Bronx River
Combined Sewer Overflow
Long Term Control Plan

Public Meeting #2
Review of Alternatives

Casita Maria Center for Arts and Education
May 7, 2015
Welcome & Introductions

Eric Landau
Associate Commissioner
DEP
LTCP Process and Public Involvement

- Existing Information Review
- Data Collection & Analysis
- Modeling
- Alternatives Development & Evaluation
- LTCP
- DEC Review

- Kickoff Meeting 2/12/15
- Alternatives Meeting TODAY
- Final Plan Review Meeting TBD

OGOING PUBLIC/STAKEHOLDER INPUT

- Bronx Borough President Meeting 1/22/15
- Data Review Meeting River Keeper & Bronx River Alliance 2/9/15
- Community Board 2 4/1/15
- Alternatives Review Meeting River Keeper & Bronx River Alliance 5/5/15
- LTCP Due 6/30/15
Bronx River Alliance:

- Bronx River has enjoyed steady improvements and has an active constituency of users, making water quality a priority for this waterbody.

Public Comments:

- Control CSOs and address upstream issues.
- Making river safe for primary contact is a long-term goal.
- Consider alternatives that make the river safe for primary contact throughout the entire year and as soon as possible after a rain event.
Bronx River Sections

Freshwater Section

Tidal Section
Freshwater Section – Current Uses

- **Boat Access Points**
  - (Contains kayak/canoe launch site)
  - 1. 219th Street (Shoelace Park)
  - 2. Forth Knox
  - 3. Kazmiroff Blvd

- **Portages**
  - (Re-access points to get around river obstructions)
  - A. Stone Mill – Botanical Garden
  - B. Twin Dams – Bronx Zoo
  - C. River Park Dam
Parks & Boat Access Points
(Contains kayak/canoe launch site)

- 4 West Farms Rapids
- 5 Starlight Park
- 6 Concrete Plant Park
- 7 Hunts Point Riverside Park
- 8 Soundview Park

Upcoming Development

- Hunts Point Vision Plan
Sampling and Modeling

Jim Mueller, P.E.
Assistant Commissioner
DEP
Annual Wet-Weather Discharge Volume:
- ~1,950 MGal (*typical year*)
  - ~26% CSO
  - ~74% Direct Drainage and Stormwater

Fresh Water Section:
- No CSO Outfalls
- 6 MS4 Outfalls (〇)
- Primarily direct drainage

Tidal Section:
- 5 CSO Outfalls (▲)
- No MS4 Outfalls

<table>
<thead>
<tr>
<th></th>
<th>NYC</th>
<th>Westchester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage Area (Acres)</td>
<td>4,318</td>
<td>23,020</td>
</tr>
<tr>
<td>Served by Combined Sewers</td>
<td>64%</td>
<td>N/A</td>
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</tbody>
</table>
Bronx River Classifications

**CLASS C**
Bathing/Fishing
Westchester

**CLASS B**
Bathing
New York City

**CLASS I**
Boating/Fishing
New York City

E. Tremont Ave
Focusing only on the **New York City portion of the Bronx River**:

<table>
<thead>
<tr>
<th>Section</th>
<th>Class</th>
<th>Dissolved Oxygen (mg/L)</th>
<th>Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fecal Coliform (col/100 mL)</td>
</tr>
<tr>
<td><strong>Freshwater</strong></td>
<td>Class B</td>
<td>never less than 4.0 daily average &gt; 5.0</td>
<td>≤ 200 (Monthly GM)</td>
</tr>
<tr>
<td>NORTH of E. Tremont Ave.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tidal</strong></td>
<td>Class I</td>
<td>≥ 4.0</td>
<td>≤ 2,000* (Monthly GM)</td>
</tr>
<tr>
<td>SOUTH of E. Tremont Ave.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* New DEC proposed rulemaking for primary contact criteria for Class I and Class SD of ≤ 200 col/100 mL for Fecal Coliform.
LTCP Sampling:
- **Outfall Pipe**
  - 2 CSO (HP-007 & HP-009)
  - 2 Stormwater (HP-608, HP-627)
- **Bronx River**
  - 10 Locations (1100+ analyses)
    - BR0 in Westchester County
    - BR1 at County line
    - BR2 - BR9 in NYC

Citizen Sampling:
- **Bronx River**
  - 3 Locations Near:
    - Botanical Gardens
    - Soundview Starlight Park
    - Hunts Point Riverside Park
# Fecal Coliform Sampling Results - GMs

## May 17th, 2014 to July 17th, 2014

### Freshwater

<table>
<thead>
<tr>
<th>BR0</th>
<th>BR1</th>
<th>BR2</th>
<th>BR3</th>
<th>BR4</th>
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</thead>
<tbody>
<tr>
<td>701</td>
<td>672</td>
<td>489</td>
<td>262</td>
<td>159</td>
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</table>

### Tidal

<table>
<thead>
<tr>
<th>BR5</th>
<th>BR6</th>
<th>BR7</th>
<th>BR8</th>
<th>BR9</th>
</tr>
</thead>
<tbody>
<tr>
<td>223</td>
<td>157</td>
<td>38</td>
<td>38</td>
<td>5</td>
</tr>
</tbody>
</table>

**Geometric Mean**

**Fecal Coliform (#/100 ml)**

**LTCP - Wet**

**LTCP - Dry**

---

*BR0 county line bi-weekly sampling conducted outside LTCP sampling timeframe (7/25/2014 to 10/24/2014).**
Enterococci Sampling Results

May 17th, 2014 to July 17th, 2014

Freshwater

Tidal

Geometric Mean Enterococci (#/100 ml)

LTCP - Wet
LTCP - Dry

*BR0 county line bi-weekly sampling conducted outside LTCP sampling timeframe (7/25/2014 to 10/24/2014).

County line bi-weekly sampling conducted outside LTCP sampling timeframe (7/25/2014 to 10/24/2014).

May 17th, 2014 to July 17th, 2014

Freshwater

Tidal

Geometric Mean Enterococci (#/100 ml)

LTCP - Wet
LTCP - Dry

*BR0 county line bi-weekly sampling conducted outside LTCP sampling timeframe (7/25/2014 to 10/24/2014).
DO Sampling Results – Averages

**May 17th, 2014 to July 17th, 2014**

- **Freshwater**
- **Tidal**

### Sampling Locations

- **BR0**
- **BR1**
- **BR2**
- **BR3**
- **BR4**
- **BR5**
- **BR6**
- **BR7**
- **BR8**
- **BR9**

*BR0* county line bi-weekly sampling conducted outside LTCP sampling timeframe (7/25/2014 to 10/24/2014). No DO samples were collected.

### Dissolved Oxygen, mg/L

- **LTCP-Wet**
- **LTCP-Dry**

#### Freshwater

- May 17th, 2014 to July 17th, 2014

#### Tidal

- May 17th, 2014 to July 17th, 2014

**Averages**

- **Freshwater (mg/L):** 6.94, 7.04, 7.01, 7.75, 7.40, 7.69
- **Tidal (mg/L):** 6.01, 6.42, 6.34
WQ Attainment Summary

Based on Model Results:

**No difference in annual attainment between Baseline and 100% CSO Control***.

- **All 100%** Seasonal Fecal
  (Monthly GM ≤ 200 col/100 ml)

- **83% to 100%** Annual Fecal
  (Monthly GM ≤ 200 col/100 ml)

- **61% to 100%** Annual Enterococcus
  (30-d rolling GM ≤ 30 col/100 ml)

- **93% to 100%** Dissolved Oxygen
  (Never less than 4.0 mg/L)
  (Daily Average > 5.0 mg/L)

*Range based on results across 9 sampling locations (BR1 to BR9).

Assumptions:

- Westchester County flows are in attainment
- 2008 rainfall year
Water Quality Improvement Projects
Green and Grey Infrastructure

Mikelle Adgate
Project Manager
DEP

Jim Mueller, P.E.
Assistant Commissioner
DEP
**GI Projects in Bronx River Watershed**

**Built Green Infrastructure:**
- 23 bioswales and 8 stormwater greenstreets constructed to date in HP-008 and HP-009
- Bronx River Houses - NYCHA
- Shoelace Park - DPR

**Planned Projects:**
- **Area-Wide Contracts:**
  - Design will begin in HP-002, HP-004 and HP-007 in 2015
- **Partnership with TPL/SCA/DOE:**
  - P.S. 129 (in construction)
- **Partnership with DPR:**
  - Watson Gleason Playground
- **GI Grant Program:**
  - ~$1 M renovation of a Bronx Zoo parking lot with rain gardens and porous paving
Grey Infrastructure Installed in Bronx River

- **Floatables Control**
  - **In-Line Netting Facilities**: at CSO Outfalls HP-004 & HP-009
  - **Mechanical Screens**: at Regulators CSO27 & 27A
  - **Floatables Boom**: by Concrete Park
    - CY2014: Bronx River had 415 cubic yard of floatables removed. Significant amount of tree branches.

- Construction Cost ~ $47M
- Completed in June 2012
Additional CSO Reduction Alternatives Evaluation

Jim Mueller, P.E.
Assistant Commissioner
DEP
Modeled Bronx River CSO Volumes

CSO Discharge Volume (MGY)

Pre-WWFP

LTCP Baseline w/ GI

Approx. 10% Reduction

HP-004 HP-007 HP-008 HP-009
Alternatives Overview

- Evaluate Alternatives for Bronx River Outfalls:
  - HP-009
  - HP-007
  - HP-008
  - HP-004

- Evaluate Floatables Control for East River Outfall:
  - HP-011

Alternatives developed based on combinations of different technology options at target outfalls
HP-011 Bending Weir and Baffle

- 4-ft bending weir and baffle at Regulator 5
- Raise weir at Regulator 13
- Relief pipe between Regulator 13 and Bronx River siphon
HP-007 Hydraulic Relief

- 5-ft diameter relief pipe
- 2,700 linear feet
- Connect to existing combined sewer
HP-007 Disinfection

- Hypochlorite Dosing at Relief Structure 27A
- Disinfection in 10 x 8 ft. Outfall Conduit
- Disinfection in 9.25 x 8 ft. Combined Sewer
- Diversion structure with tide gates
- 1,900 LF 9ft. diameter conduit with dewatering pumping
- RTB Contact Tank Sized for 75% Control
- New Outfall
100% Capture of CSO from outfalls HP-004, HP-007, HP-008 and HP-009:

- **61 MG Tunnel**
  - 31-ft Diameter
  - 11,100 Linear Feet
  - 30.5 MGD Dewatering Pump Station
Alternatives developed based on combinations of different technology options at target outfalls:

<table>
<thead>
<tr>
<th>Alt. #</th>
<th>HP-011</th>
<th>HP-009</th>
<th>HP-007</th>
<th>HP-008</th>
<th>HP-004</th>
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<tbody>
<tr>
<td>1</td>
<td>Bending Weir &amp; Baffle</td>
<td>+Hydraulic Relief</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>Bending Weir &amp; Baffle</td>
<td>+Hydraulic Relief</td>
<td>+Hydraulic Relief</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>Bending Weir &amp; Baffle</td>
<td>+Hydraulic Relief</td>
<td>+Disinfection</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>Bending Weir &amp; Baffle</td>
<td>+Outfall Conduit</td>
<td>+Disinfection</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>Bending Weir &amp; Baffle</td>
<td>+RTB Contact</td>
<td>+Disinfection</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>Bending Weir &amp; Baffle</td>
<td>+Tunnel</td>
<td>+Tunnel</td>
<td>+Tunnel</td>
<td>+Tunnel</td>
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</table>
### Time to Recover

<table>
<thead>
<tr>
<th>Station</th>
<th>Baseline</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
<th>Alt. 4</th>
<th>Alt. 5</th>
<th>Alt. 6</th>
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<tbody>
<tr>
<td>BR5</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
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<td>BR6</td>
<td>23</td>
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<td>23</td>
<td>22</td>
<td>19</td>
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<td>15</td>
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<td>BR7</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>18</td>
<td>14</td>
<td>14</td>
<td>13</td>
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<tr>
<td>BR8</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>12</td>
<td>11</td>
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<td>BR9</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>2</td>
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Based on August 15, 2008 Storm, using JFK rainfall
<table>
<thead>
<tr>
<th>Alt. #</th>
<th>Technology Combinations</th>
<th>Total CSO Volume (MGY)</th>
<th>% CSO Volume Disinfected</th>
<th>%CSO Volume Reduction</th>
<th>%Bacteria Load Reduction</th>
<th>Total NPV Cost ($ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LTCP Baseline with GI</td>
<td>455</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief</td>
<td>295</td>
<td>--</td>
<td>35%</td>
<td>35% Seasonal 35% Annual</td>
<td>$41</td>
</tr>
<tr>
<td>2</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief HP-007: Hydraulic Relief</td>
<td>286</td>
<td>--</td>
<td>37%</td>
<td>37% Seasonal 37% Annual</td>
<td>$111</td>
</tr>
<tr>
<td>3</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief HP-007: Disinfection</td>
<td>295</td>
<td>9%</td>
<td>35%</td>
<td>66% Seasonal 40% Annual*</td>
<td>$65</td>
</tr>
<tr>
<td>4</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Outfall Conduit Disinfection HP-007: Disinfection</td>
<td>437</td>
<td>43%</td>
<td>4%</td>
<td>74% Seasonal 45% Annual*</td>
<td>$153</td>
</tr>
<tr>
<td>5</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: RTB Tank Disinfection HP-007: Disinfection</td>
<td>437</td>
<td>43%</td>
<td>4%</td>
<td>74% Seasonal 45% Annual*</td>
<td>$85</td>
</tr>
<tr>
<td>6</td>
<td>HP-011: Bending Weir &amp; Baffle HP-004/007/008/009: Tunnel</td>
<td>--</td>
<td>--</td>
<td>100%</td>
<td>100% Annual</td>
<td>$701</td>
</tr>
</tbody>
</table>

*Annual bacteria load reduction based on no disinfection in non-recreational season.
## Summary of Cost Breakdown

<table>
<thead>
<tr>
<th>Alt. #</th>
<th>Technology Combinations</th>
<th>Capital Cost</th>
<th>Annual O&amp;M</th>
<th>Total NPV Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief</td>
<td>$40.7 M</td>
<td>$53 K / year</td>
<td>$41 M</td>
</tr>
<tr>
<td>2</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief HP-007: Hydraulic Relief</td>
<td>$110.7 M</td>
<td>$53 K / year</td>
<td>$111 M</td>
</tr>
<tr>
<td>3</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Hydraulic Relief HP-007: Disinfection</td>
<td>$59.8 M</td>
<td>$381 K / year</td>
<td>$65 M</td>
</tr>
<tr>
<td>4</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: Outfall Conduit Disinfection HP-007: Disinfection</td>
<td>$143.8 M</td>
<td>$701 K / year</td>
<td>$153 M</td>
</tr>
<tr>
<td>5</td>
<td>HP-011: Bending Weir &amp; Baffle HP-009: RTB Tank Disinfection HP-007: Disinfection</td>
<td>$75.6 M</td>
<td>$701 K / year</td>
<td>$86 M</td>
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<tr>
<td>6</td>
<td>HP-011: Bending Weir &amp; Baffle HP-004/007/008/009: Tunnel HP-004/007/008/009: Tunnel</td>
<td>$660.7 M</td>
<td>$2.75 M / year</td>
<td>$701 M</td>
</tr>
</tbody>
</table>
Next Steps

- LTCP Submittal to NYSDEC by June 30, 2015

- Bronx River LTCP Public Meeting # 3, TBD
  - Present and review proposed LTCP

- Comments can also 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](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
Discussion and Q&A Session