



**Environmental
Protection**

Combined Sewer Overflow Long Term Control Plans

Citywide Public Meeting

December 11, 2014

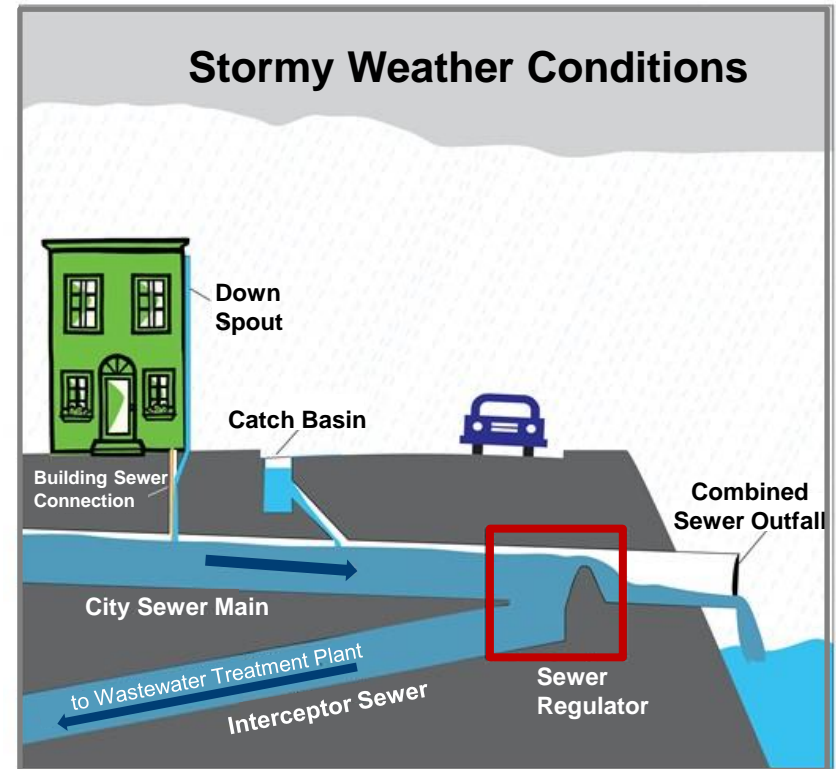
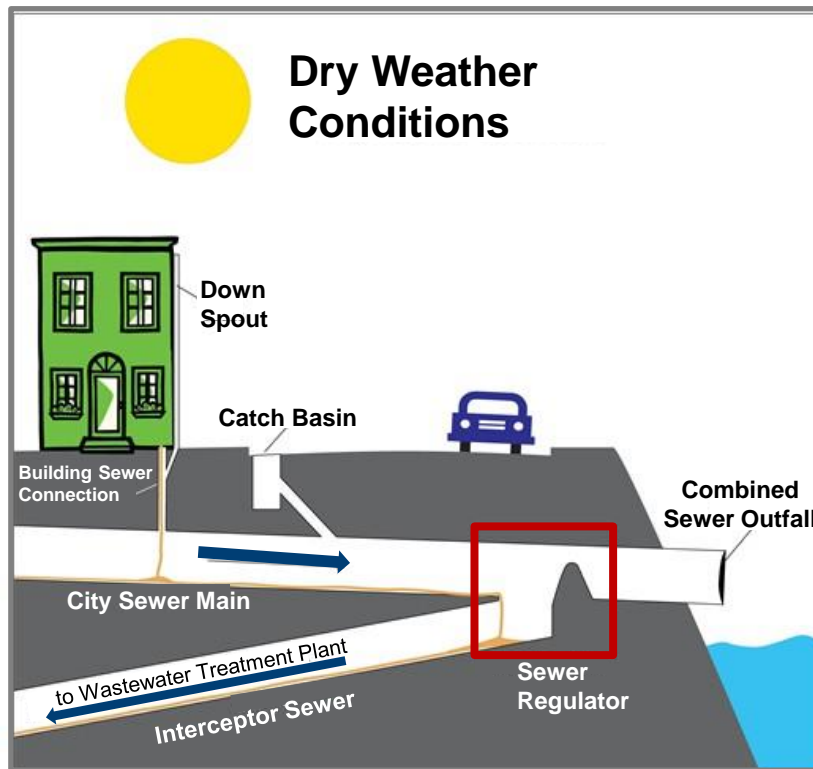
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New York City Wastewater Infrastructure

Emily Lloyd
Commissioner
DEP

What is a Combined Sewer Overflow?

- 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 can be released into local waterways. This is called a combined sewer overflow (CSO).
- 65% to 90% CSOs are fully captured at treatment plants.

Major Historical Timeline for Wastewater Infrastructure

**Clean
Water Act
1972**

**CSO
Order
1992**

**CSO
Consent Order
2005**

**Modified CSO
Consent Order
2012**



◆ **1967:** Newtown Creek WWTP Commissioned

◆ **1972:** Spring Creek CSO Facility Commissioned

1973 – 2011

Upgraded 12 WWTPs to **Secondary Treatment** and built **2 new WWTPs**

\$40 Billion
OMB Records &
10-yr Capital Plan

1995 – 2005

Implemented **Citywide Floatables Program**

\$34 Million
2004 NYCDEP's CSO White Paper

1995 – 2030

Construct **Grey / Green Infrastructure** to Mitigate CSOs

\$4.2 Billion
OMB Records & 10-yr Capital Plan

1999 – 2020

Upgrade **Biological Nitrogen Removal** at 70% of WWTPs

\$1.1 Billion
OMB Records & 10-yr Capital Plan

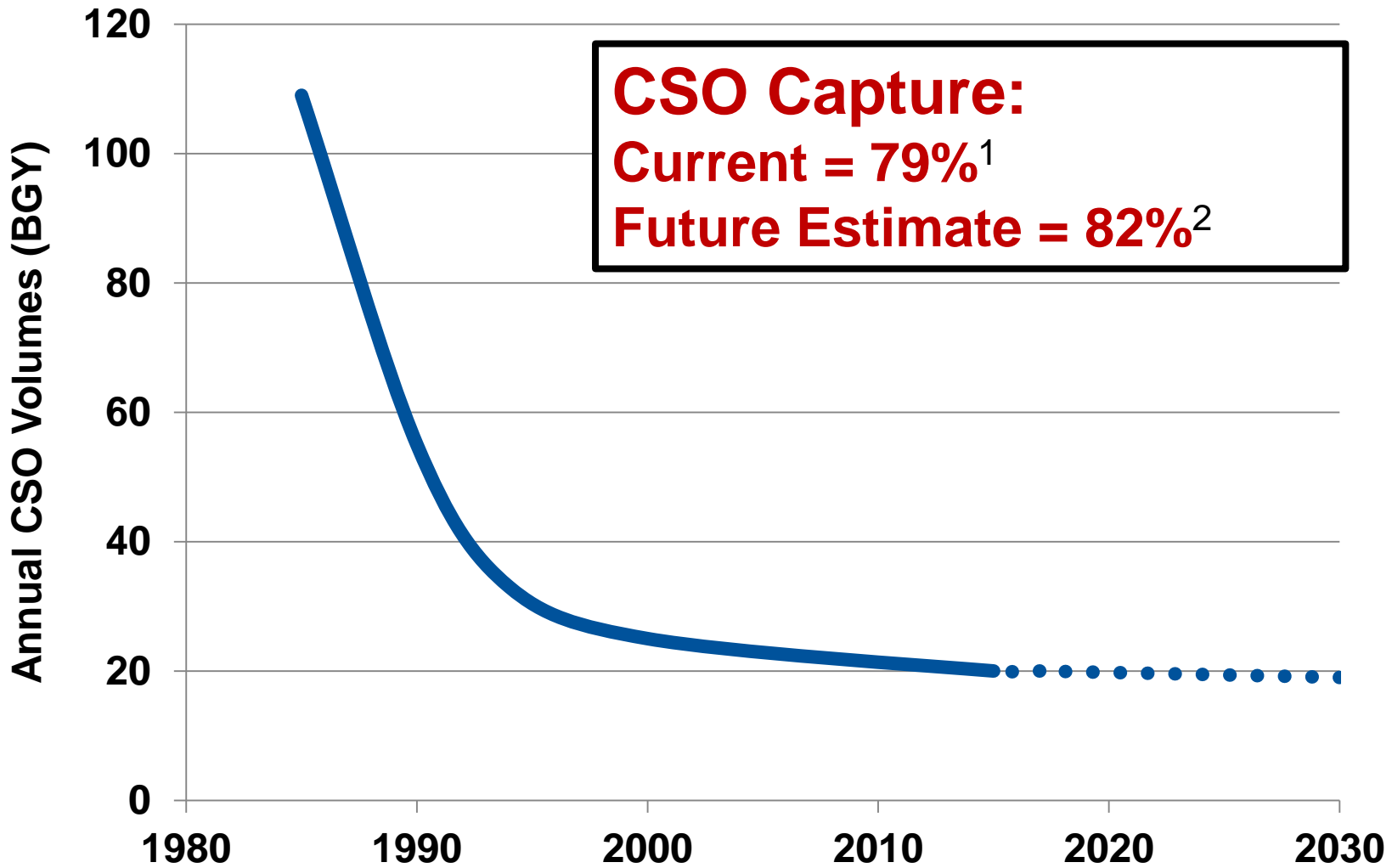
2005 – 2011
Develop **WWFPs**

2013 – 2017
Develop **LTCPs**

AC = Alley Creek
CSO = Combined Sewer Overflow
FC = Flushing Creek
LTCP = Long Term Control Plan

OMB = Office of Management and Budget
WWFP = Waterbody / Watershed Facility Plan
WWTPs = Wastewater Treatment Plants
SOGR = State of Good Repair

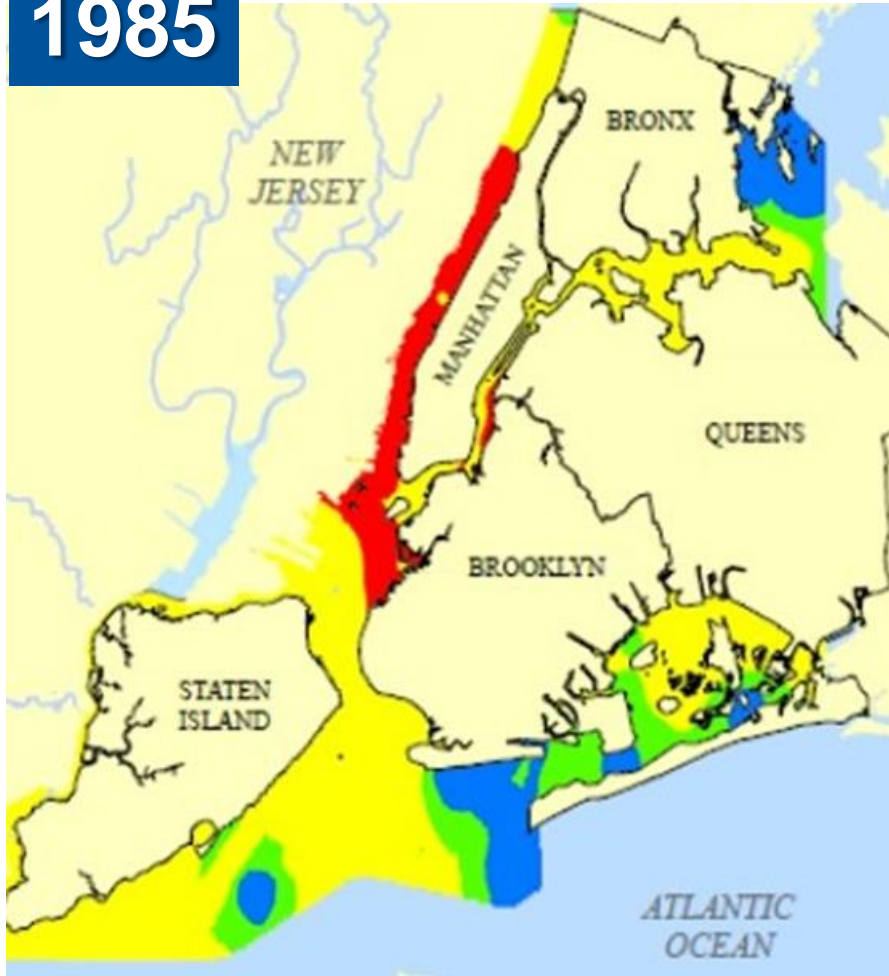
NYC CSO Reductions



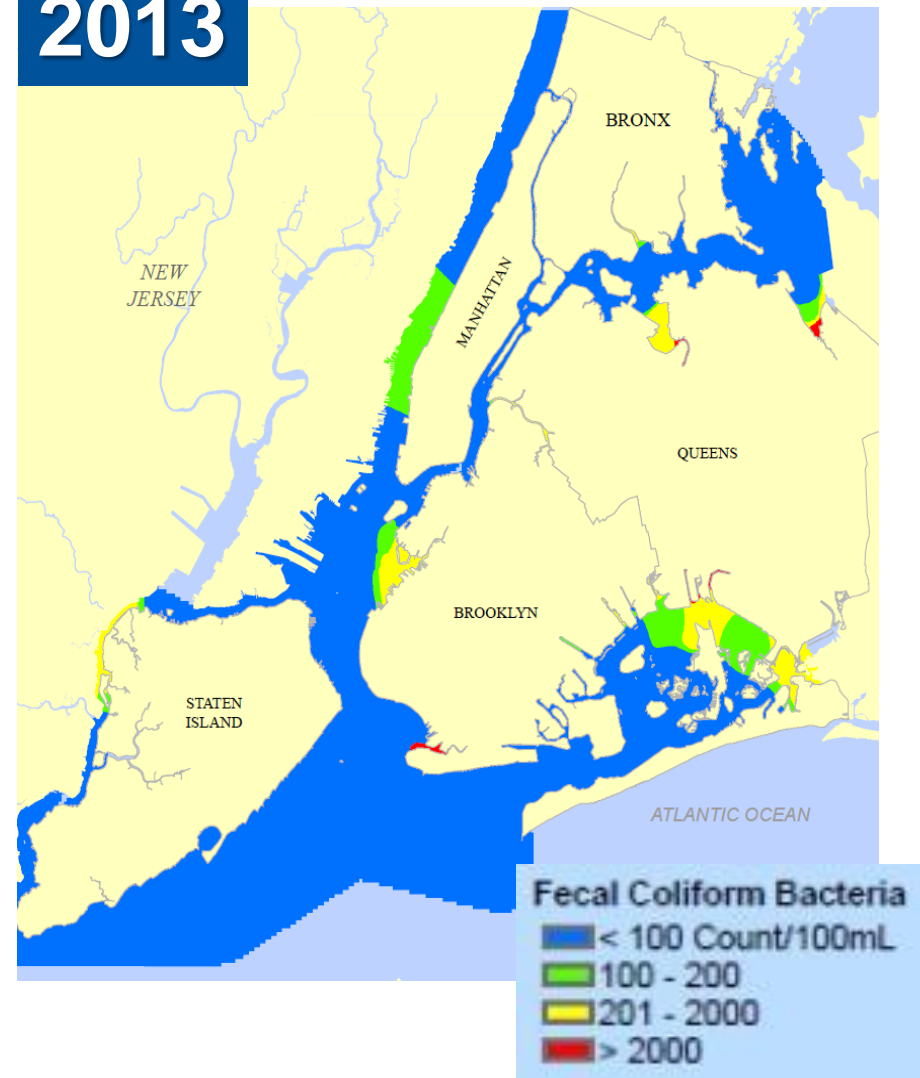
1) April 2014 CSO Annual Best Management Practices (BMP) Report
2) 2030 LTCP Baseline Scenario for Grey & Green Infrastructure Estimate

Fecal Bacteria Improvements

1985



2013



Data from Harbor Survey Program

Long Term Control Plan (LTCP)

**identifies appropriate CSO controls to achieve
applicable water quality standards**

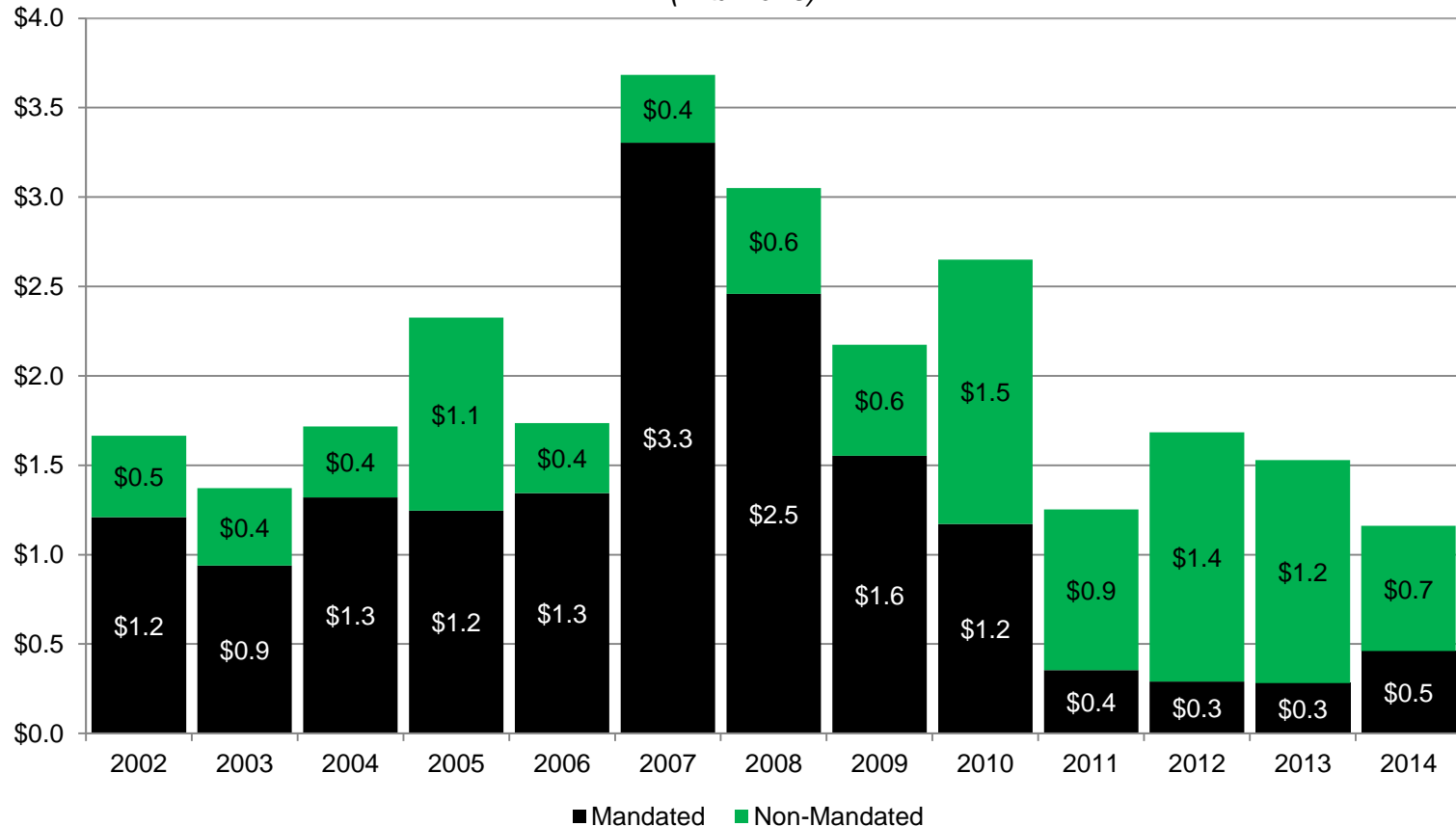
consistent with the Federal CSO Policy and Clean Water Act

Historical Capital Spending

- From FY 2002 to FY 2014, \$15.9 Billion (61%) of capital commitments were mandated. (\$9.9 billion was spent on Harbor Water Quality Improvements alone)

Capital Commitments

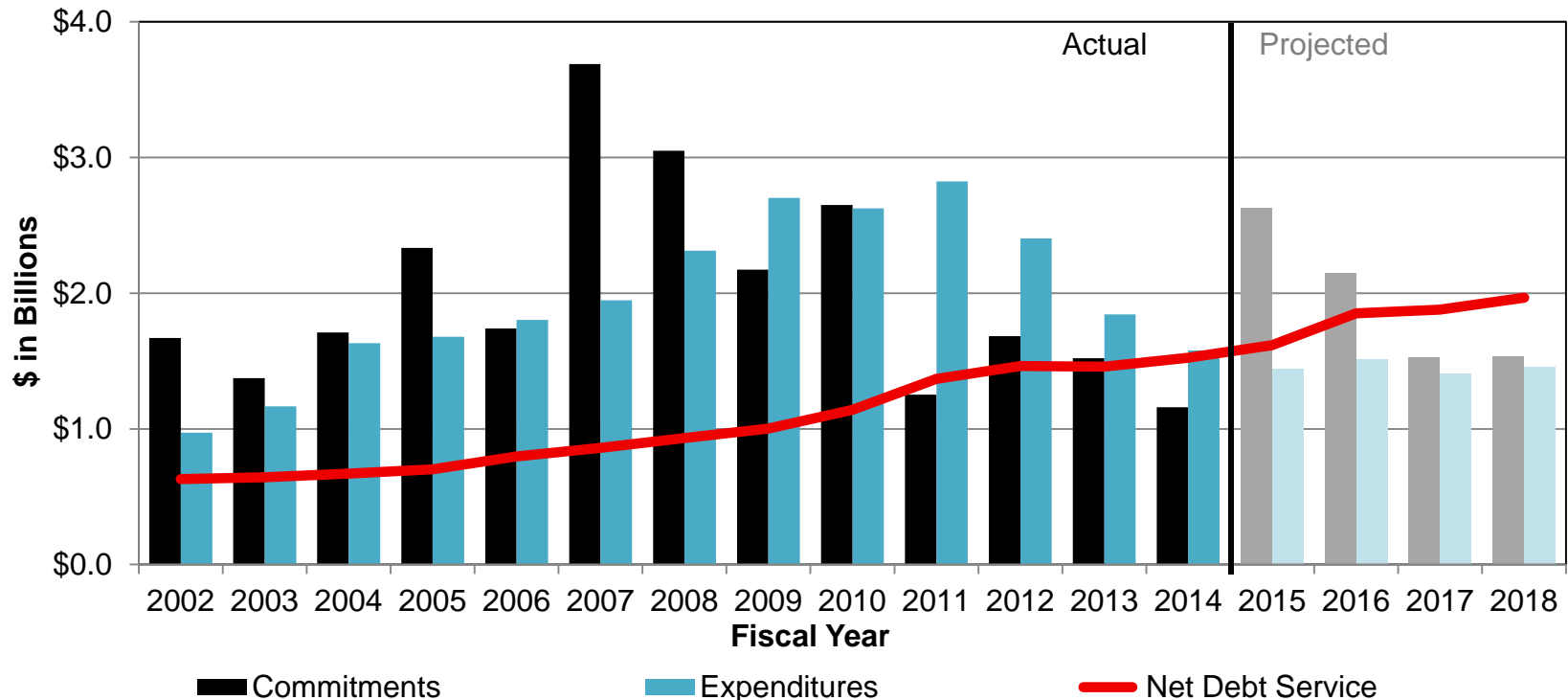
(in billions)



Total Commitments: \$26 Billion

Past Capital Costs and Current Debt Service

- The primary source of funding for DEP’s capital projects is the issuance of tax-exempt debt by the New York City Municipal Water Finance Authority
- From FY 2002 to FY 2014, capital expenditures that were funded by debt issuance totaled \$25.5 Billion, and debt service rose by 142% from \$629 Million to \$1.5 Billion per year
- DEP is currently preparing a new, proposed Ten Year Capital Plan; if projects are added, the projected capital commitments and expenditures graphed below will increase.



NYC Income Levels and Poverty Rates

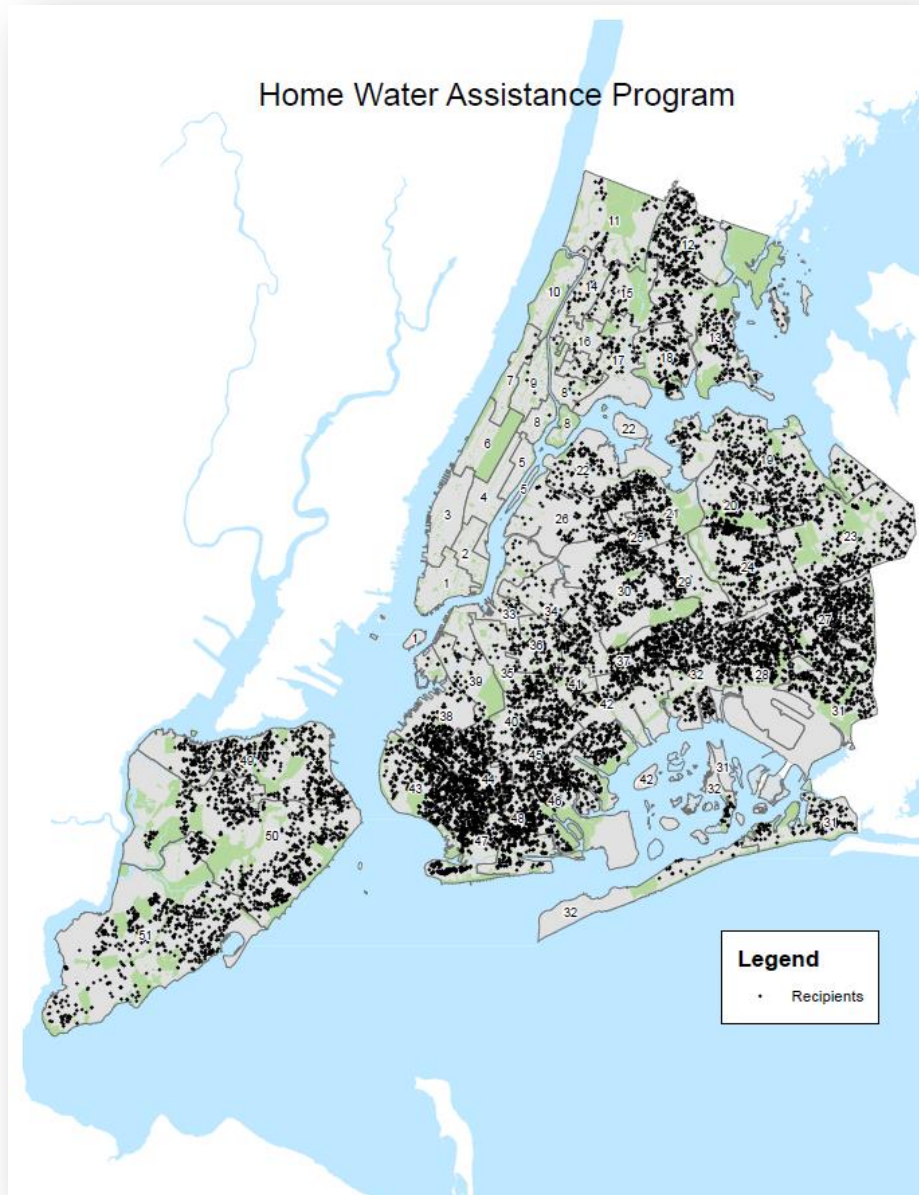
	2013 MHI
US	\$52,250
NYC	\$52,223
Bronx	\$33,009
Brooklyn	\$47,520
Manhattan	\$72,190
Queens	\$56,599
Staten Island	\$69,633

	% of individuals living below federal poverty level (2013)
US	15.8%
NYC	20.9%
Bronx	30.9%
Brooklyn	23.3%
Manhattan	18.9%
Queens	15.3%
Staten Island	12.8%

- While NYC Median Household Income (MHI) is comparable to national average, cost of living and housing burden for NYC residents is generally much higher.

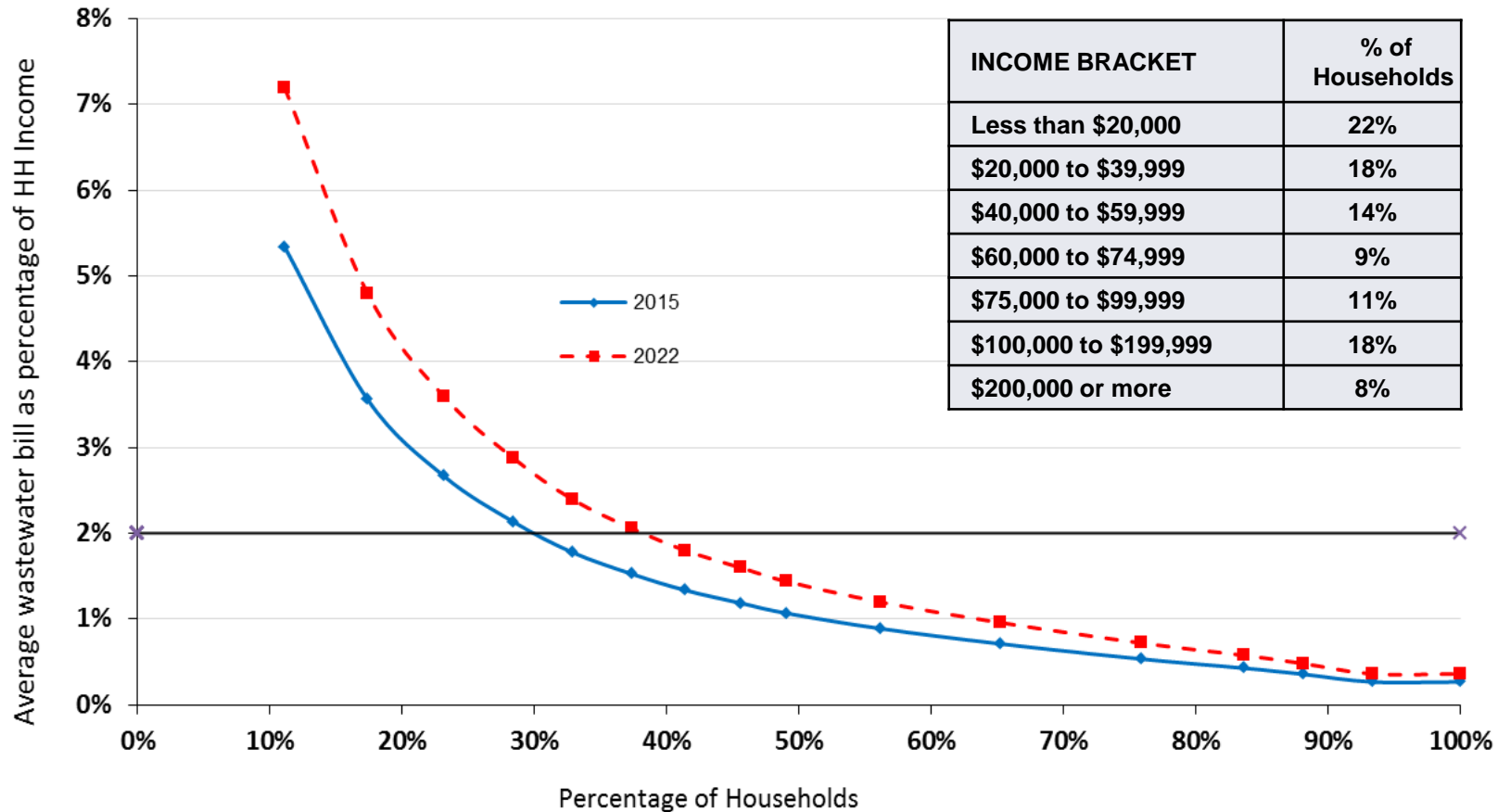
- ~ 21% of NYC population (> 1.7 million people) lives below the federal poverty level
- ~ 19 % of elderly population lives in poverty

Home Water Assistance Program



- DEP has partnered with the Human Resources Administration (HRA), which administers the Federal Home Energy Assistance Program (HEAP), to provide assistance to low income households
- More than 12,500 homeowners have received a credit of \$115.89

Avg. Wastewater Bill Compared to HH Income



- Currently ~28% of households (HH) pay 2% of income or more on wastewater/sewer bill
- Estimating modest future rate and income increases (based on costs in the CIP and historic Consumer Price Index data, respectively), this could increase to 36% in 2022

Long Term Control Plan

Jim Mueller, P.E.
Assistant Commissioner
DEP

Current NYS Water Quality Standards



Waterbody Classifications

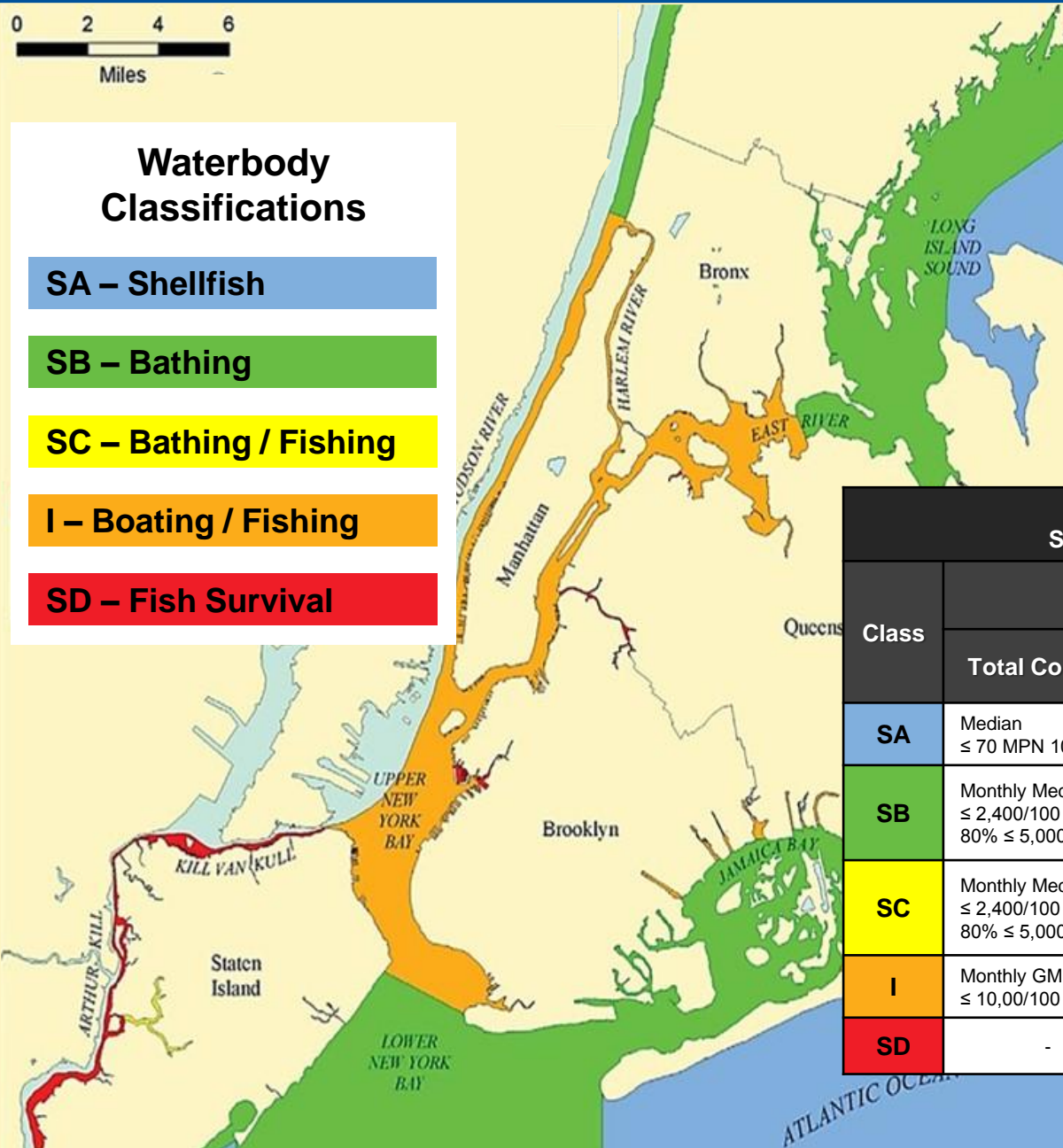
SA – Shellfish

SB – Bathing

SC – Bathing / Fishing

I – Boating / Fishing

SD – Fish Survival



New York State Saline Surface Water Quality Standards

Class	Bacteria <i>(when disinfection is practiced)</i>			Dissolved Oxygen <i>(acute, never less than)</i>
	Total Coliform	Fecal Coliform	Enterococci	
SA	Median ≤ 70 MPN/100 ml	-	-	≥ 4.8 mg/l (daily avg) ≥ 3.0 mg/l
SB	Monthly Median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml	Monthly GM ≤ 200/100 ml	*Geometric Mean ≤ 35/100 ml	≥ 4.8 mg/l (daily avg) ≥ 3.0 mg/l
SC	Monthly Median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml	Monthly GM ≤ 200/100 ml	*Geometric Mean ≤ 35/100 ml	≥ 4.8 mg/l (daily avg) ≥ 3.0 mg/l
I	Monthly GM ≤ 10,000/100 ml	Monthly GM ≤ 2,000/100 ml	-	≥ 4.0 mg/l
SD	-	-	-	≥ 3.0 mg/l

*Applicable to coastal waters. Does not apply to tributaries.

CSO Consent Order

**an agreement that settles past legal disputes
without prolonged litigation**

requires DEP to develop LTCPs and mitigate CSOs

➤ Builds upon success of 2005 CSO Consent Order

- Over 120 Consent Order milestones previously achieved
- Recommended plans from Waterbody Watershed Facility Plans are incorporated
- Projects about 90% of the NYC waterbodies will attain existing standards



Paerdegat Basin CSO Retention Facility



Flushing Bay CSO Retention Facility

CSO Improvement Projects

➤ 1995 – 2013:

- 4 CSO Storage Tanks (118 MG)
- Pumping Station Expansion (+60 MGD)
- Wet Weather Maximization (Tallman Island)
- Dredging (Paerdegat & Hendrix Creek)
- Floatables Control (Bronx & Gowanus)
- Aeration (English Kills)

➤ 2015 – 2020:

- Aeration (Newtown Creek)
- Regulator Modifications (Westchester Creek, Newtown Creek, Jamaica Tributaries)
- Sewer Work (Pugsley Creek, Fresh Creek HLSS, Belt Pkwy Crossing, & Flushing Bay Low Lying Sewers)
- Plant Wet Weather Stabilization
- Dredging (Flushing Bay)

➤ Costs:

- ~ \$2 Billion incurred to date
- ~ \$700 Million future capital

● 11 Waterbody /Watersheds:



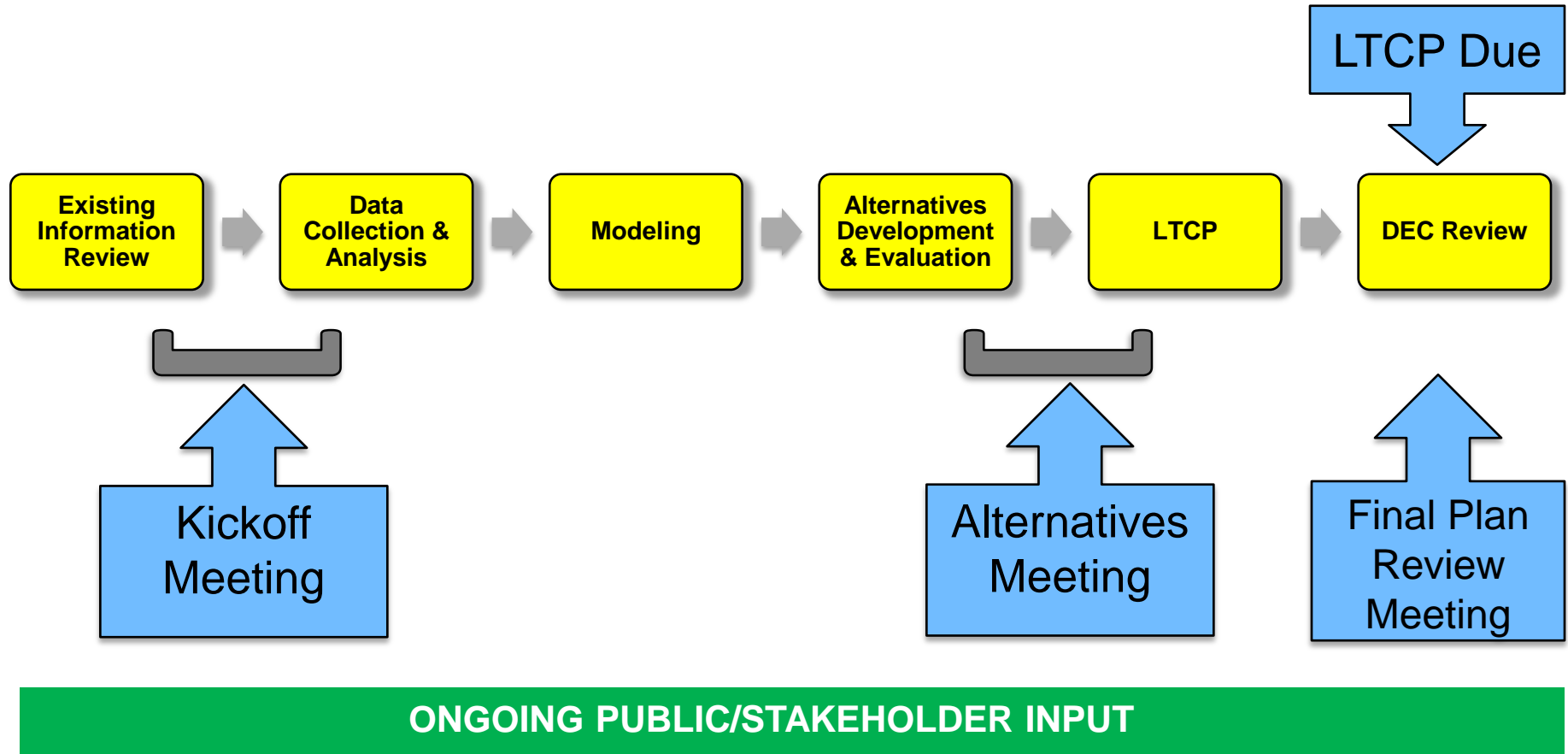
LTCP Submittal Dates

CSO Watershed	LTCP Due Date
Alley Creek	Submitted to DEC June 2014
Westchester Creek	Submitted to DEC June 2014
Hutchinson River	Submitted to DEC September 2014
Flushing Creek	December 2014
Bronx River	June 2015
Gowanus Canal	June 2015
Jamaica Tributaries & Bay	June 2016
Coney Island	June 2016
Flushing Bay	June 2017
Newtown Creek	June 2017
Citywide*	December 2017

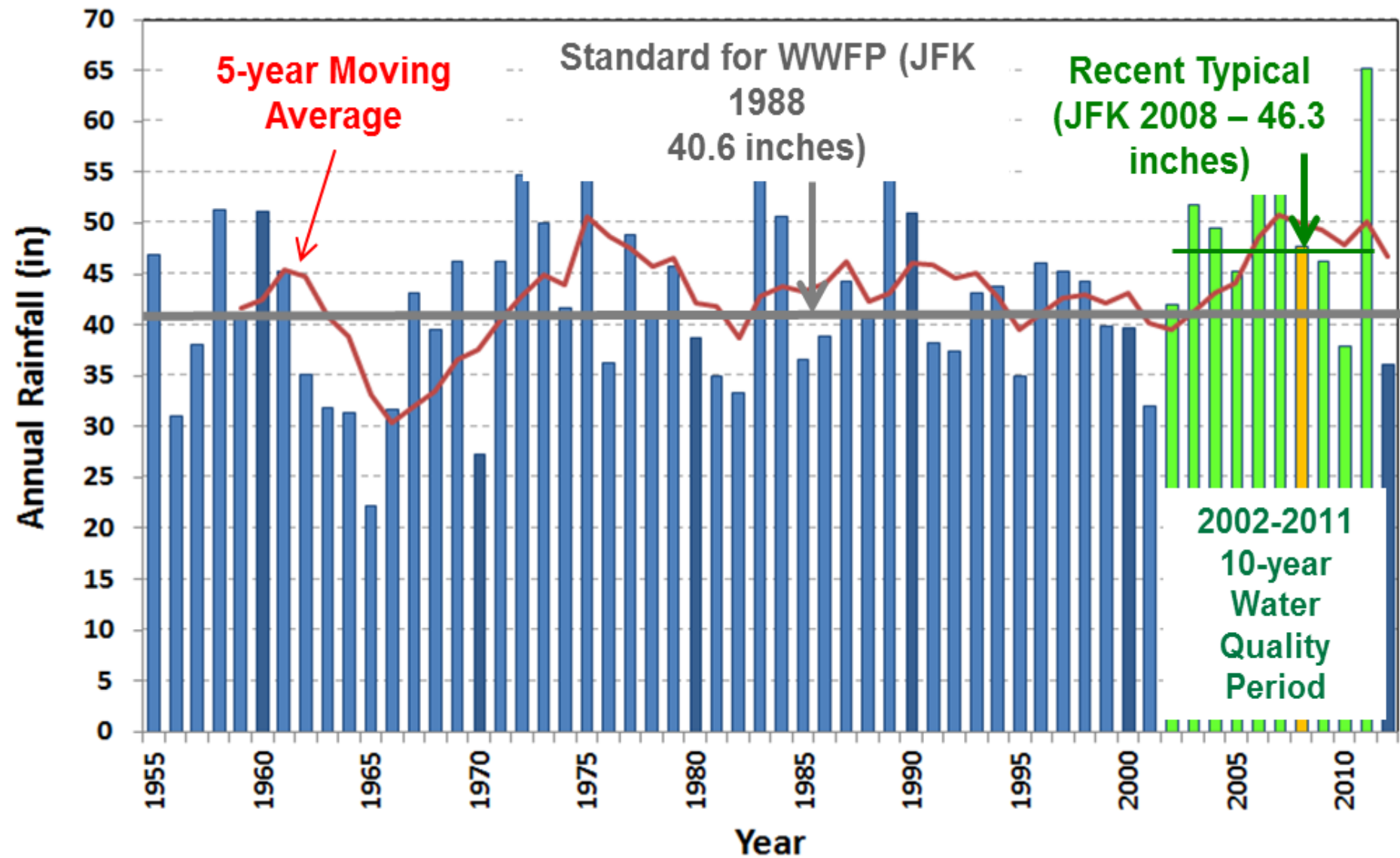
*The Citywide LTCP shall include the East River and Open Waters.

LTCP Process

LTCP Process and Public Involvement



Model Inputs & Assumptions



LTCP CSO Volume Baseline:

- 2008 JFK Rainfall & Tides
- Revised 2040 dry weather flow projections
- Plants at 2XDDWF capacity
- Updated imperviousness based on satellite imagery
- Grey infrastructure from approved WWFPs
- Green infrastructure projections
- Post-cleaning sediment conditions in interceptor

Water Quality Projection Assumptions:

- 10 year rainfall simulations performed for pathogens for:
 - Baseline Conditions
 - 100% CSO Reductions
 - Preferred Plan
- Screen and compared alternatives using 2008 rainfall

1. Bacteria Source Component Analysis

- CSO, stormwater and direct drainage

2. Gap Analysis for Water Quality Standard Attainment

- Calculate bacteria and dissolved oxygen for **baseline conditions**
- Calculate bacteria and dissolved oxygen for **100% control conditions**

3. Matching CSO Scenarios to CSO Engineering Control Alternatives



100% Storage

75% Treatment

50% System Optimization

25% Source Control

Traditional CSO Mitigation Toolbox

INCREASING COMPLEXITY 

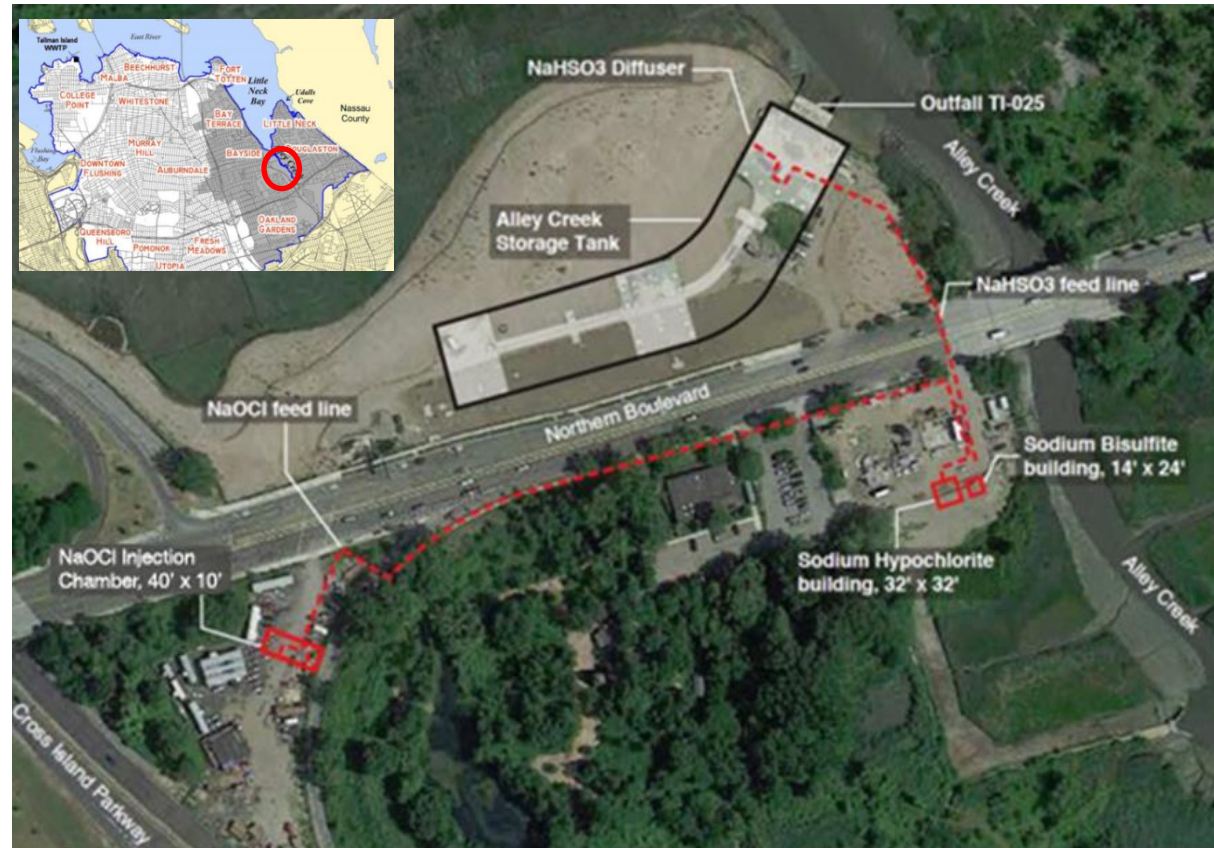
INCREASING COST 

System Optimization	Regulator Modifications	Parallel Interceptor	Inflatable Dams Bending Weirs Control Gates	Pump Station Expansion
CSO Relocation	Gravity Flow Tipping to Other WWTPs	Flushing Tunnel Reversal	Flow Tipping with Conduit/Tunnel and Pumping	
Treatment	Sewer Cleaning Maximize Flow to the WWTP	Outfall Disinfection	Retention Treatment Basin (RTB) with Disinfection	High Rate Clarification (HRC)
Storage	In-System	Shaft	Tank	Tunnel

LTCP Submittal Status

Alley Creek LTCP

- **Submitted to DEC June 2014**
- LTCP Under DEC Review:
 - Pilot Study
 - Recreational Season Disinfection Facility at the Existing CSO Facility:
 - ✓ Recreational season (May 1st – October 31st)
 - ✓ 99% bacteria kill
 - ✓ Cost \$ 11.3M
- Use Attainability Analysis (UAA) recommended as SB water quality standards are not attainable



Westchester Creek LTCP

- **Submitted to DEC June 2014**

- **LTCP Under Review by DEC:**
 - Continue to implement the WWFP recommendations: Pugsley Creek parallel sewer and regulator modifications
 - Implement a post construction monitoring

- **Use Attainability Analysis (UAA) recommended as SB water quality standards are not attainable**



Hutchinson River LTCP

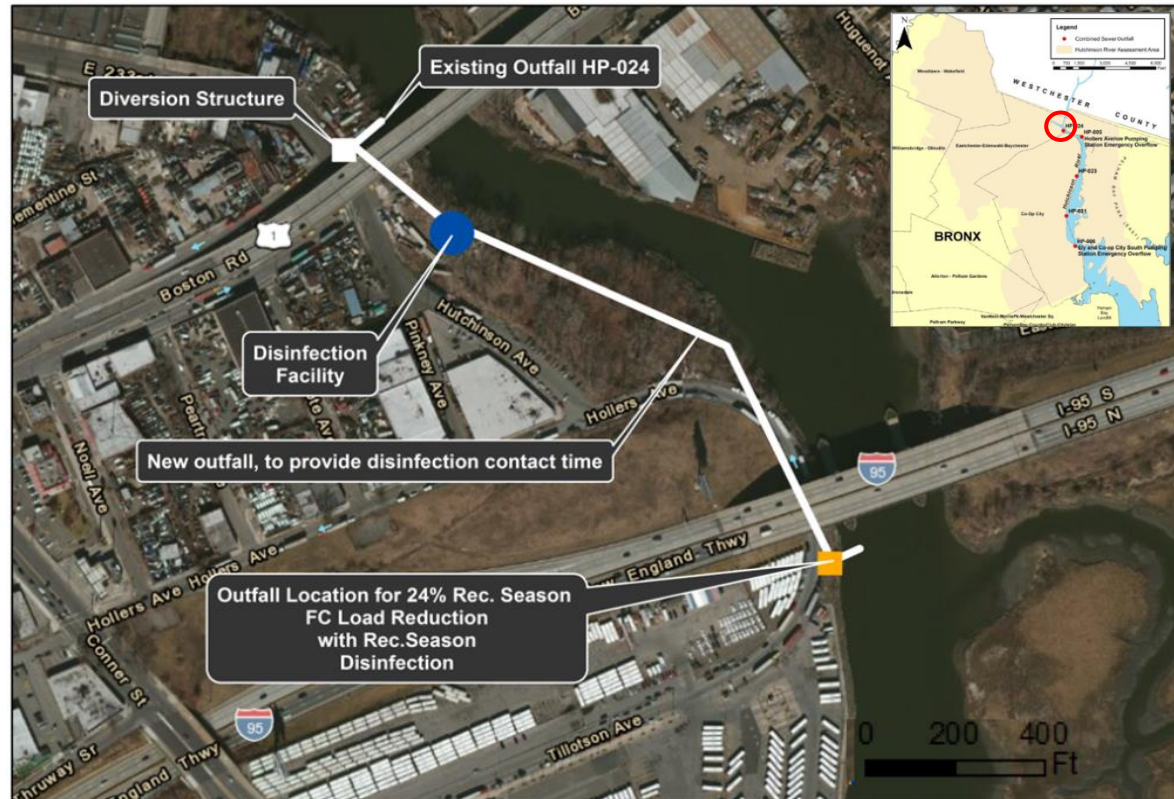
➤ Submitted to DEC September 2014

➤ LTCP Under DEC Review:

- Recreational Season Disinfection of 50 MGD of CSO in a 1,200 foot long, 10 foot diameter pipe, including a new outfall to the river:

- ✓ Construction cost \$90M
- ✓ Annual O&M cost \$1.25M
- ✓ Disinfection during recreational season only (May 1st – October 31st)

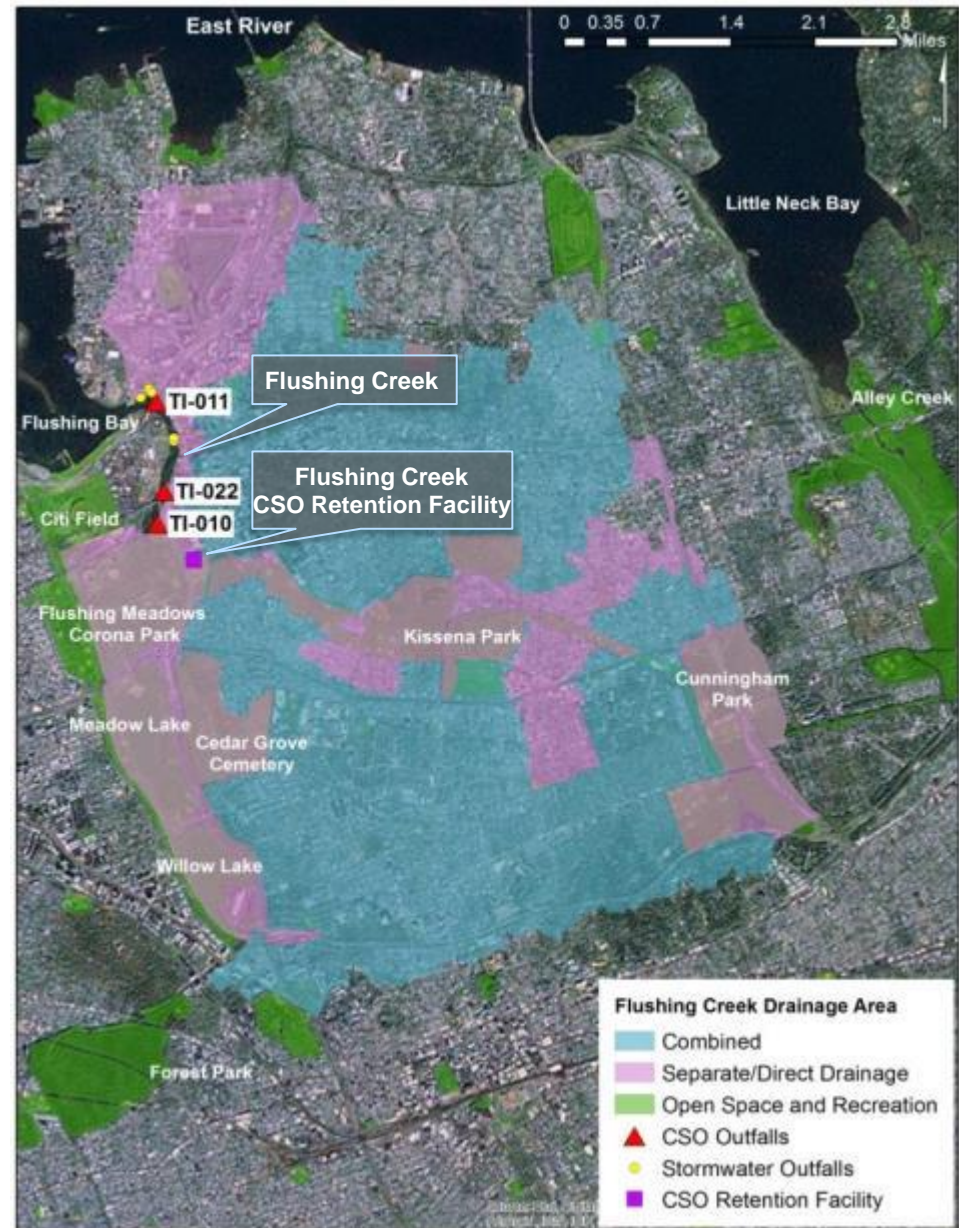
➤ Use Attainability Analysis (UAA) recommended as SB water quality standards are not attainable



- **To be Submitted to DEC December 2014**

- LTCP will recommend:
 - Recreational Season Disinfection of existing CSO Facility, TI-010 and TI-011 outfalls

 - ✓ Construction cost ~\$15M
 - ✓ Annual O&M cost \$450K
 - ✓ Disinfection during recreational season only (May 1st – October 31st)



2015

Bronx River
June 2015



Gowanus Canal
June 2015



Upcoming LTCP Submittals

2016

Coney Island Creek
June 2016



Jamaica Bay
June 2016



2017

Flushing Bay
June 2017



Newtown Creek
June 2017



Citywide
December 2017

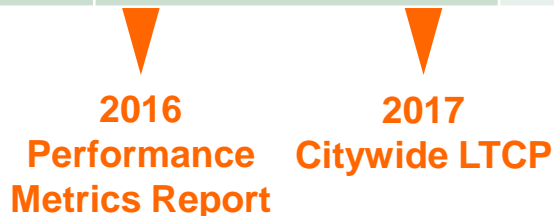


Green Infrastructure Program Update

Angela Licata
Deputy Commissioner
DEP

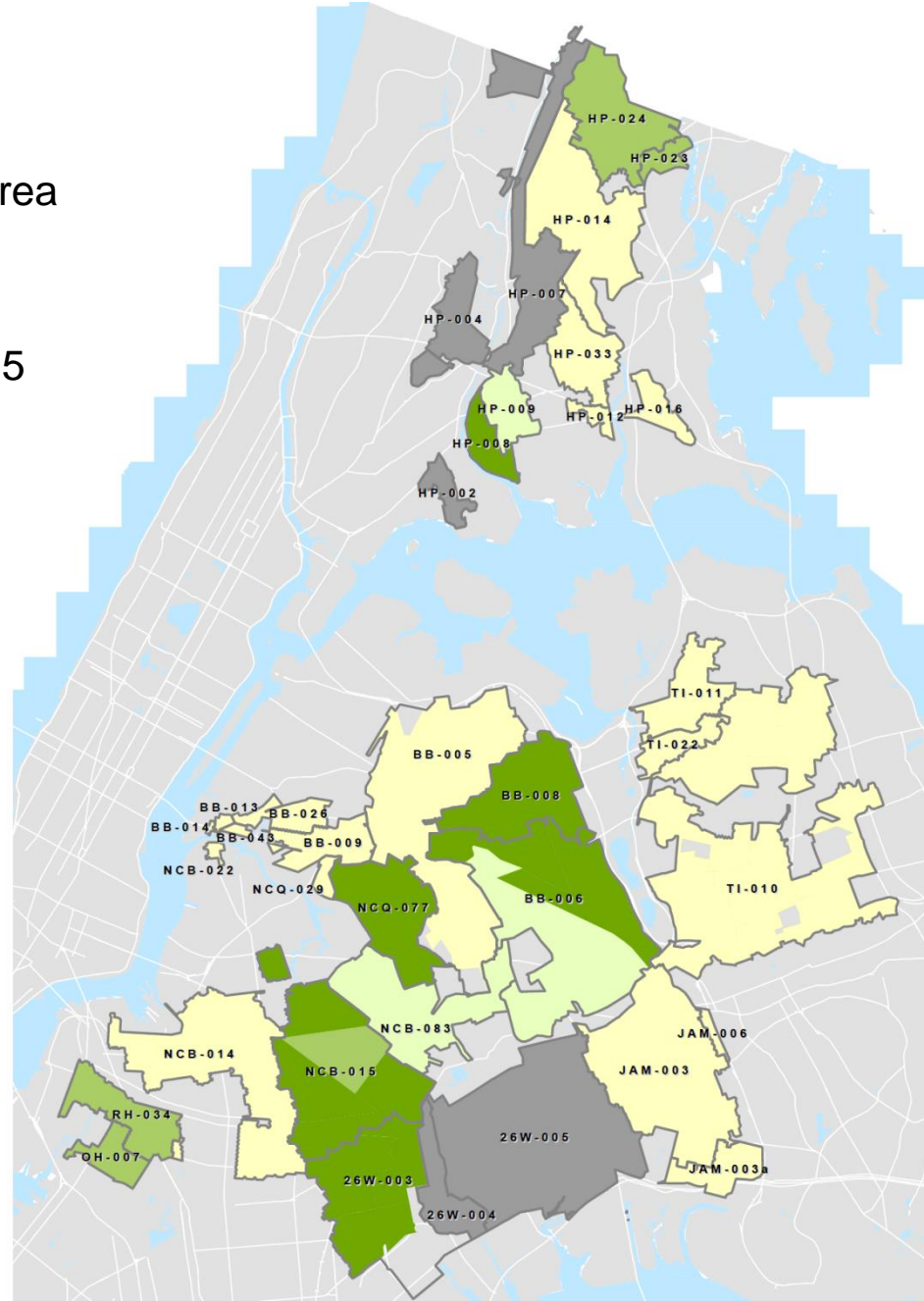
GI Milestones and Program Focuses

2011-2015	2016-2020	2021-2025	2026-2030
1.5%	4%	7%	10%
Heavy ROW Focus <i>Inter-agency partnerships, GI standards, Area-wide approach for design, construction & maintenance</i>	Continuing ROW	Remaining ROW	All work continuing until 10% target is reached
Early Projects/Establish Onsite Program <i>Develop MOUs with partner agencies, create design guidelines, site analysis, design/construct projects with NYCHA and DOE</i>	Greater Onsite implementation <i>Further design and construction, create design standards for onsite GI practices</i>	Continued Onsite implementation	
Planning/Analysis for additional GI tools <i>Pilot construction and monitoring</i>	Standardize additional GI tools	Continued implementation of innovative designs and GI tools	
Innovative design and development	Further development of new tools <i>R&D Program</i>		



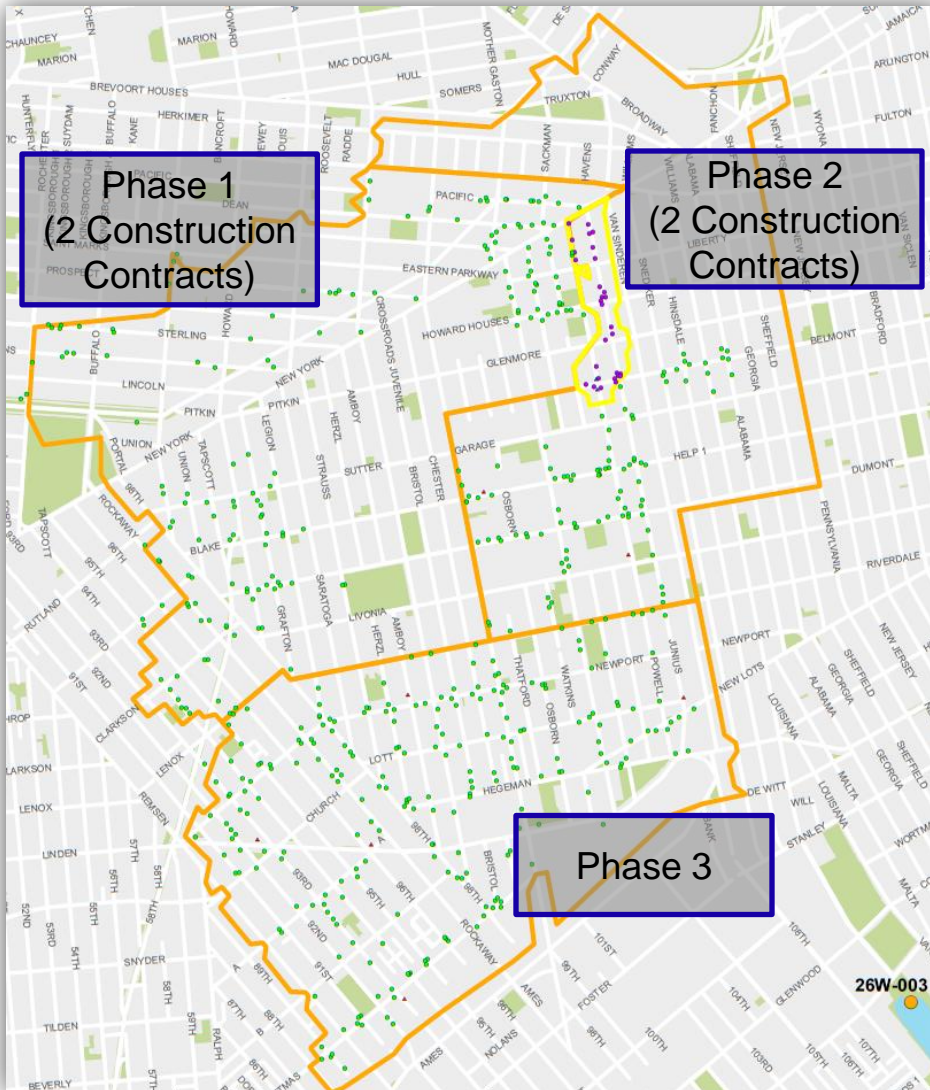
Area-Wide GI Contracts – ROW Construction Status

- CSO Tributary Area
- In Construction
- Winter 2014/2015
- Spring 2015
- In Design
- Design Initiated



Area-Wide Construction

DEP and agency partners currently have **19 active construction contracts**. Each contract consists of approx. 150-200 ROWBs at a time.





Bioretention – Hope Gardens Brooklyn

Public Onsite Retrofit Projects

DEP continues to work with partner agencies to assess all possible green infrastructure retrofit opportunities within Priority CSO Tributary Areas:

- NYC Department of Parks and Recreation (DPR)
 - Community Parks Initiative - \$36 M Partnership
- NYC School Construction Authority (SCA)
- NYC Department of Education (DOE)
- NYC Housing Authority (NYCHA)
- NYC Department of Cultural Affairs (DCA)
- Public-Private Partnership with Trust for Public Land DOES/SCA

Green Infrastructure Grant Program

29 active projects; Fall 2014 application closed November 13, 2014.



GI Maintenance Crew (Brooklyn)

ROW Maintenance:

- DEP funds 3 DPR crews to maintain sites in the ROW on a weekly or bi-weekly schedule.
- Future Maintenance Plans – new hires being planned now for near term; approximately 125 jobs for the ROW maintenance to be available.

Onsite Maintenance:

- Individual maintenance agreements with each partnering agency.

Neighborhood-Scale Demo Monitoring Results

	Demo Area 1	Demo Area 2	Demo Area 3
Total Tributary Drainage Area	24.1 ac	22.7 ac	19.3 ac
Impervious Cover*	81%	92%	92%
Design Managed Area for 1 inch Rainfall (% of Impervious Tributary Drainage Area*)	1.2 ac (6.1%)	2.5 ac (12.0%)**	0.9 ac (5.1%)***
Measured Managed Area for 1 inch Rainfall (% of Impervious Tributary Drainage Area*)	3.5 ac (17.9%)	3.9 ac (18.7%)	0.9 ac (5.1%)
Measured Managed Volume for 1 inch Rainfall	12,700 ft ³	14,300 ft ³	3,200 ft ³
% Managed Area for 1 inch Runoff from Impervious Area* across all three Demo Areas	14.3%		

**Based on impervious coverage as measured by analysis of multi-spectral infrared satellite imagery.*

***Excludes on-site GI. Including on-site would increase design managed area to 3.0 acres.*

****Excludes on-site GI. Including on-site would increase design managed area to 1.6 acres.*

Acknowledgments

Angela Licata
Deputy Commissioner
DEP

LTCP Public Participation

Eric Landau
Associate Commissioner
DEP

➤ Goal:

- Raise awareness, foster understanding, and encourage input on LTCP development.

➤ Activities:

- **Annual citywide public meetings rotating across boroughs**
- Meeting with key stakeholders and organizations
- Local public meetings in each watershed and existing forums
- Briefings with elected officials and their staff

➤ Communication Tools:

- Program Website
- Social Media
- Advisories & Notifications



- Please visit www.nyc.gov/dep to access:
 - LTCP Public Participation Plan
 - Presentation, handouts and poster boards from kick-off meeting
 - Links to Waterbody/Watershed Facility Plans
 - CSO Order including LTCP Goal Statement
 - NYC's Green Infrastructure Plan
 - Green Infrastructure Pilots 2011 Monitoring Results
 - Real-time waterbody advisories
 - Upcoming meeting announcements
 - CSO Quarterly Reports
 - Other LTCP updates

- Comments can be submitted at any information station or sent to:
 - New York City DEP at: ltcp@dep.nyc.gov

Questions and Comments?