



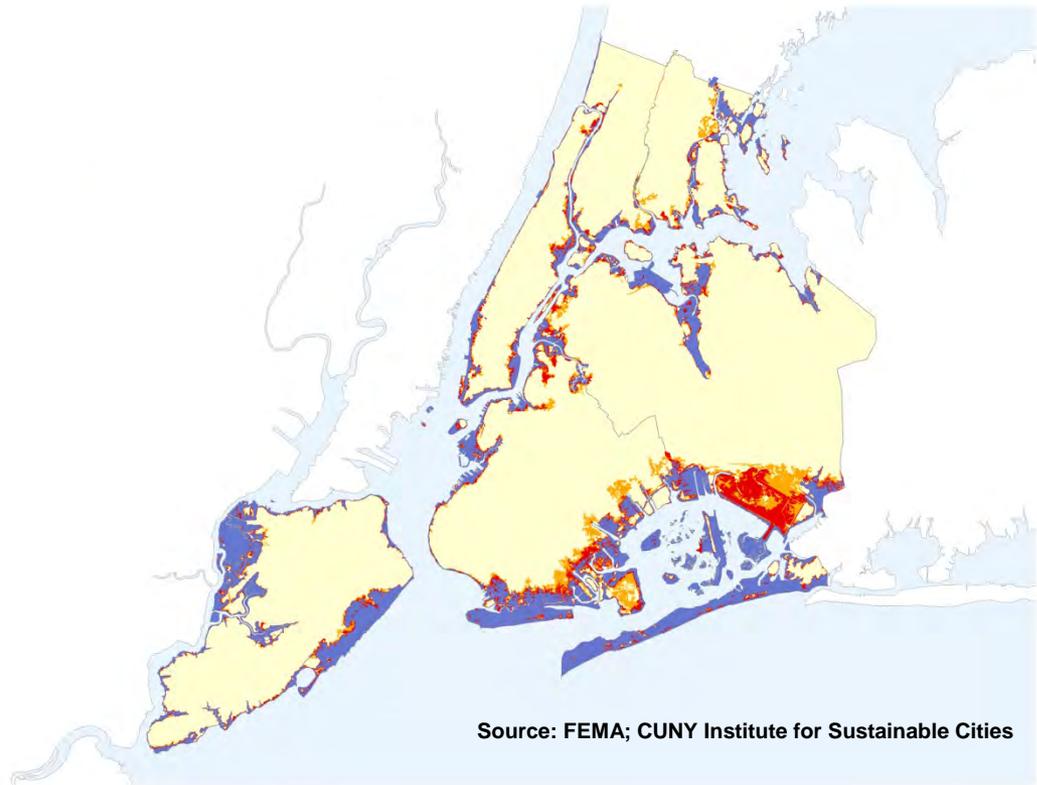
# Seaport City Feasibility Study

Community Board Presentation  
November 2013

# The Risks We Face

Using the NPCC projections, the City, with the CUNY Institute for Sustainable Cities, developed maps showing how floodplains will expand by the 2050s...

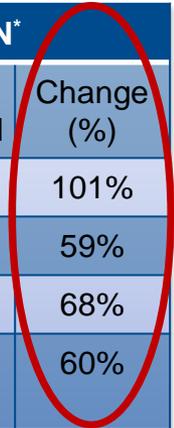
## FEMA PWMs, with 2020s and 2050s Floodplain Growth



- 100-Year Floodplain (FEMA 2013 PWMs)
- 100-Year Floodplain (Projected 2020s)
- 100-Year Floodplain (Projected 2050s)

100-YEAR FLOODPLAIN*			
	2013 PWMs	2050s Projected	Change (%)
Residents	398,000	801,000	101%
Jobs	271,000	430,000	59%
Buildings	68,000	114,000	68%
Floor Area (SF)	534M	855M	60%

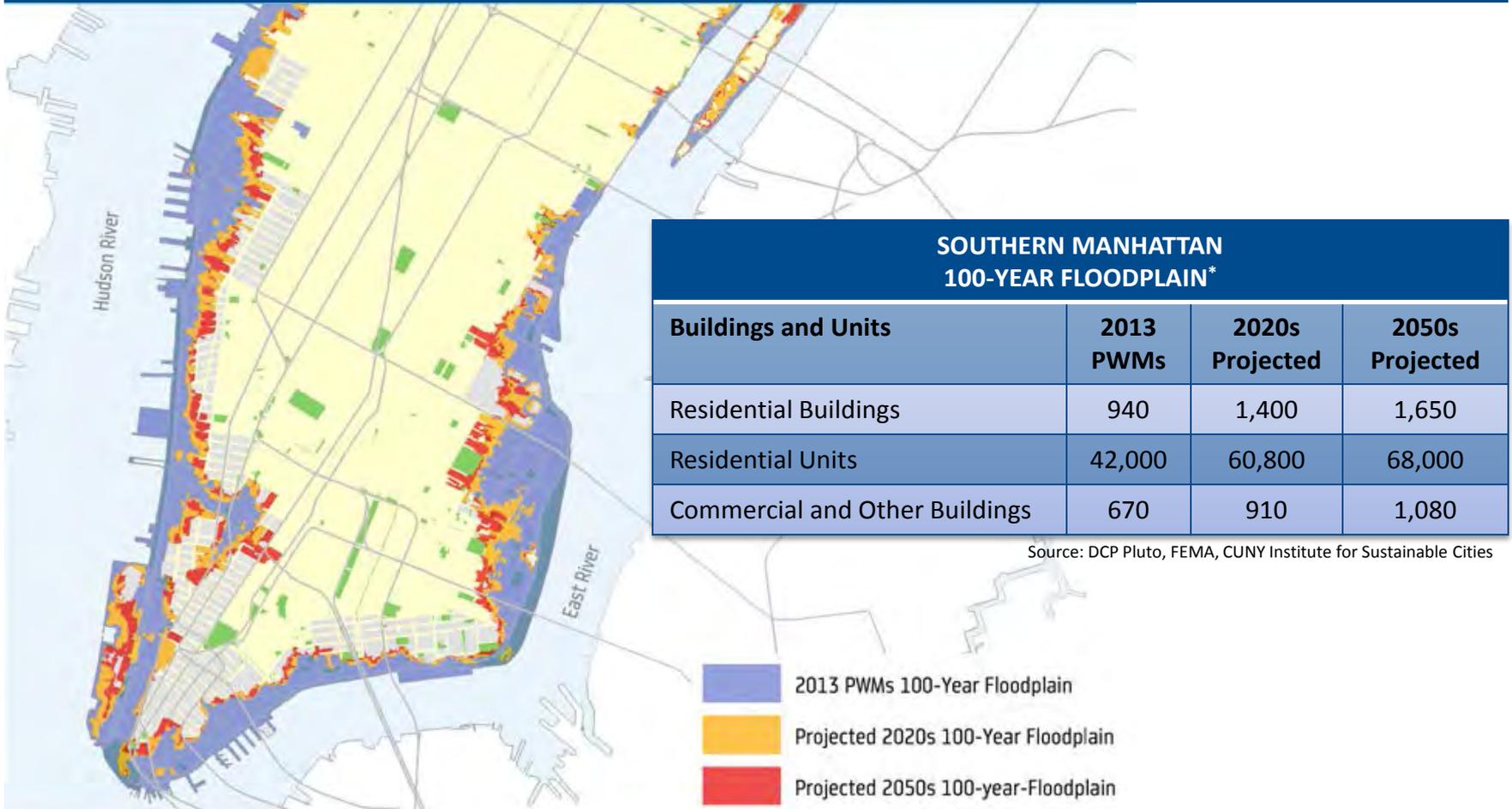
\* Numbers are rounded for clarity



# The Risks We Face

The number of buildings in the floodplain is expected to increase in Southern Manhattan through the 2050s.

## Comparison of Preliminary Work Maps and Future Floodplains



Source: FEMA, CUNY Institute for Sustainable Cities

# The Risks We Face

At the Administration's request, the NYC Panel on Climate Change updated its 2009 analysis of how climate change might impact New York for SIRR, including the risk for chronic hazards...

CHRONIC HAZARDS	Baseline (1971-2000)	2020s		2050s	
		Middle Range (25 <sup>th</sup> -75 <sup>th</sup> percentile)	High End (90 <sup>th</sup> percentile)	Middle Range (25 <sup>th</sup> -75 <sup>th</sup> percentile)	High End (90 <sup>th</sup> percentile)
Average Temperature	54°F	+2.0°F to 2.8°F	+3.2°F	+4.1°F to 5.7°F	+6.6°F
Precipitation	50.1 in.	+1% to 8%	+10%	+4% to 11%	+13%
Sea Level Rise <sup>1</sup>	0	+4 to 8 in.	+11 in.	+11 to 24 in.	+31 in.

**NPCC is extending projections out to the 2100s**

**Sea levels likely to rise 1-2 ft. and could rise by > 2 ½ ft. (on top of 1 ft. since 1900)**

Source: NPCC; for more details, see *Climate Risk Information 2013*

<sup>1</sup> Baseline period for sea level rise projections is 2000-2004.

**These sea level rise projections have been incorporated into NOAA'S coastal flood risk mapping tool and USACE'S recently released storm surge calculator.**

# The Risks We Face

The NPCC also updated its 2009 analysis for extreme events.

EXTREME EVENTS		Baseline (1971-2000)	2050s	
			Middle Range (25 <sup>th</sup> -75 <sup>th</sup> percentile)	High End 90 <sup>th</sup> percentile)
<b>Heat Waves and Cold Events</b>	Days per year $\geq 90^{\circ}\text{F}$	18	39 to 52	57
	Heat waves per year	2	5 to 7	7
<b>Intense Precipitation</b>	Days per year with rainfall $> 2$ in.	3	4	5
<b>Coastal Floods at the Battery<sup>1</sup></b>	Future annual frequency of today's 100-year flood	1.0%	1.7% to 3.2%	5.0%
	Flood heights from a 100-year flood (feet above NAVD88)	15.0	15.9 to 17.0	17.6

The number of 90+ degree days could double (or triple), to current level of Birmingham, AL

<sup>1</sup> Baseline period for sea level rise projections is 2000-2004.

Source: NPCC; for more details, see *Climate Risk Information 2013*

# Context

The June 2013, the City released “A Stronger, More Resilient New York,” which recommended the feasibility study as one of 257 initiatives to adapt NYC to the impacts of climate change.



## **Southern Manhattan Initiative 2**

*Conduct a study for a multi-purpose levee (MPL) along Lower Manhattan’s eastern edge to address coastal flooding and create economic development opportunities.*

The study is a comprehensive and detailed feasibility assessment of the MPL, including:

- Technical feasibility (including engineering, environmental),
- Legal feasibility (including regulatory and permitting), and
- Financial feasibility.

# Context

This initiative is among the several dozen from the City's resiliency plan that directly impact Southern Manhattan. Taken together, they represent a comprehensive, integrated, and multi-layered strategy.



## Plan Highlights

Install integrated flood protection system in Lower Manhattan, including LES

Install an integrated flood protection system at Hospital Row and remaining areas around Southern Manhattan and funding is secured

Harden key utility, telecom, and transit networks

Facilitate Water St. revitalization with plaza activation and enhancement and streetscape improvements

Expand Take the HELM program to incent technology and creative businesses to relocate to Lower Manhattan

# Study Area

Encompasses approx. 1.2 miles of Lower Manhattan's eastern edge, north to south.



# Consultant Team

Multidisciplinary team with significant experience in the study's subject matters.

## Company



SIVE, PAGET & RIESEL P.C.



F X F O W L E



## Expertise

Engineering (lead consultant)

Marine engineering

Environmental law

Real estate, economic development, and energy efficiency

Architecture, planning, and urban design

Design and planning

Planning, environmental, and engineering

# Study Scope

1. Assess existing conditions
  - Study area history and relevant precedents
  - Site conditions (environmental, geotechnical, etc.)
  - Regulatory framework / permitting processes
2. Identify and evaluate MPL options
3. Develop a recommended option
4. Identify next steps
5. Craft a stakeholder engagement framework



# Precedents

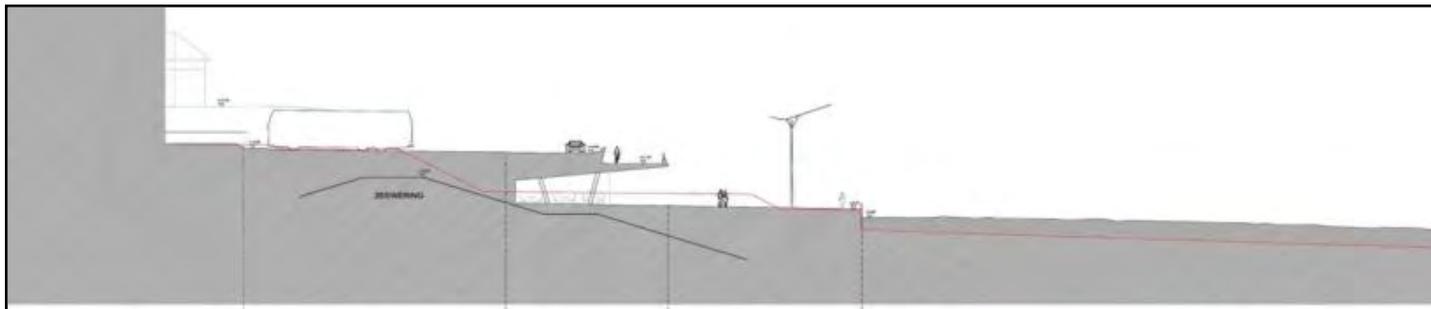
## Battery Park City (NYC)



Battery Park City suffered less damage than the east side of Lower Manhattan during Hurricane Sandy.

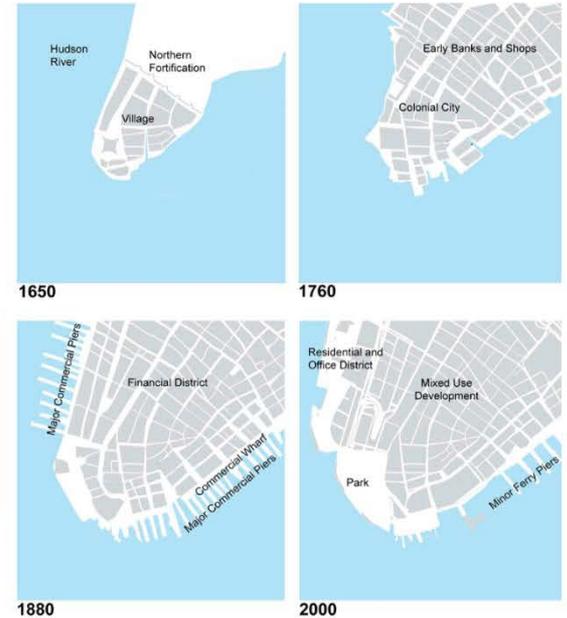
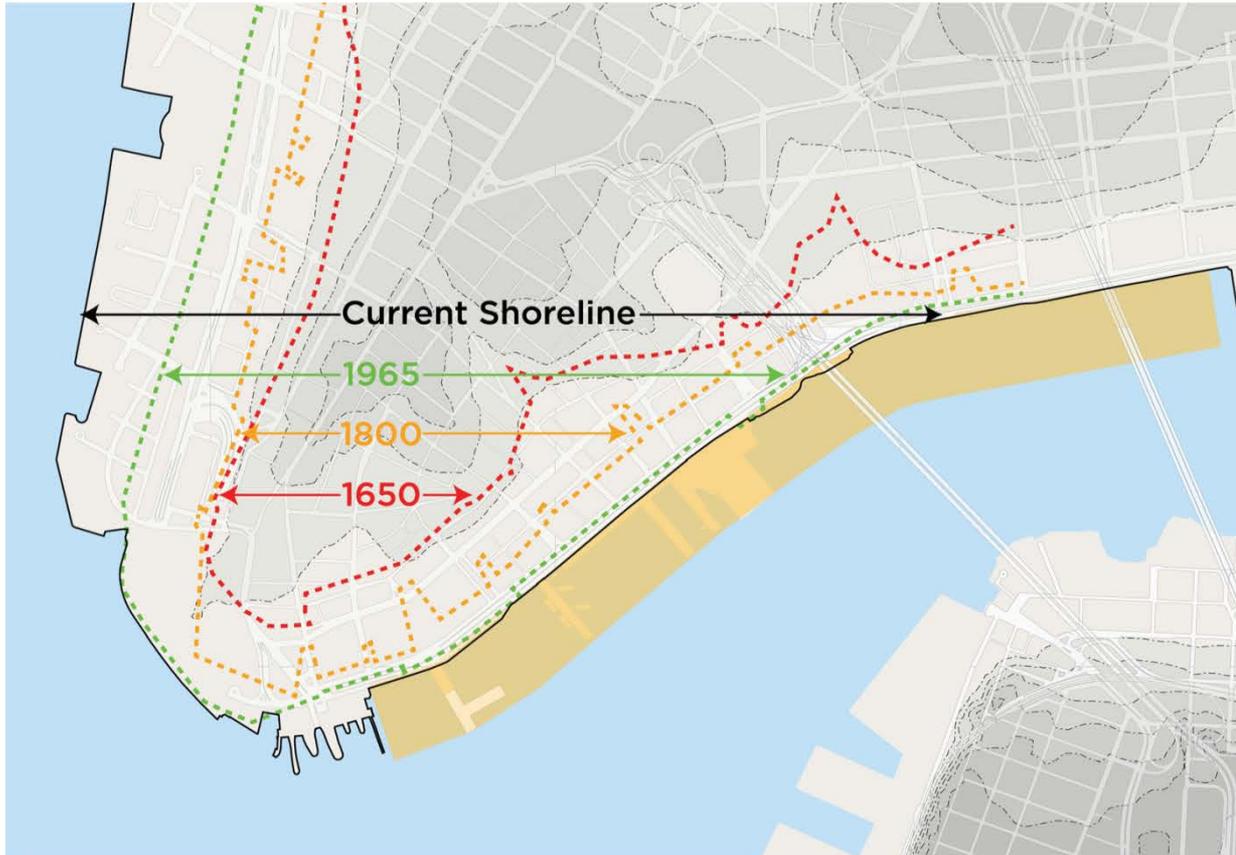
## The Hague (NL)

A multi-purpose levee in the Hague integrated with a commercial district.



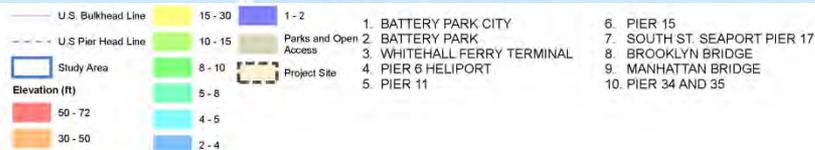
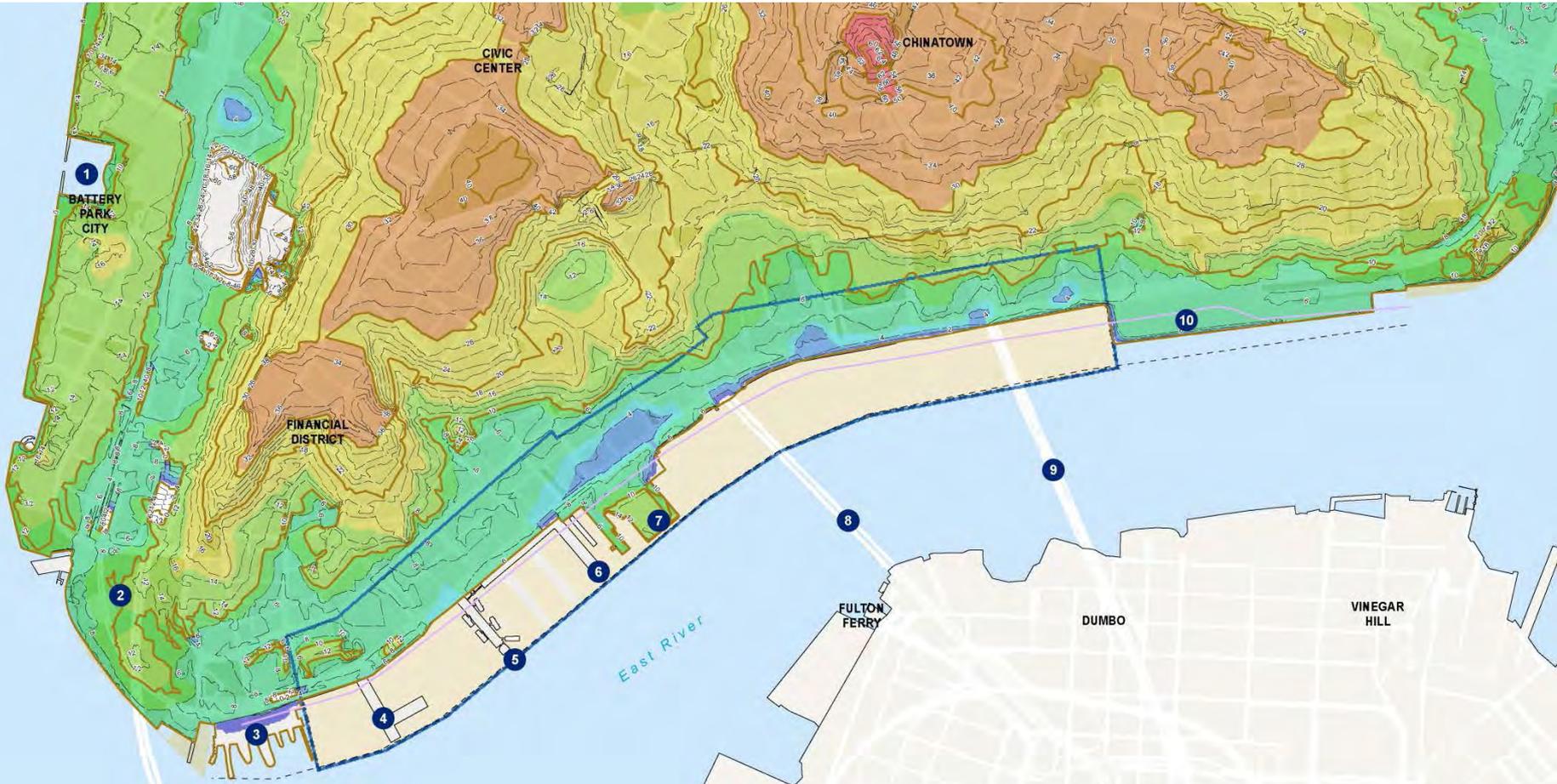
# History

Lower Manhattan's shoreline has been defined by change.



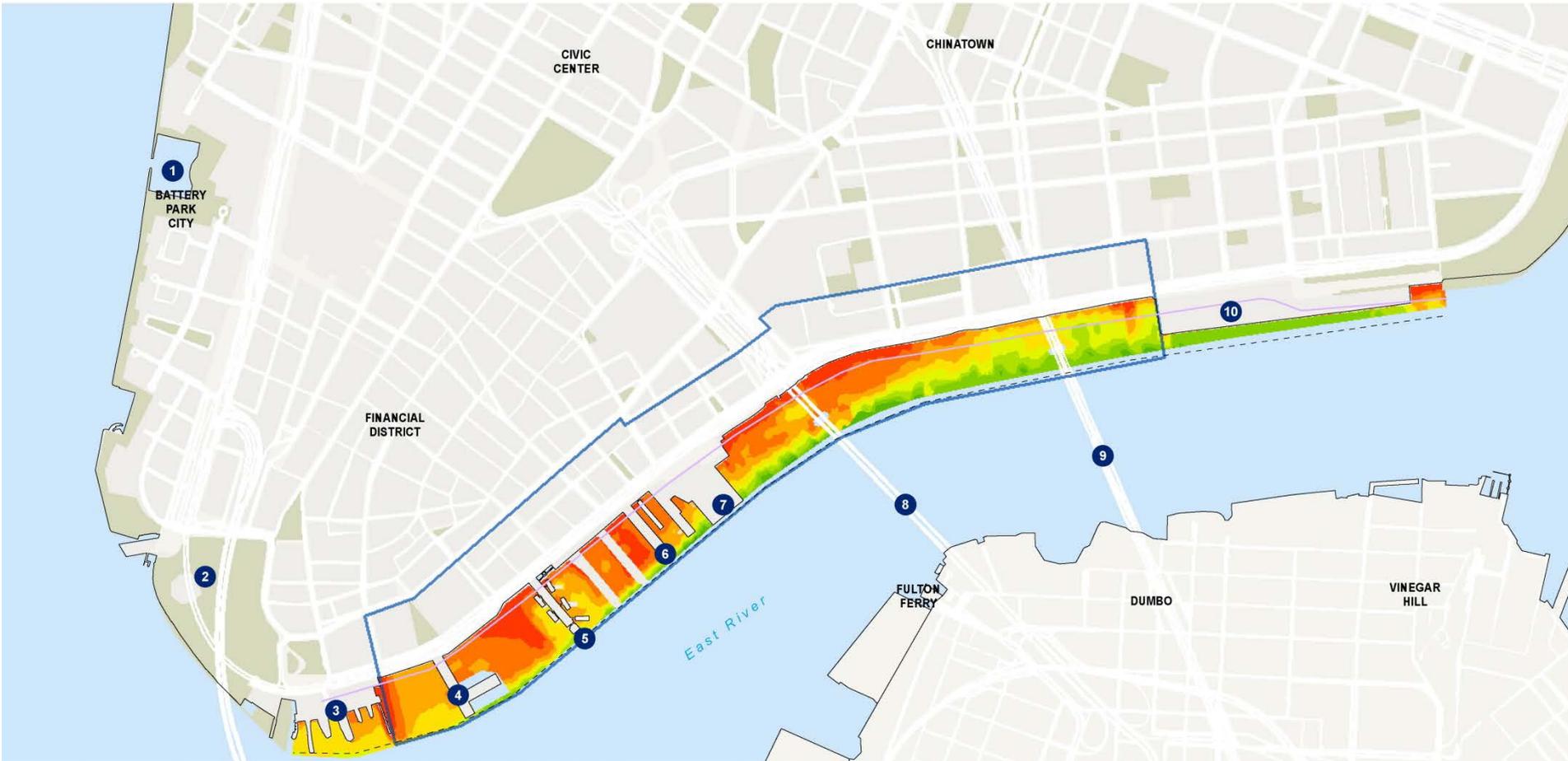
# Site Conditions

Lower Manhattan's topography consists of an elevated central rib and lower shorelines.



# Site Conditions

Water depths vary along the Study Area, with greater depths in the northern section of the area (faster currents).

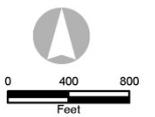


- U.S. Bulkhead Line
- U.S. Pier Head Line
- Study Area
- Parks and Open Access

Bathymetry (ft)	
	-35 - -30
	-30 - -25
	-25 - -20
	-20 - -15
	-15 - -10
	-10 - -5
	-5 - -1
	-47.2 - -45
	-45 - -40
	-40 - -35

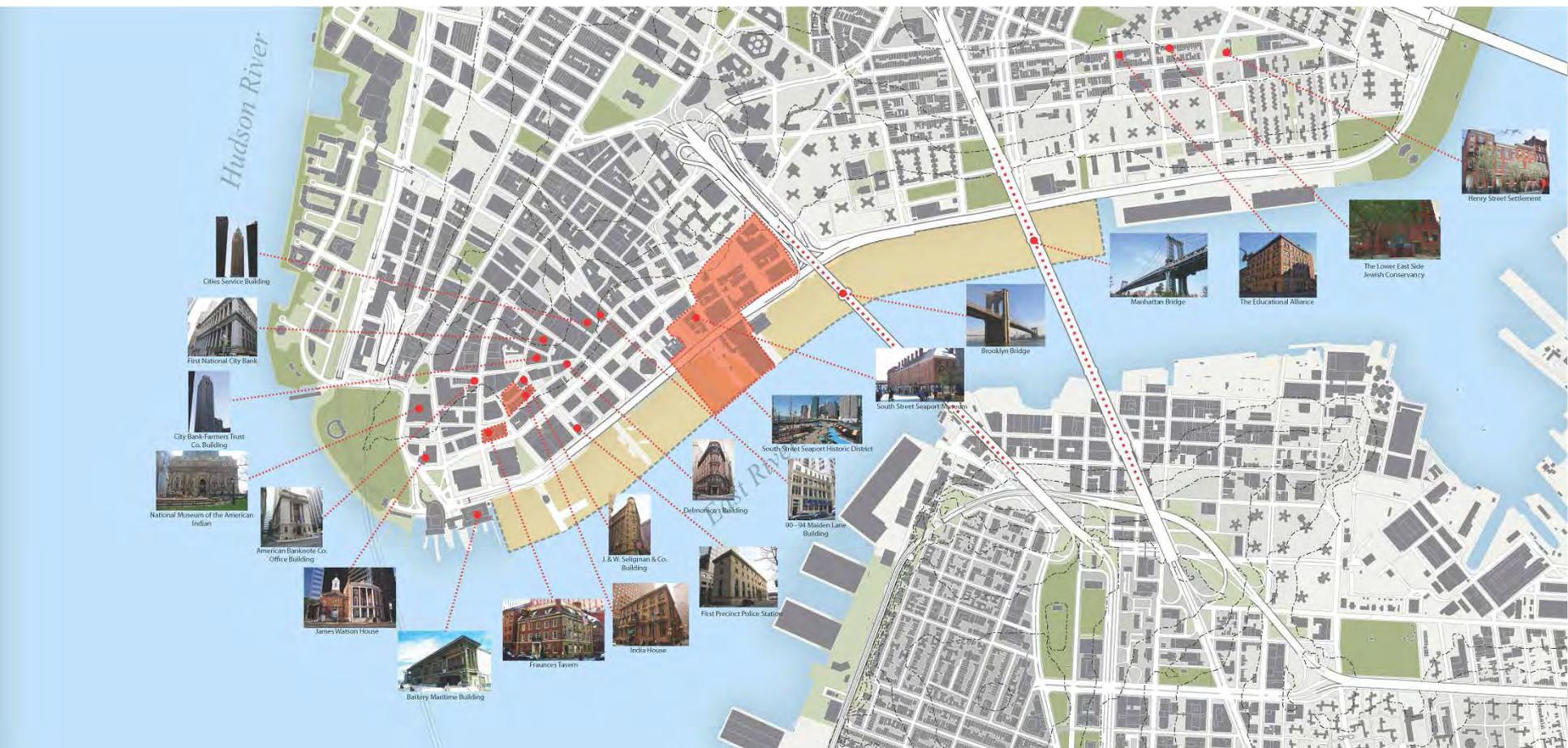
1. BATTERY PARK CITY
2. BATTERY PARK
3. WHITEHALL FERRY TERMINAL
4. PIER 6 HELIPORT
5. PIER 11

6. PIER 15
7. SOUTH ST. SEAPORT PIER 17
8. BROOKLYN BRIDGE
9. MANHATTAN BRIDGE
10. PIER 34 AND 35



# Site Conditions

There are a number of historic landmarks and cultural assets in the Study Area and its vicinity.



## LEGEND

- Historic Landmarks
- Historic Districts



# Potential Regulatory Framework / Permitting Processes

Federal, State, and City laws and regulations that will be analyzed for the study:

## Potential Congressional Actions

### Environmental Impact Review

- National Environmental Policy Act (NEPA)
- New York State Environmental Quality Review Act (SEQRA)
- New York City Environmental Quality Review (CEQR)

### Transportation

- Clean Air Act
- U.S. Department of Transportation
- Smart Growth Public Infrastructure Policy

### Historic Preservation

- National Historic Preservation
- New York City Landmarks Preservation Commission

## Major Environmental Statutes, Executive Orders, and Regulators

- Multi-Agency Determinations
- U.S. Army Corps of Engineers (ACOE)
- U.S. Environmental Protection Agency (EPA)
- National Marine Fisheries Service
- U.S. Fish and Wildlife Services
- New York State Department of Environmental Conservation (NYSDEC)
- New York State Department of State (NYSDOS)

# Next Steps

1. Assess existing conditions
  - Study area history and relevant precedents
  - Site conditions (environmental, geotechnical, etc.)
  - Regulatory framework / permitting processes
2. Identify and evaluate MPL options
3. Develop a recommended option
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**Subject:** Multi-Purpose Levee Existing Conditions Update

Following Hurricane Sandy, Mayor Michael R. Bloomberg's Special Initiative for Rebuilding and Resiliency (SIRR) issued "A Stronger, More Resilient New York," a plan to rebuild locally and make City infrastructure and buildings more resilient to climate change. The plan contains a range of short-, medium-, and long-term initiatives. One of the most ambitious long-term concepts is a multipurpose levee (MPL) for the east side of Lower Manhattan called "Seaport City." The first step, which NYCEDC was tasked to administer, is to conduct a comprehensive feasibility analysis.

The eastern edge of Lower Manhattan is one of the lowest-lying areas on the island and is at higher risk to threats both from extreme weather events and long-term sea level rise. An MPL would be a barrier to protect Lower Manhattan from flooding while also supporting residential, retail or commercial uses, providing open space, serving as transportation infrastructure, and/or providing parking. Ultimately, this MPL would be integrated with and enhance the resiliency being implemented and planned around Southern Manhattan, as directed by "A Stronger, More Resilient New York."

In July 2013, NYCEDC issued an RFP to examine the feasibility of the MPL concept. We have since selected a consultant team led by the engineering firm ARCADIS. ARCADIS is ranked among the top 10 design and engineering consultancies in the world and is New York's largest environmental engineering firm. The company's core expertise is in the fields of infrastructure, water, environment and buildings. ARCADIS has partnered with the following sub-consultants:

- Mueser Rutledge Consulting Engineers: Geotechnical and structural foundation design engineering firm
- Ocean and Coastal Consultants: Marine engineering firm
- Sive Paget & Riesel, P.C.: Environmental law firm
- HR&A Advisors, Inc.: Real estate, economic development and energy efficiency consulting firm)
- FXFOWLE Architects: Architecture, planning and urban design firm
- WXY: Design and planning firm
- AKRF: Planning, environmental and engineering firm

The team will examine a 1.2-mile area along the eastern edge of Lower Manhattan from the Battery Maritime Building to just north of the Manhattan Bridge, in order to determine the technical, financial and legal feasibility for a range of MPL options.

To date, the consultants have assessed existing conditions and contextual considerations within the study area, MPL precedents around the globe and in the U.S., as well as the regulatory framework that would govern the potential development of an MPL. Included below is a high-level summary of what has been looked at to date (see attached Community Board presentation for related graphics):

### **Precedents**

- **Rotterdam, Netherlands:** The Roof Park in the west of Rotterdam provides safety against flooding by combining a parking garage, a shopping mall, a levee and a city park.
- **Hamburg, Germany:** Hafencity in Hamburg, Germany uses pedestrian bridges and other architectural approaches to allow for easy evacuation when waters rise.
- **The Hague:** A MPL in The Hague is integrated within a commercial district.
- **Battery Park City:** Battery Park City suffered less damage than the east side of Lower Manhattan during Hurricane Sandy.

### **Site Conditions**

- **Historical Shoreline:** Lower Manhattan's shoreline has been defined by change since the 17th century, accommodating demographic and economic growth and development.
- **Topography:** Lower Manhattan's topography consists of an elevated central rib and lower shorelines. An in-depth understanding of these characteristics will be critical as the study moves into the assessment of different MPL configurations.
- **Water Depth & Currents:** Water depths vary along the study area, with greater depths and faster currents in the northern section. The relationship between these aspects and the MPL options to be considered will require close analysis.
- **Historical & Cultural Assets:** There are a number of historic landmarks and cultural assets in the study area, including Civic Center, the National Museum of the American Indian, historic banks, the Seaport District, the Battery Maritime Building and the Manhattan and Brooklyn Bridges. The MPL alternatives to be considered as part of the study will have to be mindful of these assets.

**Regulatory framework:** Any future project would certainly require environmental and land use review, and would be subject to various levels of local, state, and federal regulations. Involved or interested agencies would likely include:

- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Department of Transportation
- National Marine Fisheries Service
- U.S. Fish and Wildlife Services
- New York State Department of Environmental Conservation (NYSDEC)
- New York State Department of State (NYSDOS)
- New York City Landmarks Preservation Commission

The next step after completing the existing conditions analysis will be to identify and evaluate different MPL options. Later on, towards the end of the study, a recommended MPL configuration will be presented together with a stakeholder engagement framework that advances the dialogue and builds consensus around a future project.

As Hurricane Sandy taught, it is vital that we are better prepared for the effects of climate change. With the increasing density of our City, incorporating water defense into the urban fabric warrants further exploration and may be the best path forward. We look forward to keeping you apprised of our progress and working with you on this important initiative.