Private Source I/I
Downers Grove Sanitary District

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Today's Discussion

- Starting on the right foot
- The 'I/I project'
- Ongoing management: The carrot and the stick

Downers Grove Sanitary District

- 11 MGD Wastewater Treatment Center
- 20,000 Customers (65,000 PE)
- 250 miles of separate sanitary sewer
- Dry weather flows around 7 MGD
- Can pump 110 MGD at WWTC

Let's start with the basics

- Code enforcement is the foundation
- Construction requirements:
  - Tear-downs and demolitions included
  - Pipe and fitting specs
  - Installation requirements
  - Inside the house / overhead sewer
- 10 yrs >10% of connections, roughly 5 MGD of peak flow
- 100 years and all private I/I will be gone!

The I/I 'Project' – EPA's concept

- Born in construction grant days, made a condition of getting a grant
- Remove 'cost effective' I/I, transport and treat 'remainder'
- Assumes system conditions are static
- Feds wouldn't pay for private property work

DGSD's I/I Project

- 15,000 man-hour SSES
- $2 million on 'shotgun' rehab – $0.5 million ineligible (private property)
- Supposed to remove 25 MGD peak flow
- Built plant and interceptor improvements around this expectation - $17 million
- Within 10 years, needed additional plant expansion for peak flows
- Still dealing with sewer capacity issues

Projects are nice, but I/I doesn't sleep

- Continuous infrastructure deterioration
- Plumbing law of entropy
- Other utilities in constant flux

Private property enforcement – the stick approach

- Building Inspections – 99% compliance
- Smoke testing – almost no defects identified
- Dyed water flooding – almost no defects identified
- Full-time work with almost no measurable I/I reduction
- Confrontational approach with customers

District programs – the carrot approach

- Overhead Sewer Program
- Building Sanitary Service Repair Assistance Program
- Inflow and Infiltration Program

Overhead Sewer Program

- 50/50 Cost sharing program for overhead sewer/backflow prevention
- Condition of program is thorough investigation and elimination of all sources of I/I
- Costs <$15,000 per year
- <1% of properties in 14 years
- No more backups

Building Sanitary Service Repair Program

- Repair building services and install outside cleanouts
- Condition of program is thorough investigation and elimination of all sources of I/I
- Costs ~$0.5 million per year
- Covered about 10% of properties in 10 years
- Most popular service we offer

I/I Program

- Systematic I/I removal from system
- Public and private source I/I
- Geographic focus
- Objective to 'zip up' priority areas, one at a time
- Various rehab techniques, based on demographics of area
- Prioritization system
  - Flow data
  - Backup and overflow history
  - Location in system
- ~$1 million per year

Private Source I/I

- Improper connections
  - Various drainage structures and devices
  - Sumps
  - Footing drains
- Building service pipes
  - Transition
  - Cleanout
  - Pipe segments and joints
  - Connection at main

I/I Program dynamic

- Need access agreements (easier to get for BSSRAP program)
- Improper connections – we take on the tough ones
- Momentum of main / manhole work helps
- Property owner continues to own the (improved) service

Inspection process

- TV with See-snake
- Flood service with probe while televising
- Locate service and record all data
- Field sketch of basement piping / fixtures

Service Rehabilitation work

- Cleanout installation
- Grout
  - Lateral packer at main
  - Smaller main packer from clean-out
- Liner
  - T-liners at main
  - Liners from cleanout to building or main
- Replacement
  - Replace main connections when replacing sewer

I/I Program success

- Varies with location and rehab technique
- Early efforts performed poorly – rehab confined to public property – no improvement in flow
  - Main and service liners to property line
  - ~$0.5 million for 90 buildings
- More comprehensive liner project success
  - Line mains and services to transition
  - ~$1.5 million for 190 buildings
  - Reduced peak flow 50%, no more overflows immediately downstream*

I/I Program success (cont'd)

- Main replacement and grout services
  - Replace mains and manholes, grout services
  - 210 buildings, $2.2 million
  - Reduced peak flow by >50%, eliminated downstream overflows

Conclusions

- Private property is meaningful source of I/I
- Private property I/I sources are not always obvious
- I/I is elusive and will migrate to nearest sewer defect
- Sanitary sewer is generally the deepest utility whose trench tends to gather shallow run-off related groundwater
- Measurable I/I removal relies on comprehensive effort – geographic area needs to be 'zipped up' to address migration problem
- Meaningful reduction effort costs ~ $10k / building