CENWS-OD-TS-DM
MEMORANDUM FOR FILE 26 September 2001

SUBJECT: DETERMINATION OF THE SUITABILITY OF SEDIMENT PROPOSED TO BE DREDGED FROM THE GLACIER NORTHWEST DUWAMISH READY-MIX FACILITY (PN 2001-02-00528) FOR UNCONFINED OPEN-WATER DISPOSAL AT THE ELLIOTT BAY DISPOSAL SITE, AS EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT.

1. The following summary reflects the consensus determination of the Agencies that comprise the regional Dredged Material Management Program (DMMP) for the State of Washington. 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 dredged material for in-water disposal and have evaluated the proposed dredging associated with the Glacier Northwest Ready-Mix Facility in the Duwamish River. The Agencies assessed the suitability of approximately 4,900 cubic yards of dredged material for in-water disposal at the Elliott Bay disposal site.

2. The project was ranked high for testing purposes, and the initial SAP was submitted for DMMP review on May 4, 2001. A revised sampling and analysis plan was submitted by the applicant's agent on June 8, 2001 and approved by the DMMP agencies on June 13, 2001. Sampling of the proposed dredging footprint of 4,900 cubic yards (see figure 1) was conducted on June 21, 2001, and consisted of collecting two vibracore samples within each of the two Dredged Material Management Units (DMMUs), which were then composited for two analyses (East DMMU and West DMMU).

3. The Sampling and Analysis Plan approved by the Agencies for testing of the two DMMUs was followed, and quality assurance/quality control guidelines specified by the Puget Sound Dredged Disposal Analysis Users Manual were generally complied with. The data gathered were deemed sufficient and acceptable for decision making by the DMMP agencies based on best professional judgment.

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

Table 1. Regulatory Tracking Dates

Initial SAP submittal date: Revised SAP submittal date:	May 4, 2001 June 8, 2001
Initial SAP review response letter date: Revised SAP Approval date:	May 25, 2001 June 13, 2001
Sampling date(s):	June 21, 2001
Sediment data characterization report submittal date:	September 21, 2001
Recency Determination Date: High (2 years)	June 2003

5. Table 2 summarizes the results of the conventional parameters analyzed in the two composited DMMUs. Chemical analysis of the two composited DMMUs indicated that the West DMMU exhibited one detected chemical exceedance of the screening level guidelines for total PCBs (see Table 2). In addition, none of the chemicals-of-concern exceeded bioaccumulation triggers or maximum level guidelines in either DMMU. Therefore, biological testing was required in the West DMMU to render a suitability determination.

6. Biological testing was performed on the West-DMMU and the summary of these testing results are provided in Appendix 1. Negative control and reference sediments met the performance guidelines for each of the three bioassays. Testing results for the West-DMMU indicated that all three bioassays passed the nondispersive disposal interpretation guidelines, and therefore, this DMMU is suitable for disposal at the Elliott Bay disposal site.

7. The results of the chemical and biological analysis indicated that both DMMUs passed non-dispersive disposal guidelines for open-water disposal. Thus, the 4,900 cy of dredged material is deemed suitable for placement at the Elliott Bay nondispersive site.

8. This memorandum documents the suitability of sediment to be dredged from the Glacier Northwest Facility, for disposal at the Elliott Bay open-water 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.

Concur:

10/10/01
Date — David Kendall, Ph.D., Seattle District Corps of Engineers

10/11/01
Date — Justine Barton, Environmental Protection Agency

10/4/01
Date — Rick Vining, Washington Department of Ecology

10/04/01
Date — Robert Brenner, Washington Department of Natural Resources

Copies Furnished:
Corps Regulatory Branch Project Manager
Justine Barton, EPA
Robert Brenner, DNR
Rick Vining, Ecology
DMMO File

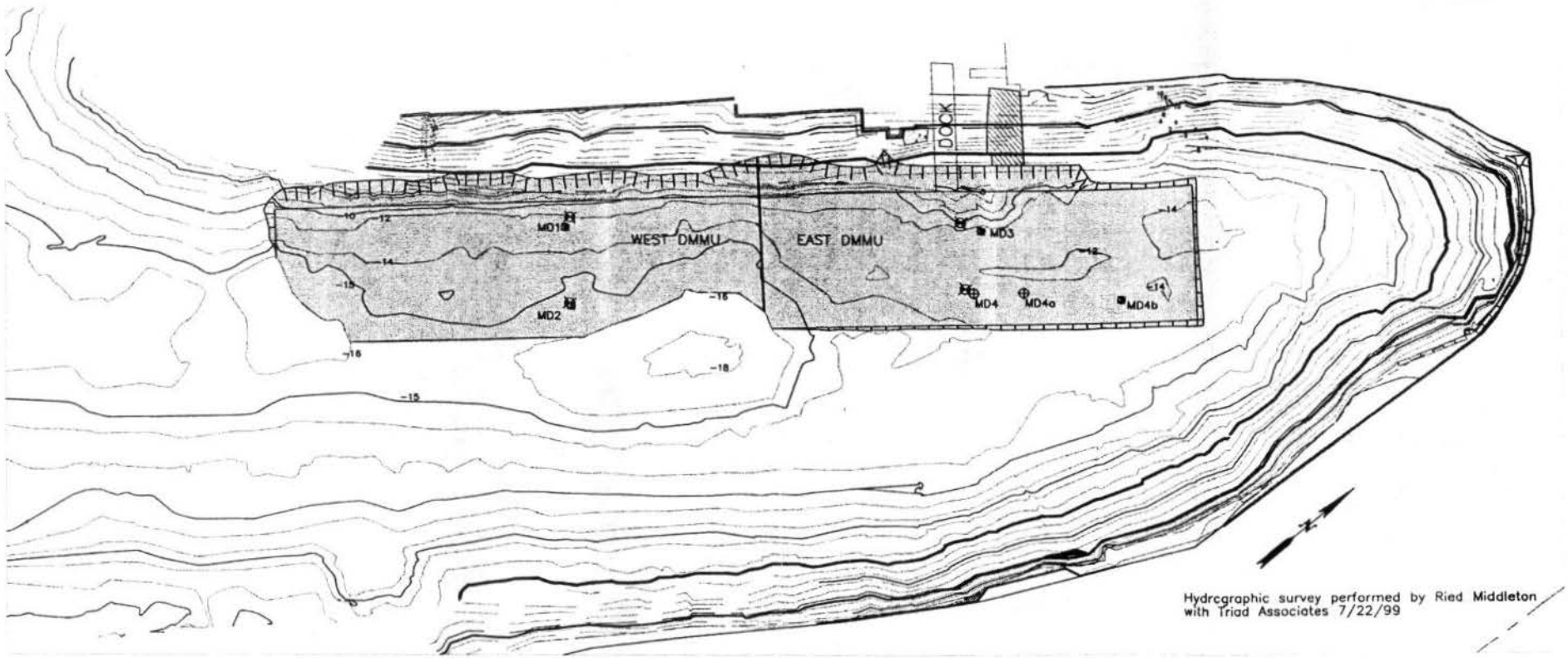

Figure # 1. Sample Station Locations

Table 2. DMMP testing summary for the Glacier Northwest Ready-Mix Duwamish Facility

CHEMICAL NAME	Units	SL	BT	Rank: ML	West DMMU H Conc.	VQ	East DMMU H Conc	VQ
Total PCBs	ug/kg	130		3,100	360		130	
Total PCBs (TOC- normalized)	mg/kg		38		25.0		6.6	
Total Solids	%				74.6		66.0	
Total Volatile Solids	%				**2.9**		**3.6**	
Total Organic Carbon	%				1.4		2.0	
Total Ammonia	mg/kg				19.0		33.0	
Total Sulfides	mg/kg				640		610	
Gravel (percent)	%				31.7		43.0	
Sand (percent)	%				48.0		29.0	
Silt (percent)	%				13.2		21.1	
Clay (percent)	%				**7.2**		**6.8**	
Fines (percent silt + clay)	%				20.4		27.9	
Carr Inlet Reference match (silt+clay):	%				22.0		22.0	
Eohaustorius estuarius hits:					NH		NA	
Mytilus galloprovincialis hits:					NH		NA	
Neanthes arenaceodentata hits:					NH		NA	
Bioassay Pass/Fail:					**Pass**		**NA**	
BTs exceeded:					no		no	
Bioaccumulation conducted:					no		no	
Bioaccumulation Pass/Fail:								
ML Rule exceeded:					no		no	
PSDDA Determination:					**Pass**		[redacted]	
DMMU Volume:	cy				2,100		2,800	
DMMU ID:					West DMMU		East DMMU	

Legend:

NA = Not Analyzed (bioassays)
NH = No Hit (nondispersive guidelines)
2H = two hit failure (nondispersive guidelines)
1H = one hit failure (nondispersive guidelines)
P = Pass (Suitable for UCOWD)
[redacted]
UCOWD = Unconfined open-water disposal
VQ = Validation Qualifier
U = Undetected
J = Positively identified; approximate concentration of the analyte in sample.
ML = Maximum Level (upper chemical guideline)
[redacted]
BT = Bioaccumulation Trigger

0 Unsuitable
4,900 Suitable
4,900 cy: Total

~~Table 3~~ **Summary of amphipod biassay test results using *Eohaustorius estuarius*.**

SAMPLE DESCRIP	REPL	INIT	SURV	REBUR	MORT	NO-BURY	TEM	PSURV	PMORT	PBURY	PNO-BURY	PTEM
West DMMU TEST	1	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
West DMMU TEST	2	20	19	19	1	0	1	95.0	5.0	100.0	0.0	5.0
West DMMU TEST	3	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
West DMMU TEST	4	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
West DMMU TEST	5	20	19	19	1	0	1	95.0	5.0	100.0	0.0	5.0
CARR 22 REF	1	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
CARR 22 REF	2	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
CARR 22 REF	3	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
CARR 22 REF	4	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
CARR 22 REF	5	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
Control	1	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
Control	2	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
Control	3	20	20	20	0	0	0	100.0	0.0	100.0	0.0	0.0
Control	4	21	21	21	0	0	0	100.0	0.0	100.0	0.0	0.0
Control	5	20	19	19	1	0	1	95.0	5.0	100.0	0.0	5.0

	SURV	MORT	NO-BURY	PSURV	PMORT	PBURY	PNO-BURY	PTEM
Mean	19.6	0.4	0.0	98.0	2.0	100.0	0.0	2.0
SD	0.5	0.5	0.0	2.7	2.7	0.0	0.0	2.7
n	5	5	5	5	5	5	5	5
Mean	20.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0
SD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
n	5	5	5	5	5	5	5	5
Mean	20.0	0.2	0.0	99.0	1.0	100.0	0.0	1.0
SD	0.7	0.4	0.0	2.2	2.2	0.0	0.0	2.2
n	5	5	5	5	5	5	5	5

INIT=initial number
FINAL IW PPT-interstitial salinity on day 10
SURV=number survivors
REBUR=number survivors which reburied
MORT=number dead=INIT-SURV
NOBURY=number of survivors not reburied-SURV-REBUR
TEM=total effective mortality=MORT+NOBURY

PSURV=%survival=100(SURV/INIT)
PMORT=%mortality=100(MORT/INIT)
PBURY=%reburial=100(REBUR/SURV)
PNOBURY=%survivors not reburied=100(NOBURY/SURV)
PTEM=%total effective mortality=100(TEM/INIT)

Appendix 1(a)

Table **Summary of sediment larval bioassay test results using *Mytilus galloprovincialis*.**

CLIENT DESCRIP	REPL	INIT	NORM	ABN	TOTAL	PMORT	PABN	PABND	NPM	NCMA
Sea water control	1	360	303	25	328	9.0	7.6	15.9	3.4	5.2
Sea water control	2	360	354	18	372	-3.2	4.8	1.8	-9.5	-10.8
Sea water control	3	360	312	19	331	8.2	5.7	13.4	2.5	2.4
Sea water control	4	360	308	18	326	9.5	5.5	14.5	4.0	3.6
Sea water control	5	360	321	20	341	5.4	5.9	10.9	-0.4	-0.4
West DMMU TEST	1	360	248	6	254	29.5	2.4	31.2	25.2	22.4
West DMMU TEST	2	360	226	0	226	37.3	0.0	37.3	33.5	29.3
West DMMU TEST	3	360	261	9	270	25.1	3.3	27.6	20.5	18.3
West DMMU TEST	4	360	258	1	259	28.1	0.4	28.4	23.7	19.3
West DMMU TEST	5	360	260	5	265	26.5	1.9	27.9	22.0	18.6
CARR 22 REF	1	360	298	7	305	15.4	2.3	17.3	10.2	6.8
CARR 22 REF	2	360	284	9	293	18.7	3.1	21.2	13.7	11.1
CARR 22 REF	3	360	309	9	318	11.8	2.8	14.3	6.4	3.3
CARR 22 REF	4	360	270	16	286	20.6	5.6	25.1	15.8	15.5
CARR 22 REF	5	360	300	7	307	14.8	2.3	16.8	9.6	6.1

	PMORT	PABN	PABND	NPM	NCMA
Mean	5.8	5.9	11.3	0.0	0.0
S.D.	5.3	1.0	5.6	5.6	6.4
n	5	5	5	5	5
Mean	29.3	1.6	30.5	25.0	21.6
S.D.	4.8	1.4	4.1	5.1	4.6
n	5	5	5	5	5
Mean	16.3	3.2	18.9	11.1	8.6
S.D.	3.5	1.4	4.2	3.7	4.8
n	5	5	5	5	5

INIT=number of inoculated embryos (from average of zero-time counts)
NORM=number normal
ABN=number abnormal
TOTAL=NORM+ABN
PMORT=percent mortality=100((INIT-TOTAL)/INIT)
PABN=percent abnormality=100(ABN/TOTAL)
PABND=combined percent mortality and abnormality=100((INIT-NORM)/INIT)
NPM=normalized percent mortality=100(1-(TOTAL/TS)),
where TS=average of total larvae counted in seawater controls
NCMA=normalized combined percent mortality and abnormality=100(1-(NORM/NS)),
where NS=average of normal larvae counted in seawater controls

zero counts	
a	382
b	380
c	338
d	346
e	356
Mean =	360

NS (mean normal)	TS (mean total)
319.6	339.6

%normal in SW cont relative to INIT

Appendix 1(b)

Table C-8 Summary of juvenile infaunal bioassay test results using *Neanthes arenaceodentata*.

SAMPLE DESCRIP	REPL	INIT NO.	SURV	MORT	INIT WT	TARE WT	WT COUNT	FINAL WT	PSURV	PMORT	TWT	WT	GR		TWT	WT	GR	PSURV	PMORT
control	1	5	5	0	0.38	56.99	5	126.16	100.0	0.0	69.2	13.8	0.67						
control	2	5	5	0	0.38	60.07	5	149.08	100.0	0.0	89.0	17.8	0.87	Mean	79.7	16.6	0.81	96.0	4.0
control	3	5	5	0	0.38	66.31	5	143.96	100.0	0.0	77.7	15.5	0.76	S.D.	11.5	2.0	0.10	8.9	8.9
control	4	5	4	1	0.38	59.37	4	128.04	80.0	20.0	68.7	17.2	0.84	n	5	5	5	5	5
control	5	5	5	0	0.38	59.59	5	153.69	100.0	0.0	94.1	18.8	0.92						
West DMMU TEST	1	5	5	0	0.38	64.24	5	140.41	100.0	0.0	76.2	15.2	0.74						
West DMMU TEST	2	5	5	0	0.38	59.12	5	115.12	100.0	0.0	56.0	11.2	0.54	Mean	64.4	13.5	0.66	96.0	4.0
West DMMU TEST	3	5	5	0	0.38	59.65	5	128.80	100.0	0.0	69.2	13.8	0.67	S.D.	8.8	2.3	0.12	8.9	8.9
West DMMU TEST	4	5	5	0	0.38	58.51	5	114.18	100.0	0.0	55.7	11.1	0.54	n	5	5	5	5	5
West DMMU TEST	5	5	4	1	0.38	63.82	4	128.69	80.0	20.0	64.9	16.2	0.79						
CARR 22 REF	1	5	5	0	0.38	63.15	5	109.28	100.0	0.0	46.1	9.2	0.44						
CARR 22 REF	2	5	4	1	0.38	59.83	4	107.08	80.0	20.0	47.3	11.8	0.57	Mean	46.4	10.1	0.48	92.0	8.0
CARR 22 REF	3	6	6	0	0.38	63.24	6	104.67	100.0	0.0	41.4	6.9	0.33	S.D.	8.8	3.4	0.17	11.0	11.0
CARR 22 REF	4	5	4	1	0.38	62.35	4	122.68	80.0	20.0	60.3	15.1	0.73	n	5	5	5	5	5
CARR 22 REF	5	5	5	0	0.38	59.22	5	95.95	100.0	0.0	36.7	7.3	0.35						

INIT NO.=initial number of worms exposed
FINAL IW PPT=interstitial salinity in ppt on day 20
SURV=number of worms surviving after 20 days
MORT=number of worms dead after 20 days
INIT WT=mean weight of worms sampled on day zero (mg)
TARE WT=weight of pan used for that replicate on day 20 (mg)
WT COUNT=number of worms weighed at test end
FINAL WT=TARE WT + weight of worms recovered on day 20 (mg)
PSURV=% SURV=100(SURV/INIT NO.)
PMORT=%MORT=100(MORT/INIT NO.)
TWT=total biomass=FINAL-TARE
WT=individual biomass=TWT/WT COUNT
GR=individual growth rate=(WT-INIT WT)/20

INIT WT

pan#	tare wt	total wt	# weighed	individual wt
1	27.14	29.24	5	0.42
2	24.72	26.54	5	0.36
3	28.42	30.26	5	0.37
			MEAN	0.38

Appendix 1(c)