



# DBOF Delivers

By Marian Clayton

*The city of Santa Paula, Calif., faced a challenge that is common to many municipalities: Its wastewater treatment facility was out of compliance and needed replacement, and the city did not have sufficient funds to pay for a new facility. Additionally, the Regional Water Quality Control Board (RWQCB) mandated a tight completion and compliance deadline that if not met would cost the city more than \$8 million in fines.*

## California city builds new wastewater facility

### Project Delivery Solution

Santa Paula is located just north of Los Angeles in Ventura County, and it has a population of approximately 30,000. The city's original wastewater facility was built in 1939. Despite several upgrades and modifications, it did not comply with state requirements and had reached the end of its useful service life. The RWQCB agreed that if the city could come into compliance by Dec. 15, 2010, the board would waive the \$8 million in fines.

The city initially chose the conventional design-bid-build approach funded by public tax-exempt municipal bonds to build the new facility. After years of work and significant financial commitments into engineering studies, however, the city council and staff realized that this method would not meet their tight timeline or budget requirements. In July 2007, the city council approved the design-build-operate-finance (DBOF) method of procurement and began a request for quotes/request for proposals selection process for the new facility.

Santa Paula's Vice Mayor Bob Gonzales was mayor at the time the DBOF contract was signed. "The cost of doing business was significant for us," he said. "We had to build a new wastewater treatment facility, and we did not have the necessary funds. The DBOF delivery method gave the city a lot more latitude, and the risk was transferred to the company who was doing the work."

In May 2008, the city council awarded the DBOF contract to Santa Paula Water LLC, a joint venture of PERC Water Corp. and Alinda Capital Partners.

### DBOF Project Structure

PERC Water, a water recycling company that designs, builds, operates and manages water recycling facilities, teamed with Alinda Capital Partners, an independent investment firm that specializes in infrastructure investments, to form Santa Paula Water. As permitted under CA Government Code 5956, Santa Paula Water entered into a service agreement with the city to design, build, operate and finance the new facility over a 30-year concession, the longest such agreement for wastewater treatment services in the U.S.

The facility was 100% privately funded, and the city was not required to pay any upfront capital costs toward the design and construction. Once the facility was in full operation, the city began paying a monthly service fee that includes facility operations and maintenance, debt service, capitalized interest during construction and 30 years of capital replacements. The city made its first payment toward the facility in July 2010.

PERC Water and Alinda were presented the Global Water Awards 2009 "Water Deal of the Year" Award of Distinction for their contribution to the advancement of public-private partnerships in the international water sector, specific to this DBOF contract.

### Facility Design Overview

PERC Water developed a membrane bioreactor (MBR) process design in which the majority of the treatment occurs in underground tanks. The tanks require approximately three-quarters of an acre of land and are built mostly below the existing grade. The tanks utilize common wall construction, requiring a total volume of 7,000 cu yd of concrete and less yard piping and conduits. The operations buildings are constructed above the tank structure, reducing land requirements, and contain the process equipment, a laboratory, restrooms, workshop, break rooms and administrative offices. The covered tanks and noise and



The new facility took on Santa Paula's full flow seven months ahead of its compliance deadline.

Table 1. Water Quality Results (October 2010)

	Influent	Effluent Permit Requirements	Effluent Results
BOD	340	10	1.1
TSS	283	10	<1
Total Nitrogen	n/a	10	6.0

odor controls makes the facility neighbor friendly and a positive addition to the surrounding community.

The facility was designed to be built in two phases, allowing for an efficient expansion when additional capacity is required. The tank structure was constructed for both Phase I and Phase II at 4.2 million gal per day (mgd) average dry-weather flow. It is equipped with the equipment needed to treat 3.4 mgd, serving a maximum population of approximately 42,500. When it becomes necessary to expand the capacity, additional equipment will be installed in the facility, increasing the rated capacity to 4.2 mgd, serving a population equivalent of approximately 52,500. This helps to keep operation and maintenance costs as well as future construction costs at a minimum.

The effluent is treated to a tertiary level meeting Title 22 requirements and present requirements of the RWQCB. It currently is disposed of in 13 acres of percolation ponds located to the east of the new facility. The city is drafting an alternate-use plan for the recycled water to reclaim and reuse it as an additional revenue stream.

### Facility Construction

PERC Water began the engineering of the project on May 6, 2008, following completion and approval of its 30% design, which was submitted to the city as part of PERC Water's proposal. The combination of the facility's design and PERC Water's integrated design-build-operate team allowed the flexibility to start construction two months into the design. Concurrent to the construction, construction drawings and documents were prepared for future components of the work in a fast-track approach. Work on the tank structures commenced in September 2008 and was completed in January 2009. Construction of the project was completed in December 2009.

"I've never known of a municipal project to be completed on time," Gonzales said. "I've been involved in a number of different organizations—community college district, city school districts—where finishing six months after the projected

completion date is considered a success. This project was completed not just on time but seven months early, and I give credit to PERC Water and their team for getting the job done."

Change orders accounted for less than 1.7% of the construction cost, most of which included additional work requested by the city. More than 85% of the construction hours devoted to the facility were from local union workers. The project required 180,000 man-hours and boasted no loss-time accidents.

After completion of construction, PERC Water commenced electrical, mechanical, equipment installation, controls, programming, testing, commissioning and startup. In May 2010, seven months in advance of its Dec. 15 compliance deadline, the facility took full flow from the city, successfully terminating the use of the original facility.

### Operational Efficiencies

Because the DBOF contract stipulated that PERC Water would operate the facility for 30 years, the company invested its own funds in design enhancements during construction to reduce energy consumption costs. These energy-efficient features included an energy-efficient membrane scouring and aeration system, a smart controlling system and an innovative lighting design.

In the first five months of the facility's operation, the power consumption costs have been approximately 35% lower than expected. The energy savings are split 50/50 with the city. "The savings are significant for the city of Santa Paula, but also for the ratepayers," Gonzales said. "The benefactors ... are the ratepayers."

As a result of the energy-saving measures employed at the facility, PERC Water was awarded the 2009 Sustainability and Resource Protection Award by the *Environmental Business Journal* and a grant through Southern California Edison's "Savings by Design" program to help fund the energy-saving technology.

### High-Quality Water for Reuse

Beginning May 13, 2010, the facility has been fully



Most of the wastewater treatment takes place in underground MBR tanks.

operational, treating all of the city's wastewater, and in compliance with the RWQCB's waste discharge permit for what the facility is intended to treat. Table 1 (see page 24) shows the facility's water quality results for the month of October 2010. The city is developing a reuse plan for the effluent produced by the facility to be used within the community. **WWD**

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