Environmental Protection

Newtown Creek

Combined Sewer Overflow Long Term Control Plan

Public Data Review Meeting

Location: Newtown Creek Visitor Center

Date: February 21, 2017

Objective

Focus today is to present the **water quality data collected**, and to get **your thoughts on issues to be addressed** in Newtown Creek.

The data shows Newtown Creek has:

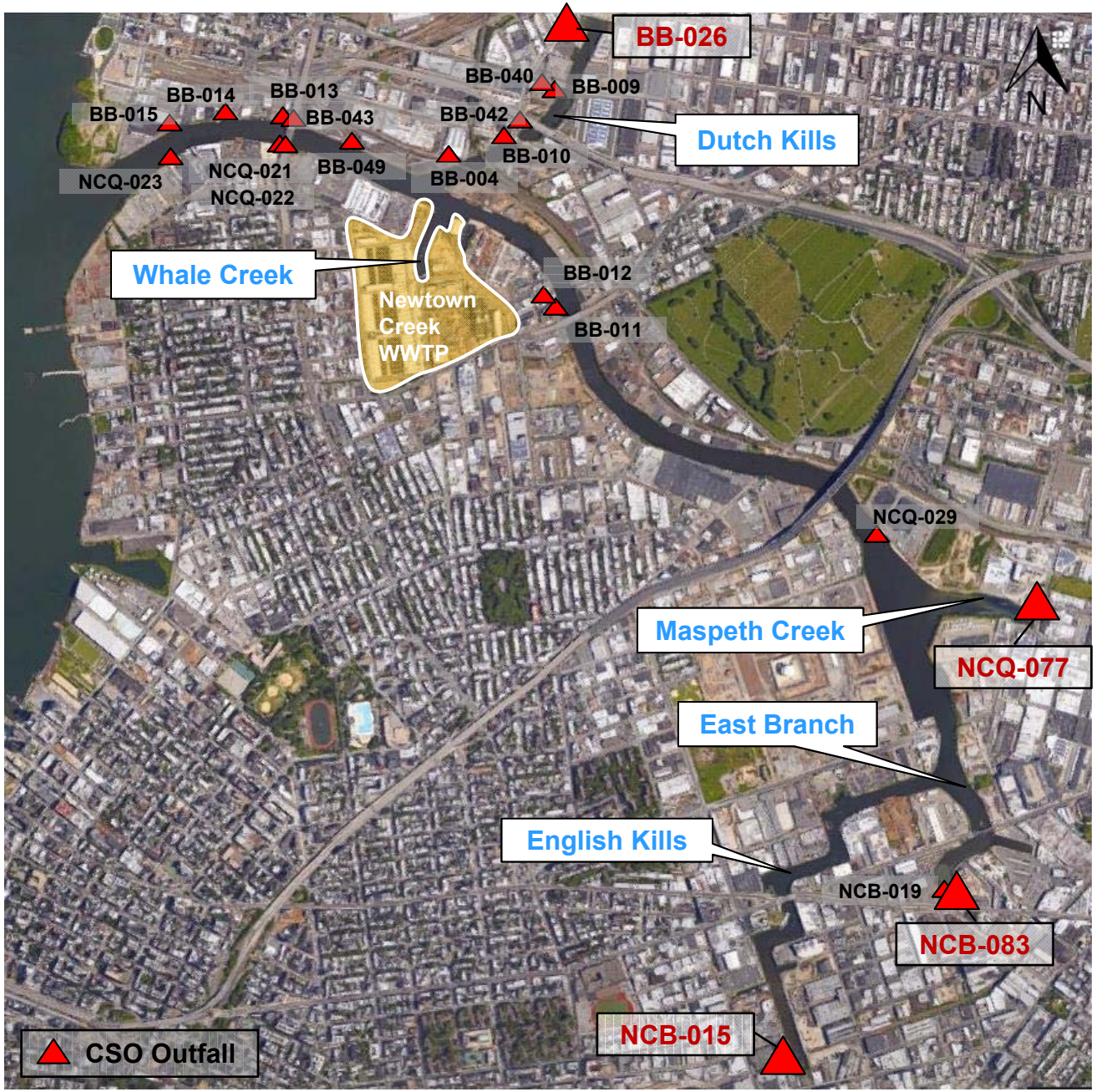
- elevated bacteria levels
- excursions below WQS for Dissolved Oxygen
- slow time to recovery

Agenda

1. Introduction
2. CSO Sampling, Monitoring, and Model Calibration
3. Water Quality Sampling and Model Calibration
4. Newtown Creek Alliance / Riverkeeper / Citizen Sampling
5. CSO Baseline Modeling
6. CSO Control Preliminary Alternatives

Introduction

Newtown Creek Overview



➢5 Urban CSO Tributaries

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

➢21 CSO Outfalls

▲ 4 Major Outfalls
- BB-026
- NCQ-077
- NCB-083
- NCB-015

Drainage Area by WWTP

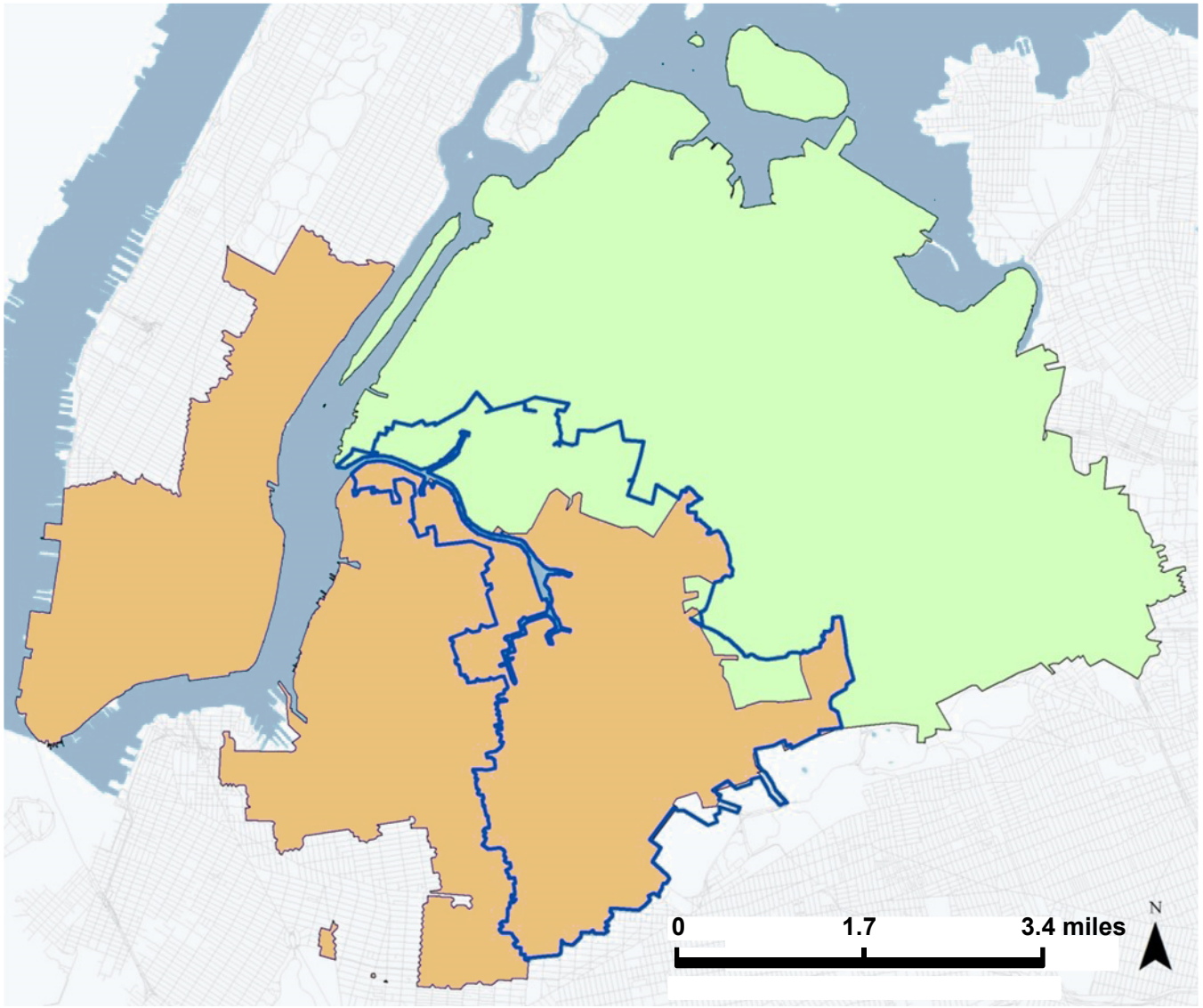
Drainage Areas:

Citywide Drainage Area
≈ 300,000 acres

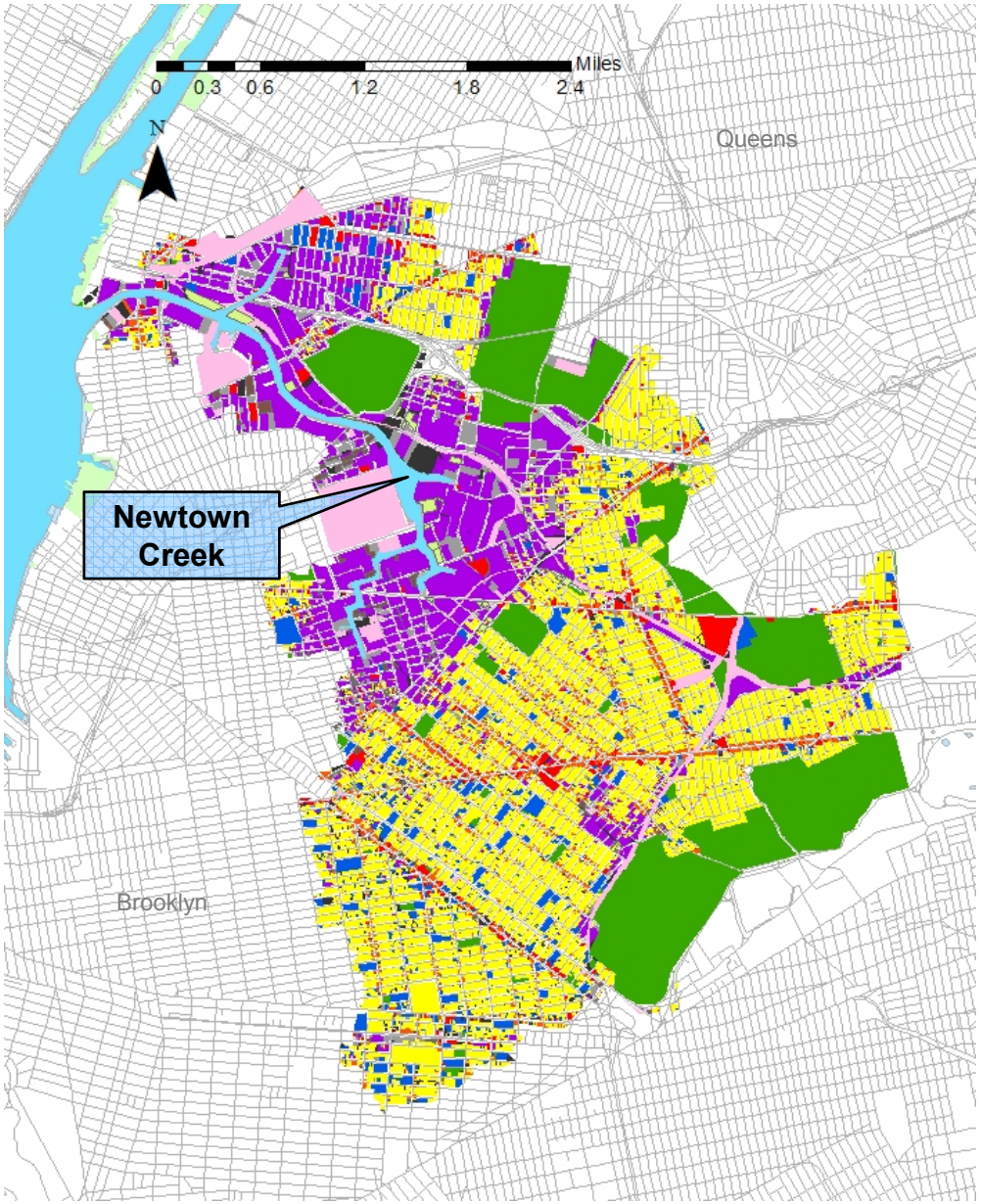
Newtown Creek WWTP
15,033 acres

Bowery Bay WWTP
14,928 acres

Portion that Drains to Newtown Creek
7,442 acres
4950 acres (67%) is served by combined sewers



Drainage Area and Land Use



LEGEND

- Residential
- Mixed Residential and Commercial
- Commercial and Office
- Industrial and Manufacturing
- Transportation and Utility
- Public Facilities and Institutions
- Open Space and Outdoor Recreation
- Parking Facilities
- Vacant Land

Residential	37%
Commercial	7%
Industrial & Transportation	24%
Public Facilities	5%
Park & Open Space	22%
Other	6%

Water Quality Standards & LTCP Goals

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.

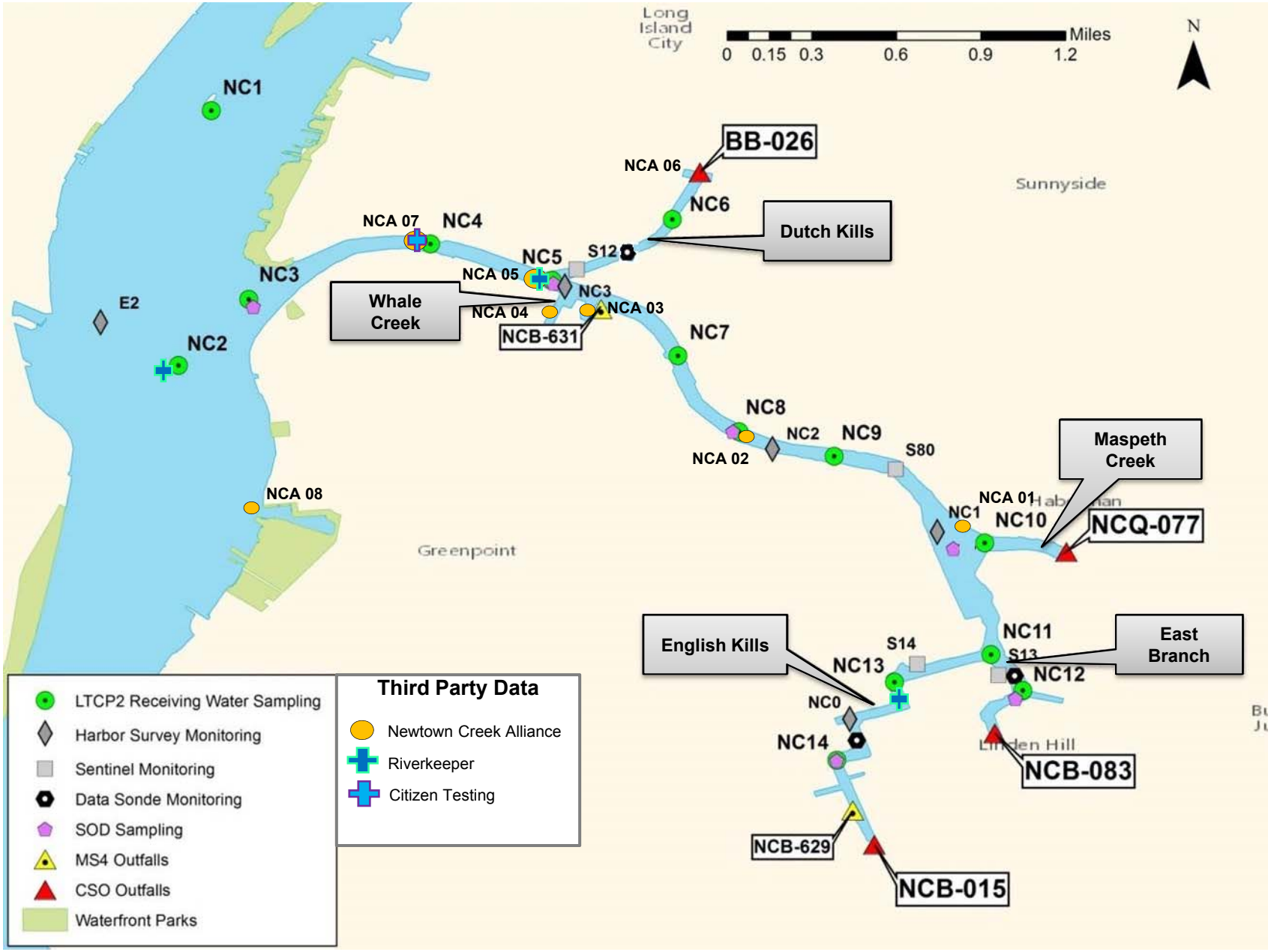
Parameter	Criteria*	DEC Water Quality Parameter Reference
Fecal Coliform	Monthly Geometric Mean ≤ 200 col/100 mL	• New York Codes, Rules and Regulations • (NYCRR Part 703.4)
Total Coliform	Monthly Geometric Mean ≤ 2,400 col/100 mL 80% ≤ 5,000 col/100 mL	• New York Codes, Rules and Regulations • (NYCRR Part 703.4)
Dissolved Oxygen	≥ 3.0 mg/L (acute, never less than)	• New York Codes, Rules and Regulations • (NYCRR Part 703.3)

* 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

Overview of Sampling Locations



Overview of Sampling Programs

LTCP Sampling:

	CSO	MS4	Receiving Water	HSM	SM	SOD	Data Sonde
Sampling Period	9/19 - 10/27	7/29 - 10/27	7/15 - 11/3	1/4 - 11/1	1/22 - 11/2	7/26 - 10/1	7/1 - 8/12
Locations	• 4	• 2	• 14	• 5	• 4	• 6	• 3
Events	• 3 wet	• 3 wet	• Four 4-day events	• Monthly/ Weekly	• Quarterly	• 3 Wet • 1 Dry	• 60 Days Continuous
Parameters	• Fecal • Entero • YSI	• Fecal • Entero • YSI	• Fecal • Entero • YSI	• Fecal • Entero • YSI	• Fecal	• SOD	• DO

3rd Party Sampling:

	NC Alliance	Riverkeeper	Citizen
Sampling Period	• April-October	• May-October	• May-October
Locations	• 8	• 3	• 1
Events	• 40	• 6	• 16
Parameters	• Entero • DO	• Entero	• Entero

2 CSO Sampling, Monitoring, and Model Calibration

CSO and MS4 Sampling Locations

Rainfall Event Statistics:

Rain Event	Date	Rainfall Depth* (in)	Rainfall Event Duration* (hr)	Rainfall Event Peak Intensity* (in/hr)
1	7/29/16	1.00	6	0.70
2	9/19/16	0.78	6	0.23
3	9/30/16	0.39	12	0.08
4	10/27/16	1.32	12	0.32

*Based on LGA Weather Station

CSO Sampling Results

CSO Outfall	Rain Event	Fecal		Entero	
		GM	Range	GM	Range
BB-026	2	**188,806**	Min: 33,000 Max: 3,300,000	**413,567**	Min: 210,000 Max: 1,400,000
	3	**670,000**[1]	n/a[1]	**560,000**[1]	n/a[1]
	4	**327,914**	Min: 210,000 Max: 800,000	**213,803**	Min: 120,000 Max: 430,000
NCQ-077	2	**349,537**	Min: 59,000 Max: 4,600,000	**379,802**	Min:170,000 Max: 1,800,000
	3	**780,000**[1]	n/a[1]	**520,000**[1]	n/a[1]
	4	n/a[2]	n/a[2]	n/a[2]	n/a[2]
NCB-083	2	**655,564**	Min: 300,000 Max: 1,600,000	**560,942**	Min:310,000 Max: 2,100,000
	3	no overflow	no overflow	no overflow	no overflow
	4	**596,581**	Min: 490,000 Max: 900,000	**353,526**	Min: 270,000 Max: 650,000

1) Only one sample collected due to closed tide gate
2) Hazardous site/traffic conditions – unable to collect samples

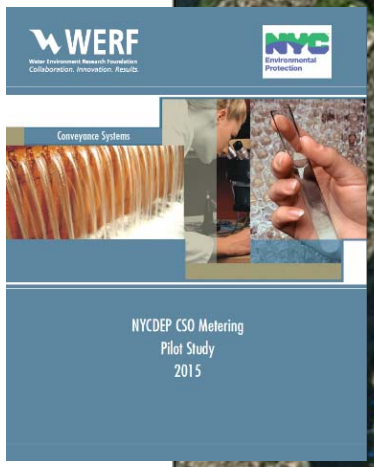
Note: No overflows were observed at CSO Outfall **NCB-015** during rain events #2, 3, and 4.

MS4 Sampling Results

CSO Outfall	Rain Event	Fecal		Entero	
		GM	Range	GM	Range
NCB-631	1	**37,433**	Min: 20,000 Max: 60,000	**132,035**	Min: 60,000 Max: 200,000
	4	**13,708**	Min: 7,300 Max: 25,000	**41,035**	Min: 32,000 Max: 63,000
NCB-629	2	**23,153**	Min: 20,000 Max: 30,000	**108,136**	Min: 64,000 Max: 230,000
	4	**25,854**	Min: 17,000 Max: 44,000	**66,828**	Min: 53,000 Max: 80,000

Landside Model Calibration

- DEP's process for flow monitoring and modeling has been **nationally peer reviewed and published**
- DEP implemented that process to update and validate its Newtown Creek sewer system model based upon:
  - Field surveys and record drawings of physical structures.
  - A validation dataset based upon a **12-month** sewer-monitoring program and extensive data analyses.
  - Data was analyzed using WaPUG approved methodologies and showed very good correlation.



Schematic of Major Features of Landside Model

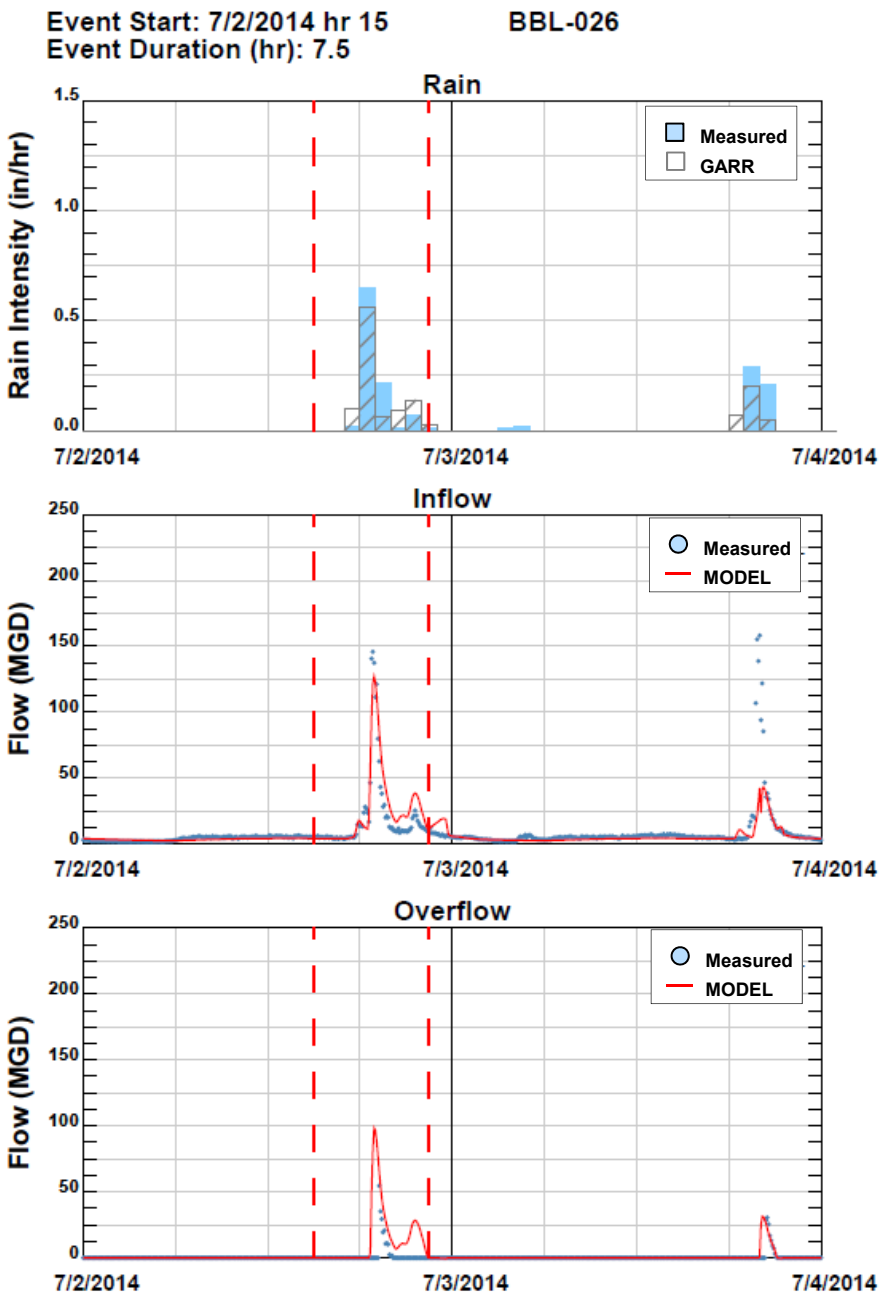
Flow Monitoring Program

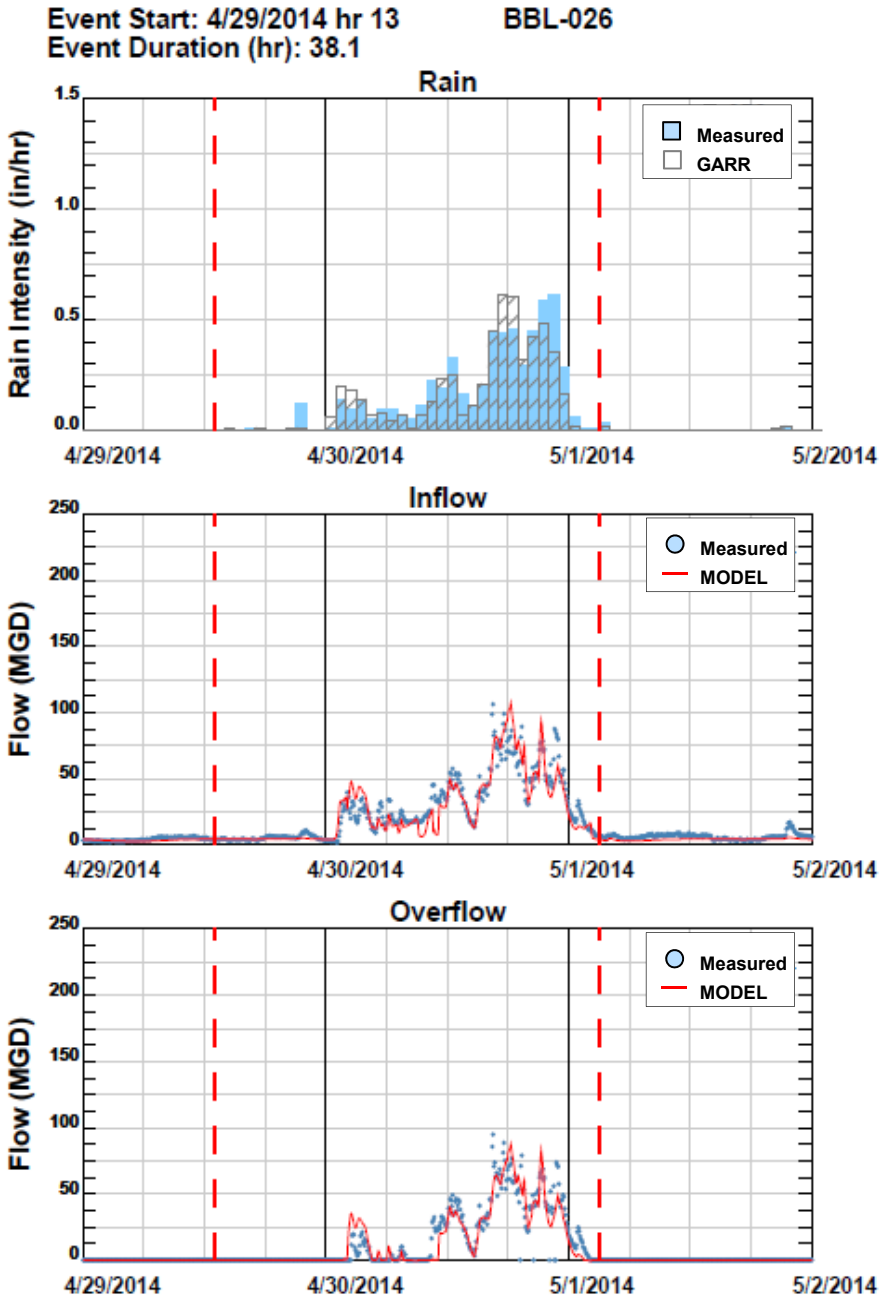
Flow Metering Period: **March 28, 2014 – March 27, 2015**

Flow Meter Locations/Configuration:

Outfall	Regulator	Receiving Water Body	Depth/Velocity Measurement Locations	Inclinometer?	Rain Events Monitored
BBL-026	L-4	Dutch Kills	• Influent • Underflow • Regulator • Overflow	✓ Yes	115
NCQ-077	Q-1	Maspeth Creek	• Overflow	No	119
NCQ-029	Q-2	Newtown Creek	• Influent • Regulator • Overflow	No	119
NCB-083	St. Nicholas Weir	East Branch	• Influent • Regulator • Overflow	No	115
NCB-015	B-1	English Kills	• Influent • Overflow	✓ Yes	116

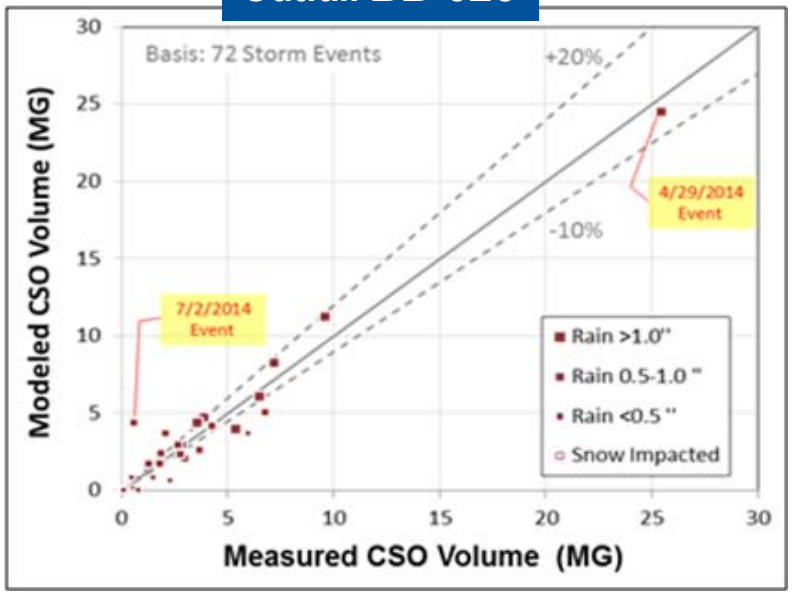
Sample Flow Data for BBL-026



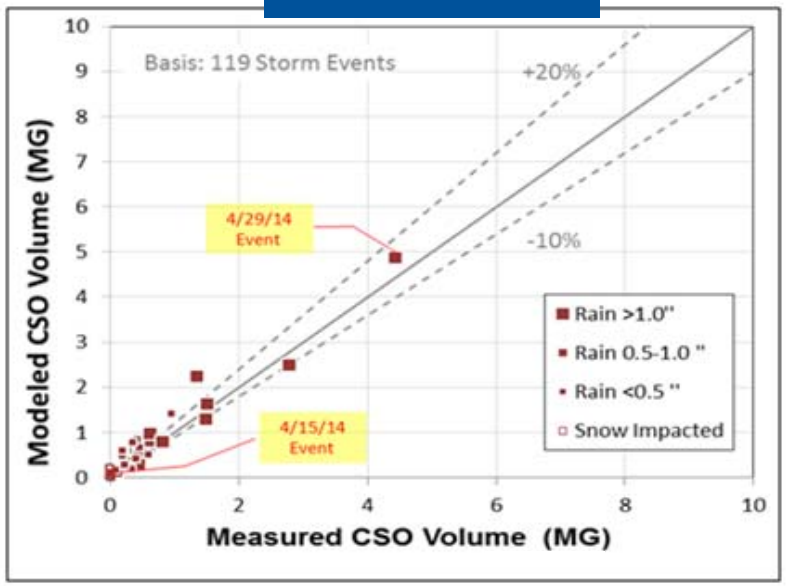


Comparisons of Predicted vs. Measured Volume

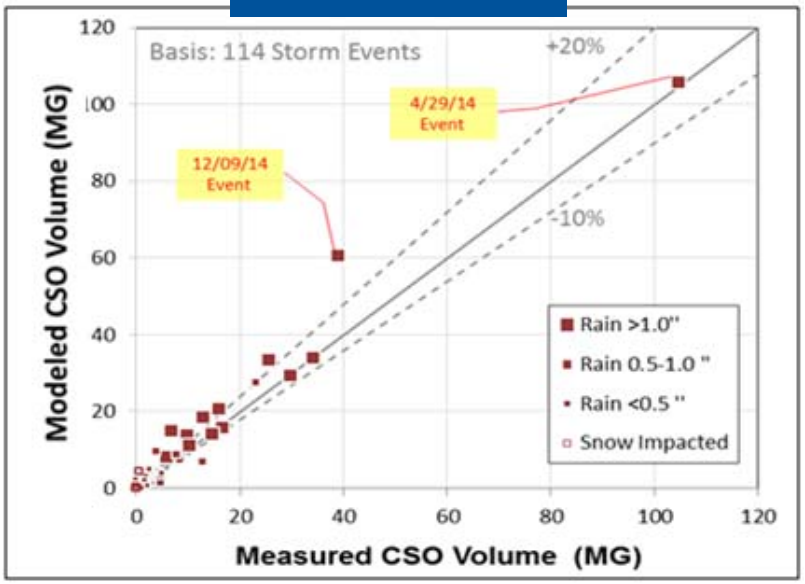
Outfall BB-026



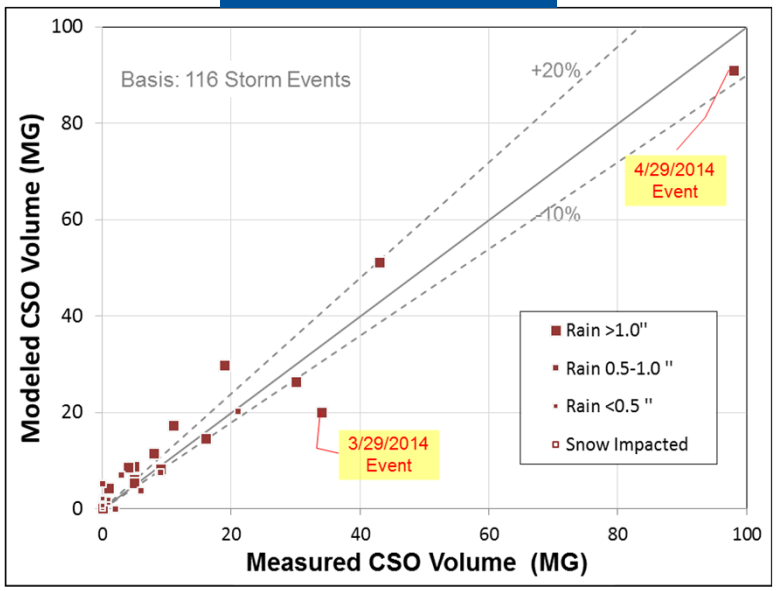
Outfall NC-029



Outfall NC-083



Outfall NC-015



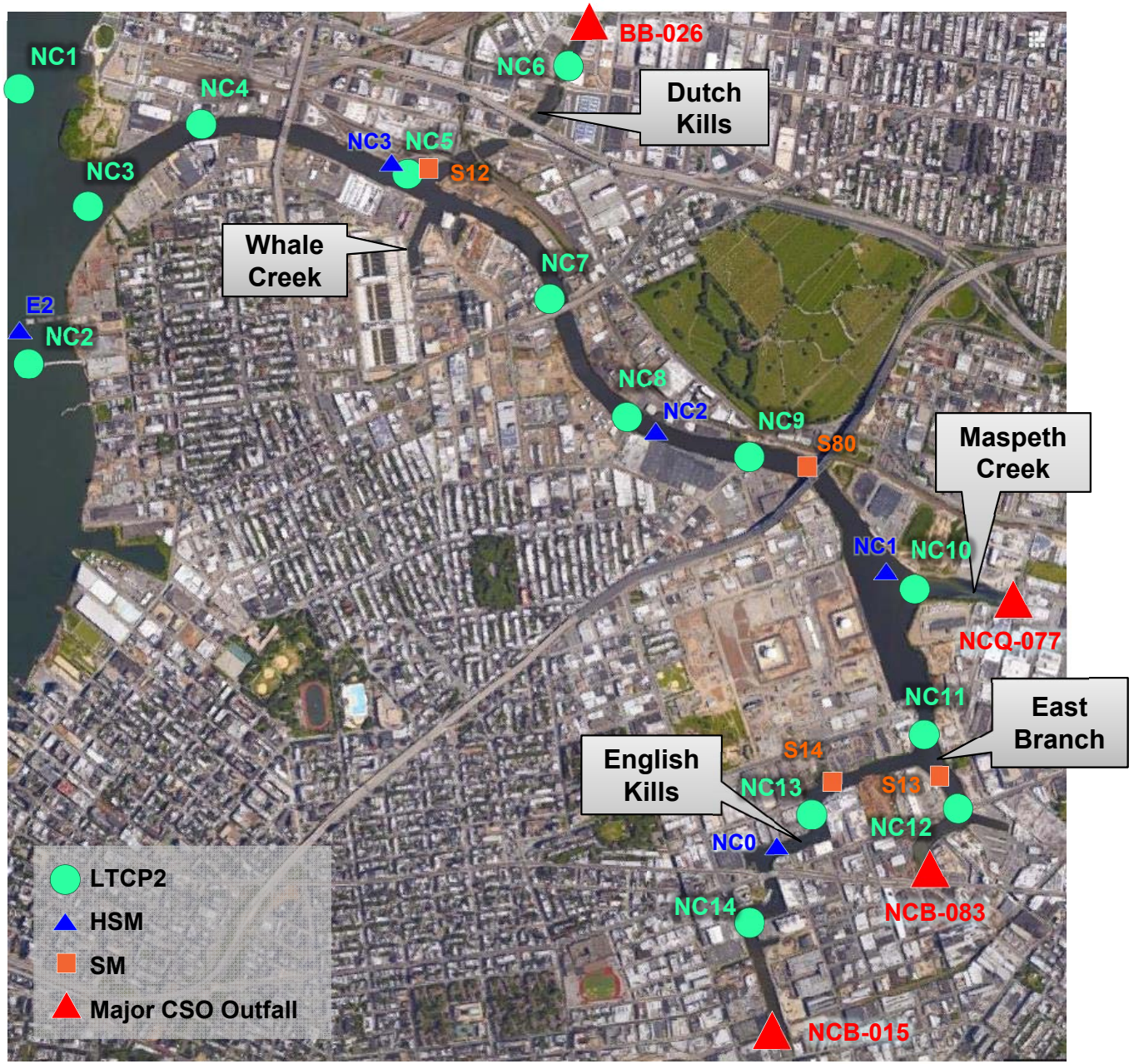
Comparisons of Model vs. Meters

CSO Outfall	Rainfall Statistics			CSO Overflow Events			CSO Duration (hr)			CSO Volume (MG)		
	Events	Duration (hr)	Depth (in)	Flow Meter Data	Model	% Difference	Flow Meter Data	Model	% Difference	Flow Meter Data	Model	% Difference
BBL-026	115	871	52.71	38	34	-11%	247	225	-9%	153	144	-6%
NCB-029	119	868	52.06	48	41	-15%	287	246	-14%	21	25	+17%
NCB-083	115	851	52.68	51	50	-2%	277	282	+2%	440	535	+22%
NCB-015	116	852	52.66	24	27	+13%	78	135	+73%	331	356	+8%

Note: Flow meter data at Outfall NCQ-077 was not valid due to tidal impacts, turbulence and unrealistically high Doppler velocities.

Water Quality Sampling and Model Calibration

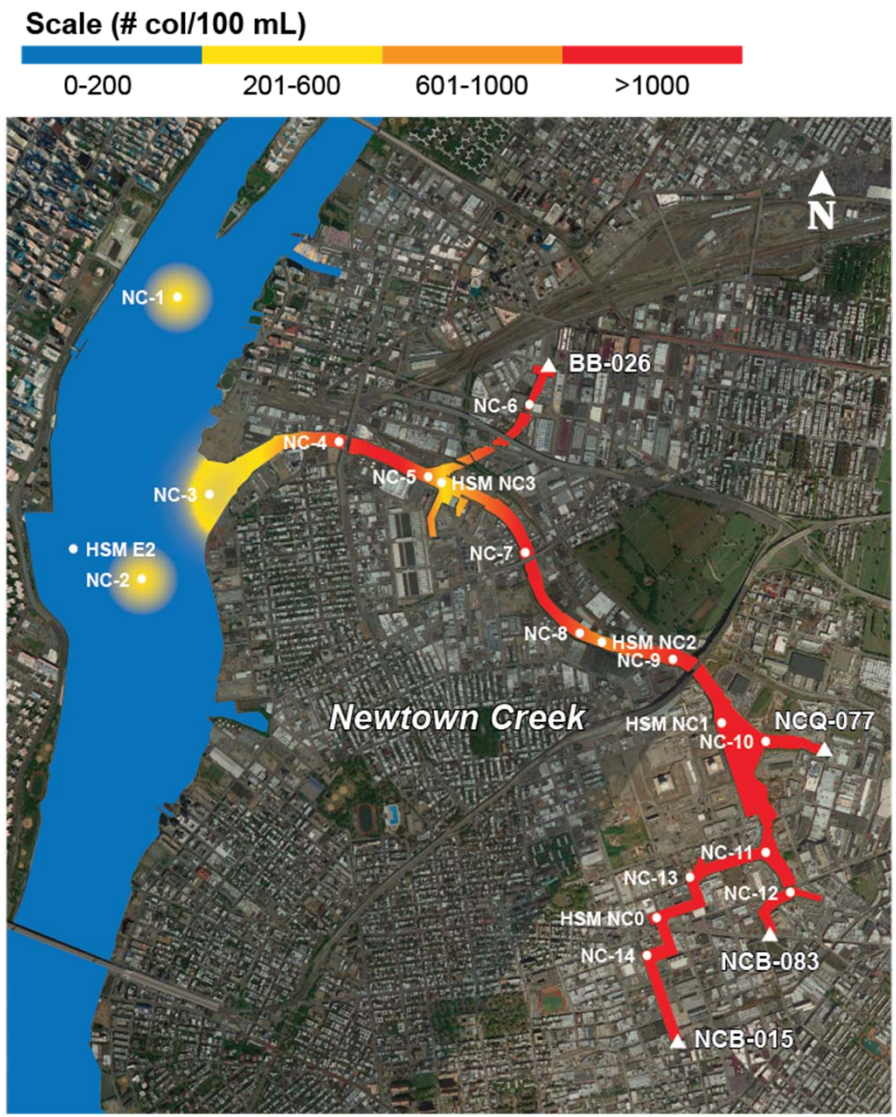
Fecal and Entero Sampling Locations



Overview of Fecal and Entero Geomeans

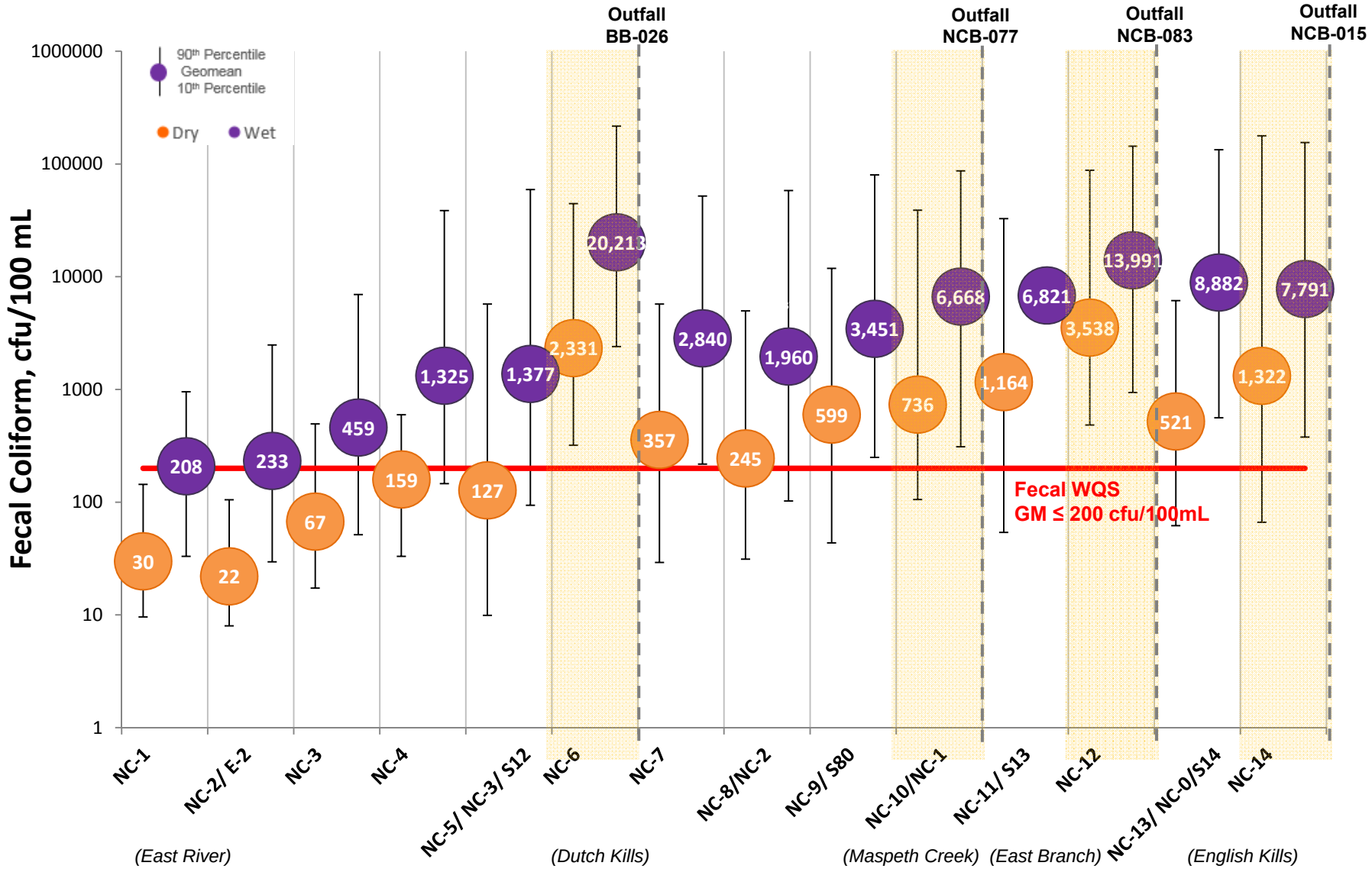
- LTCP: ~77 Wet samples per location; Jul – Nov 2016
- HSM: ~34 Wet samples per location; Jan – Nov 2016

Fecal – Wet Weather



Entero – Wet Weather

Fecal Coliform Sampling Results

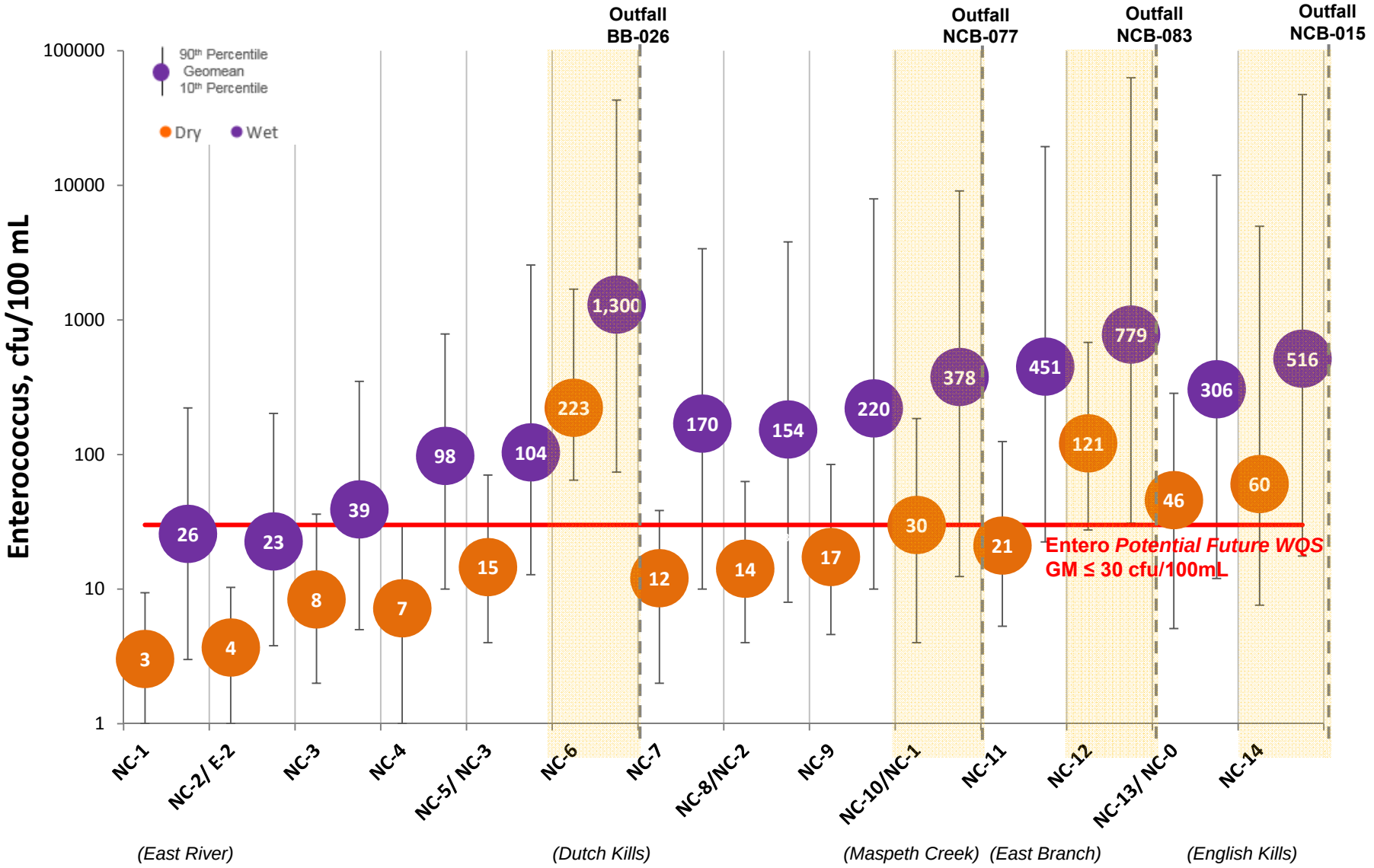


January 1, 2016 – November 3, 2016

LTCP2: ~ 14 Dry and 77 Wet weather samples per location
HSM: ~ 18 Dry and 34 Wet weather samples per location
SM: ~ 2 Dry and 2 Wet weather samples per location

Highlighted stations are directly downstream of a major CSO Outfall

Enterococcus Sampling Results



January 1, 2016 – November 3, 2016

LTCP2: ~ 14 Dry and 77 Wet weather samples per location

HSM: ~ 18 Dry and 34 Wet weather samples per location

Highlighted stations are directly downstream of a major CSO Outfall

Overview of Fecal and Entero Geomeans

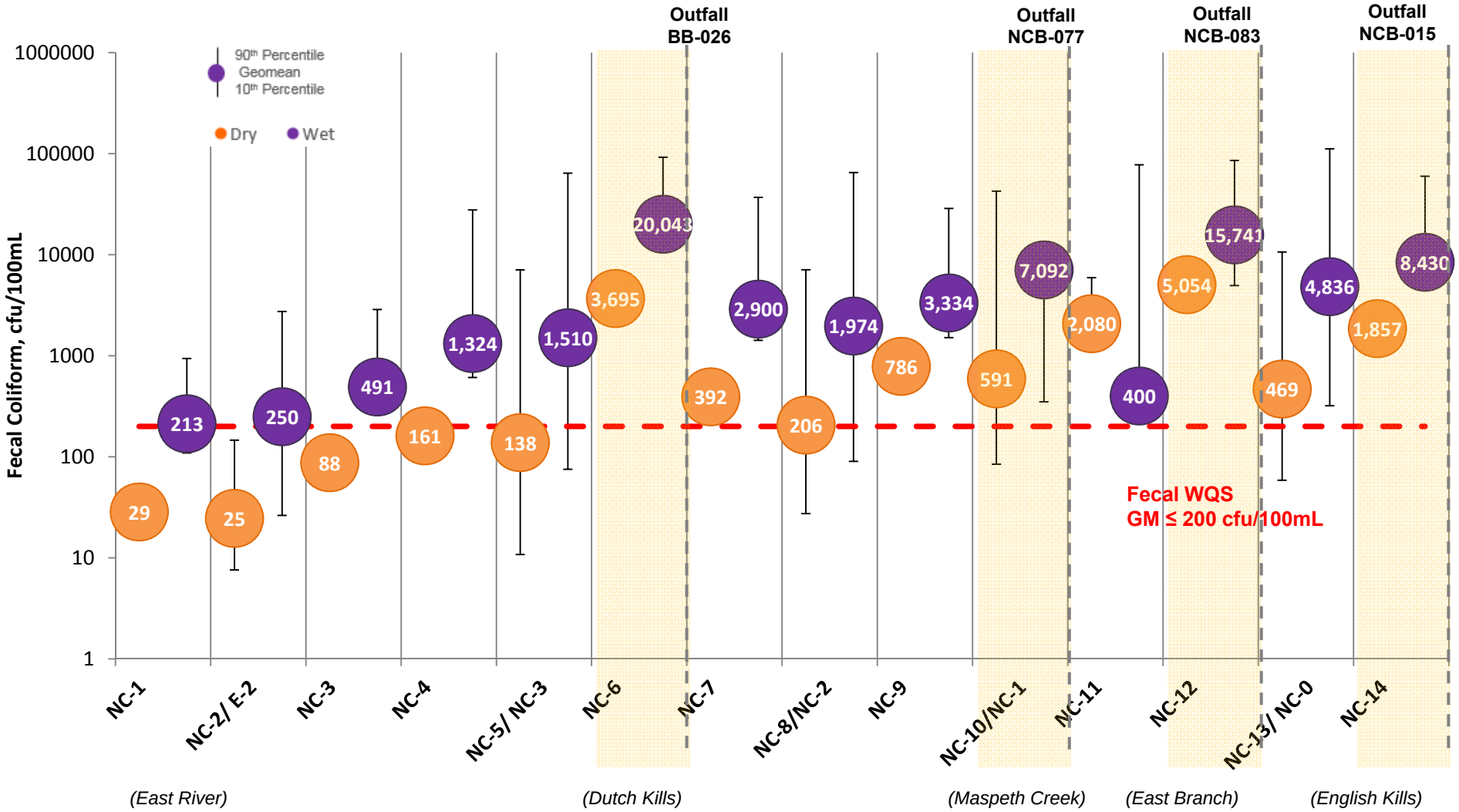
Recreation Season: May 1, 2016 – October 31, 2016

- LTCP: ~71 Wet samples per location; Jul – Oct 2016
- HSM: ~26 Wet samples per location; May – Oct 2016

Fecal – Wet Weather

Entero – Wet Weather

Fecal Coliform Sampling Results



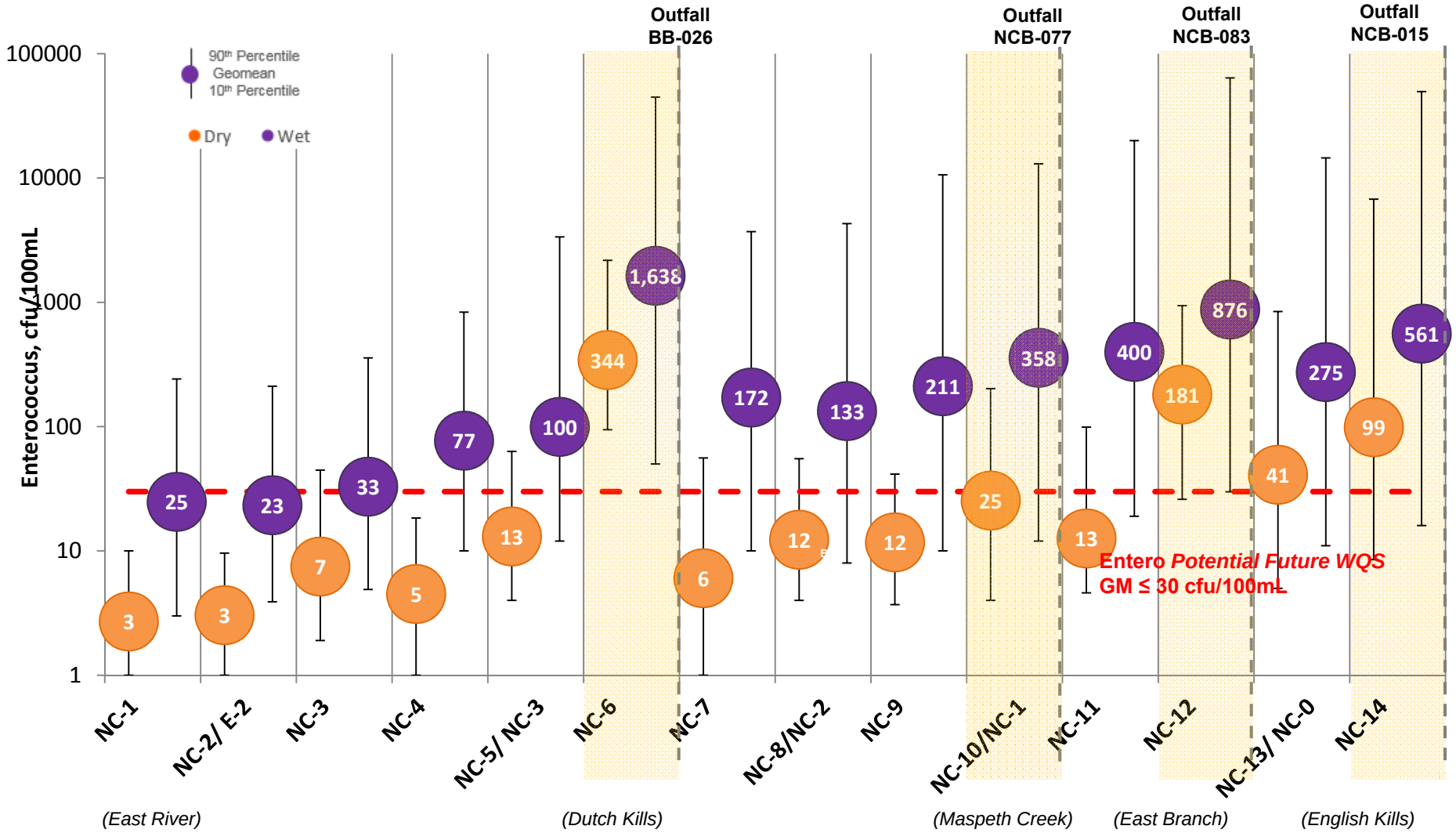
May 1, 2016 – October 31, 2016

LTCP2: ~ 10 Dry and 71 Wet weather samples per location

HSM: ~ 18 Dry and 26 Wet weather samples per location

Highlighted stations are directly downstream of a major CSO Outfall

Enterococcus Sampling Results



May 1, 2016 – October 31, 2016
LTCP2: ~ 10 Dry and 71 Wet weather samples per location
HSM: ~ 18 Dry and 26 Wet weather samples per location

Highlighted stations are directly downstream of a major CSO Outfall

Time to Recovery – Fecal Coliform

Approximate Time to Recovery (hours)

*for **Fecal Coliform Threshold of 1000 cfu/100 ml** based on current conditions and event sampling data:*

Location	Sampling Station	Storm Event #1 7/14/16	Storm Event #2 7/31/16	Storm Event #3 10/22/16	Storm Event #4 10/30/16
Main Trunk	**NC3**	47	35	79	62
	NC4	47	40	79	86
	NC5	43	40	*	86
	NC8	67	40	*	93
	NC10	72	58	*	*
	NC11	72	*	*	*
Dutch Kills	**NC6**	75	58	*	95
East Branch	**NC12**	96	41	*	*

*Never recovered below 1000 cfu/100 ml during the sampling event.

Final Storm Event from which Time to Recovery was calculated:

Storm Event #	Date	Final Event Rainfall (in)	Peak (in/hr)	Peak Time	Event End Time	Duration (hrs)	Total Daily Rainfall
1	7/14/2016	0.50	0.50	7/14/2016 16:00	7/14/2016 16:00	1	0.50
2	7/31/2016	0.52	0.42	7/31/2016 22:00	8/1/2016 0:00	4	0.57
3	10/22/2016	0.30	0.16	10/22/2016 5:00	10/22/2016 8:00	5	0.31
4	10/30/2016	0.48	0.35	10/30/2016 18:00	10/30/2016 19:00	4	0.48

Time to Recovery – Enterococcus

Approximate Time to Recovery (hours)

*for **Enterococci Threshold of 110 cfu/100 ml** based on current conditions and event sampling data:*

Location	Sampling Station	Storm Event #1 7/14/16	Storm Event #2 7/31/16	Storm Event #3 10/22/16	Storm Event #4 10/30/16
Main Trunk	**NC3**	0(1)	0(1)	56	62
	NC4	0(1)	35	56	67
	NC5	0(1)	35	56	67
	NC8	0(1)	35	80	86
	NC10	43	35	*	*
	NC11	43	87	*	94
Dutch Kills	**NC6**	66	*	*	88
East Branch	**NC12**	*	36	*	*

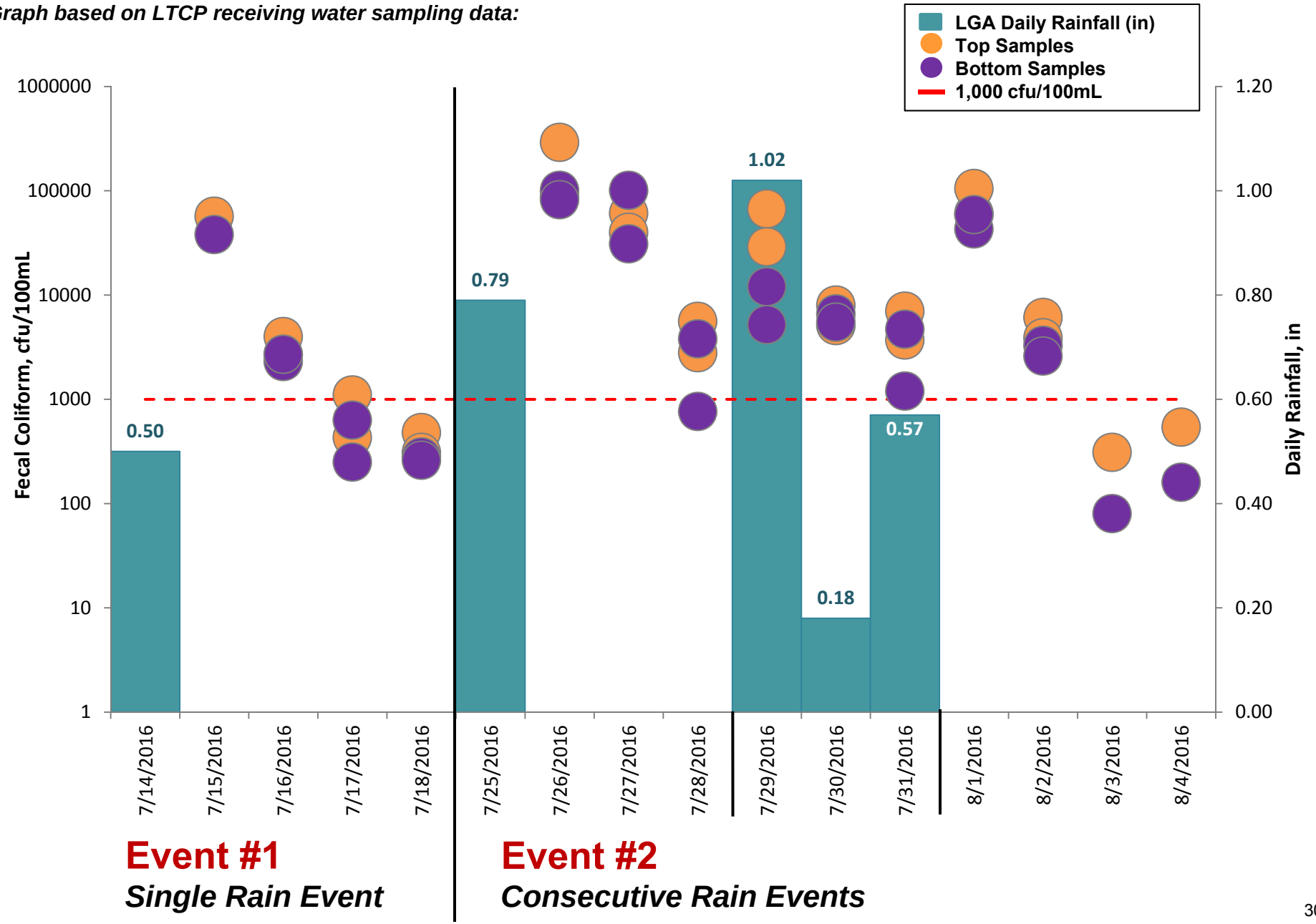
(1) Never exceeded 110 cfu/100ml during sampling event.
*Never recovered below 110 cfu/100 ml during the sampling event.

Final Storm Event from which Time to Recovery was calculated:

Storm Event #	Date	Final Event Rainfall (in)	Peak (in/hr)	Peak Time	Event End Time	Duration (hrs)	Total Daily Rainfall
1	7/14/2016	0.50	0.50	7/14/2016 16:00	7/14/2016 16:00	1	0.50
2	7/31/2016	0.52	0.42	7/31/2016 22:00	8/1/2016 0:00	4	0.57
3	10/22/2016	0.30	0.16	10/22/2016 5:00	10/22/2016 8:00	5	0.31
4	10/30/2016	0.48	0.35	10/30/2016 18:00	10/30/2016 19:00	4	0.48

Fecal Coliform Recovery Over Time at NC-10

Graph based on LTCP receiving water sampling data:

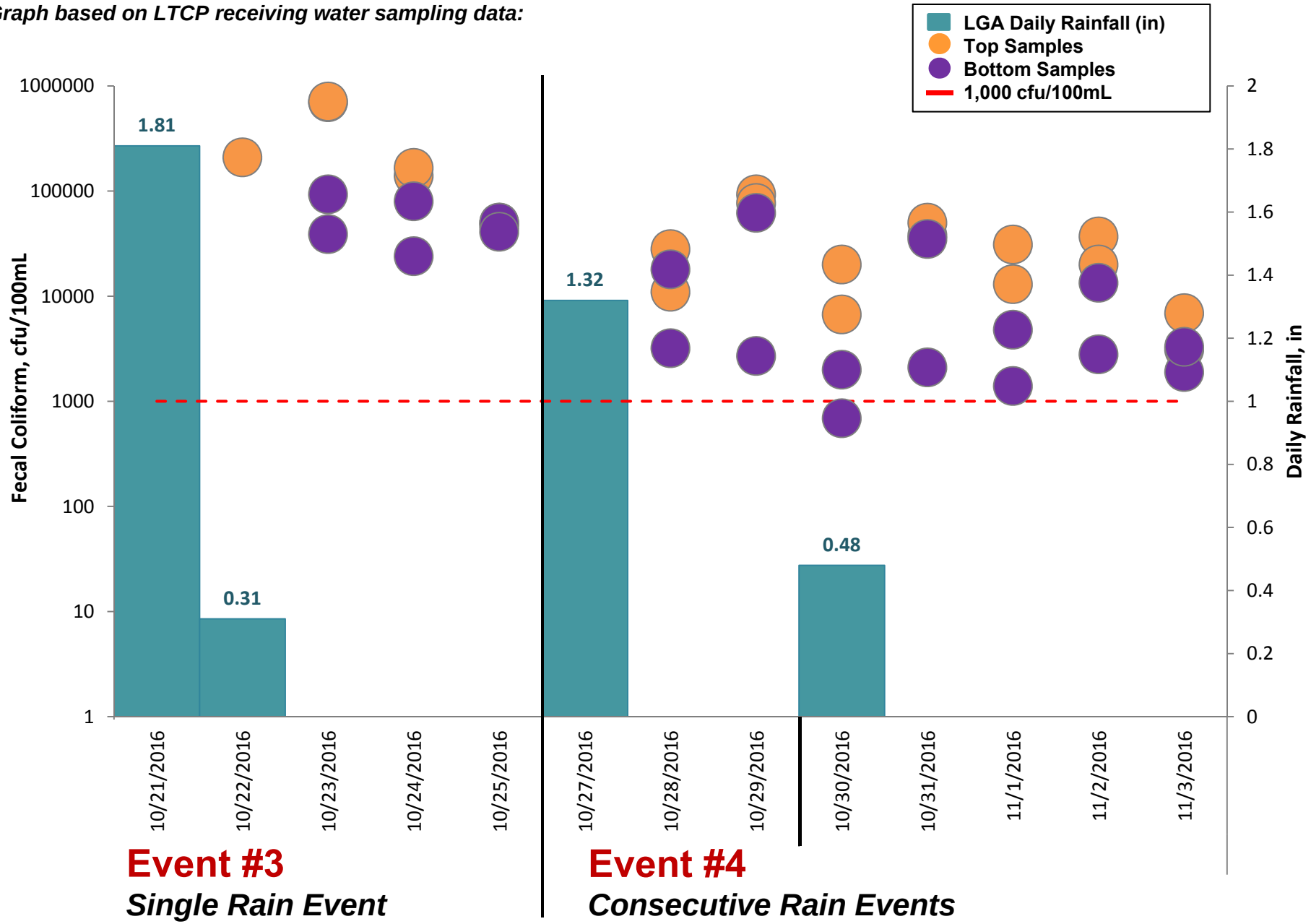


Event #1
Single Rain Event

Event #2
Consecutive Rain Events

Fecal Coliform Recovery Over Time at NC-10

Graph based on LTCP receiving water sampling data:

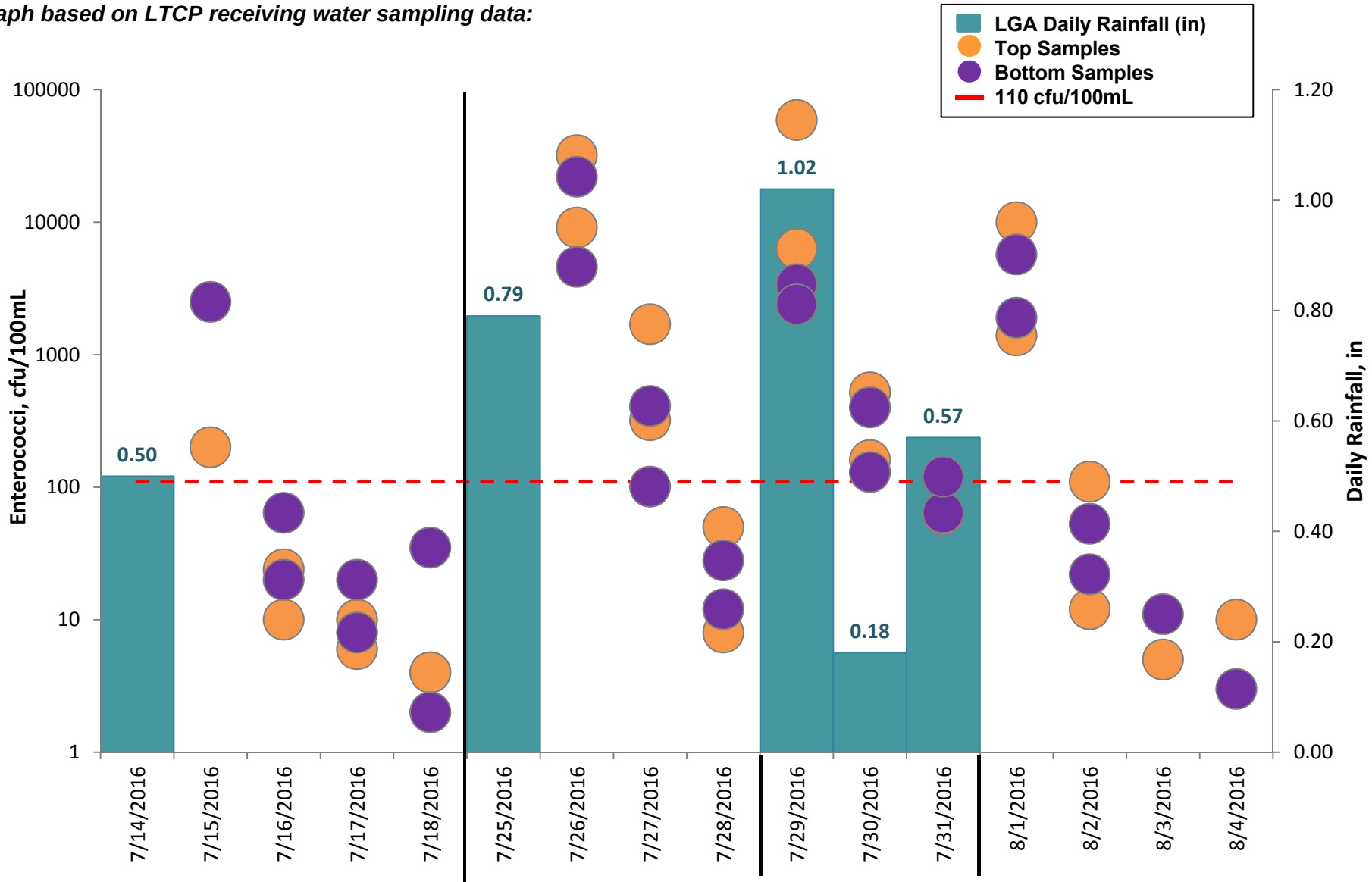


Event #3
Single Rain Event

Event #4
Consecutive Rain Events

Enterococci Recovery Over Time at NC-10

Graph based on LTCP receiving water sampling data:

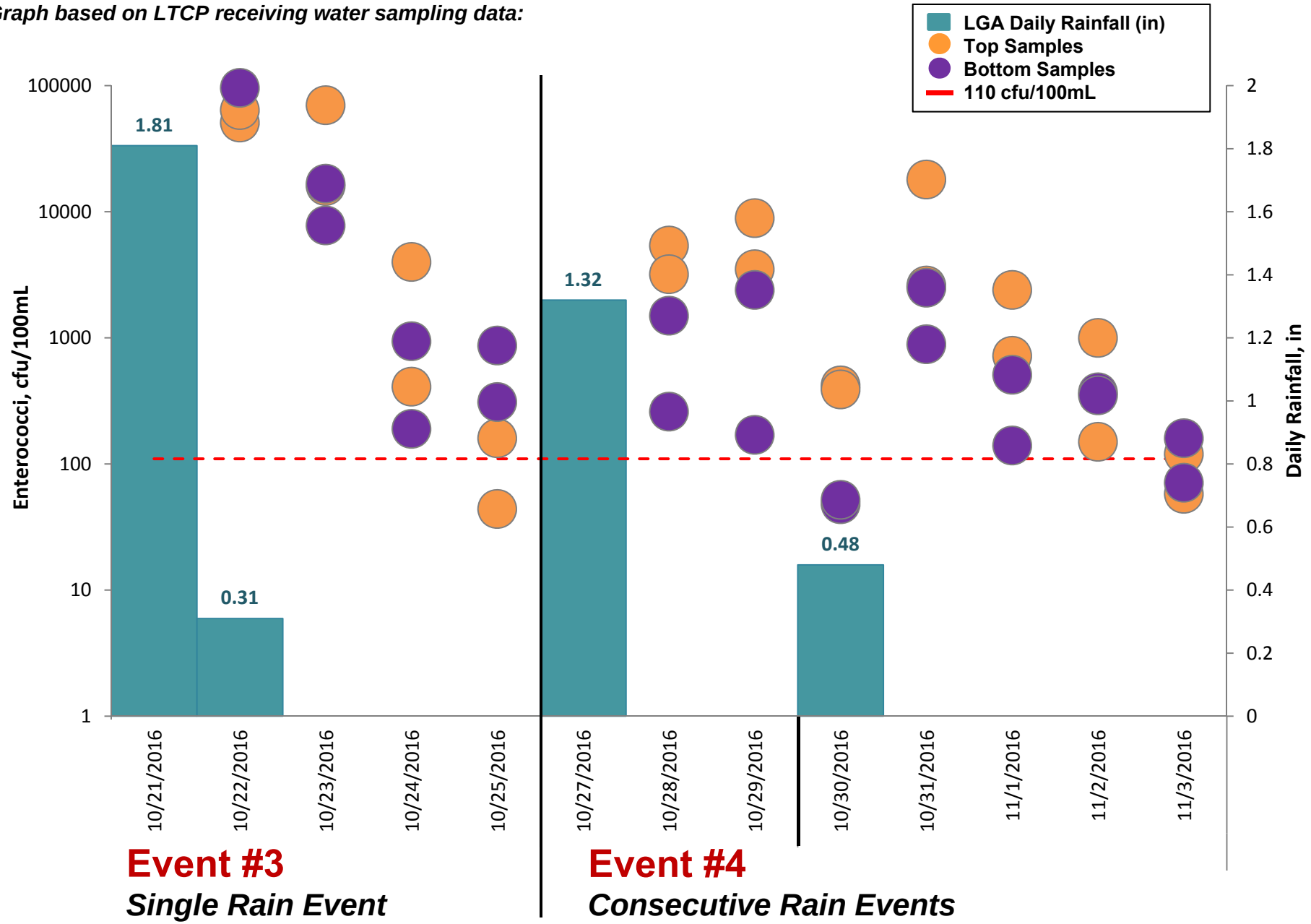


Event #1
Single Rain Event

Event #2
Consecutive Rain Events

Enterococci Recovery Over Time at NC-10

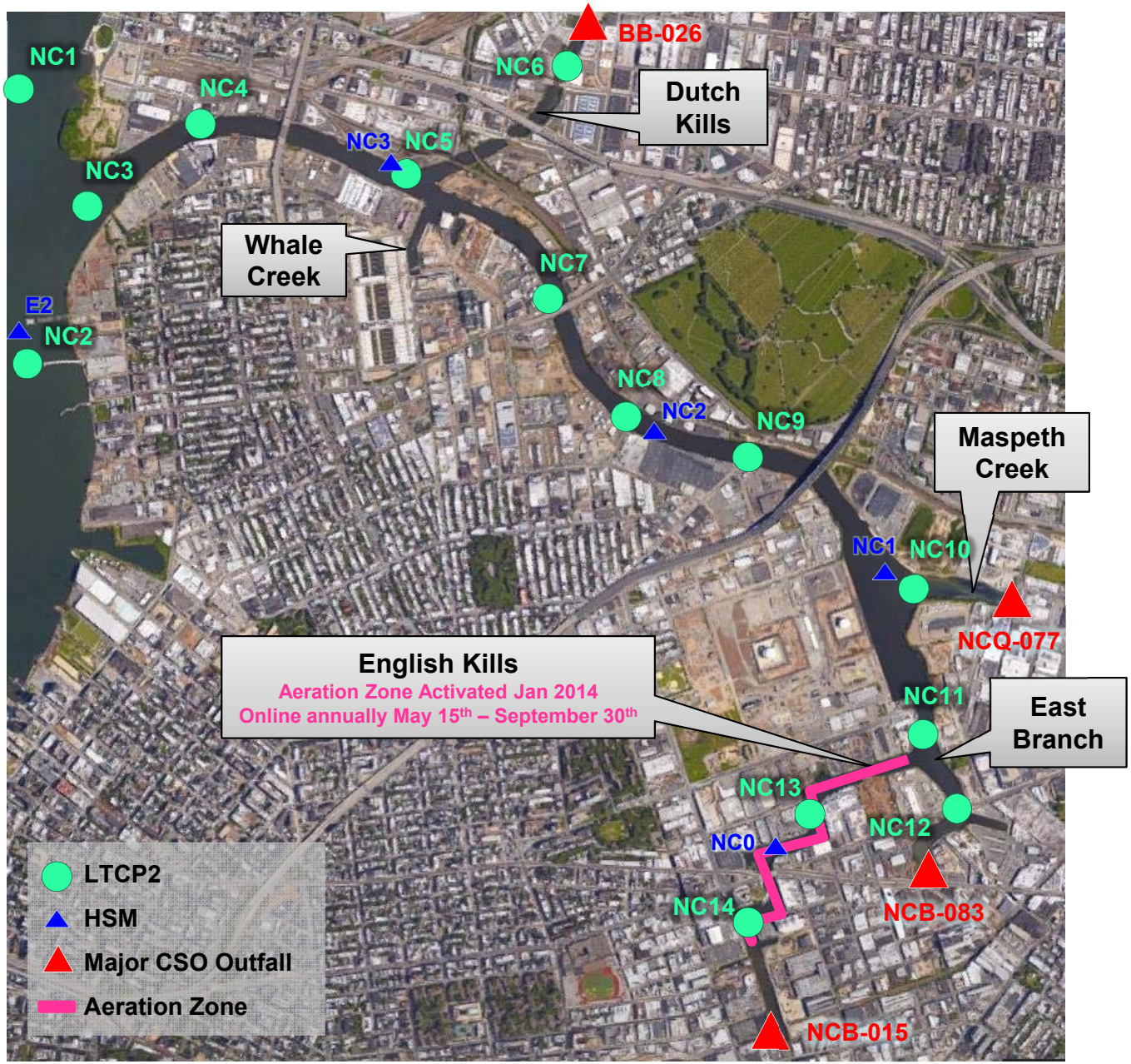
Graph based on LTCP receiving water sampling data:



Event #3
Single Rain Event

Event #4
Consecutive Rain Events

DO Sampling Locations & Aeration Zone



Dissolved Oxygen 5th 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

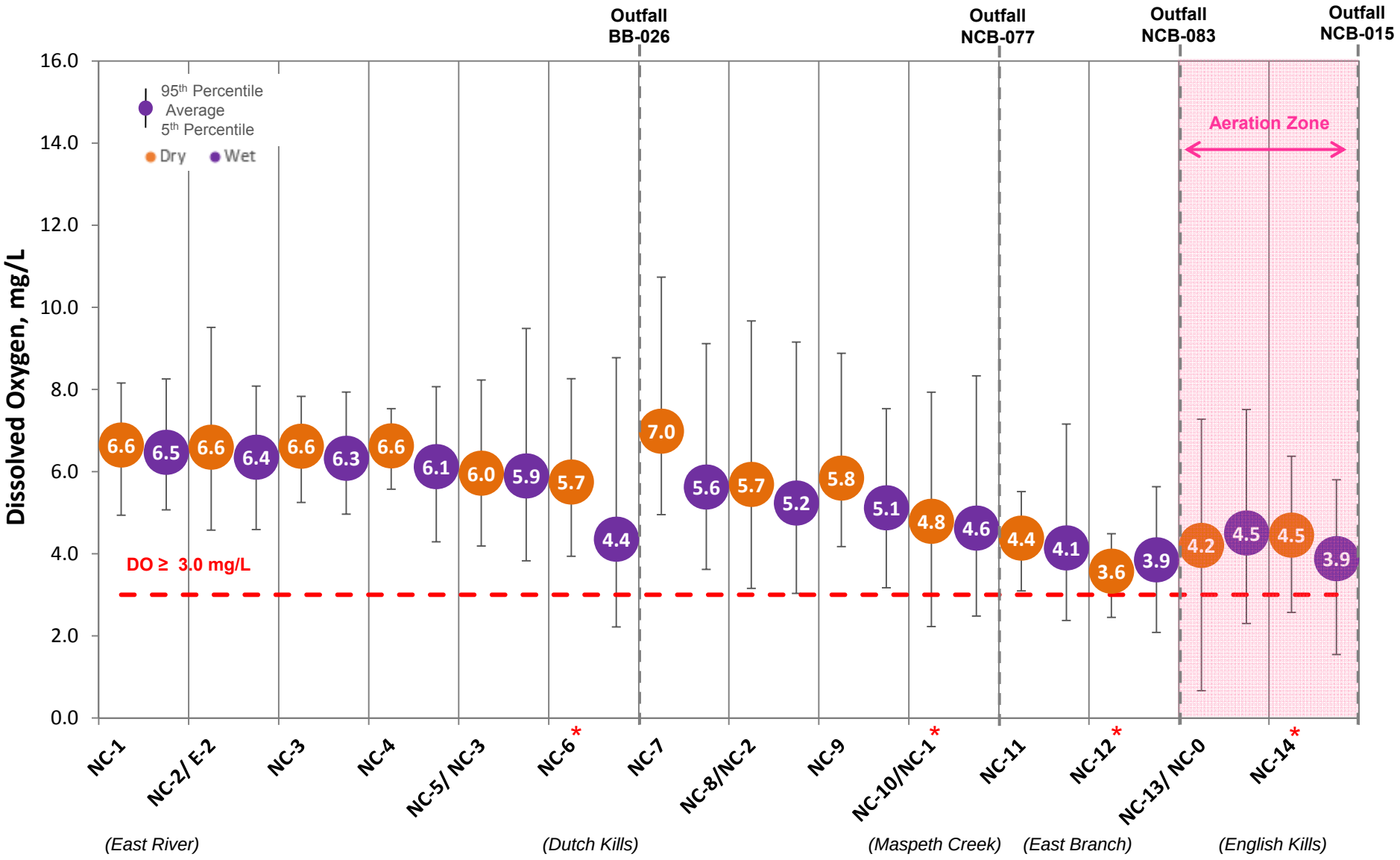
Scale (mg/L)

≥3	2-2.9	1-1.9	0-0.9

Dry Weather

Wet Weather

Dissolved Oxygen Sampling Results



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

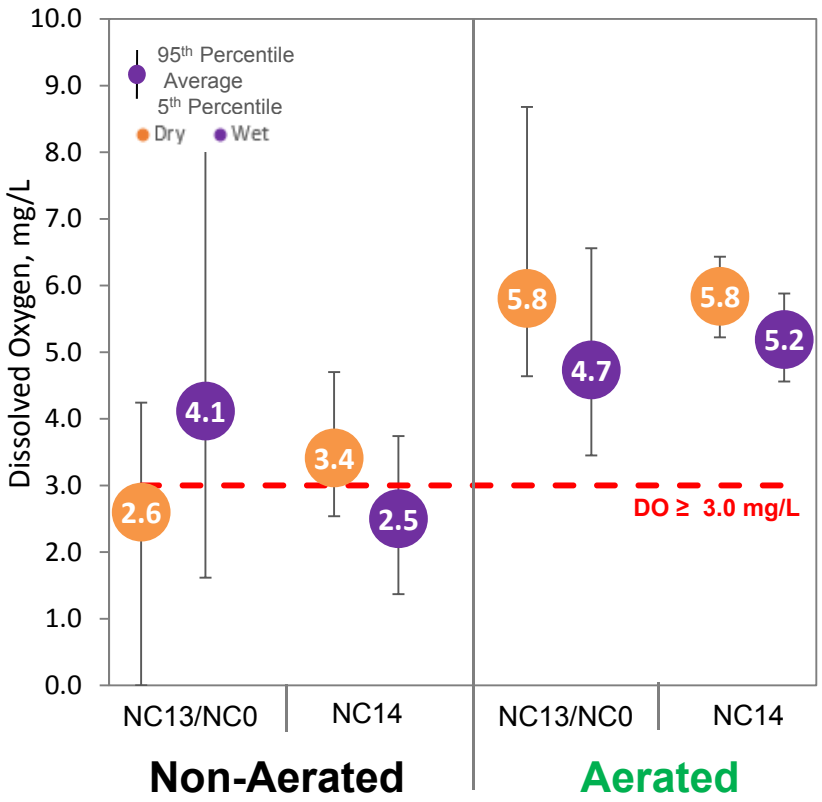
LTCP2: ~ 14 Dry and 77 Wet Weather Samples per location

HSM: ~ 32 Dry and 104 Wet Weather Samples per location

***Stations are directly downstream of a major CSO Outfall**

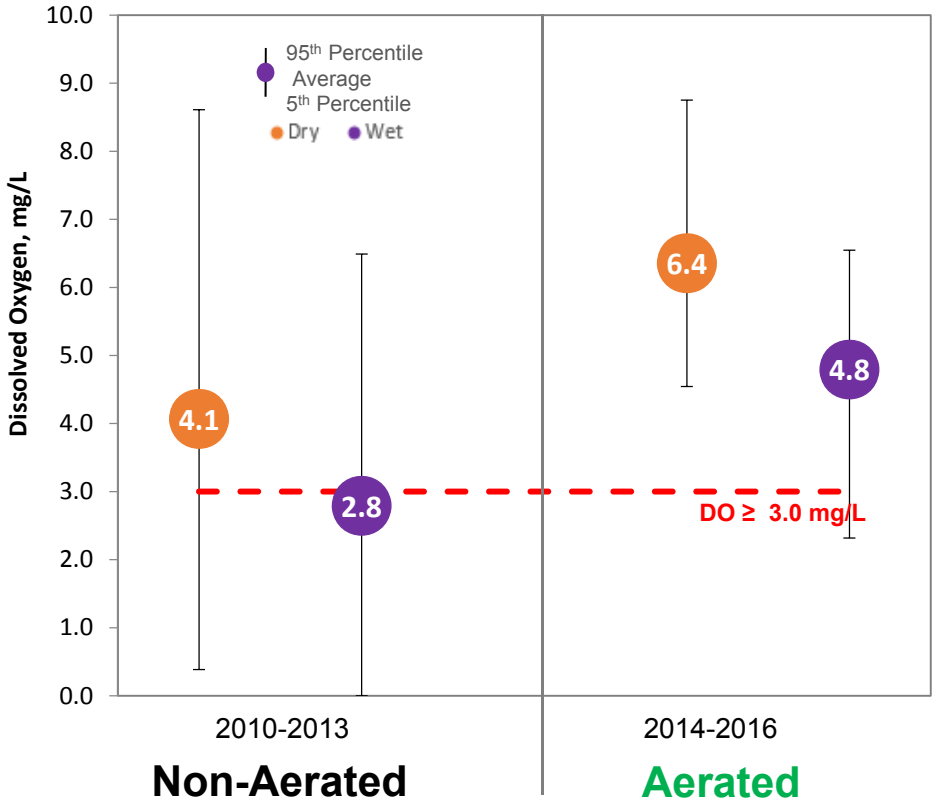
Impact of Aeration on DO Levels

LTCP/HSM 2016 Results



HSM Historic Summer Results

(at NC0)



Non-Aerated
January 1 – May 14 & October 1 – November 3, 2016
LTCP2: ~ 8 Dry and 35 Wet weather samples per location
HSM: ~ 8 Dry and 8 Wet weather samples per location

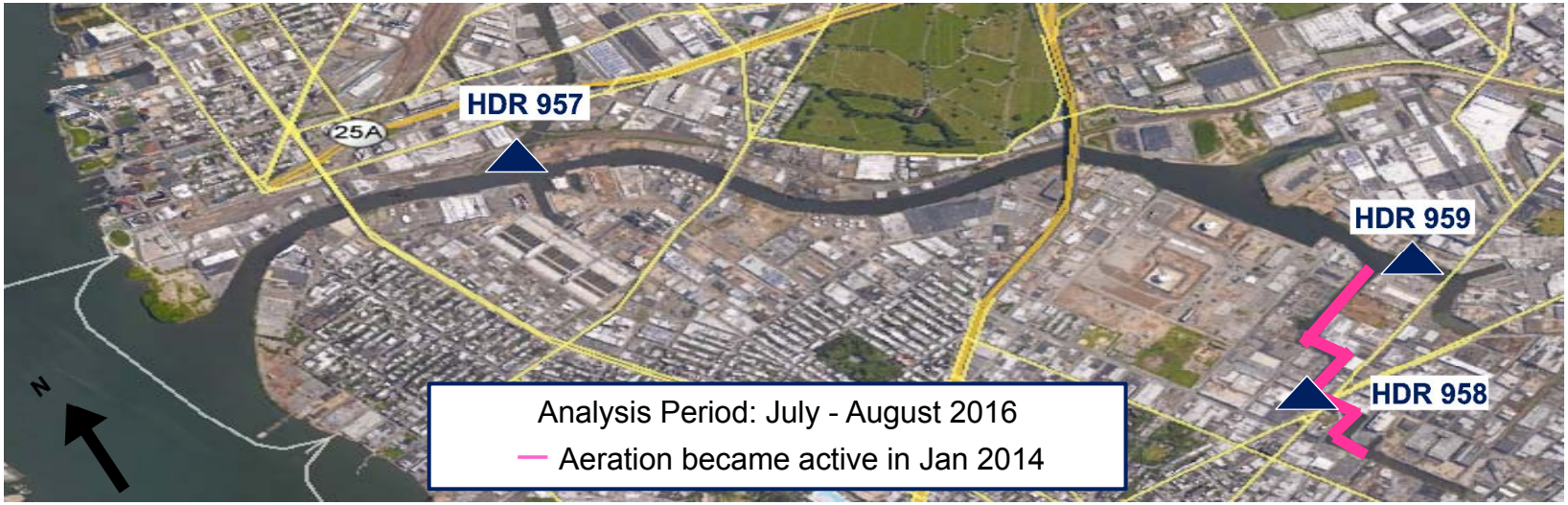
Aerated
May 15 – September 30, 2016
LTCP2: ~ 6 Dry and 37 Wet weather samples per location
HSM: ~ 10 Dry and 28 Wet weather samples per location

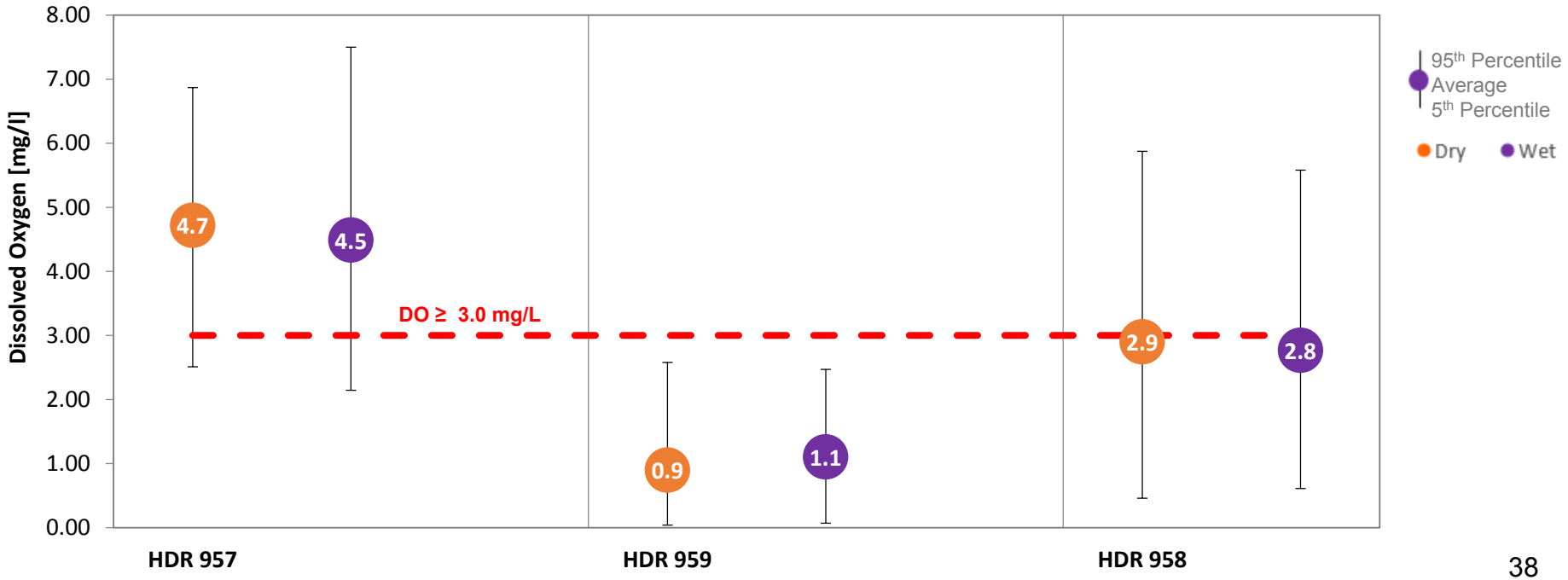
Non-Aerated
May 15 – September 30, 2010 – 2013
HSM: ~ 68 Dry and 68 Wet weather samples per location

Aerated
May 15 – September 30, 2014 – 2016
HSM: ~ 50 Dry and 56 Wet weather samples per location

LTCP2 Data Sondes

Continuous Dissolved Oxygen data collection for ~60 days



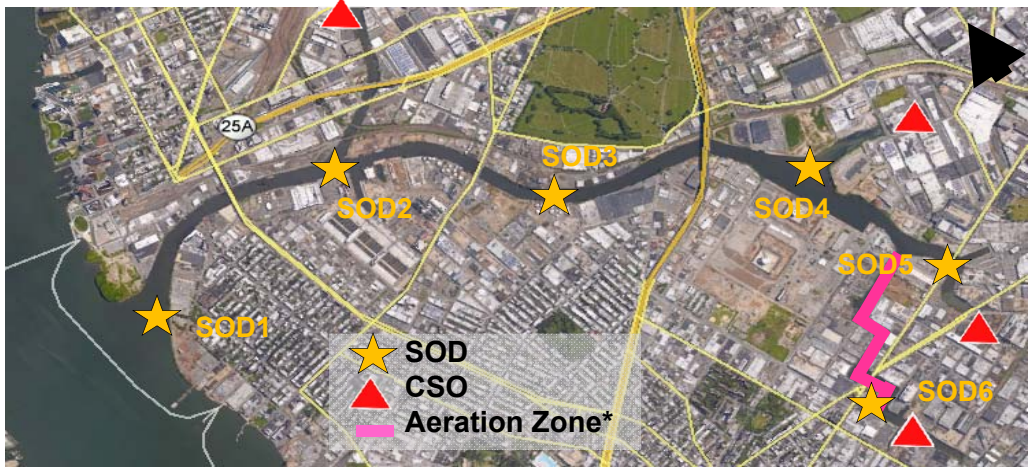


Sediment Oxygen Demand (SOD)

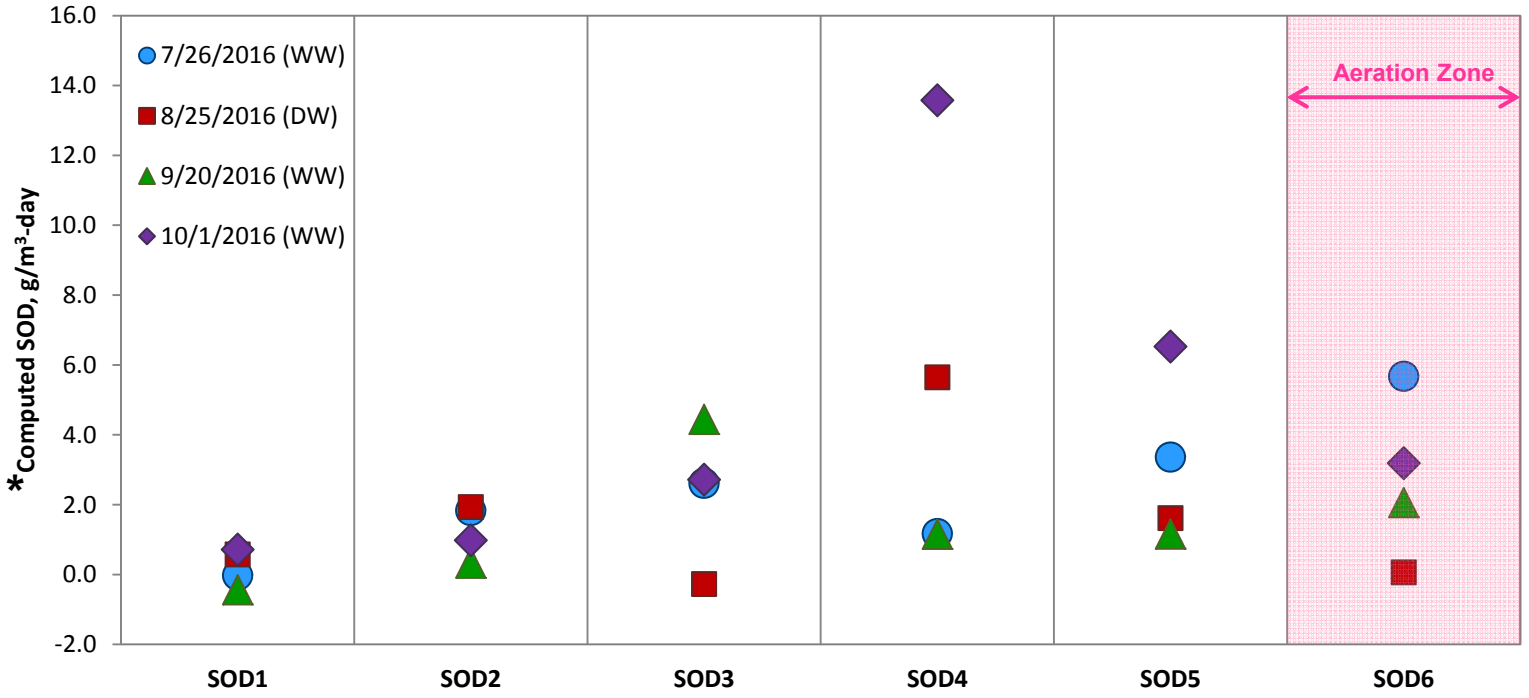
SOD Sampling Dates:

July 26 2016 WW (0.79” on 7/25)
Aug 25 2016 DW (0.13” on 8/21)
Sept 20 2016 WW (0.78” on 9/19)
Oct 1 2016 WW (0.39” on 9/30)

~ 13 Dry and 30 Wet Weather Samples per location



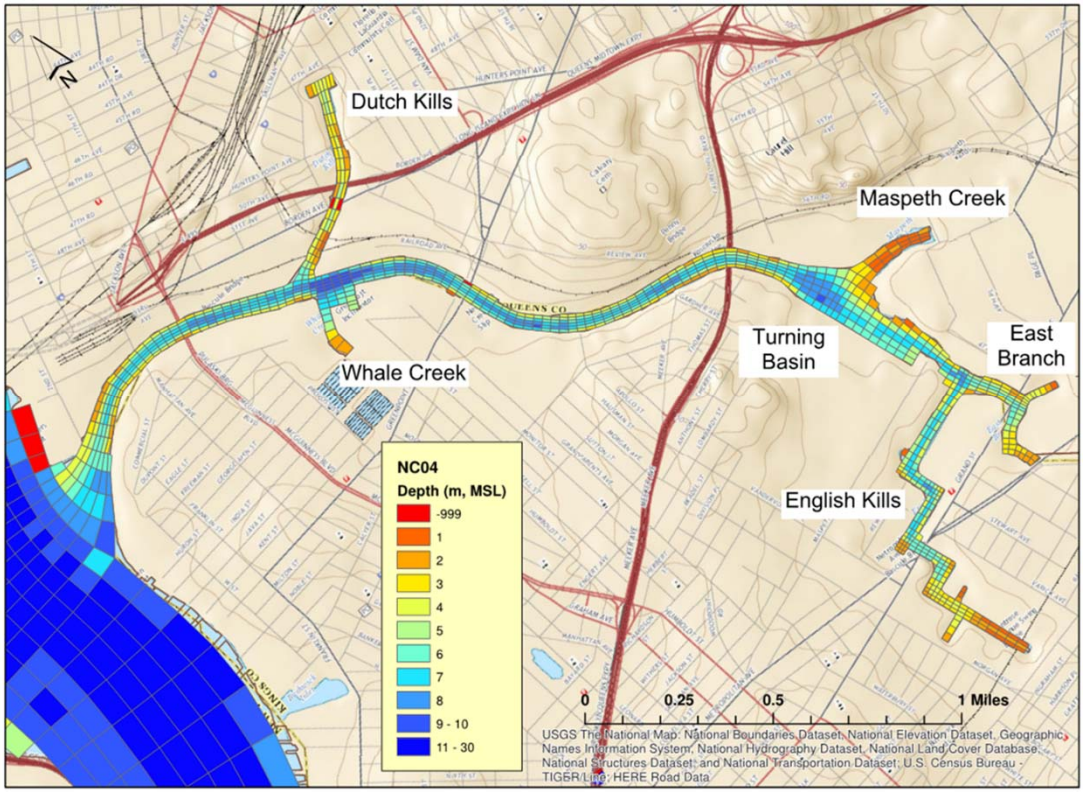
* Note: Aeration was activated January 2014



***SOD values are computed from measurements of the decline in DO concentration over time in the SOD sample, and normalized to area.**

Water Quality Model Calibration

- DEP's process for WQ Model development and application has gone through **Expert Peer Reviews**
- The WQ Model consists of three components that each need be calibrated and validated:
  1. Hydrodynamic Transport Model
  2. Sediment/Organic Carbon Transport Model
  3. Pathogen Indicator Organisms Bacteria Model
- The validated WQ Model will be used for evaluation of CSO control alternatives



Model Computational Grid Inside Newtown Creek

Water Quality Model Calibration

Model Component	Parameters Modeled	Calibration Data Period	Validation Data Period	Status
1 **Hydrodynamic Transport**	• Groundwater and point source inflows • Aeration system effects	**2012-2015** (3.75 years)	**2016** (9 months)	✓ Completed
2 **Sediment / Organic Carbon Transport**	• Organic solids • Dissolved oxygen (DO) sources and sinks • Aeration system effects	**2012-2015** (3.75 years)	**2016** (9 months)	In progress
3 **Pathogen Indicator Organisms Bacteria**	• Fecal coliform • Enterococcus	**2016** (9 months)	**2016** (9 months)	In progress

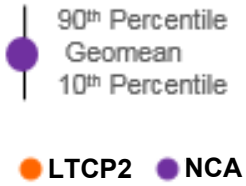
- The Hydrodynamic Transport Model replicates tides, temperature and salinity that will drive die-off rates for the bacteria. So it is important to get this first step correct before proceeding with calibrating/validating DO and Bacteria components.

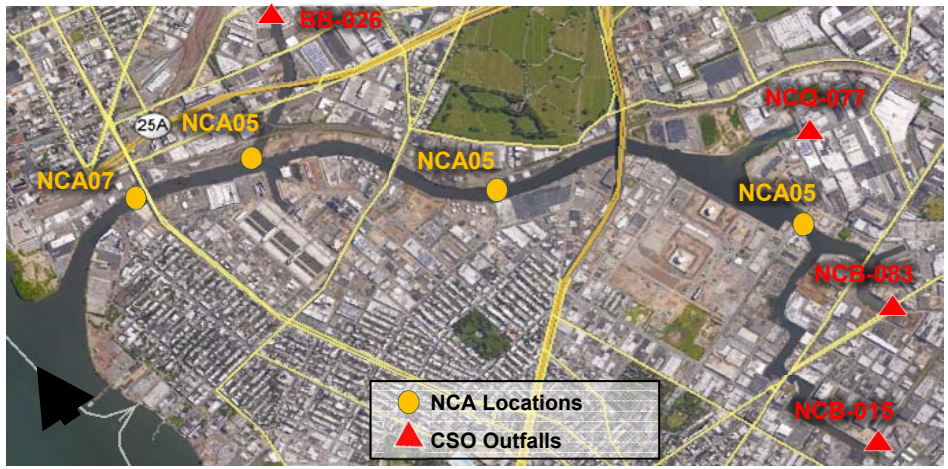
4 Newtown Creek Alliance / Riverkeeper / Citizen Sampling

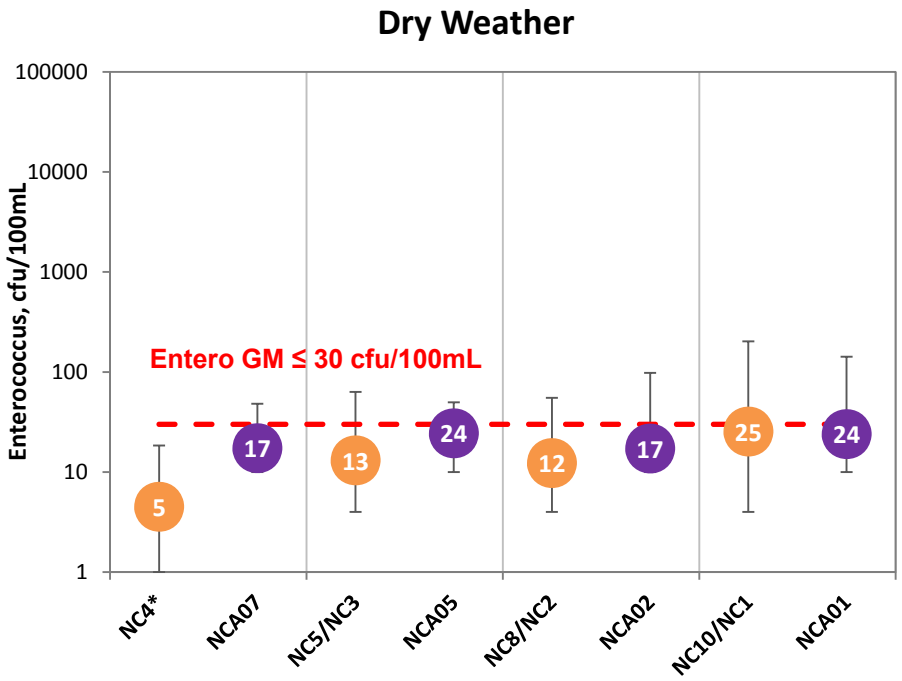
LTCP versus NCA Comparison – Enterococcus

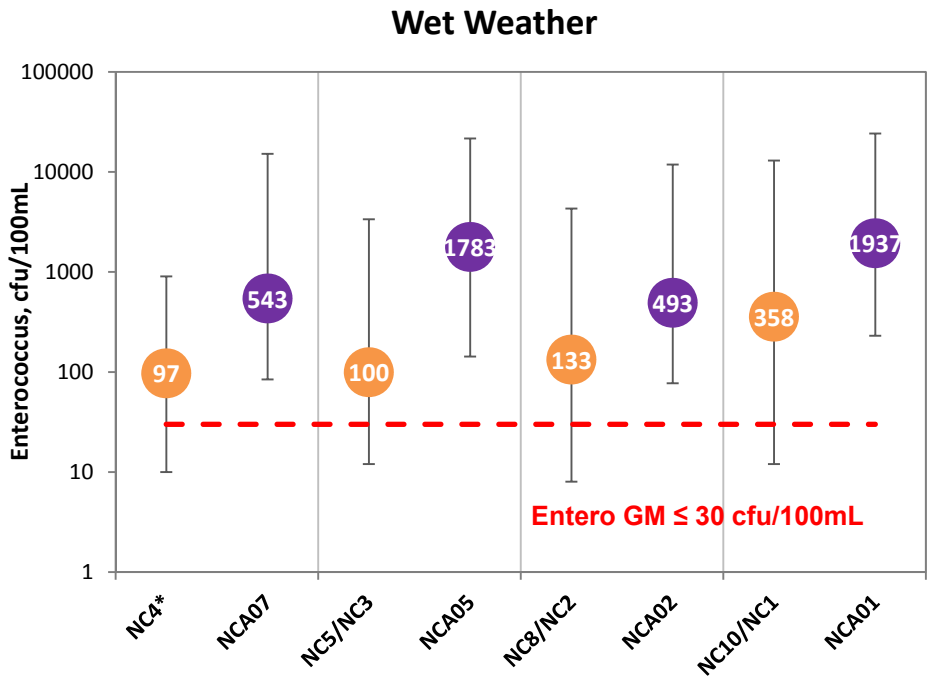
NCA Sampling Period:
April 2016 – October 30, 2016

LTCP2/HSM: ~28 Dry and 90 Wet weather samples per location
NCA: ~32 Dry and 7 Wet weather samples per location





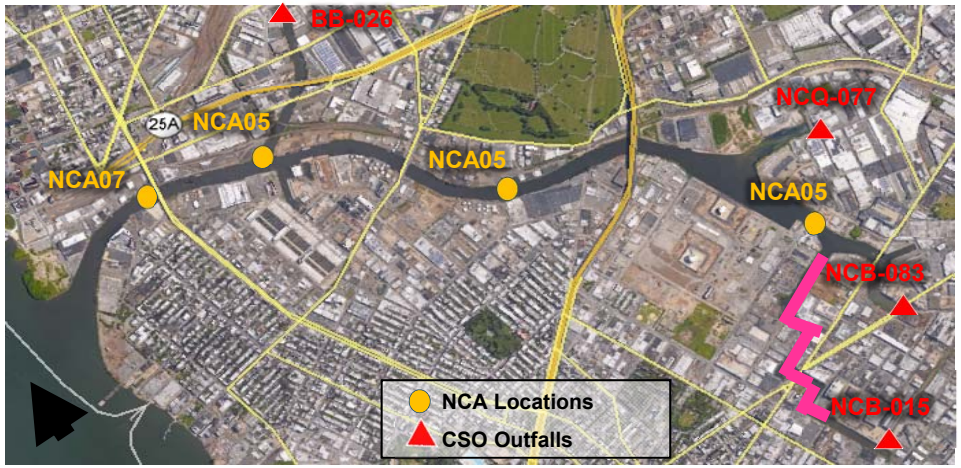




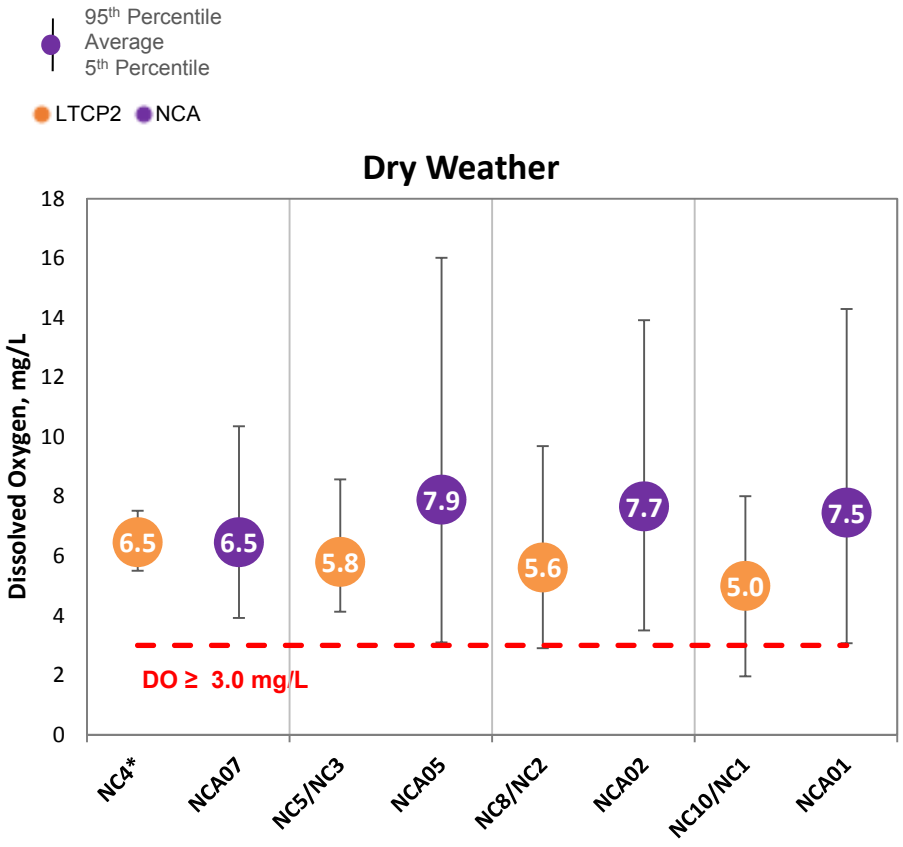
LTCP versus NCA Comparison – DO

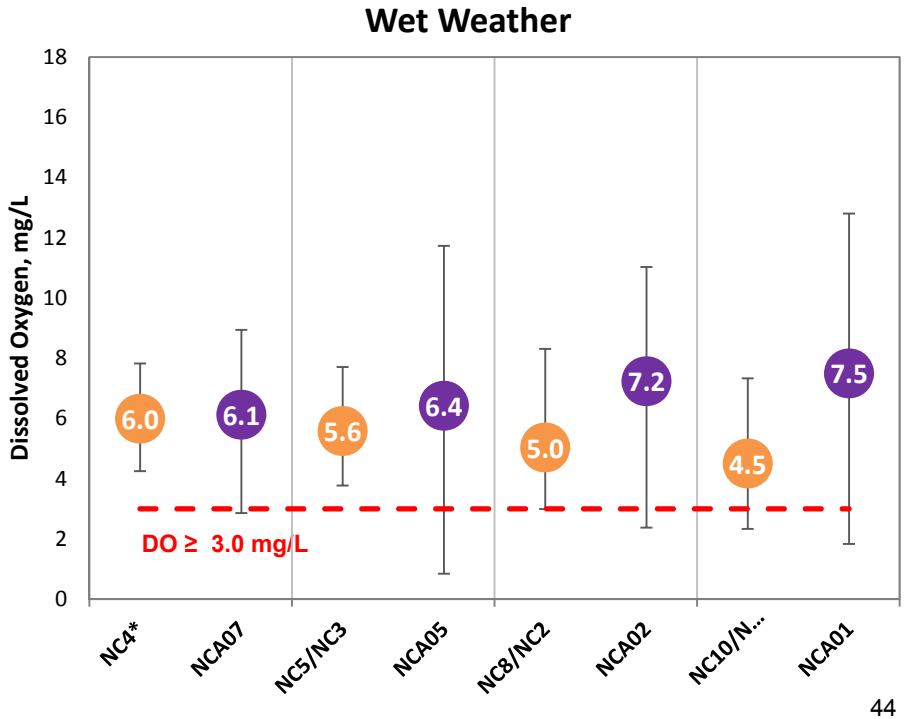
NCA Sampling Period: April 2016 – October 30, 2016

LTCP2/HSM: ~28 Dry and 90 Wet weather samples per location
NCA: ~ 32 Dry and 7 Wet weather samples per location



* Note: Aeration was activated January 2014

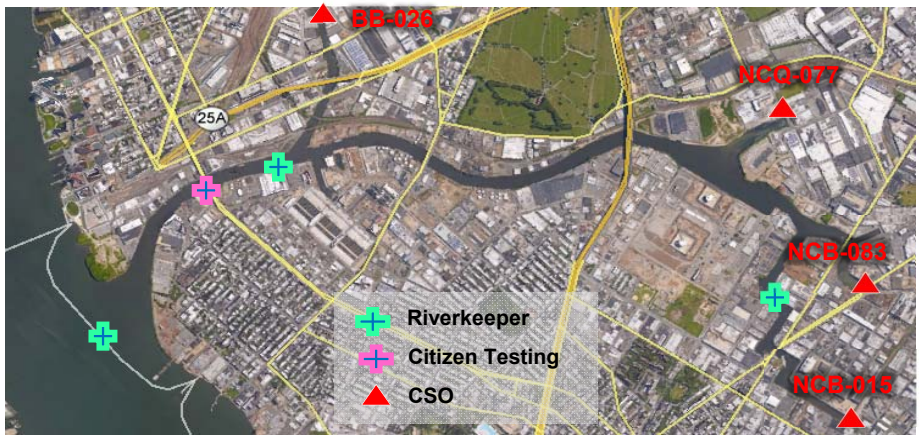


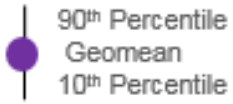


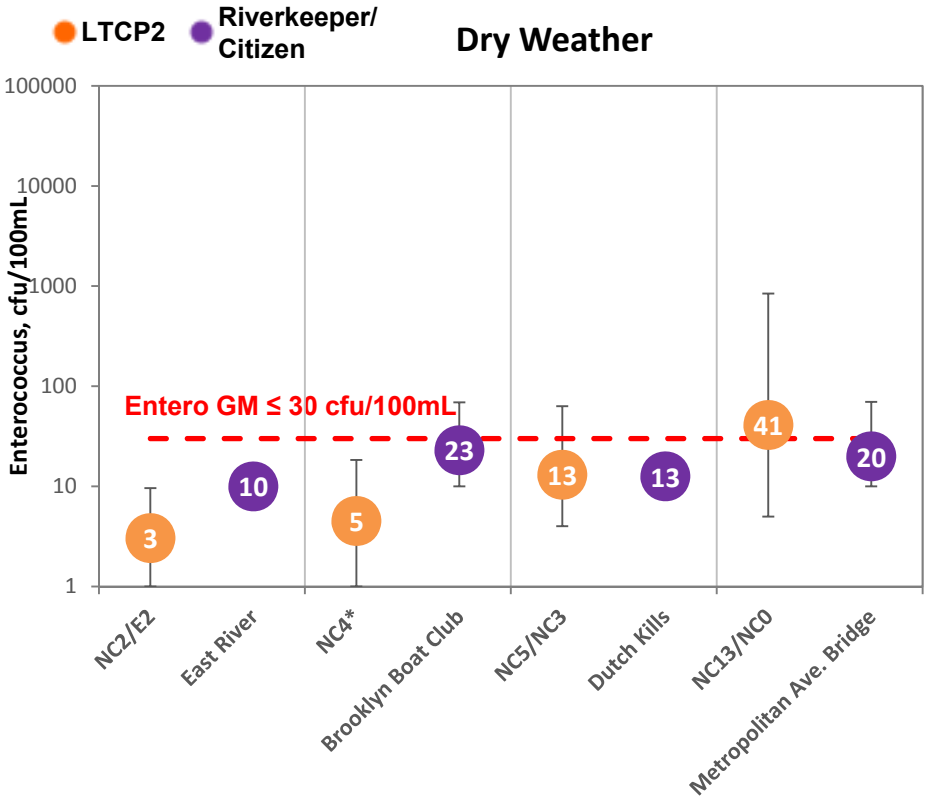
LTCP vs Riverkeeper/Citizen Comparison – Entero

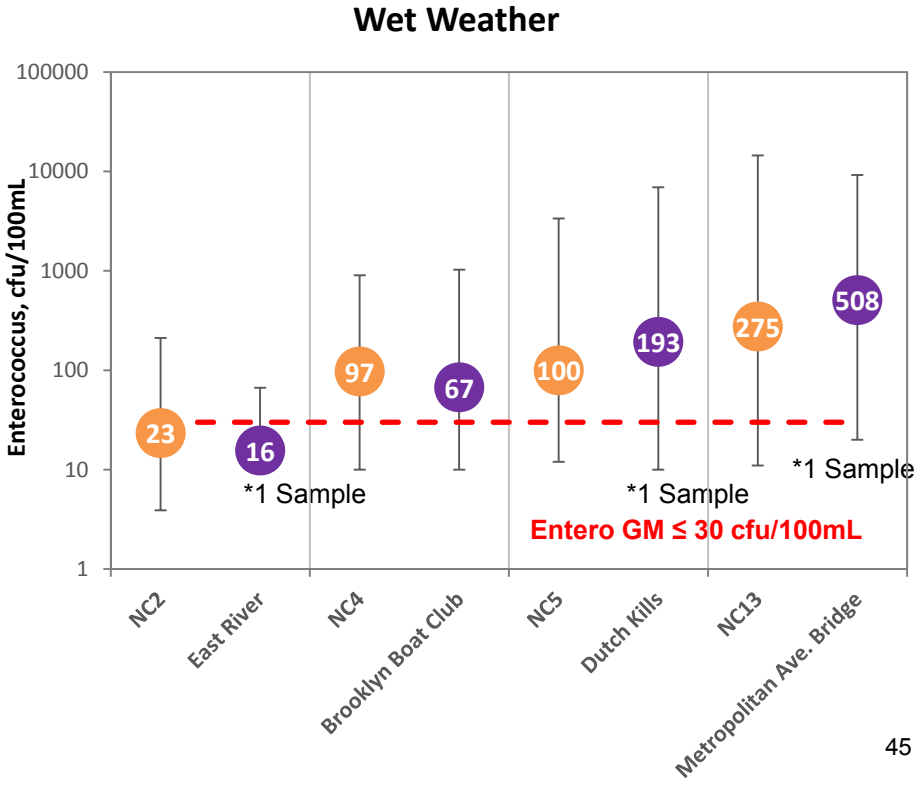
Riverkeeper / Citizen Sampling Period: May 2016 – October 2016

LTCP2: ~ 28 Dry and 90 Wet weather samples per location
Riverkeeper: ~9 Dry and 9 Wet weather samples per location
Citizen: ~ 26 Dry and 29 Wet weather samples per location





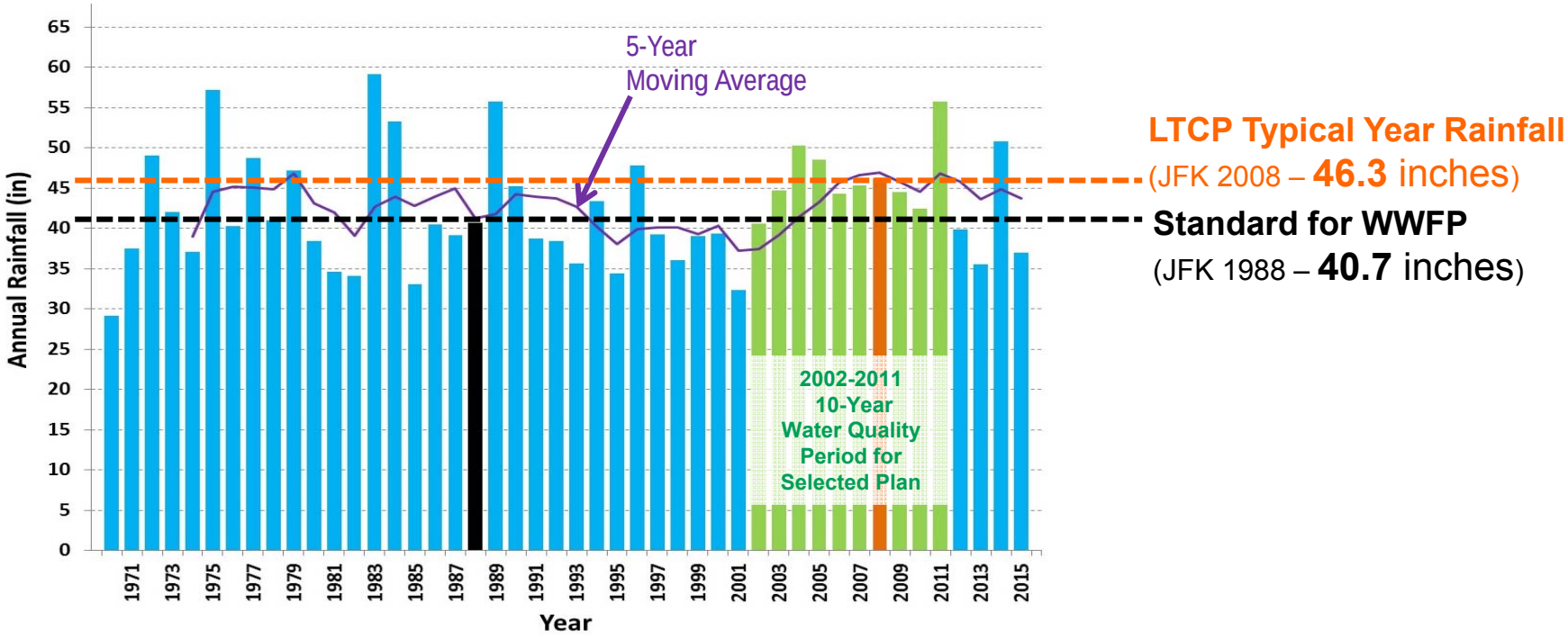




5 CSO Baseline Modeling

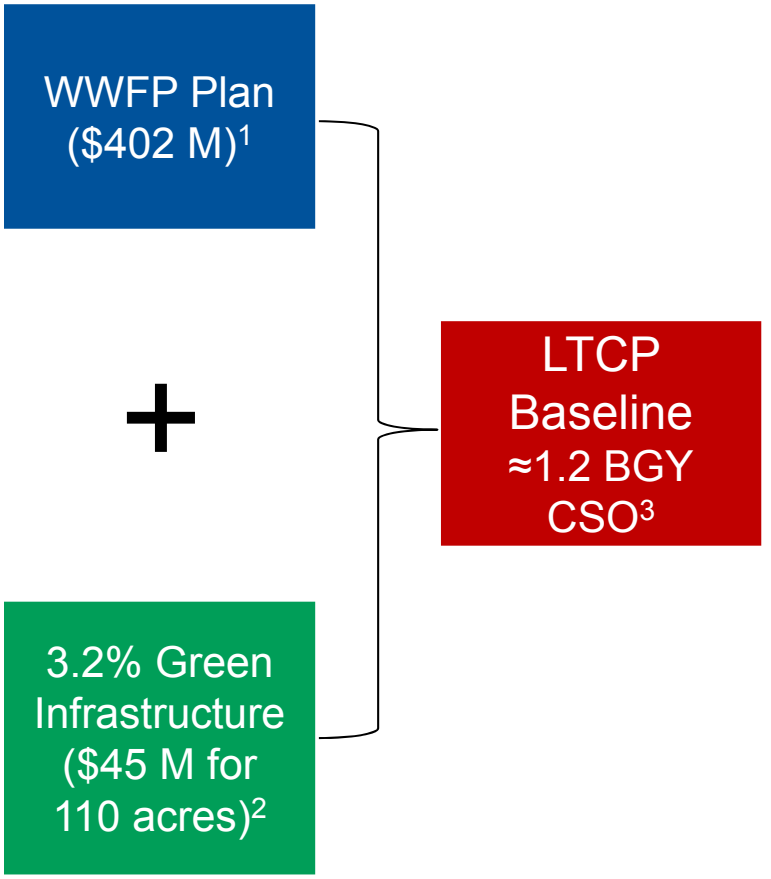
Baseline Model Inputs and Assumptions

- **Landside Model** calibrated based on flow monitoring data, gauge adjusted radar rainfall data, and satellite flyover impervious data
- **Water Quality Model** calibrated with Harbor Survey and LTCP sampling data
- Baseline modeling inputs and assumptions include:
  - Committed CSO and BNR projects
  - 2040 sanitary flows and loads
  - JFK 2008 "Typical Year Rainfall" for Alternative Analysis
  - JFK 10-yr data (2001 to 2011) for baseline and selected alternatives



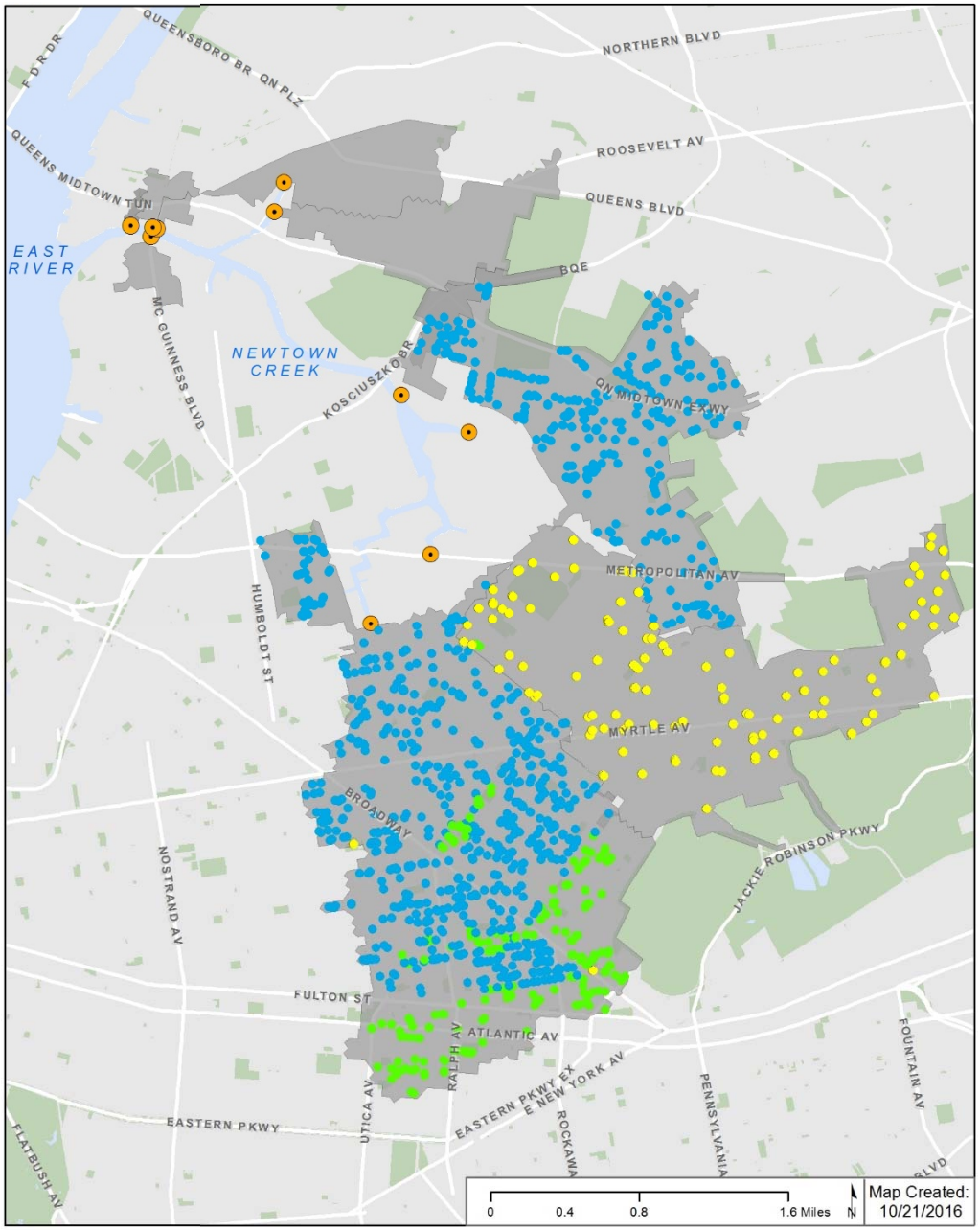
LTCP Baseline Conditions Modeling

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 In-Stream Aeration
4. Committed Green Infrastructure in Newtown Creek watershed



1) Cost pending for Maspeth Creek aeration.
2) Cost to date, more GI projects may be pending.
3) Preliminary estimate.

Newtown Creek Built and Planned GI Projects



- 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

Legend

- Waterbodies
- CSO Outfalls
- CSO Outfall Watersheds
- GI Constructed
- GI In Construction
- GI Planned

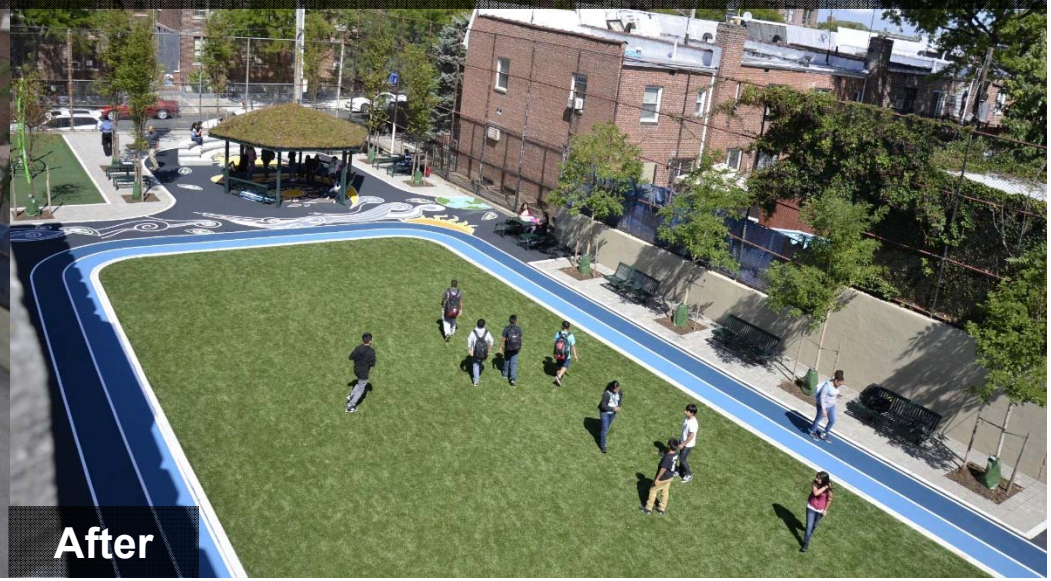
Public Property Retrofit Screening Process

- Comprehensive GIS and desktop analysis
  - Anticipated soil conditions
  - Former site uses, potential or known hazardous materials
- Screening coordinated with owner agency
  - Compatibility of GI with site uses/programming
  - Alignment with planned capital improvements
  - Facility condition (i.e., state of disrepair)
  - Review of agency records (including environmental contamination) and as-built drawings
  - Site walk through
- Geotechnical investigation
- Design process

Public Property Retrofits in Newtown Creek

NYC Environmental Protection

Junior High School 162 Willoughby
1390 Willoughby Ave, Bushwick



Project Status	Parks/ Playgrounds	Public Schoolyards	NYCHA Housing Developments	Total
Potential	0	0	1	1
Preliminary	12	7	7	26
Schematic	5	2	0	7
In Construction	4	0	0	4
Constructed	0	2	1	3
Total	21	11	9	41

Citywide Public Property Retrofits

NYC G
2015 AN

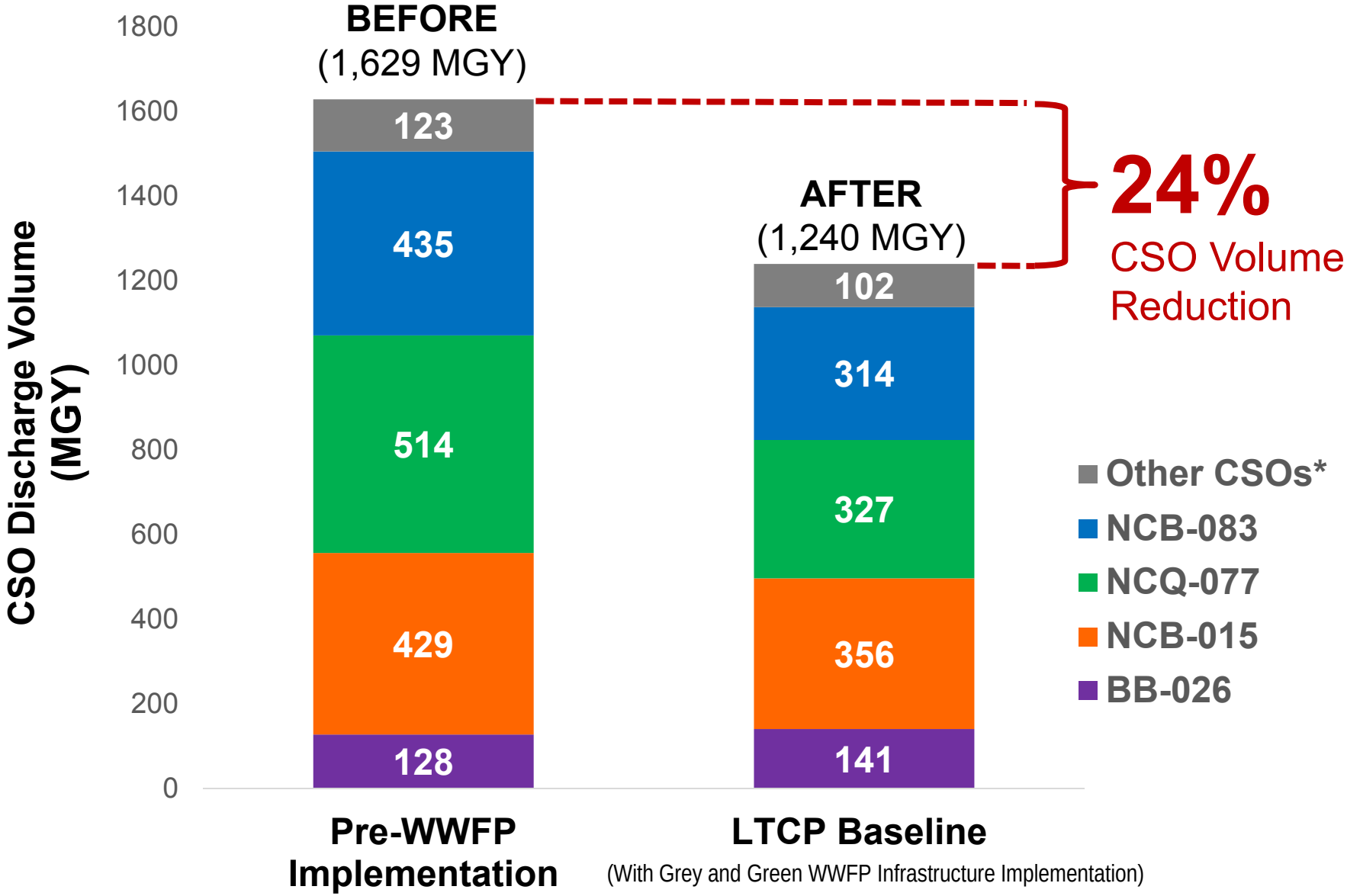
NYC Environmental Protection

EXHIBIT B – Public Property Retrofits

	Site Name	Status	Actual/Projected Completion Date
Parks (DPR)			
1	Houston Playground	Constructed	Fall 2013
2	Powell Playground (Shiplacoff Playground)	In Construction	Spring 2016
3	Forest Park- Overlook Area/Park Lane	In Construction	Spring 2016
4	Edenwald Playground	In Construction	Fall 2018
5	P.O. Nicholas Demutiis Park	Design Complete	Fall 2018
6	Watson Gleason Playground	60% Design	Fall 2018
7	Benninger Playground	Schematic Design	Fall 2018
8	Carroll Park	Schematic Design	Fall 2018
9	Ehrenreich-Austin Playground	Schematic Design	Fall 2018
10	Forest Park-Union Tpk./Metropolitan Ave.	Schematic Design	Fall 2018
11	Forest Park-Union Tpk./Myrtle Ave JRP Exit	Schematic Design	Fall 2018
12	Middle Village Playground	Schematic Design	Fall 2018
13	Real Good Park	Schematic Design	Fall 2018
14	Starr Playground	Schematic Design	Fall 2018
15	Betsy Head Park	Preliminary: Geotechnical Investigation	Fall 2018
16	Brevoort Playground	Preliminary: Geotechnical Investigation	Fall 2018
17	Corona Golf Playground	Preliminary: Geotechnical Investigation	Fall 2018
18	Howard Playground (Howard Houses)	Preliminary: Geotechnical Investigation	Fall 2018
19	Jackie Robinson Park	Preliminary: Geotechnical Investigation	Fall 2018
20	Maria Hernandez Park	Preliminary: Geotechnical Investigation	Fall 2018
21	Railroad Playground	Preliminary: Geotechnical Investigation	Fall 2018
22	South Pacific Playground	Preliminary: Geotechnical Investigation	Fall 2018
23	Van Dyke Playground (Van Dyke Houses)	Preliminary: Geotechnical Investigation	Fall 2018
24	Weeksville Playground	Preliminary: Geotechnical Investigation	Fall 2018
25	Hope Ballfield	Preliminary: Geotechnical Investigation	TBD
26	Admiral Farragut Playground	Potential	Fall 2019
27	Barretto Park	Potential	Fall 2019
28	Belmont Playground	Potential	Fall 2019
29	Ciccarone Park	Potential	Fall 2019
30	Fairmount Playground	Potential	Fall 2019
31	Givan Square/Camponaro Playground	Potential	Fall 2019
32	Gun Hill Playground	Potential	Fall 2019
33	Havemeyer Playground	Potential	Fall 2019
34	Matthews Muliner Playground	Potential	Fall 2019
35	Vidalia Park	Potential	Fall 2019
36	Bridge Park 3 - East and West	Potential	TBD
37	Bulova Park	Potential	TBD
38	Colgate Close Park	Potential	TBD
39	Crotona Parkway Malls @ E. 175th St.	Potential	TBD

- Annual Report names and details the status of all public property retrofit sites
- In 2015 Report:
  - 92 Parks and JOPs
  - 27 Schools
  - 25 NYCHA properties
  - 30 TPL/DOE Schoolyards
  - 61 CPI sites

Newtown Creek: Modeled Baseline CSO Volumes

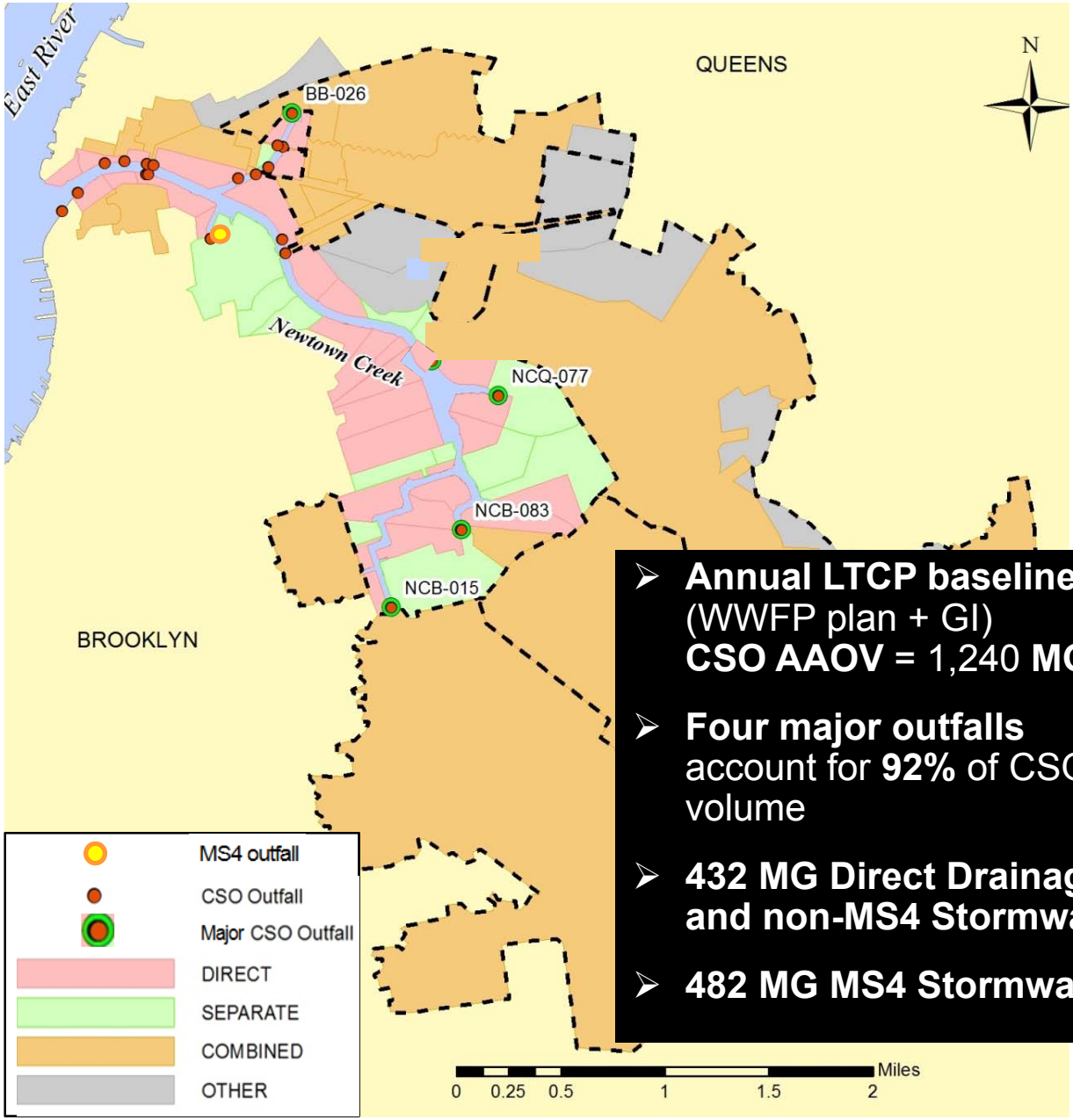


*Other Newtown Creek CSOs include: BB-009, BB-010, BB-011, BB-013, BB-040, BB-042, NCB-019, NCB-022, NCQ-029
Note: LTCP modeling is currently active and ongoing; any updated model results will be shared at the Alternatives Meeting

Newtown Creek CSO Volume

Bowery Bay WWTP (LL Interceptor)		
Outfall	**Volume (MG)**	**Freq.**
BB-009	49	35
BB-010	1	7
BB-011	2	14
BB-013	17	32
BB-026	***141***	***39***
BB-040	1	7
BB-042	2	23
Sub-Total	**213**	**39**

Newtown Creek WWTP		
Outfall	**Volume (MG)**	**Freq.**
NCB-015	***356***	***30***
NCB-019	7	31
NCB-022	8	29
NCQ-029	21	42
NCQ-077	***327***	***41***
NCB-083	***314***	***42***
Sub-Total	**1033**	**42**



- **Annual LTCP baseline** (WWFP plan + GI) **CSO AAOV** = 1,240 **MG**.
- **Four major outfalls** account for **92%** of CSO volume
- **432 MG Direct Drainage and non-MS4 Stormwater**
- **482 MG MS4 Stormwater**

Note: LTCP modeling is currently active and ongoing; any updated model results will be shared at the Alternatives Meeting

6 CSO Control Preliminary Alternatives

Newtown Creek Alternatives Toolbox

INCREASING COMPLEXITY

INCREASING COST

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

Completed or underway

Newtown Creek: LTCP Delivery Schedule

Task	Completion Date	2017 January	February	March	April	May	June
DATA COLLECTION							
Data Spreadsheet and Presentation	Jan 2017						
Data Collection Memo	Feb 2017						
MODELING							
WQ Bacteria Model Calibration	Feb 2017						
WQ Bacteria Baseline and Performance Gap	Feb 2017						
Sediment Transport DO Model Calibration	Mar 2017						
DO Basline and Performance Gap	Mar 2017						
IW & WQ Modeling for Retained Alternatives	Mar 2017						
IW & WQ Modeling for LTCP Recommendation	Jun 2017						
ALTERNATIVES DEVELOPMENT							
Alternatives Evaluation & DEP Review Meetings	Mar 2017						
DEP Selects Retained Alternatives	Mar 2017						
Evaluation of Retained Alternatives	Apr 2017						
DEP Selects LTCP Recommendations	May 2017						
PUBLIC OUTREACH							
Public Data & Modeling Meeting	Mar 2017						
Public Alternatives Meeting	Apr 2017						
LTCP DEVELOPMENT							
Draft LTCP Sections	Apr 2017						
DEP Review of LTCP Sections	May 2017						
Submit FINAL Newtown Creek LTCP to DEC	06/30/2017						

2/21 Public Data Meeting

April 2017 Public Alternatives Review Meeting

Conclusions/Next Steps

- Newtown Creek is a CSO-impacted waterbody
- The LTCP will likely propose a significant grey infrastructure project
- See you in Spring when we present the CSO control alternatives