CONCEPT A

Least costly resist barrier which provides the least coastal storm surge risk reduction benefits to the study area.

- Approximately 86% of people in the study area receive flood risk reduction benefits.
- 8,100 to 8,400 linear feet of structure and 21 gates.
- North Waterfront takes Boathouse into account.
- North Hoboken on-street protection provided along Garden Street until elevation tie-in.
- Hoboken Terminal does not receive flood risk reduction benefits.
- South Waterfront constructed independent of Longslip Canal.
- Permanent movable gates proposed to address flood risk reduction along the underpass.

Legend:

- Gate - Sliding
- Gate - Swinging
- Deployable Flood Wall
- Landscape
- Berm
- Revetment
- Raised Path
- Seawall
- Flood Wall
- T Wall
- Ramp
- Municipal Boundaries
- Study Area
- Ferry Lines
- Preliminary FEMA 100 year Flood Plain

MIN DFE : Approx. Min. FEMA Certification

MAX DFE : Approx. 500 Year + 2075 NOAA SLR

*All DFE's are Approximate and Subject to Change

N

0' 400' 800' 1,600'

State of New Jersey
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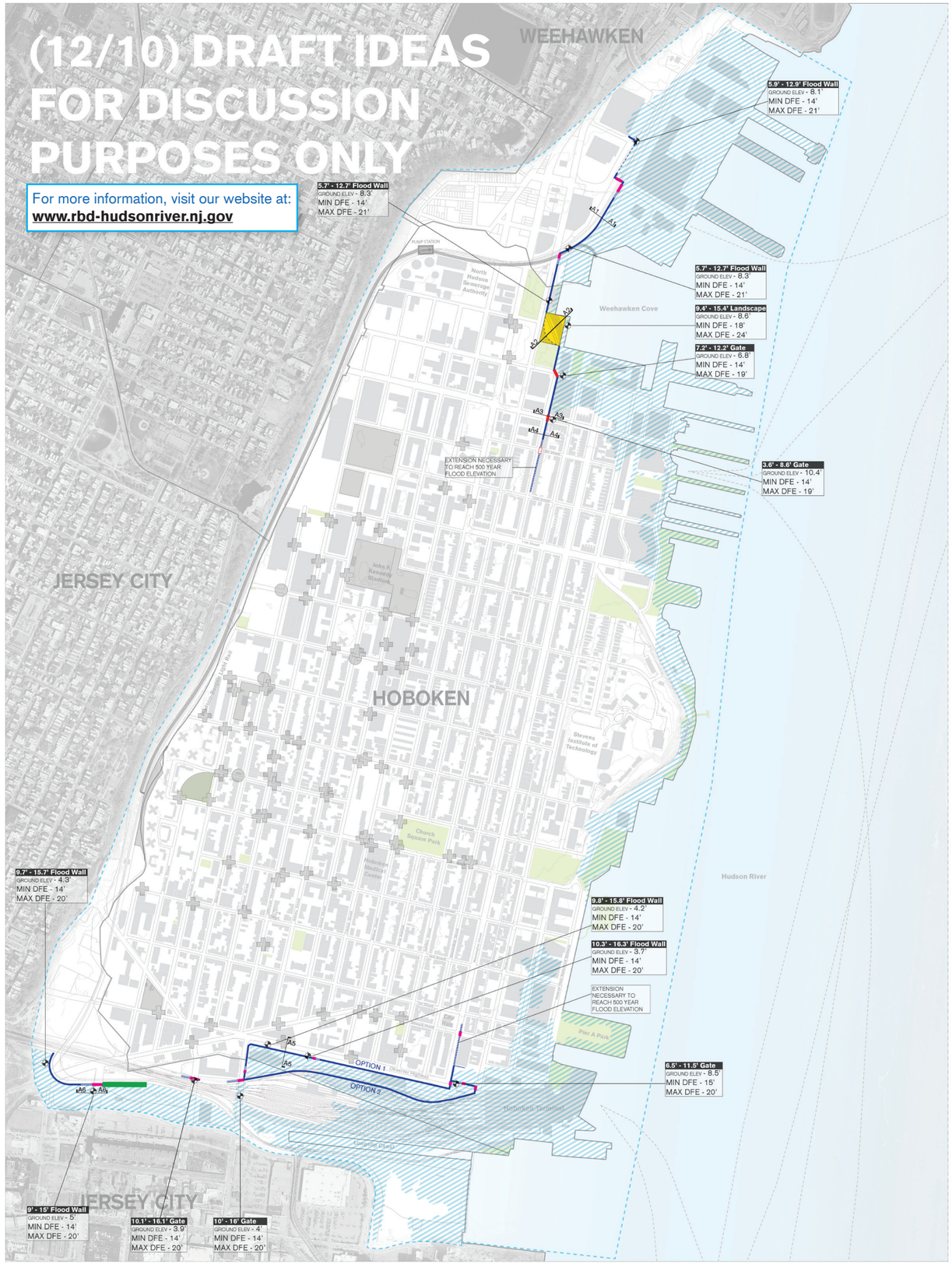
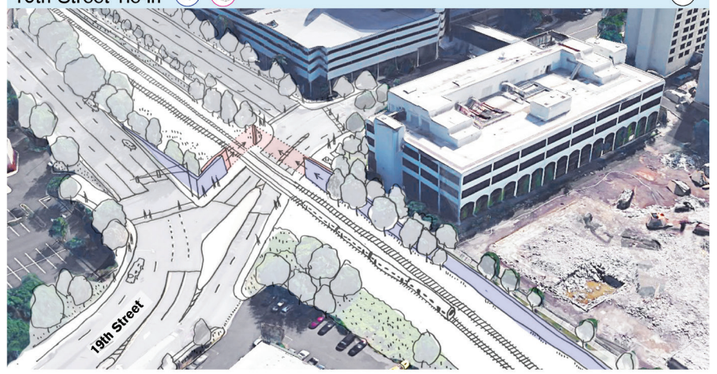
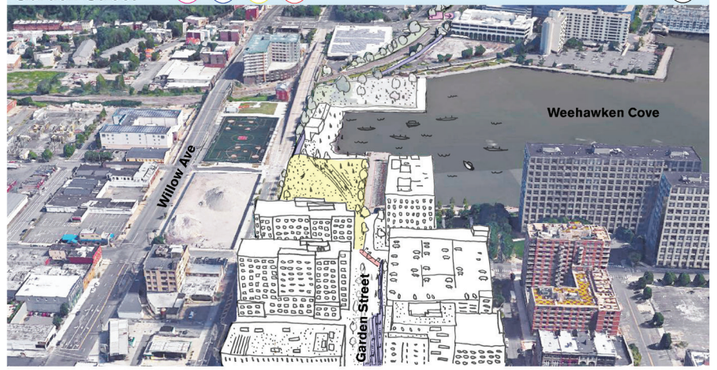


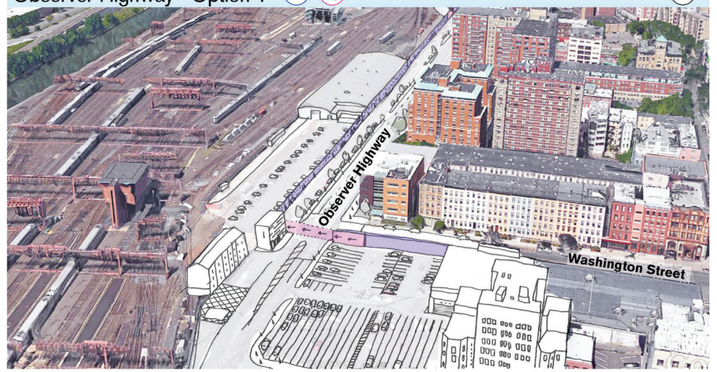
19th Street Tie-in



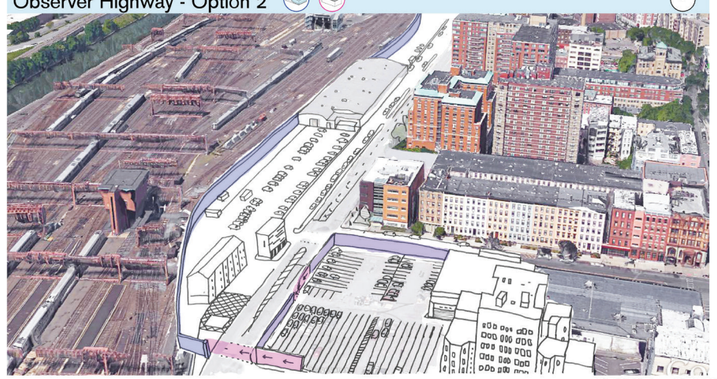
Garden Street



Observer Highway - Option 1



Observer Highway - Option 2



Alignment Options	Option 1	Option 2
Flood Risk Reduction		
Percent of Population with Coastal Storm Surge Risk Reduction Benefits	86	86
Potential to Adapt to Higher Coastal Flood Event (≥ 500yr and Sea Level Rise)	●	●
Rainfall	●	●
Built Environment		
View Corridors	●	●
Waterfront Access	●	●
Potential Community Benefits	●	●
Connectivity/ Circulation	●	●
Environmental Justice Populations	●	●
Construction/ Maintenance & Operation		
Constructability	●	●
Construction Duration	●	●
Maintenance and Operation for Overall System	●	●
Environmental Impacts		
Potential Hazardous Waste Sites (Resist Only)	32	28
Wetlands	Yes	Yes
Essential Fish Habitat	No	No
Threatened and Endangered Species	No	No
Army Corp. Permits	No	No
Historic Properties	Yes	Yes
Archaeological Resources	●	●
Benefit/Cost Analysis		
Benefits	High	High
Costs	Lowest	Lowest
Benefit/Cost Ratio	●	●

CONCEPT B

High coastal storm surge risk reduction with substantial resist structure construction in the northern study area.

- Approximately 98% of people in the study area receive flood risk reduction benefits.
- 13,430 linear feet of resist structure and 21 gates.
- Weehawken tie-in at Lincoln Tunnel.
- Permanent built structures on North Waterfront provide flood risk reduction benefits.
- Hoboken Terminal does not receive flood risk reduction benefits.
- South Waterfront constructed independent of Longslip Canal.
- Permanent movable gates proposed to address flood risk reduction along the underpass.

Legend:

- Gate - Sliding
- Gate - Swinging
- Deployable Flood Wall
- Landscape
- Berm
- Revetment
- Raised Path
- Seawall
- Flood Wall
- T Wall
- Ramp
- Municipal Boundaries
- Study Area
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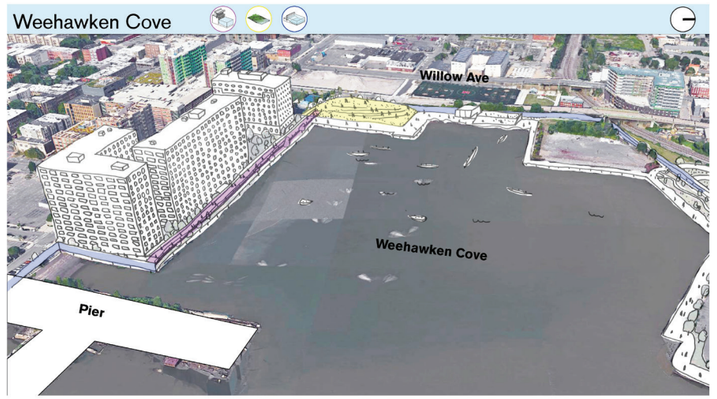
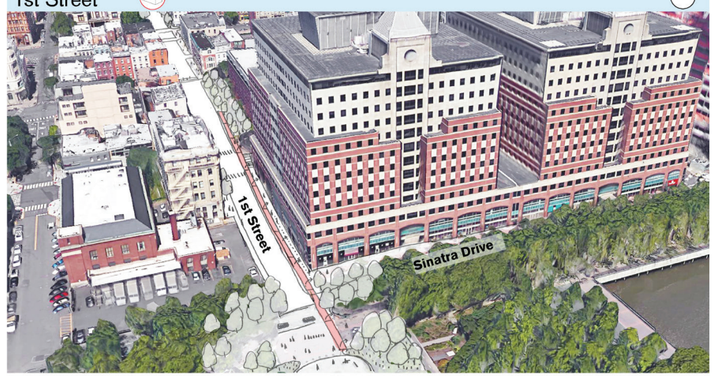
Weehawken Cove

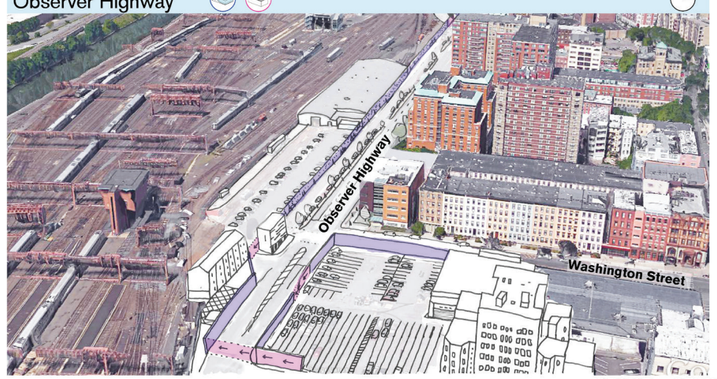


Sinatra Drive North

1st Street



Observer Highway



Alignment Options	Option 1	Option 2
Flood Risk Reduction		
Percent of Population with Coastal Storm Surge Risk Reduction Benefits	98	98
Potential to Adapt to Higher Coastal Flood Event (≥ 500yr and Sea Level Rise)	●	●
Rainfall	●	●
Built Environment		
View Corridors	●	●
Waterfront Access	●	●
Potential Community Benefits	●	●
Connectivity/ Circulation	●	●
Environmental Justice Populations	●	●
Construction/ Maintenance & Operation		
Constructability	●	●
Construction Duration	●	●
Maintenance and Operation for Overall System	●	●
Environmental Impacts		
Potential Hazardous Waste Sites (Resist Only)	31	28
Wetlands	Yes	Yes
Essential Fish Habitat	Yes	Yes
Threatened and Endangered Species	Yes	Yes
Army Corp. Permits	Yes	Yes
Historic Properties	Yes	Yes
Archaeological Resources	●	●
Benefit/Cost Analysis		
Benefits	High	High
Costs	High	High
Benefit/Cost Ratio	●	●

CONCEPT C

Highest construction costs which provide highest coastal storm surge risk reduction using free-standing, in-water revetments.

- Approximately 99% of people in the study area receive flood risk reduction benefits.
- 14,730 linear feet of on land structures with 16 gates.
- 2,700 linear feet of in-water resist barriers with 5 gates.
- An in-water revetment is planned in Weehawken Cove, and to the North a Lincoln Tunnel tie-in.
- Permanent built structures on North Waterfront provide flood risk reduction benefits.
- Programmed Bulkheads offer added community benefits, while providing flood risk reduction benefits to those on the water.
- South Waterfront constructed assuming the proposed construction of the Longslip Canal project.
- Hoboken Terminal does receive flood risk reduction benefits; resist portion is planned in-water in front of the Terminal.
- Permanent movable gates proposed to address flood risk reduction along the underpass.

Legend:

- Gate - Sliding
- Gate - Swinging
- Deployable Flood Wall
- Landscape
- Berm
- Revetment
- Raised Path
- Seawall
- Flood Wall
- T Wall
- Ramp
- Municipal Boundaries
- Study Area
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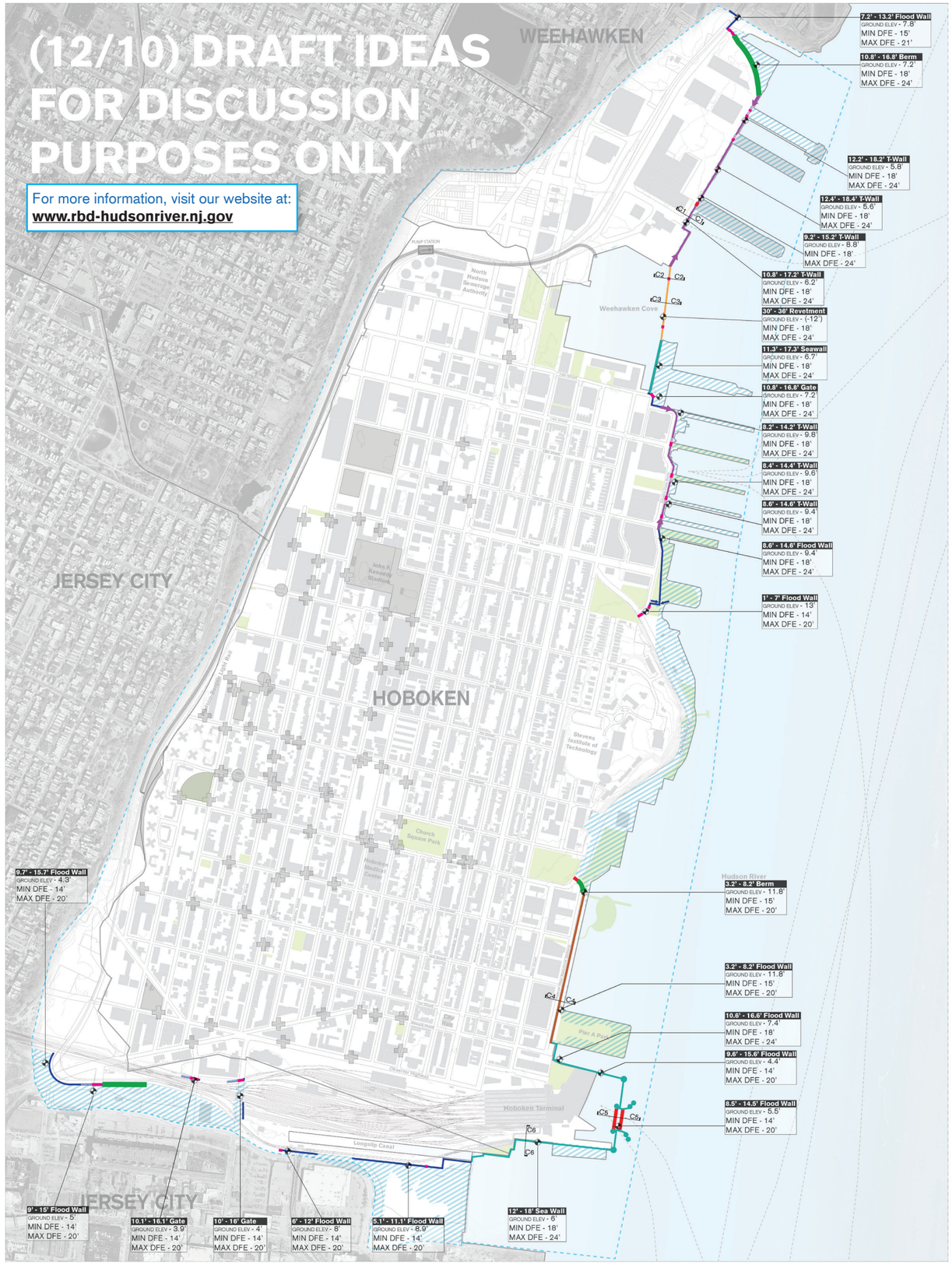
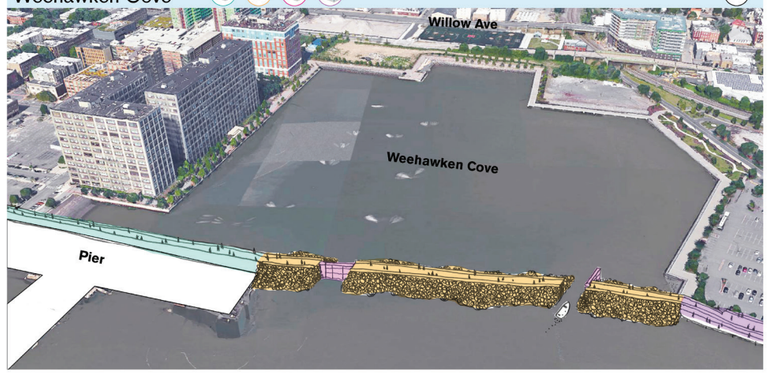
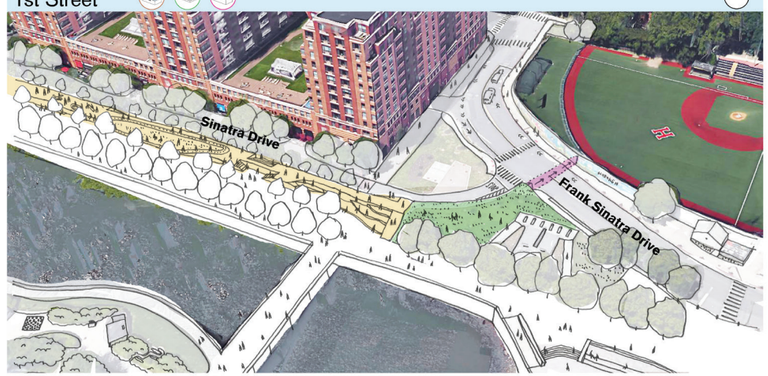


Weehawken Cove

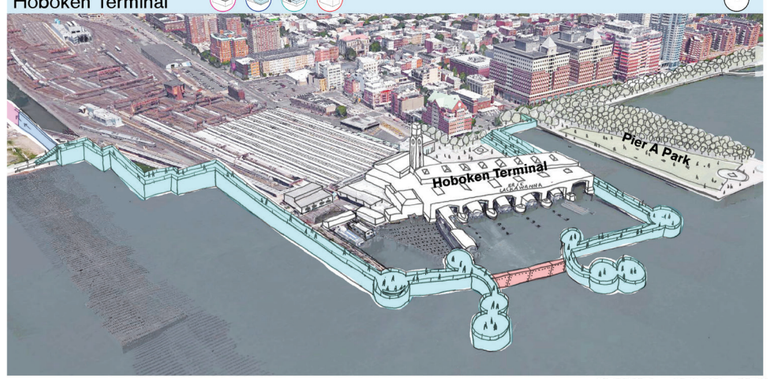


Sinatra Drive North

1st Street



Hoboken Terminal



Flood Risk Reduction	
Percent of Population with Coastal Storm Surge Risk Reduction Benefits	99
Potential to Adapt to Higher Coastal Flood Event [≥ 500yr and Sea Level Rise]	●
Rainfall	●
Built Environment	
View Corridors	●
Waterfront Access	●
Potential Community Benefits	●
Connectivity/ Circulation	●
Environmental Justice Populations	●
Construction/ Maintenance & Operation	
Constructability	●
Construction Duration	●
Maintenance and Operation for Overall System	●
Environmental Impacts	
Potential Hazardous Waste Sites (Resist Only)	18
Wetlands	Yes
Essential Fish Habitat	Yes
Threatened and Endangered Species	Yes
Army Corp. Permits	Yes
Historic Properties	Yes
Archaeological Resources	●
Benefit/Cost Analysis	
Benefits	Highest
Costs	Highest
Benefit/Cost Ratio	●

CONCEPT D

High construction cost which provides highest coastal storm surge risk reduction with no free standing, in-water revetments.

- Approximately 99% of people in the study area receive flood risk reduction benefits.
- 16,230 linear feet of resist structure and 20 gates.
- North Resist portion offers Lincoln Tunnel Tie-In.
- Permanent built structures on North Waterfront provide flood risk reduction benefits.
- Programmed Bulkheads offer added community benefits, while providing flood risk reduction benefits to those on the water.
- South Waterfront constructed assuming the proposed construction of the Longslip Canal project.
- Alignment goes through Hoboken Terminal, offering flood risk reduction benefits to essential electrical and utility assets (allows for continued operations in the case of an event).
- Permanent movable gates proposed to address flood risk reduction along the underpass.

Legend:

- Gate - Sliding
- Gate - Swinging
- Deployable Flood Wall
- Landscape
- Berm
- Revetment
- Raised Path
- Seawall
- Flood Wall
- T Wall
- Ramp
- Municipal Boundaries
- Study Area
- Ferry Lines
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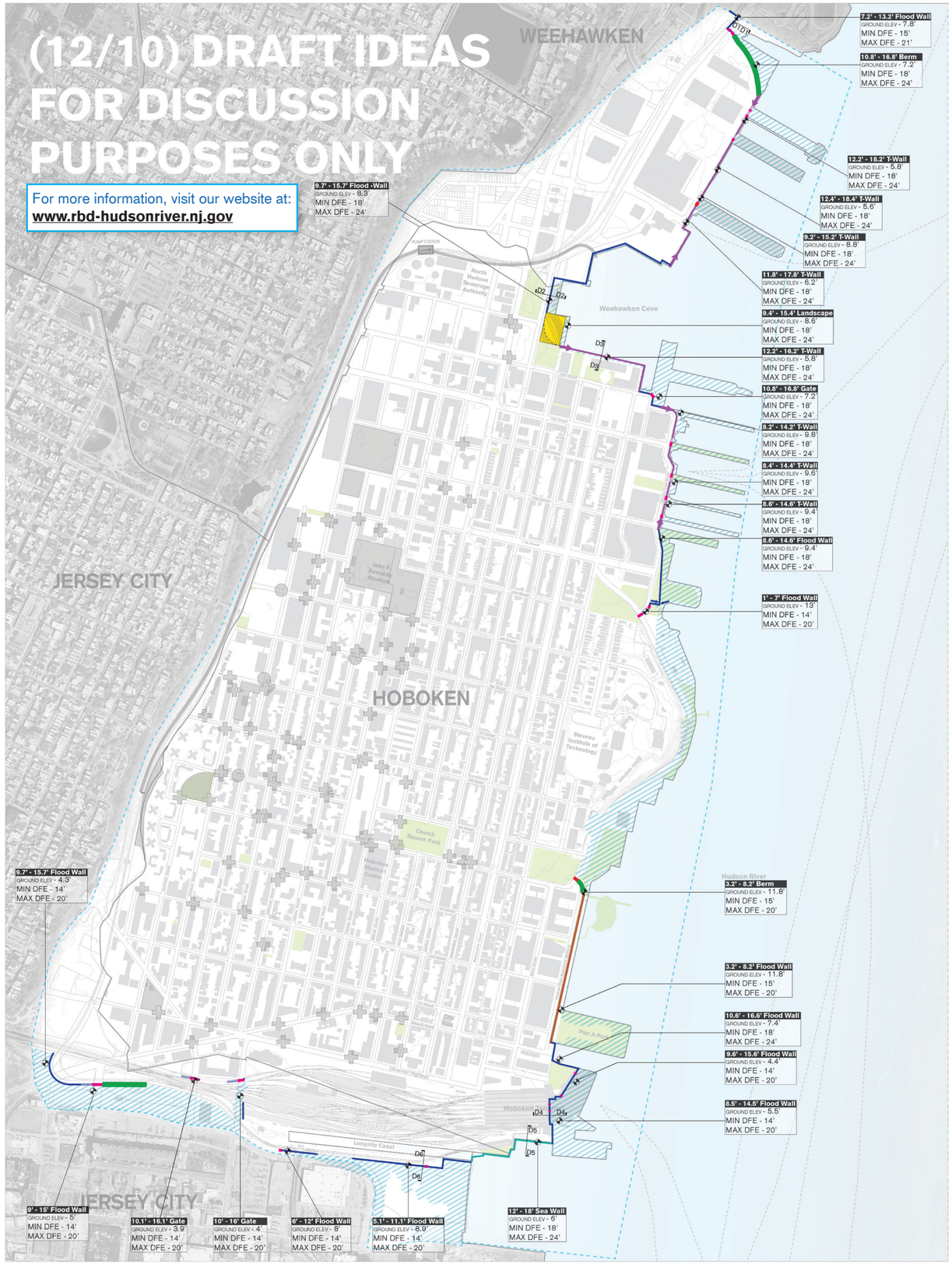
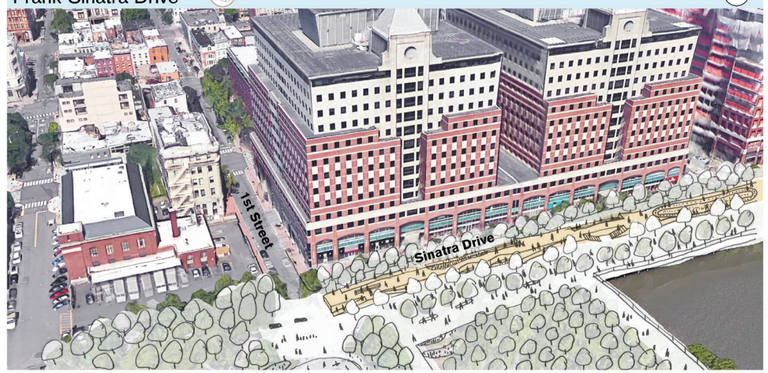


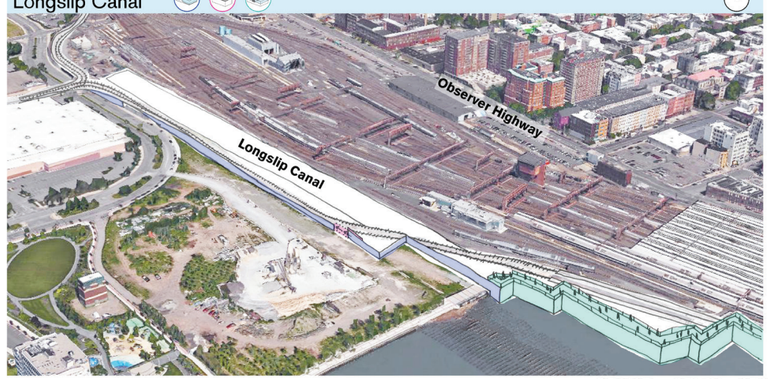
Weehawken Waterfront

Sinatra Drive North

Frank Sinatra Drive



Longslip Canal



Flood Risk Reduction	
Percent of Population with Coastal Storm Surge Risk Reduction Benefits	99
Potential to Adapt to Higher Coastal Flood Event (≥ 500yr and Sea Level Rise)	●
Rainfall	●
Built Environment	
View Corridors	●
Waterfront Access	●
Potential Community Benefits	●
Connectivity/ Circulation	●
Environmental Justice Populations	●
Construction/ Maintenance & Operation	
Constructability	●
Construction Duration	●
Maintenance and Operation for Overall System	●
Environmental Impacts	
Potential Hazardous Waste Sites (Resist Only)	20
Wetlands	Yes
Essential Fish Habitat	Yes
Threatened and Endangered Species	Yes
Army Corp. Permits	Yes
Historic Properties	Yes
Archaeological Resources	●
Benefit/Cost Analysis	
Benefits	Highest
Costs	Highest
Benefit/Cost Ratio	●

▪ RESIST ▪ DELAY ▪ STORE ▪ DISCHARGE ▪

CONCEPT E

Moderate coastal flood risk reduction benefits within the study area at moderate cost.

- Approximately 90% of people in the study area receive flood risk reduction benefits.
- 12, 010 linear feet of resist structure and 16 gates.
- North Waterfront takes Boathouse into account.
- North Hoboken on-street protection provided along Hudson Blvd (Option 1) and Shipyard Lane (Option 2) until elevation tie-in.
- Some programmed bulkhead and other resist structures proposed along South Waterfront.
- Permanent movable gates proposed to address flood risk reduction along the underpass.

Legend:

- Gate - Sliding
- Gate - Swinging
- Deployable Flood Wall
- Landscape
- Berm
- Revetment
- Raised Path
- Seawall
- Flood Wall
- T Wall
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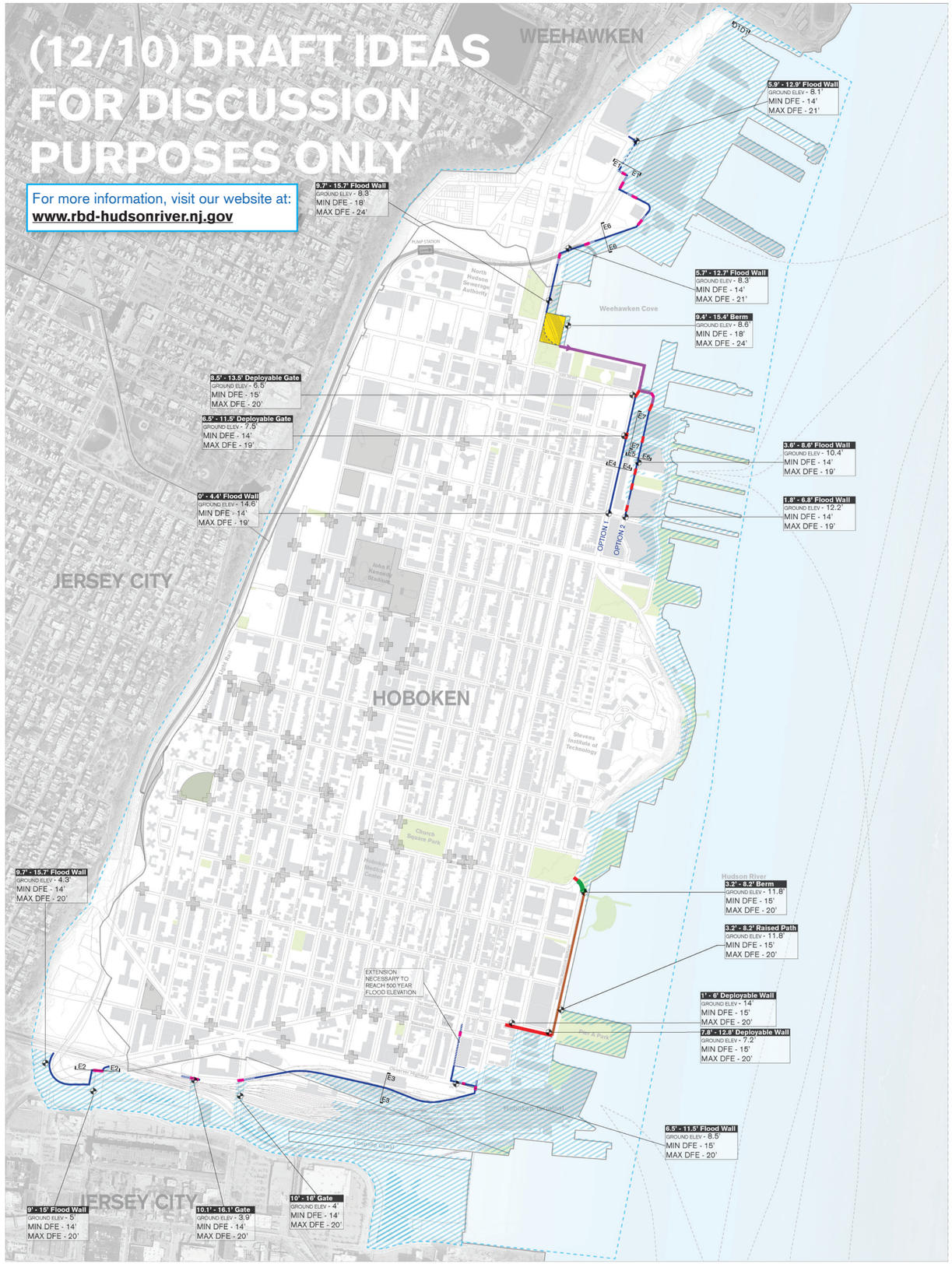
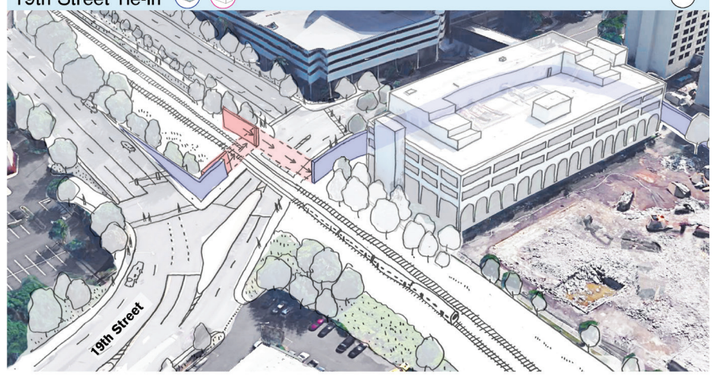
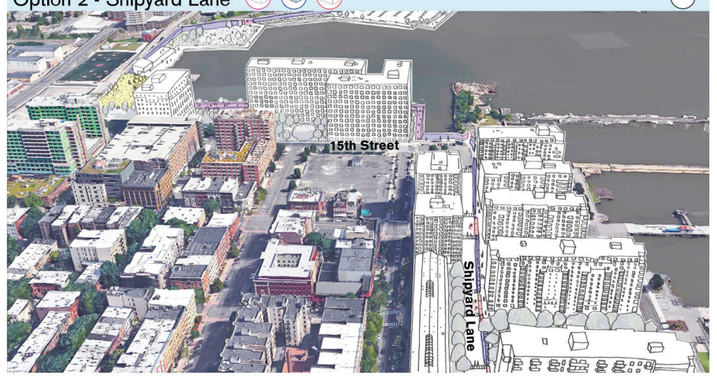


19th Street Tie-in

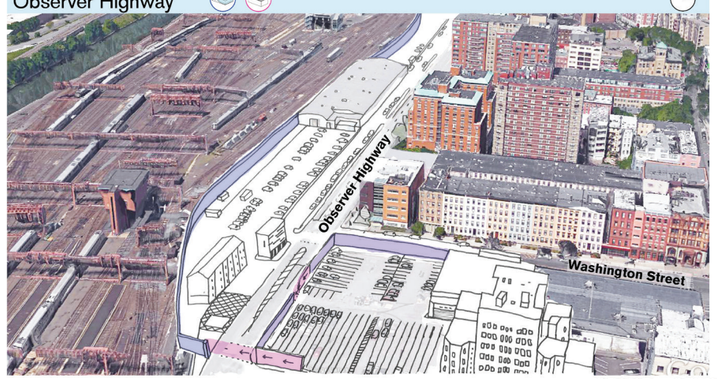


Option 1 - Hudson Street

Option 2 - Shipyard Lane



Observer Highway



Alignment Options	Option 1 Hudson Street	Option 2 Shipyard Lane
Flood Risk Reduction		
Percent of Population with Coastal Storm Surge Risk Reduction Benefits	90	90
Potential to Adapt to Higher Coastal Flood Event (≥ 500yr and Sea Level Rise)	●	●
Rainfall	●	●
Built Environment		
View Corridors	●	●
Waterfront Access	●	●
Potential Community Benefits	●	●
Connectivity/ Circulation	●	●
Environmental Justice Populations	●	●
Construction/ Maintenance & Operation		
Constructability	●	●
Construction Duration	●	●
Maintenance and Operation for Overall System	●	●
Environmental Impacts		
Potential Hazardous Waste Sites (Resist Only)	30	30
Wetlands	Yes	Yes
Essential Fish Habitat	Yes	Yes
Threatened and Endangered Species	Yes	Yes
Army Corp. Permits	Yes	Yes
Historic Properties	Yes	Yes
Archaeological Resources	●	●
Benefit/Cost Analysis		
Benefits	High	High
Costs	High	High
Benefit/Cost Ratio	●	●

DELAY
STORE
DISCHARGE

OVERALL STRATEGY

- Design proposal aims to maximize the potential to capture, store, infiltrate, evaporate, and release stormwater.
- Goal is to achieve community co-benefits while improving management of stormwater that could reduce rainfall flooding.
- Besides BASF site, all stormwater management strategies are entirely on publicly-owned land.
- Proposal uses both “green” and “grey” stormwater management strategies.
- The team considered physical, environmental and infrastructure constraints in locating and designing specific interventions.

Legend:

- Delay + Store - Parks
- Water Storage Sites
- Catchment Area
- New Outfall Pipe
- New Storm Sewer Pipe
- Hybrid Tank
- Tank
- Tank Bumpout
- Ongoing Projects
- Existing Flooding “Hotspot”
- Municipal Boundaries
- Study Area
- Ferry Lines

N

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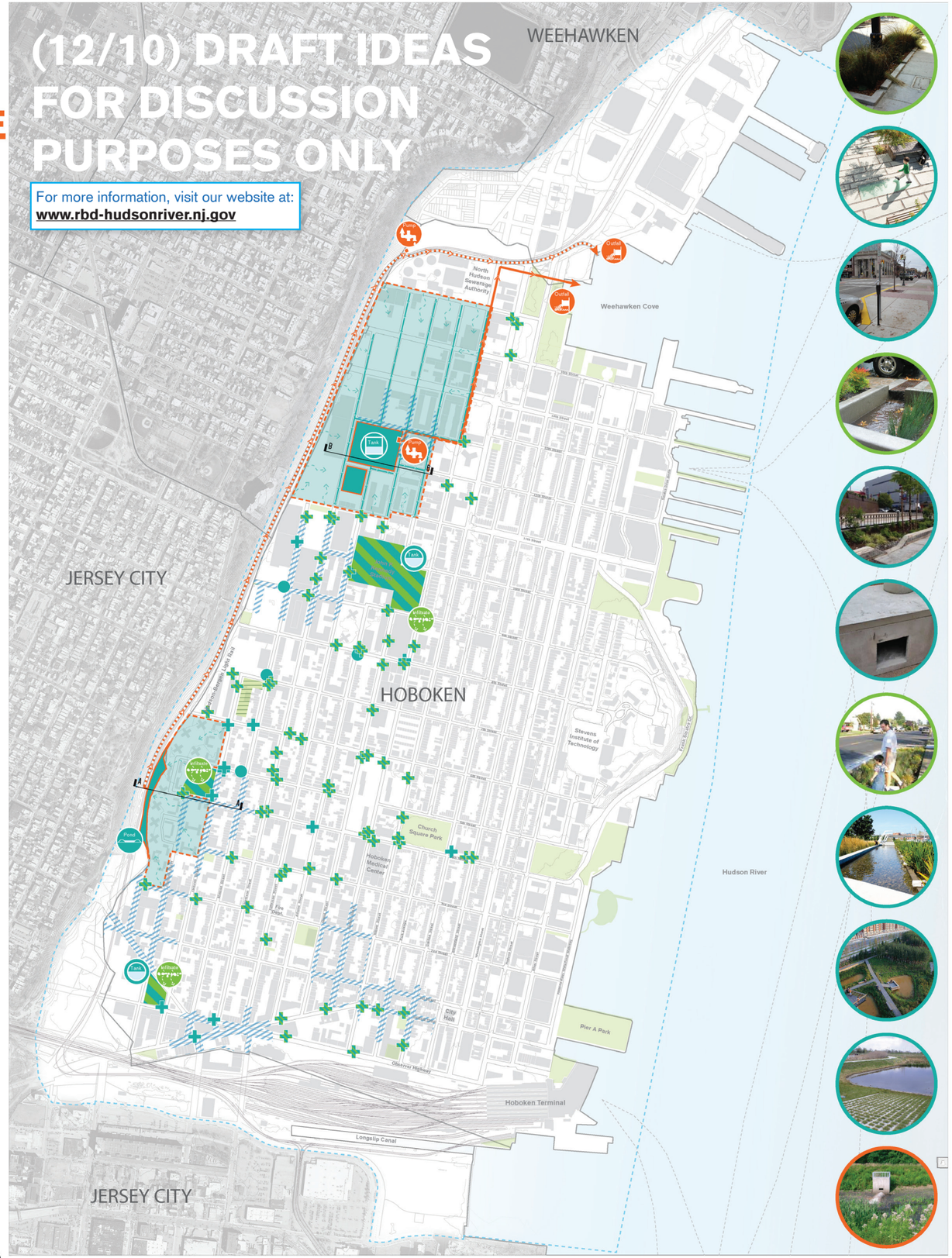
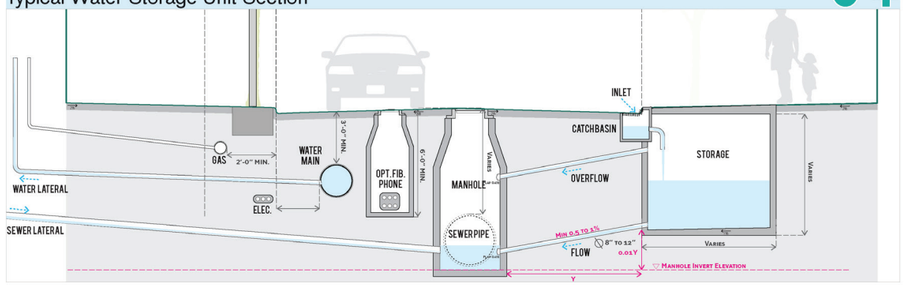
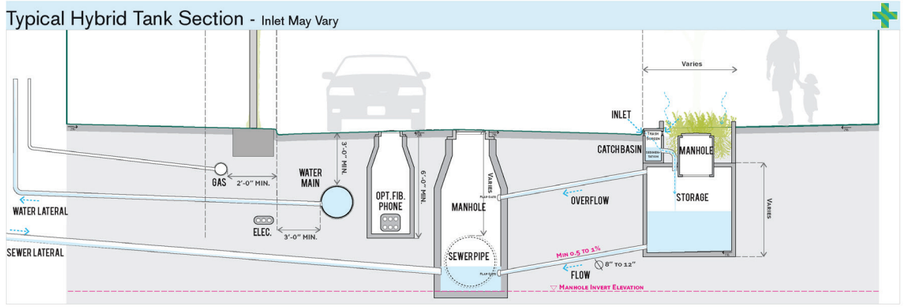


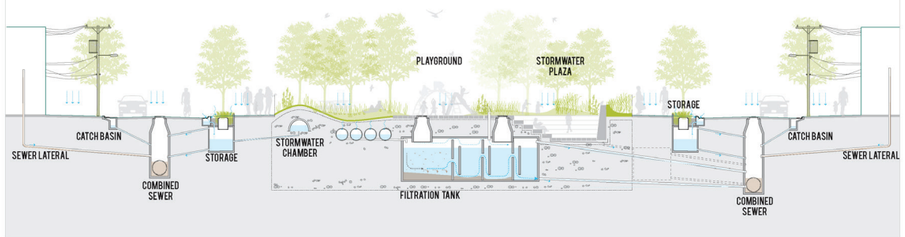
Typical Water Storage Unit Section



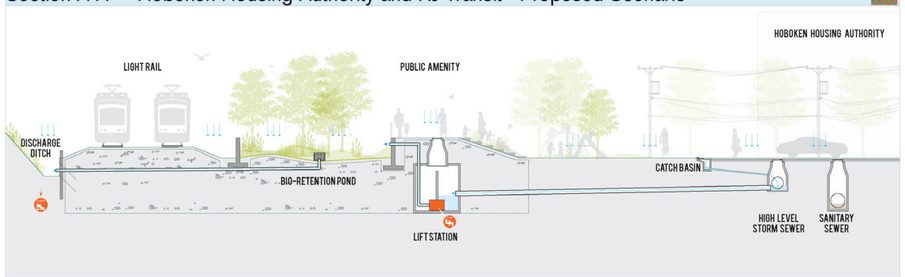
Typical Hybrid Tank Section - Inlet May Vary



Typical Retrofitted Park Condition - Proposed Scenario



Section A-A - Hoboken Housing Authority and NJ Transit - Proposed Scenario



Section B-B - BASF Site - Proposed Scenario