AAPA American Association of Port Authorities

Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

2009 FACILITIES ENGINEERING AWARDS

ENTRY FORM

This form must be submitted with each Facilities Engineering Award application. AAPA will send an e-mail notification when the submission has been received and processed. Please complete this form and include a copy with your electronic submission.

PROJECT NAME Port of Hueneme Confined Aquatic Disposal Facility – A Unique Partnership to Create a Harbor-Wide Solution for Contaminated Sediment Management

PORT Port of Hueneme / Oxnard Harbor District

CONTACT PERSON Chris Birkelo, Director of Facilities Development

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PERSON TO RECEIVE AWARD Chris Birkelo, Director of Facilities Development

AAPA may post my application summary on its Web site (Check One) ☑ **YES** _____ **NO**

AAPA may post my complete application on its Web site (Check One) ☑ **YES** _____ **NO**

ENTRY CHECKLIST

1. Follow application guidelines
2. E-mail your cover letter and your full application
3. Send your entry fee of $65, made payable to "American Association of Port Authorities," with this entry form to:

   Ed O'Connell
   Facilities Engineering Awards Program
   American Association of Port Authorities
   1010 Duke Street
   Alexandria, VA 22314-3589

DATE RECEIVED _____ **AAPA INITIAL** _____

P.O. Box 608 • 333 Ponoma Street • Port Hueneme, CA 93044-0608
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Port of Hueneme
OXNARD HARBOR DISTRICT
FOREIGN TRADE ZONE #205

MEMBER OF:
World Trade Centers Association

July 31, 2009

Mr. Ed O'Connell
Director of Membership Services
Mr. Jeffrey Florin, P.E.
Chairman, Facilities Engineering Committee
American Association of Port Authorities
1010 Duke Street
Alexandria, VA 22314-3589

Re: Facilities Engineering Award Entry from Port of Hueneme / Oxnard Harbor District

Dear Mr. O'Connell:
Dear Mr. Florin:

Enclosed for consideration by the AAPA Facilities Engineering Committee is the entry from the Port of Hueneme / Oxnard Harbor District as a candidate for the 2009 Facilities Engineering Award.

Briefly, this project was crafted through a unique partnership between the Oxnard Harbor District (OHD), the U.S. Navy (Navy) and the U.S. Army Corps of Engineers (USACE). The Port Hueneme Confined Aquatic Disposal (CAD) project provides an excellent example of a harbor-wide contaminated sediment management strategy that provided a complete solution to the needs of all three project proponents. The project was formally initiated in January, 2007 with the creation of a conceptual development plan and construction was completed on July 15, 2009. More than 1 million cubic meters of sediment were moved during the construction of the project at a cost of approximately $14 million. The project was completed on schedule and approximately 10% under budget.

The on-site CAD facility is a highly cost-effective solution for all parties involved, as it entailed minimal transportation costs, no tipping fees, and no need for sediment

rehandling. The dredging consisted of three phases: (1) hydraulic excavation of the subsurface CAD cell within the harbor with placement of the excavated clean sand on an adjacent beach that was severely eroded and in need of nourishment; (2) mechanical dredging of contaminated sediment from the OHD and Navy wharves and USACE open-water areas with barge placement of the sediments into the CAD cell; and (3) capping and armoring the CAD cell, which consists of dredging clean material from the operations and maintenance (O&M) areas within the USACE Federal Channel and placing this material in the CAD cell to form a clean cap, a portion of which was then covered by a rock armor layer to prevent scour of the cap.

The significance of this project to the members of the American Association of Port Authorities is two-fold. First, this project represents the first CAD site to be successfully permitted and constructed in California, and is one of only a handful in the United States, constructed for the sole purpose of harbor-wide sediment management. Second, this project is the first time that a harbor district, the USACE, and the Navy have proactively established a partnership to design and build a regional sediment management solution.

We are justifiably proud of this project as a model for effective partnering and cost effective project delivery and I urge your favorable consideration.

Respectfully submitted,

Anthony J. Taormina
Executive Director

PORT OF HUENEME CONFINED AQUATIC DISPOSAL FACILITY

A UNIQUE PARTNERSHIP TO CREATE A HARBOR-WIDE SOLUTION FOR CONTAMINATED SEDIMENT MANAGEMENT

Applicant

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August 6, 2009

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PROJECT DESCRIPTION

Crafted through a unique partnership between the Oxnard Harbor District (OHD), U.S. Navy (USN), and U.S. Army Corps of Engineers (USACE), the Port of Hueneme Confined Aquatic Disposal (CAD) Facility project provides an excellent example of a harbor-wide contaminated sediment management strategy that provided a complete solution to the needs of all three project proponents. Located approximately 60 miles northwest of Los Angeles, the Port of Hueneme is the only deep-water port between Los Angeles and the San Francisco Bay area and is the United States Port of Entry for California's central coast region (Figure 1). Port of Hueneme Harbor consists of berths owned by the OHD and the USN, and a Federal Channel that is maintained by the USACE (Figure 2).

The OHD and USN berths were last dredged more than 10 years ago and had accumulated between 1 and 3 meters of contaminated sediment in that time. Several open-water areas within the USACE Federal Channel also contain contaminated sediments. These sediments were chemically characterized and found to be unsuitable for open-ocean or beach disposal. In 2007, the OHD, USN, and USACE began a collaborative effort to design and obtain regulatory approval for the construction of a CAD facility as a mechanism for managing the contaminated sediments within Port of Hueneme Harbor.

The on-site CAD facility is a highly cost-effective solution for all parties involved, as it entailed minimal transportation costs, no tipping fees, and no need for sediment rehandling. The dredging consisted of three phases:

- Hydraulic excavation of the subsurface CAD cell within the harbor with placement of the excavated clean sand on an adjacent beach that was severely eroded and in need of nourishment
- Mechanical dredging of contaminated sediment from the OHD and USN wharves and USACE open-water areas with barge placement of the sediments into the CAD cell
- Capping and armoring the CAD cell, which consists of dredging clean operations and maintenance (O&M) areas from within the USACE Federal Channel and placing this material in the CAD cell to form a clean cap, a portion of which is covered by a rock armor layer to prevent scour of the cap

SOURCE: Aerial from Google Earth Pro, 2007.

0 1/4
Scale in Miles

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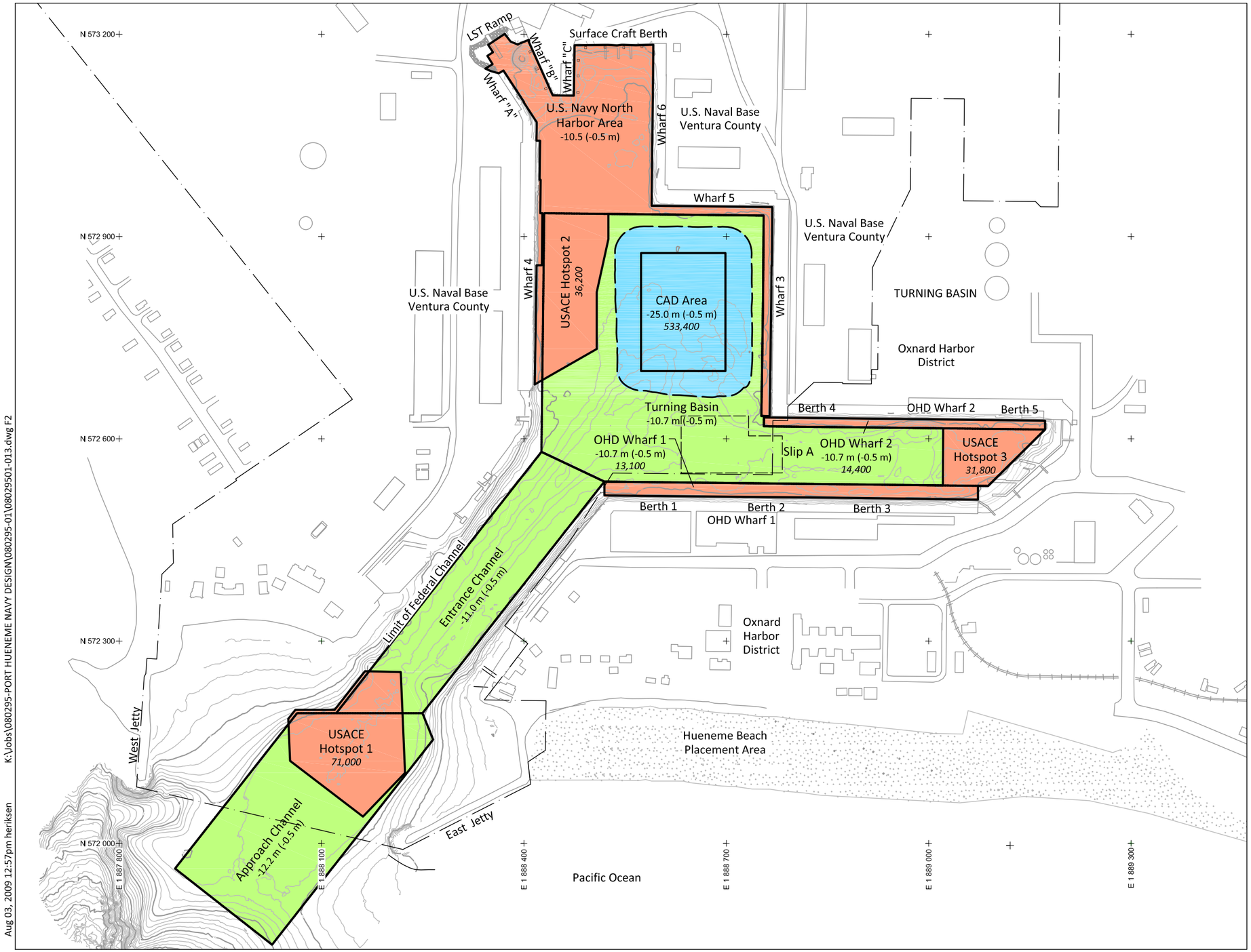
ANCHOR QEA

Figure 1
Site Location Map
Port of Hueneme



Legend:

- OHD/U.S. Navy Property Boundary (approximate)
- CAD Area to be Dredged and Placed on Hueneme Beach
- Area of Contaiminated Sediments to be Dredged and Placed in CAD
- Remaining USACE Operations and Maintenance Sediments to be Dredged and placed in CAD to Construct Cap

CAD Area — Dredge Area
-25.0 m (-0.5 m) — Target Depth (Allowable Overdepth)
533,400 — *Volume in Cubic Meters*

Summary of Estimated Contaminated Sediment Volumes (to be Contained in CAD)

Contaminated Sediment Location	Volume (m^3)
OHD Wharf 1	13,100
OHD Wharf 2	14,400
U.S. Navy Areas	73,300
USACE Hotspot 1	71,000
USACE Hotspot 2	36,200
USACE Hotspot 3	31,800
Approximate Total Contaminated Sediment Volume	239,800

SOURCE: Bathymetric contours from survey dated September 2007
HORIZONTAL DATUM: California State Plane - Zone 5 (NAD 83) Meters.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

0 100
Scale in Meters

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ANCHOR QEA

Figure 2
Project Area Site Plan Including Key Structures
Port of Hueneme

The significance of this project to the members of the American Association of Port Authorities (AAPA) is two-fold. First, this project represents the first CAD site to be successfully permitted and constructed in California and is one of only a handful in the United States, constructed for the sole purpose of harbor-wide sediment management. Second, this project represents the first time a harbor district, the USN, and the USACE have proactively established a partnership to design and build a regional sediment management solution. The project received praise from Congresswoman Lois Capps, who visited the harbor during project construction and provided the attached letter of support.

The project was formally initiated in January of 2007 with the creation of a conceptual development plan and construction was completed on July 17, 2009. More than 1 million cubic meters of sediment were moved during the construction of the project at a cost of approximately $14 million. The project was completed on schedule and approximately 10 percent under budget.

INTRODUCTION – PROJECT HIGHLIGHTS

Some of the key highlights for the project include:

- As a result of strategic phasing of construction activities and intensive coordination with harbor users, the entire dredging and construction project was completed without disrupting commercial and military operations within the harbor and at the port.
- Beneficial reuse of sediment was achieved through nourishment of an adjacent beach with approximately 600,000 cubic meters of clean sand.
- Beneficial reuse of sediment was further achieved by harvesting clean sand from below the O&M depths inside the harbor to be used as backfill material in areas where berths were dredged below design depths.
- Approximately 250,000 cubic meters of contaminated sediment were dredged from the OHD and USN berths and USACE Federal Channel and placed inside the CAD cell, which isolated the contaminants from the marine environment.

- The project restored full O&M design depths to the entire harbor.
- Solving the contaminated sediment issues within the harbor allows a federally authorized harbor deepening project to move forward.
- Harvesting of backfill material from within the harbor provided the added benefit of creating savings of approximately $2 to $3 million in dredging costs from the deepening project.

GOALS AND OBJECTIVES/BUSINESS PROBLEM

The goal of this project was to perform maintenance dredging in Port of Hueneme Harbor to restore full navigation depths to the Federal Channel, turning basin, and berths. Achieving this goal required cost-effective and environmentally sound management of contaminated sediments in multiple locations within the harbor.

Because Port of Hueneme Harbor had not been dredged fore more than 10 years, sedimentation in the harbor had resulted in the need to "light load" incoming commercial and military vessels and schedule vessel arrivals and departures around tidal cycles. In addition to the long-term impacts sustained by the OHD (resulting from potential loss of tenants due to the navigational limitations within the harbor), the direct economic impacts to both the OHD and USN were tremendous. Besides the incredible economic benefits that the OHD provides to the local economy, Naval Base Ventura County is the largest labor employer in the county and is also a crucial part of the local economy.

The shoaling within the harbor also prevented certain military vessels from calling at the Port of Hueneme and restricted the available berth days of other military vessels. These navigational constraints adversely affected the USN's ability to perform missions and threatened operational readiness.

A secondary goal for the maintenance dredging project was to provide a path forward for the harbor deepening project, which will facilitate future economic development for the OHD. In 1999, the USACE completed a Feasibility

Study that recommended deepening the Approach and Entrance Channels and turning basin within Port of Hueneme Harbor by 5 feet. The project was approved for construction but never implemented due to the lack of cost-effective management solutions for the contaminated sediment. With the contaminated sediment successfully removed from the deepening prism, the project may now proceed.

DISCUSSION

Background

Sediments in the OHD and USN berths and portions of the Federal Channel were chemically characterized and found to be unsuitable for open-ocean or beach nourishment due to elevated concentrations of metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT), and organotins (such as tributyltin). Collectively, contaminated sediments from the OHD, USN, and USACE areas of Port of Hueneme Harbor totaled approximately 250,000 cubic meters.

Because of the lack of regional cost-effective disposal options for these contaminated sediments, Port of Hueneme Harbor had been consistently passed over for dredge funding from the federal government. The absence of maintenance dredging resulted in shoaling within the harbor that adversely affecting vessel movement, which in turn resulted in economic and operational impacts to the project proponents. Available disposal options for contaminated sediments (upland landfill or off-site port fill) were either not available or were too costly for federal funding mechanisms. Prior to the current project, the OHD, USN, and USACE were working independently to solve their respective contaminated sediment issues at the site; however, this individual approach proved to be cost prohibitive.

In early 2007, the OHD, USN, and USACE began a collaborative effort to design and obtain regulatory approval for the construction of a CAD site as a mechanism for managing the contaminated sediments within Port of Hueneme Harbor. The OHD, USN, and USACE supported the CAD facility proposal because it provided a cost-effective, complete, on-site sediment management solution that is environmentally protective. Despite the fact that a CAD site

of this nature had never been permitted and constructed in California (from concept to design), this project was implemented in less than 2 years and construction was completed 7 months later.

Objectives and Methodology

The primary objective in designing and implementing the CAD project was to minimize duplication of effort and maximize efficiency throughout the process in order to ensure that the funding timelines were met. This objective was met by employing a number of streamlining methods that included:

- Using an innovative partnering agreement between the OHD, USN, and USACE
- Modifying an existing dredging contract through the USACE
- Preparing joint state and federal environmental documents and submitting joint applications, where appropriate
- Combining construction oversight and monitoring roles to the maximum extent practicable

Hardware/Software Used

As part of the CAD project design process, a number of technical analyses and modeling efforts were performed using sediment chemistry and vessel data from the harbor as well as other physical parameters like groundwater flow rates. Potential effects to water quality during dredging and disposal operations were modeled using the DREDGE and STFATE models, respectively. The steady-state model of Reible et al. (2004), was used to estimate chemical concentrations in the surface layer of the clean cap on the CAD cell to understand long-term chemical migration. Extensive modeling of vessel propeller wash was conducted using typical vessel data from the harbor to ensure that the design of the clean cap on the CAD cell would not be compromised by military and commercial vessels.

In addition to these computer tools employed during the design process, multiple types of dredging equipment were employed during the phases of the dredging project to ensure efficient production rates and environmental protection. A large hydraulic dredge was used to excavate the CAD cell and pump the clean sand directly to an adjacent beach.

A mechanical (clamshell) dredge was then employed to excavate the contaminated sediments along the wharves and in portions of the Federal Channel. During mechanical dredging, a split-hull barge was employed to transport and place the sediment into the CAD cell. Finally, a hopper dredge was used for the final dredging phase of clean O&M dredging and cap placement.

Project Cost

The anticipated final cost of the maintenance dredging and CAD facility project is $13.2 million, which is slightly less than the engineer's 30 percent design estimate of $13.5 million and the contractor's estimate of $13.8 million. The estimated cost to complete the project using the only other available management option (i.e., upland landfill disposal) would have been approximately $35 to $40 million. This difference in cost highlights the tremendous cost savings realized through the CAD approach.

Performance Measures

The project is considered successful from operational, economic, environmental, and engineering standpoints. The most obvious measure of success is that commercial and military operation within Port of Hueneme Harbor were not disturbed during construction, which ensured that the needs of port tenants were served and the USN's mission were not compromised. As stated in the preceding section, the project was completed under budget. Intensive monitoring of water quality during dredging and disposal and monitoring of sediment during and after dredging demonstrated that the project was constructed in an environmentally protective manner, without violating conditions of any permits and approvals. Monitoring of all wharf structures within the harbor and geotechnical analyses during and after the dredging process demonstrated that the engineering requirements of the project had been met.

How the Project Fulfills the Award Criteria

The primary award criteria specified by AAPA for the Facilities Engineering Awards include engineering innovation, means of contracting, speed of construction, and budget success. The following section describes how the Port of Hueneme CAD Facility project exemplifies each criterion.

Engineering Innovation. From an engineering perspective, the Port of Hueneme CAD facility project required a great degree of technical innovation. Constructing a CAD cell measuring 350 by 550 feet at the mudline and extending to a depth of -85 feet mean lower low water (MLLW) in the center of an active turning basin provided several design challenges to the team. Because Port of Hueneme is a relatively small harbor, the actual footprint of the CAD cell occupied nearly 50 percent of the entire turning basin (Figure 2). This space consideration required that all construction phases be conducted in a manner that ensured the harbor remained open at all times.

Sediment contamination at approximately 70 percent of the berths in Port of Hueneme Harbor extended below the design depths of the wharf structure by as much as 6 to 8 feet. In order to remove this contaminated sediment, "restricted" dredging cells were created where no more than a 150-linear-foot section of the berth was dredged at a time before the section was backfilled with clean sand to restore the mudline to the O&M depth. Between dredging and backfilling, confirmatory surface sediment samples were collected from each restricted cell, and bathymetric surveys were analyzed to ensure that dredging had been successful in removing the contaminated sediment. Each of the dredge/survey/backfill cycles was completed within 36 hours of dredging to ensure stability of the wharf structures. In one portion of the Federal Channel adjacent to an OHD berth, the contaminated sediment extended approximately 10 to15 feet below the design depth of the wharf structures, which required the design and placement of a 5,400-cubic meter sand buttress to shore up the side slopes and protect the structures once the contaminated sediment had been removed.

Protection of the CAD cap surface from scour from vessel propeller wash also required innovative engineering design. Large military vessels, car carriers, and tugboats traverse the turning basin and generate tremendous erosive forces. Unless erosion protection is employed, these boats possess the capability to scour more than 6 feet into the bottom of the turning basin. To provide protection without drastically inflating costs and adding significant duration to the construction phase, a protective rock layer composed of small stone was developed to cover only the portion of the CAD cap exposed to intense scour.

Means of Contracting. The Port of Hueneme CAD facility project required a unique and innovative method of contracting. The OHD and USN led the engineering design and permitting effort for the project while the USACE agreed to "manage" and contract the construction effort, which occurred through modification of an existing contract. Cost sharing was achieved by dividing the project into isolated work elements and assigning responsibility for costs as appropriate: to a single entity (e.g., wharf dredging for the OHD), jointly to two of the three entities (e.g., CAD cell construction for the OHD and USN), or shared by all three parties (e.g., construction management and environmental monitoring). Because the location of the CAD cell was targeted for an area of Port of Hueneme Harbor that is legally owned by the USN, but managed as a Federal Channel by the USACE, separate liability/Memorandum of Understanding (MOU) agreements were also developed between all parties in order to address issues such as long-term liability and future environmental monitoring costs.

Speed of Construction. The speed at which this project progressed from concept to construction was unprecedented. All design and permitting tasks were completed in approximately 18 months, and construction was initiated 3 months later. Meeting this accelerated schedule was critical to the overall project success because two of the three (i.e., USACE and USN) funding streams had to be allocated by September 1, 2008.

The following list highlights some of the key milestones in the project:

- *January 2007*. Conceptual Design for project identified
- *April 2007.* Conceptual Design Feasibility Study/Initial Field Reconnaissance Study completed
- *May 2007.* Environmental permitting and design tasks initiated
- *May 2008.* All permits and approvals completed
- *August 2008.* Engineering design completed
- *September 2008.* Construction contractor retained
- *December 2008.* Project construction initiated
- *July 2009.* Project construction completed

Budget Success. The engineer's estimate for the project at the 30 percent design step was approximately $13.5 million. The final bid amount from the contractor was $13.8 million. The actual price for construction is expected to be approximately $13.2 million. From a budget standpoint, the project was a huge success. The magnitude of this success is particularly apparent when one considers that the total project costs were $600,000 less than the contract amount and that more than $2 million in additional benefits have now accrued to the Port of Hueneme Harbor deepening project.

CONCLUSION

The Port of Hueneme Confined Aquatic Disposal facility project was a resounding success and serves as a model for other ports seeking an innovative and cost-effective strategy for leveraging shared resources to cooperatively manage contaminated sediments. The unique partnering agreements employed by the OHD, USN, and USACE to combine resources to achieve shared objectives were unparalleled. The approval of the multi-user CAD facility in California was unprecedented and serves as a real example to regulatory and resource agencies that this sediment management option is environmentally protective and practicable. The speed with which the design and regulatory approval processes were completed exemplifies the efficiency of using joint environmental documents and combining

engineering tasks to avoid duplicative efforts and inconsistencies. Perhaps the most compelling virtue of the project is that it successfully restored the entire harbor to the authorized O&M depths and set the stage for the proposed federal deepening project while coming in under budget and on schedule without disrupting commercial and military operations in Port of Hueneme Harbor.

ATTACHMENT

LOIS CAPPS
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COMMITTEE ON
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July 31, 2009

Mr. Ed O'Connell
Director of Membership Services
Mr. Jeffrey Florin, P.E.
Chairman, Facilities Engineering Committee
American Association of Port Authorities
1010 Duke Street
Alexandria, VA 22314-3589

Re: Recommendation of Facilities Engineering Award of Excellence for Oxnard Harbor District

Dear Gentlemen:

I understand the Oxnard Harbor District has submitted a project to you for consideration of the AAPA Facilities Engineering Committee Award of Excellence. The project is titled the "Port Hueneme Confined Aquatic Disposal Facility – A Unique Partnership to Create a Harbor-Wide Solution for Contaminated Sediment Management." As the federal representative of the Port Hueneme Harbor, I write to express my strong support for the Harbor District's application.

While your committee will consider the overall merits of their application, I want to highlight and comment on the particular element of the project that I believe will be of great interest to all of your members. I want to draw your attention to the innovative partnering approach that enabled this project to move forward. Three agencies, the Oxnard Harbor District, Naval Base Ventura County, and the U.S. Army Corps of Engineers, had each wrestled separately with their need to remove contaminated sediments from and maintain safe navigating depths in Port Hueneme Harbor. Each agency while acting alone was unable to complete their work. The project was finally accomplished by a unique partnership between the three agencies – now, as a result of a long and determined effort, Port Hueneme Harbor is cleaner and safer and each agency has been able to complete their portion for a fraction of the cost that they would have paid by acting alone. This leveraging of resources achieved the project goals while saving scarce local and federal funds. This benefits all of us and is a model worthy of duplication.

I have congratulated and applauded the Oxnard Harbor District and their project partners for their innovation and diligence as this project was progressing. I urge your favorable consideration of their Award of Excellence application, consistent with all relevant rules and regulations.

Respectfully,

Lois Capps

LOIS CAPPS
Member of Congress

LC:vh