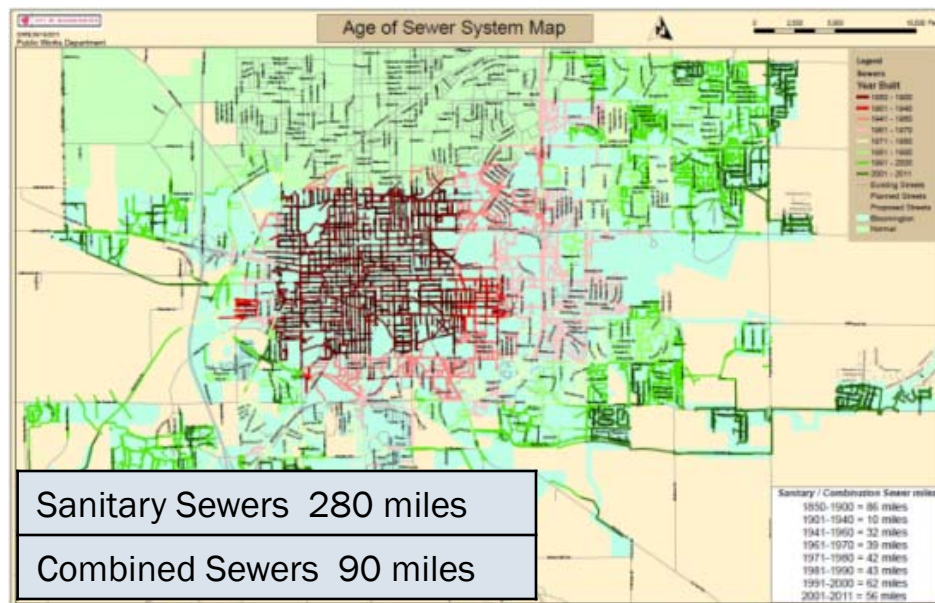


Scope of Sanitary System:

370 miles of Sanitary and Combined Sewers

Sewer Size Range: 4 inches to 96 inches in Diameter



Maroon color shows sewers likely built before 1900

Sanitary sewers: Carry wastewater

Storm sewers: Carry water from precipitation

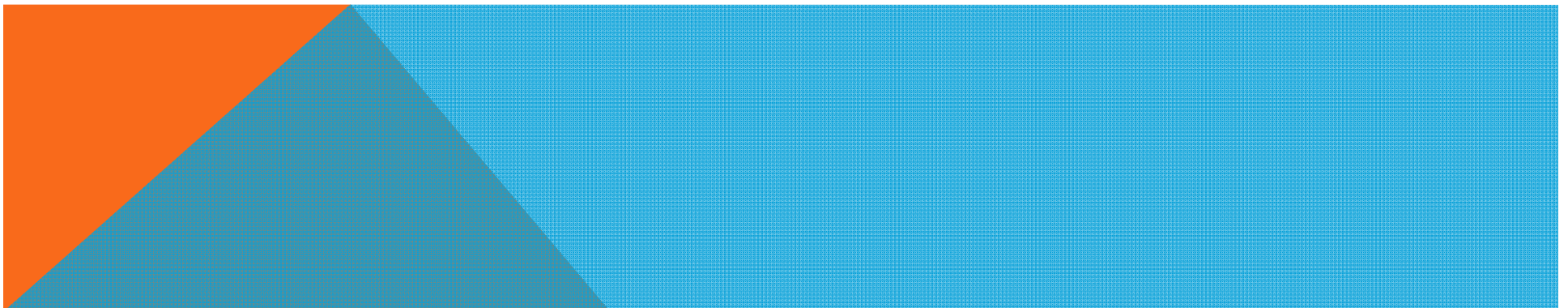
Combined sewers: Carry both.

CONTRACT ADDRESSES 2 ISSUES

- ❑ Structural Defects: Aging sewers are failing. Chunks of brick fall off. Pipes Crack. Holes form. Cave-ins occur. Connections dislodge. Mortar joints deteriorate...



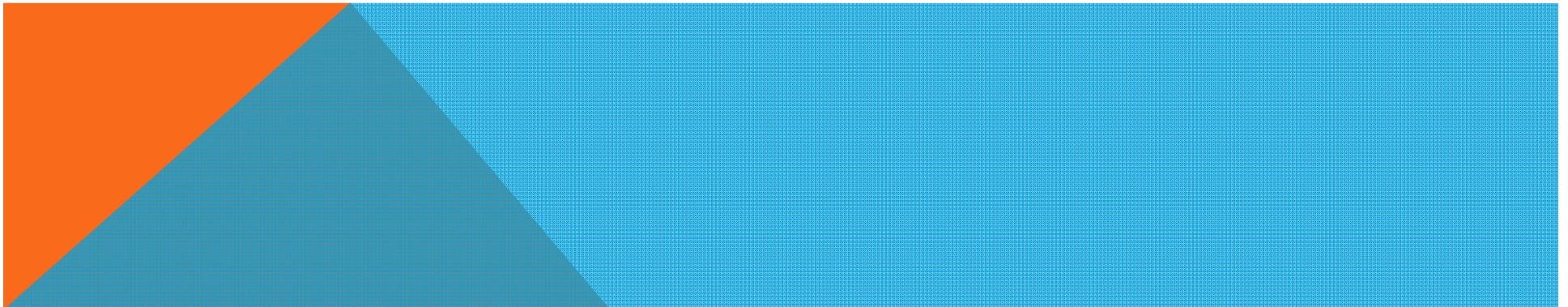
- ❑ Inflow and Infiltration: Even in some newer sanitary sewers, stormwater and groundwater get into the sewer. I/I, usually said as “I and I,” is inflow and infiltration.



ISSUE 1: AGING SEWERS

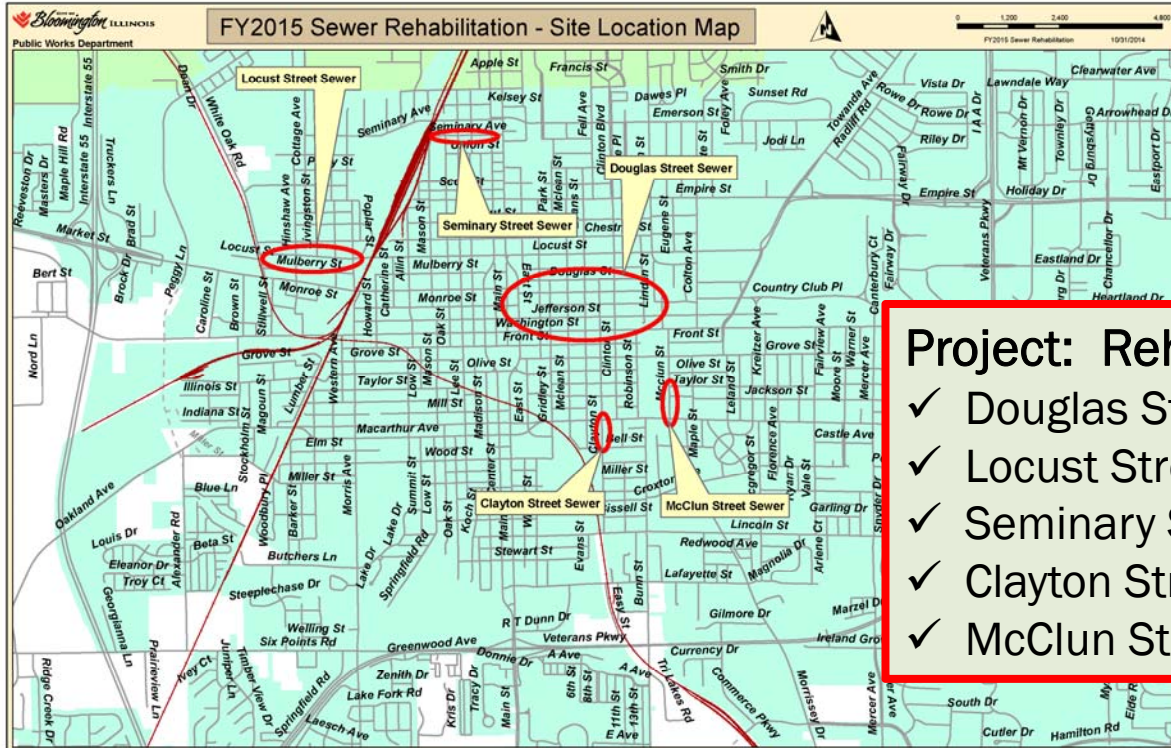
Sewer replacement cost is enormous and disruptive.

Cities look to rehabilitation instead.



AGING SEWERS

FIX EXISTING SEWERS



- Project: Rehab Old Sewers**
- ✓ Douglas Street Sewer
 - ✓ Locust Street Sewer
 - ✓ Seminary Street Sewer
 - ✓ Clayton Street Sewer
 - ✓ McClun Street Sewer



INSIDE OUR BRICK SEWERS

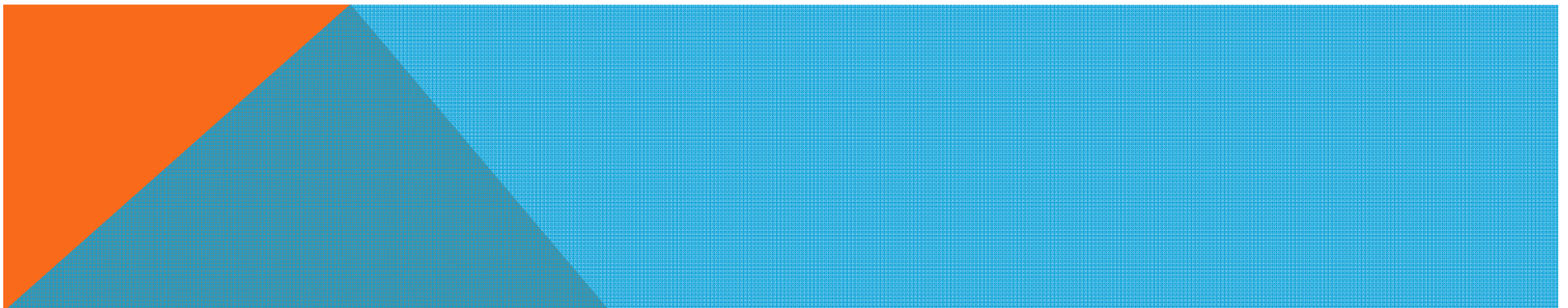
OUTSTANDING CRAFTSMANSHIP - IN THE 19TH CENTURY



THEY ARE FALLING APART IN PLACES

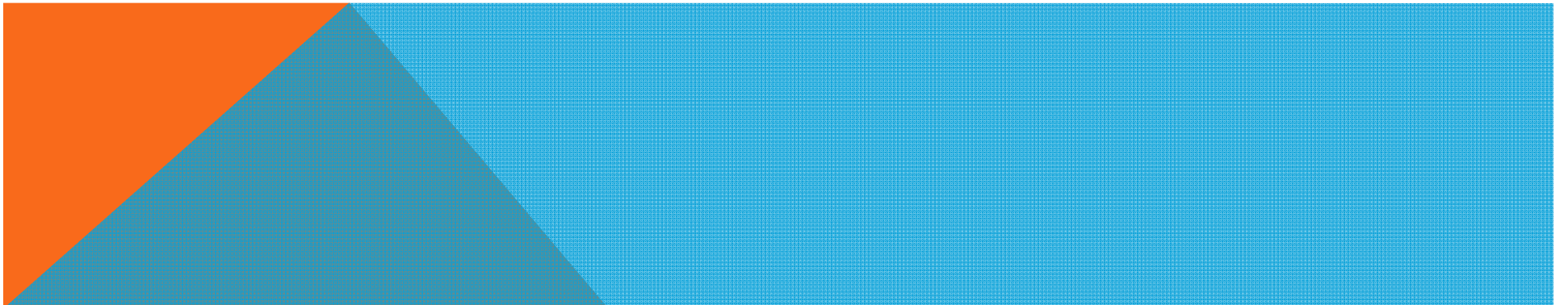


Holes in the Douglas Street Sewers filmed by CCTV





Clayton Street Sewer: Hinge cracking in clay sewer

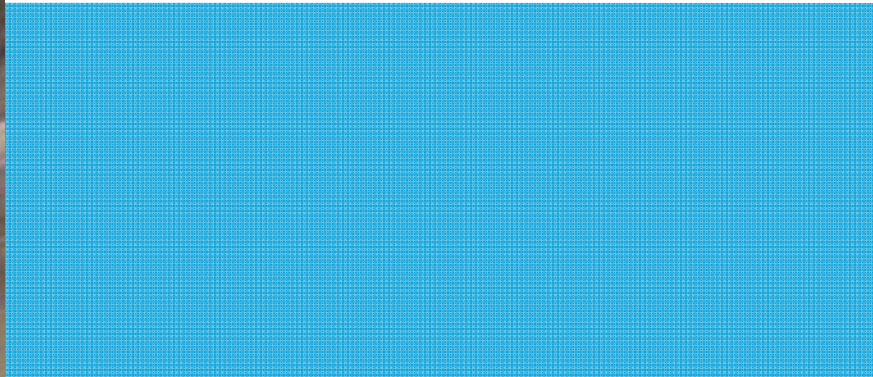




Hinge cracking is causing the structure to begin to fail along the McClun Street Sewer.

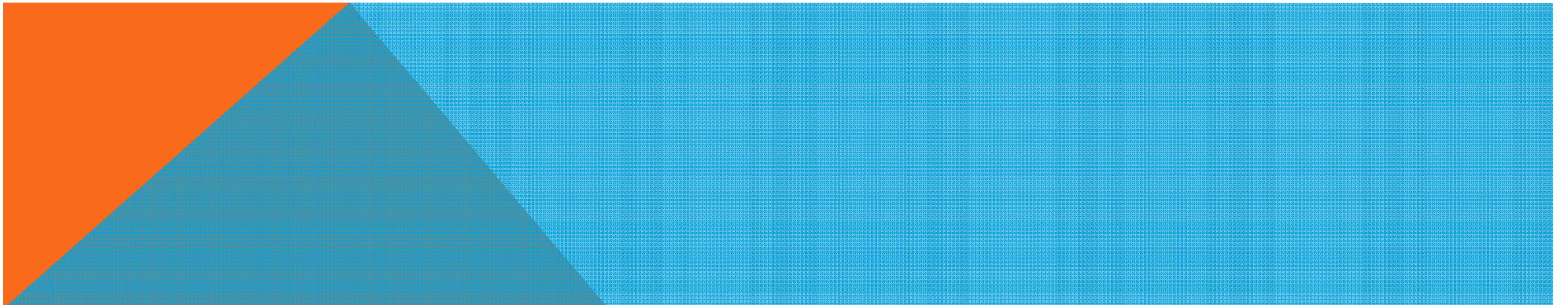


The structure devolves into an oblong shape in a process called "egging."



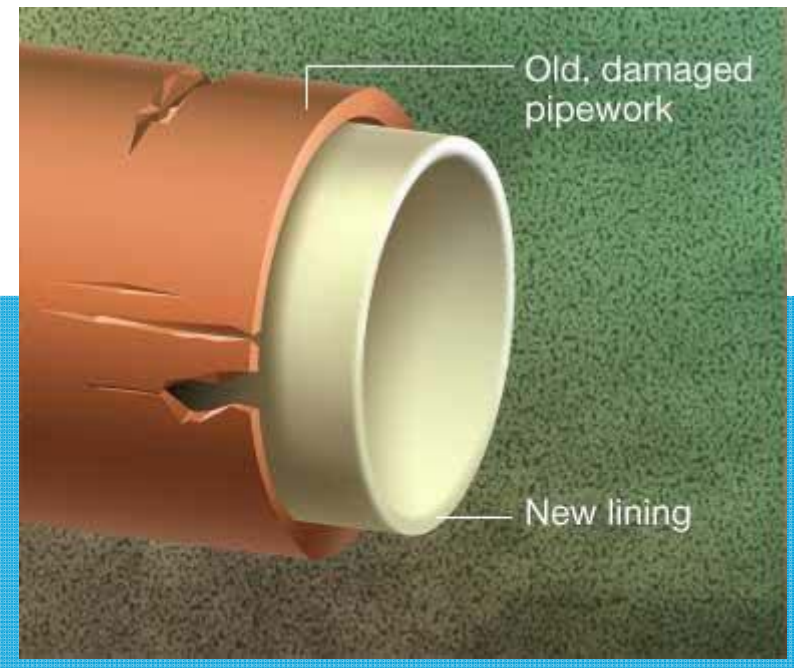


This side angle on a CCTV video of the Locust Street Sewer helps us visualize extreme egging.



HOW WILL WE FIX THESE PROBLEMS?

1. Repair serious problems prior to lining. Some repairs can be done from inside the pipe. Some may require digging to the pipe.
2. Lining:
 - Inserting a fabric sock saturated with resin to line the sewer walls.
 - Restores structural integrity.





What will happen to the old sewer?

Top left: The interior of the Clayton Street Sewer.

Top center: A liner being stretched through a sewer.

Top right: Interior of sewer, Roosevelt Avenue, Bloomington, after grouting and lining in 2007.

Right: Workers in Boston pulling liner into a sewer.



Notes

- The lining will conform to the shape of the existing sewer mains.
- Manhole lining also will be performed.

ISSUE 2: I/I (“I AND I”)

INFLOW AND INFILTRATION

Problem: Stormwater can enter a sanitary sewer in various ways. Examples: A cracked manhole lid. A downspout empties near a sewer clean-out. This is inflow.

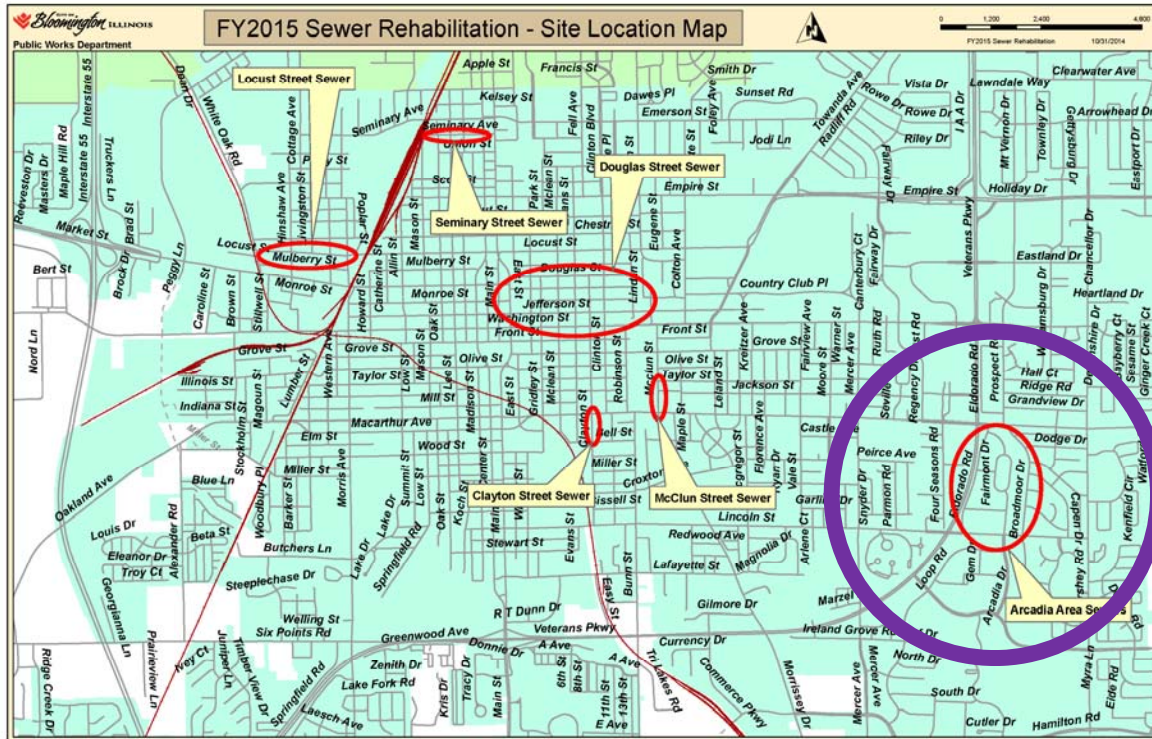
Problem: Groundwater seeps into the sewer. This is infiltration.

Problem: *The east-side sewer treatment plant isn’t designed to handle stormwater. I/I taxes its capacity and hampers effectiveness of treatment. I/I is a big problem for the east side.*



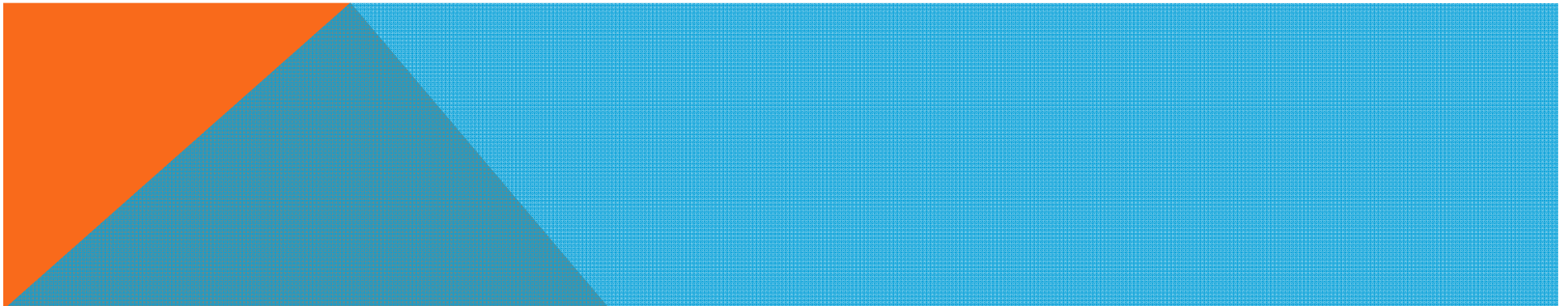
I/I REMEDIES UNDER INVESTIGATION

PHASE I: A PILOT PROGRAM

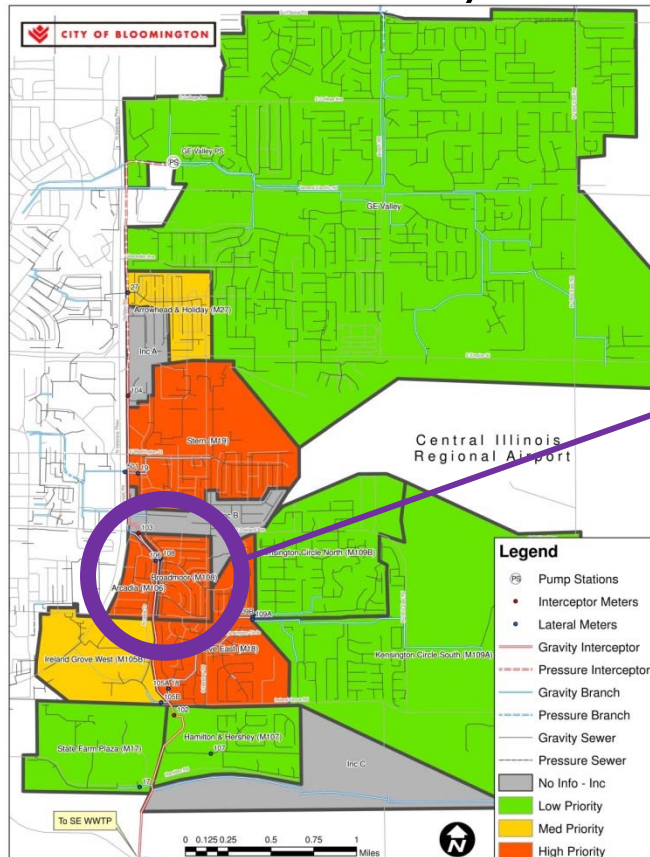


Determine Cost
Effective Solutions
for the Future

Arcadia Area
Sewers

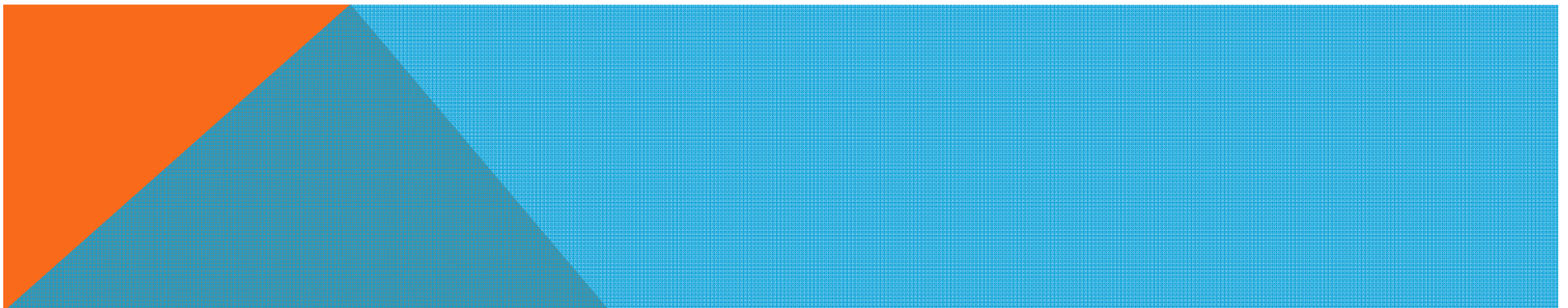


Q. WILL LINING EAST-SIDE SEWERS SUBSTANTIALLY REDUCE THE I/I PROBLEM?

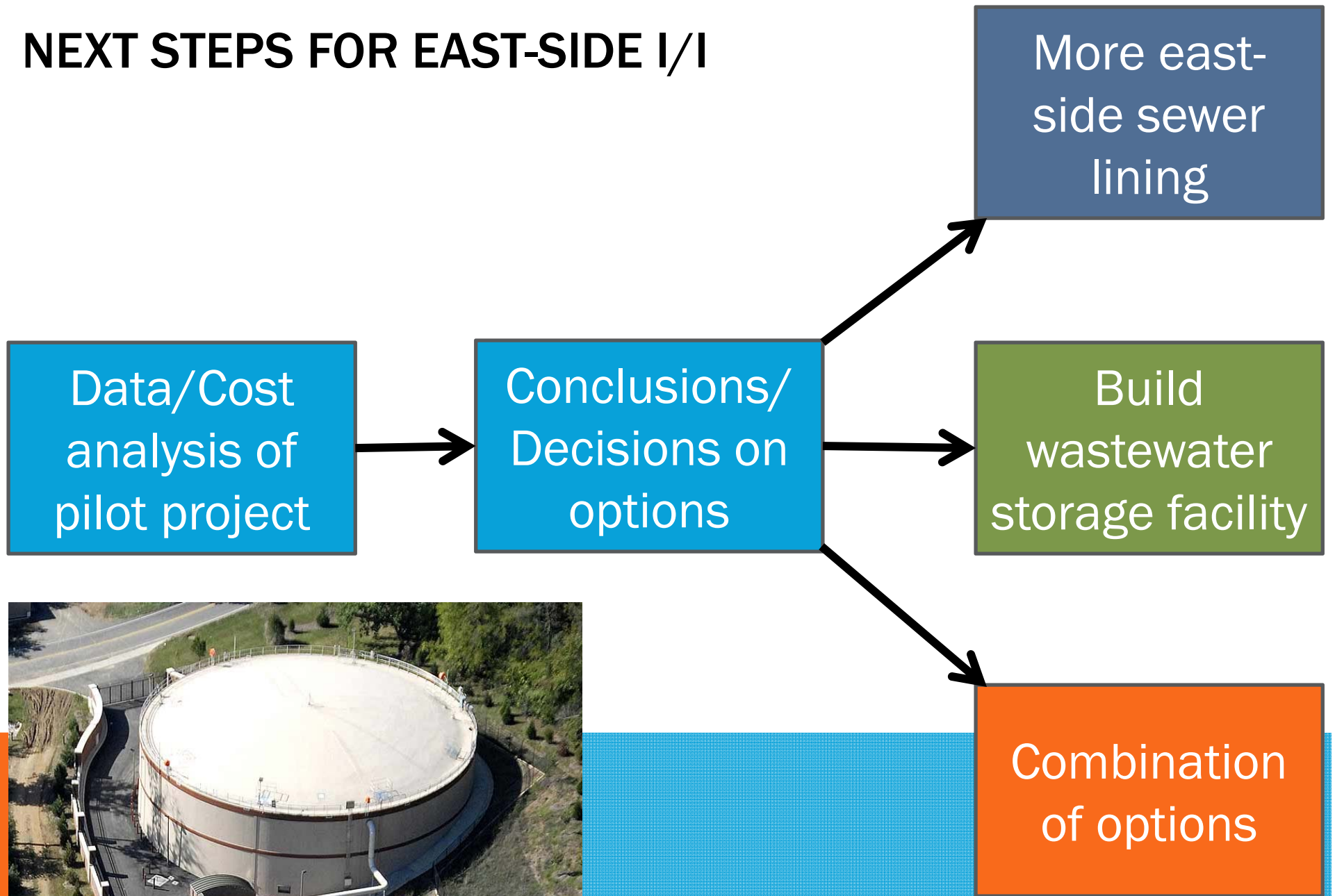


Why Test Arcadia?

- Has high I/I flow.
- Can be easily monitored.
- Strong prior data for analysis.
- Small size of area keeps cost of pilot project down.



NEXT STEPS FOR EAST-SIDE I/I



Wastewater storage facility, Knoxville, Tenn.

NEXT STEPS FOR SEWERS IN CITY CORE

- The Master Plan recommends rehabilitation of about 1% of the sewer system per year.
- In Bloomington 1% = 4 miles of sewer.
- This year's program rehabilitates approximately 2 miles of sewer.
- Continued condition evaluation and inventory of sewer system.
- Work on Combined Sewer Overflow elimination continues. A topic for another night.

