A Unique Partnership for Contaminated Sediment Management: The Port of Hueneme Confined Aquatic Disposal Project

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Overview

- Port and project history
- Confined aquatic disposal (CAD) concept
- Construction sequencing
- Partnership strategy and cost allocations
- Permitting and design
- Post-construction monitoring
- Project benefits
Port of Hueneme
Port of Hueneme History

- Oxnard Harbor District (OHD) formed in 1937 with 322 acres
- Harbor constructed and operations began in 1940
  - Constructed harbor is not on state lands
- USN acquired harbor by paying off bonds in May 1942
- USN agreed to lease 16 acres to OHD in 1947, commercial operations began again
Current Uses

- **OHD (Port of Hueneme)**
  - Produce import/export
  - Roll-on/roll-off (RO/RO) automobile import/export
  - Liquid bulk fertilizer import
  - Break bulk cargo
  - Offshore oil platform support vessels

- **USN (Naval Base Ventura County)**
  - Construction Battalion Center
  - Naval Surface Warfare Center
  - Pacific Missile Test Range
OHD Operations
USN Operations
Port of Hueneme: Joint Use

Naval Base Ventura County

Oxnard Harbor District
Project Team

- Oxnard Harbor District
- USACE, Los Angeles District
- U.S. Navy (USN)
  - Naval Base Ventura County
  - Naval Facilities Engineering Command (NAVFAC) Southwest Division
- Anchor QEA LLC
  - Everest International Consultants, Inc.
  - iLanco Environmental
Multiple Sediment Issues in Harbor

- Federal Channel had accumulated approximately 200,000 cubic meters of mostly clean maintenance material.
- USACE had authority to deepen Federal Channel by approximately 1.5 meters.
- OHD wharves or USN berths had not been dredged in decades, resulting in operational constraints.
- Contaminated sediments existed within much of Port of Hueneme Harbor.
Contaminated Sediment

Naval Base Ventura County

USACE
Federal Channel

Oxnard Harbor District
Sediment Contamination

- Approximately 220,000 cubic meters to be dredged
  - 60% from OHD wharves and USN berths
  - 40% from Federal Channel
- Chemicals of concern included PAHs, PCBs, DDT, and TBT
- Sediments composed mostly of fine sands, silts, and clays with low organic carbon
Sediment Management Alternatives

- Landfill disposal
- Beneficial reuse
- On-site nearshore confined disposal facility (CDF)
- Port fill site at Port of Los Angeles or Port of Long Beach
- On-site CAD
Rationale for CAD Approach

- Provided an on-site solution
- Not tied to other development or funding
- Provided environmental protection
- Provided local beach nourishment
- Allowed for future Port of Hueneme Harbor deepening to advance
- Restored 100% use of OHD wharves and USN berths
- Provided complete solution for all three parties
- Shared resources allowed cost effectiveness
Construction Sequence

Naval Base Ventura County

Oxnard Harbor District
CAD Excavation

Step 1: Excavate Cell

Beach Nourishment
CAD Excavation (Dec 15 to Jan 23)
Contaminated Sediment Dredging

Step 2: Place Contaminated Sediment in Cell
Contaminated Sediment Dredging
(Feb 4 to May 4)
Contaminated Sediment Placement (Feb 4 to May 4)

Average barge load = 900 cubic meters
CAD Cell Capping

Step 3: Place Cap Material
CAD Cell Capping (May 5 to June 13)
CAD Cell Armor Rock (June 13 to July 15)
Funding Strategy

- **Challenges**
  - Raising funds (total project cost ~ $14 million)
  - Coordinating budget schedules
  - Negotiating and scheduling with contractor

- **Opportunities**
  - All participants had some funds allocated for smaller individual projects
  - Project partners committed from the top down
  - Significant project momentum
Cost Sharing Approach

- Break project into components (e.g., CAD cell excavation, USN berths, OHD wharves, cap armor placement, long-term monitoring)
- Estimate costs associated with each component
- Assign components to partners based on either ownership or limitations in authority
Cost Sharing Approach (cont.)

- Fine tune cost components to accommodate secondary cost sharing strategies and funding schedules
  - Financial balancing to make project more equitable among all partners
  - Recognize previous agreements between partners
  - Account for contaminated sediment ownership allocation
# Cost Sharing Approach Responsibilities

<table>
<thead>
<tr>
<th>Project Feature</th>
<th>Responsibility</th>
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<td><strong>Project Development</strong></td>
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<tr>
<td>- CEQA/NEPA Permitting</td>
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<td>- Engineering Design</td>
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<td><strong>Contracting</strong></td>
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<td>- Contract Management</td>
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<td><strong>Construction</strong></td>
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<td>- Equipment Mobilization</td>
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<td>- CAD Cell Excavation</td>
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<tr>
<td>- Dredging USN Berths</td>
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<td>- Dredging OHD Wharves</td>
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<td>- Dredging “Hotspots” within O&amp;M Channel</td>
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<td>- Capping</td>
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<td>- Placing Armor Rock</td>
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<td>- Water Quality Monitoring</td>
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<td>- Sediment Confirmational Sampling</td>
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<td>- Construction Management</td>
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<td><strong>Post-Construction Activities</strong></td>
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<td>- Long-Term Monitoring</td>
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Contracting Approach

- USACE had an existing contract with Manson Construction for O&M dredging in Port of Hueneme and Channel Islands harbors
- Contract modification issued for additional work
- OHD/USACE signed Cost Sharing Agreement
- USACE/USN Cost Sharing Agreement for dredging was already in place
Contracting Approach (cont.)

- OHD/USN signed Cost Sharing Agreement for CAD construction and long-term monitoring/liability
- All funds transferred to USACE for overall contracting and construction management
Permitting Strategy

- Project subject to California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) regulations
  - Joint NEPA/CEQA document to streamline processes
- Also subject to Clean Water Act and other environmental regulations
Permitting Strategy

• Separate regulatory components
  - USACE O&M dredging and disposal (NEPA)
    • Supplemental NEPA document for CAD disposal
  - USN berth dredging and disposal (NEPA and CWA)
  - OHD berth dredging and disposal (CEQA and CWA)
  - CAD cell construction and beach nourishment (NEPA, CEQA, and CWA)

• Joint USN/OHD application for permits to construct the CAD and dredge respective wharves and berths
Initial Design Elements

• Contaminated sediment removal
  - Total of approximately 220,000 cubic meters
  - Mechanically dredged using clamshell
  - Restricted dredging required for some berths

• CAD cell construction and contaminated sediment disposal
  - Hydraulic excavation of CAD cell
  - Clean sand pumped to beach
  - Contaminated sediment placed via bottom-dump scow
Initial Design Elements (cont.)

- CAD cell cap design
  - Chemical isolation modeling to address movement of contaminants within the CAD
  - Hydrodynamic modeling to address scour
  - Geotechnical (i.e., bulking and settling)
  - Bioturbation
Cap Design Critical Elements

- Ship propeller wash scour from USN destroyers
  - Modeled bottom velocities up to 11.4 feet per second
  - Worst-case assumptions capable of producing more than 5 feet of scour

- Chemical flux
  - Some aquifers in region experience artesian conditions
  - Final elevation critical to prevent significant upward flux
Project Timeline

- Conceptual design for project completed in April 2007
- Design and permitting completed in August 2008 (16 months from conception)
- Construction began in December 2008
- Construction completed in July 2009
- Approximately 840,000 cubic meters of dredging
Construction Volumes

- CAD cell construction
  - 540,000 cubic meters
- Contaminated sediment placement
  - 190,000 cubic meters
- CAD cell capping
  - 110,000 cubic meters
- Armor rock
  - 34,000 tons
Monitoring Results

- Three years of monitoring completed
  - Hydrographic surveys, sediment cores, sediment chemistry, sediment porewater samples
- CAD cell performing as designed
  - Sufficient cap thickness
  - Contaminant isolation
  - Scour resistance
- Authorized depths restored to OHD wharves, in USN berths, and to Federal Channel
Monitoring Results

It appears that clean material from south of the CAD is gradually accumulating here, over the cap surface. This accumulation is not expected to affect CAD performance.

There appears to be an ongoing trend of erosion here (see comment on Figure 6). The erosion occurs outside of the CAD limits and outside of the armor rock area, so it does not affect CAD performance.

Elevation Difference between Post-Construction Survey (7-15-09) and 3 Years After Construction Survey (8-7-12)

<table>
<thead>
<tr>
<th>Elevation Range (m)</th>
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<tr>
<td>-1.2 to -1.0</td>
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<td>0.2 to 0.4</td>
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<td>-0.8 to -0.6</td>
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Bathymetric Isopach Plot Comparing Conditions Post-Construction (7-15-09) to 3 Years After Construction (8-7-12)

Part of Huememe
Project Benefits

- Recreation: restored Hueneme Beach
- Operations: restored full navigation use to Harbor
- Future Growth: provides clear path for Harbor deepening
- Financial: more than $30 million in benefits achieved for less than $14 million in costs
Biggest Accomplishment: A Model for a Teaming Approach
Questions?