CENWS-OD-TS-NR

MEMORANDUM FOR: RECORD January 5, 2017

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE SANDY HOOK MARINA, WHIDBEY ISLAND, WASHINGTON, EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UNCONFINED OPEN-WATER DISPOSAL AT THE PORT GARDNER NON-DISPERSIVE DISPOSAL 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 44,300 cubic yards (cy) of dredged material from Sandy Hook Marina (Figure 1)--owned by Sandy Hook Yacht Club Estates--for open-water disposal at the Port Gardner non-dispersive site and for compliance with the State of Washington Antidegradation Standard.

2. Background. Characterization and dredging of the Sandy Hook navigation channel last occurred in 2002 and 2004, respectively. The characterization performed prior to the most recent channel dredging in 2004 did not indicate the presence of any known contamination at or above the appropriate thresholds for contamination specified in the Model Toxics Control Act (MTCA) or Puget Sound Dredged Disposal Analysis (PSDDA). Material was placed on an adjacent beach for beach nourishment.

3. Project Summary. The current project involves dredging of 44,300 cy from the navigation channel and within the marina proper to restore the project to previously authorized depths. Sedimentation in the channel and marina have rendered the facility unusable for its designated purposes due to unsafe, non-navigable conditions for vessels during much of the daily tide cycle.

Table 1. Project Summary

Project ranking	Moderate
Proposed dredging volume	44,300
Proposed dredging depth	DMMU 1 and 2: -4 ft MLLW DMMU 3 and 4: -3 ft MLLW
1st draft SAP received	March 29, 2016
Comments provided on 1st draft SAP	April 21, 2016
2nd draft SAP received	May 2, 2016
Comments provided on 2nd draft SAP	May 12, 2016
Final SAP received	May 26, 2016
SAP approved	June 7, 2016
Sampling dates	July 12, 2016
Draft data report received	September 1, 2016
Comments provided on draft report Additional report information requested	September 23, 2016 October 14, 2016
Final data report received	October 16, 2016
EIM Study ID	SANDY16
USACE Permit Application Number	To be determined
Recency Expiration (moderate rank = 5 years)	July 2021

4. Project Ranking and Sampling Requirements. This project was ranked "moderate" by the DMMP agencies according to the guidelines set out in the DMMP User Manual for marinas. In a moderate-ranked area the number of samples and analyses are calculated using the following guidelines (DMMP, 2014):

    - 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

    The proposed dredging was broken into four distinct dredged material management units (DMMUs; Table 2); DMMU 1 (inner harbor), DMMU 2 (optional private dock inner harbor), DMMU 3 (middle channel), and DMMU 4 (outer channel). The actual locations of dredging within DMMU 2 will depend on individual private owners who choose to have their docks dredged, so actual areas and volumes dredged may not be as large as estimated. Samples representing the proposed dredged material were collected in one sampling event as described in section 5 below. Twelve samples were collected from within the dredge prism and were composited into the four DMMUs to represent the 44,300 cy of material (Figure 2). The total number of samples collected from within the proposed dredge footprint is sufficient to meet the DMMP requirements for a moderate ranked project. Sampling results are valid until July 2021.

5. Sampling. Sampling took place July 12, 2016 aboard Gravity Consulting's *R/V Tieton*. The approved sampling and analysis plan (Gravity/Element 2016a) was followed to the extent possible given the sampling conditions encountered in the field. Figure 2 shows the target and actual coring locations. Sample locations SH-04 and SH-05 were moved due to difficulty collecting a sample, but remained within 25 ft of the originally planned locations within DMMU 2. Sampling difficulty at SH-11 resulted in 4 coring attempts before a sample with adequate recovery could be collected. Even so, the final attempt resulted in penetration to only 0.86 feet into the z-layer. Sampling and compositing information is provided in Tables 3 and 4.

    The DMMP agencies evaluated the sampling effort and determined that the samples collected are representative of the material to be dredged.

6. Sediment Conventional, Grain Size, and Chemical Analysis. Analysis of conventionals and all standard DMMP COCs was conducted by ALS Environmental (Kelso, WA). The approved sampling and analysis plan was followed and quality control guidelines specified by the DMMP were generally met.

    The conventional results (Tables 5 and 6) show that sediment in the access channel differs from that within the marina. DMMUs 1 and 2 have the highest fines content with 6.6 and 10.7 percent clay and 25.0 and 40.2 percent silt, respectively. However, TOC (< 0.9%) was relatively low in these DMMUs. DMMUs 3 and 4 in the access channel consist almost entirely of sand (95.7 and 97.5 percent, respectively), with very little gravel and low fines content, and the total organic carbon content (TOC) in each DMMU is also very low (< 0.2%).

    Not all total chlordane constituents were included in the sediment characterization (cis-nonachlor, trans-nonachlor, and oxychlordane were not included), but trans-chlordane and cis-chlordane

analysis results were at non-detect levels and it is unlikely the remaining chlordane constituents would be above screening levels. Dioxins/furans analysis was not required for this project.

The standard DMMP COC results (Table 7) show that no concentrations were over screening levels or bioaccumulation triggers, so no Tier 3 biological testing was necessary. DMMUs 1 and 2 in the inner harbor areas had higher frequencies of detection and values, particularly for PAHs, than did DMMUs 3 and 4 in the middle and outer channels.

7. Sediment Exposed by Dredging. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) or the State's Antidegradation standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008). There were no detected exceedances of SQS within the dredge prism samples (Tables 6 and 7); therefore, as described in the SAP, the z-layer samples were not required to be analyzed for chemistry.

   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 Sandy Hook Marina for open-water disposal at Port Gardner non-dispersive site. The approved sampling and analysis plan was generally followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

   In summary, based on the results of the previously described testing, the DMMP agencies conclude that all 44,300 cubic yards (cy) of dredged material from Sandy Hook Marina are suitable for open-water disposal at the Port Gardner non-dispersive site.

   Debris Management. The DMMP agencies implemented a debris screening requirement in 2015 to prevent the disposal of solid waste and large debris at open-water disposal sites in Puget Sound (DMMP 2015). It states that "all projects must use a screen to remove debris unless it can be demonstrated that debris is unlikely to be present or that the debris present is large woody debris that can be easily observed and removed by other means during dredging." For this project, a 12"x12" debris screen must be used for DMMUs 1 and 2, unless information is provided to the DMMP that meet the "reason to believe" criteria laid out in DMMP 2015.

   A dredging and disposal quality control plan (QCP) must be developed and submitted to the Seattle District Regulatory project manager at least 7 days prior to the pre-dredge meeting. The QCP must include a debris management plan, including the use of a 12"x12" debris screen as required.

   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 2015. *Debris Screening Requirements for Dredged Material Disposed at Open-Water Sites.* Final DMMP Clarification Paper. October 02, 2015.

DMMP 2014. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, December 2014.

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 2008. *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.

Ecology 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Gravity/Element 2016a. *Sampling and Analysis Plan – Sediment Quality Study, Sandy Hook Dredging Project; Whidbey Island, Washington.* Prepared by Gravity Consulting, LLC and Element Solutions for Sandy Hook Yacht Club Estates. May 26, 2016.

Gravity/Element 2016b. *Sediment Quality Study – Data Report, Sandy Hook Dredging Project; Whidbey Island, Washington.* Prepared by Gravity Consulting, LLC and Element Solutions for Sandy Hook Yacht Club Estates. October 16, 2016.

Signed copy on file in Dredged Material Management Office, Seattle District Corps of Engineers

10. Agency Signatures.

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
USACE Regulatory
Shawn Hinz, Gravity Consulting LLC
Ron Young, Young Associates

Table 2. Estimated Dredge Prism Volume and Area

Designation	Area (ft^2)	Quantity to be Dredged* (cy)
Inner Harbor: DMMU 1	87,200	7,350
Inner Harbor: DMMU 2	163,600	15,200
Middle Harbor: DMMU 3	139,000	10,050
Outer Harbor: DMMU 4	299,400	11,700
Total	689,200	44,300

*Dredge volume includes overdredge volumes.

Table 3. Summary of Core Locations

Name	Date	Time	Latitude	Longitude	Water Depth (ft)	Tide Elev (MLLW)	Mudline Elevation (MLLW)	Penetration (ft)	Recovery (ft)	Sample Depth Elevation (MLLW)
SH01	7/12/2016	18:13	47.91842	-122.391	4.9	5.47	0.57	8	7.75	-7.18
SH02	7/12/2016	17:24	47.91734	-122.392	6.7	4.95	-1.75	5.8	5	-6.75
SH03	7/12/2016	16:53	47.91629	-122.392	6	5.18	-0.82	6.6	5.9	-6.72
SH04	7/12/2016	16:16	47.9157	-122.393	5.8	5.56	-0.24	7	6.6	-6.84
SH05	7/12/2016	15:20	47.9168	-122.392	6.4	5.79	-0.61	7.7	6.9	-7.51
SH06	7/12/2016	14:51	47.91704	-122.393	6.9	6.09	-0.81	7.6	7.1	-7.91
SH07	7/12/2016	9:50	47.91956	-122.392	5.3	5	-0.3	6	5.4	-5.7
SH08	7/12/2016	14:18	47.91801	-122.395	7.6	6.36	-1.24	7	6.75	-7.99
SH09	7/12/2016	13:44	47.91745	-122.396	7.9	6.63	-1.27	4.75	3.7	-4.97
SH10	7/12/2016	13:15	47.9147	-122.397	7	6.82	-0.18	7	6.3	-6.48
SH11	7/12/2016	12:15	47.913	-122.398	8.4	7.04	-1.36	3	2.5	-3.86
SH12	7/12/2016	11:05	47.91096	-122.399	7.2	6.2	-1	7	6.3	-7.3

Table 4. Compositing Information

Core Name	Mudline (MLLW)	DMMU Sample Interval (MLLW)	Z-Layer Sample Interval (MLLW)	DMMU Sample name	Z-Layer Sample
SH01	0.57	0.57 to -4	-4 to -6	DMMU1	archive
SH02	-1.75	-1.75 to -4	-4 to -6	DMMU1	archive
SH03	-0.82	-0.82 to -4	-4 to -6	DMMU2	archive
SH04	-0.24	-0.24 to -4	-4 to -6	DMMU2	archive
SH05	-0.61	-0.61 to -4	-4 to -6	DMMU2	archive
SH06	-0.81	-0.81 to -4	-4 to -6	DMMU2	archive
SH07	-0.3	-0.3 to -3	-3 to -5	DMMU3	archive
SH08	-1.24	-1.24 to -3	-3 to -5	DMMU3	archive
SH09	-1.27	-1.27 to -3	-3 to -4.97	DMMU3	archive
SH10	-0.18	-0.18 to -3	-3 to -5	DMMU4	archive
SH11	-1.36	-1.36 to -3	-3 to -5	DMMU4	archive
SH12	-1	-1 to -3	-3 to -3.86	DMMU4	archive

Table 5. Summary of Analytical Results--Conventional

Conventional	DMMU-1	DMMU-2	DMMU-3	DMMU-4
Ammonia as Nitrogen (mg/kg)	28.1	52.6	1.07	0.86
Carbon, Total Organic (TOC) (%)	0.601	0.873	0.085	0.159
Solids, Total (%)	73.7	67.5	81.1	79.2
Solids, Total Volatile (%)	2.5	3.2	1	1.3
Sulfide, Total (%)	110	29	1.6	0

Table 6. Summary of Analytical Results--Grain Size Fractions (Percent)

Grain Size	DMMU-1	DMMU-2	DMMU-3	DMMU-4
0.98 um	3.76	5.53	0.93	0.93
1.95 um	1.32	2.46	0.08	0.08
3.9 um	1.55	2.68	0	0
Total Clay	6.63	10.67	1.01	1.01
7.8 um	2.04	3.6	0.05	0.22
15.6 um	3.73	7.92	0.11	0.54
31.3 um	6.99	14.48	0.15	0
62.5 um	12.27	14.16	0.54	0.25
Total Silt	25.03	40.16	0.85	1.01
Very Fine Sand	22.97	6.67	1.8	2.12
Fine Sand	15.97	2.73	41.7	54.64
Medium Sand	20.94	6.28	45.78	38.94
Coarse Sand	4.36	7.78	5.75	1.71
Very Coarse Sand	0.8	5.27	0.69	0.08
Total Sand	65.04	28.73	95.72	97.49
Gravel	1.02	25.78	0.2	0.06
Total Gravel	1.02	25.78	0.2	0.06

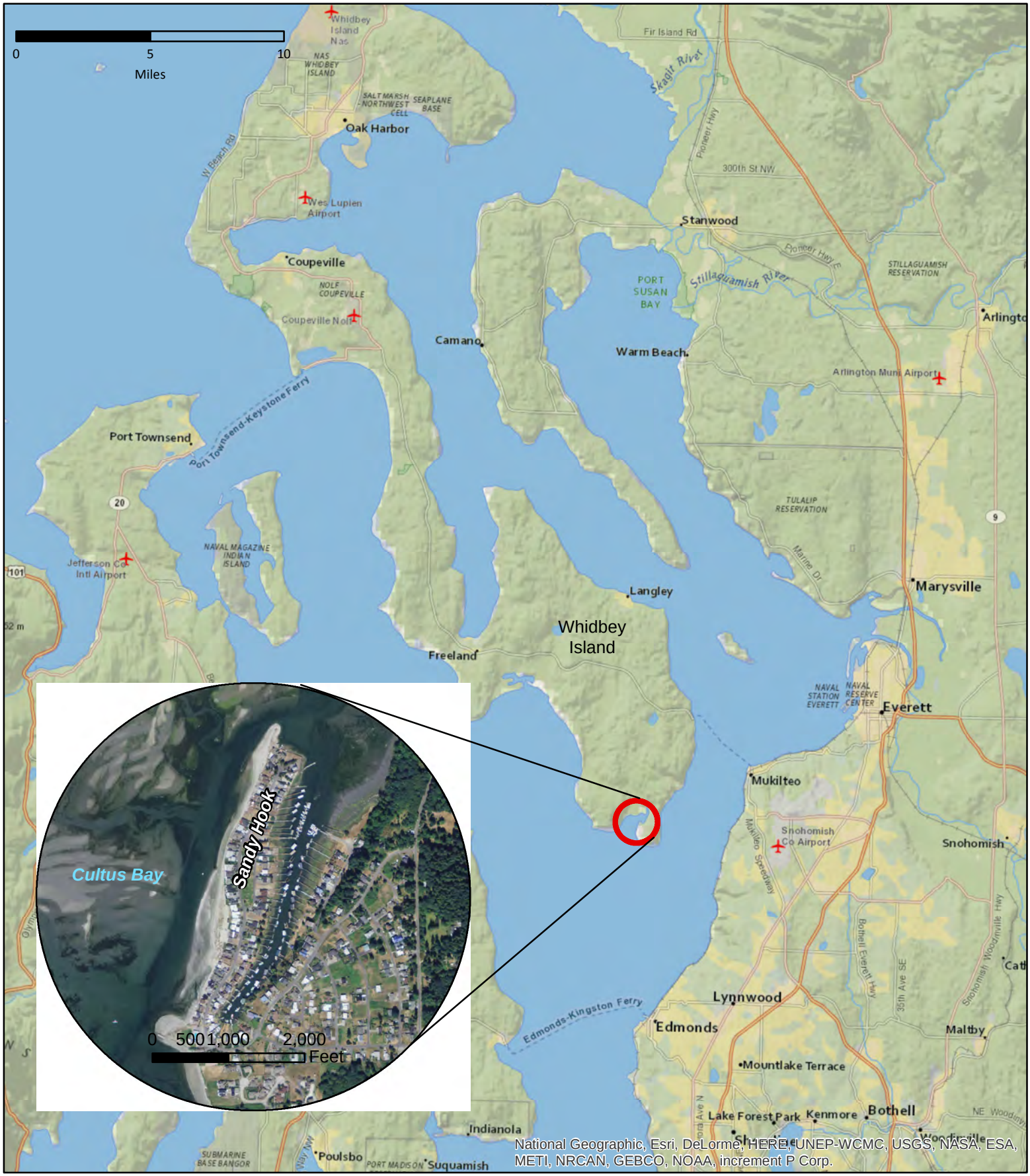
Table 7. Summary of Analytical Results Compared with DMMP Marine Guidelines

					DMMP MARINE GUIDELINES		
	DMMU-1	DMMU-2	DMMU-3	DMMU-4	SL	BT	ML
METALS (mg/kg dry weight)							
Antimony	0.032 J	0.044 J	0.016 J	0.024 J	150		200
Arsenic	2.54	3.53	1.43	1.22	57	507.1	700
Cadmium	0.283	0.37	0.038	0.051	5.1	11.3	14
Chromium	25.6	34.1	13.3	15.4	260	260	
Copper	12.6	19.1	3.57	4.01	390	1,027	1,300
Lead	3.39	4.59	1.16	1.26	450	975	1,200
Mercury	0.021	0.035	0.005 J	0.008 J	0.41	1.5	2.3
Nickel	29.4	33.5	16.5	16.6			
Selenium	0.2 J	0.27 J	0.87 J	0.97 J		3	
Silver	0.056	0.086	0.012 J	0.017 J	6.1	6.1	8.4
Zinc	35.9	46.1	17.4	18	410	2,783	3,800
PAHs (µg/kg dry weight)							
Naphthalene	5.1	7.7	2.8 J	3.7 J	2,100		2,400
Acenaphthylene	1.5 J	4 J	*4.1	*4.2	560		1,300
Acenaphthene	4.5 J	2.6 J	4.1	4.2 J	500		2,000
Fluorene	1.4 J	4.5 J	*4.1	*4.2	540		3,600
Phenanthrene	8.2	36	*4.1	2.5 J	1,500		21,000
Anthracene	3.8 J	12	0.62 J	4.2 J	960		13,000
2-Methylnaphthalene	4.4 J	4.9	1.4 J	3.5 J	670		1,900
Total LPAH	28.9 J	71.7 J	8.92 J	18.1 J	5,200		29,000
Fluoranthene	26	210	2.3 J	2.3	1,700	4,600	30,000
Pyrene	30	170	2.2	4.7	2,600	11,980	16,000
Benz(a)anthracene	9.2	30	1.3 J	1.2	1,300		5,100
Chrysene	15	74	1 J	1.2	1,400		21,000
Benzofluoranthenes (b, J ,k)	16	59	1.6 J	1.5	3,200		9,900
Benzo(a)pyrene	9.7	23	1.1	*4.2	1,600		3,600
Indeno(1,2,3-c,d)pyrene	6.4	16	1.7	*4.2	600		4,400
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene	7.8	15	2.9 J	0.97	670		3,200
Total HPAH		600.2 J	15.02 J	11.87 J	12,000		69,000
Total PAHs	150.5 J	671.9 J	23.94 J	29.97 J			
CHLORINATED HYDROCARBONS (µg/kg dry weight)							
1,4-Dichlorobenzene	*9	*9.8	*8.2	*8.4	110		120
1,2-Dichlorobenzene	*9	*9.8	*8.2	*8.4	35		110
1,2,4-Trichlorobenzene	*9	*9.8	*8.2	*8.4	31		64
Hexachlorobenzene (HCB)	*9	*9.8	*8.2	*8.4	22	168	230
PHTHALATES (µg/kg dry weight)							
Dimethyl phthalate	*9	*9.8	*8.2	*8.4	71		1,400
Diethyl phthalate	*9	*9.8	*8.2	*8.4	200		1,200
Di-n-butyl phthalate	19	6.1 J	*17	*17	1,400		5,100
Butyl benzyl phthalate	*9	*9.8	*8.2	*8.4	63		970
Bis(2-ethylhexyl) phthalate	380	9.6 J	*82	29 J	1,300		8,300
Di-n-octyl phthalate	*9	*9.8	*8.2	*8.4	6,200		6,200
PHENOLS (µg/kg dry weight)							
Phenol	4.1 J	*30	*25	*25	420		1,200
2-Methylphenol	*9	*9.8	*8.2	*8.4	63		77
4-Methylphenol	*9	*9.8	*8.2	*8.4	670		3,600

Table 7. Summary of Analytical Results Compared with DMMP Marine Guidelines

	DMMU-1	DMMU-2	DMMU-3	DMMU-4	DMMP MARINE GUIDELINES		
					SL	BT	ML
2,4-Dimethylphenol	*21	*25	*21	*20	29		210
Pentachlorophenol	*90	*98	*82	*84	400	504	690
MISCELLANEOUS EXTRACTABLES (µg/kg dry weight)							
Benzyl alcohol	*18	*20	*17	*17	57		870
Benzoic acid	*360	*400	*330	*340	650		760
Dibenzofuran	*9	*9.8	*8.2	*8.4	540		1,700
Hexachlorobutadiene	*9	*9.8	*8.2	*8.4	11		270
Nitrosodiphenylamine	*9	*9.8	*8.2	*8.4	28		130
PCBs (ug/kg dry weight)							
Aroclor 1016	*9.1	*9.9	*8.2	*8.4			
Aroclor 1221	*19	*20	*17	*17			
Aroclor 1232	*9.1	*9.9	*8.2	*8.4			
Aroclor 1242	*9.1	*9.9	*8.2	*8.4			
Aroclor 1248	*9.1	*9.9	*8.2	*8.4			
Aroclor 1254	*9.1	*9.9	*8.2	*8.4			
Aroclor 1260	*9.1	*9.9	*8.2	*8.4			
PESTICIDES (ug/kg dry weight)							
4,4'-DDD	*0.91	*0.99	*0.82	*0.84	16		
4,4'-DDE	*0.91	*0.99	*0.82	*0.84	9		
4,4'-DDT	*0.91	*0.95	*0.82	*0.84	12		
Sum of DDD, DDE and DDT	*0.91	*0.99	*0.82	*0.84		50	69
Aldrin	*0.91	*0.99	*0.82	*0.84	9.5		
alpha-BHC	*0.91	*0.99	*0.82	*0.84			
alpha-Chlordane	*0.91	*0.99	*0.82	*0.84			
beta-BHC	*0.91	*0.99	*0.82	*0.22			
delta-BHC	*0.27	*0.3	*0.2	*0.34			
Dieldrin	*0.91	*0.99	*0.82	*0.84	1.9		1,700
Endosulfan I	*0.91	*0.99	*0.82	*0.84			
Endosulfan II	*0.17	*0.17	*0.82	*0.23			
Endosulfan Sulfate	*0.14	*0.17	*0.17	*0.3			
Endrin	*0.91	*0.99	*0.82	*0.84			
Endrin Aldehyde	*0.63	*0.76	*0.67	*0.85			
Endrin Ketone	*0.91	*0.99	*0.82	*0.84			
gamma-BHC (Lindane)	*0.91	*0.99	*0.82	*0.84			
gamma-Chlordane	*0.91	*0.99	*0.82	*0.84			
Heptachlor	*0.91	*0.99	*0.82	*0.84	1.5		270
Heptachlor Epoxide	*0.91	*0.99	*0.82	*0.84			
Methoxychlor	*0.91	*0.99	*0.82	*0.84			
Toxaphene	*46	*50	*41	*42			

Notes: * =less than detection limit (ND)



Source Information:
2011 NAIP Orthophoto

ELEMENT solutions
1812 Cornwall Avenue
Bellingham, WA 98225
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Phone: 360.671.9172

FIGURE 1

Scaled Site Vicinity Map
Sandy Hook, Whidbey Island
Island County, WA

Date: 3/28/2016

Client:

Path: P:\Pse Project\2015096\ENVRMNT\GIS\ESA_SandyHook_Fig1_SiteVicinityMap.mxd

ELEMENT solutions

info@elementsolutions.org

FIGURE 2

SANDY HOOKDREDGING PROJECT:
Proposed Dredging, Sampling, and Navigational Channel

Date: 4/27/2016

Path: P:\Pse Project\2015096\ENVRMNT\GIS\SandyHookDredging_SiteFigure.mxd

SANDY HOOK PROPOSED DREDGING PROJECT

PREPARED 05/25/2016 SURVEY DATE: JANUARY 29–30, 2015

ZONE 2
CUT TO –3 (MLLW)
2:1 CUT SLOPES TO CATCH
5306.35 CUBIC YARDS CUT

NO DREDGE (PLUG)
EXISTING GROUND= –.7 MLLW

ZONE 3
CUT TO –3 (MLLW)
2:1 CUT SLOPES TO CATCH
4688.90 CUBIC YARDS CUT

ZONE 1A
CUT TO –4 (MLLW)
2:1 CUT SLOPES TO CATCH
7341.75 CUBIC YARDS CUT

ZONE 4
CUT TO –3 (MLLW)
2:1 CUT SLOPES TO CATCH
4020.82 CUBIC YARDS CUT

ZONE 1B
CUT TO –4 (MLLW)
2:1 CUT SLOPES TO CATCH
15156.54 CUBIC YARDS CUT

ZONE 5
CUT TO –3 (MLLW)
2:1 CUT SLOPES TO CATCH
7570.59 CUBIC YARDS CUT

GRAPHIC SCALE
(us survey feet)
0 300
150 600

ALL ELEVATIONS SHOWN REPRESENT MLLW DATUM

LEGEND

(3) = CORE SAMPLE POINT

Cut(–)/Fill(+) Table

Range	Cut(–)/Fill(+)	Cut(–)/Fill(+)	Color
1	–5.01	–5.00	
2	–5.00	–4.00	
3	–4.00	–3.00	
4	–3.00	–2.00	
5	–2.00	–1.00	
6	–1.00	0.00	