REBUILD BY DESIGN

MEADOWLANDS

CITIZEN ADVISORY GROUP (CAG) MEETING #10

ALTERNATIVE 3: HYBRID

June 27, 2017
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## 1.0 List of Acronyms

### List of Acronyms

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

Alternative 3: Hybrid

6-8 PM
June 27, 2017
Port Authority Conference Room
90 Moonachie Ave
Teterboro, NJ 07608

Welcome

Presentation

Opening Remarks (10 Minutes)

Welcoming (Linda Fisher, NJDEP)

Meadowlands Challenge (Chris Benosky, AECOM)

Hybrid Building Blocks: (10 Minutes)

Alternative 1: Storm Surge (Garrett Avery, AECOM)

Alternative 2: Stormwater (Lulu Loquidis, AECOM)

Building the Hybrid (Garrett Avery, AECOM, 10 Minutes)

Initial Ideas (Garrett Avery & Lulu Loquidis, AECOM, 20 Minutes)

Next Steps & Q&A/Closure (20 Minutes)

Next Steps (Chris Benosky, AECOM)

Question and Answers
AGENDA

- Welcome
- The Meadowlands Challenge
- Concept Review
  - Alternative 1
  - Alternative 2
- Building the Hybrid
  - Development Process
  - Initial Ideas
  - Building Blocks
- Next Steps
- Question & Answer

Christopher Benosky, AECOM
THE MEADOWLANDS CHALLENGE

CHALLENGE 1: STORM SURGE FLOODING

FACTOR: LOW-LYING ELEVATIONS
THE MEADOWLANDS CHALLENGE

CHALLENGE 2: FREQUENT RAIN STORMS FLOOD INTERIOR

FACTOR: UNDERSIZED & UNDERPERFORMING INTERIOR DRAINAGE
THE MEADOWLANDS CHALLENGE

FACTOR: INFRASTRUCTURE CHALLENGED TO PUMP & PROTECT

THE MEADOWLANDS CHALLENGE

PROJECT STRATEGY: DEVELOP 3 BUILD ALTERNATIVES

Alternative 1:
Storm Surge Flooding

Alternative 2:
Stormwater Flooding

Alternative 3:
Storm Surge & Stormwater Flooding
HYBRID BUILDING BLOCKS

ALTERNATIVE 1: STORM SURGE FLOODING

GARRETT AVERY, AECOM

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

The ecological systems are essential to the Meadowlands. The approach will minimize disturbance, consider habitat improvements to fragmented systems, and creation of new ecological zones.

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

APPROACH & GOALS

FILL THE GAPS // MAXIMIZE PROTECTION

PROTECT

INTEGRATE ECOLOGICAL SOLUTIONS

CULTIVATE

LEVERAGE PUBLIC LAND

ENERGIZE
HYBRID BUILDING BLOCKS // STORM SURGE
CONCEPTS CONSIDERED DURING SECOND SCREENING

- 11 Alignment Tie-In options were presented at CAG Meeting #6
- 7 Alignment Tie-In options were presented at CAG Meeting #8

SCREENING RESULTS: SELECTED LINE OF PROTECTION

Selected Line of Protection:
- Northeast Tie-In Option 3
- Southeast Tie-In Option 2
- Berry’s Creek Option 1
HYBRID BUILDING BLOCKS // STORM SURGE
PROTECTION TO A ~50 YEAR STORM

 Alignment shown as a continuous line for illustrative clarity.

Built components only occur where land falls below 7ft elevation (NAVD88)

HYBRID BUILDING BLOCKS
ALTERNATIVE 2: STORMWATER
LULU LOQUIDIS, AECOM
Through deepening and regrading, the existing channels of the project area will have capacity to convey stormwater away from flood-prone areas.

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

The creation of new public parks creates more opportunities for gathering and recreation. The public realm is enhanced by providing landscape and park improvements to existing public parks, municipal buildings, schools yards, and libraries.

**Approach & Goals**

**Improve Channels**

**Protect**

**Create Habitat // Filter Pollutants**

**Cultivate**

**Re-energize the Public Realm**

**Energize**

**Hybrid Building Blocks // Stormwater**

**Alternative 2: Screening From 7**

- Main Street
- DePeyster Creek
- Losen Slote
- Carol Place
- East Riser
- West Riser
- Main Street + East Riser Extension
Components of the 7 original concepts under consideration:

1. Main Street Green Features
   - Fluvial Park
   - Riverside Park
   - Willow Lake GI
   - Street GI

2. DePeyster Features
   - New Pump Station
   - Channel Improvements
   - Open Space
   - Street GI

3. Losen Slole Features
   - New Pump Station
   - Force Main
   - Municipal & School Improvements

4. Carol Place Features
   - Open Space
   - Street GI

5. East Riser Features
   - New Pump Station
   - Open Space
   - Channel Improvements

BUILDING THE HYBRID
INTEGRATING STORM SURGE FLOOD REDUCTION AND STORMWATER DRAINAGE IMPROVEMENTS
GARRETT AVERY, AECOM
BUILDING THE HYBRID
CONSIDERATIONS

Performance
Testing concepts throughout development with hydraulic model to better understand and optimize performance.

Screening
The Hybrid is being developed from components previously assessed and screened under Alt 1 or Alt 2.
For Alternative 3, criteria such as 'Ability to Complete Project by 2022' take on new meaning.

Future Plan
Once performance modeling and screening are complete, system function will guide a project build plan.
Components that aren’t selected for the build plan could become elements of a Future Plan, which could be implemented by others over time as new funding sources become available.

BUILDING THE HYBRID
PERFORMANCE // CHANNELS & PARKS

ALTERNATIVE 1
Rain gardens catch on site run-off from sports field, as well as street run-off

ALTERNATIVE 2

1. STREET GREEN INFRASTRUCTURE
Rain gardens filter and slow down stormwater before it runs into the Berry’s Creek hydrologic system

2. PARK GREEN INFRASTRUCTURE
Rain gardens catch on site run-off from sports field, as well as street run-off

3. IMPROVED CHANNELS
Deepening and widening will improve capacity to convey stormwater away from flood-prone areas

4. PUMP STATION
Will increase water moves from improved channel through Berry’s Creek, and past surge barrier

1. BERRY’S CREEK SURGE BARRIER
Protects from coastal storm surge when needed while allowing Berry’s Creek to flow normally at other times
**BUILDING THE HYBRID**

**BENEFITS // CHANNELS & PARKS**

1. **BERRY'S CREEK SURGE BARRIER**
   - Protects from coastal storm surge when needed while allowing Berry's Creek to flow normally at other times.

2. **GREEN INFRASTRUCTURE**
   - Rain gardens and native plantings at the park provide a new ecological area between Teterboro Airport and Berry's Creek.

3. **PROTECT**
   - Provides much needed passive and active recreation for communities along Moonachie Ave.

4. **PUMP STATION**
   - Assists in rainfall conveyance through low-lying and flat areas.

5. **WETLANDS**
   - Planted berms and wetlands at the channel edge provide new habitat and integrate native vegetation.

**BUILDING THE HYBRID**

**PERFORMANCE // RIVER’S EDGE & NEIGHBORHOODS**

1. **CANTILEVER WALKWAY**
   - Provides protection from coastal storm surge along the Hackensack River.

2. **RIVERSIDE PARK**
   - The runoff from the surrounding open space and path system flows into a series of bioswales at the park’s edges.

3. **OUTFALL**
   - Outfall at cantilever is fitted with back flow prevention.

4. **RAIN GARDENS**
   - Rain gardens at Willow Lake intercept storm water from open lawn before it reaches the lake, increasing storage capacity.

5. **PUMP STATION**
   - Stormwater is pumped from Willow lake back into the sewer system.

6. **WILLOW LAKE**
   - Acts as a storage basin for stormwater overflow.

7. **RAIN GARDENS**
   - Rain gardens filter and slow down stormwater before it reaches the sewer system.

**ALTERNATIVE 1**

**ALTERNATIVE 2**
BUILDING THE HYBRID
BENEFITS // RIVER’S EDGE & NEIGHBORHOODS

1. CANTILEVER WALKWAY
   Provides protection from coastal storm surge along the Hackensack River

2. NEW OPEN SPACE
   A new public park along the Hackensack River featuring native plantings, open space, and landforms that allow parkgoers to see the river beyond the cantilever

3. RIVERFRONT ACCESS
   Creates publicly accessible riverfront with additional width for seating and planting amenities

4. RECREATION
   Opportunities for passive and active recreation within new open space

5. GREEN INFRASTRUCTURE
   Willow lake is enhanced with rain gardens and berms that are planted in a native palette. The majority of the park’s existing open space is maintained

6. PUMP STATION + GREY INFRASTRUCTURE
   Stormwater is pumped from Willow Lake into improved grey infrastructure with increased capacity for flood prevention

7. GREEN INFRASTRUCTURE
   Planted with native plantings, providing micro habitat zones and natural beauty

INITIAL IDEAS
CONNECTING THE BUILDING BLOCKS
GARRETT AVERY & LULU LOQUIDIS, AECOM
BUILDING THE HYBRID
FIXED & FLEXIBLE

**Fixed: Alt 1**
- Protection height at 7’ elevation
- Alignment functions as a complete system
- Footprint remains the same with integrated public realm strategies

**Flexible: Alt 2**
- Stormwater strategies function together as one complete system and individually as an single improvement
- Concepts can be broken into smaller projects based on system performance
- Costs vary by system configuration

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BUILDING THE HYBRID
CHANNEL FOCUS CONCEPT

Maximize ecological and conveyance capacity along channels and public realm integration along structural protection corridors.
BUILDING THE HYBRID CHANNEL FOCUS CONCEPT

FEATURES INCLUDED

Alternative 1:
1. Hackensack Alignment
2. Surge Barrier @ Berry’s Creek

Alternative 2:
1. All Main Street Green Features
2. DePeyster Creek Open Space
3. Upper Losen Slote
4. Avanti Park
5. East Riser Ditch Extension
6. Caesar Place
7. Green Infrastructure Street Improvements
8. West Riser Extension

HYBRID BUILDING BLOCKS // STORMWATER STRATEGIES: CHANNELS

- PROTECT
- CULTIVATE
- ENERGIZE
HYBRID BUILDING BLOCKS // CHANNELS

ILLUSTRATIVE VIEW: EXISTING CHANNEL CONDITION

CURRENT

HYBRID BUILDING BLOCKS // CHANNELS

ILLUSTRATIVE VIEW: PROPOSE CHANNEL IMPROVEMENTS

PROPOSED
HYBRID BUILDING BLOCKS // STORMWATER

STRATEGIES: EQUIPMENT

- Landscape Buffer
- Access and Maintenance
- Downstream Interceptor
- Pump Station
- Upstream Interceptor

ILLUSTRATIVE VIEW: TYPICAL STREET CONDITION

CURRENT
Hybrid Building Blocks // Equipment
Illustrative View: New Pump Station & Green Infrastructure

Building the Hybrid
Community Focus Concept

Focus benefits in the community cores with integrated access to the Hackensack River edge improvements.
BUILDING THE HYBRID
COMMUNITY FOCUS CONCEPT

FEATURES INCLUDED

Alternative 1:
1. Hackensack Alignment
2. Surge Barrier @ Berry’s Creek

Alternative 2:
1. All Main Street Green Features
2. All Main Street Grey Features
3. All Losen Slot
4. DePeyster Creek Open Space
5. Modified East Riser & Caesar Place Park
6. West Riser to Vincent Street

HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: GREEN INFRASTRUCTURE

PROTECT
CULTIVATE
ENERGIZE
HYBRID BUILDING BLOCKS // GREEN INFRASTRUCTURE
ILLUSTRATIVE VIEW: EXISTING SCHOOLS

[Image: Existing school building with green infrastructure in place]

HYBRID BUILDING BLOCKS // GREEN INFRASTRUCTURE
ILLUSTRATIVE VIEW: IMPLEMENTATION AT MUNICIPAL & SCHOOL BUILDINGS

[Image: Proposed school building with extensive green infrastructure, including playgrounds and gardens]
HYBRID BUILDING BLOCKS // STORMWATER
STRATEGIES: INFRASTRUCTURE

PUBLIC SIDEWALK

IMPROVED FORCE MAIN

ROADWAY

HYBRID BUILDING BLOCKS // INFRASTRUCTURE
ILLUSTRATIVE VIEW: EXISTING DEPEYSTER CREEK CONDITION

CURRENT
HYBRID BUILDING BLOCKS // INFRASTRUCTURE

ILLUSTRATIVE VIEW: PROPOSED IMPROVEMENTS AT DEPEYSTER CREEK

BUILDING THE HYBRID

COMPLETE SYSTEM CONCEPT

Incorporating all features, creating a network of flood reduction and stormwater management with connected green infrastructure, habitat improvements, and public parks.
BUILDING THE HYBRID COMPLETE SYSTEM CONCEPT

FEATURES INCLUDED

Alternative 1:
1. Hackensack Alignment
2. Surge Barrier @ Berry's Creek

Alternative 2:
1. All Main Street Green Features
2. All Main Street Grey Features
3. Upper Losen Slote
4. DePeyster Creek Open Space
5. Fresh Water Wetland
6. Avanti Park
7. East Rise Extension
8. Caesar Place Park
9. Green Infrastructure Street Improvements
10. Complete West Riser

HYBRID BUILDING BLOCKS // STORMWATER STRATEGIES: WETLAND CREATION
HYBRID BUILDING BLOCKS // STORMWATER STRATEGIES: PUBLIC REALM

HYBRID BUILDING BLOCKS // PUBLIC REALM
ILLUSTRATIVE VIEW: UNDEVELOPED LOT

CURRENT
HYBRID BUILDING BLOCKS // PUBLIC REALM
ILLUSTRATIVE VIEW: PROPOSED PARK

NEXT STEPS
CHRISTOPHER BENOSKY, AECOM
NJDEP / AECOM: UPCOMING ACTIVITIES

- Prepare Meeting Summary for CAG #10
- Continue developing and screening:
  - Hybrid Concepts, Alternatives, and Costs
- CAG #11 in September 2017
  - Alternative 1 – Structural Flood Reduction
  - Alternative 2 – Stormwater Drainage Improvements
  - Alternative 3 – Hybrid Alternative

CAG: CALL TO ACTION

- Submit comments from CAG #10 meeting by July 11, 2017
- Share information from this meeting with friends and neighbors
- Continue to build interest in the Project
- Ensure the public knows about upcoming information (to be posted on Project website)
NEXT STEPS

Critical Information

Project Website
www.rbd-meadowlands.nj.gov

Project Email
rbd-meadowlands@dep.nj.gov

Question & Answer

THANK YOU