

Goodbye Brownfield, Hello Rec Center

By Anthony J. Maggio and Pamela Galera

The City of Orange, Calif., is turning a contaminated brownfield into a recreational campus and park on a 26-acre site that formerly served as both a landfill and asphalt plant. This task is being accomplished by creating partnerships and developing common-sense solutions to the seemingly insurmountable brownfield problems that are facing municipalities everywhere.

The site is bounded by residential developments to the north and south, and by the completed first phase of Grijalva Park at Santiago Creek to the east.

The city is working to place brownfield sites back into productive use because there is a lack of available uncontaminated property in the

area. The city identified the Grijalva site as a desirable location to construct a municipal recreational campus, given its central location to the city, good access to streets and public transit, and to the proposed bike path to be developed along Santiago Creek that will link the park to other parks, schools and retail centers.

The City of Orange acquired Grijalva in February 2001, with the intent of developing a recreational campus on the site. It received a \$200,000 Brownfield Assessment Demonstration Pilot Grant from U.S. EPA Region IX as part of EPA's Brownfield Economic Redevelopment Initiative. According to the EPA, "this initiative is designed to empower states, communities and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields."

Site History

Before 2001, the Union Pacific Railroad Company owned the site, having purchased it from the Conrock Corp., which had been excavating sand and gravel from the banks of Santiago Creek. The railroad used the excavated area as a landfill, filling it with concrete, brick and other solid waste to buttress the banks of the creek. The landfill was used from the early 1950s until the flood of 1969. The city also used the site for disposal of asphalt and curb and gutter sweepings.

Limited gas studies were conducted at the landfill in 1985. Over a two-day period, subsurface methane gas concentrations and pressures were monitored. Gas samples collected at two locations for analysis detected no methane.

Previously conducted soil assessment studies (Geomatrix 1998 and SECOR 2001) had shown that the site of the former asphalt plant had very low levels of total petroleum hydrocarbon (TPH) contamination. In the landfill portion of the site, however, lead was detected at two sampling locations near the surface, which were above allowable levels in the State of California.

The EPA grant required a Phase I and Phase II Environmental Assessment. SCS Engineers was selected by the city to provide environmental consulting and assessment services for Phase II.

Interactive Meetings with Regulatory Agencies

After reviewing the site information, the city brought together representatives from the three regulatory agencies charged with overseeing the project: the Orange County Health Care Agency-Environmental Health (OCHCA), the California Regional Water Quality Control Board Santa Ana Region (RWQCB) and the U.S. EPA Region IX.

The purpose of the meeting was to forge partnerships necessary to successfully create a public park and help define the scope of work for an expanded site assessment.

Agency representatives agreed that the lead concentrations were the primary area of concern. Additionally, the OCHCA felt that past evaluations for methane gas generation had not been sufficient and the former asphalt plant was dropped from further consideration. In light of these considerations, all parties agreed to the following program:

- Install 15 soil borings in the refuse mass within the landfill and col-



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lect soil samples for lead analysis. Samples were collected at six inches below ground surface (bgs) and every five feet thereafter until the bottom of the landfill was reached. An analysis was performed for total lead to determine whether hazardous levels of soluble lead were present.

- Collect soil samples in native soils beneath the landfill every five feet to a maximum depth of 40 feet bgs. The first sample collected in native soil was analyzed for total lead.
- Install three soil gas probes and measure methane concentrations around the perimeter of the landfill. Monitoring occurred monthly for six months. Methane volume was analyzed and the results discussed with the OCHCA to determine if further monitoring or other activities should be performed.
- Convert two of the 15 proposed soil borings into the interior of the landfill into soil gas probes. These probes were installed in the refuse mass and monitored over the same six-month period. The results of monitoring were used to evaluate whether gas was being generated within the landfill.
- Determine which, if any, remedial measures might be required before converting the landfill to a municipal park using the data and information developed during the Phase II investigation, supplemented with data from past studies. Measures could range from limited removal of lead-contaminated hot spot areas to complete excavation, removal and disposal of the landfill materials or the design and implementation of a proper landfill cover to protect human health and the environment.

Results of the Phase II Assessment

After completing the Phase II fieldwork and analyzing the results, the following conclusions were developed:

- After six months of gas monitoring was completed in the perimeter and

interior probes, no methane gas was detected.

- All but two of the soil borings drilled and sampled at the site had at least one soil sample that contained hazardous concentrations of lead (greater than 1,000 mg/kg by standard method 6010, or above 5 mg/L Soluble Threshold Limit Concentration by the Waste Extraction Test method for 6010). The highest concentration of lead detected at the site during this investigation was 1,700 mg/kg.
- Samples containing hazardous concentrations of lead were detected only within the landfill soils and did not extend into native soils beneath the fill area. Based on the results of the Phase II assessment, it became clear that a remedial measure was needed to protect human health and welfare before the site could be converted to a public municipal recreational center.

Landfill Soil Cover

After reviewing several remedial alternatives, including excavation, removal and disposal of the landfill materials at a hazardous waste landfill, the city, SCS Engineers and the three regulatory agencies agreed that a landfill cap (soil cover) would be the most cost-effective and safest way to close the landfill and protect the public. This method, considerably less expensive than some of the other possible solutions, would reduce the risk of unearthing, moving and storing the hazardous debris and seal it in, removing it from human contact. Additionally, the cap plan gave the city access to a \$200,000 cleanup grant.

In December 2005, a Closure Plan and Post Closure Monitoring and Maintenance Plan was approved by the OCHCA and the RWQCB.

The landfill was to be closed using a soil mono-cover that would isolate the waste mass and prevent public exposure to the lead in the landfill. The cover would mini-

mize, if not eliminate, the infiltration of water into the waste mass that might leach lead over the long term into soils beneath the landfill. Included in the plan was a monitoring and maintenance schedule that the city agreed to observe to protect the integrity of the cover.

The cover would be comprised of a 2-foot thick foundation layer (a compacted layer of soil that provides a stable base for overlying soil layers) and three feet of vegetative cover soil selected for its ability to support the desired plant growth. The landscaping plan would preclude use of deep-rooted bushes or trees to avoid creation of pathways for infiltration of surface water into the landfill waste.

The cover was completed in August 2006 and a Notice of Completion filed in October 2006.

The forging of partnerships did not stop with the brownfield issue. The city applied for and was granted \$2 million from the State of California under the Urban Park Grant (Proposition 40) and the Community Foundation of Orange is continuing to raise private donations in order to turn this dream into a reality for the community.

An architectural firm selected by the city is nearing completion of the construction documents for the first phase of the campus. The plan includes a gymnasium and sports center, which will include a double-court gym, dance room, and medium classroom.

Thus far, the project has been deemed a success by everyone involved, including the city staff members, the EPA, the regulatory agencies, and, most importantly, the community.

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