



# Village of Scarsdale Water System Master Plan

Westchester Water Works Conference, Oct. 12, 2022

Vito Gonnella, Village of Scarsdale Water Superintendent

Eli Barkovic, PE



#### **Presentation Overview**

- Project Scope
- Data Review and System Mapping
- Hydraulic Model Findings
- Review of System Maintenance History
- Risk-Based Capital Project Development
- Priority Project Definition





# RADIALE.

# Project Scope Summary

- Water System Summary
  - 98 miles of pipe
  - 2 pumping stations, 2 tanks
  - 3.1 MGD ADD, 6.3 MGD MDD
  - Cast iron, ductile iron, and universal joint pipe, some sections 100+ yrs old
  - ARPS, Reeves-Newsom PS, Ardsley and Boniface Tanks all recently rehabbed
- Master Plan Scope
  - GIS-Based System Map
  - Review Maintenance History
  - GIS-Based Hydraulic Model
  - Capital Plan
  - Proactive Planning Approach





#### Data Review and System Mapping



- Compiled 500+ paper copy maps, field sketches, and notes
- Updated historic mapping with recent as-built information
- Updated mapping is the foundation for hydraulic model





# Hydraulic Modeling

- Physical infrastructure represented from updated system maps
- Pumping and operational data obtained from SCADA
- Hydrant flow tests and pressure gauges for model calibration
- Evaluation Factors:
  - System Pressure
  - Pipe Velocities
  - Pressure Loss
  - Fire Protection
- 30-year demand projection









## Hydraulic Modeling Results

- System Pressure
  - >35psi except for high-elevation Murray Hill/Mamaroneck/Sheldrake area
- Pipe Velocities
  - No major issues of concern
- Pressure Loss
  - Worst in areas of unlined cast iron
- Fire Protection
  - Most of system is >1,000 GPM, <500 in high elevation areas with unlined CI pipe
- ► 30-yr demand projection (+5.2%)
  - No new issues, but wider extent

-

#### **Review of System Maintenance History**









#### **Review of System Maintenance History**



- Geographically distributed across the system with some "hot spots"
- Pattern of issues with universal joint and unlined cast iron pipe
- Repair frequency did not correlate with pipe size
- 200 main breaks and valve failures from 2008 to mid 2020







#### Water Main and Valve Maintenance Issues







## Risk-Based Capital Project Development



- Prioritize areas of high maintenance needs
- Rank remaining pipe segments based on likelihood and consequence of failure
  - Pipes ranged for likelihood of failure based on pipe material and maintenance history
  - Pipes with highest flow will cause most disruption if they fail
- 76 total pipe rehabilitation projects identified
  - \$103M total distribution system rehabilitation need (2021 dollars)
- Both replacement and lining, depending on type of pipe and likely mode of failure
- Grant and funding analysis completed to develop financial plan



# First Capital Project Design Underway - Crossway





