



Upgrades and expansions to Lake Havasu City's wastewater treatment and collection systems have made it possible to supply three area golf courses with irrigation water that is safe and affordable.

# Smart Management for Public Works

By Steve Gibbs

*Lake Havasu City sets a high standard for reuse water*

**W**hen you live in a desert, you learn to appreciate water. That is especially true for Lake Havasu City, Ariz. Located on the banks of 19,000-acre Lake Havasu and near the Colorado River, the city relies on the lake as an attraction for tens of thousands of tourists each year. On certain weekends and holidays, the city's population can swell from 55,000 to more than 200,000.

Aside from the lake and river, however, water resources are scarce. The area gets only 6 in. of rain annually and has an average daily high temperature of 100°F or more for about half of the year.

Preserving and protecting water resources is essential to the city, so the local public works department takes great care to treat and reuse wastewater as efficiently as possible. To that end, the city has invested significantly in wastewater collection and treatment. Lake Havasu City is currently in the seventh year of an 11-year, \$455-million expansion of its sewer lines and treatment facilities. The upgrade includes improvements to the city's three treatment plants, which have a combined treatment capacity of 8.2 million gal per day (mgd).

"Our wastewater treatment needs to be flexible and effective because our population fluctuates so much," said Norm Hughes, treatment utilities supervisor for Lake Havasu City. "We want to reuse our treated water and avoid polluting our groundwater supply."

The city's water reuse program is a model of smart public works management. Upgrades and expansions to the treatment plants make it possible for Lake Havasu City to supply three area golf courses with irrigation water that is safe and affordable. The golf courses pay for the water, which offsets the cost of treatment. For a resort area like Lake Havasu, it is a perfect public-private partnership.

"Reusing water is the right thing to do," said Hughes, who has worked for the city for more than 20 years. "We would much rather reuse water than pump it out of the lake. We currently have plenty of water in Lake Havasu, but the more we can do to preserve it, the better off we will be in the long run."

## Choosing Wisely

In 1986, the city decided to make improvements to one of its two existing treatment plants (it later added a third). Officials debated between choosing a biological fixed-film system and Schreiber's Counter-Current aeration technology. Impressed by its operational efficiency and fine-bubble diffusion system, the city chose Schreiber. Lake Havasu City has since equipped a second treatment facility with Schreiber technology and expanded both plants.

"The Schreiber system was attractive to us because it had a low power requirement for the aeration bridge and because of their diffusion concept," said Doug Thomas, wastewater manager for Lake Havasu City. "The fine-bubble diffusion technology made a lot of sense to us, and over the years, it has been proven to work."

The aeration system is considered among the most efficient on the market. It separates the functions of oxygen transfer and reactor mixing. During low load conditions, the blowers can be turned down or off, saving energy. For Lake Havasu City, where



the population can vary by 100,000 almost overnight, flexibility and efficiency are essential.

The company's high oxygen transfer technology is based on simple principles of physics and biology. With Counter-Current aeration, the diffuser assemblies are constantly moving through the water. The rotating diffusers create a horizontal circular flow as they disperse the bubbles more evenly than stationary diffusers. This reduces bubble coalescence and increases bubble surface area for maximum contact time and greater oxygen transfer. Dissolved oxygen (DO) rates increase more quickly than with other aeration methods, which means the blowers run for shorter periods of time.

"I've worked with the Schreiber process for more than 20 years," Hughes said. "With their traveling bridge aeration system, the blower runtimes are less than with other systems. I watch the monitor when the blowers come on, and the DO count goes up very rapidly. We also can set nitrification and denitrification times automatically."

#### Fuzzy Science

After the effluent is processed through the aeration and clarification stages, it is filtered through Schreiber's patented Fuzzy Filter. The system is compact—one filter occupies a footprint of only 5 by 5 ft—and two filters handle the entire 2.2-mgd facility. It is cost-effective, removes suspended solids and is different from conventional media filters.

The Fuzzy Filter system utilizes compressible media—small, pink synthetic fiber spheres—to capture solids. Because the media has low density and is compressible, the porosity of the filter can be adjusted to suit various filtration needs. The system operates in an upflow design, with effluent entering the chamber from the bottom. The water passes through the compressed media before being discharged to open-channel ultraviolet (UV) disinfection units. After the wastewater has been filtered, the compression is removed and clean water is cycled through the system to clean the media. Chlorine is introduced once every 12 to 18 months to kill any bacterial growth, and detergent can be added to remove any grease buildup that may occur.

"The Fuzzy Filters do an excellent job," Hughes said. "The turbidity of the water coming out of [them] is usually less than 1 NTU. Our permit limit is 5 NTU. We never have turbidity problems, and the fact that the water has very low turbidity means the UV disinfection process works better because turbidity blocks UV light."

Hughes said that treatment capacity has not been a problem with the new system. Lake Havasu City's Island Plant and Mulberry Plant, both Schreiber facilities, have an average combined output of 2.1 mgd and the capacity to treat 4.7 mgd. Because Lake Havasu City has separate sanitary and storm water sewers, Hughes is confident they have the capacity to treat high volumes of wastewater even during peak tourism periods.

"When we have a big rush of people and very high flows, the Schreiber system handles it very well. We don't see any negative results from high flows rates, and our output quality remains high," he said.

#### High Standards

Lake Havasu City's public works department takes a great deal of pride in the quality of the water produced at its treatment plants. The department understands the need to protect the environment in an area that relies on water recreation and tourism.

"The water we produce is approved for full-body contact," Hughes said. "You can theoretically put it in a pond and swim in it. We are very pleased with the water we get from our Schreiber plants; the water quality is consistently good." [www.tagteamglobal.com](http://www.tagteamglobal.com)

Steve Gibbs is a freelance writer and vice president and partner of TagTeam Global. Gibbs can be reached at 901.753.3405 or by e-mail at [sgibbs@tagteamglobal.com](mailto:sgibbs@tagteamglobal.com).