NASSAU COUNTY BACK BAYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

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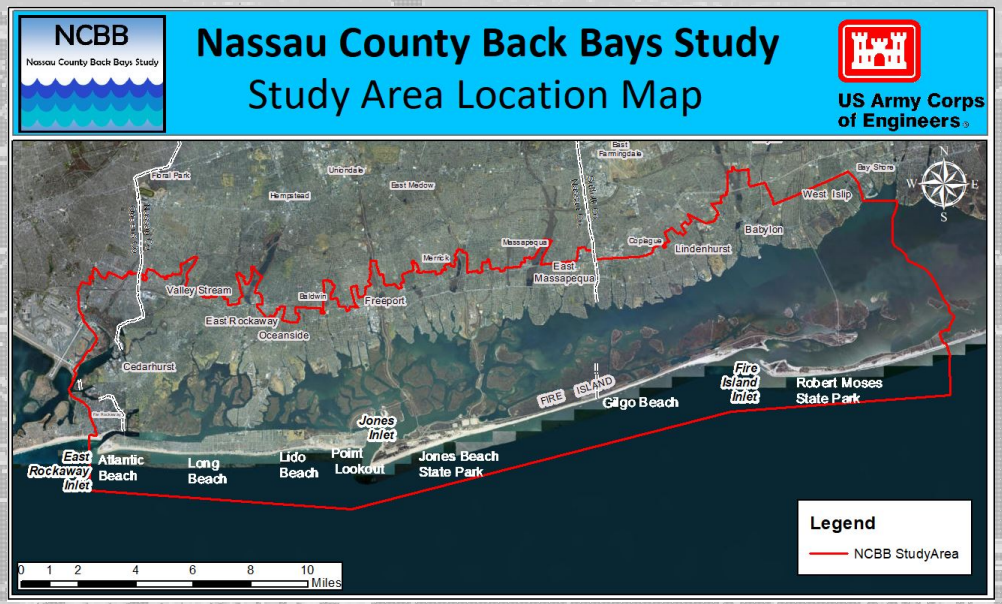


U.S.ARMY

US Army Corps of Engineers

AGENDA

Nautical Mile, Freeport, NY (2015)

- Study Background
- Status Report Highlights
- Plan Formulation Summary
- Process Overview
- Questions & Answers
- Closing Comments

Hurricane Sandy Damage, Oceanside, NY (2012)

OVERVIEW OF HURRICANE SANDY

- 22 October 2012 – Hurricane Sandy originated in the southwestern Caribbean
- Hurricane Sandy increased to a size of more than 1,000 nautical miles – largest diameter storm recorded in the Atlantic basin
- 29 October 2012 – Hurricane Sandy made landfall near Brigantine, NJ at about the same time as predicted high tide in the NY-NJ metropolitan area
- Total Damage Estimate - $65 billion
  - Highest storm surge and greatest inundation on land occurred in New Jersey and New York, especially in and around New York City
  - Surge was accompanied by powerful damaging waves in these areas, including Nassau County
  - High-water mark of 4.6 feet above ground level observed in Freeport in the Town of Hempstead

STUDY BACKGROUND

STUDY AUTHORITY

Public Law 71, Chapter 140 (15 June 1955) - *That in view of the severe damage to the coastal and tidal areas of the eastern and southern United States from the occurrence of hurricanes, particularly the hurricanes of August 31, 1954, and September 11, 1954, in the New England, New York, and New Jersey coastal and tidal areas… The Secretary of the Army… is hereby authorized and directed to cause an examination and survey to be made of the eastern and southern seaboard of the United States with respect to hurricanes, with particular reference to areas where severe damages have occurred.*

Public Law 113-2 (Disaster Relief Appropriations Act of 2013) – *North Atlantic Coast Comprehensive Study (NACCS) identified Nassau County Back Bays as one of nine high risk focus areas to manage risk associated with coastal flooding and sea level rise.*

NON-FEDERAL SPONSOR

- New York State Department of Environmental Conservation, in partnership with Nassau County
- FCSA executed 30 September 2016

STUDY PURPOSE

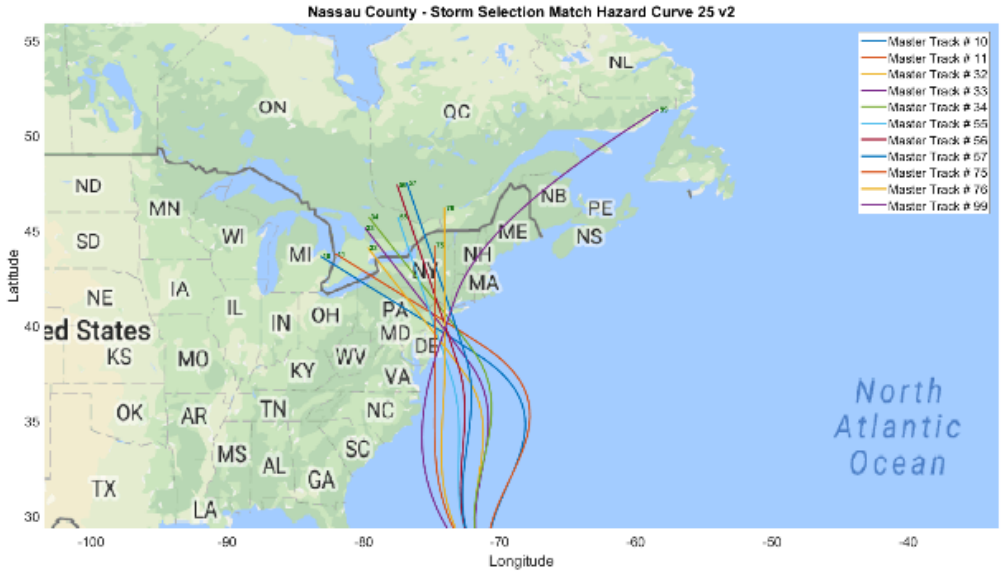
- Determine the feasibility of a project to manage coastal storm risk in the back bays of southern Nassau County
- Recommend a coastal storm risk management plan that will contribute to community and environmental resilience

STUDY AREA – Extends ~30 miles east/west

- Nassau County has a population of 1.3 million people, a land area of 287 square miles and 166 square miles of water.
- Dense, low-elevation mixed-use development (residential and commercial), including a highly developed shoreline.
- Critical infrastructure: Long Island Rail Road infrastructure serving 31.5 million annual rides, over 2 dozen police, fire, and emergency support service facilities, 3 major hospitals; energy facilities; communication and information technology facilities; water and wastewater facilities; and public housing, including that for low-income senior citizens.
- Hundreds of miles of highways and roads, many of which are designated as evacuation routes that connect to New York City and Suffolk County (Long Island).
- Study area is subject to tidal impacts under non-storm conditions as well as more widespread inundation during coastal storm events.

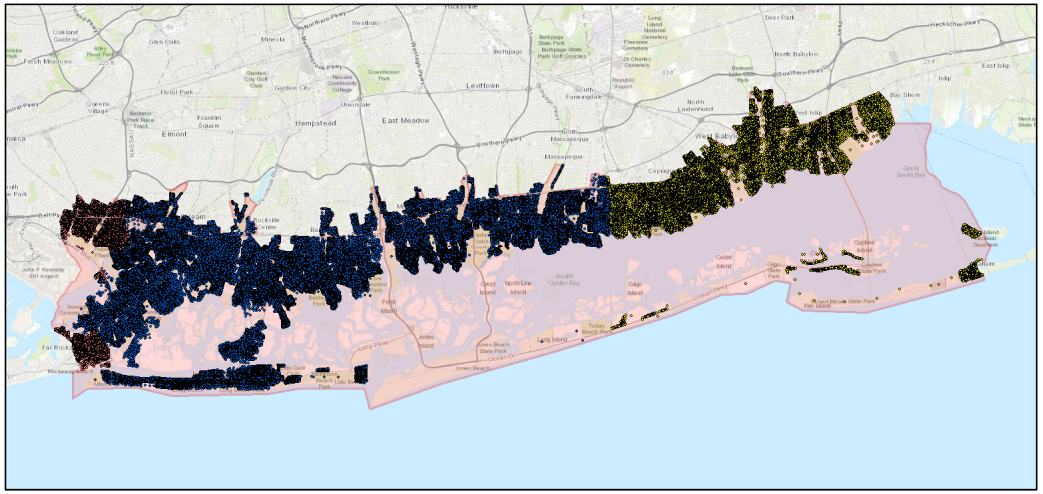
SUMMARY OF HYDRODYNAMIC MODELING

- Hydrodynamic model results show three principle processes for storm surge entering the bay:
  - Storm surge propagation through the three tidal inlets
  - Local wind-driven storm surge along the bay axis
  - Overwash across the barrier islands



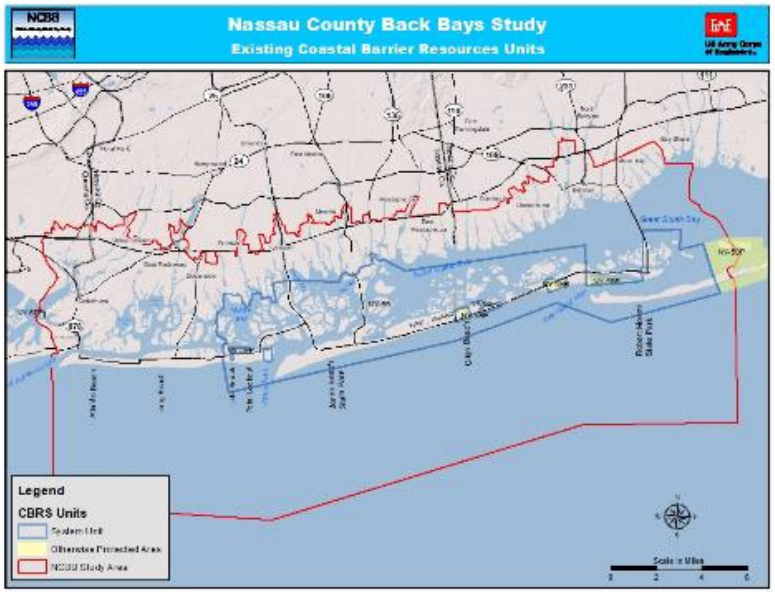
SUMMARY OF ECONOMIC ANALYSIS

- Total study area extends across three counties (Nassau, Queens and Suffolk)
  - Detailed structure inventory assessments are currently only available for Nassau County
  - Further investigation on the structure inventory in Queens County and Suffolk County is ongoing and will be implemented when calculating total storm-induced damage estimates
  - Nassau County structures and contents account for over $55 billion in total value with an additional $2 billion in value from assessed vehicles
  - With further refinement of the Queens County and Suffolk County inventories, the total study area inventory is expected to approach 150,000 total structures with over $100 billion in total damageable assets



SUMMARY OF ENVIRONMENTAL ANALYSIS

- The environmental effort to date has focused on documenting existing conditions in the study area
  - Land use, geology, soils, topography, water resources, water quality, wildlife, vegetation, infrastructure, hazardous, toxic, and radioactive waste, cultural and recreational resources, noise, and aesthetics.
- As alternatives are further refined, impacts to environmental resources will be assessed
- Based on current formulation, environmental resources likely to be impacted include:
  - Coastal Barrier Improvement Act (CBIA) of 1990 / Coastal Barrier Resource System
  - Estuarine Ecosystems – Wetlands, SAV, tidal flats, etc.
  - Wildlife – Avian and aquatic (marine finfish, shellfish, and other wildlife)
  - T&E Species (Birds, mammals, reptiles, and fish)
  - Essential Fish Habitat
  - Recreational Resources (beaches, and national, state, and county parks)
  - Aesthetics



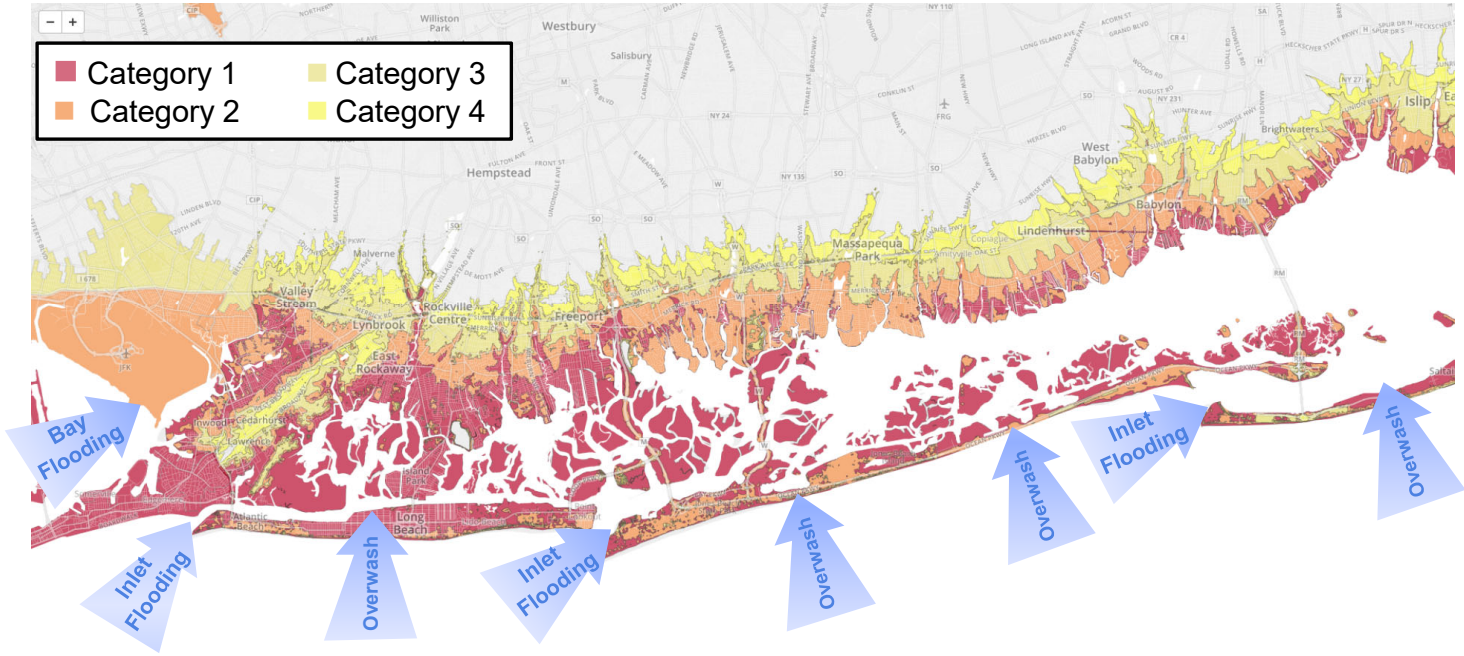
PLAN FORMULATION SUMMARY

PROBLEMS

- Frequent flooding from high tides, spring tides, sunny day flooding, and coastal storms
- High risk of coastal storm flooding and threat to life safety
- Ecosystem degradation in the back bays
- RSLC

OPPORTUNITIES

- Manage coastal storm flood risk
- Better communicate coastal storm risk to communities
- Improve recreation and restore natural systems in ways that may provide coastal storm risk management benefits
- Contribute to community rebuilding and resilience



PLAN FORMULATION SUMMARY

PLANNING OBJECTIVES

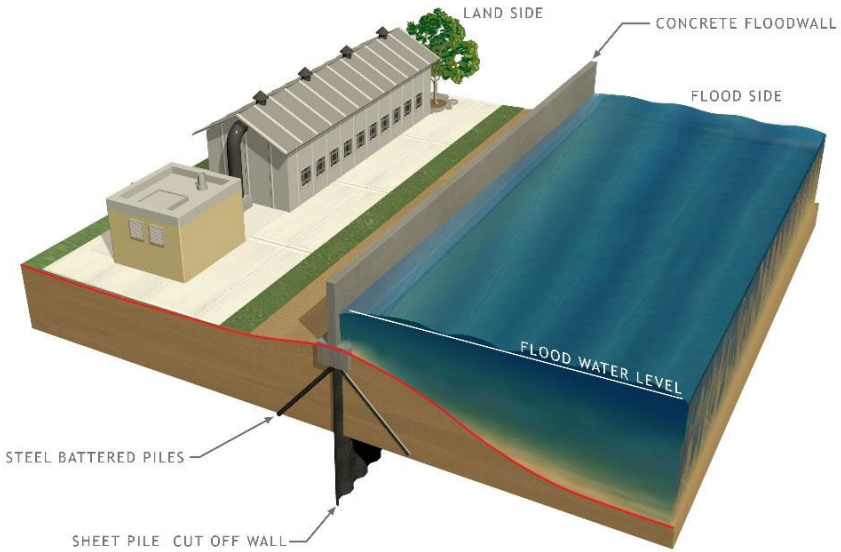
- Reduce the risk of coastal storm damage to communities, public infrastructure, important societal resources, and the environment in southern Nassau County
- Contribute to the long-term sustainability and resilience of coastal communities and back bay environment in southern Nassau County

PLANNING CONSTRAINTS

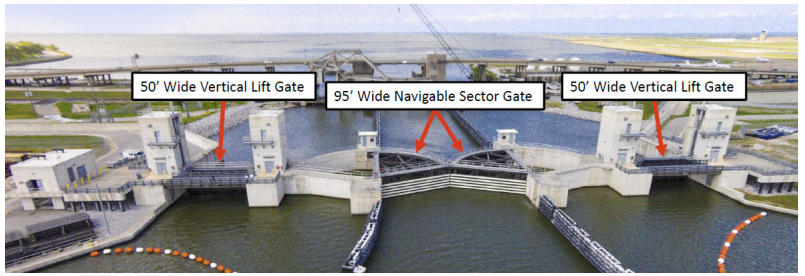
- Avoid impact to Federal navigation channels
- Avoid impact to constructed and planned resilience projects
- Avoid induced coastal flooding in adjacent communities, and flooding from rainfall or overwhelming of existing interior drainage systems
- Avoid impacts to critical infrastructure
- Minimize or avoid impacts to the environment and public access

PLAN FORMULATION SUMMARY – Structural Measures

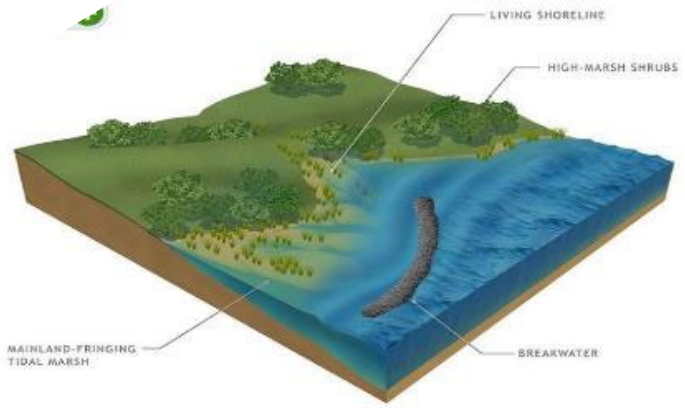
Levees & Floodwalls



Storm Surge Barriers

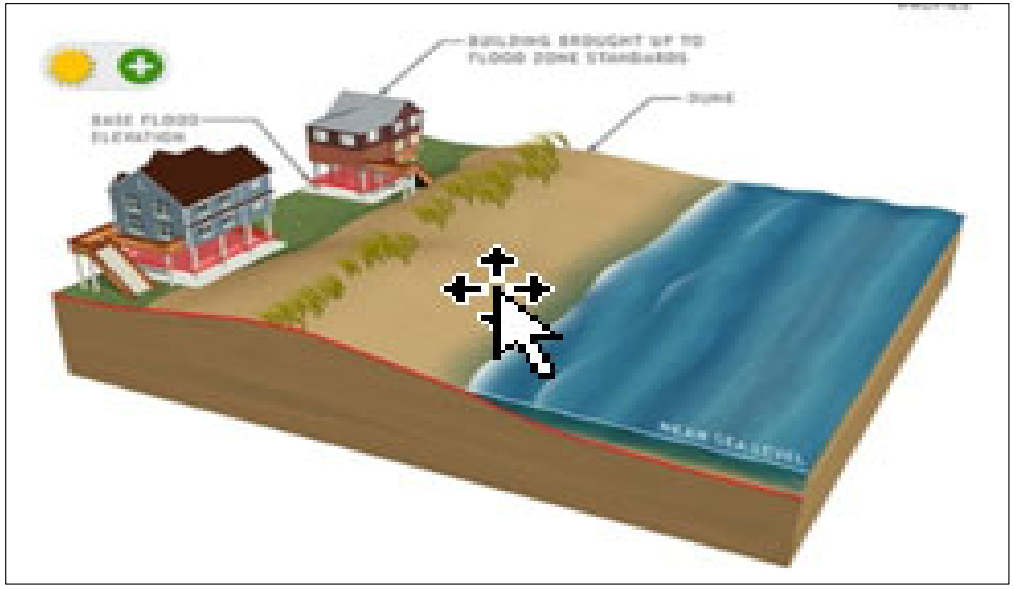


Natural & Nature-Based Features (NNBF)



PLAN FORMULATION SUMMARY – Non-Structural Measures

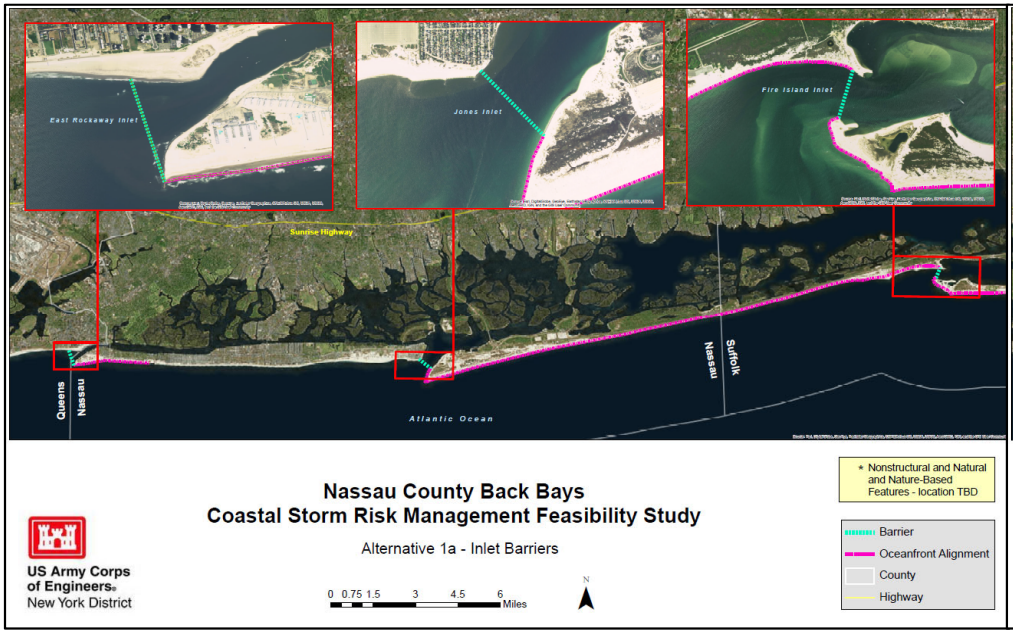
- Nonstructural measures
  - Building elevation
  - Acquisition and relocation later
  - Flood warning and evacuation planning
  - Programmatic considerations
    - Land use
    - Floodplain management
    - Zoning
- Potential to combine with structural measures

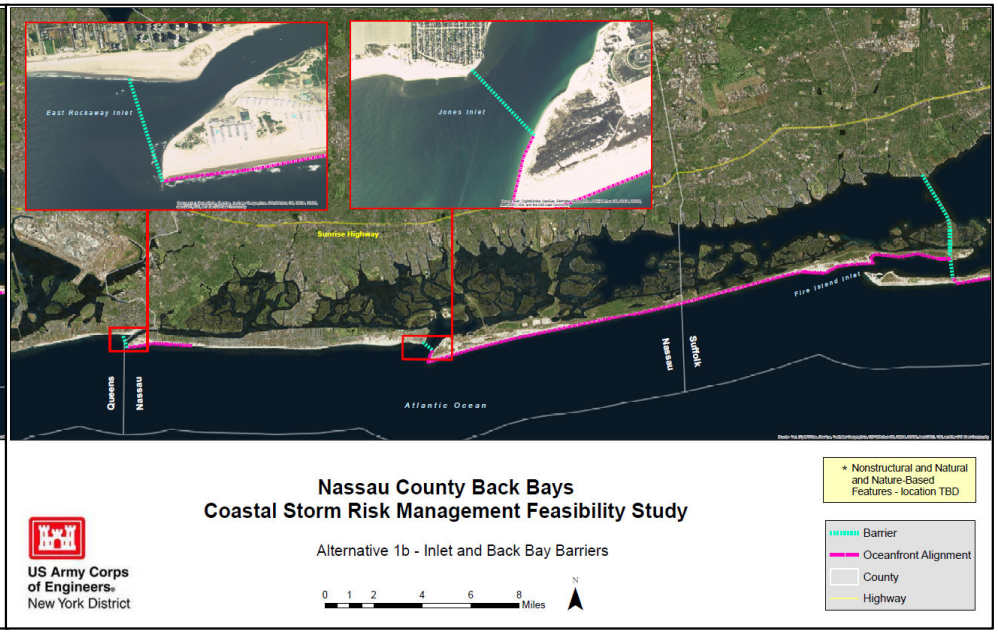


POTENTIAL ALTERNATIVES

- Alternative 1A: Oceanfront Strategy
  - Storm surge barriers at East Rockaway, Jones, and Fire Island Inlets
  - Shorefront measures along barrier island oceanfront shoreline
  - Complimentary non-structural measures and NNBFs

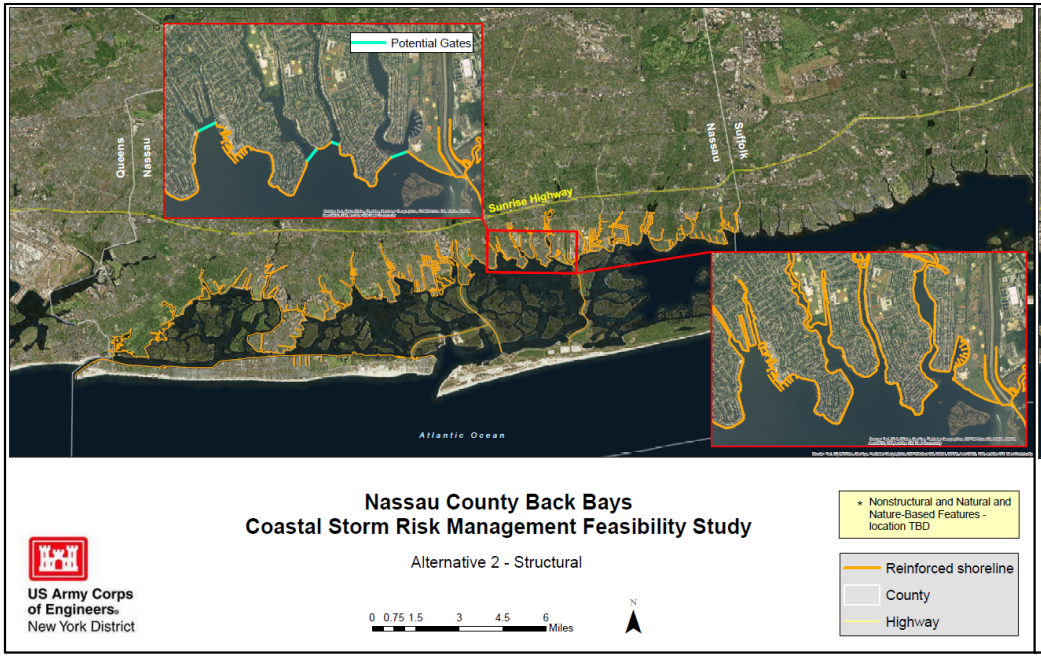
- Alternative 1B: Oceanfront/Crossbay Strategy
  - Storm surge barriers at East Rockaway and Jones Inlets, and a crossbay barrier (at Robert Moses Causeway) between barrier island and back bay shorefront
  - Shorefront measures along barrier island oceanfront
  - Complimentary non-structural measures and NNBFs

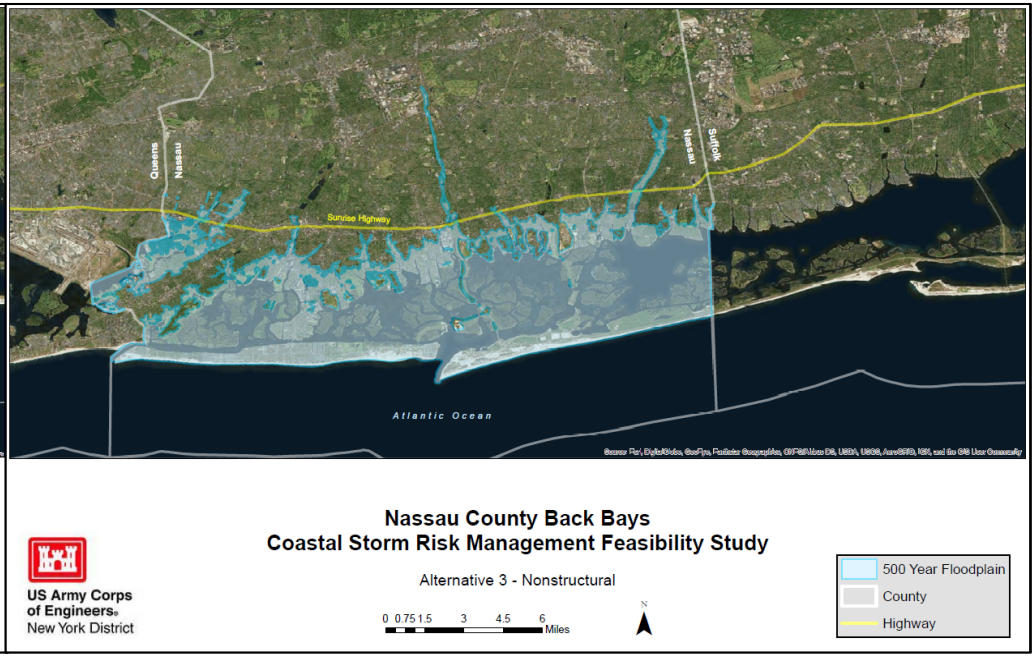




POTENTIAL ALTERNATIVES

- Alternative 2: Perimeter Strategy
  - Shorefront measures along barrier island oceanfront shoreline, and back bay shoreline
  - Complimentary nonstructural measures and NNBFs
- Alternative 3: Nonstructural-Focused Strategy
  - Measures may include structure elevations, flood-proofing, etc.
  - Complimentary NNBFs





PROPOSED SCHEDULE

Milestone	Date
FCSA	30 September 2016 (A)
Alternative Milestone	16 August 2017 (A)
Status Report	April 2019
TSP Milestone	May 2020
Draft Feasibility Report/EIS	June 2020
ADM	January 2021
Final Feasibility Report/EIS	January 2022
Chief of Engineers' Report	April 2022

Note: Schedule is dependent on approval of 3x3x3 Exemption by the Assistant Secretary of the Army for Civil Works (ASA – CW)

QUESTIONS & ANSWERS