

# Green Infrastructure and Transportation

Co-hosted by Together North Jersey & Jersey Water Works

February 6, 2019



**CDM  
Smith.**

**Bill Cesanek, AICP**

# Quick Survey

## Green Stormwater Infrastructure

### Question 1

- a) Some familiarity with Green Infrastructure design and implementation
- b) In-depth knowledge of Green Infrastructure designs & implementation

### Question 2

- a) Familiar with Green Infrastructure mostly through Land Development
- b) Familiar with Green Infrastructure mostly through Transportation projects

### Question 3

- a) Experience with Green Infrastructure is through Upgrading Existing Drainage
- b) Experience with Green Infrastructure is through New Construction

# What is Green Infrastructure?



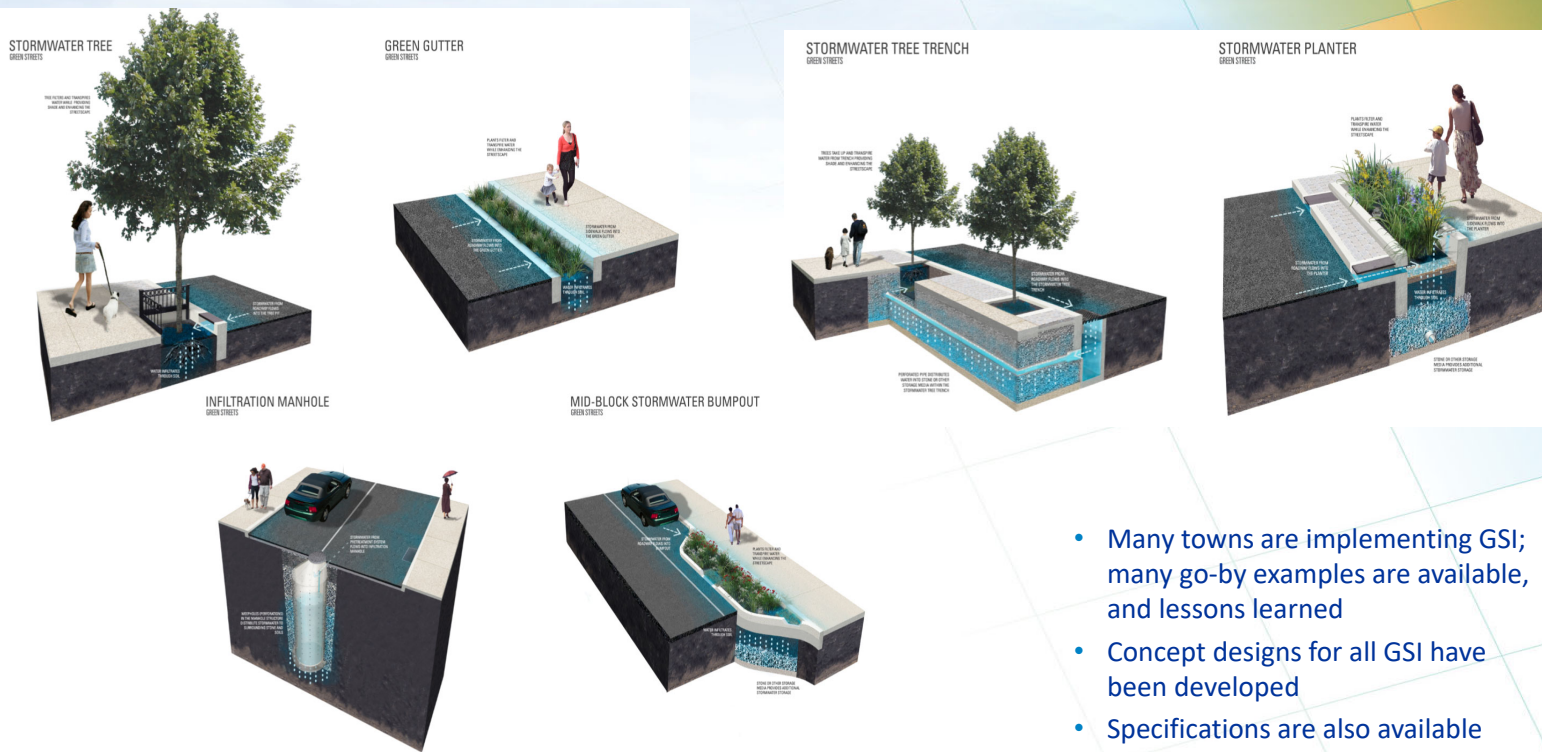
- The term “green infrastructure” or “green stormwater infrastructure” refers to a set of stormwater management practices that use or mimic the natural water cycle to ***intercept and capture*** stormwater, ***infiltrate*** a portion of it into the ground, ***evaporate and transpire*** a portion of it into the air, ***harvest and reuse*** it as a resource, and in some cases ***store and slowly release*** a portion of it back into the drainage system, thereby reducing runoff.

# What is Green Infrastructure?



- Unlike traditional gray infrastructure, green infrastructure uses high performance landscaping and hardscaping to meet stormwater management goals
- Most commonly understood as garden-like plant-based landscapes
- BUT green infrastructure can also be installed on roofs or in paved areas and parking areas
- Green infrastructure practices manage stormwater to help restore the natural hydrology

# Green Stormwater Infrastructure Designs - Typical



- Many towns are implementing GSI; many go-by examples are available, and lessons learned
- Concept designs for all GSI have been developed
- Specifications are also available

# Green Infrastructure Techniques



Subsurface Storage Infiltration



Porous Pavements



Blue Roof



Green Roof



# Newark Greenstreets – Pilot Concept

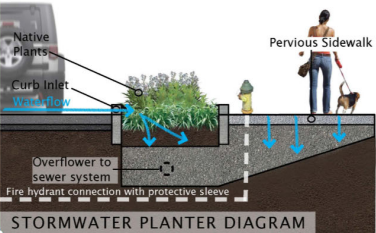
**NEWARK GREENSTREETS INITIATIVE**  
**CONCEPT DESIGN**  
Christie Street, Brill Street, and Hawking Street below Ferry Street



SITE PHOTO



STREETSCAPE RENDERING



# Greening Our Cities - Before



Source: WRT



# Greening Our Cities - After



Source: WRT

# Benefits of Green Infrastructure

- Resilience to extreme weather / climate change
- **Reduces runoff / Improves flood protection**
- Provide green, open space
- **Reduce stream pollutant loads**
- Improved livability and public health
- **Increase market values and corridor attractiveness**
- Create local, green economy
- Support (sub)urban revitalization
- Advance sustainability programs
- Restore river and stream corridors
- Preserve, restore, expand natural habitat
- **Maximize return on dollars spent**



Fishable – Swimmable – Drinkable – Safe – Attractive – Accessible

## History of Stormwater in NJ

- Over 74 percent of NJ's housing was built after 1950; 53 percent built between 1950 and 1990
- Most stormwater drainage systems were built by developers during the post-WWII suburban subdivision development boom
- Principal function: rapidly convey runoff to nearby streams and receiving waters to minimize flooding in streets; allowing safe travel by pedestrians/motor vehicles
- Storm drain systems and streets were typically deeded to the municipality by developer for future operation and maintenance; local governments became the owners and maintainers
- No system for collection of dedicated funds to support O&M was authorized, funded by tax revenues from the municipal budget. The "orphan utility." Until now.

## Traditional vs Green Stormwater Mgmt

- Conventional stormwater management:
  - **Focuses on removing stormwater quickly to reduce flooding**
  - Typical designs, such as curb and gutter inlets and piping systems, accelerate runoff to the nearest receiving water, or use detention basin BMPs to attenuate peak runoff discharge rates
  - Natural water infiltration reduced, flow rates are increased, with increases in surface runoff volume -- *less soil infiltration, less groundwater recharge, greater erosion*
- Traditional stormwater management relies on conveyance efficiency to remove stormwater
- ***Key to green management of runoff: reduce the amount of RUNOFF generated -- by maintaining and working with the hydrology of a site and managing stormwater at the source!***

# Green Infrastructure Transformation in NJ



**NJSPOTLIGHT**  
NEWS, ISSUES AND INSIGHT FOR NEW JERSEY

February 4, 2019  
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## ENERGY & ENVIRONMENT

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### SPLIT LEGISLATURE GIVES THUMBS-UP TO STORMWATER RUNOFF CONTROLS

TOM JOHNSON | FEBRUARY 1, 2019

Democratic majority champions measure as an effective tool for curbing pollution of NJ's rivers and bays; GOP decries envisioned fees as 'rain tax'



Credit: David Robinson

The Legislature yesterday gave final approval to a bill that aims to fix one of New Jersey's biggest environmental problems — managing runoff from storms that pollutes the state's waters and exacerbates flooding.

In a vote largely along party lines in both houses, lawmakers voted to allow municipalities and other entities to set up stormwater utilities, a system in place in 41 other states aimed at reducing flooding and controlling dirty runoff from rainwater.

If signed by Gov. Phil Murphy, the legislation (S-1073), debated in one form or another for a decade, would allow newly created utilities to impose fees on parking lots and other impervious surfaces to fund improvements to failing existing stormwater systems.

Aging infrastructure, much of it poorly maintained, has long been blamed as the biggest source of pollution flowing into state waters. The contaminants found there — pesticides, oils, and heavy metals — mix with runoff to foul rivers, streams and bays. Only 5 percent of New Jersey's waters meet federal standards for being fishable, swimmable and drinkable.



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A Better Tomorrow. One Community at a Time.

### Green Infrastructure Implementation \*NEW\*

10 Points 15 Points 20 Points

New Action February 2018

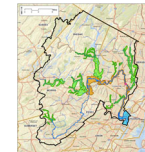
Green infrastructure is a cost-effective and sustainable approach to stormwater management that can reduce nuisance flooding and offer other important environmental, social, and economic benefits. Green infrastructure techniques capture, filter, absorb, and reuse stormwater to maintain or mimic natural hydrologic systems and to treat runoff as a resource. When used as components of a stormwater management system, green infrastructure practices, such as bioretention basins, green roofs, porous pavement, rain gardens, and vegetated swales, can produce a variety of environmental, social and economic benefits.

This action provides guidelines for implementing green infrastructure projects that will reduce your community's impervious coverage and stormwater runoff. Municipalities can earn up to 20 points for three levels of green infrastructure implementation, including:

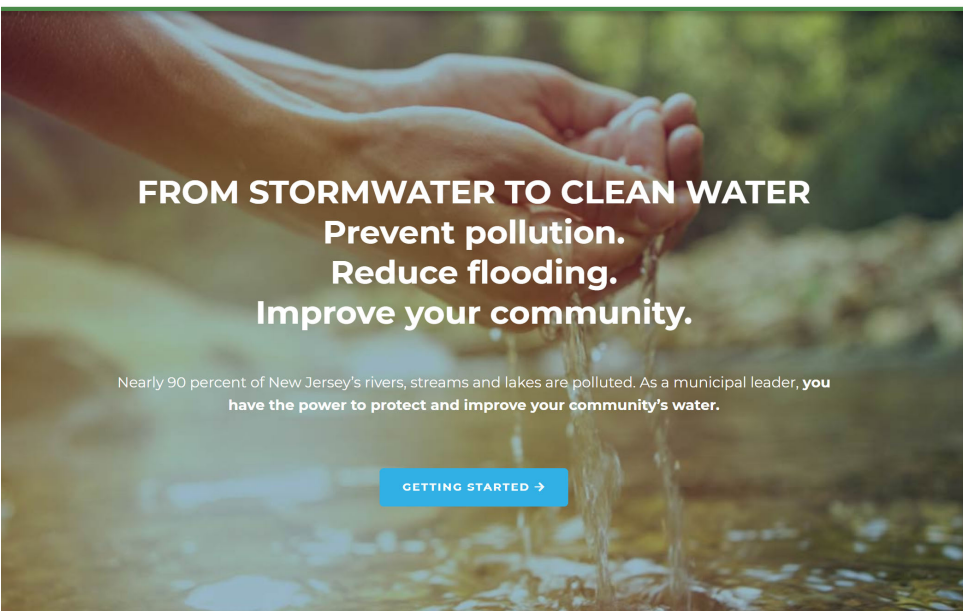
- **Tier 1 Implement Green Infrastructure Demonstration Projects.** Complete two green infrastructure demonstration projects and/or implement one green infrastructure policy. Green infrastructure projects include one or more of the green infrastructure practices shown in the [Green Infrastructure Guidance Manual for New Jersey](#): Rain Gardens, Bioswales, Downspout Planters, Stormwater Planters, Cisterns, Permeable Pavements, Tree Filter Boxes, and Green Roofs. Tier 1 replaces both the previous Green Roofs and Rain Gardens Actions in the Innovation & Demonstration Projects category. **[10 points]**
- **Tier 2 Implement Green Infrastructure Action Plan.** Complete as many green infrastructure projects as is necessary to achieve 50% of the short-term impervious cover management goal identified in the community's Green Infrastructure Action Plan (see the Green Infrastructure Planning Action). **[15 points]**
- **Tier 3 Implement Green Infrastructure Strategic Plan.** Complete as many green infrastructure projects and policy changes as is necessary to achieve 50% of the long-term impervious cover management goal identified in municipality's Green Infrastructure Strategic Plan (see the Green Infrastructure Planning Action). **[20 points]**

## Recent Momentum on Green Infrastructure & Resiliency

- NJ Legislature passes **Stormwater Utility** law – waiting for signature by Governor
- NJDEP proposes changes to **Stormwater Management Regulations**
- NJTPA **Climate Resilience Plan** for the Passaic River Basin
- NJDEP RBD Resiliency – NDR Hoboken & Meadowlands & Stormwater Maintenance Toolkit
- Coastal Resiliency Projects – NJDEP
- Camden SMART; Trenton Stream Daylighting; Hoboken; Newark; more
- NJ Future – **Mainstreaming Green Infrastructure**
- Jersey Water Works – collaboration on Agenda for Change



# Stormwater/GSI Guidance in NJ – JWW/NJ Future



# Stormwater/GSI Guidance in NJ – Rutgers



## RUTGERS COOPERATIVE EXTENSION WATER RESOURCES PROGRAM

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## GREEN INFRASTRUCTURE GUIDANCE MANUAL

FOR NEW JERSEY

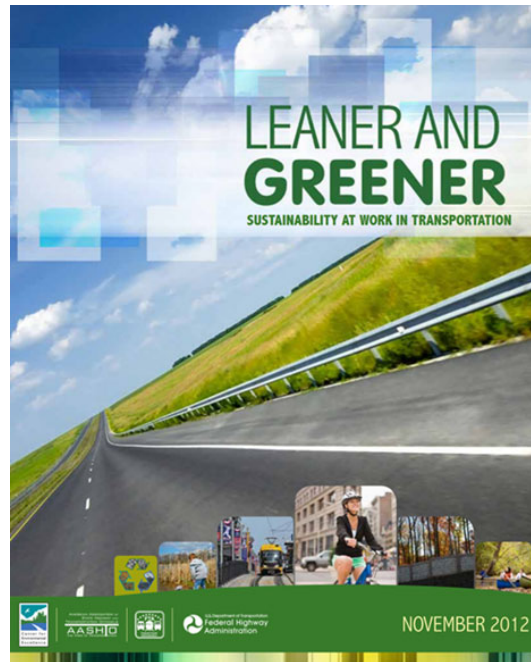
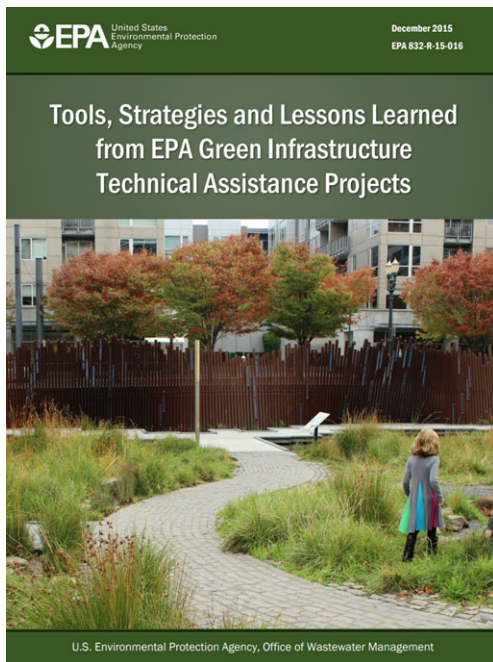


**Green Infrastructure Planning and  
Implementation in New Jersey**  
*Presented to Municipalities Seeking Sustainable Jersey  
Points by Christopher C. Obropta, Ph.D., P.E.  
on September 19, 2018*



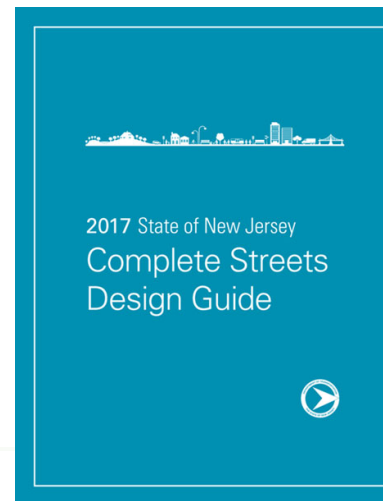


# Stormwater/GSI Guidance – National / Federal



# Complete Streets - NJ

- NJDOT adopted a Complete Streets policy in 2009
- The policy requires that roadway improvement projects include safe **accommodations for all users, including bicyclists, pedestrians, transit riders, and the mobility impaired**
- NJDOT has jurisdiction over less than 10 percent of roadway lane-miles in New Jersey; NJ's municipalities and counties need to join the Complete Streets movement
- A Complete Streets approach emphasizes the **integration of sustainable infrastructure into the design of a street, including stormwater management techniques** (such as rain gardens) that help reduce the impact of stormwater runoff (including pollutants)



# Facilitating Green Infrastructure Implementation

Issue: surface transportation systems, including roadways, railways, sidewalks and alleyways, can be the ***greatest contributor to total imperviousness*** in a given community

Planning & Implementation Actions:

- Local Stormwater ***Plan Review Requirements*** – infiltration, storage, design storm, climate change
- Upgrade development ***codes and ordinances***
- Show benefit through demonstration and pilot projects
- Add greening to capital and transportation projects (to help fund)
- Overlay multi-bureau project plans and scheduled capital improvement projects to identify how public and private projects can achieve ***multiple community and environmental benefits*** through green infrastructure
- Community education and outreach
- ***Stormwater fees – reduce imperviousness, promote disconnection***



## Green Infrastructure Presentations

### Green Infrastructure and Transportation in Neighboring States

- Philadelphia: Elizabeth Svekla, AICP:Planning Manager, Green Stormwater Infrastructure Unit, Philadelphia Water Department
- New York City: Vincent Lee, PE, LEED AP, ENV SP:Associate Principal, Arup

### Green Infrastructure and Transportation in New Jersey

- Hoboken: Jennifer Gonzalez, AICP, CFM, LEED-GA, ENV SP: Director of Environmental Services and Chief Sustainability Officer for the City of Hoboken
- Newark: Robert Thomas,Chief of Energy and Environment in the City of Newark Department of Engineering
- NJ Meadowland: Garrett Avery, Senior Project Manager, AECOM



Thank you !

Sources included: NJF, JWW, Rutgers, Philadelphia Water, State of NJ, TNJ, Univ of New Hampshire

