Subject	**Meeting Minutes – Community Meeting, Project Update, and the Preferred Alternative**
Meeting Date	**January 11, 2018**
Time	**6:00 pm – 7:30 pm ET**
Location	**Robert L. Craig School Gymnasium, 20 W. Park Street, Moonachie, NJ 07074**
Attendees	**Attendee list available; *for internal use only***

- The PowerPoint slide presentation utilized at the meeting is attached to the meeting minutes (see **Attachment 1**).
- A meeting packet was provided to all attendees and is also attached to the meeting minutes (see **Attachment 2**).
- Dave Rosenblatt, New Jersey Department of Environmental Protection (NJDEP) Assistant Commissioner, initiated the meeting and provided a brief overview of the meeting agenda.
- The Mayor of Moonachie, Dennis Vaccaro, thanked the meeting attendees for working on the RBDM project over the past three years. He stated that this project would not protect against another Hurricane Sandy, but it would be a benefit the communities and would help reduce flooding in the area.
- The Mayor of South Hackensack, Gary Brugger, commented on how fast the past three years have passed. He stated that flooding along Empire Boulevard during Hurricane Sandy was limited. He expressed that he was concerned about the RBDM project because of funding limitations, but that the project (i.e., under the Preferred Alternative, including the Build Plan and Future Plan) is an ongoing, shovel-ready project that can be built for years to come as funding is received.
- The Mayor of Little Ferry, Mauro D. Raguseo, thanked AECOM, NJDEP, the Citizens Advisory Group (CAG), and other citizens for their work through this three-year process. He stated that, while the RBDM project is not all encompassing, there would be a definite improvement and, more importantly, good things in the future. He expressed that he was skeptical, but he had a borough engineer review the proposed RBDM project plans and he is confident that there would be improvements.
- Dave Rosenblatt stated that his office is responsible for managing the RBDM project. He stated that his office works closely with municipalities and the CAG and he feels it is important to have consistent support from the community and CAG. He expressed that he is confident that the RBDM project can be completed by September 2022, as required.
- Chris Benosky, AECOM's RBDM Program Manager, provided an overview of the agenda and reviewed the original *Protect, Connect, Grow* components of the RBDM project. He reminded

the meeting attendees that implementing all three concepts would have cost $850 million; however, HUD only awarded $150 million for the Phase 1 Pilot Area (i.e., the Project Area). As such, adjustments had to be made to provide a solution that met the available funding.

- Garrett Avery, AECOM's RBDM Project Manager, provided an overview of the Proposed Project's Purpose and Need. The Purpose of the Proposed Project is to: (1) reduce flood risk; (2) increase the resiliency of the communities and ecosystems; and (3) reduce impacts to critical infrastructure, residences, businesses, and ecological resources from flooding. The Proposed Project is needed to: (1) address systematic inland flooding and coastal flooding from storm surges; (2) increase community resiliency; (3) reduce flood insurance rates and claims from future events; (4) enhance water quality and protect ecological resources; (5) protect life, public health, and property; and (6) incorporate the flood hazard risk reduction strategy with civic, cultural, and recreational values.

- Mr. Avery continued that the goals of the Proposed Project are threefold: (1) create the best possible project with the available funding; (2) meet the Proposed Project mandate by providing flood reduction and co-benefits, such as reducing sediment and improving water quality; and (3) construct a project that provides storm protection and allows for a quicker recovery. However, the Proposed Project's goals are constrained by the need: (1) to construct a Proposed Project that functions with independent utility without relying on future projects; (2) to use available funds without relying on future funding; and (3) to meet the congressionally mandated Proposed Project implementation date of September 2022. Mr. Avery stated that, as a design team, the most challenging aspects have been to create a project: with independent utility, using only available funding, and having a positive benefit-cost ratio (the project must have a benefit-cost ratio greater than 1 [i.e., more benefit than money spent]).

- Mr. Avery explained that the Proposed Project challenges include filled historical wetlands, failing berms, low elevation, under-performing infrastructure, and inadequate drainage systems. With this in mind, the Project Team came up with three alternatives. Alternative 1 addresses storm surge flooding, Alternative 2 addresses frequent rainfall flooding, and Alternative 3 addresses both storm surge flooding and frequent rainfall flooding.

- Mr. Avery concluded that the past three years have been busy, and that 2018 will be very busy. He stated that the next Action Plan Amendment (APA) will be released tomorrow (January 12, 2018) for HUD to issue funding. The APA hearing is scheduled for January 31, 2018. In the spring of 2018, the Draft Environmental Impact Statement (DEIS) will be published and a public meeting on the DEIS will be held.

- Lulu Loquidis, AECOM's RBDM Landscape Designer, discussed how the Project Team arrived at the Preferred Alternative. She began by describing the community engagement involved to date in developing the RBDM project (i.e., CAG, Executive Steering Committee [ESC], outreach, etc.) and thanked the meeting attendees for their participation. She explained the alternative

development and screening process. Alternative concepts were screened against the following metrics: (1) flood reduction benefits; (2) impacts to the built human environment; (3) impacts to the natural environment; (4) constructability, scheduling, and maintenance requirements; and (5) the benefit-cost ratio. Additionally, there are specific grant-mandated criteria, such as economic revitalization benefits, environmental benefits, and social benefits, in addition to flooding, which must be considered.

- Ms. Loquidis then continued to describe the alternatives considered for the Proposed Project. Alternative 1 would create a structural line of protection that connects to existing topographical high points to reduce construction costs and minimize regrading along the Hackensack River. The Alternative 1 approach would encourage ecological uplift by minimizing the disturbance to ecological resources and considering habitat improvements and creation. As a community co-benefit to flood reduction, Alternative 1 would connect existing public parks and provide new park space on public land.

- Ms. Loquidis continued that, during the Alternative 1 development process, the Project Team analyzed existing infrastructure for coastal storm solutions that incorporated existing features. Existing topography was analyzed to identify the areas of high ground and also to determine water flow within the Project Area. As part of this analysis, the Team utilized soils and geotechnical data to inform the flood protection design (i.e., to determine how deep the piles and substructure needed to extend). This analysis was essential because the alternative needs to be tied-off to provide a complete solution.

- Ms. Loquidis provided a review of some of the initial concepts, and the key screening criteria examined (e.g., within budget, no increased flood risk, and greater than a 1.0 benefit-cost ratio). Several options were explored, including concepts that would afford 100-year flood protection. However, all concepts resulted in a fatal flaw with the exception of the 50-year flood protection concept (i.e., protection up to 7 feet NAVD88).

- Ms. Loquidis explained that Alternative 1 would provide protection from a storm surge up to 7 feet NAVD88, which represents an approximately 50-year storm event. This alternative is comprised of several features including floodwalls, berms, sheet pile wall, a surge barrier, cantilever walkways, and new park space. Alternative 1 would provide community co-benefits through increased access to the Hackensack River and multi-functional wall elements. Ms. Loquidis presented conceptual renderings of the cantilever walkway and the sheet pile wall and viewing platform. The cantilever walkway would provide both flood protection (up to 7 feet NAVD88) and public access (recreational space and a public walkway). The sheet pile wall with a viewing platform would be a cost-effective flood protection option that integrates public viewing areas into the system.

- Mr. Avery then provided an overview of Alternative 2. Alternative 2 would use existing channels in the Project Area to convey stormwater away from flood-prone areas through the

enhancement of existing infrastructure and development of new stormwater management improvements. Alternative 2 seeks to provide ecological uplift through native plantings, the creation of naturalized channel edges, and improved water quality. While the creation of new parks and the enhancement of existing open spaces would provide recreational co-benefits to the community, they would be integral to the water management system through their ability to manage stormwater volume and quantity, and in turn slow down stormwater runoff and improve water quality in the Project Area.

- Mr. Avery explained that, during the Alternative 2 development process, the Project Team took a similar approach as Alterative 1 and analyzed how existing infrastructure could be used and/or how existing natural areas and park spaces could be enhanced. Alternative 2 was analyzed by identifying 20 sub-basins within the Project Area to better understand the hydrology of the area. As part of this analysis, the Team determined stormwater runoff flow patterns and obtained community input on frequently flooded areas. Water within the Project Area is ultimately conveyed into two primary waterbodies: the Hackensack River and Berry's Creek.

- Mr. Avery provided a review of the initial concepts, and the key screening criteria examined (e.g., within budget, distribution of benefits, and greater than a 1.0 benefit-cost ratio). Through the screening process, a Revised Concept was developed by reviewing and rearranging the components of the other concepts. This Revised Concept was carried forward as Alternative 2; it is a blending of the best features from the original five concepts and provides increased benefits. This concept focuses on two of the most important conveyance channels in the Project Area: the East Riser Ditch and Losen Slote.

- Mr. Avery explained that Alternative 2 would provide community co-benefits and a reduction in both the areal extent and depth of flooding. This alternative is comprised of several improvements including East Riser Ditch channel improvements, the creation of five new parks, improvements to five existing parks, green infrastructure, and new pump stations and force mains. Mr. Avery presented conceptual renderings of the Losen Slote drainage improvements and green infrastructure and park improvements. Losen Slote drainage improvements would include new pump stations and force mains to improve conveyance capacity. Green infrastructure and park improvements under Alternative 2 would include wetland enhancements, improvements to stormwater storage and quality, and increased public recreational opportunities.

- Mr. Avery then provided an overview of Alternative 3 (Hybrid Alternative). Alternative 3 would be the most comprehensive solution; it would provide flood protection from both storm surges and frequent rainfall and would be comprised of components from both Alternatives 1 and 2. However, this alternative would be difficult to construct due to Proposed Project constraints (e.g., funding and congressionally mandated timeframe). Therefore, this alternative includes a *Build Plan* and *Future Plan*. The *Build Plan* represents a feasible Proposed Project that can be constructed by September 2022 within the available funding limits; it would include flood

reduction improvements to address flooding from frequent rain events. The *Future Plan* consists of components that were not selected for the *Build Plan*, including the Alternative 1 line of protection, but that could be implemented by others over time as new funding sources become available.

- Mr. Avery explained that, similar to Alternative 2, the Alternative 3 *Build Plan* would provide community co-benefits and a reduction in the areal extent and depth of flooding from frequent rainfall. The *Build Plan* could be constructed within available funds, be functional by September 2022, would require less maintenance than Alternative 1, and would have a benefit-cost ratio greater than 1.0. This plan would include two new pump stations and force mains in the East Riser Ditch and Losen Slote drainage areas, East Riser Ditch channel improvements, new public parks, improvements to existing parks, and street green infrastructure.

- Ms. Loquidis provided more detail on the *Build Plan*. The East Riser Ditch channel improvements would include increased water conveyance within the channel (i.e., due to dredging), a new pump station, and a new park with wetlands (i.e., Caesar Place Park) to improve water storage and quality in this portion of the Project Area. These improvements would include habitat restoration through native plantings and improved/new habitat, an environmental education space, and a recreational area through the creation of a new park.

- Ms. Loquidis explained that the Losen Slote drainage improvements would include a new Losen Slote pump station and force main within the public right-of-way to improve conveyance, helping to move water from one location to another.

- Ms. Loquidis stated that the green infrastructure improvements under Alternative 3 would provide the following co-benefits to the Project Area: improved water quality, new habitat, and visual quality enhancements.

- Ms. Loquidis then described some of the proposed parks under the Alternative 3 *Build Plan*. The new Avanti Park would store water and capture total suspended solids through the creation of new open space, green infrastructure, rain gardens, and wetland enhancements. The proposed park would also provide the following co-benefits: water quality improvements, visual improvements, new habitats, and new space for recreation activities. Flood reduction benefits at Willow Lake and Riverside Park would reduce sedimentation, improve water quality, and improve open spaces and walking trails.

- Ms. Loquidis explained that, at different civic locations throughout the Project Area, green infrastructure would provide safer streets and enhanced visual improvements. Various co-benefits would be provided to municipal buildings.

- Ms. Loquidis explained the cost breakdown of the *Build Plan*. Approximately 15 percent would be allocated to green infrastructure and park improvements and 85 percent would be allocated

to grey infrastructure and channel improvements. The *Build Plan* meets the Proposed Project's Purpose and Need.

- Mr. Avery continued by explaining the benefits of the *Build Plan*. In a two-year storm event, approximately 20 acres would no longer flood and approximately 642 acres could experience a reduction in flood water between 0.1 and 3 feet. In a 100-year storm event, approximately 39 acres would no longer flood and approximately 1,244 acres could experience a reduction in flood water between 0.1 and 3 feet. The *Build Plan* would also allow for more households and residents to live in closer proximity to new parks and newly planted trees.

- Mr. Avery explained that grant-specific benefit/cost evaluation criteria were used, including consideration of economic revitalization benefits, environmental benefits, and social benefits. Under the *Build Plan*, $87.1 million would be recognized in making the area more resilient (81 percent of the total benefits), $10.9 million in benefits would be recognized under economic revitalization (i.e., property values, energy conservation, property taxes) (10 percent of the total benefits); $8.8 million in social benefits (i.e., recreation, water retention, aesthetic value, avoided stormwater treatment) (8 percent of the total benefits); and $175,000 in environmental benefits (i.e., air quality, nutrient pollution, pollination) (1 percent of the total benefits).

- Mr. Rosenblatt described the RBDM project's next steps. He stated that the goal of this meeting was for the attendees to understand where the RBDM project currently stands, including the identification of Alternative 3 as the Preferred Alternative. The next steps are to complete the EIS process, and then select, fully design, and construct the selected alternative. He identified that the State of New Jersey will also provide an Operations and Maintenance (O&M) Plan that identifies the entities that would perform on-going maintenance following construction. The State has already begun establishing an O&M subcommittee.

- There are several upcoming milestones, including the APA public hearing on **January 31, 2018**. The APA public comment period is from **January 13** to **February 12, 2018**, following the Draft APA publication date of **January 12, 2018**. The DEIS will be published in **Spring 2018** with a public comment period of 45 days. The DEIS public hearing will also occur in **Spring 2018** (during the public comment period). Attendees were encouraged to continue to build interest in the Proposed Project and to visit the Proposed Project website at www.rbd-meadowlands.nj.gov or email questions to rbd-meadowlands@dep.nj.gov for more information.

- Following the completion of the presentation, the CAG Members and members of the public posed the following questions and comments:

    1. We would like to offer assistance in implementing the native plantings when the Project is constructed. We would like to make native swamp azalea plants available (if successful). We would like to be involved because we want native plants only.

2. This looks like a great plan. I watched us build and plow over places we should not have; we are here because of that. This is a great step and we are improving.

3. Where is water being put in parks? Have you considered how water would be moved so that it doesn't just stand there like it does now?

   Response: Improvements would start at the lower portions to improve conveyance, and then work upstream; pump stations and green infrastructure would be designed and constructed to ensure water flowed properly.

4. This looks like a great project. How will climate change be considered?

   Response: The anticipated effects of climate change and sea level rise over the next 50-year time horizon are being considered. The Proposed Project would help mitigate the effects of climate change, sea level rise, and extreme weather events.

5. How can we improve things on our own properties?

   Response: Improvements that could be made to specific private properties are not considered as a part of the Proposed Project. Data is available on the internet for homeowners, and should be consulted.

6. In everything we are considering, O&M must be factored in. Green infrastructure features will need to be periodically cleaned out to ensure they do not clog.

7. The statistics shown in the PowerPoint represent a large range. Do you have more specific information available?

   Response: We will have more specifics after the Feasibility Study is finalized.

8. Was there any consideration of putting pump stations at the turnpike?

   Response: No, this was not one of the options that was advanced or considered in depth because there would not be a favorable benefit-cost ratio.

9. Will flood insurance rates decrease?

   Response: It is too early in the process to discuss this. This determination would involve substantial coordination with, and decisions by, FEMA.

10. I live downstream of Birch. It is one of the few places that didn't flood during previous storms. My concern is that you are taking water from above and bringing it down to me. Can we bring it down Chapman?

Response: As a project requirement, we cannot increase flooding within the Project Area or outside of the Project Area. The Proposed Project is being designed to ensure flooding does not occur for someone who did not previously experience it.

11. What is an energy dissipation system?

    Response: It is a system that slows down water to prevent erosion or sedimentation. The most common example is "rip-rap."

12. I am impressed with the green infrastructure proposed. Will there be restrictions on the existing buildings that are part of the improvements?

    Response: This would be discussed and coordinated with the local planning boards.

13. I would like to share a couple things:

    - The US Army Corps of Engineers (Public Notice Teterboro Airport) is developing 11 acres that would result in discharges into waters of the US.
    - On Empire Boulevard at the Kane Tract there was a line of trees bounding Empire Boulevard. All of those trees were cut down recently to provide increased fire protection to about $20 million in real estate.
    - The Losen Slote drainage improvements project has stopped. There is a rumor the County backed away from the project. The problem was an on-the-ground operator who was really good, but he was not being paid enough. The next operator was terrible and he should be stopped. We are going to have erosion that will go downstream.
    - Flood insurance requirements are hurting our ability to sell our homes.
        - For the East Riser Ditch improvements, why are you not going all the way north? At the last meeting, I suggested reaching out to Teterboro. Considering how much we deal with their noise, they should help the community.
        - Traffic is currently increasing on Moonachie Avenue. Once the American Dream project is built, we may have even more traffic. Maybe we should be revisiting the ERD bypass.

    Response: The Losen Slote drainage improvements project you mention is continuing and has been presented during council meetings. The process is cumbersome, but considerable progress has been made. The County is still committed and it should be complete by the end of the year. Weather, heavy rain, and snow are a problem this time of year which is why there has been a delay.

Dave Rosenblatt closed the meeting and thanked everyone for coming. The meeting adjourned at 7:30 pm ET.

Attachment 1.
Power Point Slide Presentation (as delivered)

REBUILD BY DESIGN

MEADOWLANDS

COMMUNITY MEETING

PROJECT UPDATE AND PREFERRED ALTERNATIVE
JANUARY 11, 2018

AGENDA

Christopher Benosky, AECOM 2

- Welcome
- The Meadowlands Challenge
- Alternative 1
- Alternative 2
- Alternative 3
  - Build Plan
  - Future Plan
- Preferred Alternative
- Takeaways / Next Steps
- Question & Answer

REBUILD BY DESIGN COMPETITION & AWARD

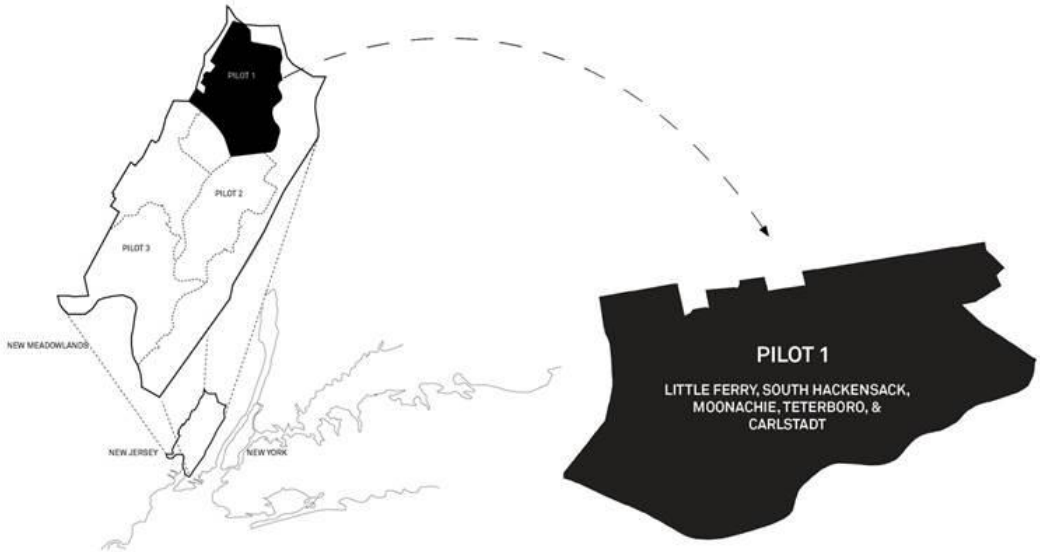
3

- Original Proposed RBD Concept
- **Protect:** Flood Protection
- **Connect:** Transportation Improvements
- **Grow:** Re-Development
- Cost Estimate (Competition Cost) **$850M+**

Competition Graphic: MIT

REBUILD BY DESIGN COMPETITION & AWARD

4



- HUD awarded State of New Jersey **$150M for Phase 1 Pilot Area only**
- Project must be functional and **completed by September 2022**

PROJECT OVERVIEW

GARRETT AVERY, AECOM

THE PURPOSE

6

Address flood risk

Increase resiliency of the communities and ecosystems

Reduce impacts to critical infrastructure, residences, businesses, and ecological resources

REBUILD BY DESIGN MEADOWLANDS

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THE NEED

7

Address systemic **inland flooding** & **coastal flooding** from storm surges

Increase **community resiliency**

Reduce flood insurance **rates** and claims from future events

Enhance water quality and protect ecological resources

Protect life, public health, and property

Incorporate flood hazard risk reduction strategy with **civic, cultural, & recreational values**

REBUILD BY DESIGN MEADOWLANDS

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PROJECT GOALS

8

1. Create the **BEST POSSIBLE PROJECT** with the available funding

2. Meets the Project Mandate by providing **FLOOD REDUCTION & CO-BENEFITS** such as reducing sediment & improving water quality

3. Construct a project that provides **STORM PROTECTION** and allows for a **QUICKER RECOVERY**

REBUILD BY DESIGN MEADOWLANDS

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PROJECT CONSTRAINTS

9

1. Construct a complete project that functions with **INDEPENDENT UTILITY** to meet purpose & need without relying on future projects

2. Use only **AVAILABLE FUNDS** without relying on future funding

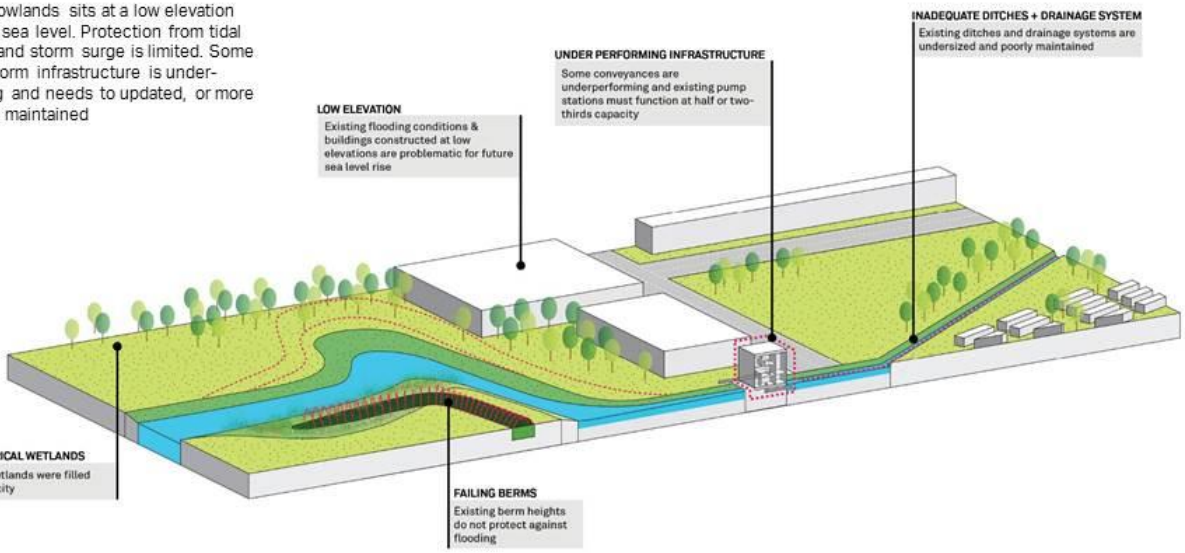
3. Construct a fully-functional project by **SEPTEMBER 2022**

4. Project must have a **POSITIVE BENEFIT COST RATIO**

PROJECT AREA CHALLENGES

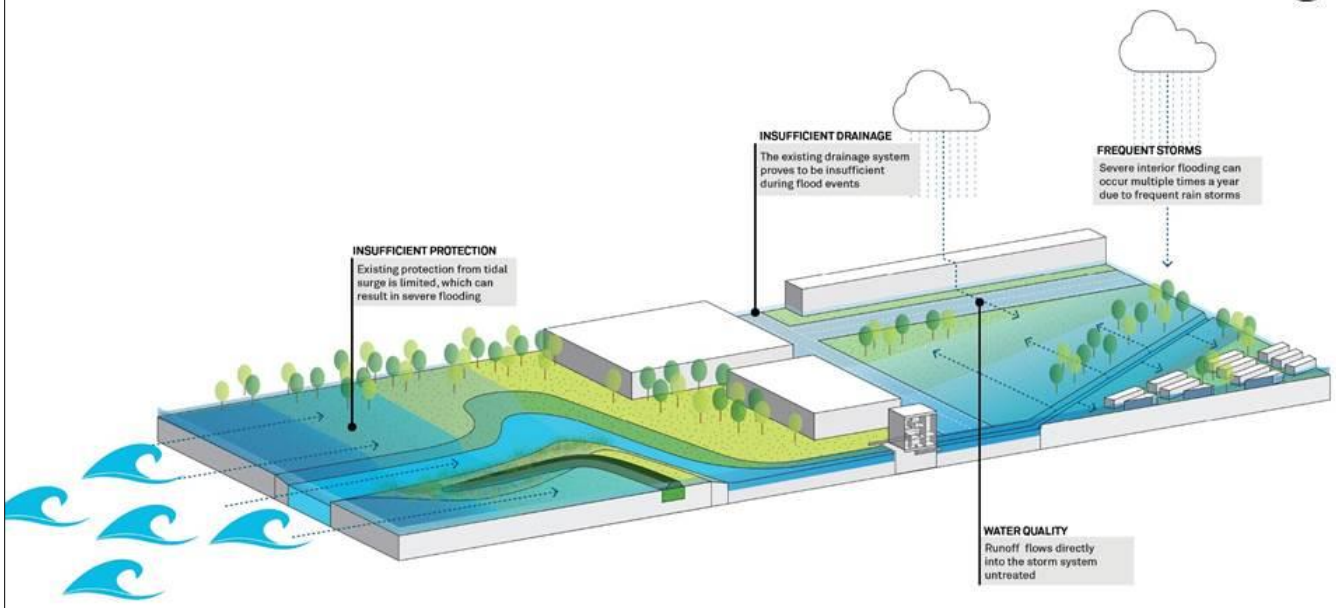
10

The Meadowlands sits at a low elevation relative to sea level. Protection from tidal influence and storm surge is limited. Some existing storm infrastructure is under-performing and needs to updated, or more frequently maintained



PROJECT AREA NEEDS

11



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THE MEADOWLANDS - THREE ALTERNATIVES

12

Alternative 1:
Storm Surge Flooding

Alternative 2:
Frequent Rain Flooding

Alternative 3:
Storm Surge & Frequent Rain Flooding

REBUILD BY DESIGN MEADOWLANDS

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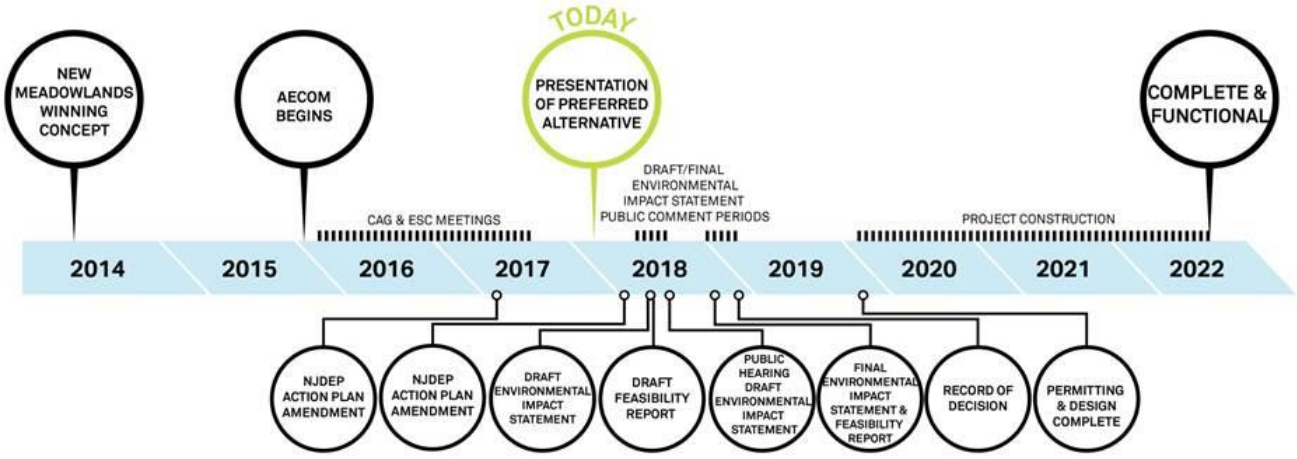
PROJECT ROADMAP

13



ALTERNATIVE 3 - THE PREFERRED ALTERNATIVE

14

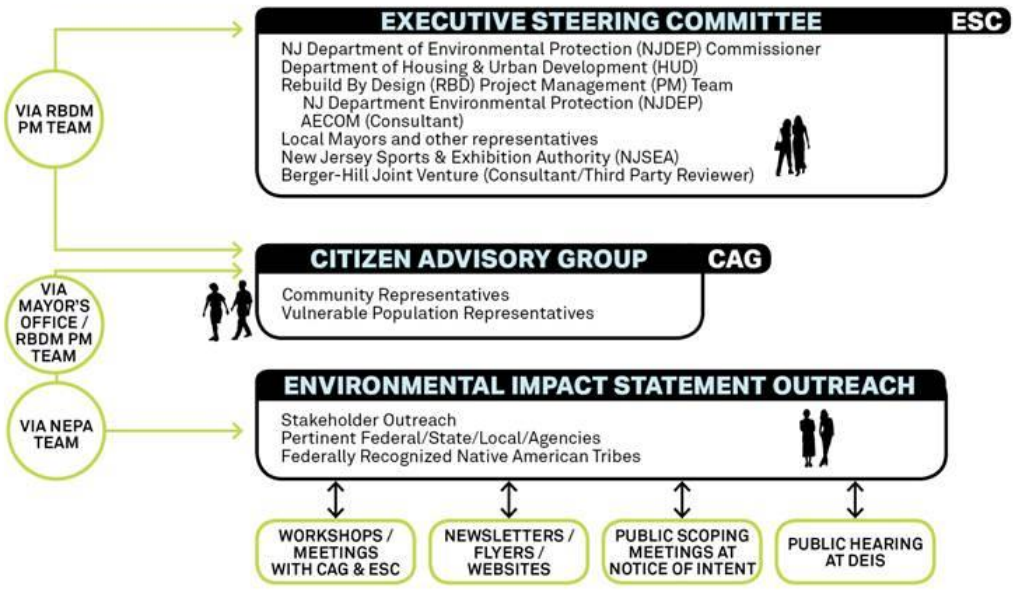
Alternative 3:
Storm Surge & Frequent Rain Flooding

SELECTING A PREFERRED ALTERNATIVE

LULU LOQUIDIS, AECOM

COMMUNITY ENGAGEMENT

EXECUTIVE STEERING COMMITTEE & CITIZENS ADVISORY GROUP



OUR PROCESS
THE SCREENING TOOL

17

Concepts are screened against each other to determine how they will meet the below metrics

FLOOD REDUCTION BENEFITS

18

Categories Evaluated:

- Reduces Flood Risk from Coastal Storm Surge (Alternatives 1 and 3)
- Reduces Flood Risk from Rainfall /Interior Drainage Challenges (Alternatives 2 and 3)
- Provides Protection to Vulnerable and Underserved Populations
- Provides Protection to Critical Infrastructure (emergency services, hospitals, transit facilities)

BUILT HUMAN ENVIRONMENT

19

Categories Evaluated:

- Effects to Existing Utilities & Utility Infrastructure
- Effects to Existing Transportation Network, Local Traffic, and Connectivity
- Effects on Land Acquisition / Housing Displacements
- Potential to Provide Increased Waterfront Access
- Effects to Recreational, Civic, and Cultural Amenities and Uses
- Effects to Viewshed and Local Visual Quality
- Effects to Air Traffic Safety at Teterboro Airport

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NATURAL ENVIRONMENT

20

Categories Evaluated:

- Effects to Existing Hazardous Waste Sites
- Effects to Berry's Creek Remediation
- Effects on the Transport of Environmental Contaminants/ Sediments during Flood Events
- Effects to Water Resources, including Water Quality, "Waters of the US," Wetlands, and Mitigation Banks
- Effects to Fisheries and Essential Fish Habitat (EFH)
- Effects on Protected Species and their Habitats
- Effects on Other Sensitive Ecological Resources, including Biodiversity, Habitat, and Migration/Movement Corridors
- Effects to Historic and Prehistoric Cultural Resources

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CONSTRUCTION & MAINTENANCE

21

Categories Evaluated:

- Constructability
- Minimizes Long-Term Maintenance & Operation Requirements for Overall System
- Potential to Complete by September 2022

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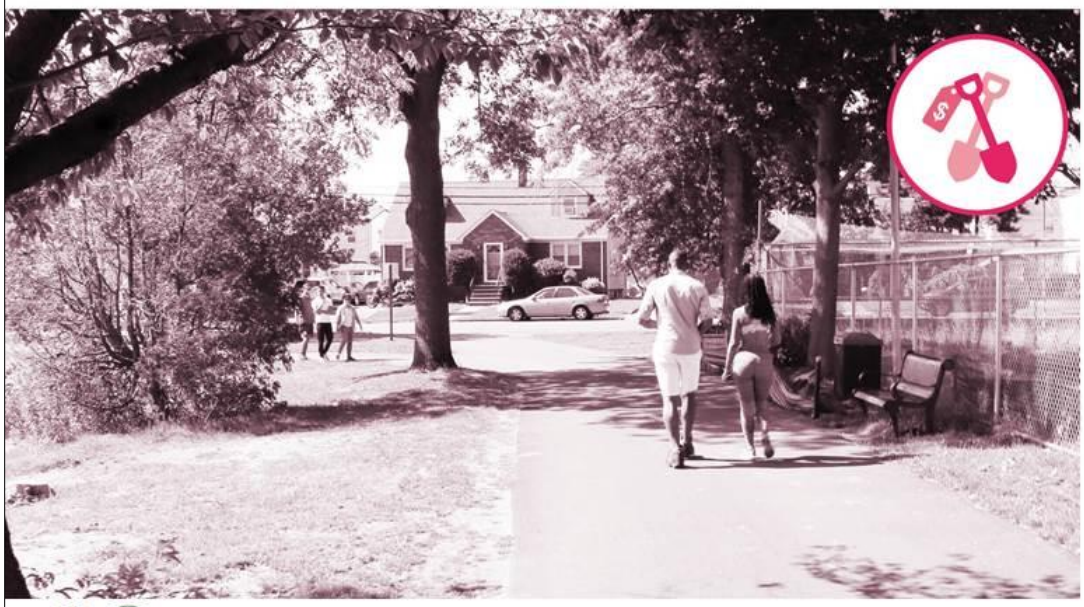
BENEFIT & COST

22



Categories Evaluated:

- Provides Benefits to the Project Area and Community
- Can be Implemented within Available Funding Limits
- Has a Positive Benefit/Cost Ratio

REBUILD BY DESIGN MEADOWLANDS

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BENEFIT COST RATIO
GRANT-SPECIFIC BENEFIT/COST EVALUATION CRITERIA

Economic Revitalization Benefits

- Direct effects on local or regional economy (e.g., tourism revenue)
- Improved Property Value (exclusive of enhanced flood protection)
- Value creation attributable to Rebuild By Design

Environmental Benefits

- Protection from disruptive non-disasters (nuisance flooding)
- Reduced vulnerability of energy and water infrastructure
- Improved Ecosystem and Biodiversity
- Water & Air Quality Improvements

Social Benefits

- Reductions in human suffering
- Improved Recreation Value
- Improved Community Identity and Social Cohesion
- Greater access to Cultural, Historical, Archeological Sites and Landscapes

STORM SURGE FLOODING

ALTERNATIVE 1
LULU LOQUIDIS, AECOM

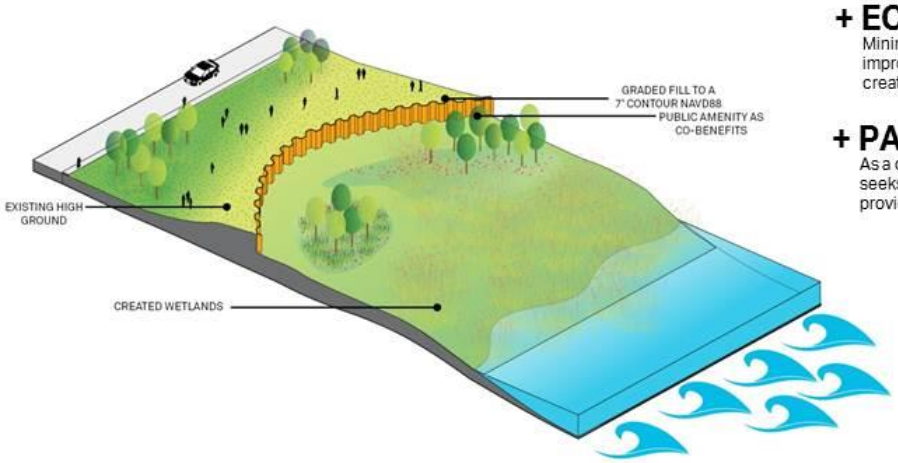
ALTERNATIVE 1 STORM SURGE
APPROACH & GOALS

25

+ INFRASTRUCTURE
Connecting to high points to reduce construction costs and minimize grading

+ ECOLOGY
Minimize disturbance, consider habitat improvements to fragmented systems, and creation of new ecological zones

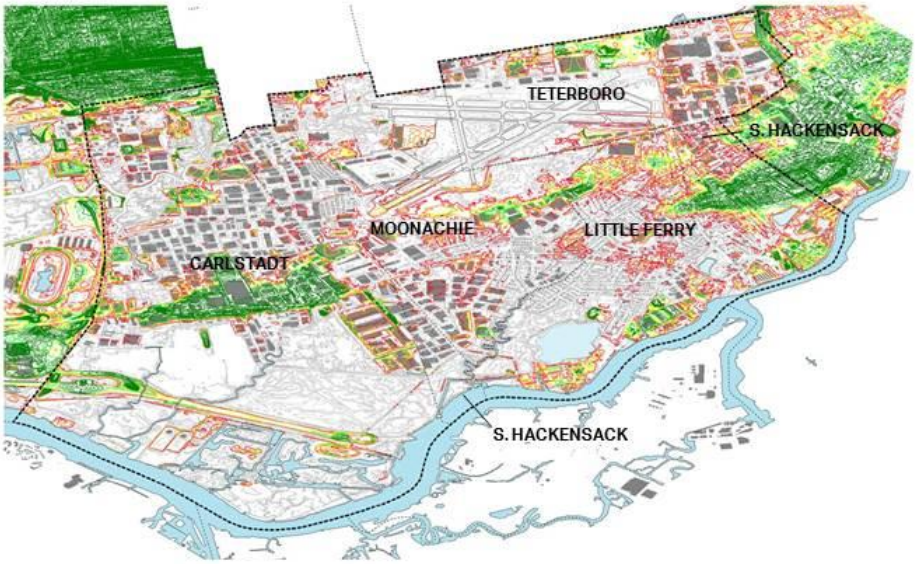
+ PARKS
As a co-benefit to flood reduction, the project seeks to connect existing public parks as well as provide new park space



ALTERNATIVE 1 STORM SURGE - ANALYSIS
HIGH POINTS

26

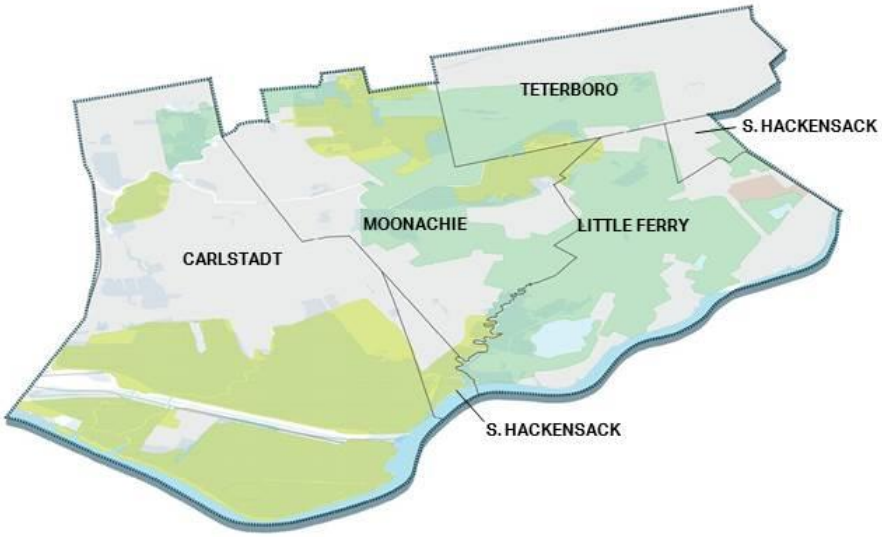
- Existing topography was analyzed to determine water flow and identify areas of high ground



Above 10' NAVD88
9' NAVD88
8' NAVD88
7' NAVD88
6' NAVD88
Below 6' NAVD88

ALTERNATIVE 1 STORM SURGE - ANALYSIS
SOILS & SUB-STRUCTURE

27



- All proposed flood protection strategies were informed by geo-technical analysis
- The soil type helped the team determine how deep the piles and sub-structure needed to extend

Frequently flooded-soils
Urban soils-wet sub stratum
Urban soils
Loam-urban context

Data Source:
USDA WSS AOI Web Soil Survey
http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

ALTERNATIVE 1 STORM SURGE
SCREENING EXAMPLE

28

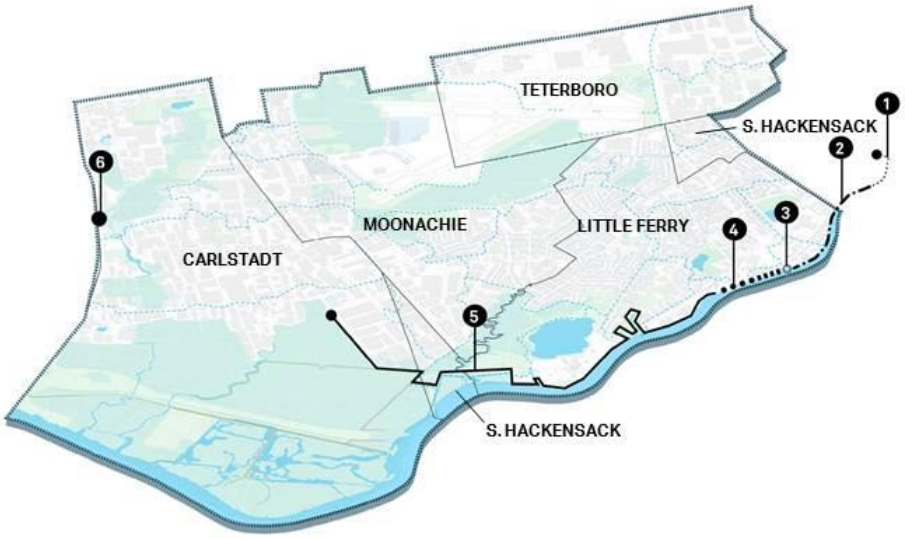
Initial Concepts	Description	Within Budget	No Increased Flood Risk	Benefit Cost Ratio >1
Option 1	100-year Storm Protection/ Expanded Project Area	X	●	●
Option 2	100-year Storm Protection/ Project Area	X	●	●
Option 3	50-year Level of Protection/ Project Area	●	●	●
Option 4	Ring Levees/ Reduced Project Area	●	●	X
Option 5	Storm Surge Barrier on Hackensack River	X	X	●

50-YEAR LEVEL OF PROTECTION ADVANCES

- Explored many options to a 100-year flood, but both Options 1 and 2 resulted in fatal flaw
- The 7' NAVD88 design elevation was further analyzed

ALTERNATIVE 1 STORM SURGE - PLAN

29



- Provides protection from a storm surge to elevation 7' NAVD88 (approximately a 50-yr storm)
- Provides community co-benefits through water access & multifunctional wall elements
- Positive Benefit Cost Ratio greater >1
- Revised Feasibility-level concept cost exceeds $150M

1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

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CANTILEVER WALKWAY

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

30

- The Cantilever Walkway combines flood protection and public access

1. Public walk
2. Modular planter
3. Cantilever access
4. Recreational space

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FLOOD PROTECTION

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

31

- The entire structure is built up to a 7'NAVD88 elevation

1. Flood protection system
2. Newly-created tidal wetland

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VIEWING PLATFORM & SHEET PILE

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

32

- Sheet pile is a cost effective material used in the southeast
- Public viewing platforms were integrated into the system

1. Viewing deck
2. Wetland

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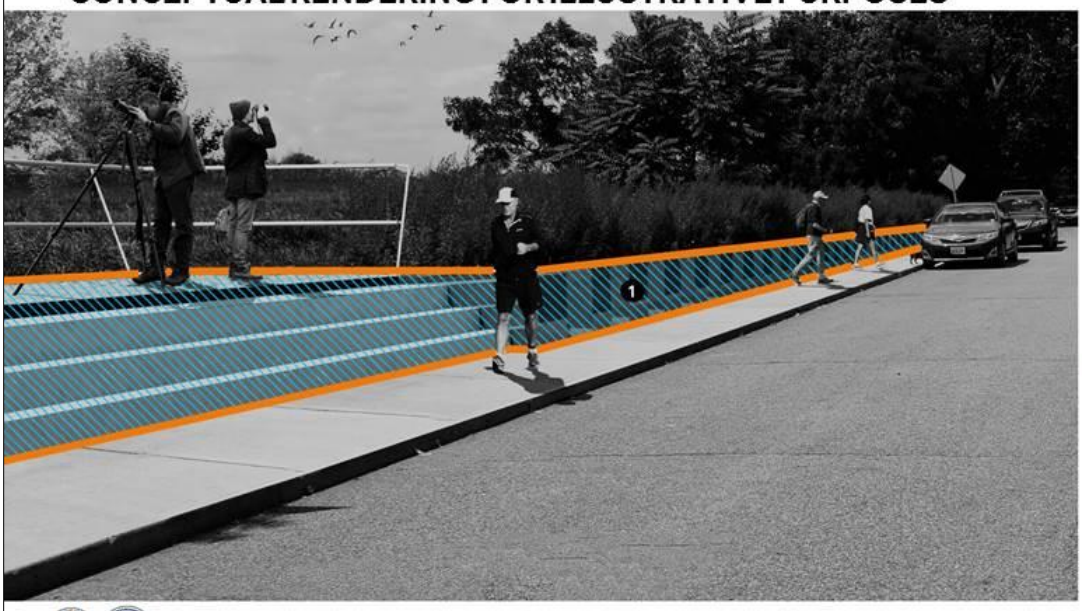
FLOOD PROTECTION

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

33



- Sheet pile wraps around viewing platform to form the flood protection system

1 Sheet pile

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FREQUENT RAIN FLOODING

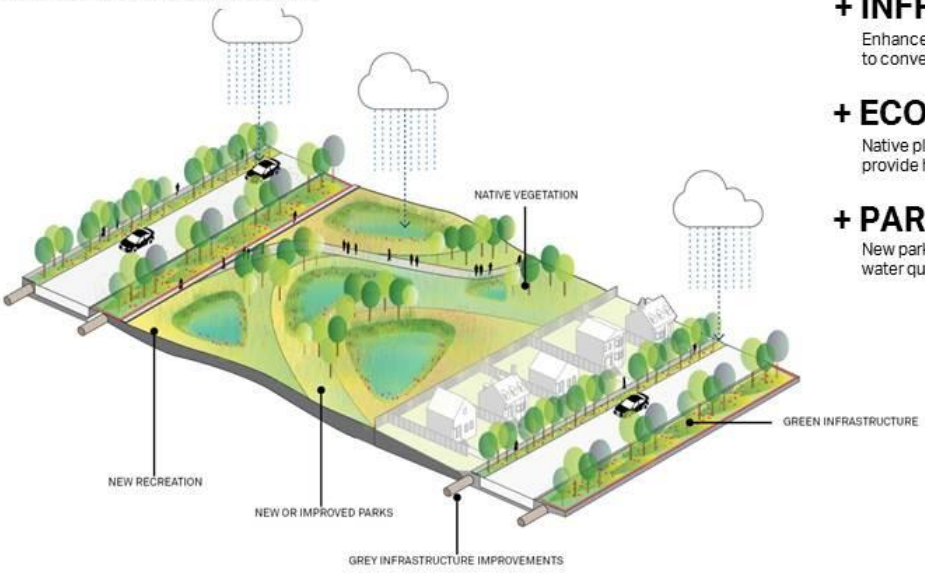
ALTERNATIVE 2

GARRETT AVERY, AECOM

ALTERNATIVE 2 FREQUENT RAIN FLOODING

35

APPROACH & GOALS



+ INFRASTRUCTURE

Enhance & restore channels to improve capacity to convey stormwater

+ ECOLOGY

Native plantings and naturalized channel edges provide habitat and improve water quality

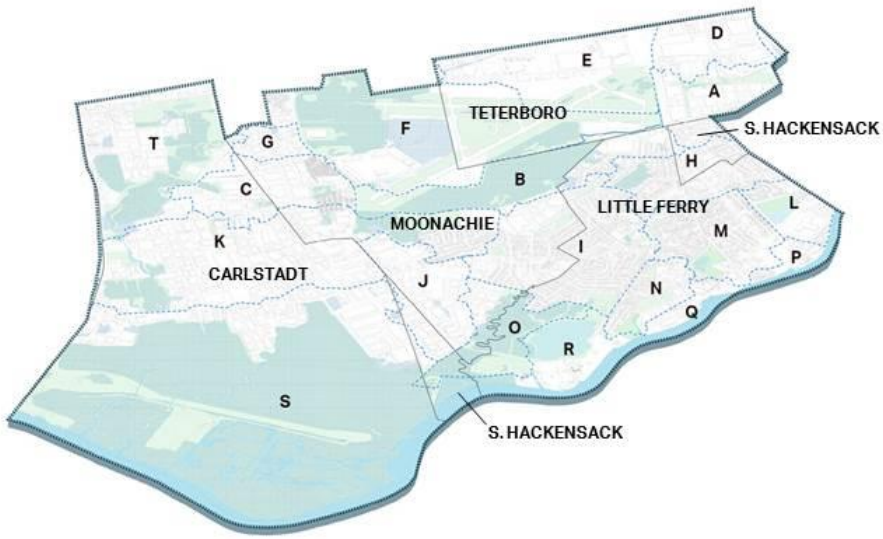
+ PARKS

New park spaces slowing runoff & improve water quality

ALTERNATIVE 2 FREQUENT RAIN FLOODING -ANALYSIS

36

20 SUB-BASINS



- Analyzed 20 sub-basin areas in the hydrologic model

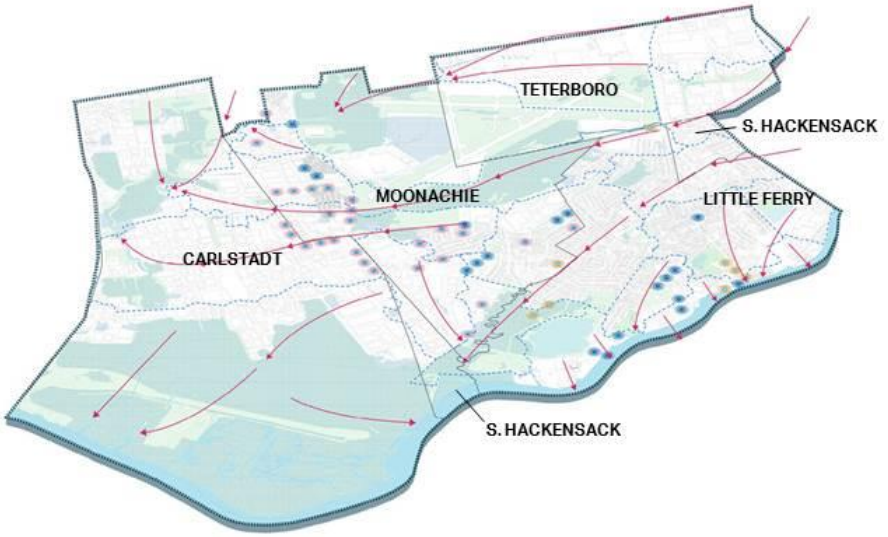
A: UPPER EAST RISER
B: MIDDLE EAST RISER
C: LOWER EAST RISER
D: UPPER WEST RISER 1
E: UPPER WEST RISER 2
F: MIDDLE WEST RISER
G: LOWER WEST RISER
H: UPPER LOSEN SLOTE 1
I: UPPER LOSEN SLOTE 2
J: MOONACHIE
K: CARLSTADT
L: INDIAN LAKE
M: MAIN STREET
N: DEPEYSTER CREEK
O: LOWER LOSEN SLOTE
P: UPPER HACKENSACK
Q: MIDDLE HACKENSACK 1
R: MIDDLE HACKENSACK 2
S: LOWER HACKENSACK
T: BERRY'S CREEK

Sub-basin boundary

ALTERNATIVE 2 FREQUENT RAIN FLOODING -ANALYSIS

37

FREQUENCY & FLOW



- Runoff flows to lower elevations, into creeks or ditches and is conveyed eventually into the Hackensack River or Berry's Creek
- We listened to the community members and used their input to map areas of frequent flooding

Floods in regular event
Floods in heavy event
Floods in major event
Primary conveyance direction
Sub-basin

ALTERNATIVE 2 FREQUENT RAIN FLOODING

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SCREENING EXAMPLE

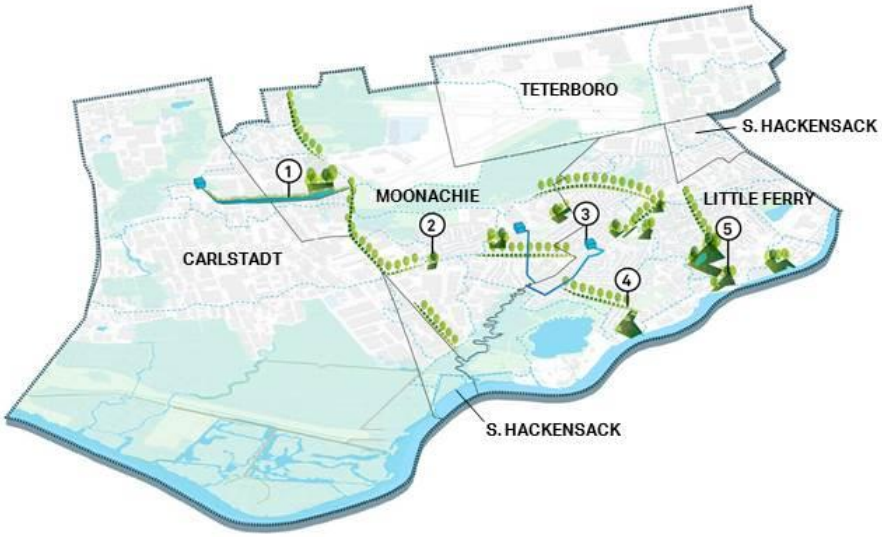
Initial Concepts	Description	Within Budget	Distribution of Benefits	Benefit Cost Ratio >1
Main Street	Increase storage capacity at Indian Lake, improves storm drainage pipes, includes upgrades to existing Willow Lake pump station discharge line, and new street and park green infrastructure	●	X	X
DePeyster Creek	Upgrade of existing pump station, upgrades of existing upstream culvert, channel dredging with habitat restoration, and new street and park green infrastructure	●	●	X
Losen Slote & Carol Place	Two new pump stations and force mains to divert stormwater from residential area to downstream of Losen Slote, upgrades to existing storm drainage ditches and culverts, and new street and park green infrastructure	●	●	X
West Riser	New pump station, channel conveyance improvements with habitat restoration, culvert upgrades, and new street green infrastructure.	●	X	●
East Riser	Pump station improvements, channel conveyance improvements with habitat restoration, culvert and bridge upgrades, and new street and park green infrastructure.	X	●	●
Revised Concept	New pump station and force mains to divert stormwater from residential area to downstream of Losen Slote, upgrades to culverts and bridge crossings, East Riser Ditch conveyance improvement and new pump station, and new street and park green infrastructure	●	●	●

REVISED CONCEPT ADVANCES

- Top concepts were reviewed and evaluated using the screening criteria
- The Revised Concept was a result of reviewing and rearranging to create a concept carrying increased benefits

ALTERNATIVE 2 – FREQUENT RAIN FLOODING PLAN

39



- Reduction in areal extent of flooding and depth of flooding for fluvial storms of a recurrence interval of 100-yr or less
- Provides community co-benefits through green infrastructure
- Positive Benefit Cost Ratio greater >1
- Revised Feasibility-level concept cost exceeds $150M

1. East Riser Channel Improvements + New Park
2. Green Infrastructure + New Park
3. Force Main + Public Facility Improvements
4. Green Infrastructure + New Park
5. Park Improvements + 3 New Parks + Green Infrastructure

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LOSEN SLOTE DRAINAGE IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

40

- New pump stations improve conveyance capacity by moving water from one location to another

1. Submersible pump
2. 36" force main
3. Losen Slote
4. Control panel

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GREEN INFRASTRUCTURE & PARK IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

41

- Wetland enhancement, improves storage and treatment capacities, and improves public recreation opportunity

1. Elevated boardwalk
2. Channel improvements
3. Shallow emergent marsh
4. Native Vegetation

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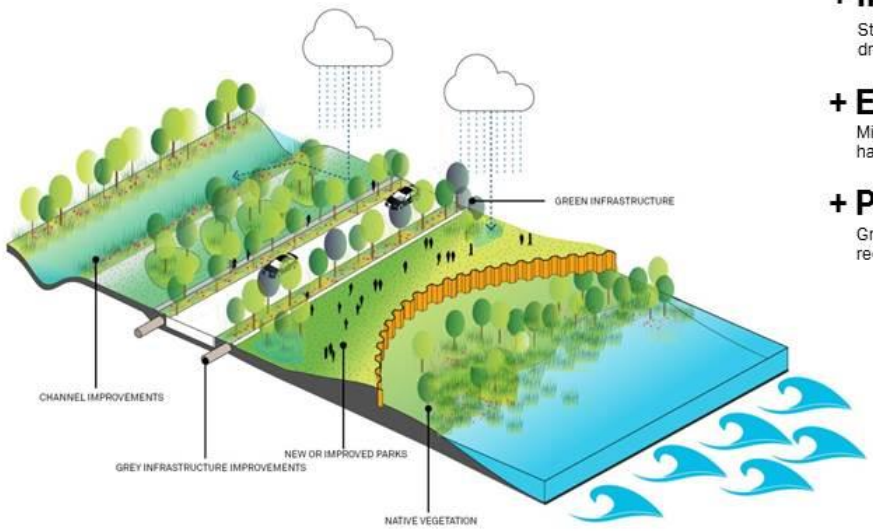
THE PREFERRED ALTERNATIVE

ALTERNATIVE 3 – STORM SURGE & FREQUENT RAIN FLOODING

GARRETT AVERY, AECOM

ALTERNATIVE 3 – HYBRID
APPROACH & GOALS

43



+ INFRASTRUCTURE

Structural Flood Reduction and local drainage infrastructure improvements

+ ECOLOGY

Minimize ecological disturbance and improve habitat within channels, streets, and parks

+ PARKS

Green infrastructure provides additional flood reduction & improves existing public parks

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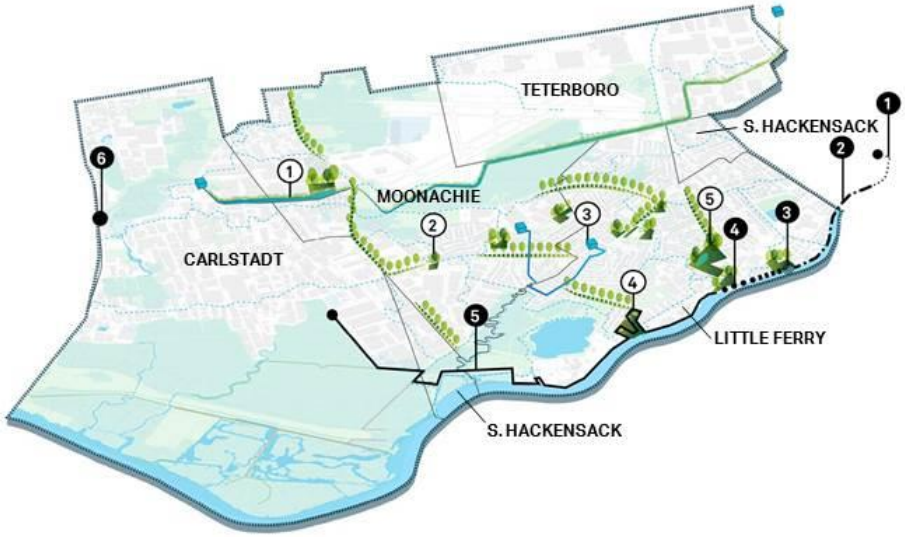
ALTERNATIVE 3 – THE PREFERRED
A PLAN FOR BOTH CHALLENGES

44



Stormwater Management

1. East Riser Channel Improvements + Enhanced Wetland Open Space
2. Green Infrastructure + Enhanced Existing Open Space
3. Force Main + Public Facility Improvements
4. Green Infrastructure + Enhanced Open Space
5. GI Improvements to Existing Park + 3 New Wetland / Open Spaces

Storm Surge Protection

1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

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ARRIVING AT A PREFERRED
ALTERNATIVE SCREENING

45

Alternatives	Description	Stormwater & Storm Surge Protection	Distribution of Benefits	Benefit Cost Ratio >1
Alternative 1	Final Storm Surge Protection Concept	X	●	●
Alternative 2	Final Stormwater Reduction Concept	X	●	●
Alternative 3	Final Storm Surge & Stormwater Protection Concept	●	●	●

THE PREFERRED ALTERNATIVE

ALTERNATIVE 3 HYBRID - THE BUILD & FUTURE PLAN

46

Build Plan

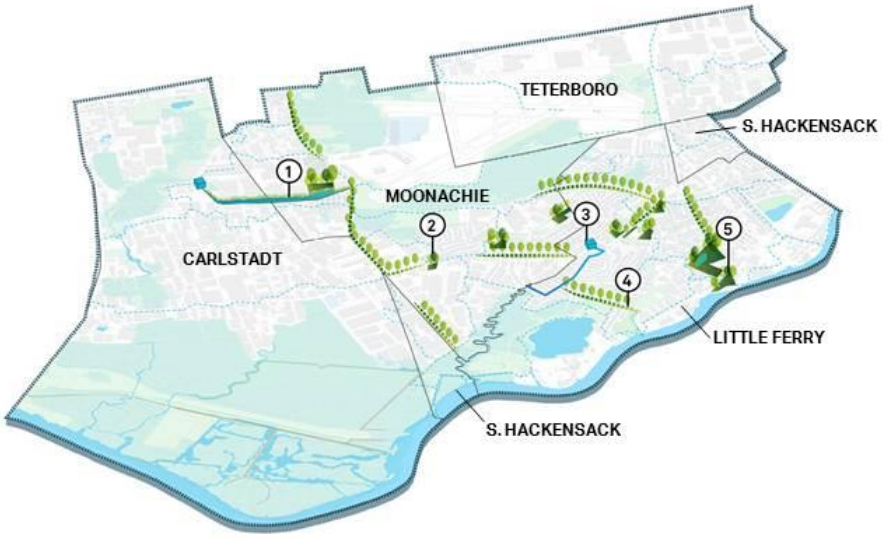
Future Plan

The *Build Plan* represents a feasible project that can be **constructed by 2022.** Components include flood reduction strategies to address frequent rain flooding

Components that were not selected for the *Build Plan* became elements of a *Future Plan*. These elements could **be implemented** by others **over time** as new funding sources become available

ALTERNATIVE 3 - BUILD PLAN
FREQUENT FLOOD REDUCTION

47



1. Pump station + Channel Improvements + New Park
2. Green Infrastructure + New Park
3. Pump Station + Force Main + Public Facility Improvements
4. Green Infrastructure
5. Park Improvements + 1 New Park + Green Infrastructure

Stormwater Management Features

1. East Riser: Channel Improvements + Enhanced Wetland Open Space
2. Avanti Park: Street Green Infrastructure + Enhanced Open Space
3. Losen Slote: Force Main + Public Facility Improvements
4. Green Infrastructure + Enhanced Wetland Open Space
5. GI Improvements to Willow Lake Park + 1 New Wetland / Open Space along Hackensack River

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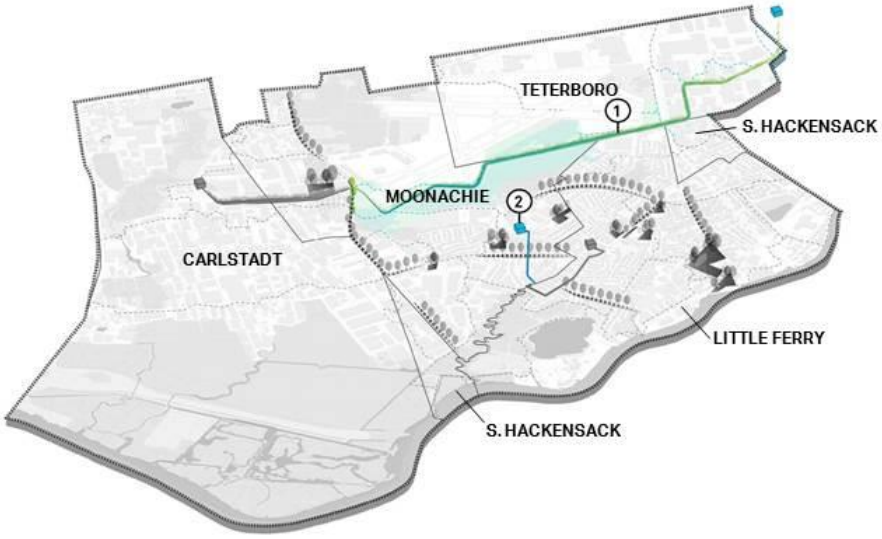
FOR FUTURE IMPLEMENTATION
ADDITIONAL RAIN FLOODING REDUCTION FROM ALTERNATIVE 2

48



1. East Riser Channel Improvements Extension toward South Hackensack
2. A second Losen Slote Pump Station & Force Main

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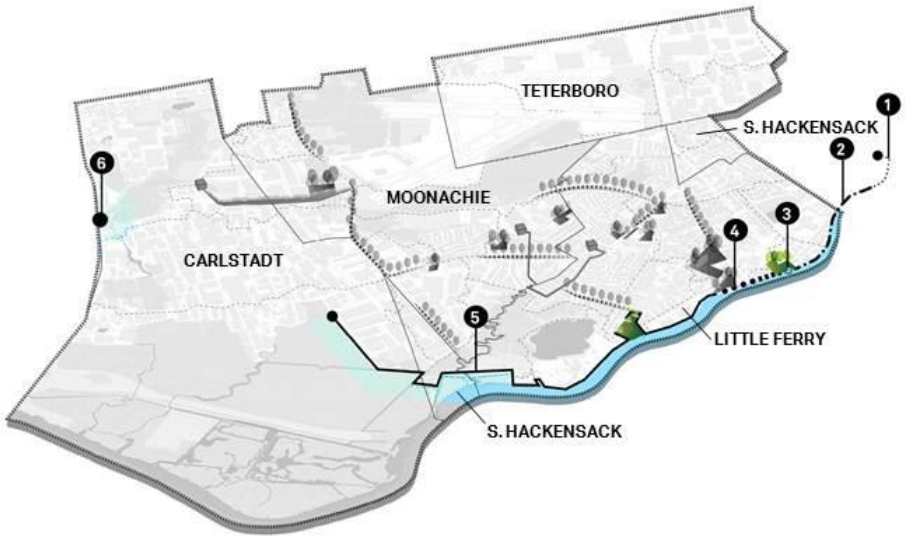
FOR FUTURE IMPLEMENTATION
50-YEAR STORM SURGE PROTECTION FROM ALTERNATIVE 1



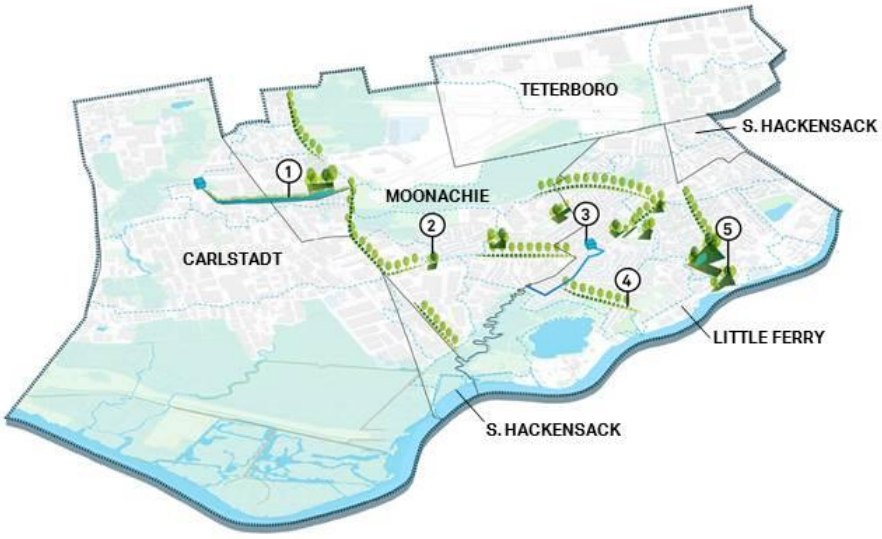
- All Future Plan elements will be evaluated in the Feasibility Study and Draft EIS
- Utilizing the Feasibility Study and EIS could reduce the timeline and initial expense for those implementing Future Plan components

1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

THE BUILD PLAN
LULU LOQUIDIS, AECOM

ALTERNATIVE 3 - BUILD PLAN

51



- The Build Plan can be constructed and functional by 2022
- Will require less maintenance than that of an Alternative 1 system
- Positive Benefit Cost Ratio greater >1
- Can be constructed within Available Funds

1. East Riser Channel Improvements + New Park
2. Green Infrastructure + New Park
3. Force Main + Public Facility Improvements
4. Green Infrastructure
5. Park Improvements + 1 New Park + Green Infrastructure

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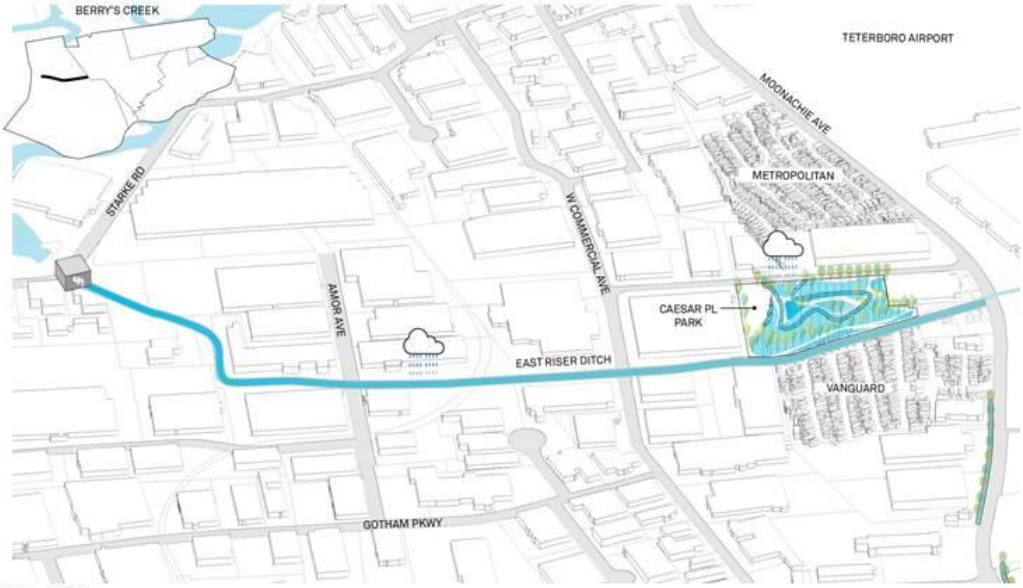
EAST RISER CHANNEL IMPROVEMENTS
FLOOD REDUCTION BENEFITS

52



- **Channel conveyance improvements** below Moonachie Ave with a **new pump station**
- New wetland eco-park with ~12,000 SF of **integrated green infrastructure** and ~129,000 SF of wooded and emergent wetland to **improve storage** and **water quality**

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EAST RISER CHANNEL IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

53

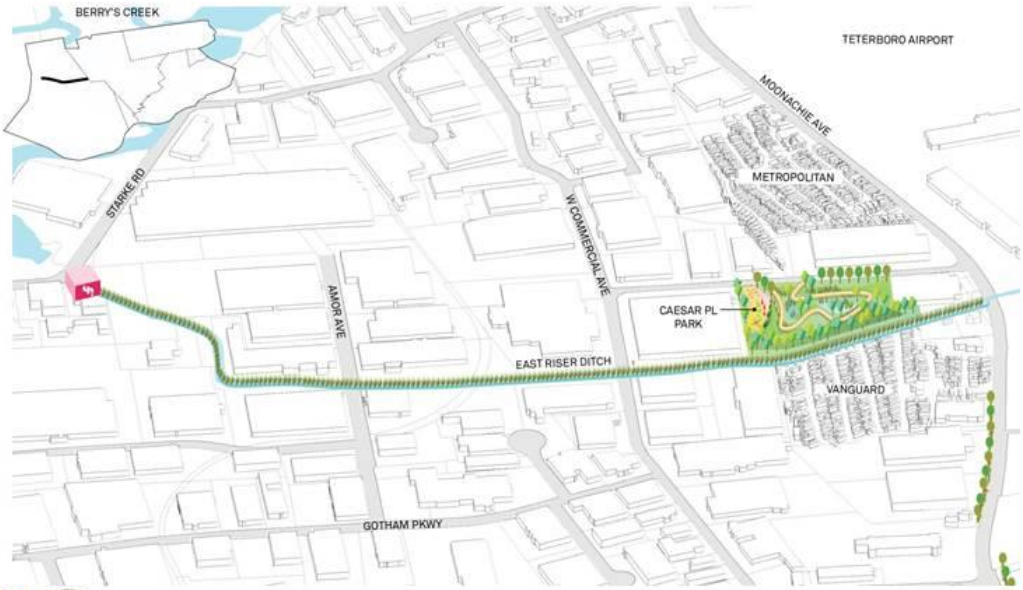
- Improves conveyance capacity
- Captures road runoff and filters suspended solids
- Native vegetation provides habitat and improves visual quality along the channel

1. Gravel trench
2. Channel improvement
3. Native vegetation
4. Curb cut

EAST RISER CHANNEL IMPROVEMENTS

FLOOD REDUCTION CO-BENEFITS

54



- Channel conveyance improvements include **habitat restoration with native vegetation**
- New wetland eco-park is part of the flood reduction system, but also offers benefits in the form of **habitat, environmental education,** and **recreation space**

GREEN INFRASTRUCTURE & PARK IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

55

- Wetland enhancement, improves storage and treatment capacities, and improves public recreation opportunity

1. Elevated boardwalk
2. Channel improvements
3. Shallow emergent marsh
4. Native vegetation

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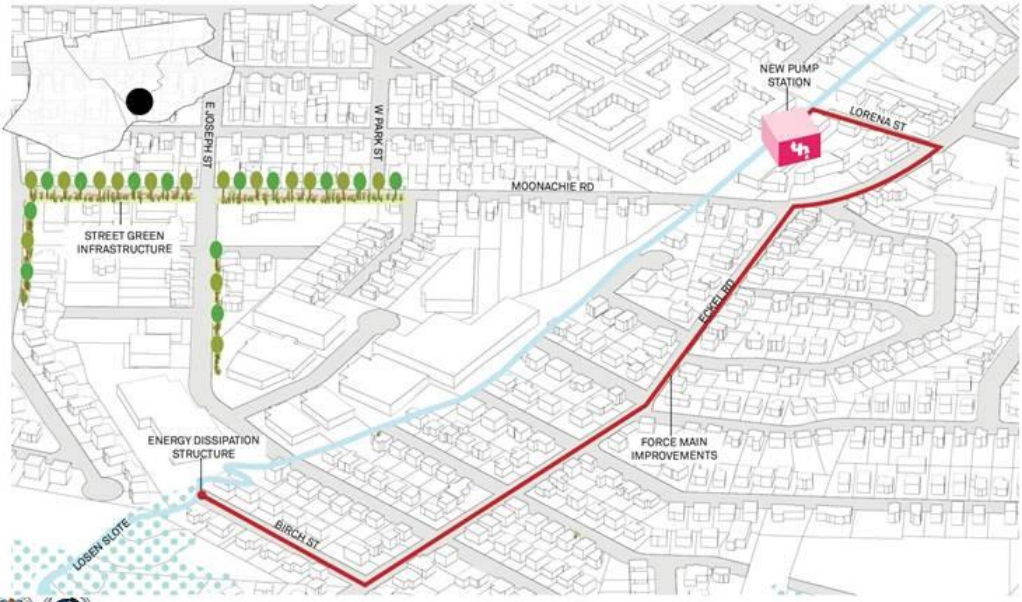
LOSEN SLOTE DRAINAGE IMPROVEMENTS

FLOOD REDUCTION & CO-BENEFITS

56



- **New pump station** within the residential area of the stream
- Stormwater discharges via a **36" force main** to the downstream Losen Slote marsh
- **Energy dissipation structure** limits erosion at discharge points
- Street green infrastructure **collects water** and **filters** total suspended solids

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LOSEN SLOTE DRAINAGE IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

57

- A new pump station improves conveyance capacity by moving water from one location to another

1. Submersible pump
2. 36" force main
3. Losen Slote
4. Control panel

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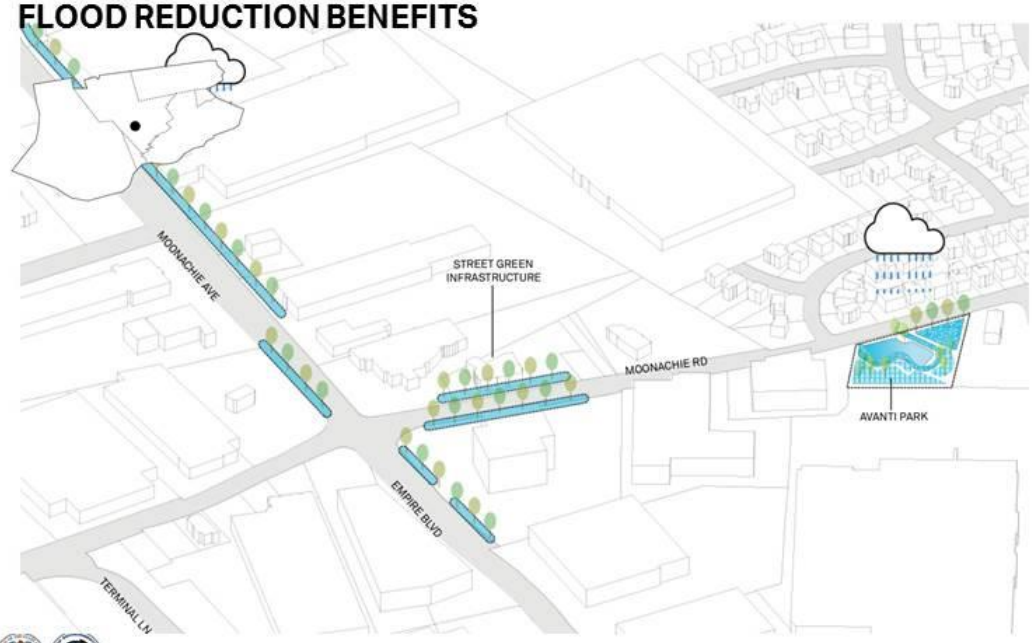
AVANTI PARK

FLOOD REDUCTION BENEFITS

58



- **Water is stored** in new open space and green infrastructure
- ~19,000 SF of **improved wetland** and ~11,000 SF of native planting and raingardens **capture total suspended solids**

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AVANTI PARK
FLOOD REDUCTION CO-BENEFITS

59

- Street green infrastructure **improves water quality**, creates new habitat, and **provides visual improvements**
- New park space also creates places for people to gather, **new habitat**, and space for **recreation**

AVANTI PARK
CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

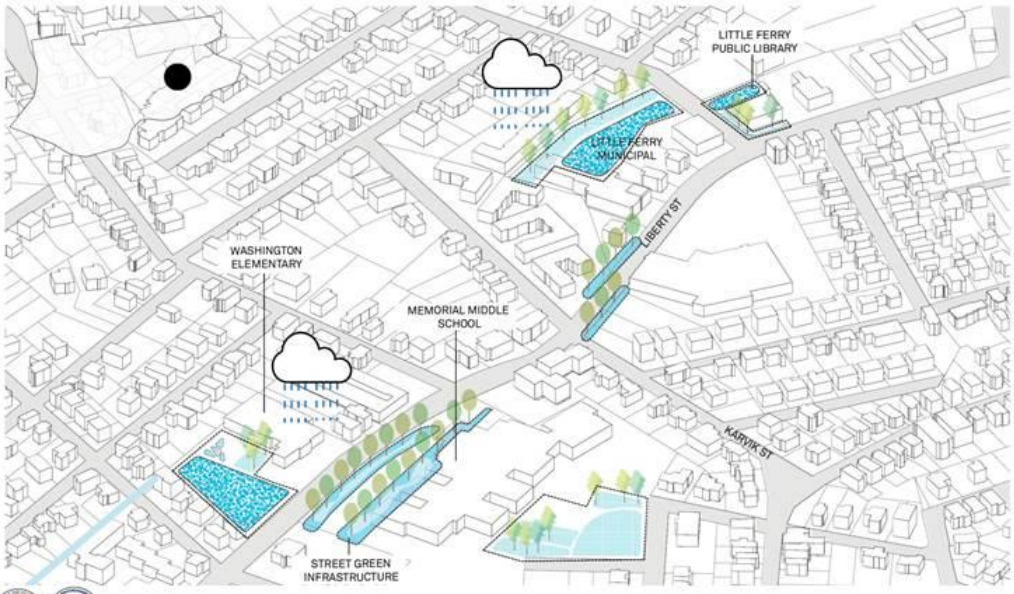
60

- Bioretention systems capture and filters 1.25 inches of rainfall in two hours through planting media
- New retention areas create room for additional water storage
- Undeveloped land becomes public park and productive ecosystem

1. Boardwalk foundation
2. Headwall & inlet pipe
3. Energy dissipator
4. Native planting
5. Integrated seating

CIVIC LOCATIONS
FLOOD REDUCTION BENEFITS

61



- Multiple improvements are proposed at public facilities in Little Ferry such as bioswales and underground storage trenches
- Improvements are planned for the following facilities: Little Ferry Library, Little Ferry Municipal Building, Memorial Middle School, Washington Elementary, and Robert Craig Elementary

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CIVIC LOCATIONS
FLOOD REDUCTION CO-BENEFITS

62

- Co-benefits to the municipal buildings include improvements near community buildings, such as opportunities for education, community outreach and involvement, and new habitat

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MUNICIPAL BUILDINGS & SCHOOLS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

63

- Permeable paving and rain gardens collect and filters 1.25 inches of rainfall in two hours through planting media
- Green infrastructure can be an educational opportunity for schools and public buildings
- Greener streets improve habitat, create safer streets, and improve visual quality of the street

1. Permeable paver
2. Bioretention
3. Grass and concrete permeable paver

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STREET GREEN INFRASTRUCTURE

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

64

- Green infrastructure provides a holding space for street runoff that is slowly released back into the stormwater system
- Subsurface green infrastructure features provide storage and ability to infiltrate runoff to reduce peak flow reaching the existing stormwater system

1. Connection to storm system
2. Filter media
3. Native vegetation
4. Street Trees

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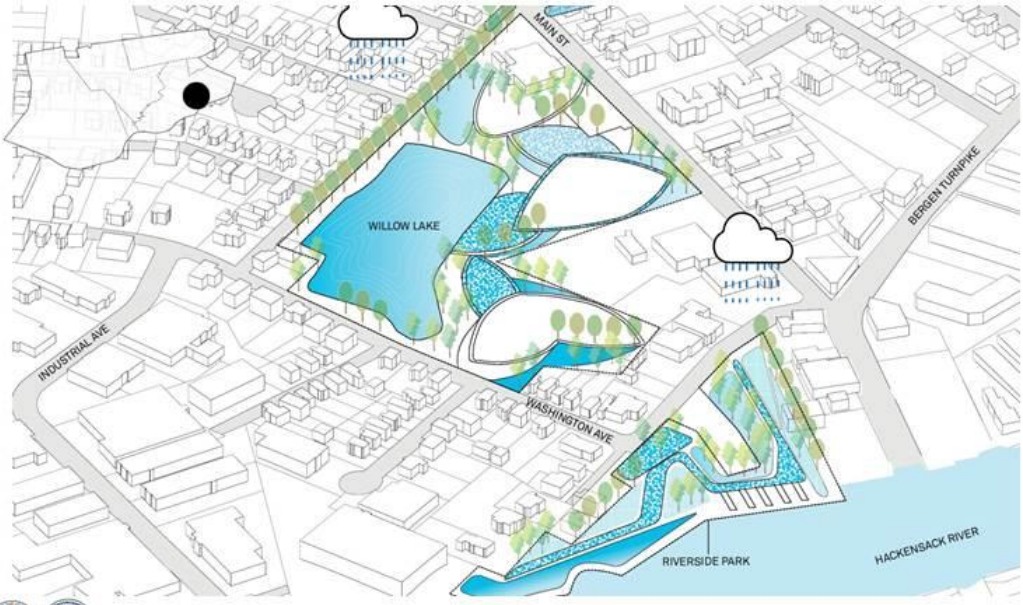
WILLOW LAKE & RIVERSIDE PARKS
FLOOD REDUCTION BENEFITS

65



- Reduce sedimentation into the drainage system & slows water movement
- Improvements to Willow Lake include approximately 65,000 SF of new native planting and low meadow and approximately 1,200 SF of rain gardens
- A new public open space on the Hackensack River includes approximately 5,700 SF of restored riparian wetland and approximately 30,000 SF of native planting and bioswales

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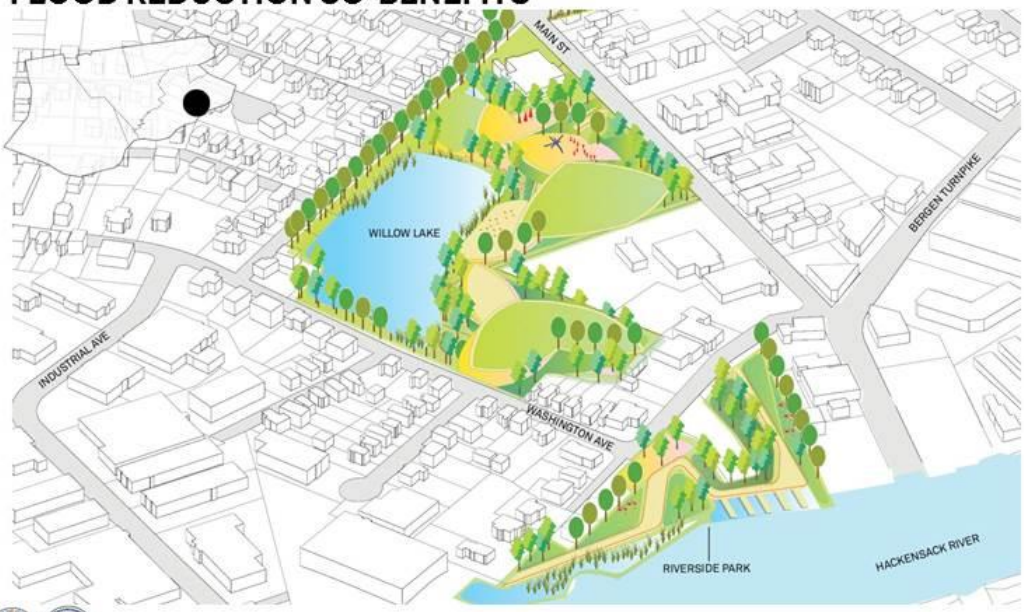
WILLOW LAKE & RIVERSIDE PARKS
FLOOD REDUCTION CO-BENEFITS

66



- Co-benefits to the new and improved Little Ferry open spaces include new walking trails, space for recreation, water access, new habitat, and visual improvements

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WILLOW LAKE PARK IMPROVEMENTS
CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

67

- Green infrastructure system would be sized to capture and treat 1.25 inches of rainfall in two hours
- Stone chimneys provided outlet for ponding water to reach stone storage
- Improvements to Willow Lake Park enhance water quality and user experience

1. Permeable paving
2. Stone chimney
3. Native planting
4. Recreation space
5. Existing playground

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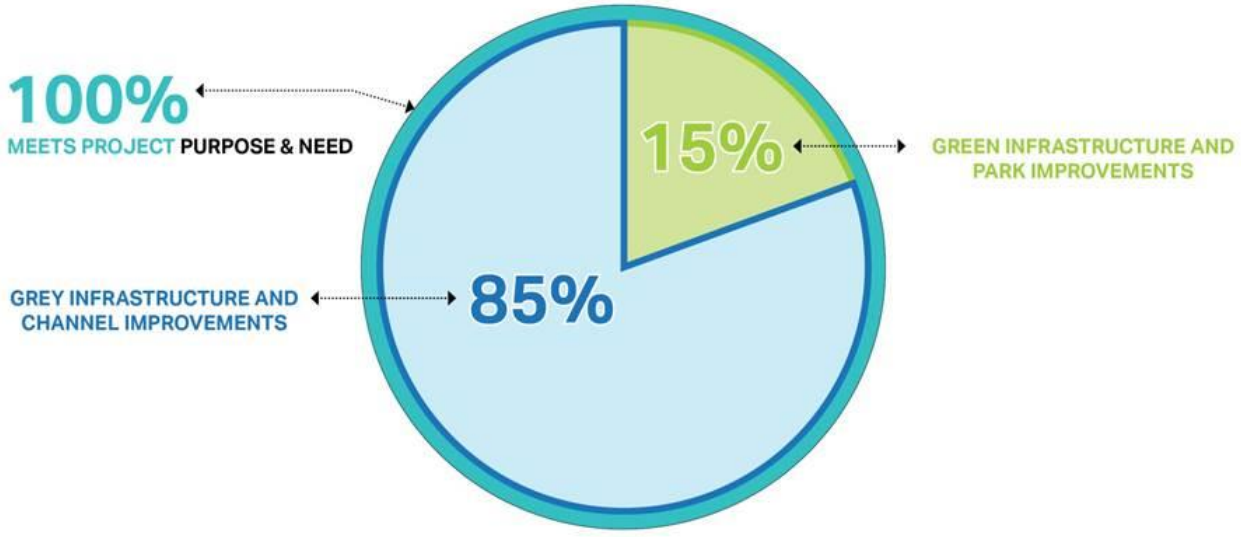
BUILD PLAN CONSTRUCTION COST
FEASIBILITY-LEVEL COST BREAKDOWN

68



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BUILD PLAN BENEFITS

GARRETT AVERY, AECOM

BUILD PLAN BENEFITS

2-YEAR STORM (2023)

70

- **Approximately 20 ACRES** would no longer flood during the 2-year storm (2023)
- **Approximately 642 ACRES*** would experience a reduction in flood water between 0.1ft to 3ft

* Additional Flood depth reduction would occur in the vicinity of the drainage channels within East Riser Ditch (East Riser Ditch tide gate to Route 46) and Losen Slote (East Joseph Street to Niehaus) watersheds.

BUILD PLAN BENEFITS
100-YEAR STORM (2023)

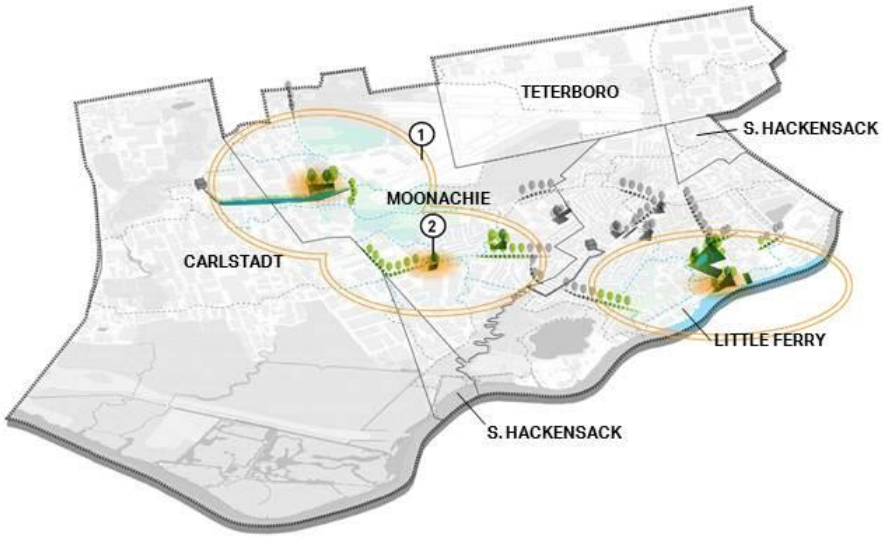
71

- **Approximately 39 ACRES** would no longer flood during the 100-year storm (2023)
- **Approximately 1,244 ACRES*** would experience a reduction in flood water between 0.1ft to 3ft

* Additional Flood depth reduction would occur in the vicinity of the drainage channels within East Riser Ditch (East Riser Ditch tide gate to Route 46) and Losen Slote (East Joseph Street to Niehaus) watersheds.

BUILD PLAN BENEFIT
OPEN SPACE ENHANCEMENT: POPULATION & HOUSEHOLDS

72



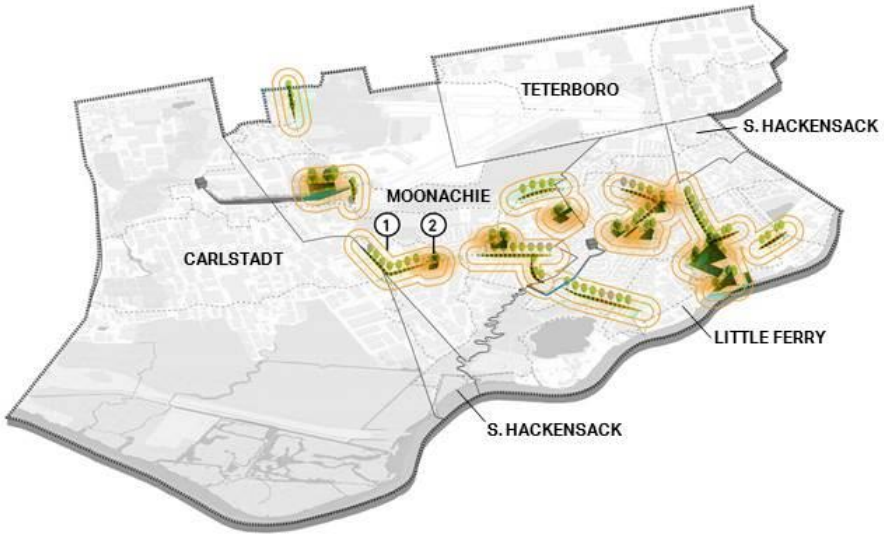
~300 HOUSEHOLDS
Within 500' of a new park

~5,000 PEOPLE
Within 0.25 miles of a new park

Benefit Inputs
1 0.25 Mile Buffer from New Parks
2 500' Buffer from New Parks

BUILD PLAN BENEFIT
STREET GREEN INFRASTRUCTURE: HOUSEHOLDS

73



~218 HOUSEHOLDS
Within 100' of a new trees

~775 TREES
New Trees Planted

Benefit Inputs

1. 100' Buffer from New Trees in Parks and Streets
2. Improvements in Parks, Schools, and Public and Municipal Facilities

BENEFIT COST RATIO
GRANT-SPECIFIC BENEFIT/COST EVALUATION CRITERIA

74

Economic Revitalization Benefits

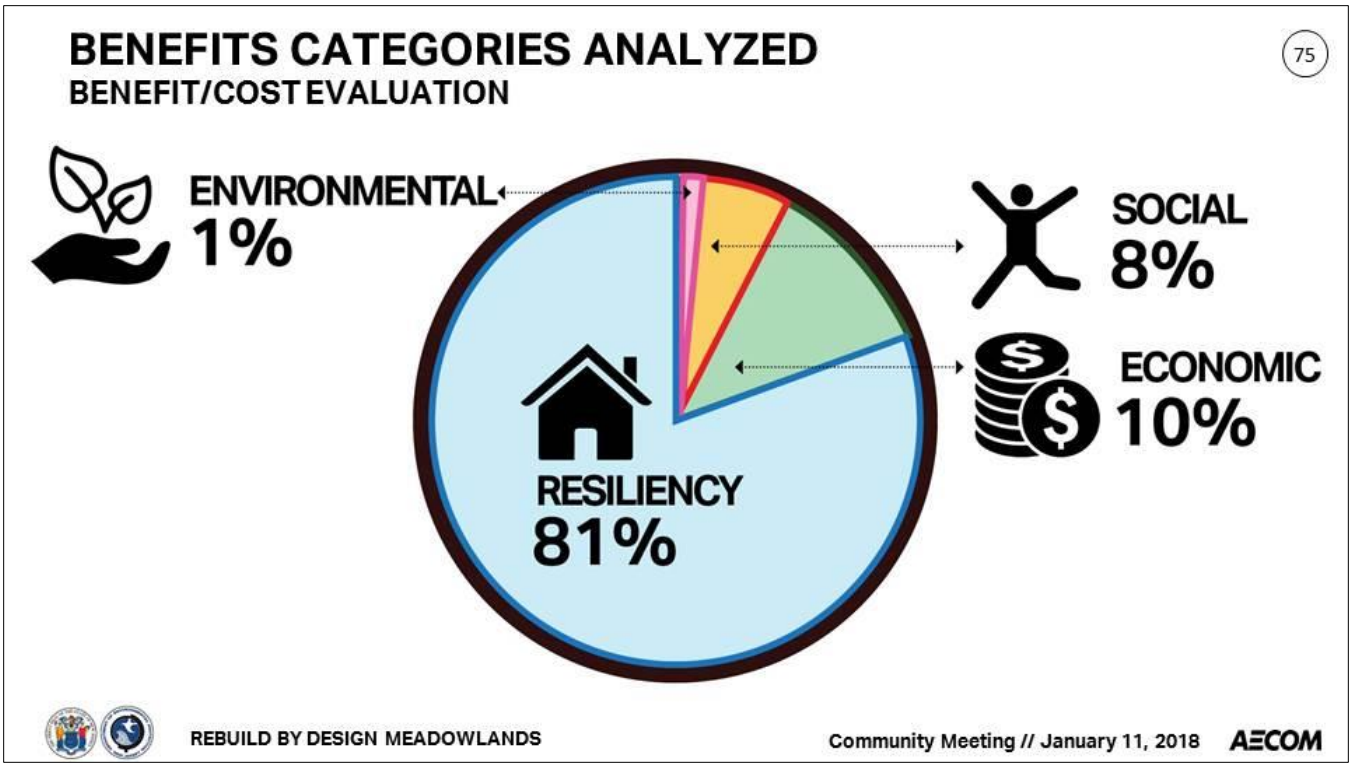
- Direct effects on local or regional economy (e.g., tourism revenue)
- Improved Property Value (exclusive of enhanced flood protection)
- Value creation attributable to Rebuild By Design

Environmental Benefits

- Protection from disruptive non-disasters (nuisance flooding)
- Reduced vulnerability of energy and water infrastructure
- Improved Ecosystem and Biodiversity
- Water & Air Quality Improvements

Social Benefits

- Reductions in human suffering
- Improved Recreation Value
- Improved Community Identity and Social Cohesion
- Greater access to Cultural, Historical, Archeological Sites and Landscapes


BENEFITS CATEGORIES ANALYZED
BENEFIT/COST EVALUATION
75
ENVIRONMENTAL
1%
SOCIAL
8%
ECONOMIC
10%
RESILIENCY
81%
REBUILD BY DESIGN MEADOWLANDS
Community Meeting // January 11, 2018
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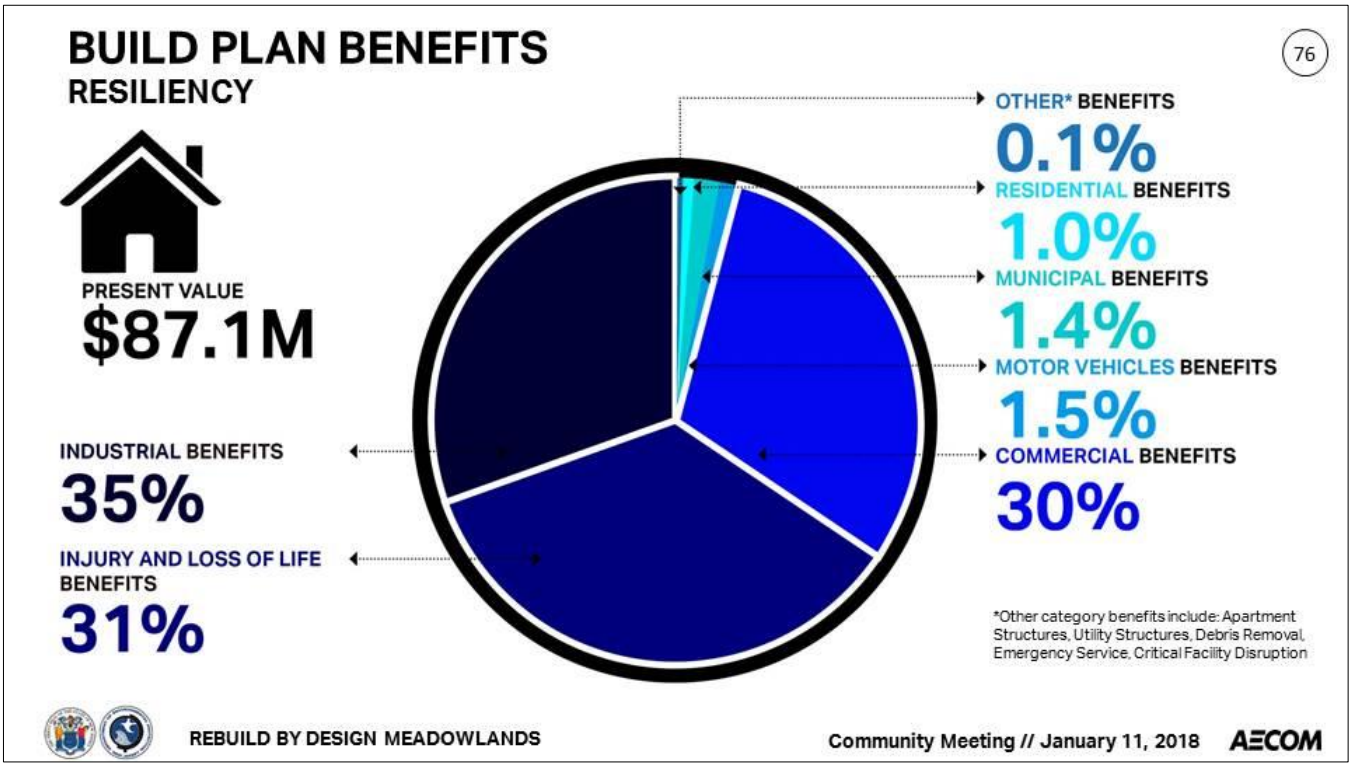
BUILD PLAN BENEFITS
RESILIENCY
76
PRESENT VALUE
$87.1M
OTHER* BENEFITS
0.1%
RESIDENTIAL BENEFITS
1.0%
MUNICIPAL BENEFITS
1.4%
MOTOR VEHICLES BENEFITS
1.5%
COMMERCIAL BENEFITS
30%
INDUSTRIAL BENEFITS
35%
INJURY AND LOSS OF LIFE BENEFITS
31%
*Other category benefits include: Apartment Structures, Utility Structures, Debris Removal, Emergency Service, Critical Facility Disruption
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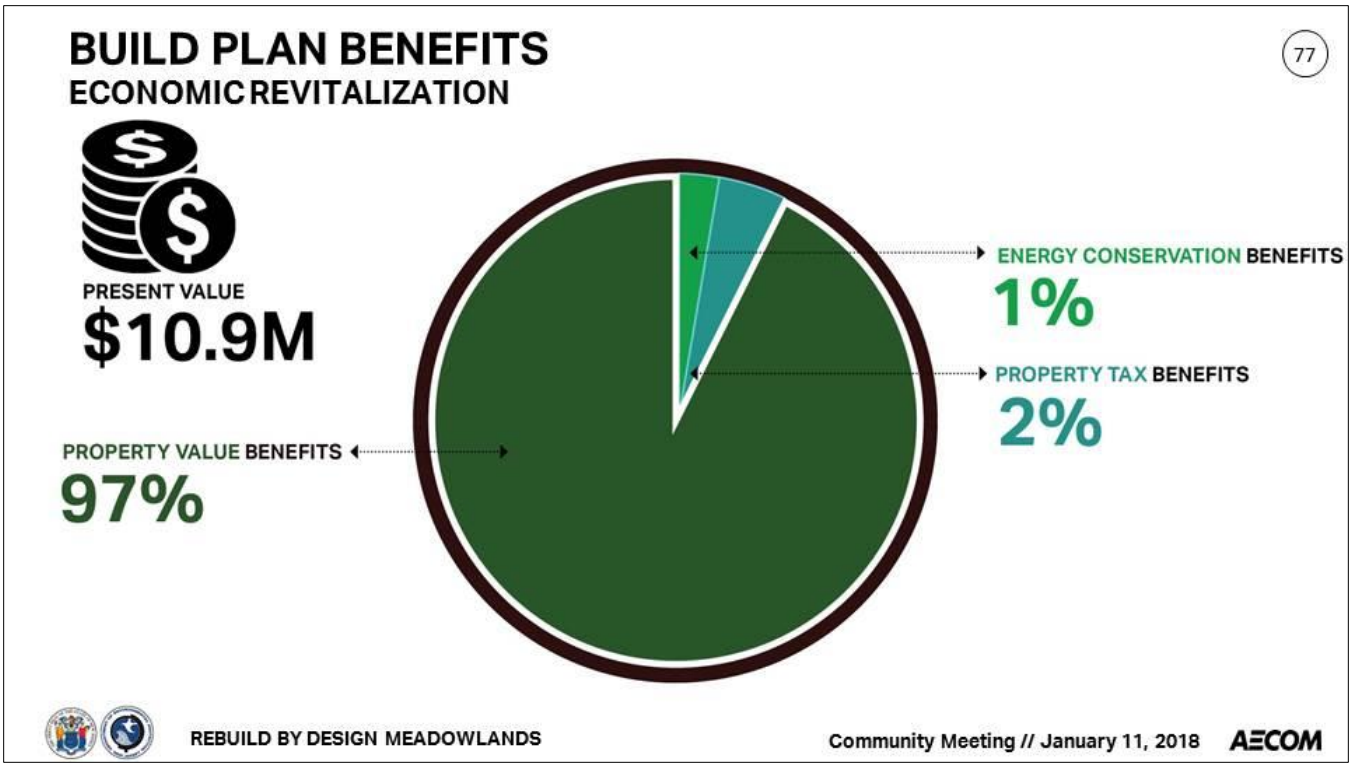
BUILD PLAN BENEFITS
ECONOMIC REVITALIZATION
77
PRESENT VALUE
$10.9M
ENERGY CONSERVATION BENEFITS
1%
PROPERTY TAX BENEFITS
2%
PROPERTY VALUE BENEFITS
97%
REBUILD BY DESIGN MEADOWLANDS
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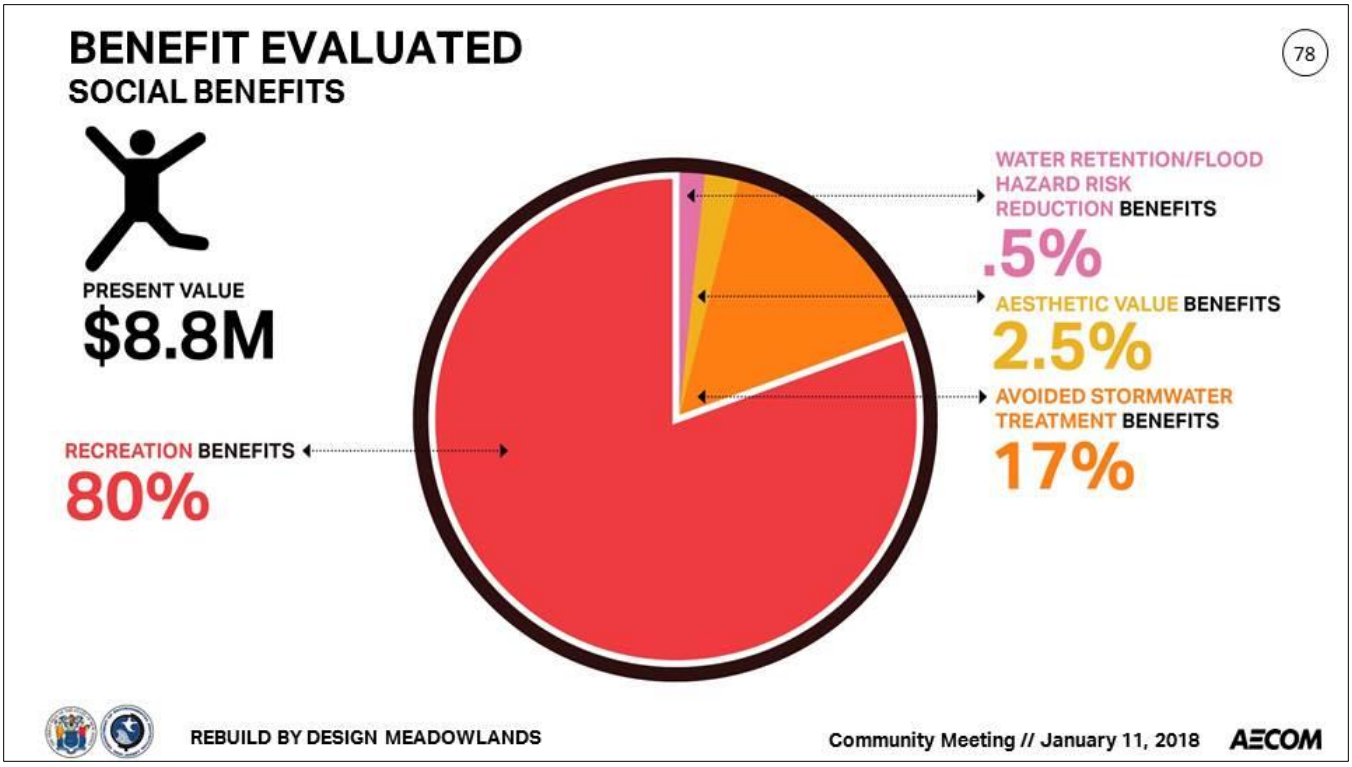
BENEFIT EVALUATED
SOCIAL BENEFITS
78
PRESENT VALUE
$8.8M
WATER RETENTION/FLOOD HAZARD RISK REDUCTION BENEFITS
.5%
AESTHETIC VALUE BENEFITS
2.5%
AVOIDED STORMWATER TREATMENT BENEFITS
17%
RECREATION BENEFITS
80%
REBUILD BY DESIGN MEADOWLANDS
Community Meeting // January 11, 2018
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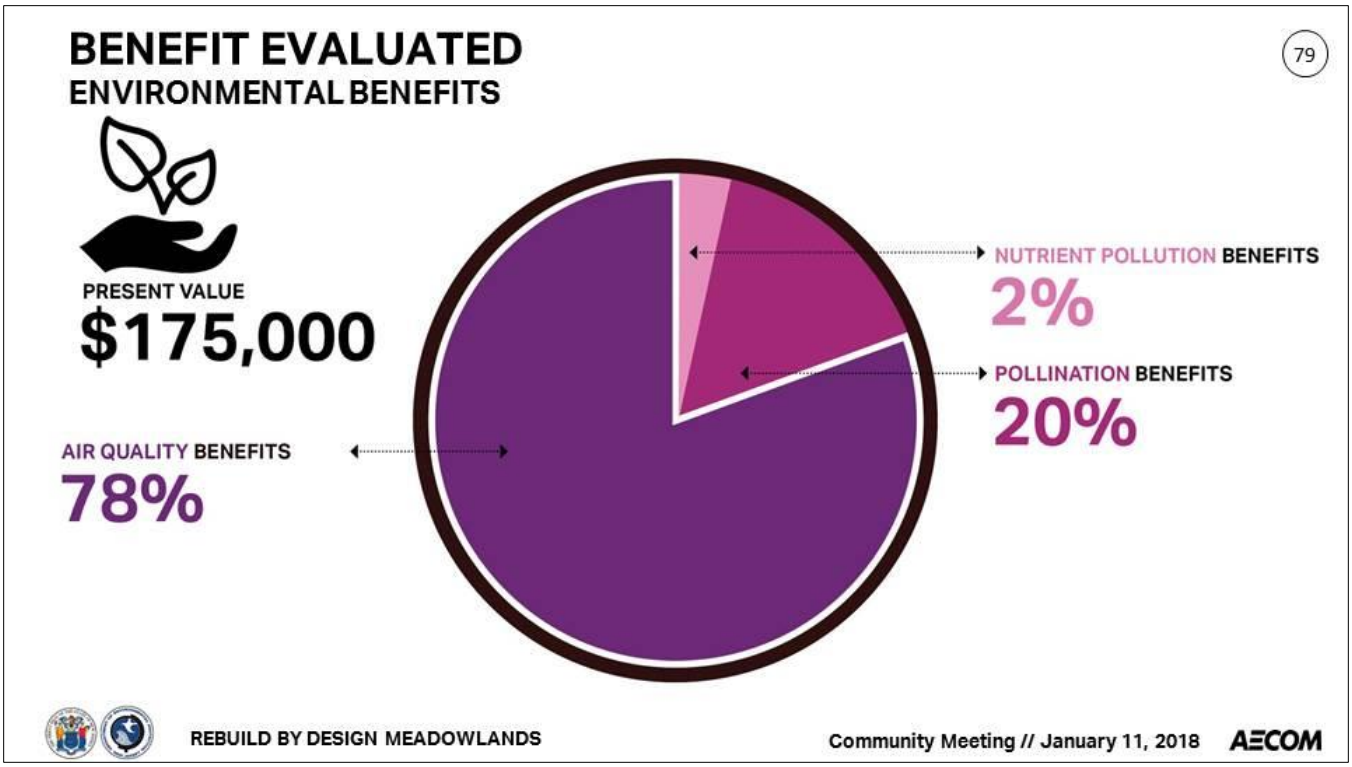
BENEFIT EVALUATED
ENVIRONMENTAL BENEFITS
79
PRESENT VALUE
$175,000
NUTRIENT POLLUTION BENEFITS
2%
POLLINATION BENEFITS
20%
AIR QUALITY BENEFITS
78%
REBUILD BY DESIGN MEADOWLANDS
Community Meeting // January 11, 2018
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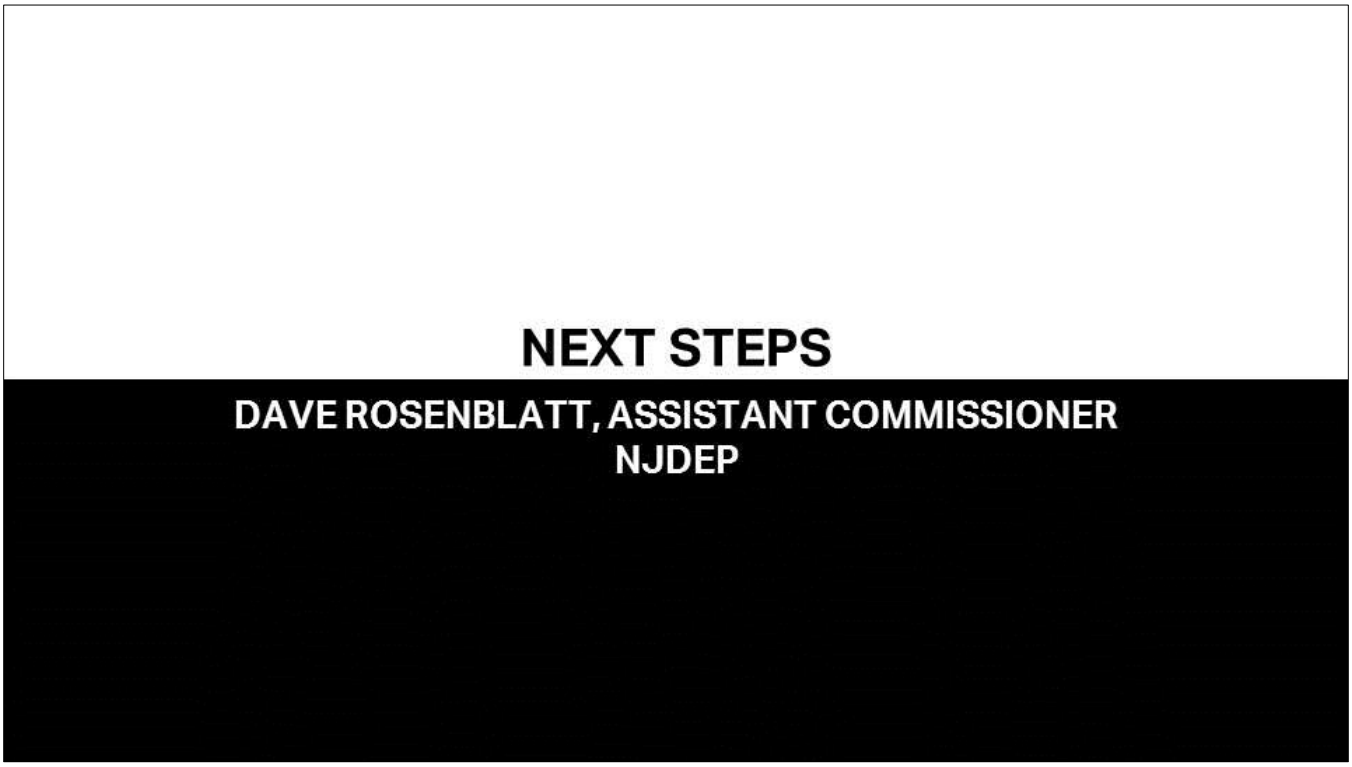

NEXT STEPS
DAVE ROSENBLATT, ASSISTANT COMMISSIONER
NJDEP

CONSTRUCTING THE PREFERRED ALTERNATIVE

81

- Meets the project Purpose & Need
- Satisfies HUD mandate
- Can be constructed by 2022 with the allocated funding
- Provides Flood Reduction & numerous co-benefits

NEXT STEPS
OPERATIONS & MAINTENANCE (O&M)

82

- The State will provide an O&M plan that identifies the entities performing routine, on-going maintenance
- In cooperation with the Agencies and local municipalities receiving flood protection benefits, the State has begun by establishing an O&M Subcommittee

NEXT STEPS

83

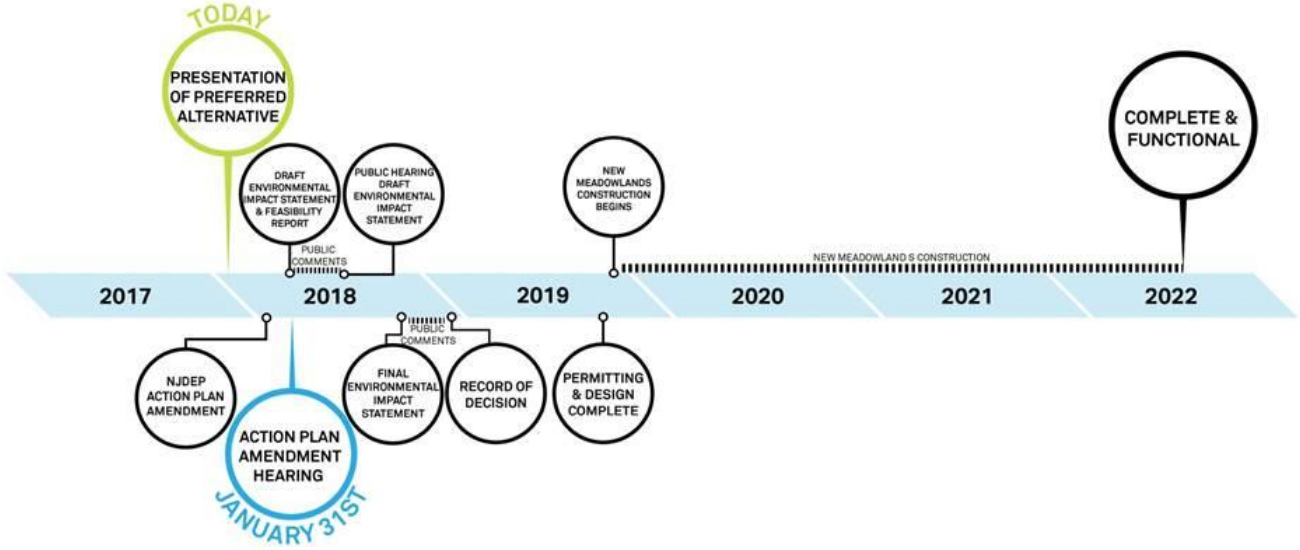
NJDEP: UPCOMING ACTIVITIES

- **Action Plan Amendment (APA) 25:**
  - Draft **APA** publication: **January 12, 2018**
  - **APA** public comment period: **January 13 – February 12, 2018**
  - **APA** Public Hearing: **January 31, 2018**

- **Draft Environmental Impact Statement (DEIS):**
  - **DEIS** publication: **Spring 2018**
  - **DEIS** public comment period: **45 Days**
  - **DEIS** Public Hearing: **Spring 2018 (during public comment period)**

UPCOMING SCHEDULE

84



NEXT STEPS

Critical Information

Project Website
www.rbd-meadowlands.nj.gov

Project Email
rbd-meadowlands@dep.nj.gov

Question & Answer

THANK YOU

Attachment 2.
Community Meeting Packet (provided as handout at meeting)

REBUILD BY DESIGN

M E A D O W L A N D S

COMMUNITY MEETING

PROJECT UPDATE AND PREFERRED ALTERNATIVE

January 11, 2018

PREPARED BY AECOM

Español 中文:繁體版 Việt-ngữ 한국어 Tagalog
Português العربية Kreyòl ગુજરાતી Italiano Polski
www.renewjerseystronger.org

Table of Contents

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

AECOM

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

2.0 Agenda

Project Update and Preferred Alternative

6-8 PM
January 11, 2018
Robert L. Craig School Gymnasium
20 West Park Street
Moonachie, NJ 07074

Project Website
www.rbd-meadowlands.nj.gov
Project Email
rbd-meadowlands@dep.nj.gov

Welcome

Presentation

- Opening Remarks (10 Minutes)
  - Welcoming (Linda Fisher, NJDEP & Borough Mayors)
  - Agenda (Chris Benosky, AECOM)
- Project Overview (Garrett Avery, AECOM)
- Selecting a Preferred Alternative (Lulu Loquidis, AECOM)
- Alternative 1 Storm Surge Flooding (Lulu Loquidis, AECOM)
- Alternative 2 Frequent Rain Flooding (Garrett Avery, AECOM)
- Alternative 3 The Preferred Alternative (Garrett Avery, AECOM)
- The Build Plan (Lulu Loquidis, AECOM)
- The Build Plan Benefits (Garrett Avery, AECOM)
- Next Steps & Q&A/Closure (Dave Rosenblatt, Assistant Commissioner NJDEP & Chris Benosky, AECOM)
  - Next Steps
  - Question and Answers

3.0 Power Point Presentation

REBUILD BY DESIGN

MEADOWLANDS

COMMUNITY MEETING

PROJECT UPDATE AND PREFERRED ALTERNATIVE
JANUARY 11, 2018

AECOM

AGENDA

Christopher Benosky, AECOM 2

- Welcome
- The Meadowlands Challenge
- Alternative 1
- Alternative 2
- Alternative 3
  - Build Plan
  - Future Plan
- Preferred Alternative
- Takeaways / Next Steps
- Question & Answer

REBUILD BY DESIGN MEADOWLANDS

Community Meeting // January 11, 2018 AECOM

REBUILD BY DESIGN COMPETITION & AWARD

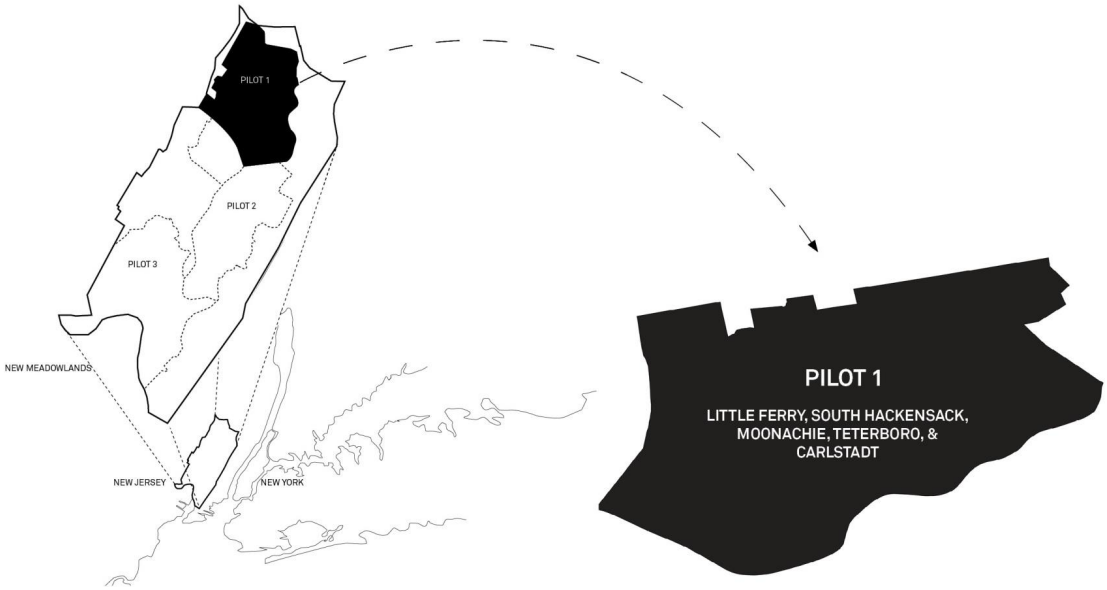
3

- Original Proposed RBD Concept
- **Protect:** Flood Protection
- **Connect:** Transportation Improvements
- **Grow:** Re-Development
- Cost Estimate (Competition Cost) **$850M+**

Competition Graphic: MIT

REBUILD BY DESIGN COMPETITION & AWARD

4



- HUD awarded State of New Jersey **$150M for Phase 1 Pilot Area only**
- Project must be functional and **completed by September 2022**

PROJECT OVERVIEW

GARRETT AVERY, AECOM

AECOM

THE PURPOSE

6

Address flood risk

Increase resiliency of the communities and ecosystems

Reduce impacts to critical infrastructure, residences, businesses, and ecological resources

REBUILD BY DESIGN MEADOWLANDS

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THE NEED

7

Address systemic **inland flooding** & **coastal flooding** from storm surges

Increase **community resiliency**

Reduce flood insurance **rates** and claims from future events

Enhance water quality and protect ecological resources

Protect life, public health, and property

Incorporate flood hazard risk reduction strategy with **civic, cultural, & recreational values**

PROJECT GOALS

8

1. Create the **BEST POSSIBLE PROJECT** with the available funding

2. Meets the Project Mandate by providing **FLOOD REDUCTION & CO-BENEFITS** such as reducing sediment & improving water quality

3. Construct a project that provides **STORM PROTECTION** and allows for a **QUICKER RECOVERY**

PROJECT CONSTRAINTS

9

1. Construct a complete project that functions with **INDEPENDENT UTILITY** to meet purpose & need without relying on future projects

2. Use only **AVAILABLE FUNDS** without relying on future funding

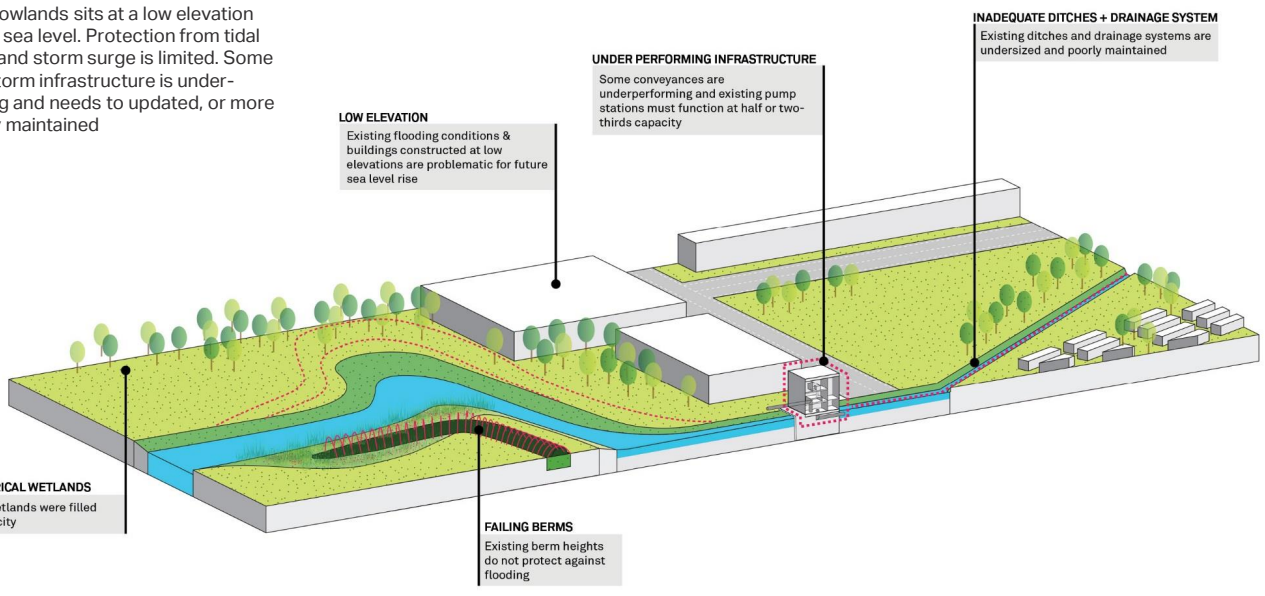
3. Construct a fully-functional project by **SEPTEMBER 2022**

4. Project must have a **POSITIVE BENEFIT COST RATIO**

PROJECT AREA CHALLENGES

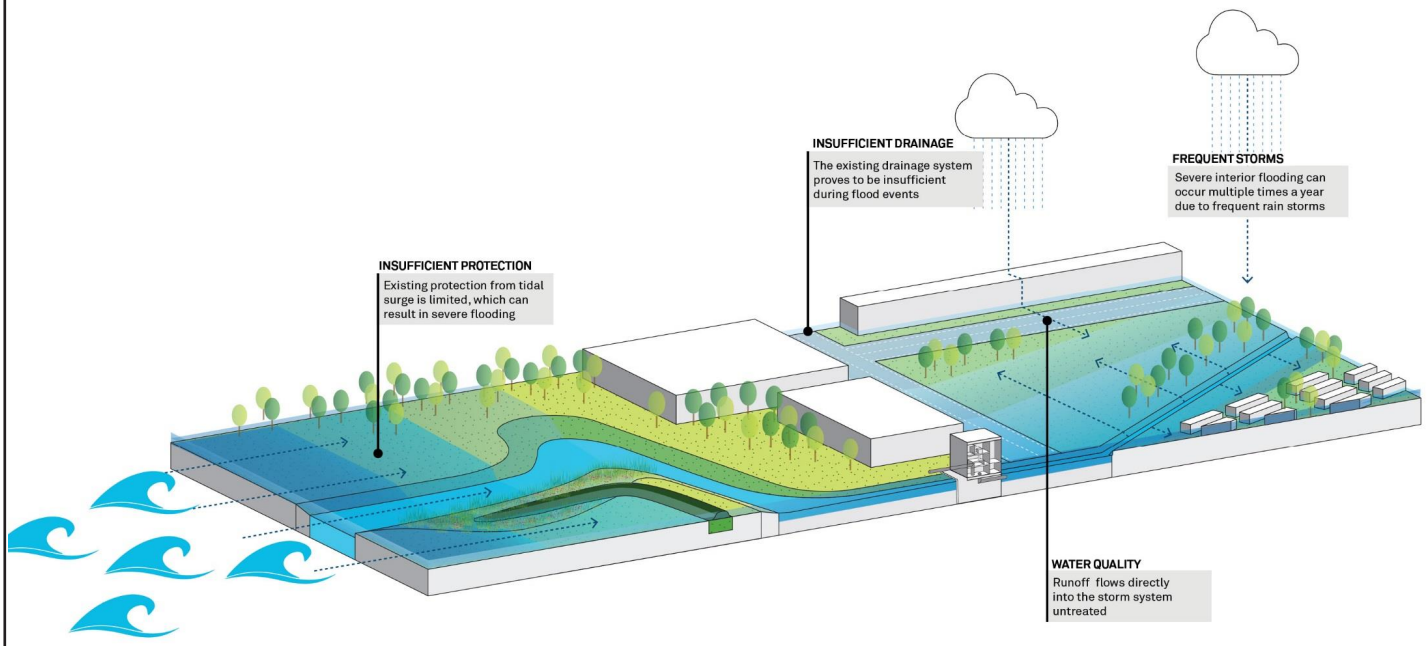
10

The Meadowlands sits at a low elevation relative to sea level. Protection from tidal influence and storm surge is limited. Some existing storm infrastructure is under-performing and needs to updated, or more frequently maintained



PROJECT AREA NEEDS

11

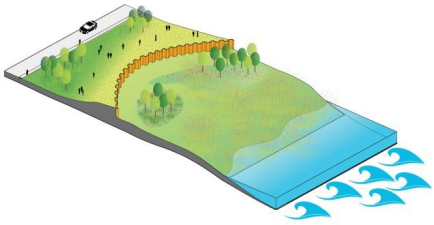


REBUILD BY DESIGN MEADOWLANDS

Community Meeting // January 11, 2018 AECOM

THE MEADOWLANDS - THREE ALTERNATIVES

12



Alternative 1:
Storm Surge Flooding

Alternative 2:
Frequent Rain Flooding

Alternative 3:
Storm Surge & Frequent Rain Flooding

REBUILD BY DESIGN MEADOWLANDS

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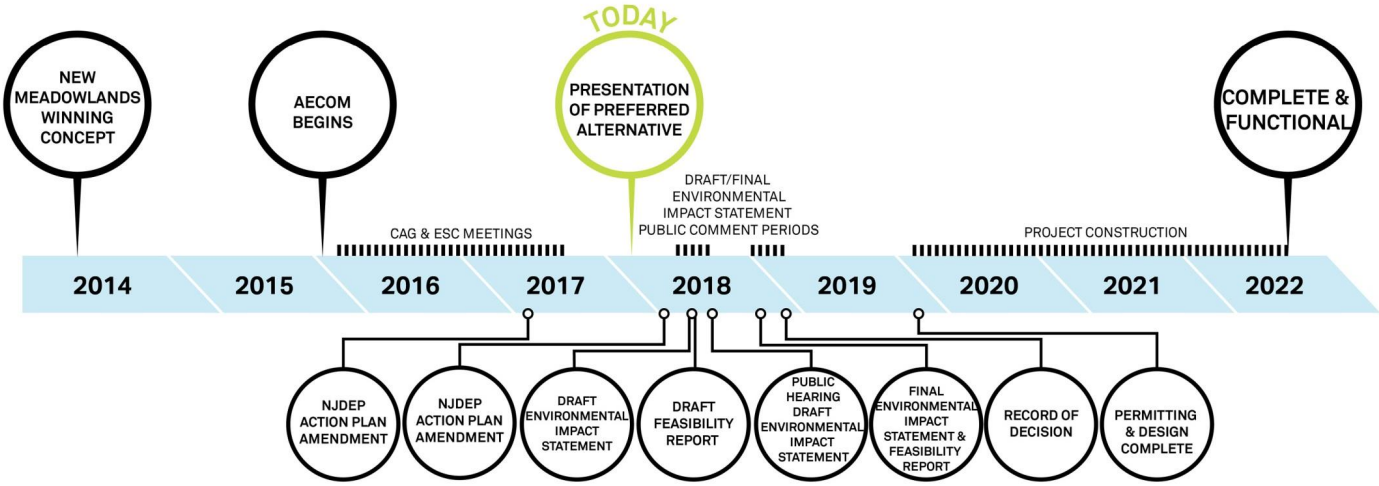
PROJECT ROADMAP

13



ALTERNATIVE 3 - THE PREFERRED ALTERNATIVE

14

Alternative 3:
Storm Surge & Frequent Rain Flooding

SELECTING A PREFERRED ALTERNATIVE

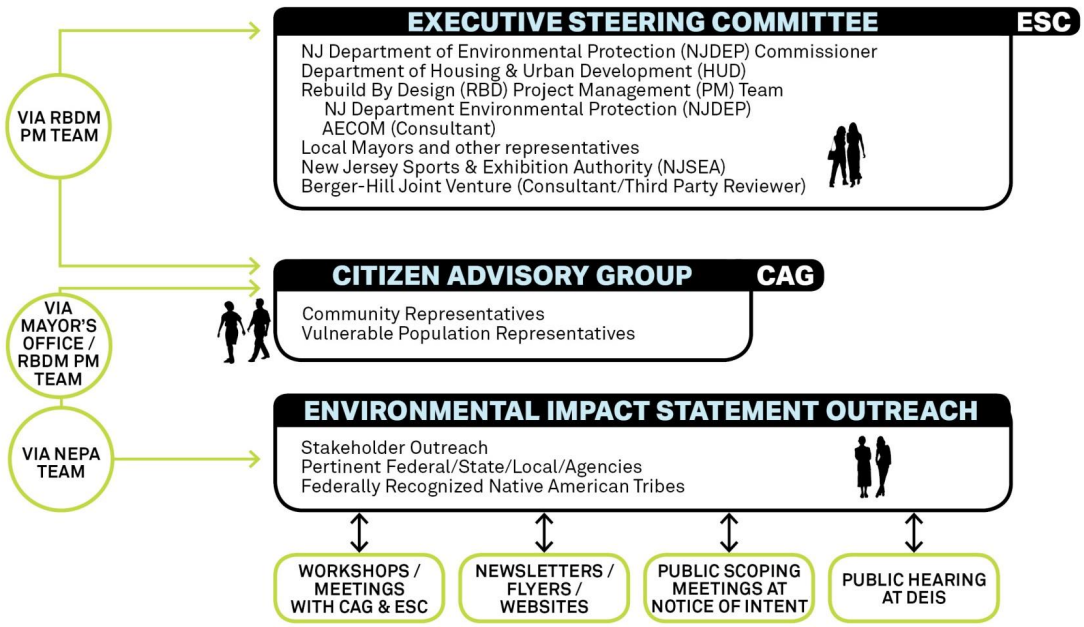
LULU LOQUIDIS, AECOM

AECOM

COMMUNITY ENGAGEMENT

16

EXECUTIVE STEERING COMMITTEE & CITIZENS ADVISORY GROUP



REBUILD BY DESIGN MEADOWLANDS

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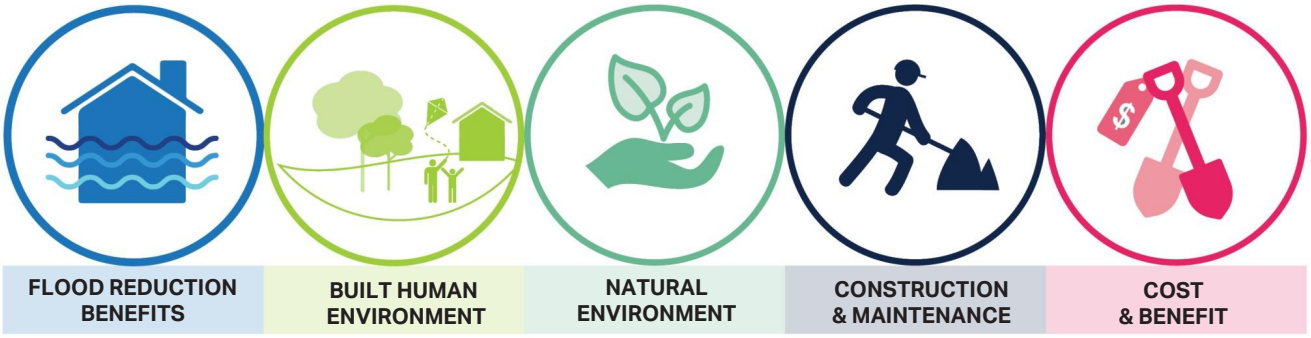
OUR PROCESS
THE SCREENING TOOL

17

Concepts are screened against each other to determine how they will meet the below metrics



FLOOD REDUCTION BENEFITS

18

Categories Evaluated:

- Reduces Flood Risk from Coastal Storm Surge (Alternatives 1 and 3)
- Reduces Flood Risk from Rainfall /Interior Drainage Challenges (Alternatives 2 and 3)
- Provides Protection to Vulnerable and Underserved Populations
- Provides Protection to Critical Infrastructure (emergency services, hospitals, transit facilities)

BUILT HUMAN ENVIRONMENT

19

Categories Evaluated:

- Effects to Existing Utilities & Utility Infrastructure
- Effects to Existing Transportation Network, Local Traffic, and Connectivity
- Effects on Land Acquisition / Housing Displacements
- Potential to Provide Increased Waterfront Access
- Effects to Recreational, Civic, and Cultural Amenities and Uses
- Effects to Viewshed and Local Visual Quality
- Effects to Air Traffic Safety at Teterboro Airport

NATURAL ENVIRONMENT

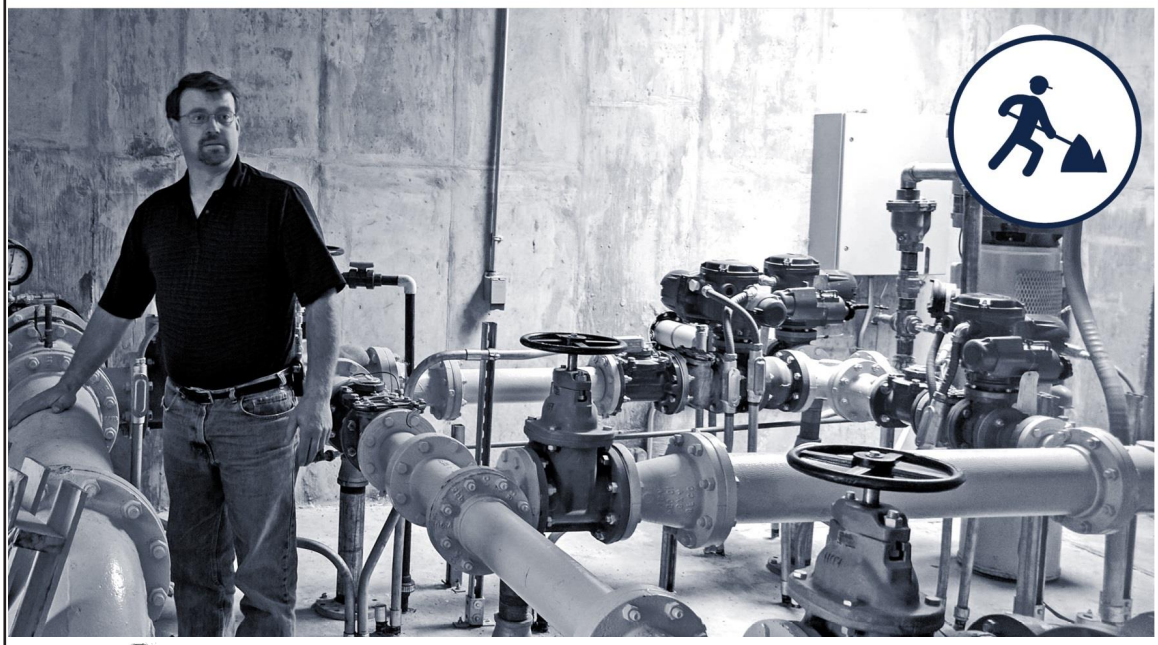
20

Categories Evaluated:

- Effects to Existing Hazardous Waste Sites
- Effects to Berry's Creek Remediation
- Effects on the Transport of Environmental Contaminants/ Sediments during Flood Events
- Effects to Water Resources, including Water Quality, "Waters of the US," Wetlands, and Mitigation Banks
- Effects to Fisheries and Essential Fish Habitat (EFH)
- Effects on Protected Species and their Habitats
- Effects on Other Sensitive Ecological Resources, including Biodiversity, Habitat, and Migration/Movement Corridors
- Effects to Historic and Prehistoric Cultural Resources

CONSTRUCTION & MAINTENANCE

21



Categories Evaluated:

- Constructability
- Minimizes Long-Term Maintenance & Operation Requirements for Overall System
- Potential to Complete by September 2022

BENEFIT & COST

22

Categories Evaluated:

- Provides Benefits to the Project Area and Community
- Can be Implemented within Available Funding Limits
- Has a Positive Benefit/Cost Ratio

BENEFIT COST RATIO

GRANT-SPECIFIC BENEFIT/COST EVALUATION CRITERIA

23

Economic Revitalization Benefits

- Direct effects on local or regional economy (e.g., tourism revenue)
- Improved Property Value (exclusive of enhanced flood protection)
- Value creation attributable to Rebuild By Design

Environmental Benefits

- Protection from disruptive non-disasters (nuisance flooding)
- Reduced vulnerability of energy and water infrastructure
- Improved Ecosystem and Biodiversity
- Water & Air Quality Improvements

Social Benefits

- Reductions in human suffering
- Improved Recreation Value
- Improved Community Identity and Social Cohesion
- Greater access to Cultural, Historical, Archeological Sites and Landscapes

STORM SURGE FLOODING

ALTERNATIVE 1

LULU LOQUIDIS, AECOM

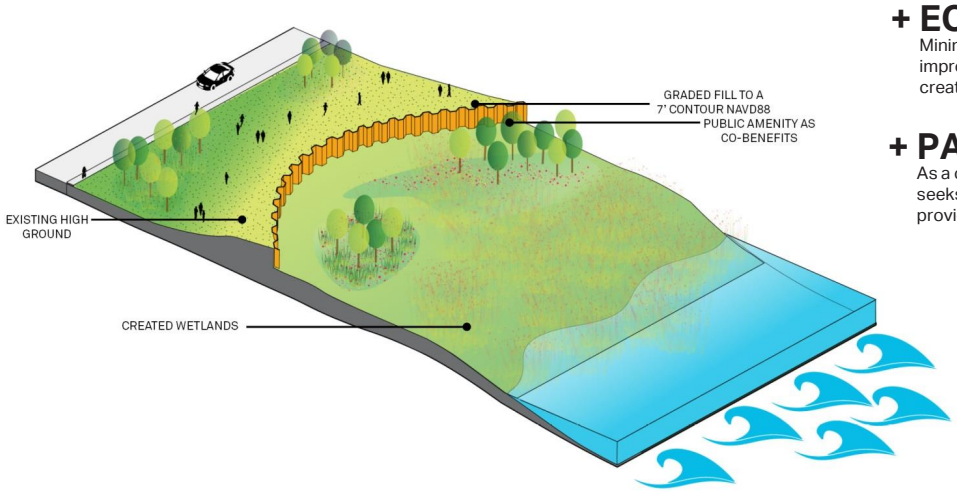
ALTERNATIVE 1 STORM SURGE
APPROACH & GOALS

25

+ INFRASTRUCTURE
Connecting to high points to reduce construction costs and minimize grading

+ ECOLOGY
Minimize disturbance, consider habitat improvements to fragmented systems, and creation of new ecological zones

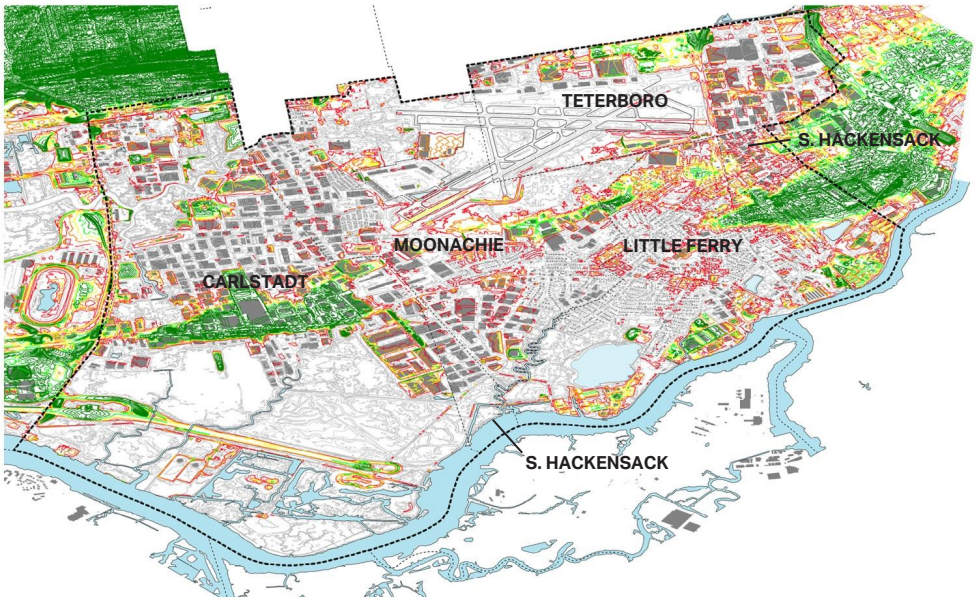
+ PARKS
As a co-benefit to flood reduction, the project seeks to connect existing public parks as well as provide new park space



ALTERNATIVE 1 STORM SURGE - ANALYSIS
HIGH POINTS

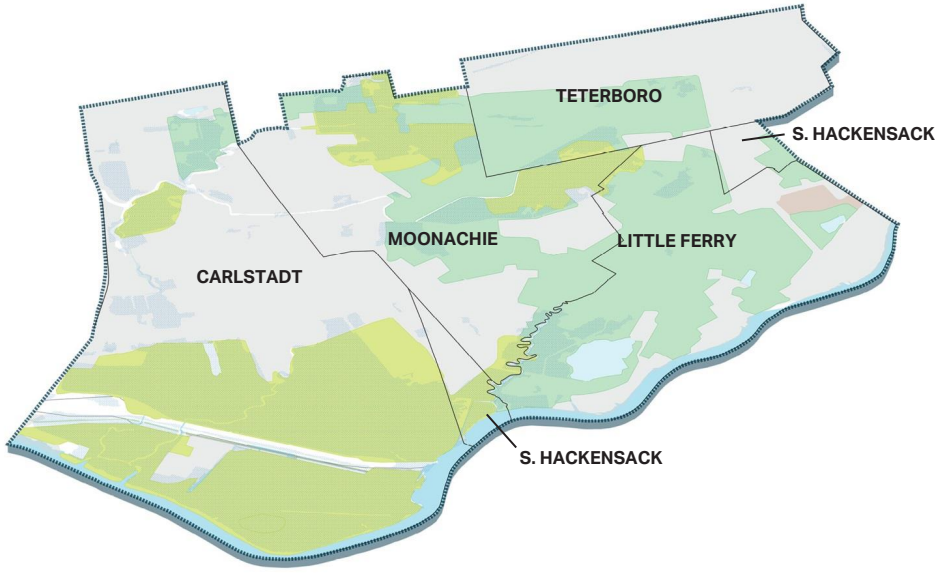
26

- Existing topography was analyzed to determine water flow and identify areas of high ground



ALTERNATIVE 1 STORM SURGE - ANALYSIS
SOILS & SUB-STRUCTURE

27



- All proposed flood protection strategies were informed by geo-technical analysis
- The soil type helped the team determine how deep the piles and sub-structure needed to extend

Frequently flooded-soils
Urban soils-wet sub stratum
Urban soils
Loam-urban context

Data Source:
USDA WSS AOI Web Soil Survey
http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

ALTERNATIVE 1 STORM SURGE
SCREENING EXAMPLE

28

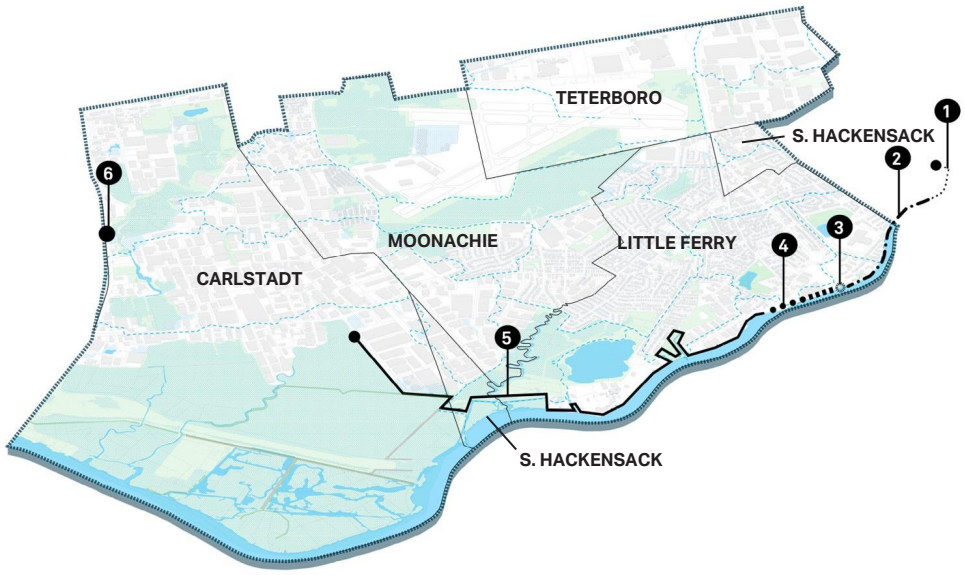
- Explored many options to a 100-year flood, but both Options 1 and 2 resulted in fatal flaw
- The 7' NAVD88 design elevation was further analyzed

Initial Concepts	Description	Within Budget	No Increased Flood Risk	Benefit Cost Ratio >1
Option 1	100-year Storm Protection/ Expanded Project Area	X	●	●
Option 2	100-year Storm Protection/ Project Area	X	●	●
Option 3	50-year Level of Protection/ Project Area	●	●	●
Option 4	Ring Levees/ Reduced Project Area	●	●	X
Option 5	Storm Surge Barrier on Hackensack River	X	X	●

50-YEAR LEVEL OF PROTECTION ADVANCES

ALTERNATIVE 1 STORM SURGE - PLAN

29



- Provides protection from a storm surge to elevation 7' NAVD88 (approximately a 50-yr storm)
- Provides community co-benefits through water access & multifunctional wall elements
- Positive Benefit Cost Ratio greater >1
- Revised Feasibility-level concept cost exceeds $150M

1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

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CANTILEVER WALKWAY

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

30

- The Cantilever Walkway combines flood protection and public access

1. Public walk
2. Modular planter
3. Cantilever access
4. Recreational space

REBUILD BY DESIGN MEADOWLANDS

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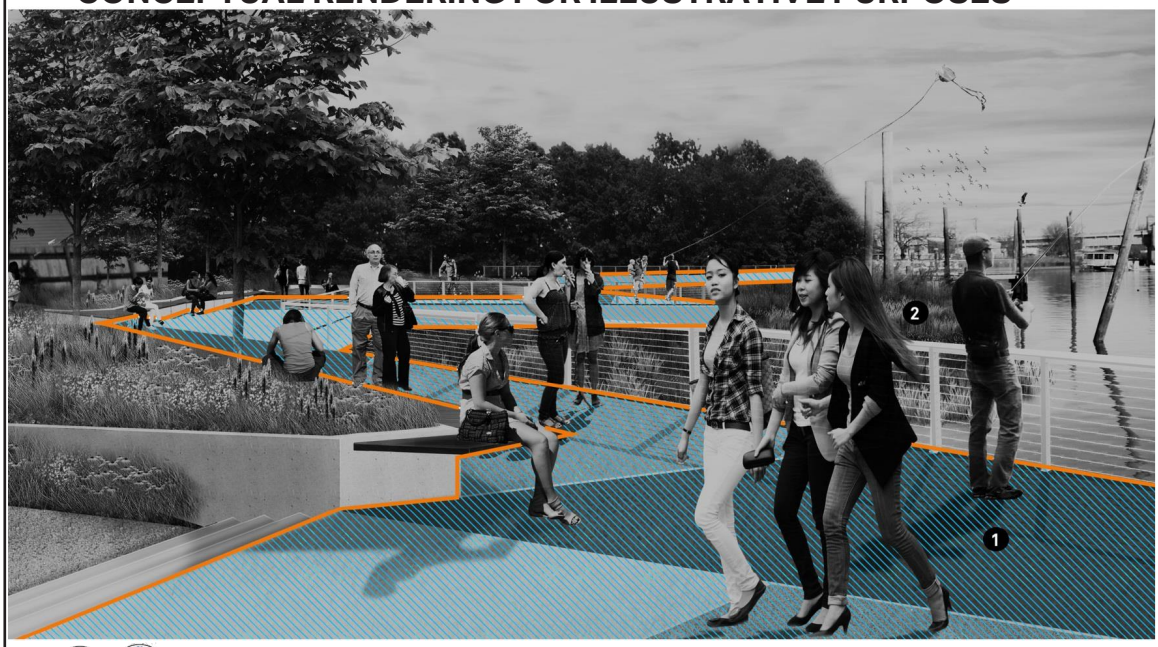
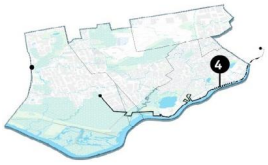
FLOOD PROTECTION

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

31



- The entire structure is built up to a 7'NAVD88 elevation



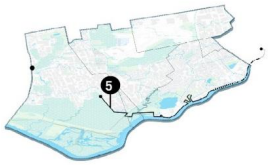
1. Flood protection system
2. Newly-created tidal wetland

VIEWING PLATFORM & SHEET PILE

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

32

- Sheet pile is a cost effective material used in the southeast
- Public viewing platforms were integrated into the system

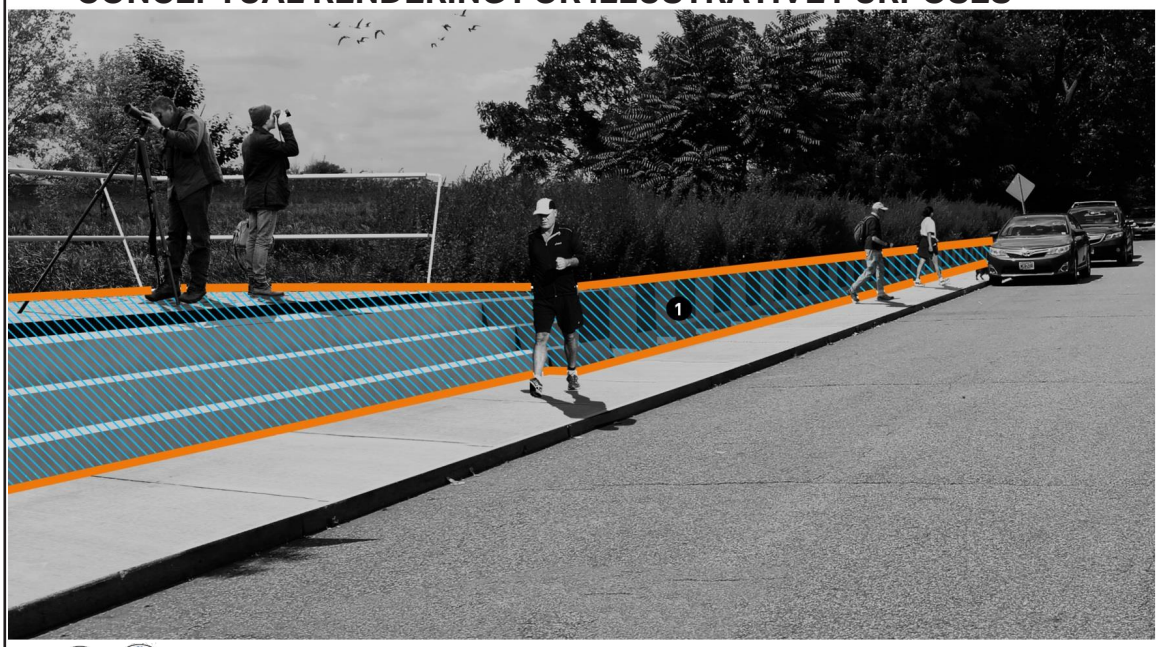


1. Viewing deck
2. Wetland

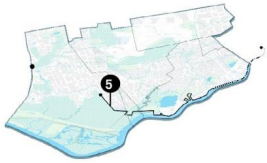
FLOOD PROTECTION

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

33



- Sheet pile wraps around viewing platform to form the flood protection system



1 Sheet pile

FREQUENT RAIN FLOODING

ALTERNATIVE 2

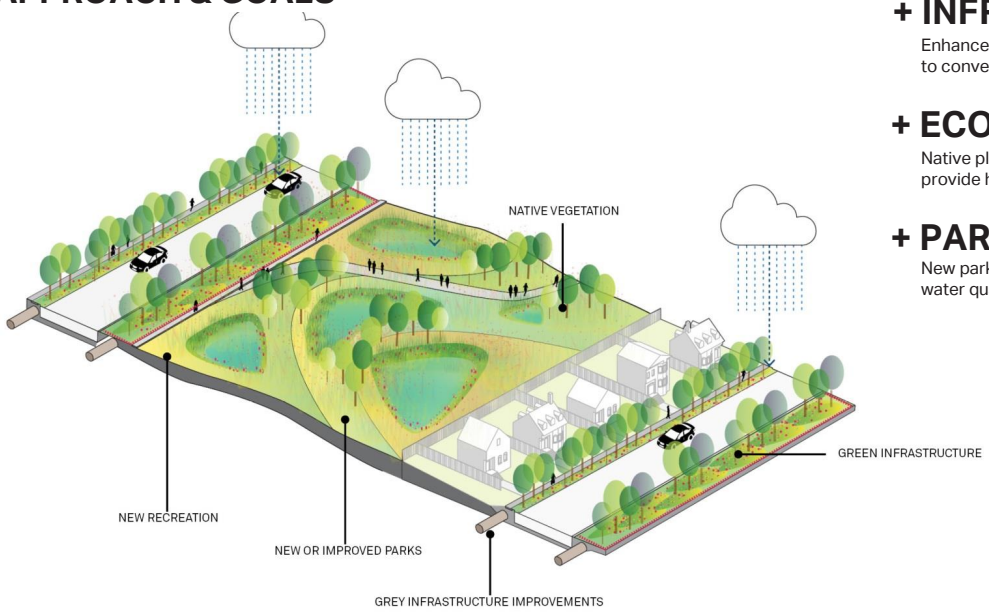
GARRETT AVERY, AECOM

AECOM

ALTERNATIVE 2 FREQUENT RAIN FLOODING

35

APPROACH & GOALS



+ INFRASTRUCTURE

Enhance & restore channels to improve capacity to convey stormwater

+ ECOLOGY

Native plantings and naturalized channel edges provide habitat and improve water quality

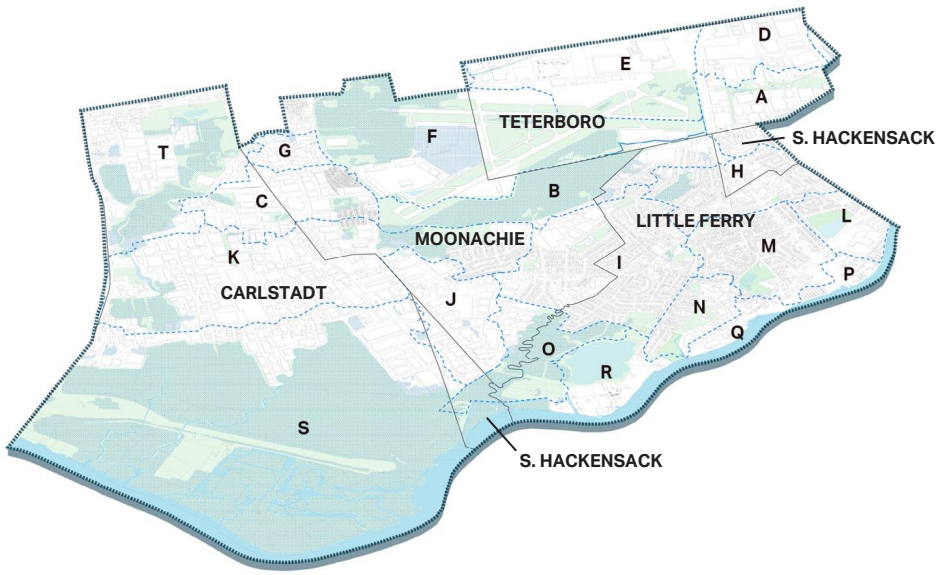
+ PARKS

New park spaces slowing runoff & improve water quality

ALTERNATIVE 2 FREQUENT RAIN FLOODING -ANALYSIS

36

20 SUB-BASINS



- Analyzed 20 sub-basin areas in the hydrologic model

A: UPPER EAST RISER
B: MIDDLE EAST RISER
C: LOWER EAST RISER
D: UPPER WEST RISER 1
E: UPPER WEST RISER 2
F: MIDDLE WEST RISER
G: LOWER WEST RISER
H: UPPER LOSEN SLOTE 1
I: UPPER LOSEN SLOTE 2
J: MOONACHIE
K: CARLSTADT
L: INDIAN LAKE
M: MAIN STREET
N: DEPEYSTER CREEK
O: LOWER LOSEN SLOTE
P: UPPER HACKENSACK
Q: MIDDLE HACKENSACK 1
R: MIDDLE HACKENSACK 2
S: LOWER HACKENSACK
T: BERRY'S CREEK

----- Sub-basin boundary

ALTERNATIVE 2 FREQUENT RAIN FLOODING -ANALYSIS

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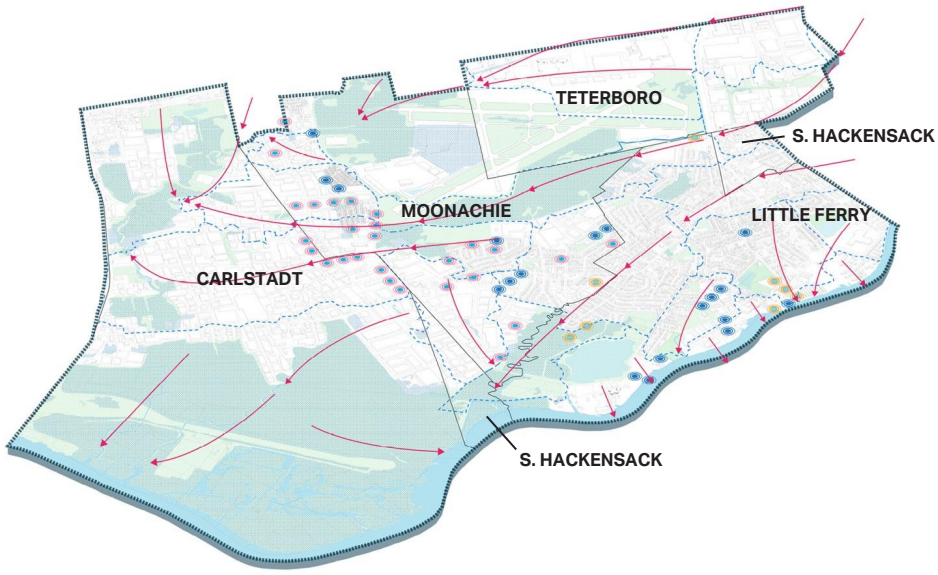
FREQUENCY & FLOW



- Runoff flows to lower elevations, into creeks or ditches and is conveyed eventually into the Hackensack River or Berry's Creek
- We listened to the community members and used their input to map areas of frequent flooding

Floods in regular event
Floods in heavy event
Floods in major event
Primary conveyance direction
Sub-basin

ALTERNATIVE 2 FREQUENT RAIN FLOODING

38

SCREENING EXAMPLE

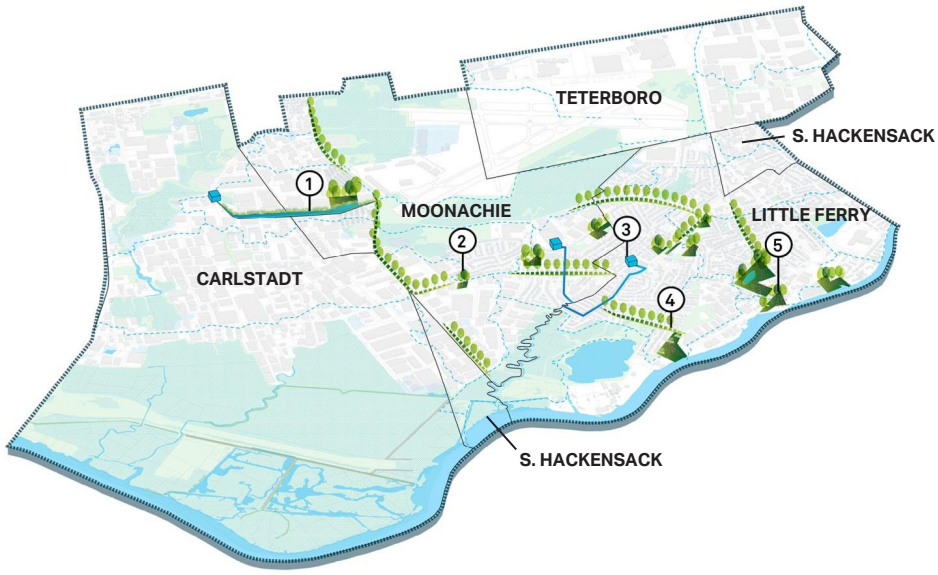
Initial Concepts	Description	Within Budget	Distribution of Benefits	Benefit Cost Ratio >1
Main Street	Increase storage capacity at Indian Lake, improves storm drainage pipes, includes upgrades to existing Willow Lake pump station discharge line, and new street and park green infrastructure	●	X	X
DePeyster Creek	Upgrade of existing pump station, upgrades of existing upstream culvert, channel dredging with habitat restoration, and new street and park green infrastructure	●	●	X
Losen Slote & Carol Place	Two new pump stations and force mains to divert stormwater from residential area to downstream of Losen Slote, upgrades to existing storm drainage ditches and culverts, and new street and park green infrastructure	●	●	X
West Riser	New pump station, channel conveyance improvements with habitat restoration, culvert upgrades, and new street green infrastructure.	●	X	●
East Riser	Pump station improvements, channel conveyance improvements with habitat restoration, culvert and bridge upgrades, and new street and park green infrastructure.	X	●	●
Revised Concept	New pump station and force mains to divert stormwater from residential area to downstream of Losen Slote, upgrades to culverts and bridge crossings, East Riser Ditch conveyance improvement and new pump station, and new street and park green infrastructure	●	●	●

REVISED CONCEPT ADVANCES

- Top concepts were reviewed and evaluated using the screening criteria
- The Revised Concept was a result of reviewing and rearranging to create a concept carrying increased benefits

ALTERNATIVE 2 – FREQUENT RAIN FLOODING PLAN

39



- Reduction in areal extent of flooding and depth of flooding for fluvial storms of a recurrence interval of 100-yr or less
- Provides community co-benefits through green infrastructure
- Positive Benefit Cost Ratio greater >1
- Revised Feasibility-level concept cost exceeds $150M

1. East Riser Channel Improvements + New Park
2. Green Infrastructure + New Park
3. Force Main + Public Facility Improvements
4. Green Infrastructure + New Park
5. Park Improvements + 3 New Parks + Green Infrastructure

LOSEN SLOTE DRAINAGE IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

40

- New pump stations improve conveyance capacity by moving water from one location to another

1. Submersible pump
2. 36" force main
3. Losen Slote
4. Control panel

GREEN INFRASTRUCTURE & PARK IMPROVEMENTS

41

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

- Wetland enhancement, improves storage and treatment capacities, and improves public recreation opportunity

1. Elevated boardwalk
2. Channel improvements
3. Shallow emergent marsh
4. Native Vegetation

REBUILD BY DESIGN MEADOWLANDS

Community Meeting // January 11, 2018 AECOM

THE PREFERRED ALTERNATIVE

ALTERNATIVE 3 – STORM SURGE & FREQUENT RAIN FLOODING

GARRETT AVERY, AECOM

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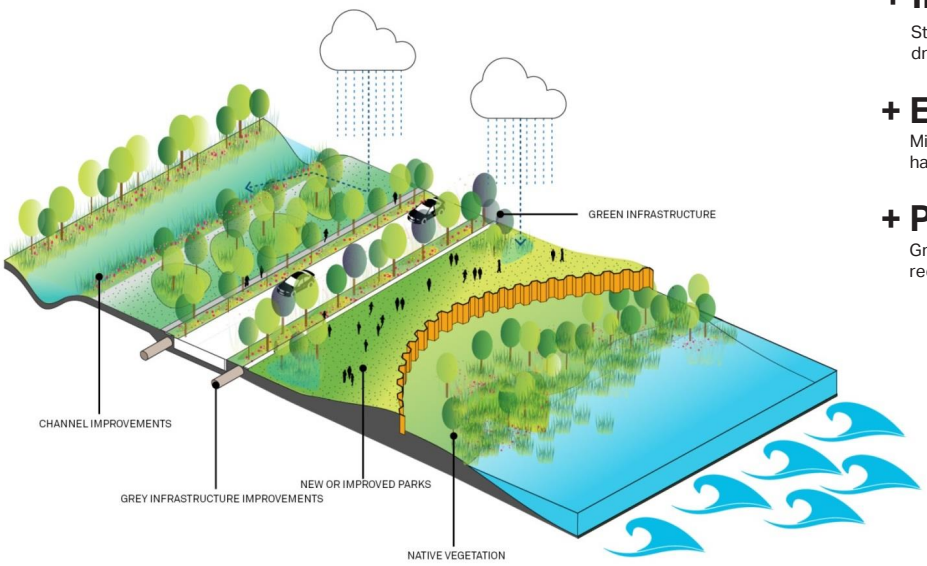
ALTERNATIVE 3 – HYBRID
APPROACH & GOALS

43



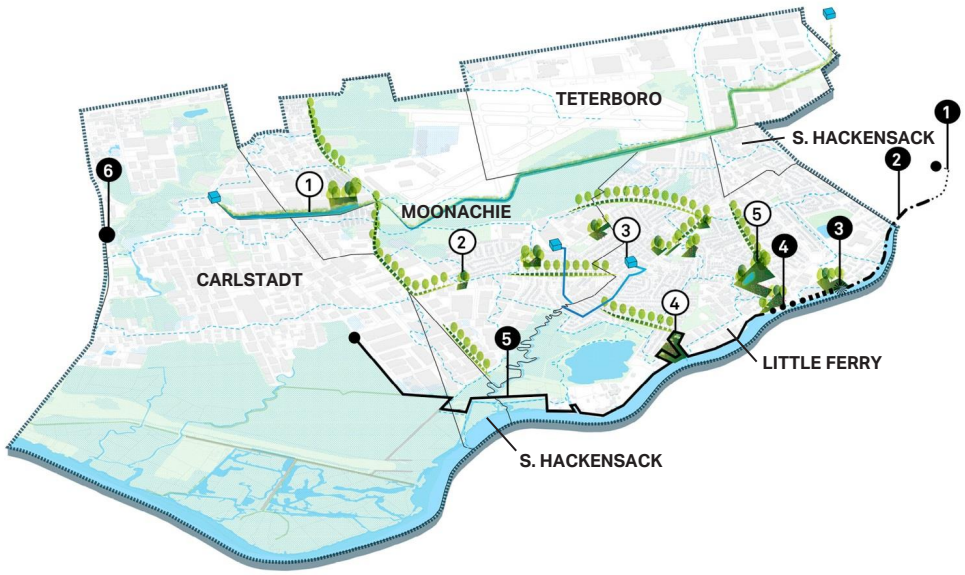
+ INFRASTRUCTURE
Structural Flood Reduction and local drainage infrastructure improvements

+ ECOLOGY
Minimize ecological disturbance and improve habitat within channels, streets, and parks

+ PARKS
Green infrastructure provides additional flood reduction & improves existing public parks

ALTERNATIVE 3 – THE PREFERRED
A PLAN FOR BOTH CHALLENGES

44



Stormwater Management
1. East Riser Channel Improvements + Enhanced Wetland Open Space
2. Green Infrastructure + Enhanced Existing Open Space
3. Force Main + Public Facility Improvements
4. Green Infrastructure + Enhanced Open Space
5. GI Improvements to Existing Park + 3 New Wetland / Open Spaces

Storm Surge Protection
1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

ARRIVING AT A PREFERRED
ALTERNATIVE SCREENING

45

Alternatives	Description	Stormwater & Storm Surge Protection	Distribution of Benefits	Benefit Cost Ratio >1
Alternative 1	Final Storm Surge Protection Concept	X	●	●
Alternative 2	Final Stormwater Reduction Concept	X	●	●
Alternative 3	Final Storm Surge & Stormwater Protection Concept	●	●	●

THE PREFERRED ALTERNATIVE

ALTERNATIVE 3 HYBRID - THE BUILD & FUTURE PLAN

46

Build Plan

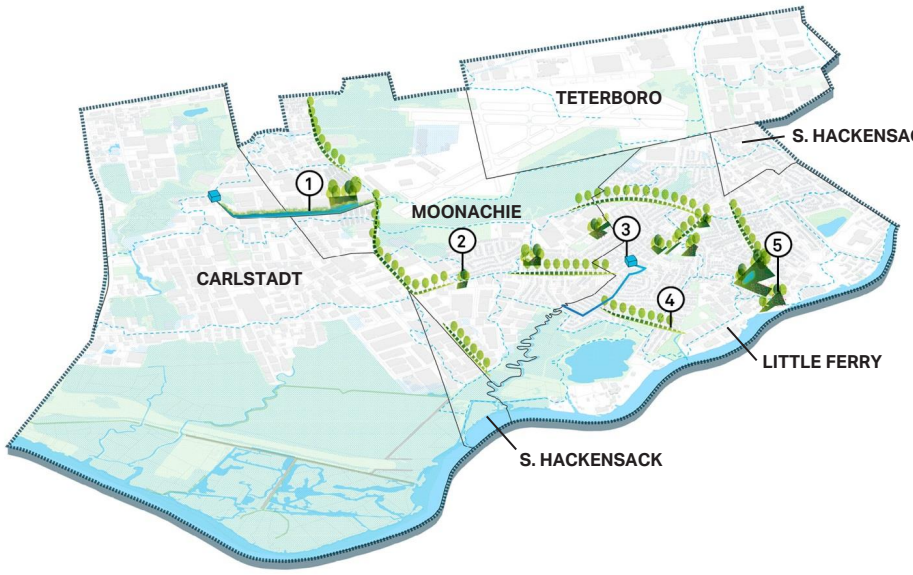
The *Build Plan* represents a feasible project that can be **constructed by 2022.** Components include flood reduction strategies to address frequent rain flooding

Future Plan

Components that were not selected for the *Build Plan* became elements of a *Future Plan*. These elements could **be implemented** by others **over time** as new funding sources become available

ALTERNATIVE 3 - BUILD PLAN
FREQUENT FLOOD REDUCTION

47



1. Pump station +Channel Improvements + New Park
2. Green Infrastructure + New Park
3. Pump Station + Force Main + Public Facility Improvements
4. Green Infrastructure
5. Park Improvements + 1 New Park + Green Infrastructure

Stormwater Management Features

1. East Riser: Channel Improvements + Enhanced Wetland Open Space
2. Avanti Park: Street Green Infrastructure + Enhanced Open Space
3. Losen Slote: Force Main + Public Facility Improvements
4. Green Infrastructure + Enhanced Wetland Open Space
5. GI Improvements to Willow Lake Park + 1 New Wetland / Open Space along Hackensack River

REBUILD BY DESIGN MEADOWLANDS

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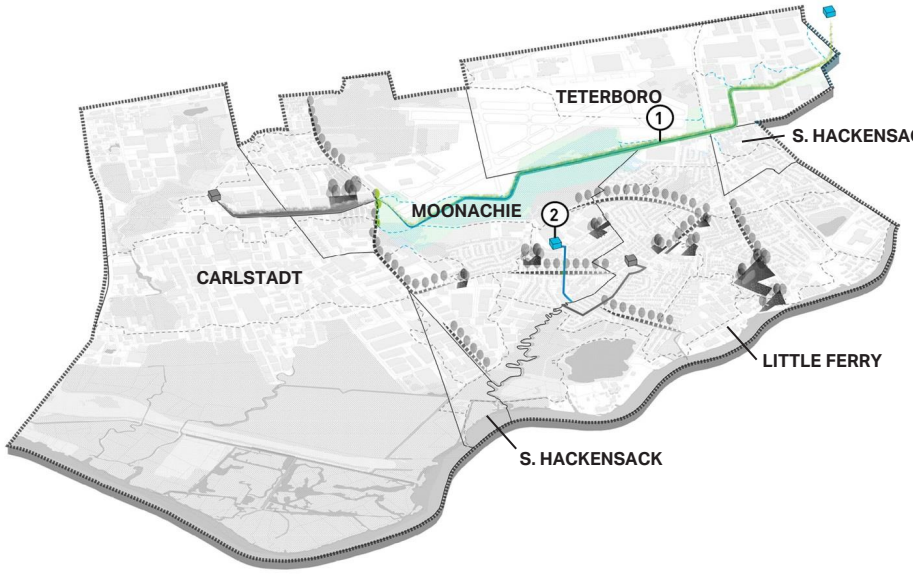
FOR FUTURE IMPLEMENTATION
ADDITIONAL RAIN FLOODING REDUCTION FROM ALTERNATIVE 2

48



1. East Riser Channel Improvements Extension toward South Hackensack
2. A second Losen Slote Pump Station & Force Main

REBUILD BY DESIGN MEADOWLANDS

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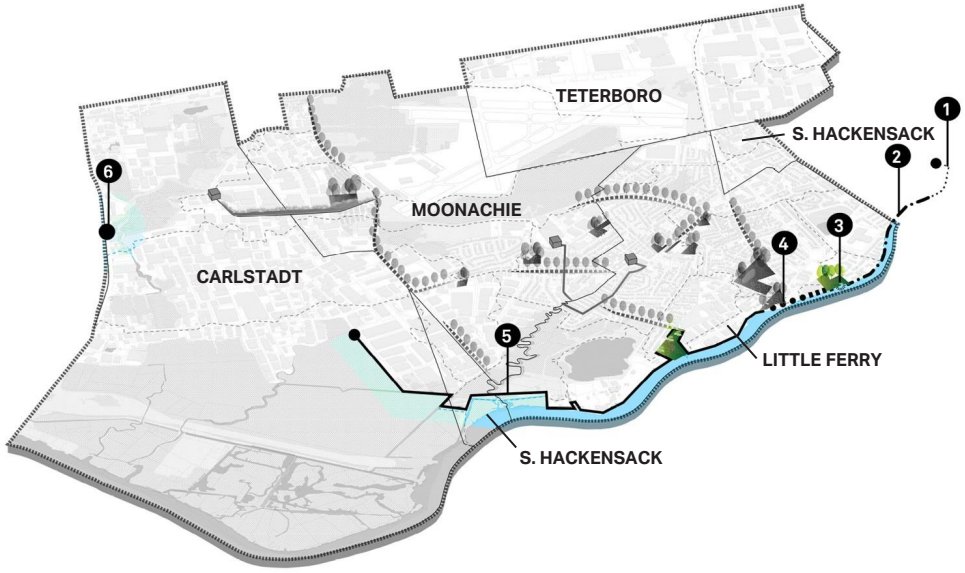
FOR FUTURE IMPLEMENTATION

50-YEAR STORM SURGE PROTECTION FROM ALTERNATIVE 1

49



- All Future Plan elements will be evaluated in the Feasibility Study and Draft EIS
- Utilizing the Feasibility Study and EIS could reduce the timeline and initial expense for those implementing Future Plan components

1. Existing Riverwalk
2. Sheet Pile Cantilever
3. Berms at Fluvial Park
4. Cantilever Walkway
5. Sheet pile or Floodwall
6. Surge Barrier

REBUILD BY DESIGN MEADOWLANDS

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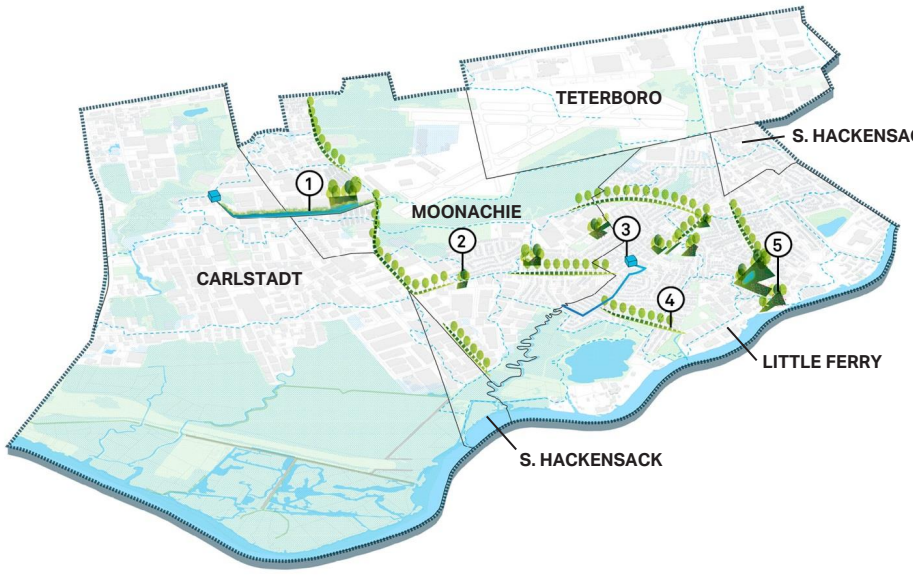
THE BUILD PLAN

LULU LOQUIDIS, AECOM

AECOM

ALTERNATIVE 3 - BUILD PLAN

51



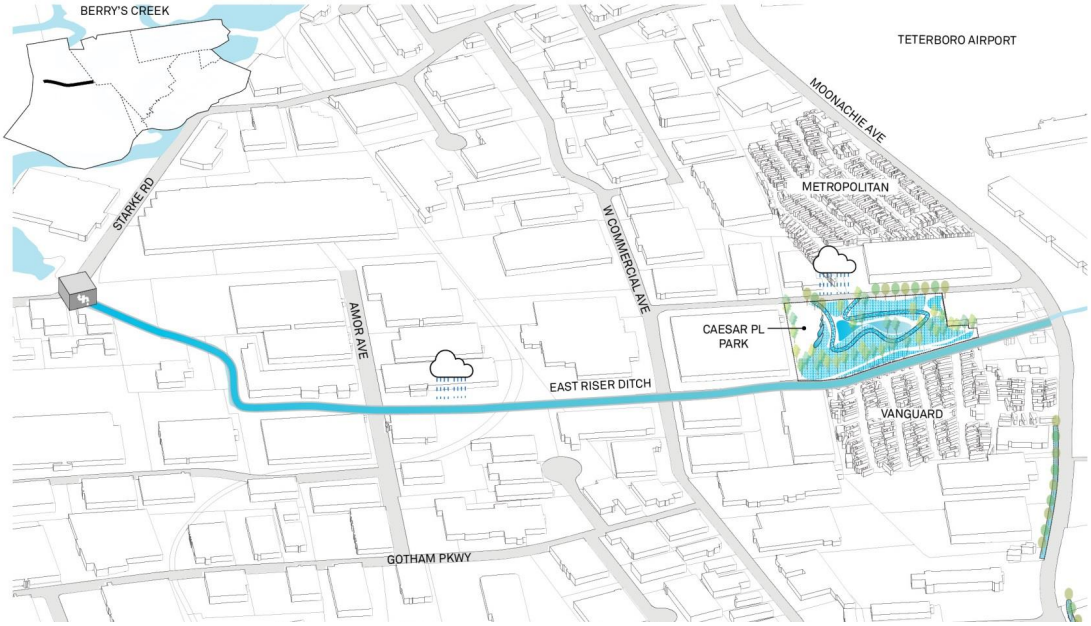
- The Build Plan can be constructed and functional by 2022
- Will require less maintenance than that of an Alternative 1 system
- Positive Benefit Cost Ratio greater >1
- Can be constructed within Available Funds

1 East Riser Channel Improvements + New Park
2 Green Infrastructure + New Park
3 Force Main + Public Facility Improvements
4 Green Infrastructure
5 Park Improvements + 1 New Park + Green Infrastructure

EAST RISER CHANNEL IMPROVEMENTS

FLOOD REDUCTION BENEFITS

52



- **Channel conveyance improvements** below Moonachie Ave with a **new pump station**
- New wetland eco-park with ~12,000 SF of **integrated green infrastructure** and ~129,000 SF of wooded and emergent wetland to **improve storage** and **water quality**

EAST RISER CHANNEL IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

53

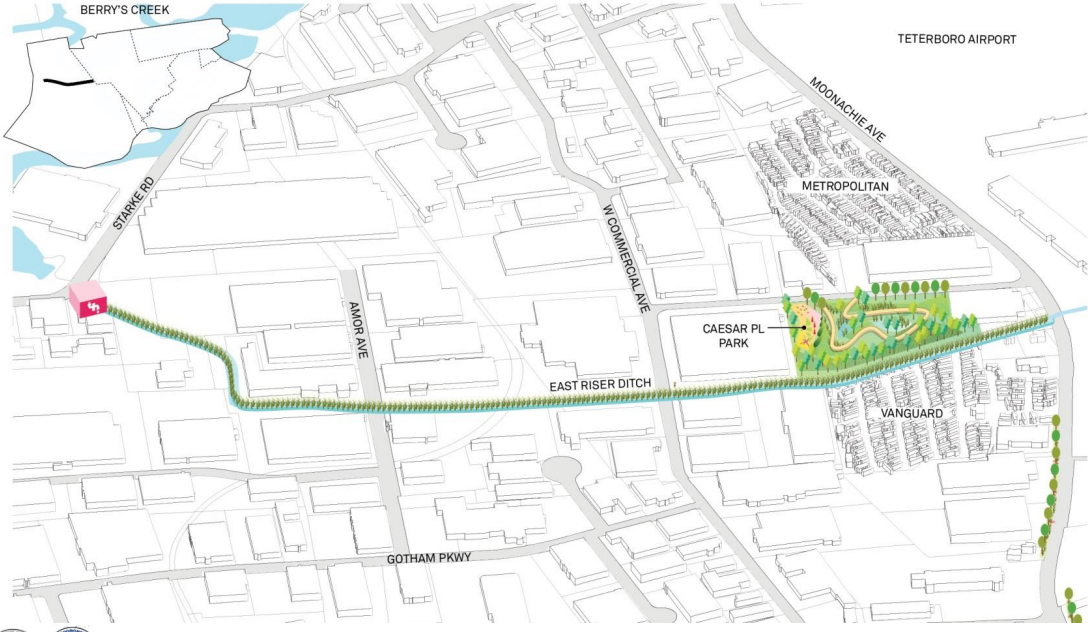
- Improves conveyance capacity
- Captures road runoff and filters suspended solids
- Native vegetation provides habitat and improves visual quality along the channel

1. Gravel trench
2. Channel improvement
3. Native vegetation
4. Curb cut

EAST RISER CHANNEL IMPROVEMENTS

FLOOD REDUCTION CO-BENEFITS

54



- Channel conveyance improvements include **habitat restoration with native vegetation**
- New wetland eco-park is part of the flood reduction system, but also offers benefits in the form of **habitat, environmental education,** and **recreation space**

GREEN INFRASTRUCTURE & PARK IMPROVEMENTS

55

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

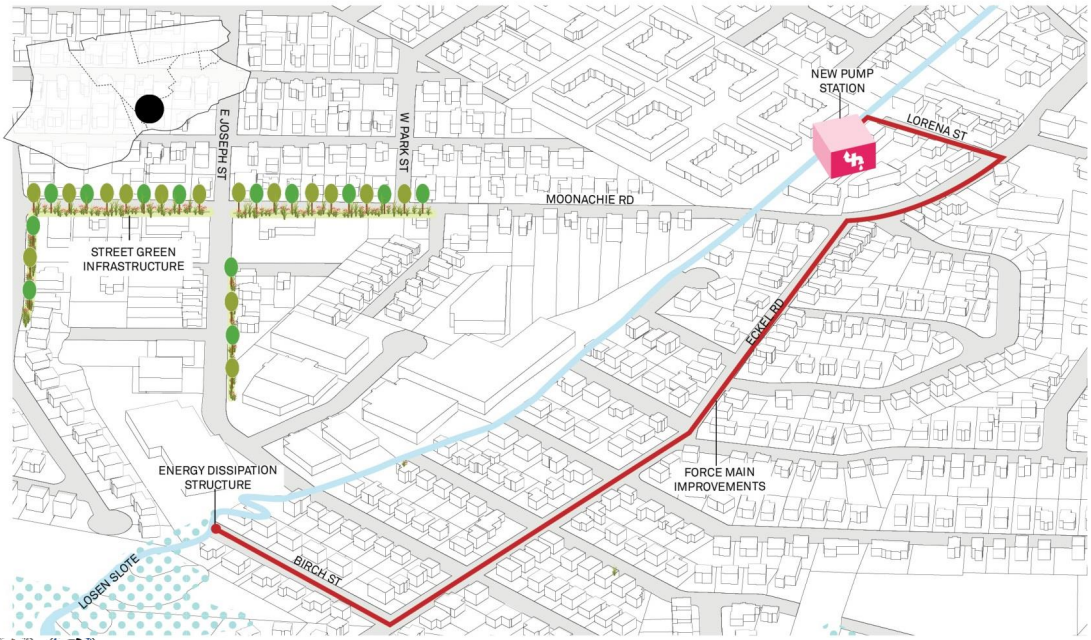
- Wetland enhancement, improves storage and treatment capacities, and improves public recreation opportunity

1. Elevated boardwalk
2. Channel improvements
3. Shallow emergent marsh
4. Native vegetation

LOSEN SLOTE DRAINAGE IMPROVEMENTS

56

FLOOD REDUCTION & CO-BENEFITS



- **New pump station** within the residential area of the stream
- Stormwater discharges via a **36" force main** to the downstream Losen Slote marsh
- **Energy dissipation structure** limits erosion at discharge points
- Street green infrastructure **collects water** and **filters** total suspended solids

LOSEN SLOTE DRAINAGE IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

57

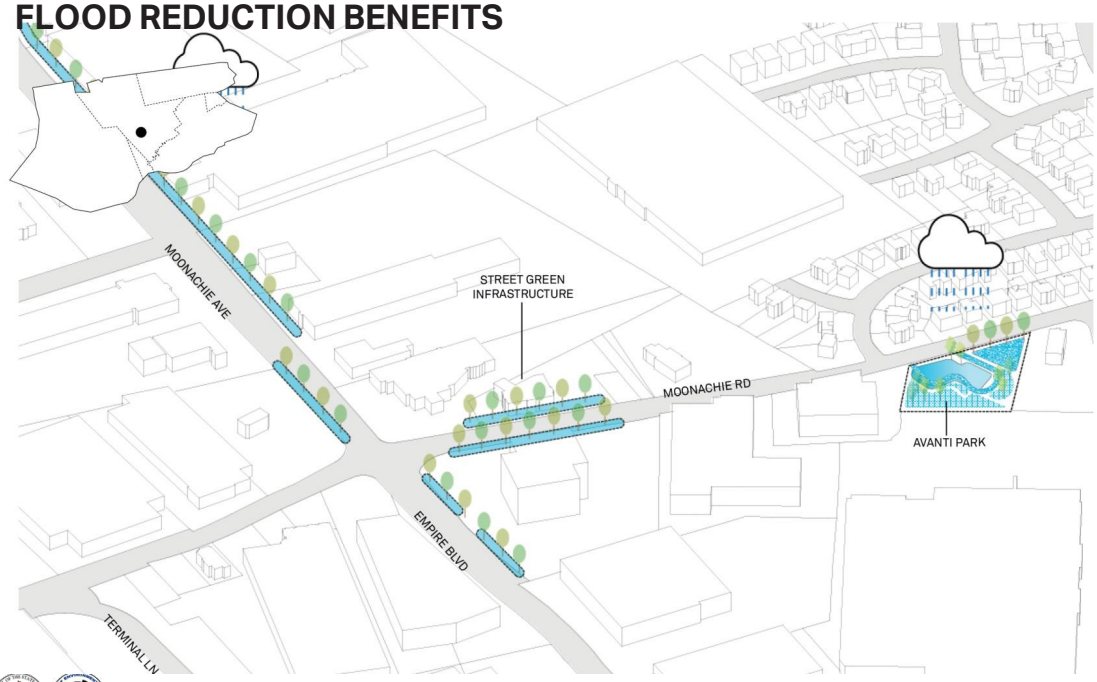
- A new pump station improves conveyance capacity by moving water from one location to another

1. Submersible pump
2. 36" force main
3. Losen Slote
4. Control panel

AVANTI PARK

FLOOD REDUCTION BENEFITS

58

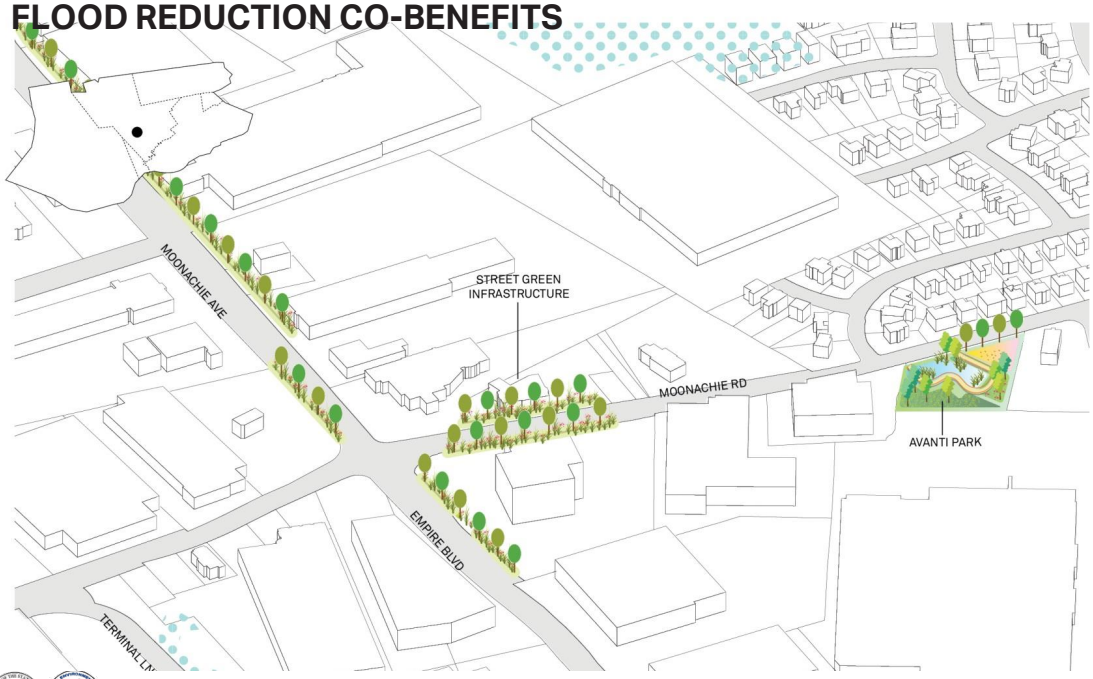


- **Water is stored** in new open space and green infrastructure
- ~19,000 SF of **improved wetland** and ~11,000 SF of native planting and raingardens **capture total suspended solids**

AVANTI PARK

FLOOD REDUCTION CO-BENEFITS

59



- Street green infrastructure **improves water quality**, creates new habitat, and **provides visual improvements**
- New park space also creates places for people to gather, **new habitat**, and space for **recreation**

AVANTI PARK

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

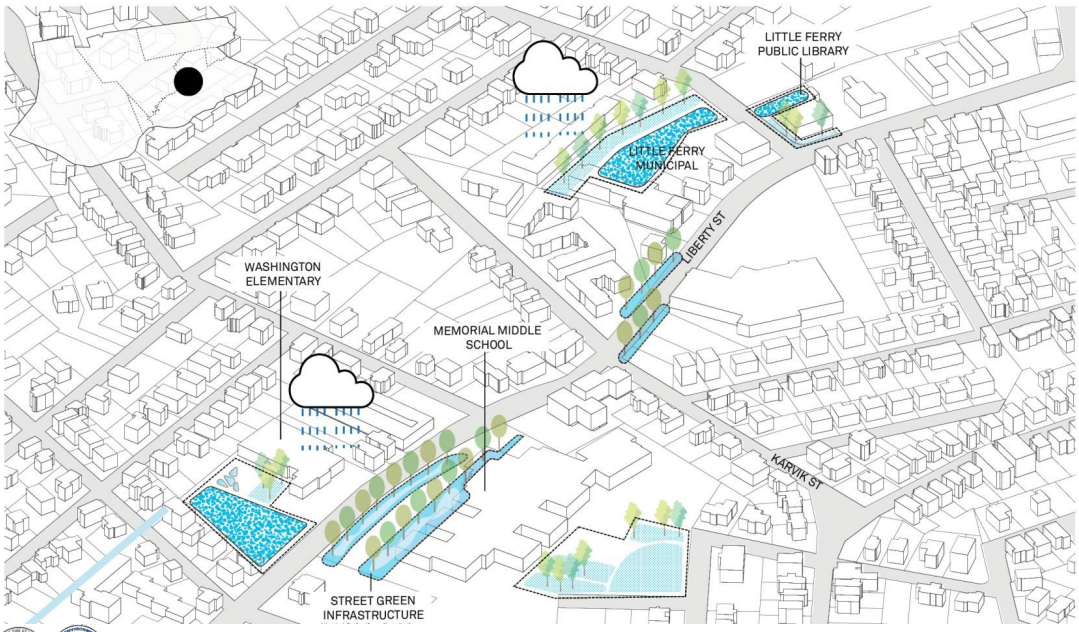
60

- Bioretention systems capture and filters 1.25 inches of rainfall in two hours through planting media
- New retention areas create room for additional water storage
- Undeveloped land becomes public park and productive ecosystem

1. Boardwalk foundation
2. Headwall & inlet pipe
3. Energy dissipator
4. Native planting
5. Integrated seating

CIVIC LOCATIONS
FLOOD REDUCTION BENEFITS

61



- Multiple improvements are proposed at public facilities in Little Ferry such as bioswales and underground storage trenches
- Improvements are planned for the following facilities: Little Ferry Library, Little Ferry Municipal Building, Memorial Middle School, Washington Elementary, and Robert Craig Elementary

CIVIC LOCATIONS
FLOOD REDUCTION CO-BENEFITS

62

- Co-benefits to the municipal buildings include improvements near community buildings, such as opportunities for education, community outreach and involvement, and new habitat

MUNICIPAL BUILDINGS & SCHOOLS

63

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

- Permeable paving and rain gardens collect and filters 1.25 inches of rainfall in two hours through planting media
- Green infrastructure can be an educational opportunity for schools and public buildings
- Greener streets improve habitat, create safer streets, and improve visual quality of the street

1. Permeable paver
2. Bioretention
3. Grass and concrete permeable paver

STREET GREEN INFRASTRUCTURE

64

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

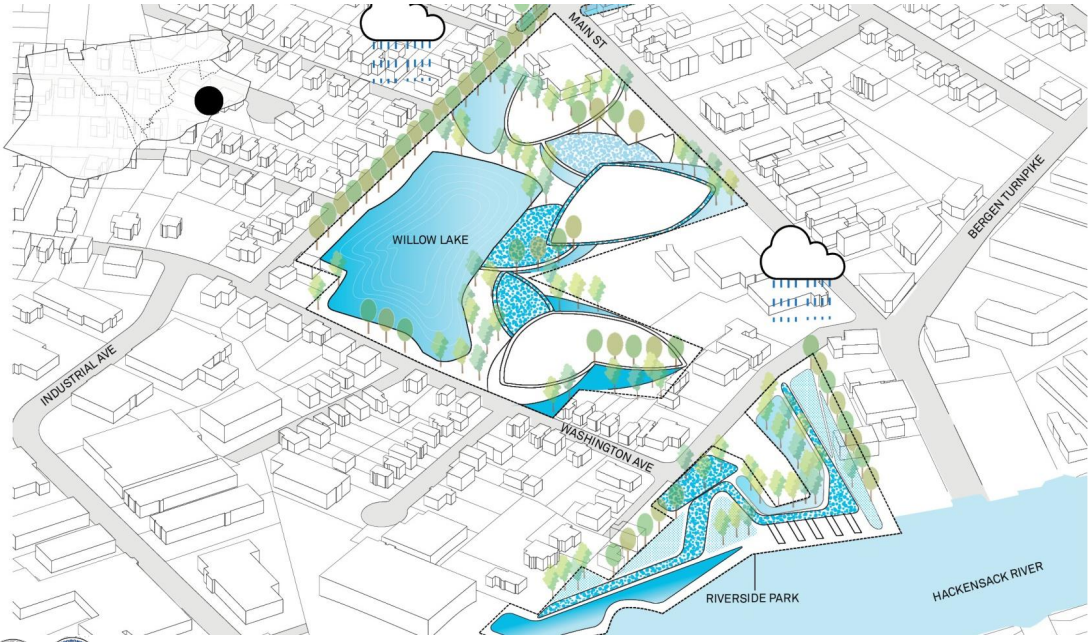
- Green infrastructure provides a holding space for street runoff that is slowly released back into the stormwater system
- Subsurface green infrastructure features provide storage and ability to infiltrate runoff to reduce peak flow reaching the existing stormwater system

1. Connection to storm system
2. Filter media
3. Native vegetation
4. Street Trees

WILLOW LAKE & RIVERSIDE PARKS

FLOOD REDUCTION BENEFITS

65



- Reduce sedimentation into the drainage system & slows water movement
- Improvements to Willow Lake include approximately 65,000 SF of new native planting and low meadow and approximately 1,200 SF of rain gardens
- A new public open space on the Hackensack River includes approximately 5,700 SF of restored riparian wetland and approximately 30,000 SF of native planting and bioswales

WILLOW LAKE & RIVERSIDE PARKS

FLOOD REDUCTION CO-BENEFITS

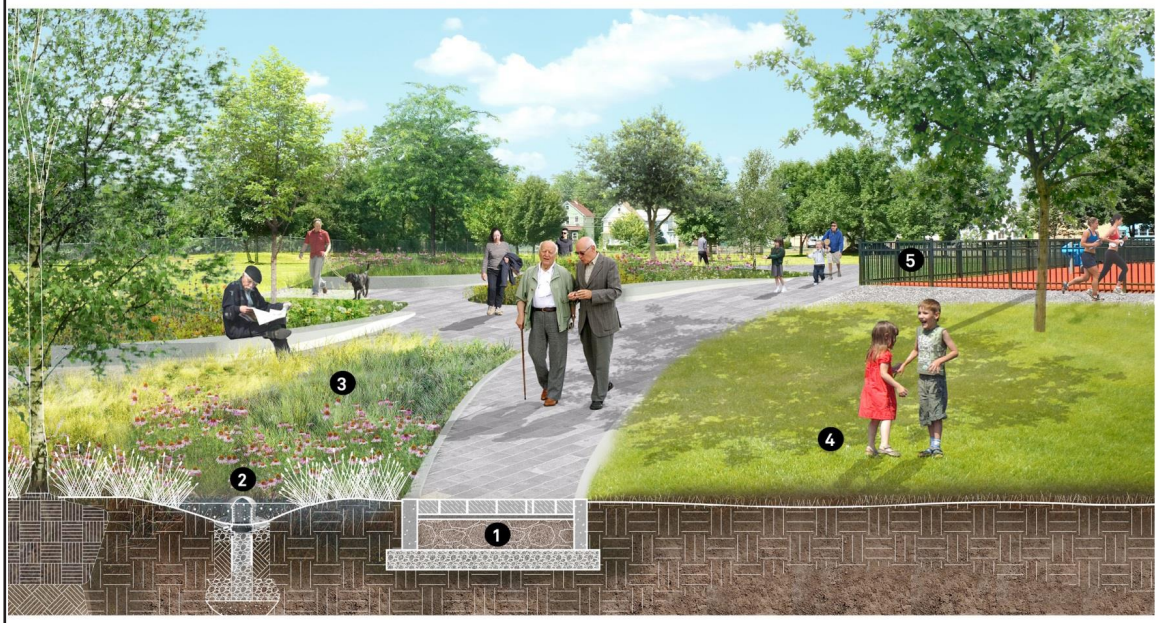
66

- Co-benefits to the new and improved Little Ferry open spaces include new walking trails, space for recreation, water access, new habitat, and visual improvements

WILLOW LAKE PARK IMPROVEMENTS

CONCEPTUAL RENDERING FOR ILLUSTRATIVE PURPOSES

67



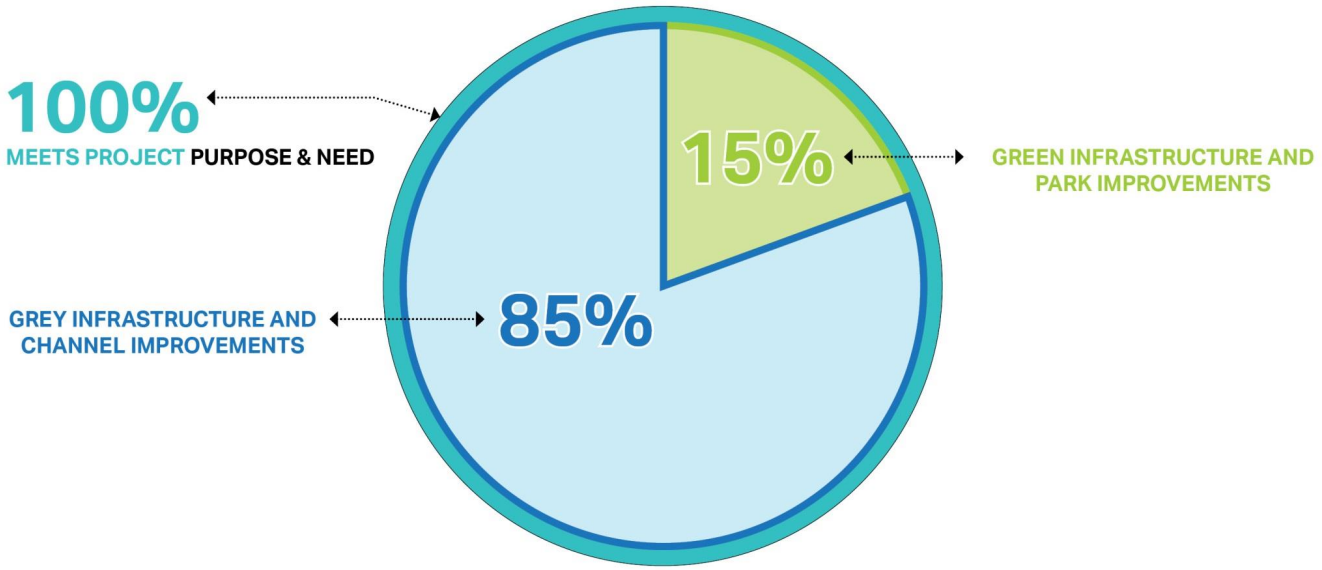
- Green infrastructure system would be sized to capture and treat 1.25 inches of rainfall in two hours
- Stone chimneys provided outlet for ponding water to reach stone storage
- Improvements to Willow Lake Park enhance water quality and user experience

1. Permeable paving
2. Stone chimney
3. Native planting
4. Recreation space
5. Existing playground

BUILD PLAN CONSTRUCTION COST

FEASIBILITY-LEVEL COST BREAKDOWN

68



BUILD PLAN BENEFITS

GARRETT AVERY, AECOM

AECOM

BUILD PLAN BENEFITS

2-YEAR STORM (2023)

70

- **Approximately 20 ACRES** would no longer flood during the 2-year storm (2023)
- **Approximately 642 ACRES*** would experience a reduction in flood water between 0.1ft to 3ft

* Additional Flood depth reduction would occur in the vicinity of the drainage channels within East Riser Ditch (East Riser Ditch tide gate to Route 46) and Losen Slote (East Joseph Street to Niehaus) watersheds.

BUILD PLAN BENEFITS
100-YEAR STORM (2023)

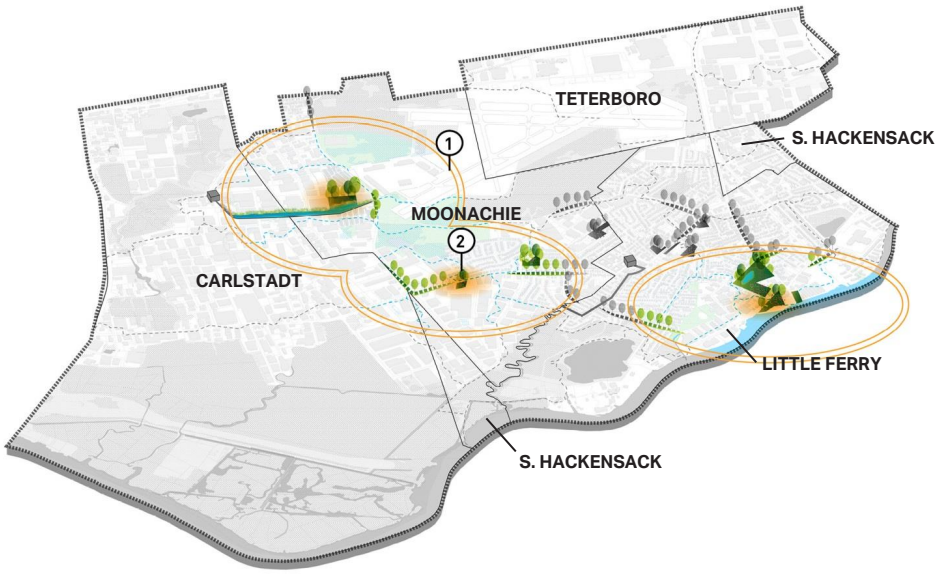
71

- **Approximately 39 ACRES** would no longer flood during the 100-year storm (2023)
- **Approximately 1,244 ACRES*** would experience a reduction in flood water between 0.1ft to 3ft

* Additional Flood depth reduction would occur in the vicinity of the drainage channels within East Riser Ditch (East Riser Ditch tide gate to Route 46) and Losen Slote (East Joseph Street to Niehaus) watersheds.

BUILD PLAN BENEFIT
OPEN SPACE ENHANCEMENT: POPULATION & HOUSEHOLDS

72



~300 HOUSEHOLDS
Within 500' of a new park

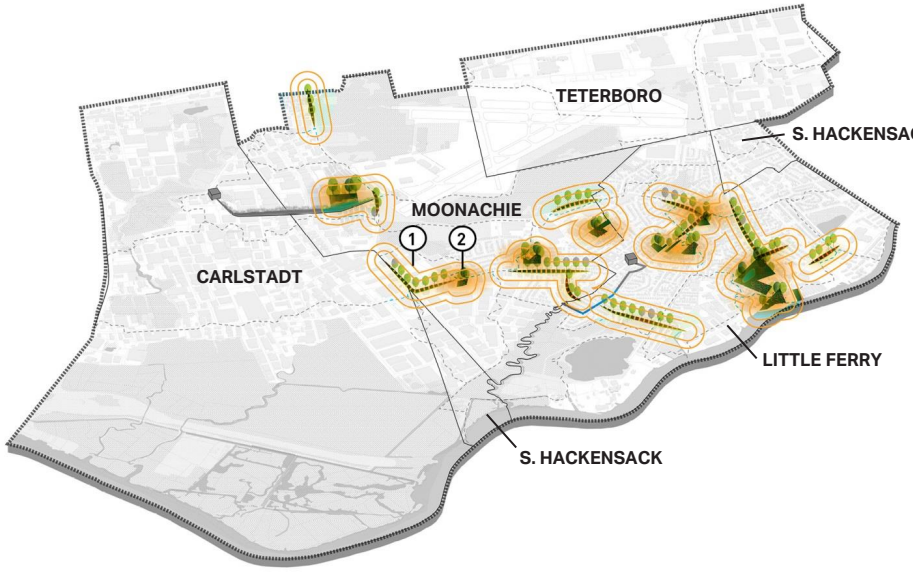
~5,000 PEOPLE
Within 0.25 miles of a new park

Benefit Inputs
1 0.25 Mile Buffer from New Parks
2 500' Buffer from New Parks

BUILD PLAN BENEFIT

STREET GREEN INFRASTRUCTURE: HOUSEHOLDS

73



~218 HOUSEHOLDS
Within 100' of a new trees

~775 TREES
New Trees Planted

Benefit Inputs

1. 100' Buffer from New Trees in Parks and Streets
2. Improvements in Parks, Schools, and Public and Municipal Facilities

BENEFIT COST RATIO

GRANT-SPECIFIC BENEFIT/COST EVALUATION CRITERIA

74

Economic Revitalization Benefits

- Direct effects on local or regional economy (e.g., tourism revenue)
- Improved Property Value (exclusive of enhanced flood protection)
- Value creation attributable to Rebuild By Design

Environmental Benefits

- Protection from disruptive non-disasters (nuisance flooding)
- Reduced vulnerability of energy and water infrastructure
- Improved Ecosystem and Biodiversity
- Water & Air Quality Improvements

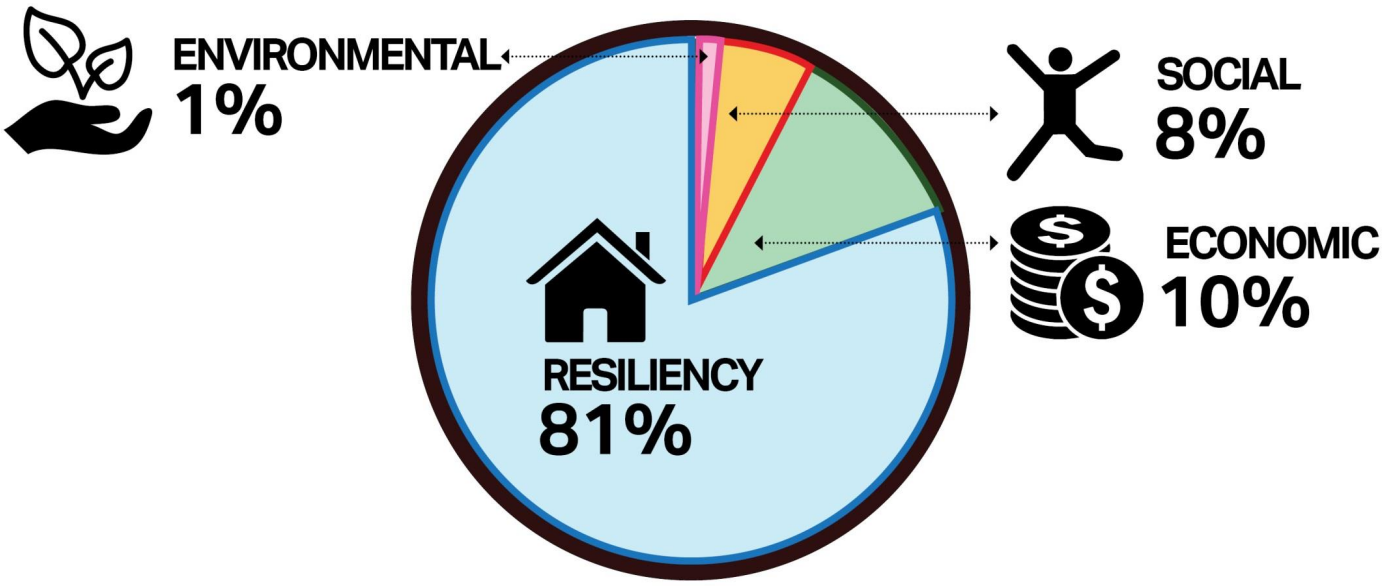
Social Benefits

- Reductions in human suffering
- Improved Recreation Value
- Improved Community Identity and Social Cohesion
- Greater access to Cultural, Historical, Archeological Sites and Landscapes

BENEFITS CATEGORIES ANALYZED

BENEFIT/COST EVALUATION

75

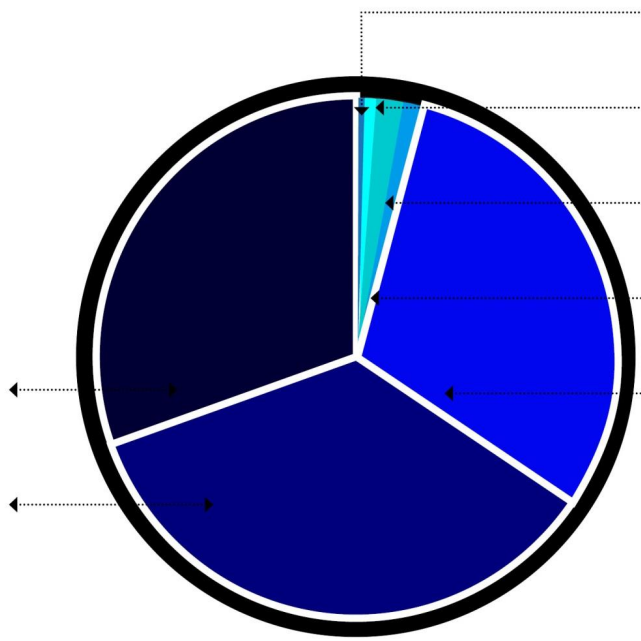


BUILD PLAN BENEFITS

RESILIENCY

76

PRESENT VALUE
$87.1M

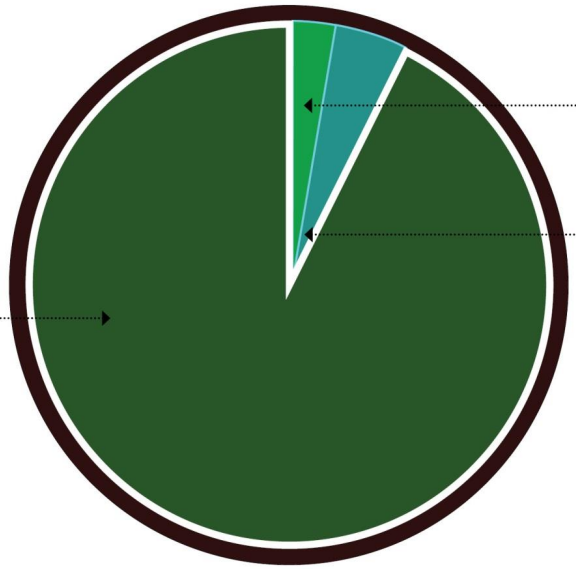


*Other category benefits include: Apartment Structures, Utility Structures, Debris Removal, Emergency Service, Critical Facility Disruption

BUILD PLAN BENEFITS
ECONOMIC REVITALIZATION

77

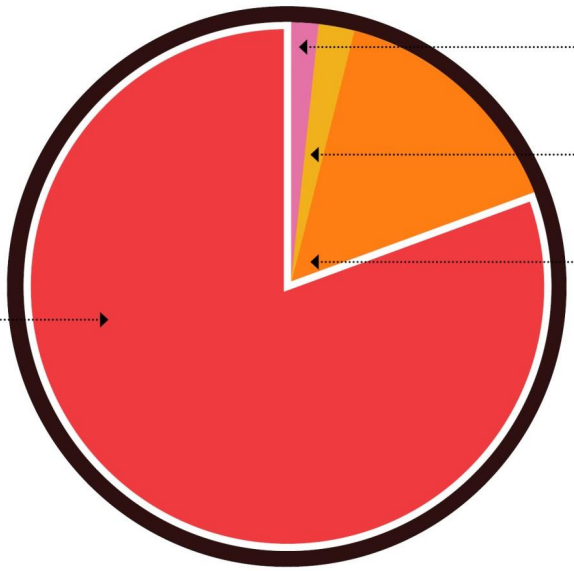
PRESENT VALUE
$10.9M



BENEFIT EVALUATED
SOCIAL BENEFITS

78

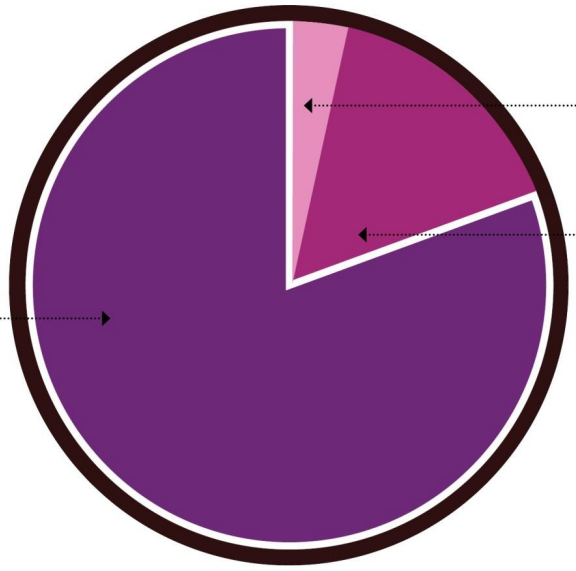
PRESENT VALUE
$8.8M



BENEFIT EVALUATED
ENVIRONMENTAL BENEFITS

79

PRESENT VALUE
$175,000



NEXT STEPS

DAVE ROSENBLATT, ASSISTANT COMMISSIONER
NJDEP

AECOM

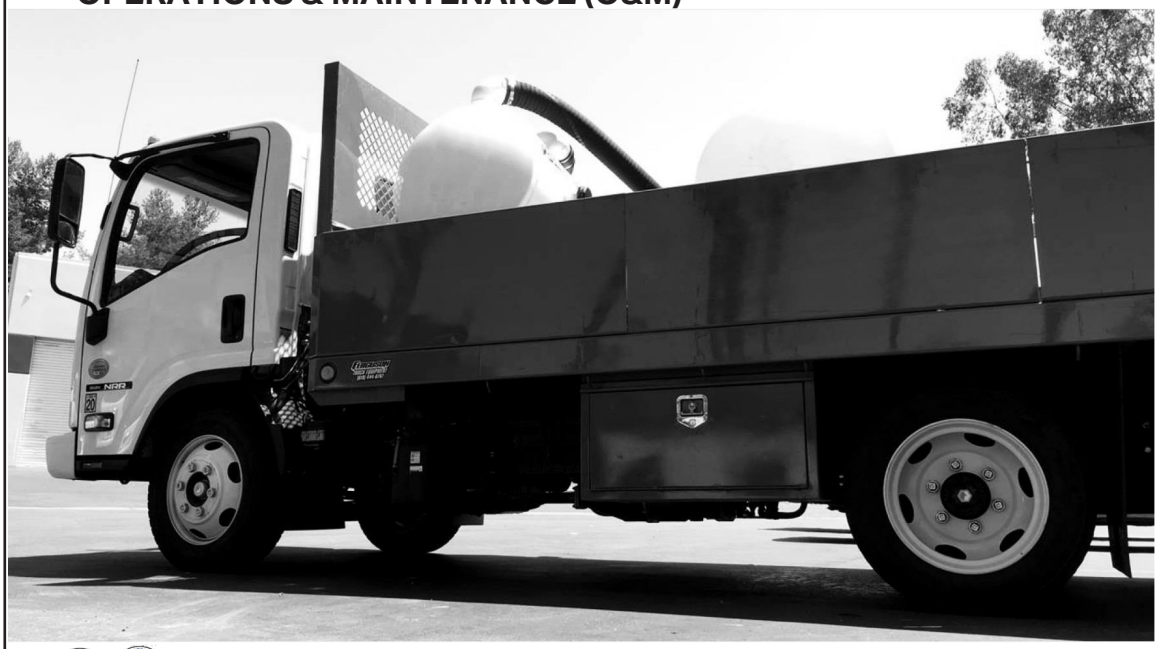
CONSTRUCTING THE PREFERRED ALTERNATIVE

81

- Meets the project Purpose & Need
- Satisfies HUD mandate
- Can be constructed by 2022 with the allocated funding
- Provides Flood Reduction & numerous co-benefits

NEXT STEPS
OPERATIONS & MAINTENANCE (O&M)

82



- The State will provide an O&M plan that identifies the entities performing routine, on-going maintenance
- In cooperation with the Agencies and local municipalities receiving flood protection benefits, the State has begun by establishing an O&M Subcommittee

NEXT STEPS

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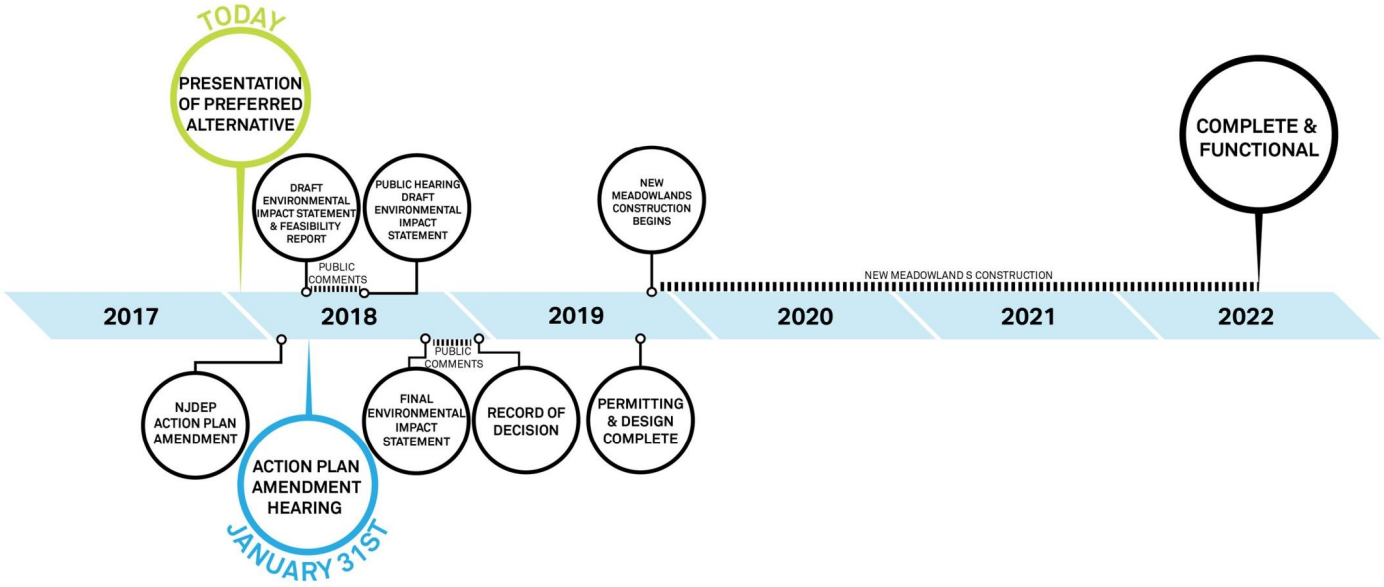
NJDEP: UPCOMING ACTIVITIES

- **Action Plan Amendment (APA) 25:**
  - Draft **APA** publication: **January 12, 2018**
  - **APA** public comment period: **January 13 – February 12, 2018**
  - **APA** Public Hearing: **January 31, 2018**

- **Draft Environmental Impact Statement (DEIS):**
  - **DEIS** publication: **Spring 2018**
  - **DEIS** public comment period: **45 Days**
  - **DEIS** Public Hearing: **Spring 2018 (during public comment period)**

UPCOMING SCHEDULE

84



NEXT STEPS

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Critical Information

Project Website
www.rbd-meadowlands.nj.gov

Project Email
rbd-meadowlands@dep.nj.gov

Question & Answer

THANK YOU

4.0 Personal Notes