Improving Water Quality in NYC's Waterways

Combined Sewer Overflow Long Term Control Plans

Annual Public Meeting

December 5, 2018

Agenda

	Topic	Speaker
1	**Introduction**	Commissioner Sapienza
2	**LTCP Program in 2018**	Pam Elardo and Jim Mueller
3	**Affordability**	Angela Licata
4	**Green Infrastructure Update**	Angela Licata
5	**NYC Waterbody Advisories Update**	Pinar Balci
6	**NYC Trash Free Waters Update**	Pinar Balci
7	**Citywide Open Waters Status**	Keith Mahoney
8	**Public Participation**	Mikelle Adgate

Introduction

Vincent Sapienza, PE
DEP Commissioner

About NYC DEP

WATER SUPPLY

- Deliver one billion gallons of water to nine million New Yorkers every day and maintain 7,000 miles of water mains
- Protect our 2,000 square mile watershed, including 19 reservoirs and three controlled lakes

WASTEWATER TREATMENT

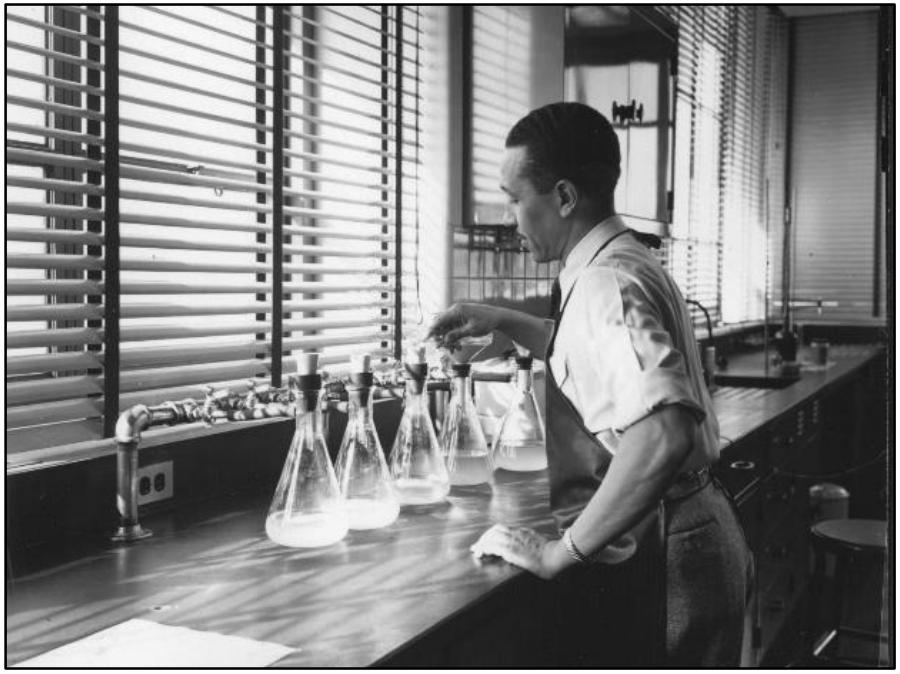
- Treat 1.3 billion gallons of wastewater each day
- Operate and maintain 14 plants, 96 pumping stations, and 7,500 miles of sewers

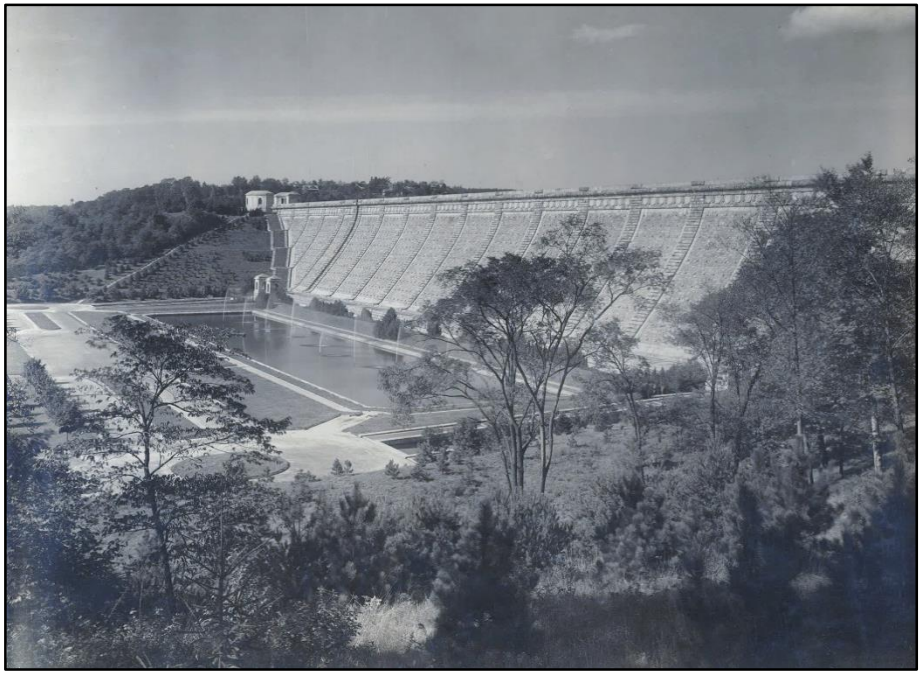
AIR, NOISE, AND HAZARDOUS WASTE

- Update and enforce the Air Code to reduce local emissions, and regulate hazardous waste and noise pollution

2018 Strategic Plan: Enriching Our Legacy

NYC Environmental Protection





Our Mission

Enrich the environment and protect public health for all New Yorkers by providing high quality drinking water, managing wastewater and stormwater, and reducing air, noise, and hazardous materials pollution.

Our Vision

Be a world class water and wastewater utility, while building a sustainable future for all New Yorkers.

Improving the Quality of Our Waterways

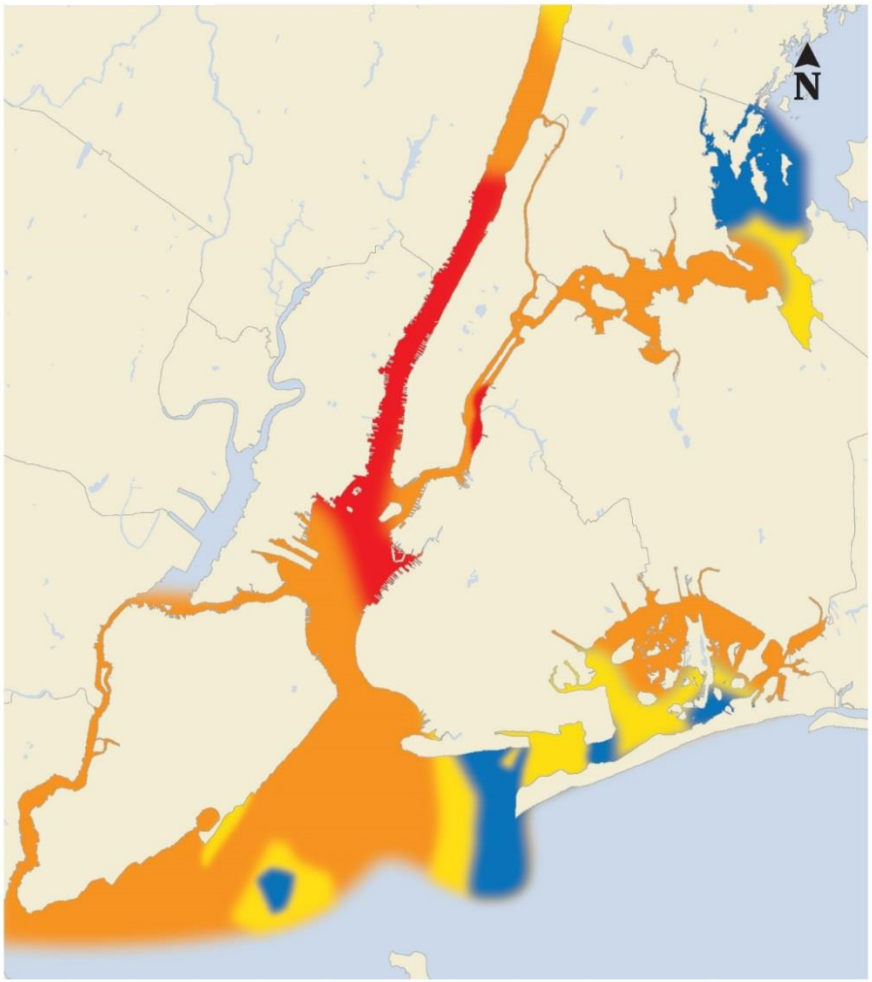
Fecal Coliform

Summer Geometric Means

Scale (# col/100 mL)

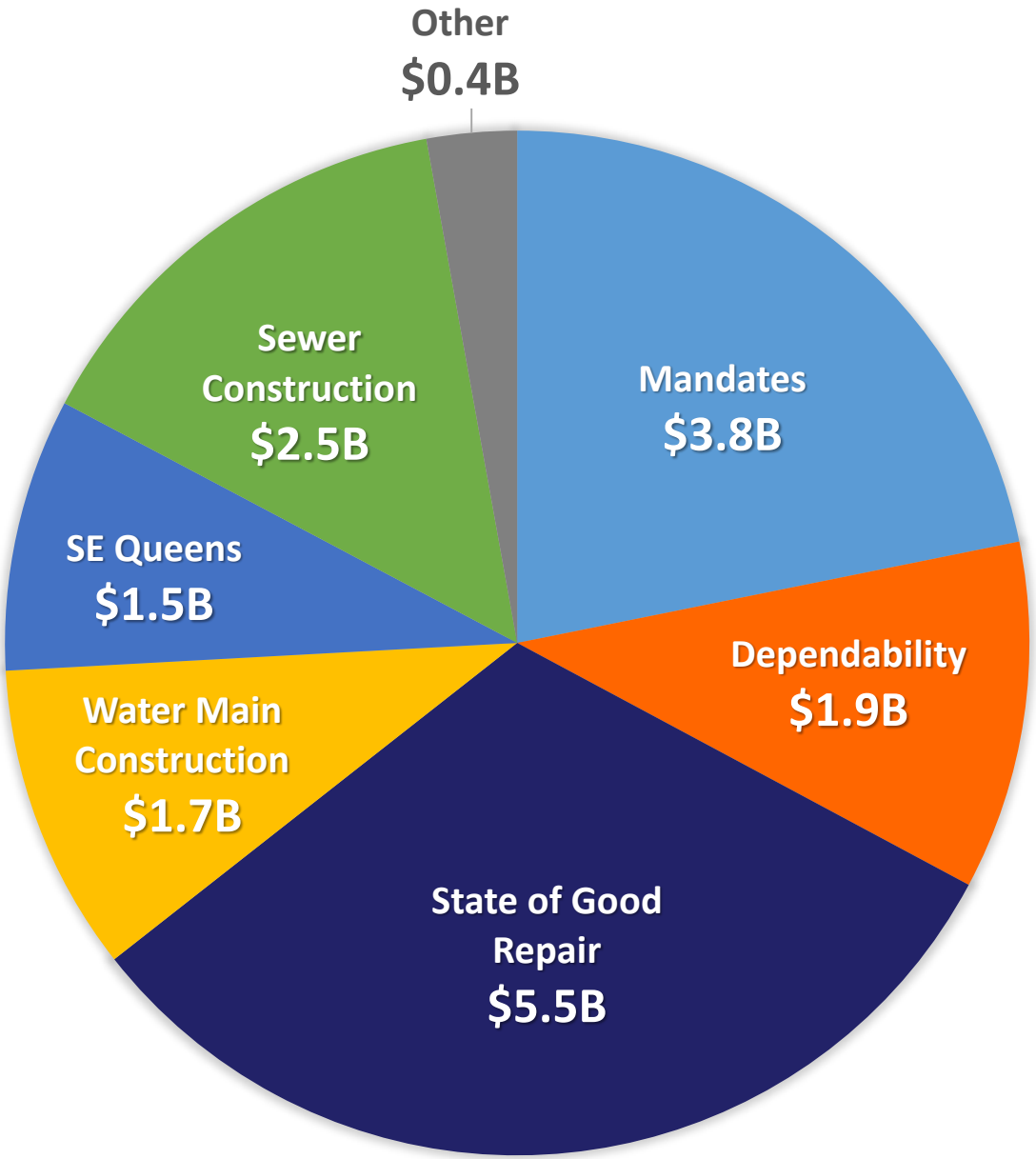
0-100 | 100-200 | 201-2000 | >2000

1985



2017

10 Year Capital Plan



FY 2019 – FY 2027

Total

$17.5B

Balancing Priorities and Investments

State of Good Repair

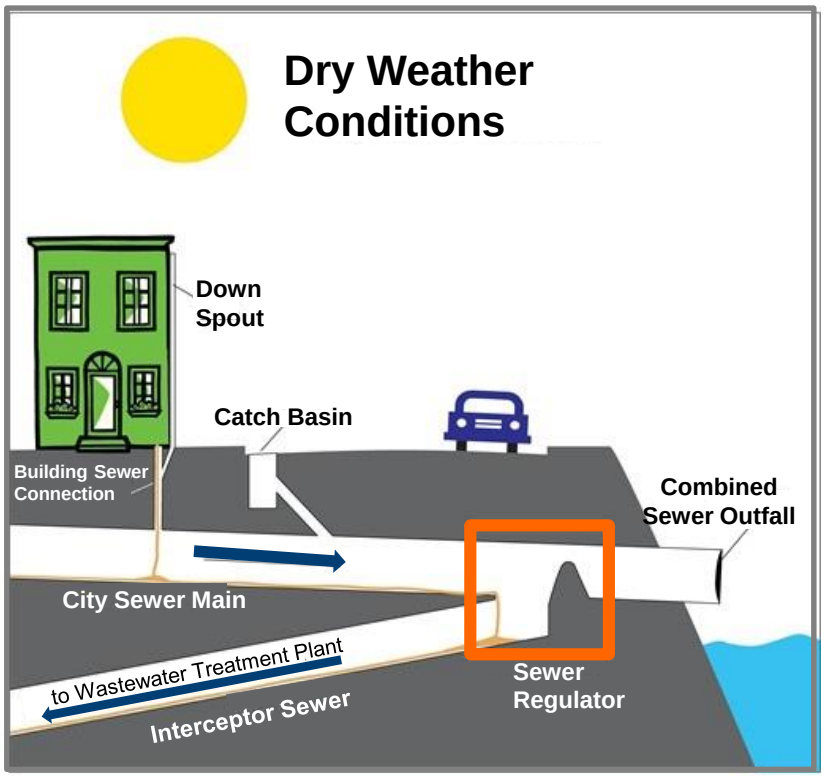
Regulatory Mandates

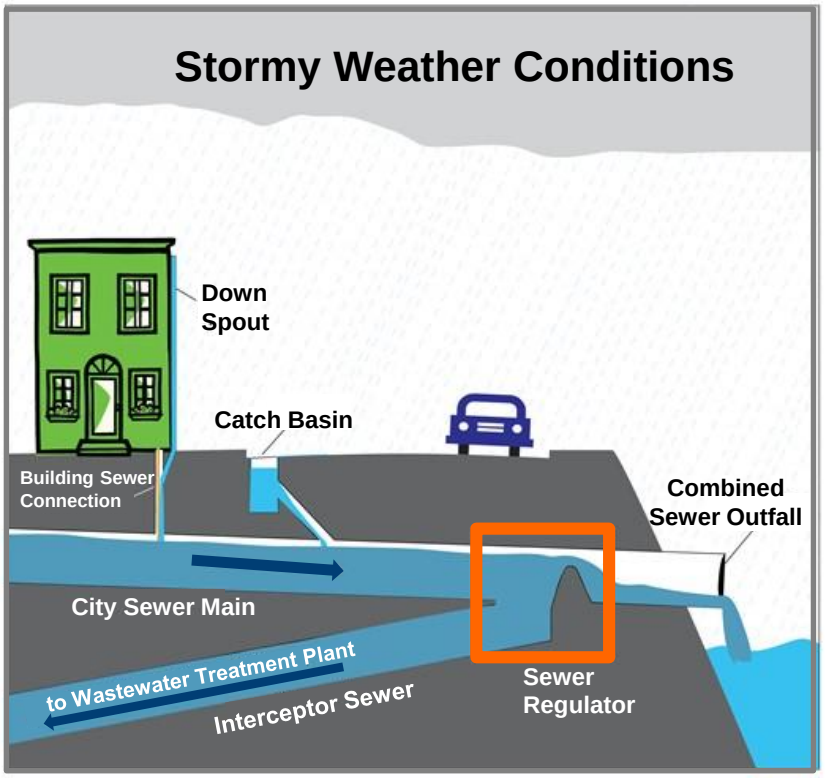
Resiliency from Extreme Weather

Climate Action, Energy Use + GHG Reduction

What is a Combined Sewer Overflow (CSO)?

NYC's sewer system is approximately 60% combined, which means it is used to **convey both sanitary and storm flows**





- When the sewer system is at full capacity, a diluted mixture of rain water and sewage may be released into local waterways. This is called a combined sewer overflow (CSO)
- 65% to 90% of **combined** sanitary & storm flow is captured at treatment plants

LTCP Program in 2018

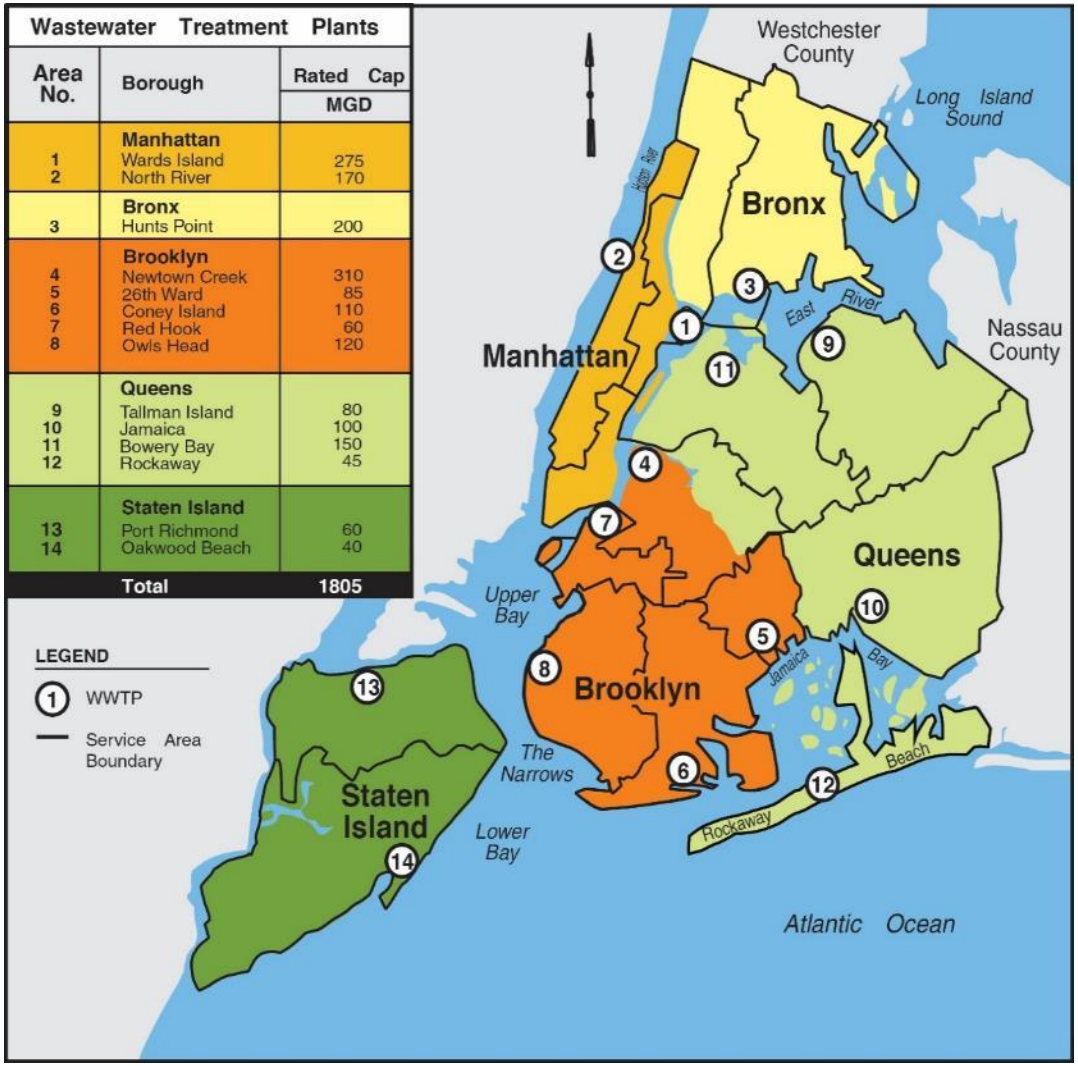
Pam Elardo, PE
Deputy Commissioner

Jim Mueller, PE
Agency Chief Engineer

Wastewater Resource Recovery Infrastructure

- 14 Wastewater Treatment Plants (WWTPs)
  - Range: 40 MGD to 310 MGD
  - Total: 1.8 BGD total
- 6 Dewatering Facilities
- 4 CSO Treatment Facilities
- 96 Pump Stations
- 497 Regulators; 152 Miles of Intercepting Sewers
- 6 Laboratories
- 14 Inner Harbor Vessels
- 5 Sludge Vessels
- 1 Biosolids Barge
- ~1,800 staff

Wastewater Treatment Plants		
Area No.	Borough	Rated Cap MGD
	Manhattan	
1	Wards Island	275
2	North River	170
	Bronx	
3	Hunts Point	200
	Brooklyn	
4	Newtown Creek	310
5	26th Ward	85
6	Coney Island	110
7	Red Hook	60
8	Owls Head	120
	Queens	
9	Tallman Island	80
10	Jamaica	100
11	Bowery Bay	150
12	Rockaway	45
	Staten Island	
13	Port Richmond	60
14	Oakwood Beach	40
	Total	1805



CSO Controls to Date

1995 – 2018 (Completed):

- Newtown Creek Wastewater Treatment Plant MSP (620 MGD to 700 MGD)
- Four CSO Storage Tanks (118 MG)
- Pumping Station Expansions (Gowanus Canal & Ave V Pump Station)
- Floatables Control (Bronx & Gowanus)
- NYC Green Infrastructure Program Initiated
- Wet Weather Maximization (Tallman Island)
- Dredging (Flushing Bay, Paerdegat Basin & Hendrix Creek)
- Gowanus Canal Flushing Tunnel Expansion
- Aeration (Newtown Creek)
- Regulator Modifications and Floatables Control (Newtown Creek, Jamaica Tributaries)
- Sewer Work (Belt Pkwy Crossing and Flushing Bay Low Lying Sewers)

Paerdegat Basin CSO Retention Facility

Flushing Bay CSO Retention Facility

CSO Controls to Date

2019 – 2030 (Ongoing):

- Regulator Modifications and Floatables Control (Westchester Creek)
- 26th Ward Plant Wet Weather Stabilization
- Ongoing GI Program implementation
- Bergen Basin Lateral Sewer Extension

Total Costs
(Completed and Ongoing):

- Grey Infrastructure: $2.7B
- Green Infrastructure: $1.5B

$4.2B

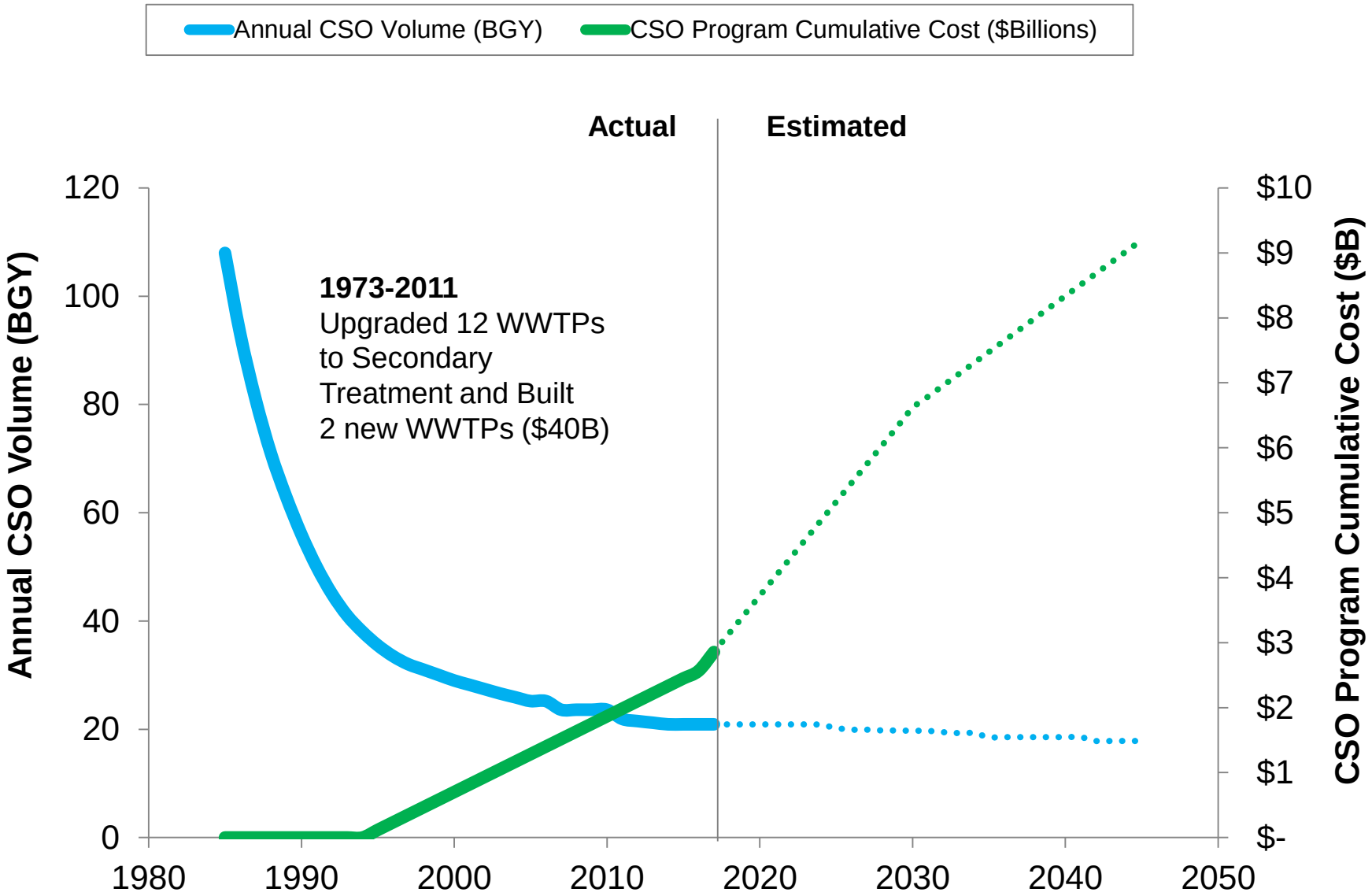
CSO Toolbox

	CSO Reduction	Cost			
Water Quality and Ecological Restorations	0 MG	~$300 M	**Wetland & Ecological Restoration**	**Environmental Dredging**	**Instream Aeration & Flushing Tunnel**
CSO Relocation and Partial Treatment	2,200 MG	~$300 M	**Minor Sewer Enhancements**	**Force Main Relocation**	**Parallel Sewers**
Sewer System Optimization	2,200 MG	~$600 M	**Weir Mods & Floatables**	**Bending Weirs & Floatables**	**Pump Station Expansion**
CSO Treatment	3,300 MG(1)	~$800 M	**Outfall Disinfection/Other Technologies**	**Retention Treatment Basin**	**WWTP Improvements or Expansion**
Source Control	1,600 MG	~$2,000 M	**Private Property GI**	**Public Property GI**	**Storm Sewer Buildout**
CSO Storage	4,200 MG(2)	~$5,400 M	**In-System Storage**	**CSO Storage Tanks**	**CSO Storage Tunnels**

1) CSO treatment reductions are primarily attributable to past upgrades at the WWTP headworks required under CSO BMP to enable the plant to treat its permitted wet weather flows.

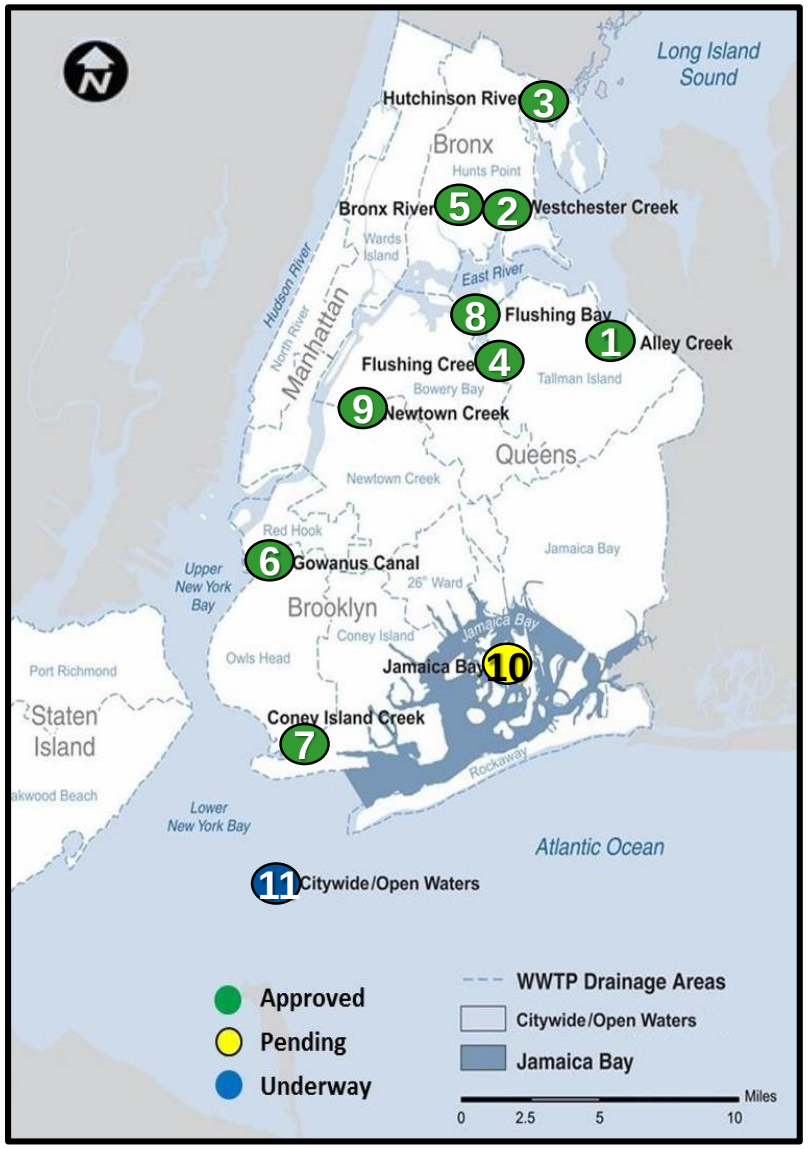
2) Storage tunnel costs and construction will be spread out over the next 15 to 22 years.

Projected CSO Reduction with LTCP Projects



LTCP Milestone Status

ID	Waterbody/LTCP	Approved	Submitted	To be Submitted
1	Alley Creek	✓		
2	Westchester Creek	✓		
3	Hutchinson River	✓		
4	Flushing Creek	✓		
5	Bronx River	✓		
6	Gowanus Canal	✓		
7	Coney Island Creek	✓		
8	Flushing Bay	✓		
9	Newtown Creek	✓		
10	Jamaica Bay and Tribs[1]		✓	
11	Citywide/Open Waters[2]			✓



(1) Jamaica Bay includes Thurston Basin, Bergen Basin, Hendrix Basin, Fresh Creek, Spring Creek, Paerdegat Basin and Jamaica Bay

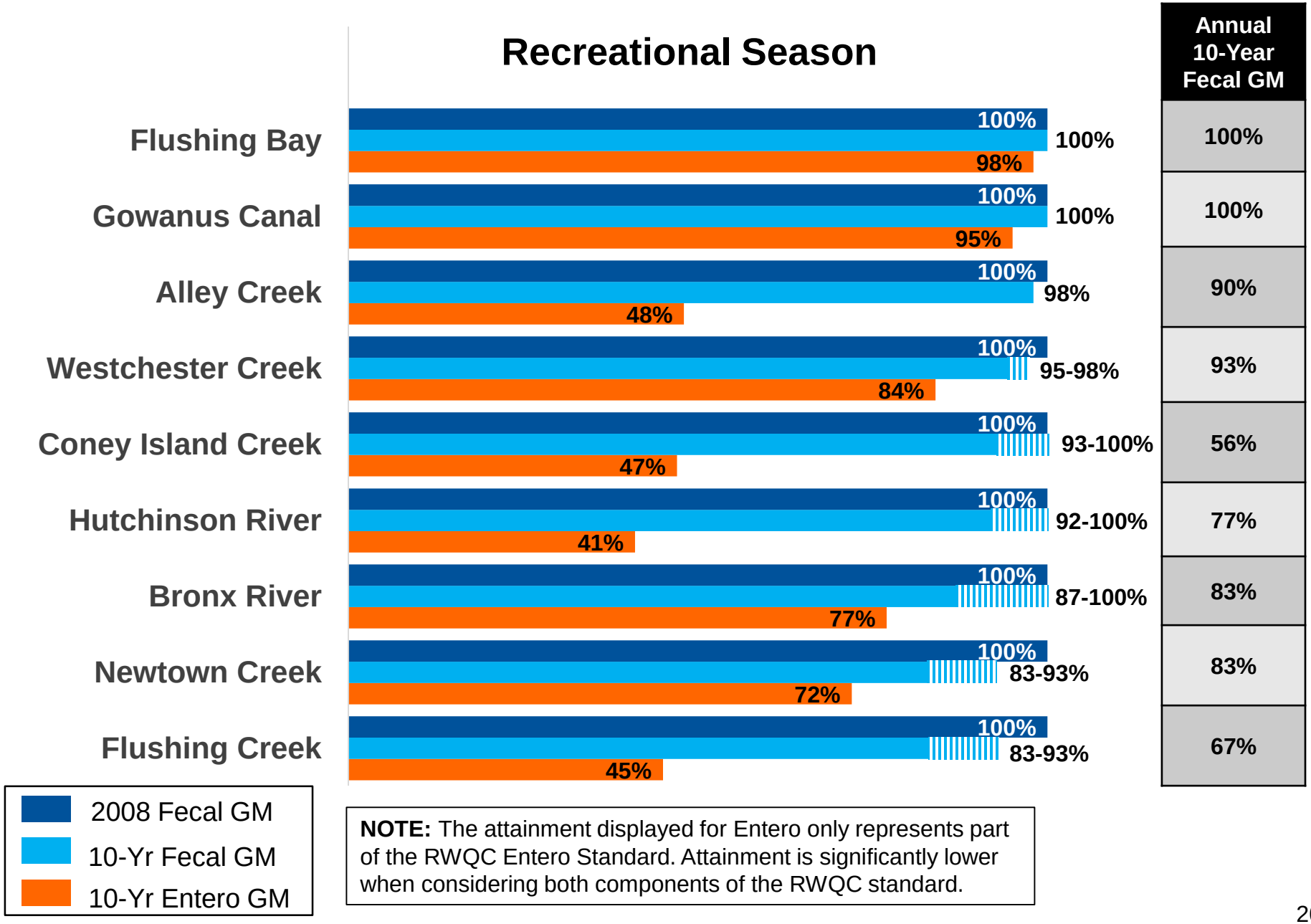
(2) Citywide/Open Waters LTCP includes East River, Hudson River, Harlem River, Lower and Upper New York Bay, Arthur Kill and Kill Van Kull

Planning for Approved LTCPs is Underway

Waterbody	LTCP Project	Escalated Project Costs	Duration (years)		
			Facility Planning/ Design[1]	Construction[2]	Total Project Duration[3]
Alley Creek	Tank Disinfection	$12M	3	2	6
Hutchinson River	Outfall Extension, Disinfection & Floatables Control	$167M	6	4	12
Flushing Creek	Outfall and Tank Disinfection	$92M	4	5	9
Bronx River	Parallel Sewer and Floatables Control	$185M	5	3	10
Flushing Bay	CSO Storage Tunnel	$1,616M	6	9	16
Gowanus Canal	Superfund CSO Storage	$932M	4	7	12
Newtown Creek	Borden Avenue Pump Station Expansion	$87M	3	4	8
Newtown Creek	CSO Storage Tunnel	$1,246M	3	12	17

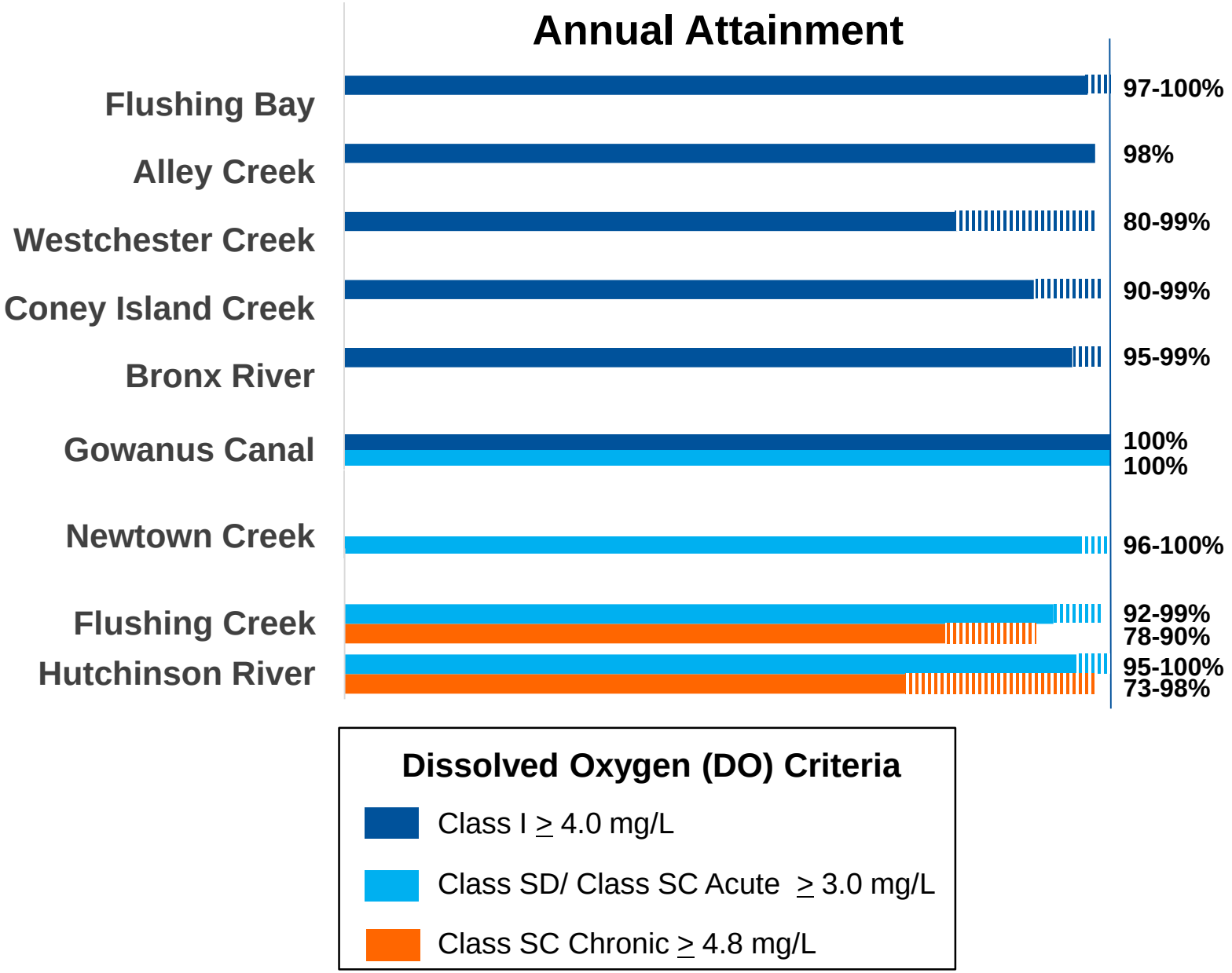
1) Facility Planning includes environmental assessment statements (EAS) and land acquisition. Design includes: 30%, 60%, 90% Progress Drawings and Specifications and Permitting
2) Construction and Project Close-out
3) Includes procurement of the Contractor

Model Projected Post-LTCP Bacteria Attainment



NOTE: The attainment displayed for Entero only represents part of the RWQC Entero Standard. Attainment is significantly lower when considering both components of the RWQC standard.

Model Projected Post-LTCP DO Attainment



Also in 2018….

DEP continues to pursue Ecology-Based Approaches to better understand their net water quality benefits

- Wetlands Restoration
- Biofiltration through ribbed mussels:
  - Similar filtration rates as oysters
  - Good candidate for nutrient bioextraction
  - Feed on a wide range of particles suspended in the water column (including phytoplankton and bacteria)
  - Water quality management in Chesapeake Bay

Jamaica Bay LTCP Submitted in 2018

Questions?

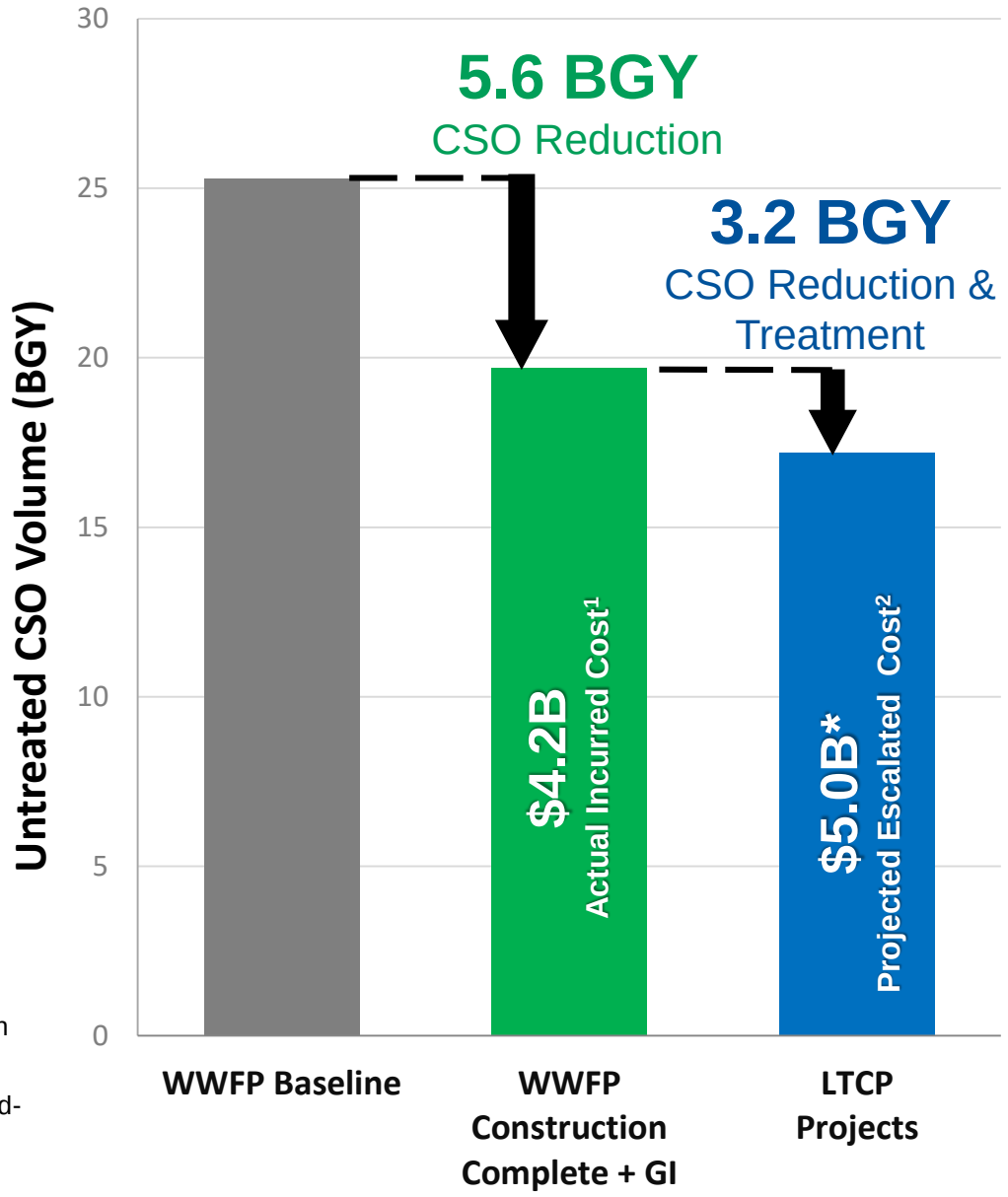
NYC Environmental Protection

Affordability

Angela Licata
Deputy Commissioner

LTCP Investment Overview

- Currently DEP has committed **$4.2B** to CSO reduction projects (including $1.5B in green infrastructure)
- Submitted and Approved LTCPs plan for **~$5.0B** additional investment in water quality improvements
  - East River/Citywide LTCP is in development; costs are not yet known
- Financial capability plays a key roll in assessing the affordability of CSO control measures.



1) Incurred cost includes $2.7B grey infrastructure and $1.5B green infrastructure.
2) Projected escalated cost includes design/DSDC escalated to mid-point of design and construction/CM escalated to mid-point of construction and $932M for Gowanus Canal as required by Superfund. Does not include pending upcoming Citywide/Open Waters LTCP.

The Cost of Water in New York

The Cost of Water in NYC

0.52¢ per gallon

+

0.83¢ per gallon

=

1.35¢ per gallon
for water + wastewater treatment

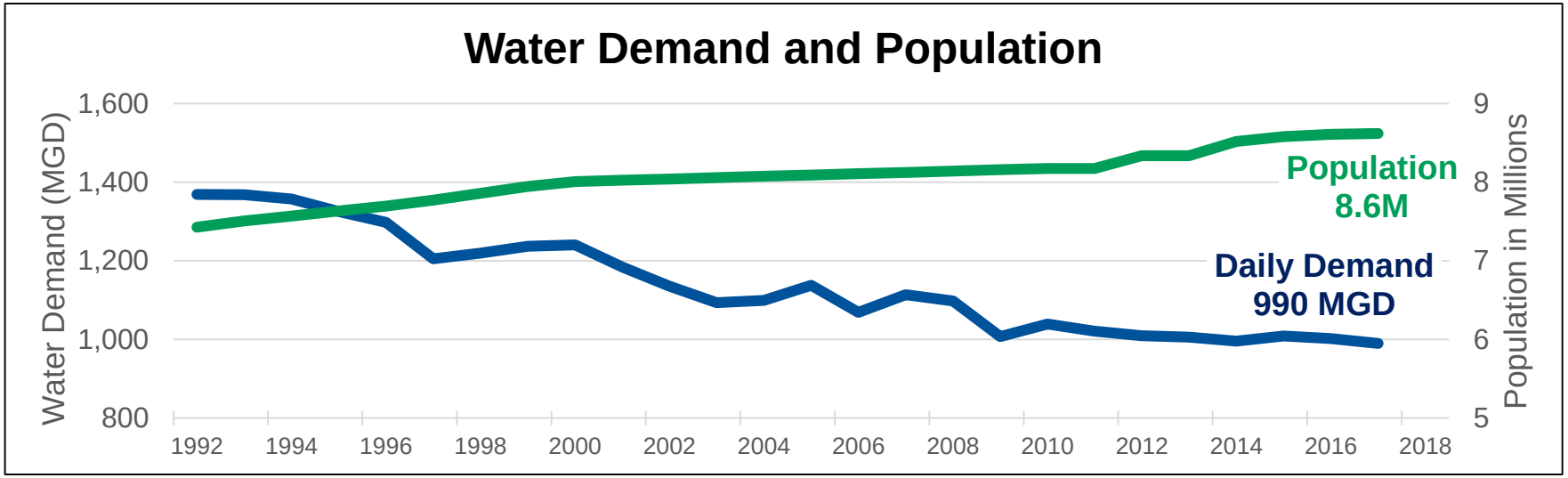
Controlling Customer Impacts

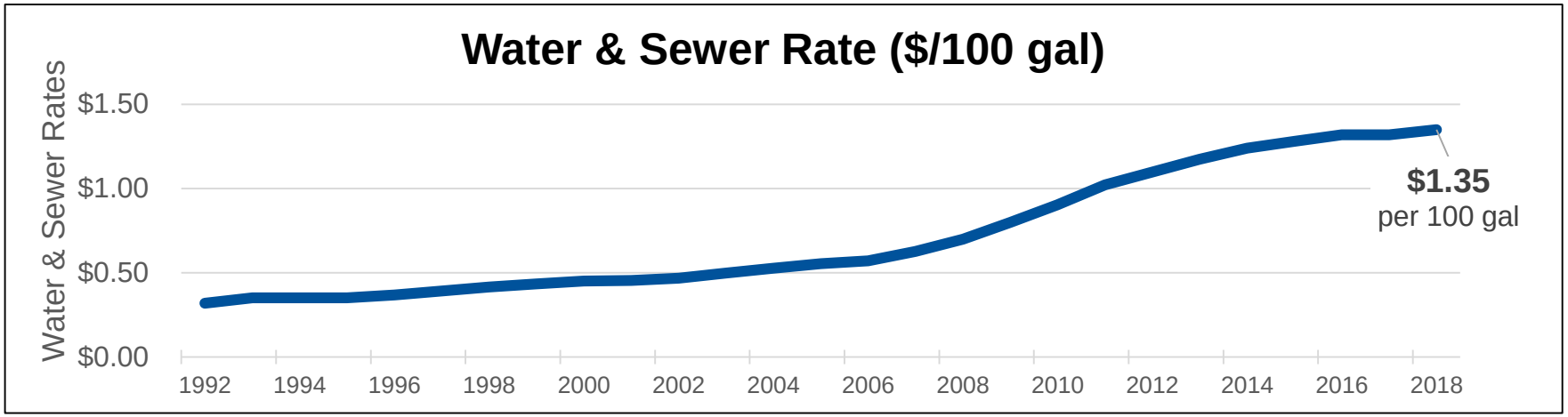
- DEP controls costs to minimize customer impacts
- DEP's revenue and debt structure ensure strong bond ratings and low borrowing costs

Legal Mandates

- Mandated projects accounted for **$19B** (53%) of capital investments between FY2000-2018
- Mandated projects cost average homeowners **~$240 in FY18**
- Average annual single family bill in FY2018: $1,055

Population / Demand / Rates





- Water Demand has declined as population has increased. Rates have nearly tripled since 2000 to keep up with cost of service.
- DEP is pursuing a study to explore and analyze sustainable rate structures.

NYC Income Levels and Poverty Rates

	Median Household Income (MHI)	% of Residents Below Federal Poverty Level
United States	**$57,617**	**14.0**
NYC	**$58,856**	**19.0**
Bronx	$37,525	**28.7**
Brooklyn	$55, 150	**20.6**
Manhattan	$77,559	**17.3**
Queens	$62,207	**13.2**
Staten Island	$77,197	**13.2**

- While NYC MHI is comparable to national average, cost of living and housing burden for NYC residents is generally much higher
- ~19% of NYC population (~1.6 million people) lives below the federal poverty level

Source: U.S. Census Bureau 2016 ACS 1-Year Estimates.

Affordability: Program Cost Impacts on Households

Annual Wastewater Cost for Households by Income Group*

	WW cost for HH at the 20th percentile	WW cost for HH at the 40th percentile	WW cost for HH at the median	HH paying more than 2% of income on WW
2018	2.6%	1.2%	0.9%	26%
2028	3.8%	1.7%	1.3%	37%

Rate impacts do not affect all customers equally

NYC Household Income**

20th percentile: $19,252

40th percentile: $42,521

Median: $58,856

* Note: Values in table reflect financial capability assessment results included in the Jamaica Bay LTCP (June 2018). Values will change based on future assessments.

** Source: U.S. Census Bureau 2016 ACS 1-Year Estimates.

DEP's Customer Assistance Programs

Program	Current Recipients	Total Benefits
Home Water Assistance Program	65,000	$7.5 M
Multifamily Water Assistance Program	40,000	$10 M
Leak Forgiveness	1,575	$3.5 M
Total (FY 2019) est.	**106,575**	**$21 M**

Home water assistance program: $115.89 bill credit targeting low income, senior, or disabled property owners

Multifamily program: $250 bill credit per residential unit for property owners entering into (or renewing) affordability agreements for at least a 15 year period

Leak forgiveness: 50% bill credit for leaks that were repaired, where the leak resulted in at least a doubling of the bill

NYC Environmental Protection

Green Infrastructure

Angela Licata
Deputy Commissioner

NYC Green Infrastructure Program

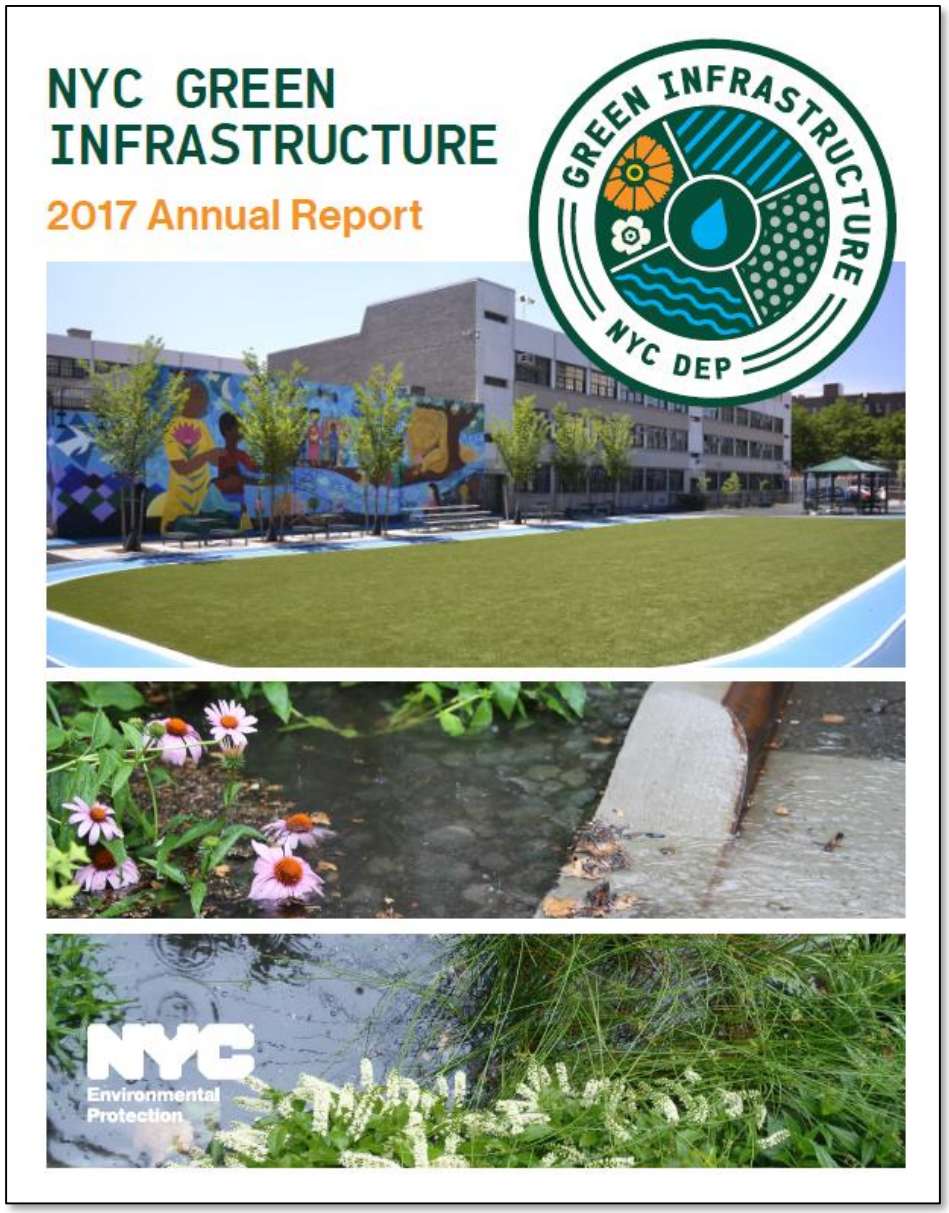
City Sidewalks


City Streets


Public Property Retrofits


Private Property

2017 Annual Report



nyc.gov/dep/greeninfrastructure

Program Snapshot

Capital Budget:

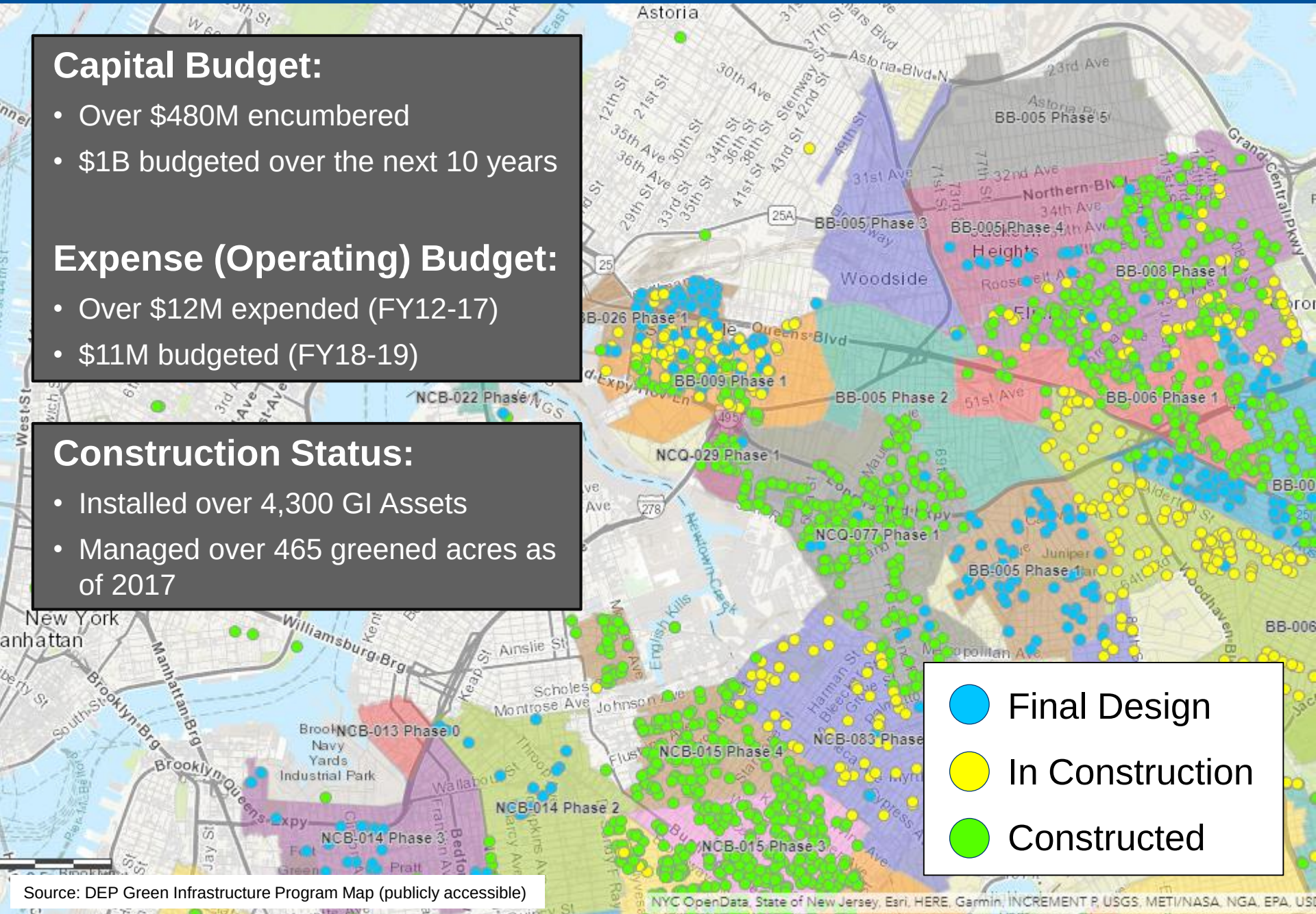
- Over $480M encumbered
- $1B budgeted over the next 10 years

Expense (Operating) Budget:

- Over $12M expended (FY12-17)
- $11M budgeted (FY18-19)

Construction Status:

- Installed over 4,300 GI Assets
- Managed over 465 greened acres as of 2017



Source: DEP Green Infrastructure Program Map (publicly accessible)

Public Property Retrofits

Key partnerships:

- NYC Housing Authority
- NYC Parks
- NYC Department of Education/ NYC School Construction Authority
- DDC Public Buildings Portfolio (Library, Fire, Police, Other)

Public Parks – Astoria Heights Playground, Queens

Public Schools – Winthrop Campus, Brooklyn

Public Housing – Hope Gardens, Brooklyn

Public Property Retrofits Status

Project Status	Parks / Playgrounds	Public Schools	NYCHA Housing Developments	Total
Constructed	33	12	4	49
In Construction	22	0	1	23
In Design	16	19	29	64
Schematic	29	0	0	29
Preliminary	48	0	0	48
Potential	106	100	31	237
Total	**254**	**131**	**65**	**450**

Private Property Programs

Green Infrastructure Grant Program:

- More than $15M committed to date to 34 private property owners
- Expanded citywide in 2017
- New green roof incentive schedule - up to $30/SF available for green roofs

South Bronx Overall Economic Development Corporation – Venture Center, Bronx

NYU Langone Medical Center – Alumni Hall, Manhattan

Private Property Programs

Private Incentive Retrofit Program:

- **$53M Request for Proposals** (RFP) released November 9, 2018

- RFP is to procure a third party program administer to implement new voluntary incentive Program

- Program will target large privately owned properties, 50,000 SF or greater, in combined sewer areas

Program Goal:

- 200 Greened Acres with projects starting in 2019

Example of potential property to retrofit

Right of Way Maintenance

- DEP maintains all green infrastructure in the public right-of-way
- **60+ green jobs**; growing annually
- Crews visit locations two times a week to:
  - Remove litter
  - Clear inlets/outlets
  - Remove sediment
  - Prune shrubs and trees
  - Perform corrective maintenance as needed

Brooklyn and Queens Maintenance Crews

Bronx Maintenance Crew

Questions?

Environmental Protection

NYC Waterbody Advisories

Pinar Balci, PhD
Assistant Commissioner

Phase I Objectives and Results

Objectives

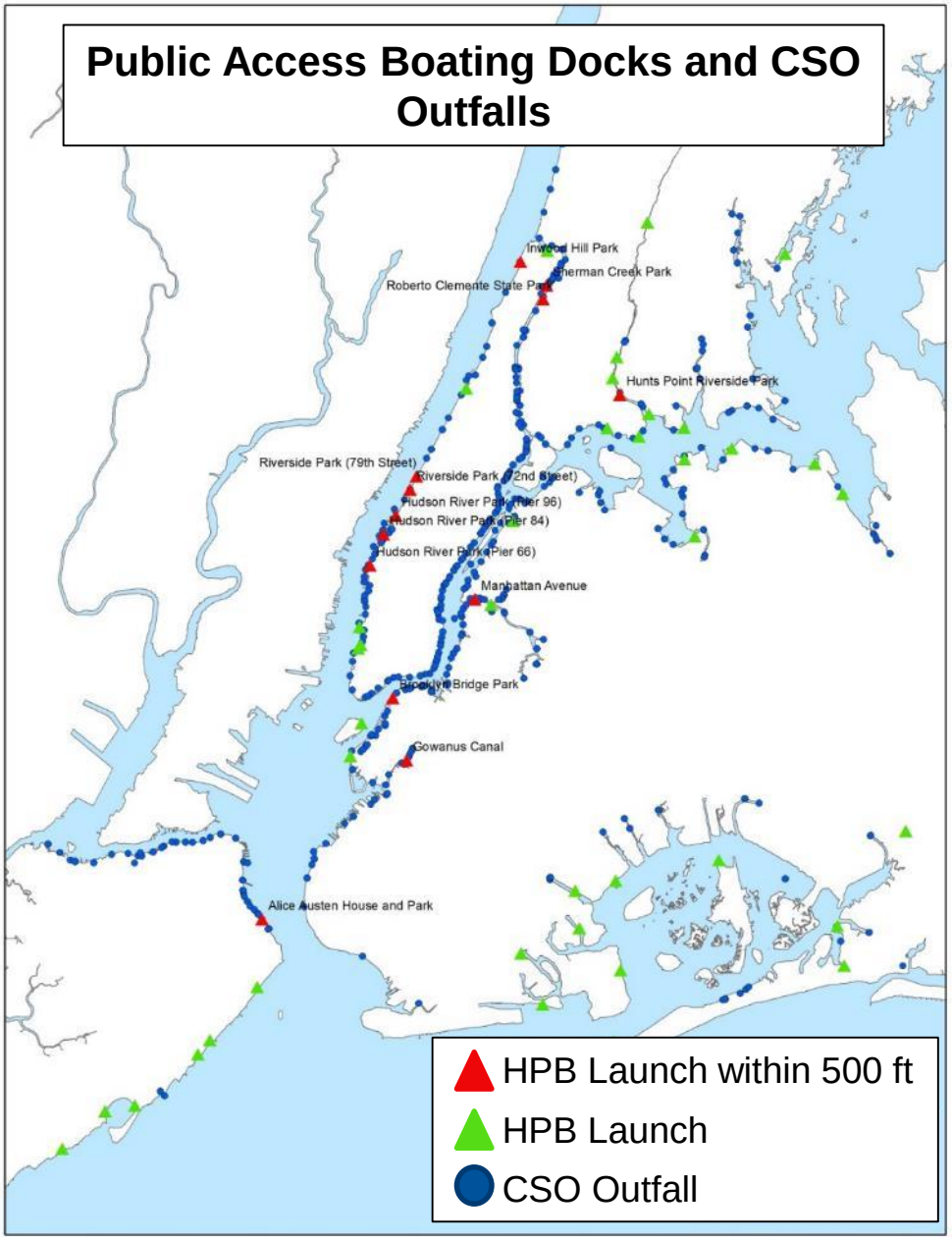
1. Update wet weather advisories using higher resolution models and current sampling data, including larger storms
2. Evaluate water quality criteria using primary contact standards and thresholds
3. Revise methodology for issuing advisories

Results

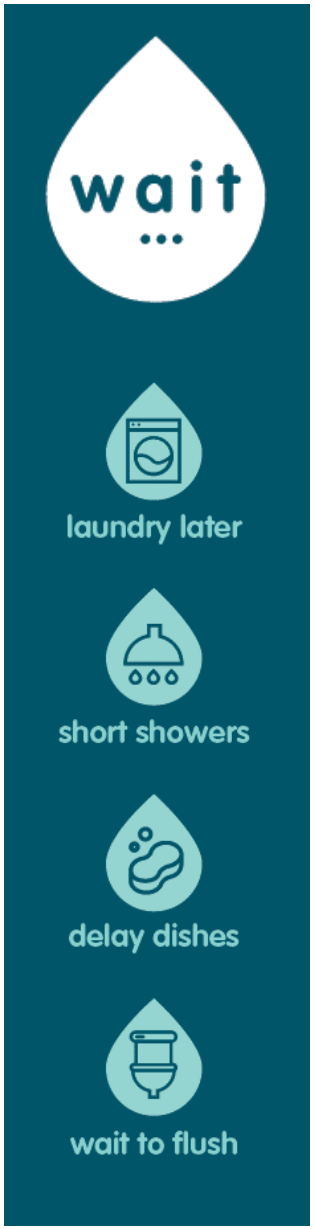
1. Waterbodies potentially receiving advisories increased from 28 to 45
2. Some waterbody advisories may take place more often and for longer due to revised water quality thresholds
3. DEP advisory website will be revised to reflect new system in Spring 2019

Phase II Objectives & Pilot Notification System

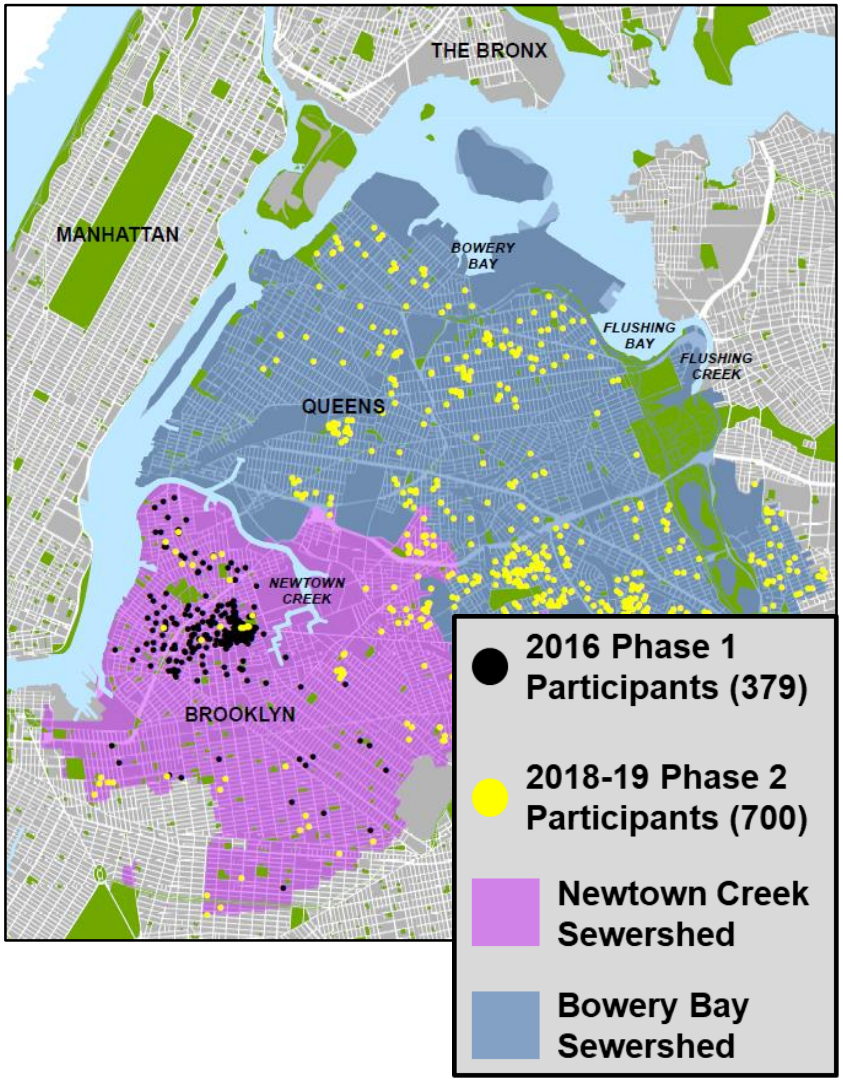
- Identify improvements to current waterbody advisory system to improve user experience and value
  - Held Stakeholder Workshop
- Develop a pilot notification system for CSO activation notices for 10-15 human powered boat (HPB) launches
  - Collaboration with stakeholders on identifying pilot locations
  - Expected beta testing in Spring 2019



Wait… Pilot Program



Wait… uses real-time text and email alerts to encourage voluntary water use reduction in residential buildings during CSO events



Phase 1:

- 379 participants
- 13 CSO events
- 7.2 hours average CSO event duration
- **5% decrease** in water use among participants

Phase 2:

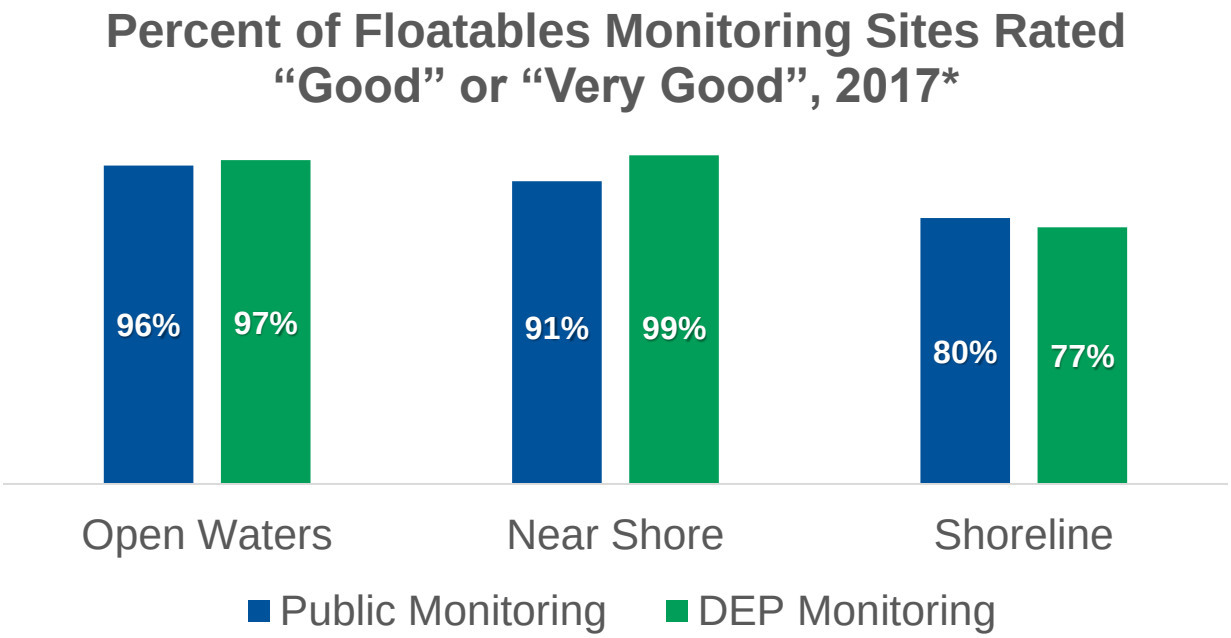
- 700 participants
- Ends May 1, 2019

Environmental Protection

NYC Trash Free Waters Update

Pinar Balci, PhD
Assistant Commissioner

Data Overview



DEP and public volunteers monitor and rate waterbodies based on floatable presence

Waterbodies with higher floatables ratings include:

- Bergen Basin, Sheepshead Bay, Newtown Creek, Coney Island Creek & Flushing Bay
- The majority of these sites are in the separate storm sewer system (MS4), so DEP is first targeting MS4 waterbodies for source control measures and assessments.

DSNY's Street Cleanliness Ratings states 96% of streets as "acceptably clean."**

* Source: DEP Floatables Monitoring Program Progress Report, http://www.nyc.gov/html/dep/pdf/harbor/2017-floatables-monitoring-report.pdf
** Source: DSNY, https://www1.nyc.gov/assets/operations/downloads/pdf/dsny_scorecard_2017.pdf

Media Campaigns

Clean Streets = Clean Beaches

B.Y.O. Campaign

Don't Trash Our Waters

Talk Trash New York

Current Public Programs & Floatables Study

Public Education and Outreach

Adopt a Catch Basin

Clean Streets Clean Beaches

Adopt a Basket

Forgot Your Bag?

Floatables Loading Rate Study

Purpose: Determine the loading rate of floatables from MS4 outfalls to waterbodies listed as impaired for floatables.

Approach: Combination of field measurements and model analysis.

Additional Monitoring:

- Street litter levels at the time of catch basin sampling.
- Street litter levels before and after street sweeping.
- Effects of catch basin stenciling

Questions?

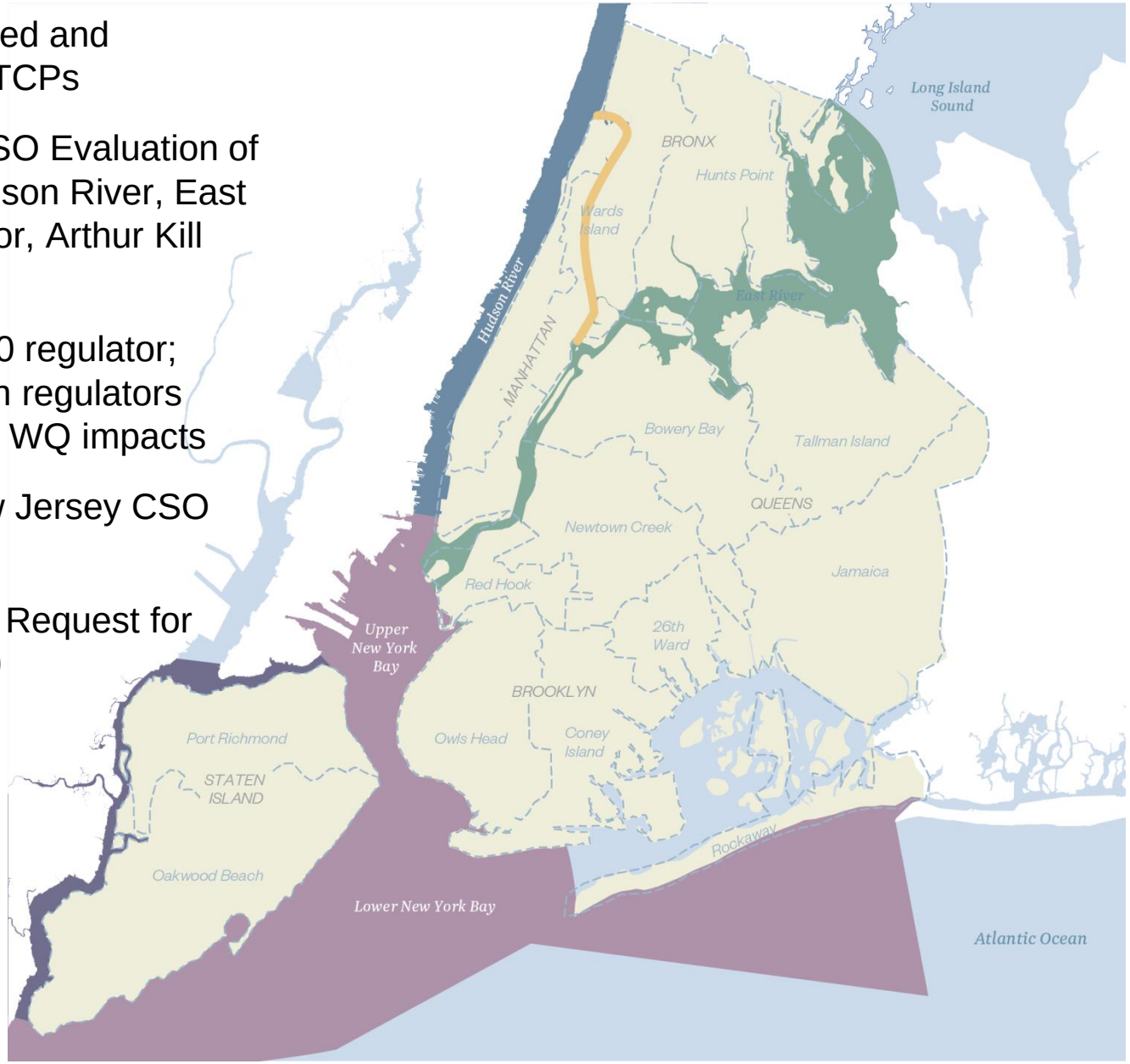
NYC Environmental Protection

Citywide Open Waters Status

Keith Mahoney, PE
Senior Director

Citywide/Open Waters LTCP

- Build upon the Approved and Submitted Tributary LTCPs
- Waterbody-specific CSO Evaluation of the Harlem River, Hudson River, East River, New York Harbor, Arthur Kill and Kill Van Kull
- DEP studied about 100 regulator; pursuing more work on regulators which may be causing WQ impacts
- Coordination with New Jersey CSO communities
- DEP submitted a Mod Request for extension to Mar 2020



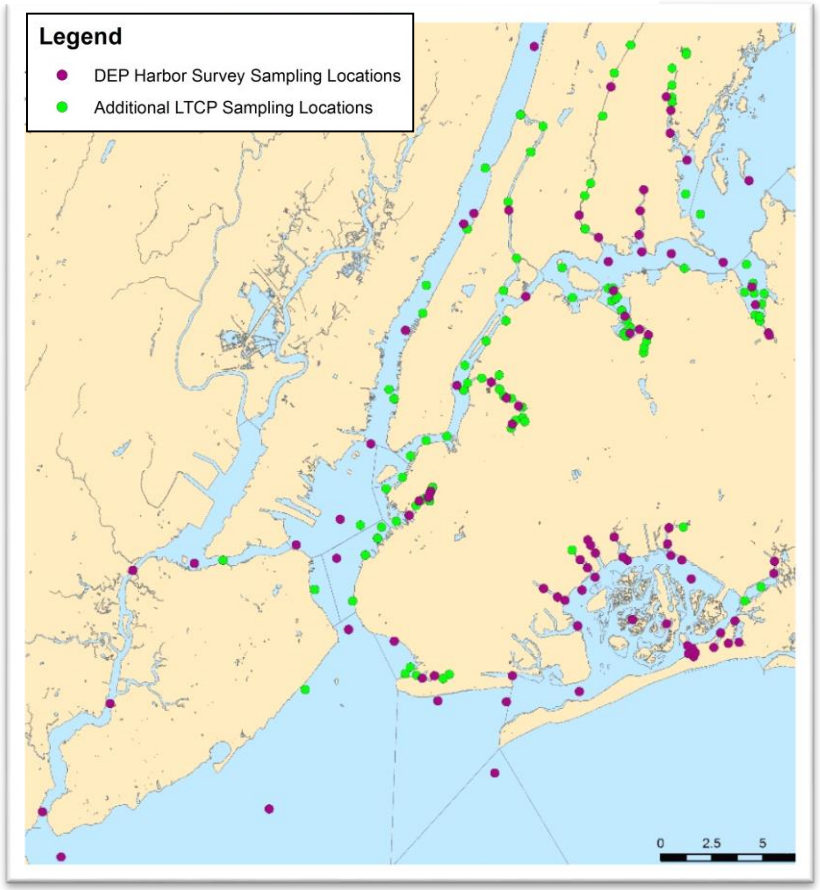
Legend
- Harlem River
- Hudson River
- East River/Lower Long Island Sound
- New York Harbor/Atlantic Ocean
- Arthur Kill and Kill van Kull

Completed Citywide/Open Waters LTCP Work

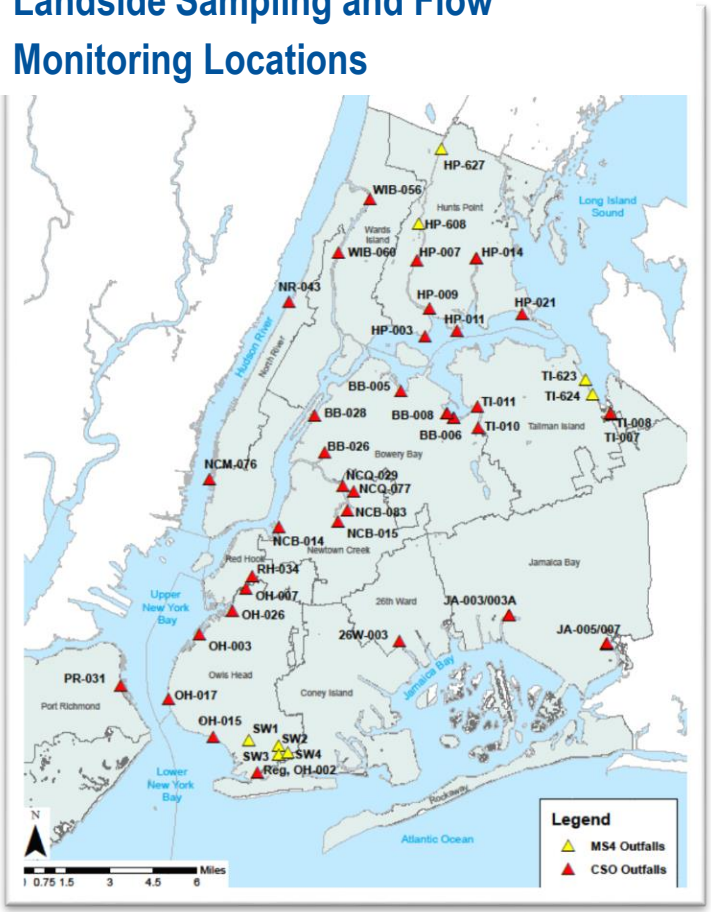
- ✓ Fecal, *Entero* & Dissolved Oxygen Collected
- ✓ 3-5 wet weather events at each station
- ✓ 14 waterbodies sampled
- ✓ 80+ receiving water locations were sampled

- ✓ Fecal, *Entero* & Dissolved Oxygen
- ✓ 3-5 wet weather events at each outfall
- ✓ 50+ landside locations sampled
- ✓ 3-6 months of flow monitoring

Receiving Water Sampling Locations

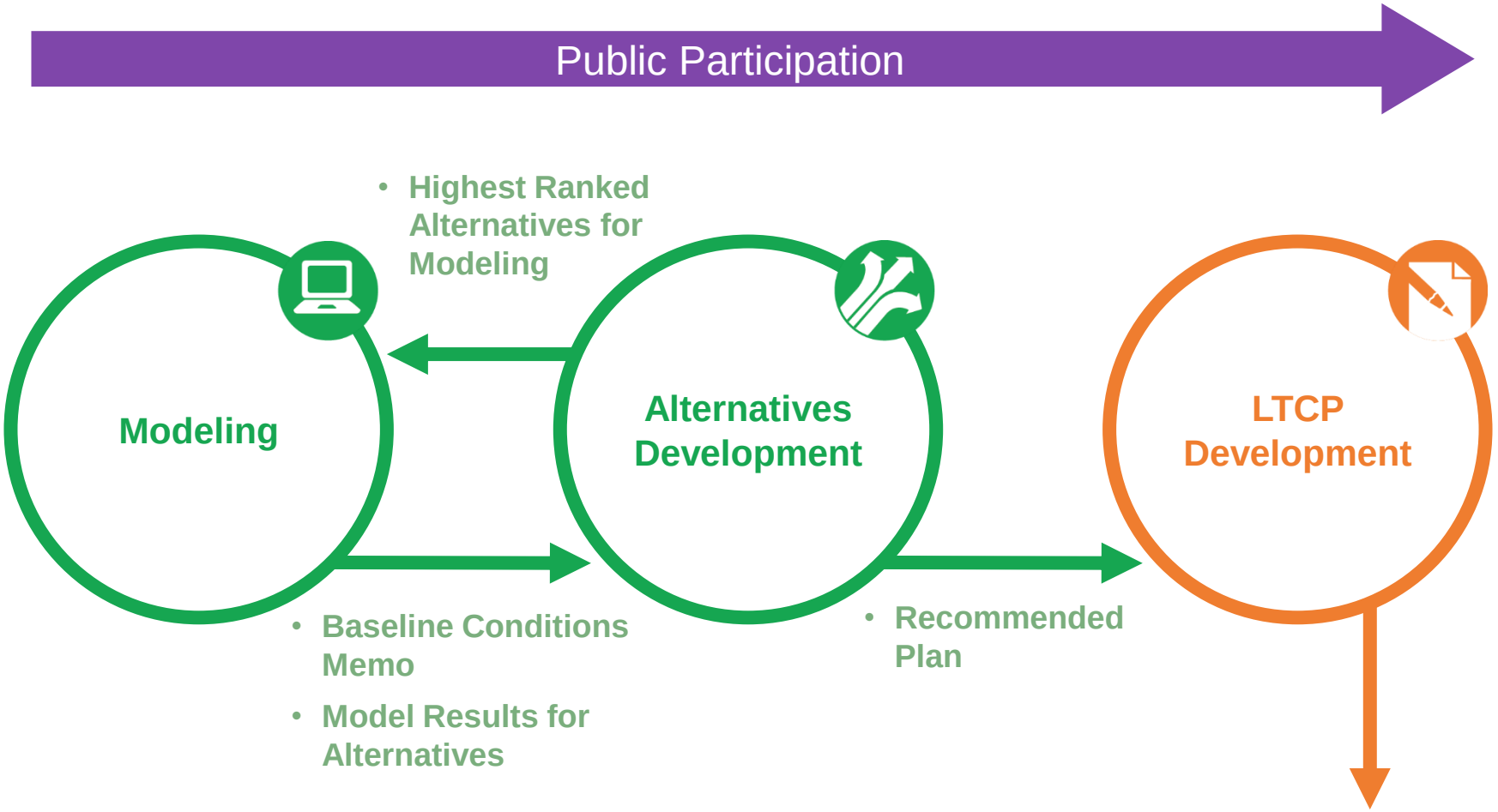


Landside Sampling and Flow Monitoring Locations

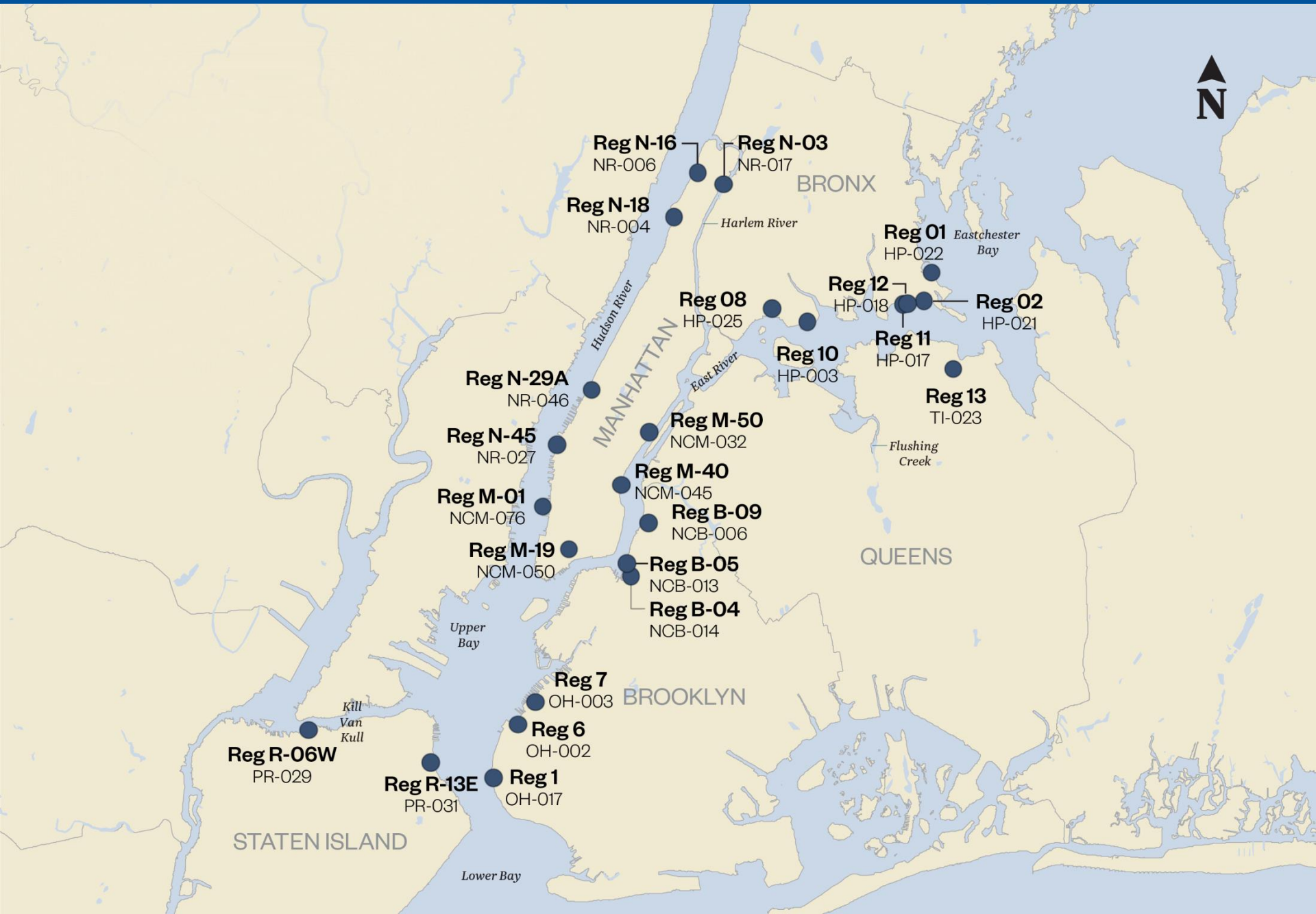


Citywide LTCP Kick-off Meeting Presentations including sampling data available at www.nyc.gov/dep/ltcp

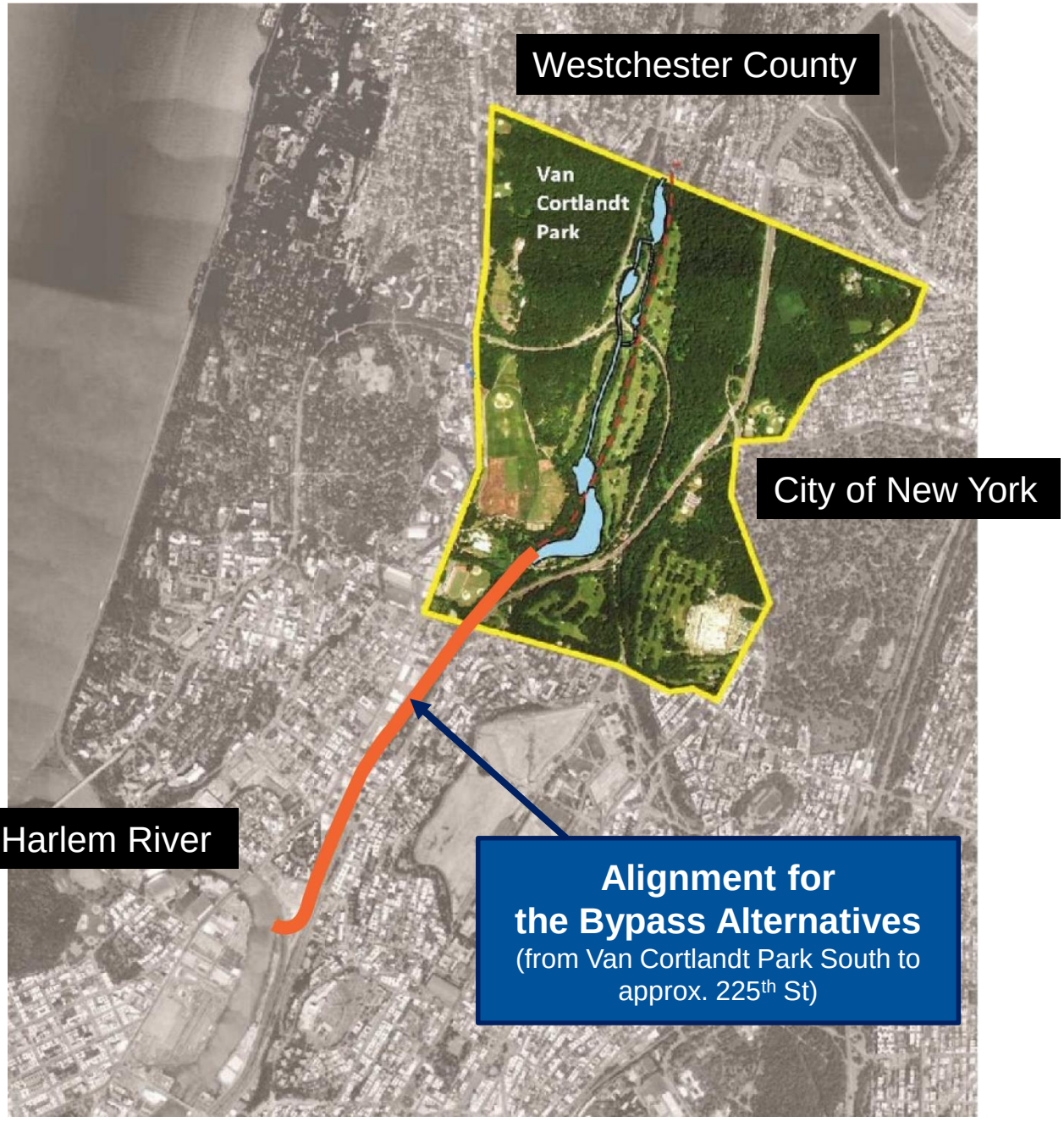
2019 Look Ahead



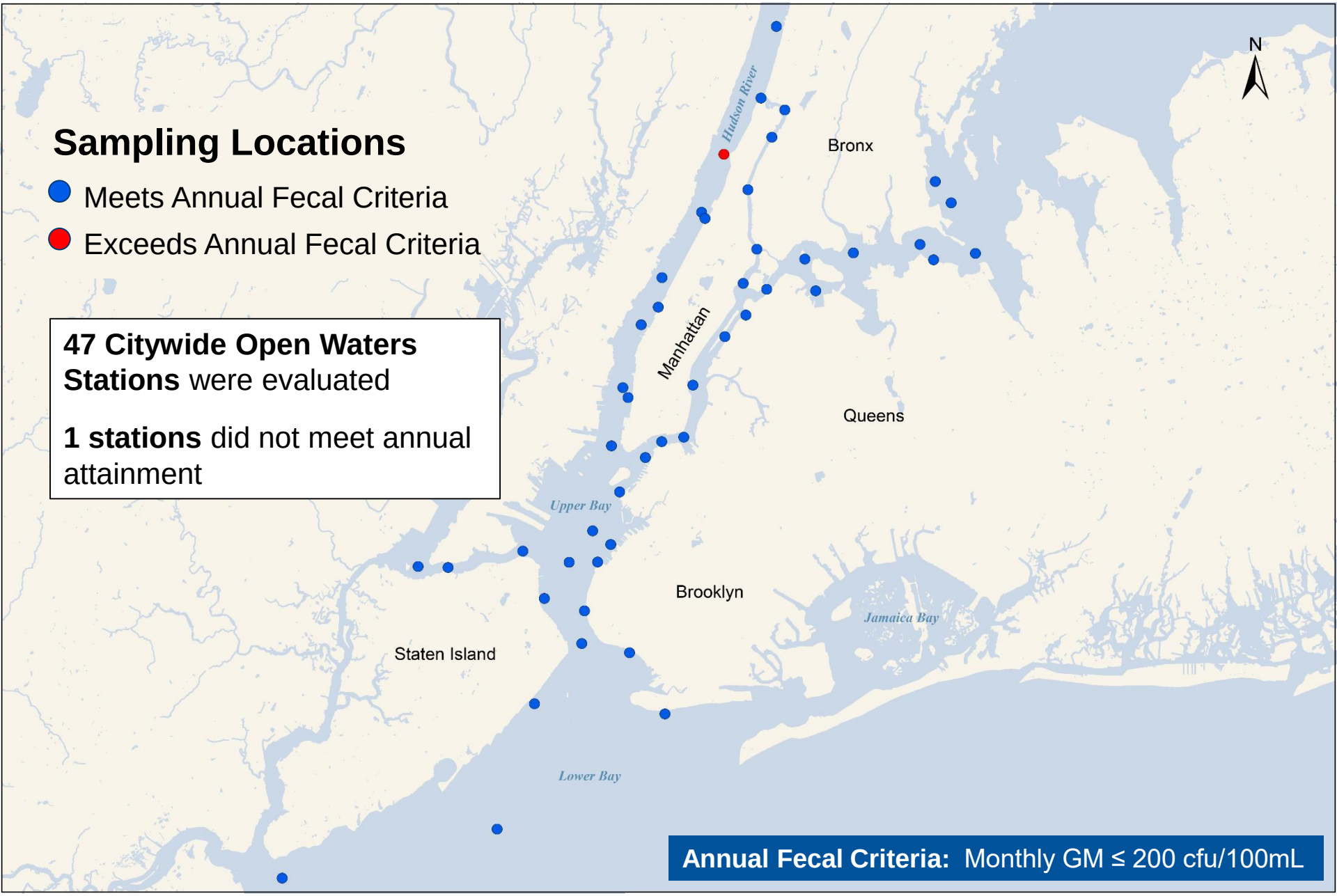
Sewer System Optimization



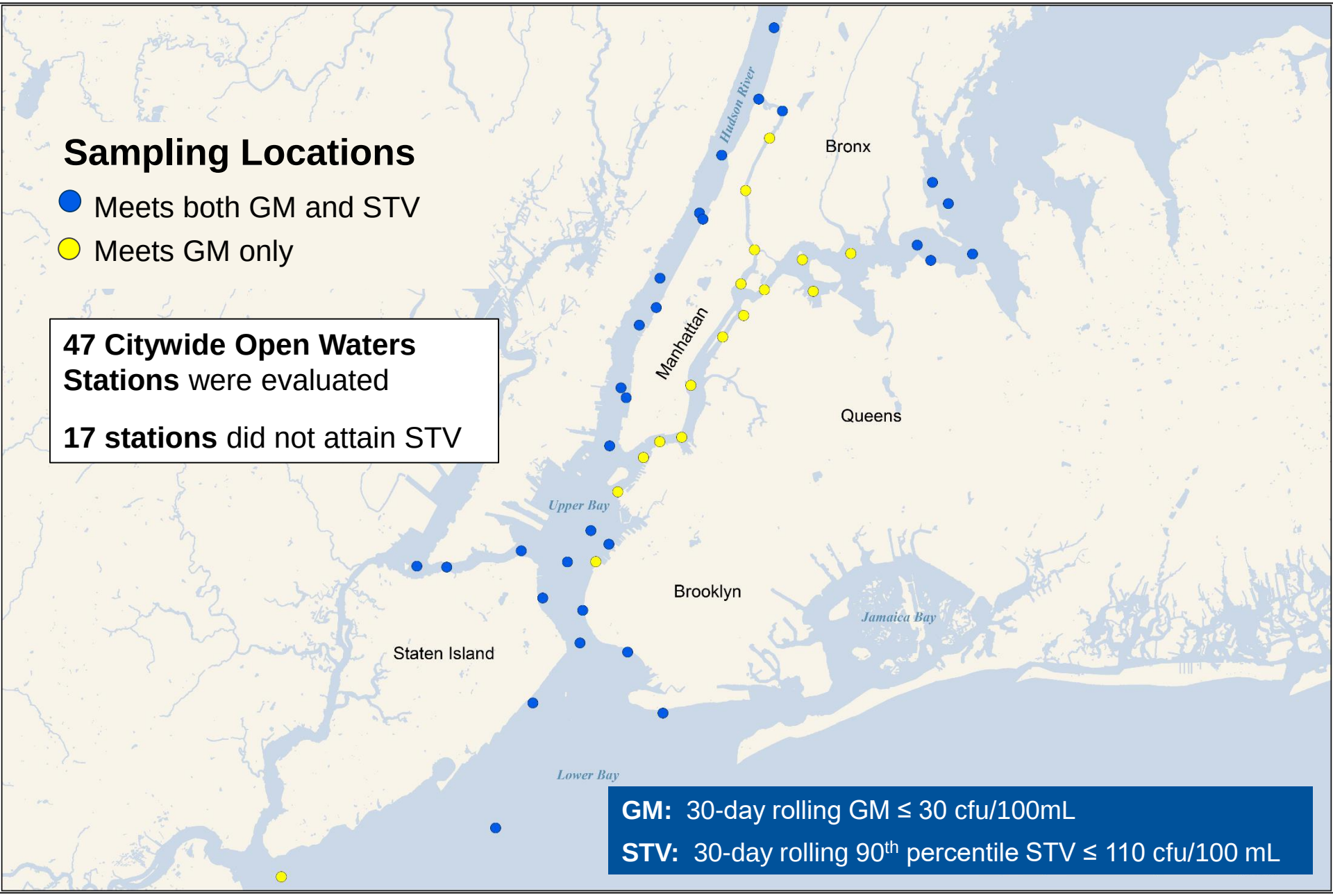
Tibbetts Brook Daylighting



Projected Citywide/Open Waters Fecal Compliance



Projected Citywide/Open Waters Entero Compliance



Questions?

Citywide/Open Waters LTCP

Public Participation

Mikelle Adgate
Senior Advisor for Strategic Planning

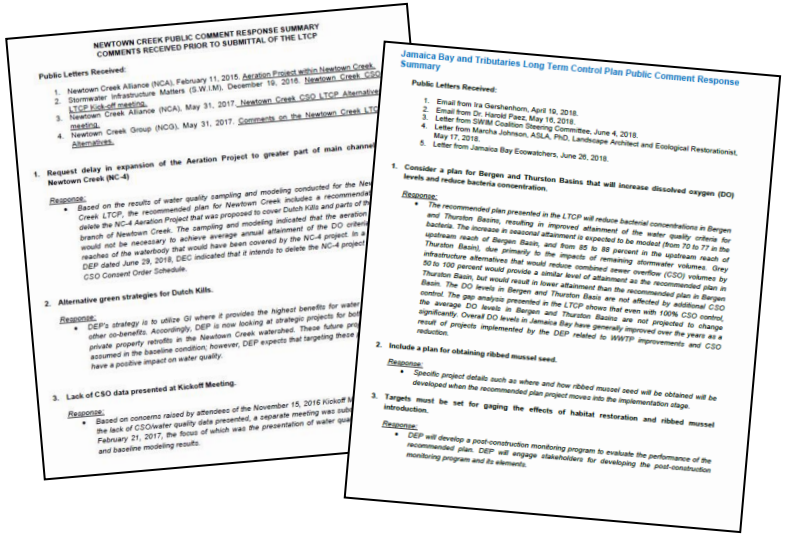
Public Participation Continues to Evolve

Additional stakeholder meetings

Improved Website & Social Media Usage

Waterbody Excursions

Responses to Public Comment Letters

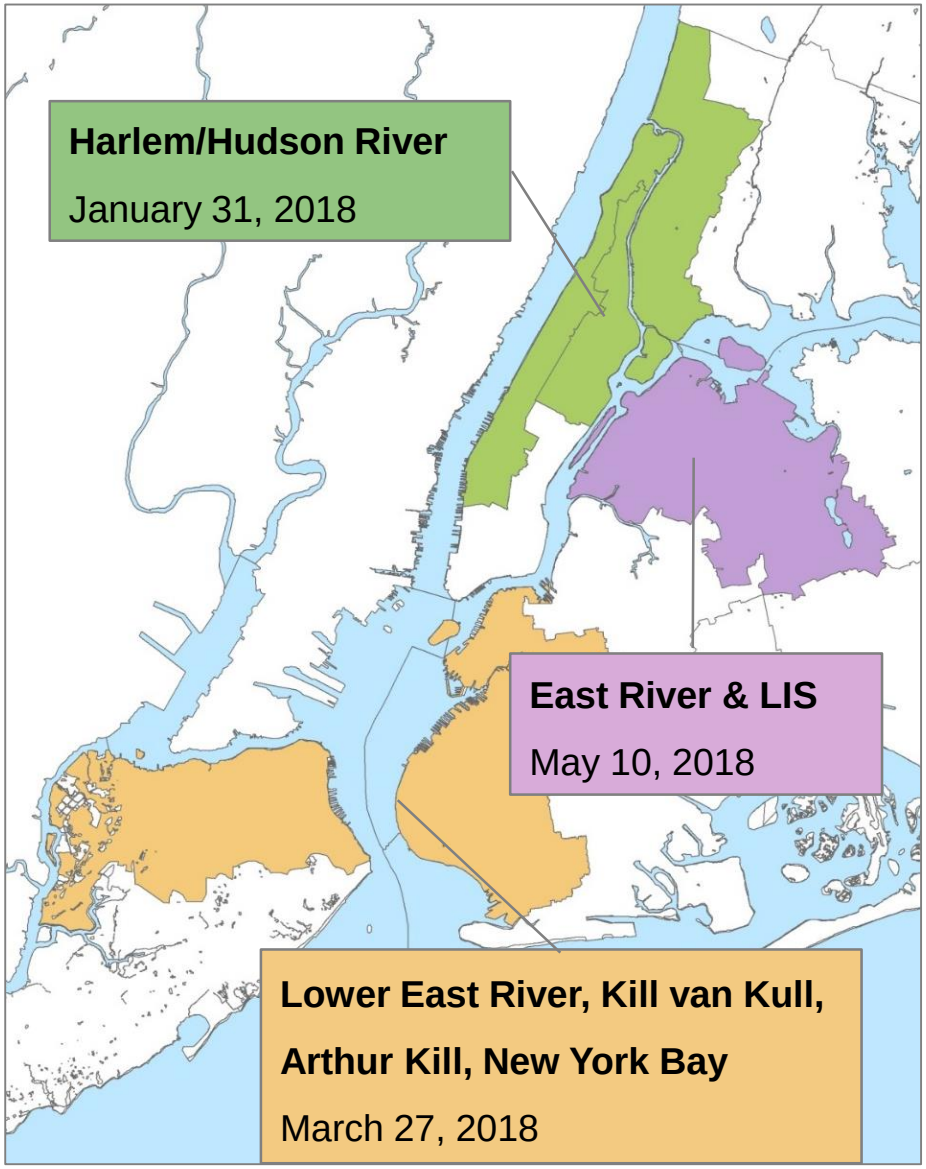


Citywide Open Waters: Three Kickoff Meetings

Presentations from all three kickoff meetings are available at **nyc.gov/dep/ltcp**

Presentations included:

- Waterbody & Watershed Characteristics and water quality sampling
- Existing and Planning Water Quality Improvement Projects
- LTCP Modeling Process and Alternatives Development Process



Citywide/Open Waters Public Outreach Schedule

Stakeholder Briefings
- Overview of LTCP Sections 1-7 Content
- Outline of LTCP Synopsis Document
- Updates on Progress

Retained Alternatives Public Meeting
- Release of Draft LTCP Summary
- Presentation of Retained Alternatives

LTCP Recommended Plan Public Meeting
- Presentation of LTCP Recommended Plan
- Revised LTCP Summary

APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR

2019 2020

LTCP Alternatives Comments Due (30 days)

LTCP Recommended Plan Comments Due (30 days)

Citywide/Open Waters LTCP Submittal to DEC
- Final LTCP Summary
- Complete LTCP Report including Response to Comments

Introducing: LTCP Summary

Proposed Approach:

- In addition to the full LTCP, the LTCP Summary will be public-friendly document that includes key takeaways for each Open Waters waterbody in a graphical format

- The summary will highlight alternatives, recommend plan, schedules and costs

Example Summary Documents

Questions?

Thank You!

www.nyc.gov/dep/ltcp
ltcp@dep.nyc.gov