MEETING OBJECTIVES

• Project Overview
• Alignment Update and Exercise
• Technical Analysis Update (Deployables)
• Community Partner (Trust for Public Land)
• Next Steps and Timeline
**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

BATTERY PARK CITY
1.15 MILES

FINANCIAL DISTRICT
1.33 MILES
CORE MISSION

FLOOD RISK REDUCTION + PUBLIC BENEFIT
PROJECT PROCESS

EXISTING CONDITIONS

CONCEPT DESIGN

FEASIBILITY AND PRIORITIZATION

SCOPING FOR IMPLEMENTATION

REVIEW & PERMITTING

COMMUNITY ENGAGEMENT

LOWER MANHATTAN COASTAL RESILIENCY

WORKSHOP 1A
What are the fundamentals?
WORKSHOP 1B

WORKSHOP 2
What are the concepts?

TODAY
WORKSHOP 3
What is the best location?

WORKSHOP 4
How can it be refined?
WORKSHOP 5
Input and feedback
WALKING TOUR: JULY 10, 2017

- 4 stops
- Included Task Force members, city agencies, the design team, and elected official representatives
- Discussed options and tradeoffs for waterfront and upland concepts

Key Takeaways:
- Ensure equitable distribution of community benefits
- Maintain open views and waterfront access
- Coordinate with ongoing projects
- Protect maximum number of residents and assets
- Connect to waterfront north and south of project area
## EVALUATION CRITERIA

### CONSTRUCTABILITY
- Cost
- Structural requirements
- Impacts on utilities
- Disruptions to existing structures and transportation
- Failure risk

### SCHEDULE
- Regulatory actions
- Environmental impacts
- Jurisdictional coordination

### RESILIENCE
- Buildings, residents, and infrastructure protected
- Adaptability

### OPERATIONS & MAINTENANCE
- Accessibility
- O&M requirements

### PUBLIC REALM BENEFITS
- Community amenities
- Placemaking and urban design opportunities
EVALUATION CRITERIA: PROJECT STUDY AREA
Evaluation criteria was used to assess the feasibility and implications of implementing flood protection within the neighborhood.
EVALUATION CRITERIA: CONSTRUCTABILITY

Goal: Minimize disruptions to street grid, circulation, and utilities

Available footprint is highly constrained around bridge + ramp footings

Required 3ft offsets around all FDR columns

Many utility lines under streets

Utility lines

CSO outfall

2050s 100 YEAR FLOODLINE
Running protection infrastructure through parkland may disrupt public space use / operations during construction.

Timeline challenges complicate integration of flood protection into future private development.

Relocating utility lines may cause delays in implementation schedule.

EVALUATION CRITERIA: SCHEDULE

Goal: Ensure project delivery by 2022 deadline by reducing actions that require significant timelines.
Goal: maximize protection of residents, businesses, and utility corridors

Evaluation Criteria: Resilience

Pier 36 will require building level resiliency measures.
EVALUATION CRITERIA: OPERATIONS AND MAINTENANCE

Goal: Minimize potential disruptions to street crossings, driveways, and building entries.

Coordinating closures of driveways and building access adds significant complication.

Tie-backs have potential impacts on emergency access during deployment.

Deployables are required when crossing streets.
EVALUATION CRITERIA: PUBLIC REALM BENEFIT

Goal: Enable opportunities to incorporate community benefits throughout Two Bridges

Consider important view corridors from neighborhood to the waterfront
A refined working envelope allows the team to shift focus to technical analysis of baseline infrastructure. This includes testing different deployable types into various configurations and locations throughout the alignment area.

Waterfront alignment would offer a continuous experience with public benefit being evenly dispersed across the neighborhood.

Coordination needed for integration with East River Esplanade packages 3 + 4.

7ft wide sewage interceptor dips into back of esplanade.

Water main runs in middle of esplanade.
TECHNICAL ANALYSIS UPDATE
EVALUATION CRITERIA: DEPLOYABLE TYPES

The project team is exploring numerous deployable flood protection technologies and manufacturers, and vetting their potential feasibility across project locations.

**STRUCTURAL REQUIREMENTS**
- Foundation size and depth
- Impacts on utilities
- Storage needs

**COST**
- Frequency + extent of maintenance
- System lifespan

**MAINTENANCE**
- Accessibility
- Labor – manpower
- Labor – hours

**DEPLOYMENT**
- Placemaking and urban design opportunities
- Preservation of view corridors

**URBAN DESIGN IMPACTS**
INFRASTRUCTURE TOOKLIT

SWING GATES

ROLLER GATES

FLIP UP BARRIER

FLEX WALL SYSTEM
SWING GATES: BLUE SKY

GENERAL DESCRIPTION

Swing gates operate similarly to a hinged door; one end is hinged in place allowing the other end to rotate from an open to closed position. Swing gates are designed to span between two end supports and can swing up to 270 degrees.

STRUCTURAL REQUIREMENTS

- Single gate is limited to a length of 35ft
- Gates are supported by wing walls with deep foundations

URBAN DESIGN IMPACTS

- Double loading gates to a central column maximizes open views and access
- Require a wide open radius to swing into place
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Roller gates, also referred to as sliding gates, are deployable barriers that are permanently installed on a track and manually slid into position prior to a flooding event.

**GENERAL DESCRIPTION**

**URBAN DESIGN IMPACTS**
- Gate permanently exposed on waterside of wall
- Gate is stored against equal length of permanent flood wall

**STRUCTURAL REQUIREMENTS**
- Track for gate requires ~1ft depth
- Walls require deep foundations and piles
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FLIP UP BARRIER: BLUE SKY

GENERAL DESCRIPTION

Flip up walls can deploy automatically, manually, or mechanically. When not deployed, the barrier lays flat on the ground flush with the surface.

STRUCTURAL REQUIREMENTS

- Structural wing walls create watertight seals
- 1ft deep trench houses the system below the ground

URBAN DESIGN IMPACTS

- Can be cladded with pavers and other materials to blend in
- Wing walls can be cladded with any smooth material (reflective glass) or painted
- Site furnishings cannot be permanently fixed on top of deployable
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FLEX WALLS: BLUE SKY

GENERAL DESCRIPTION

A custom fabric reinforced with watertight Kevlar panel. The fabric is extremely high strength and capable of withstanding hydrostatic, hydrodynamic, and debris impact loads in accordance with FEMA P-55 guidelines.

URBAN DESIGN IMPACTS

- Smallest surface footprint
- Can be integrated into raised elements like seatwalls

STRUCTURAL REQUIREMENTS

- Requires fixed structural pilasters at ~150’ [maximum] increments
- Additional deployable support posts
- Stored in 14in deep below-ground trench
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PLACEMAKING AND PROJECT DESIGN
The project team is investigating opportunities to activate the waterfront with site features that integrate flood protection infrastructure into programmatic amenities such as seating, sports courts, pavilions, and recreation spaces.

These opportunities are dependent upon feasibility considerations such as foundation requirements, subsurface infrastructure, available funding, design flood elevation, maintenance requirements, etc.

Programmatic amenities will consider planned and existing site features and community feedback.
TRUST FOR PUBLIC LAND (PROJECT PARTNER)
GREEN SCHOOLYARDS PROGRAM

- PS 184 (Shuang Wen) + PS 2 (Meyer London)
- Participatory Design Process
- Traditional play (sports courts, running tracks, fitness equipment)
- Green Infrastructure (rain gardens, bioswales)
NEXT STEPS AND TIMELINE

- Spring 2018 TF/ Public Meeting
  - Concept Design Progress
  - Drainage Management Update
  - Schematic Design/ Construction Contract Update