Massachusetts Coastal Infrastructure Inventory and Assessment Project
Massachusetts Department of Conservation and Recreation
Office of Waterways

Middle Cape Cod

Barnstable
Yarmouth
Dennis

July 6, 2009

Prepared for:
Massachusetts Department of Conservation and Recreation
Hingham, Massachusetts

Presented by:
Bourne Consulting Engineering
Franklin, Massachusetts

In Association With:
Applied Coastal Research & Engineering

Bourne Consulting Engineering
Waterfront Engineers
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Section IV – Dennis

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Section I

Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

PURPOSE

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS
Section 1 – Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

The Project and Client

The Commonwealth of Massachusetts has initiated a Coastal Hazards Commission (CHC) to identify the vulnerability of the state to coastal hazards. As one of five working groups working under the CHC, the 20-Yr Infrastructure Plan was to establish a prioritization for the repair of coastal structures. The focus areas of the Working Group include:

- Publicly owned infrastructure
- Infrastructure for which State is responsible
- Inventory of public hazards infrastructure
- Evaluation on conditions
- Development for a prioritization of work
- Estimation of capital and maintenance costs

The 20-Yr Infrastructure Working Group is led by Representative Frank Hynes with CZM as the lead State Agency overseeing the management of the project. The Massachusetts coastline has been broken up into 4 major regions consisting of the North Shore, Boston, South Coast, and the Cape and Islands. The South Shore (the Towns of Hull, Cohasset, Seekonk, Hingham, Plymouth, Kingston, Scituate and Duxbury) was previously evaluated by Bourne Consulting Engineering as a demonstration project in 2006.

Consultant Team

The consultant team that performed the demonstration project was led by Bourne Consulting Engineering (BCE) of Franklin, MA who was responsible for overall project management, specified areas of field assessments, and research. Assisting BCE was Applied Coastal Research and Engineering Inc.of Mashpee, MA, Childs Engineering Corporation, of Medfield, MA., and Waterfront Engineer LLC of Stratham, NH.

PURPOSE

Study Purpose

CZM seeks to identify the capacity of Massachusetts coastal structures to resist major coastal storms and prevent storm damage. In working toward this goal, CZM has initiated a program to perform an assessment of Commonwealth owned and/or maintained coastal structures. The first phase of this program was the performance of a demonstration project for coastal structures located on the South Shore. The demonstration project identified existing structures, their general conditions, ability to provide coastal protection and the probable cost for repairs. The information collected and developed has been incorporated into the MassGIS system to allow use for developing a 20 Year Coastal Infrastructure Plan.

The demonstration project served as a basis for the current statewide inventory assessment of all Commonwealth coastal structures and the needs for their maintenance and/or repair.
Goals of Study

The goals of the Massachusetts Coastal Infrastructure Inventory and Assessment Project include:

- To identify all the coastal structures the state either owns or has responsibility to maintain for the 4 regions included within the study.
- Of the structures identified, determine the structure location and characteristics, the structure condition relative to providing coastal protection and the structure importance in relation to what it is protecting.
- To the degree possible, identify the structure elevation and the FIRM mapping flood elevation and category.
- To the degree possible, identify structure owner and available documents from local, state and federal agencies.
- To establish an estimated cost to rehabilitate the coastal structures to provide the level of project established in the structure’s original design.
- Provide the information in a format compatible for incorporation into the MassGIS system.

Limit of Study

Due to the time constraints and the amount of effort necessary to collect, process and compile the information, the following are identified as limitations of the information presented:

- All property ownership was taken as presumed. No legal investigation of ownership was performed during the project. Property ownership is based on town assessor maps. Where structures were located outshore of assessor map defined property lines, it was assumed to be Town land unless other information indicated otherwise. Where structures were located outshore of Mean Low Water, property is assumed to be State owned.

- The structure ownership was based on assessor maps and research at the local, state and federal levels. Where there was indication of public work on a structure on Town land or on private property, the structure was presumed to be Town owned. Where the structure was on state property, the structure was presumed to be state owned. Where ownership of the structure was not clear but was located on private property, the structure ownership was defined as unknown.

- The study included town and state owned structures as it was assumed that most town owned structures received state funding at some level for construction and/or maintenance.
  - Structures that were determined to be private were not included.
  - Undocumented structures considered to be on private land, but having the potential to have been publicly built and/or maintained, were identified as having an “unknown ownership”.

- The prioritizing of structures was based primarily on risk to general infrastructure and density of housing. Infrastructure included was buildings. The study did not consider all infrastructure issues including:
  - No consideration on utility impacts – water, electrical, sewer, gas
  - No consideration of roadway and bridge protection
  - Evacuation routes were not considered within the investigation
  - Location of Emergency Shelters were not included in priority assessments

- Research was performed at the local; state and federal levels. The local research was limited to location and documenting available coastal structure contract drawings. Research at DCR was restricted to available historic construction plans for coastal structures at the MA-DCR Waterways office in Hingham, MA, and MA-DCR Division of Urban Parks and Recreation in...
Boston, MA. No investigation of state archives was performed. Research at MA DEP Chapter 91 and USACE was limited to recorded permits and licenses found in their files. No investigation was performed at the Registry of Deeds.

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

The specific attributes that would be incorporated into the MassGIS system were developed based on the scope of work and the goals to be achieved. The following was established to standardize the data collection and presentation and to allow total flexibility for sorting by attributes in the final GIS database. The attributes identified below were input into a MS Access database which was used to manage the data from all eight communities within a single file.

Database Attributes
- Attribute Descriptions/Definitions

Structure Number: A unique structure number was given to each coastal structure. The number was based on existing numbering systems that include the State Department of Environmental Protection community number followed by the local community assessor’s parcel numbering system. The last three digits of the number represent the structure within the parcel. Where structures extend over several parcels, the structure is referenced to a parcel that is approximately in the center of the structure. Where Town assessor’s references include letters, those are also included within the structure number. Some communities have block numbering within their numbering system and these are included. Communities without block numbering still have the block numbering included but these are illustrated as all zeros for that specific segment.

Structures that are on Town property, which would otherwise not have a parcel number, are referenced to a parcel that is in the immediate vicinity of the coastal structure.

On this basis, the following is the general numbering convention:

CCC-MMM-BBB-PPP-SSS

Where:
- CCC: DEP Community Number
- MMM: Community Map Number
- BBB: Block Number (000 if no block numbering system)
- PPP: Community Parcel Number
- SSS: Structure Number

Property Ownership: All property ownership was on a “presumed” basis as no legal verification of ownership was performed. The ownership of the property was classified under four basic areas which were private ownership (Private), Town ownership (Local), Commonwealth of Massachusetts ownership (State), federal government ownership (Federal) or unknown. Property ownership was based on Town assessor’s maps. Where the location was located above Mean Low Water, and not within a defined parcel, the property ownership was presumed to be the Town unless documentation was found to indicate otherwise. Where a structure was located offshore of Mean Low Water, the property ownership was presumed to be federal.

Structure Ownership: The ownership of all structures is presumed as no verification of ownership was performed. Ownership of the structure was determined by research into historic state and federal
permits and the entity indicated on the permits as the applicant. Where no other information was found, the following was utilized:

- Structures located on private land but appearing to be significant structures were identified as owned by the Town or as “Unknown”. Unknown was used where there was a question of local or private ownership.
- Structures on Town property were assumed to be owned by the Town
- Structures that were located off-shore were presumed to be federally owned
- Structures that were identified as being privately owned were eliminated from the database

**Basis of Ownership:** The basis of structure ownership was provided to give rationale to the structure ownership and identified the research resource that identified the ownership or the methodology otherwise used. The responses utilized were limited to the following:

- DPW – DPW Employee Interview
- DCR - Contract Drawings
- DEP – Ch 91 License
- USACE – Permits
- Property Ownership
- Offshore Structure

**Structure Owner’s Name:** Ownerships names reflect the presumed owner of publicly owned structures. As this was for public structures only, the ownership was restricted to the community name, the state agency or the federal agency.

**Earliest Structure Record:** The year of the oldest document located for the structure. The information is determined from the document research performed on the structure from local, state and federal agencies. If no documents could be found than this entry is denoted as “Unknown”. Where documentation of the structure could be found, the date from the oldest document was utilized.

**Primary Structure / Secondary Structure:** Many of the coastal structures consisted of combined structures which were rated separately. It was typically found that one structure was significantly more predominant (Ex. Bulkhead/Seawall) and was therefore identified as the Primary Structure while a smaller structure might exist in front (ex. Revetment) of it. The type, height and material of each structure are identified separately. The condition of each structure was based on the Primary Structure. Where there was no secondary structure, the fields were left blank.

**Structure Type:** The structure type was categorized into five basic coastal structure categories which were Bulkhead/Seawall, Revetment, Coastal Beach, Coastal Dune, and Jetty/Groin.

**Structure Material:** The identification of the coastal structure’s material of construction was performed and represents the primary material. Stone structures consisted of both mortared and non-mortared conditions.

**Structure Height:** Each type of structure was categorized by its visible height in feet which was broken into four specific ranges which are:

- < 5 feet
- 5 to 10 feet
- 10 to 15 feet
- > 15 feet

**Structure Condition:** A preliminary assessment of the condition for each structure was performed by the field teams. This was by visual observation only and no detailed investigation was performed. The condition assessments were based on a predefined five level rating system that ranged from Rating A for Excellent Condition to Rating F for Critical Condition. A detailed listing of the conditions and their definitions can be seen in Exhibit A.
Priority Rating: In order to account for the need for protection at any one site, a five level priority rating system was established. This allowed for consideration of public infrastructure protection, density of residential housing for development of structure overall importance for coastal protection. The ratings range from Level 1 for no infrastructure or residence protection to Level 5 for critical inshore infrastructure protection and/or high density residential. The detailed listing and definitions for the priority categories can be seen in Exhibit B.

Structure Repair / Reconstruction Cost: A preliminary estimation of construction costs to maintain or repair structures was made based on the preliminary field assessment of the structures. A Repair Cost Matrix was developed based on structure type, condition, height and material and can be seen in Exhibit C. Once each structure’s type, height, and material classifications were determined, the cost per foot for the structure was determined from the Repair Cost Matrix and multiplied by the length of the structure to obtain the estimated repair/restoration cost. The cost matrix repair costs include a 20 percent construction cost contingency as well as 10 percent costs for engineering and permitting.

Structure Length: The length of each structure is provided and utilized in the development of the repair/reconstruction costs. The lengths are given to the nearest foot and taken as the linear distance along the structure, as determined by the GPS location, which takes into account structure angles and curvature.

Structure Elevation: The elevation of structures was determined in feet from existing information where available. The datum used is NAVD 88 and elevations are to the nearest foot. From a previous study much of the south shore coastal structures had elevations defined based on LIDAR mapping data. Where available structure documentation with elevations was found, in areas with no LIDAR data, the information was included within the structure information. Where there was no LIDAR information or existing documentation, the item has been left blank.

LIDAR (Light Detection and Ranging) is technology that is currently being used for high-resolution topographic mapping by mounting a LIDAR sensor, integrated with Global Positioning System (GPS) and inertial measurement unit (IMU) technology, to the bottom of aircraft and measuring the pulse return rate to determine surface elevations.

FEMA Zone and Elevation: For each structure the FEMA Flood Insurance Rate Maps (FIRM) were researched for their Flood Zone designation and their Base Flood Elevation from the most recent FIRM maps for the specific Town. The elevations are provided in feet on the same datum as the FIRM maps (NGVD) with no adjustments or conversions.

Structure Comments: The engineering team provided a brief description and comment on the structure at the time of the field assessments which is provided in support of the condition rating that was given for the structure.

Pictures: At the time of the field assessments, digital photographs were taken to provide a general overview of the structure. The number of pictures was limited to a maximum of six. The first photograph for each structure is shown on the Structure Assessment Form. The list of all photographs is provided on the form.

Town Documents: Town documents represent the structure information that could be found in the Town’s DPW/Engineering Department records. Where particular records could be found, a table of document information was developed and included within the database with limited descriptions.
MA - DCR Documents: MA-DCR documents represent the structure information that could be found within DCR – Waterways office in Hingham. Where particular records could be found, a table of document information was developed and included within the database with limited descriptions.

MA - DEP Chp. 91 Licenses: MA-DEP Chapter 91 license documents represent the structure information that could be found within MA-DEP Chp 91 records in Boston. Where particular records could be found, they were scanned as pdf files and attached to the structure through the GIS database information. In addition, a table of license document information was developed and included within the database with limited descriptions.

USACE Permits: USACE Permits represent the structure information that could be found within the Army Corp of Engineers regulatory office in Concord, MA. Where particular records could be found, they were scanned as pdf files and attached to the structure through the GIS database information. In addition, a table of license document information was developed and included within the database with limited descriptions.

**DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS**

A matrix to be used within the database has been developed to assess likely rehabilitation/repair costs to restore the coastal structures to their original design condition. No attempt was made to assess the level of exposure and associated level of protection that might be required to meet current design standards for these structures. These costs are only an estimation to bring these structures back to their original design intent based on 2006 construction costs.

The development of the cost matrix is based on the following:

**Structure Condition Ratings.** – The condition of the coastal structures was determined in the field by the survey crew which was led by an engineer with waterfront structure assessment and design experience. The definitions of the rating criteria utilized for the assessments are presented elsewhere.

The cost implications for each rating condition are as follows:

- **A Rating** Structures not requiring any maintenance, repair or rehabilitation cost and would not be expected to experience damage if subject to a major coastal storm event.
- **B Rating** Structures requiring limited or no repair and would be expected to experience only minor damage if subject to a major coastal storm event. The value of these maintenance costs is assumed to be 10 percent of the construction cost.
- **C Rating** Structures requiring moderate to significant level of repair or reconstruction and would be expected to experience significant damage if subject to a major coastal storm event. The structure is presumed to be effective under a major storm event. The value of the repair costs is assumed to be 50 percent of the construction cost.
- **D Rating** Structures requiring significant level of rehabilitation or total reconstruction and would be expected to experience significant damage or possibly fail if subject to a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost.
• F Rating  Structures requiring complete reconstruction and would expect to provide little or no protection from a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost plus a cost for removal/disposal of the original structure.

Height of Structure – Height of a structure is a major factor in the structure cost and therefore was identified as a significant factor in assessing rehabilitation/repair construction costs. The structures were broken down into four major categories which were:

- < 5'  Structures that were less than five feet in height
- 5' - 10'  Structures five to 10 feet in height
- 10' - 15'  Structures over 10 feet to 15 feet in height
- > 15'  Structures greater than 15 feet in height – assumed 20 feet typical

Length of Structure – Length is based on field GPS location with measurements rounded to the nearest foot.

Bulkhead / Seawall Structures – These structures are assumed to be constructed out of concrete, steel, stone or wood with each having its own criteria for establishing costs. For each structure type the following was assumed:

- Concrete Seawalls – These walls were assumed to be gravity structures with the volume of concrete used based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from $350 to $630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.

- Stone Seawalls - These walls were treated the same as concrete seawalls and assumed to be gravity structures with the volume of the structure based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from $350 to $630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.

- Steel Bulkheads – Steel bulkheads were presumed to be constructed with steel sheet piling. Tie back systems were presumed for structures 10 feet or greater in height. Shorter walls were assumed to have a cantilever design. The total depth of sheeting was presumed to be two times the exposed height. The cost for construction varied from $40 per square foot to $60 per square foot plus the cost of excavation and demolition.

- Timber Bulkheads – Timber bulkheads were presumed to be constructed with timber piles at eight foot on center, horizontal wales and vertical four inch sheathing. The unit costs for installed materials used were $1,500 per pile and $7.50 per bfm.

Revetment Structures – Revetment structures were presumed to be constructed of dry placed (no concrete) stone with a two on one slope and a horizontal toe and crown equal to the thickness layer established for each height condition. The total thickness of the revetment layers varied from six to ten feet with the cost of armor and under-layer stone assumed to be $50 per ton and the crushed stone base to be $15 per ton.
Groins and Jetties — Groins and jetties were assumed to be the same materials and construction as the revetment structures but would have two sides and therefore double the quantities.

Coastal Beaches — Costs for restoration of Coastal beaches presumed the placement of beach renourishment sands at a 1-on-20 slope over the existing beach conditions. The cost for deposition of sand assumed relatively close source of material and utilized $20 per cubic yard for the material installed.

Coastal Dunes — Restoration of coastal dunes assumed a cross section of renourished sand with a one-on-four slope on one side of a 25 foot width at the defined dune height. The cost for deposition of sand assumed relatively close source of material and utilized $20 per cubic yard for the material installed.

Contingency — A contingency of 20 percent was added to all costs to reflect the unknowns associated with this level of rehabilitation/repair estimating.

Engineering and Regulatory Approvals — A ten percent increase to the cost matrix prices was assessed to represent the engineering design and regulatory approval requirements for the restoration of these structures.
## EXHIBIT A

**Structure Condition Table – 5 Level Rating System**

<table>
<thead>
<tr>
<th>Preliminary Condition Assessment</th>
<th>Definition Based Upon Perceived Immediacy of Action and Potential to Cause Damage if Not Corrected</th>
<th>Level of Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Excellent</td>
<td>Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm</td>
<td>None</td>
</tr>
<tr>
<td>B Good</td>
<td>Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure</td>
<td>Minor</td>
</tr>
<tr>
<td>C Fair</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life</td>
<td>Moderate</td>
</tr>
<tr>
<td>D Poor</td>
<td>Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.</td>
<td>Major</td>
</tr>
<tr>
<td>F Critical</td>
<td>Conditions of structure/landform may warrant emergency stabilization as failure may result in potential loss of property and/or life. Landform eroded, loss of integrity. Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.</td>
<td>Immediate</td>
</tr>
</tbody>
</table>
## EXHIBIT B

### Priority Rating System - 5 Level Rating System

<table>
<thead>
<tr>
<th>Preliminary Priority Level Assessment</th>
<th>Level Based Upon Perceived Immediacy of Action and Presence of Potential Risk to Inshore Structures if Not Corrected</th>
<th>Level of Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No Inshore Structures or Residential Dwelling Units Present</td>
<td>Long Term Planning Considerations</td>
</tr>
<tr>
<td>II</td>
<td>Inshore Structures Present with Limited potential for Significant Infrastructure Damage</td>
<td>Future Project Consideration</td>
</tr>
<tr>
<td>III</td>
<td>Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (&lt;1 dwelling impacted / 100 feet of shoreline)</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
<tr>
<td>IV</td>
<td>High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)</td>
<td>Consider for Next Project Construction Listing</td>
</tr>
<tr>
<td>V</td>
<td>Critical Inshore Structures Present with Potential for Infrastructure Damage and/or High Density Residential Dwellings Conditions of structure may warrant emergency stabilization as failure may result in potential loss of property and/or life. (&gt;10 dwellings impacted / 100 feet of shoreline)</td>
<td>Consider For Immediate Action Due to Public Safety and Welfare Issues</td>
</tr>
</tbody>
</table>
## CZM South Shore Coastal Infrastructure Inventory and Assessment Project

### Exhibit C

**Repair / Rehabilitation Costing Data**

Cost per linear foot of structure

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Structure Materials</th>
<th>Structure Height</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulkhead/Seawall</strong></td>
<td>Concrete</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$54</td>
<td>$425</td>
<td>$580</td>
<td>$983</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$152</td>
<td>$759</td>
<td>$1,618</td>
<td>$1,782</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$251</td>
<td>$1,254</td>
<td>$2,308</td>
<td>$2,970</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$396</td>
<td>$1,980</td>
<td>$3,980</td>
<td>$4,752</td>
</tr>
<tr>
<td></td>
<td>Steel</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$64</td>
<td>$223</td>
<td>$646</td>
<td>$690</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$195</td>
<td>$825</td>
<td>$1,462</td>
<td>$1,848</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$251</td>
<td>$1,254</td>
<td>$2,508</td>
<td>$2,772</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$343</td>
<td>$1,718</td>
<td>$3,432</td>
<td>$3,795</td>
</tr>
<tr>
<td></td>
<td>Stone</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$64</td>
<td>$425</td>
<td>$850</td>
<td>$983</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$152</td>
<td>$759</td>
<td>$1,518</td>
<td>$1,782</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$251</td>
<td>$1,254</td>
<td>$2,508</td>
<td>$2,970</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$396</td>
<td>$1,980</td>
<td>$3,980</td>
<td>$4,752</td>
</tr>
<tr>
<td></td>
<td>Wood</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$96</td>
<td>$431</td>
<td>$962</td>
<td>$964</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$127</td>
<td>$632</td>
<td>$1,265</td>
<td>$1,463</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$181</td>
<td>$804</td>
<td>$1,608</td>
<td>$1,872</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$202</td>
<td>$1,008</td>
<td>$2,017</td>
<td>$2,360</td>
</tr>
<tr>
<td><strong>Coastal Beach</strong></td>
<td>Sand</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$28</td>
<td>$132</td>
<td>$264</td>
<td>$264</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$127</td>
<td>$634</td>
<td>$1,267</td>
<td>$1,267</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$224</td>
<td>$1,122</td>
<td>$2,244</td>
<td>$2,244</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$395</td>
<td>$1,980</td>
<td>$3,980</td>
<td>$3,980</td>
</tr>
<tr>
<td><strong>Coastal Dune</strong></td>
<td>Sand</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$18</td>
<td>$93</td>
<td>$186</td>
<td>$186</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$48</td>
<td>$238</td>
<td>$476</td>
<td>$476</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$79</td>
<td>$385</td>
<td>$780</td>
<td>$780</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$132</td>
<td>$660</td>
<td>$1,320</td>
<td>$1,320</td>
</tr>
<tr>
<td><strong>Revetment</strong></td>
<td>Stone</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$98</td>
<td>$335</td>
<td>$664</td>
<td>$730</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$120</td>
<td>$601</td>
<td>$1,201</td>
<td>$1,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$187</td>
<td>$781</td>
<td>$1,584</td>
<td>$1,686</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$247</td>
<td>$1,234</td>
<td>$2,458</td>
<td>$2,666</td>
</tr>
<tr>
<td><strong>Groin</strong></td>
<td>Stone</td>
<td>Under 5 Feet</td>
<td>$0</td>
<td>$132</td>
<td>$664</td>
<td>$1,328</td>
<td>$1,460</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 To 10 Feet</td>
<td>$0</td>
<td>$240</td>
<td>$1,201</td>
<td>$2,402</td>
<td>$2,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 To 15 Feet</td>
<td>$0</td>
<td>$314</td>
<td>$1,604</td>
<td>$3,128</td>
<td>$3,302</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 15 Feet</td>
<td>$0</td>
<td>$494</td>
<td>$2,468</td>
<td>$4,937</td>
<td>$5,333</td>
</tr>
</tbody>
</table>

**Note:** Repair / Rehabilitation Costs include 10% for engineering and regulatory approvals and 20% construction contingency.
Section II

Barnstable
Section II – Community Findings – Town of Barnstable

COMMUNITY DESCRIPTION

The Town of Barnstable consists of a land area of 60.05 square miles out of a total area of 76.26 square miles and had a population of 47,821 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report’s cover. The estimated length of shoreline is 24 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Barnstable, there were 21 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 9 in Section II-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

<table>
<thead>
<tr>
<th>Primary Structure (%)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead / Seawall</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2760</td>
</tr>
<tr>
<td>Revetment</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>1220</td>
</tr>
<tr>
<td>Breakwater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3435</td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td><strong>3</strong></td>
<td><strong>13</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
<td></td>
<td><strong>7415</strong></td>
</tr>
</tbody>
</table>

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Barnstable’s case there are a total of 21 structures which would require approximately $7.9 million to bring all the coastal structures to “A” Rating. Most critical will be the structures in the “D” and “F” classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated $2.7 million would be required to upgrade the Town’s coastal protection.
STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Barnstable

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead / Seawall</td>
<td>7</td>
<td>$37,950</td>
<td>$1,720,593</td>
<td>$9,759</td>
<td></td>
<td>$758,063</td>
<td>$2,614,365</td>
</tr>
<tr>
<td>Retention</td>
<td>5</td>
<td>$21,008</td>
<td>$499,884</td>
<td></td>
<td></td>
<td></td>
<td>$20,892</td>
</tr>
<tr>
<td>Breakwater</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>9</td>
<td>$2,805,135</td>
<td>$1,984,292</td>
<td></td>
<td></td>
<td>$4,769,427</td>
<td></td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>$</td>
<td>$58,958</td>
<td>$5,025,612</td>
<td>$2,062,051</td>
<td>$758,063</td>
<td>$7,904,684</td>
</tr>
</tbody>
</table>

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Barnstable, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Barnstable

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Owned</td>
<td>21</td>
<td>$58,958</td>
<td>$5,025,612</td>
<td>$2,062,051</td>
<td></td>
<td>$758,063</td>
<td>$7,904,684</td>
</tr>
<tr>
<td>Commonwealth of Mass.</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Government</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown Ownership</td>
<td></td>
<td></td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>$</td>
<td>$58,958</td>
<td>$5,025,612</td>
<td>$2,062,051</td>
<td>$758,063</td>
<td>$7,904,684</td>
</tr>
</tbody>
</table>

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section II-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Barnstable’s coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.
Section II - Barnstable

Part B

Structure Assessment Reports
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Ocean View Avenue</td>
<td>10/31/2007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>1937</td>
<td>$31,200.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 Feet</td>
<td>Feet NAVD 88</td>
<td>V11</td>
<td>19 Feet NGVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin/Jetty</td>
<td>Stone</td>
<td>Under 5 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structure Summary:**
This structure is a groin at Ocean View Avenue beach. The armor stone is becoming unrolled with the side slopes coming away from the crest. The groin is very low profile and is partially buried.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
</tr>
</tbody>
</table>

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

**Structure Images:**
- 003-033-000-021-100-PHO1A.jpg

**Structure Documents:**
- USACE | May 1949 | Proposed Groin | 003-033-000-021-100-COE1A
- MA-DCR | November 1 | Proposed Concrete | 003-033-000-021-100-DCR1A

Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable

Location: Ocean View Avenue

Based On Comment:

Earliest Structure Record: 1937

Estimated Reconstruction/Repair Cost: $68,006.00

Length: 160 Feet
Top Elevation: 19 Feet NGVD
FIRM Map Zone: V11
FIRM Map Elevation: 19 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Concrete
Primary Height: Under 5 Feet

Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is a concrete seawall at Ocean View Avenue beach. It has a recurved front with a vertical cap on top. The wall is weathered, cracked, and spalling but still solid.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

Structure Documents:

003-033-000-021-200-PHO2A.jpg

MA-DCR November 1 Proposed Concrete 003-033-000-021-200-DCR2A
MA-DCR October 194 Proposed Shore 003-033-000-021-200-DCR2B

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable

Location: Old Shore Road
Based On Comment: 

Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $97,759.00

Date: 10/31/2007

Length: 115 Feet
Top Elevation: 19 Feet NAVD 88
FIRM Map Zone: V11
FIRM Map Elevation: 19 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Concrete
Primary Height: Under 5 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a concrete seawall at Old Shore Road adjacent to the boat ramp. The face and crest are cracked and spalled. The wall is especially degraded at the northern end.

Condition Rating
D

Level of Action Description
Poor

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
IL Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
003-035-000-072-100-PHO1A.jpg
003-035-000-072-100-PHO1B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
Structure Summary:
This structure is a revetment at the terminus of Sea View Ave. It is generally in good condition but is coming unraveled at the south end. There is a gap developing between the crest and side slopes.

Condition Rating: C
Level of Action Description: Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating: II
Action Description: Low Priority
Future Project Consideration
Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
[003-090-000-001-PHO1A.jpg]

Structure Documents:
CZM Coastal Infrastructure Inventory and Assessment  
**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Dead Neck</td>
<td>10/31/2007</td>
</tr>
<tr>
<td>Presumed Structure Owner:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>Based On Comment:</td>
<td></td>
</tr>
<tr>
<td>Owner Name:</td>
<td>Earliest Structure Record:</td>
<td>Estimated Reconstruction/Repair Cost:</td>
</tr>
<tr>
<td>Barnstable</td>
<td>1947</td>
<td>$1,105,104.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>460 Feet</td>
<td>Feet NAVD 88</td>
<td>V17</td>
<td>16 Feet NGVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin/Jetty</td>
<td>Stone</td>
<td>5 to 10 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
<tr>
<td>Major</td>
<td></td>
<td>Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (&lt;1 dwelling impacted / 100 feet of shoreline)</td>
</tr>
</tbody>
</table>

**Structure Summary:**
This structure is the east jetty at Dead Neck. There are multiple areas where the side slopes are falling away from the crest and the crest has lost elevation. Some of the armor stones are cracked.

**Structure Images:**
- 003-090-000-010-100-PH01A.jpg

**Structure Documents:**
- USACE  May 1953  Proposed Jetty  003-090-000-010-100-COE1A
- MA-DCR  February 19  Proposed Shore  003-090-000-010-100-DCR1A
- MA-DCR  April 1953  Proposed  003-090-000-010-100-DCR1B
- MA-DCR  December 1  Proposed Shore  003-090-000-010-100-DCR1C

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable

Location: Dead Neck
Based On Comment: 
Earliest Structure Record: 1953
Estimated Reconstruction/Repair Cost: $792,792.00

Length: 330 Feet
Top Elevation: feet NAVD 88
FIRM Map Zone: V17
FIRM Map Elevation: 16 feet NGVD

Primary Type: Groin/Jetty
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is the west jetty at Dead Neck. The landward portion is in fair condition, with straight crest and side slopes. The outer section is unraveled and slumped considerably.

Condition Rating:
D Poor

Level of Action Description:
Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[003-090-000-010-200-PHO2A.jpg]
[003-090-000-010-200-PHO2B.jpg]
[003-090-000-010-200-PHO2C.jpg]

Structure Documents:
MA-DCR April 1953 Proposed 003-090-000-010-200-DCR2A
MA-DCR December 1 Proposed Shore 003-090-000-010-200-DCR2B

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable
Location: Wianno Avenue
Based On Comment:

Earliest Structure Record: 1955
Estimated Reconstruction/Repair Cost: $7,808.00

Date: 10/31/2007

Length: 65 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: VII
FIRM Map Elevation: 18 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is a stone revetment at the end of Wianno Avenue. The crest and side slopes are in good condition. The crest is vegetated and the structure toe is buried.

Condition Rating
B Good

Priority Rating
II Low Priority

Level of Action Description
Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Action Description
Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
003-162-000-028-100-PHO1A.jpg

Structure Documents:
MA-DCR June 1955 Proposed Shore 003-162-000-028-100-DCR1A

Prepared By: Bourne Consulting Engineering
Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable
Location: Dowses Beach
Based On Comment:
Earliest Structure Record: 1948
Estimated Reconstruction/Repair Cost: $858,715.00

Length: 715 Feet NAVD 88
Top Elevation: 16 Feet NGVD
FIRM Map Zone: V16
FIRM Map Elevation: 15 Feet NGVD

Primary Type: Groin/Jetty
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:
This structure is the west jetty at Dowses Beach. The crest and sideslopes are generally in good condition. There is some slumping and loss of crest elevation in the center section.

Condition Rating
Level of Action Description
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storms with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
003-163-000-013-100-PHO1A.jpg
003-163-000-013-100-PHO1B.jpg

Structure Documents:
USACE December 1 Proposed Jetty 003-163-000-013-100-COE1A
MA-DCR October 194 Proposed Shore 003-163-000-013-100-DCR1A
MA-DCR November 1 Proposed Jetty 003-163-000-013-100-DCR1B
DEP September 1 Plans Accompanying 003-163-000-013-100-LIC1A

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

### Structure Assessment Form

**Property Owner:** Local  
**Presumed Structure Owner:** Local  
**Owner Name:** Barnstable  

**Location:** Dowses Beach  
**Based On Comment:**  
**Earliest Structure Record:** Unknown  
**Date:** 10/31/2007  
**Estimated Reconstruction/Repair Cost:** $13,200.00

<table>
<thead>
<tr>
<th>Length: 200 Feet</th>
<th>Top Elevation: 12 Feet NGVD</th>
<th>FIRM Map Zone: A13</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
</table>

**Primary Type:** Revetment  
**Primary Material:** Stone  
**Primary Height:** Under 5 Feet  
**Secondary Type:**  
**Secondary Material:**  
**Secondary Height:**

**Structure Summary:** This structure is riprap protection along the road crossing to Dowses Beach. The crest and side slopes are in good condition. The crest area is vegetated and the structure is fronted by a low-tide beach and marsh grass.

**Condition Rating**  
**Level of Action Description:** Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

**Priority Rating Action Description**  
**Ill**  
Moderate Priority  
Consider for Active Project Improvement Listing  
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Structure Images:**  
[003-163-000-013-200-PHO2A.jpg]

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Barnstable Marina</td>
<td>10/31/2007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>1949</td>
<td>$463,980.00</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>370 feet</td>
<td>Feet NAVD 88</td>
<td>V4</td>
<td>15 feet NGVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead/Seawall</td>
<td>Steel</td>
<td>10 to 15 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structure Summary:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This structure is a bulkhead at the Barnstable Marina parking lot. The steel sheet pile is rusted but solid. The timber caps are splintered in sections.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Priority Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
<tr>
<td>Level of Action Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (&lt;1 dwelling impacted / 100 feet of shoreline)</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structure Images:**

- [003-300-000-022-100-PHA1A.jpg](#)

**Structure Documents:**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Document Type</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACE</td>
<td>January 195</td>
<td>Proposed Timber</td>
<td>003-300-000-022-100-COE1A</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Timber</td>
<td>003-300-000-022-100-DCR1A</td>
</tr>
<tr>
<td>DEP</td>
<td>November 1</td>
<td>Plan Accompanying</td>
<td>003-300-000-022-100-LIC1A</td>
</tr>
<tr>
<td>DEP</td>
<td>October 198</td>
<td>Plan Accompanying</td>
<td>003-300-000-022-100-LIC1B</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable

Location: Barnstable Marina
Date: 10/31/2007
Based On Comment:

Earliest Structure Record: 1949
Estimated Reconstruction/Repair Cost: $758,063.00

<table>
<thead>
<tr>
<th>Length: 405 Feet</th>
<th>Top Elevation: Feet NAVD 88</th>
<th>FIRM Map Zone: V4</th>
<th>FIRM Map Elevation: 15 Feet NGVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Type:</td>
<td>Bulkhead/ Seawall</td>
<td>Primary Material: Wood</td>
<td>Primary Height: 10 to 15 Feet</td>
</tr>
<tr>
<td>Secondary Type:</td>
<td>Secondary Material:</td>
<td>Secondary Height:</td>
<td></td>
</tr>
</tbody>
</table>

Structure Summary:
This structure is a wooden bulkhead at the southern end of Barnstable Marina. The timber cap and piles are splintered and damaged. There is evidence of fill loss from behind the wall.

Condition Rating
F Critical

Level of Action Description
Immediate Conditions of structure/landform may warrant emergency stabilization as failure may result in potential loss of property and/or life. Landform eroded, loss of integrity. Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating
III Moderate Priority

Action Description
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
003-300-000-022-200-PHO2A.jpg

Structure Documents:
<table>
<thead>
<tr>
<th>USACE</th>
<th>March 1954</th>
<th>Proposed Harbor</th>
<th>003-300-000-022-200-COE2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Timber</td>
<td>003-300-000-022-200-DCR2A</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
### CZM Coastal Infrastructure Inventory and Assessment

#### Structure Assessment Form

**Property Owner:**
- Local

**Presumed Structure Owner:**
- Local

**Owner Name:**
- Barnstable

**Location:**
- Barnstable Marina

**Date:**
- 10/31/2007

**Earliest Structure Record:**
- 1949

**Estimated Reconstruction/Repair Cost:**
- $264,264.00

**Length:**
- 440 Feet NAVD 88

**Top Elevation:**
- 15 Feet NGVD

**FIRM Map Zone:**
- V4

**FIRM Map Elevation:**
- 15 Feet NGVD

**Primary Type:**
- Revetment

**Primary Material:**
- Stone

**Primary Height:**
- 5 to 10 Feet

**Secondary Type:**
- Secondary Material

**Secondary Height:**

**Structure Summary:**

This structure is a revetment along the west side of Barnstable Harbor. The structure generally has a clean side slope. The crest is obscured by vegetation, making inspection difficult. Some of the armor stones in sections of the side slopes are slumped and there is loss of elevation.

| Condition | C |
| Rating    | Fair |
| Level of Action | Moderate |
| Description | Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life. |

| Priority | III |
| Rating   | Moderate Priority |
| Action   | Consider for Active Project Improvement Listing |
| Description | Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline) |

**Structure Images:**
- [003-300-000-022-300-PHO3A.jpg](#)

**Structure Documents:**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Description</th>
<th>Document ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACE</td>
<td>March 1954</td>
<td>Proposed Harbor</td>
<td>003-300-000-022-300-_COE3A</td>
</tr>
<tr>
<td>USACE</td>
<td>June 1977</td>
<td>Plan to Accompany</td>
<td>003-300-000-022-300-_COE3B</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Timber</td>
<td>003-300-000-022-300-_DCR3A</td>
</tr>
<tr>
<td>DEP</td>
<td>August 1977</td>
<td>Plan to Accompany</td>
<td>003-300-000-022-300-_Lic3A</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable
Location: Millway Road
Based On Comment: 
Earliest Structure Record: 1956
Estimated Reconstruction/Repair Cost: $91,476.00

Length: 275 Feet NAVD 88
Top Elevation: 15 Feet NGVD
FIRM Map Zone: V4
FIRM Map Elevation: 
Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is the stone revetment at the end of Millway Road. There is some armor unraveled and some loss of crest elevation. The structure crest is vegetated and the toe is buried.

Condition Rating
C Fair
Level of Action Description
Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
003-301-000-009-100-PHO1A.jpg

Structure Documents:
MA-DCR May 1956 Proposed Shore 003-301-000-009-100-DCR1A

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Barnstable

Location: Ocean Avenue at Stewarts Creek

Based On Comment:

Earliest Structure Record: 1956

Estimated Reconstruction/Repair Cost: $378,315.00

Date: 10/31/2007

Length: 315 Feet

Top Elevation: 15 Feet NGVD

FIRM Map Zone: V16

FIRM Map Elevation: 15 Feet NGVD

Primary Type: Groin/Jetty

Primary Material: Stone

Primary Height: 5 to 10 Feet

Secondary Type: 

Secondary Material: 

Secondary Height: 

Structure Summary:

This structure is a jetty for flow from Stewarks Creek under Ocean Avenue. The outer section along the beach is in good condition. The trunk section closer to the culvert is unraveled and the crest has slumped.

Condition Rating

C Fair

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description

III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

003-305-000-001-100-PHO1A.jpg

003-305-000-001-100-PHO1B.jpg

Structure Documents:

MA-DCR November 1 Proposed Beach 003-305-000-001-100-DCR1A

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**  
**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Stewarts Creek at Ocean Avenue</td>
<td>10/31/2007</td>
</tr>
<tr>
<td>Presumed Structure Owner:</td>
<td></td>
<td></td>
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<tr>
<td>Local</td>
<td>Based On Comment:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>Unknown</td>
<td>$66,396.00</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Feet</td>
<td>Feet NAVD 88</td>
<td>V16</td>
<td>15 Feet NGVD</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin/ Jetty</td>
<td>Stone</td>
<td>Under 5 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structure Summary:**
This structure is a small stone groin at Stewarts Creek. There are no appreciable side slopes observed. The groin is very low profile and is submerged at high tide.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Priority Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>None</td>
<td>Long Term Planning Considerations</td>
</tr>
</tbody>
</table>

**Level of Action Description:**
Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm.
Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

**Structure Images:**
003-305-000-001-200-PHO2A.jpg

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**  
**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Kalmus Beach</td>
<td>10/31/2007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>1950</td>
<td>$139,440.00</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>210 Feet</td>
<td>Feet NAVD 88</td>
<td>V15</td>
<td>15 Feet NGVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin/ Jetty</td>
<td>Stone</td>
<td>Under 5 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
</table>

**Structure Summary:**

This structure is a pair of groins at Kalmus Beach. The western groin is longer and abuts a seawall for a private residence. Both groins are becoming partially unraveled.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Long Term Planning Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>I</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Action Description</th>
<th>Priority Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>No Inshore Structures or Residential Dwelling Units Present</td>
</tr>
</tbody>
</table>

**Condition**: C  
**Rating**: Fair  
**Level of Action**: Moderate  
**Description**: Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

**Structure Images:**
- 003-323-000-001-100-PHO1A.jpg
- 003-323-000-001-100-PHO1B.jpg

**Structure Documents:**
- USACE: September 1, Proposed Stone, 003-323-000-001-100-COE1A
- MA-DCR: September 1, Proposed Shore, 003-323-000-001-100-DCR1A
- DEP: July 1986, Plan Accompanying, 003-323-000-001-100-LIC1A

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable
Location: Veteran's Memorial Beach
Based On Comment:
Earliest Structure Record: 1954
Estimated Reconstruction/Repair Cost: $192,560.00

Length: 290 Feet NAVD 88
Top Elevation: V15 Feet NGVD 15
FIRM Map Zone: V15
FIRM Map Elevation:
Primary Type: Groin/Jetty
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is a small jetty at Veteran's Memorial Beach. There is some slumping of the crest and evidence of erosion behind the jetty. Some of the armor stones have broken. Sand is leaking through the outer end.

Condition Rating
Moderate

Level of Action Description
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating
Low Priority

Action Description
Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
003-324-000-038-100-PH01A.jpg

Structure Documents:
USACE July 1954 Proposed Seawall 003-324-000-038-100-COE1A
MA-DCR June 1954 Proposed Seawall 003-324-000-038-100-DCR1A
MA-DCR September 1 Proposed Shore 003-324-000-038-100-DCR1B

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Barnstable

Location: Veteran's Memorial Beach
Based On Comment:

Earliest Structure Record: 1954
Estimated Reconstruction/Repair Cost: $342,157.00

Length: Top Elevation: 805 Feet
FIRM Map Zone: V15 Feet NAVD 88
FIRM Map Elevation: 15 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Concrete
Primary Height: Under 5 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is the concrete seawall frongint the parking lot at Veteran's Memorial Beach. The wall is mostly submerged by the beach. The top is weathered and there is some cracking and spalling evident.

Condition Rating
C Fair
Level of Action Description
Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
003-324-000-038-200-PHO2A.jpg

Structure Documents:
USACE
July 1954
Proposed Seawall 003-324-000-038-200-COE2A
MA-DCR
June 1954
Proposed Seawall 003-324-000-038-200-DCR2A
MA-DCR
September 1
Proposed Shore 003-324-000-038-200-DCR2B

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Barnstable
Structure ID: 003-324-000-041-100
Key: community-map-block-parcel-structure

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<td>Kalmus Beach</td>
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<td>Groin/Jetty</td>
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Structure Summary:
This structure is the jetty at Kalmus Beach. The structure is generally in good condition with clear lines on the crest and sideslopes. There is minor slumping of the crest in the mid section.

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<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
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<tr>
<td>C Fair</td>
<td>IV High Priority</td>
<td>Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
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<th>Structure Images:</th>
<th>Structure Documents:</th>
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<td>003-324-000-041-100-PHO1A.jpg</td>
<td>USACE November 1 Proposed Stone 003-324-000-041-100-COE1A</td>
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<td>MA-DCR October 195 Proposed Stone 003-324-000-041-100-DCR1A</td>
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Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner:
Local

Presumed Structure Owner:
Local

Owner Name:
Barnstable

Location:
Hyannis Inner Harbor

Based On Comment:

Earliest Structure Record:
Unknown

Estimated Reconstruction/Repair Cost:
$37,950.00

Length:
230 Feet

Top Elevation:
Feet NAVD 88

FIRM Map Zone:
A9

FIRM Map Elevation:
10 Feet NGVD

Primary Type:
Bulkhead/Seawall

Primary Material:
Steel

Primary Height:
5 to 10 Feet

Secondary Type:
Secondary Material:

Secondary Height:

Structure Summary:
This structure is a sheetpile seawall with a concrete cap at the northwest corner of Hyannis Inner Harbor. The concrete cap is in good condition. The timber whaling in front is weathered but solid.

Condition Rating
B Good

Level of Action Description
Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
003-326-000-061-100-PHO1A.jpg

Structure Documents:

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<th>September 1</th>
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Prepared By: Bourne Consulting Engineering
### CZM Coastal Infrastructure Inventory and Assessment

#### Structure Assessment Form

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**Structure Summary:**

This structure is a steel sheetpile bulkhead with a concrete cap along the western side of Hyannis Inner Harbor. The sheetpile appears rusted in sections. The timber whaling are weathered but solid. The concrete cap is in good condition.

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**Structure Images:**

- 003-326-000-068-100-PHO1A.jpg
- 003-326-000-068-100-PHO1B.jpg

**Structure Documents:**

- USACE | January 196 |
- DEP | November 1 |
- Proposed Steel | Plan Accompanying |

**Prepared By:** Bourne Consulting Engineering
Section II - Barnstable

Part C

Structure Photographs
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<th>BCE Structure No</th>
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Section II - Barnstable

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST
  • Copies of License Documents

USACE – PERMIT DOCUMENT LIST
  • Copies of Permit Documents
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No Town Documents for the Town of Barnstable
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<td>Proposed Concrete Seawall and Stone Jetty - Cotuit, Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Proposed Shore Protection - Winnon Beach - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>1318 MA-OCR</td>
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<td>April 1953</td>
<td>Proposed Reconstruction and Extension of Easely Jetty at Entrance to West Bay - Barnstable, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>003-090-000-010-200-OCR2B</td>
<td>2768 MA-OCR</td>
<td>Barnstable</td>
<td>December 1972</td>
<td>Proposed Shore Protection - Jetty Extension and Repair - West Bay - Barnstable</td>
<td>1</td>
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<td>Jetty</td>
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<td>003-162-000-028-100-OCR1A</td>
<td>1525 MA-OCR</td>
<td>Barnstable</td>
<td>June 1955</td>
<td>Proposed Shore Protection - Repairs to Stone Mound, Groins, Beach and Bank Restoration - Winnon Shore - Barnstable, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Winnon Shores</td>
<td>Stone Mound and Groins</td>
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<td>1067 MA-OCR</td>
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<td>October 1948</td>
<td>Proposed Shore Protection - Dowses Point, Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Dowses Point</td>
<td>Groins and Riprap</td>
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<td>003-163-000-013-100</td>
<td>003-163-000-013-100-OCR1B</td>
<td>1555 MA-OCR</td>
<td>Barnstable</td>
<td>November 1955</td>
<td>Proposed Jetty Extension - Entrance to East Bay - Dowses Point - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Entrance to East Bay</td>
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<td>003-300-000-022-100-OCR1A</td>
<td>1125 MA-OCR</td>
<td>Barnstable</td>
<td>December 1949</td>
<td>Proposed Timber Bulkhead and Excavation - Maraspin Creek - Barnstable Harbor - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Maraspin Creek</td>
<td>Bulkhead</td>
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<td>003-300-000-022-200-OCR2A</td>
<td>1125 MA-OCR</td>
<td>Barnstable</td>
<td>December 1949</td>
<td>Proposed Timber Bulkhead and Excavation - Maraspin Creek - Barnstable Harbor - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Bulkhead</td>
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<td>1610 MA-OCR</td>
<td>Barnstable</td>
<td>May 1956</td>
<td>Proposed Shore Protection - In Vicinity of Mill Way Road - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Stone Mound</td>
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<td>Proposed Beach Improvements - Stone Groin and Sand Fill - Sea Street - Hyannis - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Sea Street</td>
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<td>1148 MA-OCR</td>
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<td>September 1950</td>
<td>Proposed Shore Protection - Kalmus Park - Hyannis - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
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<td>Town</td>
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<td>003-324-000-038-100</td>
<td>003-324-000-038-100-DCR1A</td>
<td>Barnstable</td>
<td>June 1954</td>
<td>Proposed Seawall and Jetty Construction - Veteran Memorial Park - Lewis Bay - Barnstable, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>Ocean Street</td>
<td>Seawall and Jetty</td>
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<td>Barnstable</td>
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<td>Proposed Shore Protection - Stone Groin and Concrete Seawall - Veteran Memorial Park - Hyannis - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>Veterans Memorial Park</td>
<td>Groin and Concrete Seawall</td>
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<td>Barnstable</td>
<td>June 1954</td>
<td>Proposed Seawall and Jetty Construction - Veteran Memorial Park - Lewis Bay - Barnstable, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>Ocean Street</td>
<td>Seawall and Jetty</td>
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<td>Barnstable</td>
<td>September 1985</td>
<td>Proposed Shore Protection - Stone Groin and Concrete Seawall - Veteran Memorial Park - Hyannis - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>Veterans Memorial Park</td>
<td>Jetty and Concrete Seawall</td>
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<td>003-324-000-041-100</td>
<td>003-324-000-041-100-DCR1A</td>
<td>Barnstable</td>
<td>October 1951</td>
<td>Proposed Stone Jetty - Dunbars Point - Hyannis Harbor - Barnstable - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>Dunbars Point by Ocean Street</td>
<td>Jetty</td>
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</table>
Install Cap Stone at Same Elevation to Meet Top of Existing Revetment (EL 7.7). From Existing Revetment Slope Downward to Intersect High Point of Dillapidated Revetment (See Plan for Elevations)

**CHANNEL SIDE**

M.W. Elev. = 0.00'

M.H.W. Elev. = 3.10'

1.5' TYP.

1.5' TYP.

H.T.L. Elev. = 4.00'

**BEACH SIDE**

Furnish and Install Chink-Stone by Hand to Fill Voids

4th Maximum

Furnish and Install Armor Stone

Existing Grade

Varies (approx. 2.8'-4.0')

Furnish and Install Armor Stone

Existing Grade

Varies (approx. 1.4'-2.5')

**Typical Revetment Section A-A**

Not to Scale

"Plans accompanying Petition of Town of Barnstable Department of Public Works, Dowses Beach, Osterville, MA"

PREPARED BY: Horsley and Witten, Inc.

Date: September 10, 1999
NOTE:
1. THE ENTIRE PROJECT IS LOCATED WITHIN THE FLOOD PLAIN BOUNDARY.

Mean Low Water
Elev 0.0 ft. (TYP.)

Mean High Water
Elev 3.1 ft. (TYP.)

Historic Mean
High Water (1846)

Proposed
Beach Grass

Rosa Rugosa &
Beach Grass

Sand

PLAN-PROPOSED
0 10 20 30 40 50 60 70 80 FEET
SCALE 1" = 40'
LICENSE PLAN NO. 8578

PLAN-PROPOSED

SCALE 1"= 40'

NOTE:
1. THE ENTIRE PROJECT IS LOCATED WITHIN THE FLOODPLAIN BOUNDARY.
NOTES:

Elevations are shown in feet and tenths based on the plane of M.L.W. minus figures represent depths below that plane.

Bulwark originally built in 1949 by Mass. D.P.W., Division of Waterways.

Bench mark: Spike set in up #18 El. 15' 77

- Replacement or new pile
- Pile to be replaced
- Existing pile to remain

Existing structure... built by Mass. D.P.W., Division of Waterways in 1949, not licensed.

Westerly abutter Barnstable Marine Service Freeza Road Barnstable, MA 02630

Plan accompanying petition of Town of Barnstable to replace bulwark, platforms, gangways and anchor piles in Maraspin Creek Barnstable, Mass.

Nov. 11, 1986 Sheet No. 2

Braman Engineering Company Civil Engineers & Surveyors 258 Main St. Buzzards Bay, MA

License Plan No. 1669

Approved by Department of Environmental Quality Engineering of Massachusetts

Robert A. Braman

Registered Professional Engineer

Civil

87W-022
NOTES:
ELEVATIONS ARE SHOWN IN FEET
AND TENTHS BASED ON THE PLANE
OF MLW. MINUS FIGURES REPRESENT
DEPTHS BELOW THAT PLANE.

BULKHEAD ORIGINALLY BUILT IN
1949 BY MASS. DPW, DIVISION
OF WATERWAYS.

BENCHMARK: SPIKE SET IN
UP#18 EL. 15.77

REPLACEMENT OR NEW PILE

PILE TO BE REPLACED

EXISTING PILE TO REMAIN

EXISTING STRUCTURE;
BUILT: BY MASS. DPW
DIVISION OF WATERWAYS
IN 1949. NOT LICENSED

WESTERLY ABUTTER
BARNSTABLE MARINE SERVICE
FREEZA ROAD
BARNSTABLE, MA. 02630

COMMUNICATED OF MASSACHUSETTS

ROBERT A.
BRAMAN
No. 10905
PROFESSIONAL ENGINEER
CIVIL

87 W-022

LICENSE PLAN NO. 1669
Approved by Department of Environmental Quality Engineering
of Massachusetts

COMMISSIONER
DEPUTY COMMISSIONER
DIVISION DIRECTOR
DEPUTY STAFF DIRECTOR
SEC. CHIEF

NOV. 11, 1986
SHEET OF 2

BANGAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST, BUZZARDS BAY, MA.
LOCATION & PLAN VIEW

EXISTING BIT. CONC. TO BE REMOVED

PROPOSED RIP-RAP
MASS SPEC. SLOPE PAVEMENT

M.H.W. 9.5
ML.W. 0.0
18% 1/8

1-0 MIN. GRAVEL
SUB-BASE

LONGITUDINAL X-SECTION
SCALE 1 IN. = 200 FT

NOTE:
ELEVATIONS ARE IN FEET
0.0 REFERS TO A PLANE OF MLW.
ALL EXCAVATED & Spoiled
MATERIAL TO BE REMOVED FROM
SITE

EXISTING TIMBER BULKHEAD

PRECAST REINFORCED CONC.
APRON TO BE JETTED INTO
EXISTING SUB-GR ADE

DET. - PRECAST CONCRETE END SLABS
SCALE: 1 IN. = 20 FT

PLAN TO ACCOMPANY PETITION OF
TOWN OF BARNSTABLE, MASS.
TO BUILD AND MAINTAIN A BOAT RAMP
AND RIP-RAP IN
MARASPIN CREEK
VILLAGE OF BARNSTABLE, MASS.

SCALE: AS NOTED . JUNE, 17, 1977
TOWN OF BARNSTABLE ENGINEERING DEPT.
397 MAIN ST. HYANNIS, MASS.
PLAN ACCOMPANYING PETITION OF TOWN OF BARNSTABLE TO CONSTRUCT & MAINTAIN CULVERT IN THE HYANNIS HARBOR, BARNSTABLE, MA. DATE: JUNE 1985

TIBBETTS ENGINEERING CORP. NEW BEDFORD, MA.
NOTES:

1. PROPOSED TIED BACK SHEET PILE BULKHEAD 265 LF; TIMBER DECK 3950 SF; 55 FENDER PILES.
2. EXISTING FLOAT WORKING PILES TO BE PULLED FOR DREDGING, WITH FLOATS AND PILING, RESET IN SAME LOCATION FOLLOWING DREDGING.
3. CONTRACTOR TO REMOVE EXISTING TIMBER BULKHEAD AFTER INSTALLATION OF NEW SHEETING.
4. DREDGED MATERIAL TO BE DISPOSE AT CAD PIT DISPOSAL SITE WITHIN CORPS DREDGING PROJECT.

PROPOSED WORK:
ASELTON PARK

SCALE IN FEET
0  20'  40'

APRIL 1997
SHEET 2 OF
LICENSE PLAN NO. 6894
Approved by Department of Environmental Protection
Date: SEP 05 1997

SECTION A-A
SCALE: 1" = 5'

SECTION B-B
SCALE: 1" = 5'

ASELTON PARK
PROPOSED BULKHEAD AND DECK SECTIONS
1" = 5'
SCALE IN FEET
0 5'

APRIL 1997
SHEET 4 OF 6
SECTION C–C
SCALE: 1" = 50' HOR.
1" = 5' VERT.

LICENSE PLAN NO. 6897
Approved by Department of Environmental Protection
Date: SEP 05 1997

SECTION D–D
SCALE: 1" = 50' HOR.
1" = 5' VERT.

PROPOSED DREDGING
ASELTON PARK

NOTE:
1. DATUM MLW=0.0; MHW=3.1; HTL=4.0.
2. DREDGE VOLUME ASELTON PARK 4800 CY, TO CAD PIT DISPOSAL.

APRIL 1997
SHEET 5 OF 6
PROPOSED DREDGING TOWN CHANNEL

1" = 20'

SCALE IN FEET

0
20

NOTES:
1. DATUM MLW=0.0; MHW=3.1; HTL=4.0.
2. DREDGE VOLUME TOWN CHANNEL 2400 CY. TO CAD PIT DISPOSAL.

APRIL 1997
SHEET 6 OF 6
EXHISTING SITE PLAN

NOTE:
003-326-000-068-100

FEBRUARY 1997 SHEET 1 OF

LICENSE PLAN NO. 6342

Approved by Department of Environmental Protection of Massachusetts

JUN 05 1997

PLANS ACCOMPANYING THE PETITION OF TOWN OF BARNSTABLE FOR MAINTAINING A STEEL BULKHEAD, DREDGING, AND REPLACING TIMBER PIERS AND PILES IN HYANNIS INNER HARBOR, BARNSTABLE, MASSACHUSETTS.
SECTION A-A

SCALE: 1" = 20'

SCALE IN FEET

0 10' 20'

PLAN VIEW
EXISTING TIEROD AND DEADMAN SYSTEM

SCALE: 1" = 10'

SCALE IN FEET

0 5' 10'

EXISTING CONDITIONS

003-326-000-068-100

LICENSE PLAN NO. 6342
Approved by Department of Environmental Protection
Date: JUN 0 5 1997

APRIL 1996
SHEET 2 OF 5
PROPOSED WORK PLAN

RALPH BISMORE PARK

PROPOSED WORK PLAN

SCALE: 1" = 100'

SCALE IN FEET

0 100'

NOTES:
1. PROPOSED DREDGING WITHIN 20' OF BULKHEAD DREDGE TO EL. -8 (WITH 1 FT. OVERDREDGE TO -7). BEYOND TO EL. -8 (WITH 1 FT. OVERDREDGE TO EL. -10). AREA=41,000 SF; VOLUME=4500 CY.
2. DREDGED MATERIAL TO BE DEPOSITED AT CAUS PROJECT.
3. AREA OF PROPOSED FINGER PIER IS 2800 SF. PIER TO UTILIZE 172'-12" DIA. TIMBER PILES. EXCISED FINGER PIER TO BE REPLACED AND/OR RELOCATED AS REQUIRED.
4. VOLUME OF FILL BELOW MHW = 500 CY.
5. NUMBER OF SLIPS = 27.
PROPOSED SECTION B-B

PROPOSED TIEROD REPLACEMENT

PROPOSED BULKHEAD RECONSTRUCTION

003-326-000-068-100
TYPICAL FINGER PIER PROFILE

SCALE: 1" = 10'

NOTE:
1. WIDTH OF PIER VARIOUS 3' TO 6' - SEE SHEET 3.
2. LENGTH OF PIER VARIOUS 50' TO 70' - SEE SHEET 3.

PROPOSED FINGER PIERS
PLAN ACCOMPANYING PETITION OF TOWN OF BARNSTABLE
TO MAINTAIN A STEEL BULKHEAD,
TO CONSTRUCT TIMBER PIERS AND
TO PLACE PILES IN
HYANNIS INNER HARBOR
BARNSTABLE, MASS.
DECEMBER 17, 1986. SHEET 1 OF 3

BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST., BUZZARDS BAY, MA.
LICENSE PLAN NO. 1858
Approved by Department of Environmental Quality Engineering
Date: Nov 14 1988

TOWN OF BARNSTABLE   DECEMBER 17, 1986

SHEET 2 OF 3
PLAN ACCOMPANYING PETITION OF
TOWN OF BARNSTABLE
TO MAINTAIN A STEEL BULKHEAD,
TO CONSTRUCT TIMBER PIERS AND
TO PLACE PILES IN
HYANNIS INNER HARBOR
BARNSTABLE, MASS.
DECEMBER 17, 1986 SHEET 1 OF 3

BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS
250 MAIN ST., BUZZARDS BAY, MA.
LICENSE PLAN NO. 1858
Approved by Department of Environmental Quality Engineering
Date: NOV 14 1988

TOWN OF BARNSTABLE DECEMBER 17, 1986

SHEET 2 OF 3
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<th>Municipality</th>
<th>Date</th>
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<td>003-033-003-021-100-C0E1A</td>
<td>49-105</td>
<td>USACE</td>
<td>Barnstable</td>
<td>May 1949</td>
<td>Proposed Groin Construction, Excavation and Fill in Cuttyhunk Bay - Barnstable - Mass. - Application by DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Cuttyhunk Bay</td>
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<td>003-090-000-010-100-C0E1A</td>
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<td>USACE</td>
<td>Barnstable</td>
<td>May 1953</td>
<td>Proposed Jetty Construction - West Bay Entrance - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>West Bay Entrance</td>
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<td>003-153-000-013-100-C0E1A</td>
<td>55-2</td>
<td>USACE</td>
<td>Barnstable</td>
<td>December 1955</td>
<td>Proposed Jetty Extension - Dowes Point - Nantucket Sound - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Dowes Point</td>
<td>Jetty Extension</td>
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<td>003-300-003-022-103-C0E1A</td>
<td>53-20</td>
<td>USACE</td>
<td>Barnstable</td>
<td>January 1960</td>
<td>Proposed Bulkhead and Excavation - Maranip Creek - Barnstable Harbor - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
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<td>003-300-003-022-203-C0E2A</td>
<td>54-79</td>
<td>USACE</td>
<td>Barnstable</td>
<td>March 1954</td>
<td>Proposed Harbor Improvements - Timber Pile, Excavation and Riprap - Maranip Creek - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
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<td>Maranip Creek</td>
<td>Riprap</td>
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<td>003-300-000-022-300</td>
<td>003-300-003-022-303-C0E3A</td>
<td>54-79</td>
<td>USACE</td>
<td>Barnstable</td>
<td>March 1954</td>
<td>Proposed Harbor Improvements - Timber Pile, Excavation and Riprap - Maranip Creek - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Maranip Creek</td>
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<td>003-300-000-022-303-C0E3B</td>
<td>76-267</td>
<td>USACE</td>
<td>Barnstable</td>
<td>June 1977</td>
<td>Plan to Accompany Petition of Town of Barnstable, Massachusetts to Build and Maintain a Boat Ramp and Riprap in Maranip Creek - Village of Barnstable, Barnstable County, Massachusetts</td>
<td>1</td>
<td>Maranip Creek</td>
<td>Riprap</td>
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<td>003-323-000-001-100-C0E1A</td>
<td>50-201</td>
<td>USACE</td>
<td>Barnstable</td>
<td>September 1950</td>
<td>Proposed Stone Jetty and Sand Fill at Kalmus Park - Hyannis - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Kalmus Park</td>
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<td>54-189</td>
<td>USACE</td>
<td>Barnstable</td>
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<td>Proposed Seawall and Jetty Construction - Veterans Memorial Park - Lewis Bay - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
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<td>003-324-000-038-203-C0E2A</td>
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<td>USACE</td>
<td>Barnstable</td>
<td>July 1954</td>
<td>Proposed Seawall and Jetty Construction - Veterans Memorial Park - Lewis Bay - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
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<td>Veterans Memorial Park</td>
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<td>51-201</td>
<td>USACE</td>
<td>Barnstable</td>
<td>November 1951</td>
<td>Proposed Stone Jetty - Dunbar's Point - Hyannis Harbor - Barnstable, Massachusetts - Proposed Seawall and Jetty Construction - Veterans Memorial Park - Lewis Bay - Barnstable, Massachusetts - Application by DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Dunbar's Point</td>
<td>Jetty</td>
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<td>003-326-000-068-100</td>
<td>003-326-000-068-100-C0E1A</td>
<td>62-239</td>
<td>USACE</td>
<td>Barnstable</td>
<td>January 1962</td>
<td>Proposed Steel Bulkhead and Finger Pier Extension - Hyannis Harbor (inner) - Barnstable, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Ralph Bismore Park</td>
<td>Steel Bulkhead</td>
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NOTE

MOUNDING IS IN FEET AND TENTHS AND
SHOW DEPTHS BELOW THE PLANE OF MEAN
LOW WATER.
WORK TO BE DONE SHOWN IN RED.

PROPOSED JETTY CONSTRUCTION
WEST BAY ENTRANCE
BARNSTABLE, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MAY 1933
SCALES SHOWN

[Signature]
NOTE
ELEVATIONS ARE IN FEET AND TENTHS
ABOVE THE PLANE OF MEAN LOW WATER.
MINUS FIGURES SHOW DEPTHS BELOW
THE SAME PLANE.
LOCATION OF PROPOSED WORK SHOWN
IN RED.

PROPOSED
JETTY EXTENSION
DOWSESS POINT
NANTUCKET SOUND
BARNSTABLE VT MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS MASSACHUSETTS
DIVISION OF WATERWAYS
DECEMBER 1955
SIGNED R. B. McCollum
PROPOSED HARBOR IMPROVEMENTS
Timber Piles, Excavation & Riprap
MARASPIN CREEK
BARNSTABLE HARBOR
BARNSTABLE, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1954

PROPOSED WORK SHOWN IN RED.
MATERIAL EXCAVATED, APPROX. 7200
CUBIC YARDS, TO BE DEPOSITED IN LOCATIONS SHOWN.

ELEVATIONS ARE IN FEET AND TENTHS
ABOVE PLAN OF MEAN LOW WATER.
MINUS FIGURES SHOW DEPTHS BELOW
SAME PLANE.

NOTE
PROPOSED HARBOR IMPROVEMENTS
Timber Piles, Excavation & Riprap
MARASPIN CREEK
BARNSTABLE HARBOR
BARNSTABLE, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS DIVISION OF WATERWAYS
MARCH 1954

Proposed Harbor Improvements
Timber Piles, Excavation & Riprap
Maraspin Creek
Barnstable Harbor
Barnstable, Mass.
Application by
Department of Public Works, Massachusetts
Division of Waterways
March 1954
Robert H. MacPherson
District Waterways Engineer
LOCATION & PLAN VIEW

EXISTING RIP-RAP

M.H.W. 9.5
ML.W. 0.0
18%

1.0 MIN. GRAVEL SUB-BASE

PROPOSED RIP-RAP
MASS SPEC. SLOPE PAVEMENT

LONGITUDINAL X-SECTION

SCALE: 1 IN. = 40 FT

NOTE:
ELEVATIONS ARE IN FEET
0.0 REFERS TO A PLANE OF MLW.
ALL EXCAVATED & Spoiled
MATERIAL TO BE REMOVED FROM SITE

DET.: PRECAST CONCRETE END SLABS

SCALE: 1 IN. = 20 FT

PLAN TO ACCOMPANY PETITION OF
TOWN OF BARNSTABLE, MASS.
TO BUILD AND MAINTAIN A BOAT RAMP
AND RIP-RAP IN
MARASPIN CREEK
VILLAGE OF BARNSTABLE, MASS.

SCALE: AS NOTED
JUNE, 17, 1977
TOWN OF BARNSTABLE ENGINEERING DEPT.
397 MAIN ST. HYANNIS, MASS.
NOTE
ELEVATIONS ARE IN FEET AND TENTS ABOVE THE PLANE OF MEAN LOW WATER AND MINUS FIGURE SHOW DEPTHS BELOW THE SAME PLANE. LOCATION OF WORK TO BE DONE IS SHOWN IN RED.

PROPOSED SEAWALL AND JETTY CONSTRUCTION
Veterans Memorial Park
LEWIS BAY
BARNSTABLE - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
JULY 1954
SCALES SHOWN
PROPOSED SEAWALL AND JETTY CONSTRUCTION
Veterans Memorial Park
LEWIS BAY
BARNSTABLE - MASS.
APPLICATION OF DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JULY 1954
SCALES SHOWN

NOTE
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER AND MINUS FIGURE SHOW DEPTHS BELOW THE SAME PLANE. LOCATION OF WORK TO BE DONE IS SHOWN IN RED.
NOTE

Proposed work shown in R.D. elevation are in feet and tenths and shown heights above the plane of mean low water. Minus figures show depths below the same plane.

Toe stones (both sides of jetty) to be imbedded 18" to 26" below existing ground from the inner end of jetty to mean low water.

PROPOSED STONE JETTY
DUNBAR'S POINT - HYANNIS HARBOR
BARNSTABLE

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER 1931

H. W. Whitcomb
DISTRICT WATERWAYS ENGINEER
ELEVATIONS IN FEET AND TENTHS REFER TO PLANE OF MEAN LOW WATER. APPROXIMATE ELEVATIONS GIVEN. EXISTING HARDWARE, SPOON CHECKS AND OTHER SUBORDINATE HOLDINGS NOT SHOWN ARE TO BE PURCHASED IN PLACE. EXISTING PILING FOR BULKHEAD IS TO BE INTERRED OR SUNK ONE FT. BELOW TO EL-100 OR AS REQUIRED. WOODEN PILES 20 TO 30 FT. LONG AND TREATED OR NOT AS REQUIRED ARE TO BE USED. ALL THE ABOVE MATERIALS AND CONSTRUCTION TO BE STANDARD.

PROPOSED STEEL BULKHEAD
UP FINGER PIER EXTENSIONS
HYANNIS HARBOR (INTERIOR)
BARNSTABLE - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JANUARY - 1962

Robert D. Mendonca
Chief Waterways Engineer.
Section III

Yarmouth
Section III – Community Findings – Town of Yarmouth

COMMUNITY DESCRIPTION

The Town of Yarmouth consists of a land area of 24.25 square miles out of a total area of 28.22 square miles and had a population of 24,807 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report’s cover. The estimated length of shoreline is 9 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Yarmouth, there were 21 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 10 in Section III-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>Structure Condition Rating</th>
<th>Total Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Bulkhead / Seawall</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revetment</td>
<td>14</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Breakwater</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Yarmouth’s case there are a total of 21 structures which would require approximately $3.8 million to bring all the coastal structures to “A” Rating. Most critical will be the structures in the “D” and “F” classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated $660,000 would be required to upgrade the Town’s coastal protection.
STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Yarmouth

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead / Seawall</td>
<td>1</td>
<td></td>
<td>$75,240</td>
<td></td>
<td></td>
<td></td>
<td>$75,240</td>
</tr>
<tr>
<td>Revetment</td>
<td>14</td>
<td>$ 55,255</td>
<td>$1,320,442</td>
<td>$91,245</td>
<td></td>
<td></td>
<td>$1,466,942</td>
</tr>
<tr>
<td>Breakwater</td>
<td>1</td>
<td></td>
<td>$205,840</td>
<td></td>
<td></td>
<td></td>
<td>$205,840</td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>5</td>
<td></td>
<td>$1,546,710</td>
<td>$497,970</td>
<td></td>
<td></td>
<td>$2,044,680</td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

21 $ - $55,255 $3,074,992 $573,210 $91,245 $3,794,702

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Yarmouth, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Yarmouth

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Owned</td>
<td>20</td>
<td>$55,255</td>
<td>$2,789,707</td>
<td>$573,210</td>
<td>$91,245</td>
<td></td>
<td>$3,504,417</td>
</tr>
<tr>
<td>Commonwealth of Massachusetts</td>
<td>1</td>
<td></td>
<td>$285,285</td>
<td></td>
<td></td>
<td></td>
<td>$285,285</td>
</tr>
<tr>
<td>Federal Government Owned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td>Unknown Ownership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

21 $ - $55,255 $3,074,992 $573,210 $91,245 $3,794,702

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section III-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Yarmouth’s coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.
Section III - Yarmouth

Part B

Structure Assessment Reports
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Parker's River
Based On Comment:
Earliest Structure Record: 1951

Date: 10/26/2007
Estimated Reconstruction/Repair Cost: $1,225,020.00

Length: 1020 Feet
Top Elevation: 16 Feet NGVD
FIRM Map Zone: V15
FIRM Map Elevation:

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:

This structure is the West jetty at Parker's River. The side slopes and crest are generally in good condition. There is some slumping evident in a small area in the central section of the jetty.

Condition C
Rating Fair
Level of Action Moderate
Description Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
083-015-000-023-100-PHO1A.jpg

Structure Documents:

<table>
<thead>
<tr>
<th>USACE</th>
<th>October 195</th>
<th>Proposed Stone</th>
<th>083-015-000-023-100-COE1A</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACE</td>
<td>February 19</td>
<td>Proposed Excavation</td>
<td>083-015-000-023-100-COE1B</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>November 1</td>
<td>Proposed Shore</td>
<td>083-015-000-023-100-DCR1A</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>October 195</td>
<td>Proposed Excavation</td>
<td>083-015-000-023-100-DCR1B</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>August 1961</td>
<td>Proposed Shore</td>
<td>083-015-000-023-100-DCR1C</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Webster Street</td>
<td>10/26/2007</td>
</tr>
<tr>
<td>Presumed Structure Owner:</td>
<td>Based On Comment:</td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner Name:</td>
<td>Earliest Structure Record:</td>
<td>Estimated Reconstruction/Repair Cost:</td>
</tr>
<tr>
<td>Yarmouth</td>
<td>Unknown</td>
<td>$91,245.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 Feet</td>
<td>Feet NAVD 88</td>
<td>V15</td>
<td>16 Feet NGVD</td>
</tr>
</tbody>
</table>

**Primary Type:** Revetment  
**Primary Material:** Stone  
**Primary Height:** Under 5 Feet

**Secondary Type:**  
**Secondary Material:**  
**Secondary Height:**

**Structure Summary:**
This structure is the dumped stone revetment at conservation property along Webster Street. There is no interlocking of stones. They are simply placed side by side in a line. The crest is severely depressed at center of structure.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Priority Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Low Priority</td>
<td>Future Project Consideration</td>
</tr>
</tbody>
</table>

**Description:** Conditions of structure/landform may warrant emergency stabilization as failure may result in potential loss of property and/or life. Landform eroded, loss of integrity. Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

**Structure Images:**
[083-016-000-003-100-PHO1A.jpg]

**Structure Documents:**
[DEP] May 21, 200 Plan Accompanying [083-016-000-003-100-LIC1A]

Prepared By: Bourne Consulting Engineering
Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth
Location: Englewood beach
Based On Comment:
Earliest Structure Record: 1956
Estimated Reconstruction/Repair Cost: $205,840.00
Date: 10/26/2007

<table>
<thead>
<tr>
<th>Length: 310 Feet</th>
<th>Top Elevation: NAVD 88 Feet</th>
<th>FIRM Map Zone: V15</th>
<th>FIRM Map Elevation: 13 Feet NGVD</th>
</tr>
</thead>
</table>

Primary Type: Breakwater
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is a breakwater which is impounding sand at Englewood beach. The stones at the toe have slumped and become unlocked from the stones above. The structure crest is in fair condition.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
</tbody>
</table>

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Structure Images:
[083-016-000-059-100-PH01A.jpg]

Structure Documents:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACE</td>
<td>January 1955</td>
<td>Proposed Stone</td>
</tr>
<tr>
<td>USACE</td>
<td>December 1, 1963</td>
<td>Proposed Groins and Piers - In</td>
</tr>
<tr>
<td>USACE</td>
<td>June 1979</td>
<td>Proposed Boat Ramp</td>
</tr>
<tr>
<td>USACE</td>
<td>July 1982</td>
<td>Plan Accompanying</td>
</tr>
<tr>
<td>DEP</td>
<td>June 1963</td>
<td>Plan Accompanying</td>
</tr>
<tr>
<td>DEP</td>
<td>August 1970</td>
<td>Plan Accompanying</td>
</tr>
<tr>
<td>DEP</td>
<td>April 1992</td>
<td>Plan Accompanying</td>
</tr>
<tr>
<td>DEP</td>
<td>September 1, 1992</td>
<td>Plan Accompanying</td>
</tr>
<tr>
<td>DEP</td>
<td>September 2, 1992</td>
<td>Plan Accompanying</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
| DEP          | December 2 | Plan Accompanying | 083-016-000-059-100-LIC1F |

Town: Yarmouth
Structure ID: 083-016-000-059-100
Key: community-map-block-parcel-structure

Prepared By: Bourne Consulting Engineering
## CZM Coastal Infrastructure Inventory and Assessment
### Structure Assessment Form

**Property Owner:**
- Local

**Presumed Structure Owner:**
- Local

**Owner Name:**
- Yarmouth

**Location:**
- Seaview Beach

**Date:**
- 10/26/2007

**Based On Comment:**

**Earliest Structure Record:**
- Unknown

**Estimated Reconstruction/Repair Cost:**
- $16,817.00

<table>
<thead>
<tr>
<th>Length</th>
<th>Top Elevation</th>
<th>FIRM Map Zone</th>
<th>FIRM Map Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>140 Feet</td>
<td>16 Feet NGVD 88</td>
<td>V15</td>
<td>16 Feet NGVD</td>
</tr>
</tbody>
</table>

**Primary Type:**
- Revetment

**Primary Material:**
- Stone

**Primary Height:**
- 5 to 10 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

**Structure Summary:**
This structure is the revetment fronting the parking lot at Seaview Beach. The armor stone is grouted and the sideslopes are in good condition. Toe is buried in beach and not visible for inspection.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>III</td>
<td>Minor</td>
<td>Consider for Active Project Improvement Listing</td>
</tr>
</tbody>
</table>

**Structure Images:**
- [083-019-000-002-100-PHO1A.jpg](#)

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner:
Local

Presumed Structure Owner:
Local

Owner Name:
Yarmouth

Location:
Thacher's Beach

Date:
10/26/2007

Based On Comment:

Earliest Structure Record:
1956

Estimated Reconstruction/Repair Cost:
$117,117.00

Length:
195 Feet NAVD 88

Top Elevation:

FIRM Map Zone:
V15

FIRM Map Elevation:
16 Feet NGVD

Primary Type:
Revetment

Primary Material:
Stone

Primary Height:
5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary:
This structure is the revetment fronting the parking lot at Thacher's Beach. The revetment is generally in good condition. The armor stone is beginning to slump at the west end.

Condition Rating
C
Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating Action Description
III
Moderate Priority
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
083-019-000-006-100-PHO1A.jpg

Structure Documents:
MA-DCR January 195 Proposed Shore 083-019-000-006-100-DCR1A
DEP September 1 Plan Accompanying 083-019-000-006-100-LIC1A

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment  
Structure Assessment Form  

Town: Yarmouth  
Structure ID: 083-019-000-006-200  
Key: community-map-block-parcel-structure

Property Owner:  
Local

Presumed Structure Owner:  
Local

Owner Name:  
Yarmouth

Location:  
Thacher's Beach

Date:  
10/26/2007

Based On Comment:

Earliest Structure Record:  
Unknown

Estimated Reconstruction/Repair Cost:  
$99,594.00

Length:  
75 Feet

Top Elevation:  
Feet NAVD 88

FIRM Map Zone:  
V15

FIRM Map Elevation:  
16 Feet NGVD

Primary Type:  
Groin/ Jetty

Primary Material:  
Stone

Primary Height:  
Under 5 Feet

Secondary Type:  

Secondary Material:  

Secondary Height:  

Structure Summary:

This structure is a single groin at Thacher's beach. The structure shows no interlocking between stones and the groin head is unraveled.

Condition Rating  
D

Level of Action Description
Major

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating  
1

Action Description
None

Long Term Planning Considerations
No Inshore Structures or Residential Dwelling Units Present

Structure Images:

Structure Documents:

083-019-000-006-200-PHO2A.jpg

Prepared By: Bourne Consulting Engineering
## CZM Coastal Infrastructure Inventory and Assessment
### Structure Assessment Form

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Mill Creek</td>
<td>10/26/2007</td>
</tr>
<tr>
<td>Presumed Structure Owner:</td>
<td>Based On Comment:</td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner Name:</td>
<td>Earliest Structure Record:</td>
<td>Estimated Reconstruction/Repair Cost:</td>
</tr>
<tr>
<td>Yarmouth</td>
<td>1951</td>
<td>$134,719.00</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
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</thead>
<tbody>
<tr>
<td>405 Feet</td>
<td>Feet NAVD 88</td>
<td>V15</td>
<td>16 Feet NGVD</td>
</tr>
</tbody>
</table>

Primary Type: Revetment  
Primary Material: Stone  
Primary Height: Under 5 Feet  
Secondary Type:  
Secondary Material:  
Secondary Height:  

Structure Summary:
This is the stone revetment along the east side of the entrance to Mill Creek. The structure side slopes are intact. The crest elevation is quite low and some erosion is evident behind the crest for much of the structure length.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
<th>Priority</th>
<th>Rateing</th>
<th>Level of Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>III</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement</td>
<td>Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (~1 dwelling impacted / 100 feet of shoreline)</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Structure Images:
[083-021-000-049-100-PH01A.jpg](#)

Structure Documents:
- USACE: October 195  
- Proposed Stone: 083-021-000-049-100-COE1A  
- Proposed Shore: 083-021-000-049-100-DCR1A  
- Proposed Shore: 083-021-000-049-100-DCR1B  
- Proposed Channel: 083-021-000-049-100-DCR1C  
- Proposed Relocation: 083-021-000-049-100-DCR1D

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

**Property Owner:** Local  
**Location:** Beachwood Road  
**Date:** 10/26/2007

**Presumed Structure Owner:** Local  
**Based On Comment:**

**Owner Name:** Yarmouth  
**Earliest Structure Record:** Unknown

**Length:** 300 Feet  
**Top Elevation:** V15 Feet NAVD 88

**FIRM Map Zone:** V15  
**FIRM Map Elevation:** 18 Feet NGVD

**Primary Type:** Groin/Jetty  
**Primary Material:** Stone  
**Primary Height:** Under 5 Feet

**Secondary Type:**  
**Secondary Material:**  
**Secondary Height:**

**Structure Summary:**  
This is the 3 groins at the terminus of Beachwood road and eastward. There are few stones serving as side slopes. As a result there is little interlocking between adjacent stones. The groins are very low profile.

**Condition:** D  
**Priority:** II

**Rating:** Poor  
**Rating:** Low Priority

**Level of Action:** Major  
**Action:** Future Project Consideration

**Description:** Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

**Structure Images:** [083-025-000-287-100-PHO1A.jpg]

**Structure Documents:**
- USACE December 1: Proposed Stone Jetty 083-025-000-287-100-COE1A
- USACE October 195: Proposed Stone 083-025-000-287-100-COE1B
- MA-DCR August 1935: Proposed Shore 083-025-000-287-100-DCR1A
- MA-DCR October 194: Proposed Shore 083-025-000-287-100-DCR1B
- MA-DCR December 1: Proposed Shore 083-025-000-287-100-DCR1C

**Estimated Reconstruction/Repair Cost:** $398,376.00

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner:
Local

Presumed Structure Owner:
Local

Owner Name:
Yarmouth

Location:
Parkers River Beach

Based On Comment:

Date:
10/26/2007

Earliest Structure Record:
1936

Estimated Reconstruction/Repair Cost:
$291,291.00

Length:
485 Feet

Top Elevation:
3 Feet NAVD 88

FIRM Map Zone:
V15

FIRM Map Elevation:
16 Feet NGVD

Primary Type:
Revetment

Primary Material:
Stone

Primary Height:
5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary:
This structure is the revetment fronting Parkers River Beach. The armor stone is grouted together. There is damage to the armor stone and undermining of fill at east end of structure.

Condition Rating
C
Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
Ill
Moderate Priority
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
083-025-000-297-100-PHO1A.jpg

Structure Documents:

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Description</th>
<th>ID</th>
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<tbody>
<tr>
<td>September 1</td>
<td>Proposed Shore</td>
<td></td>
<td>083-025-000-297-100-DCR1A</td>
</tr>
<tr>
<td>October 194</td>
<td>Proposed Shore</td>
<td></td>
<td>083-025-000-297-100-DCR1B</td>
</tr>
<tr>
<td>February 1</td>
<td>Proposed Shore</td>
<td></td>
<td>083-025-000-297-100-DCR1C</td>
</tr>
<tr>
<td>December 1</td>
<td>Proposed Shore</td>
<td></td>
<td>083-025-000-297-100-DCR1D</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Parkers River Beach
Based On Comment:
Earliest Structure Record: 1935
Estimated Reconstruction/Repair Cost: $119,520.00

Date: 10/26/2007

Length: 180 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V15
FIRM Map Elevation: 16 Feet NGVD

Primary Type: Groin/Jetty
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
These are the 2 stone groins at Parkers River Beach. The side slopes are slumping away from the crest and the armor is coming unraveled. The crest elevation is very low.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
<th>Level of Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>Moderate</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
</tr>
</tbody>
</table>

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images: 083-025-000-297-200-PHO2A.jpg
Structure Documents:

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Description</th>
<th>Document ID</th>
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</thead>
<tbody>
<tr>
<td>USACE</td>
<td>October 195</td>
<td>Proposed Stone</td>
<td>083-025-000-297-200-COE2A</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>August 1935</td>
<td>Proposed Shore</td>
<td>083-025-000-297-200-DCR2A</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>October 194</td>
<td>Proposed Shore</td>
<td>083-025-000-297-200-DCR2B</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Shore</td>
<td>083-025-000-297-200-DCR2C</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Bass River Beach
Based On Comment: 
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $249,249.00

Length: 415 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: V13
FIRM Map Elevation: 13 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is the revetment at Bass River Beach. The crest has settled to the point where there is little distinction between the crest stones and the side slope stones. The interlocking between armor stones is still good however.

Condition Rating
C
Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
II
Moderate Priority
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
083-026-000-116-100-PHO1A.jpg

Structure Documents:

<table>
<thead>
<tr>
<th>MA-DCR</th>
<th>June 1945</th>
<th>Proposed Jetty</th>
<th>083-026-000-116-100-DCR1A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Repairs to</td>
<td>083-026-000-116-100-DCR1B</td>
</tr>
<tr>
<td>DEP</td>
<td>January 199</td>
<td>Plan Accompanying</td>
<td>083-026-000-116-100-LIC1A</td>
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<tr>
<td>DEP</td>
<td>August 1991</td>
<td>Plan Accompanying</td>
<td>083-026-000-116-100-LIC1B</td>
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<tr>
<td>DEP</td>
<td>August 6, 19</td>
<td>Plan Accompanying</td>
<td>083-026-000-116-100-LIC1C</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Bass River Beach
Based On Comment: 
Earliest Structure Record: 1945
Estimated Reconstruction/Repair Cost: $204,170.00

Date: 10/26/2007

Length: 170 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: V13
FIRM Map Elevation: 16 Feet NGVD

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is the jetty at Bass River Beach. The side slopes have begun to slump away from the crest, creating a gap between the sides and crest. There is some evidence of erosion along the back of the jetty crest, along the beach.

Condition Rating
C Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[083-026-000-116-200-PH02A.jpg]

Structure Documents:

<table>
<thead>
<tr>
<th>USACE</th>
<th>October 1944</th>
<th>Proposed East Jetty</th>
<th>083-026-000-116-200-COE2A</th>
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<tbody>
<tr>
<td>MA-DCR</td>
<td>January 1944</td>
<td>Proposed Jetty</td>
<td>083-026-000-116-200-DCR2A</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>December 1</td>
<td>Proposed Repairs to</td>
<td>083-026-000-116-200-DCR2B</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>September 1</td>
<td>Proposed East Jetty</td>
<td>083-026-000-116-200-DCR2C</td>
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<tr>
<td>DEP</td>
<td>August 1991</td>
<td>Plan Accompanying</td>
<td>083-026-000-116-200-LIC2A</td>
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<tr>
<td>DEP</td>
<td>August 8, 19</td>
<td>Plan Accompanying</td>
<td>083-026-000-116-200-LIC2B</td>
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</table>

Prepared By: Bourne Consulting Engineering
## CZM Coastal Infrastructure Inventory and Assessment
### Structure Assessment Form

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
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</thead>
<tbody>
<tr>
<td>Local</td>
<td>River Street</td>
<td>10/26/2007</td>
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<table>
<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
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<tbody>
<tr>
<td>Local</td>
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<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
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<tbody>
<tr>
<td>Yarmouth</td>
<td>1994</td>
<td>$78,078.00</td>
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<tbody>
<tr>
<td>130 Feet</td>
<td>Feet NAVD 88</td>
<td>V:3</td>
<td>13 Feet NGVD</td>
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</table>

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<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revetment</td>
<td>Stone</td>
<td>5 to 10 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
</table>

### Structure Summary:
This structure is the revetment at the turn in River Street. The structure toe is slumping somewhat at the south end. The remainder of the structure is in good condition, with level crest and side slopes.

### Condition Rating

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
<th>Level of Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>Moderate</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
</tr>
</tbody>
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### Priority Rating

<table>
<thead>
<tr>
<th>Priority</th>
<th>Action</th>
<th>Description</th>
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<tbody>
<tr>
<td>IV</td>
<td>Consider for Next Project Construction Listing</td>
<td>High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)</td>
</tr>
</tbody>
</table>

### Structure Images:

- [083-035-000-001-100-PHO1A.jpg](083-035-000-001-100-PHO1A.jpg)

### Structure Documents:

- DEP [April 1994](083-035-000-001-100-LIC1A)
- DEP [April 15, 199](083-035-000-001-100-LIC1B)

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Willow Street
Based On Comment: 
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $39,039.00

Date: 10/26/2007

Structure Summary:
This structure is the revetment at Willow Street on Windmill Beach. The side slopes are starting to slump away from the crest, creating a gap between the crest and body of the structure. Interlocking between armor stones is decreasing. The structure toe is not buried.

Condition Rating: C
Level of Action Description: Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating: II
Action Description: Low Priority
Future Project Consideration: Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
083-043-000-042-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Yarmouth
Structure ID: 083-052-000-001-100
Key: community-map-block-parcel-structure

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: North Cove Landing
Date: 10/26/2007

Based On Comment:

Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $9,009.00

Length: 15 Feet
Top Elevation: 9 Feet NGVD
FIRM Map Zone: A8
FIRM Map Elevation: 9 Feet NGVD
Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:
This structure is a revetment of dumped riprap at the terminus of North Cove Landing. Inspection was difficult due to vegetation overgrown across the entire structure. The riprap is quite small and appears to be loosely piled together.

Condition Rating
Level of Action Description
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
[083-052-000-001-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
### Structure Assessment Form

**Property Owner:**
- Local

**Presumed Structure Owner:**
- Local

**Owner Name:**
- Yarmouth

**Location:**
- Town: Yarmouth
- Structure ID: 083-061-000-771-100
- Key: community-map-block-parcel-structure

**Date:**
- 10/26/2007

**Earliest Structure Record:**
- 1955

**Estimated Reconstruction/Repair Cost:**
- $75,075.00

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<tr>
<th>Length:</th>
<th>Top Elevation:</th>
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<tr>
<td>125 Feet</td>
<td>9 Feet NGVD 88</td>
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</table>

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<thead>
<tr>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A8</td>
<td>9</td>
</tr>
</tbody>
</table>

**Primary Type:**
- Revetment

**Primary Material:**
- Stone

**Primary Height:**
- 5 to 10 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

**Structure Summary:**
This structure is the revetment fronting a parking lot immediately south of the Route 28 bridge across Bass River. There is some slumping of the toe in the central portion of the structure. There is some erosion of the fill behind the northwest corner.

**Condition**
- C

**Rating**
- Fair

**Level of Action**
- Moderate

**Description**
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

**Priority**
- IV

**Rating**
- High Priority

**Level of Action**
- Consider for Next Project Construction Listing

**Description**
High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

**Structure Images:**
- 083-061-000-771-100-PHO1A.jpg

**Structure Documents:**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Document Type</th>
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<tbody>
<tr>
<td>USACE</td>
<td>April 1955</td>
<td>Proposed Timber</td>
<td>083-061-000-771-100-COE1A</td>
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<tr>
<td>USACE</td>
<td>February 19</td>
<td>Proposed Timber</td>
<td>083-061-000-771-100-COE1B</td>
</tr>
<tr>
<td>USACE</td>
<td>June 1982</td>
<td>To Construct a Stone</td>
<td>083-061-000-771-100-COE1C</td>
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<tr>
<td>DEP</td>
<td>May 1955</td>
<td>Plan Accompanying</td>
<td>083-061-000-771-100-LIC1A</td>
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<tr>
<td>DEP</td>
<td>February 19</td>
<td>Plan Accompanying</td>
<td>083-061-000-771-100-LIC1B</td>
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<td>DEP</td>
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<td>Plans Accompanying</td>
<td>083-061-000-771-100-LIC1C</td>
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<td>DEP</td>
<td>938</td>
<td></td>
<td>083-061-000-771-100-LIC1D</td>
</tr>
</tbody>
</table>

**Prepared By:** Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Yarmouth

Location: Bass River Gold Course
Based On Comment: 

Location:

Earliest Structure Record: 1981
Estimated Reconstruction/Repair Cost: $15,015.00

Length: 125 Feet NAVD 88
Top Elevation: 8 Feet NGVD
FIRM Map Zone: A6
FIRM Map Elevation: 8

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:

This structure is a revetment fronting a golf course green at Bass River. The crest and side slopes are level. The structure is in good condition.

Condition B
Rating Good
Level of Action Minor
Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority II
Rating Low Priority
Action Future Project Consideration
Description Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images: 083-080-000-117-100-PHO1A.jpg

Structure Documents:

Structure Documents: USACE May 1982 Plan Accompanying 083-080-000-117-100-COE1A
DEP November 1  Plan Accompanying 083-080-000-117-100-LIC1A

Prepared By: Bourne Consulting Engineering
## CZM Coastal Infrastructure Inventory and Assessment

### Structure Assessment Form

**Property Owner:** Local  
**Location:** Wilbur Park  
**Date:** 10/26/2007  
**Location:** Wilbur Park  
**Date:** 10/26/2007  
**Location:** Wilbur Park  
**Date:** 10/26/2007  
**Location:** Wilbur Park  
**Date:** 10/26/2007

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<th>Length</th>
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<td>A5</td>
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<tr>
<td>FIRM Map Elevation</td>
<td>7 Feet NGVD</td>
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**Primary Type:** Revetment  
**Primary Material:** Stone  
**Primary Height:** 5 to 10 Feet  
**Secondary Type:**  
**Secondary Material:**  
**Secondary Height:**

**Structure Summary:**

This structure is a revetment at Wilbur Park, fronting a dirt parking lot. The crest and side slopes are level and straight. The structure is in good condition.

**Condition Rating:** B  
**Level of Action Description:** Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

**Priority Rating Action Description:** II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

**Structure Images:** 083-102-000-081-100-PHO1A.jpg

**Structure Documents:**

---

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner:  
State

Presumed Structure Owner:  
State

Owner Name:  
MHD

Location:  
Route 6 Bridge

Based On Comment:  

Earliest Structure Record:  
Unknown

Estimated Reconstruction/Repair Cost:  
$285,285.00

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<td>Feet NAVD 88</td>
<td>A4</td>
<td>6 Feet NGVD</td>
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Primary Type:  
Revetment

Primary Material:  
Stone

Primary Height:  
5 to 10 Feet

Secondary Type:  

Secondary Material:  

Secondary Height:  

Structure Summary:
Placed stone rip rap at the bridge abutment. Moderate stone movement and unraveling at the toe.

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<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
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| C Fair           | IV High Priority| Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Structure Images:
[083-111-000-022-100-PHO1A.JPG]

Structure Documents:

Prepared By: Bourne Consulting Engineering
**Structure Assessment Form**

| Property Owner: | Location: Bass River |
| Local | Based On Comment: |
| Presumed Structure Owner: Local | Earliest Structure Record: Unknown |
| Owner Name: Yarmouth | Estimated Reconstruction/Repair Cost: $0.00 |

| Length: 30 Feet | Top Elevation: 6 Feet NGVD | FIRM Map Zone: A4 | FIRM Map Elevation: 6 Feet NGVD |
| Primary Type: Bulkhead/Seawall | Primary Material: Stone | Primary Height: 10 to 15 Feet |
| Secondary Type: | Secondary Material: | Secondary Height: |

**Vertically stacked stone blocks that are grouted. Stone at the waterline are losing grout and show signs of movement and rotation.**

**Condition Rating**
- D Poor

**Level of Action**
- Major

**Description**
- Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

**Priority Rating**
- II Low Priority

**Action Description**
- Inshore Structures Present with Limited potential for Significant Infrastructure Damage

**Structure Images:**
- [083-000-000-000-100-PHOT1A.JPG]

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: [Local]

Location: Bass Hole

Date: 10/26/2007

Presumed Structure Owner: [Local]

Based On Comment:

Owner Name: Yarmouth

Earliest Structure Record: Unknown

Estimated Reconstruction/Repair Cost: $41,580.00

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Primary Type: Revetment

Primary Material: Stone

Primary Height: Under 5 Feet

Secondary Type: Secondary Material:

Secondary Height:

Structure Summary:
This structure is the stone revetment at the parking lot at Bass Hole. The armor stone is generally in good condition. The eastern end of the structure is becoming unraveled.

Condition Rating: C

Level of Action Description: Moderate

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating: III

Action Description: Moderate Priority

Consider for Active Project Improvement Listing

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images: [083-148-000-025-100-PHA1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
Section III - Yarmouth

Part C

Structure Photographs
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Massachusetts Coastal Infrastructure and Assessment

Town of Yarmouth
Section III - Yarmouth

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents
No Town Documents for the Town of Yarmouth

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<th>SCE Structure No</th>
<th>Document No</th>
<th>Contract Drawing Number</th>
<th>Entity</th>
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<th>Date</th>
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<td>1685  MA-DCR Yarmouth</td>
<td>November 1955</td>
<td>Proposed Shore Protection - Jetty Extension - Parkers River - Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>1619  MA-DCR Yarmouth</td>
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<td>Proposed Excavation and Jetty Reconstruction - Parkers River - Yarmouth, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>Proposed Shore Protection - Stone Mound and Jetty Reconstruction - Parkers River - Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>2369  MA-DCR Yarmouth</td>
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<td>Proposed Channel Relocation - Mill Creek - Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
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<td>West of Bass River</td>
<td>Groins and Riprap</td>
</tr>
<tr>
<td>083-026-000-116-100</td>
<td>083-026-000-116-100-DCR1A</td>
<td>823</td>
<td>MA-DCR</td>
<td>Yarmouth</td>
<td>June 1945</td>
<td>Proposed Jetty Repairs - Bass River Entrance - Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Bass River</td>
<td>Jetty</td>
</tr>
<tr>
<td>083-026-000-116-100</td>
<td>083-026-000-116-100-DCR1B</td>
<td>914</td>
<td>MA-DCR</td>
<td>Yarmouth</td>
<td>December 1946</td>
<td>Proposed Repairs to Stone Jetty - Bass River - Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Bass River Entrance</td>
<td>Jetty</td>
</tr>
<tr>
<td>083-026-000-116-200</td>
<td>083-026-000-116-200-DCR2C</td>
<td>1000</td>
<td>MA-DCR</td>
<td>Yarmouth</td>
<td>September 1943</td>
<td>Proposed East Jetty Repairs and West Jetty Extension - Bass River - Dennis and Yarmouth - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Bass River</td>
<td>Jetty Extension</td>
</tr>
</tbody>
</table>
Plan accompanying Petition of Town of Yarmouth
114C Route 28
South Yarmouth, MA 02664
To License Existing Stone Groin and To Replace Existing
5" Culvert to Restore Tidal Flushing to Salt Marsh in Lewis Bay, West Yarmouth, MA

License Plan No. 11784
Approved by Department of Environmental Protection of Massachusetts

[Signature] May 21, 2007

Jeffrey W. Cakes
Civil No. 35974
PROPOSED 18" HDPE INV. -2.0
BEDDED IN ANGULAR STONE GRADED
FROM 1-1/2" TO 6"

EXISTING STONE GROIN TO BE LICENSED

RE-USE EXISTING DISPLACED RIP RAP
FROM PERIMETER, 40± CUBIC YARDS

PROPOSED STONE COVER,
200 LB MINIMUM
SUPPORTED BY TRENCH
SIDEWALL STONES

100 YR
FLOODPLAIN
EL 13

2.3 MHW
0.0
-1.4 MLW
-2.0
-4.0

10
5
0
1 INCH=10 FEET

CULVERT OUTLET DETAIL

SITE PLAN

VERMONT AVENUE

CONNECTICUT AVENUE

SHORE ROAD

NEW HAMPSHIRE AVENUE

LEWIS BAY

GENERAL NOTES:
1. RESULTS OF TOPOGRAPHIC SURVEYS DATED 08/18/04, 10/09/06 AND 04/21/06 BY
THE TOWN OF YARMOUTH ENGINEERING DEPARTMENT WERE COMBINED WITH AERIAL
PHOTOGRAVIMETRY PRODUCED FOR THE TOWN OF YARMOUTH TO CREATE THIS PLAN.
2. ELEVATIONS ARE IN FEET AND TENTHS, AND REFER TO NGVD 29 DATUM.
3. BENCHMARK IS YARMOUTH MONUMENT #28 AT ENGLEWOOD BEACH WHICH WAS USED
TO ASSIGN ELEVATION 4.85 TO THE HYDRANT TAG BOLT #624.
4. PROPERTY LINE INFORMATION FROM PLAN TITLED "TOPOGRAPHIC PLAN, WETLANDS
DELINEATION AT SHORE ROAD IN SOUTH YARMOUTH" BY TOWN OF YARMOUTH
5. POSSESSION AND USE OF THE MATERIAL CONTAINED ON THESE DRAWINGS IS GRANTED
ONLY IN CONNECTION WITH ITS USE AS IT RELATES TO THE TITLED PROJECT, ANY OTHER
USE, REPRODUCTION OR DISCLOSURE OF THE INFORMATION CONTAINED HEREIN IS
EXRESSLY PROHIBITED WITHOUT THE WRITTEN CONSENT OF CLE ENGINEERING INC.

PLAN ACCOMPANYING PETITION OF:
TOWN OF YARMOUTH
1146 ROUTE 28
SC 1 YARMOUTH, MA 02664
TO LICENSE EXISTING STONE GROIN AND TO
REPLACE EXISTING
15" CULVERT TO RESTORE TIDAL
FLUSHING TO SALT MARSH
IN LEWIS BAY, WEST YARMOUTH, MA
BARNSTABLE COUNTY, MA

PAGE 2 OF 2, DATE: 9/14/06

LICENSE PLAN NO. 11784
Approved by Department of Environmental Protection
Date: MAY 2, 2007
NOTE:

PROPOSED WORK SHOWN IN RED.

ELEVATIONS SHOWN IN FEET AND
TENTHS AND SHOW HEIGHT ABOVE
THE PLANE OF MEAN LOW WATER
MINUS FIGURES ARE SOUNDINGS
AND SHOW DEPTHS BELOW SAME PLANE.

PLAN ACCOMPANYING PETITION OF
THE TOWN OF YARMOUTH
TO BUILD AND MAINTAIN A TIMBER PIER WITH
FLOAT AND MAINTAIN AN EXISTING CONC
BOAT RAMP AND STONE GROIN WITH NEW CONC CONCRETE
LEWIS BAY, WEST YARMOUTH
JUNE 4, 1963 SHEET 1 OF 2 SHEETS
JULY 23, 1963
PROFILE OF EXISTING STONE GROIN

TYPICAL CROSS SECTION

PLAN FOR THE TOWN OF YARMOUTH TO MAINTAIN THE EXISTING CONC. BOAT RAMP AND TO CAP AND MAINTAIN THE EXISTING STONE GROIN IN LEWIS BAY AT (ENGLEWOOD) WEST YARMOUTH, MASS. AND TO BUILD A TIMBER PIER WITH FLOAT.

LICENSE PLAN NO. 4720
APPROVED - AUGUST 6, 1963
JULY 23, 1963
SHEET 2 OF 2 SHEETS
PLAN ACCOMPANYING PETITION OF THE TOWN OF YARMOUTH TO BUILD AND MAINTAIN A STONE PIER WITH 2 CONCRETE CAP AND ATTACHED FLOAT IN LEWIS BAY AT WEST YARMOUTH TOWN OF YARMOUTH MASSACHUSETTS

SCALE AS SHOWN AUGUST 11, 1970

PROPOSED WORK SHOWN IN RED
DATUM MEAN LOW WATER = 0.00
MEAN RANGE OF TIDE = 3.2'
SOUNDINGS ARE IN FEET AND TENTHS BELOW THE PLANE OF M.L.W. PLUS FIGURES SHOW ELEVATIONS ABOVE THE SAME PLANE.

LICENSE PLAN 

BY DEPARTMENT OF PUBLIC WORKS OF TOWN OF YARMOUTH, APRIL 14, 1970

SCALE IN FEET

U.S.G.S. SURVEY DENNIS QUAD.
0 1000 2000 3000 4000
SCALE IN FEET

PLAIN OF ELEVATION

LICENSE 

REGISTRATION OF DEEDS

R. D. FOSTER
PLAN ACCOMPANYING PETITION OF
THE TOWN OF YARMOUTH
TO BUILD AND MAINTAIN A STONE PIER WITH
A CONCRETE CAP AND ATTACHED FLOAT IN
LEWIS BAY
AT WEST YARMOUTH
TOWN OF YARMOUTH
MASSACHUSETTS
SCALE AS SHOWN
AUGUST 11, 1970

LICENSE PLAN NO. 5655
APPROVED BY DEPARTMENT OF PUBLIC WORKS
APRIL 1971
PLAN ACCOMPANYING PETITION OF TOWN OF YARMOUTH TO CONSTRUCT & MAINTAIN TIMBER FLOATS, RAMP & PILES

LAWNS BAY

YARMOUTH, BARNSTABLE COUNTY, MA. DECEMBER 24, 1991 SHEET 1 OF 2.

BRAMAN ENGINEERING COMPANY, LTD.
CIVIL-ENGINEERS AND SURVEYORS
200 MAIN ST. RHIZARDS BAY, MA.
LICENSE PLAN NO. 2972
Approved by Department of Environmental Protection
Date: APR 24 1992
TOWN OF YARMOUTH
THOMAS E. KELLEY CO.
ENGINEERS — SURVEYORS
346 LONG POND DRIVE
SOUTH YARMOUTH, MASS.
02664

PROPOSED WORK SHOWN IN RED
DATUM MEAN LOW WATER = 0.00
MEAN RANGE OF TIDE = 3.2
SOUNDINGS ARE IN FEET AND
TENTHS BELOW THE PLANE OF
M.L.W.; PLUS FIGURES SHOW
ELEVATIONS ABOVE THE SAME
PLANE.

LICENSE PLAN NO. 759
Approved by Department of Environmental Quality Engineering of Massachusetts September 4, 1981

COMMISSIONER
CHIEF ENGINEER
NOTE:
ELEVATIONS ARE IN FEET AND TENTHS ON THE PLANE OF MEAN LOW WATER. MINUS FIGURES REPRESENT ELEVATIONS BELOW THAT SAME PLANE.
BENCH MARK: TOP OF CONCRETE CAP ELEV. 7.0 MLW.

ROBERT A. BRAMAN
REGISTERED PROFESSIONAL ENGINEER

LICENSE PLAN NO. 918
Approved by Department of Environmental Quality Engineer of Massachusetts
September 29, 1982
COMMISSIONER
CHIEF ENGINEER
EXIST. GROUND
ELEV 00 MLW
DREDGE TO -2.0

ELEV 3.3
SLOPE 12:1

2½" BIT CONC. LAID
IN 2 EQUAL COURSES

G" CEM. CONC. ON G" GRAVEL
SLOPE: 5:1

G" 24" CURB
SET 18" DEEP
2½" BIT CONC. TYPE I-I
PLACED IN 2 EQUAL COURSES
ON G" OF GRAVEL

RAMP PROFILE

G" 8' CLEAR
G" CLASS D
CEM. CONC. 7

G" OF GRAVEL
=4 @ 12" BOTH WAYS

G" CURB
RECONSTRUCTED PORTION ONLY

EXIST. JETTY

NOTE: PORTION OF RAMP TO REMAIN SHALL BE DRILLED TO ALLOW
REINFORCEMENT STEEL MAT TO SECURE JOINT.

SECTION A-A

G" 4'-0" 11'-0"

G" 2½" BIT. CONC. 2

EXIST. JETTY

G" NEW GRAVEL

EXISTING CONCRETE TO REMAIN FOR 40'.
LOWER PORTION TO BE REPLACED WITH
G" OF COMPACTED GRAVEL.

SECTION B-B

82w - 0.94
TOWN OF YARMOUTH
JULY 28, 1982

LICENSE PLAN NO. 918
Approved by Department of Environmental Quality Engineering
September 29, 1982
NOTE:
PROPOSED TIMBER STAIRWAY
TO BE 4' WIDE AND LOCATED
AT SURVEY BASELINE 1+20.

TYPICAL SECTION
PROPOSED TIMBER STAIRWAY
SCALE: 1" = 4'-0"

TYPICAL SECTION
PROPOSED STONE SLOPE
SCALE: 1" = 5'-0"

MATERIAL TO BE PLACED BELOW M.H.W
ARMOR STONE 173 c.y.
CRUSHED STONE 80 c.y.

LICENSE PLAN NO. 2051
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DATE: SEP 15 1989
MARCH 19 1989
SHEET 2 OF
PLAN ACCOMPANYING PETITION OF TOWN OF YARMOUTH TO CONSTRUCT A HANDICAPPED ACCESSIBLE FISHING PLATFORM IN BASS RIVER YARMOUTH, MA.
MARCH 6, 1991 SHEET 1 OF 2
BRAMAN ENGINEERING COMPANY, LTD. CIVIL ENGINEERS & SURVEYORS 258 MAIN ST., BUZZARDS BAY, MASS.

LICENSE PLAN NO. 2706
APPROVED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION OF MASSACHUSETTS

ROBERT A. BRAMAN
REGISTERED PROFESSIONAL ENGINEER civil

COMMODORE OF MASSACHUSETTS

83-026-000-116-100
83-026-000-116-200

NANTUCKET SOUND
FLOOD ZONE
V 13
EXISTING JETTY
1" = 40'

PROPOSED 19' x 99' HANDICAPPED ACCESSIBLE FISHING PLATFORM
NOTES:
EXIST JETTY CONSTRUCTED UNDER DPW CONTRACT NO. 212
ELEVATIONS ARE IN FEET AND TENTHS BASED ON THE PLANE OF MEAN LOW WATER.

NORTH ABUTTER
SIDNEY TUCKER
164 S. MAIN ST.
RANDOLPH, MA. 02368

SOUTH ABUTTER
CLIFFORD HAGBERG SR., TR.
BEACH REALTY TRUST
34 PLEASANT ST.
S. YARMOUTH, MA. 02660

083-026-000-116-100
083-026-000-116-200

COMMONWEALTH OF MASSACHUSETTS

083-026-000-116-200
083-026-000-116-200
LICENSE PLAN NO. 2706

TOWN OF YARMOUTH

MARCH 6, 1991

HANDRAIL

2" x 10" BENCH

2" DECK

3/4" BOLTS

12" DIA. TIMBER PILES

H.T.L. 3.0
M.H.W. 2.8
M.L.W. 0.0

EXISTING JETTY

TYPICAL SECTION

SCALE: 1" = 10'

NOTE:
TIMBER PILES TO BE CCA TREATED AT 2.5 LBS./CU.FT. ALL OTHER TIMBER TO BE CCA TREATED AT 1.0 LBS./CU.FT. ALL HARDWARE TO BE GALVINIZED.

083-026-000-116-100
083-026-000-116-200
PLAN ACCOMPANYING PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT A HANDICAPPED
ACCESSIBLE FISHING PLATFORM IN
BASS RIVER
YARMOUTH, MA.
MARCH 6, 1991

BRAMAN ENGINEERING COMPANY, LTD.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST., BUZZARDS BAY, MASS.

LICENSE PLAN NO. 2706
Approved by Department of Environmental Protection
of Massachusetts

COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
PLAN ACCOMPANYING PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT A HANDICAPPED ACCESSIBLE FISHING PLATFORM IN
BASS RIVER
YARMOUTH, MA.
MARCH 6, 1991
SHEET 1 OF 2
BRAMAN ENGINEERING COMPANY, LTD.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST., BUZZARDS BAY, MASS.

LICENSE PLAN NO. 2706
Approved by Department of Environmental Protection of Massachusetts
COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
AUG 03 1991
LICENSE PLAN NO. 2706

TYPICAL SECTION
SCALE: 1" = 10'

NOTE:
TIMBER PILES TO BE CCA TREATED AT 2.5 LBS./CU.FT. ALL OTHER TIMBER TO BE CCA TREATED AT 1.0 LBS./CU.FT. ALL HARDWARE TO BE GALVINIZED.

088-026-000-116-100
083-026-000-116-200
PLAN ACCOMPANYING PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT A HANDICAPPED
ACCESSIBLE FISHING PLATFORM IN
BASS RIVER
YARMOUTH, MA.
MARCH 6, 1991

BRAMAN ENGINEERING COMPANY, LTD.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST., BUZZARDS BAY, MASS.

LICENSE PLAN NO. 2706
Approved by Department of Environmental Protection
of Massachusetts

Robert A. Braman
Professional Engineer

Z"
LICENSE PLAN NO. 2706

083-026-000-116-100
083-026-000-116-200

TOWN OF YARMOUTH
MARCH 6, 1991
SHEET 2 OF 2
PLAN TO ACCOMPANY PETITION OF TOWN OF YARMOUTH TO CONSTRUCT AND MAINTAIN A STONE REVETMENT IN BASS RIVER SOUTH YARMOUTH, MASS TOWN OF YARMOUTH ENGINEERING 1146 ROUTE 28

LICENSE PLAN NO. 3760
Approved by Department of Environmental Protection of Massachusetts

APR 15 1994

COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
DATE
PLAN TO ACCOMPANY PETITION OF TOWN OF YARMOUTH TO CONSTRUCT AND MAINTAIN A STONE REVETMENT IN BASS RIVER
SOUTH YARMOUTH, MASS.
TOWN OF YARMOUTH ENGINEERING 1146 ROUTE 28

LICENSE PLAN NO. 3760
Approved by Department of Environmental Protection Date APR 15 1991
Typical Section
Scale 1" = 4'

Proposed Stairs (Wooden)
Concrete Slab
Finished Grade
1 to 2 Ton Stone

MLW EL. 0.0
3 to 5 Ton Toe Stone

Existing Grade
EL. 2.5:

Front Elevation
Scale 1" = 4'

1 to 2 Ton Stone
Concrete Foundation

MHW EL. 2.8
3 to 5 Ton Toe Stone

License Plan No. 3760
Approved by Department of Environmental Protection
Date: APR 15 1994
Plan to accompany petition of Town of Yarmouth to construct and maintain a stone revetment in Bass River, South Yarmouth, Mass.

Town of Yarmouth Engineering

1146 Route 28

Sheet 1 of 3

License Plan No. 3760

Approved by Department of Environmental Protection of Massachusetts

Commissioner

Division Director

Section Chief

Apr 15 1994
PLAN TO ACCOMPANY PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT AND MAINTAIN
A STONE REVETMENT
IN
BASS RIVER
SOUTH YARMOUTH, MASS.
TOWN OF YARMOUTH ENGINEERING
HHS ROUTE 28

LICENSE PLAN NO. 3760
Approved by Department of Environmental Protection
Date APR 15, 1994
PROPOSED STAIRS (WOODEN)
CONCRETE SLAB
FINISHED GRADE
1 TO 2 TON STONE

TYPICAL SECTION
SCALE 1"=4'

MLW EL. 0.0
3 TO 5 TON TOE STONE

EXISTING GRADE
EL. 2.5:

MHW EL. 2.

PROPOSED STAIRS (WOODEN)

1 TO 2 TON STONE

FRONT ELEVATION
SCALE 1"= 4'

MLW EL. 0.0

EXISTING GRADE
3 TO 5 TOE STONE

MHW EL. 2.8

PLAN TO ACCOMPANY PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT AND MAINTAIN A STONE REVETMENT IN
BASS RIVER
SOUTH YARMOUTH, MASS.
TOWN OF YARMOUTH ENGINEERING
1146 ROUTE 28
SOUTH YARMOUTH, MASS

LICENSE PLAN NO. 3760
Approved by Department of Environmental Protection
Date: APR 15 1994

SHEET 3 OF 3
PLAN ACCOMPANYING PETITION OF
TOWN OF YARMOUTH
TO BUILD A TIMBER BULKHEAD, BACKFILL
AND DREDGE IN
BASS RIVER
YARMOUTH

EFFECTIVE DATE: JULY 16, 1955

VERIFIED BY:

COMMISSIONER OF PUBLIC WORKS
ASSOCIATE COMMISSIONERS
DIRECTOR OF DIVISION OF WATERWAYS
Plan accompanying petition of The Town of Yarmouth
to build and maintain a timber pier, to place fixed piles, to place a floating pier and to maintain existing timber bulkhead in Bass River at South Yarmouth, Town of Yarmouth, Massachusetts

Scale as shown February 1972

State Highway
Route 28

PROPOSED WORK SHOWN IN RED
DATUM MEAN LOW WATER = 0.00
MEAN RANGE OF TIDE = 3.1
SOUNDINGS ARE IN FEET AND TEETH BELOW THE PLANE OF M.L.W. PLUS FIGURES BELOW THE SAME PLANE
PLAN ACCOMPANYING PETITION OF
THE TOWN OF YARMOUTH
TO BUILD AND MAINTAIN A TIMBER PIER,
TO PLACE FIXED PILES, TO PLACE A FLOATING
PIER AND TO MAINTAIN EXISTING TIMBER BULKHEAD
IN BASS RIVER
AT SOUTH YARMOUTH
TOWN OF YARMOUTH
MASSACHUSETTS
SCALE AS SHOWN
FEBRUARY 1972

LICENSE PLAN NO. 75
Approved by Department of Environmental Quality Engineering
JANUARY 21, 1976
NOTES:
1. ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES REPRESENT DEPTHS BELOW THAT SAME PLAN.
2. PROPOSED TIMBER PILES TO BECCA TREATED @ 2.5 K CFT.
3. PROPOSED PILES TO BE 35' LONG WITH THE TOP AT ELEV. 10.0 M.L.W.
4. B.M. #1 S.E. CORNER - BOT STEP EL. 9.33 M.L.W.; B.M. #2 U.S.G.C. BOUND EL. 6.87 M.L.W.
5. REFER TO LIC. NO. 938 FOR EXIST. STONE REVETMENT AND QUAY WHARF.
6. ALL PILES TO HAVE PROTECTIVE CAPS.
7. PROPOSED STRUCTURE WATER DEPENDENT USE.
8. M.H.W. ELEV. 2.8
9. H.T.L. ELEV. 3.4
ABUTTERS:
NORTH: COMMONWEALTH OF MASS.
DEPARTMENT OF PUBLIC WORKS
10 PARK PLAZA BOSTON, MA 02116
SOUTH: SAMUEL & SOPHIA FERRONI
9 BEACHING ST. WORCESTER, MA 01601

PLAN ACCOMPANYING PETITION OF TOWN OF YARMOUTH TO CONSTRUCT FLOATS, RAMP, REMOVE PILES & TO PLACE PILES IN BASS RIVER YARMOUTH, MASS.
3. 8, 1984
SHEET 1 OF 2
BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST, BUZZARDS BAY, MA.

LICENSE PLAN NO. 1384
Approved by Department of Environmental Quality Engineering of Massachusetts
COMMISSIONER
CHIEF ENGINEER
DIVISION DIRECTOR
FEBRUARY 28, 1986 DATE
TYPICAL FLOAT SECTION 6'-0" WIDE
SCALE: 1/2" = 1'-0"

30" x 16'-0" ALUMINUM GANGWAY DETAIL
NO SCALE

TYPICAL FLOAT SECTION 3'-0" WIDE
SCALE: 1/2" = 1'-0"

84W-138
LICENSE PLAN NO. 1384
Approved by Department of Environmental Quality Engineering
February 28, 1988

TOWN OF YARMOUTH
AUG. 8, 1984
SHEET 2 OF 2
NOTES:
B.M.1 - S.E. Corner of Bot Step. EL = 9.33 MLW
B.M.2 - USCGS BOUND EL = 6.87 MLW
Datum = Mean Low Water
All Timber CCA Treated with 2.5 # H2. Except As Noted
30' 9" of Revetment Below High Tide Line
M.H.W = EL 2.8' Above MLW

LEGEND

083-061-000-771-100
LICENSE PLAN NO. 938
Approved by Department of Environmental Quality Enginee of Massachusetts November 22, 1982
COMMISSIONER
CHIEF ENGINEER
PROFILE OF BULKHEAD & WHARF

Scale: 1/4" = 1'-0"

- 6" x 8" Wale
- Conc. Pad
- Felt Pads
- 12" x 12" Cap
- 3/4" Galv. Bolt
- 3/4" Drift Pin
- 3/4" Galv. Bolts
- 1" Pile, 20' Long
- 8" Tongue & Groove Sheeting
- 3" Bit. Conc.
- 3'-0" EL. 7.0
- 10'
- 8" Pipe
- High Tide Line EL. 3.5
- Plastic Stabilty Filter Cloth To EL 10
- 18" Crushed Stone To Extend To M.L.W.
- MHW, EL 2.8
- Catch Basin Gas Trap Type
- Exist. Bulkhead To Be Cut At EL 1.0

SECTION A-A

Scale: 1/4" = 1'-0"

- Base Stones To Be Large & Small
- Approx. Ground EL. 4.0
- EL. 0.0 M.L.W.
- EL. 6.0

LICENSE PLAN NO. 938
Approved by Department of Environmental Quality Engineering
November 22, 1982

Robert A. O'Laurence

083-061-000-771-100

TOWN OF YARMOUTH JUNE 20, 1982 SHEET 2 OF 3

8202-079
TYPICAL SECTION

SCALE: 1" = 4'

NOTES:
ELEVATIONS ARE IN FEET & TENTHS ABOVE THE PLANE OF MEAN LOW WATER.
BENCH MARK: HIGH CORNER OF CONTROL VALVE BOX RIM ELEV. 7.71 M.L.W.

81w-134
PLAN ACCOMPANYING PETITION OF TOWN OF YARMOUTH TO CONSTRUCT A STONE MOUND

BASS RIVER
YARMOUTH, MASS.

NOVEMBER 26, 1981 SHEET 1 OF 1
BRAMAN ENGINEERING COMPANY CIVIL ENGINEERS & SURVEYORS

LICENSE PLAN NO. 858
Approved by Department of Environmental Quality Engineer of Massachusetts MAY 17, 1982
COMMISSIONER CHIEF ENGINEER

PROPOSED STONE JETTIES
NANTUCKET SOUND & LEWIS BAY
YARMOUTH, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
OCTOBER 1981
DISTRICT WATERWAYS 230-02-23

PROPOSED PROFILES

HOR. 1"-40' 1"-40' 1"-40'
VER. 1"-20' 1"-20' 1"-20'

NOTE:
ELEVATIONS ARE IN FEET & TENTHS
SHOW HEIGHTS ABOVE PLAN OF M.L.W.
MINUS FIGURES SHOW DEPTHS BELOW SAME PLANE.
FOR TYPICAL SECTION SEE SHEET 4
FOR LOCATION MAP SEE SHEET 1
PROPERTY LINES ARE APPROXIMATE.
NOTE:
ELEVATIONS ARE IN FEET & TENTHS
SHOW HEIGHTS ABOVE PLANE OF M.L.W.
FOR LOCATION MAP SEE SHEET 1.
PROPERTY LINE APPROXIMATE.

PROPOSED JETTY NO. 7

PROPOSED PROFILE

ELEV. 30
EXISTING GROUND ELEV. 20

PROPOSED TYPICAL SECTION

ELEV. 6.5
ELEV. 5.0

EXISTING ELEVATIONS

PROPOSED STONE JETTIES
NANTUCKET SOUND & LEWIS BAY
YARMOUTH, MASS.

APPROVAL BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
OCTOBER 1951

DISTRICT ENGINEER
NOTE
SOUNDRINGS ARE IN FEET AND TENTHS
AND REFER TO PLANS OF MEAN LOW
WATER. MINUS FIGURES Show ELEV
ATIONS ABOVE THE SAME PLANE.
EXCAVATED MATERIAL APPX. 39,000 CY,
TO BE DEPOSITED ON TOWN OF YARMOUTH
BENCH AREA APPROX. 500 TO 1500 AT WEST
OF PROPOSED WORK. DEPOSIT SHALL ALL
BE ABOVE M.H.W. AND THE TOP ROUGHLY
GRADED NOT EXCEEDING ELEVATION 7.
JETTY RECONSTRUCTION AS PER THIS PLAN AND
SECTION USING EXISTING AND NEW STONE.
LOCATION OF PROJECT SHOWN IN RED.

PROPOSED EXCAVATION
AND JETTY RECONSTRUCTION
PARKERS RIVER
YARMOUTH, MASS.
APRIL 28, 1956
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
FEBRUARY 1958

Robert R. MacKenzie
CHIEF, WATERWAYS ENGINEER

ACC. 03814
NOTE
ELEVATIONS ARE IN FEET AND TENTHS
ABOVE THE PLANE OF MEAN LOW WATER
MINUS FIGURES SHOW DEPTHS BELOW
THE SAME PLANE.
APPROX. EXISTING GROUND SHOWN THUS:
ALL GROIN SIDE AND END SLOPES 15 TO 1.
LOCATION OF PROPOSED WORK SHOWN IN RED.

PROPOSED
STONE GROINS AND SAND FILL
HYANNIS PARK
LEWIS BAY
YARMOUTH-MASS.
APPLICATION TO
DEPARTMENT OF PUBLIC WORKS MASSACHUSETTS
DIVISION OF WATERWAYS
JANUARY 1956

Robert A. McDermott
NOTE
ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW
WATER. MINUS FIGURES SHOW DEPTHS
BELOW THE SAME PLANE.
APPROX. EXISTING GROIN THUS TYPICAL
SIDE AND END SLOPES FOR GROINS ARE
ALL 1:3.5:
LOCATION OF PROPOSED WORK IN RED.
AVERAGE PROJECTION OF GROINS FROM
M.M.W. LINE INTO TIDAL WATER IS APPROX-
IMATELY 110 FEET.

PROPOSED
GROINS & SAND FILL
VICINITY OF ENGLEWOOD
LEWIS BAY
YARMOUTH-MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
DECEMBER 1958

Robert B. MacIntyre
CHIEF, WATERWAYS ENGINEER
NOTE
ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLAN OF MEAN LOW WATER. NUMERIC FIGURES SHOW DEPTHS BELOW THE SAME PLANE.

APPROX. EXISTING GROUND THUS SIDE AND END SLOPES FOR GROIN 1:5 TO 1:10 LOCATION OF PROPOSED WORK IS SHOWN IN RED.

PROJECTION OF GROIN FROM M.N.W. LINE INTO TIDWATER IS APPROXIMATELY 150 FEET.

PROPOSED
GROINS & SAND FILL
VICINITY OF ENGLEWOOD
LEWIS BAY
YARMOUTH, MASS.
APPLICATION BY
DIVISION OF PUBLIC WORKS OF MASSACHUSETTS
DEPARTMENT OF WATERWAYS
DECEMBER 1958

Robert A. MacKenzie, P.E.
NOTE:
PROPOSED WORK SHOWN IN RED.
ELEVATIONS SHOWN IN FEET AND
TENTHS AND SHOW HEIGHT ABOVE
THE PLANE OF MEAN LOW WATER.
MINUS FIGURES ARE SOUNDINGS
AND SHOW DEPTHS BELOW SAME PLANE.

LONGITUDINAL SECTION

PROPOSED PIER
IN LEWIS BAY AT WEST YARMOUTH
COUNTY OF BARNSTABLE, MASS.
APPLICATION BY THE TOWN OF YARMOUTH
JUNE 4, 1963

ONE SHEET
PLAN ACCOMPANYING PETITION OF
THE TOWN OF YARMOUTH
TO MAINTAIN A STONE PIER WITH
A CONCRETE CAP AND ATTACHED FLOATS IN
LEWIS BAY
AT WEST YARMOUTH
TOWN OF YARMOUTH
MASSACHUSETTS
SCALE AS SHOWN JUNE 1979
THOMAS E. KELLEY CO.
ENGINEERS — SURVEYORS
346 LONG POND DRIVE
SOUTH YARMOUTH, MAA.
02664

DETAIL CONCRETE CAP & FLOAT

2 1/2" DIA. GALV. POST AND RAIL
6'-0" ON CENTER

CONCRETE CAP ELEV. = 10.00

HANDRAIL ELEV. = 10.00

CONCRETE CAP ELEV. = 7.0

M.H.W. ELEV. = 3.2

M.L.W. ELEV. = -0.0

EXISTING GRADE

TOWN OF YARMOUTH, LEWIS BAY

SHEET 3 OF 3
RAMP PROFILE

EXIST JETTY
HTL EL 3.96
MLW EL 3.1

CONC CURB
G' OF GRAVEL
6' 3' CLEAR
G' CLASS D
CEM. CONC.
G' 4' 0"
11' 0"

EXIST JETTY
HTL EL 3.96
MLW EL 3.1

CONC CURB
G' NEW GRAVEL

SECTION A-A

SECTION B-B

NOTE: PORTION OF RAMP TO REMAIN SHALL BE DRILLED TO ALLOW REINFORCEMENT STEEL MAT TO SECURE JOINT.

EXISTING CONCRETE TO REMAIN FOR 60'. LOWER PORTION TO BE REPLACED WITH G' OF COMPACTED GRAVEL.

TOWN OF YARMOUTH
JULY 28, 1982
SHEET 2 OF 2

ROBERT A. DRUMMEN
NOTE
ELEVATIONS ARE IN FEET AND
DEPTHS ABOVE THE PLANE OF
MEAN LOW WATER. MINUS
FIGURES SHOW DEPTHS BE-
LOW THE SAME PLANE.

PROPOSED STONE JETTY IN
NANTUCKET SOUND
YARMOUTH SHORE - PARKERS NECK, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
DECEMBER 1948

[Signatures]
PROPOSED JETTY REPAIRS
REMAINS OF OLD TIMBER BULKHEAD
A CONCRETE WALL TO BE REMOVED
AND REPLACED WITH STONE JETTY.

PROFILE - WEST JETTY EXTENSION
PROPOSED EAST JETTY REPAIRS
AND WEST JETTY EXTENSION

BASS RIVER
DENNIS & YARMOUTH, MASS

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
1947
PROPOSED TIMBER BULKHEAD, BACKFILL AND DREDGE IN
BASS RIVER
YARMOUTH
COUNTY OF BARNSTABLE, MASSACHUSETTS
APPLICATION BY THE TOWN OF YARMOUTH
APRIL 20, 1955
PROPOSED TIMBER PIER, FLOAT PILES FOR FLOATING PIER AND DOLPHIN PILES IN BLACK RIVER AT SOUTH YARMOUTH TOWN OF YARMOUTH
COUNTY OF BARNSTABLE, MASSACHUSETTS
APPLICATION BY THE TOWN OF YARMOUTH
SCALE AS SHOWN FEBRUARY 1972
PROPOSED TIMBER PIER, FLOAT FILES FOR FLOATING PIER AND DOLPHIN PILES IN BASS RIVER AT SOUTH YARMOUTH TOWN OF YARMOUTH COUNTY OF BARNSTABLE, MASSACHUSETTS APPLICATION BY THE TOWN OF YARMOUTH SCALE AS SHOWN FEBRUARY 1972
NOTES:
B.M.1 - S.E. Corner of Bot. Step, El. = 9.33 MLW
B.M.2 - USCG S. Bound El. = 6.87 MLW
Datum - Mean Low Water
All Timber CCA Treated with 2.5"/hr. Except As Noted
307.9 cu. of Revetment Below High Tide Line.

To Construct a Stone Revetment, Quay Wharf, Timber Bulkhead & Files
BASS RIVER
YARMOUTH, BARNSTABLE CO, MA.
APPLICATION BY
TOWN OF YARMOUTH
JUNE 9, 1982.
SHEET 1 OF 3
BRAMAN ENGINEERING CO.
CIVIL ENGINEERS & SURVEYORS
444 MAIN ST., Wareham, Mass.
TYPICAL SECTION

SCALE: 1" = 4'

NOTES:
ELEVATIONS ARE IN FEET & TENTHS
ABOVE THE PLANE OF MEAN LOW
WATER.
BENCH MARK: HIGH CORNER OF
A CONTROL VALVE BOX RIM
ELEV. 7.71 M.L.W.

81w-134
PLAN ACCOMPANYING PETITION OF
TOWN OF YARMOUTH
TO CONSTRUCT A STONE MOUND

BASS RIVER
YARMOUTH, MASS.
NOVEMBER 26, 1981 SHEET 1 OF 1
BRAMAN ENGINEERING COMPANY

LICENSE PLAN NO. 858
Approved by Department of Environmental Quality Eng.
of Massachusetts MAY 17, 1982
COMMISSIONER
CHIEF ENGINEER
Section IV

Dennis
Section IV – Community Findings – Town of Dennis

COMMUNITY DESCRIPTION

The Town of Dennis consists of a land area of 20.61 square miles out of a total area of 22.24 square miles and had a population of 15,973 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report’s cover. The estimated length of shoreline is 14 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Dennis, there were 49 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 14 in Section IV-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

<table>
<thead>
<tr>
<th>Primary Structure (f)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead / Seawall</td>
<td>13</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
<td>6770</td>
</tr>
<tr>
<td>Revetment</td>
<td>24</td>
<td>2</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td></td>
<td>4980</td>
</tr>
<tr>
<td>Breakwater</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>740</td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>11</td>
<td>3</td>
<td></td>
<td>8</td>
<td></td>
<td></td>
<td>6230</td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>7</td>
<td>14</td>
<td>23</td>
<td>5</td>
<td></td>
<td>18720</td>
</tr>
</tbody>
</table>

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Dennis’s case there are a total of 42 structures which would require approximately $13.5 million to bring all the coastal structures to “A” Rating. Most critical will be the structures in the “D” and “F” classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated $2.6 million would be required to upgrade the Town’s coastal protection.
STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Dennis

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead / Seawall</td>
<td>13</td>
<td>$ 24,288</td>
<td>$ 28,755</td>
<td>$ 2,875,755</td>
<td>$ 785,393</td>
<td>$ 2,900,043</td>
<td></td>
</tr>
<tr>
<td>Revetment</td>
<td>24</td>
<td>$ 208,218</td>
<td>$ 1,551,244</td>
<td>$ 1,551,244</td>
<td>$ 785,393</td>
<td>$ 2,544,853</td>
<td></td>
</tr>
<tr>
<td>Breakwater</td>
<td>1</td>
<td>$ 1,777,776</td>
<td>$ 1,777,776</td>
<td>$ 1,777,776</td>
<td>$ 1,777,776</td>
<td>$ 1,777,776</td>
<td></td>
</tr>
<tr>
<td>Groin / Jetty</td>
<td>11</td>
<td>$ 473,980</td>
<td>$ 5,829,320</td>
<td>$ 5,829,320</td>
<td>$ 5,829,320</td>
<td>$ 6,303,300</td>
<td></td>
</tr>
<tr>
<td>Coastal Dune</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ -</td>
<td></td>
</tr>
<tr>
<td>Coastal Beach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ -</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49</strong></td>
<td><strong>$ 708,484</strong></td>
<td><strong>10,256,319</strong></td>
<td><strong>$ 2,583,169</strong></td>
<td><strong>$ 2,583,169</strong></td>
<td><strong>$ 13,525,972</strong></td>
<td></td>
</tr>
</tbody>
</table>

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Dennis, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Dennis

<table>
<thead>
<tr>
<th>Primary Structure (1)</th>
<th>Total Structures</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Owned</td>
<td>44</td>
<td>$ 708,484</td>
<td>$ 9,885,375</td>
<td>$ 2,583,169</td>
<td>$ 2,583,169</td>
<td>$ 13,135,028</td>
<td></td>
</tr>
<tr>
<td>Commonwealth of Massachusetts</td>
<td>4</td>
<td></td>
<td>$ 390,944</td>
<td></td>
<td></td>
<td></td>
<td>$ 390,944</td>
</tr>
<tr>
<td>Federal Government Owned</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ -</td>
</tr>
<tr>
<td>Unknown Ownership</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ -</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49</strong></td>
<td><strong>$ 708,484</strong></td>
<td><strong>10,256,319</strong></td>
<td><strong>$ 2,583,169</strong></td>
<td><strong>$ 2,583,169</strong></td>
<td><strong>$ 13,525,972</strong></td>
<td></td>
</tr>
</tbody>
</table>

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section IV-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Dennis’s coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.
Section IV - Dennis

Part B

Structure Assessment Reports
COASTAL STRUCTURE LOCATION PLAN

TOWN OF DENNIS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

SCALE: 1" = 150'

Bourne Consulting Engineering
164 West Dennis Street
Dennis, MA 02639

(508) 394-8233
(508) 394-6771

SHEET 2
**Structure Assessment Form**

**Property Owner:**
- Local

**Presumed Structure Owner:**
- Local

**Owner Name:**
- Dennis

**Location:**
- West Dennis Beach

**Based On Comment:**

**Earliest Structure Record:**
- 1917

**Estimated Reconstruction/Repair Cost:**
- $401,920.00

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280 Feet</td>
<td>Feet NAVD 88</td>
<td>V13</td>
<td>15 Feet NGVD</td>
</tr>
</tbody>
</table>

**Primary Type:**
- Groin/Jetty

**Primary Material:**
- Stone

**Primary Height:**
- 10 to 15 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

**Structure Summary:**
This structure is the east jetty at the Bass River. A few single armor stones are cracked. There is some minor displacement of the armor stone but the structure is generally in good condition.

**Condition Rating**
- B

**Priority Rating**
- Moderate Priority

**Level of Action Description**
- Minor

**Action Description**
- Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Structure Images:**
- [016-011-000-031-100-PH01A.jpg]

**Structure Documents:**
- USACE
  - October 194
  - Proposed East Jetty
  - 016-011-000-031-100-COE1A
- MA-DCR
  - June 1917
  - Commonwealth of
  - 016-011-000-031-100-DCR1A
  - December 1
  - Proposed Jetties -
  - 016-011-000-031-100-DCR1B
- MA-DCR
  - September 1
  - Proposed East Jetty
  - 016-011-000-031-100-DCR1C

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: West Dennis Beach

Based On Comment:

Earliest Structure Record: Unknown

Estimated Reconstruction/Repair Cost: $115,315.00

Length: 960 Feet NAVD 88

FIRM Map Zone: V13

FIRM Map Elevation: 1.3 Feet NGVD

Primary Type: Revetment

Primary Material: Stone

Primary Height: 5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary:
This structure is the revetment from the jetty to the front of the parking lot. There is some minor slumping and weathering of the armor stones. The structure is generally in good condition.

Condition B
Rating Good
Level of Action Minor
Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[016-011-000-031-200-PH02A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: West Dennis Beach
Based On Comment: 
Earliest Structure Record: 1958

Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $1,846,835.00

Length: 4285 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V13
FIRM Map Elevation: 13 Feet NGVD

Primary Type: Bulkhead/ Seawall
Primary Material: Wood
Primary Height: Under 5 Feet

Secondary Type: Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a long bulkhead that is mostly buried by beach and partly buried by dunes. The visible portions are weathered but appear to be solid. The exact location of the start and end points are difficult to discern as much of the structure is buried.

Condition Rating
C Fair
Level of Action Description Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-011-000-031-300-PHO3A.jpg

Structure Documents:
MA-DCR April 1958 Proposed Beach 016-011-000-031-300-DCR3A
MA-DCR August 1960 Proposed Beach 016-011-000-031-300-DCR3B
MA-DCR February 19 Proposed Beach 016-011-000-031-300-DCR3C

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

**Town:** Dennis  
**Structure ID:** 016-011-000-031-400  
**Key:** community-map-block-parcel-structure

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>West Dennis Beach</td>
<td>9/20/2007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dennis</td>
<td>1956</td>
<td>$464,726.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>735 Feet</td>
<td>Feet NAVD 88</td>
<td>V13</td>
<td>13 Feet NGVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulkhead/Seawall</td>
<td>Wood</td>
<td>5 to 10 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
</tr>
</thead>
</table>

**Structure Summary:**
This structure is a bulkhead fronting the eastern-most portion of the town parking lot immediately west of the Lighthouse Inn. The cap is cracked and missing in sections and the majority of the wall is covered by beach.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Priority Rating</th>
<th>Description</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>III</td>
<td>Moderate Priority</td>
<td>Consider for Active Project Improvement Listing</td>
<td>Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (&lt;1 dwelling impacted / 100 feet of shoreline)</td>
</tr>
</tbody>
</table>
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Loring Avenue
Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $3,300.00

Date: 9/20/2007

Length: 50 Feet NAVD 88
Top Elevation: Feet NAVD 88
FIRM Map Zone: V13
FIRM Map Elevation: 13 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
These structures are the armored abutments of the Loring Ave bridge (South Side). The abutments are riprap that is generally in good condition.

Condition Rating Level of Action
B Good Minor
Description: Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[016-011-000-031-500-PHC5A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
**Structure Assessment Form**

**Property Owner:**
Local

**Presumed Structure Owner:**
Local

**Owner Name:**
Dennis

**Location:**
West Dennis Beach

**Date:**
9/20/2007

**Based On Comment:**

**Earliest Structure Record:**
1956

**Estimated Reconstruction/Repair Cost:**
$126,160.00

**Length:** 190 Feet

**Top Elevation:** Feet NAVD 88

**FIRM Map Zone:** V13

**FIRM Map Elevation:** 15 Feet NGVD

**Primary Type:** Groin/ Jetty

**Primary Material:** Stone

**Primary Height:** Under 5 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

**Structure Summary:**
This structure is a groin at the east end of West Dennis Beach. The armor stones are weathered and staring to slump. The central section of the groin is coming unraveled.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Fair</td>
<td>I None</td>
<td>Moderate</td>
</tr>
<tr>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structure Images:**
016-011-000-031-600-PH06A.jpg

**Structure Documents:**
MA-DCR (February 19) Proposed Shore 016-011-000-031-600-DCR8A

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Loring Avenue
Based On Comment:

Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $3,300.00

Length: 50 Feet NAVD 88
Top Elevation: Feet NGVD
FIRM Map Zone: V13
FIRM Map Elevation: 13 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:
These structures are the armored abutments of the Loring Ave bridge (North Side). The abutments are riprap that is generally in good condition.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project ImprovementListing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images: 016-011-000-031-700-PHO7AB.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
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<tbody>
<tr>
<td>Local</td>
<td>Lighthouse Road</td>
<td>9/20/2007</td>
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<tr>
<th>Presumed Structure Owner:</th>
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<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
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<tr>
<td>Dennis</td>
<td>1994</td>
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<tr>
<td>55</td>
<td>Feet</td>
<td>Feet NAVD 88</td>
<td>Feet NGVD</td>
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<td></td>
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<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
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<tbody>
<tr>
<td>Revetment</td>
<td>Stone</td>
<td>Under 5 Feet</td>
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</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
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</thead>
</table>

**Structure Summary:**

These structures are the armored abutments of the Lighthouse Road bridge (South Side). The armor stones are small and in good condition.

**Condition Rating**
- **Rating**: Good
- **Level of Action**: Minor
- **Description**: Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

**Priority Rating Action Description**
- **Priority**: Low Priority
- **Rating**: Future Project Consideration
- **Action**: Inshore Structures Present with Limited potential for Significant Infrastructure Damage

**Structure Images:**
- [016-012-000-001-100-PHO1A.jpg]

**Structure Documents:**
- **DEP February 19**: Plans Accompanying [016-012-000-001-100-LIC1A]
- **DEP March 15, 19**: Plans Accompanying [016-012-000-001-100-LIC1B]

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Lighthouse Road

Based On Comment:

Earliest Structure Record: 1994

Estimated Reconstruction/Repair Cost: $3,300.00

Length: 50 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A11

FIRM Map Elevation: Feet NGVD 11

Primary Type: Revetment

Primary Material: Stone

Primary Height: Under 5 Feet

Secondary Type: Secondary Material:

Secondary Height:

Structure Summary:
These structures are the armored abutments of the Lighthouse Road bridge (North Side). The armor stones are small and in good condition.

Condition Rating
B Good

Level of Action Description
Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
016-012-000-001-200-PHO2A.jpg

Structure Documents:
DEP February 19 Plans Accompanying 016-012-000-001-200-LIC2A

DEP March 15, 19 Plan Accompanying 016-012-000-001-200-LIC2B

Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Trotting Park Road Extension
Based On Comment: 
Earliest Structure Record: Unknown

Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $20,460.00

Length: 155 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V13
FIRM Map Elevation: 15 Feet NGVD

Primary Type: Groin/Jetty
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a groin at the end of the Trotting Park Road extension with unknown ownership. The groin is being flanked at high tide and the stone is in good condition.

Condition Rating 
B Good

Level of Action Description 
Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description 
I None Long Term Planning Considerations No Inshore Structures or Residential Dwelling Units Present

Structure Images:
[016-014-000-019-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

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<thead>
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<th>Property Owner:</th>
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<th>Date:</th>
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<tbody>
<tr>
<td>Local</td>
<td>Swan River Inlet</td>
<td>9/20/2007</td>
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<th>Based On Comment:</th>
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<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
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<tbody>
<tr>
<td>Dennis</td>
<td>1934</td>
<td>$720,600.00</td>
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<tr>
<th>Length: 600 Feet NAVD 88</th>
<th>Top Elevation: 15 Feet NGVD</th>
<th>FIRM Map Zone: V13</th>
<th>FIRM Map Elevation:</th>
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</table>

<table>
<thead>
<tr>
<th>Primary Type: Groin/ Jetty</th>
<th>Primary Material: Stone</th>
<th>Primary Height: 5 to 10 Feet</th>
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</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
</table>

**Structure Summary:**
This structure is the west jetty at Swan River. It has a very low profile and parts are overtopped at high tide. There is some slumping and unraveling of armor stone. The structure is clearly leaking sand at the southern end and likely along its entire length.

**Condition Rating**

<table>
<thead>
<tr>
<th>Level of Action Description</th>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Action Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
<td>C</td>
<td>Moderate</td>
<td>Consider for Active Project Improvement Listing</td>
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</table>

**Structure Images:**

- [016-015-000-045-100-PHO1A.jpg](#)
- [016-015-000-045-100-PHO1B.jpg](#)

**Structure Documents:**

- MA-DCR: April 1934 Proposed Stone 016-015-000-045-100-DCR1A
- MA-DCR: December 1 Proposed Shore 016-015-000-045-100-DCR1B
- DEP: September 1 Plan Accompanying 016-015-000-045-100-LIC1A

Prepared By: Bourne Consulting Engineering
**Structure Assessment Form**

**Property Owner:** Local

**Presumed Structure Owner:** Local

**Owner Name:** Dennis

**Location:** Lower County Road at Swan River

**Date:** 9/20/2007

**Based On Comment:**

**Earliest Structure Record:** Unknown

**Estimated Reconstruction/Repair Cost:** $7,207.00

<table>
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<th>Length</th>
<th>Top Elevation</th>
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<th>FIRM Map Elevation</th>
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<tbody>
<tr>
<td>60 Feet</td>
<td>Feet NAVD 88</td>
<td>A8</td>
<td>10 Feet NGVD</td>
</tr>
</tbody>
</table>

**Primary Type:** Revetment

**Secondary Type:**

**Primary Material:** Stone

**Secondary Material:**

**Primary Height:** 5 to 10 Feet

**Secondary Height:**

**Structure Summary:**
These structures are the abutments of the Lower County Road bridge that crosses the Swan River (West Side). The section looks weathered but solid.

**Condition Rating**
- **Condition** B
- **Rating** Good

**Level of Action Description**
- **Description** Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

**Priority Rating Action Description**
- **Priority** III
- **Rating** Moderate Priority
- **Action** Consider for Active Project Improvement Listing
- **Description** Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Structure Images:**
- 016-015-000-066-100-PHO1A.jpg
- 016-015-000-066-100-PHO1B.jpg

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Lower County Road at Swan River
Based On Comment:
Earliest Structure Record: Unknown

Length: 55 Feet Top Elevation: 10 Feet NGVD
FIRM Map Zone: A8
FIRM Map Elevation:

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
These structures are the abutments of the Lower County Road bridge that crosses the Swan River (East Side). The eastern section is beginning to slump down with a gap forming between the riprap and the bridge foundation.

Condition Rating Level of Action Description
D Poor Major Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm.
Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-015-000-066-200-PH02A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
**Structure Assessment Form**

<table>
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<th>Property Owner:</th>
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<tr>
<td>Local</td>
<td>Haigis Beach</td>
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<thead>
<tr>
<th>Presumed Structure Owner:</th>
<th>Based On Comment:</th>
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<tbody>
<tr>
<td>Local</td>
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<table>
<thead>
<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
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<tbody>
<tr>
<td>Dennis</td>
<td>1973</td>
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<th>FIRM Map Elevation:</th>
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<tbody>
<tr>
<td>300 Feet</td>
<td>Feet NAVD 88</td>
<td>V8</td>
<td>17 Feet NGVD</td>
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<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
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<tbody>
<tr>
<td>Revetment</td>
<td>Stone</td>
<td>10 to 15 Feet</td>
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<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
</tr>
</thead>
</table>

**Structure Summary:**

This structure is the revetment fronting the parking lot at Haigis Beach. The armor stone is heavily grouted. There is some slumping at the toe and undermining behind the crest. Portions of the toe and crest are vegetated.

**Condition Rating**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
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</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
</tr>
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</table>

**Level of Action Description**

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

**Priority Rating Action Description**

III
Moderate Priority
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Structure Images:**

[016-018-000-199-100-PHO1A.jpg]

**Structure Documents:**

| USACE | March 1973 | Proposed Shore | 016-018-000-199-100-COE1A |

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Town: Dennis
Structure ID: 016-018-000-199-200
Key: community-map-block-parcel-structure

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Haigis Beach
Based On Comment:
Earliest Structure Record: 1949
Estimated Reconstruction/Repair Cost: $51,600.00

Date: 9/20/2007

Length: 215 Feet
Top Elevation: V8 Feet NAVD 88
FIRM Map Zone: 17 Feet NGVD
FIRM Map Elevation:

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:
This structure is the groin at the east side of the of the parking lot at Haigis Beach. The crest and the side slopes are in good condition. The beach is accreted on the west side of the groin with an offset on the east side.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superfluous in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[016-018-000-199-200-PHO2A.jpg]

Structure Documents:
<table>
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<tr>
<th>USACE</th>
<th>March 1973</th>
<th>Proposed Shore</th>
<th>016-018-000-199-200-COE2A</th>
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<tbody>
<tr>
<td>MA-DCR</td>
<td>September 1</td>
<td>Proposed Shore</td>
<td>016-018-000-199-200-DCR2A</td>
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Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

**Structure Assessment Form**

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<th>Location:</th>
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<tr>
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<td>Glendon Road Beach</td>
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<th>Based On Comment:</th>
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<tr>
<td>Local</td>
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<tr>
<th>Owner Name:</th>
<th>Earliest Structure Record:</th>
<th>Estimated Reconstruction/Repair Cost:</th>
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<tbody>
<tr>
<td>Dennis</td>
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<td>460 Feet</td>
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<td>V13</td>
<td>15 Feet NGVD</td>
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<tr>
<th>Primary Type:</th>
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<tbody>
<tr>
<td>Bulkhead/ Seawall</td>
<td>Wood</td>
<td>Under 5 Feet</td>
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<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
<th>Secondary Height:</th>
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**Structure Summary:**

This structure is a timber seawall fronting the parking lot at Glendon Road Beach. The timbers are weathered and the cap is cracked or missing in some sections. The majority of the structure is buried by the beach. The emergent part of the wall is approximately 2 feet high.

**Condition Rating Level of Action Description**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
<th>Level of Action</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>Moderate</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
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**Priority Rating Action Description**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Rating</th>
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<tr>
<td>II</td>
<td>Low Priority</td>
<td>Future Project Consideration</td>
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**Structure Images:**

[016-019-000-091-100-PHO1A.jpg]

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Glendon Road Beach
Based On Comment:
Earliest Structure Record: 1949
Estimated Reconstruction/Repair Cost: $262,280.00

Date: 9/20/2007

| Length: 395 Feet | Top Elevation: 15 Feet NGVD |
| FIRM Map Zone: V13 | FIRM Map Elevation: |
| Feet NAVD 88 | |

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
These structures are three groins at Glendon Road Beach. The crests and side slopes are becoming unraveled. The armor stones are no longer interlocking very much.

Condition Rating
C Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
[016-019-000-091-200-PHO2A.jpg](016-019-000-091-200-PHO2A.jpg)
[016-019-000-091-200-PHO2B.jpg](016-019-000-091-200-PHO2B.jpg)

Structure Documents:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>USACE</td>
<td>March 1956</td>
<td>Proposed Groin 016-019-000-091-200-COE2A</td>
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<tr>
<td>MA-DCR</td>
<td>September 1</td>
<td>Proposed Shore 016-019-000-091-200-DCR2A</td>
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<tr>
<td>MA-DCR</td>
<td>August 1950</td>
<td>Proposed Shore 016-019-000-091-200-DCR2B</td>
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<tr>
<td>MA-DCR</td>
<td>January 195</td>
<td>Proposed Hurricane 016-019-000-091-200-DCR2C</td>
</tr>
<tr>
<td>MA-DCR</td>
<td>March 1973</td>
<td>Proposed Shore 016-019-000-091-200-DCR2D</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis
Location: Sea Street Beach
Based On Comment:
Earliest Structure Record: 1956
Estimated Reconstruction/Repair Cost: $58,258.00

Length: 485 Feet
Top Elevation: 20 Feet NGVD
FIRM Map Zone: V8
FIRM Map Elevation:

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is a revetment fronting the parking lot at Sea Street Beach. The side slopes and crest are in good condition. The toe and crest areas of the structure are vegetated.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-021-000-059-100-PHO1A.jpg

Structure Documents:
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<tr>
<th>Agency</th>
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<th>Type</th>
<th>File Number</th>
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<tr>
<td>USACE</td>
<td>July 1981</td>
<td>To Reconstruct a</td>
<td>016-021-000-059-100-COE1A</td>
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<td>MA-DCR</td>
<td>February 19</td>
<td>Proposed Shore</td>
<td>016-021-000-059-100-DCR1A</td>
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<td>DEP</td>
<td>July 1981</td>
<td>Plan Accompanying</td>
<td>016-021-000-059-100-LIC1A</td>
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Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis
Location: Sea Street Beach
Based On Comment: 
Earliest Structure Record: 1950
Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $192,560.00

Length: 290 Feet
Top Elevation: 88 Feet NAVD
FIRM Map Zone: V8
FIRM Map Elevation: 20 Feet NGVD

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
These structures are three groins at the end of Sea Street. They are generally in good condition but the heads are becoming unraveled. The central groin is shorter than the outer two structures and there is little offset in the shoreline position on either side.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-021-000-059-200-PHO2A.jpg

Structure Documents:
USACE March 1956 Proposed Groins -
USACE July 1981 To Reconstruct a
MA-DCR November 1 Proposed Shore
MA-DCR April 1954 Proposed Shore
MA-DCR February 19 Proposed Shore
DEP July 1981 Plan Accompanying

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis
Location: Union Wharf Road
Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $2,356.00
Date: 9/20/2007

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<td>15 Feet</td>
<td>Feet NAVD 88</td>
<td>V8</td>
<td>20 Feet NGVD</td>
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Primary Type: Revetment
Primary Material: Stone
Primary Height: 10 to 15 Feet
Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is a short stone revetment at the end of Union Wharf Road. The stones are all grouted. The crest and sideslopes are in good condition. The top of the structure is vegetated.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-022-000-013-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
Town: Dennis
Structure ID: 016-023-000-007-100
Key: community-map-block-parcel-structure

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Raycroft Parkway
Earliest Structure Record: Unknown

Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $8,408.00

Length: 70 Feet
Top Elevation: 20 Feet NGVD
FIRM Map Zone: V8
FIRM Map Elevation: 20 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is a stone revetment at the end Raycroft Parkway. The armor stones have been grouted. The crest and side slopes are in good condition.

Condition Rating
Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images: [016-023-000-007-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Uncle Freemans Road

Based On Comment: 

Earliest Structure Record: Unknown

Estimated Reconstruction/Repair Cost: $0.00

Length: 170 Feet

Top Elevation: Feets NAVD 88

FIRM Map Zone: A11

FIRM Map Elevation: 11 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Wood

Primary Height: 5 to 10 Feet

Secondary Type: 

Secondary Material: 

Secondary Height: 

Structure Summary:
This structure is a bulkhead at the end of Uncle Freemans Road. The bulkhead consists of poly sheetpiles and has a timber cap. This appears to be recent construction.

Condition Rating
A Excellent

Level of Action Description
None

Priority Rating Action Description
II Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
[016-043-000-014-100-PHO1A.jpg]

Structure Documents:
DEP May 10, 200 Plan To Accompany 016-043-000-014-100-LIC1A

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Captain Harding Lane

Date: 9/20/2007

Based On Comment:

Earliest Structure Record: Unknown

Estimated Reconstruction/Repair Cost: $24,288.00

Length: 160 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A8

FIRM Map Elevation: 8 Feet NGVD

Primary Type: Bulkhead/Seawall

Primary Material: Concrete

Primary Height: 5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary:
This structure is a concrete seawall at the end of Captain Harding Lane. The wall consists of vertical concrete columns arranged side by side. Each column has a hexagonal cross section. The structure is in good condition but there is some weathering.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
I None No Inshore Structures or Residential Dwelling Units Present

Structure Images: 016-044-000-007-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Ferry Street landing

Based On Comment:

Earliest Structure Record: Unknown

Estimated Reconstruction/Repair Cost: $0.00

Length: 80 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A8

FIRM Map Elevation: 8 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Wood

Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material:

Secondary Height:

Structure Summary:
This structure is a wooden bulkhead at the Ferry Street landing. The timbers are clear and in good condition. The structure is fronted by stacked granite blocks.

Condition Rating
Excellent

Level of Action Description
Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images: 016-061-000-010-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner:

Location:
Route 28 at Bass River

Date:
9/20/2007

Presumed Structure Owner:

Based On Comment:

Owner Name:
Unknown

Earliest Structure Record:
Unknown

Estimated Reconstruction/Repair Cost:
$48,048.00

Length: 80 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: A7
FIRM Map Elevation: 9 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is the stone abutment at the Route 28 bridge over Bass River. The armor is discolored and becoming unraveled along the north side.

Condition Rating
C
Fair
Moderate

Level of Action Description
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protected shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
IV
High Priority
Consider for Next Project Construction Listing
High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

Structure Documents:

Prepared By: Bourne Consulting Engineering
# CZM Coastal Infrastructure Inventory and Assessment
## Structure Assessment Form

### Property Owner:
- State: [Blank]
- Presumed Structure Owner: [Blank]
- Owner Name: Unknown

### Location:
- Route 28 at Swan River
- Based On Comment: [Blank]
- Earliest Structure Record: Unknown

### Date:
- 9/20/2007

### Estimated Reconstruction/Repair Cost:
- $18,295.00

### Structure Summary:
These structures are the abutments at the Route 28 bridge over Swan River (West Side). The armor stone is becoming unraveled. There is little interlocking between stones at the waterline.

### Condition Rating
- **C**
- **Fair**

### Level of Action Description
- **Moderate**
- Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

### Priority Rating Action Description
- **III**
- **Moderate Priority**
- **Consider for Active Project Improvement Listing**
- **Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)**

### Structure Images:
- 016-070-000-105-100-PHO1A.jpg

### Structure Documents:

Prepared By: Bourne Consulting Engineering
Property Owner: State
Presumed Structure Owner: State
Owner Name: Unknown
Location: Route 28 at Swan River
Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $18,295.00
Date: 9/20/2007

Length: 55 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: A8
FIRM Map Elevation: 10 Feet NGVD
Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
These structures are the abutments at the Route 28 bridge over Swan River (East Side). The armor stone is becoming unraveled and there is little interlocking between the armor at the water line.

Condition Rating
Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-070-000-105-200-PH02A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: [Local]

Presumed Structure Owner: [Local]

Owner Name: [Dennis]

Location: [Aunt Julia Ann's Road]

Based On Comment: 

Earliest Structure Record: [Unknown]

Estimated Reconstruction/Repair Cost: [$110,649.00]

Length: [175 Feet NAVD 88]

Top Elevation: [8 Feet NGVD]

FIRM Map Zone: [A6]

FIRM Map Elevation: [8 Feet NGVD]

Primary Type: [Bulkhead/ Seawall]

Primary Material: [Wood]

Primary Height: [5 to 10 Feet]

Secondary Type: 

Secondary Material: 

Secondary Height: 

Structure Summary:
This structure is the wooden bulkhead fronting the dirt parking lot at the end of Aunt Julia Ann's Road. It is solid but weathered and some of the timbers on the cap are splintering. The structure is fronted by a small sand beach at low tide.

Condition Rating
C Fair

Level of Action Description
Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
I None No Inshore Structures or Residential Dwelling Units Present

Structure Images:
[016-078-000-019-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Cove Road
Based On Comment: 
Earliest Structure Record: Unknown

Length: 160 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: A6
FIRM Map Elevation: 7 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Wood
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a timber bulkhead with a poly sheetpile at the landing off Cove Road. The structure is in excellent condition. The structure is fronted by a small sand beach at low tide.

Condition Rating Excellent
Level of Action None
Description Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

Priority Rating Low Priority
Action Description Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
016-080-000-016-100-PHO1A.jpg

Structure Documents: 

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Highbank Road at Bass River
Based On Comment: 
Earliest Structure Record: Unknown

Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $142,751.00

Length: 215 Feet
Top Elevation: 45 Feet NAVD 88
FIRM Map Zone: A5
FIRM Map Elevation: 7 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is the abutment at the Highbank Road bridge over the Bass River. The structure essentially consists of dumped stone blocks at the base of the bank. There is no sideslope constructed and no interlocking between armor stones.

Condition Rating Level of Action Description
D Poor Major Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (~1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-127-000-040-100-PHO1A.jpg
016-127-000-040-100-PHO1B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: State
Preumed Structure Owner: State
Owner Name: Unknown

Location: Route 6 at Bass River
Based On Comment: 
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $306,306.00

Length: 510 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: A4
FIRM Map Elevation: 6 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
These structures are the Route 6 bridge abutments over the Bass River. They are generally in good condition but the armor is partially unraveled at the water line. The toe section appears to be partially slumping.

Condition Rating
Level of Action Description
C Fair Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
IV High Priority Consider for Next Project Construction Listing
High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:
[016-148-000-010-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Bass River - South of Route 6
Date: 9/20/2007

Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $43,890.00

Length: 35 Feet
Top Elevation: 8 Feet NAVD 88
FIRM Map Zone: A4
FIRM Map Elevation: 6 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Stone
Primary Height: 10 to 15 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
These structures are the stone abutments for the abandoned railroad across Bass River. The structure consists of vertically stacked stone blocks with grout between. They are solid but the grout between the stones near the water line is becoming removed.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
[016-148-000-010-200-PHO2A.jpg]
[016-148-000-010-200-PHO2B.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Chapin Beach
Based On Comment: 
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $54,054.00

Date: 9/20/2007

Length: 45 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V4
FIRM Map Elevation: 15 Feet NGVD

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a short revetment facing a ramp to Chapin Beach at the end of Judah's Creek Road. The armor is slumped, the toe is exposed, and there is no fronting beach.

Condition Rating
Level of Action Description
D Poor Major Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
III Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
016-296-000-001-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Dr. Bottero Road
Based On Comment: 

Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $406,349.00

Length: 520 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V4
FIRM Map Elevation: Feet NGVD 15

Primary Type: Revetment
Primary Material: Stone
Primary Height: 10 to 15 Feet

Secondary Type: Secondary Material: 
Secondary Height: 

Structure Summary:
This structure is a stone revetment fronting Doctor Bottero Road. There are multiple sections where the side slope and crest has started to slump.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additon material for full protection and extended life.

Priority Rating Action Description
IV High Priority Consider for Next Project Construction Listing High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:
[016-321-000-001-100-PHO1A.jpg]
[016-321-000-001-100-PHO1B.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
**CZM Coastal Infrastructure Inventory and Assessment**

**Structure Assessment Form**

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<tr>
<th>Secondary Type:</th>
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**Structure Summary:**

These structures are the timber abutments leading to the culvert at Bridge Street (West Side). Both sides were entirely submerged at the time of inspection. There is recent construction and the visible portions look brand new.

**Condition**
- Rating: Excellent
- Level of Action: None
- Description: Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

**Priority**
- Rating: III
- Action: Moderate Priority

**Structure Images:**
- [016-393-000-011-100-PHO1A.jpg](#)

**Structure Documents:**

Prepared By: Bourne Consulting Engineering
**Property Owner:**
Local

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<tbody>
<tr>
<td>Feet NAVD 88</td>
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</table>

**Primary Type:** Bulkhead/Seawall

**Primary Material:** Wood

**Primary Height:** 5 to 10 Feet

**Secondary Type:** Secondary Material

**Secondary Height:**

---

**Structure Summary:**
These structures are the timber abutments leading to the culvert at Bridge Street (East Side). Both sides were entirely submerged at the time of inspection. There is recent construction and the visible portions look brand new.

**Condition Rating**
- **Description:** Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

**Priority Rating**
- **Description:** Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Condition** | **Priority** | **Level of Action** | **Description**
---|---|---|---
A | Excellent | None | Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

**Prepared By:** Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Sea Street
Based On Comment: 
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $0.00

Length: 15 Feet
Top Elevation: 11 Feet NGVD
FIRM Map Zone: A3
FIRM Map Elevation:

Primary Type: Revetment
Primary Material: Stone
Primary Height: Under 5 Feet

Secondary Type: 
Secondary Material: 
Secondary Height: 

Structure Summary:
These structures are the abutments at Sea Street (north side). There are new concrete abutments at the footpath over the creek. The concrete and riprap are in good condition.

Condition Rating
A Excellent
None

Priority Rating
I None

Level of Action Description
Long Term Planning Considerations
No Inshore Structures or Residential Dwelling Units Present

Structure Images:
[016-398-000-018-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
**Property Owner:**
Local

**Presumed Structure Owner:**
Local

**Owner Name:**
Dennis

**Location:**
Sea Street

**Date:**
9/20/2007

**Early Structure Record:**
Unknown

**Estimated Reconstruction/Repair Cost:**
$0.00

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<tr>
<td>15 Feet</td>
<td>Feet NAVD 88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>11 Feet NGVD</td>
</tr>
</tbody>
</table>

**Primary Type:**
Revetment

**Primary Material:**
Stone

**Primary Height:**
Under 5 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

---

**Structure Summary:**
These structures are the abutments at Sea Street (south side). There are new concrete abutments at the footpath over the creek. The concrete and riprap are in good condition.

**Condition Rating**
Excellent

**Priority Rating**
None

**Level of Action**
None

**Description**
Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

**Long Term Planning Considerations**
No Inshore Structures or Residential Dwelling Units Present

---

**Structure Images:**
[016-398-000-018-200-PHO2A.jpg]

**Structure Documents:**
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Nobscussett Harbor
Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $148,695.00

Date: 9/20/2007

Length: 345 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: V4
FIRM Map Elevation: 15 Feet NGVD

Primary Type: Bulkhead/Seawall
Primary Material: Wood
Primary Height: Under 5 Feet

Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is a wooden bulkhead fronting the parking lot at Nobscussett Harbor. The timbers on the face and caps are weathered but sturdy. A majority of the structure is buried in the beach.

Condition Rating Level of Action Description
C Fair Moderate Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:
016-402-000-001-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis
Location: Nobsusett Harbor
Based On Comment:
Earliest Structure Record: Unknown
Estimated Reconstruction/Repair Cost: $43,160.00
Date: 9/20/2007

<table>
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<tr>
<th>Length: 65 Feet</th>
<th>Top Elevation: Feet NAVD 88</th>
<th>FIRM Map Zone: V4</th>
<th>FIRM Map Elevation: Feet NGVD 16</th>
</tr>
</thead>
</table>

Primary Type: Groin / Jetty
Primary Material: Stone
Primary Height: Under 5 Feet
Secondary Type: Secondary Material: Secondary Height:

Structure Summary:
This structure is a stone groin in the lee of the Nobsusett breakwater. The armor stones are completely unraveled and the structure is not serving much purpose.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority Rating</th>
<th>Level of Action Description</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>Moderate</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.</td>
</tr>
</tbody>
</table>

Structure Images: [016-402-000-001-200-PHO2A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Nobscusset Harbor
Based On Comment: Unknown
Earliest Structure Record: Unknown

Date: 9/20/2007
Estimated Reconstruction/Repair Cost: $1,777,776.00

Length: 740 Feet
Top Elevation: 88 Feet NAVD 88
FIRM Map Zone: V4
FIRM Map Elevation: 17 Feet NGVD

Primary Type: Breakwater
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:
This structure is a stone breakwater at Nobscusset Harbor. The armor at the west end and on the sides is becoming unraveled. The crest elevation along the outer portion is markedly lower than the body of the structure. The stones at the outer end show no interlocking.

Condition Rating: D
Priority Rating: None
Level of Action: Major
Long Term Planning Considerations: None
Description: Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Structure Images:
[016-402-000-002-100-PHO1A.jpg]

Structure Documents:

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

<table>
<thead>
<tr>
<th>Property Owner:</th>
<th>Location:</th>
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<tbody>
<tr>
<td>Local</td>
<td>Nobsucsett Harbor</td>
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<tr>
<td>Presumed Structure Owner:</td>
<td>Based On Comment:</td>
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<tr>
<td>Local</td>
<td></td>
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<tr>
<td>Owner Name:</td>
<td>Earliest Structure Record:</td>
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<tr>
<td>Dennis</td>
<td>1933</td>
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<table>
<thead>
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<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
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</thead>
<tbody>
<tr>
<td>300 Feet</td>
<td>Feet NAVD 88</td>
<td>V4</td>
<td>16 Feet NGVD</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Primary Type:</th>
<th>Primary Material:</th>
<th>Primary Height:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin/ Jetty</td>
<td>Stone</td>
<td>Under 5 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Type:</th>
<th>Secondary Material:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Structure Summary:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This structure is the two spurs off the back of the Nobsucsett Harbor breakwater. They are unvaried and were mostly submerged at inspection. The structures are not serving much purpose.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Priority</th>
<th>Rating</th>
<th>Level of Action Description</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>I</td>
<td>None</td>
<td>Moderate</td>
<td>No Inshore Structures or Residential Dwelling Units Present</td>
</tr>
<tr>
<td>Fair</td>
<td></td>
<td></td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Structure Images:</th>
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<td>016-402-000-002-200-PHO2A.jpg</td>
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<tr>
<td>016-402-000-002-200-PHO2B.jpg</td>
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<table>
<thead>
<tr>
<th>Structure Documents:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA-DCR</td>
</tr>
<tr>
<td>MA-DCR</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Nobsucsett Harbor

Based On Comment:

Earliest Structure Record: 1951

Estimated Reconstruction/Repair Cost: $291,291.00

Length: 485 Feet NAVD 88

Top Elevation: Feet NAVD 88

FIRM Map Zone: V4

FIRM Map Elevation: 16 Feet NGVD

Primary Type: Revetment

Primary Material: Stone

Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material:

Secondary Height:

Structure Summary:
This structure is a revetment that leads to the Nobsucsett Harbor breakwater. The crest and side slopes have slumped and there is erosion evident behind the structure. The armor still appears to be interlocking well.

Condition Rating
C Fair

Level of Action Description
Moderate

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating
I None

Action Description
Long Term Planning Considerations
No Inshore Structures or Residential Dwelling Units Present

Structure Images:
016-402-000-002-300-PHO3A.jpg

Structure Documents:
MA-DCR January 195 Proposed Shore 016-402-000-002-300-DCR3A

Prepared By: Bourne Consulting Engineering
# CZM Coastal Infrastructure Inventory and Assessment

## Structure Assessment Form

**Property Owner:**
- Local

**Presumed Structure Owner:**
- Local

**Owner Name:**
- Dennis

**Location:**
- Sesuit Harbor

**Based On Comment:**

**Earliest Structure Record:**
- 1961

**Estimated Reconstruction/Repair Cost:**
- $62,700.00

**Length:**
- 50 Feet NAVD 88

**Top Elevation:**
- 11 Feet NGVD

**FIRM Map Zone:**
- A3

**FIRM Map Elevation:**
- 11

**Primary Type:**
- Bulkhead/Seawall

**Primary Material:**
- Steel

**Primary Height:**
- 10 to 15 Feet

**Secondary Type:**

**Secondary Material:**

**Secondary Height:**

**Structure Summary:**
This structure is a bulkhead at the town landing inside Sesuit Harbor. The front and cap are rusted and weathered. There is a small amount of erosion of the fill behind the southeast corner.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rating</th>
<th>Level of Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Fair</td>
<td>Moderate</td>
<td>Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.</td>
</tr>
</tbody>
</table>

**Priority Rating Action Description**
- III
- Moderate Priority
- Consider for Active Project Improvement Listing
- Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

**Structure Images:**
- [016-410-000-023-100-PHO1A.jpg](#)

**Structure Documents:**

<table>
<thead>
<tr>
<th>USACE</th>
<th>March 1985</th>
<th>Proposed Bulkhead</th>
<th>016-410-000-023-100-COE1A</th>
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<tbody>
<tr>
<td>MA-DCR</td>
<td>October 1996</td>
<td>Proposed Harbor</td>
<td>016-410-000-023-100-DCR1A</td>
</tr>
<tr>
<td>DEP</td>
<td>November 1</td>
<td>Plan Accompanying</td>
<td>016-410-000-023-100-LIC1A</td>
</tr>
</tbody>
</table>

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: [Local]
Presumed Structure Owner: [Local]
Owner Name: [Dennis]
Location: [Sesuit Harbor]
Based On Comment:
Earliest Structure Record: [1968]
Estimated Reconstruction/Repair Cost: [$228,228.00]
Date: [9/20/2007]

<table>
<thead>
<tr>
<th>Length:</th>
<th>Top Elevation:</th>
<th>FIRM Map Zone:</th>
<th>FIRM Map Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>380 Feet</td>
<td>Feet NAVD 88</td>
<td>A4</td>
<td>12 Feet NGVD</td>
</tr>
</tbody>
</table>

Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet

Secondary Type: Secondary Material:
Secondary Height:

Structure Summary:

This structure is a bulkhead on the east side of Sesuit Harbor fronted by a stone revetment. The wooden bulkhead is weathered and deteriorating and the revetment appears to be in good condition.

Condition Rating: C
Level of Action: Moderate
Description: Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating: II
Action Description: Consider for Active Project Improvement Listing

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images: [016-411-000-012-100-PH01A.jpg]
Structure Documents: [USACE November 1 Proposed Access 016-411-000-012-100-COE1A]

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner: Local

Presumed Structure Owner: Local

Owner Name: Dennis

Location: Stephen Phillip Road

Based On Comment: 

Earliest Structure Record: 1958

Estimated Reconstruction/Repair Cost: $3,142.00

Length: 20 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V4

FIRM Map Elevation: 16 Feet NGVD

Structure Summary:
This structure is a stairway with a stone revetment at the end of Stephen Phillip Road. The side slopes and crest are in good condition. The stone shows some minor discoloration from weathering.

Condition Rating Level of Action Description
B Good Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority Rating Action Description
1 None Long Term Planning Considerations No Inshore Structures or Residential Dwelling Units Present

Structure Images:
[016-419-000-002-100-PHO1A.jpg]

Structure Documents:
[MA-DCR | February 19 | Proposed Harbor | 016-419-000-002-100-DCR1A]

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Property Owner:
Local

Presumed Structure Owner:
Local

Owner Name:
Dennis

Location:
Sesuit Harbor

Date:
9/20/2007

Based On Comment:

Earliest Structure Record:
1937

Estimated Reconstruction/Repair Cost:
$1,595,280.00

Length:
1020 Feet

Top Elevation:

FIRM Map Zone:
V4

FIRM Map Elevation:
17 Feet NGVD

Primary Type:
Groin/ Jetty

Primary Material:
Stone

Primary Height:
10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary:
This structure is the west jetty at Sesuit Harbor. The jetty is generally in good condition. There are some displaced armor stones and small sections of the crest and side slopes are slumped.

Condition Rating
C
Fair

Level of Action Description
Moderate

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority Rating Action Description
IV
High Priority
Consider for Next Project Construction Listing
High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:
016-420-000-004-100-PHO1A.jpg
016-420-000-004-100-PHO1B.jpg

Structure Documents:

| USACE | June 1954 | Proposed Jetty and
016-420-000-004-100-COE1A, Proposed Jetty 016-420-000-004-100-COE1B, Proposed Shore 016-420-000-004-100-DCR1A |
| USACE | May 1958 | Proposed Jetty 016-420-000-004-100-COE1B |
| MA-DCR | August 1937 | Proposed Jetty 016-420-000-004-100-DCR1A |
| MA-DCR | October 194 | Proposed Dredging 016-420-000-004-100-DCR1B |
| MA-DCR | July 1949 | Proposed Dredging 016-420-000-004-100-DCR1C |
| MA-DCR | May 1952 | Proposed Dredging 016-420-000-004-100-DCR1D |
| MA-DCR | May 1954 | Proposed Harbor and 016-420-000-004-100-DCR1E |

Prepared By: Bourne Consulting Engineering
CZM Coastal Infrastructure Inventory and Assessment
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis

Location: Sesuit Harbor
Based On Comment:
Earliest Structure Record: 1937
Estimated Reconstruction/Repair Cost: $2,690,080.00

Date: 9/20/2007

Length: 1720 Feet
Top Elevation: 15 Feet NGVD
FIRM Map Zone: V4
FIRM Map Elevation:

Primary Type: Groin/ Jetty
Primary Material: Stone
Primary Height: 10 to 15 Feet

Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is the east jetty at Sesuit Harbor. The jetty is generally in good condition. There is some slumping of the armor stone. Some erosion is evident behind the landward end.

Condition Rating
C
Fair

Level of Action Description
Moderate
Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority Rating Action Description

III
Moderate Priority
Consider for Active Project Improvement Listing
Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:
- 016-421-000-005-100-PHO1A.jpg
- 016-421-000-005-100-PHO1B.jpg

Structure Documents:
- USACE June 1954 Proposed Jetty and 016-421-000-005-100-COE1A
- USACE May 1958 Proposed Jetty 016-421-000-005-100-COE1B
- MA-DCR August 1937 Proposed Shore 016-421-000-005-100-DCR1A
- MA-DCR October 194 Proposed Dredging 016-421-000-005-100-DCR1B
- MA-DCR July 1949 Proposed Stone 016-421-000-005-100-DCR1C
- MA-DCR May 1952 Proposed Dredging 016-421-000-005-100-DCR1D
- MA-DCR May 1954 Proposed Harbor and 016-421-000-005-100-DCR1E

Prepared By: Bourne Consulting Engineering
Structure Assessment Form

Property Owner: Local
Presumed Structure Owner: Local
Owner Name: Dennis
Location: Sesuit Harbor
Based On Comment:
Earliest Structure Record: 1968
Estimated Reconstruction/Repair Cost: $522,522.00

Length: 435 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: A4
FIRM Map Elevation: 12 Feet NGVD
Primary Type: Revetment
Primary Material: Stone
Primary Height: 5 to 10 Feet
Secondary Type:
Secondary Material:
Secondary Height:

Structure Summary:
This structure is a loosely constructed revetment along the interior of the northeast side of Sesuit Harbor. Most of the stones are just dumped and there is some concrete rubble at the end. There is no appreciable interlocking or side slopes to the structure. The crest elevation varies along the length of the structure.

Condition Rating Level of Action Description
D Poor Major Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority Rating Action Description
II Low Priority Future Project Consideration Inshore Structures Present with Limited potential for Significant infrastructure Damage

Structure Images:
016-421-000-005-200-PHO2A.jpg

Structure Documents:
USACE November 1 Proposed Access 016-421-000-005-200-COE2A

Prepared By: Boume Consulting Engineering
Section IV - Dennis

Part C

Structure Photographs
<table>
<thead>
<tr>
<th>BCE Structure No</th>
<th>Document No</th>
<th>Contract/ Drawing Number</th>
<th>Entity</th>
<th>Municipality</th>
<th>Date</th>
<th>Title</th>
<th>Sheets</th>
<th>Location</th>
<th>Description</th>
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<tbody>
<tr>
<td>016-011-000-031-100</td>
<td>016-011-000-031-100-PH01A.jpg</td>
<td>Bourne Consulting Engineering</td>
<td>October 2007</td>
<td>DIGITAL IMAGE</td>
<td>1</td>
<td>Structure Location</td>
<td>Structure Condition Photo at Time of Survey</td>
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<tr>
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<td>016-011-000-031-300-PH03A.jpg</td>
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<td>DIGITAL IMAGE</td>
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<td>October 2007</td>
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<td>Structure Location</td>
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<td>Bourne Consulting Engineering</td>
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<td>October 2007</td>
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<td>Structure Condition Photo at Time of Survey</td>
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<td></td>
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Section IV - Dennis

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents
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<td>Plans Accompanying Petition of Town of Dennis for Bridge Over Weir Creek, Loring Avenue, Town of Dennis, Barnstable County, Massachusetts</td>
<td>3</td>
<td>Weir Creek, Loring Avenue</td>
<td>Stone Retention</td>
</tr>
<tr>
<td>016-012-000-001-200</td>
<td>016-012-000-001-200-LC2A</td>
<td>3694</td>
<td>DEP</td>
<td>Dennis</td>
<td>February 1994</td>
<td>Plans Accompanying Petition of Town of Dennis for Bridge Over Weir Creek Tributary, Lighthouse Road, Town of Dennis, Barnstable County, Massachusetts</td>
<td>3</td>
<td>Weir Creek</td>
<td>Riprap Abutment</td>
</tr>
<tr>
<td>016-012-000-001-200</td>
<td>016-012-000-001-200-LC2B</td>
<td>7866</td>
<td>DEP</td>
<td>Dennis</td>
<td>March 15, 1999</td>
<td>Plans Accompanying Petition of Town of Dennis for Bridge Over Weir Creek, Loring Avenue, Town of Dennis, Barnstable County, Massachusetts</td>
<td>3</td>
<td>Weir Creek, Loring Avenue</td>
<td>Stone Retention</td>
</tr>
<tr>
<td>016-015-000-045-100</td>
<td>016-015-000-045-100-LC1A</td>
<td>2423</td>
<td>DEP</td>
<td>Dennis</td>
<td>September 19, 1999</td>
<td>Plans Accompanying Petition of Town of Dennis to Construct A Stone Retention, Channel Excavation, and Timber Laying Ramps</td>
<td>3</td>
<td>Swan Pond River/Swan Pond River Road</td>
<td>Stone Gravel/Concrete Foundation</td>
</tr>
<tr>
<td>016-021-000-059-100</td>
<td>016-021-000-059-100-LC1A</td>
<td>770</td>
<td>DEP</td>
<td>Dennis</td>
<td>July 1981</td>
<td>Plans Accompanying Petition of Town of Dennis to Reconstruct an Existing Groin and Portion of Beach - Nantucket Sound - Dennis, Massachusetts</td>
<td>2</td>
<td>Sea Street Beach</td>
<td>Groin and Retention</td>
</tr>
<tr>
<td>016-021-000-059-200</td>
<td>016-021-000-059-200-LC2A</td>
<td>770</td>
<td>DEP</td>
<td>Dennis</td>
<td>July 1981</td>
<td>Plans Accompanying Petition of Town of Dennis to Reconstruct an Existing Groin and Portion of Beach - Nantucket Sound - Dennis, Massachusetts</td>
<td>2</td>
<td>Sea Street Beach</td>
<td>Groin and Retention</td>
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<tr>
<td>016-045-000-014-100</td>
<td>016-045-000-014-100-LC1A</td>
<td>9270</td>
<td>DEP</td>
<td>Dennis</td>
<td>May 10, 2002</td>
<td>Plans To Accompany Petition of Town of Dennis to License, Reconstruct and Maintain an Existing Boat Launch Facility In Bass River</td>
<td>5</td>
<td>Bass River, Uncle Freeman's Road</td>
<td>Wood Bulkhead/Seawall</td>
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<tr>
<td>016-410-000-023-100</td>
<td>016-410-000-023-100-LC1A</td>
<td>1347</td>
<td>DEP</td>
<td>Dennis</td>
<td>November 1985</td>
<td>Plans Accompanying Petition of the Town of Dennis to Construct and Maintain a Bulkhead at Scituate Harbor, West Side - East Dennis, County of Barnstable, Massachusetts</td>
<td>1</td>
<td>Scituate Harbor</td>
<td>Bulkhead</td>
</tr>
</tbody>
</table>
PLANS ACCOMPANYING
PETITION OF TOWN OF
DENNIS FOR BRIDGE
OVER WEIR CREEK TRIBUTARY,
LIGHTHOUSE ROAD,
TOWN OF DENNIS,
BARNSTABLE COUNTY,
MASSACHUSETTS
ELEVATION
SCALE: 1/4" = 1'-0"

RIDGE OVER WEIR CREEK TRIBUTARY
LIGHTHOUSE ROAD
TOWN OF DENNIS
BERNABLE COUNTY, MASSACHUSETTS
SEPTEMBER 1993

LICENSE PLAN NO. 3694
Approved by Department of Environmental Protection
Date: FEB 23 1994
TYPICAL BRIDGE SECTION AT STIFFENER BEAM

SCALE: 1/4" = 1'-0"
PLANS ACCOMPANYING PETITION OF TOWN OF DENNIS FOR BRIDGE OVER WEIR CREEK, LORING AVENUE, TOWN OF DENNIS, BARNSTABLE COUNTY, MASSACHUSETTS. OCTOBER 1998

LICENSE PLAN NO. 7846
Approved by Department of Environmental Protection of Massachusetts

Edward P. King
MARCH 15
 LICENSE PLAN NO. 7866
Approved by Department of Environmental Protection
Date: MAR 15 1998

COMMUNIK OF MASSACHUSETTS
REG & BASED

EMMA A. ELBAAMA
STRUCTURAL
No. 49441

BRIDGE OVER WEIR CREEK
LORING AVENUE
TOWN OF DENNIS
BARNSTABLE COUNTY, MASSACHUSETTS
OCTOBER, 1998

TYPICAL BRIDGE SECTION AT STIFFENER BEAM

SCALE: 1/4" = 1'-0"

016-012-000-001-100
016-012-000-001-200
PLANS ACCOMPANYING
PETITION OF TOWN OF
DENNIS FOR BRIDGE
OVER WEIR CREEK TRIBUTARY,
LIGHTHOUSE ROAD,
TOWN OF DENNIS,
BARNSTABLE COUNTY,
MASSACHUSETTS
LICENSE PLAN NO. 2423

Approved by Department of Environmental Protection
Date: SEP 19 1990

Robert A. Brauman

TOWN OF DENNIS
AUGUST 1 1990
SHEET 3 OF 3
SECTION B
SCALE: HORIZ. 1" = 5'
VERT. 1" = 2.5'

SECTION C
NOT TO SCALE

SECTION D
SCALE: 1" = 5'

NOTES
1. ELEVATIONS SHOWN ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES REPRESENT ELEVATIONS BELOW THAT SAME PLANE.
2. TIMBER PILES TO BECCA TREATED AT 2.5 PCF. ALL OTHER TIMBERS TO BECCA TREATED AT 10 PCF.
3. ALL HARDWARE TO BE GALVANIZED.
4. FOR COMMERCIAL USE.

LICENSE PLAN NO. 2423
Approved by Department of Environmental Protection
Date: SEP 19, 1990

TOWN OF DENNIS AUGUST 1, 1989 SHEET 3 OF 3
NOTE:
ELEVATIONS ARE IN FEET AND TENTHS ON THE PLANE OF MEAN LOW WATER.
MINUS FIGURES REPRESENT ELEVATIONS BELOW THAT PLANE.

PLAN ACCOMPANYING PETITION OF TOWN OF DENNIS TO RECONSTRUCT AN EXISTING GROIN & PORTION OF BEACH NANTUCKET SOUND DENNIS, MASS.
JULY 14, 1981 SHEET 1 OF 2.

ROBERT A. BRAMA CIVIL ENGINEER & SURVEYOR

LICENSE PLAN NO. 770
APPROVED BY DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING OF MASSACHUSETTS SEPTEMBER 25, 1981
COMMISSIONER OF ENVIRONMENTAL QUALITY ENGINEERING

PLAN: 1" = 100'
TYPICAL BEACH SECTION

SCALE: 1" = 20'

GROIN PROFILE

SCALE: 1" = 30'

SECTION A-A
GROIN SECTION - TYPICAL
SCALE: 1" = 4'

LICENSE PLAN NO. 770
Approved by Department of Environmental Quality Engineering
SEPTEMBER 25, 1981

TOWN OF DENNIS
JULY 14, 1981 SHEET 2 OF 20
NOTE:
ELEVATIONS ARE IN FEET AND TENTHS ON THE PLANE OF MEAN LOW WATER MINUS FIGURES REPRESENT ELEVATIONS BELOW THAT PLANE.

COVELLO REALTY TRUST
242 COHASSET STREET
WORCESTER, MA, 01604

EDGE OF PAVEMENT

PITS

PROPOSED LEACHING PIT

COMFORT STATION

EXISTING REVETMENT LICENSE NO. 8418

BEGIN CONSTRUCTION

STAIRWAY

END CONSTRUCTION

FILL WITH SAND TO EL 7.0

1.0

-0.2

SLOPE: 0.15:1

-2.0

EXISTING GROIN

DIVISION OF WATERWAYS CONTRACT 
PROPOSED RECONSTRUCTION OF EXISTING GROIN

EXISTING GROIN

NANTUCKET SOUND
PLAN
SCALE: 1" = 100'

PLAN ACCOMPANYING PETITION OF
TOWN OF DENNIS
TO RECONSTRUCT AN EXISTING
GROIN & PORTION OF BEACH
NANTUCKET SOUND
DENNIS, MASS.
JULY 14, 1981 SHEET 1 OF 2

ROBERT A. BRAMAN
CIVIL ENGINEER A.S.C.E.
TYPICAL BEACH SECTION

SCALE: 1" = 20'

GROIN PROFILE

SCALE: 1" = 30'

SECTION A-A

GROIN SECTION - TYPICAL

SCALE: 1" = 4'

LICENSE PLAN NO. 770

Approved by Department of Environmental Quality Engineering

SEPTEMBER 25, 1981

TOWN OF DENNIS
REFERENCE DATUM IS MEAN LOW WATER = 0.0
FEMA DATUM IS N.G.V.D.
REF: DENNIS ASSESSOR'S MAP 43, PARCEL 14

PLAN TO ACCOMPANY PETITION OF
TOWN OF DENNIS
TO LICENSE, RECONSTRUCT AND MAINTAIN
AN EXISTING BOAT LAUNCHING FACILITY
IN BASS RIVER,
DENNIS, BARNSTABLE COUNTY, MA

PREPARED BY
COASTAL ENGINEERING CO., INC.
260 CRANBERRY HIGHWAY
ORLEANS, MA 02653

Sheet 1 of 5  July 31, 2001  C15144-C91.DWG
REFERENCE DATUM IS MEAN LOW WATER = 0.0

PROPOSED RAMP PROFILE

SCALE 1" = 10'
REFERENCE DATUM IS MEAN LOW WATER = 0.0

PROPOSED TIMBER PILES
BEACH
RECONSTRUCTED BULKHEAD
EXISTING BULKHEAD
PARKING AREA

SHORE GUARD S700 SHEETING
8"x8" OUTSIDE WALE
3"x8" INSIDE WALE
EXISTING WALE
EXISTING SHEETING
ANCHOR TIE RODS 6' 6" O.C.
CEMENTITIOUS FILL

EXISTING PILE
SHOREGUARD SERIES 700 VINYL SHEETING

BULKHEAD—PLAN VIEW

SCALE 1" = 4'

BULKHEAD—SECTION

SCALE 1" = 4'
SEE NOTE: ABUTTER

PLAN

50
15
30
5
20
40
80
10
15
20

50
15
30
5
20
40
80
10
15
20

WOOD PIER

PROPOSED BULKHEAD
(BANK-RETENTION)

BOAT RAMP

APPROX. 8' ON CENTER

TIMBER PILES

SECTION

M.H.W. + 2.5

+ 3 MLW

MLW 0.0

APPROX. 1' ABOVE ASPHALT LEVEL

PROPOSED BULKHEAD
(BANK-RETENTION)

FLOOD

SHORT BULKHEAD
(BANK-RETENTION)

This wall will follow ramp line

WALL

APPROX. LOW WATER MARK

HORIZONTAL SCALE

VERTICAL SCALE

PURPOSE: TO KEEP DOCKING FACILITY
FROM SITTING & BACK INTO PIER

DAMAGED

FROM ERODING

DATUM: OBSERVED

©SESUIT MARINE SERVICES INC.
(ABUTTER)

PLAN ACCOMPANYING PETITION OF
THE TOWN OF DENNIS
TO CONSTRUCT & MAINTAIN A BULKHEAD
AT SESUIT HARBOR, WEST SIDE, E. DENNIS,
COUNTY OF BARNSTABLE, MASS.

license plan no. 1347
Approved by Department of Environmental Quality Engineering
of Massachusetts

comissioner

chiefe engineer

division director

november 16, 1985 date
<table>
<thead>
<tr>
<th>BCE Structure No</th>
<th>Document No</th>
<th>Contract/ Drawing Number</th>
<th>Entity</th>
<th>Municipality</th>
<th>Date</th>
<th>Title</th>
<th>Sheets</th>
<th>Location</th>
<th>Description</th>
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<tr>
<td>016-011-000-031-100</td>
<td>016-011-003-031-100-CDE1A</td>
<td>47-245</td>
<td>USACE</td>
<td>Dennis</td>
<td>October 1947</td>
<td>Proposed East Jetty Repairs and West Jetty Extension - Bass River - Dennis and Yarmouth, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Bass River</td>
<td>Jetty Repairs</td>
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<td>016-018-000-199-100</td>
<td>016-018-000-199-100-CDE1A</td>
<td>74-91</td>
<td>USACE</td>
<td>Dennis</td>
<td>March 1973</td>
<td>Proposed Shore Protection - Groin Reconstruction and Sand Fill - Haigis Beach - Nantucket Sound - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Haigis Beach</td>
<td>Groin and Revetment</td>
</tr>
<tr>
<td>016-018-000-199-200</td>
<td>016-018-000-199-200-CDE2A</td>
<td>74-91</td>
<td>USACE</td>
<td>Dennis</td>
<td>March 1973</td>
<td>Proposed Shore Protection - Groin Reconstruction and Sand Fill - Haigis Beach - Nantucket Sound - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Haigis Beach</td>
<td>Groin and Revetment</td>
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<tr>
<td>016-019-000-091-200</td>
<td>016-019-000-091-200-CDE2A</td>
<td>56-78</td>
<td>USACE</td>
<td>Dennis</td>
<td>March 1959</td>
<td>Proposed Groin Relocation - Glen Road - Dennisport Shore - Nantucket Sound - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Glen Road</td>
<td>Groin Relocation</td>
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<tr>
<td>016-021-000-059-100</td>
<td>016-021-000-059-100-CDE1A</td>
<td>81-413</td>
<td>USACE</td>
<td>Dennis</td>
<td>July 1981</td>
<td>To Reconstruct a Groin and Portion of Beach - Nantucket Sound - Dennis, Barnstable County, Massachusetts - Application by Town of Dennis</td>
<td>2</td>
<td>Sea Street Beach</td>
<td>Groin and Revetment</td>
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<tr>
<td>016-021-000-059-200</td>
<td>016-021-000-059-200-CDE2A</td>
<td>56-64</td>
<td>USACE</td>
<td>Dennis</td>
<td>March 1959</td>
<td>Proposed Groin - Sea Street Beach - Dennisport Shore - Nantucket Sound - Dennis, Barnstable County, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Sea Street Beach</td>
<td>Groin</td>
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<td>016-021-000-059-200</td>
<td>016-021-000-059-200-CDE2B</td>
<td>81-413</td>
<td>USACE</td>
<td>Dennis</td>
<td>July 1981</td>
<td>To Reconstruct a Groin and Portion of Beach - Nantucket Sound - Dennis, Barnstable County, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sea Street Beach</td>
<td>Groin and Revetment</td>
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<td>016-410-000-023-100</td>
<td>016-410-000-023-100-CDE1A</td>
<td>86-257</td>
<td>USACE</td>
<td>Dennis</td>
<td>March 1985</td>
<td>Proposed Bulkhead at Sewall Harbor in East Dennis, Massachusetts, County of Barnstable - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>1</td>
<td>Sewall Harbor</td>
<td>Bulkhead</td>
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<td>016-411-000-012-100</td>
<td>016-411-000-012-100-CDE1A</td>
<td>69-4</td>
<td>USACE</td>
<td>Dennis</td>
<td>November 1981</td>
<td>Proposed Access Ramp and Facilities - Sewall Harbor - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Timber Bulkhead</td>
</tr>
<tr>
<td>016-420-000-004-100</td>
<td>016-420-000-004-100-CDE1A</td>
<td>54-144</td>
<td>USACE</td>
<td>Dennis</td>
<td>June 1854</td>
<td>Proposed Jetty and Groin Construction - Sewall Harbor - Dennis, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Jetty</td>
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<td>016-420-000-004-100</td>
<td>016-420-003-004-100-CDE1B</td>
<td>58-174</td>
<td>USACE</td>
<td>Dennis</td>
<td>May 1958</td>
<td>Proposed Jetty Extensions - Revetment and Dredging - Sewall Harbor - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Jetty Extension</td>
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<td>016-421-000-005-100</td>
<td>016-421-000-005-100-CDE1A</td>
<td>54-144</td>
<td>USACE</td>
<td>Dennis</td>
<td>June 1954</td>
<td>Proposed Jetty and Groin Construction - Sewall Harbor - Dennis, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Jetty</td>
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<td>016-421-000-005-100</td>
<td>016-421-000-005-100-CDE1B</td>
<td>58-174</td>
<td>USACE</td>
<td>Dennis</td>
<td>May 1958</td>
<td>Proposed Jetty Extensions, Revetment and Dredging - Sewall Harbor - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Jetty Extension</td>
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<td>016-421-000-005-200</td>
<td>016-421-000-005-200-CDE2A</td>
<td>69-4</td>
<td>USACE</td>
<td>Dennis</td>
<td>November 1966</td>
<td>Proposed Access Ramp and Facilities - Sewall Harbor - Dennis, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways</td>
<td>2</td>
<td>Sewall Harbor</td>
<td>Riprap</td>
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</tbody>
</table>
PROPOSED JETTY REPAIRS AND WEST JETTY EXTENSION

BASS RIVER
DENNIS & YARMOUTH, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

1948

This page contains a plan, section, and profile drawings for Proposed Jetty Repairs and West Jetty Extension at Bass River, Dennis & Yarmouth, Massachusetts. The drawings show the existing jetty, proposed jetty extension, and related details. The scale for the drawings is indicated at the top of the page.
PLAN

SCALE 1" = 80'

NANTUCKET SOUND

LOCATION OF PROPOSED WORK SHOWN IN RED
APPROXIMATELY 11,000 CUBIC YARDS OF SAND FILL

NOTE: Elevations are in feet and tenths and refer to the plane of Mean Low Water, minus figures denote depths below that plane.
TBM Elev 15.17 MLW iron collar fill pipe of bath house.
Date of Survey April 1972

PROPOSED SHORE PROTECTION
GROIN RE-CONSTRUCTION and SAND FILL

HAIGIS BEACH
NANTUCKET SOUND
DENNIS MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1973

Fred C. Schreiber
DEPUTY CHIEF ENGINEER - WATERWAYS

ACC. NO. 04975-A
NOTE: Elevations are in feet and tenths and refer to the plane of Mean Low Water, minus figures denote depths below that plane.
TBM Elev. 15.17 MLW iron collar fill pipe of bath house.
Date of Survey April 1972

PROPOSED SHORE PROTECTION
GROIN RE-CONSTRUCTION and SAND FILL

HAIGIS BEACH
NANTUCKET SOUND
DENNIS MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1973

ACC. NO. 04975-4
PROPOSED SHORE PROTECTION
GROIN RE-CONSTRUCTION and SAND FILL

HAIGS BEACH
NANTUCKET SOUND
DENNIS MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

MARCH 1973

Fred C. Schueler
Chief Engineer-Waterways

ACC NO 04975-B
NOTE
ELEVATIONS ARE IN FEET AND TENTHS
ABOVE PLANE OF MEAN LOW WATER
MINUS FIGURES SHOW DEPTHS BELOW
THE SAME PLANE
APPROX. EXISTING GROUNDS SHOWN TRUE HMT
LOCATION OF PROPOSED WORK IS SHOWN
IN RED.
ALL SIDE AND END SLOPES FOR GROIN ARE 1:2:1

PROPOSED GROIN RELOCATION
GLENDOON RD., DENNISPORT SHORE
NANTUCKET SOUND
DENNIS - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1936

[Signature]
NOTE
ELEVATIONS ARE IN FEET AND TENTHS ON THE PLANE OF MEAN LOW WATER
MINUS FIGURES REPRESENT ELEVATIONS BELOW THAT PLANE
700 CFY OF SAND BELOW HIGH TIDE LINE
200 CFY OF CRUSHED STONE BELOW HIGH TIDE LINE

COVELLO REALTY TRUST
242 COHASSET STREET
WORCESTER, MA, 01604

LOT 29
JOHN E. MARQUES ET AL
62 KESL CAPE DRIVE
SOUTH YARMOUTH

EXISTING REVESTMENT LICENSE NO. 94-18

EXISTING GROIN
PROPOSED RECONSTRUCTION OF EXISTING GROIN
DIVISION OF WATERWAYS CONTRACT 54C

EXISTING GROIN

TO RECONSTRUCT A GROIN & PORTION OF BEACH
NANTUCKET SOUND
DENNIS, BARNSTABLE COUNTY, MASS.
APPLICATION BY
TOWN OF DENNIS

JULY 14, 1981
ROBERT A. BRAMAN
CIVIL ENGINEER & SURVEYOR
444 MAIN STREET
WAREHAM, MASS.

SCALE: 1" = 100'

NANTUCKET SOUND
PLAN

SHEET 10F2

Dennis G. Guzzi
1" = 2000'
NOTE
ELEVATIONS ARE IN FEET AND TENTHS
ABOVE THE PLANE OF MEAN LOW WATER,
MINUS FIGURES SHOW DEPTHS BELOW
THE SAME PLANE.
SIDE AND END SLOPES OF GROINS ARE 1:4:
PROPOSED GROIN NUMBER 1 APPROX.
EXISTING GROIN SHOWN THUS:
LOCATION OF PROPOSED WORK SHOWN IN RED.

PROPOSED GROINS
SEA STREET BEACH, DENNISPORT SHORE
NANTUCKET SOUND
DENNIS - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION = WATERWAYS
MARCH 1956
ROBERT A. MCKENNA
DISTRICT WATERWAYS ENGINEER.
NANTUCKET SOUND

PLAN

SCALE: 1" = 100'

TO RECONSTRUCT A GROIN & PORTION OF BEACH
NANTUCKET SOUND
DENNIS, BARNSTABLE COUNTY, MASS.
APPLICATION BY
TOWN OF DENNIS

JULY 14, 1981
ROBERT A. BRAMAN
CIVIL ENGINEER & SURVEYOR
444 MAIN STREET
WAREHAM, MASS.

SHEET 1 OF 2
**Proposed Bulkhead**

At Sesuit Harbor in E. Dennis, MA, County of Barnstable

Application by Town of Dennis

**Purpose:** To keep docking facility from silting & bank around pier from eroding.

**Datum:** Observed

Any dredge material to be placed in Dennis landfill

1. Sesuit Marine Services Inc. (Abutter)

**Note:** Observed high water 2/20/85

**Approx. Low Water Mark**

**Plan & Profile**

**Section**

**Horizontal Scale:** 10' 0' 5' 30' 15'

**Vertical Scale:** 10' 0' 5'

**Approx. 8' on center**

**Timber Piles**

**Wood Pier**

**Proposed Bulkhead**

(Bank Retention)

**Short Bulkhead (Silt Retention)**

**Boat Ramp**

**Proposed**

**Boat Ramps**

**Approx. 1' above asphalt level**

This wall will follow line of ramp.

**Approx. 10.5 MLW**

**Approx. +3 MLW**

**MLW O.G.**

**MHW +9.5**

**Approx. 312 treated matched staving**

**All Hardware Not 1/2 in. stainless steel**

**All Wood Treated 2.3 lb. CCA**

**Proposed Bulkhead**

**Dredge Depth**

**Field Variations Allowable W/ or by Town Authority**

**3/10/85**
LOCATION OF PROPOSED WORK SHOWN IN RED

NOTE: ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO THE PLANE OF MEAN LOW WATER MINUS FIGURES DENOTE ELEVATIONS BELOW THAT SAME PLANE

PROPOSED ACCESS RAMP AND FACILITIES
SESUIT HARBOR
DENNIS, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

NOVEMBER 1968

DEPUTY CHIEF ENGINEER FOR WATERWAYS
NOTE
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANS OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW SAME PLANS. LOCATIONS OF PROPOSED WORK ARE SHOWN IN RED.

PROPOSED JETTY AND GROIN CONSTRUCTION
SESUIT HARBOR
DENNIS, MASS.
APPLICATION BY DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1954
SCALES SHOWN

ARCHITECT AND ENGINEER:

[Signature]
GROIN NO. 3

Profiles - Proposed Groins

Typical Section - Proposed Groins

Section - Westerly Jetty

Section - Easterly Jetty

PROPOSED JETTY & GROIN CONSTRUCTION
SESUIT HARBOR
DENNIS - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1954
SCALES SHOWN

DISTRICT WATERWAYS ENGINEER

SCALE = FEET
1" = 10'
PROPOSED
JETTY EXTENSIONS
REVENTMENT AND DREDGING
SESUIT HARBOR
DENNIS - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
MAY 1958

CHIEF WATERWAYS ENGINEER
PROFILE EAST JETTY

SCEPTIONS--FEET--BOTH PROFILES

PROFILE WEST JETTY

TYPICAL JETTY SECTION

SCEPTIONS--FEET--BOTH SECTIONS

NOTE
ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW WATER
APPROX. EXISTING GROUND SHOWN THUS
ALL SIDE AND END SLOPES 1.5 TO 1, EXCEPT
INNER FACE OF REVETMENT IS 1.0 TO 1.0

PROPOSED JETTY EXTENSIONS

MLW

MLW

PROPOSED DREDGING

MLW

MLW

3'MIN, MLW

MLW

3'MIN, MLW

3'MIN, MLW

MLW

MLW

3'MIN, MLW

PROPOSED FILL

PROPOSED REVETMENT

MLW

MLW

MLW

MLW

MLW

MLW

MLW

PROPOSED FILL

PROPOSED REVETMENT

MLW

MLW

MLW

MLW

MLW

MLW

MLW

PROPOSED FILL

PROPOSED REVETMENT

MLW

MLW

MLW

MLW

MLW

MLW

MLW

PROPOSED FILL

PROPOSED REVETMENT

MLW
NOTE
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANES OF MEAN LOW WATER. MIRUS FIGURES SHOW DEPTHS BELOW SAME PLANE. LOCATIONS OR PROPOSED WORK ARE SHOWN IN RED.

PROPOSED JETTY AND GROIN CONSTRUCTION
SESUIT HARBOR
DENNIS - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1954
SCALES SHOWN

[Signature]
DISTRICT WATERWAYS ENGINEER.
GROIN No. 1

PROFILES-PROPOSED GROINS

SCALE=FEET

1"=80'

TYPICAL SECTION-PROPOSED GROINS

SCALE=FEET

1"=10'

SECTION-WESTERLY JETTY

SCALE=FEET

1"=20'

PROPOSED JETTY& GROIN CONSTRUCTION

SESUIT HARBOR

DENNIS-MASS.

APPLICATION BY

DEPARTMENT OF PUBLIC WORKS-MASSACHUSETTS

DIVISION OF WATERWAYS

JUNE 1935

SCALES SHOWN

DISTRICT WATERWAYS ENGINEER

ACC 02340-8
PROFILE EAST JETTY

PROFILE WEST JETTY

NOTE
ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW WATER
APPROX. EXISTING GROUND SHOWN THUS:
ALL SIDE AND END SLOPES 1.5 TO 1. EXCEPT
INNER FACE OF REVETMENT IS 1.0 TO 1.0
PROPOSED ACCES RAMP AND FACILITIES
SESUIT HARBOR
DENNIS, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER 1968

DEPUTY CHIEF ENGINEER FOR WATERWAYS