



# THE CITY OF SPRINGFIELD - OFFICE OF PUBLIC WORKS - SEWER DIVISION

Northeast Area Pilot Sewer Investigation

Public Information Meeting  
July 27, 2023

# MEETING OUTLINE

- Sewer Study & Investigation Timeline
- Study Purpose
- Northeast: Study Area and Pilot Area
- Pilot Area Evaluation Results
- Implementation Schedule



# **SEWER STUDY & INVESTIGATION TIMELINE**

# PROJECT TIMELINE - UPDATE



February 7, 2013: USEPA issues an Administrative Order (AO) to the City of Springfield requiring proactive action to address sanitary sewer overflows (SSO's).



June 30, 2015: A plan (Sanitary Sewer Alternatives Analysis - SSAA) to eliminate SSO's is submitted to USEPA for review and approval.



October 2016 - January 2019: review letters and responses exchanged between USEPA and City of Springfield.



March 2022: USEPA suggests the plan is acceptable but asks City to complete it sooner.



June 2022: CMT initiates Sewer Investigation.



July 20, 2022: NE Pilot Area Sewer Investigation Public Meeting (@ St. Al's gym)



July 26, 2022: USEPA approves Sanitary Sewer Alternatives Analysis and Implementation Schedule of 13 years.

# PURPOSE

Why are We doing this work?

# SEWER TYPES



**Storm Sewer**  
carries stormwater  
runoff from the  
ground

**Sanitary Sewer**  
carries sewage produced  
by residential and  
commercial sources

**Service Sewer**  
private line that carries  
sewage from building to  
the public sewer (lateral  
sewer)

# REGULATIONS

## USEPA Regulations

- Sewers (sanitary & storm) are distinct from other Public Works assets in that they are regulated.
- AO addresses sanitary sewers only.
- USEPA mandates to eliminate SSO's.
- SSO's violate the Clean Water Act (CWA).



### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 5

|                               |   |                            |
|-------------------------------|---|----------------------------|
| IN THE MATTER OF:             | ) | DOCKET NO.: V-W-12-AO-23   |
| CITY OF SPRINGFIELD, ILLINOIS | ) | PROCEEDING UNDER           |
| RESPONDENT,                   | ) | SECTIONS 308(a) AND 309(a) |
|                               | ) | OF THE CLEAN WATER ACT     |

#### COMPLIANCE ORDER

1. The Director of the Water Division, U.S. Environmental Protection Agency (EPA), Region 5, is issuing this administrative Compliance Order (Order) to the City of Springfield, Illinois (Respondent) under Sections 308(a) and 309(a) of the Clean Water Act (CWA), 33 U.S.C. §§ 1318(a) and 1319(a).

#### STATUTORY AUTHORITY

2. The Director of the Water Division, EPA, Region 5, is making the following **FINDINGS** and is issuing the following **ORDER** pursuant to the authority of the Administrator of the EPA under Sections 308(a) and 309(a) of the Clean Water Act (CWA), 33 U.S.C. §§ 1318(a) and 1319(a). The Administrator delegated this authority to the Regional Administrator, EPA, Region 5, who then re-delegated the authority to the Director of the Water Division, EPA, Region 5.
3. Section 301(a) of the CWA, 33 U.S.C. § 1311(a), prohibits the discharge of pollutants to the waters of the United States by any person except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit issued pursuant to Section 402 of the CWA, 33 U.S.C. § 1342.
4. Section 502(12) of the CWA, 33 U.S.C. § 1362(12), defines "discharge of a pollutant" to mean, among other things, "any addition of any pollutant to navigable waters from any point source."
5. Section 309(a)(3) of the CWA, 33 U.S.C. § 1319(a)(3), states that whenever the Administrator finds a person in violation of Section 301(a) of the CWA, 33 U.S.C. § 1311(a), she may issue an order requiring that person to comply with the provisions of the CWA.
6. Section 308(a) of the CWA, 33 U.S.C. § 1318(a), authorizes the Administrator to require the owner or operator of any point source to establish and maintain records, make reports, install, use and maintain monitoring equipment, sample

# WHAT IS AN SSO?

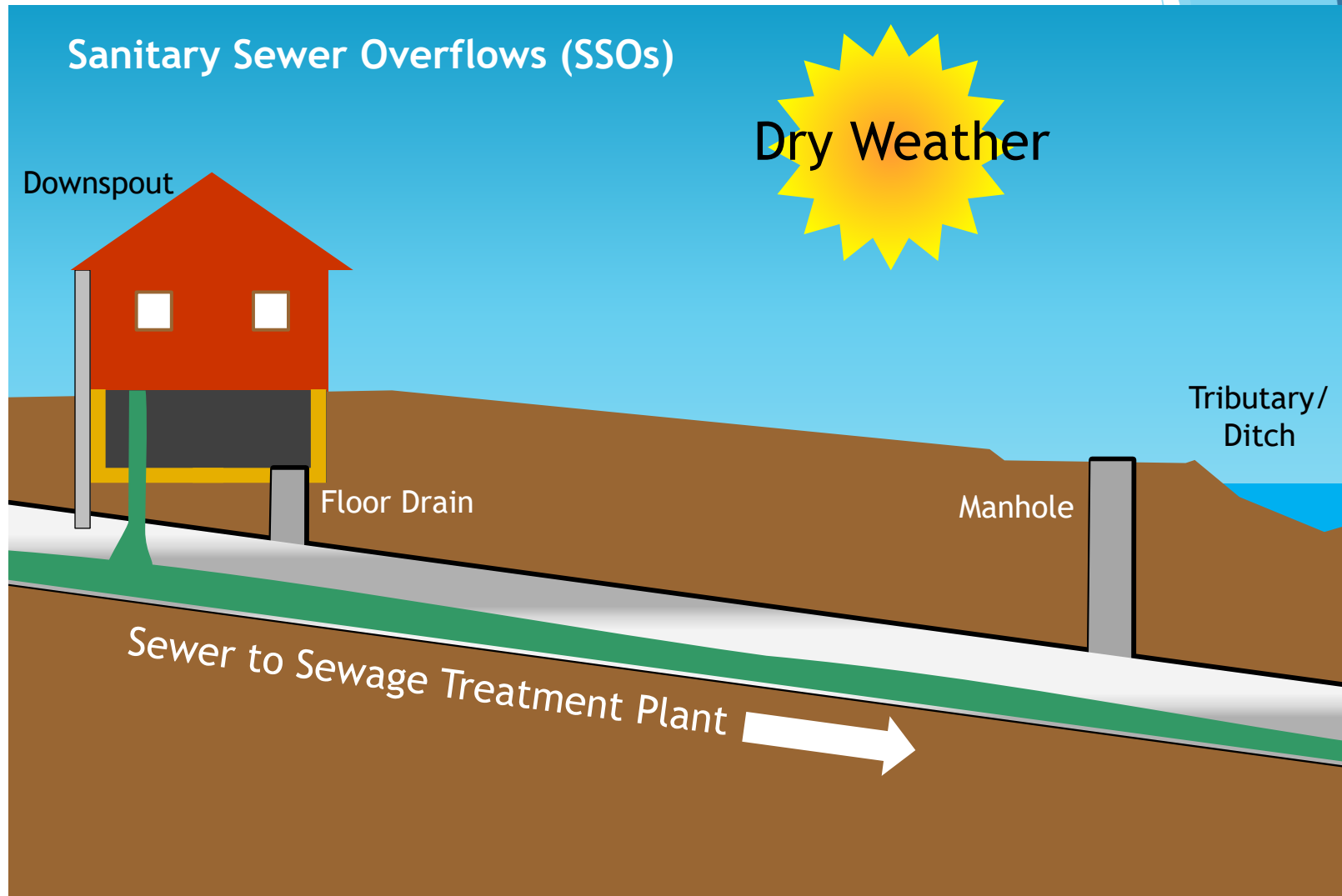
SSO's are not unique to just Springfield



Sanitary Sewer Overflow (SSO):  
sewage leaves the system through  
manhole lids or other openings....

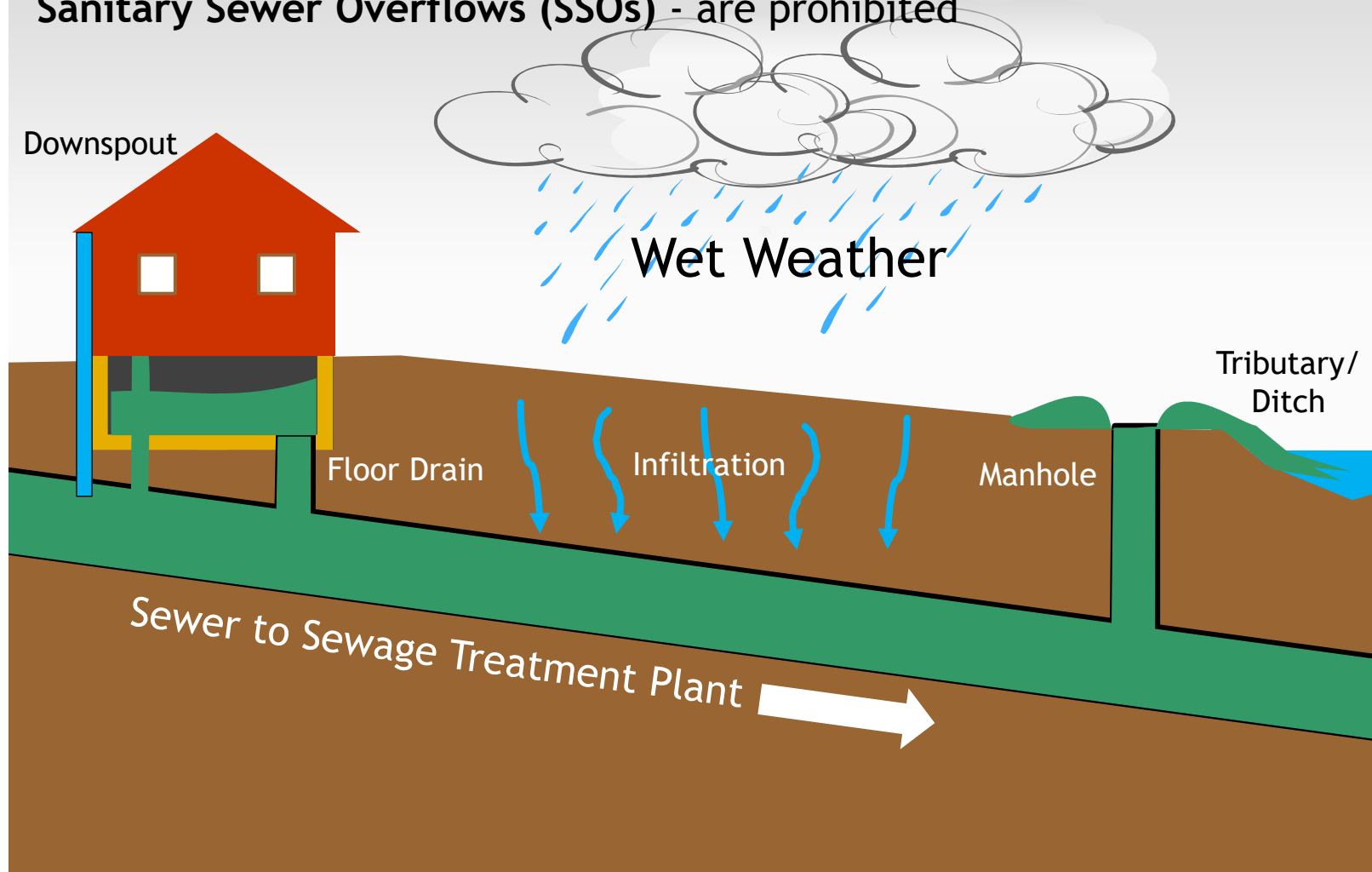
...Aging sewers contribute to SSOs,  
a public health hazard

# NO OVERFLOWS



# OVERFLOWS

Sanitary Sewer Overflows (SSOs) - are prohibited

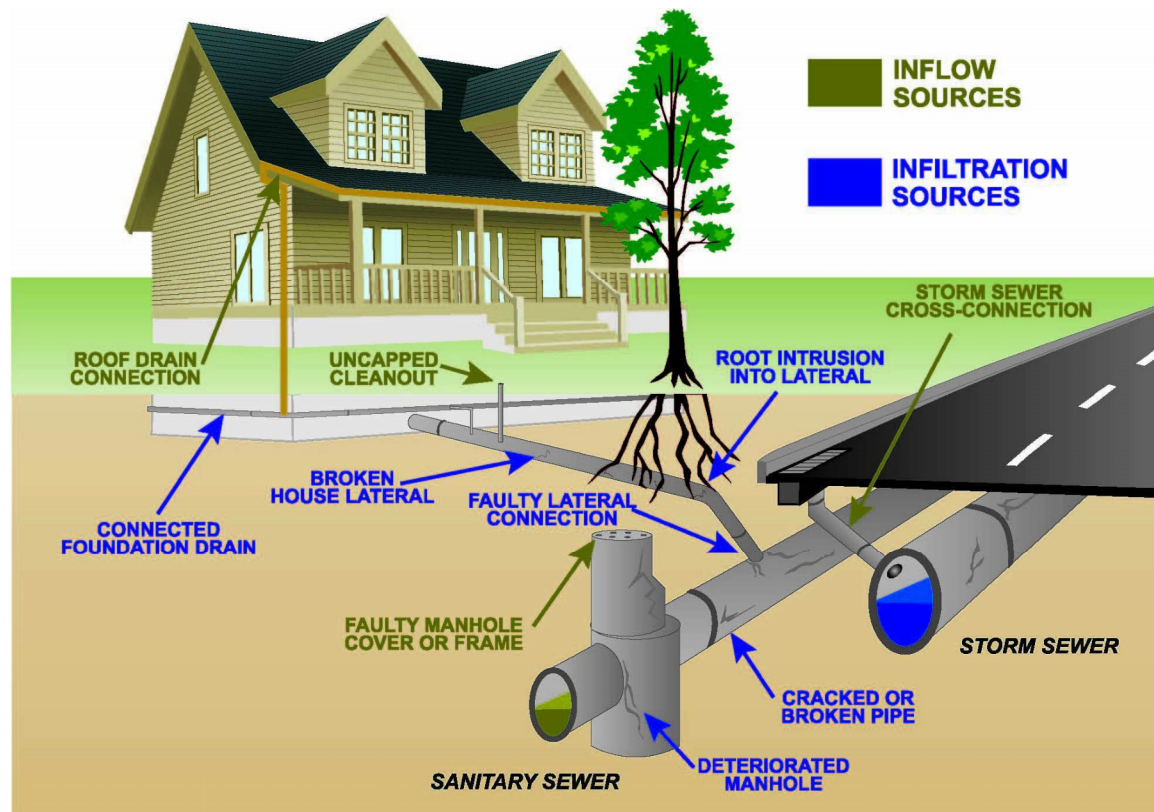




# INFLOW & INFILTRATION

The key source of Sanitary Sewer Overflows

*I&I*



# WHAT MUST WE DO?

## USEPA AO Actions Required:

- ✓ Prepare and implement a procedure to report all SSOs
- ✓ Prepare and implement an Overflow Emergency Response Plan
- ✓ Prepare and implement a Capacity, Management, Operation and Maintenance (CMOM) plan
- ☐ Address site-specific SSO's in the Northeast Area by implementing the SSAA by July 2035

**As of July 1, 2015, all items have been addressed except for the Northeast Area.**



City of Springfield, Illinois  
Office of Public Works  
Sewer Division

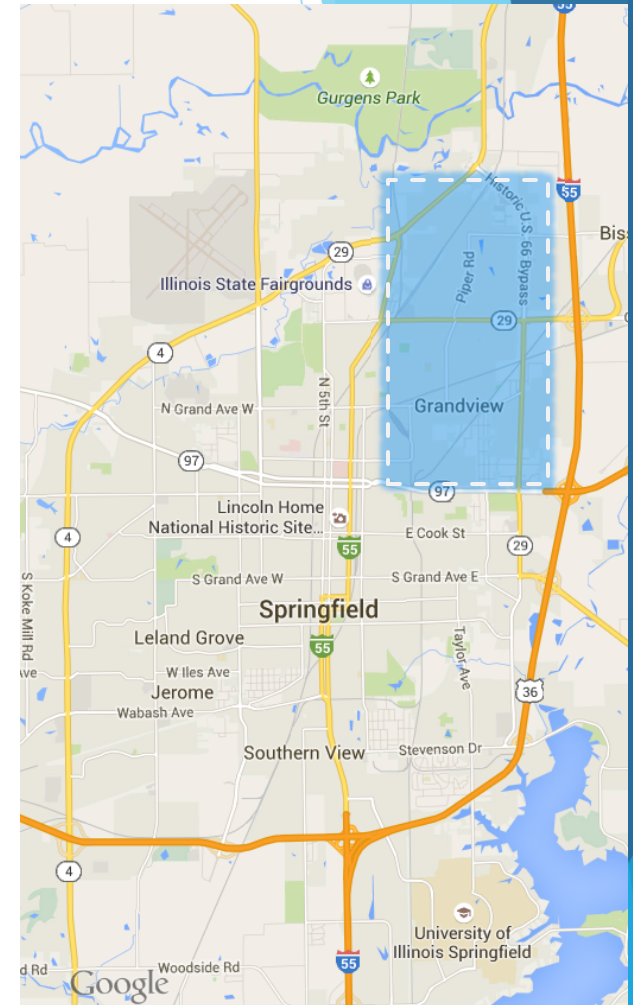
**Capacity,  
Management,  
Operations and  
Maintenance**

11/3/2014

# WHAT AREA IS AFFECTED?

## Northeast Area

- 2.66 Sq. Mile (1,700 acres) area of the City
- History of sewer surcharging and basement backups
- To alleviate this problem, Public Works previously pumped out of the sanitary sewer during heavy rainfall events. This practice is no longer allowed.
- The SSAA completed in 2015 better quantified the issues and developed alternatives to eliminate SSOs.



# NORTHEAST

Study and Pilot Areas

# NORTHEAST STUDY AREA





# NORTHEAST STUDY AREA DETAILS

41

miles of City-owned  
sewers

71

Est. miles of  
private sewer  
laterals

755

manholes

3.4

miles of  
SCWRD sewers

63%

of sewer length is  
privately owned

4,679

Estimated total  
residences

1,866

Estimated residences  
with basements

# KEY REPORT TAKEAWAYS

- Confirmed that I&I was significant and causes:
  - Sewer surcharging
  - Basement backups
  - SSOs
- Confirmed there is no single solution
  - It is multi-faceted (sanitary, storm)
  - It involves both public and private infrastructure
  - It is multi-jurisdictional
  - Stormwater management a contributing factor
- Conservative Estimate of Cost: ~\$57M
- Timeline: implement over 13 years (by July 2035)
- **Goal moving forward is to Optimize the solution**

# RECOMMENDED/CORRECTIVE ACTION

## An Incremental Step-Wise Approach

1

Attack the source: surface and ground water entering through sewer defects

2

Monitor and Evaluate results every step of the way

3

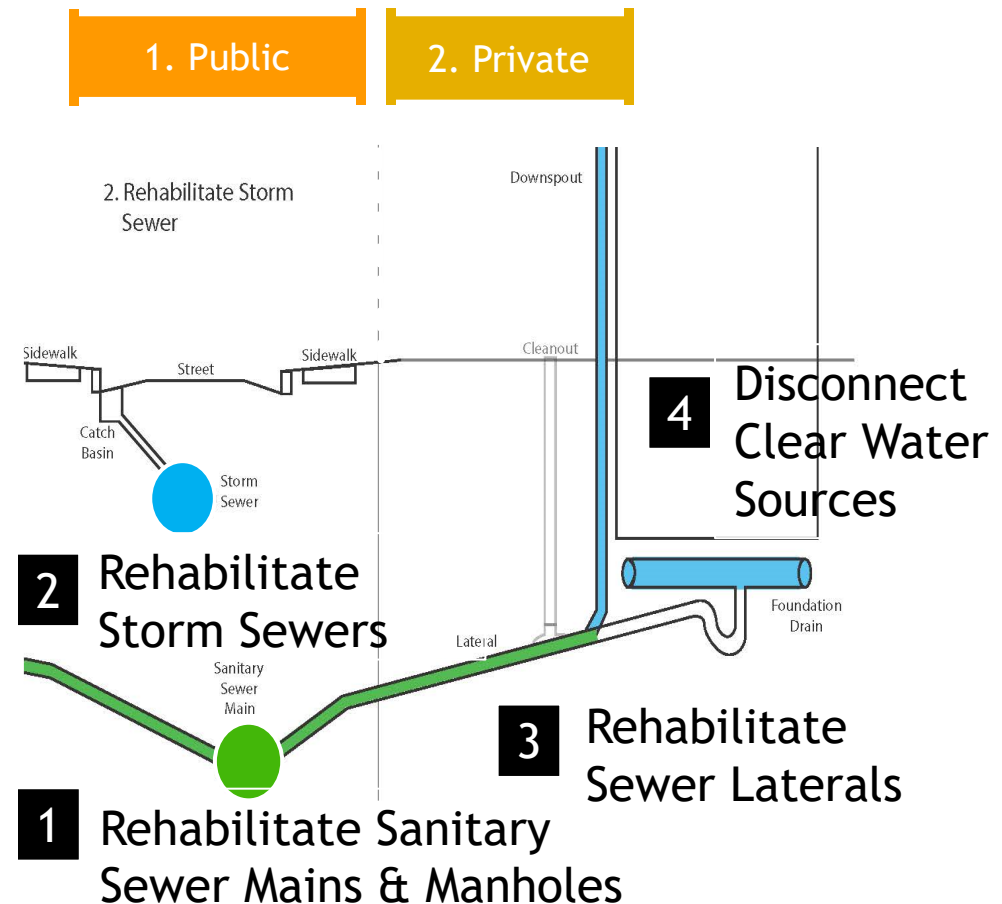
Then, only if needed - add capacity (larger sewers, detention, storage tanks etc.)



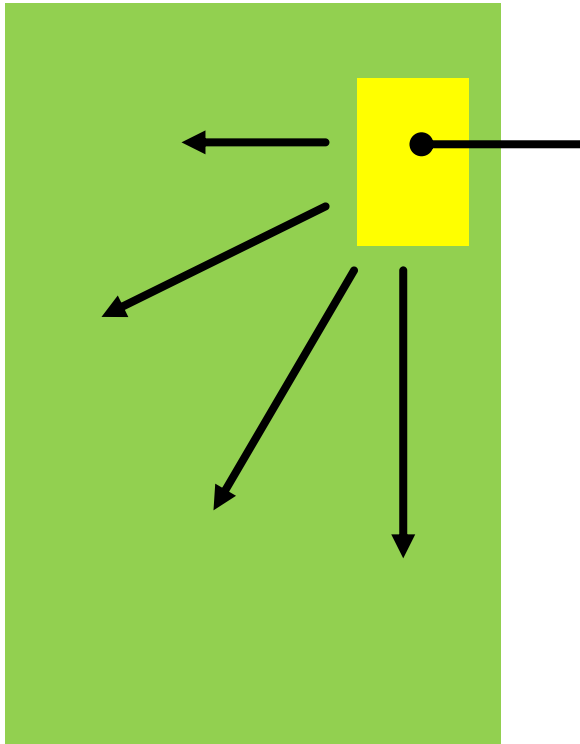
# RECOMMENDED/CORRECTIVE ACTION

## An Incremental Step-Wise Approach:

- Public Infrastructure First
- Private Infrastructure Second



# ROADMAP MOVING FORWARD




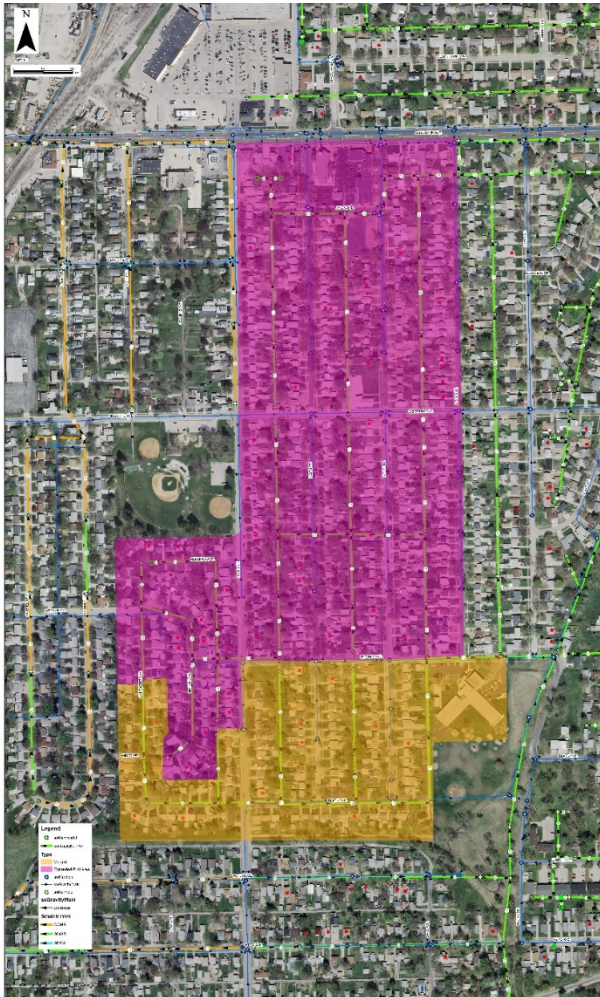
**Step One:** Report and USEPA approval

**Step Two:** *Pilot Area Investigation and Implementation (current)*

**Step Three:** Learn, Modify and Apply throughout NE Area (future)



# PILOT AREA BOUNDARIES



# Pilot Area

(84 acres)

## Control Area (33 acres)

# NE PILOT AREA STATISTICS

424

Number of  
parcels

12,025

Feet of sanitary  
sewer (8in., 10in.,  
12in., & 15in.)

45

Sanitary  
manholes

371

Sewer Connections

≈ 30,000

Feet of sewer  
lateral length

166

Storm manholes  
& inlets

14,142

Feet of storm sewer



# NE CONTROL AREA STATISTICS

137

number of  
parcels

5,248

Feet of sanitary  
sewer (8in.,  
10in. & 12in.)

16

sanitary  
manholes

119

Sewer Connections

10,640

Estimated feet of  
sewer  
lateral length

50

Storm manholes  
& inlets

4,871

Feet of storm  
sewer length

# PILOT AREA INTENSIVE EVALUATION

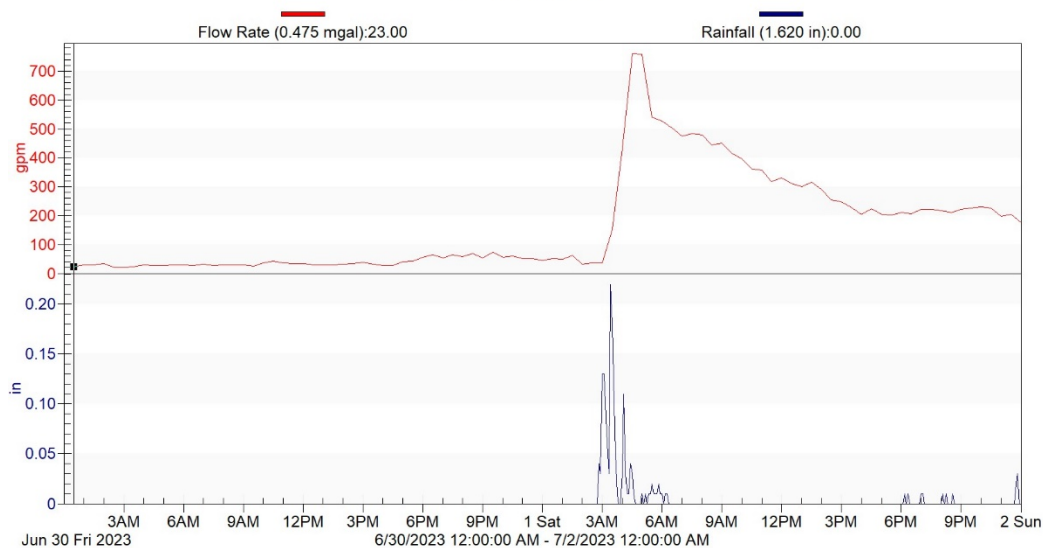
# WHAT DID WE INVESTIGATE?

- Sewer flow and rainfall
- Groundwater levels
- Private property connections
- Basement plumbing
- Sanitary sewers and manholes
- Storm sewers and manholes
- Sanitary sewer laterals

# Rain Gauge



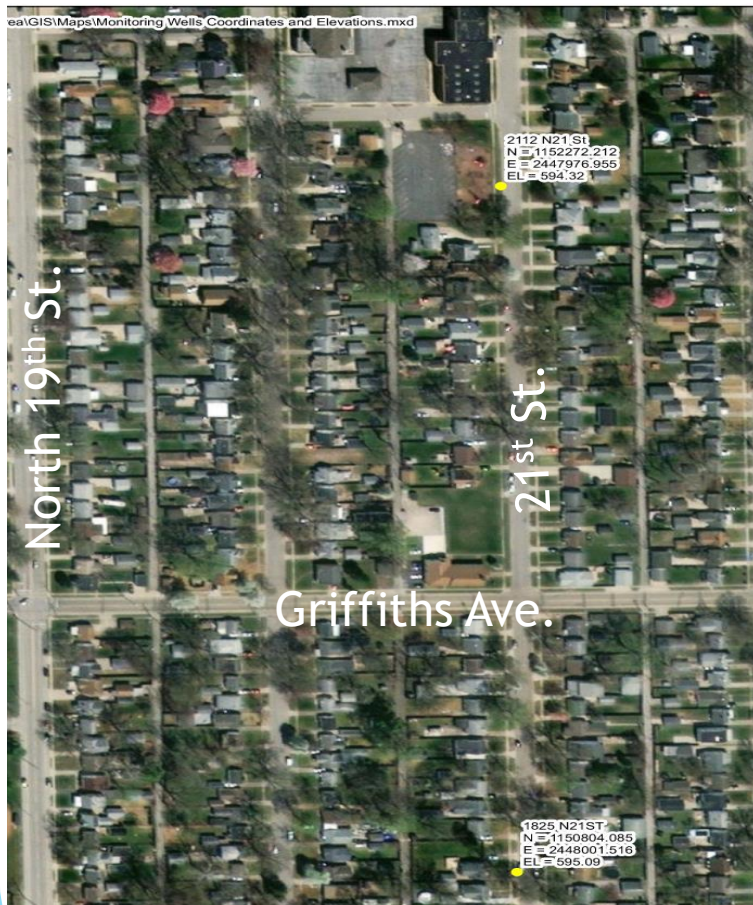
## Flow Meter



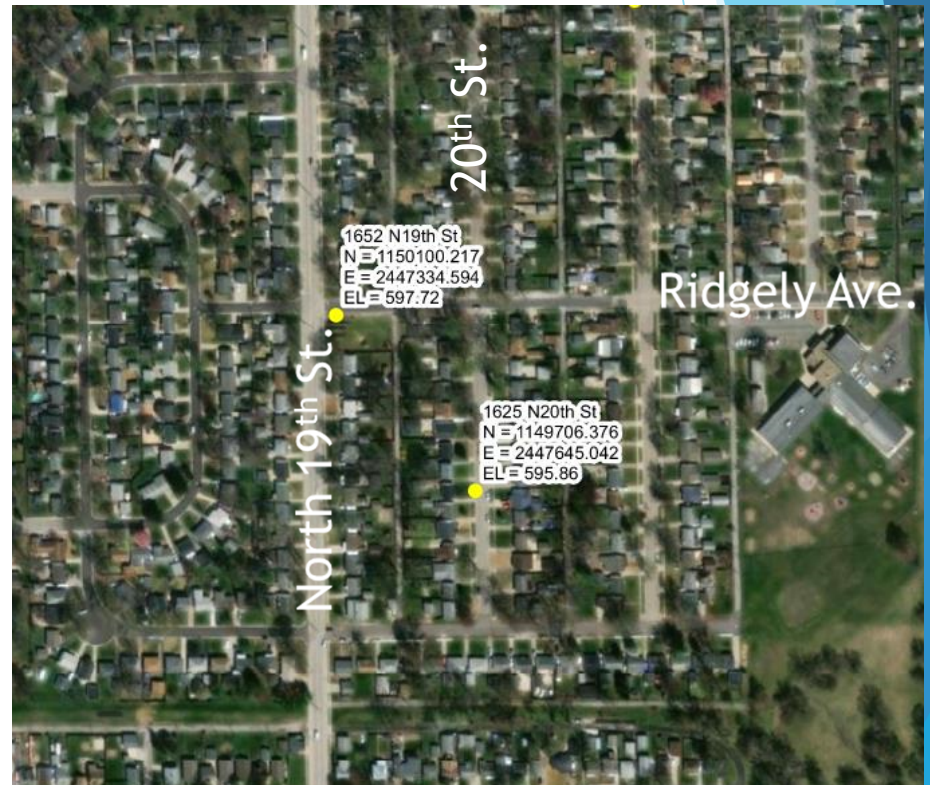


# 4 GROUNDWATER MONITORING WELLS

## Northern

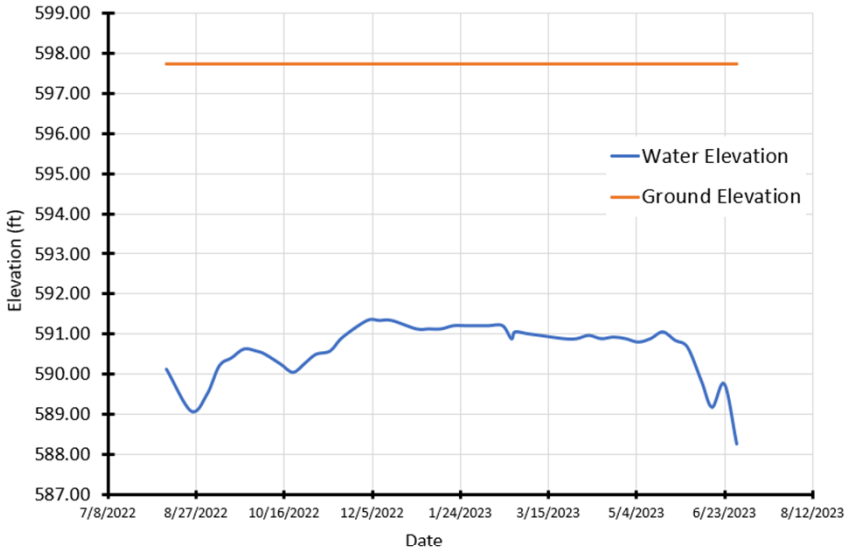


## Southern

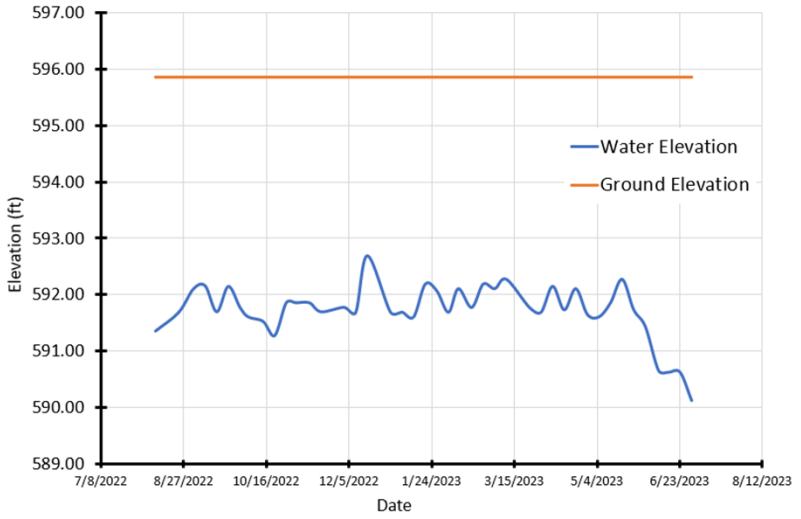


# GROUNDWATER MONITORING SUMMARY

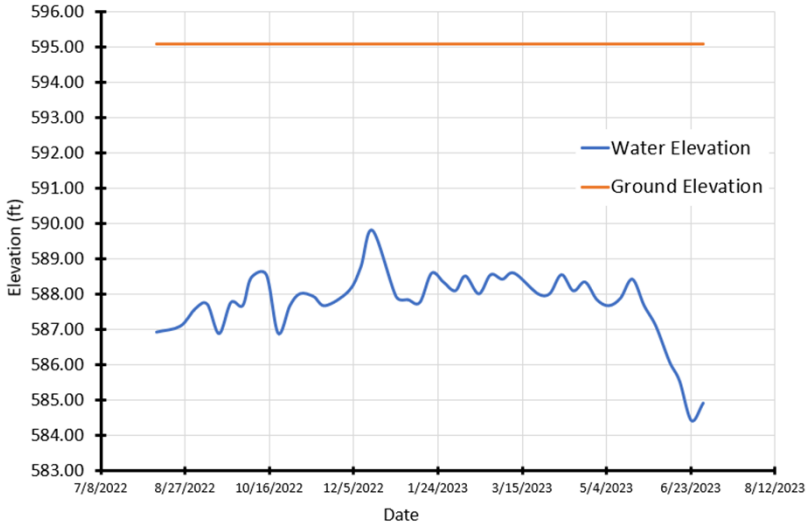
1652 North 19th St



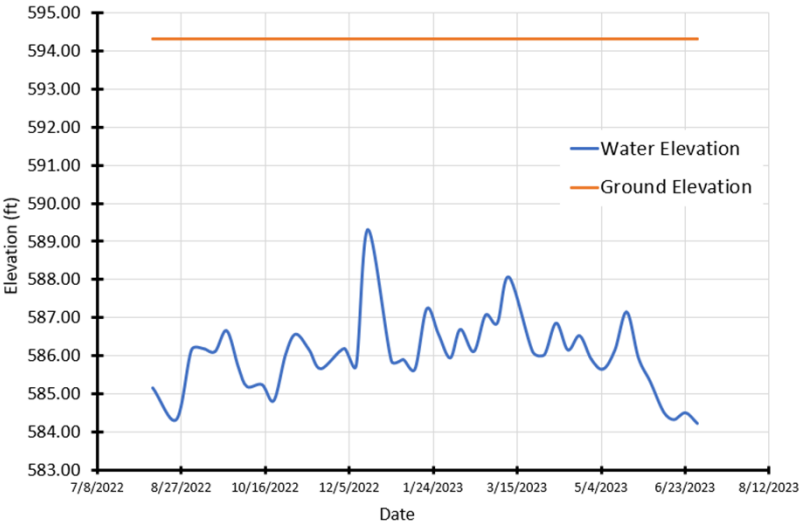
1625 North 20th St



1825 North 21st St



2112 North 21st St





# INSPECTED 202 PRIVATE PROPERTIES FOR CLEAR WATER CONNECTIONS TO SANITARY SEWER

Downspouts Connected  
to Sanitary Sewer:  
None



Broken & Leaking  
Clean-outs:  
3



MH: 1423AB132

MH: 1423AB061

# SMOKE TEST AND DYE WATER TEST SEWERS

## Smoke Test Discovered:

- 3 Broken Clean Out Caps
- 5 Leaking Sewer Laterals
- No Connected Downspouts or Area Drains

No connections discovered through Dye Test



# INSPECT BASEMENT PLUMBING SYSTEMS FOR PROPER CONNECTIONS

| Total Basements | Inspections Performed | Illegal Connections Found |
|-----------------|-----------------------|---------------------------|
| 210             | 41                    | 1                         |
|                 | 20%                   | 2%                        |

Sump Pump  
Connected to  
Sanitary Sewer





# CLEAN AND TELEWISE SANITARY & STORM SEWER

Sanitary Sewer (12,025')



Storm Sewer (8,629')



# CLEAN AND TELEWISE SANITARY & STORM SEWER - RESULTS

## Sanitary Sewer

| Size    | Length  | Materials                           |
|---------|---------|-------------------------------------|
| 8"- 15" | 12,025' | Concrete, Clay, Plastic Mortar, PVC |

## Storm Sewer

| Size     | Length | Materials                    |
|----------|--------|------------------------------|
| 10"- 36" | 8,629' | Concrete, Clay, PVC, Unknown |

# INSPECTED SANITARY & STORM MANHOLES

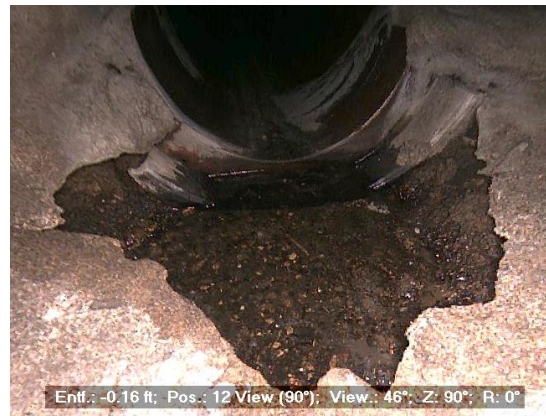
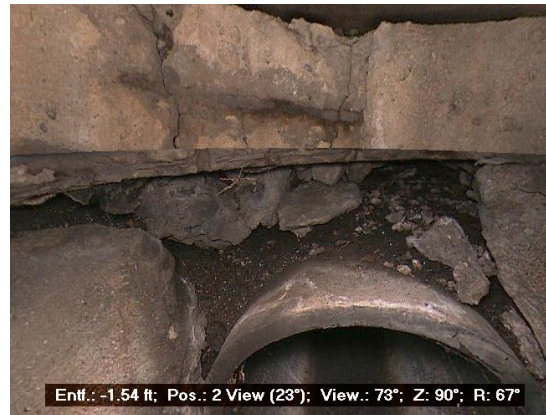
## Sanitary

45 Structures:  
4 Brick, 41 Concrete



## Storm

30 Structures:  
17 Brick, 13 Concrete





# SEWER LATERAL INSPECTIONS

|          | Completed | Partial <sup>1</sup> | Unable to Inspect <sup>2</sup> | Vacant Lots <sup>3</sup> | Totals |
|----------|-----------|----------------------|--------------------------------|--------------------------|--------|
| Laterals | 301       | 73                   | 35                             | 6                        | 415    |
| % Total  | 72.5%     | 17.6%                | 8.4%                           | 1.5%                     | 100%   |

1. Partial inspection due to roots or other debris encountered during the inspection.

2. Unable to inspect due to roots or other debris at the start of inspection or locked gate.

3. No inspection of vacant lots.

|          | Concrete Pipe | Clay Pipe | Plastic Pipe | Unknown | Totals   |
|----------|---------------|-----------|--------------|---------|----------|
| Laterals | 176           | 144       | 81           | 14      | 415      |
| Length   | 11,447'       | 10,827'   | 6,786'       | ≈700'   | ≈29,700' |
| % Total  | 38.5%         | 36.5%     | 22.9%        | 2.1%    | 100%     |

# SEWER LATERAL INSPECTION RESULTS

## Broken Tap Connection



## Dropped Pipe Joint



City repaired nine broken & dropped connections to facilitate the inspections

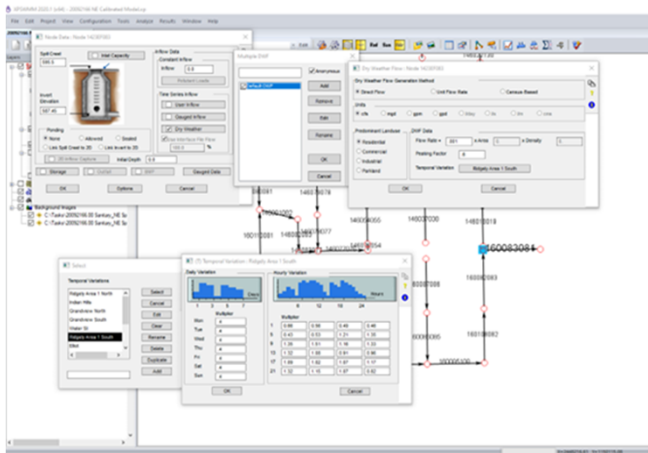
Seven homeowners had their laterals cleaned

# COLLECTION SYSTEM MODEL UPDATES

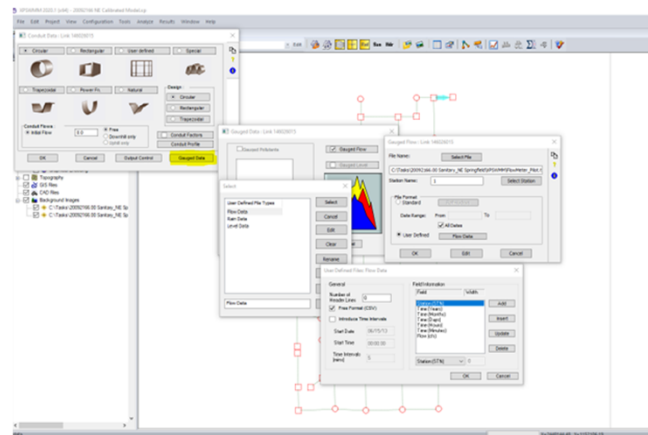
- Additional and more accurate data available about the sewer system, which included:
  - Pipe sizes
  - Sewer lengths
  - Manhole and pipe elevations
  - Improved methodology for modeling the system
- Modeling methodology evaluated:
  - Based on the fraction of rainfall entering the sewer system
  - Classifies I&I as 'short', 'medium' or 'long'
- Lead to model recalibration

# COLLECTION SYSTEM MODEL UPDATES

## Model Parameter Update

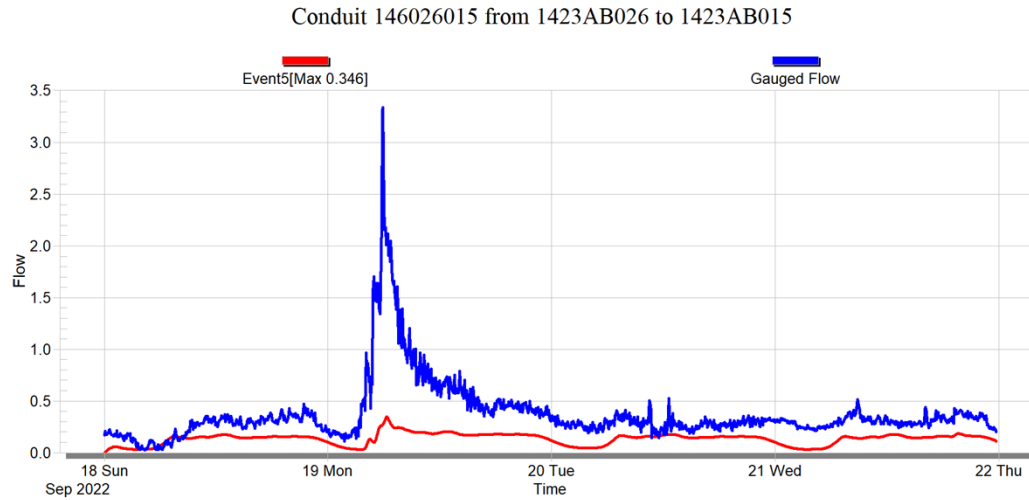


## Calibration Parameter Update

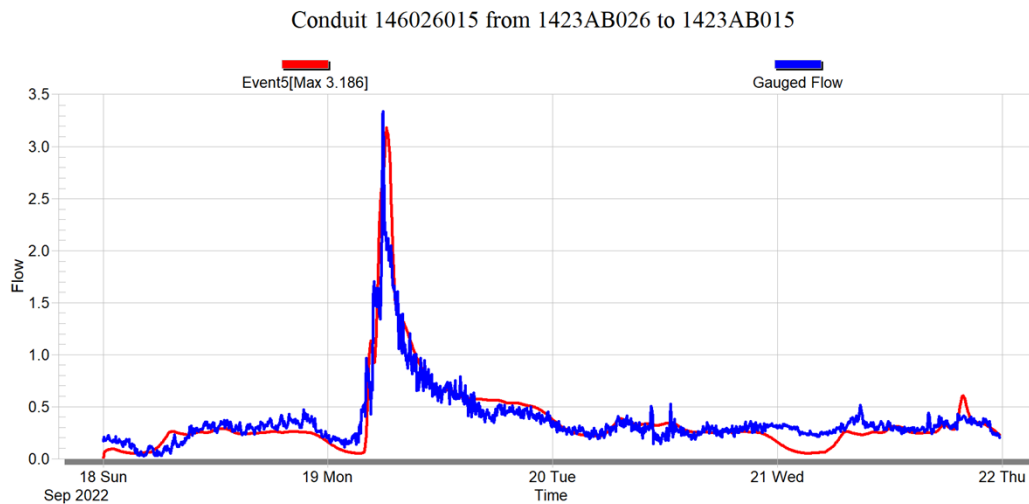


# COLLECTION SYSTEM MODEL UPDATES

## Pre Calibration



## Post Calibration



# PILOT AREA INTENSIVE EVALUATION RESULTS

| Investigated     | Results   | Actions   |
|------------------|---|---|
| Private Property | Clean out caps missing,<br>Lateral sharing                                    | Replace caps, sewer<br>extensions   |
| Sewer Mains      | Broken pipe,<br>deteriorated materials,<br>leaking joints                     | Install 7,900' of cured-<br>in-place-pipe, pressure<br>grout 2,300' of pipe<br>joints                                   |
| Sewer Manholes   | Leaking frames & lids,<br>deteriorated materials,<br>leaking joints           | Repair frames & lids,<br>grout injection to stop<br>leaks, spray coatings<br>to restore integrity: 41<br>manholes       |
| Sewer Laterals   | Broken pipe,<br>deteriorated materials,<br>leaking joints, root<br>intrusions | Techniques similar to<br>sewer mains, <b>still to<br/>be determined</b> if work<br>will be done on private<br>property* |

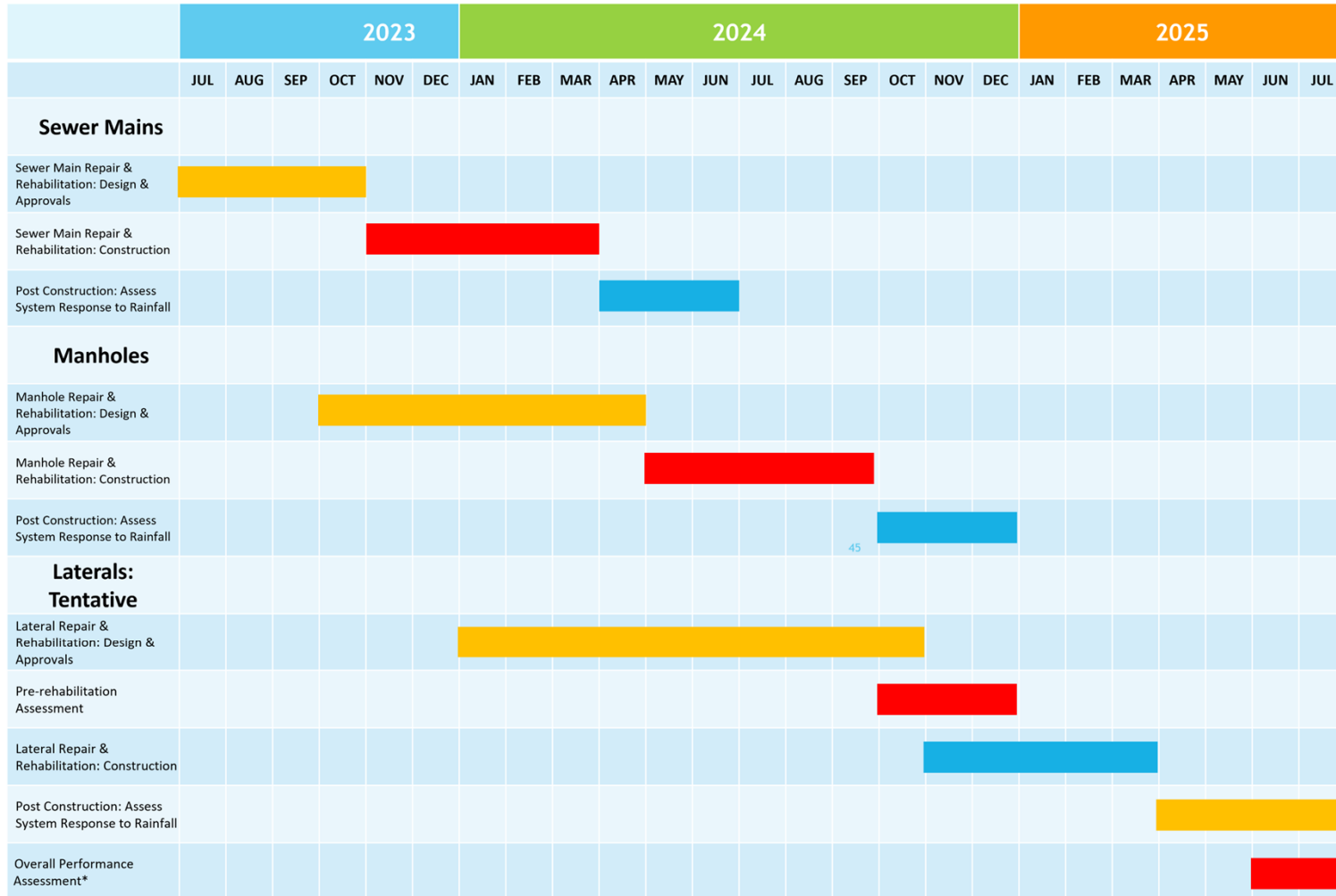
*\*Process & procedures to be developed & approved by City*



The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the slide, creating a modern, dynamic feel.

# **PILOT AREA IMPLEMENTATION SCHEDULE**

# PROJECT SCHEDULE



\* Per USEPA Agreement, Pilot Area Work to be Complete by July 2025

# PROJECT SCHEDULE - SEWER MAINS

|  | 2023 |     |     |     |     |     | 2024 |     |     |     |     |     |     |     |
|--|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|
|  | JUL  | AUG | SEP | OCT | NOV | DEC | JAN  | FEB | MAR | APR | MAY | JUN | JUL | AUG |
| <b>Sewer Mains</b>                                     |      |     |     |     |     |     |      |     |     |     |     |     |     |     |
| Sewer Main Repair & Rehabilitation: Design & Approvals |      |     |     |     |     |     |      |     |     |     |     |     |     |     |
| Sewer Main Repair & Rehabilitation: Construction       |      |     |     |     |     |     |      |     |     |     |     |     |     |     |
| Post Construction: Assess System Response to Rainfall  |      |     |     |     |     |     |      |     |     |     |     |     |     |     |

# PROJECT SCHEDULE - MANHOLES

|   | 2023 |     |     | 2024 |     |     |     |     |     |     |     |     |     |     |     |
|---|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|   | OCT  | NOV | DEC | JAN  | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| <b>Manholes</b>                                       |      |     |     |      |     |     |     |     |     |     |     |     |     |     |     |
| Manhole Repair & Rehabilitation: Design & Approvals   |      |     |     |      |     |     |     |     |     |     |     |     |     |     |     |
| Manhole Repair & Rehabilitation: Construction         |      |     |     |      |     |     |     |     |     |     |     |     |     |     |     |
| Post Construction: Assess System Response to Rainfall |      |     |     |      |     |     |     |     |     |     |     |     |     |     |     |

# PROJECT SCHEDULE - LATERALS

|  | 2024 |     |     |     |     |     |     |     |     |     |     |     | 2025 |     |     |     |     |     |     |
|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
|  | JAN  | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN  | FEB | MAR | APR | MAY | JUN | JUL |
| <b>Laterals:<br/>Tentative</b>                           |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |
| Lateral Repair & Rehabilitation:<br>Design & Approvals   |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |
| Pre-Rehabilitation Assessment                            |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |
| Lateral Repair & Rehabilitation:<br>Construction         |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |
| Post Construction:<br>Assess System Response to Rainfall |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |
| Overall Performance Assessment*                          |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |

\* Per USEPA Agreement, Pilot Area Work to be Complete by July 2025



**QUESTIONS?**

**THANK YOU!**

