

**June 21, 2022
Planning Board
Utility Infrastructure Planning**

Public Works

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City Resources:

www.cambridgema.gov/fiveyearplan
www.cambridgema.gov/tenyearplan

[www.cambridgema.gov/Departments/
waterdepartment](http://www.cambridgema.gov/Departments/waterdepartment)





CAMBRIDGE
DEPARTMENT
OF PUBLIC
**THE
WORKS**

City of Cambridge
Department of Public Works

Five Year Sidewalk and Street Reconstruction Plan

May 2022



INTRODUCTION | COMPLETE STREETS



Complete Streets are **streets for everyone**. They are designed and operated to enable **safe access for all users**. Pedestrians, bicyclists, motorists, and public transportation (transit) users of all ages and abilities are able to safely move along and across a Complete Street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They help buses run on time and make it safe for people to walk to and from train stations.

Vision Zero calls for the elimination of fatalities and serious injuries resulting from traffic crashes, and emphasizes that they can and should be prevented.

On March 21, 2016, the Cambridge City Council unanimously passed resolutions put forth by the City Manager to formally adopt Complete Streets and Vision Zero policies, showing that the City is committed to achieving these goals, assuring safe access for all users.



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Department of Public Works

Ten Year **Sewer and Drain** Infrastructure Plan

April 2022

INFRASTRUCTURE | ENVIRONMENTAL FOCUS



Photo courtesy of Stantec

Twenty-five years of major investment in sewer and stormwater infrastructure and maintenance has had a **significant, positive impact on improving the water quality** of discharges to receiving waters.

The amount of Combined Sewer Overflows to the Charles River and Alewife Brook have **significantly decreased** over the past two decades: Charles River by 98%, Alewife Brook by 85%. In the Lower Charles, **water quality has improved from a grade of D to a B**. This is a significant accomplishment, but the work is not done to reach the goal of a swimmable Charles River.

PROGRAMS | SEWER SEPARATION

Cambridge's sewer system is approximately 55% separated, where sewage goes to the MWRA for treatment and the stormwater discharges directly to Alewife Brook or the Charles River.

The remaining system is combined sewer, where the sewer and stormwater share a common pipe and can be directed to the MWRA for treatment during dry and wet weather, and to the Alewife Brook or the Charles River during wet-weather CSOs.

Sewer separation provides benefits by:

- Improving the quality of waterways in and around Cambridge
- Reducing CSOs
- Eliminating sanitary sewer backups that cause SSOs
- Reducing flooding
- Maintaining compliance with regulations

Separating the sewer introduces additional considerations. Challenges can present themselves related to water quality, flooding, increased SSOs, and other public health factors.

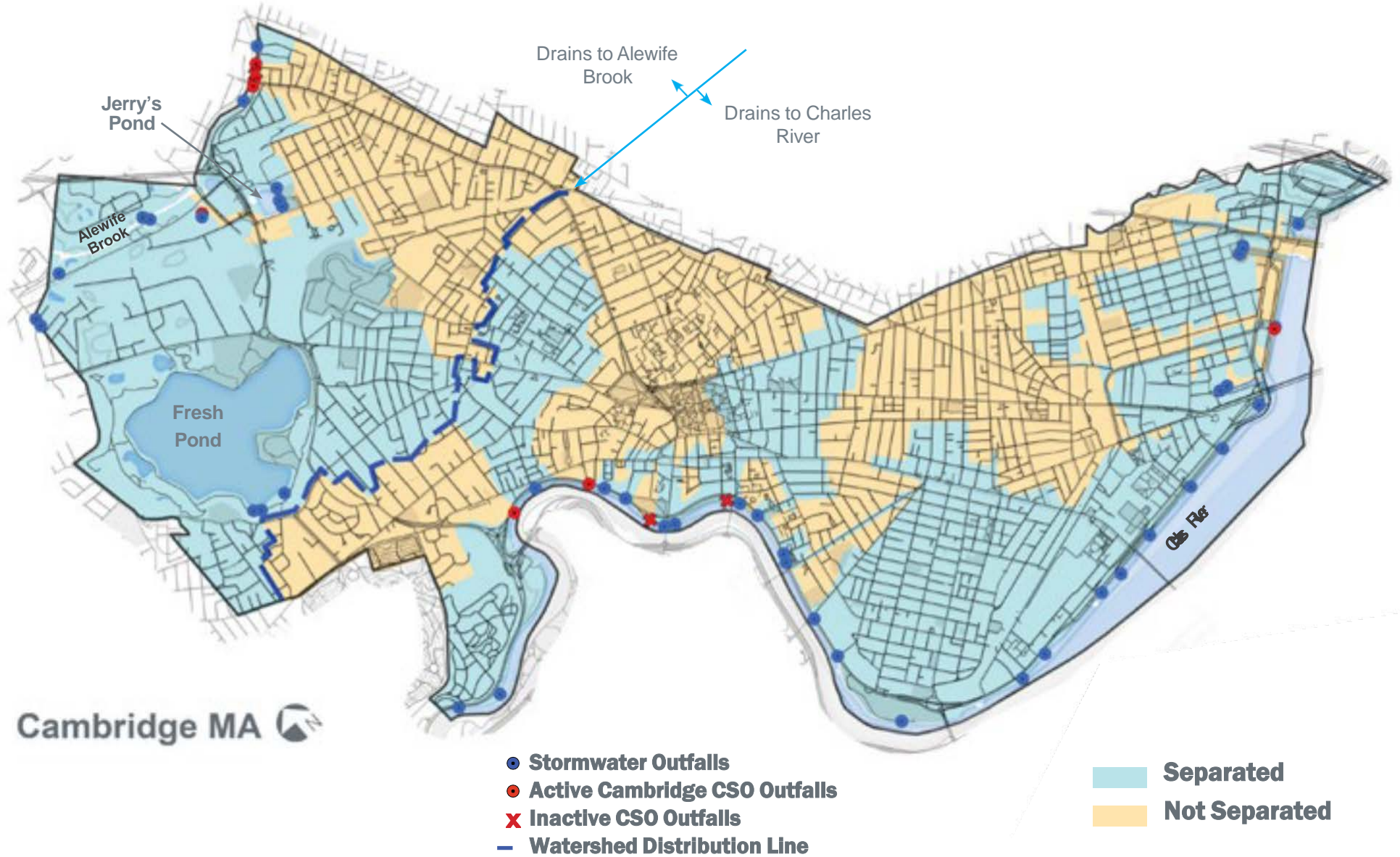
Separated



Combined



PRIORITIES | SEWER SYSTEM



This map shows the areas of Cambridge's sewer system that are separated and are not separated and the active City-owned outfall locations. The City is 55% separated and 45% not yet separated.

PROGRAMS | CSO PLANNING



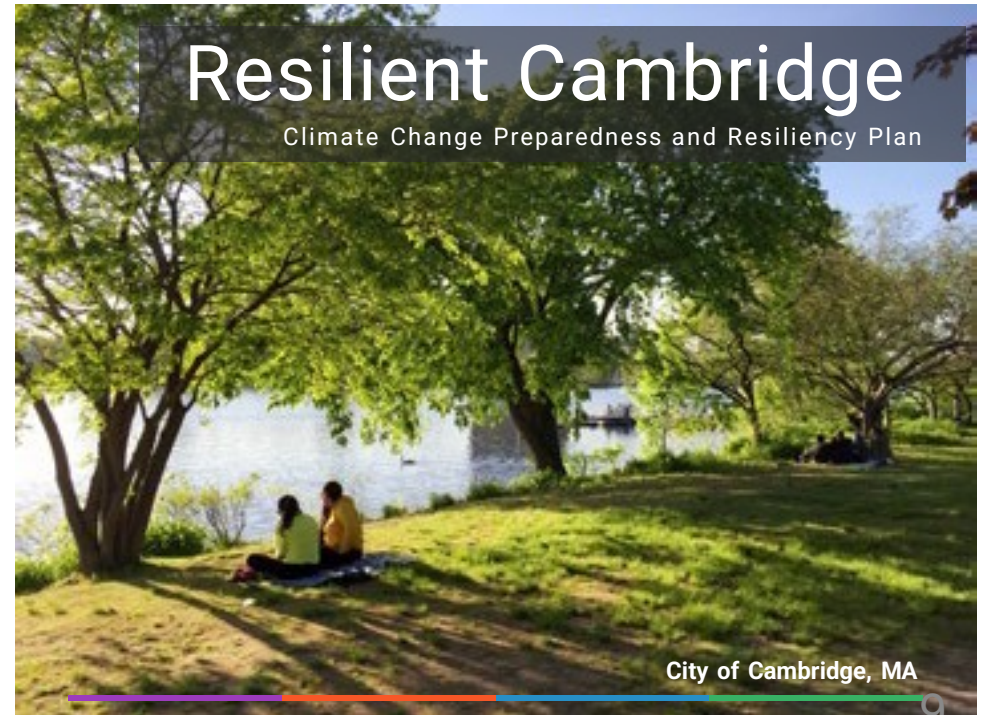
In accordance with the **Variances for CSO Discharges** to the Charles River Basin and to the Alewife Brook/Upper Mystic River Basin, the City is developing a CSO Control Plan for the 12 CSO outfalls that the City owns and operates through its NPDES CSO Permit. Two CSOs have been permanently closed (and one outfall temporarily) in the Alewife Brook watershed, while two more are temporarily closed pending hydraulic evaluations along the Charles River. **The City's CSO Control Plan will be developed from April 2022 through December 2023** through a process that includes:

- **Coordination with MWRA and the City of Somerville**
- **Development of additional CSO control measures**
- **Collaboration through public participation**
- **Evaluation of benefits to water quality and system performance**

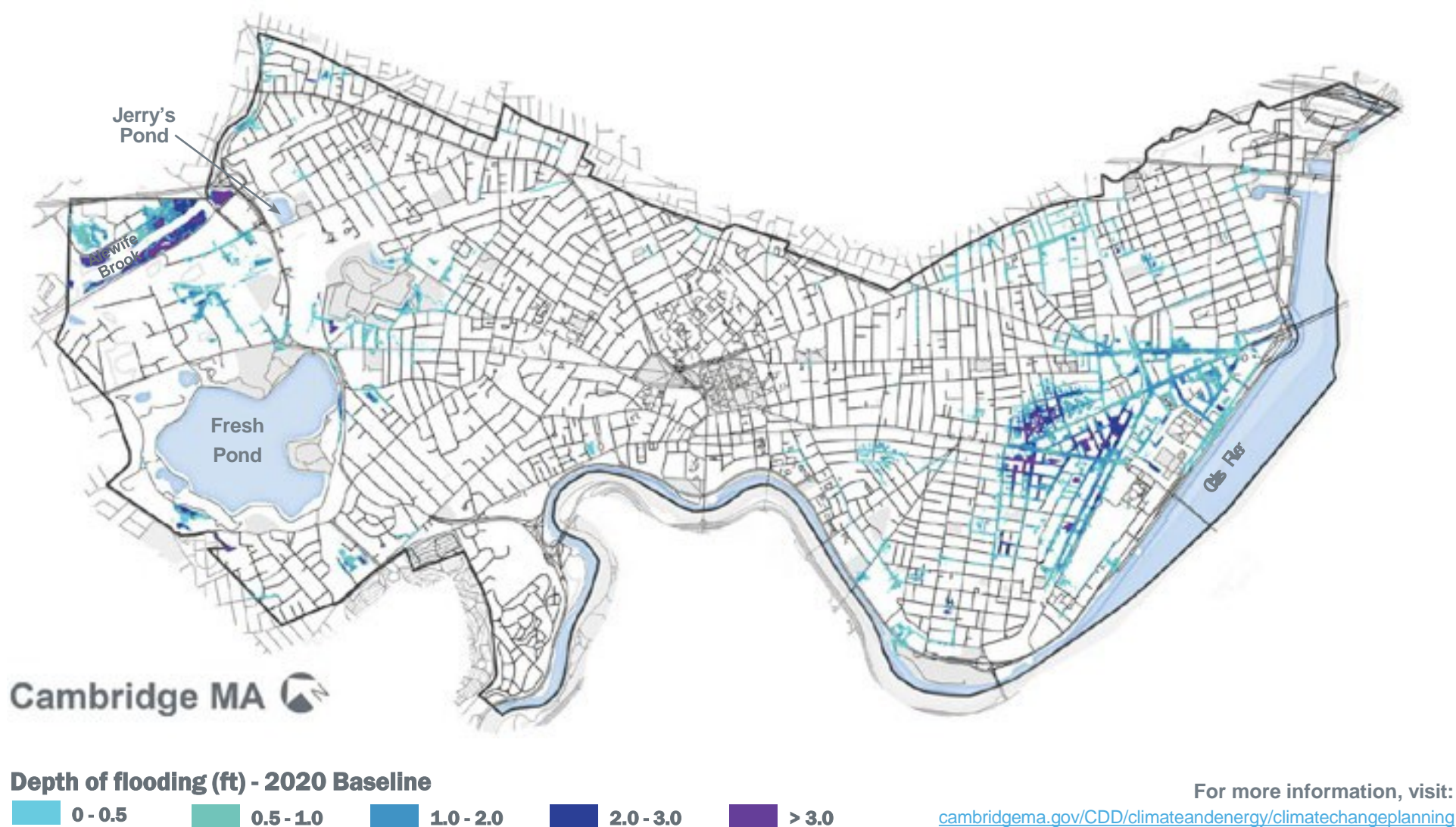
PROGRAMS | CLIMATE CHANGE PLANNING

The City is committed to **Climate Change Vulnerability and Preparedness Planning**, a summary of which can be viewed in the City's Resilient Cambridge plan. Planning efforts include:

- Identifying vulnerabilities to flooding due to increasing precipitation and sea level rise/storm surge
- Identifying adaptation and resiliency strategies, including strategies for sewer and drain infrastructure
- Informing changes to regulations
- Evaluating project impacts to climate change
- Coordinating federal, state, and regional efforts
- Preparing community through education and outreach



PRIORITIES | CLIMATE CHANGE



From the Climate Change Vulnerability Assessment, this map shows the precipitation flooding scenario under the 10-year 24-hour storm by 2070s (updated March 2022 with data from the FloodViewer). 10

PROGRAMS | CLIMATE CHANGE PLANNING

Focus on Building a Resilient Cambridge

FloodViewer – informational tool to assess climate change threats from flooding and to make properties and neighborhood spaces more resilient by implementing specific strategies.

Build / Protect – 2070, being incorporated into zoning

How to use the FloodViewer:

- Visit Type in the property address
- Select the Flooding Scenario to see the flooding simulation at the address



www.cambridgema.gov/services/floodmap



The FloodViewer shows that Cambridge DPW on Hampshire Street is at risk of flooding from a 2070 storm that has a 10% chance of happening.

DESIGN | STORMWATER & SANITARY TANKS

Development and redevelopment projects provide on-site detention storage for the stormwater volume difference between the **2070 2-year 24-hour** and the **2070 25-year 24-hour** storm event – enables the stormwater system to be resilient against larger storm events.

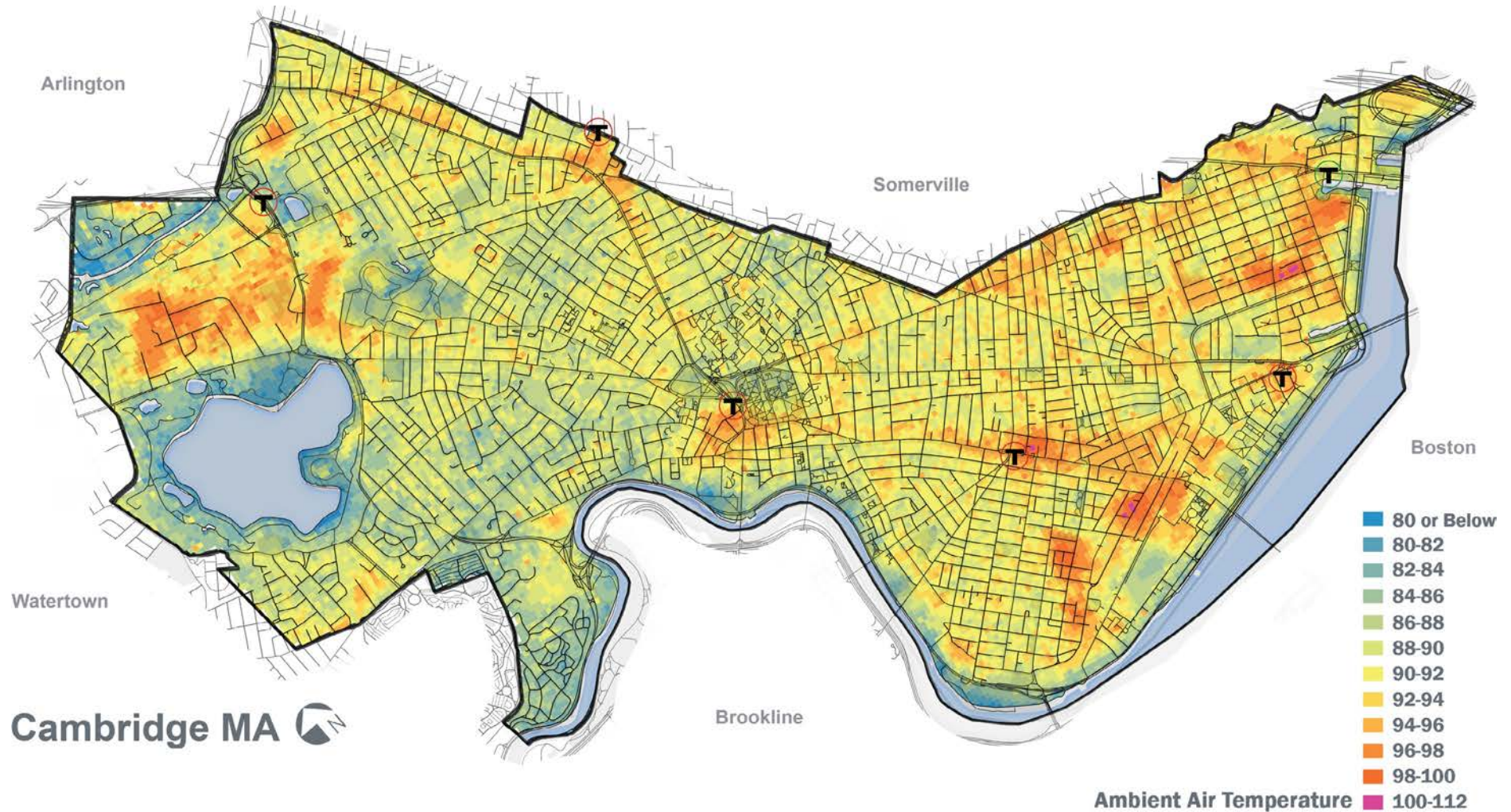
Owner	Stormwater Tanks	Sewer Tanks	Total
City	13	1	14
Private	33	30	63
<i>Subtotal</i>	<i>46</i>	<i>31</i>	<i>77</i>

Stormwater is managed through a variety of strategies – green infrastructure, private stormwater and sewer tanks, as well as larger stormwater tanks to help manage flooding during large storm events.

The Parking Lot 6 (PL6) Stormwater Tank, for example, went online in May 2021 and diverted more than 3.5-million gallons of stormwater in summer 2021, the third-wettest summer on record. **The tank significantly reduces flooding in The Port neighborhood.**



Urban Heat Index | CLIMATE CHANGE



The Urban Heat Index (UHI) shows the “feels-like” temperature based on a 90-degree day with 46% humidity. Factors, such as increasing temperatures and tree canopy loss, are increasing the “feels-like” temperature over time. Young children and older residents are most at risk of heat-related illness.

For more information, visit: www.cambridgema.gov/CDD/Projects/Climate/climatechangeresilienceandadaptation

Urban Heat Index | CLIMATE CHANGE

Street trees



Sprinkler parks



Cool roofs/
cool asphalt



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Urban Heat Index | CLIMATE CHANGE

A healthy urban forest is a vital part of a healthy city. Trees - whether they are on streets and in parks, on private properties and campuses - help us lower sidewalk temperatures in the summer, reduce home cooling costs, improve air quality, and support a living ecosystem.

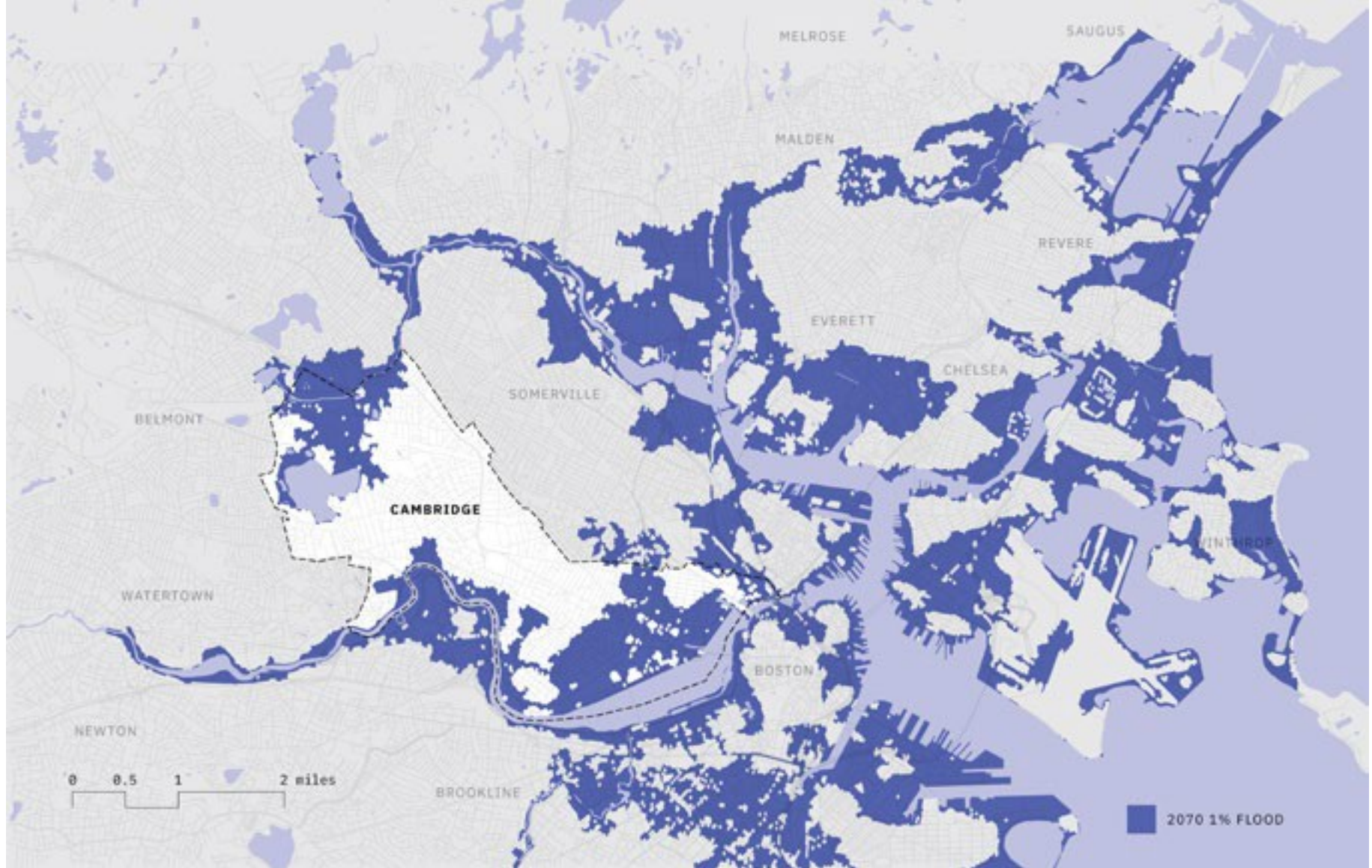
The City maintains over 19,000 trees and has developed an Urban Forest Master Plan to guide the development of the urban forest into the future. The goals are: increase canopy cover where lacking; enhance canopy cover in the public realm to create “cool corridors”; and incentivize each landowner to increase canopy cover.



The images above show the cooling impact on a 90-degree day relative to streetscape. As the tree canopy increases, the temperature decreases. It is our common responsibility to plant and maintain trees every year to sustain our urban forest and foster a healthy city.

For more information, visit: www.cambridgema.gov/Departments/publicworks/urbanforestmasterplan

Coastal Flooding | CLIMATE CHANGE



The dark blue area on this map shows the probable flooding from sea level rise and storm surge during a storm in 2070 that has a 1% chance of occurring. Ten interventions have been identified that address upstream flooding in the Charles and Mystic rivers. View them on Page 21.

Coastal Flooding | CLIMATE CHANGE

Protection for a 2070 1% coastal storm:

- 10 target interventions
- 12 communities
- 108,000 residents
- \$60 billion in real estate value



The City is working with regional partners to implement these interventions including raising the Amelia Earhart and Charles River dams, both circled in red, which are critical to protecting the region from a 2070 1% coastal storm.

CONCLUSION

Goal – infrastructure that serves **residents and businesses** today and in the future.
Resiliency of new development is a critical piece of this work.



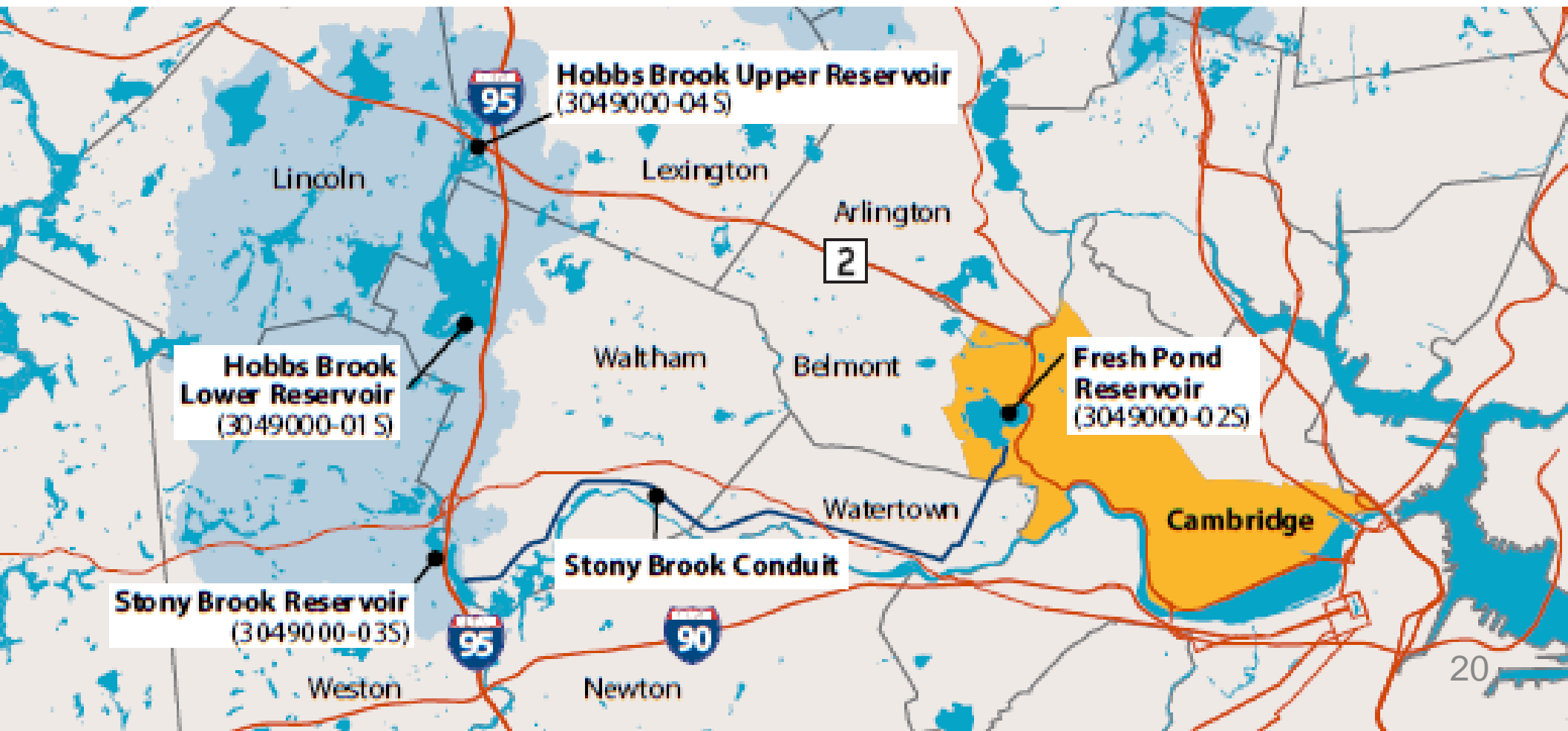
WATER | SUPPLY, DEMAND & DISTRIBUTION



WATER | SUPPLY

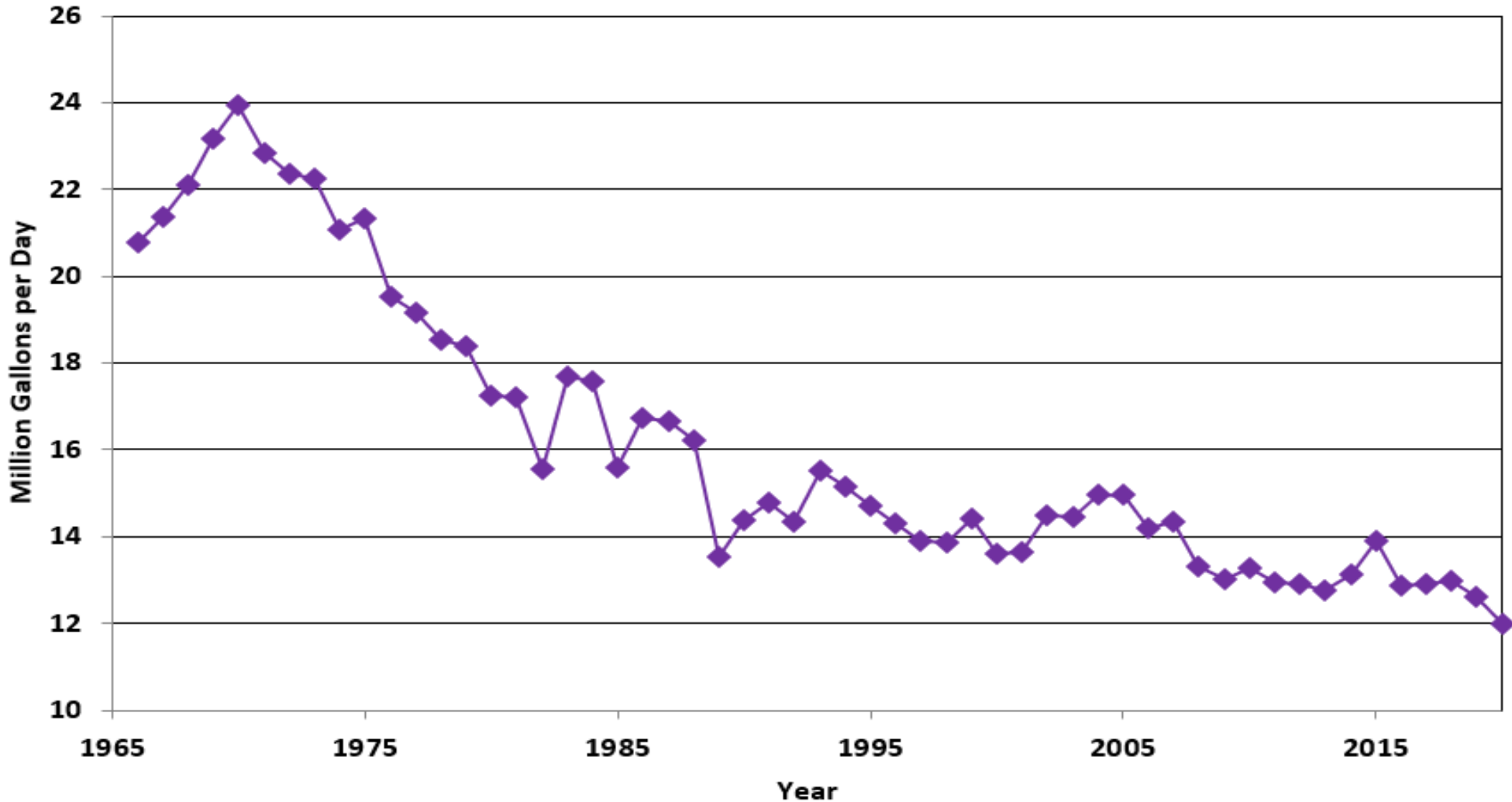
Stony Brook Watershed, nested within the Charles River Basin, in the towns of Lincoln, Lexington, Weston, and the City of Waltham.

Water makes its way through tributaries and a series of reservoirs to its final destination in Fresh Pond and the Water Treatment Facility.



WATER | DEMAND

Historical Finished Water (1966 - 2020)



46% Reduction in water (1970 to 2019)

\$100M+ investment since 1995 to replace 50 miles of water mains; reducing leaks and breaks. Increased water efficiency in new and existing buildings.

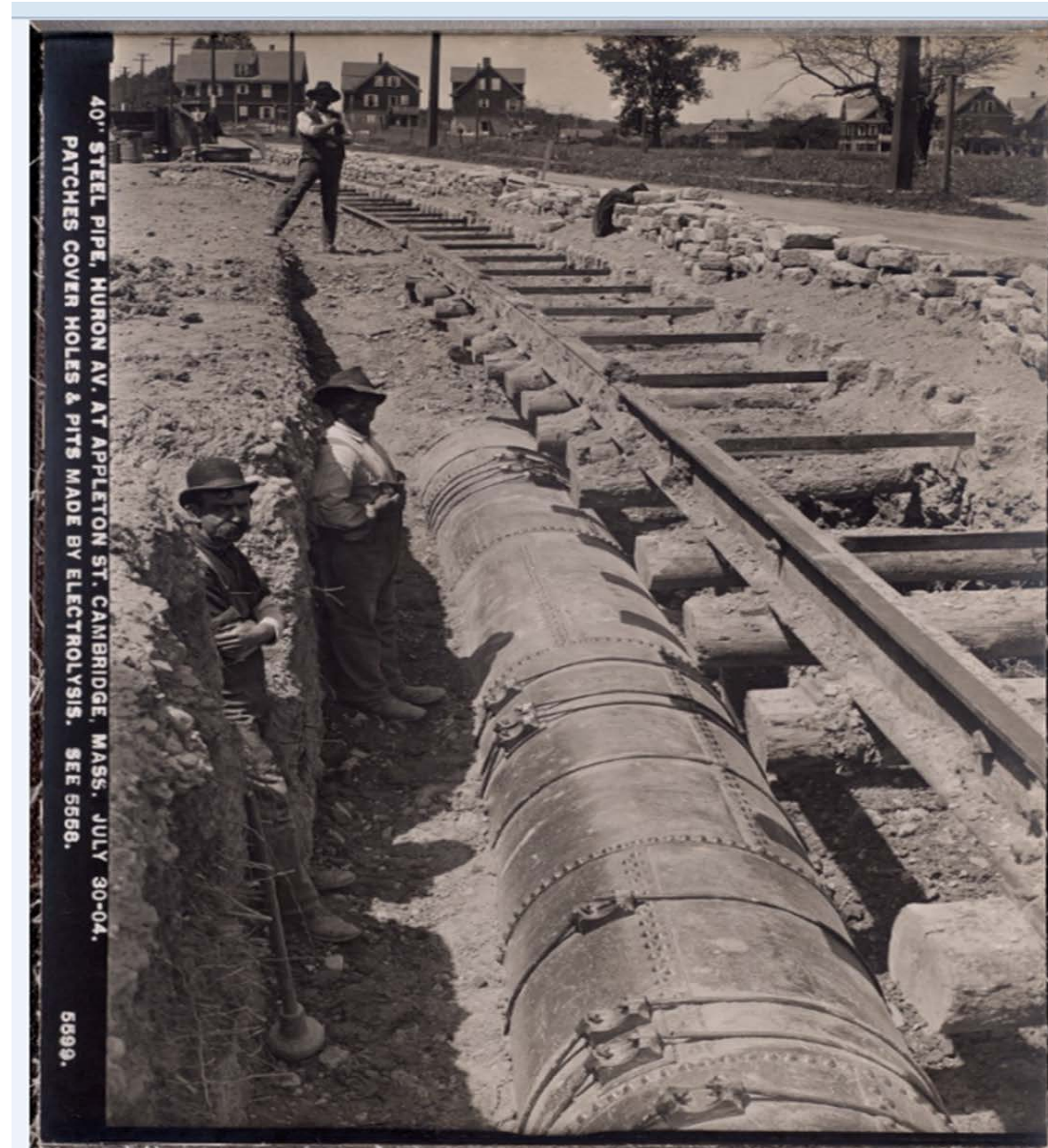
WATER | TRANSMISSION & DISTRIBUTION

Approximately 210 miles of pipe ranging from 4" – 63"

24 miles of Transmission Mains

186 miles of Distribution Mains

Pipe Install dates range from 1864-Present



WATER | TRANSMISSION & DISTRIBUTION

Proactive approach

In 1992 CDM Assessment of the Transmission and Distribution system to identify areas of vulnerability and make recommendations for repair, replacement and preventative maintenance.

75% of all leaks and fire flow issues were found on **old 6” unlined cast iron mains**.



WATER | TRANSMISSION & DISTRIBUTION



PRO-ACTIVE LEAK DETECTION SURVEY

Minimize cost and
disruption of unplanned
water main repair



1 leak on JFK Street = \$80,000 repair





PRO-ACTIVE
TRANSMISSION MAINS
CATHODIC PROTECTION/CORROSION
CONTROL STUDY

WATER MAIN REPLACEMENT PROJECTS

2021				
STREET	FROM	TO	SIZE	FT
TREMONT	100	200	8	140
HURON	PARK	GOLF COURSE	12	1800
AVON HILL	LINNEAEN	RAYMOND	8	1300
GORE	THIRD	SEVENTH	8	1400
CAMB PK DR	100	200	12	200
OAK	CAMBRIDGE	SOMERVILLE LINE	8	300
CAMBRIDGE	ANTRIM	SPRING	12	200
BROADWAY	BINNEY	AMES	16	650
			TOTAL LENGTH REPLACED	5850

2022				
STREET	FROM	TO	SIZE	FT
WINSLOW	SHERMAN	DEADEND	8	400
BINNEY	FULKERSON	SIXTH	12	200
HURON	ABERDEEN	FRESH POND PKWY	12	1000
HARVARD	PROSPECT	PORTLAND	12	2600
BELMONT	HOLWORTH Y	ERICSSON	12	1250
MONSIGNOR O'BRIEN HWY	THIRD	SOMERVILLE LINE	12	1050
			TOTAL LENGTH REPLACED	6500

**LEAD SERVICE
REPLACEMENTS**

**87 Service
Replacements in
2021**

CAMBRIDGE WATER QUALITY



- CAMBRIDGE WATER DEPARTMENT (CWD) EXCEEDS ALL US EPA AND MASSDEP REGULATIONS
 - 2021 Water Quality Report
- Per and Polyfluoroalkyl Substances (PFAS)
 - Continue to be in compliance with MassDEP PFAS6 regulations (2019 to Present)
 - PFAS6 < 20 ppt (parts per trillion)
- Under Contract to Replace Granular Activated Carbon (GAC) Filter Media
 - GAC will reduce PFAS6 levels significantly
 - Expect GAC Filter Media Replacement to be completed by 1 September 2022

