



JUNE 19, 2018

REBUILD BY DESIGN

■ RESIST ■ DELAY ■ STORE ■ DISCHARGE ■

HUDSON RIVER

Hoboken

Weehawken

Jersey City

| New Jersey

2018 ASSOCIATION OF FLOODPLAIN MANAGERS CONFERENCE

The NJDEP Team

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NJDEP, Assistant Commissioner

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NJDEP, RBDH Project Team Manager

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NJDEP, RBDH Project Manager

Alexis Taylor

NJDEP, RBD Outreach Team Leader

Kim McEvoy

**NJDEP, RBD Environmental Team
Leader**

Key Stakeholders

City of Hoboken, NJ

City of Jersey City, NJ

Town of Weehawken, NJ

New Jersey Transit

Hudson County, NJ

North Hudson Sewerage Authority

The DEWBERRY Team

 Dewberry®	PRIME CONSULTANT (FEASIBILITY ENGINEERING AND EIS)
OMA	ARCHITECTURE AND URBAN DESIGN
SCAPE	LANDSCAPE ARCHITECTURE
BOSWELL ENGINEERING	WATERFRONT INSPECTION
 ECONSULT SOLUTIONS	ECONOMIC ANALYSIS
 FITZGERALD & HALLIDAY, INC. Innovative Planning, Better Communities	PUBLIC ENGAGEMENT
Paul Carpenter Associates, Inc. AIR QUALITY AND NOISE CONSULTANTS	AIR QUALITY AND NOISE
 CRAIG DRILLING COMPANIES, INC.	GEOTECHNICAL BORING

Study Area

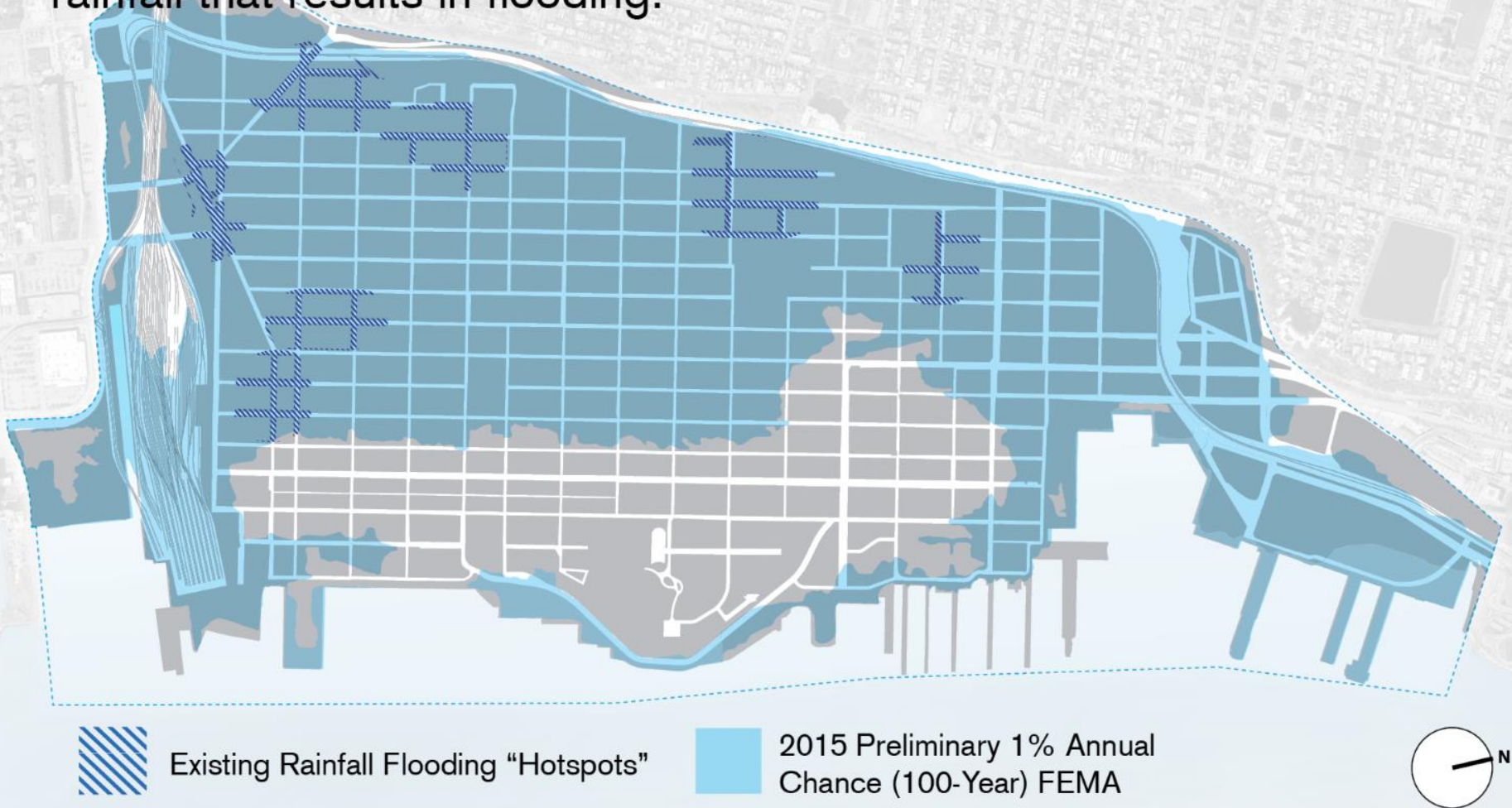
Study Area Characteristics

- City of Hoboken and parts of Jersey City and Weehawken
- Size – 1.8 square miles
- Population – 50,000
- Major transportation hub
- High residential density population
- Active recreational waterfront
- Aging infrastructure



WHY DO WE NEED THE PROJECT?

The project area is at risk from storm surge events and heavy rainfall that results in flooding.



Flooding Risks

COASTAL STORM SURGE (HURRICANE SANDY - 2012)



RAINFALL (HURRICANE IRENE - 2011)



Rebuild by Design Vision

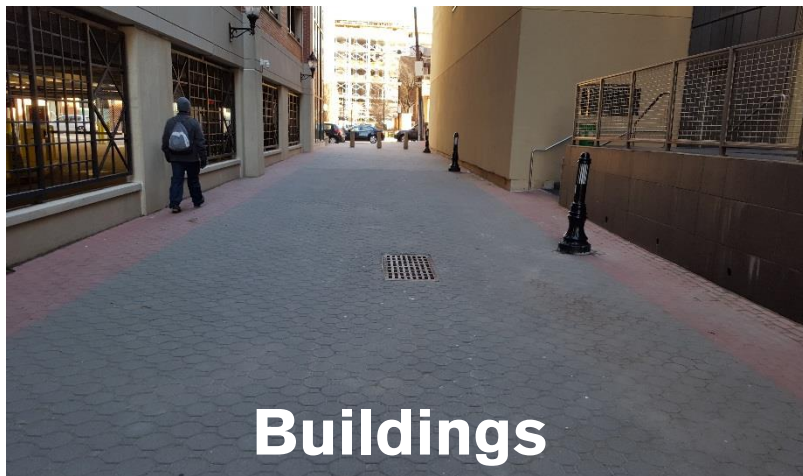
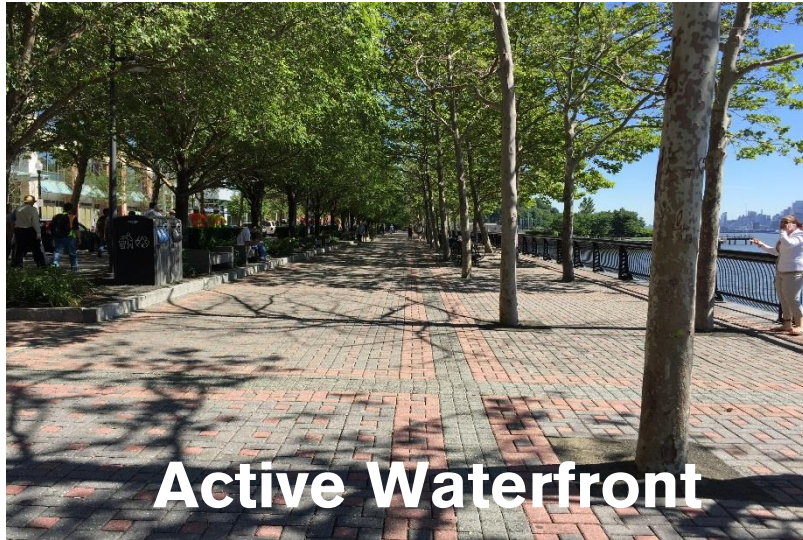
A Comprehensive Urban Water Strategy



Project Status

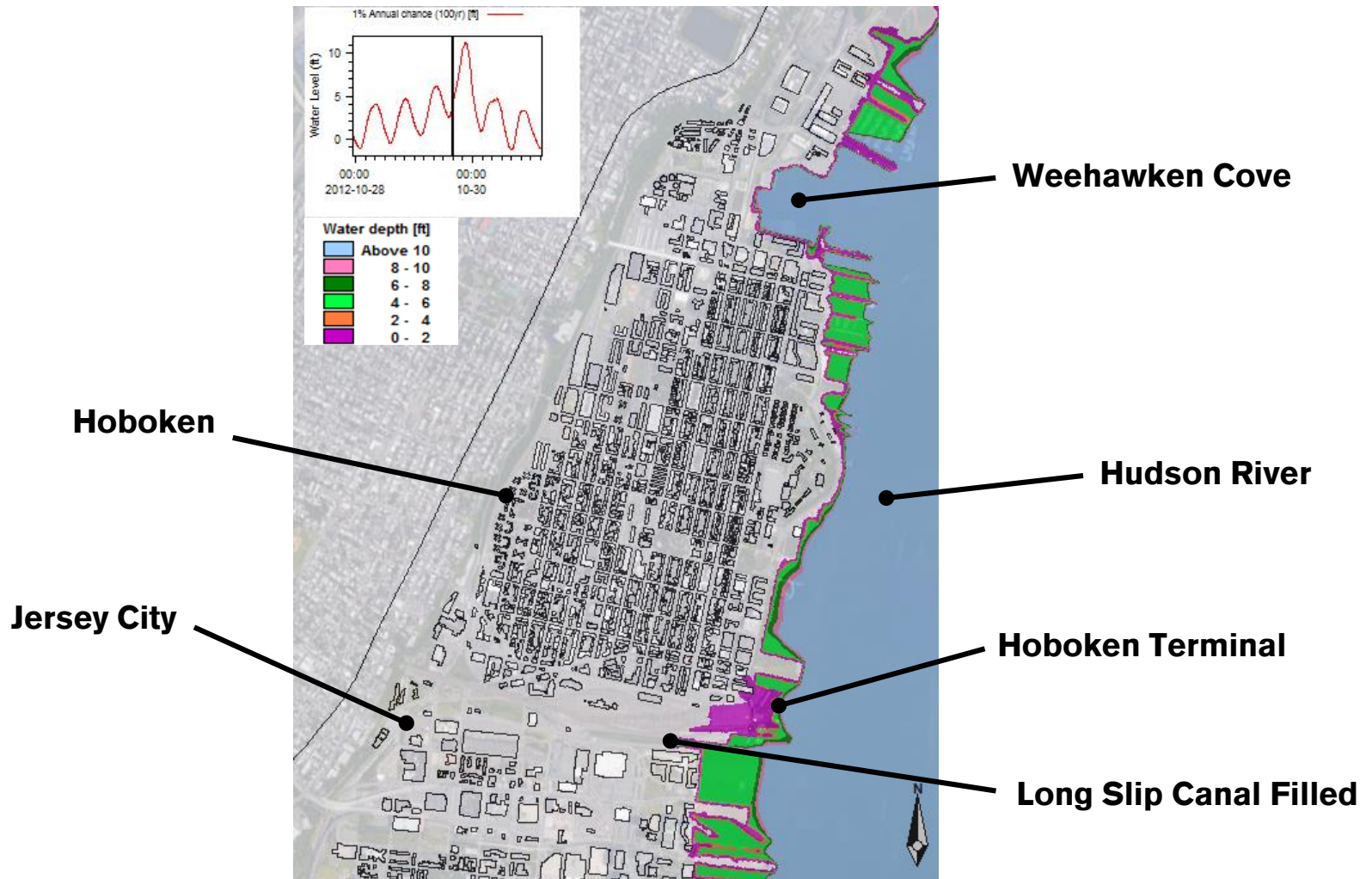


Major Constraints



Coastal Storm Surge Model Simulation

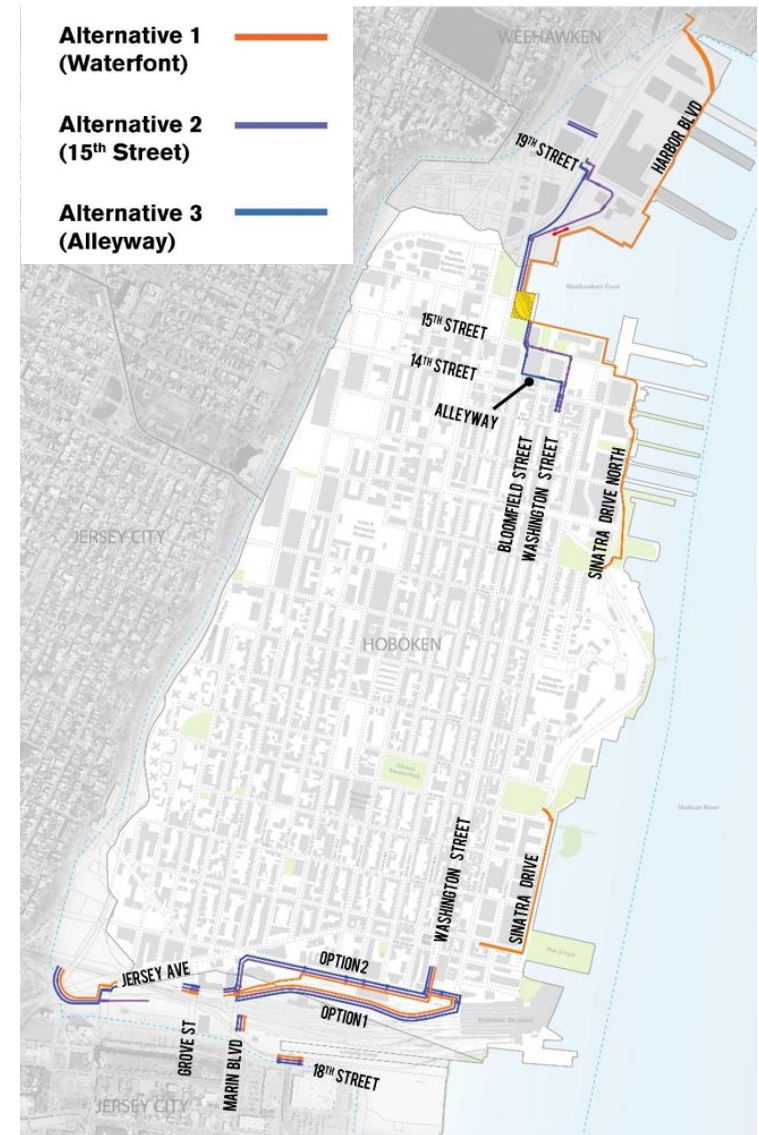
1% Annual Chance Simulation (100-year)



Three “Resist” Alternatives

Alternative Features

Feature	Alt. 1	Alt. 2	Alt. 3
Length	3 miles	1.8 miles	1.7 miles
No. of Gates	29-31	21-25	19-23
Population Benefits	98%	86%	85%
Benefit-Cost Ratio	2.21	3.83	3.94



Preferred Alternative

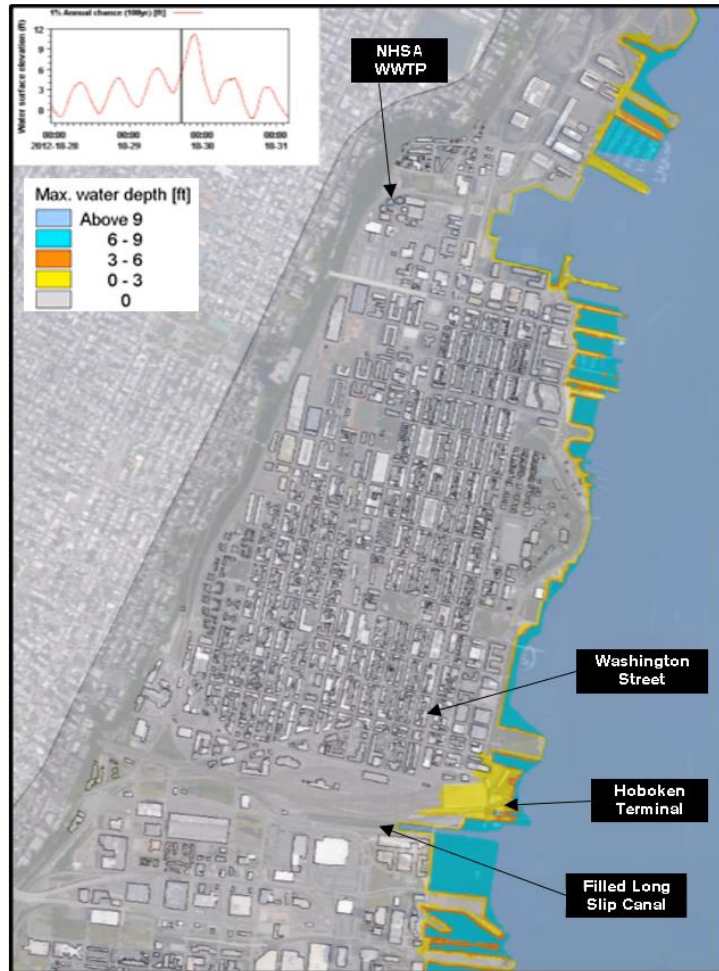
ALT-3

- **Provides a high degree of flood risk reduction while balancing public input, cost and urban amenities**
- **Can be constructed with available funds**
- **Significantly reduced impact to built environment compared to ALT-1 ; slightly lower than ALT-2**
- **Lowest annual maintenance cost**
- **Fewest number of gates**
- **Least impact to waterfront access and views**

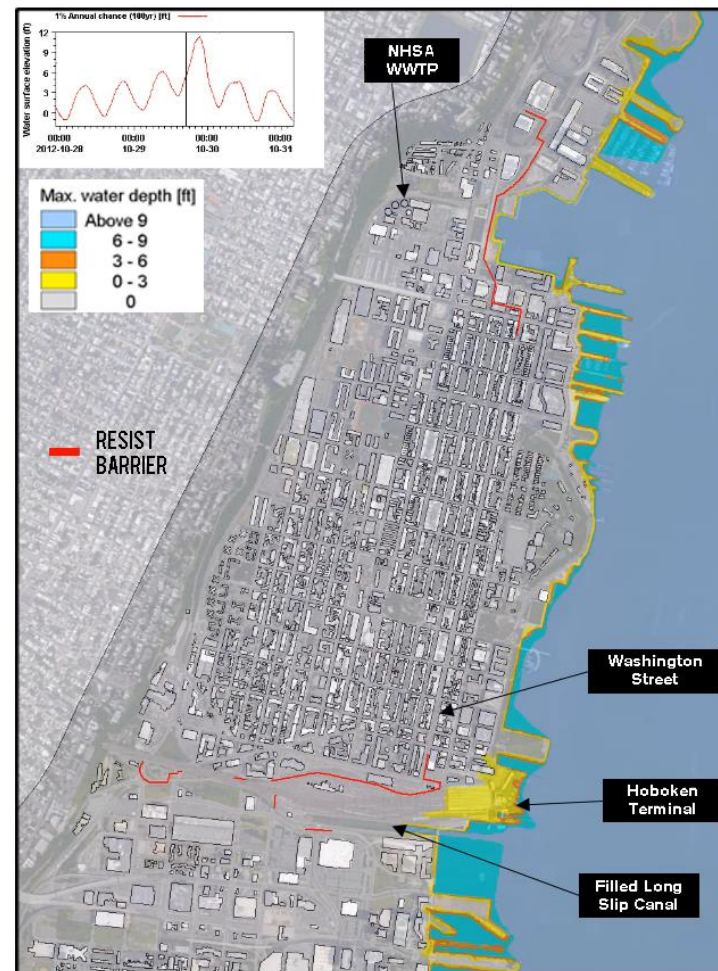
Coastal Storm Surge Model Simulation

1% Annual Chance (100-Year)

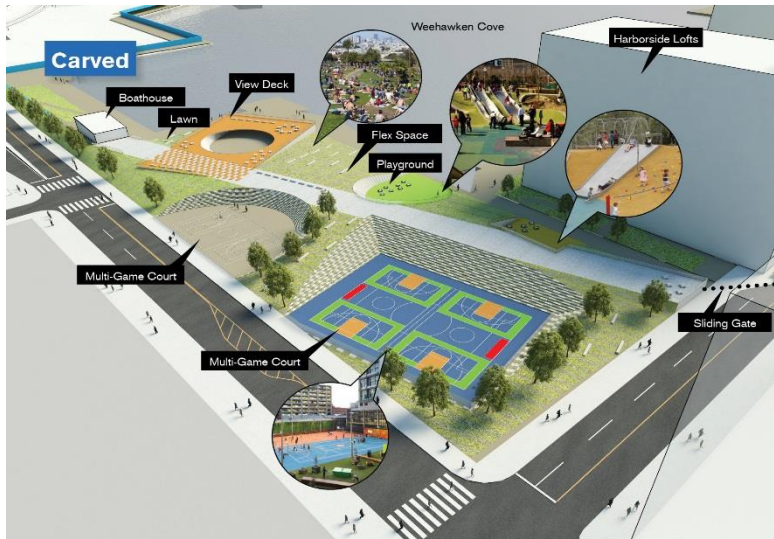
Without Project



With Project



Recommended “Resist” Alternative



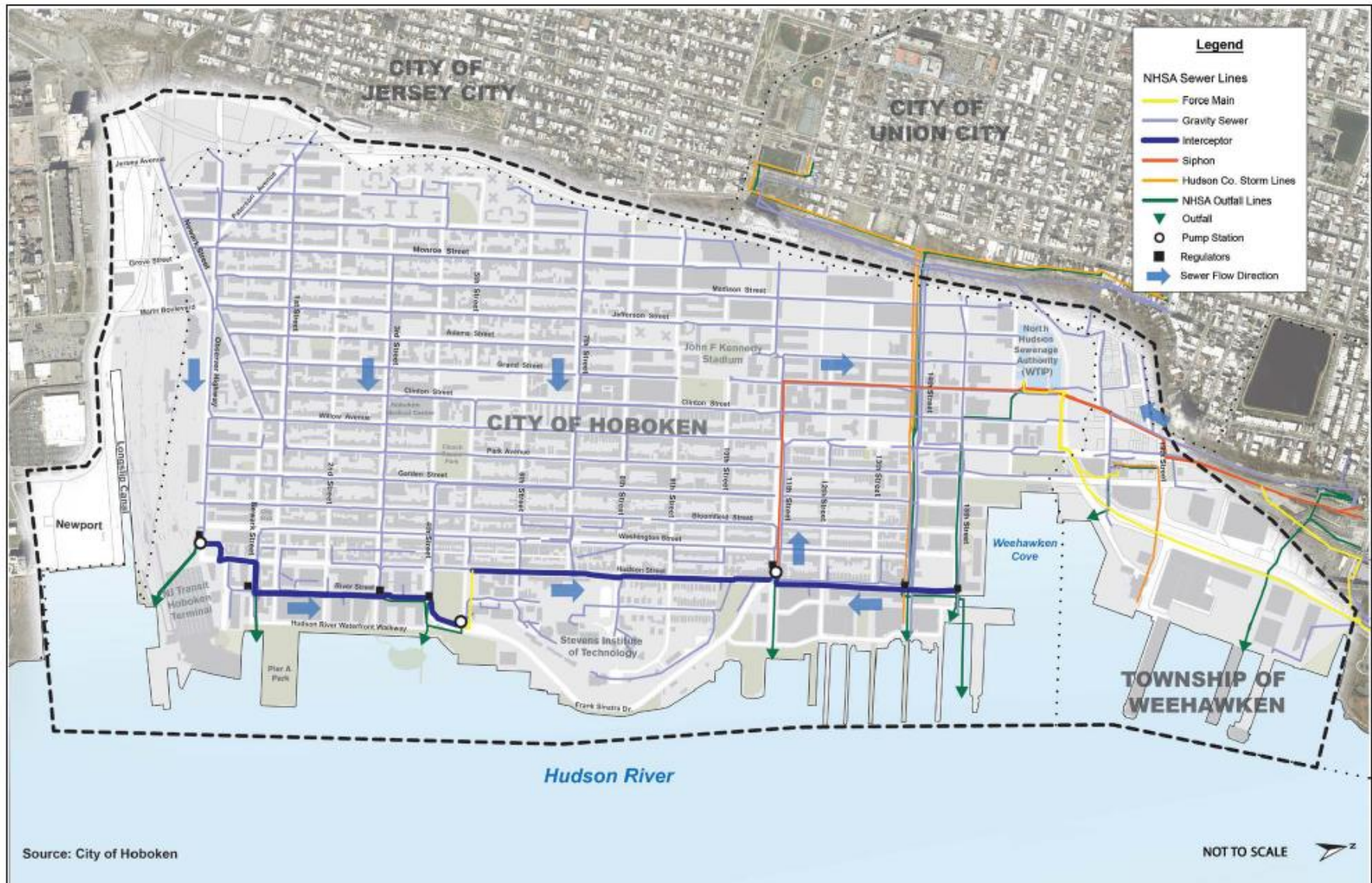
Project Highlights



Project Highlights



Existing Drainage System

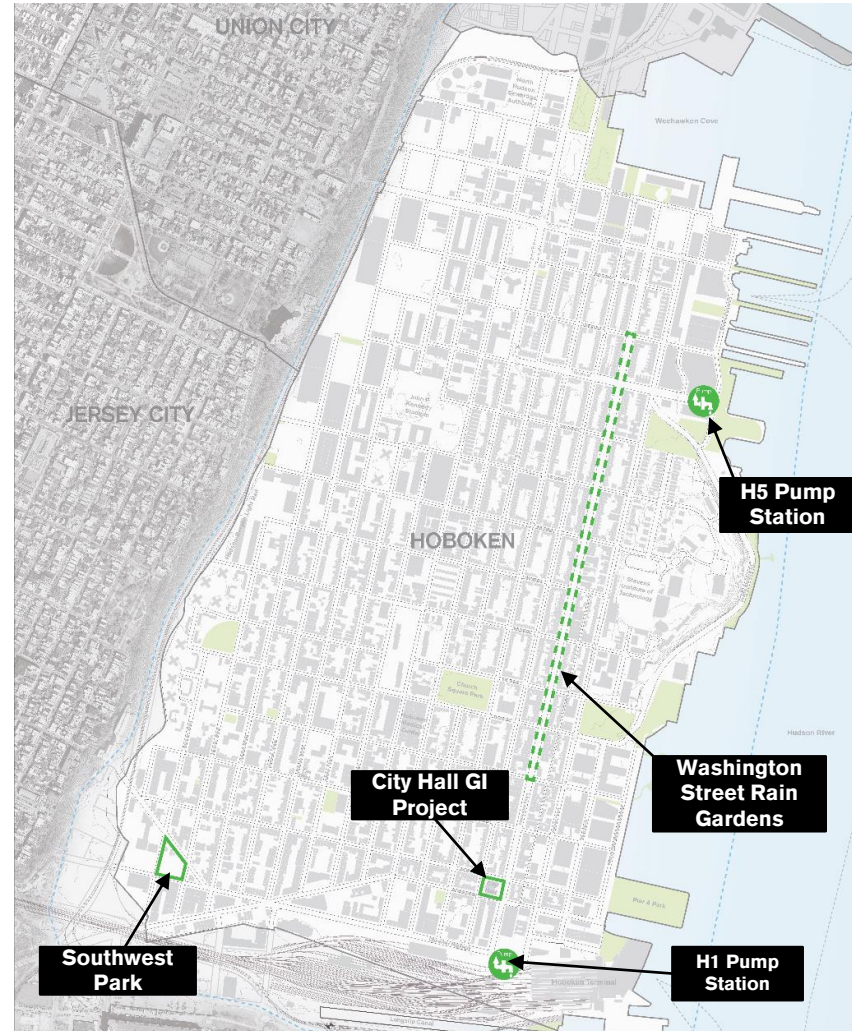


Baseline Conditions (NAA) for Stormwater Modeling

Ongoing or completed projects

- **H1 Wet Weather Pump Station (Observer Highway)**
- **H 5 Wet Weather Pump Station (11th Street)**
- **City Hall Green Infrastructure Projects**
- **Southwest Resiliency Park (Block 12)**
- **Washington Street Rain Gardens**

* NAA – No Action Alternative



Delay, Store, Discharge Alternative

Proposed underground detention facilities with green/open space on ground surface with discharge features such as pumps to manage rainfall runoff volume

ROW Green/Gray Infrastructure Practices

- **Total of 61 sites to manage street drainage for approx. 13 acres**

BASF site

- **Manages rainfall runoff for approx. 55 acres**

NJ Transit site

- **Manages rainfall runoff for approx. 15 acres**

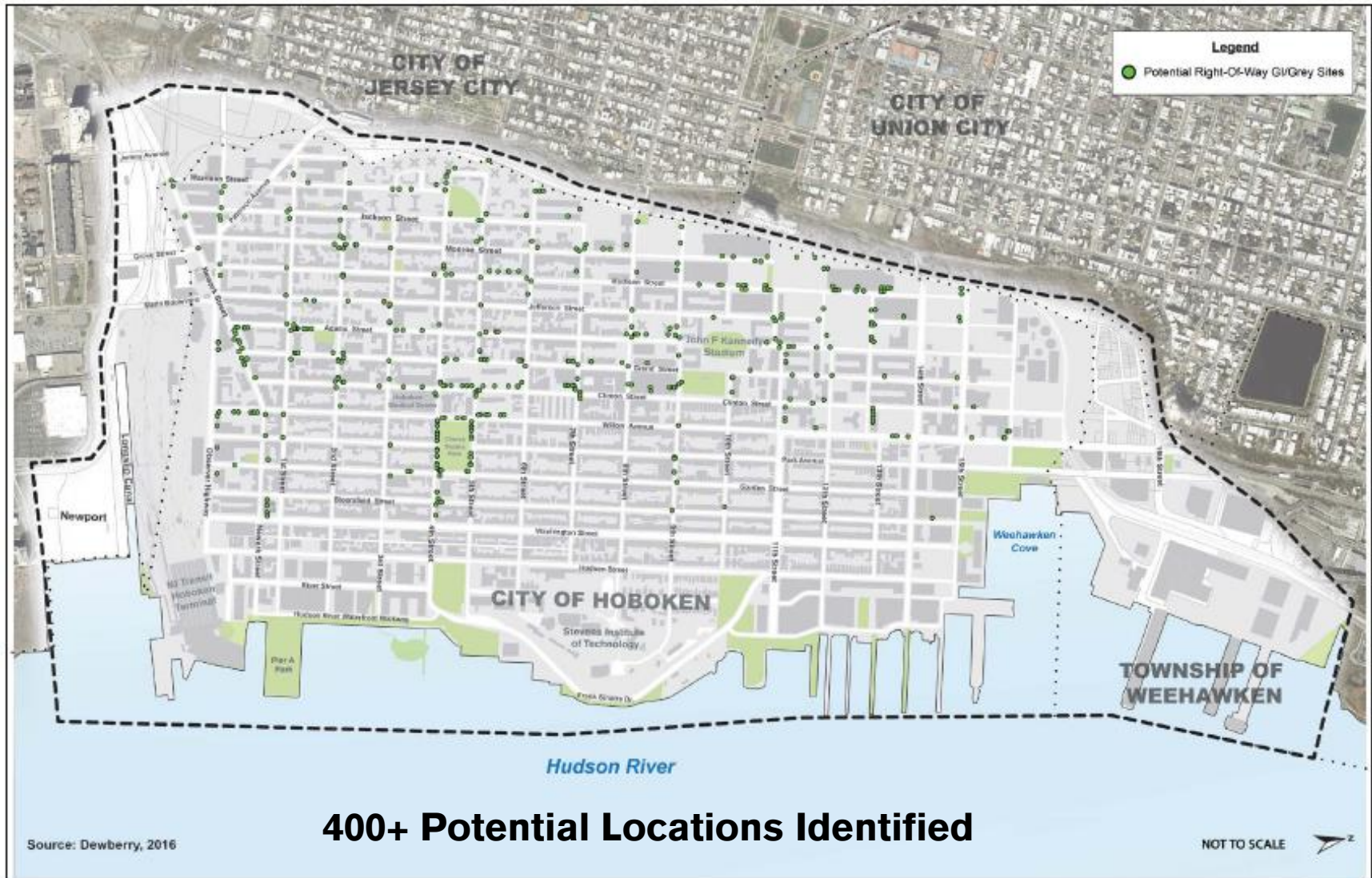
Block 10 site

- **Manages rainfall runoff for approx. 8 acres**

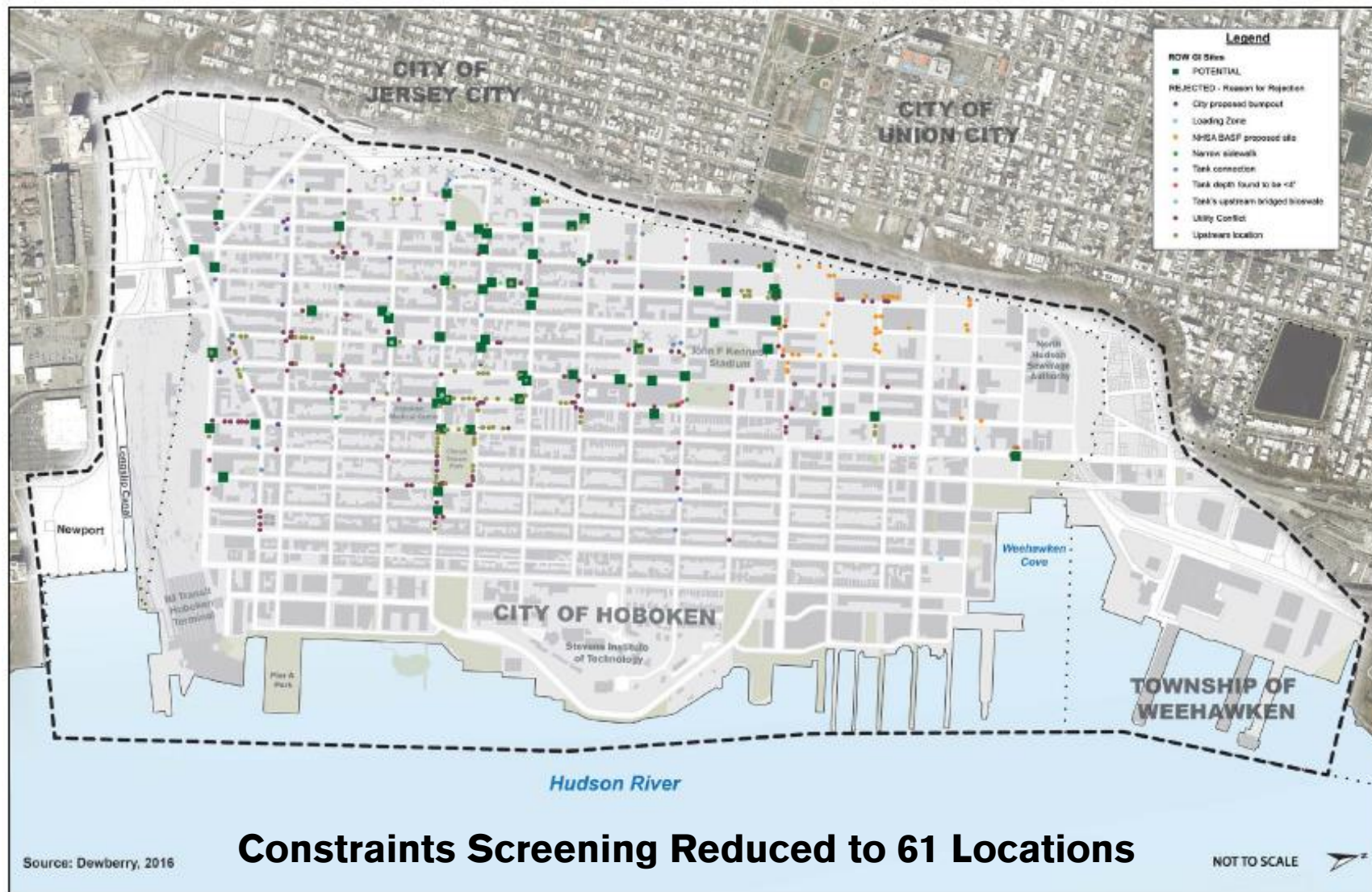
TOTAL BENEFIT – COST RATIO : 2.35



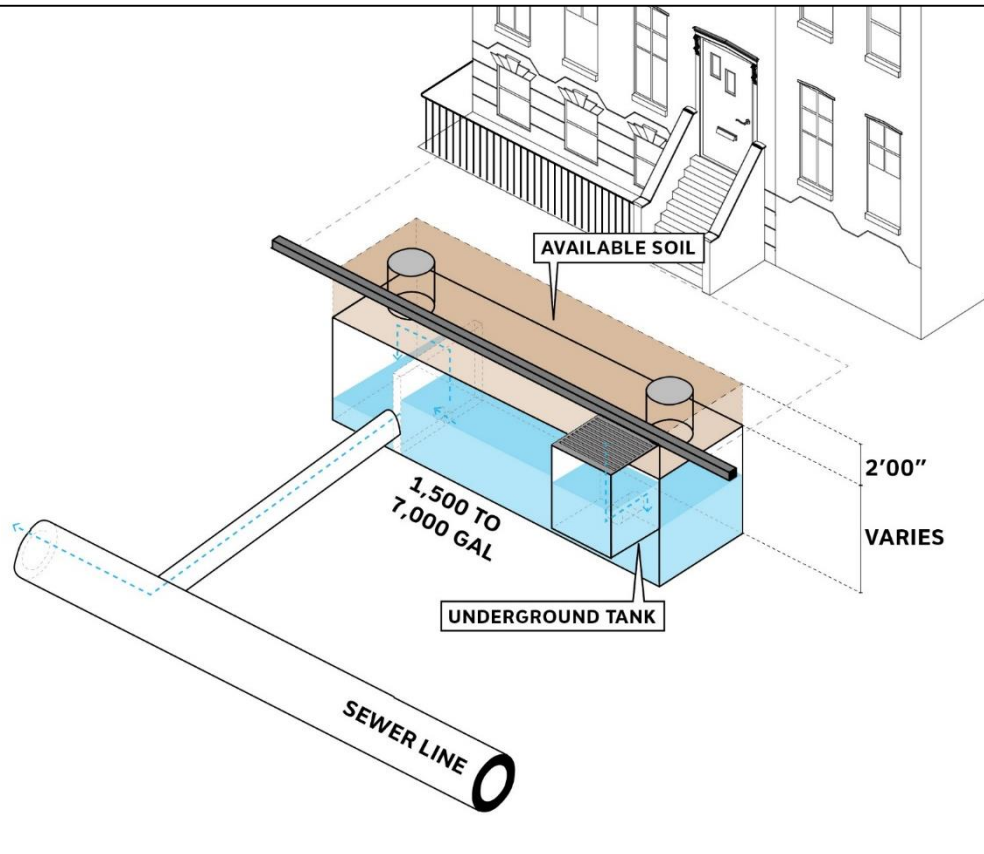
ROW Green and Gray Potential Locations



ROW Green and Gray Final Locations

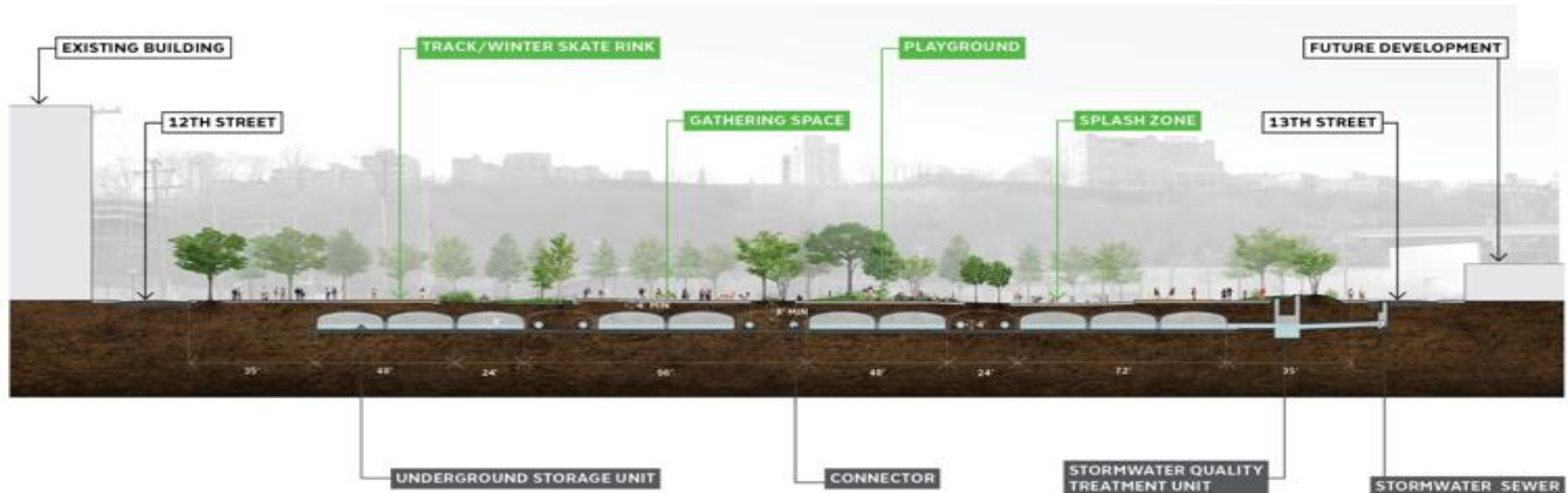


ROW Green and Gray Typical Condition

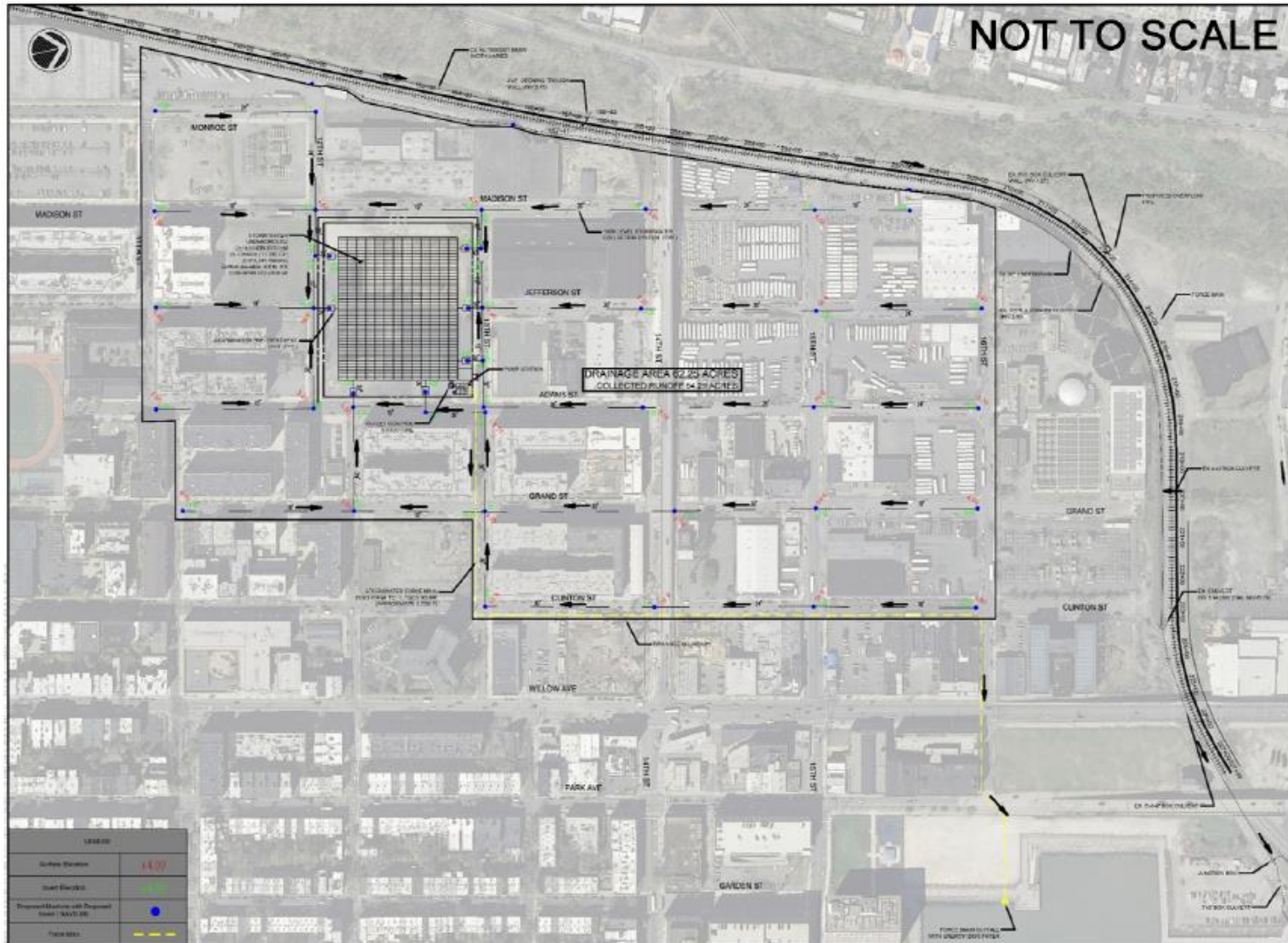


Parcel Based Stormwater Management System

- Requires separation of storm and sewer system
- Use of a new High Level Storm System to capture and convey rainfall runoff
- Integrates with community benefit features

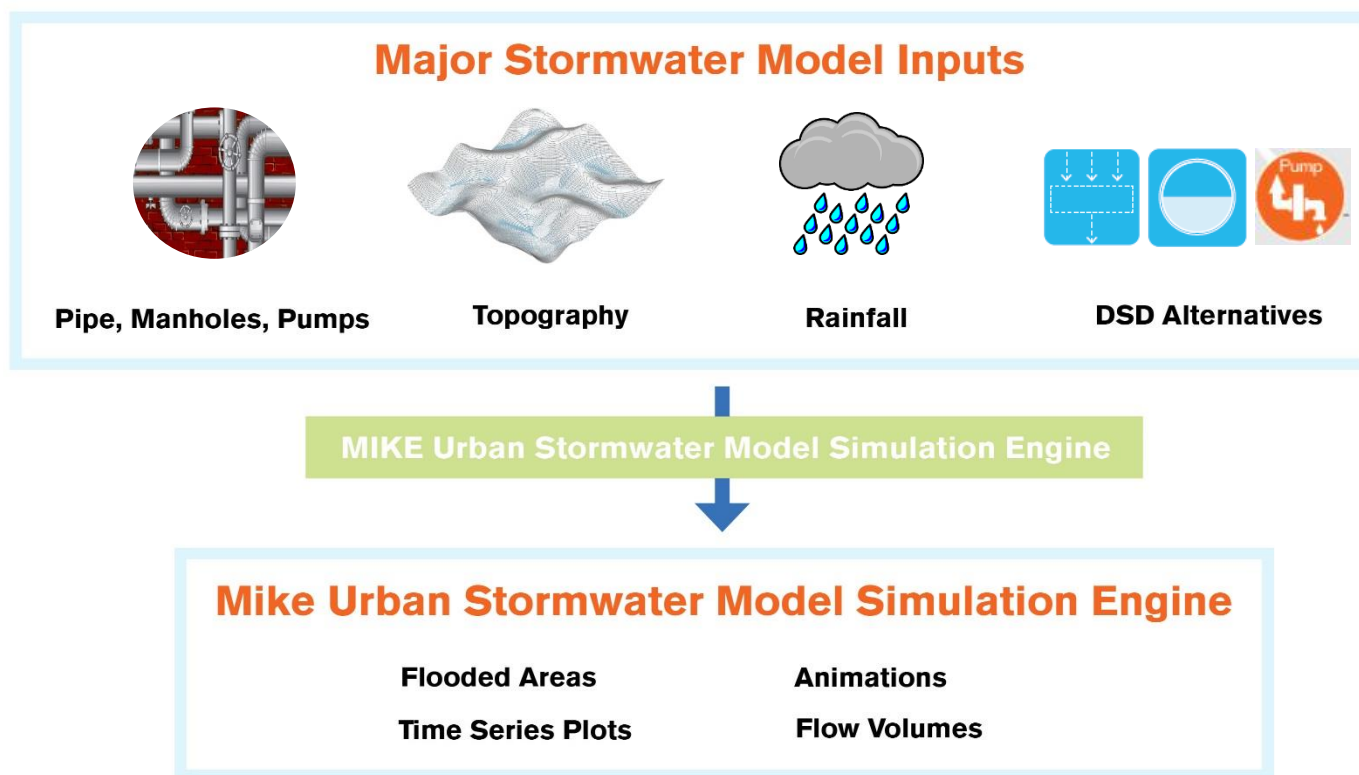


Example of High Level Storm Conveyance System

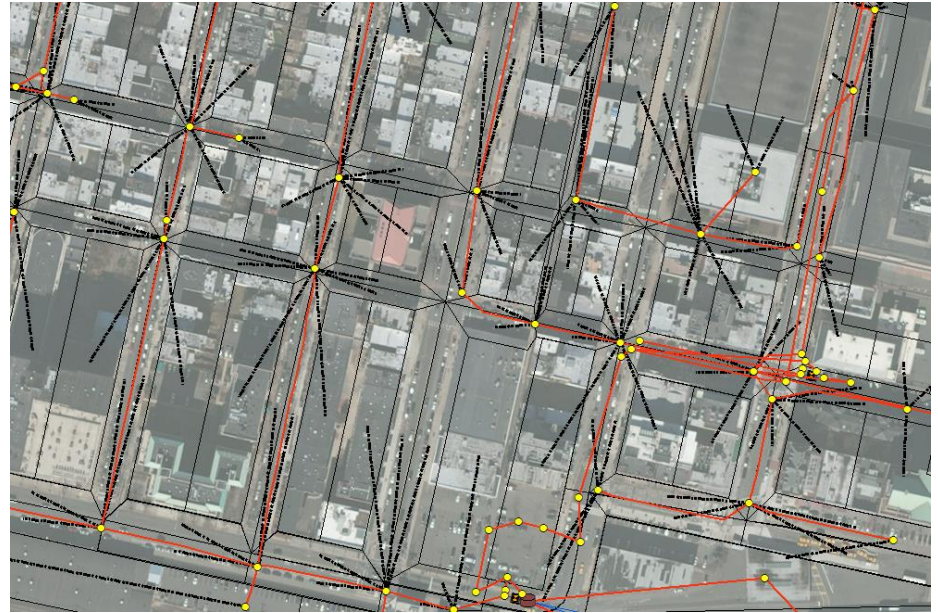


Stormwater Modeling - Input and Output Parameters

Used FEMA accepted Danish Hydraulic Institute (DHI) MIKE URBAN Model



Example of High Level Storm Conveyance System



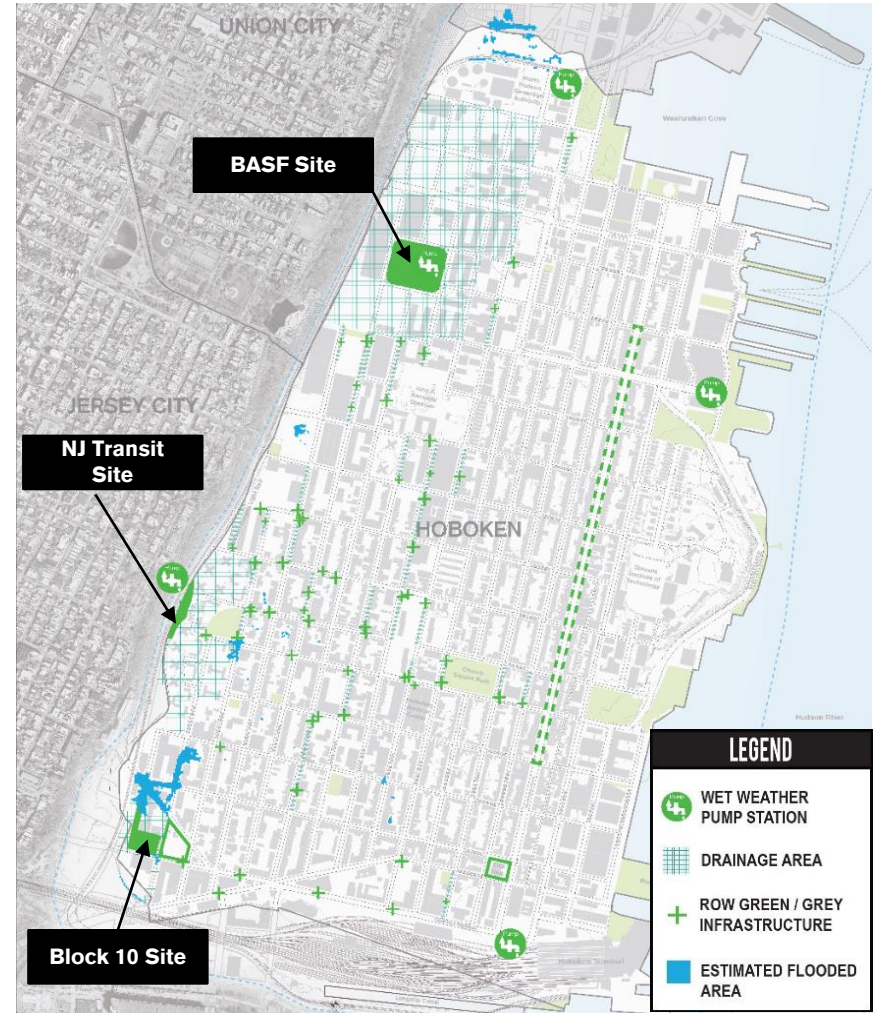
- **Block Level Scale H&H 2-D Model**
- **1500 + Catchments and 850 + Pipes**
- **Includes regulators and pumps**
- **Simulations with Low and High Tide**

Comparison of Flooding Areas with 5-Year/Low Tide

Baseline Conditions (NAA)

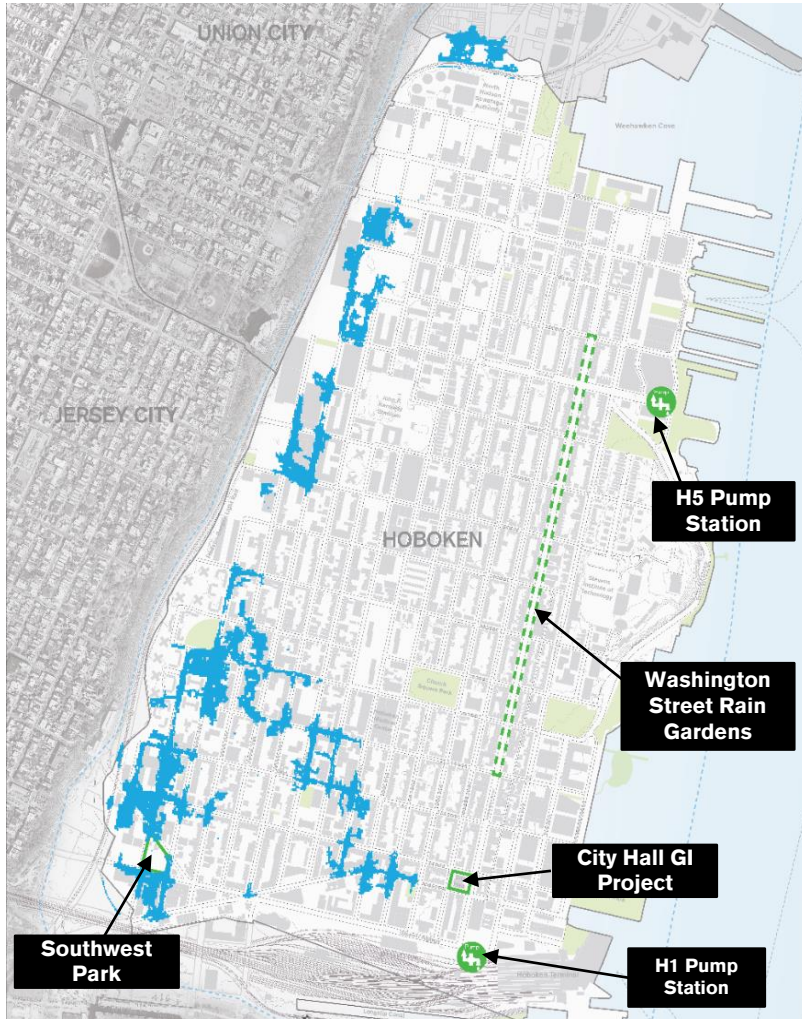


Proposed DSD Alternative

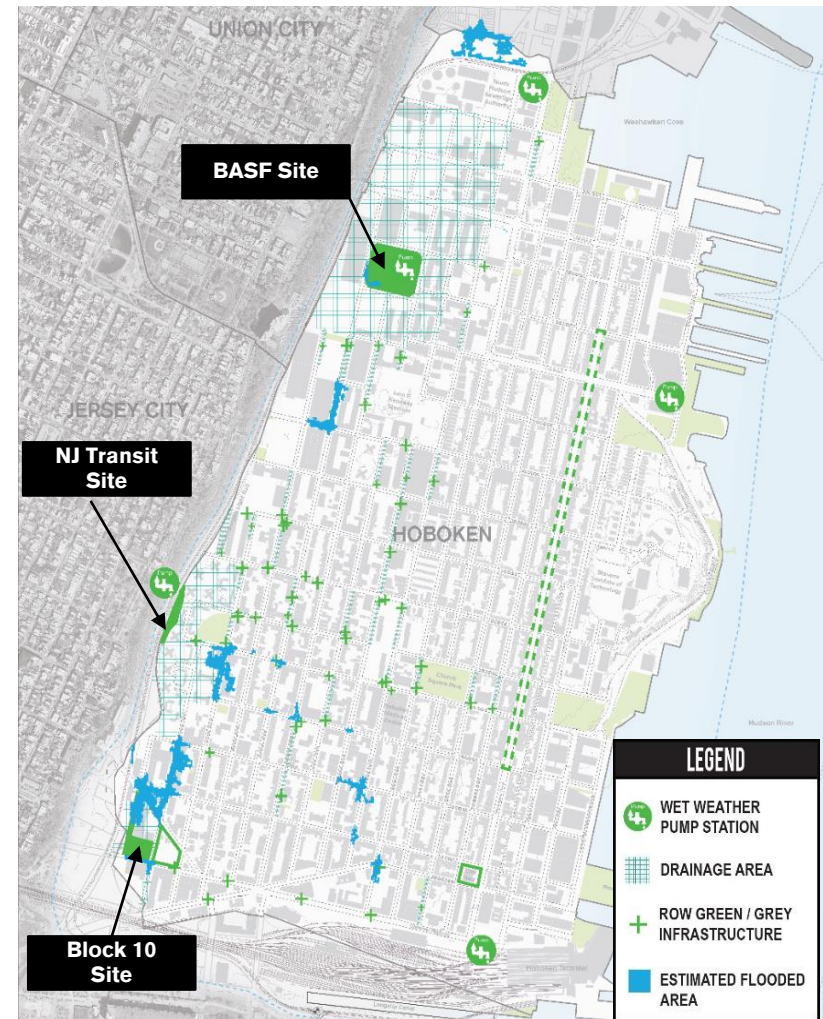


Comparison of Flooding Areas with 5-Year/High Tide

Baseline Conditions (NAA)

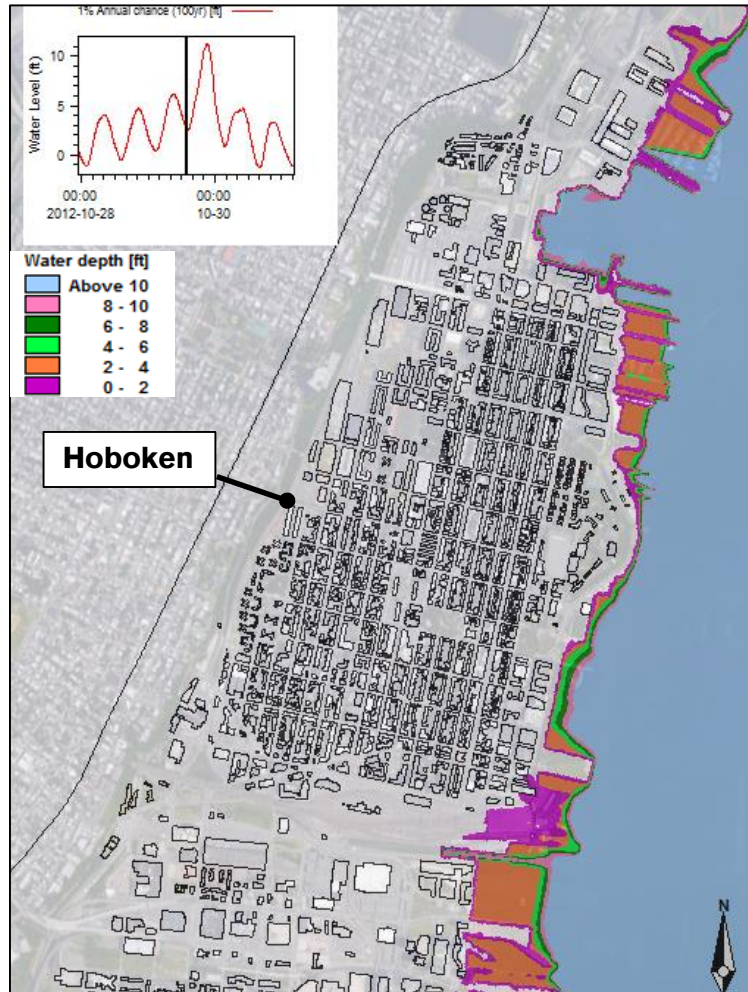


Proposed DSD Alternative

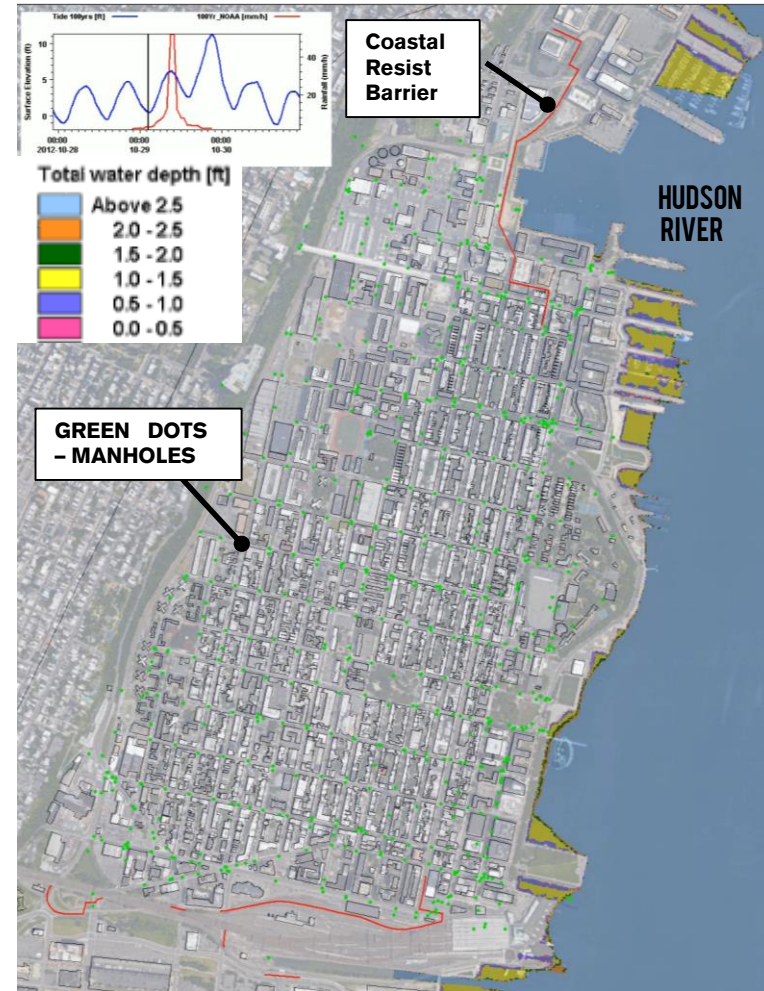


Innovative Integrated Coastal and Stormwater Model Example

Without Project (100-year Coastal Storm Surge)



With Resist Project (100-year Rain + Surge)

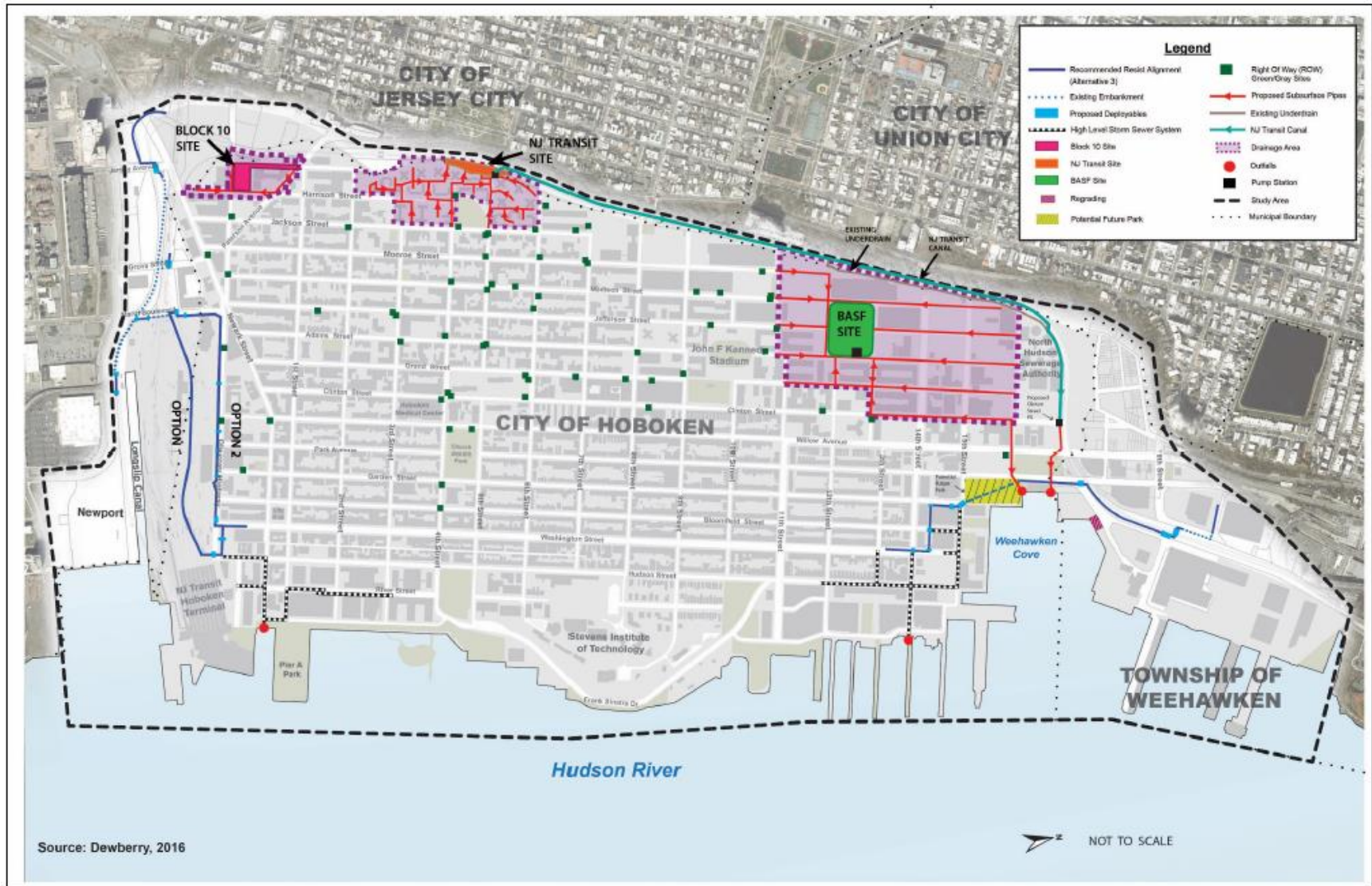


Model Simulation Results Summary

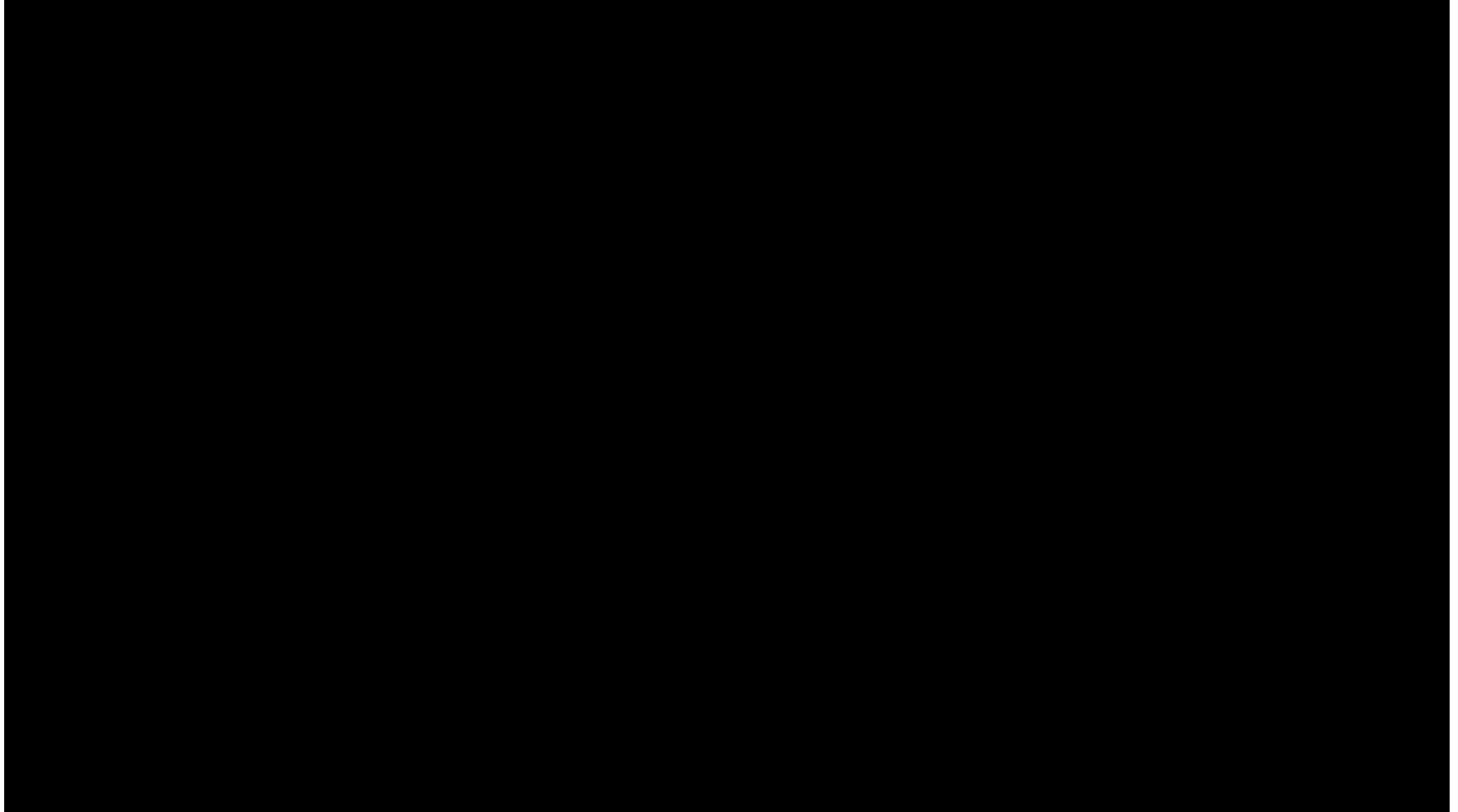
Rainfall Return Period	Tidal Condition	Flooded Areas (acres)		Percent Reduction in Flooded Areas
		NAA	DSD Alternative	
20% annual chance (5-year)	Low	25.5	4.8	81%
	High	48.4	13.0	73%
10% annual chance (10-year)	Low	35.5	10.2	71%
	High	59.7	26.0	56%
4% annual chance (25-year)	Low	64.5	26.8	58%
	High	95.9	49.1	49%
2% annual chance (50-year)	Low	95.1	42.0	56%
	High	122.1	69.9	43%
1% annual chance (100-year)	Low	147.5	91.7	38%
	High	148.6	93.4	37%

Flood Risk Reduction Benefits Dependent of Tidal Condition

Final Master Plan



ROW Green and Gray Typical Condition



Q&A

