CENPS-OP-DMMO

MEMORANDUM FOR RECORD 3 May 1994

SUBJECT: DETERMINATION ON THE SUITABILITY OF DREDGED MATERIAL TESTED FOR THE INNER CHANNEL OF GRAYS HARBOR OPERATION AND MAINTENANCE DREDGING PROJECT (PN: CENPS-OP-NP-71 DATED 15 OCTOBER 1990) FOR DISPOSAL AT EITHER THE SOUTH JETTY OR POINT CHEHALIS ESTUARINE OPEN WATER DISPOSAL SITES, OR AT THE 3.9 MILE OCEAN DISPOSAL SITE; AND DREDGED MATERIAL DREDGED FROM THE OUTER NAVIGATION CHANNEL (PN: CENPS-OP-NP-80) FOR PLACEMENT AT THE BREACHED SPIT AND ADJACENT BEACHES NEAR WESTPORT, WASHINGTON (PN: 94-2-00322).

1. The following summary reflects the consensus determination of the 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 2,600,000 cubic yards of material scheduled for maintenance dredging from the federally maintained inner channel, Grays Harbor, Washington for disposal at either the South Jetty or Point Chehalis estuarine disposal sites, or at the 3.9 mile ocean disposal site. The determination of suitability is based on the acceptability of the sampling plan and all relevant test data contained in April 14, 1994 SAIC Data Summary Report.

2. This suitability determination also includes the material dredged from the outer navigation channel (South Reach, Entrance Channel, and Point Chehalis Reach) proposed for placement at the breached spit and adjacent beaches near Westport, Washington, to restore the area to prebreached condition as described in Public Notice 94-2-00322. Table 1 provides a summary of the volumes and Figure 1 shows the locations of the material to be dredged within each of the outer harbor reaches to accomplish the proposed restoration project. This material is predominantely sand and is removed from known contamination sources, and therefore, meets the exclusionary criteria outlined in 40 CFR 230.60(a),(b),(c), and (d) of the Clean Water Act (CWA). Therefore, the agencies with jurisdiction on dredging and disposal agreed that the material to be dredged for placement and restoration of the breached spit at Westport, Washington, does not require testing under Section 404 of the CWA. It should be noted that the Washington State Parks Department has jurisdiction over the state owned tidal lands proposed for dredged material placement under the aforementioned public notice. The Department of Natural Resources does not have jurisdiction for the placement of the material at the breached spit and adjacent beaches near Westport, Washington.

3. The Agencies' approved sampling and analysis plan for testing the inner harbor dredging area was followed, and quality assurance/quality control guidelines specified by the interim Grays Harbor sampling and testing guidelines, which incorporate by reference those recommended by the PSEP and the PSDDA programs, were generally complied with. The data gathered were deemed sufficient and acceptable for decision making by the Agencies based on best professional judgement.

Table 1. Outer Harbor Reaches.

Dredging Area	Estimated Volume (cubic yards)	Dredge Equipment	Notes
Outer South Reach	500,000 - 1,000,000 sand	Hopper, Pipeline, Mechanical	STA 490+00 - 629+00 Dredging depth 46' Normal Depth 38' + 2' OD[1]
Entrance/Pt. Chehalis Reaches	500,000 sand	Hopper/Pipeline	STA 325+00 - 425+00 Dredging Depth 46' Normal Depth 40' to 44' + 2' OD[2]

1/ The outer South Reach may be dredged either by hopper, clamshell, or pipeline dredge. Hopper dredged material may be pumped out directly to the spit from a moorage buoy in the vicinity of Half Moon Bay Berm site and by pipeline onto the spit. Pipeline dredged material will be pumped directly to the spit by way of the rock pier or by way of Point Chehalis. Clamshell dredged material would be transported to the rock pier and pumped to the spit.

2/ The Entrance/Point Chehalis Reaches will be dredged by hopper dredge and be either pumped out directly onto the spit from a moorage buoy and pipeline in the vicinity of Half Moon Bay or from the rock pier.

Table 2. Summary of Sampling and Compositing within each Inner Channel Reach for the Grays Harbor O&M Project.

Channel Reach	Estimated Volume (cubic yards)	Minimum No. of Samples	Minimum No. of Analyses (Composite ID)
Elliott Slough Turning Basin	75,000	not sampled	not sampled
Cow Point	600,000 (290,000)[1]	38	5 (C5, C6, C7, C8, C9)
Hoquium	140,000	16	2 (C3, C4)
North Channel	120,000	15	2 (C1, C2)
Crossover	600,000	not sampled	not sampled
TOTALS	1,535,000 total volume (550,000 tested volume)	69	9

1/ Volume characterized of total reach volume.

4. The sampling and compositing strategy consisted of targeting shoaled upstream areas around possible contaminant sources, as well as areas showing SL exceedances in 1992 O&M testing, as locations for retesting. The sampling targeted approximately one-third of the total dredging volume from shoaled areas to be dredged within the five reaches of the inner channel (1.535 million cubic yards. A total of 2.6 million cubic yards of dredging is estimated when including the material from the outer reaches.

5. Previous testing in 1992 from eight composited analyses stratified within shoaled areas from four of the inner channel reaches (excluding Elliott Slough Turning Basin) showed the O&M material to be suitable for unconfined open-water disposal. Chemical testing data from these analyses showed that only two of the eight analyses had minor detected chemical exceedances of PSDDA screening level (SL) guidelines (1992 SDM).

6. Sampling in 1994 consisted of compositing 69 samples for nine analyses within shoaled areas from Cow Point, Hoquiam, and North Channel Reaches as depicted in Table 2 and Figures 2-5. In addition to the 58 chemicals of concern routinely analyzed under the PSDDA program, congeners of dioxin including 2,3,7,8-TCDD were quantified as well as the biocide sevin.

7. Sediment conventional parameters for each of the nine composited analyses are depicted in Table 3. Chemical analyses conducted on the nine composited samples indicated that there were no detected or undetected exceedances of screening levels for the 58 chemicals of concern. PSDDA SL's are used in Puget Sound to establish a concern for biological effects, where chemicals below the SL have a low level of concern. In this context, they are only used in Grays Harbor as an interim yardstick to evaluate chemical concentration levels measured in sediments. Sevin was undetected in the nine analyses.

Table 3. Sediment Conventional Parameters for all nine dredged material management units and reference sediment.

Parameter	C1	C2	C3	C4	C5	C6	C7	C8	C9	Reference GHS7
Grain Size:										
% Gravel	0	0	0	0	0	0	0	0	0	0
% Sand	45	16	34	30	19	14	26	29	38	56
% Silt	45	73	55	57	65	72	65	54	49	39
% Clay	10	11	11	13	16	14	9	17	13	5
% Fines	55	84	66	70	81	86	74	71	62	44
Total Solids	49	35	43	42	38	38	36	40	43	52
Volatile Solids	3.2	5.6	4.3	4.4	4.9	4.9	4.9	4.5	4.4	2.6
Total Organic Carbon	1.2	2.3	1.8	1.3	1.9	2.1	2.0	1.5	1.7	1.0
Total Sulfides	0.12u	14	3.6	20	1.7	33	1.6	18	32	0.12u
Total Ammonia	7.1	7.7	7.0	8.4	5.1	9.0	5.7	6.3	9.1	2.0

8. Nine composited sediment samples were also analyzed for dioxins by Twin City Testing Corporation utilizing EPA method 8290. These data are summarized in Table 4. Results indicated that 2,3,7,8 TCDD (Tetrachloro-Dibenzo-p-Dioxin) was detected in all nine samples ranging from a low of 1.6 to a high of 2.9 pptr (parts per trillion). This congener is regarded by the EPA as the most toxic form of dioxin. A few other less toxic dioxin congeners were detected at low parts per trillion concentrations. In the following table, the toxicity equivalence in terms of 2,3,7,8-TCDD is shown for

the nine most toxic congeners of furan and dioxin (U expresses the detection limit for congeners that could not be quantified).

9. One way to summarize potential toxicity for mammals is to calculate the toxicity equivalent concentrations (TEC) measured in tissue. Total TEC is calculated by multiplying the toxicity equivalent factor (TEF) by the congener specific concentration and summing the TEC's for all congeners. Total TEC comparisons are usually used for food ingestion, and have limited applicability to sediment because TEC **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. For comparison purposes only, the TEC's ranged from a low of 4.54 to a high of 7.67 pptr.

10. Based on the Agencies' present best professional judgment, these low concentrations are unlikely to be environmentally harmful for this project. The Agencies' consensus is that the material is suitable for either estuarine or ocean unconfined open-water disposal relative to these dioxin test results.

11. Two DMMU, C3 and C9 underwent biological testing after chemical analyses were completed and reviewed by the Agencies. Chemical analyses for these two DMMU showed no chemical guideline exceedances, and two DMMU were selected by the Dredged Material Management Office in consultation with the Agencies for biological testing based on the conceptual sampling and analysis plan for confirmatory analyses. The results of these analyses are summarized in Table 5 below. The results showed that for the two DMMU tested, biological testing results passed PSDDA disposal interpretation guidelines for dispersive sites for the echinoderm sediment larval test and the *Neanthes* 20-day biomass test. The results of the amphipod bioassay were equivocal due to high mortalities exhibited by both reference sediment and test sediments, where the reference sediment failed to meet the performance standard (< 20 % mortality over control). The test was rerun after the bioassay testing lab consulted the Dredged Material Management Office and the Agencies, but failed to meet the control performance standard (≤ 10% mortality). Discussions with the bioassay lab indicated that the source of the amphipods (*Ampelisca abdita*) on the West Coast (Brezina & Associates; Dillion Beach California) have reported animal viability and performance problems from other bioassay testing labs using the same population during this time frame. Heavy rains during this period may be negatively impacting the testing population, which is serving as the source for the amphipods for the two testing rounds. Attempts to secure animals from another source on the east coast were unsuccessful due to severe winter storms. After consulting the Dredged Material Management Office and discussions with the Agencies, a decision was made to set aside the results of the amphipod test for suitability decisionmaking. Based on the results of the echinoderm and *Neanthes* bioassays, these two DMMU passed dispersive disposal guidelines.

12. Based on the chemistry and biological testing results described above no bioassay or bioaccumulation testing was required for the remaining seven DMMU that did not undergo biological testing.

13. The Agencies concluded based on the above discussion and summary of sediment chemical and biological characterization results for the inner harbor of the Grays Harbor Operations and Maintenance Project, that all the dredged material tested (550,000 cubic yards) is suitable for disposal at either the South Jetty or Point Chehalis estuarine disposal sites, or at the 3.9 mile ocean disposal site.

14. Based on this analysis, the agencies also concluded that the material proposed for dredging from the outer harbor area is suitable for placement at the Westport, Washington restoration site.

Table 4. Native congeners of Dioxin quantitated in Grays Harbor O&M sediments.

NATIVE CONGENERS[1] (pptr)	TEF[2]	C1 (TEC)	C2 (TEC)	C3 (TEC)	C4 (TEC)	C5 (TEC)	C6 (TEC)	C7 (TEC)	C8 (TEC)	C9 (TEC)
2,3,7,8-TCDD	1	1.7 (1.7)	2.9 (2.9)	2.0 (2.0)	2.4 (2.4)	2.5 (2.5)	2.8 (2.8)	1.6 (1.6)	2.1 (2.1)	1.9 (1.9)
1,2,3,7,8-PeCDD	0.5	2.4 (1.2)	4.2 (2.1)	2.8 (1.4)	3.5 (1.75)	3.5 (1.75)	3.9 (1.95)	2.3 (1.15)	2.8 (1.4)	2.6 (1.3)
1,2,3,7,8-HxCDD	0.1	9.26 (0.09)	12.3 (1.23)	9.82 (0.98)	11.9 (1.19)	10.6 (1.06)	12.7 (1.27)	8.0 (0.8)	10.9 (1.09)	9.7 (0.97)
1,2,3,4,7,8-HpCDD	0.01	31.0 (0.31)	38.0 (0.38)	35.0 (0.35)	40.0 (0.4)	30.0 (0.3)	46.0 (0.46)	32.0 (0.32)	36.0 (0.36)	35.0 (0.35)
OCDD	0.001	220 (0.01)	170 (0.17)	190 (0.19)	250 (0.25)	160 (0.16)	240 (0.24)	180 (0.18)	190 (0.19)	210 (0.21)
2,3,7,8-TCDF	0.1	4.7 (0.47)	1.6 (0.16)	1.4 (0.14)	1.5 (0.15)	1.7 (0.17)	2.0 (0.2)	1.3 (0.13)	1.8 (0.18)	1.6 (0.02)
1,2,3,7,8-PeCDF	0.05	0.29u (0.01)	0.34u (0.01)	0.3u (0.01)	0.44 (0.02)	0.44u (0.01)	0.43u (0.01)	0.27u (0.01)	0.4u (0.01)	0.45 (0.02)
2,3,4,7,8-PeCDF	0.5	0.41u (0.10)	0.56 (0.28)	0.48 (0.24)	0.63 (0.32)	0.74 (0.37)	0.74 (0.37)	0.34u (0.17)	0.59 (0.3)	0.53 (0.27)
1,2,3,7,8-HxCDF	0.1	0.66 (0.07)	1.51 (0.15)	1.75 (0.17)	2.22 (0.22)	1.69 (0.17)	2.16 (0.22)	1.69 (0.08)	2.12 (0.21)	1.91 (0.19)
1,2,3,7,8-HpCDF	0.01	8.7 (0.01)	8.58 (0.09)	9.48 (0.09)	9.7 (0.10)	7.44 (0.07)	12.7 (0.13)	7.9 (0.01)	9.0 (0.09)	9.56 (0.10)
OCDF	0.001	13 (0.01)	14 (0.01)	14 (0.01)	16 (0.02)	9.9 (0.01)	18 (0.02)	12 (0.01)	13 (0.01)	12 (0.01)
TOTALS:		(3.98)	(7.48)	(5.58)	(6.8)	(6.57)	(7.67)	(4.54)	(5.94)	(5.48)

[1] TCDD = Tetrachlorodibenzodioxin; TCDF = Tetrachlorodibenzofuran
PeCDD = Pentachlorodibenzodioxin; PeCDF = Pentachlorodibenzofuran
HxCDD = Hexachlorodibenzodioxin; HxCDF = Hexachlorodibenzofuran
HpCDD = Heptachlorodibenzodioxin; HpCDF = Heptachlorodibenzofuran
OCDD = Octachlorodibenzodioxin; OCDF = Octachlorodibenzofuran

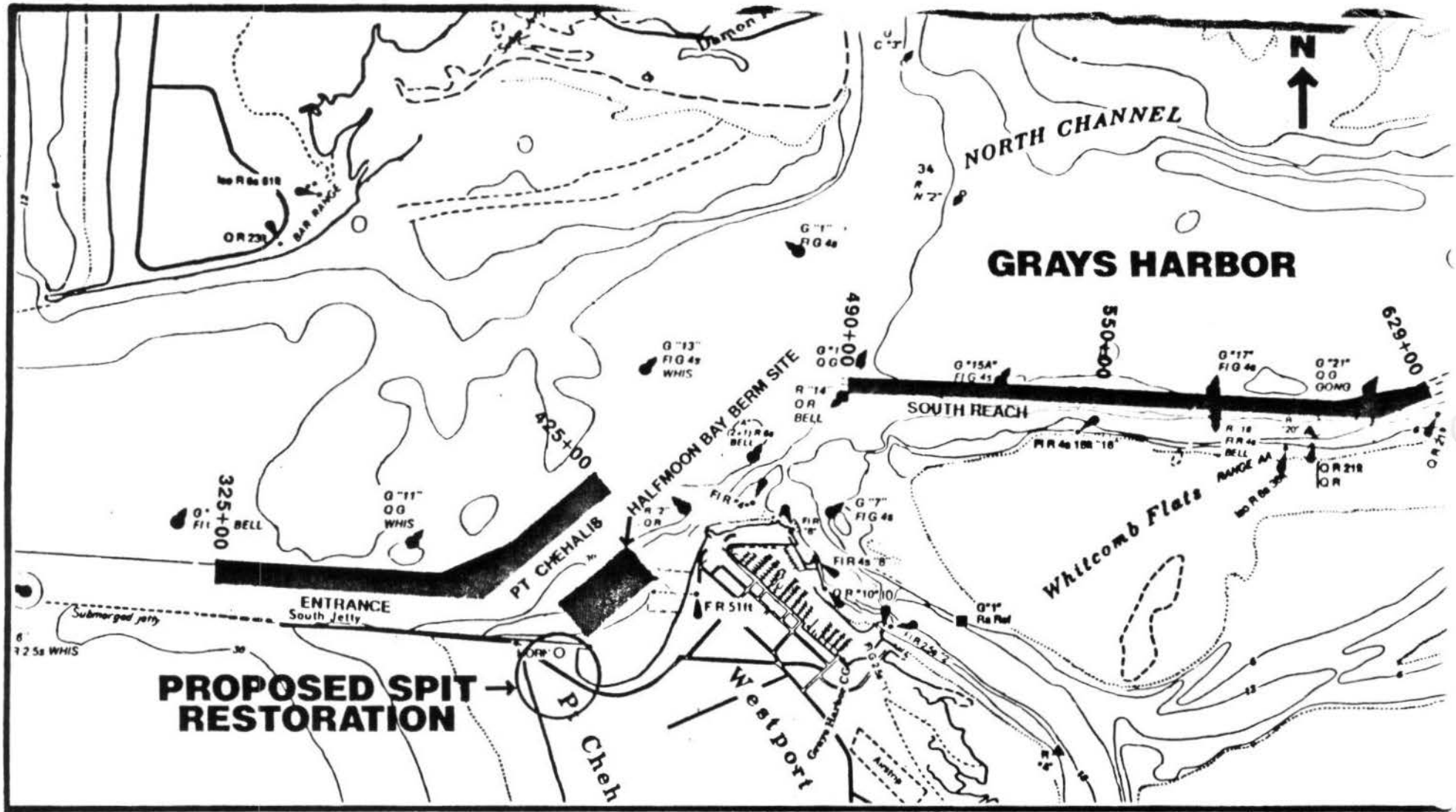
[2] Toxicity Equivalent Factor

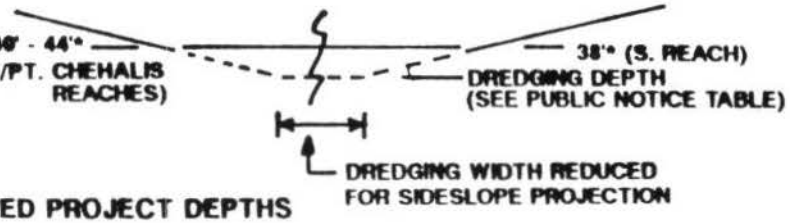
Table 5. Biological Testing Summary.

STATION	Amphipod Mortality (%)	Echinoderm		20-day *Neanthes* Biomass		
		Mort.+Abnorm. (%)	Abnormality (%)	Mortality (%)	Biomass (mg/worm dry wgt.)	Biomass % of reference
Control	9	N/A	6.6	0.0	6.3	126
GHS7 Reference	47 (QA)	0.0	8.8	4.0	5.0	--
C3	55	9.4	9.8	4.0	5.1	102
C9	63 *	2.7	8.9	0.0	6.6	132
Reference toxicant	96 hr LC50 0.22 mg/l Cd	72 hr EC50 6.23 mg/l Cd			96 hr LC50 7.18 mg/l Cd	

* Significantly different from reference sediment ($p \leq 0.05$).

15. This memorandum documents the suitability of proposed dredged sediments for unconfined open-water disposal at either a DNR estuarine disposal or EPA ocean disposal site. This memorandum also documents agency determinations on the suitability of dredged sediments from the outer harbor for placement at the Westport, Washington breached spit site. It does not constitute final agency approval of the project. A public notice was issued for dredged material placement at the breached spit (94-2-00322) at Westport, Washington. An erratum was issued on 9 May 1994 for the above public notice, and stated that the City of Westport is no longer the project proponent and therefore is no longer an applicant for a permit. The Corps of Engineers, Seattle District (CENPS-OP-NP-80) is now the project proponent for this project. During the public comment period, which follows this public notice, the resource agencies will provide input on the overall federal 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.





*AUTHORIZED PROJECT DEPTHS

CHANNEL CROSS SECTION

NOT TO SCALE

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
Seattle, Washington

WESTPORT, WA & VICINITY
Dredging/South Jetty Spit Restoration
CHANNEL DREDGING

DATE	PUBLIC NOTICE	SHEET
1 APRIL 1994	CENPS-OP-NP-80	3 OF 3

94-2-00322

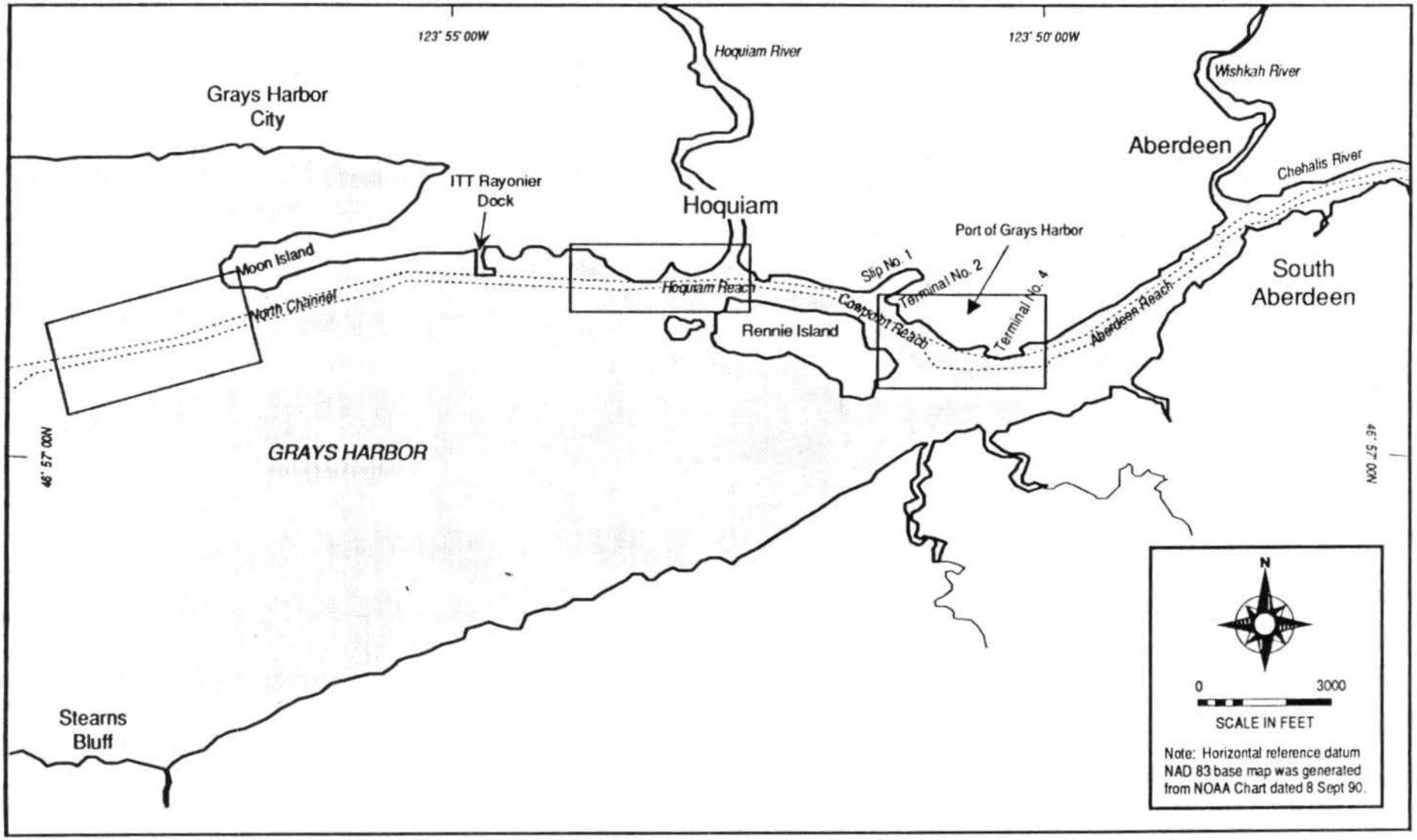


Figure 2-1. Grays Harbor Sediment Characterization Study sediment sampling locations.

SUBJECT: DETERMINATION ON THE SUITABILITY OF DREDGED MATERIAL TESTED FOR THE INNER CHANNEL OF GRAYS HARBOR OPERATION AND MAINTENANCE DREDGING PROJECT (PN: CENPS-OP-NP-71 DATED 15 OCTOBER 1990) FOR DISPOSAL AT EITHER THE SOUTH JETTY OR POINT CHEHALIS ESTUARINE OPEN WATER DISPOSAL SITES, OR AT THE 3.9 MILE OCEAN DISPOSAL SITE; AND DREDGED MATERIAL DREDGED FROM THE OUTER NAVIGATION CHANNEL (PN: CENPS-OP-NP-80) FOR PLACEMENT AT THE BREACHED SPIT AND ADJACENT BEACHES NEAR WESTPORT, WASHINGTON (PN: 94-2-00322).

Concur:

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Enclosures

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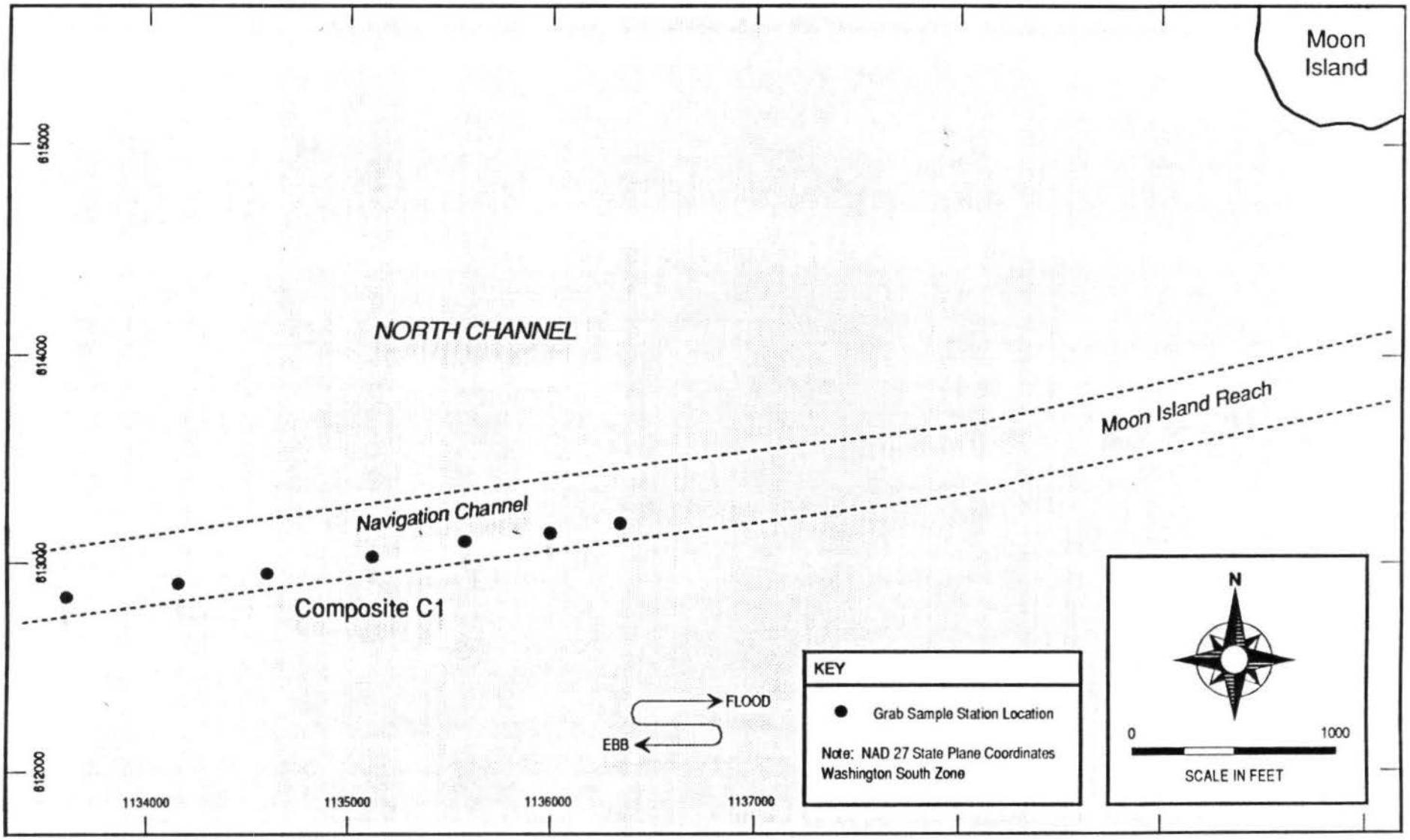

Figure 2-2. Grays Harbor Sediment Characterization Study sediment sampling locations - North Channel.

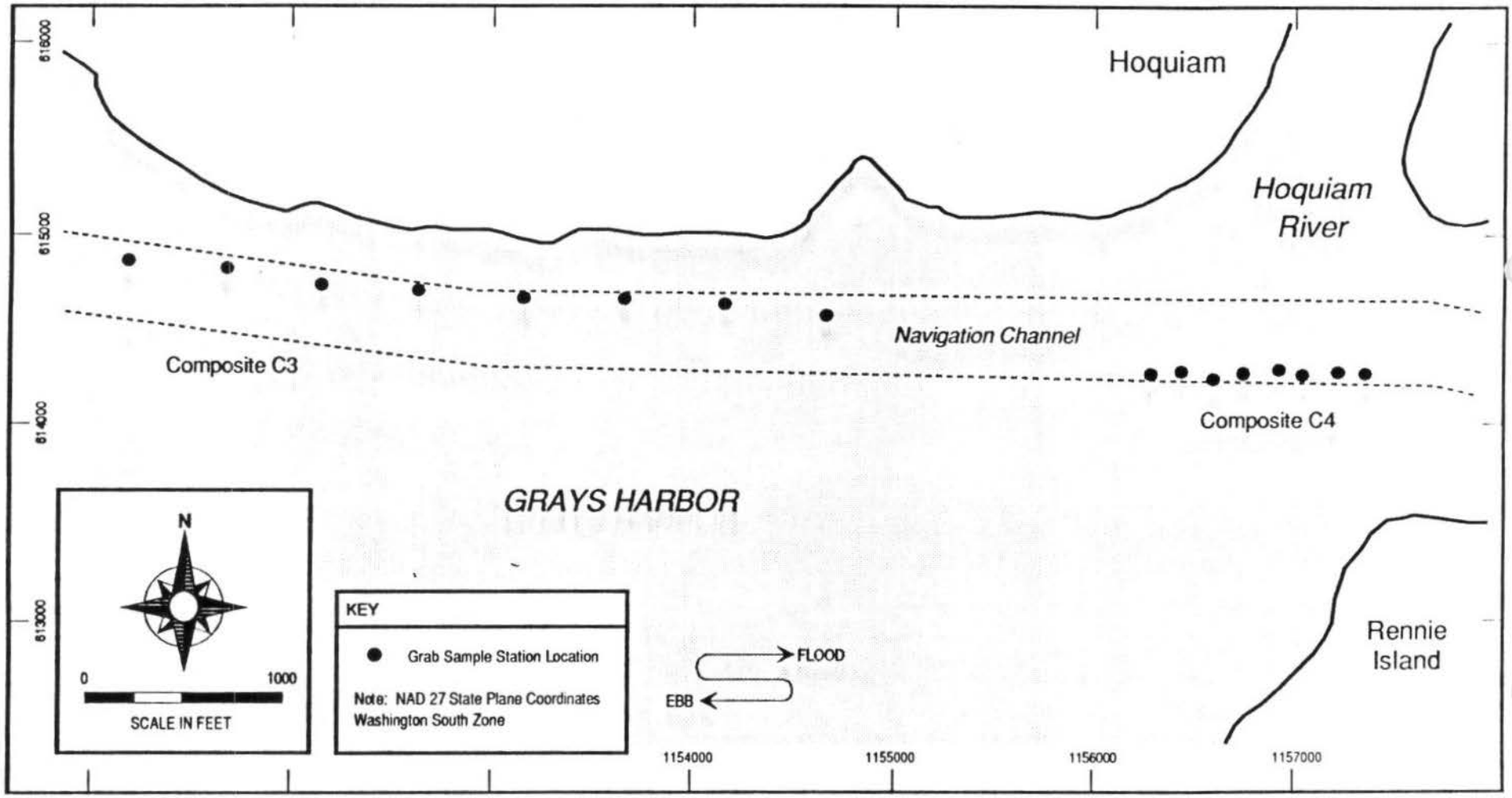

Figure 2-3. Grays Harbor Sediment Characterization Study sediment sampling locations - Hoquiam Reach.

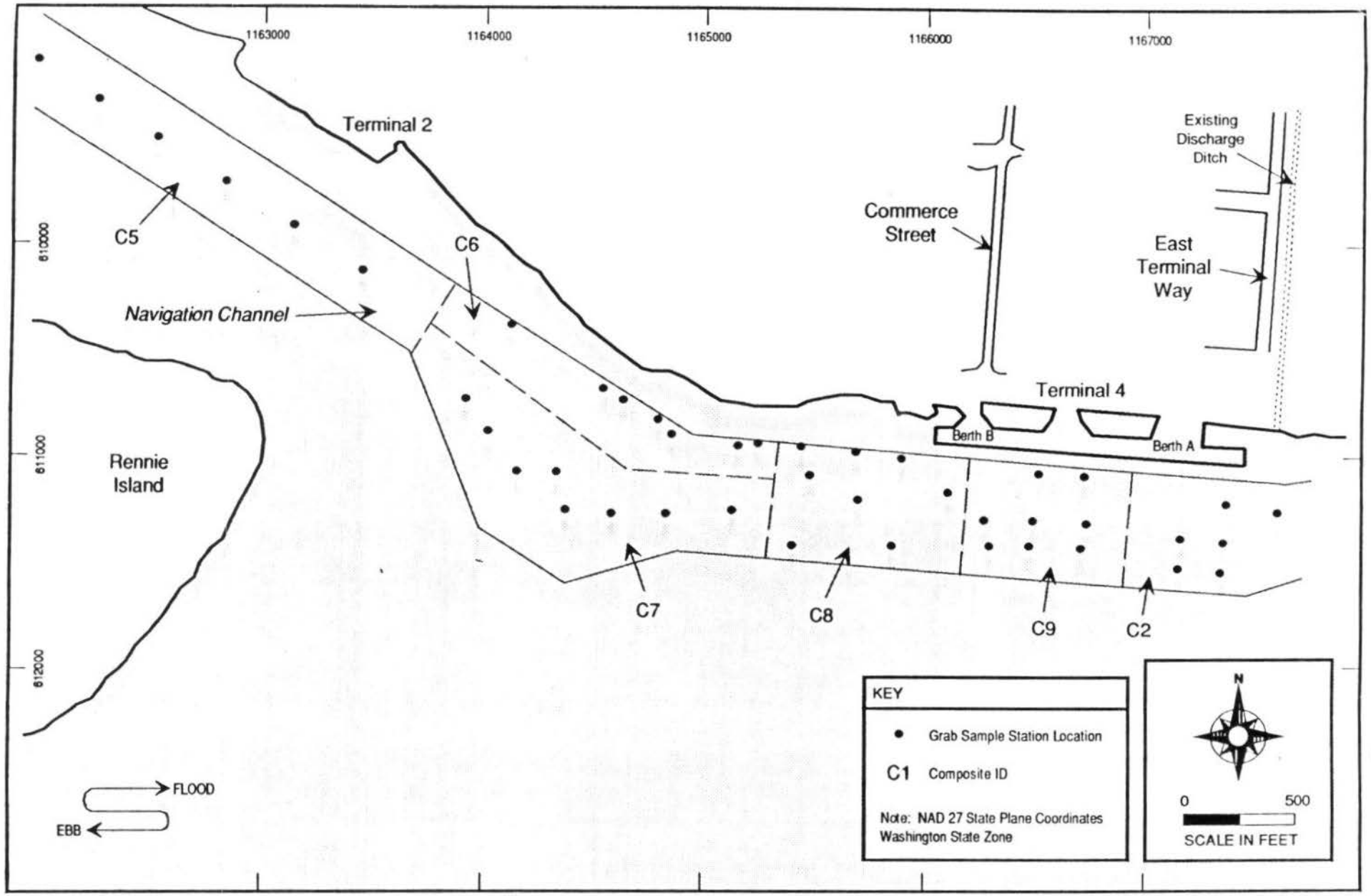

Figure 2-4. Grays Harbor Characterization Study sediment sampling locations - Cow Point Reach.