CENWS-OD-TS-DM

MEMORANDUM FOR RECORD

3 February 2000
(Corrected 11 August 2000)

SUBJECT: DETERMINATION ON THE SUITABILITY OF PROPOSED FEDERAL OPERATIONS AND MAINTENANCE DREDGED MATERIAL FROM THE DUWAMISH RIVER, PUGET SOUND (CENPS-OP-NP-92, 7 July 1995) EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT (CWA) FOR OPEN-WATER DISPOSAL AT THE ELLIOTT BAY NONDISPERSIVE DISPOSAL SITES.

1. The following summary reflects the consensus determination of the Dredged Material Management Program (DMMP) Agencies' (U.S. Army Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency) with jurisdiction on dredging and disposal on the suitability of the estimated 76,000 cy of federal maintenance material from the lower part of the Duwamish River Navigation Channel, Seattle, Washington for unconfined open-water disposal at the Elliott Bay open-water disposal. Desired depth in the project area ranges from 20 ft. (+2 ft. overdepth) to 30 ft. (+2 ft. overdepth.)

2. **Time of dredging:** February - March 2000
   Disposal sites: Elliott Bay PSDDA site
   Sediment ranking: high
   Project last dredged: Spring 1992 (high ranked DMMUs passing PSDDA)

3. The area proposed for maintenance dredging was last characterized and dredged in 1992. The upper portion of the Duwamish River Navigation Channel, directly south of the subject area, was characterized in 1998 and dredged in early 1999. All of the area presently proposed for dredging is in a high-ranked area, due to elevated chemical concentrations found in historical as well as recent data. Dredging in the area furthest downstream (channel stations 118 to 135) is authorized to –30 ft. MLLW (+2 ft. overdepth); further upstream in the navigation channel (stations 135 to 205) the authorized depth is to –20 ft. (+2 ft. overdepth). For the 1999 characterization and dredging, it was estimated that 57,705 cubic yards of available dredged material in this prism was surface material, and 18,299 cubic yards was subsurface material. Characterization of the material consisted of collecting Vibracore samples at 54 stations, which were composited into eighteen surface and two subsurface dredged material management units (figure 1).

4. Sampling within each ranked subarea was initiated between August 23-27, 1999 as described above. The Agencies' approved sampling and analysis plan for testing maintenance material in the Duwamish Waterway was followed, and quality assurance/quality control guidelines specified by the PSDDA Users Manual were generally complied with. The final data report (Striplin 2000) is available in the DMMP office. The data gathered were deemed sufficient and acceptable for decision making by the DMMP agencies based on best professional judgment.

5. Table 2 summarizes the sediment conventional parameters for the twenty DMMUs. Chemical analysis indicated that 17 out of 20 composited samples, including both subsurface composites, had exceedances of screening levels for at least one of the 58 chemicals of concern. Fourteen of the samples exceeded screening levels for PCBs but no other chemical of concern; two of the DMMU exceeded screening levels of tributyltin but no other chemical of concern. One DMMU (S15) exceeded screening levels of both PCBs and tributyltin. No other chemicals of concern exceeded screening levels in any sample.

6. Because the screening level is also the bioaccumulation trigger for TBT, the decision was made not to dredge those DMMUs with TBT exceedances, and no thus no further testing was conducted on samples S3, S4, and S15. Total volume in these three DMMU is 8,400 cubic yards.

7. Relevant dates for regulatory tracking purposes are included in Table 1.

Table 1. Regulatory Tracking Dates

SAP Received:	July 22, 1999
SAP Approved:	August 6, 1999
Sampling:	August 23 – 27, 1999
Data report submittal:	December 10, 1999
Suitability Determination	February 3, 2000
Recency Determination: High Concern (2 years)	August 2001

8. Biological testing was conducted on 14 composited samples: S1, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S16, B1, and B2. Reference sediment was collected on 7 October 1999 from Carr Inlet. Control sediment (NAS#4391F) was from North San Francisco Bay. Results of biological analysis are summarized in Table 3. All three bioassays met their respective performance guidelines for negative controls, reference sediments and positive controls. The results indicated that twelve DMMU passed the nondispersive site disposal guidelines. No DMMU had any hits for the amphipod bioassay, and no DMMU failed nondispersive site disposal guidelines under the one-hit rule. Seven of the 12 DMMU had hits for the Neanthes growth bioassay under the two hit rule, but five of these had no corroborating hits from the other two bioassays, and thus were deemed suitable for unconfined open-water disposal at a non-dispersive site. Three of the 14 DMMU had hits for the bivalve larval bioassay, but one of these (S12) had no corroborating hits. The two DMMU (S1 and B2) that had hits on both the Neanthes and larval bioassays thus failed the nondispersive site disposal guidelines under the two-hit rule. Total volume in the two DMMUs unsuitable for open-water disposal (S1 and B2) is 10,200 cy.

9. The agencies concluded that DMMU S1, S3, S4, S15 and B2, representing 18,600 cy, are unsuitable for open-water disposal. The Corps does not have alternative disposal plans and does not plan to dredge these DMMUs. The remaining 15 of the 20 DMMU tested, representing 57,400 cy, passed PSDDA nondispersive site guidelines for open-water disposal, and are suitable for placement at the Elliott Bay open-water disposal site.

10. PCB chemical analytical data were also compared to the State Sediment Management Standards. Comparative sediment conventional data is included in Table 2.

11. This memorandum documents the suitability of 57,400 cy of proposed dredged sediments from Duwamish maintenance material for disposal at the Elliott Bay nondispersive open-water disposal site. 18,600 cy of the proposed dredged sediments, in DMMU S1, S3, S4, S15 and B2 are unsuitable for disposal at the Elliott Bay nondispersive open-water 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 alternative analysis is done under Section 404(b)(1) of the Clean Water Act.

REFERENCE

Striplin Environmental Associates, Inc. January 2000. PSDDA Sediment characterization of Duwamish River Navigation Channel – FY2000 perations and maintenance dredging data report.

Table 2. Selected Sediment Results.[1]

PARAMETER	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
VOLUME (cubic yards)	3,019	2,089	2,601	2,902	3,095	3,345	3,143	3,273	3,143	3,143	2,820	3,891
GRAIN SIZE												
% Gravel	0.2	0	0.3	0.4	0.1	0	0.2	0.4	0.2	0.4	0.1	0
% Sand	15.2	13.2	18.1	18.0	18.7	21.3	22.2	25.7	29.2	47.3	13.7	14.3
% Silt	60.8	61.3	65.1	65.1	66.6	63.3	62.5	60.0	56.8	53.1	70.1	69.1
% Clay	23.8	25.4	16.5	16.5	14.6	15.5	15.1	14.0	13.9	13.0	16.1	16.6
% Fines (clay + silt)	84.6	86.7	81.6	81.6	81.2	78.8	77.6	74.0	70.7	66.1	86.2	85.7
TOTAL SOLIDS, %	55.2	54.5	54.0	55.0	54.8	54.8	54.4	55.6	55.2	56.9	54.6	53.9
VOLATILE SOLIDS, %	7.2	7.2	7.6	7.5	6.8	7.9	6.9	6.7	7.0	6.5	8.0	8.6
TOTAL ORGANIC CARBON, %	1.8	1.7	1.9	1.9	1.9	1.9	2.0	2.3	1.7	1.9	2.0	2.4
TOTAL SULFIDES, mg/kg	1,500	1,700	1,900	2,200	1,300	1,300	990	1,100	960	820	760	3,700
TOTAL AMMONIA, mg/kg	120	100	80	77	83	90	79	78	72	76	130	140
PCB, dry weight ng/kg (bold: ≥PSDDA SL guideline of 130 ng/kg)	**150**	120	100	110	**130**	**200**	**140**	**240**	140	**130**	**720**	**680**
PCB, TOC norm., mg/kg (bold: ≥SQS guideline of 12 mg/kg)	8.3	7.1	5.3	5.8	6.8	10.5	7.0	**10.4**	8.2	6.8	**36.0**	**28.3**
TBT, ug/TBT/L – porewater (bold: ≥PSDDA SL/BT of 15 ug/L)	.04 M[2]	.02 MJ[3]	**0.15**	**0.15 M**	.01 J	.02 J	.05 M	.04 M	.02 J	0.11 M	.04 M	.02 J

1 Table includes all chemicals of concern (COC) that exceeded PSDDA SL triggers. No additional COCs exceeded SLs.
2 "M" is used in cases where the mass spectra generated by the sample do not exactly match those in the NBS library, but the analyst judges that there is enough of a spectral match to report the analyte as detected.
3 "J" indicates an estimated value when that result is less than the calculated detection limit.

Table 2, cont. Selected Sediment Results

PARAMETER	S13	S14	S15	S16	S17	S18	B1	B2	REFERENCE
VOLUME (cubic yards)	3,701	3,970	2,898	3,754	3,746	3,175	11,113	7,186	CR-02
GRAIN SIZE									
% Gravel	0.1	0.2	0	0	0.3	0.2	0	0.1	0.0
% Sand	26.7	25.2	25.9	47.1	56.2	60.9	28.7	20.4	29.2
% Silt	54.1	52.7	60.4	55.4	36.4	31.8	50.3	61.5	60.7
% Clay	19.2	21.9	13.5	13.0	7.0	7.2	20.9	17.9	10.1
% Fines (clay + silt)	73.3	74.6	73.9	68.4	43.4	39.0	71.2	79.4	70.8
TOTAL SOLIDS, %	55.3	56.6	55.5	56.0	65.1	64.9	61.6	57.4	59.8
VOLATILE SOLIDS, %	7.3	7.3	8.0	7.3	4.6	4.2	6.0	7.7	3.0
TOTAL ORGANIC CARBON, %	1.6	1.7	1.9	1.7	1.3	1.4	1.5	2.1	0.7
TOTAL SULFIDES, mg/kg	1,500	1,700	2,000	2,200	1,400	940	510	1,800	190
TOTAL AMMONIA, mg/kg	130	150	170	100	19	40	110	200	12
PCB, dry weight ng/kg (bold: ≥PSDDA SL guideline of 130 ng/kg)	**150**	**150**	**240**	**170**	91	85	**220**	**380**	n/a
PCB, TOC norm., mg/kg (bold: ≥SQS guideline of 12 mg/kg)	9.4	8.8	**12.6**	10.0	7.0	6.1	**14.7**	**18.1**	n/a
TBT, ug/TBT/L – porewater (bold: ≥PSDDA SL/BT of 15 ug/L)	.02 J	.02 J	**0.61**	0.03	.02 J	.01 J	0.03	0.04	n/a

Table 3. Biological Testing Summary.

STATION	% fines	Amphipod (*Ampelisca*) Mortality (%)		Sediment Larval (*Dendraster*) NCMA (%)		20-day Neanthes Growth			
						Survival (%)	Growth (mg/ind/day) 0.5 mg initial weight		Growth % of reference
		mean	sd	mean	sd		mean	sd	
Control		2.0	4.5	n/a	n/a	92	0.92	0.17	122.7%
Reference CR-02	70.8	1.0	2.2	9.8	17.0	100	0.75	0.08	-
B1	71.2	8.0	6.7	11.3	3.9	100	0.45	0.11	60.0%
[redacted]	79.4	5.0	5.0	27.4	16.3	100	0.51	0.15	68.0%
[redacted]	84.6	4.0	5.5	25.4	16.5	100	0.47	0.10	62.7%
S5	81.2	8.0	4.5	7.6	9.4	100	0.47	0.03	62.7%
S6	78.8	6.0	6.5	23.1	15	100	0.57	0.11	76.0%
S7	77.6	6.0	6.5	12.4	11.8	100	0.47	0.08	62.7%
S8	74	5.0	6.1	15.5	17.7	100	0.52	0.10	69.3%
S9	70.7	6.0	8.2	9.3	7.2	100	0.54	0.12	72.0%
S10	66.1	6.0	5.5	15.1	10.5	100	0.56	0.10	74.7%
S11	86.2	0	n/a	11.4	16.9	100	0.48	0.07	64.0%
S12	85.7	8.0	7.6	28.6	18.7	100	0.63	0.17	84.0%
S13	73.3	2.0	2.7	15.3	10.4	100	0.55	0.15	73.3%
S14	74.6	4.0	6.5	7.8	16.6	100	0.63	0.15	84.0%
S16	68.4	6.0	4.2	11.5	12.6	96	0.66	0.22	88.0%
Reference toxicant		0.52 mg/L Cd		9.69 mg/L Cd		7.97 mg/L Cd			
Lab Control limits		0.08 - 0.94 mg/L		5.10 - 12.4 mg/L		4.20 - 11.0 mg/L			

= failed PSDDA for open-water disposal (non-dispersive)
= passed PSDDA for open-water disposal (non-dispersive)
= significantly different than CR-02 / NO HIT
= significantly different than CR-02 / TWO-HIT RULE

Concur:

2/4/00
Date

George Hart, Seattle District Corps of Engineers

2/3/00
Date

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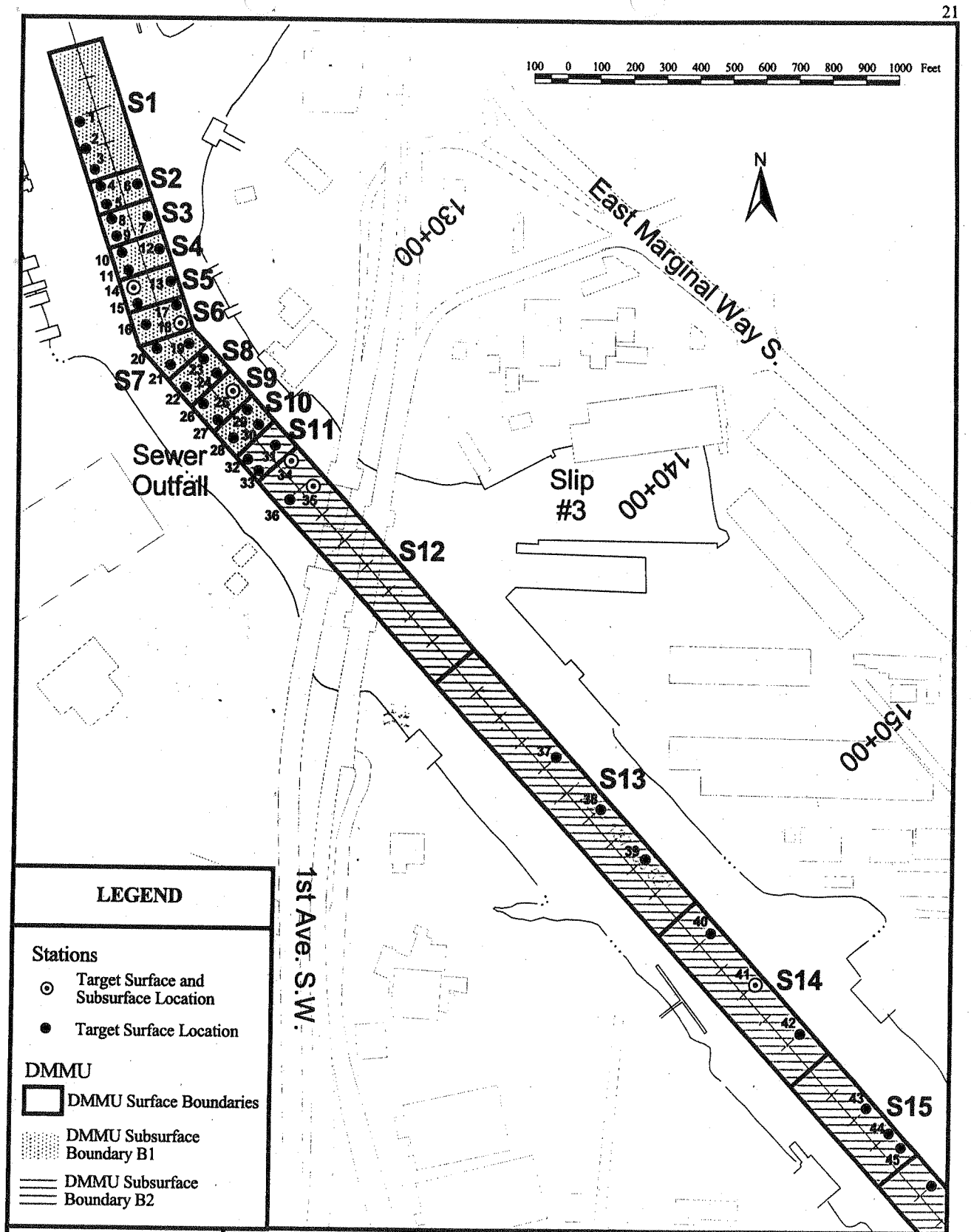

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Figure 1a

DMMUs and Sampling Locations (North)
Duwamish River Navigation Channel

Duwamish River

Aug 99

Duwamish2.apr
Sample Locations (North)

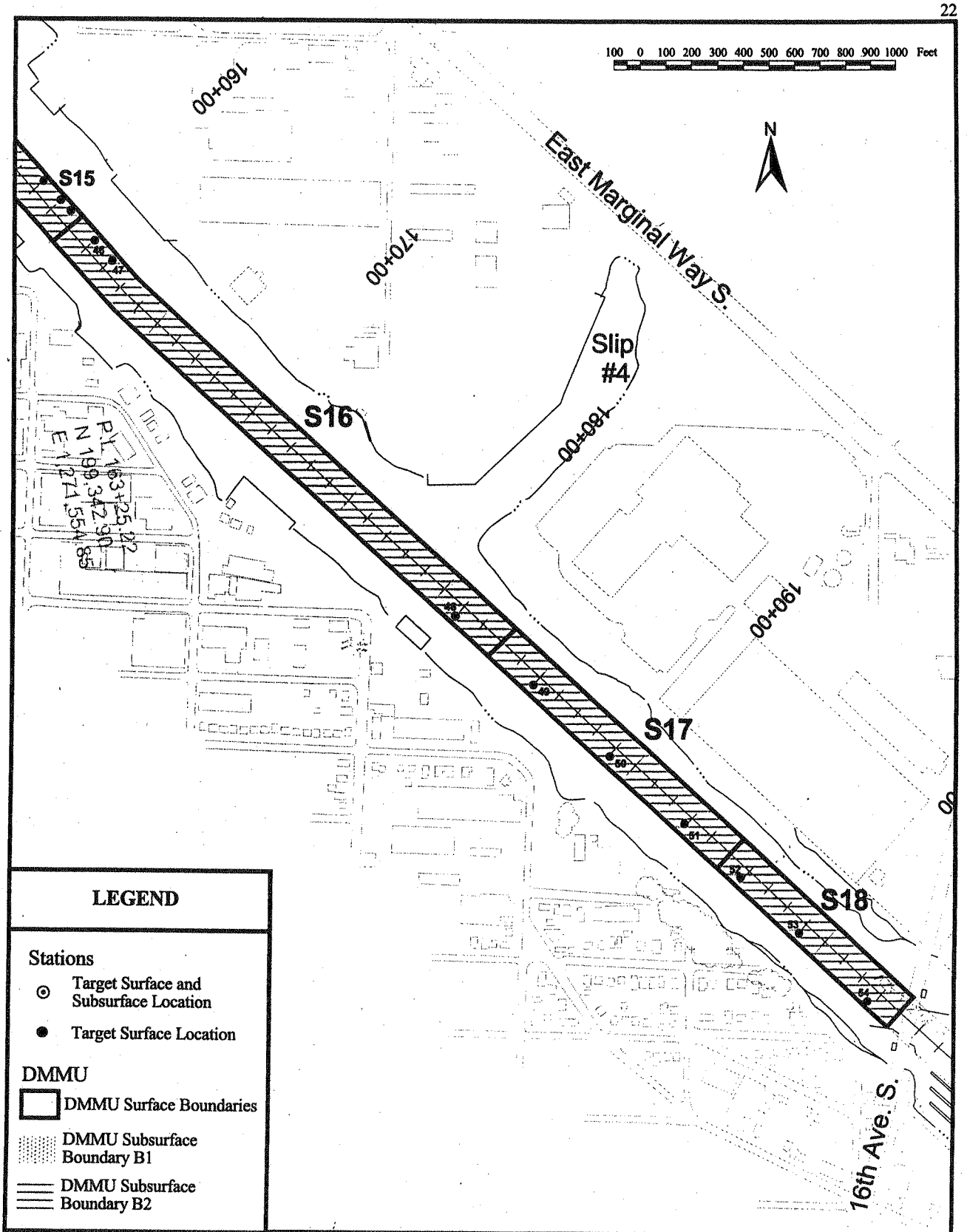

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Figure 1 1b

DMMUs and Sampling Locations (South)
Duwamish River Navigation Channel

Duwamish River

Aug 99

Duwamish2.apr
Sample Locations (South)