

Planning & Designing for Green Infrastructure:

Implementation in the Public Right-of-way

Presenters



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Learning Objectives

Understanding how NYC DOT's policy and planning measures can be used to accommodate pedestrian needs and achieve safety benefits within the framework of NYC DEP's green infrastructure implementation goals.

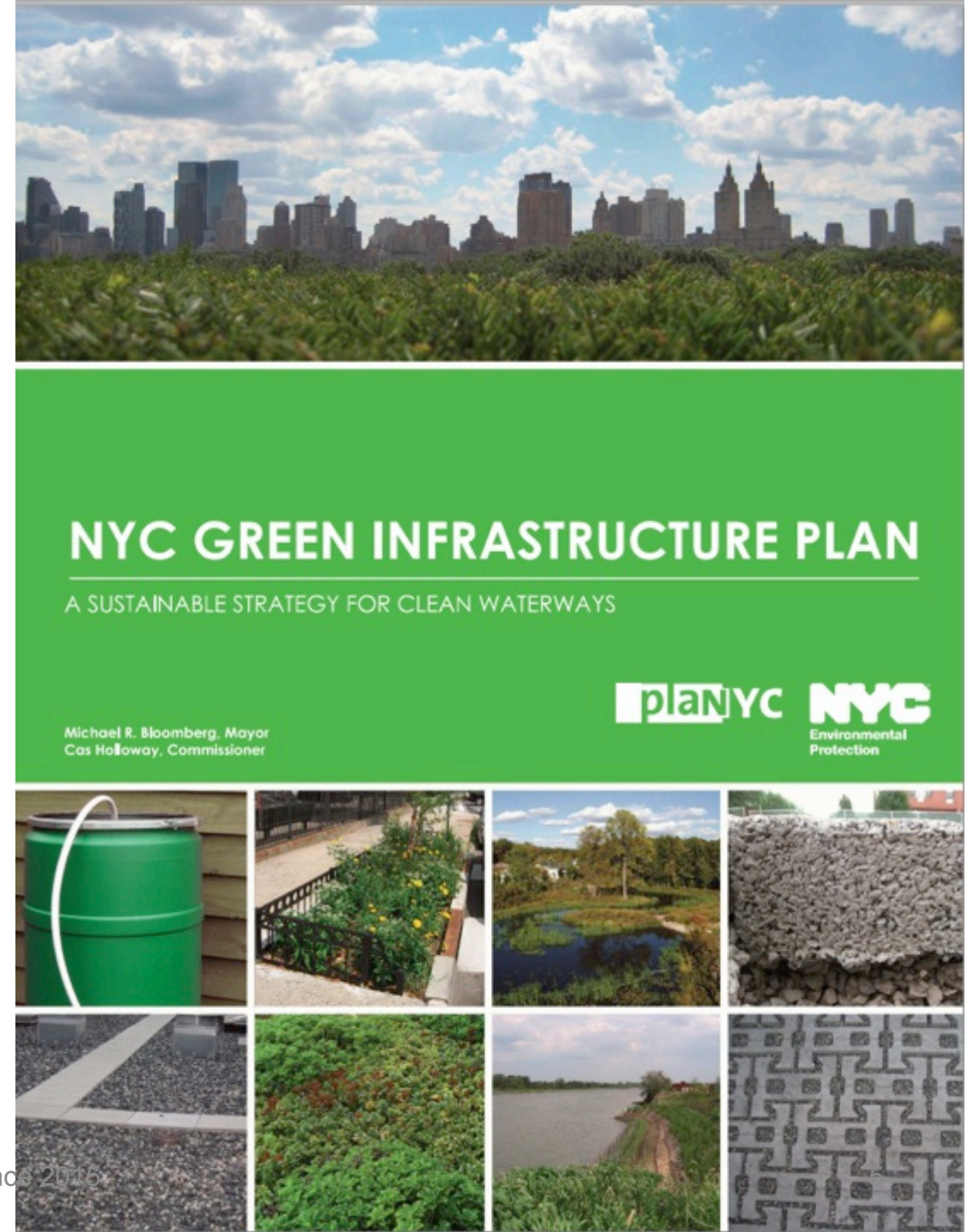
Agenda

1. Overview: NYC DEP GI Program
2. Program History
3. Concept to Construction
4. Green Infrastructure: Siting & ROWB Design
5. Designing Stormwater Greenstreets
6. Key Questions

NYC Green Infrastructure Plan

GI Plan will achieve better water quality and sustainability benefits than all-Grey strategy by:

- Reducing CSO volume by addition 3.8 billion gallons per year
- **Capturing rainfall from 10% of impervious surfaces through GI and other source controls**
- Providing substantial, quantifiable sustainability benefits
 - Cooling the city
 - Reducing energy use
 - Increasing property values
 - Cleaning the air



GI in NYC

Right-of-way bioswales (ROWB):

Planted into sidewalk with curb cuts to let water in.

Stormwater greenstreets (SGS):

Planted in roadbed, change street geometry



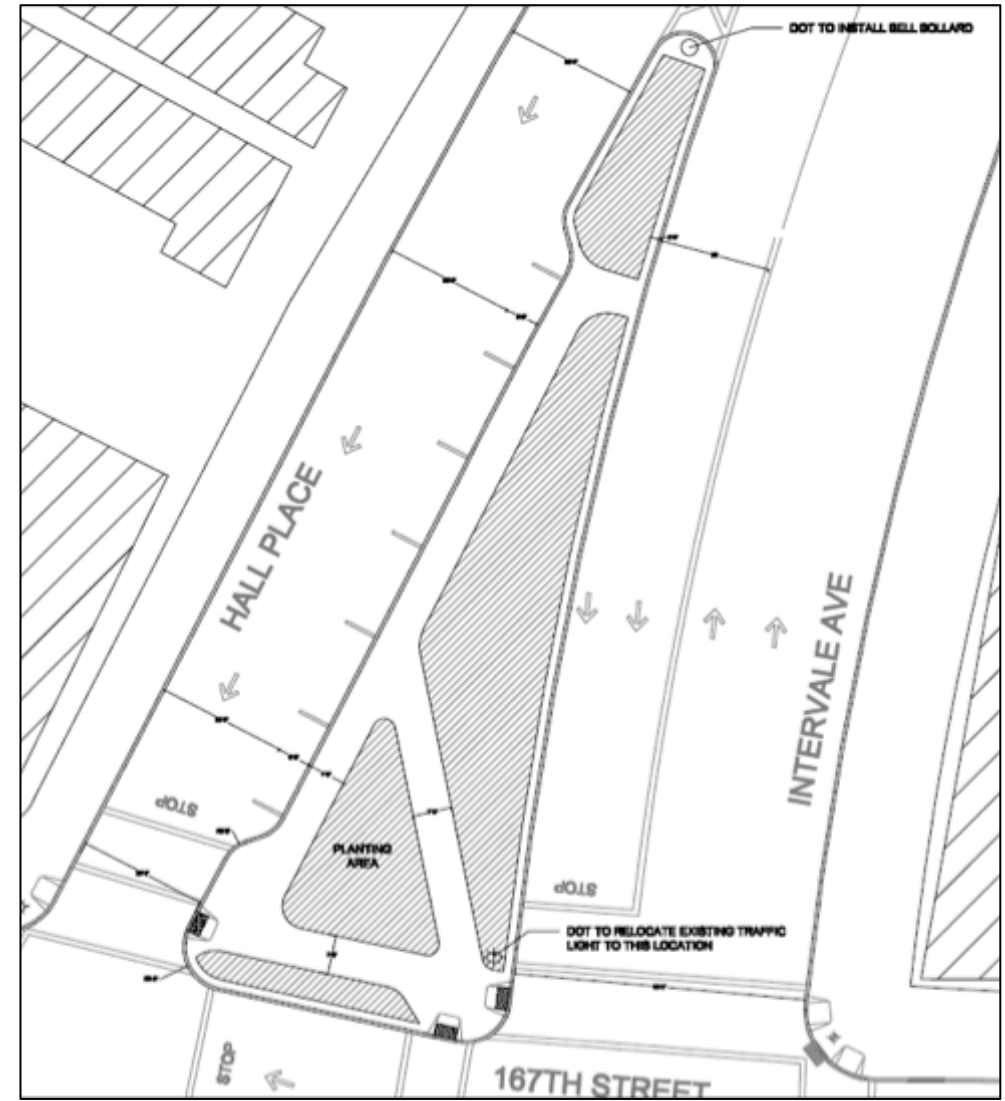
Program History



Program History

DOT Review of GI

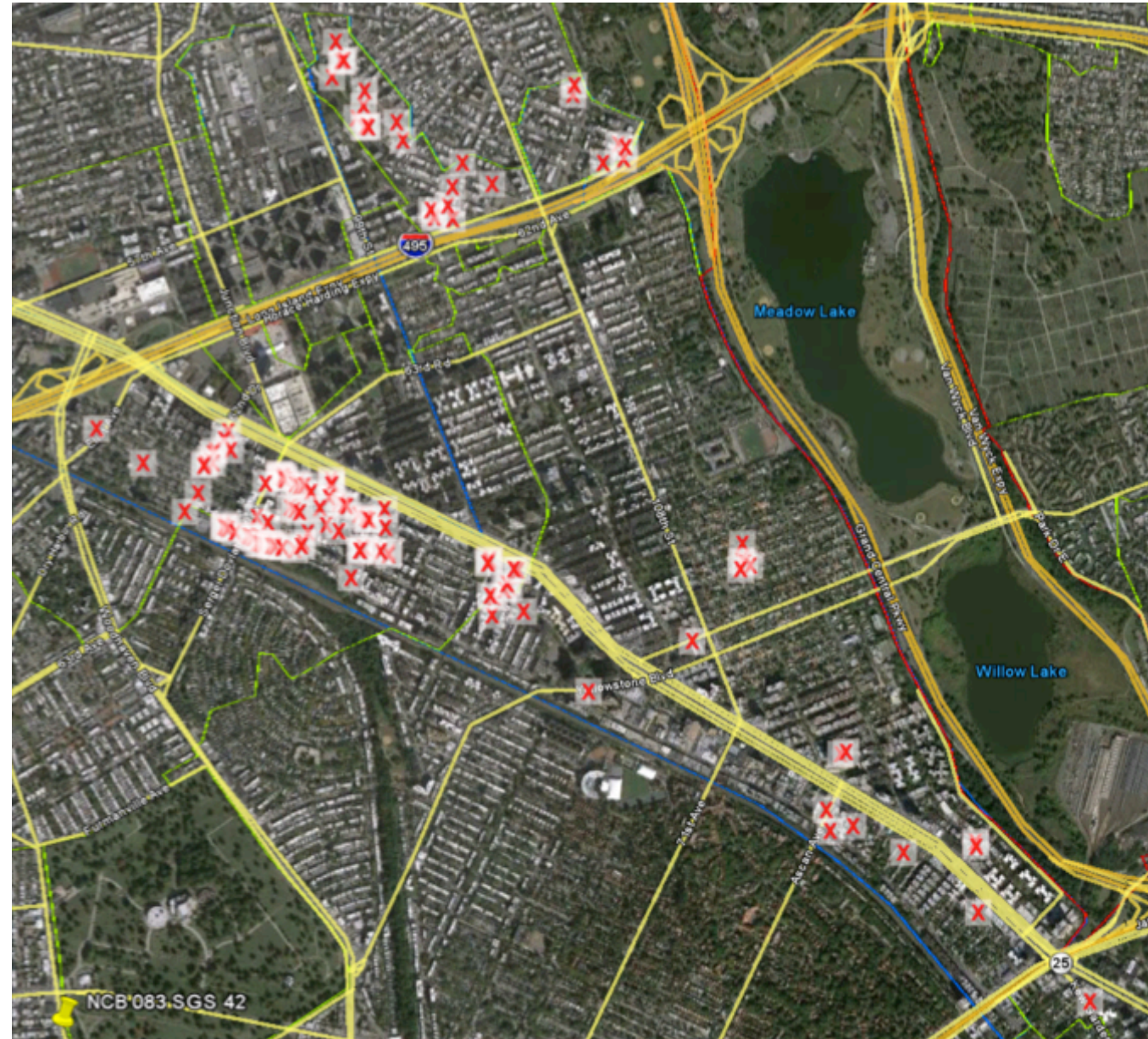
- Before 2012: “Greenstreets”
 - Dept. of Parks & Rec in lead
 - Approx. 20 projects per year
 - Various funding sources
- 2012-2013: 1st Phase ROWBs
 - DPR managed design/ construction
 - Approx. 20 projects per year
 - DEP funding



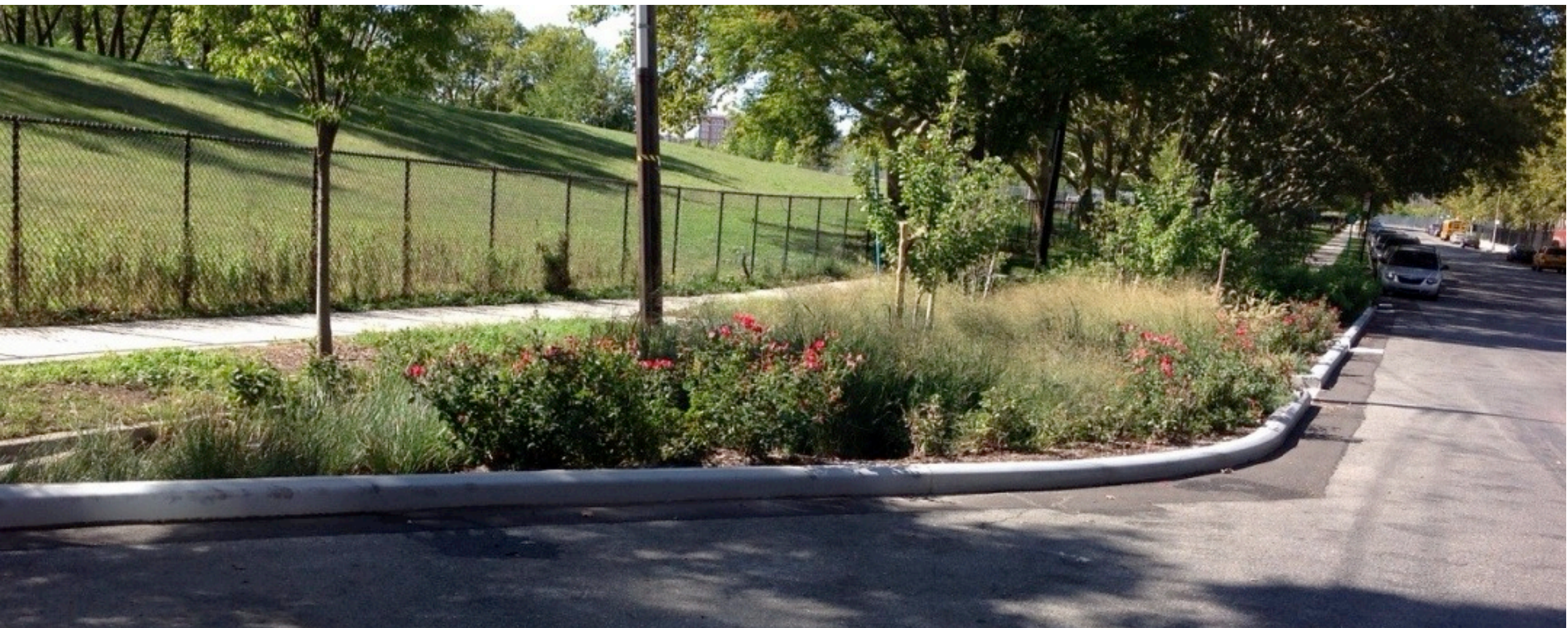
Program History

DOT Review of GI

- 2014-present, Full Program
 - DEP in lead, with up to 10 consultants managing design
 - Approx. 1,000 projects per year
 - DEP funding



Concept to Construction

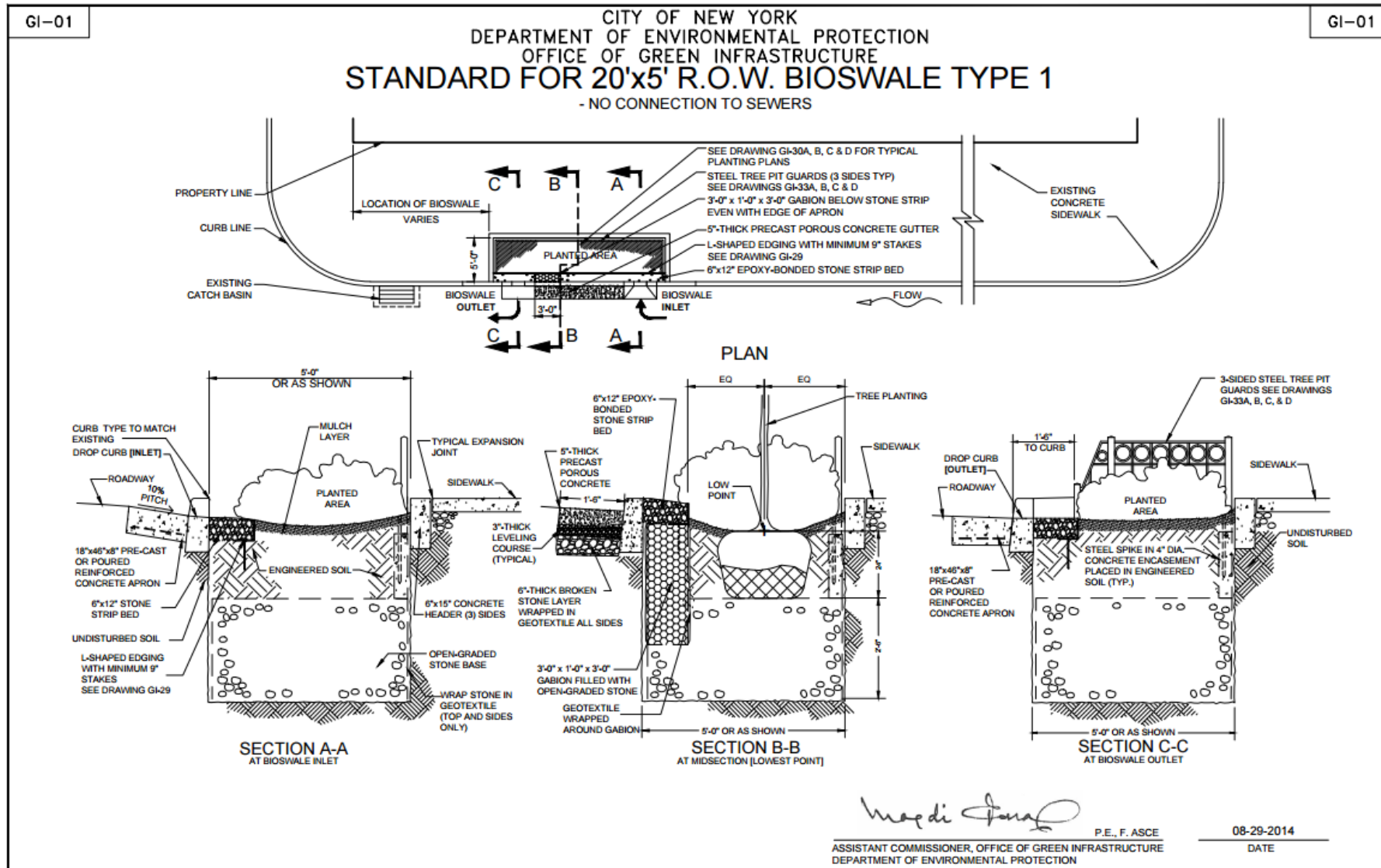


Concept to Construction

Agency Interaction









- NYC DEP
 - Manage contract areas
 - Decide how many/where
 - Prepare design/construction documents
 - Maintain GI
- NYC DOT
 - Provide guidance on siting/design
 - Review/approve locations
- NYC DPR
 - Provide input on trees/plantings



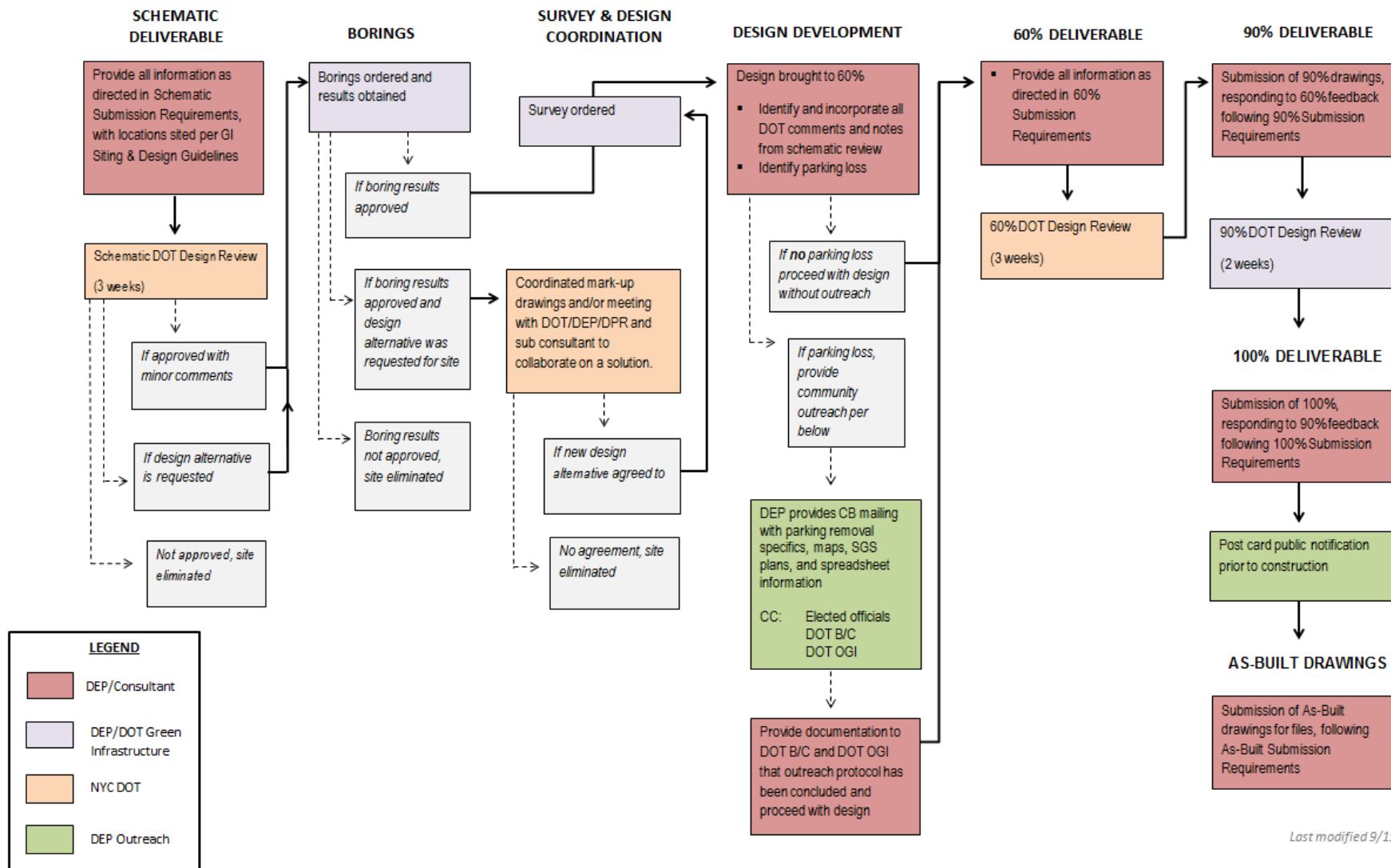


Original NYC DEP Green Infrastructure Standards










	Walkthrough	Design	Approval	Build	Maintain
	DEP uses: -DOT GI Siting Guidelines 	DEP uses: -DOT GI Submission Requirements -DOT GI Design Guidelines 			
			DOT reviews at 10%, 60%, 90%, and 100% 		
					

GREEN INFRASTRUCTURE STORMWATER GREEN STREET (SGS) DESIGN & SUBMISSION PROCESS



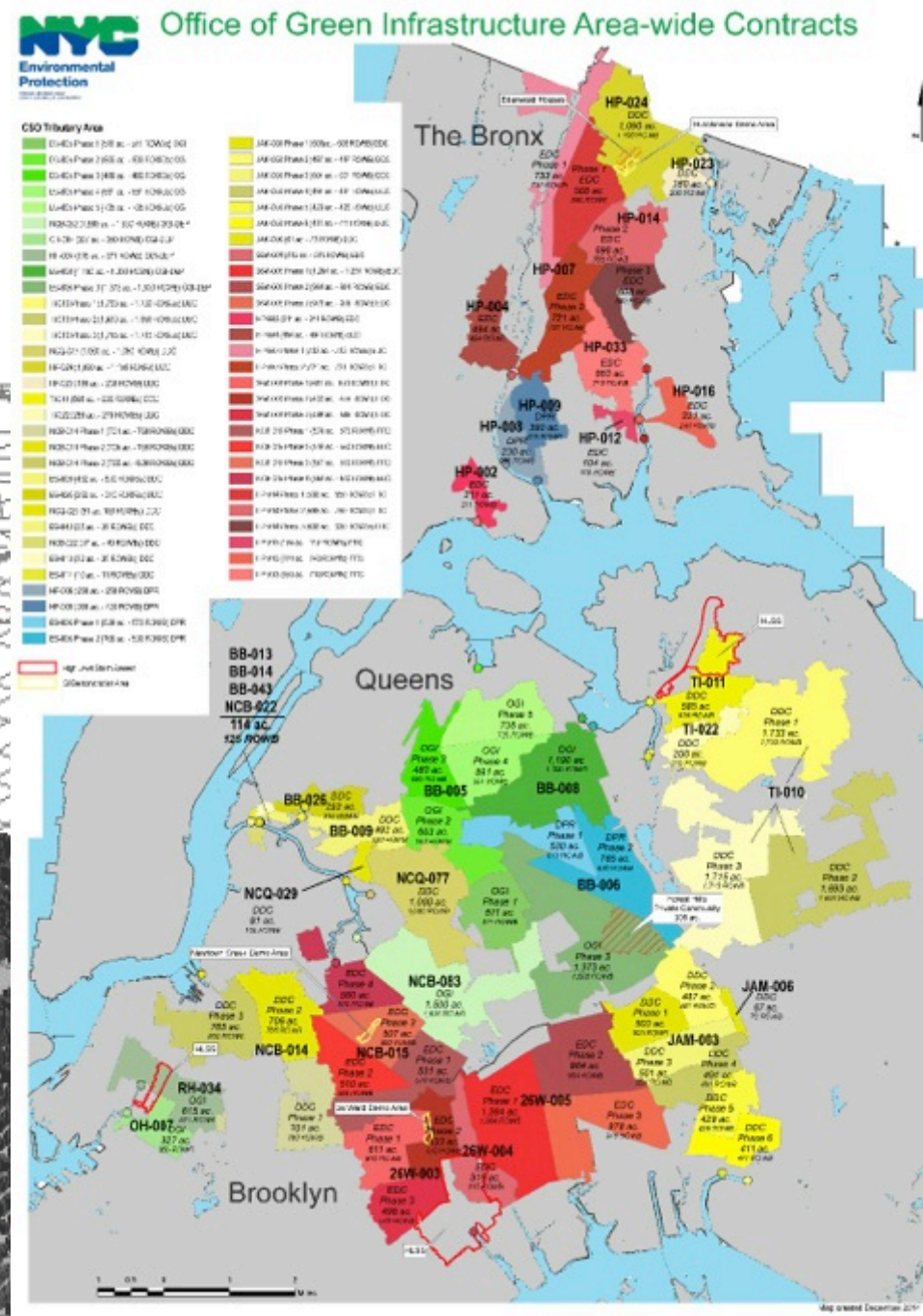
Last modified 9/15/2014



	Walkthrough	Design	Approval	Build	Maintain
	DEP uses: -DOT GI Siting Guidelines 	DEP uses: -DOT GI Submission Requirements -DOT GI Design Guidelines 		Borough Commissioner Offices Capital Program Management Bridges Street Furniture Wayfinding Accessibility Programs Sidewalk Inspection & Management Roadway Repair & Maintenance Traffic & Planning Parking Public Spaces & Urban Design Project Development Pedestrian & Bicycle Programs RIS Street Lighting Signals Operations Geometric Design Borough Engineering OCMC / Permits	
			DOT units review at 10%, 60%, 90%, and 100% 		
					

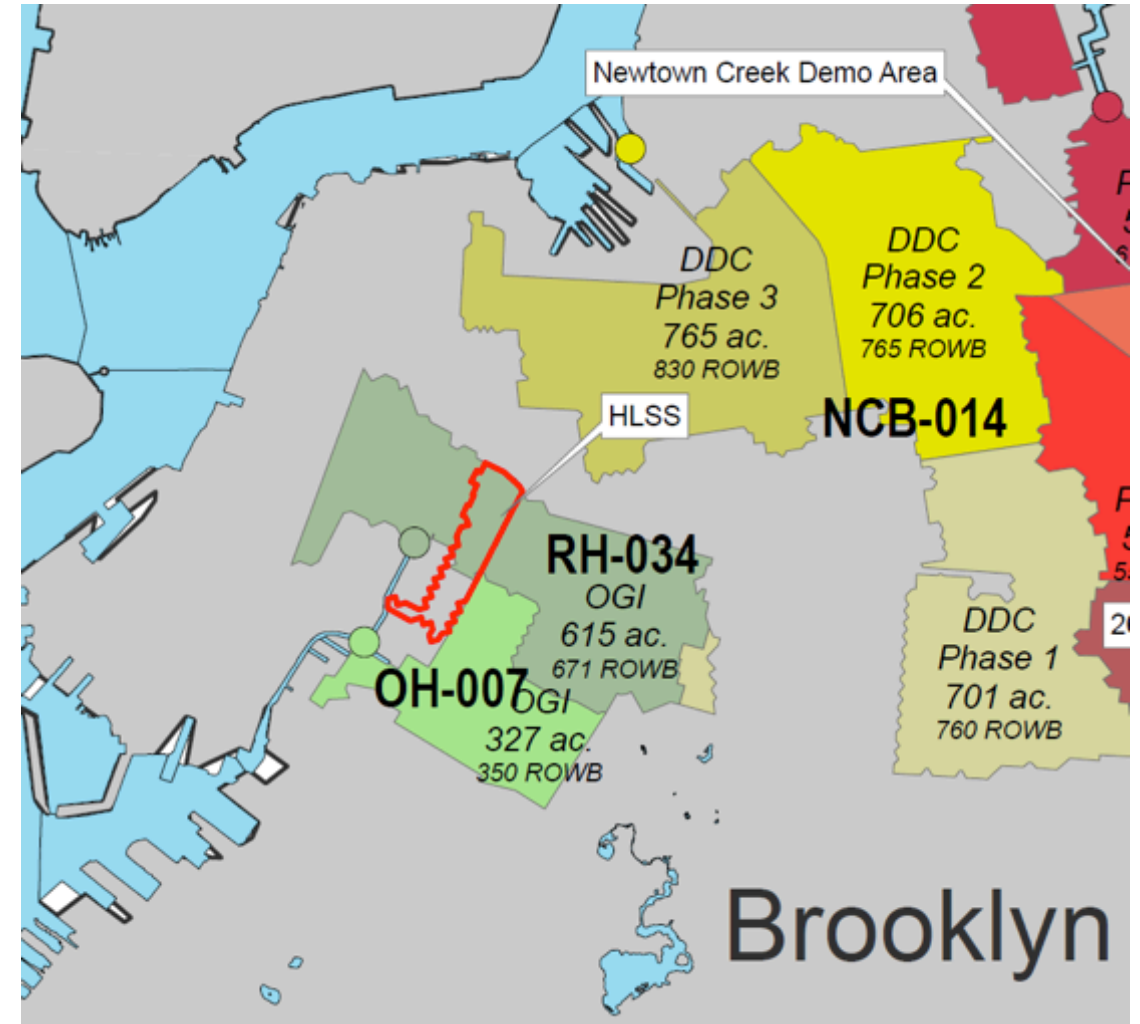
NYC DOT Wrap

SEI Conference 2015



NYC DEP GI Siting Process

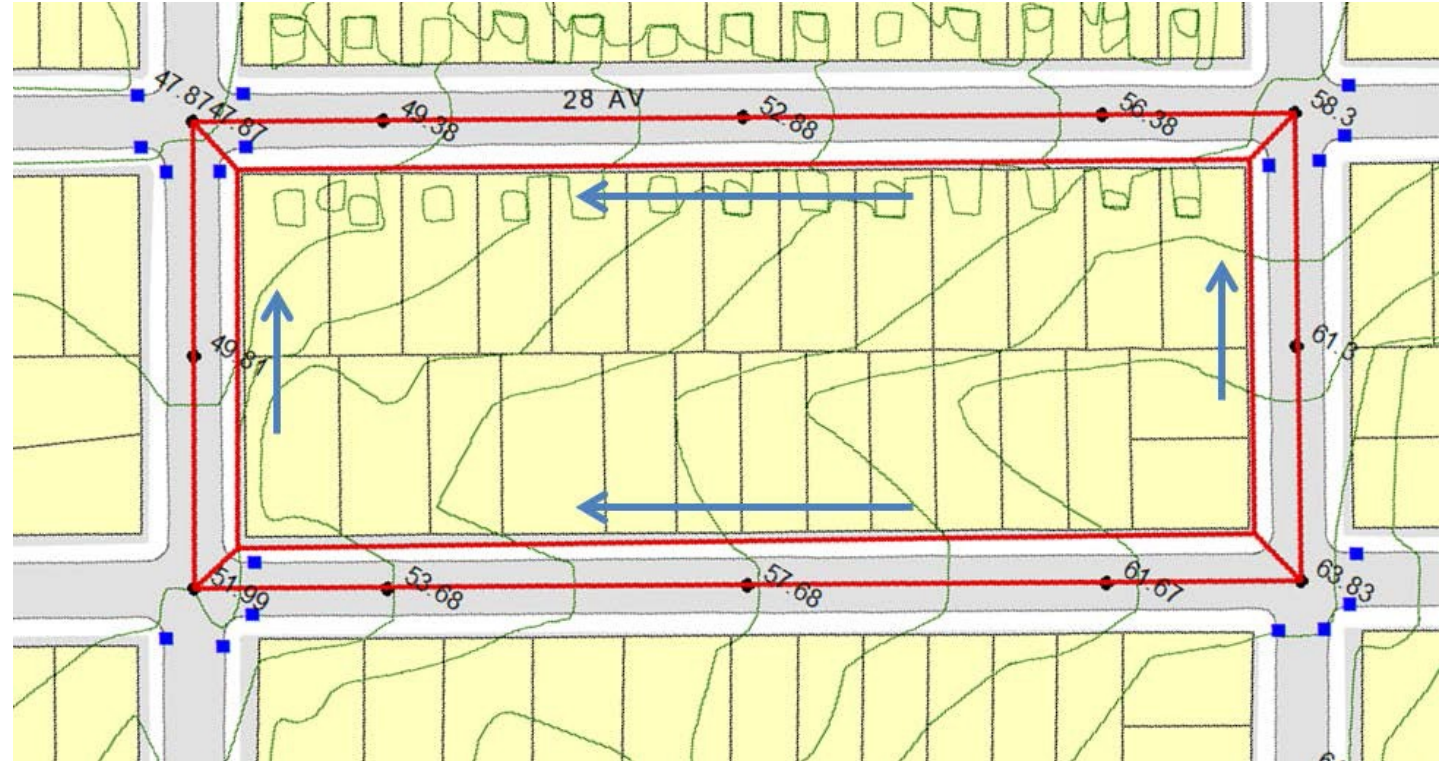
- Contract area based on CSO outflow point



NYC DEP Office of Green Infrastructure, Area-wide Contracts

NYC DEP GI Siting Process

- Stormwater capture needs based on block-level analysis



Tributary Drainage Area (TDA) analysis

NYC DOT Siting Guidelines

- Comprehensive field guidelines for walkthrough team
- First distributed in 2011/2012
- Re-issued many times
 - Iterative, learning process for agencies and units involved
- Balance of technical requirements, engineering analysis and existing context



GREEN INFRASTRUCTURE SITING GUIDELINES (ROWB & SGS)*

1. GENERAL SITING INFORMATION

A. General: These guidelines are not criteria but are minimum standards to provide field guidance for initial siting. Internal reviews will be more comprehensive considering information and other factors not always available in the field.

B. Context: Green Infrastructure ("G.I.", consisting of Right of Way Bioswales "ROWBs" and Stormwater Greenstreets "SGSs") should fit into context of the block and be guided by existing straight walking clear paths. Subtle deviations are acceptable as long as the appropriate clear path width is maintained. Deviations to straight path should be brought to DOT for review after the walkthrough.

C. City codes/ordinances: G.I. shall not violate any building code or FDNY requirements.

D. Gathering areas: G.I. shall not be sited in "No Standing Anytime" zones for school buses or in any locations at school entrances that would impede drop off and pick up of students, including waiting areas for parents. Consideration should also be given to religious facilities, funeral homes, day care centers and other uses where groups may need to gather.

E. Stormwater Greenstreets: Should only be located in the curbside lane if it is never used as a moving lane.

F. Vision Zero: If the following conditions exist, it is strongly advised that opportunities to achieve Vision Zero goals be incorporated by providing intersection or mid-block SGS neckdowns. DOT can advise at 10/60% reviews.

- The adjacent roadbed is more than 30' for one-way traffic with parking on both sides and more than 36' for two-way traffic with parking on both sides.
- The intersection is skewed (allowing drivers to make fast right turns), or has long crossing distances for pedestrians.

G. No Standing Anytime regulations next to any GI: Any locations with this condition should be brought to DOT after the walkthrough so as to determine the purpose of the regulation and if it would impact siting.

H. Sign Issues: DOT Borough Engineering is to review all potential impacts to existing and new traffic signage.

I. Design: Refer to NYC DOT Green Infrastructure Design Guidelines for the design of ROWBs and SGSs.

J. Trees: Trees should be no less than 35' from the apex to the intersection. For more information refer to NYC DOT Green Infrastructure Design Guidelines (DWGs R-3 & R-4).

NYC DOT Green Infrastructure Siting Guidelines

Siting & Design: Pedestrian Mobility

Key Issues in R.O.W.

- Pedestrian volumes
 - Dictated by land use: residential, commercial, industrial
- Available sidewalk (before and after installation)
- Pedestrian desire lines

Requirements for Implementation

- Adequate room for mobility
- Access to street



Low volume industrial



Low volume residential

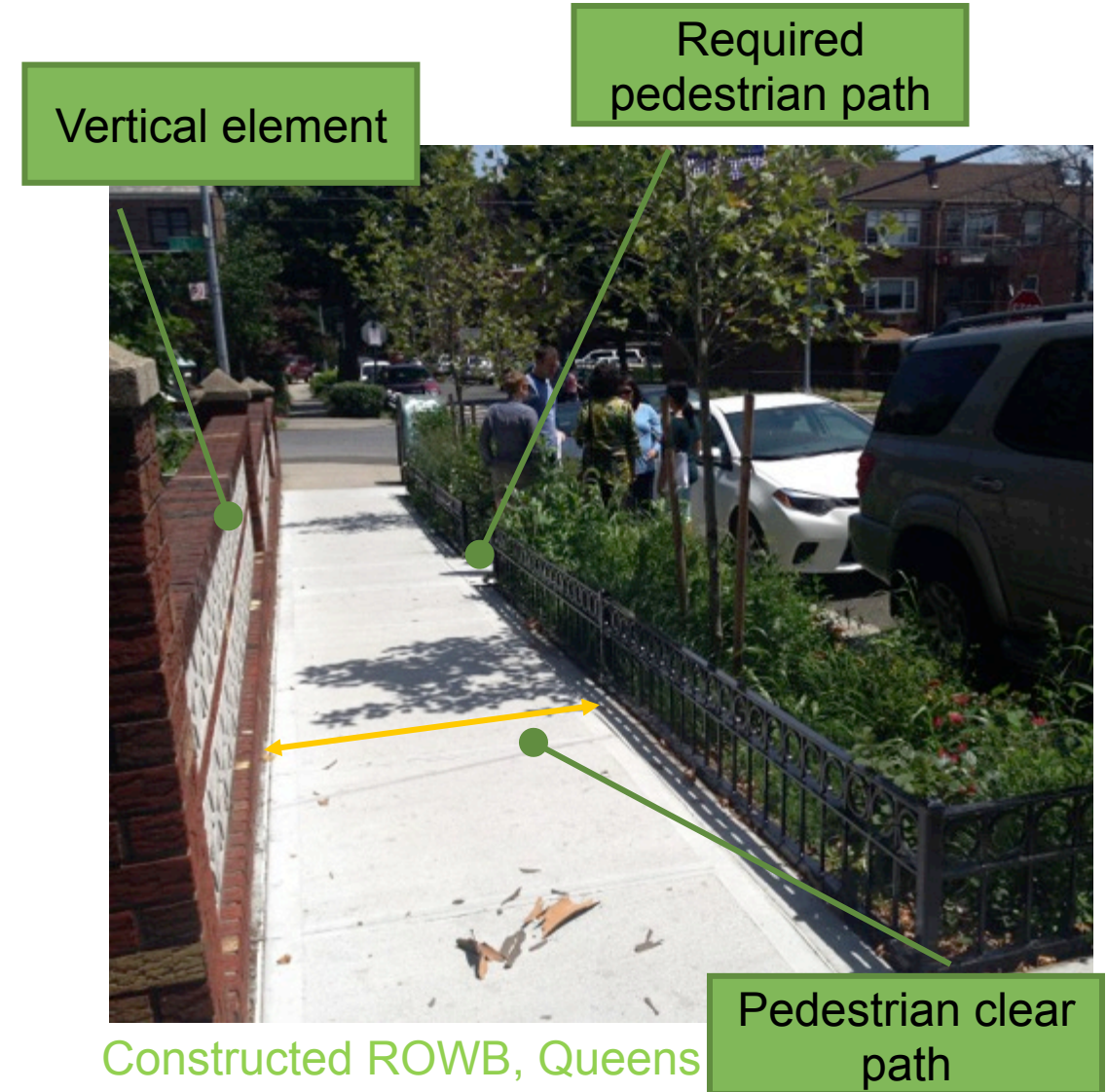


High volume commercial

Siting & Design: Pedestrian Mobility

2. GI LOCATION & SIZE <i>For any extenuating circumstances requiring an exception, DEP may submit aerial images with as many dimensions as reasonable at the walkthrough phase for tentative feedback or highlight exceptions at 60% design with a detailed survey for consideration.</i>			
Land use/zoning	Pedestrian clear path	ROWB size	SGS Length <i>Sizes below reference maximum length without pedestrian path. For sizes larger than listed below, pedestrian path is required every 20'.</i>
A. Low Density Residential (R1-R5)	5'-0" – 5'-11" and next to vertical element 3' or higher	13' (DOT reserves the option to reduce to 10' where it deems necessary during design drawing reviews)	25'
	5'-0" -5'-11" (no vertical elements)	20'	25'
	Clearance > 6'-0"	20'	30'
B. High Density Residential (R6-R10) & Industrial & Commercial (with no frontage)	5'-0" – 5'-11"	10'	25'
	6'-0" – 7'-11"	13'	25'
	Clearance > 8'-0"	20'	30'
C. Commercial* (with frontage) <i>*Attention should be given to commercial corridors with high levels of pedestrian traffic</i>	6'-0" – 8'-0"	10'	25'
	Clearance > 8'-0"	13' (Spacing should be minimum 10')	25'

NYC DOT Green Infrastructure Siting Guidelines



Siting & Design: Pedestrian Mobility



Siting & Design: Access to Curb

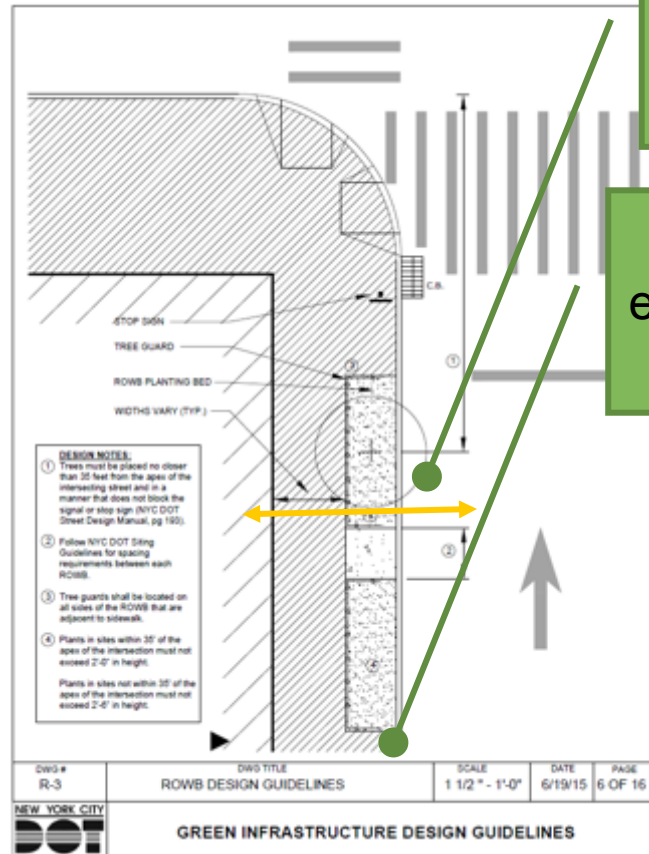
Key Issues

- Loading & drop off
- Parking
- Garbage pick up

3. CLEARANCES/DISTANCE TO EXISTING CONDITIONS	
Existing Condition	Minimum Clearance
A. Doors & gates [refer to the NYC DOT G.I. Design Guidelines (DWG R-1)]	Maintain a minimum of 5' wide (or width of door/gate, whichever is greater) access path from the front of the door to the curb line at the street. ROWBs may not be sited in front of a doorway.
B. Fences or other projections which impact pedestrian clear path [refer to the NYC DOT G.I. Design Guidelines (DWG R-1)]	Clear path plus diagonal clearance of 7'
C. Building vaults	5'
D. Bus Stops [refer to the NYC DOT G.I. Design Guidelines (DWG R-2)]	100' (from posted bus stop sign towards back of bus) 20' (ahead of posted sign at discretion of DOT Bus Stop Management.)
E. Driveways or legal curb cuts	5' (Curb cuts not perceived as legal and in conflict with proposed siting should be verified in writing with the Department of Buildings)
F. Fire hydrant	3' (Offset is from both sides of hydrant. When bollards are present, DOT may request offset from outside edge of bollard.)
G. Guy wires	5'
H. Marked or unmarked crosswalks, [refer to the NYC DOT G.I. Design Guidelines (DWG R-2)]	5' (Commercial areas: Stay outside the Corner Quadrant, 10' into the block from the building line - Executive Order #22 of 4/13/95d , as amended)
I. Manholes	5'
J. Muni meters	4'
K. School entrances	25' from center of main entrance (50' total)

NYC DOT GI Siting Guidelines

Siting & Design: Access to Curb



Sample page, NYC DOT Green Infrastructure Design Guidelines

Allows for parking along curb

Access to entrances, vaults and gates

Pedestrian path provides path for parking, loading, and garbage



Constructed ROWB, Queens

Siting & Design: Visibility

Key Issues

- Maximum height of planting
- Tree distance from intersection



Designing Stormwater Greenstreets



Designing Stormwater Greenstreets

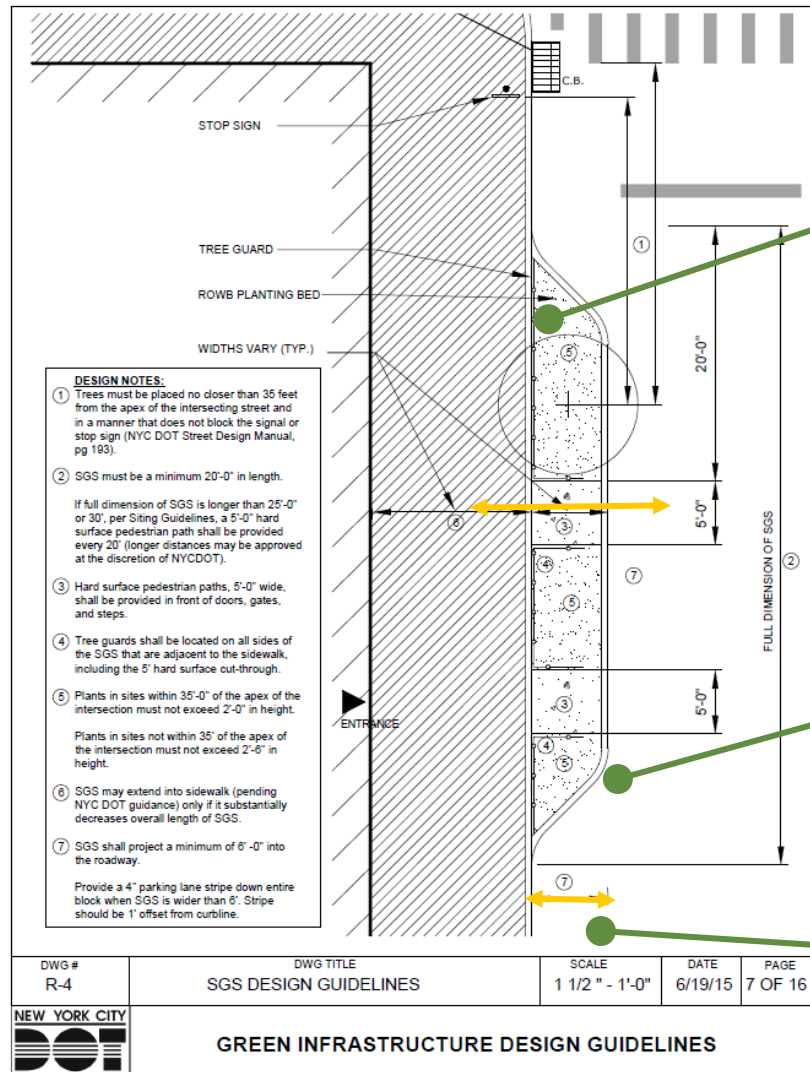
SGS Background

- Sited where ROWBs do not fit in sidewalk

Key Considerations:

- Curb alignments
- Signs/object markers/markings
- FDNY requirements
- Pedestrian facilities/mobility
- Car turning movements
- Accessibility
- Plant heights
- Tree locations





Tree guard

Correct curb radius

Required minimum projection into roadbed



NYC DOT Green Infrastructure Design Guidelines

GI: Potential for Co-Benefits

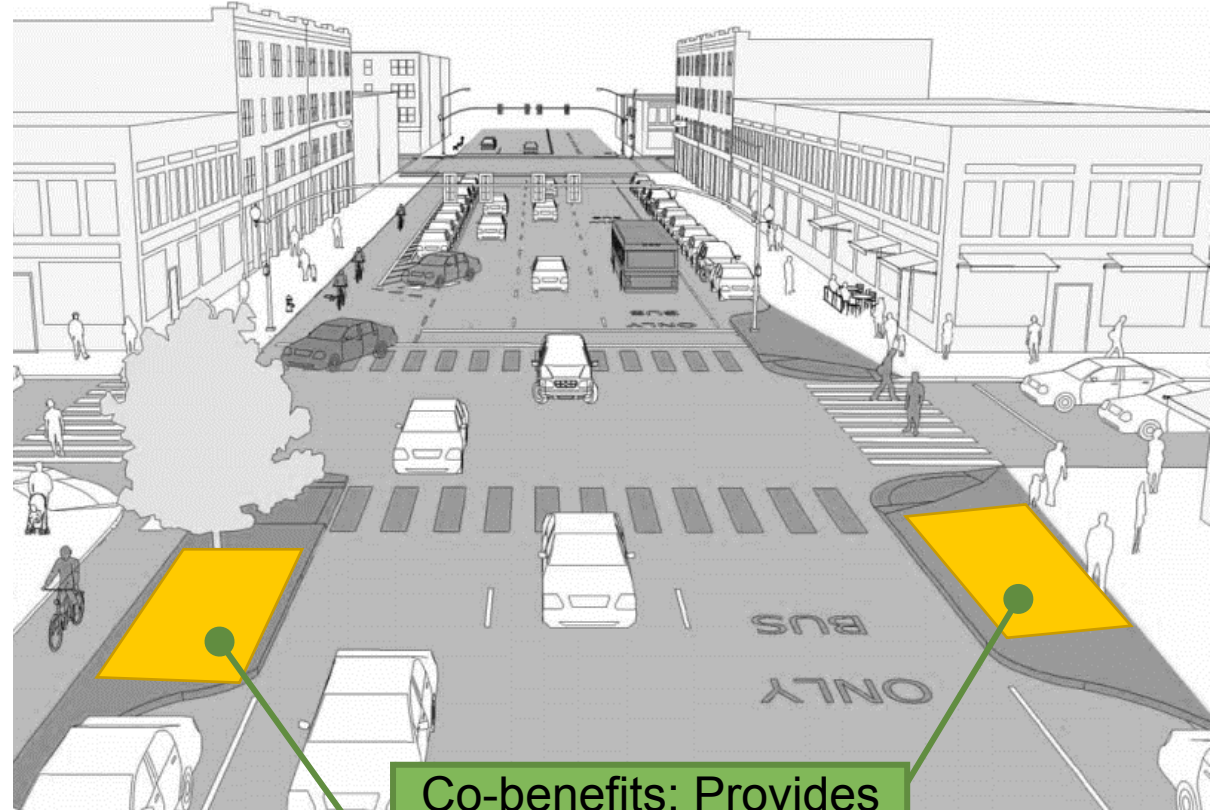
- Vision zero objectives
- Neighborhood beautification
- Improving pedestrian access



DOT-Pedestrian Projects Group Goals

Street Improvement Goals

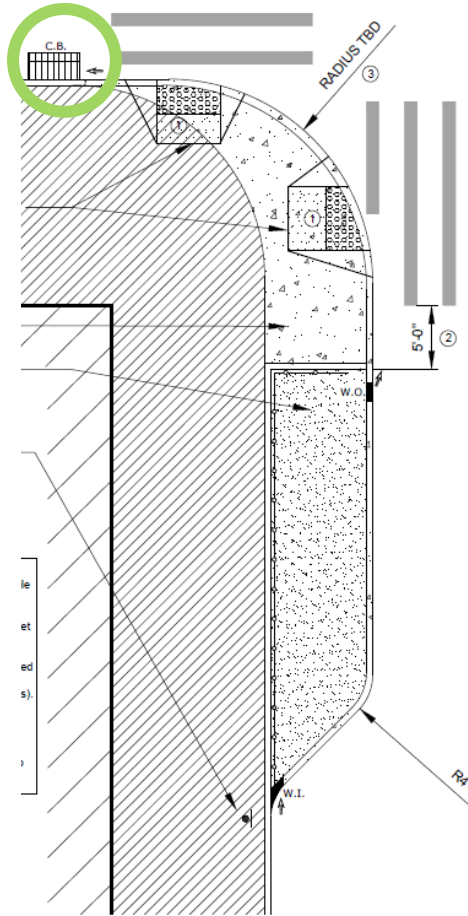
- Shorten pedestrian crossing distances
- Align pedestrian access with the “desire line”
- Reduce pedestrian/vehicle conflicts



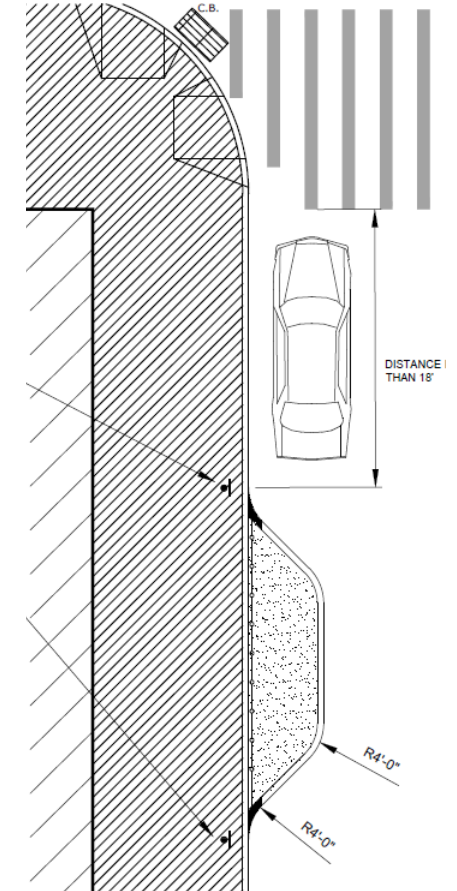
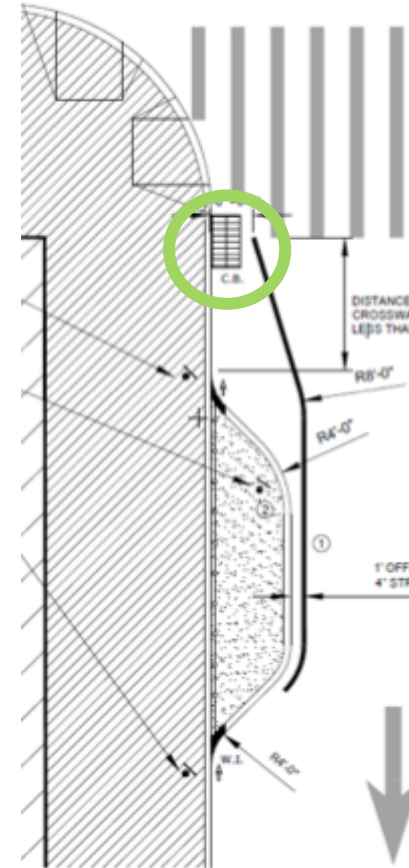
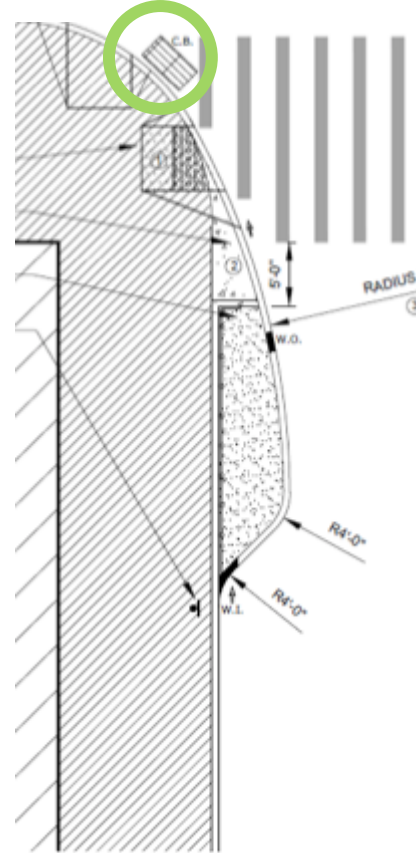
Co-benefits: Provides shorter ped crossing distance and space for GI

SGS Designs

(contingent upon catch basin & street conditions)

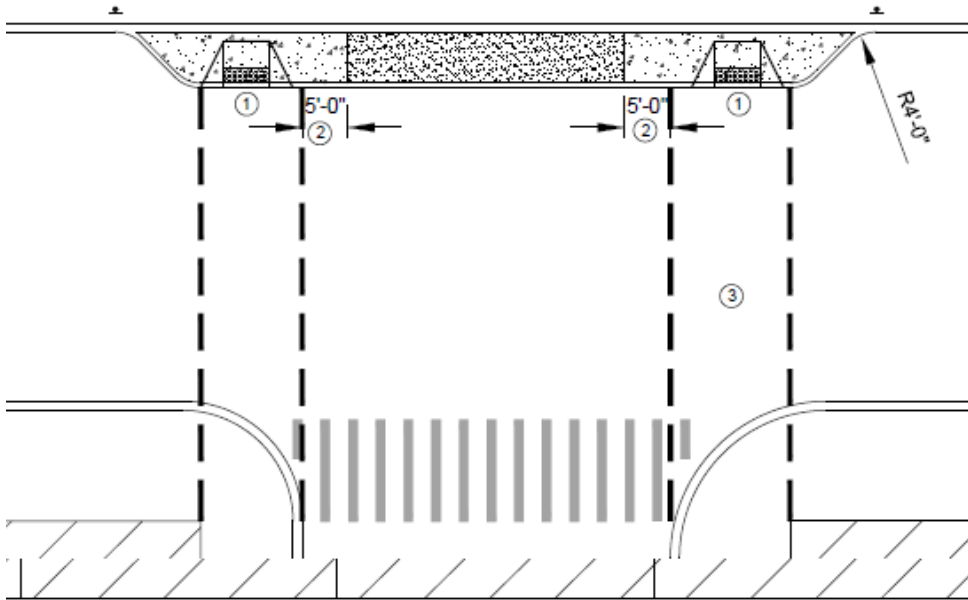


*Preferred option

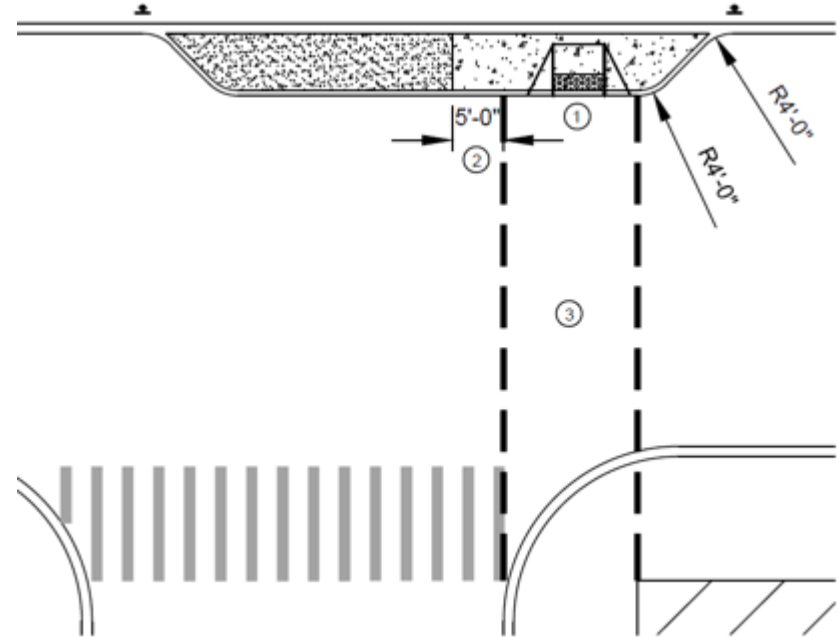


T-intersection designs

Preferred option



Alternative



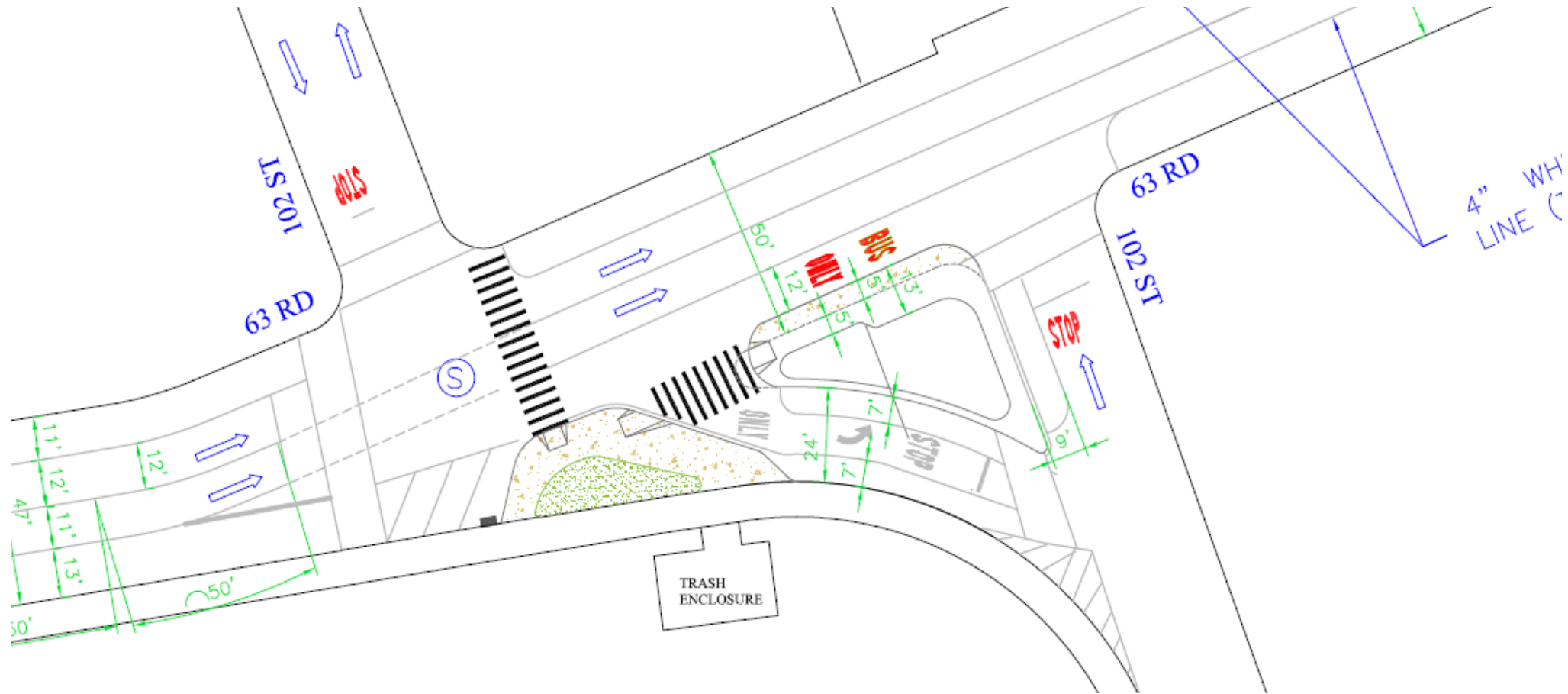
SGS – Alternative Designs



Existing

102nd Street and 63rd Road

SGS – Alternative Designs



Proposed
102nd Street and 63rd Road

Questions

1. What is the first step in analyzing locations for green infrastructure in NYC?
2. What are two pedestrian requirements for GI implementation in the public right-of-way?
3. What are the two concerns for visibility?

Answers

1. What is the first step in analyzing locations for green infrastructure in NYC?
 1. Tributary drainage analysis
2. What are two pedestrian requirements for GI implementation in the public right-of-way?
 1. Adequate room for mobility
 2. Access to the street
3. What are the two concerns for visibility?
 1. Plant height
 2. Distance of trees to intersections

Thank you!

