NYC GREEN INFRASTRUCTURE

2017 Annual Report







NYC Environmental Protection

COVER PHOTOS: (TOP) TPL PLAYGROUND AND TURF FIELD AT C.S. 300, BRONX; (MIDDLE AND BOTTOM) ROW RAIN GARDENS, BROOKLYN



TPL GROUNDBREAKING CEREMONY AT P.S. 33, MANHATTAN

Dear Friends:

I am pleased to share the 2017 Green Infrastructure Annual Report. Green infrastructure plays a key role in New York City's stormwater solution and is part of DEP's broader commitment to improve harbor water quality citywide. Beyond managing stormwater, green infrastructure provides many environmental and social co-benefits, including improving air quality, providing jobs in construction and maintenance, and increasing green space across the City.

In 2017, DEP gained ground toward our goals by managing 586 million gallons of stormwater per year and 467 equivalent greened acres through green infrastructure projects. DEP worked to broaden the focus of the Green Infrastructure Program from primarily right-of-way (ROW) to public property and private property green infrastructure. Our efforts on strategic planning, growing interagency partnerships, and developing innovative incentive programs has yielded new contracts and professional services that will carry the Program through this next phase.

This year's report unveils an updated and unified visual and graphic branding for DEP's green infrastructure program. Going forward, New Yorkers will easily be able to identify the specific green infrastructure efforts undertaken by DEP, from curbside rain gardens, to green schoolyards, to grants for private installations.

In addition, DEP continues to build on past successes and seek innovative methods of managing stormwater. These innovations include cloudburst projects that use infrastructure and public land to reduce flooding during large rain events, and wetland projects, which create biodiversity hotspots that filter stormwater and provide resiliency benefits.

DEP remains mindful of the financial impacts of our projects and investments on our ratepayers, and pursues cost effective green infrastructure methods. I encourage you to learn more about our exciting initiatives in this report.

Finally, DEP would like to acknowledge that this program would not be possible without the support of our partners at the Department of Transportation, Department of Design and Construction, Economic Development Corporation, Department of Parks and Recreation, Department of Education, School Construction Authority, New York City Housing Authority, Trust for Public Land, and other city agencies and non-profit organizations.

Sincerely,

Vincent Sapienza, P.E.



RAIN GARDEN IN VAN ALST PLAYGROUND, COMMUNITY PARKS INITIATIVE, QUEENS

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TPL GREEN INFRASTRUCTURE PLAYGROUND AT P.S. 154, MANHATTAN

Hi!

DEP is excited to present our 2017 Green Infrastructure Annual Report. The Annual Report provides an update on the NYC Green Infrastructure Program (or the "Program") including all of the Program's achievements and advancements through 2017 and outlines the highlights for 2018. Previous Annual Reports and the Green Infrastructure Plan can be found on DEP's website here.

Installing green infrastructure is a win-win-win for New York. While the primary goal of the Program is to reduce combined sewer overflows (CSO) into New York Harbor, the distributed projects also provide community and environmental benefits to New York neighborhoods and residents in a cost-effective way. These "co-benefits" include increased urban greening, urban heat island reduction, and more habitat for birds and pollinators around the City.

By retrofitting NYC's streets, sidewalks and other public property, and incentivizing retrofits on private property, DEP is well on its way toward the 2030 CSO reduction goal of 1.67 billion gallons of stormwater a year. As reported in past years, DEP has successfully installed thousands of right-of-way (ROW) rain gardens and other green infrastructure practices in Priority CSO Tributary Areas through "area-wide" contracts. And thousands more green infrastructure practices are in planning, design, and construction phases.

The Program staff do more than just design and build projects, they also perform all of the maintenance of constructed green infrastructure in the ROW, conduct research and development on green infrastructure, engage elected officials and civic stakeholders, track all green infrastructure projects, and lead planning, mapping and data management efforts.

Speaking of data, in 2017, DEP advanced the critical project tracking tool called GreenHUB. GreenHUB went live last summer and is now the key to tracking green infrastructure at both the project (or property) level and at the individual asset level, and includes all related asset attributes such as geographic location, cubic feet of stormwater managed, soil classification and permeability data, year constructed, and other data. GreenHUB allows DEP staff to conduct various analyses, queries, mapping, reporting, and other critical functions as the number of assets exponentially grows.

As of early 2018, the Program has committed approximately $480 million in capital funds since fiscal year 2012, and has approximately $1 billion currently budgeted through fiscal year 2028 (see Exhibit A). These future funds are earmarked for ongoing design, construction, and construction management work, which are primarily undertaken by DEP, the Economic Development Corporation (EDC) and the Department of Design and Construction (DDC) for the ROW program, but also includes our partnership work with the Department of Parks and Recreation (DPR), the Department of Education (DOE), and the New York City Housing Authority (NYCHA) as well as other city agencies such as the New York Police Department (NYPD), the New York Fire Department (FDNY), the Housing, Preservation and Development (HPD) agency, and public libraries.

Throughout 2017, DEP staff engaged over a thousand people on the Program at various neighborhood association meetings, classroom activities, private grant program workshops, groundbreaking ceremonies, and public tours (see Exhibit B). This outreach is critical to the success of the Program and also includes hundreds of correspondences and phone conversations with residents and local organizations.

DEP has big things planned for 2018, as we seek new opportunities to improve parks, schools, sidewalks and other public spaces with green infrastructure, and work with private property owners to install even more green infrastructure. The work accomplished in 2017 laid the foundation for the next phases of the Program.

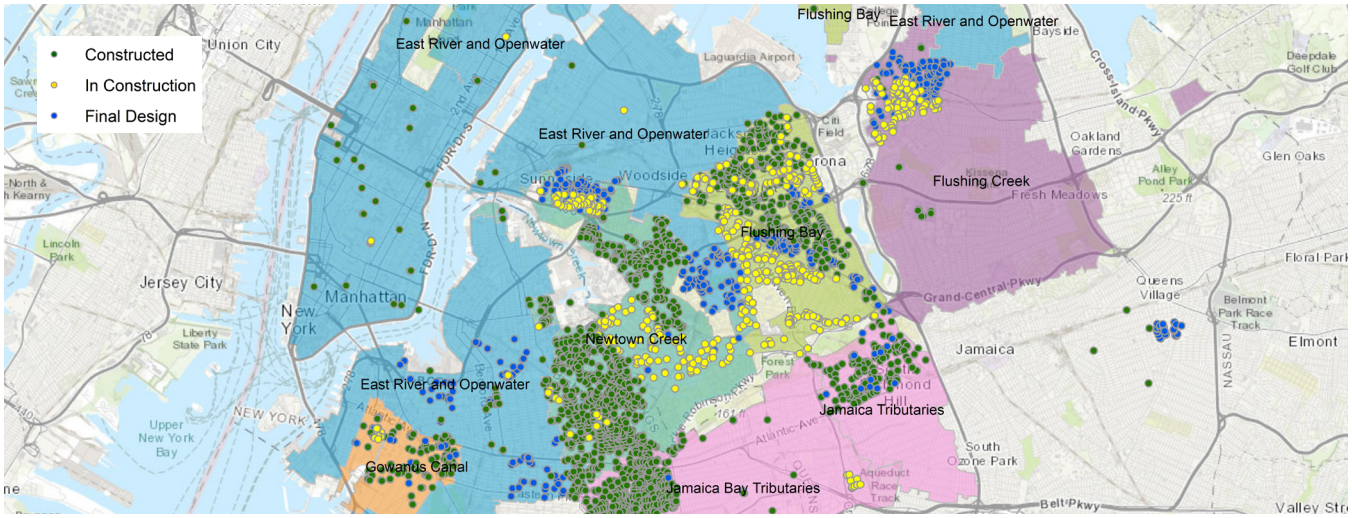
PROGRAM HIGHLIGHTS

467
Greened Acres from 2010-2017

140-180
Projected Additional Greened Acres in 2018

4,320
Total Green Infrastructure Assets

VIEW A MAP OF ALL GREEN INFRASTRUCTURE LOCATIONS AT NYC.GOV/DEP/GIMAP



IMPLEMENTATION UPDATE


ROW RAIN GARDENS, BROOKLYN

ROW GREEN INFRASTRUCTURE

The public right-of-way (ROW) includes sidewalks, parking lanes, medians, and roadway. It makes up approximately 30% of the impervious cover in the City, which generates a lot of stormwater runoff during rain events. In 2012, DEP launched area-wide green infrastructure projects, in partnership with DOT, and has achieved the vast majority of stormwater management through the installation of rain gardens (formerly called bioswales). All of the initial priority CSO area-wide projects are either constructed, in construction, or in advanced design phases. In addition, DEP selected a few East River/Open Waters CSO tributary areas to build ROW green infrastructure based on public access or other water quality considerations. By and large, this effort has been a tremendous success and has greened many neighborhoods across the City.

In 2017, the ROW program initiated construction in the western Queens tributary to Newtown Creek, in northern Queens tributary to Flushing Creek, and in southern Queens tributary to Jamaica Bay/Bergen Basin. In addition, there are several design contracts completing work in the Westchester Creek and Jamaica Bay watersheds that are anticipated to go into construction in 2018/2019.

Detailed descriptions of the area-wide implementation strategy and the design and construction processes are described in previous Annual Reports. Photos of ROW green infrastructure construction can be found on DEP's website.

DEP has constructed over 4,000 rain gardens across the City.

PUBLIC PROPERTY RETROFITS

DEP and its City agency partners continued green infrastructure project design development on almost 200 publicly owned properties in 2017. In addition, constructed projects included several green infrastructure schoolyards with the Trust for Public Land (TPL) and playgrounds with DPR's Community Parks Initiative (CPI).

DEP also works closely with DDC's Public Buildings Unit in order to facilitate retrofits with their client city agencies. This partnership has yielded a green roof on the Windsor Terrace Public Library in Brooklyn in 2017, with several more projects in development, such as a green roof at the new Greenpoint Public Library, a rain garden and green roof in design development for a renovation of a Taxi and Limousine Commission property in Queens, and several renovated parking lots with the NYPD.

DEP acknowledges these agencies for sharing our mission and for their willingness to take on more work by facilitating the design and construction of public property retrofits. In the next several years, these partnership projects will deliver real improvements to New York City's schools, parks, housing, and other city-owned property as well as improve water quality in the City.

In the Watershed Section of this report, individual sites in the pipeline for each watershed are listed. Photos of constructed projects can be seen here.

TABLE 1: PUBLIC PROPERTY RETROFITS BY PROJECT STATUS

Project Status*	Parks/Playgrounds	Public Schools	NYCHA Housing	Total
Constructed	33	12	3	48
In Construction	22	0	2	24
In Design	16	13	1	30
Schematic	29	6	1	36
Preliminary	48	51	28	127
Potential	146	130	33	309
Total	**294**	**212**	**68**	**574**

* Schematic: Geotechnical investigation accepted and project in schematic design.
Preliminary: Project site analysis complete and project in geotechnical investigation phase.
Potential: Interagency vetting complete, site analysis and investigation plan underway.



OUTDOOR CLASSROOM AND TURF POD, P.S. 154, TPL SCHOOLYARD, MANHATTAN



SOBRO VENTURE CENTER GREEN ROOF, GRANT PROJECT, BRONX

PRIVATE PROPERTY INITIATIVES

Green Infrastructure Grant Program

Since its introduction in 2011, the Green Infrastructure Grant Program has sought to strengthen public-private partnerships and public engagement in the design, construction and maintenance of green infrastructure on private property. To date, the Grant Program has committed more than $14.5 million to 35 private property owners to build green infrastructure projects.

Originally available only to properties in the combined sewer area, the Grant Program became city-wide in 2017. This change expands DEP's private property green infrastructure investments and will help the City in working toward its broader water quality goals. Last year, one project started construction and three others were completed.

Photos of constructed grant projects can be found on DEP's website.

Housing Preservation & Development Partnership

In 2017, DEP and NYC Housing Preservation & Development (HPD) worked together on a pilot to provide funding for green infrastructure at one new construction affordable housing project in the Bronx. See the 2018 Highlights Section for more information on this exciting new partnership.

Green Roof Tax Abatement

Administered by NYC Department of Finance with application review and approval by NYC Department of Buildings, the Green Roof Tax Abatement provides a one-time property tax abatement for properties that have green roofs. In 2017, the Green Roof Tax Abatement was $4.50 per square foot of green roof space and capped at the lesser of $100,000 or the amount of property taxes due for the building that tax year. The Green Roof Tax Abatement expired March 15, 2018. The table below provides a summary of the applications received and approved from 2011-2017.

TABLE 2: GREEN ROOF TAX ABATEMENT APPLICATIONS SUMMARY

Year	Submitted	Approved
2011	1	1
2012	4	4
2013	7	1
2014	16	7
2015	15	13
2016	17	2
2017	10	3
Total	**70**	**31**

2012 Stormwater Performance Standard

New development and redevelopment projects often require a sewer certification from DEP to certify new sewer connections or the adequacy of the existing sewer to receive flow from the development. Sewer certifications require either a Site Connection Proposal (SCP) or a House Connection Proposal (HCP). DEP tracks the number of new SCPs and HCPs submitted to the Agency that are affected by the 2012 Stormwater Performance Standard (or Stormwater Rule).[1] Since the rule took effect in July 2012, approximately 1,120 sites have been required to meet reduced stormwater release rates of 0.25 cubic feet per second or 10% of the allowable flow, whichever is greater. In 2017, 384 sites draining an area of 165 acres were affected by the Rule. Tables 3 and 4 present the breakdown of stormwater management types employed by applicants affected by the rule in 2017. These systems are primarily detention-based.

In Table 4, the Total Planned and Total Constructed totals are independent from one another. Certified HCPS and SCPs are valid for two years. Therefore, the planned connections may not have been constructed in the same year. Additionally, sites may have proposed more than one structure type. Constructed connections are those where DEP has permitted and inspected the installation of the certified sewer connection. DEP continues to work internally to collect this data for the purposes of crediting the stormwater managed from these private projects toward green infrastructure goals.

TABLES 3 AND 4: STORMWATER RULE SUMMARY

Table 3 - Certified SCPs/HCPs Affected by Stormwater Rule by Borough, 2017

Borough	# of HCPs/SCPs
Manhattan	88
Bronx	60
Brooklyn	149
Queens	79
Staten Island	8
Total	**384**
Contributing Drainage Area (acres)	**164.8**

Table 4 - SCP/HCP Sewer Connections Planned and Constructed by Structure Type

Structure Type*	Connections Planned			Connections Constructed**		
	Primary Structure	Other Structures	Total Planned	Primary Structure	Other Structures	Total Constructed
Bioswale	1	0	1	0	0	0
Blue Roof	118	32	150	46	23	69
Green Roof	0	0	0	0	0	0
Drywell	14	21	35	3	8	11
Perforated Pipe	2	0	2	2	0	2
Tank	187	6	193	93	5	98
Storm Chamber	5	0	5	3	0	3
Total	**327**	**59**	**386**	**108**	**36**	**183**

* Sites may have proposed more than one structure type.
** Constructed connections are those where DEP has permitted and inspected the installation of the certified sewer connection, and whatever structure was required pursuant to the approved SCP/HCP is assumed to have been installed/constructed.

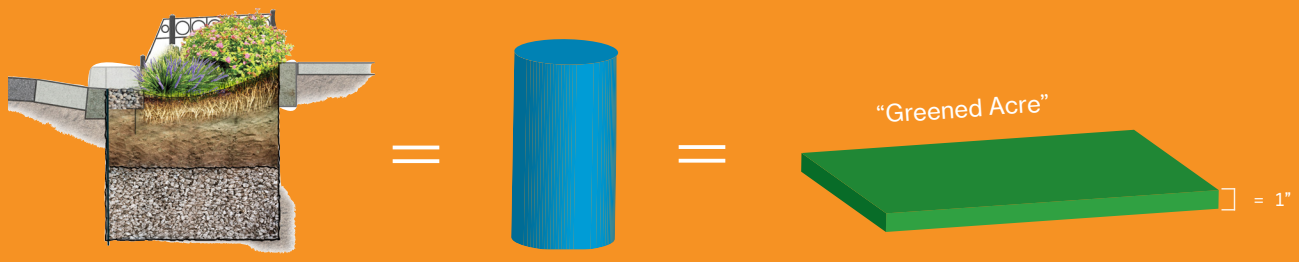
1 DEP's Stormwater Rule tracking does not include SCP/HCPs certified by the Department of Buildings (DOB); hence, the Stormwater Rule may affect additional sites. More information on the Rule is located here.

What is a "Greened Acre"?

Since 2011, DEP has reported and will continue to report on the equivalent impervious acres as outlined in the Consent Order between DEP and the Department of Environmental Conservation (DEC) for CSOs (CSO Order).[1] A "greened acre" is another way of saying "equivalent impervious acre" but it's easier to say and understand. It represents a volume of runoff managed by a green infrastructure practice. If you take that volume and spread it out evenly at a 1" depth over an impervious area – that area represents a "greened acre." Here are some questions we think our stakeholders might ask:

HOW DO YOU CALCULATE A "GREENED ACRE"?

Let's use a rain garden on the sidewalk as an example – a particular rain garden might hold 250 cubic feet of runoff. If you spread that volume over an area at 1" deep, its greened acres would be 3,000 square feet, or 0.07 greened acres (GA). Like many other U.S. cities, DEP starts with the water holding capacity of each green infrastructure practice and "backs out" the equivalent impervious area that would be managed if that volume was spread out 1" deep over an area.



ROW rain garden (section view)

250 CF Stormwater managed

Stormwater spread over 3,000 SF at 1" deep = 0.07 Greened Acres

WHY CHANGE THE TERMINOLOGY NOW?

DEC approved DEP's Performance Metrics Report (PMR) in the summer of 2017, thereby establishing the 2030 CSO volume reduction target for the Program. Because the PMR established a relationship between the green infrastructure projects to runoff reduction and actual CSO reduction, it's time to update and more accurately represent the metrics and targets in a volumetric unit. The "greened acre" metric is just that.

Additionally, updating the public and stormwater stakeholders on our CSO volume reduction progress will be much easier going forward. DEP works hard to measure the green infrastructure's performance, or the volume of stormwater managed, in all types of rain events. Ultimately, that performance data is used to assess CSO volume reductions. Rain events can vary in a typical year – some are short and intense, some are long with less than a few inches over many hours. These variations in precipitation affect the way the green infrastructure practices perform and also dictate how much runoff during that particular rain event will be managed and ultimately the resulting CSO volume reduction.

WILL THE GREEN INFRASTRUCTURE PROGRAM REPORTING CHANGE?

Fundamentally, no. DEP will continue to follow the CSO Order and report on greened acres, annual stormwater volume managed, and funding expended and budgeted (see Exhibit A) in each Annual Report. Additionally, at each milestone DEP will update the CSO volume reductions for all green infrastructure practices implemented by the milestone date. The next milestone is December 2020 and must be certified by June 30, 2021. Table 5 shows the greened acres and the total green infrastructure assets built and in construction through 2017.

1 (DEC # CO2-2000107-8, as modified).

TABLE 5: STORMWATER MANAGED AND GREENED ACRES BY WATERSHED

Watershed	2010-2016		2017		Total 2010 - 2017	
	Implemented		Implemented / In Construction[1]		Number of Assets	Greened Acres
	Number of Assets	Greened Acres	Number of Assets	Greened Acres		
Alley Creek	0	0	0	0	0	0
Bronx River	94	22	0	0	94	22
Coney Island Creek	0	0	0	0	0	0
Flushing Bay	959	105	165	16.26	1,124	121
Flushing Creek	140	13	2	1.80	142	15
Gowanus Canal	111	10	0	0	111	10
Hutchinson River	204	26	0	0.00	204	26
Jamaica Bay & Tributaries	1,081	93	0	0	1,081	93
Newtown Creek	1,156	99	285	29.30	1,441	128
Westchester Creek	2	0	0	0	2	0
Total[2] Watershed	**3,747**	**368**	**452**	**47**	**4,199**	**415**
East River / Open Waters	112	51	5	1.09	117	52
Total[2] Citywide[3]	**3,859**	**419**	**457**	**48**	**4,316**	**467**

1 Assets constructed or in construction in 2017.
2 Sum may not add up to total due to rounding.
3 Total Waterbodies plus ER/OW.

Watersheds by the Numbers

New this year, DEP is presenting the green infrastructure implementation and planning updates at a watershed level in order to show stakeholders the magnitude and scale of the work undertaken, underway, and planned in each of the City's watersheds to reduce CSOs and provide the co-benefits resulting from green infrastructure projects.

- **HOW DOES DEP IDENTIFY POTENTIAL PROJECTS WITHIN A WATERSHED?** The watershed maps illustrate DEP's area-wide approach to evaluating green infrastructure opportunities block-by-block and site-by-site in each watershed, starting with the Priority CSO watersheds. Once this area-wide survey is completed, DEP implements green infrastructure at each feasible location through ROW and public property retrofits, private property initiatives or other strategic partnerships. These maps also include green infrastructure and ecosystem restoration projects that DEP is undertaking in non-combined sewer areas as part of other City initiatives.

The 2010-2017 accomplishments provide a quick visual representation of all the work in each watershed that "rolls up" to the Program-wide information presented in Table 5. Each page also includes a list of all upcoming projects that DEP is working hard to bring to reality. The result is a comprehensive, watershed-by-watershed snapshot of DEP's current and projected Program.

No matter which watershed, all of the green infrastructure assets that are constructed, in construction, and planned are tracked and counted. Each asset we build contributes to the overarching goals of the Program to reduce CSO volume and provide co-benefits for New Yorkers. DEP expects to achieve 1.67 billion gallons of CSO volume reduction per year by 2030.

PROGRESS TOWARD 1.67 BILLION GALLONS PER YEAR OF CSO REDUCTION

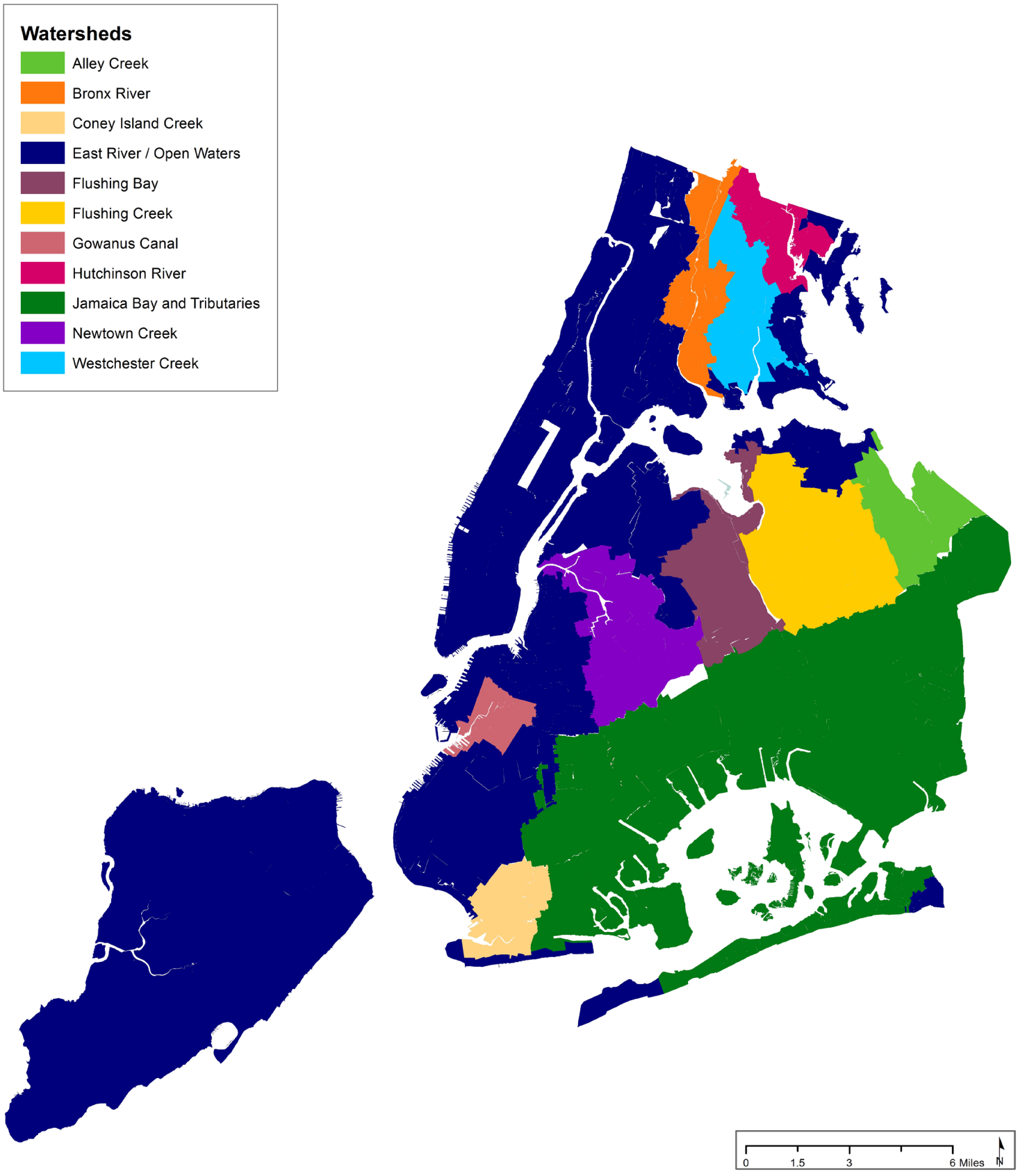
As of 2017, the Program has reduced approximately **200 million gallons of CSO volume per year**. This is a **HUGE** achievement! The green infrastructure assets implemented so far are working to improve New York Harbor and we have a lot more coming (see the Watershed maps on the following pages).

DEP's Performance Metrics Report (PMR) submitted on June 30, 2016 to DEC and approved July 5, 2017, showed 507 million gallons a year (MGY) of CSO reductions for the 2015 target, primarily from retention practices. The projects included in the 507 MGY reduction are still underway and are part of the 2015 Contingency Plan (see Exhibit C) that was also approved by DEC July 5, 2017. DEP is on track to complete those projects by 2020.

Through the PMR, DEP also projected a reduction of 1.67 billion gallons a year (BGY) by 2030 by using green infrastructure retention and detention practices.

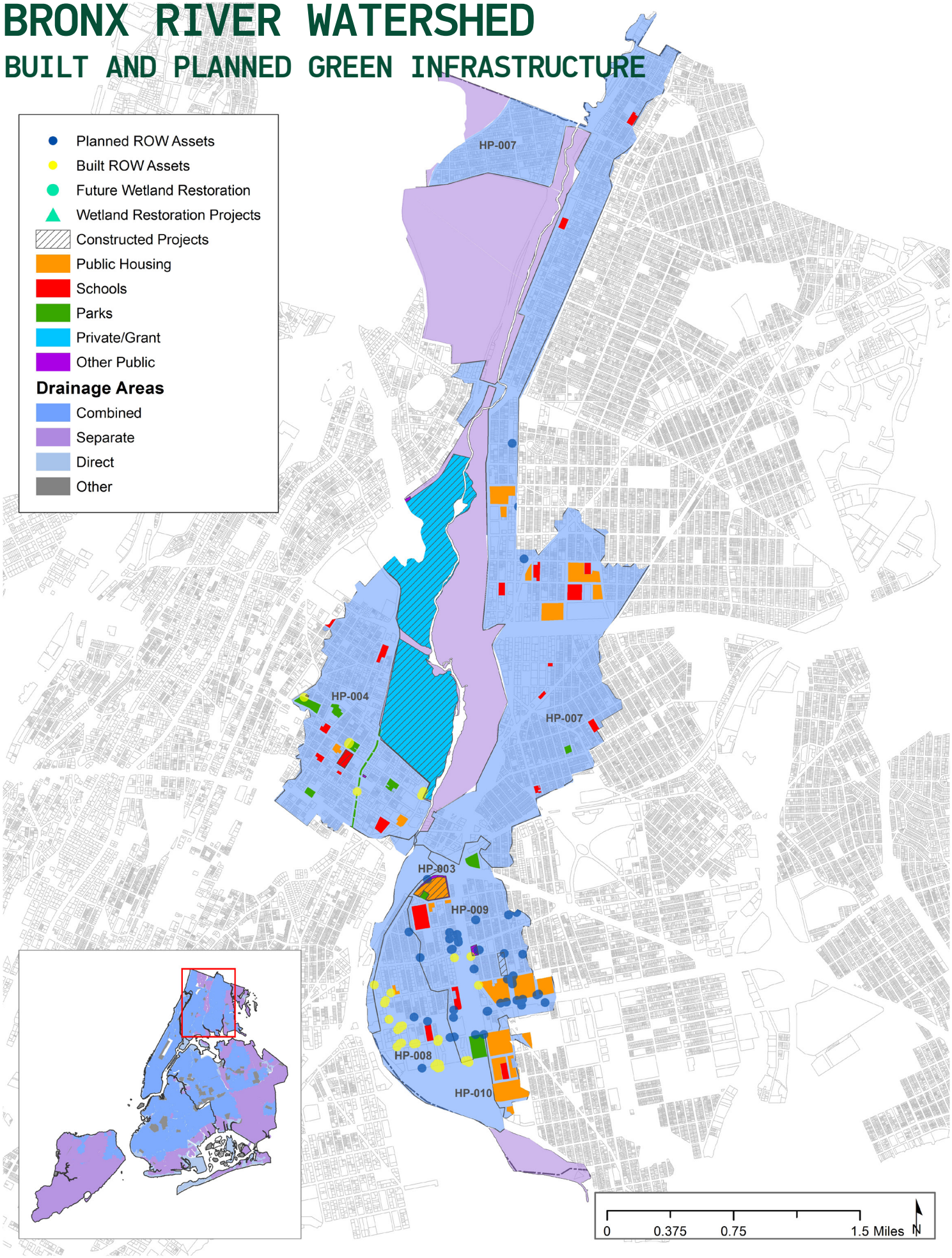
- **THIS SOUNDS GREAT BUT WHAT DOES IT MEAN EXACTLY?** It means that all of the green infrastructure we build can manage enough stormwater in a typical year to reduce the volume of CSO being discharged into the harbor. The more green infrastructure we build, and the more volume the green infrastructure can capture results in greater capacity for the sewer and wastewater system, and thereby can reduce CSO volume and frequency.
- **WHEN WILL THE CSO REDUCTIONS BE UPDATED?** We will update the modeling to recalculate the CSO reduction for the additional projects for the 2020 milestone.
- **WILL DEP MEET THE 2020 MILESTONE?** Over the last seven years, DEP has learned through experience that the original Green Infrastructure Plan (2010) implementation schedule was too ambitious. Although DEP has made significant progress and continues to design and build green infrastructure, we are expecting to submit a contingency plan for the 2020 target (due in June 30, 2021). Which projects that plan will include are still being determined, but some of them are included in the upcoming projects lists in the following watershed maps.

WATERSHED MAP KEY



BRONX RIVER WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



BRONX RIVER WATERSHED

2010-2017 ACCOMPLISHMENTS

28.3M

Annual Gallons of Stormwater Managed*

22

Equivalent Greened Acres

94

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- NYCHA
- Bronx Zoo - GI Grant

UPCOMING PROJECTS**

AREA-WIDE ROW

- HP-004
- HP-007

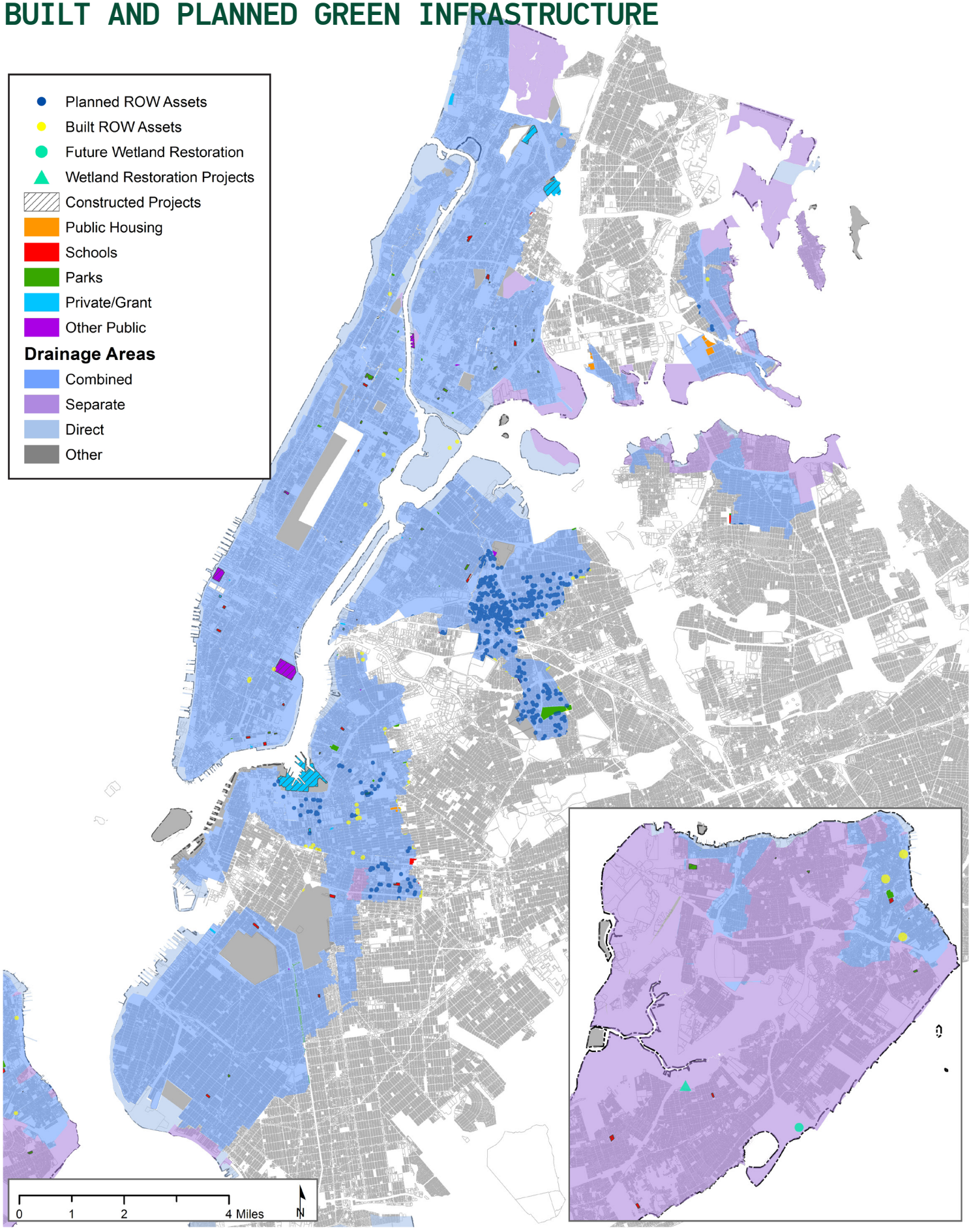
PUBLIC

- Belmont Playground
- Matthews Muliner Playground
- Ciccarone Park
- Fairmount Playground
- Vidalia Park
- Grace H. Dodge Voc H.S. X
- Bronx H.S. for the Visual Arts
- Christopher Columbus H.S. Campus
- I.S. 135 X
- P.S. 103 X
- P.S. 83 X
- P.S. 89 X
- P.S. 38 K (TPL)
- Boston Road Plaza
- Murphy Houses
- Parkside Houses
- Pelham Parkway
- Twin Parks East
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

EAST RIVER / OPEN WATERS

BUILT AND PLANNED GREEN INFRASTRUCTURE



EAST RIVER / OPEN WATERS

2010-2017 ACCOMPLISHMENTS

65.2M

Annual Gallons of Stormwater Managed**

52

Equivalent Greened Acres

117

Assets Built and Planned

PARTNERSHIPS*

- DOT
- DPR
- DOE
- NYCHA

UPCOMING PROJECTS***

AREA-WIDE ROW

- NCB-013, Wallabout Creek
- NCB-014, Wallabout Creek
- HP-002, Barretto Cove
- BB-005, Bowery Bay

PUBLIC

- Barretto Park
- Martin Luther King Jr. Playground
- Roosevelt I Houses
- M.S. 366 X
- P.S. 12 Q
- P.S. 384/216 K
- P.S. 71 K (TPL)
- P.S. 33 M (TPL)
- M.S. 354 K (TPL)
- P.S. 184 / 137 M (TPL)
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

PRIVATE

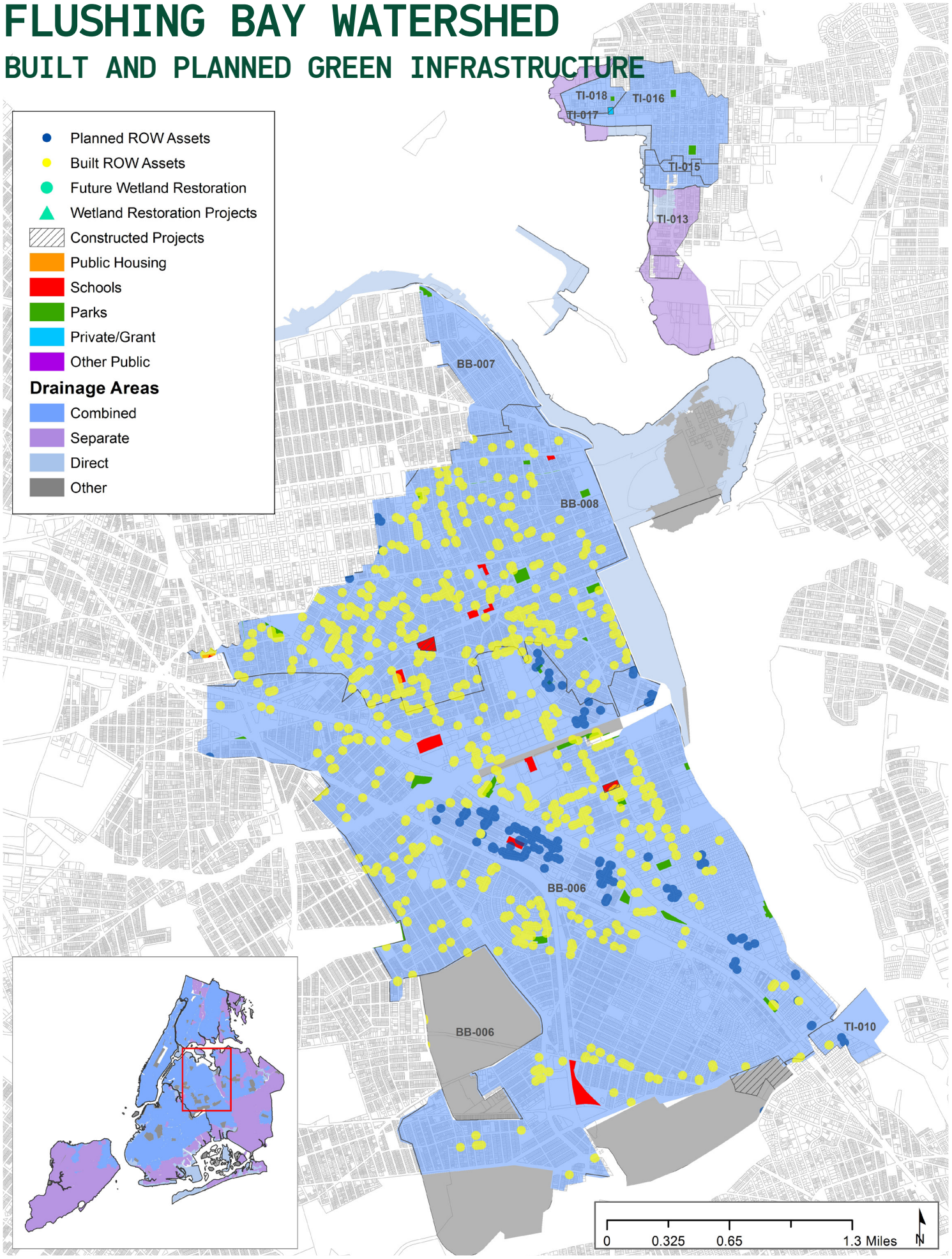
- Two Bridges Neighborhood Council
- Sugar Hill Cooperative
- Salmar Building – Sunset Park
- Bedford Stuyvesant Restoration
- Citylights
- Hayden on the Hudson
- Lafayette Development LLC
- Montefiore (Moses)

* Additional partnerships: GI Grant, New York Botanical Garden, Brooklyn Navy Yard, Bishop Loughlin Memorial High School, Forest House – Blue Sea Development, Lafayette Development LLC, Montefiore Medical Center, NYU Langone Medical Center, Paradise on Earth Garden/New York Restoration Project, Osborne Association, UA Local 1 – Plumbers Union, SoBRO (EBP), St. Luke and St. Matthew, Brooklyn (EBP), The New School (EBP), ATCO Properties – GI Grant (EBP), Ballet Tech – GI Grant (EBP), Banana Kelly – GI Grant (EBP).

** Based on 46.25" of annual rainfall.
*** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

FLUSHING BAY WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



FLUSHING BAY WATERSHED

2010-2017 ACCOMPLISHMENTS

152.1M

Annual Gallons of Stormwater Managed*

121

Equivalent Greened Acres

1,124

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- Poppenhusen Institute – GI Grant Program

UPCOMING PROJECTS**

AREA-WIDE ROW

- Permeable Pavement Pilot Project - LL80

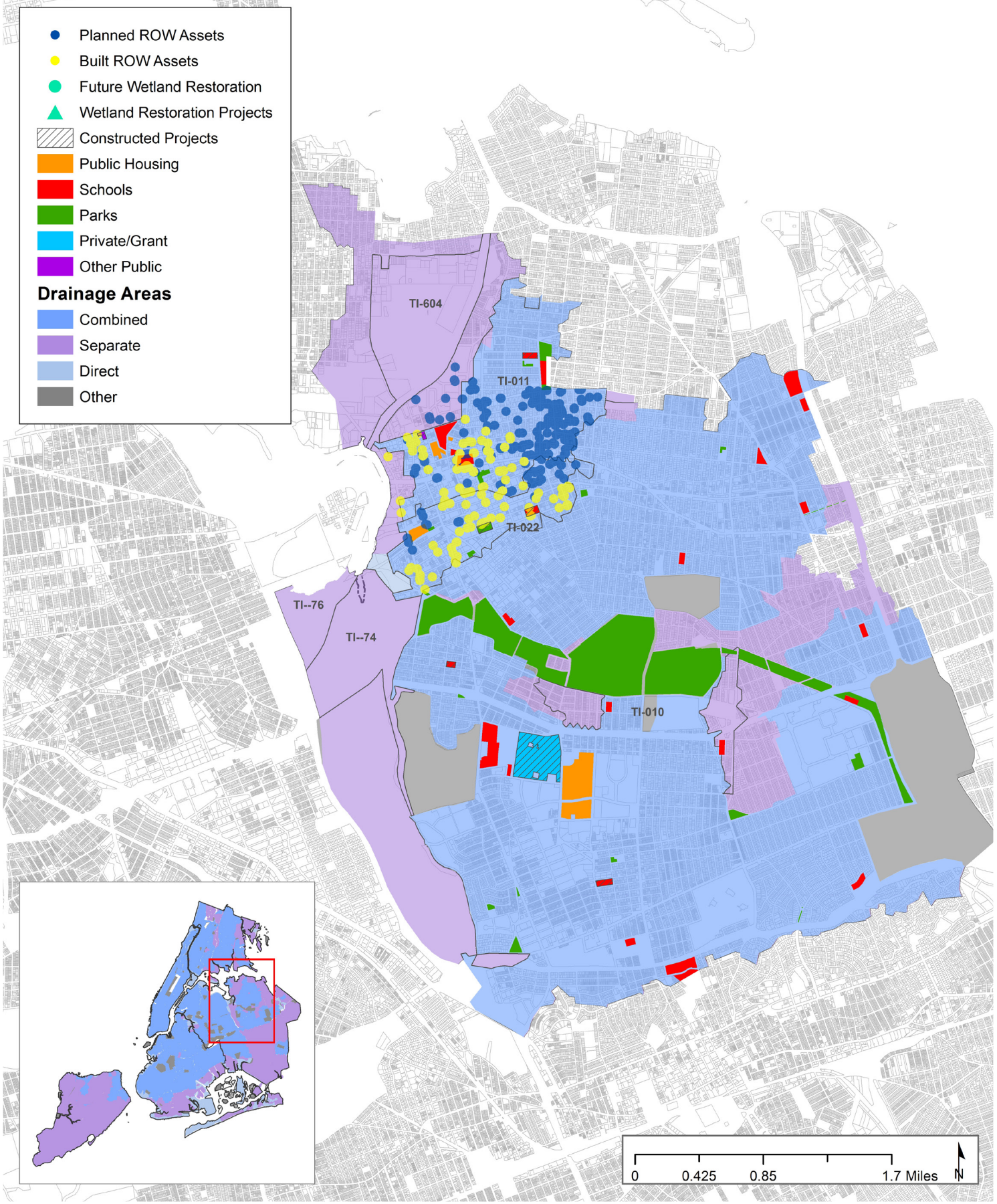
PUBLIC

- P.S. 139 Q
- Real Good Park
- Russell Sage Playground / J.H.S. 190 Q
- The Painter's Playground / P.S. 174 Q
- Annadale Playground / P.S. 175 Q
- Corona Golf Playground
- Ehrenreich-Austin Playground
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

FLUSHING CREEK WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



FLUSHING CREEK WATERSHED

2010-2017 ACCOMPLISHMENTS

18.9M

Annual Gallons of Stormwater Managed*

15

Equivalent Greened Acres

142

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- Flushing Town Hall
- Queens College – GI Grant Program

UPCOMING PROJECTS**

AREA-WIDE ROW

- TI-010
- TI-011

PUBLIC

- I.S. 189 Q / Flushing International H.S (TPL)
- I.S. 250 / R.F. Kennedy (TPL)
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

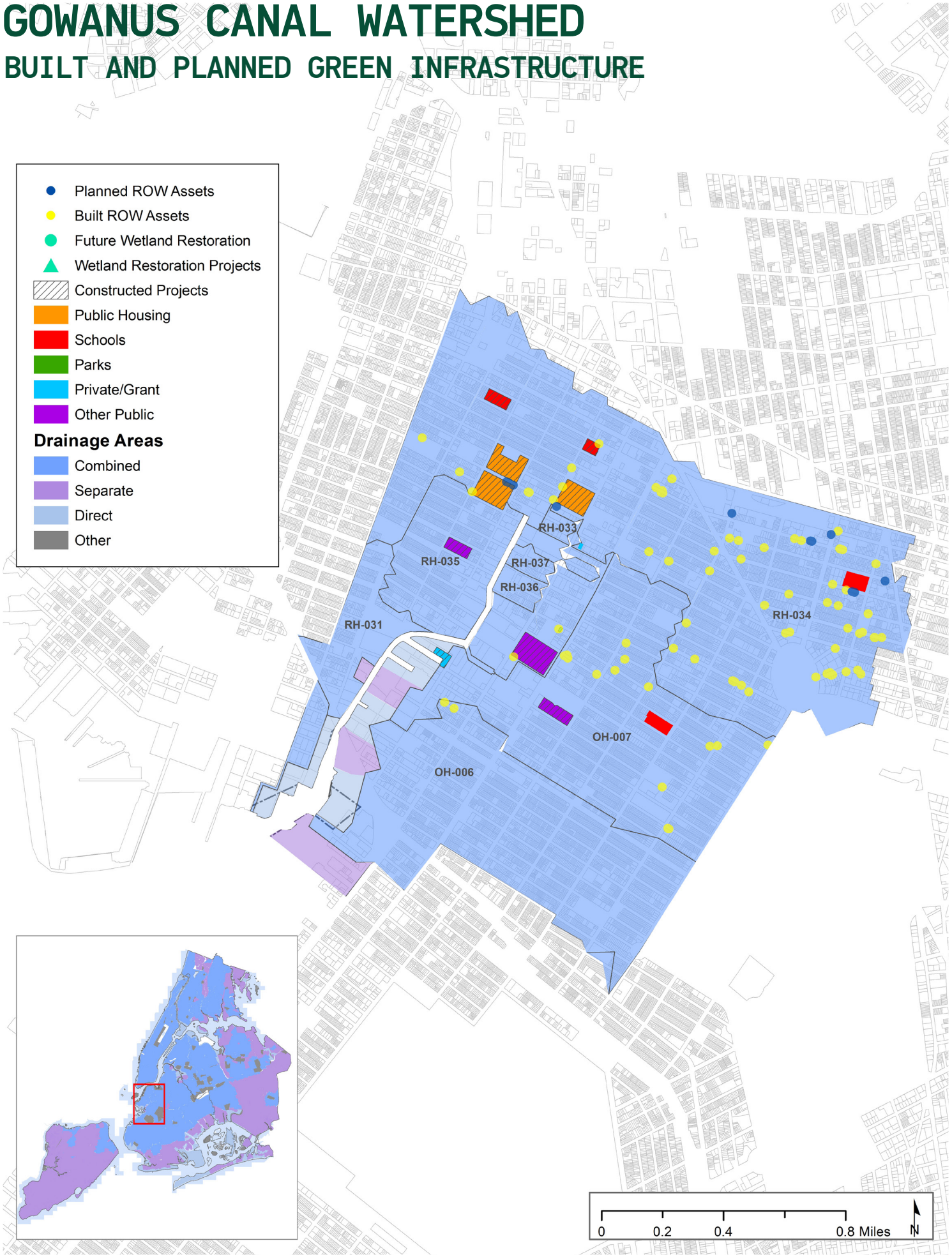
PRIVATE

- Queens College Dining Hall

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

GOWANUS CANAL WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



GOWANUS CANAL WATERSHED

2010-2017 ACCOMPLISHMENTS

12.1M

Annual Gallons of Stormwater Managed*

10

Equivalent Greened Acres

111

Assets Built and Planned

PARTNERSHIPS

- DPR
- DOE
- NYCHA
- Gil Hodges Garden/New York Restoration Project – GI Grant Program

UPCOMING PROJECTS**

PUBLIC

- Park Slope Playground
- Boerum Park
- Carroll Park
- P.S. 321 K
- P.S. 9 K
- P.S. 41 Q (TPL)
- Gowanus Houses
- Wyckoff Gardens
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

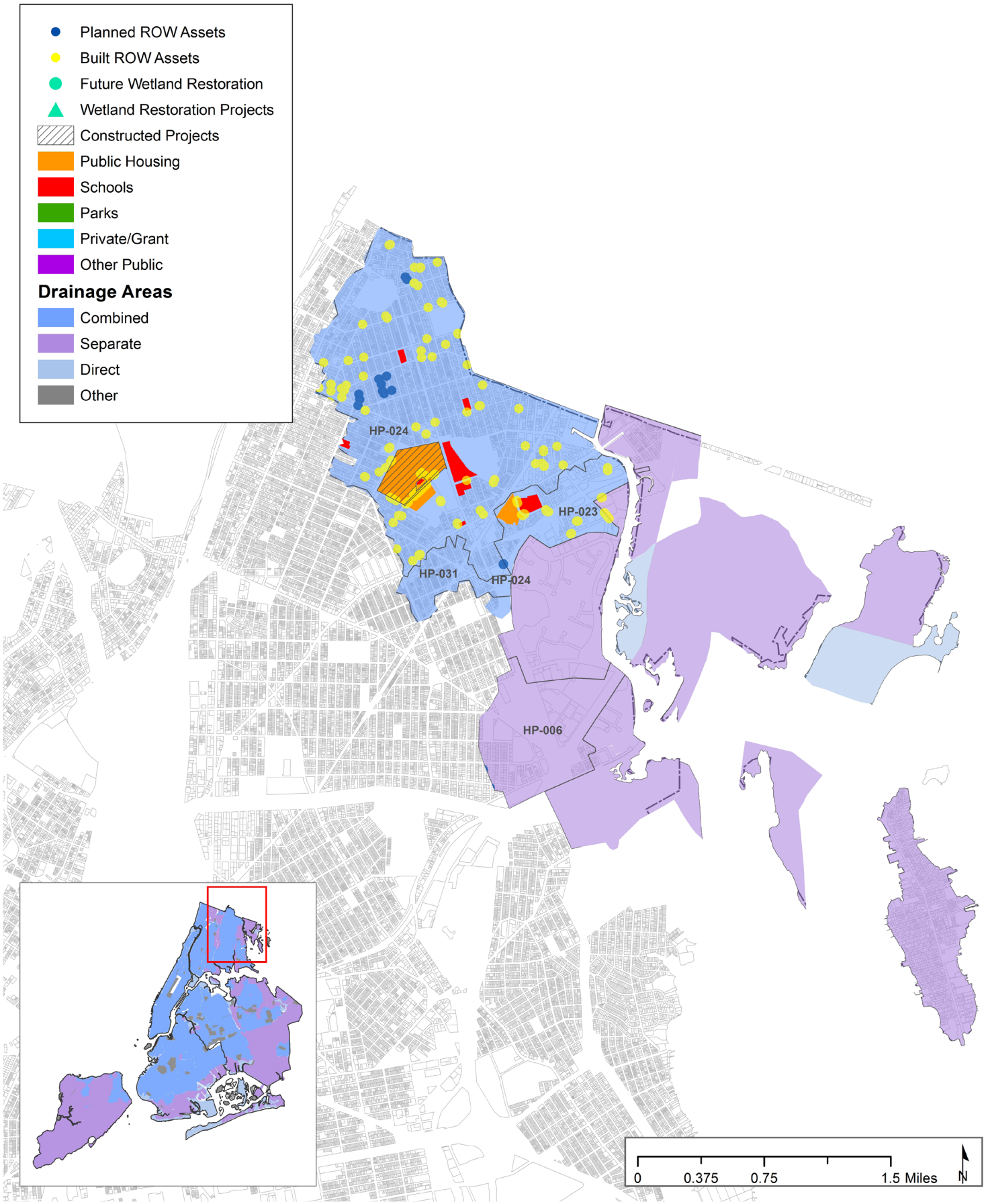
PRIVATE

- Gowanus Arts Rooftop Farm – GI Grant Program

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

HUTCHINSON RIVER WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



HUTCHINSON RIVER WATERSHED

2010-2017 ACCOMPLISHMENTS

32.1M

Annual Gallons of Stormwater Managed*

26

Equivalent Greened Acres

204

Assets Built and Planned

PARTNERSHIPS

- DOT
- NYCHA

UPCOMING PROJECTS**

AREA-WIDE ROW

- HP-024 – Permeable Pavement Pilot Project - LL80

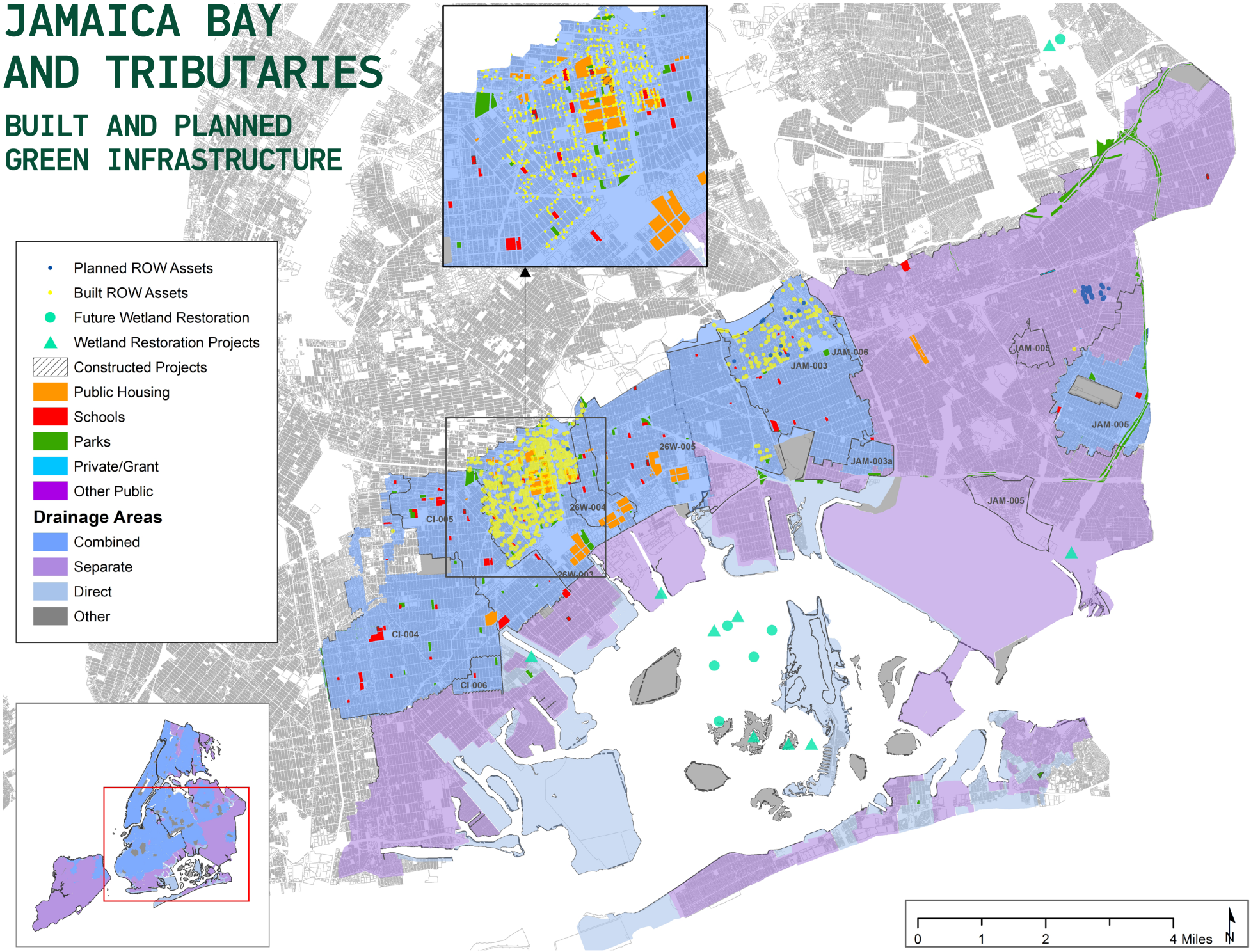
PUBLIC

- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

JAMAICA BAY AND TRIBUTARIES

BUILT AND PLANNED GREEN INFRASTRUCTURE



JAMAICA BAY AND TRIBUTARIES

2010-2017 ACCOMPLISHMENTS

116.3M

Annual Gallons of Stormwater Managed*

93

Equivalent Greened Acres

1,081

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- NYCHA

UPCOMING PROJECTS**

AREA-WIDE ROW

- 26W-004/005, Hendrix Creek and Spring Creek
- JAM-003, Bergen Basin
- CI-005, Paerdegat Basin

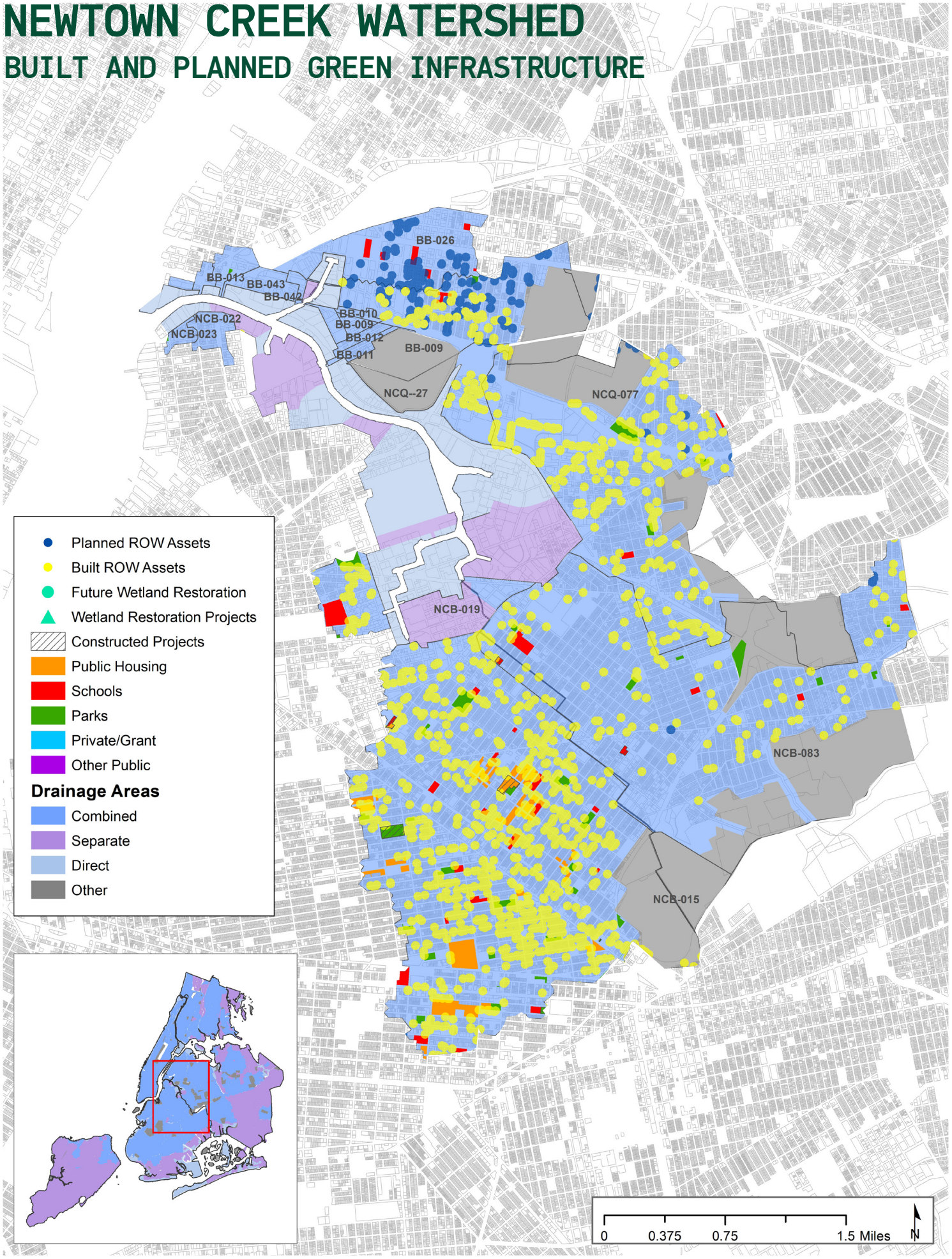
PUBLIC***

- Belmont Playground / P.S. 214
- Centreville Playground
- Chester Playground
- Dr. Richard Green Playground
- Howard Playground
- Martin Luther King Jr. Playground (CPI)
- Osborn Playground
- Pink Playground
- Railroad Playground
- Van Dyke Playground
- East NY Voc. H.S. of Transit Tech
- H.S. Suspension Center K
- I.S. 323 K
- P.S. 13 K
- P.S. 159 K
- P.S. 165 K
- P.S. 174 K
- P.S. 183 / 446 K
- P.S. 191 K
- P.S. 202 K
- P.S. 233 K
- P.S. 328 K
- P.S. 72 K
- P.S. 97 Q
- I.S. 581 K (TPL)
- Thomas Jefferson H.S.
- Belmont Sutter
- Boulevard Houses
- Brownsville
- East New York City Line
- Cypress Hills
- Fiorentino Plaza
- Garvey (Group A) Houses
- Glenmore Plaza
- Howard Houses
- Pennsylvania-Wortman Ave
- Linden Houses
- Pink Houses
- Seth Low
- Tilden Houses
- Van Dyke I
- Van Dyke II

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.
*** Includes the 2018 DOE Design Contract, 2018 DPR Design Contract, and 2018 NYCHA Design Contract.

NEWTOWN CREEK WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



NEWTOWN CREEK WATERSHED

2010-2017 ACCOMPLISHMENTS

161M

Annual Gallons of Stormwater Managed*

128

Equivalent Greened Acres

1,441

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- NYCHA

UPCOMING PROJECTS**

AREA-WIDE ROW

- BB-009/013/014/026/043 – Dutch Kills and Main Branch
- NCQ-29/NCB-022 – Main Branch
- Permeable Pavement Pilot Project - LL80

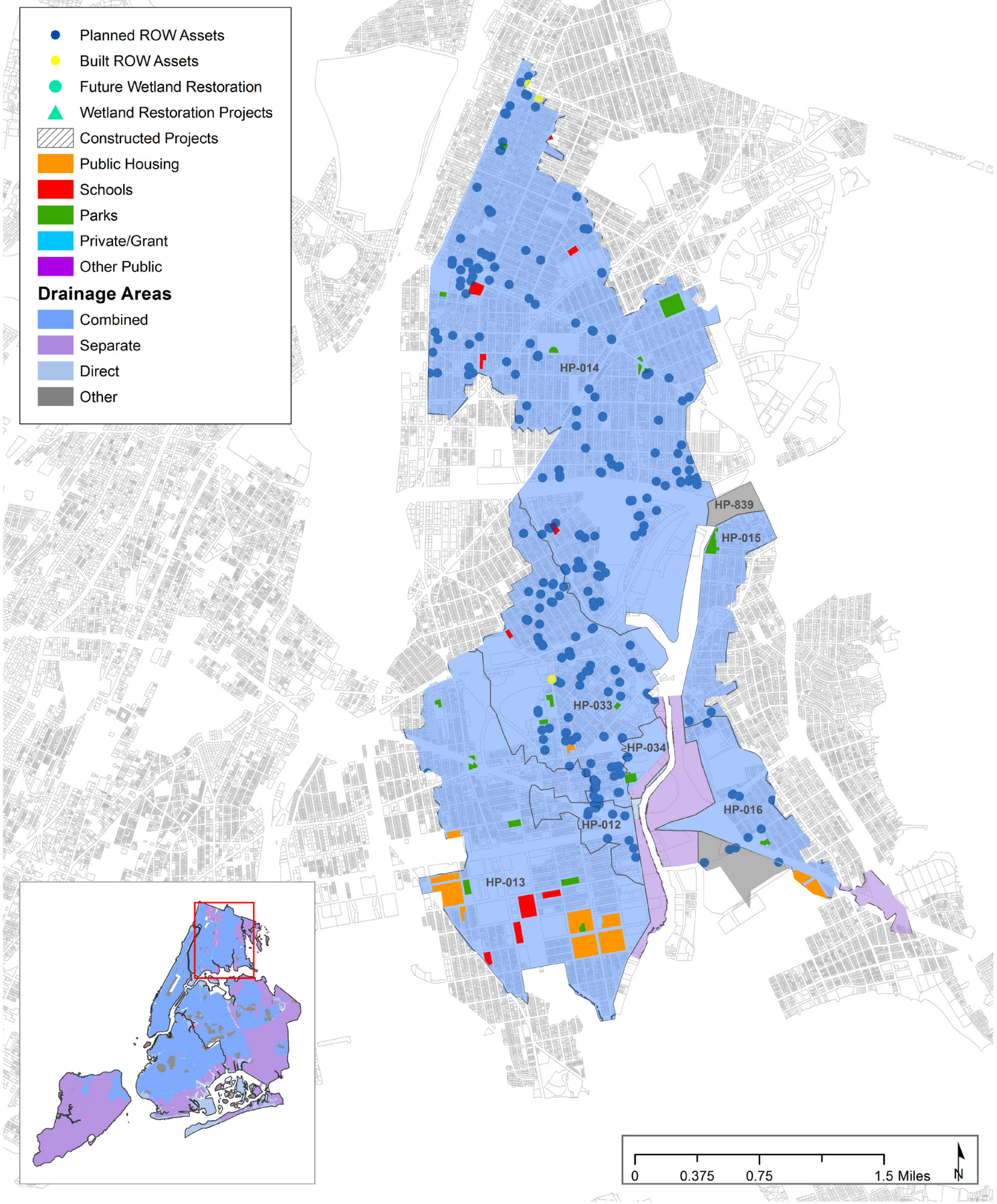
PUBLIC

- Brevoort Playground
- Carver Playground
- El Shabazz Playground
- Eleanor Roosevelt Playground
- Evergreen Playground
- Fermi Playground
- South Pacific Playground
- Tiger Playground
- Weeksville Playground
- Woods Playground
- Rosemarys Playground
- Maria Hernandez Park
- Middle Village Playground
- Benninger Playground
- Jackie Robinson Playground
- Jesse Owens Playground (CPI)
- Grand Street Campus
- I.S. 119 / Pinocchio Playground
- P.S. 178 K
- P.S. 299 K
- P.S. 309 K
- P.S. 5 K
- P.S. 91 Q
- P.S. 145 K (TPL)
- Bushwick Houses
- Brevoort Houses
- Hope Gardens
- Kingsborough Houses
- Roosevelt I Houses
- Roosevelt II Houses
- Saratoga Houses
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

WESTCHESTER CREEK WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



WESTCHESTER CREEK WATERSHED

2010-2017 ACCOMPLISHMENTS

432,005

Annual Gallons of Stormwater Managed*

0

Equivalent Greened Acres

2

Assets Built and Planned

PARTNERSHIPS

- DOT
- DPR
- DOE
- NYCHA
- Albert Einstein College of Medicine – GI Grant Program (EBP)

UPCOMING PROJECTS**

AREA-WIDE ROW

- HP-012
- HP-014
- HP-016
- HP-033

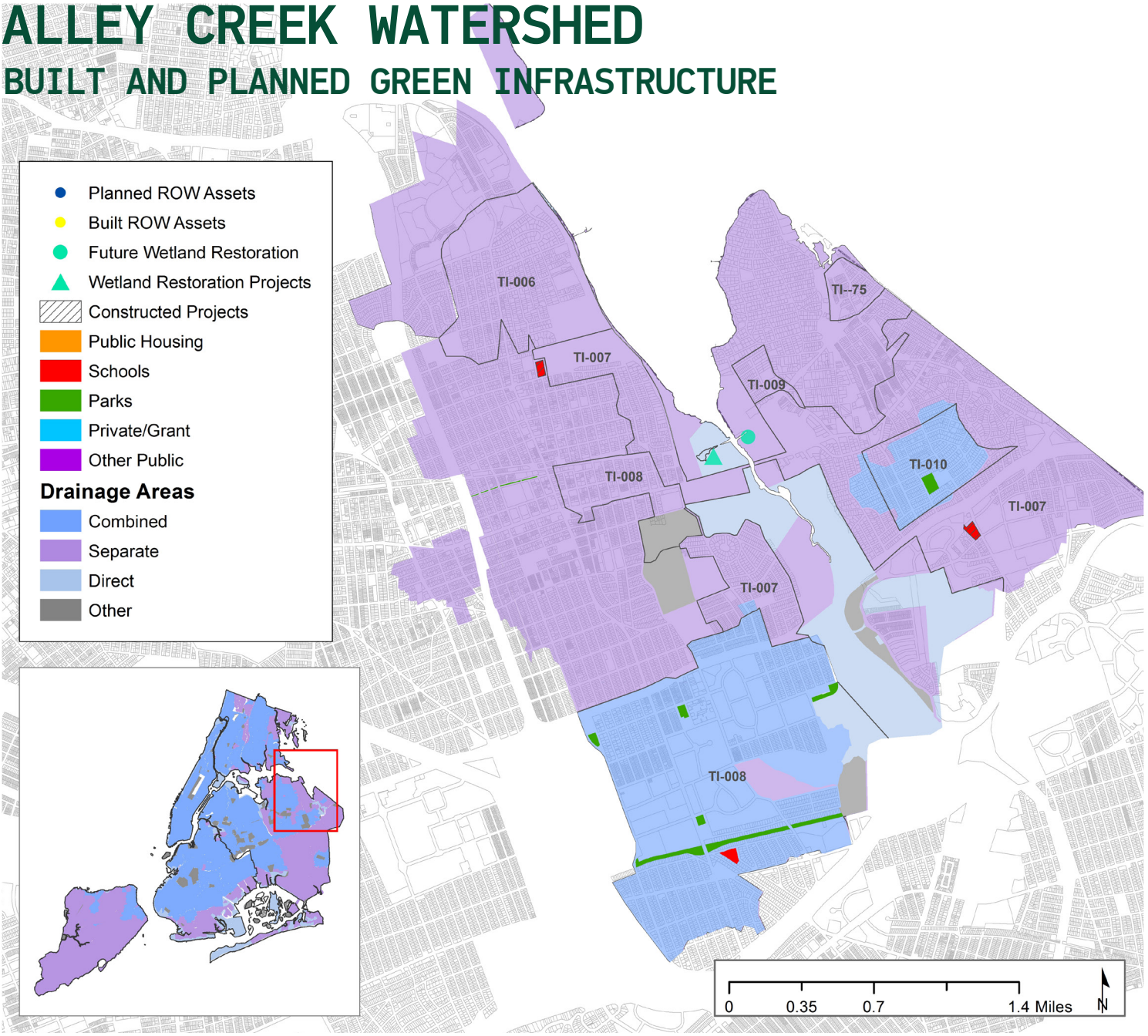
PUBLIC

- Bruckner Playground / I.S. 101X
- Caserta Playground / P.S. 106X
- Castle Hill Playground / I.S. 127X
- Givan Square / Camponaro Playground
- Havemeyer Playground
- Rienzi Playground
- P.S. 108 X
- P.S. 78 X
- Glebe-Westchester
- Throggs Neck Houses
- 2018 DOE Design Contract
- 2018 DPR Design Contract
- 2018 NYCHA Design Contract

* Based on 46.25" of annual rainfall.
** Not counted toward stormwater managed or greened acres above. Subject to change based on feasibility and/or other project constraints.

ALLEY CREEK WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE

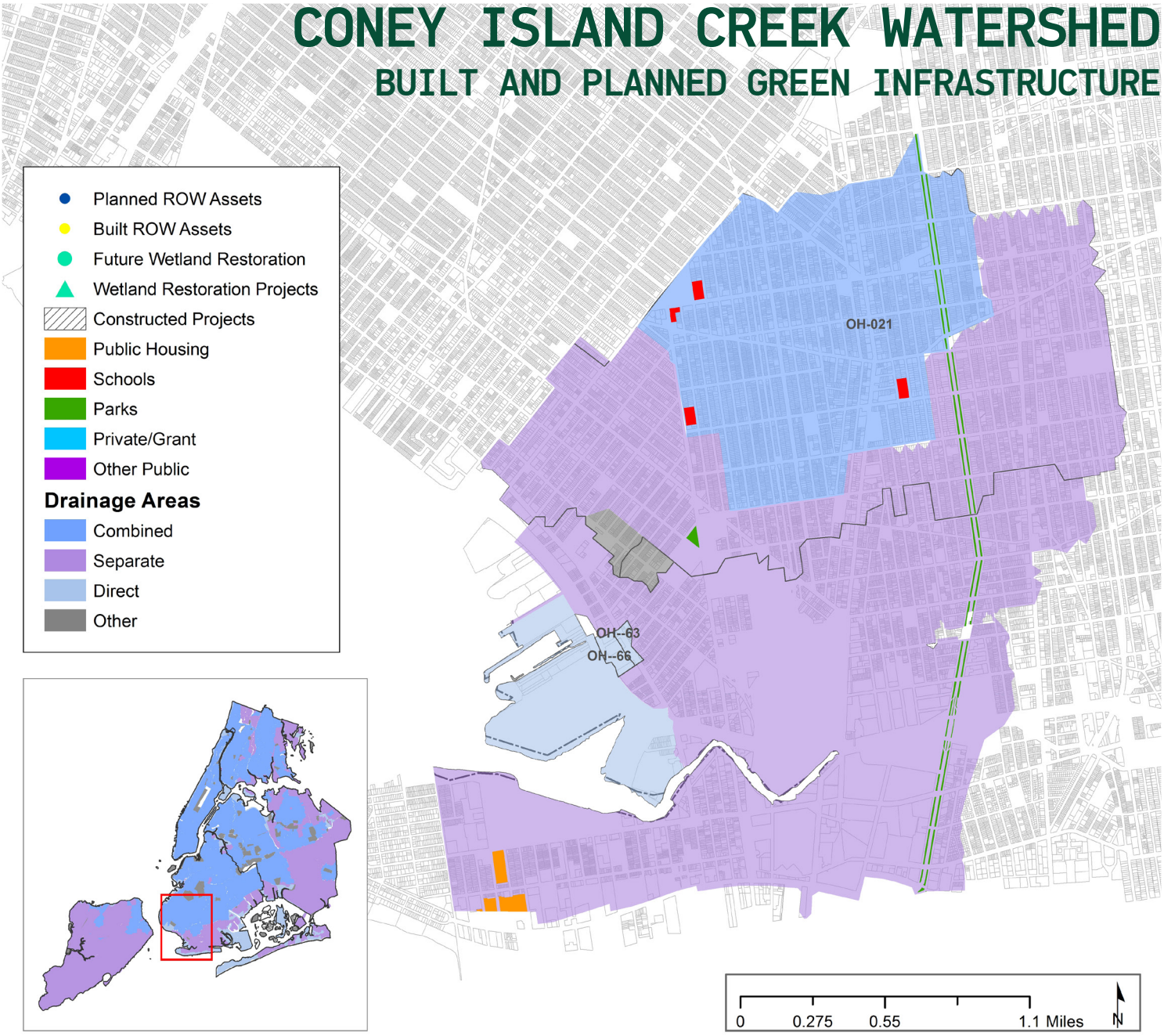


The Alley Creek and Little Neck Bay watershed is a tributary to the Tallman Island Wastewater Treatment Plan (WWTP), and contains a complex wastewater and stormwater system comprised of combined and separately sewered areas as well as direct drainage. The annual wet weather discharge volume to the watershed is predominately dominated by stormwater and direct drainage runoff. DEP has completed a 5 million gallon (mg) Alley Creek CSO retention facility that has been in operation since 2011, reducing overflows by 132 million gallons per year. Accordingly, the watershed has not been considered a priority for right of way green infrastructure implementation in the combined sewer areas. However, DEP is pursuing retrofit opportunities under the new contracts for design of public schools and parks and has identified six park properties and one public school to further investigate for green infrastructure implementation. There are also two TPL green infrastructure schoolyards to be constructed in 2018 in the separate sewer areas of the watershed, P.S. 221Q and P.S. 41Q.

In addition, there have been past and will be future efforts to restore and build wetlands in Alley Creek for water quality improvements and ecological habitat benefits. The Alley Creek wetland is an enormous natural resource in northern Queens and DEP is expanding it by adding 1.5 acres. DEP is also designing a “treatment wetland” in Alley Creek to target pollutant load reductions and to better quantify water quality and environmental improvements of wetland expansions in the receiving waters. DEP is collaborating with Jamaica Bay Science and Resiliency Institute for treatment wetland sampling design and data collection and analysis (see Related Initiatives).

CONEY ISLAND CREEK WATERSHED

BUILT AND PLANNED GREEN INFRASTRUCTURE



The Coney Island Creek watershed is an urban tributary to Gravesend Bay, and the Bay is tributary to the Lower New York Bay. Water quality in Coney Island Creek is influenced by multiple sources, including stormwater discharges, dry-weather sources and CSOs. The annual wet weather discharge volume to the watershed is predominately dominated by stormwater and direct drainage runoff.

DEP has completed pump station upgrades which has been operational since 2014, reducing overflows by 68% from 245 million gallons a year to 75 million gallons a year. Accordingly, the watershed has not been considered a priority for right of way green infrastructure implementation in the combined sewer areas in the early years of the program. However, looking ahead, there are new efforts worth mentioning where DEP applies an integrated approach for stormwater management. DEP's new design contract will investigate green infrastructure opportunities at four public schools and potential median projects in the combined sewer areas, as well as several parks and public housing properties in the separate sewer areas identified as part of DEP's Stormwater Management Program Plan. There are also green infrastructure projects funded through the New York Rising program in development now with planned construction in 2020.

GREEN INFRASTRUCTURE MAINTENANCE


BROOKLYN AND QUEENS MAINTENANCE CREWS

RIGHT-OF-WAY MAINTENANCE

The rain garden maintenance teams provide maintenance for thousands of constructed green infrastructure practices in the ROW. Planning for hiring and training is paced with new construction and graduation of assets from contractor guarantee to full maintenance, so that DEP's maintenance team grows as the number of new rain gardens increases. Staffing has doubled between 2016 and 2017 (see Table 6, below), and is expected to double again in 2018. To accommodate these increased operations, DEP now has two maintenance facilities, one in Brooklyn and one in the Bronx, to eliminate excess travel time and to improve the overall efficiency of the Bronx teams.

The maintenance teams perform a variety of tasks to keep the rain gardens functional and attractive. To ensure performance, the teams typically remove weeds, prune, and replace dead plants as well as remove sediment from inlets, outlets, stone columns and soil to make sure stormwater flows into and within the rain garden properly. For appearance, the teams remove litter and trim plants. These actions keep the curb appeal of the rain gardens and preserve sight lines to keep pedestrian and vehicles safe. Although the amount of maintenance each rain garden needs varies by size, neighborhood (commercial or residential areas), and by season, every rain garden is visited at least once a week.

Each new staff is trained for this critical work using the ROW Green Infrastructure Operations and Maintenance Manual, along with on the job training course taught by current crew leaders and Gardeners. Additional training will be offered to select staff to undergo horticulture and plant care training or certifications through a partnership with the New York Botanical Garden in 2018.

TABLE 6: DEP ROW GREEN INFRASTRUCTURE MAINTENANCE STAFFING BY YEAR

	Total Headcount Per Calendar Year*			
ROW Green Infrastructure Maintenance	2014	2015	2016	2017
DEP (BWSO)	15	23	25	62

* Total Headcount includes both full-time and seasonal titles.

If the public witnesses any issues with a particular rain garden between visits, they can call 311 as indicated on the blue "rain garden" decals on each rain garden. Staff at the City's 311 call centers are trained to process rain garden-related requests in concert with the full installation of decals identifying rain gardens across the City. The public can also use 311 online to report a broken tree guard, trash, or flooding. Through 311, public requests are directed to DEP's maintenance team and the response is tracked.

To manage the operations of the rain gardens, crew leaders conduct evaluations before beginning site maintenance. Maintenance data allows program managers to understand where and how frequently rain gardens are being maintained, the type of work being done, the level of staff effort required, and what types of issues keep coming up. By understanding the level of effort required to keep rain gardens in good condition, managers can allocate resources as needed. These evaluations also allow the maintenance team to resolve larger issues like damage from construction or utility work that cannot be corrected through routine maintenance alone.



RAIN GARDEN DECAL WITH PROMPT "QUESTIONS? CALL 311"

PUBLIC PROPERTY RETROFITS MAINTENANCE

DEP and its partners have ensured that all other green infrastructure will be maintained over the long term. DEP has accepted maintenance responsibility for green infrastructure implemented within developments owned by the NYC Housing Authority. The Department of Education's Division of School Facilities has agreed to incorporate the maintenance of green infrastructure practices into their typical schoolyard tasks. Similarly, the Department of Parks and Recreation has incorporated green infrastructure maintenance into the borough maintenance and operations crew responsibilities. DEP has committed to an ongoing and open dialogue with all of our partnering agencies to provide support, adjust designs, and consider other changes to implementation practices as the Program proceeds.


BRONX MAINTENANCE CREW

RELATED INITIATIVES


JACK'S POND BLUEBELT, STATEN ISLAND

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PROGRAM

Separate storm sewers, which carry stormwater runoff directly to a local waterbody, serve nearly 40% of the City. (The combined sewer system serves the remaining 60% of the City.) In a dense, urban environment, stormwater runoff can absorb and convey pollutants such as trash, pathogens, oil, and grease and carry it directly to the waterway through separate storm sewers.

Technically, a municipal separate storm sewer system (MS4) is a stormwater conveyance system that can include public streets, catch basins, curbs, gutters, ditches, or storm drains that is owned by a municipality.

Separate storm sewers serve nearly 40% of the City.

On August 1, 2015, the City received its first citywide State Pollutant Discharge Elimination System (SPDES) Municipal Separate Storm Sewer System Permit (MS4 Permit) (No. NY-0287890) from DEC. This permit requires the City to implement measures to reduce pollution in stormwater runoff, which protect and improve water quality. The MS4 Permit significantly expands the City's previous obligations to reduce pollutants discharging to the MS4 system. The Permit includes robust requirements in the form of minimum control measures and best management practices (BMPs) to reduce the discharge of pollutants to the maximum extent practicable (MEP), and includes timelines for key deliverables to NYSDEC. Numerous City agencies have significant responsibilities under the MS4 Permit. DEP is responsible for coordinating the interagency efforts to meet the City's MS4 Permit requirements.

Three new programs include green infrastructure components for implementation in the MS4 area: Construction and Post-Construction, Pollution Prevention/Good Housekeeping for Municipal Facilities and Operations (PPGH), and Special Conditions for Impaired Waters.

PARKING LOT STORMWATER FEE PILOT

First initiated in 2011, DEP's Parking Lot Stormwater Pilot Program generates revenue for operation and maintenance of the City's wastewater system. The program applies a stormwater discharge fee to stand-alone parking lots that contribute runoff to the City's wastewater system, but do not receive (or pay for) City water service. Effective January 26, 2018, DEP's stormwater charge is currently $0.0647 per square foot. On July 1, 2016, DEP billed 535 accounts for $320,896.91. On July 1, 2017, DEP billed 520 accounts for $300,923.93. Parking lot owners who implement green infrastructure practices are exempt from the stormwater discharge fee. To date, zero parking lot owners have implemented green infrastructure practices to become exempt from the stormwater discharge fee.



STORM CHAMBERS AT HOPE GARDENS PARKING LOT, BROOKLYN

SOUTHEAST QUEENS AND THE CLOUDBURST PILOT PROJECTS

Flooding has been a problem in Southeast Queens for over 70 years. Increasing rainfall, loss of permeable surfaces, and reduced groundwater use have worsened conditions. Over the past ten years, Community Boards 12 and 13 have had more flooding complaints than any other area of New York City. In OneNYC, Mayor De Blasio identifies alleviating flooding in Southeast Queens as a priority initiative. DEP's 10 Year Capital Budget allocates $1.5 billion over the next decade to plan and begin full sewer build-out and to provide short term relief wherever possible. Full build-out requires approximately 450 miles of new storm sewers, upgrades to 260 miles of sanitary sewers, and 30 miles of combined sewers to be completed over many years. DEP is additionally partnering with other City agencies to implement green infrastructure in the ROW and on public properties as another tool to reduce localized flooding.

To complement storm sewer and green infrastructure work in Southeast Queens, DEP is also implementing pilot projects identified as part of a study to assess risks, prioritize responses, develop neighborhood-based solutions, and assess costs and benefits for managing extreme rain events, or "cloudbursts." The Cloudburst Resiliency Planning Study adapted an approach developed in Copenhagen to manage large volumes of stormwater using streets and open space, and has created a unique learning exchange between Copenhagen and New York City. By modeling the flow of floodwater over the local topography, the study determines opportunities to slow and safely convey water to minimize damages and maximize co-benefits to the community. DEP is initiating design of two cloudburst pilot projects in Southeast Queens, one in the St Albans neighborhood and another at NYCHA's South Jamaica Houses, which will maximize stormwater capture for up to 2.3 inches of rainfall per hour--a storm with a 10% chance of occurring in any given year by the middle of the century.

DEP has allocated $1.5 B to Southeast Queens to begin the sewer buildout.

ECOLOGICAL SERVICES AND WETLAND RESTORATION

In the academic and restoration communities, there has been recent attention and studies on the ability of wetlands to sequester pathogens, improve water quality, and reduce nutrient levels. With this knowledge, natural and constructed wetlands have been widely utilized for water quality enhancement. Within a tidal environment, marshes are able to dissipate tidal flow energies approximately one order of magnitude when the flows encounter vegetated marsh surface and flow velocity continues to decrease as vegetation density increases. These tidal patterns have important implications concerning the assessment of water quality parameters associated with Fecal Indicator Bacteria (FIB) because they may provide a method to remove suspended bacteria and deposit them within marshes. This flooding and ebbing of salt marsh habitats can increase the mortality, and subsequently decrease negative impacts, of FIB by sequestering these bacteria within the marsh sediments and increasing the Ultraviolet (UV) light exposure, which kills FIB.

In Alley Creek, DEP has designed a 1-acre tidal marsh that will provide the opportunity for monitoring and data collection of various spatial configurations of wetland and tidal channels to achieve maximum water quality benefits. The Alley Creek project has the potential to provide meaningful local data on the water quality improvements and benefits related to wetland restoration. The existing marshes within Alley Creek can provide an opportunity to examine how natural and anthropogenic sources of FIB can be sequestered and differentiated within wetland systems. The Alley Creek Pilot Wetland FIB sampling program will include 54 sampling events. Monitoring of the pilot tidal wetland will begin after one full growing season (April 2019) has occurred in order for the marsh soils to stabilize and plantings to become established. Sampling will be conducted weekly from May through September during the growing season and then once per month from October through April.

This monitoring effort is anticipated to be undertaken by researchers from the Science and Resiliency Institute at Jamaica Bay (SRIJB). SRIJB has extensive knowledge and vast expertise in wetland research programs that promote cutting edge techniques across many disciplines. This effort will advance the core understanding of changes and ecosystem services provided by urban coastal systems, as well as further DEP and SRIJB's wish to continue engaging in activities of mutual interest in the field of research and development of strategies for improved water quality and ecological habitat.



SPRING CREEK, BROOKLYN

Table 7 summarizes the total acres of tidal wetland restoration resulting from DEP funded or cost shared projects to date.

DEP has restored over 170 acres of tidal wetlands.

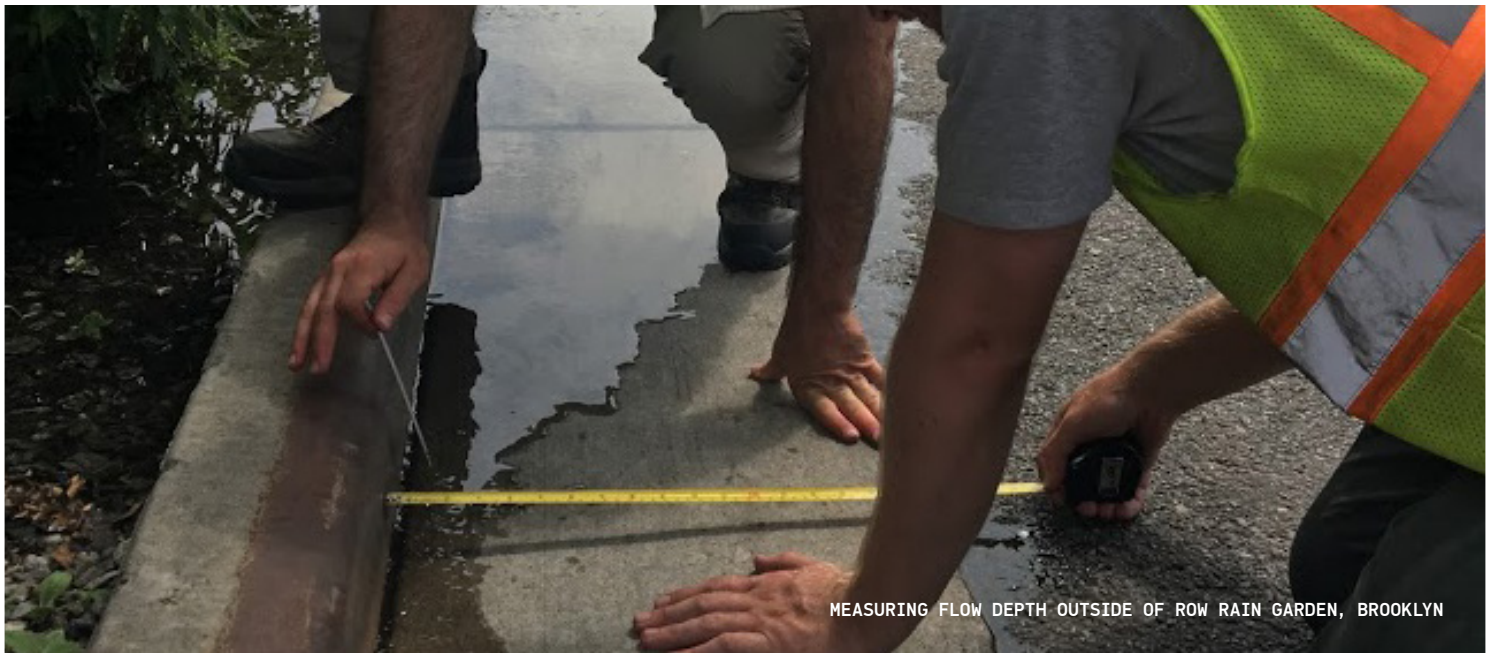
TABLE 7: TIDAL WETLANDS RESTORED OR FUNDED BY DEP

Site	Acres
Elders East (cost share)	38
Paerdegat	8
Idlewild	5
Powell's Cove	1
Hendrix Creek (cost share)	2
Elders West (cost share)	34
Yellow Bar (cost share)	42
Black Wall (cost share)	20.5
Ruler's Bar (cost share)	9.8
Brookfield	3.5
Alley Creek	8
Future	
Alley Creek (2018)	1.5
Oakwood Beach (cost share)	35
Additional Jamaica Bay Marsh Islands (cost share)	20
Total Installed	**171.8**
Total Planned	**56.5**



ALLEY CREEK, QUEENS

ADAPTIVE MANAGEMENT



MEASURING FLOW DEPTH OUTSIDE OF ROW RAIN GARDEN, BROOKLYN

RESEARCH AND DEVELOPMENT PROGRAM

DEP's $10 million comprehensive Research & Development (R&D) Program collects crucial performance and co-benefit data for a variety of green infrastructure practices. Work completed under the R&D Program will support the Program by reviewing performance over time, ensuring performance-based maintenance and operations, and conducting cost-benefit analyses of various green infrastructure designs.

In addition, the scope of work supports the development of Long Term Control Plans (LTCPs) and other water-quality related compliance documents, fills data gaps DEP has identified through previous green infrastructure monitoring activities, and will review DEP's current modeling framework for calculating co-benefits. DEP is actively incorporating this work into the overall Program planning and implementation.

To guide the monitoring and data collection, DEP conducted a peer review and then finalized the Green Infrastructure Monitoring Strategy and Protocols report in June 2016. In 2017, DEP continued to set up new experiments, collect data and develop detailed methodologies for remaining experiments.

During 2017, DEP used automated sensors to collect data on how water flows through rain gardens for 200+ storm events. DEP also conducted field experiments using hydrants with controlled flow to simulate various types of rainfall events on rain gardens and other types of green infrastructure practices.

A preliminary analysis of the monitoring data from the rain gardens provided insight on the degree to which certain features of rain garden design, such as the curb cut inlet and soil contouring, affect performance. DEP also collected routine soil samples and plant inventories throughout 2017 as part of an ongoing effort to improve overall ecological benefits of rain gardens, in addition to the stormwater benefits. DEP used the monitoring data and field observations to develop a training workshop for rain garden construction, which DEP will conduct in 2018. DEP also began compiling a document incorporating maintenance practices and protocols for ROW and public property green infrastructure projects in 2017, which will be finalized in 2018.

DEP has collected performance data on rain gardens for over 200 storm events.

Outside of rain gardens, DEP conducted field experiments to evaluate the performance of synthetic turf fields that are designed to manage stormwater practices. In general, synthetic turf fields appeared to be performing at or greater than the practices were designed for. Reduced infiltration rates were observed along the edges of turf fields that had been installed without trenches or piped conveyance systems, but overall the turf fields are still capable of sufficiently managing typical storm events.

Other R&D work in 2017 included a comprehensive literature review and the development of an evapotranspiration model for green roofs, which was calibrated to actual rainfall patterns within New York City. The model was validated using green roof monitoring data that DEP had previously collected. The findings established a relationship between green roof planting media depth, stormwater management, and construction costs. The results provided the framework for the green roof reimbursement schedule under the Green Infrastructure Grant Program.

Rain garden monitoring and field data collection will continue in 2018, and DEP will further pursue design elements such as sediment pads, engineering soil mixes, and geotextile fabrics. DEP's monitoring plans for 2018 also include constructed wetlands and larger bioretention designs.

PERMEABLE PAVEMENT PILOT – LOCAL LAW 80 (2013)

In 2013, the New York City Council passed Local Law 80 of 2013 requiring DEP and DOT to study of three permeable pavement installations in the City's streets and sidewalks. In 2014, the agencies worked together to identify pilot locations in the Hutchinson River and Flushing Bay Priority CSO Tributary Areas and developed the monitoring protocol. The third pilot area in the Newtown Creek Priority CSO Tributary Areas was identified in 2016, and is being pursued in coordination with DDC.

Pre-construction monitoring was completed in 2016 for the Hutchinson River pilot, and in 2017 for the Flushing Bay pilot. Designs were finalized for both areas in 2017, and construction is scheduled for 2018.

Progress during 2017 for the Newtown Creek pilot included development of preliminary designs and commencement of pre-construction monitoring. Pre-construction monitoring for the Newtown Creek pilot will continue through 2018. Designs for this pilot are also anticipated to be finalized in 2018, followed by construction and post-construction monitoring.

A final report will be prepared by DEP and DOT after post-construction data is collected and analyzed.



POROUS PAVEMENT SIDEWALKS, BROOKLYN

2018 HIGHLIGHTS



THE SOBRO JASMINE COURT GREEN ROOF, GRANT PROJECT, BRONX

01 PRIVATE INCENTIVE RETROFIT PROGRAM

Private property is the next big push for the Green Infrastructure Program, and in 2018, after almost two years of planning and outreach efforts, DEP will release a Request for Proposals (RFP) to procure a Program Administrator to launch and administer a new green infrastructure Private Incentive Retrofit Program. The subsequent five-year contract has an anticipated value of $43-$58 million and a goal of retrofitting 200 greened acres, which DEP anticipates will be more cost effective on a per acre basis as compared to public property retrofits.

The RFP, supported by a 2016 Request for Information (RFI) and a private property stormwater market analysis carried out in 2017, establishes key parameters for a voluntary and scalable retrofit Program, while giving proposers the flexibility to determine how they will identify and work with private property owners to retrofit their properties. The use of community-level partners to reach property owners and exceptional community service will be key to the success of the Program.

Retrofitting 200 private greened acres is an ambitious, yet attainable goal with the right prioritization of sites and strategic messaging to private property owners. Phase one of the Program will be limited to specific tiers of private properties in the combined sewer areas of the City to maximize the potential greened acres managed. These tiers and estimated numbers of sites and gross acres available within each tier are identified in the table below.

TABLE 8: PRIVATE INCENTIVE PROGRAM SITES AND ACRES BY TIER

Tier	Definition	Number of Sites	Gross Acres
Tier 1	Privately owned properties in the combined sewer areas of the City that are greater than 100,000 SF	915	6,170
Tier 2	Privately owned properties in the combined sewer areas of the City that are greater than 50,000 sf and less than 99,999 SF	1,511	2,366

Interested proposers for the forthcoming RFP should sign up for the City Record Online to receive notification by email upon release.

02 GREEN ROOF REIMBURSEMENT SCHEDULE – GI GRANT PROGRAM

DEP recently released a streamlined funding schedule and a fast track review process for private green roof projects funded through its Green Infrastructure Grant Program. The funding schedule sets reimbursement rates for green roof projects based on growing media depth and planted area.

The highest funding rate of $30 per square foot (SF) is available for projects that include 3,500-20,000 SF of planted area and that have 4 inches of growing media depth, with reduced rates available for projects with shallower depths. For projects larger than 20,000 SF funding is also available, see table below. For those projects meeting the requirements for $30/SF, this is the highest green roof incentive in the nation and this shows the City's commitment to greening NYC's rooftops.

The funding schedule and project guidelines provide applicants with an upfront understanding of DEP's cost-effectiveness criteria for green roof projects, and eliminate uncertainty over how much funding is available for potential projects. By providing this information to applicants in advance, DEP is able to fast track green roof grant applications, with anticipated design approval within 90 days from the submittal date.

Green roofs have been a popular request from the Grant Program since it was initiated in 2011, making up 60% of funded projects to date. DEP is hoping to encourage more proposals and increase awareness of the funding available for private owners. There are no restrictions on types of plantings; sedum, native plants, and vegetables, for example, are all eligible. Green roofs are an important part of achieving reductions in stormwater runoff from building rooftops, which account for a sizable portion of impervious area in the City.

TABLE 9: REIMBURSEMENT RATES ($/SF) FOR GREEN ROOF PROJECTS

Soil Depth (in.)	3,500 - 20,000 (SF)*
1.5 - 1.99	$10
2.0 - 2.99	$15
3.0 - 3.99	$25
4.0 +	$30

*** The reimbursement rate for SF of planted area over 20,000 SF is calculated using 50% of the rate shown above.**

Interested applicants can find out more details on DEP's Green Infrastructure Grant Program website or email gigrantprogram@dep.nyc.gov with questions.

03 HOUSING PRESERVATION & DEVELOPMENT PARTNERSHIP

In 2018, DEP will kick off a new partnership with NYC Housing Preservation & Development (HPD) to fund green infrastructure in new construction affordable housing projects. Through the partnership, DEP and HPD will work with developers on an estimated 17 projects over the next four fiscal years to provide upfront funding for green infrastructure. DEP and HPD will provide project developers with a funding schedule for typical green infrastructure practices so that they know exactly how much additional funding is available for their projects if they incorporate green infrastructure. Developers that move forward with green infrastructure will work with DEP on design review as they put their project plans together and move toward project closing with HPD. Providing this dedicated funding source will ensure that green infrastructure practices remain a part of the project designs from start to finish and support both agencies' goals to incorporate green features into these projects.

04 RAIN GARDEN STEWARDSHIP

In 2018, DEP will launch a rain garden adoption program to partner with New Yorkers in keeping the rain gardens in our communities beautiful and effective, to recognize and track adopter stewardship activities, and to foster support for the ongoing work of the Program.

Adopters will be able to access a guide to perform care-taking activities on their own, as well as receive training from green infrastructure Maintenance workers. An online map will also be generated to illustrate which rain gardens have been adopted and which are available.

05 CONSTRUCTION MANAGEMENT TRAINING

DEP will provide training to ROW green infrastructure construction management firms involved with design, construction and maintenance of ROW green infrastructure. The material or items covered during the training will be based on the DEP rain garden design standards and lessons learned and observations from DEP maintenance teams and our R&D researchers. The training session will explain major components of the rain gardens and how they function, identify key areas to focus for verification of rain garden construction being consistent with design documents, provide examples and lessons learned from the field observations and opportunities for optimization.

06 NATIONAL GREEN INFRASTRUCTURE CERTIFICATION PROGRAM

The National Green Infrastructure Certification Program is a nationally recognized professional certification for individuals interested in joining the green infrastructure field, or currently employed in the field or related field. The Water Environment Federation with DC Water, developed the certification program over the last few years and are now actively conducting trainings, offering exams, and issuing certifications. DEP has been in ongoing discussions with WEF and other cities and utilities who have conducted trainings and examinations. And in 2018, DEP hopes to determine the best way to offer or support the certification of eligible and interested New Yorkers in green infrastructure design, construction, and/or maintenance and operations related fields.

07 SUSTAINABLE RATE STRUCTURE ANALYSIS

Through the Sustainable Rate Structure Analysis, DEP is seeking consultant support to conduct a holistic rate structure study that provides recommendations and an implementation plan for DEP to achieve a more predictable and sustainable revenue steam. The recommendations and implementation plan should support DEP's revenue, conservation, and affordable objectives, among others. DEP expects to release the RFP for this 3-year study in Quarter 2 of 2018. Dependent upon contracting, DEP expects that this study would be complete in 2021-2022.



ROW RAIN GARDEN, QUEENS

EXHIBIT A - PROGRAM SPENDING AND BUDGET

CAPITAL ENCUMBRANCE, 10-YEAR BUDGET AND EXPENSE BUDGET

TABLE 10: ENCUMBERED CAPITAL FUNDING BY FISCAL YEAR

Fiscal Year	Encumbered Capital Funding
FY12	$9,015,345
FY13	$15,202,880
FY14	$152,935,549
FY15	$58,041,000
FY16	$114,976,316
FY17	$118,115,231
FY18[1]	$11,253,034
Total	**$479,539,355**

TABLE 11: CAPITAL IMPROVEMENT PROGRAM BUDGET, FY 18-28

Fiscal Year	Approved FY 2019 Preliminary Capital Improvement Program
FY18[2]	$153,509,815
FY19 - FY28	$825,470,000
Total	**$978,979,815**
PROGRAM GRAND TOTAL[3]	**$1,458,519,170**

TABLE 12: EXPENSE BUDGET - OTHER THAN PERSONNEL SERVICES ONLY (OTPS)

Fiscal Year	OTPS Expenditures
FY12	$60,265
FY13	$2,039,773
FY14	$1,989,918
FY15	$2,006,620
FY16	$2,234,715
FY17	$4,134,828
Total	**$12,466,119**
Fiscal Year	**OTPS Budget, as of FY19 Preliminary Plan**
FY18	$5,121,527
FY19	$5,458,250
GRAND TOTAL	**$23,045,896**

1 FY18 encumbered to date.
2 FY18 remaining.
3 Estimated total is based on the total encumbered and the Approved FY19 Preliminary January Capital Improvement Plan (FY18-28).

EXHIBIT B - COMMUNITY OUTREACH

GREEN INFRASTRUCTURE PUBLIC OUTREACH MEETINGS

TABLE 13: 2017 PUBLIC GREEN INFRASTRUCTURE MEETINGS

Date	Community Member(s)	Type of Outreach	Attendees
January			
17	Auburndale Improvement Association	Presentation	30
19	Community Board 4, Transportation & Infrastructure Subcommittee	Presentation	20
25	SWIM Steering Committee	Meeting	12
March			
22	Bronx Council for Environmental Quality (BCEQ) Workshop	Presentation	45
24	Newtown Creek Alliance/Riverkeeper	Meeting	7
27	Queens College Course	Presentation	20
31	Gowanus Canal Conservancy/CCNY MLArch	Tour	15
April			
5	Newtown Creek Citizens Advisory Group	Update	25
6	Kissena Park Civic Association	Presentation	40
7	Flushing Bay Vision Planning with Riverkeeper	Meeting	5
12	Guardians of Flushing Bay Presentation on Flushing Bay Dredging	Meeting	15
13	Community-Based Organization Private Property Incentive Program	Workshop	35
20	Edenwald Earth Day Event with NYCHA and PS112	Workshops	30
21	Plank Road Site Visit with Newtown Creek Alliance	Meeting	10
25	SWIM Steering Committee	Meeting	12
26	Newtown Creek LTCP Alternatives Meeting	Presentation	44
May			
10	Hunts Point Vision Plan Members	Presentation	20
16	Bronx & Harlem Urban Waters Federal Partnership	Presentation	15
23	Ground-Breaking for TPL Playground at P.S. 120 Q	Ceremony	150
June			
8	West Cunningham Park and Utopia Estates Civic Associations	Presentation	40
13	Wyckoff Gardens Resident Association	Presentation	30
14	Green Infrastructure Grant Program Workshop	Presentation	42
28	Fresh Meadows Resident Association	Presentation	50
July			
26	100 Resilient Cities - OneNYC Panel - CSO Program Overview	Conference	20
27	Hunts Point Resiliency Project Collaboration Lab	Meeting	35

TABLE 13: 2017 PUBLIC GREEN INFRASTRUCTURE MEETINGS (CONTINUED)

Date	Community Member(s)	Type of Outreach	Attendees
August			
8	Ground-Breaking for TPL Playground at J.H.S. 189 Q	Ceremony	25
10	STEM Institute Teacher Training on CSO Program and GI	Conference	20
September			
13	Green Infrastructure Grant Program Workshop	Presentation	33
13	Evergreen: North Brooklyn Buisness Exchange	Meeting	20
19	South Ozone Park Civic Association West Meeting	Presentation	30
26	Brooklyn Community Board 6, Parks/Env. Protection Committee Meeting	Presentation	15
28	Ribbon-Cutting for TPL Playground at P.S. 120 Q	Ceremony	75
October			
2	Councilmember Brad Lander's Office	Walking Tour	5
4	Bronx Bourgh Services Cabinet	Presentation	25
10	Brooklyn Community Board Leaders	Presentation	15
11	Newtown Creek Citizens Advisory Group	Meeting	25
13	Jamaica Bay Boat Tour with Env. Stakeholders and Elected Officials	Boat Tour	5
17	Queens Civic Congress	Presentation	30
19	Jamaica Bay LTCP Update Briefing	Presentation	10
25	Newtown Creek Boat Cruise hosted by the Newtown Creek Group and the Newtown Creek CAG	Boat Tour	Unknown
30	Ribbon-Cutting for TPL Playground at P.S. 154 M	Ceremony	Unknown
November			
6	Queens Community Board 8 Environmental Committee	Presentation	25
14	Queens Borough President's Office	Presentation	45
17	Riverkeeper Meeting	Meeting	Unknown
29	Greater Whitestone Taxpayers Association	Presentation	40
December			
12	Green Infrastructure Grant Program Workshop	Presentation	21
13	Brooklyn North STEAM Collaborative	Presentation	20

EXHIBIT C - 2015 CONTINGENCY PLAN

2015 CONTINGENCY PLAN

The 2015 Contingency Plan submitted on June 27, 2016 and approved by DEC on July 5, 2017, outlined the plan for managing the equivalent of 1,181 impervious acres, or equivalent greened acres. The table below is the list of planned projects that will provide those greened acres by 2020 and the status.

TABLE 14: STATUS OF GREEN INFRASTRUCTURE 1.5% CONTINGENCY PLAN PROJECTS

Waterbodies	Area-Wide ROW Project	Status as of March 31, 2018	Reported Construction Completion Date[1]	Projected Construction Completion Date[2]
Flushing Creek	TI-011	100% Design – partial delay for one of three packages[3]	December 2019	February 2020
Newtown Creek	BB Cluster	100% Design – on schedule	December 2019	December 2019
Jamaica Bay	JAM-003	60% Design – partial delay for six of seven packages	December 2019	July 2020
EROW/Wallabout	NCB-014	100% Design – on schedule for package 1; In Survey – on schedule for packages 2 and 3	December 2020	December 2020
EROW/Bowery Bay	BB-005	90% Design – on schedule	December 2020	December 2020
Westchester Creek	HP-014	100% Design – on schedule	December 2020	December 2020
Westchester Creek	HP-033	100% Design – on schedule	December 2020	December 2020
Flushing Creek	TI-010	Geotech – partial delay for four of 12 packages	December 2020	December 2020
Bronx River	HP-007	Geotech – on schedule	December 2020	
Bronx River	HP-004/-002	Geotech – on schedule	December 2020	
Jamaica Bay	26W-005/-004	Geotech – on schedule	December 2020	

1 The Anticipated Construction Completion date as reported in the June 27, 2016 Contingency Plan.
2 Projected construction completion dates only shown for projects that have entered design phase.
3 "Packages" are the anticipated number of construction bids per design area and are subject to change based on final designs.

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