

REBUILD BY DESIGN  
MEADOWLANDS

**CITIZEN ADVISORY GROUP (CAG) MEETING #8**

ALTERNATIVE 1: STRUCTURAL FLOOD REDUCTION CONCEPT DEVELOPMENT

# AGENDA

Christopher Benosky, AECOM

2



- Project Status Update and Schedule
- Alternative 1
  - Screening Process
  - Concept Development

## Alternative 2

Reviewed during CAG #7 in January

Will be revisited in future CAG meetings

- Alternative 3
  - Hybrid Concept Development
- Next Steps
- Question & Answer
- Physical Model Stations



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# PROJECT STATUS UPDATE

Christopher Benosky, AECOM

3



- Refined working draft Concept Screening Criteria
- Completed and published to Project Website:
  - Meeting Minutes from CAG Meeting #7
  - February 2017 Newsletter
- Developing cost and moving toward a hybrid
- Fieldwork remains ongoing
  - Biological Resource Surveys
  - Topographical and Drainage Surveys
  - Geotechnical Investigations
- Action Plan Amendment



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**ALTERNATIVE 1: ALIGNMENT**

**SCREENING PROCESS**

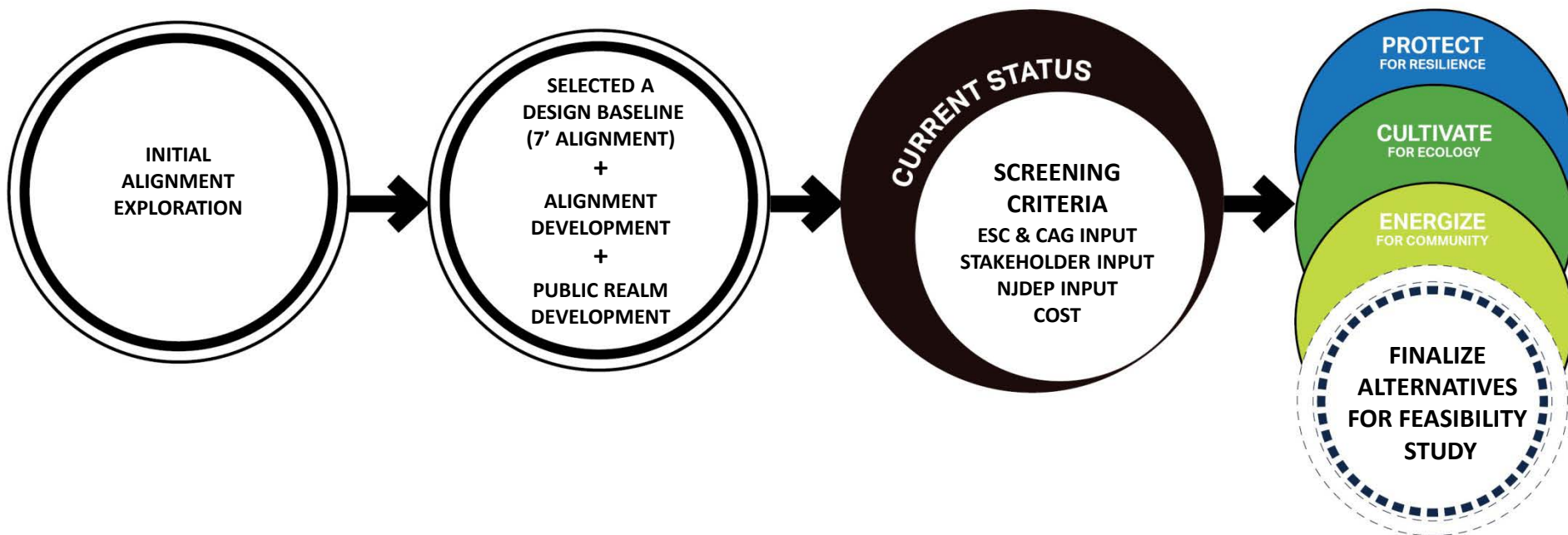
**CHRISTOPHER BENOSKY, AECOM**



# SCREENING PROCESS

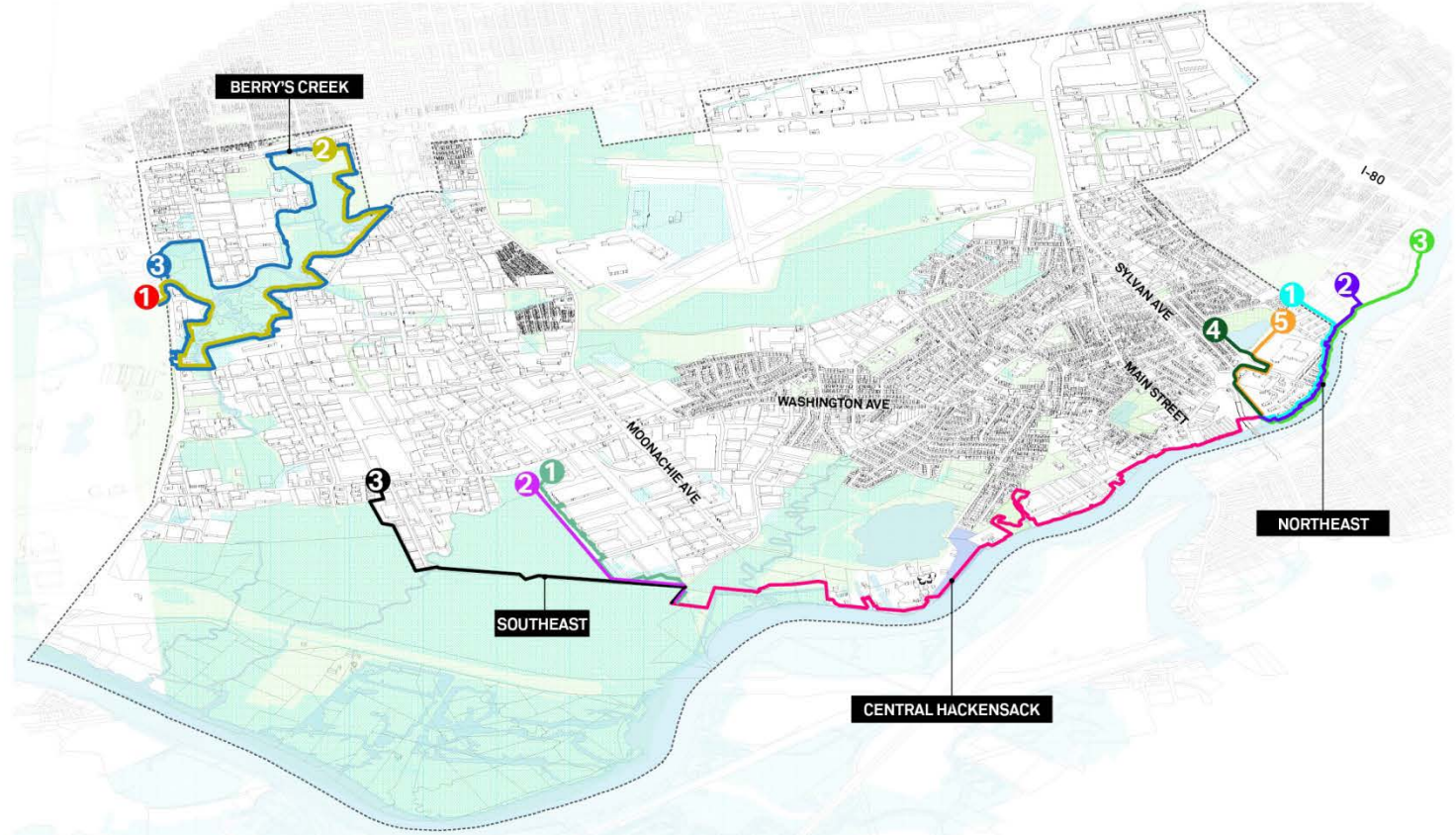
## CONCEPT DEVELOPMENT & SCREENING PROCESS

5



# ALIGNMENT OPTIONS: 11 PRESENTED IN DECEMBER

6

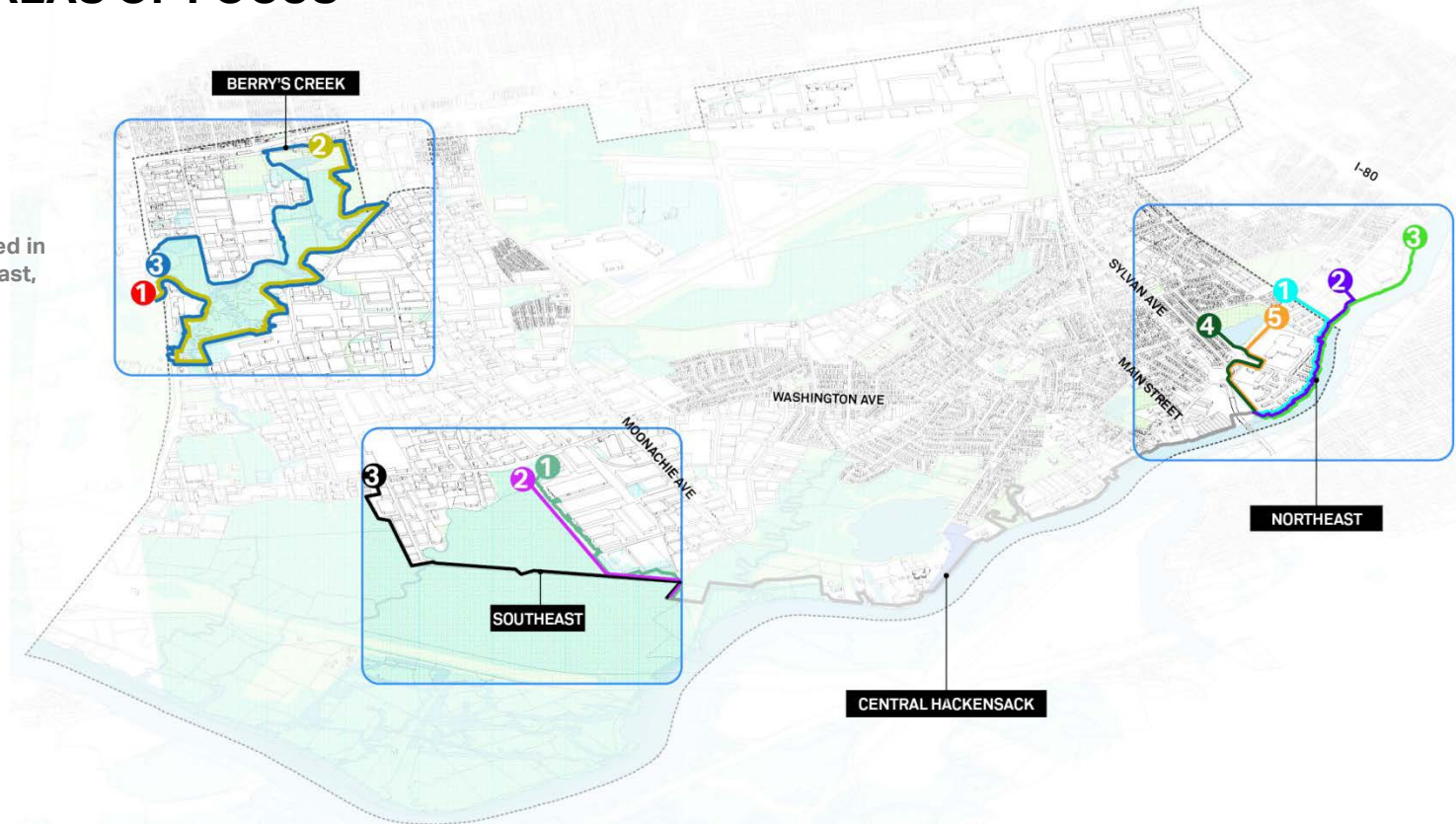


# ALIGNMENT OPTIONS: SCREENING PROCESS

## 3 DISTINCT AREAS OF FOCUS

7

- 5 tie-in options were evaluated in the northeast, 3 in the southeast, and 3 at Berry's Creek



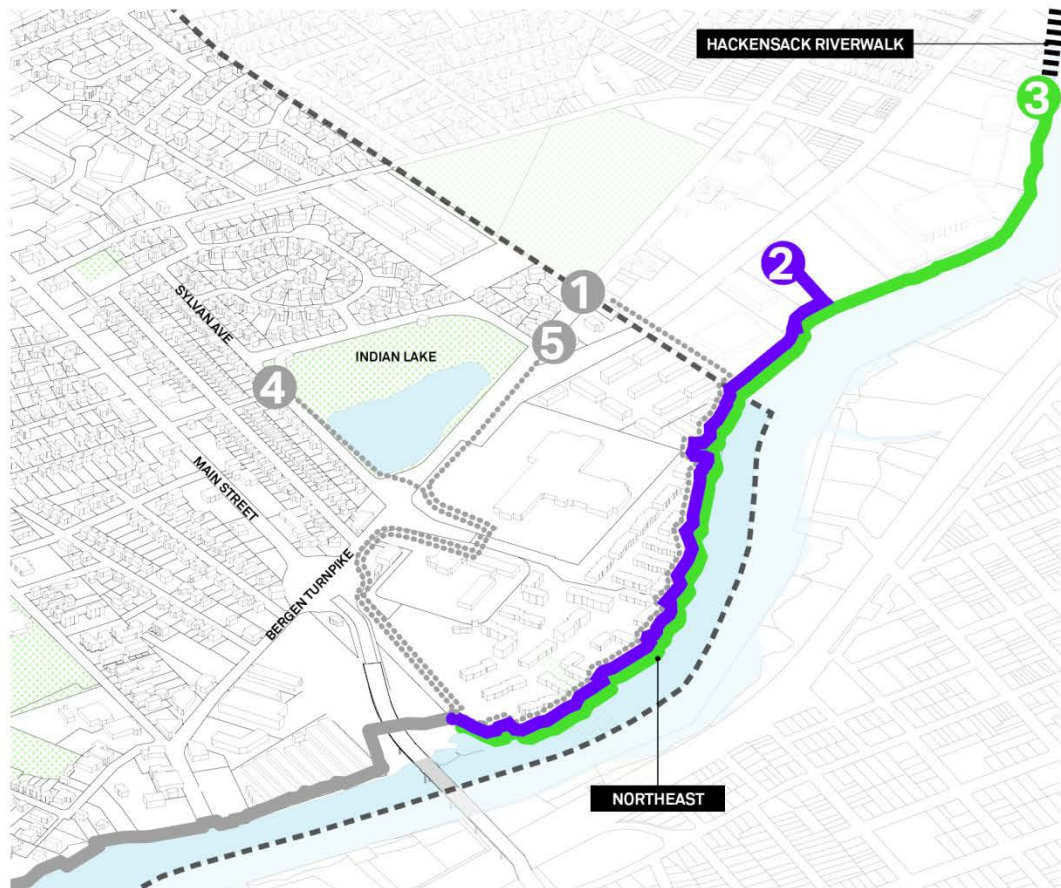


# INITIAL SCREENING OF THE NORTHEAST OPTIONS

8



- 1**
  - Screened out – passive deployable (gate closure) required in evacuation route
- 2**
  - No road crossing or regrading required
  - Tie-in north of project boundary in City of Hackensack
- 3**
  - Extends Option 2 north 700ft to connect project to an existing 1500ft segment of high ground protection
  - Creates connection to existing Hackensack Riverwalk
- 4**
  - Screened out -passive deployable (gate closure) required in evacuation route
  - Provides less protection than 2 & 3
- 5**
  - Screened out -passive deployable (gate closure) required in evacuation route
  - Provides less protection than 2 & 3



# SCREENING THE SOUTHEAST OPTIONS

9



1

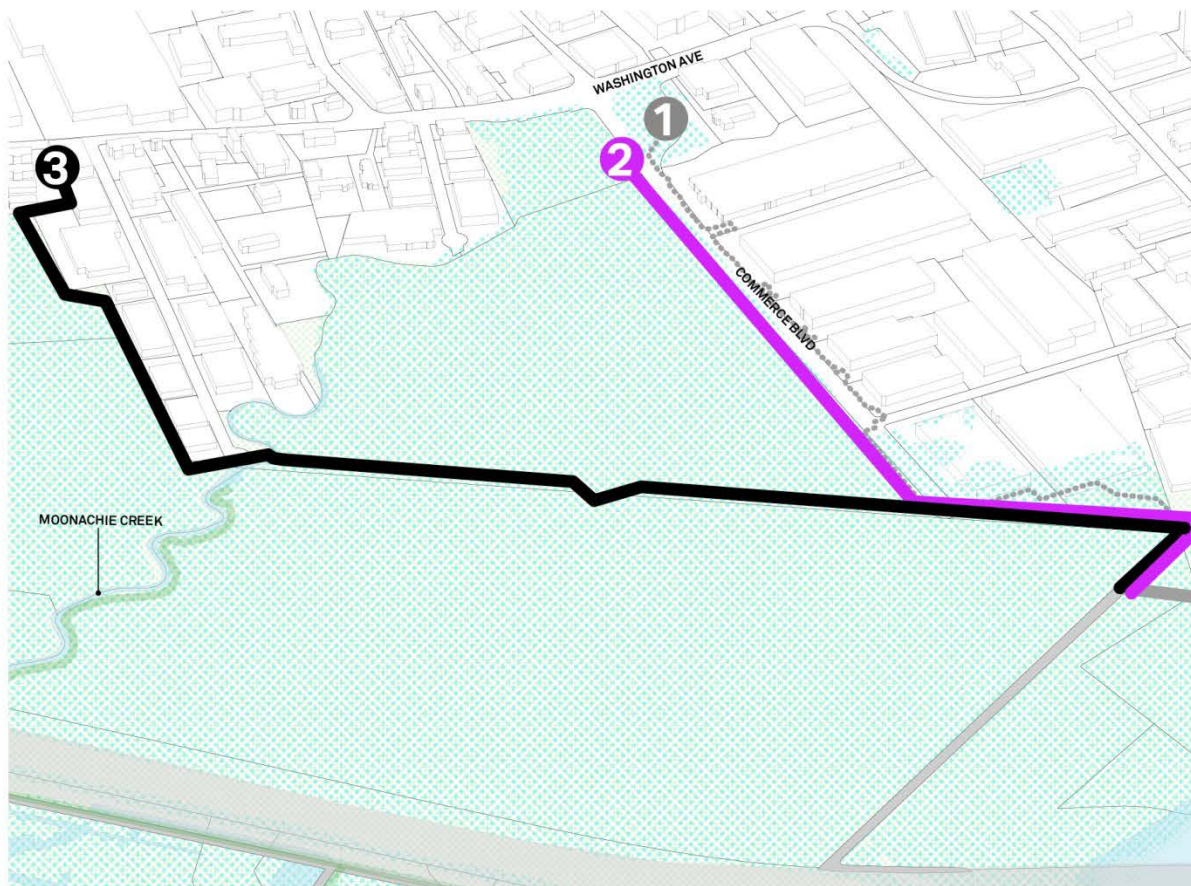
- Screened out – many deployables (gate closure) needed to cross private driveways
- Requires substantial acquisition of private property

2

- Tie-in on south side of Commerce Blvd
- Located primarily within Carlstadt R.O.W. (between curb and marsh)

3

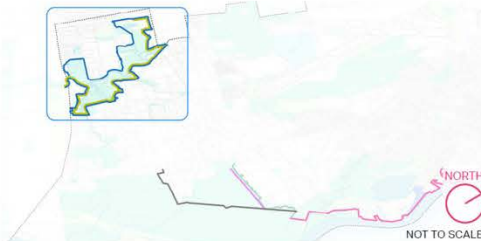
- Sheet pile or berm with new tide gate at Moonachie Creek
- Located on the Kane mitigation bank berm on the freshwater side
- Tie-in on south side of Barella Riverwalk





# SCREENING THE BERRY'S CREEK OPTIONS

10



1

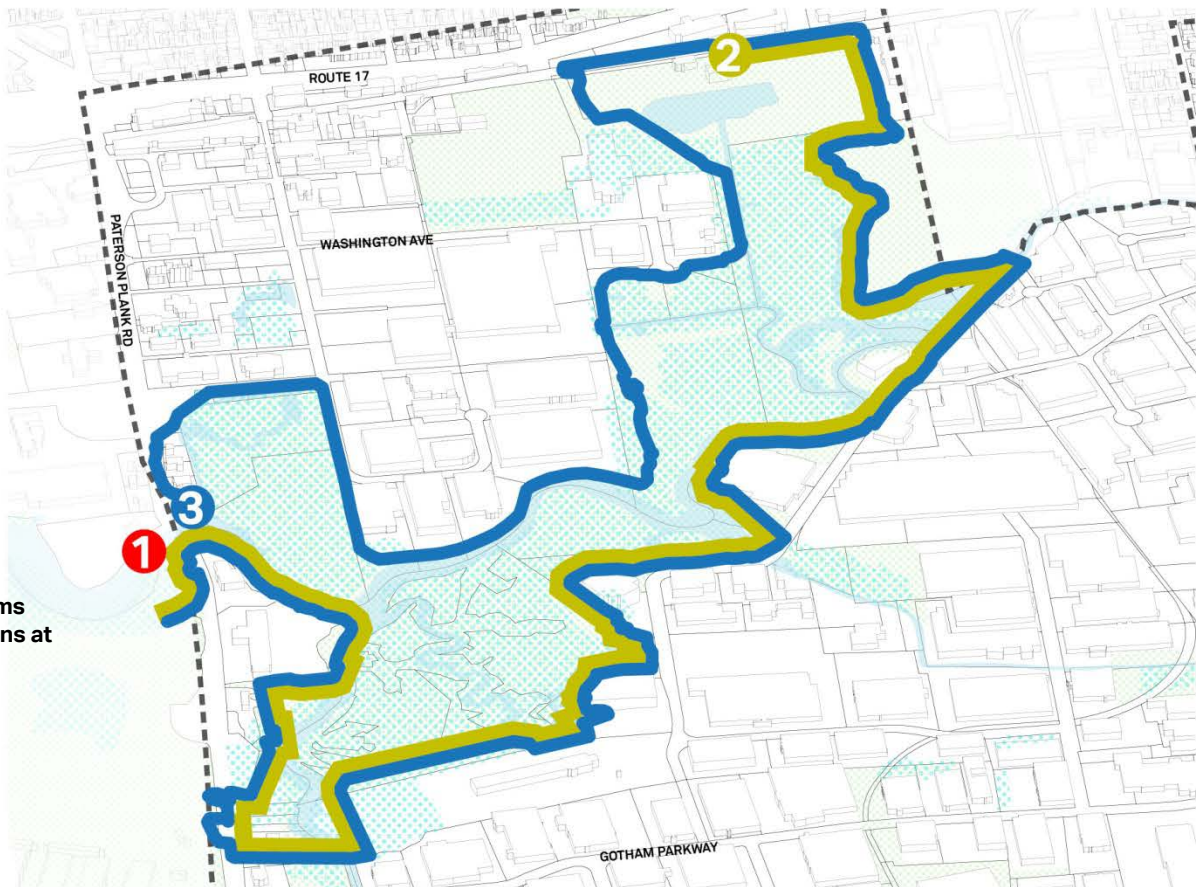
- Surge barrier at Berry's Creek

2

- Combined single sheet pile with concrete cap and reinforced double sheet pile and earthen berms
- Two new tide gates near Peach Island Creek
- Two new pump stations at the West Riser and East Riser tide gates

3

- Combined single sheet pile with concrete cap, reinforced double sheet pile, and earthen berms
- Five new tide gates and three new pump stations at the West Riser and East Riser tide gates





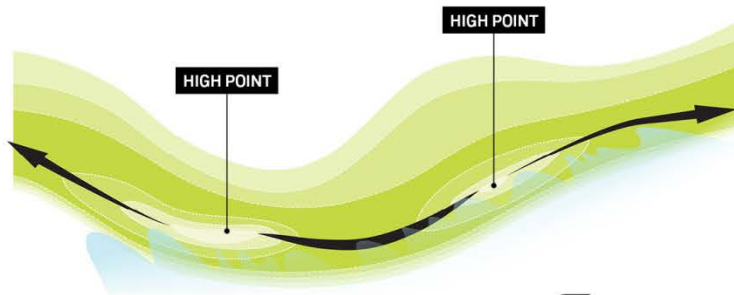
# **ALTERNATIVE 1: ALIGNMENT**

## **NORTHEAST**

**GARRETT AVERY, AECOM  
&  
LULU LOQUIDIS, AECOM**

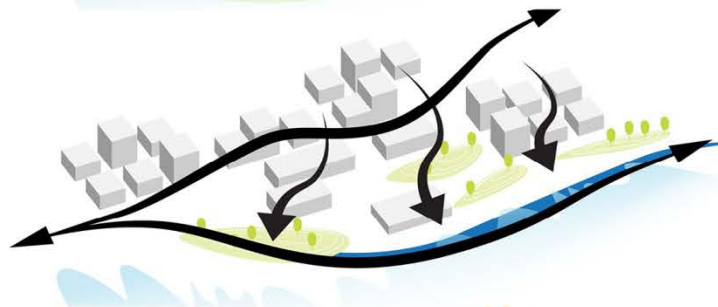
# REFINING ALIGNMENT CONCEPTS

12



## FILL THE GAPS

By connecting the existing topographical high points, the project can reduce construction costs and minimize additional regrading of the Hackensack River edge.



## STICK TO THE EDGE/MAXIMIZE PROTECTION

Where possible, the flood risk intervention runs along the edge between social activity and ecology. This allows maximum engagement for place-making activities and increases the protection area.



## LEVERAGE PUBLIC LAND

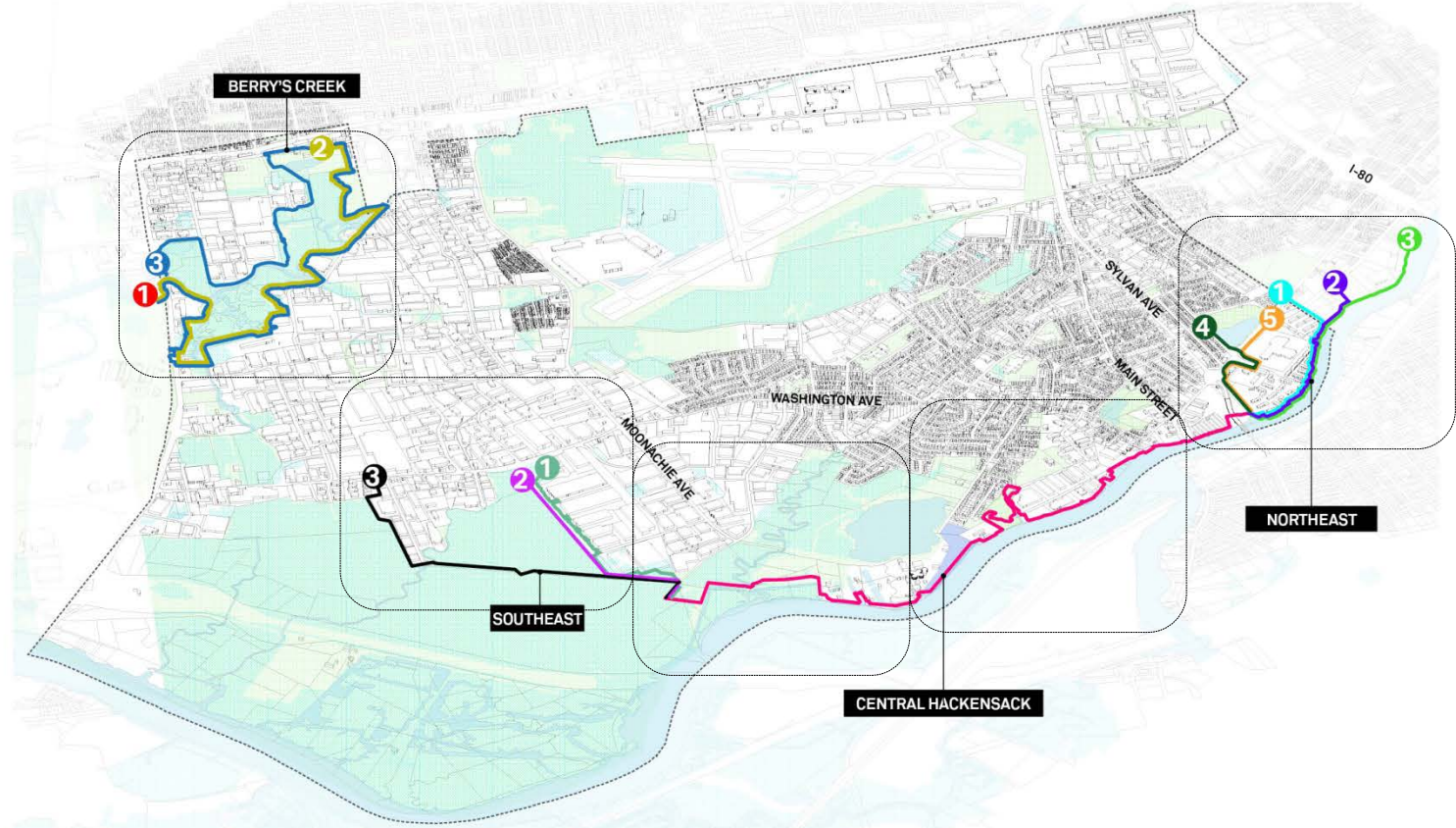
With numerous public agencies in the project area, the project seeks to connect existing public parks as well as provide new park space on existing public land.





# ALIGNMENT DEVELOPMENT – OVERVIEW

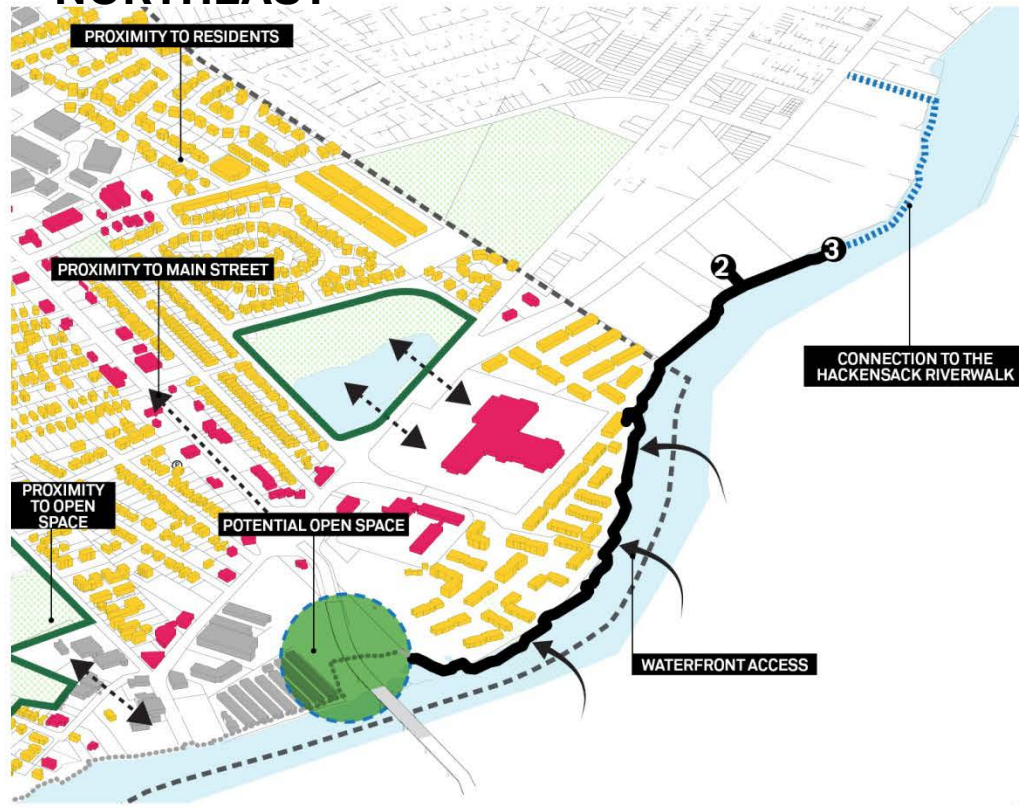
13



# CONSIDERATIONS – WHAT GOES WHERE

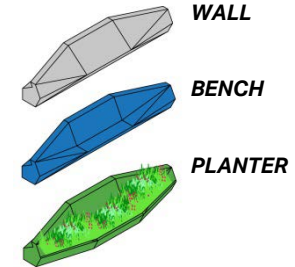
## NORTHEAST

14



### APPLYING THE "KIT OF PARTS"

- Proximity to existing open space, the Hackensack Riverwalk, Main Street, and residential communities
- Opportunities for waterfront connection and new open space



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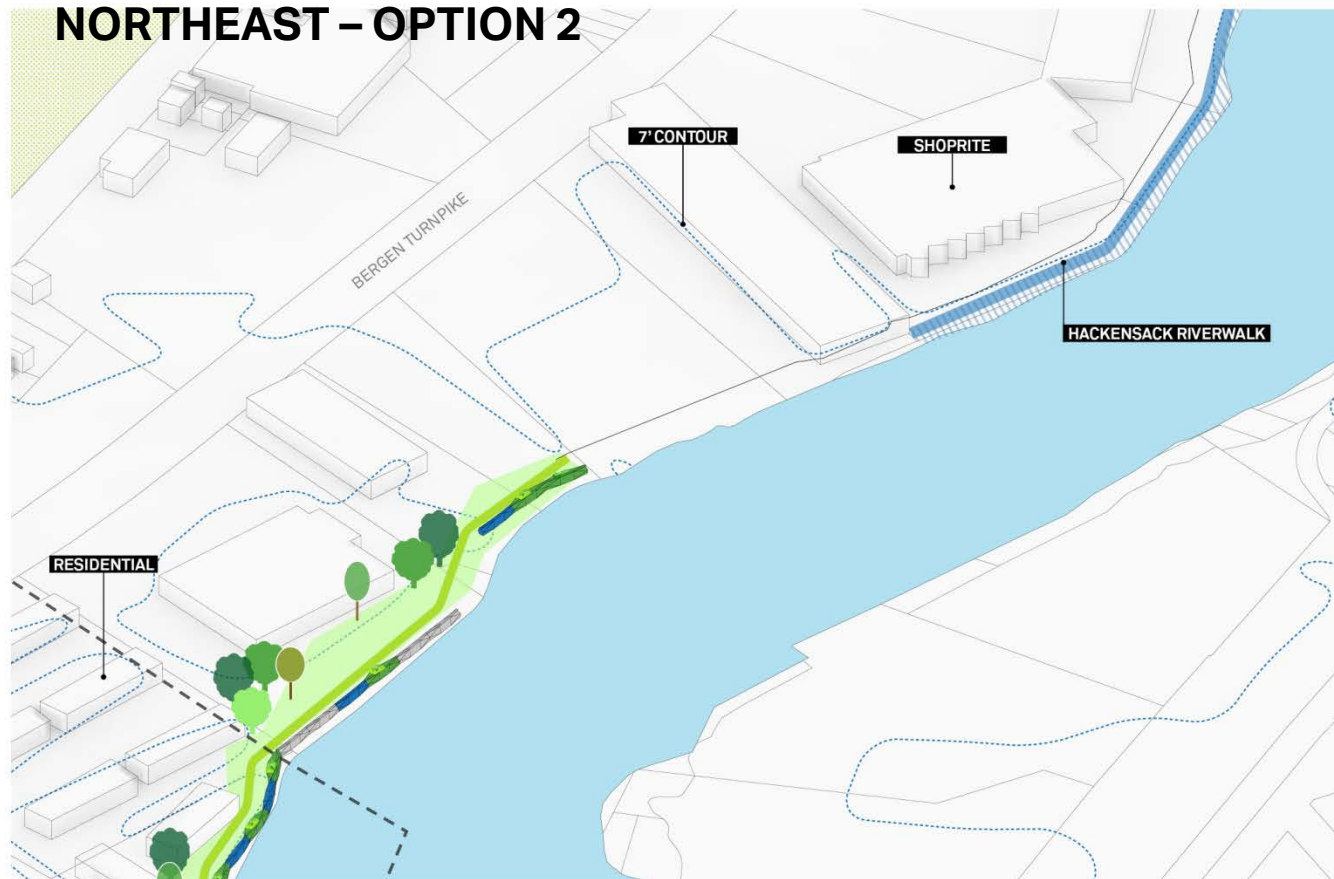
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# ALIGNMENT DEVELOPMENT – 7' CONTOUR TIE-IN

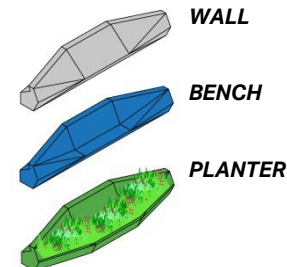
15

## NORTHEAST – OPTION 2



### APPLYING THE "KIT OF PARTS"

- No road crossing or regrading required
- Tie-in north of project boundary in the City of Hackensack

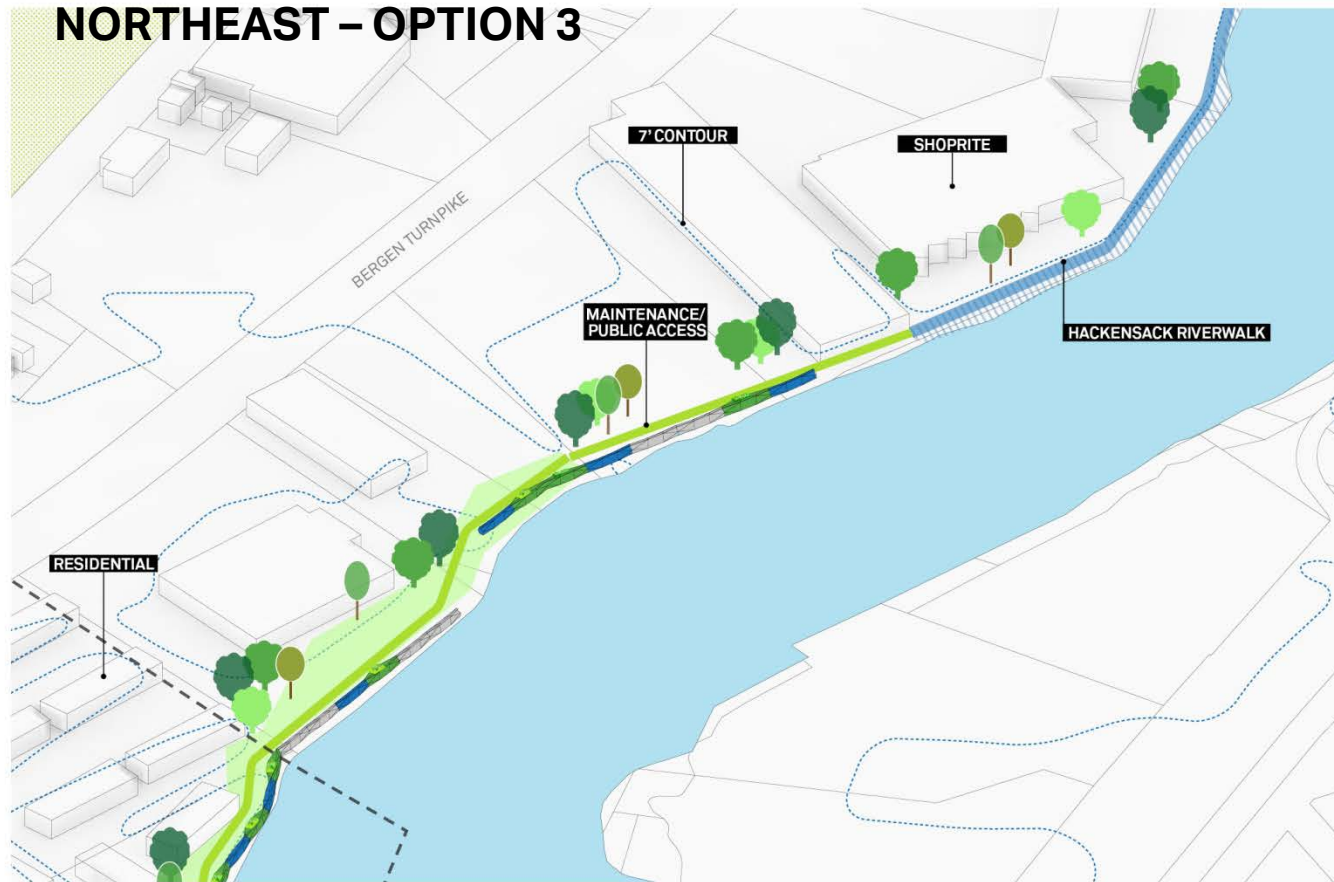




# ALIGNMENT DEVELOPMENT – HACKENSACK TIE-IN

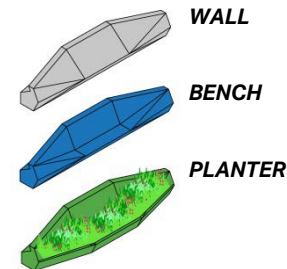
16

## NORTHEAST – OPTION 3



### APPLYING THE "KIT OF PARTS"

- Creates connection to existing segment of the Hackensack Riverwalk
- Further extends protection and modular system



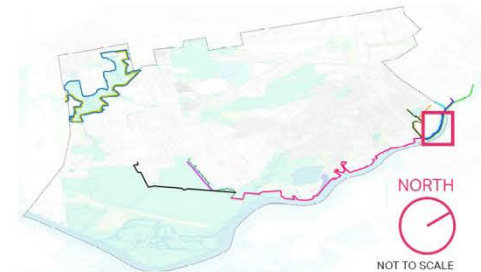
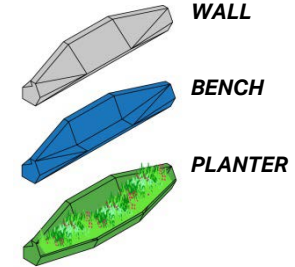
# ALIGNMENT DEVELOPMENT –TYPICAL NORTHEAST

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## APPLYING THE "KIT OF PARTS"

- Infrastructure improvements continue as the alignment moves south





# ALIGNMENT DEVELOPMENT – MULTI-FUNCTIONAL SYSTEM

## NORTHEAST

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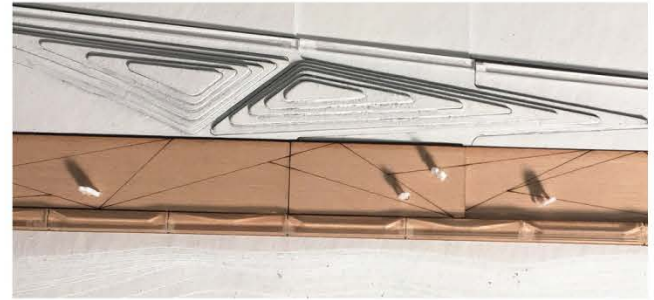
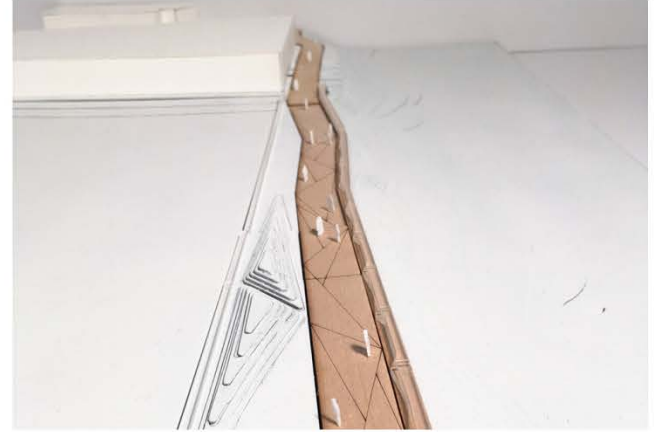
**AECOM**

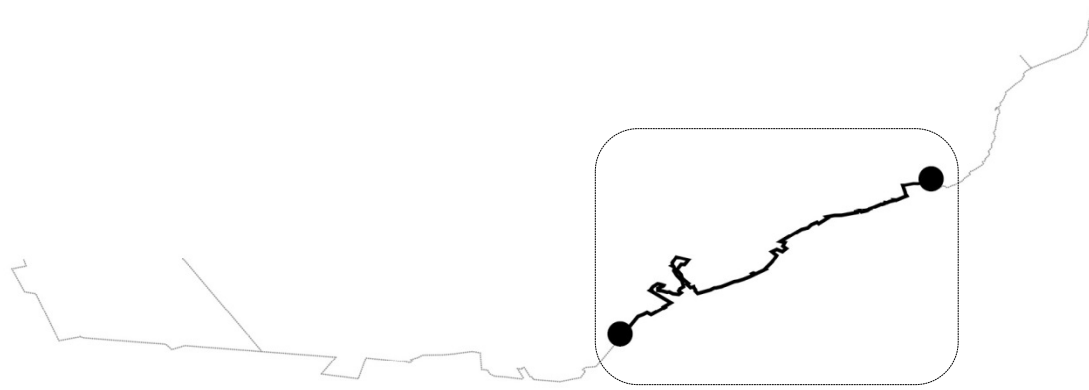
# ALIGNMENT DEVELOPMENT – MULTI-FUNCTIONAL SYSTEM

## PROCESS MODEL

19

- Model making is used to explore concept ideas
- This study examines site constraints and adjacencies





# **ALTERNATIVE 1: ALIGNMENT**

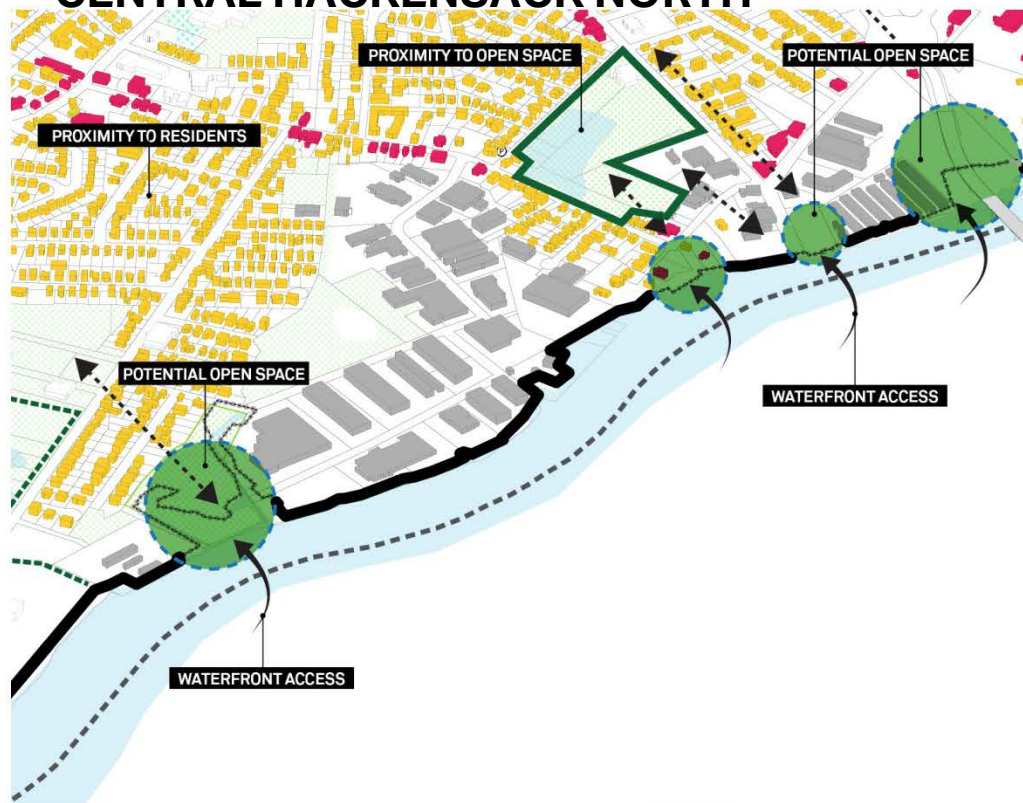
## **CENTRAL HACKENSACK NORTH**



# CONSIDERATIONS – WHAT GOES WHERE

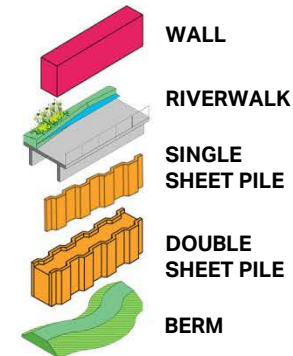
## CENTRAL HACKENSACK NORTH

21



### APPLYING THE "KIT OF PARTS"

- Proximity to existing open space and residential communities
- Opportunities for waterfront connection and new open space



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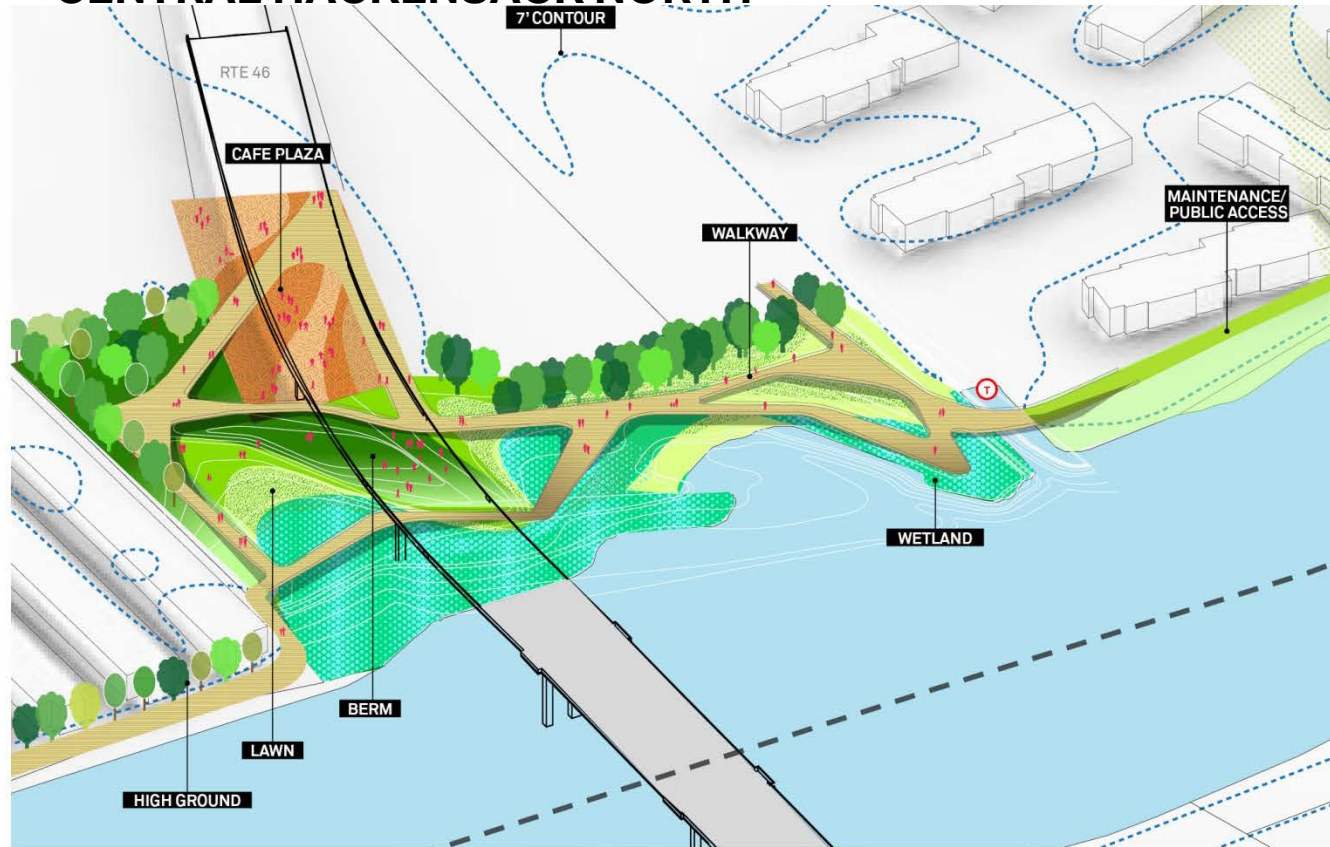
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# ALIGNMENT DEVELOPMENT – FLUVIAL PARK

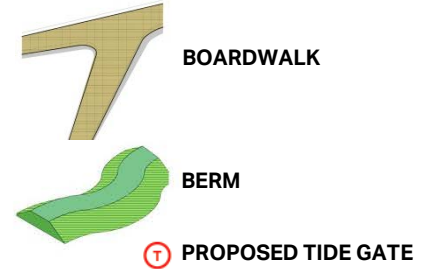
## CENTRAL HACKENSACK NORTH

22



### APPLYING THE "KIT OF PARTS"

- A berm system turns into a public space under Route 46
- The berm system allows for inundation on the river's side during a flood event





# ALIGNMENT DEVELOPMENT – FLUVIAL PARK CONNECTION

## CENTRAL HACKENSACK NORTH

23



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# ALIGNMENT DEVELOPMENT – FLUVIAL PARK CONNECTION

## CENTRAL HACKENSACK NORTH

24



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# ALIGNMENT DEVELOPMENT – FLUVIAL WETLAND PARK CENTRAL HACKENSACK NORTH

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# ALIGNMENT DEVELOPMENT – FLUVIAL WETLAND PARK CENTRAL HACKENSACK NORTH

26



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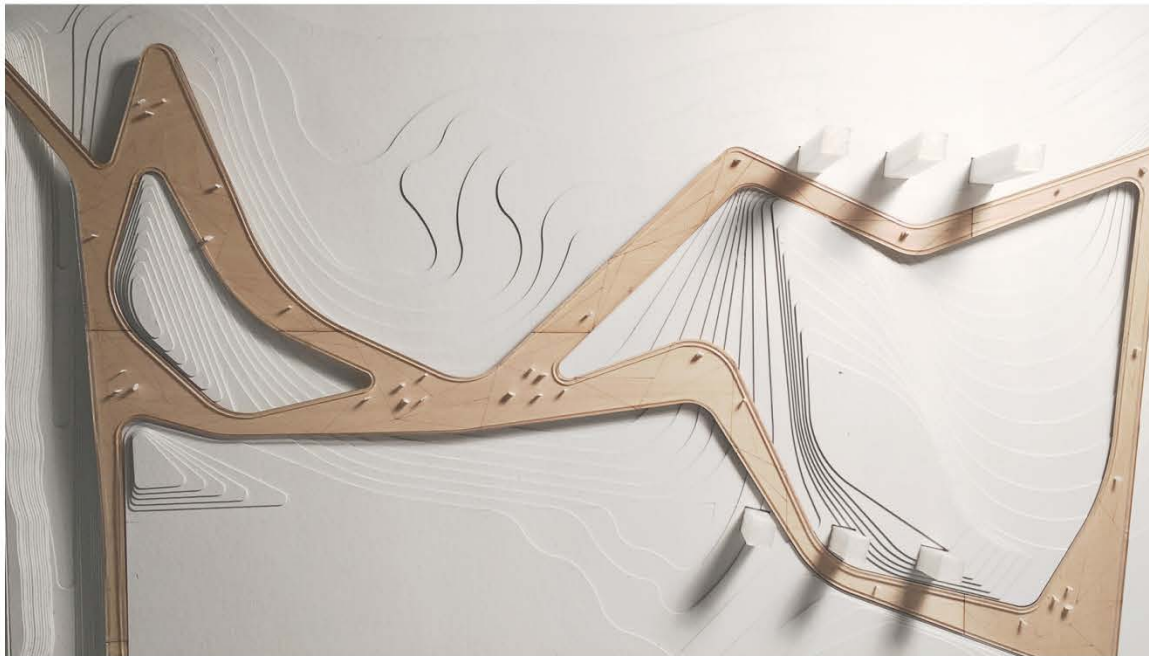
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# ALIGNMENT DEVELOPMENT – FLUVIAL WETLAND PARK PROCESS MODEL

27

- Model making is used to explore design ideas
- This study examines grading and the utilization of soft edges as the protection strategy





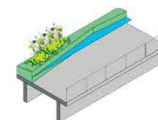
# ALIGNMENT DEVELOPMENT – K-TOWN PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

28

### APPLYING THE “KIT OF PARTS”

- Active recreation field and public realm on the river's edge
- Cantilever walkway is designed to reduce inland flooding and provide a waterfront destination
- The floodwall is built into the structure of the walkway



RIVERWALK

Ⓟ EXISTING PUMP STATION



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# ALIGNMENT DEVELOPMENT – K-TOWN PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

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# ALIGNMENT DEVELOPMENT – K-TOWN PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

30



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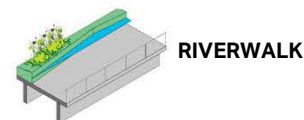
# ALIGNMENT DEVELOPMENT – RIVERSIDE PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

31

### APPLYING THE “KIT OF PARTS”

- The alignment terminates with a connection to Riverside Park
- The new open space is a combination of active and passive recreation



RIVERWALK





# ALIGNMENT DEVELOPMENT – RIVERSIDE PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

32



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# ALIGNMENT DEVELOPMENT – RIVERSIDE PARK & RIVERWALK

## CENTRAL HACKENSACK NORTH

33



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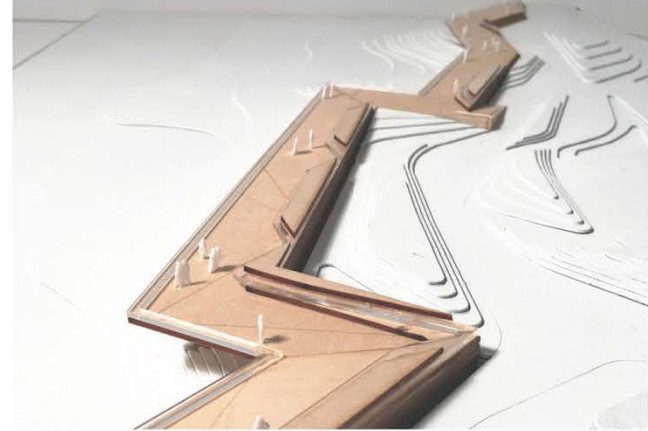
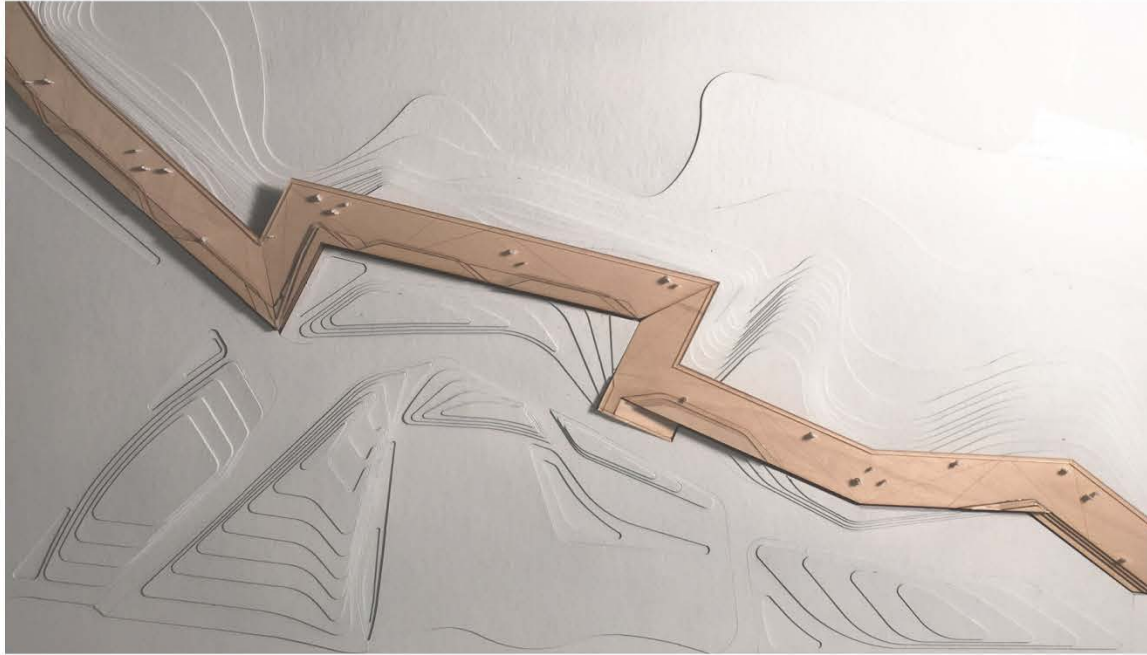
**AECOM**

# ALIGNMENT DEVELOPMENT – RIVERSIDE PARK & RIVERWALK

## PROCESS MODEL

34

- Model making is used to explore design ideas
- This study examines integrated protection strategies at a human scale





# CENTRAL HACKENSACK SOUTH

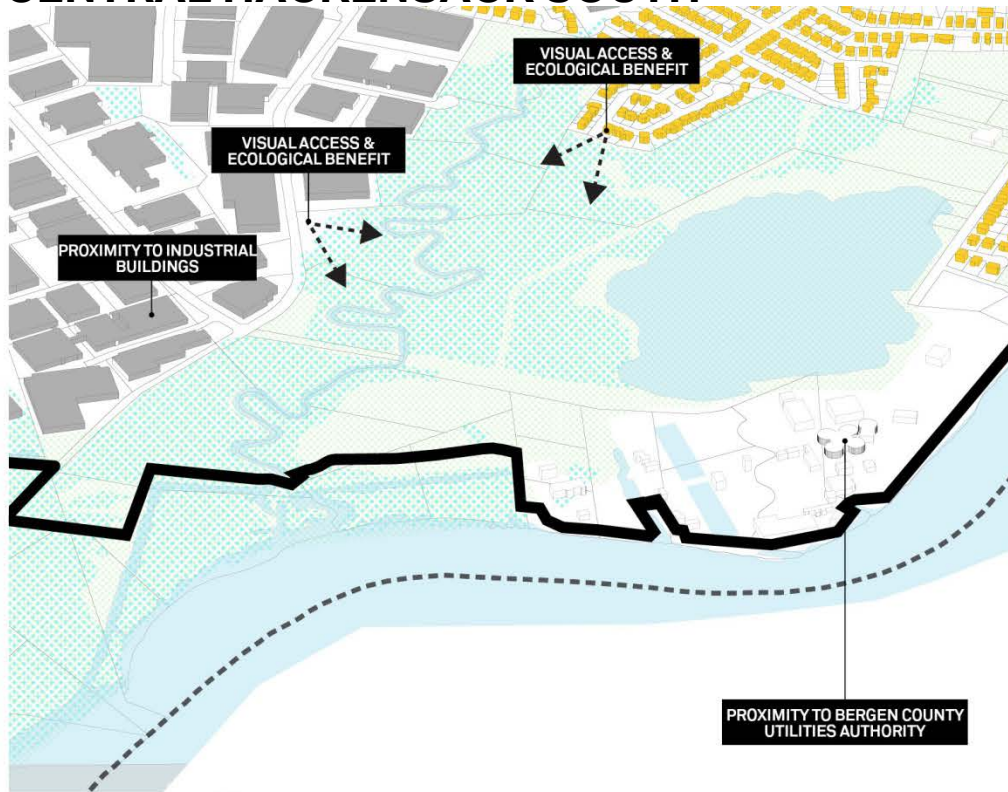
# CENTRAL HACKENSACK SOUTH



# CONSIDERATIONS – WHAT GOES WHERE

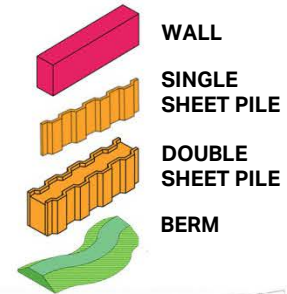
## CENTRAL HACKENSACK SOUTH

36



### APPLYING THE "KIT OF PARTS"

- Proximity to industrial buildings and Bergen County Utilities Authority
- Less public space opportunity
- Potential for visual access and ecological benefit to Losen Slote



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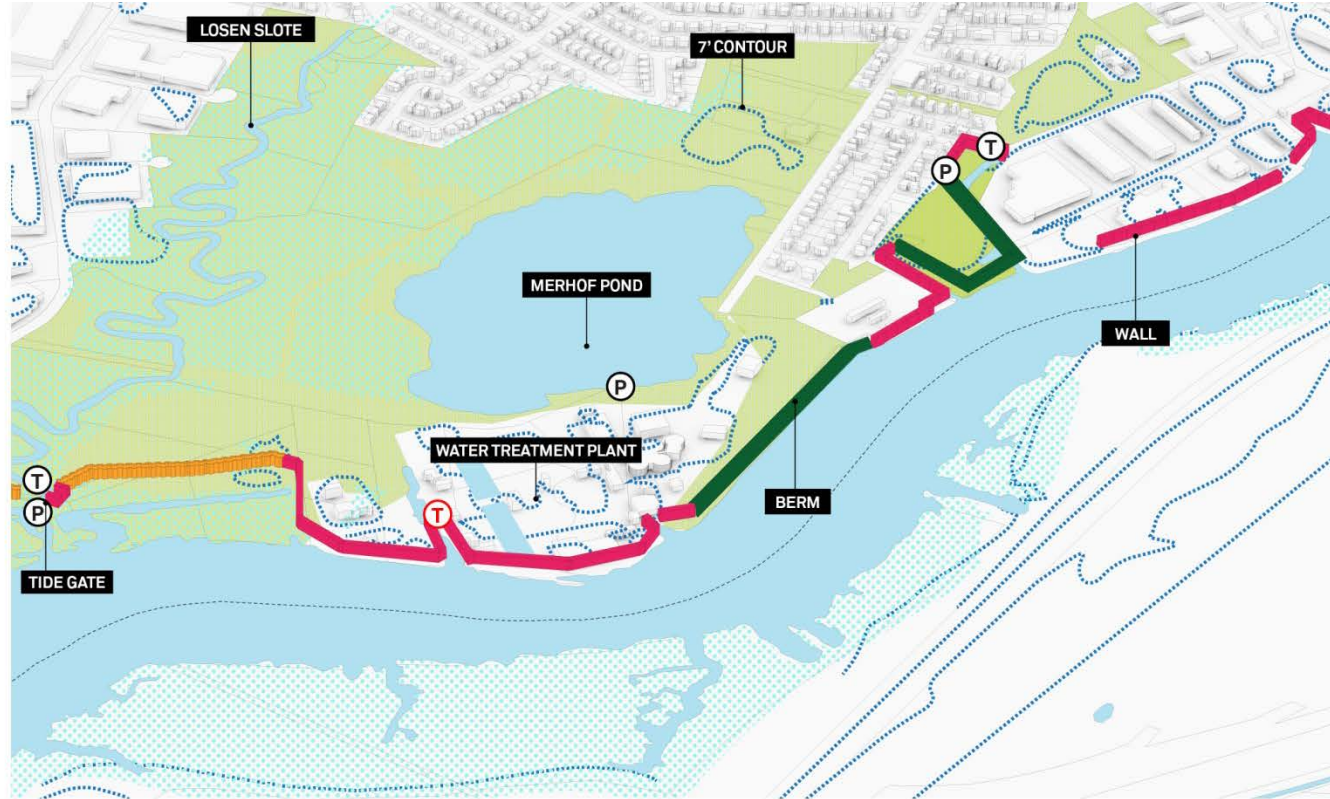
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# ALIGNMENT DEVELOPMENT – TYPICAL

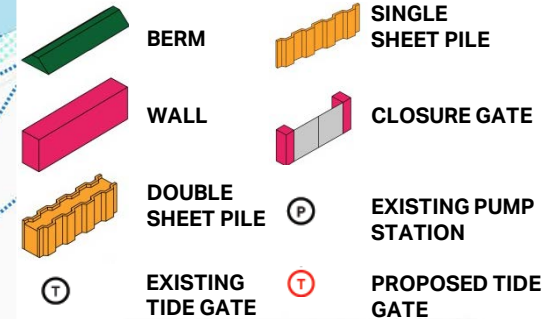
## CENTRAL HACKENSACK SOUTH

37



### APPLYING THE "KIT OF PARTS"

- The typical run is composed of floodwalls, sheet pile, and berm where space allows
- A tide gate protects existing treatment plant outfalls





# ALIGNMENT DEVELOPMENT – BERMS AND WALLS

## CENTRAL HACKENSACK SOUTH

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# ALIGNMENT DEVELOPMENT – BERM

## CENTRAL HACKENSACK SOUTH

39



# PROPOSED



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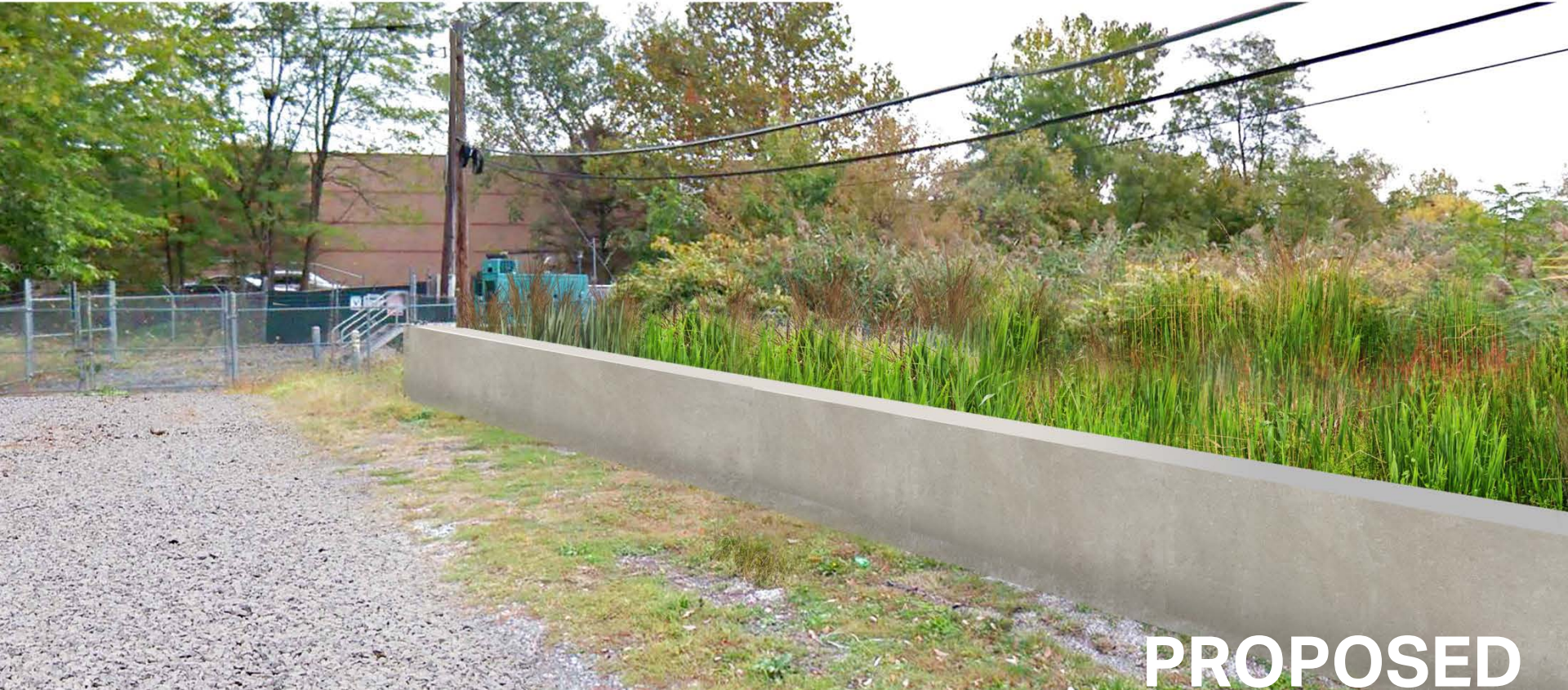
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# ALIGNMENT DEVELOPMENT – WALL

## CENTRAL HACKENSACK SOUTH

40



# PROPOSED

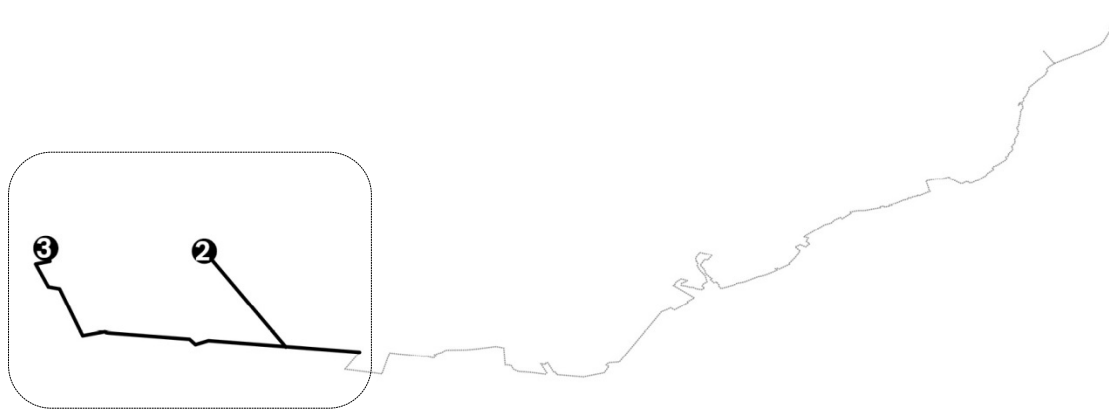


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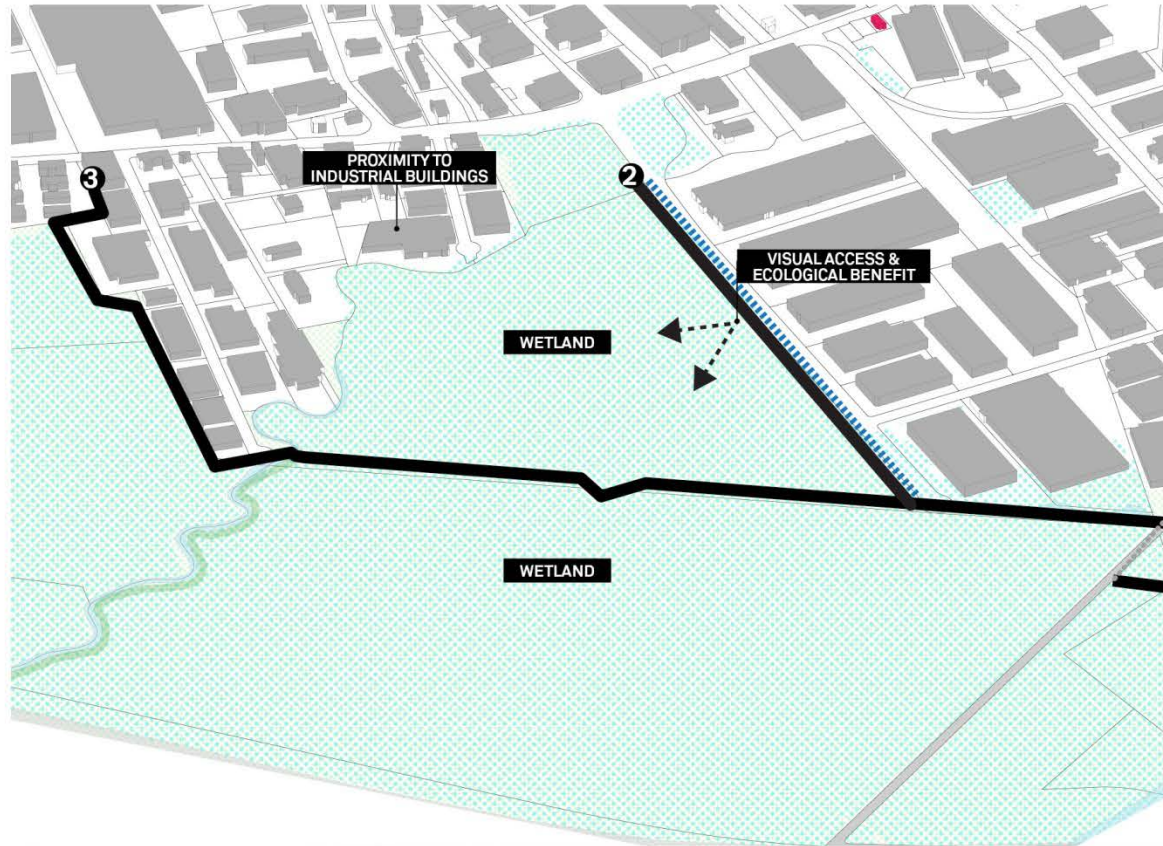


# **ALTERNATIVE 1: ALIGNMENT SOUTHEAST**

# CONSIDERATIONS – WHAT GOES WHERE

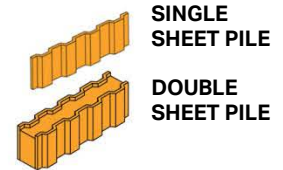
## SOUTHEAST

42



### APPLYING THE "KIT OF PARTS"

- Proximity to industrial buildings
- Less public space opportunity
- Potential for visual access and ecological benefit to adjacent wetlands



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# ALIGNMENT DEVELOPMENT – ON COMMERCE BLVD

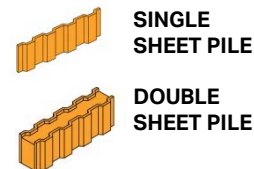
## SOUTHEAST – OPTION 2

43



### APPLYING THE "KIT OF PARTS"

- Single sheet pile wall between Commerce Blvd and marsh
- Double sheet pile wall for structural integrity adjacent to existing berm





# ALIGNMENT DEVELOPMENT – ON COMMERCE BLVD

## SOUTHEAST – OPTION 2

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# ALIGNMENT DEVELOPMENT – ON COMMERCE BLVD

## SOUTHEAST – OPTION 2

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PROPOSED



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# ALIGNMENT DEVELOPMENT – SOUTHEAST

## OPTION 3

46

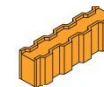


### APPLYING THE "KIT OF PARTS"

- Double sheet pile for structural integrity
- Existing berm and maintenance access remain



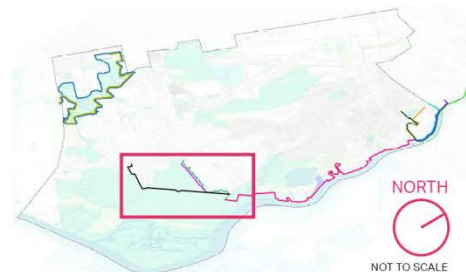
**SINGLE  
SHEET PILE**



**DOUBLE  
SHEET PILE**



**PROPOSED FLUVIAL GATE**



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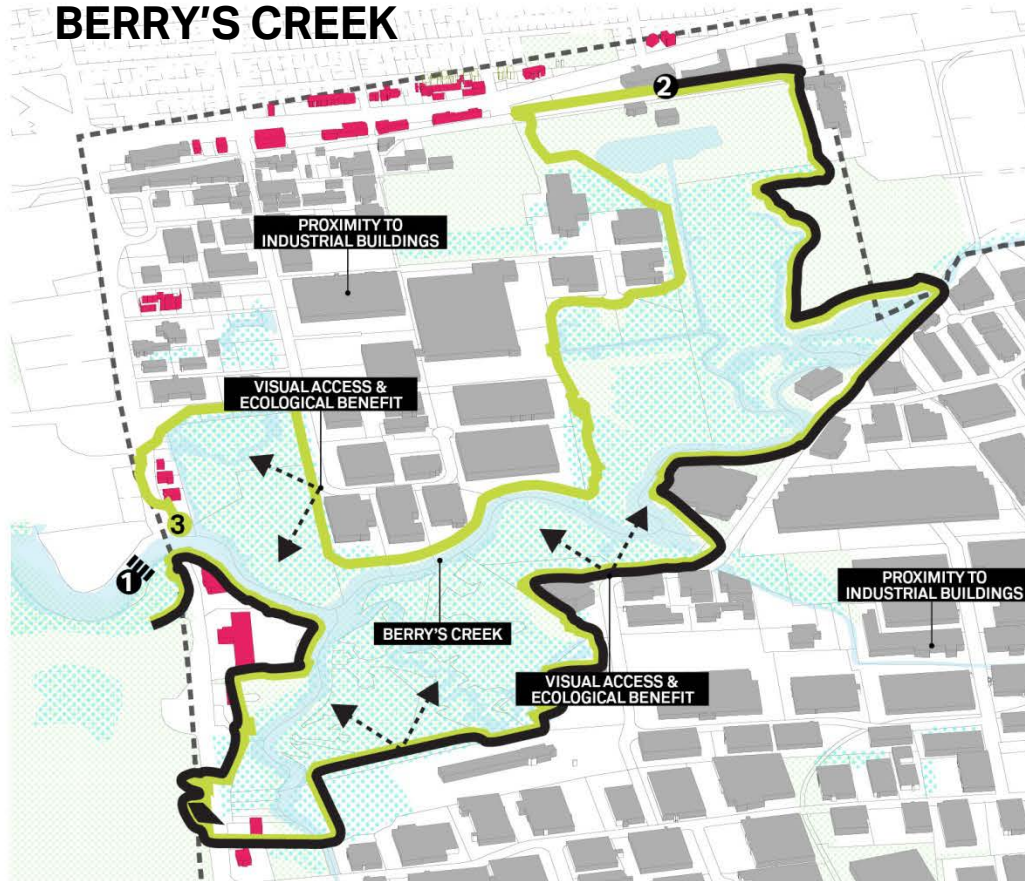


**ALTERNATIVE 1: ALIGNMENT**

**BERRY'S CREEK**

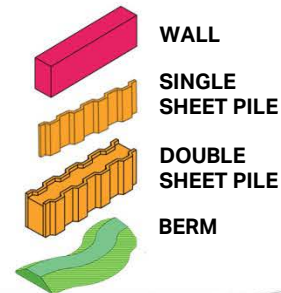
# CONSIDERATIONS – WHAT GOES WHERE

## BERRY'S CREEK



### APPLYING THE "KIT OF PARTS"

- Proximity to industrial buildings and Berry's Creek
- Less public space opportunity
- Potential for visual access and ecological benefit



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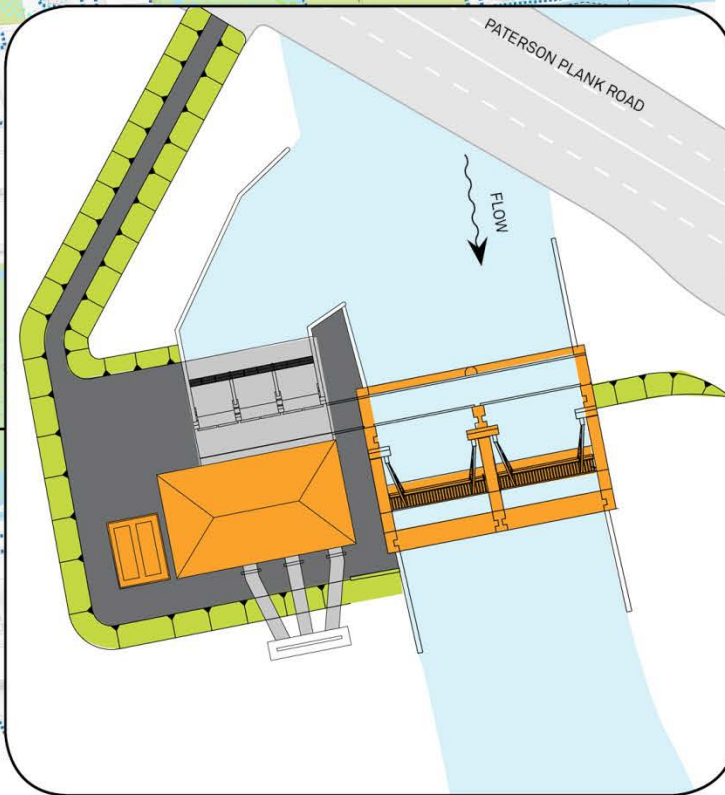
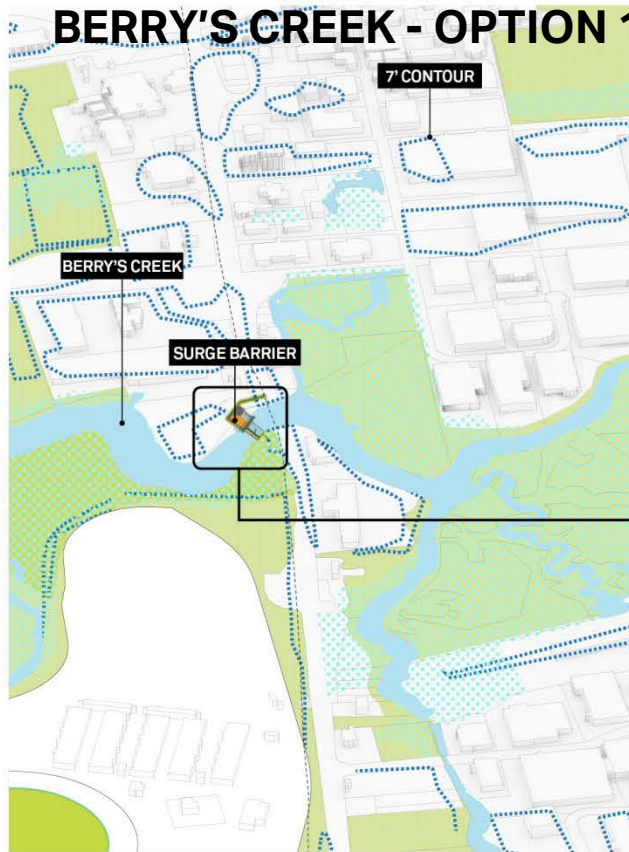
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# ALIGNMENT DEVELOPMENT – SURGE BARRIER

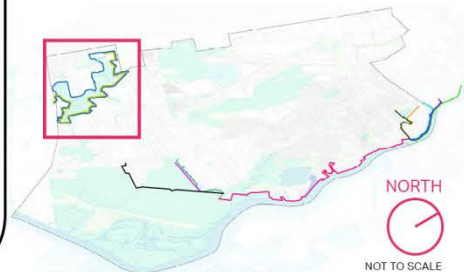
49

## BERRY'S CREEK - OPTION 1



### APPLYING THE "KIT OF PARTS"

- 118' wide dual-gate opening with short "t-wall" and earthen berms to prevent flanking (water flowing around surge barrier)
- Gate preserves low-clearance navigation through channel

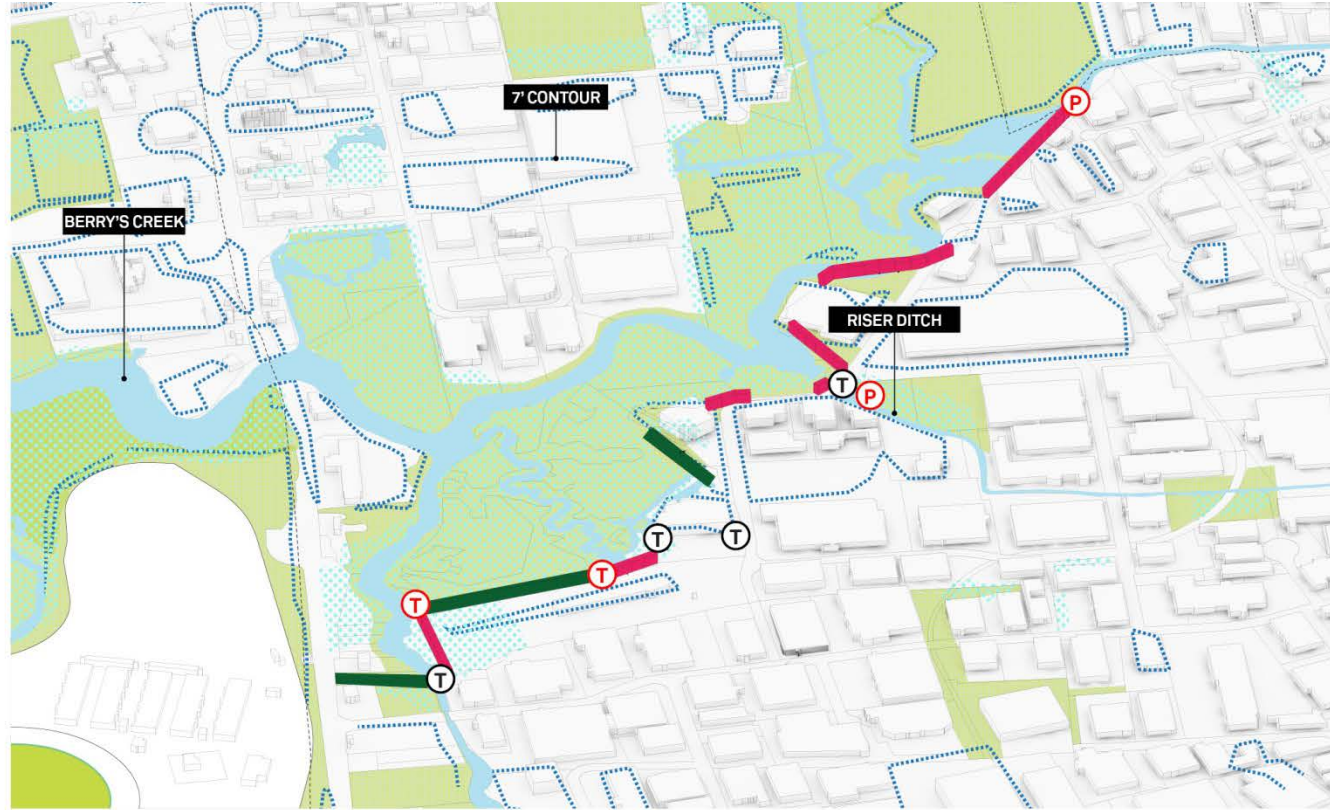




# ALIGNMENT DEVELOPMENT – EAST

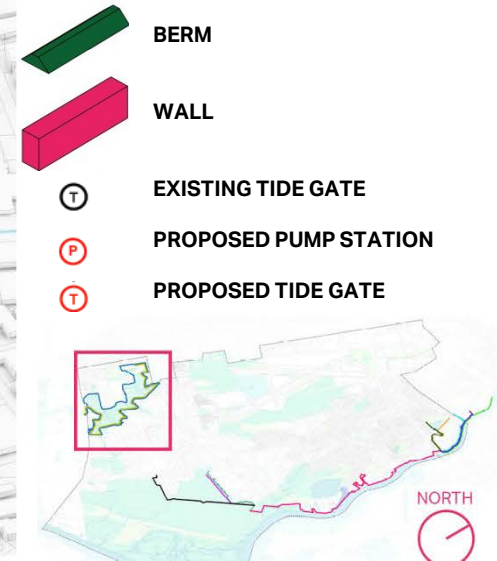
## BERRY'S CREEK - OPTION 2

50



### APPLYING THE "KIT OF PARTS"

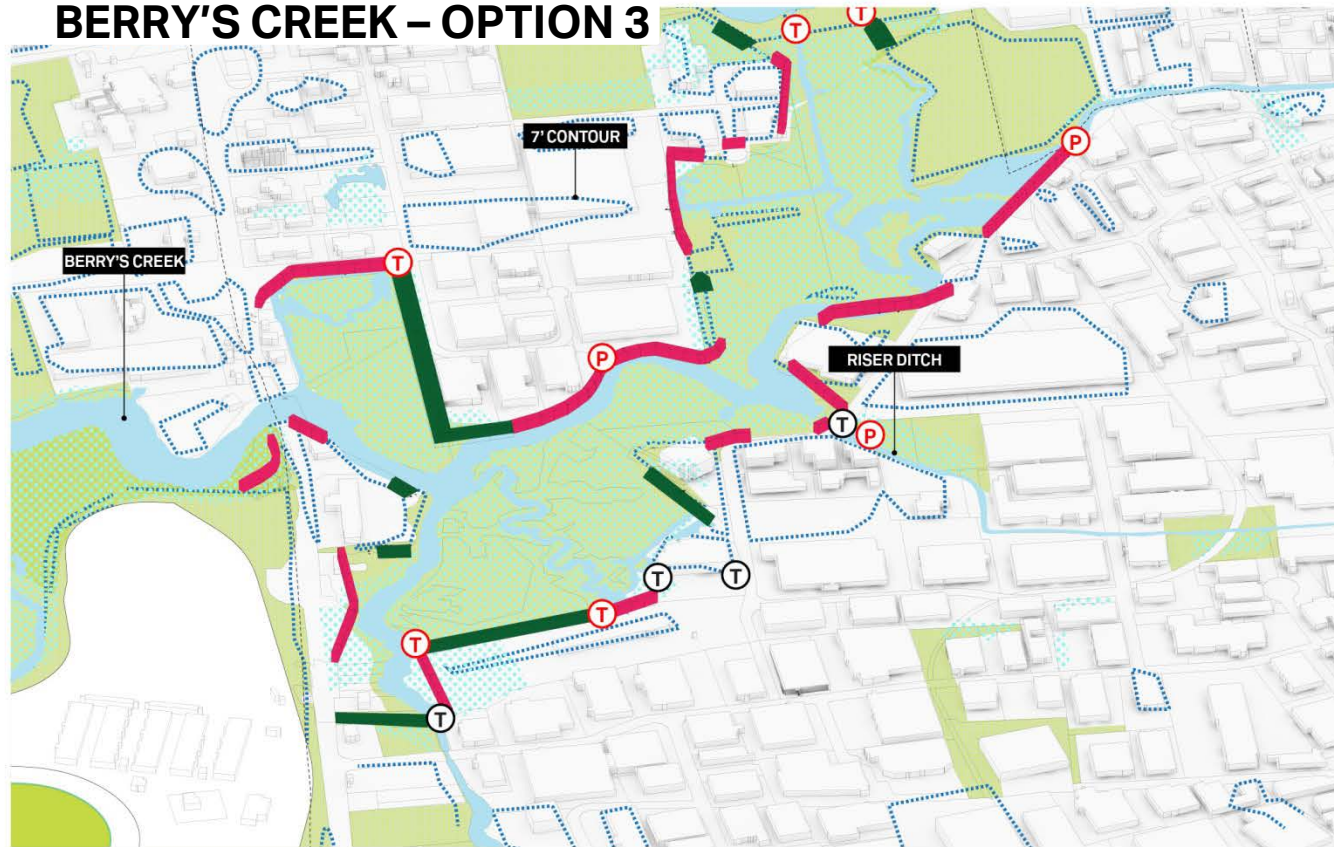
- Combined single sheet pile with concrete cap + reinforced double sheet pile + earthen berms
- Two new tide gates near Peach Island Creek and two new pump stations at the West Riser and East Riser tide gates



# ALIGNMENT DEVELOPMENT – EAST & WEST

## BERRY'S CREEK – OPTION 3

51

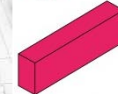


### APPLYING THE "KIT OF PARTS"

- Combined single sheet pile with concrete cap + reinforced double sheet pile + earthen berms
- Five new tide gates
- Three new pump stations at the West Riser and East Riser tide gates



BERM



WALL



EXISTING TIDE GATE



PROPOSED PUMP STATION



PROPOSED TIDE GATE



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**ALTERNATIVE 3:**

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**HYBRID ALIGNMENT**



# ALTERNATIVE 3 – DEVELOPING THE HYBRID

## COMBINING ALTERNATIVES 1 & 2

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### PROTECT FOR RESILIENCE

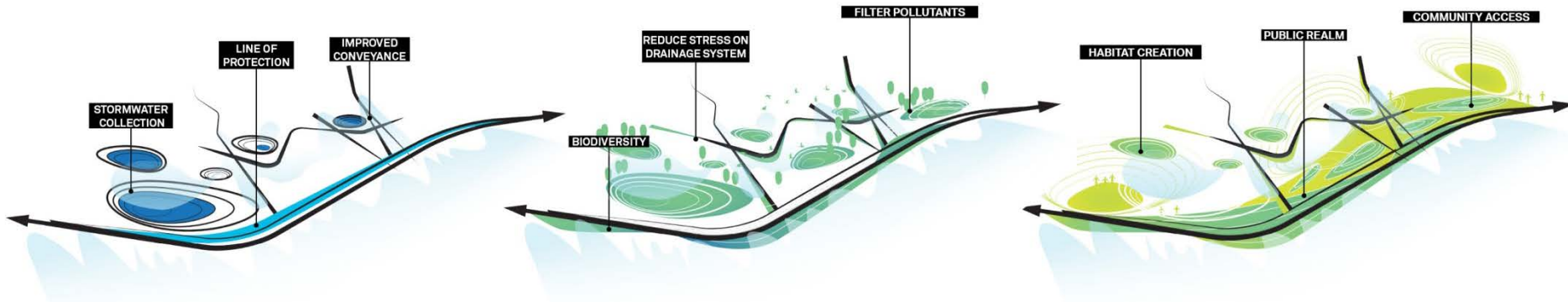
Establish effective combination of structural and stormwater strategies.

### CULTIVATE FOR ECOLOGY

Ecologically enhance both strategies to maximize variety of habitat and program.

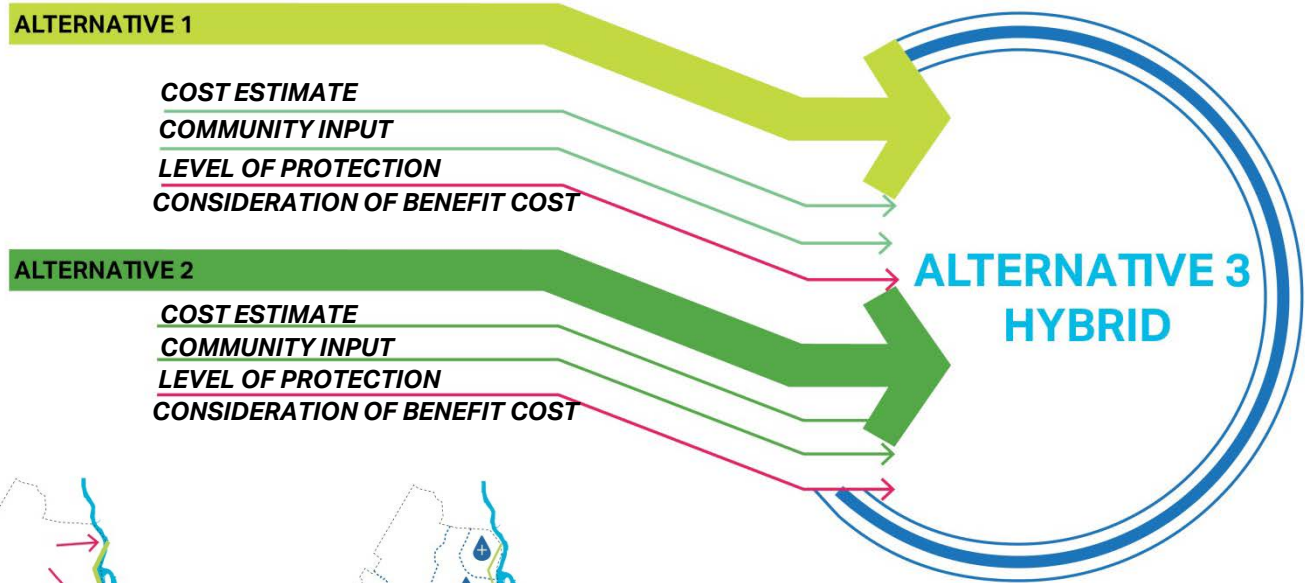
### ENERGIZE FOR COMMUNITY

Public realm improvements integrated into the strategies energize communities.



# ALTERNATIVE 3 – DEVELOPING THE HYBRID HYBRID APPROACH

- Understand cost implications, analyze community feedback, and identify level of protection
- The benefit cost analysis will assist in determining best approach to achieve maximum benefits for the community overall



NETWORK MAP



MAXIMIZE PROTECTION



INTEGRATE STORMWATER STRATEGIES

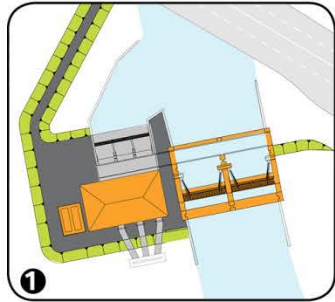


# ALTERNATIVE 3 – HYBRID EXAMPLE A

## POTENTIAL COMBINATIONS

55

### ALT 1: SURGE BARRIER @ BERRY'S CREEK



+

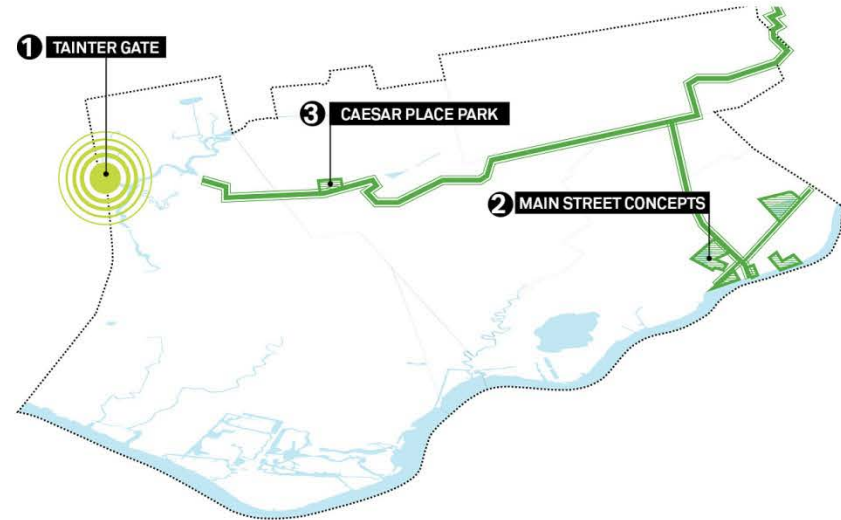
### ALT 2: EAST RISER + MAIN STREET DRAINAGE IMPROVEMENTS + OPEN SPACE



=



- Hybrid options are currently under consideration
- This option combines interior drainage improvements and a surge barrier at Berry's Creek



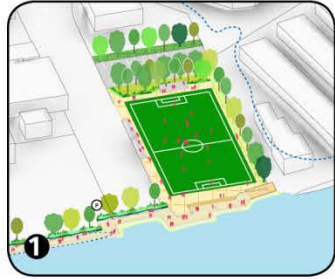
# ALTERNATIVE 3 – HYBRID EXAMPLE B

## POTENTIAL COMBINATIONS

56

**ALT 1:**

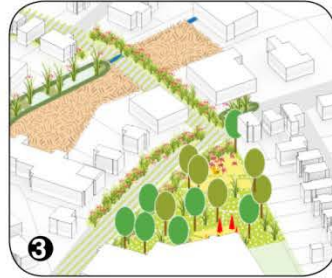
**NE 3 + CENTRAL + SE 2**



+

**ALT 2:**

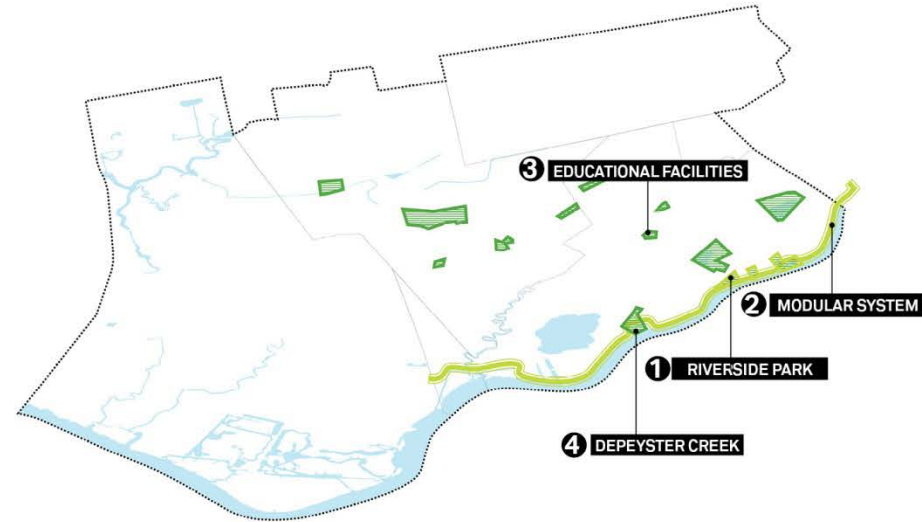
**PARKS**



=



- Hybrid options are currently under consideration
- This option combines interior drainage improvements and Hackensack alignment options



REBUILD BY DESIGN MEADOWLANDS

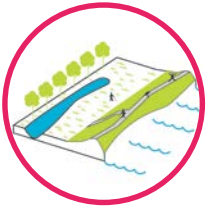
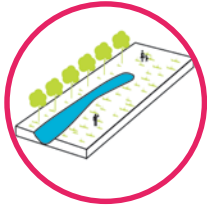
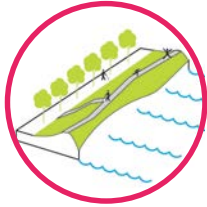
CAG Meeting #8 // March 29, 2017

**AECOM**



# **NEXT STEPS**

**CHRISTOPHER BENOSKY, AECOM**



## NJDEP / AECOM UPCOMING ACTIVITIES

- Prepare Meeting Summary for CAG #8
- Continue developing:
  - Concepts, Alternatives, & Costs
- CAG #9 in Late May
  - Alternative 3 – Hybrid & Biological Resource Update
- Hold Public Hearing on Action Plan Amendment



# PUBLIC HEARING – ACTION PLAN AMENDMENT

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- HUD requires that all RBD projects create an Action Plan Amendment that documents the proposed use of funds, and publish it for public input.
- The Action Plan Amendments for all RBD projects are required to be submitted to HUD before June 1st of this year.
- This Action Plan Amendment will be publicly noticed in local newspapers and on our DCA and DEP project website.
- The Action Plan Amendment will also be open to public comment and the State will hold a public hearing on **May 3, 2017 from 5pm to 8pm**

# NEXT STEPS

## CAG: CALL TO ACTION

- Submit comments from CAG #8 meeting by **April 5, 2017**
- Share information from this meeting with friends and neighbors
- Continue to build interest in the Project
- Ensure the public knows about upcoming information (to be posted on Project website)

# NEXT STEPS

## CRITICAL INFORMATION

**May 3, 2017**

**Public Hearing: Action Plan Amendment**

**Project Website**

**[www.rbd-meadowlands.nj.gov](http://www.rbd-meadowlands.nj.gov)**

**Project Email**

**[rbd-meadowlands@dep.nj.gov](mailto:rbd-meadowlands@dep.nj.gov)**

**Question & Answer**



# THANK YOU!

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