Citizen Advisory Group (CAG) Meeting #5 // October 24, 2016

REBUILD BY DESIGN
MEADOWLANDS

FLOOD PROTECTION PROJECT
Boroughs of Little Ferry, Moonachie, Carlstadt, and Teterboro, and the Township of South Hackensack in Bergen County, New Jersey

CITIZEN ADVISORY GROUP (CAG) MEETING #5

ECOLOGY AND DRAINAGE BASIN OPPORTUNITY AREAS
AGENDA

Linda Fisher, NJDEP

- Welcome and Agenda
- Project Status Update & Schedule
- Project Process & Screening Criteria
- What We Learned from CAG #4 Meeting
- Project Area Ecology
- Drainage Basin Opportunity Areas
- Developed working draft Concept Screening Criteria
  - Updated based on CAG #3 meeting
- Completed and published to the project website
  - CAG #4 meeting minutes
  - September 2016 Newsletter
- Received additional input from CAG #4 meeting
- Developing the Preliminary Draft EIS
  - Conducting field work to support EIS and Feasibility Study
- Further developing the alternative conceptual ideas and locations
CAG SCHEDULE

MOVING FORWARD

CAG #5 TONIGHT
Focus on Alternative 2: Storm Water Drainage Improvements

CAG #6 DECEMBER
Focus on Alternative 1: Structural Flood Reduction

CAG #7 JANUARY
Focus on Alternative 3: Hybrid
SITE INVESTIGATION AND RESEARCH

CONCEPT DEVELOPMENT

SCREENING AND FEASIBILITY
### Screening Criteria

#### Comparative Concept Screening Metrics**

<table>
<thead>
<tr>
<th>Screening Criteria</th>
<th>Good (G)</th>
<th>Fair (F)</th>
<th>Poor (P)</th>
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<tr>
<td>Flood Risk Reduction</td>
<td>Provides the greatest relative reduction in future flood risk, as measured by annual flood damage reduction from coastal storm surge risk.</td>
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<td>Protects a moderate relative amount of critical infrastructure as compared to other concepts.</td>
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<tr>
<td>Effects to Existing Utilities &amp; Utility Infrastructure</td>
<td>Requires no or only limited modifications of existing utility infrastructure.</td>
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<td>Requires a large amount of modifications of existing utility infrastructure.</td>
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<tr>
<td>Effects to Existing Transportation Network, Local Traffic, and Connectivity</td>
<td>May result in land use improvements over the long term. Would not result in land use improvements over the long term.</td>
<td>May result in minor land use improvements over the long term. Would require no or only limited improvements to transportation infrastructure.</td>
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<tr>
<td>Potential to Provide Increased Waterfront Access</td>
<td>Includes features that would improve waterfront access within the Project Area.</td>
<td>Under certain conditions, includes features that would improve waterfront access within the Project Area.</td>
<td>Potential to provide increased waterfront access would be limited.</td>
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**Use of the terms “relative” or “relatively” indicates that concepts are compared to each other.

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**Screening process**

- How do we use the screening criteria to consolidate potential opportunity areas?
  - Identify potential opportunities and develop into concepts
  - Screen concepts using screening criteria
  - Not all opportunities/concepts will pass screening process

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**Sample of the screening criteria matrix**

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WHAT WE LEARNED FROM CAG #4 MEETING

Susan Bemis, AECOM
INVEST
- Address frequent flooding from rain fall events.
- Utilize the most immediate and cost efficient option(s) for protection from storm surges.

EXAMINE
- Potential water displacement towards neighboring communities.
- Holistic solution.

MAINTAIN
- Long-term maintenance of proposed project infrastructure is a concern: Who maintains and for how long?

DISCUSS AND CONSIDER
- Opportunities for private land acquisition during the concept development process.
ALTERNATIVE 1 - CAG #4 COMMENTS

WATERFRONT ACCESS
• Access to the Hackensack River needs to remain a priority.

PROTECTION OF WETLANDS
• Emphasize wetland and biological resources protection + enhancement.

MINIMIZE ENVIRONMENTAL IMPACTS
• Consider minimal footprints.

DEPLOYABLES
• Maintenance and operations of deployables are a concern.

PRIORITIZE FLOOD PROTECTION
• General interest in flood protection incorporated with public benefit, but flood protection is the main objective.
CURRENT SYSTEMS
• Improve current systems, including ditches and pipes.
• Potential to install backflow preventers.

CONSIDER VARIOUS ENGINEERING IMPROVEMENTS
• Green - rain gardens, permeable paving, bioswales, among other green infrastructure elements.
• Grey - pump stations, increase flow capacity of drainage basins, and detention basins.

OPEN SPACES
• Enhance the performance of existing open spaces.

NATURAL CONDITIONS
• Return developed areas to natural conditions and find opportunities for enhancement.
NO ADDITIONAL DEVELOPMENT
- Development has displaced natural habitat and systems.
- Improvements should not be used to generate or promote new development.

POLLUTION + CONTAMINATION
- Understand and consider pollution issues associated with Berry’s Creek.
- Consider a tide gate at Paterson Plank Road.

GREEN + GREY INFRASTRUCTURE
- Utilize a combination of both to get the most benefit.
SITE-SPECIFIC - CAG #4 COMMENTS

TETERBORO AIRPORT
Opportunity for green infrastructure at Teterboro Airport (upgrade of disturbed environments).

TETERBORO AIRPORT, WEST COMMERCIAL AVENUE
Bioswales and green infrastructure (south/east of the Teterboro Airport, West Commercial Avenue, southern end of the Project Area).

EAST AND WEST RISER
Prioritize the East and West Riser ditches for Berry’s Creek area, especially in consideration of the nearby mobile home communities.

PATERSON PLANK ROAD
Consider addition of a tide gate along Paterson Plank Road in the Berry’s Creek Zone.

TETERBORO FOREST, LOSEN SLOTE, WILLOW LAKE, VACANT LOTS
Utilize existing open spaces.

HACKENSACK RIVER EDGE
Potential for additional habitat creation, water storage, and water access.

MEHRHOF WETLAND ZONE
Area immediately north of Mehrhof pond wetland zone could be a good location for recreational paths.

LOSEN SLOTE
Large migratory bird area would benefit from enhancements such as widening.
PROJECT AREA ECOLOGY

John Rollino, AECOM
The Project Area contains natural areas surrounded by suburban, industrial, and commercial development. Several of these natural areas have not been intensively studied to date by others.

The ecological studies being conducted by AECOM will be used to support the NEPA analysis, regulatory agency consultations, and associated permitting.
PROJECT AREA ECOLOGY

PRELIMINARY DATA

- As part of the EIS, the field data collection will be supplemented with previous and ongoing studies (e.g., Fisheries Inventory of the Hackensack River, FAA Wildlife, etc.)

- Members of the project team have past experience conducting studies for the NJSEA (formerly HMDC) (e.g., Secaucus High School Site) and/or other multi-year studies (Empire Tract)

(Foreground) Birds and marshes along the Hackensack (Background) NJ Turnpike Bridge
• Biological resource studies (ongoing) include:
  
  - Habitat mapping and evaluation
  - Wetland delineation
  - Botanical inventories
  - Wildlife studies:
    - Avifauna (birds)
    - Benthic Invertebrates
    - Fish
    - Herptofauna (Reptiles and Amphibians)
    - Mammals
BIOLOGICAL RESOURCES: GOALS

PRELIMINARY DATA

- Categorize habitats, flora, and fauna, and conduct ecological evaluations in support of a NEPA-level analysis.

- Identify high-value ecological resources and provide input into planning process in order to minimize impacts to greatest extent possible.

- Identify and develop opportunities to increase ecologic value of the Project Area post project construction.

Scientists evaluate soil conditions in Little Ferry
Project Area ~5,800 acres.

~4,000 acres are commercial, industrial, and residential.

~1,800 acres are “natural areas” – parcels with vegetated communities.
Scientists traversed the Project Area on foot and identified “natural areas.”

Aerial images of the Project Area were used as a background on hand-held tablets.

Natural areas were sketched in tablets and inputed as a GIS file.

~ 400 habitat polygons and shoreline developments (~1,800 ac).

Each natural area was given an alpha-numeric code, based on its geographic location.
MAPPED DATA COLLECTION

PRELIMINARY DATA

- Other data collected for each natural area polygon included:
  - Dominant Habitat Type - wetland/upland/waterbody/etc.
    - Covertype – herbaceous, forested, deciduous, etc.
    - Ditch/drainage present/adjacent – Y/N
    - Disturbed – Y/N
    - Dominant species – species identified
    - Habitat Community – floodplain forest, urban woodlot, common reed marsh.

EPW mathematically scores wetlands on a number of functions (sediment stabilization, wildlife habitat, water quality, etc).

Through computation, scientists assess “health” of existing wetlands and calculate the “Functions and values” of mitigated wetlands.

Using site-specific information gathered from studies, habitats are being coded based on ecological value and function.
• Section 404 of the Federal Clean Water Act: Wetlands are “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

• Freshwater Wetlands: The “three parameter approach.” Wetlands under normal conditions have hydric soils; dominance of hydric vegetation; and presence of hydrology.

• Tidal Wetlands: Use elevation data too (e.g., Spring high tide line).
SOILS: UPLAND AND WETLAND

PRELIMINARY DATA

- Upland soils
  Note brown color, loose friable texture. Soils are dry.

- Wetland soils
  Note dark black color, mucky appearance, obvious saturation. Changes in soil are a result of anoxic conditions.

- Bog Iron

Soils cores taken less than 5 feet from each other at a site near Bellman's Creek.
During a wetland delineation, scientists note soil characteristics, hydrology, and vegetation. These observations allow for the delineation (i.e., delineated line) between uplands and wetlands.
WILDLIFE STUDIES

PRELIMINARY DATA

- Birds, reptiles/amphibians, fish, benthic invertebrates, and mammal studies occur seasonally (summer completed).

- Additional studies for birds – weekly during summer, fall, and spring. Specialized nesting study in spring.

- Other specialized studies – vernal pools, nocturnal species/activity, game cameras.

Indian Lake, Little Ferry, NJ
At 10 locations throughout the Project Area, scientists conduct morning and/or evening studies.

All birds sighted are counted. Activity is noted, as well as direction and distance from scientist.

Data allows for the creation of a spherical histogram to be overlaid on habitat mapping data to determine site usage.
BIRDS

PRELIMINARY DATA

- To date, over 70 bird species identified.

- Majority of sightings were very common species: European starlings, mourning dove, ring-billed gull.

- Habitats in which birds sighted:
  - 7.07% Open Water
  - 19.87% Structure
  - 21.80% Upland
  - 51.33% Wetland

Double-crested cormorant flying above Hackensack River
### BIRDS

#### PRELIMINARY DATA

<table>
<thead>
<tr>
<th>American Crow</th>
<th>Carolina Wren</th>
<th>Great Blue Heron</th>
<th>Northern Flicker</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Goldfinch</td>
<td>Cedar Waxwing</td>
<td>Great Egret</td>
<td>Northern Harrier</td>
</tr>
<tr>
<td>American Kestrel</td>
<td>Chimney Swift</td>
<td>Herring Gull</td>
<td>Northern Mockingbird</td>
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<td>American Redstart</td>
<td>Common Grackle</td>
<td>House Finch</td>
<td>Osprey</td>
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<td>American Robin</td>
<td>Common Yellowthroat</td>
<td>House Sparrow</td>
<td>Ovenbird</td>
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<td>American Tree Sparrow</td>
<td>Domestic Goose</td>
<td>Killdeer</td>
<td>Palm Warbler</td>
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<td>Bald Eagle</td>
<td>Double-crested Cormorant</td>
<td>King Bird</td>
<td>Peregrine Falcon</td>
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<td>Barn Swallow</td>
<td>Downey Woodpecker</td>
<td>Lesser Yellow Legs</td>
<td>Red Tail Hawk</td>
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<td>Belted Kingfisher</td>
<td>Eastern Pheobe</td>
<td>Little Blue Heron</td>
<td>Red Winged Blackbird</td>
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<tr>
<td>Blue Jay</td>
<td>European Starling</td>
<td>Mallard</td>
<td>Red-bellied Woodpecker</td>
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<tr>
<td>Brown-headed Cowbird</td>
<td>Field Sparrow</td>
<td>Marsh Wren</td>
<td>Ring-billed Gull</td>
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<tr>
<td>Bufflehead</td>
<td>Fish Crow</td>
<td>Mourning Dove</td>
<td>Rock Dove</td>
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<tr>
<td>Canada Goose</td>
<td>Gray Catbird</td>
<td>Northern Cardinal</td>
<td>Rufous-sided Towhee</td>
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<tr>
<td>Carolina Chickedee</td>
<td>Great Black-backed Gull</td>
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<td>Sandpiper sp.</td>
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<td>Sharp-shinned hawk</td>
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<td>Snowy Egret</td>
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<td>Song Sparrow</td>
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<td>Sparrow sp.</td>
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<td>Spotted Sandpiper</td>
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<td>Swallow sp.</td>
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<td>Tree Swallow</td>
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<td>Water Thrush</td>
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<td></td>
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<td></td>
<td>White-breasted Nuthatch</td>
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<td>Wood Duck</td>
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<td>Yellow Rumped Warbler</td>
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<td>Yellow Warbler</td>
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<tr>
<td></td>
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<td></td>
<td>Yellow Throated Warbler</td>
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FISH AND BENTHIC INVERTEBRATES

PRELIMINARY DATA

- Sampled from 9 different locations in the Project Area using fish traps.
- Fish identified to date include: bluegill, pumpkinseed, catfish, carp, goldfish, mummichogs, and mosquitofish.
- Species common to disturbed environments.

Minnow traps in Losen Slote headwater

Mummichog
MAMMALS

PRELIMINARY DATA

- Mammals surveyed through game cameras, presence identification (tracks and scat), nocturnal surveys, and (soon) snow tracking.

- Mammal survey locations occur throughout Project Area in a variety of representative habitats.

- Bats studied with night vision scopes, meters, and ultrasonic microphones that capture bat echolocations.

- Game cameras stationed throughout the Project Area in a variety of habitats.

Skunk captured on infrared game camera near River Barge Park in the southern portion of the study area.
<table>
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<td>Opossum (Didelphis virginiana)</td>
</tr>
<tr>
<td>Cat (Felis silvestris catus)</td>
<td>Rabbit (Sylvilagus floridanus)</td>
</tr>
<tr>
<td>Chipmunk, unknown species</td>
<td>Raccoon (Procyon lotor)</td>
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<td>Grey Squirrel (Sciurus carolinensis)</td>
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<td>Red Fox (Vulpes vulpes)</td>
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<td>Little Brown Bat (Myotis lucifugus)</td>
<td>Skunk (Mephitis mephitis)</td>
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<td>Muskrat (Ondatra zibethicus)</td>
<td>White-tailed Deer (Odocoileus virginianus)</td>
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MAMMALS

PRELIMINARY DATA

- Using a meter with ultrasonic microphone, scientists record bat echolocations.
- Analyzing timing, kHz, and other factors, scientists can identify what species are present in an area.
ECOLOGICAL ENHANCEMENT

PRELIMINARY DATA

- Using existing data collected to identify potential areas to avoid and enhance.

- Using ecological value calculation methods (e.g., EPW, IVA, etc.) and other metrics, it is possible to quantify impacts and ensure that enhancement would provide a net ecological benefit.

BEFORE

AFTER

Forested Mitigation Area, Duke Farms, Hillsborough, NJ
PRELIMINARY CONCLUSIONS

John Rollino, AECOM

- Many Project Area habitats are home to invasive species and other stressors.

- Studies to date have shown aquatic fauna affected by contamination south of Moonachie Ave.

- Many small waterways are polluted and stressed, often due to previous engineering projects and efforts.

- To date, data has shown that developed industrial / commercial areas have limited ecological value to fauna.
• The Proposed Project presents a unique opportunity to reduce flooding and simultaneously improve habitat values and functions.

• Improvements could include, but are not limited to:
  - New marshes along the Hackensack
  - Upgrades of streams – daylighting, select plantings, fish habitat improvements.
  - Invasive species removal.
DRAINAGE BASIN OPPORTUNITY AREAS

Michael Vecchio, HDR
How do we use the screening criteria to consolidate potential opportunity areas?

- Identify potential opportunities and develop into concepts
- Screen concepts using screening criteria
- Not all opportunities/concepts will pass screening process
EXISTING STORM WATER ISSUE
impervious paving, insufficient pipe and pump capacity leads to flooding

STORM WATER SOLUTION
collect, slow down, infiltrate, re-use and store storm water before discharging to the river
KIT OF PARTS:
MOVING FROM STRATEGY TO OPPORTUNITY

OPEN SPACE

BIOSWALE

WETLAND ENHANCEMENT/CREATION

BIORETENTION

FILTER STRIP

PERMEABLE PAVING

RUNNEL

RAIN GARDEN

BIKEABLE STREETS

WIDENING DITCHES

Michael Vecchio, HDR
• Zones represent distinct sub-basins within the Project Area.
• Identify storm water management strategies within watershed and zones:
  • Grey Infrastructure
  • Green Infrastructure
How is water moving and being captured within each sub-basin?
DRAINAGE SUB-BASIN ZONES

ZONE A
West Riser Ditch + Berry's Creek

ZONE B
East Riser Ditch

ZONE C
Losen Slote

ZONE D
DePeyster Creek + Main Street Ditch

ZONE E
Carol Place Ditch + Moonachie Creek + Peach Island Creek
DRAINAGE SUB-BASIN ZONE A

POTENTIAL OPPORTUNITIES

- West Riser dredging
- West Riser Tide Gate and Pump Station
- Access for O&M
- Green streets
- East Riser dredging
- East Riser Tide Gate
- Pump Station
- East Riser Tide Gate upgrade
- Off-channel storage
• Losen Slote outfall backflow prevention
• Losen Slote dredging
• Storm sewer capacity upgrades
**POTENTIAL OPPORTUNITIES**

- Depeyster Creek Pump Station upgrade and Willow Lake
- Storm sewer capacity upgrades
- Main Street conveyance
- Backflow protection on Hackensack
- Storm sewer capacity upgrades
- Interior pump stations
- Pump station upstream of Peach Island Creek Tide Gate
- Upgrade of Peach Island Creek Tide Gate
WHAT COULD THESE LOOK LIKE?

Susan Bemis, AECOM
Citizen Advisory Group (CAG) Meeting #5 / October 24, 2016

REBUILD BY DESIGN MEADOWLANDS

OPEN SPACE + HABITAT IMPROVEMENTS

CAESAR PLACE ILLUSTRATIVE EXAMPLE

Susan Bemis, AECOM

**WETLAND CREATION**
Through grading and wetland planting, existing upland is transformed into wetland

**WETLAND ENHANCEMENT**
With minimal re-grading and native plantings, existing west Riser Ditch and low-quality wetlands are improved to filter and store more storm water

**BOARDWALK**
Accessible walkway allows for contiguous wetland and storm water system beneath

KEY MAP
OPEN SPACE IMPROVEMENTS

FLUVIAL PARK ILLUSTRATIVE EXAMPLE

Susan Bemis, AECOM

PERMEABLE PAVING
Gravel paving absorbs storm water

BIOSWALES
Filters 60-90% of suspended solids and prevents water from overflowing sewer systems

BIORETENTION
Filters 80-90% of suspended solids and slows flow of storm water into sewer systems

WETLAND CREATION
Native ecological habitat and storm water infiltration
DITCH IMPROVEMENTS

EAST RISER ILLUSTRATIVE EXAMPLE

**FILTER STRIP**
Native plantings uptake pollutants before entry into water systems

**BIORETENTION**
Filters 80-90% of suspended solids and slows flow of storm water into combined sewer systems

**DITCH WIDENING**
Maximizes ecological opportunity and storm water conveyance to larger watershed

**GRAVEL TRENCH**
Provides initial infiltration of road runoff before overflow into ecologically improved ditch

Susan Bemis, AECOM
STREET IMPROVEMENTS

MAIN STREET ILLUSTRATIVE EXAMPLE

- OPEN SPACE: Absorbs more storm water
- NATIVE PLANTS: Low-maintenance options that contribute to native ecological systems
- RAIN GARDENS: Filters 60-90% of suspended solids and prevents water from overflowing sewer systems
- PERFORATED PIPE: Drains storm water overflow during larger rain events
- PERMEABLE PAVING: Absorbs storm water and serves as place-making for Main Street

Susan Bemis, AECOM
CURB CUT
Allows infiltration of road runoff into adjacent bioswales while maintaining the safety of raised curbs

BIOSWALEs
Filters 60-90% of suspended solids and prevents water from overflowing sewer systems

OPEN SPACE
Absorbs more storm water
NEXT STEPS

Chris Benosky, AECOM
NEXT STEPS

NJDEP / AECOM
UPCOMING ACTIVITIES

• Prepare Meeting Summary for CAG #5 meeting
• Continue developing:
  • Initial Alternatives and Concepts
  • Preliminary Draft EIS
**NEXT STEPS**

**CAG CALL TO ACTION**

- Review and comment on Meeting Summary for CAG #5 meeting.
- Share information from this meeting with friends and neighbors.
- Educate your friends and colleagues on the Project and NEPA process.
- Continue to build interest in the Project.
- Continue obtaining information, ideas, and potential concerns from constituents.
- Ensure the public knows about upcoming information (to be posted on Project website).
NEXT STEPS

CRITICAL INFORMATION

TUESDAY DECEMBER 6TH
CAG MEETING #6

PROJECT WEBSITE
WWW.RBD-MEADOWLANDS.NJ.GOV

PROJECT EMAIL
RBD-MEADOWLANDS@DEP.NJ.GOV

Q&A
THANK YOU!