



Stemming the Tide

Island community takes an innovative approach to tightening its collections system and reducing treatment volume

STORY Giles Lambertson | PHOTOS Michael Pronzato

OPPOSITE PAGE: Sullivan's Island Water & Sewer Department operator John Myers checks a gas monitor while Chief Operator Darrell Noisette prepares to enter a manhole for a visual inspection. RIGHT: Work begins on Gull Street on the island.



In a perfect world, average daily flow to the wastewater treatment plant on Sullivan's Island, South Carolina, would be 182,000 gpd. That's what the utility distributes daily in potable water and, theoretically, should receive back through its closed collections system.

However, the actual flow to the plant averages 552,000 gpd, according to Greg Gress, who manages the island's water and sewer department. The 370,000 additional gallons enters the system through bad connections (inflow) and cracked or otherwise faulty pipe (infiltration). To begin to stem this invasive tide of I&I, Gress championed a trenchless pipeline repair solution — injection of chemical grout.

Grouting of utility lines has been around for more than a half-century. What made Gress' initiative noteworthy was that he opted to grout first and resort to point repairs and lining of existing pipe only when there was no other choice. He felt he had good reasons to proceed in this fashion and the initial phase of the repair project has borne out his reasoning.

Gress didn't act precipitously. When the Illinois native took the job with the barrier island community in 2004, I&I was already a problem. Sewer lines are uniquely stressed in the sandy setting of a barrier island. In addition to the instability of the footing and invasive nature of sand, the system is jeopardized by the constant salin-

ity of the water and tidal surges during heavy storms. "Hurricanes are always on my mind," Gress says.

GROWING CONCERN

A decade after Gress came to town, the treatment plant was nearing its capacity and state environmental officials were hovering to pounce in the event of sanitary sewer overflows. "We've had a few discussions with

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Pete Fleetwood

regulatory agencies," Gress says. "We are not operating under a consent order. We are trying to prevent a consent order. I initiated the project, but we'd had the discussions and I knew where their heads were."

Rather than launch an expensive project to replace all 81,000 feet of 8-inch vitrified clay pipe — most of it laid in 1968 — and 26,000 feet of 6-inch laterals, he leaned toward grouting lines to reduce inflow and infiltration "and buy us time to do structural repairs on our schedule."



The Sullivan's Island team includes (from left) Eric Bond, John Myers, Greg Gress and Darrell Noisette.

UTILITY:

**SULLIVAN'S ISLAND,
South Carolina**

PROJECT:

Grouting and lining 38,000 feet of pipe to reduce I&I in one of the community's most problematic basins

RESULT:

A 40 percent reduction of I&I

COST:

\$1.5 million

With the blessing of town leadership, Gress studied the situation for a couple of years, making field trips to places like Winter Park, Florida, to learn from their grouting experience and compare cost estimates. He learned that lining a pipe costs about \$65 per foot versus \$20 per foot for grouting — not much to debate there.

What's more, the preliminary work for lining a sewer pipe can, in itself, be a problem. That's because to clean a pipe prior to inspection means blasting the pipe with water at 2,000 to 4,000 psi, which can worsen existing leaks and create new ones. "There's vacuum and pressure on every pass, like a plunger in a toilet bowl, making the situation worse," Gress says.

He liked that the grouting process gives multiple views of the interior — first the initial inspection video, then the view during actual grouting, and finally a post-work video. This chance for repeated viewing of the pipe's condition, combined with the cost differential, led Gress and Sullivan's Island officials to go with grout as the primary option.

Gress actually favored having his department do the grouting work in-house, figuring the process would cost no more than \$7 or \$8 per foot using town labor. He hesitated, however, because the necessary equipment was going to cost three-quarters of a million dollars. "But the reason we fell off the fence on the side of using a contractor was a phone call from our attorney who said he'd been notified by the regulatory agency that a 'friendly' consent order was coming," Gress says. "Contracting out the work was the quickest thing we could do."

COOPERATIVE EFFORT

The project was designed for three phases, the first one targeting 38,000 feet of pipe in two especially problematic basins. The town chose to collaborate on the project with contractors and a separate engineer serving as

trial and error but we figured out how to do it and it worked really well."

Pete Fleetwood of Bio-Nomic Services, one of the contractors, says such on-the-fly cooperative decisions made the project a real team effort. "Greg is a forward-thinking utility director. He's not satisfied with just any answer unless he can prove it. He was very good to work with." The innovative longitudinal fracture solution, Fleetwood recalls with a smile, came about over barbecue and a couple of beers.

BIG IMPACT

The contractors' four crews wrapped up the first phase in June 2015, having lined 5,000 of the 38,000 feet of pipe and grouted the rest. Some point repairs were made following a decision-making hierarchy that Gress established. It was based on cost of repairs. If more than two point repairs were needed in a segment, it was deemed more cost-effective to line the whole segment.

project manager using a construction manager at risk (CMAR) arrangement. James Shelton, a vice president of the ARCADIS design and consultancy firm, was chosen to direct the work of four contracting teams.

Shelton allied with Gress in pushing grout as the first step in repairing the lines. Shelton said the only real surprise on the job was seeing how willing Gress was to try new things. A prime example was the process by which the team devised a way to seal longitudinal fractures using a special packer and an altered chemical grout recipe.

"Greg kept saying, 'Why can't we do this?'" Shelton recalls. "We repeated the conventional wisdom of, 'You never do that.' He'd say, 'We should figure out a way to make this work.' And so we did. It took a little



Darrell Noisette pauses to view an infiltration source while inspecting a sewer main on Sullivan's Island.



Darrell Noisette wraps up after cleaning a sewer main.



PHOTO COURTESY OF SULLIVAN'S ISLAND WATER & SEWER DEPT.

A camera cable, hoses carrying the two-part grout mix, and air lines for the grout packer pass over a roller on a manhole. The grout packer is attached in the sewer line.

The project ended up costing slightly more than \$1.5 million, with grouting work claiming half of it. Warranty work has just been completed and Gress awaits the report. This much he already knows: In the first phase, the town had hoped to achieve a 30 percent reduction of inflow and infiltration. In fact, the work reduced I&I by nearly 40 percent.

The effort was so successful that rainwater now puddles in some yards where it formerly found its way into lateral footings and poured into the town's collections system.

On the other hand, a good portion of the remaining I&I is from the private side, that is, through laterals on private property. "We believe we are getting a good bit from that side," Gress says. "How much is coming from the private side is a difficult thing to segregate. What we do know is that following the first couple rain events after phase one, we saw sinkholes developing there. We have to do something to address that."

The next phase of the project has been delayed to fiscal year 2019. Urgent repairs to the treatment plant have moved it ahead of pipeline repair on the town's to-do list, Gress says. "We had anticipated going right into phase two this year and put money in the budget to do so, but the treatment plant has a very strong need."

In the meantime, he is fielding questions from other municipal utility heads considering his approach to repairing pipelines. The calls are apt to



Darrell Noisette (left) and John Myers connect extension tubes to the vacuum boom on a Vactor jet/vac truck before removing debris from the sewer line.

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Greg Gress

multiply because Shelton reports that officials in the South Carolina Department of Health and Environmental Control have become advocates of the grout-first approach.

"The state is telling other communities that it will give money for repair projects if the community will do it this way," Gress says. "To come out of this and have the state feel as strongly as it does about this cost-effective approach is really satisfying." **I&I**

TAKING I&I TO SCHOOL

Grout school provides a hands-on education to help fight the flow of infiltration

By Luke Laggis

When it comes to training your crews and handling rehabilitation work in-house, you can learn some things from the contractors who serve your utilities.

Frank Klima knows a thing or two about running a business, and training his people to do the job right. The president of Lake County Sewer in Willowick, Ohio, makes sure his people get a thorough education at Municipal Sewer Grout School, because it helps his bottom line. It also helps his customers' manholes and sewer lines.

"It pays for itself in the long run," Klima says. "If you have a truck — especially the ones we build — they aren't cheap and can break if handled incorrectly. Just the basics regarding how the panel operates, how the packer is inserted in the pipe, there is just so much they can learn from the instructors. Every guy picks up a little something different from each school."

The school is a joint venture between Aries Industries, Avanti International, CUES and Logiball; they teamed up to develop the two-day school to educate contractors and municipal utilities on the process of grouting. The school covers everything from mixing and optimizing grout performance to specification requirements and live demonstrations.

"We need to educate everyone about what they are going to be doing. Avanti, Aries, CUES and Logiball have the program down where it's a teaching program. Whether the person has been in the industry forever or they are just

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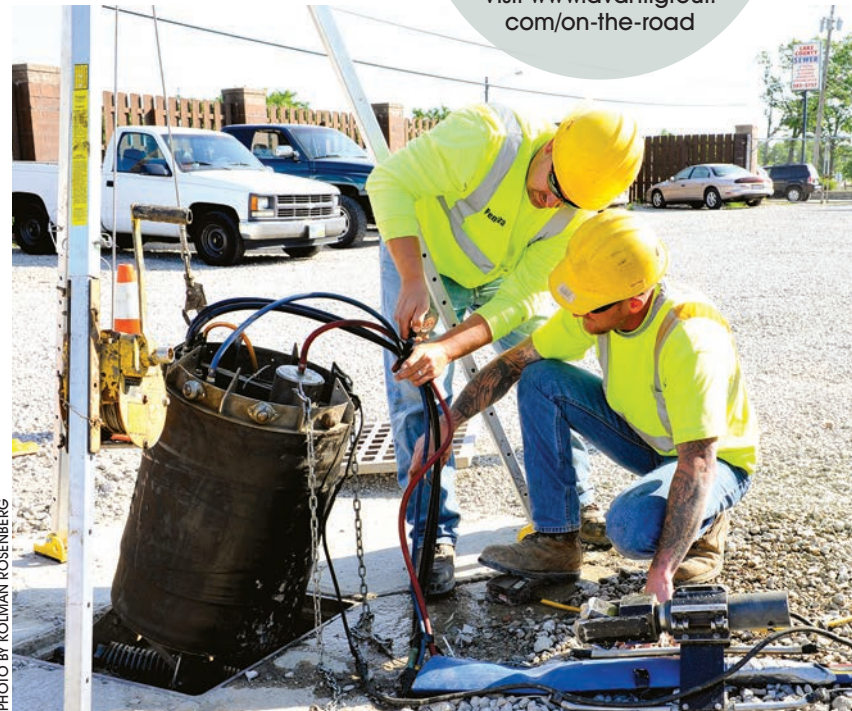


PHOTO BY KOLMAN ROSENBERG

Well-trained technicians from Ohio-based Lake County Sewer prepare to lower a grouting unit into a sewer line.

"The payback is there when it comes to that guy jumping on a grout truck and knowing how to run it to get the job done. The overall benefit outweighs the cost."

Frank Klima

starting out, we like the idea of keeping our team up to date with technology and anything else out there we don't know," Klima says. "The payback is there when it comes to that guy jumping on a grout truck and knowing how to run it to get the job done. The overall benefit outweighs the cost."

FINDING FOCUS

Lake County Sewer has several divisions, including manhole rehabilitation. The company got involved with grouting in 1991, and may have been

(continued)



PHOTO COURTESY OF AVANTI INTERNATIONAL

Over 500 students have gained knowledge and know-how through Municipal Sewer Grout School sessions held across the U.S.