2019 Green Infrastructure Annual Report

Public Webinar

August 18, 2020
Welcome

Pinar Balci, Ph.D.
Assistant Commissioner
Bureau of Environmental Planning & Analysis
Program Overview

Melissa Enoch
Acting Managing Director
Green Infrastructure Planning & Partnerships
NYC Green Infrastructure Program

Right-of-Way (Sidewalks and Roadways)

Public Onsite

Private Property
NYC Green Infrastructure Program

Program Budget

- Capital
  - Over $800M encumbered
  - $850M budgeted over the next 10 years

- Expense
  - Over $20M expended
<table>
<thead>
<tr>
<th>Watershed</th>
<th>Total Green Infrastructure Assets(^1)</th>
<th>Total Greened Acres(^1)</th>
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<tbody>
<tr>
<td>Alley Creek</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Bronx River</td>
<td>472</td>
<td>59</td>
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<tr>
<td>Coney Island Creek</td>
<td>2</td>
<td>1</td>
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<tr>
<td>East River/Open Waters</td>
<td>884</td>
<td>195</td>
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<td>Flushing Bay</td>
<td>764</td>
<td>78</td>
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<td>Flushing Creek</td>
<td>1,654</td>
<td>165</td>
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<tr>
<td>Gowanus Canal</td>
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<td>13</td>
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<td>Hutchinson River</td>
<td>213</td>
<td>42</td>
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<tr>
<td>Jamaica Bay &amp; Tributaries</td>
<td>4,224</td>
<td>514</td>
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<tr>
<td>Newtown Creek</td>
<td>1,476</td>
<td>141</td>
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<td>Westchester Creek</td>
<td>226</td>
<td>21</td>
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<td><strong>Total(^2)</strong></td>
<td><strong>10,032</strong></td>
<td><strong>1,230</strong></td>
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\(^1\) Includes assets constructed and in construction in 2020

\(^2\) Sum may not add up to total due to rounding
Citywide Implementation – Program Area Comparison

- **1,003 GAs** within streets and sidewalks (Right-of-way)
- **88 GAs** tracked as a result of stormwater regulations (Private Regulated)
- **76 GAs** on publicly owned properties (Public Onsite)
- **38 GAs** tracked as externally funded and non-regulated projects (External)
- **25 GAs** through incentives to private property owners (Private Incentivized)

**1,230 Greened Acres (GAs)**
Right-of-Way Implementation

Andres Garcia
Accountable Manager
Right-of-way Green Infrastructure Design & Construction
Right-of-Way Implementation – Areawide Approach

- Watershed-based areawide planning
  - Focus on Priority CSO Tributary Areas and East River/Open Waters confined tributaries
  - CSO Tributary Areas (sewersheds) selection based on:
    - Annual CSO volume
    - Frequency of CSO events
    - Outfalls that may be affected by Waterbody/Watershed Facility Plans or other system improvements in the future
    - Outfalls in close proximity to existing and future public access locations
Right-of-Way Implementation – Areawide Approach

- Direct resources to defined areas
- Analyze all potential right-of-way opportunities
- Saturate these areas with green infrastructure as much as possible
- Achieve efficiencies in design and construction through standardization
Right-of-Way Implementation – Design and Construction

**Design** Each stage has set protocols/procedures and submittal requirements

- Desktop analysis
- Walkthroughs
- Geotechnical investigation

- Survey
- Design development
- Other agency & utility coordination

- Construction documents

**Construction**

- Packages of 100-300 assets
- Standard specifications

**Program partners**

- **Department of Design and Construction (DDC)**
  - Initial program planning and implementation support
  - Implementation of design and construction contracts

- **Economic Development Corporation (EDC)**
  - Implementation of design and construction contracts

- **Department of Parks and Recreation (DPR)**
  - Initial program planning and implementation support
  - Street tree planting

- **Department of Transportation (DOT)**
  - Initial program planning and implementation support
  - Siting in the right-of-way
  - Street construction coordination
In Construction

- 23 construction contracts bid across Westchester Creek, Bronx River, Newtown Creek, Flushing Creek and Jamaica Bay watersheds
- Over 9,000 ROW green infrastructure practices constructed or in construction

In Design

- Additional areawide design contracts in progress in:
  - Coney Island Creek (CI-005)
  - East River/Open Waters (TI-003, TI-023)
  - Jamaica Bay (OH-015)
New and enhanced design standards to reflect field conditions and feedback from the community are finalized and online.

**Standard Rain Garden (Bioswale)**
- Wider inlet apron
- Standardized inlet and outlet openings
- Sediment capture ring behind inlet
- Concrete strip in place of stone strip
- New planting plans

**Rain Gardens with Type D inlet**
- Inlet allows greater capture for higher intensity storms and high slope streets
- Standard DEP catch basin grate
- Modified soil and planting plan
- Flat surface with topsoil

**Infiltration Basins**
- Concrete or grass top to match existing sidewalk conditions
- Inlet apron slope dependent on sidewalk curb reveal
- Design improvements to inlet basin features for easier maintenance
- Relocation of inlet and removal of outlet
Construction Management (CM)

- Launched new CM team
- Developed CM inspector checklist and testing protocols
- Continuous construction oversight throughout COVID-19 pandemic
- Testing of new infiltration basins upon construction completion is showing higher than anticipated stormwater capture

ROW GI Enforcement

- Amendments made to sewer use rules to allow DEP to take action against certain damages inflicted against ROW GI
- Updated DOT street opening permit stipulations with new GI types and protection requirements
- In communication with DOB for construction on buildings impacting ROW GI

Utility Coordination

- Held 7 training seminars with utility contractors
- Rolled out informational materials on proper ROW green infrastructure protection measures
Right-of-way Implementation – Informational Signage

- To be placed on select rain garden tree guards
- Incorporating into active construction contracts
Public Property Implementation

Paul Wojtal
Section Manager
Onsite Green Infrastructure Design & Construction
Public Onsite Implementation – Program Approach

**DEP-led Citywide Retrofits**
- DPR
- Department of Education (DOE), School Construction Authority (SCA)
- NYC Housing Authority (NYCHA)

**Opportunistic DEP Retrofits**
- NYC Fire Department (FDNY)
- NYC Police Department (NYPD)
- DDC

**Agency Projects**
- DDC
- Department of Housing Preservation and Development (HPD)
- DPR
- SCA

**Strategic Partnerships**
- Community Parks Initiative
- Trust for Public Land

Hunts Point Playground, Bronx
Public Onsite Implementation – 2019 Achievements

Design
- 2019 Public Onsite Design Manual helped streamline and expedite new designs
- Nearing design completion on over 70 parks and housing sites

Construction
- Construction completed at 5 Trust for Public Land and 9 Community Parks Initiative sites
- Initiated construction at 16 schools through DOE DSF JOC
- Construction initiation pending at 37 parks and housing sites through EDC

<table>
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<tr>
<th>Project Status</th>
<th>Parks/Playgrounds</th>
<th>Public Schools</th>
<th>NYCHA Housing</th>
<th>Other Public</th>
<th>Total</th>
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<tr>
<td>In Construction/Constructed</td>
<td>39</td>
<td>32</td>
<td>5</td>
<td>1</td>
<td>77</td>
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<tr>
<td>In Design</td>
<td>97</td>
<td>48</td>
<td>28</td>
<td>1</td>
<td>174</td>
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<td>Potential</td>
<td>81</td>
<td>94</td>
<td>27</td>
<td>14</td>
<td>216</td>
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<tr>
<td>Total</td>
<td>217</td>
<td>174</td>
<td>60</td>
<td>16</td>
<td>467</td>
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On-site Design Manual

- Standardize the approach to on-site green infrastructure design

- Specific requirements for the tasks, procedures, and deliverables may vary by Owner Agency

- Guide designers through the phases of the design process
  - Design guidance and requirements
  - Site analysis and feasibility
  - Design submittals and reviews
  - Post-design
The Trust for Public Land

Coordination
• Schoolyards to Playgrounds

Portfolio of sites
• Completed: 24
• In Construction: 2
• In Design: 33

TPL Green Infrastructure Playground at P.S. 221Q, Before (Left) and After (Right)
Other Public Property Implementation – New Opportunities

- Tibbetts Brook and Van Cortlandt Lake Improvements
- Stormwater Recovery and Reuse
- Cloudburst Pilots
- Large Capture Medians
Private Property Implementation

Ashita Mehta
Project Manager
Green Infrastructure Planning and Partnerships
Private Property Implementation – Program Approach

DEP-led Incentives
• Green roof retrofits
• Private incentive retrofits

Other Incentives
• Green Roof Tax Abatement
• Agency incentives

Stormwater Regulations
• 2012 Stormwater Performance Standard
• MS4 Construction/Post-Construction Program

Other City Requirements
• Local Laws 92/94 of 2019

NYU Langone Alumni Hall Green Roof, Manhattan
Private Property Implementation – Incentives

Green Infrastructure Grant Program
• More than $13 million committed to date to 30 private property owners
• Streamlined program for green roof retrofits only
• 6 projects pending construction

Community Stormwater Grants (Under Development)
• Funding categories under consideration for community groups:
  o Construction
  o Maintenance
  o Assessment of ROW green infrastructure
  o Educational outreach
Private Property Implementation – Incentives

**Private Incentives Retrofit Contract**
- Contract pending registration
- Program targets properties 50,000 SF or larger
- Early adopters list generated including institutions and other privately owned large properties
- Goal: 200 Greened Acres in 5 years

**Other Agency Incentives**
- Partnerships with agencies to integrate green infrastructure into projects receiving incentives or scoring criteria

**Green Roof Tax Abatement**
- Renewed NYS legislature in 2019
- $5.23 per SF available, up to $15 SF in designated community districts (TBD)
GI Program Supporting and Related Initiatives

Miki Urisaka
Section Manager
Green Infrastructure Research & Development
Right-of-way
• Staffing: full-time and seasonal

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<td>1st</td>
<td>23</td>
<td>25</td>
<td>62</td>
<td>103</td>
<td>104</td>
<td></td>
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</table>

• Additional facilities
• Stewardship
  o Developed stewardship manual and other promotional materials
  o 25 stewards trained
  o 305 volunteer hours provided

Public Onsite
• Schools, parks, other public projects: property owner or partnership
• NYCHA: DEP maintained

Private
• Property owner must prepare maintenance plans
• DEP inspections
Supporting Initiatives – Adaptive Management

Feedback loop
- Get input from designers, maintenance staff, other cities, etc
- Ongoing effort to improve design, construction methods, and maintenance approach

Research and Development Program
- $10 million comprehensive research and development program
- Findings from 2019 monitoring and modeling work
  - Additional stormwater capture may be realized by modifying outlet design and soil grading to maximize ponding depth
  - Urban trees may provide stormwater management through bark storage
- Developed post-construction performance inspection protocols
Supporting Initiatives – Permeable Pavement Pilots

Permeable Pavement Pilots

• Flushing Bay
  o Porous concrete panels, constructed 2018
  o Data analysis in progress

• Hutchinson River
  o Porous concrete panels and permeable pavers, constructed 2019
  o Data collection in progress

• Newtown Creek
  o Porous asphalt, in construction
  o Data collection in progress
Supporting Initiatives – Public Outreach

Continuing Outreach

- Participated in or conducted over 30 meetings with the public, elected officials, community boards and civic associations
- Improved direct outreach to one and two family homeowners, managed rain garden hotline and email box
- Green Infrastructure Grant Program workshops

311 and general email for anyone to inquire about or submit report

Informational Signage on rain gardens

Public Online Map

- Continues to be regularly updated
- Additional projects to be reflected in map
Related Initiatives

Southeast Queens Projects

MS4 Permit - Stormwater Management Program Plan

Ecological Restoration

Parking Lot Stormwater Fee Pilot

Jamaica Bay LTCP Recommended Plan

NY Rising
Looking Ahead

Melissa Enoch
Acting Managing Director
Green Infrastructure Planning & Partnerships
Looking Ahead

2020 Contingency Plan
ROW GI Enforcement
Maintenance and Workforce Development RFI
Public Onsite Construction

Private Incentive Program Launch
Green/Solar Hybrid Rooftop Systems
Unified SW Rule and “new” NYC Design Manual
Stormwater Resiliency Plan
Looking Ahead – Proposed Stormwater Rule Amendments

Intro No. 1851

- DEP is seeking to expand MS4 Construction/Post-Construction Program to the Combined Sewer System areas of the city
- City Council hearing August 14

Unified Stormwater Rule

- Rule amendments to align regulations across the city and provide greater onsite stormwater management and infiltration requirements
- New NYC Stormwater Design Manual
- Release Fall 2020

Unified Stormwater Rule Briefings

- Fall 2020

Infiltration
Description: water is captured and infiltrated into the underlying soils, which is sometimes referred to as infiltration.
Design: relies on sufficient permeability rates of underlying soils. Practices do not have underdrains that outlet water.
Example: Bioretention system, no underdrain

Evapotranspiration
Description: Water is captured and evaporated or transpired back into the atmosphere.
Design: relies on ET occurring between rainfall events. Practices are usually shallow and have no outlet or ability to infiltrate.
Example: Green roof

Reuse
Description: Water is captured and reused for non-irrigation purposes.
Design: relies on continuous reuse of water. Practices can be integrated into existing non-potable and non-contact water uses.
Example: Reuse in cooling tower

Filtration
Description: Water passes through a filtration media to remove various pollutants.
Design: relies on steady flow of water through the filtration media. Practices are usually outfitted with an underdrain to support filtration.
Example: Sand filter

Detention
Description: Water is temporarily stored and released at a lower flow rate.
Notes: Relies on ability to control outlet flow rate. Practices usually have a low flow orifice and means to bypass large events.
Example: Detention tank

Filtration + Detention
Description: Water passes through a filtration media to remove pollutants and is then restricted by the underdrain system.
Design: relies on both steady flow of water and ability to control outlet flow rate. Practices require special design considerations.
Example: Bioretention with controlled release underdrain
### Proposed Stormwater Rule Amendments

#### Looking Ahead

#### Primary Goal: Retention

**Vegetated Retention**
- Bioretention
- Rain Garden
- Green Roof
- Tree Planting / preservation
- Stormwater planter
- Grass filter strip

**Vegetated Detention**
- Bioretention
- Rain Garden
- Green Roof
- Stormwater planter

#### Secondary Goal: Green surface

**Nonvegetated Retention**
- Dry well
- Synthetic turf field
- Porous pavements
- Stone trench
- Subsurface chambers/ pipes

**Nonvegetated Detention**
- Synthetic turf field
- Porous pavements
- Stone trench
- Pond
- Subsurface chambers/ pipes
- Blue roof
- Detention tank

#### Separated Sewer Area GI Hierarchy

**Vegetated Filtration**
- Bioretention
- Rain Garden
- Green Roof
- Stormwater planter
- Wetland (Detention)

**Nonvegetated Filtration**
- Synthetic turf field
- Porous pavements
- Stone trench
- Sand filter
- Organic filter
- Pond (Detention)

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*Combined Sewer Area GI Hierarchy from New NYC Stormwater Design Manual

*Separate Sewer Area GI Hierarchy from New NYC Stormwater Design Manual*
Links

2019 GI Annual Report (pdf)

Online GI Public Map (ArcGIS Online map)
http://www.nyc.gov/dep/gimap

Latest ROW GI Standards (pdf)

Public Onsite Design Manual (pdf)

General Questions:
RainGardens@dep.nyc.gov