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New York Department of Environmental Conservation
NYC Mayor's Office of Recovery & Resiliency

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PUBLIC INFORMATION MEETING

East Rockaway to Rockaway Inlet and Jamaica Bay Reformulation Study

Revised Draft General Reevaluation Report & Environmental Impact Statement

Jamaica Bay, facing South from Brooklyn towards the Bay, Rockaway Peninsula, and Atlantic Ocean. Source: Boating Times Long Island, Photo by Jim Mobel

MEETING PURPOSE: Public Meeting for Review of Revised Draft Report and EIS

Welcome & Poster Session: 6:00 p.m. – 6:30 p.m.
Presentation: 6:30 p.m. – 7:00 p.m.
Comments, Questions, and Discussion: 7:00 p.m. – 7:45 p.m.
Second Poster Session & Wrap Up: 7:45 p.m. – 8:15 p.m.

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PUBLIC INFORMATION MEETING

Meeting Purpose

The National Environmental Policy Act (NEPA) provides for public involvement and ensures that public officials consider the environmental effects of proposed actions and alternatives in order to foster better decision- making. **The purpose of this meeting is to present information contained in the Rockaway Inlet to East Rockaway Inlet and Jamaica Bay, Coastal Storm Risk Management, Revised Draft General Reevaluation Report & Draft Environmental Impact Statement. The documents are available at:**

http://www.nan.usace.army.mil/Rockaway

The public comment period opened August 31st and ends October 22, 2018

Comments received will assist in the agency's evaluation of the project and will be reflected in the project record.

For information about the project please contact:
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Send Comments to:
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Project Biologist
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Rockaways History of Coastal Projects

- State & City Projects constructed 1927 – 1975
  - Over 12 Million CY of sand placed
  - Several hundred groins built, stone and wood
- Joint Corps, State, City Project 1975 - 2012
  - Approximately 19 Million CY of sand placed
  - Terminal groin constructed (1979)

Before and After
Initial Construction 1975

Corps Project (Authorized in 1965)

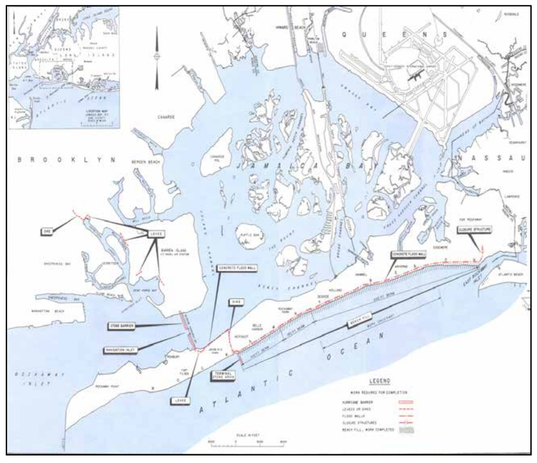
Beach Erosion Control and Hurricane Protection Project

Beach Erosion Control Features:

- Beach Berm at +10 ft MSL, up to 200 ft wide, length - 6 miles
- 5 M CY of sand placed for initial construction
- Renourished for a period of 10 years, each of 1M CY

Hurricane Protection Features:

- Hurricane Barrier w/ Navigation gate across Rockaway Inlet
- Floodwall at +18 ft MSL, for 7.7 miles along Rockaway



Authorized Project

Corps Construction

1974 Corps authorized separate construction of “beach erosion control” portion plus 10-years of renourishment

Constructed in 1975-1977

Terminal groin added at Beach 149th Street in 1979

Project Renourished through 1987

“Hurricane Protection Features” were de-authorized by Congress

In 1993, approved to extend renourishment

Renourishment undertaken in 1996, 2000, 2004

Constructed Project Cross-Section

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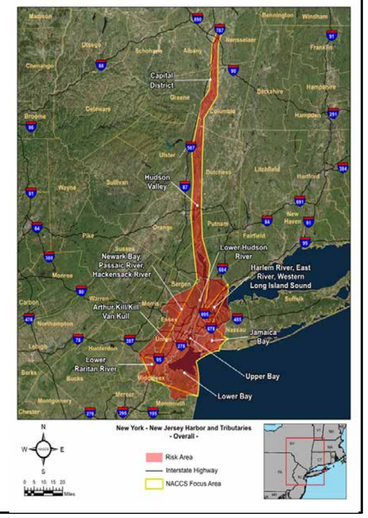
Post-Sandy Projects

The Corps has worked with partners in NYC and New York State to build a robust coastal storm risk management project along the Atlantic Coast of Rockaway

- **3.5 million cubic yards of sand placed**
- More than 6 miles of beach widened and elevated
- City-funded betterment incorporated to elevate berm to provide additional risk reduction
- City’s dune grass planting efforts further strengthen project
- **More coastal storm risk management than has ever existed in Rockaway**

New York/New Jersey Harbor & Tributaries Study (NYNJHATS)

- The Rockaways are within the NYNJHATS study area, which is one of the 9 high-risk focus areas identified in the North Atlantic Coast Comprehensive Study (NACCS)
- Study is investigating comprehensive coastal storm risk management alternatives for the region.
- **Further analysis and potential recommendation of the proposed Rockaway storm surge gate will be performed under NYNJHATS**



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Recommended Plan

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Initial Cost	Initial Construction - Shorefront	$220,988,000
	Initial Construction - HFFRRF	$210,179,000
	Interest During Construction	$12,312,000
	Investment Cost	$443,479,000
Annualized Cost	Total Initial Construction	$16,427,000
	Renourishment (Planned/Emergency)	$7,666,000
	O&M	$1,652,000
	Major Rehab	$332,000
	SLR Adaptation	$2,288,000
	Total Annual Cost	$28,365,000
Benefits	Shorefront Damage Reduced	$14,972,000
	Cost Avoided (Emergency Nourishment)	$1,266,000
	Shorefront Benefit (Reduced Damage Plus Cost Avoided)	$16,238,000
	Cross-Shore Flood Damage Reduced	$12,848,000
	HFFRRF Damage Reduced	$27,889,990
	Total Storm Damage Reduction Benefits	$56,975,990
	Recreation Benefits	$29,430,000
	Total Benefits	$86,405,990
BCR		3.0

Changes Since the Tentatively Selected Plan (TSP)

- Comments received on the Draft Hurricane Sandy GRR/EIS largely called for 1) expediting construction to address vulnerability after Sandy, 2) more analysis of the proposed storm surge barrier, and 3) more refinement of what *natural and nature-based features* would be included for Jamaica Bay.
- The project has been expedited to cut a year off of the schedule in order to start construction in 2019
- Storm surge barrier will be further analyzed under a separate study—the NYNJHATS study—which was initiated around the time that the 2016 Draft Rockaway Integrated Report was released to the public
- The NYNJHATS study is looking at coastal flood risk from a broader regional perspective, including an alternative which would obviate the need for the Rockaway barrier. Moving the barrier to the NYNJHATS study allows for the components of the Rockaway Reformulation which are implementable under the Hurricane Sandy Recovery Act to move forward while the barrier, which would have needed additional money and authority from Congress to implement, can be further analyzed
- Residual risk component refined into *High Frequency Flooding Risk Reduction Features* (HFFRRFs) including **five *natural and nature-based features* in Jamaica Bay.** Full analysis was done on all at-risk communities in and around Jamaica Bay, including Nassau County, and those which met the Corps' standards for economic justification were included in the Recommended Plan.

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Recommended High Frequency Flooding Risk Reduction Features

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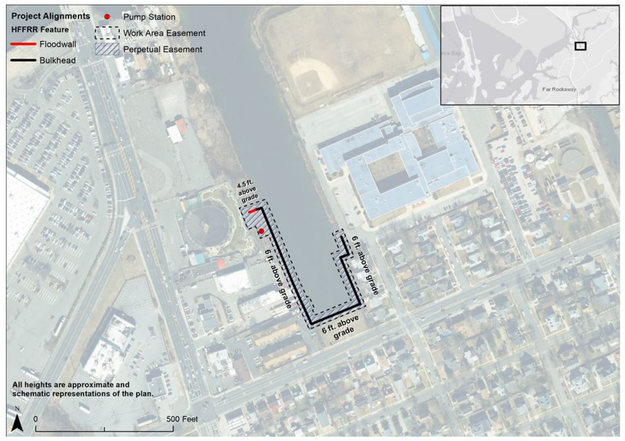
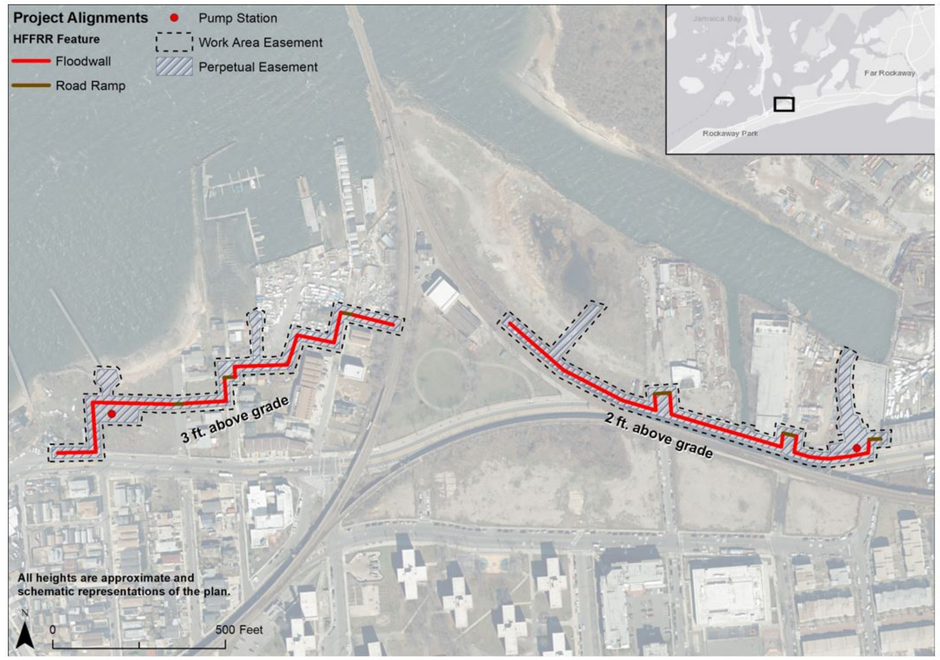


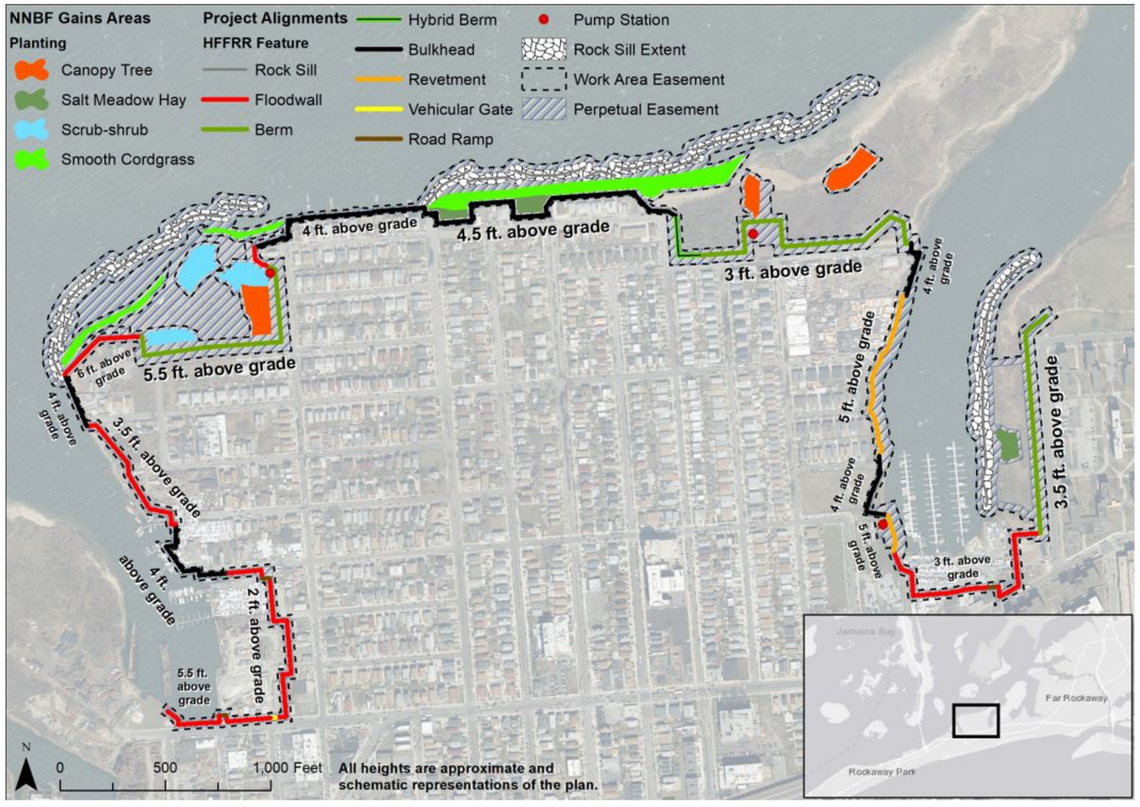
Cedarhurst-Lawrence Project Plan

Motts Basin North Project Plan

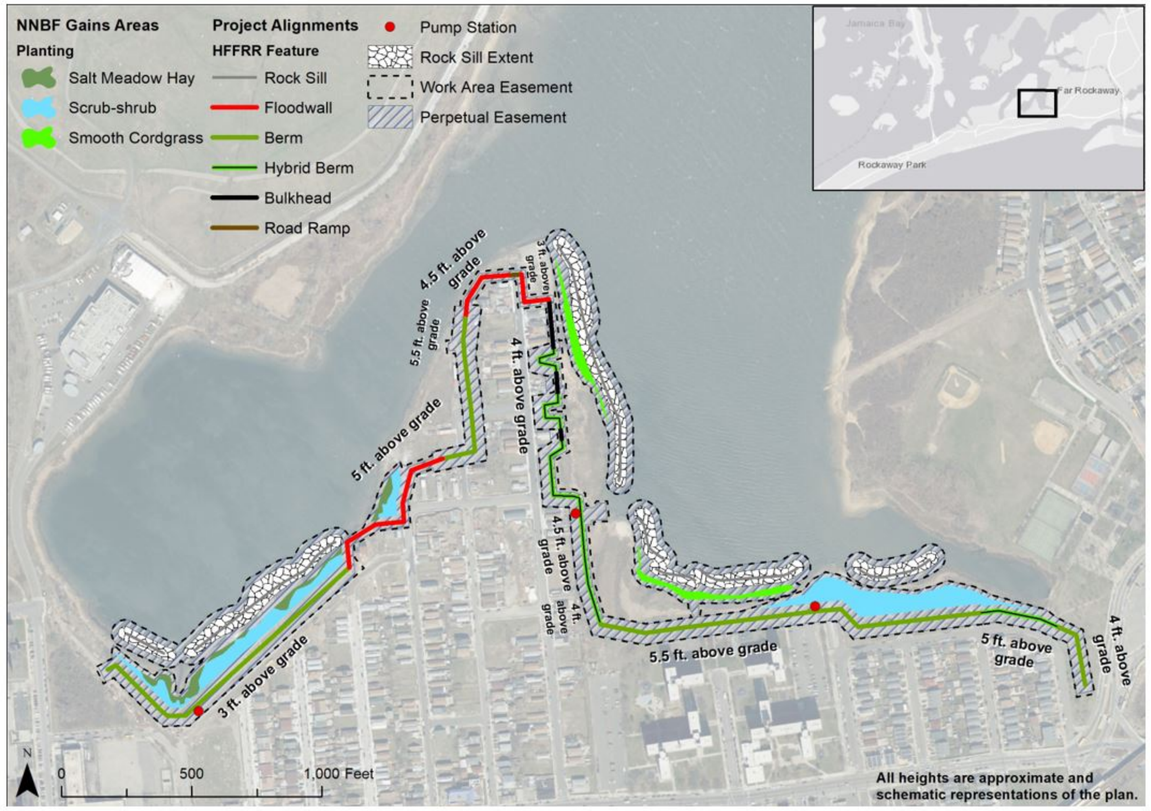
Site	Cost	BCR
Mid-Rockaway	$222,508,000	1.3
Cedarhurst-Lawrence	$15,790,000	7.7
Motts Basin North	$3,160,000	1.0



Mid-Rockaway – Hammels Area Project Plan



Mid-Rockaway – Arverne Area Project Plan



Mid-Rockaway – Edgemere Area Project Plan

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High Frequency Flooding Risk Reduction Features

Natural and Nature-Based Features (NNBFs)

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Proposed Jamaica Bay NNBFs in the Revised Recommended Plan

- In-water stone toe protection and rock sill to attenuate waves and allow tidal marsh establishment.
- Restoration and establishment of high and low tidal marsh habitat
- Restoration of maritime forest

Benefits

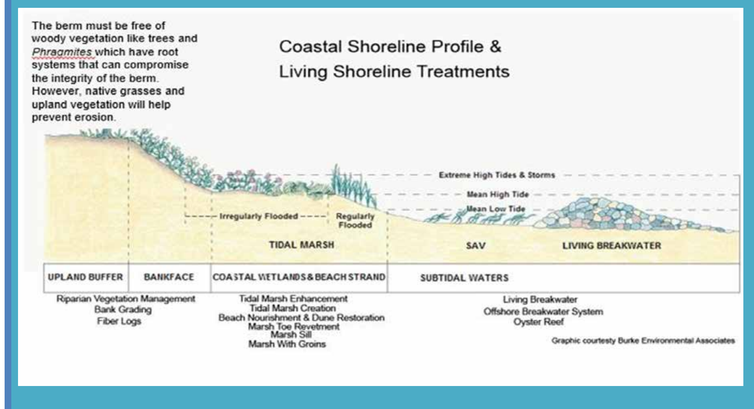
- Resilient to high frequency flooding and coastal storms
- Wave energy attenuation
- Improved coastal habitat
- Erosion control
- Sea level rise adaptability
- Storm water filtration
- Sediment retention
- Enhance aesthetics

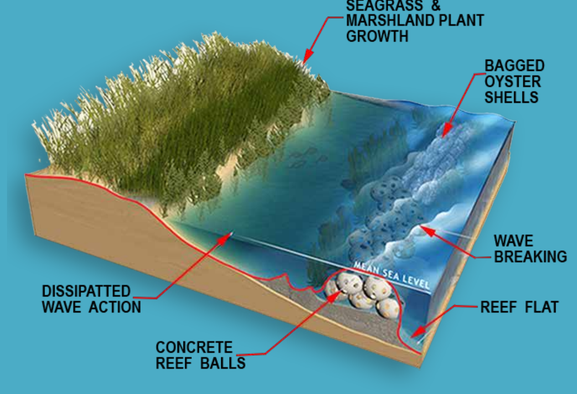
Shoreline Comparison : North Carolina Bay

Hurricane Irene caused some significant damage to back-barrier In North Carolina. This is a picture of one of a bulkhead site and a living shoreline site that are approximately 50 m apart along the same shoreline. The photos are one year before and immediately after Irene. The marsh had just been planted at the living shoreline site in the before photo. The water levels were still high when the after photos were taken. The bulkhead collapsed completely and the living shoreline had no observable damage, nor any change in shore elevation.

Source: Gittman et al. 2014 *Ocean & Coastal Management*

NNBF Conceptual Diagram





Source: ERDC, 2015, available at: https://ewn.el.erdc.dren.mil/nnbf/other/5_ERDC-NNBF_Brochure.pdf

A Local Example: Hunt's Point Landing – Bronx, NY

Hunt's Point Landing shoreline before installation of nature based features. Photo looking southwest.

Aerial image of project site from June, 2010, before project implementation.

As part of the NYC Economic Development Corporation South Bronx Greenway, this ecological restoration project removed degraded industrial features, restored salt water habitat, improved stormwater treatment, and increased public access to the water. NNBFs used include establishment of high and low tidal marsh protected by in-water stone toe protection and rock sills

Project design diagram

Hunt's Point Landing shoreline and park after the installation of nature based features. Photo looking west from new pier.

Aerial image of project site from October 2014, after project implementation.

Source: HRNERR, undated, available at: https://www.hrnerr.org/doc?doc=240203620

Sediment Modeling Results

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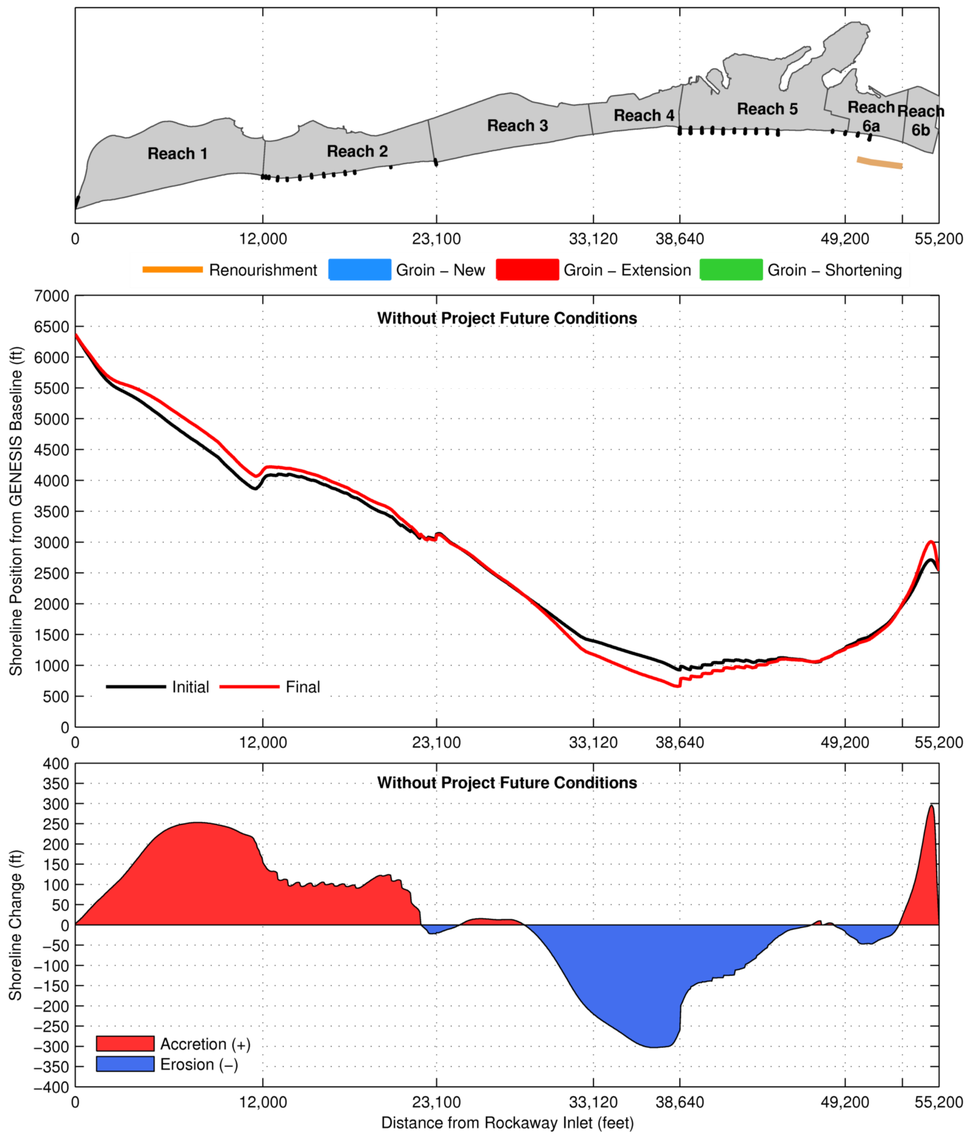
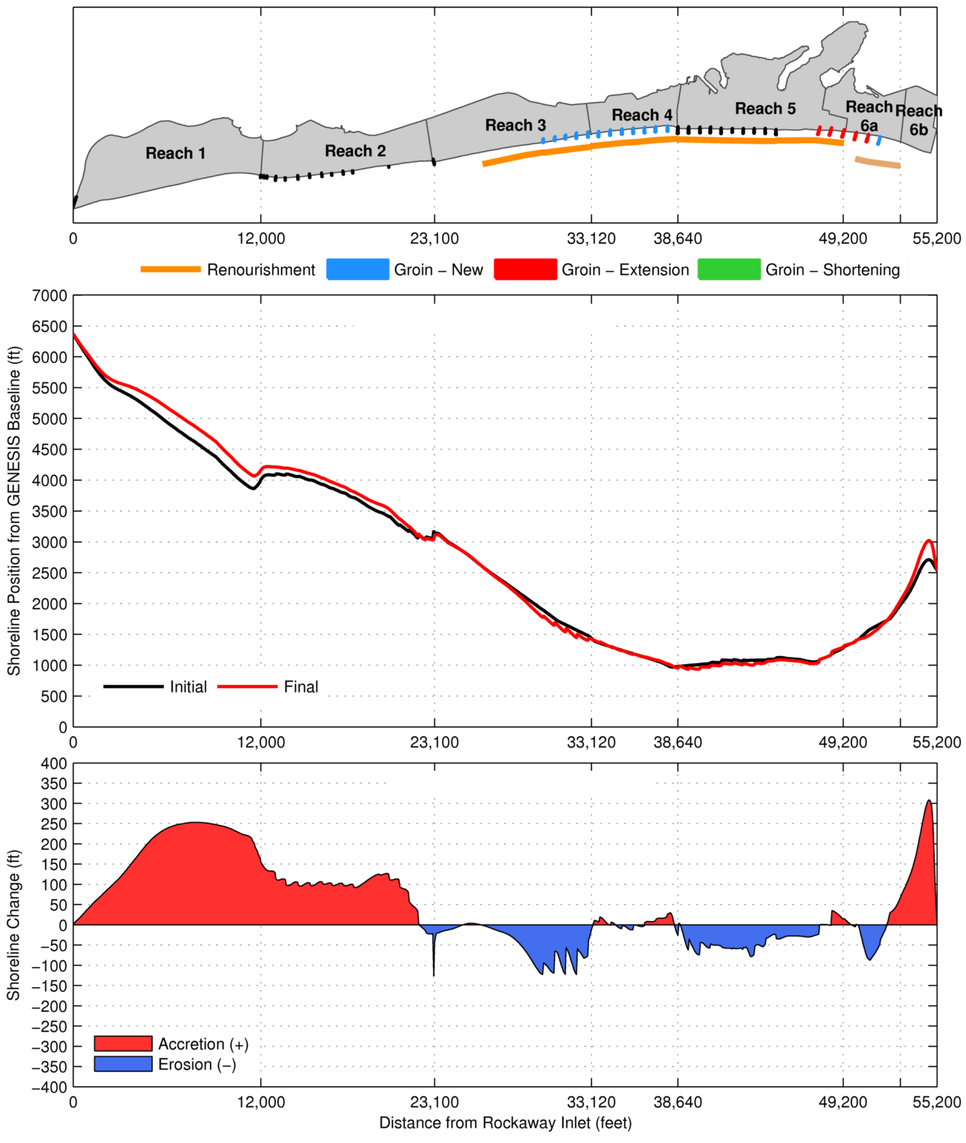
Modeled Shoreline Change: Future Without Project Conditions



Modeled Shoreline Change: Recommended Plan



Reach Number	Boundaries
Reach 1	Rockaway Point to Beach 193rd St.
Reach 2	Beach 193rd St. to Beach 149th St.
Reach 3	Beach 149th St.to Beach 109th St.
Reach 4	Beach 109th St. to Beach 86th St.
Reach 5	Beach 86th St. to Beach 42nd St.
Reach 6	Beach 42nd St. to Beach 9th St.

Coastal Engineering

- Beaches are inherently dynamic systems where sand erodes and accretes naturally, i.e. beaches left to their own devices move and change
- Storms and offshore topography affect how beaches erode or accrete over time
- Without Project Future Conditions graph on left used available historic data to identify long-term trends on where erosion hotspots are

Pre-Construction Engineering & Design Phase

- Incorporate new surveys
- Further refine design
- Phased design/construction enables earlier implementation

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Recommended Plan Shorefront Features (Beach Berm and Dune with Groin Construction and Groin Modification)

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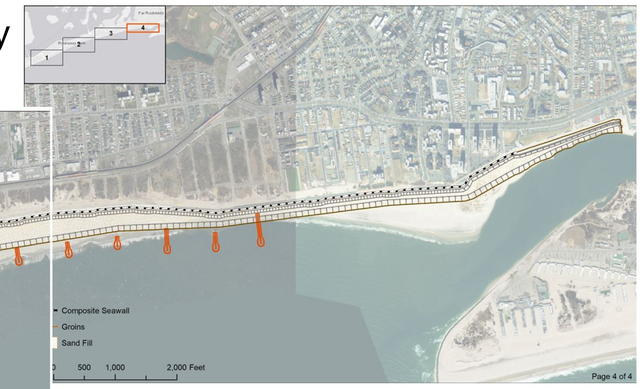
- Reinforced vegetated dune and beachfill from Beach 9th St. to Beach 149th St. Construction of 12 new groins between Beach 90th to Beach 122nd
- Enhancement of existing groin field from Beach 36th to Beach 49th (extending groins) and new groin at Beach 34th. **Note: Comment received that groins are needed in Belle Harbor and Neponsit. This will be looked at during the Preconstruction Engineering and Design Phase.**
- *Initial Investment Cost* and *Benefit to Cost Ratio* for shorefront features equal $285,064,000 and 3.2 respectively

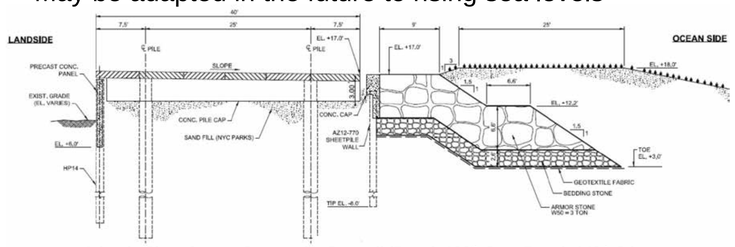
Dune Construction and Beachfill

- Dune crest elevation +18 feet NAVD88
- Estimated total initial beach fill equals 1,596,000 cubic yards
- Renourishment (every 4 years) equals 1,021,000 cubic yards

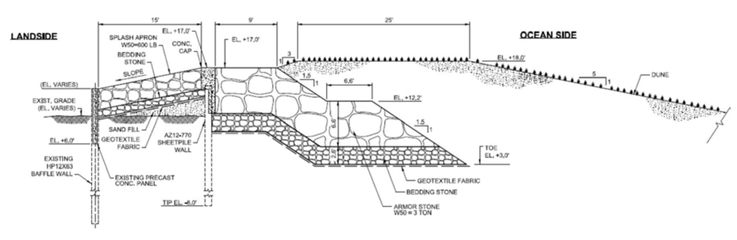


Composite Seawall Construction

- Seawall crest elevation +17 feet NAVD88
- Armor stone significantly reduces wave breaking pressure, which allows smaller steel sheet pile walls to be used in design
- May be adapted in the future to rising sea levels



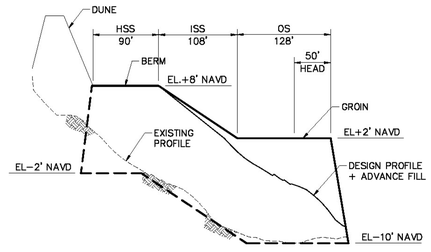
Atlantic Shorefront – Composite Seawall (Beach 126th St to Beach 149th St)



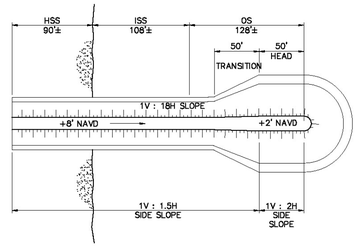
Atlantic Shorefront – Composite Seawall (Beach 9th St to Beach 126th St)

Groin Construction

34th St new groin - 498 ft
37th St extend groin - 209 ft
40th St extend groin - 307 ft
43rd St extend groin - 114 ft
46th St extend groin - 155 ft
49th St extend groin - 180 ft
92nd St new groin - 302 ft
95th St new groin - 298 ft
98th St new groin - 299 ft
101st St new groin - 298 ft
104th St new groin - 302 ft
106th St new groin - 303 ft
108th St new groin - 302 ft
110th St new groin - 351 ft
113th St new groin - 376 ft
115th St new groin - 376 ft
118th St new groin - 376 ft
121st St new groin - 299 ft
Reach 2 new groin (1) – 369 ft
Reach 2 new groin (2) – 413 ft
Reach 2 new groin (3) – 431 ft



Typical groin section



Typical groin layout

High Frequency Flooding Risk Reduction Features

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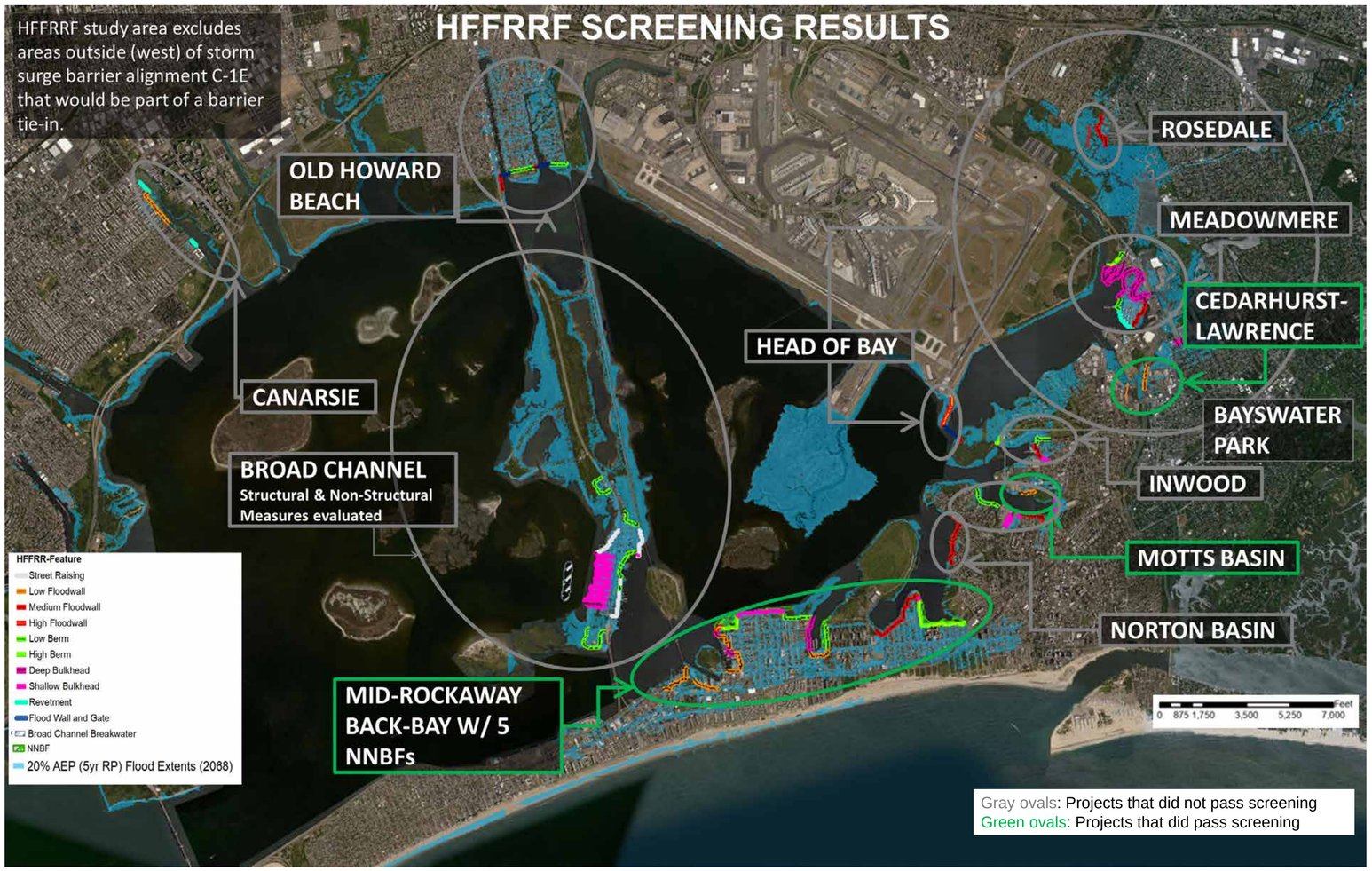

Preliminary Screening of Structural HFFRRFs

Project	Annual Benefits ($)	Annual Costs ($)	Net Benefits ($)	BCR	Passed (Y/N)	Number Structures
Canarsie	1,244	367	877	3.4	YES	222
Mid-Rockaway +	9,086	5,040	4,046	1.8	YES	1,505
Motts Basin North	137	77	60	1.8	YES	18
Old Howard Beach	10,892	10,719	173	1.0	NO++	986
Bayswater +	16	225	-209	0.1	NO	9
Norton Basin +	29	828	-799	0.0	NO	19
Motts Basin South +	281	1,055	-774	0.3	NO	118
Inwood Marina	343	553	-210	0.6	NO	60
Head of Bay Gate	14,422	32,423	-18,001	0.4	NO	1,368
Cedarhurst-Lawrence	2,936	352	2,584	8.3	YES	128
Meadowmere	523	1,814	-1,291	0.3	NO	99
Meadowmere North	579	1,399	-820	0.4	NO	38
Meadowmere East	324	565	-241	0.6	NO	25
Rosedale	348	423	-75	0.8	NO	104
Broad Channel	3,237	10,622	-7,385	0.3	NO	764

\+ NNBF included in potential project evaluation
++ Assumed that inclusion of real estate and interior drainage costs would drive BCR to below 1.0

- Preliminary screening did not include costs for real estate or interior drainage. When those costs were added, Canarsie also dropped out due to high interior drainage costs.
- Non-structural for Broad Channel was also analyzed and screened out based on high costs.

HFFRRF Feature Placement Considerations

Existing Shoreline and Structural Features	HFFRR-Feature: Low Flood Wall	Medium Flood Wall	High Flood Wall	Shallow Bulkhead	Deep Bulkhead	Revetment	Natural and Nature Based Feature (NNBF): Berm & Limited Seaward Marsh Extension (Type A)	NNBF: Berm & Limited Landward Marsh Extension (Type B)	NNBF: Berm & Full Seaward marsh extension (Type A)	NNBF: Berm & Full Landward Marsh Extension (Type B)	Non-Structural (house raisings, buyouts, and/or flood-proofing)
Natural Shoreline	√	√	√				√	√	√	√	
Revetment						√					
Bulkhead				√	√						
Parks or Wetlands	√						√	√	√	√	
Street End	√	√	√	√	√						
Urban Waterfront Development	√	√	√	√	√						
Industrial Waterfront Development	√	√	√	√	√						
Separate Single Family Homes Not Densely Configured											√

In siting feature type, the team looked at existing uses and shoreline condition to ensure compatibility and also to avoid shoreline hardening, which reduces natural resiliency inherent in *living shorelines* and causes adverse environmental impacts. Where feasible, *nature-based features* were added or enhanced to improve natural resiliency.

Consideration of Environmental Impacts

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Impacts Considered: Benthic Communities, Fisheries, Shorebirds, Water Quality, Air Quality and Noise, Cultural Resources, Aesthetics, Surfing, Fishing, Beach Usage

Impacts Avoided or Minimized

Benthic:
Short term, recovery expected within 2 - 6.5 months nearshore and 1.5 to 2.5 years offshore following construction

Intertidal: High Frequency Flooding Risk Reduction Features have been designed to avoid wetlands and mudflats as much as possible. Where wetlands may be impacted, Natural and Nature-Based Features (NNBFs) are incorporated into self-mitigating designs

Fisheries:
No long-term impacts expected, will generally avoid construction area. Integration of NNBFs may increase habitat for fisheries species.

Shorebirds/Endangered Species:
No construction during breeding season

Avoidance and enhancement of existing foraging/nesting habitats

NOAA concurrence received that project *May Affect But Not Likely to Adversely Affect* marine endangered and threatened species

Water Quality:
No significant impacts

Air Quality and Noise:
No significant impacts. Mitigation provided to offset minor air quality impacts

Aesthetics:
New sand similar to the existing beach

Unavoidable, Minimal &Temporary Recreational and Environmental Impacts

Beach Access:
Temporary disruption to beach access via walkovers over the dune

Aesthetics:
Potential impacts to view of beach from north side of the dune

Surfing and Fishing:
Will be temporary and will dissipate as the beach returns to equilibrium

Beach Usage:
Impacts end as construction moves along the beach

Groins/Jetties:
Impact local shoreline sand supply, disrupt benthic habitat, provide vertical and structural habitat for many marine organisms;

Potential adverse effect to buried cultural resources

Seawalls:
Reduce aquatic-terrestrial connectivity. Reducing spawning habitat for forage fish. Potential loss of upper beach and backshore altered sediment transport (loss of beach shoreward of the structure);

Potential adverse effects to buried cultural resources