# Nunziato Stormwater & Park Renovation Project

Mayor Joseph A. Curtatone
Alderman Robert McWatters

Community Meeting 4 – Project Review

25 April 2017

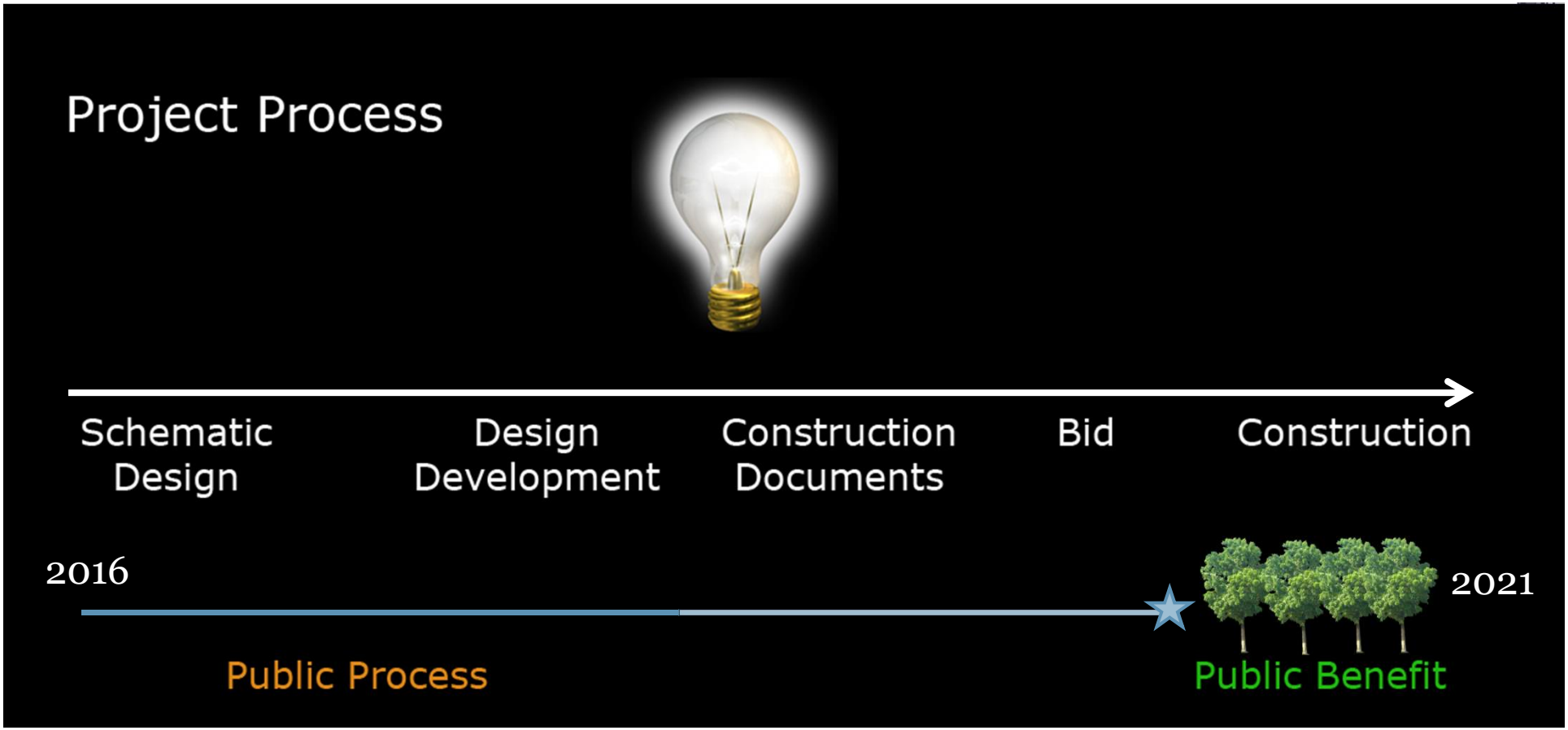
# Meeting Goal –> Answer Your Questions

- Why a project at Nunziato?
- What is going to happen at Nunziato?
- How will we minimize construction impacts?
- How will the park be restored?

- Questions & discussion

# Communications

- Press release to newspapers
- Neighborhood notes
- Elected officials
- City Calendar
- Somerville City Cable
- City of Somerville on Facebook & Twitter
- Neighborhood Updates on Facebook & Twitter
- City of Somerville Spanish/Portuguese/Haitian Kreyol language pages
- Flyers delivered to properties
- Posters at Nunziato Field
- Email mailing list – Loliveira@SomervilleMA.gov
- **http://www.somervillema.gov/nunziato**




NUNZIATO PUBLIC MEETINGS:
November 21, 2016
February 13, 2017
February 22, 2017
April 25, 2017

# Sewer & Drain System Overview

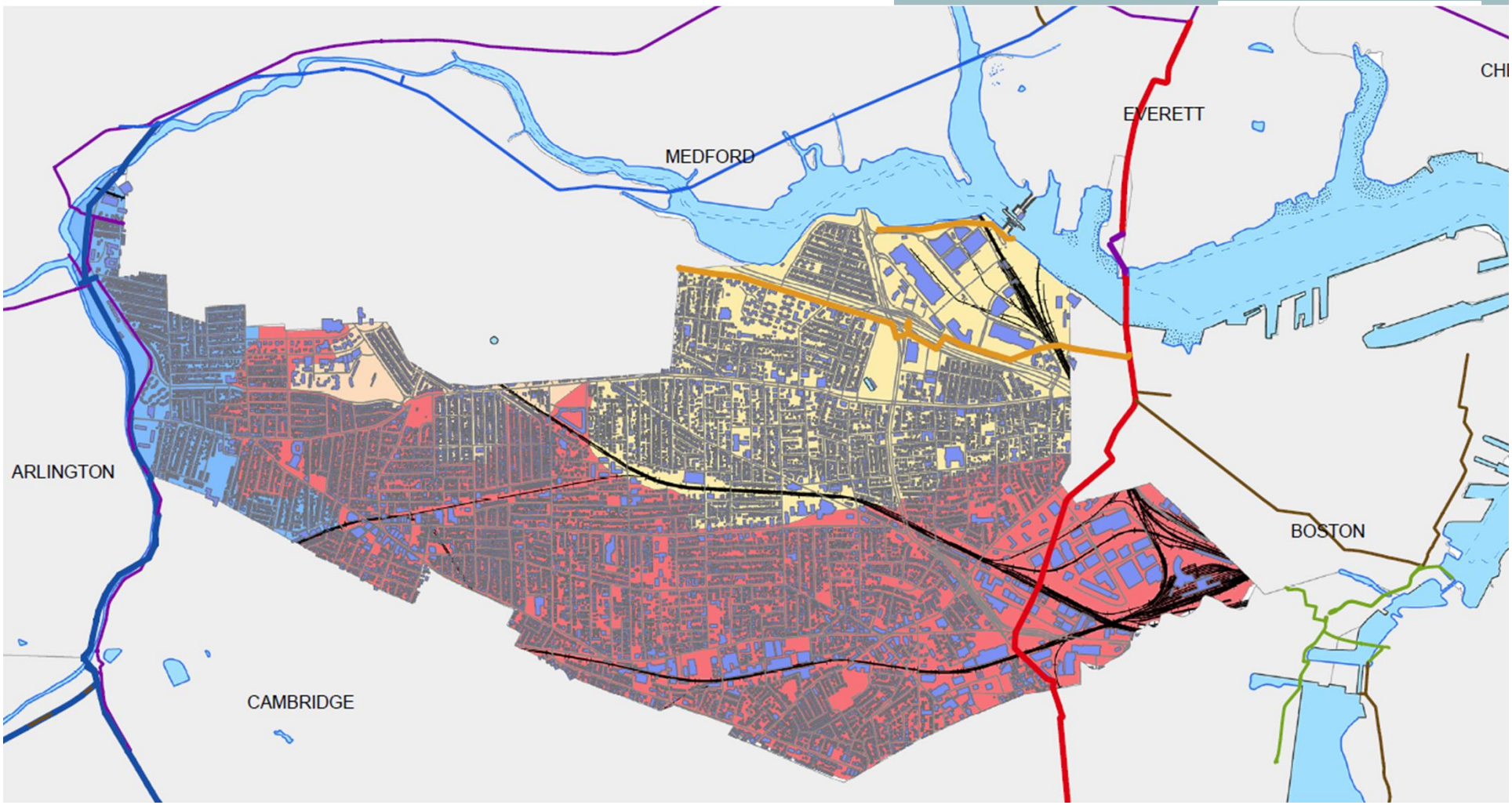
Why construct a tank at Nunziato?

# Somerville Geography

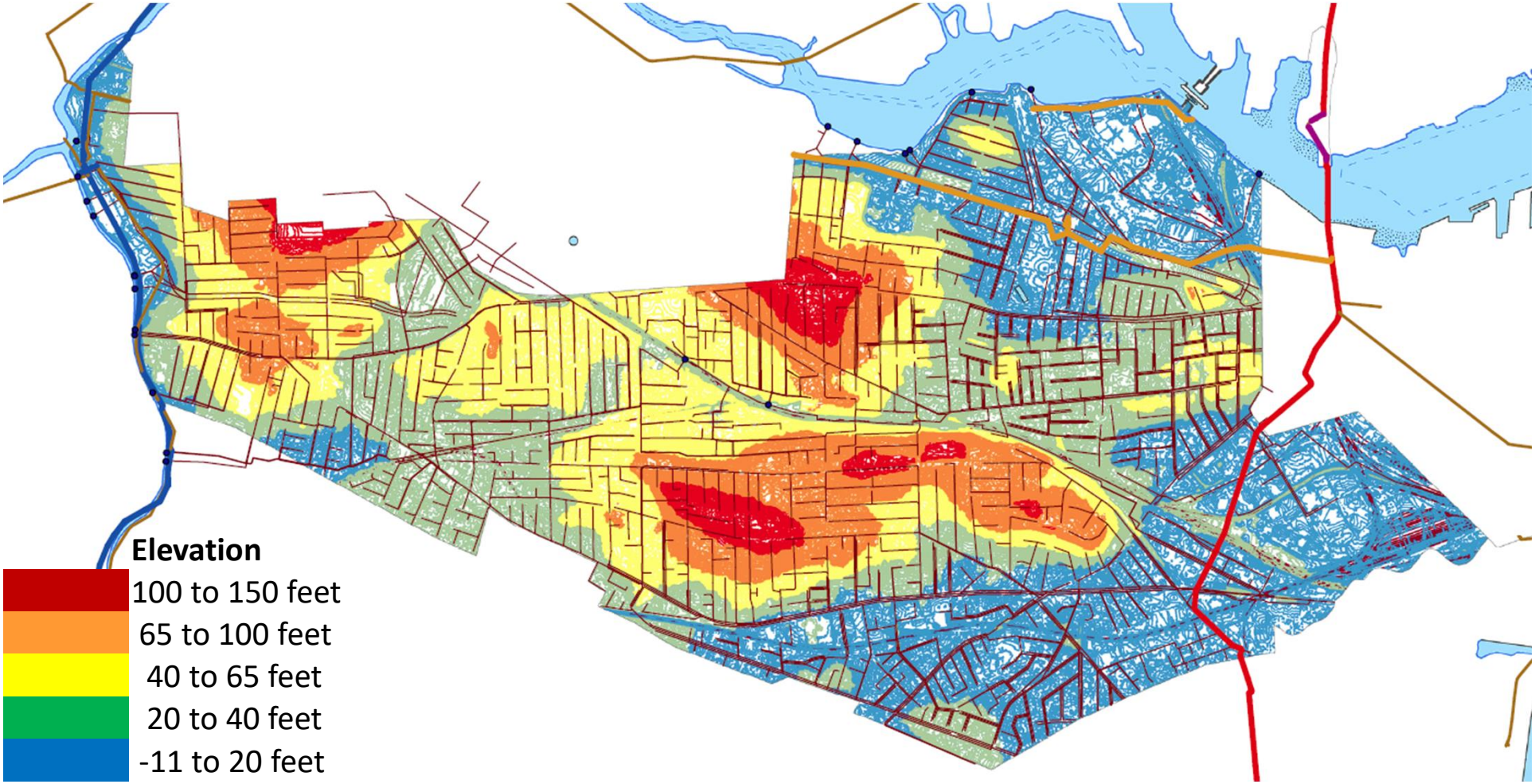
4.2 square miles – every square foot is valuable!

# Until 1876, Millers River reached Union Square

# Fill, Development, and MDC pipes



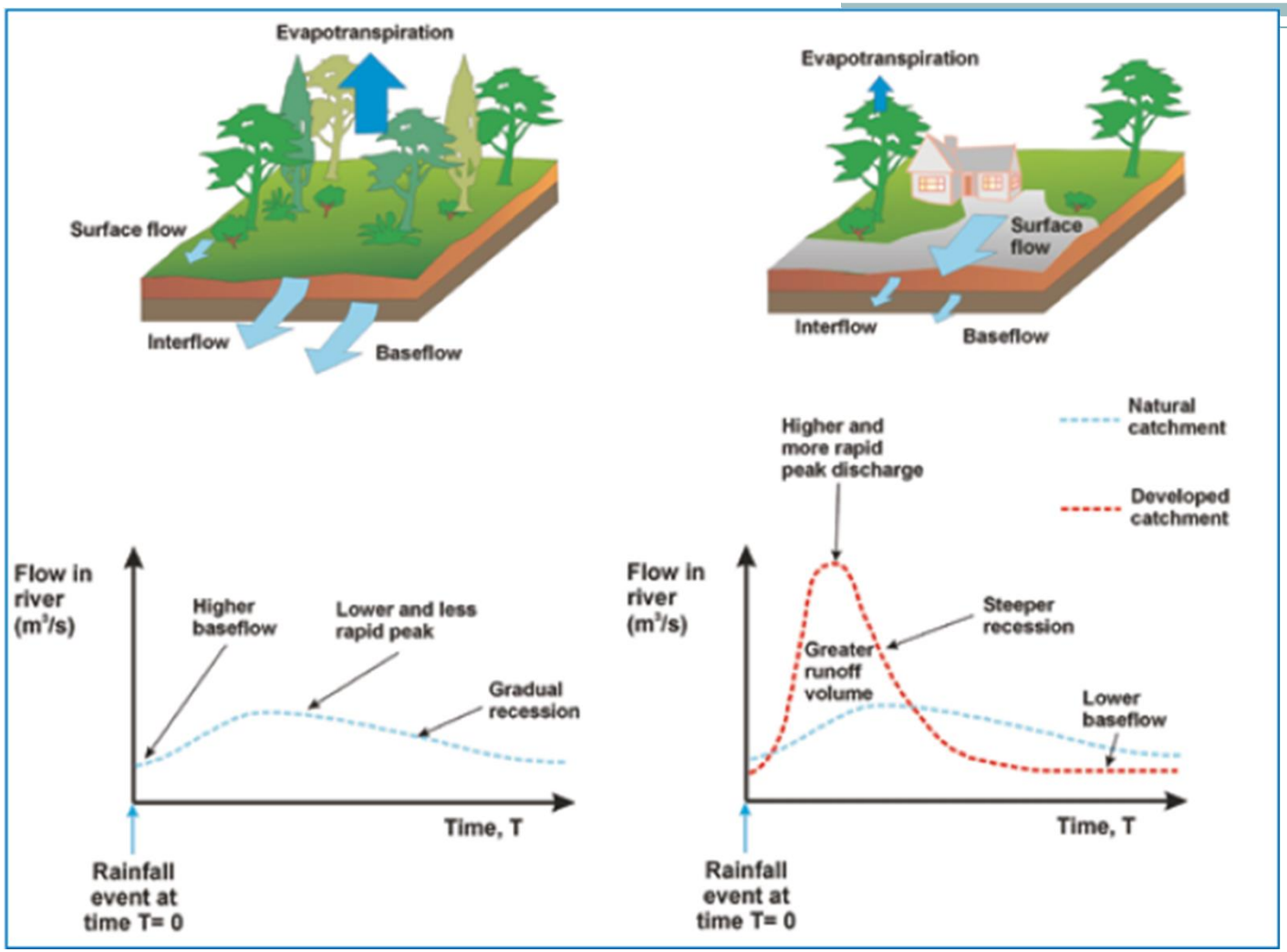
# Water flows downhill, and to MWRA pipes



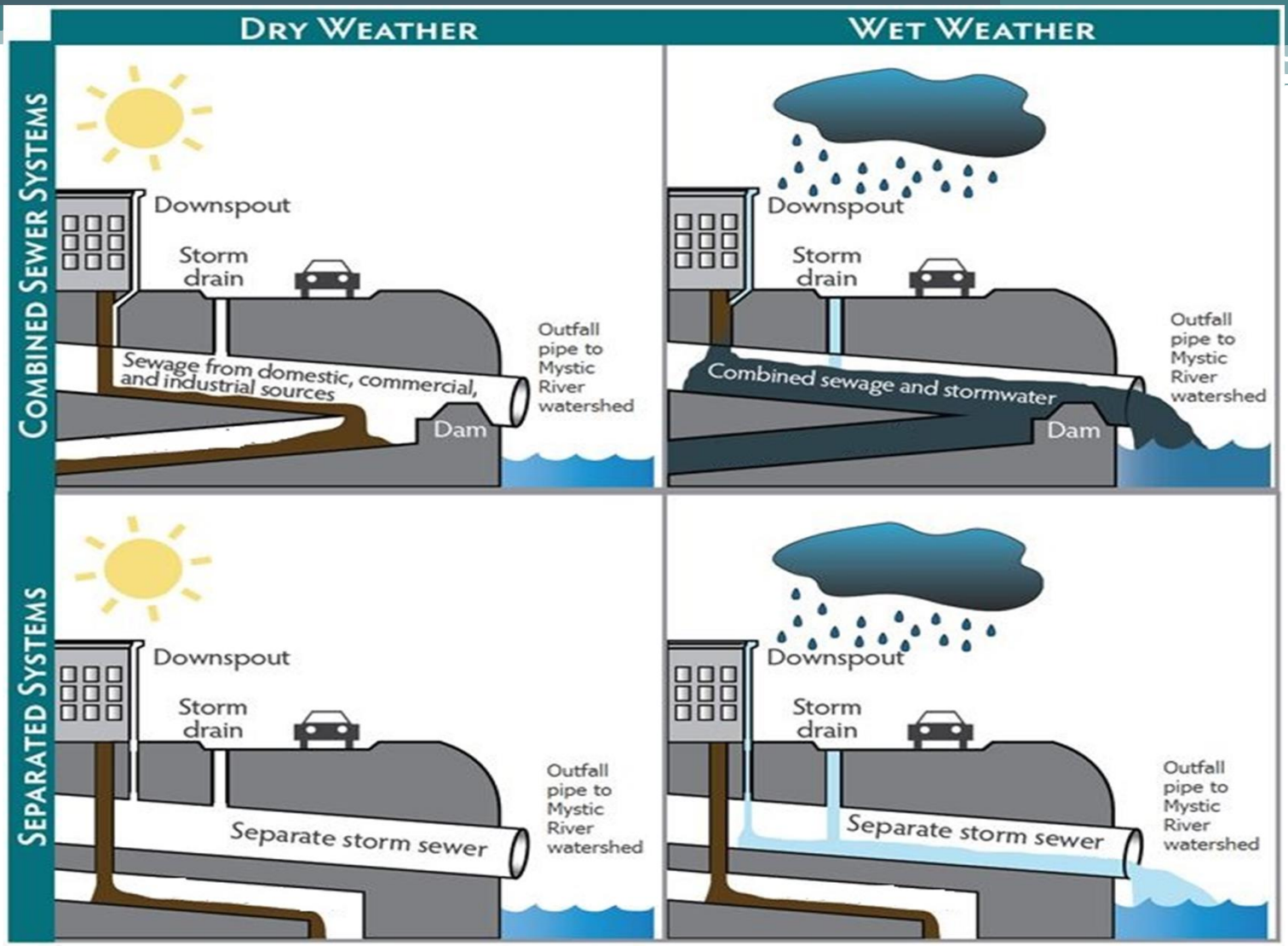
# Urban Hydrology

Where does water go, and why doesn’t it go there sometimes?

# Hydrologic cycle



# Storm drains, sanitary sewers and combined systems

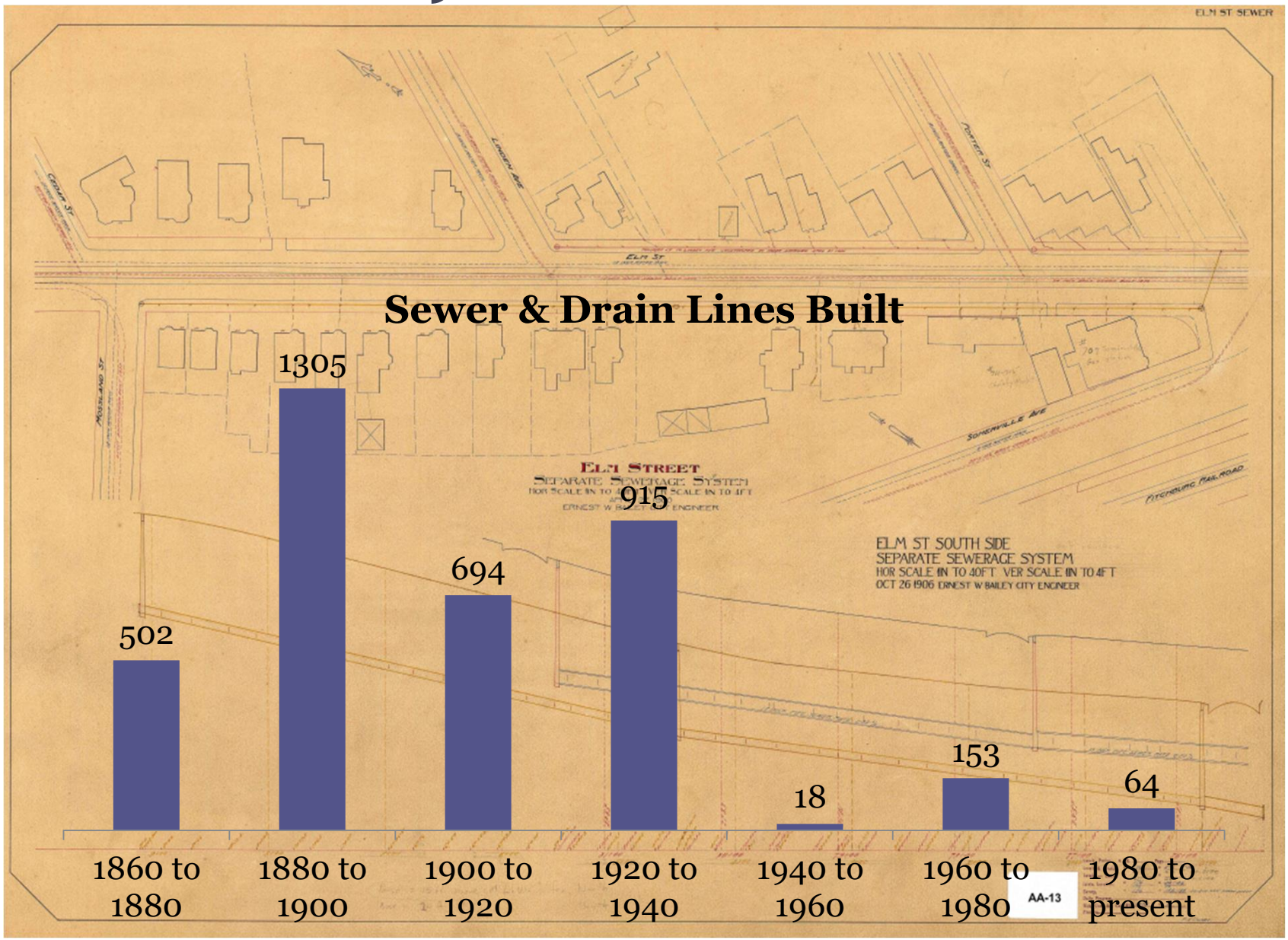


# Somerville's System

State of the Art water handling

...in 1890

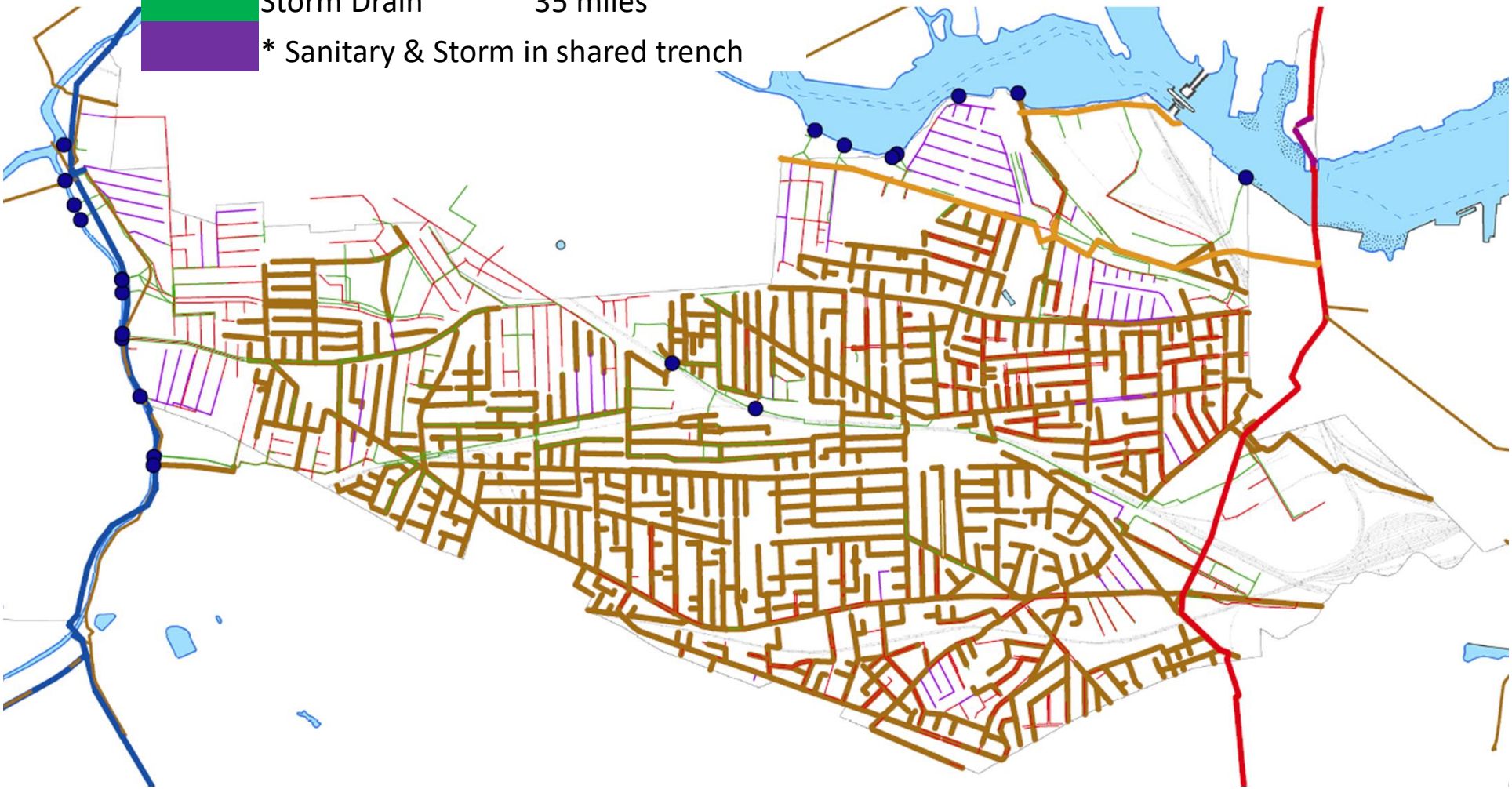
# Collection System



# Combined sewers

| | |
|---|---|
| Combined | 68 miles |
| Sanitary | 62 miles |
| Storm Drain | 35 miles |

* Sanitary & Storm in shared trench

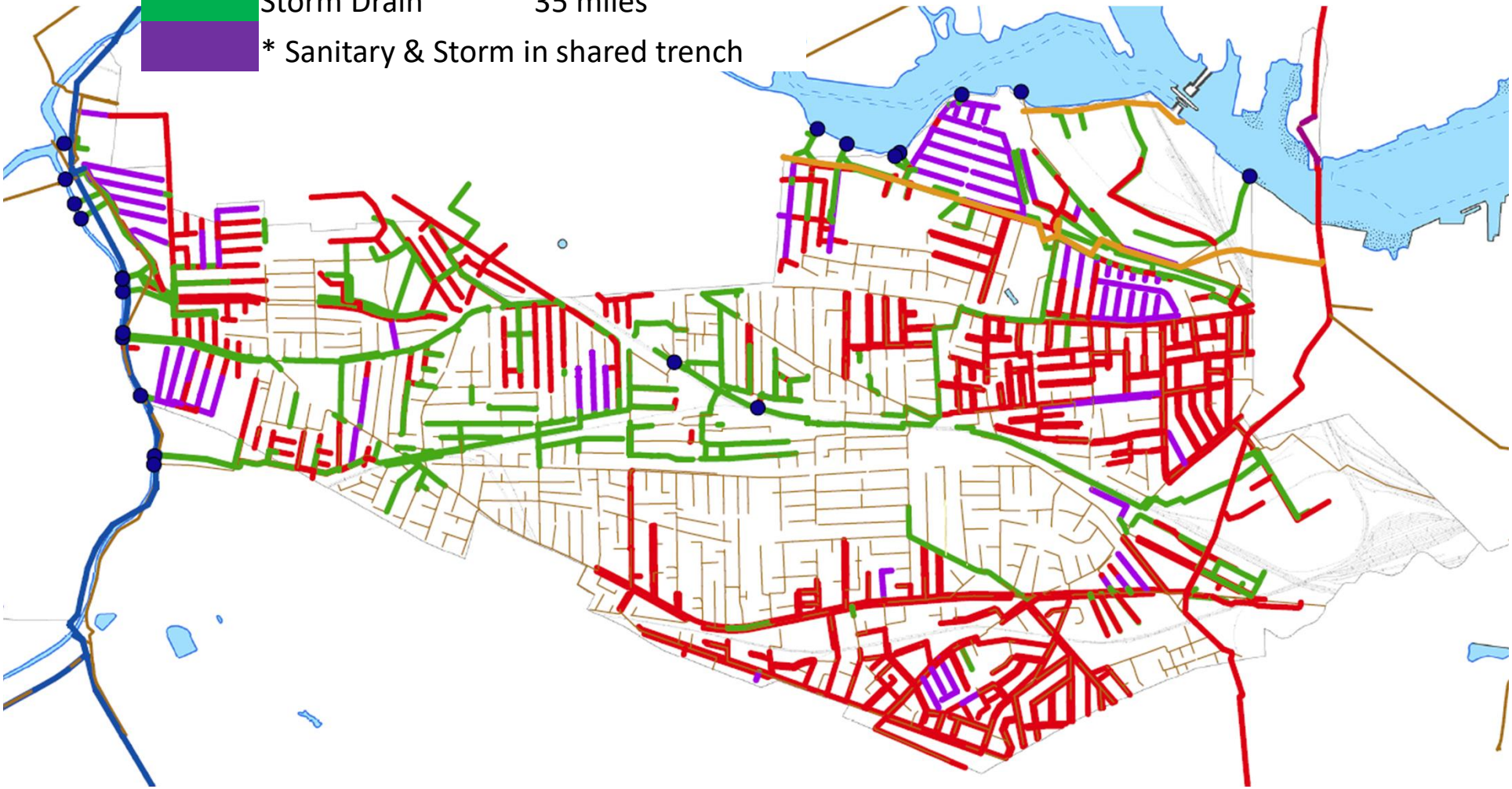


# Two pipe roads

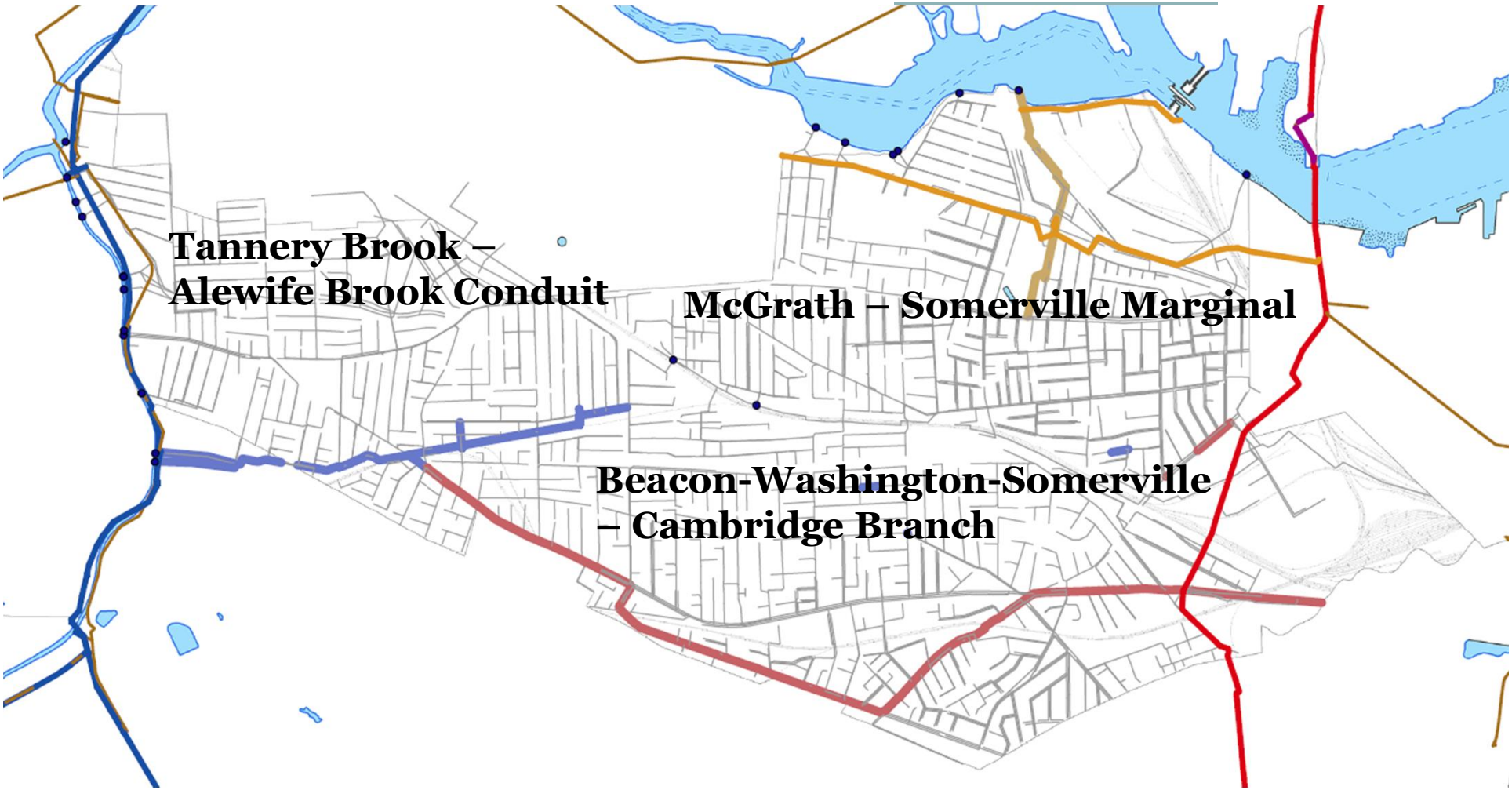
## … but not really separate

| | |
|---|---|
| Combined | 68 miles |
| Sanitary | 62 miles |
| Storm Drain | 35 miles |

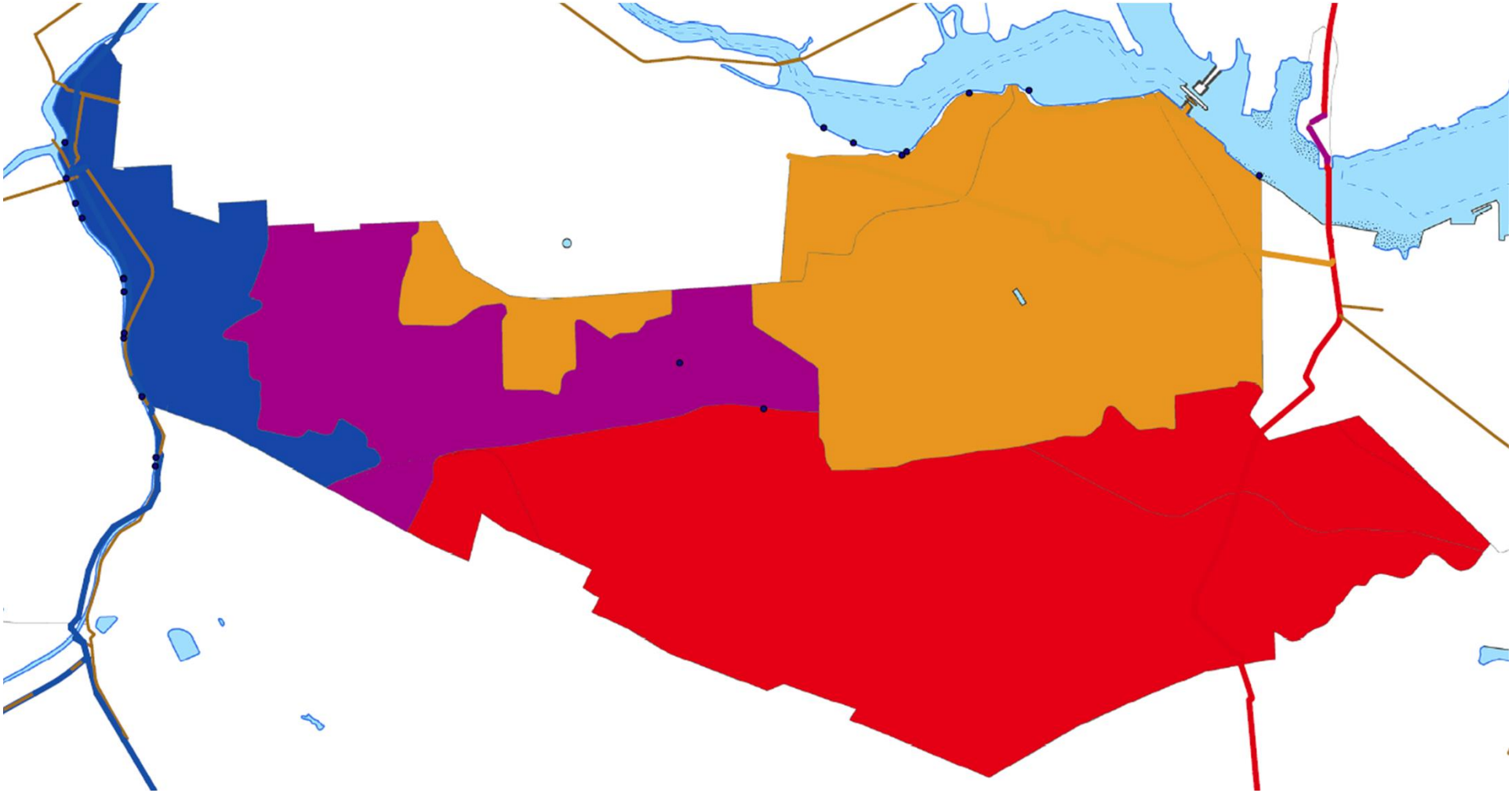
* Sanitary & Storm in shared trench



# Smaller pipes flow to larger ones – 3 major interceptors

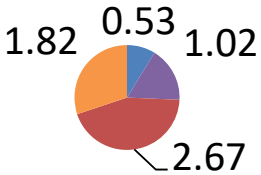


# Major Subsystems



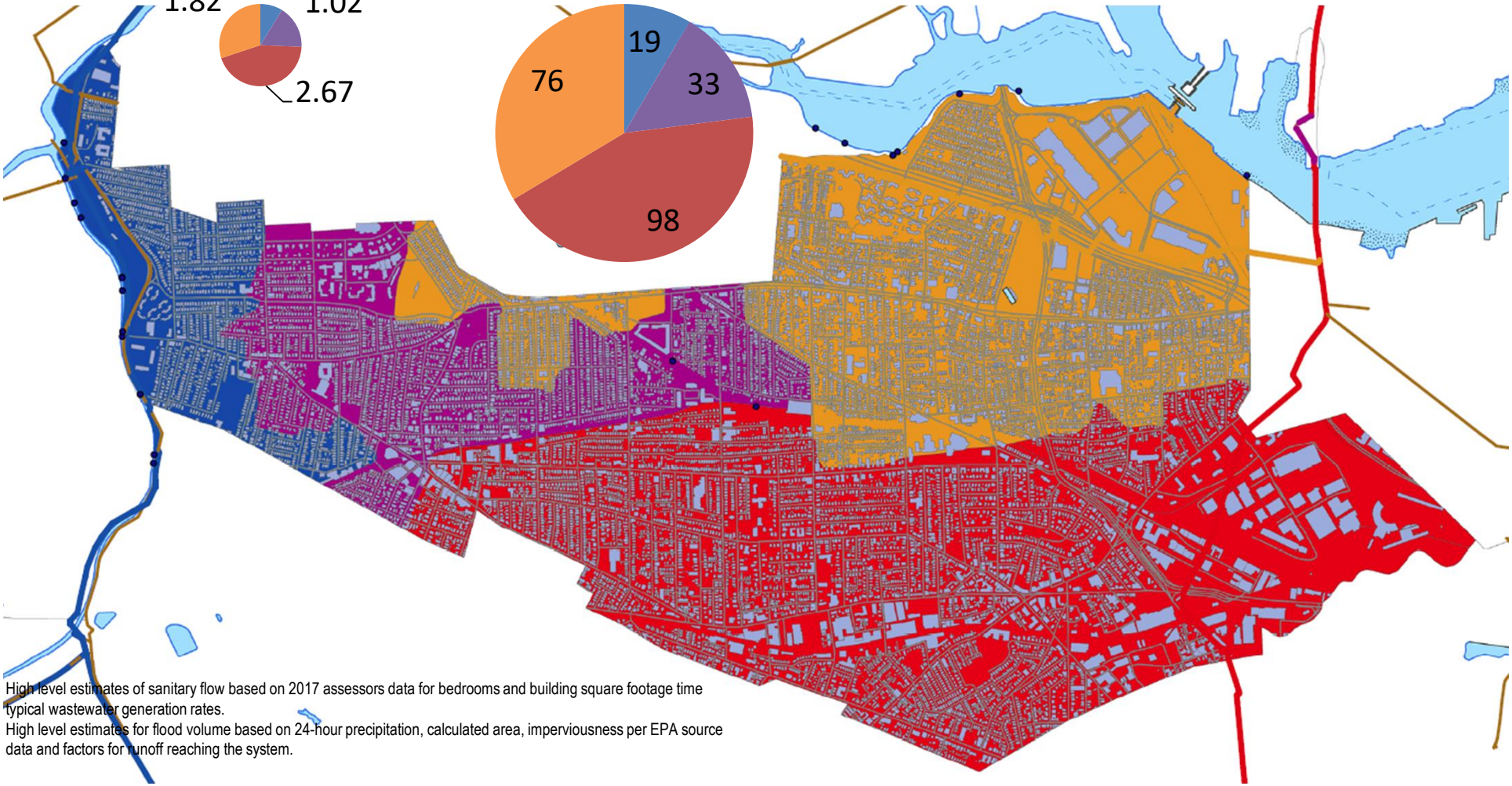
# Subsystem statistics

**Sanitary Flow (mgd)**



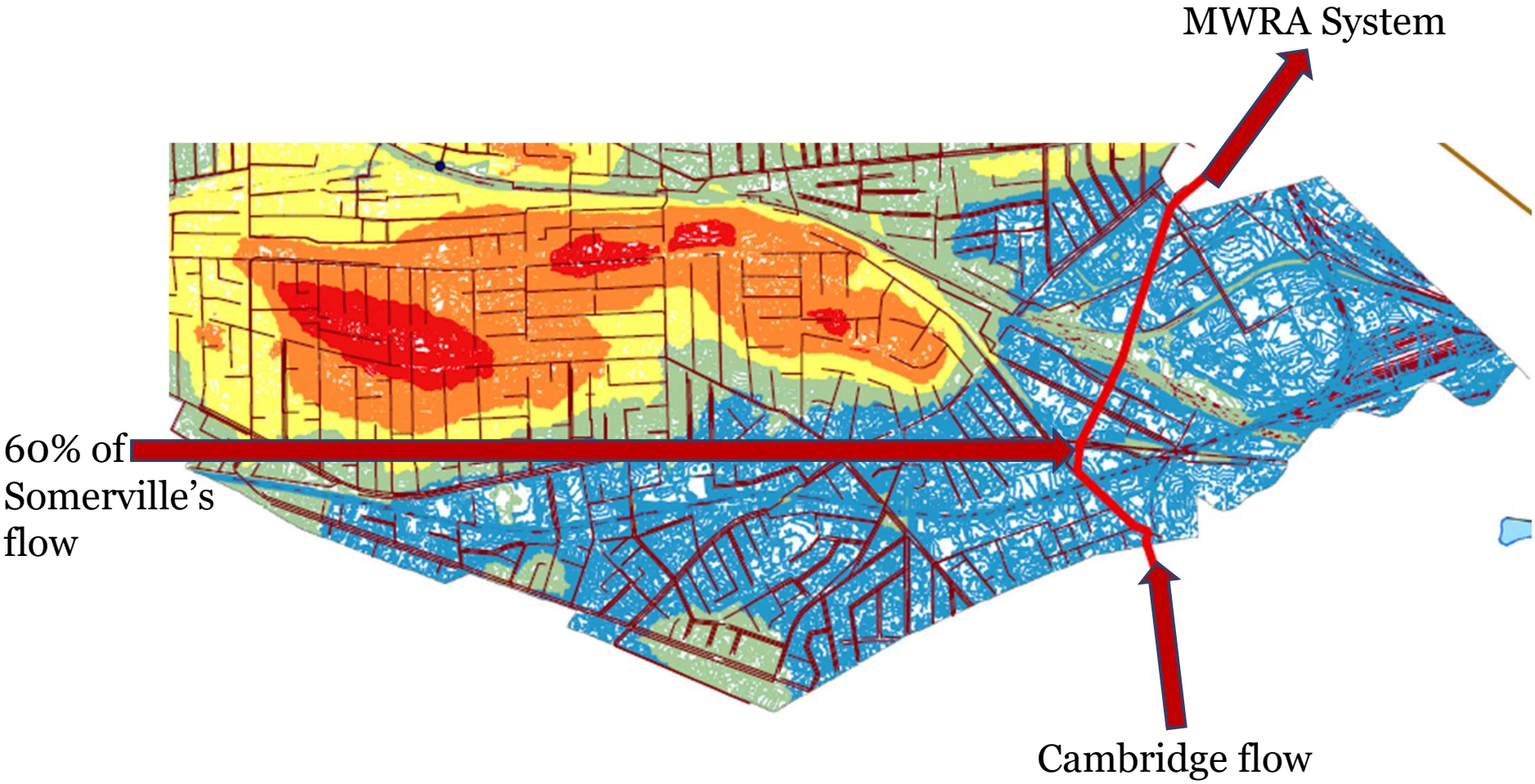

**10-Year Flood Volume (mgd)**



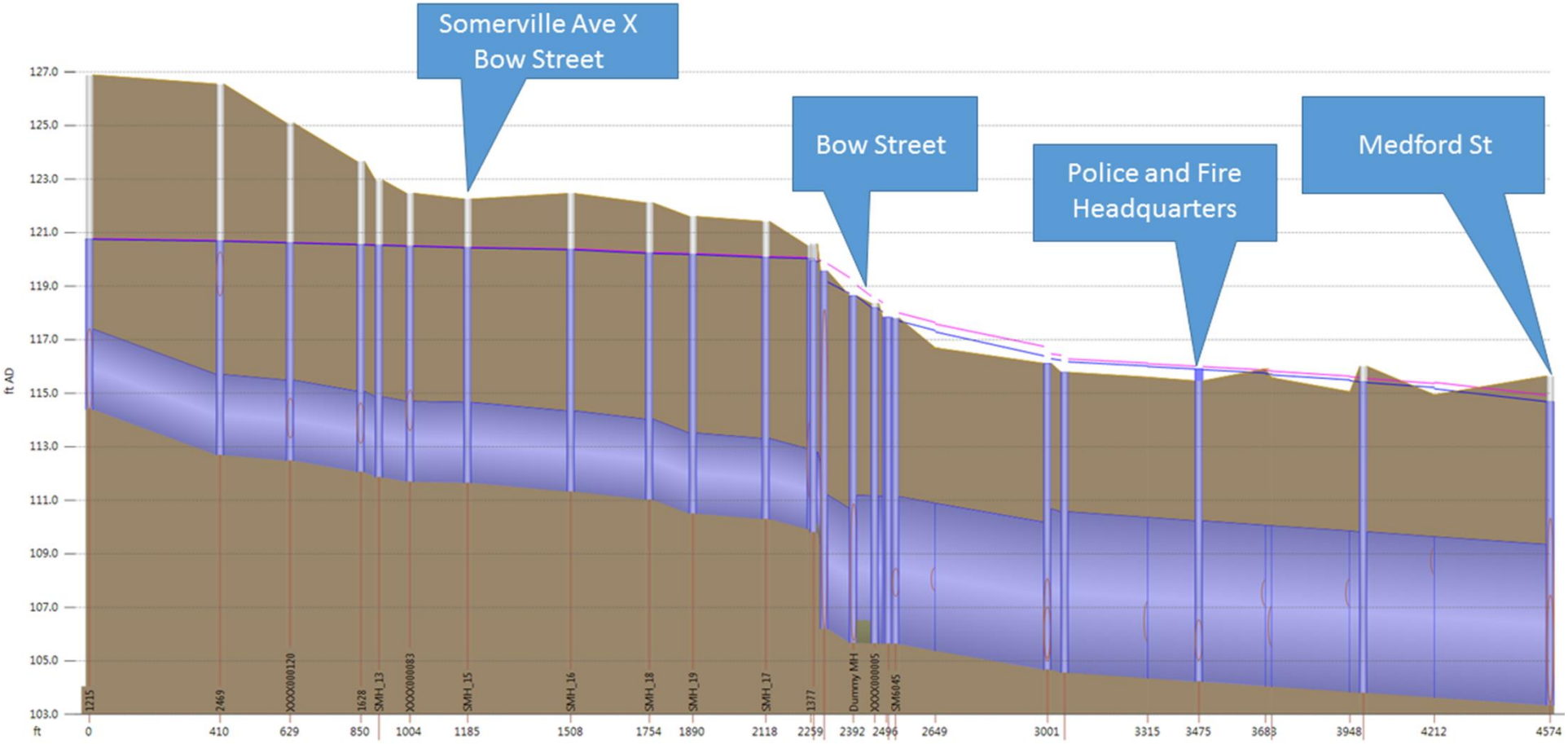
High level estimates of sanitary flow based on 2017 assessors data for bedrooms and building square footage time typical wastewater generation rates.
High level estimates for flood volume based on 24-hour precipitation, calculated area, imperviousness per EPA source data and factors for runoff reaching the system.

# Union Square – Nexus of Flows




- Uphill / Up-pipe areas all contribute to flooding

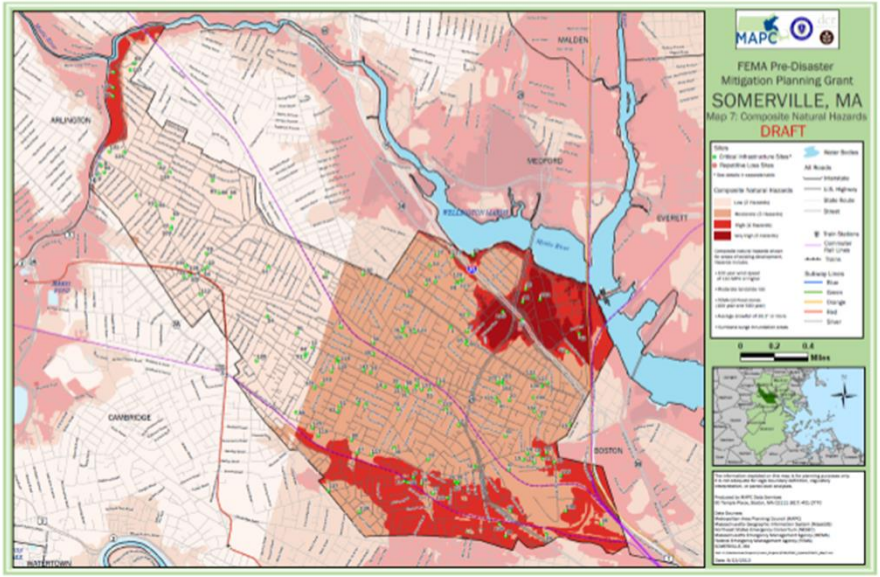
# Rain from above.. trouble from below



# Flood Hazards

CITY OF SOMERVILLE

**HAZARD MITIGATION PLAN UPDATE**




MAPC
METROPOLITAN AREA PLANNING COUNCIL

Metropolitan Area Planning Council

Draft for Review
December 2013

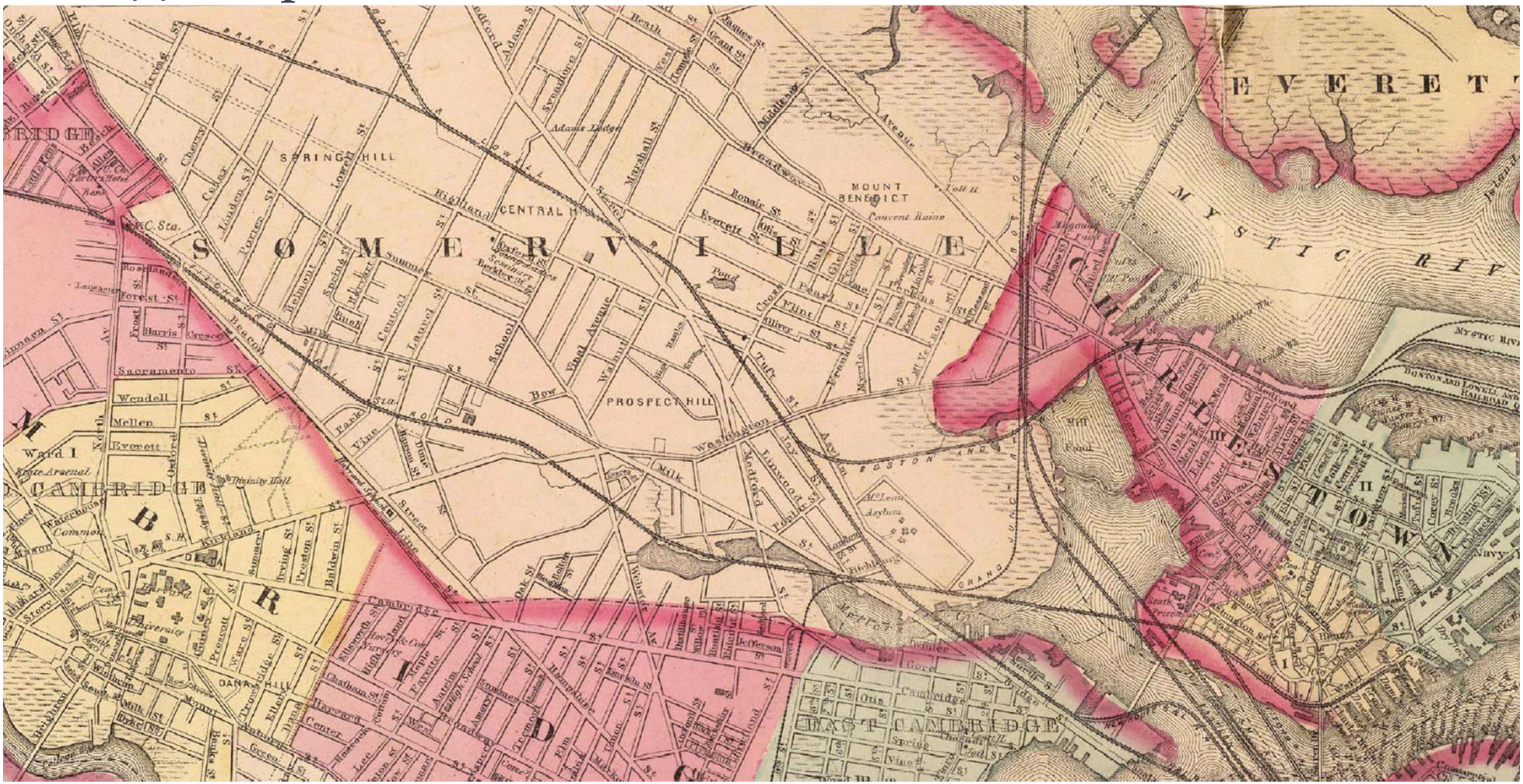
- Twelve events noted 1968 to 2010
- Twelve high risk areas defined
- Model predicts damages between $38.5M and $192.5M

# Past Planning

These aren’t new problems, what has been done to find solutions?

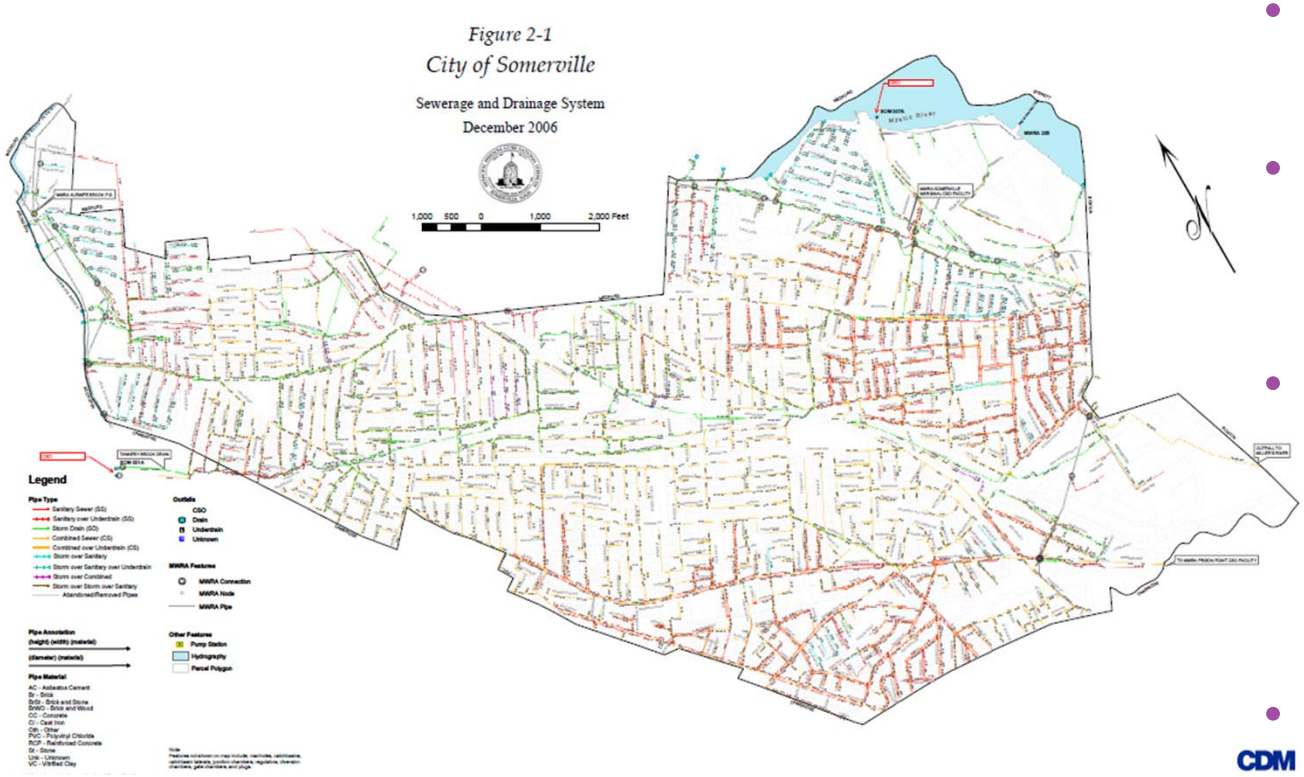
# Millers River Culvert - Capacity in MBTA System

1990s - present



# Sewer Separation - Cost Prohibitive

CDM Reports 1994 – 2009




- Marginal sewer separation $74M
  2009$
- Tannery Brook partial sewer separation $33M
  2006$
- Cambridge Branch partial sewer separation $115M plus $?? stormwater pumping & outfall
  2009$
- **No projects resulted**

CDM

# SomerVision

## 2009 - present

- Increase level of service
- Remove stormwater from system
- Reduce flooding and CSOs

### Transportation & Infrastructure
Sewer & Stormwater

#### Sewer Separation
*What's it all about?*

Somerville has an old "combined" sewer system that often puts sewage and stormwater in the same pipes. This means that during storms, the system can overflow, spilling raw sewage into our rivers or even backing up sewer pipes into homes. To minimize these risks, cities can improve infrastructure to separate stormwater from sewer water. Low-cost stormwater management plans can also minimize the need for expensive construction by limiting the amount of storm drainage entering the system.

**VIII. Goal: Improve stormwater and wastewater management systems to increasingly separate storm water and sewerage systems and support desired levels of future growth.**

*A. Policy: The City should provide a stormwater and sewer system that is able to accommodate extreme events without flooding or causing combined sewer overflows (CSOs).*

1. Action: Continue to separate sewer and stormwater drains by working with the Massachusetts Water Resources Authority, the Enviornmental Protection Agency and others to develop strategies and secure funding.
2. Action: Develop and adopt a comprehensive Action Plan that will produce a stormwater system with the capacity to accommodate flooding, greater frequency and intensity of storms, and rising sea levels.
3. Action: Establish and ensure new development follows stormwater management guidelines.
4. Action: Investigate the potential cost and benefit of installing pumping stations at key areas to alleviate flooding issues.
5. Action: Ensure all catch-basins are cleaned on a regular and sufficient basis.

#### Somerville Sewers

Somerville's collection system consists of 62 miles of sewer, 68 miles of combined sewers, and 35 miles of storm drains. The pipes range in diameter from six inches to more than three feet. The largest pipes serve what were historically rivers and streams, such as the Millers River in Union Square and the Tannery Brook near Davis Square. Our sewer system drains more than 150 million gallons of stormwater and wastewater every day, with most of this flowing to a headworks in Chelsea and from there to the regional treatment plant in Boston Harbor.

*Deer Island in Boston Harbor*

### Transportation & Infrastructure
Sewer & Stormwater

*B. Policy: The City should create incentives and zoning regulations to infiltrate stormwater and to limit stormwater runoff from entering the wastewater system.*

1. Action: Establish a permitting requirement for increased impervious surface for projects in residential districts that do not otherwise require a zoning or building permit.
2. Action: Heighten enforcement of non-compliance with sewer and stormwater regulations.
3. Action: Create incentive or educational programs for green roofs, rainwater catchment systems, rain gardens and other stormwater re-use options.
4. Action: Ensure that any new City projects include provisions for water and drainage runoff.
5. Action: Make rain barrels available at more frequent intervals and advertise broadly.
6. Action: Design street reconstruction and renovation projects to capture and release stormwater runoff slowly, where feasible.
7. Action: Design and install landscaped medians to increase pervious surface and capture runoff where possible.
8. Action: Continue to increase the number of healthy street trees and, where possible, incorporate climate-appropriate vegetation to slow velocity of stormwater runoff on both private and public lands.
9. Action: Consider designing and implementing systems to harvest rainwater and collect stormwater for irrigation use in new parks and other public projects.
10. Action: Investigate the potential use of grey water systems in public and private projects.

#### Stormwater Runoff
*What's it all about?*

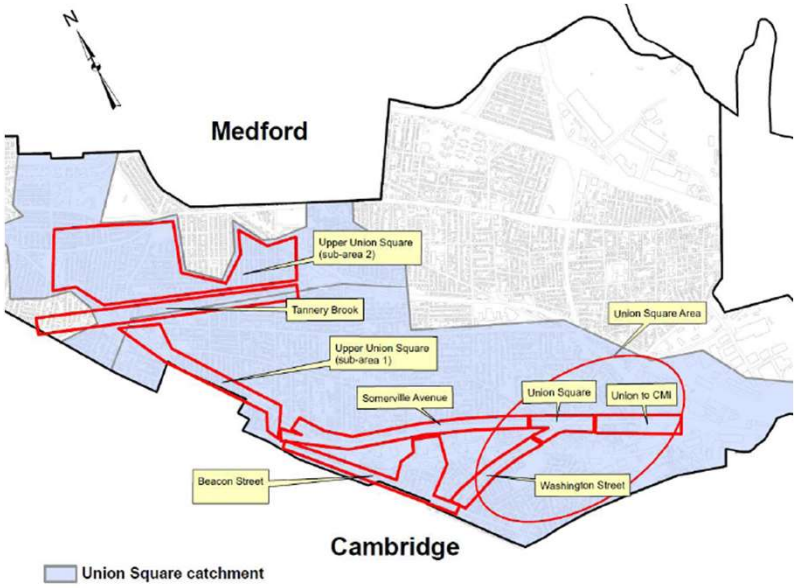
Stormwater runoff is bad for taxpayers and bad for the environment. When water goes into storm drains, we pay for it to travel all the way to the regional sewage treatment plant in Boston Harbor. We can save money and energy by adding pervious surfaces to our driveways and yards, instead of impervious surfaces like concrete and asphalt.

*Pervious pavers use materials that allow water to percolate through.*

# Stormwater Management

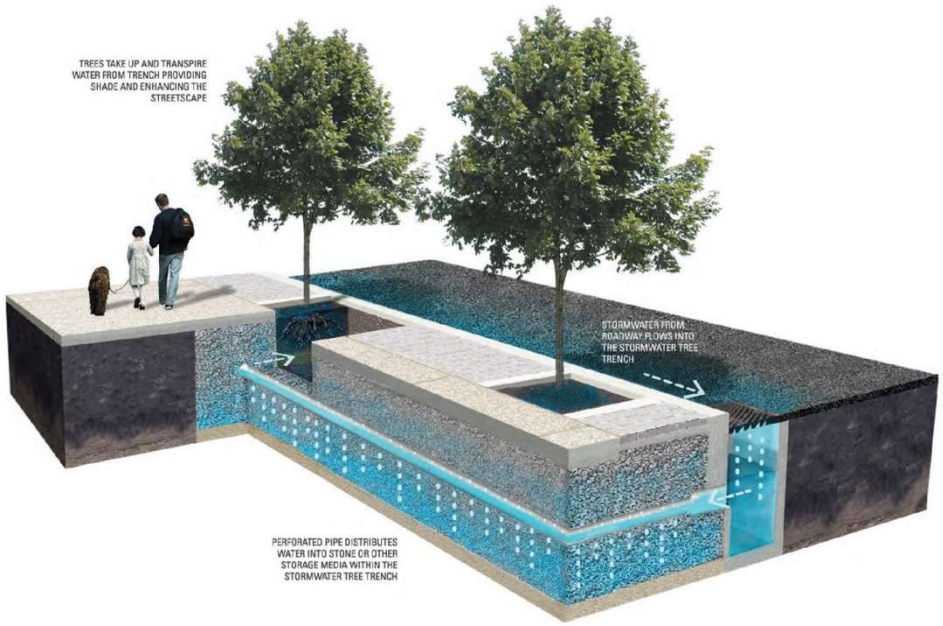
MWH Report 2013

- Shifted focus
- Previous solutions
  - Bottom of hill
  - End-of-pipe
  - Increase capacity
- New solutions
  - Intercept rain
  - Distributed throughout catchment
  - Preserve capacity



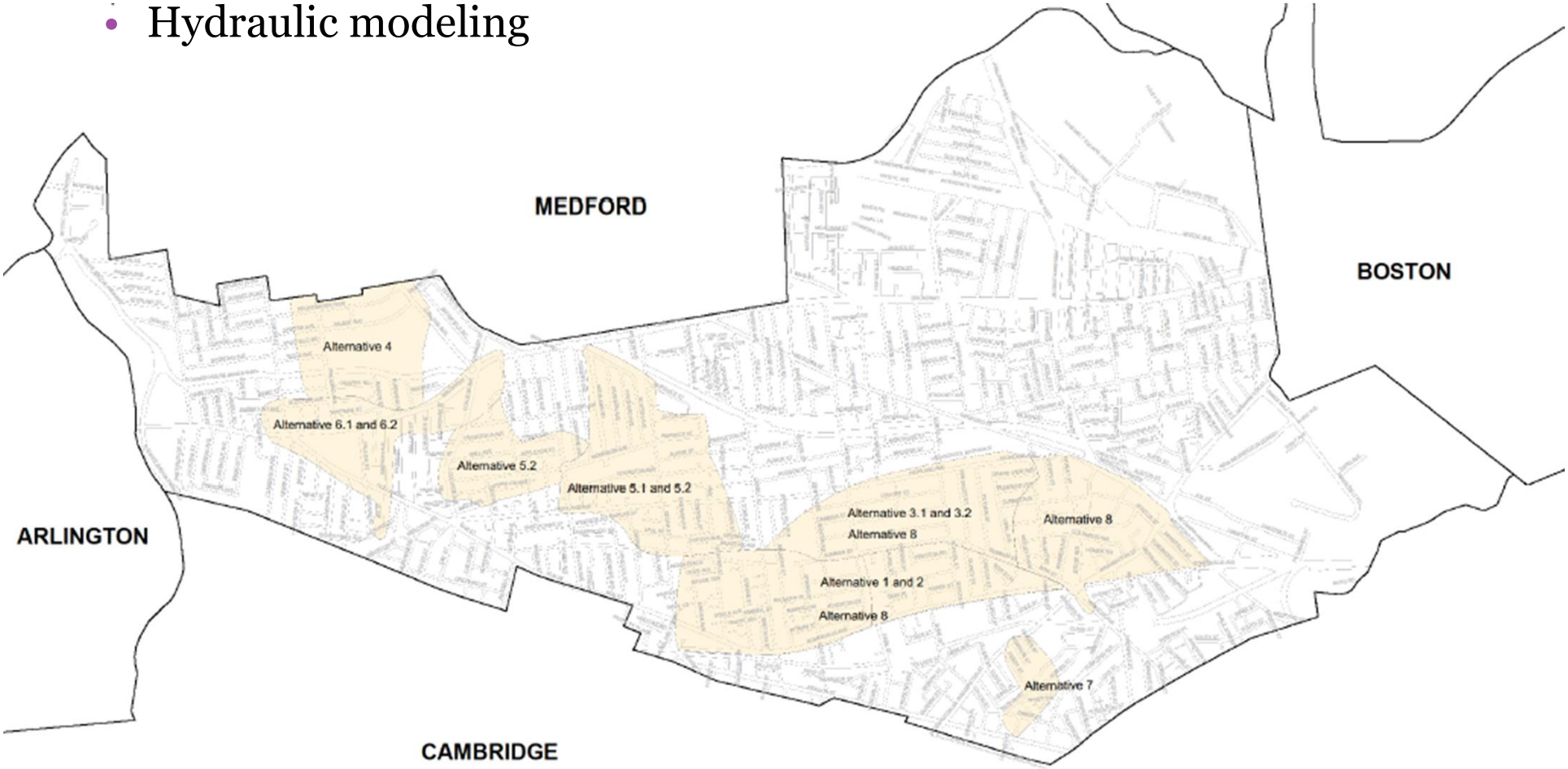
# Stormwater Management Strategies

- Runoff management
- Surface storage
- Underground storage
- Pipe capacity


# Project identification and evaluation

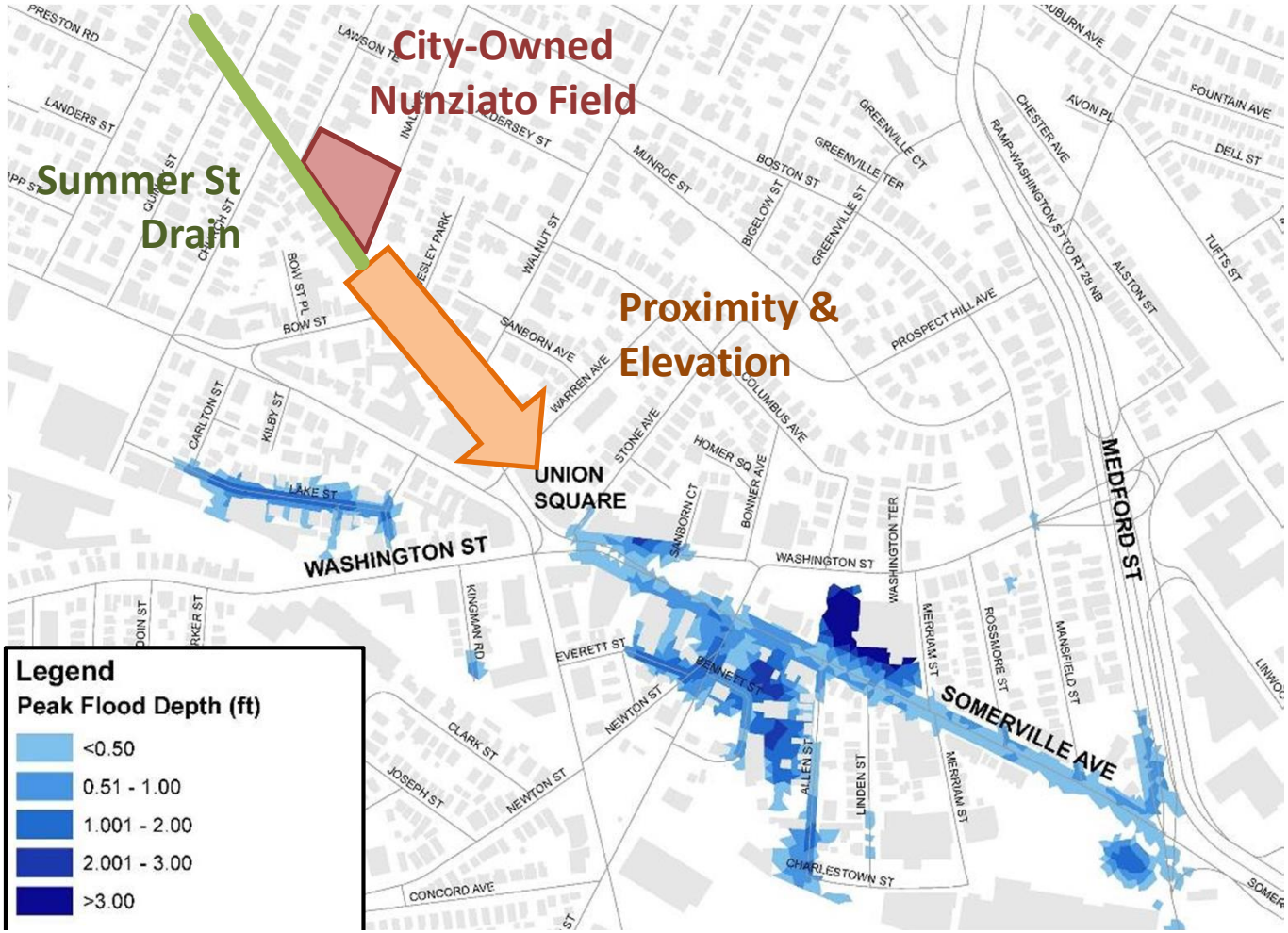
- Concept designs – 8 areas / 11 sub-alternatives
- Cost estimates
- Hydraulic modeling



# Project ranking

- Flood Reduction
- Cost-Effectiveness
- Combination
  - √ Lincoln Park is most cost-effective, but has smaller impact
  - ▫ Somerville Ave Drain has most impact, but expensive
  - ▫ Nunziato most balanced
  - x Conway half as beneficial
- No other projects of benefit

# Nunziato Stormwater & Park



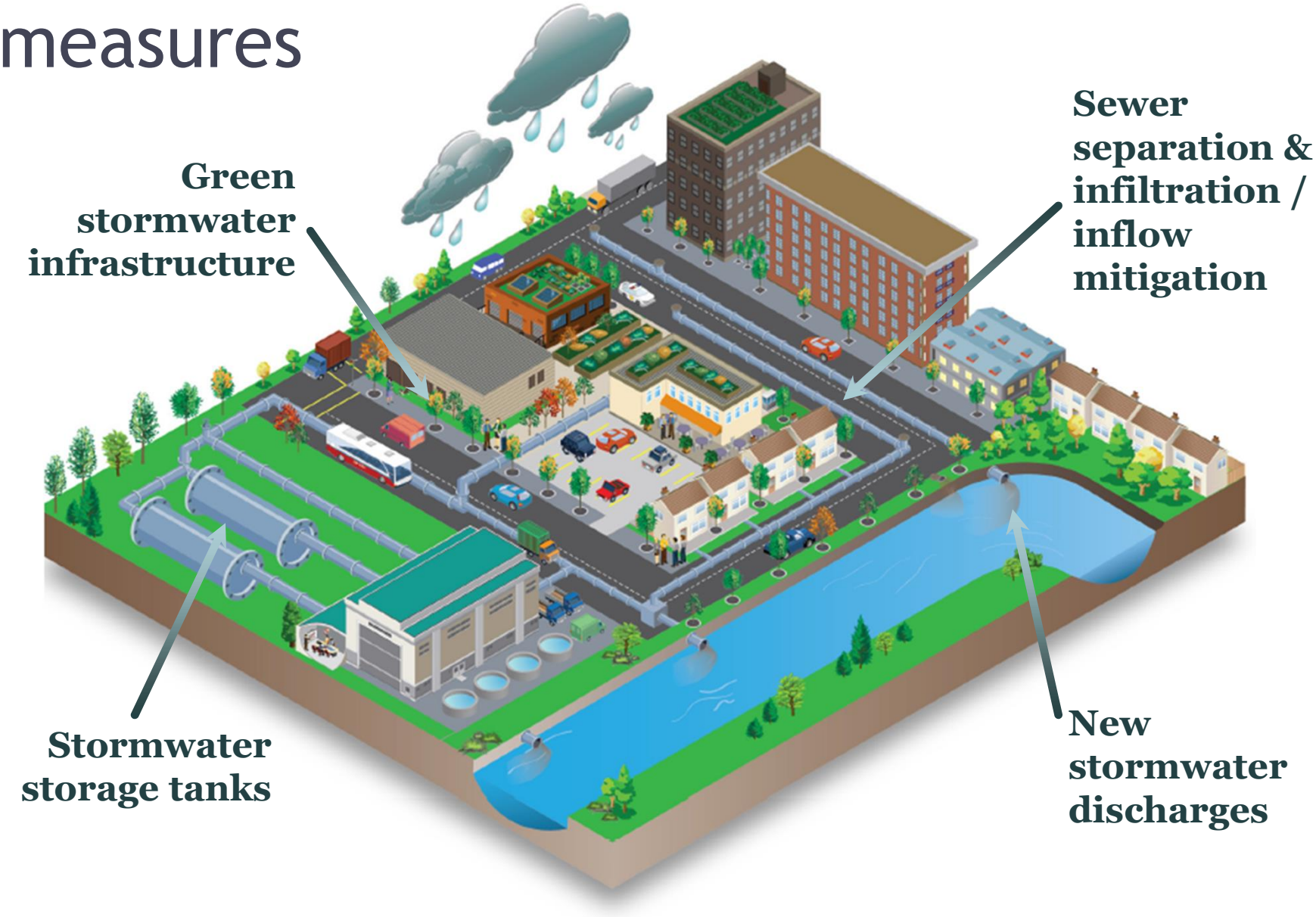
# City-Wide System Problems – Systematic Solutions

Flooding occurs because the system moves water downhill.

Solutions need to be system-wide.

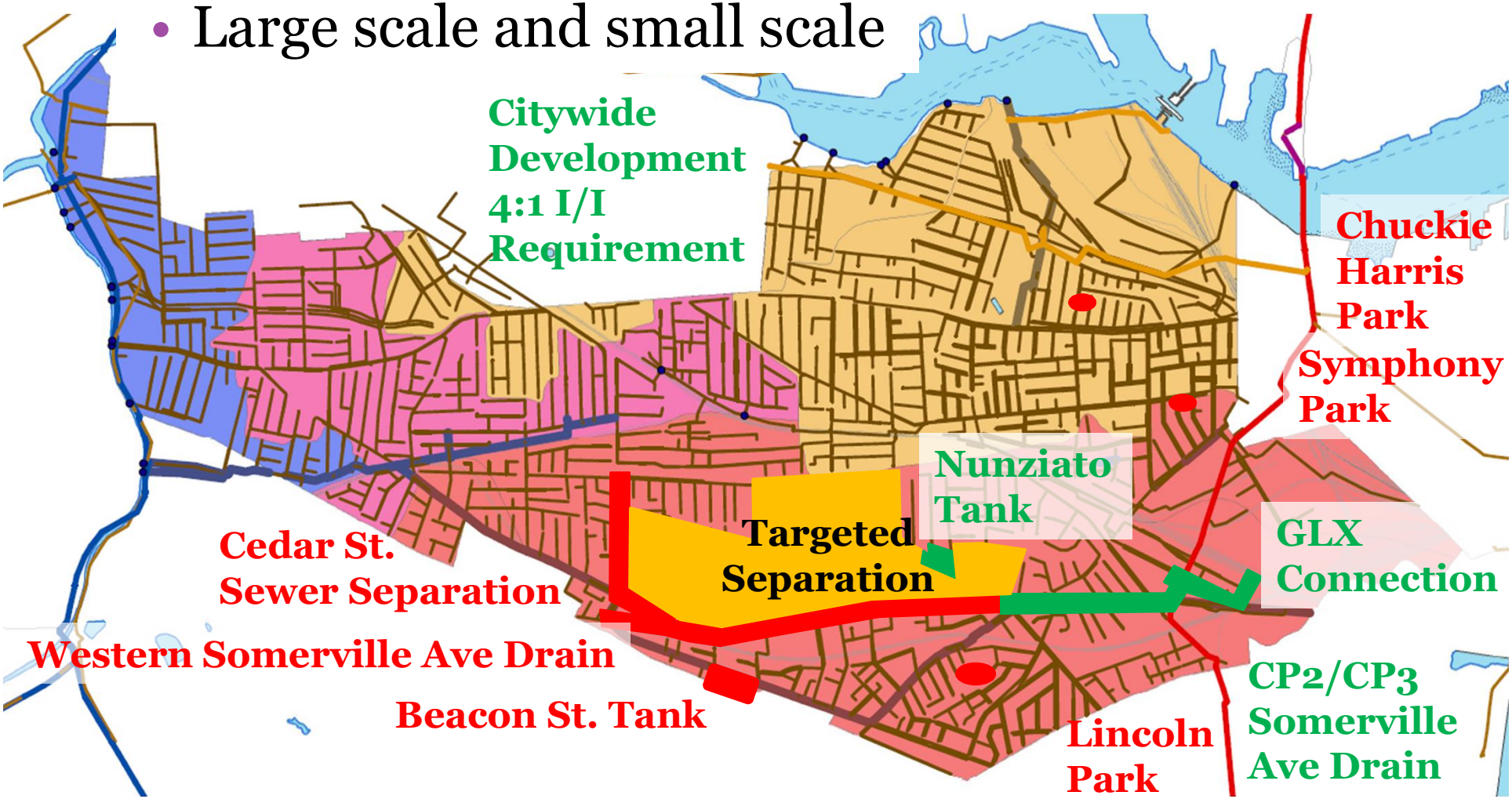
# Complex problem without simple solution

# Requires suite of targeted control measures



# Ongoing and evolving strategy

- **Past – Present – Future**
- Large scale and small scale



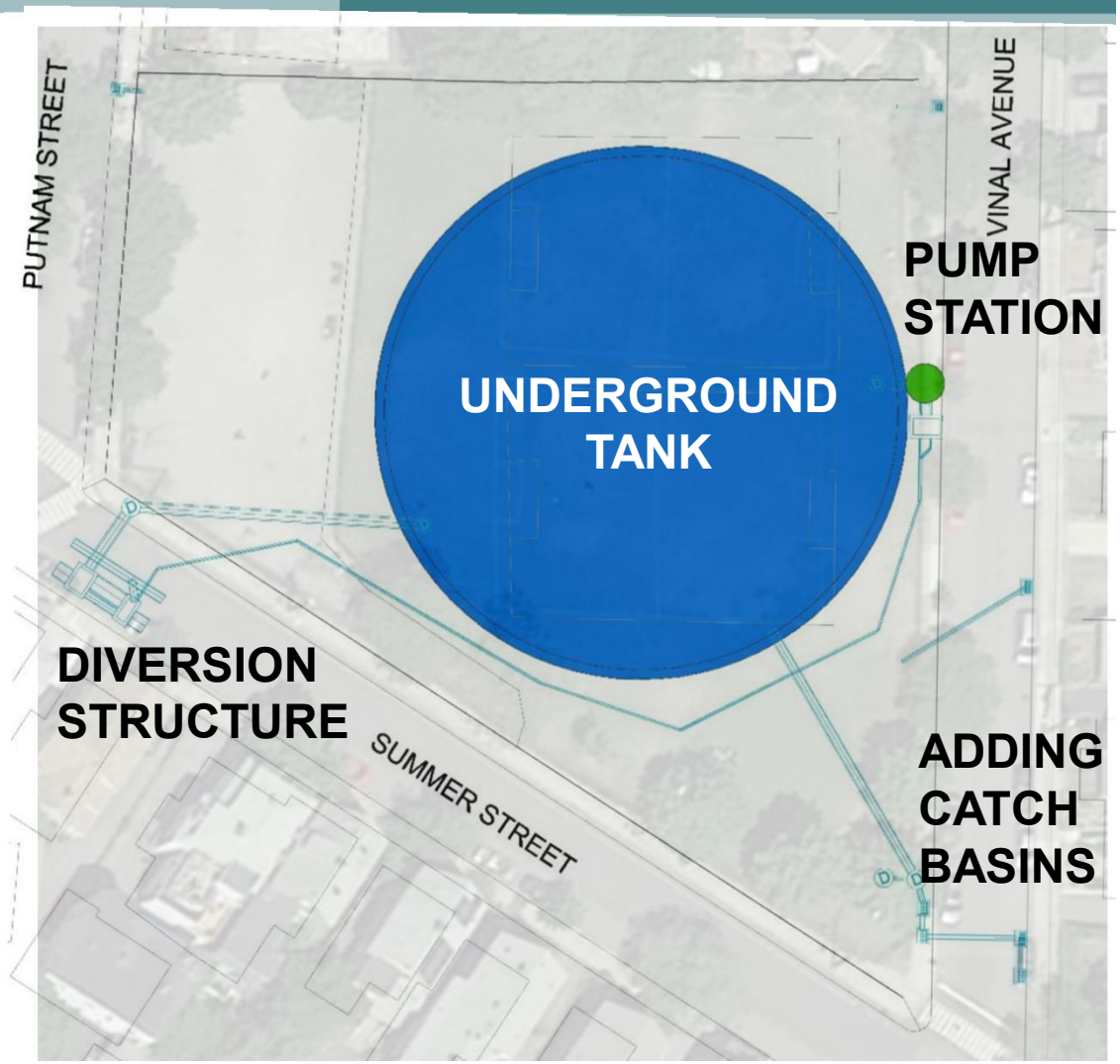
# Project Summary

Quick review and orientation

# Components

# Components

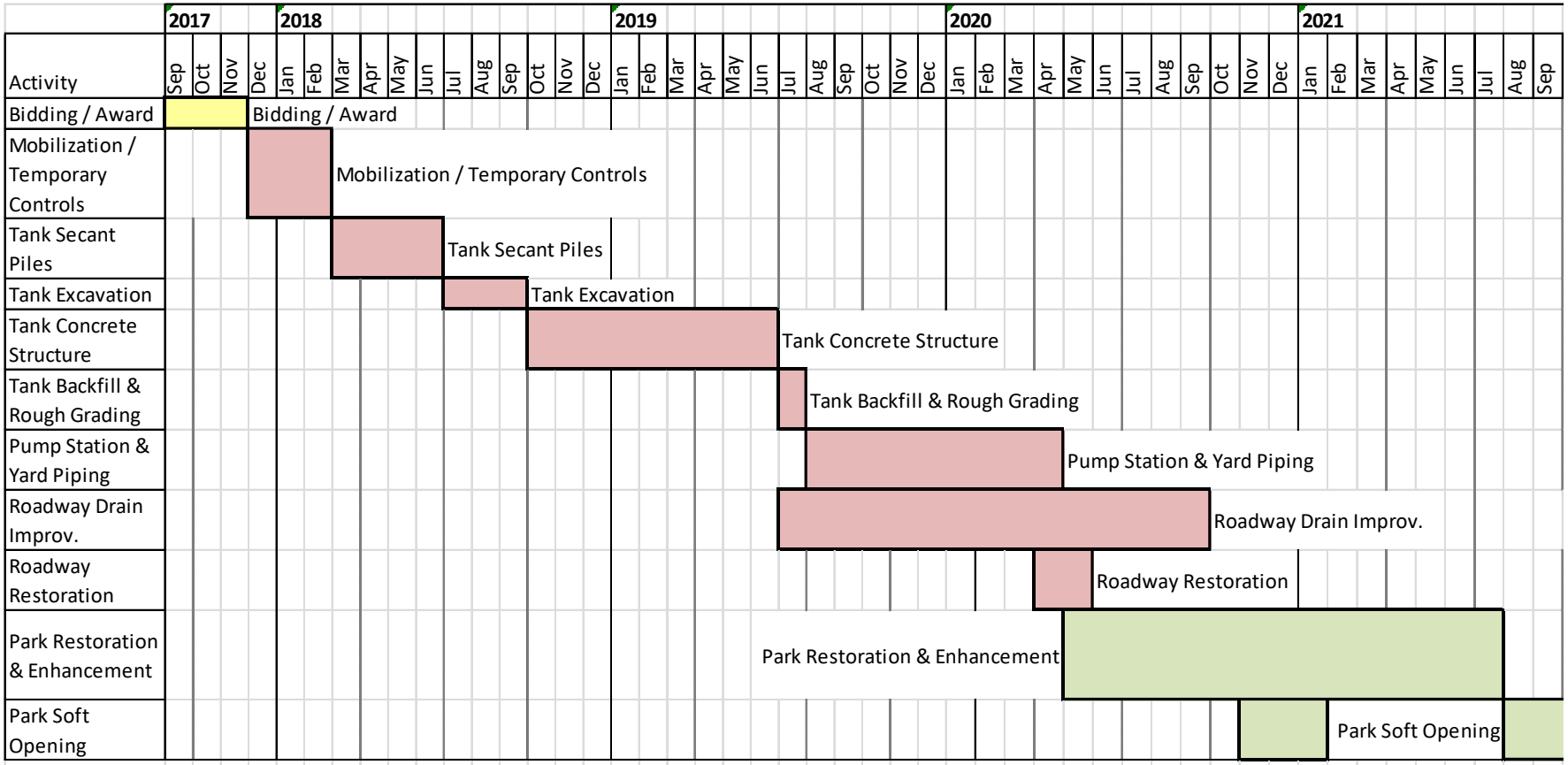
- 1.6 Million gallon underground storage tank
- Pump station & drainage infrastructure
- Green infrastructure
- Raised crosswalks
- Park restoration & enhancements



# Remaining Schedule

## 3 to 4 year project

- Start date and growing season drive park completion date



# Construction Mitigation

What will be done to minimize the impact?

# Thoughtful Design

- Mobilize after soccer season
- Secant pile foundation for tank
- Staging of vehicles and equipment
- Controlled / predictable sequence of construction

# Controls & Protective Measures

## Dust Control

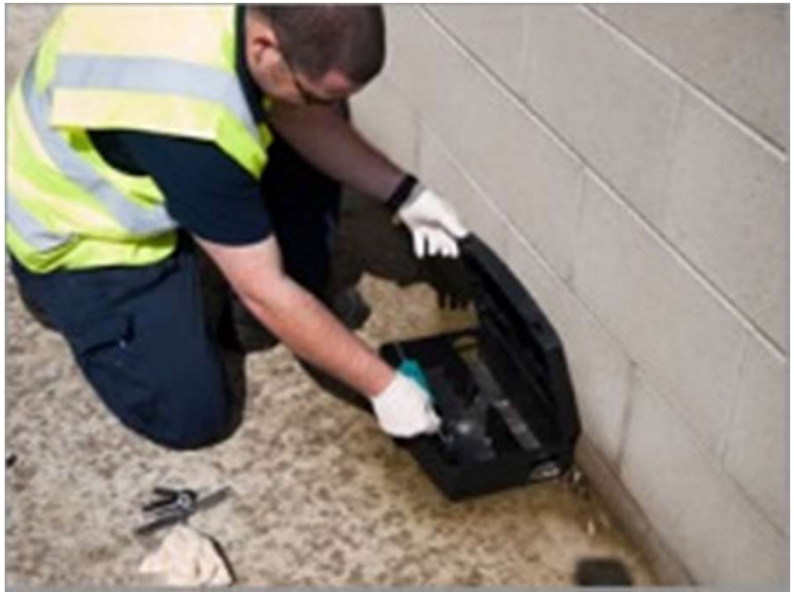
- Sediment & erosion barriers
- Street sweeping
- Suppressant sprays
- Truck washing

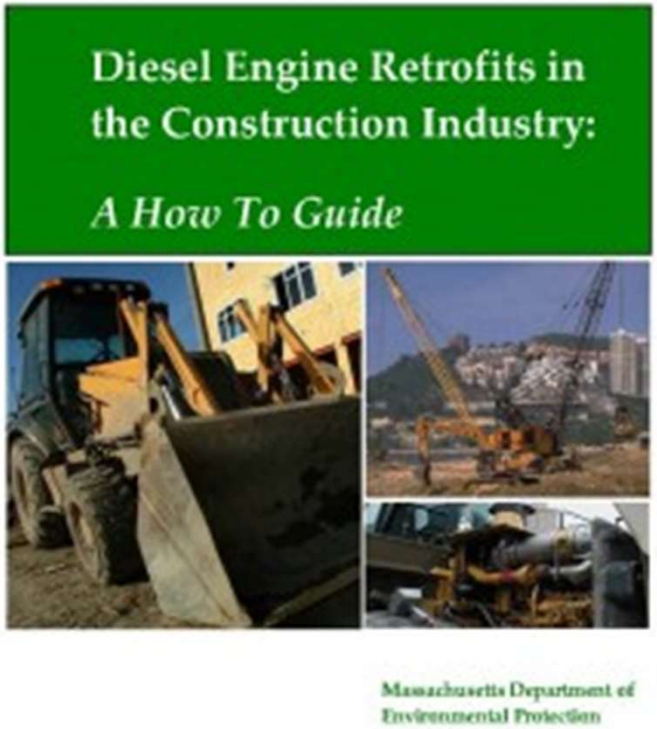

# Noise & Appearance

- City noise ordinance (Monday-Saturday 7am to 7pm)
- Privacy screen at park perimeter
- Contractor clean-up

# Public Health Measures

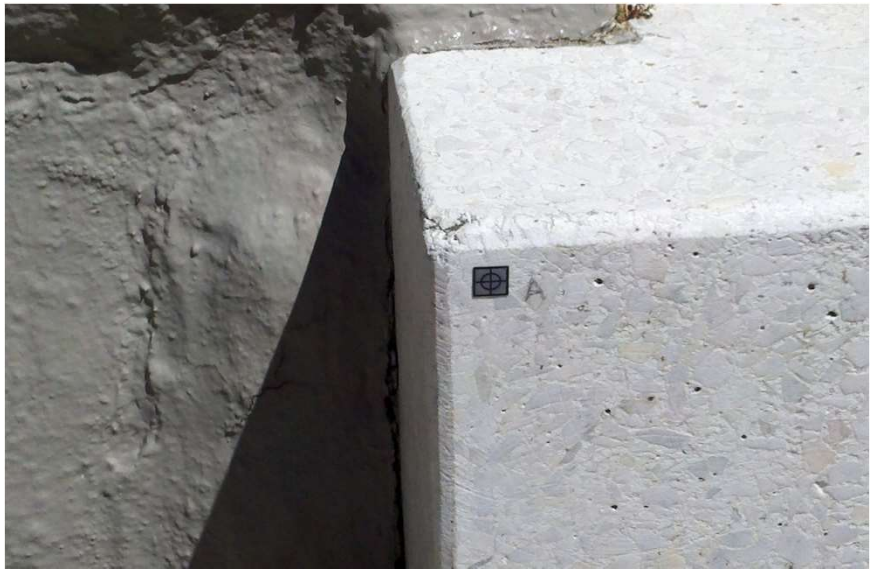
- Securing the site with security fencing
- Rodent controls and special handling of contractor food waste
- Retrofit of diesel construction vehicles with pollution controls





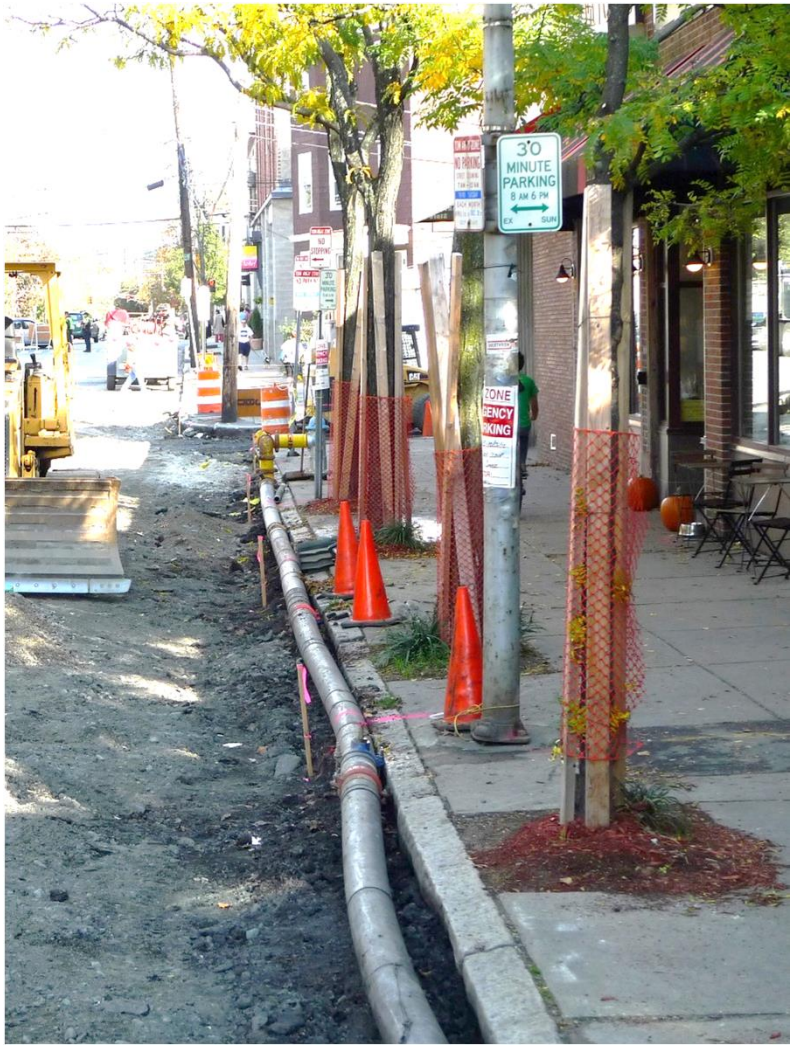
# Property Protective Measures

- Pre-construction survey of structural foundations and building interior
- Real-time monitoring and adaptive response to:
  - Excessive vibration
  - Settlement
  - Groundwater level



# Tree Protection

- Fenced boxes
- Timber strapping



# Traffic Management

- City Traffic Department oversight
- Vehicles, pedestrians and cyclists

# Construction phase updates and issue resolution

- Construction-phase community outreach

# Nunziato Park Design Update

What changed following the February meeting?

# Park Design Concept

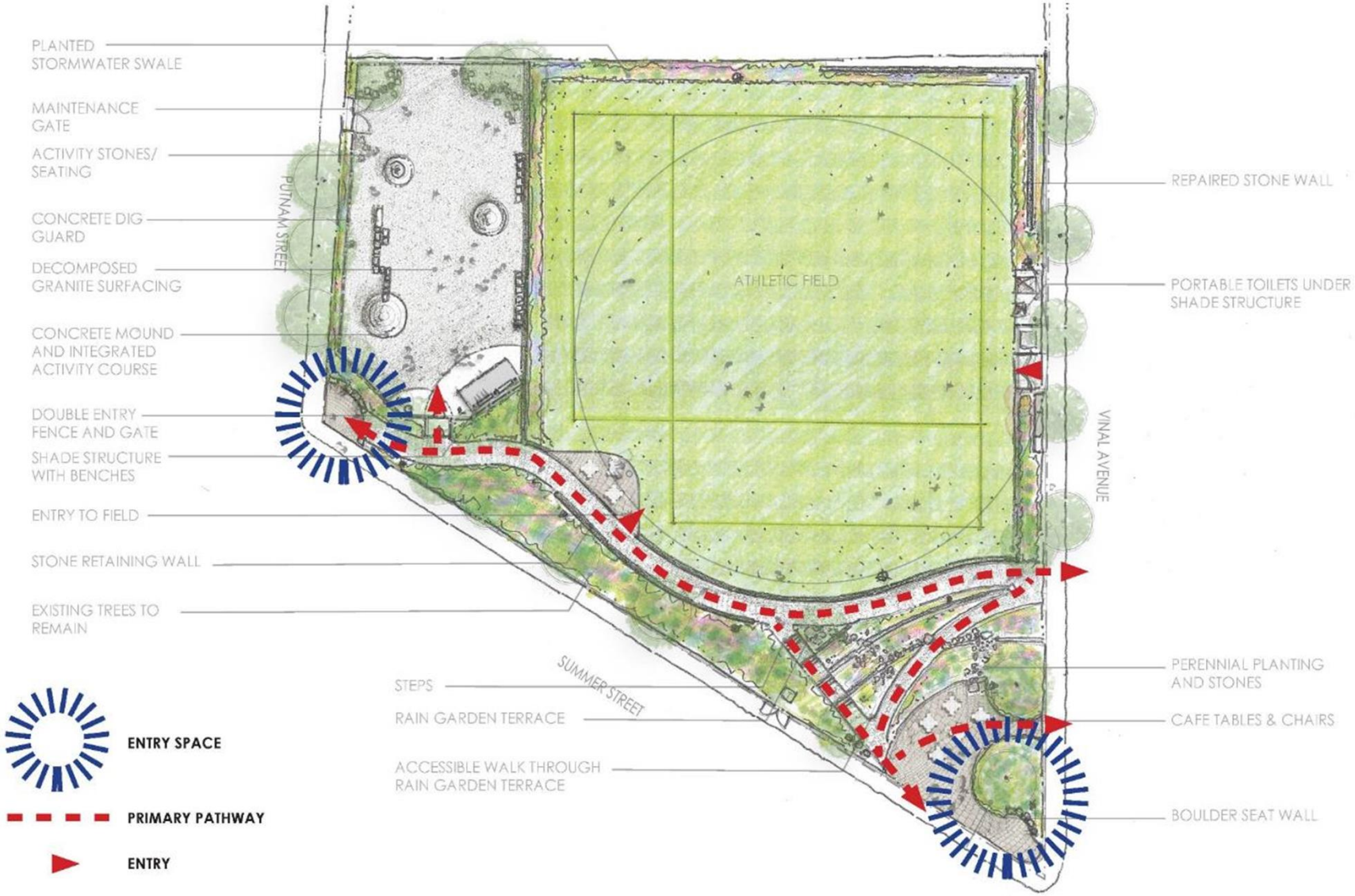
# Park Program

# Design Concept

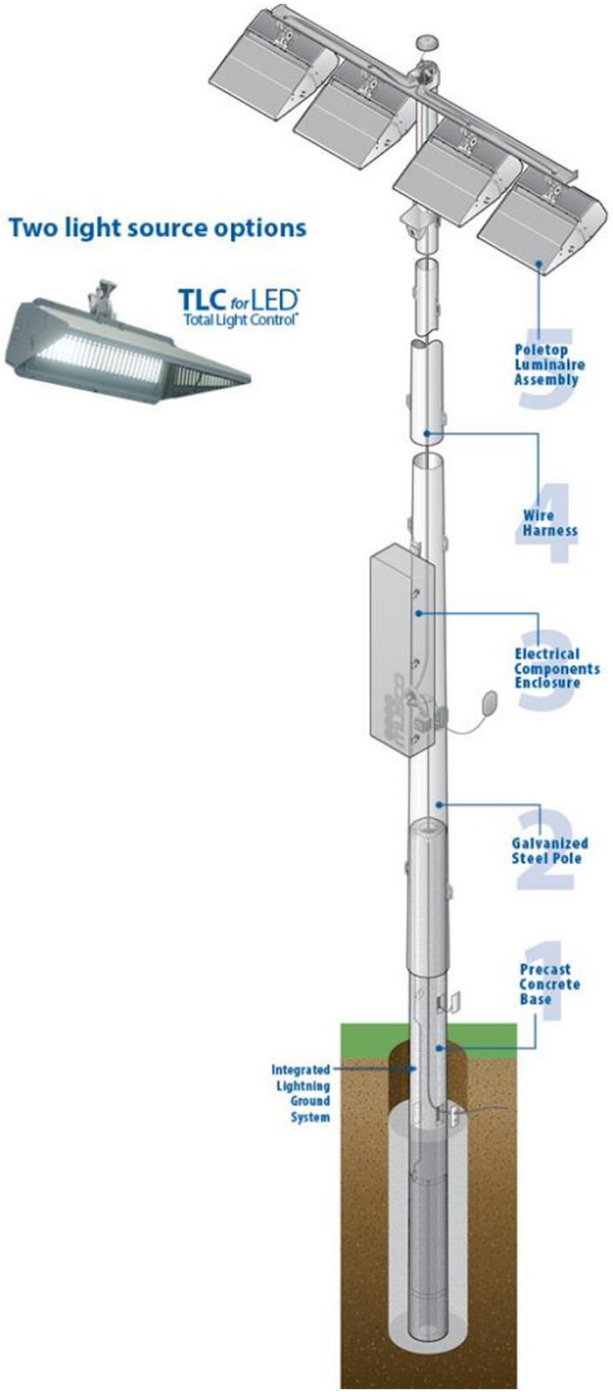

**NUNZIATO PARK** | PLAN
City of **Somerville**
APRIL 2017

Stantec
Planning and Landscape Architecture P.C.

# Entrances & Circulation



# High Performance Grass Field


Two light source options
TLC for LED
Total Light Control
Poletop Luminaire Assembly
Wire Harness
Electrical Components Enclosure
Galvanized Steel Pole
Precast Concrete Base
Integrated Lightning Ground System
5
4
3
2
1

# Green Infrastructure

# Trees


PLANTED STORMWATER SWALE
MAINTENANCE GATE
ACTIVITY STONES/ SEATING
CONCRETE DIG GUARD
DECOMPOSED GRANITE SURFACING
CONCRETE MOUND AND INTEGRATED ACTIVITY COURSE
DOUBLE ENTRY FENCE AND GATE
SHADE STRUCTURE WITH BENCHES
ENTRY TO FIELD
STONE RETAINING WALL
EXISTING TREES TO REMAIN
STEPS
RAIN GARDEN TERRACE
ACCESSIBLE WALK THROUGH RAIN GARDEN TERRACE
PUTNAM STREET
SUMMER STREET
ATHLETIC FIELD
VINAL AVENUE
REPAIRED STONE WALL
PORTABLE TOILETS UNDER SHADE STRUCTURE
PERENNIAL PLANTING AND STONES
CAFE TABLES & CHAIRS
BOULDER SEAT WALL

# Trees


PLANTED STORMWATER SWALE
MAINTENANCE GATE
ACTIVITY STONES/ SEATING
CONCRETE DIG GUARD
DECOMPOSED GRANITE SURFACING
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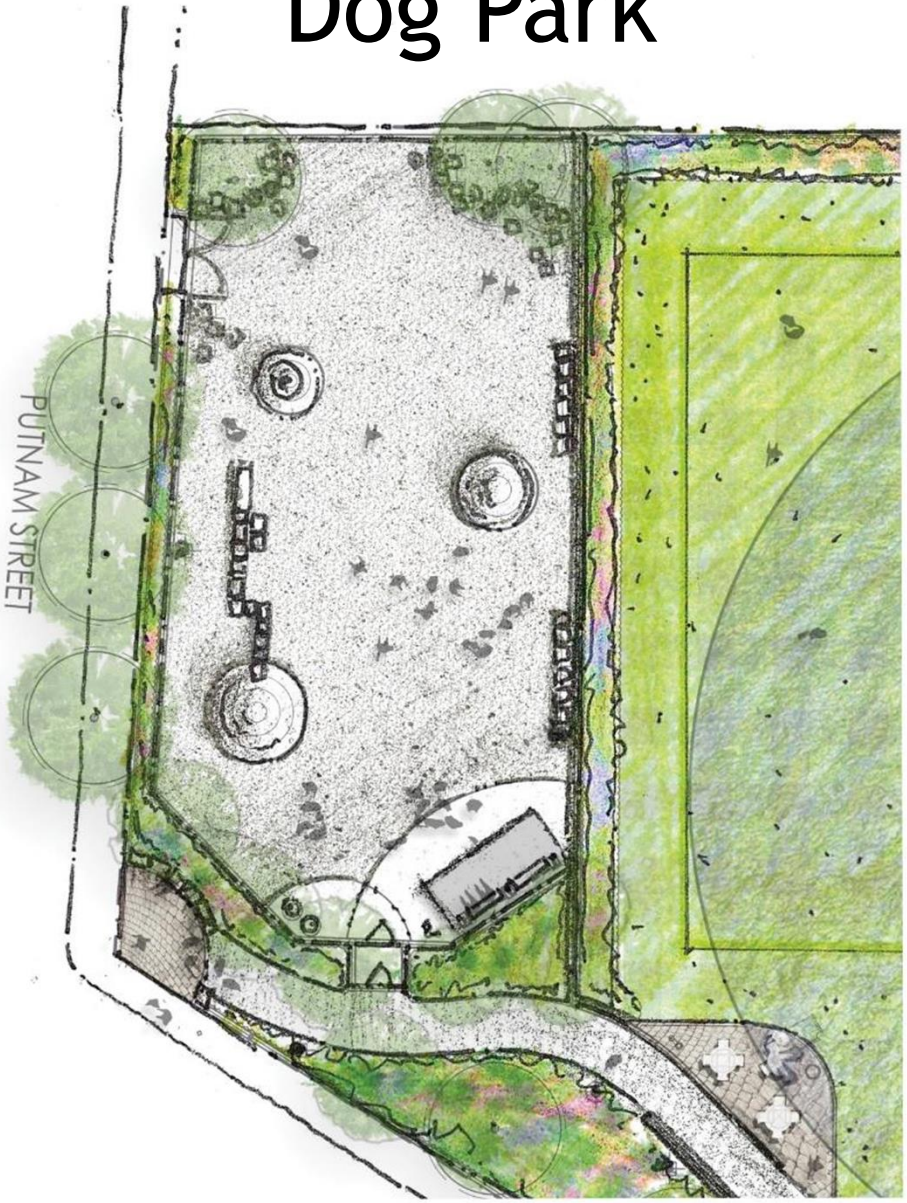
PERENNIAL PLANTING AND STONES
CAFE TABLES & CHAIRS
BOULDER SEAT WALL
ATHLETIC FIELD
SUMMER STREET
VINAL AVENUE
EXISTING TREE
PROPOSED TREE

# Dog Park



# Next Steps

# Next steps

- 100% Design complete
- Obtain Board of Aldermen approval for funding
- Public bid for construction
- Construction contract award
- Mobilization
- Construction

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Mayor Joseph A. Curtatone
Alderman Robert McWatters

Community Meeting 4 – Project Review

25 April 2017