TWO BRIDGES PUBLIC WORKSHOP #2
MAY 31, 2017

OneNYC: RESILIENCY

Following Hurricane Sandy, a global conversation on resiliency emerged. Here's what it means to us in New York City.

Our Resilient City

Our neighborhoods, economy, and public services will be ready to withstand and emerge stronger from the impacts of climate change and other 21st century threats

OneNYC: SUSTAINABILITY

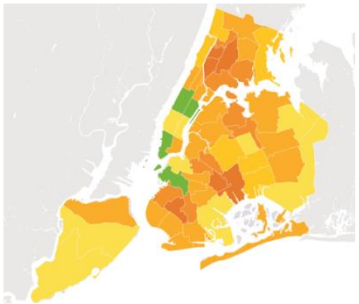
Our Sustainable City

New York City will be the most sustainable big city in the world and a global leader in the fight against climate change

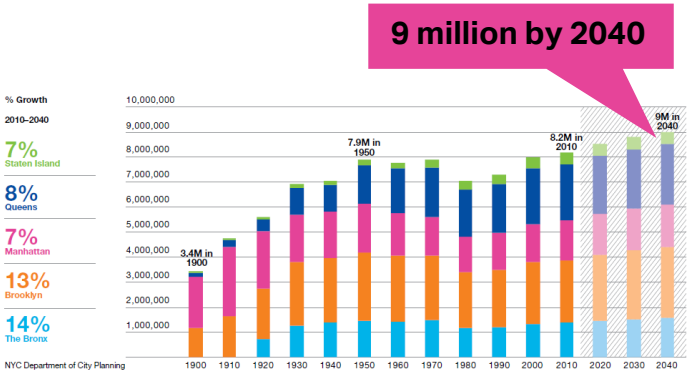
CLIMATE CHANGE / 21ST CENTURY THREATS

…But we know that Sandy is not the only risk we face. As we look towards the future, we must take stock of our current challenges…

Hurricane Sandy



Increasing Inequality



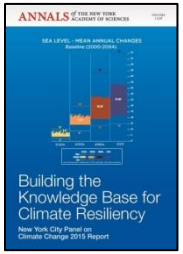
A Growing Population

Aging Infrastructure

CLIMATE CHANGE / 21ST CENTURY THREATS

…And grapple with the impacts of climate change on our city.

The NYC Panel on Climate Change (NPCC) projects increased chronic climate hazards…



By the 2050s*:*
+ 4.1°F to 5.7°F increase in average temperature
+ 4% to 11% increase in average annual precipitation
+ Sea levels likely to rise 1-2 ft.; maybe 2½ ft.

By 2100:
+ High-end projections *may* reach 6 ft.

…and increased impact from extreme weather events.

By the 2050s:
+ Number of days in NYC above 90º F could triple
+ Number of most intense hurricanes and associated extreme winds may increase

Even today:
+ Flooding is more intense

AGENDA

- **Re-cap the project goals and previous workshop priorities**
- **Provide an update on technical analysis**
- **Capital and resiliency projects coordination**
- **Identify tradeoffs through design concepts in group activities**

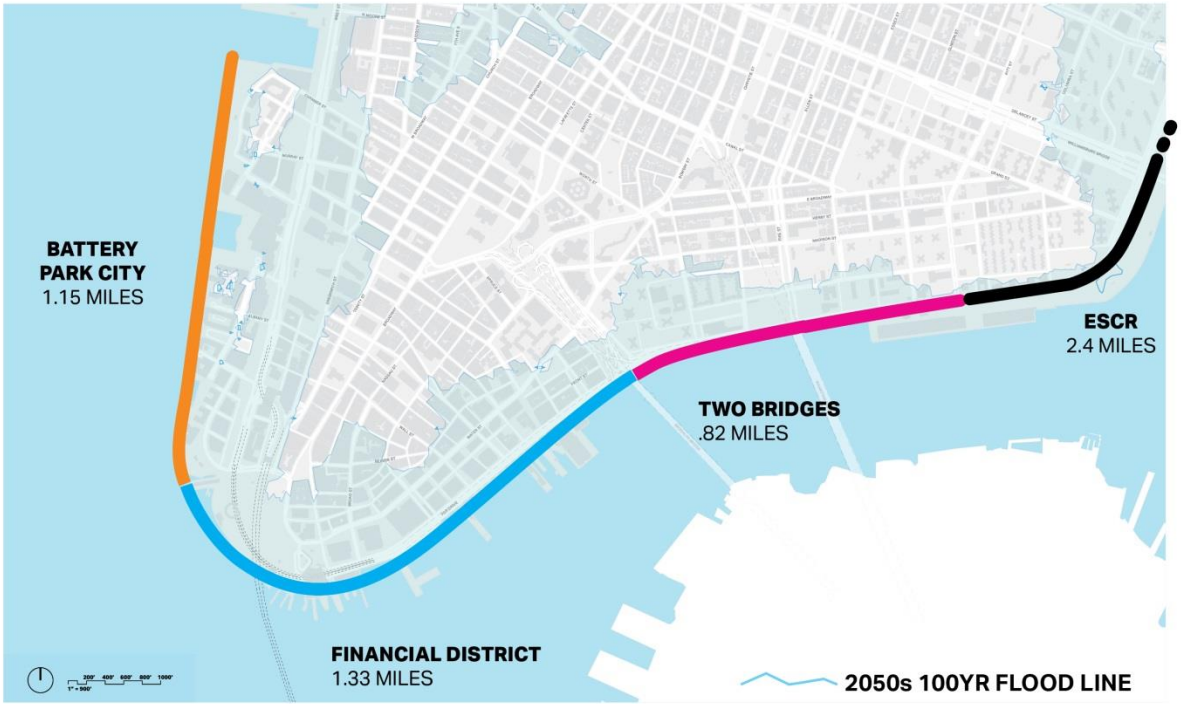
PROJECT OVERVIEW

Purpose of Study:

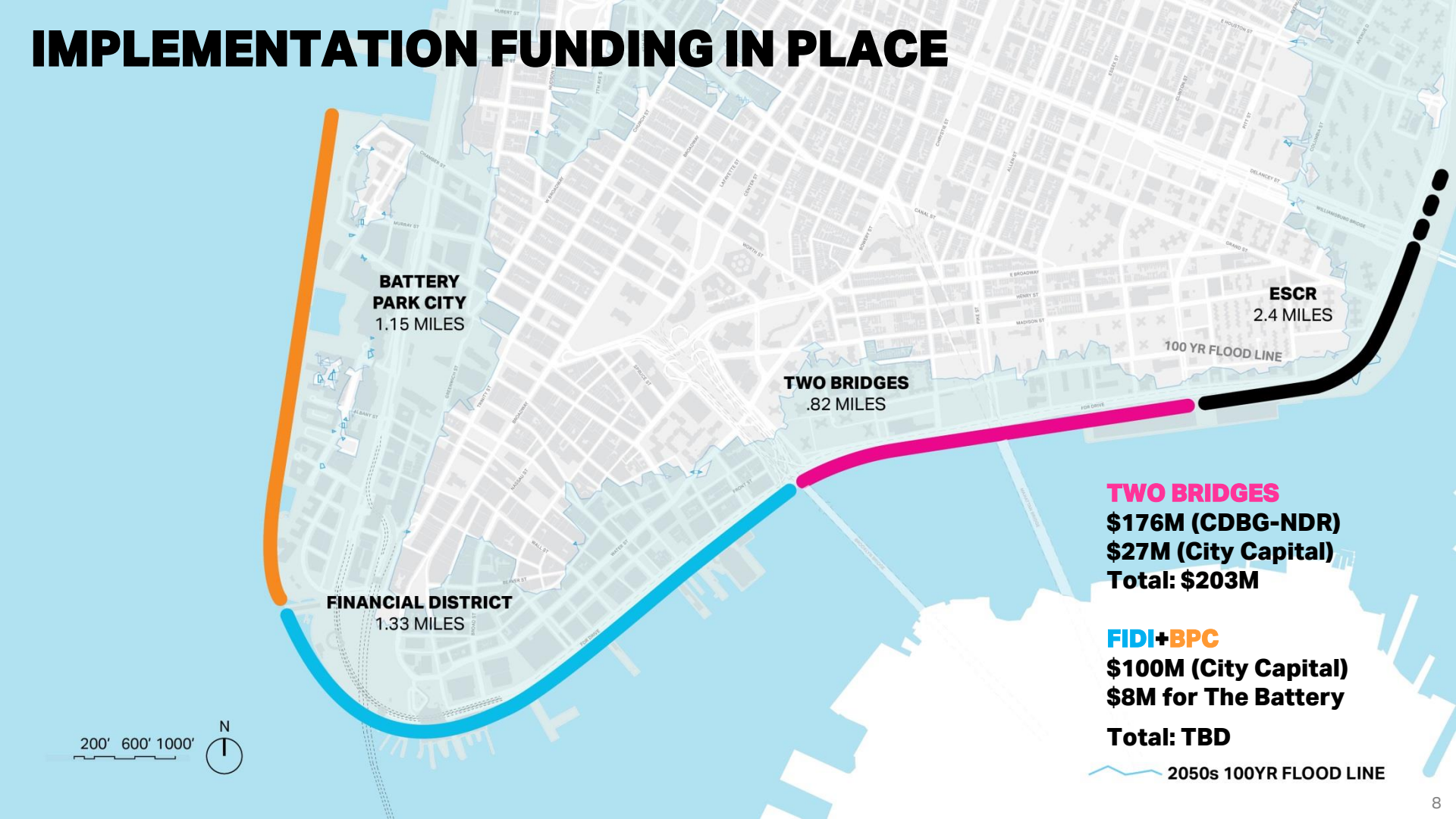
1. Develop long-term strategy and feasible concept design for all of Lower Manhattan
2. Prioritize project concepts toward implementation and conduct advanced planning when possible
3. Engage with community on core design principles and priorities

Study Funding:

+ $7.25M CDBG-DR
  ($3.75M GOSR; $3.5M NYC)



IMPLEMENTATION FUNDING IN PLACE



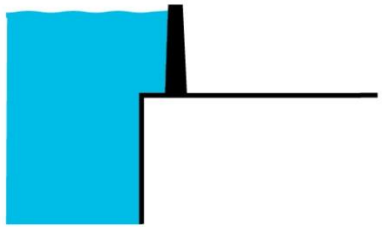
TWO BRIDGES
$176M (CDBG-NDR)
$27M (City Capital)
Total: $203M

FIDI+BPC
$100M (City Capital)
$8M for The Battery

Total: TBD

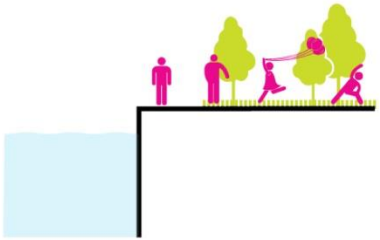
2050s 100YR FLOOD LINE

CORE MISSION



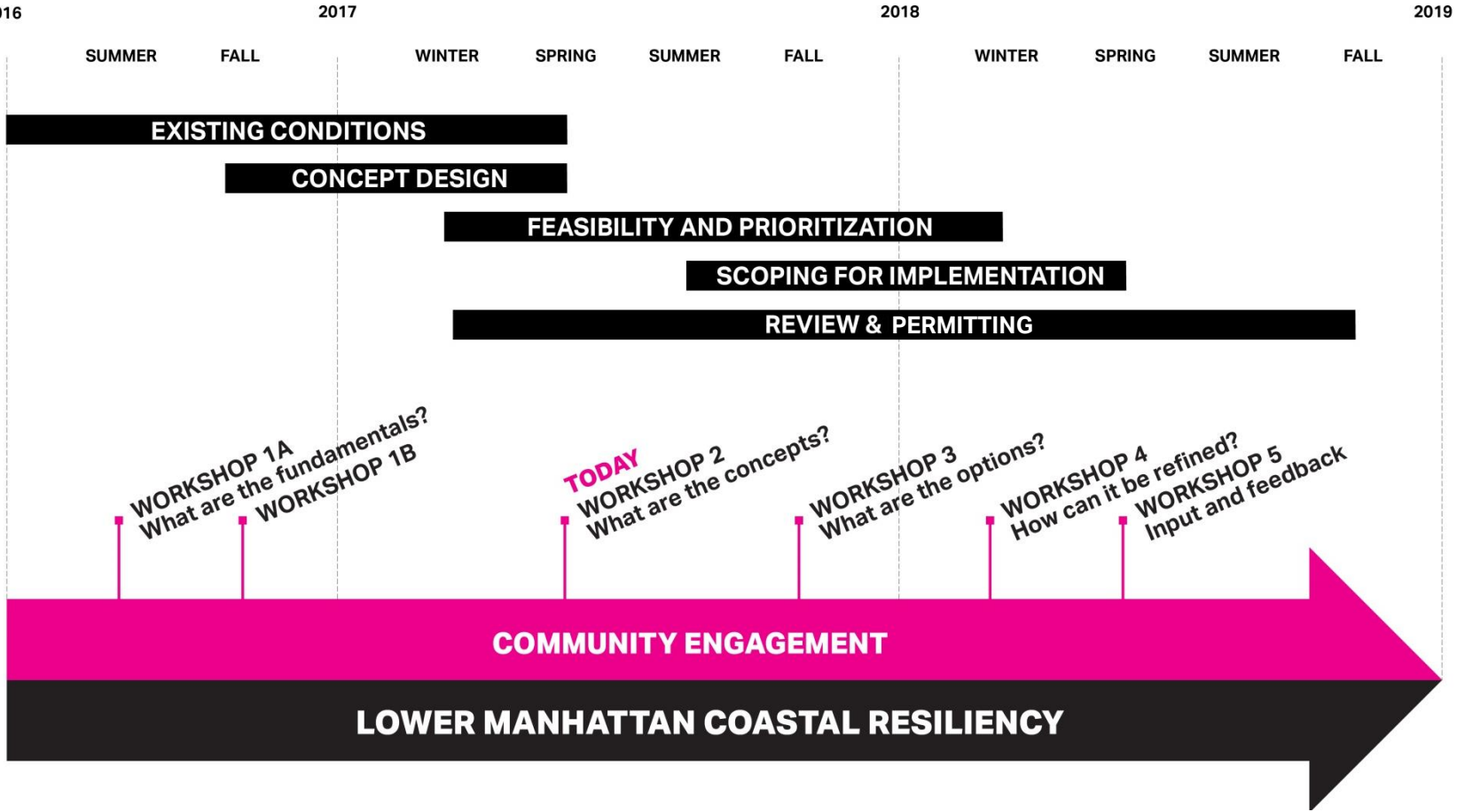
FLOOD RISK REDUCTION

+



PUBLIC BENEFIT

PROJECT PROCESS



COMMUNITY ENGAGEMENT FEEDBACK

KEY PREFERENCES:

- Protect waterfront views and access
- Prioritize urban and earthen berms where they fit, and explore use of deployables or glass flood walls in tight spaces
- Make infrastructure look natural
- Ensure new programming and uses benefit existing community

KEY CONCERNS:

- Deployables not working
- Not enough funding
- High maintenance requirements
- Not enough space for preferred infrastructure types

COMMUNITY PRIORITIES

RELIABILITY

28 VOTES

RESIDENTS
16 VOTES

NON- RESIDENTS
12 VOTES

WATERFRONT ACCESS

13 VOTES

RESIDENTS
9 VOTES

NON- RESIDENTS
4 VOTES

SAFETY + LIGHTING

12 VOTES

RESIDENTS
10 VOTES

NON- RESIDENTS
2 VOTES

MAINTENANCE + OPERATIONS

9 VOTES

RESIDENTS
6 VOTES

NON- RESIDENTS
3 VOTES

LOOK + FEEL

8 VOTES

RESIDENTS
5 VOTES

NON- RESIDENTS
3 VOTES

RECREATION

5 VOTES

RESIDENTS
2 VOTES

NON- RESIDENTS
3 VOTES

VIEWS

4 VOTES

RESIDENTS
4 VOTES

NON- RESIDENTS
0 VOTES

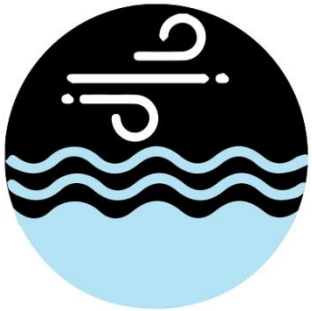
AMENITIES

3 VOTES

RESIDENTS
2 VOTES

NON- RESIDENTS
1 VOTE

TECHNICAL ANALYSIS INFORMS CONCEPT DESIGN

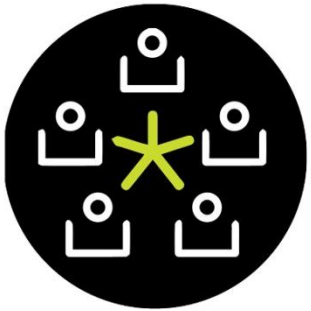


COASTAL ASSESSMENT

Measuring future risk to inform design decisions and height of protection.

SUBSURFACE CONDITIONS

Modifying design decisions to best accommodate existing constraints.



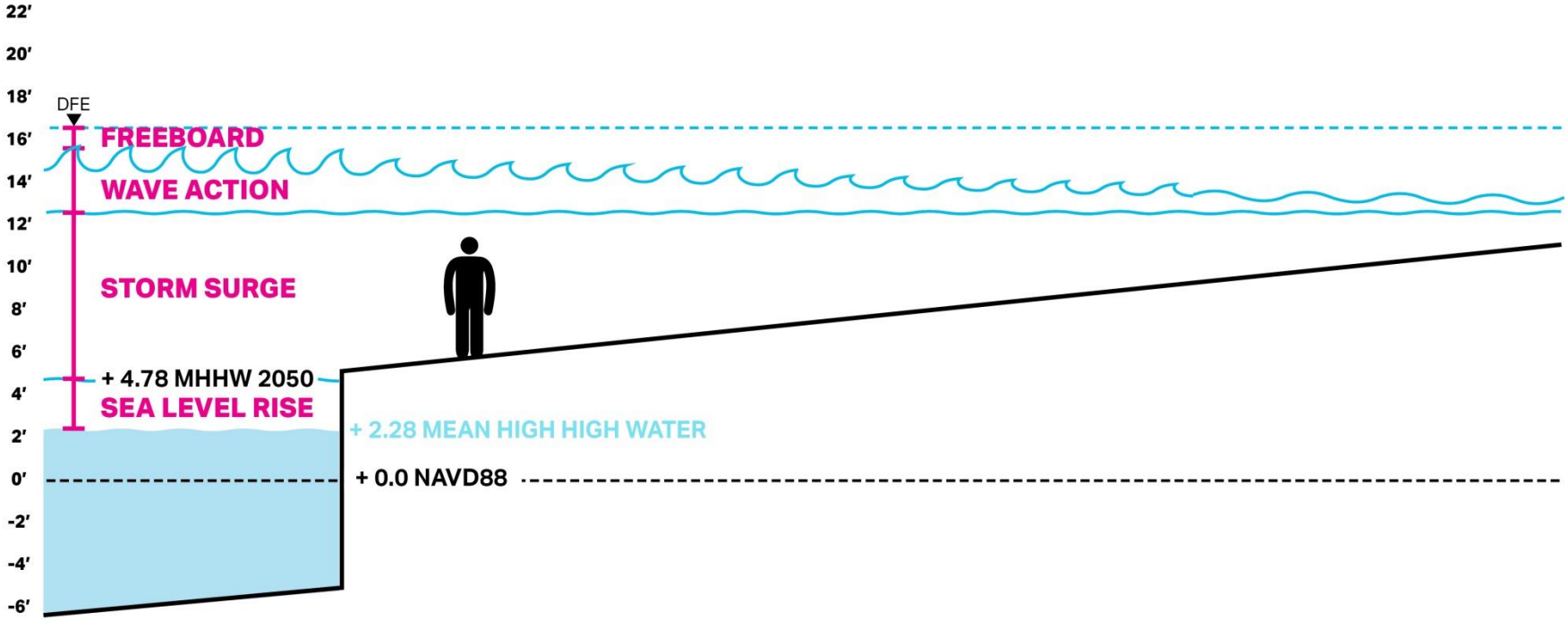
CAPITAL COORDINATION

Inventory of ongoing projects and city efforts, and how timelines intersect with LMCR.

COASTAL ASSESSMENT

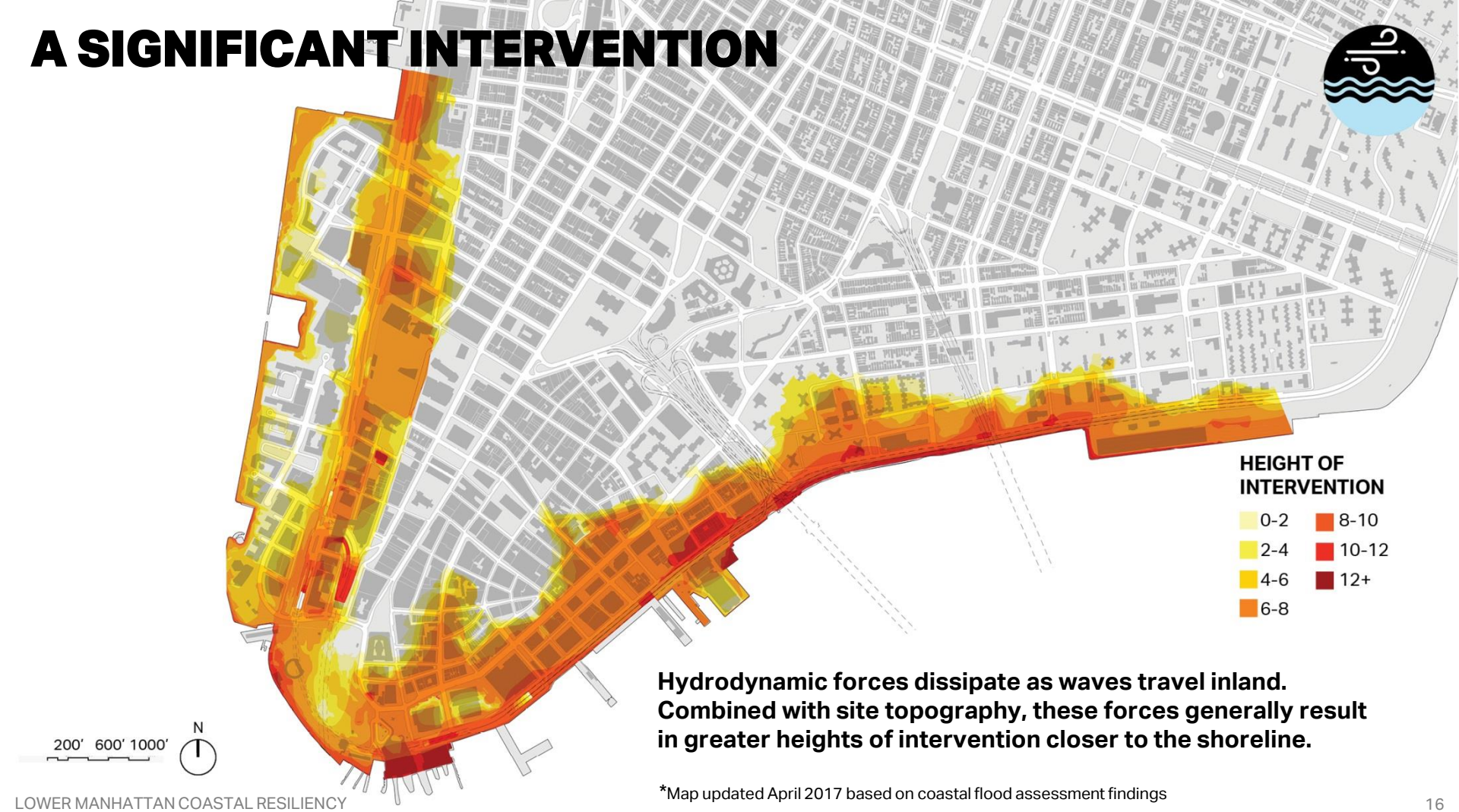
DESIGN FLOOD ELEVATION - COMPONENTS

High tide + Sea Level Rise + 1% annual storm event + Associated wave action + Freeboard = **DFE**



VERTICAL DATUM NAVD88

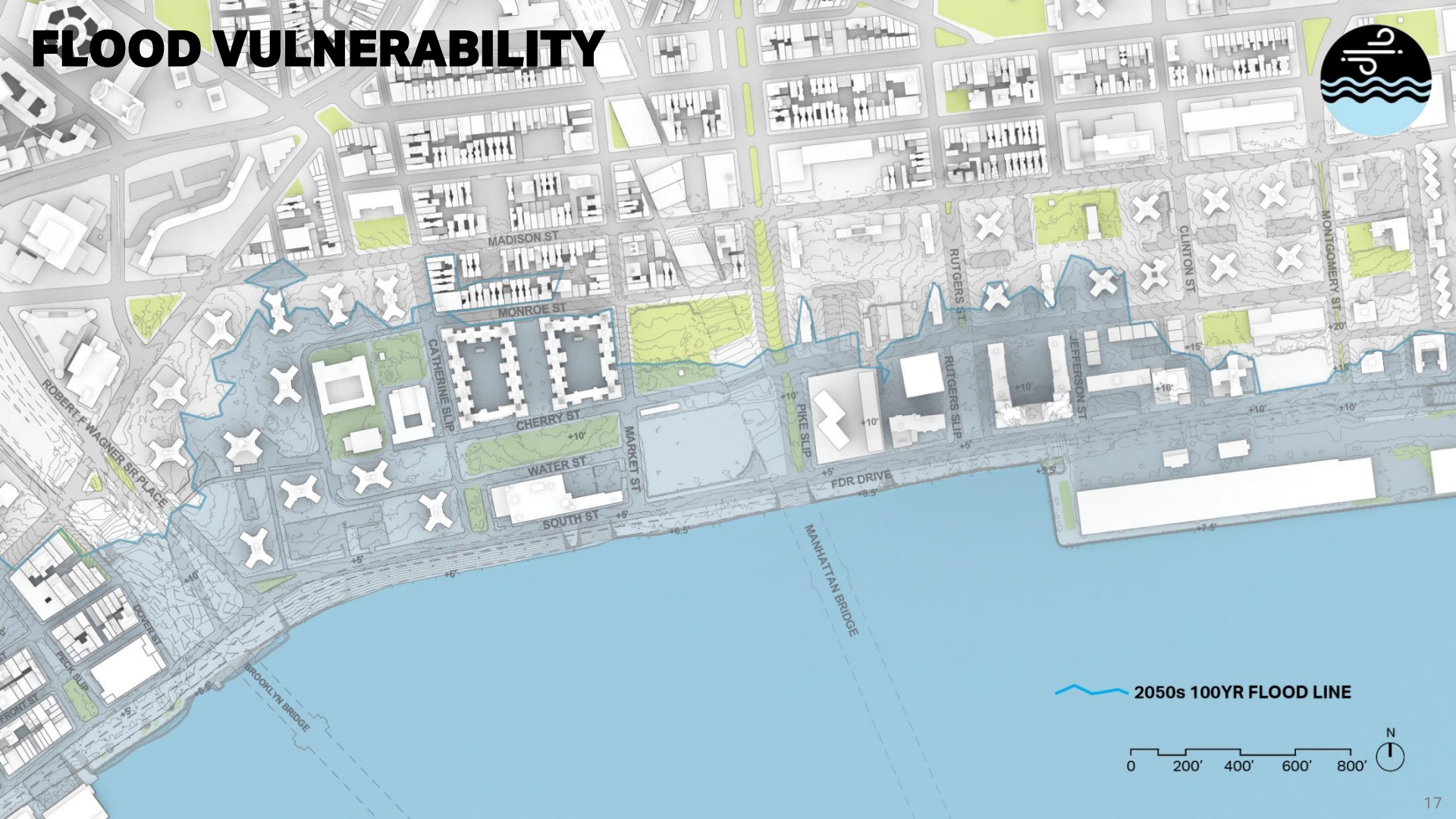
A SIGNIFICANT INTERVENTION



Hydrodynamic forces dissipate as waves travel inland. Combined with site topography, these forces generally result in greater heights of intervention closer to the shoreline.

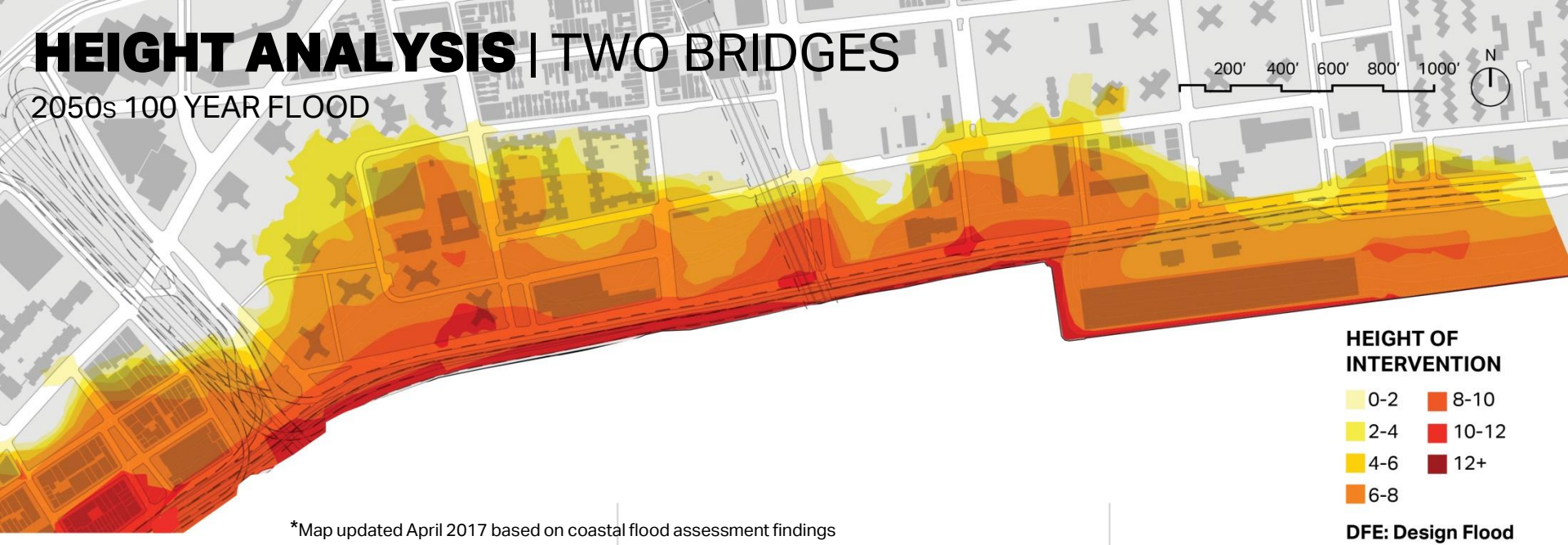
*Map updated April 2017 based on coastal flood assessment findings

FLOOD VULNERABILITY



HEIGHT ANALYSIS | TWO BRIDGES

2050s 100 YEAR FLOOD



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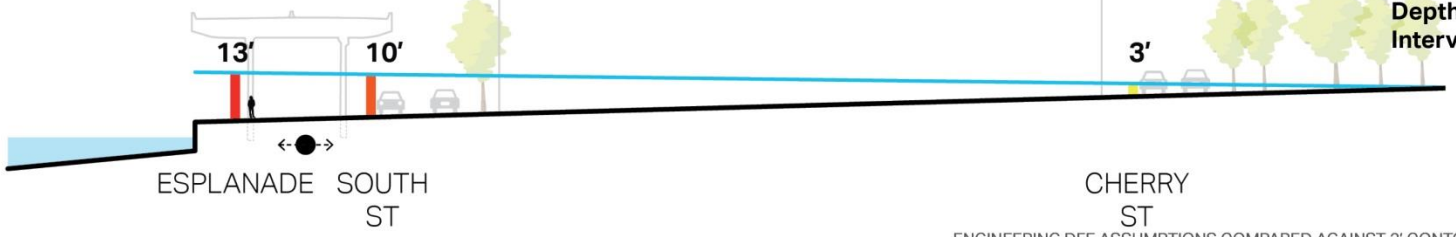
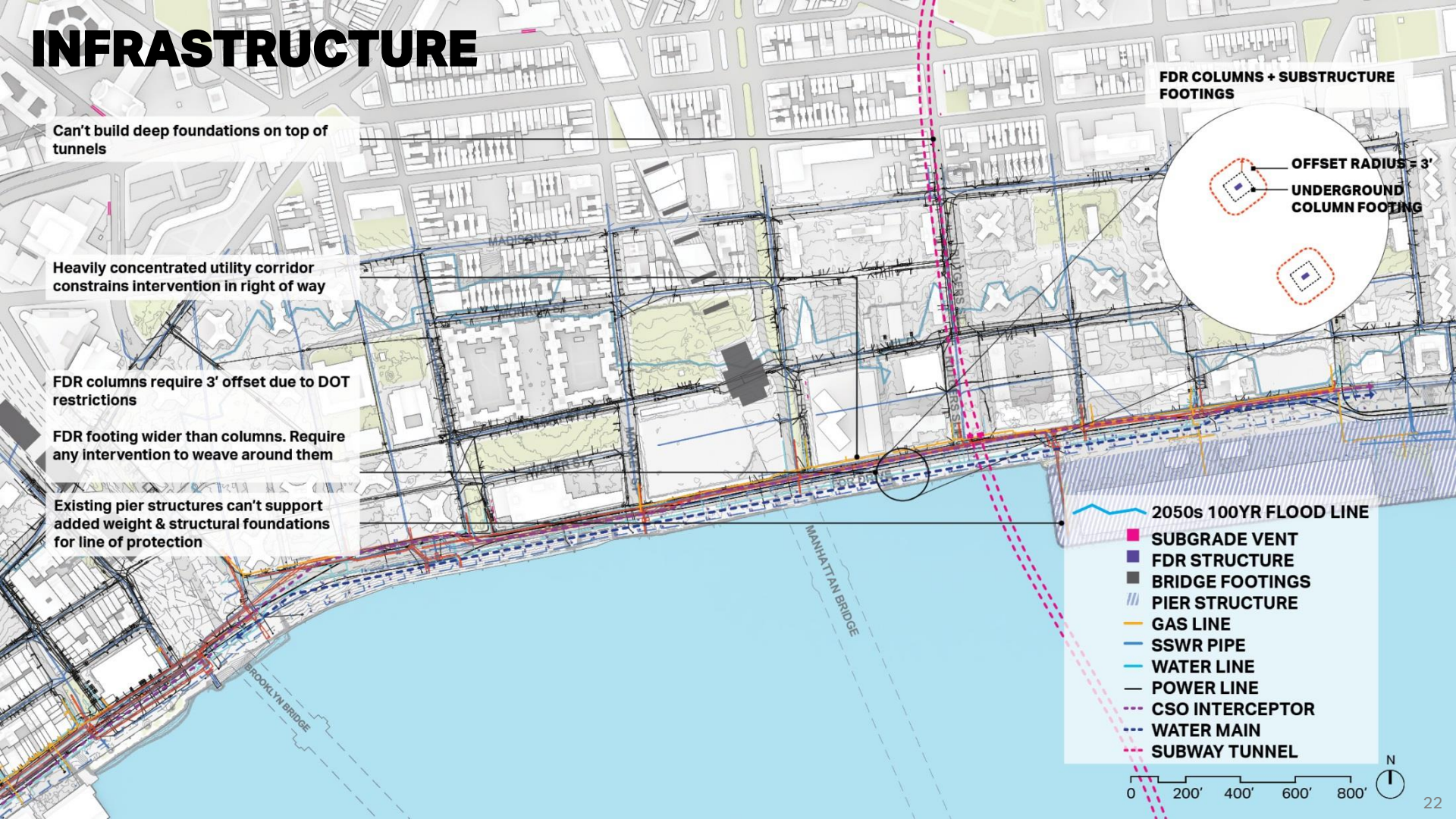
SOUTH STREET



ENGINEERING DFE ASSUMPTIONS COMPARED AGAINST 2′ CONTOURS (DOITT 2006)

SUBSURFACE CONDITIONS

INFRASTRUCTURE



KEY TAKEAWAYS: SUBSURFACE CONDITIONS

1. Lower Manhattan is largely built on top of **uncontrolled miscellaneous fill**. Preliminary seepage analysis indicates water flows are **within tolerable limits and can be mitigated**.

2. Unknown debris within the fill may impact construction

3. Concrete T Wall structures above 6ft tall require **deep foundation systems (piles)**, which are costly and increase construction impacts

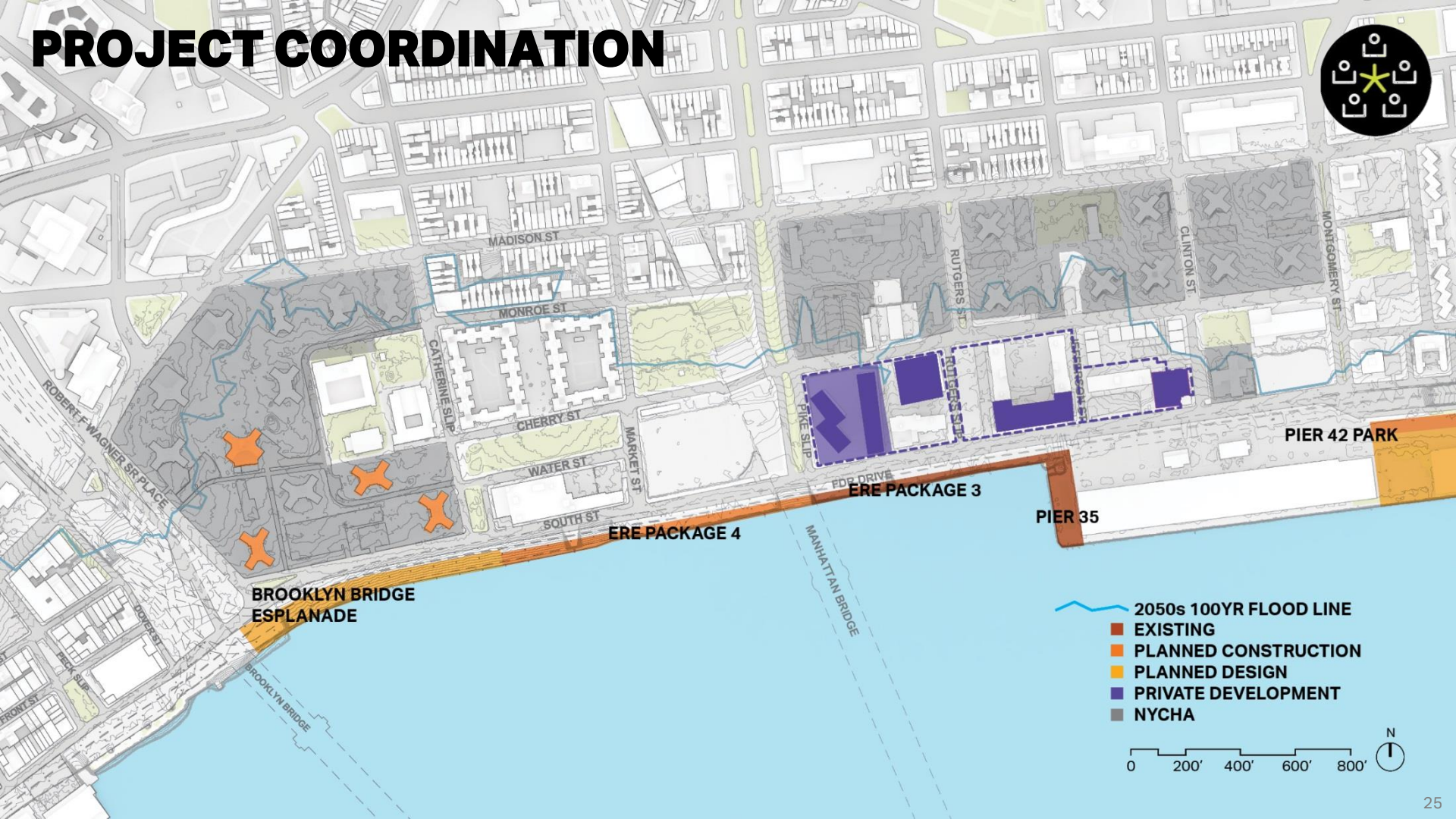
4. Under the FDR, there is a **limited footprint** to avoid the existing bulkhead and FDR column foundations.

    a. Buffers around FDR columns are necessary to maintain **structural integrity** of the elevated highway.
    b. Relocating or replacing the existing bulkhead brings **significant added cost** to construction.

5. Flood protection infrastructure must navigate the high number of **utilities** running under South Street.

CAPITAL COORDINATION

PROJECT COORDINATION

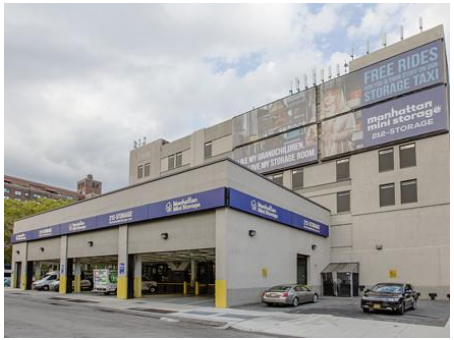


EXISTING RESILIENCY INVESTMENT

NYCHA SMITH HOUSES

KNICKERBOCKER VILLAGE

NYCHA LAGUARDIA HOUSES



MANHATTAN MINI STORAGE

NYCHA TWO BRIDGES URA

FUTURE DEVELOPMENTS

PRIVATE PROPERTY OWNER INTERVIEWS

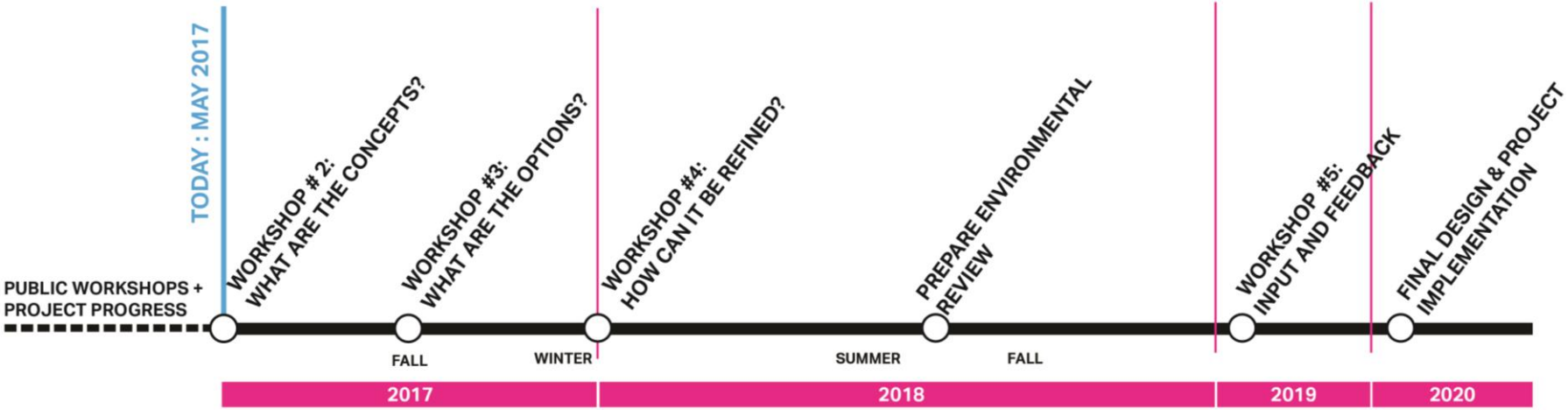
Private property owners have made significant investments in building-level protection, but to a lower level of protection than LMCR intends to provide.

- LMCR Project team gathered data on 27 privately-owned properties across the Financial District and Two Bridges neighborhoods
- Average recovery period for buildings to be fully operational for tenants was 3-5 months.
- Average water-level of flooding at the lobby level of the building was 4-5ft.
- The total amount of capital put into protection across the properties was $114,000,000
- 67% of properties have relocated mechanical equipment such as electrical and cooling systems to a higher floor
- 69% of properties interviewed had implemented or planned flood protection.
- Average Height of Protection = 6ft 10in
- Average time to deploy protection is between 9-17 hours

NEXT STEPS

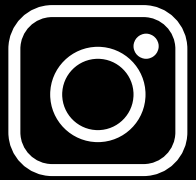
- **Use coastal model to inform alignment and drainage**
- **Evaluate land use and environmental review timelines**
- **Develop preliminary cost estimates**
- **Narrow potential alignment options**

FUTURE MILESTONES



STAY IN TOUCH

www.nyc.gov/lmcr



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By Mail
253 Broadway – 14th Floor

In person

nycresiliency@cityhall.nyc.gov