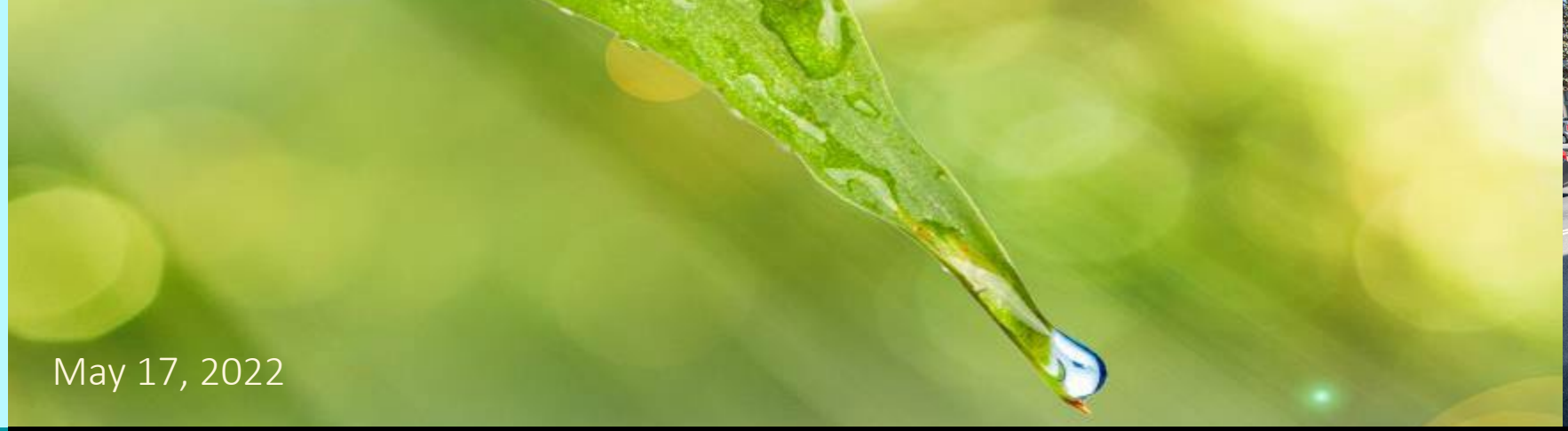


May 17, 2022

Green Infrastructure Master Strategy and Implementation Roadmap

lighting the way NB new bedford

KLA KIM LUNDGREN ASSOCIATES, INC.

CDM Smith 75th

Water • Environment • Transportation • Energy • Facilities

Welcome

Agenda

- Welcome
- Green Infrastructure Master Strategy and Implementation Roadmap
- Neighborhood mapping
- Green infrastructure operation and maintenance
- Closing

Green Infrastructure Master Strategy and Implementation Roadmap

Master Strategy and Roadmap Overview

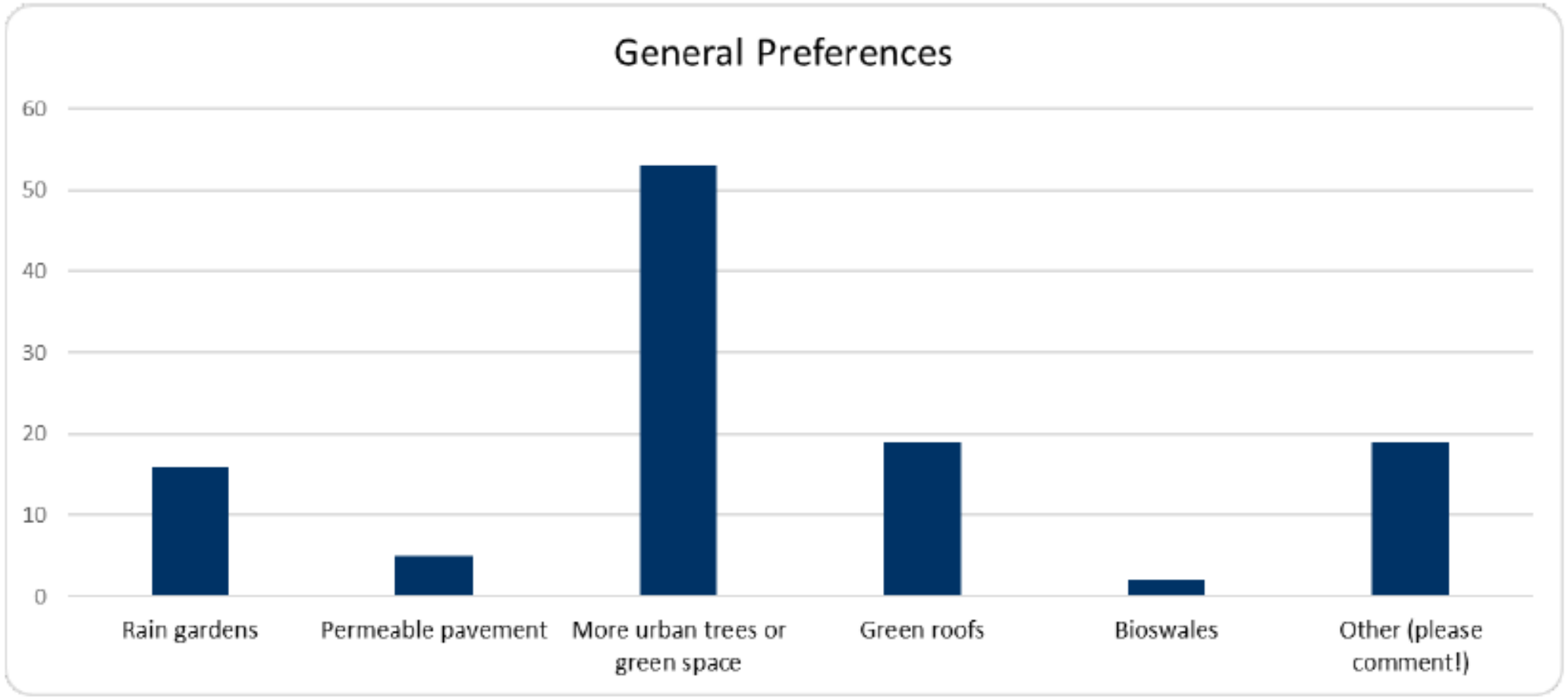
- Purpose and benefits of green infrastructure
- Green infrastructure survey results
- Green infrastructure techniques
- New Bedford green infrastructure opportunities
- Creating New Bedford standard green infrastructure design tools

Purpose and Benefits of Green Infrastructure

- Purpose
  - Peak rate attenuation
  - Recharge
  - Water quality improvement (MS4)
  - Volume reduction (CSOs)
- Additional Benefits
  - Erosion control
  - Flood mitigation
  - Cooler temperatures
  - Improved air quality
  - Improved aesthetics

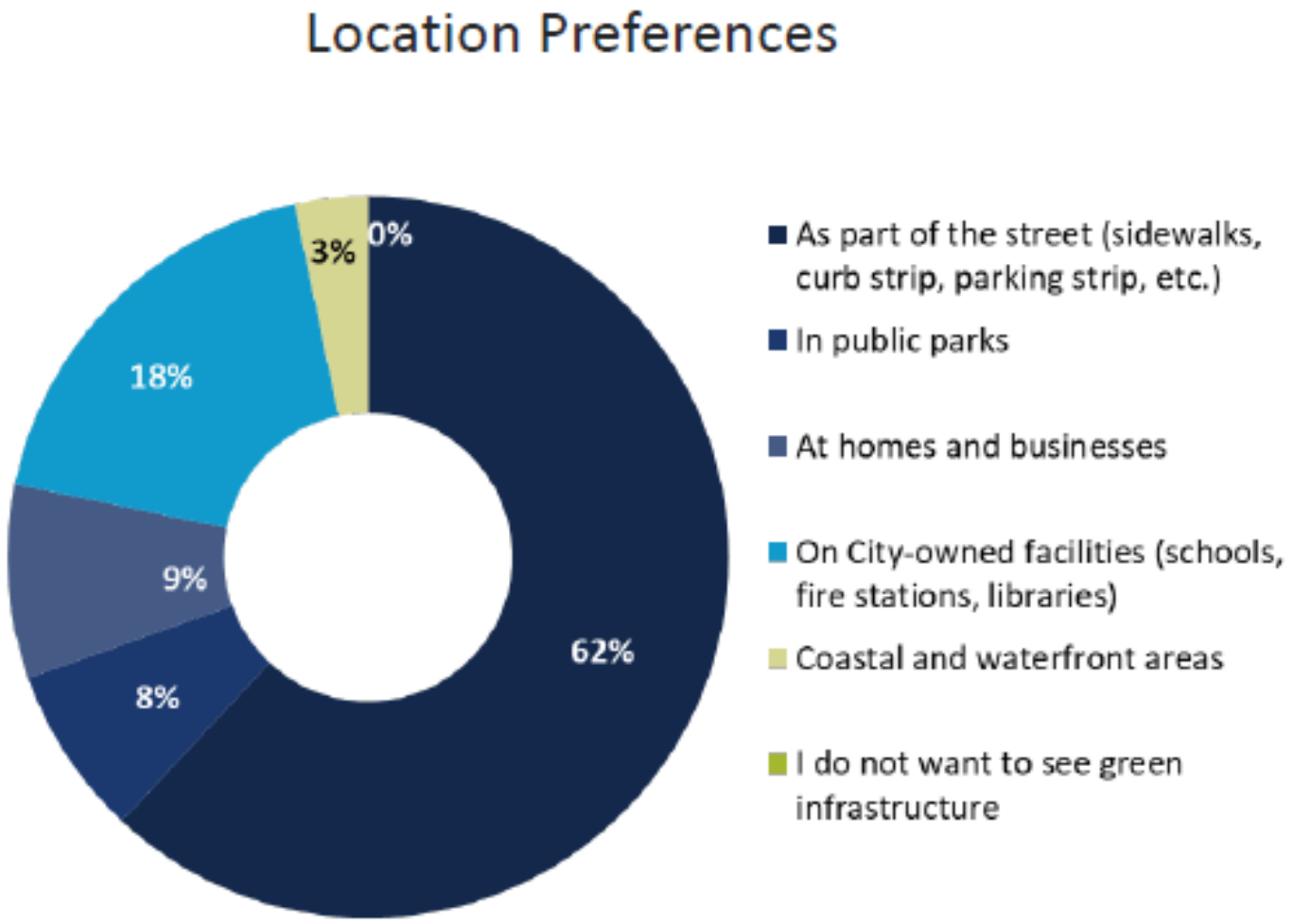
Green Infrastructure Survey Results

Preferred Types of Green Infrastructure



Green Infrastructure Survey Results

Preferred Locations



Green Infrastructure Survey Results

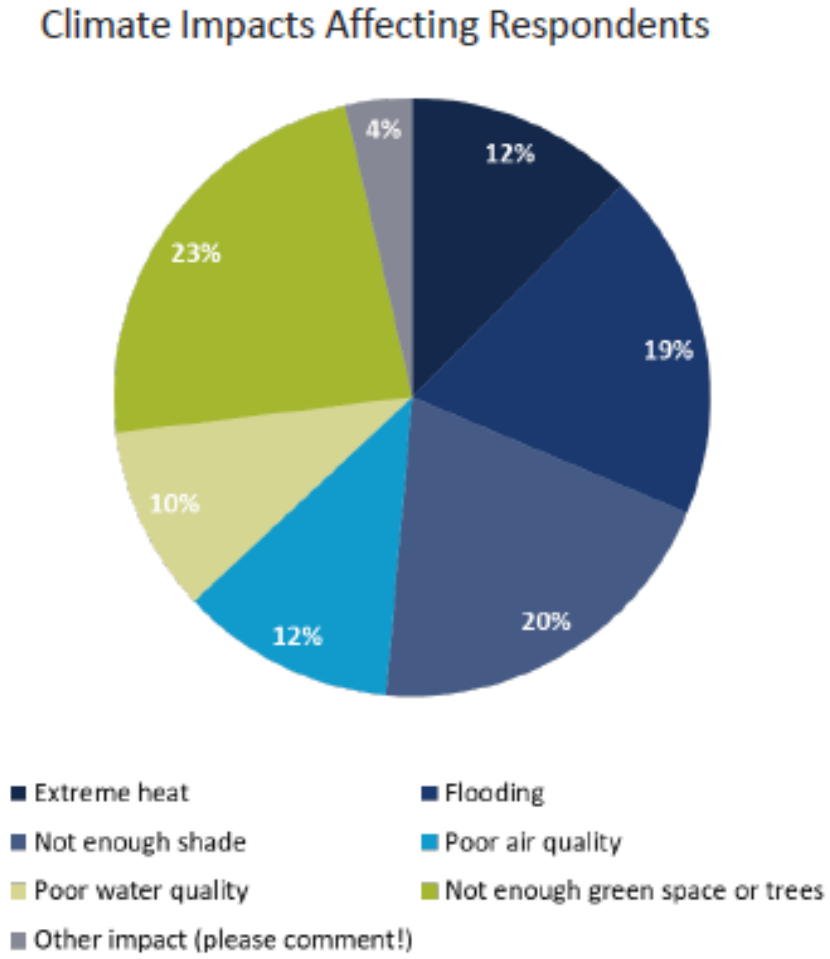
Importance of Climate Impact Mitigation

81%

Think it is *very important* to prioritize implementing green infrastructure in neighborhoods experiencing severe climate impacts

70%

Feel *very concerned* that climate change will worsen impacts like flooding and urban heat



Green Infrastructure Techniques –
Areas With Limited Space

Porous Pavements

Blue Roof

Subsurface Storage and Infiltration

Green Roof and Rainwater Harvesting

Bioretention / Rain Gardens / Street Planters

Green Infrastructure Techniques – Large Open Spaces

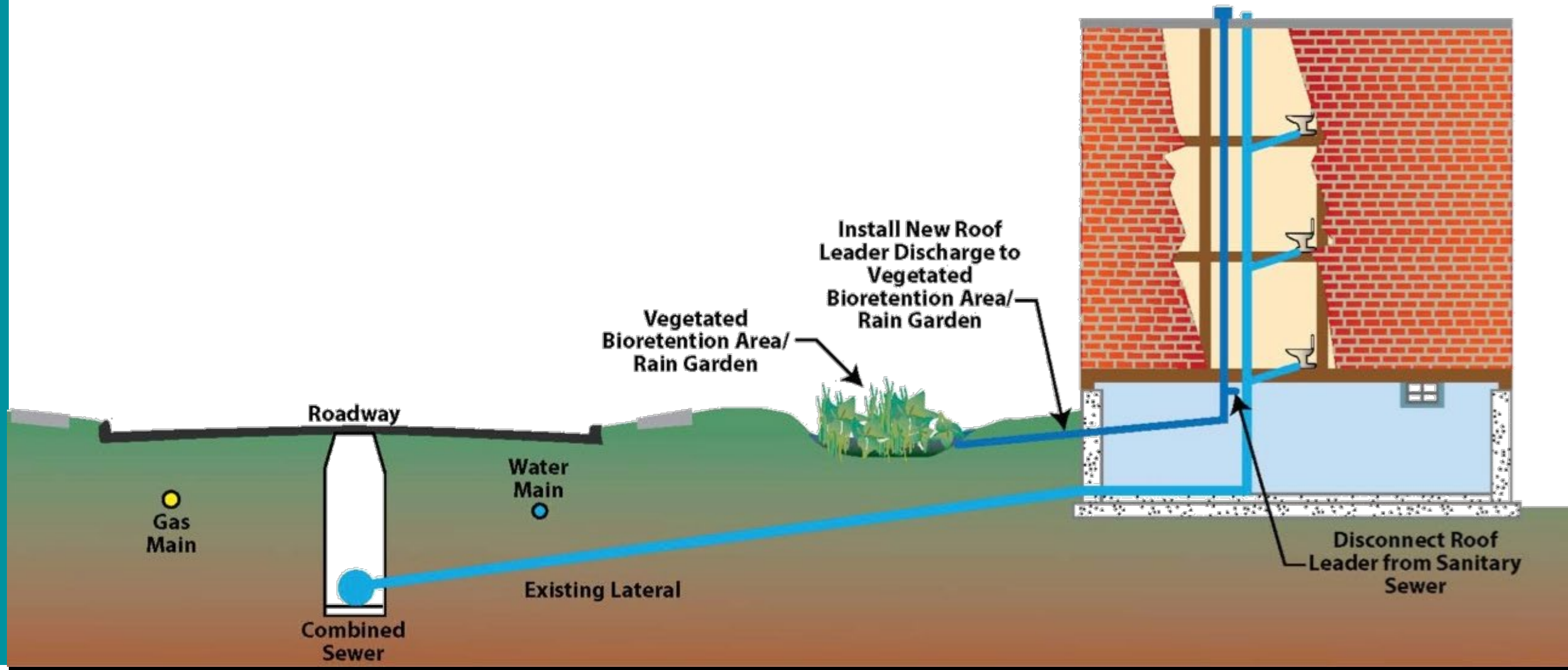
11

Green Roof Retrofit Design Considerations

- Extensive green roof
- Media depth
  - Chose 4.5-inch deep root growth soil media in Hartford
- Structural integrity of roof
- Effective waterproofing
- More cost-effective on new building than retrofit

Alternative Rooftop Solution

Redirect Runoff to Green Infrastructure



Right-of-Way Bioswales

Right-of-Way Bioswales – New York City

20' x 5' Bioswale

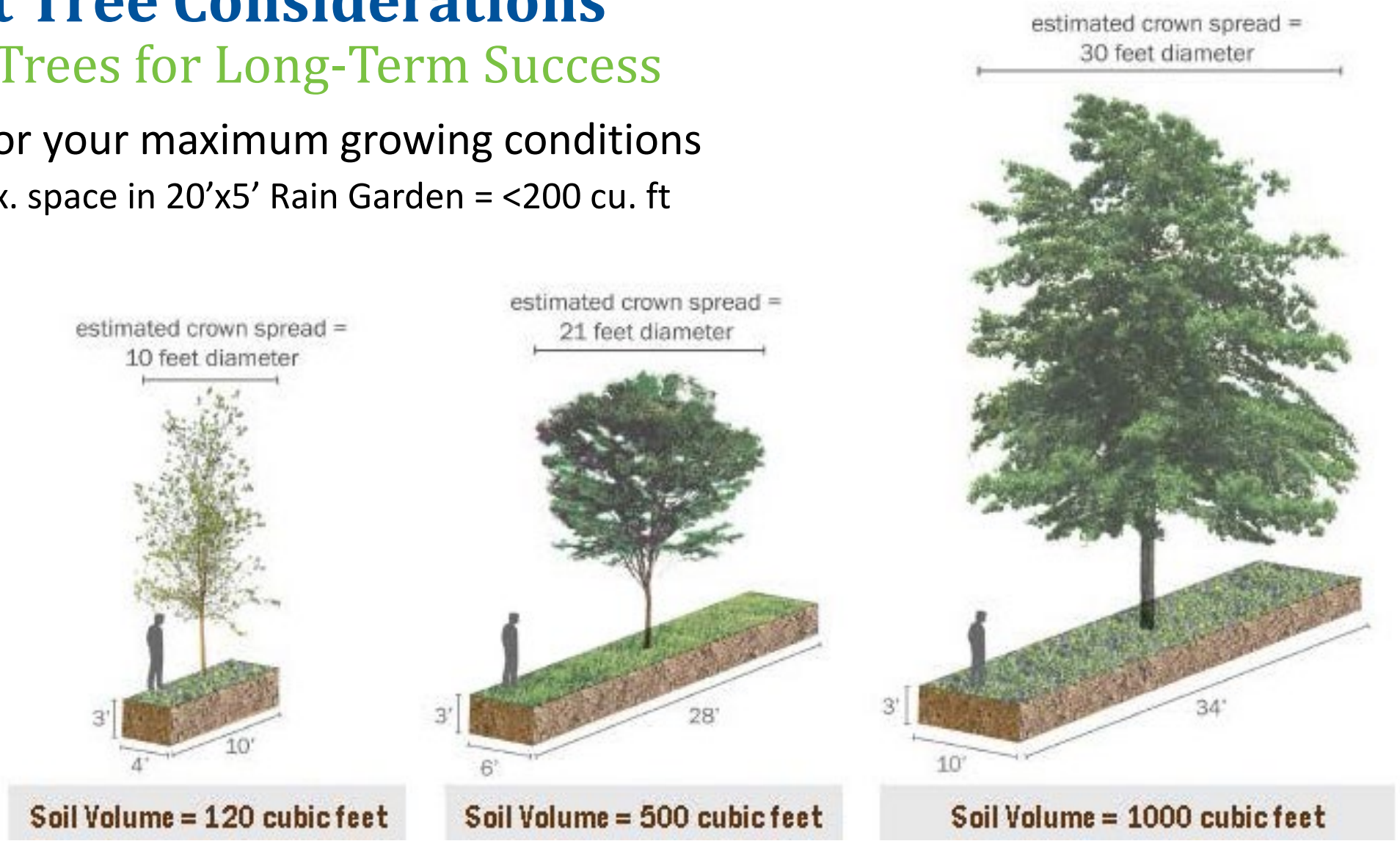
15' x 5' Bioswale

10' x 5' Bioswales

Street Tree Considerations

Sizing Trees for Long-Term Success

- Plant for your maximum growing conditions
  - Max. space in 20’x5’ Rain Garden = <200 cu. ft



Source: Casey Trees, Washington DC

Street Tree Considerations

Sizing Trees for Long-Term Success

Swamp White Oak

Vegetated Bioretention Area Maintenance

- Highest maintenance first two years
- Seasonal weeding, raking and pruning
- Infiltration improves over time as roots establish

Design with Maintenance in Mind

- Install hardscapes instead of planted areas if trash is an issue
- Install grasses instead of plantings
  - Easier to maintain
  - Found to have better infiltration over time (UNH Stormwater Center)
- Provide ready access
  - Sufficient manholes on structures
  - Ramp for bobcat/mower in basins
  - Access to forebay

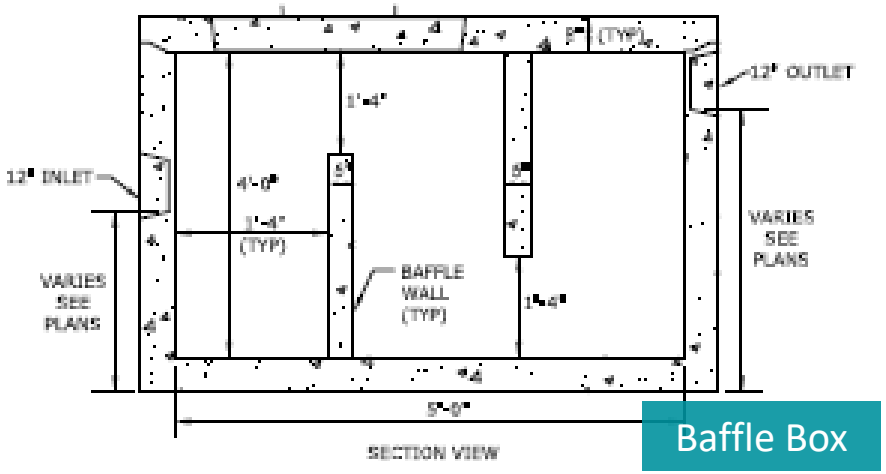
Hartford Green Capitols Project

Constructed in 2010 – Good Maintenance Makes a Difference

20

Pre-Treatment to Reduce Sediment and Debris in Street Planters

- Catch basin
- Baffle box
- Particle separator



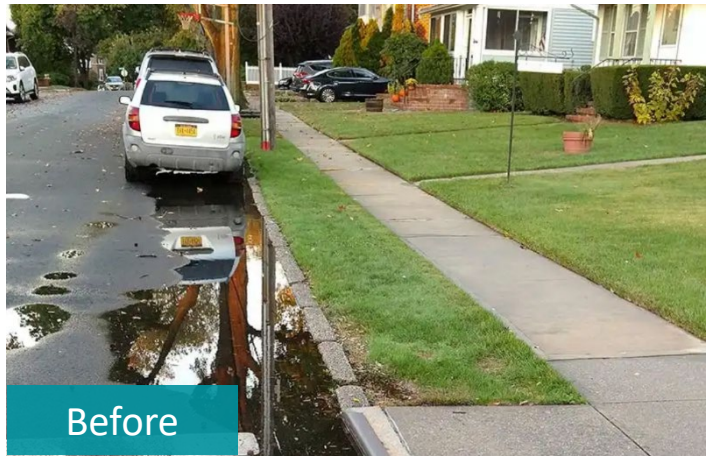
Baffle Box

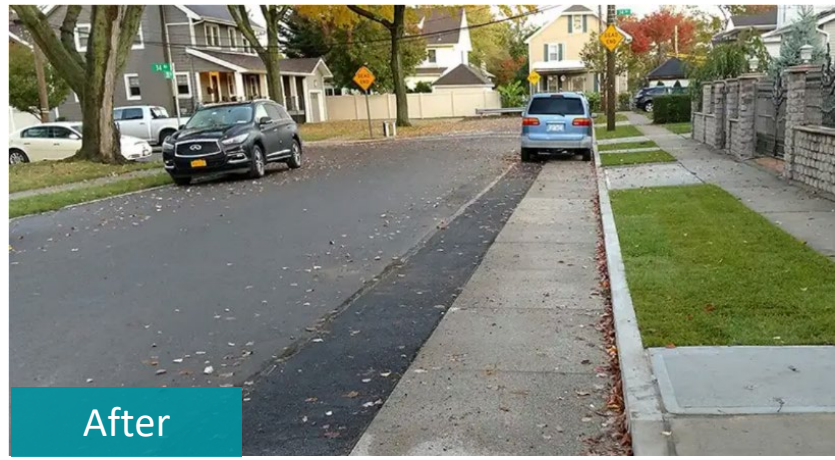
Harvard University Allston Campus

New York City Green Infrastructure Hardscapes

Precast pervious concrete panels installed in street gutter

Source: Storm Water Solutions, November 13, 2020



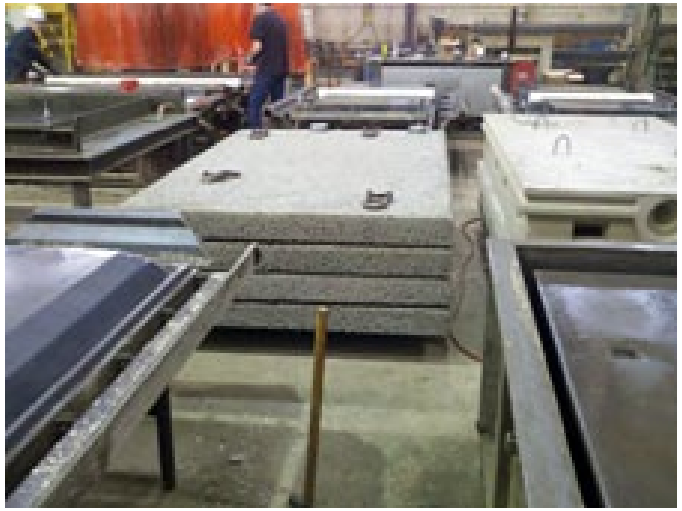


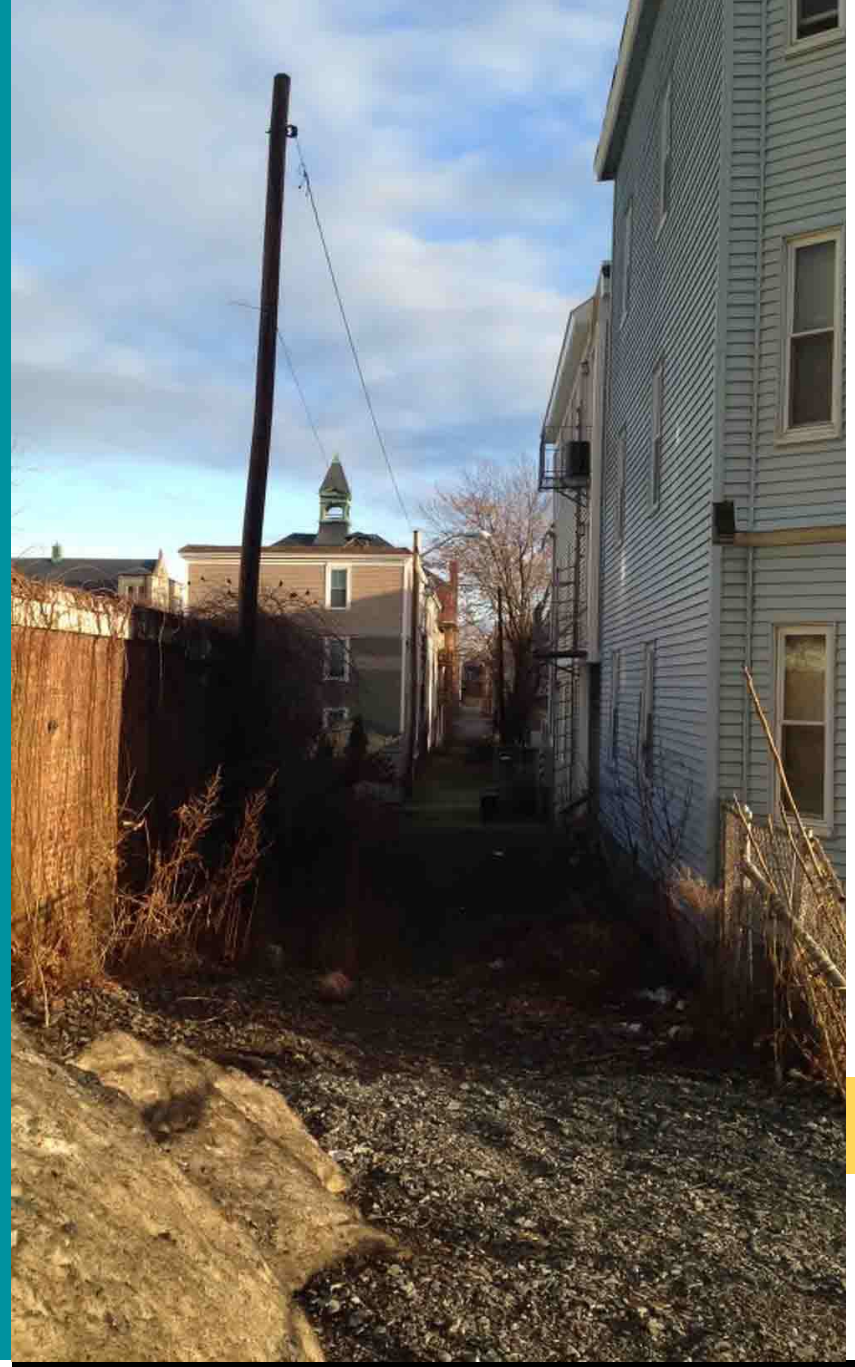
NYC infiltration basin

Source: NYC Green Infrastructure 2020 Annual Report (NYCDEP)

Precast Pervious Concrete Panels

Easy to Install and Maintain



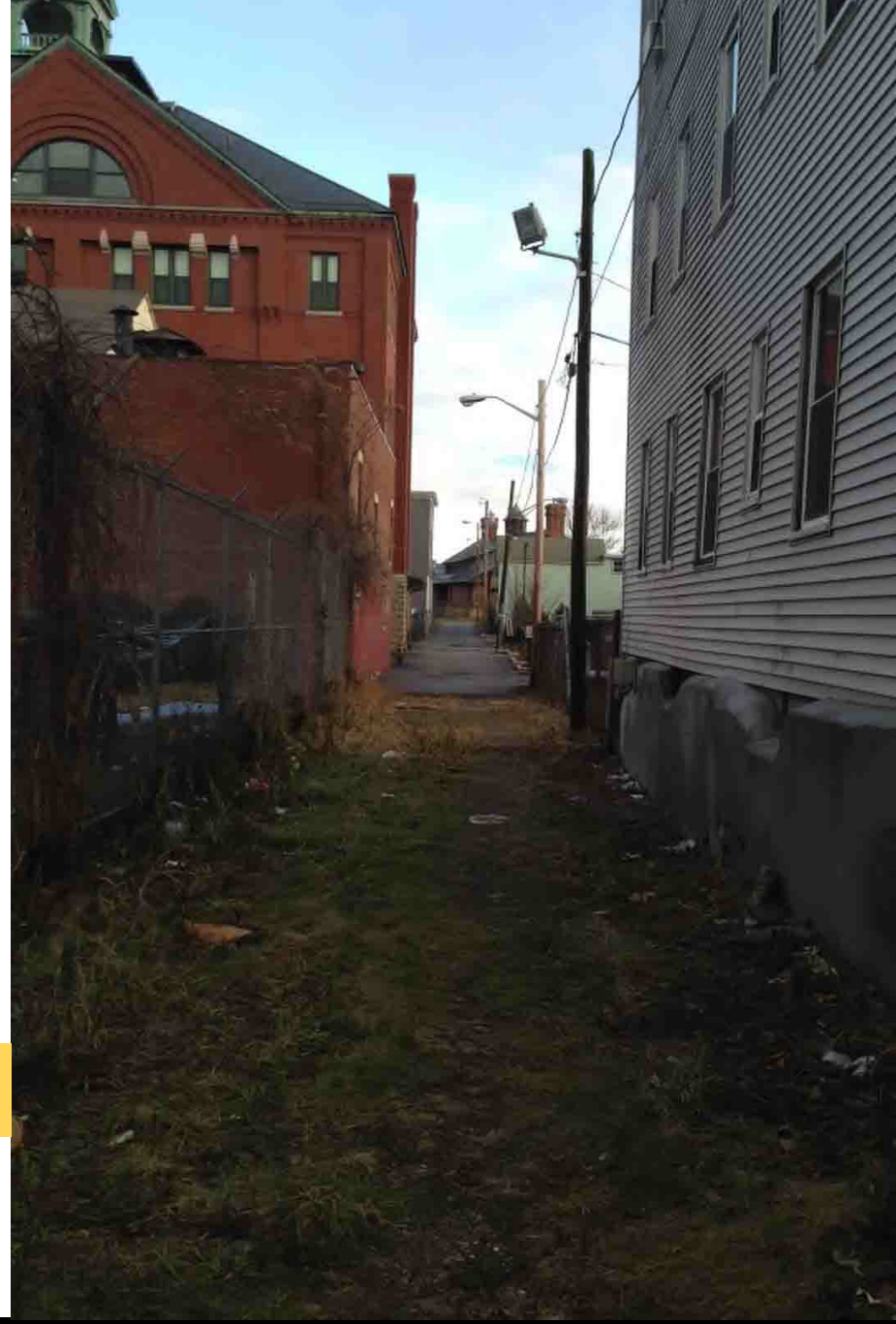


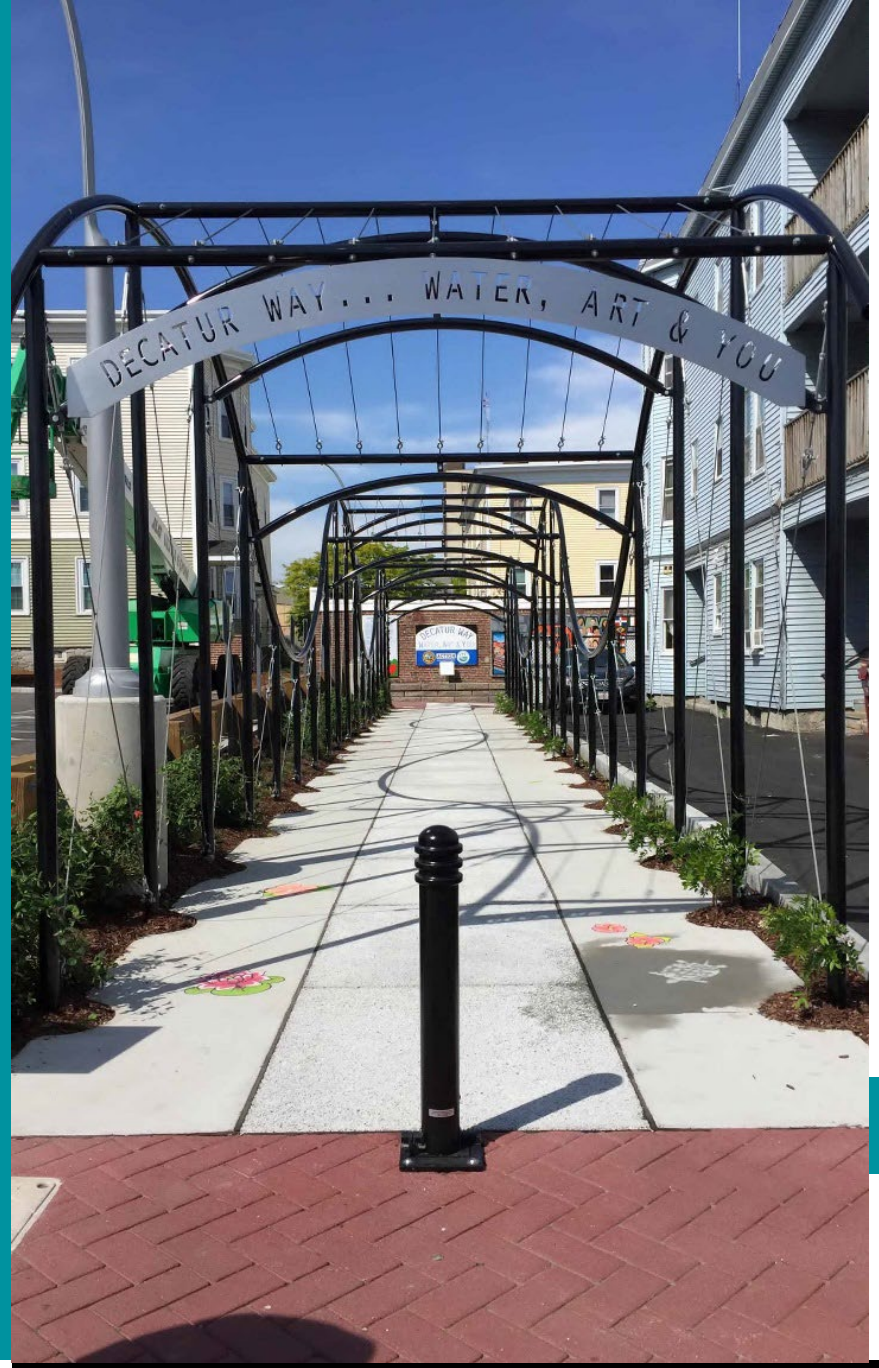
Hardscapes Can Transform Neighborhoods, Too

Green Alley Project

LOWELL, MA

BEFORE



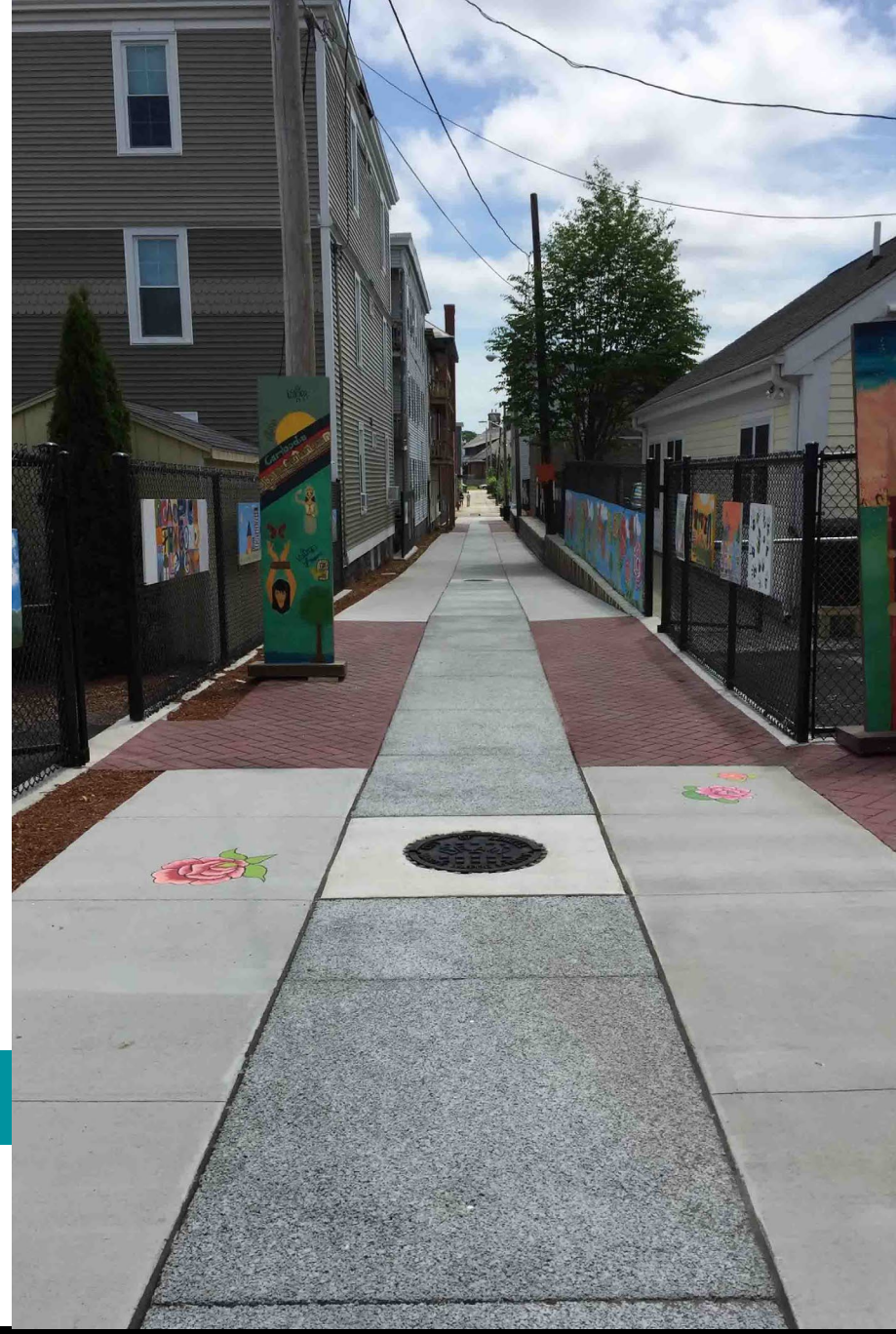


Hardscapes Can Transform Neighborhoods, Too

Green Alley Project

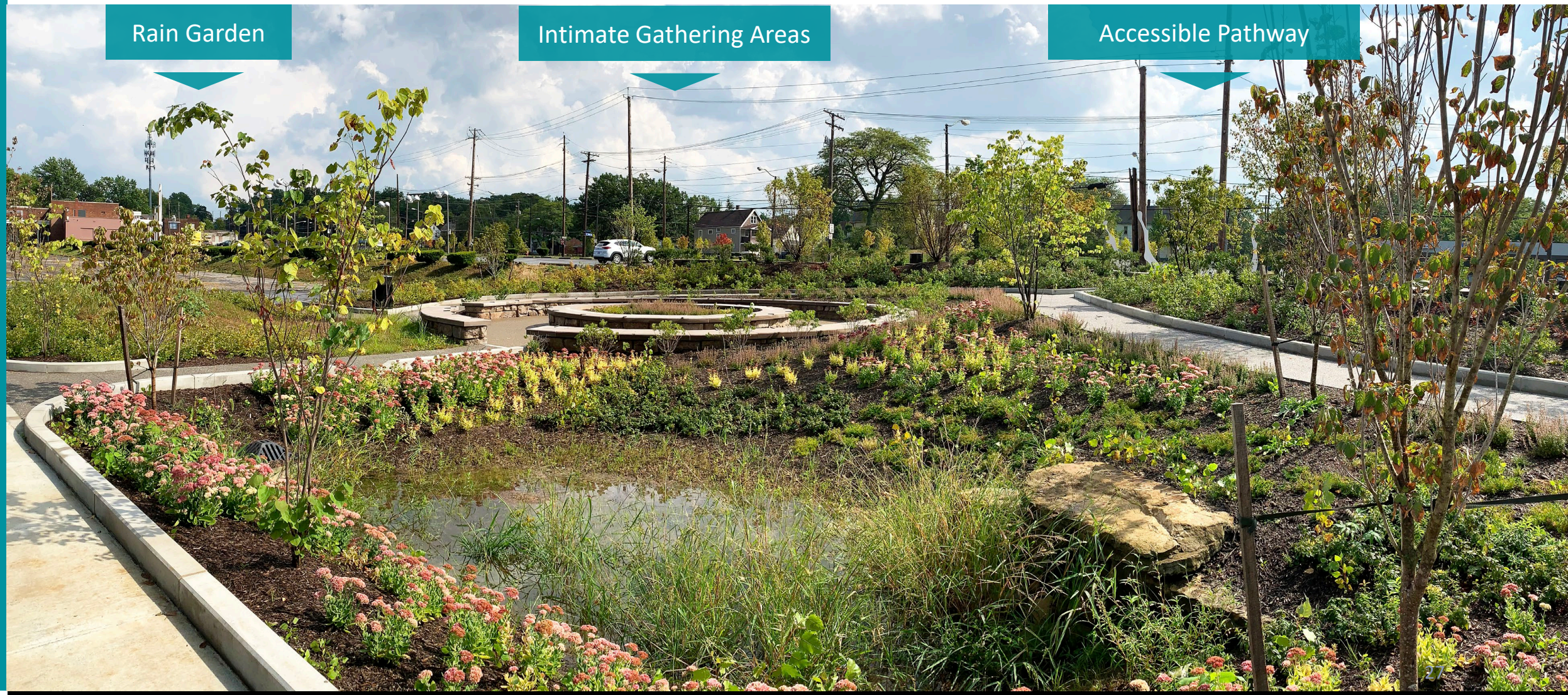
LOWELL, MA

AFTER



Maximizing Use of Space
Union Buckeye Project – Gateway Site
Cleveland, OH

Union Buckeye Project – Gateway Site



Union Buckeye Project – Gateway Site

Modular Precast Subsurface Storage System

Public Art – Local Craftsmen

Custom Precast Concrete
With Inscribed Poetry

Custom-Fabricated
Trench Drains

Public Art – Local Craftsmen

Water Tower Sculpture

Bike Rack Sculpture

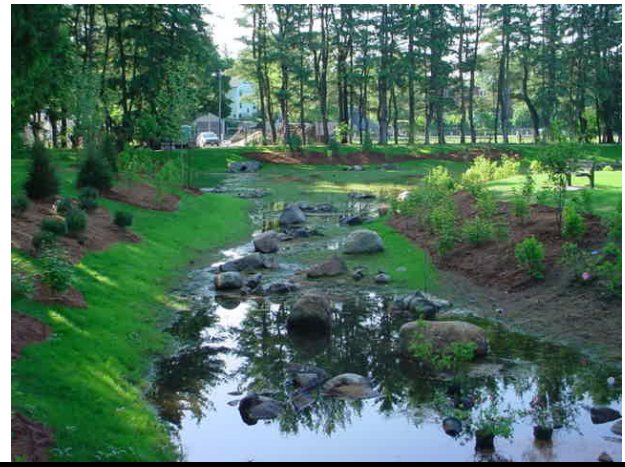
Community Input Promotes Community Ownership

Anniversary Park – Nashua, NH

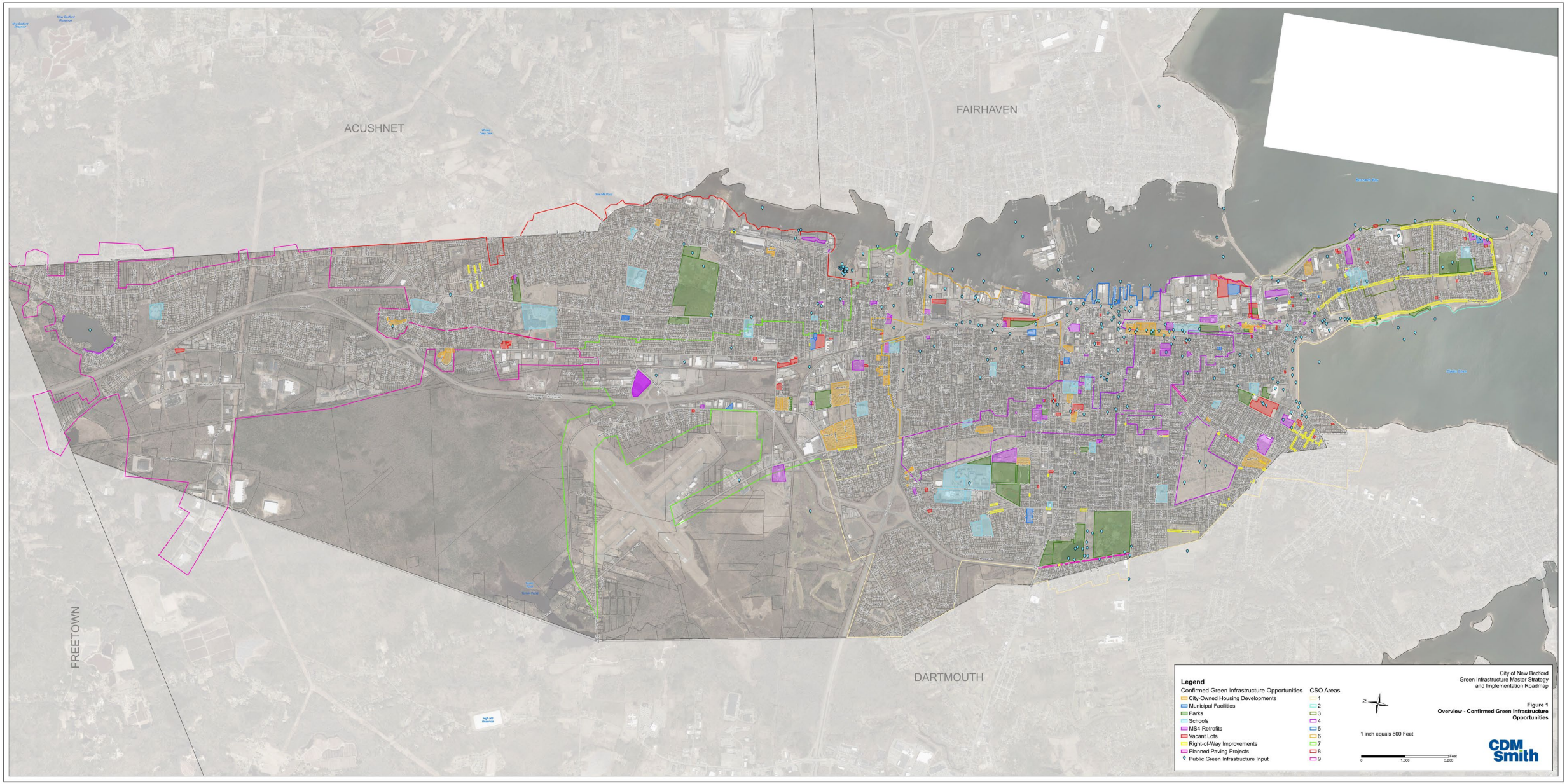
From Public Eyesore to Community Asset

A New Hampshire community turns a new stormwater basin into a unique recreation area and centerpiece of a popular neighborhood park

John Z. Olcott Jr. and Amy Prouty Gill



New Bedford Green Infrastructure Opportunities



New Bedford Green Infrastructure Opportunities

James B Congdon Elementary School

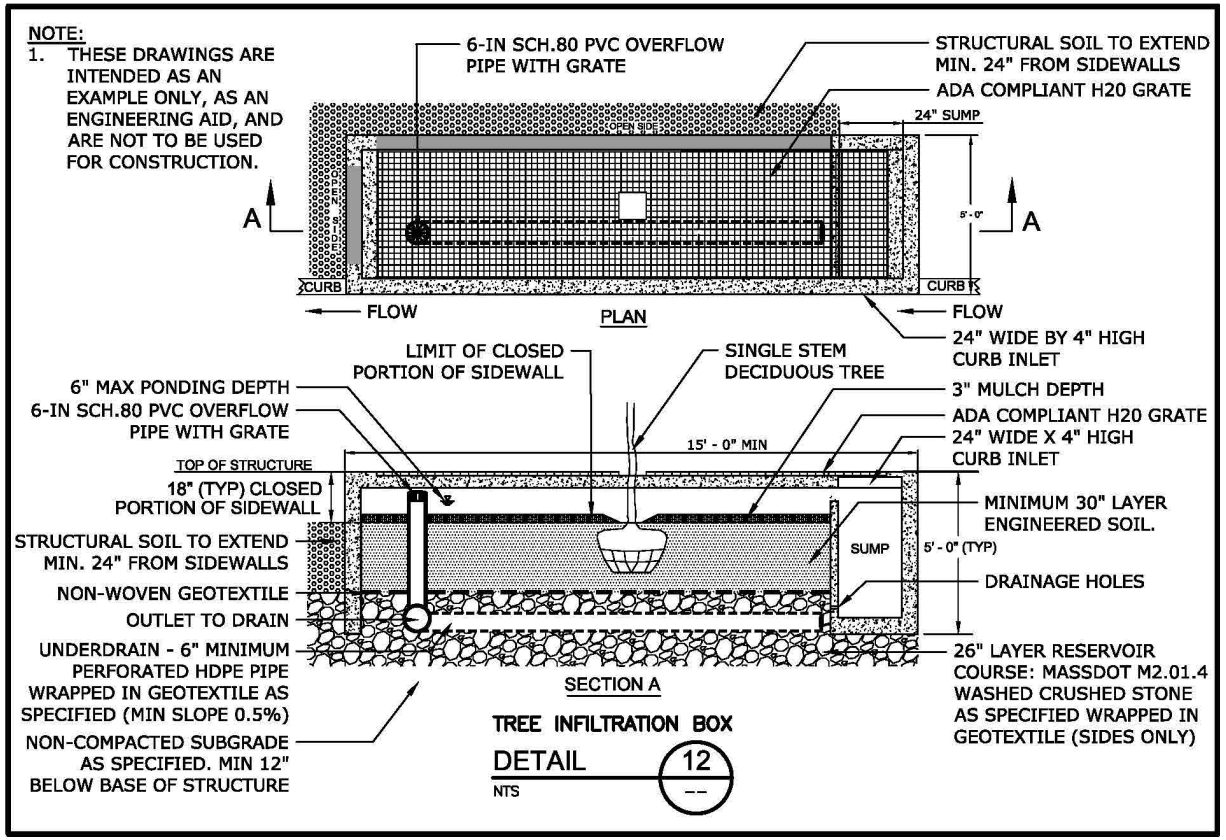
Dr Paul F Walsh Athletic Field

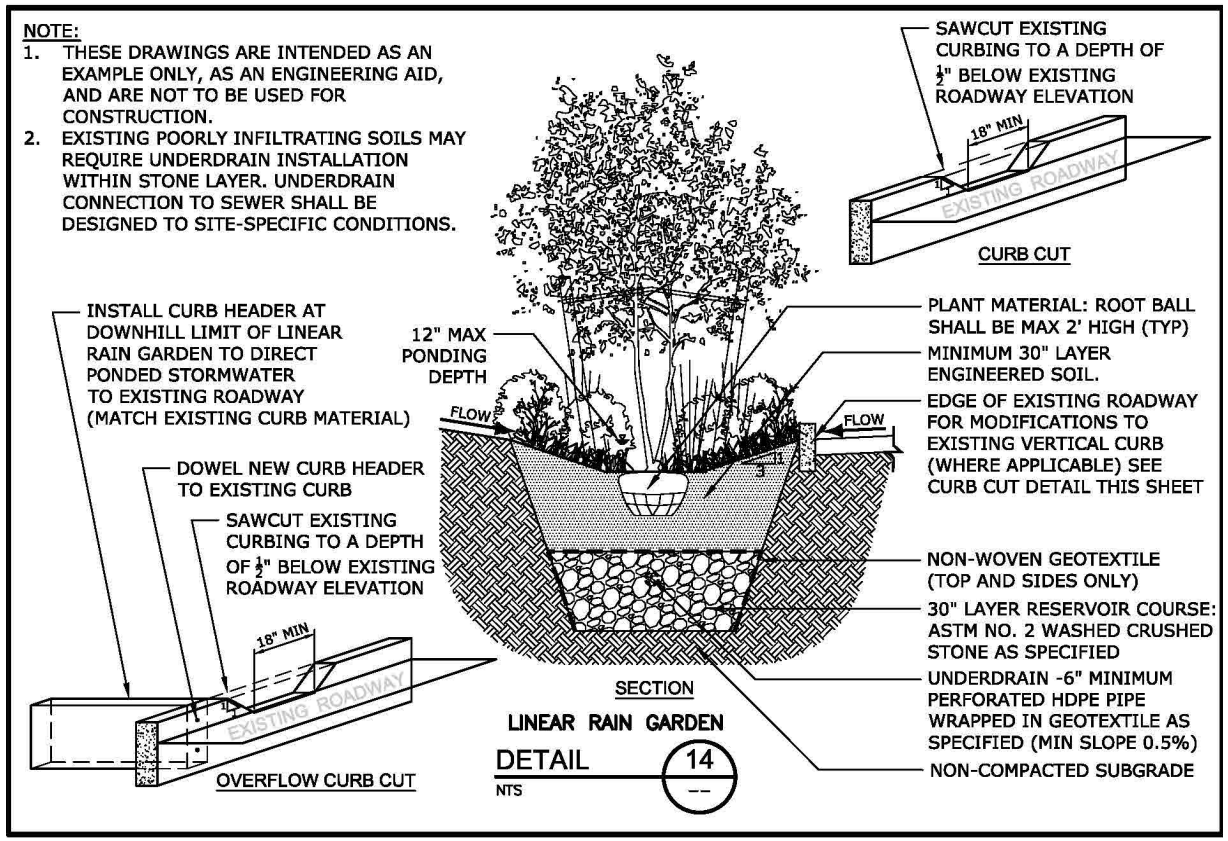
Blue Meadows

Payne Cutlery Site

Creating Standard Green Infrastructure Design Tools

New Bedford Standard Details and Specifications





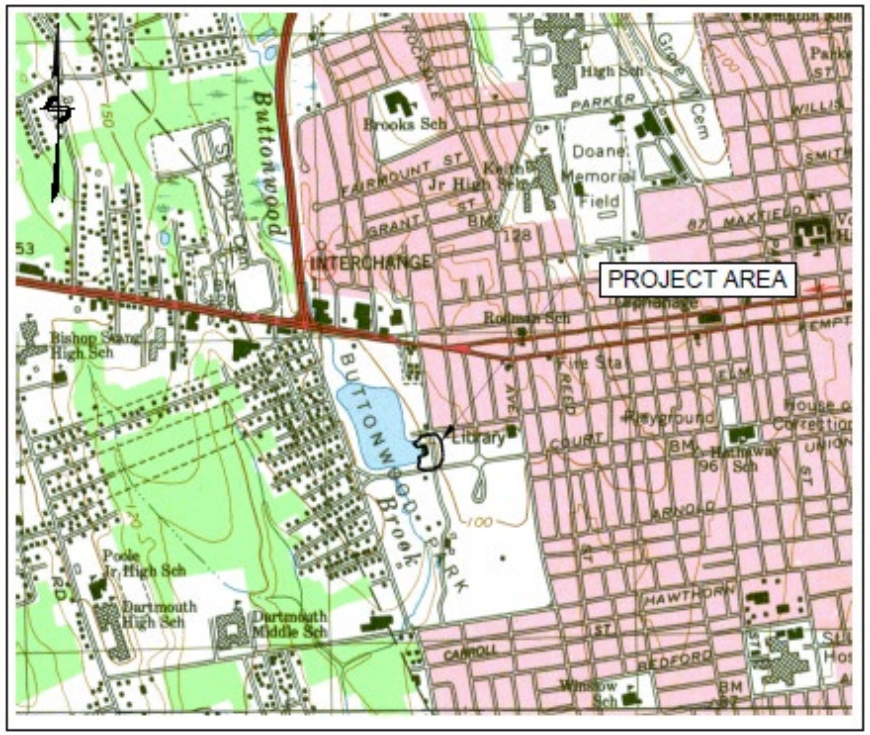
New Bedford Green Infrastructure – In Progress

Brooklawn Park Constructed Wetland

Brooklawn Park Constructed Wetland

New Bedford Green Infrastructure – In Progress

Buttonwood Community Center Bioretention Basins



LOCATION PLAN

1000 0 1000 2000

SCALE IN FEET

Buttonwood Community Center Bioretention Basins

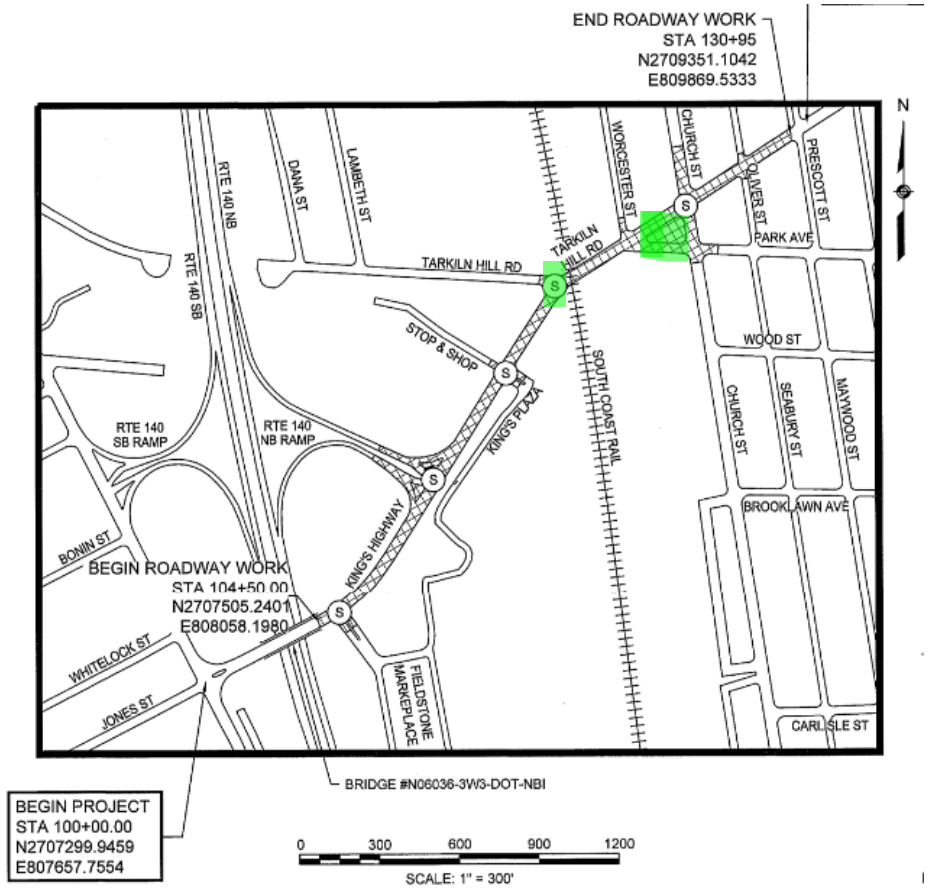
New Bedford Green Infrastructure – In Progress

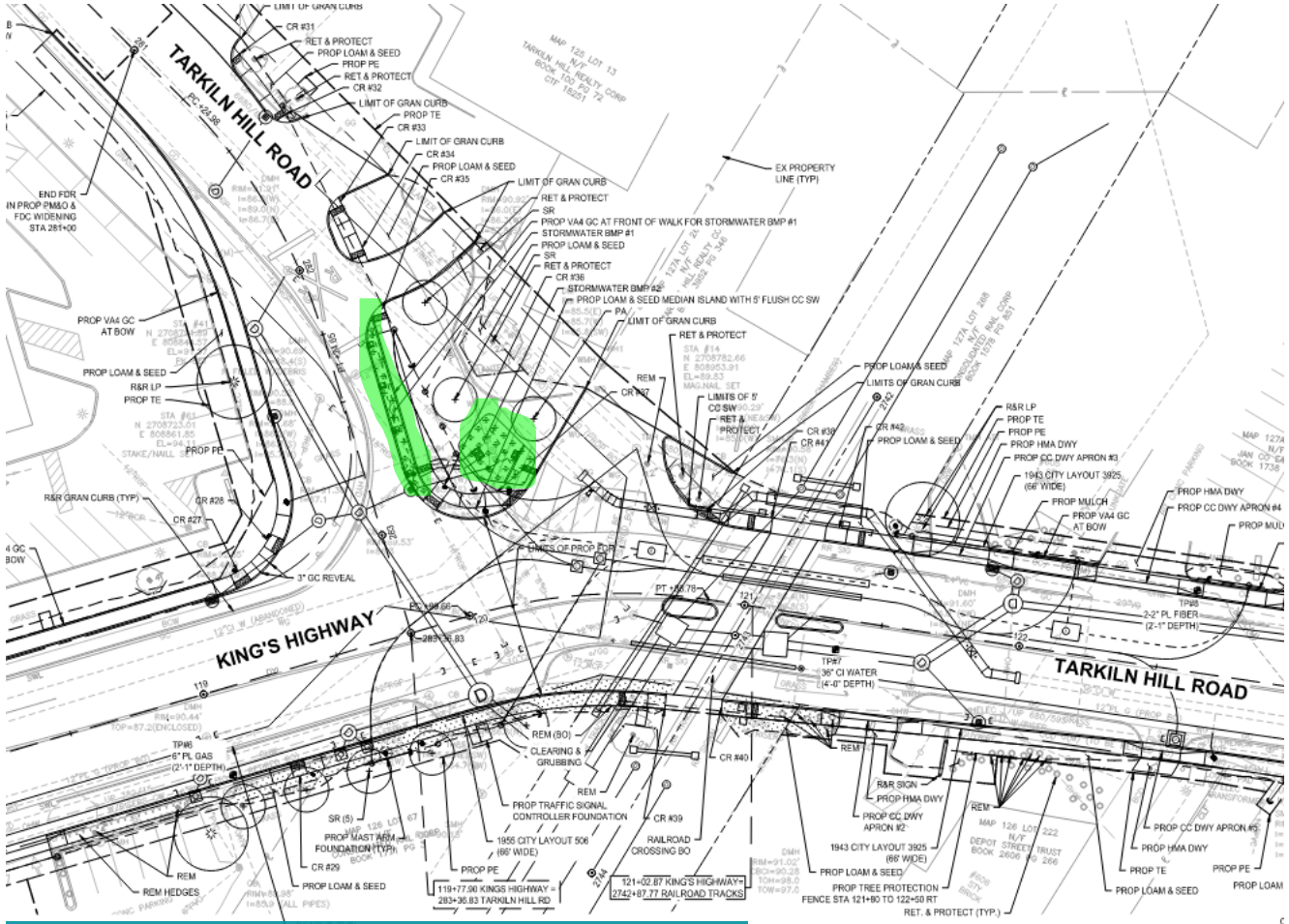
East Beach Parking Lot Bioretention Basins and Subsurface Infiltration

East Beach Parking Lot Bioretention Basins and Subsurface Infiltration

New Bedford Green Infrastructure – In Progress

King's Highway Bioretention/Rain Gardens





King's Highway Bioretention/Rain Gardens

Neighborhood Mapping

Green Infrastructure Operation and Maintenance

lighting the way NB new bedford

ONE WATER

ONE RESOURCE. ONE FUTURE.

Closing

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