Resilient Riverfront Renewal

MAIN STREET, WESTERLY, RI

FUSS & O'NEILL

Southern Rhode Island Conservation District

THE TOWN OF WESTERLY, R.I. 1669 OFFICIAL SEAL

Paving, Paving Everywhere

Impervious Cover

FUSS & O'NEILL

OVERVIEW

200 100 0 200 FT

Project Site

Fly Over:

Main Street Tour.kmz

Pluvial, Fluvial, and Coastal Flooding

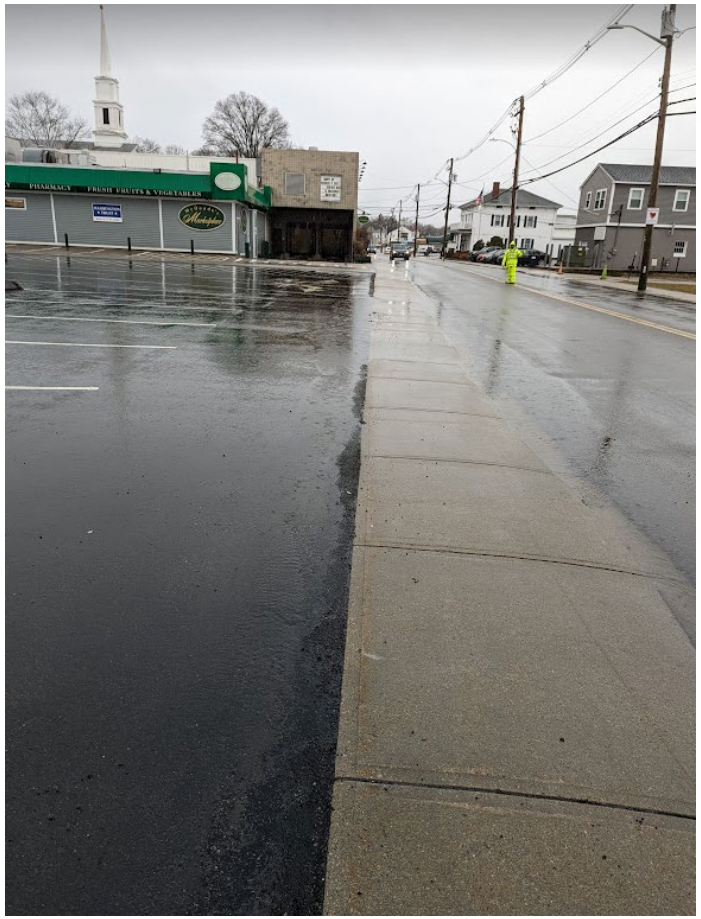


Photo credit: Harold Hanka, The Westerly Sun

Pluvial, Fluvial, and Coastal Flooding

Photo credit: Christine Corrigan, The Westerly Sun

Impaired Waterbody

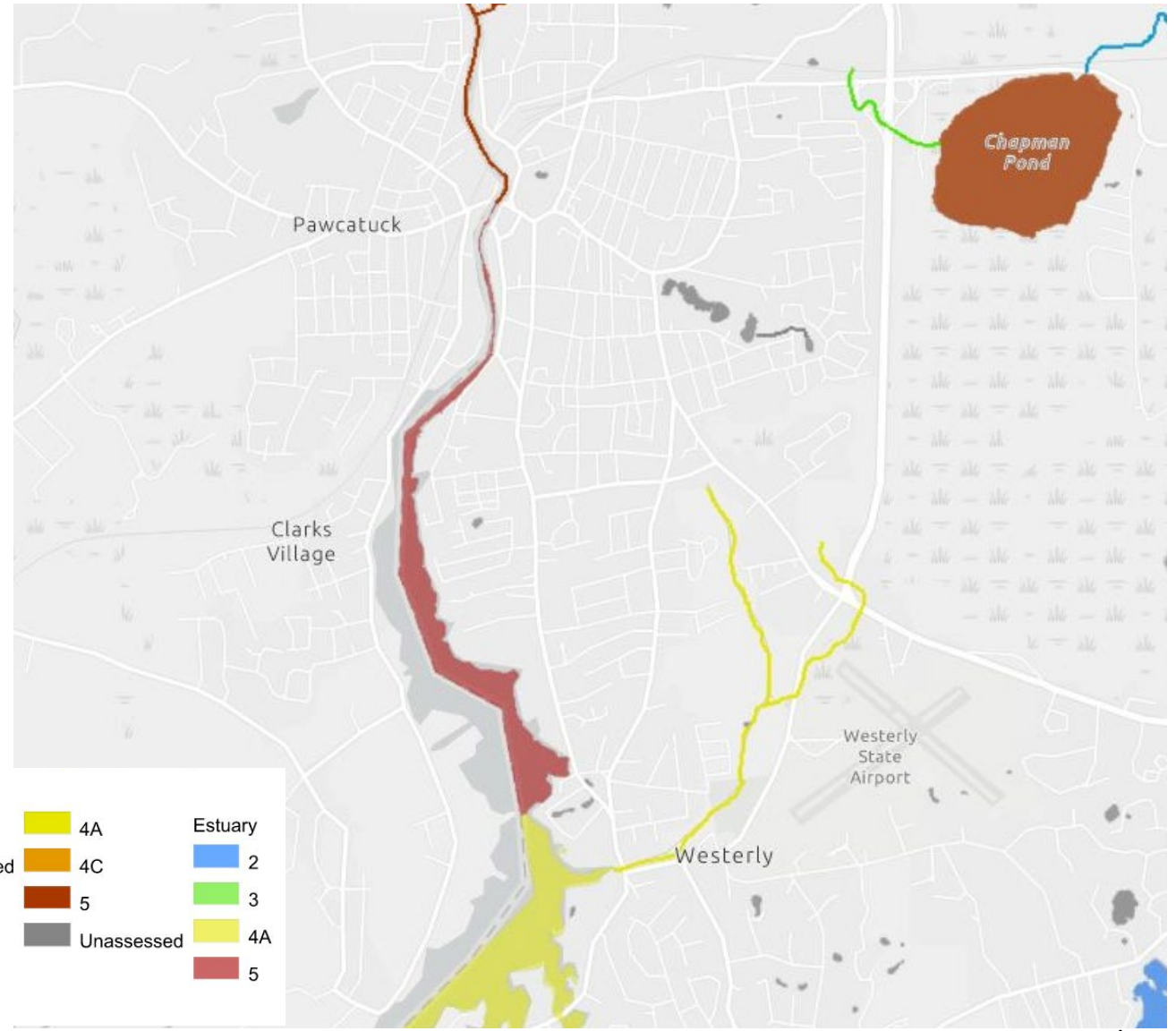
The Pawcatuck River just upstream and the estuarine portion of the river along Main Street are both considered Category 5:

Impaired and/or Threatened

The area downstream from the Main Street waterfront is considered Category 4A:

Impaired and a TMDL has been developed

The TMDL study for the river indicates that the primary pollutant in both areas is **fecal coliform and there is low dissolved oxygen**.



Not to scale

Project Goals

Improve Water Quality

Evaluate opportunities for **green infrastructure**, reduce impervious surfaces, and create planted areas to infiltrate and treat stormwater

Establish a Green Corridor

Increase the **economic vitality** of Downtown Westerly and improve the quality of life for residents and visitors through the creation of a green corridor

Create a Sense of Place

Establish a **gateway experience** that celebrates the arrival to the Town of Westerly & Rhode Island

Improve Resilience

Improve conditions along the riverfront to **mitigate the risk** to the Main Street corridor from sea level rise and increased storm surge while creating opportunities for public access to the River.

Project Timeline

Spring 2021: Getting Community Buy-in for Stormwater Funding workshop.

Fall 2021: SNEP Technical Assistance grant – Stormwater Concepts for 107 Main St

Fall 2021: RIDOT funding for advanced assistance to introduce green infrastructure to the corridor to improve the impairments to the Pawcatuck River.

Winter 2022: Narragansett Bay Estuary Program provides funding for a Stormwater Master Plan funded by Narragansett Bay Estuary Program

Spring 2022: Town of Westerly provided funding for a Traffic Study covering the Main Street Corridor.

Summer 2022: The Rhode Island Infrastructure Bank awarded funding to design, permit and implement green infrastructure in the corridor.

Fall 2022: SNEP awarded funding (via the SWIG program) to design, permit and implement green infrastructure in the corridor.

Current: Working with private landowners to finalize designs and obtain permits.

Near Future: Funding for conducting stakeholder engagement and completing the design for the streetscape is being finalized.

Future: Additional funding will be sought to fund the implementation of the streetscape design.

Project Engagement

PARTICIPATING PROPERTIES

200 100 0 200 FT

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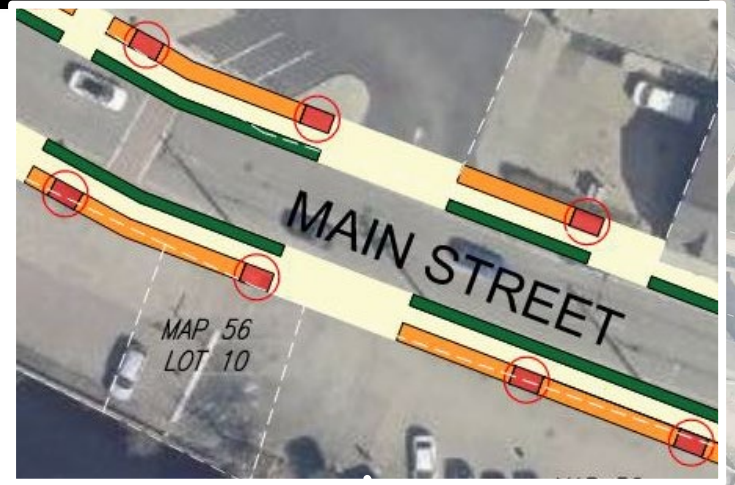
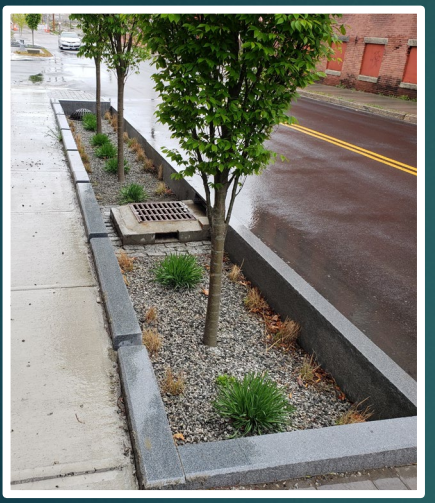
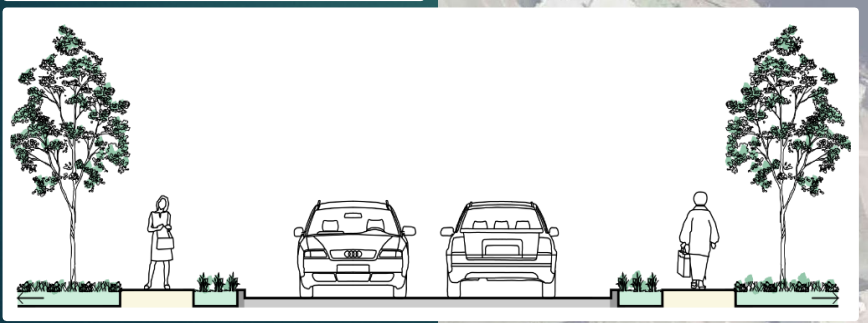
LEGEND

- BIORETENTION
- BIORETENTION WITH "WELCOME TO WESTERLY" PLANTINGS
- CONCRETE SIDEWALK
- CRUSHED STONE
- GRASS
- TREE BOX FILTERS
- TREES
- PROJECT AREA BOUNDARY
- PROPERTY BOUNDARY

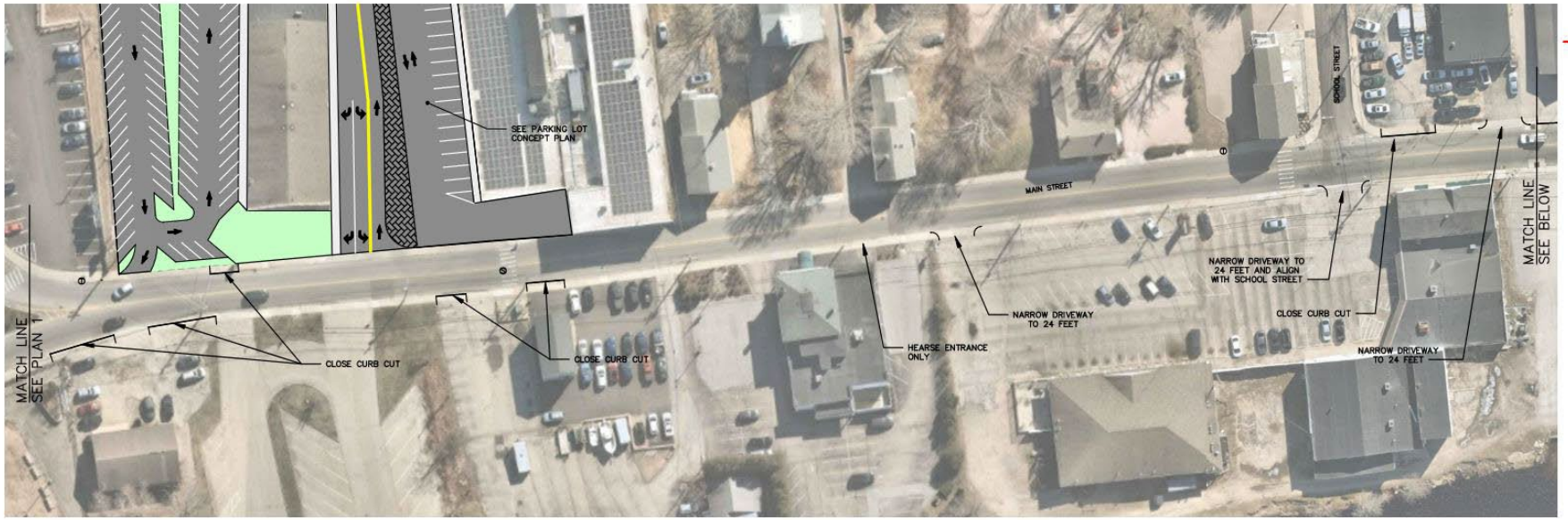


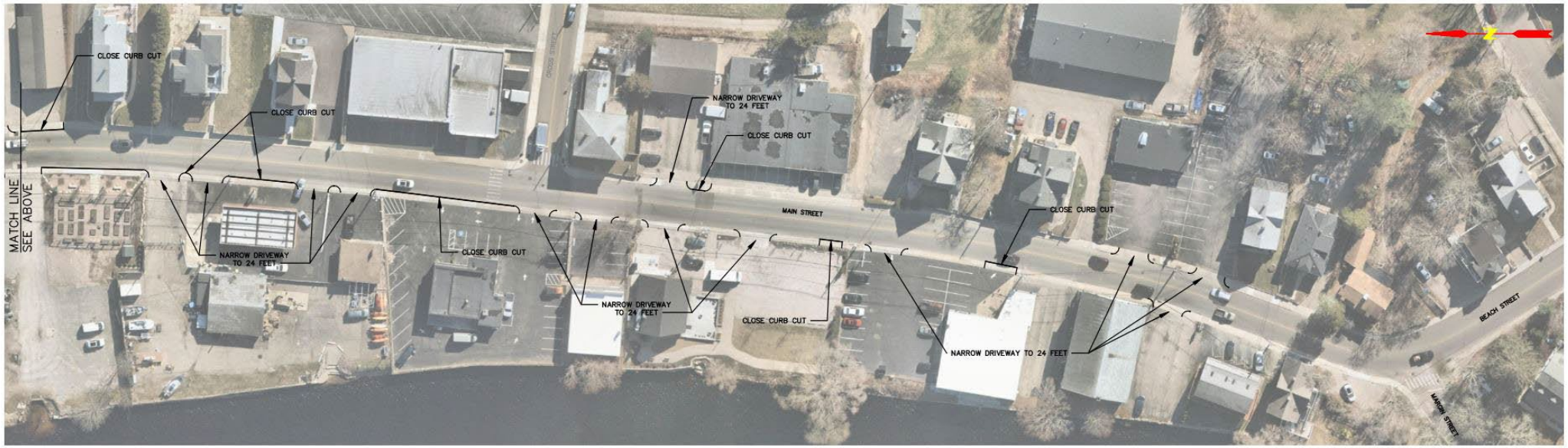




MAIN STREET: NORTH END


LEGEND
BIORETENTION
BIORETENTION WITH "WELCOME TO WESTERLY" PLANTINGS
CONCRETE SIDEWALK
CRUSHED STONE
GRASS
TREE BOX FILTERS
TREES
PROJECT AREA BOUNDARY
PROPERTY BOUNDARY
ELM STREET
SCHOOL STREET
CROSS STREET
MAIN STREET
MAIN STREET
BEACH STREET
MARGIN STREET
PAWCATUCK RIVER
MAP 66 LOT 53
MAP 66 LOT 52
MAP 66 LOT 47A
MAP 66 LOT 48
MAP 66 LOT 49
MAP 66 LOT 50
MAP 66 LOT 52
MAP 66 LOT 3
MAP 66 LOT 4
MAP 66 LOT 5
MAP 66 LOT 6
MAP 66 LOT 7
MAP 66 LOT 43
MAP 66 LOT 44
MAP 66 LOT 45
MAP 66 LOT 46
MAP 66 LOT 47
MAP 66 LOT 12
MAP 66 LOT 13
MAP 66 LOT 11
MAP 66 LOT 10
MAP 66 LOT 9
MAP 66 LOT 8
MAP 66 LOT 16
MAP 66 LOT 14
MAP 66 LOT 14
MAP 66 LOT 12A
MAP 76 LOT 37
MAP 76 LOT 40
MAP 76 LOT 38
MAP 76 LOT 39
MAP 76 LOT 41
MAP 76 LOT 42
MAP 76 LOT 43
MAP 76 LOT 44
MAP 76 LOT 35
MAP 76 LOT 34
MAP 76 LOT 33
MAIN STREET: SOUTH END





FUSS & O'NEILL

ACCESS MANAGEMENT CONCEPT PLAN 2 | MAIN STREET, WESTERLY, RI | SCALE 1" = 80'

Alignment with Comprehensive Plan

"***Maximize traffic safety and mobility*** by maintaining local road surfaces, introducing traffic calming tools where appropriate, and re-engineering traffic patterns ***with related storm water infrastructure***."

"***Limit automobile traffic*** through support of commuter rail, Rhode Island Public Transit Authority (RIPTA) and other public transportation services, and ***establishment of local pedestrian and bicycle networks*** where public safety concerns can be met."

Alignment with Comprehensive Plan

"Downtown Westerly will be a ***welcoming and attractive gateway for visitors*** arriving by public transportation or otherwise, a premier cultural center for all, continue its legacy as an Historic District and Arts Center, and will be well-connected to all neighborhoods through its public spaces, programs, events, and services of community-wide interest."

"The shoreline, Pawcatuck River, salt ponds, and ***greenspace will remain Westerly's trademarks***, with public rights-of-way carefully managed and maintained both to ensure accessibility and to sustain their uses while preserving their health and natural beauty for future generations to enjoy."

"Westerly will have achieved a condition of ***economic and physical resilience*** to natural and man-made events."

First coastal retrofit and application of the Urban Coastal Greenway Design Guidelines in the Main Street corridor at Cinder Restaurant

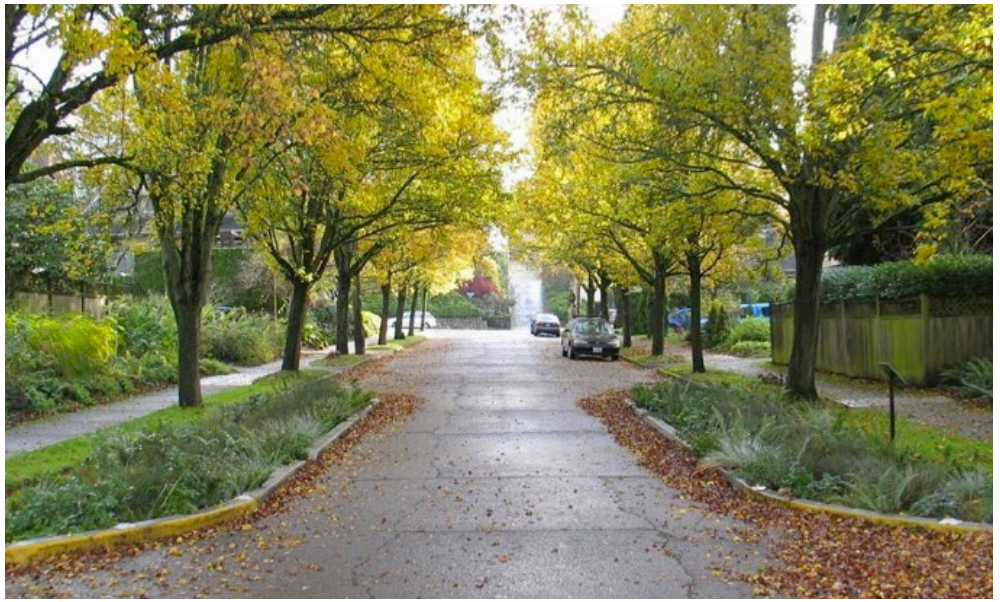
Green Infrastructure: Bioretention

Pollutant Removal Efficiencies (RI Stormwater Design and Installation Standards Manual)

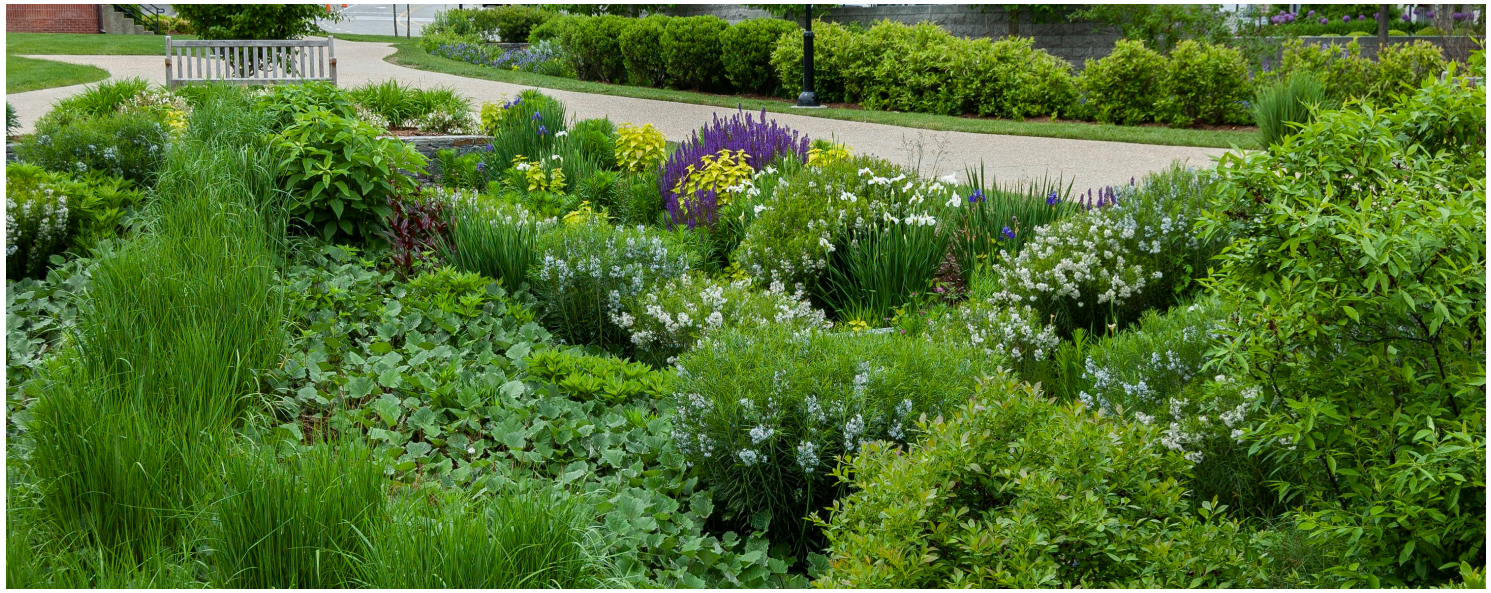
- 70% Bacteria
- 90% Total Suspended Solids

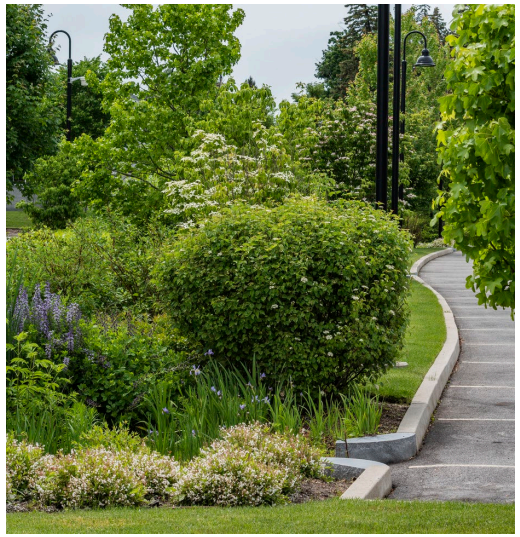
BENEFITS

- Treats and improves water quality via filtration
- Reduces runoff
- Provides flood mitigation
- Allows groundwater recharge
- Highly versatile
- Effective in small spaces
- Easily incorporated into existing or new development
- Offers instant beautification
- Simple, low-maintenance landscapes
- Increases property values
- Creates habitat and biodiversity



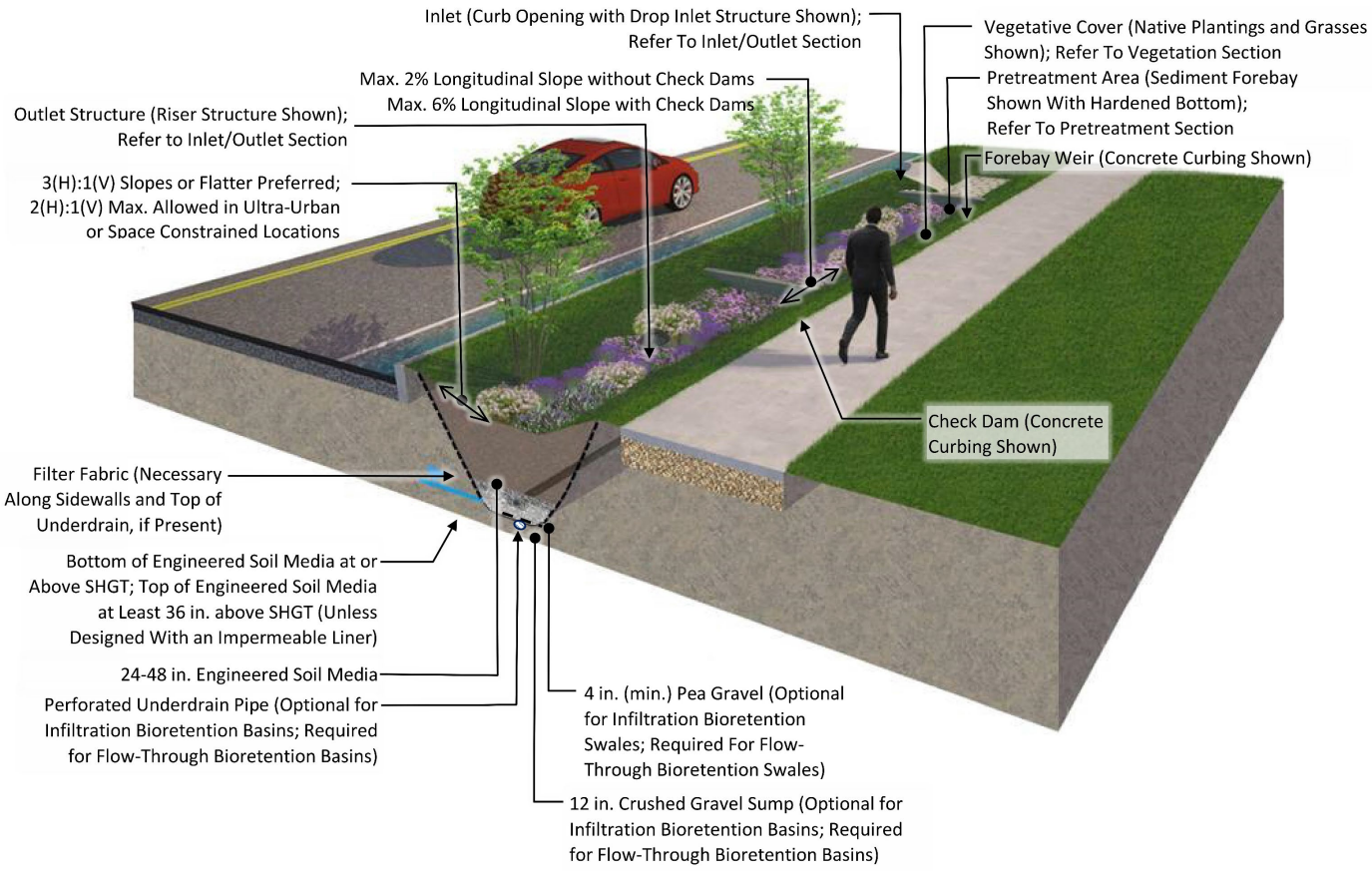
Bioretention Basins





Bioretention Swales

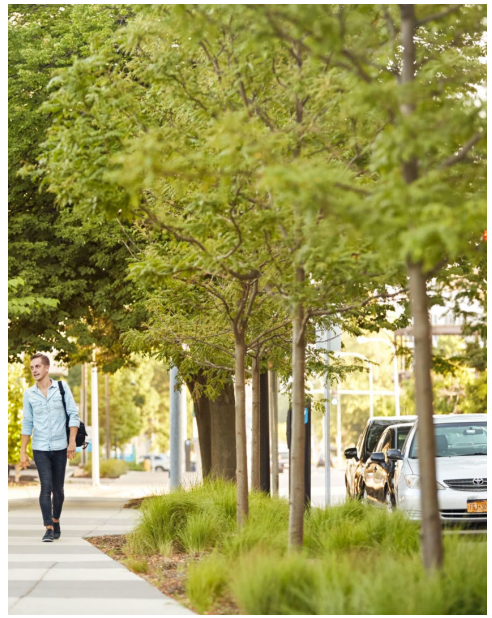
Bioretention swales are shallow, gently sloped, vegetated/landscaped open channel systems designed to convey and filter stormwater.



Bioretention Planters

DESIGN CONSIDERATIONS

- **Basic components:** ponding area, soil media, mulch layer, plants
- **Pretreatment:** Direct initial runoff to a pretreatment area to filter out coarse materials
- **Filtration:** Use special engineered soils to infiltrate stormwater
- **Plants:** Use diverse native perennials suited to urban environment
- Consider aesthetics and benefits to habitat
- **Drainage:** Water must drain within a few days
- Best suited to areas with shallow slopes
- Strategically locate rain garden to intercept runoff
- Not well-suited to managing high volumes of runoff
- Use rain gardens to calm traffic and enhance pedestrian safety
- Minimal maintenance

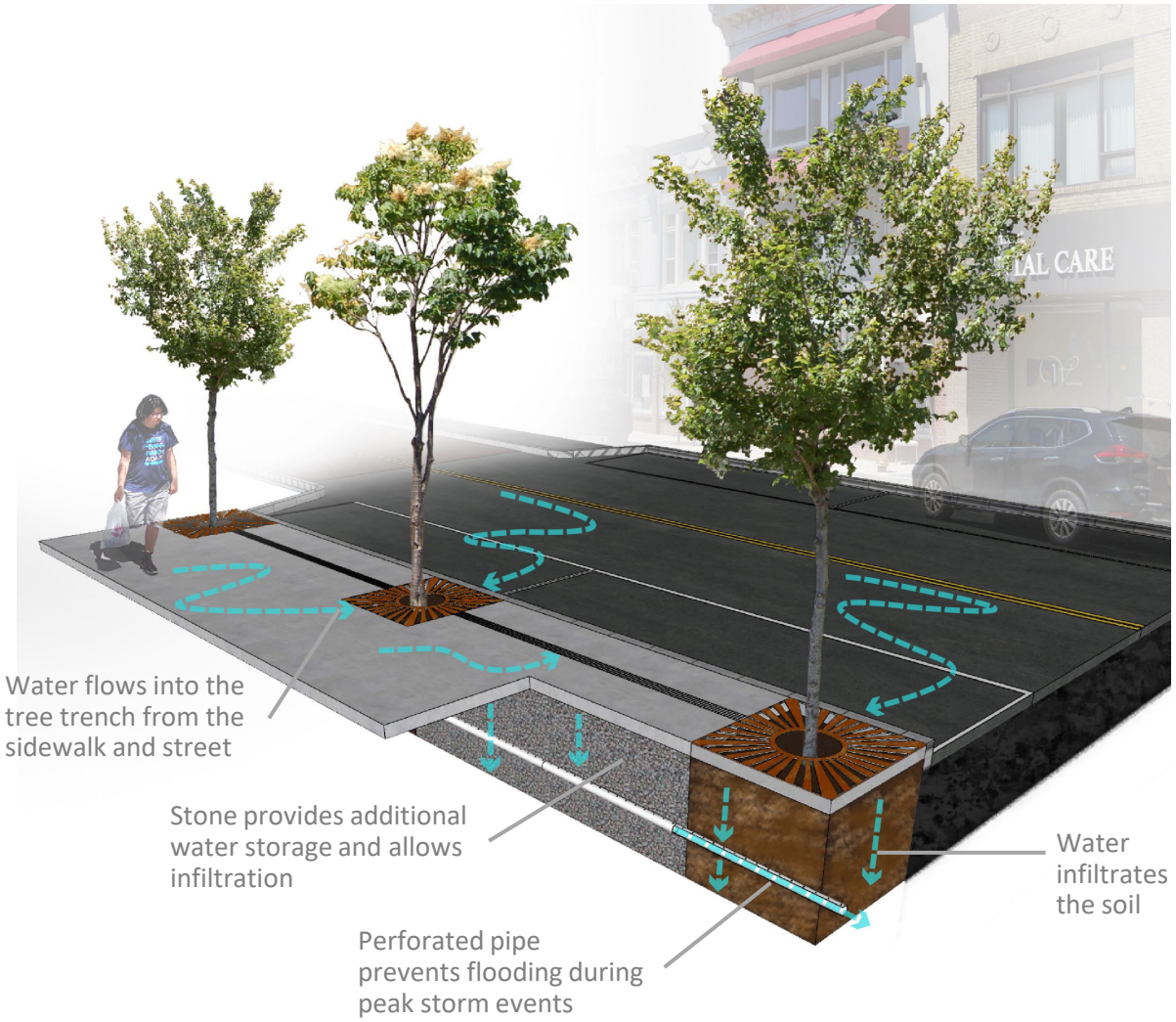


Tree Filters

DESIGN CONSIDERATIONS

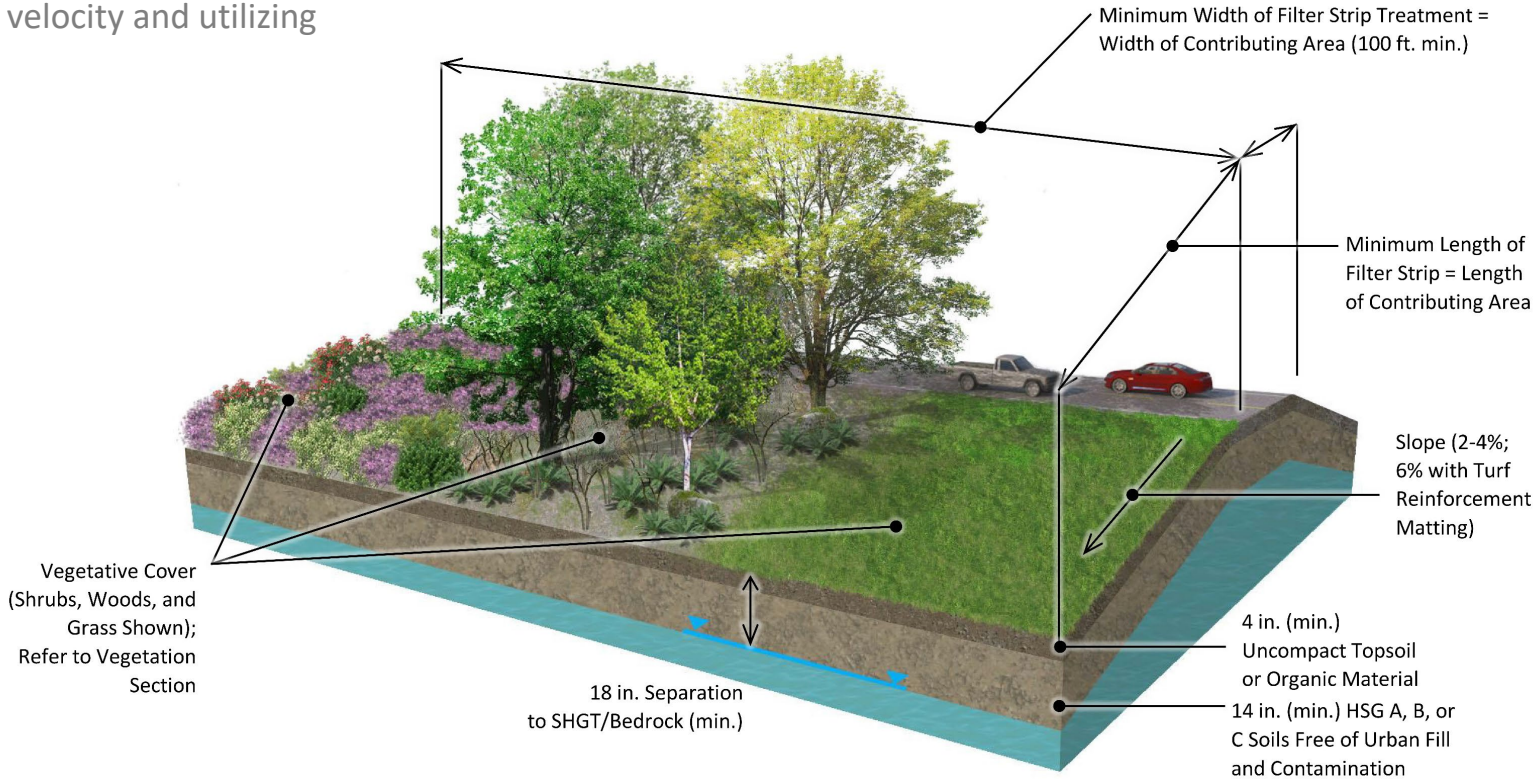
- **Basic components:** tree(s); concrete trench or pit; metal grating at surface; layers of mulch, soil, stone; subdrain
- Tree selection is critical
- Employ tree trenches or pits anywhere traditional street tree pits might typically be used
- Tree trench may be covered with permeable pavers, grates, or consist of an open trench planted with additional vegetation
- Pay attention to pretreatment since flow is routed to subsurface
- Use in right of way helps to separate roadway from pedestrian areas
- May require considerable excavation
- Routine tree maintenance and cleaning of inlets and pipes
- Can include grates or fences

Tree filters allow runoff from sidewalks and streets to enter a subsurface trench underneath one or a series of street trees



Filter Strips

Vegetated filter Strips are uniformly graded, vegetated slopes that treat sheet flow from adjacent areas by reducing runoff velocity and utilizing vegetation to filter coarse sediments and debris.



Pollutant Removal Efficiencies

- 25% Total Suspended Solids

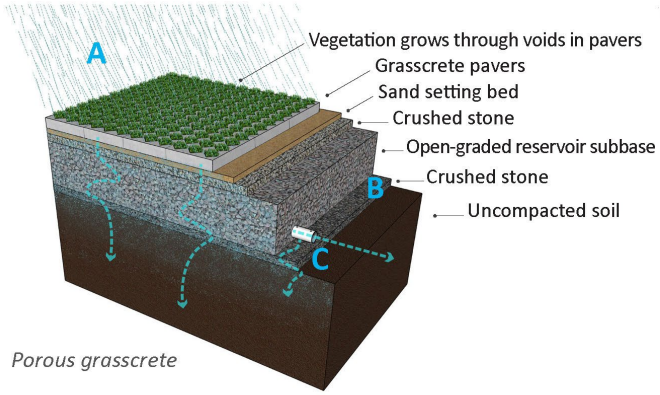
(RI Stormwater Design and Installation Standards Manual)

Permeable Pavement

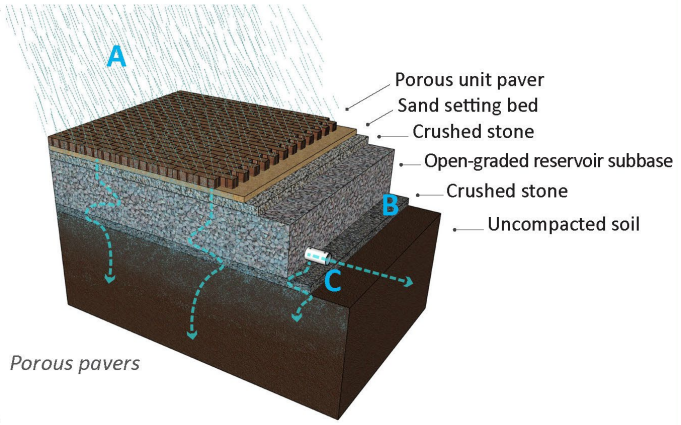
Permeable pavement is any porous, hard surface that allows rainwater to seep though into an infiltration area underneath.

DESIGN CONSIDERATIONS

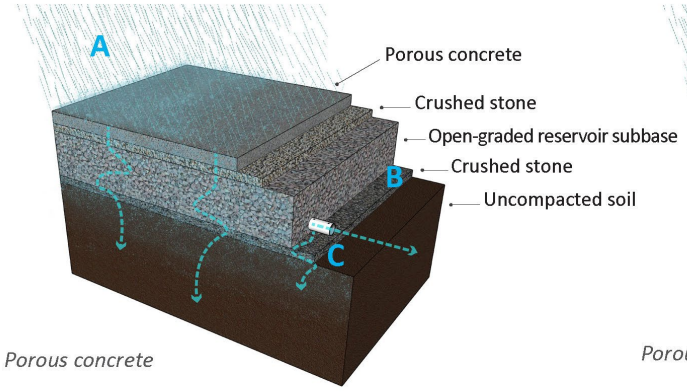
- **Basic components:** storage media such as stone, variety of permeable surfaces
- Can use in street right-of-way
- Avoid use of interlocking pavers in bike lanes
- Employ a variety of permeable pavements to establish use zones
- Sub-base may exist that must be removed to accommodate permeable pavement
- Consider traffic levels - not typically used with heavy vehicular traffic
- Maintenance: Surface cleaning (vacuuming) required periodically to prevent sediment build up



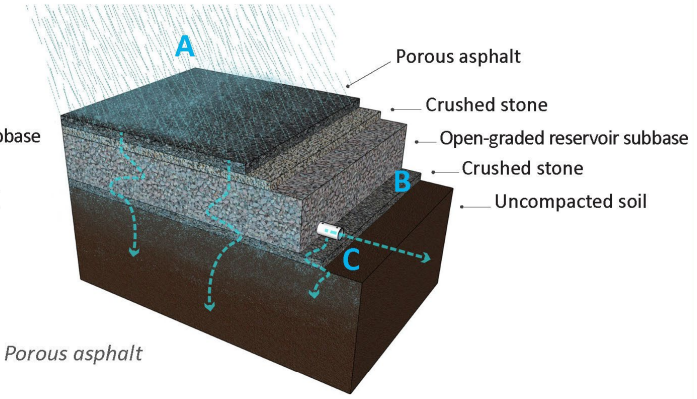
Porous grasscrete



Porous pavers



Porous concrete

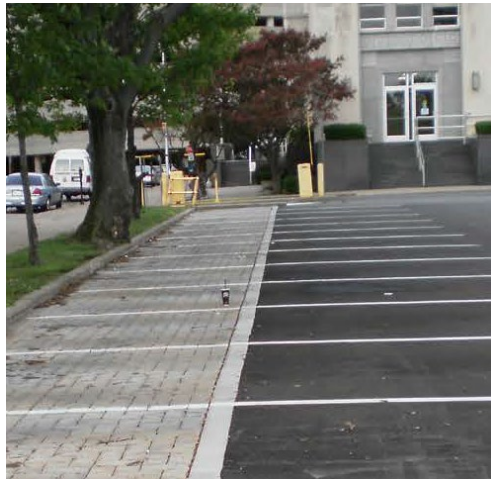


Porous asphalt

A Depending on type, stormwater seeps through vegetation or spaces in paving system, joints of permeable paver, or surface of porous concrete or asphalt.

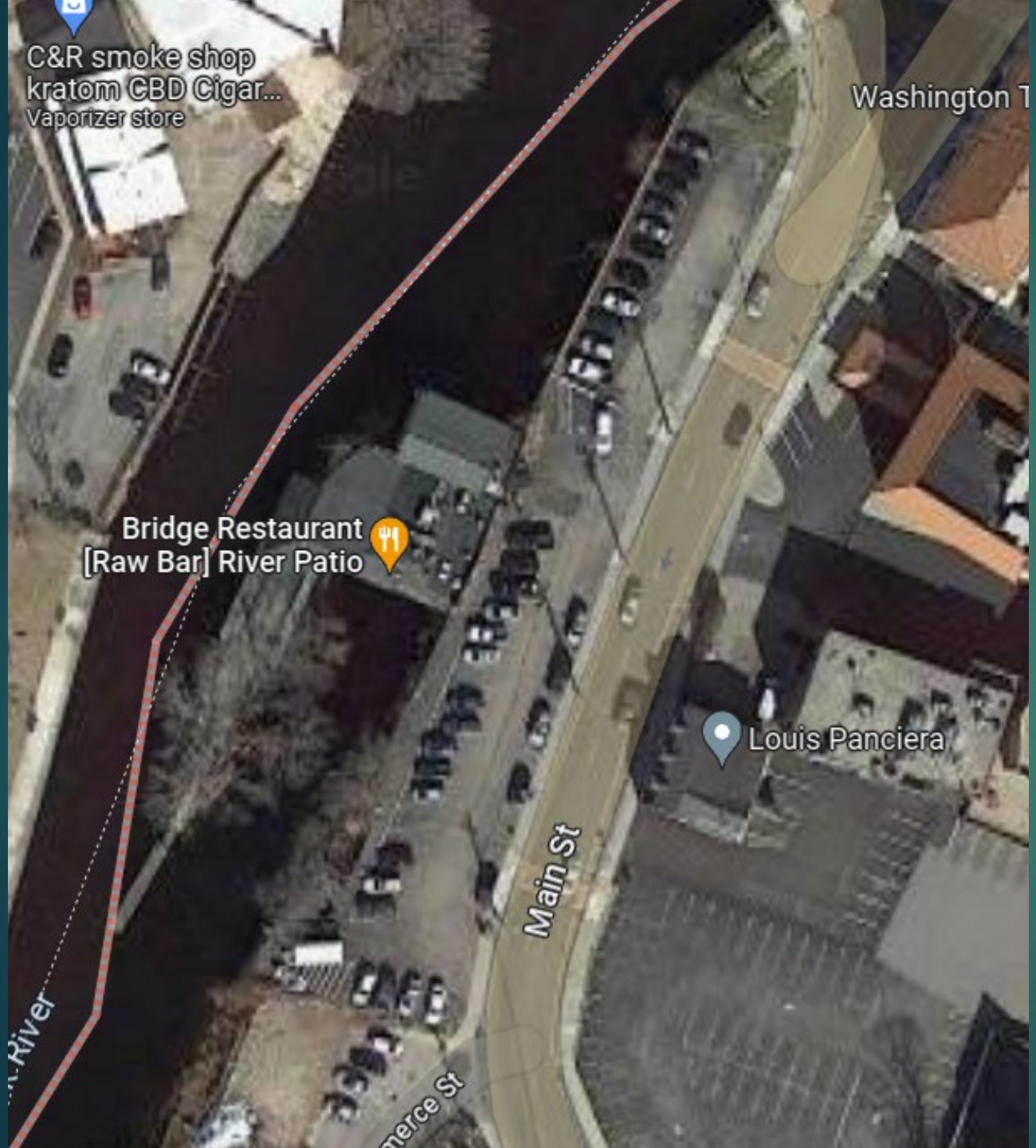
B Stone provides structural support and stormwater storage.

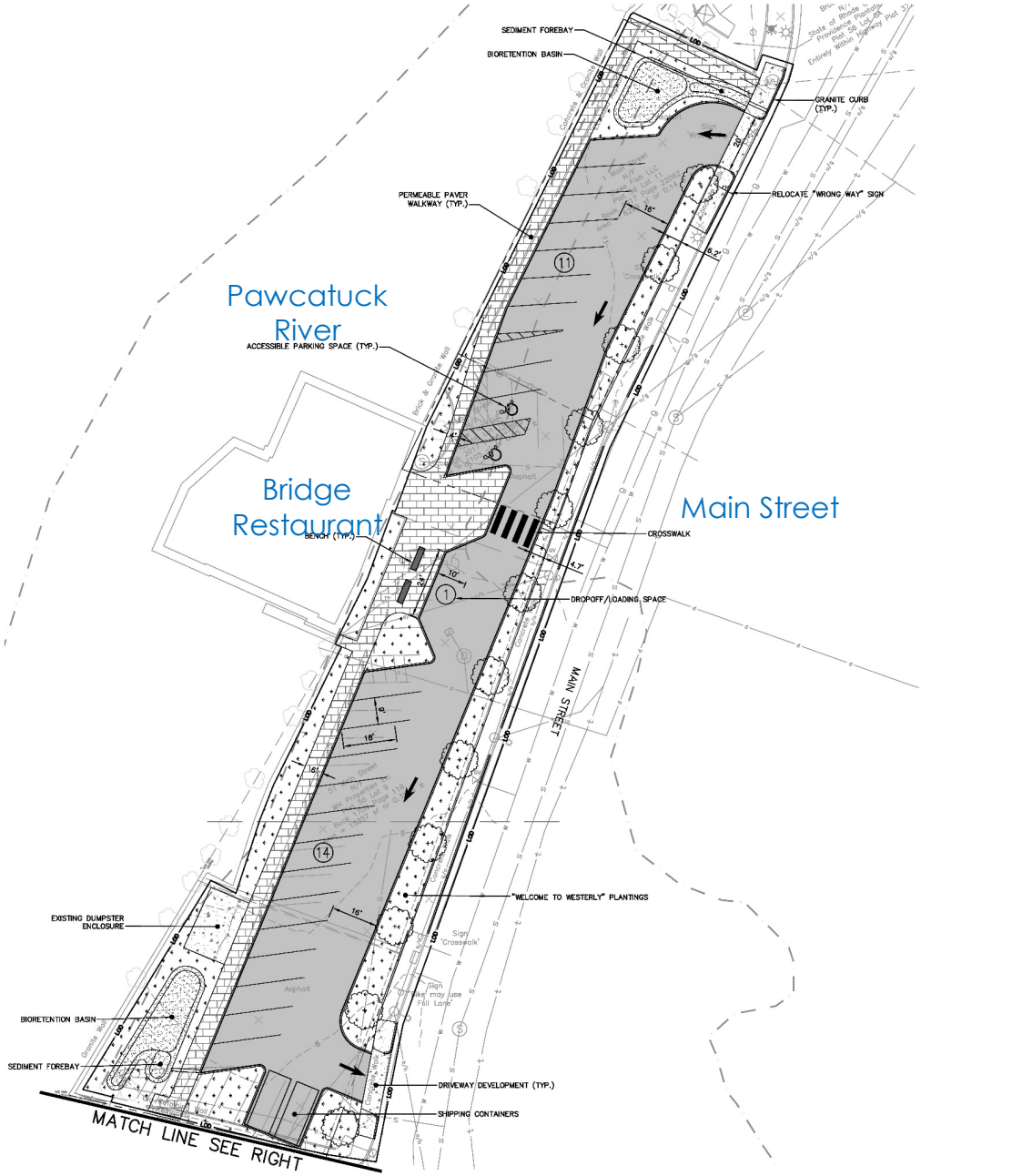
C Drainage pipe ensures efficacy in major storm events.



Westerly Boat Ramp
Washington Trust
Buckler-Johnston Funeral Home
115
117
119
107
109
Pawcatuck River
RHODE ISLAND
CONNECTICUT

MAIN STREET
GRANITE CURB
BIKE RACK (TYP. OF 4)
DRIVEWAY DEVELOPMENT
ENTRY SIGN
SOLID FENCE AROUND MECHANICAL EQUIPMENT
TIMBER POST AND ROPE RAILING
5' CLEARANCE BETWEEN POSTS TO PROVIDE PEDESTRIAN ACCESS
SOLID FENCE
OUTDOOR SEATING (TYP. OF 6)
CRUSHED STONE PATIO WITH SEASONAL DINING AND WINTER BOAT STORAGE - SEE PLANNING BOARD APPROVAL NOTE 1
SHIPPING CONTAINER FOR WINTER STORAGE (TYP. OF 2)
SINGLE DUMPSTER ENCLOSURE
RELOCATE MAILBOX
FOOD TRUCK PARKING - SEE PLANNING BOARD APPROVAL NOTE 2
PERMEABLE PAVER WALKWAY
CROSSWALK
BITUMINOUS CONCRETE BERM
STRIPED PAVEMENT ISLAND (TYP.)
ACCESSIBLE PARKING SPACE WITH SIGNAGE (TYP.)
PAVED WATERWAY
5' CLEAR SPACE BETWEEN GATE POST AND POST AND RAIL FENCE (TYP.)
16' BAR SWING GATE
TIMBER POST AND ROPE RAILING
BITUMINOUS CONCRETE BERM
GRASS CHANNEL AND BIORETENTION BASIN EXTENTS
RIPRAP SPLASH PAD
RESIDENTIAL PARKING WITH SIGNAGE
ALIGN WALKWAY WITH DECK STAIRS
4' PERMEABLE PAVER WALKWAY
CLEAN WASHED CRUSHED STONE
RAISED PLANTER ON CASTERS (TYP.)
TURF REINFORCEMENT FOR OVERFLOW PARKING
APPROXIMATE LOCATION OF TEMPORARY EVENT TENT - MAX SIZE 40' x 80'
PICNIC TABLE (TYP. OF 5)
RIPRAP OUTFALL TO ABUT REVETMENT
10' SIDE SETBACK
MAP 66 LOT 20
MAP 66 LOT 19
MAP 66 LOT 18
MAP 66 LOT 17
MAP 66 LOT 16
N/F LANDS OF MAIN REALTY LLC
N/F LANDS OF 115 MAIN STREET LLC
N/F LANDS OF CARNAVAL FUNERAL HOLDINGS
Existing Structure
SEAL
NOT FOR CONSTRUCTION
SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
FUSS & O'NEILL
SOUTHERN RHOD





SEAL

SEAL

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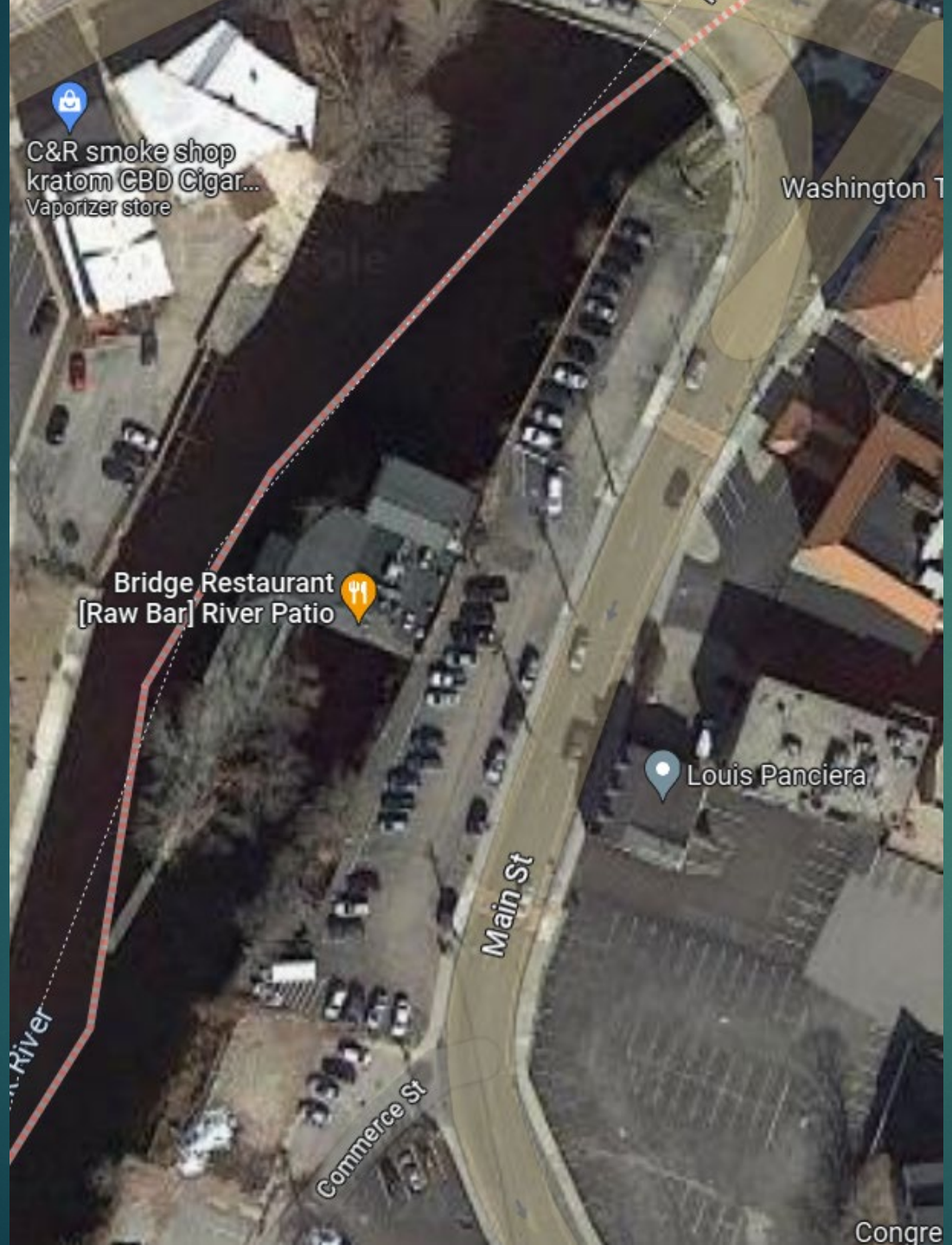
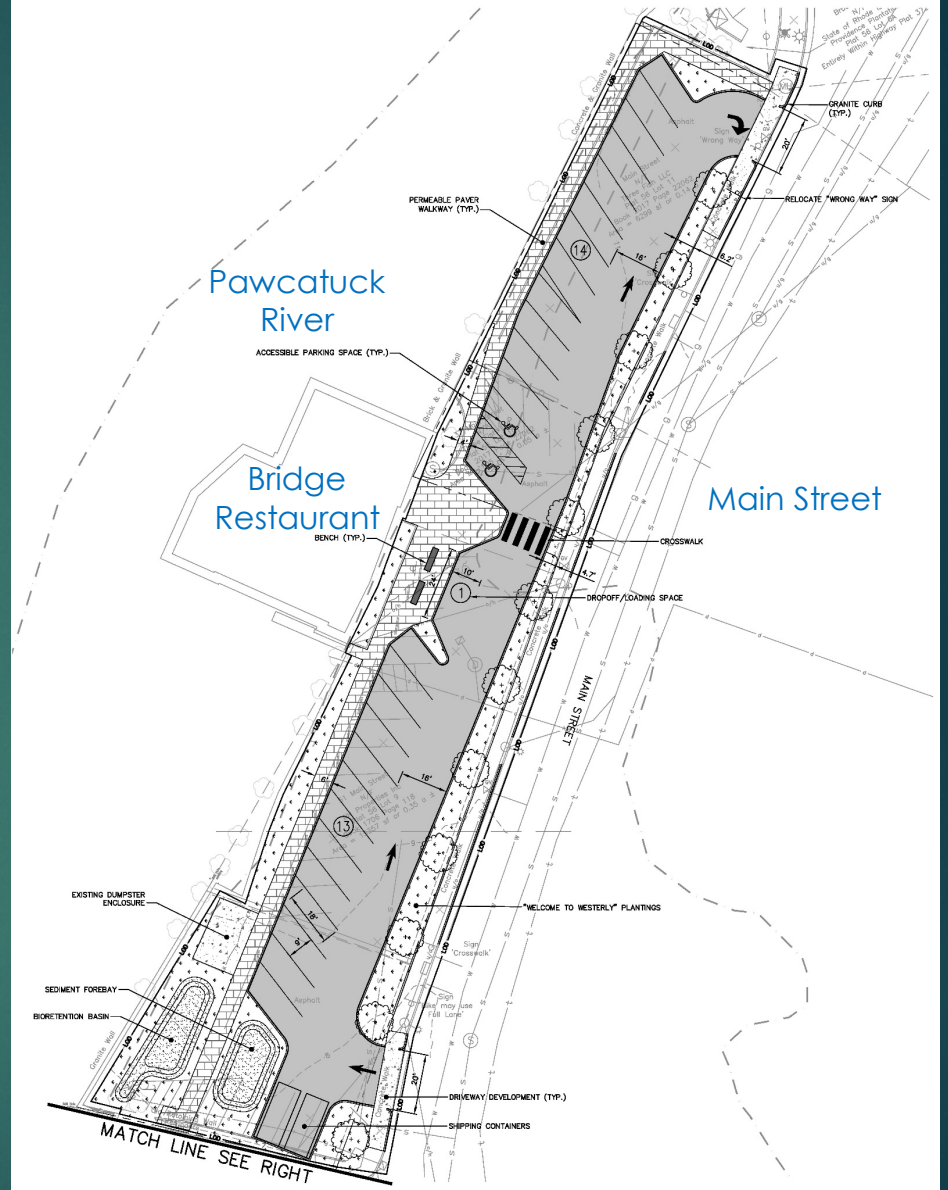
FUSS & O'

317 IRON HORSE WAY, S
PROVIDENCE, RI 02908
401.861.3070
www.fando.com





SEAL

SEAL

NOT FOR CONSTRUCTION

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

DESIGNER | REVIEWER

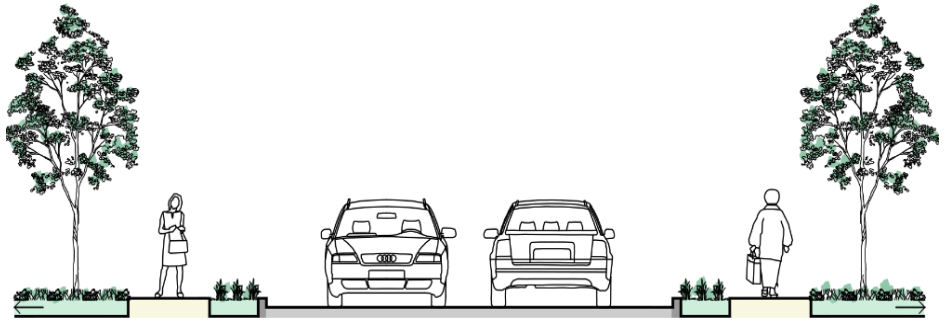
Project Phases & Funding

Project to Date

Funder	Amount	Scope
SNEP	$25,000	Stormwater Management Training
RIDOT	$25,000	Design Assistance for stormwater/green infrastructure
	+$500,000	Construction
NBEP	$75,000	Masterplan of Main St stormwater & streetscape improvements
Town of Westerly	$375,000	Planning/Design/Construction
RI Infrastructure Bank	$500,000	Planning/Design/Construction
SNEP/SWIG	$200,000	Planning/Design/Construction

Future Phases

Amount	Scope
$3 Million	Streetscape Design & Permitting (including the remaining storm water management, burying the utility lines & improving safety)
$2 Million	Resilience interventions Design & Permitting
$15 Million	Streetscape Construction
$10 Million	Resilience Interventions Construction



Trending Discussions

- **To what extent will the new green infrastructure be treated as public infrastructure?**
- **Who will maintain these systems?**
- **Who will perform major repairs when and if the systems are impaired?**
- **How will drainage easements and/or permitting affect the long-term use of a property?**

Stormwater Stewards- coming soon!

- SRICD's trained maintenance team

- In response to concerns from RIDOT about Green Infrastructure BMP's/STU's not getting maintained at all or with untrained staff
- In response to landowner and Town concerns about not having capacity to keep up with maintenance of many new systems
- In response to relative lack of trained landscape companies throughout the state
- Structured as job skills training and stepping stone to employment pathways for underserved populations
- Structured as educational enrichment for retired or professional volunteers
- Training will be based on national and regional certification models but adapted to local conditions
- Training will be delivered in a variety of formats to best fit the different audiences
- As projects throughout our District grow, this team can expand beyond Westerly
- The team's services will be offered to private and town landowners at cost to ensure long-term functionality of the green infrastructure

National Green Infrastructure Certification Program

City of Portland, OR

Everyone needs to give a little…

Who	What
State	Provide support to property owners who have agreed to house infrastructure to improve the public good on their private land.
Town of Westerly	Remove barriers to future use and development that might be restricted if property owners turn over their land to house the green infrastructure.
Property Owners	Provide maintenance to the green infrastructure in the long-term. Adjust their use of their properties to make room for green infrastructure.