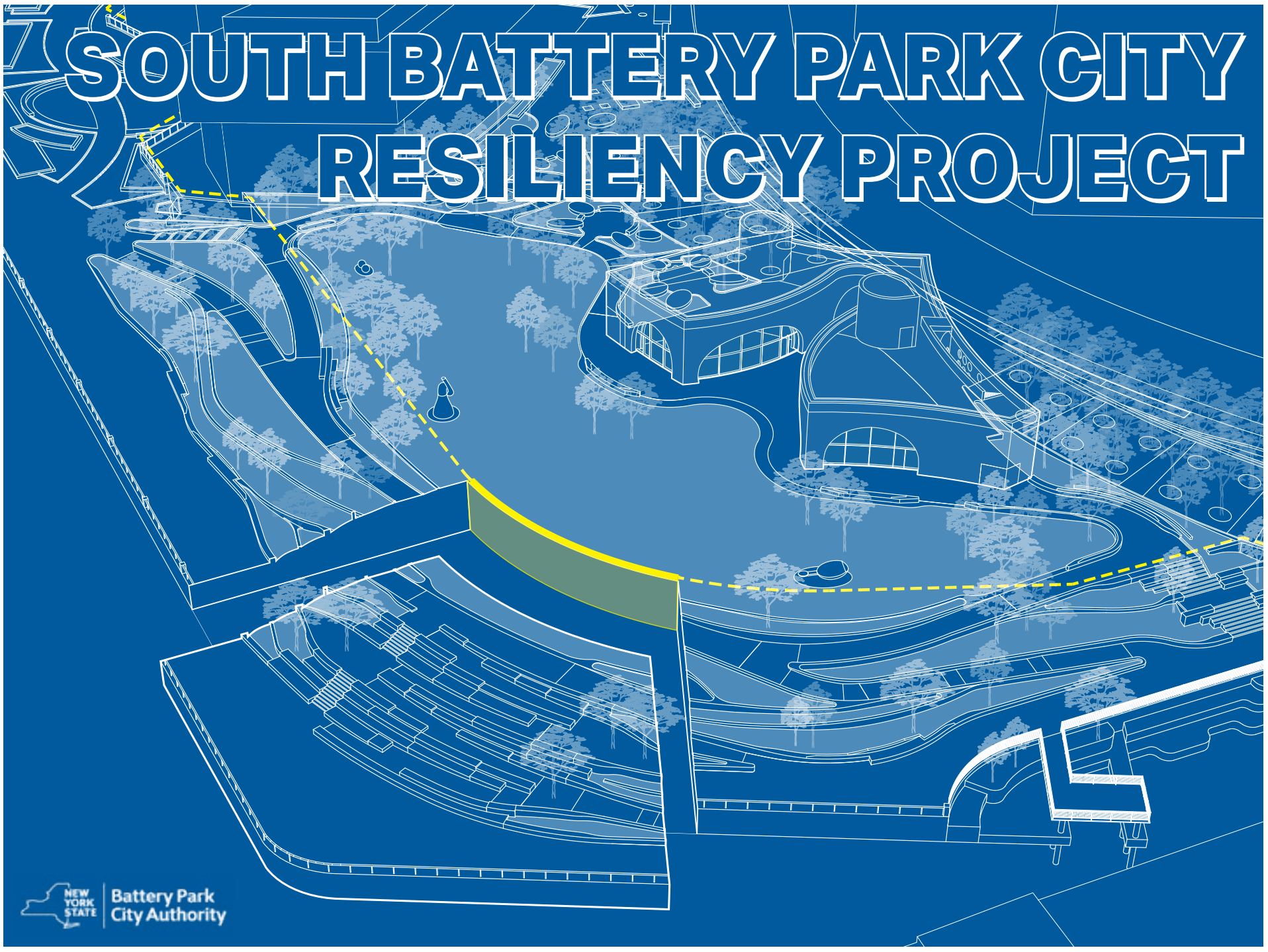
# SOUTH BATTERY PARK CITY RESILIENCY PROJECT



NEW YORK STATE | Battery Park City Authority

Battery Park City Authority is proud to share the story behind the South Battery Park City Resiliency Project, one of two BPCA-led elements of the City of New York's Lower Manhattan Coastal Resiliency Project. As this document shows, SBPCR is the product of years of iterative design and community engagement, a high standard of design excellence, and incredibly hard work by an interdisciplinary team of professionals here at BPCA alongside our countless partners in both the private and public sectors. We are proud to reopen the centerpiece of this project—a flood-resistant Wagner Park—on schedule this summer, as we turn our attention to constructing the next phase of our climate resiliency work, the North/West BPC Resiliency Project. We'll see you in the park!

Don Capoccia, BPCA Chair
Raju Mann, BPCA President & CEO

Wagner Park

# ACKNOWLEDGMENTS

**The team thanks the multitude of residents, community members, and other stakeholders who offered their time and input to this project. We also acknowledge the City, State, and Federal agencies and local organizations as important project partners throughout this process, including:**

- Mayor's Office of Climate and Environmental Justice (MOCEJ)
- Mayor's Office of People with Disabilities (MOPD)
- Metropolitan Transportation Authority (MTA)
- New York City Department of Environmental Protection (NYCDEP)
- New York City Department of Small Business Services (SBS)
- New York City Department of Transportation (NYCDOT)
- New York City Department of Parks and Recreation (NYCDPR)
- New York City Economic Development Corporation (NYCEDC)
- New York City Police Department (NYPD)
- New York City Public Design Commission (PDC)
- New York City Landmarks Preservation Commission (LPC)
- Fire Department of New York (FDNY)
- Triborough Bridge and Tunnel Authority (TBTA)
- New York State Department of Environmental Conservation (NYSDEC)
- New York State Historic Preservation Office (SHPO)
- United States Army Corps of Engineers (USACE)
- Museum of Jewish Heritage (MJH)
- The Battery Conservancy (TBC)
- Waterfront Alliance
- Manhattan Community Board 1 (CB1)

**This document was prepared by:**

NEW YORK STATE OF OPPORTUNITY. Battery Park City Authority

AECOM LAUD NYC

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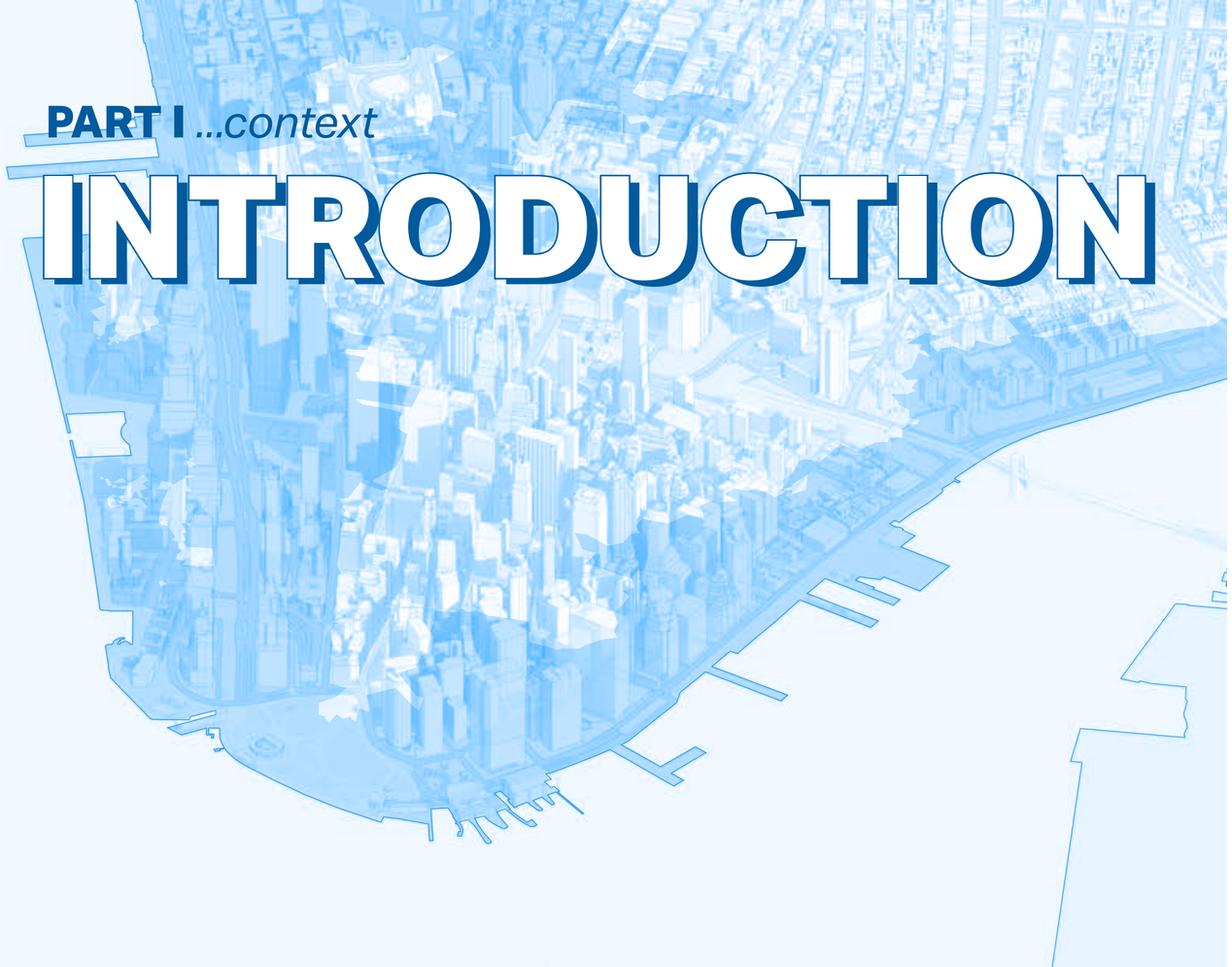
**PART I** *...context*

# INTRODUCTION



The identity of New York City is tied to **Lower Manhattan**. The impacts of **climate change** threaten this district, and with it the past and future of New York City. The **South Battery Park City Resiliency Project,** along with other Lower Manhattan Resiliency Projects, are designed to **protect** this dense urban area from **future storms and sea level rise**, and provide **world-class public spaces** that are built to last.

**Superstorm Sandy hit New York City on October 29, 2012. Over the course of 48 hours, wind, rain, and water destroyed approximately 300 homes, damaged critical public and private infrastructure, left hundreds of thousands of New Yorkers without power, and left many more vulnerable in the aftermath.**

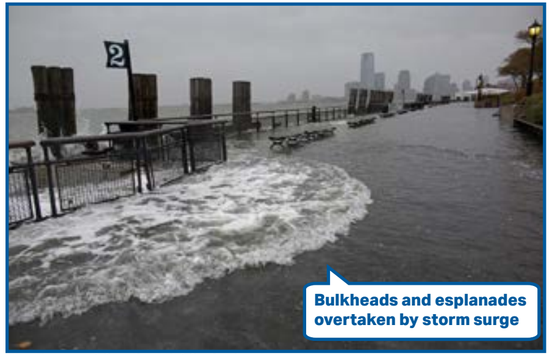
**The storm resulted in the deaths of 44 City residents, damage to more than 69,000 residential units, and inflicted an estimated $19 billion in damages and lost economic activity across the New York City.**

**The frequency and scale of future storms are expected to increase and exceed Superstorm Sandy.**

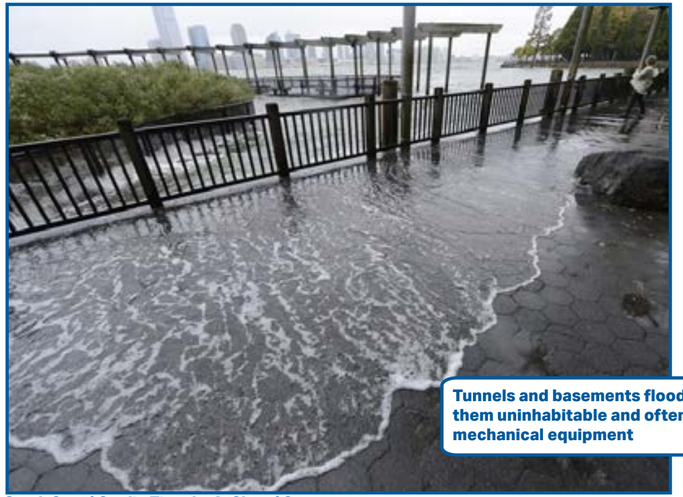
Sources: https://www1.nyc.gov/site/cdbgdr/about/About%20Hurricane%20Sandy.page
https://www.nyc.gov/html/sirr/downloads/pdf/final_report/Ch_1_SandyImpacts_FINAL_singles.pdf



Battery Park Underpass | Credit: Patrick McFall



The Battery | Credit: AP / Craig Ruttle



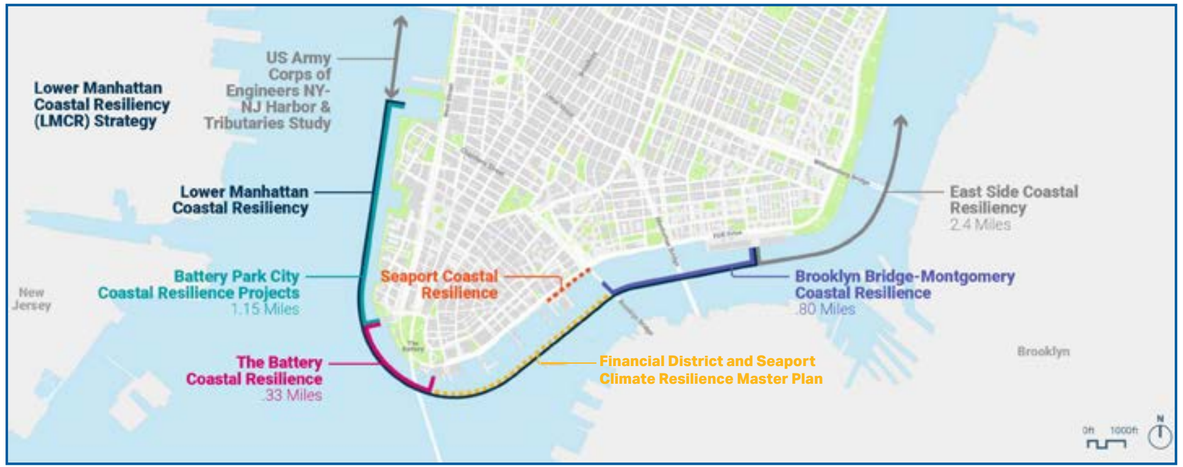
South Cove | Credit: Timothy A. Clary / Getty


One New York Plaza Shops Entrance | Credit: EPA / Justin Lane

# PART OF A CITY-WIDE MASTERPLAN

New York City is taking significant action to protect Lower Manhattan, investing in climate adaptation projects, and planning for long-term adaptation. The City of New York released the Lower Manhattan Climate Resilience Study in 2019 to highlight the vulnerabilities of the area through a comprehensive multi-hazard climate risk assessment.

The report identified capital projects to adapt and protect 70 percent of Lower Manhattan's shoreline. These capital projects, along with the Financial District and Seaport Climate Resilience Master Plan, comprise the Lower Manhattan Coastal Resiliency (LMCR) strategy.




**Sources: https://fidiseaportclimate.nyc/**

**Battery Park City Coastal Resilience Projects**
**Lead: Battery Park City Authority (BPCA)**
Two linked flood risk reduction projects and interior drainage improvements primarily located within Battery Park City to protect Battery Park City and adjacent neighborhoods. These projects are designed for a 100 year storm in 2050 including sea level rise.

OTHER LMCR PROJECTS

**The Battery Coastal Resilience**
**Lead: NYC Economic Development Corporation (NYCEDC), NYC Parks**
This project will raise and harden the esplanade within The Battery, protecting this important open space while preserving its historic character and active waterfront uses. The flood defense will be designed for sea level rise through 2100.

**Brooklyn Bridge-Montgomery Coastal Resilience (BMCR)**
**Lead: NYCEDC, NYC Department of Design and Construction**
Integrated floodwalls and deployable gates will be constructed with new public amenities in the highly constrained waterfront esplanade underneath FDR Drive. The project is designed for a 100 year storm in 2050, including passive protection for "sunny day" future tidal flooding.

**Seaport Coastal Resilience (SPCR)**
**Lead: NYCEDC, Mayor's Office of Climate Resiliency (MOCR)**
The project will raise the esplanade approximately three to five feet to defend against tidal flooding and coastal storms and includes drainage improvements. The project will also improve waterfront access for pedestrians and cyclists, and connect to the future extended and raised waterfront as part of the Financial District and Seaport Climate Resilience Master Plan.

**Financial District and Seaport Climate Resilience Master Plan**
**Lead: NYCEDC, Mayor's Office of Climate Resiliency (MOCR)**
The master plan proposes an elevated, resilient waterfront to withstand severe coastal storms and rising sea levels, which together pose a serious threat to the low-lying Financial District and South Street Seaport neighborhoods.

# PART OF A NEIGHBORHOOD-WIDE MASTERPLAN

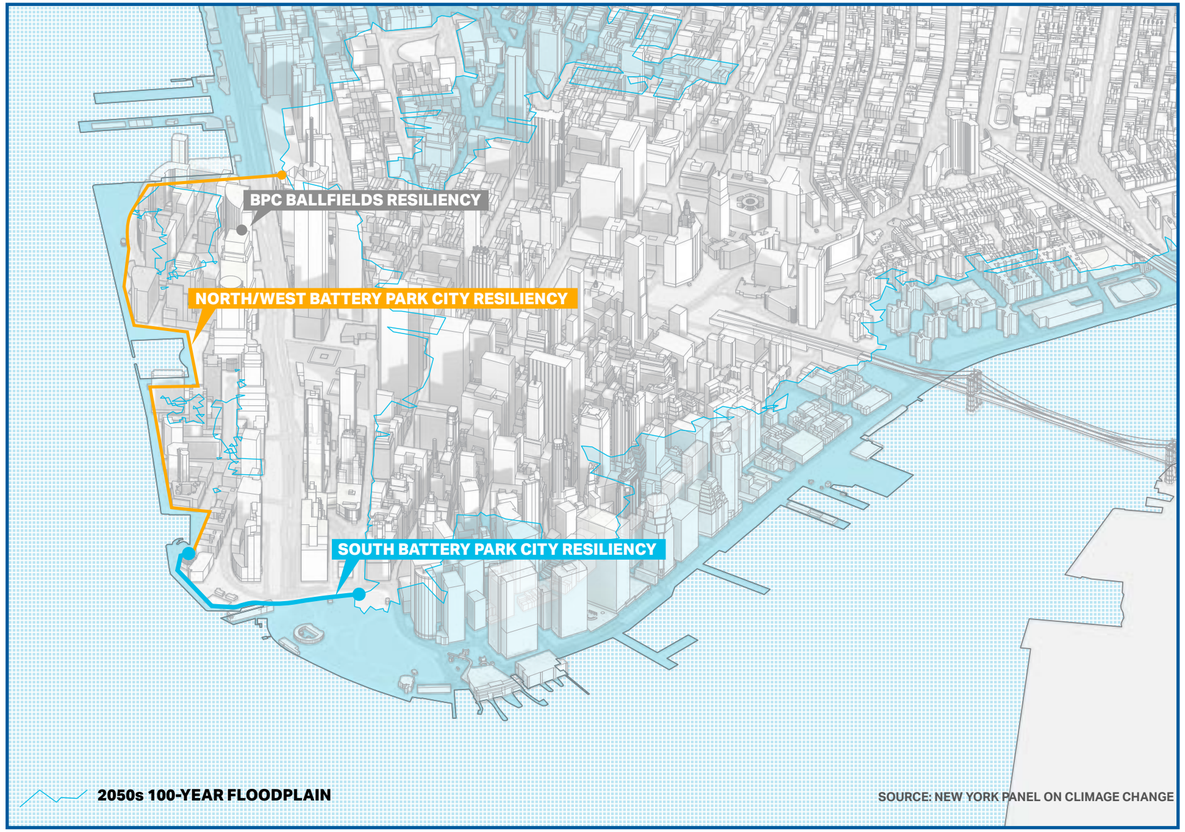
Battery Park City sustained millions of dollars of damage due to Superstorm Sandy.

Today, the Battery Park City Authority (BPCA) is looking ahead and taking action on climate adaptation. This includes three interrelated resiliency projects as part of the Lower Manhattan Coastal Resiliency (LMCR) project to protect Battery Park City and the Lower Manhattan coast from the threats of storm surge and sea level rise. In addition, BPCA has completed many other adaptation measures, including water-resistant lighting upgrades, raising electrical vaults above the flood zone, wet flood proofing restoration of the Pier A building, and new legislation allowing a $500 million increase to bond cap.

**BPC Ballfields Resiliency**
An independent flood barrier system along the eastern, northern, and southern boundaries of the BPC Ball Fields. The approximately 800-linear foot barrier system protects the 80,000 square foot playing surface – used by some 50,000 local youth annually – and adjacent community center from the risks associated with storm surge and sea level rise. This project is complete.

**North/West Battery Park City Resiliency**
A fully integrated coastal flood risk management system from First Place, north along the Battery Park City Esplanade, across to the east side of West Street/Route 9A, terminating above Chambers Street at a high point on Greenwich Street. Work will proceed through a progressive design-build effort.

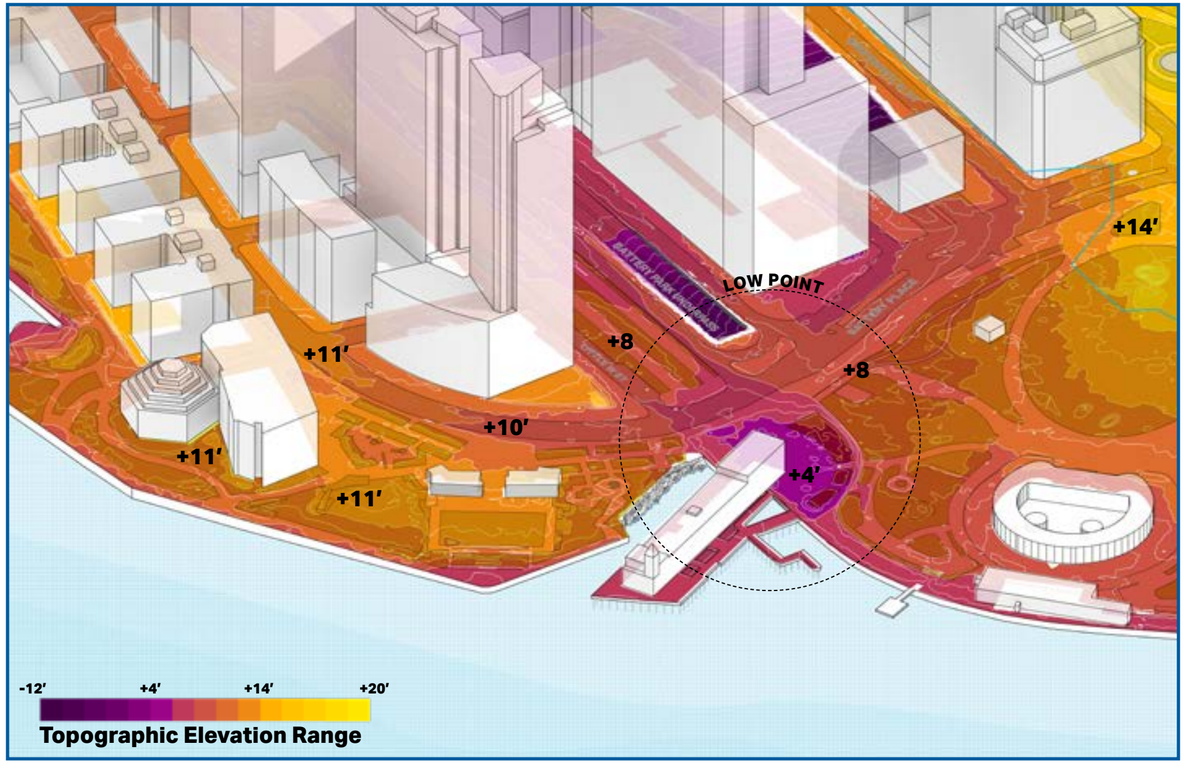
**South Battery Park City Resiliency**
The project will create an integrated coastal flood risk management system from the Museum of Jewish Heritage, through Wagner Park, across Pier A Plaza, and along the northern border of the Historic Battery. Construction started in late 2022 and is expected to be completed in 2025. Upon completion, Wagner Park will include expansive lawns and gardens; education, community, dining, and programming spaces; public restrooms; beautiful views; and access for all.



# WHY SOUTH BATTERY PARK CITY?

The project area is an important waterfront access point that provides an array of programmatic uses for residents, workers, and tourists. However, increased magnitude and frequency of extreme weather events combined with rising sea levels means that this area is becoming increasingly vulnerable. The project area is located at the southern tip of Manhattan and includes Pier A Plaza, which contains one of the lowest elevations in Lower Manhattan and was a major breach point for floodwaters during Superstorm Sandy.

The blue color represents the height of potential flooding from future severe weather. It depicts the height of a 2050's 100 year storm with sea level rise, as published by the NYC Panel on Climate Change

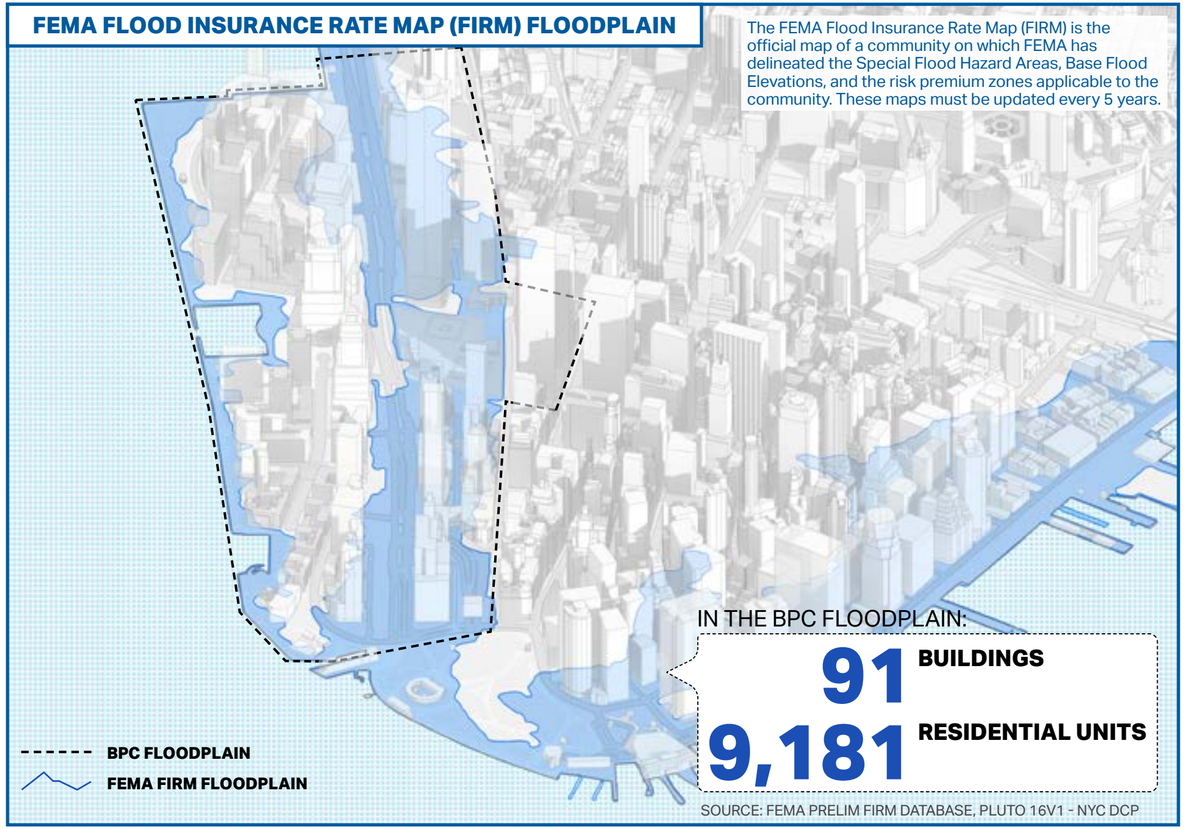



Graphic depicts current site topographic elevation points

# WHY SOUTH BATTERY PARK CITY (SBPC)?

## FEMA FLOOD INSURANCE RATE MAP (FIRM) FLOODPLAIN

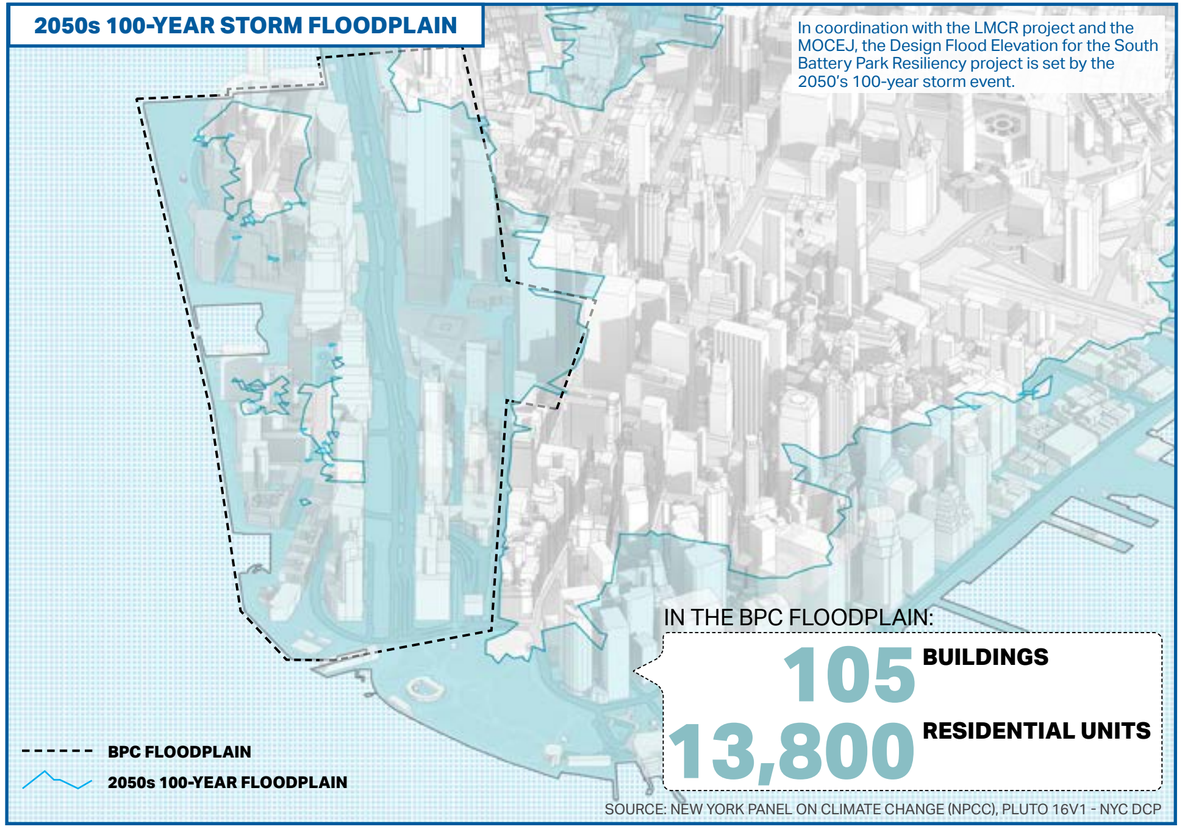
The FEMA Flood Insurance Rate Map (FIRM) is the official map of a community on which FEMA has delineated the Special Flood Hazard Areas, Base Flood Elevations, and the risk premium zones applicable to the community. These maps must be updated every 5 years.




SOURCE: FEMA PRELIM FIRM DATABASE, PLUTO 16V1 - NYC DCP

## 2050s 100-YEAR STORM FLOODPLAIN

In coordination with the LMCR project and the MOCEJ, the Design Flood Elevation for the South Battery Park Resiliency project is set by the 2050's 100-year storm event.




SOURCE: NEW YORK PANEL ON CLIMATE CHANGE (NPCC), PLUTO 16V1 - NYC DCP

# WHY NOW?

New York City is at risk from more frequent and severe storms, including hurricanes and nor'easters. Superstorm Sandy devastated the area in 2012, taking 44 lives in New York City and damaging buildings, streets, and infrastructure. In 2021, Tropical Storm Henri and Hurricane Ida brought record rainfall to the city. The number and frequency of these threats will only increase over time.

By the 2050's, annual losses from coastal storms, including building damage, healthcare costs, and lost services are expected to be over 1 billion dollars a year if no action is taken. By 2050, severe storms will bring up to 13.5 feet of flooding above existing elevation and will inundate a majority of Battery Park City. The drainage system will also be increasingly stressed due to the combined effects of increased rainfall and coastal storms, leading to flooding of streets and basements.

**We cannot plan for the Battery Park City of today; we have to plan for the Battery Park City that will be home to future generations.**



# PROJECT GOALS

## REDUCE RISK TO BPC AND LOWER MANHATTAN FROM COASTAL FLOODING

Develop and construct an implementable flood risk reduction structure
Develop and construct drainage infrastructure solutions to manage stormwater

## INTEGRATE BPCA'S BROADER GOALS TOWARDS A CLIMATE RESILIENT PLACE

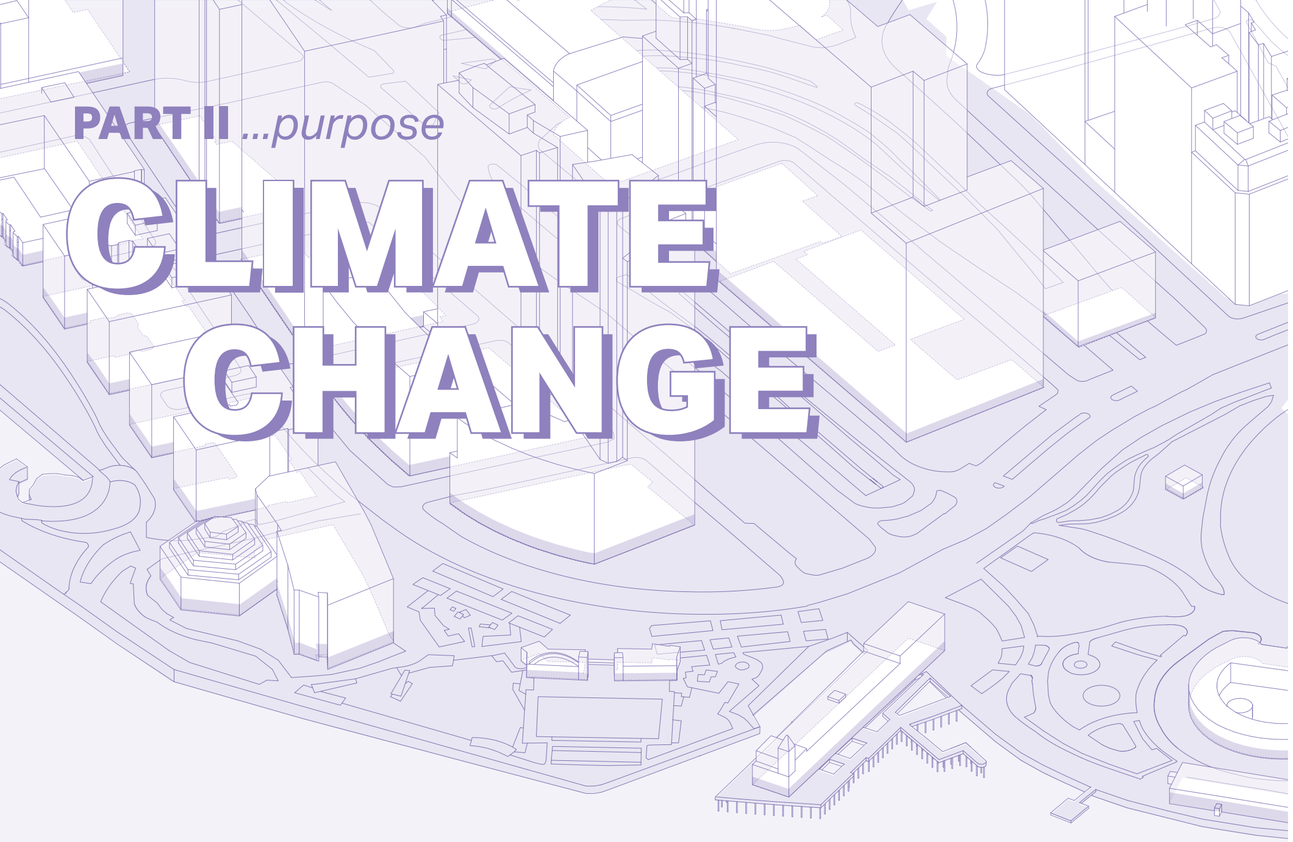
Design in accordance of BPC's Sustainability Plan and Green Guidelines
Salvage existing site materials and reuse when possible

## ENGAGE WITH THE COMMUNITY ON NEEDS AND PRIORITIES

Ensure continuous dialog with members of the public
Utilize multiple formats to share information and gather public feedback

## ENHANCE PUBLIC OPEN SPACES

Maintain views and access to the waterfront
Retain and create new opportunities for programming in public spaces
Ensure all public spaces follow the highest universal design standards



**PART II** *...purpose*

# CLIMATE CHANGE

**Lower Manhattan is vulnerable** to impacts from **climate change fueled coastal storms**. The frequency and scale are only expected to get worse. The coastline must be studied and **re-imagined** once again in order to **prepare for future impacts.**

# CLIMATE CHANGE

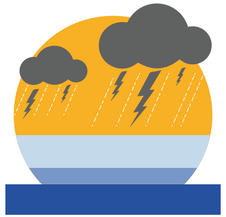
**Coastal storms** include hurricanes, nor'easters, and tropical storms and cause severe flooding, strong winds, and heavy rain. During major storm events, storm surge causes a rise in water levels, over and above the predicted astronomical tides.

**Tidal flooding** is the temporary inundation of low-lying areas as a result of high tides. Sea level rise will cause tides to be higher than they are today, resulting in more frequent tidal flooding.

**Extreme precipitation** corresponds to heavy rainfall where the amount of rain experienced substantially exceeds what is normal. This increases stress on the sewer system and can flood streets and basements.

**Coastal Storms**

**Tidal Flooding**



**Extreme Precipitation**

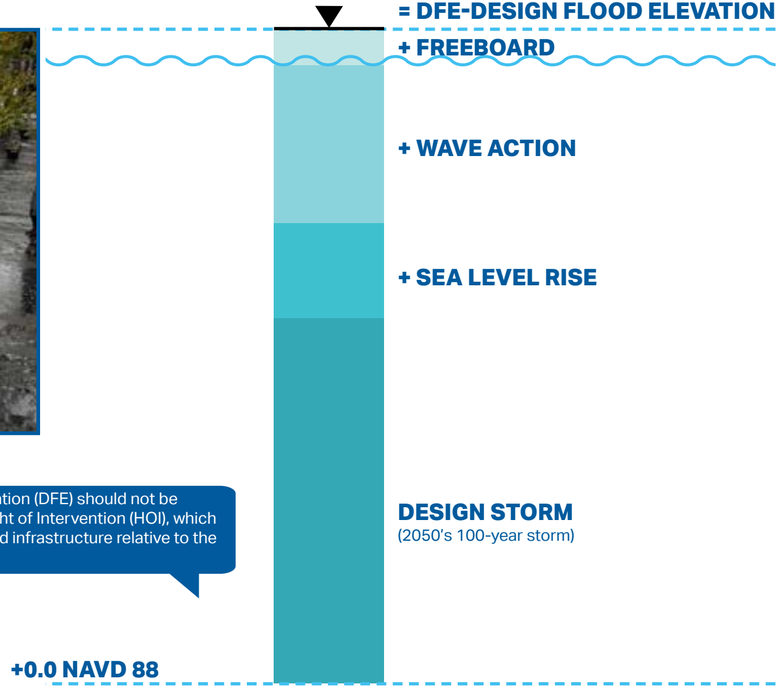
**Sources:** **https://www1.nyc.gov/site/doh/health/emergency-preparedness/emergencies-extreme-weather-coastal-storm.page**
**https://www.nhc.noaa.gov/surge/**



The Design Flood Elevation (DFE) is the height, relative to +0.0 NAVD88, of the flood defense measures necessary to defend the project area from future coastal storms. A DFE is a composite of multiple factors shown below.

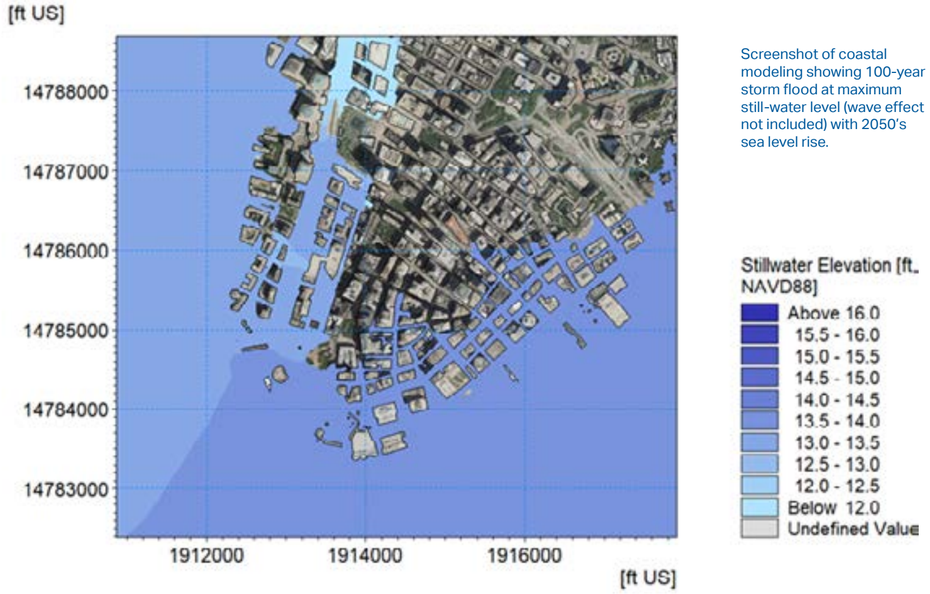
**Superstorm Sandy**

The Design Flood Elevation (DFE) should not be confused with the Height of Intervention (HOI), which is the height of the flood infrastructure relative to the sites finished grade.

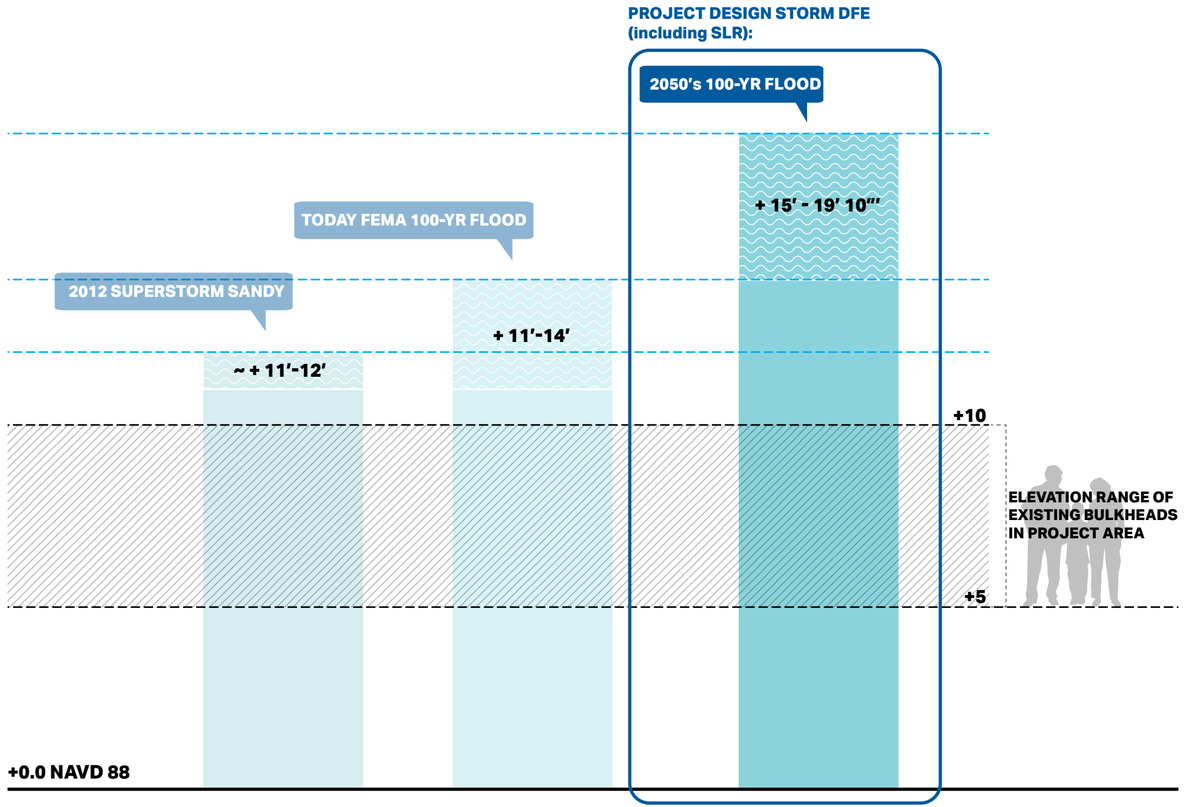


# COASTAL STORM IMPACTS

The design flood elevation used for this project, consistent with all other Lower Manhattan Coastal Resiliency (LMCR) projects, is a 2050's 100-year storm event. The project site and much of Lower Manhattan will be inundated under 100-year storm conditions. The Design Flood Elevations (DFE) associated with this storm event and relative to the project area conditions are much higher than what was seen during Superstorm Sandy or today's FEMA maps. Because of the project area location in the New York Harbor, it is particularly vulnerable to taller, stronger waves, as there is substantial space in the harbor for these waves to gain energy before hitting our site.




Screenshot of coastal modeling showing 100-year storm flood at maximum still-water level (wave effect not included) with 2050's sea level rise.



# HOW DID WE ASSESS COASTAL FLOODING IMPACTS?

Coastal modeling was performed to predict the extent and impact of coastal flooding due to the combination of the daily tides, extreme storm surge and waves, and included projected sea level rise. State-of-the-art technology computer models simulated the force of strong winds and low atmospheric pressure acting on the water surface to compute elevated levels of the tide and large waves generated within the New York Harbor that eventually travel inland over the project site, break and run-up to over-top the shoreline. The computer model parameters are set up to create conditions similar to a large Nor'easter or larger-than Superstorm Sandy type of event. Using computer models allows the design team to simulate and plan for conditions that are infrequent and may occur in the future, including future sea level rise. The models can accommodate numerous design scenarios to allow for evaluations of which design may be the most effective.

**FEMA**
**FEDERAL EMERGENCY MANAGEMENT AGENCY**

FEMA studies provide a baseline for the coastal stillwater elevation (the astronomical tide plus the storm surge), offshore and overland wave heights and wave runup.

+

**NPCC**
**NEW YORK CITY PANEL ON CLIMATE CHANGE**

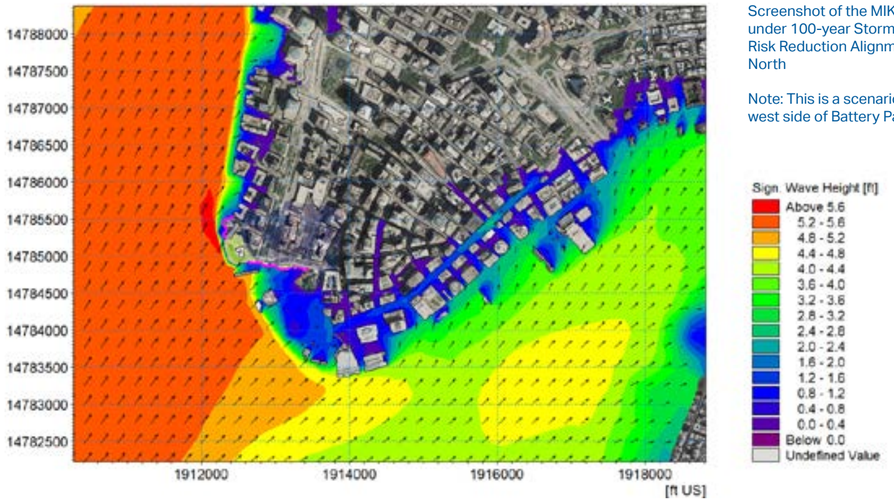
NPCC provides the basis for the recommended sea level rise rates that were applied for future conditions design.

+

**COASTAL MODELING**

Coastal Modeling uses the information from FEMA and NPCC to build numerical models providing a more refined and detailed analysis to support the design.



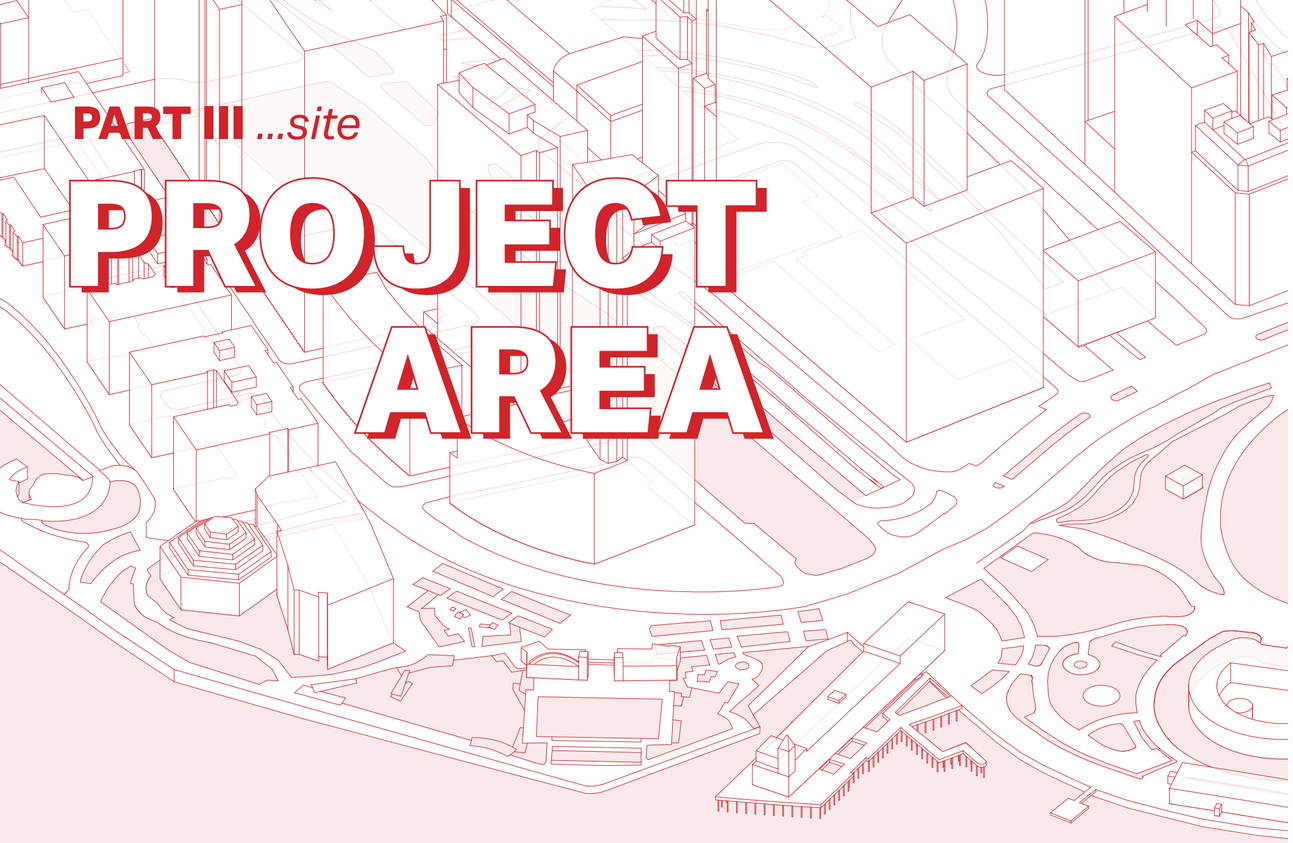



Screenshot of the MIKE 21 SW Model Simulated Wave Field under 100-year Storm and 2050s SLR with the Proposed Flood Risk Reduction Alignment, Wind Direction from 220 degree to North

Note: This is a scenario with no flood wall implemented on the west side of Battery Park City

The primary objective of the coastal model is to develop a system to assess the project area's vulnerability to flooding for existing conditions (with no flood risk reduction implemented) and for the proposed flood risk reduction alignment, with Sea Level Rise (SLR) considered. This computer modeling helped the project team answer various "what if" scenarios to evaluate these future conditions.

In order to define future storms, the team used data from the Federal Emergency Management Agency (FEMA) to estimate the depth and extent of present-day flood hazards combined with data from the New York Panel on Climate Change (NPCC) for future sea level rise projections. The project team then conducted its own more detailed computer modeling to understand how these hazards relate to the conditions of the project site. The first component that the project team identified was the stillwater elevation, which is the projected height of floodwaters caused by tides and storm surge, not including waves. FEMA has defined the stillwater elevation for a 100-year flood, or a flood that has a one-percent chance of occurring in any given year, across the study area. The project team added NPCC's future sea level rise projections to FEMA's current stillwater elevation definition to estimate the expected increase in stillwater elevation by 2050. The project team also used numerical wave models, including the MIKE 21 hydrodynamic and wave models, to better understand future wave behavior, heights and frequency. Under varying storm conditions, the computer model simulates the local wave action and identifies the expected wave heights in the project area. The project team used best-available data, including FEMA's statistical information on wave heights and water elevations, in combination with these additional computer models to better understand the potential wave crest elevation on- and off-shore for a 100-year storm through the year 2050. Wave impacts in this area occur due to the study area's relative location adjacent to New York Harbor, where there is substantial "fetch" or space, for waves to gain energy across open water before reaching land. After the waves break, the wave run-up on the shoreline structures add up to an additional 9 feet to the total flood elevation. To withstand these higher waves during a coastal storm, it is necessary to construct flood risk reduction infrastructure with a DFE ranging from +15 to 19' 10" NAVD88 to reduce risk against a 100-year storm in 2050. This accounts for sea level rise, stillwater, waves, and freeboard.



**PART III** *...site*

# PROJECT AREA

More than **one-third of Battery Park City is parkland**. This project encompasses Wagner Park, the Museum of Jewish Heritage, Pier A Plaza and The Battery.

# A BRIEF HISTORY

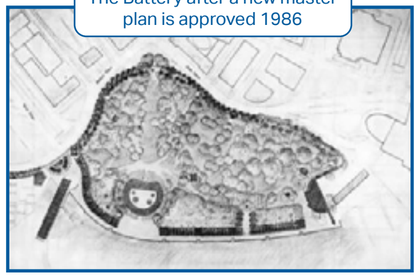
Understanding the history of Battery Park City (BPC) is imperative for understanding the constraints and opportunities of the site. Battery Park City is a planned community and neighborhood on the west side of the southern tip of Manhattan, with more than one-third of its space dedicated to parkland.

**1855** Landfill is used to connect Castle Garden (Clinton) to the mainland, creating the current footprint of The Battery.

**1865** Construction is completed on City Pier A, designed as the headquarters of NYC Board of Dock Commissioners

**1968** Battery Park City Authority is established to manage development of the Hudson shoreline

**1976** The 92 acre landfill on which Battery Park City rests is completed



**1994** The Battery Conservancy is founded to rebuild and revitalize The Battery after a new master plan is approved 1986

**1996** Robert F. Wagner Park, designed by Machado and Silvetti Associates, Laurie Olin, and Lynden Miller opens to the public

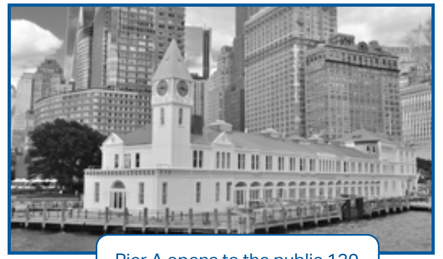
**2012** Superstorm Sandy causes storm surges reaching 14' at The Battery

The New York Times

STORM PICKS UP SPEED AND DISRUPTS MILLIONS OF LIVES

G.O.P. TURNS FIRE ON OBAMA PILLAR, THE AUTO BAILOUT

Power Lines and Trees Doomed in Flooded Ghost Towns



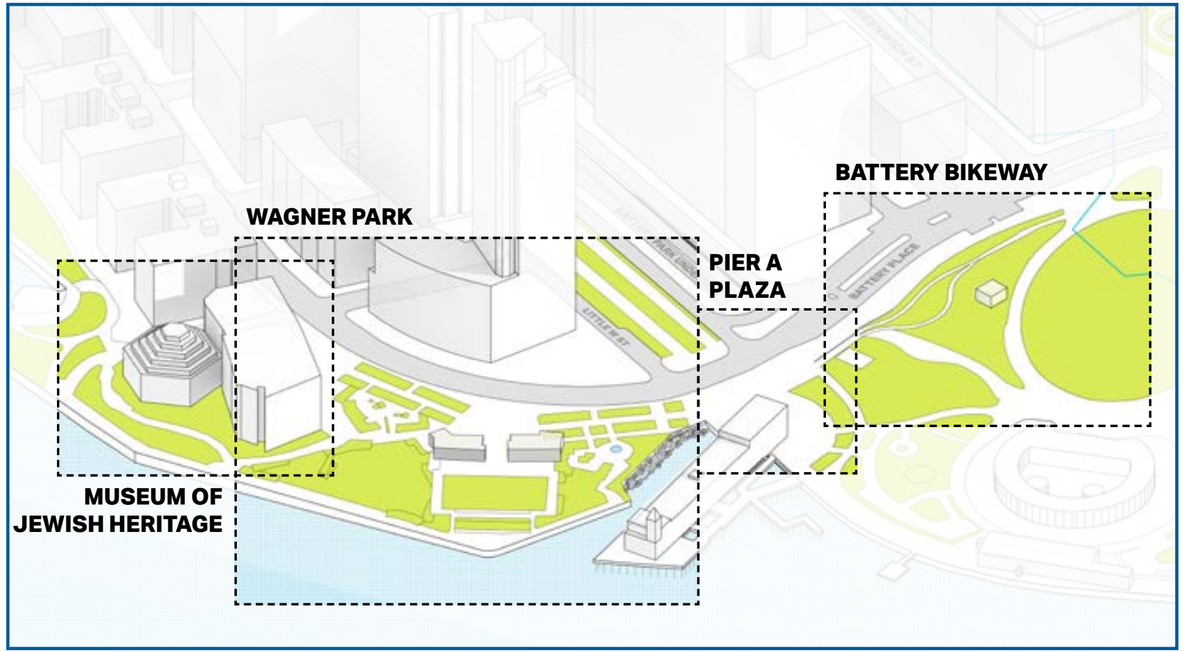
**2014** Pier A opens to the public 130 years after it was originally built.

**2016** BPCA taking steps to reduce risk associated with climate change events

# THE PROJECT AREA

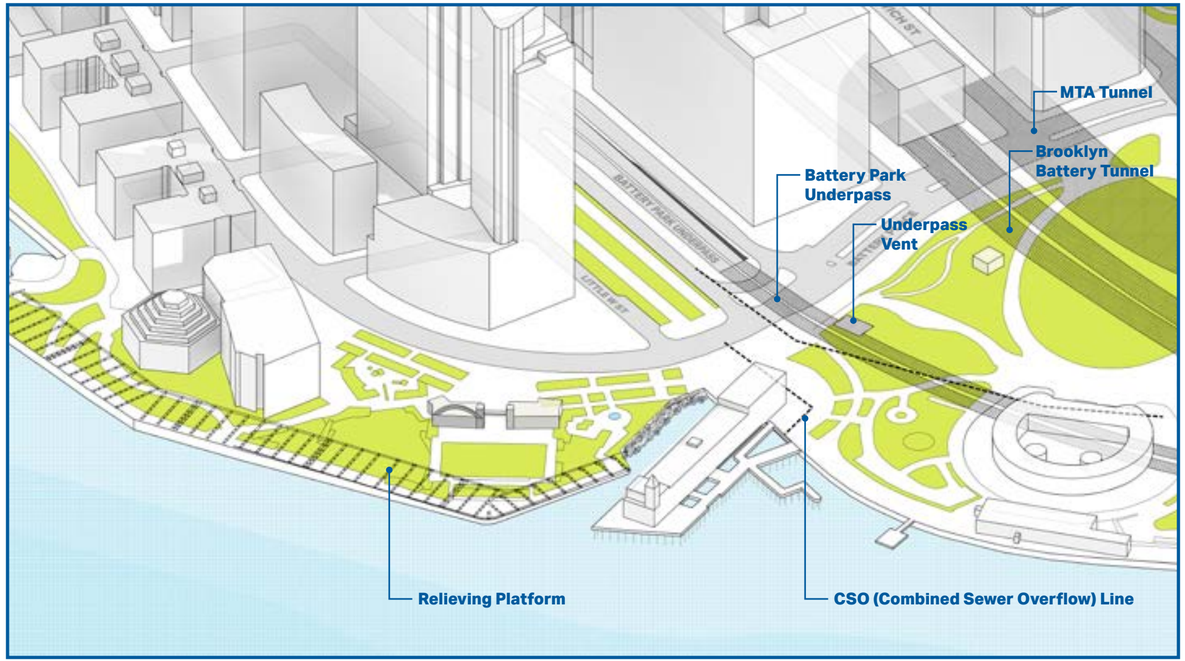
The project area contains primary waterfront access points in Lower Manhattan and includes a wide range of programmatic uses. Wagner Park and the Museum of Jewish Heritage fall under the jurisdiction of Battery Park City Authority (BPCA), Pier A Plaza is under the jurisdiction of Battery Park City Authority (BPCA) and the NYC Economic Development Corporation (EDC), and The Battery is under NYC Department of Parks and Recreation (DPR). Each of these four sites have a direct connection to each other and serve different programmatic purposes. How they are used, what programs facilitate those uses, and what makes the spaces successful or unsuccessful were observed and documented by the design team in order to inform the design process.



# OPPORTUNITIES, CONSTRAINTS, AND CONSIDERATIONS

The project site contains multiple structures above and below ground that increase the complexity of the design of flood risk reduction measures and the associated open space improvements. Each one of these features, labeled below and described on the next page, has been studied by the design team to fully understand the engineering and public realm implications. The Battery Park City relieving platform and the Battery Park Underpass both prompted significant design consideration on the project.

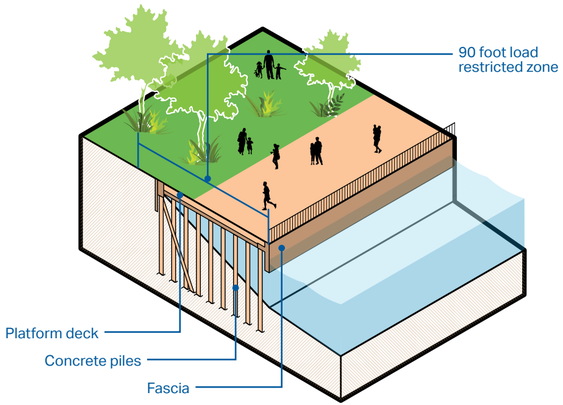



## RELIEVING PLATFORM

The majority of the waterfront in Wagner Park is supported by a sub-surface relieving platform. This pile-supported platform was constructed when Battery Park City was built and supports the Battery Park City Esplanade and adjacent open space. It consists of the following from top to bottom:

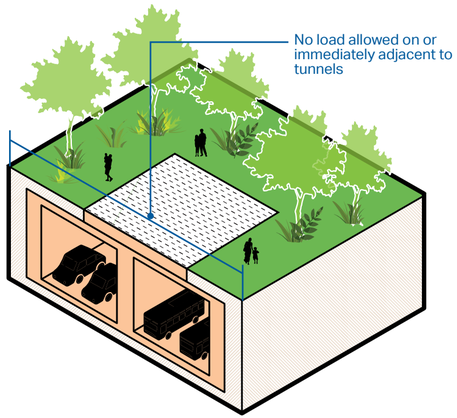
- A platform deck, of various widths. The deck is typically built with pre-cast pre-stressed concrete planks, topped with cast-in-place reinforced concrete and finished with paving or planting material.
- Pre-cast concrete piles with concrete pile caps. The piles are driven to bedrock through a sloped revetment under the platform, which retains the earthen fill used to create Battery Park City. The revetment is surfaced with armor stone to stabilize the slope.
- The fascia panels on the waterside edge of the platform are made of pre-cast reinforced concrete panels.

Due to load restrictions on the relieving platform, any structure must avoid additional weight impacts on and around the platform itself. Therefore, building on top of the platform it is limited and must be carefully studied.




## TUNNELS

The Battery Park Underpass and the Hugh L. Carey Tunnel cross underneath the Battery. Both of these tunnels are located just below the park surface, with as little as six inches between the top of the tunnel and the park's ground elevation. As the flood risk reduction alignment crosses over tunnels, the design must avoid adding additional weight on the tunnel structures. In these locations, the flood risk reduction alignment and associated foundation must span over the buried tunnels.



# MUSEUM OF JEWISH HERITAGE

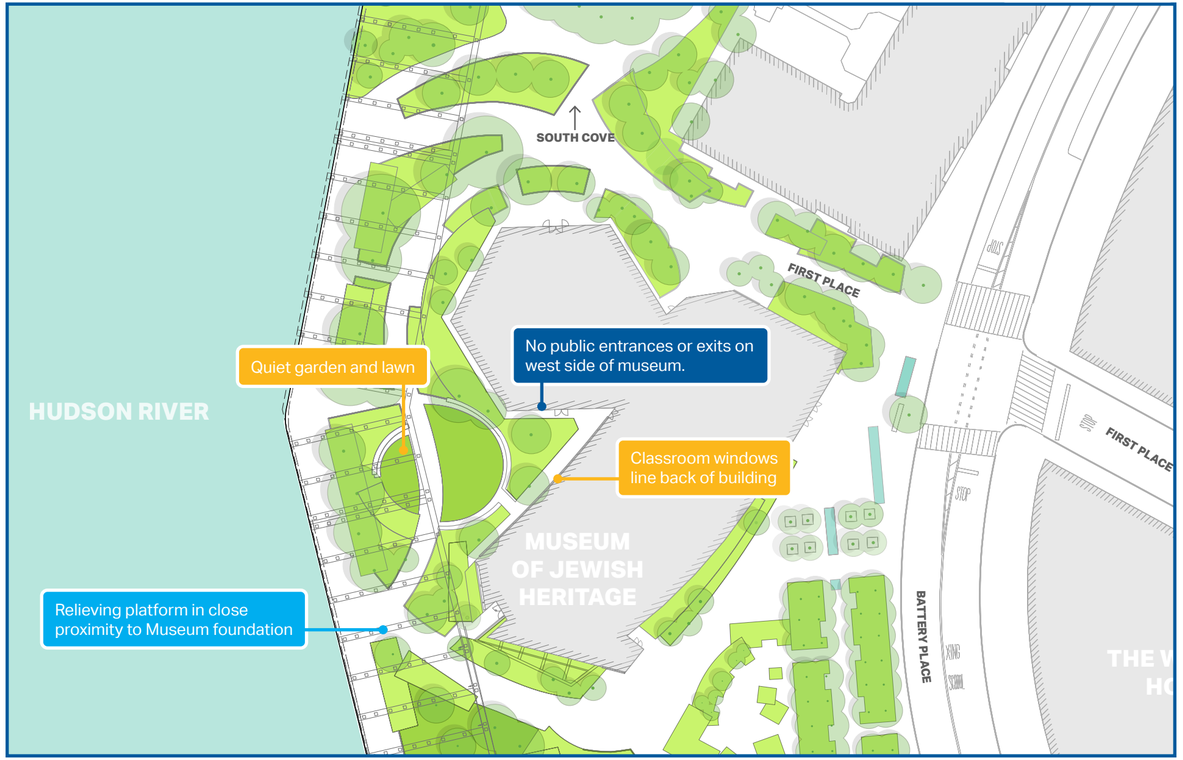
The public realm in this portion of the project area is composed of a small, circular lawn, bisected by a generously sized pathway. The lawn is lined with seat walls integrated with lush stepped and curved planters that create a sense of enclosure. The site is characterized by the distinctive architecture of the Museum of Jewish Heritage and the proximity to the Battery Park City Esplanade.
Classroom windows on the 1st floor of the museum overlook the landscape. There are three emergency egress doors that open to the east.





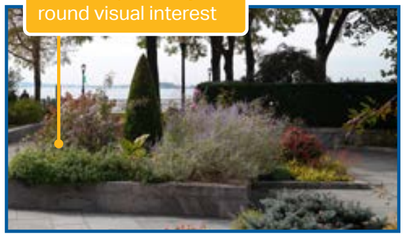
**LEGEND**

- OPPORTUNITY
- CONSTRAINT
- CONSIDERATION



# WAGNER PARK

Robert F. Wagner Park is located at the southern terminus of Battery Park City and features views towards the Statue of Liberty. The center of the existing park is defined by a rectangular lawn enclosed by a brick pathway with stone and wood clad bench seating. The park pavilion is located immediately to the east of the lawn and allows visitors to either ascend to the roof level or pass through the pavilion to access the park. The lawn and pavilion are located on axis with the primary view to the Statue of Liberty. Surrounding these central features are intimate garden "rooms', enclosed by geometric raised planters. The park is not universally accessible. The primary entrance to Wagner Park is through two double allees of maple trees on Battery Place that flank the pavilion entrance. Although the park is slightly elevated, future storm levels are projected at even higher elevations.



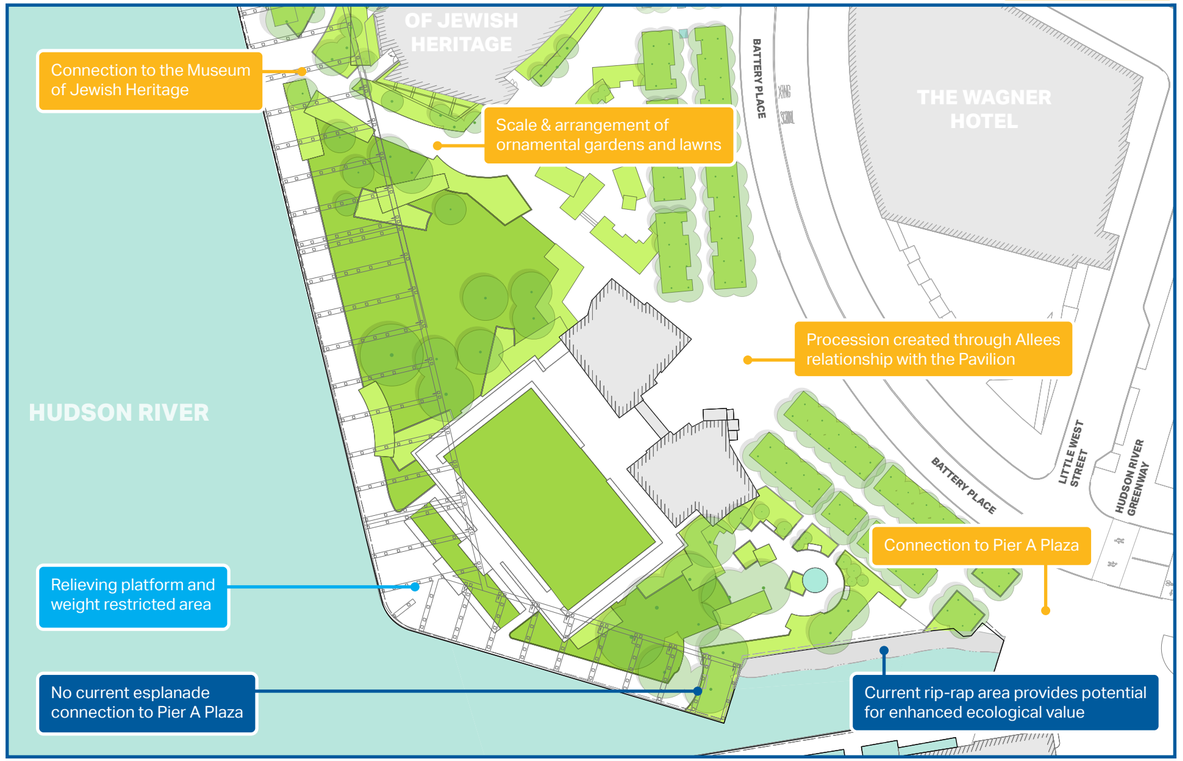


LEGEND

OPPORTUNITY

CONSTRAINT

CONSIDERATION



# PIER A PLAZA

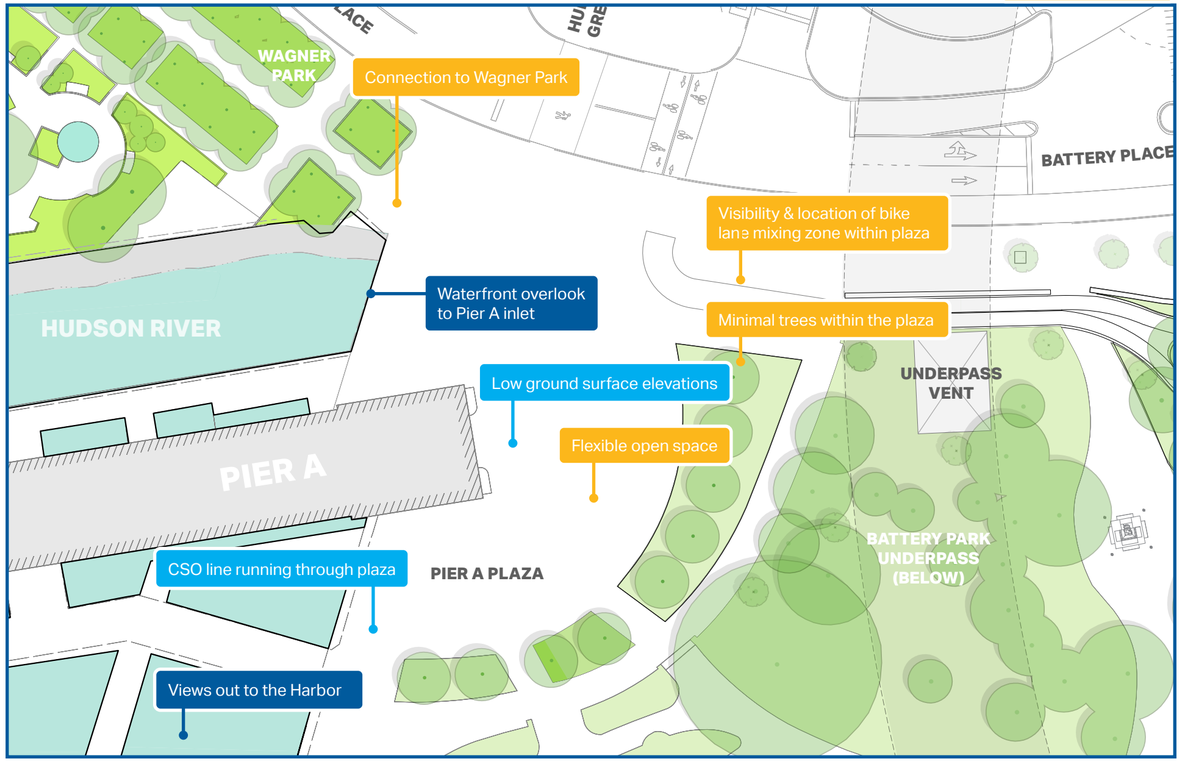
Pier A Plaza is an open and flexible paved plaza space that connects The Battery, Battery Park City, and the Hudson River Greenway. The Plaza is primarily hardscape and contains the lowest existing surface elevations within the project area. The historic and landmarked Pier A building is located on the west side of the Plaza. Linear planters provide seating on the eastern edge and provide planting between The Battery and the large paved open space. The plaza is bounded by Battery Place to the north and connects to the Battery Esplanade to the south.





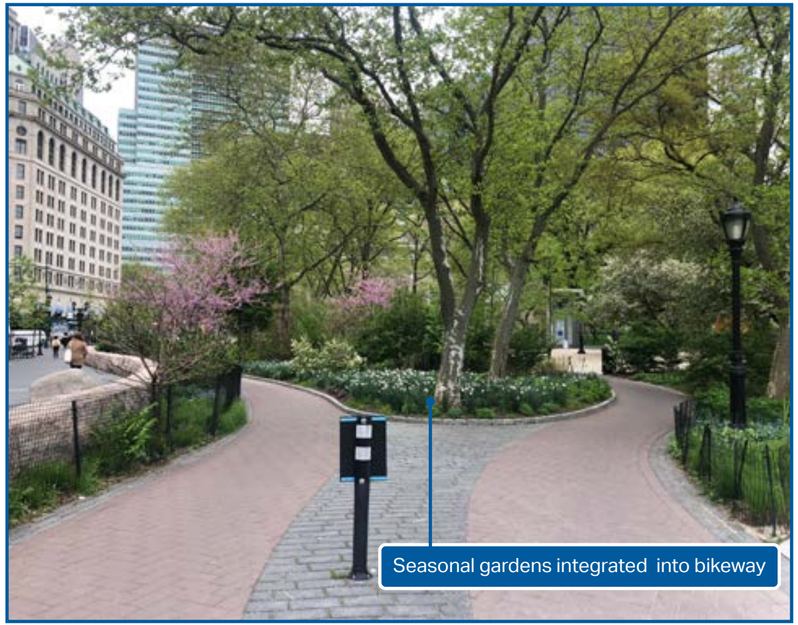
**LEGEND**

- OPPORTUNITY
- CONSTRAINT
- CONSIDERATION



# THE BATTERY

The Battery is a significant open space in Lower Manhattan. The project area includes the northern edge of The Battery at the existing Battery Bikeway. To the north of the Battery and within the 2050's 100-year floodplain is the Hugh L. Carey Tunnel (Brooklyn Battery Tunnel) entrance and Ventilation Building, the National Museum of the American Indian, and many more significant features of Lower Manhattan. The Brooklyn Battery Tunnel, the Battery Park Underpass, and the MTA's 1 subway line tunnel pass underneath The Battery.

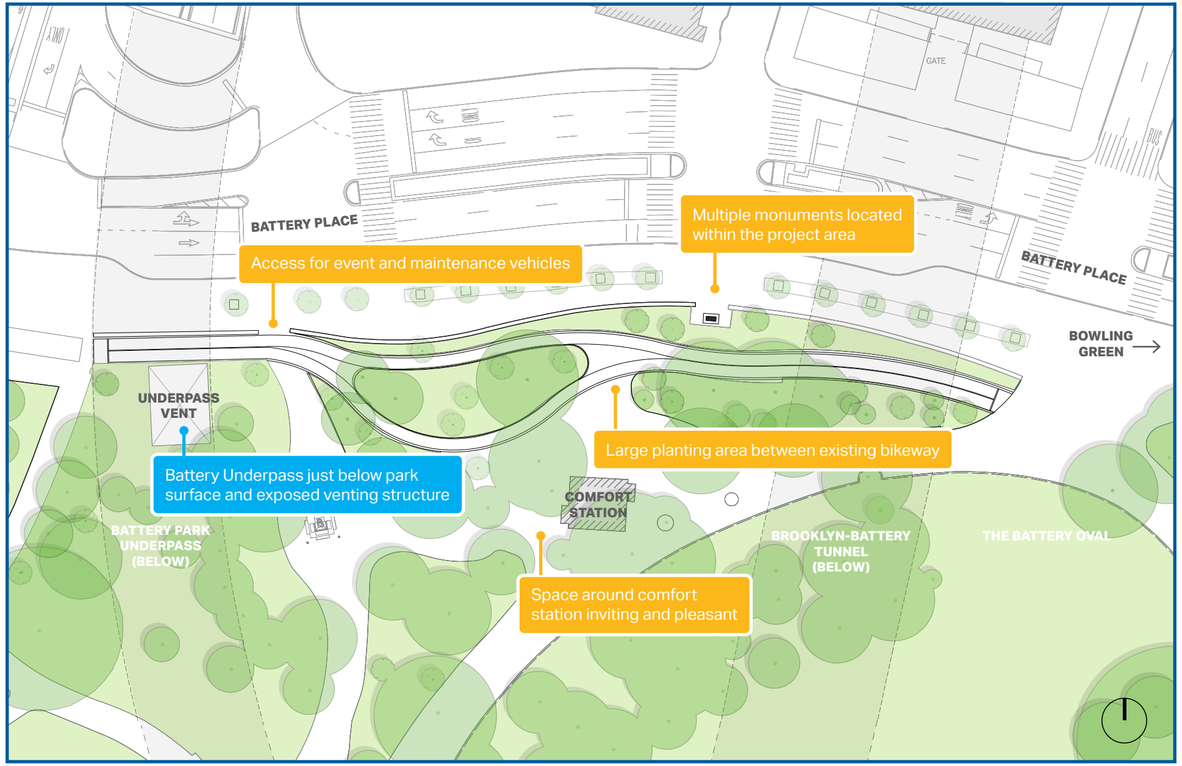







**LEGEND**

- OPPORTUNITY
- CONSTRAINT
- CONSIDERATION



**PART IV** *...development*

# DESIGN PROCESS

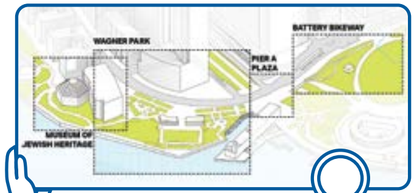
The success of the project reflects a **shared vision** between the **Battery Park City Authority** (BPCA), the **community,** and the **City of New York,** combined with **creative** and technologically advanced **interdisciplinary** thinking.

# DESIGN PROCESS

A project of this scale and complexity requires interdisciplinary collaboration, creativity, advanced technical knowledge, and robust community participation. Together, these elements ensure that the final design is shaped by people with diverse backgrounds and expertise, and has the necessary components for long-term success.

## STEP 1

**Assess the current site**

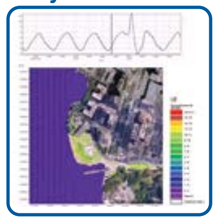



**Identify opportunities and constraints**

OPPORTUNITIES

CONSTRAINTS

**Begin coastal modeling analysis**



**Kick off community engagement**

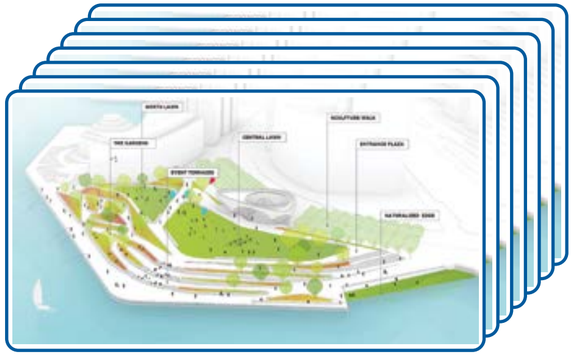
## STEP 2

**Generate and analyze flood alignment options and how they interact with public spaces they sit within**

**Continue community engagement**

## STEP 3

**Incorporate community feedback**



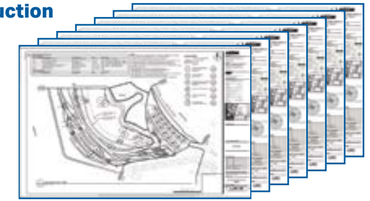
**Generate conceptual designs based on preferred flood alignments**

## STEP 4

**Develop final design**

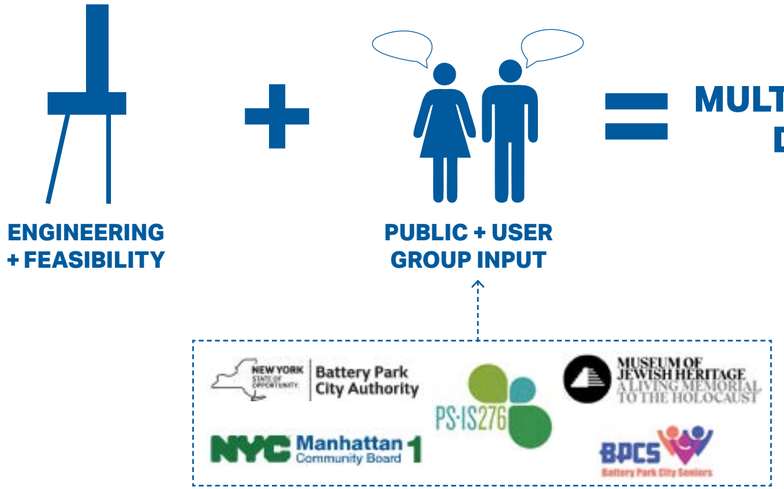
**Ongoing coordination from agencies and community members**

**Develop construction documentation**



# COMMUNITY ENGAGEMENT APPROACH

It has been critical throughout this process that the Battery Park City Authority (BPCA), the City of New York, and the local Battery Park City and Lower Manhattan communities share a vision for this project. To accomplish this, BPCA worked with the general public, local community groups, and other stakeholders to gather input and share technical analysis, design concepts, and current data on future extreme storms throughout the design process. This multi-faceted engagement facilitated the incorporation of diverse inputs into the design of the project in all stages. The team used a variety of digital and physical tools to support this engagement. Roughly half of this engagement occurred during the COVID-19 pandemic, requiring the team to develop new ways to share and collect information.




# COMMUNITY ENGAGEMENT TIMELINE

The timeline below shows the engagement meetings and workshops that have occurred to date. The design process was continually informed by public input and engagement with project stakeholders.

**ENGAGEMENT TYPES**

- BPCA-Hosted Public Meetings
- Community Board 1 Meetings
- Small Group Meetings
- Activities
- Environment Impact Statement

**2018**

- **CB1 MEETING** NOV 2018
- **BPCA PUBLIC MEETING** NOV 2018

**2019**

- **CB1 MEETING** MAR 2019
- **BPCA PUBLIC MEETING** MAR 2019
- **CB1 MEETING** APR 2019
- **PUBLIC DESIGN ACTIVITY MEETING** APR 2019
- **ONLINE ACTIVITY** MAY 2019
- **SENIOR GROUP MEETING** MAY 2019
- **PS IS 276 MEETING** MAY 2019
- **CB1 MEETING** JUN 2019
- **BPCA PUBLIC MEETING** JUN 2019

**2020**

- **UPDATE TO CB1** OCT 2019
- **BPCA PUBLIC MEETING** JAN 2020
- **CB1 DEPLOYABLES WORKSHOP** MAY 2020
- **UPDATE TO CB1** JUN 2020

**2021**

- **LMCR UPDATE TO CB1** JAN 2021
- **UPDATE TO CB1** FEB 2021
- **UPDATE TO CB1** APR 2021
- **LMCR UPDATE TO CB1** JUN 2021
- **UPDATE TO CB1 EXECUTIVE COMMITTEE** AUG 2021

**2022**

- **PUBLIC SCOPING MEETING** OCT 2021
- **EIS PUBLIC HEARING** MAY 2022
- **UPDATE TO CB1** MAR 2022
- **CONSTRUCTION STARTS** SEP 2022

# COMMUNITY ENGAGEMENT TAKEAWAYS

## TYPE OF VISITORS TO BPC PARKS

| | |
|---|---|
| Visitor to Battery Park City | 45% |
| Lives in Battery Park City | 36% |
| Works in Battery Park City | 16% |
| Commuting through Battery Park City | 6% |

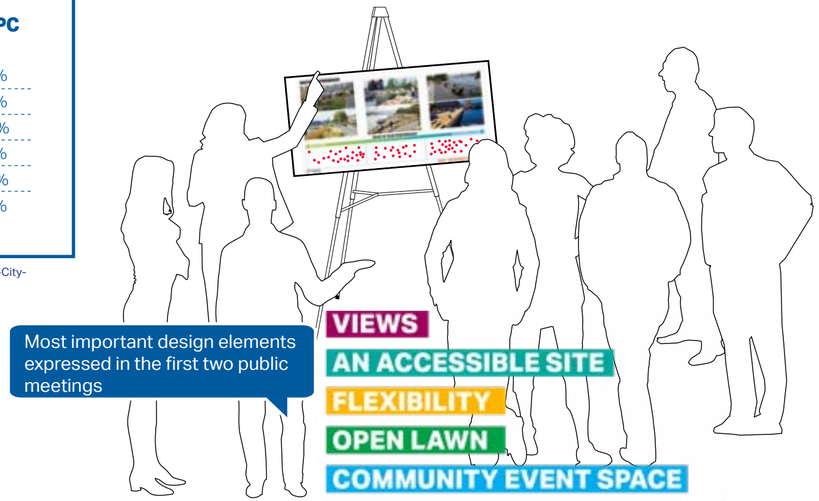
## USERS FAVORITE THINGS TO DO IN BPC

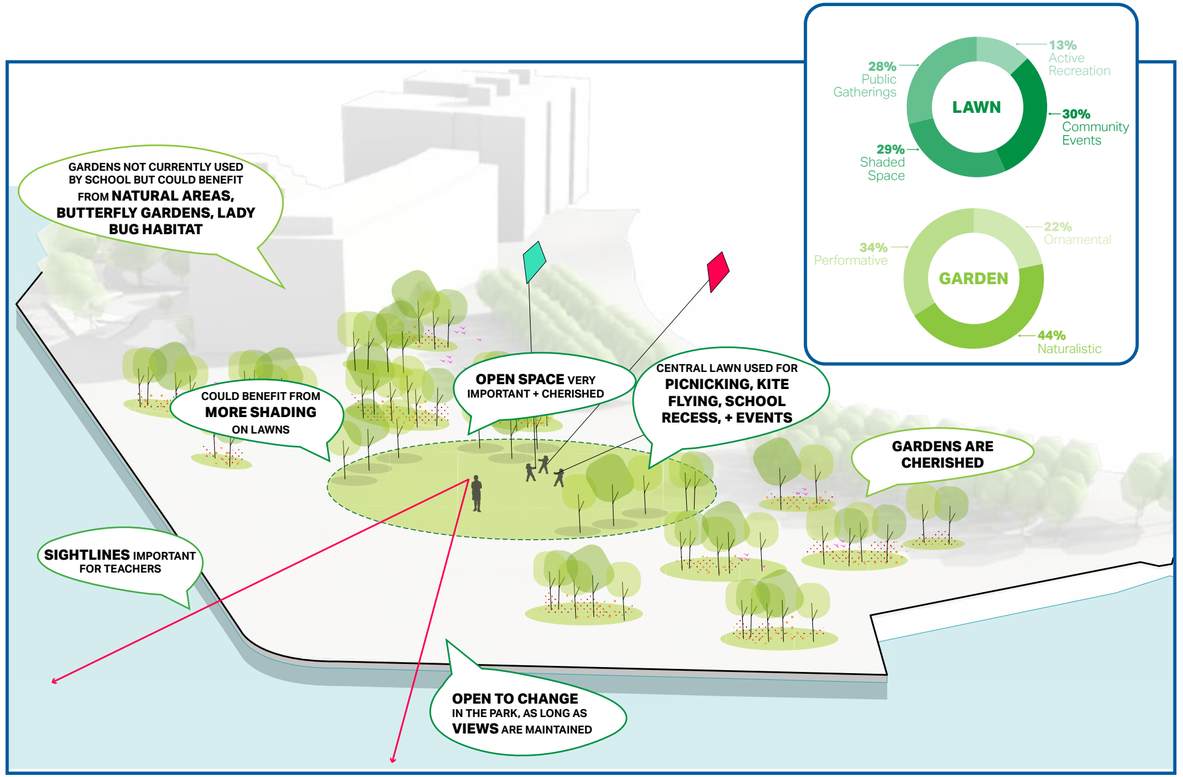
| | |
|---|---|
| Passive Leisure | 42% |
| Active Leisure - Physical | 33% |
| Combo - Active and Passive Leisure | 10.1% |
| Active Leisure - Family | 9.3% |
| Active Leisure - Dog | 4% |
| Events Only | 1.6% |

Source: https://bpca.ny.gov/wp-content/uploads/2018/10/Battery-Park-City-Authority-Parks-User-Count-Study-October-2018.pdf

Battery Park City Authority engaged a team of researched from BMCC studied users and types of use throughout Battery Park City between 2017-2018. Excerpts from this study showing the origin of park users in Battery Park City and favorite activities is shown at **left**.

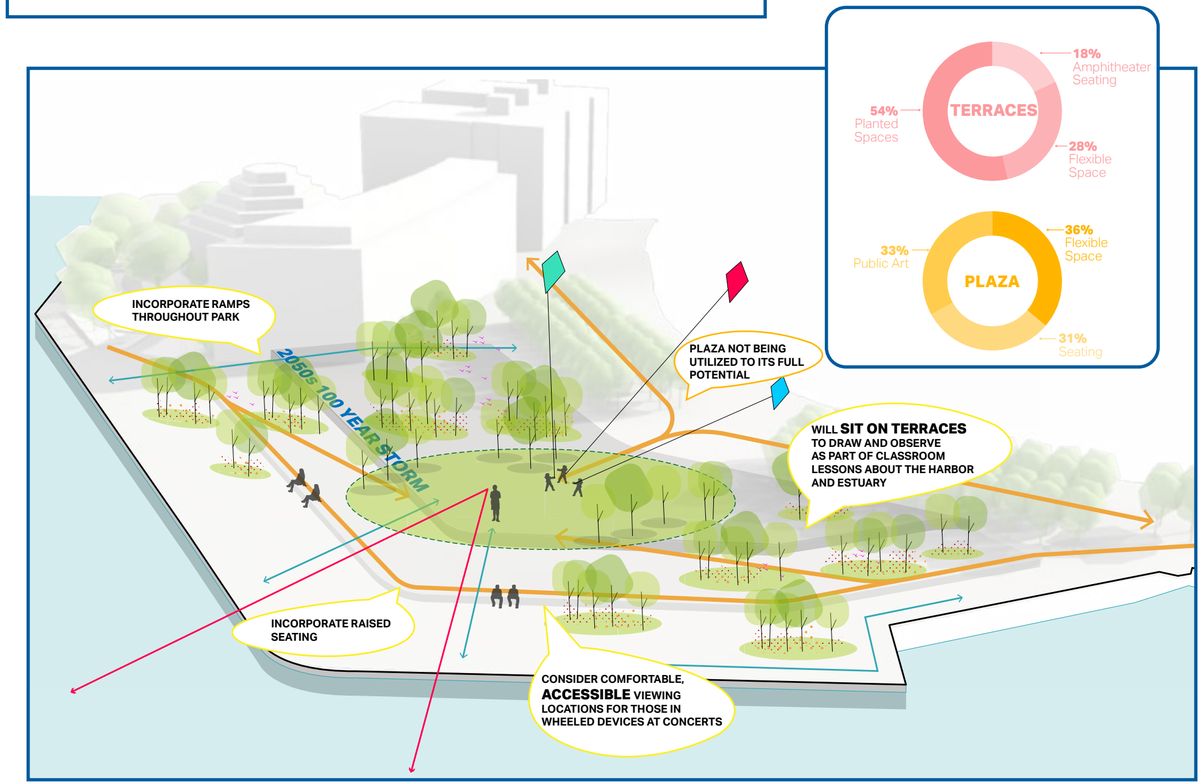
**Below** and on the following pages are takeaways from community engagement workshops and meetings for the South Battery Park City Project.



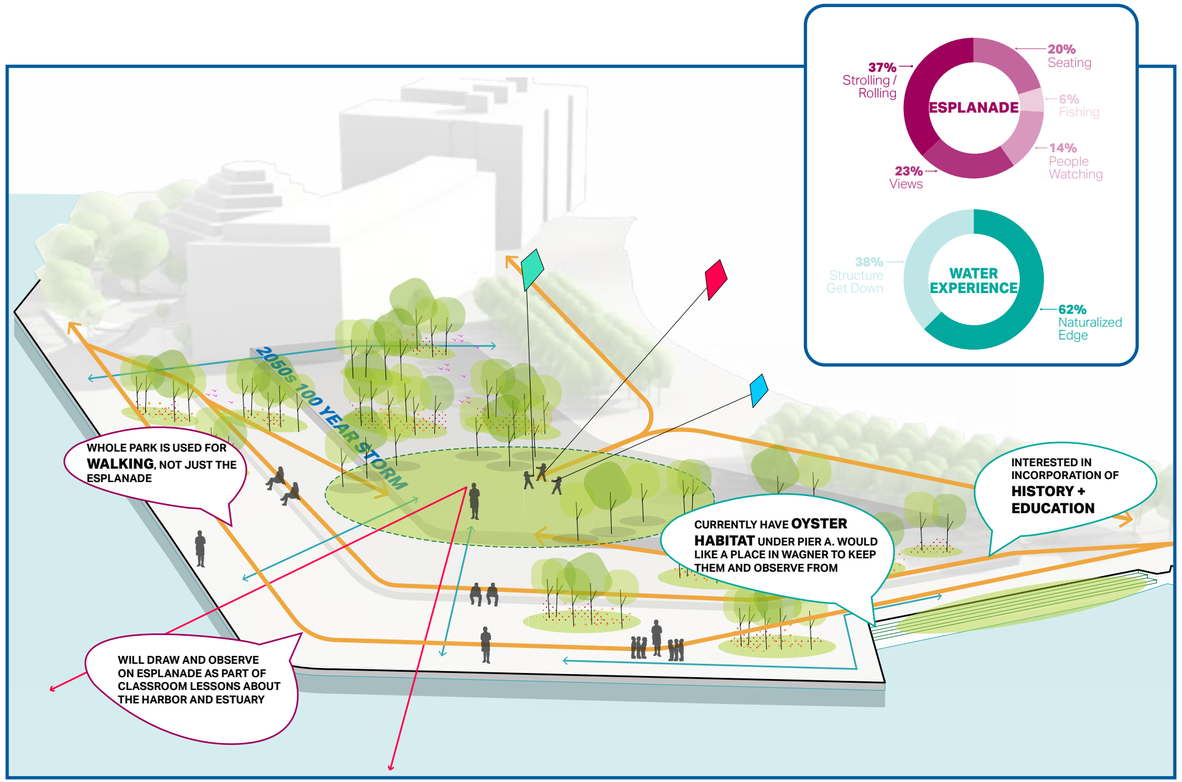




The community has an interest in creating naturalized gardens; these areas are cherished by the locals and visitors. The lawns are heavily used and there is an interest in adding some shade to this space

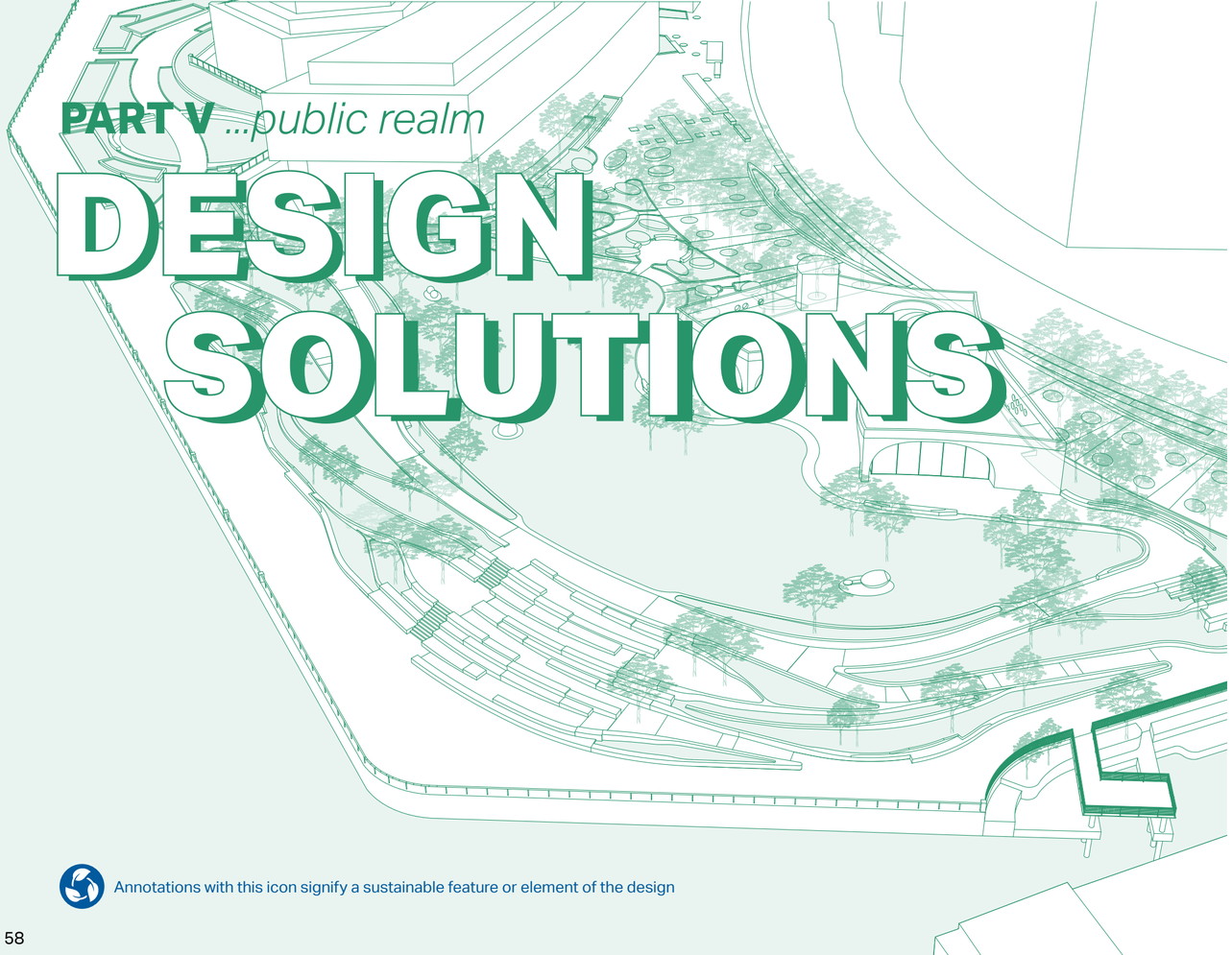
# COMMUNITY ENGAGEMENT TAKEAWAYS




There is a desire to make all the spaces ADA accessible, and ensure they can be used in a flexible way




There is an interest to create spaces for contemplation and education along the waterfront



**PART V** *...public realm*

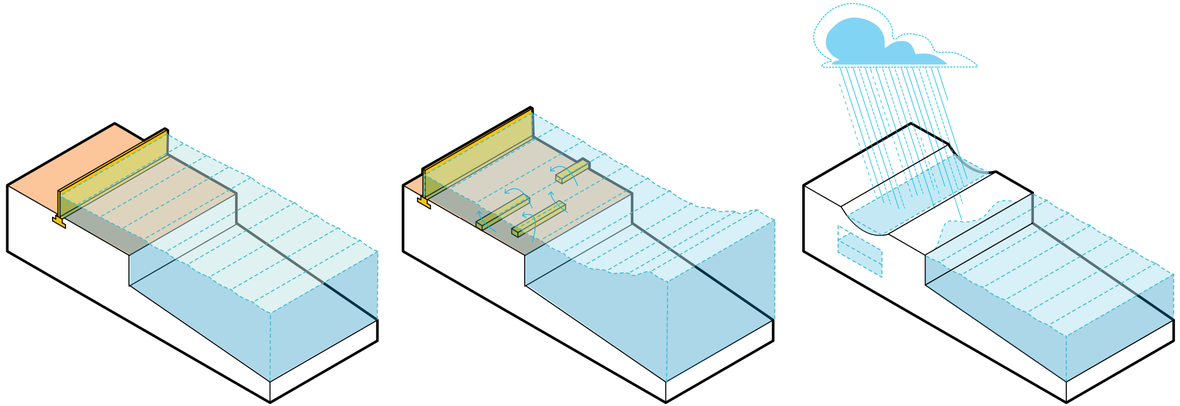
# DESIGN SOLUTIONS

Annotations with this icon signify a sustainable feature or element of the design

An interdisciplinary design process combined **flood risk reduction, sustainable practices**, **stormwater management**, strengthened **pedestrian and bicycle connections**, and **universal accessibility** into a project which integrates seamlessly into the surrounding fabric of Lower Manhattan.

# DESIGN STRATEGIES

Multiple flood resiliency measures were studied in different combinations by interdisciplinary teams. They were evaluated for technical feasibility and impacts on the public realm in order to determine their alignment with project goals. The existing public realm and the cherished unique public spaces within and around the project area were important considerations when selecting resiliency measures. The height of interventions required across the site meant that in all areas, impacts to the current public spaces would be unavoidable and would require change. The project blended the necessary resiliency measures with public benefit to create an integrated and cohesive flood risk reduction system.

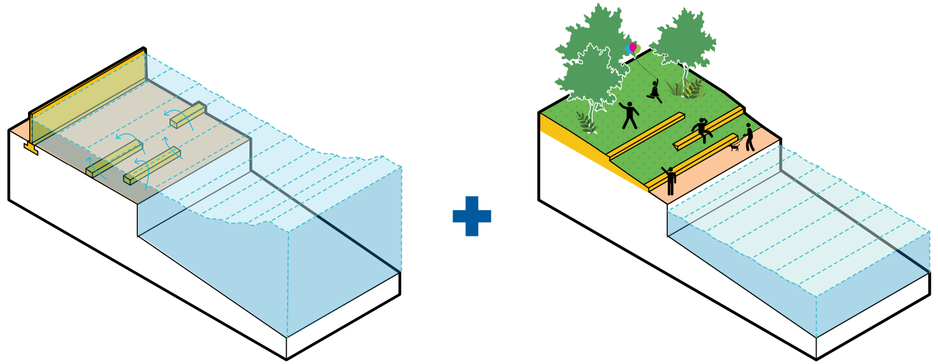


**FLOOD STRUCTURES** + **WAVE ATTENUATION** + **STORMWATER MANAGEMENT**

Physical barrier to prevent floodwater from entering Battery Park City and surrounding areas.

Structures designed to lower Design Flood Elevations by reducing the size of waves.

Measures to slow, capture, detain, and collect rainfall to reduce inland flooding and burden on sewer system.



**RESILIENCY MEASURES** + **PUBLIC BENEFIT**

= **MULTI-PURPOSE PERFORMANCE**

# FLOOD RISK REDUCTION TOOLKIT

Given the diverse range of public open spaces the project area includes, and the variety of elevations across the site, a wide range of flood risk reduction tools were studied and evaluated. The project will provide a comprehensive flood risk reduction alignment in a way that maintains public access to the waterfront while using as many static structures as possible in order to reduce risk of operational complexity or failure.

## STATIC STRUCTURES

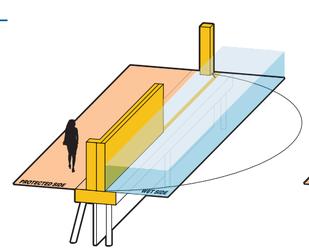
A floodwall is the most versatile tool for flood risk reduction due to its narrow footprint and proven track record in other parts of the country and world. Floodwalls can be either exposed or buried. Buried floodwalls can be integrated into the landscape so that the wall is concealed and the waterfront remains accessible. While buried floodwalls are desired, visible floodwalls are sometimes required in order to connect to adjacent structures, or because of technical challenges. While a floodwall has a narrow width above ground, the foundation, usually underground, is much wider to ensure that the floodwall can withstand wave action and other forces. Additionally, a fifteen foot tree and shrub offset on both sides of the wall is required to keep roots from damaging the structures.

## DEPLOYABLE GATE STRUCTURES

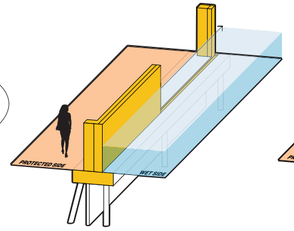
Deployable gates are temporary flood barriers that can be installed, or “deployed”, prior to a coastal storm and then stowed afterwards. In a non-storm event, they can be stored in ways that integrate into the surrounding public realm with limited impact. Deployable gates require mechanical systems to physically move the gates and have a larger footprint than a static floodwall.



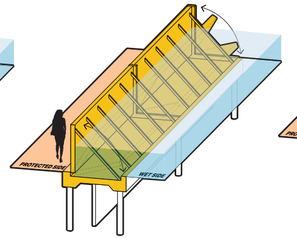
DEPLOYABLE



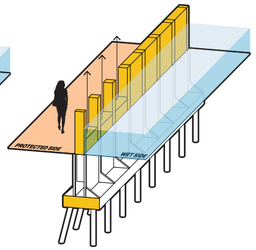

SWING GATE



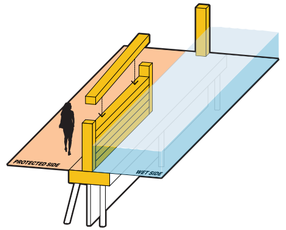

SLIDING GATE




FLIP UP GATE

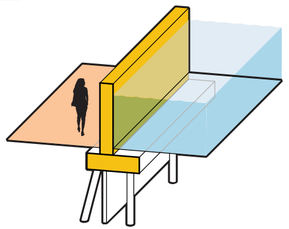



VERTICAL SLIDING GATE

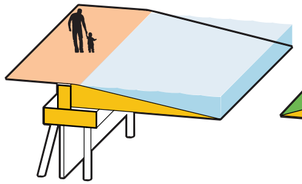



STOP LOGS

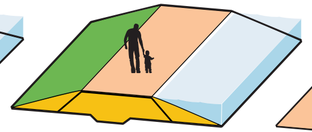
STATIC



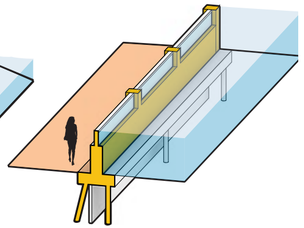
FLOOD WALL



CONCEALED FLOODWALL



STRUCTURAL BERM



GLASS-TOPPED FLOODWALL

# **ALIGNMENT ALTERNATIVES** | MUSEUM OF JEWISH HERITAGE

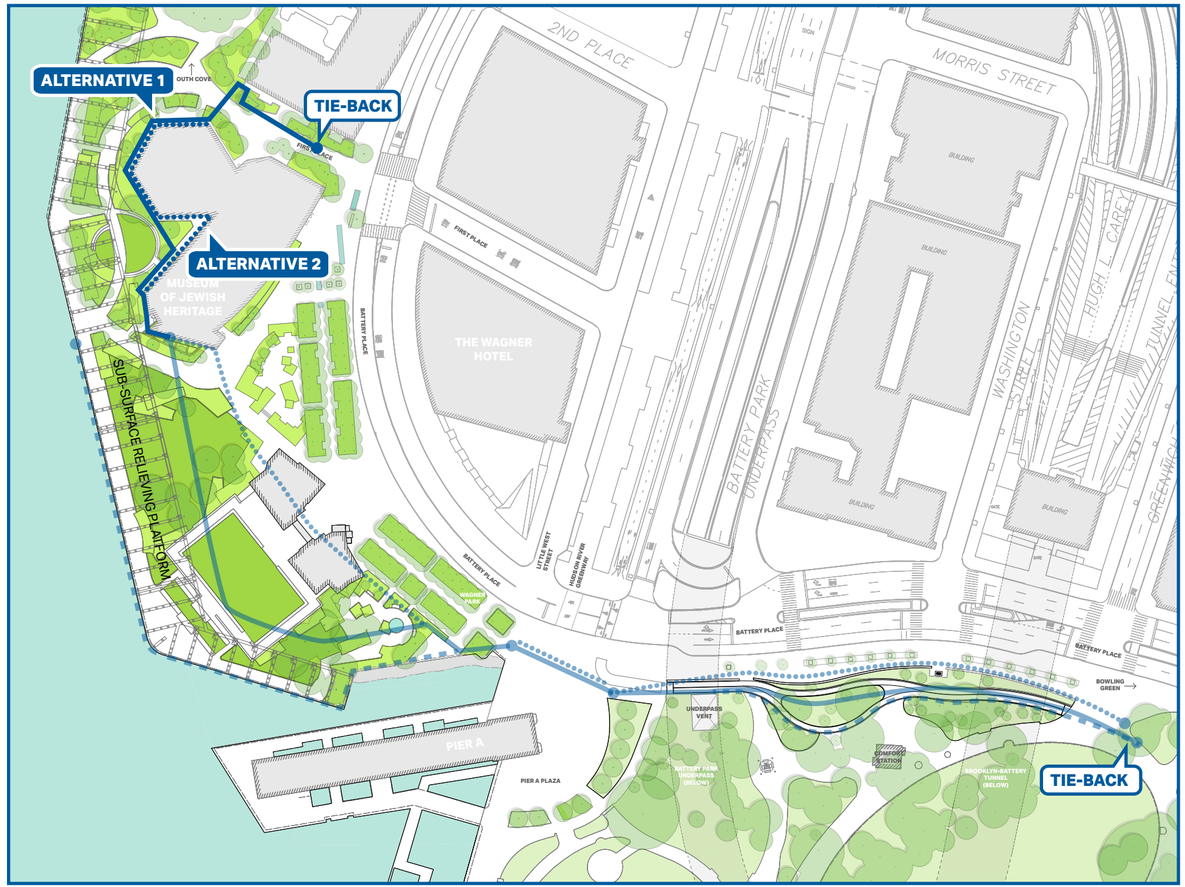
This segment runs along the landscaped courtyard of the Museum of Jewish Heritage, connecting with the southern end of the 1st Place segment.

Two alternatives were considered for this segment: Alternative 1 (the selected alignment) and Alternative 2.

**ALTERNATIVE 2**

Alternative 2 proposed flood mitigation built into the façade of the Museum and dry-proofing the existing building. This alternative was technically infeasible due to the following:

- Replacement of the façade with a thickened wall created a potential for water to become trapped between the thickened wall and the museum wall;
- BPCA would undertake additional risk in modifying a building that it does not own or maintain; in addition, any future modifications to the building performed by the owner would require BPCA approval and/or FEMA review to ensure continued protection; and
- Construction would conflict with upcoming exhibits at the museum.



# ALIGNMENT ALTERNATIVES | WAGNER PARK

In addition to the selected alignment (Alternative 3), two alternatives were evaluated for Wagner Park.

### ALTERNATIVE 1

This alternative is located farthest inland and bisects the pavilion. This flood alignment requires a rebuilt pavilion to be part of the flood barrier system, which is an uncommon and unreliable strategy. It would complicate construction unnecessarily and require frequent maintenance of the pavilion, reducing the availability of the pavilion to the public. This alternative would also rely heavily on deployable elements, which is contrary to the objective of relying on passive elements when possible. Further, with the bulk of Wagner Park remaining unprotected from severe storm events and sea level rise, this alternative had the potential for prolonged periods of inaccessibility due to extensive repairs to and restoration of the Park after storm events, as well as considerable costs for recurrent repairs. For these reasons, Alternative 1 was eliminated from further consideration.

### ALTERNATIVE 2

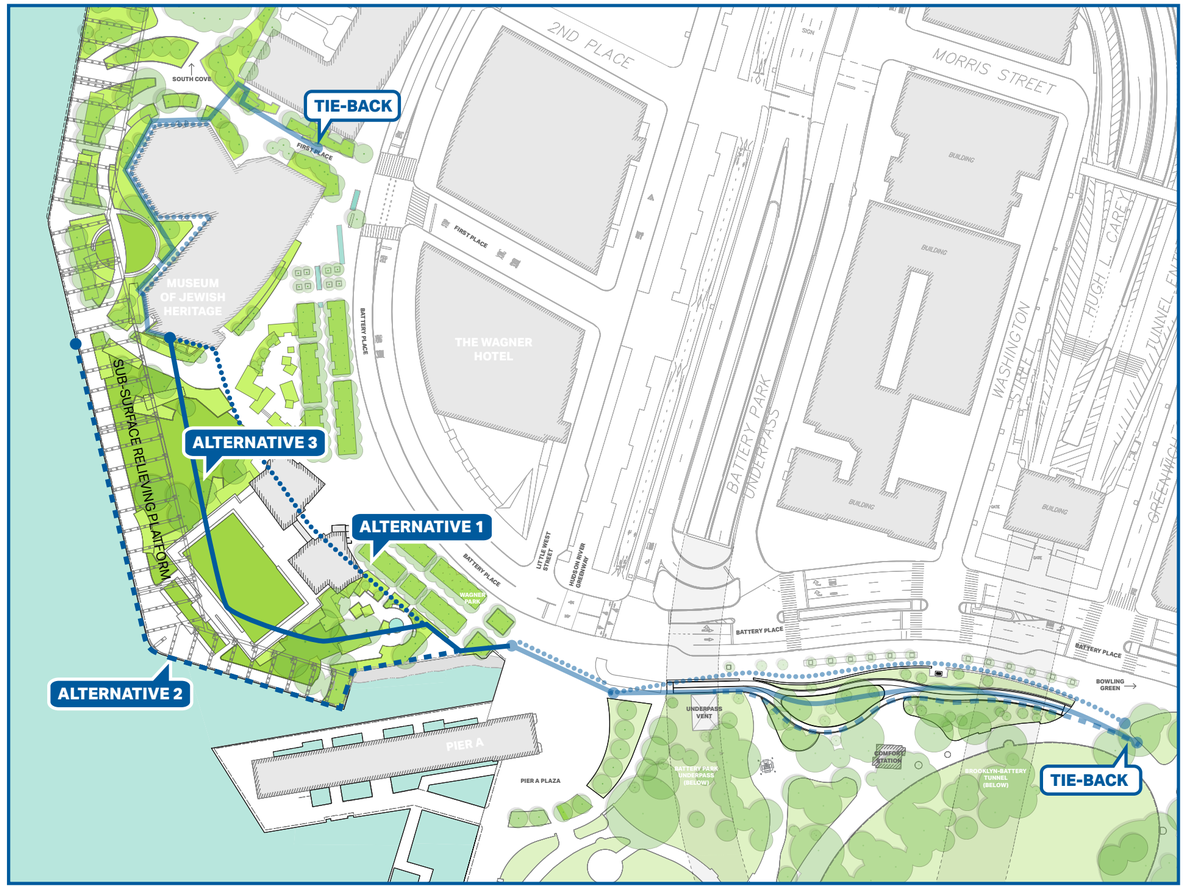
The flood alignment in this alternative would be constructed at the waters edge of the Battery Park City Esplanade, which is supported over water by a relieving platform (shown in grey at right). Two options were considered: exposed floodwalls and flip-up deployables. Any alignment on the existing relieving platform requires demolition, reconstruction, and elevation of the entire platform, including demolition and reconstruction of all features on the existing platform, to support additional load.

**Exposed Floodwall Option**

This option involved constructing an exposed floodwall along the waterfront. The exposed floodwall option presents several engineering, design, and permitting challenges that rendered this option technically and economically infeasible.

**Flip-up Deployable Floodwall Option**

The foundations for the flip-up deployables would be constructed on top of the reconstructed relieving platform. This option presents several engineering, design, and other challenges that render it economically and technically infeasible.



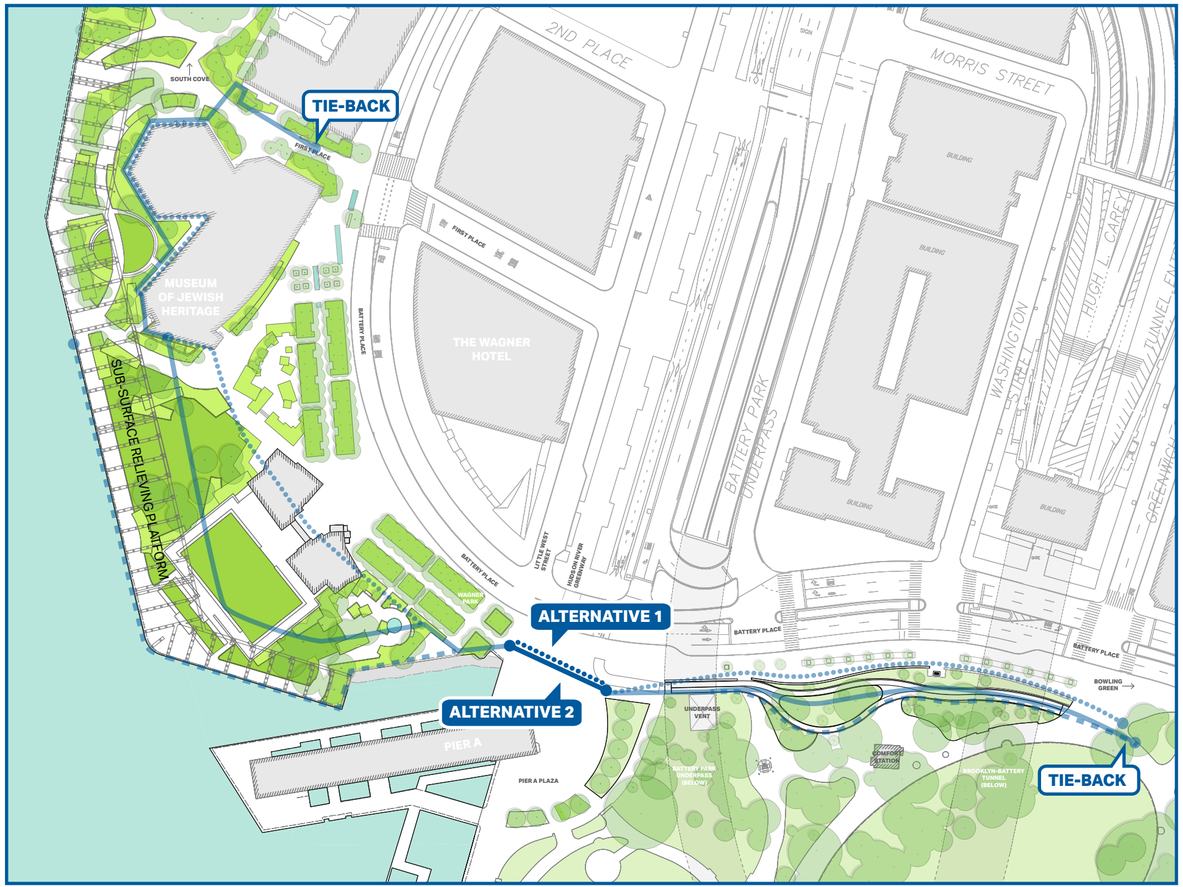
# ALIGNMENT ALTERNATIVES | PIER A PLAZA

The alternatives for Pier A Plaza were developed to meet the purpose and need and project objectives but also were evaluated on specific criteria to this area: maximizing flood protection due to the low elevation and avoiding impacts to the subsurface infrastructure. Two alternatives were evaluated for the Pier A Plaza: 1. a Deployable Alternative and 2. a Deployable plus Raised Grade Alternative (the selected alignment).

**ALTERNATIVE 1**

The existing grade of the Plaza is the lowest through the entire Project Area. Alternative 1 would preserve the existing elevation, design and aesthetic of the Plaza. The alignment would run along the upper Plaza closer to Battery Place and consist of flip-up deployables. For the segment connecting Wagner Park and Pier A Plaza a freestanding exposed floodwall was selected to reduce the risk associated with mechanical and human error and maintenance costs. This alignment overall had several challenges that rendered the alternative economically and technically infeasible.

- Due to the low elevation of this segment, the flip-up deployables would need to be deployed on a more frequent basis to prevent flooding from smaller more frequent storms than the 100-year design storm. Because this alternative maintains the existing grade, it does not address nuisance flooding that occurs during tidal events.
- By maintaining the existing grade, the flip-up deployables would need to be approximately 12.5 feet high to achieve the DFE.
- This alternative was significantly taller than the Proposed Action and lacked community support.



# ALIGNMENT ALTERNATIVES | THE BATTERY

The subsurface conditions in The Battery include the Battery Park Underpass of the FDR Drive, Hugh L. Carey Tunnel, MTA Subway lines for the 1 Train, the Bowling Green Subway Station for the 4 and the 5 Trains, as well as other utilities. Three alternatives were evaluated for this segment, including the selected alignment (Alignment 3).

### ALTERNATIVE 1

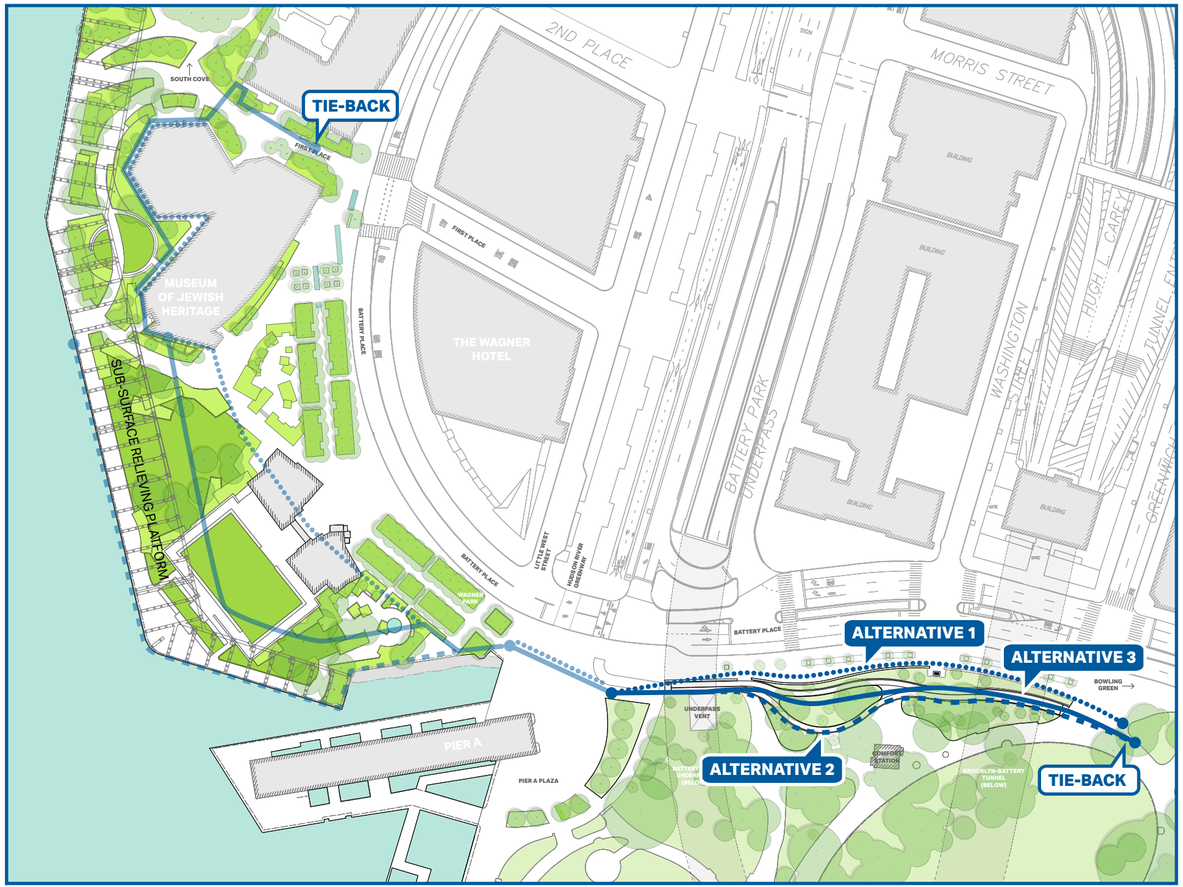
Alternative 1 considered a floodwall alignment within The Battery, located at the northern edge of the park area, parallel to Battery Place. This option evaluated using a combination of raised grade with flip-up deployables and floodwalls on top. The raised grade was intended to function to integrate areas of vegetation, access and seating. This alternative had several challenges that rendered it infeasible.

- Locating the flood alignment and bikeway closer to Battery Place would provide limited ROW space, making universal accessibility challenging.
- Vegetation would need to be offset from the floodwall, requiring the existing street trees along Battery Place to be removed.
- Further, to fully conceal the park side of the wall, regrading of the site would be required, which would impact the existing bikeway.
- This alternative would not minimize reliance on deployables, and it was determined not feasible.

### ALTERNATIVE 2

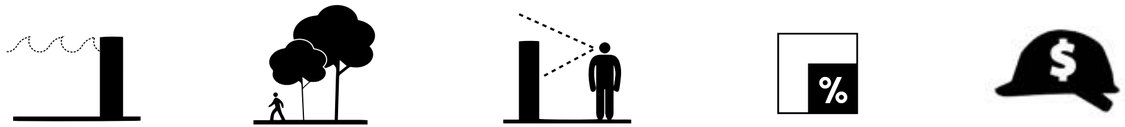
Alternative 2 considered a floodwall alignment within The Battery that runs through the park area parallel to the southern bikeway. This was imagined as a freestanding sculptural wall that would weave through the site, to minimize impact to the existing park landscape and trees. This alignment required minimal reconfiguration of the western end of the existing bikeway. Alternative 2 had several design challenges that rendered this alternative infeasible.

- The location of the flood alignment for Alternative 2 would conflict with subsurface infrastructure on the western end of this alignment.
- The floodwall would separate the existing bikeway from The Battery, counter to how it currently functions.
- This alternative would cut off views into the park due to the vertical wall and reduce pedestrian and cyclist safety.
- connect the flood alignment to neighboring properties in a context-sensitive manner that would allow for a smooth transition from each of those resources to the waterfront.



# FINAL FLOOD RISK REDUCTION ALIGNMENT

The extent of the flood risk reduction alignment is determined by the need to create a continuous line of protection at a fixed elevation (the Design Flood Elevation) that connects to locations where the existing ground elevation is the same. The exact placement of the alignment along the barrier system's length was studied at length with a priority of maximizing the greatest amount of risk reduction. The alignment and alignment alternatives described previously were studied and evaluated for feasibility as well as coordinated with city agencies and stakeholders.



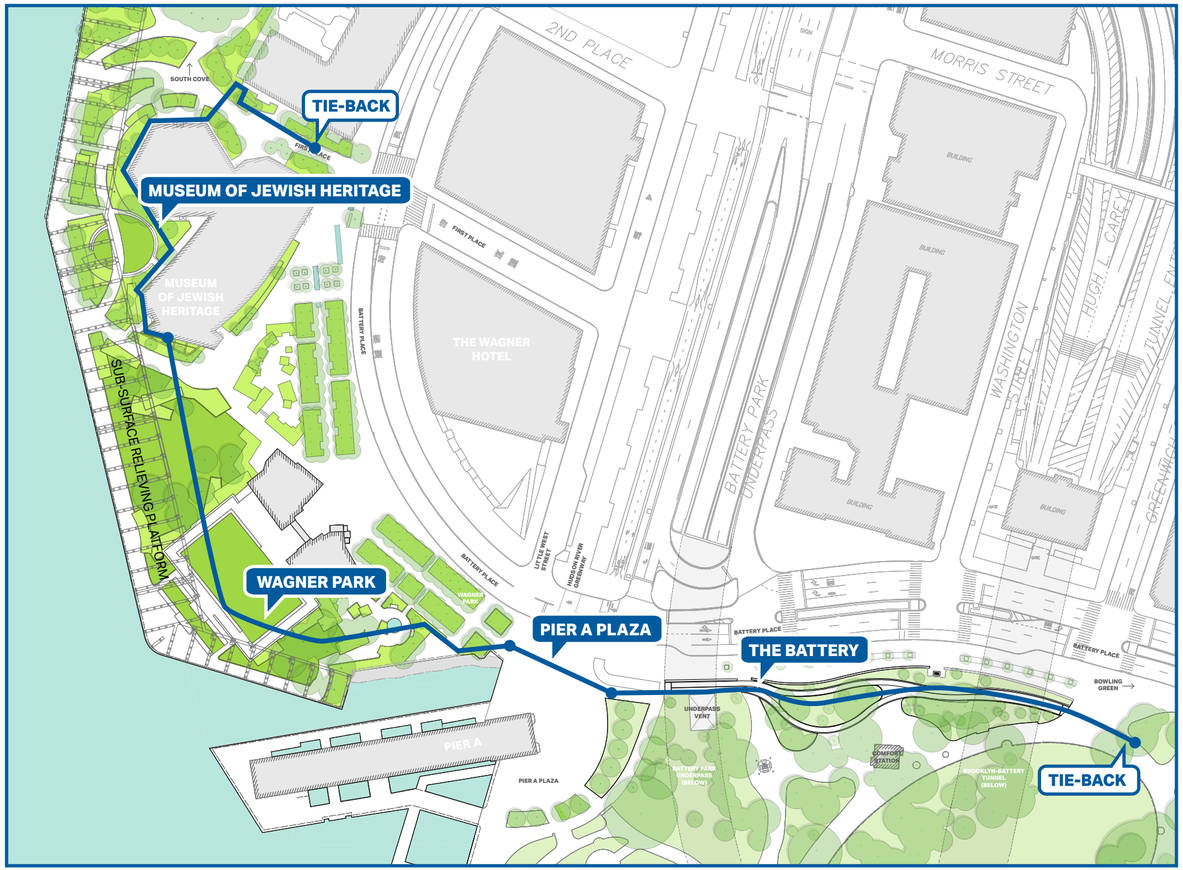

**RELIABILITY**
- DESIGN FLOOD ELEVATION
- PASSIVE/DEPLOYABLE
- WAVE ATTENUATION
- STORMWATER MANAGEMENT

**URBAN BENEFITS**
- WATERFRONT ACCESS
- PROGRAMMING
- SAFETY
- ECOLOGY

**VISUAL + PHYSICAL IMPACT**
- HEIGHT
- FOOTPRINT
- DESIGN

**AREA OF EXPOSURE**
- LOCATION OF ALIGNMENT
- CRITICAL INFRASTRUCTURE

**FEASIBILITY**
- COST
- CONSTRUCTIBILITY
- REGULATORY APPROVALS
- OPERATIONS + MAINTENANCE
- SPEED OF IMPLEMENTATION
- FEMA CERTIFICATION




The project alignment creates a cohesive line of flood risk reduction for the project area.

# INTERIOR DRAINAGE

In addition to the flood alignment system and the stormwater drainage integrated within the site, the project includes sewer system modifications designed to prevent coastal storm surge and rainfall from entering and flooding the protected project area behind the flood risk reduction structure.

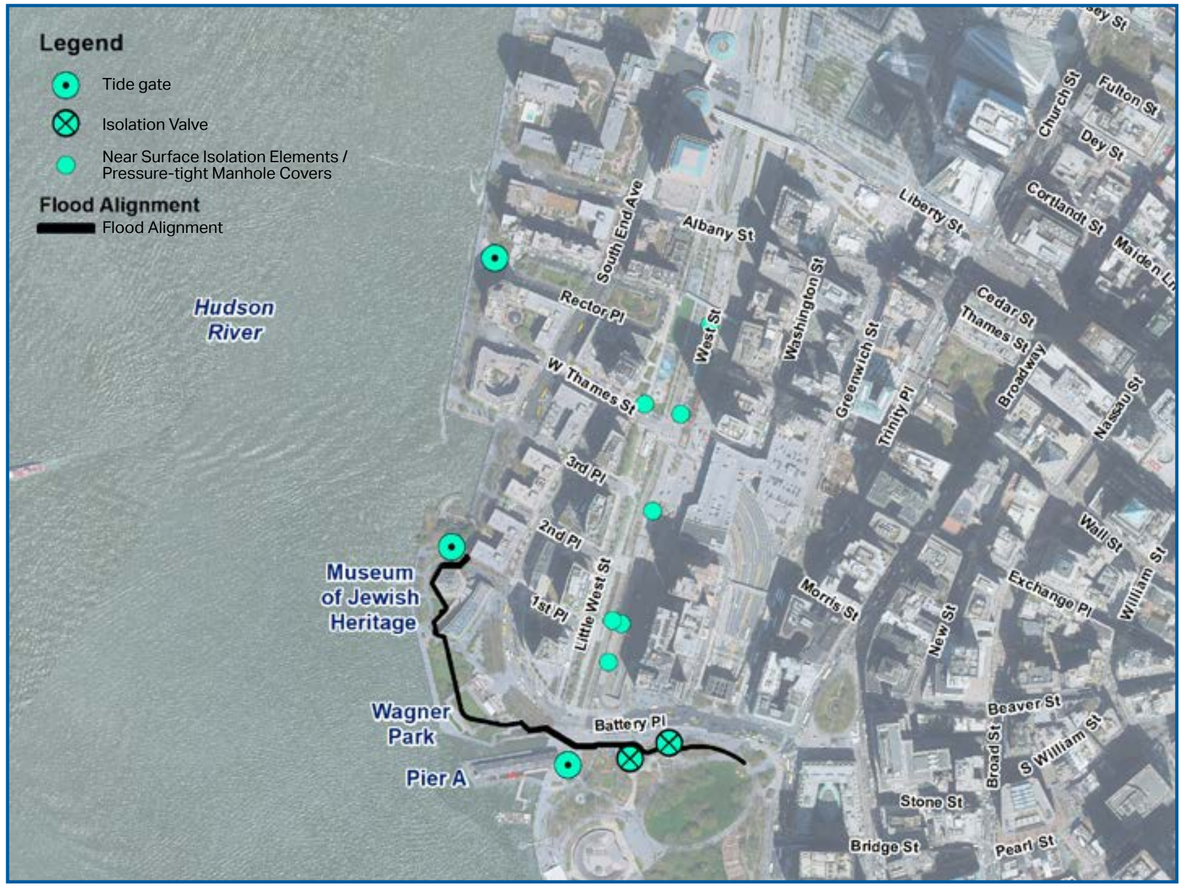
This was accomplished with tide gates, valves, and pressure-tight manhole covers, which are all solutions that occur without impacting the above-ground public experience. The resulting flooding risk after implementation of these solutions was evaluated for a five year rainfall storm concurrent with a 100-year coastal surge.

**TIDE GATES**
Automatically close when the coastal surge is higher than the water level in the pipes

**PRESSURE-TIGHT MANHOLE COVER**
Locked ahead of a forecasted coastal storm in coordination with the Emergency Response Plan

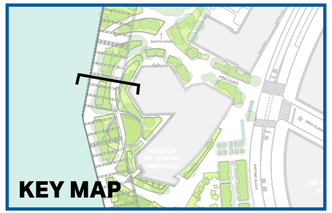
**ISOLATION VALVE**
Closed ahead of a forecasted coastal storm in coordination with the Emergency Response Plan

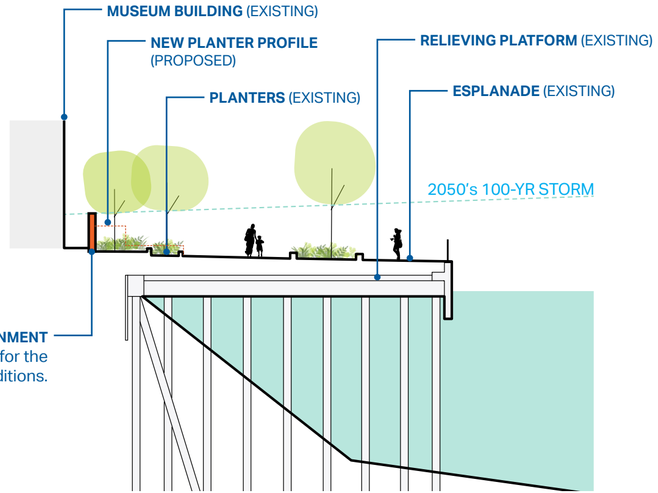




# MUSEUM OF JEWISH HERITAGE

The flood risk reduction alignment around the Museum of Jewish Heritage is primarily an exposed static floodwall located immediately adjacent to the building. This structure will be screened from the museum gardens by layered planting. Views from the classrooms to the gardens and waterfront are preserved through the use of flood-proof glass, which further reduces the visual impact of the static wall. Emergency egress is maintained in-place using flip-up deployable gates. Flip-up deployable gates will also be used to cross 1st Place and connect to the future North West Battery Park City Resiliency Project.





Terraced planters conceal the floodwall at the oval lawn next to the Museum of Jewish Heritage.

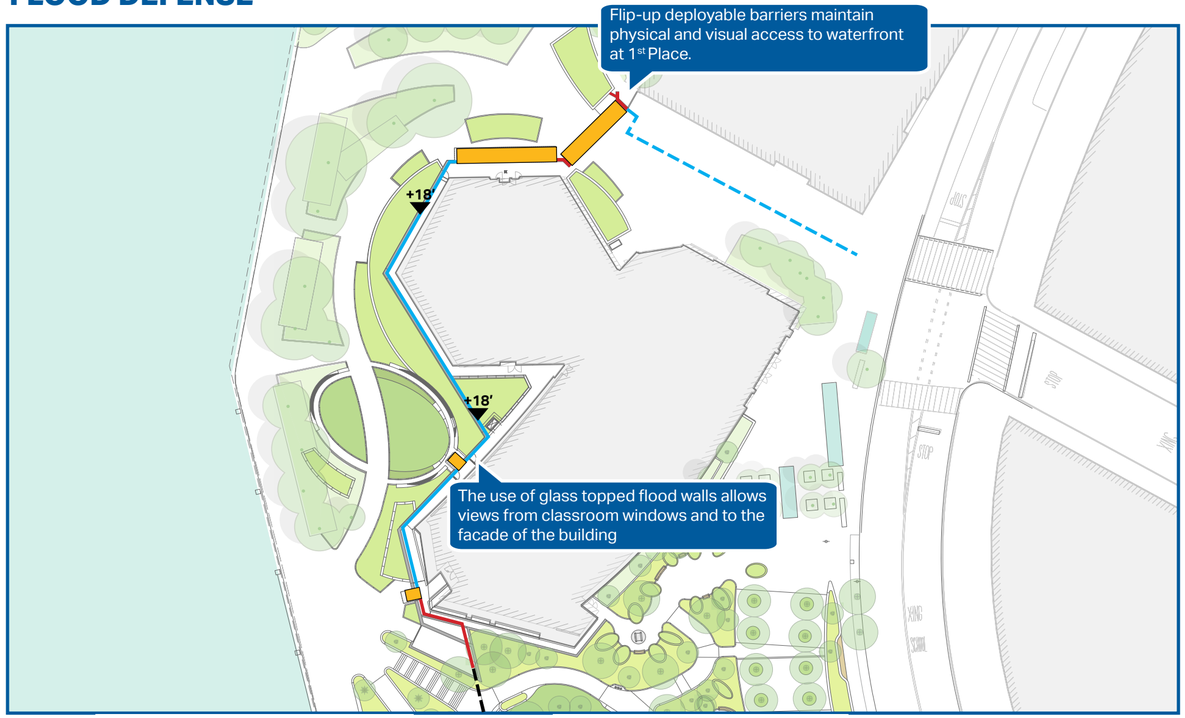
# MUSEUM OF JEWISH HERITAGE

## FINAL DESIGN

**GARDENS**
A flood wall is integrated behind stepped planters to minimize the visual impact. The new planter walls will be clad using salvaged stone from the current planter walls.

**OVAL LAWN**
The current lawn location, as well as the use of a perimeter seating edge is maintained.

## FLOOD DEFENSE




- Exposed Floodwall (Coastal Storms)
- Flip Up Deployable Gate (Coastal Storms)
- Glass-Topped Floodwall
- Buried Floodwall (Coastal Storms)
- Stop Log Deployables (Coastal Storms)
- +X' Design Flood Elevation (DFE)

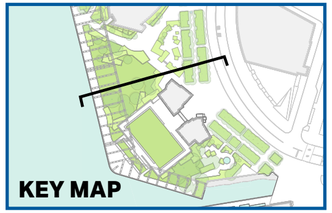
# MUSEUM OF JEWISH HERITAGE

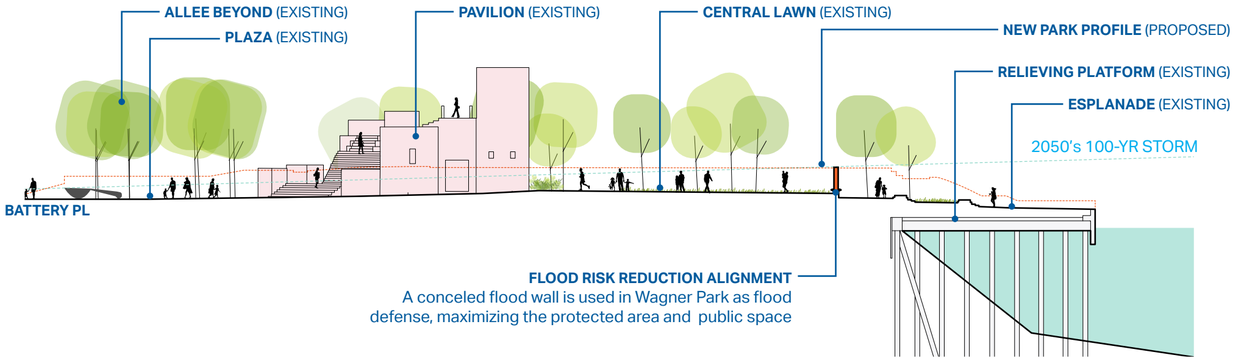
The interior esplanade is re-built in place with new, terraced planters concealing a glass-topped floodwall.

New perimeter seating is added to the oval lawn at the Museum of Jewish Heritage.

# WAGNER PARK

The legacy park was a mixture of open lawns and seasonal gardens, and was organized around views of the Statue of Liberty, capitalizing on it's location at the southern terminus of BPC. The future park will be elevated approximately 10 feet above the former elevation while maintaining and strengthening connections with the landscape of the Museum of Jewish Heritage to the north, the streetscape of Battery Place to the east, and to Pier A Plaza to the south. Preservation of long-term waterfront access and respect for the design legacy of the site inspired the design of Wagner Park. The spatial organization that defines Wagner Park today will be maintained and updated to integrate resilience, sustainability, and universal access.

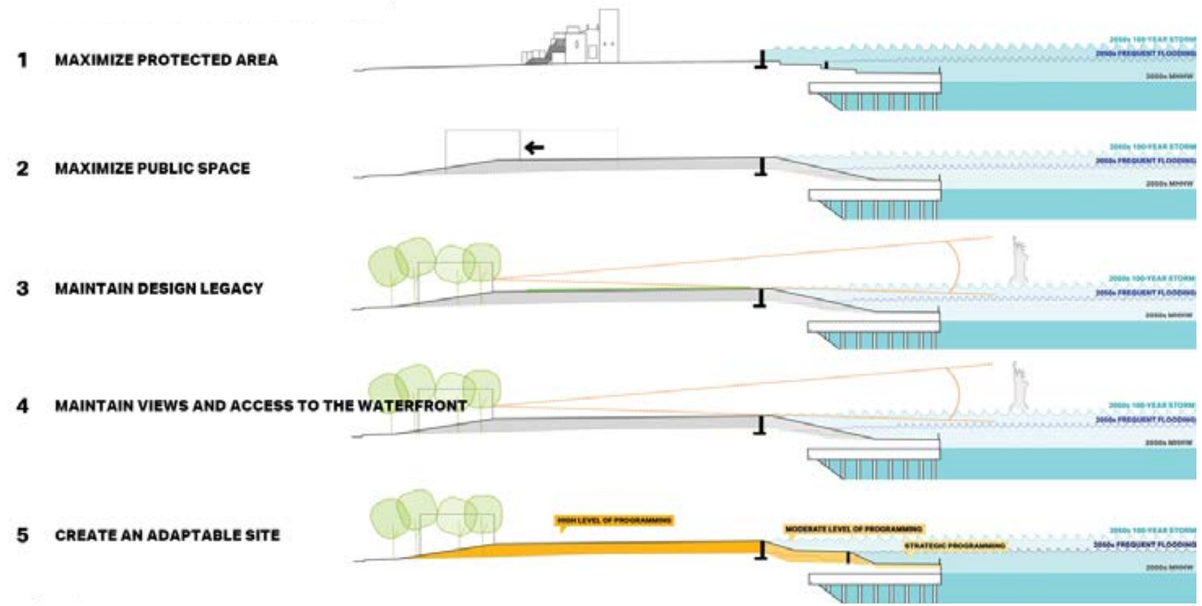


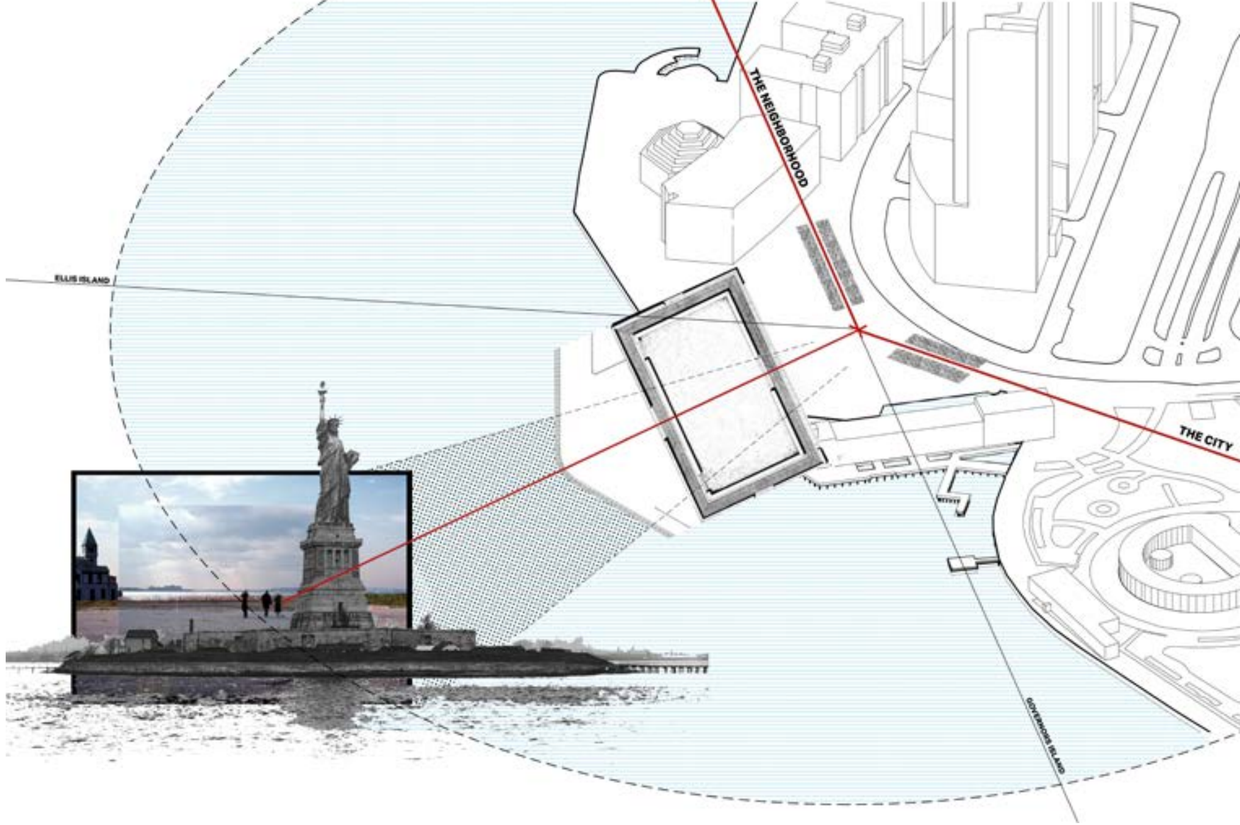




Communal seating and waterfront views from the new performative gardens in Wagner Park.

# **WAGNER PARK** | DESIGN PRINCIPLES

The legacy design of Wagner Park was organized around the entry experience through two double allees of trees and entry to a central lawn through a pavilion on axis with the Statue of Liberty. The Y-shaped axis formed by the allees, pavilion, and lawn form as the organizational backbone to the design. The new design of Wagner park follows the same organizational principles, spatial experiences, and views by hiding the necessary flood risk reduction infrastructure underneath the elevated park.

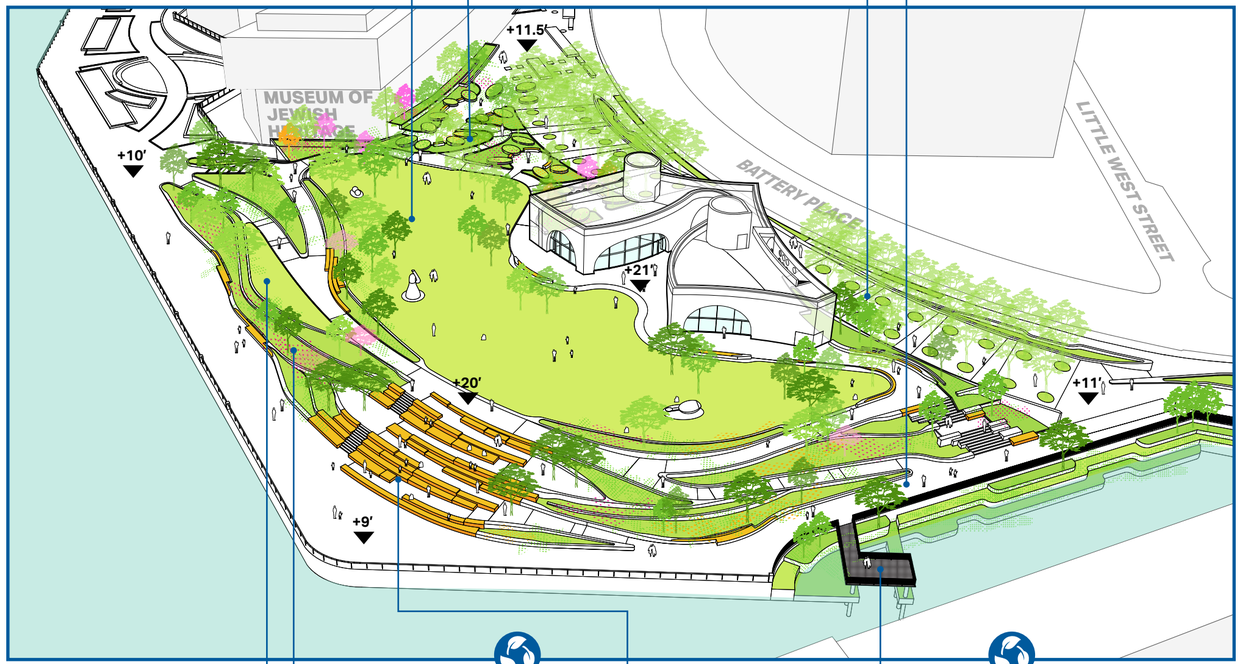



The allees and the framed views of the Statue of Liberty are kept as key features of the new park organization

# WAGNER PARK

## FINAL DESIGN




**CENTRAL LAWN**
Large open lawn provides views to water with shade trees located to create a variety of gathering areas without blocking views.

**ORNAMENTAL GARDENS**
Intimate garden "rooms" with spaces for artwork, seating, and seasonal planters.

**ALLEES**
Gently sloping pedestrian access to park level from Battery Place and Pier A shaded by new trees.

**ESPLANADE**
New direct connection from Battery Park City Esplanade to Pier A Plaza.

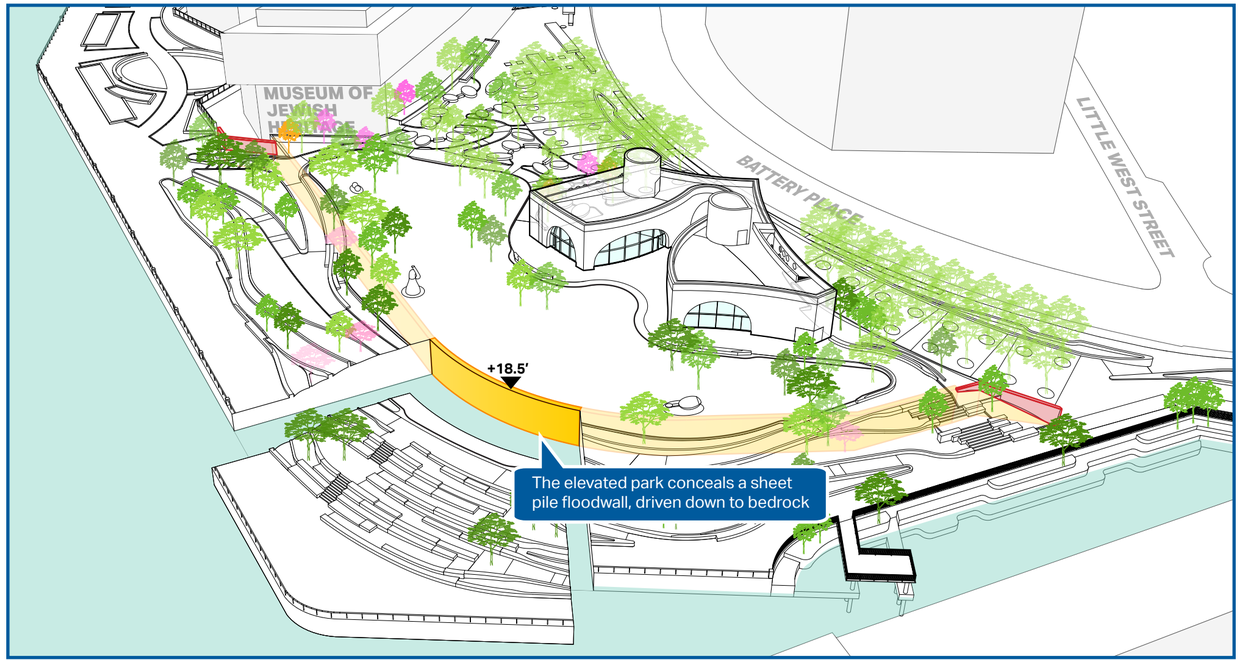
**TERRACE LAWN**
Shaded lawns overlooking performative gardens and Battery Park City Esplanade.

**PERFORMATIVE GARDENS**
Terraced gardens planted with native and salt tolerant species designed to capture and filter stormwater.

**EVENT TERRACE**
Terraced seating with views of Statue of Liberty.

**PIER A INLET**
New waterfront marine habitat with vegetation, tide pools, and educational opportunities.

## FLOOD DEFENSE




+X'

Exposed Floodwall (Coastal Storms)
Buried Floodwall (Coastal Storms)
Design Flood Elevation (DFE)

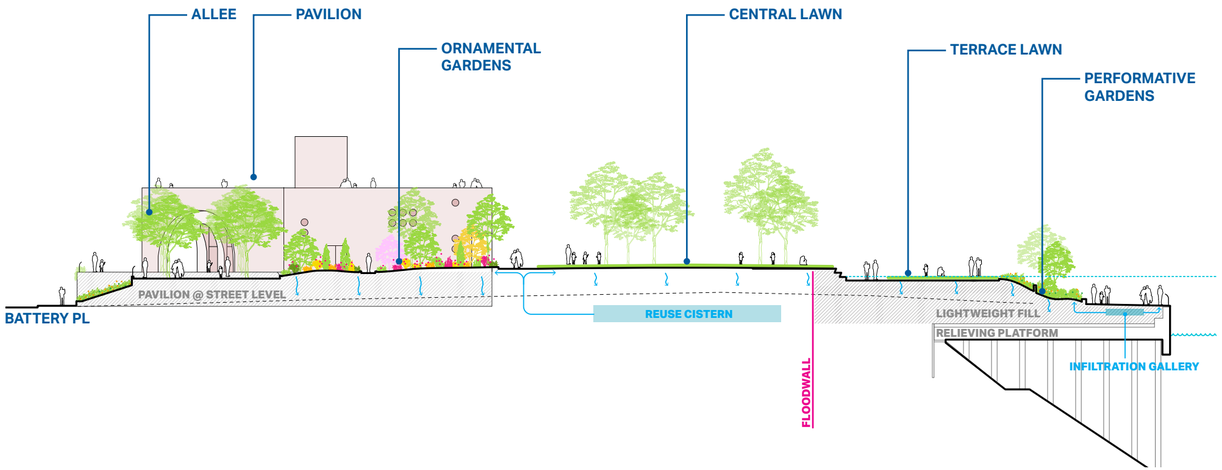
# WAGNER PARK

A new esplanade extension provides direct and clear access to Pier A Plaza. Along the walk, a newly designed Pier A Inlet provides enhanced ecological value and an educational experience.

The Central Lawn serves as the core of the park. It provides spaces to lounge amongst the shade of large trees, as well as a central open space for community gathering.

# **WAGNER PARK** | STORMWATER APPROACH

The stormwater management approach will create a site that treats and slowly releases runoff on the water-side of flood infrastructure, or "wet" side; and treats, stores, and reuses water on the "dry" side. In Wagner Park, precipitation that falls on the "wet" side will be treated through vegetated planting areas within the Performative Gardens and/or filters on the Esplanade prior to being conveyed to an infiltration gallery where the water will be stored before it percolates through the soil down to the relieving platform. The relieving platform contains weep holes that allow the water to pass through. Precipitation that falls on the "dry" side of the line of protection will be conveyed to a reuse cistern before connecting to the water reuse equipment room where it will be filtered and treated prior to reuse. Reuse water will be used for wash-down, site irrigation, and restroom flush demands. For areas on the "dry" side that will not drain to the reuse cistern, the majority of stormwater will be collected and treated prior to release to the NYCDEP storm drain system.




Wagner Park integrates many waterfront seating and viewing opportunities, shade, and gathering areas.

# WAGNER PARK

Northern entrance to Wagner Park through the ornamental gardens.


Outdoor “rooms” support intimate seating and artwork opportunities.

# **WAGNER PARK** | SUSTAINABILITY APPROACH

The design of the Park achieved the Waterfront Alliance's Waterfront Edge Design Guidelines (WEDG) certification through innovative and integrated landscape architectural and engineering site planning.

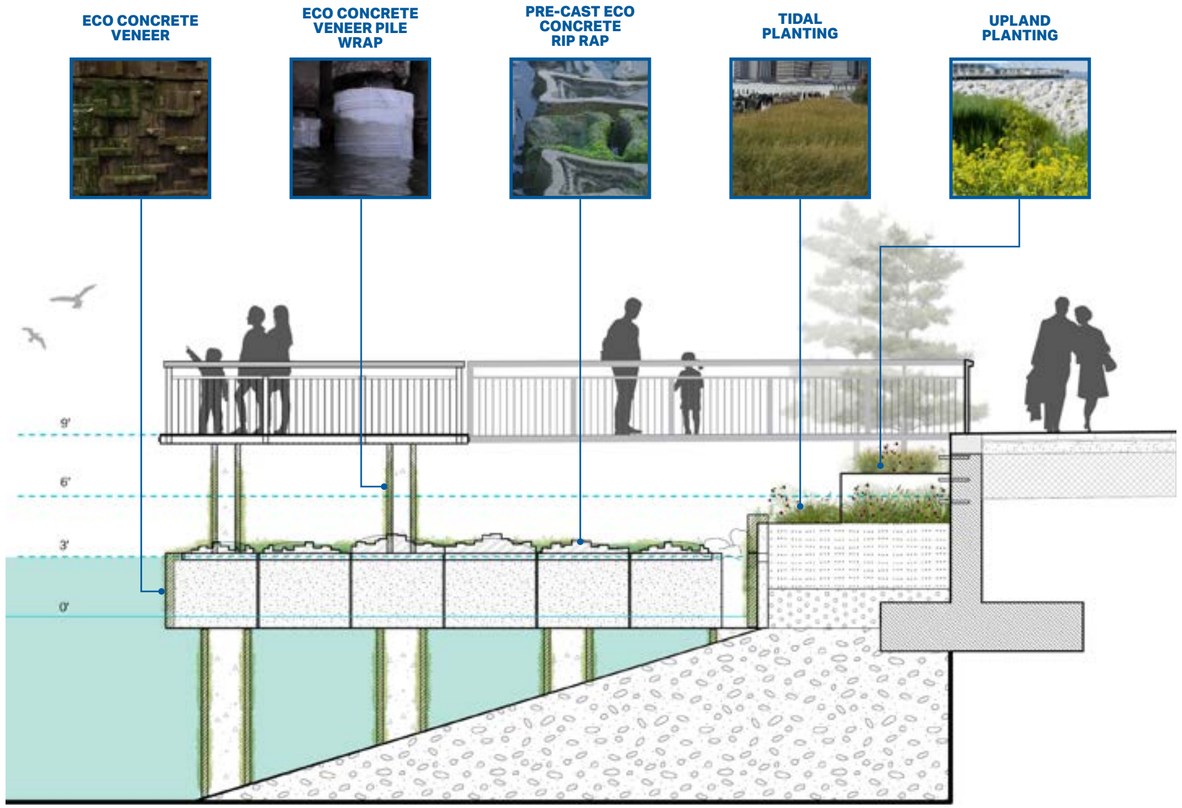
WEDG is a rating system and set of guidelines to create resilient, ecological and accessible waterfronts. The project enhances the site's programmatic and ecological diversity through a range of solutions.

- New waterfront **marine habitat** educational area at Pier A inlet
- Integration of the plan layout and site grading ensures the park is universal accessibility while also carefully controlling overland stormwater flows to **maximize stormwater capture and reuse**.
- Integrates targeted **salvaging of existing site stone, wood, and trench drains** to be used in the new construction.
- Paving color and material selections are carefully calibrated to increase the parks solar reflectance index (SRI) **reducing the park's urban heat island contribution**.
- Site lighting, including some **solar lighting**, carefully follows **dark sky principles** to reduce glare and enhance nighttime viewing of the New York Harbor and Statue of Liberty.
- Four **regional plant communities** within the park include tidal estuary, maritime meadow, maritime forest, and upland woodland.
- The use of **native plants** reduces water consumption and reduces maintenance labor while significantly **boosting local biodiversity and habitat support**.
- The turfgrass areas make use of subsurface irrigation to **reduce water consumption** by more than 30%.

The southern entrance to Wagner Park, as seen from above Pier A Plaza, will be a welcoming experience. The allee draws visitors up to the pavilion and the new extended esplanade provides a direct connection into the park, next to the new ecologically enhanced Pier A Inlet.

# **WAGNER PARK** | PIER A INLET ECOLOGICAL FUNCTION

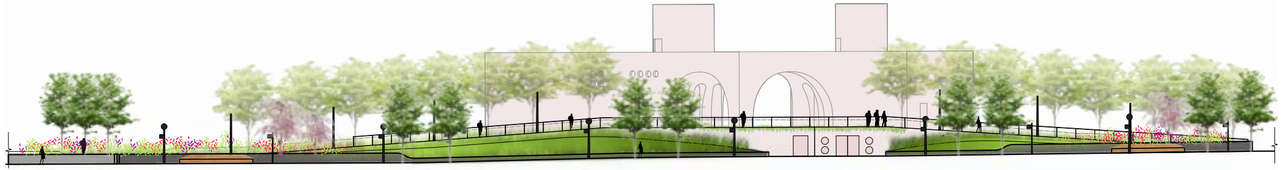
A metal grate viewing platform provides visitors with an educational experience with sight lines to all of the terraces. 50% of available light will pass through to the water below, as to avoid shaded conditions on the water.




Terraced conditions improve habitat opportunities through vegetation, tide pools, and habitat shelves. Pile wraps and specialized veneer add additional surfaces for habitat enhancement.

# **WAGNER PARK** | BATTERY PLACE

Battery Place will feature new seating for transit, street trees, and garden planting beds. The allees that provide access to the park lawn slope gently from the park entrances to the north and south.

Service entrance into the lower level of the Pavilion which is tucked under the raised park

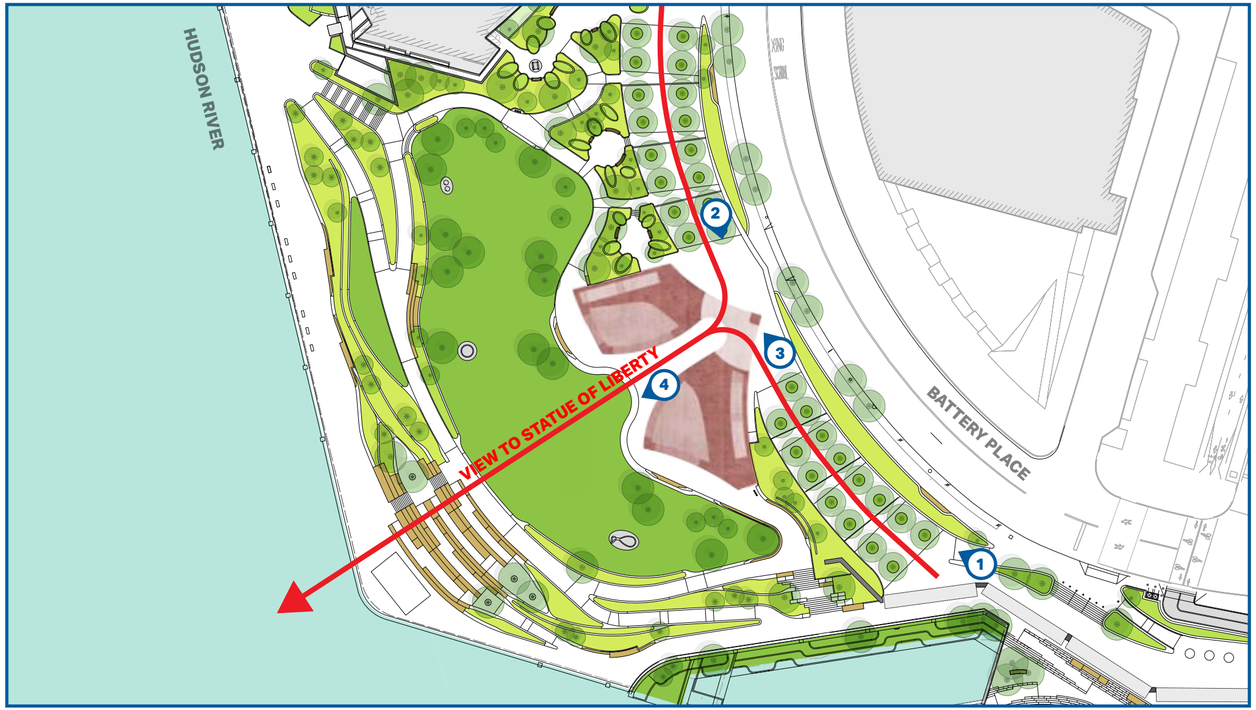
The planted area ascends from stone clad security seat walls on the north and south of the Park toward the center and creates a garden-like condition. The planting design strategy highlights the north and south entry points with a colorful and seasonal planting palette.

# PAVILION APPROACH

Park users discover the pavilion while approaching from the street and walking up through the entry gardens ordered with the rhythm of twin allées of trees. The pavilion is slowly revealed, taking its inspiration from the scale and experience of the trees and gardens.

The warm color of the concrete pavilion honors and harmonizes with the warmth of the brick buildings that distinguish Battery Park City. As the pavilion meets the sky, visitors see vines and greenery draped over the cornices, changing color with the seasons and unifying the pavilion with the gardens.

1 Entrance to the south allée, looking north along Battery Place towards the Pavilion




Site Plan highlighting pedestrian approach up allées and axial relationship of the Pavilion, Park, and the Statue of Liberty

# HARBOR GATEWAY

The vaulted openings on the eastern side of the Pavilion serve to welcome the public at the top of the allees and frame a central gateway to the park. As visitors move between the two wings of the pavilion, they are treated with an expansive view of the park and the harbor beyond. Standing there, visitors might notice that they are pointed directly toward the Statue of Liberty, a major design intent of both the original Wagner Park Pavilion and the current design.

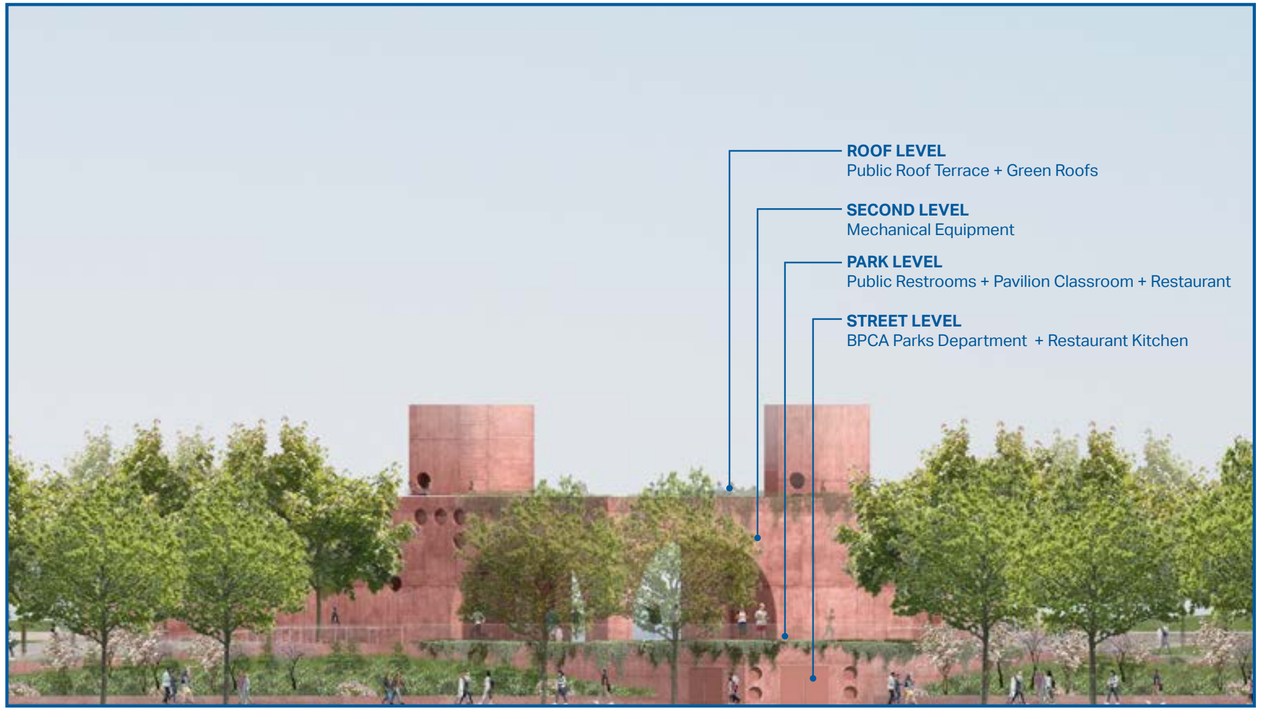
2 Approaching the Pavilion from the north allée, looking south

View of the Pavilion arrival entryway, looking north to the gardens. Turning left, the Statue of Liberty comes into view. 3

# PAVILION CLASSROOM

On the left visitors discover a restaurant and on the right, a community space- the Pavilion Classroom that participates in the life of Battery Park City. The opportunity to sit at the tables outside the restaurant and the Pavilion Classroom brings the life of these rooms closer to the gardens and the park. This collective piazza joins the pavilion and the park with the entry experience, bringing energy and delight as it all unfolds and opens to the landscape and the harbor. The facades and entries to these rooms are also formed with arched vaults, uniting the pavilion with the entry experience while bringing a softness and intimate human scale to the experience of the architecture.

4 View towards the Statue of Liberty, with Restaurant to left and Pavilion Classroom to right

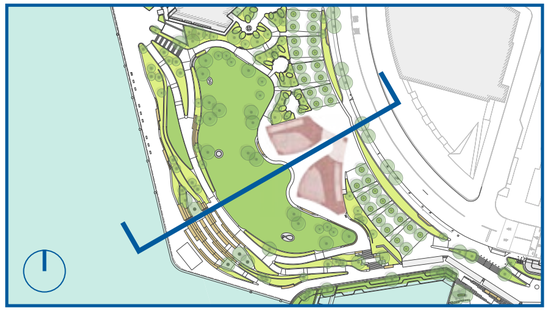



Elevation view from Battery Place

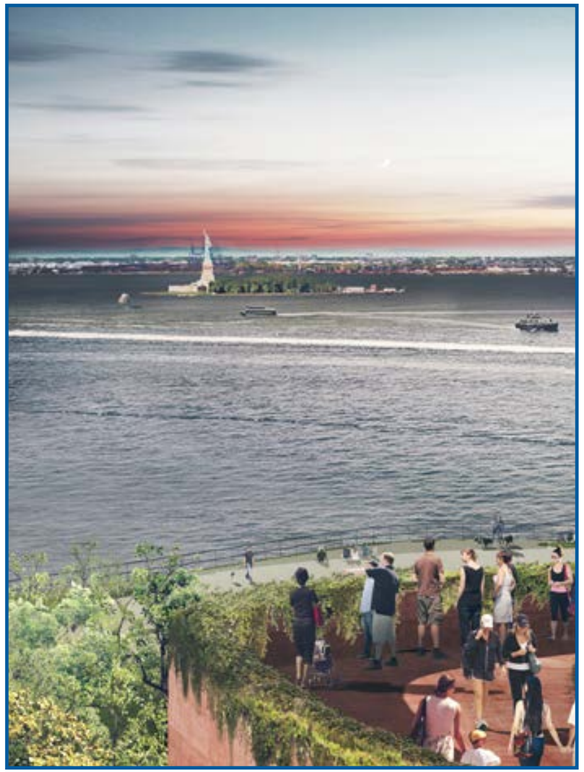
# HARBOR & CITY VIEWS

Visitors are drawn to the top of the roof by two grand stairs, which are open to the sky, with framed views of the park and the harbor. The observation deck offers 360 degree views looking out over the Statue of Liberty and The Battery towards Staten Island and New Jersey, and inland to Battery Park City and downtown Manhattan. The roof is covered with green plantings and flowers that change their impressions season by season- the pavilion and the gardens cohesively come together as one experience.

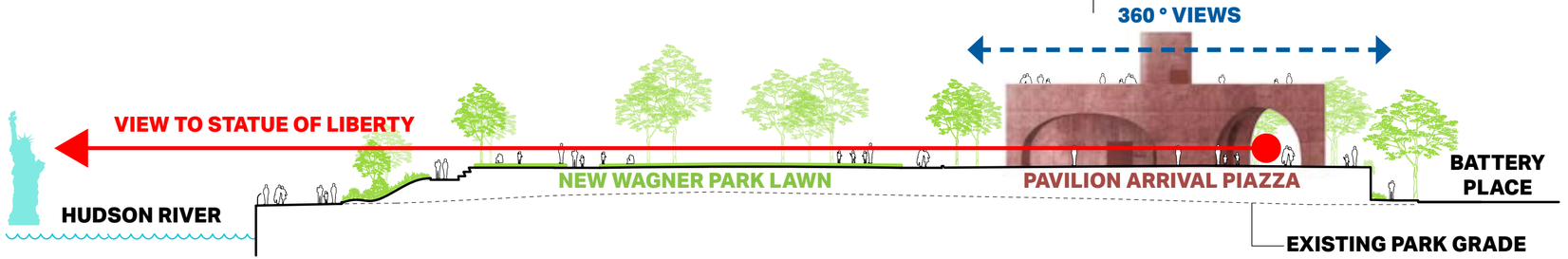
The pavilion geometry is designed with softly curving walls to reflect the softness of the topography and the gardens- it is a pavilion that belongs in nature and offers a poetic experience of discovery, grounded in its place and honoring the history of this great city.



Key Plan



View towards the harbor, Statue of Liberty, and New Jersey from the publicly accessible Pavilion roof terrace




Section through Pavilion arrival piazza and new park lawn, looking north

# BATTERY PLACE STREET LEVEL PLAN


No Public Access, Underground Below New Park Level

Service Entrances Accessed from Battery Place

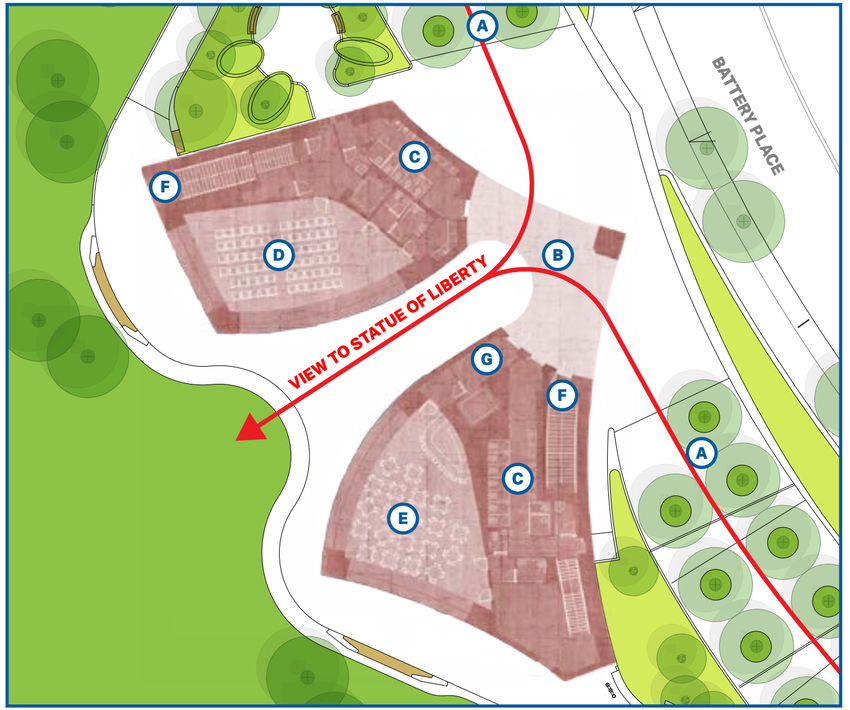
**A.** Parks Service Entrance

**B.** Restaurant Service Entrance

**C.** Parks Department Programming and Operations

**D.** Restaurant Kitchen

# PARK LEVEL PLAN




All Public Programming

Park allées **(A)** meet at arrival piazza **(B)** on axis with view to the Statue of Liberty

**C.** Public Restrooms

**D.** Pavilion Classroom and Environmental Education Center

**E.** Restaurant

**F.** Public Roof Access Stairs

**G.** Public Roof Access Elevator

# SECOND LEVEL PLAN


Mechanical equipment located on Second Level to eliminate need for rooftop equipment

**A.** Mechanical Equipment Rooms



# ROOF TERRACE LEVEL PLAN


Fully Publicly Accessible

360° Views of Statue of Liberty, Harbor, the Battery, and Downtown Manhattan

**A.** Public Roof Terrace

**B.** Green Roofs

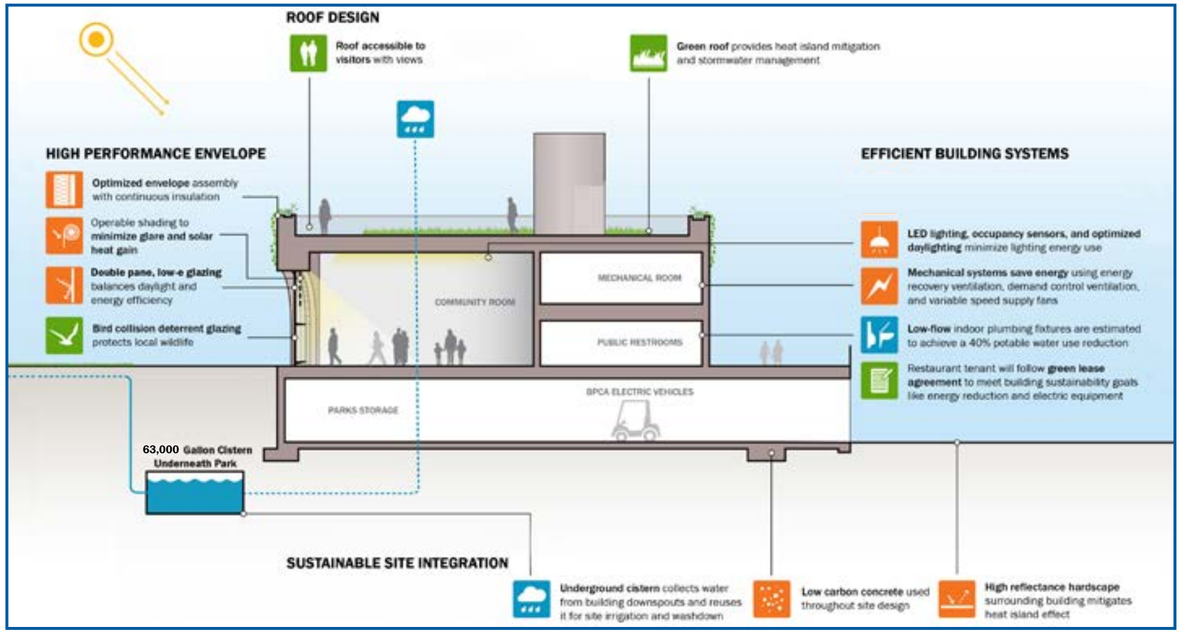
**C.** Parapet Planters

**D.** Public Roof Access Stairs

**E.** Public Roof Access Elevator

# PAVILION SUSTAINABILITY

The new pavilion is designed to minimize further impact to the environment while creating harmony within its natural context. From diverting construction waste to reduction in both operational and embodied carbon, the proposed design encompasses a host of sustainable design practices and is aligned with Battery Park City's long-term sustainability plan. The pavilion will achieve Net Zero Carbon status through these practices and off-site carbon offsets.




Diagrammatic Section looking north through the Pavilion Classroom



# INTERNATIONAL LIVING FUTURE INSTITUTE (ILFI) ZERO CARBON CERTIFICATION

The Pavilion is pursuing International Living Future Institute (ILFI) Zero Carbon Certification to reduce operational and embodied carbon. The Pavilion is fully electrified and designed with no combustion elements on-site, which meets the criteria for ILFI certification and also prepares the building for a clean New York State electricity grid by 2050.

## OPERATIONAL CARBON REQUIREMENTS

- Net zero carbon including onsite & offsite measures
- No combustion
- Achieve 25% Energy Use Intensity (EUI) reduction from ASHRAE equivalent building
- Offset all energy with renewable energy

- **Current Design:** Exceeding target, anticipating 38% EUI reduction

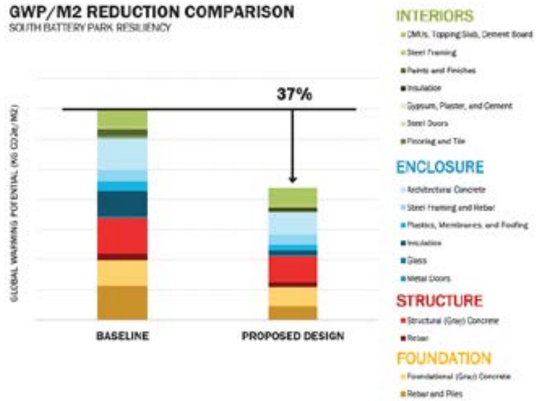
## EMBODIED CARBON REQUIREMENTS

- Embodied carbon of primary foundation, structure, and enclosure must be reduced by 10%
- Project total embodied carbon should be <500 kg CO2e/m2
- Disclose and offset the remainder of embodied carbon

- **Current Design:** Exceeding target, anticipating 37% Embodied Carbon reduction

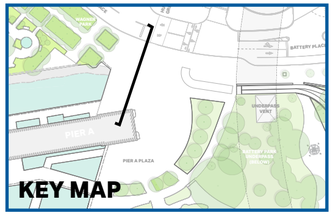
INTERNATIONAL LIVING FUTURE INSTITUTE

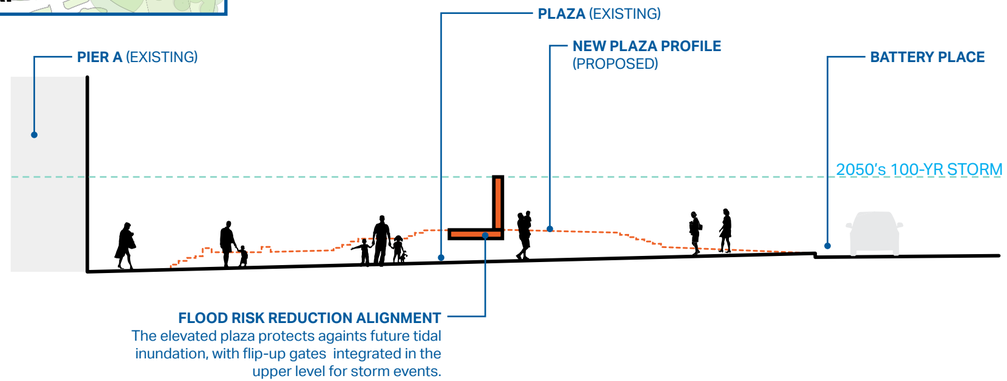
ZERO CARBON CERTIFICATION



# PIER A PLAZA

Pier A Plaza sits at the lowest ground surface elevation within the project area and is currently arranged as a large, flexible open space. Design drivers and community requests included enhanced urban amenities, universal access, safety, and the ability to mitigate the height of the flood infrastructure due to the low ground surface. The re-design required accommodations for pedestrian and bicycle circulation, and emergency, maintenance, and operational vehicular access to the new upper and lower plaza areas.




Universally accessible pathways, shaded seating, and gathering areas in the terraces of Pier A Plaza.

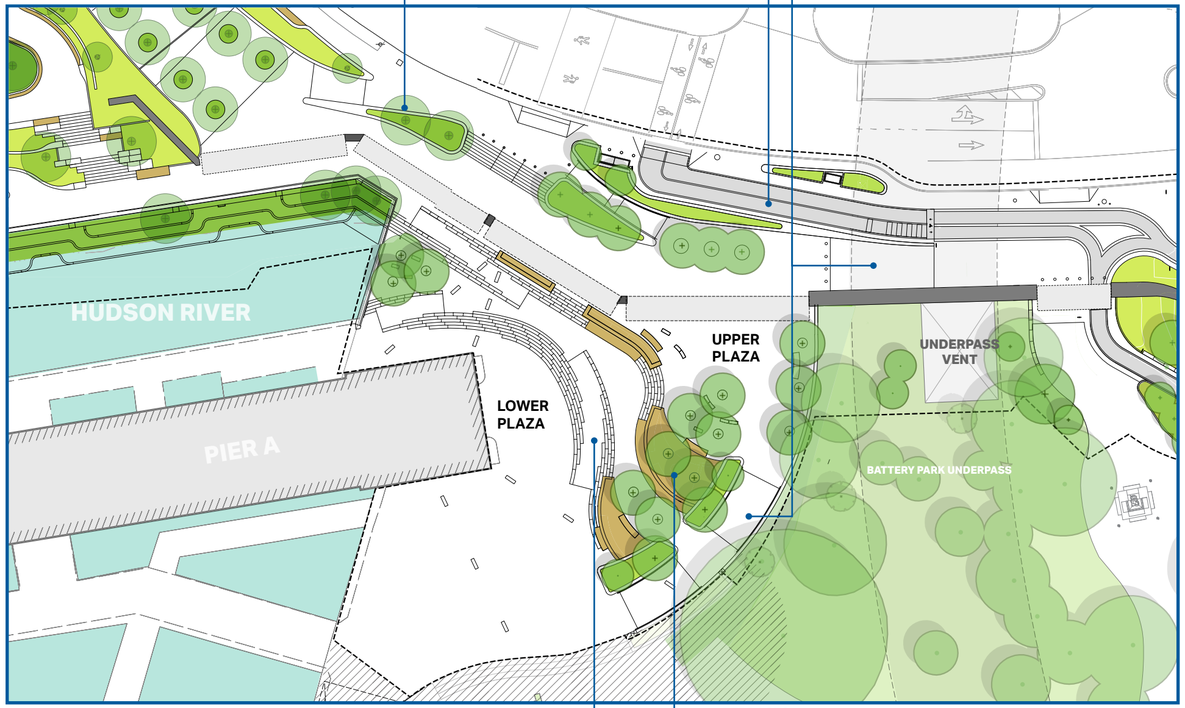
# PIER A PLAZA

## FINAL DESIGN

**SECURITY PLANTER WALLS**
Planters with integrated vehicular security.

**DEDICATED BIKE PATH**
Improved pedestrian and bicycle safety.

**WIDE RAMPS**
Generous width for pedestrian and occasional maintenance and emergency vehicle access.

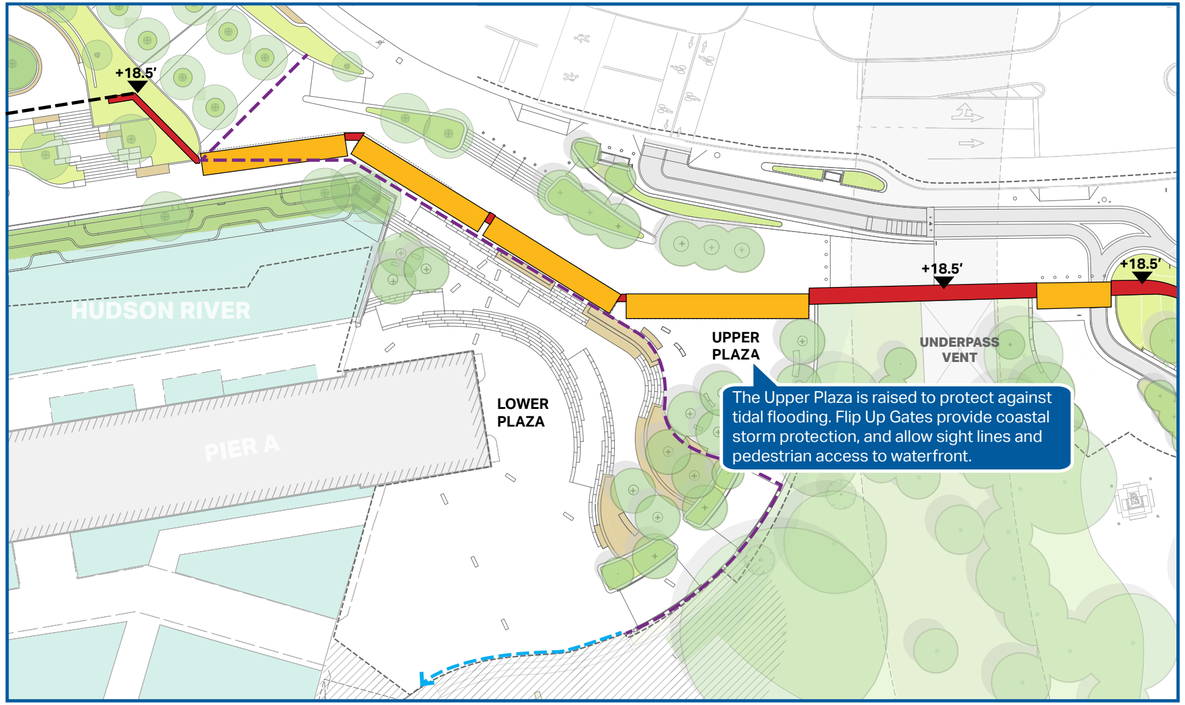



**TERRACES**
Shaded areas for seating and gathering with water views.

**RAMPS & STAIRS**
Universal access to Upper and Lower Plaza.

LIMIT OF WORK
LMCR BATTERY RESILIENCY

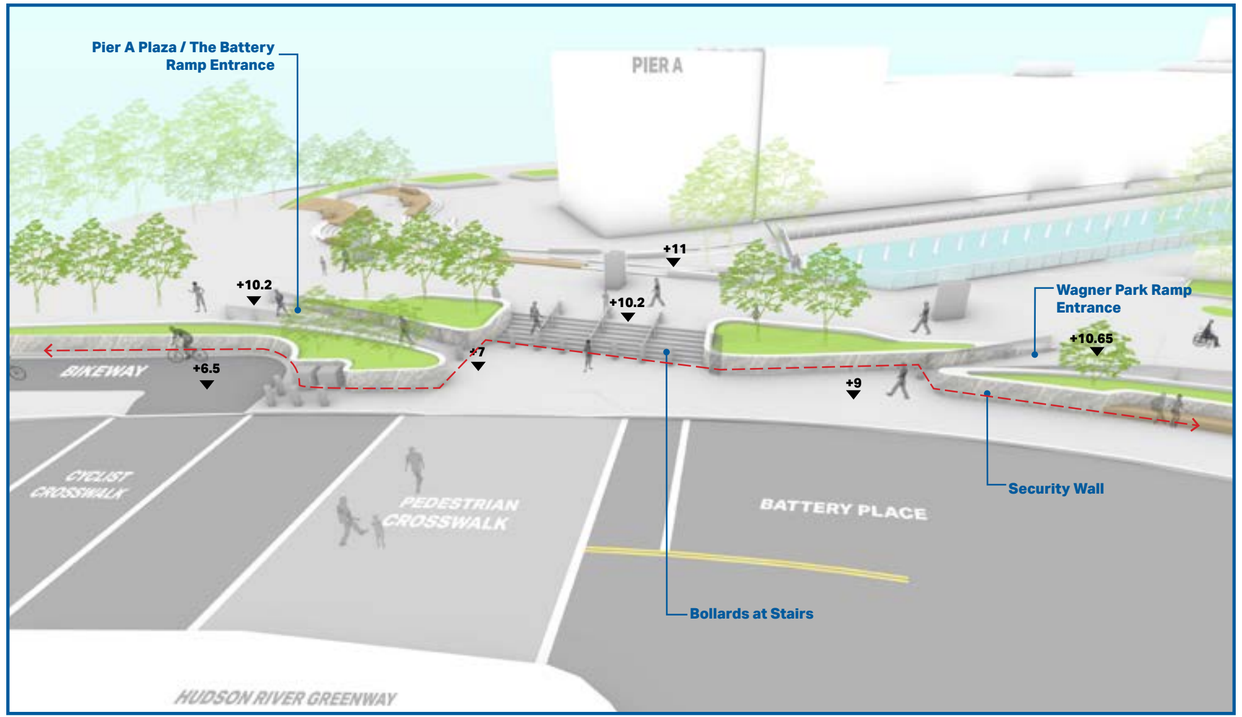
## FLOOD DEFENSE




Exposed Floodwall (Coastal Storms)
Flip Up Deployable Gate (Coastal Storms)
Buried Floodwall (Coastal Storms)
+11' Ground Elevation Ridge (2100 Sea Level Rise)
+11' Battery Resiliency Project (2100 Sea Level Rise)
+X' Design Flood Elevation (DFE)

# PIER A PLAZA

## VEHICULAR SECURITY AT PIER A PLAZA



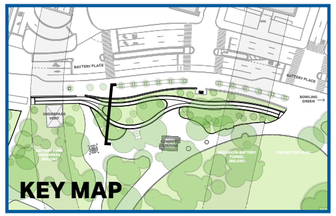

Continuous Line of Security

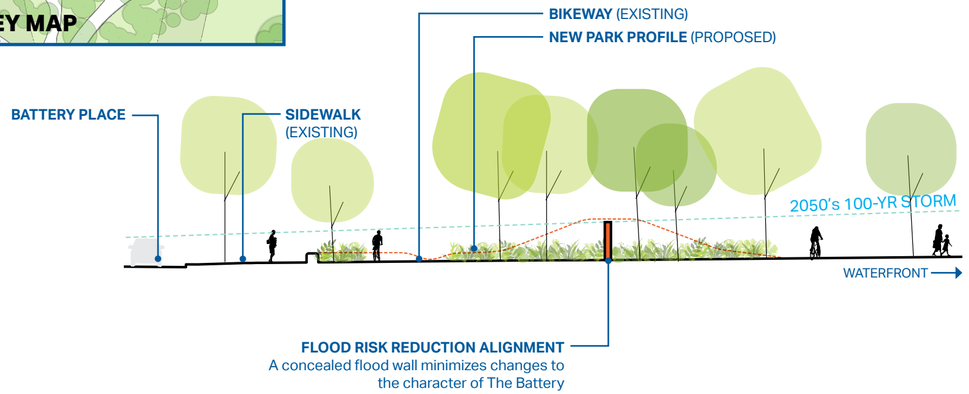
+X' Ground Elevation

The streetscape incorporates K12 vehicular security barriers into the planter edges and bollards in order to maintain a safe and cohesive streetscape condition from the critical view and access corridor.

# THE BATTERY

The design of the flood alignment in the Battery integrates into the park landscape by burying the majority of the flood alignment underneath a sinuous and fully planted berm. Community requests and design drivers included maximizing trees and planted areas, preserving existing trees when possible, and designing to respect and complement the character and materials of The Battery.




The re-built Battery Bikeway with looking towards Pier A Plaza.

# THE BATTERY

## FINAL DESIGN

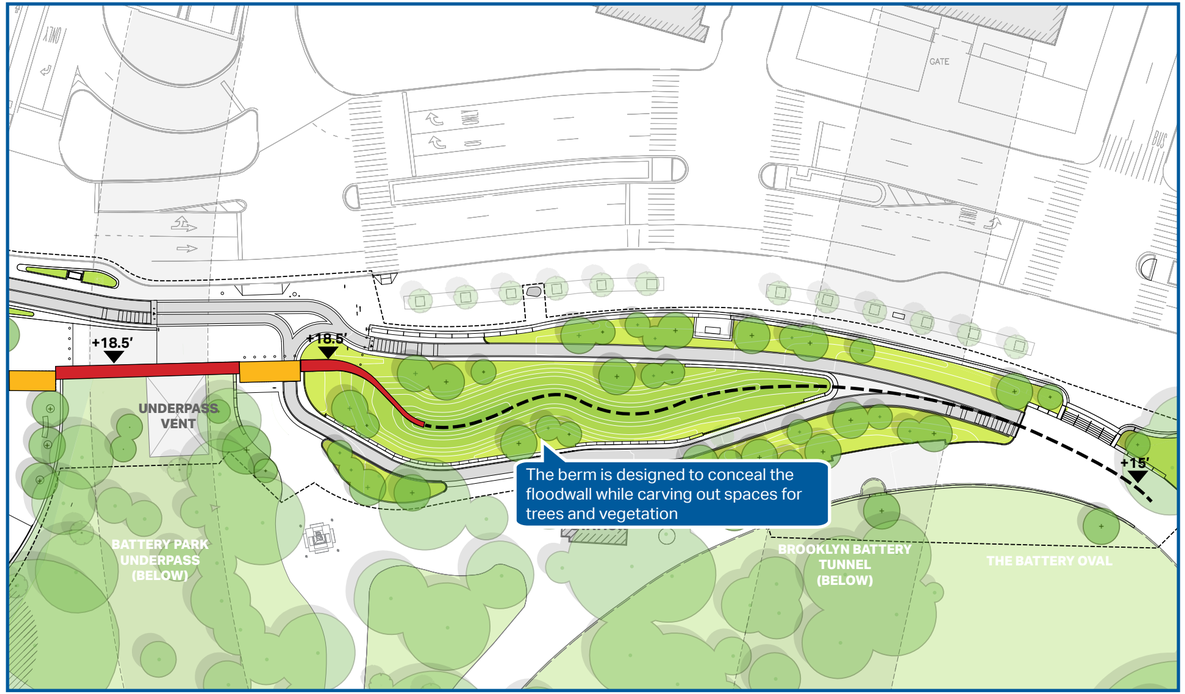
**BIKE PATH CROSSING ZONE**
Signage and material changes alert users of crossing.

**STONY CREEK GRANITE WALL**
Re-used granite blocks line edge of The Battery.


**VEGETATED BERM**
The flood barrier is buried under the berm, which is designed to integrate into the surrounding park and maximize areas of new tree planting.

**DEDICATED BIKE PATH**
The east and west-bound bike lanes located on either side of the berm re-use salvaged material from the existing bike path.

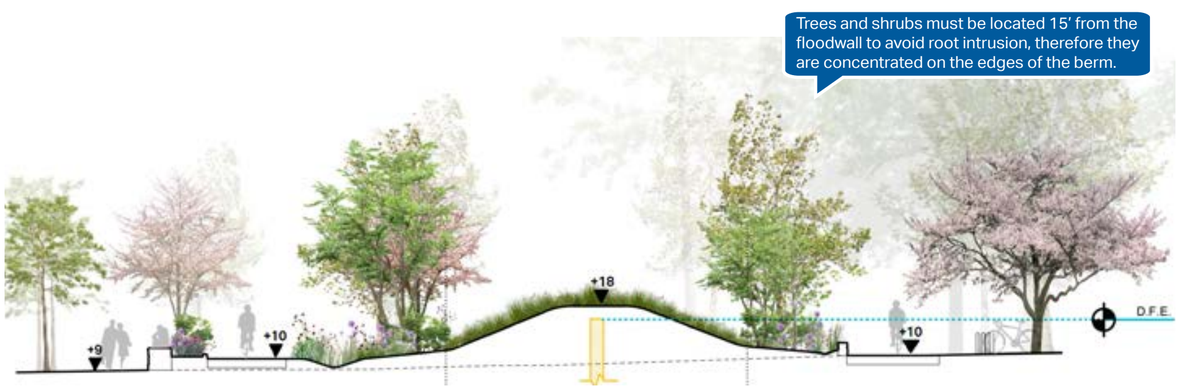
## FLOOD DEFENSE

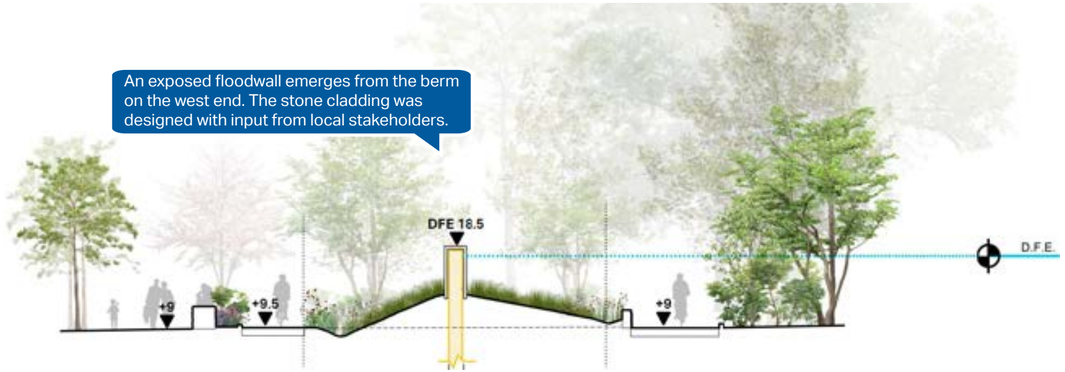



**Exposed Floodwall (Coastal Storms)**
**Flip Up Deployable Gate (Coastal Storms)**
**Buried Floodwall (Coastal Storms)**
**Design Flood Elevation (DFE)**

------- LIMIT OF WORK

# THE BATTERY

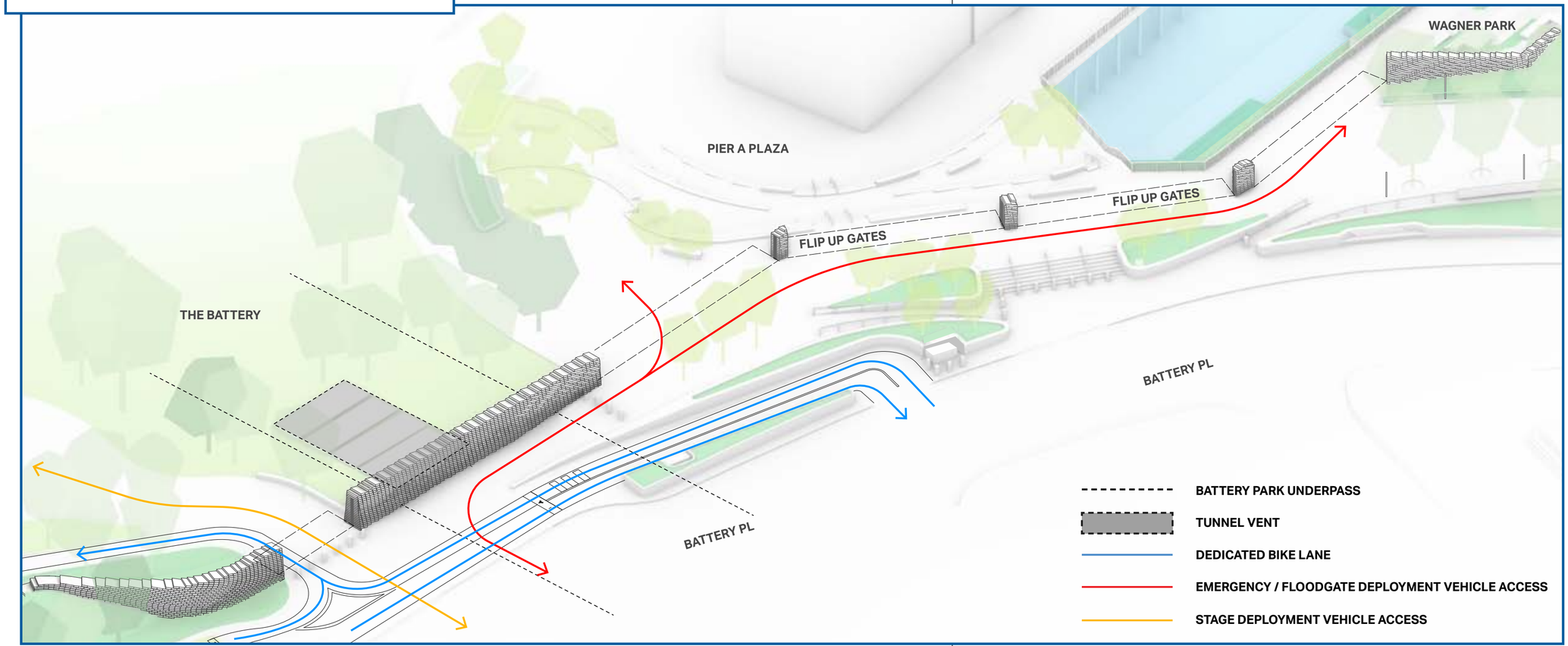





The Battery Bikeway will feature lush, seasonal planting that conceal the buried floodwall.

# EXPOSED FLOODWALL DESIGN



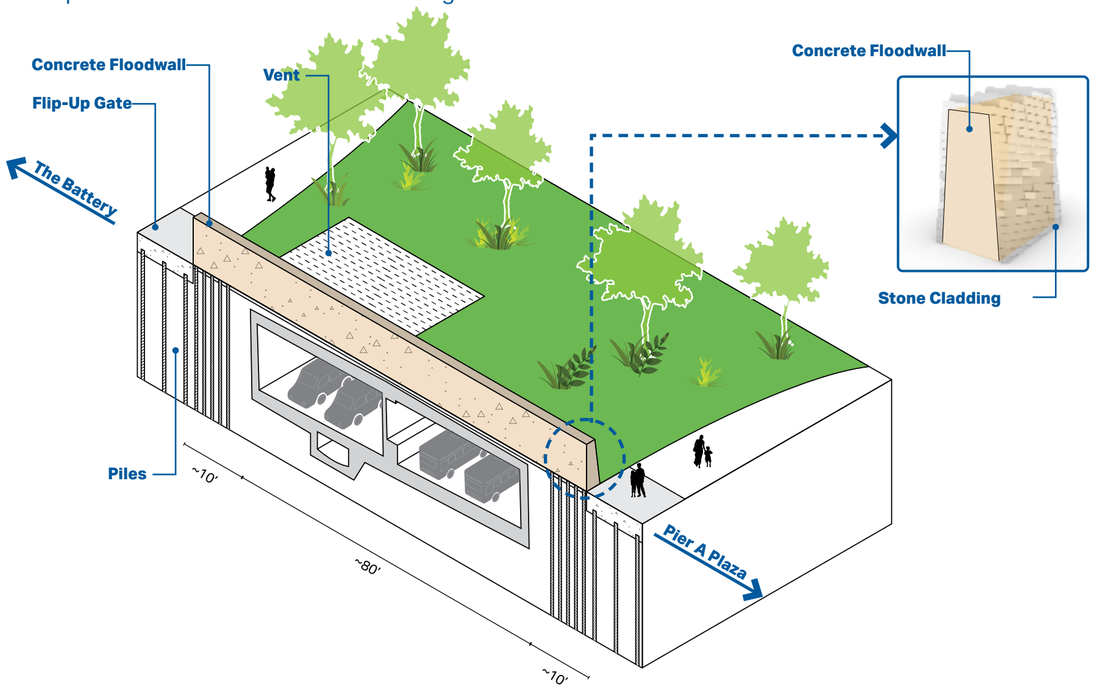

A fixed and exposed flood barrier is required to cross the Battery Underpass due to structural limitations of the tunnel, which is located very close to the surface (detail on next page).

Flip-up deployable gates are located between support columns in Pier A Plaza. The span of the flip-up gates is maximized to minimize the number of columns. The buried flood wall in Wagner Park extends from underneath the park to connect to the flip-up gates. The columns and exposed segments of flood wall will be finished with a distinctive stone cladding.

The length, location, and footprint of the deployable flip-up gates, columns, and exposed walls are arranged to accommodate daily pedestrian and bicycle movement as well as occasional vehicular maintenance, emergency, and event access requirements.

# EXPOSED FLOODWALL ENGINEERING

Because the Battery Park Underpass sits just 6 inches below grade at this location, an exposed floodwall is the only feasible solution. The flood barrier must not add any additional load to the tunnel, therefore the barrier must bridge over the tunnel and be anchored on either side via piles. As a result the structural footing of the wall, which would normally be underground, is integrated into the exposed wall increasing the overall width. The profile of the wall tapers to the top and is clad with architectural stone to reduce the visual impact.




The exposed floodwall spanning the Battery Underpass is finished with an architectural stone veneer. New paving treatments improve pedestrian and bicycle circulation.

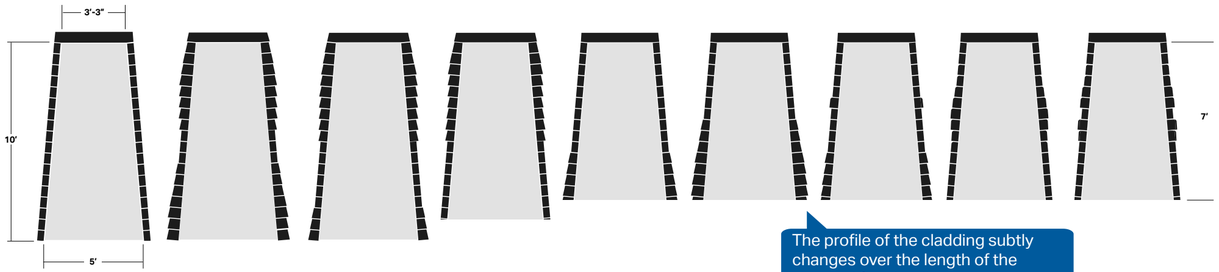
# EXPOSED FLOODWALL CLADDING DESIGN

The finish of the floodwall in this location uses a distinctive and visually interesting stone in varying finishes to create continuity between The Battery, Pier A, and Wagner Park. The finish of the stone changes from rough split-face to sandblasted over the length of the wall, highlighting different qualities of the stone and subtly representing the interplay of earth, water, and light. This stone treatment is applied to all sides of the exposed floodwall. This design was developed in close coordination with project stakeholders and with a focus on constructibility and maintenance.

PEARL GREY SPLIT FACE

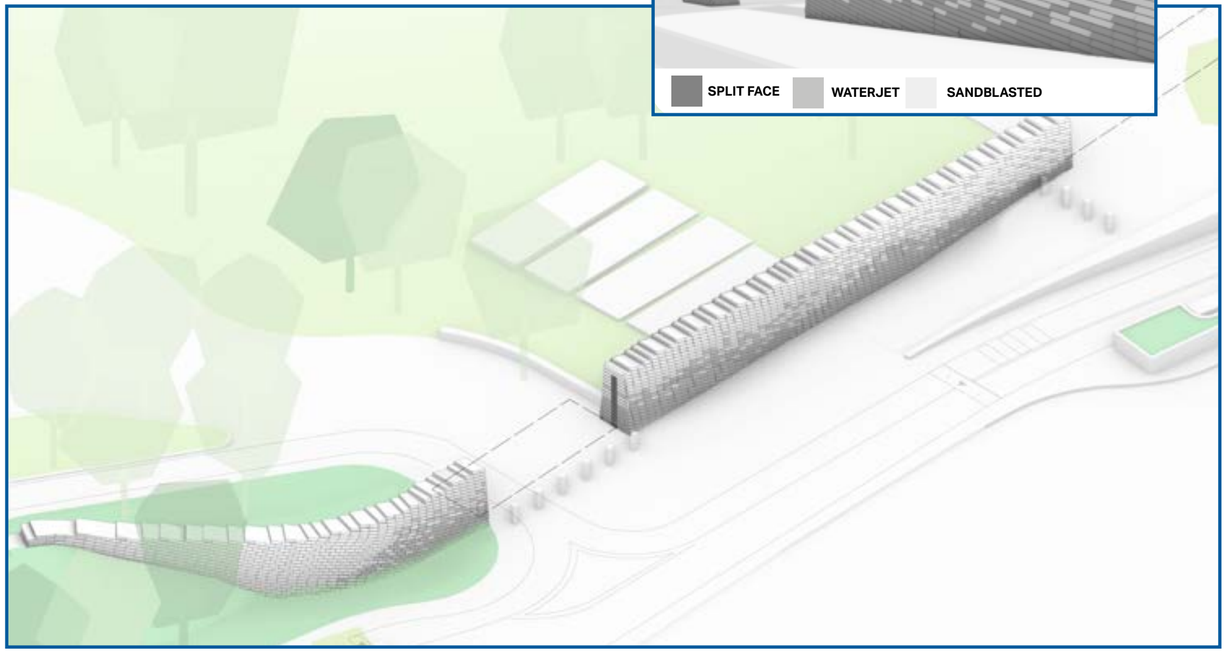
PEARL GREY WATERJET

PEARL GREY SANDBLASTED



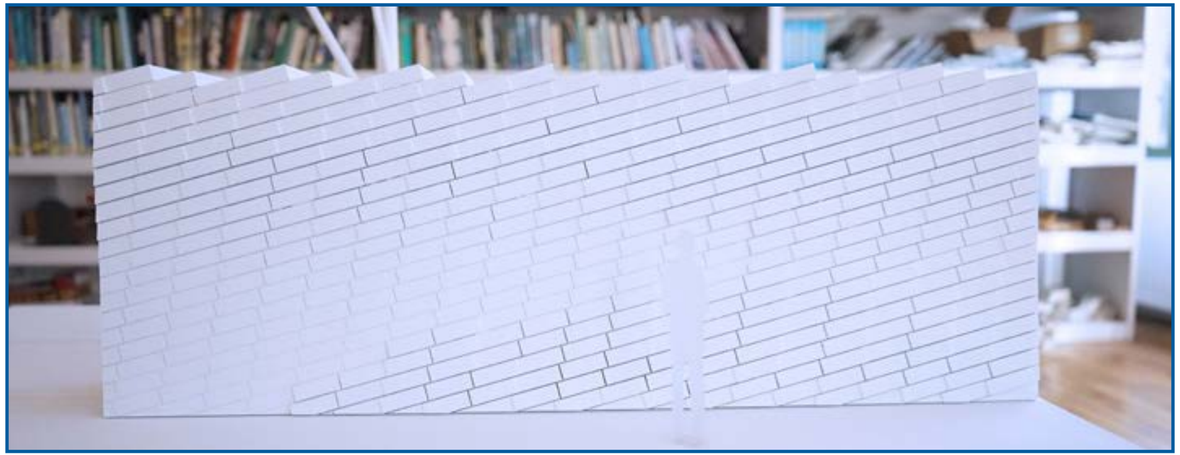

The profile of the cladding subtly changes over the length of the exposed flood wall.

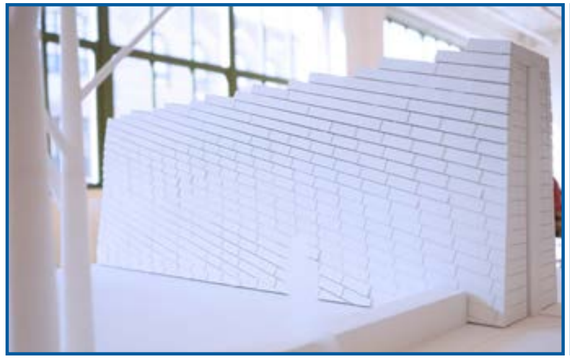


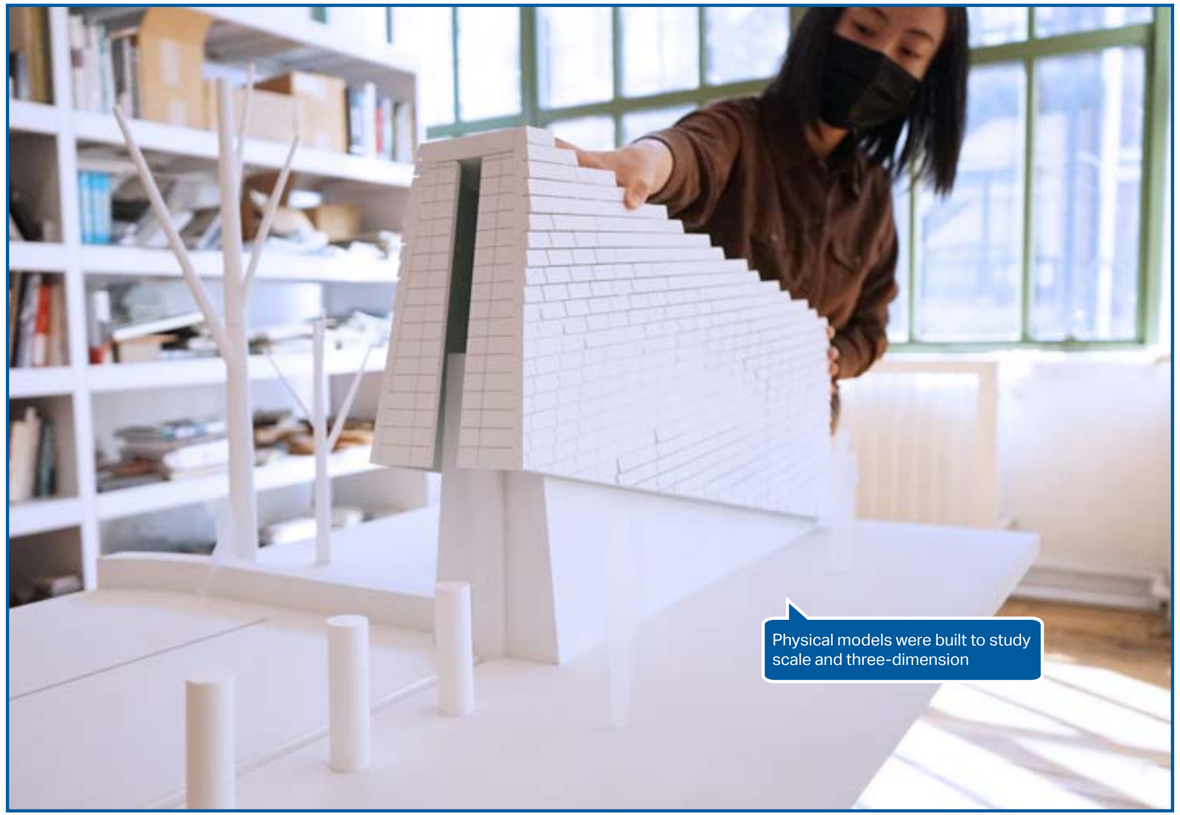



The three finishes selected for the cladding design relate to the three public spaces that the wall passes through. The stone module size and pattern reduce visual impact and scale.

# PHYSICAL MODEL







# PHYSICAL MODEL


# CONSULTING TEAM

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**AECOM Engineering**
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**SiteWorks**
*Landscape Architect of Record*

**Thomas Phifer and Partners**
*Pavilion Architecture*

**Tillotson Design Associates**
*Lighting Design*

**Milhouse Engineering**
*Mechanical, Electrical, & Plumbing*

**Nautilus International Development Consulting**
*Urban Design, Sustainability*

**Atelier Ten**
*Sustainability Certification*

**Arch Street Communications**
*Community Engagement*