Combined Sewer Overflow
Long Term Control Plans

Citywide Public Meeting
December 11, 2014
Agenda

1. New York City Wastewater Infrastructure
2. Long Term Control Plan (LTCP)
3. Green Infrastructure Program
4. Questions and Comments
New York City
Wastewater Infrastructure

Emily Lloyd
Commissioner
DEP
NYC’s sewer system is approximately 60% **combined**, which means it is used to convey both sanitary and storm flows.

When the sewer system is at full capacity, a diluted mixture of rain water and sewage can be released into local waterways. This is called a combined sewer overflow (CSO).

65% to 90% CSOs are fully captured at treatment plants.
Major Historical Timeline for Wastewater Infrastructure

**Clean Water Act** 1972

**CSO Order** 1992

**CSO Consent Order** 2005

**Modified CSO Consent Order** 2012

- **1967**: Newtown Creek WWTP Commissioned
- **1972**: Spring Creek CSO Facility Commissioned

- **$40 Billion**
  - OMB Records & 10-yr Capital Plan
  - **1973 – 2011**
  - Upgraded 12 WWTPs to **Secondary Treatment** and built 2 new WWTPs

- **$34 Million**
  - 2004 NYCDEP’s CSO White Paper
  - **1995 – 2005**
  - Implemented **Citywide Floatables Program**

- **$4.2 Billion**
  - OMB Records & 10-yr Capital Plan
  - **1995 – 2030**
  - Construct **Grey / Green Infrastructure** to Mitigate CSOs

- **$1.1 Billion**
  - OMB Records & 10-yr Capital Plan
  - **1999 – 2020**
  - Upgrade **Biological Nitrogen Removal** at 70% of WWTPs

**AC = Alley Creek**

CSO = Combined Sewer Overflow

**FC = Flushing Creek**

LTCP = Long Term Control Plan

OMB = Office of Management and Budget

WWFP = Waterbody / Watershed Facility Plan

WWTPs = Wastewater Treatment Plants

SOGR = State of Good Repair

2005 – 2011: Develop **WWFPs**

2013 – 2017: Develop **LTCPs**
NYC CSO Reductions

CSO Capture:
Current = 79%\(^1\)
Future Estimate = 82%\(^2\)

2) 2030 LTCP Baseline Scenario for Grey & Green Infrastructure Estimate
Fecal Bacteria Improvements

Data from Harbor Survey Program
Long Term Control Plan (LTCP) identifies appropriate CSO controls to achieve applicable water quality standards consistent with the Federal CSO Policy and Clean Water Act.
• From FY 2002 to FY 2014, $15.9 Billion (61%) of capital commitments were mandated. ($9.9 billion was spent on Harbor Water Quality Improvements alone)

Capital Commitments
(in billions)

Total Commitments: $26 Billion

Mandated
Non-Mandated
The primary source of funding for DEP’s capital projects is the issuance of tax-exempt debt by the New York City Municipal Water Finance Authority.

From FY 2002 to FY 2014, capital expenditures that were funded by debt issuance totaled $25.5 Billion, and debt service rose by 142% from $629 Million to $1.5 Billion per year.

DEP is currently preparing a new, proposed Ten Year Capital Plan; if projects are added, the projected capital commitments and expenditures graphed below will increase.

Capital Improvement Program amounts are as reported in the New York City Municipal Water Finance Authority Fiscal 2015 Series EE Official Statement.
NYC Income Levels and Poverty Rates

### 2013 MHI

<table>
<thead>
<tr>
<th>Region</th>
<th>2013 MHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>$52,250</td>
</tr>
<tr>
<td>NYC</td>
<td>$52,223</td>
</tr>
<tr>
<td>Bronx</td>
<td>$33,009</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>$47,520</td>
</tr>
<tr>
<td>Manhattan</td>
<td>$72,190</td>
</tr>
<tr>
<td>Queens</td>
<td>$56,599</td>
</tr>
<tr>
<td>Staten Island</td>
<td>$69,633</td>
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</tbody>
</table>

### % of individuals living below federal poverty level (2013)

<table>
<thead>
<tr>
<th>Region</th>
<th>% Below Poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>15.8%</td>
</tr>
<tr>
<td>NYC</td>
<td>20.9%</td>
</tr>
<tr>
<td>Bronx</td>
<td>30.9%</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>23.3%</td>
</tr>
<tr>
<td>Manhattan</td>
<td>18.9%</td>
</tr>
<tr>
<td>Queens</td>
<td>15.3%</td>
</tr>
<tr>
<td>Staten Island</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

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

  - ~ 21% of NYC population (> 1.7 million people) lives below the federal poverty level
  - ~ 19% of elderly population lives in poverty
• DEP has partnered with the Human Resources Administration (HRA), which administers the Federal Home Energy Assistance Program (HEAP), to provide assistance to low income households.

• More than 12,500 homeowners have received a credit of $115.89.
Avg. Wastewater Bill Compared to HH Income

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

Jim Mueller, P.E.
Assistant Commissioner
DEP
### Waterbody Classifications

- **SA** – Shellfish
- **SB** – Bathing
- **SC** – Bathing / Fishing
- **I** – Boating / Fishing
- **SD** – Fish Survival

### New York State Saline Surface Water Quality Standards

<table>
<thead>
<tr>
<th>Class</th>
<th>Bacteria (when disinfection is practiced)</th>
<th>Dissolved Oxygen (acute, never less than)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Coliform</td>
<td>Fecal Coliform</td>
</tr>
<tr>
<td><strong>SA</strong></td>
<td>Median ≤ 70 MPN 100 ml</td>
<td>-</td>
</tr>
<tr>
<td><strong>SB</strong></td>
<td>Monthly Median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml</td>
<td>Monthly GM ≤ 200/100 ml</td>
</tr>
<tr>
<td><strong>SC</strong></td>
<td>Monthly Median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml</td>
<td>Monthly GM ≤ 200/100 ml</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Monthly GM ≤ 10,00/100 ml</td>
<td>Monthly GM ≤ 2,000/100 ml</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>-</td>
<td>-</td>
</tr>
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</table>

*Applicable to coastal waters. Does not apply to tributaries.*
What is a CSO Consent Order?

CSO Consent Order

an agreement that settles past legal disputes without prolonged litigation

requires DEP to develop LTCPs and mitigate CSOs
Builds upon success of 2005 CSO Consent Order

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

**1995 – 2013:**
- 4 CSO Storage Tanks (118 MG)
- Pumping Station Expansion (+60 MGD)
- Wet Weather Maximization (Tallman Island)
- Dredging (Paerdegat & Hendrix Creek)
- Floatables Control (Bronx & Gowanus)
- Aeration (English Kills)

**2015 – 2020:**
- Aeration (Newtown Creek)
- Regulator Modifications (Westchester Creek, Newtown Creek, Jamaica Tributaries)
- Sewer Work (Pugsley Creek, Fresh Creek HLSS, Belt Pkwy Crossing, & Flushing Bay Low Lying Sewers)
- Plant Wet Weather Stabilization
- Dredging (Flushing Bay)

**Costs:**
- ~ $2 Billion incurred to date
- ~ $700 Million future capital
### LTCP Submittal Dates

<table>
<thead>
<tr>
<th>CSO Watershed</th>
<th>LTCP Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alley Creek</td>
<td>Submitted to DEC June 2014</td>
</tr>
<tr>
<td>Westchester Creek</td>
<td>Submitted to DEC June 2014</td>
</tr>
<tr>
<td>Hutchinson River</td>
<td>Submitted to DEC September 2014</td>
</tr>
<tr>
<td>Flushing Creek</td>
<td>December 2014</td>
</tr>
<tr>
<td>Bronx River</td>
<td>June 2015</td>
</tr>
<tr>
<td>Gowanus Canal</td>
<td>June 2015</td>
</tr>
<tr>
<td>Jamaica Tributaries &amp; Bay</td>
<td>June 2016</td>
</tr>
<tr>
<td>Coney Island</td>
<td>June 2016</td>
</tr>
<tr>
<td>Flushing Bay</td>
<td>June 2017</td>
</tr>
<tr>
<td>Newtown Creek</td>
<td>June 2017</td>
</tr>
<tr>
<td>Citywide*</td>
<td>December 2017</td>
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*The Citywide LTCP shall include the East River and Open Waters.*
LTCP Process
LTCP Process and Public Involvement

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

- Kickoff Meeting
- Alternatives Meeting
- Final Plan Review Meeting

ONGOING PUBLIC/STAKEHOLDER INPUT
Model Inputs & Assumptions

- Plants at 2XDDWF capacity
- Grey infrastructure from approved WWFPs (Appendix A of 2012 ACO)
- Current phase of GI implementation shown in Slide 38
- Post-cleaning sediment

5-year Moving Average

Standard for WWFP (JFK 1988 40.6 inches)

Recent Typical (JFK 2008 – 46.3 inches)

2002-2011 10-year Water Quality Period
LTCP CSO Volume Baseline:

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

Water Quality Projection Assumptions:

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

2XDDWF = 2 times design dry weather flow
1. Bacteria Source Component Analysis
   - CSO, stormwater and direct drainage

2. Gap Analysis for Water Quality Standard Attainment
   - Calculate bacteria and dissolved oxygen for baseline conditions
   - Calculate bacteria and dissolved oxygen for 100% control conditions

3. Matching CSO Scenarios to CSO Engineering Control Alternatives

   Increasing CSO Reduction
   - 100% Storage
   - 75% Treatment
   - 50% System Optimization
   - 25% Source Control
**Traditional CSO Mitigation Toolbox**

<table>
<thead>
<tr>
<th>INCREASING COMPLEXITY</th>
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</thead>
<tbody>
<tr>
<td><strong>System Optimization</strong></td>
</tr>
<tr>
<td>Regulator Modifications</td>
</tr>
<tr>
<td><strong>CSO Relocation</strong></td>
</tr>
<tr>
<td>Gravity Flow Tipping to Other WWTPs</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>Sewer Cleaning Maximize Flow to the WWTP</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
</tr>
<tr>
<td>In-System</td>
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</tbody>
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**INCREASING COST**
LTCP Submittal Status
Alley Creek LTCP

- Submitted to DEC June 2014

- LTCP Under DEC Review:
  - Pilot Study
  - Recreational Season Disinfection Facility at the Existing CSO Facility:
    - Recreational season (May 1st – October 31st)
    - 99% bacteria kill
    - Cost $11.3M

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

- Submitted to DEC June 2014

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

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

- Submitted to DEC September 2014

- LTCP Under DEC Review:
  - Recreational Season Disinfection of 50 MGD of CSO in a 1,200 foot long, 10 foot diameter pipe, including a new outfall to the river:
    - Construction cost $90M
    - Annual O&M cost $1.25M
    - Disinfection during recreational season only (May 1st – October 31st)

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

To be Submitted to DEC
December 2014

LTCP will recommend:

- Recreational Season Disinfection of existing CSO Facility, TI-010 and TI-011 outfalls
  - Construction cost ~$15M
  - Annual O&M cost $450K
  - Disinfection during recreational season only (May 1st – October 31st)
Upcoming LTCP Submittals

- **Bronx River**
  - June 2015

- **Gowanus Canal**
  - June 2015

2015
Upcoming LTCP Submittals

2016

- Coney Island Creek
  June 2016

- Jamaica Bay
  June 2016

2017

- Flushing Bay
  June 2017

- Newtown Creek
  June 2017

- Citywide
  December 2017
Green Infrastructure Program Update

Angela Licata
Deputy Commissioner
DEP
# GI Milestones and Program Focuses

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<tr>
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<tbody>
<tr>
<td>1.5%</td>
<td>4%</td>
<td>7%</td>
<td>10%</td>
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## Heavy ROW Focus
- Inter-agency partnerships, GI standards, Area-wide approach for design, construction & maintenance

<table>
<thead>
<tr>
<th>2016-2020</th>
<th>2021-2025</th>
<th>2026-2030</th>
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<tbody>
<tr>
<td>Continuing ROW</td>
<td>Remaining ROW</td>
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## Early Projects/Establish Onsite Program
- Develop MOUs with partner agencies, create design guidelines, site analysis, design/construct projects with NYCHA and DOE

<table>
<thead>
<tr>
<th>2016-2020</th>
<th>2021-2025</th>
<th>2026-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Onsite implementation</td>
<td>Continued Onsite implementation</td>
<td>All work continuing until 10% target is reached</td>
</tr>
</tbody>
</table>

- Further design and construction, create design standards for onsite GI practices

## Planning/Analysis for additional GI tools
- Pilot construction and monitoring

<table>
<thead>
<tr>
<th>2016-2020</th>
<th>2021-2025</th>
<th>2026-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardize additional GI tools</td>
<td>Continued implementation of innovative designs and GI tools</td>
<td></td>
</tr>
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## Innovative design and development

<table>
<thead>
<tr>
<th>2016-2020</th>
<th>2021-2025</th>
<th>2026-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further development of new tools</td>
<td></td>
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</tr>
</tbody>
</table>

- R&D Program

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- 2016 Performance Metrics Report
- 2017 Citywide LTCP
DEP and agency partners currently have **19 active construction contracts.** Each contract consists of approx. 150-200 ROWBs at a time.
Public Onsite Retrofit Projects

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

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

Green Infrastructure Grant Program

29 active projects; Fall 2014 application closed November 13, 2014.
Maintenance of Green Infrastructure

ROW Maintenance:

• DEP funds 3 DPR crews to maintain sites in the ROW on a weekly or bi-weekly schedule.

• Future Maintenance Plans – new hires being planned now for near term; approximately 125 jobs for the ROW maintenance to be available.

Onsite Maintenance:

• Individual maintenance agreements with each partnering agency.
### Neighborhood-Scale Demo Monitoring Results

<table>
<thead>
<tr>
<th></th>
<th>Demo Area 1</th>
<th>Demo Area 2</th>
<th>Demo Area 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Tributary Drainage Area</td>
<td>24.1 ac</td>
<td>22.7 ac</td>
<td>19.3 ac</td>
</tr>
<tr>
<td>Impervious Cover*</td>
<td>81%</td>
<td>92%</td>
<td>92%</td>
</tr>
<tr>
<td>Design Managed Area for 1 inch Rainfall (% of Impervious Tributary Drainage Area*)</td>
<td>1.2 ac (6.1%)</td>
<td>2.5 ac (12.0%)**</td>
<td>0.9 ac (5.1%)***</td>
</tr>
<tr>
<td>Measured Managed Area for 1 inch Rainfall (% of Impervious Tributary Drainage Area*)</td>
<td>3.5 ac (17.9%)</td>
<td>3.9 ac (18.7%)</td>
<td>0.9 ac (5.1%)</td>
</tr>
<tr>
<td>Measured Managed Volume for 1 inch Rainfall</td>
<td>12,700 ft³</td>
<td>14,300 ft³</td>
<td>3,200 ft³</td>
</tr>
<tr>
<td>% Managed Area for 1 inch Runoff from Impervious Area* across all three Demo Areas</td>
<td>14.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

Angela Licata
Deputy Commissioner
DEP
LTCP Public Participation

Eric Landau
Associate Commissioner
DEP
Public Participation

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

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

Communication Tools:
- Program Website
- Social Media
- Advisories & Notifications
Next Steps

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

- Comments can be submitted at any information station or sent to:
  - New York City DEP at: [ltcp@dep.nyc.gov](mailto:ltcp@dep.nyc.gov)
Questions and Comments?