Metropolitan Council

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 storm water 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.

The Metropolitan Council in January 2006 adopted a program to assist communities that have excessive I/I in their local sewer system to eliminate the problem. The program gave communities a choice: to either submit a plan to reduce the problem or, starting in 2007, pay a surcharge on their regional wastewater bill, with rebates given for money expended to eliminate I/I.

By the end of 2006, every community had either solved the problem, begun to solve the problem, or committed to a work plan to eliminate I/I. 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.

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 (which are designed to capture water that enters basements) 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 onto the ground, not to the sanitary sewer system. The cost for a homeowner to disconnect a sump pump or drain can range from $100 to $3,000, depending on the extent of work needed on a home's foundation.

Clear water consumes system capacity

Clear water 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 (mgd) of wastewater flowing to the Metro 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. These occurrences put public health at risk and violate state and federal environmental regulations.

The Council's continuous monitoring of wastewater flows shows a direct correlation between precipitation and the

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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; many have excessive I/I.

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 are projected out to 2030, it becomes 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.

Wastewater treatment infrastructure is very expensive. In addition, most of the region's treatment plants – and notably the Metro Plant – could not handle the additional flow of a growing clear water problem because of space constraints at its site.

The most cost-effective solution is a region-wide effort to remove clear water from the system by disconnecting sump pumps and foundation drains connected to sanitary sewers, and repairing leaky sewer pipes.

Solving the problem

In 2003 the Metropolitan Council appointed a task force of local government representatives to examine the problem of infiltration and inflow (I/I) and propose strategies to solve it. Based on their recommendations, and after extensive outreach to and input from local communities, the Council in 2006 adopted the surcharge program to reduce I/I. The Council:

- Set I/I goals for all communities served by the metropolitan disposal system, and required communities to reduce their I/I to meet design flow standards by 2012.
- Requires 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 need to develop plans for maintaining acceptable levels as the local infrastructure ages.
- Deferred for one year (2007) a surcharge for maximum peak excessive I/I to all communities that committed to I/I reduction plans. The Council will evaluate community results and apply the surcharge, starting in 2008, for communities that haven't met reduction goals.
- Starting in 2013, the Council may 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.
- Potentially limit increased wastewater service to communities with ongoing, excessive I/I.

The Council provides technical assistance to communities to reduce I/I in the wastewater system.

For more information

- Visit Environmental Services at www.metrocouncil.org.
- For flow issues, call Don Bluhm of the MCES staff at 651-602-1116. For financial questions, contact Jason Willett at 651-602-1196.
- Related fact sheets:
  - Environmental Services
  - Wastewater Services
  - Water Resources Planning

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