DREDGING AND DISPOSAL ROAD MAP

April 7, 1995

San Francisco Bay Conservation and Development Commission

United States Army Corps of Engineers
San Francisco District

The Long Term Management Strategy (LTMS) Reuse/Upland Work Group has studied opportunities for reusing and disposing dredged material at a variety of other sites. As a part of this effort, approximately 75 sites potentially suitable for beneficial reuse projects, rehandling facilities, or confined disposal have been examined and ranked based on engineering, environmental, and land use factors. As a result, the feasibility of expanding reuse operations at three existing facilities was found to be high while implementing projects at another 17 sites (12 in San Pablo Bay, 2 in Suisun Bay, 2 in the South Bay, and 4 in the Delta) also ranked highly.

Recent LTMS efforts have focused on implementation options at several of the most feasible sites, including: Hamilton Army Air Field (Marin County); North Point Property (Sonoma County); Mare Island Naval Ship Yard (Solano County); and Rio Vista Airport Borrow Pits (Solano County). Preliminary findings indicate that the implementation of reuse projects at these sites would require, among other things: acquisition of privately-owned sites and/or the involvement of a party interested in sponsoring a particular reuse project; potential mitigation for the loss of jurisdictional wetlands or seasonal wetland habitat; and adequate funding.

The dates potential reuse and/or disposal sites would be available have been estimated (see Table 2). These dates represent the earliest date of availability, and are based on the assumption that project sponsors currently exist and are already working toward implementation. Further, these dates are later than shown in the first Road Map (1992). For example, the Road Map originally indicated that the Sonoma Baylands and Montezuma site would be available during the second and third quarters of 1993, respectively. The delays in these projects can be attributed in part to their experimental nature as well as obstacles encountered which were not initially anticipated. Many of the factors affecting the progress of earlier projects are now better understood. Consequently, during the planning stage of future reuse projects, strategies could be developed to help overcome or address such obstacles. With the use of these strategies, implementation time for future reuse projects should be significantly shorter. Preliminary conceptual plans already developed for many of these sites will also help to reduce implementation time.

The data collected through the LTMS studies will aid in the development of policies that address the constraints typical of beneficial reuse projects, and thus facilitate implementation of such projects in the future.

3. **Ocean Disposal**. In fall, 1994, the U.S. Environmental Protection Agency (U.S. EPA) designated a dredged material disposal site in deep ocean waters about fifty miles from the Golden Gate. U.S. EPA has set an interim annual disposal capacity of the site, pending completion of the LTMS, of up to 6 mcy. This site was previously used by the Department of the Navy, pursuant to a separate single-project permit, to dispose approximately 850,000 cy of dredged material. In 1996, this site will be used for the disposal of approximately 2.9 mcy of dredged material from the Port of Oakland deepening project.

Road Map

The Commission and the Corps produced an *Interim Disposal Policy Road Map*, dated April 4, 1992, to advise permit applicants about dredging and disposal activities and to guide regulatory decisions while the LTMS was being prepared. Besides providing information about dredging and disposal activities in the San Francisco Bay region, the Road Map contains information regarding existing and potential disposal sites.

Map 1 shows the locations of major dredging projects in the San Francisco Bay. [1] Table 1 lists: (1) the amount of material dredged in 1994; (2) the volumes proposed for dredging in 1995 and 1996; and (3) actual and proposed disposal sites. Chart 1 shows the volume of material dredged and disposed in 1994. Chart 2 shows the percentage of dredged material projected for

1 Map 1 includes areas dredged historically for U.S. Naval operations that are scheduled for base closure. At some of these sites, dredging may continue in the future.

- To achieve broad support for solutions to Bay dredging problems both environmental and economic concerns must be addressed.

- There is need for an interim disposal policy pending adoption of the LTMS plan.

The Bay Plan amendment recognized that regular dredging is likely to continue, capacity of existing disposal sites is limited, and ocean and non-tidal disposal sites are necessary to accommodate future dredging projects (see attached Bay Plan Amendment No. 3-91). To develop such solutions, the Bay Plan was also amended to establish the policy basis for the Commission's involvement in the LTMS. This Commission action was consistent with the San Francisco Bay Dredging Act of 1991, which directed and funded the Commission's involvement in the LTMS, and which became effective on January 1, 1992.

TABLE 1
Dredging and Disposal Projects
(Provided for planning purposes. Figures contained herein are preliminary estimates .)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site
CALENDAR YEAR 1994			
San Francisco Harbor Main Ship Channel [1]	600,000	887,000	Ocean 102 (SF-8)
Oakland Harbor			
• Inner & Outer Harbor, 42' Deepening [2]	2,600,000	0	Sonoma Baylands
• Inner & Outer Harbor [1]	400,000	60,000	Alcatraz (SF-11)
• Port Maintenance	150,000	126,490	Alcatraz (SF-11)
		6,852	Upland (on-site)
Arco	50,000	0	Alcatraz (SF-11)
Chevron	150,000	0	Alcatraz (SF-11)
City & County of San Francisco Marina	50,000	17,345	Sand Reclamation
		43,864	Alcatraz (SF-11)
Clipper Yacht Harbor (Richardson Harbor)	45,000	8,726	Alcatraz (SF-11)
Coyote Point Marina	130,000	118,500	Alcatraz (SF-11)
Greenbrae Marina (Larkspur)	70,000	75,000	Alcatraz (SF-11)
N.A.S. Alameda (U.S. Navy)	1,200,000	219,000	Alcatraz (SF-11)
Paradise Cay (Tiburon)	10,000	0	Alcatraz (SF-11)
Port of Redwood City Marina	10,000	15,000	Alcatraz (SF-11)
Port of San Francisco	169,000	26,000	Alcatraz (SF-11)
Red Rock Marina (Richmond)	20,000	0	SF-11 or SF-10
Richmond Harbor			
• Inner & Outer & Southampton Shoal [1]	700,000	300,000	Alcatraz (SF-11)
• Port of Richmond (Berths)	178,500	28,500	Alcatraz (SF-11)
Strawberry Recreation District	25,000	0	Alcatraz (SF-11)
U.S.C.G. Horseshoe Cove	15,000	15,000	Alcatraz (SF-11)
U.S.C.G. Yerba Buena Island	40,000	40,000	Alcatraz (SF-11)
Larkspur Ferry Terminal	600,000	0	San Pablo (SF-10)
Marin Yacht Club	2,000	1,000	San Pablo (SF-10)
San Rafael Creek (River Channel) [1]	60,000	0	San Pablo (SF-10)
Benicia Port Terminal	60,000	25,771	Carquinez (SF-9)
City of Benicia	20,000	919	Carquinez (SF-9)
Exxon	27,000	7,597	Carquinez (SF-9)
Mare Island Strait [1]	1,000,000	120,100	Carquinez (SF-9)
Shell Oil (Martinez)	50,000	0	Carquinez (SF-9)
Wickland Oil	5,000	0	Carquinez (SF-9)
Alameda County	120,000	0	Upland (on-site)
Allied Signal	12,803	16,800	Upland (Kettlemen's Landfill)
Contra Costa Flood District	6,000	4,800	Upland (on-site)
Napa River [1]	250,000	0	Upland (Napa River)
New York Slough [1]	100,000	32,500	Jersey Island

1 Maintained by the U.S. Army Corps of Engineers.
2 New work project.

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site
CALENDAR YEAR 1995			
San Francisco Harbor Main Ship Channel [1]	600,000	0	Ocean 102 (SF-8)
Oakland Harbor			
• Inner/Outer Harbor, 42' Deepening [2]	2,500,000	0	Sonoma Baylands
	1,200,000	0	Galbraith Golf Course
• Inner Harbor [1]	800,000	0	Alcatraz (SF-11)
• Berths 25, 32, 33, 38, 60, 61 , 62, & 63 [1]	145,000	0	Galbraith Golf Course
• Howard Terminal	200,000	0	Upland (on-site)
• Port Maintenance	120,000	0	Alcatraz (SF-11)
Belvedere Cove	3,000	0	Alcatraz (SF-11)
Candlestick Point [2]	70,000	0	Alcatraz (SF-11)
Clipper Yacht Harbor (Richardson Harbor)	26,000	0	Alcatraz (SF-11)
Greenbrae Marina (Larkspur)	15,000	0	(SF-11) or (SF-10)
Larkspur Ferry Terminal	480,000	0	Alcatraz (SF-11)
Paradise Cay (Tiburon)	10,000	0	Alcatraz (SF-11)
Port of Redwood City Marina	1,500	0	Alcatraz (SF-11)
Port of San Francisco	47,000	0	Alcatraz (SF-11)
	40,000 [2]	0	
Port Sonoma-Marin	45,000	0	Alcatraz (SF-11)
Red Rock Marina (Richmond)	20,000	0	SF-11 or SF-10
Richmond Harbor			
• Inner/Outer & Southampton Shoal [1]	700,000	0	Alcatraz (SF-11)
• Port of Richmond (Berths)	123,500	0	Alcatraz (SF-11)
San Francisco Drydock (Pier 70)	144,000	0	Alcatraz (SF-11)
Schnitzer Steel Co. (Oakland Harbor)	13,000	0	Alcatraz (SF-11)
Strawberry Recreation District	5,000	0	Alcatraz (SF-11)
Unocal (Richmond Inner Harbor)	18,200	0	Alcatraz (SF-11)
City of San Rafael, Dept. of Public Works	63,000	0	San Pablo (SF-10)
Loch Lomond Yacht Harbor (San Rafael)	48,590	0	San Pablo (SF-10)
Pinole Shoal [1]	480,000	0	San Pablo (SF-10)
San Rafael Rock Quarry	27,600	0	San Pablo (SF-10)
Benicia Port Terminal	30,000	0	Carquinez (SF-9)
City of Benicia	19,376	0	Carquinez (SF-9)
Exxon (Carquinez Strait)	10,000	0	Carquinez (SF-9)
Mare Island Strait [1]	850,000	0	Carquinez (SF-9)
Shell Oil (Martinez)	40,000	0	Carquinez (SF-9)
Cargill Salt (North Bay)	94,500	0	Upland (on-site)
Montezuma Harbor	1,000	0	Upland (on-site)
SIMS-LMC Recyclers (Redwood Creek)	700	0	Upland (on-site)
Southern Sonoma County R.C.D.	10,000	0	Upland (on-site)
Suisun Slough	115,000	0	Pierce Island
Jerico Products, Inc.	200,000	0	Sand Reclamation
Tidewater Sand and Gravel (Moe Sand)	600,000	0	Sand Reclamation

1 Maintained by the U.S. Army Corps of Engineers.
2 New work project.

TABLE 1 (cont.)

Dredging Project	Projected Volume Dredged (cubic yards)	Actual Volume Dredged (cubic yards)	Disposal Site
CALENDAR YEAR 1995			
Jones Sand Co.	250,000	0	Sand Reclamation
TOTAL 1995			
	600,000	0	***Ocean***
	2,681,200	0	***Alcatraz (SF-11)***
	619,190	0	***San Pablo (SF-10)***
	949,376	0	***Carquinez (SF-9)***
	0	0	***Suisun Bay***
	4,266,200	0	***Upland***
	1,050,000	0	***Sand Reclamation***
TOTAL 1995 Dredging & Disposal Volumes	10,165,966	0	

TABLE 2
Dredged Material Disposal Options

(Provided for planning purposes. Figures contained herein are preliminary estimates.)

Disposal Site (County) [1]	Site Status [2]	Implementation Costs (million dollars)	Disposal Cost Per Cubic Yard (dollars) [3]	Site Capacity	Feasibility of Use	Comments
In-Bay						
1) Alcatraz (SF-11)	In use.	0	2-3	4 million cubic yards (mcy)/yr	Existing /High	Site use constraints: limited capacity; seasonal restrictions.
2) Carquinez Strait (SF-9)	In use.	0	5-6	2-3 mcy/yr	Existing /High	Site use constraints: capacity limited.
3) San Pablo Bay (SF-10)	In use.	0	4-5	0.5 mcy/yr	Existing /High	Site use constraints: capacity limited.
4) Suisun Bay (next to fed. chanl.)	In use.	0	Not applicable	0.2 mcy/yr	Existing /High	Use limited to Corps maintenance projects; sandy material only.
5) Bay Farm Island Borrow Pit	Considered for Oakland Harbor -42´ deepening project, but eliminated due to insufficient data re: site use impacts and unlikelihood of designation during project time frame.	80.2 (excluding costs for further studies, etc.)	2-3	10-15 mcy	Low	Near-term designation unlikely due to lack of data re: site use impacts, and inconsistency with BCDC's laws and policies.
Ocean						
6) Channel Bar (SF-8)	Used to dispose material dredged at Bay entrance.	0	Not applicable	Not applicable	Existing /High	Used for clean sand only, not material from Bay.
7) B1B Site	Inactive.	1.5 [4]	8	50+ mcy	Low	Port of Oakland used in '88. In Marine Sanctuary.
8) 100-Fathom Site	Inactive.	2.0 [4]	9	100+ mcy	Low	Located in Farallones Natl. Marine Sanctuary.
9) U.S. Navy 103 Site	Project completed 1994.	4.4 (incl. monitoring)	8-10	0.8 mcy	High	Same general location as deep ocean site (below).
10) Deep Ocean Site	Site designated fall, 1994.	5.0	6-8	6 mcy/yr	Existing /High	Located off continental shelf, 57 statute miles from Golden Gate.
Reuse/Non-tidal						
11) Port Sonoma-Marin (Sonoma)	Presently used to rehandle material some of which is reused at Redwood Landfill. LTMS identified as "highly feasible" as rehandling facility.	0	12	0.06 mcy per drying cycle [5] 0.3 mcy (total pond capacity)	Existing /High	Existing capacity insufficient to rehandle volume of material (up to 6 mcy) needed at Redwood if landfill expansion permitted (expected 7/95). Presently, ponds are full.

1 Disposal site shown on Map 2.
2 Site availability based on assumption that project sponsor exists and planning and engineering work begins 2nd quarter, 1995.
3 Disposal cost estimates based on Central Bay dredging projects (unless noted otherwise), and do not include implementation costs.
4 Planning and engineering costs only.
5 In the Bay and Delta region, rehandling or drying cycle typically lasts from 18 to 24 months.

TABLE 2 (cont.)

Disposal Site (County) [1]	Site Status [2]	Implementation Costs (million dollars)	Disposal Cost Per Cubic Yard (dollars) [3]	Site Capacity	Feasibility of Use	Comments
Reuse/Non-tidal						
19) Montezuma Wetlands (Solano)	LTMS identified as "highly feasible" for habitat creation, confined disposal, and/or rehandling. FEIS/R under preparation. Available 2nd qtr, '96.	To be borne by project applicant.	8 [10]	20 mcy for habitat creation with a portion possibly used for confined disposal [8] 0.4 mcy/drying cycle [5]	High	Existing proposal to restore wetlands and rehandle dredged material. Potential impacts to onsite and nearby habitat.
20) Skaggs Island (Sonoma)	LTMS identified as "highly feasible" for habitat creation, and/or confined disposal; prepared conceptual restoration plan (5/93). Available 2nd qtr, '97.	39.9 for habitat creation [6]	5.2 [11]	16 mcy for habitat creation, or 72 mcy for confined disposal [8]	High	U.S. Navy-owned, and slated for base closure. US FWS may acquire. Sponsor and funding required to undertake project.
21) Cargill Salt evaporator ponds (Solano & Napa)	LTMS identified as "highly feasible" for habitat creation, and developed conceptual restoration plans (5/93). Available to use 2nd qtr., '97.	38.2 [6]	5 [11]	7-11.4 mcy	High	Site publicly acquired in 2/94. Site manager, DFG, has not expressed interest in using dredged material to restore habitat.
22) Cargill Salt crystallizer ponds (east of Napa Rv) (Napa)	LTMS identified as "highly feasible" for rehandling and confined disposal projects, and prepared conceptual plans for confined disposal (5/93), and for rehandling facility (11/93). Available to use 2nd qtr., '97.	3.4 (rehandling) [6] 14-65 (confined disposal) [12]	7-16 (rehandling) [7] 5 (confined disposal) [11]	Up to 1.9 mcy/drying cycle [5] 5.5 mcy for confined disposal [8]	High	Site is privately-owned, and has direct, deep-water access.
23) Cullinan Ranch (Napa & Solano)	LTMS identified as "highly feasible" for habitat creation option. Available 4th qtr., '97.	To be determined.	9	16 mcy	High	US FWS, site manager, determined dredged material not preferred method to achieve site restoration.
24) Petaluma Drying Ponds (Sonoma)	LTMS identified as "highly feasible" for rehandling option. Used periodically for material from Petaluma River federal channel. Available 2nd qtr, '98.	Not available	Not available	0.5 mcy/drying cycle [5]	Existing /High	City of Petaluma currently manages ponds and drying operations. USACOE intends to use site in 2nd qtr., '96.
25) North Point Property (Sonoma)	LTMS identified as "highly feasible" for habitat restoration, and prepared conceptual restoration plans (12/94). Available to use 2nd qtr., '97.	1.0 [9]	4.7 [7]	3 mcy	High	Privately-owned but currently for sale. Adjacent to Sonoma Baylands.
26) Jersey Island (Contra Costa)	LTMS demonstration project completed Fall, '94 with material from New York Slough and Suisun Bay federal channels. Available to use 2nd qtr., '96.	Not available	17	1.6 mcy	Existing /High	Potential to use material at other Jersey Island locations to be determined upon analysis of final demo. project results. Concerns re: salinity impacts likely.

10 Includes all disposal-related costs except for dredging and transport.
11 Includes costs for transport, pump-out and placement at reuse site; dredging costs not included. Add 2.20/cy for small projects.
12 $65 million cost to establish operations comparable to hazardous waste facility.

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August 7, 1992

To: All Commissioners, Alternates, and Interested Parties
From: Alan R. Pendleton, Executive Director

Subject: **Bay Plan Amendment No. 3-91: San Francisco Bay Plan Dredging Findings and Policies**
(For Information Only)

On May 21, 1992, the Commission amended the *San Francisco Bay Plan* dredging findings and policies and on July 13, 1992 the federal Office of Ocean and Coastal Resource Management (OCRM) concurred that the amendment is routine program implementation of the Commission's coastal management program for the San Francisco Bay segment of the California coastal zone. The amended *Bay Plan* dredging findings and policies are now in effect and are set forth below.

San Francisco Bay Plan
Dredging

Findings

a. Much of the Bay bottom is shallow. It averages 20 feet in depth, and the bottom is covered with accumulated sediment—silt, sand, and clay sediment is carried into the Bay annually in tributary waterway flows, most of it settling to the Bay bottom. In addition, over 100 million cubic yards of sediment—inflowing and resuspended—lodges in harbors and navigable channels from which it must be dredged at considerable cost.

b. Dredging consists of excavating or extracting materials from the Bay. Dredging is often necessary to provide and maintain safe navigation channels and harbors for port facilities, water-related industries, and recreational boating, and for flood control channels.

c. Past and present waste disposal practices have resulted in the introduction of pollutants in to the Bay, some of which have degraded Bay sediments. These pollutant are not distributed evenly in the Bay and localized areas are highly contaminated. Dredging and subsequent aquatic disposal of contaminated sediments in the Bay can resuspend and redistribute pollutants in the water column, making them accessible to Bay organisms and result in possible adverse impacts on natural resources of the Bay.

d. Material dredged from the Bay has historically been disposed of aquatically in the Bay. In more recent times, most aquatic disposal has occurred at one of four Bay U.S. Army Corps of Engineers designated disposal sites where the material is expected to disperse and the maximum amount would be carried out the Golden Gate on the Ebb tides and cause the least environmental impact as possible. These sites are: (1) off Alcatraz Island; (2) in San Pablo Bay; (3) in Carquinez Strait; and (4) in the Suisun Bay Channel. But even at the site nearest the ocean, off Alcatraz Island, less than half of the disposed material is carried out to sea by the tides.

e. Capacity at the Alcatraz Island disposal site is limited because over years of use a large mound of material has formed which, unless future disposal is properly managed, may adversely affect water circulation and Bay aquatic life, and pose a hazard to maritime navigation.