

Placeholder for Video
“DEP Jamaica Bay SD”

Video will loop until Presentation Begins



Jamaica Bay & Tributaries Combined Sewer Overflow Long Term Control Plan

Alternatives and Recommended Plan
Public Meeting

Jamaica Bay Wildlife Refuge Visitor Center
April 18, 2018

	Topic	Speaker
1	Welcome and Recap of LTCP Process	Mikelle Adgate
2	Water Quality, Baseline Conditions and Performance Gap	Keith Mahoney
3	Evaluation of Grey Alternatives	Keith Mahoney
4	Evaluation of Watershed Based Alternatives	John McLaughlin
5	Recommended Plan	Pinar Balci
4	Discussion and Q&A Session	All
5	Next Steps	Mikelle Adgate

Welcome & Recap of LTCP Process

Mikelle Adgate
Senior Policy Advisor
DEP

Long Term Control Plan (LTCP)

identifies appropriate CSO controls to achieve applicable water quality standards

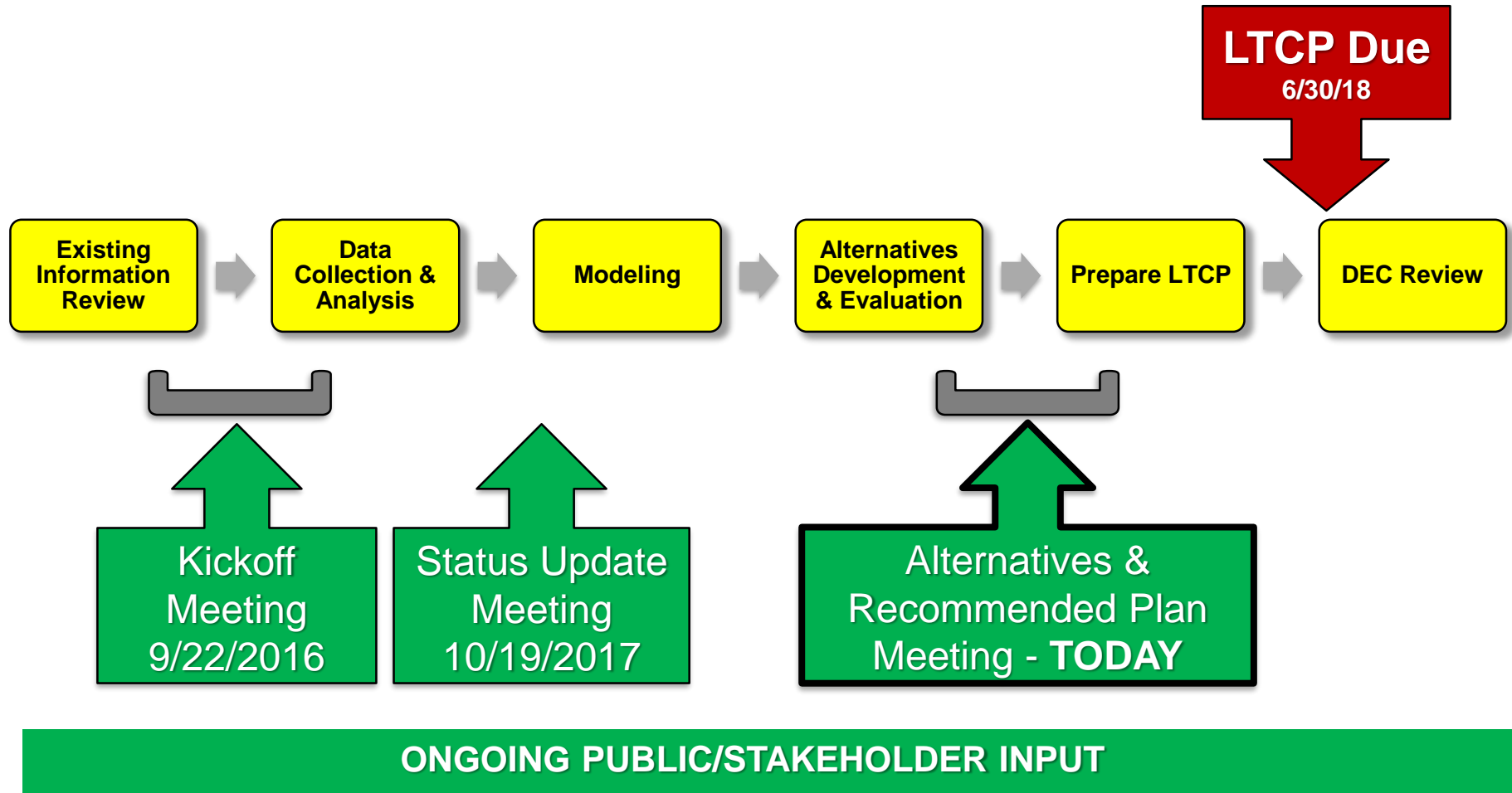
consistent with the Federal CSO Policy and Clean Water Act

CSO Consent Order

an agreement between NYC and DEC that settles past legal disputes without prolonged litigation

DEC requires DEP to develop LTCPs and mitigate CSOs

LTCP Process and Public Involvement



- OneNYC identifies alleviating flooding in Southeast Queens as a priority initiative
- The 10 Year Capital Budget allocates \$1.7 billion over the next decade to plan and begin full sewer buildout and to provide short term relief wherever possible
- Full build-out requires approximately 450 miles of new storm sewers, and upgrade 260 miles of sanitary sewers and 30 miles of combined sewers over many years



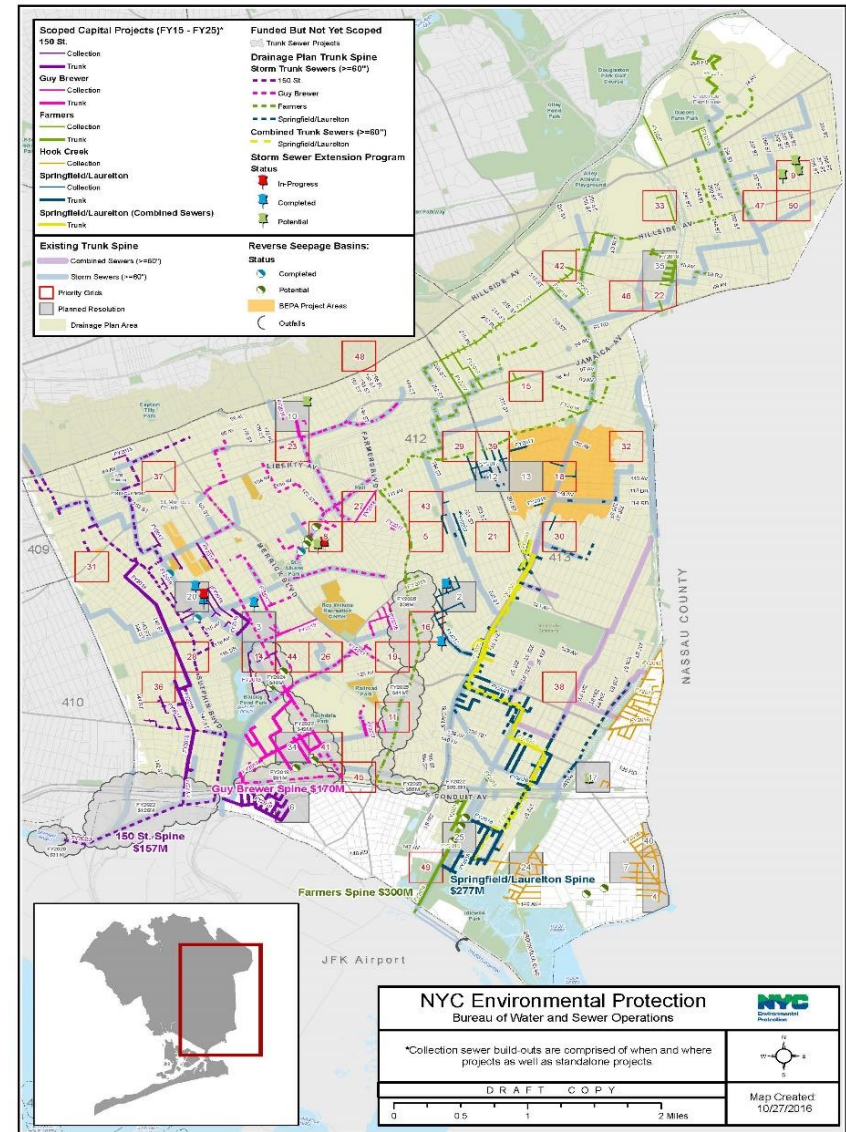
Strategy:

Build early action storm sewers in flood prone areas as quickly as possible

Process Overview:

1. Accelerate scoped projects scheduled for future construction
2. Use complaint data to prioritize projects
3. Complete wet and dry weather site investigations to identify root causes
4. Design and construct site-specific solutions

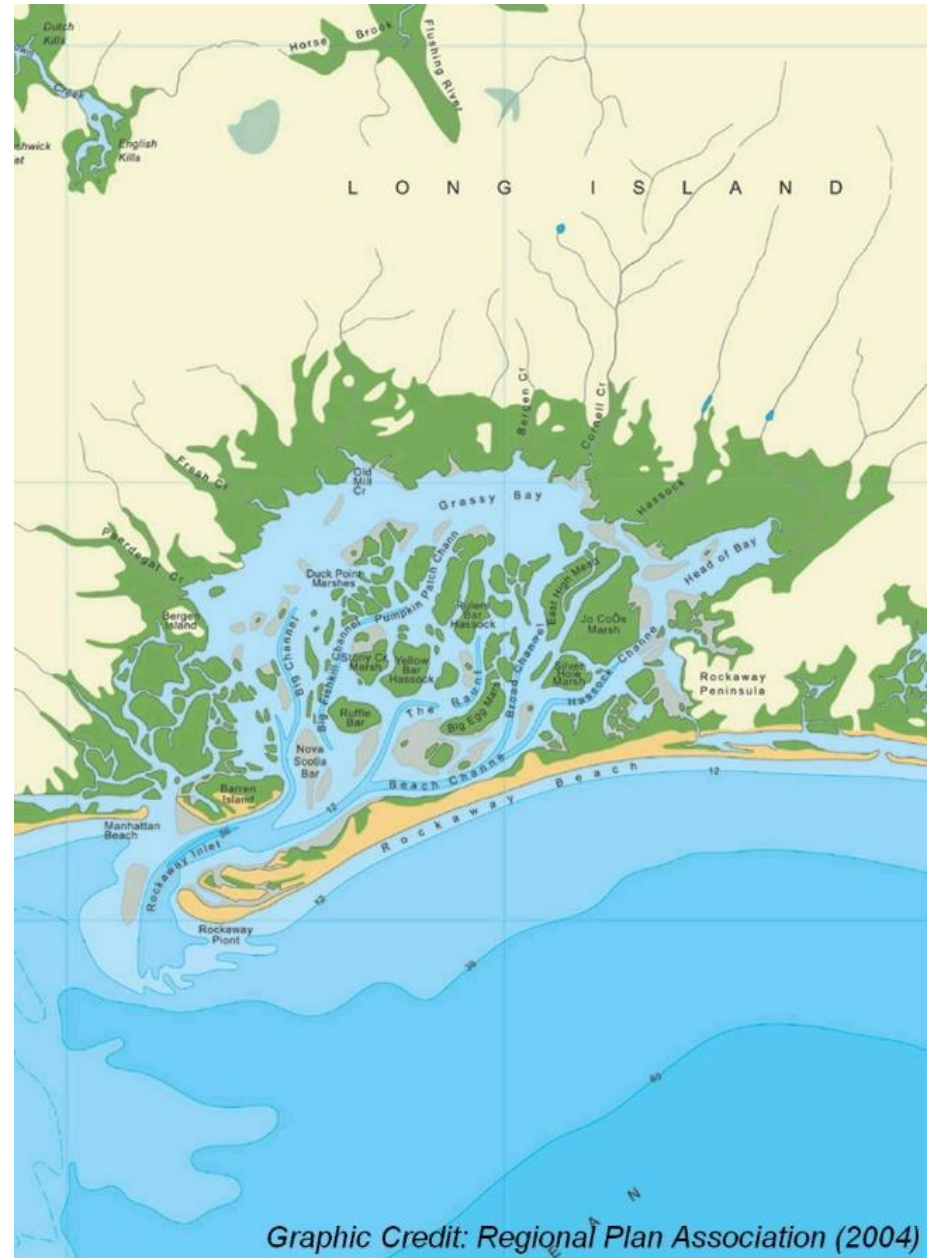
Proposed Sewer Build-Out: Capital Projects FY2015 - FY2025
Community Districts 412 & 413, Queens



Jamaica Bay Watershed Protection Plan

Jamaica Bay Historical Context

- ❖ Loss of over 20 freshwater streams spatially distributed around the perimeter of Jamaica Bay.
- ❖ Over 12,000 acres of the original 16,000 acres of wetlands have been lost.
- ❖ Bay historically shallow, ~12 ft to 20 ft and has been dredged to 40 ft to 50 ft in some locations.
- ❖ Tidal exchange has been altered and constriction of the western end due to the natural extension of the western spit by nearly 16,000 ft (three miles) over the last 200 years.
- ❖ Significant alterations to the natural attenuating features of the watershed have resulted in vast expanses of impervious surfaces.



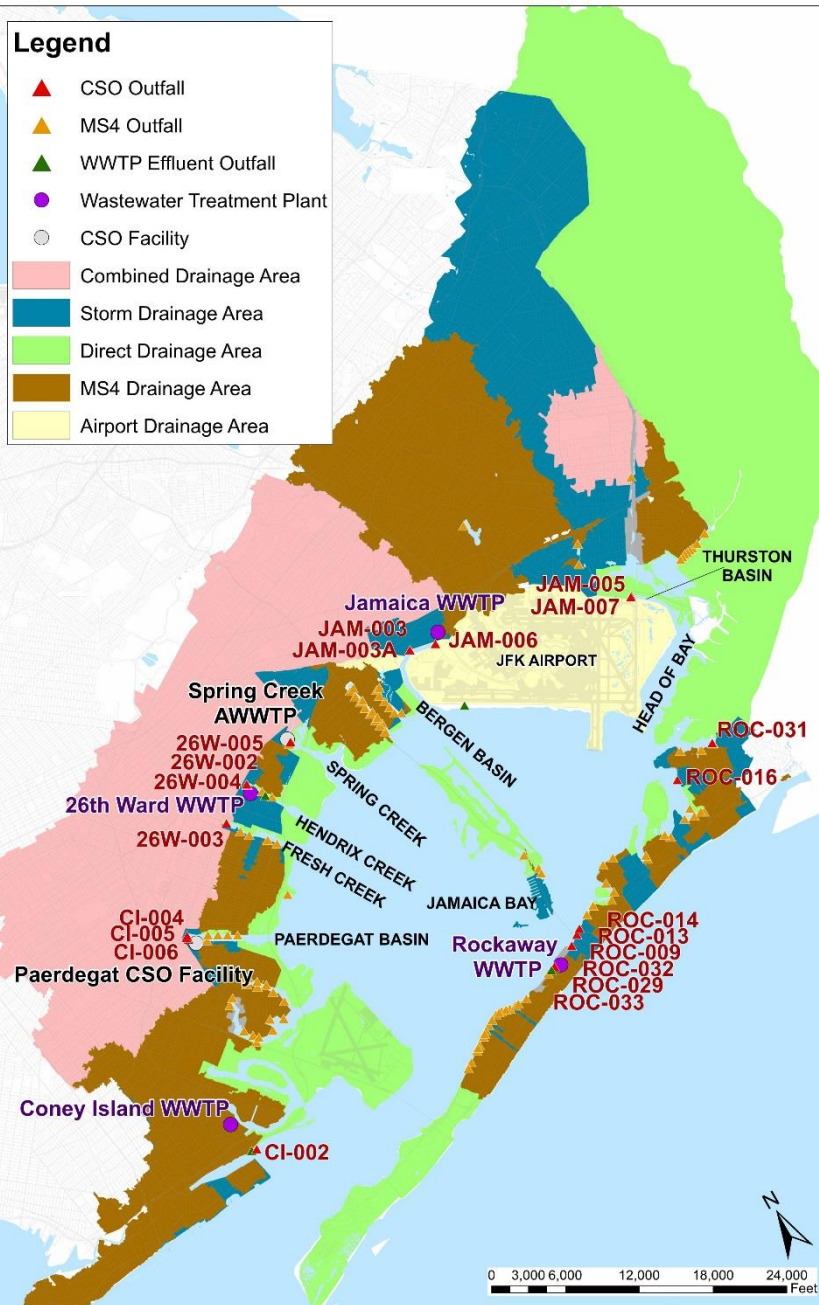
- 1** Interest in GI and Ecological Enhancements
- 2** Concerns of Impacts of Disinfection
- 3** Updates on SEQ Sewer Separation/Redevelopment Area
- 4** Interest in Sustainability and Resiliency Issues



Water Quality, Baseline Conditions and Performance Gap

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

Jamaica Bay Drainage Area



➤ 6 Urban CSO Tributaries

- Paerdegat Basin
- Spring Creek
- Fresh Creek
- Bergen Basin
- Hendrix Creek
- Thurston Basin

➤ Sewer System

- 20 CSO Outfalls (▲)
- 149 MS4 Outfalls

➤ 4 Wastewater Treatment Plants (●)

- Jamaica, 26th Ward, Rockaway, Coney Island

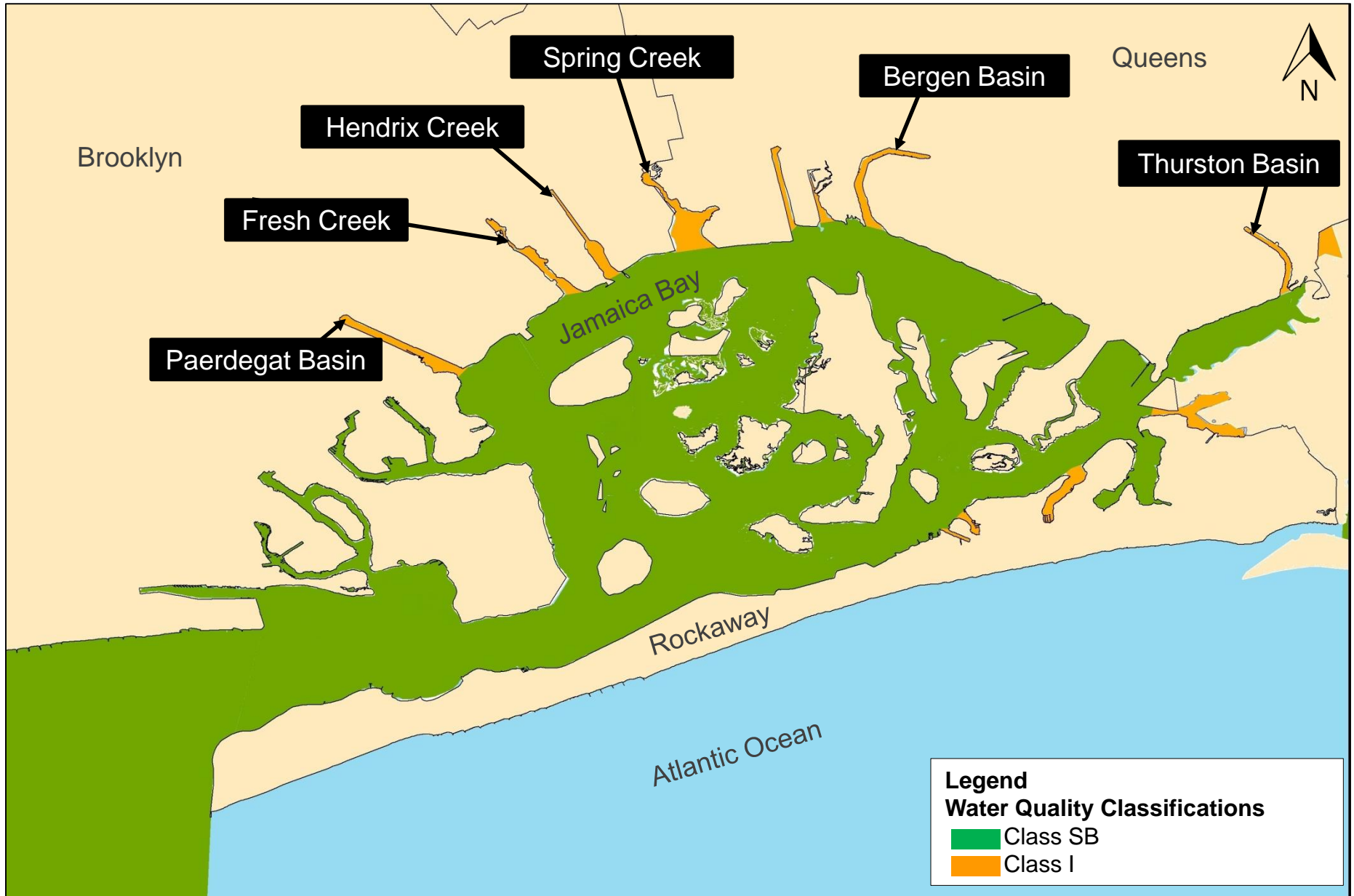
➤ 2 CSO Facilities (○)

- Spring Creek, Paerdegat

➤ Significant stormwater discharge in area

Drainage Area	
Total Acres	52,200
Served by Combined Sewers	31%

Waterbody Classifications



CLASS SB

Bathing

The best usages of Class SB waters are **primary and secondary contact** recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

CLASS I

Boating/Fishing

The best usages of Class I waters are **secondary contact** recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

Waterbody	Class	Dissolved Oxygen (mg/L)	Fecal Coliform* (cfu/100 mL)	Total Coliform* (cfu/100 mL)
Jamaica Bay	SB	≥ 4.8 (daily average) ≥ 3.0 (acute, never less than)	Monthly Geometric Mean ≤ 200	Monthly Median $\leq 2,400$ and 80% $\leq 5,000$
Tributaries	I	≥ 4.0 (acute, never less than)		

*(NYCRR Part 703.3)

** (NYCRR Part 703.4)

➤ CSO LTCP Goals and Targets:

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

On March 21, 2018, DEC publicly noticed a revision to the water quality standards and classifications for certain waterbodies.

Jamaica CSO Mitigation Projects



Recommended Project	Status
1 26 th Ward WWTP Drainage Area Sewer Cleaning	Completed in 2010
2 Hendrix Creek Canal Dredging	Completed in 2012
3 Spring Creek Auxiliary WWTP Upgrade	In Operation Since 2007
Warnerville Pump Station and Force Main	In Operation Since 2009
4 Paerdegat Basin CSO Facility	In Operation Since 2011
Shellbank Destratification	In Operation Since 2012
5 Bending Weirs	In Operation Since 2017
6 New Parallel Sewer West Interceptor	Construction Completed in 2016 ¹
Bergen Basin Lateral Sewer	Projected Completion: 2021
26 th Ward WWTP Wet Weather Stabilization	Projected Completion: 2018
26 th Ward High Level Storm Sewers	Projected Completion: 2022
Total Cost	\$1.03 Billion



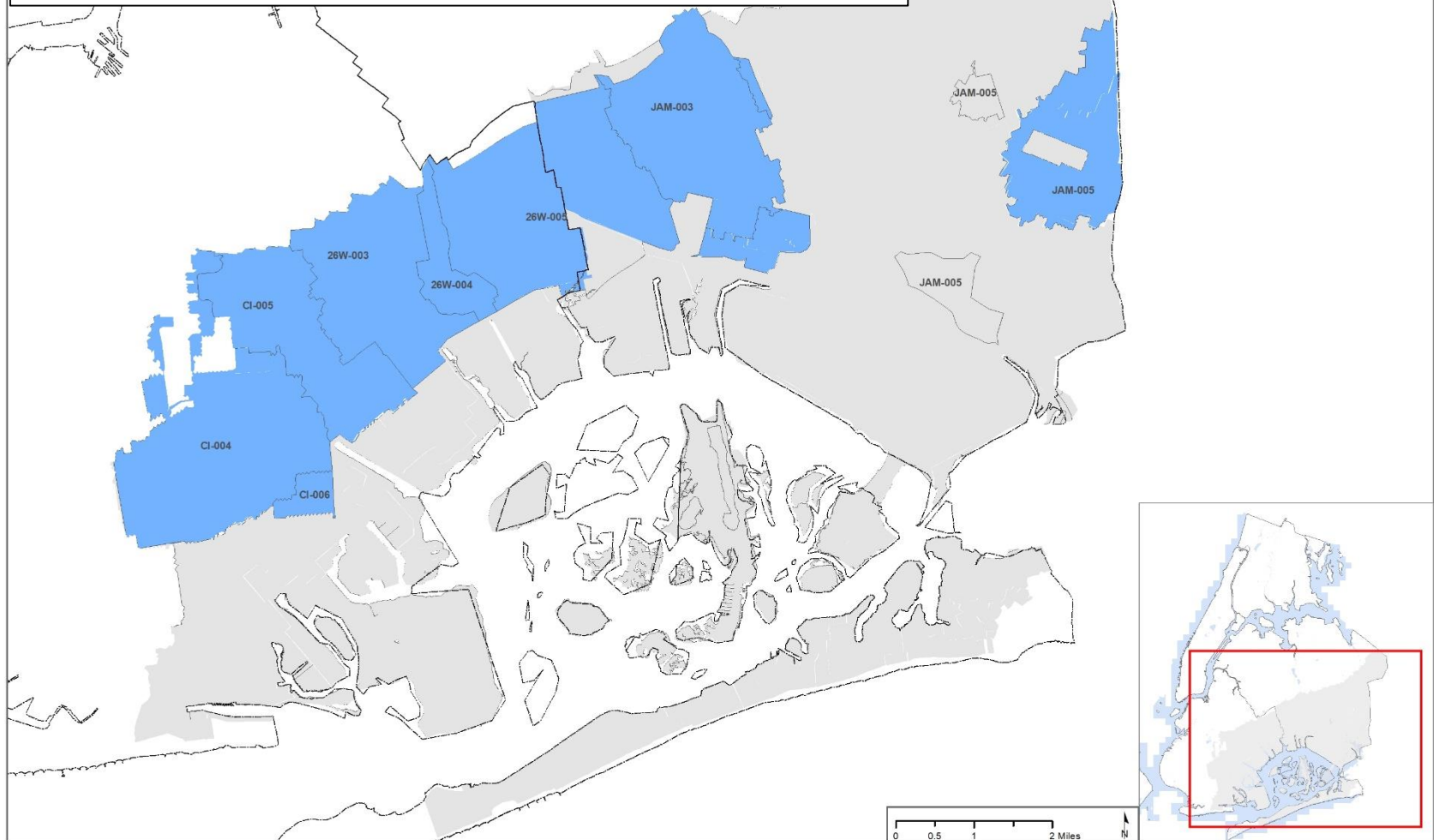
1) New Parallel Sewer West Interceptor will go into operation once the Bergen Basin Lateral Sewer has been completed

GI Program in Jamaica Bay

Current CSO Commitments (~\$300M)

GI Baseline CSO Reductions : **~83 MGY**

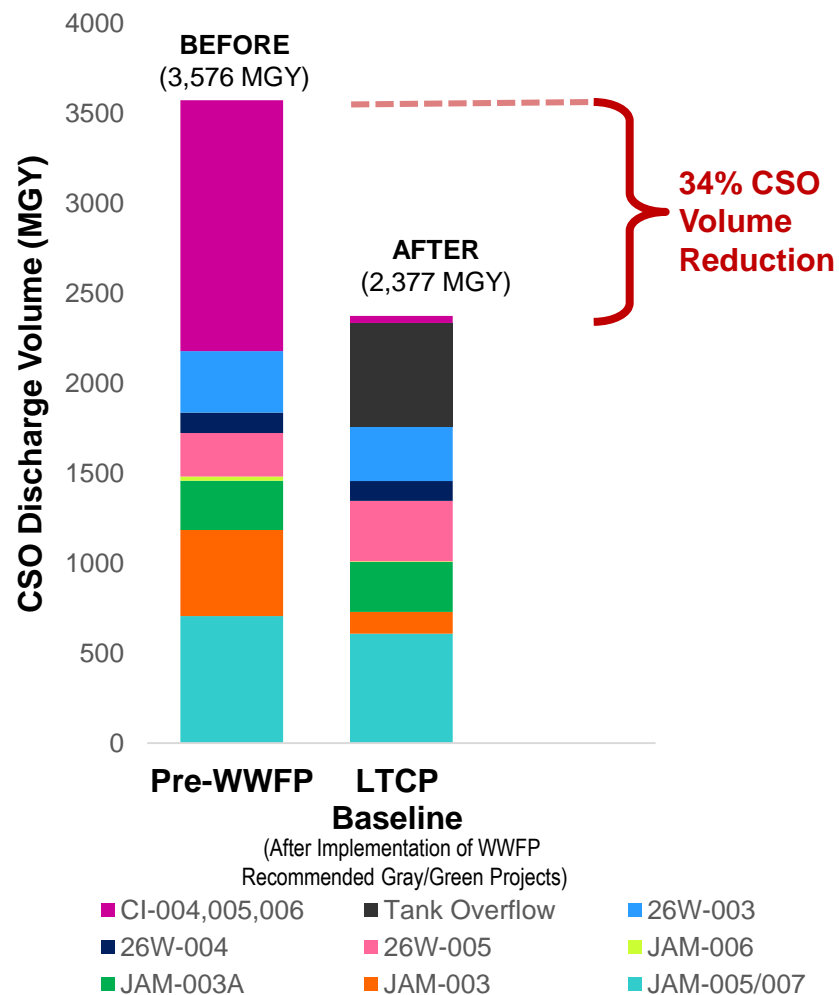
CSO Planned Reductions toward 2030 Goal: **133 MGY**



Modeled Jamaica Bay CSO AAOVs

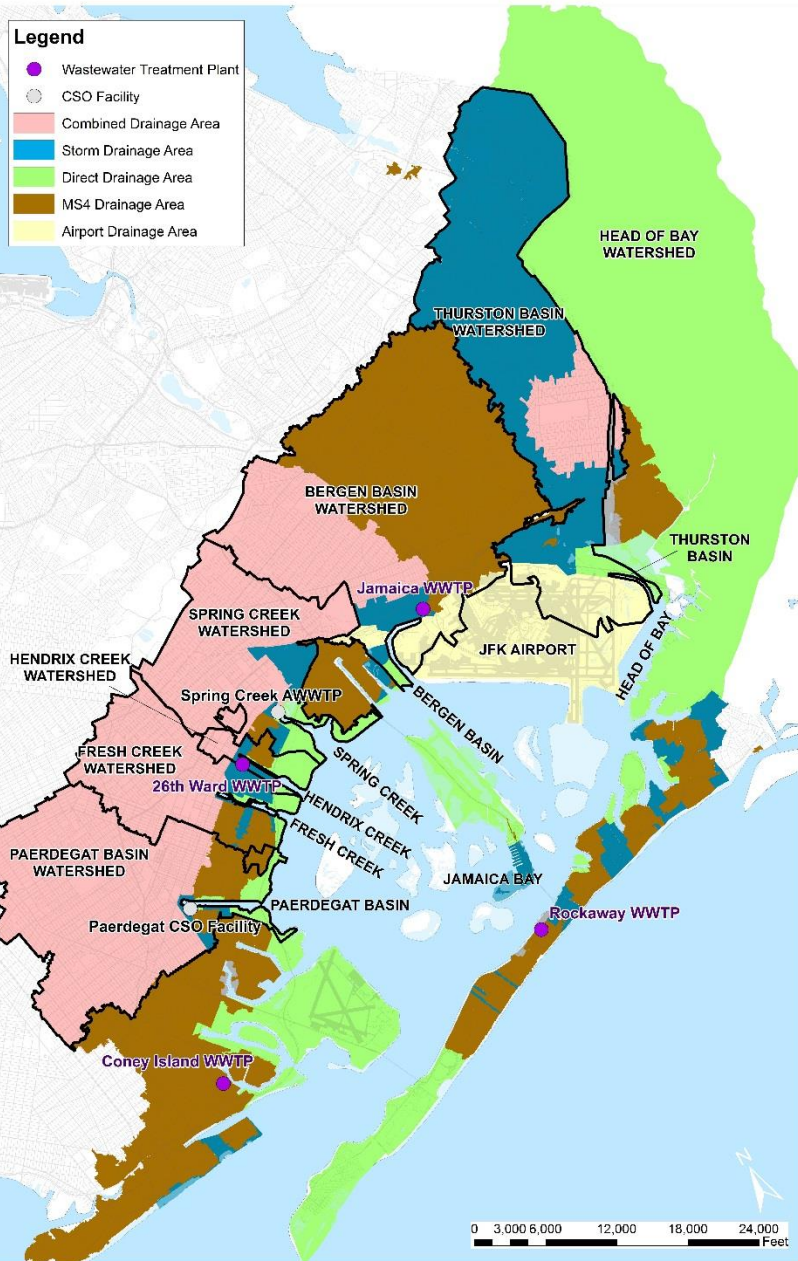
Model Calculated CSO Statistics (2008 Typ. Year)

Location	Outfalls	CSO Volume (MG)		Activation Frequency	
		Pre-WWFP	LTCP Baseline ²	Pre-WWFP	LTCP Baseline ²
Thurston Basin	JAM-005/007	707	608	73	73
Bergen Basin	JAM-003	478	122	48	19
	JAM-003A	275	278	49	35
	JAM-006	22	3	38	15
	Subtotal	775	403	49	35
Spring Creek ²	26W-005	242	337	6	7
Hendrix Creek	26W-004	114	110	31	31
Fresh Creek	26W-003	342	303	15	15
Paerdegat Basin ²	Tank Overflow	-	576	-	12
	CI-004, 005, 006	1,396	40	51	5
	Subtotal	1,396	616	51	12
Jamaica Bay	Rockaway Outfalls ¹	-	-	-	-
Total		3,576	2,377		



1) Rockaway CSOs do not activate during the typical 2008 rainfall year.
 2) The Spring Creek AWWTP and the Paerdegat Basin CSO Facility provide floatables control and settling prior to overflow of storms exceeding the tank storage capacity.

Modeled Stormwater Baseline AAOVs



Model Calculated SW Statistics (2008 Typical Year)

Waterway	Total (MG)	DEP MS4 (MG)	SW ³ (MG)	Airport (MG)	Direct ⁴ (MG)
Jamaica Bay ¹	6,688	2,483	1,241	957	2,007
Bergen Basin	3,278	2,838	116	302	22
Thurston Basin	814	-	381	372	61
Fresh Creek	520	215	273	-	32
Hendrix Creek	112	36	42	-	34
Spring Creek	141	26	38	-	77
Paerdegat Basin	309	196	113	-	-
Head of Bay (Nassau Co.)	6,468	35	49	141	6,243
Other Tributaries ²	362	326	36	-	-
Total³	18,692	6,155	2,289	1,772	8,476

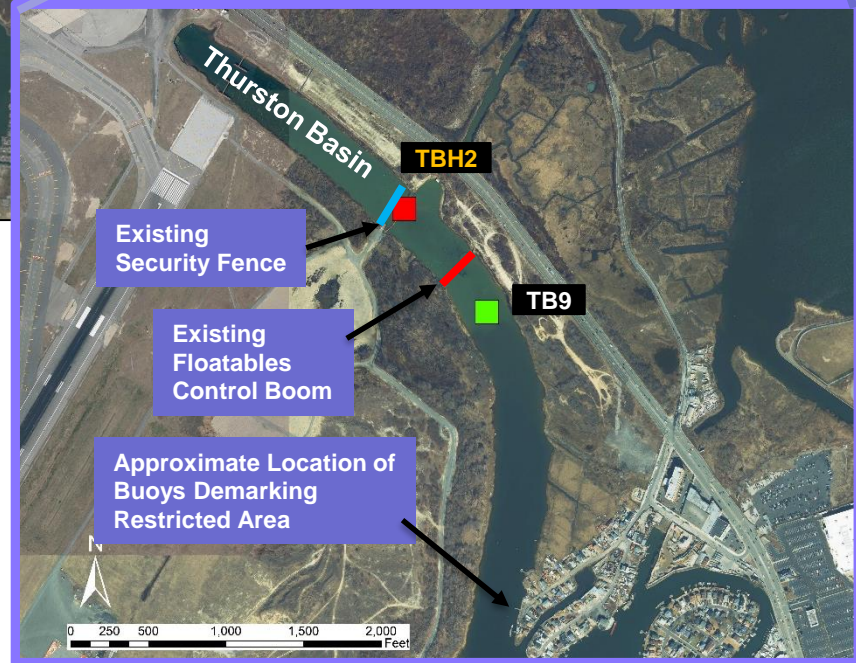
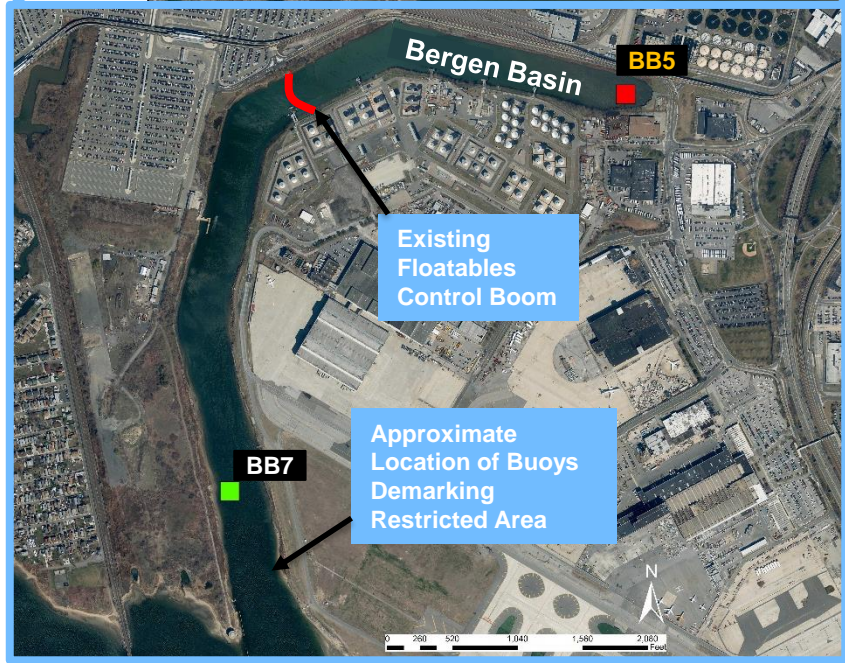
Notes:

1. Grassy Bay, Hassock Creek, Grass Hassock Channel, Shell Bank Creek, Mill Basin and Rockaway are included with Jamaica Bay.
2. Other tributaries include Hawtree and Shellbank Basins.
3. Stormwater (SW) consists of all outfalls except for DEP MS4 and airport stormwater sources.
4. Direct drainage consists of all remaining drainage areas not tributary to defined CSO, MS4 and SW subcatchments.

Monitoring Stations for Assessing WQS Attainment

Legend

- Monitoring Station in Restricted Area
- Monitoring Station



Gap Analysis (Existing WQ Criteria: Jamaica Bay – Class SB, Tributaries – Class I)

✓ = 95%+ Attainment

Waterbody (Monitoring Station) ⁴	Existing Criteria - Fecal Coliform ¹ (Percent Attainment)				Dissolved Oxygen ² (Percent Attainment)	
	Annual (Monthly GM ≤ 200 cfu/100 mL)		Recreational Season (Monthly GM ≤ 200 cfu/100 mL)		Tributaries: Class I (≥ 4.0 mg/l) Jamaica Bay: Class SB (Chronic ≥ 4.8 mg/l, Acute ≥ 3.0 mg/l)	
	LTCP Baseline	100% CSO Control	LTCP Baseline	100% CSO Control	LTCP Baseline	100% CSO Control
Thurston Basin (TBH2)	78%	83%	88%	90%	92%	92%
Thurston Basin (TB9)	91%	✓	✓	✓	92%	92%
Bergen Basin (BB5)	49%	57%	68%	75%	88%	88%
Bergen Basin (BB7)	✓	✓	✓	✓	90%	91%
Hendrix Creek (HC1)	✓	✓	✓	✓	90%	91%
Spring Creek (SP1)	✓	✓	✓	✓	✓	✓
Fresh Creek (FC1)	86%	91%	93%	✓	✓	✓
Paerdegat Basin (PB2)	✓	✓	✓	✓	✓	✓
Jamaica Bay (J5)	✓	✓	✓	✓	✓	✓

- 1) Fecal coliform attainment is based upon 10 year model runs utilizing CSO and SW concentrations reflective of the LTCP stormwater sampling program.
- 2) Dissolved oxygen attainment is based upon a typical year 2008 model run.
- 3) Water quality attainment projections assume that illicit connections have been eliminated.
- 4) Stations TBH2 and BB5 are located within portions of Thurston and Bergen Basins that are restricted from public access by Homeland Security.

Gap Analysis (Potential Future WQ Criteria: Jamaica Bay – Class SB, Tributaries – Class I)

✓ = 95%+ Attainment

Waterbody (Monitoring Station) ³	Existing Criteria – Enterococcus ¹ (Percent Attainment)			
	Rolling 30-day GM ≤ 30 colonies/100 mL		90 th Percentile STV ≤ 110 colonies/100 mL	
	LTCP Baseline	100% CSO Control	LTCP Baseline	100% CSO Control
Thurston Basin (TBH2)	56%	63%	5%	5%
Thurston Basin (TB9)	84%	88%	15%	16%
Bergen Basin (BB5)	22%	22%	0%	0%
Bergen Basin (BB7)	89%	93%	13%	15%
Hendrix Creek (HC1)	✓	✓	29%	37%
Spring Creek (SC1)	✓	✓	72%	85%
Fresh Creek (FC1)	✓	✓	15%	20%
Paerdegat Basin (PB2)	✓	✓	24%	32%
Jamaica Bay (J5)	✓	✓	✓	✓

1) Enterococcus attainment is based upon 10 year model runs utilizing CSO and SW concentrations reflective of the LTCP stormwater sampling program.

2) Water quality attainment projections assume that illicit connections have been eliminated.

3) Stations TBH2 and BB5 are located within portions of Thurston and Bergen Basins that are restricted from public access by Homeland Security.

Gap Analysis for Time to Recover

(Fecal Coliform Threshold 1000 cfu/100 ml)

Storm Size	Percent of Total No. of Storms	Mean Time to Recover (Hours) ¹															
		Thurston Basin (TBH2) ²		Thurston Basin (TB9) ²		Bergen Basin (BB5) ²		Bergen Basin (BB7) ²		Hendrix Creek (HC1)		Spring Creek (SC1)		Fresh Creek (FC1)		Paerdegat Basin (PB2)	
		Base	No CSO	Base	No CSO	Base	No CSO	Base	No CSO	Base	No CSO	Base	No CSO	Base	No CSO	Base	No CSO
<0.1"	44%	1	1	1	1	2	2										
>0.1" - 0.4"	25%	2	2	1	1	7	7	1		3	3	1	1	7	7	1	1
>0.4" - 0.8"	15%	8	6	3	3	26	22	8	2	11	7	2	2	19	18	6	6
>0.8" - 1.0"	5%	30	15	17	11	36	33	17	8	15	8	5	5	27	23	10	7
>1.0" - 1.5"	6%	38	29	31	18	43	38	21	12	18	11	5	5	32	25	19	9
>1.5"	5%	46	43	36	31	38	36	23	16	21	11	36	8	39	24	44	10

- 1) Mean Time to Recover (TTR) reflect the model predicted conditions at the head of each waterbody where the TTRs tend to be the highest, except for Thurston and Bergen Basins where TTRs for additional stations are provided.
- 2) Stations TBH2 and BB5 are located within portions of Thurston and Bergen Basins that are restricted from public access by Homeland Security.

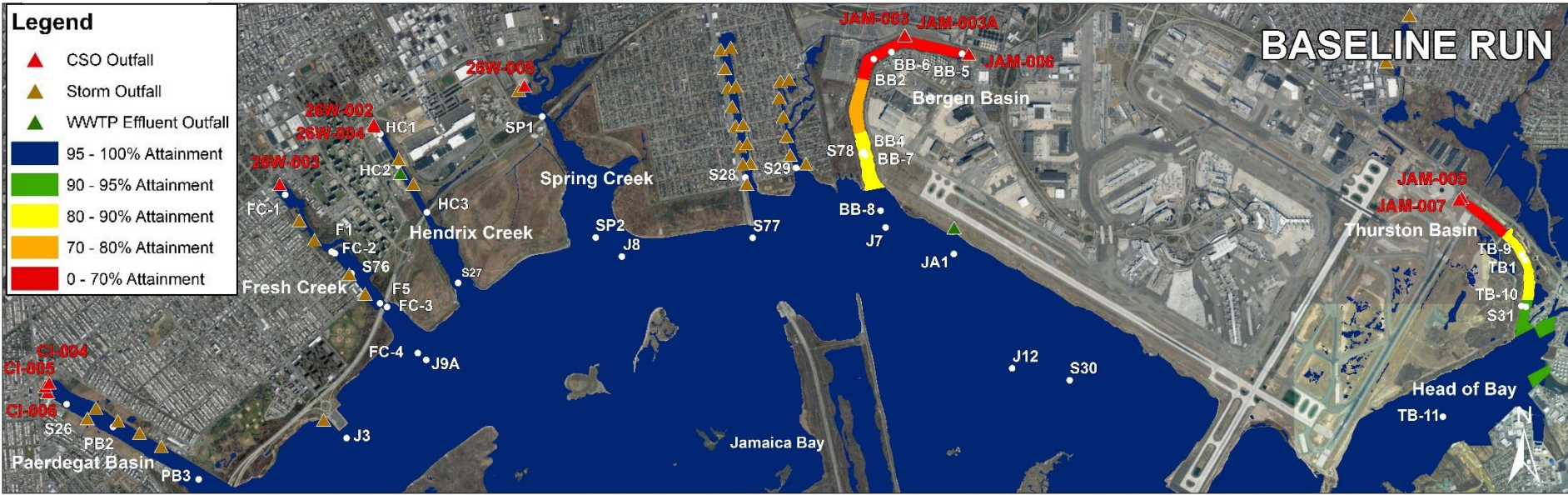
Fecal Coliform Modeled Attainment (CSO)

Baseline vs 100% CSO Capture



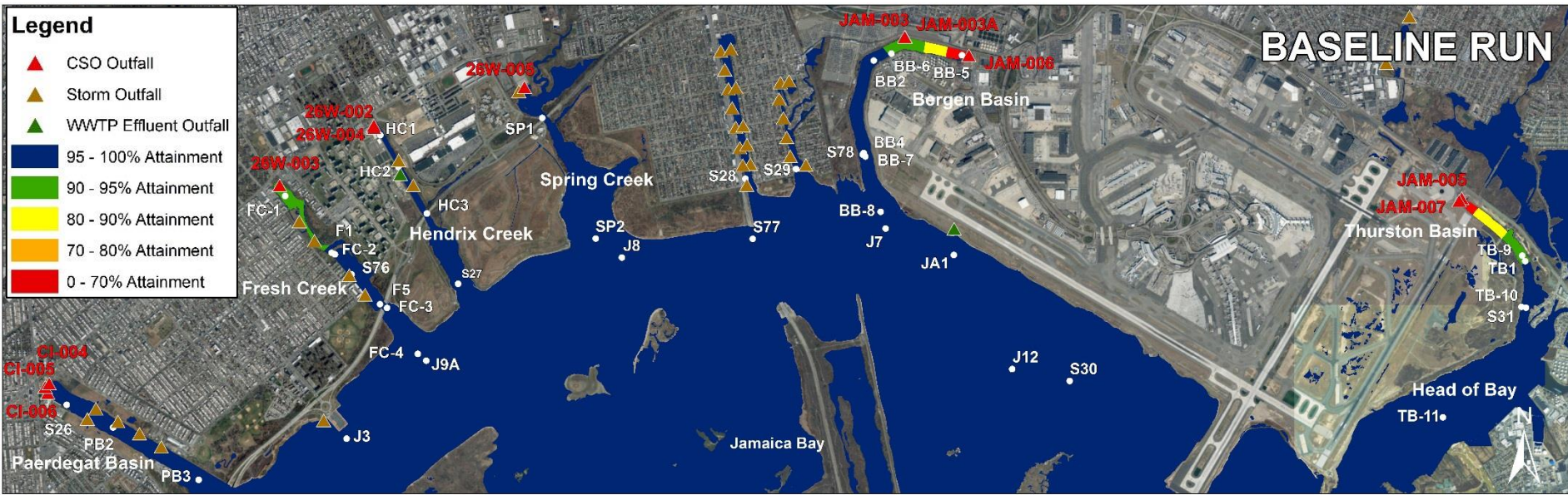
Enterococcus Modeled Attainment (CSO)

Baseline vs 100% CSO Capture



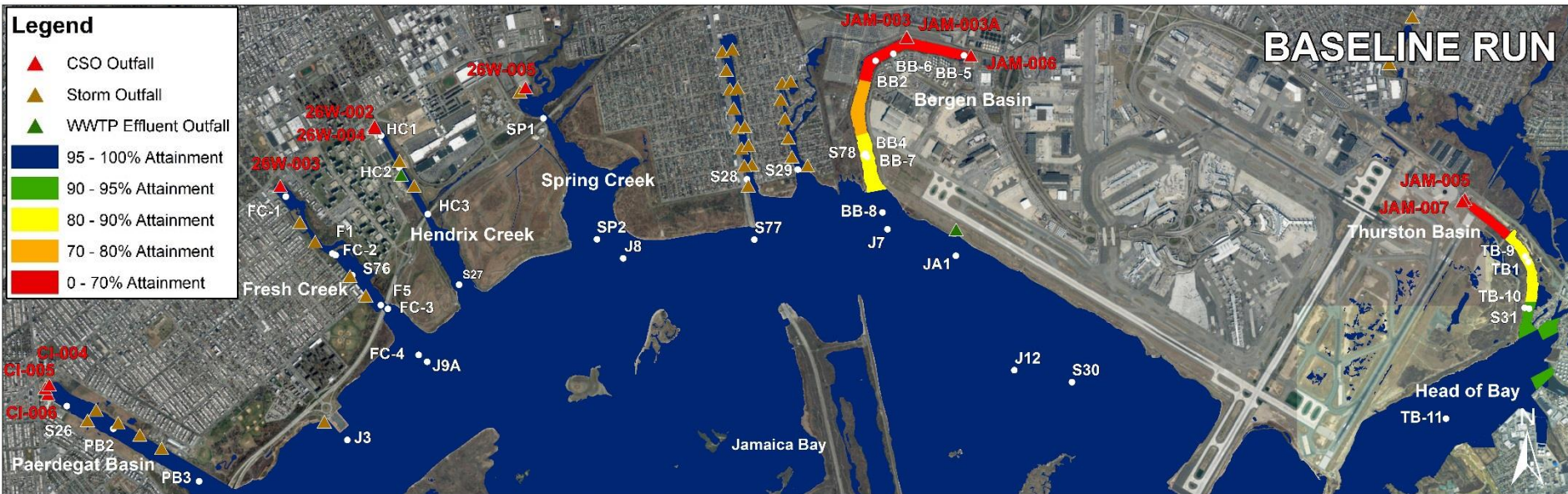
Fecal Coliform Modeled Attainment (MS4)

Baseline vs 100% MS4 Capture



Enterococcus Modeled Attainment (MS4)

Baseline vs 100% MS4 Capture



- Overall, water quality in Jamaica Bay has improved dramatically
- Water quality impairments are situated at the head-ends of Bergen and Thurston Basin
 - Restricted waterbodies (JFK security)
 - 100% CSO reduction provides minimal water quality benefits
 - Significant stormwater inputs to Bergen
- Consideration of Completed and Ongoing Investments:
 - Existing Grey Infrastructure (\$1.03B Committed)
 - Existing and Planned Green Infrastructure toward 2030 Goal (\$300M Committed)
 - SE Queens Sewer Build-out (\$1.7B Committed)
- Identified potential ecological enhancement projects and additional GI to provide benefits in lieu of further grey infrastructure

Evaluation of Grey Alternatives

Keith Mahoney, P.E.
Director of Water Quality Planning
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



Sample Technologies:

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

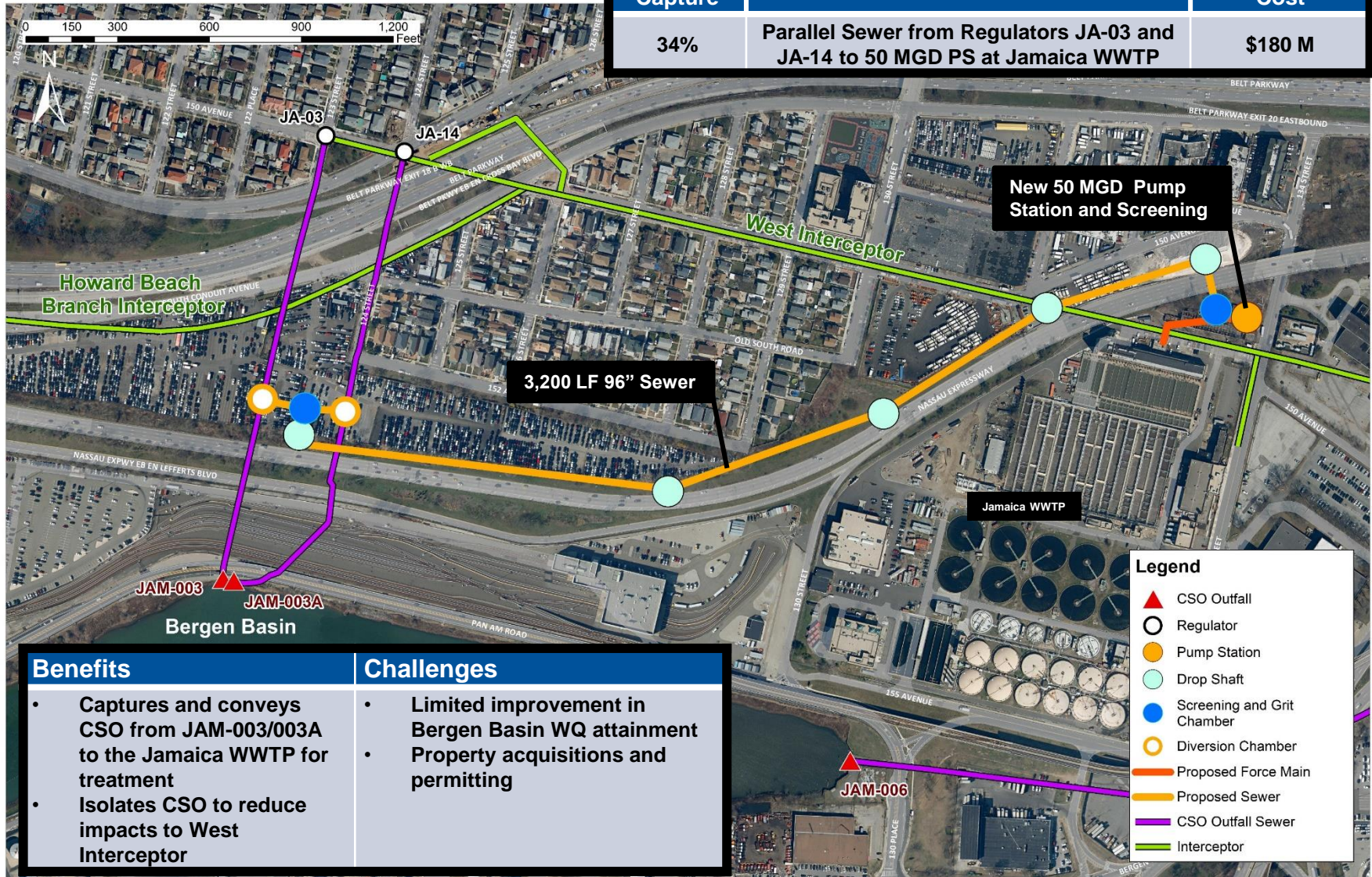
Jamaica LTCP Alternatives Toolbox

Source Control	Additional GI		High Level Storm Sewers	
System Optimization	Fixed Weir Modifications	Bending Weirs / Control Gates	Pump Station Modifications	Parallel Interceptor
CSO Relocation	Gravity Flow Tipping to Other Watersheds		Flow Tipping with Conduit/Tunnel and Pumping	
Water Quality / Ecological Enhancement	Floatables Control	Environmental Dredging	Mechanical Aeration	Tidal Wetlands, Bluebelts, Shellfish
Treatment <i>Satellite:</i>	Outfall Disinfection	Retention Treatment Basin (RTB)		High Rate Clarification (HRC)
<i>Centralized:</i>	WWTP Upgrades			
Storage	In-System	Shaft	Tank	Tunnel

- Completed or Underway Per WWFP*
- Completed/Underway Per WWFP & Identified for Evaluation**
- CSO Controls Identified for Evaluation**

Alt. B-2d1: Parallel Interceptor to 50 MGD PS at WWTP

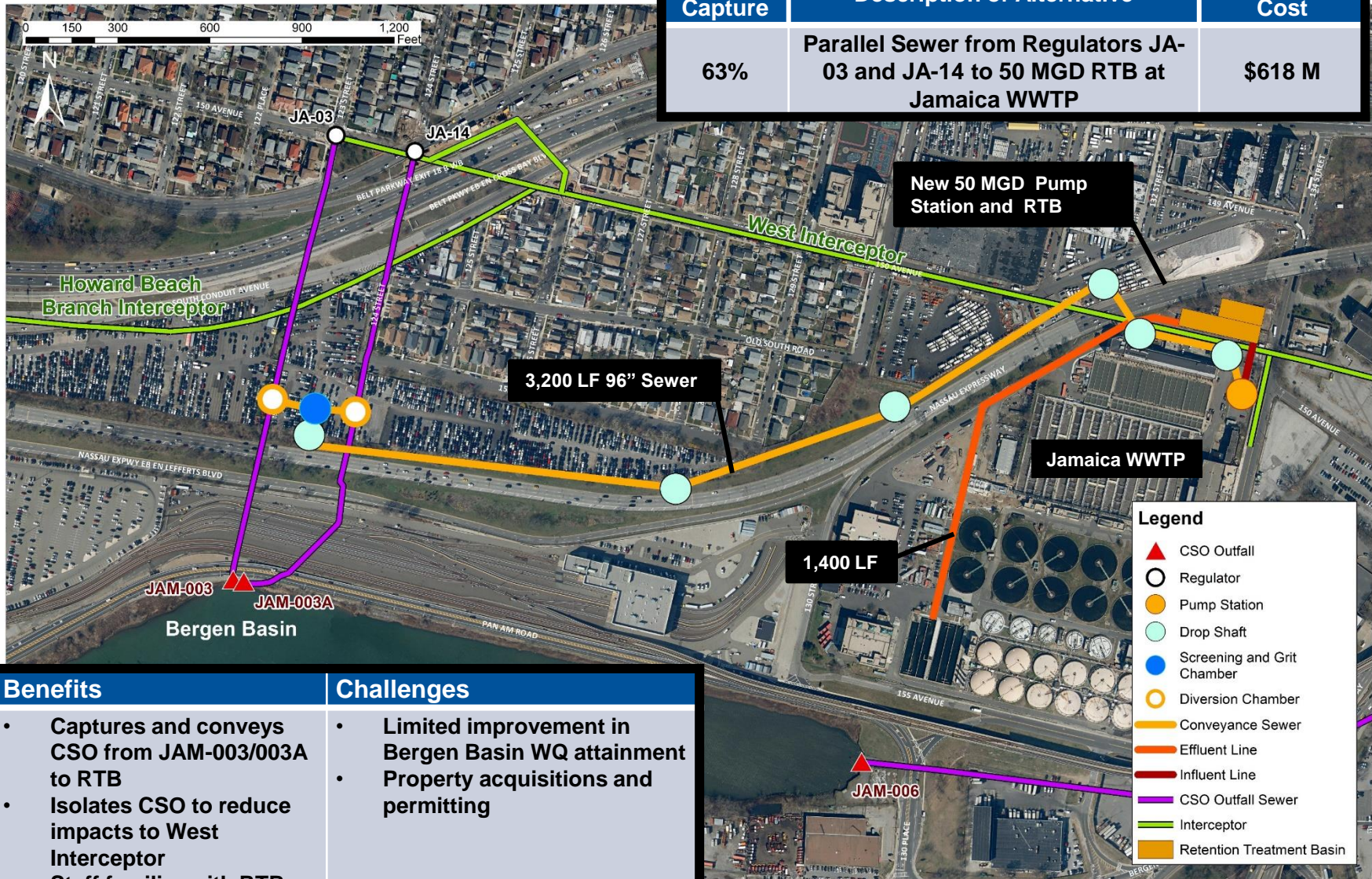
CSO Capture	Description of Alternative	Construction Cost
34%	Parallel Sewer from Regulators JA-03 and JA-14 to 50 MGD PS at Jamaica WWTP	\$180 M



Benefits	Challenges
<ul style="list-style-type: none"> Captures and conveys CSO from JAM-003/003A to the Jamaica WWTP for treatment Isolates CSO to reduce impacts to West Interceptor 	<ul style="list-style-type: none"> Limited improvement in Bergen Basin WQ attainment Property acquisitions and permitting

Alt. B-2d2: Parallel Interceptor to 50 MGD RTB at WWTP

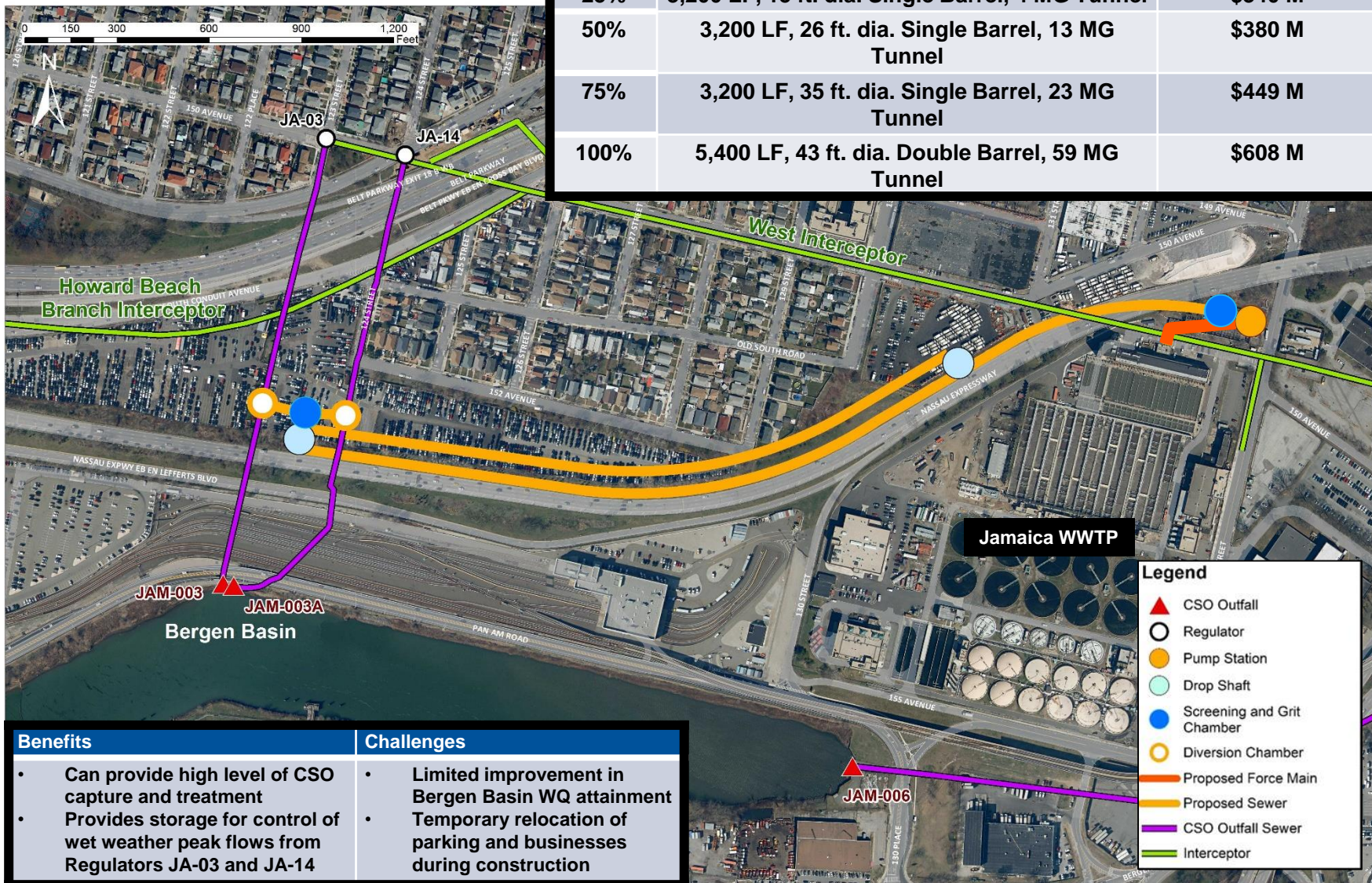
CSO Capture	Description of Alternative	Construction Cost
63%	Parallel Sewer from Regulators JA-03 and JA-14 to 50 MGD RTB at Jamaica WWTP	\$618 M



Benefits	Challenges
<ul style="list-style-type: none"> Captures and conveys CSO from JAM-003/003A to RTB Isolates CSO to reduce impacts to West Interceptor Staff familiar with RTB O&M 	<ul style="list-style-type: none"> Limited improvement in Bergen Basin WQ attainment Property acquisitions and permitting

B-6: Bergen CSO Storage Tunnel

Capture	Description of Alternative	Construction Cost
25%	3,200 LF, 15 ft. dia. Single Barrel, 4 MG Tunnel	\$340 M
50%	3,200 LF, 26 ft. dia. Single Barrel, 13 MG Tunnel	\$380 M
75%	3,200 LF, 35 ft. dia. Single Barrel, 23 MG Tunnel	\$449 M
100%	5,400 LF, 43 ft. dia. Double Barrel, 59 MG Tunnel	\$608 M



Benefits	Challenges
<ul style="list-style-type: none"> Can provide high level of CSO capture and treatment Provides storage for control of wet weather peak flows from Regulators JA-03 and JA-14 	<ul style="list-style-type: none"> Limited improvement in Bergen Basin WQ attainment Temporary relocation of parking and businesses during construction

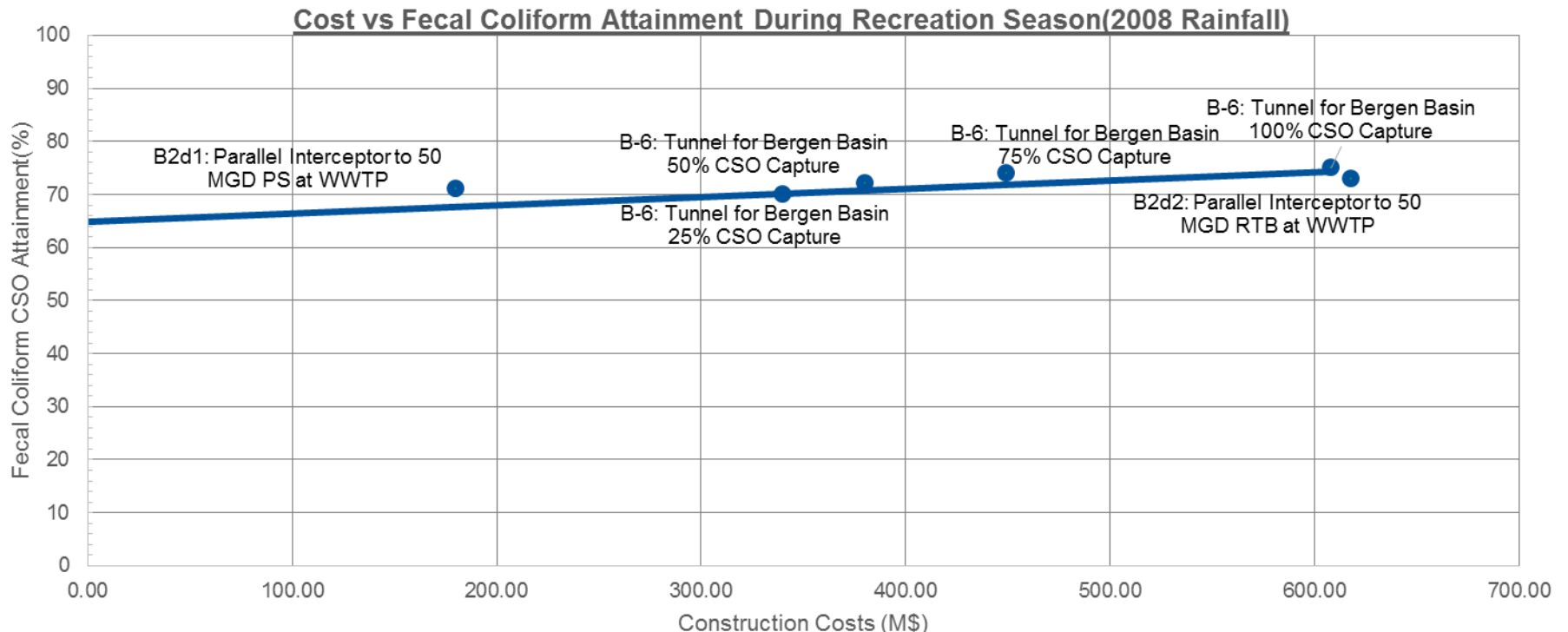
Legend

- ▲ CSO Outfall
- Regulator
- Pump Station
- Drop Shaft
- Screening and Grit Chamber
- Diversion Chamber
- Proposed Force Main
- Proposed Sewer
- CSO Outfall Sewer
- Interceptor

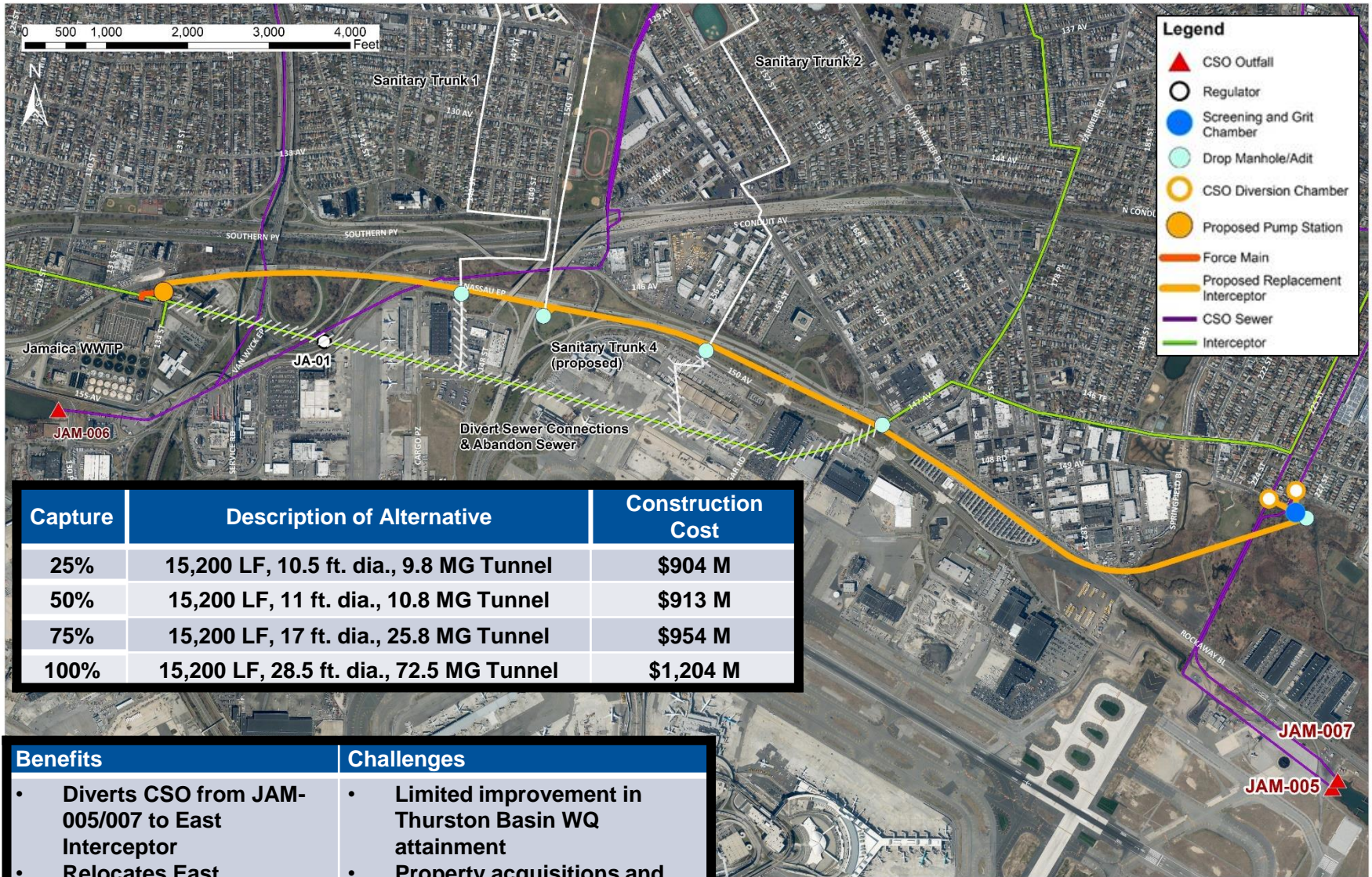
Bergen Basin – Retained Gray Alternatives

Alternative	Description	Remaining CSO Vol. (MG)	Percent Capture (%)	Frequency of Overflow	Fecal Coliform Recreation Season Attainment (%)	Construction Cost (\$ Millions)
B-2d1	JAM 003/003A CSO to PS	242	34	16	71	\$180 M
B-2d2	JAM 003/003A CSO to RTB	137	63	11	73	\$618 M
B-6	4 MG CSO Tunnel to WWTP	277	25	20	70	\$340 M
	13 MG CSO Tunnel to WWTP	185	50	13	72	\$380 M
	23 MG CSO Tunnel to WWTP	92	75	6	74	\$449 M
	59 MG CSO Tunnel to WWTP	0	100	0	75	\$608 M

Note: Each alternative consists of conveyances to divert CSO from JAM-003/003A to a dewatering pump station or RTB located at the Jamaica WWTP.



Alt. T-6: Thurston CSO Tunnel - Replacement Interceptor



Capture	Description of Alternative	Construction Cost
25%	15,200 LF, 10.5 ft. dia., 9.8 MG Tunnel	\$904 M
50%	15,200 LF, 11 ft. dia., 10.8 MG Tunnel	\$913 M
75%	15,200 LF, 17 ft. dia., 25.8 MG Tunnel	\$954 M
100%	15,200 LF, 28.5 ft. dia., 72.5 MG Tunnel	\$1,204 M

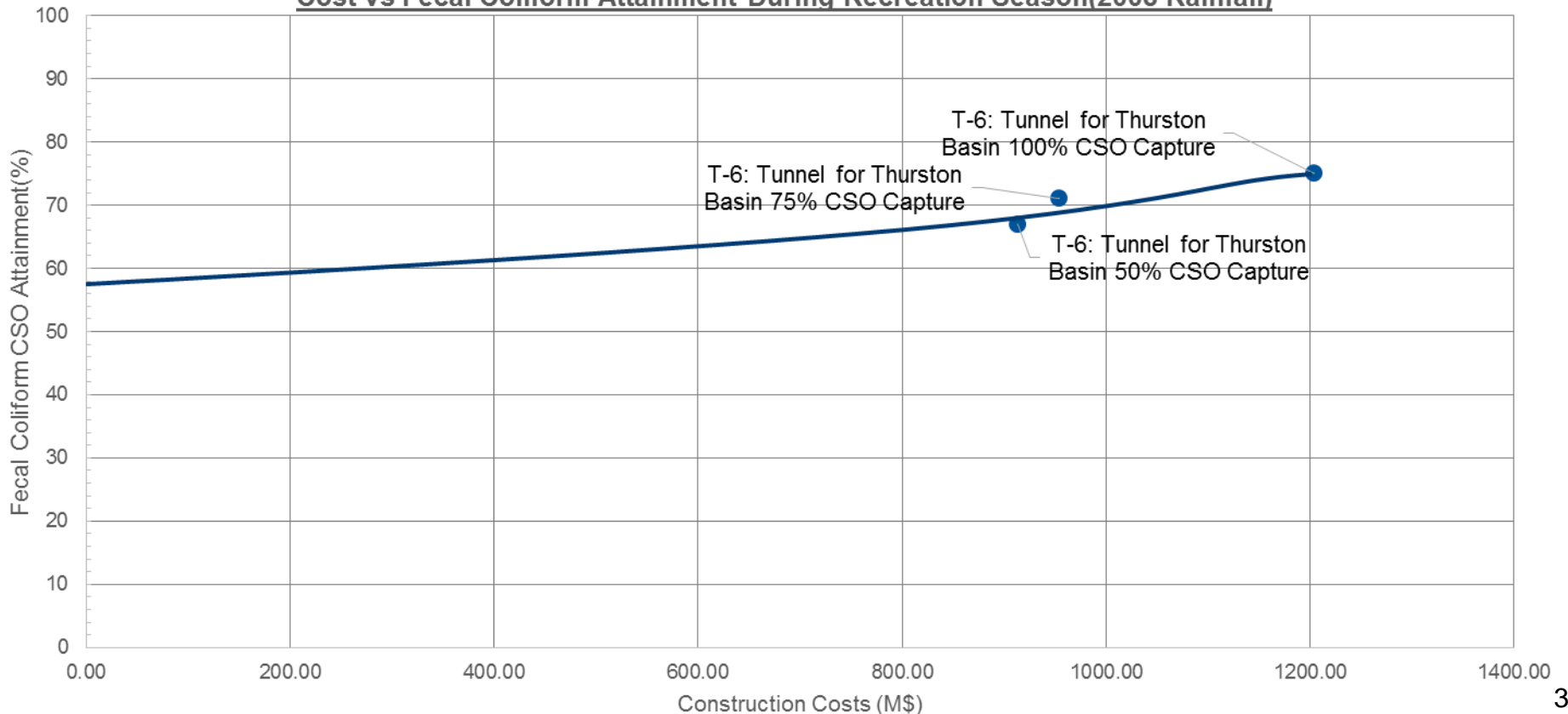
Benefits	Challenges
<ul style="list-style-type: none"> Diverts CSO from JAM-005/007 to East Interceptor Relocates East Interceptor from Port Authority property 	<ul style="list-style-type: none"> Limited improvement in Thurston Basin WQ attainment Property acquisitions and permitting

Thurston Basin - Retained Gray Alternatives

Alternative	Description	Remaining CSO Vol. (MG)	Percent Capture (%)	Frequency of Overflow	Fecal Coliform Attainment (rec. season) (%)	Construction Cost (\$ Millions)
T-6	11 MG CSO Tunnel	306	50	6	67	\$913 M
	29 MG CSO Tunnel	153	75	2	71	\$954 M
	80 MG CSO Tunnel	0	100	0	75	\$1,204 M

Note: Alternative T-6 consists of a CSO storage tunnel from JAM-005/007 to a dewatering pump station located at the Jamaica WWTP.

Cost vs Fecal Coliform Attainment During Recreation Season(2008 Rainfall)



Evaluation of Watershed Based Alternatives

John McLaughlin
Managing Director, Ecological Services
DEP – BEPA

Environmental Benefits of Dredging

- Reduces odors by removing exposed organic deposits and improve benthic habitat.
- Recovered cross sectional area can improve tidal exchange and flushing for improved water quality.
- Produce a healthier system that can result in a more suitable habitat for fish and other wildlife.



Benefits of Ribbed Mussel Installation

- Similar filtration rates as oysters (5.1 liters per hour vs. 6.5 liters per hour with no attractive nuisance issues).
- Good candidate for nutrient bioextraction in highly impacted urban environments.
- Ribbed mussels feed on a wide range of particles suspended in the water column, including phytoplankton and bacteria.
- The use of ribbed mussels to improve water quality in Chesapeake Bay is being explored as a potential management practice.



- Remove nitrogen, increase dissolved oxygen and remove pathogens through various physical, chemical, and biological processes.
- Create habitat for juvenile fish and other marine organisms.
- Create recreational and educational opportunities for the public.



The Jamaica Bay Watershed Protection Plan: Precursor to the LTCP Conceptual Plan Proposal

Ecological Blueprint To Improve Water Quality and Habitat



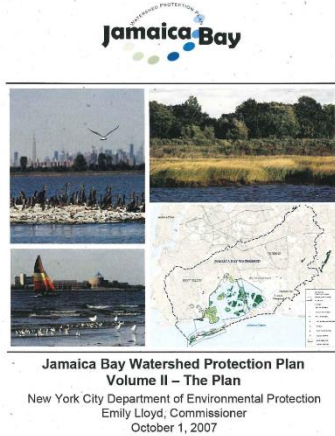
400+ years can make a difference....



Restoring functional and sustainable ecological connections is our goal...

However...

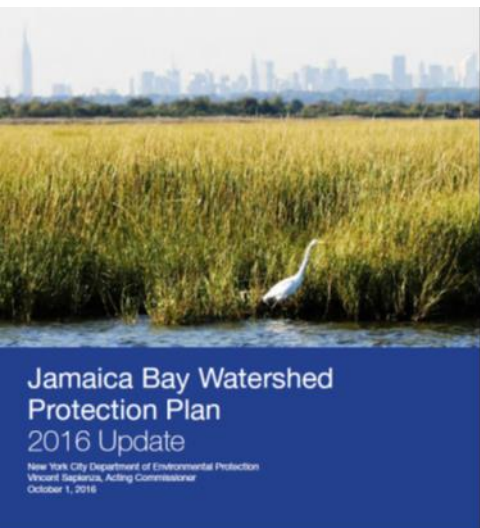
We need to understand that the current physical and ecological conditions are vastly different from the past and we need to establish realistic and achievable goals under the current setting.



- The first JBWPP with 127 strategies first issued in 2007 with an update in 2008 and then every two years thereafter with a focus on:

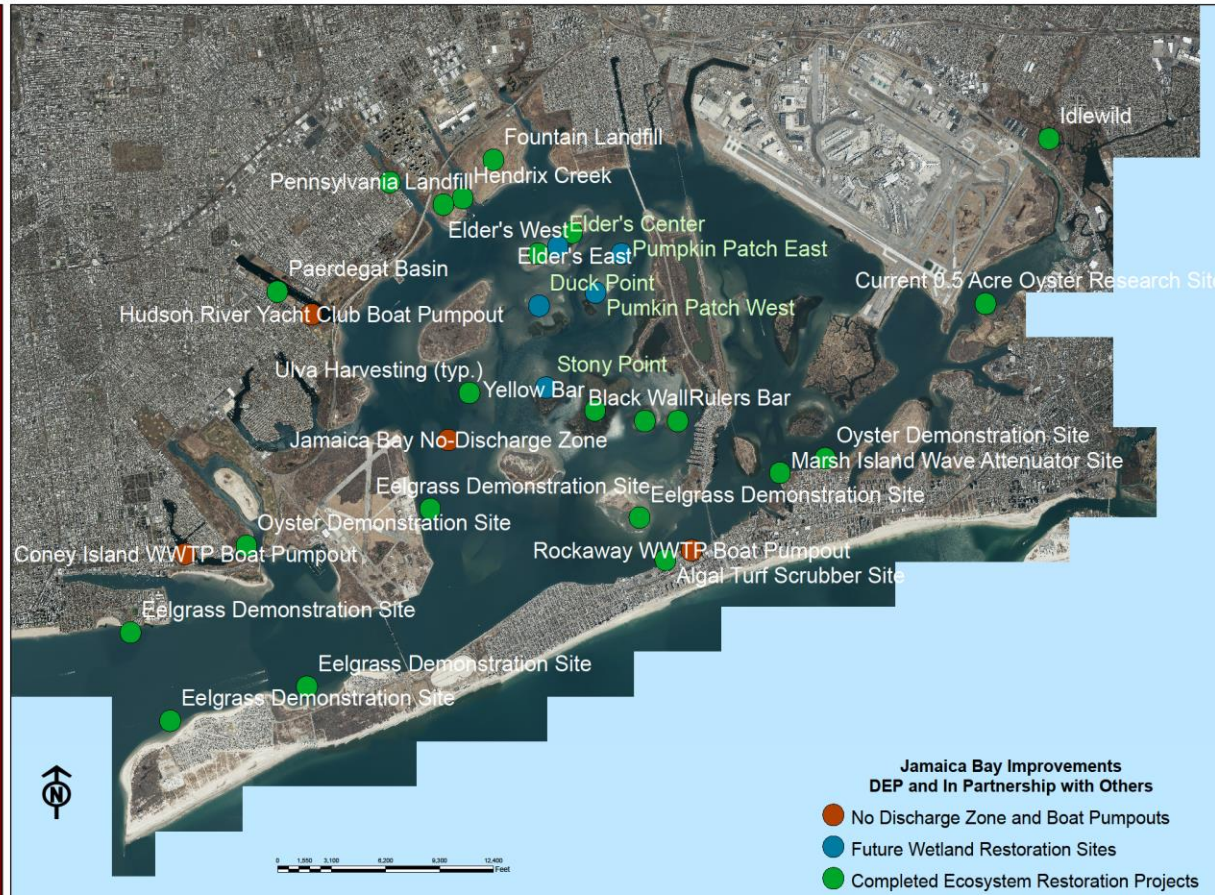
- (1) Water Quality
- (2) Restoration Ecology
- (3) Stormwater Management through Sound Land Use
- (4) Public Education and Outreach
- (5) Public Use and Enjoyment
- (6) Coordination and Implementation

- Developed with Jamaica Bay stakeholder input as a “living document” and provide an adaptive management approach to understanding and resolving the issues facing the bay, today and in the future.
- DEP will partner with the Science and Resiliency Institute at Jamaica Bay (SRIJB) for the October 2018 and the State of the Bay Symposium, including holding workshops with environmental stakeholder groups for their input.



Overview of Jamaica Bay WPP Efforts

DEP Jamaica Bay Restoration and Research Efforts



- Over 26 individual efforts and \$32M allocated over the last 10-years.
- Wetland research for pathogen reduction and dissolved oxygen improvements.
- Jamaica Bay is a “No Discharge Zone” and DEP maintains 3 Boat Pump Out facilities.

- DEP will continue to be a local cost-sharing sponsor for additional Jamaica Bay ecological projects under the Hudson Raritan Estuary Ecosystem Restoration Feasibility Study (HRE).
- **A robust ecologically (e.g., wetland and upland maritime) based perimeter watershed approach is required – similar to that of the Chesapeake Bay programs. Using natural systems for not only ecological improvements but to help meet regulatory water quality standards.**

LTCP Recommended Plan

Pinar Balci
Assistant Commissioner
DEP – BEPA



LTCP Recommended Plan: Jamaica Bay Integrated Watershed Plan

- Dovetails with existing Jamaica Bay Watershed Protection Plan efforts and SE Queens Initiatives.
- Includes area wide expansion of Green Infrastructure to MS4 portion of Thurston and Bergen Tributaries of Jamaica Bay.
- Additional 50 acres of wetland and other coastal habitat restoration around the Bay perimeter (separate from the marsh island restoration)
- Nature-based features for biological water quality treatment through ribbed mussel installations in select tributaries (i.e., Bergen and Thurston Basins) but final locations to be identified with stakeholder input (~7 acres).
- Environmental dredging: Proposed location of head end of Bergen Basin but final locations to be identified with stakeholders input

Additional GI Investment: Area-Wide ROW Contracts and Public Property Retrofits in Thurston and Bergen Basin MS4 Areas

- ❖ **New Area-wide ROW Contracts in Southeast Queens, tributary to Bergen and Thurston Basins**
- ❖ **Implementation on Publicly Owned Sites**
 - Schools
 - Public Housing
 - Playgrounds/Parks

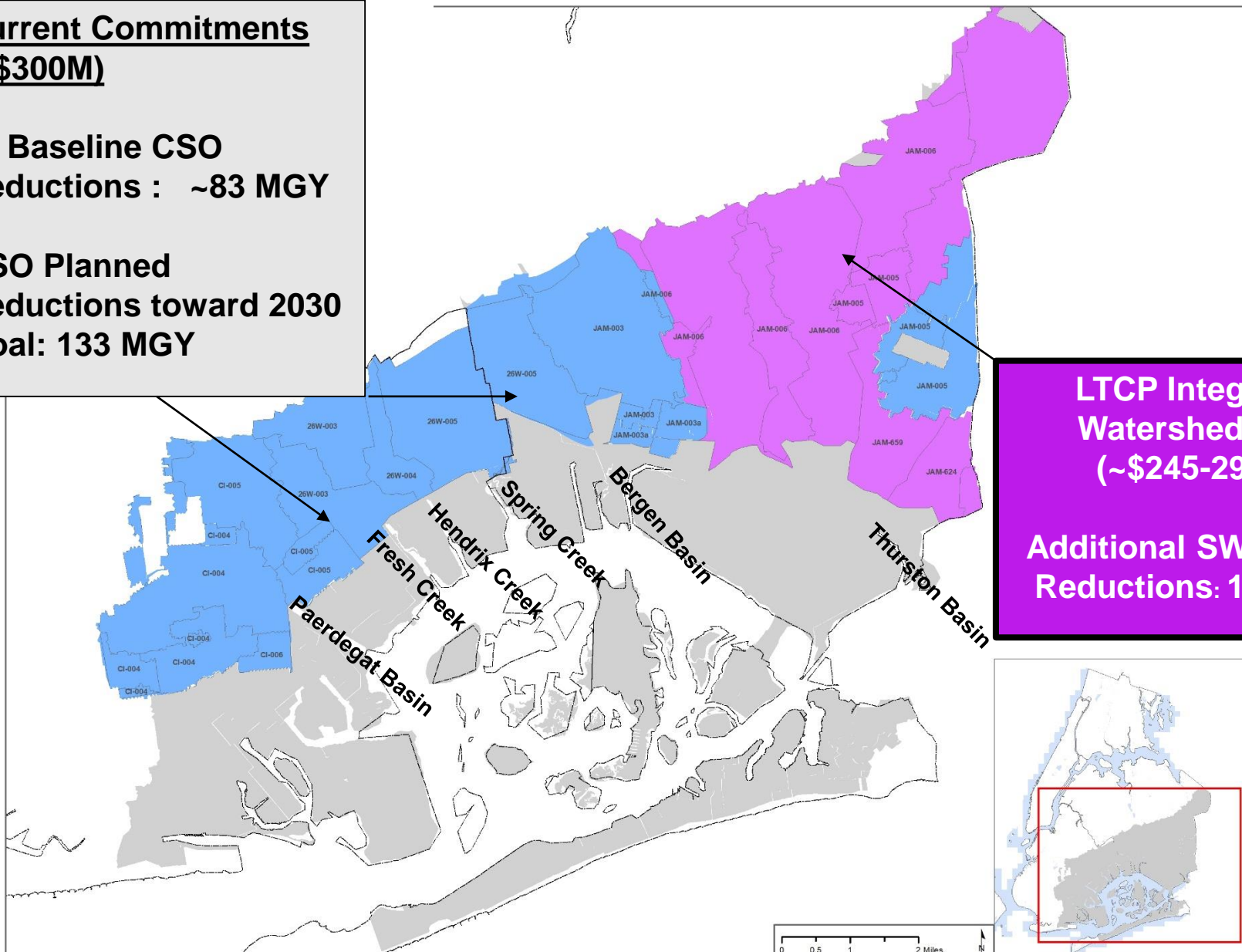


Green Infrastructure – Baseline, Planned, and Additional Projects

Current Commitments (~\$300M)

**GI Baseline CSO
Reductions : ~83 MGY**

**CSO Planned
Reductions toward 2030
Goal: 133 MGY**



**LTCP Integrated
Watershed Plan
(~\$245-290M)**

**Additional SW Volume
Reductions: 129 MGY**

Ecological Restoration Investments



Environmental Dredging: Proposed location head of Bergen Basin but final locations TBD



Ribbed Mussel Restoration: Up to 7 acres (Proposed Location- Bergen and Thurston Basins but final locations TBD)



Wetland and Other Habitat Restoration in Tributaries and Around the Bay (up to 50 acres around Bay perimeter). Separate from Marsh Island Restoration

LTCP Recommended Plan



- ✓ Additional Green Infrastructure and stormwater management:
 - Area-wide ROW contracts; public property retrofits
- ✓ Increased protection against flooding
- ✓ Greater co-benefits for Brooklyn and Queens residents (urban heat island reduction and neighborhood greening)
- ✓ Increased adaptation measures for climate resiliency
- ✓ Increased protection from coastal flooding through wetland creation and restoration
- ✓ Improved overall water quality
- ✓ Increased habitat for wildlife through wetland protection

Questions

Next Steps

Mikelle Adgate
Senior Policy Advisor
DEP

It is possible...with your input...



- Public Comments will be accepted through **May 14, 2018**

- LTCP Submittal to NYSDEC by June 30, 2018

- Comments can be submitted to:
 - New York City DEP at: ltcp@dep.nyc.gov

- Visit the informational tables tonight for handouts and poster boards with detailed information

- Go to 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