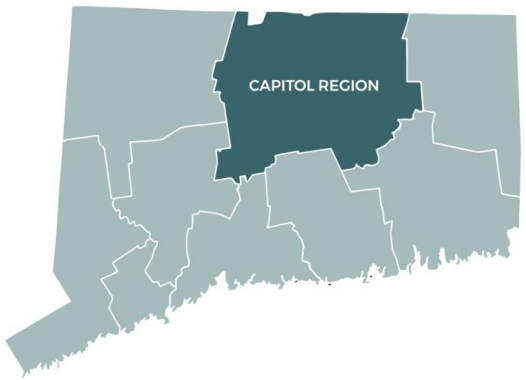
Stormwater Management Workshop

BIL Workshop Series| May 31, 2024

CRCOG
CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

Weston & Sampson SM

Welcome to CRCOG



Introductions

CRCOG

Matt Hart
Executive Director

Elizabeth Sanderson
BIL Coordinator

Heidi Samokar
Principal Planner

Sonya Carrizales
Environmental Planner

Weston & Sampson℠

Raju Vasamsetti, PE, CFM
Regional Manager
Rocky Hill, CT

Alex Simpson
Lead Green Infrastructure Engineer
Reading, MA

Doris Jenkins, PE
Project Engineer
Reading, MA

Agenda

- **Presentation by Weston & Sampson**
  - Refresher on Stormwater Quality and MS4 requirements and updates
  - Low Impact Development and Best Management Practices
  - Case Studies and Lessons Learned
  - Additional Components to a Successful Stormwater Program
- **Funding Opportunities**
- **Regional Stormwater Utilities**
- **Lunch and Q&A with speakers**
- **Round Table Discussion**

Introductions

Raju Vasamsetti, PE, CFM

Regional Manager

Rocky Hill, Connecticut

Alex Simpson

Lead Green Infrastructure Engineer

Reading, Massachusetts

Doris Jenkins, PE

Project Engineer

Reading, Massachusetts

Presentation Outline

01. Stormwater Quality and MS4

02. Low Impact Development and Best Management Practices

03. Case Studies

04. Additional Components to a Successful Stormwater Program

Stormwater Quality and MS4

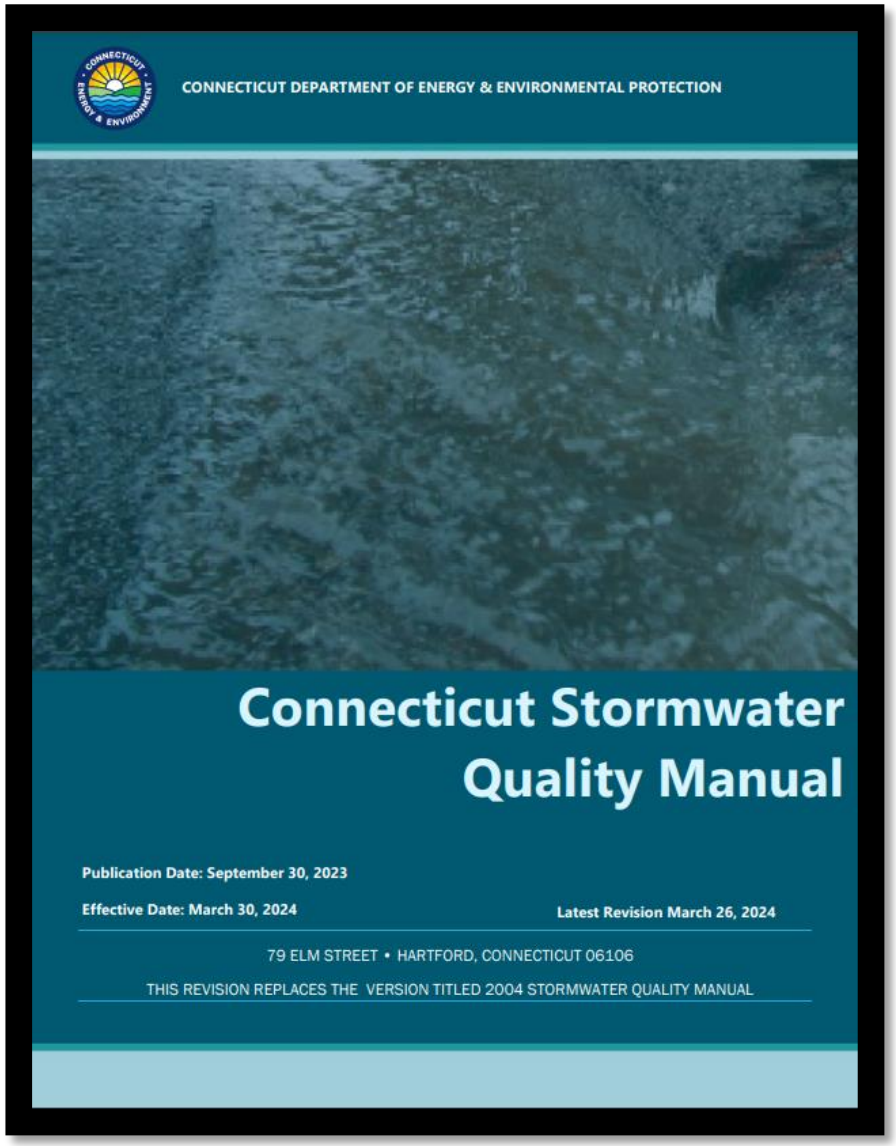
New Stormwater Quality Manual, MS4, and Low-Impact Development

Connecticut Stormwater Quality Manual

New Stormwater Manual

- Publication Date: September 30, 2023
- Effective Date: March 30, 2024
- Grace Period: September 30, 2024

- Updated for consistency with
  - Soil Erosion and Sediment Control Guidelines
  - CT DEEP Stormwater General Permits
  - General MS4 and CTDOT MS4



Link: CONNECTICUT STORMWATER QUALITY MANUAL

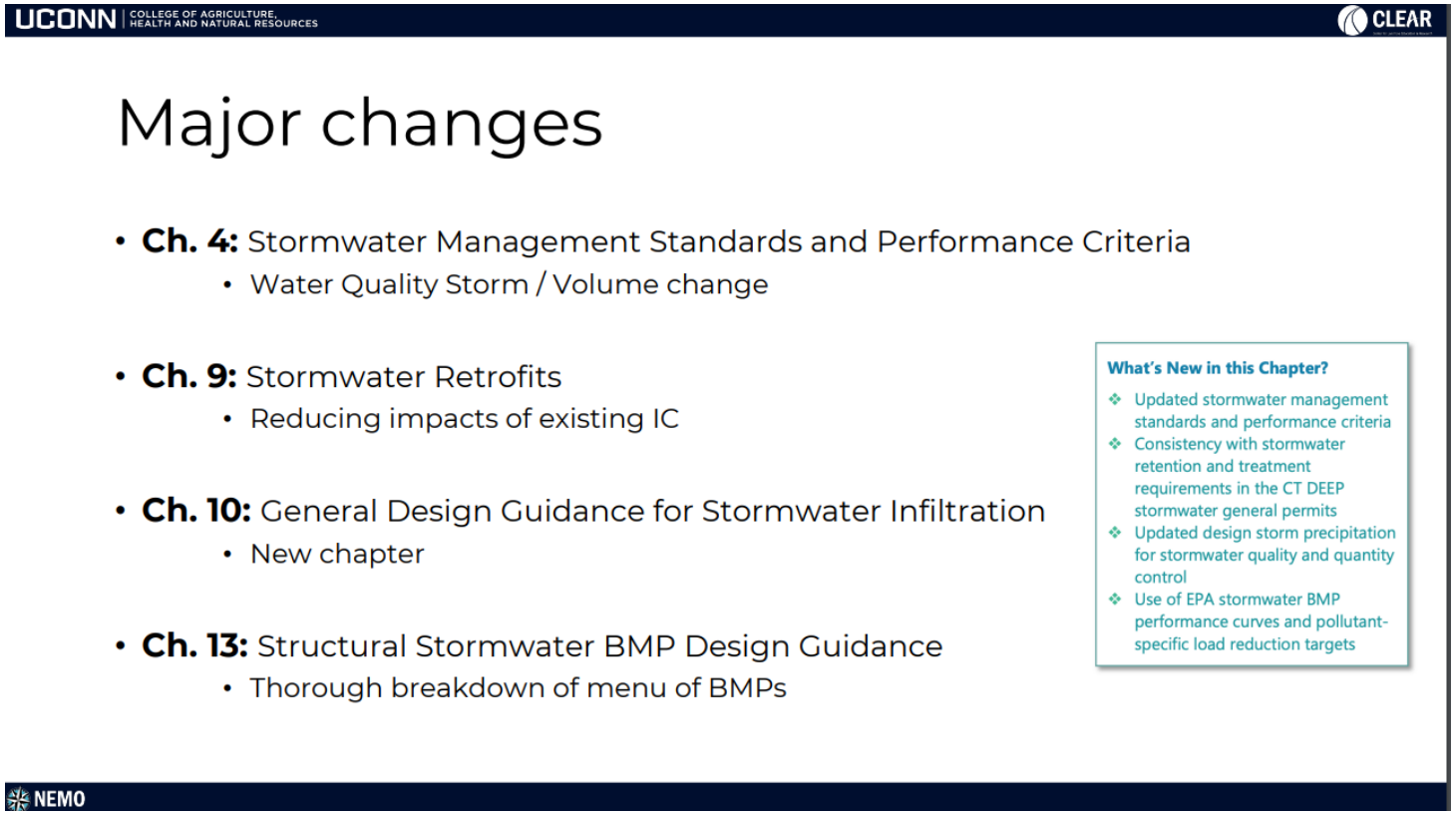
Stormwater Quality Manual – Presentation

The New Stormwater Quality Manual: What You Should Know

September 26, 2023

Presented by: Mary Looney & Dave Dickson, UConn CLEAR

Link: https://clear.uconn.edu/wp-content/uploads/sites/163/2023/09/SWQM-Overview-Presentation-FINAL-DRAFT.pdf



Stormwater Quality Manual – Presentation

Weston & Sampson

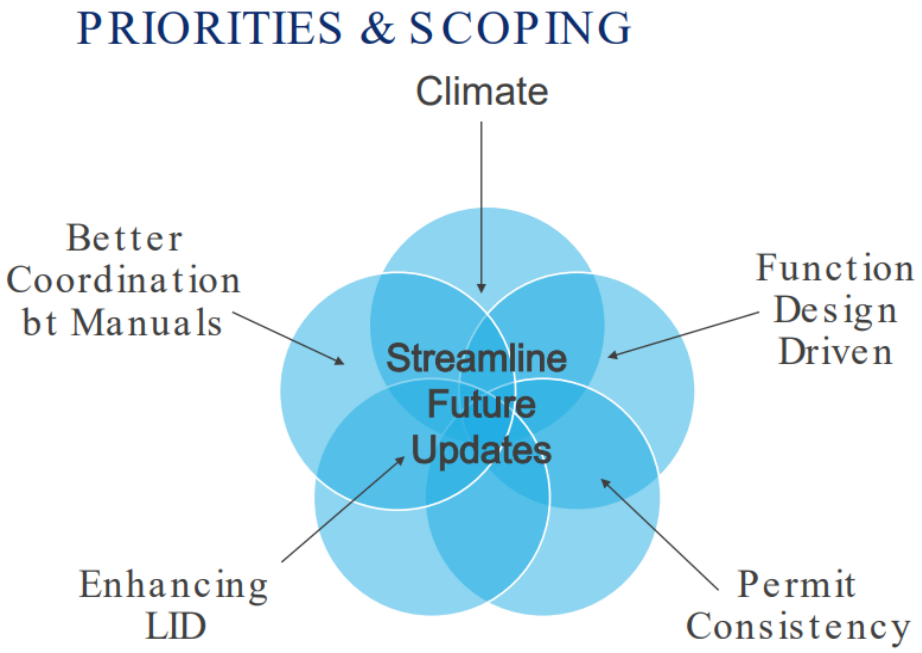
EBC Connecticut Webinar: Connecticut Stormwater Manual Update

April 25, 2023

Introduction by: Jaclyn Caceci, PE, LEED AP & Diane Mas, PhD, REHS/RS

Presented by: Kathleen Knight & Erik Mas, PE

Link: PowerPoint Presentation (ebcne.org)



With lessons learned incorporated, examples include:

- A disconnect between two manuals has emerged and during construction controls have been forgotten.
- Proprietary lists quickly become outdated.
- The tendency for the single BMP is not as effective as whole site planning.
- Accounting for TSS alone does not address actual pollution problem of most areas.
- Flexibility proving to be most successful method for best implementation.
- Designing bigger isn't always better.
- LID as an appendix gets treated as an afterthought.
- Documents need more linking to make them more user-friendly and easier to jump between sections.

Water Quality Volume (WQV)

- Water Quality Volume (WQV) is based on the “first flush” principle.
- Water Quality Storm is defined as the 90th percentile rainfall event (accounting for 90% of all 24-houor storms on an average annual basis).
- Manual replaces the 1.0 inch water quality storm with the updated 90th percentile rainfall depth of **1.3 inches.**

1.3 inches was chosen to:

1. Reflect current CT rainfall amounts, which were observed over last 40 years.
2. Better preserve pre-development hydrology (runoff duration, rate, volume, and temperate and groundwater recharge).

Low Impact Development (LID)

- Chapter 5 - Low Impact Development Site Planning and Design Strategies
  - Combines 2004 Manual LID Section and the 2011 LID Appendix

Figure 5-2. LID Site Planning and Design

What's New in this Chapter?

- Replaces and integrates the 2011 Low Impact Development Appendix into the revised Manual
- Streamlines content to focus on non-structural LID site planning and design strategies (Chapters 7 through 13 address structural LID measures)
- Provides design guidance for impervious area (simple) disconnection
- Incorporates LID credits to help quantify the benefits and incentivize the use of certain non-structural site planning and design techniques for meeting the runoff volume and pollutant reduction standard in Chapter 4 - Stormwater Management Standards and Performance Criteria

Municipal Separate Storm Sewer System (MS4)

1999 EPA STORMWATER PHASE II RULES

↓

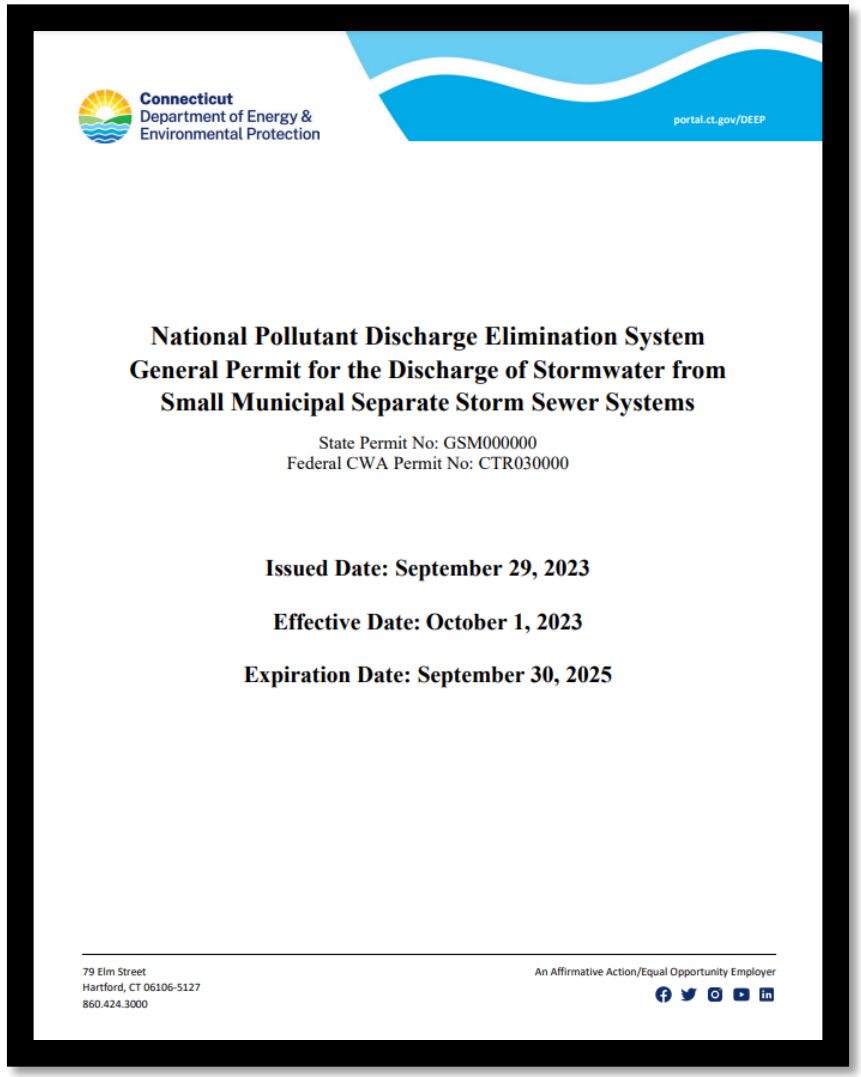
2004 CONNECTICUT GENERAL MS4

↓

2017 CONNECTICUT GENERAL MS4
Updated Outfall Sampling Requirements

↓

2023 CONNECTICUT GENERAL MS4
No changes to 2017 MS4. Expires 2025.



Connecticut
Department of Energy &
Environmental Protection

portal.ct.gov/DEEP

National Pollutant Discharge Elimination System
General Permit for the Discharge of Stormwater from
Small Municipal Separate Storm Sewer Systems

State Permit No: GSM000000
Federal CWA Permit No: CTR030000

Issued Date: September 29, 2023

Effective Date: October 1, 2023

Expiration Date: September 30, 2025

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Hartford, CT 06106-5127
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An Affirmative Action/Equal Opportunity Employer

MS4 Requirements

Best Management Practices (BMPs)

- Good Housekeeping
  - Catch Basin Inspection/ Cleaning
  - Sweeping of streets
- Preventive Maintenance
- Spill Prevention & Response
- Erosion and Sediment Control

Outfall Sampling

- 6 Priority Outfalls per year
- Illicit discharge sampling (dry & wet)

- Operation & Maintenance Programs
  - Park/Open Space
  - Vehicles/Equipment
  - Buildings/Facilities
  - Stormwater Ponds

Low Impact Development and Best Management Practices

How to incorporate green infrastructure into existing stormwater programs

Overview of Terminology

Resilience

The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner.

Low Impact Development (LID)

“A site design and stormwater management strategy that maintains, mimics, or replicates pre-development hydrology through the use of numerous site design principles and small-scale structural stormwater practices distributed throughout a site to manage runoff volume and water quality at the source.” – CT Stormwater Quality Manual

Best Management Practices (BMPs)

Green Infrastructure (GI)

Stormwater management features that use plants, soil and other natural materials to remove pollutants and allow stormwater to absorb back into the ground ***(Think site specific)***

Nature-Based Solutions (NBS)

NBS use natural systems and can work in tandem with traditional approaches to address natural hazards like flooding, erosion, drought, and heat islands ***(Think large scale)***

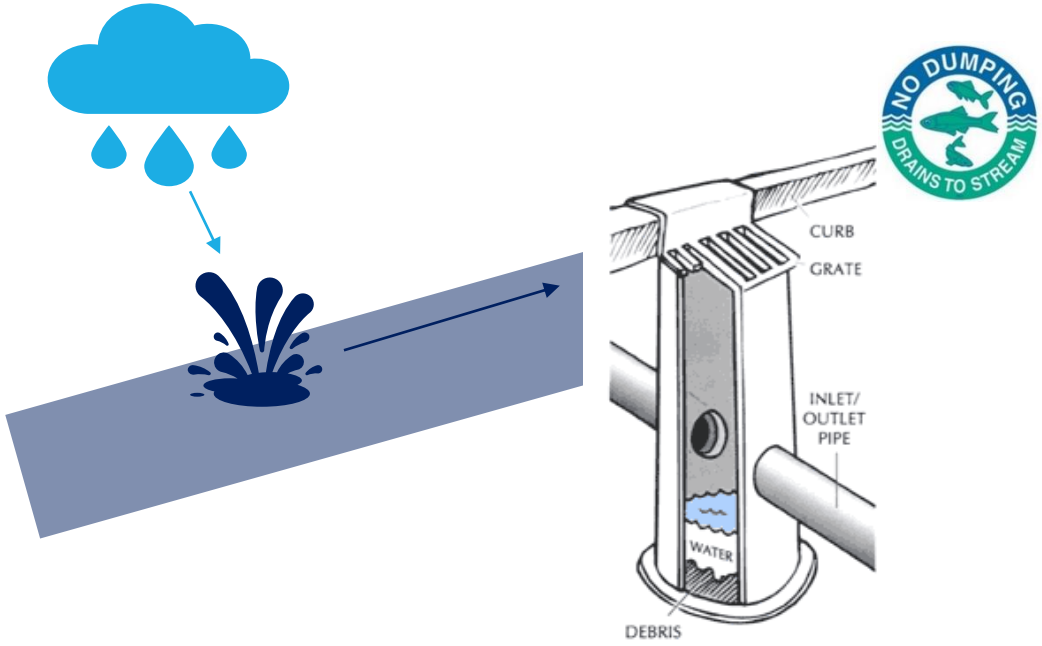
LID, NBS, and GI are stormwater management terms / tools that use natural systems, mimic natural processes, or work in tandem with traditional approaches to address climate hazards like flooding, erosion, drought, and heat islands.

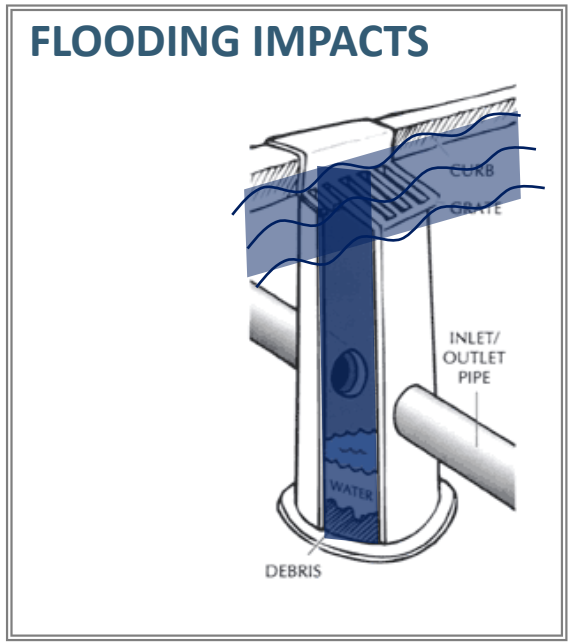
Grey Infrastructure

Typical urban infrastructure – water from roads, roofs, and other impervious surfaces enters a separate stormwater drainage system (MS4).

Constraints:

- Water picks up pollutants along the ground surface.
- No treatment before being released into water bodies.





Benefits

- ✓ Improve local water quality
- ✓ Reduce localized temperatures
- ✓ Improve/create wildlife habitat
- ✓ Foster biodiversity
- ✓ Add pollinators
- ✓ Improve local air quality
- ✓ Sequester carbon
- ✓ Visually pleasing
- ✓ Reduce noise from traffic/ roads

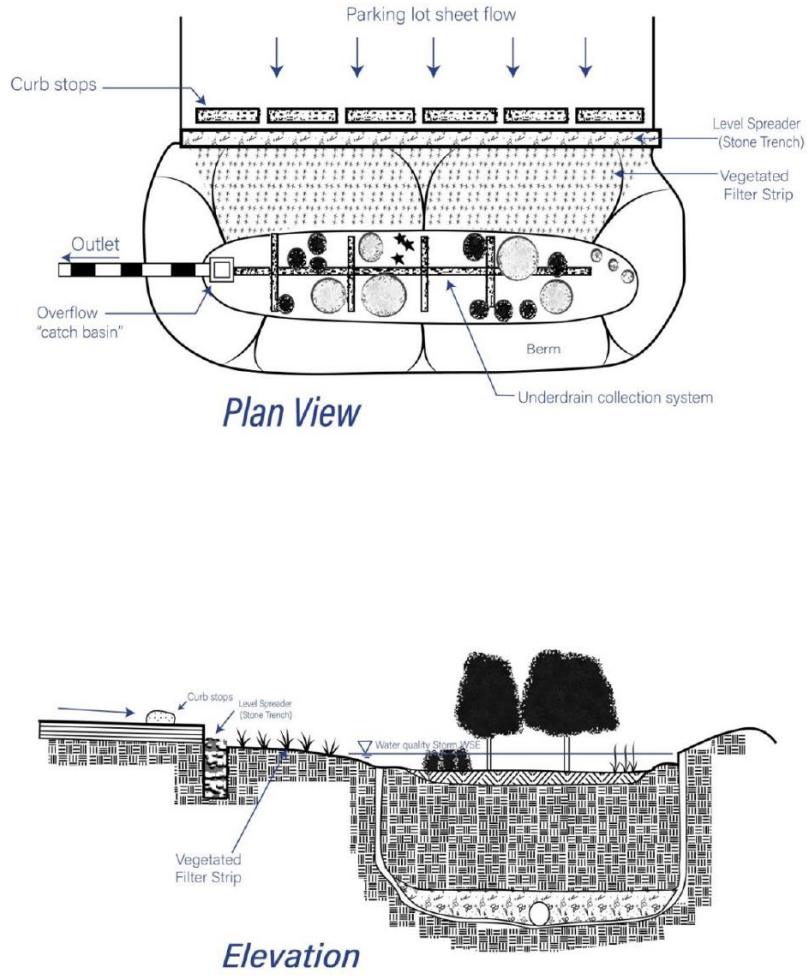
- ✓ Reduce flooding
- ✓ Create job opportunities
- ✓ Improve physical and mental health of community
- ✓ Enhance/create new recreational opportunities
- ✓ Create outdoor spaces (a.k.a. "placemaking")
- ✓ Increase local property values
- ✓ Improve public safety

Bioretention Areas & Rain Gardens

Bioretention systems are shallow, vegetated depressions that capture, temporarily store, and filter stormwater runoff *(Connecticut Stormwater Quality Manual)*

- Uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged
- Shallow depressions filled with sandy soil topped with a thick layer of mulch and planted with dense native vegetation
- Stormwater runoff is directed into the cell via conveyance pipe or sheet flow

A bioretention basin in Lynn, MA designed by Weston & Sampson



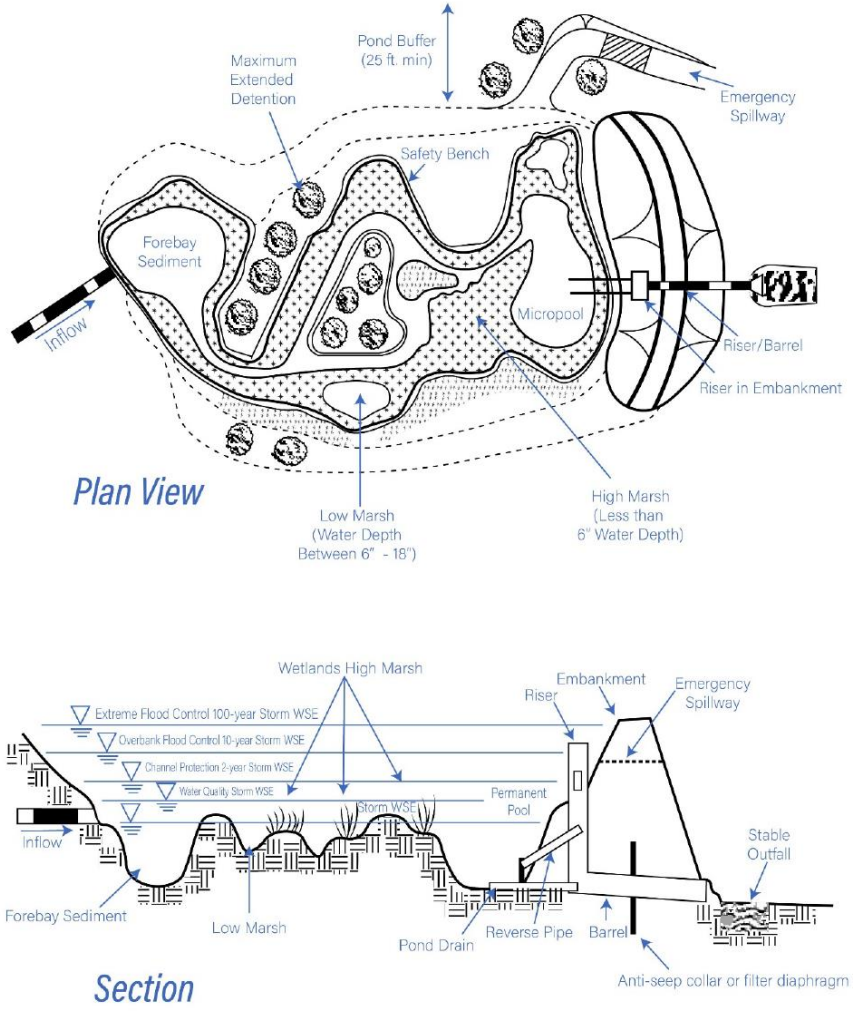
Bioretention System Schematic (CT Stormwater Quality Manual)

Constructed Stormwater Wetlands

Stormwater wetlands are constructed wetlands that incorporate marsh areas and permanent pools to provide enhanced treatment and attenuation of stormwater flows. *(Connecticut Stormwater Quality Manual)*

- Maximize the removal of pollutants from stormwater runoff through wetland vegetation uptake, retention and settling
- Temporarily store runoff in shallow pools that support conditions suitable for the growth of wetland plants

Constructed stormwater wetland in Wellesley, MA designed by Weston & Sampson



Extended Detention Shallow Wetland Schematic (CT Stormwater Quality Manual)

Dry Detention Basin / Floodable Field

Dry extended detention basins, also called “dry ponds” or “detention basins”, are stormwater basins designed to capture, temporarily hold, and gradually release a volume of stormwater runoff to attenuate and delay stormwater runoff peaks.
(Connecticut Stormwater Quality Manual)

Dry Extended Detention Basin (CT Stormwater Quality Manual)

A floodable field is a recreational area that can serve as a temporary dry extended detention basin.

Floodable field concept for Lynn, MA, Weston & Sampson

Floodable field cross section, Weston & Sampson

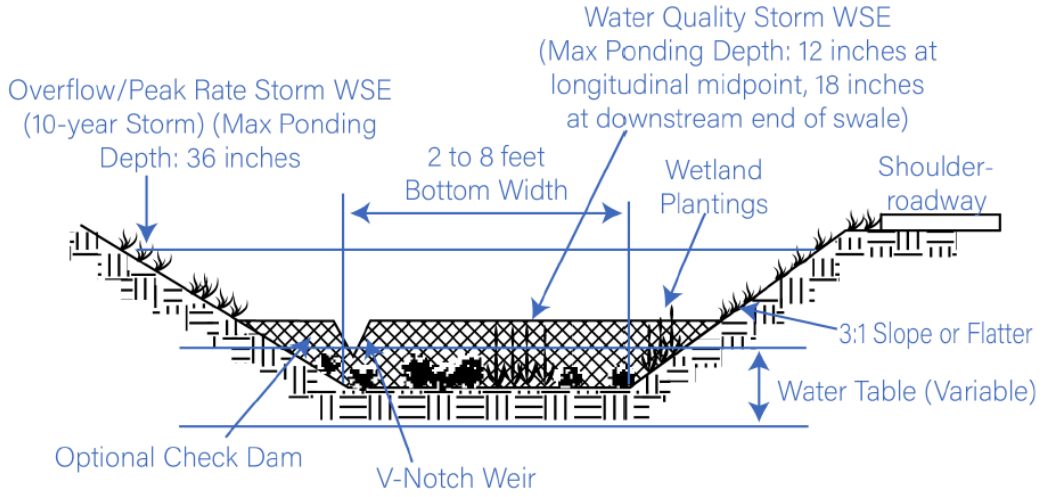
Grassed Channel / Biofilter Swales / Water Quality Swales

Water quality swales are shallow vegetated open channels designed to treat and convey stormwater runoff *(Connecticut Stormwater Quality Manual)*

- treatment systems with a longer hydraulic residence time than drainage channels
- removal mechanisms are sedimentation and gravity separation, rather than filtration
- higher pollutant removal efficiencies than grass channels

Wet Water Quality Swale (CT Stormwater Quality Manual)

Dry Water Quality Swale (CT Stormwater Quality Manual)

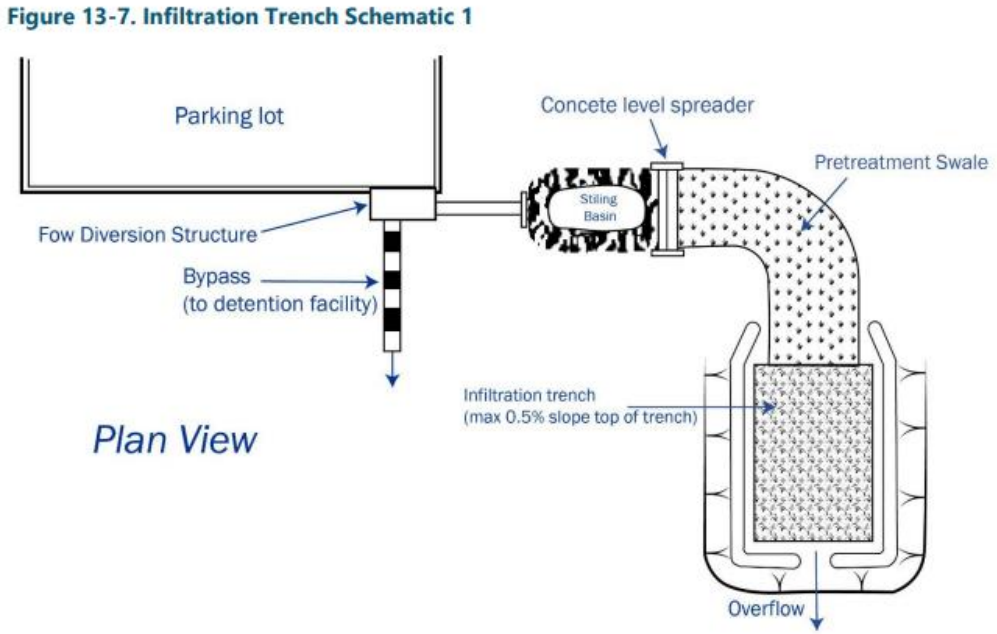


Wet Water Quality Swale Schematic (CT Stormwater Quality Manual)

Infiltration Basins / Trenches

Infiltration trenches are shallow, excavated, stone-filled trenches in which stormwater is collected and infiltrated into the ground. *(Connecticut Stormwater Quality Manual)*

- Cost-effective approach to managing stormwater where there is adequate space for a narrow stormwater feature and where plantings are not needed, and the surface of the trench can be left open.
- Stored runoff gradually exfiltrates through the bottom and/or sides of the trench into the subsoil and eventually into the water table



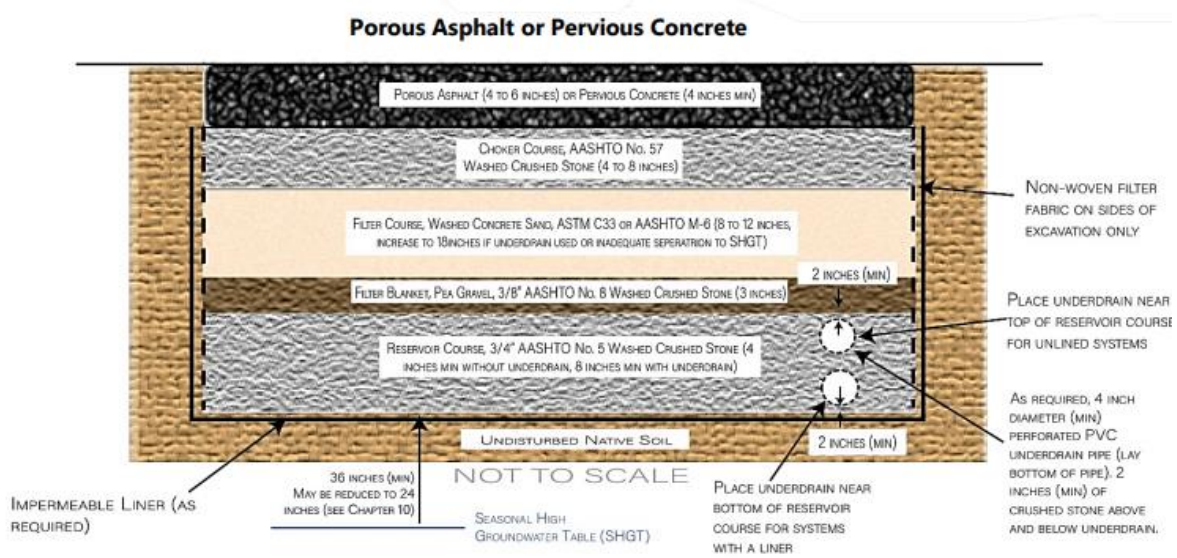
Infiltration Trench Schematic, CT Stormwater Quality Manual

Infiltration basin at an Eversource Facility in Plymouth, MA. Designed by Weston & Sampson

Porous Pavement / Pervious Pavement

Permeable pavement is an alternative paved surface and stormwater management facility designed to capture stormwater runoff and snowmelt and allow it to move through void spaces in the surface course or through the joints in paver units or using an optional underdrain. *(Connecticut Stormwater Quality Manual)*

- Replaces traditional pavement, allowing parking lot, driveway, and roadway runoff to infiltrate directly into the soil and receive water quality treatment.
- Permeable paving techniques include porous asphalt, pervious concrete, paving stones, and manufactured “grass pavers” made of concrete or plastic



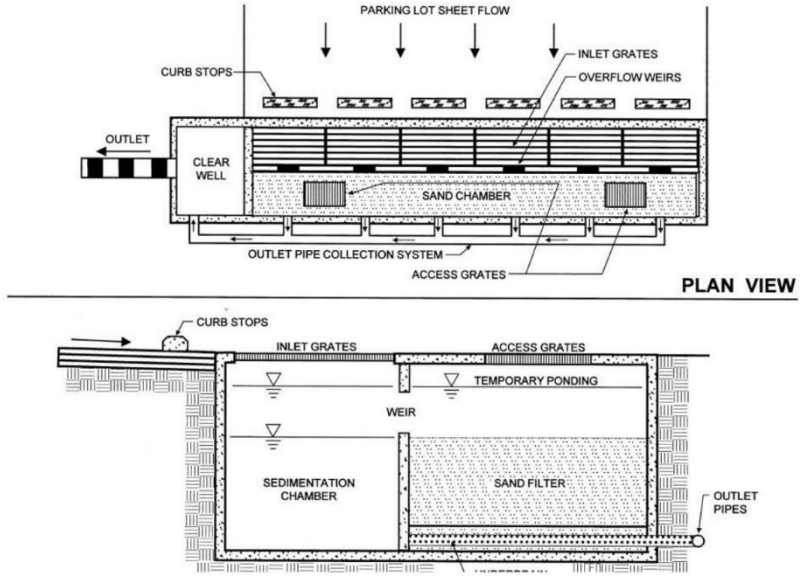
Porous Asphalt Cross Section (CT Stormwater Quality Manual)

Porous pavement parking in Lynn, Massachusetts.
Designed by Weston & Sampson

Underground Infiltration Systems

An underground infiltration system consists of open bottomed storage chambers in a crushed stone reservoir. *(CT Stormwater Quality Manual)*

- The chamber and crushed stone reservoir provide temporary storage for stormwater before it infiltrates into the underlying soil.
- Common types include pre-cast concrete or plastic pits, chambers (manufactured pipes), perforated pipes, and galleys.



Subsurface Infiltration Trench Schematic, MA Stormwater Quality Manual

Subsurface infiltration structure, Town of Weston DPW. Designed by Weston & Sampson

Selecting a BMP For Your Site

- Things to consider when siting green infrastructure
  - Land ownership
  - Available space and site topography
  - Available funding & potential funding sources
  - Upcoming nearby construction projects
  - Maintenance capacity
  - Community input

Photos: BMP Maintenance Training in Fitchburg, MA, Weston & Sampson

Strategies to Incorporate BMPs

- Consider the following questions when identifying areas for capital improvement projects
  - Is there flooding?
  - Where are water quality improvements needed?
  - Is there room for GI in the roadways?
  - Is there a need for grey infrastructure upgrades?
- Optimal Opportunities to incorporate BMPs
  - Utility trenching projects
  - Building / Site upgrade projects
  - Street redesign
  - Open space / park projects
  - Coastal / Riverine projects

Case Study

Watershed Scale Planning and Site Scale Interventions, Lynn, MA

Strawberry Brook Watershed

2,400 acres

Over 45% impervious

Culverted Stream

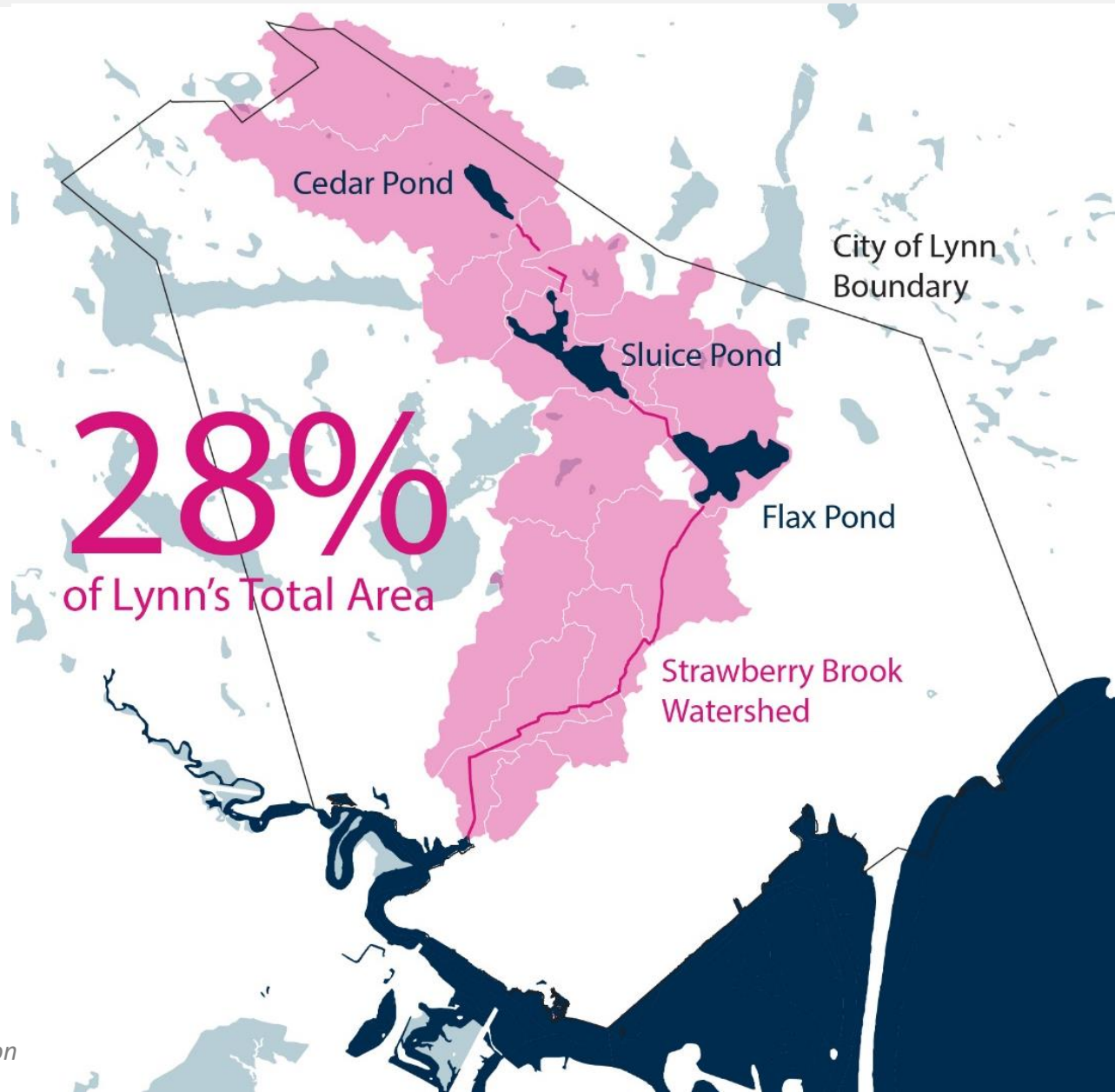
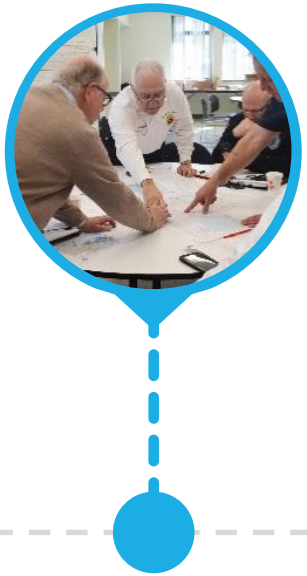


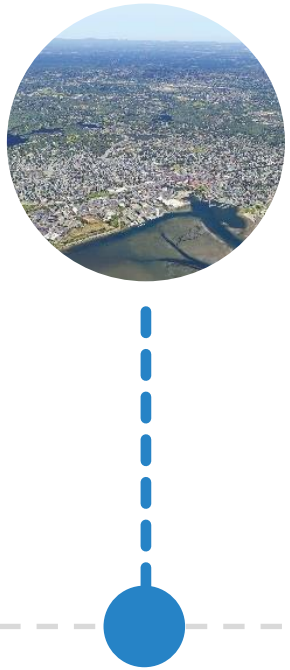
Image credit: Weston & Sampson

Project Timeline



2019-2020 (FY20)

Community Resilience Building Planning



2020-2021 (FY21)

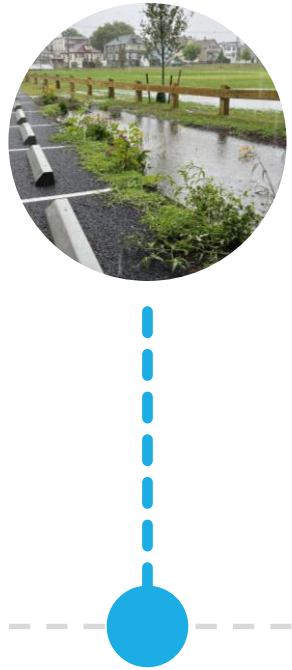
Strawberry Brook Resilient Stormwater Management and Implementation Plan

2021-2022 (FY22)

Boston Street Green Infrastructure Design and Construction

Barry Park Green Infrastructure Design

GEAA Field Vision



2022-2023 (FY23)

Barry Park Green Infrastructure Construction

GEAA Field Concepting

2023 Onward

GEAA Field Pre-Permit Design

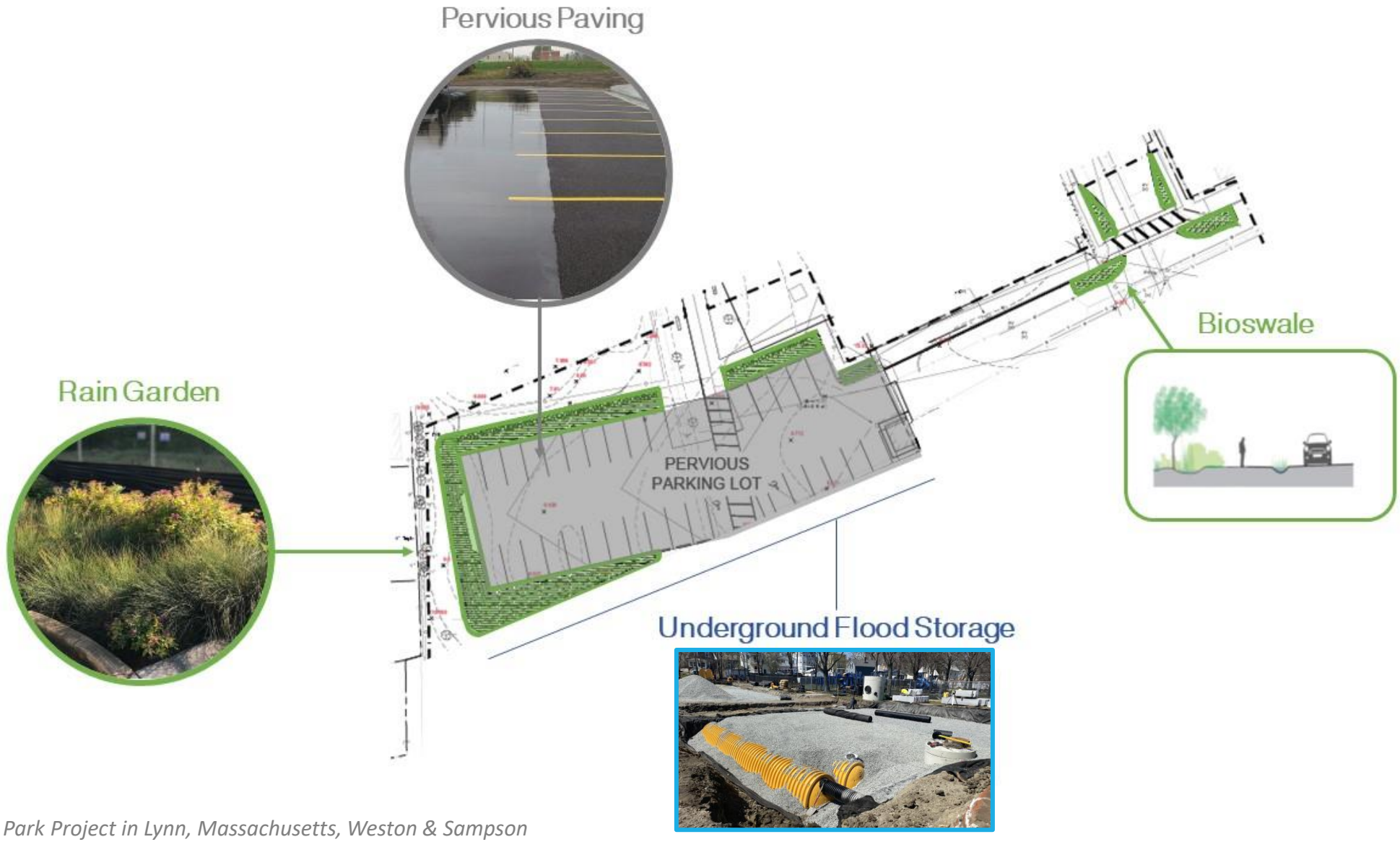
Vision for Barry Park & G.E.A.A Fields

Barry Park Vision, Lynn, MA, Weston & Sampson

Barry Park Existing Conditions

Photos: Barry Park Project in Lynn, Massachusetts, Weston & Sampson

Barry Park Green Infrastructure



Photos: Barry Park Project in Lynn, Massachusetts, Weston & Sampson

Barry Park Green Infrastructure

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Photos: Barry Park Project in Lynn, Massachusetts, Weston & Sampson

Barry Park Green Infrastructure

Photos: Barry Park Project in Lynn, Massachusetts, Weston & Sampson

Barry Park Green Infrastructure

- Increased capacity works
- Baseline storms allow for monitoring
- Adaptative design

Photos: Barry Park Project in Lynn, Massachusetts, Weston & Sampson

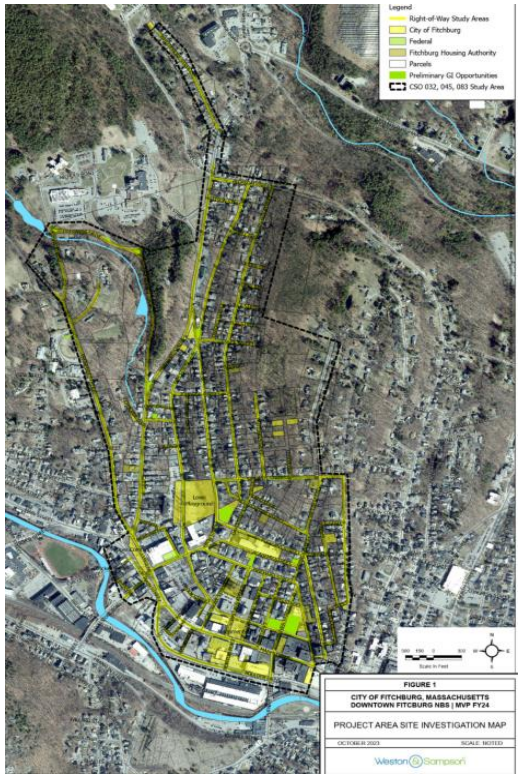
Case Study

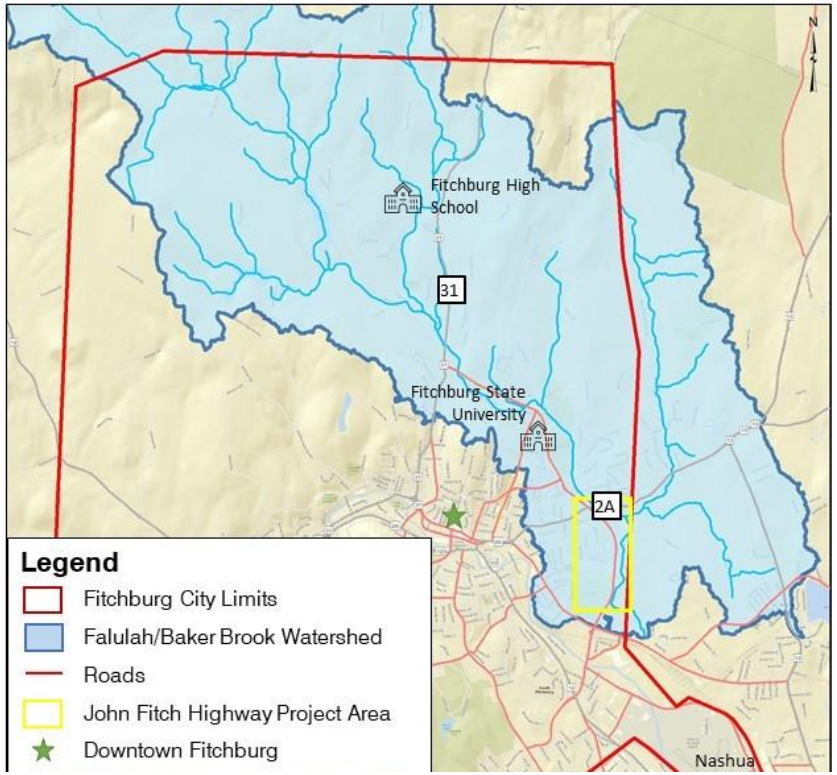
Construction of GI, Fitchburg, MA

Fitchburg MVP Projects 2021-24

- Identifying **flooding problems** and opportunities to reduce flooding
- Reduce impervious surfaces and increase green spaces
- Improve **climate resilience**
- Develop long-term monitoring and maintenance plan
- Get community input on priorities

Funded by State MVP Program





Photos: Fitchburg, MA, Weston & Sampson

Sucker Brook Watershed

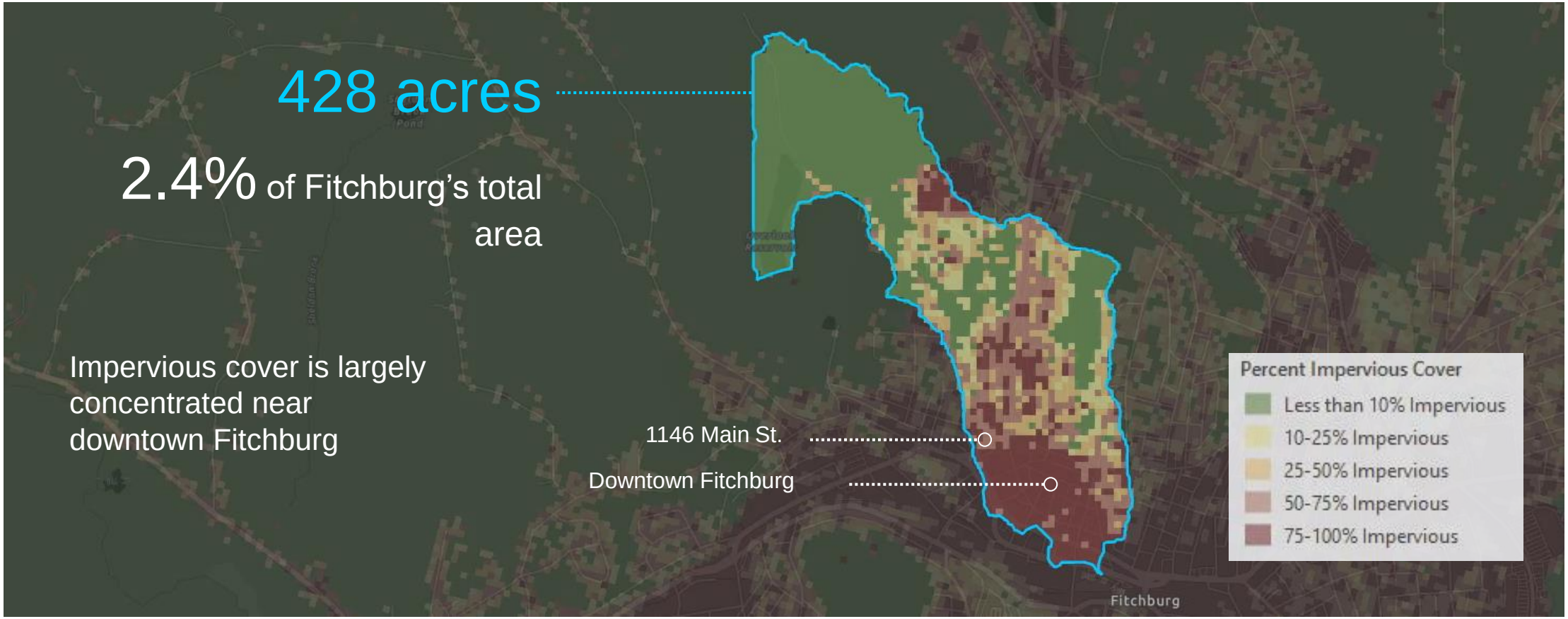


Image: Fitchburg, MA, Weston & Sampson

Fitchburg

- Multiple CSO separation projects are in construction and design
  - Funded through the Clean Water Act State Revolving Fund (SRF) loan
- Opportunity to implement GI as part of ROW disturbance
  - Green infrastructure design is funded through the Massachusetts Vulnerability Grant (MVP)
- Implementation was streamlined
  - Costs were a fraction of the overall construction budget
  - Permitting completed as part of separation work
  - Abutter disturbance minimized due to schedule integration
- Lessons learned
  - The more coordination the better
  - Bid-alts and other budgeting mechanisms provide contract cost flexibility

Construction

Photos: Construction progress in Fitchburg, MA, Weston & Sampson

Post-Construction

Photos: BMP Maintenance Training in Fitchburg, MA, Weston & Sampson

Case Study

NBS/GI Maintenance & Monitoring

Fitchburg, MA

Goals and Objectives

Project Resiliency

- Ensure the continued function and effectiveness of the NBS projects
- Implementing regular maintenance and monitoring activities.

Performance Assessment

Assess the performance of the NBS projects in achieving their intended goals

- reducing flood risk
- capturing and infiltrating water
- reducing surface temperatures
- maintaining vegetative cover
- enhancing biodiversity

Adaptation

Facilitate adaptive management by providing data and insight that can inform adjustments

- current and future NBS design or maintenance activities
- respond to changing environmental conditions or project outcomes

Staff Roles and Users

Site Monitoring

- **Engineering Division** will conduct monitoring and assessment of NBS sites
- Triggers maintenance or further investigation

Maintenance

- **Streets Division & Engineering Division** will perform maintenance on NBS sites
- Coordinated by Superintendent and Foreman

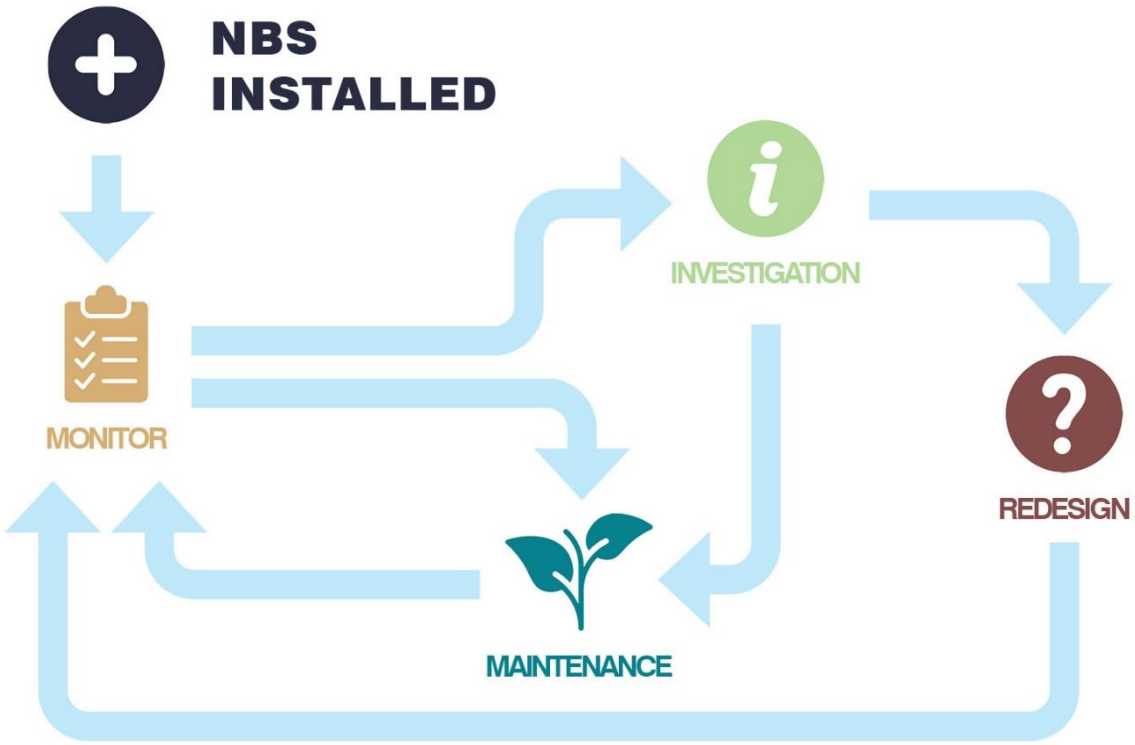


Image credit: Weston & Sampson

NBS Monitoring Categories

- Site conditions (trash and debris, snow, sedimentation)
- Infrastructure Condition and Maintenance (structural maintenance, erosion control)
- Hydrologic Effectiveness (water flow monitoring, infiltration)
- Vegetation Condition and Maintenance (planting and restoration, invasive species control)
- Wildlife and Biodiversity (fauna monitoring, pest removal)
- Heat Island Reduction (surface temperature monitoring)

Photos: Fitchburg, MA, Weston & Sampson

Monitoring Frequency & Scope

- Maintenance & Monitoring at several key points in project stages
  - Pre-construction
  - After construction (before planting)
  - After planting (initial establishment 1 year)
  - Regular monitoring (after 1 year)
- Starting with a handful of sites 2024
- Continue to build more in the future

NBS Project Stage	Monitoring Period	Purpose
Pre-construction	• Dry conditions	• Establish baseline site conditions
	• During or soon after rain event (<48 hours)	• Establish baseline hydrology
After construction, before planting	• Dry conditions	• Assess new site conditions
	• During or soon after first rain event (<48 hours)	• Assess new hydrology/ detention times
After planting, during initial establishment (for 1-2 years)	• Dry conditions	• Assess plant conditions
	• During or soon after first rain event (<48 hours)	• Assess new hydrology with plants
Regular monitoring (starts 1 year after initial establishment period)	• Any conditions	• Evaluate performance and maintenance needs
	• After major storm events[2] (within 24-48 h)	• Evaluate hydrology/ detention times

Table 2. NBS Annual Monitoring and Maintenance Schedule

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task	Frequency & Time of the Year											
Site Inspection				X							X	
Debris & Trash Removal				X	X	X	X	X	X	X	X	
Sediment Removal								X				
Mowing/ Plant Maintenance					X				X			

	Should also be completed after major storm events (see definition)
X	Required inspection

Tables for Fitchburg, MA, Weston & Sampson

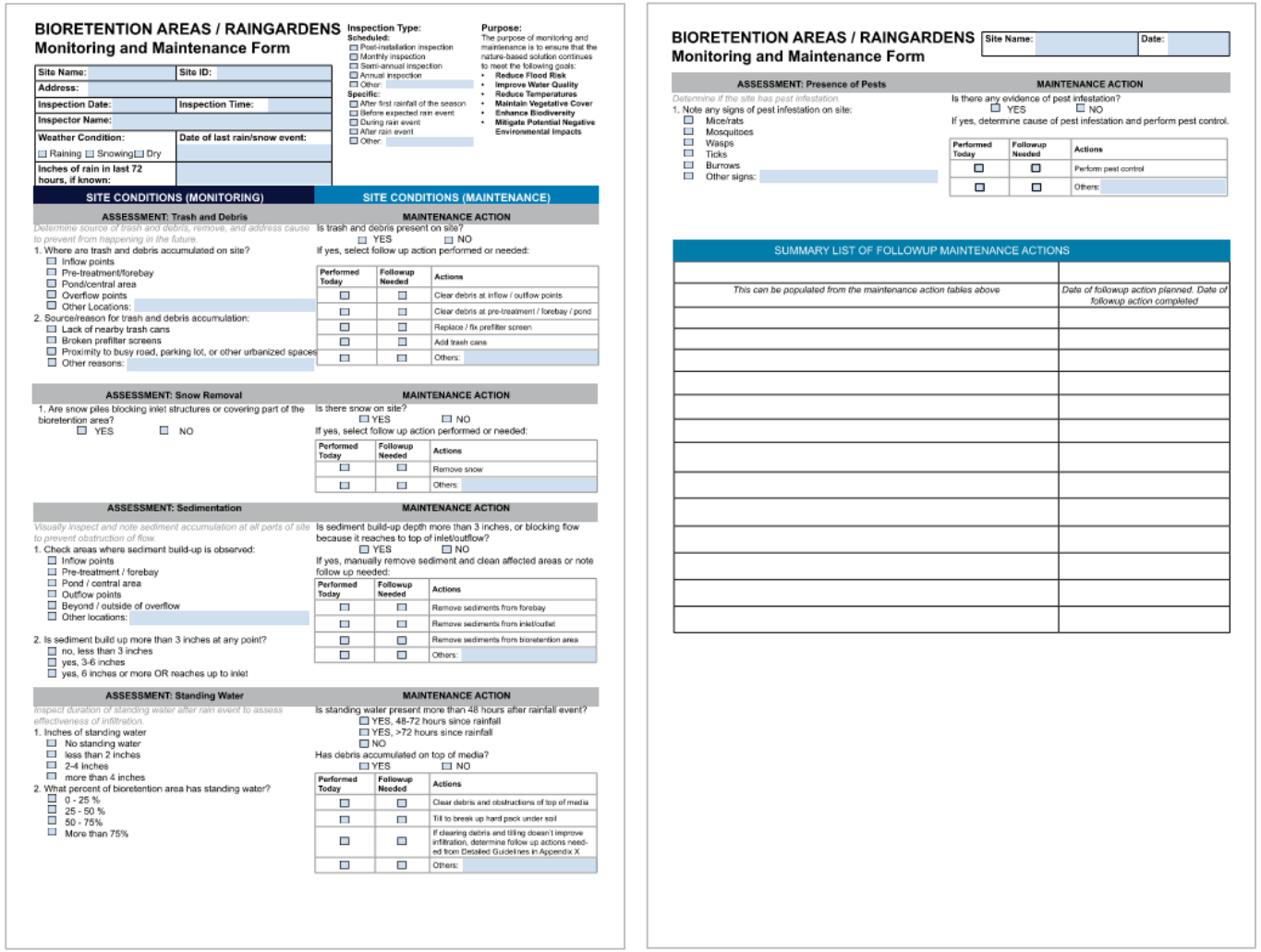
Piloting NBS Monitoring Forms

- Based on NBS projects Fitchburg is considering for the future, these forms will support future success
- Testing a similar monitoring approach as other cities

Photo: Fitchburg, MA, Weston & Sampson

NBS Monitoring Forms

- Bioretention Areas & Rain Gardens
- Constructed Stormwater Wetlands
- Floodable Field / Dry Detention Basin
- Grassed Channel / Biofilter Swales / Water Quality Swales
- Infiltration Basins / Trenches
- Porous Pavement / Pervious Pavement
- Subsurface Structures (Storage / Infiltration)



BIORETENTION AREAS / RAINGARDENS
Monitoring and Maintenance Form

Inspection Type:
Scheduled:
- ☐ Post-installation inspection
- ☐ Monthly inspection
- ☐ Semi-annual inspection
- ☐ Annual inspection
- ☐ Other:

Specific:
- ☐ After first rainfall of the season
- ☐ Before expected rain event
- ☐ During rain event
- ☐ After rain event
- ☐ Other:

Purpose:
The purpose of monitoring and maintenance is to ensure that the nature-based solution continues to meet the following goals:
- Reduce Flood Risk
- Improve Water Quality
- Reduce Temperatures
- Maintain Vegetative Cover
- Enhance Biodiversity
- Mitigate Potential Negative Environmental Impacts

Site Name:	Site ID:
Address:	
Inspection Date:	Inspection Time:
Inspector Name:	
Weather Condition: ☐ Raining ☐ Snowing ☐ Dry	Date of last rain/snow event:
Inches of rain in last 72 hours, if known:	

SITE CONDITIONS (MONITORING) | **SITE CONDITIONS (MAINTENANCE)**

ASSESSMENT: Trash and Debris | **MAINTENANCE ACTION**

Determine source of trash and debris, remove, and address cause to prevent from happening in the future.

1. Where are trash and debris accumulated on site?
   - ☐ Inflow points
   - ☐ Pre-treatment/forebay
   - ☐ Pond/central area
   - ☐ Overflow points
   - ☐ Other Locations:
2. Source/reason for trash and debris accumulation:
   - ☐ Lack of nearby trash cans
   - ☐ Broken prefilter screens
   - ☐ Proximity to busy road, parking lot, or other urbanized spaces
   - ☐ Other reasons:

Is trash and debris present on site? ☐ YES ☐ NO

If yes, select follow up action performed or needed:

Performed Today	Followup Needed	Actions
☐	☐	Clear debris at inflow / outflow points
☐	☐	Clear debris at pre-treatment / forebay / pond
☐	☐	Replace / fix prefilter screen
☐	☐	Add trash cans
☐	☐	Others:

ASSESSMENT: Snow Removal | **MAINTENANCE ACTION**

1. Are snow piles blocking inlet structures or covering part of the bioretention area? ☐ YES ☐ NO

Is there snow on site? ☐ YES ☐ NO

If yes, select follow up action performed or needed:

Performed Today	Followup Needed	Actions
☐	☐	Remove snow
☐	☐	Others:

ASSESSMENT: Sedimentation | **MAINTENANCE ACTION**

Visually inspect and note sediment accumulation at all parts of site to prevent obstruction of flow.

1. Check areas where sediment build-up is observed:
   - ☐ Inflow points
   - ☐ Pre-treatment / forebay
   - ☐ Pond / central area
   - ☐ Outflow points
   - ☐ Beyond / outside of overflow
   - ☐ Other locations:
2. Is sediment build up more than 3 inches at any point?
   - ☐ no, less than 3 inches
   - ☐ yes, 3-6 inches
   - ☐ yes, 6 inches or more OR reaches up to inlet

Is sediment build-up depth more than 3 inches, or blocking flow because it reaches to top of inlet/outflow? ☐ YES ☐ NO

If yes, manually remove sediment and clean affected areas or note follow up needed:

Performed Today	Followup Needed	Actions
☐	☐	Remove sediments from forebay
☐	☐	Remove sediments from inlet/outlet
☐	☐	Remove sediments from bioretention area
☐	☐	Others:

ASSESSMENT: Standing Water | **MAINTENANCE ACTION**

Inspect duration of standing water after rain event to assess effectiveness of infiltration.

1. Inches of standing water
   - ☐ No standing water
   - ☐ less than 2 inches
   - ☐ 2-4 inches
   - ☐ more than 4 inches
2. What percent of bioretention area has standing water?
   - ☐ 0 - 25 %
   - ☐ 25 - 50 %
   - ☐ 50 - 75%
   - ☐ More than 75%

Is standing water present more than 48 hours after rainfall event?
- ☐ YES, 48-72 hours since rainfall
- ☐ YES, >72 hours since rainfall
- ☐ NO

Has debris accumulated on top of media? ☐ YES ☐ NO

Performed Today	Followup Needed	Actions
☐	☐	Clear debris and obstructions of top of media
☐	☐	Till to break up hard pack under soil
☐	☐	If clearing debris and tilling doesn't improve infiltration, determine follow up actions needed from Detailed Guidelines in Appendix X
☐	☐	Others:

BIORETENTION AREAS / RAINGARDENS
Monitoring and Maintenance Form

Site Name: | Date:

ASSESSMENT: Presence of Pests | **MAINTENANCE ACTION**

Determine if the site has pest infestation.

1. Note any signs of pest infestation on site:
   - ☐ Mice/rats
   - ☐ Mosquitoes
   - ☐ Wasps
   - ☐ Ticks
   - ☐ Burrows
   - ☐ Other signs:

Is there any evidence of pest infestation? ☐ YES ☐ NO

If yes, determine cause of pest infestation and perform pest control.

Performed Today	Followup Needed	Actions
☐	☐	Perform pest control
☐	☐	Others:

SUMMARY LIST OF FOLLOWUP MAINTENANCE ACTIONS

This can be populated from the maintenance action tables above	*Date of followup action planned. Date of followup action completed*

Monitoring Forms, Fitchburg, MA, Weston & Sampson

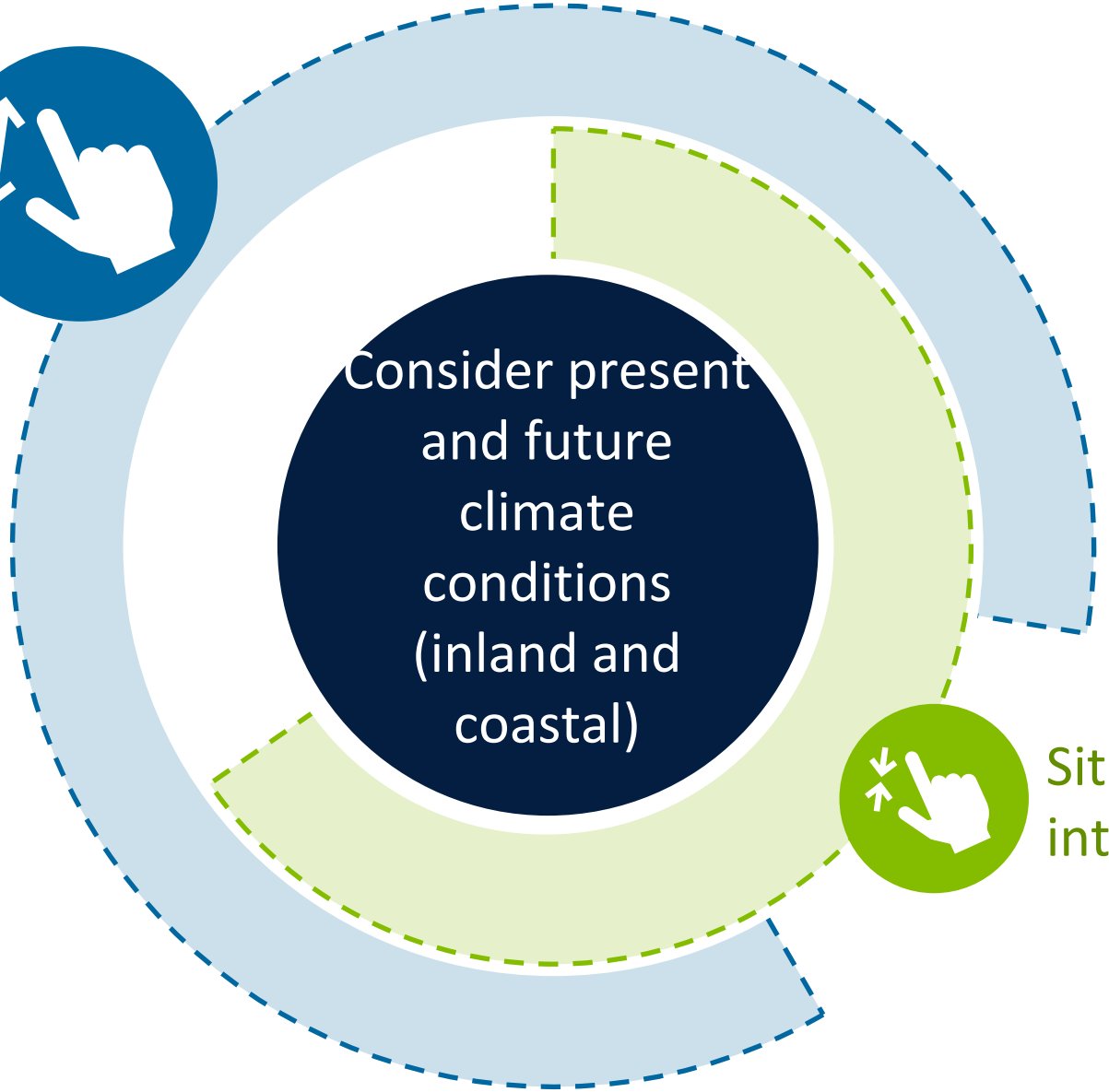
Additional Components to a Successful Stormwater Program

Sizing Infrastructure for the Future, Equity, and Community Involvement

Sizing Infrastructure for the Future

Weston & Sampson

Watershed scale planning



Site specific interventions

Precipitation Projections – Case Study

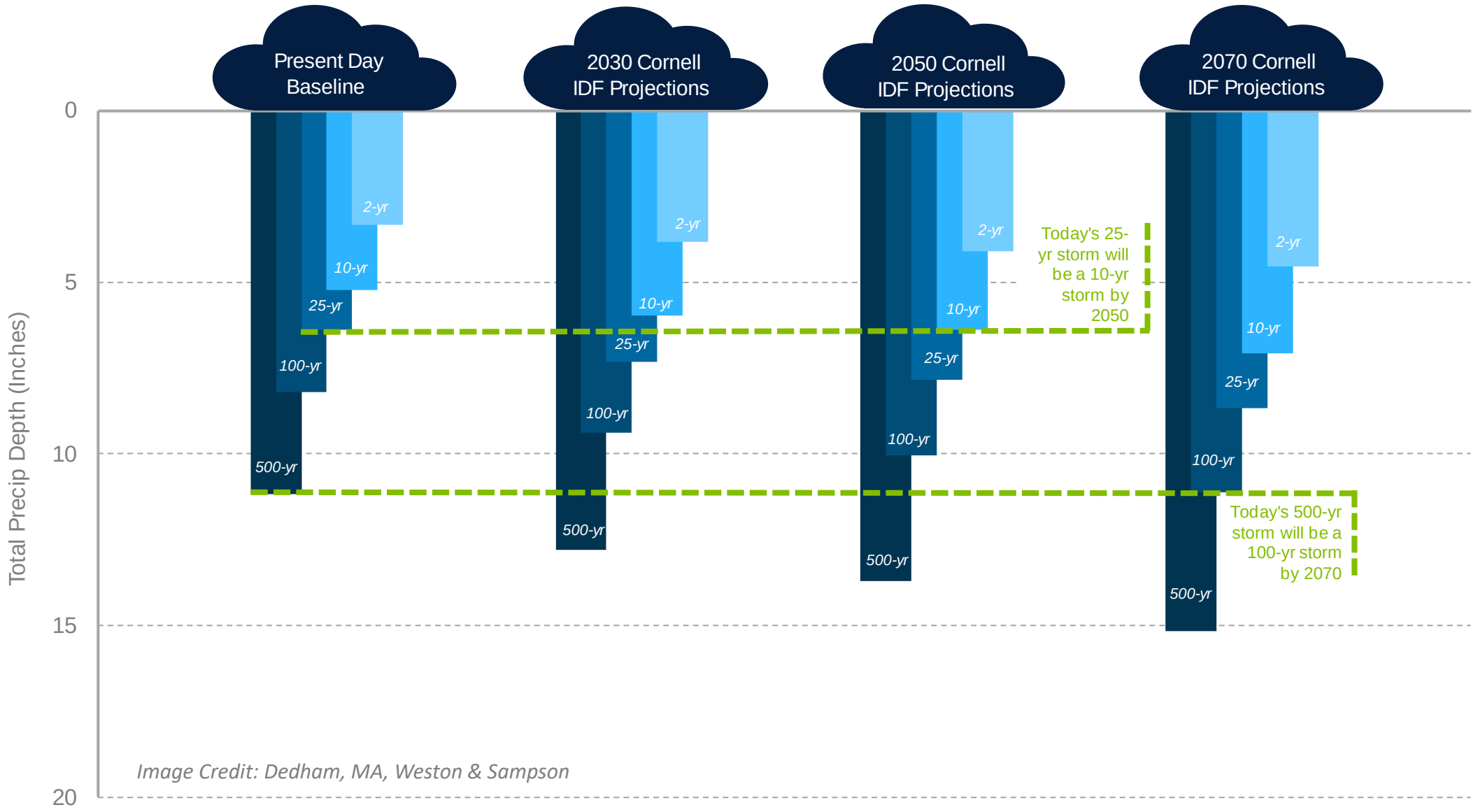
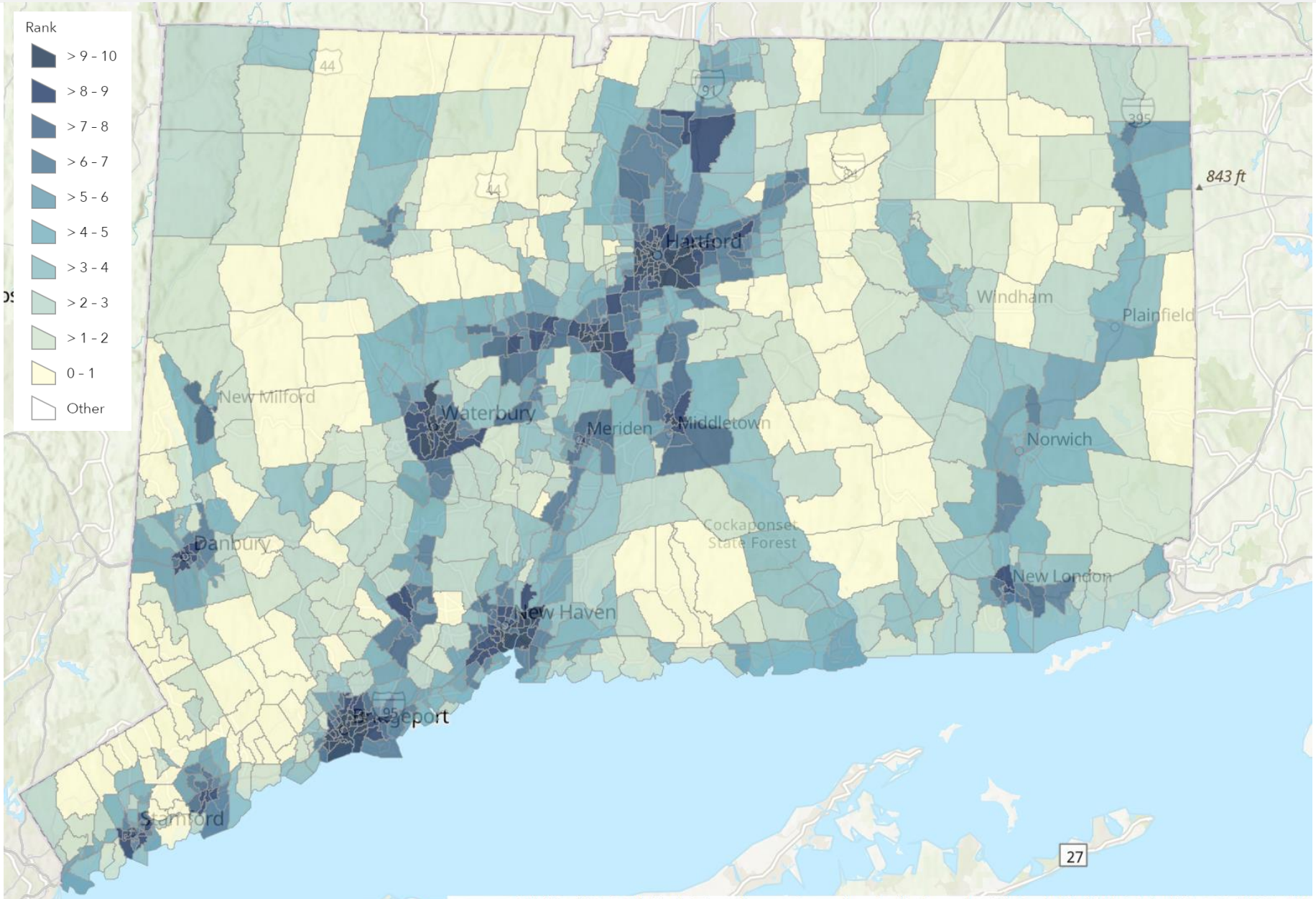


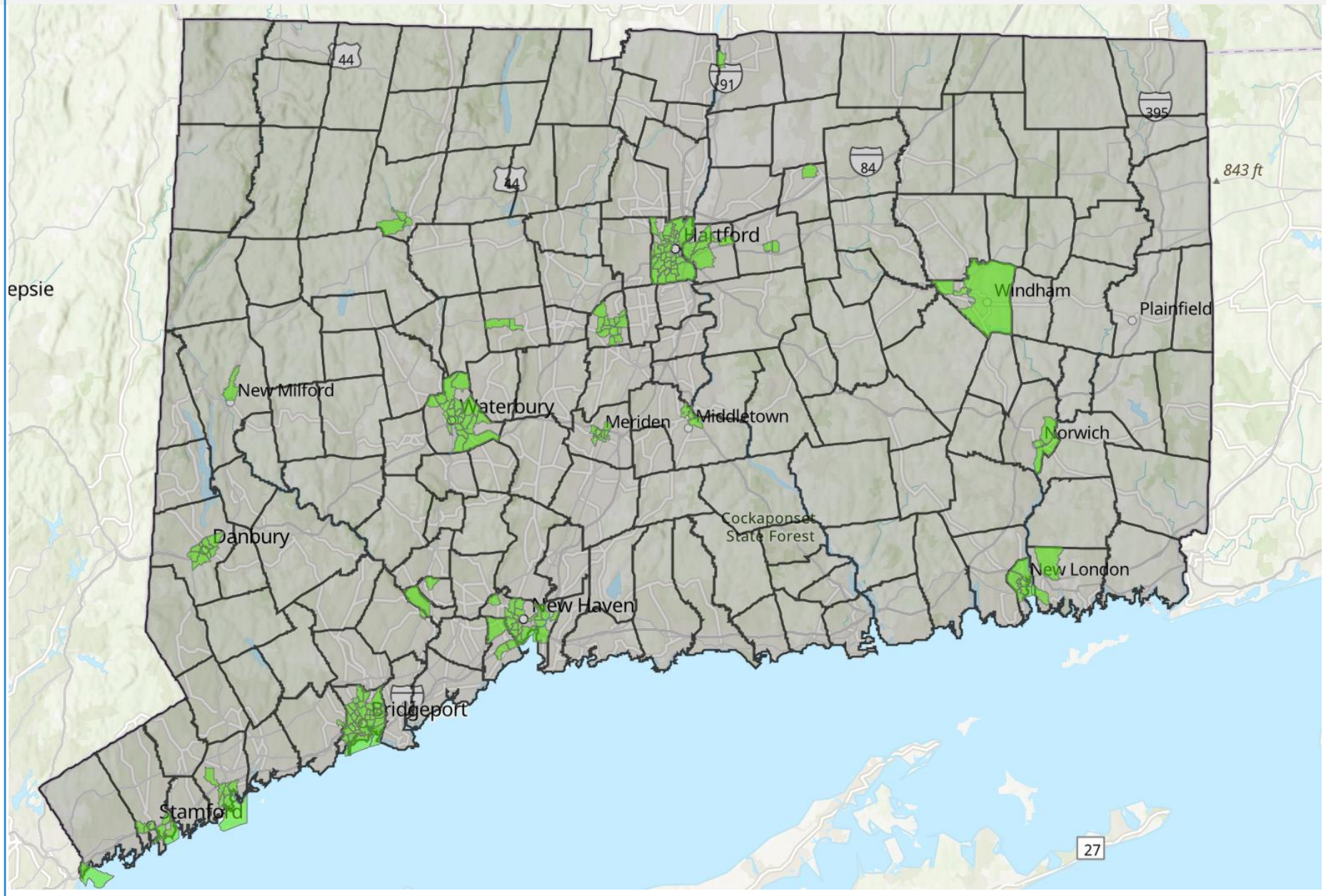
Image Credit: Dedham, MA, Weston & Sampson

Improving Equity with NBS



Connecticut Environmental Justice Mapping Tool: Community and data-driven approach that incorporates environmental burdens and demographic indicators

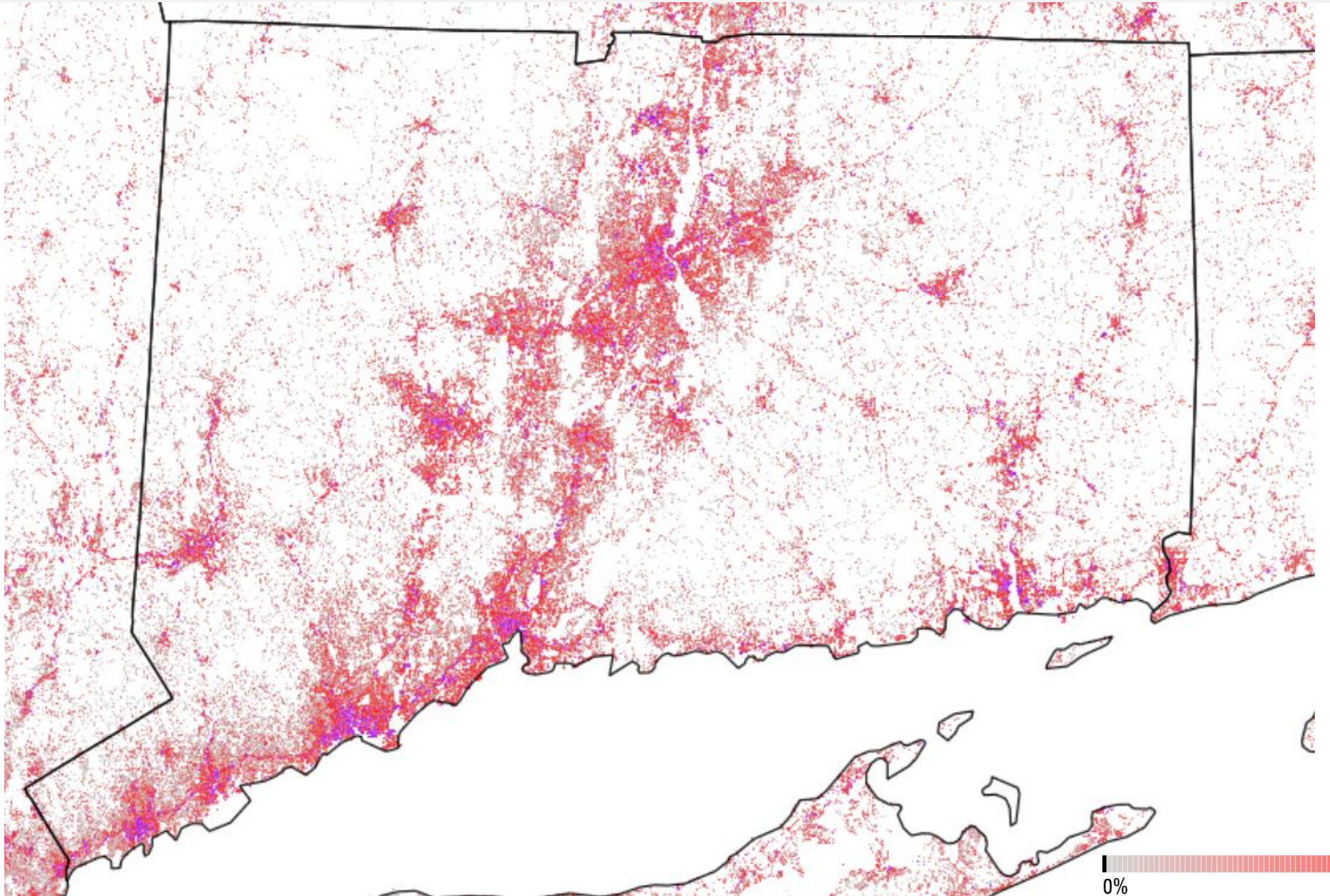
Improving Equity with NBS



United States Climate and Economic Justice Screening Tool:

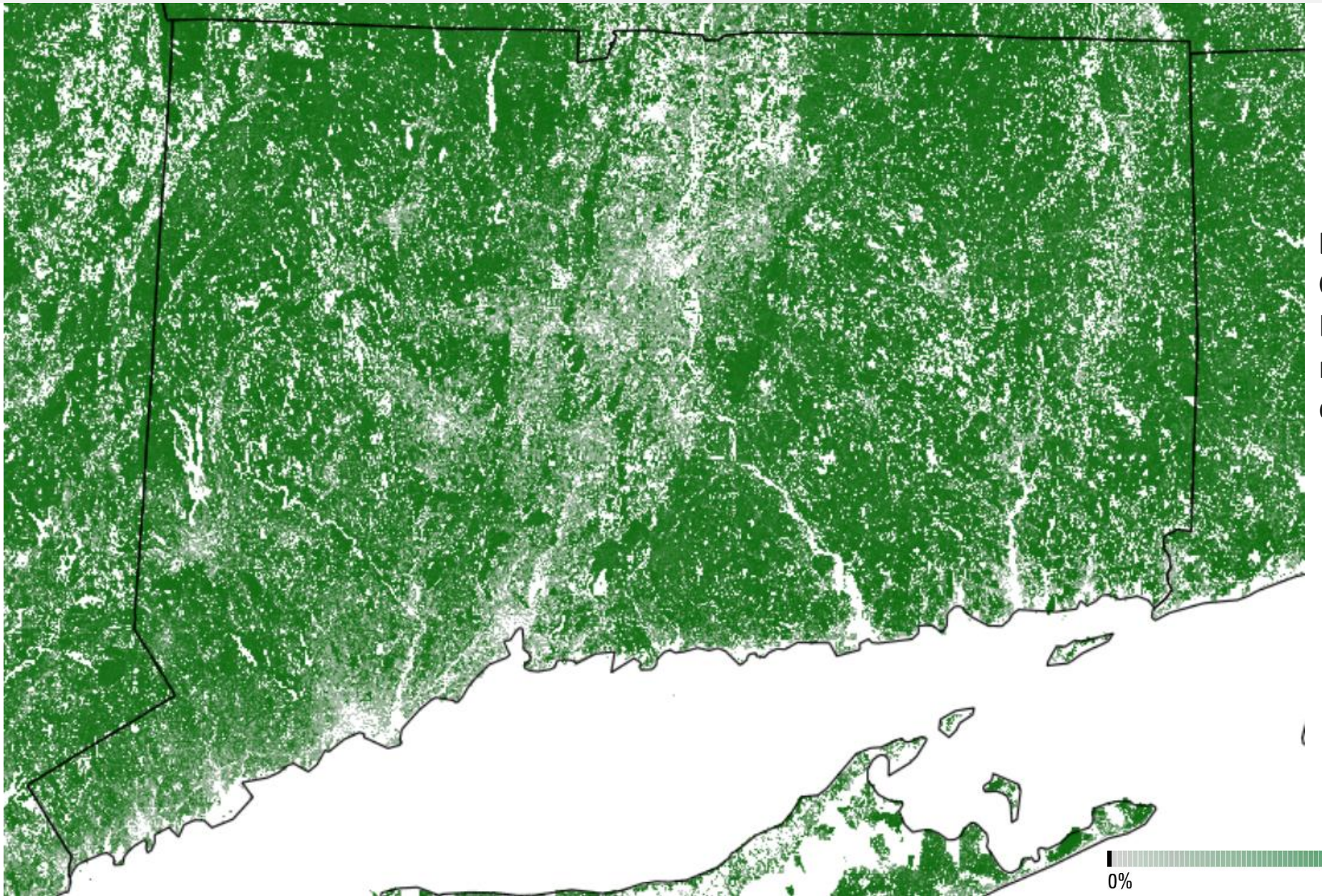
Census tracts that are overburdened and underserved are highlighted as being disadvantaged on the map.

Improving Equity with NBS



Land Cover Land Use Impervious Cover Data: LiDAR data capturing nationwide impervious land cover (2021)

Improving Equity with NBS



Land Cover Land Use Tree Canopy Data:
LiDAR data capturing nationwide tree canopy coverage (2021)

Improving Equity with NBS

- Where there are highly impervious areas and minimal green space, there is likely:
  - Increased flooding
  - Increased heat
  - Decreased air and water quality

- The people being impacted by these factors are overburdened and underserved, as shown with both EJ mapping tools.

- Using nature-based solutions in conjunction with traditional grey infrastructure to manage stormwater and increase vegetation in these priority locations is a way to equitably implement resilient solutions.

Community Involvement

- Maintenance of NBS can be taxing for DPWs that are already at capacity
- Look to the community to help with maintenance
  - Garden clubs
  - Community centers
  - Town Committees
  - “Adopt-a-Basin” programs
  - STEM education to build out the future workforce
    - Internships
    - School clubs

Photos: GI Maintenance Training in Lynn and Lowell, MA, Weston & Sampson

Funding Stormwater Projects

Grant funding opportunities

- Federal and State programs for resiliency, stormwater management, and water quality improvement which can all help fund municipal projects.

Employ regional partnerships to complete planning projects

- Areas can be grouped by watershed
- Cost sharing
- Able to see the big picture – water does not follow municipal boundaries

Stormwater Utilities

- Sustainable, adequate, flexible, and equitable stormwater program funding

QUESTIONS?

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Weston & Sampson℠

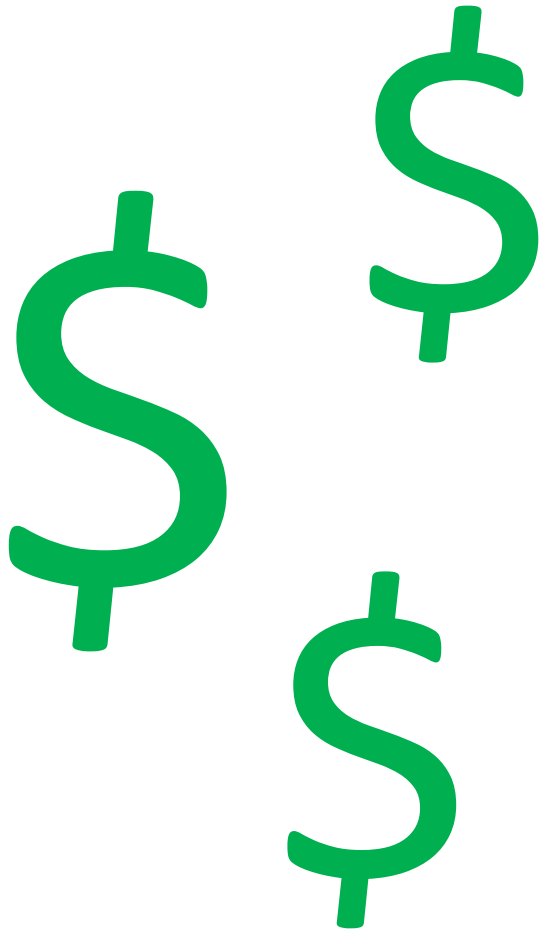
Funding Opportunities for Stormwater Management and Building Resilient Communities

IIJA/BIL

- **$1.2 trillion** appropriated under the Infrastructure Investment and Jobs Act (IIJA) to **improve infrastructure, generate good-paying jobs, confront the climate crisis, grow the economy equitably, and create a transportation system that works for every American.**

- 5-year term, FY2022 through FY2026

- **CT** is estimated to receive **$6.04B** through a mix of funding.



Federal Funding Programs

- FEMA BRIC – Building Resilient Infrastructure and Communities - Funds hazard mitigation projects to **reduce future risks from disasters and natural hazards**. Learn about past grant recipients here; for FY22, **64 projects included nature-based solutions** from 19 states and 8 regions.*
- FEMA FMA – Flood Mitigation Assistance Program – Funds projects that reduce or eliminate the risk of **repetitive flood damage to buildings** insured by the National Flood Insurance Program. Learn about past grant recipients here.*
- FEMA HMGP – Hazard Mitigation Grant Program - Funds projects to **address future risk to lives and property from natural hazards**. FEMA Guidance Document.*

*Coordination with CT DEMHS is required

Federal Funding Programs

- FHWA PROTECT Discretionary Grant Program - Funds projects that address the climate crisis by **improving the resilience of the surface transportation system**, including highways, public transportation, ports, and intercity passenger rail.
    - Improve the ability of surface transportation assets to withstand **natural disasters, flooding, and extreme weather events.**
    - Eligible projects include **nature-based solutions like protective wetland buffers and culverts.**
    - NOFO anticipated in **July 2024.**
    - Formula Funding also available through CTDOT.

Federal Funding Programs

- FHWA National **Culvert Removal, Replacement & Restoration** Discretionary Grant Program (a.k.a. Culvert Aquatic Organism Passage (AOP) Program) – Meaningfully improve fish passage for anadromous fish. NOFO anticipated **May 2024.** Learn more at CTDEEP webpage and view this list of anadromous fish in CT.

- US Fish and Wildlife Service National Fish Passage Program - Improve fish passage, conserving vulnerable species while **building safer infrastructure for communities and improving climate resilience.**

Federal Funding Programs

- **Congressionally Directed Spending (CDS)/Community Project Funding** – apply to U.S. Senators and U.S. Representatives. Learn more about Senator Murphy's application process here. The application period is now closed. Read the FY25 CDS Guide here to better plan for next year.

- **EPA WIFIA (Water Infrastructure Finance and Innovation Act) – Loan program** offering low-cost, flexible loans to a variety of applicants for water infrastructure projects. There is a **rolling selection process;** $6.5B available in 23/24.

    - **EPA SWIFIA (State Infrastructure Financing Authority)** - Loan program exclusively for State infrastructure financing authorities. $1B available 23/24.

State-Administered Funding Programs

- **EPA Sewer Overflow and Stormwater Reuse Municipal Grant (OSG) Program –** formula funding available for planning, design, and construction of combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and stormwater management projects. Administered by CTDEEP.
  - **$1.054M FY24/$1.054M FY25.**
  - Small communities (pop. of 10k or less) and financially distressed communities are encouraged to apply.
  - Projects on the **Priority List.**
  - Private or Public properties are eligible.
  - More information is available from EPA here and CTDEEP here.

State-Administered Funding Programs – CWSRF

EPA Clean Water State Revolving Fund (CWSRF) – CTDEEP administered program to upgrade wastewater infrastructure.

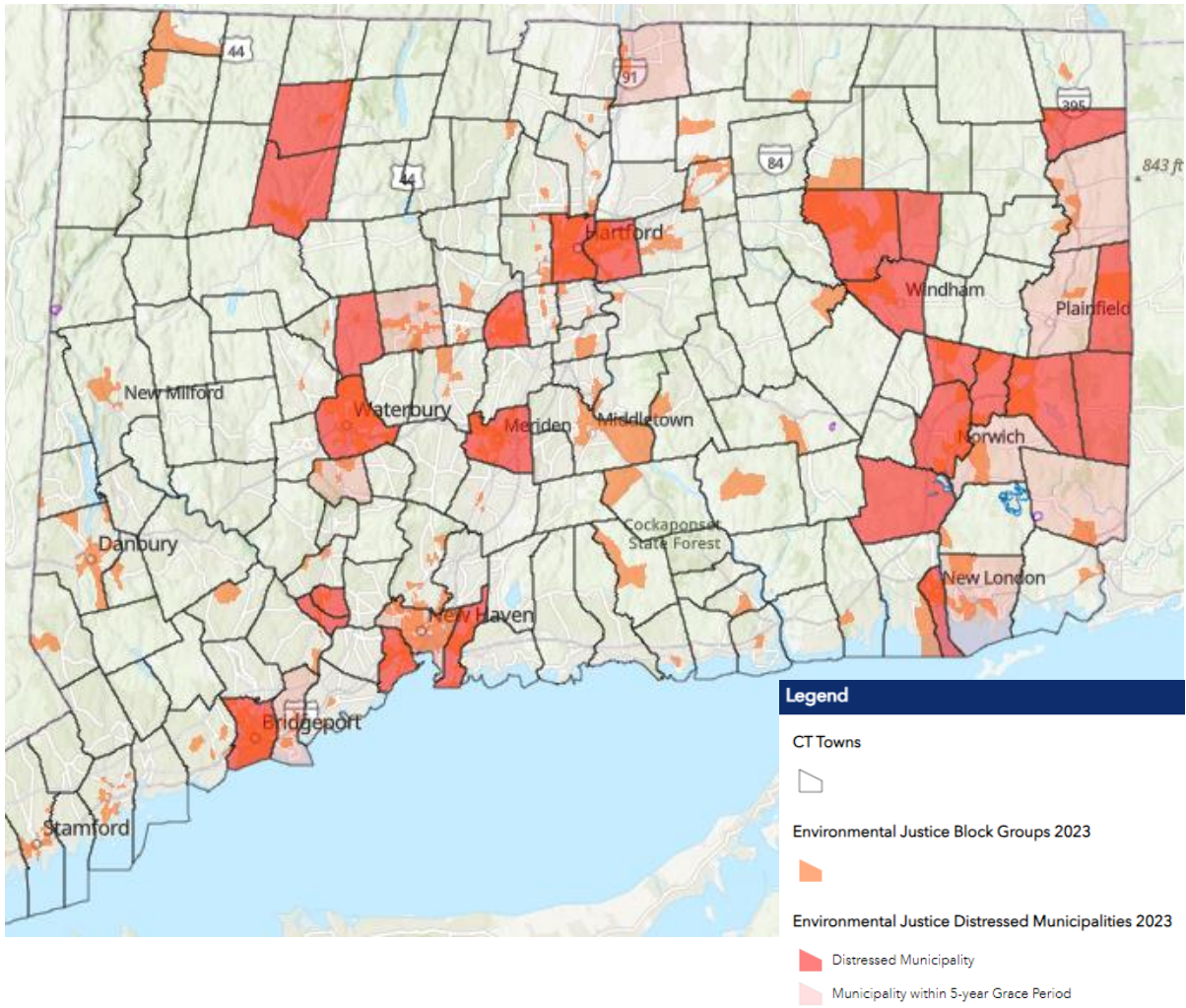
- **Base Capitalization Grant -** $9.19M for FY24/$6.89M FY25
  - 10% of grant shall be for **green infrastructure, energy efficiency, or other environmentally innovative projects**.
- **General Supplemental Grant** - $25.5M FY24/$25.5M FY25
  - available to DECD distressed municipalities as grants and/or forgivable loans
  - Priority: **removal of sanitary sewer overflows** (i.e., untreated discharges of sewage) to **address health and environmental impacts** to Long Island Sound directly or indirectly through inland waters.

State-Administered Funding Programs

- **EPA Emerging Contaminants Grant –** Funding to address **emerging contaminants** (such as per- and polyfluoroalkyl substances (**PFAS**) through projects eligible per the Clean Water Act.
  - **$2.605M FY24/$2.605M FY25.**
  - EPA pilot program for PFAS removal technologies on landfill leachate.

State-Administered Funding Programs

- **Clean Water Act Section 319 Nonpoint Source (NPS) Grant Program**
  - Implementation projects, plans, statewide NPS management efforts.
  - Applications for designated environmental justice communities will be considered a priority. View map of EJ communities in CT here.
  - Min. 40% non-Federal source match
  - Learn more here.
  - DEEP.Watershed@ct.gov



State Funding Programs

- **CT DEEP Climate Resilience Fund –** Grants for **planning and development projects** that will help CT communities become more **resilient to the effects of climate change**.
    - Funds nature-based solutions, including green infrastructure; flood prevention; climate resilience and erosion control systems; gray infrastructure; and non-structural project solutions.
    - **$8.8M for 21 projects in CT**
    - Next round coming soon!
    - Learn more here.

CRCOG Region Stormwater Authority Feasibility Study

Stormwater Challenges in Region

- Increased frequency of heavy rain events
- More impervious cover
- Several areas have poorly draining soils
- Many properties with stormwater lines directly connected to sanitary sewer system (even in SSO communities)
- Stormwater infrastructure is aging, undersized or both
- Progress meeting MS4 requirements is slow for many communities

Flood of 1936, Temple Street, Hartford. Credit: The Graphics Collection, the Connecticut Historical Society.

Stormwater Authority

- State has recognized the financial burdens associated with stormwater management and in 2021 passed legislation (PA 21-115) allowing municipalities to create a local stormwater authority

- Can establish stormwater authority as a new entity or assign function to an existing body such as Water Pollution Control Authority (WPCA)

Stormwater Authority (continued)

- Local stormwater authority has ability to levy separate user fee for stormwater management purposes
- Fees can be used for education, planning, and infrastructure such as storm sewers, drains, flood control reservoirs, rain gardens, and bioswales
- Both private and public properties can be subject to the fee, with limitations for hospitals, forest lands, working farms, and state-owned properties
- Fees can be structured in various ways; most common method is to base the user fee on the amount of impervious cover and runoff generated by an individual property
- Property owners that reduce impervious cover or mitigate runoff have their fees reduced

Stormwater Authority

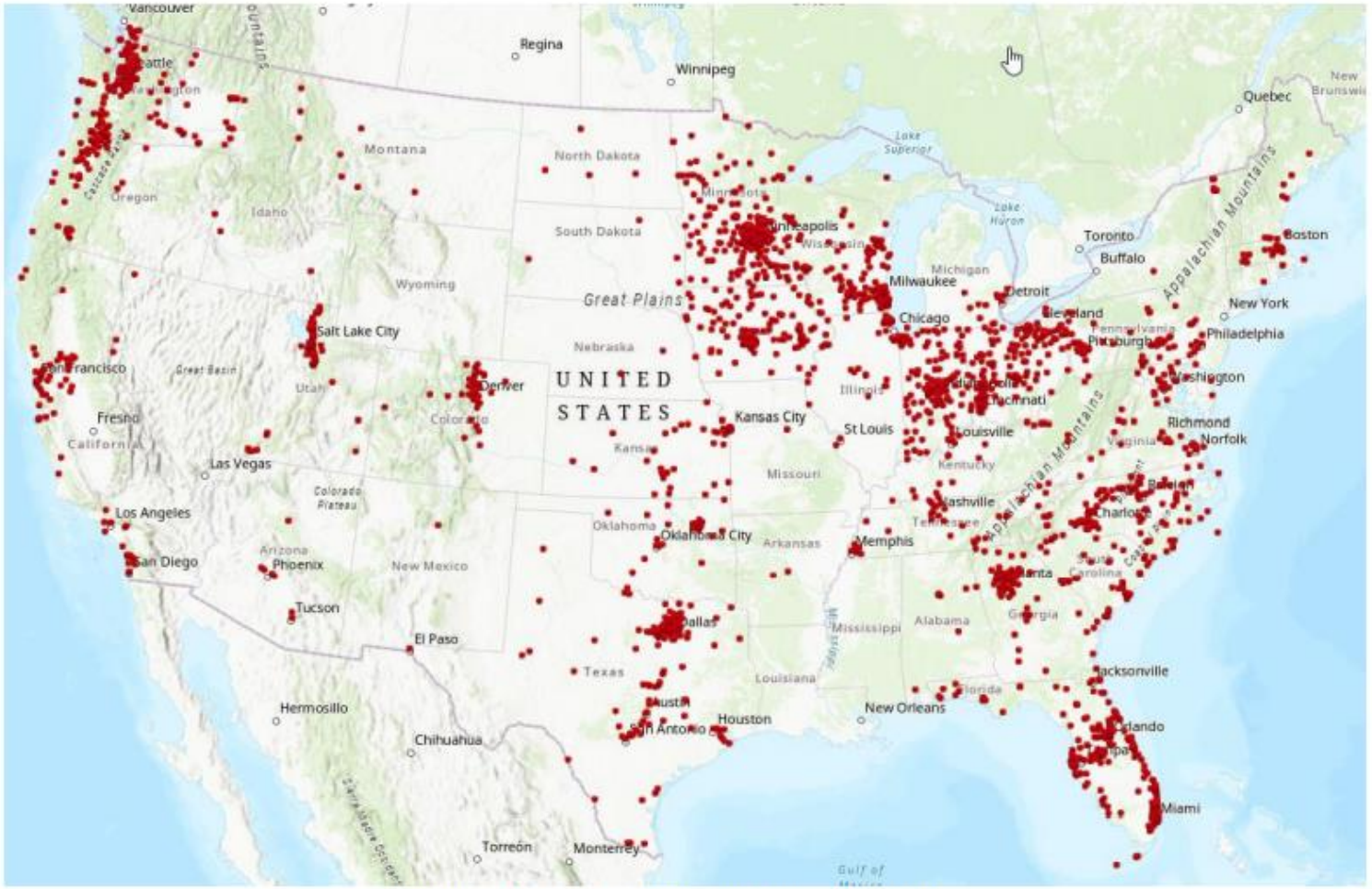


Figure 1. U.S. stormwater utilities (SWUs).

Per 2022 Western Kentucky Stormwater Utility Survey:

- Over 2,000 Stormwater Utilities in U.S.

Map excludes New Britain which was created more recently.

Stormwater Authority (continued)

CRCOG - Climate Resilience Fund Grant

- To prepare feasibility study for a regional/subregional stormwater authority
- Finalizing budget and scope of work with CT Department of Energy and Environmental Protection (DEEP)
- Will explore partnership opportunities with MDC and local WPCA's
- Expect to begin project in early fall; 18-month project timeframe

Other CRCOG Projects

- Hazard Mitigation & Climate Adaptation Plan
- Resilient 2.0
- Regional Plan of Conservation and Development
- MS4 / DEEP Focus Group

Round Table Discussion

- What are your community's biggest stormwater challenges?
- What grants are you thinking of applying for?
- What are some lessons learned in your community as you address stormwater issues?
    - Funding?
    - Planning process?
    - Construction?
    - Maintenance?

Thank You!

Learn more about **CRCOG's Strategic Priorities** and how we are improving communities in the Hartford Region here.

CRCOG's Funding Newsletter - Sign up here or with the QR Code (note: there are separate forms for CRCOG Connection and BIL/IIJA)

Let's stay connected

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Weston & Sampson℠

You're invited - register today!

Tickets are $30. Payment options are included in the registration link.