IDENTIFYING INFLOW AND INFILTRATION (I&I) IN COLLECTION SYSTEM

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Inflow and infiltration are the two words that come up during almost every onsite visit that I make to a wastewater plant throughout the state. Also known as I & I, inflow and infiltration is one of the costliest issues facing almost every wastewater system in the world. The U.S. Environmental Protection Agency (EPA) estimate that water and sewer systems in the United States will require funding upward of $500 billion above current spending levels over the next 20 years to improve the aging infrastructure. Much of that funding will look to correct the inflow into sanitary sewers.

The first step in dealing with an inflow and infiltration is to inspect and map your collection system and determine where your I & I is the worst. As you inspect your system, determine if your lift station pumps run for a long time after a rain event. If it has a large number of starts and stops after it rains, this means stormwater has entered the sanitary sewer system and is on its way to be treated. Do mains or lateral pipes back-up? Residential or business basements flood during a rain event? Manholes spill wastewater onto roadways or green space? When it rains do you see significant spikes in flow at your treatment plant corresponding with spring time snow melts or storm events. Once you have determined the system has an I & I problem, the next step is to identify what section of your system has the greatest potential for the infiltration. Relatively inexpensive ways to find problem connections and leaks include flow monitoring, CCTV line inspections, smoke testing, and manhole inspections.

Flow monitoring instruments can be set up in specific areas of the collection system to determine lines that are more susceptible to inflow issues. Once those lines are monitored and a plan is developed, the next step is to perform a more intensive inspection to determine specific points to repair if the entire line is not to be relined or replaced.

Smoke testing is an excellent way to determine fairly accurately the areas requiring attention. An added advantage to smoke testing is the ability to discover illegal sump pump hookups and gutter downspouts that are tied into the collection system. The smoke from the testing will also make visible: cracks in clay tile, breaks in manhole walls, separated laterals broken from excavation, tree roots or settling. After smoke testing, it is important to act on the findings by disconnecting roof drains, repair broken or missing cleanout caps, and possibly disconnecting cross-connections between storm and sanitary sewers. Improperly installed vents can produce more than 50 gpm during rainfall events.

Inspection of manholes can identify leaks from joints and provides the opportunity to review the drainage near a structure. Manholes can be located within a wetland or ditch that gets submerged during rain events. These manholes can contribute significant inflow and infiltration through leaky covers. 3D manhole scanning technology can inspect manholes and uncover these defects. If a manhole inspection reveals I & I there are a few repairs available to quickly reduce inflow. Including replacement of manhole covers, sealing covers and resetting cover rings, chemical grouting to seal up leaking joints and epoxy lining of the manhole.

Inflow and infiltration adds clear water to a sewer collection system. When this happens it can cause backups, system strains and interruptions. Because the water is treated along with wastewater, the costs add up. By identifying inflow and infiltration early on, municipalities can make arrangements to correct the problem. The final step to a good I & I reduction should be documenting the progress and completion of repairs. This can be done the use of a GIS mapping program.

NY Rural Water Association offers many tools to assist in the reduction of inflow and infiltration in a wastewater collection system. Currently the wastewater technicians each have a smoke machine and a pull camera with DVD recording ability. NY Rural Water Association also has at its disposal GPS units that allow for GIS mapping of collection systems, documenting and recording points description that can include age, condition, repairs, photos of the point, as well as work orders relating to the point. These points can include manholes, laterals, tree root trouble spots, cleanouts and any other points of interest in a wastewater system.