

**Hashamomuck Cove
Southold, New York
Coastal Storm Risk Management
Integrated Feasibility Study/EA**

**Appendix D
Civil Engineering**

Hashamomuck Cove, Southold, NY Coastal Storm Risk Management Feasibility Study

June 2019

**Appendix D
Civil Design**

Hashamomuck Cove Coastal Storm Risk Management Feasibility Study

Appendix D: Civil Design

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Plan Set – Recommended Plan

Chapter 1: Introduction

1.1 Study Area

Hashamomuck Cove is located on the north shore of Long Island in the Town of Southold, New York and is bounded on the north by Long Island Sound and on the south by the north fork of Long Island. The project study area consists of approximately 1.5 miles of shoreline of densely developed residential and commercial buildings and County Route 48 (CR) which provides primary access and utilities to the eastern end of the north fork of Long Island (see Figure 1). The topography is relatively flat with the exception of a small bluff in the middle portion of the study area. For analysis purposes the study area has been divided into fifteen reaches, based on shoreline characteristics and orientation. These fifteen reaches were further broken down into three concave coves for analysis runs. These three coves are defined as “West Cove”, “Central Cove”, and “East Cove”.

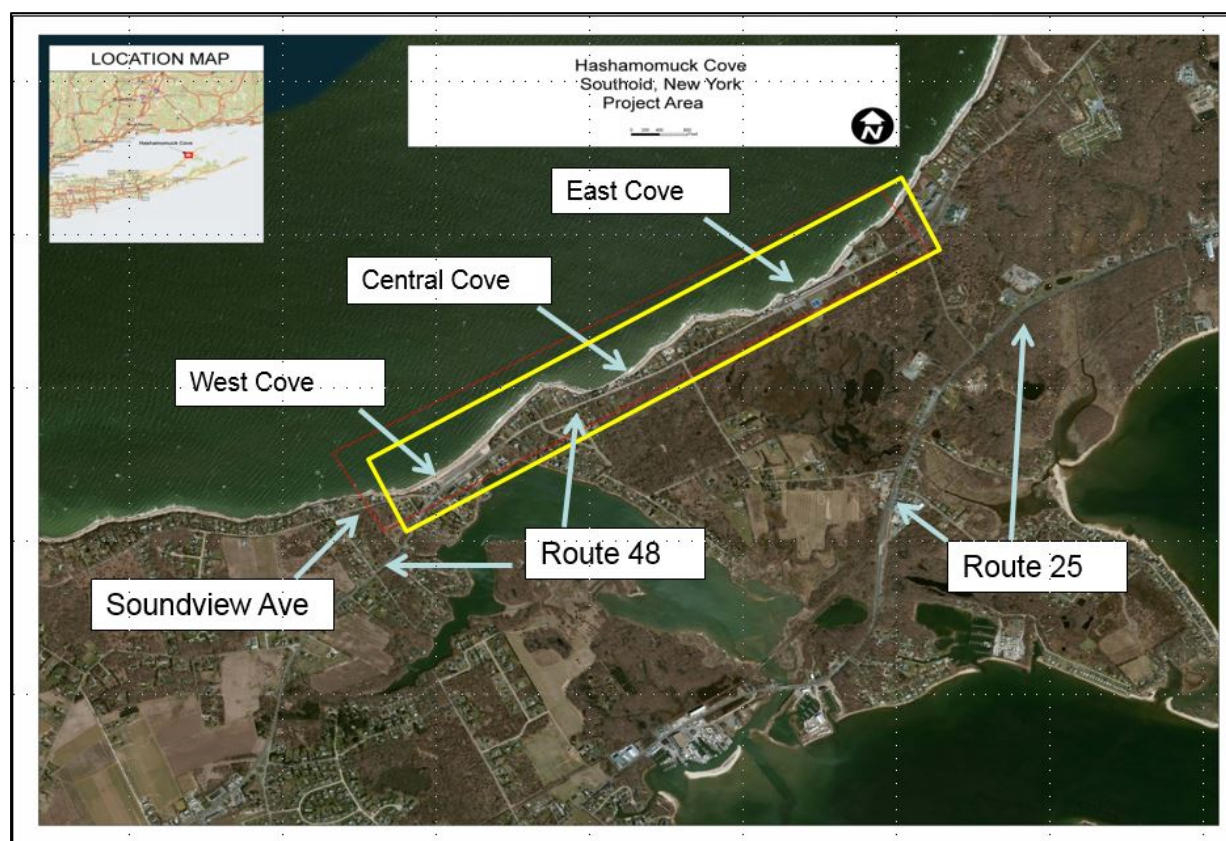


Figure 1: Hashamomuck Study Area

1.2 Shoreline Condition

The shoreline within the study area is typified by undulating concave sandy beaches with large offshore rocks backed by low bluffs and Hashamomuck Pond. A large portion of the shoreline is composed primarily of bulkheads and stone revetments. Residences, a public beach (Hashamomuck Beach) and two areas of commercial properties characterize the shoreline. The existing beaches and bulkheads are relatively stable, although there are portions of deteriorated timber bulkheads which are in need of repair.

The relatively flat topography of the waterfront fill and low existing bulkhead elevations allow tidal inundation during periods of major storm events. The 1% (100-year) storm flood event limit would submerge major portions of the shoreline to the base of the bluffs. Portions of CR 48 and adjoining side roads would be below water during a 1% (100-year) storm event. These elevations range from 16.0 feet NAVD88 in VE Zones to 11.0 NAVD88 in AE Zones.

Chapter 2: Survey Data

2.1 Topographic Data

Topographic data used for this study consists of 10 short range beach profiles and profile lines of all existing shore protection structures and bluffs. The short range beach profiles range from the centerline of CR 48 and extend seaward to approximately elevation -3.0. The structure and bluff profiles include elevations at the crest, toe, and the landward intercept with the structure. Horizontal data from the survey is referenced to New York State Plane Coordinate System, Long Island Lambert NAD 83, US Survey Feet and vertical data is referenced to NAVD88, US Survey Feet. The data was field surveyed during December 2014.

2.2 Bathymetric Data

Bathymetric profiles of the project area were taken in October and November 2014 and consist of 11 long range lines, each extending approximately 2,500 feet seaward from near the shoreline, and spaced approximately 900-1000 feet apart. Horizontal data from the survey is referenced to New York State Plane Coordinate System, Long Island Lambert NAD 83, US Survey Feet and vertical data is referenced to NAVD88, US Survey Feet.

Chapter 3: Project Alternatives

3.1 Preliminary Alternatives Array

Preliminary alternatives considered for this study include:

- **Alternative 1:** Without Project Condition
- **Alternative 2:** Beach Fill Plan (Berm)
- **Alternative 3:** Beach Fill with Dune Plan (Berm with Dune)
- **Alternative 4:** New Bulkhead
- **Alternative 5:** Non-structural Plan – Buyouts

3.1.1 **Alternative 1: Without Project Condition**

This alternative assumes no action for coastal storm risk management and does not require civil design input.

3.1.2 **Alternative 2: Beach Fill Plan (Berm)**

This alternative consists of the shoreline being re-nourished with beach fill, extending the existing waterline seaward and mitigating for the isolated historic erosion that is occurring at this location. The beach fill will be built up to elevation +6 ft. NAVD88 based on a height that attempts to resemble an average natural elevation of existing shoreline. This alternative analyzes a berm for the entire study length in different widths and combination of widths. Alternative 2A uses a 25 ft. wide berm. Alternative 2B uses a 50 ft. wide berm, and Alternative 2C uses a 75 ft. berm in the concave portion of each cove, tapering to a 25 ft. wide berm on both sides. The foreshore slope is 1:10.

A sand source for the berm was assumed to be from an upland location on Long Island. There is no known, permitted, off-shore under water borrow area within an economically viable location to the study area. Therefore the volume of sand required for this alternative would need to be trucked and dumped at various locations within the berm fill area and moved into location by mechanical means.

It should be noted that this was a screening level analysis. Actual determination of the sand source would need to be refined to determine the most cost effective solution for importing sand.

3.1.3 **Alternative 3: Beach Fill with Dune Plan (Berm with Dune)**

This alternative combines structural storm damage reduction features described in Alternative 2 with a contiguous dune, likely planted with native dune grass. Alternative 3 encompasses the entire study length.

The alternative uses a proposed dune crest elevation of +12.0 NAVD88 in the West Cove and +11.0 NAVD88 in the Central and East Coves. These elevations were chosen to achieve approximately the highest dune practical due to space constraints in several locations of the study area. The side slopes will be 1V:3H allowing for a narrow profile to allow space for a high tide beach fill. The width of the dune varies from 10 feet wide in the East Cove to 5 feet wide in both the Central and West again controlled by space constraints. In both alternatives, a beach fill (berm) is proposed seaward of the dune at an elevation of +6.0 NAVD88 and a 50 foot width. The foreshore slope is 1:10.

The Beach Fill with Dune Alternative will require timber stair walkovers to maintain waterfront access. See Section 5 for a typical timber stair walkover.

3.1.4 **Alternative 4: New Bulkhead**

Raised bulkheads are proposed for this alternative. Alternative 4A encompasses the entire study length while Alternative 4B encompasses road protection only (CR 48) along the three coves.

In Alternative 4A, the bulkhead runs immediately seaward of the existing private bulkheads and revetments. Scour protection is provided using two layers of toe protection comprised of 2 to 4 foot block stones (one-half to two ton stones) within the first 10 feet seaward of the piles. The stone will be placed

on top of a 6 in. layer of bedding material on geotextile. A crest elevation of +10.5 NAVD88 matching the 1% (100 year) flood stillwater elevation (with wave set-up) was chosen for analysis. Final crest elevation will be determined in more detailed design.

As an alternative, to geotextile, design efforts would consider the use of stone filled marine mattresses which incorporate the geotextile into or on the bottom of the mattress or cabled concrete block mattresses which have the geotextile fastened to the bottom. The mattresses may be easier to place than geotextile and bedding, particularly when placement is below water.

The bulkhead will require timber stair walkovers to maintain waterfront access at approximately six locations to be determined. Portions of the bulkhead would require sand fill along the landward side of the bulkhead for public safety purposes. See Section 5 for more detail on the timber stair walkover.

In Alternative 4B, the bulkhead runs along the CR 48 right-of-way for lengths of roadway that are most susceptible to coastal storm damage. The bulkhead would be driven flush with the existing grade along the proposed locations to allow access to existing property seaward of the bulkhead. This alternative would require utility relocation where existing utilities service property seaward of the bulkhead. The utilities consist of gas, water and electric services to primarily single family residential use. These utilities would be excavated, temporarily discontinued, and then re-routed through a core hole in the new bulkhead.

3.1.5 Alternative 5: Non-structural Plan – Buyouts

This alternative consists of non-structural storm damage reduction through property buyouts of the most significantly affected properties. A total of 29 structures are considered suitable candidates for buyout based on projected damage reduction. The non-structural features will not obstruct any water views, nor will waterfront access need to be modified.

Refer to the body of the report for a more detailed description of this alternative.

Chapter 4: Project Tie-Ins

4.1 Western Tie-In

The tie-in for the western end of the study area is an existing groin. This groin is in fair condition and for the beach fill and dune alternatives, the elevations of the groin and beach to the west of the groin will provide a stable tie-in location.

For Alternative 4A, the bulkhead would abut the higher elevation at the landward end of the existing groin. The elevation in this location would blend with the proposed bulkhead with minimal site grading.

4.2 Eastern Tie-In

The tie-in for the eastern end of the study area is an existing groin adjacent to the motel property in the East Cove. This groin is in fair condition and for the beach fill and dune alternatives, the elevations of the groin and beach to the east of the groin will provide a stable tie-in location. Future design considerations

may look into a short cobble beach directly to the east of the existing groin where scarping of the existing beach is evident. The cobble beach would prevent scarping of the new beach fill.

For Alternative 4A, the bulkhead would abut the higher elevation at the landward end of the most easterly existing groin. The elevation in this location would blend with the proposed bulkhead with minimal site grading.

Chapter 5: Access

5.1 Timber Stair Walkover

A timber stair walkover would be required under either Alternative 3 (Berm Fill with Dune) or Alternative 4 (Bulkhead) to provide access to the beach. Figure 2 shows a typical timber stair walkover. Access would be designed to be ADA compliant in PED phase.

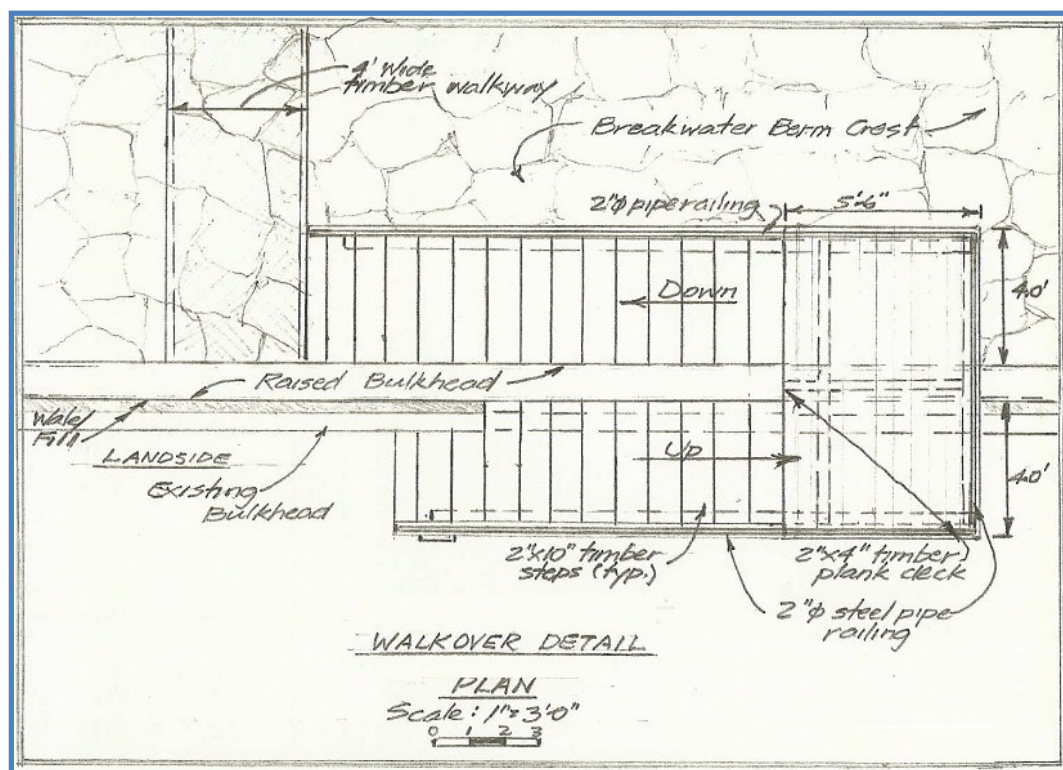


Figure 1: Timber Stair Walkover Typical Plan

5.2 Public Beach Access

Public beach access and parking as outlined in Engineer Regulation (ER) 1105-2-100 is provided at the existing public beach for the West Cove. Parking and access for the East Cove and Central Cove are

provided in the Public Access Plan (Appendix G) and details will be finalized during a future phase of the project.

Chapter 6: **Right-of-Way**

The proposed alternatives will require acquisition of a right-of-way corridor wide enough to allow for the footprint of all permanent design features as well as enough room for future flood event monitoring and recurring inspection activities. For the final alternatives array, the following assumptions for right-of-way acquisition were used:

- Permanent easement: Encompassing property seaward and to the extent of design feature except in Alternative 4B where an easement 10 ft. along the frontage of the existing properties would be required.

Contractor staging areas will be required and will be based on available real estate. The actual location(s) for contractor staging will be determined during Pre-construction Engineering and Design.

Chapter 7: **Utilities**

It is not anticipated that many conflicts with utilities will be encountered since the majority of the proposed design features would be installed on the seaward side of the existing protection. The bulkhead outlined in Alternative 4B would present the greatest impact of potential conflict with existing utilities since the location of the bulkhead is along the existing right-of-way of CR 48 in the probable location of utilities serving the existing development along the shoreline. Costs for these impacts are based on the need to temporarily discontinue the services. The bulkhead would be cored, the utility lines will pass through the core hole and would be properly sealed to prevent loss of backfill.

Only one other stormwater outfall exists that would present a potential conflict to other alternatives. This is located in the far West Area near the beginning of the project study area. Based on preliminary investigations, it appears this outfall could be extended to a new rip-rap stabilized outfall as part of the proposed alternatives.

Chapter 8: **Recommended Plan**

Following evaluation of the alternatives (see body of main report) the Recommended Plan is the beach fill plan with a 25-foot berm in West Cove, Central Cove, and East Cove.

Refer to the body of the report for a more detailed description of the recommended plan. The recommended plan is illustrated in the attached plan set.