CENPS-OP-DMMO

MEMORANDUM FOR RECORD February 10, 1992

SUBJECT: DECISION ON THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER PSDDA EVALUATION PROCEDURES FOR THE PORT OF EVERETT 10TH STREET BOAT RAMP (OYB-2-014611) FOR DISPOSAL AT THE PORT GARDNER OPEN-WATER DISPOSAL SITE.

1. The following summary reflects the PSDDA agencies' (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the 12,340 cubic yards of material proposed for dredging from the 10th Street Boat Ramp project. Disposal is proposed at the PSDDA Port Gardner open-water site.

2. The PSDDA Management Plan-Phase II (page A-10) ranked the subtidal areas of the Snohomish River in the project vicinity as "moderate", while the intertidal areas were ranked "high". Because the majority of project sediments were subtidal and there were no active sources on-site, the entire project site was ranked "moderate" by the PSDDA agencies. Under a "moderate" rank, the entire project volume could have been represented by a single dredged material management unit (DMMU). However, the Port of Everett opted to divide the project into two DMMU (C1 and C2), with C1 representing intertidal sediments and C2 representing subtidal sediments. C1 and C2 were represented by two and four composited field samples respectively. A tiered testing approach was followed.

3. Chemistry data indicated that one or more exceedances of the 1992 PSDDA screening levels (SL) occurred for test sample C1 (See Attachment 1). There were no exceedances of bioaccumulation triggers (BT) or maximum levels (ML). Some minor QA/QC problems, documented in Pentec's 2 January 1992 Final Sediment Characterization Report (p 17-18), were encountered in the analysis of metals. Because the metals concentrations at issue were well below SLs, the PSDDA agencies agreed with the assessment that the QA/QC problems did not warrant a retest.

4. Dioxins and furans were quantitated for C2 by Triangle Laboratories of North Carolina. The most toxic congener, 2,3,7,8-tetrachloro-dibenzo-p-dioxin, was detected at 0.67 parts per trillion (ppt). The total toxic equivalent concentration (TEC) of all dioxins and furans (detected and undetected) was 7.3 ppt (see Attachment 2).

In the toxicity equivalency approach in which TECs are calculated, polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) that include substitution with chlorine at the 2, 3, 7, and 8 positions are assigned a toxicity equivalency factor (TEF). The TEF is used to calculate TECs relative to 2,3,7,8-TCDD, the most toxic member of the group of PCDDs and PCDFs.

The TEC approach is used to estimate the potential toxicity to mammals of PCDDs and PCDFs bioaccumulated in mammal tissue. It has limited applicability to sediment because it does not consider the relative bioavailability of the congeners. Accordingly, TEC overstates toxicity to mammals when applied to sediments. TEC as a toxicity measure does not apply to fish, shellfish or birds. However, TEC does allow for a quick comparison of this one measure of dioxin and furan toxicity among sediment samples.

Based on the PSDDA agencies' present best professional judgement, the concentration of 2,3,7,8-TCDD and the calculated TEC are unlikely to be environmentally harmful for this project. The agencies' consensus is that the material is suitable for unconfined open-water disposal relative to these dioxin test results.

5. The SL exceedances for C1 triggered the requirement for biological testing under the tiered testing approach. The amphipod 10-day acute toxicity test, echinoderm sediment larval combined mortality and abnormality (effective mortality) test, the Neanthes 10-day acute toxicity test, and the Microtox bacterial luminescence test were conducted. PSDDA interpretation guidelines specified in the Phase II Management Plan Report (Sept 1989), modified by changes made at the second annual review meeting, were used to evaluate the bioassay data. The control sediment for the amphipod and Neanthes bioassays was collected at West Beach, while the seawater control for the sediment larval test came from the Duwamish Head. The reference sediment (all bioassays) came from Carr Inlet. Two reference sediments, Parametrix's Carr 4 and Carr 5, were used.

6. There were no hits for the amphipod or Microtox bioassays.

7. There was no hit for the Neanthes bioassay. However, a QA/QC problem was encountered in the positive control test. None of the concentrations of cadmium chloride used resulted in 50% mortality or greater. The maximum cadmium chloride concentration was 13 mg/l and the mortality measured at this concentration was only 25%. The LC50 was extrapolated from the data and reported as 30 mg/l. The range of LC50 values found in the PSEP Neanthes protocol is 12-22 mg/l (from Reish and Johns).

The worms used in this experiment were taken from a culture which had been developed at the subcontractor's (Parametrix) laboratory. This culture was developed from stock obtained from Don Reish's laboratory in Long Beach. Don Reish's laboratory had supplied all Neanthes worms for all previous PSDDA projects. Pentec's 2 January 1992 report (Appendix E, page 5) stated that "both the negative and positive control data were within expected ranges. There is no impact on data quality".

Additional data were requested from Parametrix to support the contention that the sensitivity of the Parametrix culture was similar to that of the Reish population. Results from another positive control test, in which worms from both the Reish and Parametrix populations were run side-by-side, were submitted to the Dredged Material Management Office on 6 February 1992. The highest concentration used was 13 mg/l. The Reish population mortality at this concentration was 30%, while the Parametrix population mortality was 15%. The 30% mortality of the Reish population compared favorably to the 25% mortality exhibited for the Parametrix stock in the original 10th Street Boat Ramp bioassay.

While the data presented were not entirely conclusive, the PSDDA agencies agreed that for this project the concern raised over the comparative sensitivity of the two Neanthes populations did not justify a retest. The PSDDA agencies accepted the Neanthes data for regulatory decision-making. There was, therefore, no hit for this bioassay. Data from future bioassays using the Parametrix Neanthes culture will be closely evaluated so as to ensure that the sensitivities of the two populations remain comparable.

8. In the sediment larval test, Carr 5 did not meet its performance standard; therefore, Carr 4 was used for test interpretation. The test sediment, C1, exhibited an effective mortality of greater than 20% over the seawater control and was statistically different from the reference sediment. The effective mortality was less than 30% over reference. There was, therefore, a hit under the two-hit rule. There were no corroborating hits on any other bioassays. Therefore, C1 passed biological testing.

9. In summary, the PSDDA-approved sampling and testing plan was followed, and quality assurance, quality control guidelines specified by PSDDA were generally complied with. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the PSDDA program. Based on the results of the chemical and biological testing, the following consensus decision was made by the PSDDA agencies:

All 12,340 cubic yards proposed for dredging from the 10th Street Boat Ramp (OYB-2-014611) are suitable for disposal at the Port Gardner open-water site.

Concur:

2/27/92
Date

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

2/18/92
Date

David F. Fox
David Fox, P.E.
Seattle District Corps of Engineers

2/18/92
Date

Justine D. Smith
Justine Smith
Environmental Protection Agency, Region X

2/24/92
Date

Russ McMillan
Russ McMillan
Washington Department of Ecology

2/18/92
Date

Gene Revelas
Washington Department of Natural Resources

2 Attachments

Copies Furnished:

Frank Urabeck/CENPS-EN-PL-PF
Pat Cagney/Linda Cox/CENPS-EN-PL-ER
Tom Mueller/CENPS-OP-RG
Jack Gossett/CENPS-OP-RG

EPA/Justine Smith
DOE/Russ McMillan
DNR/Gene Revelas
DMMO file

ATTACHMENT 1

Port of Everett
10th Street Boat Ramp
OYB-2-014611

	DY92 Sediment Guideline Values			DMMU
Chemical-of-Concern	SL	BT	ML	C1
Acenaphthylene	64	--	640	69
1,2,4-Trichlorobenzene	13	--	64	15 U
4-Methylphenol	120	--	1200	190
Hexachlorobutadiene	29	212	290	30 U

	Treatment Identification			
Bioassay	Control	CARR 4	CARR 5	C1
Amphipod (% mortality)	6	9	12	14
Sediment Larval (% effective mortality)	6	4.8[1]	20.7[1]	28.5[1]
Neanthes (% mortality)	8	2	2	12
Microtox (% decrease in luminescence)	N/A	-15.8[2]	-15.2[2]	-13.5[2]

[1]Normalized to seawater control
[2]A negative decrease in luminescence is considered a nontoxic response

Attachment 1B. DAIS Value Table - Dry Weight Basis (all COC except dioxin/furans)

Project: Port of Everett - 10th Street POE101BF042

	units	C1	C2
SEDIMENT CONVENTIONALS			
Total Solids	%	66.48	54.96
Volatile Solids	%	6.68	7.79
Total Organic Carbon	%	1.96	1.96
Ammonia	MG/KG	31	63
Total Sulfides	MG/KG	29	455
METALS			
Antimony (1)	MG/KG	0.15 u	0.17 u
Arsenic	MG/KG	8.6	13
Cadmium	MG/KG	0.36 b	0.45 b
Chromium (4)	MG/KG	-	-
Copper	MG/KG	40.4	65.7
Lead	MG/KG	11.8	12.8
Mercury	MG/KG	0.07 b	0.11 b
Nickel	MG/KG	39	48.7
Selenium (4)	MG/KG	-	-
Silver	MG/KG	0.13 b	0.19 b
Zinc	MG/KG	63.3 e	88.6 e
LPAH			
2-Methylnaphthalene (1)	UG/KG	38	12
Acenaphthene (1)	UG/KG	40	52
Acenaphthylene (1)	UG/KG	69	21
Anthracene (1)	UG/KG	55	49
Fluorene (1)	UG/KG	39	41
Naphthalene (1)	UG/KG	140	56
Phenanthrene (1)	UG/KG	170	130
Total LPAH (1)	UG/KG	551	361
HPAH			
Benzo(a)anthracene (1)	UG/KG	83	79
Benzo(a)pyrene (1)	UG/KG	110	46
Benzo(g,h,i)perylene (1)	UG/KG	37	38
Benzofluoranthenes (1)	UG/KG	130	120
Chrysene (1)	UG/KG	170	170
Dibenzo(a,h)anthracene (1)	UG/KG	28	21 e
Fluoranthene	UG/KG	81	140
Indeno(1,2,3-c,d)pyrene (1)	UG/KG	61	50
Pyrene	UG/KG	190	340
Total HPAH (1)	UG/KG	890	1004
CHLORINATED HYDROCARBONS			
1,2,4-Trichlorobenzene (1)	UG/KG	15 u	9 u
1,2-Dichlorobenzene (1)	UG/KG	15 u	18 u
1,3-Dichlorobenzene (3)	UG/KG	15 u	18 u
1,4-Dichlorobenzene (1)	UG/KG	15 u	18 u
Hexachlorobenzene	UG/KG	15 u	18 u
PHTHALATES			
Bis(2-ethylhexyl)phthalate (1)	UG/KG	26	100

	units	C1	C2
Butyl benzyl phthalate (1)	UG/KG	15 u	18 u
Di-n-butyl phthalate (1)	UG/KG	15 u	5.8 e
Di-n-octyl phthalate (1)	UG/KG	15 u	18 u
Diethyl phthalate (1)	UG/KG	15 u	18 u
Dimethyl phthalate (1)	UG/KG	15 u	14
PHENOLS			
2 Methylphenol (1)	UG/KG	5.2	18 u
2,4-Dimethylphenol (1)	UG/KG	15 u	18 u
4 Methylphenol (1)	UG/KG	190	110
Pentachlorophenol	UG/KG	80 u	44 u
Phenol (1)	UG/KG	37	23
MISCELLANEOUS EXTRACTABLES			
Benzoic acid (1)	UG/KG	240	180
Benzyl alcohol (1)	UG/KG	15 u	18 u
Dibenzofuran (1)	UG/KG	23	27
Hexachlorobutadiene (1)	UG/KG	30 u	18 u
Hexachloroethane (1)	UG/KG	30 u	40 u
N-Nitrosodiphenylamine (1)	UG/KG	15 u	18 u
VOLATILE ORGANICS			
Ethylbenzene (1)	UG/KG	1.3 u	1.7 u
Tetrachloroethene (1)	UG/KG	1.3 u	1.7 u
Total Xylene (1)	UG/KG	2.6 u	3.4 u
Trichloroethene (1)	UG/KG	1.3 u	1.7 u
PESTICIDES AND PCBs			
Aldrin (3)	UG/KG	2 u	2 u
Chlordane (2)	UG/KG	2 u	2 u
Dieldrin (3)	UG/KG	4 u	4 u
Heptachlor (3)	UG/KG	2 u	2 u
Lindane (3)	UG/KG	2 u	2 u
Total DDT	UG/KG	4 u	4 u
Total PCBs	UG/KG	66 u	66 u
ORGANOMETALLICS			
Tributyltin (porewater) (2)	UG/L	-	-

ATTACHMENT 2

Port of Everett
10th Street Boat Ramp
OYB-2-014611

	Congener/Isomers	Concentration (ng/kg)	Toxic Equivalency Factor (TEF)	Toxic Equivalent Concentration (TEC)
Dioxins	2,3,7,8-TCDD	0.67	1.0	0.67
	1,2,3,7,8-PeCDD	1.1	0.5	0.55
	2,3,7,8-HxCDDs	13.8	0.1	1.38
	1,2,3,4,6,7,8-HpCDD	139	0.01	1.39
	OCDD	1060	0.001	1.06
Furans	2,3,7,8-TCDF	6.6	0.1	0.66
	1,2,3,7,8-PeCDF	0.99	0.05	0.05
	2,3,4,7,8-PeCDF	1.4	0.5	0.7
	2,3,7,8-HxCDFs	4.95	0.1	0.50
	2,3,7,8-HpCDFs	22.8	0.01	0.228
	OCDF	83.9	0.001	0.084
	Total TEC:			7.3

Attachment 2B. Updated Dioxin Data using 2005 WHO TEFs

Summary of DY1992 Port of Everett 10th Street Dioxin Data

Analyte	WHO (05) TEF	POE-10th St.(C2)=12,340 cy		
		ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	**0.67**		0.67
1,2,3,7,8-PeCDD	1	**1.1**	e	1.1
1,2,3,4,7,8-HxCDD	0.1	**1.8**		0.18
1,2,3,6,7,8-HxCDD	0.1	**7**		0.7
1,2,3,7,8,9-HxCDD	0.1	**5**		0.5
1,2,3,4,6,7,8-HpCDD	0.01	**139**		1.39
OCDD	0.0003	**1060**		0.318
2.3.7.8-TCDF	0.1	**6.6**		0.66
1,2,3,7,8-PeCDF	0.03	**0.99**		0.0297
2,3,4,7,8-PeCDF	0.3	**1.4**		0.42
1,2,3,4,7,8-HxCDF	0.1	**1.9**		0.19
1,2,3,6,7,8-HxCDF	0.1	**0.95**		0.095
2,3,4,6,7,8-HxCDF	0.1	**2**		0.2
1,2,3,7,8,9-HxCDF	0.1	0.1	u	0.005
1,2,3,4,6,7,8-HpCDF	0.01	**21.5**		0.215
1,2,3,4,7,8,9-HpCDF	0.01	**1.3**		0.013
OCDF	0.0003	**83.9**		0.02517
Total TEQ (u = 1/2):				**6.711**
Total TEQ (u=0):				**6.706**
Total TOC, %:				

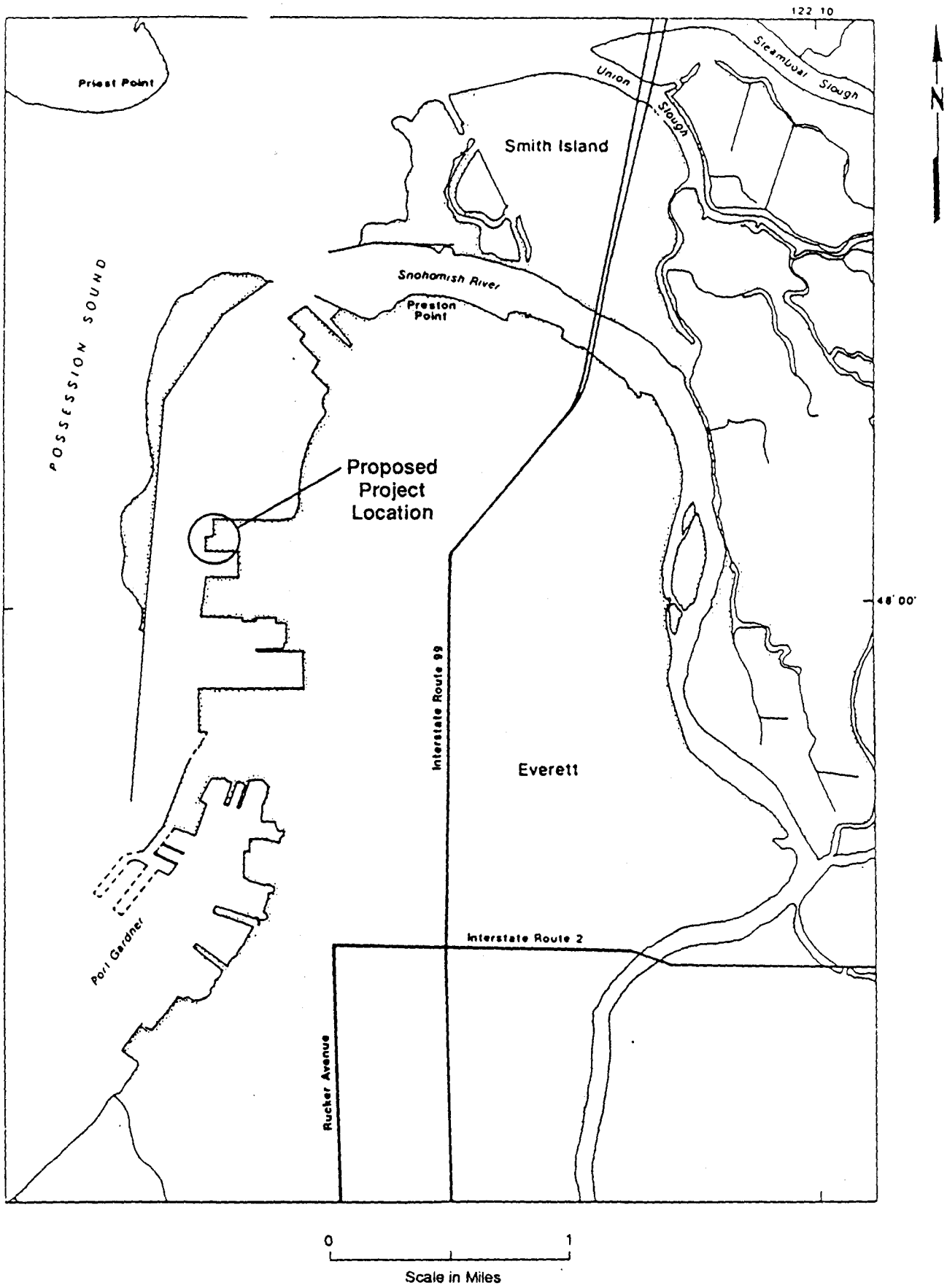

Figure 1
Vicinity map

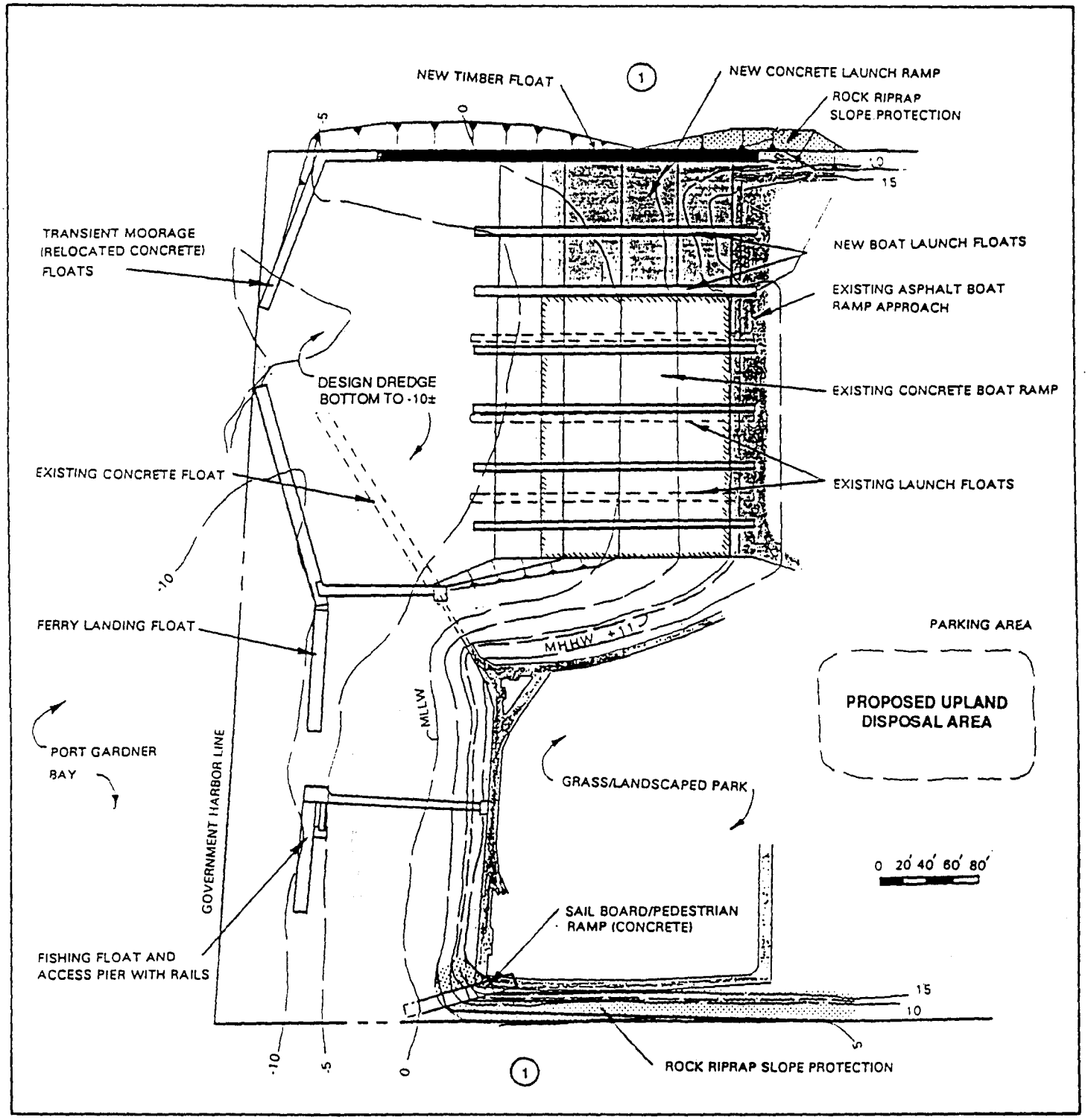

Figure 2
Proposed additions to the 10th Street boat launch

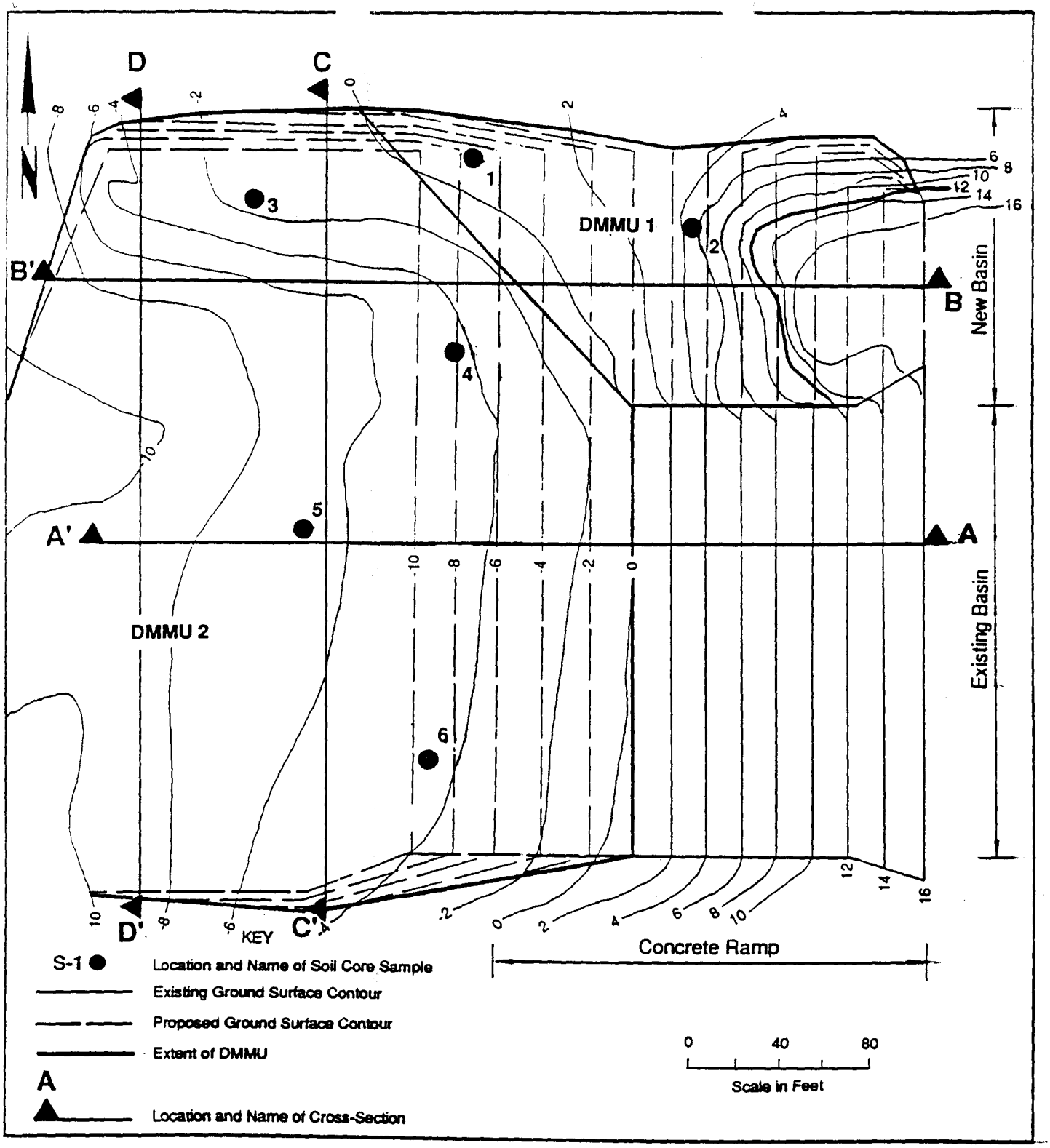

Figure 6
Location of sediment cores within each DMMU