



Route 1 Falmouth Commercial District

Stormwater Planning for Long-Term Sustainable Growth

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Introductions

Theo Holtwijk, Director of Long Range Planning
Mel Dickenson, Conservation Commission

Zach Henderson, Woodard & Curran



Meeting Goals

To provide overview of Stormwater Management Plan.

To get your input.

Town officials have made no decisions on any matters that will be discussed here.



How did this Project come about?

The future of Route 1 has been discussed since 2002.

Current work has two components:

- Zoning - Town land use rules
- Infrastructure -Town financial investment
 - Traffic
 - Utilities, incl. stormwater management
 - Streetscape/Landscaping

February 2012: Maine Competitive Coastal Grant Program



Project Goals

Our project hopes to accomplish the following through a collaborative partnership between state, town and private property owners:

1. Identification of opportunities for shared runoff management versus conventional approach where each property owner manages stormwater runoff on their own property.
2. Evaluation of the potential cost savings and reduced permitting requirements for managing stormwater runoff in the project area.
3. Enhanced capacity for future commercial growth.
4. A roadmap to better water quality in Mill Creek, Mussel Cove and Casco Bay.



What About Drainage?

- Drainage is not the sewer we often think of, but it *is* an underground system of pipes that maintains our urban built environment.
- Drainage systems convey fallen rainwater, called *stormwater*, from paved streets, parking lots, our lawns and basements (via sump pump) to prevent pooling and flooding.



Drainage Prevents Damage

Stormwater is drained away to prevent expensive damage to our infrastructure.

basements



cracking

streets

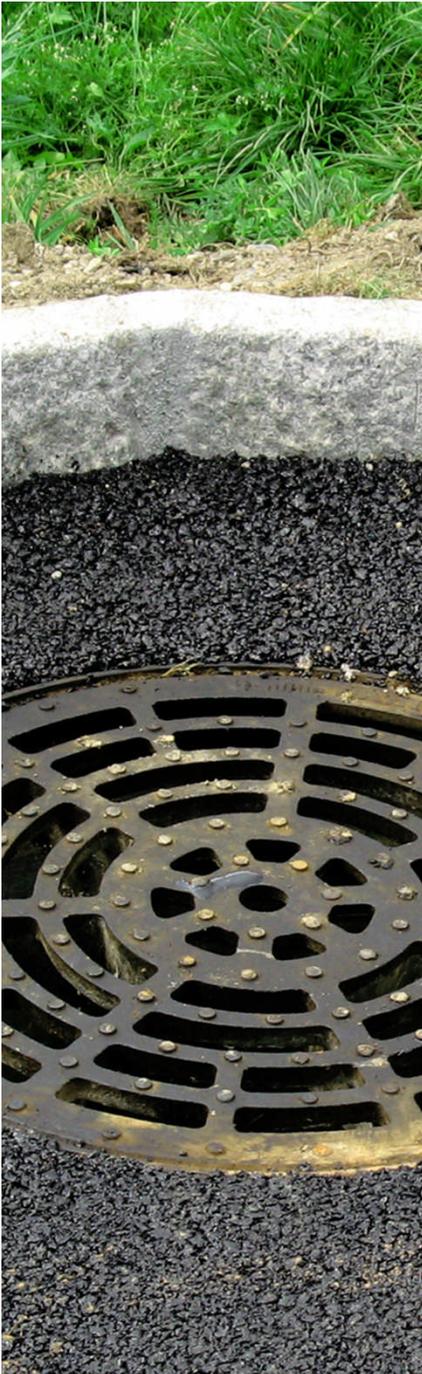


flooding

beneath roadways



heaving



Polluted Stormwater

- Unfortunately, our drainage systems also carry pollutants like oil, fertilizers, sediment and trash.
- Rainwater that falls on paved streets, lawns, parking lots and sidewalks becomes polluted stormwater.



Stormwater & Maine Water Pollution

So, polluted stormwater from our neighborhoods runs directly to streams and water bodies, including the Casco Bay.

- **Did You Know:** polluted stormwater runoff is the largest source of water quality problems for Maine's waters?

Table 1. Water chemistry data summer 1996

Parameters (unit)	Upstream (256)	Downstream (257)	Water Quality Criteria	
Total Phosphorus (mg/L)	0.012	0.140	0.031 ¹	
Total Suspended Solids (mg/L)	5.5	2.5	NC	
Heavy metals			CMC ²	CCC ³
Cadmium (µg/L)	ND 0.5	ND 0.5	0.64	0.32
Copper (µg/L)	2.8	3.4	3.89	2.99
Iron (µg/L)	280	610	NC	1,000
Lead (µg/L)	< 2	< 2	10.52	0.41
Zinc (µg/L)	ND 4	ND 4	29.9	27.1
Manganese (µg/L)	13	75	NC	NC
Nickel (µg/L)	< 1	1.3	363.4	40.4

Date	Downstream (257)		Water Quality Criteria
	15-Jul	11-Aug	
8-Sep	0.5	ND 0.5	0.031
15-Jul	0.32	0.32	0.031
11-Aug	0.75	0.75	0.031
8-Sep	1.21	0.12	1.21
15-Jul	0.015	0.019	0.016
11-Aug	0.037	0.063	0.046
8-Sep	8.6	4.4	NC
15-Jul	0.0041	0.0052	0.0031
11-Aug	5	2	NC
8-Sep	800	400	200



That Storm Drain does **NOT** lead to the Sewer

Water from your toilet and sink flows to the sanitary sewer and on to the treatment plant.

Polluted stormwater enters the drainage system through the storm drains, which drain directly to nearby ponds, rivers and streams. Stormwater is **not** treated.



Our cities and towns can be hard on Casco Bay

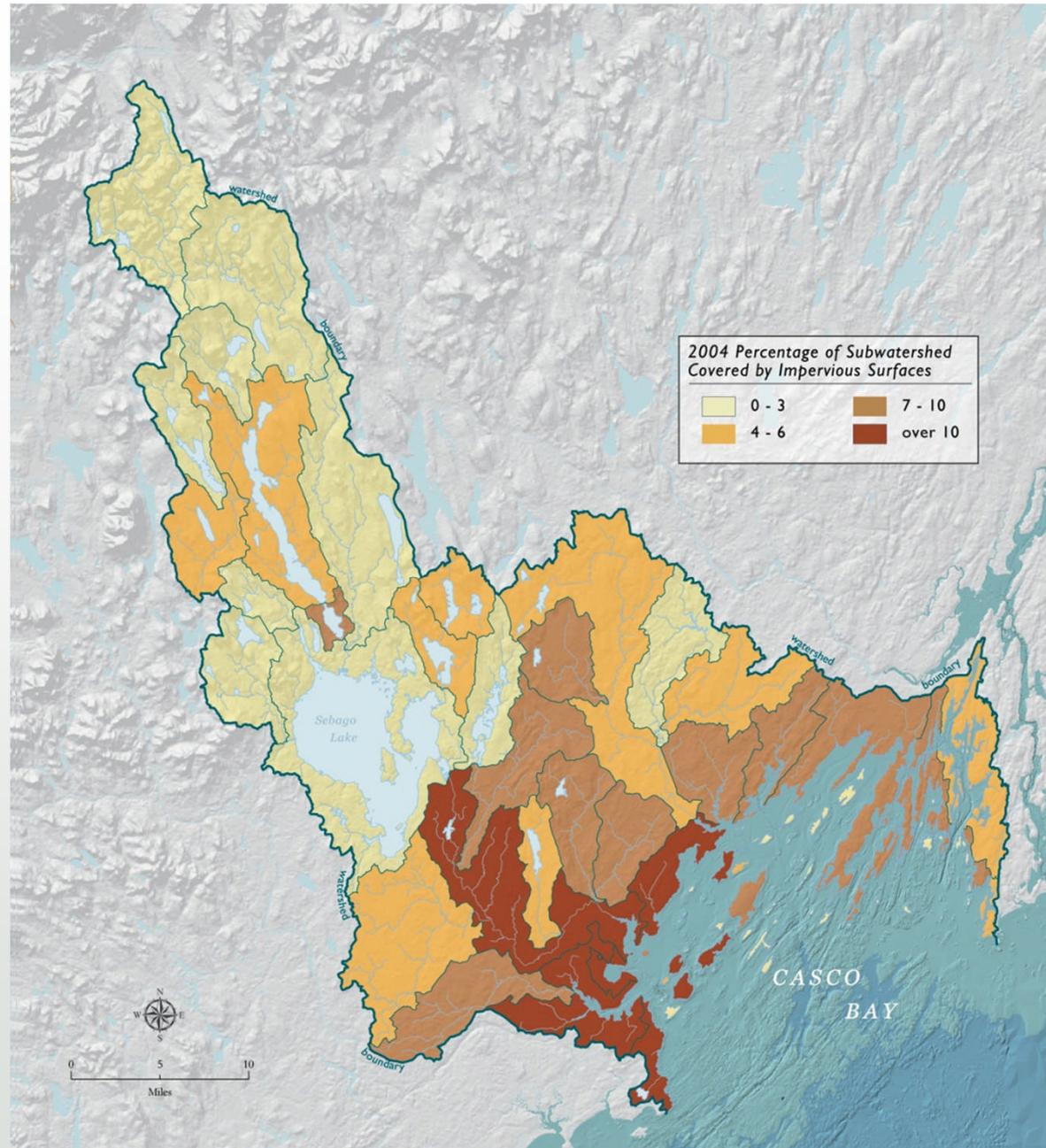
- Developed land pollutants degrade coastal water quality
 - High bacteria counts can close clam flats, swimming beaches
 - Nutrients in runoff affect coastal water quality
 - algae blooms
 - low DO
 - potential fish kills
 - Toxic chemicals accumulate in sediments and marine organisms, especially top predators like Osprey
- (Sub) urbanization triggers loss and reduction in quality of habitat





Casco Bay Impaired Waters Are Suburban

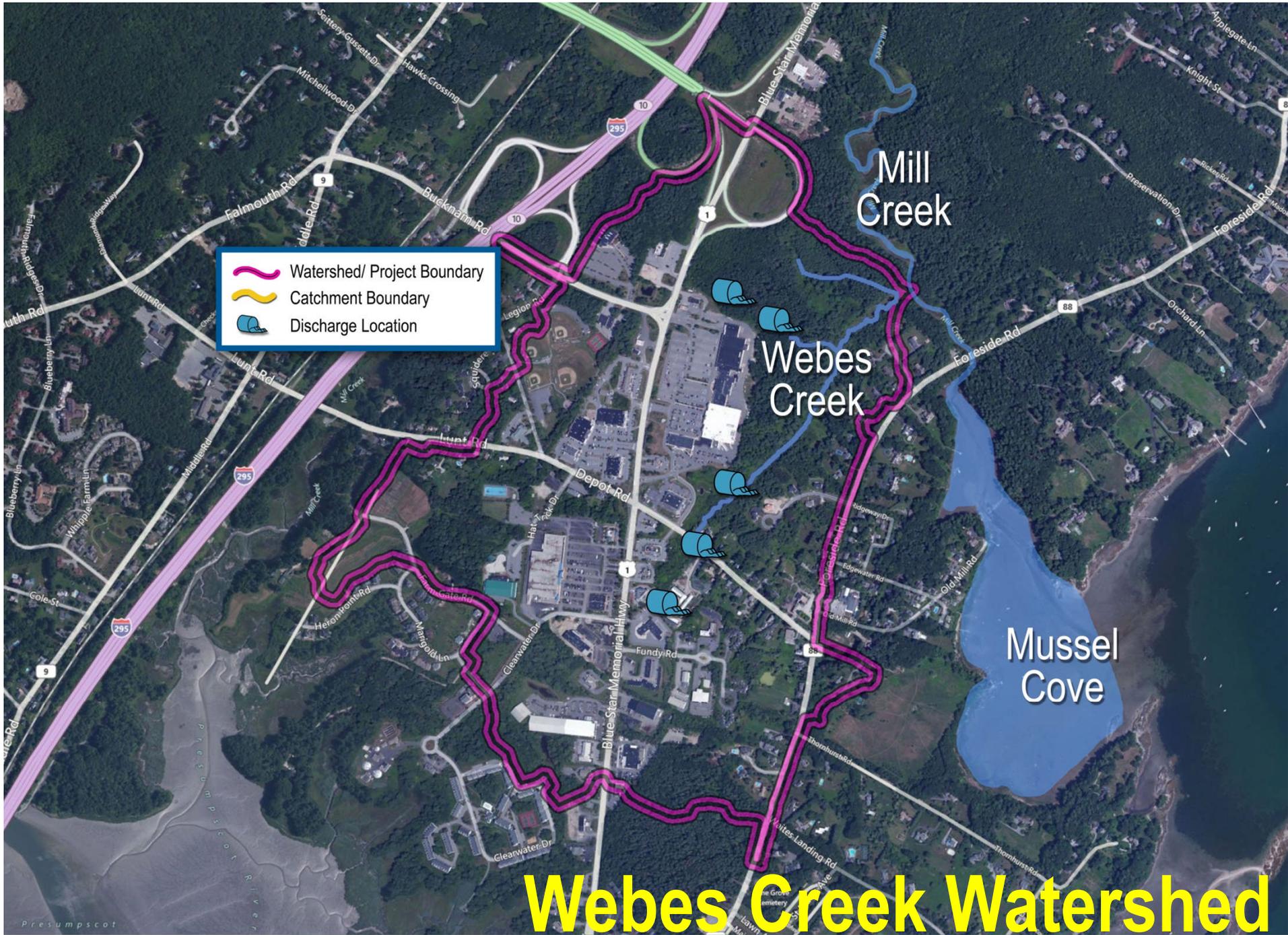
A close relationship between impaired waters and stormwater derived from roads, parking areas and rooftops

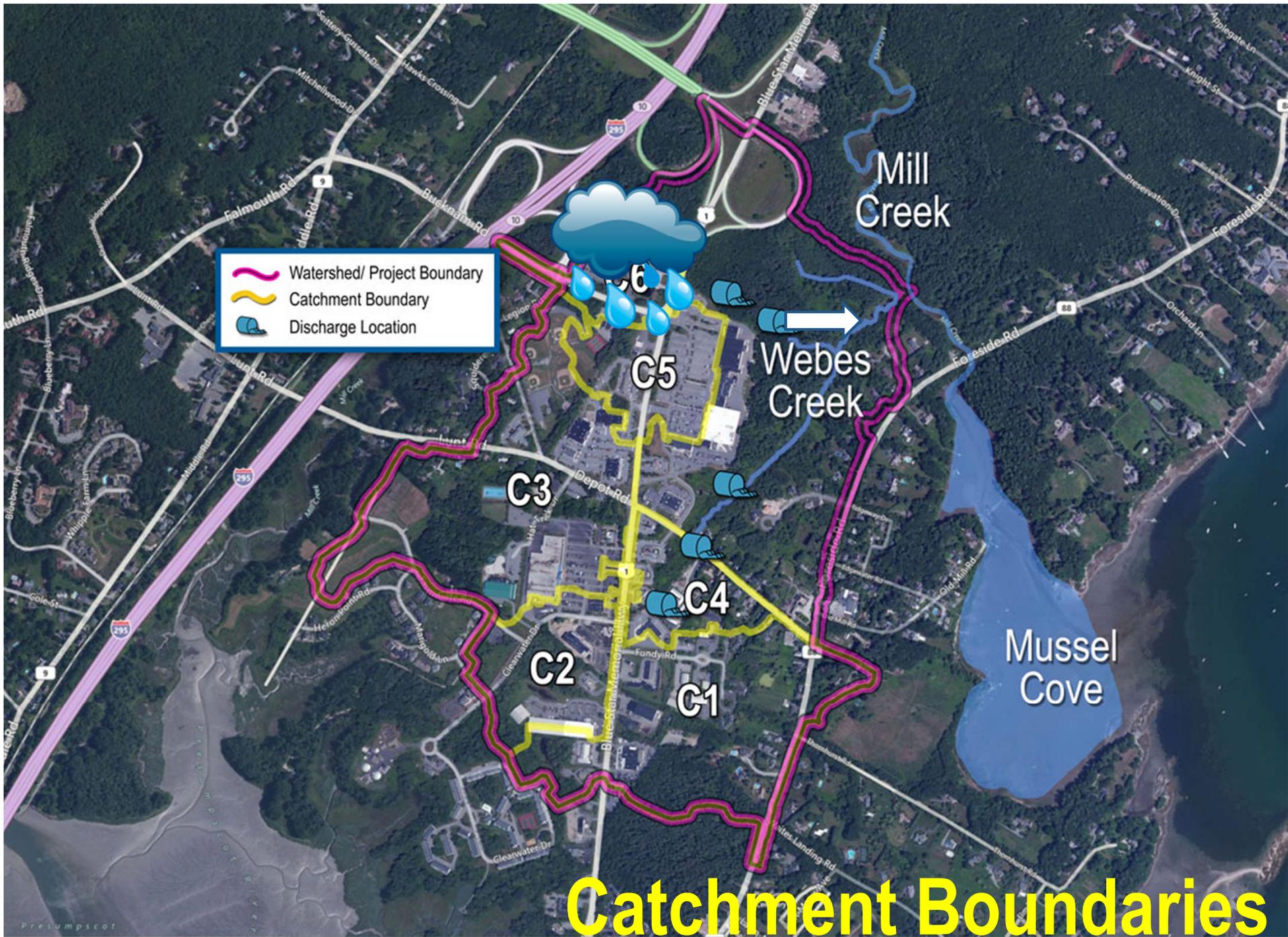




Project Tasks

- Identification of opportunities for shared runoff management and cost savings.
 - Mapping
 - Evaluation of private and public stormwater management
- Integration with Route 1 Infrastructure Study
 - Zoning modifications
- Enhanced capacity for future commercial growth.
 - Build-Out analysis
 - Stormwater management opportunities
- A Roadmap to better water quality in Mill Creek, Mussel Cove and Casco Bay.
 - MDOT- Town Demonstration project









Rite Aid Wetpond



Key Bank Soil Filter



Maine Med Detention Basin

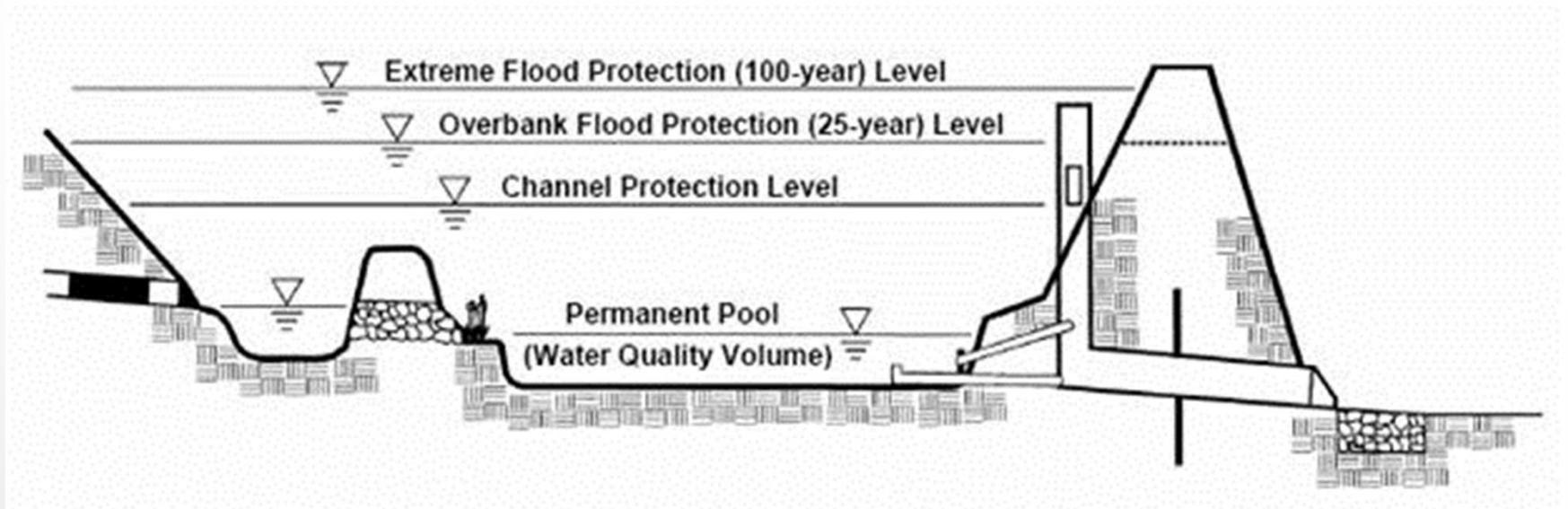


Falmouth Shopping Center Detention Basin



Norway Savings Below-Grade Stormwater Management Facility

What Do These Systems Do?



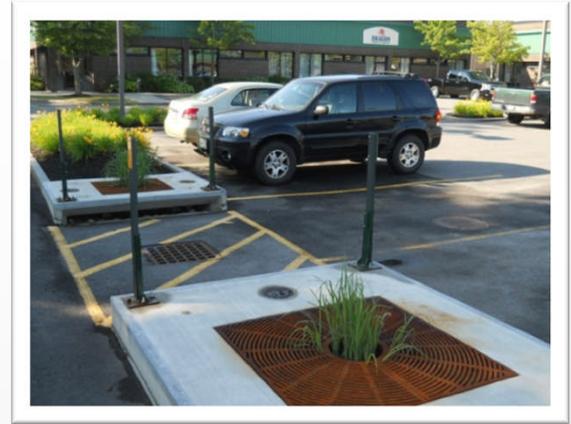
- **Water Quality Volume = 1" Rainfall x Area Producing Runoff**
- **Channel Protection Volume = 2.5" in 24 hrs**
- **Flooding Protection = 5.5" - 6.7" in 24 hrs**



Soil Filter - South Portland



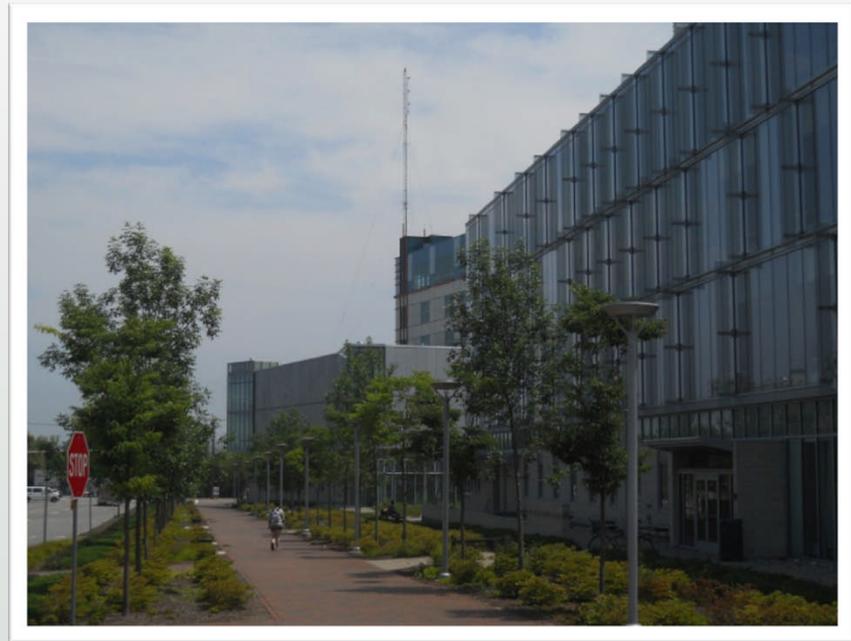
Streetscape Esplanade Filter



Tree Box Filter - South Portland



Rainwater Harvesting



Sidewalk Tree Filters - Portland

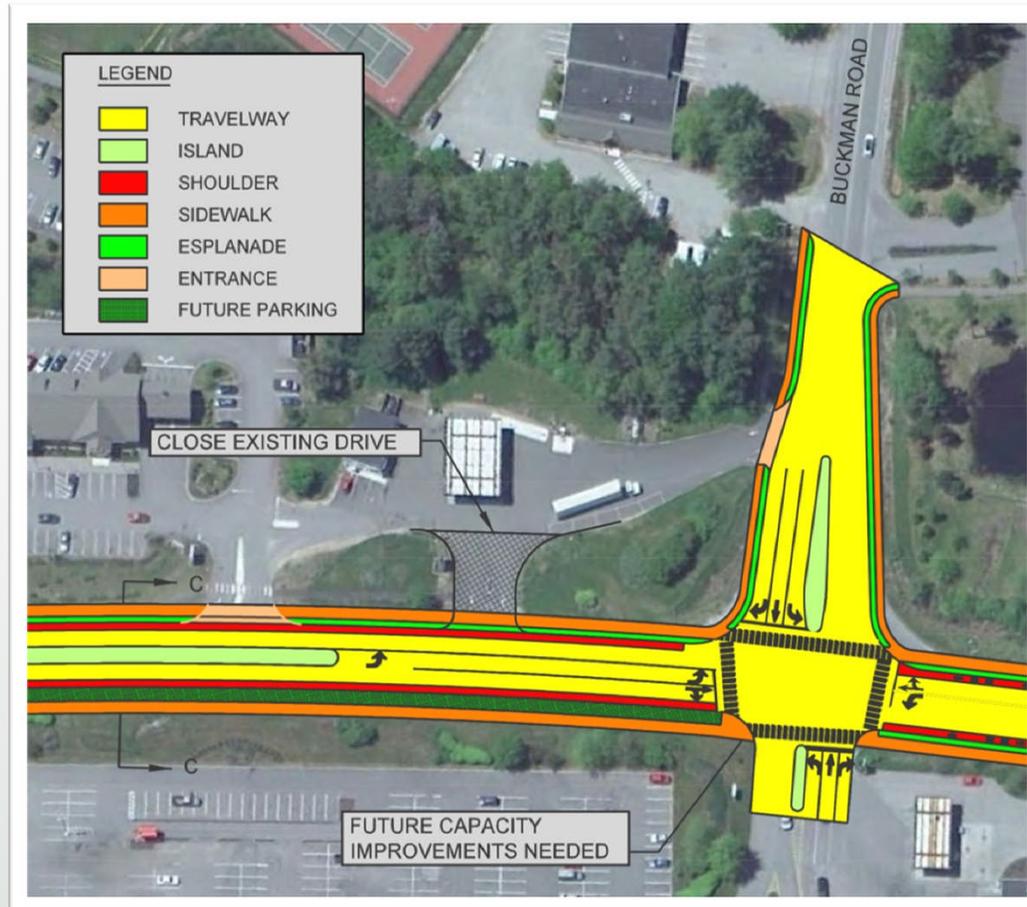
The Future of SW Management Infrastructure



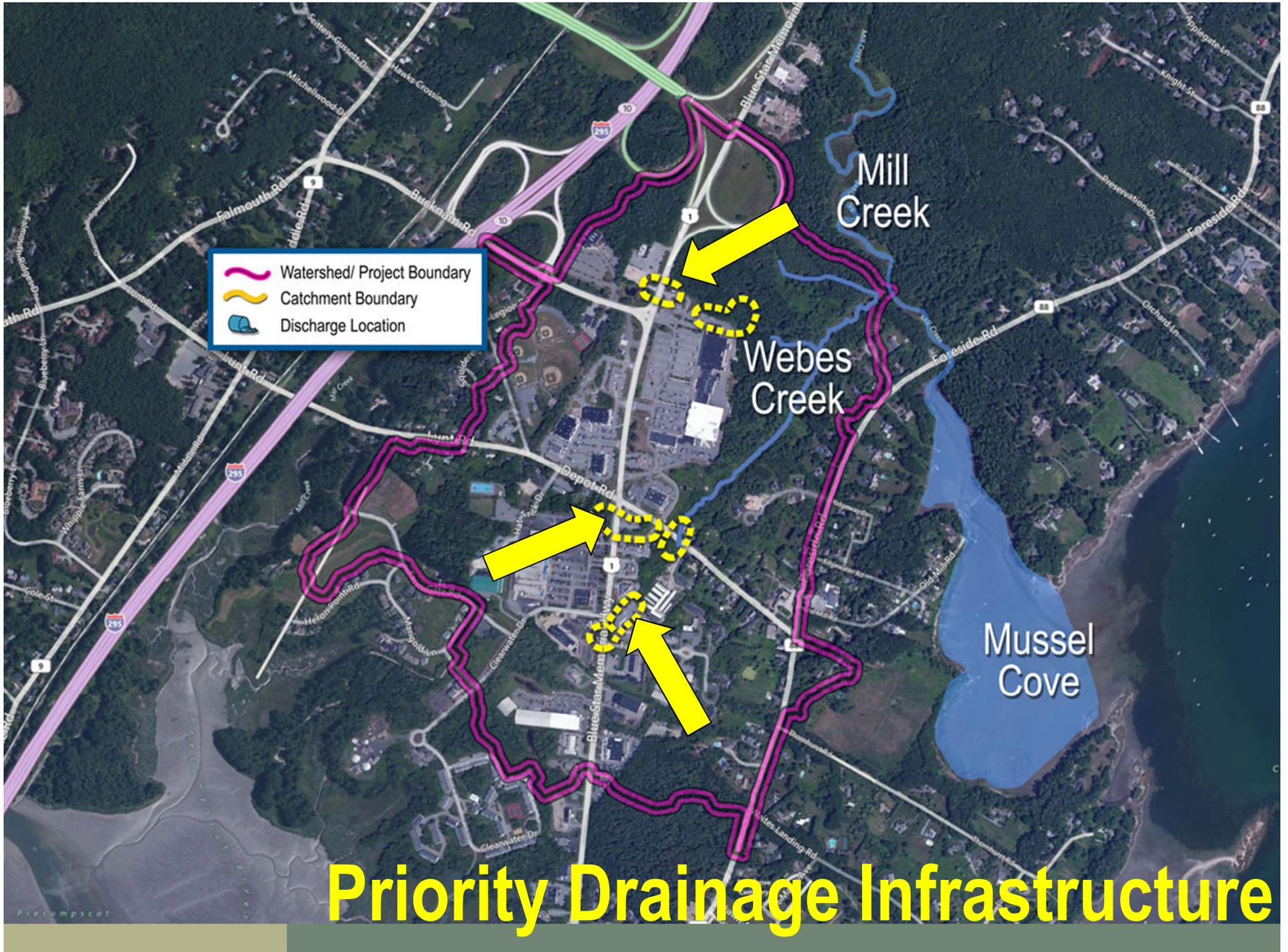
The Future is Expensive....

Stormwater Retrofit Opportunity Area	Possible Stormwater Management Retrofit	Total Construction Cost (+/-)
1. The Falmouth Shopping Center Dry Detention Basin Retrofit	Gravel Wetland Retrofit	\$135,000
2. The Falmouth Shopping Center Plaza Quality Enhancements	Gravel Wetland/Below-Grade Filter System	\$795,000- \$1,315,000
3. Clearwater Drive Flow Control	Flow Control	\$30,000
6. The Falmouth Inn Greenspace Retrofit	Gravel Wetland	\$220,000
10. Bucknam Road Gateway Retrofit	Filtration Swale/Soil Filter	\$210,000-\$260,000
11. Route 1 Roadway Per Unit	Catch Basin Insert/Filter Box	\$35,000-\$45,000¹
12. The Wal-Mart Plaza Quality Retrofits	Raingarden/ Below-Grade Filter System	\$90,000-\$1,305,000

Integration With Route 1 Study



- Where is the priority drainage infrastructure?
- What are the possible impacts from Build-Out?

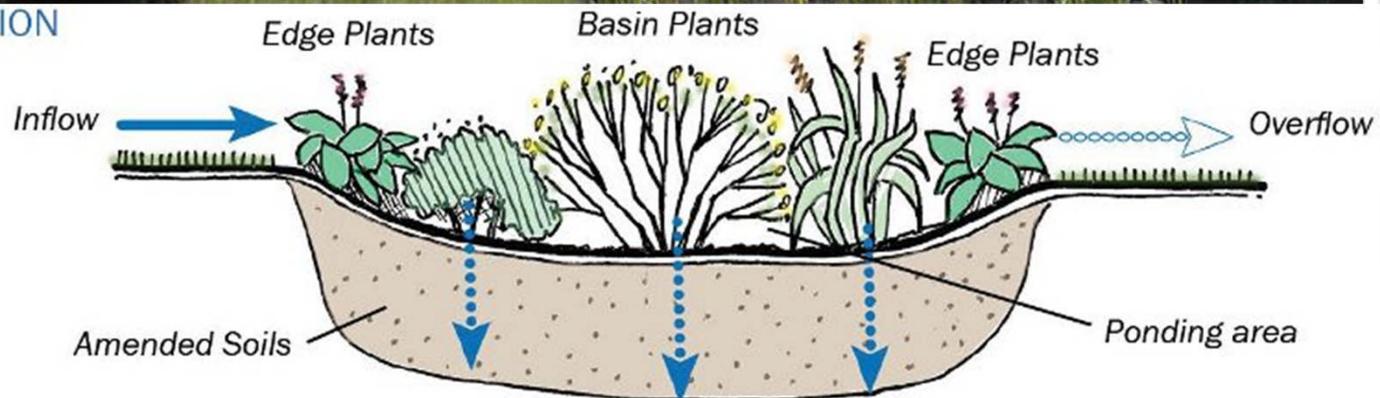




Retrofit Opportunities



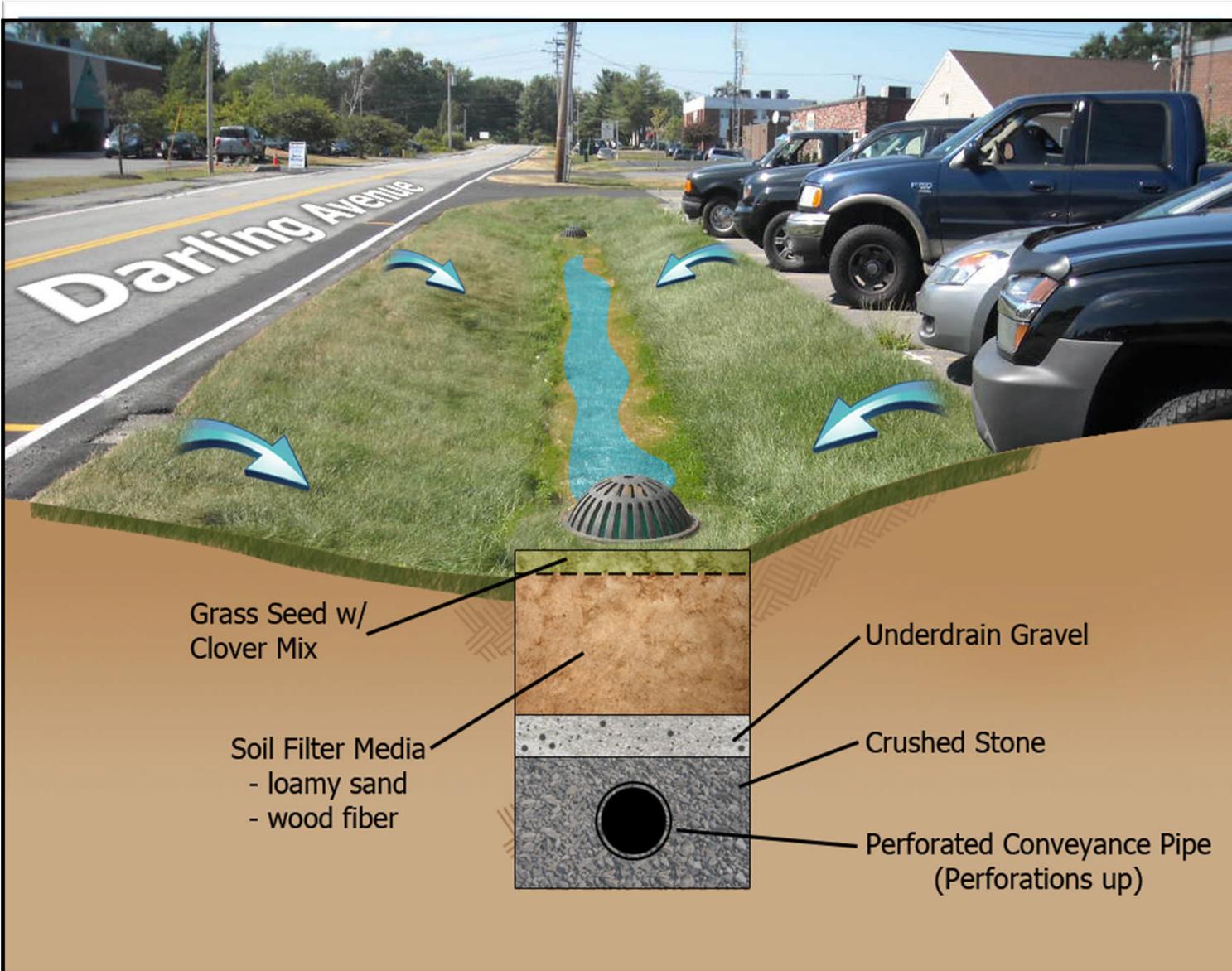
SECTION



Wal Mart Plaza Rain garden



Hat Trick Drive Flow Control



Bucknam Road Gateway



Ordinance Considerations

- Reduce Impediments to Low Impact Development Design and Construction
 - Use of Setbacks for Treatment Zones
 - Flexible Off-Street Parking Requirements
- Overlay District
- Reduced Individual Site Requirements Under A Managed Plan



Funding Considerations

- Special Assessment Districts (TIF)
- Grants and Loans
- General Fund Revenues
- User Fees



Future Opportunities

- Ahead of Regulatory Requirements
- Re-Visioning of Route 1
- Shared Opportunities Often Less Expensive than Site-by-Site
- Shared Private Property Management (Landscaping, Winter Operations, Sweeping)



Questions & Discussion