FiDi Seaport Ecology and Coastal Defense Workshop

As you're waiting for the meeting to start, please take a moment to update your name and affiliation by hovering over your name in the participant window and clicking "More" and "Rename."

Financial District & Seaport Climate Resilience Plan

January 2021

Welcome to Zoom!

A few requests:

1. *Please mute yourself while others are speaking. You will have time in the second half to unmute and discuss.*
2. *Add questions to the chat box during presentations. Please message “everyone” as others may have the same question!*
3. *Turn on your camera if you can!*

Introductions

Please share in the chat:

- *Name*
- *Organization*
- *What is your goal for today's meeting?*

Join the conversation!

Please use the chat function to ask questions as we go!

Agenda:

1. Introductions
2. Purpose and goals of the workshop
3. LMCR & FiDi Seaport Master Plan overview
4. Ecology and Coastal Defense
5. Discussion
6. Close out

Join the conversation!

Please use the chat function to ask questions as we go!

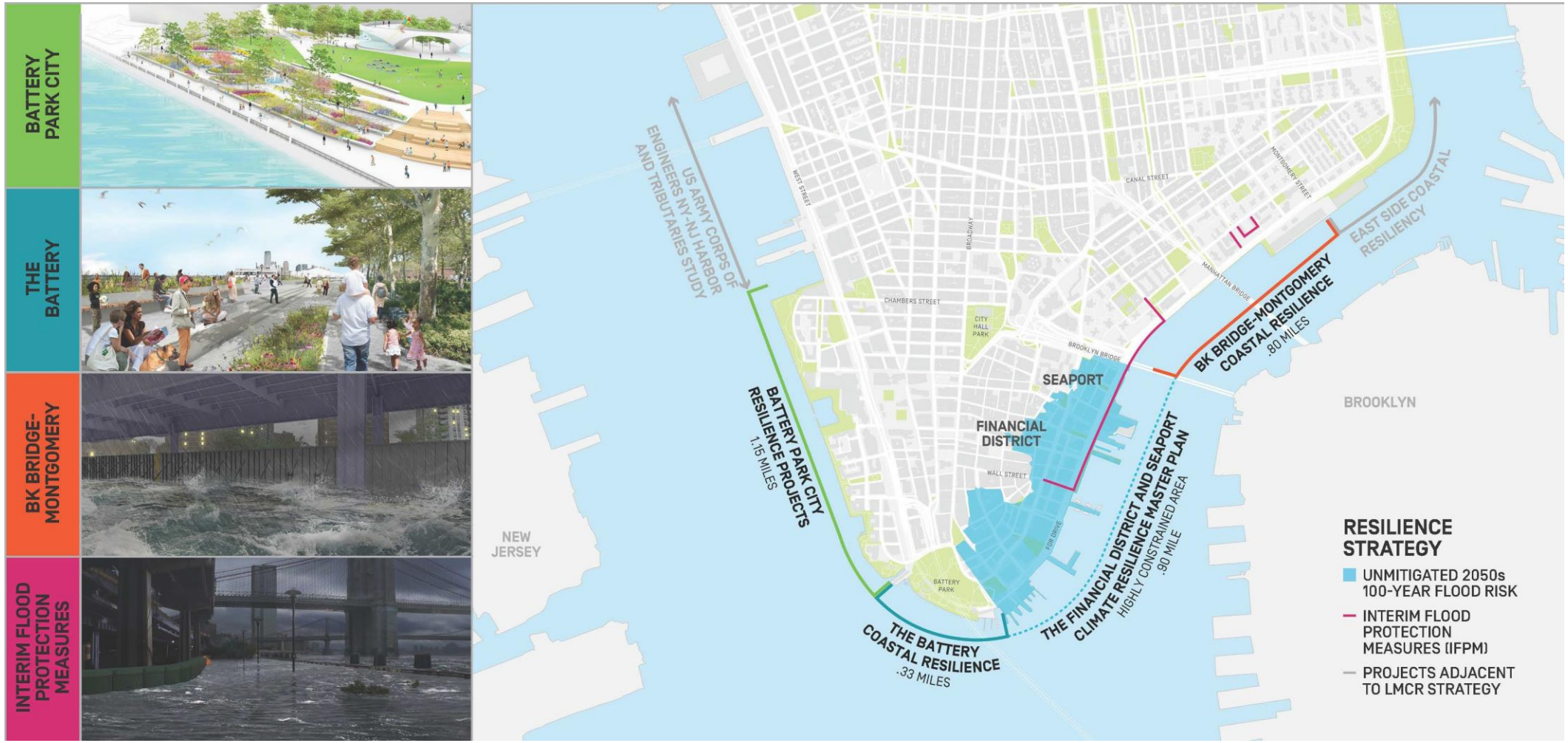
Your participation today will support our understanding of the ecological impacts and opportunities of coastal defense and support the development of project options for the FiDi Seaport Master Plan.

Meeting objectives:

1. **Share information** with a broader group of stakeholders about the FiDi Seaport Master Plan and gain specific perspectives from content experts on ecological and environmental considerations.
2. **Get input** on priorities and concerns related to ecosystems, ecosystems services, and environmental benefits and impact.
3. **Incorporate this feedback** into the Master Plan as we move into the next phase of project work.
4. **Build relationships** with stakeholders for continued engagement throughout the planning process, building new relationships and incorporating new perspectives.

Project Overview

In Lower Manhattan, the City is advancing $500M in climate adaptation projects to protect various areas within the district.



FIDI SEAPORT CLIMATE RESILIENCE PLAN

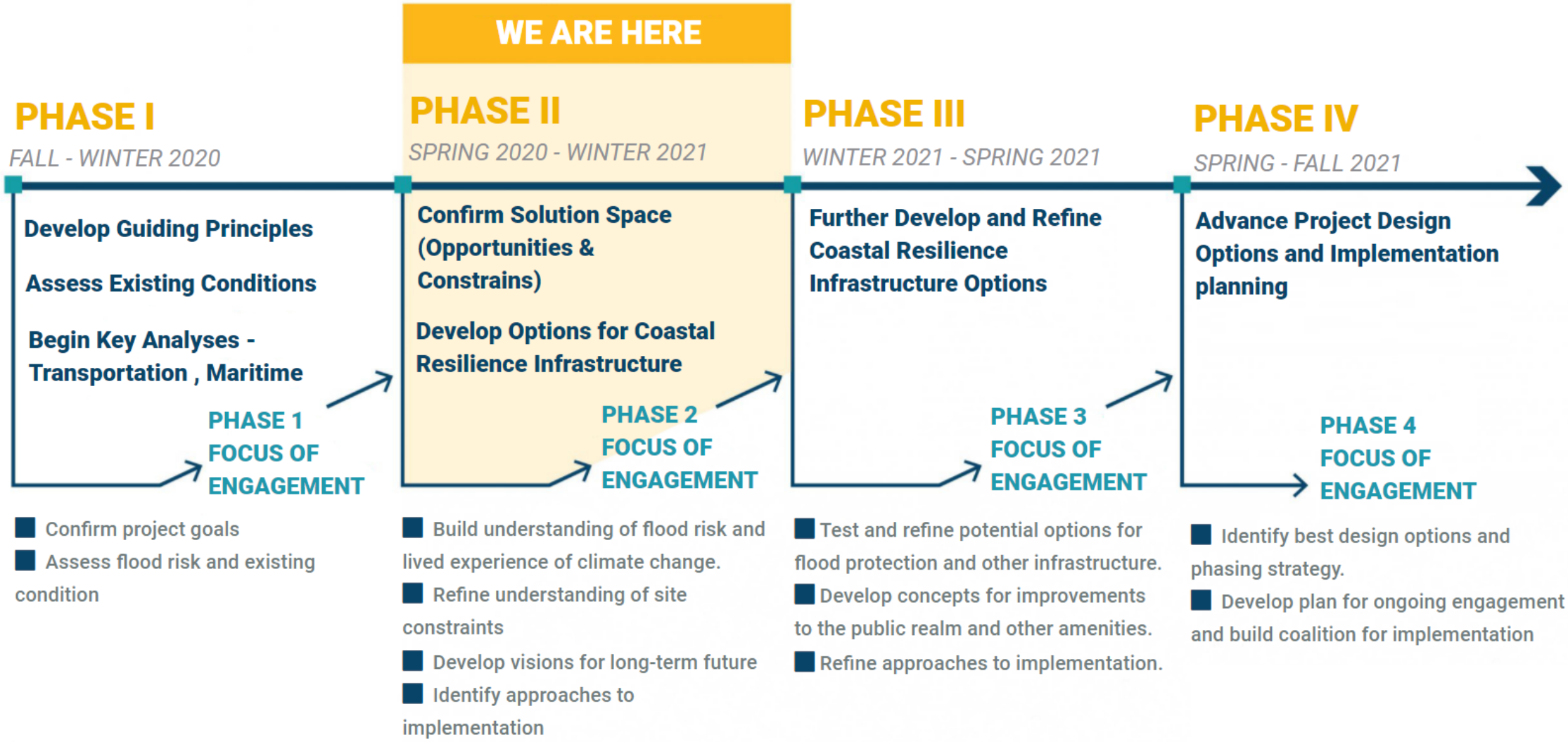
Coastal Defense and Ecology Workshop: January 2021

The FiDi-Seaport Climate Resilience Plan will develop a coastal resiliency solution to protect Lower Manhattan

What can we achieve by 2021?

- Develop a conceptual design of coastal defense and infrastructure and identify first phase project options
- Create a roadmap with details on implementation, financing, construction, and governance framework
- Work with regulatory agencies to identify a pathway for permitting and approvals
- Create a drainage strategy to manage stormwater and wastewater
- Build the foundation for an intergenerational coalition to carry the project forward

Where are we in the Planning Process?



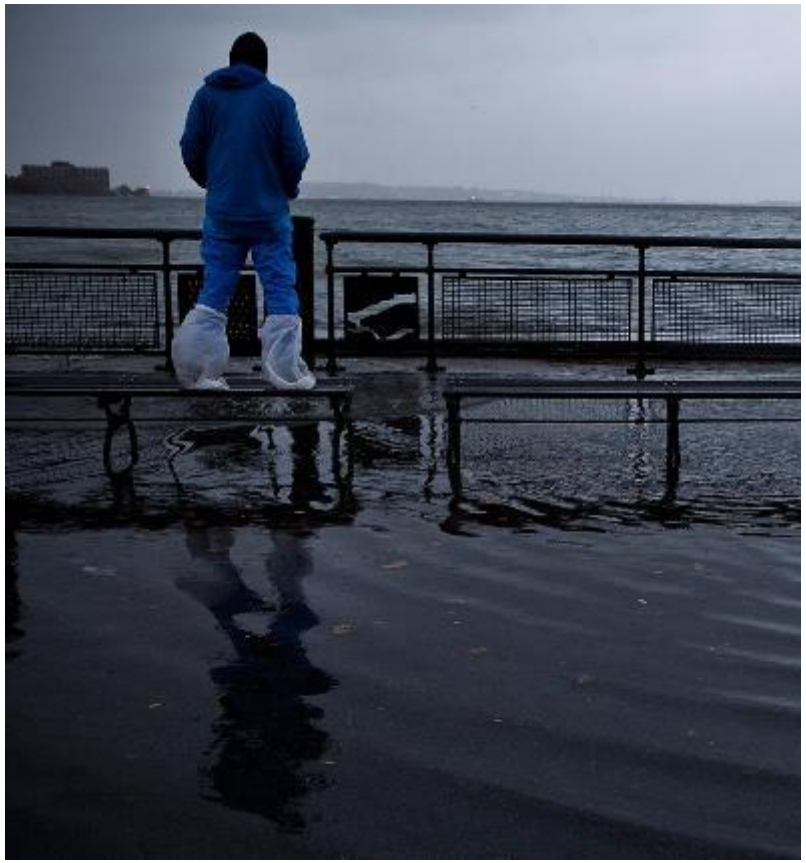
The need for **Coastal Defense**

The primary goal for the project is to provide flood risk reduction for the FiDi-Seaport district from storms and tidal flooding through 2100. Accordingly, the project team needs to either design the project to meet the 2100 DFE from the outset or, at a minimum, ensure that the design allows for future adaptability to protect to the 2100 DFE.

Climate change isn't coming; it's here.

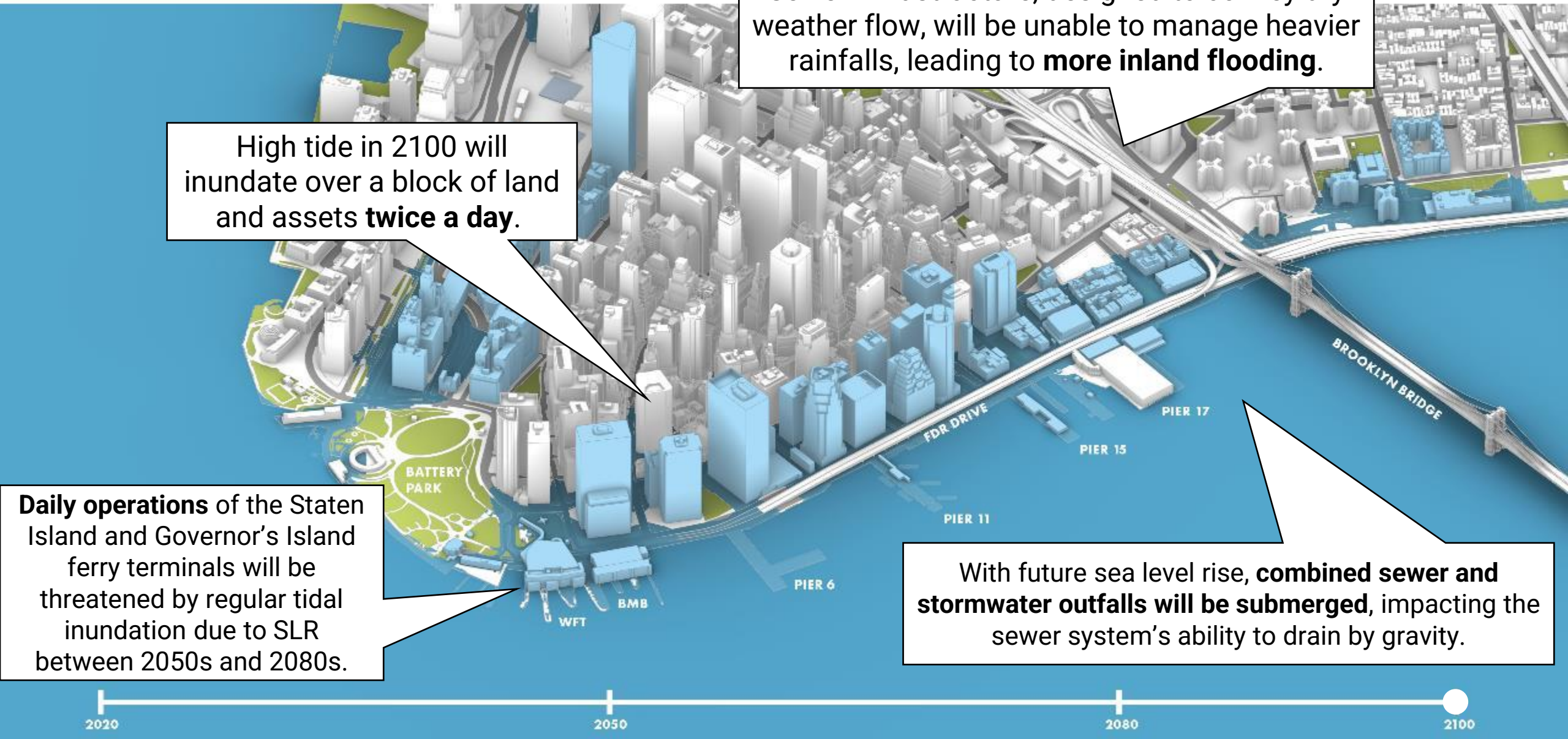
Coastal storms are increasing in frequency and intensity, bringing the impact of surge to our front doors.

Extreme precipitation is occurring more frequently, stressing our sewer system and flooding our streets.



Sea level rise is projected to rise up to 6 feet this century, with certain areas impacted daily by flooding from tides.

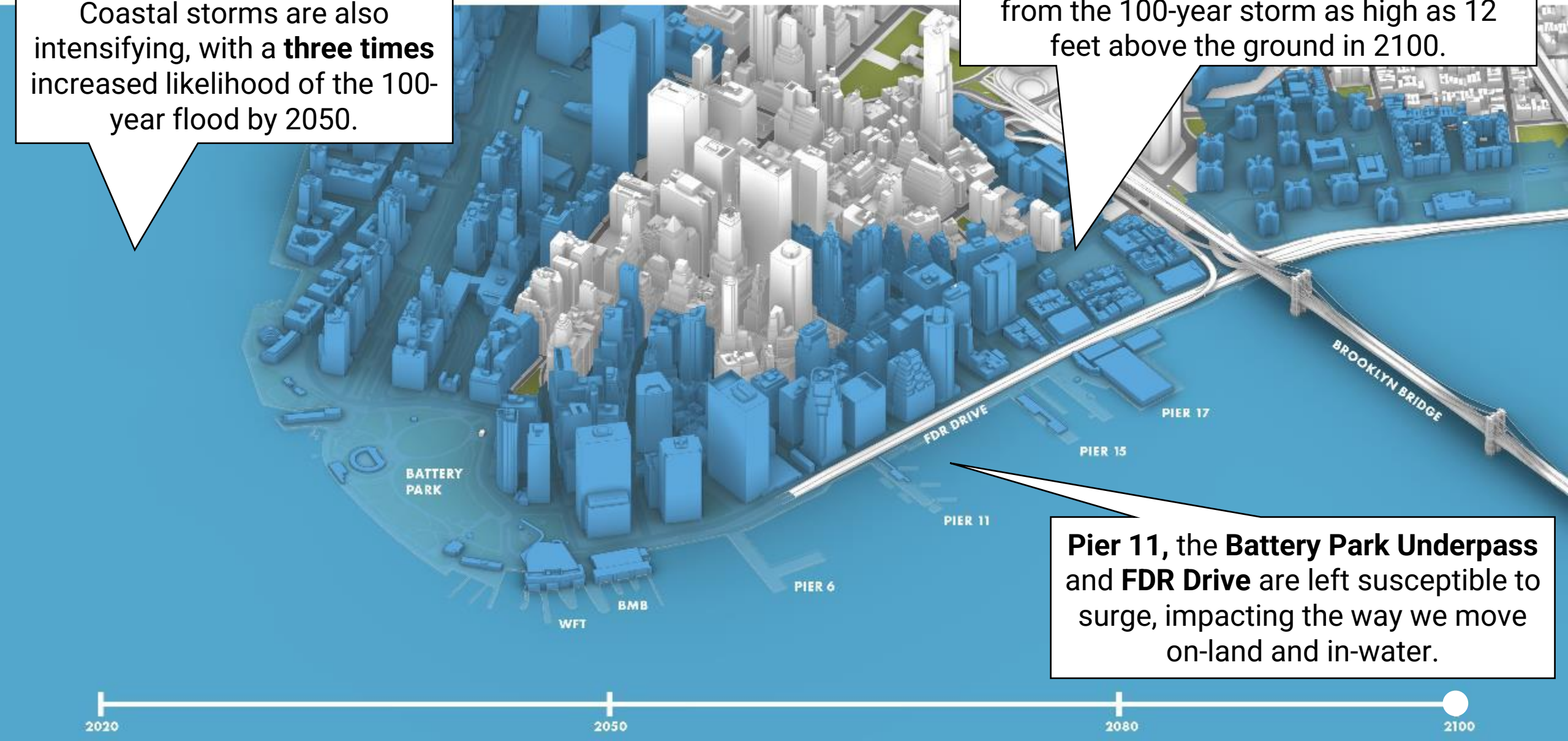
Anticipated Sea Level Rise in Lower Manhattan by 2100



Anticipated 2100s 100-Year Storm Floodplain

Coastal storms are also intensifying, with a **three times** increased likelihood of the 100-year flood by 2050.

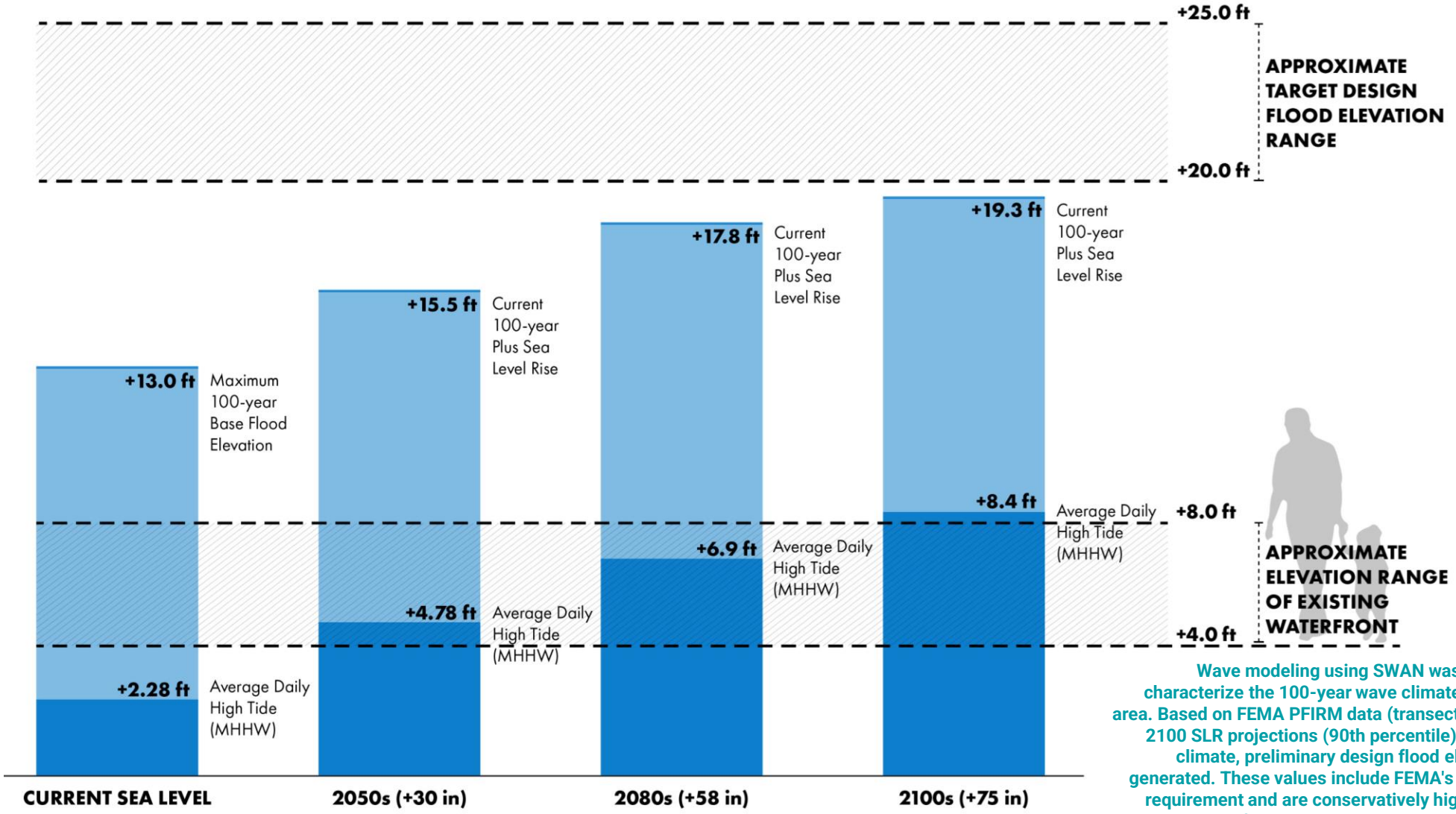
Historic buildings, emergency response services for 62,000 residents, small businesses and more could see surge from the 100-year storm as high as 12 feet above the ground in 2100.



Pier 11, the **Battery Park Underpass** and **FDR Drive** are left susceptible to surge, impacting the way we move on-land and in-water.

Target Design Flood Elevation

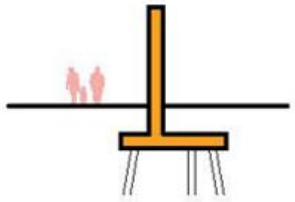
Preliminary Targets



Wave modeling using SWAN was completed to characterize the 100-year wave climate in the project area. Based on FEMA PFIRM data (transect NY18), NPCC 2100 SLR projections (90th percentile), and the wave climate, preliminary design flood elevations were generated. These values include FEMA's 2-ft freeboard requirement and are conservatively high awaiting the results of additional modeling and an overtopping analysis.

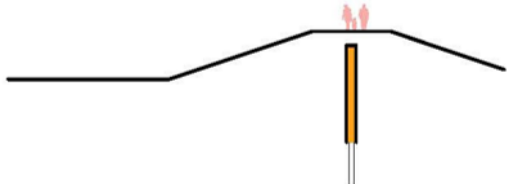
Providing for Comprehensive Flood Risk in Lower Manhattan

Coastal Defense



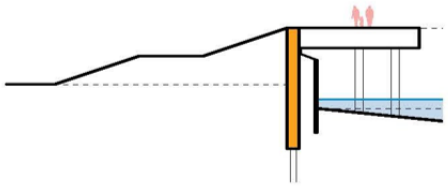
Floodwall

Foundation Width: 10-15 ft
Construction Clearance: 18-20 ft
Access Requirements: 15 ft (each side)



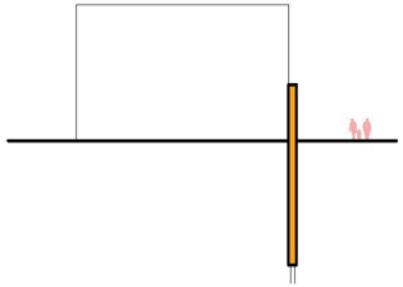
Buried Floodwall

Foundation Width: 50 ft
Access Requirements: 15 ft (each side)



Bulkhead (or Caisson)

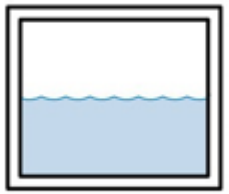
Foundation Width: 35 ft
Access Requirements: Across the whole system



Integrated with Buildings (assumes floodwall)

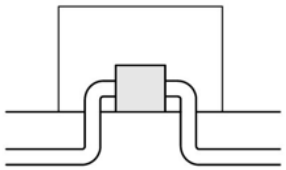
Foundation Width: 10-15 ft
Construction Clearance: 18-20 ft
Access Requirements: 15 ft (at least 1 side)

Drainage



Storage

Footprint: Large; based on amount of water stored
Operations: Pump station would be required to take water back to interceptor when capacity is available



Pump Station

Footprint: 3,000 – 4,000 SF each (1 or 2 likely needed)
Operations: Requires a wet well, or large tank below ground, to receive water and force main, or pressurized pipe, to take stormwater to an outfall for discharge

Green Infrastructure

Footprint: Varies; often local solution (bioswale)
Operations: Complementary part of drainage strategy; unable to manage heavy precipitation or surge

Examples of Flood Risk Reduction Projects in an Urban Environment

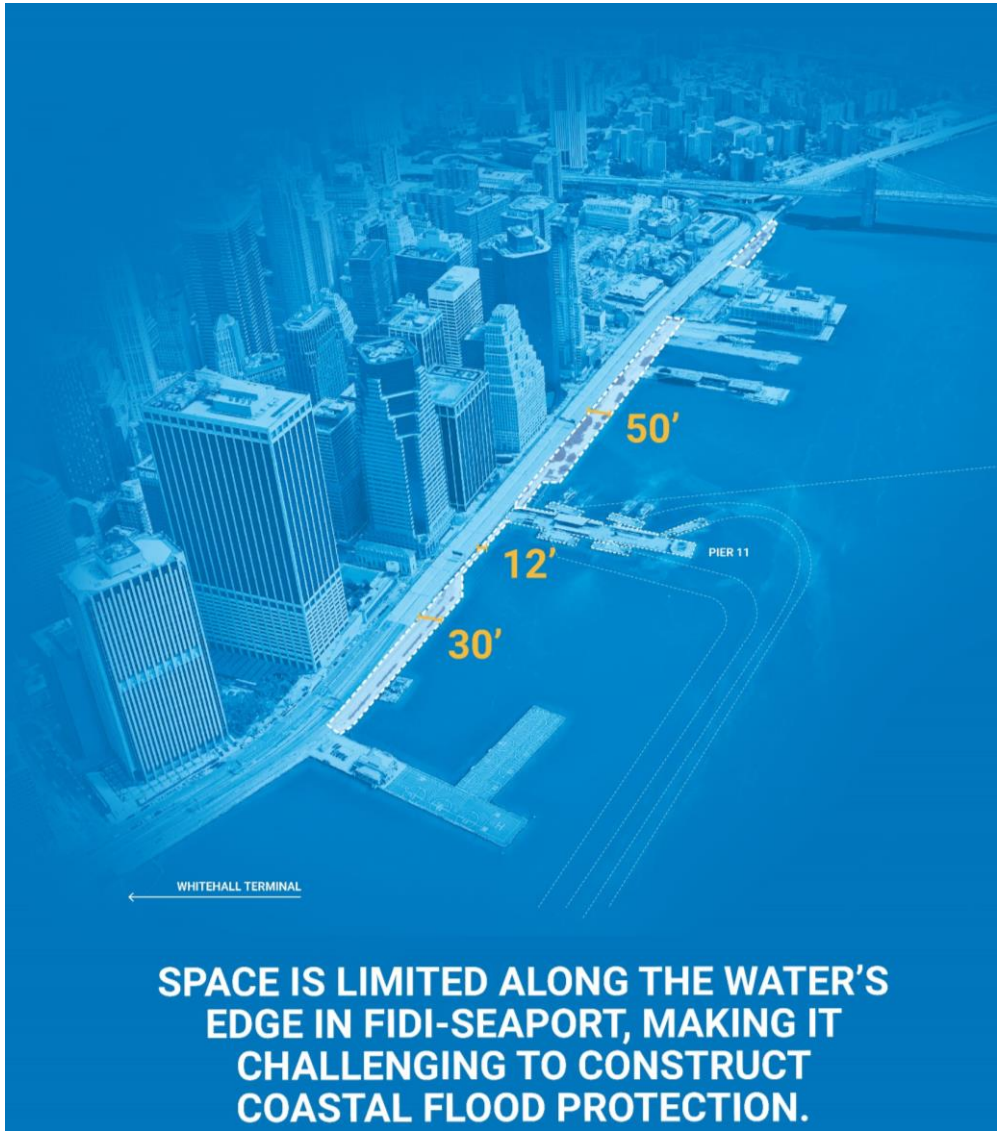
Wuhan Yangtze Riverfront Park;
Wuhan China
Flood Protection + Waterfront Park

Scheldt Quay; Antwerp, Belgium
Flood Protection + Programmed Waterfront; Stabilization of Historic Quay Wall

Climate Tile; Copenhagen, Denmark
Stormwater Management + Neighborhood Improvements

Considerations for Potential Shoreline Extension

- To accommodate **coastal protection**, we need to consider going into the water due to the limited space along the water's edge and the need to preserve and protect the neighborhood's current assets.
- Our goal here is to construct a **flood protection system** to keep water out during a storm or high tides. To achieve this goal, features can be permanently integrated into the landscape or measures deployed before a storm.
- **Local ecology** must be considered while exploring the option of going into the water because of its implications on **bay and river ecosystems**.



In addition to coastal defense, the project must consider …

Drainage	The project must incorporate drainage infrastructure to ensure that the existing drainage system is able to continue to function under future sea level rise, storm surge, and precipitation conditions. More specifically, drainage will be critical to safeguarding the performance and reliability of the flood protection system by managing any stormwater behind the coastal defense.
Transportation	The Study Area serves as a vital multi-modal regional transportation connector and the project must maintain functionality and reliability and support future capacity needs for all modes while allowing for adaptation to future transportation trends. This includes public transit, roadways, non-motorized, and maritime transportation.
Open space & Waterfront access	The existing waterfront in the Project Area provides public open space and continuous public access to and along the waterfront. This project must maintain the quality and quantity of open space and access to the waterfront, water, and water-based transportation.
Historic & Cultural Significance:	The Project Area is a historically significant waterfront and home to historic districts and specific historic assets that must be preserved and protected, wherever possible.
Environmental (particularly aquatic) **Resources**	The project should avoid or minimize negative impacts on existing environmental resources or ecosystem services, in particular aquatic resources. Where feasible, the project should seek to enhance and add value to the environment and ecosystem services provided by the project area

Consultant Team

Environment & Ecological Design

Pippa Brashear – SCAPE

Aquatic Ecosystems

Justin Krebs, PhD – AKRF

Hydrodynamics & Wave Modeling

Nick Irza, PE – Arcadis

Approach to Ecology & Environmental Resources

*The project should **avoid or minimize** negative impacts on existing environmental resources or ecosystem services, in particular aquatic resources.*
*Where feasible, the project should seek to **enhance and add value** to the environment and ecosystem services provided by the project area.*

Permitting / Environmental Regulations

knowing the context

How does the regulatory framework inform how we design?

As we develop options for the project, it is imperative that we comply with rules and regulations based on the existing Federal and State regulatory framework as these entities will be the ultimate decision makers on whether the project advances forward. This includes, in this order:

1. **Avoiding:** fully assessing if an on-land option is possible to implement based on technical feasibility, impacts, and cost.

2. **Minimizing:** if we must go into the water to site our coastal resilience infrastructure, we must justify every inch and demonstrate that we are minimizing our impact.

3. **Mitigating:** if we must go into the water, we must understand all potential impacts – including ecological, navigation, and scour – and demonstrate to the State and Federal government that we can mitigate any negative impacts.

Role of Regulators in our Process

- A project of this scale and scope has little precedent; we are working with regulators early and often through an "Aquatic Resources Advisory Committee (ARAC)"
    - ARAC is a body of Federal & State regulators (i.e., Army Corp of Engineers, DEC, etc.), coordinated by the Army Corps, to advise the project team on feasibility of design options from a permitting perspective
    - **ARAC helps ensure the selected project will have a path to implementation**
- Any selected project will have to go through environmental review process (CEQR, SEQRA, NEPA); we must study the potential for impact on the environment and protected aquatic resources, specifically compliance with:
    - Water quality-Clean Water Act and Article 15 of the NY Environmental Conservation Law (ECL)
    - Tidal wetland habitats-Clean Water Act and Article 25 of the NY ECL
    - Aquatic biota-Endangered Species Act, Magnuson-Stevens Act (Essential Fish Habitat), Article 11 of the NY ECL

Habitat Sampling

understanding existing conditions

What are we doing to understand the East River Aquatic Ecosystem?

- Conducting one-year (Fall 2020-Summer 2021) aquatic sampling within the Study Area
  - **Phytoplankton and zooplankton**: Summer
  - **Benthic macroinvertebrates**: Fall, Spring, Summer
  - **Fish**: Fall, Winter, Spring, Summer
  - **Sediment characteristics**
  - **Water quality** (temperature, salinity, total nitrogen, etc.), **water depth**, and **current velocity**
- Preliminary results from October 2020 samples being analyzed

Grab sampling (East River channel)

Where are we sampling?

Sampling Zones

- Zone 1 – Primary Study Area
- Zone 2 – Manhattan Adjacent
- Zones 3 and 4 – Channel
- Zones 5 and 6 - Brooklyn

Beach seining
(Brooklyn Bridge Park)

Deployment of fish traps
(East River)

Sediment grab sample

Fish measurements

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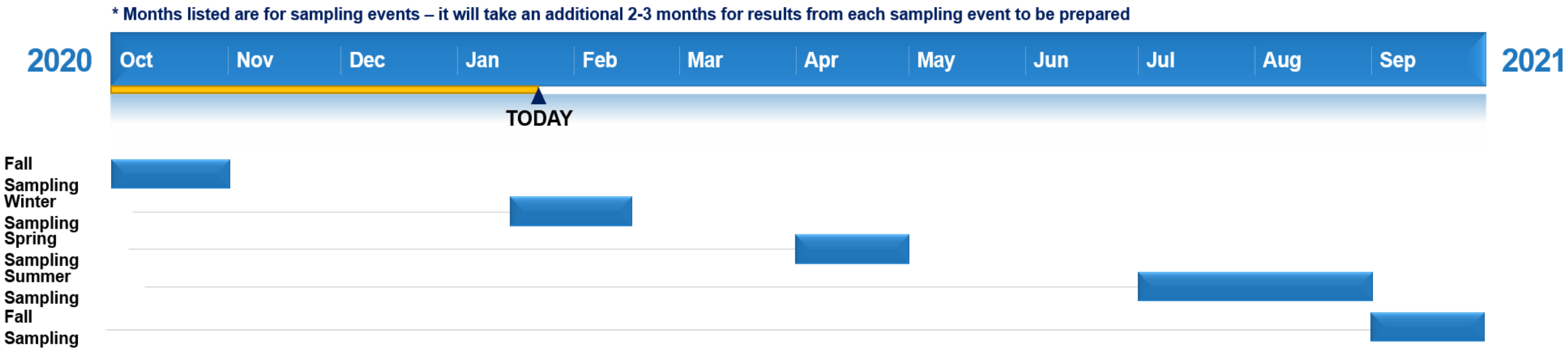
Future Sampling and Results Analysis



Hydrodynamic Modelling

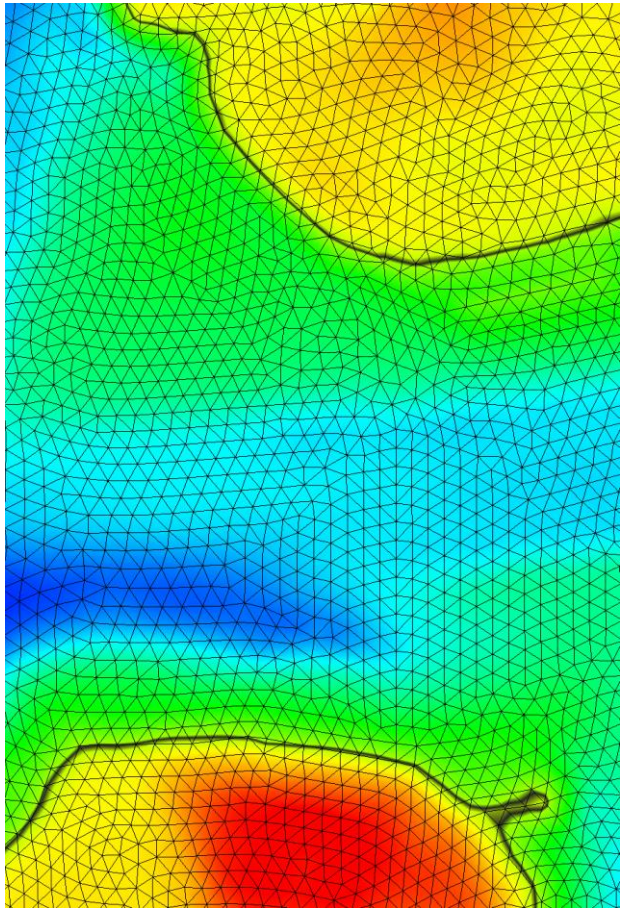
studying potential impacts

Modeling Overview

- **Hydrodynamic models** simulate the movement of water. Model outputs include water elevation and current velocity.
- **Wave models** simulate wave generation, propagation, breaking and dissipation. Model outputs include wave heights and wave period.

Models used

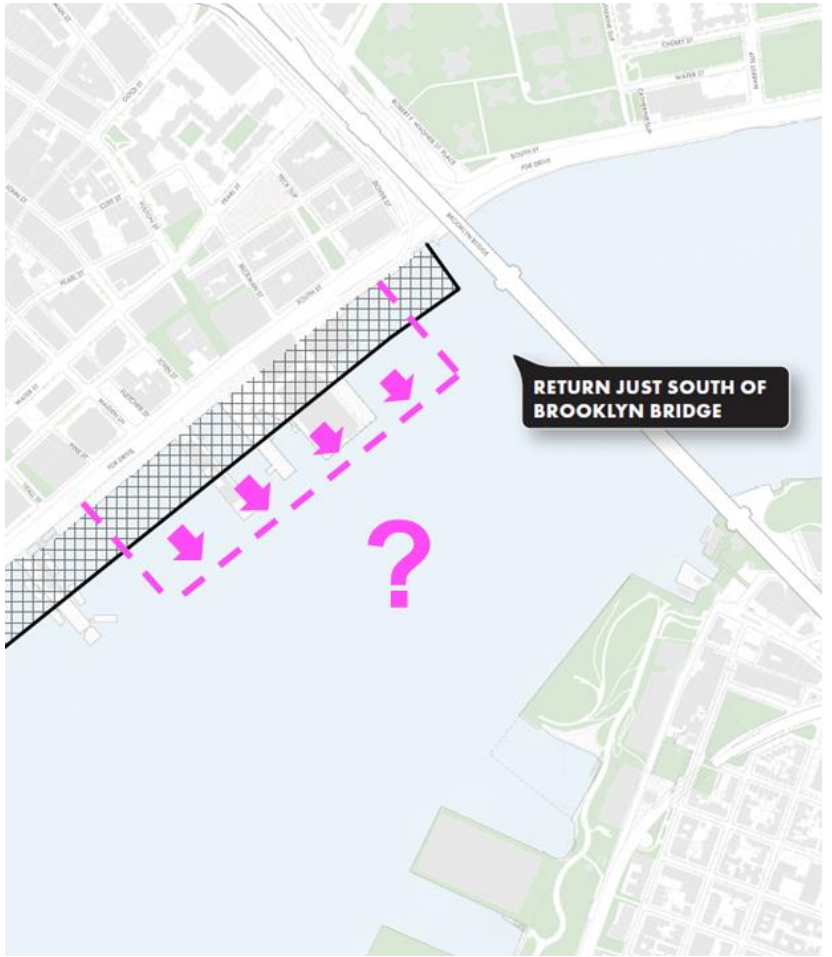
- **ADvanced CIRCulation (ADCIRC) - Large Scale**
  - Storm Surge and tides
  - Provides the "big picture" of water moving in and out of NYC area
- **Delft-3D – Regional/Local Scale**
  - Represents local flow patterns and velocity changes
- **Simulating Waves Along Nearshore (1D SWAN) - Sub-project Scale**
  - Simulates local wave climate and lets us know project area wave heights



Example ADCIRC triangular mesh representing Lower Manhattan and Governors Island.

Applying Modeling to Coastal Defense

- **Benefits of Modeling**
  - **Provides detail between observation points.** Gives us a broader understanding than what we can gain from observed data alone.
  - Allows evaluation of hypothetical scenarios to answer the **"What ifs**?" (e.g., sea level rise, synthetic storms, proposed floodwalls, etc.)
- **Role in project**
  - Provides the water elevations and wave heights **to determine design flood elevation**
  - Evaluates project alternatives for potential adverse impacts
  - Incorporates ecological analysis
  - Considers the physical environment's impact on the biological environment

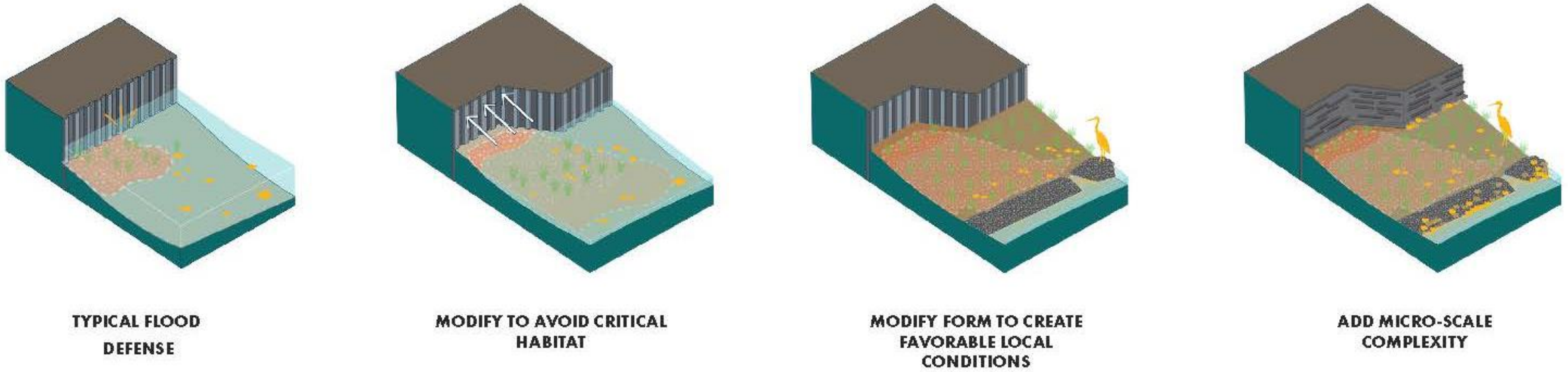


Design Considerations

Integrating ecology with other goals & constraints

What Should We Consider During Design?

- Avoid or minimize impacts to the aquatic ecosystem
- Incorporate measures within the project that will enhance or restore habitats and result in ecosystem benefits
- Any unavoidable adverse impacts will need to be mitigated



Potential Concerns and Opportunities in Design

How the project might ***impact*** aquatic ecosystems?	How the project might ***restore*** habitats or ***enhance*** ecosystems ?
Indirect effects due to changes in water velocity or currents resulting from in-water structures/shoreline extension	Incorporate ecological enhancements targeted to benefit known aquatic communities
Shading of aquatic habitat by overwater structures in the project site	Enhance biodiversity within project area
Altered currents resulting from in-water structures/shoreline extensions	Increase ecosystem services within the project area
	Avoid / minimize potential negative impacts on water quality and flushing

Discussion

Discussion Questions

1. **What are the greatest opportunities around aquatic resources, habitat restoration, & ecosystem enhancement?**
2. **What additional information would help you better understand the project, its potential impacts, and benefits to aquatic ecosystems? What else do you want to know for you to be able to give feedback?**
3. **Do you have suggestions for how we can engage with the groups, community members and stakeholders interested in this technical area?**

Wrap-up and Next Steps

What's Coming Next?

1. **Public Open House on February 25th**: Save the date, and please share with your respective networks! RSVP on our engagement portal (link below)
2. **Public Realm and Funding/Financing Workshops** (March): More information coming soon!
3. **Meeting minutes and notes**: Stay tuned for summary notes and presentation materials, which will be shared in the coming weeks
4. **Continue the conversation online:** Explore our engagement portal to learn more about other aspects of this project and share your feedback through interactive features (https://fidiseaportclimate.nyc/)

Additional areas of interest?

1. **Drainage & Stormwater management:** How will the project address inland drainage and stormwater management including CSOs?
2. **Feedback on aquatic sampling:** Further discussion of findings and considerations as additional data is gathered.
3. Other things you would like to discuss?