

REBUILD BY DESIGN MEADOWLANDS

CITIZEN ADVISORY GROUP (CAG) MEETING #6

**ALTERNATIVE 1: STRUCTURAL FLOOD
REDUCTION CONCEPT DEVELOPMENT**

December 6, 2016



PREPARED BY **AECOM**

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Table of Contents

1.0 List of Acronyms	3
2.0 Agenda	4
3.0 Power Point Presentation.....	5
4.0 Concept Worksheets	32
5.0 Personal Notes	35

1.0 List of Acronyms

List of Acronyms

BCR	Benefit/Cost Ratio
CAG	Citizen Advisory Group
CDBG-DR	Community Development Block Grant – Disaster Recovery
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
HUD	Department of Housing and Urban Development
NEPA	National Environmental Policy Act
NJDEP	New Jersey Department of Environmental Protection
RBD	Rebuild by Design
RBDM	Rebuild by Design Meadowlands

2.0 Agenda

Alternative 1: Structural Flood Reduction Concept Development

6-8 PM

December 6, 2016

Conference Room 90

Port Authority Conference Room

90 Moonachie Ave

Teterboro, NJ 07608

Project Website

www.rbd-meadowlands.nj.gov

Project email

rbd-meadowlands@dep.nj.gov

Welcome

Presentation

Opening Remarks (10 Minutes)

Agenda (Linda Fisher, NJDEP)

Project Status Update and Introduction to Alternative 1 (Chris Benosky, AECOM)

Alternative 1: Structural Flood Reduction Concept Development (40 Minutes)

Flood Conditions (Chris Benosky, AECOM)

Preliminary Flood Reduction Alignment Options (Garrett Avery, AECOM)

Design Elements- Applying the “Kit of Parts” (Susan Bemis, AECOM)

Next Steps & Q&A/Closure (30 Minutes)

Next Steps (Chris Benosky, AECOM)

Question and Answers

3.0 Power Point Presentation

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ALTERNATIVE 1: STRUCTURAL FLOOD REDUCTION CONCEPT DEVELOPMENT

AGENDA

Linda Fisher, NJDEP

2

- Welcome & Opening Remarks
- Project Status Update and Schedule
- Alternative 1: Structural Flood Reduction Concept Development
 - Flood Conditions
 - Flood Reduction Alignment Options
 - Developing the "Kit of Parts"



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PROJECT STATUS UPDATE

Chris Benosky, AECOM

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- Developed working draft Concept Screening Criteria
- Completed and published to Project Website:
 - Meeting Minutes from CAG Meeting #5
 - November 2016 Newsletter
- Developing Alignment Options



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ALTERNATIVE 1:

STRUCTURAL FLOOD REDUCTION

CHRIS BENOSKY, AECOM



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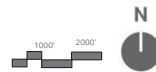
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EXISTING 100-YEAR FLOODPLAIN

5

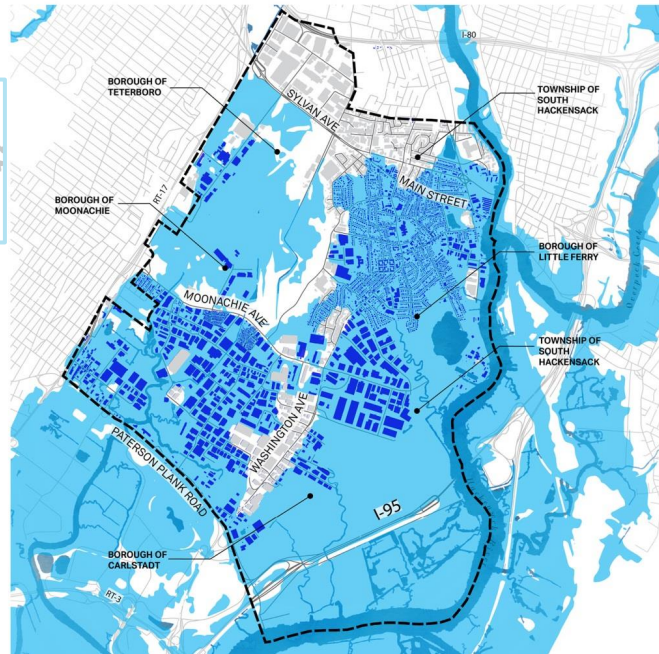
▪ **NEARLY ALL THE PROJECT AREA IS WITHIN THE 100-YEAR FLOODPLAIN.**

Location Key



Legend

- Municipality
- 100-Year Floodplain
- Properties Within 100-Year Floodplain
- Properties Not Within 100-Year Floodplain



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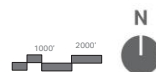
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ESTIMATED SEA LEVEL CHANGE IN ~35 YEARS SEA LEVEL RISE BY 2050

6

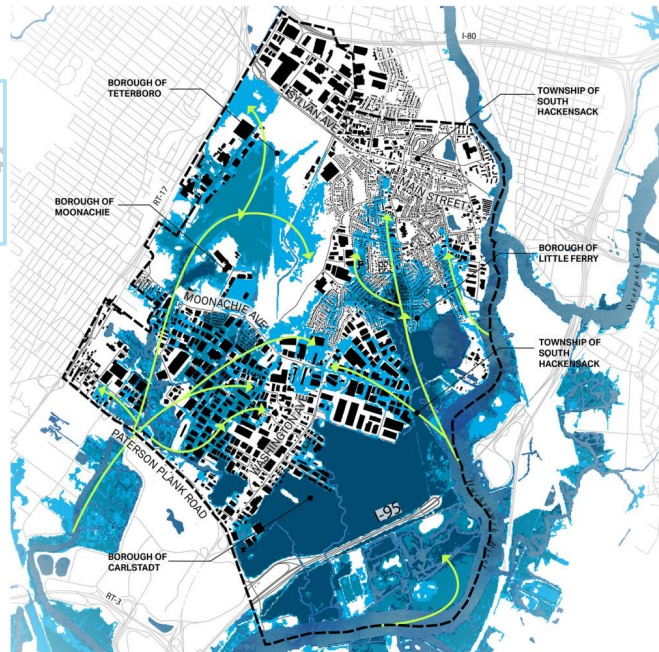
▪ **SEA LEVEL IS ESTIMATED TO RISE BETWEEN 0.5 – 1.1 FEET**

Location Key



Legend

- Municipality
- Direction of Water
- Water
- 0' Sea Level Rise
- 1' Sea Level Rise
- 2' Sea Level Rise
- 3' Sea Level Rise
- 4' Sea Level Rise
- 5' Sea Level Rise
- 6' Sea Level Rise



Data Sources: NOAA Int-High, NOAA Int-Low/USACE Intermediate (Modified NRC Curve II, Sea Level Rise (SLR) Inundation Data, NOAA Coastal Services Center (2015)



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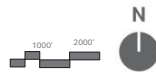
ESTIMATED SEA LEVEL CHANGE IN ~60 YEARS

7

SEA LEVEL RISE BY 2075

▪ SEA LEVEL IS ESTIMATED TO RISE BETWEEN 1.2 – 2.4 FEET

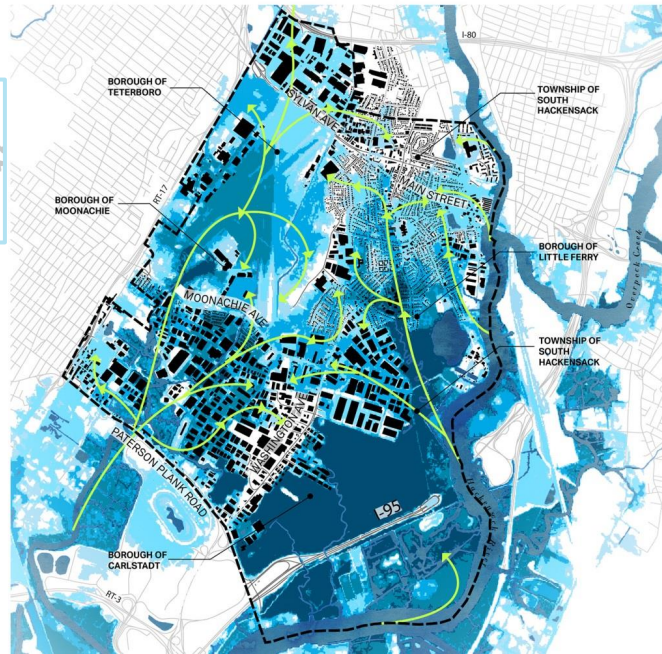
Location Key



Legend

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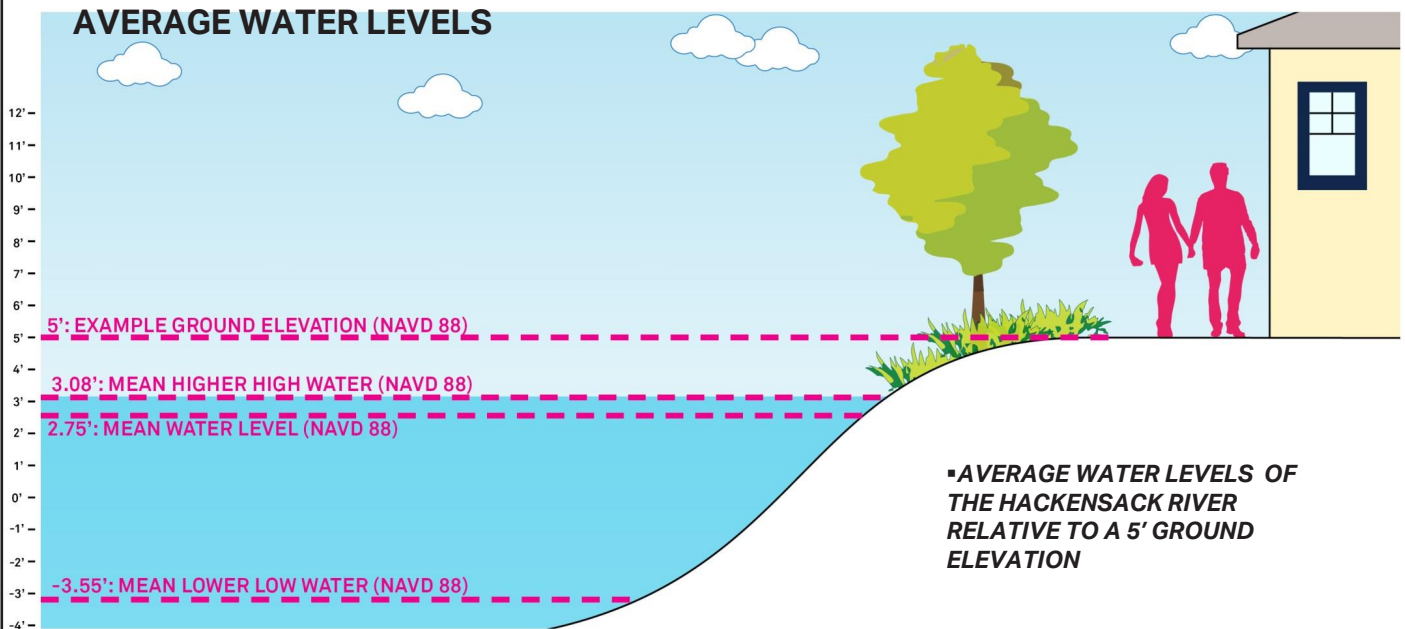
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HACKENSACK RIVER EXISTING CONDITIONS

8

AVERAGE WATER LEVELS



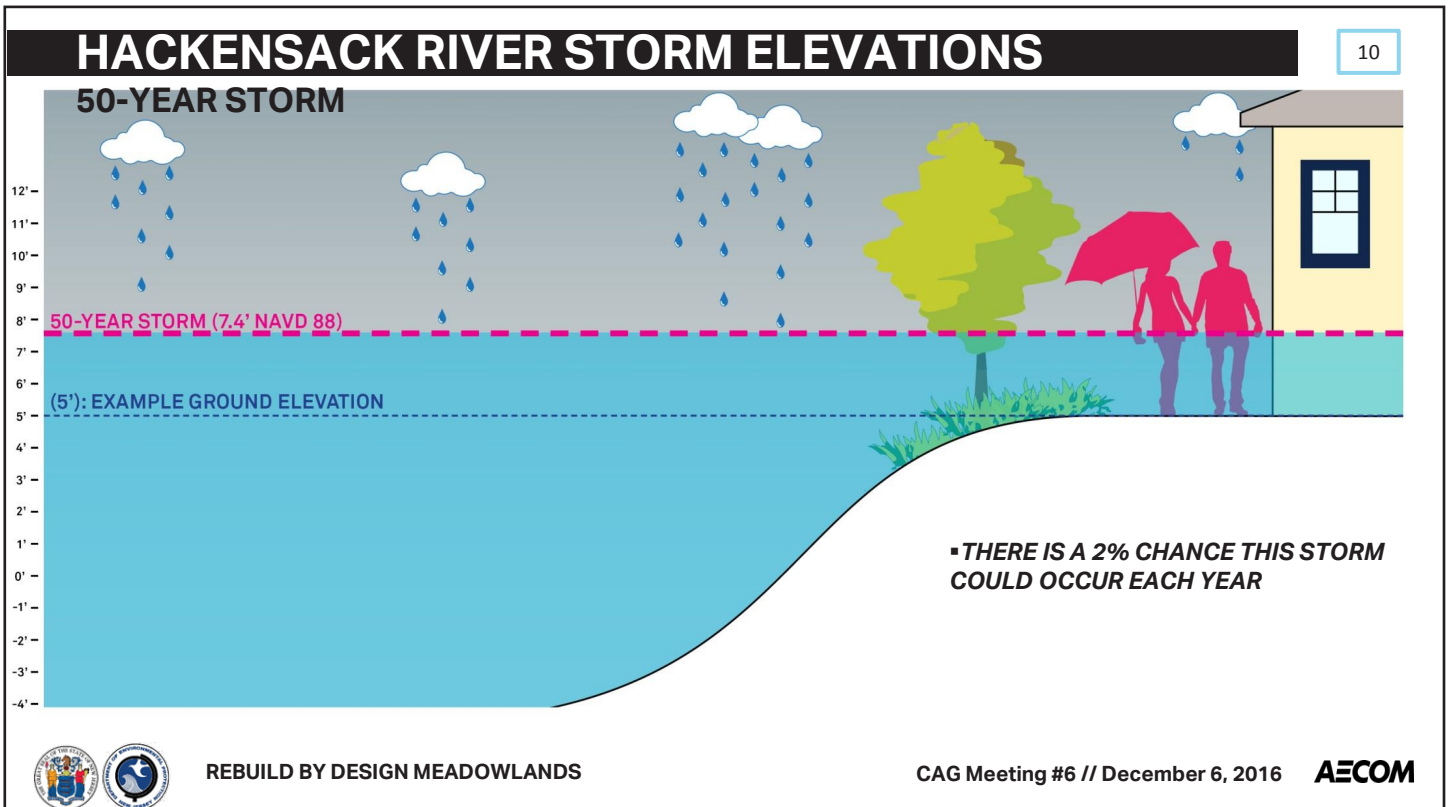
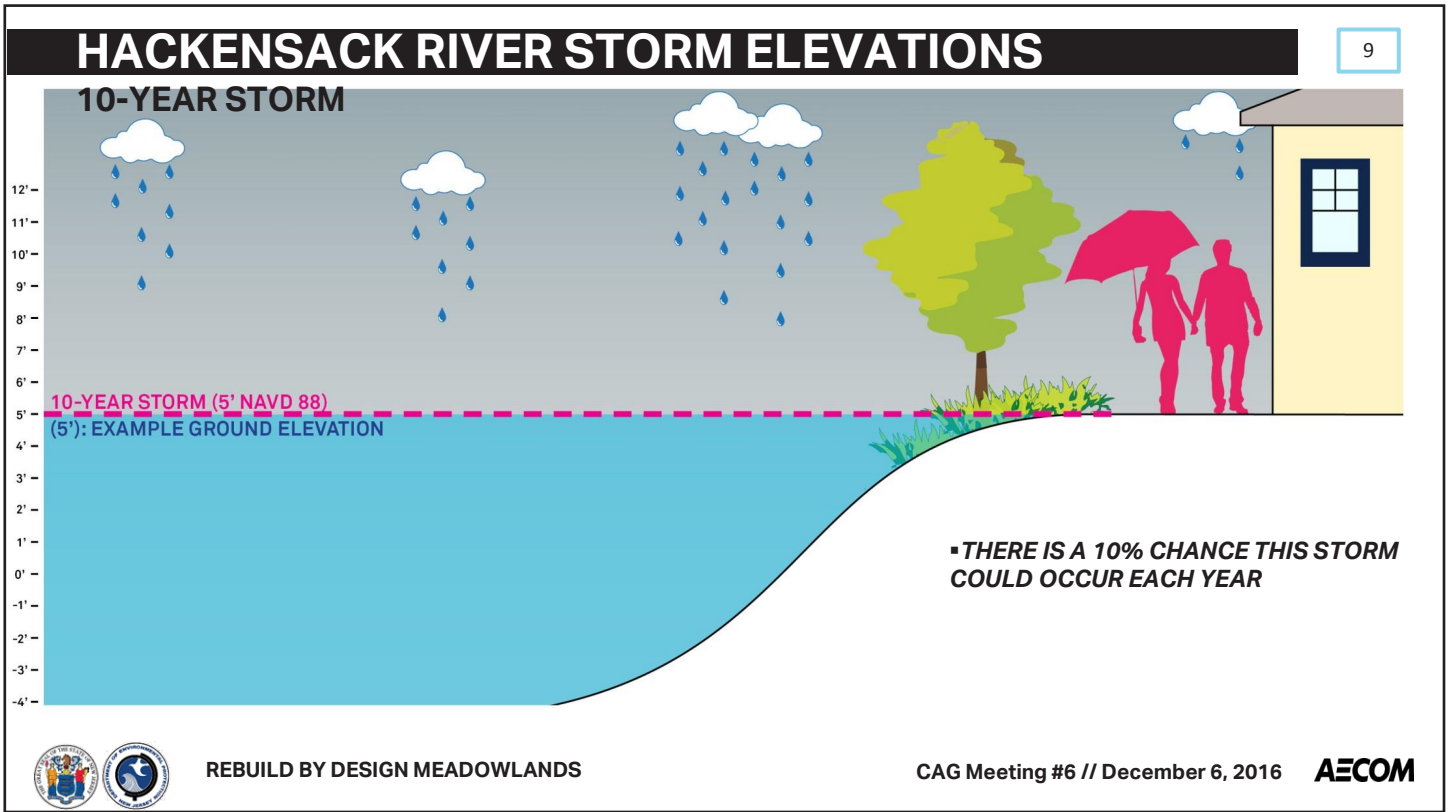
▪ AVERAGE WATER LEVELS OF THE HACKENSACK RIVER RELATIVE TO A 5' GROUND ELEVATION

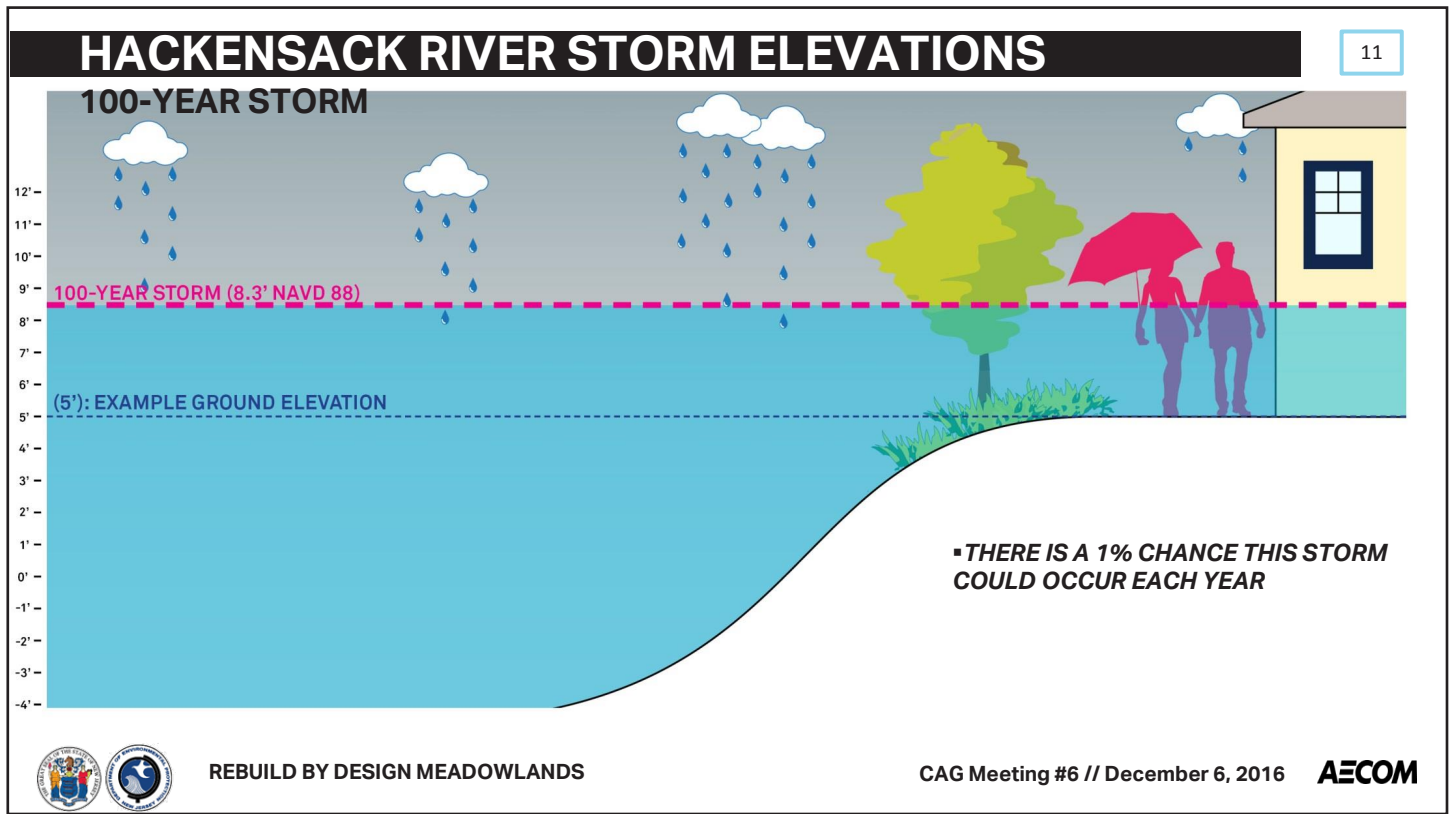


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DEVELOPING THE ALIGNMENT

Chris Benosky, AECOM

12

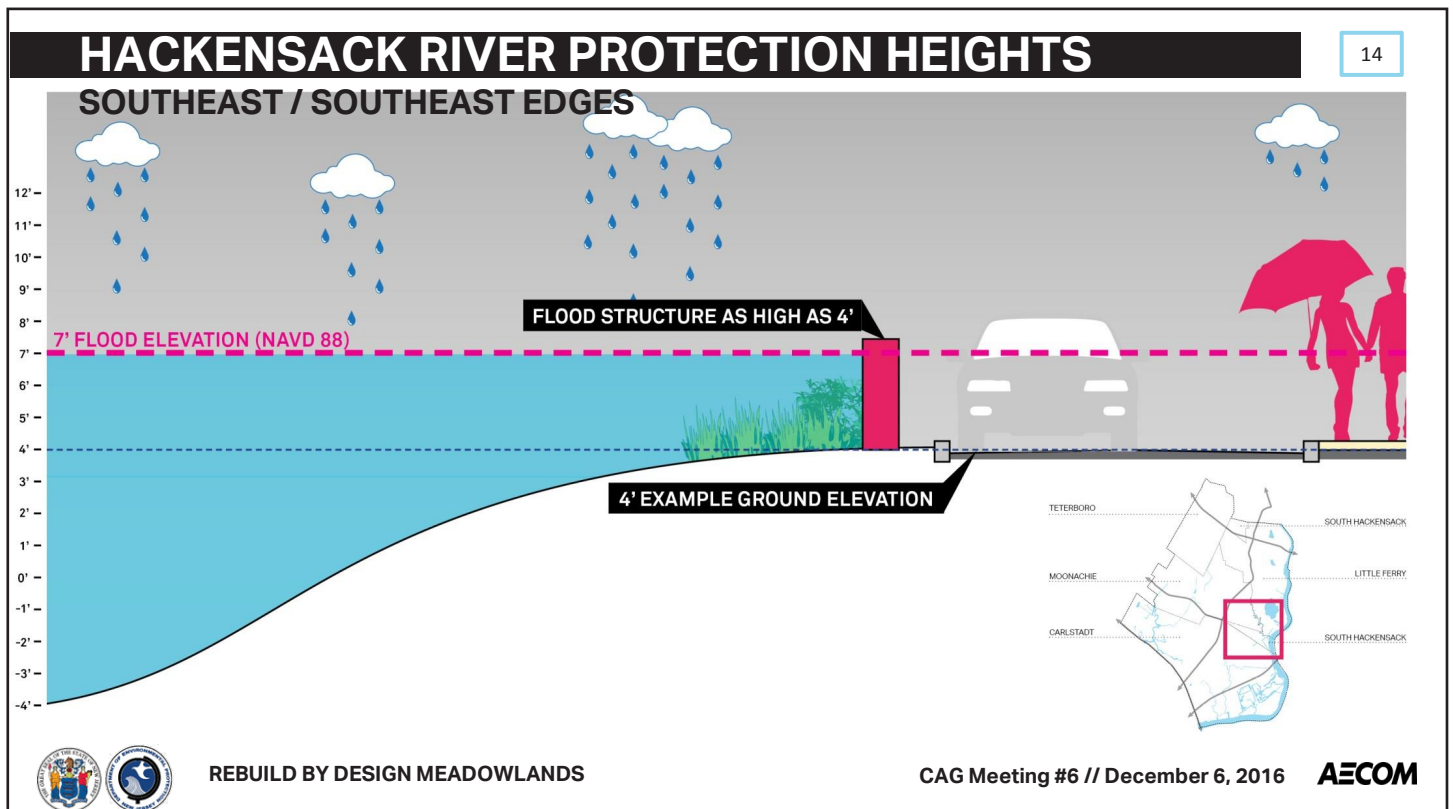
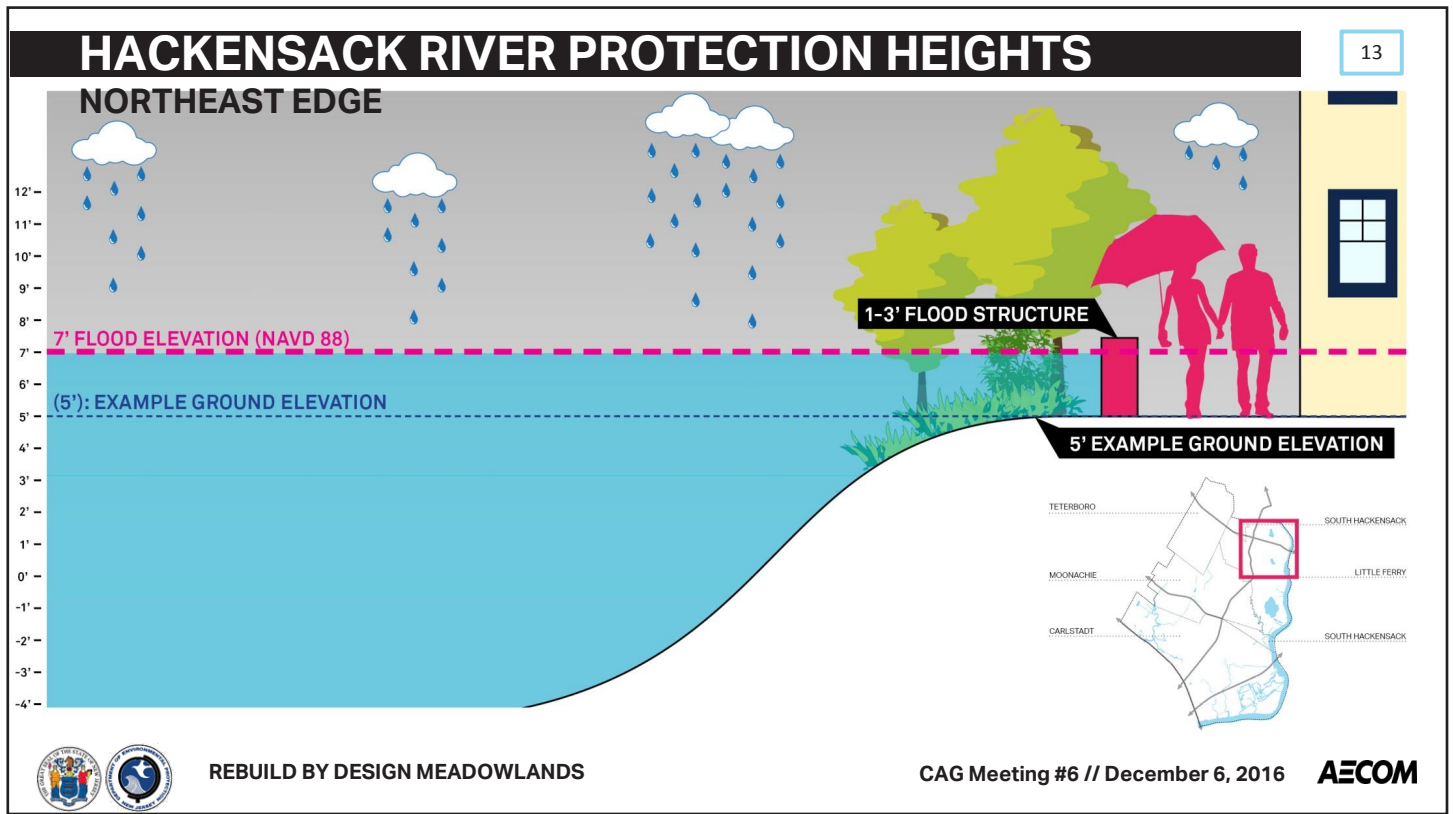
STARTING AT A 7' ELEVATION

- 7' NAVD88 is approximately 8' NGVD29
- Using the 7' elevation as a study baseline
- 7' elevation maintains existing level of protection with Sea Level Rise through 2050
- Other elevation heights are being considered and will be included as costs and feasibility inputs are identified
- Currently investigating tie-in options and footprint locations

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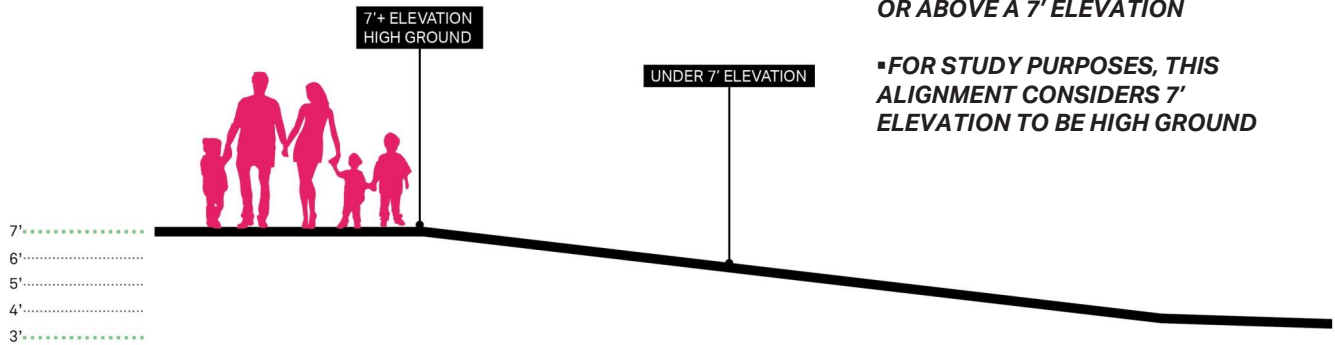
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CONNECTING HIGH GROUND

7' ELEVATION - FILLING IN THE GAPS

15



▪EXISTING GROUND CONDITIONS
IN THE PROJECT AREA MAY BE AT
OR ABOVE A 7' ELEVATION

▪FOR STUDY PURPOSES, THIS
ALIGNMENT CONSIDERS 7'
ELEVATION TO BE HIGH GROUND



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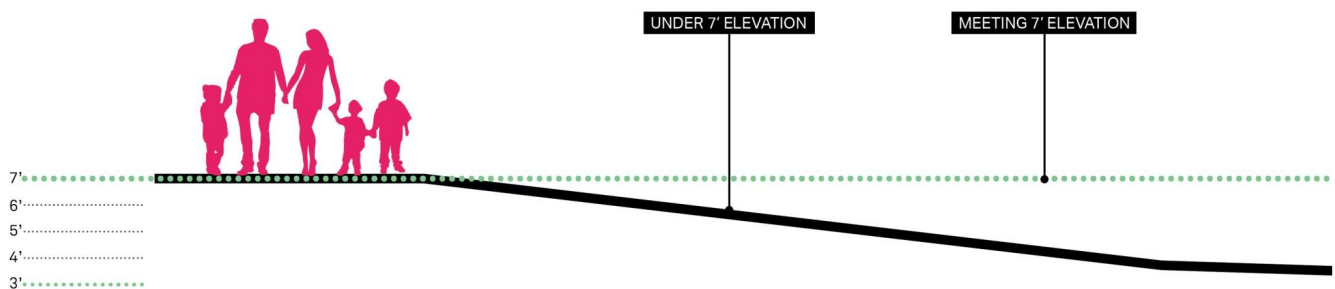
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CONNECTING HIGH GROUND

7' ELEVATION - FILLING IN THE GAPS

16



▪A FLOOD REDUCTION STRATEGY
WILL BE PROPOSED IN AREAS
WHERE GROUND ELEVATION IS
BELOW 7'



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3.0 Power Point Presentation

CONNECTING HIGH GROUND

HOW TIE-INS WORK

■ **STRUCTURAL FLOOD REDUCTION TIE-IN**

■ **STRUCTURAL FLOOD REDUCTION CONNECTS EXISTING HIGH GROUND (7' ELEVATION)**

■ **UNDER 7' ELEVATION**

■ **STRUCTURAL FLOOD REDUCTION**

7'
6'
5'
4'
3'

17

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PRIMARY FLOOD REDUCTION TYPES

HARD & SOFT EDGES

■ **THE COLORS ON THE FOLLOWING ALIGNMENT MAPS REPRESENT POTENTIAL LOCATION OF WALLS AND BERMS**

BERM

WALL

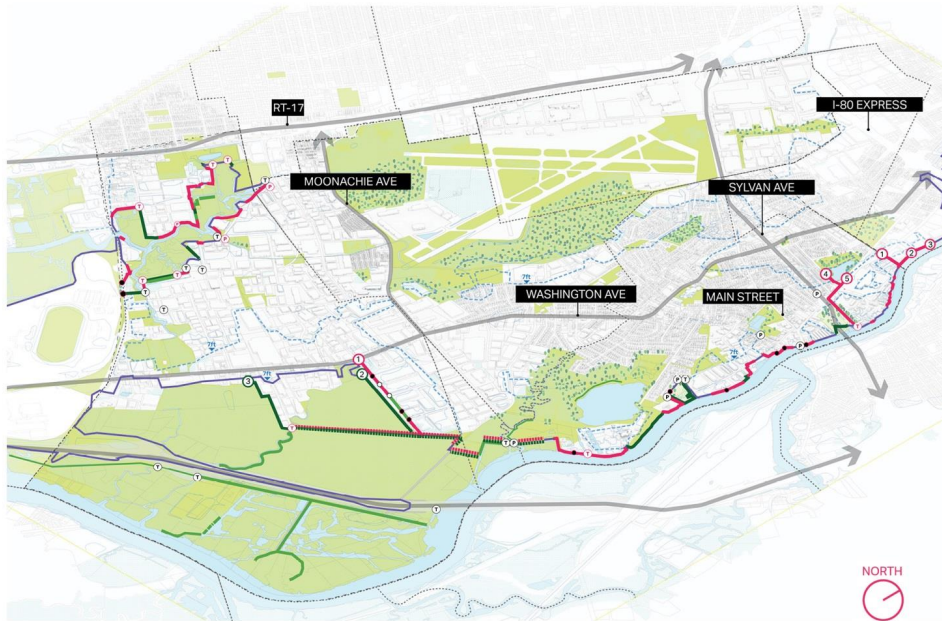
18

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7' ELEVATION ALIGNMENT OVERVIEW

19



- OVERVIEW OF ALL ALIGNMENT OPTIONS AT 7' ELEVATION
- SCREENING OF OPTIONS IS ONGOING
- INTERACTIVE MAPS AVAILABLE POST-MEETING



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PRELIMINARY

FLOOD REDUCTION ALIGNMENT OPTIONS

GARRETT AVERY, AECOM



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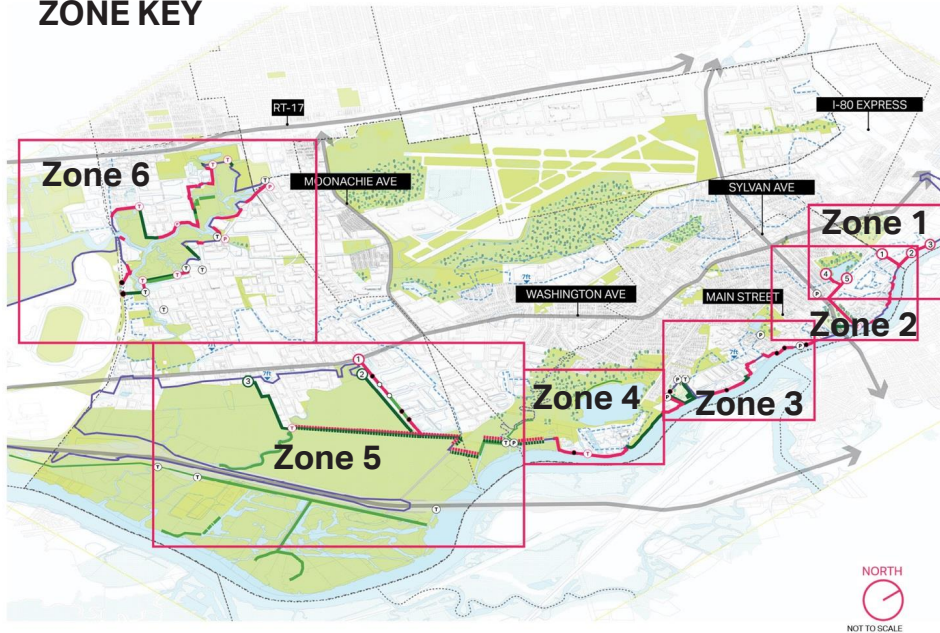
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ALIGNMENT OVERVIEW

21

ZONE KEY



- SIX AREAS WITH SEVERAL OPTIONS
- MIX OF WALLS AND BERMS PROVIDE FLOOD PROTECTION
- NEW TIDAL GATES AND PUMP STATIONS



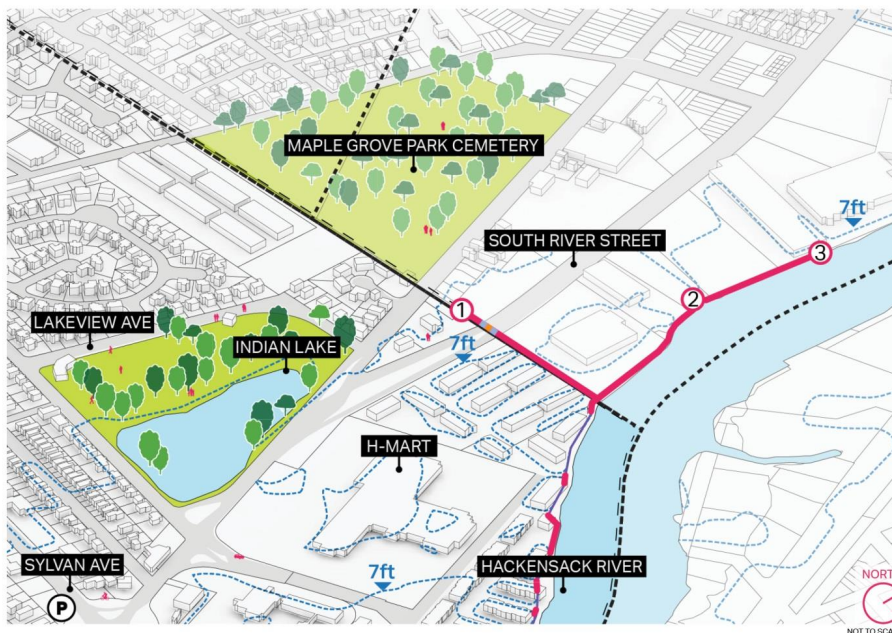
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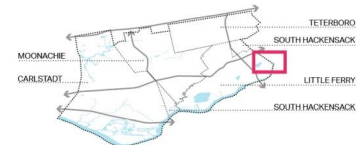
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ALIGNMENT OPTION – ZONE 1

22



- OPTION 1: TIE-IN WEST OF BERGEN TNP. ROAD REGRADING OR A DEPLOYABLE WOULD BE REQUIRED.
- OPTION 2: TIE-IN NORTH OF PROJECT AREA. NO ROAD CROSSINGS OR REGRADING NEEDED.
- OPTION 3: TIE INTO HACKENSACK RIVERWALK NORTH OF PROJECT AREA. NO ROAD-CROSSING REQUIRED.



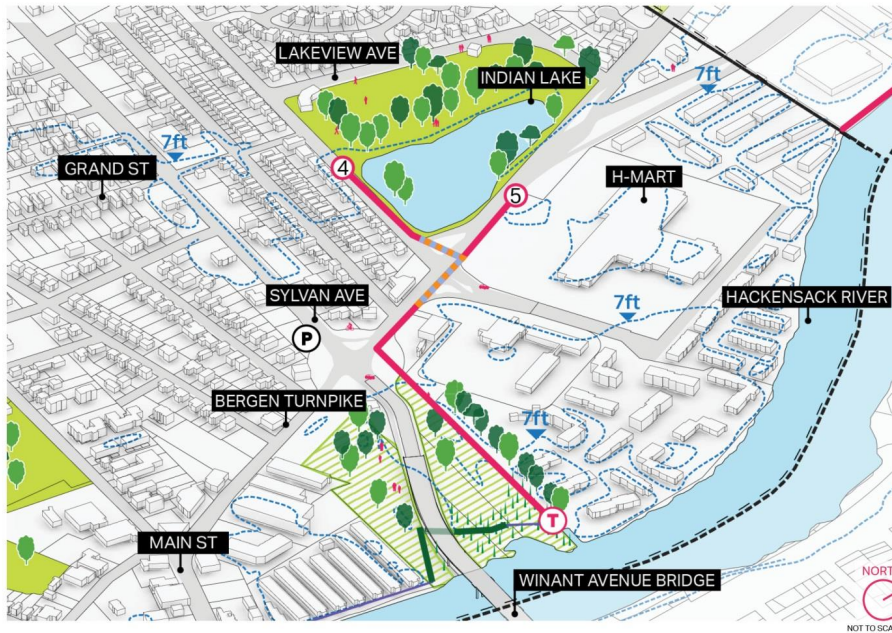
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ALIGNMENT OPTION – ZONE 2

23



- **OPTION 4: INTERIOR ALIGNMENT, TIE-IN AT 7' CONTOUR AT INDIAN LAKE. WOULD REQUIRE ROAD REGRADING AND DEPLOYABLES.**
- **OPTION 5: INTERIOR ALIGNMENT, TIE-IN AT 7' CONTOUR ON THE EAST SIDE OF BERGEN TNP. WOULD REQUIRE ROAD REGRADING AND DEPLOYABLES.**



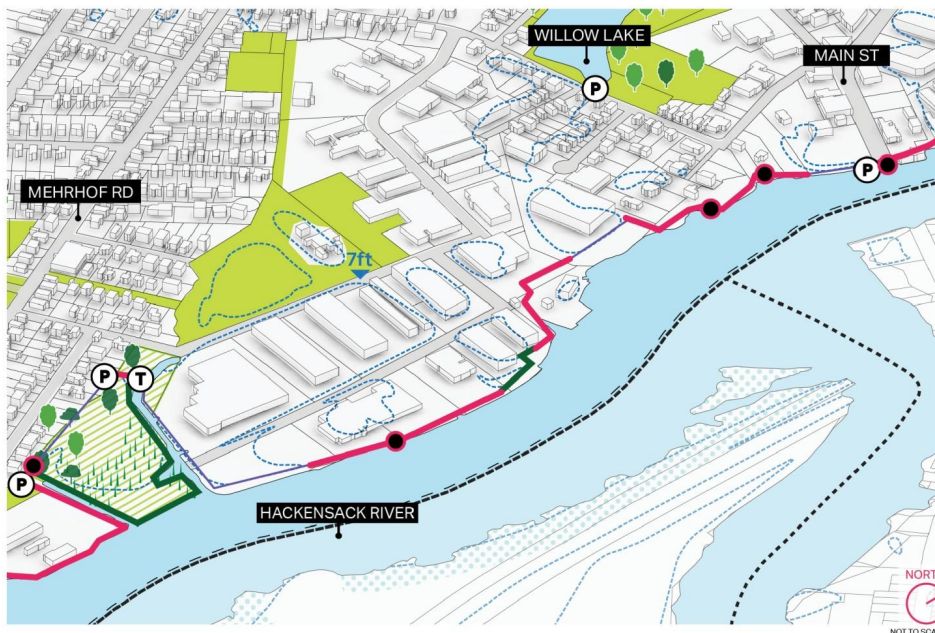
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ALIGNMENT OPTION – ZONE 3

24



- **ELEVATION 7' ALIGNMENT CONTINUES ALONG THE EDGE.**
- **TYING INTO TO HIGHGROUND AND USING BERMS WHERE POSSIBLE.**
- **EXISTING RIVER ACCESS PRESERVED BY CLOSURE GATES.**



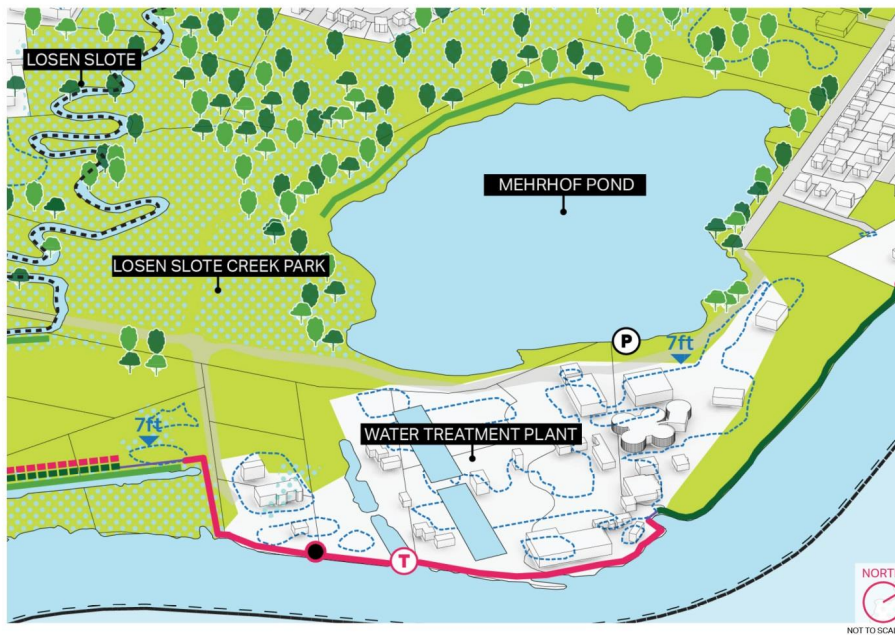
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ALIGNMENT OPTION – ZONE 4

25



- ELEVATION 7' ALIGNMENT COMPOSED OF FLOODWALL OR BERM AS SPACE ALLOWS.
- SURGE GATE TO PROTECT EXISTING TREATMENT PLANT OUTFALLS.
- REINFORCEMENT OR REPLACEMENT OF EXISTING BERMS BEING STUDIED. FLOODWALL AND BERM BEING CONSIDERED TO LIMIT POTENTIAL WETLAND DISTURBANCE.



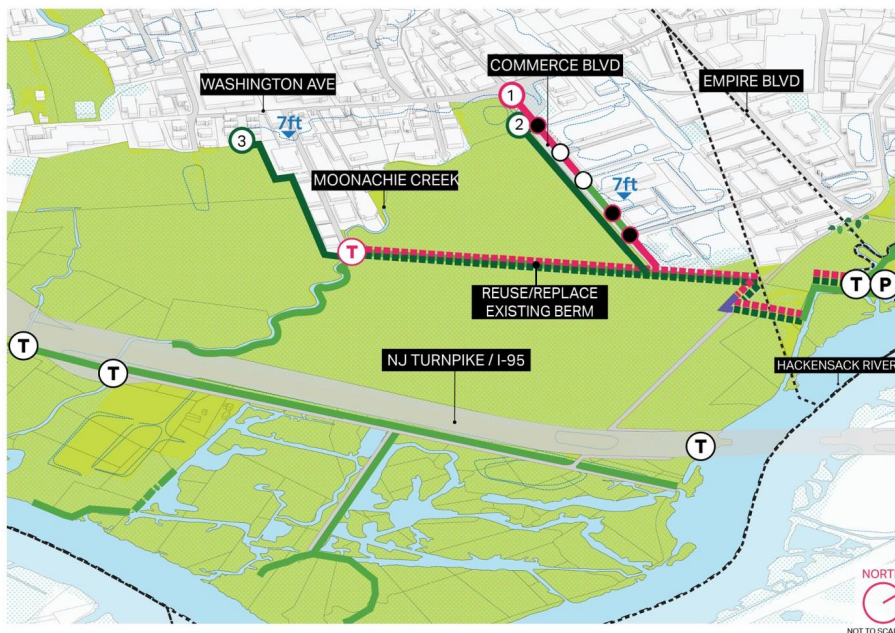
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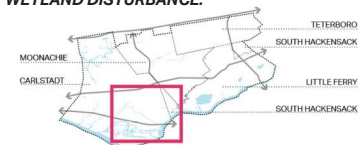
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ALIGNMENT OPTION – ZONE 5

26



- OPTION 1: TIE-OFF ON NORTH SIDE OF COMMERCE BLVD. WOULD REQUIRE ROAD REGRADING AND CLOSURE GATES (CROSSES ACCESS POINTS).
- OPTION 2: TIE-OFF ON SOUTH SIDE OF COMMERCE BLVD. COULD BE A BERM OR A WALL. NO REGRADING OR STREET CROSSINGS.
- OPTION 3: TIE-OFF TO 7' CONTOUR. FOLLOWS PATH OF EXISTING BERM TO LIMIT POTENTIAL WETLAND DISTURBANCE.



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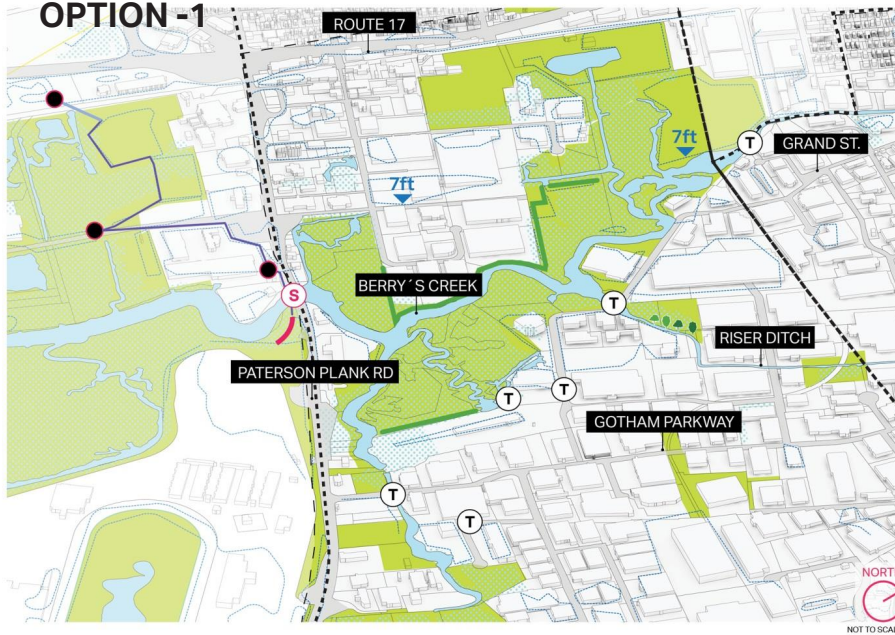
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ALIGNMENT OPTION – ZONE 6

27

OPTION - 1



- SURGE BARRIER AT PATERSON PLANK ROAD (SOUTH OF THE BRIDGE) WOULD PROTECT OVER 50% OF THE PROJECT AREA.
- (3) CLOSURE GATES, REGRADING, AND MINOR WALL TO TIE-OFF.
- NEW PUMP STATION TO CONTROL WATER LEVEL IN BERRY'S CREEK DUE TO RAINFALL.



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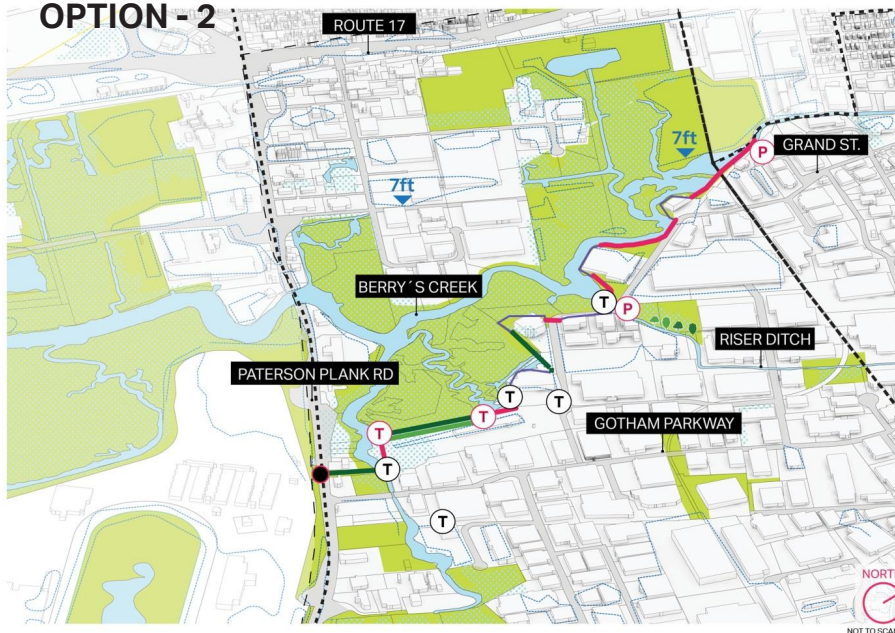
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ALIGNMENT OPTION – ZONE 6

28

OPTION - 2



- INTERIOR ALIGNMENT ALONG THE EAST BANK OF BERRY'S CREEK.
- CONNECTS EXISTING TIDE GATES AND SURROUNDING POINTS AT 7' GROUND ELEVATION.
- WOULD REQUIRE ADDITIONAL TIDE GATES AND NEW PUMP STATION.



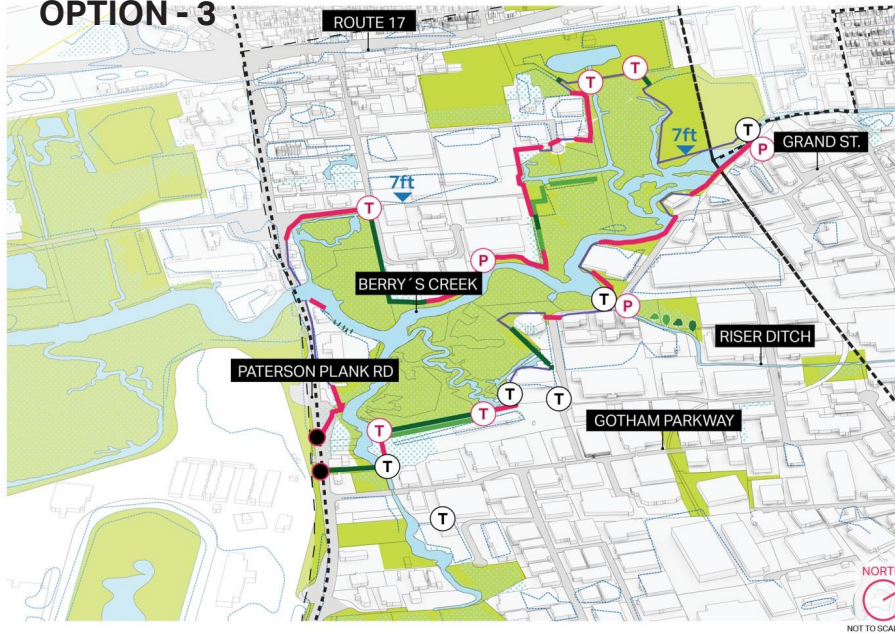
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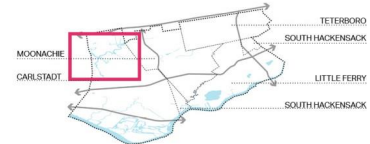
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ALIGNMENT OPTION – ZONE 6

OPTION - 3



• INTERIOR CONNECTIONS TYING OFF TO 7' CONTOURS.



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DESIGN ELEMENTS

APPLYING THE "KIT OF PARTS"

SUSAN BEMIS, AECOM



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"KIT OF PARTS" – INITIAL IDEAS

31



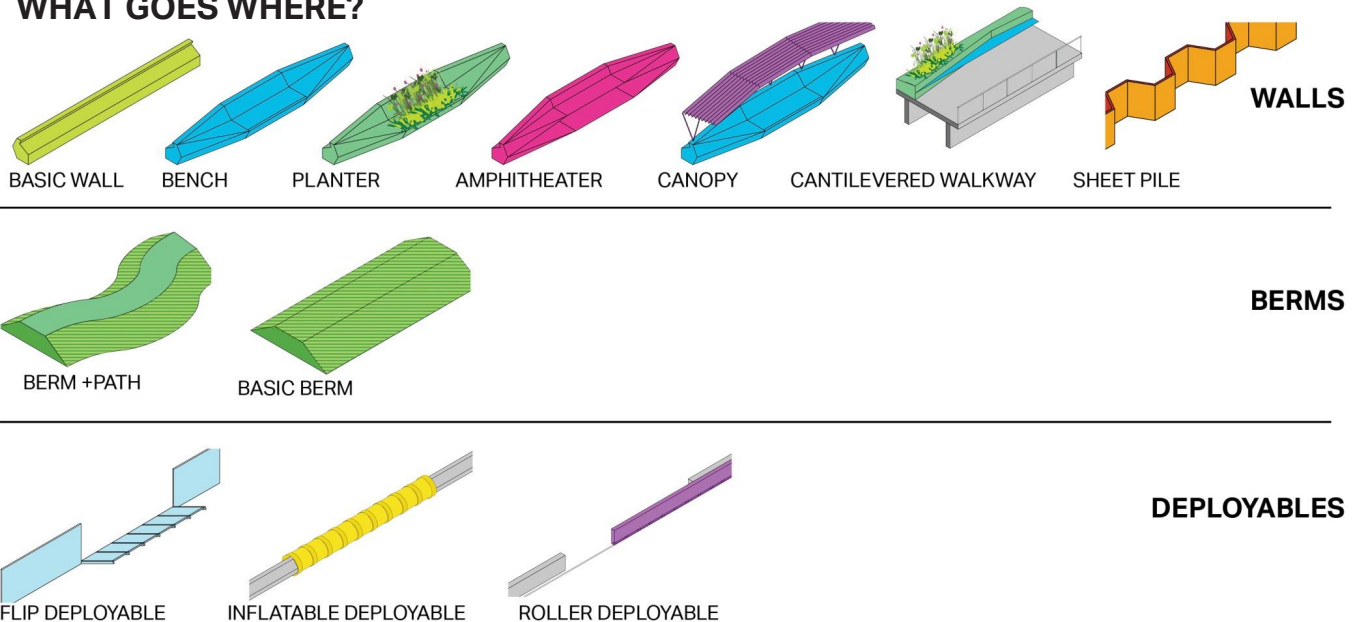
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MODULARIZING THE "KIT OF PARTS" WHAT GOES WHERE?

32



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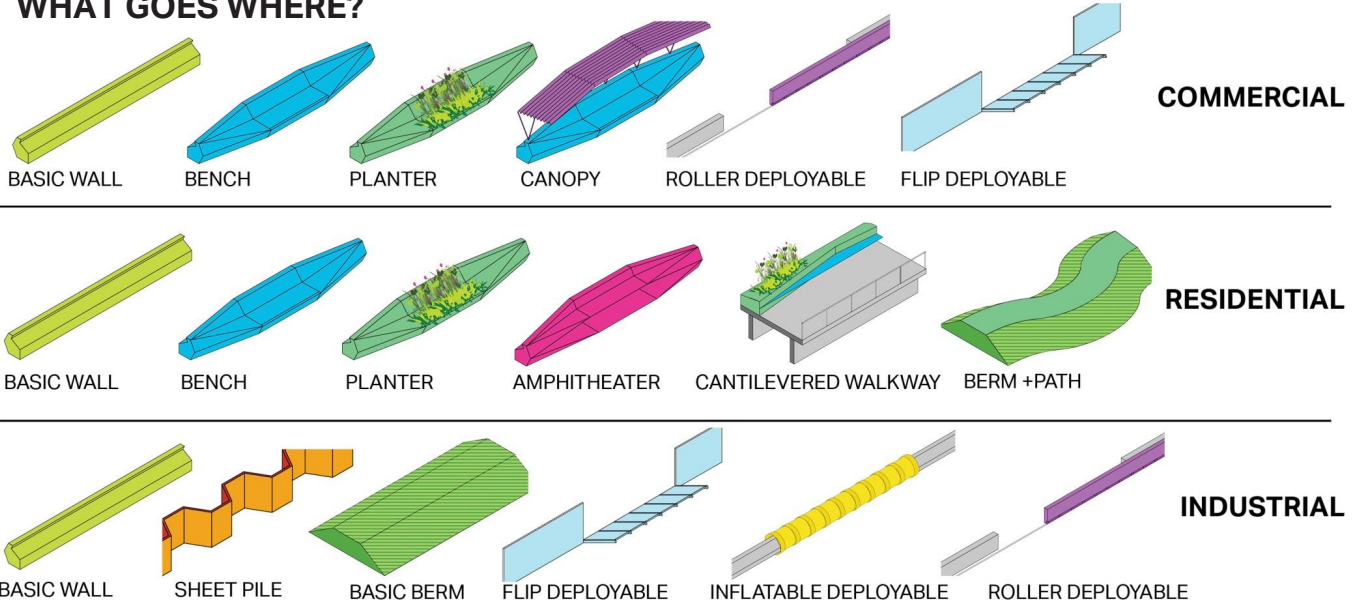
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MODULARIZING THE "KIT OF PARTS"

33

WHAT GOES WHERE?



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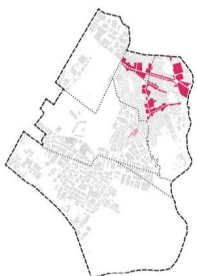
COMMERCIAL ZONE

34

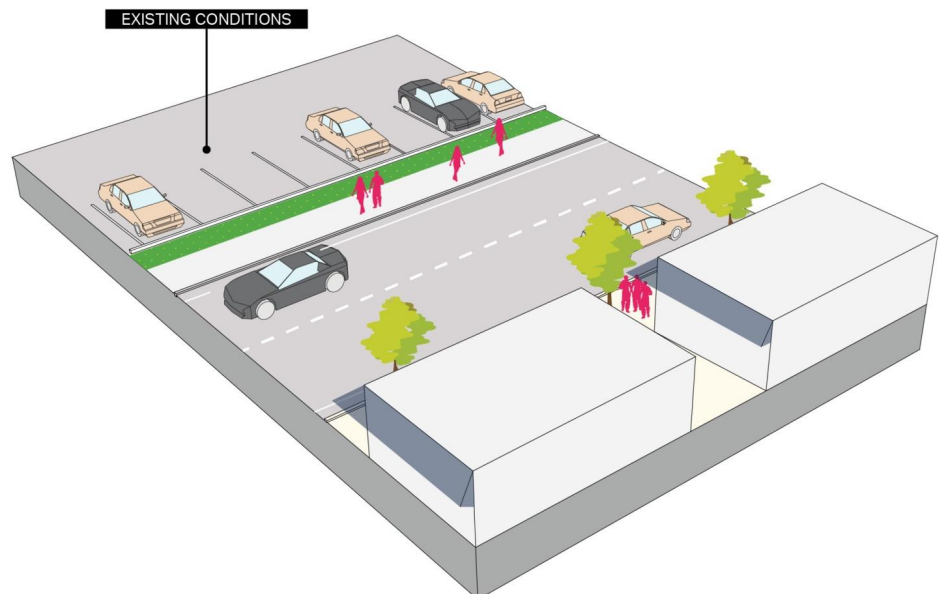
EXISTING CONDITIONS

▪ **BUILDING THE LINE OF PROTECTION**

▪ **RESPONDING TO THE EXISTING COMMERCIAL ENVIRONMENT**



COMMERCIAL ZONE



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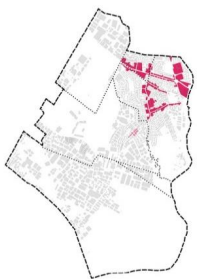
COMMERCIAL ZONE

BUILDING THE PROTECTION

35

▪ **STARTING WITH THE BASIC WALL**

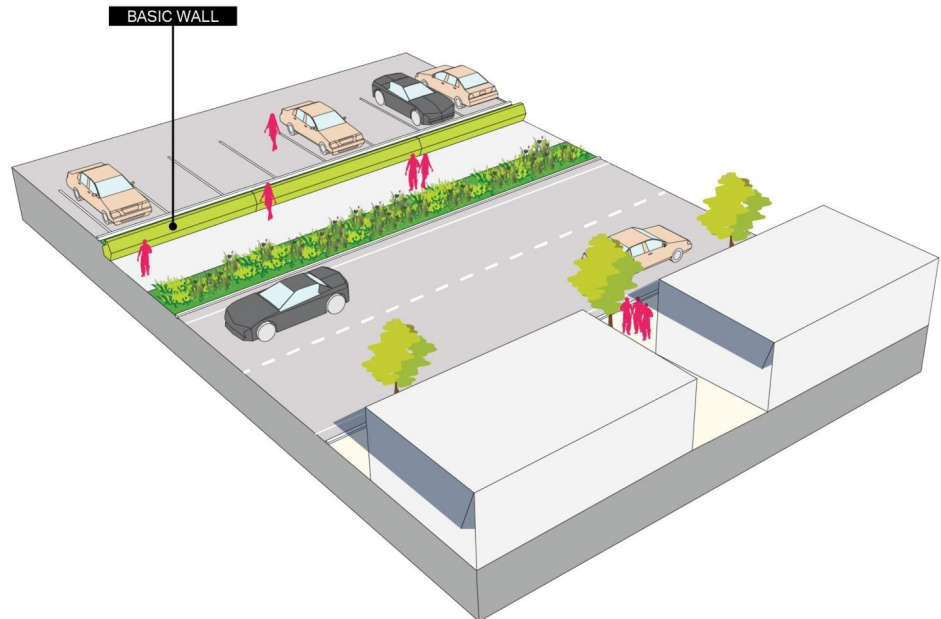
▪ **BUILDING THE SYSTEM WHERE APPROPRIATE**



COMMERCIAL ZONE



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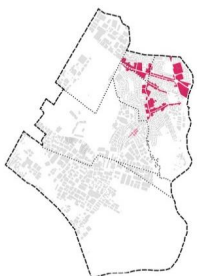
COMMERCIAL ZONE

BUILDING THE PROTECTION

36

▪ **MODULAR SYSTEM WORKS IN 30' UNITS**

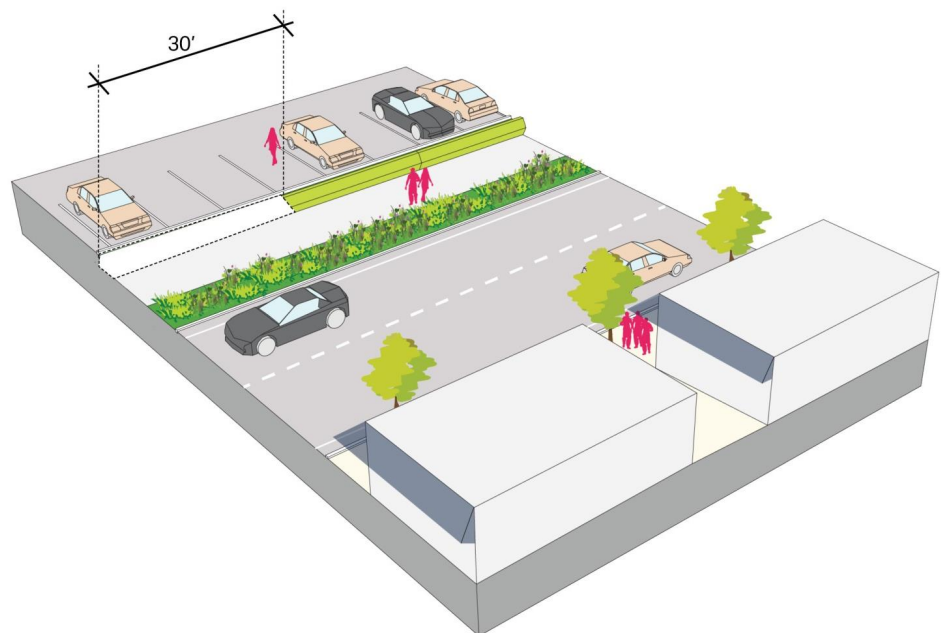
▪ **SYSTEM REDUCES COST AND TIME OF CONSTRUCTION**



COMMERCIAL ZONE



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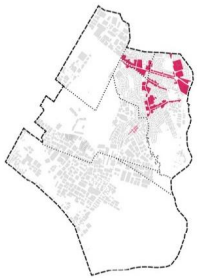
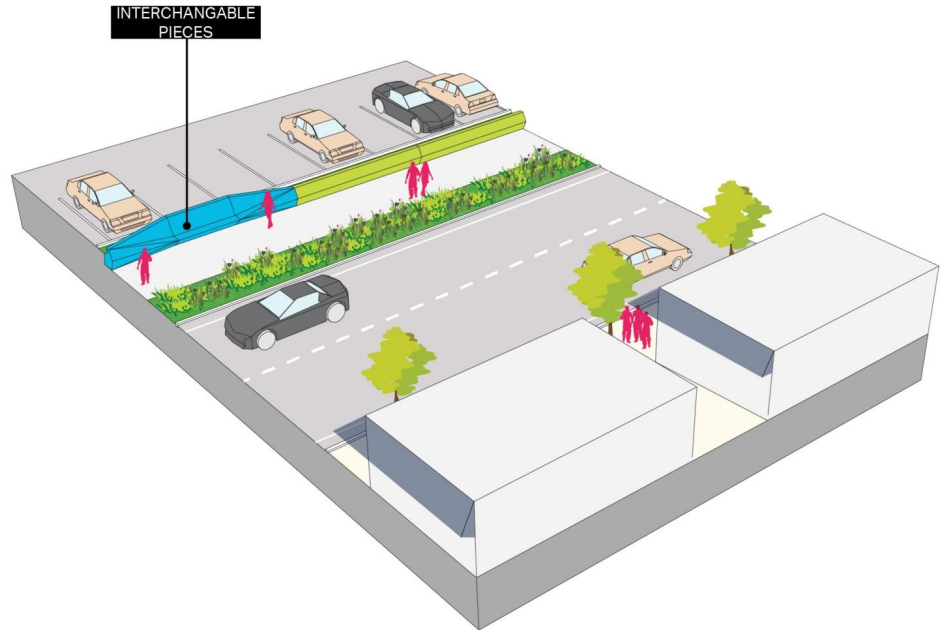
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COMMERCIAL ZONE BUILDING THE PROTECTION

37

- **UNITS ARE INTERCHANGEABLE**



COMMERCIAL ZONE



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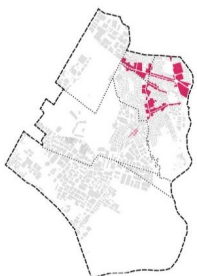
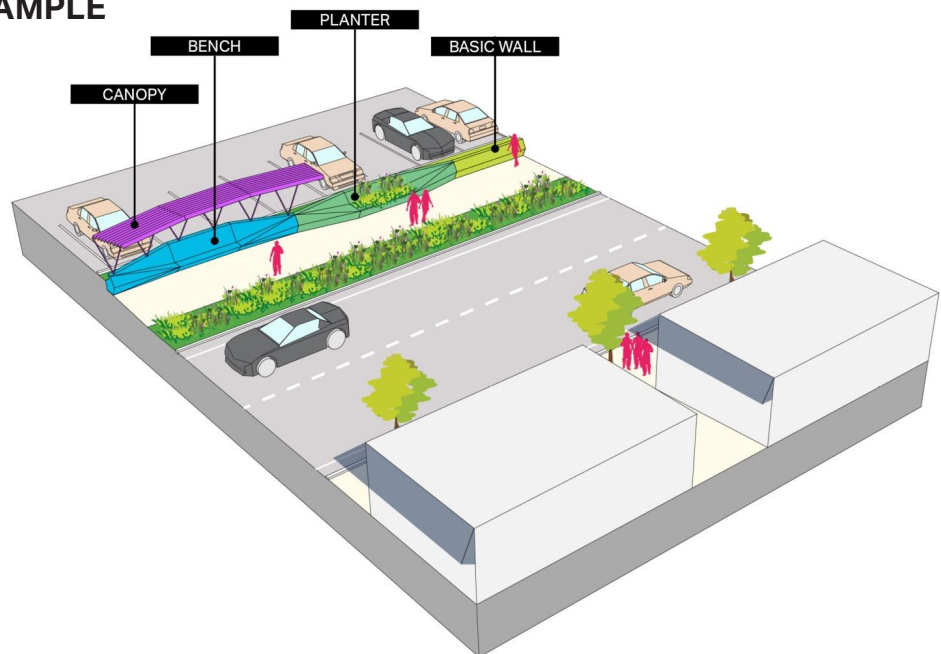
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COMMERCIAL ZONE MODULAR SYSTEM EXAMPLE

38

- **FLOOD PROTECTION + STREET AND PUBLIC BENEFITS**

- **INTERIOR CONDITION**



COMMERCIAL ZONE



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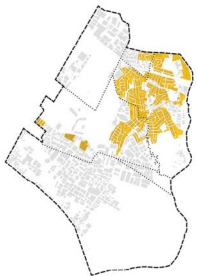
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RESIDENTIAL ZONE

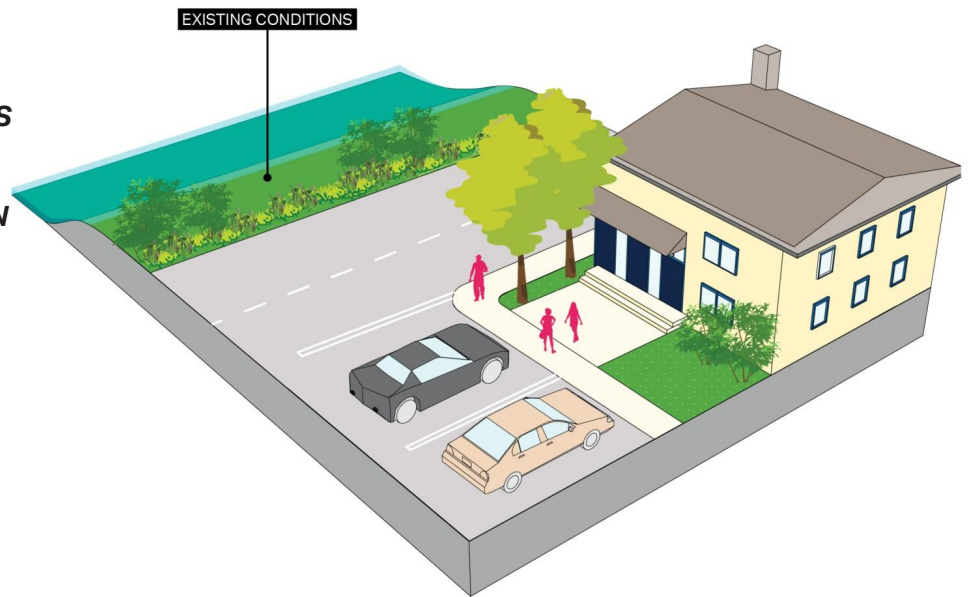
39

EXISTING CONDITIONS

- **RESPONDING TO THE RESIDENTIAL CONTEXT**
- **PROVIDE ACCESS AND VIEWS TO THE HACKENSACK RIVER**
- **POTENTIAL FOR RECREATION AND NEIGHBORHOOD CONNECTIONS**



RESIDENTIAL ZONE



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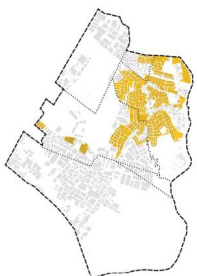
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RESIDENTIAL ZONE MODULAR SYSTEM EXAMPLE

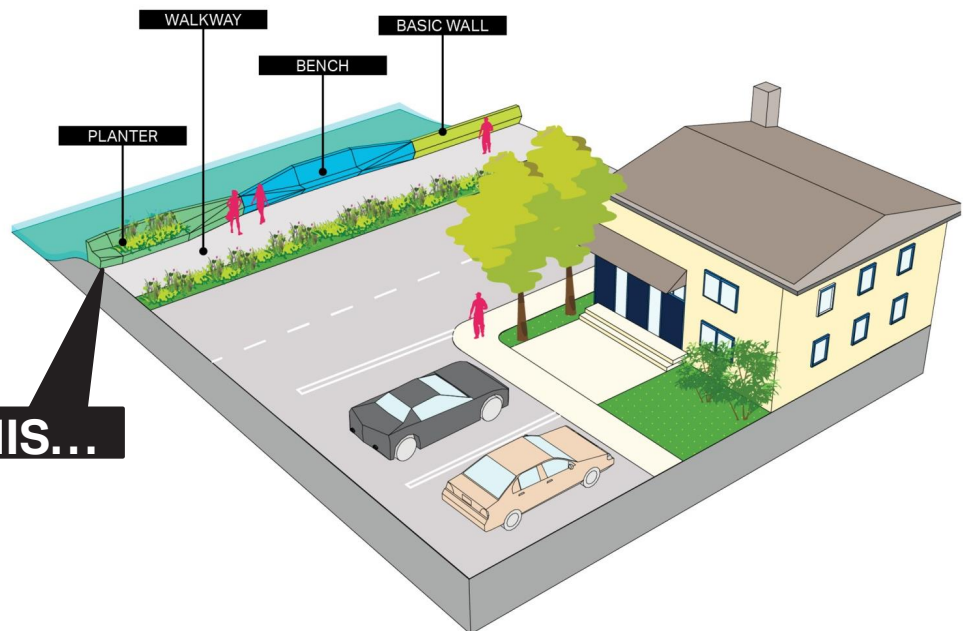
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- **THE MODULAR SYSTEM PROVIDES PLACES TO SIT AND ENGAGE WITH THE HACKENSACK RIVER**



RESIDENTIAL ZONE

THIS...



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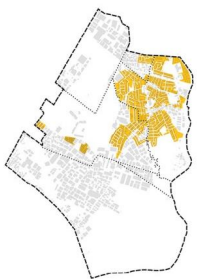
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RESIDENTIAL ZONE

BERM + WALKWAY EXAMPLE

41

- *IN AREAS THAT ALLOW FOR A GREATER FOOTPRINT, A SOFT BERM COULD BE INCORPORATED*

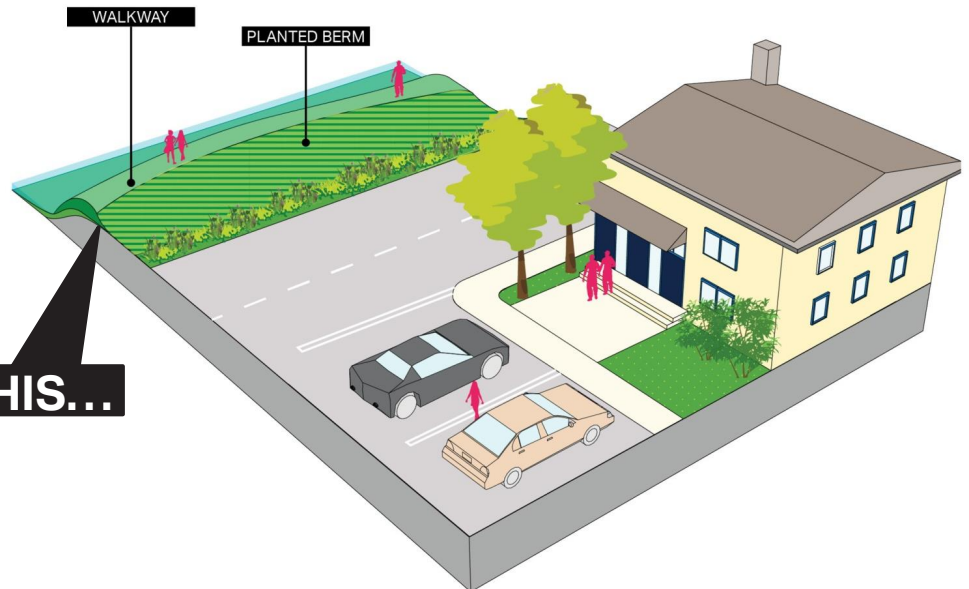


RESIDENTIAL ZONE



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OR THIS...



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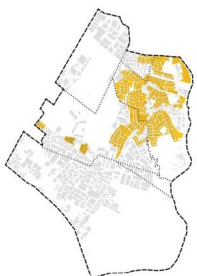
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RESIDENTIAL ZONE

CANTILEVERED WALKWAY EXAMPLE

42

- *CANTILEVERED WALKWAY IS STILL BEING CONSIDERED WHERE POSSIBLE*
- *PROVIDES RECREATION AND WATER ACCESS*

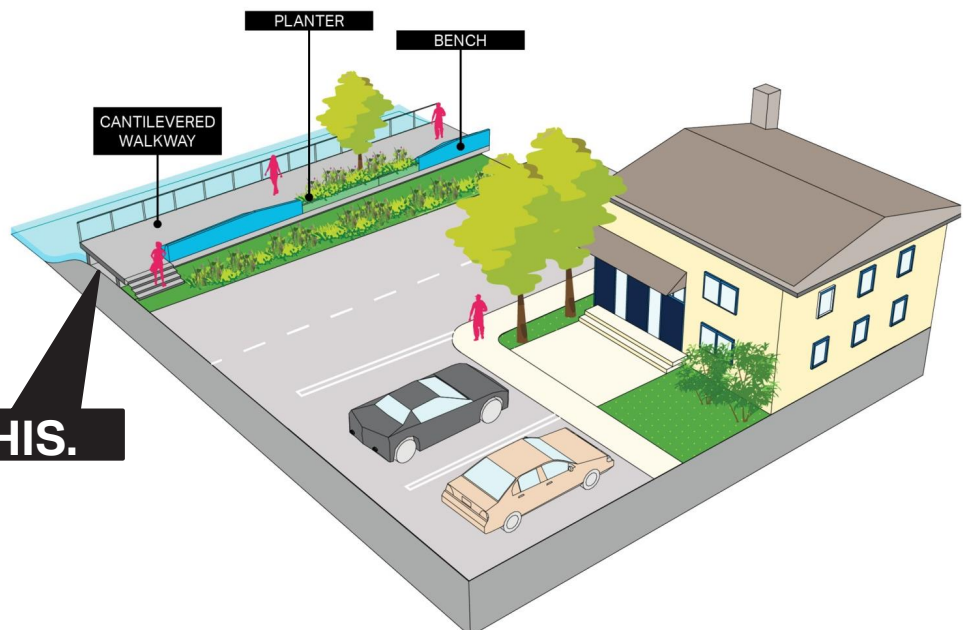


RESIDENTIAL ZONE



REBUILD BY DESIGN MEADOWLANDS

OR THIS.



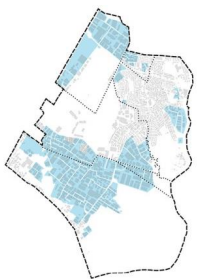
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43

INDUSTRIAL ZONE EXISTING CONDITIONS

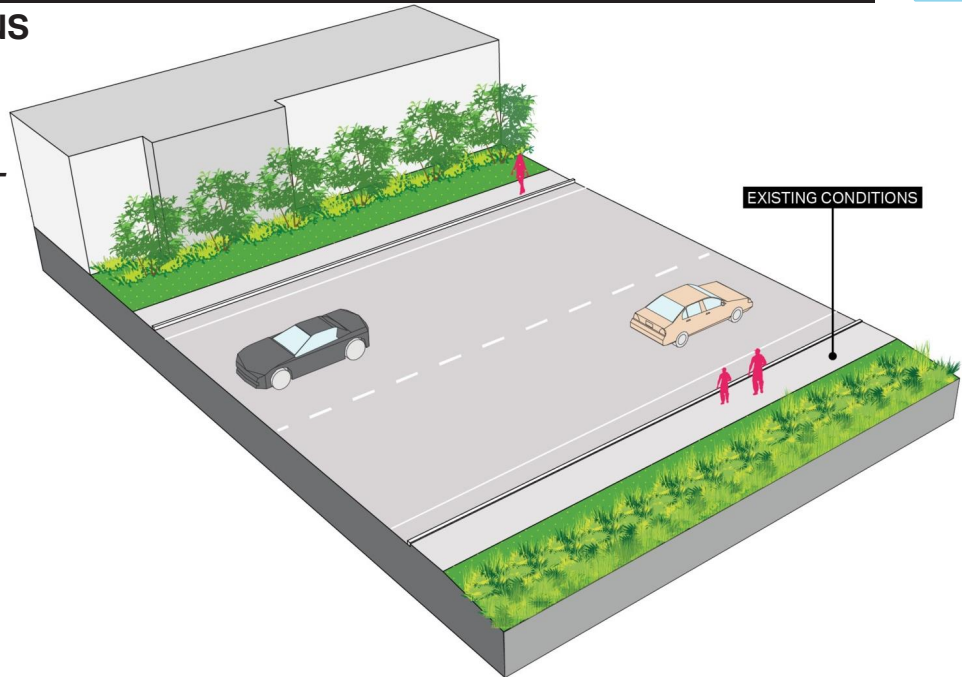
- **BLENDING INTO THE INDUSTRIAL ENVIRONMENT**
- **COST EFFICIENCY**



INDUSTRIAL ZONE



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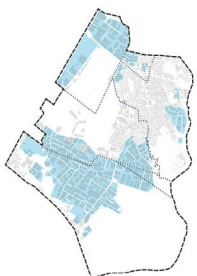
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44

INDUSTRIAL ZONE MODULAR SYSTEM EXAMPLE

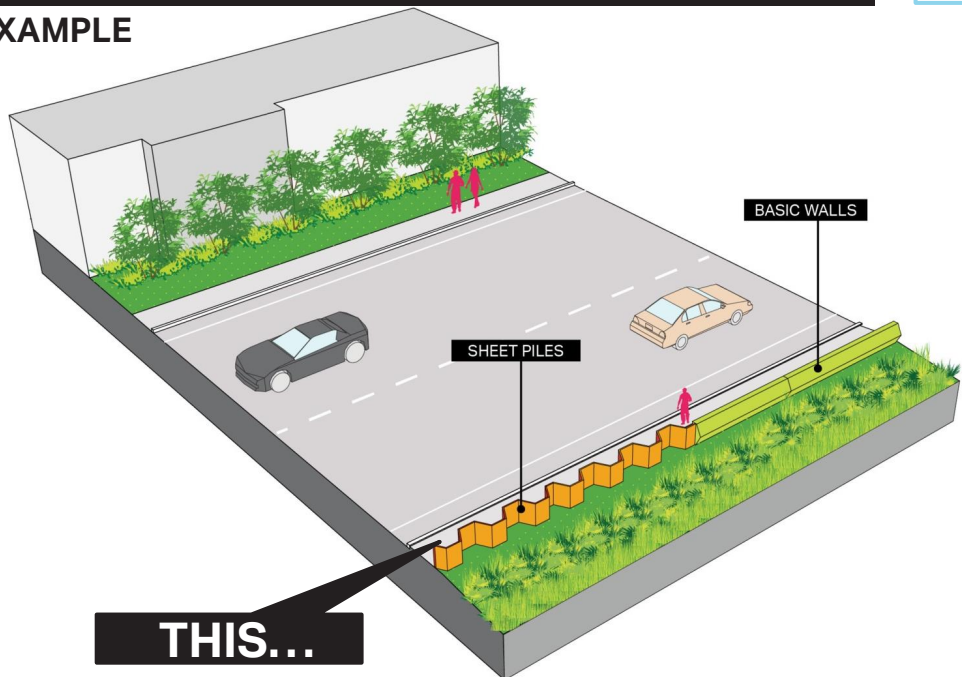
- **SHEET PILE AND BASIC WALLS FOR AREAS WITH SMALL FOOTPRINTS**



INDUSTRIAL ZONE



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3.0 Power Point Presentation

INDUSTRIAL ZONE

BASIC BERM EXAMPLE

- **BASIC BERM WHEN LARGER FOOTPRINT CAN BE ACCOMMODATED**

45

INDUSTRIAL ZONE

OR THIS.

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MODULAR COMPONENT DEVELOPMENT

INVESTIGATION: 1

- **THE DESIGN TEAM IS CURRENTLY DEVELOPING THE MODULAR SYSTEM BASED ON FEEDBACK FROM CAG #4 WORKSHOP**
- **THE FOLLOWING IMAGES REFLECT CURRENT SYSTEM DESIGN STUDIES**

46

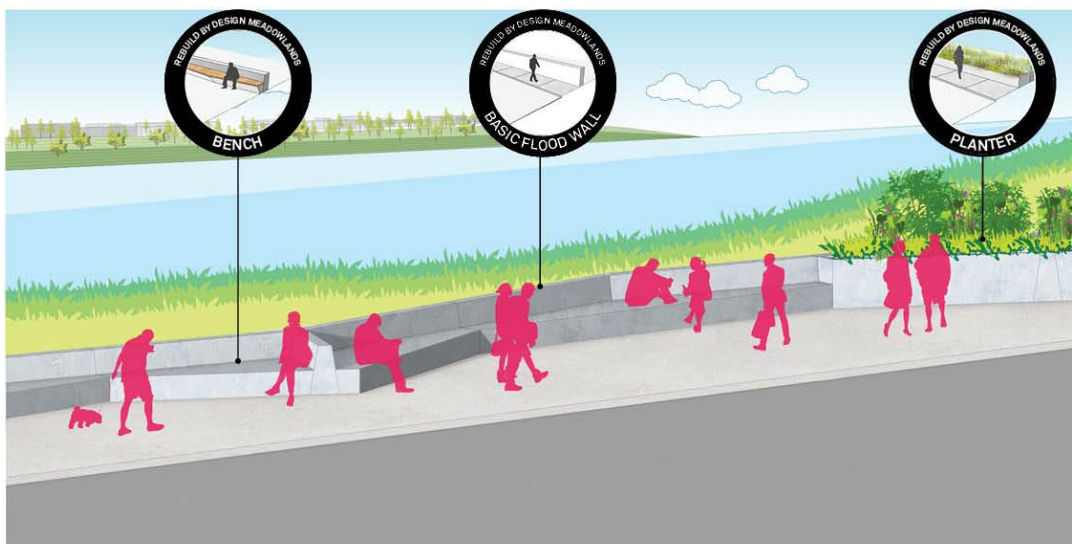
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MODULAR COMPONENT DEVELOPMENT

INVESTIGATION: 2

47



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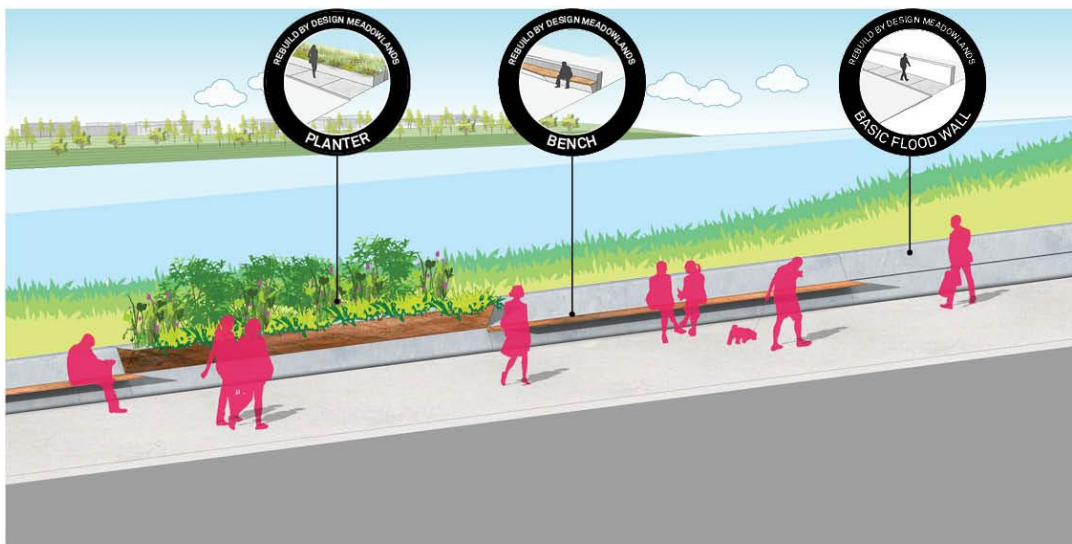
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MODULAR COMPONENT DEVELOPMENT

INVESTIGATION: 3

48



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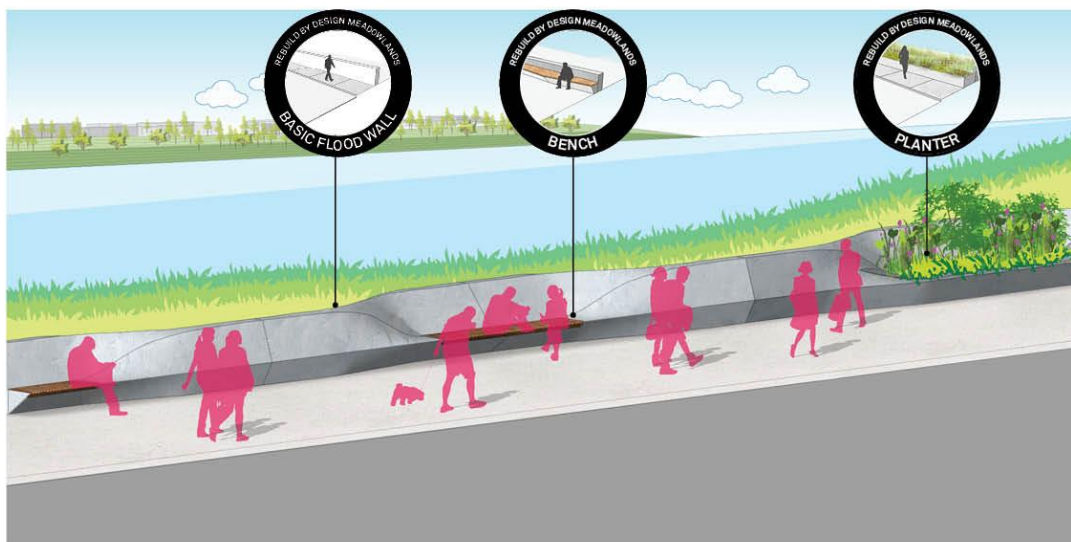
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MODULAR COMPONENT DEVELOPMENT

49

INVESTIGATION: 4



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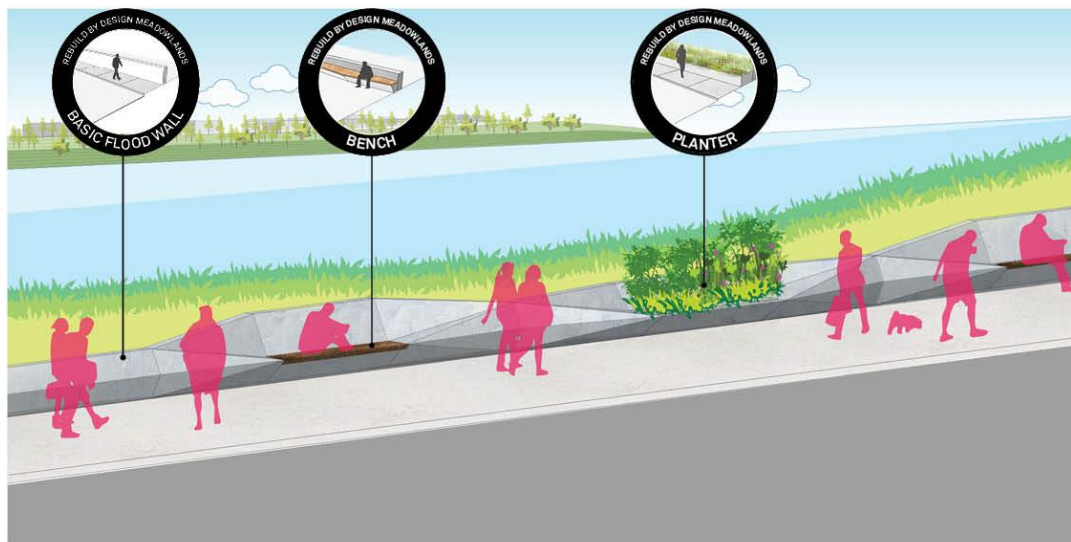
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MODULAR COMPONENT DEVELOPMENT

50

INVESTIGATION: 5



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NEXT STEPS

CHRIS BENOSKY, AECOM



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NEXT STEPS

Chris Benosky, AECOM

52

NJDEP / AECOM UPCOMING ACTIVITIES

- Prepare Meeting Summary for CAG #6
- Continue developing:
 - Concepts and Alternatives
- CAG #7 in January
 - Alternative 3 - Hybrid



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NEXT STEPS

53

CAG: CALL TO ACTION

- Submit comments & worksheet from CAG #6 meeting on **December 16, 2016**
- 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)



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CAG Meeting #6 // December 6, 2016

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NEXT STEPS

54

Critical Information

January 31, 2017

CAG Meeting #7: Alternative 3 (Hybrid)

Project Website

www.rbd-meadowlands.nj.gov

Project Email

rbd-meadowlands@dep.nj.gov

Question & Answer



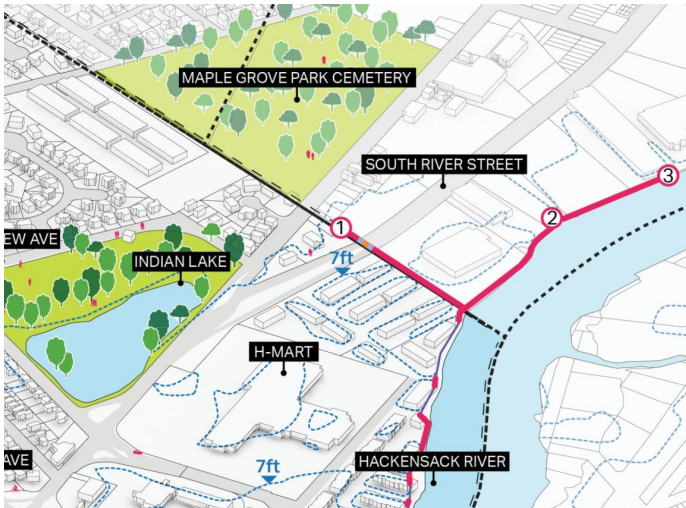
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CAG Meeting #6 // December 6, 2016

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4.0 Concept Worksheets

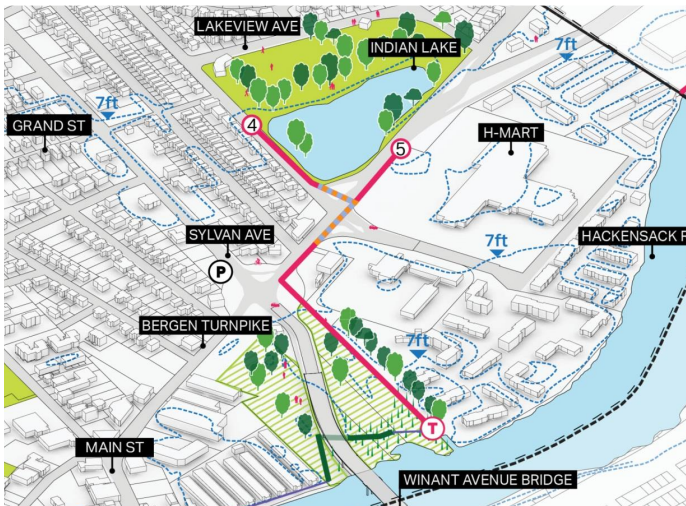
ALIGNMENT OPTION - ZONE 1



What alignment do you prefer, and why?

Are there any options you dislike, and why?

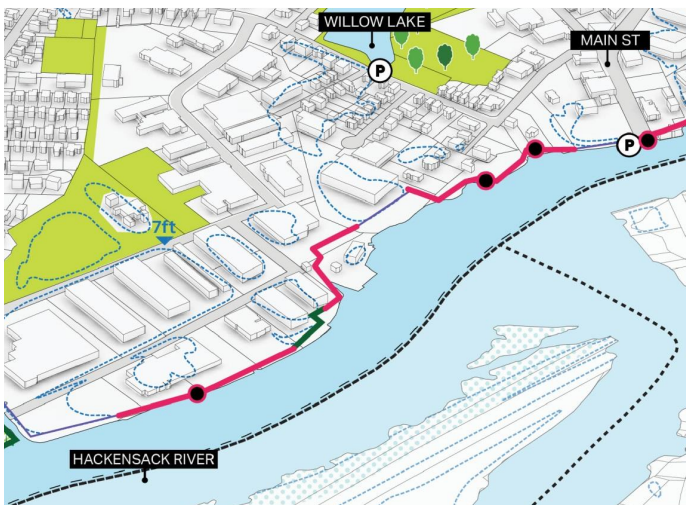
ALIGNMENT OPTION - ZONE 2



What alignment do you prefer, and why?

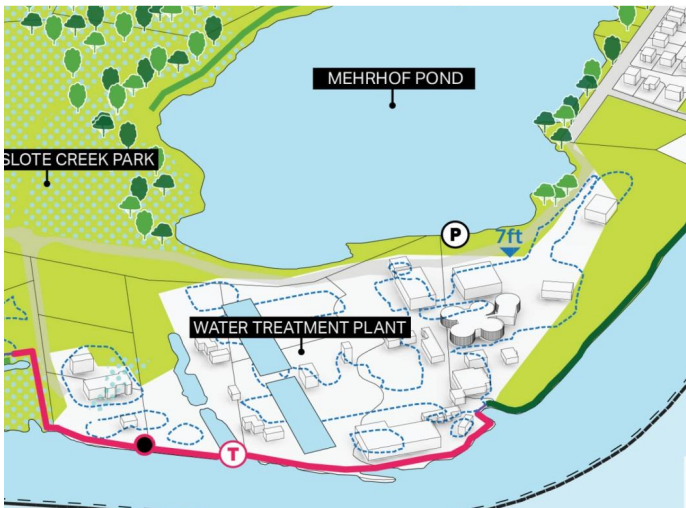
Are there any options you dislike, and why?

ALIGNMENT OPTION - ZONE 3



What alignment do you prefer, and why?

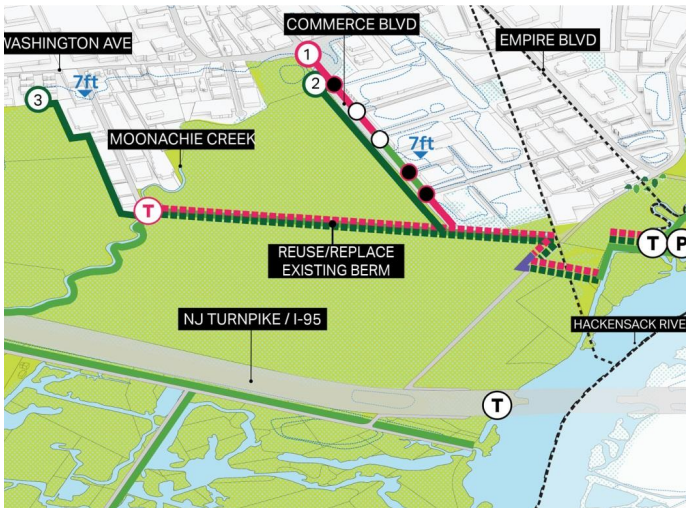
Are there any options you dislike, and why?



ALIGNMENT OPTION - ZONE 4

What alignment do you prefer, and why?

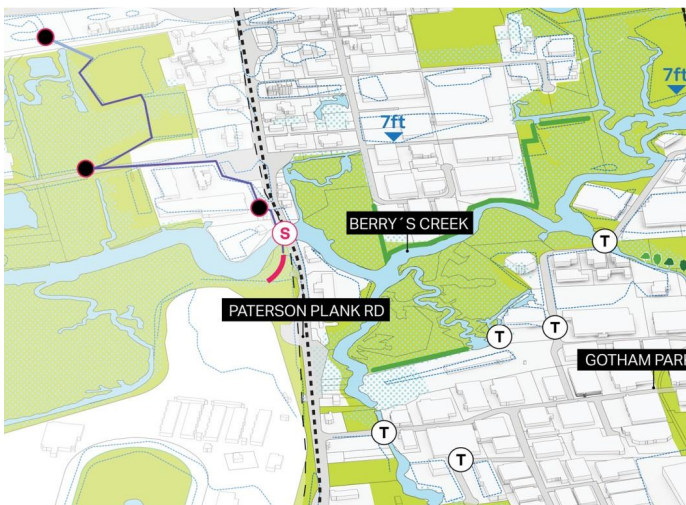
Are there any options you dislike, and why?



ALIGNMENT OPTION - ZONE 5

What alignment do you prefer, and why?

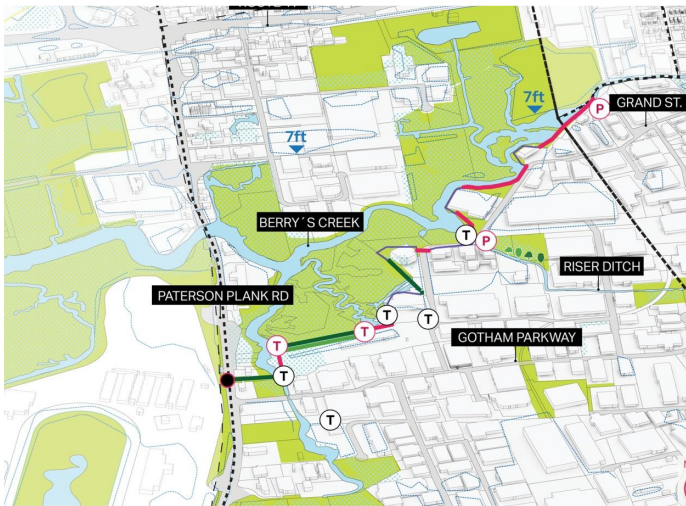
Are there any options you dislike, and why?



ALIGNMENT OPTION - ZONE 6 OPTION 1

What alignment do you prefer, and why?

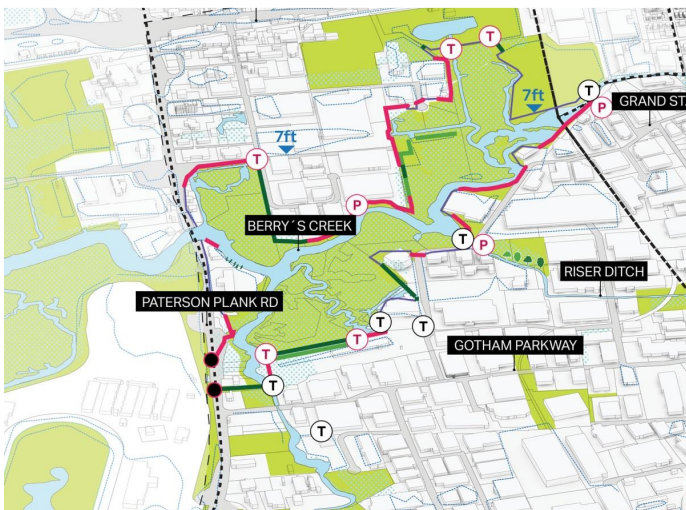
Are there any options you dislike, and why?



ALIGNMENT OPTION - ZONE 6 OPTION 2

What alignment do you prefer, and why?

Are there any options you dislike, and why?



ALIGNMENT OPTION - ZONE 6 OPTION 3

What alignment do you prefer, and why?

Are there any options you dislike, and why?

5.0 Personal Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no vertical margin lines or other markings present. The paper appears to be a standard sheet of notebook paper.

CAG MEETING #6 // December 6, 2016 | 36

CAG MEETING #6 // December 6, 2016 | 37