

Fire Island Inlet to Montauk Point, NY Final General Reevaluation Report



APPENDIX I COASTAL PROCESS FEATURES

**U.S. Army Corps of Engineers
New York District**



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FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY – FINAL GRR

Appendix I

Coastal Process Features

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1.0 CPF DEVELOPMENT

The Fire Island Inlet to Montauk Point (FIMP) project (Project) identified the restoration of coastal processes as essential to maintaining the natural features necessary for a resilient system. Accordingly, a key Project objective is to restore the natural coastal processes that have been impacted by past development of the barrier island, including: 1) alongshore transport, 2) cross-island transport, 3) dune growth and evolution, 4) bay shoreline processes, and 5) estuarine circulation and water quality. Likewise, past development on the Long Island mainland has constrained the functionality of the floodplain. Reestablishment of natural floodplain function on the mainland is a Project objective that compliments the non-structural plan.

Initially, roughly forty sites on the barrier island and five sites on the mainland were identified that had potential for providing coastal process features (CPFs). The screening and evaluation process considered economic benefits, concept level feasibility, and property owner support. Details on the screening and evaluation process for the CPF sites, including justification for site removal, is presented in the Plan Formulation (Appendix E). The screening and evaluation was conducted in coordination with other Federal agencies, stakeholders, and New York State as the Local Sponsor and yielded the 12 barrier island and two mainland CPF sites that are part of the Recommended Plan.

1.1 Coastal Process Features of the FIMP Recommended Plan

To achieve the objective of restoring natural coastal processes, and to provide offsets for Endangered Species Act (ESA) impacts and Coastal Storm Risk Management (CSRМ) impacts, the Recommended Plan:

- Provides for 12 barrier island locations and two mainland locations for reestablishment or enhancement of CPFs
- Includes placement of approximately 4.2 million cubic yards (M CY) of sediment in accordance with the Policy Waiver for a Mutually Acceptable Plan between the Department of the Army and the Department of the Interior
 - Sediment will be placed along the barrier island bayside shoreline over the 50 year project period of analysis that reestablishes the coastal processes consistent with the reformulation objective of no net loss of habitat or sediment.
 - The placement of sediment along the bay shoreline will be conducted in conjunction with other nearby beach fill operations undertaken on the barrier island shorefront.

The CPF sites will compensate for reductions in cross-island transport and sediment input to the Bay, offset ESA impacts from the placement of sediment along the barrier island shorefront, augment the resiliency and enhance the overall barrier island and natural system coastal processes. The CPF site locations are summarized in Table I-1 and illustrated in Figure I-1.

**Table I-1. Summary of CPF Sites included in the Recommended Plan
Barrier Island and Mainland Sites for Reestablishment of Coastal Process Features**

CPF Number	CPF Name	CPF Purpose	CPF Description	Construction Contract	Initial Volume	Renourish Volume (4-year)
1	Democrat Point West	ESA	Regrade and devegetate; modify pond to improve functionality of existing wetland/create new foraging habitat; conserve on site sand volume.	FI Inlet bypassing	n/a	n/a
2	Democrat Point East	ESA	Regrade and devegetate bay side; modify sand stockpiles to form barrier between recreation and ESA areas; conserve on site sand volume.	FI Inlet bypassing	n/a	n/a
3	Dunefield West of Field 4	ESA	Devegetate ocean side; maintain vegetation buffer with road on north side.	FI Inlet bypassing	n/a	n/a
4	Clam Pond	CSRM	Bay side fill placement to simulate cross island transport; possible living shoreline on north side per adaptive management plan.	FI Renourishment	51,212	41,843
5	Atlantique to Corneille	CSRM	Bay side fill placement to simulate cross island transport.	FI Renourishment	64,640	58,204
6	Talisman	CSRM	Bay side fill placement to simulate cross island transport.	FI Renourishment	85,880	81,291
7	Pattersquash Reach	CSRM/ ESA	Devegetate bay side; shallow water bay side fill placement; south boundary follows Burma Rd alignment, includes physical barrier.	Moriches Inlet Bypassing	19,396	11,244
8	New Made Island Reach	CSRM/ ESA	Devegetate bay side; shallow water bay side fill placement; south boundary follows Burma Rd alignment, includes physical barrier.	Moriches Inlet Bypassing	100,583	21,998
9	Smith Point County Park Marsh	CSRM	Bay side marsh restoration; fill placement to simulate cross island transport; regrade marsh elevation filling ditches and creating channels for tidal exchange.	Moriches Inlet Bypassing	259,430	13,543
10	Great Gun	ESA	Devegetate ocean side parcel.	Moriches Inlet Bypassing	n/a	n/a
11	Dune Rd Bayside Shoreline	CSRM	Bay side fill placement; bulkhead/groin removal; possible additional fill within offshore channel.	Shinnecock Inlet bypassing / PBRP	49,890	23,654
12	Tiana Bayside Park	CSRM	Bay side fill placement at east side of site; PED will determine fate of existing gabions.	Shinnecock Inlet bypassing / PBRP	36,647	35,833
MB 1	Mastic Beach 1	CSRM	Regrade and vegetate in conjunction with NS acquisition	Non-Structural Contract	n/a	n/a
MB 2	Mastic Beach 2	CSRM	Regrade and vegetate in conjunction with NS acquisition	Non-Structural Contract	n/a	n/a

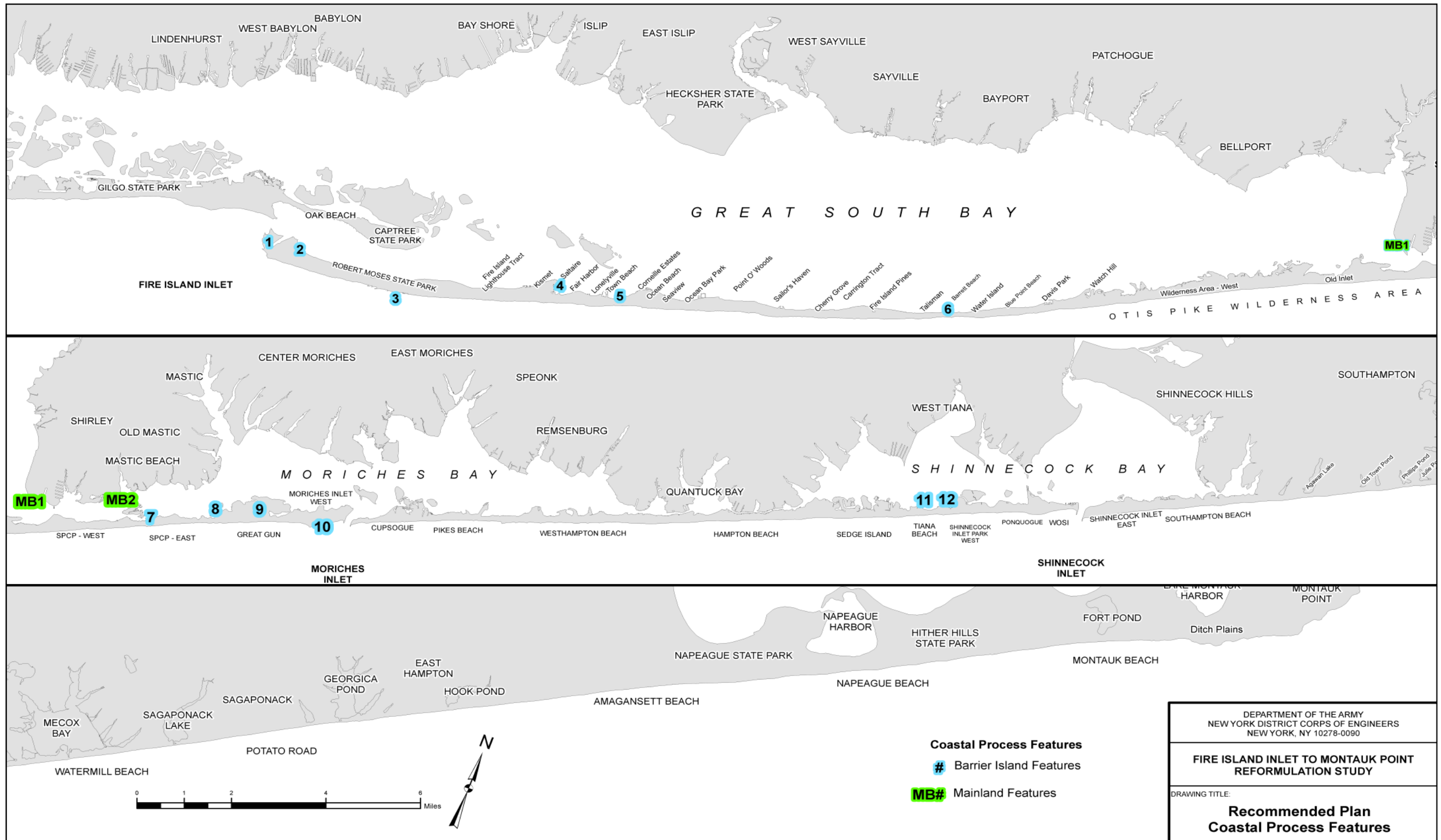


Figure I-1. Recommended Plan Coastal Process Features

2.0 CPF SITE CONCEPTS

Sections 2.1 and 2.2 present the barrier island and mainland CPF site concepts. Site specific descriptions of each CPF site included in the Recommended Plan are provided in Section 3.

2.1 Barrier Island CPF Site Concepts

The various Barrier Island CPF sites would provide for reestablishment of CSRSM functions, ESA habitat functions, or both.

The Barrier Island CSRSM CPF sites address the expected sediment deficit into the bay system from the implementation of the FIMP beach fill plan components. The expected reduction in the number of island breaches and overtopping events during the life of the Project would in turn reduce the amount of sediment and associated overwash fan habitat introduced into the bay system. As part of the cross island transport analyses, the total reduced sediment volume to the backbay system was calculated at approximately 4.2 M CY of sediment over the 50 year project life. The CSRSM CPFs make up for this volume by considering the expected site-specific erosion rates at each CSRSM CPF and determining the total volume anticipated placed over the project life.

Construction activities will range from standard beach fill placement techniques, to submerged nearshore bayside placement, to thin layer placement and marsh regrading. The CPFs will be constructed in conjunction with the construction of other FIMP beach placement projects, and renourished when the beachfill features are nourished, currently estimated to be approximately a 4-year cycle.

The ESA CPF sites seek to produce no net loss of habitat for ESA species of concern – specifically piping plovers. Both nesting and foraging habitat have been considered based on criteria established by the FWS during the plan development process. FWS criteria include, among others, shoreline slope, elevation, vegetation cover, buffers, and predator control. Each CPF has been evaluated for ESA offsets based on these criteria, and the total portfolio of CPFs provides the required total acreage offset as determined by FWS.

Specific criteria values under consideration include nesting habitat between elevations +4 and +9 ft NGVD, foraging habitat between the locally determined lowest astronomical tide (LAT) and highest astronomical tide (HAT) elevation, beach slope no steeper than 4%, vegetation coverage less than 17% to qualify for full credit, and various buffer distances based on the adjacent upland land cover.

ESA CPF construction activities include a combination of regrading existing on-site sand to meet the target slopes and elevations and devegetation of upland areas to meet the target cover goals.

Regrading will occur through use of standard earthmoving equipment. Devegetation will occur either via mechanical processes or the targeted application of herbicides.

All barrier island CPFs will be evaluated for ESA offsets during the project's monitoring and adaptive management phase.

CPF initial construction will coincide with the adjacent beach fill initial construction. CPF maintenance activities are expected to follow the beach fill's anticipated four-year nourishment cycle. Adaptive management principles will be applied to the CPFs during each maintenance cycle, including CPF design criteria such as fill template elevations, and the need for living shoreline features.

Table I-1 summarizes the Recommended Plan CPF's, and identifies the sediment requirements for initial construction and for renourishment. The estimated sediment placement does not meet the 4.2 M CY requirement over a period of 30 years. In order to meet the 4.2 M CY requirements, the Corps is committed to adaptive management of the project. The adaptive management will include the following considerations for achieving the 4.2 M CY volume requirement:

- 1) Since inlet bypassing is recommended to continue for 50 years, renourishment of CPF's in proximity to inlet bypassing activities would continue beyond 30 years, and can achieve the quantity requirements, with no other modifications.
- 2) As part of adaptive management, the size and scope of each site will be revisited, and assessed if additional quantity during renourishment would achieve the volumetric requirements.
- 3) There are several sites along Fire Island that were eliminated from consideration, due to land owner concerns. These sites could be revisited through the adaptive management process to achieve the sediment objectives.
- 4) Over the project life, if there is the need for a breach closure action, there is an opportunity to place an additional quantity of sand on the bay shoreline as part of this closure operation, which is not accounted for, and would increase the amount of sediment placed.

The first option is currently included within the project cost estimate.

2.2 Mainland CPF Site Concepts

The mainland CPF restoration concepts were developed to provide both CSRSM benefits by providing a buffer to reduce wave energy and impacts to the developed areas and to provide sustainable natural habitats. There are two basic design profiles:

- Some of the mainland CPF site or portions thereof have a typical tidal marsh profile, in which low marsh vegetation lines the shore within the intertidal zone between mean low water (MLW) and mean high water (MHW). High marsh would be located at roughly the high tide line (HTL) and would extend to a little above mean higher high water (MHHW), with high marsh grasses found at the lower elevation in this zone and high marsh shrubs dominating the higher elevations. The high marsh shrubs would form a mosaic with upland forest species in the transition zone above tidal influence, yielding to a dominant upland maritime forest community. Depending on the existing elevations, either material removal or fill may be required to achieve the final grade. This profile is illustrated in Figure I-2.
- Other parts of the sites have higher elevation areas along the shoreline. Although this may be from historic filling associated with development, removal of fill and lowering of the elevation would be counter to the intended objective of providing CSRM. This existing condition gives a different profile of CPFs when viewed from the shoreline. At these locations a maritime forest community would border the shoreline, followed by a high marsh shrub, high marsh grasses and low marsh. The transition would be reversed leading to an upland forest community toward the mainland. Locations with interior tidal channels or creeks may have a similar profile. This profile is illustrated in Figure I-3.

In the Preliminary Engineering and Design (PED) phase, a community-by-community design will be undertaken specifically for the Non-Structural Alternatives, including CPFs. In addition to stakeholder and community outreach, the PED phase will include field studies, surveys and data collection inputs to a more detailed design of CPFs. Accordingly, the concept level plans presented simply illustrate examples of what possibly could be undertaken at the identified sites, or similar sites, to provide or improve CPFs.

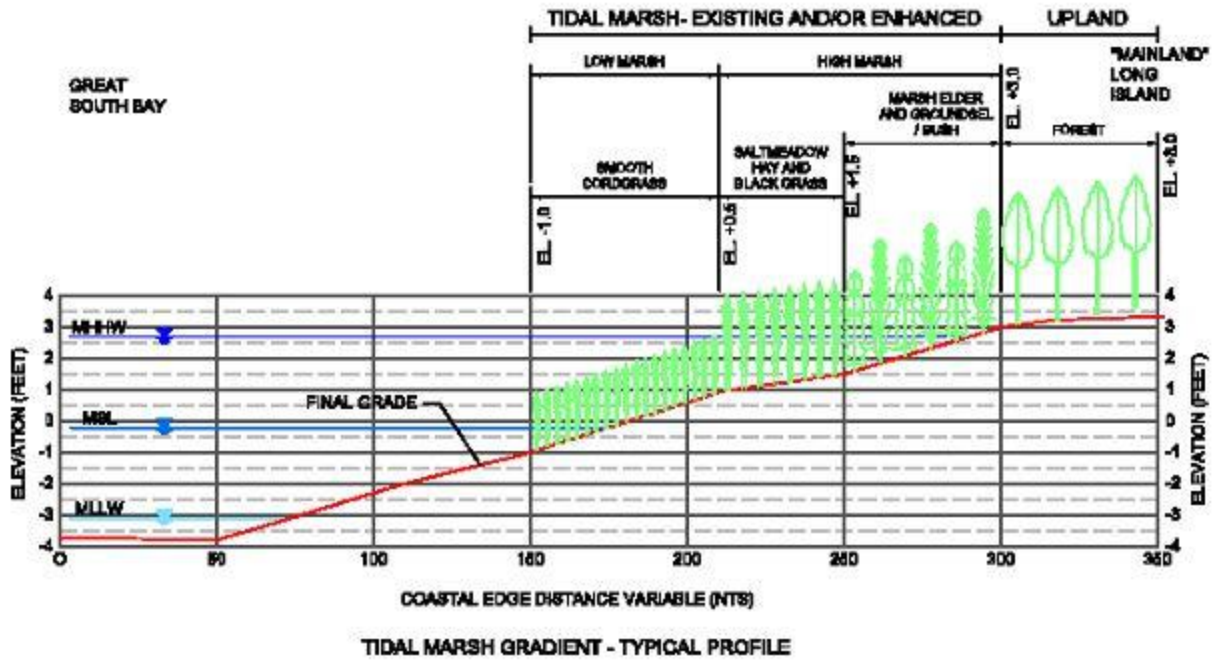


Figure I-2. Tidal Marsh to Upland - Typical Profile

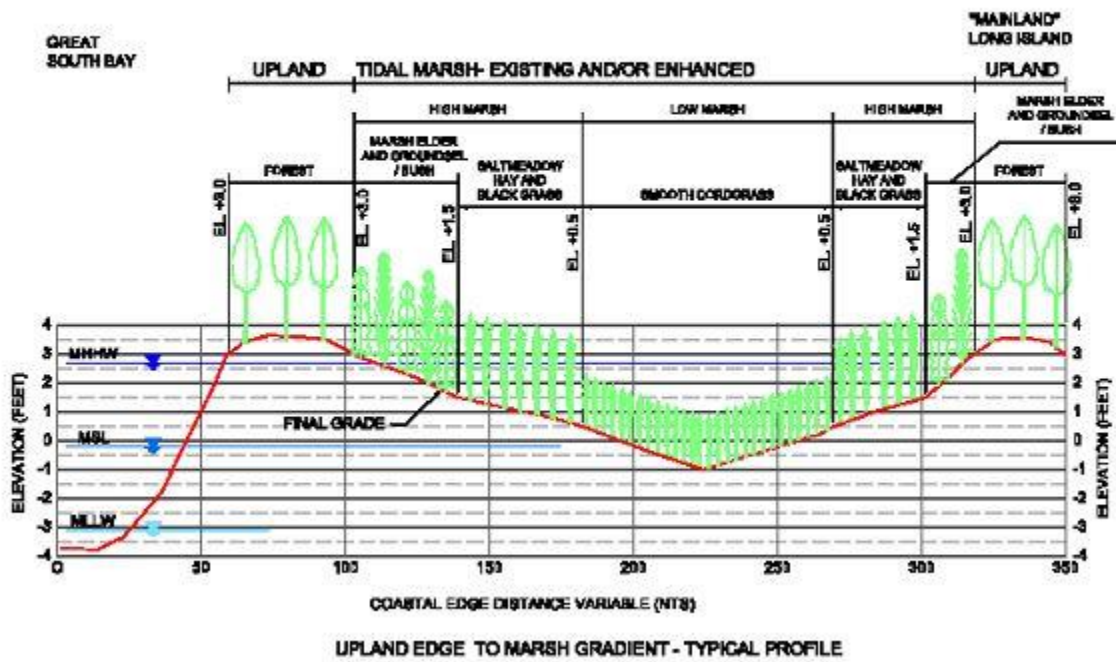


Figure I-3. Upland Shoreline to Marsh to Inland Upland - Typical Profile

3.0 BARRIER ISLAND AND MAINLAND CPF SITE DESCRIPTIONS

Descriptions of each of the barrier island and mainland CPF sites included in the Recommended Plan are provided in this section. A summary of each is provided in Table I-1.

3.1 CPF #1 Democrat Point West

Democrat Point is located on the western end of Fire Island within Robert Moses State Park. Democrat Point defines the south and east boundary of Fire Island Inlet with Oak Beach to the north and west. Democrat Point is a complex coastal area. At the western end lies a continuously evolving sand spit. A wetland encompasses portions of the center of Democrat Point. A rock jetty spanning the width of the island defines the east boundary of Democrat Point. Democrat Point contains dunes with heavy vegetation near the center. These taper toward the water on the north, west, and south sides. A small tidal pond, located just east of the Point's center, is surrounded by wetlands.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +8.33 ft-NAVD88 (+9.5 ft-NGVD29) at Democrat Point.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating proposed habitat. Foraging habitat encompasses the area between the LAT and the highest astronomical tide (HAT), while nesting habitat extends from the HAT to an elevation of +8.33 ft-NAVD88 (+9.5 ft-NGVD29). Habitat is proposed on the north and south sides of the Point with a berm spanning the interior portion at a maximum elevation of +8.3 ft-NAVD88. Modifications are not proposed along the western side of the project due to the migrating sand spit. Fill will be placed in the vicinity of the wetland and tidal pond area to improve the productivity and functionality of the wetland. Through the proposed activities at Democrat Point, early successional habitat will be created.

FIMP designates the Democrat Point CPF as a species protection zone and recommends prohibiting installation of beach stabilization features. The USACE recommends the local land management agency consider predator management in newly set-aside areas.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure the resolution of project objectives. The

USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future sediment placement.

3.2 CPF #2 Democrat Point East

Democrat Point (East of Jetty) is located on the western end of Fire Island within Robert Moses State Park. Democrat Point (East of Jetty) lies just east of the Fire Island Inlet with Oak Beach to the north and west. Democrat Point (East of Jetty) is a sandy bayside beach, where sand was previously stockpiled after dredging projects in the vicinity. The project area contains coastal dunes with sporadic vegetation.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +5 ft-NAVD88 at Democrat Point (East of Jetty).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for regrading and devegetating the site. The regrading template includes a 2% slope on the north bank to allow for viable shorebird habitat. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to a constructed elevation of +5 ft-NAVD88.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly created CPF's. In addition, the USACE anticipates the park's ORV policy will be implemented during nesting season.

3.3 CPF #3 Dunefield West of Field 4

Dunefield West of Field 4 is located on the western end of Fire Island, southeast of the Robert Moses Causeway, within Robert Moses State Park on the oceanside. Dune Field West of Field 4 contains dunes with heavy vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for removing vegetation from the site. No regrading is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +10 ft-NAVD88 at Dune Field West of Field 4.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating to produce both foraging and nesting habitat within the project site. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the naturally occurring +10 ft-NAVD88 elevation contour.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly established CPF's.

3.4 CPF #4 Clam Pond

Clam Pond is located on the western portion of Fire Island between Saltaire and Fair Harbor. Clam Pond lies south of the West and East Fire Islands. The Clam Pond area is shallow with an average depth of approximately 1 ft with a maximum of about 5 ft. Historically a sand spit existed at this location. This CPF seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +5 ft-NAVD88 at Clam Pond.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for fill placement and grading over a project area of approximately 15.3 acres (ac). The project

area includes 4.4 ac of proposed newly created nesting habitat and 8.2 ac of proposed foraging habitat. The foraging habitat consists of both newly created and existing habitat between the HAT and LAT elevations. On the north side of the project, fill will slope from the +5 ft-NAVD88 contour to the intersection with existing grade. A living shoreline will be placed on the north side of the project site to help retain fill. On the south side, fill will slope at 3% between +5 ft-NAVD88 and the HAT elevation, then at 1% to the intersection with existing grade.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

3.5 CPF #5 Atlantique to Corneille

Atlantique to Corneille is located on the western portion of Fire Island, on the bay just east of Atlantique Park. The average nearshore water depth on the bayside at Atlantique to Corneille is approximately 3 ft. Boat docks exist to the east and west of this CPF, while several small bulkheads lie on either side of the site. The CPF design fill must limit impacts to navigation features. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRSM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +4 ft-NAVD88 at Atlantique to Corneille.

To simulate cross island transport and create early successional habitat that provides nesting and foraging for shorebirds, plans call for the placement of fill, transitioning from the western bulkhead area to the spit to the east. The regrading template includes 3% and 1% slopes on the north bank to allow for viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. The landward side of the fill profile will tie into existing grade at +4 ft-NAVD88. The cross shore extent of this CPF is limited due to the overall site configuration.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends

the local land management agency consider predator management and symbolic fencing to the +10 ft-NAVD88 contour.

3.6 CPF #6 Talisman

Talisman is located in the central portion of Fire Island within Barrett Island Park between Fire Island Pines and Water Island. The average nearshore water depth on the bayside at Talisman range from 1 ft to 3 ft. Historically a sand spit existed at this location. The west side of Talisman includes a park dock extending approximately 400 ft into the bay. The proposed fill extends eastward approximately 1,400 ft. A private dock lies to the east of this CPF. Fill placed at this CPF should account for potential impacts to these structures. This CPF design seeks to add fill to provide ESA bird habitat (foraging and nesting) as well as provide CSRSM benefits by simulating cross island transport.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tidal induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation up to +4 ft-NAVD88 at Talisman.

To simulate cross island transport and create early successional habitat that provides nesting and foraging for shorebirds, plans call for the reestablishment of approximately 1,400 ft of the historic shoreline through the placement of fill. A living shoreline will be placed on the north side of the project site to help reduce the erosion rate. The regrading template includes 3% and 1% slopes on the north bank to create viable shorebird habitat, and a 4% slope below the LAT to tie into the existing grade. Some of the upland portions of this CPF lie below the design berm elevation of +4 ft-NAVD88. As such, the landward side of the fill profile will transition to existing grade at a 4% slope, where necessary. Otherwise the berm will tie in to the existing grade at +4 ft-NAVD88. This will preserve the area as nesting habitat. The cross shore extent of this CPF is limited due to the overall site configuration.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the +10 ft-NAVD88 contour.

3.7 CPF #7 Pattersquash Reach

Pattersquash Reach is located on the eastern portion of Fire Island on the bayside within Smith Point County Park. Pattersquash Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRМ benefits by placing fill to simulate cross island transport.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating the site. All devegetation will occur north of Burma Road. In addition, in-water sediment placement to an elevation of -1 ft-NAVD88 will simulate cross island transport. No upland regrading is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA’s reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to the naturally occurring +8 ft-NAVD88 contour at Pattersquash Reach.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the 10 ft-NAVD88 contour.

3.8 CPF #8 New Made Island Reach

New Made Island Reach is located on the eastern portion of Fire Island on the bayside, within Smith Point County Park. New Made Island Reach lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains coastal dunes with vegetation and an historically ephemeral sand spit. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting) as well as provide CSRМ benefits by placing fill to simulate cross island transport.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating the site. All devegetation will occur north of Burma Road. In addition, in-water

sediment placement to an elevation of -1 ft-NAVD88 over 15.8 ac will simulate cross island transport. No upland regrading is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to the naturally occurring +10 ft-NAVD88 contour at New Made Island Reach.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management and symbolic fencing to the 10 ft-NAVD88 contour.

3.9 CPF #9 Smith Point County Park Marsh

Smith Point County Park Marsh is located on the eastern portion of Fire Island on the bayside, within Smith Point County Park. Smith Point County Park Marsh lies between two inlets, Old Inlet to the west and Moriches Inlet to the east. The project area contains a large coastal salt marsh with linear man-made ditches cut through the wetland. The north/south running ditches are cut at approximately 1,000 ft intervals while the east/west running ditches are cut at approximately 200 ft intervals. This CPF design seeks to add fill to provide CSRSM benefits by simulating cross island transport.

To restore cross island transport, plans call for placement of fill across the salt marsh. The site will be regraded to allow for wetland vegetation reestablishment. Higher elevations buffer the project area mimicking its current state. The existing man-made ditches will be filled to reestablish a uniform marsh across the entire project area. Tidal channels will be established. These are design features that will allow tidal exchange to extend to the interior of the marsh.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

3.10 CPF #10 Great Gun

Great Gun is located on the eastern portion of Fire Island on the Atlantic Ocean side within Smith Point County Park. Great Gun lies immediately west of Moriches Inlet. The project area contains coastal dunes with vegetation. This CPF design seeks to devegetate uplands to provide ESA bird habitat (foraging and nesting).

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for removing vegetation. No regrading is anticipated.

Foraging habitat is defined as the intertidal area that is intermittently submerged and exposed during tide-induced water surface fluctuations. As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for foraging habitat.

Nesting habitat is located immediately upland of foraging habitat and extends from the HAT elevation to +10 ft-NAVD88 at Great Gun.

To create early successional habitat that provides nesting and foraging for shorebirds, plans call for devegetating the site. Foraging habitat encompasses the area between the LAT and the HAT, while nesting habitat extends from the HAT to the naturally occurring +10 ft-NAVD88 elevation contour or 640 ft from the HAT.

Maintenance activities at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and are subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management in newly established CPF's.

3.11 CPF #11 Dune Road, East Quogue

45, 47, and 51 Dune Road, East Quogue is located on the eastern portion of Westhampton Island, on the bayside just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at 45, 47, and 51 Dune Road, East Quogue is approximately 3 ft with a maximum of about 6 ft. A couple bulkheads and groins lie in the center of the project site while multiple pile supported and floating docks associated with Tiana Bayside Park lie just to the east. The CPF design fill must limit impacts to adjacent navigation features. This CPF design seeks to add fill to provide CSRМ benefits by simulating cross island transport.

As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and the Highest Astronomical Tide (HAT) as the upper bound for the tide range.

To restore cross island transport, plans call for removal of the bulkheads and groins and placement of fill across the embayment centered on the currently bulkheaded properties. The fill template includes a berm extending bayward from the existing HAT contour with a landward extension to the intersection with native ground. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration. This is considered the base project for CPF 37.

The design may add CSRMs benefits by considering additional fill within the existing offshore channel. Additional Fill 1 involves placing 7,021 cy of fill within a 350 ft x 600 ft area immediately north of the base project. Additional Fill 2 extends this area an additional 500 ft to the north and adds 8,581 cy. Combined Additional Fill 1 and 2 provide capacity for an additional 15,602 cy.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

3.12 CPF #12 Tiana Bayside Park

Tiana Bayside Park is located on the eastern portion of Westhampton Island, on the bayside just west of Shinnecock Inlet and Shinnecock County Park West. The average nearshore water depth on the bayside at Tiana Bayside Park is approximately 3 ft with a maximum of 6 to 7 ft in an offshore channel. Several pile supported and floating docks lie along the western half of the project site. A 750 ft long line of rock-filled gabions fronts the shoreline within the dock structures. The CPF design fill must limit impacts to navigation features. This CPF design seeks to add fill to provide CSRMs benefits by simulating cross island transport.

As a proxy for the local spring tide range, the following discussion applies NOAA's reported Lowest Astronomical Tide (LAT) as the lower bound and Highest Astronomical Tide (HAT) as the upper bound for the tide range.

To restore cross island transport, plans call for the placement of fill from the eastern bulkhead area across the adjacent bayside shoreline to the east. The landward side of the fill profile will tie into the closer of the existing grade at +4 ft-NAVD88 or the adjacent roadway right-of-way. The

fill template includes a berm extending bayward. The template includes an assumed 5% slope from the bayside edge of berm to the intersection with the bay bottom. The cross shore extent of this CPF is limited due to the overall site configuration.

The base design includes fill placed to -3 ft-NAVD88 within the eastern half of the navigation channel immediately offshore of the project area. The total fill currently envisioned in the project area is 36,647 cy.

The eastern 350 ft of gabions may be treated in one of three possible ways. First, they may be left as-is in place. Second they may be removed and replaced with a small amount of fill to soften the shoreline. Finally, they may be left in place and buried beneath a small amount of fill to soften the shoreline while retaining the shoreline protection should erosion re-expose the gabions.

Sand placement at the CPF sites will be performed in coordination with renourishment cycles of the beachfill features and subject to monitoring to ensure resolution of project objectives. The USACE will not implement vegetation management or manipulation of the sites unless conducted as an incidental action associated with future placement. The USACE recommends the local land management agency consider predator management.

3.13 CPF Site MB#1 Mastic Beach #1

Mastic Beach #1 is a roughly 25 acre site located on the “mainland” of Long Island in the town of Mastic Beach, north of Narrow Bay. It is situated west of Pattersquash Creek and east of Sheepen Creek and includes the shoreline and adjacent areas along Riviera Drive, roughly between Montauk Drive and Hickory Road. This CPF site predominantly consists of vacant land, but also includes eight buyout parcels in residential areas that are subject to very frequent flooding and low lying roads that in some locations are lower than adjacent areas and provide conduits for floodwaters. Undeveloped areas consist primarily of common reed dominated wetlands, some existing uplands and high marsh shrub areas. Linear channels within the existing marshes are visible on the aerial photos, indicating that alterations in hydrology have contributed to degradation of the natural marsh ecosystem.

The conceptual CPF plan for MB#1 consists of reestablishment of a natural vegetation community transition, beginning with forested uplands adjacent to the remaining residential areas, followed by high marsh shrub, high marsh grasses and low march near the shoreline. Following selective acquisition, former private parcels and abandoned roads would be restored to forested areas, enhancing the CPF function of this vegetation type by increasing the width of this community. Where higher elevations exist along the shoreline, these areas would be expanded if possible to create and enhance a high marsh shrub vegetation community. Although not depicted

on the concept plan, existing linear channels would be replaced with more sinuous natural configurations to enhance the hydrologic function of the wetland. The channel configuration and refinement of the various planting zones would be developed during the PED phase. The current concept level plan consists of approximately 2 acres of maritime forest, approximately 14 acres of high marsh and approximately 9 acres of low marsh habitat creation and enhancement.

3.14 CPF Site MB#2 Mastic Beach #2

Mastic Beach 2 consists of two areas in the town of Mastic Beach and east of Pattersquash Creek. Area 1 has two sections. One section to the west is south of Grove Road West and west of Jefferson Drive. It consists of primarily vacant land, with one buyout property. The other section consists of marshes and adjacent vacant lands on either side of the tidal creek between Jefferson Drive and Beaver Drive. Mastic Beach 2 Area 2 is located west of Lawrence Creek and is bordered on the east by the William Floyd Estate section of Fire Island National Seashore. There are five buyout parcels associated with MB#2 Area 2. Mastic Beach 2 consists primarily of common reed dominated wetlands, some of which have been hydrologically altered as a result of linear channel construction. Other locations appear to be hydrologically isolated and low lying. Low marsh vegetation is present in lower lying areas and adjacent to channels. Uplands and scattered residences are present throughout the site.

The CPF approach for MB#2, Areas 1 and 2, are similar to that for MB#1. Basically, the forested upland perimeter would be enhanced or established at existing high ground, including selectively acquired properties and abandoned roads. Wetland hydrology would be enhanced and high marsh and low marsh would be established or enhanced at suitable elevations. The hydrologic enhancements and refinement of the various planting zones would be developed during the PED phase. The current concept level plan for MB#2 Area 1 consists of approximately 2 acres of maritime forest, approximately 9 acres of high marsh and approximately 13 acres of low marsh habitat creation and enhancement, for a total of approximately 24 acres. MB#2 Area 2 is smaller, totally approximately seven acres. The current concept level plan for MB#2 Area 2 consists of approximately 2 acres of maritime forest, approximately 2 acres of high marsh and approximately 3 acres of low marsh habitat creation and enhancement.