925 Harbor Plaza, Long Beach, CA 90802 Tel 562.437.0041 Fax 562.901.1725

The Port of
LONG BEACH

April 29, 2010

Mr. Ed O'Connell
American Association of Port Authorities
1010 Duke Street
Alexandria, VA 22314-3589

Subject: 2010 AAPA Facilities Engineering Awards – Application
Pier A West / Area 2 Interim / Source Removal Action

Dear Mr. O'Connell:

Enclosed is our application for the 2010 AAPA Facilities Engineering Award for our Pier A West / Area 2 Interim / Source Removal Action project (Project). The Project was designed and constructed to perform an environmental cleanup of the 123-acre Port of Long Beach property, known as Pier A West (or Area 2). Historically, and prior to Port ownership, Pier A West had been impacted by oil production operations and its use as a permitted disposal area for oilfield related wastes. These former uses created 19 disposal pits containing contaminated solids, known as sumps which are also thought to have resulted in two areas of contaminated groundwater in a shallow aquifer beneath the site.

In 2001, the Port entered in to a Voluntary Cleanup Agreement with the California Department of Toxic Substances Control (part of CA EPA) for the environmental cleanup. With the subsequent discovery of contaminated groundwater, the Los Angeles Regional Water Quality Control Board became involved and ultimately assumed oversight of the Project, issuing a cleanup order to facilitate proceeding with the needed interim cleanup action. The need for the Project centered on the protection of groundwater and surrounding community. The Project design and its construction incorporated elements of the Port's Green Port Policy including sustainability and environmental stewardship.

The existing oilfield was relocated to facilitate execution of the Project. The Project resulted in the excavation, treatment (groundwater only), and disposal of over 400,000 tons of solid waste of numerous classifications and nearly 3 million gallons of contaminated groundwater. The site was re-graded for improved storm water management. Additionally, a parking lot used by an adjacent marina, originally built over one of the sumps, was removed and reconstructed during as part of the Project.

Numerous factors including the site's elevation (largely below sea level), the nature and characterization of the wastes, the need to restore operations of a productive Port oilfield as quickly as possible, the needs of the adjacent marina, and rigorous attention to the health and safety of onsite workers and surrounding community required an engineering approach that was both stringent but flexible when required to manage unknowns. This was accomplished through the development of project specifications with provisions for both needs and through the hiring of design and construction management consultants with the expertise needed to manage the construction work at times when unknowns were encountered at the site and flexible provisions of the specification were in use. The application describes how these measures were used to help ensure delivery of the Project on a tight schedule without significant change orders.

Most importantly, the $73M project was accomplished within the Port's required 10-month timeframe, meeting the requirements of the cleanup order and other Port requirements, within budget, and with 288,000 labor hours in a heavy construction environment and no lost-time injuries or recordable accidents.

On behalf of the Port of Long Beach, I believe the design, execution, and management of this project is worthy of recognition by the AAPA for the outstanding results achieved, and I respectfully submit this project for your consideration.

Sincerely,

Sean Gamette
Deputy Chief Harbor Engineer

/s

Enclosure

AAPA Facilities Engineering Award Application

Pier A West (Area 2) Interim/Source Removal Action

Port of Long Beach, California

April 30, 2010

Name of Applicant: Port of Long Beach

Point of Contact for Program Management:
Sean Gamette
Deputy Chief Harbor Engineer
Program Management Division
Port of Long Beach
925 Harbor Plaza
P.O. Box 570
Long Beach, CA 90802
Telephone: 562-590-4172
Fax: 562-901-1732
E-mail: gamette@polb.com

Point of Contact for Construction Management:
Gary J. Cardamone, P.E.
Director of Construction Management
Construction Management Division
Port of Long Beach
925 Harbor Plaza
P.O. Box 570
Long Beach, CA 90802
Telephone: 562-590-4172
Fax: 562-901-1732
E-mail: cardamone@polb.com

Design/Construction Management Team

URS Corporation - Design
Philip Hadfield
Vice President/Senior Project Manager
URS Corporation
915 Wilshire Blvd., Suite 700
Los Angeles, CA 90017
Telephone: 213-996-2410
Fax: 213-996-2458
E-mail: Philip_Hadfield@URSCorp.com

Weston Solutions, Inc. – Construction Management
Douglas W. Cowan, P.E.
Construction Manager
Weston Solutions, Inc.
9301 Oakdale Avenue, Suite 320
Chatsworth, CA 91311
Telephone: 818-641-3258
Fax: 818-350-730
E-mail: Douglas.Cowan@westonsolutions.com

Table of Contents

Project Description

The Pier A West Interim/Source Removal Action at the Port of Long Beach consisted of the restoration of a 123-acre site that had been impaired from historic use as an oil production field and from permitted disposal of oilfield wastes into 19 shallow impoundments (sumps), which may have resulted in the formation of two shallow impacted groundwater plumes.

The action was undertaken as a component of the Port's Green Port Policy, which includes sustainability solutions and environmental stewardship.

The Port remediated the 19 sumps and portions of the two impacted groundwater plumes under the oversight of the Los Angeles Regional Water Quality Control Board, which had issued a Cleanup and Abatement Order. The goal of the project was to remove the contamination source (sump) materials to protect the public, on-site oil operations workers, and groundwater. Additional fill was imported to address stormwater management issues. Another component of the project was the reconstruction of the parking lot of an adjacent marina, which had been built over one of the sumps and had to be removed during remediation.

The $73 million project was accomplished within 10 months, fully meeting the requirement of the Cleanup and Abatement Order as well as the Port's other requirements, within budget, and—with 288,000 labor hours worked in a heavy construction environment—no lost-time injuries or recordable incidents.

Introduction – Project Highlights

Project highlights included:

- The removal and offsite disposal of 422,500 tons of sump material waste in several categories: Toxic Substances Control Act (TSCA), Resource Conservation and Recovery Act (RCRA) hazardous, non-RCRA California-hazardous, and non-hazardous waste
- Performing the remediation while maintaining current oil operations, and because this oil field is highly productive, accelerating the project design and construction to reestablish the oilfield as quickly as possible
- An excavation approach that reduced exposure to contaminated groundwater (with high concentrations of vinyl chloride[VC]), minimized the quantity of groundwater that had to be addressed during excavation, and avoided on-site stockpiling, which minimized double-handling of the sump materials
- In situ chemical oxidation of the two groundwater plumes and removal and treatment of 2.7 million gallons of impacted groundwater through the use of two multiphase extraction (MPE) systems, which reduced the levels of volatile organic vapor emissions during sump excavation
- Import and placement of more than 1.3 million tons of clean fill—which had to meet extremely rigid chemical and geotechnical requirements—to address site drainage issues resulting from low-lying site elevations below seawater levels
- More than 54,000 truckloads exporting sump material and importing fill via an access route that involved crossing a "lift" bridge and three at-grade rail lines, all without incident
- Site-wide implementation of irrigationless, drought-tolerant hydroseeding to provide a sustainable approach to post-construction stormwater and dust management
- Minimizing disruption to residents of adjacent marinas, while addressing the requirement to remove a marina parking lot, which had been built over one of the sumps; the subsequent

reconstruction of the parking lot employed sustainability principles that included drought-tolerant landscaping, and porous asphalt pavement and bioswales to manage stormwater on-site.

- Extensive mitigation measures to reduce the impact of dust, noise, vapor, and mud on on-site workers, adjacent marina residents, and members of the general public, with a commensurate level of public communications
- Most importantly, successfully completing the $73 million project to the required permit conditions, quality standards, on time, within budget, and with zero lost-time incidents

Goals and Objectives/Business Problem

The primary goal of the project was to remove the contamination source (sump) materials to protect the public, on-site oil operations workers and groundwater, in accordance with the requirements of the Cleanup and Abatement Order, while maintaining current oil operations and access to the adjacent marina.

Additional goals included partial treatment of the contaminated groundwater plumes, regrading the site and raising surface grades to address site drainage issues and meet permit-mandated stormwater management requirements, implementing sustainable stormwater management measures, and minimizing impacts to the surrounding communities.

Discussion

Background

The Port purchased the Pier A West Area 2 site in 1994 as part of a 720-acre property acquisition. The 123-acre property was created from dredged sediments and has been used for oil production since the 1930s. Between 1948 and 1970, portions of the site were used for the disposal of oil production by-products, such as drilling mud from oil operations, construction debris, crude oil tank bottoms, solvents,

spent catalysts, and paint sludge, which were deposited into the 19 sumps. The contaminants of concern (COCs) included total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), and metals.

In 2001, the Port entered into a Voluntary Cleanup Agreement (VCA) with the California EPA Department of Toxic Substances Control (DTSC) to provide remediation oversight of the sump materials. However, initial site studies identified the two shallow groundwater plumes (9.2 and 5.7 acres in size) impacted with TPH, benzene, toluene, ethylbenzene, xylenes (BTEX), and chlorinated VOCs, such as VC, 1,2-dichloroethane (1,2-DCA), and trichloroethylene (TCE). With identification of the groundwater plumes, the DTSC requested involvement of the Los Angeles Regional Water Quality Control Board (LARWQCB). The LARWQCB entered into negotiations with the DTSC and Port to transfer oversight of the site to the LARWQCB, and site cleanup goals were developed to protect the groundwater. The Cleanup and Abatement Order was subsequently issued for removal of the sump materials as the continuing source of contaminants polluting the groundwater underlying the site.

Objectives and Methodology

- *Addressing low surface elevations and site flooding*: Due to historical subsidence (10 to 15 feet) resulting from oil extraction, surface elevations of the site range from approximately 6 feet below mean lower low water (MLLW) to 5 above feet MLLW. Since most of the site is below sea level, engineered features such as levees (with elevations ranging between 12 and 15 feet above MLLW) and pumping facilities were installed to protect the site from flooding. Permitting approval for the project included regrading the site to raise the surface elevation, which will facilitate drainage and provide improved stormwater management.
- *Groundwater treatment*: Site studies showed that sump excavation within the groundwater plumes would encounter high levels of VC (greater than 2 parts per million [ppm]) and VOC emissions in

excess of 2,000 ppm. To avoid performing excavation in Level A or B personal protective equipment (PPE), in situ chemical oxidation was performed within the plumes pre-construction and MPE systems were installed prior to initiating sump excavation activities and operated throughout the sump removal duration.

- *Minimizing groundwater impacts on sump removal:* The low ground-surface elevations and high water levels meant that almost as soon as the contractor began excavating, groundwater would begin to enter the excavation. This water had the potential to negatively impact schedule and cost in two ways: it would reduce the pace of excavation, and it would significantly increase the quantity of water that needed to be handled, treated, and disposed of. The project design provided two options to handle groundwater: installation of active dewatering systems to lower groundwater levels for full-scale sump excavation, or strip excavation of the sumps to minimize dewatering efforts and the quantity of groundwater requiring offsite disposal. The contractor utilized strip excavation techniques, in which soil was excavated to the full design depth of the sump, and the fill was then immediately placed to minimize the time for water to enter the empty excavation. This approach enabled eliminating the use of 3/4-inch rock at the base of the excavation, originally designed to facilitate dewatering and create a working surface, since it became clear that the rock was acting as a "French drain." This rock was put to beneficial use: it was used to create a road network around the site that proved invaluable with the onset of heavy rains that would have otherwise made the site impassible and shut down operations for days. The MPE systems provided an additional benefit by lowering the groundwater levels for the sumps within the plumes, thereby reducing the amount of groundwater to be dealt with during excavation.
- *Categorization of waste for disposal*: A random sampling program and statistical analyses had been performed per the USEPA SW-846 Chapter 9 "Sampling Plan" guidance to determine the waste characterization of each sump. Based on these results, 10 sumps (approximately 205,000 tons) had been classified as non-hazardous waste and nine sumps (approximately 140,000 tons) as California-hazardous (Cal-haz) waste. During construction, the contractor's disposal facilities performed

- *Sump material transportability:* The site studies included performing paint filter testing on the sump materials, in accordance with USEPA Test Method 9095B, to evaluate free liquid content and the transportability of the sump materials. During construction, although all excavated material passed paint filter testing, some truckloads arrived at the landfills with excess free liquid, which required drying or the addition of amendments to stabilize the material for disposal. To avoid recurrence, when saturated sump materials were removed during excavation, absorbent-type amendments were added on-site to the truck loads, which resolved the free liquid issues.

- *Minimizing impacts on adjacent marinas:* Minimizing the impacts of the project on the residents of a local marina and the surrounding community required a multifaceted approach, supported by the entire project team. The parking lot for one of the local marinas had been constructed over one of the historic sumps. As a result, it was necessary to remove this parking lot, along with the residents' restrooms, showers, storage units, and trash receptacles. Temporary amenities were provided adjacent to the marina and a temporary parking lot was constructed ¼ mile away, along with a 24/7 shuttle service. Residents of the marina and other community members were provided with a 24-hour hotline to ensure their concerns were addressed as quickly as possible. The contractor's health and safety program included elements specifically for the protection of the marina residents, and an air monitoring system was stationed adjacent to the marina.

- *Traffic control:* Environmental regulations require that trucks hauling waste travel on haul routes separate from trucks with clean fill. Working multiple sumps simultaneously created a significant level of complexity to avoid cross-contamination, and, with 350 to 400 import and export trucks

passing through the site daily, a commensurate increase in the project team's concern for safety. In addition, city agencies required establishment of an offsite sump export haul route that avoided the adjacent residential communities. As a result, the approved haul route required crossing three at-grade rail lines and a lift bridge. To prevent excessive truck build-up on the local streets due to a train or vessel crossing, which occurred multiple times per day and stopped traffic for up to 30 minutes each time, a nearby site within the Port was designated as a truck staging area. All import/export trucks traveling to the site were required to visit the staging area to determine whether access to the site was clear. To further manager truck traffic, a liaison was established with the rail line to provide early notification of road closures due to trains.

- *Suitability of import fill:* Import fill was tested for geotechnical and chemical acceptance requirements. For each source considered, the contractor submitted a sampling plan for review and approval prior to actually collecting official samples for each potential borrow source. The project team would then accompany the contractor's representative and witness the sample collection from the potential borrow sites. The sample was lab-tested for cleanliness by the contractor while the Construction Manager tested for geotechnical suitability with an on-site lab.
- *Verification of sump removal*: Upon completion of sump removal, sidewall samples were collected to confirm removal standards were met. In some areas, additional excavations were performed up to 10 feet beyond the original boundaries where analytical data indicated hazardous material remaining in the sidewalls. An additional 77,500 tons of sump materials was removed and disposed of as non-RCRA, Cal-Haz waste.
- *Stormwater management:* To address stormwater management, the grading design included drainage of runoff to three detention basins, each sized to contain a ¾-inch "first-flush" storm. Underground storm drains conveyed the runoff from the basins to an on-site pump station for offsite discharge. To prevent intrusion of contaminated groundwater, the basins were designed with a liner (polypropylene geomembrane, geocomposite and geotextile), and waterproofing measures were implemented for manholes and junction structures. Fusion-welded, high-density polyethylene (HDPE) drainage pipe

was used to address water intrusion, and suitable because the site was not being developed for future marine terminal use. Site-wide hydroseeding using an irrigationless drought-tolerant mix was implemented for erosion control and fugitive dust management.

- *Oilfield reconstruction:* One of the key challenges was to phase the remediation and site restoration with an ongoing $36 million oilfield reconstruction project. Existing oilfield infrastructure, including oil production and injection wells, production equipment, pipelines, and electrical infrastructure, were removed, capped, or abandoned in advance of construction. With completion of fill placement, reconstruction of the oilfield was initiated, which included reactivating capped oil wells, replacing oil-producing facilities, and reconnecting the pipeline and electrical infrastructure. With significant revenue being generated from this oilfield, reestablishing oilfield operations as soon as possible was critical. Furthermore, the injection wells needed to be reestablished to help control oil production-related land subsidence. Construction was phased to complete remediation and grading of the northern portion of the site first so that the most productive part of the oilfield could be reactivated.

- *On-site construction coordination:* Because the oilfield reconstruction contractors would be working in proximity to the remediation activities, the contractor coordinated closely with the oilfield operator and developed a health and safety program that would include the oilfield contractors. One of the primary concerns was separating remediation equipment from non-remediation equipment and ensuring that the exclusion zones established around each sump were not breached. Internal traffic circulation patterns were developed daily to address changing work tasks and areas.

- *Project reimbursement:* As part of the property acquisition, the Port had an agreement with the former property owner for reimbursement of remediation-related costs for the project site. Reimbursement percentages were developed for each element of the project design. The team met the necessary milestones so the Port was able to recover approximately $38 million of its costs. Maximizing the reimbursement was a key client success factor.

- *Permit compliance:* Permits were necessary from various state and local agencies, with approvals requiring implementation of stringent traffic, dust, odor, and vapor control and mitigation measures. The project team maintained an on-site weather station and monitored for dust, VOC emissions, and noise. VOC monitoring was also performed at sump excavations, and vapor suppression sprays were used when concentrations exceeded permit limits. Dust monitoring was performed and mitigation measures, such as on-site water trucks, wheel-wash facility for exiting trucks, and street sweepers were used offsite to manage fugitive dust and soil track-out. The project was completed with minimal offsite disturbances and passed every air quality and fugitive dust inspection conducted by the South Coast Air Quality Management District.

Hardware/Software Applications

During the design phase, a modeling program was used to create 3-D finite difference modeling to simulate the groundwater flow system at the site for existing as well as post-construction groundwater levels; these models helped determine, among other things, groundwater infiltration rates for groundwater treatment systems and the final surface elevations needed to address site drainage issues. Additional 3-D modeling was used for each sump, identifying the locations and concentrations of contaminants of each sample. Geotechnical modeling was used to evaluate concerns that raising the site elevation behind the perimeter earthen levees would over-stress the levees, and additional concerns that the potential for seismic-induced liquefaction of the soils within and below the levees would weaken them; the levees were shown to be sufficiently stable.

To manage the process of sidewall sampling to determine sump boundaries, the team used Geographic Information Systems (GIS) to track the boundaries of each sump, the testing status, and test results. The CM's Web-based collaboration tool, TeamLink®, provided a platform for the project team to post, store and share real-time information on multiple aspects of the project. Because each source of the 1.3 million tons of import fill required ongoing testing for acceptability standards, the team developed a database to

track the quantity of fill received from each source to ensure the approved quantity was not exceeded, a monitoring process that alerted the team when additional testing would be required, and thus avoiding shutting down a source while waiting for test results.

Project Cost

The original budget was $74,096,920.17, which included the contractor's base bid of $67,360,836.52 plus a 10% contingency ($6,736,083.65) intended to address unforeseen conditions. Scope changes included owner enhancements, code compliance issues, addressing unforeseen conditions, and quantity adjustments. The final cost at completion was $73,760,091.27.

The project employed a proactive approach to handling unforeseen conditions. Based on previous experience, the project team recognized the inevitability of uncovering unforeseen conditions, such as abandoned piping and oil wells, construction debris and undocumented contamination "hot spots," when digging into an historic oilfield/waste disposal site—particularly one that had been in operation for approximately 80 years.

To address these expected-but-unforeseeable situations, a contingency fund was established to cover the cost of time-and-materials (T&M) work at pre-negotiated rates. Whenever one of these situations was encountered, work on the contract bid item was suspended, and the unforeseen condition (piping, construction debris, concrete rubble) was addressed under this T&M arrangement. Costs related to T&M work could then be tracked on a daily basis.

Performance Measures

- *Safety*: No measure of a project's success is more important than the safety of the workforce and other stakeholders. With more than 288,000 hours worked in a heavy-equipment environment and more than 54,000 import/export truck trips, there were no lost-time or recordable incidents.

- *Quality*: The project fully met the requirements of the LARWQCB Cleanup and Abatement Order. The LARWQCB accepted closure of the Order on March 11, 2010.
- *Budget*: The project was completed within budget for the base bid without exhausting the contingency fund. At the completion of the project, cost was still less than the second-place bid and substantially under the engineer's estimate.
- *Reimbursement*: Through the reimbursement agreement with the former property owner, the Port was reimbursed more than $38 million for the remediation work performed
- *Schedule*: Notice to Proceed was issued on August 11, 2008 with the schedule calling for all work, with the exception of landscape maintenance, to be completed within 300 calendar days, on June 6, 2009. All the work under the base bid was substantially complete as of June 6; however, the project completion date was extended to June 26 as part of an owner-initiated change order calling for the contractor to import and stockpile additional fill material intended for future use. The establishment of the contingency fund as described above greatly reduced the lost time that would have otherwise been associated with frequent change orders and scope changes, and contributed to an on-time completion.
- *Community Relations*: An important success criterion of the project was to minimize the impact on the community. Through an approach that included monitoring, communications, truck wash stations, alternate truck routes and staging areas for truck traffic, and a 24/7 hotline, local residents—including those in the marina—remained supportive of the project and its goal to reduce the potential impacts of contaminated soil and groundwater on the environment and the community.

Award Criteria

Engineering Innovation

- The sump materials were characterized using a random sampling program and statistical analyses of the analytical data, per the USEPA SW-846 Chapter 9 "Sampling Plan" guidance, which meant that "outliers" did not impact the overall profile of each sump. For example, an isolated metal hit that

exceeded non-RCRA, California-hazardous criteria did not impact an overall non-hazardous characterization for an individual sump. Ultimately, this approach resulted in a cost savings of more than $10 million for disposal of the sump materials.

- The MPE systems used to minimize exposure to contaminated groundwater with high levels of VC and VOC emissions during sump excavation proved very effective. The systems reduced VOC emission levels so that only Level C and D PPE was required (i.e., supplied air was not required). Additionally, with the systems in place, active dewatering was not required to facilitate removal of the sump materials.
- To the extent possible, sustainable measures were implemented into the project design, including:
    - Porous asphalt pavement and bio swales in the reconstructed marina parking lot to provide a pre-treatment measure and reduce the volume of stormwater runoff.
    - Drought-tolerant landscaping within the parking lot.
    - Site-wide hydroseeding—a drought-tolerant mix that could be applied without temporary irrigation with germination occurring after the first rain—for post-construction stormwater management and dust control.
- With two groundwater plumes underlying the site, the three detention basins were constructed with a landfill liner system, composed of polypropylene geomembrane, geocomposite and geotextile layers, to prevent groundwater intrusion and commingling with stormwater runoff. In addition, fusion-welded HDPE drainage pipe was used to address water intrusion, and suitable because the site was not being developed for future marine terminal use. Waterproofing measures were implemented for the manholes and junction structures.
- To reduce construction-related diesel emissions, all off-road equipment was required to meet the California Air Resources Board Tier II standards.

Means of Contracting and Budget/Schedule Success

Using the supplemental T&M contract was a factor in the budgetary and scheduling success of the project. With more than 15,000 tons of oilfield debris ultimately disposed of, the requirement to stop work on the primary-bid contract while multiple change orders and scope changes were worked out would have had a major negative impact. This inventive approach kept the project moving in a cost-effective manner.

Conclusion

As originally designed, the Pier A West Area 2 Interim/Source Removal project required offsite disposal of 345,000 tons of sump material, and placement of 1.28 million tons of import fill material, with all work elements described completed within 10 months. At completion, the project included disposal of 422,500 tons of sump material and the placement of 1.32 million tons of fill material, while meeting the project schedule, coming in within the original budget including contingency fee, fully satisfying the requirements of the Cleanup and Abatement Order, and working with the community to ensure their concerns were addressed, all with no lost-time injuries.

The project was a success story of issue management, addressing challenges that arose from the start. It was also a testament to collaboration. The technical and scheduling challenges were overcome by a project team that worked together and with the mutual commitment to meeting the project goals.

AAPA Facilities Engineering Award Nomination

Pier A West (Area 2) Interim Source Removal Action

Port of Long Beach, California

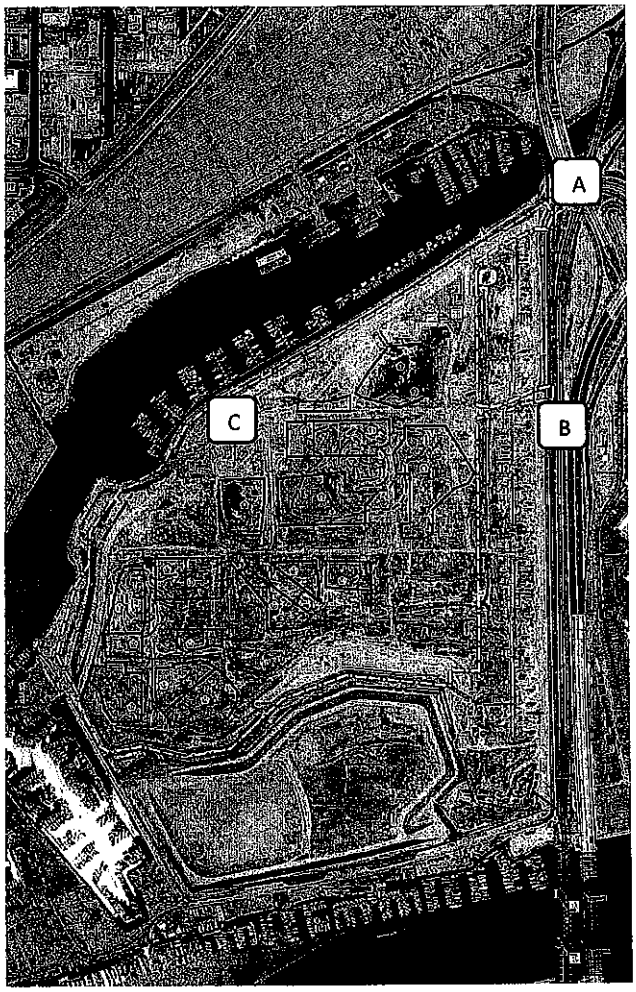
Supplemental Material

Project Photos

Press Clips

Other Awards

Project Photos



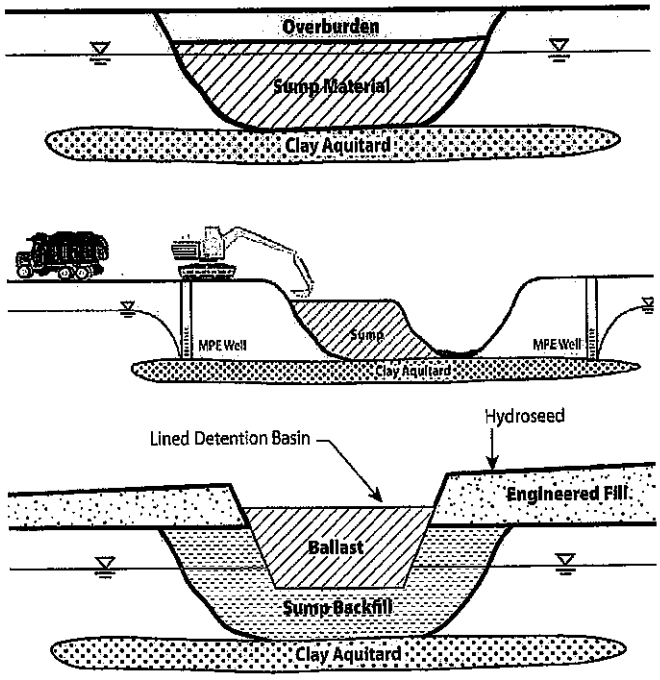
This aerial picture shows the 19 sumps of impacted soil outlined in red and the two plumes of impacted groundwater in blue.

***A** indicates the location of the entrance point for all traffic to the site*

***B** indicates the exit point*

***C** shows the marina parking that was removed to perform the restoration and rebuilt employing sustainability principles.*

With marinas on three sides of the site, it was essential that access to the marinas was maintained and impacts to the community—including the marina residents—was minimized.



These drawings indicate the condition of the site prior to construction, methods employed during construction, and the final site after restoration.

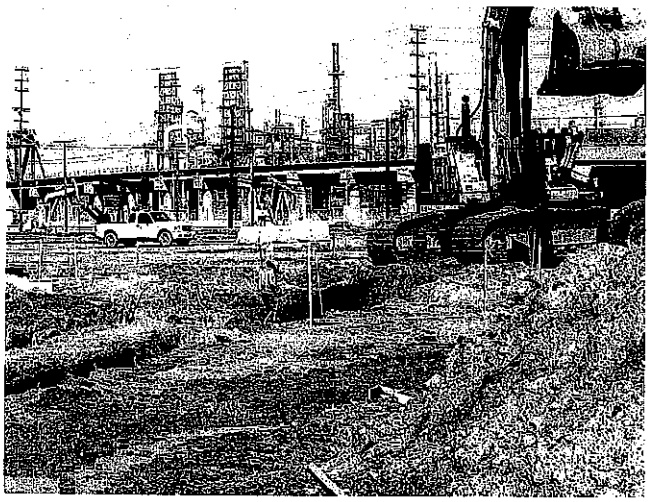
Note the MPE well for sumps within the groundwater plume in the middle diagram.

The third diagram demonstrates the raised surface elevation following restoration for improved stormwater management.

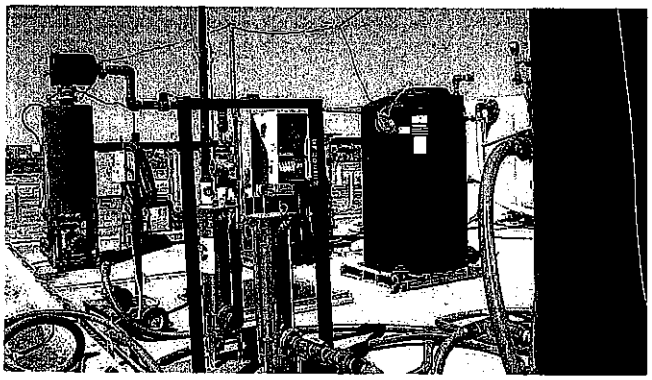
This imagine shows the proximity of the marina and the rest of the Long Beach community in the background and oil production equipment in the foreground.

Construction was phased to complete remediation and grading of the northern portion of the site first so that the most productive part of the oilfield could be reactivated.

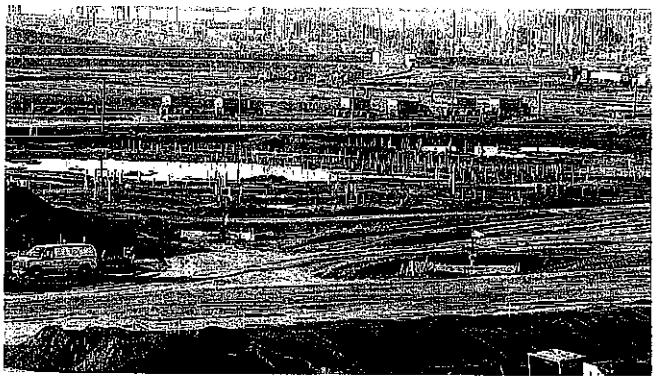
The project included extensive efforts to ensure the safety of the community as well as site workers, including perimeter monitoring for emissions, dust, and noise.



With the site located below sea level, a process called strip excavation was used in which the contractor excavated to the full design depth, and then the fill was immediately placed into the excavation site. This minimized the amount to groundwater that had to be addressed as part of the site restoration.



During excavation of sumps within the groundwater plumes, multiphase extraction systems reduced the levels of volatile organic vapor emissions, which site studies had shown would be in excess of 2,000 ppm. This avoided the necessity of excavation workers wearing Level A or Level B personal protection equipment. A side benefit was to further reduce the volume of water present in these sumps.

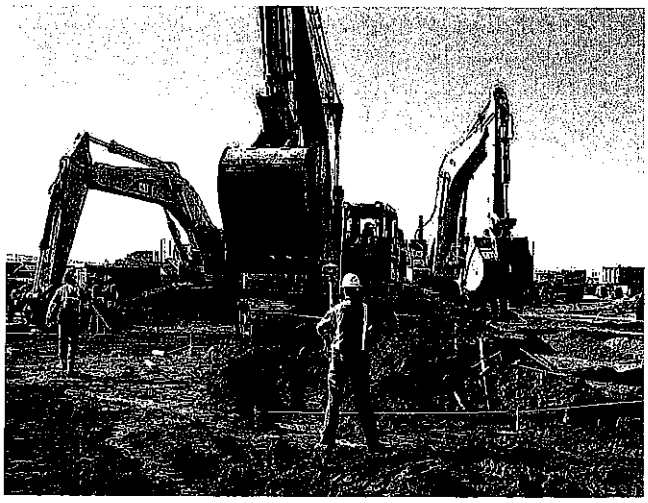


Sidewall samples were collected at each sump to confirm removal standards were met. In some cases, test results indicated the continued presence of contaminants of concern and additional excavation— up to 10 feet beyond the original sump boundary— was required. An additional 77,500 tons of sump materials was removed and disposed of as a result of sump boundary confirmation testing.

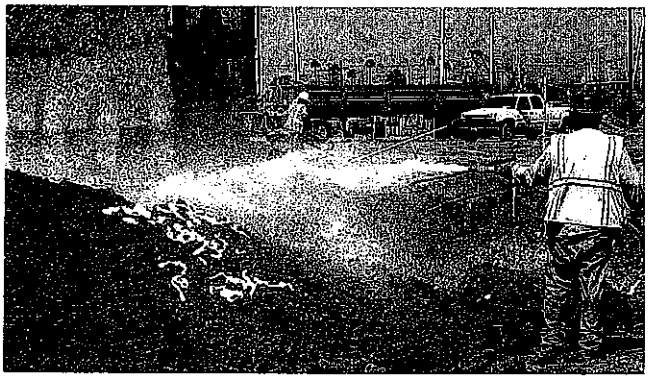
The sequencing of sump excavation required overburden to be removed for reuse on site, followed by excavation of the sump material for transport off site.

The polypropylene geomembrane liner system, showing being installed in one of the three detention basins, prevents contaminated groundwater from contacting stormwater runoff.

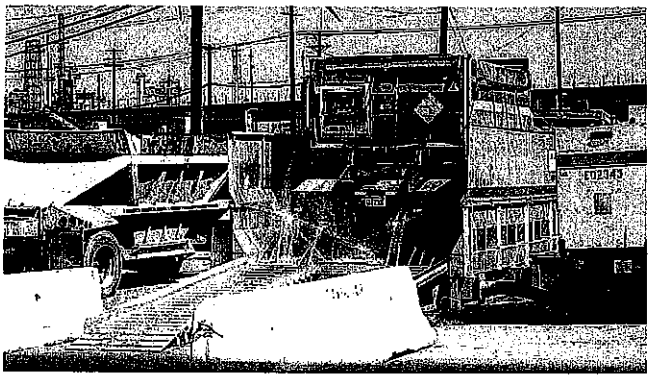
Construction of the collection v-ditch around one of the three detention basins



The heavy equipment environment required a rigorous approach to health and safety.

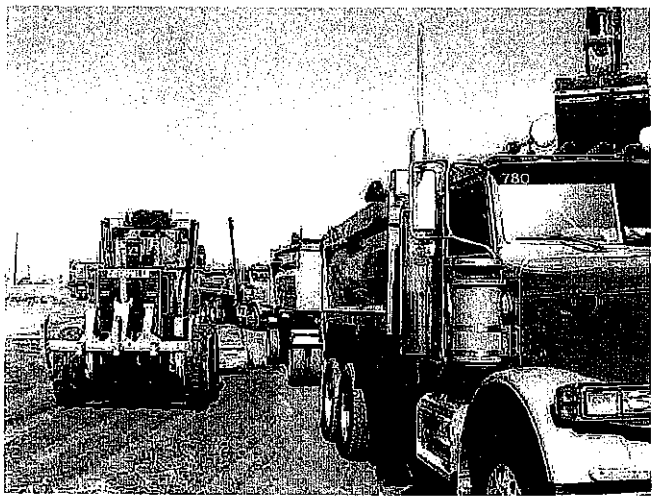


To address chemical hazards, foam suppression was used to ensure vapors as well as odors were controlled, and air monitoring sensors were placed around the site to prevent off-site migration of airborne contaminants.



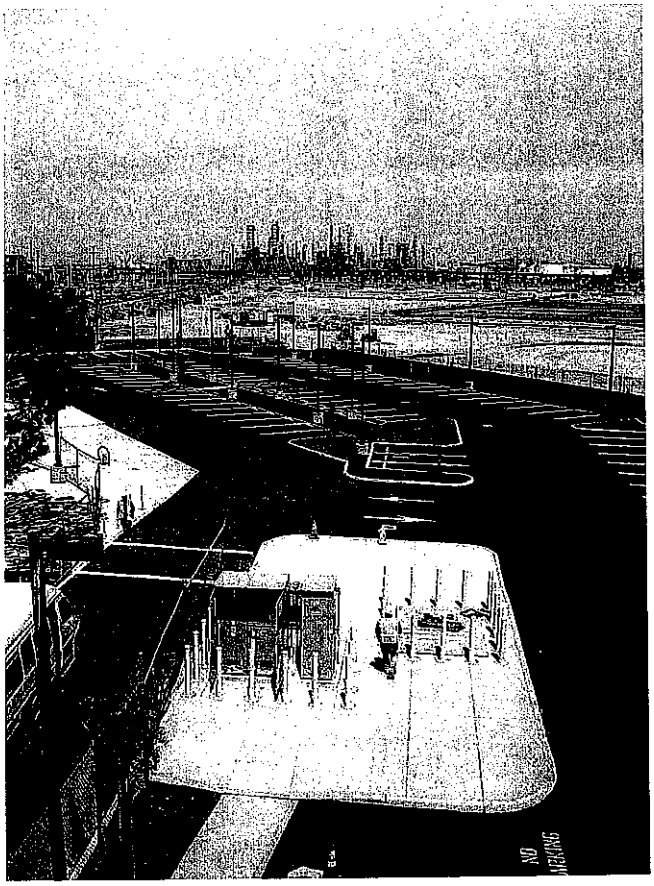
To further address chemical hazards, all trucks exiting the site were washed off, with the captured wash water itself sampled and appropriately disposed of.

In addition to addressing possible contamination, every attempt was made to minimize inconvenience to the neighboring public, with extra efforts to avoid tracking mud or other debris through residential streets



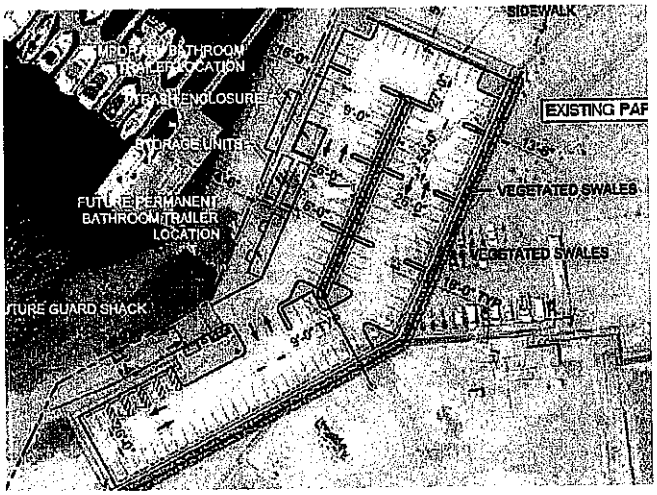
As many as 400 trucks entered and exited the site each day for a total of ~54,000 loads hauled.

With multiple sumps being worked simultaneously and an regulatory requirement to keep trucks hauling waste on a different route from trucks hauling fill, managing traffic on-site to ensure compliance as well as worker safety was a massive undertaking.



The new parking lot for the marina residents—replacing the one that had been built over one of the sumps, and thus necessitating its removal as part of the restoration process—was built emphasizing sustainability principles.

While the permanent parking lot was inaccessible, a temporary lot was constructed approximately a quarter-mile away, along with restroom, shower, and storage facilities. A 24/7 shuttle service was provided to marina residents and guests.



Sustainability features included in the parking lot included porous asphalt paving, bioswales for stormwater management, and drought-tolerant vegetation in the parking lot landscaping.

Dock Talk

The Port of LONG BEACH
The Green Port

Port of Long Beach news and updates for March 2009

Planning for the Future at the Port of Long Beach

Dick Steinke
Executive Director

Our challenge at the Port of Long Beach is not only to manage the Port's resources for today, but to look ahead and responsibly plan for the future. While we all engage in various types of planning in our jobs, forecasting the Port's "big picture" outlook — development needs, growth issues, job creation, economic impacts and more — falls primarily to our Master Planning Division. In the space below, you can learn more about what Master Planning does and how the division is making major contributions to our port-wide initiatives.

I also invite you to meet the team overseeing the important Pier A West environmental cleanup project, see how our hard-working Maintenance Division landscaping crews are helping to brighten up the Port landscape, and learn how our Security Division helped welcome the USS Green Bay into the Port.

Find out what Kathleen Cox is up to on her lunch breaks — maybe you'll be motivated to join her! See who volunteered to remove invasive plants at Colorado Lagoon. Get help decoding such Port acronyms as RAP, TAP and CAAP.

Finally, my personal kudos to the employees in this month's "Applause Applause" section — it's these kinds of accomplishments that make our Port of Long Beach employees among the very best in the nation!

Division Spotlight

When Master Planning Comes Together

In the Master Planning Division, which includes, from left, Senior GIS Analyst **Tony Chan**, Port Planner **Matt Goldman**, Secretary **Milagro Alvarado**, Director **Larry Cottrill** and Port Planner **Matt Plezia**, nothing goes unplanned.

The Master Planning Division boasts employees from backgrounds as varied as city planning, economics and environmental science. With that type of intellectual diversity, it's no wonder that the division can handle multiple significant projects simultaneously.

Led by Director Larry Cottrill, the division maintains the state-certified Port Master Plan. The division also prepares long-range cargo forecasts and economic impact assessments of port operations and construction, and long-term terminal capacity, among many other tasks.

"Our division is important because it provides input to others — Engineering, Transportation, Environmental — that helps determine what types of port facilities need to be constructed and when they are needed," Cottrill said.

Although staff members often work independently on projects because of their different areas of expertise, they still maintain a sense of community. It is this balance of individuality and teamwork that allows Master Planning to accomplish tasks, according to Cottrill.

Did You Know?

- Just one of the Port's largest cargo container ships could carry enough shoes to supply one pair for nearly every person living in California (31 million).
- One of the Port's cargo container ships carries enough products to fill an entire regional shopping mall with clothing, shoes, toys and handbags stacked eight feet high and wall to wall.
- One train loaded with containers carries the equivalent cargo of 250 to 280 trucks. (Source: Alameda Corridor Transportation Authority)
- A 2007 diesel truck is 60 times less polluting than a 1987 truck. (Source: Gateway Cities Council of Governments)
- The Port's high-tech air monitoring system tracks and reports air quality and weather conditions 24 hours a day at www.polb.com.

Applause, Applause

Congratulations to Harbor Patrol Sergeant **Doug Rangel**. He was selected as a "Hometown Hero" by the Greater Long Beach Chapter of the American Red Cross for his heroic act of working with police to rescue a suicidal man in February 2008. He was recognized at a breakfast on March 10.

Congratulations to **Tony Chan** for passing his dissertation on "Metallic Burden of Deciduous Teeth and Childhood Behavioral Deficits." He has earned his doctorate in Environmental Health, Science and Policy from University of California, Irvine.

Congratulations to **Cheng Lai** for his advanced work in creating the Port Wharf Design Criteria, which will serve as the guide to building new wharfs that will protect the Port and public from earthquake damage.

Environmental Corner: Pier A West

From left, Port Planner **Matt Goldman**, Deputy Chief Harbor Engineer **Sean Gamette**, Environmental Remediation Specialist **Christine Houston**, Program Manager **Sunny Zia**, and Environmental Remediation Specialist **Dan Ramsay** gather at Pier A West to work on the cleanup project.

A Dirty Job They're Happy to Do

Cleaning up 80 acres of seriously contaminated Port property is no small feat, especially on a tight schedule and under close scrutiny from environmental regulators, the community and the Port itself.

To take care of this dirty job, the Port assembled a "clean team" that is on track to remedy the oil-fouled soil on Pier A West.

Bringing the soil-remediation know-how are Deputy Chief Harbor Engineer Sean Gamette, Program Manager Sunny Zia, Environmental Planning's Dan Ramsay and Christine Houston, and Master Planning's Matt Goldman.

As there are no plans for developing Pier A West; this is all about improving the environment. At the end of the project, the site will be returned to its role as an active oilfield.

The project involves removing and replacing hundreds of thousands of cubic yards of soil tainted years ago by the dumping of oilfield wastes under previous ownership. The soil remediation will help to protect ground water, which is consistent with the Green Port Policy.

In 1994, the Port acquired the Pier A West property. Aware that a major clean up the site would be necessary, the Port negotiated an agreement with the previous owner to pay much of the costs.

The remediation project began with excavation in August 2008. Hundreds of trucks per day have been toting the old soil out. By summer of this year, the clean fill will be in place and graded to minimize storm water runoff.

The project – with a $145 million budget – requires the cooperation of several Port divisions, to ensure that the Port will achieve reimbursement from the responsible party for most of the project's cost.

As a Program Management consultant who came to the Port in August, Zia said she is impressed with the project's aggressive schedule and the Port's teamwork.

Although most of the contamination has been removed, it's not over yet.

"The project is not complete until oil field operations are back on line," Ramsay said.

Cleaning Up the Past

THE PORT OF LONG BEACH, CALIF., IS COMPLETING A MASSIVE REMEDIATION PROJECT. BY BRIAN SALGADO

When embarking on an environmental cleanup project as complex as the Pier A West/Area 2 interim/source removal action in Long Beach, Calif., having an experienced project team is crucial. "It's not unusual in my experience to have unforeseen problems crop up on these projects," says Gary J. Cardamone, director of construction management for the Port of Long Beach.

"What's been reinforced here is the need to have the right team assembled that has been through a number of these kinds of projects and have the kind of experience to respond to unforeseen issues and challenges, and the ability to respond quickly and effectively."

This $73 million project – which has Weston Solutions as its construction manager and Tutor-Saliba Corp. as general contractor – involves soil and groundwater cleanup at an active oil field site. The Port of Long Beach purchased the site in 1994, but the site has been an operating oil field since the 1930s. The project – which broke ground in August 2008 and was completed in June 2009 – is part of the port's overall capital improvement program, and this is the only work currently planned for or at Pier A West. "We have no future plans for the use of the area, and we won't develop any plans until we have an environmental impact report for the CEQA [California Environmental Quality Act] process," Cardamone says. "This is unique as far as port projects go because there usually is some expected return on investment you hope to gain when a project is completed.

"But this is purely an environmental cleanup project with no revenue being derived from it when completed," Cardamone adds. "We have a very aggressive green port policy here, and we are making very large investments to green the port and reduce and eliminate some of the impacts of the past."

Doug Cowan, construction manager for Weston Solutions, says the construction team had to deal with 19 existing sumps where oil had impacted the soil, creating a great deal of waste that had to be transported off site. Complicating matters, each sump had multiple waste streams that had to be removed and transported separately to several different disposal facilities. "This does create quite a coordination issue to make sure that each waste stream goes to the right facility," Cowan says. "It was a bit more complicated

Weston Solutions

www.westonsolutions.com

- *Project cost: $73 million*
- *Scope: Environmental remediation of Pier A West*
- *Location: Long Beach, Calif.*

"The design team, contractor and the CM team worked very closely together to get the job done." –Doug Cowan, construction manager

» The $73 million remediation project includes soil and groundwater cleanup.