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Crossing the Property Line

Service lateral repairs in Sarasota, Fla.

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Crossing the Property Line

In its I&I pilot project, the City of Sarasota has taken a new approach by publicly funding the replacement of homeowners' service laterals

By Sanford Payton

The city of Sarasota, Fla., has begun replacing private service laterals at public expense in a pilot program designed to gauge impact on total inflow and infiltration (I&I).

After several years of study, public works officials in Sarasota became convinced that private service laterals were the largest single source of I&I into the sanitary sewer system. As a result, they designed a pilot project in which 324 homes will get completely new service laterals at no direct cost to the homeowner.

The pilot project area includes Siesta Key, one of Sarasota's barrier islands, and some property on the mainland that is part of the same drainage area. City offi-

Although sewer laterals traditionally are the homeowner's responsibility, Sarasota decided to pay for the repairs to expedite the pilot project. City officials believe the use of public funds is justified because all ratepayers will benefit from reduced loading to the wastewater treatment plant and better protection of public waterways.

cial chose those areas because they can easily isolate and measure the flows, and because the area often surcharges during heavy rainfalls.

Sarasota's lateral replacement program is a proactive initiative — not an effort driven by state or federal regulatory compliance. City officials want to reduce I&I during extremely wet weather, thereby reserving treatment plant capacity for future population growth.

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Citywide solution?

Patrick (Rick) Ray, senior utilities engineer for the city's Public Works Utilities Division, says that if the new,



The City of Sarasota uses white HPDE pipe for its lateral replacement pilot project, providing excellent visibility during video inspections.

watertight service laterals reduce I&I as much as he expects, the program will be expanded systemwide. He believes the project may even start a national trend in managing service lateral replacement programs.

The service laterals are being replaced via pipe bursting, a widely used trenchless technology, licensed worldwide by Advantica (www.advanticatech.com), formerly a part of British Gas. Many companies manufacture pipe bursting installation equipment, including several in the United States.

The pipe bursting technology involves pulling a cone-shaped device, with a new polyethylene (PE) pipe attached, through an existing pipeline. As the head moves through, it breaks the old pipe and pushes the pieces back into the surrounding soil. The head also expands the bore diameter slightly larger than the outside diameter of the new pipe it is pulling in. This reduces friction, but it also makes it possible to replace an existing pipeline with one of a larger diameter.

A bursting head with no other attachment is called a static head, and it depends entirely upon the power of a winch to pull it through an existing pipeline. In some cases, a bursting head is equipped with a cutting blade or an internal pneumatic hammer. The cutting blade concentrates all the pulling force into one area, making the initial opening of the pipe easier. In hard, dry soils, or when heavy pipe fittings are encountered, the driving force of a hammer aids penetration.

Winning bidder: Omni-Eye

In Sarasota, a wide range of trenchless technologies were considered, and some were tested to evaluate their effectiveness. In a pilot study, the city discovered that 52 percent of the private sewer laterals were cast iron, 6 percent were Orangeburg, 19 percent were vitrified clay pipes (VCP), and 23 percent were polyvinyl chloride (PVC).

All of the Orangeburg and most of the cast iron pipes were badly tuberculated, so their flow capacity was restricted. All lining technologies reduced the capacity of the laterals even more, and some were prohibitively expensive for the application. However, pipe bursting overcame both those concerns, and actual bids revealed that the technology was affordable.

The bid to replace the service laterals in the pilot project was won by Omni-Eye, Inc., a general contractor in Sarasota. Jim

P R O F I L E

City of Sarasota, Fla.

POPULATION:	51,000
AREA:	13.6 square miles
SEWER CUSTOMERS:	16,800
SEWER SYSTEM:	180 miles of mainline, 26 miles of force main, 76 miles of public service lines (the section from the mainline to the property line)
TREATMENT CAPACITY:	25 mgd
AVERAGE FLOW:	7.4 mgd
PEAK FLOWS:	13.2 mgd monthly, 22 mgd daily
WEB SITE:	www.ci.sarasota.fl.us



During lateral replacement, cleanouts are installed every 75 feet to comply with city codes.



The small hydraulic puller used in Sarasota's pipe bursting project generates up to 60,000 pounds of pulling force.

The replacement pipe for Sarasota's pilot project is supplied on 800-foot reels. This greatly reduces the need for onsite pipe fusion.

property line because it is deeper, and therefore offers more head wall surface to pull against. The Tric hydraulic puller can produce a pulling force of 60,000 pounds.

The white, 4-inch SDR 17 HDPE (high-density polyethylene) pipe is supplied on 800-foot reels. The color enhances video inspections, and the length greatly reduces the need for onsite pipe fusion.

Making the pull

When the pits are ready, a cable is strung through the existing service line from the property line to the house. There, the cable is attached to a 4-inch bursting head, which has a special blade to help crack or cut the old pipe. In turn, the bursting head is fused to the new pipe.

In the pulling pit, the cable runs through a resistance plate and metal frame before it attaches to the hydraulic

Therault, president, explains that he is using lightweight, modular equipment and small crews to replace the existing laterals. The location of each service line had been established in an earlier phase of the program.

Challenging environment

Sarasota is a coastal community with populated barrier islands, so it has a very high water table. As a result, well points are necessary at some locations. When used, the well points are established the day before the lateral is replaced and are allowed to run until installation and backfilling are complete.

Each installation starts with excavation of a small pit (about two feet by three feet) at the property line and another where the service line enters the house. Vacuum excavation is used to open the pits because many utilities are clustered near the property lines. The soil is cut with a water jet, then vacuumed out by a Vactor truck with a 6-inch tube. Usually, the pits can be excavated in less than an hour.

City code in Sarasota requires that a cleanout be installed every 75 feet in new

service laterals. For laterals over 75 feet long, pits are sometimes dug for the extra cleanouts, and the new pipe is pulled from one pit to the next. At other times, the entire length of the new line is pulled first and the cleanouts are installed later.

Omni-Eye uses small, modular equipment manufactured by Tric Tools, Inc. (www.trictrenchless.com) to install the new lateral lines. Normally, the pulling equipment is set up in the pit at the

A Perfect Fit

Omni-Eye, Inc., was uniquely qualified to handle the trenchless lateral replacements in the City of Sarasota's pilot project. The company had already built a track record as a supplier of trenchless solutions for local plumbers.

Company president Jim Therault has worked in construction all his life and began locating private buried pipelines with a sonde in 1983. Later, he added remote-controlled TV inspection services and also began applying chemical grout.

"It became obvious from reading *Cleaner* that trenchless technologies were an important new trend, and that pipe bursting could be used to replace the pipelines that we were already locating and inspecting," Jim says.

In 1997, Jim and a partner, Jack Brown, started the company now called Omni-Eye. "Our market focus was plumbers in Sarasota and other towns within 50 miles or so," he explains. "When a buried pipeline needed to be replaced, they'd hire us for that part of the work, and they would do the rest. As a result, we became very good at lateral service line replacement.

"That expertise allowed us to make the winning bid for Sarasota's pilot project. We knew exactly what to expect, and what it would cost us to do the work."

P R O F I L E

Omni-Eye, Inc., Sarasota, Fla.

OWNERS: Jim Therault, President;
Jack Brown, Vice President

FOUNDED: January, 1997

EMPLOYEES: 10

SPECIALTY: Sewer system diagnostics,
pipe bursting pipeline replacement

EQUIPMENT: Tric Tools, Inc. and Vermeer pipe bursting
systems, RS Technical mini and mainline camera
inspection systems, Vactor combination truck



Entry pits for pipe bursting are cut with a water jet, then vacuumed by a Vactor truck.

“Since the beginning, we have proceeded methodically, proving one step before we took the next. Then, we didn’t know how much infiltration was coming into our system through the service laterals. And until we discovered the pipe bursting process, we didn’t know service laterals could be replaced cost-effectively.”

**Bill Hallisey,
PublicWorks Director
City of Sarasota, Fla.**

puller. A diesel-powered Vermeer high-pressure pump supplies hydraulic power to the puller. Once the pull begins, the new HDPE pipe is pulled into place at 5 to 10 feet per minute, depending upon the power of the hydraulic pump.

When the new lateral line is in place, a double-sweep tee and cleanout is installed at each end, and in any intervening cleanout pits. The tees are then reconnected to the original line at the house and at the property line.

Restoration work is usually limited to backfilling the pits with dry soil and replacing the original sod or mulch at the surface. Any specialized work such as replacement of brick or tile is usually subcontracted to specialists. The pipe bursting process allows new pipe to be installed under existing driveways, mature landscaping, and even add-on buildings without destructive excavation.

High wet-weather flows

Sarasota’s system experiences substantial peak flows during wet weather. Average dry-weather flows are 7.5 million gallons per day (mgd), but monthly averages of 13.2 mgd and daily spikes as high as 22 mgd have been recorded at the 25 mgd wastewater treatment plant.

Dan Castorani, Wastewater Program Manager for the city, explains that before the project began, some lift stations in the project area would surcharge any time the water table rose to less than 2.5 feet below grade. “We believe that’s the level at which large volumes of groundwater

start to enter our system through customer service lines,” says Dan.

If, as a result of replacing all the leaking customer service lines in the project area, wet weather flows are greatly reduced, many benefits to the city will follow:

- Reduced system operating and maintenance costs.
- Improved environment from reduced or eliminated sanitary sewer overflows (SSO).
- Elimination of SSO-related fines from regulatory agencies.
- Extra capacity for transportation and treatment of wastewater, allowing more development without expansion of treatment facilities.

“If we prove that customer service lines are the source of most of our wet weather I&I, we can take the next step,” says Bill Hallisey, PublicWorks Director for the city. At that point, the city may decide to replace more customer service laterals at public expense, or require customers to pay for the replacement.

“Since the beginning, we have proceeded methodically, proving one step before we took the next,” Bill says. “Then, we didn’t know how much infiltration was coming into our system through the service laterals. And until we discovered the pipe bursting process, we didn’t know service laterals could be replaced cost-effectively.” ■

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