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Community-based Green Infrastructure Initiative in New Jersey

Rutgers Cooperative Extension Water Resources Program

www.water.rutgers.edu

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Water Resources Program

Our Mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

Program History

- Created in 2002
- Statewide focus
- $1,500,000 annual operating budget
- All grant funded
- Diverse staff
- Effective partnerships
- Measurable impact

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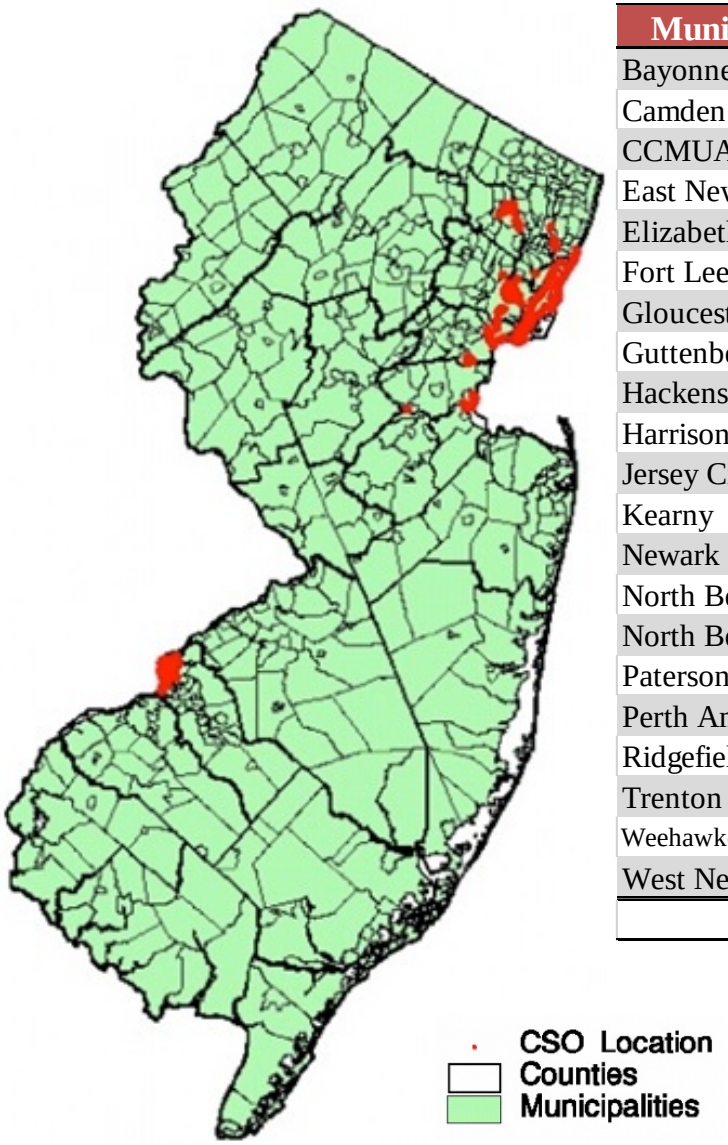
Stormwater Management in New Jersey

Definitions

- Stormwater Best Management Practices (BMPs): structural or non-structural management measures designed to control stormwater runoff

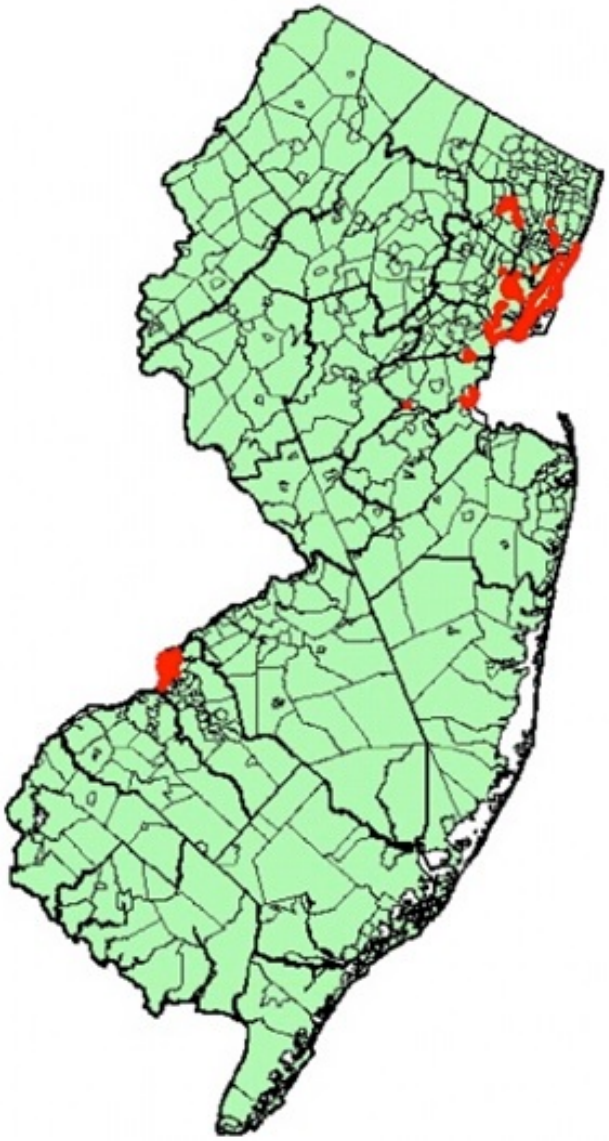
- Stormwater Control Measures (SCMs): name given “BMPs” by professionals conducting research on stormwater related issues

New Jersey's Combined Sewer Communities



Municipality	Permit Holder Entity	County	# CSOs
Bayonne	Passaic Valley Sewerage Commission	Hudson	30
Camden City	Camden County Municipal Utilities Authority	Camden	22
CCMUA	Camden County Municipal Utilities Authority	Camden	1
East Newark	Passaic Valley Sewerage Commission	Hudson	1
Elizabeth	Joint Meeting of Essex & Union	Union	29
Fort Lee	Bergen County Utilities Authority	Bergen	2
Gloucester	Camden County Municipal Utilities Authority	Camden	7
Guttenberg	North Bergen Municipal Utilities Authority-Woodcliff	Hudson	1
Hackensack	Bergen County Utilities Authority	Bergen	2
Harrison	Passaic Valley Sewerage Commission	Hudson	7
Jersey City	Passaic Valley Sewerage Commission	Hudson	21
Kearny	Passaic Valley Sewerage Commission	Hudson	5
Newark	Passaic Valley Sewerage Commission	Essex	18
North Bergen	North Bergen Municipal Utilities Authority-Woodcliff	Hudson	1
North Bergen	Passaic Valley Sewerage Commission	Hudson	9
Paterson	Passaic Valley Sewerage Commission	Passaic	23
Perth Amboy	Middlesex County Utilities Authority	Middlesex	16
Ridgefield Park	Bergen County Utilities Authority	Bergen	6
Trenton	Trenton	Mercer	1
Weehawken/Hoboken	North Hudson Sewerage Authority-Adams	Hudson	8
West New York	North Hudson Sewerage Authority-West NY	Hudson	2
Total			**212**

New Jersey's Municipal Separate Storm Sewer (MS4) Communities



- 456 Tier A Stormwater Permits
- 99 Tier B Stormwater Permits (mostly rural municipalities)
- 75 Public Complex Stormwater
- 33 County and State Highway Stormwater Permits

Interesting Facts

- New Jersey is 8,723 square miles
- Population is 8,864,590 (1,170.64/mi2)*
- 1,055 square miles of impervious cover = 12.1%
- One inch of rain = 18.2 billion gallons
- 90% of NJ's rivers are impaired

* CT population density is 722.65/mi

Green Infrastructure is…

… an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly.

Green infrastructure projects:

- capture
- filter
- absorb, and
- reuse

stormwater to restore the natural water cycle.

Addressing Impervious Cover

Can we eliminate it?

Can we change it?

Can we disconnect it?

Can we reuse it?

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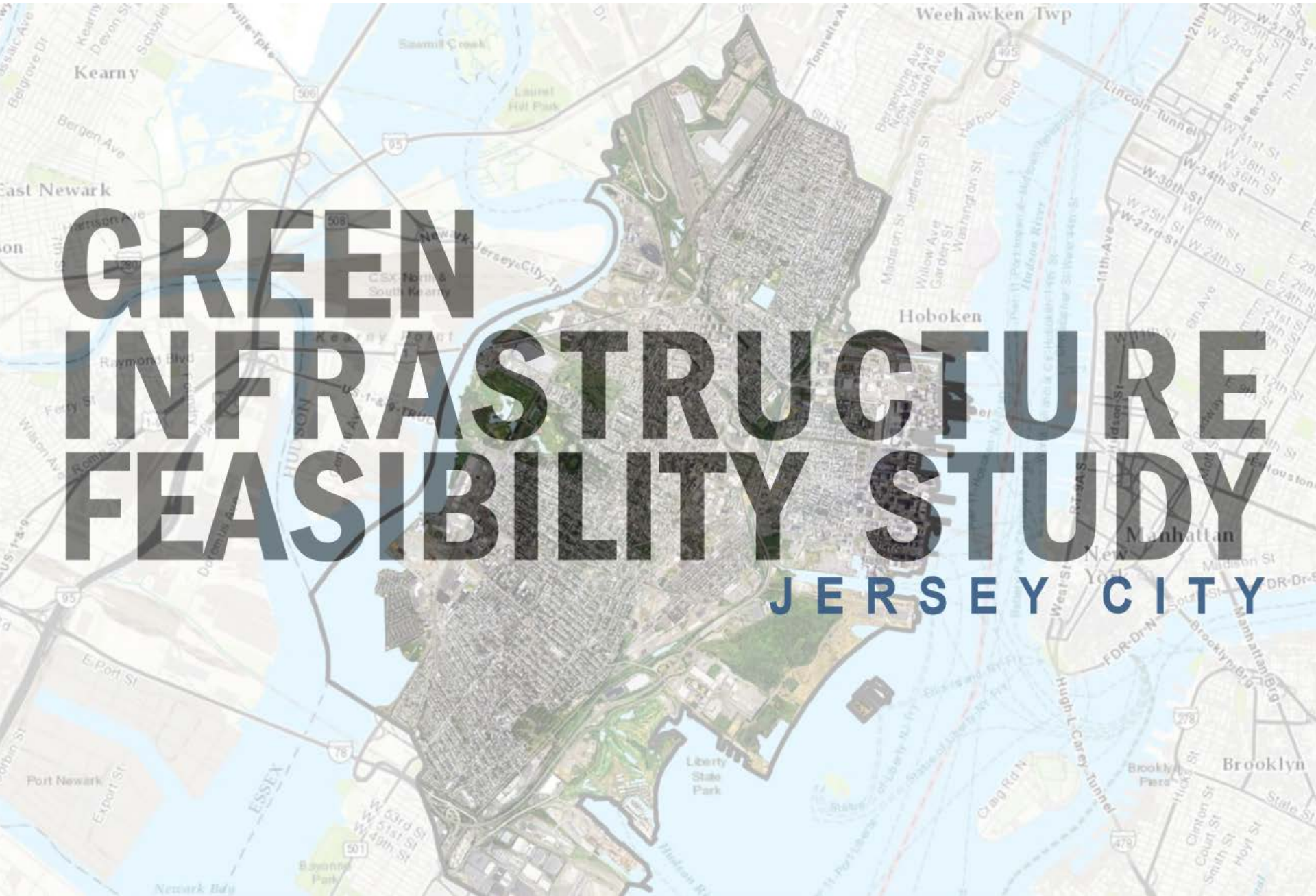
Green Infrastructure Programs

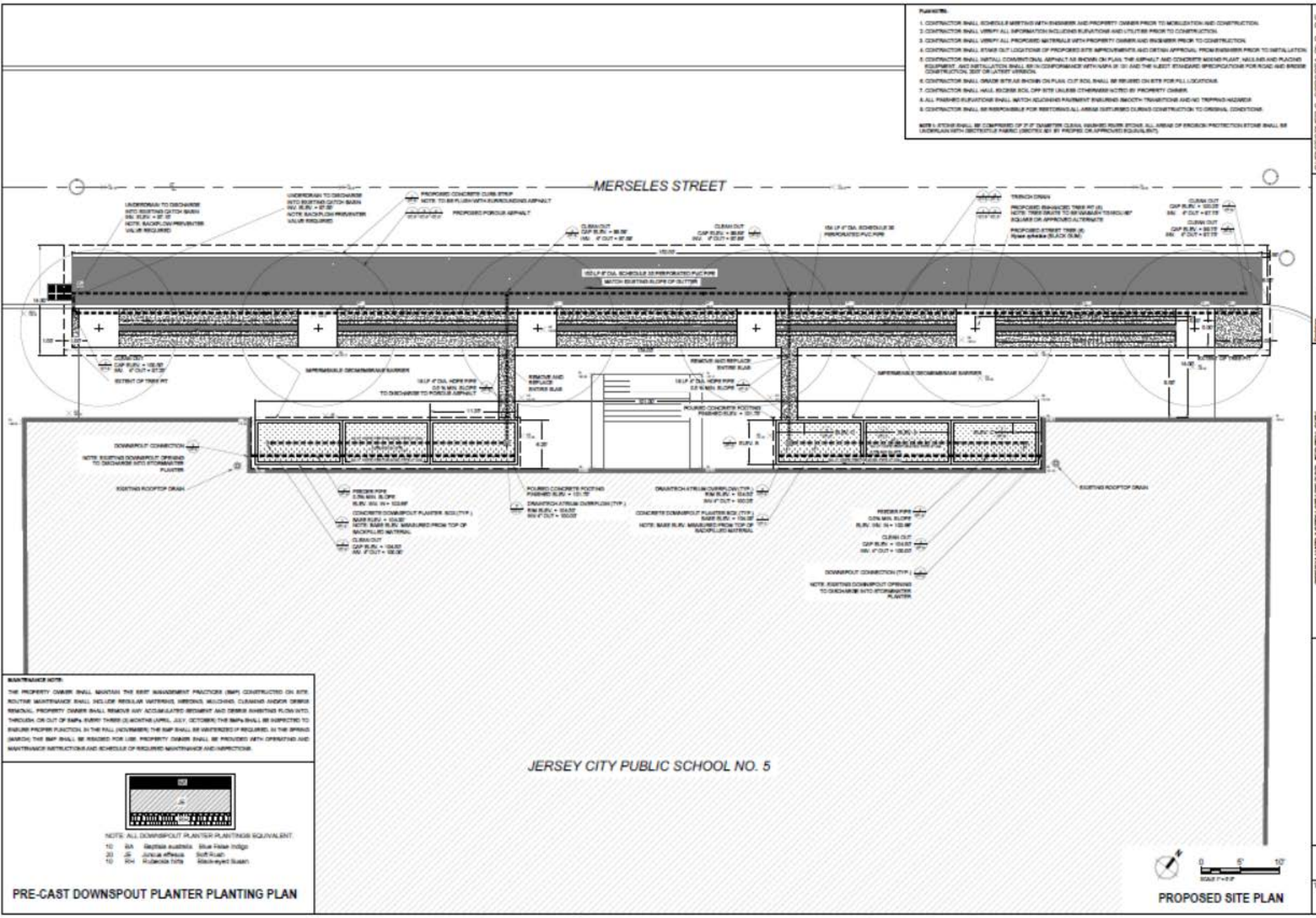
New Jersey Technical Assistance Program for CSO Communities

- Creating municipal action team for green infrastructure
- Conducting education and outreach programs for a variety of audiences (dischargers, politicians, residents, businesses, community groups)
- Developing Green Infrastructure Feasibility Studies
- Designing demonstration projects
- Soliciting funding including NJ Environmental Infrastructure Trust (EIT) Loan applications



GREEN INFRASTRUCTURE FEASIBILITY STUDY

JERSEY CITY

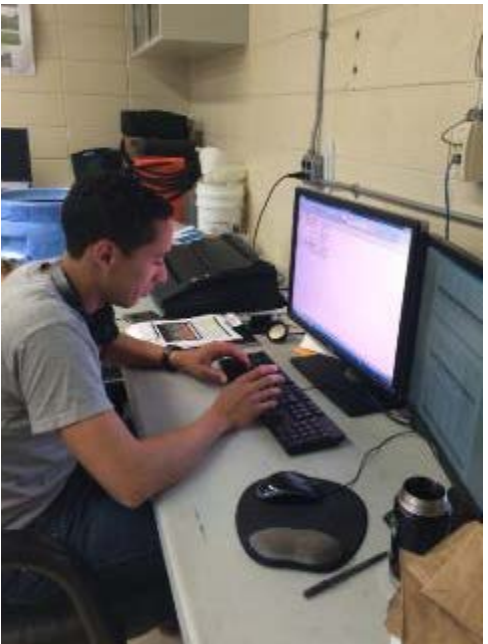

MERSELES STREET
JERSEY CITY PUBLIC SCHOOL NO. 5
PRE-CAST DOWNSPOUT PLANTER PLANTING PLAN
PROPOSED SITE PLAN
GREEN INFRASTRUCTURE FOR JERSEY CITY
PUBLIC SCHOOL NO. 5
RUTGERS

Dr. Michael Conti School #5 - Before

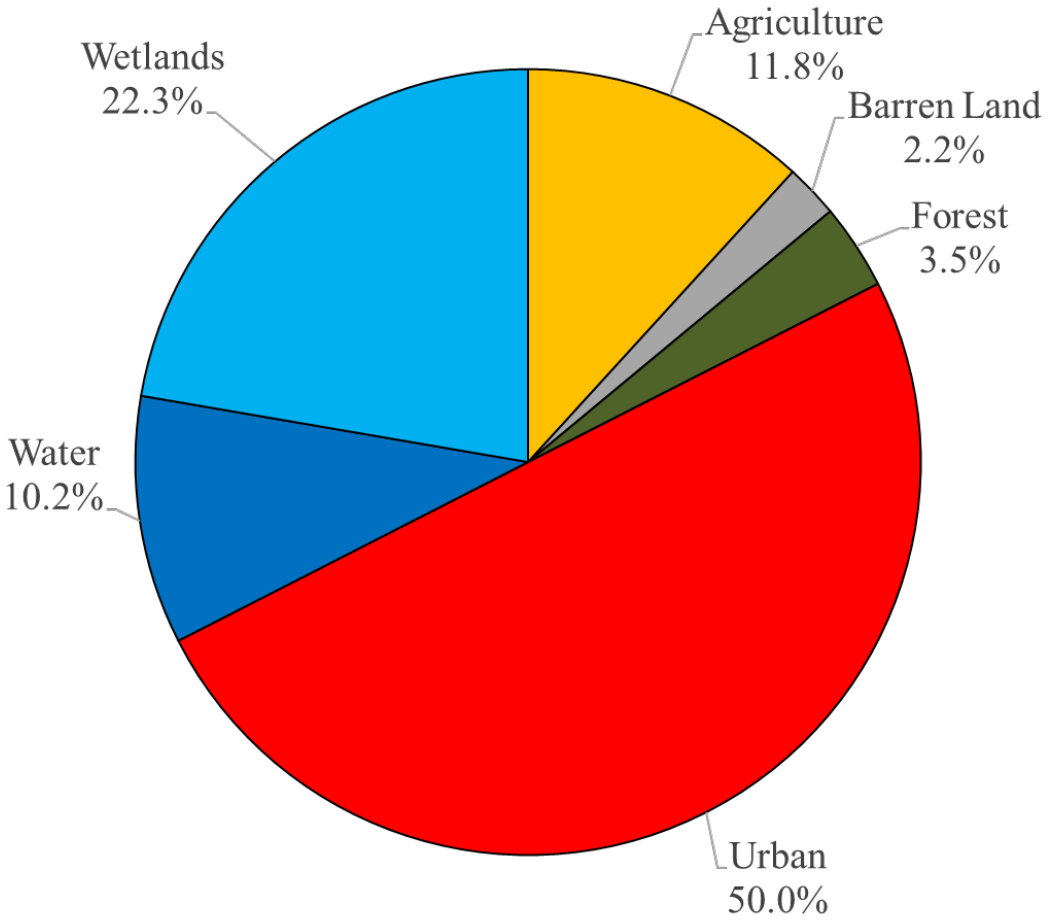
Dr. Michael Conti School #5 - After

Stormwater Management for Impervious Surfaces

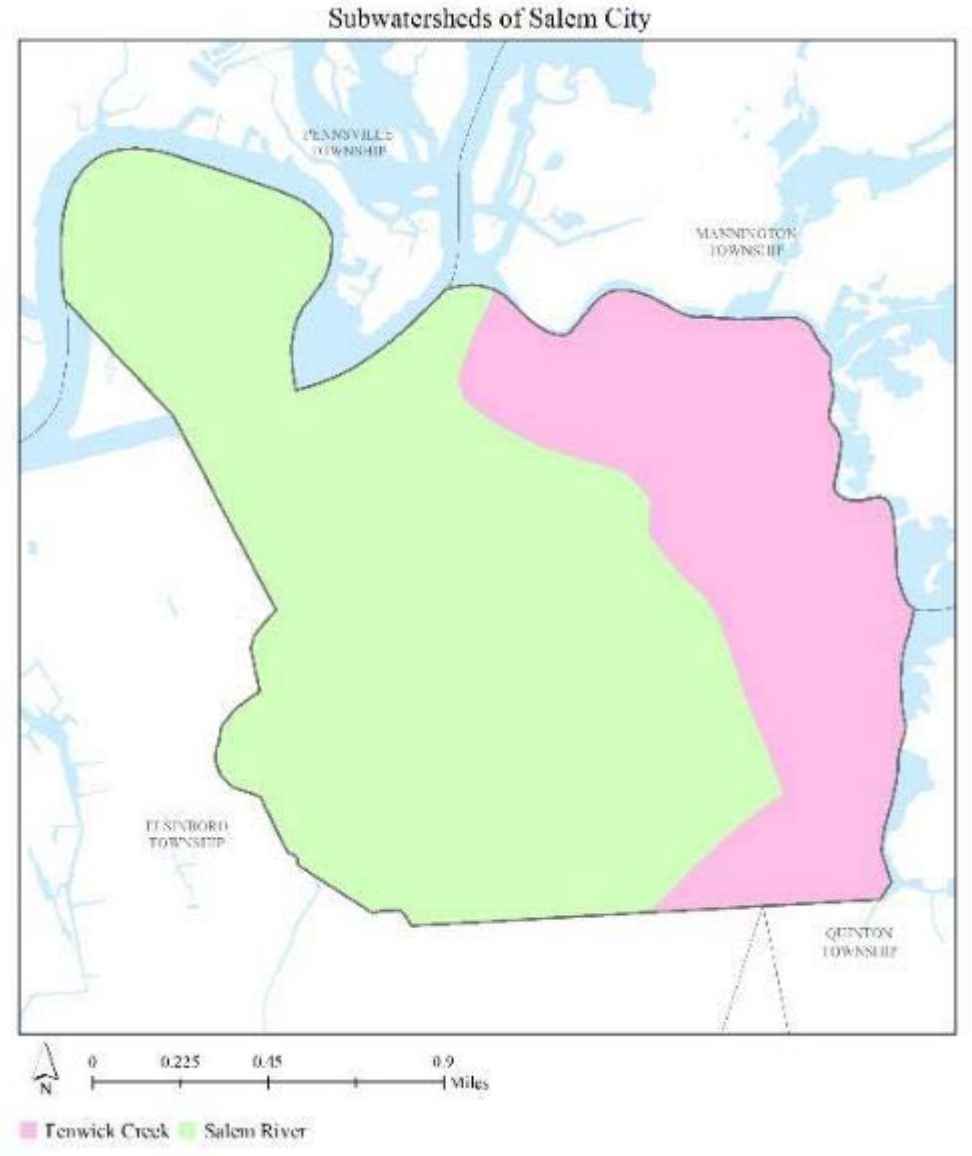
- Conducting Impervious Cover Assessments (ICAs)
- Hosting community meetings and delivering workshops
- Developing Impervious Cover Reduction Action Plans (RAPs)
- Designing and implementing demonstration projects
- Updating ordinances, building codes, and master plans



Impervious Cover Assessment (ICA)



Impervious Cover Assessment (ICA)

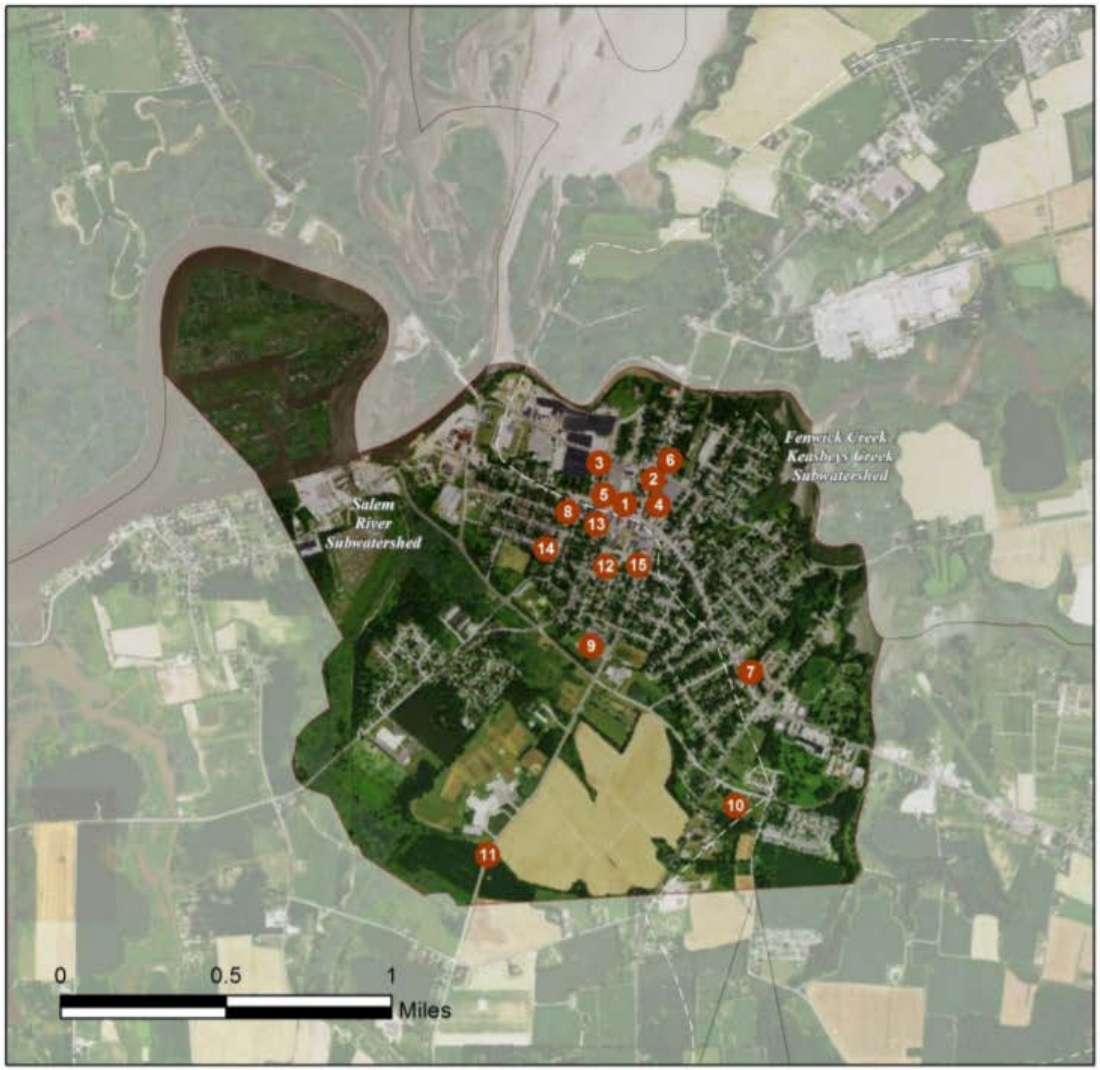


Impervious Cover Assessment (ICA)

Subwatershed	Total Area	Impervious Cover	
	(acres)	(acres)	(%)
Fenwick Creek	549.1	168.8	34.3%
Salem River	1,212.3	171.3	15.7%
Total	1,761.4	340.2	21.5%

Impervious Cover Reduction Action Plan (RAP)

SALEM CITY: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE FENWICK CREEK/ KEASBEYS CREEK SUBWATERSHED:

1. First Baptist Church
2. First Presbyterian Church
3. Liberty Fire Company
4. Salem County Courthouse
5. Salem Post Office
6. St. John's Episcopal Church
7. Washington Fire Company

SITES WITHIN THE SALEM RIVER SUBWATERSHED:

8. Broadway United Methodist Church
9. John Fenwick Elementary School
10. Mount Zion Baptist Church
11. Salem High School
12. Salem Middle School
13. Salem Police Department
14. St. Mary's Regional School
15. Union Fire Company No. 21

JOHN FEWICK ELEMENTARY SCHOOL

Subwatershed: Salem River

Site Area: 381,920 sq. ft.

Address: 183 Smith Street
Salem, NJ 08079

Block and Lot: Block 83, Lot 6

Bioretention systems may be installed to reduce stormwater runoff and can be used as landscaping for the school. A cistern near the mobile classroom can capture rainwater that can be reused for irrigation or classroom functions. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
36	138,002	6.7	69.7	633.6	0.108	3.78

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.094	16	6,934	0.26	725	$3,625
Rainwater harvesting	0.054	9	3,949	0.15	2,000 (gal)	$4,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

John Fenwick Elementary School

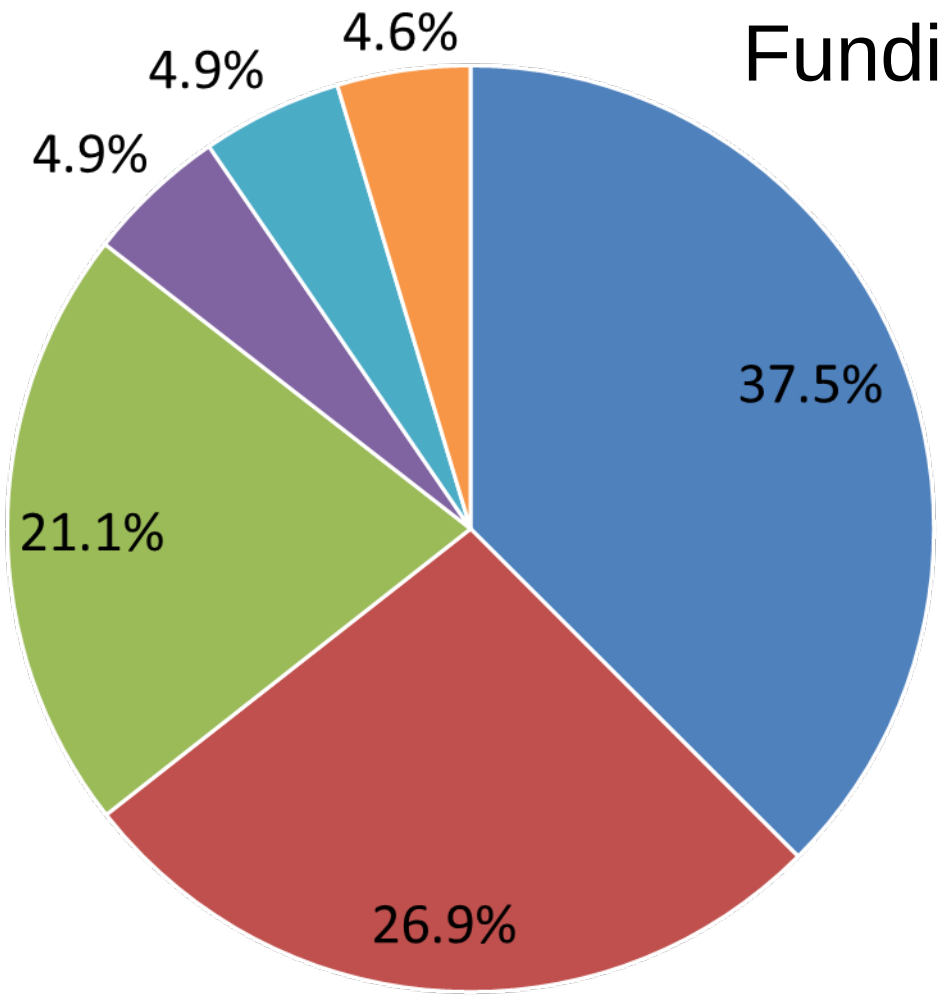
- bioretention system
- rainwater harvesting
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 100' 200'

Stormwater Management in Your Schoolyard

- Delivering K-12 educational programs
- Engaging student in design process
- Building GI Practices on school properties
- Assisting with green certification for schools

Funding Sources



Funding Sources

- Camden County Municipal Utilities Authority (CCMUA)
- Passaic Valley Sewerage Commission (PVSC)
- NJ Department of Environmental Protection 319(h) Program
- NJ Sea Grant
- Surdna Foundation
- Geraldine Dodge Foundation
- Hamilton Township
- Association of New Jersey Environmental Commissions
- North Jersey Resource Conservation and Development Program

The Process…

- Green Infrastructure Feasibility Plan
- Project Partner Meetings
- Developing a Municipal Action Team
- Site Investigations
- Surveys
- Design
- Funding & Contracting
- Education & Training

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Municipal Action Teams

Strong Community Engagement

What is a municipal action team?

- A municipal action team is a collaborative group of local government officials, utility authorities, residents, and community organizations.
- Together these groups work to set an agenda for a community-based green infrastructure initiative.

Municipal Action Team

- The goal of the action team is to **foster collaboration** and **collective action** that helps the municipality speak with a common voice to achieve a common go
  *(Collective Impac
  Approach)*
- The g
  improv
  infrastru
  solution t
  stormwate
  communities

Scott already stole my thunder on this topic

Camden SMART Initiative
Stormwater Management and Resource Training

Examples of Municipal Action Teams in New Jersey

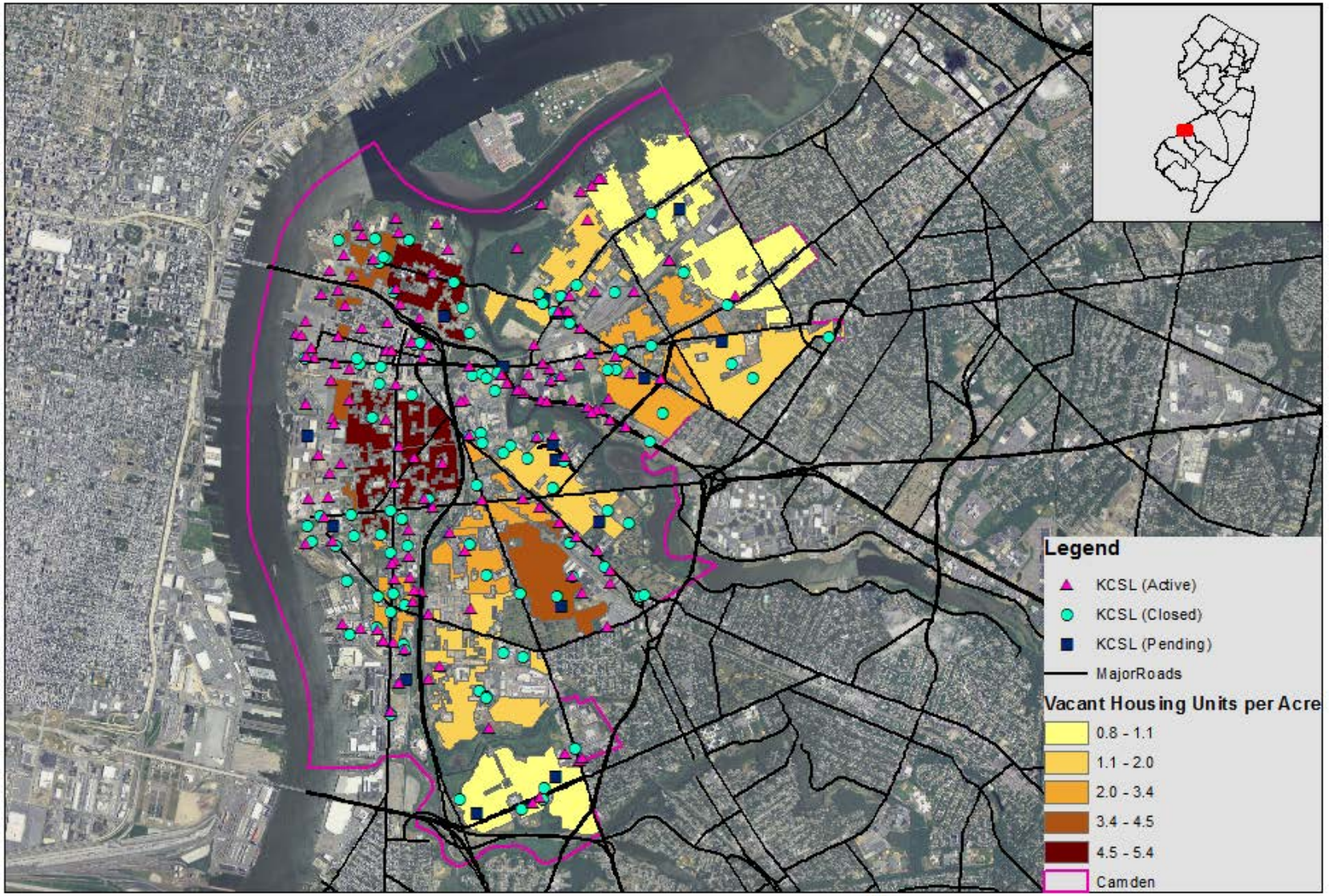
CAMDEN SMART EST. 2010

(Backbone Support: Camden County Municipal Utilities Authority)

City of Camden

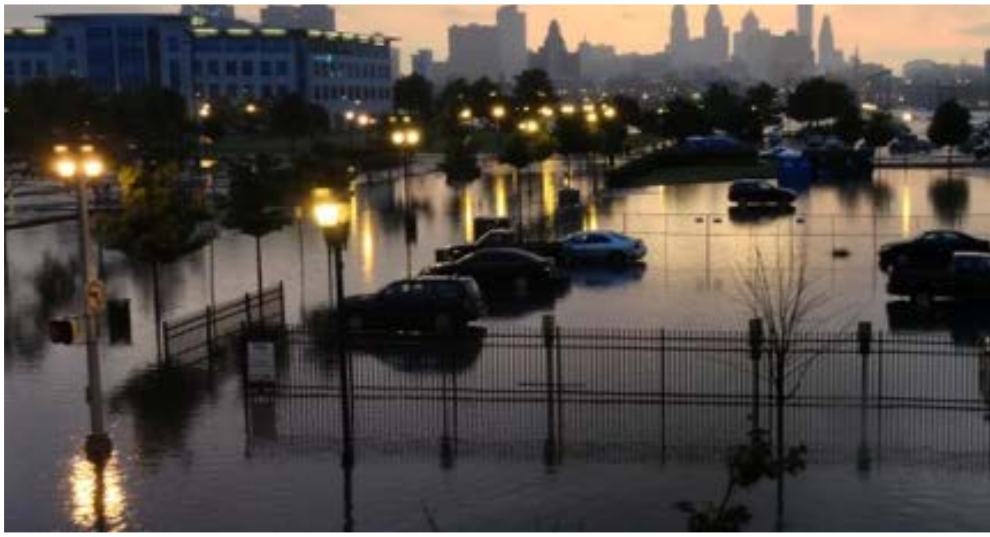
- Located across the Delaware River from Philadelphia
- In the early 20th Century, thriving city with RCA Victor and New York Shipbuilding Corporation
- Home to several institutions of higher learning: Rutgers-Camden University, Rowan University, Cooper Hospital
- Today, many areas of the city are vacant and is nationally recognized by its struggles with crime and poverty

Camden Contaminated Sites and Vacant Housing Units



DRAFT September 2013

City of Camden's Struggle with Stormwater



The Camden SMART Team

City of Camden

Cooper's Ferry Partnership

NJ Department of Environmental Protection

RCE Water Resources Program

Camden County Municipal Utilities Authority

NJ Tree Foundation

Camden SMART Goals

- Community Education
- Creating a Sustainable Network
- Green & grey infrastructure project implementation
- Green infrastructure training

SMART in Numbers

- 47 green infrastructure projects completed
- 1,458 trees planted

- 223 rain barrels distributed

- 4,000 residents engaged

- 40+ partnerships created
- $25 million invested in Camden from 2011-2015

11,126,814+ gallons of stormwater diverted from combined sewer system by grey & green infrastructure


04/25/2014


CAUTION

Examples of Municipal Action Teams in New Jersey

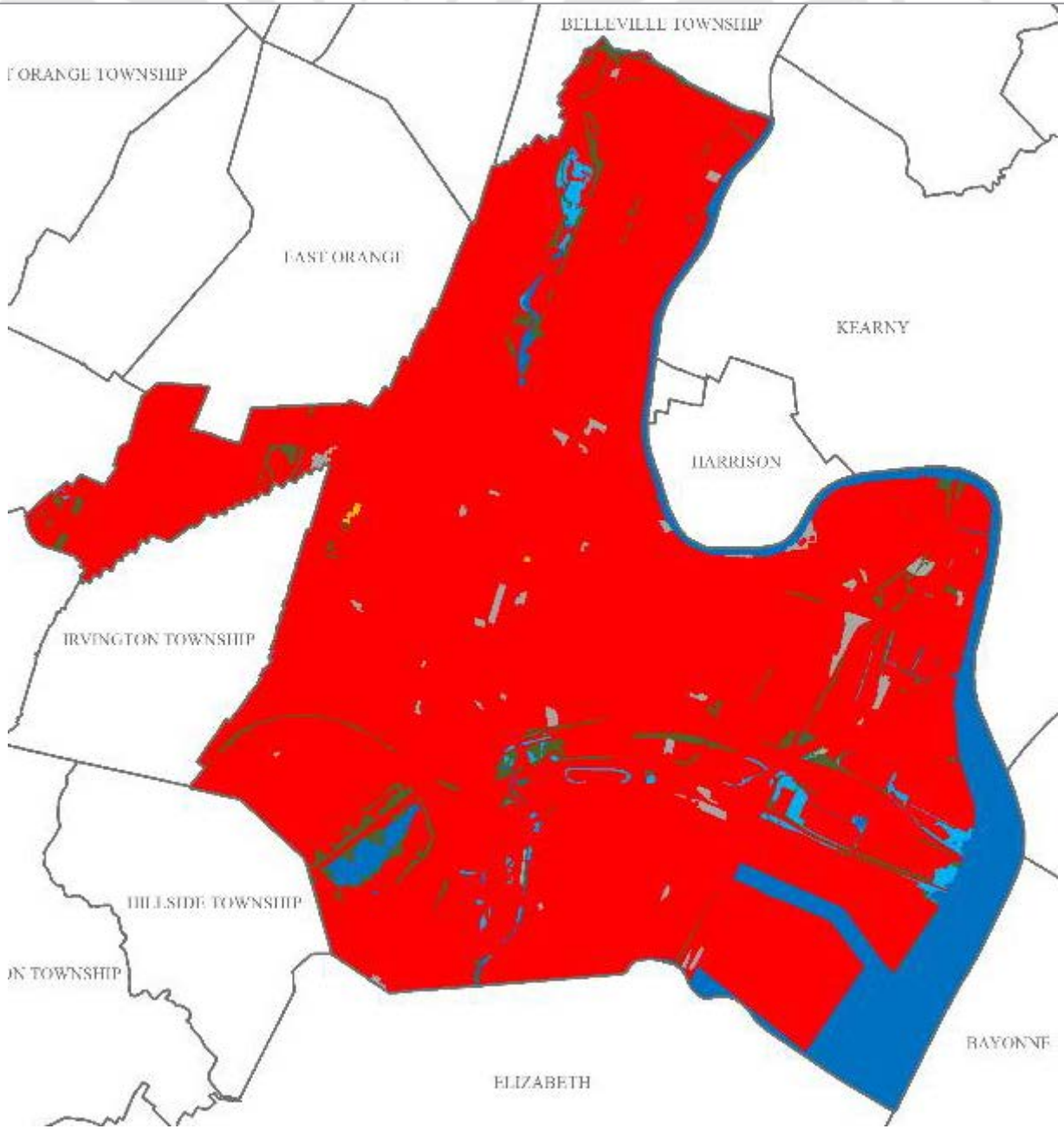
NEWARK DIG EST. 2013

(Backbone Support: Office of Sustainability, City of Newark)

City of Newark

- Bordered by two major water bodies: Passaic River and Newark Bay
- One of the oldest cities in the country
- Newark is the largest city in the State *(26.16 square miles)*
- Over 275,000 residents with a population density of 11,458 per square mile *(most densely populated city in the state)*
- Home to Newark Liberty International Airport and the Port Newark/Elizabeth-Port Authority Marine Terminal, one of the largest container shipping ports in the United States
- Seven major highways pass through the city

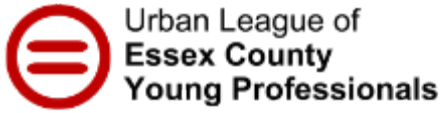
Land Use Types in the City of Newark



Newark's Struggle with Stormwater

The Newark DIG Team

- City of Newark
- Clean Water Action and Clean Water Fund
- Greater Newark Conservancy
- Ironbound Community Corporation
- New Jersey Department of Environmental Protection
- New Jersey Tree Foundation
- NY/NJ Baykeeper
- MnM Consulting
- Passaic Valley Sewerage Commission
- Rutgers Cooperative Extension Water Resources Program
- Trust for Public Land
- Unified Vailsburg Services Organization
- Urban League of Essex County
- Victoria Foundation



Newark DIG Goals

- Our primary goal is the establishment of sustainable green infrastructure as the first line of defense to
  - better manage stormwater runoff
  - improve water quality & resilience to flooding
  - reduce combined sewer overflows (CSOs) with a focus on the Passaic River and its tributaries

DIG in Numbers

- 28 green infrastructure projects implemented
- 2,800+ trees planted

- 93 rain barrels distributed

- 10,000+ doorknockers, postcards, and flyers distributed to residents

- 825+ residents participated in green infrastructure programs

529,262+ gallons of stormwater diverted from combined sewer system by green infrastructure


TREE
PLANTING


PASSAIC
VALLEY
SEWERAG
COMMISS

Recommendations for Successful Public-Private Partnerships

- **Educate** community members through mutually reinforcing activities to build advocacy for sustainable initiatives
- **Involve** the community from the beginning of any planning process to build public acceptance and advocacy
- **Build** relationships with local government officials who will advocate for sustainability initiatives
- **Communicate** with the community through as many means as possible (social media, flyers, face-to-face meetings and workshops)

Camden SMART Initiative

NEWARK DIG doing infrastructure green

PATERSON SMART STORMWATER MANAGEMENT AND RESOURCE TRAINING

PERTH AMBOY SWIM Storm Water Infrastructure Management

JERSEY WATERWORKS

Trenton Green Infrastructure Partners
Gloucester City Environmental Partners

2017 YEAR OF WATER

JERSEY CITY MAKE IT GREEN

TIDE HARRISON
Transforming Infrastructure & Defending our Environment

Extension & Research Needs for Community-based Green Infrastructure Success

- Land Grant University's commitment to urban communities
- National and regional collaboration
- Stronger linkages between research and Extension
- Research on:
  - Human Dimension
  - Economic Impacts
  - Ancillary Benefits
  - Long-term Effectiveness
  - Maintenance

- Visionary Leadership
- Willingness to partner and not always lead

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