

# Pervious Pavement

## A Strategic Plan For NYC DOT

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Spring 2012 Capstone  
April 24, 2012



# Agenda

- Project Summary
- Case Study Findings
- Site Selection Analysis
- Recommended Locations
- Implementation Plan

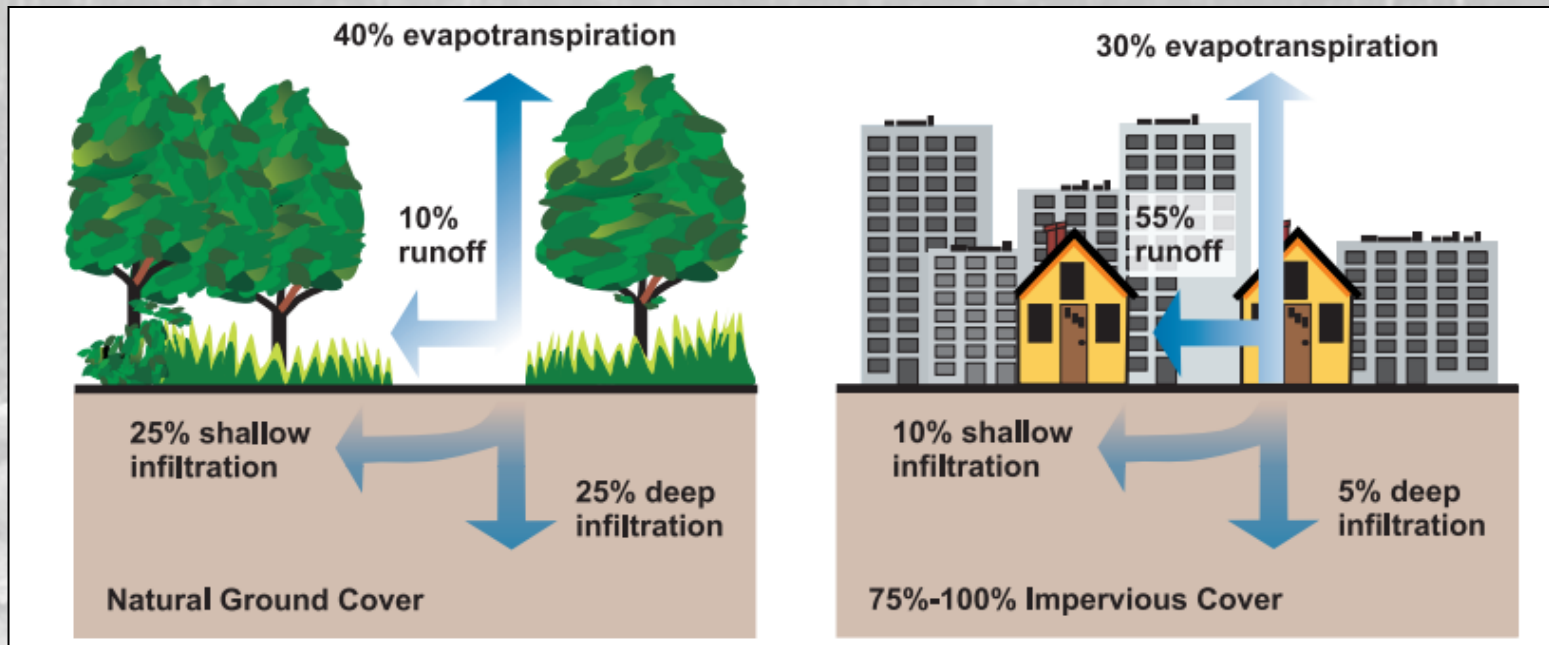


*Image courtesy of: Jason King at Landscape + Urbanism*



# Project Summary

- Sustainability Problem: Combined Sewer Overflows (CSO)
  - 27 billion gallons/year = 41,000 Olympic-size swimming pools



*Image courtesy of: EPA Stormwater Management*

# Project Summary

- NYC's Comprehensive Plan to address CSOs
  - Grey & Green Infrastructure
  - Goal is to reduce runoff from 10% of impervious surfaces by 2030

## Grey



Newtown Creek Digester Eggs

## Green



Pervious Pavement



Green Roof



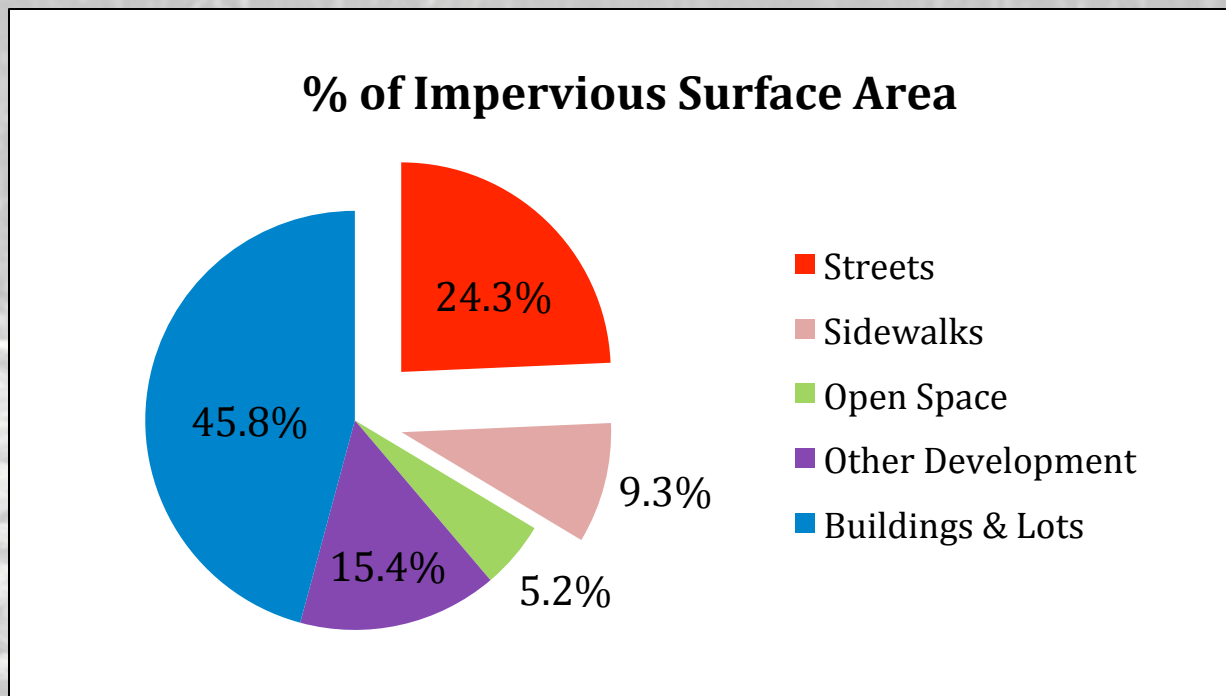
Bioswale

*Images courtesy of: NYC DEP, the Calhoun School, and TecEco Ltd.*




# Project Summary

- Role of DOT in alleviating CSO problem
  - DOT has jurisdiction over streets & sidewalks
  - Streets are 24% of all impervious surfaces
  - DOT must install green infrastructure on hundreds of streets by 2030 to meet this target



# Client Needs

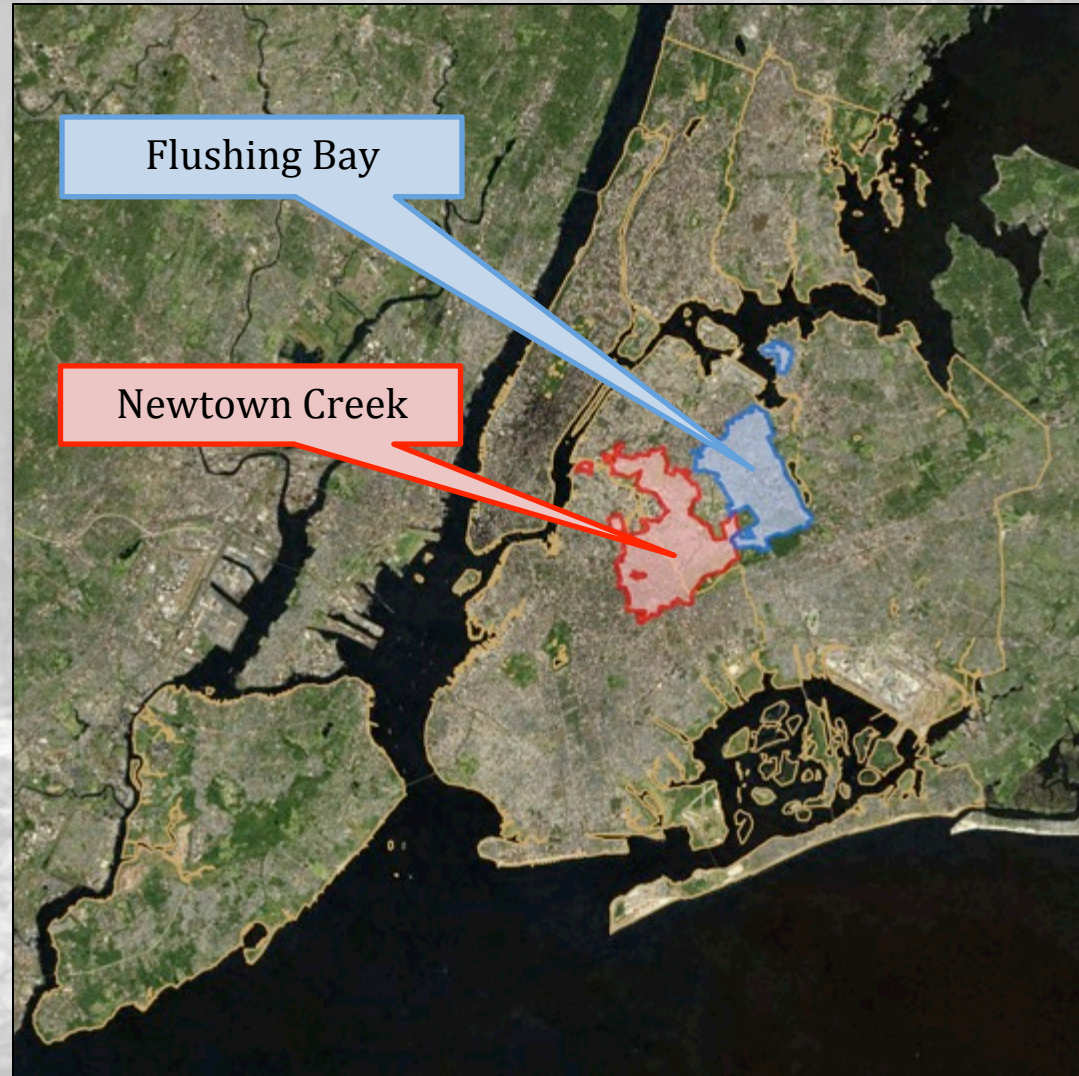
- DOT wanted NYC to be first major U.S. city to deploy pervious pavement in significant volume, but needed guidance on how or where to start
- Our main objective was to develop a new decision tool for DOT to locate, evaluate, and install potential sites for pervious pavement

Client Need	 Deliverable
A. Show decision makers that PP can be effective	Case Studies
B. Provide Design & Construction teams with list of suitable locations	Site Recommendations
C. Vision of initial roll-out and expansion of PP to meet 10% impervious capture target	Implementation Plan
D. Internal documentation to request funding	Capital Project Initiation Documentation

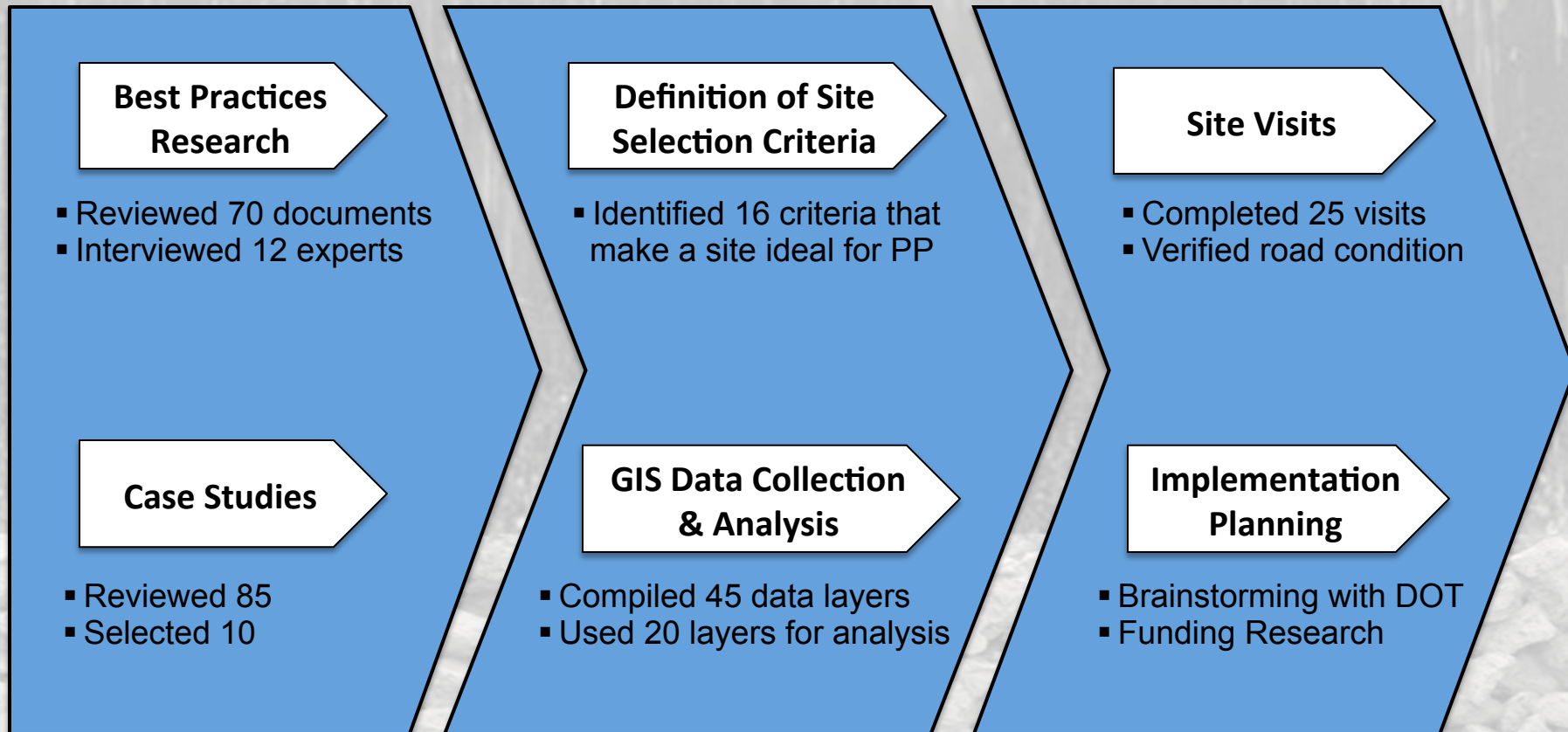


# Project Scope

- Two Priority Watersheds
  - Flushing Bay Watershed
  - Newtown Creek Watershed
- DOT Parameters
  - Streets
  - Porous Asphalt



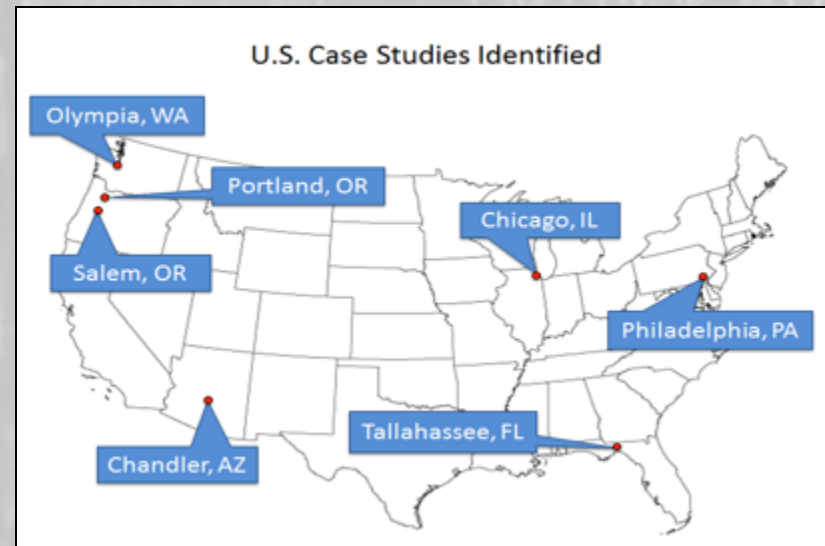
# Methodology & Approach





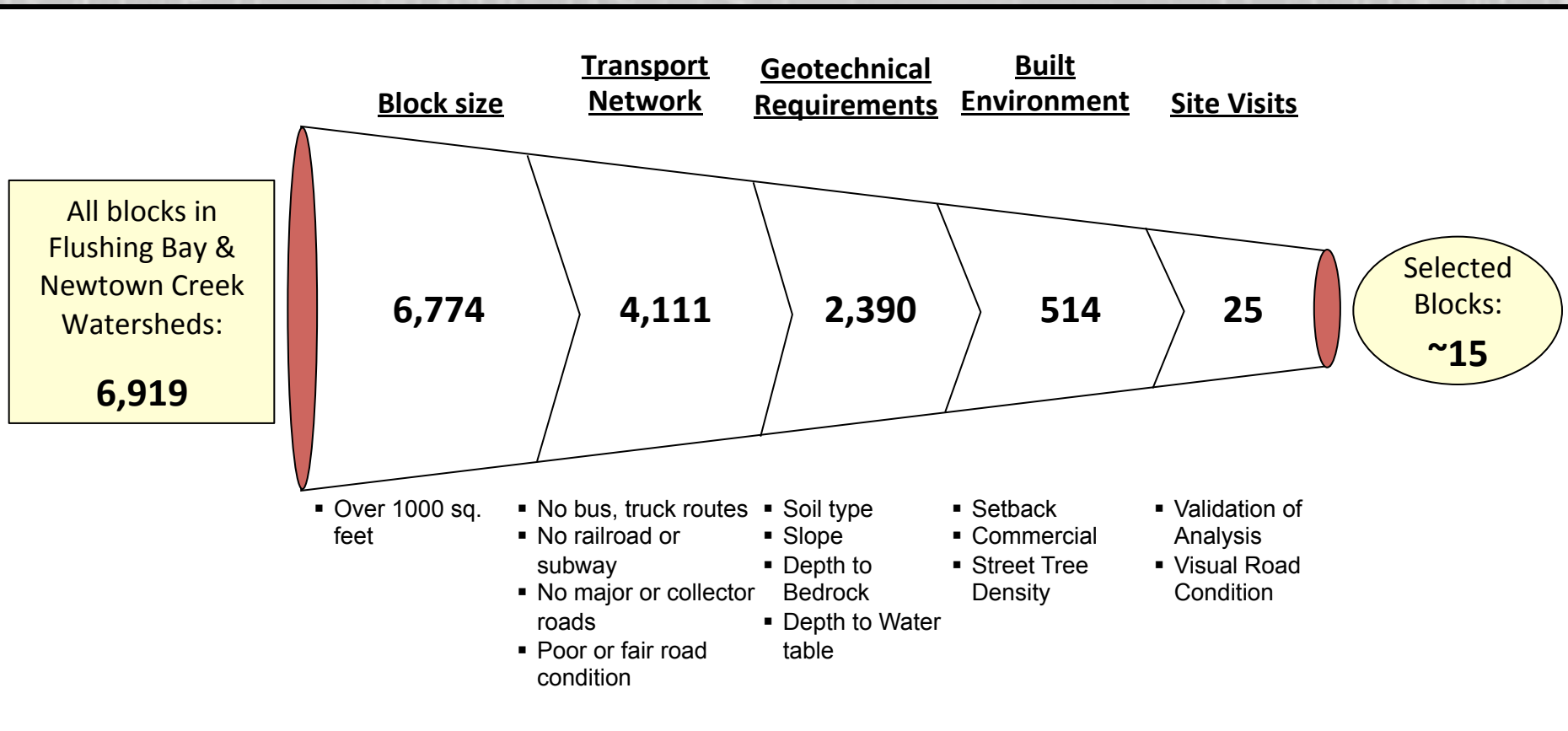
# Case Study Findings

- 85 cases reviewed, 10 selected
- Domestic
  - Small-scale installations
  - Parking lots
- International
  - Standardized practice in Germany and Japan
  - Integrated into the stormwater management system
- Illustrates PP has been installed globally and is an effective green infrastructure measure



# GIS Analysis

- Excluded blocks using various filters to arrive at recommendations





# Site Selection based on GIS Analysis

GIS Analysis Table		
	Criteria	Site Data
GEOTECHNICAL	Depth to bedrock	473.8 feet
	Depth to watertable	76.2 feet
	Slope	2.00%
	Hydrologic soil group	B
	Permeability	Moderate
	Clay content	< 20%
TRANSPORT NETWORK	Road designation	Local
	Major road	No
	Bus route	No
	Truck route	No
	Subway line	No
	Railroad line	No
BUILT ENVIRONMENT	Building setback	> 10'
	Residential zoning	Yes
	Street tree density	< 3 / K sq. ft.
	Pavement condition	Fair

 Verified through Site Visit



68<sup>th</sup> Rd between 110<sup>th</sup> and 112<sup>th</sup> St, Queens, NY



# Site Visits



**Road Condition**



**Curb Condition**

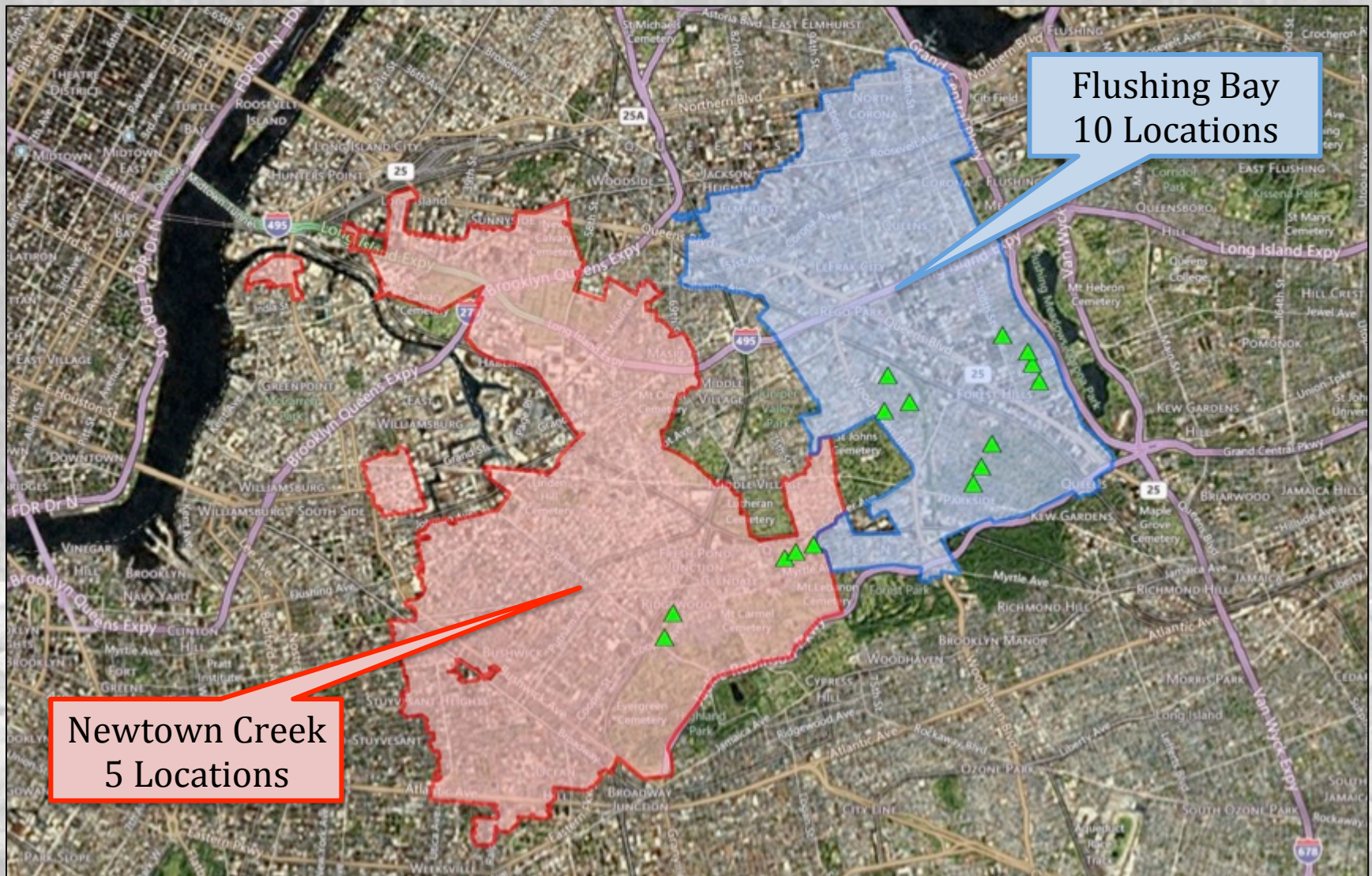


**Street Features**



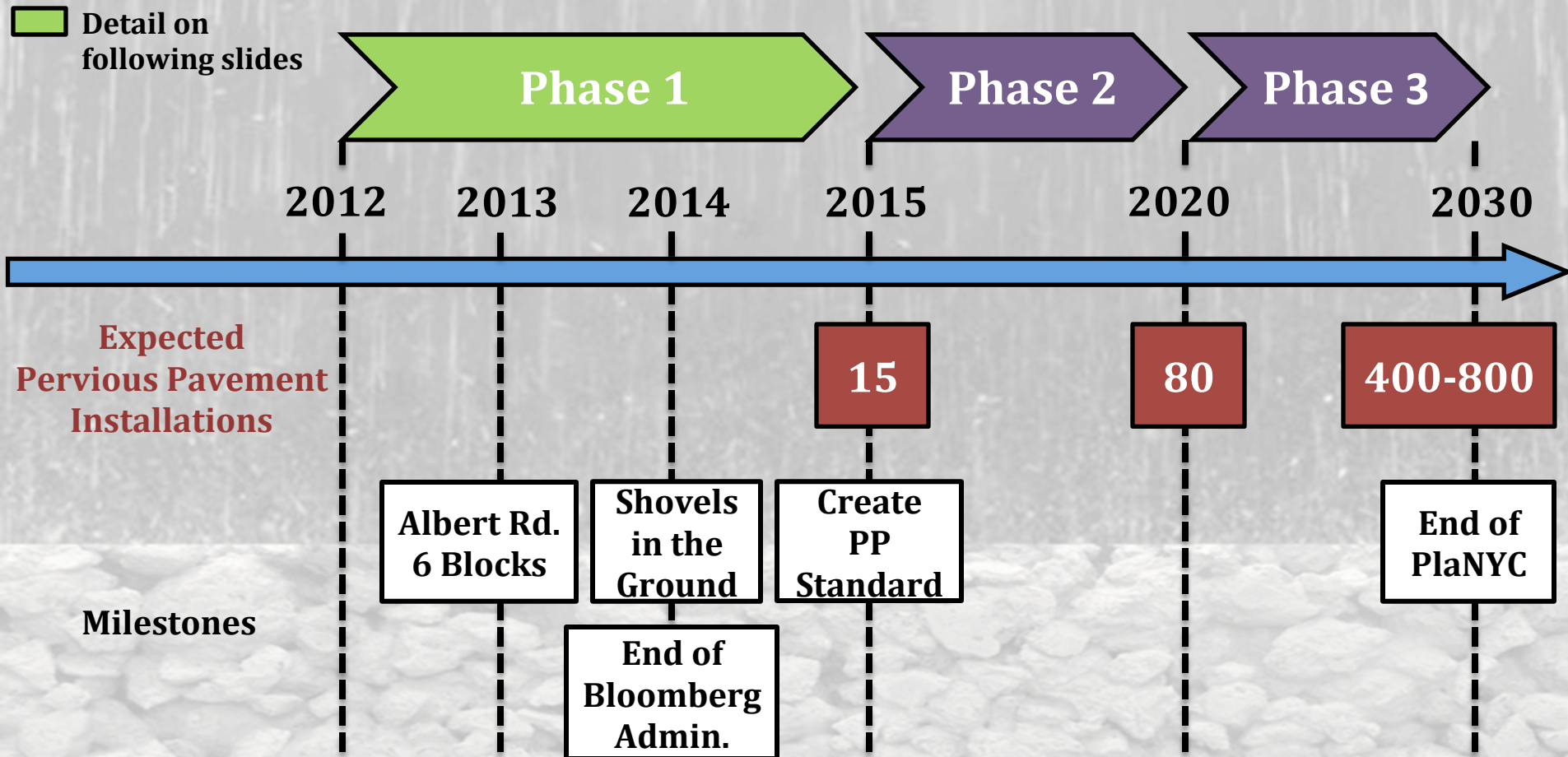


## Recommended Locations – Phase I





# Implementation Plan



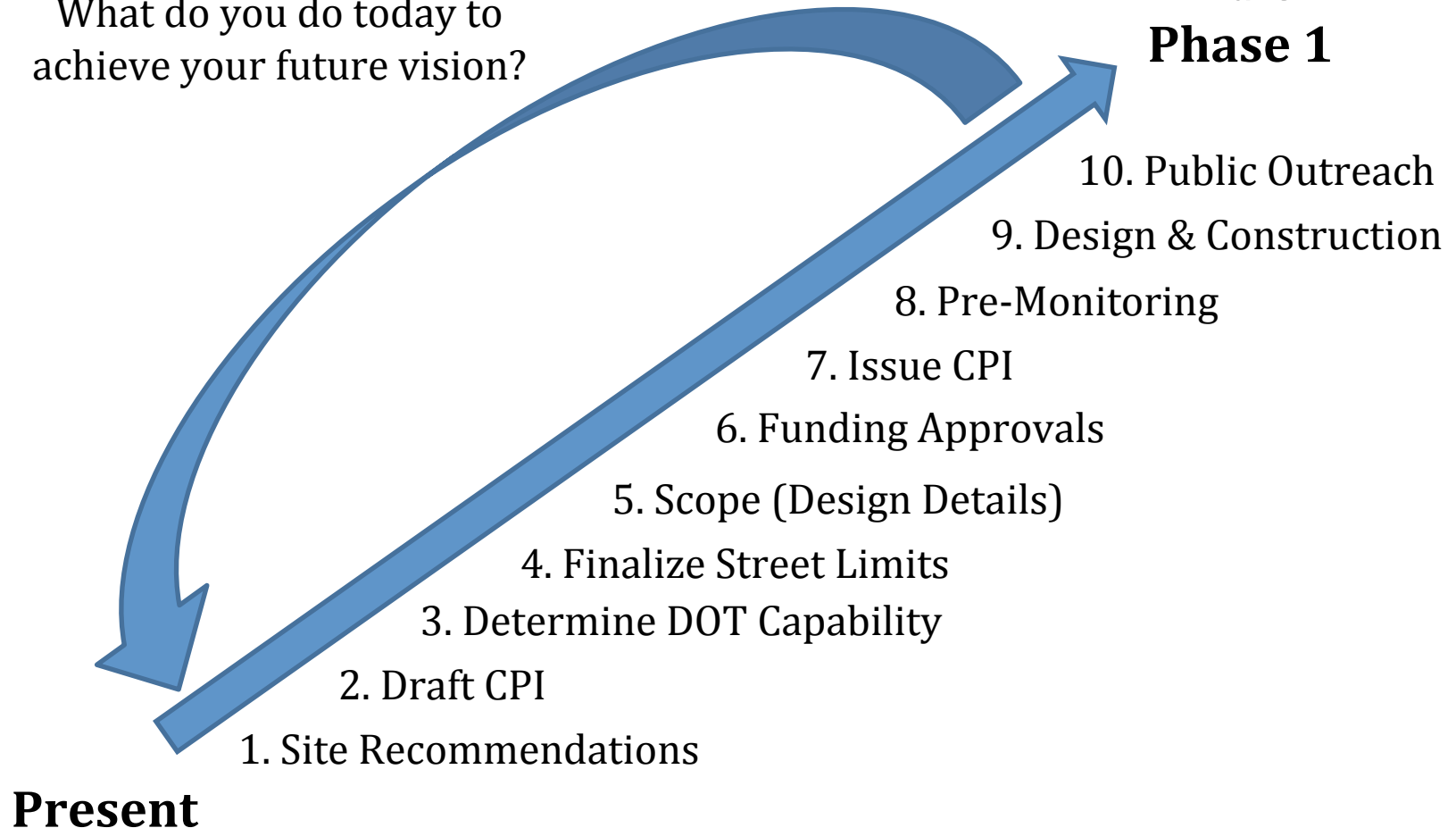


# Implementation Plan: Phase 1

## Backcasting Exercise with DOT


What do you do today to achieve your future vision?

**End of Phase 1**



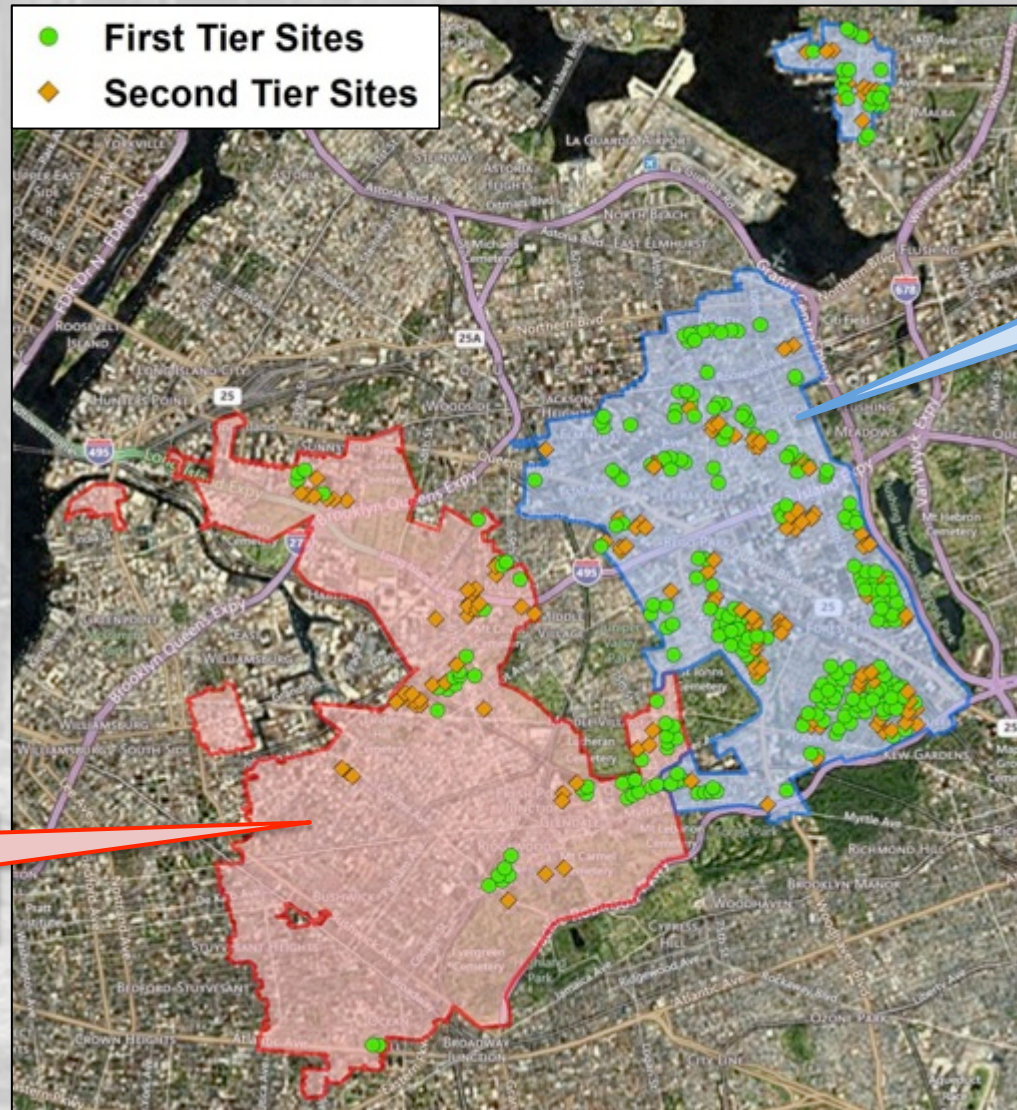
# Capital Project Initiation (CPI)

- Completed draft documentation (one for each watershed) to begin design & construction
- Will directly lead to funding allocations from DOT and DEP

		Department of Transportation		JANETTE SADIK-KHAN, Commissioner	
<b>CAPITAL PROGRAM MANAGEMENT CAPITAL PROJECT INITIATION</b>					
<b>PROJECT</b>	Pervious Pavement in the Newtown Creek and Flushing Bay Watersheds				
<b>BUDGET LINES</b>	XXXX	<b>BOROUGH</b>	Brooklyn, Queens		
<b>FMS ID #</b>	XXXX	<b>DATE/REV</b>	4/1/2012		
<b>PROJECT SUMMARY</b>					
<p>This project will create pervious pavement options in key watersheds helping to mitigate the occurrence of CSO events in the areas of highest CSO exposure. Those areas are located throughout several priority watershed zones within Brooklyn, Queens, and the Bronx. This demonstration project with focus on the Newtown Creek and Flushing Bay Watersheds, as these have met our initial list of selection criteria such as depth to water table, depth to bedrock, etc. In order to better assess the durability, yet maintain potential budgetary constraints due to the cost of business disruption we avoid medium to high density commercial zones for that reason. We also seek to avoid roads with high density traffic and those roads with high truck/bus use.</p>					
<b>NOTE:</b> See attached project scope for detailed project description.					
<b>FUNDING &amp; ESTIMATE SUMMARY</b>					
<b>FMS FUNDING LEVELS (as of Month FY## Approved Plan)</b>					
<b>FUNDING SOURCE</b>	<b>DESIGN</b>	<b>CONSTRUCTION</b>	<b>SUPERVISION</b>	<b>TOTAL</b>	<b>CONTINGENCY</b>



# Recommended Locations – Future Phases



Flushing Bay Watershed

Newtown Creek Watershed



# Conclusion

- Main sustainability issues are CSOs
- Pervious pavement is an effective green infrastructure measure
- DOT wants NYC to “pave the way”
- Our team provided DOT with:
  - Case Studies = Internal Buy-in
  - GIS Analysis = Recommended Sites
  - CPI = Funding
  - Implementation Plan → 2030



*Image courtesy of: Sundt Construction*



# Questions?



**DOT Client:**

**“This is going to help us so much in moving the discussion forward within DOT and making pervious pavement a reality.”**

*Image courtesy of: University of New Hampshire Stormwater Center*