



SANTA PAULA WATER RECYCLING FACILITY

A Case Study

Innovative Solutions to Municipal Wastewater Problems

The City of Santa Paula was required to comply with waste discharge standards mandated by the Regional Water Quality Control Board. The City's existing wastewater treatment plant, originally built in 1939 was in need of replacement. The City spent several years designing alternatives and incurred significant dollars during this time, with a looming deadline ahead of them and \$8 million of accrued fines. In 2007, the City entered into a settlement agreement with the RWQCB to achieve compliance with the permit by December 15, 2010. Following years of design efforts and millions of dollars of engineering consulting fees, the City voted to solve its wastewater problems using a Public-Private Partnership (P3) delivery method.

In May 2008, the City of Santa Paula awarded a P3 contract to Santa Paula Water, LLC with PERC Water as its DBO firm for the design, construction, and operation of the new facility. Two months later, PERC Water broke ground and commenced construction and, in parallel, completed the engineering documents for the project. In May 2010, the new water recycling facility was treating 100% of the City's wastewater in accordance with the P3 contract, seven months ahead of the deadline mandated by the RWQCB. The award winning plant has continuously operated in accordance with the P3 contract since the commencement of operations.

The City's goals were fully achieved, as follows:

- Provide certainty of financing — *Achieved*
- No capital outlay by City — *Achieved*
- Local Job Creation — *Achieved, 88% of hours were local labor*
- Provide certainty of schedule — *Achieved, seven months ahead of schedule*
- Provide certainty of costs — *Achieved*
- Provide certainty with P3 contract effluent requirements — *Achieved, seven months early*
- Provide transfer of risk for energy costs — *Achieved, 30% lower than guaranteed*
- Provide a facility that would meet the City's future capacity — *Achieved*



Facility Design Overview

PERC Water developed a membrane bioreactor (MBR) process design where all of the treatment occurs in underground tanks and beneath the operations buildings. The tanks require less than one acre of land and are built mostly below grade. 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 odor controls makes the facility neighbor-friendly and a positive addition to the surrounding community.

Facility Statistics

Design Capacity	4.2 million gallons per day
Footprint	1.5 acres
Process Design	Membrane Bio-Reactor (MBR)

The facility was designed to allow for an efficient expansion when additional capacity is required. The tank structure is constructed for 4.2 million gallons per day (MGD) and is equipped to treat 3.4 MGD serving a population of approximately 42,500. When it is necessary to expand the capacity, additional membranes will be installed into 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 and future construction costs at a minimum.

Advantages of the PERC ASP® design include:

- Maximum odor control and noise reduction – the covered process tanks eliminate the unpleasant offsite odors and noises that typically surround a traditional wastewater treatment facility
- Minimal land use – the total tank area is less than one acre resulting in 70% less land required by open tank design
- Aesthetically-pleasing facilities – The operations buildings built above the process tanks are designed to complement the surrounding community



Major treatment processes include:

- Influent Lift Station
- Screening and Head Works
- Flow Equalization Tanks
- Pre-Anoxic Zone
- Aerobic Zone
- Post-Anoxic Zone
- Membrane Separation Tank
- UV-Disinfection
- Effluent Storage
- Effluent Pump Station
- Percolation Ponds



Solution: A Public-Private Partnership

The City of Santa Paula originally considered the Design/Bid/Build approach for the new Facility but realized it would not meet their tight timeline and budget requirements. After having spent significant funds and time on studies and designs that exceeded their budget, they were introduced to the P3 method of procurement, provided under California Government Code Section 5956-5956.10, and chose to seek a single entity to finance, design, build, operate and maintain the new Facility.

- Guaranteed schedule
- Guaranteed water quality
- Guaranteed financing for 30 years
- Energy/power risk and responsibility
- Exit standards upon transfer to the City

The City entered into a P3 Contract with Santa Paula Water, LLC to design, build, operate and finance the new Facility over a 30-year concession. The P3 Agreement includes:

- Fixed capital repayments
- Capital replacements
- Operations and maintenance

The Facility is 100% privately funded and privately owned by Santa Paula Water LLC. The City began paying Santa Paula Water, LLC a monthly Service Fee upon commencement of Facility operation in accordance with the P3 contract.

“The cost of doing business was significant for us. 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.”

Bob Gonzales, former Mayor of Santa Paula

Awards

DBIA Western Pacific – Best Project – Water Award 2011

PERC Water was awarded the top tier “Best Project – Water” Regional Award from the 2011 Design-Build Institute of America Western Pacific Region.

2010 Business Achievement Award - Project Merit

For the second year in a row, the EBJ selected PERC Water as a 2010 Award Recipient, this year in the Project Merit category for the design, construction, and operation of this Facility.

2009 Business Achievement Award - Sustainability & Resource Protection

The EBJ selected PERC Water as a 2009 Sustainability and Resource Protection Award recipient as a result of their efforts to deploy energy-saving technology at this Facility.

Global Water Intelligence – Water Deal of the Year 2009

PERC Water and Alinda Capital were presented the Global Water Awards' 2009 “Water Deal of the Year” Award of Distinction for their utilization of public-private partnerships in their contract for this Facility.



Facility Construction



Timeline

May 2008	Contract date & design start
July 2008	Construction start
December 2009	Construction completed
May 2010	Startup completed
December 2010	Required completion
<i>7 months early</i>	



“I’ve never known of a municipal project to be completed on time. 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.”

Bob Gonzales, former Mayor of Santa Paula



Operational Efficiencies

On average, the Facility's operating costs have been approximately 15% lower than projected, mainly due to the energy consumption being 30% lower than expected. Because PERC Water is contracted to operate the Facility for 30 years, they invested their own funds in design enhancements during construction to reduce the energy consumption costs. The energy savings are split 50/50 with the City.

These energy-efficient features included:

- UV Disinfection
- Membrane system
- Aeration system
- Lighting design
- Smart controlling system

To improve the efficiency of the smart controlling system, PERC Water developed Central PERC™, a web application where all the facility's operational data is integrated within one platform that can be accessed and controlled wirelessly from an iPad, iPhone, Droid, etc.

As a result of these energy saving measures, 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

The Facility has consistently produced water quality significantly better than required under the P3 Contract. The Facility removes biochemical oxygen demand (BOD) and total suspended solids (TSS) from the wastewater with greater than 99% efficiency, producing a high-quality final effluent well below the permit limits established by the SWRCB.

The Facility also effectively removes total nitrogen from the wastewater. The Facility's unique process configuration produces an astonishingly clear effluent, referred to as turbidity. This excellent measure of water clarity is more than 20 times better than the standards established by the SWRCB.

The Facility is currently producing approximately 2,000 acre-feet per year of recycled water, which hopefully will be utilized as reuse water in the near future.

Parameter	Effluent Permit Requirements	Average Effluent Concentration
BOD	10 mg/l	2 mg/l
TSS	10 mg/l	0.9 mg/l
Total Nitrogen	10 mg/l	7 mg/l
Turbidity	2 NTU	< 0.1 NTU



Additional Media

To learn more about the Santa Paula Water Recycling Facility, click on the links to the videos below.



Santa Paula Animation

<http://www.youtube.com/watch?v=CfX6zEakmsM>



The Santa Paula Solution

http://www.youtube.com/watch?v=E_OKr3n5JYc



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