



Challenges for Dredging at Contaminated Sites in SF Bay

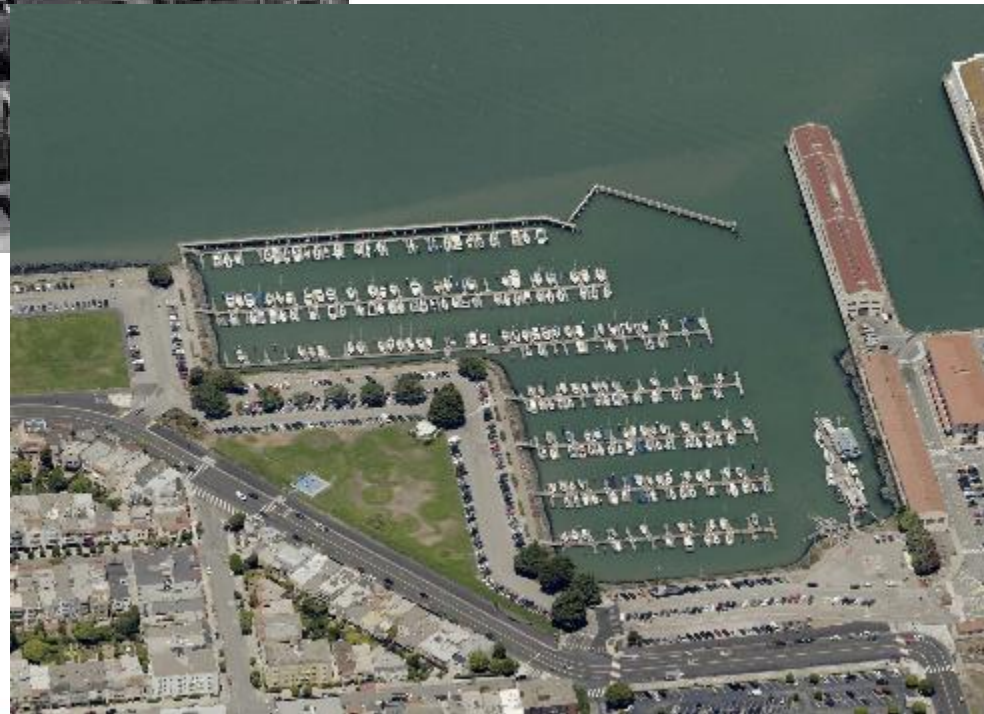
Bridgette DeShields

January 18, 2018

Overview

- Standard dredging projects either have clean or slightly contaminated material (marginally above ambient) that can readily get to alternative disposal sites (e.g., ocean, beneficial reuse)
- With contaminated sites, additional challenges
 - Regulatory constraints and requirements
 - Impacts on project timing
 - Additional testing requirements and special studies
 - Buried contamination (z-layer unacceptable)
 - Other constraints (engineering, institutional controls, long-term monitoring and corrective measures)
 - Permitting challenges

East Harbor Marina



Regulatory Framework

- CERCLA (USEPA) vs. State (DTSC or Water Board)
 - Voluntary program or Order
 - Separate approval process (not DMMO)
- Public review process for remediation plan
- Negotiations with Responsible Party(ies)
- Subject to CEQA (except for CERCLA)



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Tools

Reports

UST Case Closures

Information

**SF MARINA EAST HARBOR (T10000005263) - (MAP)**[SIGN UP FOR EMAIL ALERTS](#)

10 MARINA BLVD.
SAN FRANCISCO, CA 94123
SAN FRANCISCO COUNTY
CLEANUP PROGRAM SITE (INFO)
[PRINTABLE CASE SUMMARY / CSM REPORT](#)

CLEANUP OVERSIGHT AGENCIES
SAN FRANCISCO BAY RWQCB (REGION 2) (LEAD) - CASE #: T10000005263
CASEWORKER: [BOB STEENSON](#)

[Summary](#) [Cleanup](#) [Action Report](#) [Regulatory Activities](#) [Environmental Data \(ESD\)](#) [Site Maps / Documents](#) [Community Involvement](#) [Related Cases](#)

Regulatory Activities		Action Type Filter: Show All Activities	Go		* Indicates a revised due date
ACTION TYPE	ACTION	ACTION DATE	RECEIVED / ISSUE DATE	TITLE / DESCRIPTION / COMMENTS	
NEW DOC Other Regulatory Actions	Technical Correspondence / Assistance / Other	11/28/2017	11/29/2017	2nd Amendment to Water Quality Certification for Interim Remedial Measure	
NEW DOC Other Regulatory Actions	Email Correspondence	11/1/2017	11/1/2017	Water Board Staff Review of 20-Sep-17 Darts WP and 10-Oct-17 IRM Phase I Memo	
NEW DOC Other Regulatory Actions	Annual Estimation Letter	7/5/2017	7/5/2017	Annual Estimate for SCP Cost Recovery Oversight	
NEW DOC Other Regulatory Actions	Technical Correspondence / Assistance / Other	5/19/2017	5/19/2017	Amendment to Water Quality Certification for Interim Remedial Measure	
Other Regulatory Actions	Technical Correspondence / Assistance / Other	5/19/2017	5/19/2017	Amendment to Water Quality Certification for Interim Remedial Action	
NEW DOC Response Requested - Other	Correspondence	5/5/2017	5/5/2017	Request from SF RPD for Amendment to Water Quality Certification for Interim Remedial Measure	
NEW DOC Response Requested - Other	Fact Sheets - Public Participation	5/3/2017	5/3/2017	Presentation Materials for May 3, 2017 Community Meeting	
NEW DOC Other Regulatory Actions	Email Correspondence	2/8/2017	2/8/2017	Update on Reactive Core Mat Interim Remedial Measure monitoring	
NEW DOC Response Requested - Other	Email Correspondence	1/20/2017	1/20/2017	Observations During Jan 13 IRM Monitoring Event	
NEW DOC Other Regulatory Actions	Technical Correspondence / Assistance / Other	8/3/2016	8/3/2016	Water Quality Certification for Interim Remedial Measure	
NEW DOC Other Regulatory Actions	Annual Estimation Letter - #T10000005263	6/30/2016	6/30/2016	Annual Estimate for SCP Cost Recovery Oversight for San Francisco Marina East Harbor, Marina Boulevard, San Francisco, San Francisco County	
NEW DOC Other Regulatory Actions	Staff Letter	5/20/2016	5/20/2016	Water Board Concurrence with Interim Remedial Repair Measure for Periodic Soap	
NEW DOC Response Requested - Workplans	Interim Remedial Action Plan	4/28/2016	4/28/2016	Interim Remedial Repair Measure for Periodic Soap	
NEW DOC Other Regulatory Actions	Email Correspondence	3/7/2016	3/7/2016	Revision to GW Wet Season SAP	
NEW DOC Other Regulatory Actions	Email Correspondence	2/25/2016	2/25/2016	Water Board Concurrence with Wet Season GW SAP	
NEW DOC Other Regulatory Actions	Email Correspondence	8/29/2015	8/29/2015	Water Board Response to Field Investigation Status Report	
NEW DOC Other Regulatory Actions	Email Correspondence	8/25/2015	8/25/2015	Field Investigation Status Report	

Subject: Water Code Section 13267 Technical Report Requirement, Evaluation of Potential Shallow Sediment Impacts Near San Francisco Marina, East Harbor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN FRANCISCO BAY REGION

TENTATIVE ORDER

ADOPTION OF FINAL SITE CLEANUP REQUIREMENTS for:

Additional Testing Requirements

Typical Dredge Project

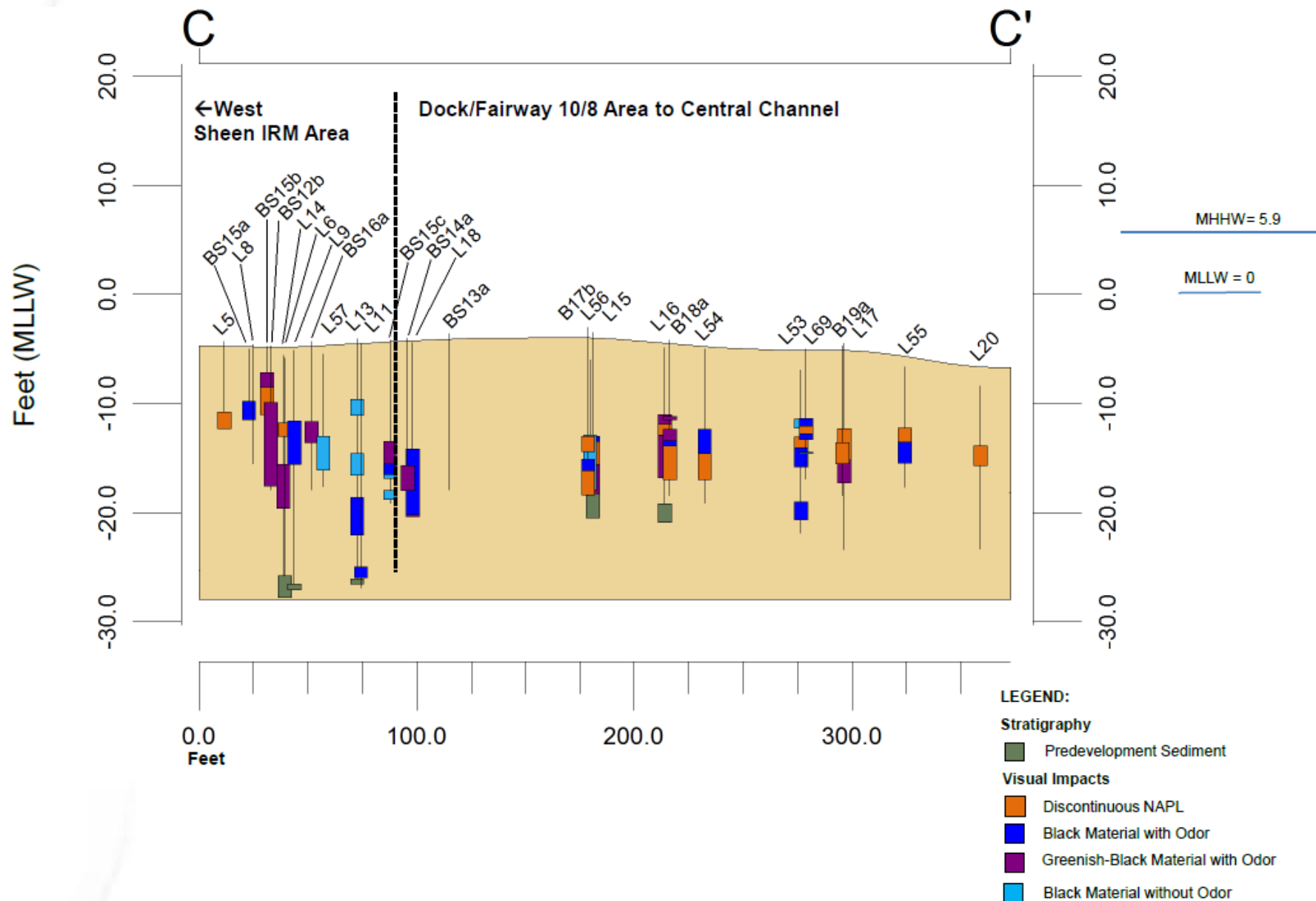
DREDGE VOLUME* (<i>in situ</i> cubic yards)	MINIMUM # OF SAMPLE STATIONS	# OF COMPOSITES ANALYZED **
5,000 – 20,000	4	1
20,000 – 100,000	8	2
100,000 – 200,000	12	3
200,000 – 300,000	16	4
300,000 – 400,000	20	5
400,000 – 500,000	24	6

Sampling at contaminated site

- More intensive:
 - number of samples
 - spatial distribution
 - depth intervals (z-layer)
- Additional analytes
- Porewater
- Geotechnical
- Dredging residuals (DRET)
- Sediment profile imaging (BAZ)
- Borrow material sampling

Sediment Sampling Locations





11/10/2020

Note: PAH Concentrations in $\mu\text{g}/\text{kg}$	< 3,390 $\mu\text{g}/\text{kg}$	< 4,500 $\mu\text{g}/\text{kg}$	4,500 - 64,792 $\mu\text{g}/\text{kg}$	64,792 - 150,000 $\mu\text{g}/\text{kg}$	> 150,000 $\mu\text{g}/\text{kg}$	<div> <div>1962-68 East Harbor design dredge depth = 8.3 ft MLLW</div> <div>Dock/Valspar SPRPD Preliminary Dredge Depth = 10 ft MLLW</div> </div>
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Total PAH = Jan 2015 PAH-25 (Eurofins); Dec 2015 PAH-25 (Eurofins & Alpha Analytical); March 2016 (Eurofins)

Rock/Fillings: SFRPD Preliminary Design Depth=OD: -10 ft MLLW

Western End Cross Section C - C' - Dock 8 Sheen Area													
Core ID #	WEST												
	15	16	17	18	19	20	21	22	23	24	25	26	27
	Top of Core Depth (Feet MLLW)	-4.8	-4.7	-4.8	-4.8	-5.1	-5.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
	Bottom of Core Depth (Feet MLLW)	-12.8	-13.3	-13.8	-13.8	-17.1	-17.1	-17.1	-17.1	-17.1	-17.1	-17.1	-17.1
Depth (Feet MLLW) ±													
MUDLINE													
0 to 9		43,827				4,872				12,723			
9 to 10	150,910	297,730				150,700	225,410			21,830	39,254		
mudline to 10													
10 to 10.5	2,881,100					11,069,000				18,880			
10 to 11	1,133,800.00					11,450,000				26,590	58,772	792,300	
11 to 12	96,740									1,142,700			82,200
12 to 13	19,671,100		96,084	21,940,700	12,471,800	Surface							
13 to 14	Core Bottom	100,650					80,130			3,109,600	576,750		
14 to 15		657,700								947,400			
15 to 16													
16 to 17				210,570								130,540	
17 to 18											19,215		94,740
18 to 19								8,561,320	11,710,480				
19 to 20													
20 to 21													
21 to 22													
22 to 23													
23 to 24													
24 to 25				584,036 (10 - 24.8)	319,049 (10 - 25.1)								
25 to 26													14,537,880 (10 - 25.5)
26 to 27													
27 to 28													

Notes:

Total PAH (RMP 25) Jan 2015 Eurofins Lab; Dec 2015 Eurofins & Alpha Analytical Lab; March 2016 Eurofins Lab

Total PAH (RMP-25) Concentrations	< 3,390 ug/kg	< 4,500 ug/kg	4,500 - 44,792 ug/kg	44,792 - 150,000 ug/kg	> 150,000 ug/kg
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1362-63 East Harbor dock/fairway area design dredge depth: -4.3 ft MLLW

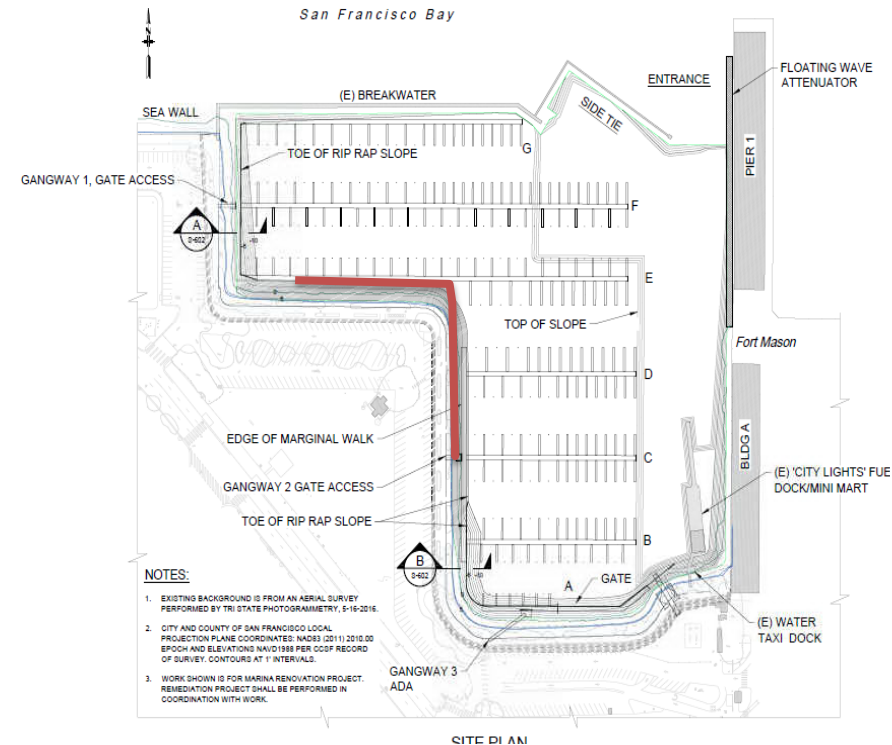
Dock/fairway SFRPD Preliminary Design Depth+OD: -10 ft MLLW

Types of Remedial Measures and Challenges

- Removal of all contaminated sediments
 - Deep dredging, large volumes for disposal, slope stability
- Capping only
 - Limits on future maintenance, mitigation
- Partial removal with capping (most common)
 - Cap design to prevent breakthrough
 - Monitoring / protection of cap
- Monitored natural recovery (MNR)
 - Potential for remedy failure, not a short-term fix
- Institutional controls (limits on types of uses)
 - Hard to enforce

East Harbor Project: Primary Elements

- Demolish Existing Marina
- Remediation
- Install low-permeability barrier wall
- Dredge to achieve operational depths, remove nonaqueous-phase liquid (NAPL), allow for a cap
- Capping with sand (erosion protection layer and amendments as needed)
- Reconstruct Marina



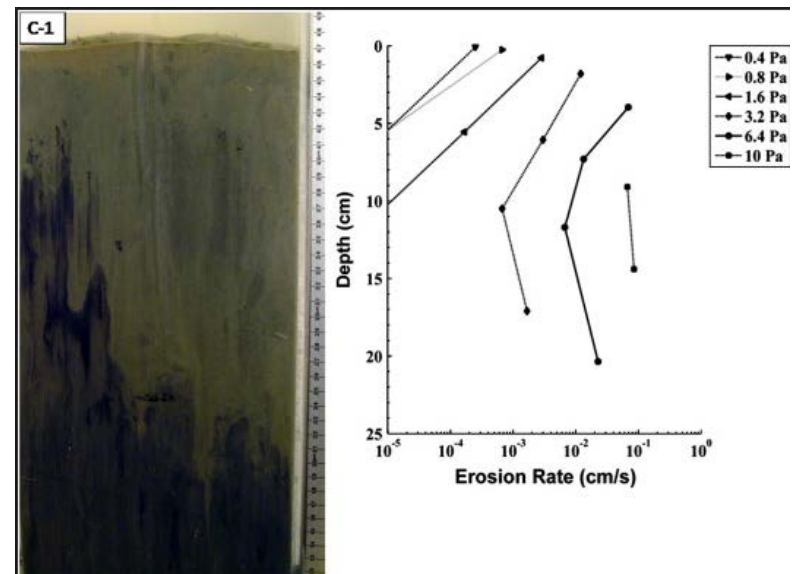
From FEIR, SF Planning 2007
* New element

Additional Requirements for Design of Remedial Projects

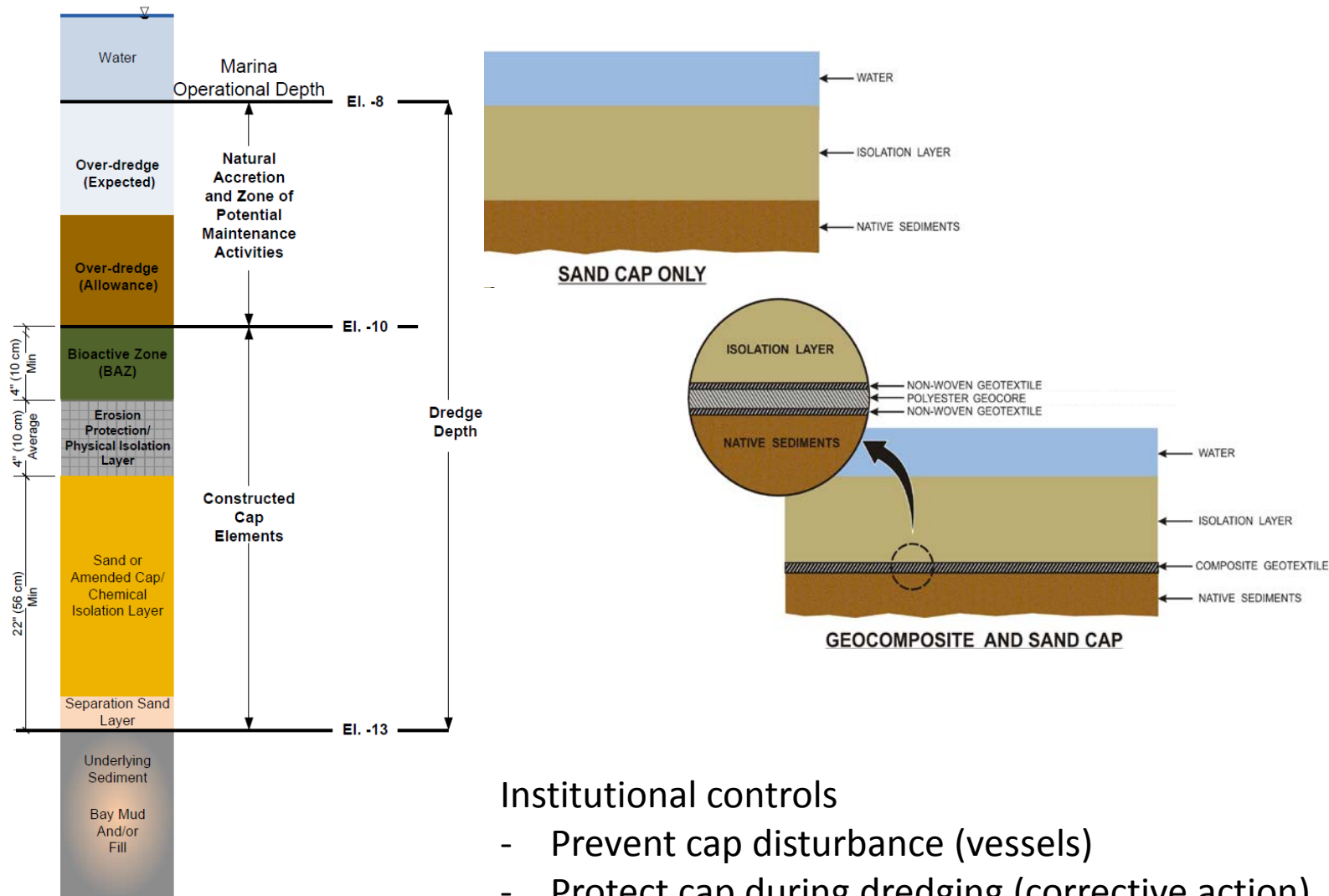
Other requirements

- Cap modeling (effectiveness)
- Bench scale or pilot studies
- Hydrodynamic modeling
- Source control studies
- Dewatering evaluation
- Waste characterization
- Engineering/design studies

All of these could require additional data collection



Cap Types - Constraints

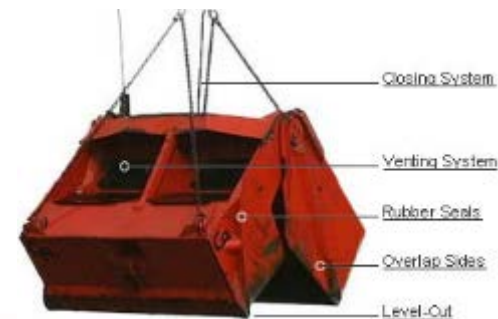


Institutional controls

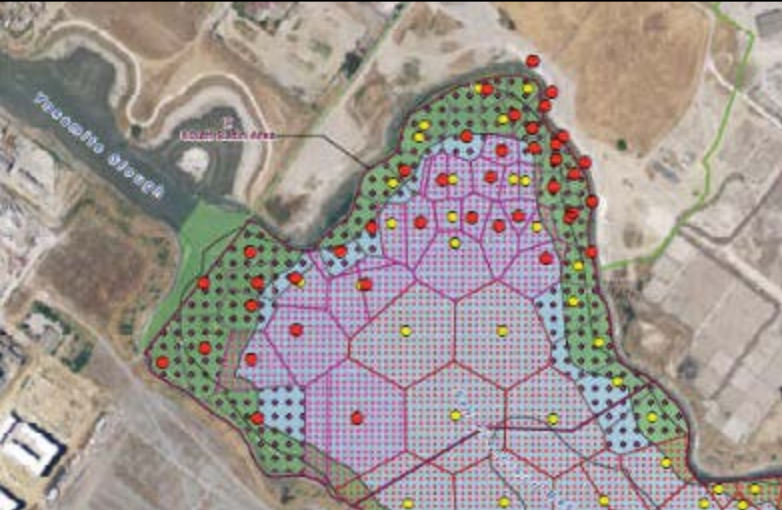
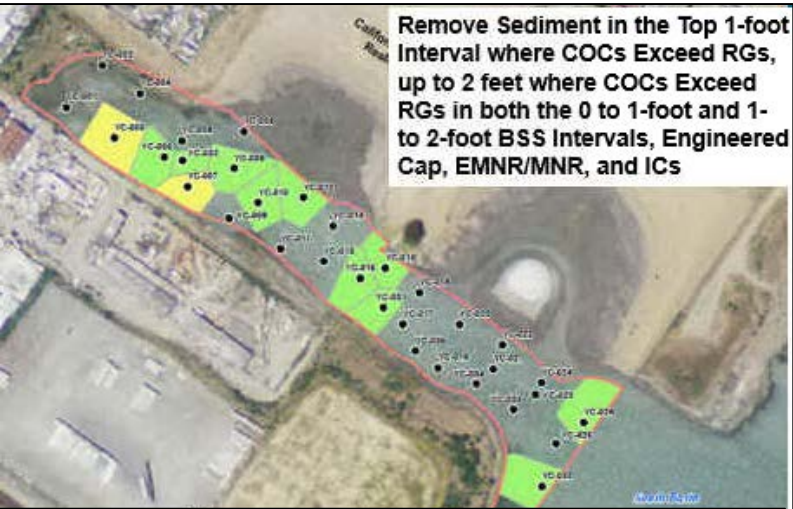
- Prevent cap disturbance (vessels)
- Protect cap during dredging (corrective action)

Other Challenges

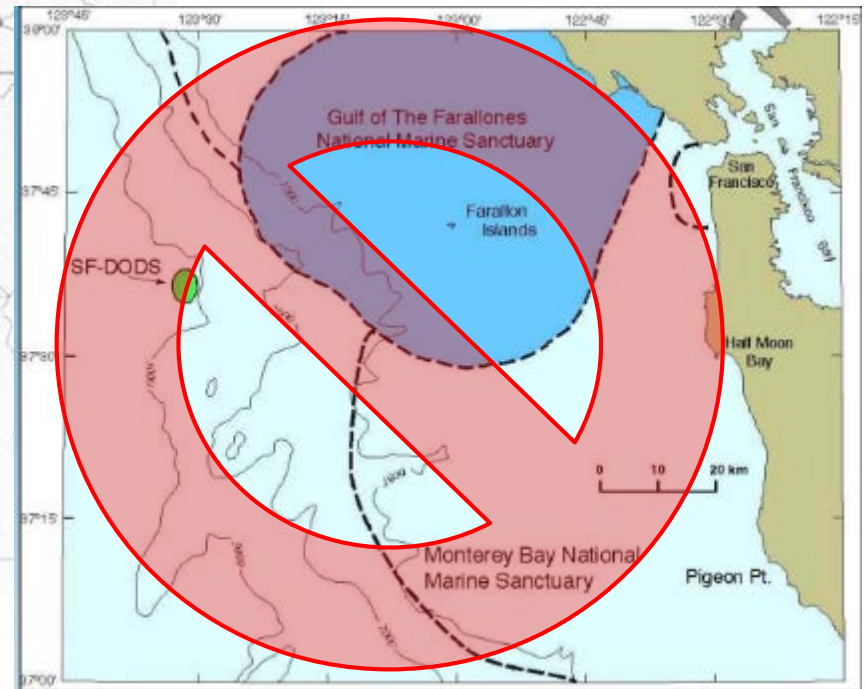
- Reuse vs upland/landfill
 - Cover and non-cover ratio
 - Offloading, timing / sequencing
 - Dewatering, water management
 - Throughput / production impacts
- Dredging around docks/piles vs. removal
 - Residual / recontamination potential
 - Marina reconstruction
- Special equipment (e.g., environmental bucket, coffer dams, sheet pile walls, silt curtains)
 - Adds cost, slows production

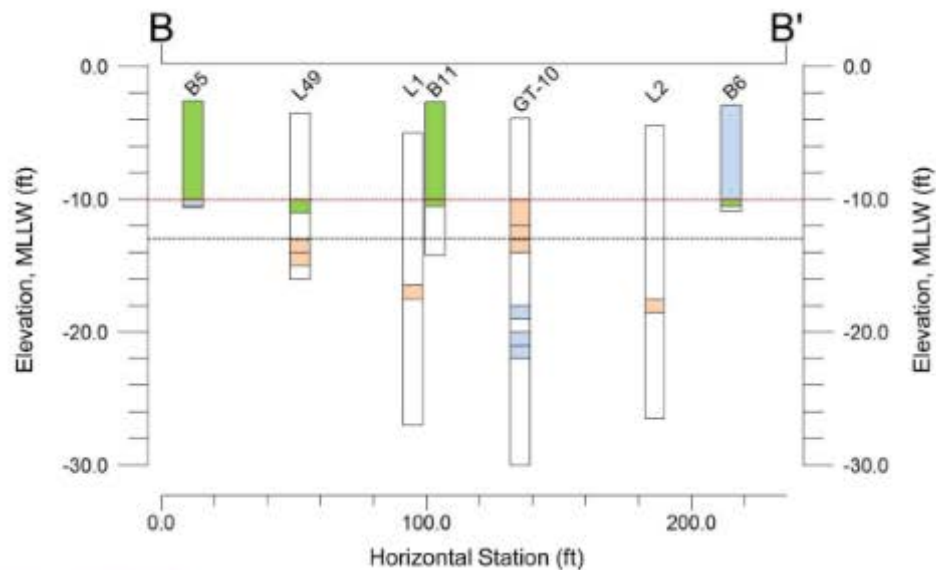


A Tale of Two Caps/Designs



AQUATIC DISPOSAL SITES





NOTES:

Includes all cores sampled for Total PAH (RMP 25) within DU-2. Projected section displays 5X vertical exaggeration.

Vertical scale is in feet related to Mean Lower Low Water (MLLW).

Discrete core sediments samples from Jan 2015, Dec 2015, March 2016, and Oct-Nov 2016 surveys.

Composite and Z-layer samples that overlap with higher resolution discrete layer results have been omitted.

LEGEND:

Total PAH (RMP 25)
 < 3,390 µg/kg
 3,390 – 44,792 µg/kg
 44,792 – 150,000 µg/kg
 > 150,000 µg/kg
 No Data

----- Dredge Surface
 - - - - - Additional Dredge Cut



San Francisco Recreation & Parks
 East Harbor Marina
 San Francisco, CA

Figure 6

Projected Section B - B', Distribution of Total PAHs in DU-2

Permitting

- Cleanup independent from DMMO but permits and approvals required from DMMO agencies and possibly others
- Possible use of Corps NW38 (Cleanup of Hazardous and Toxic Waste)
- Additional requirements related to remedial components
- If Federal lead under CERCLA, permit equivalency

