

# Video Loop



*On July 20<sup>th</sup>, 2016, DEP joined the Newtown Creek Alliance for a canoe tour of Newtown Creek*



# **Newtown Creek**

## **Combined Sewer Overflow Long Term Control Plan**

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### **Review of Alternatives**

Location: Newtown Creek WWTP

Date: April 26, 2017

# Agenda

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	<b>Topic</b>	<b>Speaker</b>
1	Welcome and Overview	Angela Licata
2	Recap of LTCP Process	Mikelle Adgate
3	Water Quality, Baseline Conditions and Performance Gap	Keith Mahoney
4	Evaluation of Alternatives	James Mueller
5	Discussion and Q&A Session	All
6	Next Steps	Mikelle Adgate

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# Welcome and Overview

Angela Licata  
Deputy Commissioner, Sustainability  
DEP – BEPA

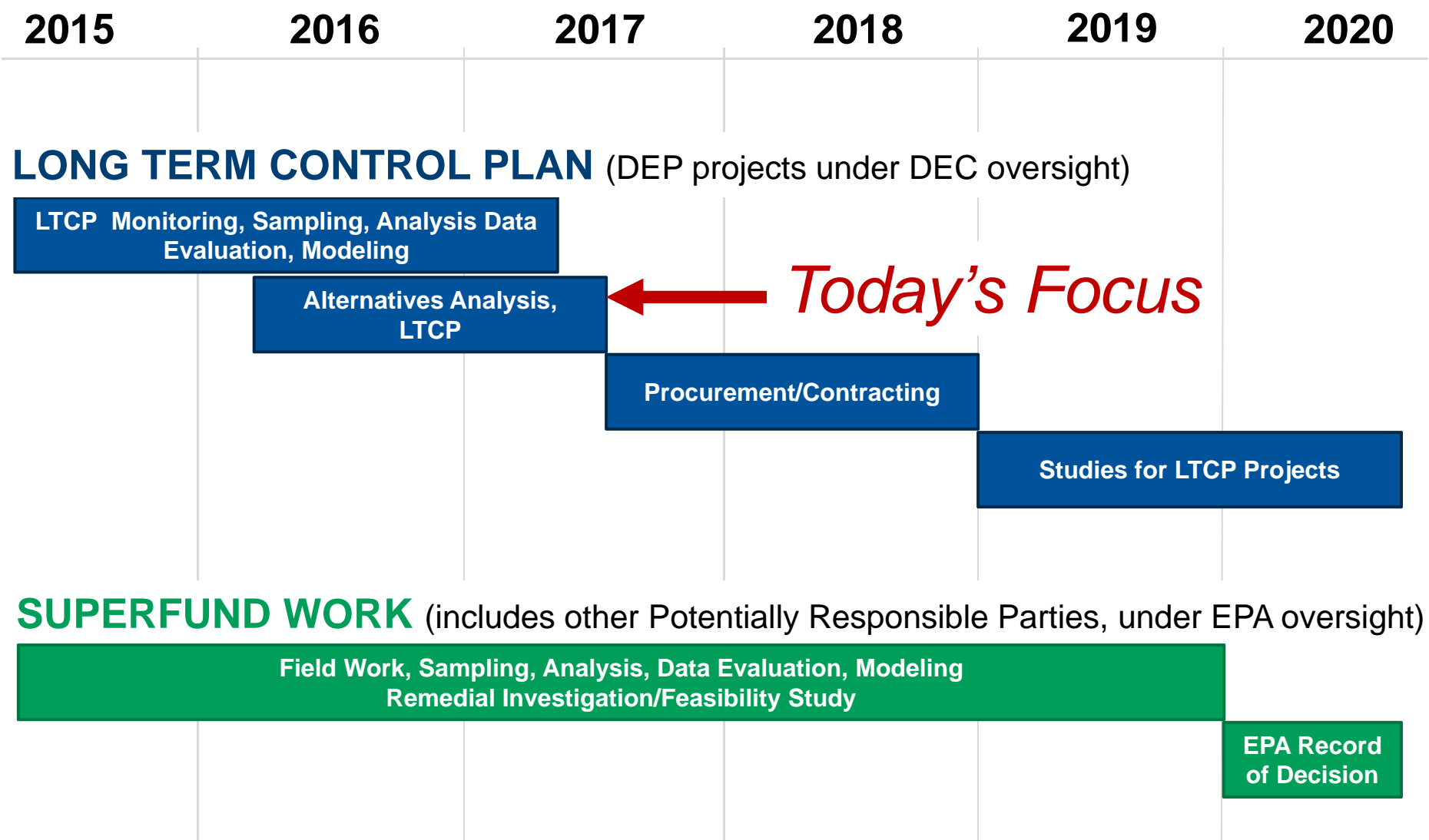
## ➤ Clean Water Act (1972)

- Goal: “Water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water.”
- Administered by DEC in the State of New York
- The goal of DEP’s **Long Term Control Plan** is to bring water quality into compliance with DEC’s water quality standards for **pathogens** and **dissolved oxygen**. It is due **June 30, 2017**.

## ➤ Comprehensive Environmental Response, Compensation, and Liability Act (1980)

- Commonly known as **Superfund**, establishes prohibitions and requirements concerning the remediation of closed and abandoned hazardous waste sites
- Administered by USEPA
- Focus on **chemical contaminants** such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, metals, and oil wastes such as non-aqueous phase liquids (NAPLs).
- The goal of the **Remedial Investigation/Feasibility Study** is to define the extent and nature of contamination as well as the fate and transport of ongoing sources of contaminants to the Creek, including upland sites. Feasible alternatives to address contaminants and their sources are then evaluated. It is currently due **2019**.

# Concurrent Newtown Creek Programs



## CLASS SD

### Fish Survival

The **best usage** of Class SD water is **fishing**. These waters shall be suitable for fish, shellfish, and wildlife survival. In addition, the water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Parameter	Criteria*	DEC Water Quality Parameter Reference
<b>Fecal Coliform</b>	Monthly Geometric Mean ≤ 200 col/100 mL	<ul style="list-style-type: none"> <li>• New York Codes, Rules and Regulations</li> <li>• (NYCRR Part 703.4)</li> </ul>
<b>Total Coliform</b>	Monthly Geometric Mean ≤ 2,400 col/100 mL 80% ≤ 5,000 col/100 mL	<ul style="list-style-type: none"> <li>• New York Codes, Rules and Regulations</li> <li>• (NYCRR Part 703.4)</li> </ul>
<b>Dissolved Oxygen</b>	≥ 3.0 mg/L (acute, never less than)	<ul style="list-style-type: none"> <li>• New York Codes, Rules and Regulations</li> <li>• (NYCRR Part 703.3)</li> </ul>

\* EPA has also proposed a potential future RWQC for enterococcus: 30-Day Rolling GM ≤ 30 col/100 mL.

### ➤ CSO LTCP Goals and Targets:

- Seasonal Bacteria Compliance
- Annual Dissolved Oxygen Compliance
- Time to Recovery for Bacteria of ≤ 24 hours
- Floatables Control

# Recap of LTCP Process

Mikelle Adgate  
Director of Stormwater Management Outreach  
DEP – BPA



## ➤ What is an LTCP?

- The goal of each LTCP is to identify appropriate CSO controls necessary to achieve waterbody specific water quality standards, consistent with the Federal CSO Policy and water quality goals of the CWA.

## ➤ The LTCP process:

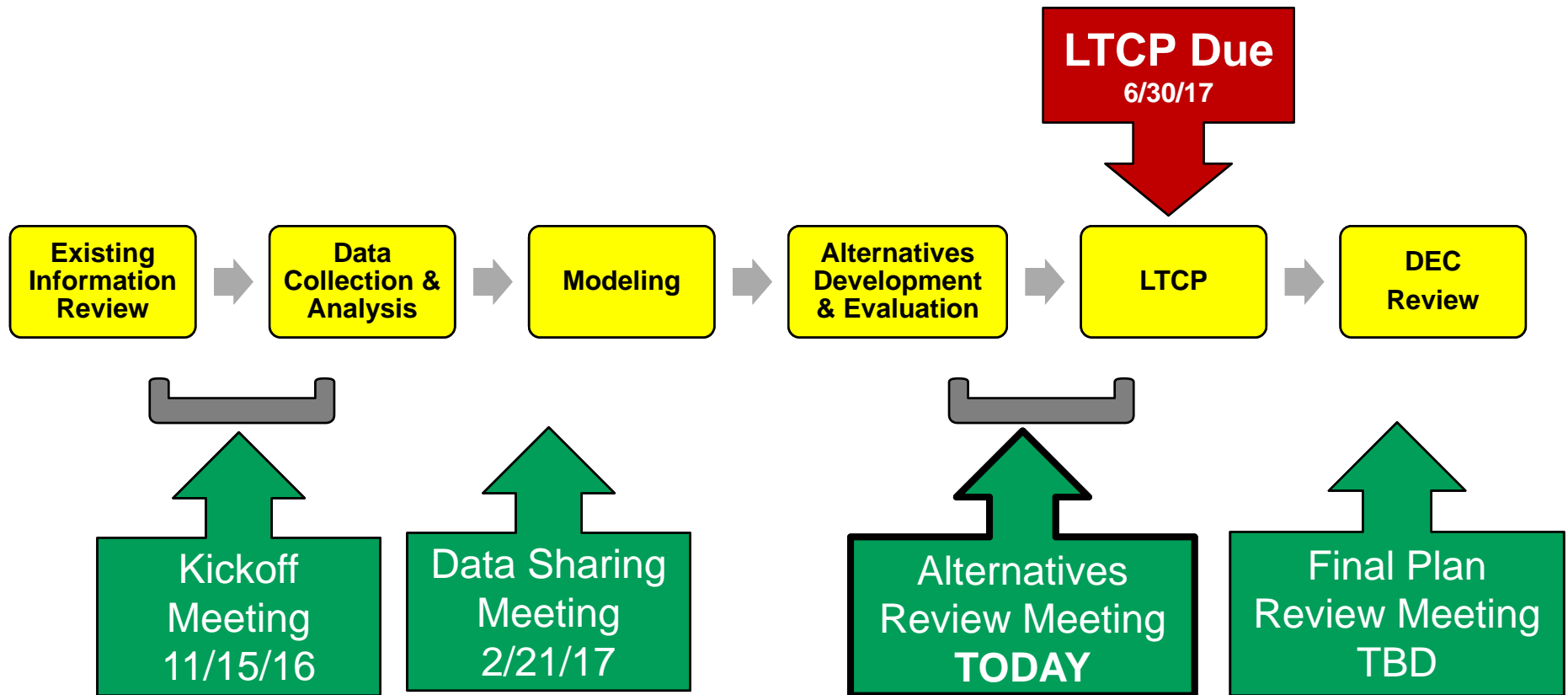
- Builds off existing infrastructure investments (i.e. Waterbody/Watershed Plans)
- Assesses current waterbody and watershed characteristics
- Identifies and analyzes **Grey-Green\*** infrastructure balance for different watersheds to meet applicable water quality standards
- The LTCP is subject to DEC review and approval
- Includes a public engagement process

### *\*Definitions:*

**Grey** = traditional practices such as tanks, pipes, and sewers

**Green** = sustainable pollution reducing practices that also provide other ecosystem benefits

# LTCP Process and Public Involvement



**ONGOING PUBLIC/STAKEHOLDER INPUT**

# Public Comments Received

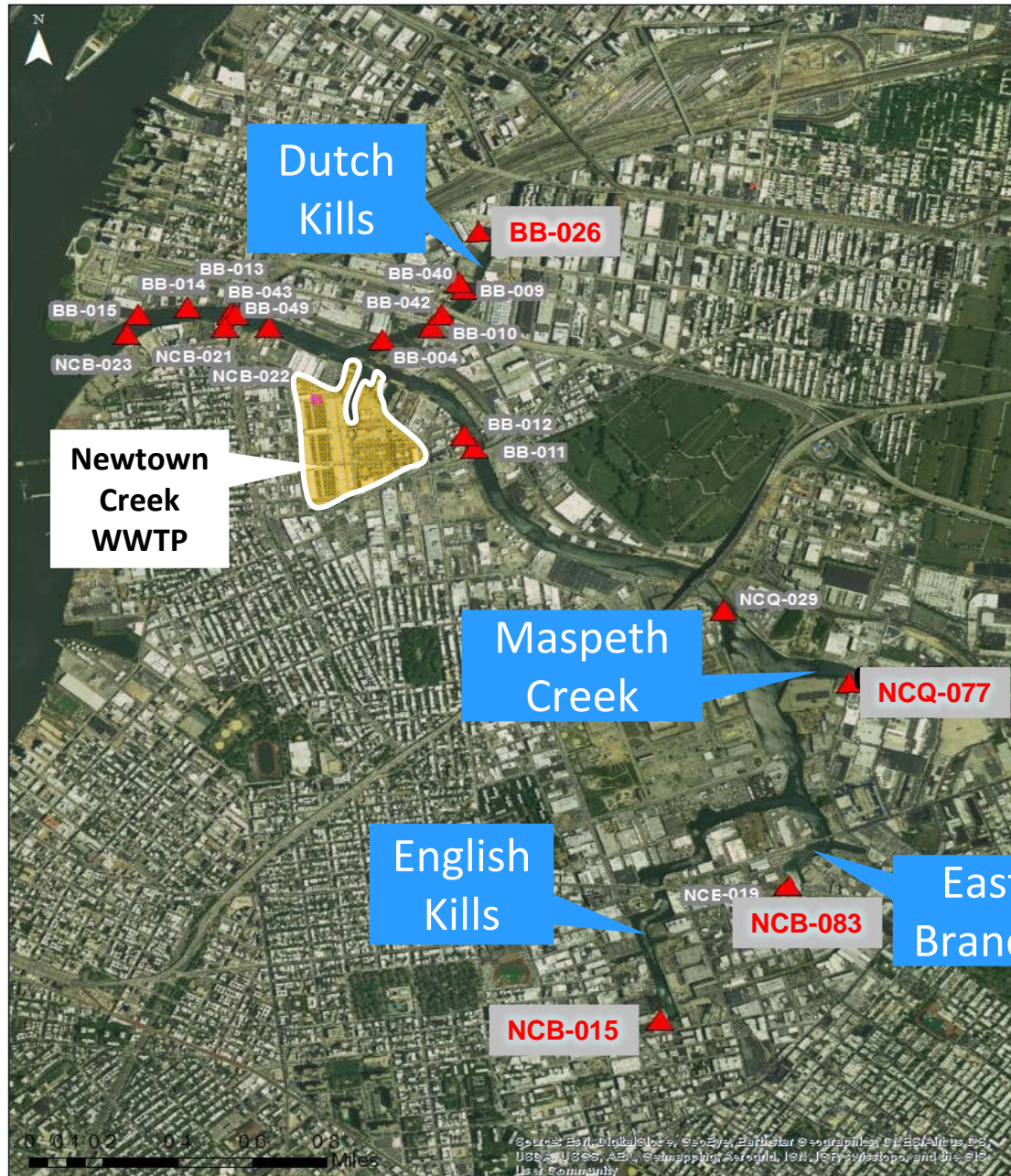
- 1 Assess **Green Infrastructure** in the vicinity of Newtown Creek
- 2 Evaluate **alternatives** beyond aeration system
- 3 Concerns about **illegal dumping and discharges** to the Creek
- 4 Consider **wetlands restoration** for Dutch Kills
- 5 Assess **CSO storage options** for Newtown Creek



# **Water Quality, Baseline Conditions and Performance Gap**

Keith Mahoney, P.E.  
Director of Water Quality Planning  
DEP – BEDC

# Overview of Newtown Creek



➤ **4 Urban CSO Tributaries**

- Dutch Kills
- Maspeth Creek
- East Branch
- English Kills

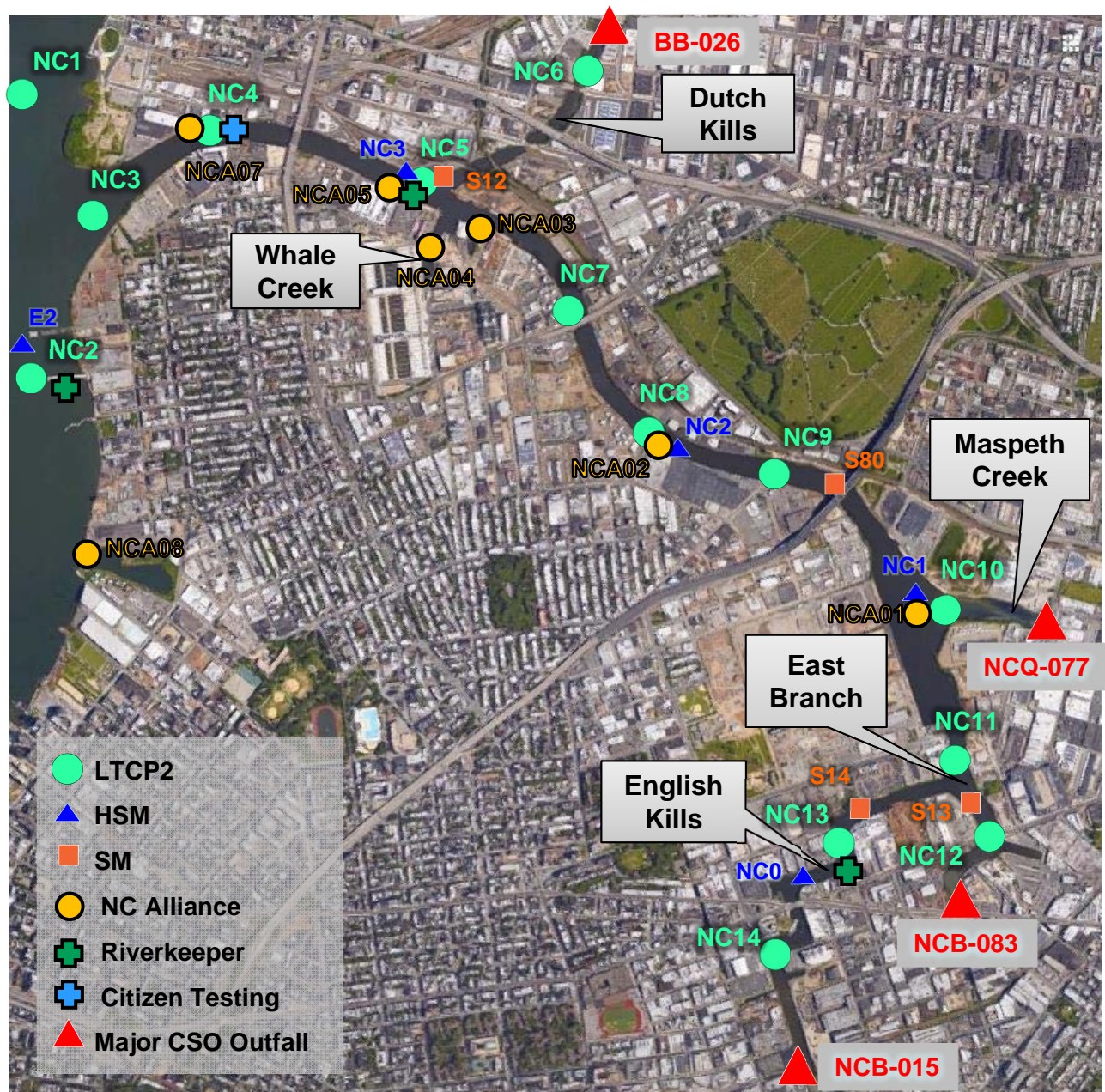
➤ **4 CSO Outfalls account for 91% of Annual CSO Volume:**

Outfall	Annual CSO Volume (MG)
BB-026	120
NCQ-077	300
NCB-083	315
NCB-015	321
All Other	105
<b>Total</b>	<b>1,161</b>

➤ DEP's process for flow monitoring and modeling has been **nationally peer reviewed and published**

# Fecal and Entero Sampling Locations

- Conducted extensive sampling
- **Data indicates:**
  - elevated bacteria levels
  - excursions below WQS for Dissolved Oxygen
  - slow time to recovery
- Data is available online

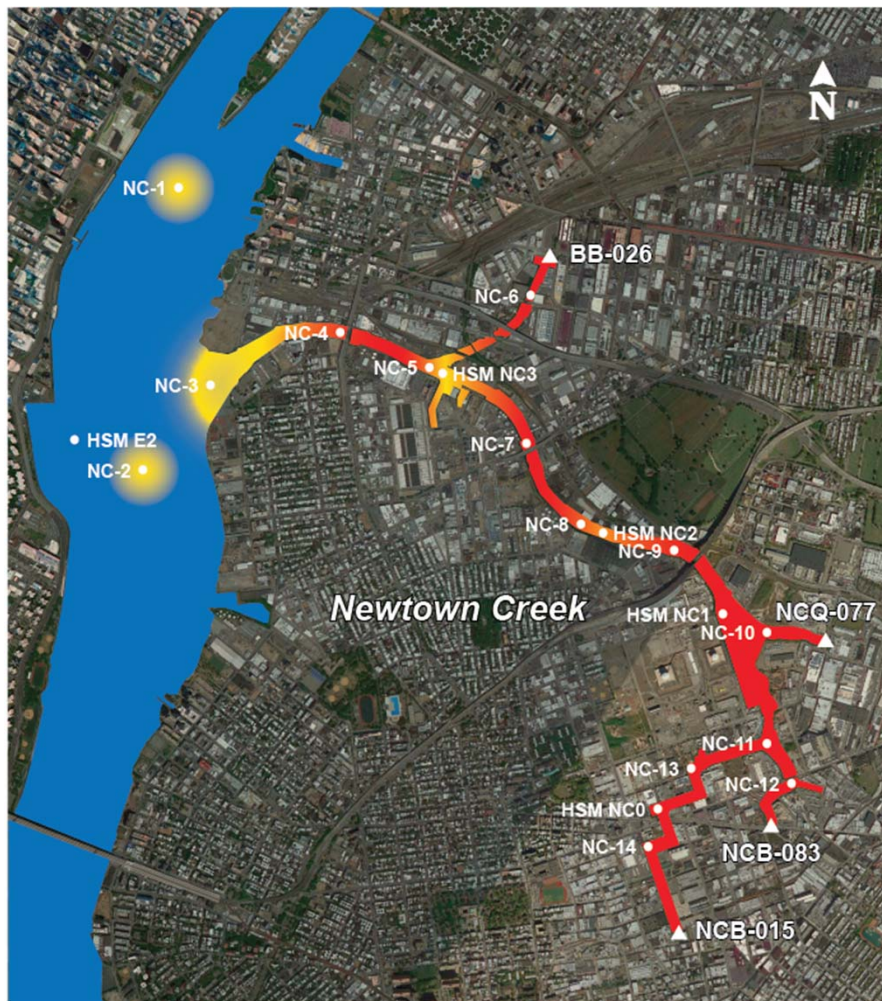


# Fecal and Entero Geomeans

LTCP: ~77 Wet samples per location; Jul – Nov 2016  
HSM: ~34 Wet samples per location; Jan – Nov 2016

## Fecal – Wet Weather

Scale (# col/100 mL)



## Enterococci – Wet Weather

Scale (# col/100 mL)



# Dissolved Oxygen 5<sup>th</sup> Percentile Values

2016 YTD: January 1, 2016 – November 3, 2016

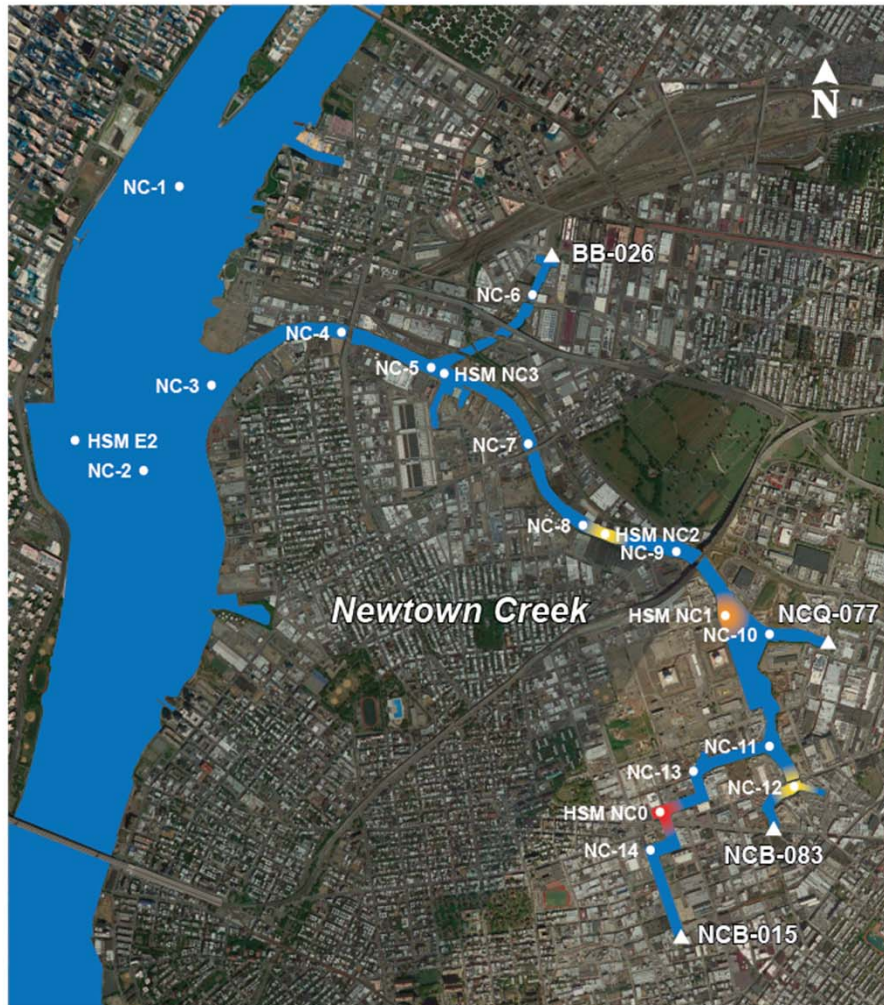
LTCP: ~14 Dry and 77 Wet samples per location; July – Nov 2016

HSM: ~18 Dry and 34 Wet samples per location; January – Nov 2016

Scale (mg/L)



## Dry Weather



## Wet Weather





# Newtown Creek: CSO Mitigation Projects

Recommended Project	Construction Cost	Status
<b>1</b> Brooklyn/Queens Pump Station at Newtown Creek WWTP	\$300 M	Completed
<b>2</b> Bending Weirs and Underflow Baffles	\$42 M	In-Construction thru 2017
<b>3</b> In-Stream Aeration Projects	\$30 M <sup>1</sup>	In-Construction thru 2018
<b>4</b> Built and Planned GI Projects	\$45 M <sup>2</sup>	Ongoing Design and Construction
<b>Total = \$417 M</b>		

1) Includes Upper and Lower English Kills and East Branch Aeration  
 2) Cost to date, more GI projects may be pending.

**1**

- PS Wet Weather Capacity = 400 MGD
- includes 5 new MSPs, headworks upgrade, In-line storage facility, odor control

**4**

- More than 1,300 GI assets within streets, parks, and schools
- 98% are ROW Raingardens (aka bioswales)
- Design resources for public onsite only in NCB-015 & NCB-083
- Other areas will be assessed in 2017 with design resources citywide available in 2018

**2**

- Construction Completion: Dec. 2017
- Volume Reduction: 62 MGY
- Provides Floatables Control
- Being installed at NCB-015, NCQ-077, NCB-083, BB-026

**3**

Contract	Aeration Location	Construction Completion	Cost
<b>EK-11</b>	Upper English Kills	Dec. 2008	\$9 M
<b>CSO-NC-2</b>	Lower English Kills	Jan. 2014	\$2.2 M
<b>CSO-NC-3</b>	East Branch	Jun. 2018	\$18 M
<b>CSO-NC-4</b>	Dutch Kills and Newtown Creek*	TBD	N/A

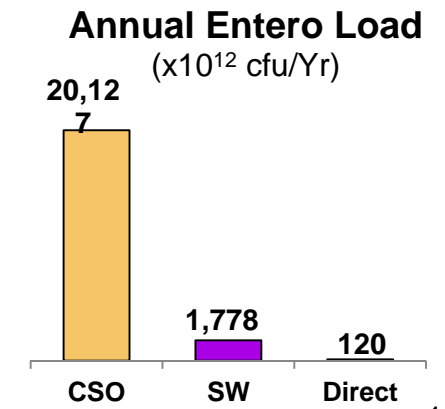
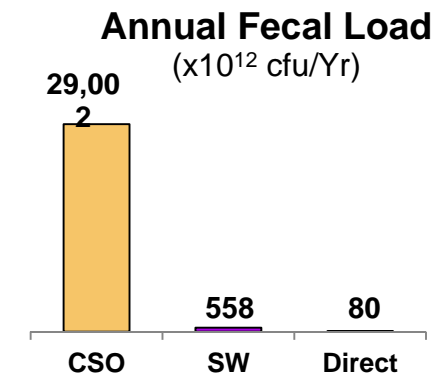
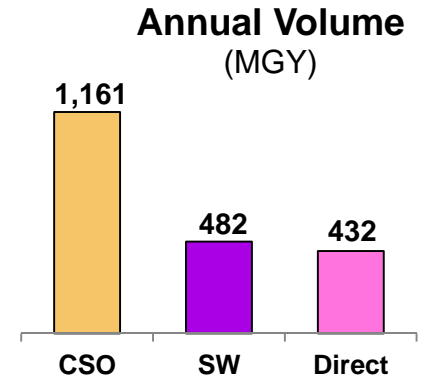
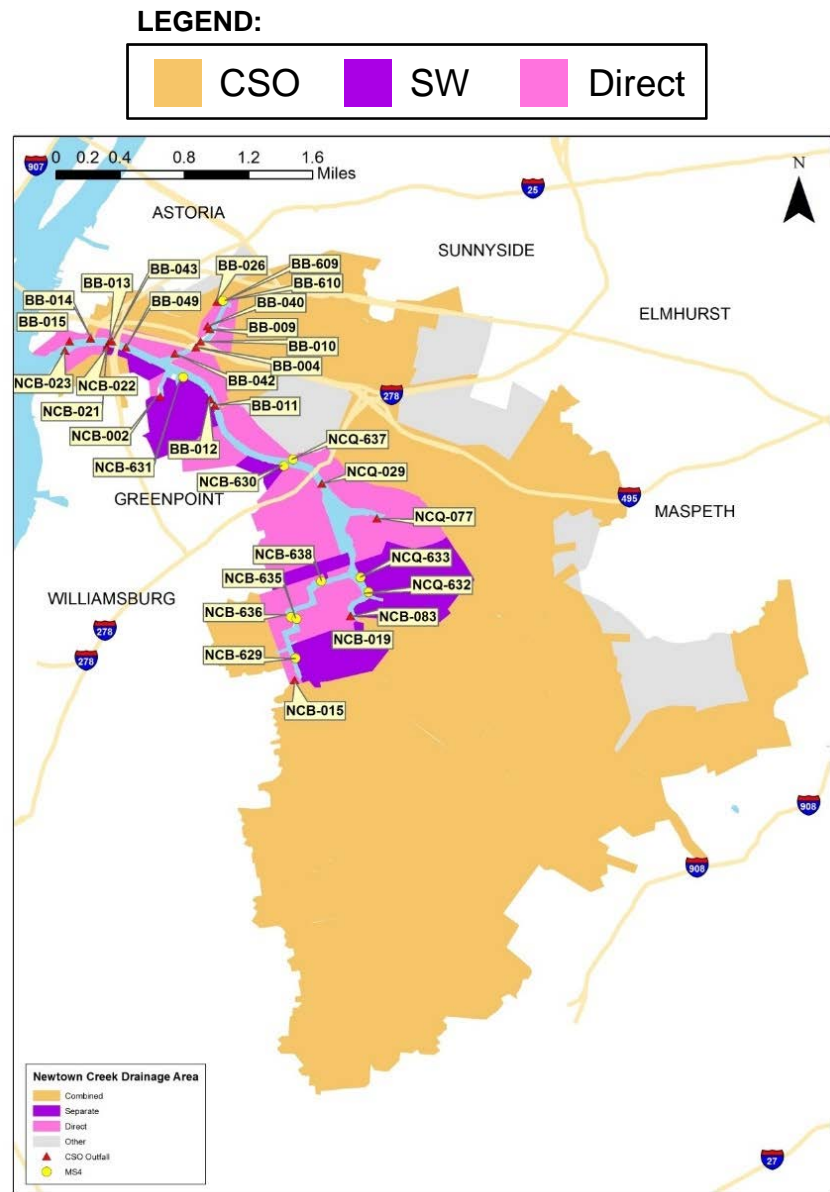
\*Dutch Kills aeration is not included in the Baseline Conditions; need for project will be evaluated in LTCP

# Newtown Creek Baseline CSO Volumes/Loads

Bowery Bay WWTP (LL Interceptor)		
Outfall	Volume (MG)	Freq.
BB-004	0	1
BB-009	43	34
BB-010	1	7
BB-011	2	14
BB-012	0	1
BB-013	16	31
BB-014	2	18
BB-015	1	13
<b>BB-026</b>	<b>120</b>	<b>37</b>
BB-040	1	16
BB-042	2	22
BB-043	9	32
BB-049	0	0
<b>Sub-Total</b>	<b>196</b>	<b>37</b>

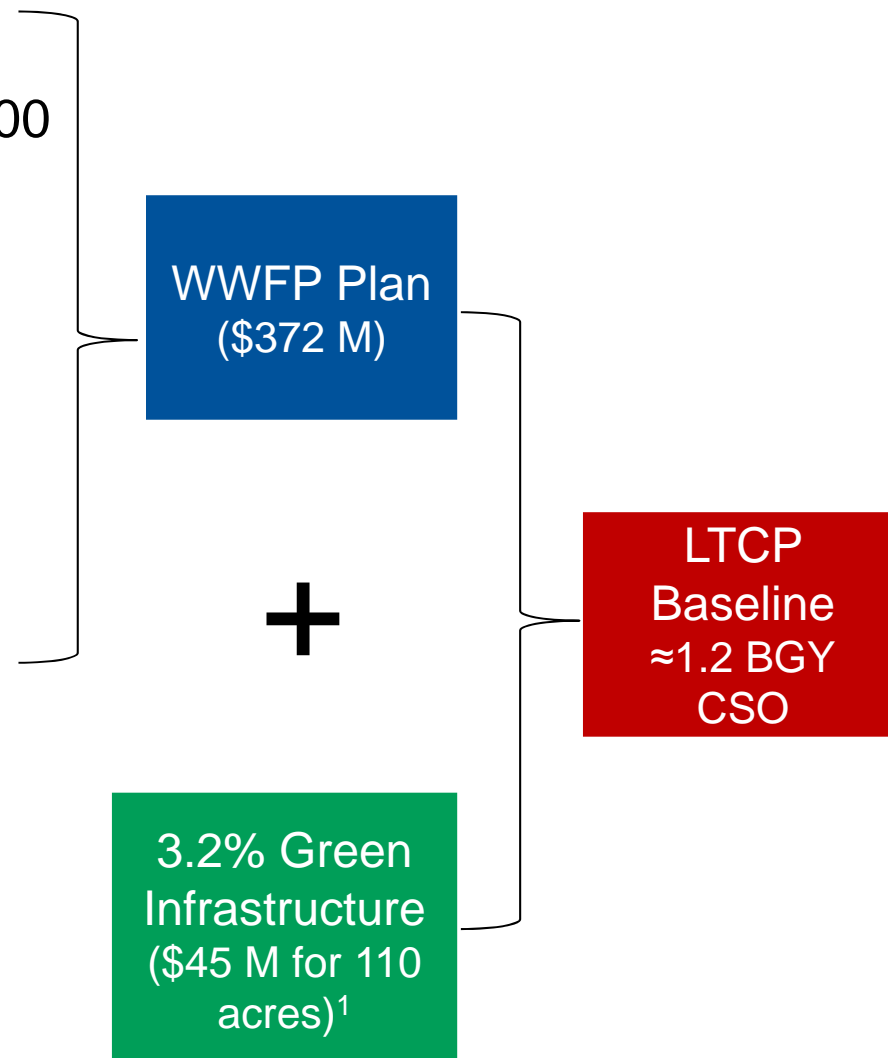
Newtown Creek WWTP		
Outfall	Volume (MG)	Freq.
<b>NCB-015</b>	<b>321</b>	<b>31</b>
NCB-019	3	21
NCB-021	0	0
NCB-022	7	29
NCB-023	0	8
NCQ-029	19	40
<b>NCQ-077</b>	<b>300</b>	<b>41</b>
<b>NCB-083</b>	<b>315</b>	<b>42</b>
<b>Sub-Total</b>	<b>965</b>	<b>42</b>

NCB-015 + NCB-083 + NCQ-077 + BB-026 = 91% of Total Annual Volume



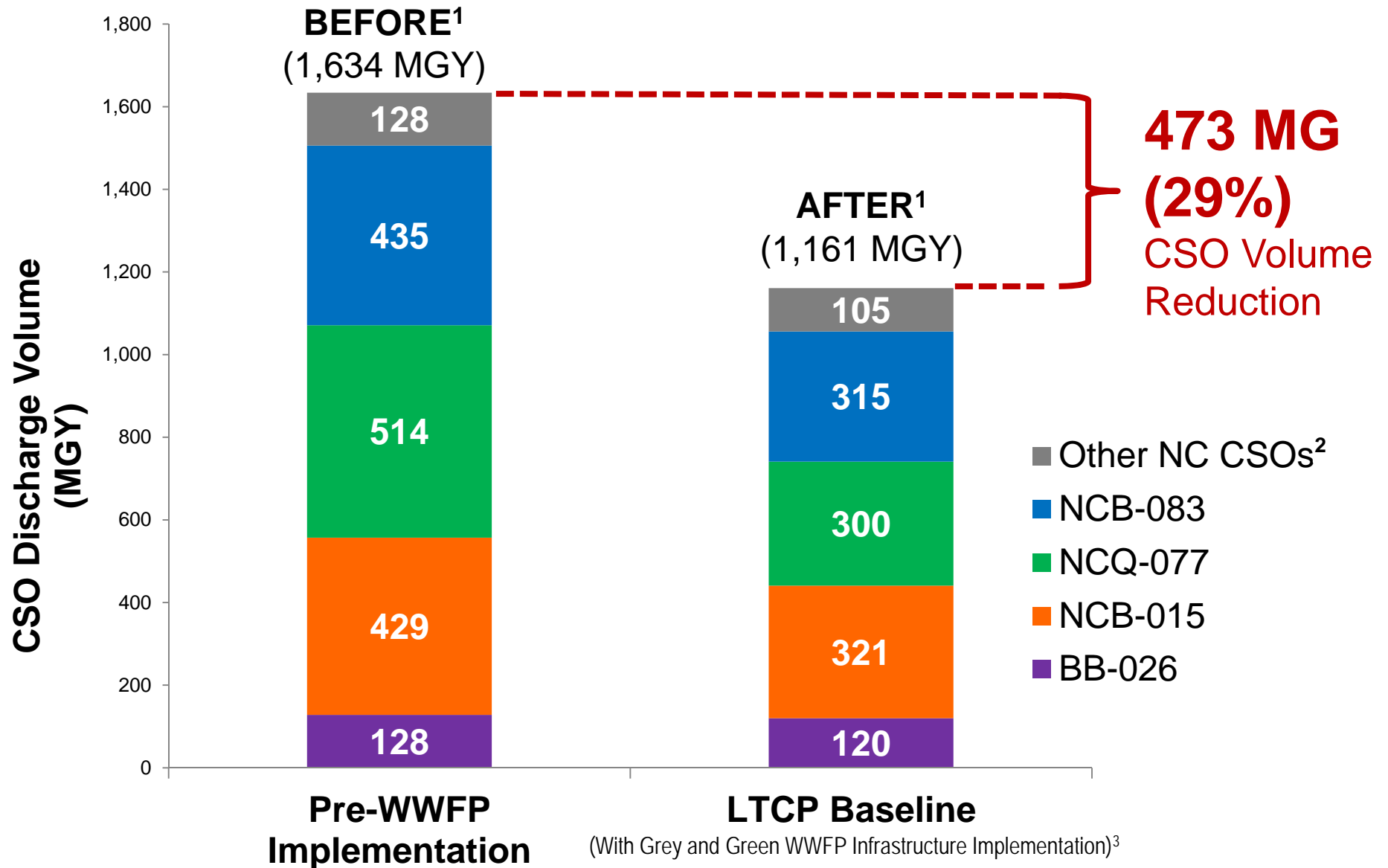
# LTCP Baseline Conditions Modeling

- 1 Continued operation of Brooklyn / Queens PS at NC WWTP at up to 400 MGD during wet weather
- 2 Construction of Bending Weirs and Underflow Baffles at 4 Locations
- 3 Construction of East Branch and English Kills In-Stream Aeration
- 4 Committed Green Infrastructure in Newtown Creek watershed



1) Cost to date, more GI projects may be pending.

# Modeled Baseline CSO Volumes



1) CSO Volumes have changed slightly since 2/21/2017 Public Data Review Meeting as a result of updated modeling

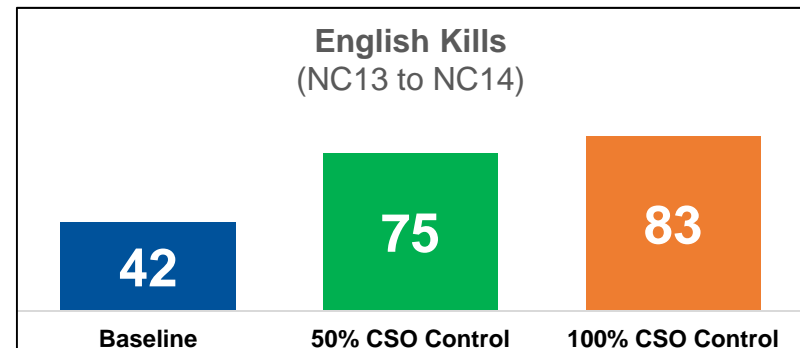
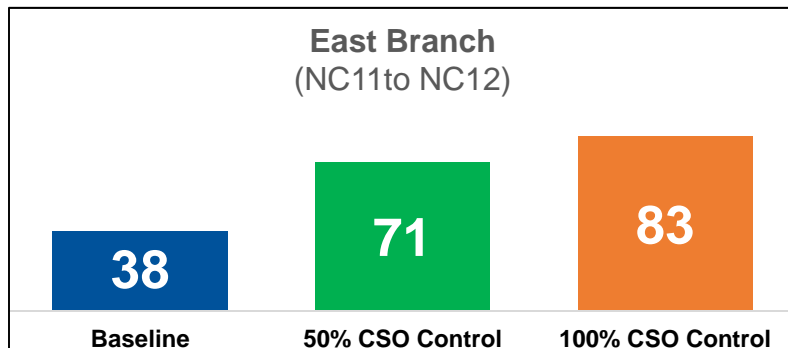
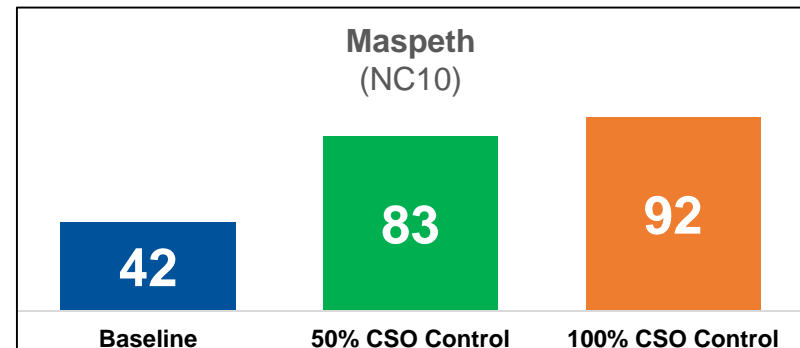
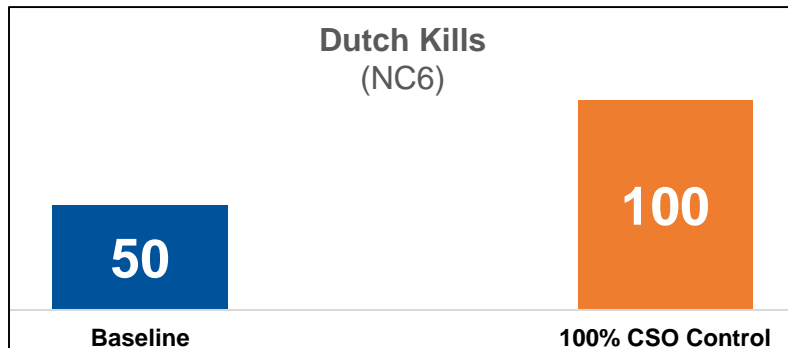
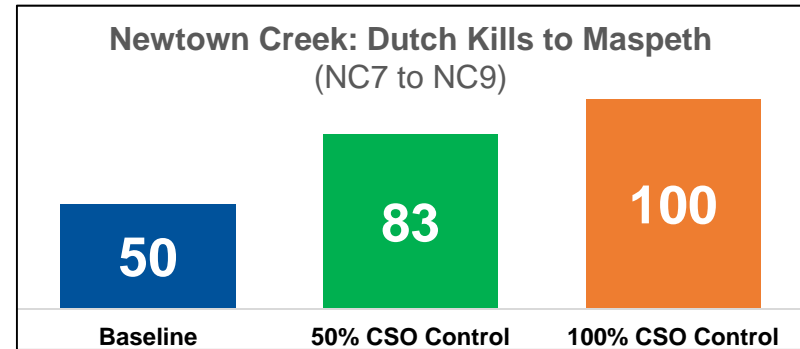
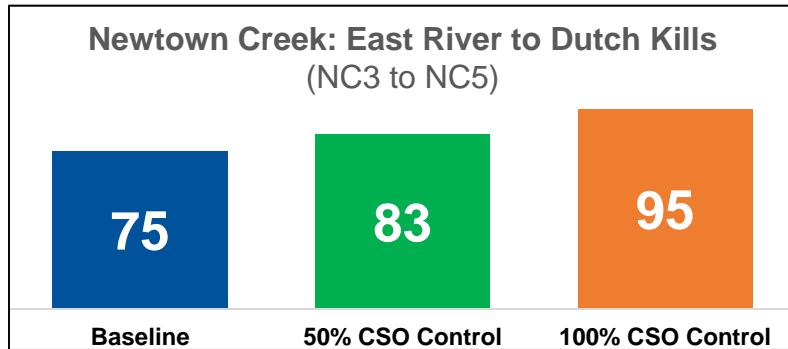
2) Other Newtown Creek CSOs include: BB-009, BB-010, BB-011, BB-013, BB-040, BB-042, NCB-019, NCB-022, NCQ-029

3) CSO Volumes are based on 1.5% Citywide GI application rate with 3% detention-based system on private property

# Gap Analysis Description

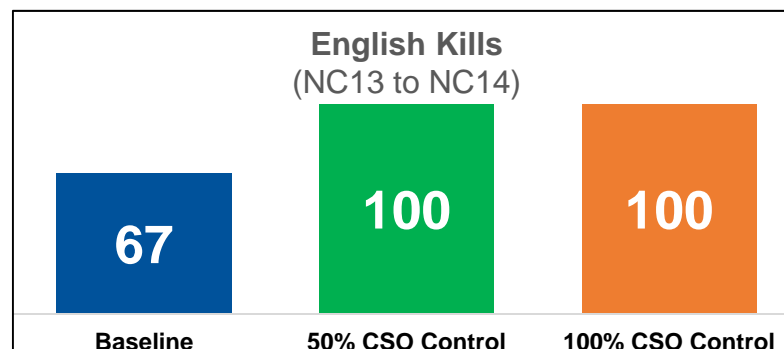
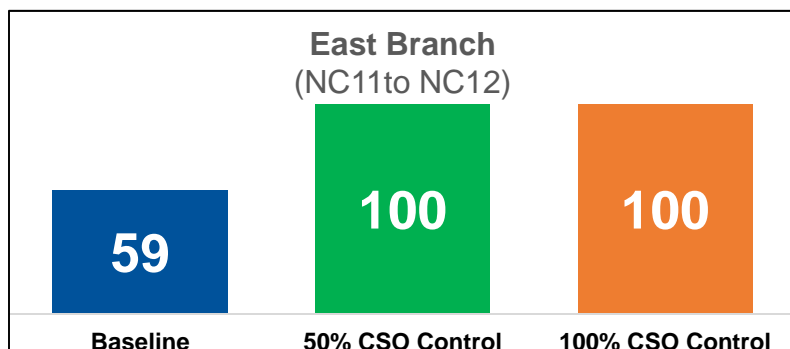
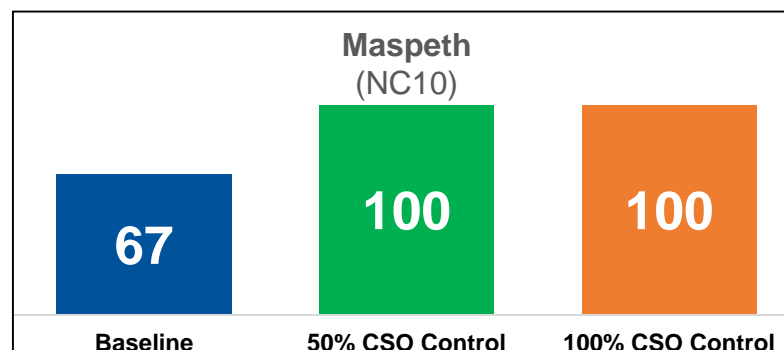
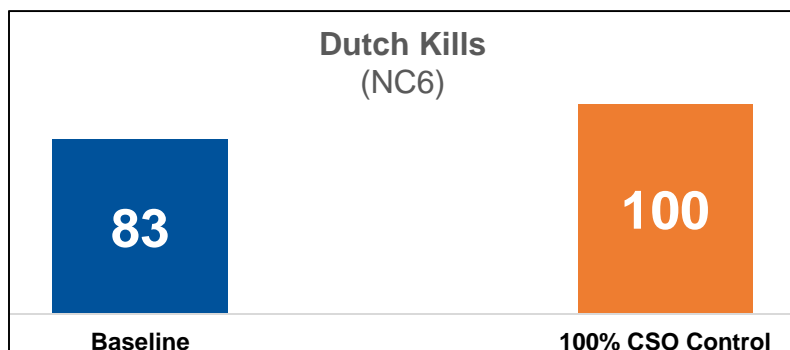
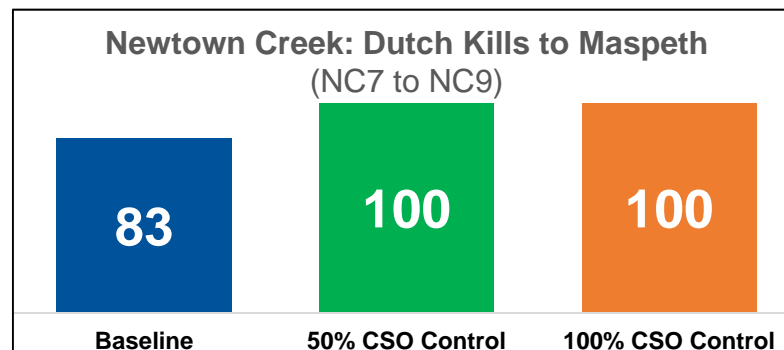
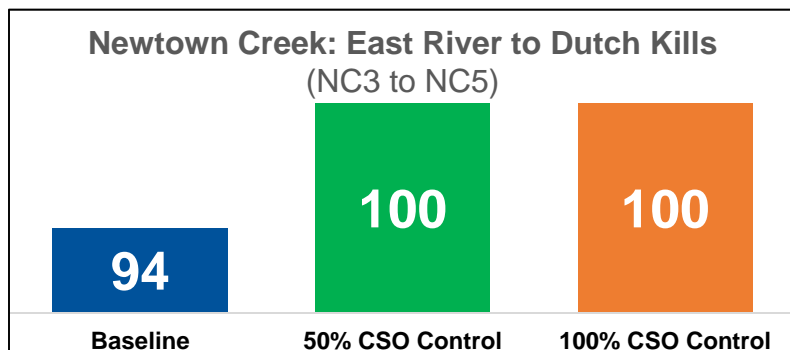
- Collection system and receiving water quality models are used to quantify the “Gap” in water quality standards attainment between baseline conditions and 100% CSO Control
- Provides an assessment of the maximum level of WQS attainment achievable through CSO controls
- Gap is evaluated for:
  - Existing Class SD bacteria WQ criteria (fecal coliform)
  - Time to recovery for fecal coliform
  - Potential future primary contact WQ criteria (Enterococcus)
  - Class SD Dissolved Oxygen criteria
- Assessment is based on the Typical Year rainfall (JFK Airport 2008)

# Annual Fecal Coliform – %Attainment



\*50% CSO Control is based on control of the 3 largest CSO outfalls (NCQ-077, NCB-083 & NCB-015)

# Recreational Fecal Coliform – %Attainment



\*50% CSO Control is based on control of the 3 largest CSO outfalls (NCQ-077, NCB-083 & NCB-015)

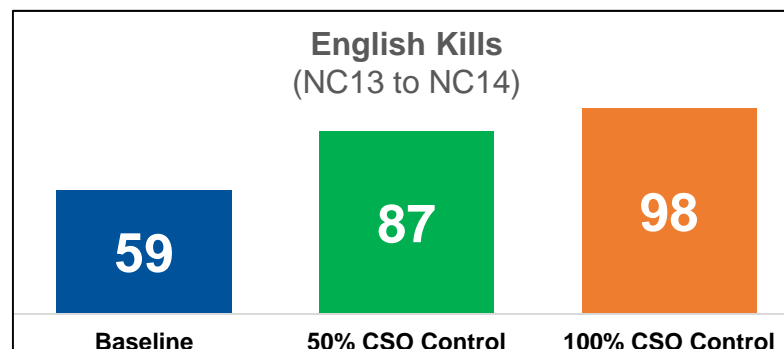
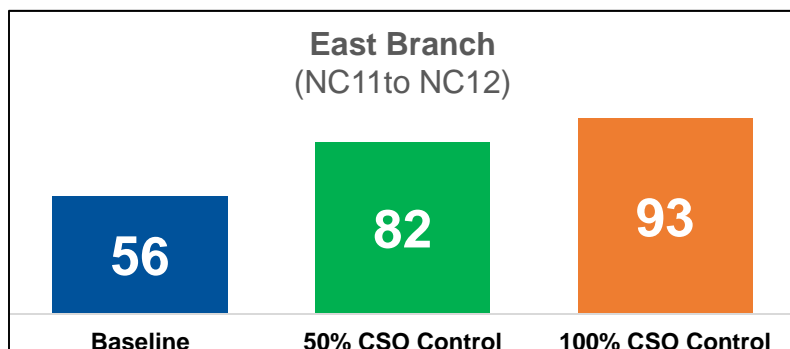
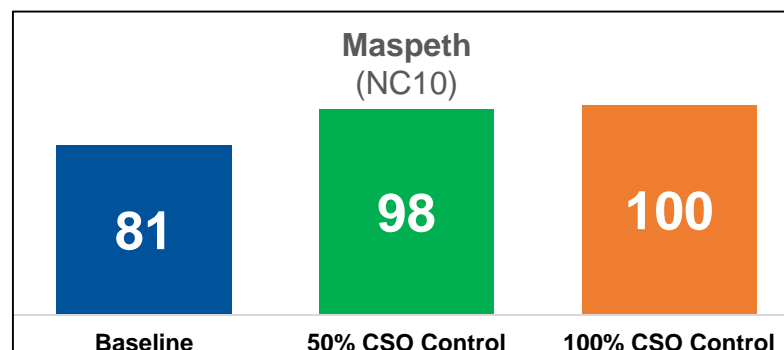
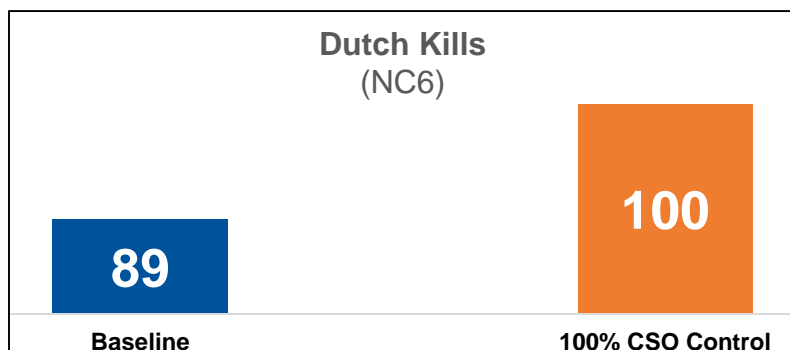
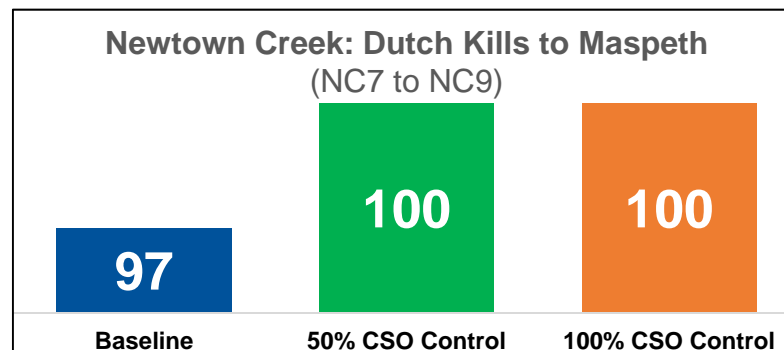
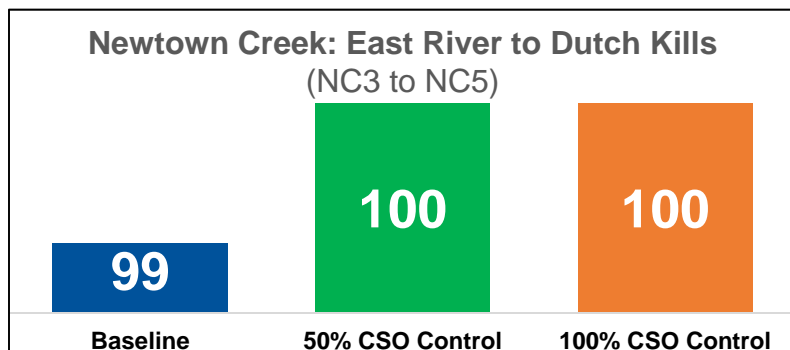
# LTCP Gap Analysis – Time to Recovery

Red >24 hrs Green ≤24 hrs

	Location	Time to Recover to 1,000 cfu/100mL Fecal Coliform for Aug 15, 2008 storm	
		Baseline (hrs)	100% CSO Control (hrs)
<b>East River</b>	NC1	10	10
	NC2	9	9
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<b>Main Trunk</b>	NC3 (at East River)	30	2
	NC4	67	0
	NC5 (at Dutch Kills)	68	0
	NC7	69	0
	NC8	79	0
	NC9	80	0
	NC10 (at Maspeth Creek)	94	0
	NC11 (at East Branch)	105	7
	-----		
<b>Dutch Kills</b>	NC6	71	0
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<b>East Branch</b>	NC12	107	20
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<b>English Kills</b>	NC13	118	0
	NC14	130	9

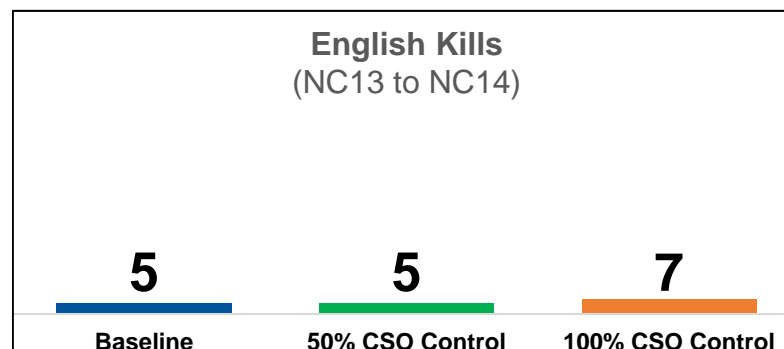
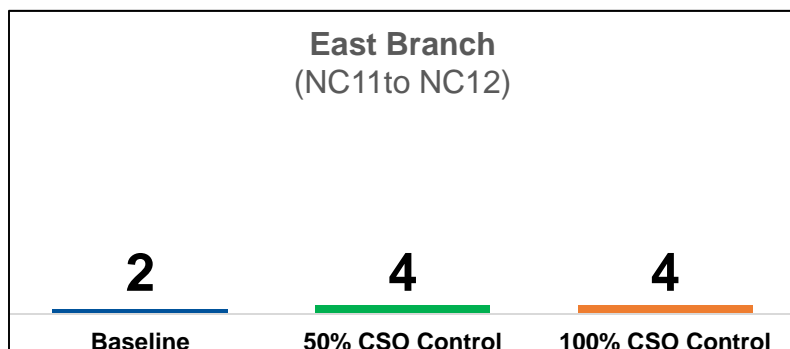
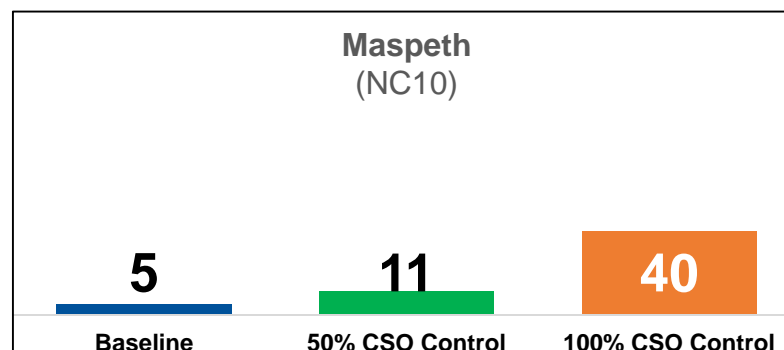
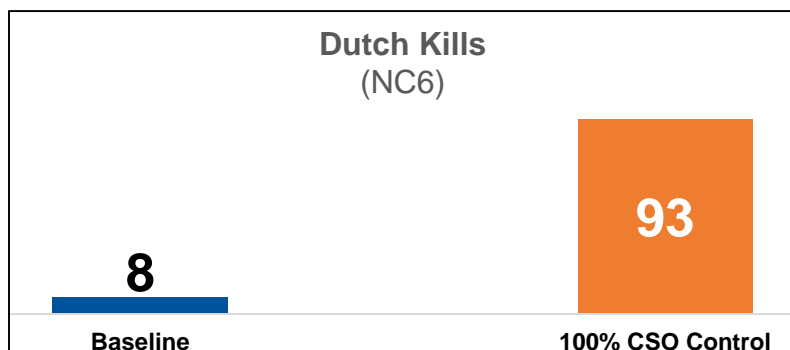
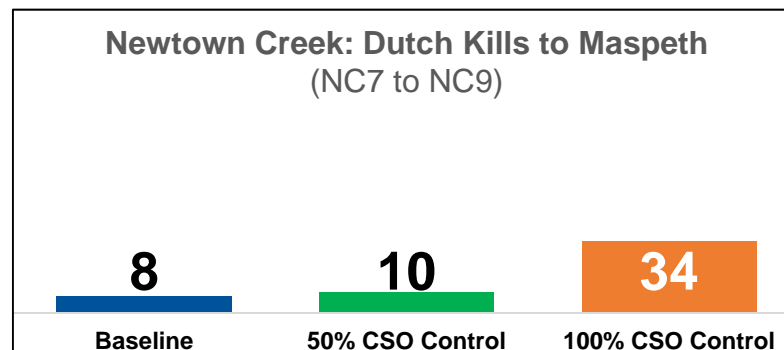
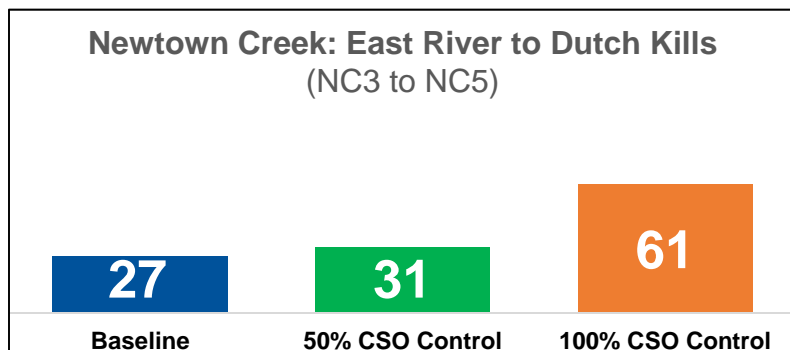


# Entero GM 30-day – %Attainment



\*50% CSO Control is based on control of the 3 largest CSO outfalls (NCQ-077, NCB-083 & NCB-015)

# Entero 90<sup>th</sup> Percentile STV – Attainment



\*50% CSO Control is based on control of the 3 largest CSO outfalls (NCQ-077, NCB-083 & NCB-015)

# LTCP Gap Analysis – Dissolved Oxygen

Red <95% attainment  
Green ≥95% attainment

	Location	% Annual Attainment for Class SD (Average DO <sub>≥</sub> 3 mg/L)			
		Baseline (%) Incl. Aeration*	100% CSO Control (%) Incl. Aeration*	100% CSO Control (%) No Aeration	
<b>East River</b>	NC1	100	100	100	
	NC2	100	100	100	
<b>Main Trunk</b>	NC3 (at East River)	100	100	100	
	NC4	100	100	100	
	NC5 (at Dutch Kills)	100	100	100	
	NC7	100	100	100	
	NC8	100	100	100	
	NC9	99	100	100	
	NC10 (at Maspeth Creek)	94	100	98	
	NC11 (at East Branch)	95	100	95	
	<b>Dutch Kills</b>	NC6	98	100	100
	<b>East Branch</b>	NC12	94	100	92
<b>English Kills</b>	NC13	93	100	92	
	NC14	88	100	79	

\* Assumes seasonal operation of East Branch and English Kills aeration systems

# Evaluation of Alternatives

James Mueller, P.E.  
Acting Deputy Commissioner  
DEP – BEDC

## 1. Bacteria Source Component Analysis

- CSO, stormwater and direct drainage

## 2. Gap Analysis for Water Quality Standard (WQS) Attainment

- Calculate bacteria and dissolved oxygen for:
  - Baseline Conditions
  - 100% CSO Control Conditions

## 3. Assess Levels of CSO Control Necessary to Achieve WQS

## 4. Identify Technologies to Cost-Effectively Achieve the Required Level of CSO Control

Increasing CSO Reduction Potential

### *Sample Technologies:*

- **Storage**
- **Treatment**
- **System Optimization**
- **Source Control**

# Newtown Creek Alternatives Toolbox

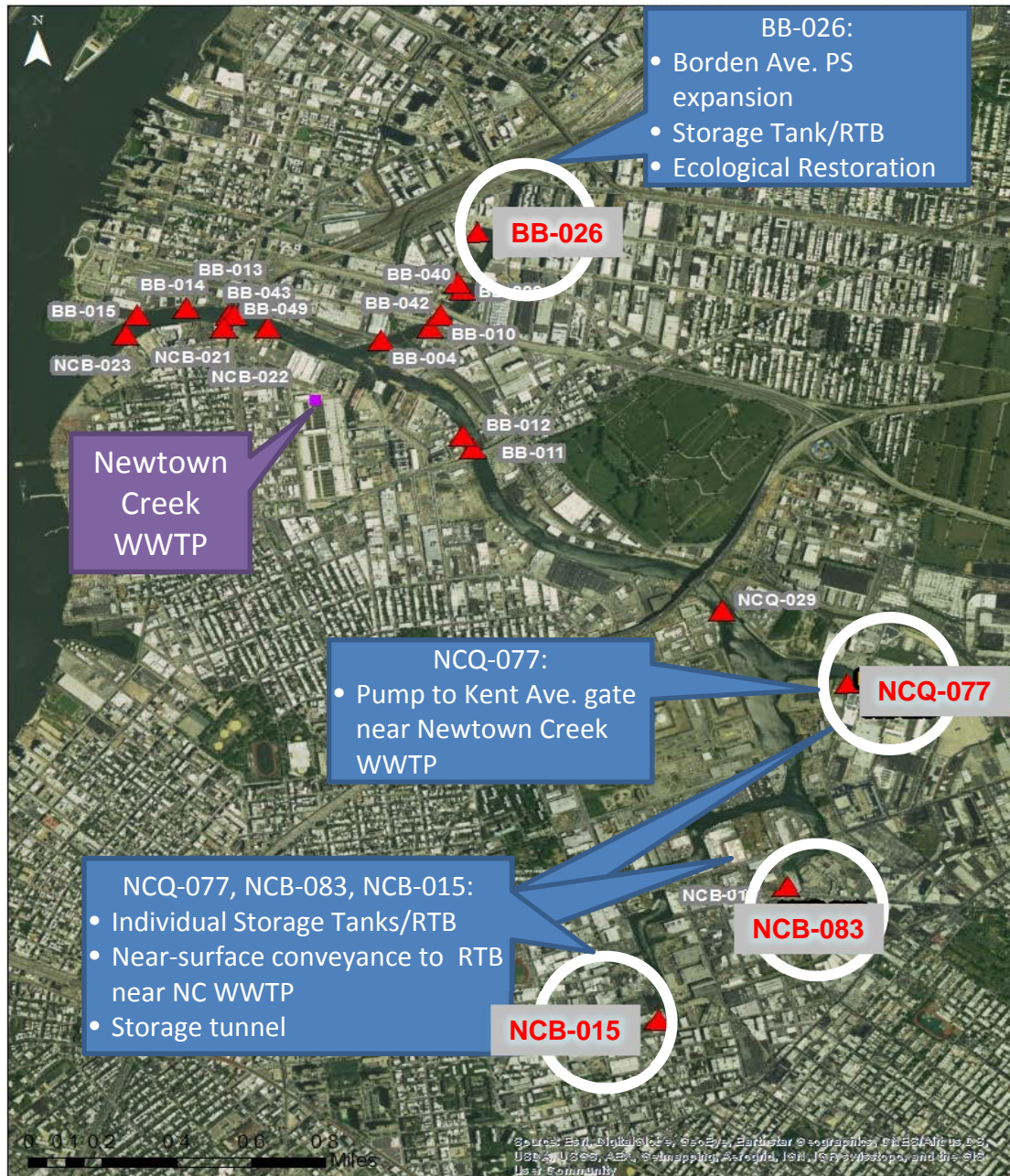
INCREASING COMPLEXITY

INCREASING COST

<b>Source Control</b>	Existing GI	<del>Additional GI</del>	<del>High Level Sewer Separation</del>		
<b>System Optimization</b>	<del>Fixed Weir</del>	Parallel Interceptor / Sewer	Bending Weirs Control Gates	<del>Pump Station Optimization</del>	Pump Station Expansion
<b>CSO Relocation</b>	<del>Gravity Flow Tipping to Other Watersheds</del>	<del>Pumping Station Modification</del>	Flow Tipping with Conduit/Tunnel and Pumping		
<b>Water Quality / Ecological Enhancement</b>	Floatables Control	Environmental Restoration	Mechanical aeration	<del>Flushing Tunnel</del>	
<b>Treatment Satellite:</b>	<del>Outfall Disinfection</del>	Retention Treatment Basin (RTB)		<del>High Rate Clarification (HRC)</del>	
<b>Centralized:</b>	WWTP Expansion				
<b>Storage</b>	<del>In-System</del>	<del>Shaft</del>	Tank	Tunnel	

■ Completed or underway  
■ CSO Controls further evaluated

# Overview of Newtown Creek Alternatives

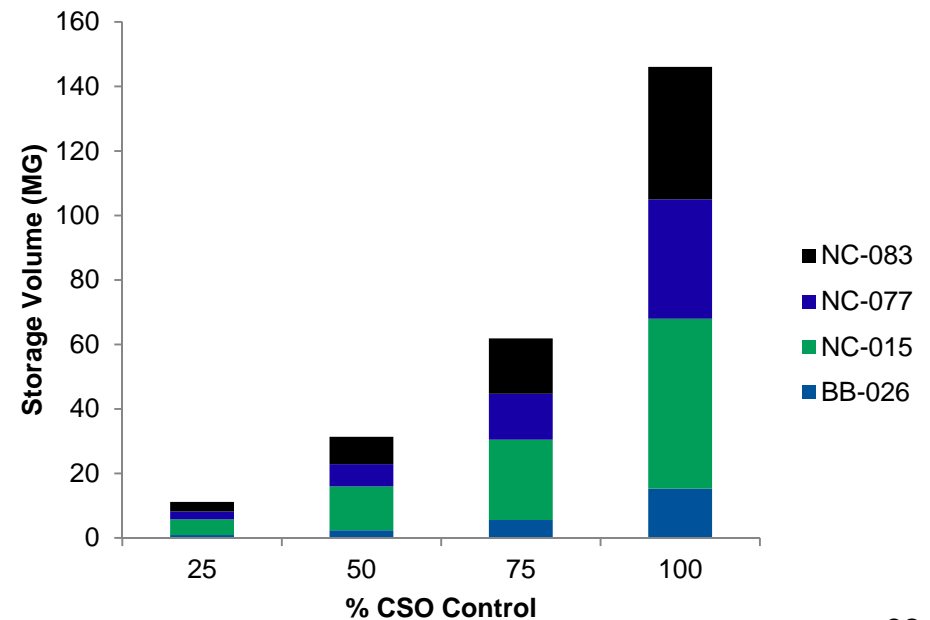
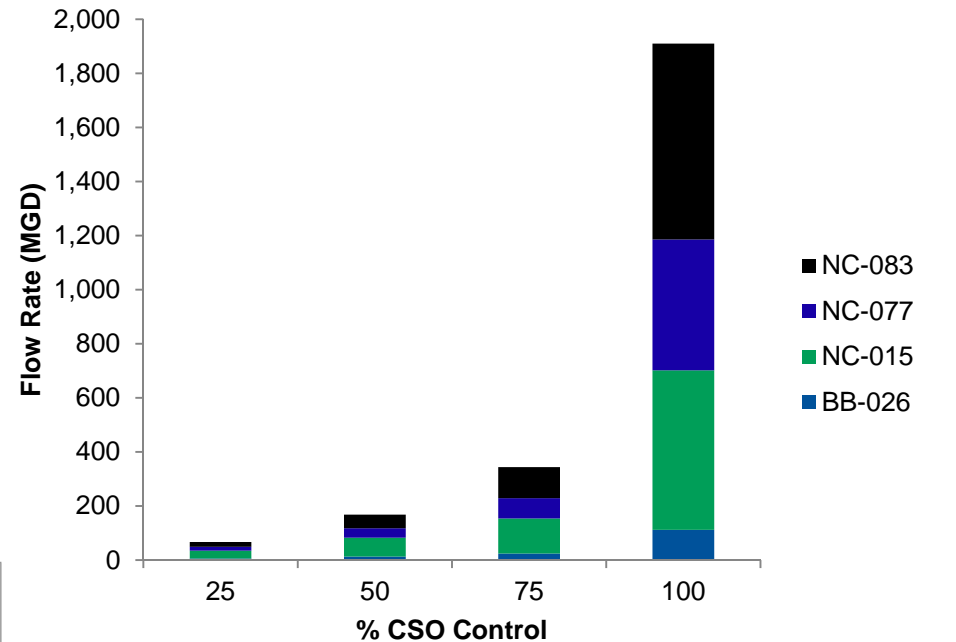
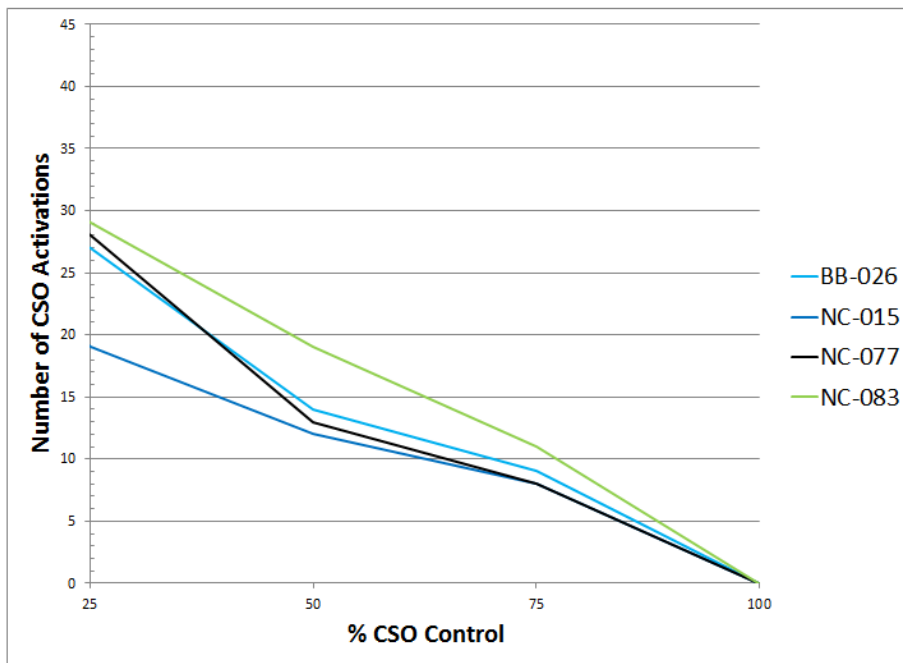


- **Pumps Station Expansion and Flow Tipping / Relocation**
  - Borden Ave. PS expansion + Force main to NC WWTP
  - NC-077 Wet Weather PS + Force main to NC WWTP
  
- **Parallel Interceptor / Sewers**
  - Parallel Interceptors from NCQ-077, NCB-083, & NCB-015
  
- **Ecological Restorations**
  - Dutch Kills (BB-026)
  - Dutch Kills Flushing System
  
- **Individual Storage Tanks or RTBs:**
  - NCQ-077, NCB-083, NCB-015, & BB-026
  
- **Combined Storage Tunnels**
  - NCQ-077, NCB-083, & NCB-015
  - NCQ-077, NCB-083, NCB-015, & BB-026

# CSO Storage Volume, Peak Flow, and Activation vs. % Capture

## EPA CSO Policy:

- LTCP to consider a reasonable range of alternatives
- LTCP should evaluate a range of levels of control
- Selected controls should meet CWA requirements





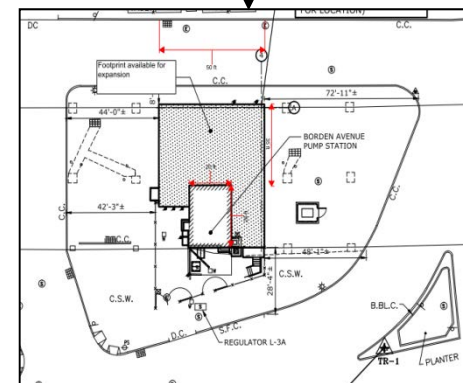
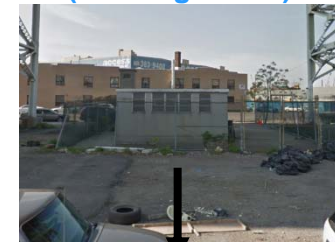
# BB-026: Borden Ave. PS Expansion to 13 MGD



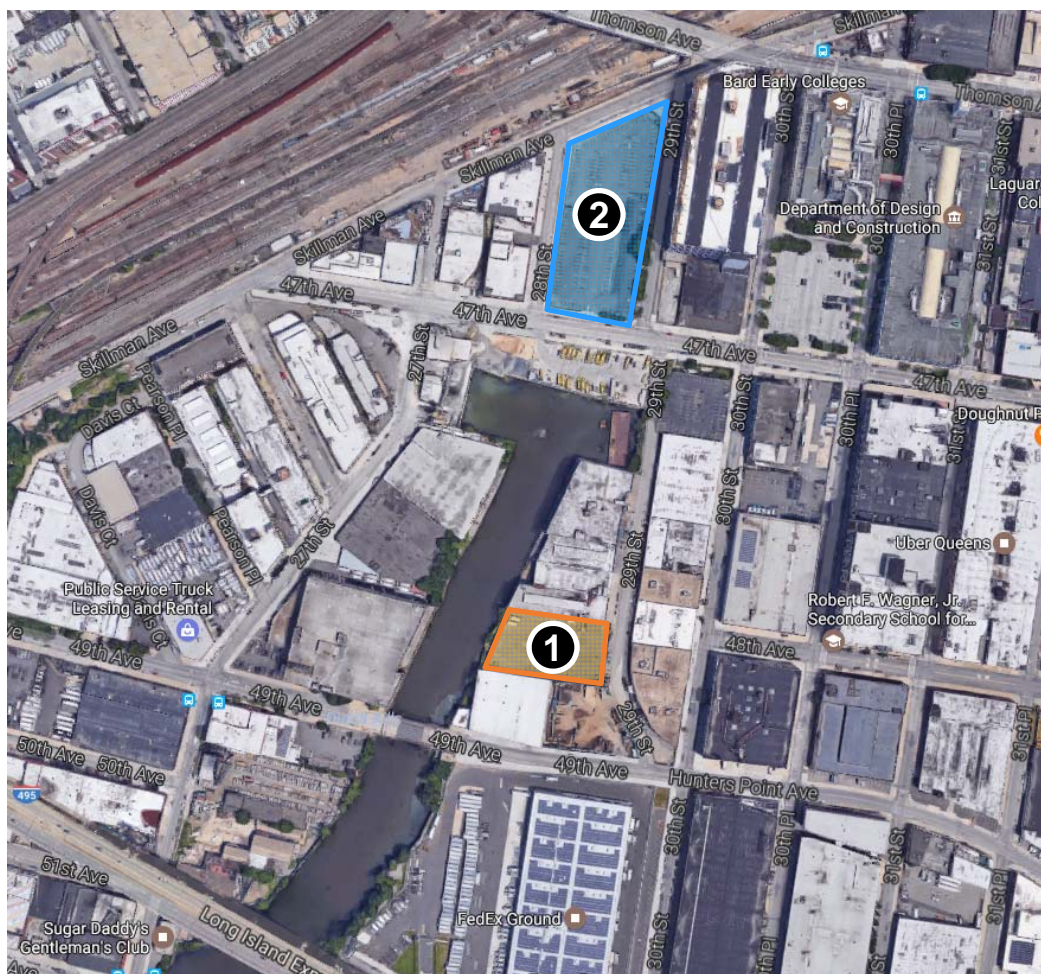
BB-026 %CSO Control:	25%	50%	75%	100%
PS Capacity (MGD)	6	13	24	112 <sup>(1)</sup>
FM Diameter (ft)	1.5	2	3	5.5
Gravity Conduit Diameter (ft)	2	3	3.5	6.5
Prelim. PBC <sup>(2)</sup> (\$M)	\$35	\$40	\$50	\$100

- (1) Alternative may not be feasible at this flow rate/level of control
- (2) Costs are in 2017 dollars, not including site acquisition or escalation

**Borden Ave PS (Looking South)**



# Potential Sites at Dutch Kills



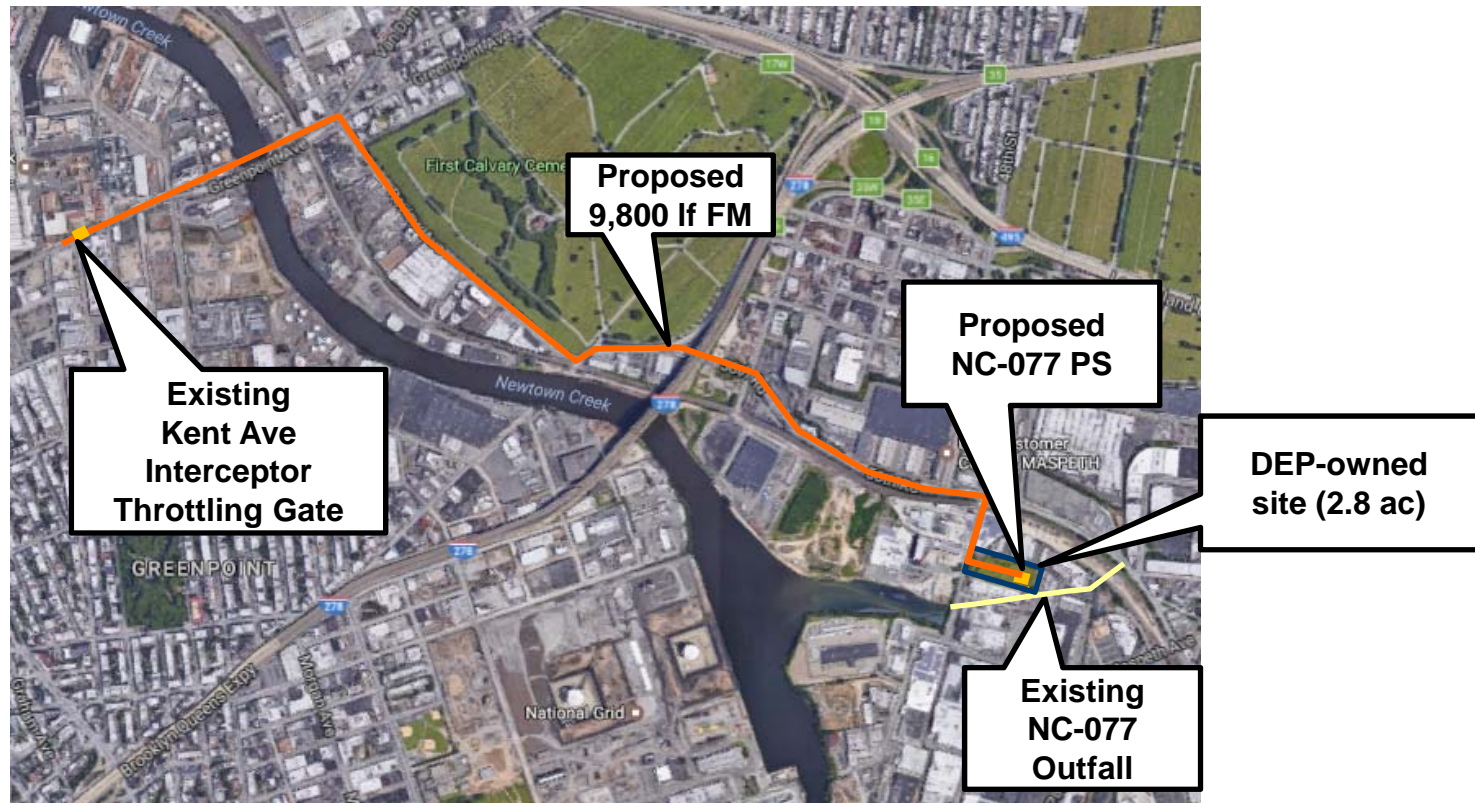
Storage Tank				
% Annual Control	Tank Volume (MG)	Required Area (acres)	# of Identified Parcels	Preliminary Cost <sup>(1)</sup> (\$M)
25	0.9	1.0	32	\$110
50	2.4	1.5	16	\$180
75	5.6	2.3	13	\$280
100	15.3	4.3	2	\$480

(1) Costs are in 2017 dollars, not including site acquisition or escalation

Site #	Size (ac)	Owner
1	1.0	Anoroc Realty Parking Lot
2	2.1	NYS – The Dormitory Authority (Parking Lot for LaGuardia Community College)

- **Site 1** could accommodate 25% CSO control storage tank or site for wet weather pump station
- **Site 2** not considered feasible due to impacts on LaGuardia Community College

# NC-077: New Wet Weather PS+ FM to Kent Ave Interceptor



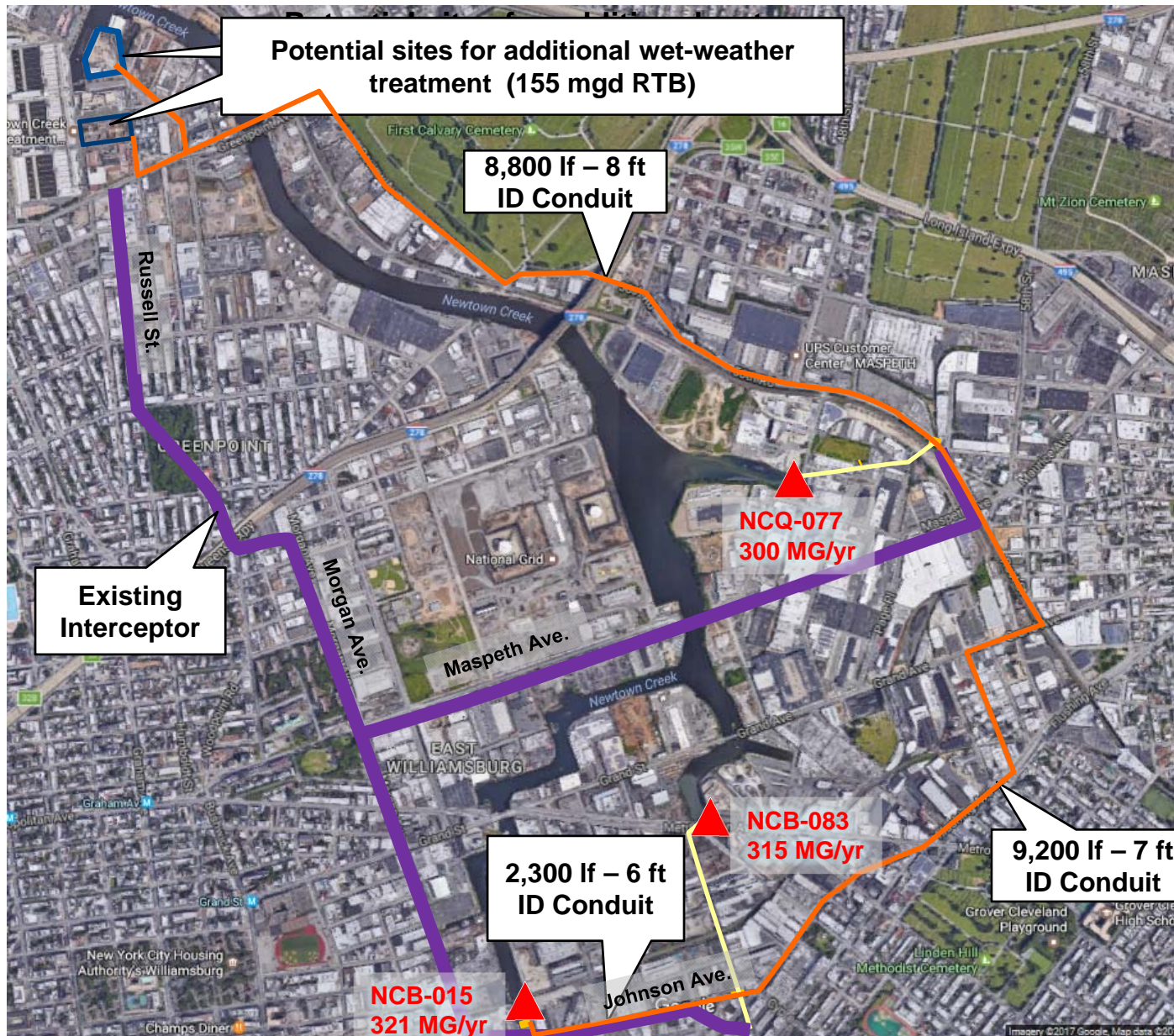
## Concept:

- Divert overflow from NCQ-077 to wet weather pump station
- Discharge from new force main to upstream of Kent Ave. gate
- Potentially throttle Kent Ave. gate to limit impacts to Morgan Ave. Interceptor

NCQ-077 %CSO Control:	25%	50%	75%	100%
PS Capacity (MGD)	14	35	75	484 <sup>(1)</sup>
FM Diameter (ft)	2.5	3.5	5	2 x 8
PBC <sup>(2)</sup> (\$M)	<b>\$50</b>	<b>\$70</b>	<b>\$100</b>	<b>\$260</b>

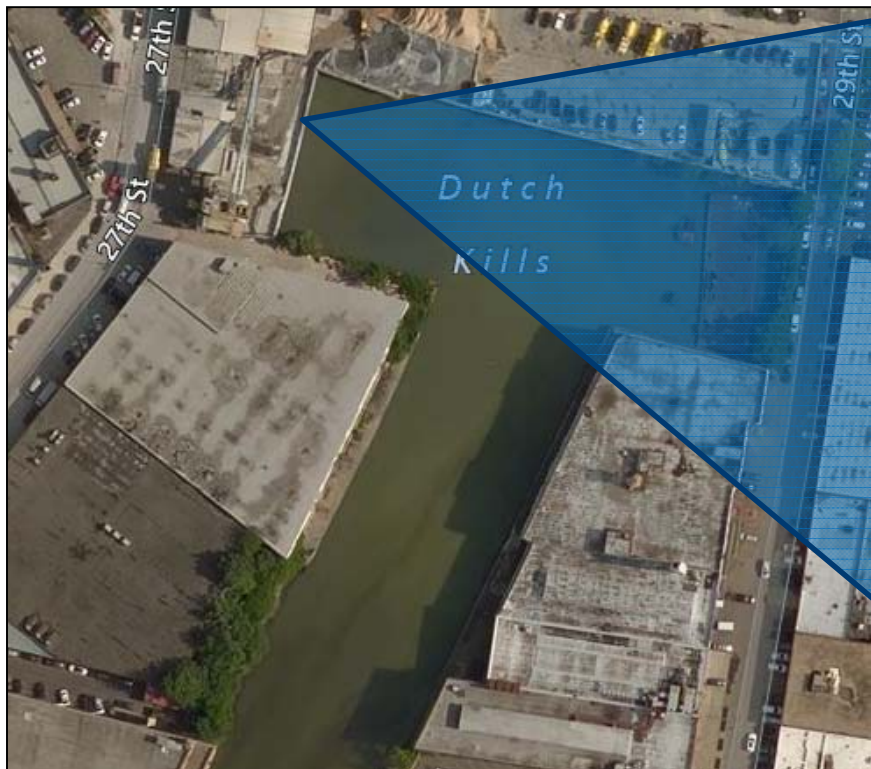
(1) Alternative may not be feasible at this flow rate/level of control  
 (2) Costs are in 2017 dollars, not including site acquisition or escalation

# NCB-015, NCB-083 & NCQ-077: Parallel WW Interceptor



- 20,300 lf of new conduit
- Provides 50% control of NCB-015, NCB-083 and NCQ-077
- 100% FC attainment in Rec. Season in Newtown Creek and upper tributaries
- Challenges:
  - Limited potential for future expansion for higher levels of CSO control.
  - Construction impacts/siting of multiple jacking/receiving shafts
- Preliminary Est. Cost = \$530 M
  - (1) Costs are in 2017 dollars, not including site acquisition or escalation

# Ecological Restorations



➤ Existing Pilot Restoration Site in Dutch Kills

## Examples of Other Ecological Restoration Projects:



Paerdegat Basin



Alley Creek

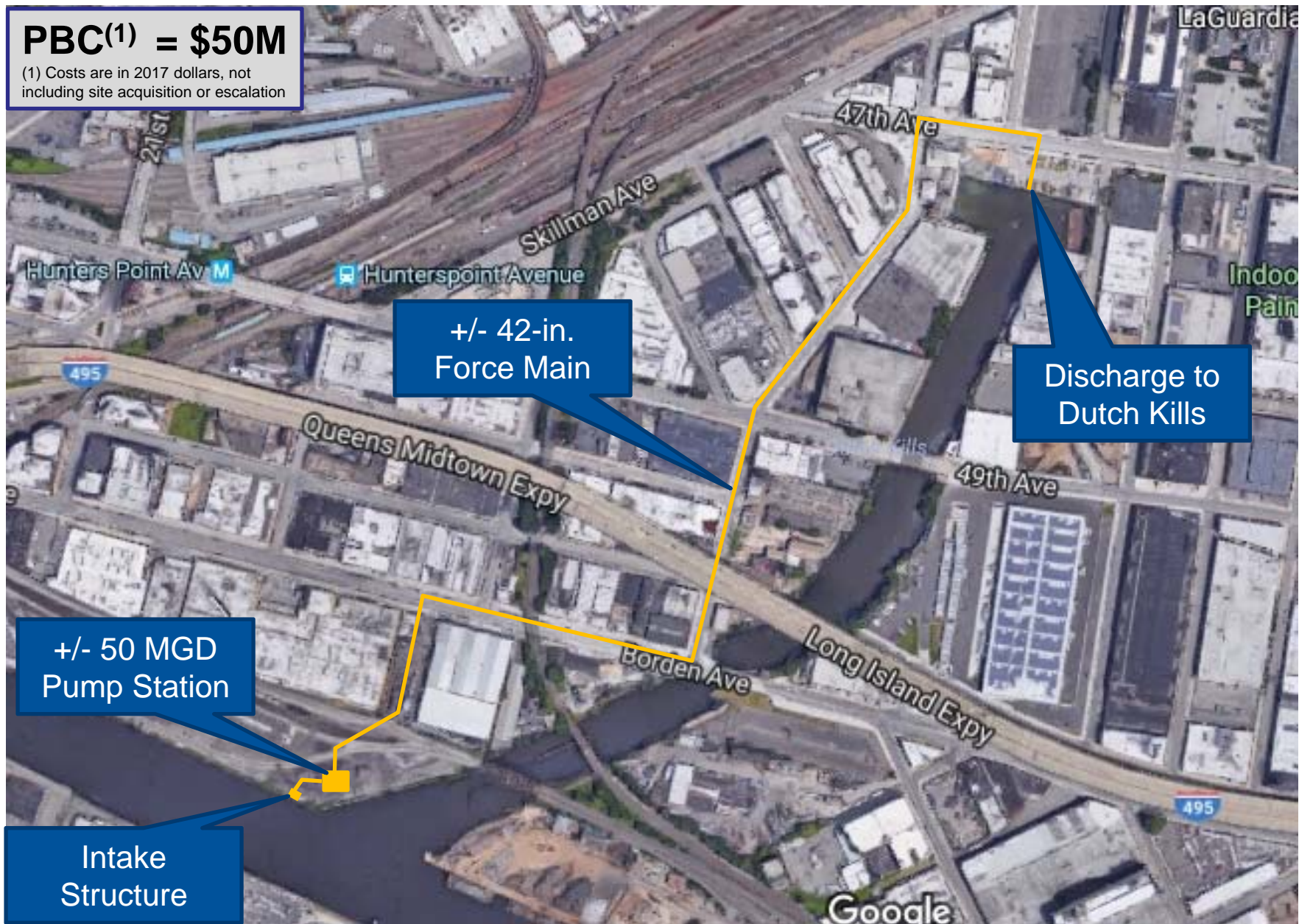


Hendrix Creek

# Dutch Kills Flushing System Concept

**PBC<sup>(1)</sup> = \$50M**

(1) Costs are in 2017 dollars, not including site acquisition or escalation



+/- 42-in.  
Force Main

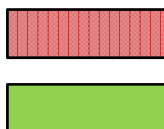
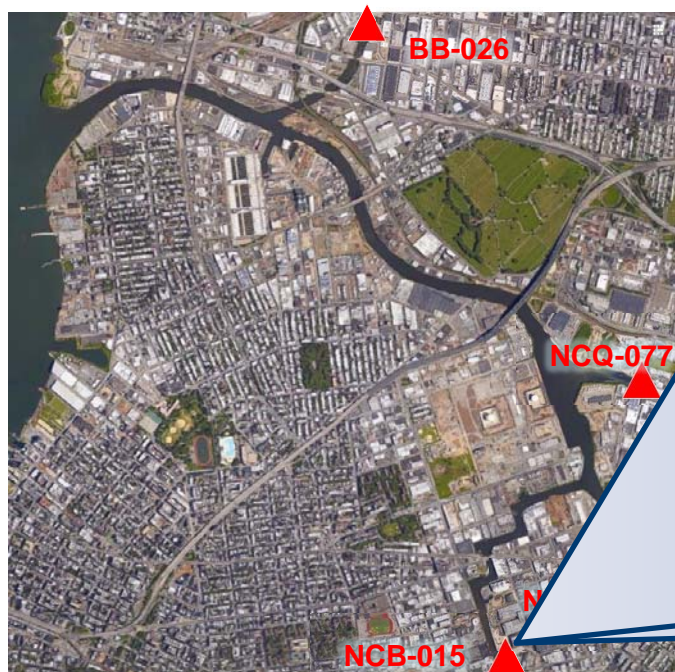
Discharge to  
Dutch Kills

+/- 50 MGD  
Pump Station

Intake  
Structure

# Storage Tanks at Each Outfall

Outfall	25% Annual Control		50% Annual Control		75% Annual Control		100% Annual Control	
	Volume (MG)	Required Area (ac.)	Volume (MG)	Required Area (ac.)	Volume (MG)	Required Area (ac.)	Volume (MG)	Required Area (ac.)
BB-026	0.9	1.0	2.4	1.5	5.6	2.3	15.3	4.3
NCQ-077	2.4	1.5	6.9	2.4	14.2	3.7	37.0	N/A <sup>(1)</sup>
NCB-083	3.0	1.5	8.5	2.6	17.2	4.1	41.1	7.9
NCB-015	4.9	1.9	13.6	3.6	24.9	5.3	44.3	8.2
Prelim. PBC <sup>(2)</sup> (\$M)	\$640		\$1,100		\$1,600		\$2,420	



Sites would require relocation of existing uses/buildings

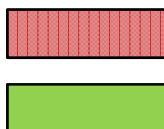
Vacant parcel of sufficient size identified

(1) Not feasible due to capacity limitation in interceptor for dewatering tank  
 (2) Costs are in 2017 dollars, not including site acquisition or escalation



# Retention/Treatment Basins at Each Outfall

Outfall	25% Annual Control		50% Annual Control		75% Annual Control		100% Annual Control	
	Peak Flow (MGD)	Required Area (ac.)	Peak Flow (MGD)	Required Area (ac.)	Peak Flow (MGD)	Required Area (ac.)	Peak Flow (MGD)	Required Area (ac.)
BB-026	6	0.8	13	1.1	24	1.6	112	N/A <sup>(1)</sup>
NCQ-077	14	1.0	35	1.4	75	2.2	484	N/A <sup>(1)</sup>
NCB-083	18	1.0	50	1.5	115	2.5	724	N/A <sup>(1)</sup>
NCB-015	29	1.2	70	1.8	130	2.9	590	N/A <sup>(1)</sup>
Prelim. PBC <sup>(2)</sup> (\$M)	\$480		\$760		\$1,090		N/A <sup>(1)</sup>	



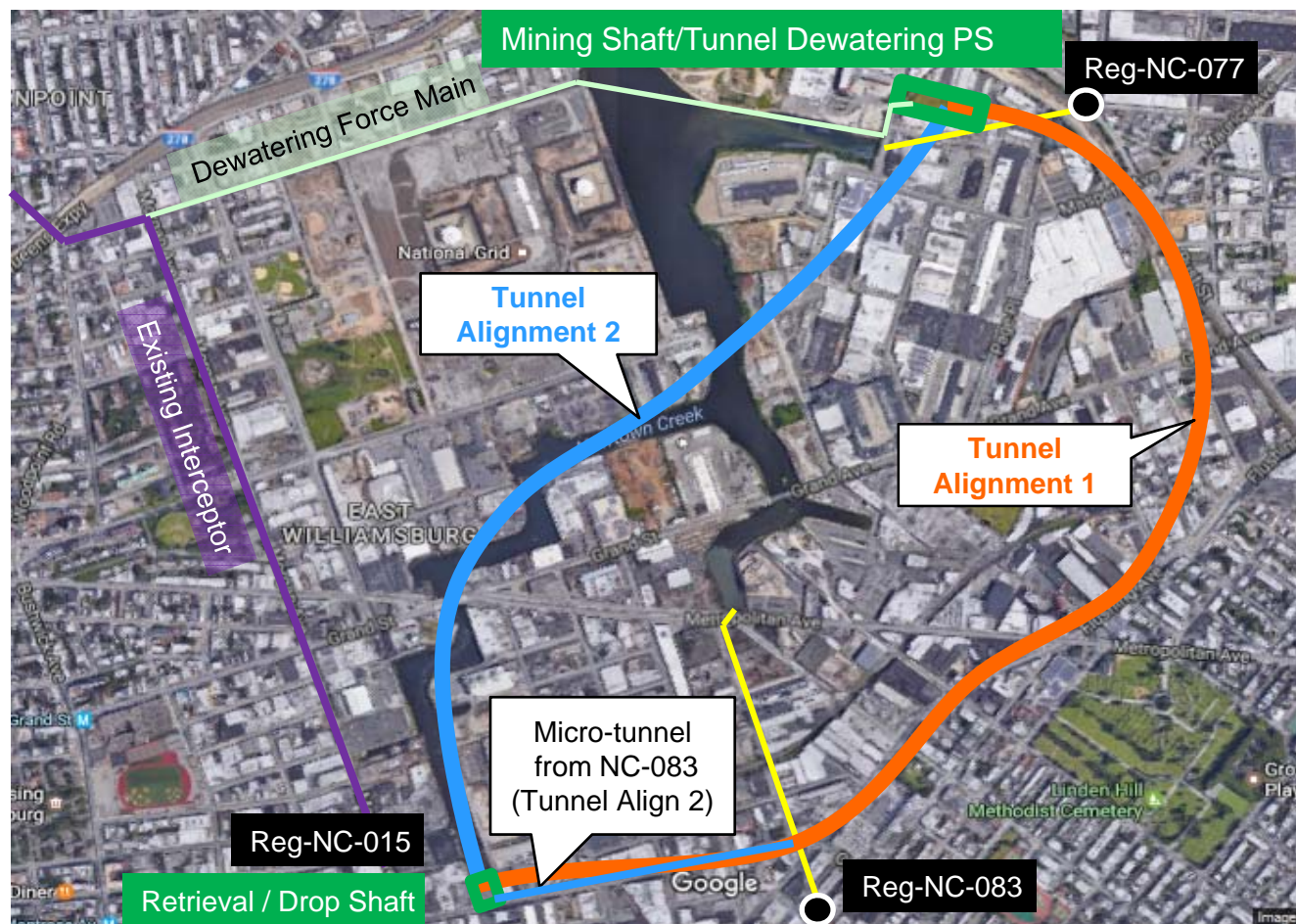
Sites would require relocation of existing uses/buildings

Vacant parcel of sufficient size identified

(1) Seasonal operation of RTB disinfection cannot achieve 100 % control  
 (2) Costs are in 2017 dollars, not including site acquisition or escalation



# Tunnel Alternative A

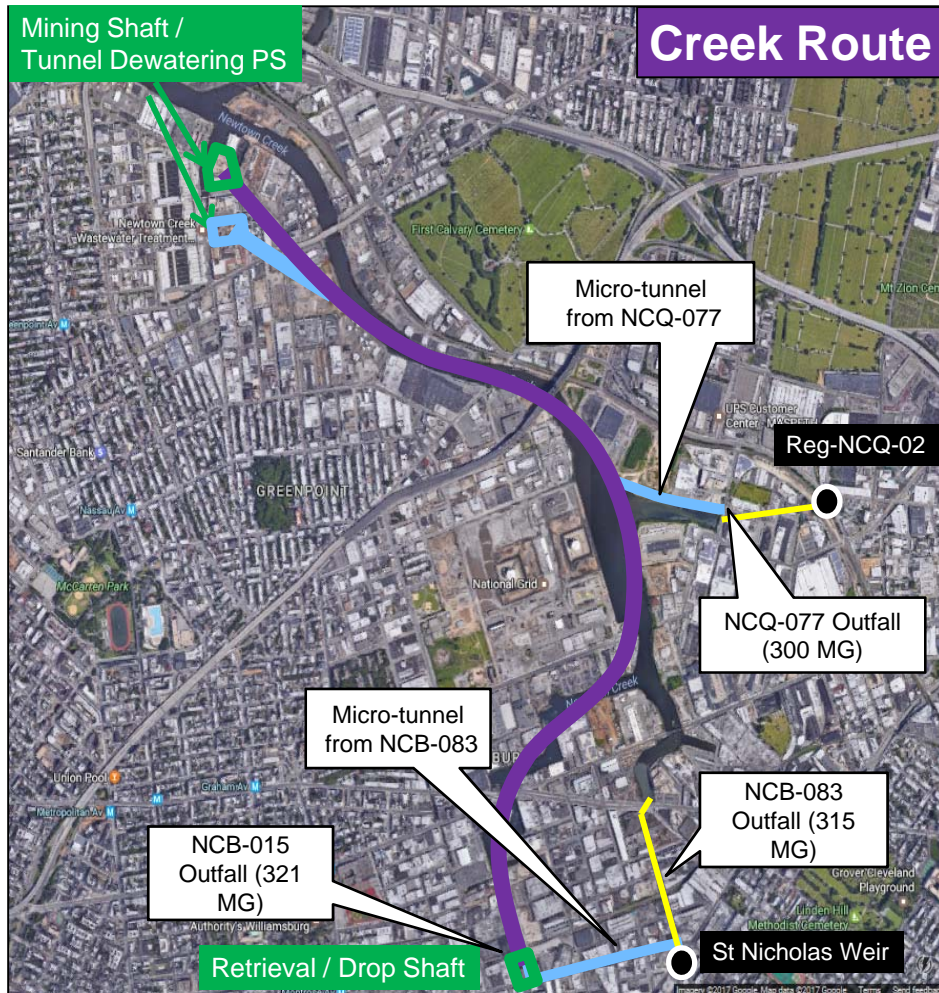


➤ 50% capture at NCB-015, NCB-083 and NCQ-077 results in 100% FC attainment in Recreational Season in Newtown Creek and upper tributaries

Notes:  
 (1) Costs are in 2017 dollars; does not include site acquisition or escalation.  
 (2) Tunnel diameter required for 100% control approaching limit of feasibility for rock tunnel

%CSO Control:	25%		50%		75%		100%	
	Align1	Align2	Align1	Align2	Align1	Align2	Align1	Align2
Length (lf)	9,800	7,300	9,800	7,300	9,800	7,300	9,800	7,300
Diameter (ft)	16	16	23	26	32	36	48	56
Volume (MG)	15	11	30	29	59	56	133	134
Prelim. PBC <sup>(1)</sup> (\$M)	\$360	\$350	\$460	\$430	\$590	\$560	N/A <sup>(2)</sup>	N/A <sup>(2)</sup>

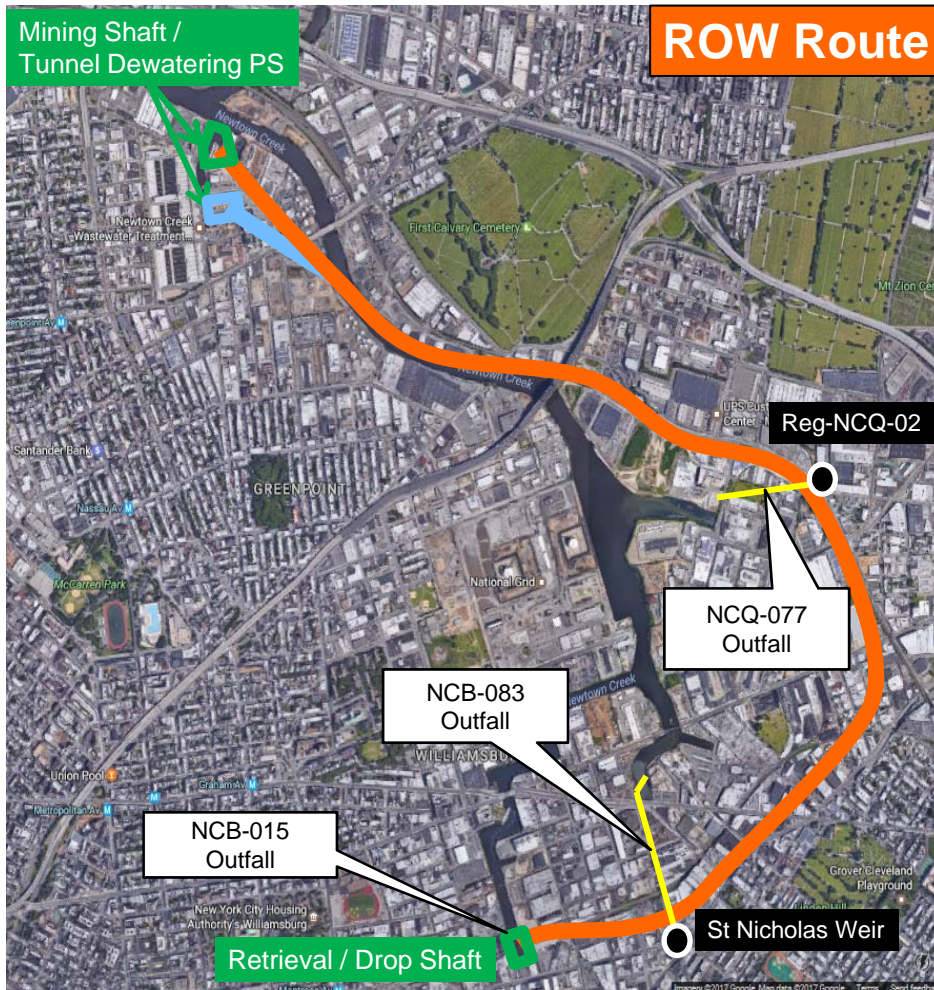
# Tunnel Alternative B



Creek Route, Capture NCB-015, NCB-083, NCQ-077 – Microtunnel Branches to NCB-083, NCQ-077				
CSO Capture	Diam. (ft)	Length (lf)	Volume (MG)	Prelim. PBC <sup>(1)</sup> (\$M)
25%	11	13,700	10	\$330
50%	19	13,700	28	\$450
75%	26	13,700	55	\$590
100%	40	13,700	130	\$910

(1) Costs are in 2017 dollars, not including site acquisition or escalation

# Tunnel Alternative B



ROW Route, Capture NCB-015, NCB-083, NCQ-077				
CSO Capture	Diam. (ft)	Length (lf)	Volume (MG)	Prelim. PBC <sup>(1)</sup> (\$M)
25%	10	18,800	11	\$335
50%	16	18,800	28	\$460
75%	23	18,800	58	\$640
100%	35	18,800	135	\$980

(1) Costs are in 2017 dollars, not including site acquisition or escalation

# Alternatives Summary – 2017 Costs



Outfall	Alternative	Prelim. PBC (\$M), 2017 Dollars			
		25% Control	50% Control	75% Control	100% Control
BB-026	Expand Borden Ave. PS	\$35	\$40	\$50	\$100
NCQ-077	Pump NCQ-077 to Kent Ave.	\$50	\$70	\$100	\$260
NCQ-077, NCB-083, NCB-015	Wet Weather Interceptor to RTB	\$320	\$530	N/A	N/A
BB-026, NCQ-077, NCB-083, NCB-015	Storage Tanks at BB-026, NCB-083, NCB-015	\$640	\$1,120	\$1,590	\$2,420
BB-026, NCQ-077, NCB-083, NCB-015	RTBs at BB-026, NCB-083, NCB-015, NCQ-077	\$480	\$760	\$1,090	N/A
NCQ-077, NCB-083, NCB-015	Storage Tunnel Option A	\$360	\$460	\$590	N/A
NCQ-077, NCB-083, NCB-015	Storage Tunnel Option B w/out Microtunnel to BB-026	\$330	\$450	\$590	\$910
BB-026, NCQ-077, NCB-083, NCB-015	Storage Tunnel Option B w/ Microtunnel to BB-026	\$390	\$520	\$680	\$1,040

Dutch Kills Flushing System: \$50M

Dutch Kills Ecological Restoration: \$TBD

# Alternatives Summary – Escalated Costs

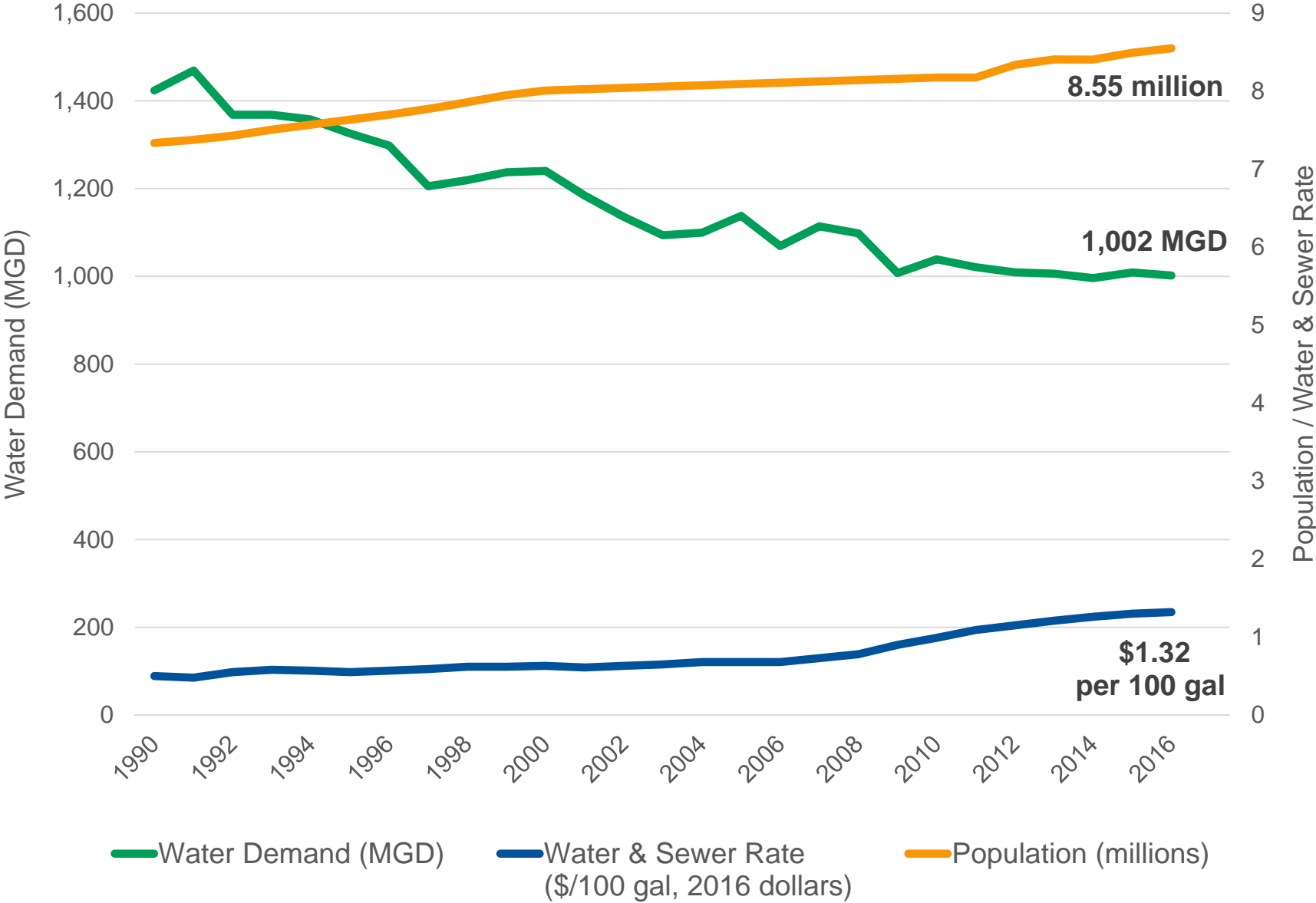


Outfall	Alternative	Including Soft Costs, Escalated 15 Yrs. (\$M)			
		25% Control	50% Control	75% Control	100% Control
BB-026	Expand Borden Ave. PS	\$70	\$80	\$100	\$200
NCQ-077	Pump NCQ-077 to Kent Ave.	\$100	\$140	\$200	\$515
NCQ-077, NCB-083, NCB-015	Wet Weather Interceptor to RTB	\$630	\$1,050	N/A	N/A
BB-026, NCQ-077, NCB-083, NCB-015	Storage Tanks at BB-026, NCB-083, NCB-015	\$1,270	\$2,220	\$3,150	\$4,790
BB-026, NCQ-077, NCB-083, NCB-015	RTBs at BB-026, NCB-083, NCB-015, NCQ-077	\$950	\$1,500	\$2,160	N/A
NCQ-077, NCB-083, NCB-015	Storage Tunnel Option A	\$710	\$910	\$1,170	N/A
NCQ-077, NCB-083, NCB-015	Storage Tunnel Option B w/out Microtunnel to BB-026	\$650	\$890	\$1,170	\$1,800
BB-026, NCQ-077, NCB-083, NCB-015	Storage Tunnel Option B w/ Microtunnel to BB-026	\$770	\$1,030	\$1,350	\$2,060

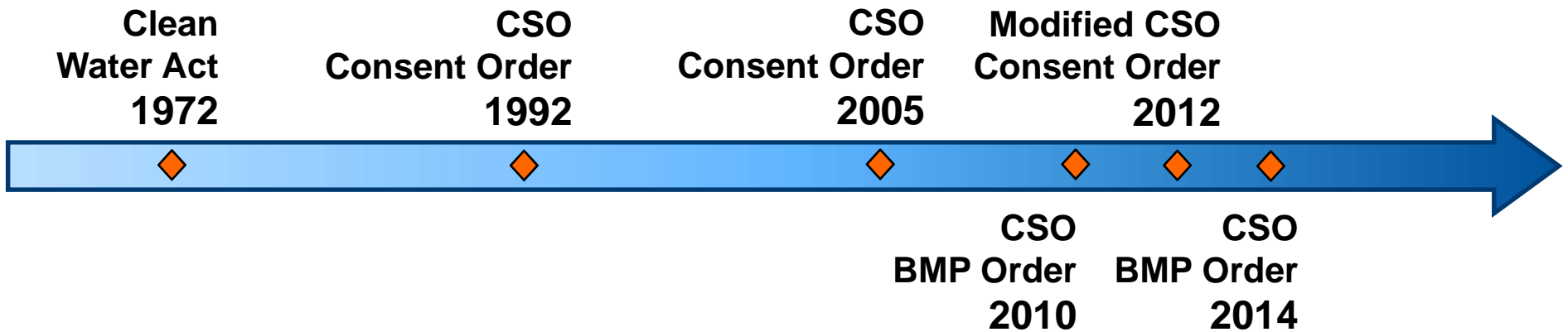
Dutch Kills Flushing System: \$100 M

Dutch Kills Ecological Restoration: \$TBD

# Population / Demand



# Major Historical Timeline for Wastewater Infrastructure



**\$40 Billion**

OMB Records & 10-yr Capital Plan

**1973 – 2011: Upgraded 12 WWTPs to Secondary Treatment and built two new Wastewater Treatment Plants**

**\$1.1 Billion**

OMB Records & 10-yr Capital Plan

**1999 – 2020**

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

**\$4.2 Billion**

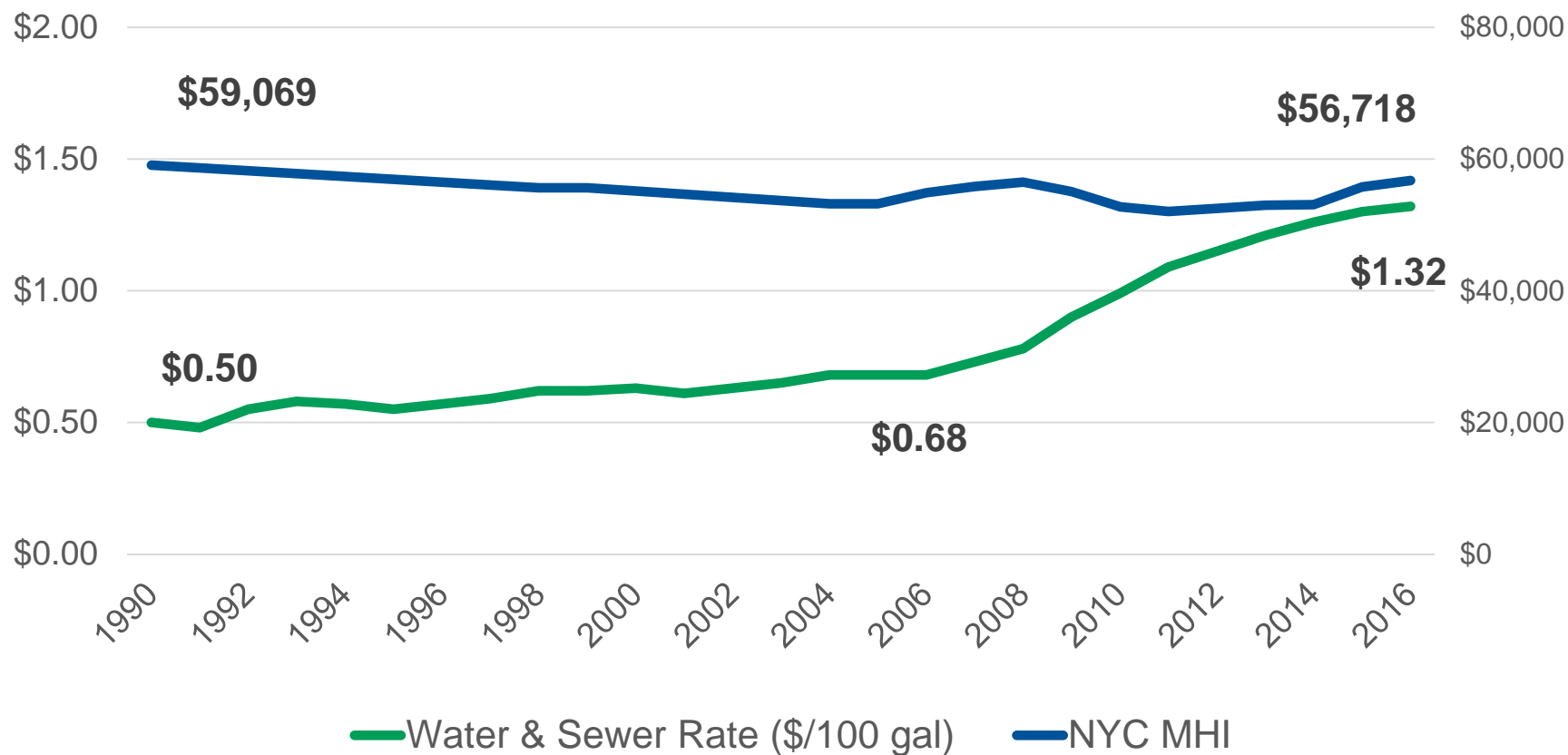
OMB Records & 10-yr Capital Plan  
Grey (1995 – 2022, \$2.7 B)  
Green (2012 – 2030, \$1.5 B)

**1995 – 2030**

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

# Income and Rate increases over Time

Water & Sewer Rates and MHI, 1990-2016  
2016 dollars



- NYC MHI declined by over \$2,300/year, adjusted for inflation
- Rates rose 160%, adjusted for inflation



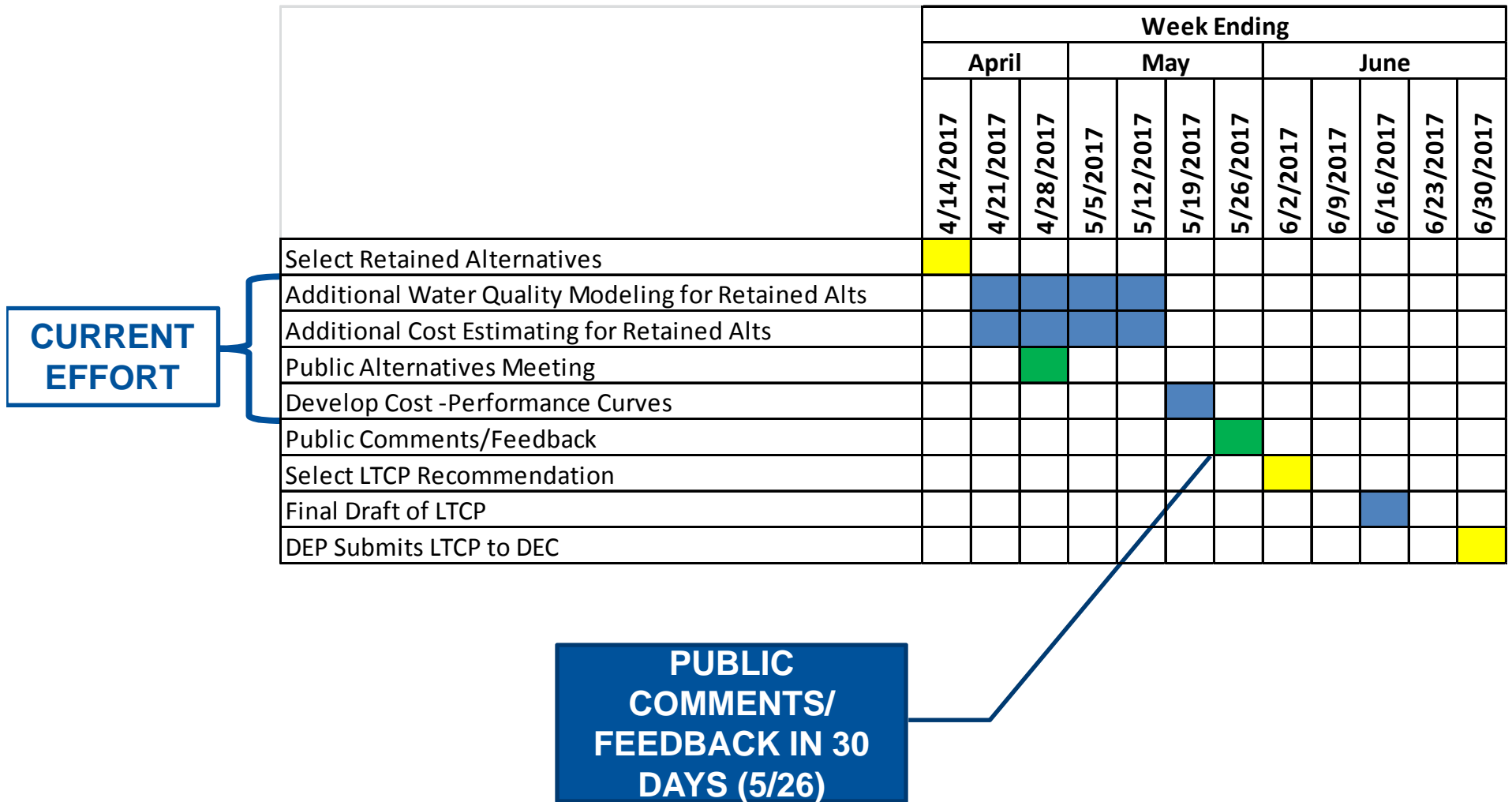
# Questions and Discussion

# Next Steps

Mikelle Adgate  
Director of Stormwater Outreach  
DEP – BPA

# LTCP Delivery Schedule

- **Ongoing LTCP Activities: Additional WQ runs for retained alternatives, cost estimating, cost-performance curves, selection of LTCP Recommendation in late May**



- LTCP Submittal to NYSDEC by June 30, 2017
  
- Public Comments will be accepted for Newtown Creek through **May 31, 2017**
  - There will be subsequent comment periods following the Final Plan Review Meeting.
  
- Comments can also be submitted to:
  - New York City DEP at: [ltcp@dep.nyc.gov](mailto:ltcp@dep.nyc.gov)

- Visit the informational tables tonight for handouts and poster boards with detailed information
  
- Go to [www.nyc.gov/dep/ltcp](http://www.nyc.gov/dep/ltcp) to access:
  - LTCP Public Participation Plan
  - Presentation, handouts and poster boards from this meeting
  - Links to Waterbody/Watershed Facility Plans
  - CSO Order including LTCP Goal Statement
  - NYC's Green Infrastructure Plan
  - Green Infrastructure Pilots 2011 and 2012 Monitoring Results
  - NYC Waterbody Advisory Program
  - Upcoming meeting announcements
  - Other LTCP updates