

# **Illicit Discharge Detection and Elimination Workshop for MS4s**

Case Study – Deteriorating Infrastructure



City of Seven Hills  
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City Engineer

# **IDDE is often identified by**

Complaint

or

MCM No. 3

or

During our Infrastructure GIS Mapping Project

# **IDDE Team**

- Cuyahoga County Board of Health
- Seven Hills Engineering, Building, Law and Service Departments
- URS

# Our Case Study

- Received complaint
- CCBH tested outfall
- Results exceeded 576 ecoli counts per 100 ml

# Possibilities

## City Issue

- Deteriorating sanitary lines/manhole leaking into storm
- Failed laterals within Right-of-Way

## Service Connection Private Property Issue

- Direct connection of sanitary lateral to storm
- Deteriorated/Collapsed sanitary lines

# Methodology

- Use GIS infrastructure mapping to identify areas of potential interest
  - The branch of storm line connected to outfall
  - Determine areas where sanitary sewer line is even with the storm or above the storm in elevation in the storm branch of the outfall.
- Use dry weather tracing to determine areas of flow. Use GPS unit to record findings.
- Where there is flow, use smoke/dye testing and televising to find the illicit discharge.





# Dry Weather Tracing Field Work

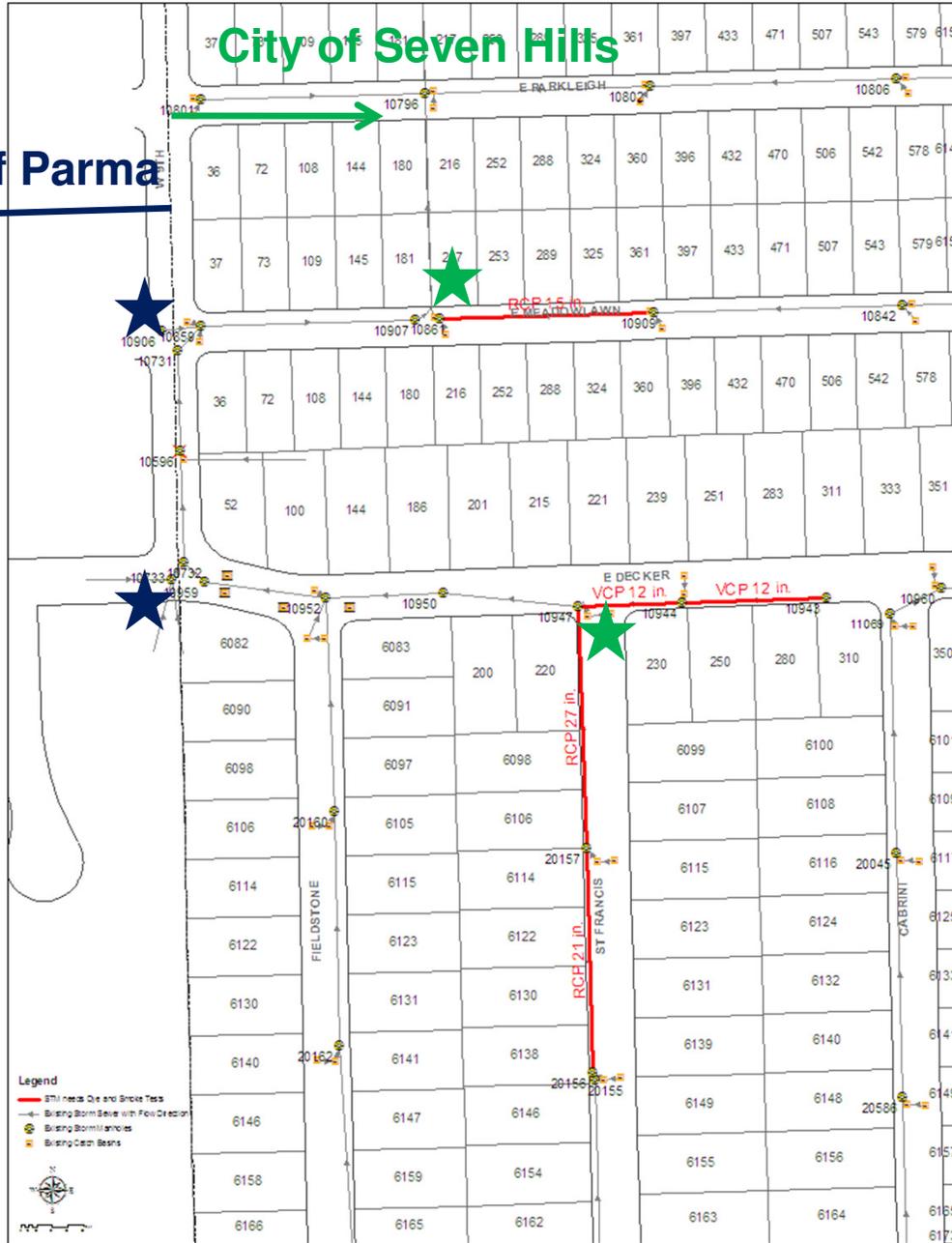
- No rainfall in the last 72 hours.
- Start at outfall and work up stream.
- Determine where there is and is not flow.

# Dry Weather Tracing - Results

- Steady flow up to STM 10907
- STM 10907 had water pouring in through manhole walls – Probably Water main break (makes findings downstream inconclusive until repaired).
- Four (4) manholes identified flow during dry weather tracing.

# City of Seven Hills

City of Parma

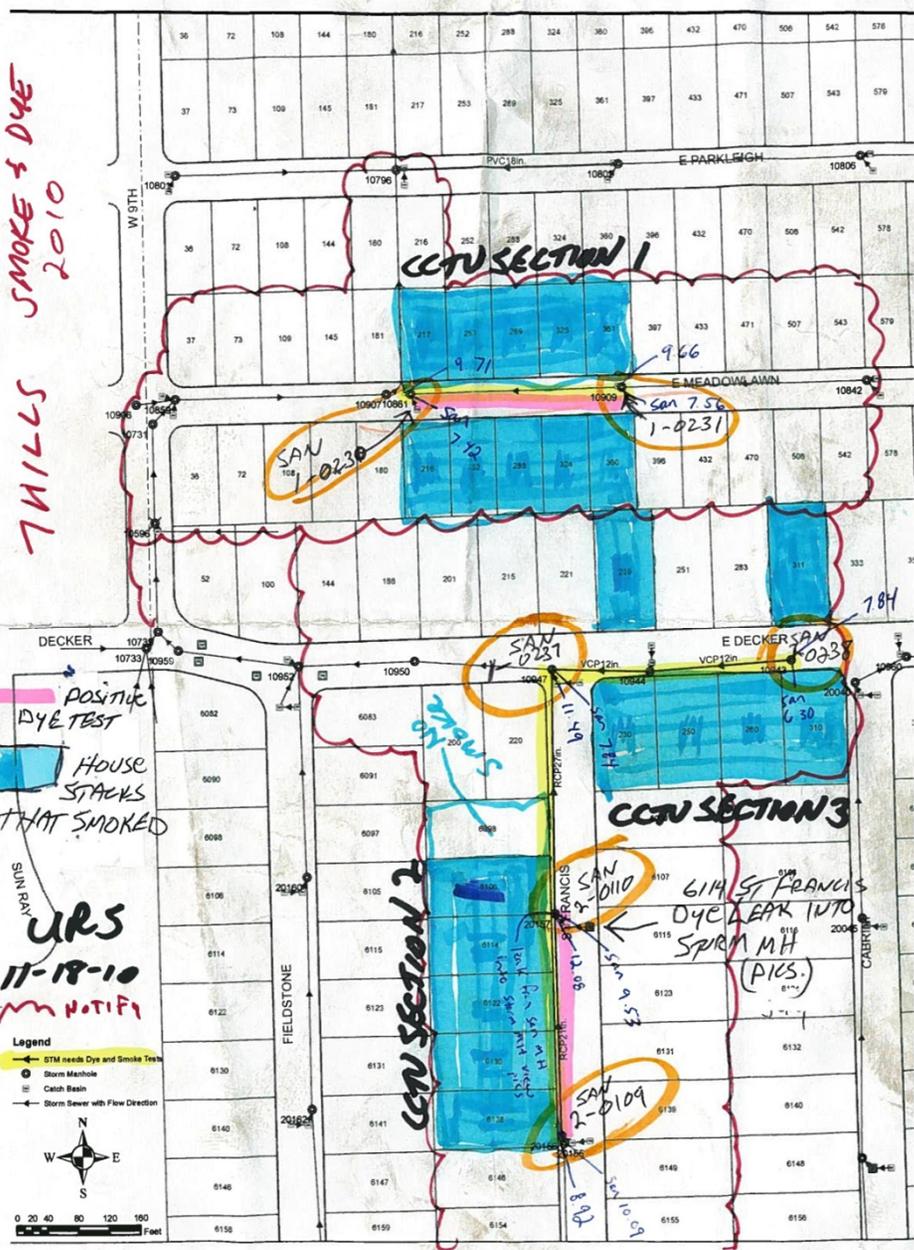


★ Inflow detected  
Notify Parma

★ Inflow detected  
Lines scheduled to  
be televised, smoke  
& dye tested

# Televising, Smoke & Dye Testing

- Smoke tested the storm line
  - Results inconclusive but showed communication between storm and sanitary
- Dye test sanitary line
  - Results still inconclusive but showed sanitary is getting through via manholes.
- Televising sanitary line (CCTV)
  - Results indicate separations and tree roots.



## Seven Hills Smoke and Dye Test Results

Address: 6114 St. Francis  
MH Section: 2-0109 to 2-0110

Smoke Test Results	
Smoke Induction Point:	STM1518
Source Description:	San-2-0110
Smoke Source Type:	Manhole
Test Date:	11/18/2010
Dye Test Results	
Dye Induction Point	SAN-2-0109 to San-2-0110
Source Description:	STM MH walls
Location of Observed Dye:	STM MH 1518
Estimated Flow:	1-3 gpm
CCTV Section Number:	2
Test Results:	Positive
Test Date:	11/18/2010

Photo: Photo below shows smoke from STM 1517 into SAN -2-0109



**URS**

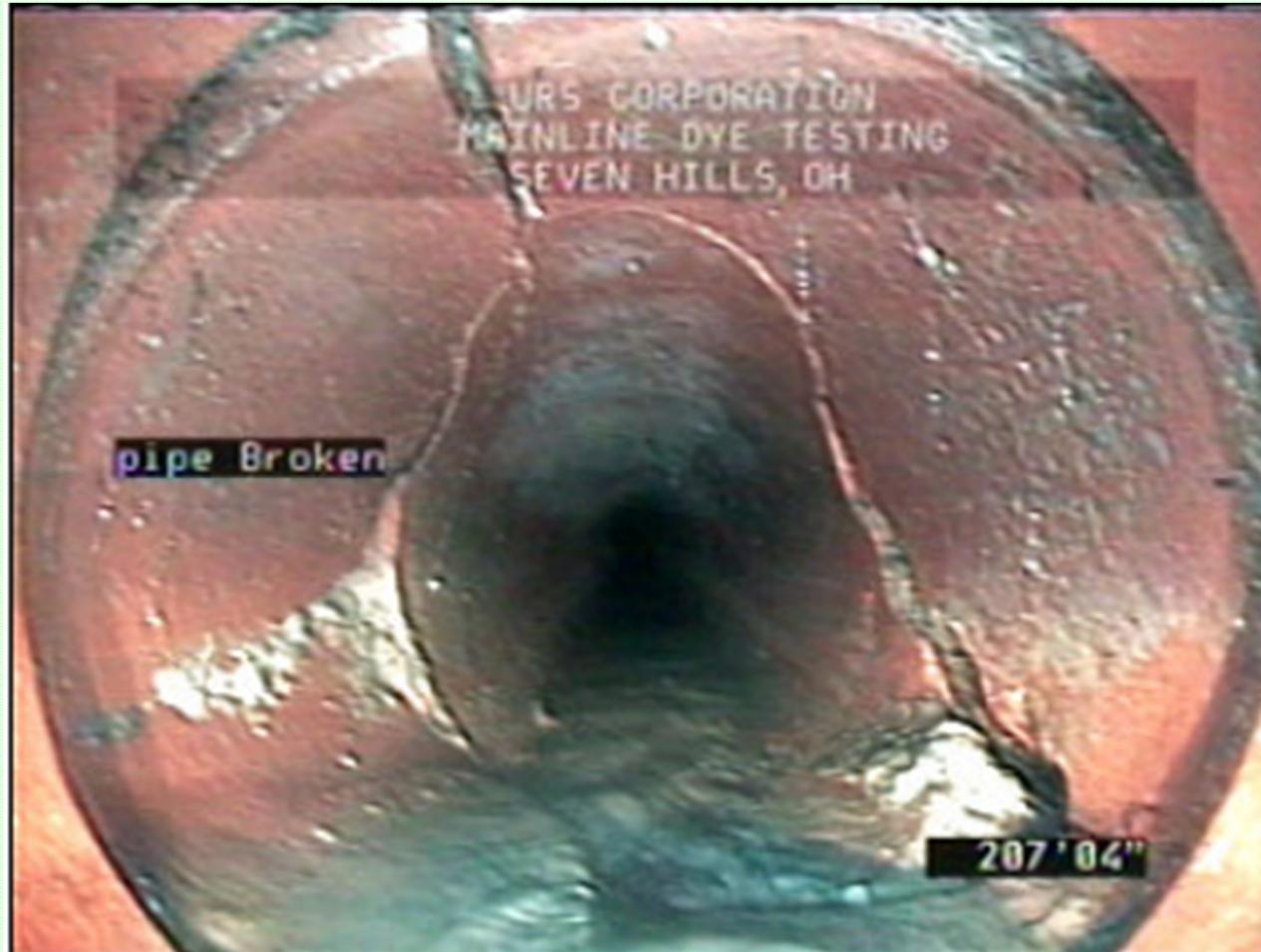
**Photo:** Photo below shows dye in STM-1518 from SAN-2-0109 to SAN-2-0110 DYE TEST



## Broken Sections of Sanitary Sewer Pipe



## Broken Sections of Sanitary Sewer Pipe



# Tree Roots



# Interpreting the Data

- Sanitary infrastructure installed in 1950's requires rehabilitation and at some locations replacement
- Fix City issues first → mainline, manhole and laterals (in R-O-W) replacement or rehabilitation
- Selected Cured In-Place Pipe Lining and Manhole Lining
- Put together bid package for three (3) separate projects
  - 920' sanitary sewer CIPP lining
  - Two (2) manhole re-linings

# CIPP – Process

- Notification to residents (300' done in 8 hours)
- After pipe is cleaned and lateral locations are recorded

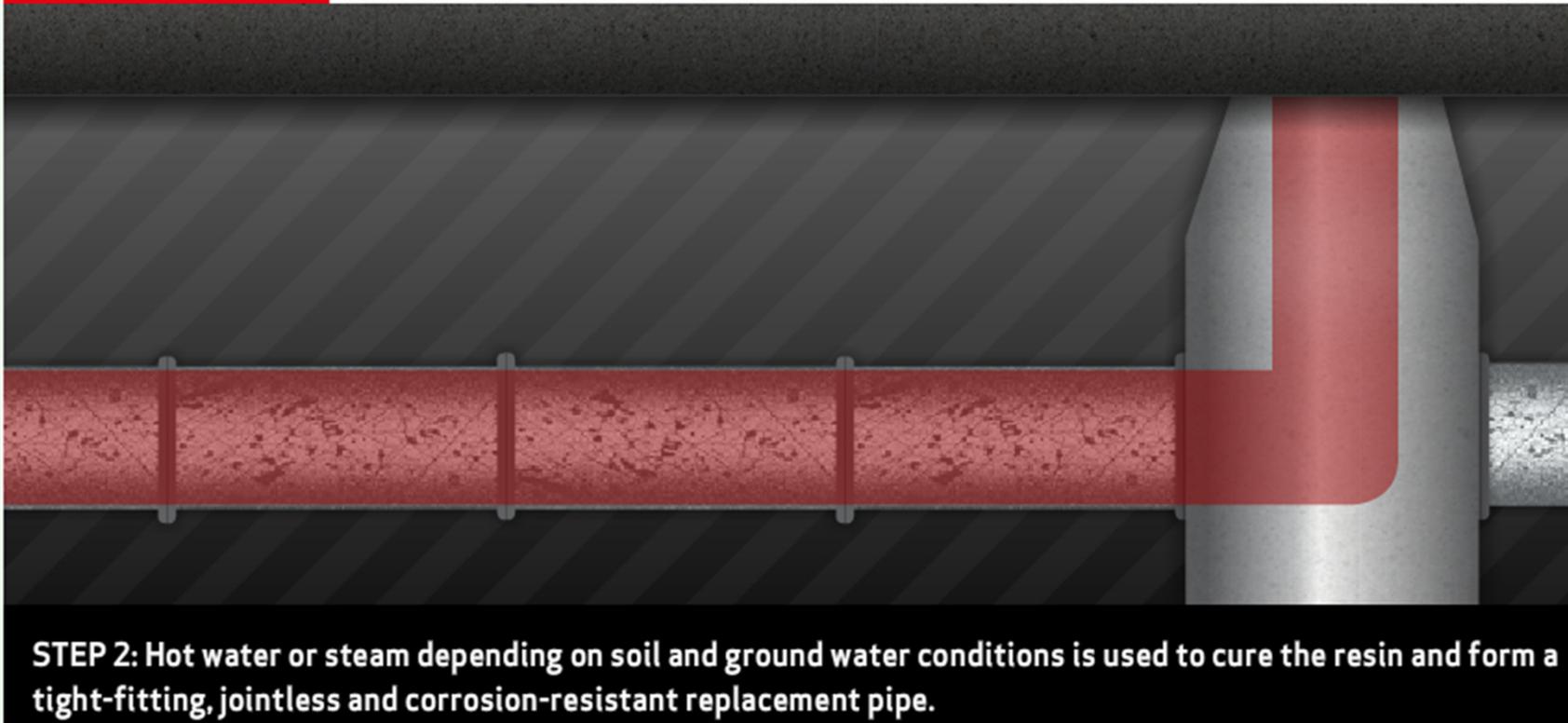
## CIPP PROCESS



STEP 1: A resin-saturated, coated felt tube is inserted into a damaged pipe.

Courtesy of <http://www.usa-cipp.com/cipp-process.php>.

## CIPP PROCESS



**STEP 2: Hot water or steam depending on soil and ground water conditions is used to cure the resin and form a tight-fitting, jointless and corrosion-resistant replacement pipe.**

Courtesy of <http://www.usa-cipp.com/cipp-process.php>.

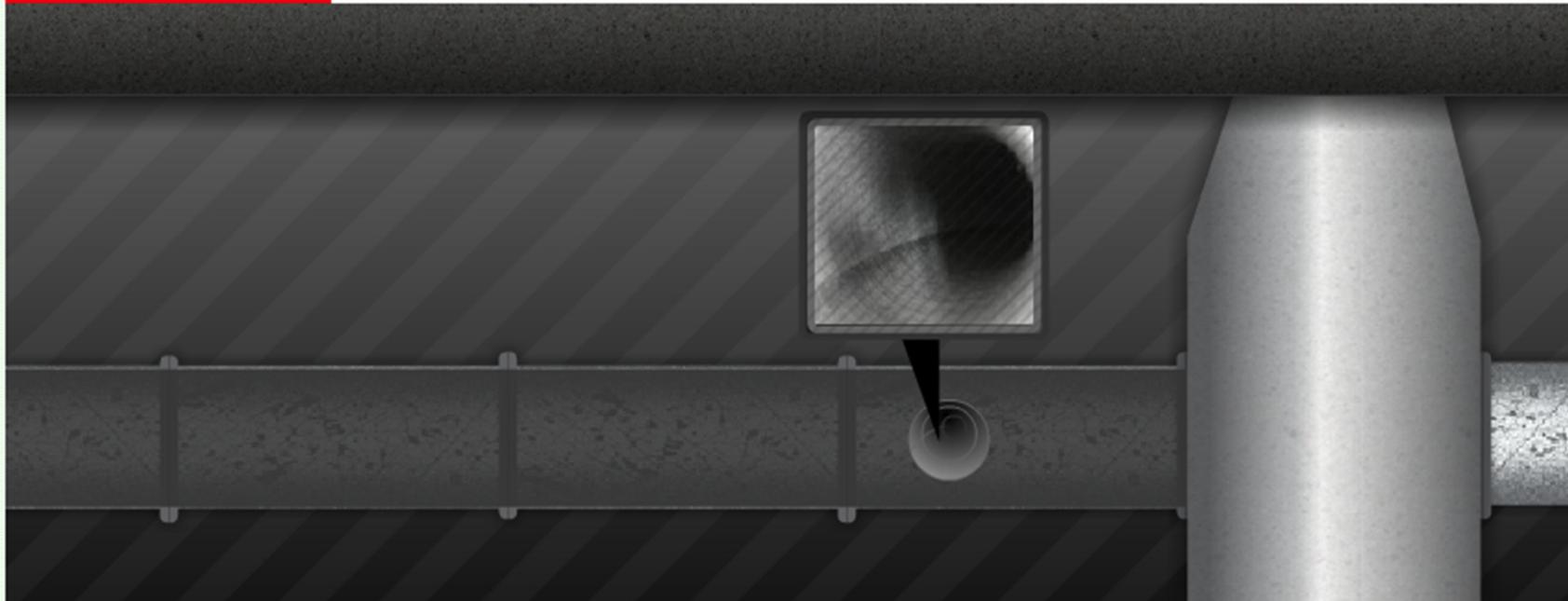
## CIPP PROCESS



**STEP 3: New pipe ends are removed**

Courtesy of <http://www.usa-cipp.com/cipp-process.php>.

## CIPP PROCESS



**STEP 4: Service laterals are restored with a robotically controlled cutting device and then inspected by closed-circuit TV.**

Courtesy of <http://www.usa-cipp.com/cipp-process.php>.

# After Rehabilitation

- Relining work recently completed
  - CCTV after lining performed
  - Sample of the lining for material strength testing
  - Vacuum test lined manholes
- Waiting for dry period to determine the results
  - Perform dry weather tracing & screening if flow exists
- If the results indicate a problem still exists, we will televise laterals and reline laterals as needed which is a more expensive and may involve property owner contributions

# **IDDE - Troubleshooting Costs**

- Smoke Testing per foot - \$0.50 per foot
- Dye Testing – \$185 per house
- Smoke/Dye Testing & CCTV - \$902 per day
- Televising Mainline – \$5.00 per foot
- Televising Laterals – \$1,250 each

# 8" Diam. Sanitary Sewer Rehabilitation Costs

- Cleaning – \$5.00 per ft
- Bypass Pumping - \$500 (lump sum)
- Before & After Mainline CCTV - \$5.00 per foot
- Cured In-Place Pipe Lining - \$25.25 per foot
- Manhole Lining - \$2,850 each
- Lateral CCTV - \$650 to \$1,250 each
- Lateral Lining - \$4,000 to \$5,500 each
- Sewer point repair - \$625 to \$850 per foot

Pricing does not include permitting, Above Ground Video, etc.

# IDDE Advice

- Up to date infrastructure mapping
- Provide notification to residents regarding and smoke and/or dye testing with door hangers
- Field crew → Patience
- Thorough and concise documentation of tests and communications especially if the matter needs to go to the legal process
- Work with and help private property owners that are required to remediate problems

# IDDE Advice

- Updated City Ordinances that will back your illicit discharge elimination efforts
- Create an in-house process for handling illicit discharges on private property
- Perform storm and sanitary dye testing on all new houses constructed and when a building permit is obtained for any sewer work on private property (septic conversions, line replacements, etc.)
- Good teamwork – City Council & Administration

# Contact

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