

*Inflow and Infiltration/  
Sewer Overflow Reduction Program  
Part 2*

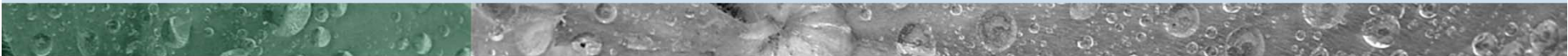
October 13, 2011





## ***Our Agenda for this Meeting***

- Brief recap from Part 1
- Additional approaches to consider for I/I Reduction





***Recap from Part 1***





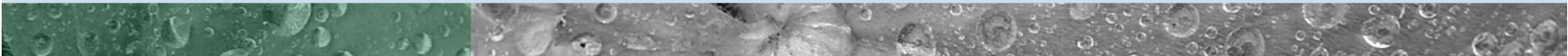
# *Definition of Inflow, Infiltration, and I/I*

## **Inflow**

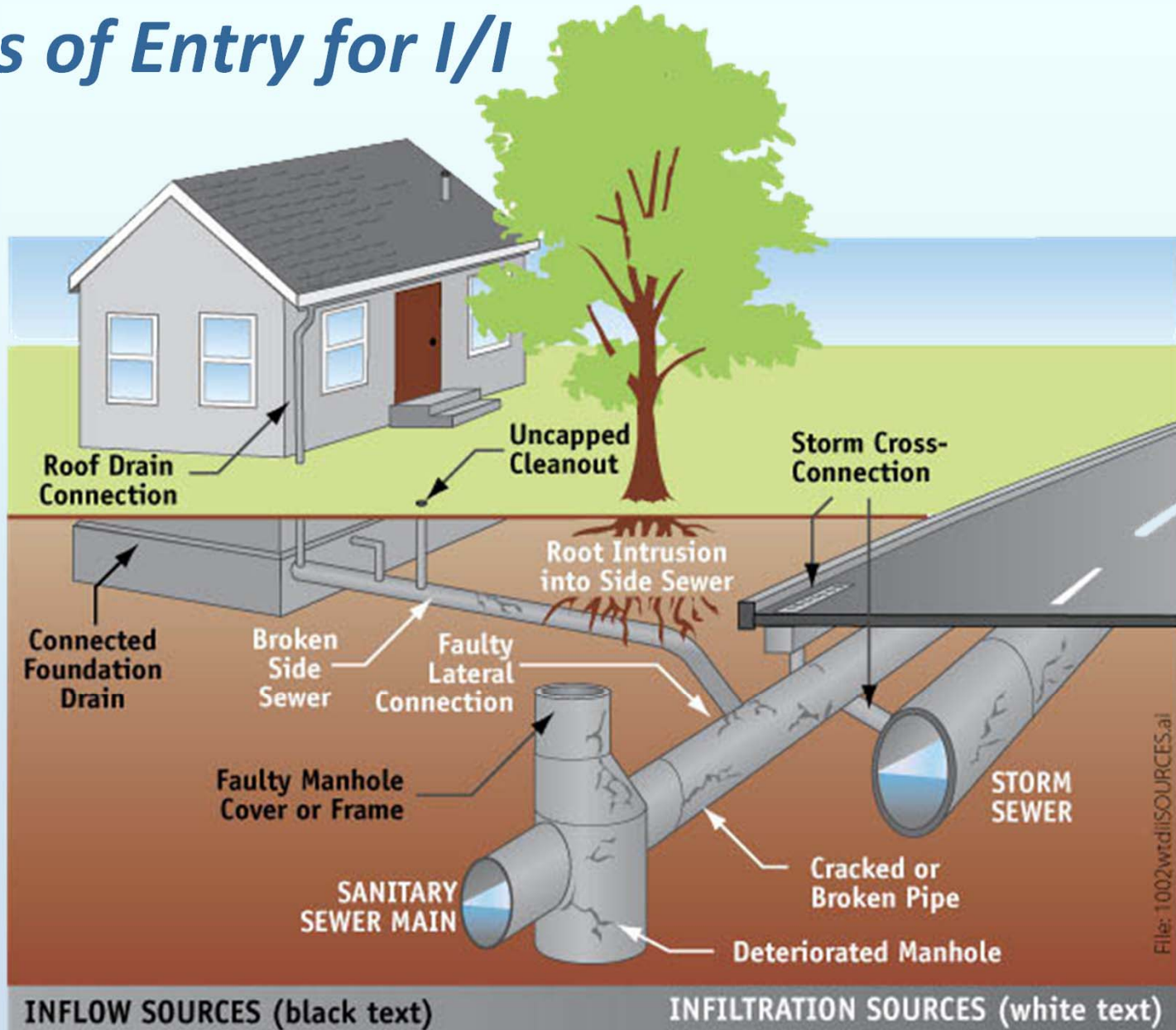
Rainfall that enters the sewer system through direct connections, such as downspouts and area drains that are connected to sewer laterals.

## **Infiltration**

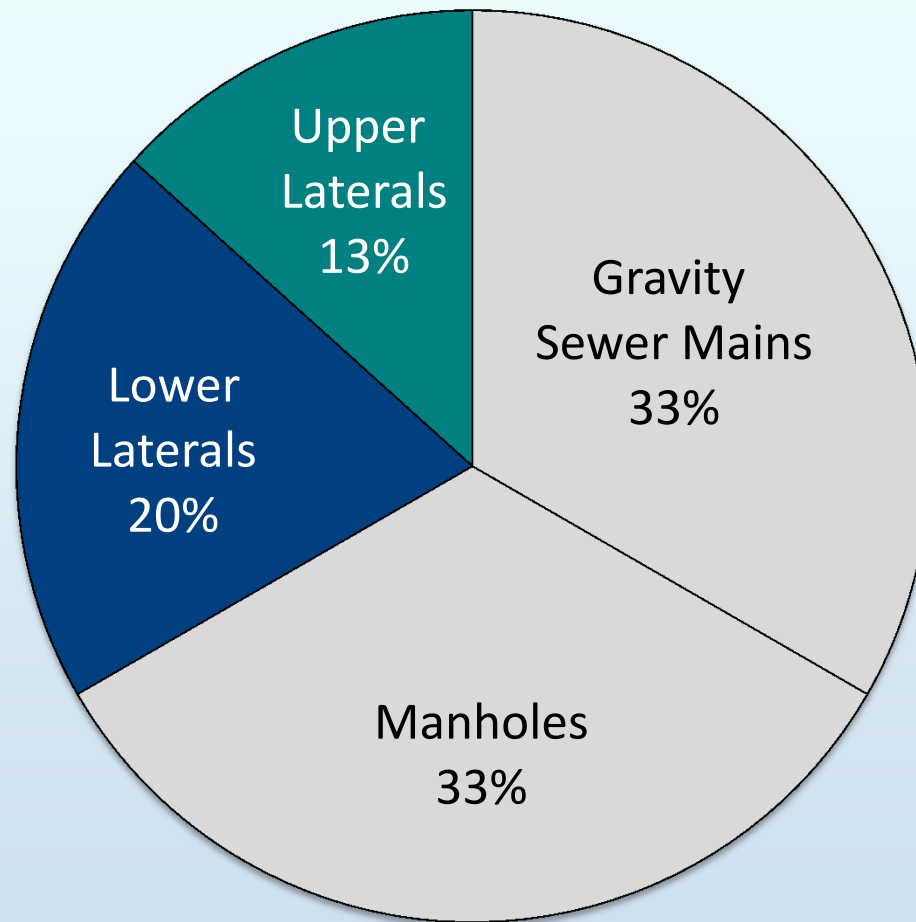
Rainfall that accumulates in sewer trenches and then enters the sewer system through failed joints and structural problems (e.g. cracks and holes in pipes: Pre-1958 pipes leak)



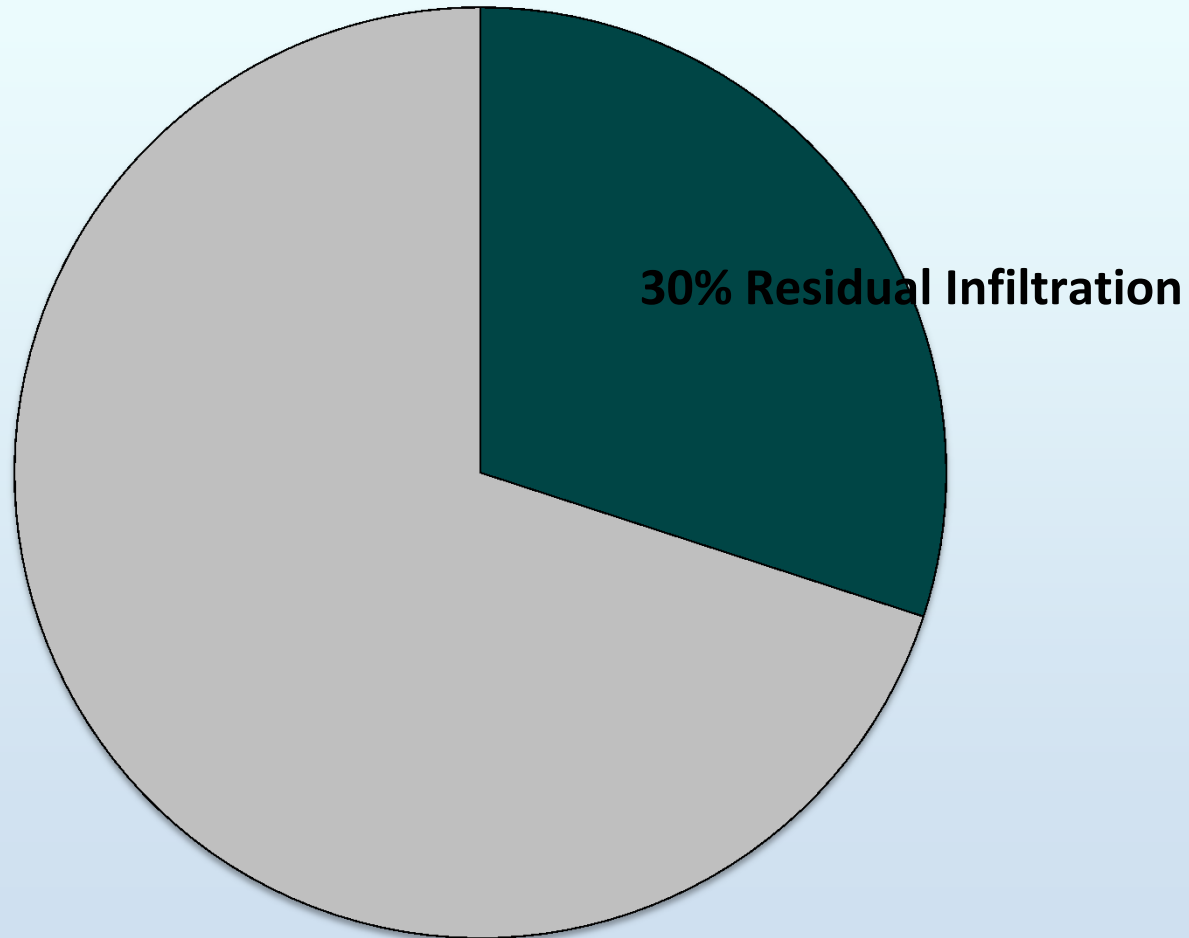
# Points of Entry for I/I



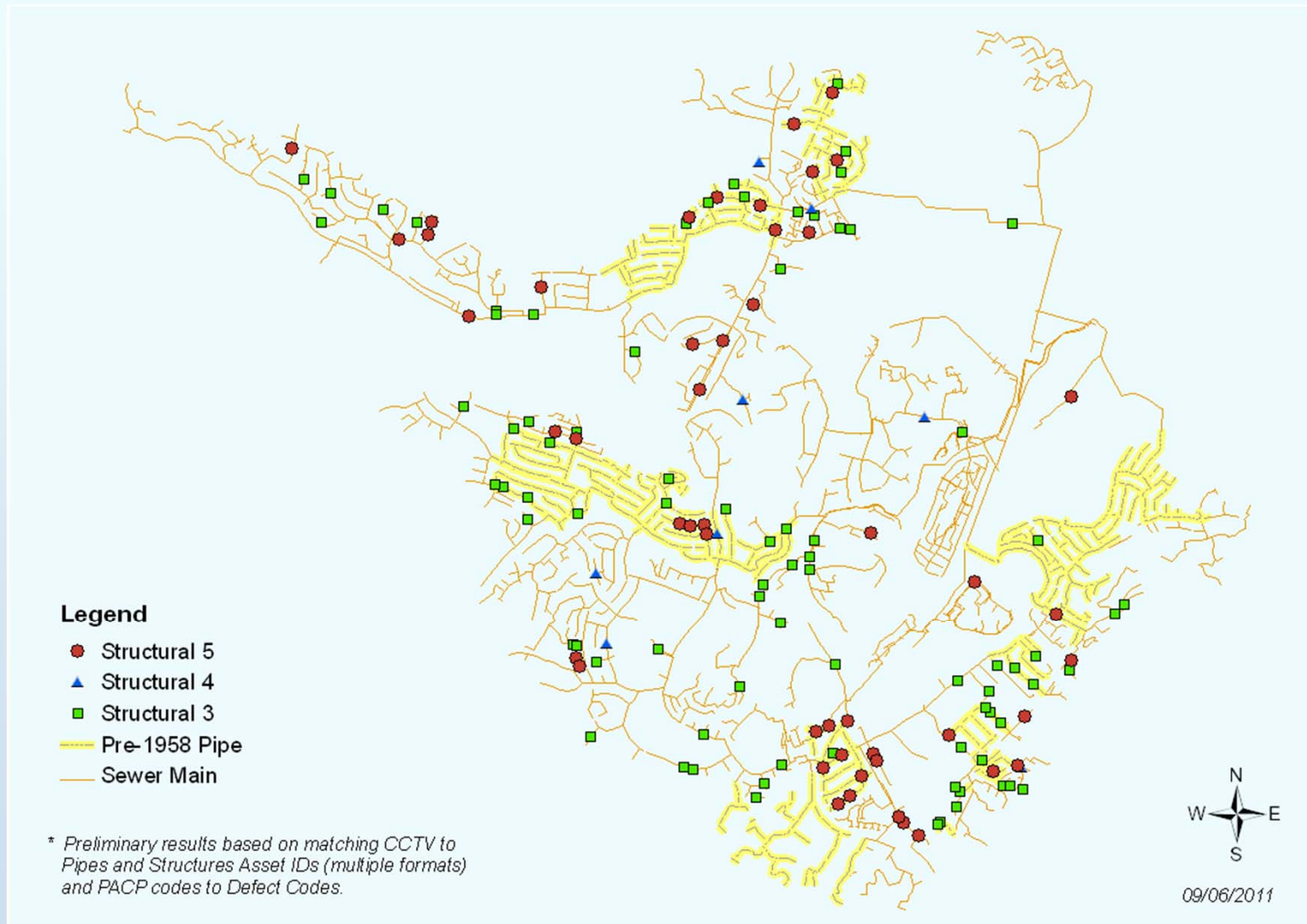
# *Relative Contribution to Infiltration*



# *Maximum Infiltration Reduction is 70%*



# Some Areas have I/I Sources



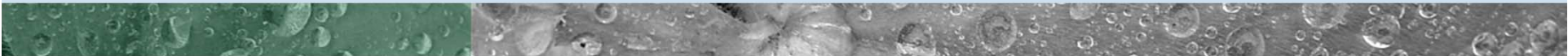




# *Where we Stand on I/I*

## **LGVSD has Moderately Elevated RDI/I**

- 1,000 gallons per acre per day at upper limit of “10 State Standards” for modern sewer system design
  - EBMUD satellites range from 2,000 to 17,000 GPAD
- 690 gallons per capita per day is above the EPA guideline for excessive RDI/I of 275 gallons per capita per day
- Current Peak Hour I/I  $\approx$  20 MGD
  - Peak Hour Wet Weather Flow of Record = 22 MGD
  - Average Dry Weather Flow = 2.3 MGD

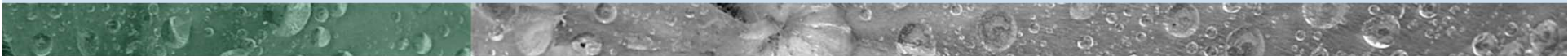




# ***LGVSD's Options for Reducing/Eliminating Effluent Blending***

## **Develop an Optimum Combination of Approaches:**

- Reduce RDI/I entering the sewer system
- Increase secondary treatment capacity
- Construct storage for flows exceeding secondary treatment capacity until flows subside following storm events

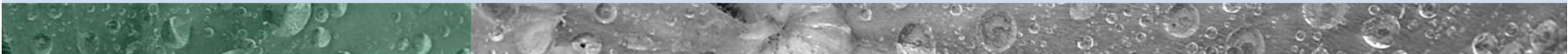




## *Existing I/I Reduction Programs*

- Manhole Sealing\*
- Smoke Testing
- CCTV Inspection
- Sewer Main and Lower Lateral Rehabilitation
- Offering property owners opportunity to have upper laterals included in sewer rehabilitation projects at a lower cost – but paid by the property owner.
- Realtor Disclosure Form\*
  - “Buyers are advised to obtain a video inspection of the sewer lateral.”

\* Not included in Part 1 presentation. Added here for completeness.





***Approaches to Consider for  
Increased I/I Reduction***





## ***Additional Approach #1***

### ***Public Outreach and Education***

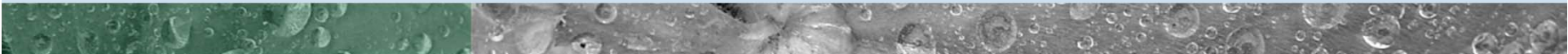
**Description:** Continue/expand Public Outreach and Education as part of I/I Reduction Program

- Low cost
- Anticipated direct impact on I/I is small

#### **Comments:**

Impact depends on responsiveness of public, but will have limited direct impact on I/I.

Necessary to increase participation in programs and for political and financial support of programs.



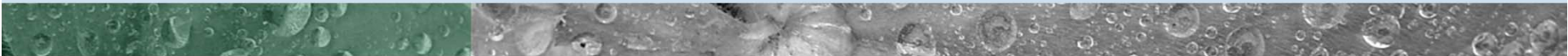


## ***Additional Approach #2***

### ***Include Incentives/Disincentives for I/I Reduction in Rate Structure***

**Description:** Incentives and Disincentives could be used to increase voluntary efforts to reduce I/I from private sewer laterals:

- Incentive: Reduced cost of lateral rehabilitation:
  - Optional rehabilitation during sewer main rehabilitation (in place)
  - Annual bids for lateral rehabilitation
  - Low interest loans
  - Lateral repair/rehabilitation insurance
- Disincentive: Increased annual sewer service charge for properties not inspecting their lateral





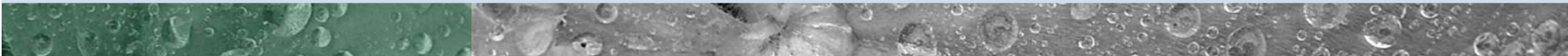
## ***Additional Approach #2 (cont'd)***

### **Comment:**

Number of property owners that would participate is unknown

Complications would need to be addressed:

- Who pays the additional cost?
- Nexus between fee and actual cost
- Adverse public reaction to disincentives





## ***Additional Approach #3***


# ***Include Upper Laterals in Gravity Sewer Rehabilitation Program***

**Description:** Current Sewer Rehabilitation Projects include the lower lateral and are estimated to reduce I/I by 40%.

Adding all of the upper laterals to a project:

- Increases I/I reduction from 40% to 70%
- Cost per upper lateral rehabilitation lower due to economy of scale
- Adds 15-25% to the cost per mile, but reduces cost of I/I eliminated by 50%

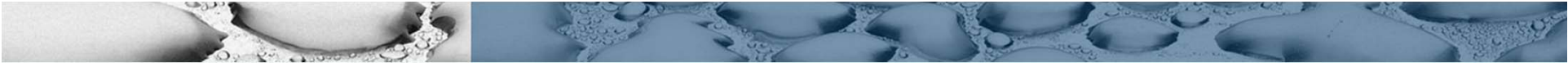
**Comment:** Complications would need to be addressed:

- Work on private property
  - Long term liability
  - Who pays the additional cost?
- 



# *Estimated Cost of Adding Upper Laterals to Sewer Rehabilitation Projects*

	<b>Current Approach</b>	<b>Add Upper Laterals</b>
Sewer Mains, Manholes, and Lower Laterals	\$1,000,000	\$1,000,000
Upper Laterals	\$0	\$230,000
<b>TOTAL COST</b>	<b>\$1,00,000</b>	<b>\$1,230,000</b>
RDI/I Reduction Effectiveness	40%	70%
RDI/I Eliminated per Mile	0.2 MGD	0.3 MGD
Cost per gallon per day of I/I Eliminated	\$6.90	\$4.80



# ***Additional Approach #4***

## ***Public Ownership of Residential Private Sewer Laterals***

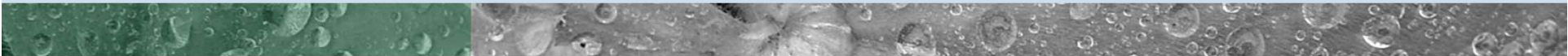
**Description:** District takes responsibility for ownership and maintenance of 8,800 residential private sewer laterals.

### **Comments:**

Benefits from public ownership include:

- Fewer SSOs from residential laterals and sewer mains
- Effective at reducing I/I

Complications would need to be addressed:

- Work on private property
  - Long term liability
  - Who pays the additional cost?
  - Impact on local sewer contractors
- 

# *Additional Approach #4*

## *Workload, Annual Cost, and Staffing*

<b>Activity</b>	<b>Estimated Annual Number of Events</b>	<b>Estimated Annual Cost</b>	<b>Estimated Additional Staffing, FTE</b>
Respond to Service Calls	750	\$210,000	1.2
Cleanup, Investigate, and Report Overflows	120	60,000	1.3
Property Damage Claims	25	625,000	0.4
Clean Laterals to Prevent Overflows (Scheduled Cleaning)	4,600	740,000	3.1
Repair Laterals	250	380,000	3.5
Replace Laterals	500	1,250,000	1.5
Administration and Overhead		1,100,000	3.1
Total		4,100,000	14

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***Any Questions?***