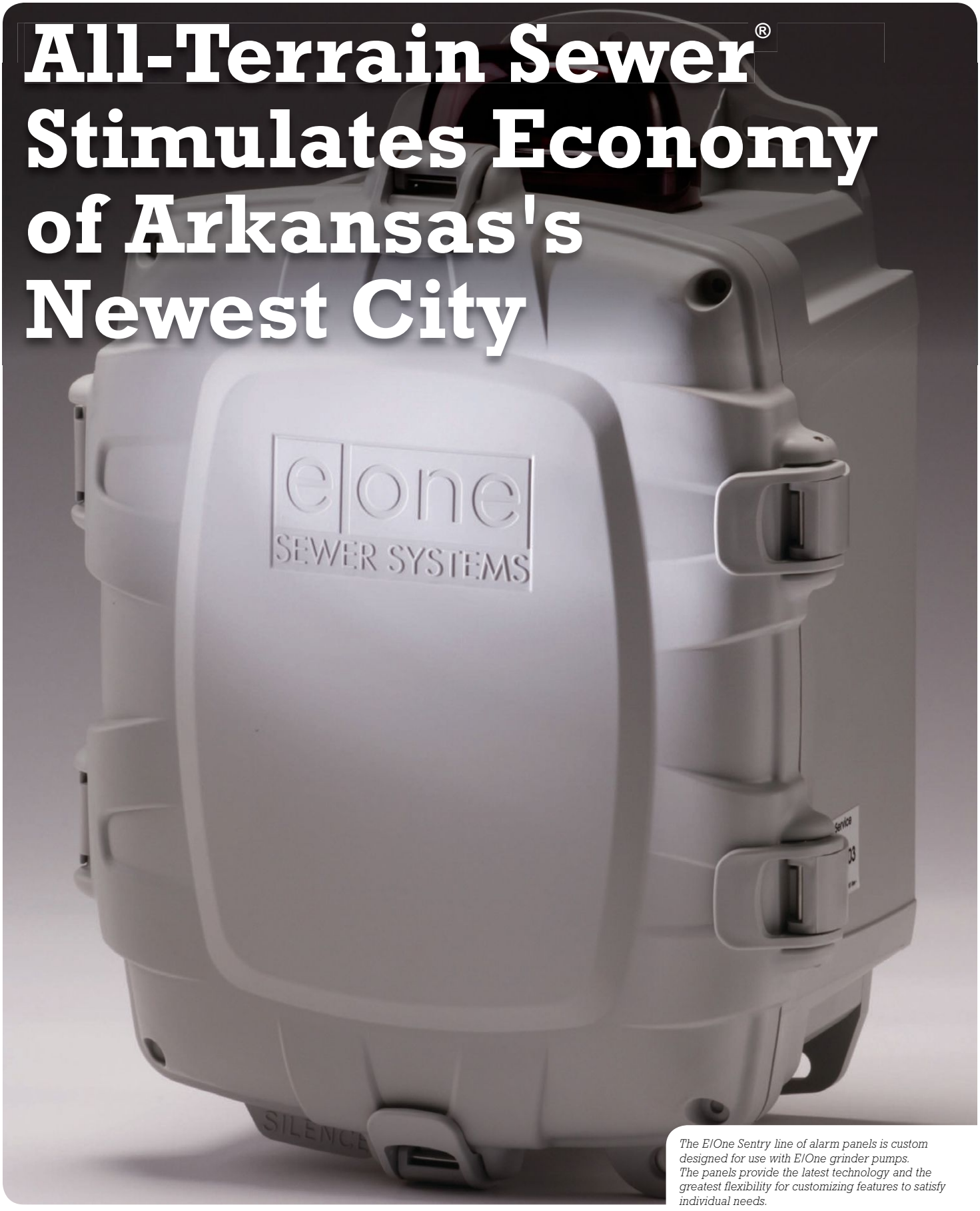
All-Terrain Sewer® Stimulates Economy of Arkansas's Newest City



The E/One Sentry line of alarm panels is custom designed for use with E/One grinder pumps. The panels provide the latest technology and the greatest flexibility for customizing features to satisfy individual needs.

Part 1 of 2

By Joseph Harmes

The Ozarks, White River Valley, and Mississippi Delta converge in Independence County just southeast of Batesville, one of the earliest settlements of the Arkansas Territory and esteemed today as the state's second-oldest city. During their 200-year history, Batesville flourished while the unincorporated patchwork quilt of small towns collectively known as Southside played "the other side of the tracks" to the county seat on the northern banks of the White River, their dividing line.

In recent years, however, Batesville revived a long-standing covetousness of its traditionally less prosperous cousin. Southside, whose biggest economic worry regarded slowing growth, had started to blossom. After some of Batesville's businesses began relocating there, it proposed in 2014 to annex Southside to commandeer land for its own expansion. But Southside, wary for generations of Batesville's appetite, had another vision for itself and moved first and fast. Residents went to the polls later that year to vote on their own initiative: incorporation. When the final ballots were counted, Southside became the state's 501st and newest city, population 3,901.

In hindsight, a sewer system's success might have been the allure inciting the whole sequence of events.

Southside contains a very rocky terrain. In some areas the ground is clay while in others, approximately three feet of soil sit above limestone and marble bedrock.

NAVIGATING SEPTIC-TO-SEWER

During its existence, Southside's "wastewater system" evolved from privies and cesspools to a predominance of septic tanks for sewage disposal. Some septic systems were more than a half-century old, falling into disrepair and even presenting potential health hazards.

"Most home sites required at least one acre for the septic system," says Mark Carlson, a former wastewater plant supervisor for the Southside Public Water Authority (SPWA) and currently the utility's electrician supervisor. "Some sites would not perk and could not be used for housing. Being able to shower and do laundry on the same day was a problem for some, as was using your yard or mowing grass because of the soggy ground. Sewage smells during wet weather were not uncommon. In wetter areas you could smell raw sewage when you lifted the lid to read the water meter."

When it began exploring a septic alternative, the Southside Rural Water Association served the locality. Like in most unincorporated areas, it was powerless and possessed few fiscal resources so a traditional gravity network was impractical from a financial standpoint, especially when privately owned septic systems did not provide any revenue.

Southside initiated its septic-to-sewer conversion by contracting Crist Engineers, Inc. in Little Rock. After evaluating areas most in need of wastewater collection, the firm designed a pressure sewer system incorporating an initial 611 grinder pumps to service about 675 connections comprising homes atop the 500-foot Ramsey Mountain as well as the lower business district concentrated along both sides of Highway 167.

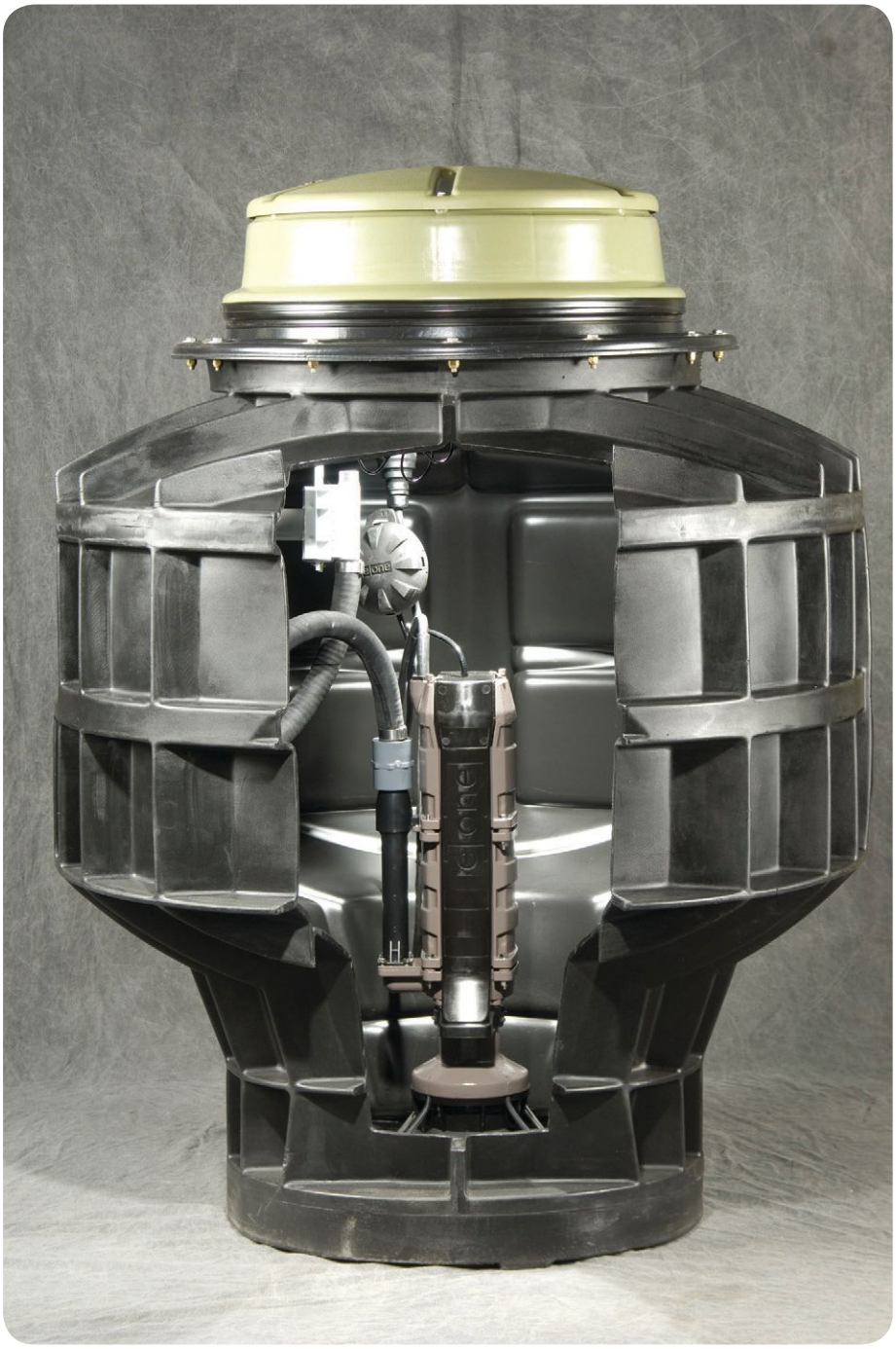
"The area that could be effectively served was put on the election ballot as a Sewer Improvement District for voter approval of a tax," says Carlson. "On the same ballot there was an incorporation of Southside issue to preclude any desire the city of Batesville might have to annex parts of Southside. Voters tied the two issues together and voted both down."

With the help of Crist and some political sway in the state capitol, Southside's leaders successfully argued for a law allowing the Southside Rural Water Association to transition to the non-profit SPWA. The move made public financing and grants possible.

Helmed by Matt Dunn, a partner at Crist Engineers who oversaw the Southside project and design, SPWA bankrolled a project that included a packaged extended aeration-activated sludge treatment plant, an HDPE pipe collection system, two

lift stations and Environment One Corp. (E/One) manufactured grinder pumps after Dunn helped secure a loan of $8.2 million from the U.S. Department of Agriculture-Rural Development; a loan of $300,000 from the Arkansas Natural Resources Commission; and, a $300,000 grant from the Delta Regional Authority.

The capitalization "was pretty straightforward. We do this with our municipal clients all the time," says Dunn. "Our firm has done other projects with E/One. We wrote a spec around the E/One grinder pump station and kind of pre-qualified E/One, and it actually was a bidder."



Featuring the E/One Extreme grinder pump, the WH231/WR231 offers a high level of reliability and ruggedness. The lower portion of the tank has a smaller diameter, tapered down to a dish-shaped bottom. These design features reduce the retained volume and promote scouring, which will minimize odor and corrosiveness.

A PRACTICAL, AFFORDABLE TECHNOLOGY

The All-Terrain Sewer® (ATS) from E/One begins with an E/One grinder pump station —activated by more than one million end users daily— which has a tank about the size of a dishwasher that is buried in the ground, its lid easily camouflaged with minor landscaping. Inside, the primary component is a 1-horserpower, semi-positive displacement pump.

The pump's robust torque can propel wastewater through small-diameter, inflow-and-infiltration-free pressurized pipe buried just below the frost line for a distance of more than two miles—or even straight up 185 feet—to a force main or treatment plant. The total dynamic head provides a nearly identical flow rate regardless of the network's contours and fluctuating elevations, making the ATS the appropriate technology for Southside's challenging physical characteristics.

"It's a very rocky terrain with a lot of undulation topography," says Dunn. In some areas the ground is clay while in others, approximately three feet of soil sit above limestone and marble bedrock. The lower reaches near the river have high water tables which, like septic leach fields, become exacerbated by Southside's annual rainfall of 30 to 40 inches. In these circumstances, a gravity system—unlike the ATS—would require de-watering, a massively expensive and environmentally disruptive requirement to bury large, pitched sewer mains.

Ultimately, Southside did not even solicit a bid for a gravity system. Besides a series of lift stations (which alone would have added millions to the budget), a "gravity system was just not feasible due to the rock and topography that we were facing in this area so that's what led us to the All-Terrain Sewer option," says Dunn.

INTEGRATING THE ATS

Initially, SPWA gifted its wary and often cash-strapped customers

a turnkey service through which it would purchase, install, own and operate the grinder pumps and ATS connections on private properties.

"We didn't have the ability to force people who were already on private septic to hook on a public system," says John Richardson, SPWA's manager. "We offered all the equipment and installation and even the switchover from their homes to the tank at zero cost to them."

Southside adheres to state law requiring any new construction within 300 feet of a public sewer main to connect to it. A county sanitarian will not issue permits for new private septic systems if a public sewer is within that distance.

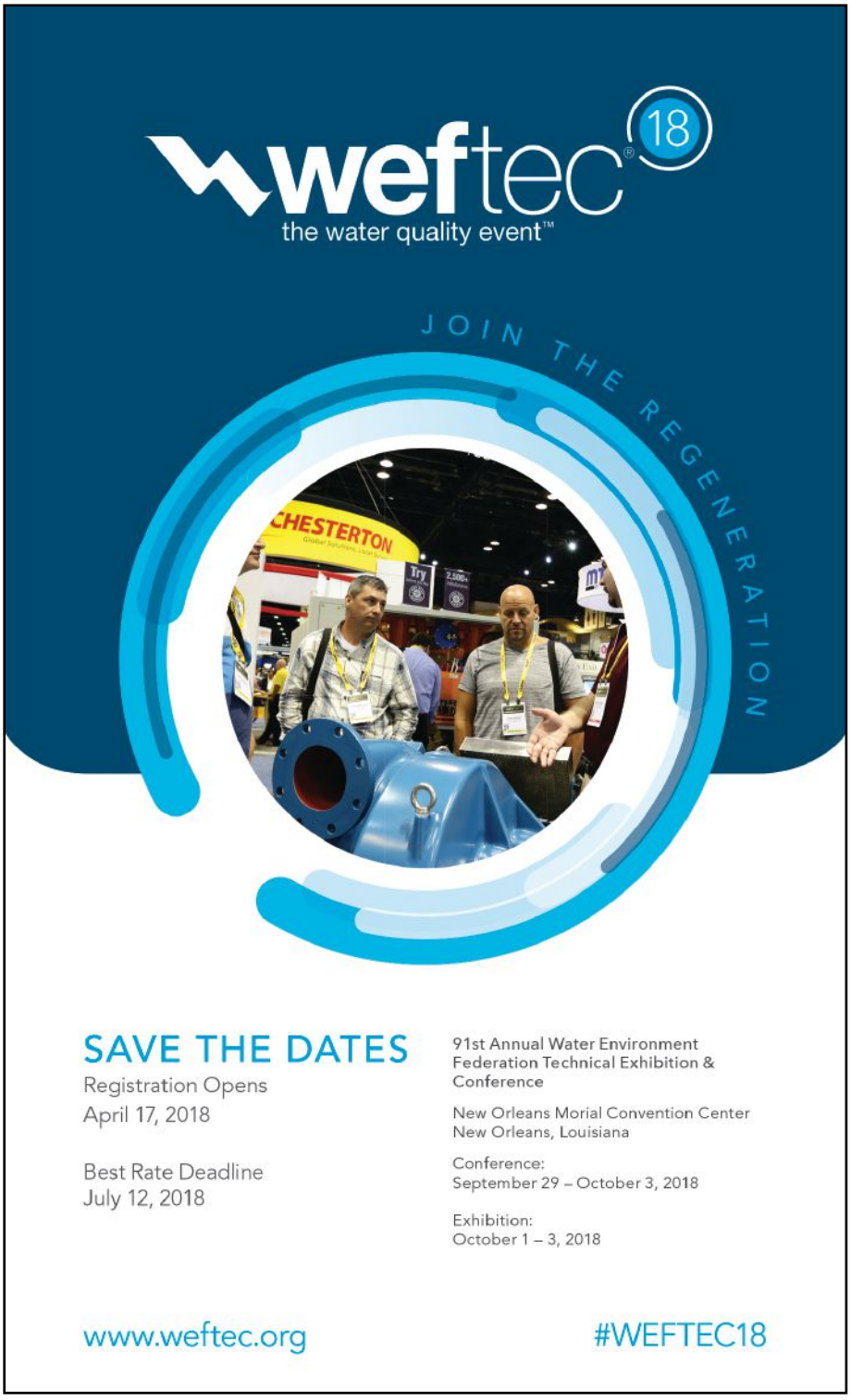
Under current SPWA statutes, "All new construction, or any connections to the current system, will require a connection fee to be established by the board of directors, based on the cost of a complete grinder pump station, discharge piping and labor to install it, estimated at this time to be in the $5,000 to $6,000 range along with a sewer deposit."

Customers pay a base rate of $63.10 per month for both water and wastewater, plus $4.10 per 1,000 gallons of water and $2.25 per 1,000 gallons of wastewater. A wastewater customer who uses 2,000 gallons per month would pay about $65.80.

A LOOK AHEAD

In next month's conclusion, we'll take a closer look at how SPWA and E/One worked together to address some of the important questions raised during the proposal's exploratory phase—especially those focused on future operations and maintenance (O&M) expenditures including pump replacements, parts, and labor. Also, we'll demonstrate how the E/One system better handles the community's growth than would a typical grinder pump. ◆

With corporate headquarters in New York and regional offices and distribution throughout the industrialized world, Environment One Corporation (E/One) is a manufacturer and provider of products and services for the disposal of residential sanitary waste and utility systems for the protection and performance optimization of electric utility assets. For more information, visit **www.eone.com.**



An All-Terrain Sewer® Stimulates Economy of Arkansas's Newest City

Part 2 of 2

See Part 1 on modernpumpingtoday.com

By Joseph Harmes

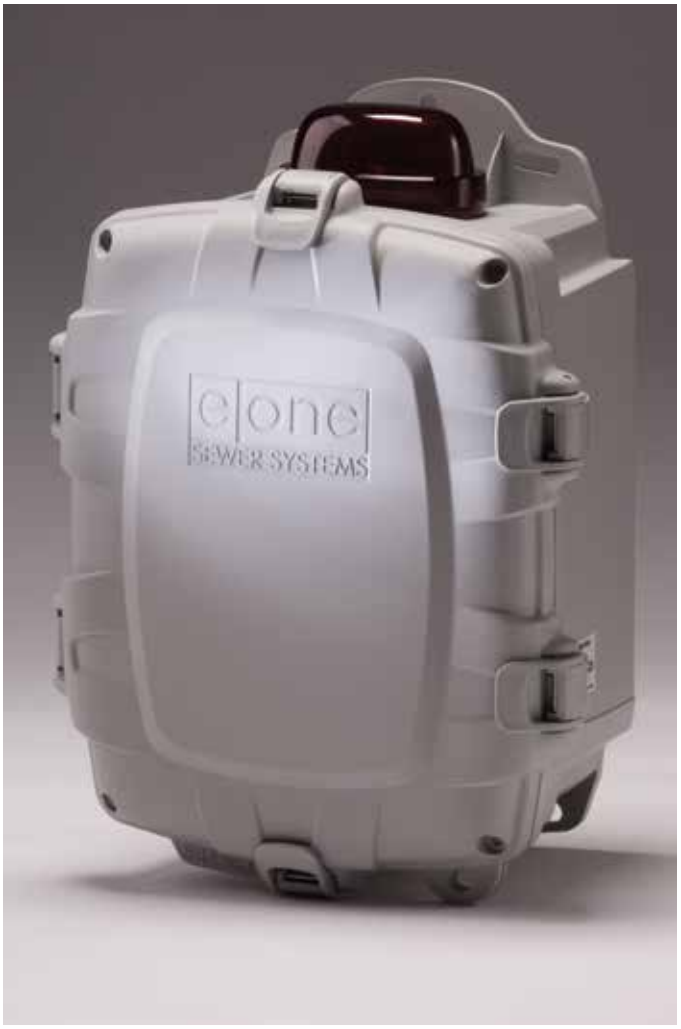
In part 1 of this series, we introduced the E/One Sentry line of alarm panels, which is custom designed for use with E/One grinder pumps. The panels provide the latest technology and the greatest flexibility for customizing features to satisfy individual needs, which makes it a perfect fit when the wastewater authority of Southside, Arkansas, was looking for an efficient solution to meet their needs without breaking the bank.

OPERATIONS AND MAINTENANCE TREPIDATIONS

A high-priority question during the proposal's exploratory phase focused on future Operations and Maintenance (O&M) expenditures including pump replacements, parts, and labor.

"They did some initial cost analysis and predictions before they even began the project," says Jared Richardson, the wastewater supervisor for SPWA, "because in the planning stage they had to establish a rate charge and how does that return our money plus allow for O&M. I think O&M costs were a great deal of the consideration and I think they would be wrong to not be."

SPWA maintains complete ownership and is responsible for all repairs of the system which started running in 2008. After E/One pioneered the grinder pump and ATS technology in 1969, many engineers and operating personnel were reluctant to adopt its system because of a concern that O&M requirements and outlays could be excessive. While those apprehensions were prudent 40+ years ago when E/One had a slim "track record," today there is a large body of well-documented experience showing the long-term reliability and operating costs with data ranging over decades for some projects.



The E/One Sentry line of alarm panels is custom designed for use with E/One grinder pumps. The panels provide the latest technology and the greatest flexibility for customizing features to satisfy individual needs.

SPWA SERVICE RECORDS FINDINGS

In the case of Southside, SPWA assembled its own meticulous O&M research examining service calls, type of repair, labor costs and average mean time between service calls for each malfunction. SPWA's service records are compiled on an annual basis beginning with the original 611 pumps in 2008 and numbering 706 at the end of 2017. A summary of the last decade indicates:

- Two service technicians respond to service calls. Average service call is one hour. Pumps are pulled, replaced with a spare pump for minimum inconvenience to the homeowner, and taken to the shop for repair. This one-hour average includes shop to shop, service call and clean up. All homes are in close proximity to wastewater treatment plant shop.
- One service technician completes the shop repair and/or rebuilds pumps that are pulled onsite and taken to the shop. Average time for shop repairs and rebuilds is 3 hours. This average is based on two hours for simple repairs/4 hours for rebuilds. Time includes pump wash, repair or rebuild, testing and cleanup. (As of 9/27/17, nineteen spare pumps have been purchased since system installation in 2008. Quantities four in 2015, thirteen in 2016, two in 2017.)
- Southside labor rate is based on $45.00 an hour.
- Southside does not charge a monthly grinder pump maintenance fee. The water and sewer bill covers grinder pump O&M.
- Pump average mean time between service calls 2008-2017 = fifteen years.

"One of the key components of a successful grinder pump system is how often service is required at each home," notes E/One regional manager Marvin Springer. "The average mean time between service calls for 2008-2017 is a very good reflection of how well the system has been operating."

To contrast the earliest and latest figures, in 2009 (the first full year of

placeholder

the study), SPWA had 619 pumps and 52 service calls totaling 260 total labor hours (104 service call hours, 156 shop repair hours) and total utility labor costs of $3,600. In all of 2017, SPWA counted 706 pumps and 56 service calls and 280 total labor hours (112 service call hours and 168 shop repair hours) and total utility labor costs of $12,600.

The cost has increased, says Jared Richardson, because in the initial years the pumps and parts were covered under warranty. Since then, "The cost has gone up because the labor has gone up."

REPAIRED PUMPS RETURNED TO SERVICE

Most of the pumps purchased by SPWA are for new installations and it maintains about 20 pumps in its inventory at all times. "We bring [the removed] back, we clean it, we repair it and put it back into our inventory," says Richardson. "Unless I'm setting new services, the number of pumps I have on hand does not decrease."

"We don't have a lot of customer issues—very seldom—but sometimes we do find something [a homeowner] has introduced in the tank," adds Richardson.

When a pump malfunctions for other reasons, "I chart them each and every time we pull one. I start looking for trends. Now it's just routine: some mechanical object that tears up from time to time, mainly motors and switches in the beginning, but then over the course of time as the pumps have gotten older it's moved into cutter wheels, stators, the typical wear items, the typical fail items, things that have worn out over a period of time," says Richardson.

"That's the beauty: what we love about the E/One pumps is we're able to repair them and then use them right back over again."

ELIMINATING I&I CUTS OTHER COSTS

Downstream from the pumps is the wastewater treatment plant which could be built to a smaller scale because the lack of inflow and infiltration (I&I) greatly reduces extraneous water like storm run-off from having to be treated.

"When you've got a collection system, especially ours being a 'sealed system' I like to call it, I don't have manholes which are going to take on water, especially during extreme rains, and it makes a world of difference. In talking to other wastewater operators in the area, when they have a heavy rain, they're treating a lot of water that they shouldn't be and, of course, anytime you're treating a gallon more than you should be it's going to cost and it adds up. Having an All-Terrain Sewer is a tremendous cost savings as far as treatment goes," says Richardson.

The E/One sewer is changing the way Southsiders live in a number of ways, from the economic prospects of Arkansas' youngest city to a renewed vitality and boost in civic pride.

THE ATS "INVENTS" NEW LAND

"In the initial project we went up to our biggest subdivision on the top of the hill, where the need was the most. People couldn't wash clothes or none of that," says Richardson. "So, we sewered it and a year or so later, people that live up there were commenting on how the ground has finally dried up to the point where they can drive their four-wheelers into their yards for the first time in years because the ground was so saturated. With so many houses there discharging water into the ground, over time it had just gotten to the point where they were having trouble. It really helped existing homes not to mention what it did down on the highway, opening up real estate which before was just used for pasture land because it couldn't be built."

Whereas potential home sites unfit for even septic sat idle for decades, Richardson now is working with a contractor planning a 94-lot restricted subdivision. More than sixty apartment and duplex units have been built. Tractor businesses have arrived. The school has added another campus and the nursing home was able to expand. Other new construction includes a car wash, a supermarket and airport upgrades. All, including a fast food franchise, are a result of Southside's conversion from septic to the All-Terrain Sewer.

"So much of the land wouldn't perk and was not able to be used for years," says Richardson. "Recently, the car dealerships have come out of Batesville and used the land that we were able to sewer."

"There's so much growth out here. It's so noticeable when you drive down the main highway that I've had

Featuring the E/One Extreme grinder pump, the WH231/WR231 offers a high level of reliability and ruggedness. The lower portion of the tank has a smaller diameter, tapered down to a dish-shaped bottom. These design features reduce the retained volume and promote scouring, which will minimize odor and corrosiveness.

several mayors from other areas call me and say, 'I was driving through and the growth just stood out so much that I want to come and see what you're doing.' So, they've visited and looked at the ATS and I've showed them the E/One pumps and how we operate and how it works. It's been a steady, steady growth. There's no question it's been a big help," Richardson says.

"There's not been any really big surprises," Richardson says of the last decade's experience. "I can't say good enough things about the E/One product and the company, I'm that impressed with it, and ten years in I'm still impressed with it," he adds.

"We've not used any other brands," he observes. "The typical grinder pump is not going to work in a low-pressure system, I don't care how you paint it and make it look pretty and talk good about it, it's not going to work and we know that and they can't match the endurance of this E/One grinder pump." ◆

With corporate headquarters in New York and regional offices and distribution throughout the industrialized world, Environment One Corporation (E/One) is a manufacturer and provider of products and services for the disposal of residential sanitary waste and utility systems for the protection and performance optimization of electric utility assets. For more information, visit **www.eone.com**.

placeholder