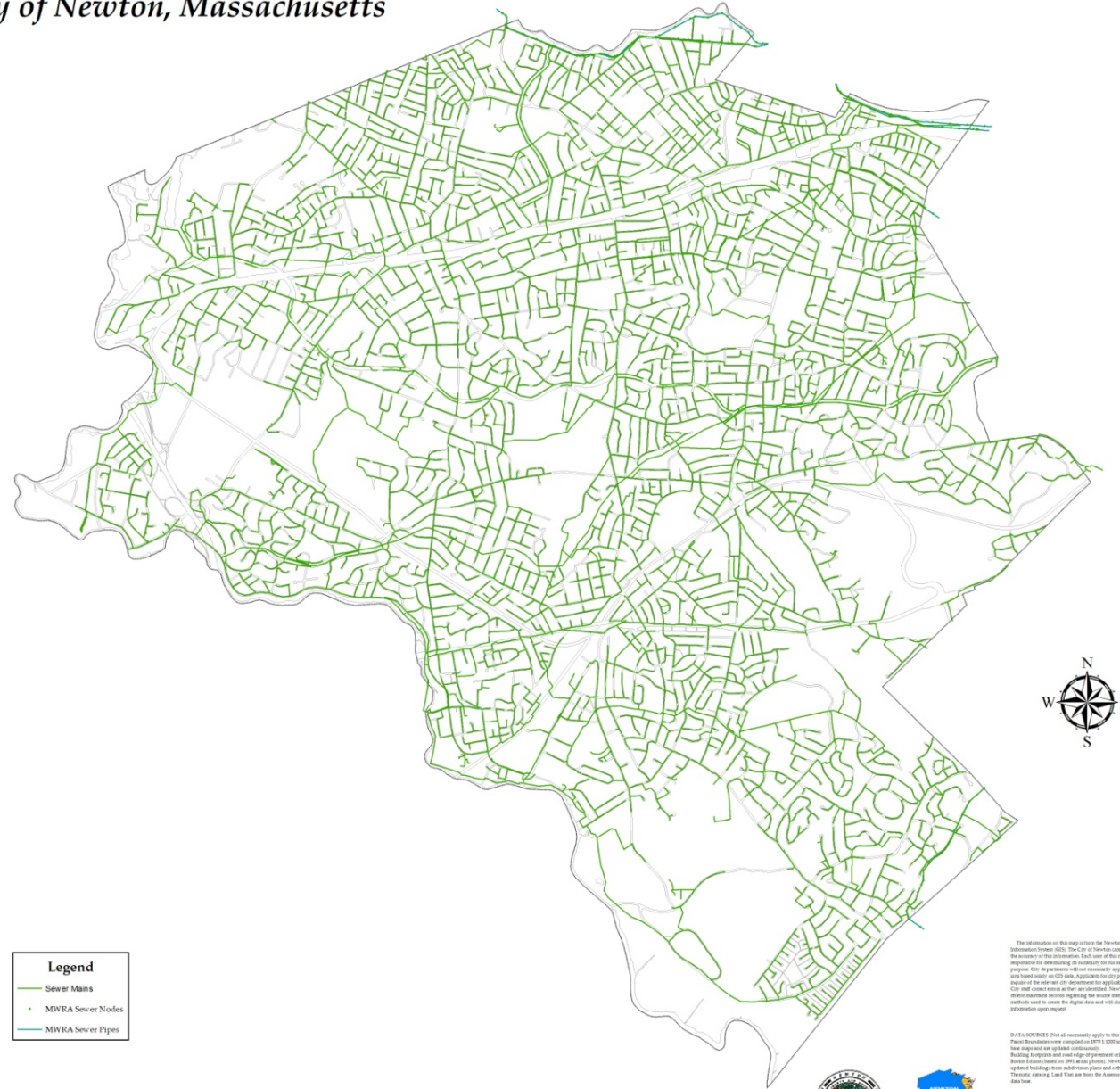


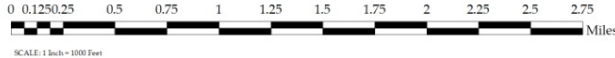
City of Newton Sewer Capital Improvement Program - Update September 2019

Sewer Collection System City of Newton, Massachusetts



Legend

- Sewer Mains
- MWRA Sewer Nodes
- MWRA Sewer Pipes



The information on this map is from the Newton Geographic Information System (GIS). The City of Newton cannot guarantee the accuracy of this information. Each user of this map is responsible for determining its suitability for his or her intended purpose. City departments will not warrant or approve specific use based solely on GIS data. Applicants for city permits must include the address and city department for applicable requirements. City staff cannot verify as they are identified. Newton GIS Administrators reserve the right to update the map and will disclose this information upon request.

DATA SOURCES that do not necessarily apply to this map:
Aerial photography was compiled in 2011 and 2012 and may not be the most current and are updated periodically.
Building footprints and road right-of-ways were originally from Boston Earth (based on 2001 aerial photos). Newton staff have updated building footprints and road right-of-ways.
The street data is from the Assessor's CANA database.



Sewer System

- 1.5 million linear feet (284 miles) of pipe
- 9,100 manholes
- 400,000 linear feet (75 miles) of underdrains
- 25,000+ service connections
- 10 Pump Stations
- 15 million gallons of average daily sewer flow

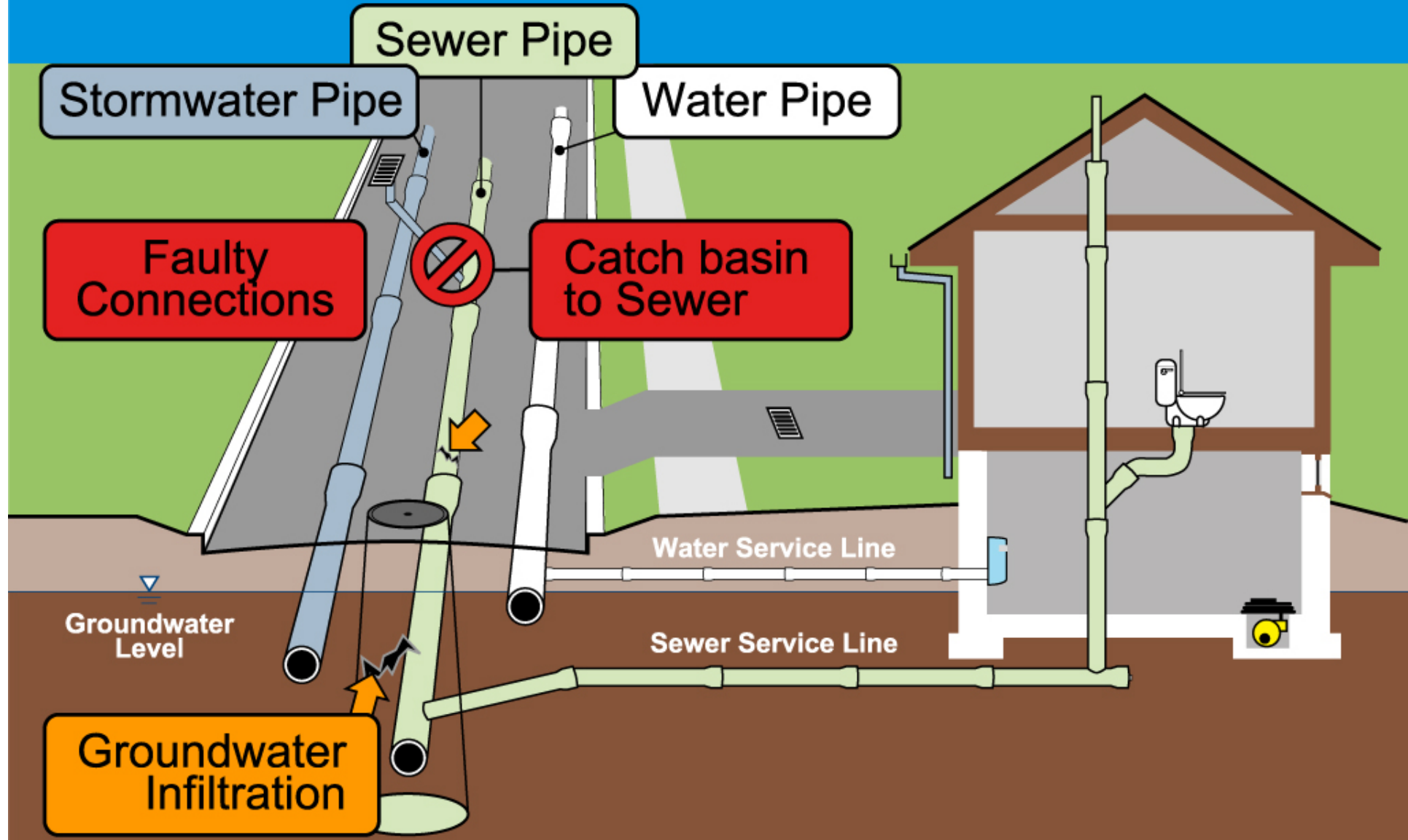
Program Development

- Infiltration and Inflow (I/I)
 - Contamination through pipes and underdrains
- Sewer Overflow and Back-ups
- Aging Infrastructure
 - Structural problems (breaks, sagging)
 - Intrusion/blockages (roots, grease)
- Steadily increasing MWRA Sewer Assessments

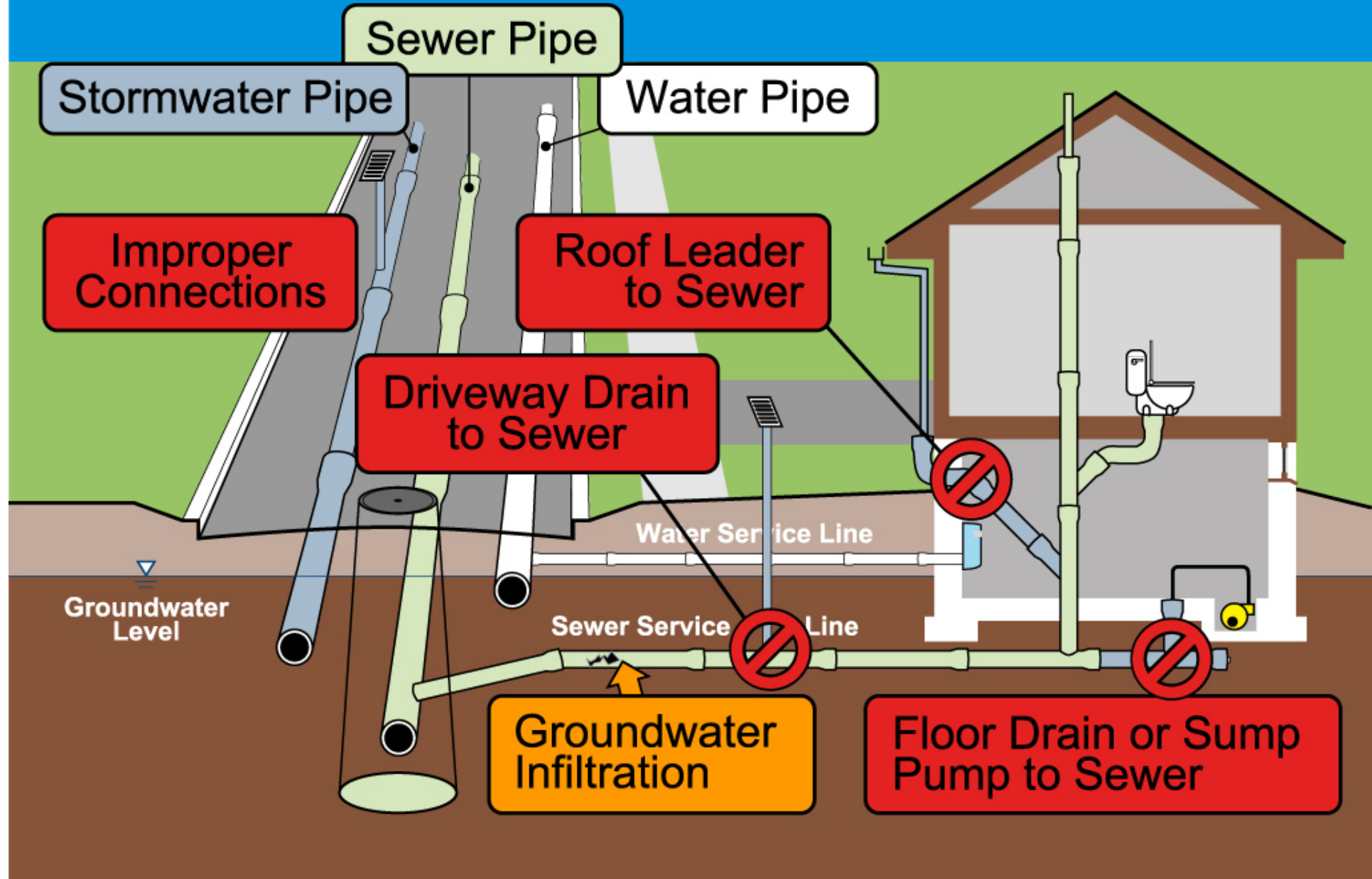
What is Infiltration & Inflow (I/I)?

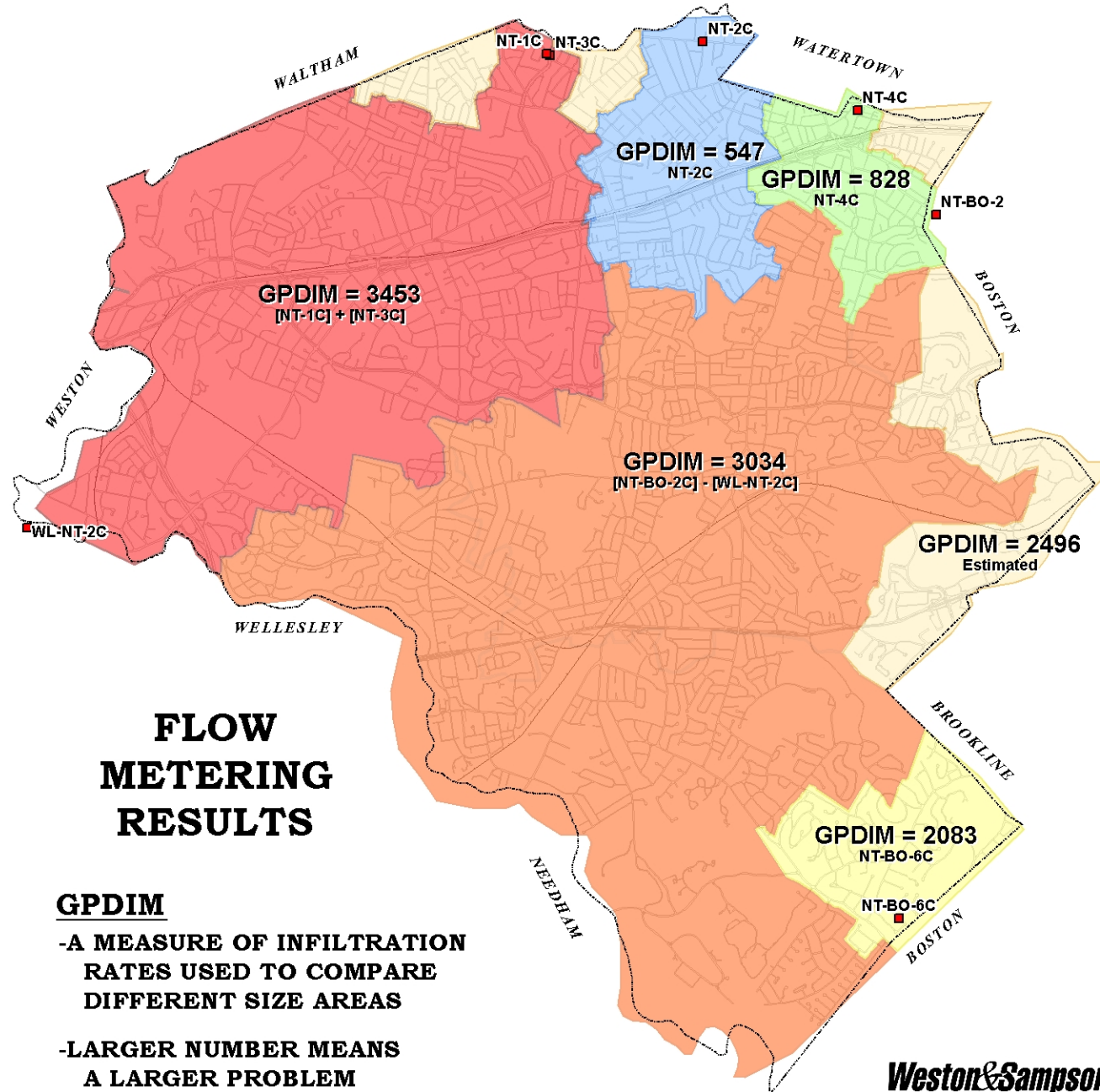
- **Infiltration**: Groundwater that enters the sewer system through damaged or deteriorated infrastructure.
- **Inflow**: Rainwater that enters the sewer system through improperly connected pipes.
- I/I impacts both public and private sewer lines

Public Infiltration/Inflow Sources



Private Infiltration/Inflow Sources

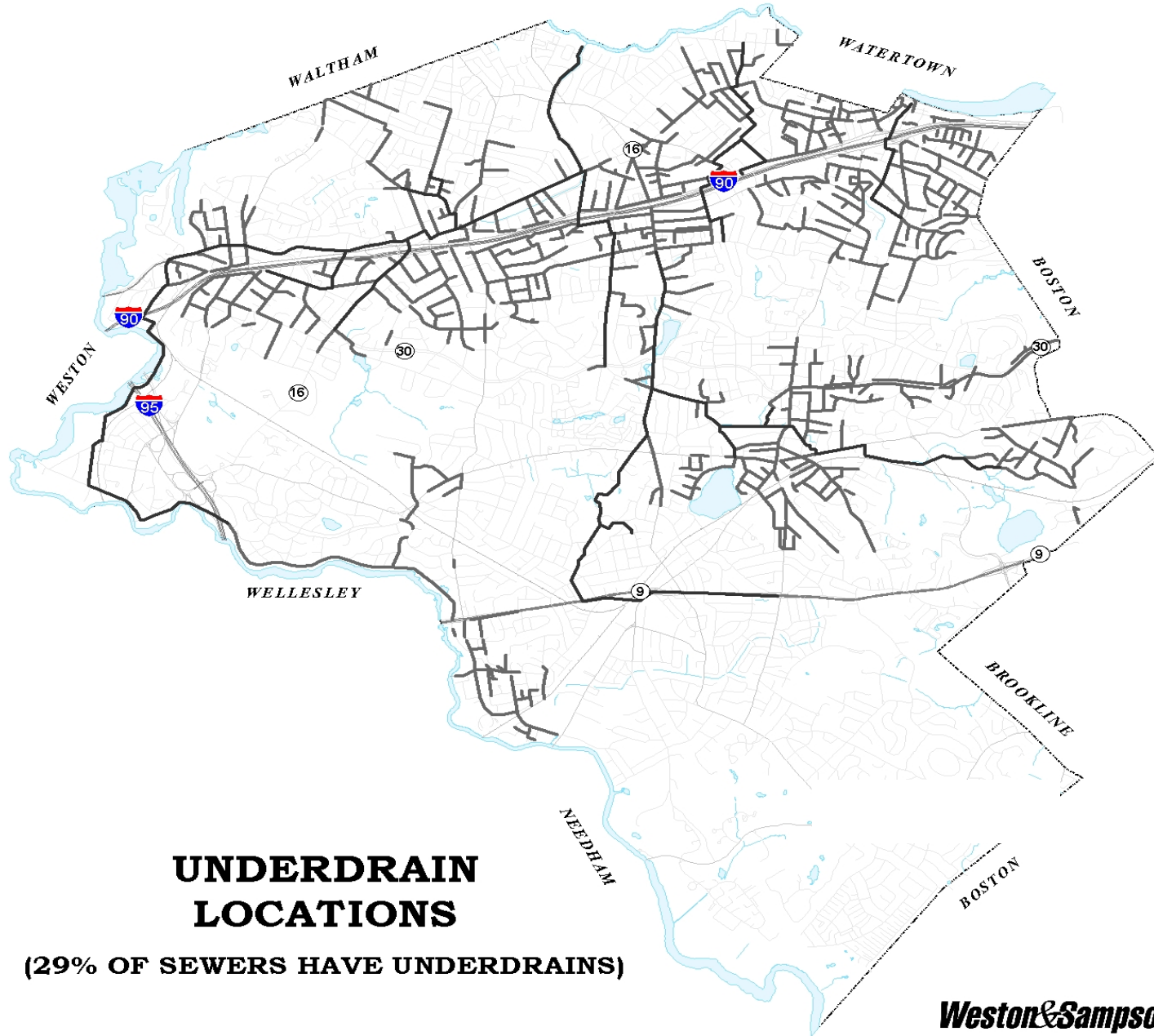




FLOW METERING RESULTS

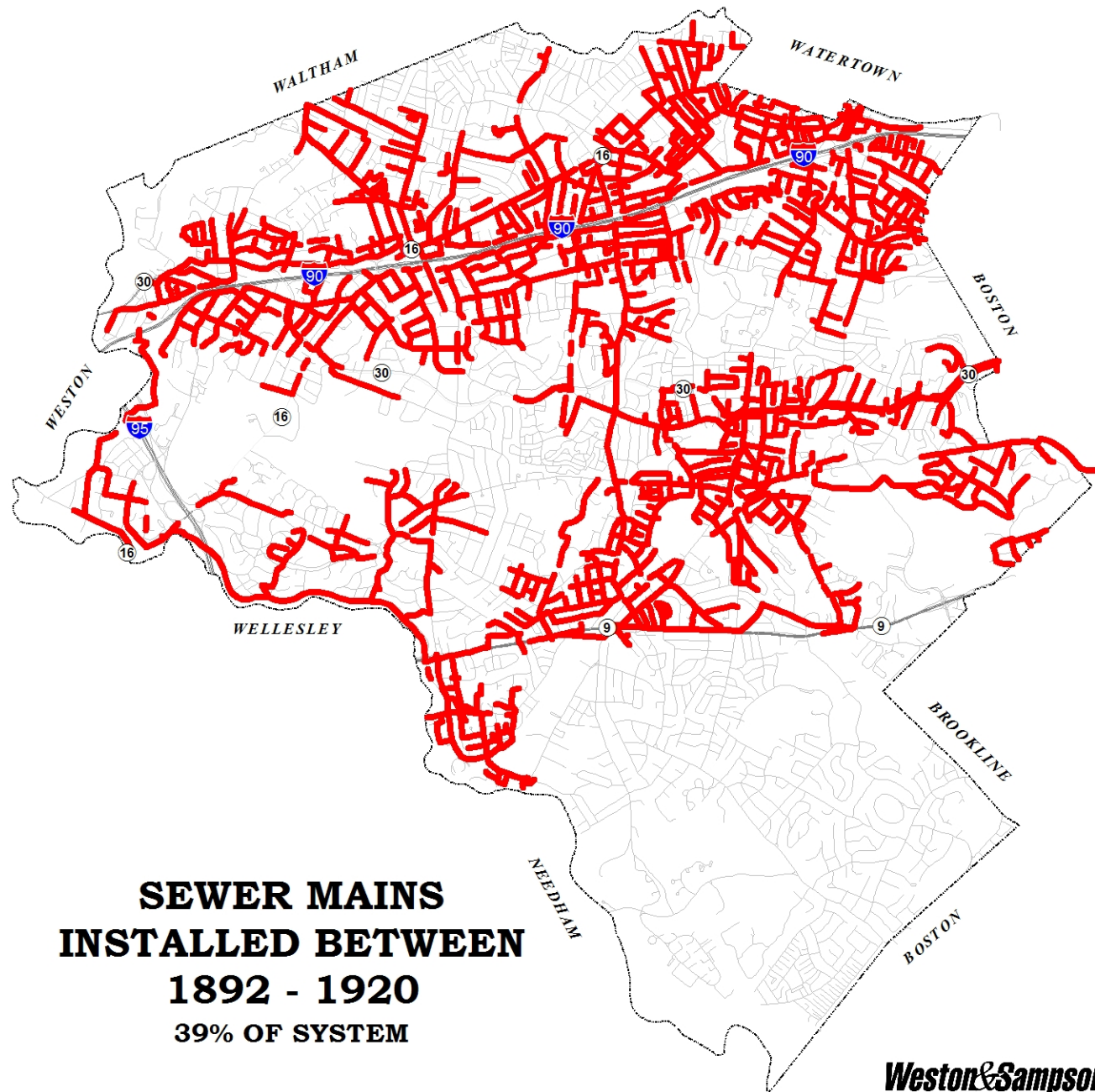
GPDIM

- A MEASURE OF INFILTRATION RATES USED TO COMPARE DIFFERENT SIZE AREAS
- LARGER NUMBER MEANS A LARGER PROBLEM

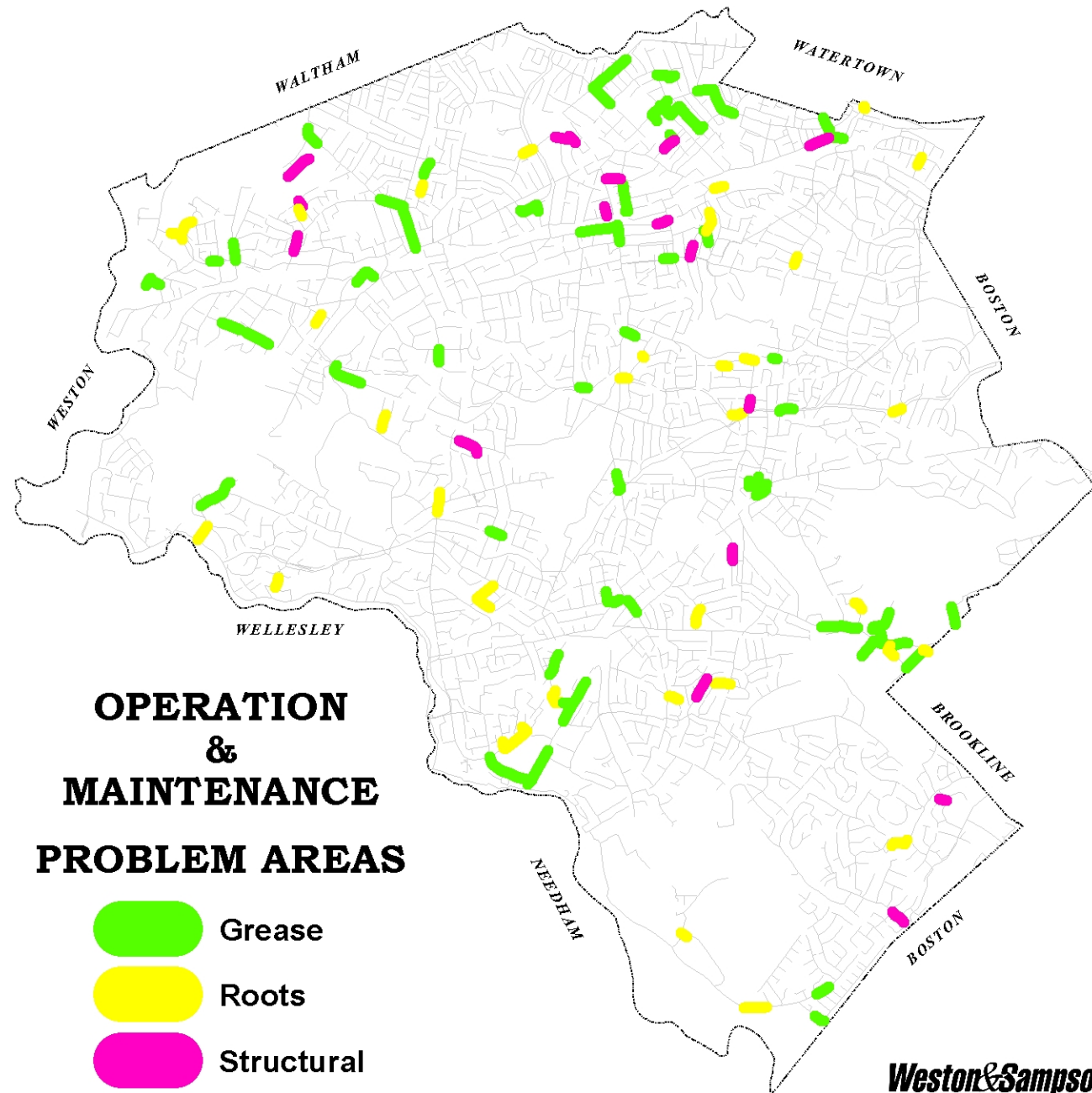


UNDERDRAIN LOCATIONS




(29% OF SEWERS HAVE UNDERDRAINS)



**SEWER MAINS
INSTALLED BETWEEN
1892 - 1920
39% OF SYSTEM**

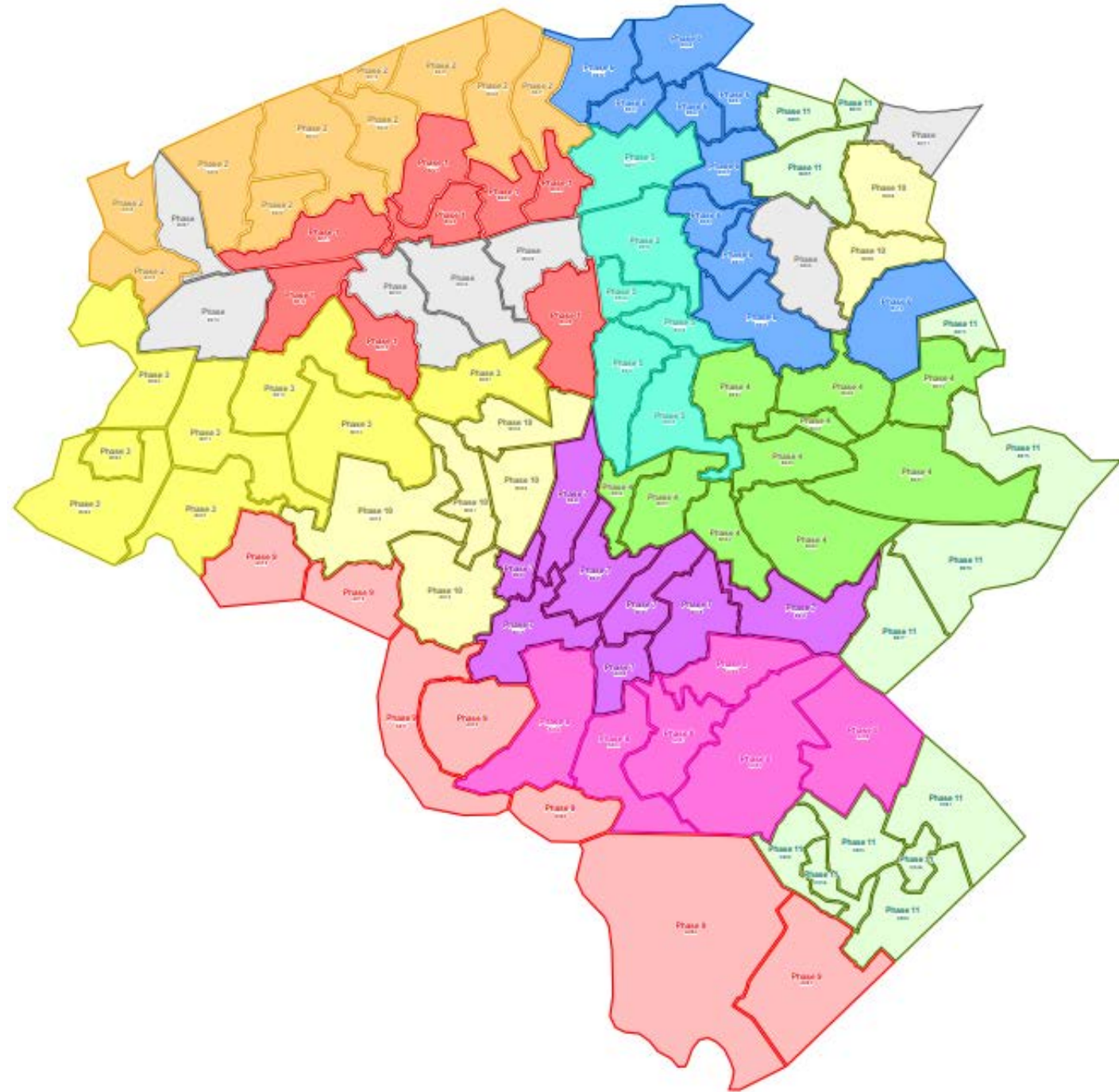


**OPERATION
&
MAINTENANCE
PROBLEM AREAS**

-  Grease
-  Roots
-  Structural

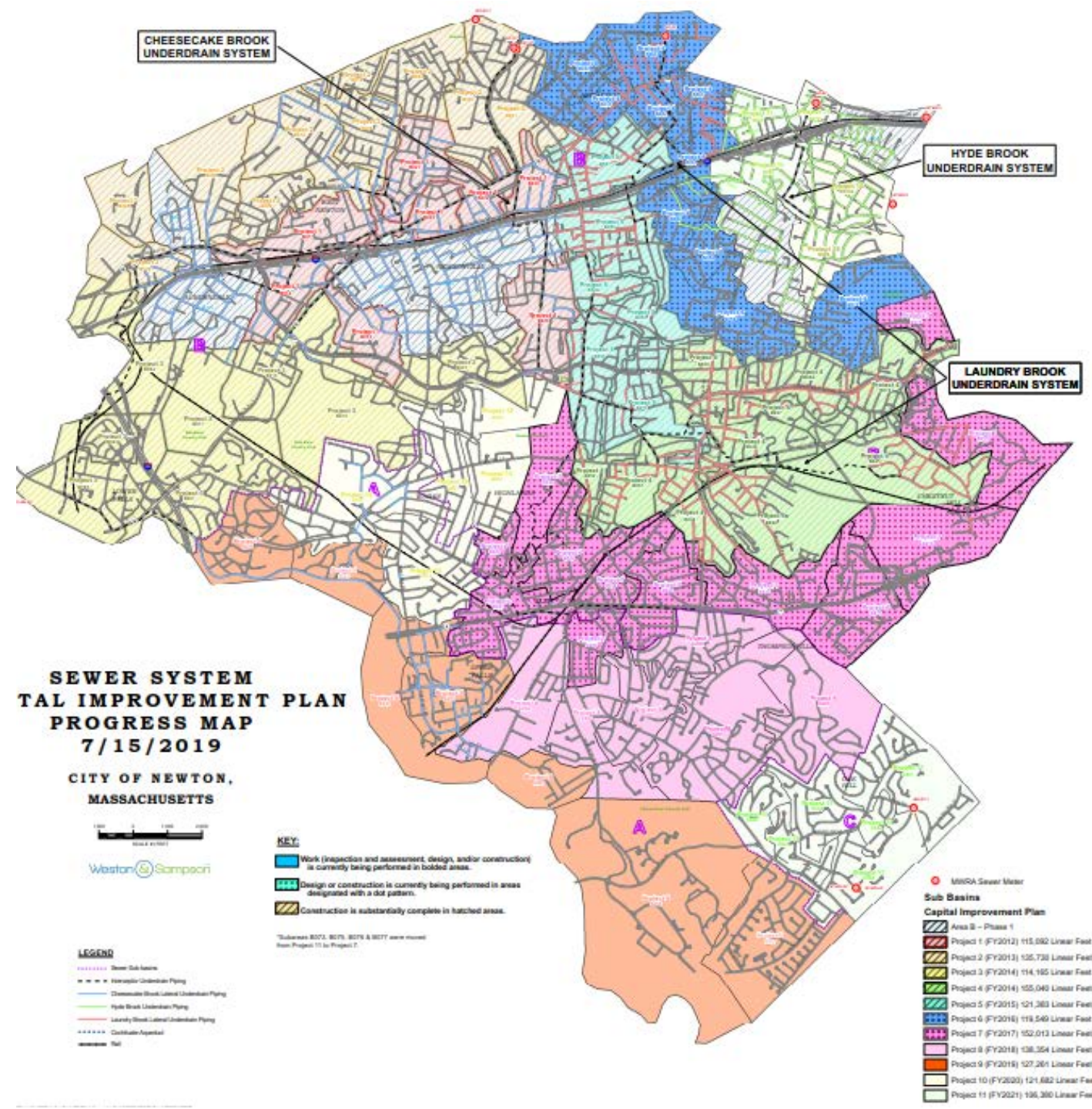
Prioritization of Project Areas

- MWRA Flow Metering Results
- Underdrain Locations
- Sewer Main Install Year
- Operation and Maintenance Problem Areas



Sewer Capital Improvement Program – Status 2019

11 Project Areas



Sewer Capital Improvement Program - Status

Inspection and Assessment Status

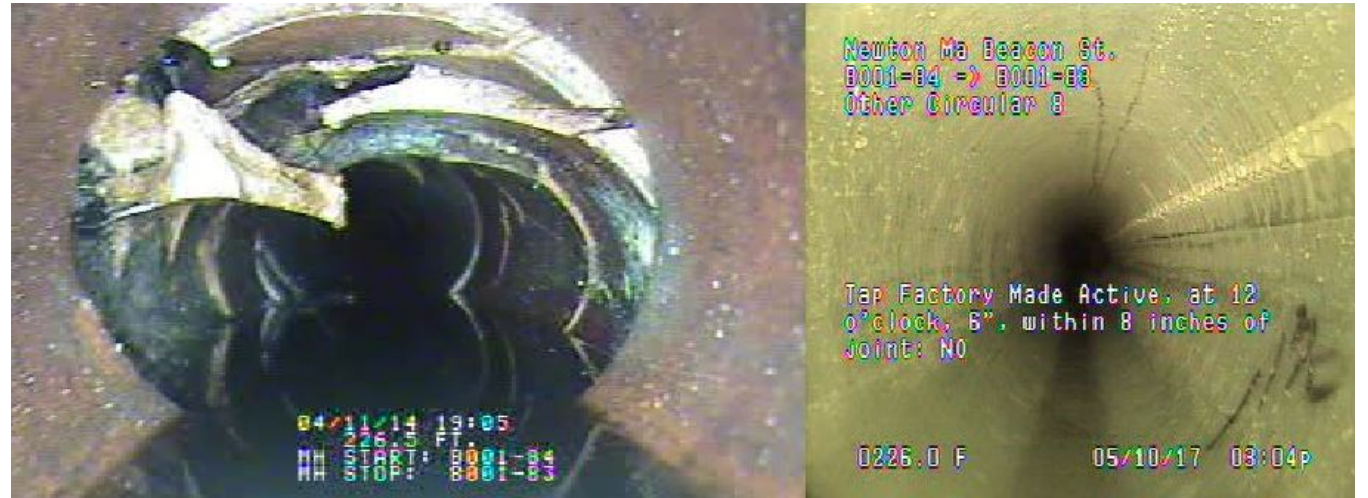
- CIP Project 1 to 8 Complete
 - 1,240,000 linear feet (235 miles) sewer inspected
 - 7,500 manholes inspected
- CIP Project 9; Ongoing
- CIP Project 10; Spring 2020
- CIP Project 11; Spring 2021



Sewer Capital Improvement Program - Status

Rehabilitation Status

- CIP Projects 1, 2, 3, 4, and 5 Complete
 - 390,000 linear feet (74 miles) sewer rehabilitated
 - 2,900 manholes lined
 - 800 underdrain access points sealed
- CIP Project 6; Ongoing
- CIP Project 7; Start Winter 2019
- CIP Construction to be complete 2025



Sewer Capital Improvement Program - Infiltration

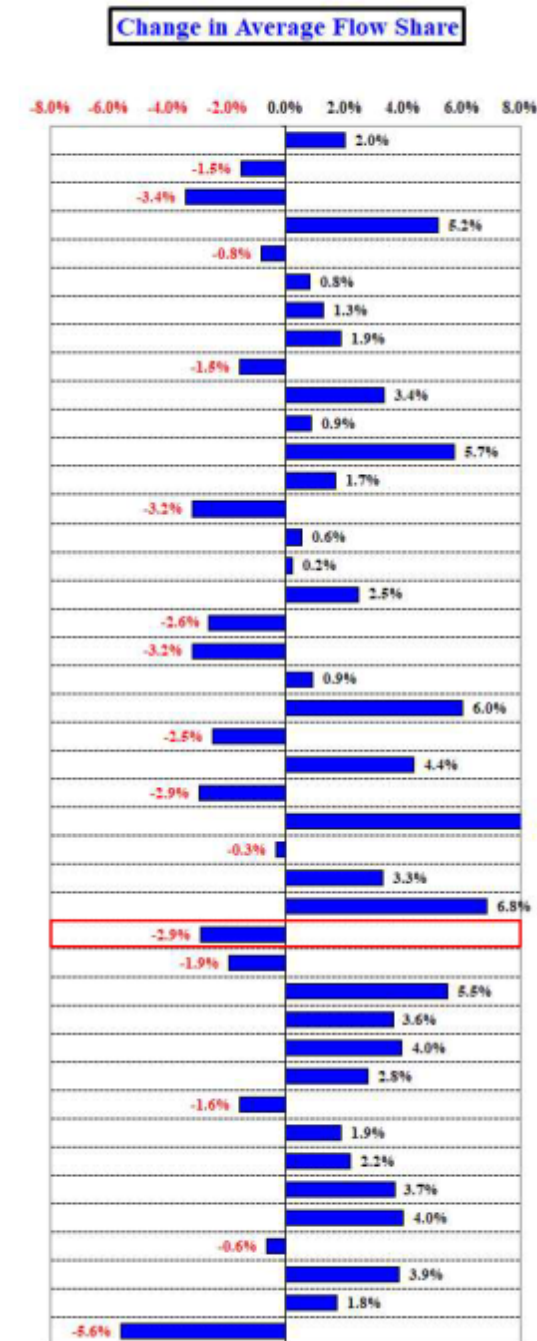
- Peak Infiltration:
Infiltration identified during high groundwater period
- Assume 50% removable
- Peak Infiltration Removed to Date = 1,750,000 gallons per day



Sewer Capital Improvement Program – Flows

Sewer Flows

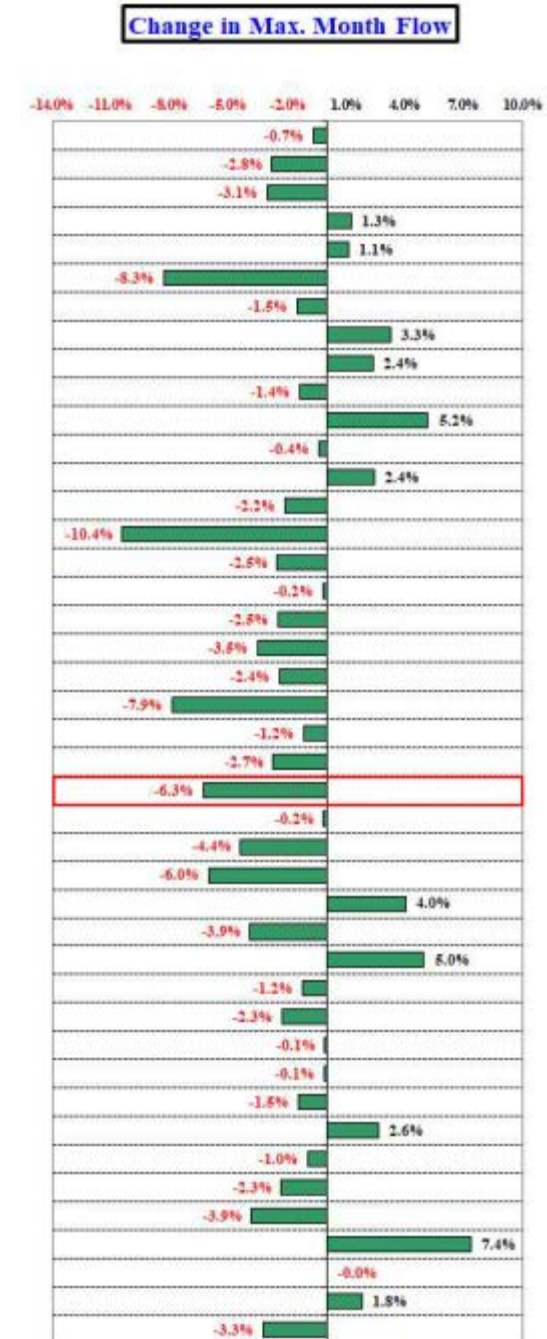
- MWRA 3-Year Averaging of CY16, CY17 and CY18 vs. CY15, CY16 and CY17
 - **Average Sewer Flows;**
Change in Flow Share Percent
 - Average for 42 MWRA communities = +1.3%
 - **Newton = -2.9%**



Sewer Capital Improvement Program – Flows

Sewer Flows

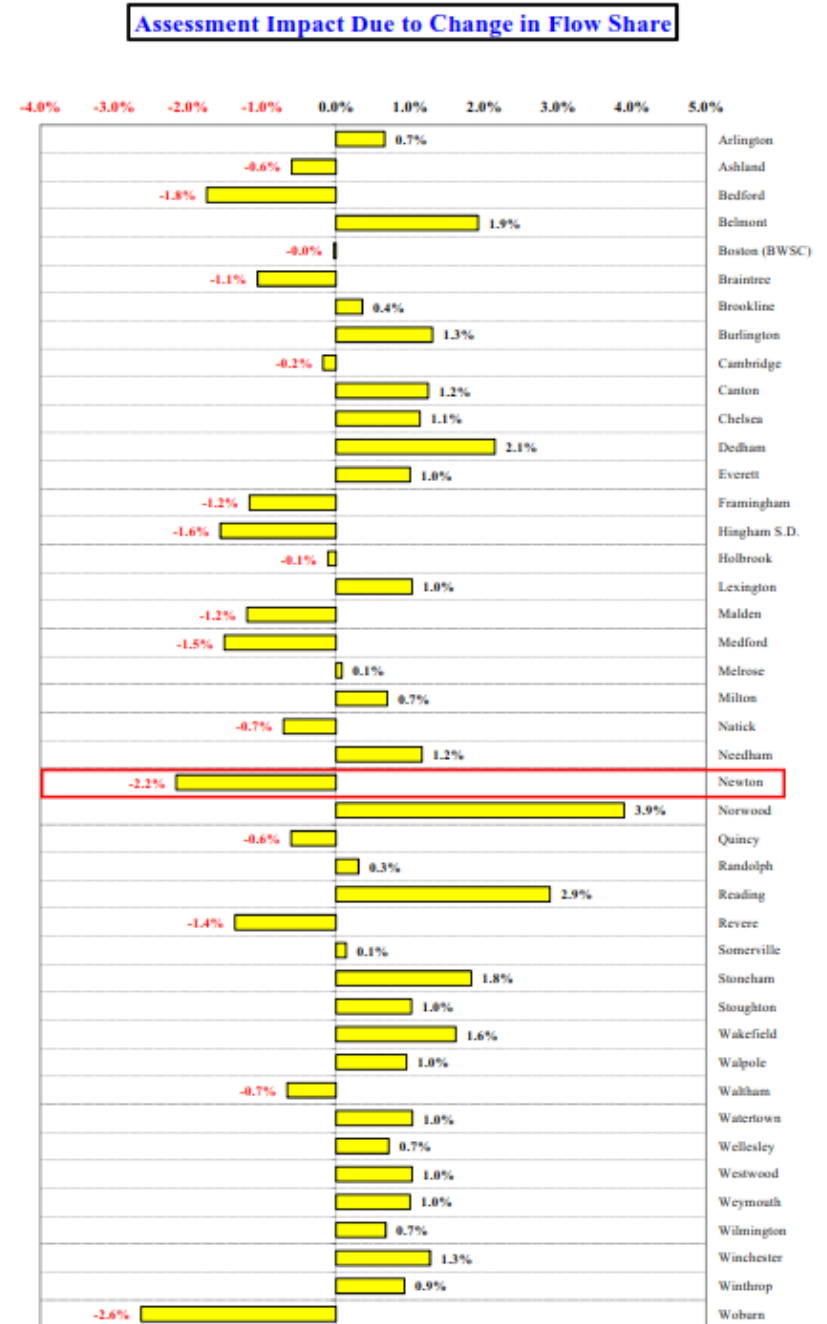
- MWRA 3-Year Averaging of CY16, CY17 and CY18 vs. CY15, CY16 and CY17
 - **Max Monthly Sewer Flow; Change in Flow Percent**
 - Average for 42 MWRA communities = -1.2
 - **Newton = -6.3%**



Sewer Capital Improvement Program – Flows

Sewer Flows

- MWRA 3-Year Averaging of CY16, CY17 and CY18 vs. CY15, CY16 and CY17
 - **FY20 Base Assessment Impact**
 - Average for 42 MWRA communities = +0.3%
 - **Newton = -2.2%**



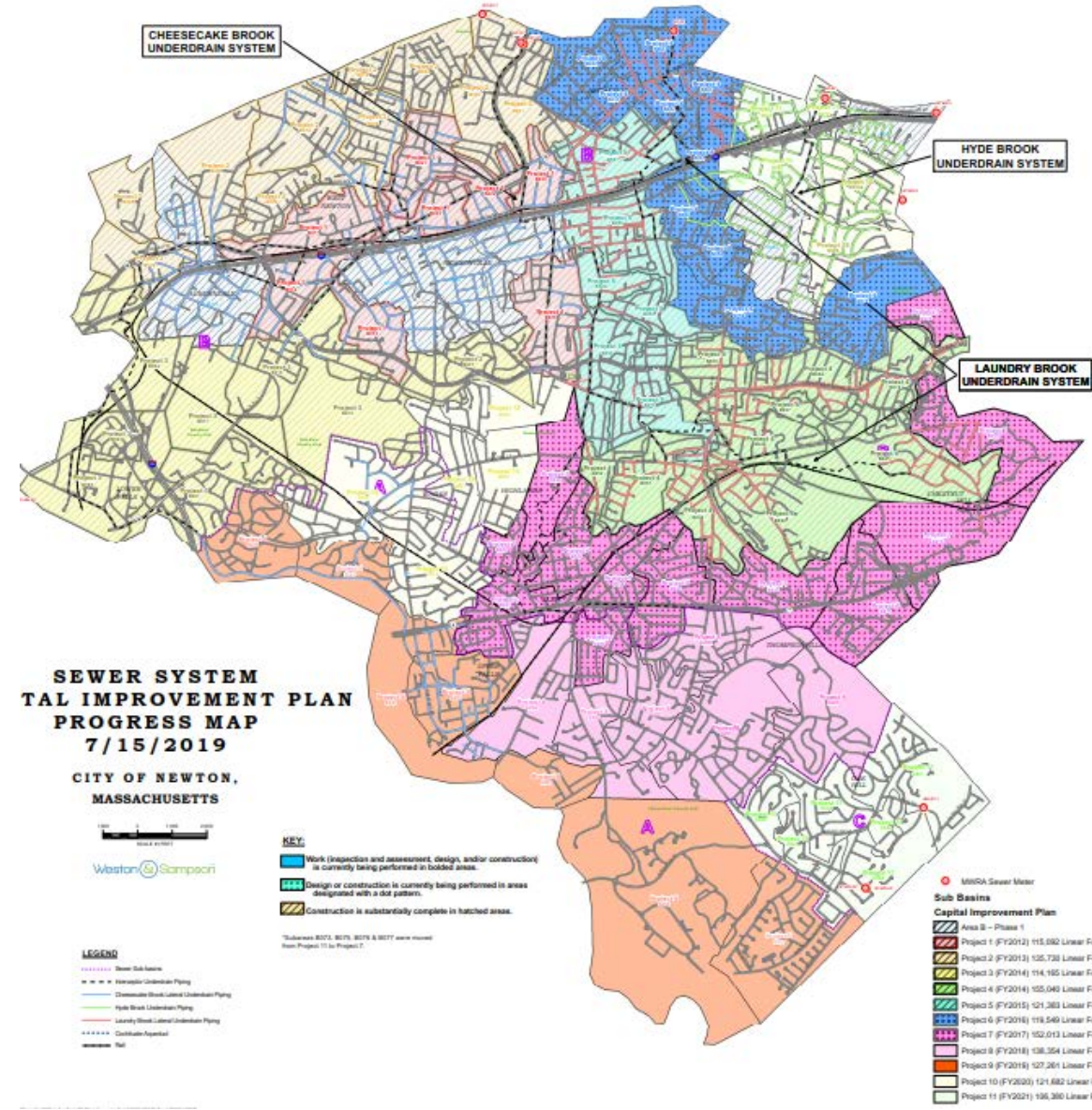
Sewer Capital Improvement Program – Sewer Overflow Reduction

- 2006 to 2014: 10 Overflows
 - 5/14/06; 6/7/06; 12/4/06
 - 3/31/07; 4/15/07; 4/18/07
 - 3/9/08
 - 3/14/10; 3/30/10
 - 12/9/14
- **2015 to Present: Zero Overflows**
 - CIP Project 1 Rehabilitations completed 2014



Post Sewer Capital Improvement Program Planning

- CIP Inspections Complete 2021
- CIP Rehabilitations Complete 2025
- In 2025 approximately 60% of system will be vitrified clay (VC)



Post Sewer Capital Improvement Program Planning

- Predictive Maintenance
- Comprehensive Inspection and Rehabilitation Data Set
- Reprioritization of Sewer Assets



Post Sewer Capital Improvement Program Planning

- Potential Criteria for Post CIP Project 11 Evaluations
 - Flow Metering
 - Service connection Unidentified Service Flow
 - Pavement Management Program
 - Water System CIP
 - Stormwater Infrastructure Improvement Program (SIIP)
 - MS4/IDDE

QUESTIONS?

Sewer Capital Improvement Program – Flows

MWRA Percent Flow Share to Rehabilitation Spending

