agencies agreed to use dry weight-normalized marine SLs for comparison with z-samples (DMMP, 2008b).

   The results of this comparison are shown in Table 4. There were no detected exceedances of the SL for any of the chemicals; although there were three instances of undetected exceedances caused by reporting limits exceeding SLs. The reporting limit exceeded the SL for selenium in the z-sample from DMMU 2, and for 2,4-dimethylphenol in the z-samples from both DMMUs. As mentioned above, the analytical laboratory indicated that neither of these compounds were detected in either sample at the method detection limit, which was well below the SLs and BTs. Thus, the DMMP agencies determined that these chemicals were not likely to be present above the screening levels in these samples.

   As demonstrated by the results of the above analysis, the sediment to be exposed by dredging is not considered to be degraded relative to the currently exposed sediment surface. On this basis the DMMP agencies conclude that this project is in compliance with the State of Washington anti-degradation policy.

8. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Port of Brownsville Marina for open-water disposal at the Elliott Bay disposal site. Deviations from the approved sampling and analysis plan were noted above. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

   There were no detected SL exceedances for standard DMMP chemicals of concern. Therefore, with respect to these chemicals, the dredged material is suitable for open-water disposal. With regard to dioxin, the DMMP agencies implemented new interim guidelines for interpreting dioxin data on December 6, 2010 (DMMP, 2010). These interim guidelines state that DMMUs with dioxin concentrations below 10 pptr TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 pptr TEQ. The dioxin concentrations for Port

of Brownsville Marina DMMUs were all below the disposal site management objective of 4 pptr TEQ. Therefore, with respect to dioxin, the dredged material is suitable for open-water disposal at the Elliott Bay site.

In summary, based on the results of the previously described testing, the DMMP agencies conclude that all 17,500 cubic yards from the Port of Brownsville Marina project are suitable for open-water disposal at the Elliott Bay non-dispersive site.

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.

A pre-dredge meeting with DNR, Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting. A DNR site use authorization must also be acquired.

9. References.

DMMP, 2011. *Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in DMMP.* A Clarification Paper prepared by Laura Inouye (Ecology) and David Fox (USACE) for the Dredged Material Management Program, June 2011.

DMMP, 2010. *Dredged Material Management Program New Interim Guidelines for Dioxins*. December 6, 2010.

DMMP, 2008a. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2008.

DMMP, 2008b. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

DMMP, 2003. *Determination on the Suitability of Maintenance Dredged Material Tested for the Port of Brownsville Marina, Kitsap County, Washington (Reference: 199311290) for Disposal at a PSDDA Unconfined Open-Water Disposal Site*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 1993.

Ecology, 1995. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, December 1995.

MSA, 2011. *Sampling Analysis Plan: Port of Brownsville Marina Dredge Project*. Prepared by Marine Surveys and Assessments for the Port of Brownsville, November 2011.

10. Agency Signatures.

Signed SDM is on file in the DMMO project file.

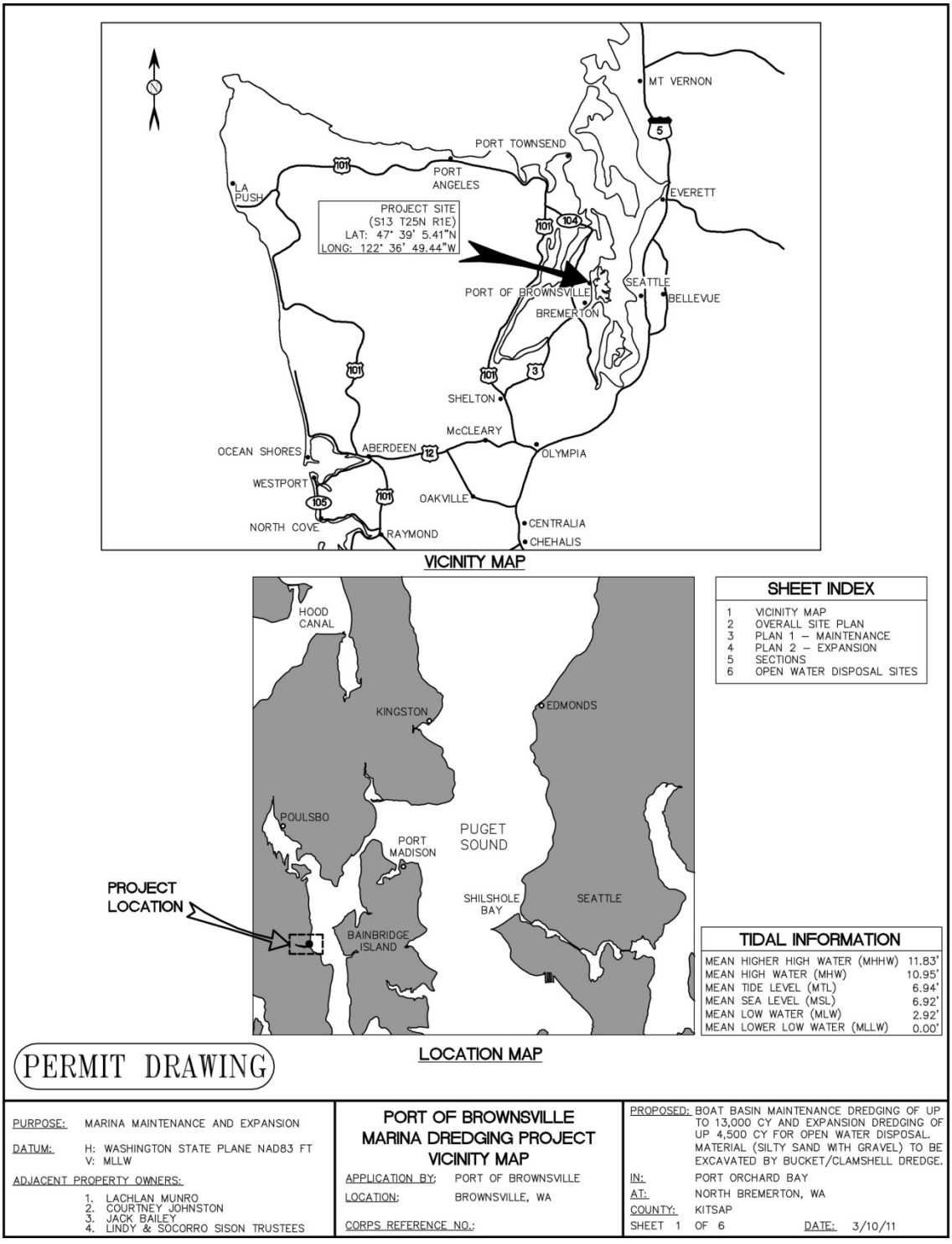
Concur:

_____	_____
Date	Kelsey van der Elst - Seattle District Corps of Engineers
_____	_____
Date	Erika Hoffman - Environmental Protection Agency
_____	_____
Date	Laura Inouye, Ph.D. - Washington Department of Ecology
_____	_____
Date	Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Amy Leitman, Marine Surveys and Assessments
Jerry Rowland, Port of Brownsville
Darren Habel, Seattle District Regulatory

Figure 1. Vicinity Map for Port of Brownsville Marina



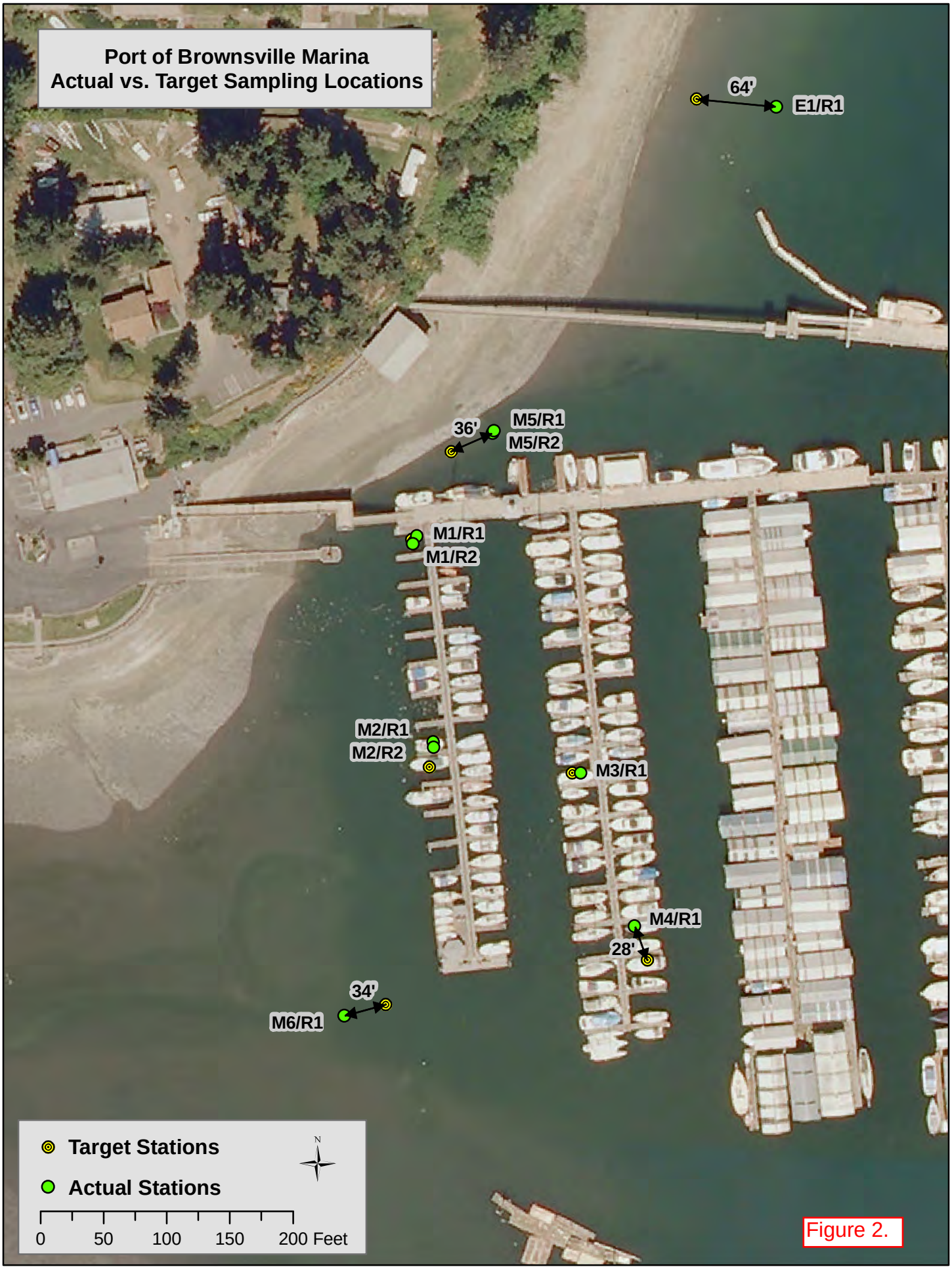

Port of Brownsville Marina
Actual vs. Target Sampling Locations
64'
E1/R1
36'
M5/R1
M5/R2
M1/R1
M1/R2
M2/R1
M2/R2
M3/R1
M4/R1
28'
34'
M6/R1
Target Stations
Actual Stations
N
0
50
100
150
200 Feet

Figure 2.

Table 4. Chemical results compared to DMMP regulatory guidelines.

CHEMICAL	DMMP Guidelines			DMMU 1				DMMU 2			
	SL	BT	ML	surface		Z-sample		surface		Z-sample	
CONVENTIONALS				conc	LQ	conc	LQ	conc	LQ	conc	LQ
Gravel, %				2.9		40.8		16.8		68.3	
Sand, %				57.9		45.5		76.2		23.0	
Silt, %				36.7		13.3		7.0		8.7	
Clay, %				2.5		0.4		0.1		0.1	
Fines (Silt + Clay), %				39.3		13.7		7.1		8.8	
Total Solids, %				61.6		81		80.7		85.9	
Volatile Soilids, %				4.4		1.82		1.69		1.58	
Total Organic Carbon, %				0.962		0.485		0.287		0.087	
Total Sulfides, mg/kg				373		82		9.3			
Total Ammonia, mg N/kg				33.8		17.4		0.85		0.26	j
METALS (mg/kg)											
Antimony	150	---	200	0.7	j	0.5	j	4.7	u	0.3	j
Arsenic	57	507	700	3.4		2.3	j	2.8	j	1.2	j
Cadmium	5.1	11.3	14.0	0.91		0.59		0.44		0.31	
Chromium	260	260	---	24.8		16.4		14.1		15.8	
Copper	390	1,027	1,300	28.9		9.9		6.3		7.1	
Lead	450	975	1,200	9.4		3.3		2.2		0.8	
Mercury	0.41	1.5	2.3	0.052		0.021		0.018		0.005	j
Selenium	---	3	---	2.2	u	*0.5*	*u*	*0.6*	*u*	1.6	u
Silver	6.1	6.1	8.4	0.6	u	0.9	u	0.9	u	0.5	u
Zinc	410	2,783	3,800	54.3		27		18.5		17.2	
PAHs (ug/kg dry)											
Total LPAH	5,200	---	29,000	71.2		1.5	j	25		18	j
Naphthalene	2,100	---	2,400	21	u	10	u	10	u	10	u
Acenaphthylene	560	---	1,300	11	j	3.2	u	8.6	j	3.2	j
Acenaphthene	500	---	2,000	4.5	j	10	u	10	u	10	u
Fluorene	540	---	3,600	6.7	j	2	u	2	j	2	j
Phenanthrene	1,500	---	21,000	28		6.8	j	2.4	j	6.8	j
Anthracene	960	---	13,000	21		6	u	12		6	j
2-Methylnaphthalene	670	---	1,900	21	u	10	u	10	u	10	u
Total HPAH	12,000	---	69,000	738		72		186		223	
Fluoranthene	1,700	4,600	30,000	140		22	u	5.1	j	22	
Pyrene	2,600	11,980	16,000	190		72	j	17		72	
Benzo(a)anthracene	1,300	---	5,100	47		14	u	12		14	
Chrysene	1,400	---	21,000	110		30	u	25		30	
Total benzofluoranthenes	3,200	---	9,900	135		43	u	66		43	
Benzo[a]pyrene	1,600	---	3,600	47		18	u	32		18	
Indeno(1,2,3-c,d)pyrene	600	---	4,400	32		11	u	14		11	
Dibenzo(a,h)anthracene	230	---	1,900	9	j	3	u	3.8	j	3	j
Benzo(g,h,i)perylene	670	---	3,200	28		10	u	11		10	
CHLORINATED BENZENES (ug/kg)											
1,2-Dichlorobenzene	35	---	110	21	u	10	u	10	u	9.9	u
1,4-Dichlorobenzene	110	---	120	21	u	10	u	10	u	9.9	u
1,2,4-Trichlorobenzene	31	---	64	21	u	10	u	10	u	9.9	u
Hexachlorobenzene	22	168	230	8.8	j	10	u	10	u	9.9	u
PHTHALATE ESTERS (ug/kg)											
Dimethyl phthalate	71	---	1,400	3.9	j	1.5	j	1.2	j	1.4	j
Diethyl phthalate	200	---	1,200	21	u	1.3	j	10	u	2	j
Di-n-butyl phthalate	1,400	---	5,100	41	u	11	j	10	j	8.4	j
Butyl benzyl phthalate	63	---	970	21	u	10	u	10	u	9.9	u
Bis(2-ethylhexyl)phthalate	1,300	---	8,300	28	j	100	u	100	u	99	u
Di-n-octyl phthalate	6,200	---	6,200	21	u	10	u	10	u	9.9	u

CHEMICAL	SL	BT	ML	surface		Z-sample		surface		Z-sample	
MISCELLANEOUS EXTRACTABLES (ug/kg)											
Benzoic acid	650	---	760	*200*	*u*	600	u	600	u	600	u
Benzyl alcohol	57	---	870	41	u	20	u	20	u	20	u
Dibenzofuran	540	---	1,700	2.7	j	10	u	10	u	9.9	u
Hexachlorobutadiene	11	---	270	*5.1*	*u*	10	u	10	u	9.9	u
Hexachloroethane	---	---	---	21	u	10	u	10	u	9.9	u
N-Nitrosodiphenylamine	28	---	130	4.5	j	10	u	10	u	9.9	u
PESTICIDES (ug/kg)											
Aldrin	10	---	---	0.59	u	0.62	u	0.58	u	0.58	u
Total Chlordane	3	37	---	0.093	j	0.62	u	0.58	u	0.58	u
Dieldrin	2	---	---	0.59	u	0.62	u	0.58	u	0.58	u
Heptachlor	2	---	---	0.59	u	0.62	u	0.58	u	0.58	u
p,p'-DDE	9	---	---	0.11	j	0.62	u	0.58	u	0.58	u
p,p'-DDD	16	---	---	0.59	u	0.62	u	0.58	u	0.58	u
p,p'-DDT	5	---	---	0.59	u	0.27	j	0.58	u	0.58	u
Total DDT		50	69	0.11	j	0.27	j	0.58	u	0.58	u
PCBs (ug/kg)											
Total PCBs	130	---	3,100	17	u	13	u	13	u	12	u
Total PCBs (mg/kg OC)	---	38	---								
PHENOLS (ug/kg)											
Phenol	420	---	1,200	13	j	3.1	j	3.2	j	2.7	j
2 Methylphenol	63	---	77	21	u	10	u	10	u	9.9	u
4 Methylphenol	670	---	3,600	5.9	j	10	u	10	u	9.9	u
2,4-Dimethylphenol	29	---	210	*12*	*u*	*5.5*	*u*	*5.5*	*u*	*5.5*	*u*
Pentachlorophenol	400	504	690	210	u	100	u	100	u	99	u
DIOXIN (TEQ)											
Dioxins/Furans				2.24				0.93	u		
DMMP DETERMINATION											
DMMU volume, cy				13,000				4,500			
Rank				Moderate				Moderate			
Determination				pass				pass			
Mean sample depth (ft MLLW)				-7.9				-8.4			
Maximum sampling depth (ft MLLW)				-10.6				-12.9			
	SL	**BT**	**ML**	**DMMU 1**				**DMMU 2**			

LQ = laboratory qualifier
j = estimated concentration
u = undetected
SL = screening level
BT = bioaccumulation trigger
ML = maximum level
reported at the MDL

Table 5. Results of Dioxins/Furans analysis

ANALYTE	WHO (05) TEF	DMMU 1			DMMU 2		
		ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
1,2,3,4,6,7,8-HpCDD	0.01	56.3		0.563	3		0.030
1,2,3,4,6,7,8-HpCDF	0.01	4.86		0.049	0.601		0.006
1,2,3,4,7,8,9-HpCDF	0.01	0.585	u	0.003	0.274	u	0.001
1,2,3,4,7,8-HxCDD	0.1	0.798	u	0.040	0.437	u	0.022
1,2,3,4,7,8-HxCDF	0.1	0.47	u	0.024	0.262	u	0.013
1,2,3,6,7,8-HxCDD	0.1	1.8		0.180	0.384	u	0.019
1,2,3,6,7,8-HxCDF	0.1	0.418	u	0.021	0.233	u	0.012
1,2,3,7,8,9-HxCDD	0.1	2.08		0.208	0.39	u	0.020
1,2,3,7,8,9-HxCDF	0.1	0.566	u	0.028	0.315	u	0.016
1,2,3,7,8-PeCDD	1	0.937	u	0.469	0.742	u	0.371
1,2,3,7,8-PeCDF	0.03	0.374	u	0.006	0.523	u	0.008
2,3,4,6,7,8-HxCDF	0.1	0.614		0.061	0.267	u	0.013
2,3,4,7,8-PeCDF	0.3	0.398	u	0.060	0.556	u	0.083
2,3,7,8-TCDD	1	0.67	u	0.335	0.585	u	0.293
2,3,7,8-TCDF	0.1	0.588	u	0.029	0.364	u	0.018
OCDD	0.0003	519		0.156	28.6		0.009
OCDF	0.0003	16.4		0.005	2.18		0.001
Total TEQ (U= 1/2 EDL)				2.24			0.93
Total TEQ (U= 0)				1.22			0.05

LQ = laboratory qualifier
u = undetected