



From Planning to Practice: Stormwater Management in Malden, MA

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Mystic River Watershed Association

A stylized map of the Mystic River watershed. The land is shown in light gray, and the water bodies, including streams, rivers, and lakes, are shown in various shades of teal and blue. The map covers a large area, showing the extensive network of waterways that drain into the main Mystic River.

The Mystic River watershed is a network of streams, rivers, and lakes, all draining into the Mystic River.

76
SQUARE MILES

44
LAKES & PONDS

21
COMMUNITIES

600,000
PEOPLE

LEARN MORE
MYSTICRIVER.ORG

- **Introduction and Background**

- MyRWA
- The problem
- MassBays grant

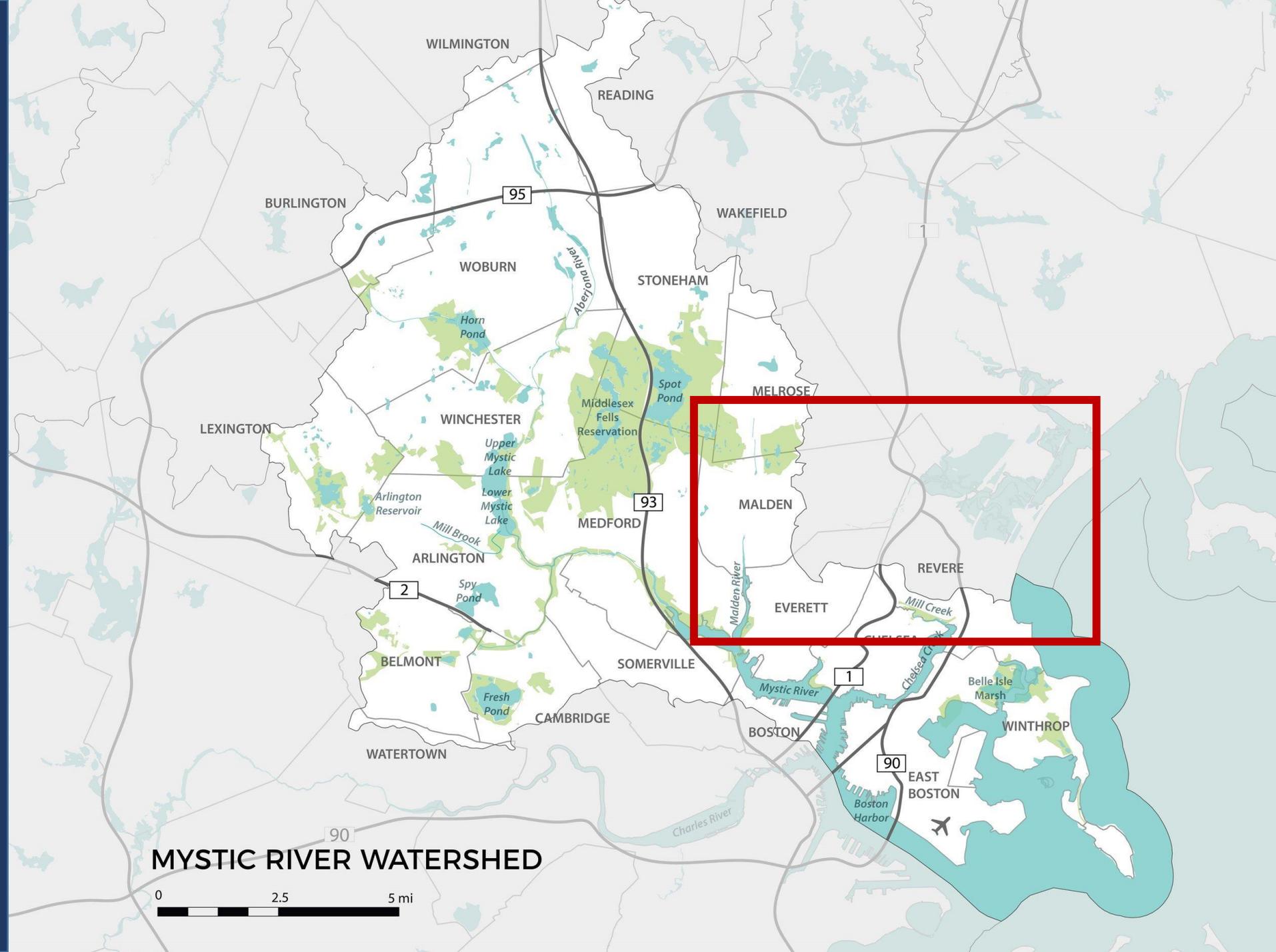
- **The Project**

- Regulatory Support
- Stormwater Management & Funding Approaches
- Green Stormwater Infrastructure Pilot Project

- **Discussion and Q&A**

City of Malden

- ~ 66,000 residents
- Among the oldest (1639) incorporated municipalities in the country
- Drained by the Malden River



History of the Malden River

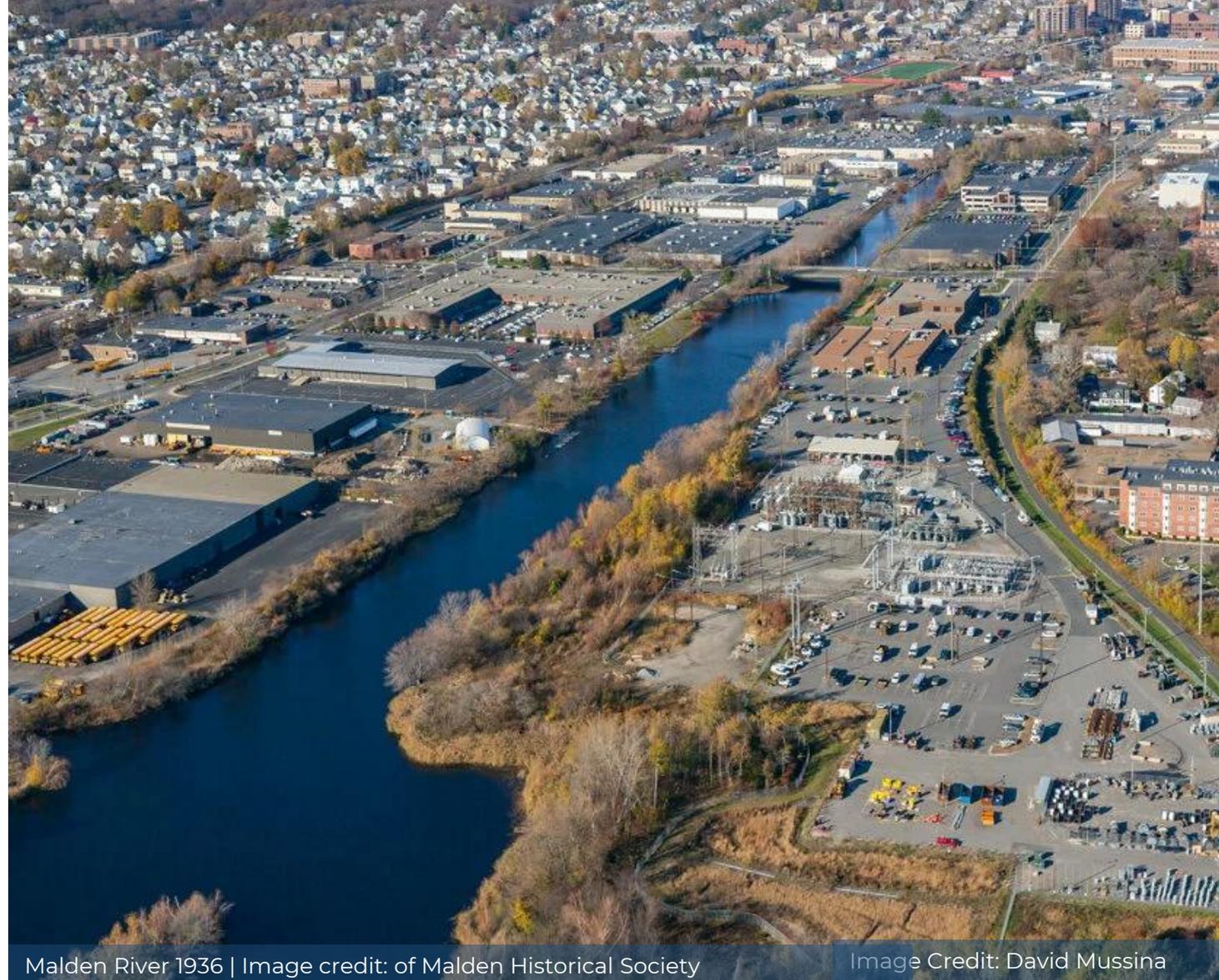
- The Malden River originates north of Malden at Spot Pond, flows under the City of Melrose, and re-emerging in Malden.
- Malden has a long history of industrialization
- Salt marshes have been filled and paved over for new roads and industries.



Malden River 1936 | Image credit: of Malden Historical Society

History of the Malden River

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Malden River 1936 | Image credit: of Malden Historical Society

Image Credit: David Mussina

Cities Change Rivers

- Industrial development led to environmental degradation
- The Malden River has been documented as impaired for 20 parameters including Dissolved Oxygen, Phosphorus Total, and Trash.
- Data collected by the MWRA and MyRWA has shown chronically elevated levels of *E. coli* for more than 25 years.



Image Credit: David Mussina



Image Credit: Jack Bitney

Waterfronts can be transformed by investments in clean water

- **The waterfront in Malden itself has been revitalized**
 - Malden River no longer a scene of industrial pollution
 - **Malden River Works** is evidence of a thriving waterfront
 - Human Health Risk Assessment: safe for boating



But problems remain...

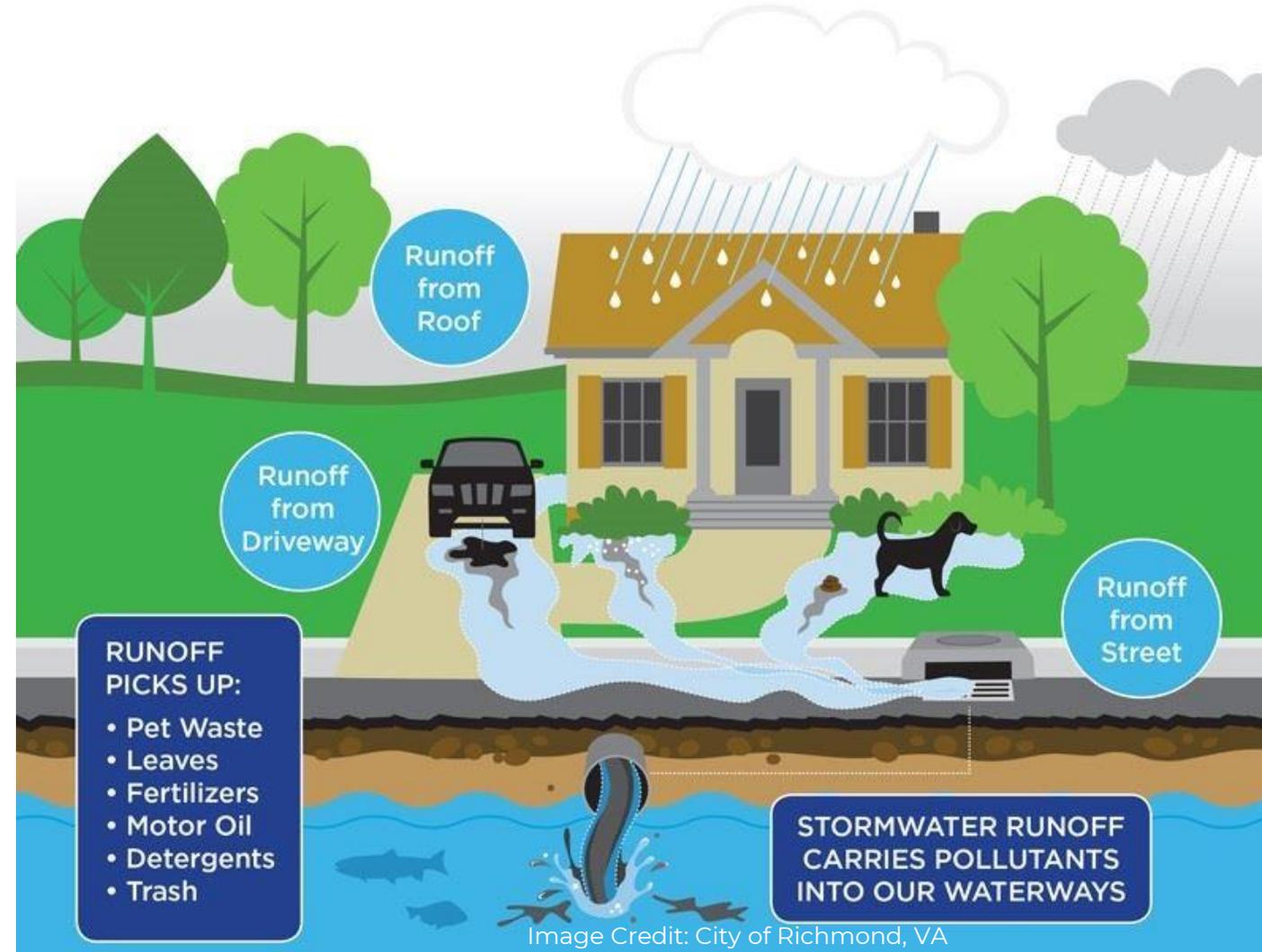
Why Clean Water?



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Stormwater pollution

- Acute in all urban areas
- Result of paving over the landscape
- Regulated by EPA in MA--MS4 permit



Stormwater is the principal source of water pollution today



Project Overview

- Through 2021 federal Bipartisan Infrastructure Law funding (EPA Grant No. 4B 00A01085-0), MassBays funded the Mystic River Watershed Association to provide **stormwater technical support** to Malden.
- The scope included:
 - Regulatory support
 - Stormwater management and funding approaches research and analysis
 - Green stormwater infrastructure
 - Community engagement



1. Promote the development of a stormwater management program that reduces nutrient runoff and improves anadromous fish habitat;
2. Contribute to the development of sustainable funding for the stormwater management program;
3. Raise awareness and understanding in municipal government and the general public about nutrient pollution and green infrastructure;
4. Complete the siting and conceptual design of a series of green infrastructure installations;
5. Implement stormwater infiltration to show how green infrastructure can be implemented in the City.

Regulatory Support: Stormwater Ordinance

Overview

- The MS4 Permit has specific requirements for cities like Malden to have an **ordinance** regulating stormwater from **construction sites** and **new development** and **redevelopment**, disturbing **one acre or more** of land.
- Malden had a stormwater ordinance (11.28.020), but there were opportunities for improvement.



Regulatory Support: Stormwater Ordinance

Process

- Reviewed and considered:
 - MS4 Permit requirements
 - Nearby municipalities' approaches
 - Other best practices
- Coordinated with the Engineering Department and Conservation Commission for feedback and input
- Shared example forms and checklists for implementation

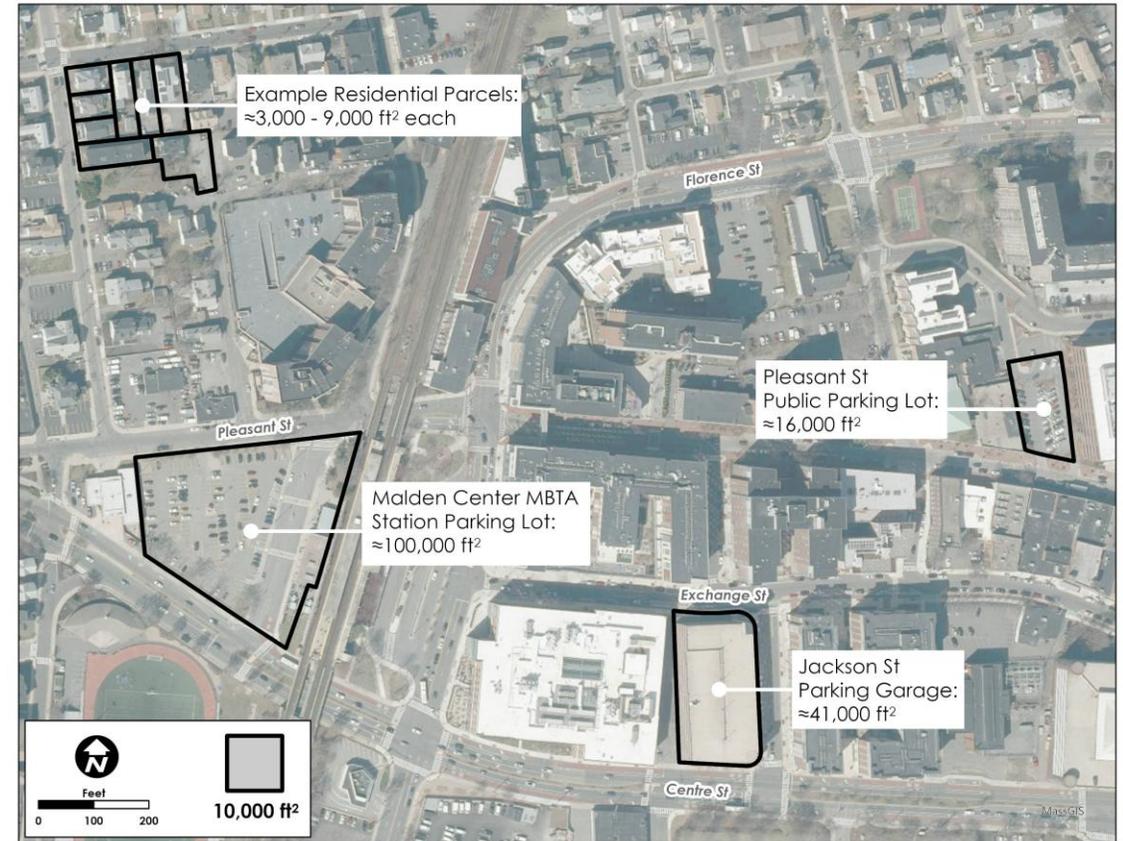


Image Credit: Malden River Works and David Mussina

Regulatory Support: Stormwater Ordinance

Thresholds

- The MS4 Permit's required ordinance threshold is **1 acre** (43,560 sq ft).
- Municipalities can choose to make that threshold **lower** than one acre.
- In Malden:
 - ~98% of parcels are < 1acre.
 - ~89% of parcels are <10,000 sq ft.
- **A 10,000 square foot threshold** was deemed to be an appropriate alternative threshold



Regulatory Support: Stormwater Ordinance

Requirements

- For applicable projects that meet or exceed the threshold(s), Malden's updated stormwater ordinance has requirements:
 - Land Disturbance Permit
 - Construction Phase Erosion and Sediment Control Plan
 - Stormwater Management Plan
 - Operation and Maintenance Plan



Image Credit: Washington Stormwater Center

Regulatory Support: Stormwater Regulations

- A common best practice is to develop stormwater regulations to provide more details to supplement a stormwater ordinance.
- Worked with the Engineering Department to finalize stormwater regulations for Malden.



Stormwater Management & Funding Approaches



Stormwater Management

- Municipalities **manage** stormwater and **fund** stormwater management in different ways.
- We conducted interviews with Malden City staff and research to understand and share information about potential stormwater management and funding approaches.



Stormwater Management

- Spoke to different entities in Malden to understand and share info about potential stormwater management and funding approaches plus additional research.
- Interviews with the different entities involved in stormwater management in Malden, including:
 - Water Utilities
 - Public Works
 - Engineering
 - Health and Human Services
 - Inspectional Services
 - Conservation Commission
- Strong collaborative atmosphere, nothing doing “wrong” but some ideas for additional consideration.

Major Findings

1. Formalize, document, and automate internal systems
2. Improve connection between community planning, capital and infrastructure planning, and stormwater management
3. Increase emphasis on green stormwater infrastructure
4. Explore additional funding options for stormwater management
5. Hire an interdisciplinary stormwater manager or coordinator

Municipal Stormwater Funding Sources

- Many municipalities fund stormwater management responsibilities out of the **General Fund**.
- Other potential stormwater funding sources used by municipalities include:
 - Additional taxes
 - One-time fixed fees
 - Bonds & loans
 - Grants
 - Public-private partnerships
 - Stormwater fees & stormwater utilities
 - Other



Municipal Stormwater Responsibilities

- Stormwater capital projects
- Stormwater management
 - Administration
 - Regulation & enforcement
 - Engineering & master planning
 - Monitoring
 - Operations & maintenance
- Growing responsibilities:
Regulatory, Political, Financial, Climatic



How Might A Stormwater Fee Be Structured?

Approaches (not mutually exclusive):

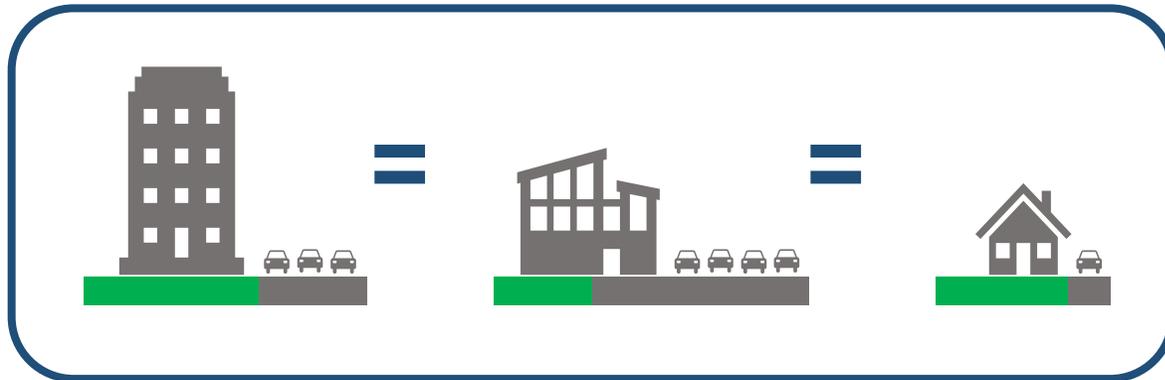
- Flat Fee
- Parcel-Specific Impervious Area
- Equivalent Residential Unit (ERU)
- Hybrid



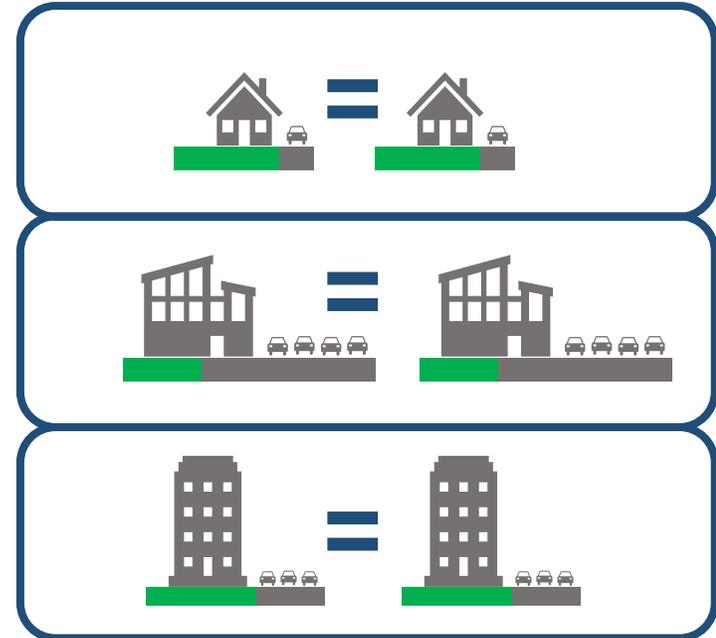
Flat Fee

The same fee is applied based on a shared characteristic.

Same fee for all parcels



Same fee by land use



Parcel-Specific Impervious Area (IA)

Fee based on the amount of impervious area present on a parcel, often represented in “units of impervious area” (e.g., 100 sf of impervious area = 1 Unit of Impervious Area).



2,000 sf
impervious
area



20 Units of Impervious Area
(2,000 sf IA / 100 sf Unit IA)



8,000 sf
impervious
area



80 Units of Impervious Area
(8,000 sf IA / 100 sf Unit IA)



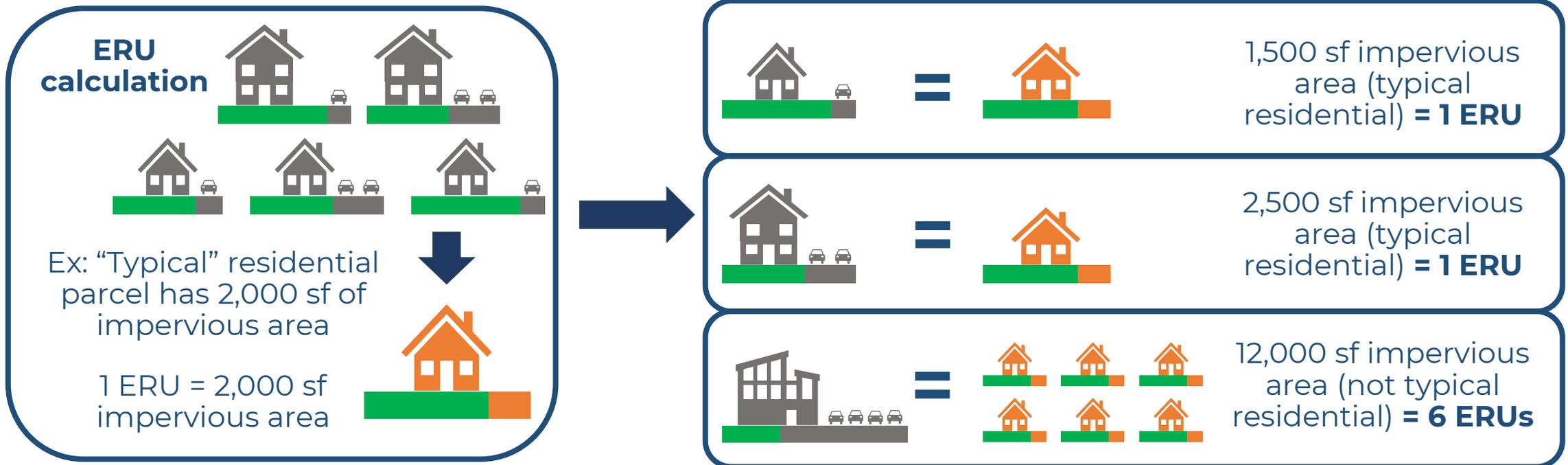
12,000 sf
impervious
area



120 Units of Impervious Area
(12,000 sf IA / 100 sf Unit IA)

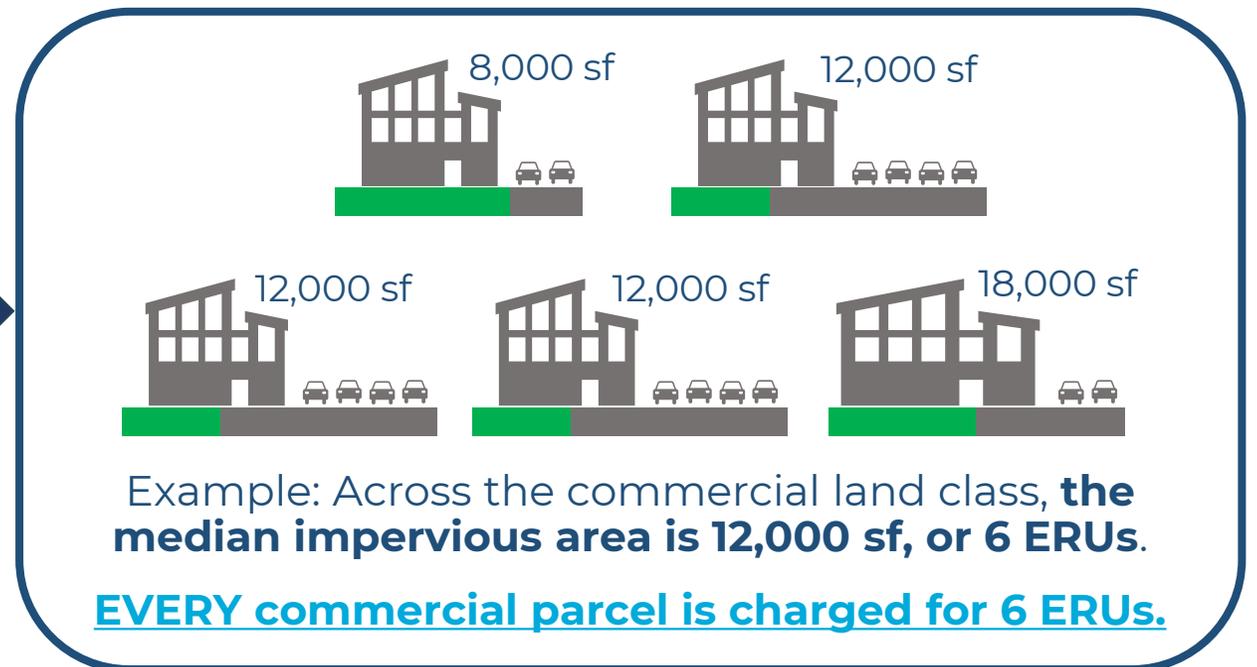
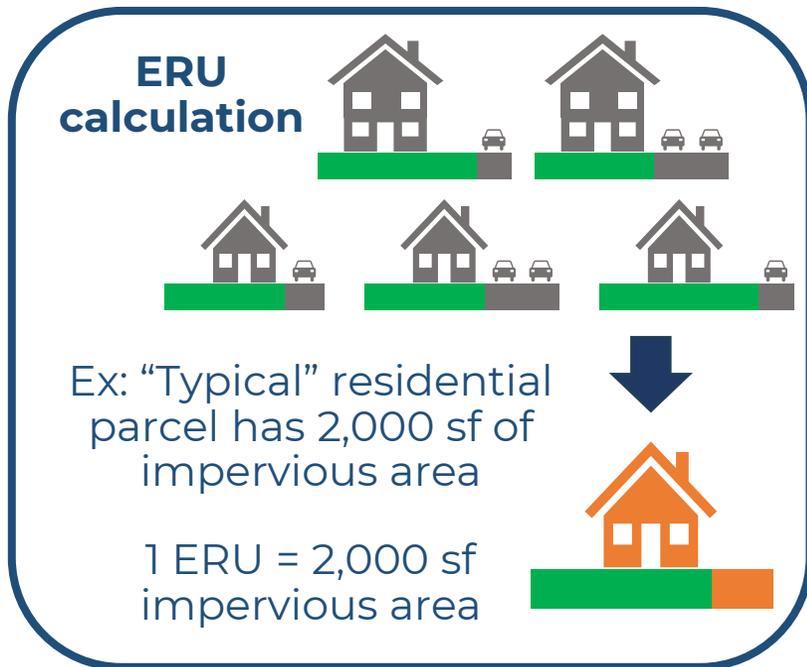
Equivalent Residential Unit (ERU): By Parcel

Fee based on the number of ERUs present on each parcel, where 1 ERU equals the median (or average) impervious area amount on a “typical” residential parcel.



ERU: By Land Class

Fee based on the median (or average) number of ERUs present on each land class, where 1 ERU equals the median (or average) impervious area amount on a “typical” residential parcel.



Land Use Category	% of Total Impervious Area	Flat Fee	ERU Ratio Method	ERU Parcel-Specific Method	Parcel-Specific Impervious Area Calculation	Hybrid ERU Ratio Method and Impervious Area Calculation
		% of Total Revenue Generated				
Single-Family Residential	25.2%	49.1%	41.0%	25.9%	25.5%	27.7%
Multifamily Residential (2-3 Units)	23.5%	35.2%	29.4%	18.6%	23.7%	19.8%
Multifamily Residential (4-8 Units)	1.7%	1.7%	3.2%	2.1%	1.7%	1.9%
Condominium	4.3%	2.4%	4.5%	5.0%	4.3%	2.7%
Other Residential	8.7%	3.3%	6.3%	9.8%	8.6%	9.2%
Commercial/Industrial	24.7%	4.9%	9.3%	25.7%	24.5%	26.1%
Tax-Exempt	11.8%	3.3%	6.2%	12.9%	11.8%	12.5%

Potential Next Steps

1. Advance Understanding of Existing and Projected Stormwater Needs and Associated Costs
2. Stakeholder Engagement
3. Financial Analyses and Feasibility Studies

Green Infrastructure

- Nature-based approach to managing stormwater
- Can remove pollution before it reaches our rivers, lakes, and streams



Image Credit: Mystic River Watershed Association



Image Credit: Boston Water and Sewer Commission

Catch-basin retrofits

- Worked with students from UMass Boston, Dept. of Urban Planning and Community Development

Xhorxho (George) Gjoka

Alexander (Alex) Bergstrand



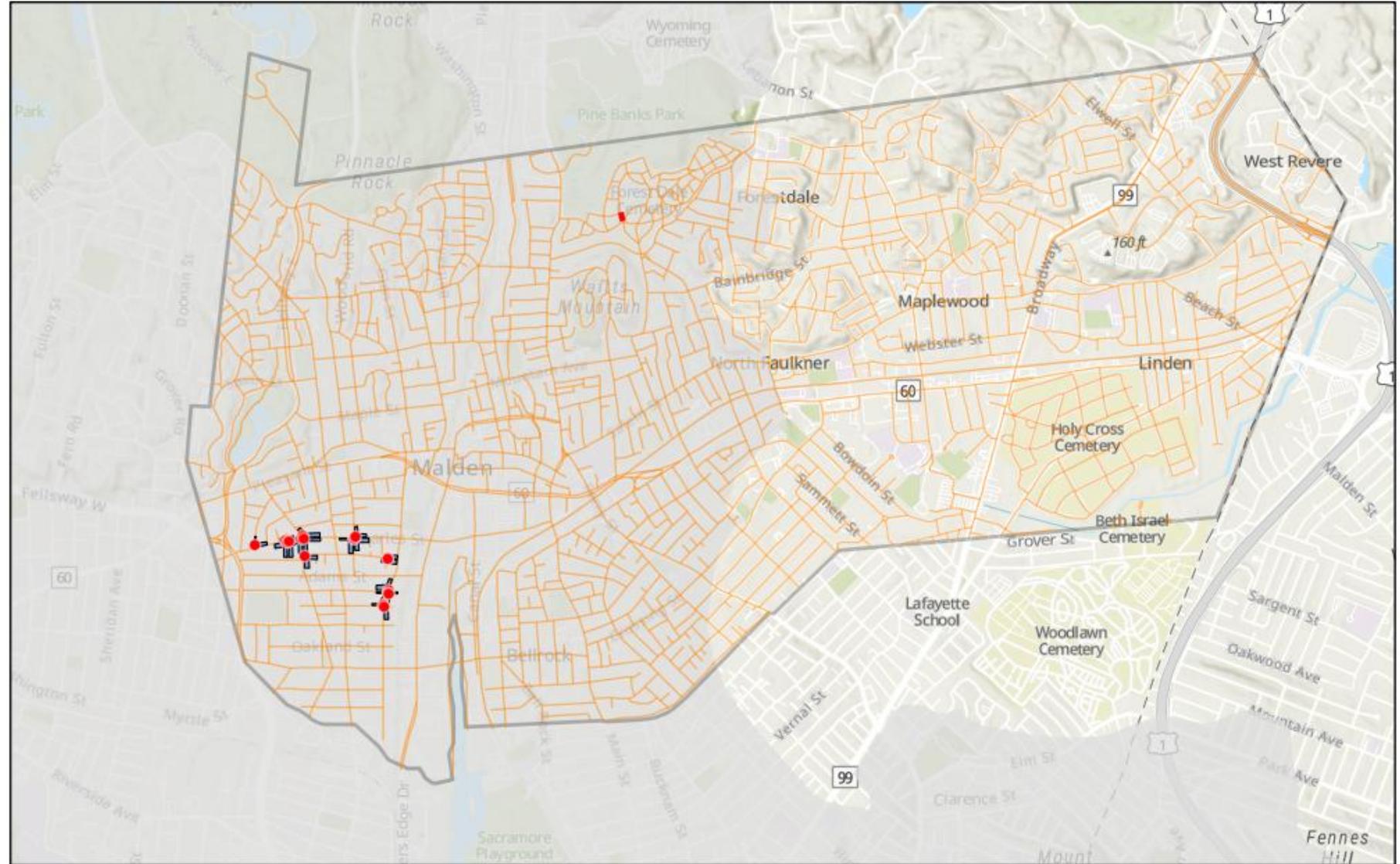
Drain ID: 12	Cluster ID: Presley/Charles
Address: 66 Presley St	Coordinates: 71.0852710°W 42.4230518°N
CB Tributary	Land Use
	
Utility Map	Cluster Aerial
	

- Tributary Area: 13,124.80 sq ft (0.30 acres)
- Impervious Area: 11,639.64 sq ft (0.27 acres, 88.68%)
- Estimated TP Load: 0.30 lbs/year
- Feasible Trench Length: 46 feet
- Estimated TP Removal: 0.36 lbs/year (full capture)

Key Considerations: Favorable slope, clean curb line, minor lateral obstructions

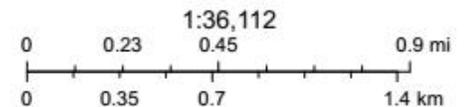
Green Infrastructure

City of Malden - Project Map



12/8/2025

- Catch basins
- Proposed trenches
- Roads
- MALDEN
- Mystic River Watershed
- World_Hillshade



Esri, NASA, NGA, USGS, FEMA, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User



Green Stormwater Infrastructure Pilot

Stormwater improvements in the Forest Dale Cemetery.

- Project includes:
 - Replacing asphalt with permeable pavers
 - Store and clean stormwater runoff
 - 4,400 sq. ft
 - Base capacity- 26,331 gal
 - First project of its kind in Malden



Green Malden Fair & Malden Volunteer Fair



Image Credit: Mystic River Watershed Association



Image Credit: Mystic River Watershed Association

Community
Engagement



Mystic River
WATERSHED ASSOCIATION

Thank you

- Mass Bays Estuary Program (EPA Grant No. 4B 00A01085-0)
- City of Malden, Engineering Department
- City of Malden, Cemetery Department
- City of Malden, Water Department
- UMass Boston, Dept. of Urban Planning and Community Development
- Horsley Witten Group (J. Relstab, N. Cohen, K. King, & E. Baker)

Discussion and Q&A

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