

Reducing Inflow and Infiltration

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Costly addition to wastewater

Inflow and infiltration (I/I) are terms for the ways that clear water and stormwater make their way into sanitary sewer pipes and eventually get treated, unnecessarily, at wastewater treatment plants.

I/I is a problem because it takes up fixed capacity in large regional sewer pipes (interceptors) that will be needed to convey wastewater from future households in the region. It can also be costly to communities; once clear water gets mixed in with wastewater, communities are charged for the treatment of all the water.

Regional solution wins national award

In 2003, the Metropolitan Council appointed a task force of local government representatives to examine the problem and propose strategies to solve it. Three years later, after extensive outreach to local communities, the Council adopted a multi-year program to reduce I/I based on the task force recommendations.

In 2009, the National Association of Clean Water Agencies

bestowed its 2009 Operations Award for Environmental Achievement to the Council's I/I reduction program. The award recognizes outstanding initiatives in wastewater treatment operations that are cost-effective and environmentally sound.

Sources of I/I

Infiltration occurs when groundwater seeps into sewer pipes through cracks, leaky joints or deteriorated manholes. Inflow is by far the larger problem, and occurs in direct proportion to rainfall.

Typical inflow sources are water from rain leaders, basement sump-pumps, or foundation drains illegally connected directly to a sanitary sewer pipe. A sump pump can contribute 7,200 gallons of clear water to the wastewater system in 24 hours, the equivalent of the normal daily flow from 26 homes.

State law prohibited these connections in the 1960s, but many remain. Sump pumps, foundation drains and rain leaders should be connected directly to a storm sewer or into the ground, not to the sanitary sewer system.

Clear water consumes system capacity

Clear water and stormwater entering the wastewater treatment system consumes system capacity needed for future growth in the region. For example, during a heavy rainstorm, the normal 200 million gallons a day of wastewater flowing to the Metro Wastewater Treatment Plant in St. Paul can more than triple for up to several hours.

Inflow during major rainfalls may also exceed current sewer capacity, causing system backups into homes and overflows into local lakes and rivers. This puts public health at risk and violates state and federal regulations.

The Council's continuous monitoring of wastewater flows shows a direct correlation between precipitation and the volume of clear-water flow from many communities served by the regional wastewater system. Thus, customers are being charged to treat water that doesn't need to be treated. In 2006, approximately 45 of the region's 103 sewered communities showed a significant response to rainfall events.

Adding capacity is not feasible

The Council has projected significant growth in the metropolitan area by 2030. These projections are used to predict and plan for wastewater flows through the interceptors and treatment plants. These facilities are designed using national standards for average and peak flows of wastewater.

When current levels of inflow and infiltration were projected out to 2030, it became apparent that a significant investment in relief sewers and pumping stations would be required. But simply adding capacity to convey and treat the clear water is not feasible, both because of the enormous expense and because of space constraints at the Metro Plant.

Local solutions

The task force and Council determined that the most cost-effective solution would be a region-wide effort to remove clear water from the system by disconnecting sump pumps and foundation drains connected to sanitary sewers, and by repairing leaky sewer pipes. Solving the problem at the local level is estimated to cost communities about \$150 million, in total. This compares with an estimated minimum of \$900 million to expand regional interceptor and wastewater treatment

capacity to handle the excess clear water.

The Council’s I/I reduction program set goals for all communities served by the metropolitan disposal system, and required them to reduce their I/I to meet design flow standards by 2012.

In addition, the program required all communities to develop and implement an I/I reduction program and include it in their local comprehensive plan. Communities currently within their I/I goals are required to develop plans for maintaining acceptable levels as the local infrastructure ages.

Achieving results

As of April 2009, 8 of the original 46 communities have fulfilled their commitments to reduce I/I to acceptable levels; one community was taken off the list through the formal appeals process; and the remainder are on track to fulfill their commitments.

Communities that do not take action to reduce I/I are eligible for a surcharge on their regional wastewater bill that would raise enough money to undertake the local solutions. Because all communities with excessive I/I have acted responsibly, the Council has yet to apply any surcharges.

In 2008, the Council initiated a grant program to help homeowners, through their

local city, to defray the cost of disconnecting sump pumps and foundation drains, and to repair private pipes connecting to local sewer pipes.

Starting in 2013, the Council could institute a “demand charge” for communities that still do not meet their I/I reduction goals. The Council would employ these funds to address the problem. At that point the Council could, if necessary, limit increased wastewater service to communities with ongoing, excessive I/I.

The Council provides a variety of technical assistance to communities to reduce I/I in the wastewater system, including an online [Inflow and Infiltration Tool Box \(pdf\)](#).

For more information

- [Get more information about Environmental Services online.](#)
- For flow issues, call Kyle Colvin of the MCES staff at 651-602-1151. For financial questions, contact Jason Willett at 651-602-1196.
- See related fact sheets online:
 - [Environmental Services](#)
 - [Wastewater Services](#)
 - [Surface Water Planning](#)
 - [Water Supply Planning](#)

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