Nassau County Back Bays, NY, Coastal Storm Risk Management Feasibility Study

U.S. Army Corps of Engineers, Philadelphia District – Feasibility Summary

Non-Federal Sponsor: New York State Department of Environmental Conservation in Partnership with Nassau County, NY

September 2021

Nautical Mile, Freeport, NY (2015)

Hurricane Sandy Damage, Oceanside, NY (2012)

AGENDA

- Opening Remarks
- Study Background
- Tentatively Selected Plan
- Plan Formulation Summary
- Plan Selection Risk Analysis
- Ongoing Analysis
  - Critical Infrastructure
  - Natural & Nature-Based Features
- Schedule & Path Forward
- Questions & Discussion

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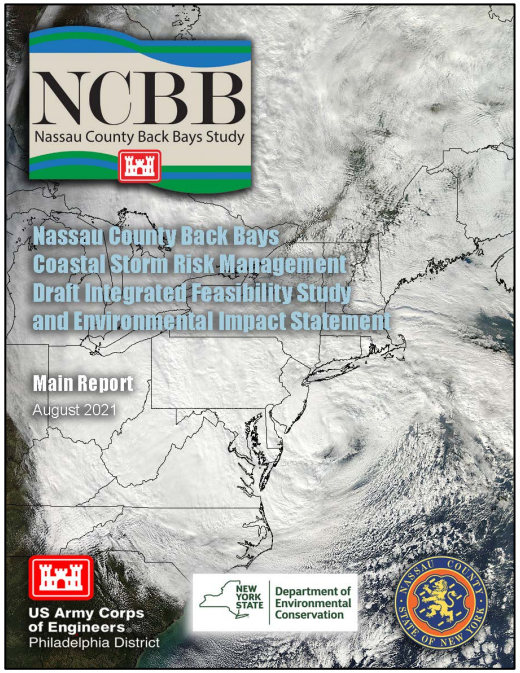
OPENING REMARKS



Responsible Agencies:

- Lead Federal Agency – U.S. Army Corps of Engineers
- Non-Federal Sponsor – New York State Department of Environmental Conservation (NYSDEC) in Partnership with Nassau County, NY
- Cooperating Agencies – NOAA, FEMA, USEPA, USFWS

In accordance with the National Environmental Policy Act, the public, agencies, and stakeholders are invited to provide comments by **October 18, 2021**.

- Submit comments by email: PDPA-NAP@usace.army.mil
- Submit comments by mail: U.S. Army Corps of Engineers Planning Division, Wanamaker Building, 100 Penn Square E. Philadelphia PA 19107
- Study webpage: https://www.nap.usace.army.mil/Missions/Civil-Works/Nassau-County-Back-Bays-Study/

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STUDY BACKGROUND

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.*

Bipartisan Budget Act of 2018 (Public Law 115-123)

Note: *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.*

STUDY BACKGROUND

- **PURPOSE –** to determine the feasibility of a project to reduce coastal storm risk in the back bays of Nassau County, New York, while contributing to the resilience of communities, critical infrastructure, and the natural environment.

- **NEED** – the study area is low-lying and experiences flooding from coastal storms and astronomically high tides; is considered at high risk to coastal storm flooding with an associated threat to life safety; is susceptible to relative sea level change in the future; includes a degraded back bay ecosystem supporting sensitive species and habitats.

TENTATIVELY SELECTED PLAN

- Non-Structural Countywide Plan
  - Elevate: 14,183 Residential Structures
  - Floodproof: 2,667 Industrial/Commercial Structures

ESTIMATED COSTS FOR THE TENTATIVELY SELECTED PLAN	
Period of Analysis	2030 to 2080 (50 Years)
Price Level	October 2020 (FY21)
Discount Rate	2.5%
Base Year	2030
Initial Construction Costs	$3,849,693,000
Interest During Construction	$11,864,000
Annual OMRR&R (Operation & Maintenance)	$0
Average Annual Cost	$135,733,000
Average Annual Benefits	$610,751,000
Average Annual Net Benefits	$474,839,000
BCR (Benefit/Cost Ratio)	4.5
Residual Risk	40%

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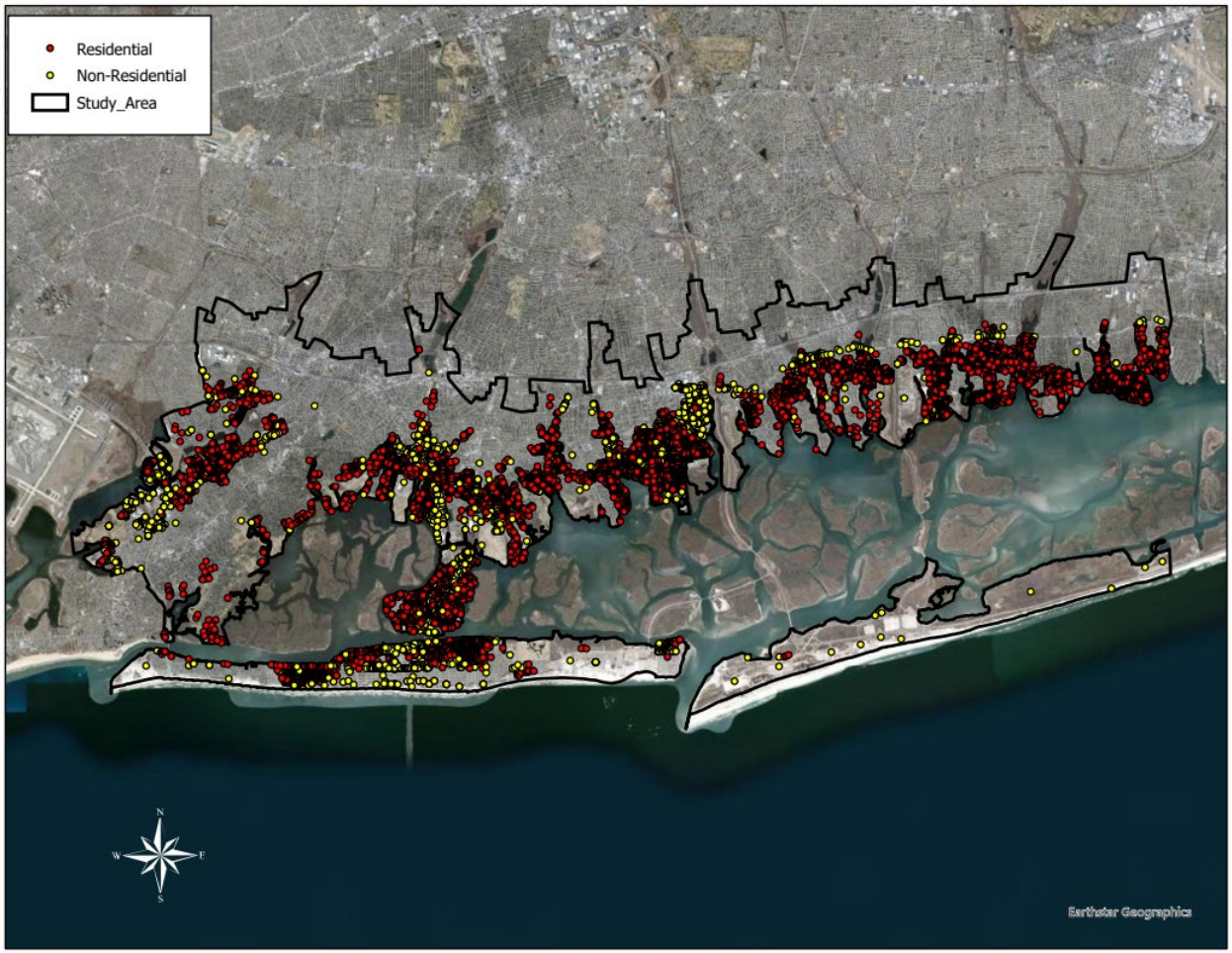
TENTATIVELY SELECTED PLAN



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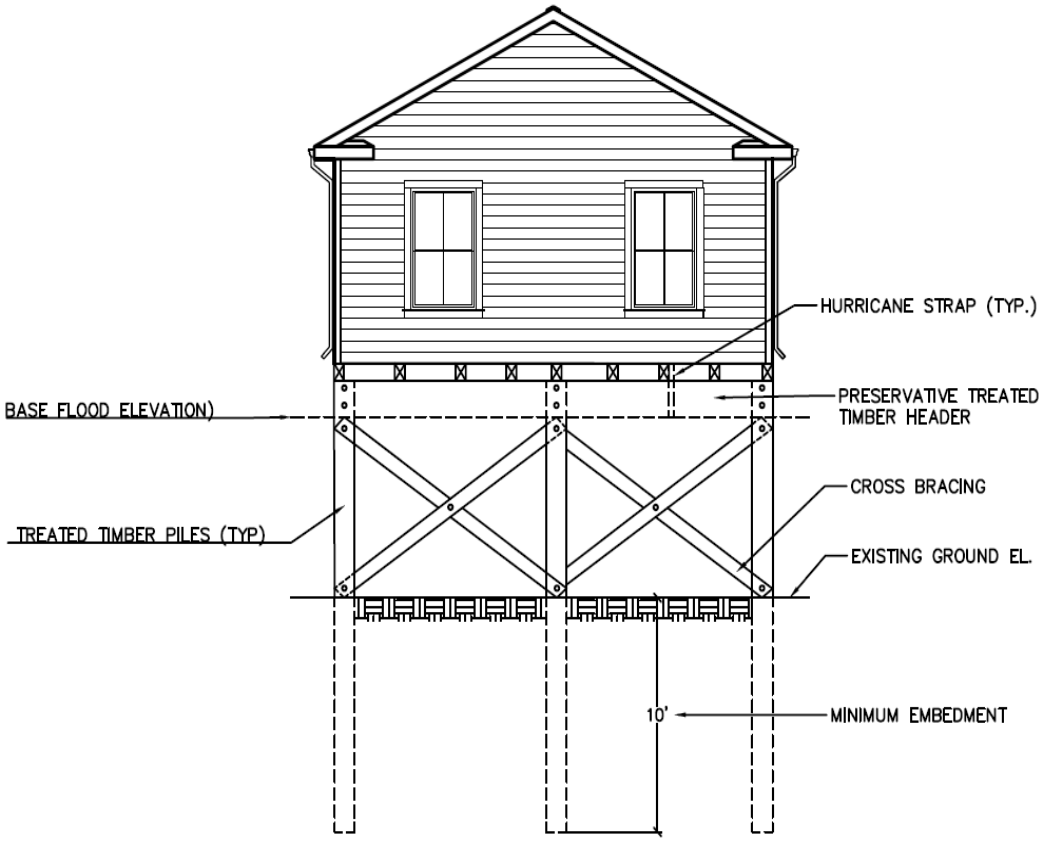
TENTATIVELY SELECTED PLAN – NON-STRUCTURAL MEASURES

1. **Elevation** of eligible residential structures will consist of elevating structures to the modeled 1% AEP (100-year return period) non-structural design water surface elevation, which includes intermediate sea level change projected to 2080.*
2. **Acquisition** or relocation of residential structures that would require elevation over 12 ft above ground level and properties in poor condition. Property owners would receive fair market value for the property acquired and



Elevating structures greater than 12 ft above ground level introduces damage risk from winds during tropical events as a new condition. This height generally serves as a differentiator for insurance rates for wind/hail coverage as well and is therefore used as the upper limit for elevating structures.

Elevation will not be below the local regulatory requirement.

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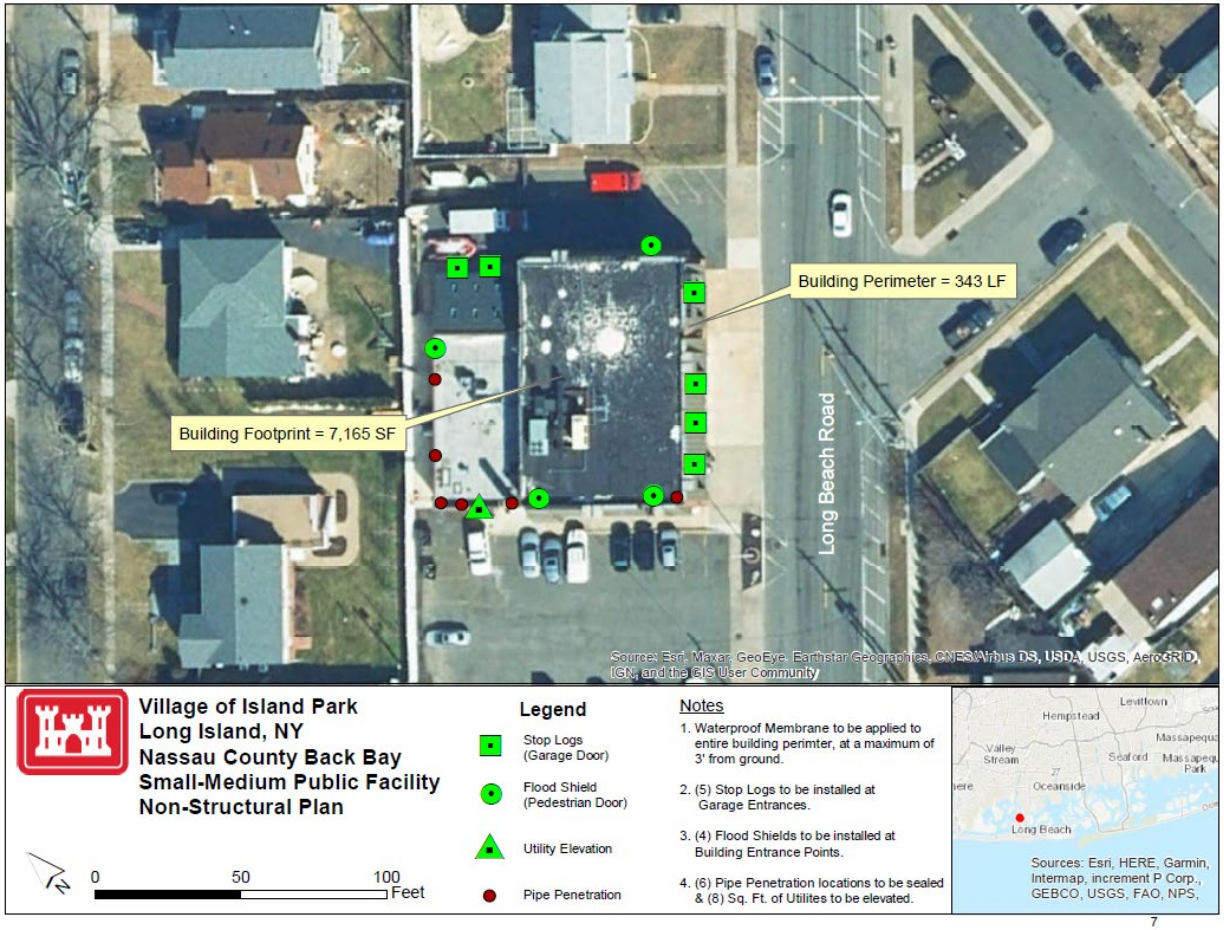
TENTATIVELY SELECTED PLAN – NON-STRUCTURAL MEASURES

Dry Floodproofing of non-residential and public structures (Example – Island Park Fire Department)



Dry flood proofing is analyzed to provide Coastal Storm Risk Management benefits associated with 3 ft. of vertical construction. A structural analysis is required to determine if a higher vertical construction level can be applied and be able to withstand the additional forces from the increase in water height.

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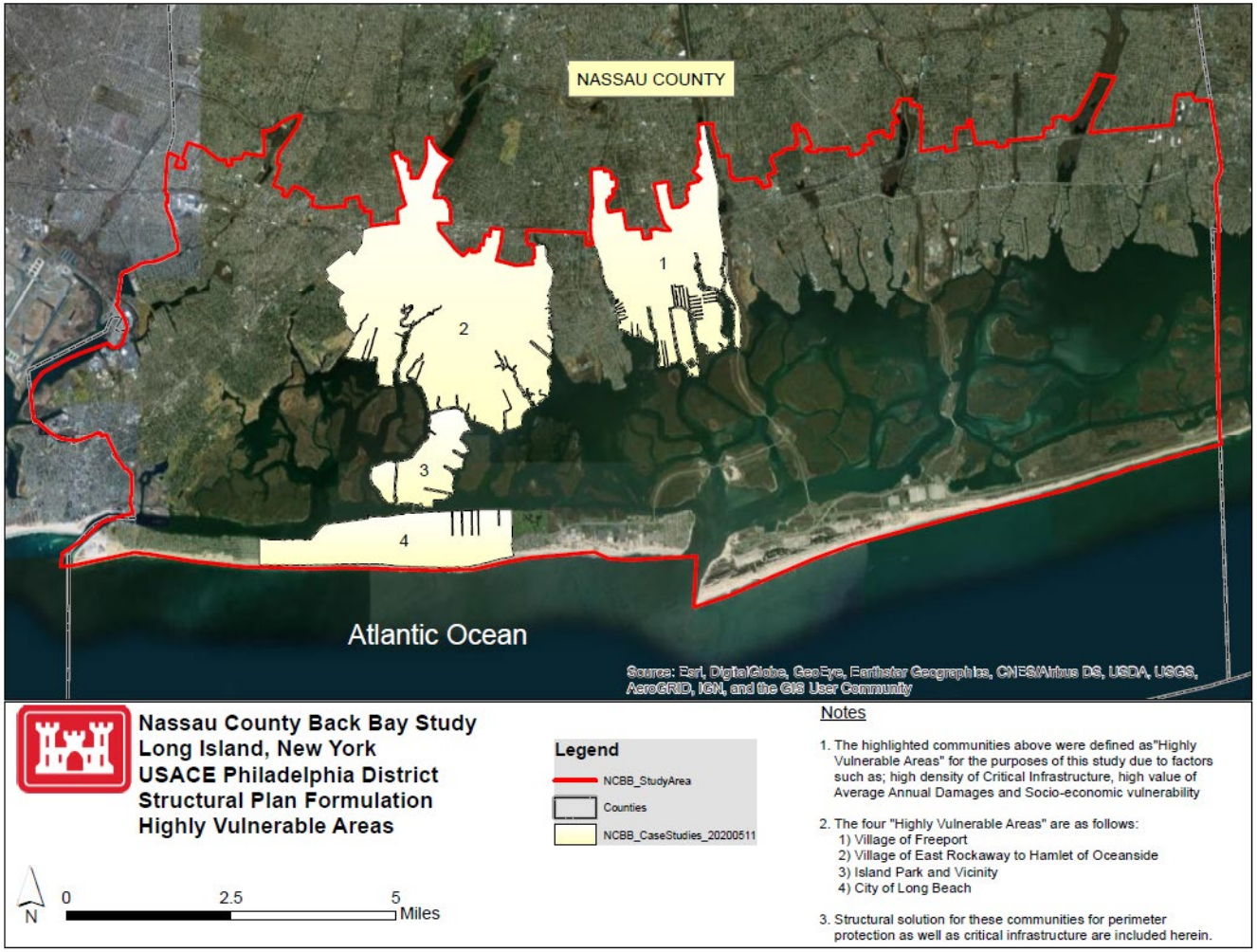
PLAN FORMULATION

- Four highly vulnerable areas (encompassing approximately 29% of the study area) were identified with a combination of high average annual damages and critical infrastructure.



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ALTERNATIVES ANALYSIS – STRUCTURAL MEASURES

Structural Measures Included in the Focused Array:

1. Floodwalls (Permanent, Deployable, Crown Walls, Bulkheads)
2. Inlet Storm Surge Barriers/Interior Bay Closures
3. Levees
4. Seawalls
5. Revetments
6. Beach Nourishment

Structural Measures Screened Out of the Focused Array:

- Inlet Storm Surge Barriers/Interior Bay Closures
- Seawalls
- Revetments
- Beach Nourishment

Structural Measures Carried Forward in the Focused Array:

- Floodwalls
- Levees

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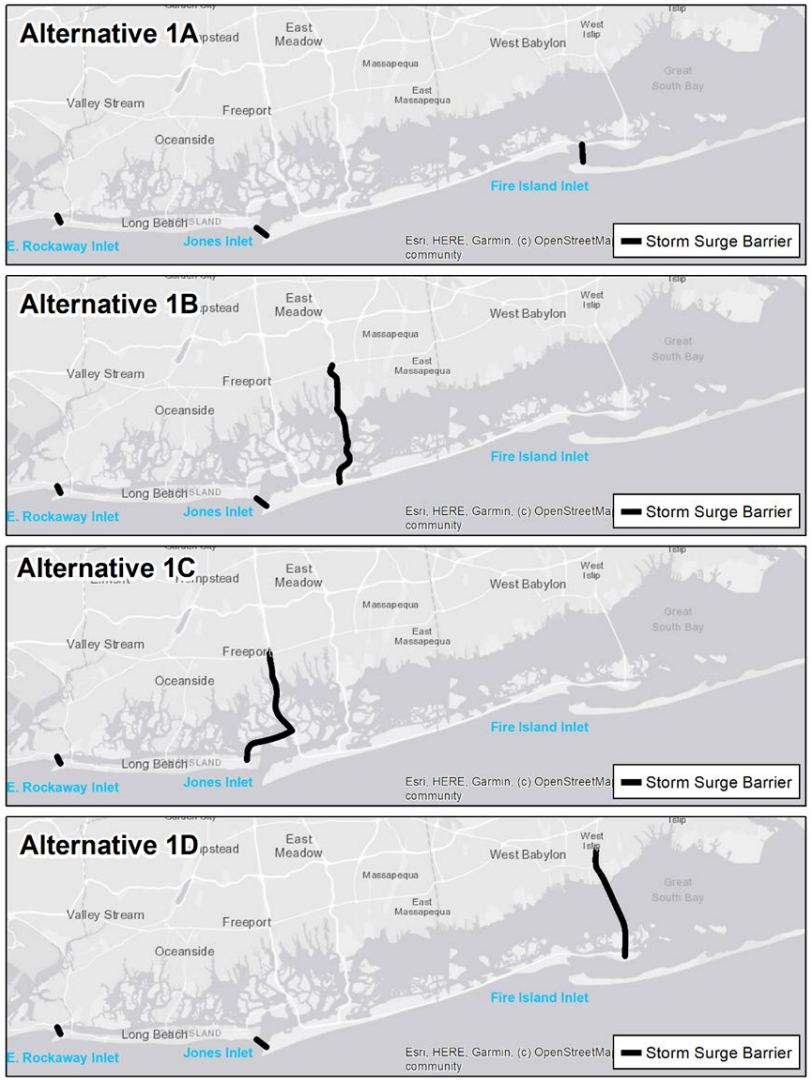
ALTERNATIVES ANALYSIS – STRUCTURAL MEASURES



- Four inlet storm surge barrier/interior bay closure combinations were evaluated and modeled by the USACE Engineer Research and Development Center:
- **Alternative 1A** - inlet closures alone are only able to reduce the 1% AEP water elevation by approximately one foot, from 10 feet NAVD88 to 9 feet NAVD88. into the study area limiting the effectiveness of Alternative 1A)

- **Alternatives 1B, 1C, and 1D** combinations of storm surge barriers/interior bay closures successfully reduce water elevations inside the storm surge barrier/interior bay closure system. However, outside the system, specifically east of the bay closures in Great South Bay, the 1% AEP water elevations increase by 2 to 4 feet over extensive areas (10 to 20 miles).

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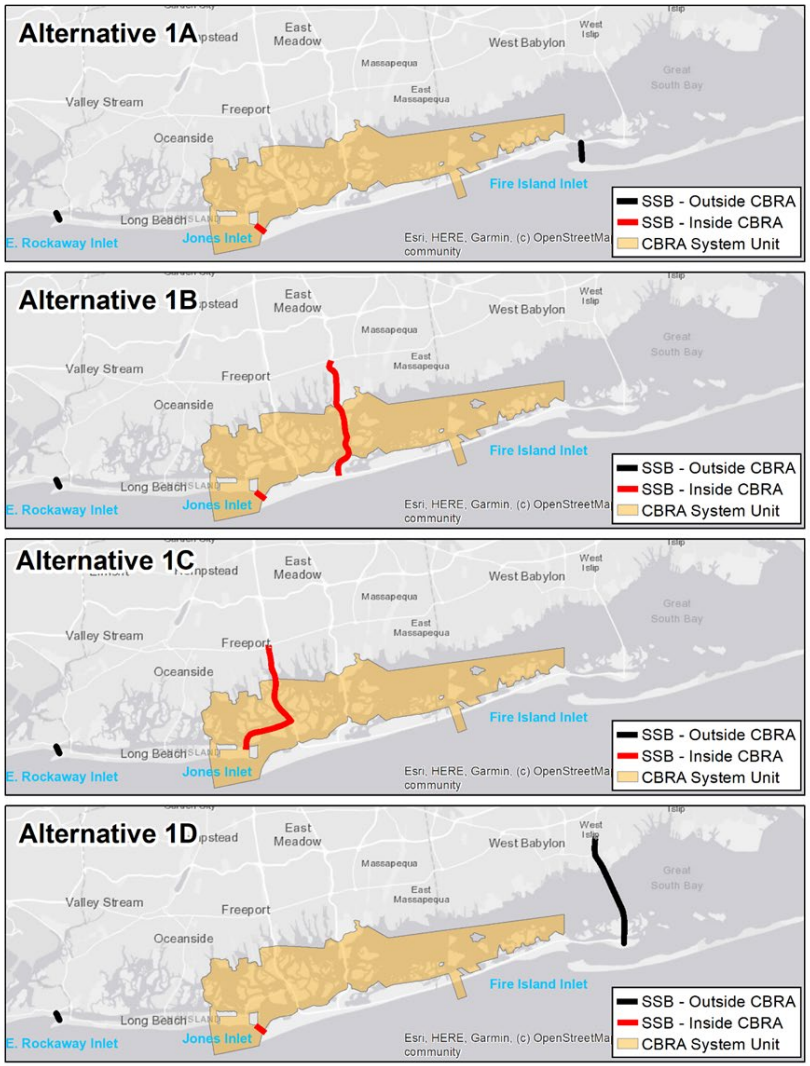
ALTERNATIVES ANALYSIS – STRUCTURAL MEASURES



- Alternatives 1A through 1D have at least one storm surge barrier and/or interior bay closure located entirely within footprint of CBRA (Coastal Barrier Resources Act) System Unit.
- Eliminating storm surge barrier and/or interior bay closures located in a CBRA System Unit will render these alternatives even less effective at reducing storm surge by severely limiting their ability to reduce storm surge from both of the primary processes responsible for NCBB back bay flooding.

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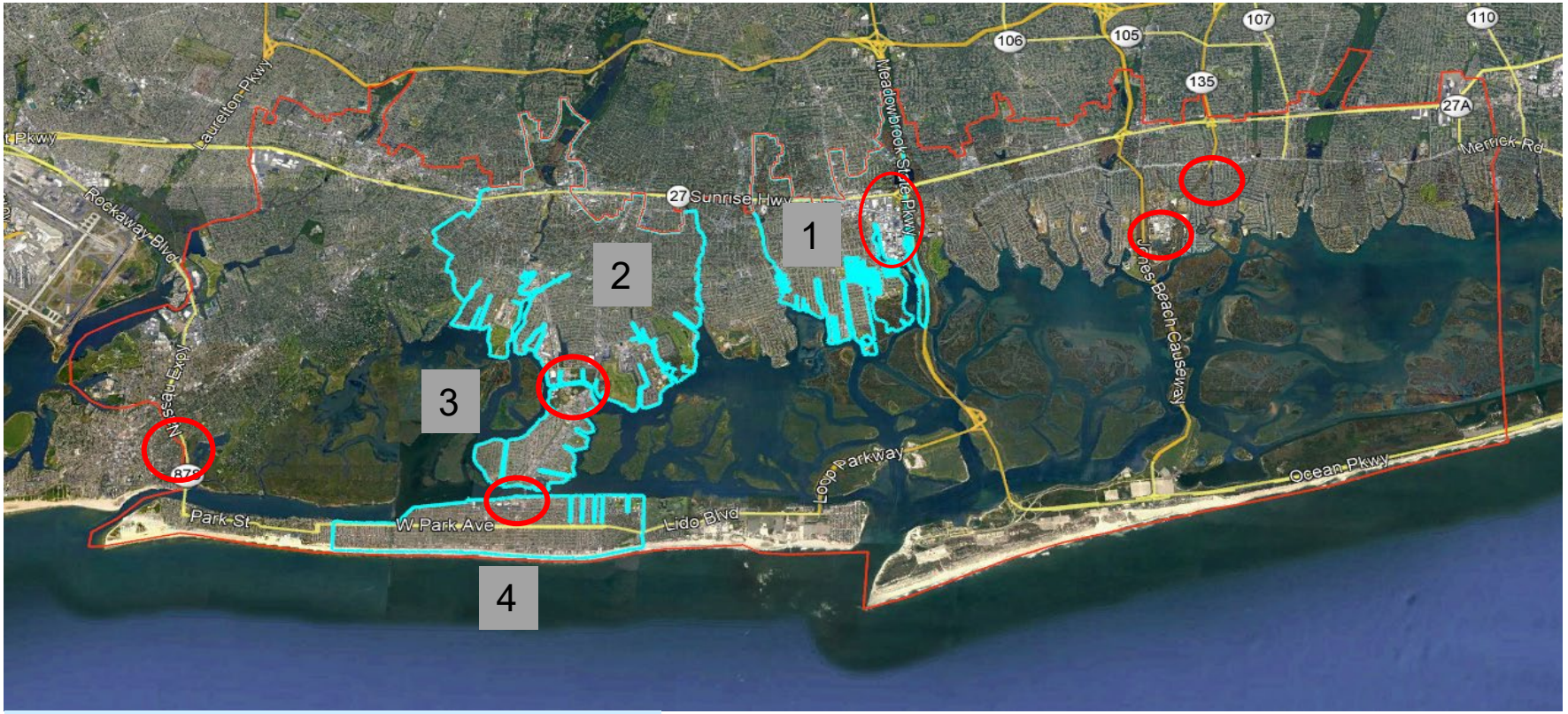
ALTERNATIVES ANALYSIS – STRUCTURAL MEASURES



SUMMARY

- Cycle 1 Screening
- Four (4) Case Study Areas
- Four (4) Selected Types of Floodwalls & Levees
- Includes Locations for Road Closure, Sluice Gates & Navigational Gates
- Case Study Area Perimeter Plans (20%, 5% and 1% AEP)
- Critical Infrastructure Plans (1% AEP)

HIGH VULNERABILITY AREAS

1) Village of Freeport, NY
2) East Rockaway to Oceanside, NY
3) Island Park, NY
4) City of Long Beach, NY

○ Critical Infrastructure Plans

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PLAN SELECTION RISK ANALYSIS

- Public Acceptability - It is uncertain at this time if stakeholders will accept the use of coastal storm risk management alternatives in their communities.

- Potential alternative plans were formulated with less level of detail leading to uncertainty in economics, design and costs.

- Final optimization between the draft and final report may impact design, costs and benefits,

- Changes in the Tentatively Selected Plan from the draft to the final report would potentially require a second release of a draft report depending on the magnitude of the changes.

ONGOING ANALYSIS

- Critical infrastructure risk management analysis - post storm functionality of police stations, fire stations, hospitals, generating stations, treatment plants, etc.
- Additional evaluation of complementary natural and nature-based features to provide added coastal storm risk management, while potentially improving ecosystem services.
- Update real estate analysis
- Refine environmental/cultural impact analysis

CRITICAL INFRASTRUCTURE ANALYSIS - LOCALIZED FLOODWALL

EF Barrett Power Station

Bay Park Reclamation Facility

Planned

Existing

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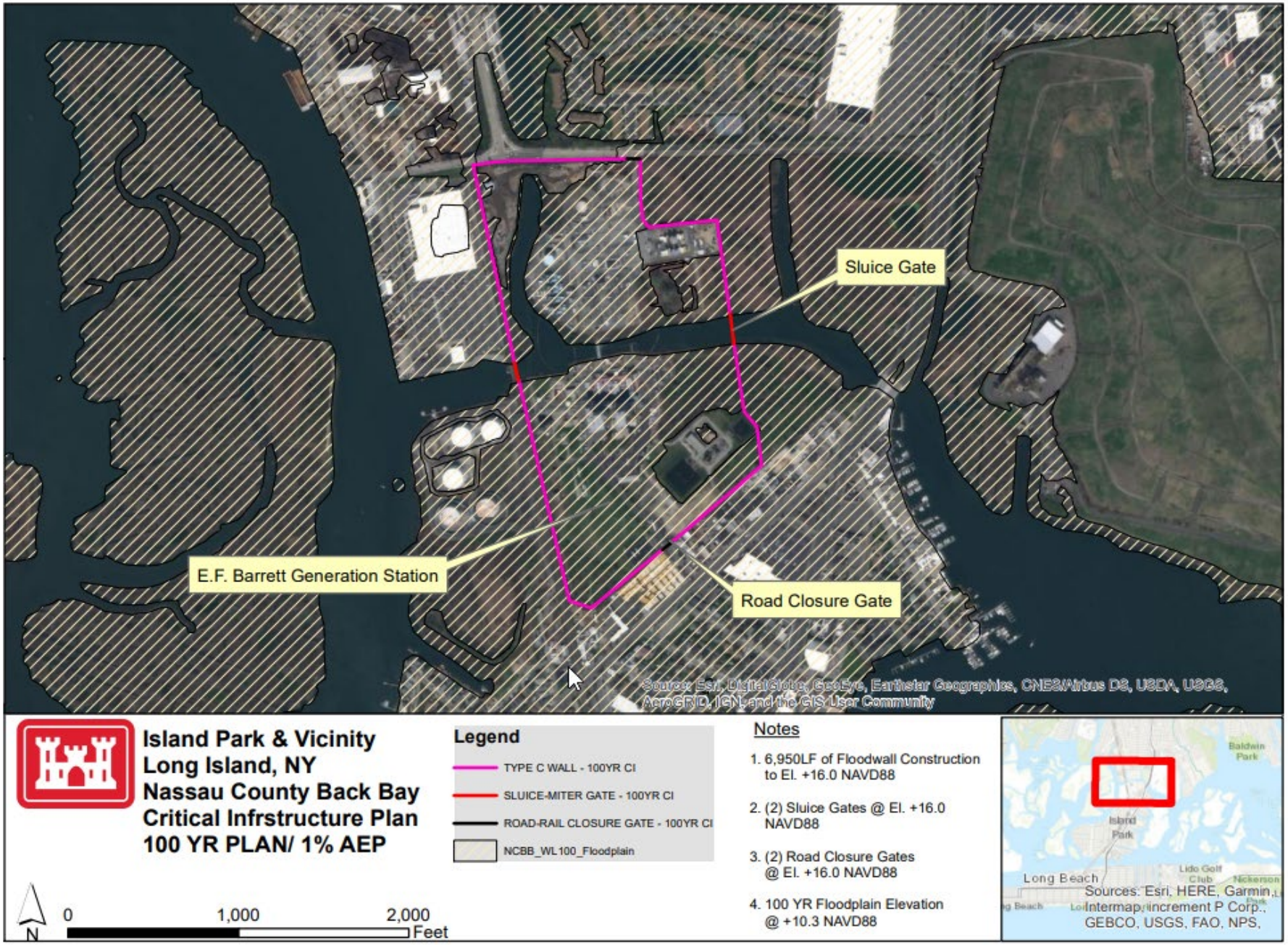
Sluice Gate
E.F. Barrett Generation Station
Road Closure Gate
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Island Park & Vicinity
Long Island, NY
Nassau County Back Bay
Critical Infrstructure Plan
100 YR PLAN/ 1% AEP
Legend
TYPE C WALL - 100YR CI
SLUICE-MITER GATE - 100YR CI
ROAD-RAIL CLOSURE GATE - 100YR CI
NCBB_WL100_Floodplain
Notes
1. 6,950LF of Floodwall Construction to El. +16.0 NAVD88
2. (2) Sluice Gates @ El. +16.0 NAVD88
3. (2) Road Closure Gates @ El. +16.0 NAVD88
4. 100 YR Floodplain Elevation @ +10.3 NAVD88
N
0
1,000
2,000
Feet
Baldwin Park
Island Park
Long Beach
Lido Golf Club
Nickerson Park
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,

ADDITIONAL LOCALIZED FLOODWALL ANALYSIS

HIGH RISK EVACUATION ROUTES

- **Route 1**
  - Section 1
  - Section 2
  - Section 3
  - Section 4
- **Route 2**
  - Section 1
  - Section 2
  - Section 3
- **Route 3**
  - Section 1
  - Section 2
- **Route 4**
  - Section 1

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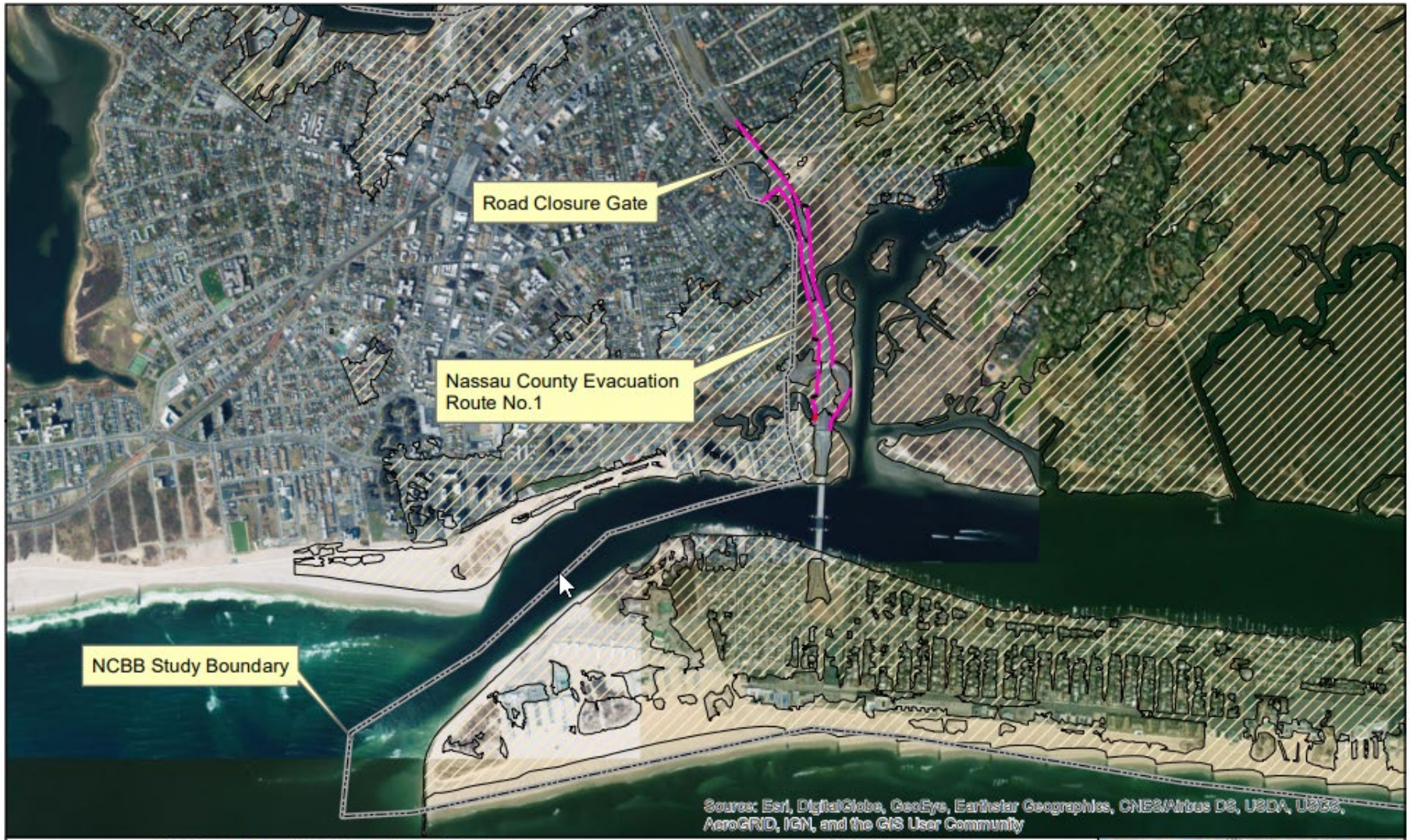


Evacuation Route Protection
Far Rockaway, NY
Nassau County Back Bay
Critical Infrastructure Plan
100 YR/ 1% AEP

N

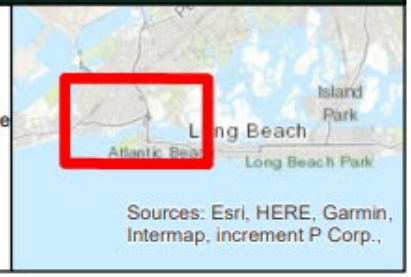
0 2,500 5,000 Feet

Legend

- MITER-SLUICE GATE - 100YR CI PLAN
- ROAD-RAIL CLOSURE - 100YR CI PLAN
- TYPE C WALL - 100YR CI PLAN
- NCBB_StudyArea_02Aug2018
- NCBB_WL100_Floodplain

Notes

1. 7,000LF of Floodwall Construction to Elevation @ El. +16.0 NAVD88
2. (4) Road Closure Gates & (1) Sluice Gate @ El. +16.0 NAVD88
3. 100 YR Floodplain Elevation @ +10.3 NAVD88
4. Key Route Protected As Shown



Sources: Esri, HERE, Garmin, Intermap, increment P Corp.,

NATURAL & NATURE BASED (NNBF) ANALYSIS

- **NNBF** are intended to be complementary measures to attenuate surge and waves by increasing both elevation and roughness, per lessons learned from NJBB ERDC modeling efforts.
- Targeting of Marsh Feature Restoration
  - Combat degradation of marsh features towards open water
  - Limit fetch driving much of back bay storm surge suggested by previous modeling


LONG ISLAND TIDAL WETLANDS
TRENDS ANALYSIS

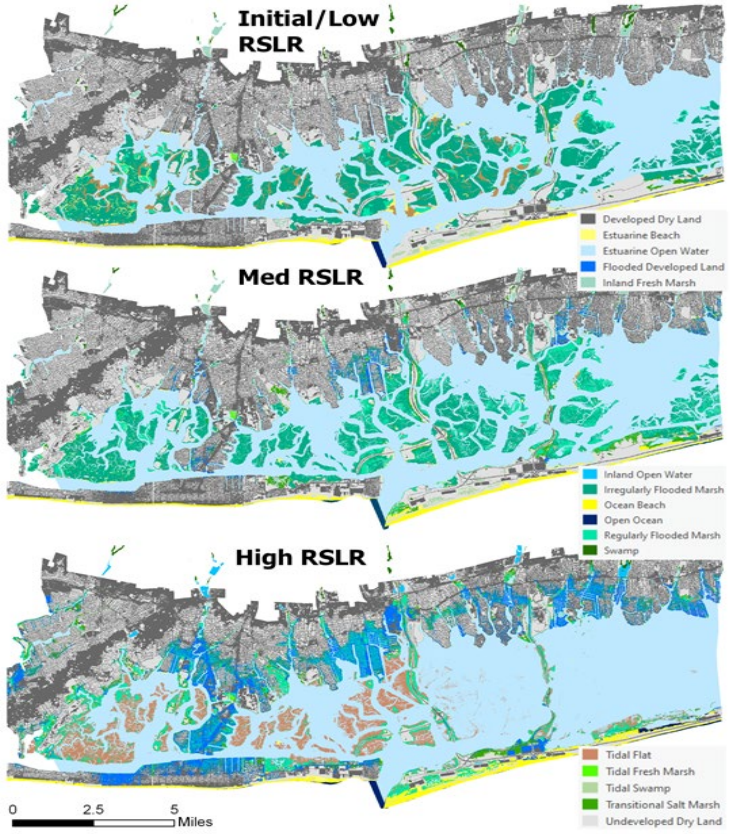
Prepared for the

NEW ENGLAND INTERSTATE
WATER POLLUTION CONTROL COMMISSION

Prepared by

CAMERON ENGINEERING
& ASSOCIATES, LLP

July 2015



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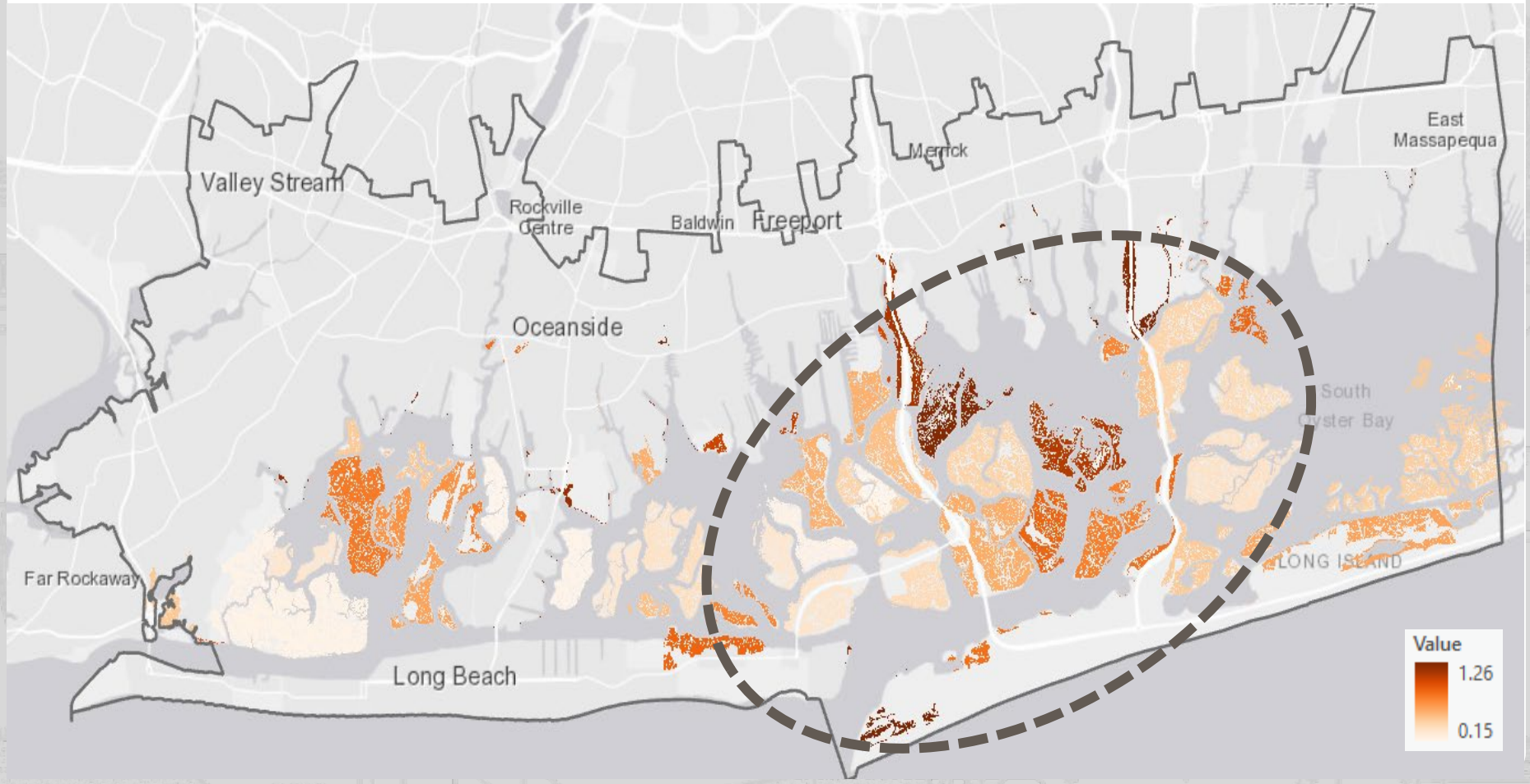
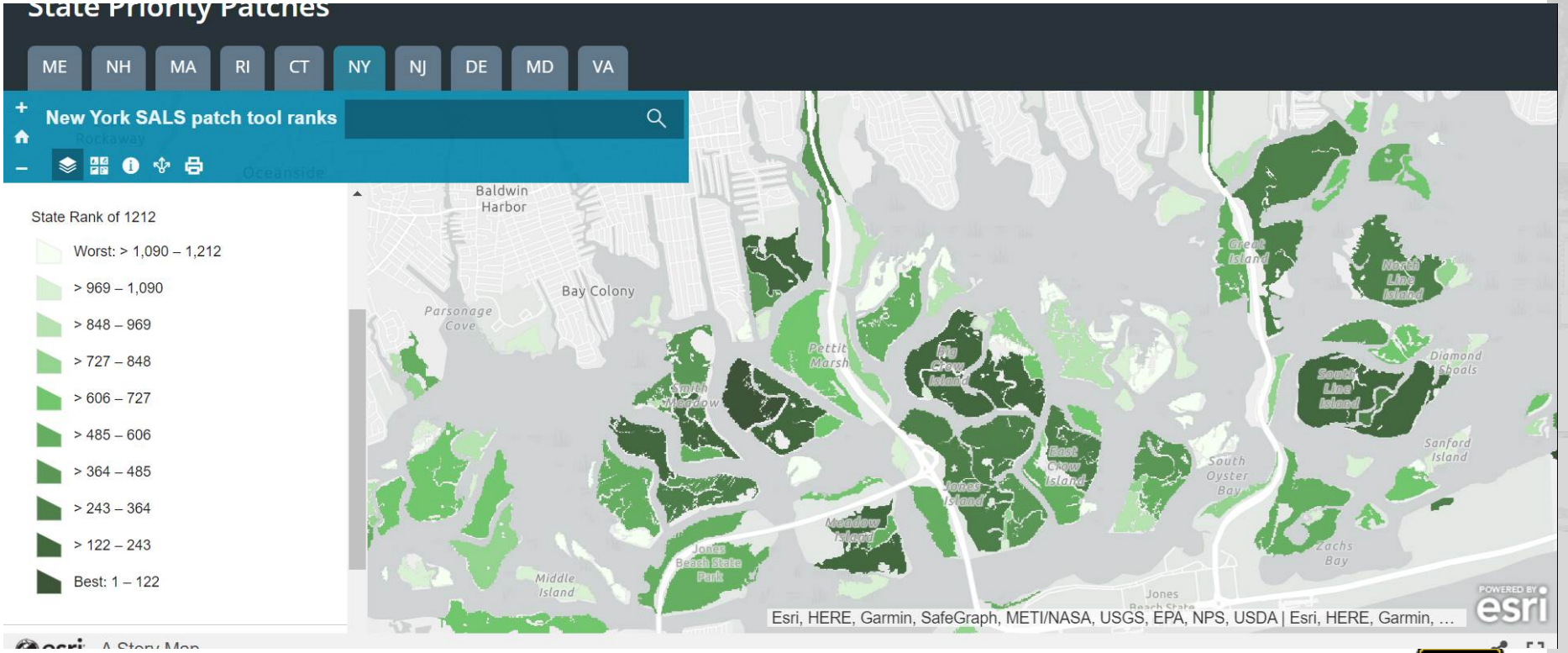
NNBF – WETLAND TREND FINDINGS

- USACE developed a marsh vulnerability index incorporating 3 data sets:
  1. Long Island Tidal Wetland Trend Data (1974 to 2008)
  2. Unvegetated to Vegetated Marsh Ratio (UVVR), per USGS
  3. Sea Level Affecting Marshes Model (SLAMM)



NNBF – WETLAND TREND FINDINGS

- Potential environmental benefits
- Current area of interest for continued NNBF formulation provides important habitat for the saltmarsh sparrow (USFWS Species of Concern).



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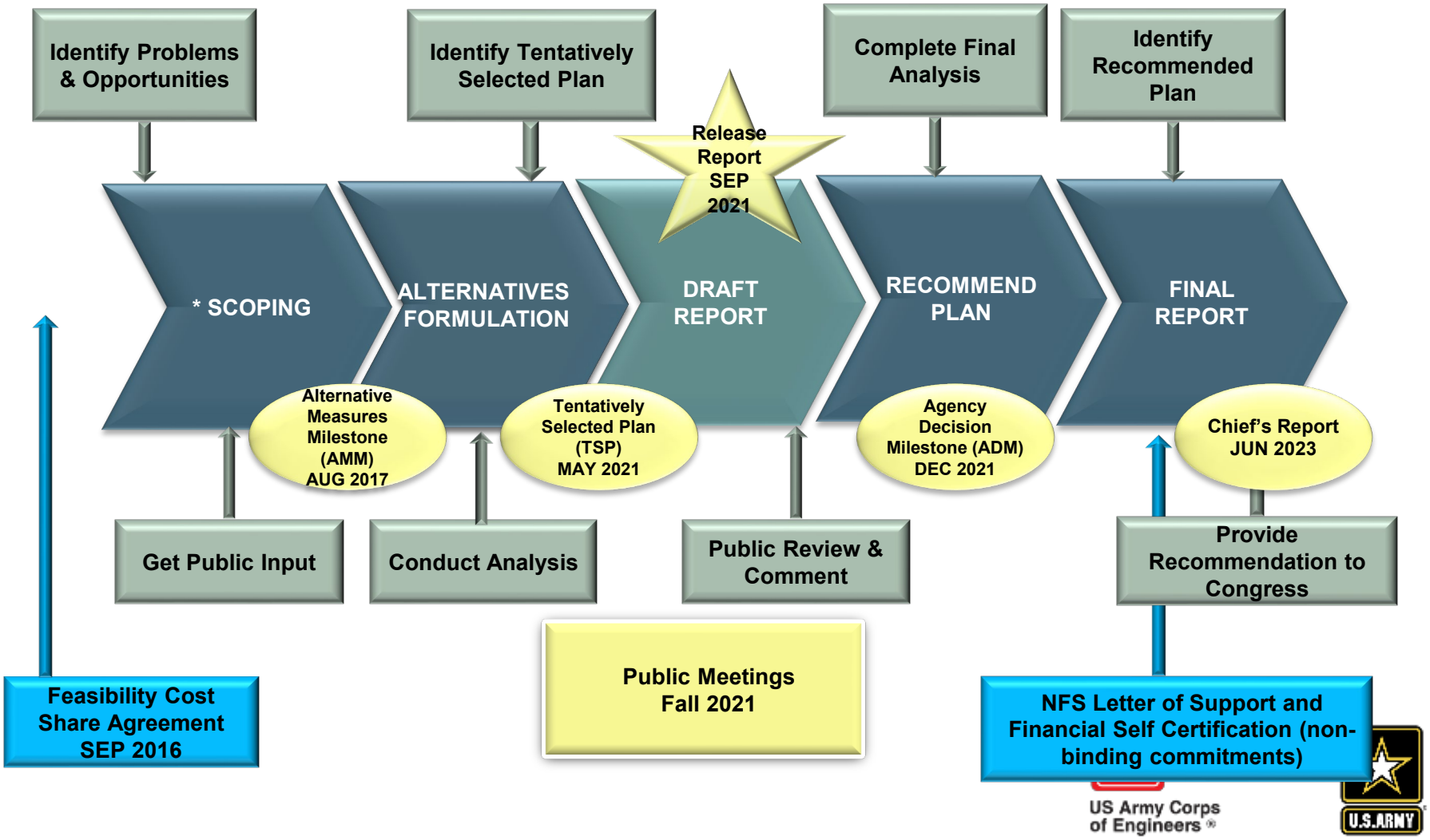
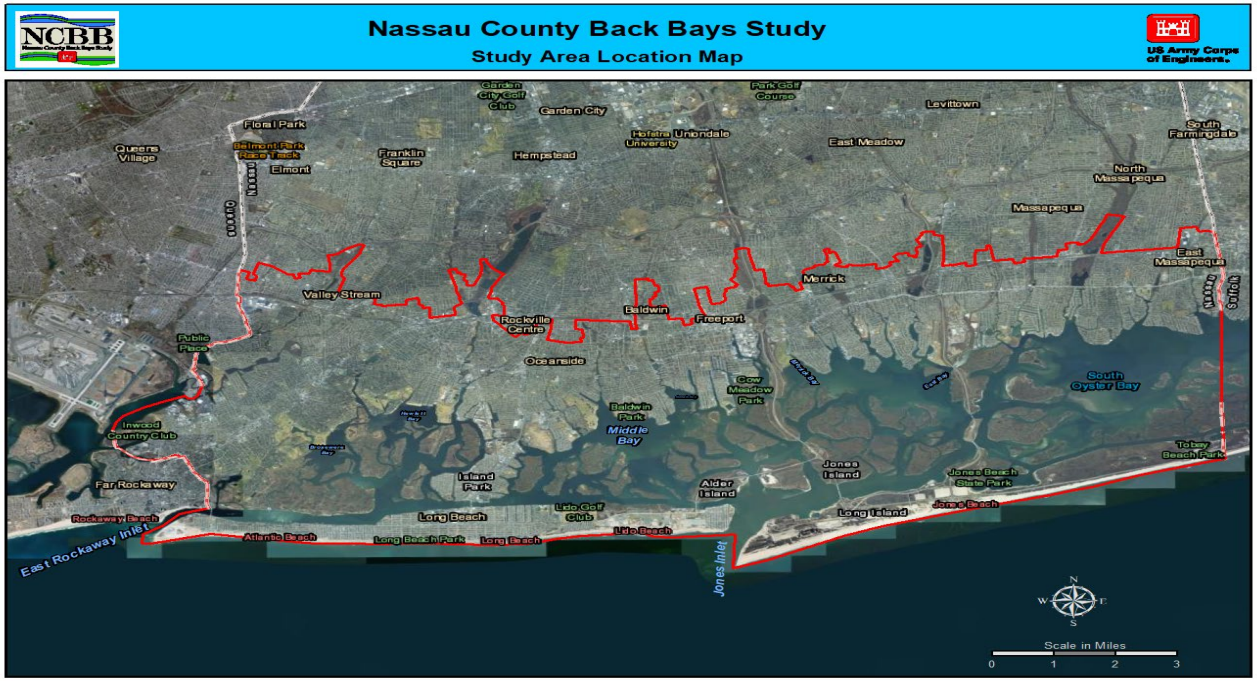
SCHEDULE/PATH FORWARD



QUESTIONS/COMMENTS



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