PRIVATE I/I:
A TRICKY SITUATION

By Jeff Boss, Division Director, Field Operations,
Gwinnett County Water Resources, *jeffrey.boss@gwinnettcounty.com*

The Private I/I Problem:

On a dry day in Gwinnett County, GA, the Department of Water Resources (DWR) treats approximately 60 million gallons of sewage. Like other utilities all across the United States, DWR bases a customer's sewage treatment bill on the amount of water the customer uses.

On a rainy day in Gwinnett County, DWR processes and treats approximately 100 million gallons of sewage. That means the County must treat an additional 40 million gallons of flow, without being able to bill for the additional cost.

The culprit is infiltration and inflow, or I/I, caused when excess water leaks into the sewer system. Infiltration occurs when groundwater seeps into sewer pipes through holes, cracks, joint failures, and faulty connections. Inflow occurs when stormwater rapidly surges into sewers from roof drain downspouts, foundation drains, storm drain cross-connections, holes in manhole covers, and even parking lots. Often, I/I is caused by aging infrastructure in need of maintenance or replacement. Inflow can also be caused by illegal connections to the public sewer system from privately-owned property. Infiltration and inflow coming from private property is what we call "private I/I."

Broken cleanout caps are a very common problem, often caused by lawn mowers hitting and breaking them.

Local governments across the country struggle with the financial, environmental, and political impacts of I/I. I/I drives up the cost of sewage treatment by sending a rush of 'clean' stormwater through sewage treatment systems, creating unnecessary volume. For municipalities that use biological treatment processes, this rush of stormwater can also increase costs by washing away the good bacteria that breaks down sewage, requiring an expensive restart of treatment facilities. In some extreme cases where there is low capacity in a system, I/I can cause sewage overflows, which can negatively affect the environment, public health, and public opinion.

Counties and municipalities that attempt to address the I/I problem often face two options: they spend hundreds of thousands of tax dollars to rehabilitate main sewer lines and try to tackle the tricky issue of private I/I. Fixing defects in privately-owned sewer laterals can provide some of the best flow reduction for the fewest dollars spent, but finding a way to accomplish private I/I repairs can be a political balancing act.

Because a public utility doesn't own these private laterals and connections, the utility can't go onto private property to make these types of repairs. However, if a local government attempts to force private property owners to make the repairs, this action can be viewed as yet another government regulation placed upon ordinary citizens and business owners.

Example of an SSO caused by excessive I/I.

Gwinnett County's Approach

In Gwinnett County, we believe most private property owners have never heard of private I/I. They don't know what it is and they aren't aware they could be contributing to it. In many cases, private property owners don't see the impacts of a leaky sewer connection the way they see the immediate effects of a leaky roof.

Therefore, Gwinnett County's approach to the problem is to educate private property owners about I/I and encourage them to voluntarily maintain their sewer laterals and connections the

Faulty service lateral pipe in a drainage ditch.

way they maintain any other part of their properties. Our approach includes two separate phases. First, we gathered accurate data in order to understand the extent of the problem. Now, based upon this information, we are putting in place an aggressive educational and community outreach program. We believe our approach can be replicated by other counties and municipalities.

We suspected we had a private I/I problem in the County. We knew we had done a good job of maintaining the publicly-owned sewer system, which includes more than 2,600 miles of pipeline, ranging from 8 to 72-inches in diameter, and 225 pump stations and 3 water reclamation facilities. However, many of the 400,000 homes in Gwinnett County were constructed approximately 20 years ago. We suspected that most of the homeowners had never maintained their sewer laterals and connections. And, like most communities, the County has some older private laterals with clay pipes that are especially prone to leaks.

We also knew that we needed more than our suspicions to tackle this problem; we needed solid, verifiable data. To gather accurate and reliable information, we hired Woolpert, an engineering and infrastructure management consulting firm, to guide us through the process of indentifying I/I sources. Working hand-in-hand with the County, Woolpert reviewed the County's Geographical Information System (GIS) to develop a field monitoring plan. The plan included recommendations for installing flow meters and rain gauges. Woolpert installed and monitored flow meters and rain gauges, and performed analysis of the flow data. The firm also conducted smoke testing to find inflow sources and defects in laterals and connections. As a result of the basin studies it completed, Woolpert was able to calculate the total I/I in gallons per day (gpd).

Woolpert provided the hard data we needed to understand the extent of the problem and to educate the public. For example, the recent smoke testing of 127,362 linear feet (LF) of pipe identified 107 defects, or one for every 1,190 feet of main line. With this information, the County estimated total I/I at 18% of total flow, or 8 million gallons per day (MGD). The testing found that 19 of the defects were part of the public sewer system, while 88 of the defects were on private property. *In other words, 82 percent of the defects were caused by private I/I, which adds 6.8 million gallons to the sewer system each day. The County's cost to treat this private inflow is estimated at $4.3 million per year.*

With these results in hand, the County has developed a pilot program to raise awareness of I/I and encourage private property owners to voluntarily maintain their laterals and connections. To begin, we created a communications and outreach strategy and documented the strategy in an Outreach Guide. This process also included identifying our stakeholders, or target audiences, and developing specific goals and objectives, key messages, tactics, and benchmarks for measuring our success.

Our Stakeholders

In Gwinnett County, sewer customers are definitely a target audience. We are reaching out to these customers through homeowner associations and

Woolpert staff installing permanent flow meter network.

other community groups. In addition, we are working to create third-party advocates for sewer lateral maintenance in related businesses and industries. These third-party advocates will include builders and developers, home inspectors, real estate agents, insurance agents, and plumbers. This public-private partnership is a win-win situation: these advocates can experience business growth by helping the County to educate private property owners about the benefits of properly-maintained laterals and connections. We are also working to educate the County's customer service staff, elected leaders in the County and cities served by DWR, and other groups that have an interest in water quality and the environment.

Getting out the Right Messages

Our key message is simple: connecting to the public sewer system through a private sewer lateral requires a level of responsibility equivalent to other maintenance activities. For example, you would replace your roof or furnace if it breaks down or doesn't work properly. Likewise, you are responsible for repairing and replacing defective sewer laterals and connections.

Other important messages in our pilot program are designed to show private property owners how their sewer lateral maintenance helps protect their family, the environment, the community, and their investment in the County's sewer collection system and treatment plants. Examples of these messages are as follows:

- "Properly maintaining your private sewer lateral protects your family members and their health, as well as your home and property, by reducing and preventing the potential for damages caused by sewage back-ups." This message helps to remind people that properly-working sewer systems are a major factor in public health. The thought of having to deal with the cost and effort of cleaning up a sewage back-up is also a strong incentive for taking appropriate action.
- "Properly maintaining your private sewer lateral helps protect our drinking water sources, our local environment, and our communities from pollution and damage associated with sewage back-ups." We believe linking lateral maintenance to drinking water makes a strong connection in people's minds and encourages them to take action.
- "Reducing inflow and infiltration through proper sewer lateral maintenance helps protect the County's sewage infrastructure, including pipes, pump stations and treatment plants, and helps DWR continue to be fiscally responsible with ratepayers' investment." This message is important because it connects the private lateral to the overall system and the public cost to maintain the County's system.

At the present time, we are creating materials to support the pilot program. These materials—a presentation, a brochure, and website content—will be used to reach homeowner associations, real estate and insurance agents, home inspectors, builders, plumbers, and others. These materials will show the delineation between the public sewer and the private lateral and explain the private property owner's level of responsibility.

Success Measures

To see how well the program performs in its first year, we have set some benchmarks that link the pilot education program to quantifiable outreach targets, as well as reductions in what gets into the collection system. These goals include the following:

- A 10 percent reduction in damage claims paid by the County
- A 10 percent reduction in calls to DWR that involve sewage back-ups
- A 10 percent reduction in inflow and reduction in treatment costs
- A quarterly increase in traffic to the sewer lateral content section of the Department's website
- Completion of at least three speaking engagements to homeowner associations or other civic groups with an emphasis on areas impacted by sewage back-ups

Smoke rises from a service lateral with a missing clean-out cap, located on private property in Gwinnett County. Smoke testing, performed by Woolpert, helped to locate inflow sources and defects in private laterals and connections. Gwinnett County used this information to develop a pilot program to educate private property owners about I/I and encourage them to voluntarily maintain their laterals and connections.

Conclusion

The Gwinnett County I/I study completed by Woolpert confirms that private I/I adds significant costs to our sewage treatment program. We will use this accurate data to educate private property owners, third-party advocates, and elected officials about the private I/I problem. We believe that through our educational outreach program, our first-year benchmarks are achievable. Next year, we look forward to writing a second article to share the results of our efforts with you.