



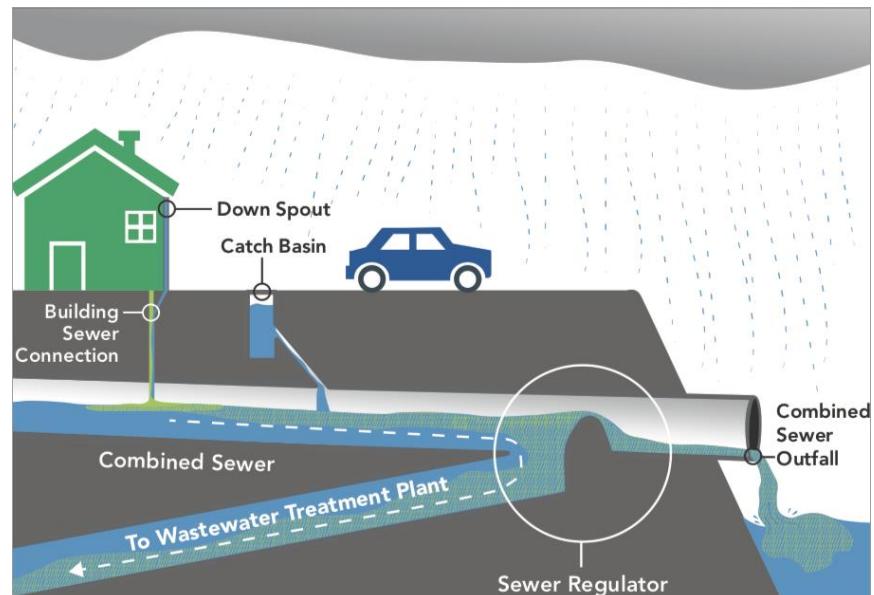
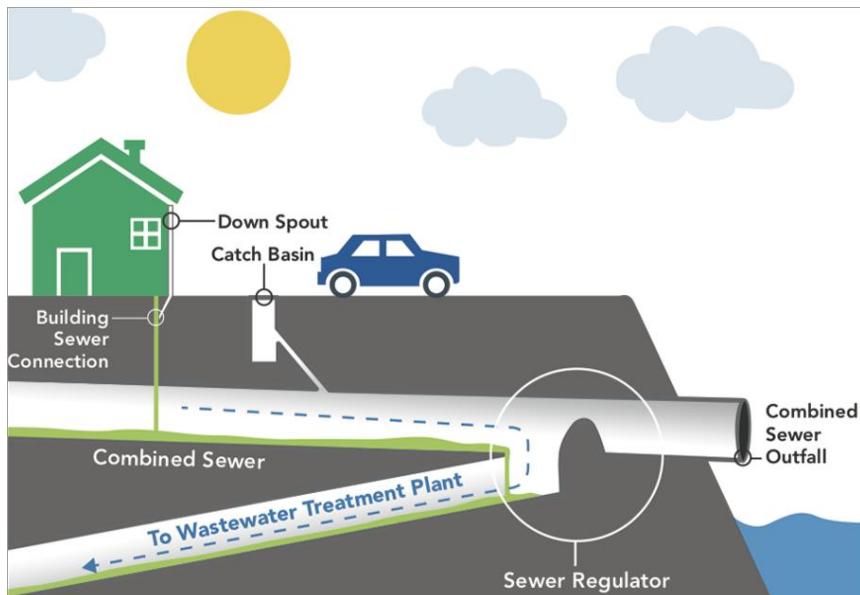
NYC Green Infrastructure Program: Opportunities and Lessons Learned

Pinar Balci, Ph.D., Assistant Commissioner
NYC Department of Environmental Protection

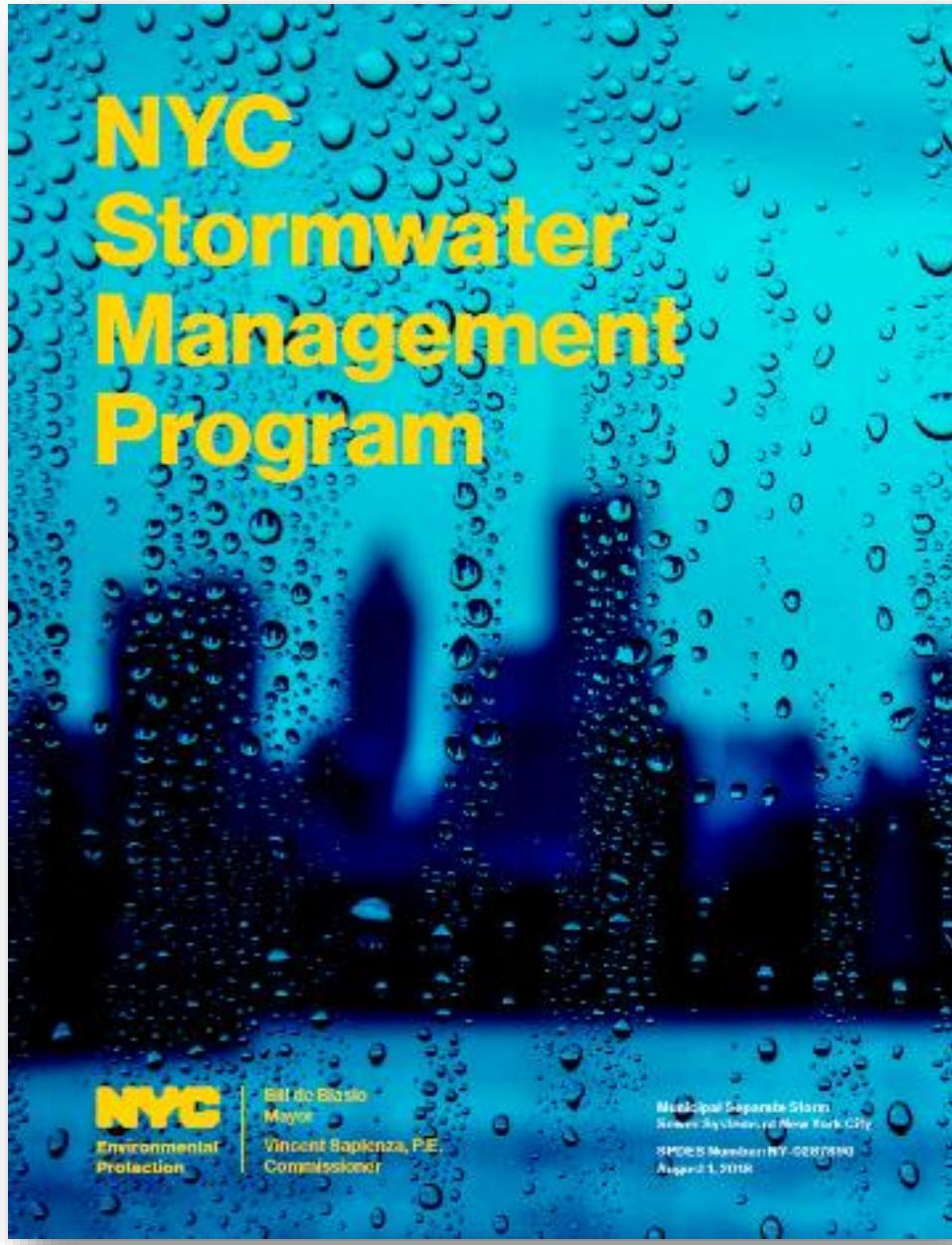
October 17, 2019

Legacy Issues: Combined Sewer Overflow

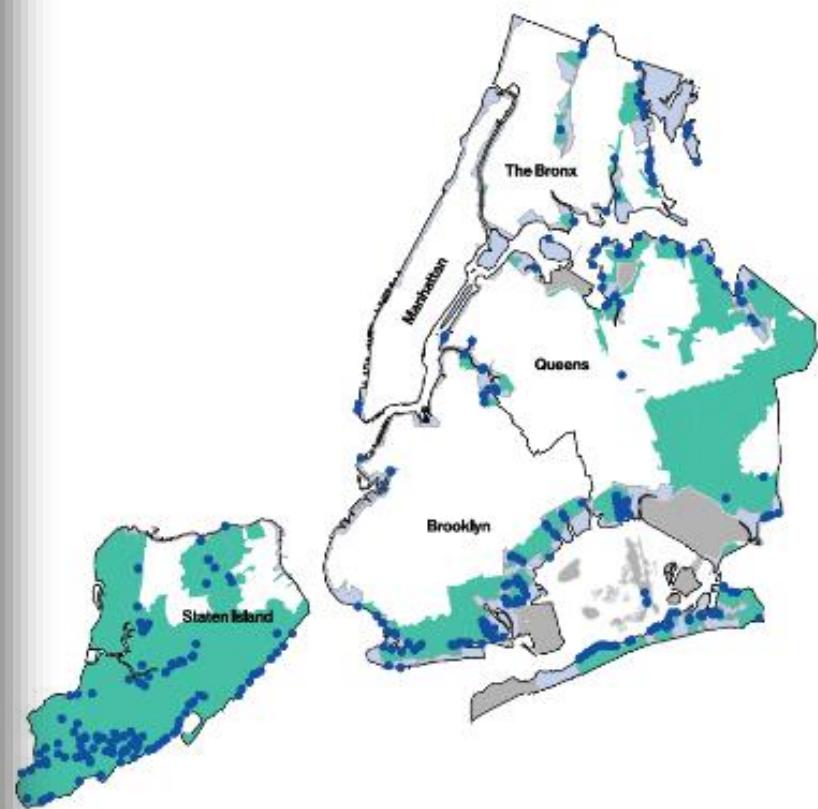
The combined sewer system serves approximately 60% of New York City (by land area), and is a legacy of previous sewage conveyance and treatment technologies



MS4 Permit and Regulations

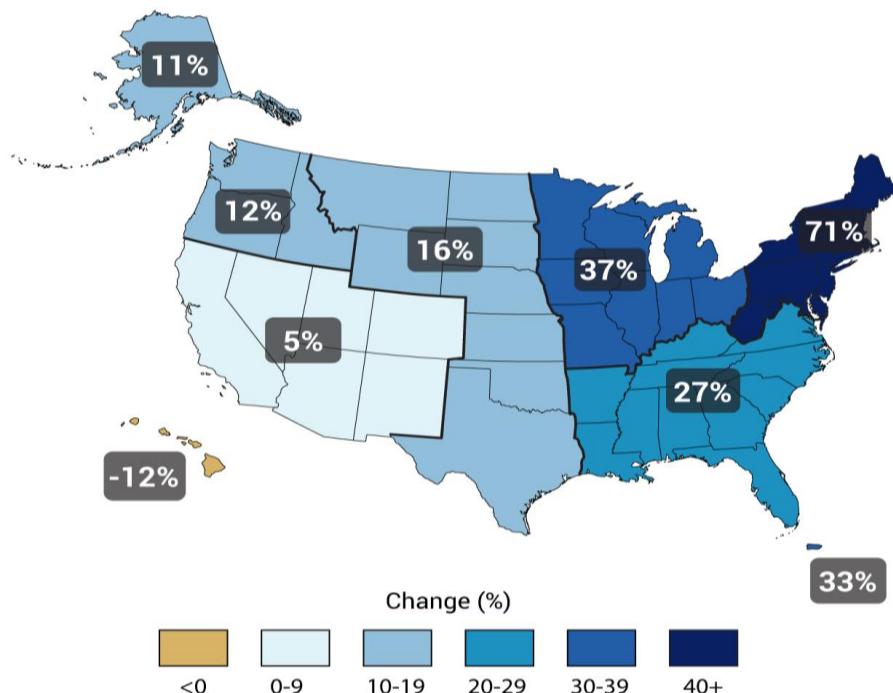


Issued on August 2015
Covers 14 City Agencies



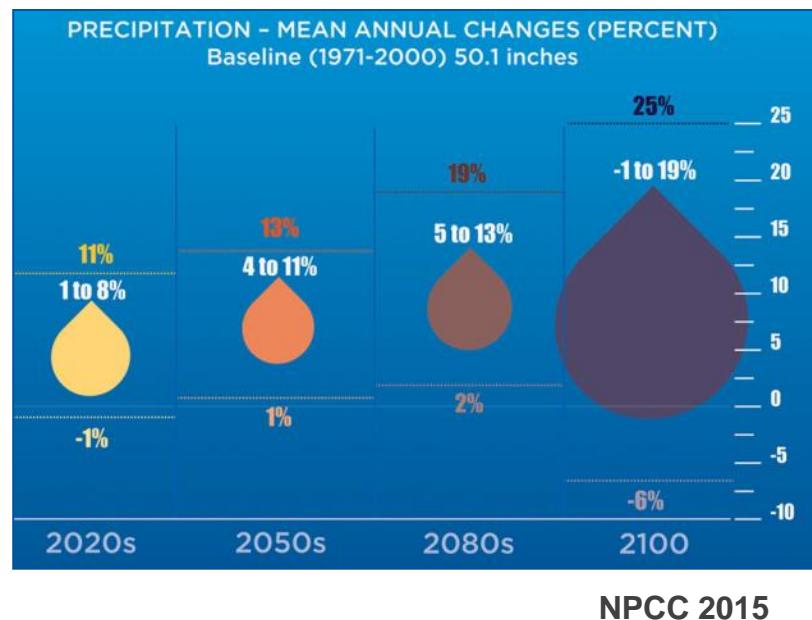
NYC is Getting Wetter – How Do We Adapt?

Intense rainfall is increasing in the Northeast United States



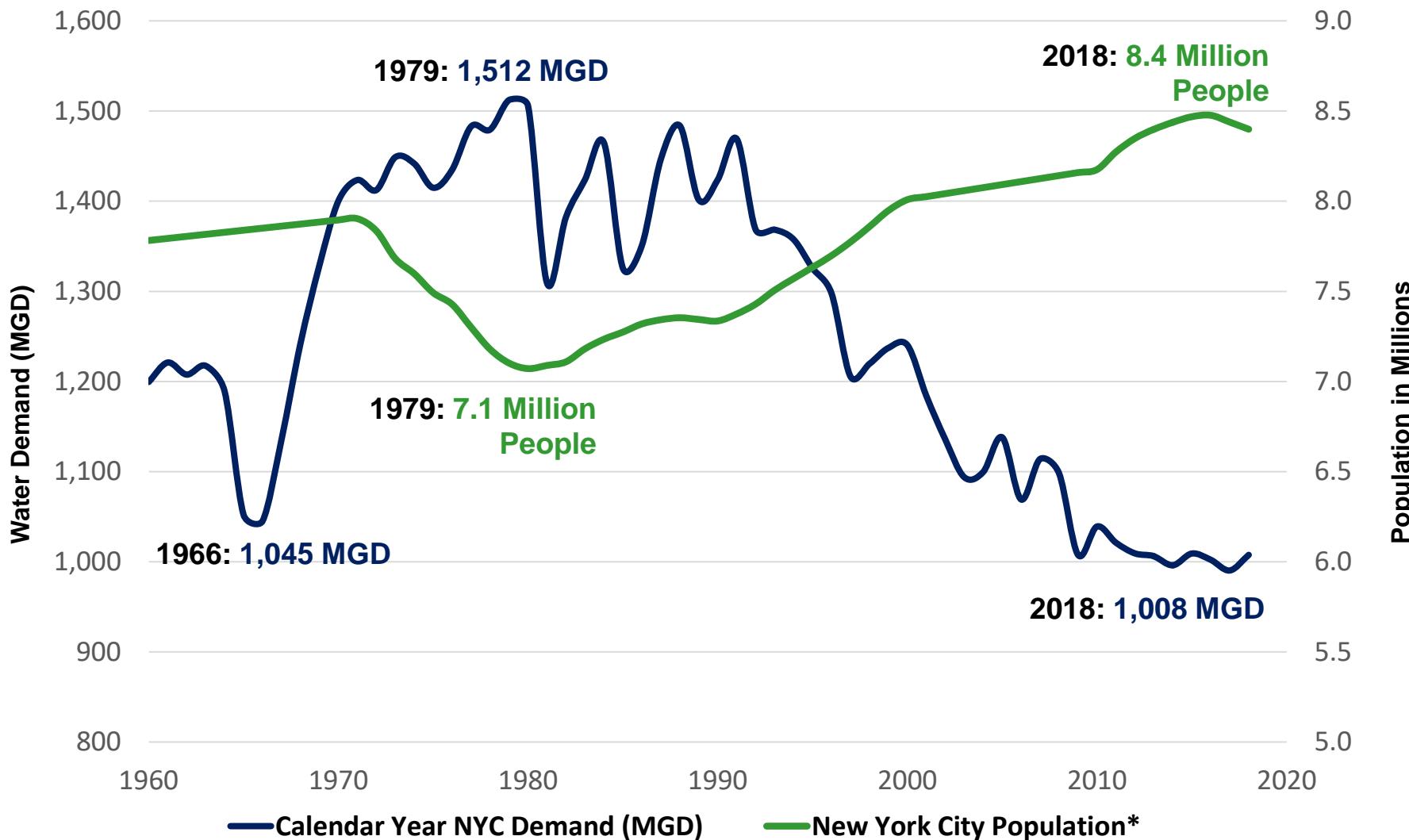
Percent increases in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012 (NCA 2014)

Climate projections show rainfall will continue to increase



Historical Water Demand and Population

Since 2009, average daily demand has been below the 1960s drought-of-record (1,045 MGD), even as population hits record highs. Daily demand peaked in 1979 at over 1.5 billion gallons.



* Official 2018 New York City Department of City Planning Estimate

NYC Green Infrastructure Program



City Sidewalks



City Streets



Public Property Retrofits



Private Property

NYC Green Infrastructure Program



Program Snapshot

Program Budget - Capital

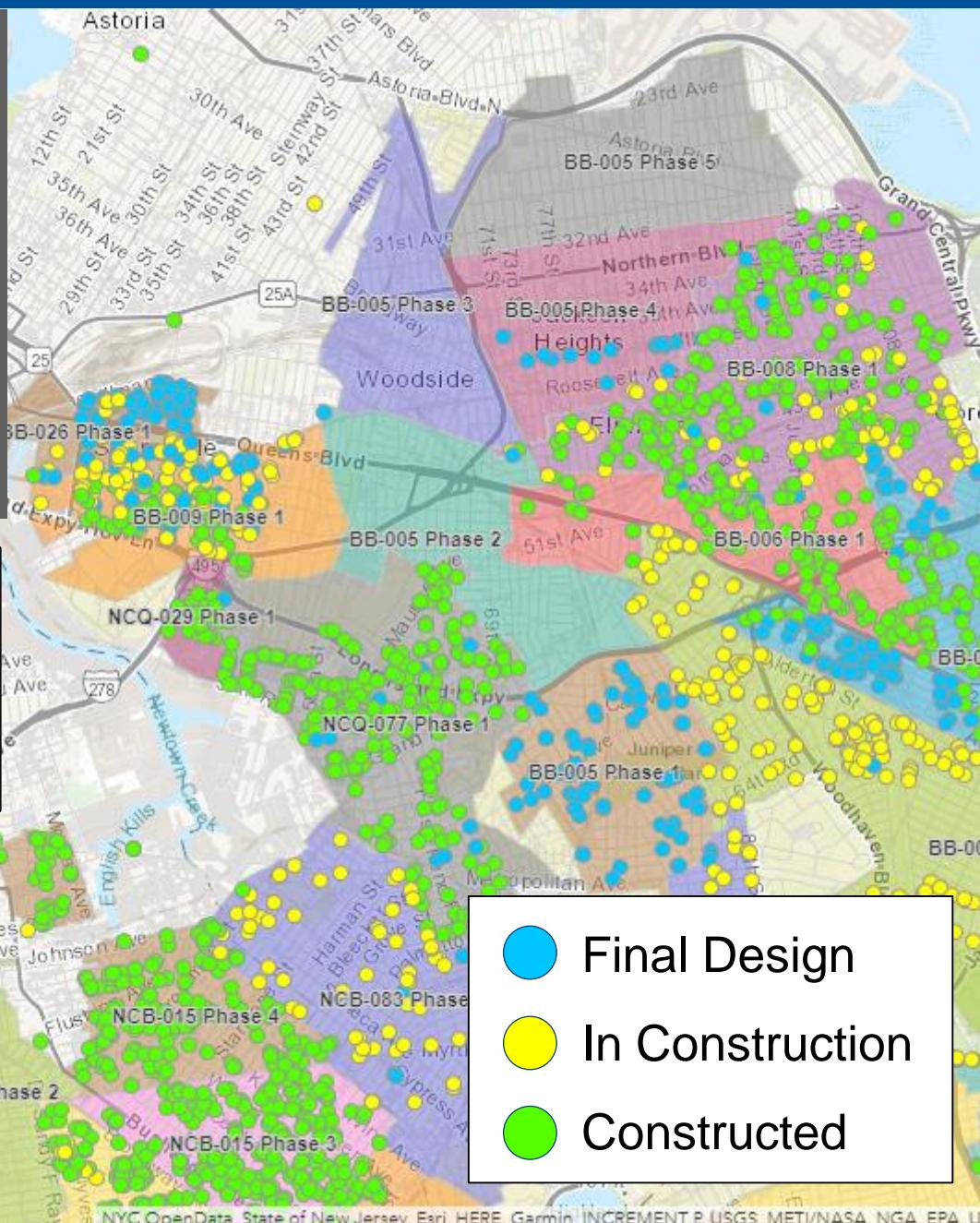
- Over \$700M encumbered
- \$700M budgeted over the next 10 years

Program Budget - Expense (Operating)

- Over \$16M expended
- \$27M budgeted

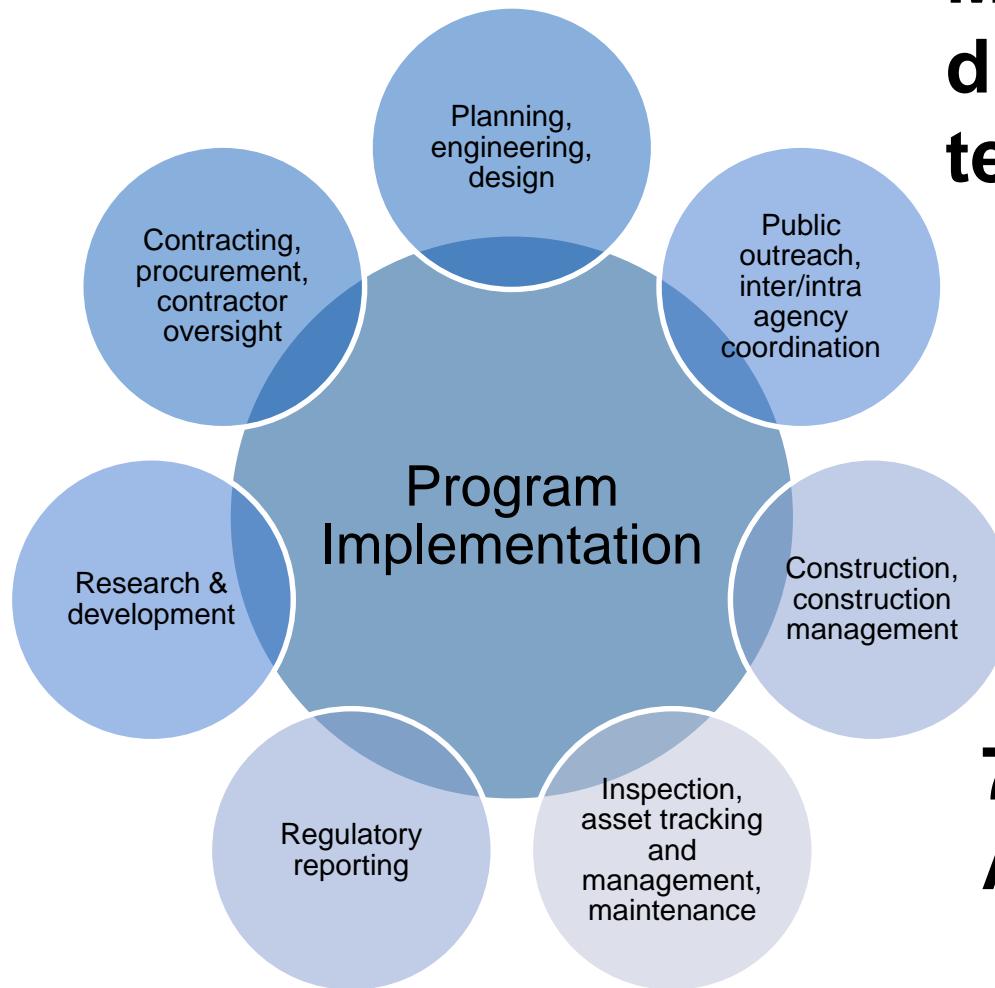
Construction Status:

- Installed over 4,500 GI Assets
- Managed over 591 greened acres as of 2018



Holistic Program Management Approach

**Over 100
staff**

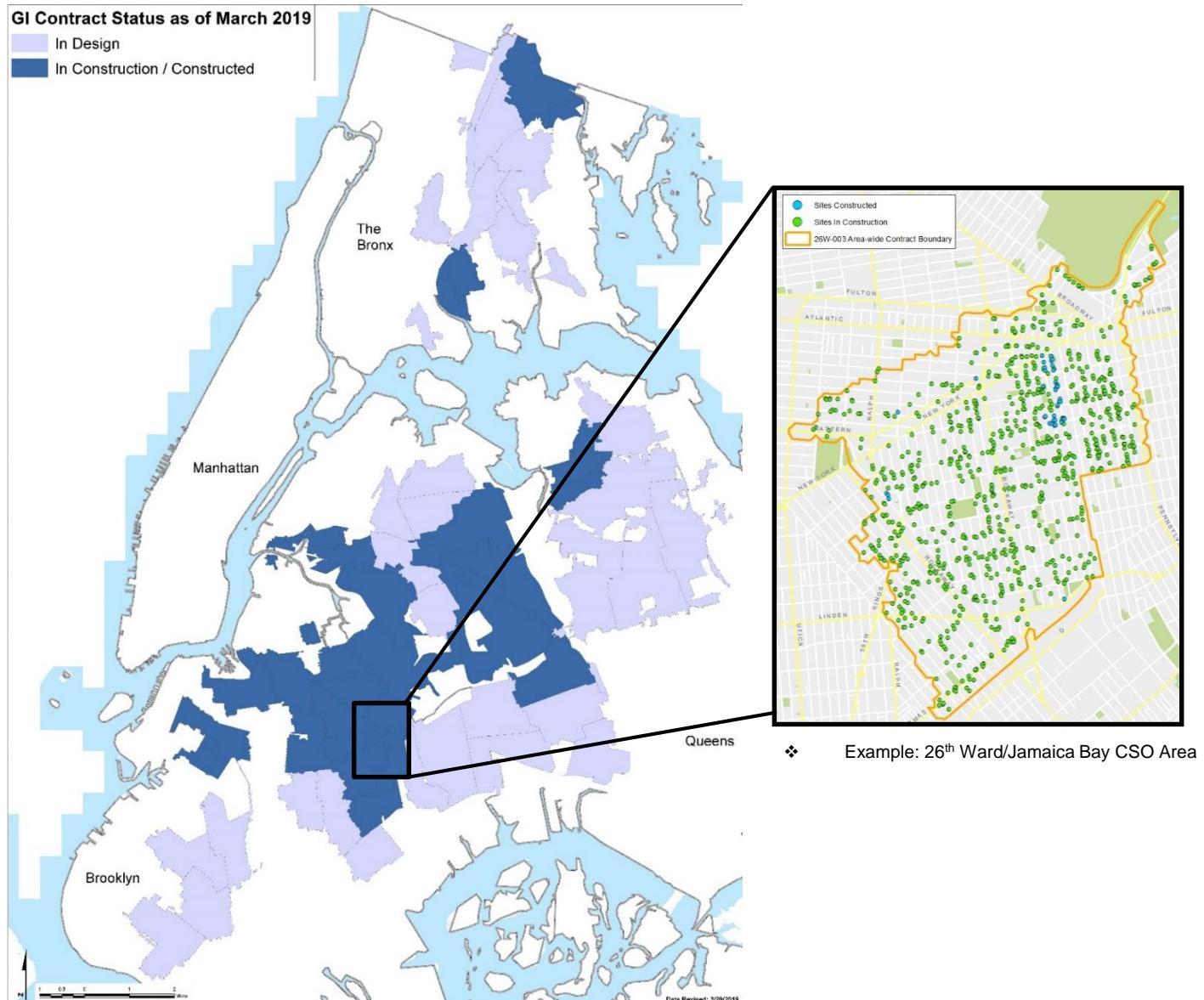


**Multi-
disciplinary
team**

**7 City
Agencies**

Right of Way Implementation

Area-wide
Approach



Right of Way Implementation

- ❖ Over 4,300 rain gardens constructed as of 2018, thousands more on the way
- ❖ Primary component of 2020 507 MGY CSO volume reduction target
- ❖ Standardized and highly replicable toolbox

Public Property Implementation

Key partnerships

- NYC Housing Authority
- NYC Parks
- NYC Department of Education/ NYC School

Construction Authority

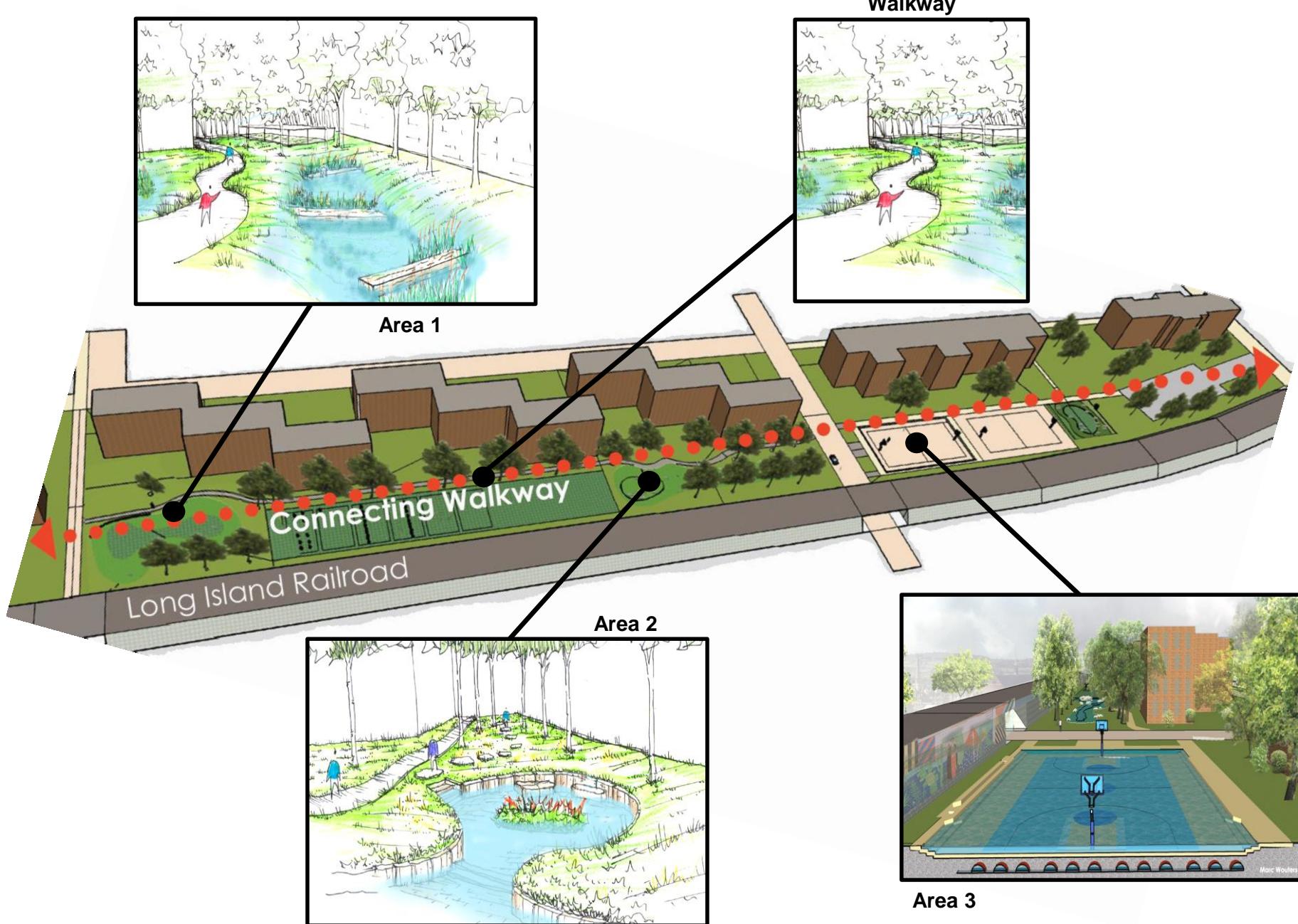
- DDC Public Buildings Portfolio (Library, Fire, Police, Other)



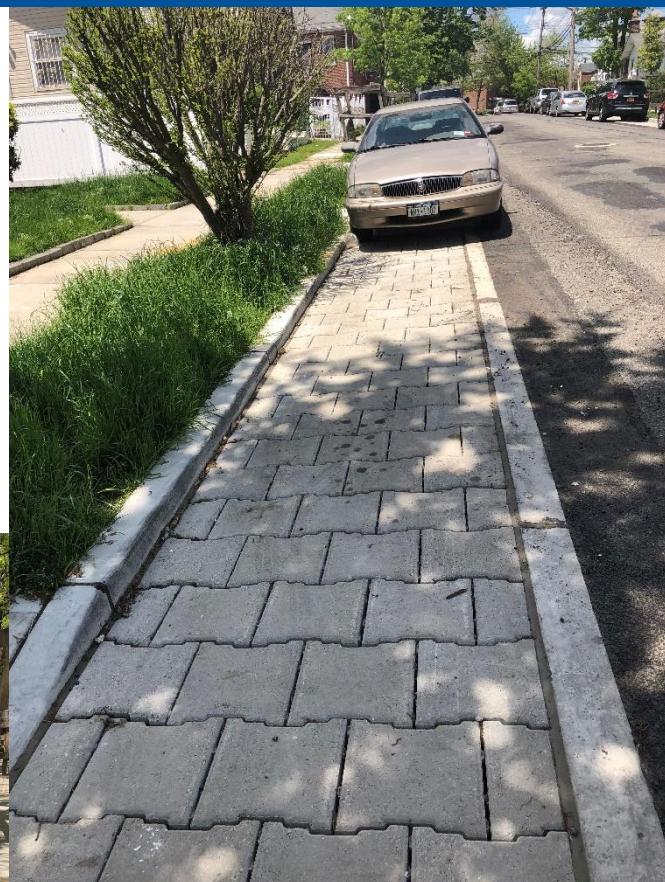
Public Property Implementation

| Project Status | Parks/ Playgrounds | Public Schools | NYCHA Housing | Other Public | Total |
|------------------------------|-----------------------|----------------|------------------|--------------|------------|
| In Construction /Constructed | 39 | 25 | 5 | 2 | 71 |
| In Design | 53 | 35 | 27 | 1 | 116 |
| Potential | 128 | 150 | 27 | 3 | 308 |
| Total | 220 | 210 | 59 | 6 | 495 |

Expanding the Stormwater Toolbox



Expanding the Stormwater Toolbox



Incentives

- Green Infrastructure Grant Program
- Private Incentive Retrofit Program
- Community Grants (GIFT)*

Regulations

- 2012 Stormwater Performance Standard
- MS4 Construction/Post-construction Rule
- Expansion of MS4 rule to CSS area under consideration in 2019

Private Property Implementation

Green Infrastructure Grant Program

- Initiated in 2011
- More than \$13M committed to date to 32 projects
- Expanded citywide in 2017



Private Property Retrofit Program

- ❖ \$53M RFP released Nov 2018
- ❖ Third party administrator implementation
- ❖ 200 Greened Acres in 5 years starting in 2020
- ❖ Properties > 50,000SF

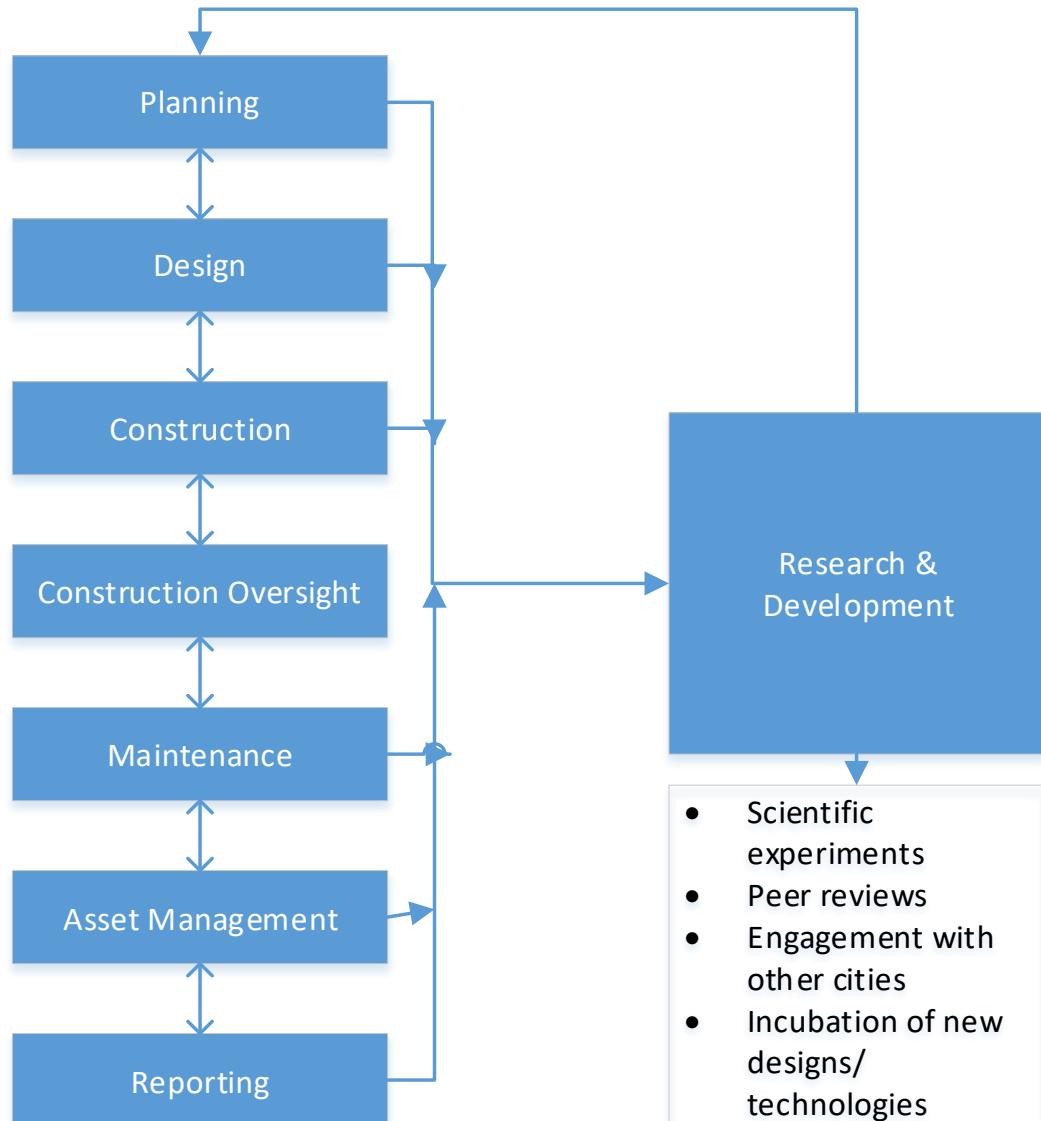


Private Property Implementation

- ❖ 2012 Stormwater Performance Standard
 - ❖ Detention is primary tool
- ❖ MS4 Construction/Post-construction Rule
 - ❖ Reduced 20,000 SF disturbance threshold starting in 2021
 - ❖ Retention of WQv (1.5") required
- ❖ Expansion of MS4 Rule to CSS area under consideration in 2019

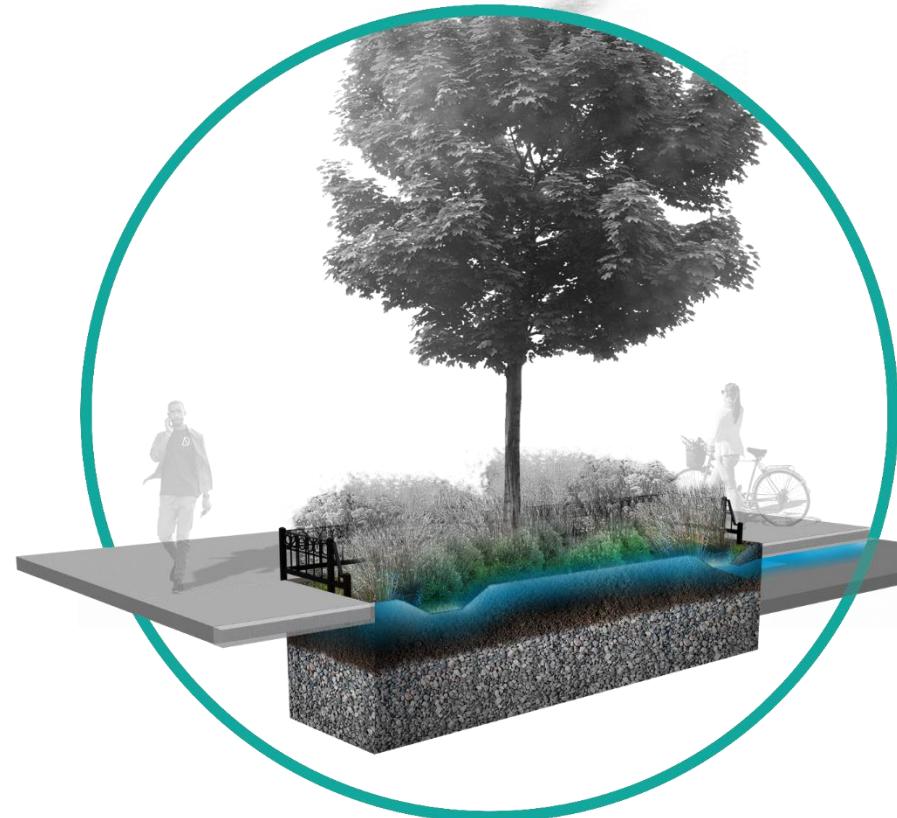
Lesson 1: Feedback loops and evaluation process

Over 75,000 individual locations assessed for green infrastructure in NYC as of 2018



Lesson 2: Traditional infrastructure approaches may not work

- ❖ Rapid implementation –
 - ❖ More than 4000 assets constructed up to date, over 5,000 assets in construction
- ❖ Green infrastructure specific CM training and oversight protocols
- ❖ Emphasis on functionality of systems



Lesson 3: Program flexibility and reprioritization

Phase 1

Phase 2

Phase 3



Lesson 4: Regulatory flexibility and stakeholder coordination

- ❖ DEP's *2016 Performance Metrics Report*
- ❖ Integrated planning
- ❖ Co-benefits
- ❖ Continuous stakeholder engagement through all phases
 - ❖ Online map of all green infrastructure assets
 - ❖ Annual report
 - ❖ Door-to-door outreach in areas with ROW asset investigations and construction

Water Reuse is an Integrated Approach



Stormwater

- Rainwater capture and reuse reduces flow to sewers



Wastewater

- On-site treatment reduces flow to treatment plants and reduces sewage in combined sewer overflows



Drinking Water

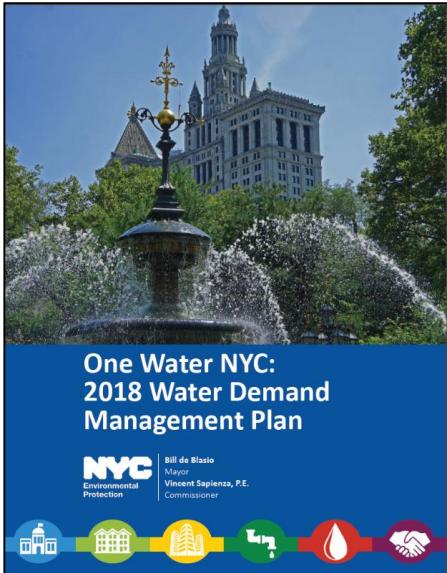
- Helps offset potable water demand



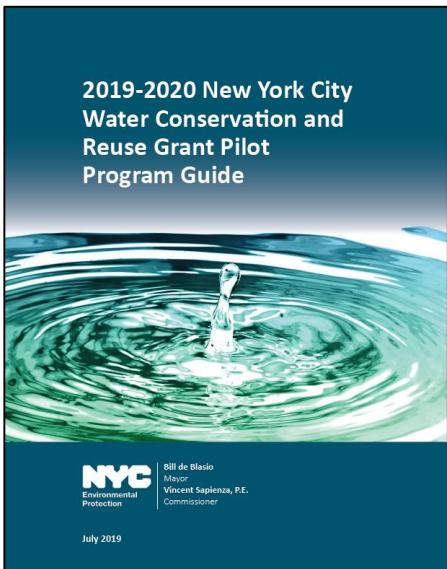
Resiliency

- Provides redundancy during extreme events

Demand Management and Reuse



- DEP's Water Demand Management Program was launched in 2013
- Reduced NYC's demand by 10 million gallons per day (MGD)
- Additional 10 MGD planned by 2022

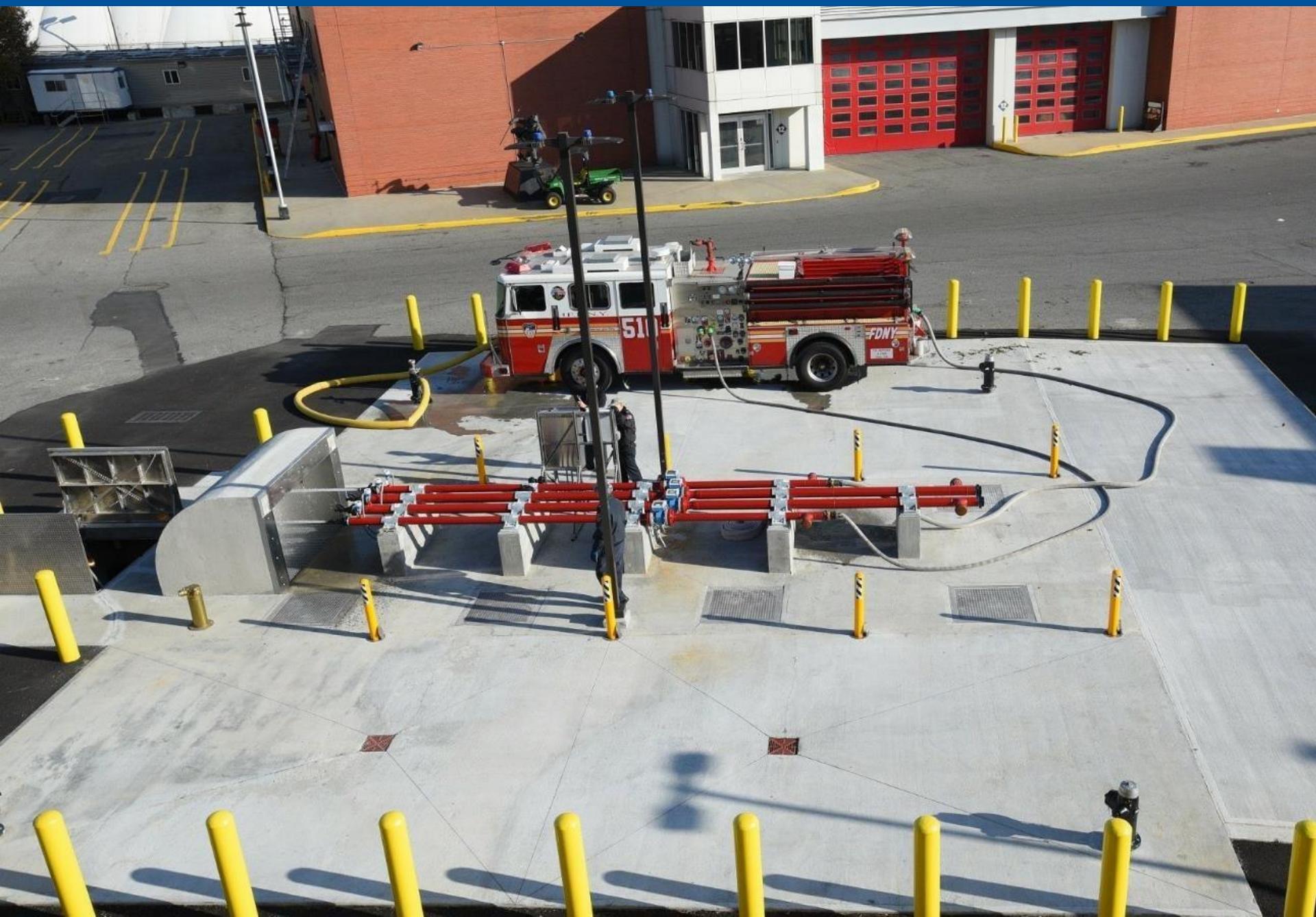


- Reuse is an important part of demand management
- Current water reuse and conservation pilot grant applications are due Oct 1st
 - Reuse is for non-potable uses: including toilets, laundry, cooling towers, drip irrigation
 - On-site water reuse systems and/or fixture retrofits
 - Goal is to reduce demand by 1 MGD by 2022

Reuse in Action: Brooklyn Botanic Garden



Reuse in Action: FDNY Fire Academy



Public Communication and Outreach

Hi!



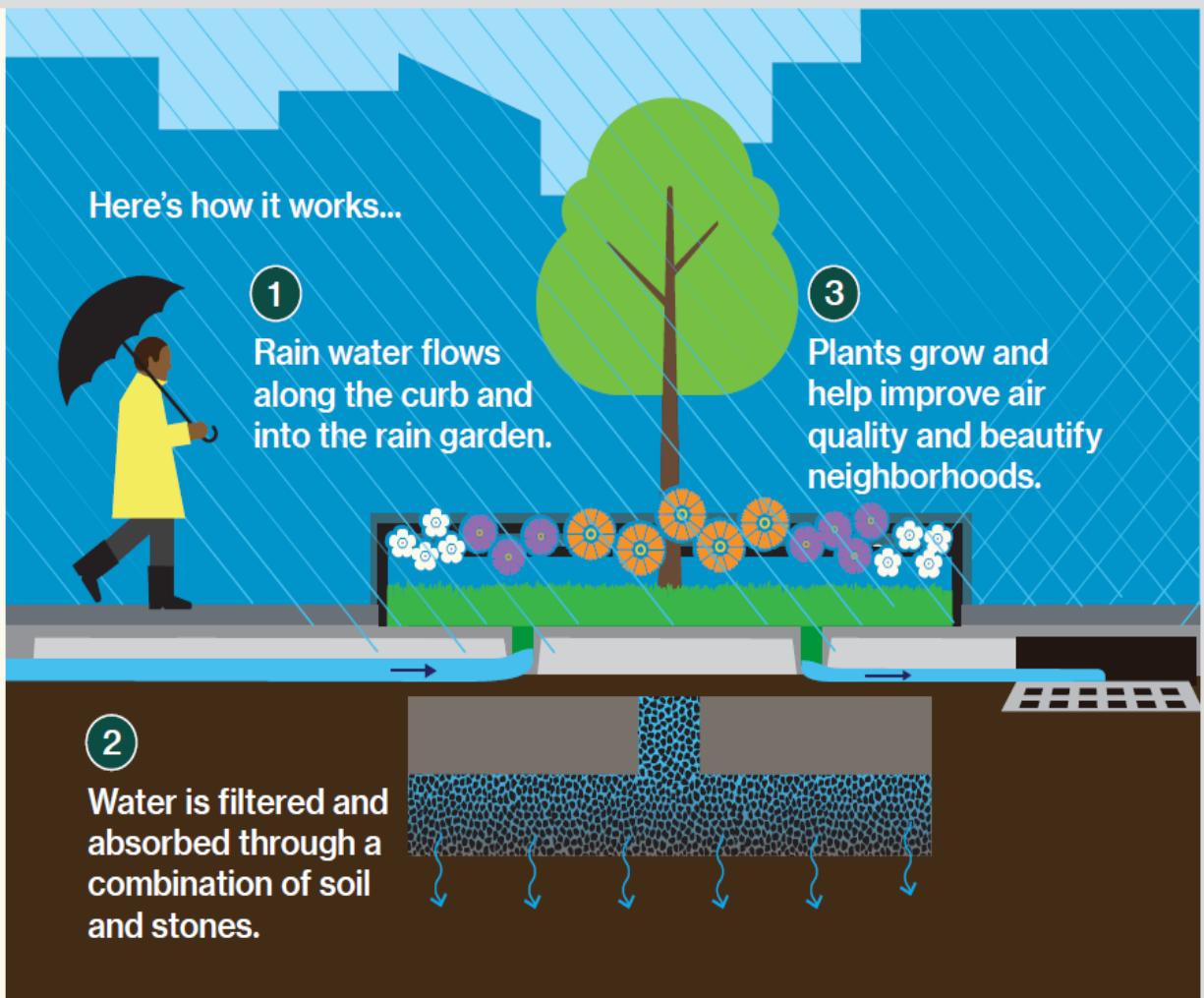
I'm a Rain Garden

Please keep me trash free.

Rain gardens prevent stormwater runoff from entering the City's sewer system, helping to improve the health of local waterways.

Questions?

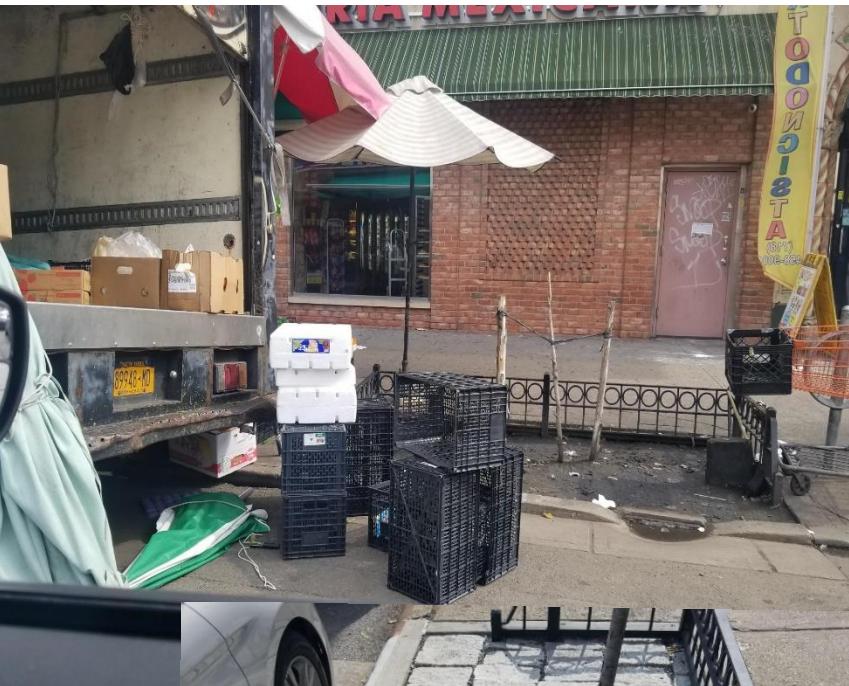
- Call 311
- Visit nyc.gov/raingardens



Public Communication and Outreach



Public Communication and Outreach



Other Utility Coordination and Training



- Interferences with utilities
- GI Protection during utility work
- Notification
 - ❖ GI web map
- Enforcement

Conclusions

- ❖ Feedback loops between teams and phases and an evaluation process are critical
- ❖ Traditional infrastructure approaches may not be effective in a highly distributed infrastructure program
- ❖ Program flexibility and reprioritization of implementation areas and staff are essential to continued growth
- ❖ Regulatory flexibility and consistent stakeholder coordination are necessary for success



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