

A TALL DRINK OF

It's a hot day in August. Chances are you might be reaching for a cold bottle of water on a dusty jobsite. But if you're a contractor working in the water and wastewater treatment industry, you might want to put down that plastic bottle and turn on the tap instead.

Currently, people spend \$11 billion a year on bottled water, which costs cities more than \$70 million a year in dumping and incineration fees, not including the cost of collection, trucking and litter removal, according to Corporate Accountability International.

Believing this money could be better spent to close the \$22 billion funding gap between needed water infrastructure and available dollars, the mayors of San Francisco, Salt Lake City and Minneapolis recently introduced a resolution to phase out spending on bottled water and redirect taxpayer dollars to support municipal water and other under-funded city services.

On June 25, the U.S. Conference of Mayors voted to support the resolution, gaining the support of at least 60 cities.

In the days leading up to the vote, San Jose, Calif.; Ann Arbor, Mich.; Orlando,

Fla. and Miami announced bottled water phase-outs, canceling contracts with major suppliers. Major cities including Philadelphia, New York, Chicago and Boston also came on board.

Green consumers on a budget are thinking twice about the safety, cost and environmental impact of bottled water, too. While a bottle of water can cost up to \$2.50 per liter, a day's worth of drinking water from the tap costs just 0.001 cent, or 50 cents a year, according to a survey conducted by the American Water Works Association.

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BY LAUREN PINCH

**CONTRACTORS
PUT WATER
SUPPLY AND
TREATMENT
PROJECTS IN
THE PIPELINE**

TAP WATER

The U.S. Conference of Mayors reported bottled water sells for as much as 4,000 times the cost of tap water delivery, even though 40 percent of bottled water comes from the same source.

And with today's technologies, such as UV filtration, treated water is often just as safe, if not safer, than bottled water. City tap water regulations often are stricter than those imposed by the Food and Drug Administration for bottled water.

For example, according to the National Resources Defenses Council, about 22 percent of bottled water brands contain at least one chemical that exceeds state safety guidelines.

In terms of the overall pipeline cost, the average consumer pays less than 62 cents a day (through utility bills and connection charges) for wastewater treatment, according to the Water Environment Federation.

While the bottled water debate may seem unrelated to the construction industry, the consumer ripple effect could influence city leaders and voters to invest more in water facility projects. The resolution is a sure sign citizens are thinking about the cost and safety of their water—and where it will come from—in a time when water shortages are almost as dire as oil short-

ages. And when leaders respond to the demands of an ever-growing population, it usually means more jobs for contractors.

In the pages ahead, three construction projects exemplify contractors' skills in troubleshooting jobsite issues to develop clean, cost-efficient water and wastewater treatment facilities that meet expanding community needs.

MOUNTAIN HOUSE WATER TREATMENT PLANT

Before developer Shea Homes could dive into a billion-dollar project to create the building blocks of a brand new city in Mountain House, Calif., local governing agencies demanded an essential element for future residents: potable drinking water.

Based on growth projections, the development needed the capacity to provide 16,000 homes and commercial services with water for up to 45,000 people within 10 years.

The Department of Health Services and the Regional Water Quality Board stipulated the owner, the Mountain House Community Service District, could not put taps on any newly built houses until it found a skilled team to add additional capacity to the water infrastructure.

Western Summit Constructors, Inc. met the challenge to build a full-scale \$42 million water treatment plant and entered a contract with Carollo Engineers, which masterminded the fast-track design-build plan.

The team began work in 2004 to construct new buildings and modify existing structures to create a traditional treatment plant using a UV disinfection system that meets California Department of Health Standards.

"Design-build clearly helped support the overall time restraint, allowing cost, design, quality control and construction to be complete in one cycle," says Kevin Kurz, west coast division manager, based in Vista, Calif. Construction began with only partial drawings and permitting in place.

Western Summit Constructors self-performed 65 percent of the work, ensuring the plant was substantially complete and operational in just 24 months.

The new treatment facility is a concrete structure on a pile foundation, incorporating influent pump mixing, flocculation and sedimentation basins and filters. Western Summit also built a clearwell, low lift pumps, backwash pumps, filter washwater basin and transfer pumps, and blocker and channel agitation pumps.

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The contract included chemical storage and feed systems as well.

“The project was a challenge because of the sheer number of people who were involved,” Kurz says. “We had to work to meet the needs of both the short-term owner [Shea Homes] and the long-term owner [the Mountain House Community Service District].”

Western Summit worked with six different owner and engineering entities, along with the state building, health services and regional water boards and departments.

The team overcame a 10-week lag time between the bid and the notice to proceed without gaining any relief to the end-completion date. In addition, Shea Homes requested the team expand the scope to increase the treatment basin capacity from 15 million gallons per day (gpd) to 20 mil-

lion gpd, requiring an addition of a third train of flocculation/sedimentation basins and two filters.

Western Summit shifted its work plan to accommodate the change and minimize impact to the schedule, with only a 7 percent increase in construction costs.

Working with subcontractors including Bergelectric Corp. of Las Vegas and Pacific Coast Steel of San Diego, the team achieved zero recordable incidents on the jobsite.

“We had to be very nimble to work through all of the different challenges of working with various project stakeholders,” Kurz says. “As a whole, it was a big challenge, and it took everyone to commit themselves to the project.”

The treatment plant currently serves more than 200 homes in the growing Mountain House community.

BLAINE WATER TREATMENT PLANT

Another fast-growing city, Blaine, Minn., a northern suburb of Minneapolis, was struggling to meet water demands with its 40-year-old public water system. After receiving complaints from citizens about water quality and discovering two city wells had unacceptable levels of volatile organic chemicals (VOCs), the city decided to undertake a \$3.4 million water treatment project.

The city needed a firm that could meet an aggressive 12-month schedule to install an air-stripping tower with a filtration system that removes iron and manganese from the water.

Municipal Builders, Inc., Andover, Minn., which concentrates in public and environmental projects, began work in September 2005. The company’s top five employees have a cumulative 82-years experience in water treatment work, giving the project team the know-how to address changes and redesign issues that often arise in public projects.

Crews performed quickly to pour concrete footings and build a 30,000-gallon below-grade concrete backwash tank before the harsh Minnesota winter began. Municipal Builders next built an above-grade structure with concrete block bearing walls, an insulated cavity wall, and



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stone and brick exterior veneers.

Inside are five treatment vessels, including a 60-foot-tall air-stripping tower that protrudes through the roof, and the flanged process piping and pumps necessary to convey water through the plant.

An exterior masonry enclosure houses a diesel generator and air scrubber system that cleans the air in the event of a chlorine leak.

The owner chose an air-stripping tower over a granular activated carbon system—not a typical method to treat residential drinking water. As originally designed, the project did not have enough holding capacity at the bottom of the tank to allow for proper pump operation. But after some deliberation between Municipal Builders and the project engineers, the team decided to add eight feet and six inches to the height of the tower to resolve the issue.

Additional issues arose. The tower did not arrive on the jobsite on time, and once it did, it needed new lifting eyes to raise and then lower the tower into the structure. The blower to create the updraft in the tower, designed to be inside the building, needed to move to the roof because it was too large. And, the team needed to install additional mist eliminators to reduce the amount of water expelled from the tower.

But project manager John Wegner says despite these challenges, he'd build the facility this way again. "According to the owner, the stripping tower system is doing a very good job of removing the contaminants," he says.

A stripping tower functions by pumping untreated water to the top of the tower, and as the water cascades through plastic media inside the tower, a large blower induces an updraft that strips the petro-

leum pollutants from the water molecules and exhausts these outside the top of the tower. Next, pumps convey the water out of the tower into two pressure filters to remove iron and manganese from the water. The water is then chemically treated with sulfur dioxide, chlorine and fluoride, which are housed in the treatment plant within gas tight rooms.

The project includes a below-grade backwash tank to hold and settle out impurities and contaminants caught by the filter and expelled during backwashes. Reclaim and sludge discharge pumps gather water after it settles and discard the settled waste.

The project also includes a sophisticated remote plant-monitoring system.

To incorporate all of these complex components, Municipal Builders called on both value engineering and a healthy relationship with the city of Blaine and the consulting engineer, PCE. Communication helped this project become a true success story.

"We had a good relationship with the architect and the engineer," Wegner says. "This was the second of three projects we've done with that partnership (between the city and PCE)."

In this project, keeping the community happy with the appearance of the facility was a key component.

"Owners nowadays are trying to give these facilities a residential-looking component, with additional landscaping so they fit in nicely with the surrounding area," Wegner says.

Site restoration efforts included plantings, irrigation, curbs and paving.

The plant is now operating smoothly as designed, with VOC levels far below state standards.

JOHNS CREEK ENVIRONMENTAL CAMPUS

Keeping up appearances also played a role in a design-build project to add wastewater treatment capacity to an upscale suburb of Atlanta.

Archer Western Contractors entered a \$138 million contract with Fulton County, Ga., to build a 15-million-gpd facility using an activated sludge treatment process with a membrane bioreactor.

Currently, the contractor is two years into the Johns Creek Environmental Campus project, with an anticipated completion date of October 2009. The team has poured 35,000 of 40,000 total cubic yards for the project.

"One of the specific challenges related to this project is its location in an affluent part of town," says Matt McCormack, project manager. "We have several performance requirements to meet, including zero odor and zero noise."

Working with design consultant Brown and Caldwell, Fulton County chose a design reflective of an historic mill, complete with a neighborhood education center and a surrounding park. It also chose a membrane filter process that allows a contractor to build on a much smaller footprint than using a different mechanism.



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"The big advantage to the end user is a lot less operator time required—the system almost runs itself," McCormack says.

To achieve the community's odor-free requirements, the entire process is covered with aluminum—from the primary clarifier basins to the membrane tanks. After centrifuge, solids are placed on trucks and hauled offsite. "It's common to cover the 'front of the train,' but to cover the entire process is unique," McCormack says.

In addition to building the below-grade treatment process, Archer Western is taking charge of site clearing and grading, erosion control, and building an

18,000-cubic-yard berm. The contract also includes a \$4 million landscaping package for trees and plantings.

Archer Western paired with subcontractors ZENON, a membrane filter supplier; Excel Electrical Technologies, Inc., Kennesaw, Ga.; Shumate Mechanical, Inc., Duluth, Ga.; and Valley Crest Landscaping Development, Durham, N.C., among several others.

Despite cost escalation of materials, the project is moving within the 40-month construction window due to design-build efficiency and positive community relations.

"We've even attended local homeowner's

association meetings to keep up with their questions and concerns," McCormack says.

Under a separate contract, the contractor will perform a final site survey for Fulton County with a four-month test-run of the facility to ensure it meets operating cost and water usage requirements.

With regional droughts and despite city budget shortfalls, water supply will be an urgent construction segment in years to come.

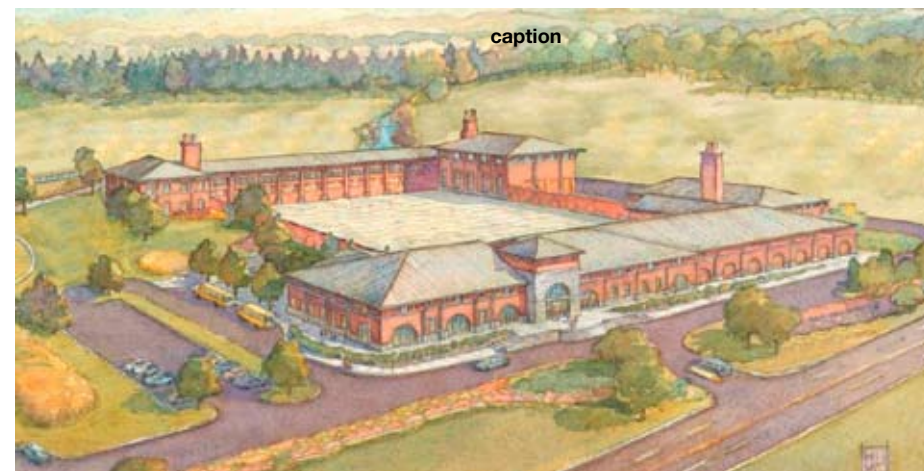
According to McGraw Hill Construction, contracting in the water supply category was estimated to rise 18 percent to \$12.2 billion in 2007. And the Environmental Protection Agency estimates capital spending on drinking water infrastructure between 2002 and 2023 to reach \$276.8 billion.

"It appears water is something everyone agrees will need continual upgrading, so I believe we'll have a good future in this industry," Wegner says.

So put down the bottled water and invest in the tap.

Pinch is assistant editor of Construction Executive.

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