*Massachusetts Coastal Infrastructure Inventory and Assessment Project*

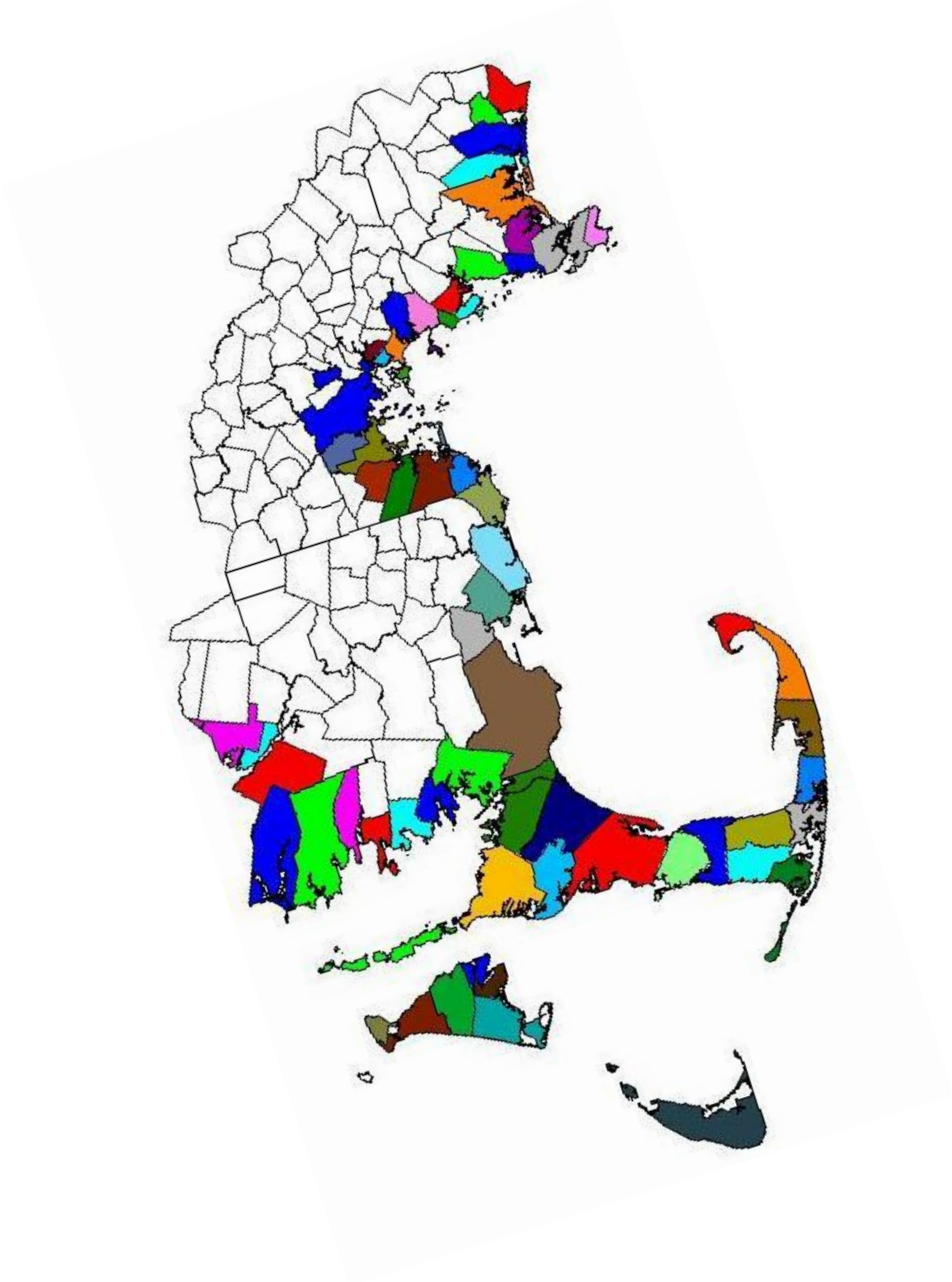
*Massachusetts Department of Conservation and Recreation*

*Office of Waterways*

dcr

# Massachusetts Coastal Communities

**October, 2009**



# *Massachusetts Coastal Infrastructure Inventory and Assessment Project*

## *Massachusetts Department of Conservation and Recreation*

## *Office of Waterways*

## TABLE OF CONTENTS



## INDEX OF APPEDIXES

***Massachusetts Coastal Infrastructure Inventory and Assessment Project***
***Coastal Hazards Commission***
***Infrastructure Plan Working Group***
***Summary Report***

## EXECUTIVE SUMMARY

The Infrastructure Plan Working Group of the Coastal Hazards Commission (CHC) was tasked with prioritizing coastal protection structures maintenance and repairs. In the report ***Preparing for the Storm: Recommendations for Management of Risk from Coastal Hazards in Massachusetts***; May 2007, Chapter 3 - Infrastructure Inventory discussed the South Shore Pilot Project, since the time of the project, the remaining coastline inventory has been completed. The report is for the entire coastal inventory project.

Many types of structures exist along the coast of Massachusetts to protect buildings and infrastructure constructed prior to coastal management policies and regulations. Historically, coastal land was developed out of economic necessity. Commercial development primarily included piers, wharfs, and warehouses. Residential development, roads, and other infrastructure followed due to increasing population demand and the desire to work and live near the ocean. Public and private buildings along the coast are often more valuable than their inland complements and represent an extraordinary economic investment. Today, maintenance of coastal structures built prior to 1978 to protect public and private development in dynamic coastal areas challenges the Commonwealth, municipalities, and private owners.

The Infrastructure Plan Working Group focused primarily on shoreline stabilization structures and their ability to resist major coastal storms and prevent damage due to flooding and erosion. Since ownership and maintenance are major issues for these coastal structures, this infrastructure project was developed to research, inventory, survey, and assess existing coastal infrastructure was conducted along the shoreline from the New Hampshire border to the Rhode Island border including the islands. An atlas of coastal hazards on the South Shore has also been completed and is a valuable resource for this project (Applied Coastal Research and Engineering, Inc., 2006). A methodology was developed for this project to be used in each of the 78 communities in each of the five (5) coastal regions (see Appendix A), as identified by the Massachusetts Coastal Zone Management, as shown below:

**North Shore** - Amesbury, Beverly, Danvers, Essex, Gloucester, Ipswich, Lynn, Manchester, Marblehead, Nahant, Newbury, Newburyport, Peabody, Revere, Rockport, Rowley, Salem, Salisbury, Saugus, and Swampscott.

**Boston Harbor** - Boston, Braintree, Chelsea, Everett, Milton, Quincy, Weymouth, and Winthrop

**South Shore** - Cohasset, Duxbury, Hanover, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, and Scituate

**Cape Cod and Islands** - Aquinnah, Barnstable, Bourne, Brewster, Chatham, Chilmark, Dennis, Eastham, Edgartown, Falmouth, Gosnold, Harwich, Mashpee, Nantucket, Oak

Bluffs, Orleans, Provincetown, Sandwich, Tisbury, Truro, Wellfleet, West Tisbury, and Yarmouth

**South Coast** - Acushnet, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Marion, Mattapoisett, New Bedford, Rehoboth, Seekonk, Somerset, Swansea, Wareham, and Westport

During recent coastal storm events, it has become apparent that FEMA (Federal Emergency Management Agency) has changed methodology for review of damages occurring at storm events. The primary question when assessing damage was a request for documentation of monitoring of the structure and demonstrable proof of the damage caused by the storm event. FEMA requires annual inspections as well as inspections after storm events (monitoring) and a full review of infrastructure in five (5) year intervals. The Infrastructure Plan Working Group developed objectives and goals for the infrastructure inventory project report that would identify the information to assist in the existing conditions of the coastal infrastructure and shall develop recommendations for a 20 year infrastructure repair program and d maintenance and monitoring program, which are established below:

1. Inventory and assess the condition of coastal hazards protection infrastructure owned by, maintained by and/or otherwise the responsibility of the Public (Commonwealth and the coastal municipalities) using a standard methodology that can be applied to coastal infrastructure along of the Massachusetts shoreline, the Initial Condition Survey requirements of the DCR - Waterways, ***Guideline for Consultants*****,** December 2002; were utilized for this purpose.

2. Inventory and assess the condition of coastal beaches and dunes that are considered the primary coastal hazards protection owned by, maintained by and/or otherwise the responsibility of the Public using a standard methodology that can be applied to coastal infrastructure along of the Massachusetts shoreline, the Initial Condition Survey requirements of the DCR - Waterways, ***Guideline for Consultants***, December 2002; were utilized for this purpose.

3. Develop a working database of coastal structure information, with appropriate Geographic Information System (GIS) files, which can be expanded to include future work covering the remainder of the shoreline and can be used by the Commonwealth to plan and budget for maintenance, repair, and/or reconstruction needs and integrate this information into the MassGIS system.

4. Develop an interactive program for MassGIS that will allow communities and agencies to access the database with MassGIS, and allows Commonwealth and the communities to update information relating to their infrastructure on MassGIS.

5. Develop maintenance and monitoring program that will keep data on infrastructure recent and available on MassGIS for review by any interested agency including disaster management agencies such as FEMA & MEMA.

6. Develop a 20-Year Spending Plan to address the repair requirements identified within the inventory reports.

A summary of the report process identified publicly-owned coastal protection structures through research of local, state and federal records research. Each structure was located, recorded, and described for the initial review prior to the field inspections. The structures are broken into two (2) categories:

> Structures that are hard or man-made structures including seawalls, revetments, bulkheads, groins, jetties, breakwaters, and dikes or levees are designed to control reduce coastal damages by preventing erosion and flooding from damaging adjacent property.
>
> Structures that are soft or natural landforms including beaches, dunes, and coastal banks that are managed to provide the primary protection and minimize potential damage to property were also considered structures for this inventory; soft or natural landforms that are located seaward of hard infrastructure were not assessed in the reports.

Filed inspections, by civil engineers, performed initial condition surveys of each structure, based on visual inspections, the structure condition were described and assessed the general condition of each structure. Geographically referenced digital photographs were taken of each structure to supplement the inspections. The visual inspections resulted in the rating of each structure according to its condition using a letter system (Appendix B). Each structure was also assigned a priority rating based on its condition and ability to protect buildings from coastal hazards (Appendix C). The capacity of the shoreline stabilization structure to protect infrastructure, such as roads and utilities, was not considered in the analysis due to time and resource constraints.

Coastal protection structures that were not considered by this study are federally-owned, state authority-owned and privately-owned. The owners of these structures are responsible for the condition and assessment of their structures.

**Preliminary Findings**

Final drafts of the project reports have been reviewed and the information shared with the consultant; several communities have identified structures that were not included in the reports and at least 28 beach areas are missing. The consultant is currently gathering the field data and will update the effective reports to show the final tabulations.

The reports has assessed 1,284 hard (bulkheads, seawalls, revetments, groins, jetties, and breakwaters )and 63 soft (coastal banks, coastal beaches, coastal dunes)structures that are located along 139.14 miles of the 1730 miles of coastline; which represents 8.04% of the entire coastline of Massachusetts is protected by publicly owned structures. The Commonwealth is responsible for 38.41 miles of structure and the municipalities are responsible for 100.73 miles of structure. The total assessed value for repairs in 2006 dollars is $626,798,185. A project by project breakdown of the projects are listed in the Spending plans at the end of the report, a breakdown of the overall rating of projects is listed on Appendix F with a summary on Appendix G. Based on the proposed spending plan, approximately $31.5 million will be needed each year to meet the 20-year repair plan.

The condition of the structures ranged from excellent (A) to critical (F), but the majority of the structures were either in good (B) or fair (C) condition. Overall, 1,183 (92%) structures are stable, ranging from A to C, and 193 (8%) need moderate to immediate repair, ranging from D to F. The priority ratings of the structures are currently being finalized. These findings, along with the results of the projects in the

remaining coastal regions, will serve as the beginning of the development of a statewide plan for maintenance and/or repair of the Commonwealth's coastal protection structures.

The condition, quantities and repair costs for the beaches are not truly reliable for only beaches that are considered the primary coastal protection means. The biggest challenge with assessing the beaches is that beaches exist in front of the hard structures at most locations and cannot be truly assessed until a full condition survey can be performed for the entire coastal protection system. With the completion of the reports, better statistics will be provided.

The estimated costs identified in the reports are to repair/rebuild the structures to the condition and configuration as last repaired or originally constructed. coastal and marine structures are constructed with a life cycle of 50 years; review of all the dates indicate that 206 structures (15%) are less than 50 years old, only 69 (5.1%) are less than 25 years old. in the 20th century there has been seven (7) hurricanes and one (1) blizzard. In the 21st century there has been one (1) hurricane thus far, these events do not include our most destructive storms, the Nor'easter. Records within the DCR - Waterways database identify that the most activity for coastal protection occurs after a major event in the first half and mid-point of the 20th century. From 1958 to the present, only 206 projects have been repaired or constructed; therefore 85% of the public protection structures have gone without any major repairs. It is feared that without rehabilitation of these structures, a storm equivalent to the Blizzard of 1978 or Hurricane Bob year will caused incalculable damage to the coastline and upland areas of the Commonwealth.

Beach erosion plays a major role in the degradation of coastal protection structures. Regional sediment management studies for each sub-region are needed to develop management programs to reduce the erosion of beaches, dunes and coastal banks.

**Recommendations**

**Region Sediment Management Studies** should be developed for each littoral sub-region along the coastline and for the Islands.

**Full Condition Surveys/Designs** should be developed for the highest priorities, in order according to the 20-year spending plan.

**Construction of Repairs/Rehabilitation** should be for projects within the highest priorities as the projects are permitted and final design is completed.

**Annual Maintenance and Monitoring** shall be established for all publicly owned costal protection infrastructure.

**Funding requests** for the first five (5) years repairs and rehabilitation for state-owned and the state 50% cost share of municipally-owned infrastructure is $94 million. In addition, $5 million is requested for the regional sediment management studies and $1.5 million is requested for FY2013 to complete another full assessment of coastal protection structures report to comply with FEMA to be eligible for federal funding after state declared disaster.

## *Coastal Hazard Commission*
## *Infrastructure Plan Working Group*
## *Members*

**Representative Frank M. Hynes, Chairman (RET.)**
State House
Boston, MA 02133

**Kevin P, Mooney, Sr. Waterways Engineer**
Department of Conservation & Recreation – Waterways
Hingham, MA 02043

**Joe Orfant, Chief**
Department of Conservation & Recreation - Bureau of Project Design & Management
Boston, MA 02114

**Mr. Raul Silva**
Department of Conservation & Recreation – Bureau of Engineering
Boston, MA 02114

**David Mahr,**
Executive Office of Energy and Environmental Affairs
Boston, Massachusetts 02114

**Keith Dobie, President**
F.R. Mahoney Associates
Rockland, MA 02370

**Carlos Peña, P.E.**
CLE Engineering, Inc.
Marion, MA 02738

**Mary Lee King**
Massachusetts Coastal Zone Management
Boston, MA 02114

**Dan Sampson,**
Massachusetts Coastal Zone Management
Boston, MA 02114

**Workgroup Acknowledgement**: We *would like to thank the entire working group for the time and effort that went into the preparation and review of the study documents. Our thanks and gratitude also goes to all the municipalities within the study areas, DCR Archives, DCR Waterways, DEP Waterways Section and the U.S. Army Corps of Engineers for access to their archives and documentation. Without their assistance we could not have been so successful in completing this massive undertaking. A very special thank you goes to the newly retired Representative Frank M. Hynes for his many years of effective legislation and for being a leader in the legislature for his constitutes and for all the coastal communities of Massachusetts.*

***Massachusetts Coastal Infrastructure***

***Inventory and Assessment Project***

***Coastal Hazards Commission***

***Infrastructure Plan Working Group***

***Summary Report***

**INTRODUCTION**

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 Infrastructure Plan Working Group was to establish to develop a 20-Year Infrastructure Assessment and Inventory Report that would identify and prioritize the most critical repair of coastal structures in Massachusetts. The focus areas of the Working Group include:

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

The Infrastructure Plan Working Group set up regional hearings with the communities, DCR - Waterways, Massachusetts Coastal Zone Management, (MCZM), and the Governor's Seaport Advisory Council, (SAC). The municipal mayor's, town mangers and harbormasters were invited. The hearings were developed to perform several issues at the same time:

**20-Year Infrastructure Inventory and Assessment Report (Report)**, an overview of as presented. Parties gathered were requested to submit a primary and a secondary contact person from each community that would be use for the consultant's point of contact. The contact would have the best knowledge of the communities' infrastructure and all available plans and documents that would be needed to perform the project. The contact would receive documents from the CHC for review and comment.

**Harbor Survey** DCR - Waterways in conjunction with MCZM are in the process of updating the 1990 report *The State of our Harbors.* A joint Harbor Survey was developed and sent to all coastal communities to fill out and return. The survey incorporates all aspects of the harbor along with dredging needs and beach erosion problems. An updated report will result from the survey, and all information received will assist in identifying challenges with the stabilizing the coastline. If beach erosion is identified better systems of determining beneficial use of dredged materials.

**The Rivers and Harbors (R&H) Assistance Program** with DCR - Waterways explained the R&H program for municipalities and provided copies of the application

with contact information for additional assistance. Under the R&H communities can submit an application for funding assistance for up to 75% of a total project costs for dredging and up to 50% of the total project costs for all other types of waterway's related work, including the repairs and rehabilitation of coastal protection structures. These hearing are required under the R&H program; all applications received are to be placed on the Division of Waterways 10 year plan or waiting list until funding becomes available. The Report as developed assesses the priorities. Once funding becomes available Waterways will contact the communities, in order of priority, to check their availability to fund the municipality cost share for their projects.

**The Seaport Advisory Council (SAC)** Ann overview of the SAC program was given and their application and contact information was made available to the municipalities. SAC's different programs were discussed with the different cost share requirements. The SAC holds up to four (4) meetings per year where the submitted applications are voted on by the full SAC.

The Infrastructure Plan Working Group worked with the DCR Waterways to develop the Request for Proposals (RFP) utilizing the approved consultants from the Waterways Master Service Agreement for Surveying and for Design & Engineering. The Infrastructure Plan Working Group individually and collectively reviewed and commented on all assessment reports. The RFP developed included the following Scope of Services:

**SCOPE OF SERVICES:**
All bidders shall submit a detailed proposal that describes fully and completely how the goals of this project, described generally above, shall be accomplished. At a minimum, proposals shall include the core deliverables listed below.

The Contractor shall be responsible for completing the following scope of services in accordance with the schedule set forth in Section II.5, *Time of Performance* above, and for ensuring that deliverables meet all technical specifications and requirements set forth at the end of this section.

**Task 1. Baseline Survey and Inventory Coordination** The selected contractor shall:

**A.** Complete all work in a manner that is compatible with the uniform methodology developed as part of the South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project, All GIS data and information (including the numbering system for structures and digital photography), inventory development, and assessment work shall integrate directly into work completed as part of the Demonstration Project.

**B.** Compile necessary coastal structure research at appropriate local offices (municipal Assessors, Engineers, Harbormasters, etc.), state agencies (DCR, Division of Waterways and Department of Environmental Protection (DEP), Division of Waterways - Chapter 91) and the U.S. Army Corps of Engineers (USACOE) to identify previous permits and licenses, construction work, inspections, and available plans. Where possible, the ownership of each coastal structure should be recorded (*e.g.*, public–municipal/state, private*).*

.

**C.** Work with the DCR-GIS Coordinator to ensure that work complies with the standard system for identifying and cataloguing coastal structures included in the GIS files developed as part of the Demonstration project, including standard coding for use in the field work and the development of a MassGIS compatible database that categorizes structures according to such attributes as location, type, length of structure, age, ownership, approximate elevation, current physical condition, FEMA Flood Insurance Rate Map (FIRM) zone, and information regarding previous construction work, inspections, available plans, etc.

**Task 2. Field Investigation** The selected Contractor shall:

**A.** Contact and coordinate with appropriate local officials prior to conducting all fieldwork.

**B.** Locate all hard and soft structures as defined above, in a manner that meets all technical specifications and requirements set forth at the end of this section, and record and describe each structure. In conjunction with DCR, Division of Waterways, a unique identifier number shall be assigned to each structure.

**C.** Perform an initial conditions survey and, based on a visual inspection, describe and assess the general condition of each structure. Wall and revetment structures shall be stationed as appropriate to facilitate identification.

**D.** Take digital photographs of each structure to supplement each inspection with representative views at appropriate intervals. At least one digital photograph shall be provided for each structure and up to six digital photographs for structures exhibiting damage or significant deterioration. All photographs shall be referenced geographically to the project datum.

**Task 3. Analyses and Evaluations** The selected Contractor shall

**A.** Assess and evaluate the condition of all existing structures based on visual inspection using the rating system developed as part of the Demonstration Project. Under this system, the rating value assigned to each structure shall, in addition to the condition of each structure, incorporate an assessment of the importance of the structure to the protection of landward structures, infrastructure, etc. from coastal hazards.

**B.** Evaluate the condition of each structure, including recommendations for repairs and, as necessary, with an assessment of the degree of urgency for implementation in accordance with the procedures and tables developed as part of the Demonstration Project.

**C.** Develop cost estimates for the recommended work based on industry accepted unit costs and methodology similar to those set forth in the Demonstration Project.

**Task 4. Project Report** The selected Contractor shall:

**A.** Prepare a Project Report(s), provided in electronic (Microsoft WORD compatible) and hard copy formats, that is compatible with that developed as part of the Demonstration Project and includes, at a minimum, the following information:

**B.** A detailed discussion of all inventory and assessment results, unique findings, and any deviations from Demonstration Project methodology.

**C.** A brief discussion of each coastal structure using a template that includes: 1. Identification Attributes; 2. Location; 3. Description; 4.Investigation Findings; and 5. Recommended Improvements.

**D.** An inventory, in the form of a spreadsheet (Microsoft EXCEL compatible), of all structures, organized by community, noting the location, unique identifier, condition, type, length of structure, age, current physical condition based on the A-F Rating System of the Demonstration Project, FEMA Flood Insurance Rate Map (FIRM) zone, recommendations for repair and the associated degree of urgency, estimated cost for recommended repairs, and other attributes compiled from the research, field inspection and evaluation work, including all necessary maps, digital photographs, charts, tables and illustrations.

**E.** A table or series of tables compiled in an EXCEL spreadsheet summarizing the information discussed in item III.4.ii above. GIS data files of all geospatial information collected and used as part of this project, including the location of each hard and soft structure. All GIS data files shall include attribute tables containing the information and attributes described in Tasks through 3 above. All geospatial data shall be provided as shape files (ESRI, ARCMap, v.9.x format.)

**F.** Final drafts of the project reports shall be submitted to CZM no later than January 17, 2008 for review and comment. A minimum of 10 copies shall be provided. The Selectman Chair or Council President of each municipality shall be contacted and asked to review and comment on the draft report and any necessary changes and comments shall be incorporated into the final draft prior to submission to CZM.

1. Meet with representatives of the 20-Year Infrastructure Working Group, which reports to the Coastal Hazards Commission, every six (6) weeks to discuss the status of work being performed under this scope services.

2. Attend seven (7) meetings (March, May, July, September, November, January, and February) with representatives of the 20-Year Coastal Infrastructure Working Group of the Coastal Hazard Commission to discuss the status, methodologies, procedures and progress of the project.

3. Attend a meeting with representatives of the 20-Year Coastal Infrastructure Working Group of the Coastal Hazard Commission in January of 2008 to present the draft of the project report.

4. Submit all final deliverables, including 20 copies of the final report incorporating all review comments of the draft, no later than February 29, 2008.

**Technical Specifications and Requirements for Coastal Structures Inventory and Assessment Project**

- The base map for GIS components of this project shall be the MassGIS orthophoto imagery. This imagery consists of 1:5,000 scale, color, digital orthophoto images produced from stereoscopic aerial photography, collected along flight lines running approximately north/south during spring "leaves off" periods, with 60% forward and 30%-42% side overlap. The scale of the photography is 1:30,000, obtained at a flying height of 15,000 ft. using a calibrated mapping camera with forward motion compensation. All the images exceed National Map Accuracy Standards at the nominal output scale of 1:5,000. DTM data points were collected on analytical stereo plotters at a density sufficient to support generation of 3-meter contours conforming to the National Map Accuracy Standards (+ or – 1.5 meters). MassGIS considers these medium resolution images as the "base map" for the Commonwealth and EOEA.
- All geospatial deliverables shall relate horizontally to the Massachusetts State Plane Coordinate System (NAD83, meters) and be compiled to meet three (3) meters horizontal accuracy at the 95% confidence level. If appropriate, elevation data shall relate vertically to NAVD88 with associated accuracies documented.
- All spatial data shall be provided in ArcGIS 9.x shape file or other mutually acceptable format.
- All digital data shall be completely and thoroughly substantiated by Metadata, compliant with FGDC Standard, *Content Standard for Digital Geospatial Metadata, FGDC-STD-001*-1998 and the FGDC *Geospatial Positioning Accuracy Standards*, Parts 1-5, as appropriate. These standards are downloadable from http://www.fgdc.gov/standards/standards.html (follow hyperlink entitled Status of FGDC Standards). The National Standard for Spatial Data Accuracy provides guidelines in Section 3.2.3, Accuracy Reporting, for reporting positional accuracy in Metadata.

- All work is to be performed in accordance with the DCR, Division of Waterways Master Services Agreement (MSA) for *Engineering Services for Waterways Projects* Services and the December 2002 Office of Waterways' *Guidelines for Consultants*, or as otherwise specified.

Consultant Team

Bourne Consulting Engineering (***BCE***) of Franklin, MA, was selected as the consultant team to perform the overall project management, specified areas of field assessments, and research. Applied Coastal Research and Engineering Inc. of Mashpee, MA, Childs Engineering Corporation, of Medfield, MA, and Waterfront Engineer LLC of Stratham, NH assisted ***BCE***...

The Infrastructure Plan Working Group was led by Representative Frank Hynes (Ret.) with DCR-Waterways as the lead State Agency overseeing the management and administration of the project. The Massachusetts coastline has been broken up into 5 major regions consisting of the North Shore, Boston, South Shore, South Coast, and the Cape and Islands. The South Shore region, Phase I of the study, was selected as the Pilot Project Area, and evaluated by Bourne Consulting Engineering in 2006. The initial evaluation assisted in the review of the remaining regional areas for it identified items not originally considered, such as Emergency Evacuation Routes and major overhead or underground utilities that are protected by a structure, thus increasing the priority evaluation and incorporated into Phase II the remaining coastal regions. The project identified existing structures, their general conditions, ability to provide coastal protection and the probable cost for repairs.

In order to develop the study, the Massachusetts Coastal Zone Management, (MCZM), regions were used to divide the study areas, as shown on Appendix A. Due to the geography of the South Shore and the diverse types of coastal protection structures within this region it was selected for Phase I of the study and was performed in 2006. The remaining regions were inspected in 2007/08. Currently the final reports have been reviewed, and modifications are being made as necessary. The following is a listing of the MCZM regions and the communities with those regions:

**North Shore** - Amesbury, Beverly, Danvers, Essex, Gloucester, Ipswich, Lynn, Manchester, Marblehead, Nahant, Newbury, Newburyport, Peabody, Revere, Rockport, Rowley, Salem, Salisbury, Saugus, and Swampscott.

**Boston Harbor** - Boston, Braintree, Chelsea, Everett, Milton, Quincy, Weymouth, and Winthrop

**South Shore** - Cohasset, Duxbury, Hanover, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, and Scituate

**Cape Cod and Islands** - Aquinnah, Barnstable, Bourne, Brewster, Chatham, Chilmark, Dennis, Eastham, Edgartown, Falmouth, Gosnold, Harwich, Mashpee, Nantucket, Oak Bluffs, Orleans, Provincetown, Sandwich, Tisbury, Truro, Wellfleet, West Tisbury, and Yarmouth

**South Coast** - Acushnet, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Marion, Mattapoisett, New Bedford, Rehoboth, Seekonk, Somerset, Swansea, Wareham, and Westport

**STUDY PURPOSE**

CHC seeks to identify the capacity of Massachusetts coastal structures to resist major coastal storms and prevent storm damage. In working toward this goal, CHC has initiated a program to perform an assessment of Commonwealth and Municipal owned and/or maintained coastal structures.

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

- To identify all the coastal structures the public either owns or has responsibility to maintain for the coastal region;
- Identify the structures and 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;
- To develop an interactive program for access and use of MassGIS that will allow the owners to update information from annual monitoring programs;
- To develop a 20 Year Maintenance and Repair program to be implemented by the Commonwealth and the Municipalities;
- To recommend a maintenance and monitoring program for the structure owners to use for annual monitoring reports to be incorporated into MassGIS;
- And to recommend potential statue revisions for these structures and other similar structures throughout the Commonwealth.

**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 study included town and state owned structures as it was assumed that most town owned structures received state or federal funding at some level for construction and/or maintenance.
    - Structures that were identified as private were not included.
    - Structures that were federally built and are the responsibility of the federal agencies were not included; the federal agencies have their own inventory and assessment of their structures.
    - Structures that were federally built and are the responsibility of the Commonwealth or the municipalities were included.
    - Structures that were determined to be the responsibility of a state authority were not included in the study; these agencies conduct studies and assessments on their structures.
    - Undocumented structures considered to be on private land, but having the potential to have been publicly built and/or maintained, were identified as being Town-owned.

- The prioritizing of the structures was based primarily on risk to general infrastructure, public and private buildings, and density of housing. The study relied on the Towns to identify emergency evacuation routes, emergency shelters and roadways carrying major utilities.
- Research was performed at the local, state and federal levels. The local research was limited to location and documenting of 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 MA Registry of Deeds.

**DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES**

The specific attributes that will be incorporated into the MassGIS system were developed based on the scope of work. The following standardizes the data collection and presentation to allow flexibility for sorting by attributes in the final GIS database. The attributes identified below were input into a MS Access database to manage the data from all communities within a single file.

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 Massachusetts 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. Only Town or State Ownership has been included in the final datasheets and analysis. 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.
- Structures on Town property were assumed to be owned by the Town
- Structures that were located off-shore were presumed to be federally owned; but may be the Town responsibility for maintenance and repairs
- 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. The DCR - Waterways; Guidelines for Consultants; Preliminary Condition Survey requirements were used for the initial inspections. The assessment of the condition of each structure 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 Appendix B. Conditions were revised based on Town review and a consensus from DCR - Waterways.

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 Appendix C. The priorities were revised by request for towns from their review of the draft reports to determine the emergency evacuation route, emergency shelter or a roadway with major utilities.

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 Appendix D. Once each structure's type, height, and material classifications were determined, the cost per foot for the structure was determine 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. **All costs are based on 2006 costs figures to ensure consistency throughout the reports.**

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 NAVD88 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 was found in the Town's DPW/Engineering Department records. Where particular records were 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 was found within DCR – Waterways office in Hingham Where particular records were found, a table of document information was developed and included within the database with limited descriptions.

MA - DEP Chapter 91 Licenses: MA-DEP Chapter 91 license documents represent the structure information that was found within MA-DEP Chapter 91 records in Boston. Where particular records were 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 was found within the Army Corp of Engineers regulatory office in Concord, MA. Where particular records were 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 (Appendix D). The scope of work for the report does not assess the level of exposure and associated level of protection that may 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.** One clerical note is that the prices for Category B Groins and Jetties are not listed properly; the adjusted pricing was used for the development of the estimated cost.

The development of the cost matrix is based on cost pricing for similar projects within the range of conditions and size using industry standards for the Commonwealth. Actual cost will vary; this report does not consider variants for protection standards required today, but only considered repairing the structures to the condition of its latest design.

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 is 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.

Most Coastal Infrastructure Inventory and Assessment project reports were developed and bound for the regional multiple communities. If a municipality had a significant number of structures and information, the municipality has its own bound report. Appendix E is a sample summary report within the reports developed for individual communities.

**DEVELOPMENT OF THE 20-YEAR MAINTENANCE/REPAIR PROGRAM**

All information developed within the study has been placed within datasheets and databases for overall review. The information for each town has been broken down into individual data sheets for each municipality. A sample can be found in Appendix E, the City of Boston was used in this sample.

In Appendix F, Infrastructure Priority Listing, the combined datasheets have been reviewed and a priority list has been established to determine the most critical structures that need repairs or replacement. Appendix F is the Infrastructure Priority Listing showing all the individual type of infrastructure rating and the overall rating. The initial establishment of the priorities is seawalls, bulkheads and revetments identified as (S) are the most critical, followed by beaches and dunes identified as (B), and then jetties and groins identified as (J). Structure Protection Priority is identified in the table. Each was given a designation based on the condition and priority, for example a seawall in F condition with a priority of IV has been identified as S01, a beach in D condition in priority IV is B01, and so on. Next a determination of overall priority was established based on the assumed destruction that could be raked if a major storm hit the coast, S01 has an overall priority of being No. 1; B01 is ranked No. 6 overall. Appendix G, Breakdown of Structure Types by Condition Rating, is a matrix of structure types, the number of each type ranked by overall condition and a breakdown of state-owned and municipally owned.

The reports has assessed 1,347 hard and soft structures that are located along 139.1 miles of the 1730 miles of coastline; which represents 8.1% of the entire coastline of Massachusetts protected by publicly owned structures. The Commonwealth is responsible for 38.4 miles and the municipalities 100.7 miles. The total assessed value for repairs in 2006 dollars is $626,798,1858. A project by project breakdown of the projects are listed in the spending plans at the end of the report, a breakdown of the overall rating of projects is listed on Appendix F with a summary on Appendix G. Based on the spending plans approximately $31.5 million will be needed each year to meet the 20-year repair plan.

A total of 1, 284 hard structures covering 119.7 miles have been assessed to require $501,147,785. There are 198 structures listed above that are the responsibility of the Commonwealth, which encompasses 28.1 miles of

coastline that are included in these reports at this time, with an assessed repair cost value of $106,369,574. The remaining 1,086 structures are the responsibility of the local municipalities; these encompass 88.9, miles of coastline and have the assessed repair value of $4847,541,894. Under the Rivers and Harbors Program within the DCR Waterways, the Commonwealth may participate in funding repairs to these structures up to 50% state cost share of the total project costs, approximately $243 million funding will be necessary for the to rehabilitate the protection structures within the report.

A total of 63 beaches covering 20.7 miles have been assessed to require $34,775,217. There are 21 beaches listed above that are the responsibility of the Commonwealth, of which cover 10.3 miles of coastline that are included in this reports at this time, with an assessed repair cost value of $21,714,418. The remaining 42 beaches are the responsibility of the municipalities; these encompass 10.4, miles of coastline and have the assessed repair value of $13,060,799. Under the Rivers and Harbors Program within the DCR Waterways, the Commonwealth may participate in funds repairs to these structures up to 50% of the total project costs, the exception to this rule is if the nourishment for these areas is created as a byproduct of dredging, then the Commonwealth may participate up to 75% of the total cost of the project, approximately $6.5-$9.8 million will be needed for the beach structures within the report.

The estimated costs listed in the reports are only to repair/rebuild the structures to the condition and configuration at they were in from the latest construction project. Coastal and marine structures are designed and constructed with a life cycle of 50 years; review of all the data indicates that 206 structures (13.5%) are less than 50 years old, and 69 (5.1%) are less than 25 years old. Therefore over 86.5% of structures are over 50 years old. In the 20th century there have been seven (7) hurricanes and one (1) blizzard. In the 21st century, there has been one (1) hurricane thus far; these storm events do not include the most destructive New England storm, the Nor'easter. Records within Waterways identify that the most construction activity for coastal protection structures occurred after a major storm events in the first half of the 20th century. Since that time (1958 to present) only 206 projects were constructed, leaving 85% of the public structures without any major repairs. It is feared that without the rehabilitation of these structures, another storm with intensity such as the Blizzard of'78 or Hurricane Bob will cause incalculable damage to the coastline of the Commonwealth. Therefore, the actual costs of rehabilitation will need to take in many other factors and will be much higher that the costs listed.

As stated previously, the beaches included in the assessment reports are only beaches that are considered the primary coastal protection amenity and not beach areas in front of existing hard structures. The research indicates that the beach areas in front of the structures are an interrelated part of the structures ability to protect the coast. The hard structures are designed not only to support the earth behind them but also to be able to take the force of wave and wind action based on the height of the beach area in front of the structure. The USACOE *Coastal Design Manual* identifies potential height of a wave is 1/2 the depth of water available, thus if 10 feet of water exists the top of the wave can be 5 feet higher. The erosion of beach areas also affects the foundation of a hard structure as well for if the beach in front of a structure is eroded enough the foundation of the wall can be exposed and the material on which the foundation is placed can be scoured. Normally the structure will fail prior to this occurrence for the earthen pressures behind the structure causes overtopping of the structure before the foundation can be fully washed away.

A prime example of this would be the seawall/revetment system known as Seawall Boulevard on Allerton Hill in the Town of Hull; north of Nantasket Beach. The U. S. Army Corps of Engineers, (USAOE), built a granite block seawall along Allerton Hill in 1874; the foundation was constructed on natural materials at +5' MLW. During the Blizzard of '78, a 200 L.F. section of the seawall overtopped from the erosion of the beach and the pressures of the earth behind. The USACOE did not rebuild the seawall, but opted to reinforce the system by placing a rip-rap revetment in the failed and adjacent areas. The USACOE turned over ownership to the Commonwealth in 1981, after the repairs were complete. During the 1991 storms (Hurricane Bob & the unnamed Storm) more damages to the entire system were sustained. When the Commonwealth performed the repairs, the depth of the revetment toe

was set at -17' MLW; a 22 foot difference from the original foundation depth. The eroded beach area in front of this structure is 22 vertical feet, causing the failure of the overall system from the loss of beach.

Although this example is not as severe as most areas, it does give a sense of overall coastal problems. The effect of the sand loss at Seawall Boulevard can be seen along the North Nantasket and Nantasket Beaches. The natural processes that feeds sediment onto the beach area is a long process that starts with littoral drifts, during the fall and winter months. The waves are erosive, pulling material from the coast into the water, this phenomenon can be seen on beaches that become cobble in the winter months, the finer sands are eroded leaving the heavier cobble. The eroded material is brought out to a maximum depth of -30' mean sea level, (MSL) and is stored there for the winter. In the spring, most material is moved back to the beaches with the gentler tides, but not back to where it came from but instead it is moved down the coastline; this is the littoral drift. This process causes some natural sediment loss, materials never reclaimed from the ocean. Once all the available materials have eroded from the source area, no more sediment is available for the littoral drift process, creating erosion in other areas where material is available.

The loss of sediment source material can be attributed to both man-made and natural causes. Hard structures not only create coastal protection, they also stop the eroding of the coastal banks they protect, causing a stop to sediment source feed. Hard structures have been found to also accelerate erosion from in front of the structure, but the natural wave action scouring at the structure from the wave energy cannot dissipate into softer materials. The rising sea level increases the depth of the underwater storage areas, making the littoral drift process more difficult to complete for loss of storage area with the increasing depths. Major coastal storms in the fall and winter months, primarily Nor'easters, siphon stored sediment for the littoral drift process past the -30' MSL area, which sediment cannot naturally return from.

Whereas, the hard coastal protection structures have changed from being navigation aids or land development aides to protecting public and private infrastructure, the possibility of removing them and allowing the area to go back to natural is nearly impossible. Prior to the 20th century, seawalls and revetments were built predominantly to stop the erosion of drumlins and coastal banks, to keep navigable channels and harbors open. Bulk-heading was used to expand landforms and were used for depositing dredged materials as was performed for the City of Boston. Since that time a big push to the water's edge was made for residential and commercial development and for public amenities to service these areas; now these structures protect these developed areas. All new considerations should strive to balance nature and the man-made protection structures.

**RECOMMENDATIONS:**

**Regional Sediment Management Studies** should be developed for each coastal sub-region. The sub-region is a portion of the region that can be an overall littoral cell. The first study being developed is for the Sub-region North-North Shore, the Commonwealth's coast line from the New Hampshire Border in Salisbury to the tip of Cape Anne in Rockport. The Infrastructure Assessment Reports will be used along with information from the Harbor Surveys to initially identify areas of erosion, accretion and dredging needs. Each community within the sub-region will participate in the program to develop an overall regional plan. All local, state and federal environmental agencies will be requested to assist in the development of the plans and data needed to generate the plans. All existing data will be sought for the study. The study itself will be developed by a consulting firm specializing in the coastal processes, the scope of work will include compiling all existing data, determining the need for further data including topography and hydrographic surveys (as needed), wave analysis, littoral cells, sediment analysis, searching for source materials both on land, coastal or off coast (sand mining), working with the Ocean Management Committee to develop a full plan that can be endorsed by the Ocean Management Committee and working with the public for the studies.

**Full Condition Surveys/Design** for the highest prioritized structures, as based within the 20-Year Spending Plan, Appendix I. The survey will include topographic and hydrographic surveys (as needed), physical inspection of the entire structure, borings and soils sampling, utilizing the regional sediment management report for wind, wave and littoral data, calculating the protection needs for the area using current design guidelines (100-year flood protection plus 1 foot), developing at least five (5) alternate designs for both hard and soft solutions, developing cost: benefit ratios along with pros and cons for each alternate design. The scope of work will also include developing a draft report for review by the Commonwealth and the municipality, holding at least one meeting after the review to determine the best alternative, holding a public meeting (if needed) to discuss the study and retrieve all public comments, having a pre-application meeting with all local, state and federal environmental agencies to review and discuss the study and possible recommendations, acquiring any natural resource information that may not have been fully reviewed in the study, developing the final report to incorporate all information and changes from the reviews and the pre-application meeting, developing maintenance and monitoring plans for beach areas, developing plans suitable for submitting for the permit process. Perform all environmental data collection and reports that were indicated through the pre-application process, prepare and submit all permit applications. After the permit process, final design, plans and specifications for construction will be completed.

**Construction of Repairs/Rehabilitation** projects will be prioritized in the order of which permits and final design have been completed and as funding is available. Some projects within the Infrastructure Assessment Reports are ready for construction, but are not at the top of the list, but are within the top prioritized structures. These structures may be repaired first with funding availability. Some projects within the top of the priority listing may take years to get through the permit process because the protection structure needed differs significantly to the existing structure(s) and the permitting agencies will require additional information and time for approvals. It is recommended that structures with design completed and municipal cost share in place, be the first to receive state assistance for construction.

**Maintenance and Monitoring** according to current FEMA guidelines. Funding of repairs caused by a natural disaster can only be for actual damage from the event per FEMA guidelines; documentation of yearly maintenance and monitoring of the structures is required to receive federal assistance. Recording of maintenance and monitoring has not been very efficient over the years. Major improvements can be documented through the old plans on record with the municipalities, state and/or federal agencies. Without annual documentation, monitoring and maintenance cannot be justified. Appendix H is the Maintenance and Monitoring Report Form; this form was developed to assist in the documentation of the structure's condition and any maintenance or repairs. The annual municipal and state inspection should be performed by Mid-Spring and reports submitted by June 30 of that year.

The structure owner will be responsible for the inspection of each structure; they will be responsible for each structure in their municipality. This form can be developed into one document file with the base information for each structure. To meet FEMA's policies, annual inspection of the structure is needed with photo documentation. Additional inspections will be needed after major storm events. The person filing the report should use the stencil document to bring to the field for inspection and can draft all information of the report, as well as take photographs that can be digitally included in the report. Once the inspections are completed, the reports shall be entered in the word documents, with the photographs and printed and saved in a file within the municipality. Digital files should be named (municipality) (year) CHC inspection.

Until the MassGIS interface is completed, reports shall be electronically mailed (E-mail) to kevin.p.mooney@state.ma.us for compiling and for changes with MassGIS. Once the MassGIS interface is established, each community will be able to access their structures to update the information. A message service is being investigated to inform municipal officials that their information has not been updated. These reports will assist the community in receiving funding assistance from the state and federal agencies, but will also provide documentation for disaster review and disaster funding assistance.

**Funding** will be necessary to initiate this program. The Rivers and Harbors Program with the DCR - Division of Waterways allows funding assistance to municipalities and assistance with federal projects for waterway's related work. Therefore, state funding should be allocated to the Rivers and Harbors Program. Massachusetts General Laws, Chapter 91, Section 10A1/2 established the Harbor and Inland Waterways Funds (repealed), which was funded with 0.5% of the gas tax (boats use a lot of fuel). It is recommended that this section be re-enacted. Funding for this program would be the same as previously allowed, or modified to utilize the full portion of the state tax for marine fuel. Bond funds are also recommended to initiate funding the program.

Although the assessment reports have assessed approximately $627 million over 20 years, the top priorities are within the first five (5) years at a total repair value of $164 million, this can be broken down to state-owned structures requiring $23,059,405 and the municipalities requiring $141 million. If state funds are made available to assist municipalities, the state share will be $71 million. Therefore, the initial state cost share funding requirement is approximately $94 million. This cost will likely increase for protection structures to meet current code and policy requirements.

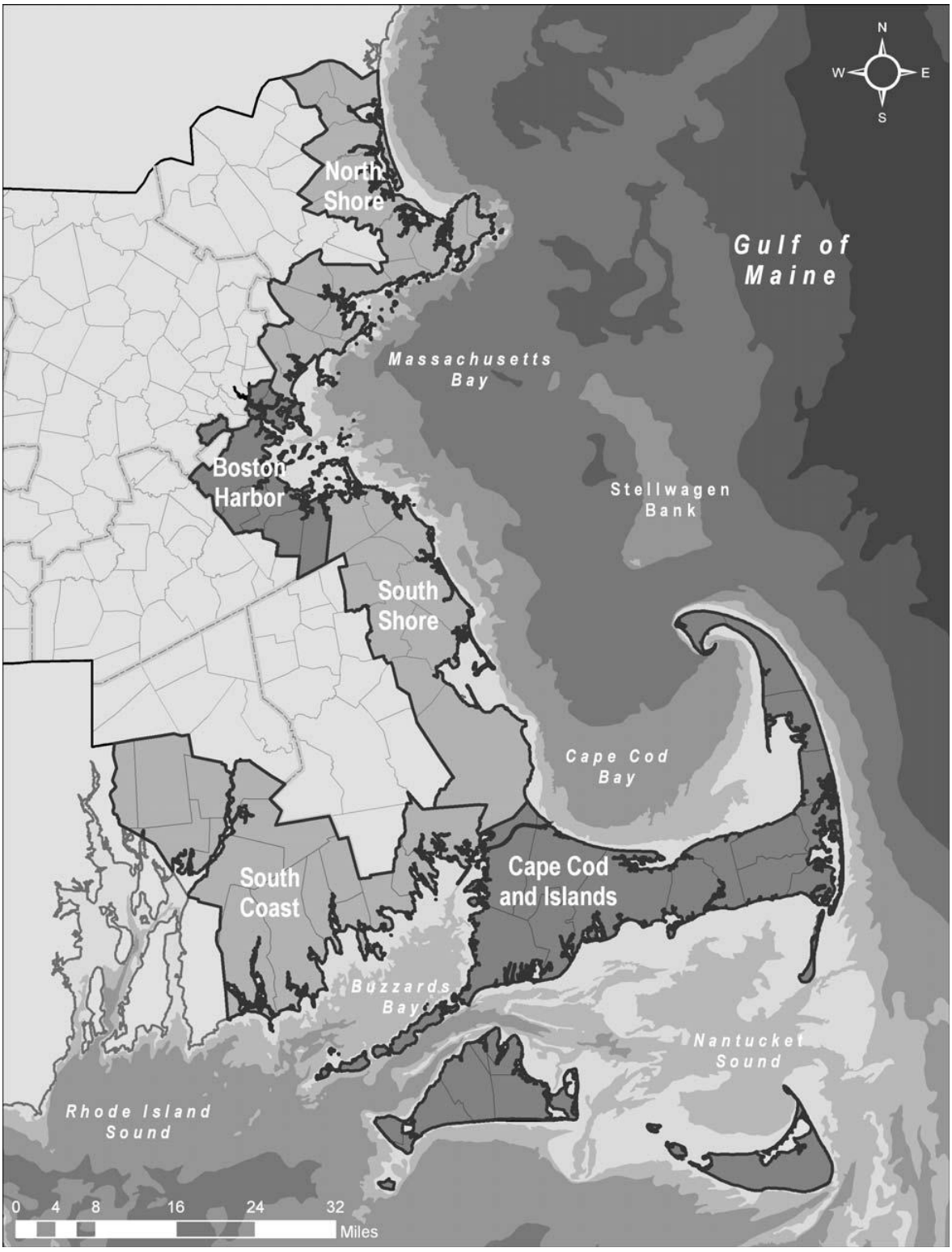
In addition to the repair/rehabilitation of coastal protection structures, it is recommended that $5 million in funding be allocated to develop the Region Sediment Management Studies for a three (3) year study program. This type of work is under the Rivers and Harbors Program within Division of Waterways. Waterways will work with all the agencies to develop a data set that can be used by any agency and municipality for coastal issues.

Whereas, FEMA requires a full inspection and assessment of all public structure every five (5) years to be considered a viable report, $1.5 million is recommended to be allocated in FY 2013 to develop the new report. The success of the MassGIS interface will reduce most of the research.

## APPENDIX A

**Coastal Regions Map**

**Used for the Reports**



## APPENDIX B

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

| **Preliminary Condition Assessment** | | **Definition Based Upon Perceived Immediacy of Action and Potential to Cause Damage if Not Corrected** | **Level of Action Required** |
|---|---|---|---|
| **A** | Excellent | Like new condition. Structure expected to withstand major coastal storm without damage.<br>Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm | None |
| **B** | Good | Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present.<br>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 | Minor |
| **C** | Fair | 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.<br>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 | Moderate |
| **D** | 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.<br>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. | Major |
| **F** | Critical | 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<br>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.<br>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. | Immediate |

## APPENDIX C

**Priority Rating System -** 5 Level Rating System

| **Preliminary Priority Level Assessment** | | **Level Based Upon Perceived Immediacy of Action and Presence of Potential Risk to Inshore Structures if Not Corrected** | **Level of Action Required** |
|---|---|---|---|
| **I** | None | No Inshore Structures or Residential Dwelling Units Present | Long Term Planning Considerations |
| **II** | Low Priority | Inshore Structures Present with Limited potential for Significant Infrastructure Damage | Future Project Consideration |
| **III** | Moderate Priority | Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings ( <1 dwelling impacted / 100 feet of shoreline) | Consider for Active Project Improvement Listing |
| **IV** | High Priority | High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline) | Consider for Next Project Construction Listing |
| **V** | Immediate / Highest Priority | Structure protects an emergency evacuation route, emergency shelter or a roadway that houses utilities for major portion of the population. 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. (>10 dwellings impacted / 100 feet of shoreline ) | Consider For Immediate Action Due to Public Safety and Welfare Issues |

# APPENDIX D

## 2006 Repair/Rehabilitation Costing Data for Entire Study

The following matrix was developed for Phase I (South Shore) reports and it was determined to utilize the same costing data for the entire report to be consistent. An assumed 4% per year can be added to the prices for a generalized inflation costing. Please note that Groin rated B pricing has been modified; <5' is $132, 5'-10' is $240; 10'-15' is $314 and >15' is $494.

CZM SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESMENT PROJECT

**EXHIBIT C**

September 14, 2006

**REPAIR / REHABILITATION COSTING DATA**

Cost per linear foot of structure

| STRUCTURE TYPE | STRUCTURE MATERIALS | STRUCTURE HEIGHT | STRUCTURE CONDITION RATING A | B | C | D | F |
|---|---|---|---|---|---|---|---|
| BULKHEAD/ SEAWALL | CONCRETE | Under 5 Feet | $0 | $84 | $425 | $850 | $983 |
| | | 5 To 10 Feet | $0 | $152 | $759 | $1,518 | $1,782 |
| | | 10 To 15 Feet | $0 | $251 | $1,254 | $2,508 | $2,970 |
| | | Over 15 Feet | $0 | $396 | $1,980 | $3,960 | $4,752 |
| | STEEL | Under 5 Feet | $0 | $54 | $273 | $546 | $680 |
| | | 5 To 10 Feet | $0 | $165 | $825 | $1,650 | $1,848 |
| | | 10 To 15 Feet | $0 | $251 | $1,254 | $2,508 | $2,772 |
| | | Over 15 Feet | $0 | $343 | $1,716 | $3,432 | $3,795 |
| | STONE | Under 5 Feet | $0 | $84 | $425 | $850 | $983 |
| | | 5 To 10 Feet | $0 | $152 | $759 | $1,518 | $1,782 |
| | | 10 To 15 Feet | $0 | $251 | $1,254 | $2,508 | $2,970 |
| | | Over 15 Feet | $0 | $396 | $1,980 | $3,960 | $4,752 |
| | WOOD | Under 5 Feet | $0 | $86 | $431 | $862 | $994 |
| | | 5 To 10 Feet | $0 | $127 | $632 | $1,265 | $1,463 |
| | | 10 To 15 Feet | $0 | $161 | $804 | $1,608 | $1,872 |
| | | Over 15 Feet | $0 | $202 | $1,008 | $2,017 | $2,380 |
| COASTAL BEACH | SAND | Under 5 Feet | $0 | $26 | $132 | $264 | $264 |
| | | 5 To 10 Feet | $0 | $127 | $634 | $1,267 | $1,267 |
| | | 10 To 15 Feet | $0 | $224 | $1,122 | $2,244 | $2,244 |
| | | Over 15 Feet | $0 | $396 | $1,980 | $3,960 | $3,960 |
| COASTAL DUNE | SAND | Under 5 Feet | $0 | $18 | $93 | $186 | $186 |
| | | 5 To 10 Feet | $0 | $48 | $238 | $476 | $476 |
| | | 10 To 15 Feet | $0 | $79 | $395 | $790 | $790 |
| | | Over 15 Feet | $0 | $132 | $660 | $1,320 | $1,320 |
| REVETMENT | STONE | Under 5 Feet | $0 | $66 | $333 | $664 | $730 |
| | | 5 To 10 Feet | $0 | $120 | $601 | $1,201 | $1,300 |
| | | 10 To 15 Feet | $0 | $157 | $781 | $1,564 | $1,696 |
| | | Over 15 Feet | $0 | $247 | $1,234 | $2,468 | $2,666 |
| GROIN | STONE | Under 5 Feet | $0 | $157 | $664 | $1,328 | $1,460 |
| | | 5 To 10 Feet | $0 | $157 | $1,201 | $2,402 | $2,600 |
| | | 10 To 15 Feet | $0 | $157 | $1,564 | $3,128 | $3,392 |
| | | Over 15 Feet | $0 | $157 | $2,468 | $4,937 | $5,333 |

NOTE: Repair / Rehabilitation Costs include 10% for engineering and regulatory approvals and 20 % construction contingency.

# APPENDIX E
## Sample Community Data Sheets

**Section II – Community Findings – City of Boston**

### COMMUNITY DESCRIPTION

The City of Boston consists of a land area of 48.4 square miles out of a total area of 89.6 square miles and had an estimated population of 596,763 in the 2006. The City is located in Boston Harbor of Massachusetts and its location can be seen on this report's cover. The communities of Charlestown, East Boston, Boston, Dorchester and South Boston make up the coastal portion of the City of Boston. The estimated length of shoreline is 15 miles that are directly exposed to open ocean. The City 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 City is also protected by the Boston Harbor Islands and the Winthrop and Deer Island peninsula. The man-made and publicly owned structures that protect the City 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 NUMBER

A unique structure number was given to each coastal structure. The number was based on existing numbering systems but differs from the previous structure numbers assigned to other communities. This difference is because the Boston Assessor's Office assigns a ten digit number to each parcel. This ten digit number was divided to match the format of the previous structure number assignments. The first two digits of the ten digit number is the ward number and were used as the structure map number. The next four digits were used as the structure block number. The last four digits were used as the parcel number.

### STRUCTURE INVENTORY

Within the City of Boston, there were 110 structures which had public or unknown ownership which provide significant coastal protection. East Boston had 18 structures. Charlestown had 16 structures. Boston had 13 structures. South Boston had 36 structures and Dorchester had 27 structures. The location of the structures can be seen in Sheets 1 through Sheet 22 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:

**STRUCTURE TYPE AND QUANTITY - City of Boston**

| | Total | Structure Condition Rating | | | | | |
|---|---|---|---|---|---|---|---|
| Primary Structure (1) | Structures | A | B | C | D | F | Total Length |
| Bulkhead / Seawall | 59 | 4 | 29 | 16 | 9 | 1 | 36804 |
| Revetment | 40 | 3 | 26 | 9 | 2 | | 31905 |
| Breakwater | | | | | | | |
| Groin / Jetty | | | | | | | |
| Coastal Dune | 1 | | 1 | | | | 850 |
| Coastal Beach | 10 | | 9 | 1 | | | 14614 |
| | 110 | 7 | 65 | 26 | 11 | 1 | 84173 |

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 City of Boston's case there are a total of 110 structures which would require approximately $ 46 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 $ 23 million would be required to upgrade the City's coastal protection.

**STRUCTURE REPAIR / RECONSTRUCTION COST - City of Boston**

| Primary Structure (1) | Total Structures | Structure Condition Rating A | B | C | D | F | Total Cost |
|---|---|---|---|---|---|---|---|
| Bulkhead / Seawall | 59 | $ | 4,686,429 | $ 8,665,714 | $ 20,382,001 | $ 814,216 | $ 34,548,360 |
| Revetment | 40 | $ | 4,484,796 | $ 3,903,108 | $ 1,361,760 | | $ 9,749,664 |
| Breakwater | | | | | | | |
| Groin / Jetty | | | | | | | |
| Coastal Dune | 1 | $ | 148,512 | | | | $ 148,512 |
| Coastal Beach | 10 | $ | 1,411,625 | $ 491,040 | | | $ 1,902,665 |
| | 110 | $ | 10,731,362 | $ 13,059,862 | $ 21,743,761 | $ 814,216 | $ 46,349,201 |

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 City of Boston the breakdown of structures by assumed ownership is as follows:

**STRUCTURE OWNERSHIP / REPAIR COST - City of Boston**

| Primary Structure (1) | Total Structures | Structure Condition Rating A | B | C | D | F | Total Cost |
|---|---|---|---|---|---|---|---|
| Town Owned | 47 | $ | 2,619,830 | $ 6,863,881 | $ 20,913,761 | | $ 30,397,472 |
| Commonwealth of Massachusetts | 62 | $ | 8,111,532 | $ 5,682,666 | $ 830,000 | $ 814,216 | $ 15,438,414 |
| Federal Government Owned | | | | | | | |
| Unknown Ownership | 1 | | | $ 513,315 | | | $ 513,315 |
| | 110 | $ | 10,731,362 | $ 13,059,862 | $ 21,743,761 | $ 814,216 | $ 46,349,201 |

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 City of Boston'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.

## APPENDIX F
## Infrastructure Priority Listing

| Overall Priority | Structure Priority | Type of Structure | Structure Condition | Structure Protection Priority | Number of Structures | Total Length in L.F. | Total Length in Miles | 2006 Est. Repair Costs |
|---|---|---|---|---|---|---|---|---|
| 1 | S01 | Seawall | F | IV | 4 | 655 | 0.12 | $1,367,800 |
| 2 | S02 | Seawall | D | V | 5 | 5,476 | 1.04 | $8,747,013 |
| 3 | S03 | Seawall | D | IV | 23 | 18,137 | 3.45 | $37,890,078 |
| 4 | S04 | Seawall | F | III | 5 | 1,762 | 0.33 | $2,609,396 |
| 5 | S05 | Seawall | D | III | 36 | 24,094 | 4.58 | $49,287,994 |
| 6 | B01 | Beach | D | IV | 1 | 1,912 | 0.36 | $2,422,504 |
| 7 | B02 | Beach | D | III | 2 | 1,580 | 0.30 | $667,280 |
| 8 | S06 | Seawall | C | V | 18 | 25,155 | 4.78 | $29,227,380 |
| 9 | S07 | Seawall | C | IV | 113 | 90,101 | 17.13 | $109,248,618 |
| 10 | S08 | Seawall | C | III | 119 | 66,904 | 12.72 | $59,890,532 |
| 11 | B03 | Beach | C | IV | 2 | 16,680 | 3.17 | $10,575,120 |
| 12 | B04 | Beach | C | III | 7 | 2,830 | 0.54 | $1,095,330 |
| 13 | J01 | Jetty | D | V | 1 | 0 | 0.00 | $1,579,840 |
| 14 | B05 | Beach | D | I | I | 4,500 | 0.86 | $5,701,500 |
| 15 | J02 | Jetty | F | III | 2 | 0 | 0.00 | $2,580,120 |
| 16 | S09 | Seawall | F | II | 6 | 3140 | 0.60 | 5751100 |
| 17 | J03 | Jetty | D | III | 12 | 0 | 0.00 | $13,179,720 |
| 18 | S10 | Seawall | D | II | 21 | 9,892 | 1.88 | $18,390,067 |
| 19 | B06 | Beach | B | V | 2 | 3,175 | 0.60 | $82,550 |
| 20 | B07 | Beach | B | IV | 2 | 14,815 | 2.82 | $1,881,505 |
| 21 | B08 | Beach | B | III | 2 | 795 | 0.15 | $44,405 |
| 22 | B09 | Beach | C | II | 7 | 5,350 | 1.02 | $4,826,580 |
| 23 | J04 | Jetty | C | V | 2 | 0 | 0.00 | $1,935,856 |
| 24 | J05 | Jetty | C | IV | 6 | 0 | 0.00 | $10,561,360 |
| 25 | J06 | Jetty | C | III | 30 | 0 | 0.00 | $15,735,800 |
| 26 | S11 | Seawall | F | I | 14 | 8,765 | 1.67 | $23,689,560 |
| 27 | S12 | Seawall | D | I | 28 | 10,072 | 1.91 | $23,728,157 |
| 28 | S13 | Seawall | B | V | 19 | 18,736 | 3.56 | $5,761,466 |
| 29 | S14 | Seawall | B | IV | 123 | 89,970 | 17.10 | $26,894,492 |
| 30 | S15 | Seawall | B | III | 101 | 57,681 | 10.97 | $14,493,621 |
| 31 | S16 | Seawall | C | II | 91 | 29,824 | 5.64 | $31,899,189 |
| 32 | S17 | Seawall | B | II | 125 | 67,881 | 12.91 | $13,708,803 |
| 33 | B10 | Beach | B | II | 20 | 28,154 | 5.35 | $3,486,823 |
| 34 | B11 | Beach | C | I | 1 | 3,700 | 0.70 | $1,056,270 |

| Overall Priority | Structure Priority | Type of Structure | Structure Condition | Structure Protection Priority | Number of Structures | Total Length in L.F. | Total Length in Miles | 2006 Est. Repair Costs |
|---|---|---|---|---|---|---|---|---|
| 35 | J07 | Jetty | D | II | 9 | 0 | 0.00 | $7,759,610 |
| 36 | J08 | Jetty | F | I | 5 | 0 | 0.00 | $1,160,700 |
| 37 | J09 | Jetty | D | I | 19 | 0 | 0.00 | $10,625,527 |
| 38 | J10 | Jetty | B | V | 6 | 0 | 0.00 | $3,937,030 |
| 39 | J11 | Jetty | B | IV | 1 | 0 | 0.00 | $99,000 |
| 40 | J12 | Jetty | B | III | 21 | 0 | 0.00 | $2,005,960 |
| 41 | J13 | Jetty | C | II | 2 | 0 | 0.00 | $5,095,595 |
| 42 | S18 | Seawall | C | I | 89 | 27,794 | 5.28 | $25,963,461 |
| 43 | S19 | Seawall | B | I | 84 | 25,940 | 4.93 | $5,874,977 |
| 44 | B11 | Beach | B | I | 9 | 19,550 | 3.72 | $2,935,300 |
| 45 | J15 | Jetty | C | II | 21 | 0 | 0.00 | $4,701,035 |
| 46 | J16 | Jetty | B | II | 16 | 0 | 0.00 | $1,126,300 |
| 47 | J17 | Jetty | C | I | 23 | 0 | 0.00 | $5,081,870 |
| 48 | J18 | Jetty | B | I | 27 | 0 | 0.00 | $3,708,860 |
| N/A | B13 | Beach | A | III | 1 | 2,000 | 0.38 | $0 |
| N/A | B14 | Beach | A | II | 1 | 215 | 0.04 | $0 |
| N/A | B15 | Beach | A | I | 3 | 247 | 0.05 | $0 |
| N/A | J19 | Jetty | A | II | 1 | 0 | 0.00 | $0 |
| N/A | J20 | Jetty | A | I | 7 | 0 | 0.00 | $0 |
| N/A | S20 | Seawall | A | V | 7 | 4,189 | 0.80 | $0 |
| N/A | S21 | Seawall | A | IV | 18 | 9,836 | 1.87 | $0 |
| N/A | S22 | Seawall | A | III | 10 | 7,883 | 1.50 | $0 |
| N/A | S23 | Seawall | A | II | 12 | 4,519 | 0.86 | $0 |
| N/A | S24 | Seawall | A | I | 15 | 7,430 | 1.41 | $0 |
| | | **TOTALS** | | | **1,354** | **721,216** | **137.11** | **$626,798,185** |

## APPENDIX G
## Breakdown of Structure Types by Condition Rating

| Hard Structures | A | B | C | D | F | TOTAL |
|---|---|---|---|---|---|---|
| Bulkhead/ Seawalls | 38 | 272 | 248 | 63 | 17 | 638 |
| Revetment | 24 | 176 | 182 | 50 | 11 | 443 |
| Groin/ Jetties | 8 | 58 | 73 | 37 | 5 | 181 |
| Breakwater | 0 | 12 | 11 | 4 | 1 | 28 |
| **TOTALS** | **70** | **514** | **512** | **154** | **34** | **1284** |

There are 198 structures listed above that are the responsibility of the Commonwealth, which encompasses 28.1 miles of coastline that are included in this reports at this time, with an assessed repair cost value of $106,369,574. The remaining 1,086 structures are the responsibility of the local communities; these encompass 88.9 miles of coastline and have the assessed repair value of $484,541,894. Under the Rivers and Harbors Program within the DCR Division of Waterways, the Commonwealth may participate in funds repairs to these structures up to 50% of the total project costs, approximately $243 million would be needed for the projects within the report.

| Soft Structures | A | B | C | D | F | TOTAL |
|---|---|---|---|---|---|---|
| Coastal Bank | 0 | 0 | 1 | 0 | 0 | 1 |
| Coastal Beach | 5 | 32 | 13 | 3 | 0 | 53 |
| Coastal Dune | 0 | 3 | 5 | 1 | 0 | 9 |
| **TOTALS** | **4** | **29** | **15** | **2** | **0** | **63** |

There are 21 beaches and dunes listed above that are the responsibility of the Commonwealth, which encompasses 10.3 miles of coastline that are included in this reports at this time, with an assessed repair cost value of $21,714,418. The remaining 42 beaches and dunes are the responsibility of the local communities; these encompass 9.8 miles of coastline and have the assessed repair value of $13,060,799. Under the Rivers and Harbors Program within the DCR Division of Waterways, the Commonwealth may participate in funds repairs to these structures up to 50% of the total project costs, the exception to this rule is if the nourishment for these areas is created as a byproduct of dredging, then the Commonwealth may participate up to 75% of the total cost of the project, approximately $6.5-$9.8 million would be needed for the projects within the report.

## APPENDIX H
## Maintenance and Monitoring Report

**DATE _____ TOWN/CITY _____**

**Structure Number ____-_____-_____-_____-_____ LOCATION _____**

**Assessed Condition ____ Assessed Priority ___ Revised Condition ___**

**Primary Type _____ Primary Material _____**

**Primary Height _____ Primary Length _____Linear Feet**

**Secondary Type _____ Secondary Material _____**

**Inspected By _____ (check one) Inspection Type ___Annual ____ After Storm**

**Has any maintenance/repairs/improvements made since the last inspection _____, if yes please give a brief explanations:_____**

**_____**

**_____**

**_____**

**_____ Date work was completed _____**

**Has the condition changed from the last inspection _____; if yes, please give a brief explanation:**

**_____**

**_____**

**_____**

**_____**

**_____**

**If the condition of the structure changed significantly from the condition assessed in the report, then enter the new condition above**

**Has a major repair/rehabilitation/improvement design/construction project been performed or is in the planning stage? _____; Schedule to Proposed Construction _____**

**When will local funding be approved? _____**

**When will State and/or federal funding be approved? _____**

**What is the anticipated percentage of project cost sharing? Local _____%, State _____%, Federal _____%**

**If structure is a beach, dune or coastal bank; Date of Annual Survey _____**

**Date annual beach maintenance was performed _____**

**Copy and paste all photographs on to a separate sheet within this document and give views taken.**

**Attach any other information that may be pertinent to this structure and projects regarding the structure**

## Appendix I
# 20 YEAR MAINTENANCE AND REPAIR
# YEAR ONE

**NOTE: All vertical hard structure (seawall & bulkheads) are listed as seawalls**

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 1 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $1,024,650 |
| 1 | Falmouth | Local | Davis Neck Road | Revetment | Stone | $76,650 |
| 1 | Falmouth | Local | Surf Drive Beach | Revetment | Stone | $201,500 |
| 1 | Rockport | Local | Sea view Avenue Extension | Revetment | Stone | $65,000 |
| 2 | Beverly | Local | Ocean Avenue | Seawall | Stone | $277,200 |
| 2 | Beverly | Local | The Causeway Ocean Avenue | Seawall | Concrete | $1,197,120 |
| 2 | Falmouth | Local | Fort Point Road | Revetment | Stone | $990,825 |
| 2 | Marblehead | Local | South Boston - Summer Street | Seawall | Concrete | $5,941,015 |
| 2 | Weymouth | Local | East Boston - Coleridge Street | Seawall | Concrete | $5,930,139 |
| 3 | Boston | State | Chatham Light | Revetment | Stone | $830,000 |
| 3 | Boston | Local | Hedge Street | Seawall | Steel | $551,760 |
| 3 | Chatham | Local | Woods Hole | Revetment | Stone | $262,280 |
| 3 | Fairhaven | Local | Falmouth Heights | Seawall | Stone | $34,000 |
| 3 | Falmouth | Local | Stacey Boulevard - West | Revetment | Stone | $680,340 |
| 3 | Falmouth | Local | Stacey Boulevard - East | Revetment | Stone | $3,797,710 |
| 3 | Gloucester | Local | Lincoln St. (Rt. 3A) | Seawall | Stone | $5,078,700 |
| 3 | Gloucester | Local | James Ave. | Seawall | Concrete | $712,800 |
| 3 | Hingham | State | Newport Rd. | Revetment | Stone | $518,280 |
| 3 | Hull | Local | SEAWALL BOULEVARD | Seawall | Concrete | $350,658 |
| 3 | Hull | State | Nantasket Beach | Seawall | Stone | $3,837,516 |
| | | | **YEAR ONE TOTALS** | | | **$33,621,855** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR TWO

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 3 | Hull | State | Nantasket Beach | Seawall | Concrete | $1,065,848 |
| 3 | Marshfield | Local | Foster Ave. | Seawall | Concrete | $6,451,500 |
| 3 | Marshfield | Local | Foster Ave. | Seawall | Concrete | $829,160 |
| 3 | Marshfield | Local | Ocean St. | Revetment | Stone | $203,320 |
| 3 | Marshfield | Local | Green Harbor Point | Seawall | Concrete | $4,621,720 |
| 3 | New Bedford | Local | East Rodney French Boulevard | Seawall | Concrete | $1,396,560 |
| 3 | Rockport | Local | Back Beach | Revetment | Stone | $2,319,920 |
| 3 | Scituate | Local | Beach Way | Revetment | Stone | $869,524 |
| 3 | Somerset | Local | Riverside Street | Revetment | Stone | $1,591,325 |
| 3 | Somerset | Local | Riverside Street | Seawall | Stone | $250,800 |
| 3 | Weymouth | Local | Fore River Avenue | Seawall | Concrete | $372,645 |
| 4 | Barnstable | Local | Barnstable Marina | Seawall | Wood | $758,160 |
| 4 | Boston | State | Dorchester - Taylor Street | Seawall | Wood | $814,320 |
| 4 | Falmouth | Local | Chapoquoit Road | Revetment | Stone | $339,450 |
| 4 | Falmouth | Local | Washburn Road | Seawall | Wood | $577,540 |
| 4 | Hull | State | Nantasket Beach | Seawall | Concrete | $119,926 |
| 5 | Boston | Local | Charlestown - Eighth Street | Seawall | Steel | $589,380 |
| 5 | Boston | Local | Dorchester - Victory Road | Seawall | Wood | $183,425 |
| 5 | Boston | Local | South Boston - Summer Street | Seawall | Steel | $1,053,360 |
| 5 | Boston | Local | South Boston - Summer Street | Seawall | Steel | $2,545,620 |
| 5 | Boston | Local | South Boston - Summer Street | Seawall | Concrete | $3,950,100 |
| | | | **YEAR TWO TOTALS** | | | **$30,903,603** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR THREE

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 5 | Boston | Local | South Boston - Summer Street | Seawall | Steel | $2,583,240 |
| 5 | Boston | Local | South Boston - Summer Street | Seawall | Steel | $7,207,200 |
| 5 | Braintree | Local | Harbor Villa Ave | Revetment | Stone | $199,200 |
| 5 | Cohasset | Local | Jerusalem Rd. | Revetment | Stone | $242,360 |
| 5 | Dartmouth | Local | Padanaram Bridge | Seawall | Stone | $5,898,750 |
| 5 | Dennis | Local | Chapin Beach | Revetment | Stone | $54,045 |
| 5 | Dennis | Local | Highbank Road at Bass River | Revetment | Stone | $142,760 |
| 5 | Dennis | Local | Lower County Road at Swan River | Revetment | Stone | $66,055 |
| 5 | Falmouth | Local | West Falmouth Harbor | Seawall | Stone | $303,600 |
| 5 | Falmouth | Local | Chapoquoit Beach | Seawall | Concrete | $381,850 |
| 5 | Falmouth | Local | Falmouth Harbor | Seawall | Concrete | $144,500 |
| 5 | Falmouth | Local | Little Pond | Revetment | Stone | $276,230 |
| 5 | Hingham | Local | Causeway Rd. | Seawall | Stone | $309,672 |
| 5 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $163,944 |
| 5 | Hull | Local | Highland Ave. | Seawall | Stone | $9,251,584 |
| 5 | Hull | State | SEAWALL BOULEVARD | Seawall | Stone | $2,280,320 |
| 5 | Hull | Local | Caddish Ave. | Revetment | Stone | $73,040 |
| 5 | Nahant | Local | Willow Road and Cliff Street | Revetment | Stone | $481,260 |
| 5 | Nahant | Local | Willow Road and Summer Street | Revetment | Stone | $162,135 |
| 5 | New Bedford | Local | West Rodney French Boulevard | Revetment | Stone | $2,221,850 |
| | | | **YEAR THREE TOTALS** | | | **$32,443,595** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR FOUR

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 5 | New Bedford | Local | West Rodney French Boulevard | Seawall | Concrete | $1,331,020 |
| 5 | Plymouth | State | State Pier | Seawall | Concrete | $480,040 |
| 5 | Plymouth | Local | Plymouth Beach | Revetment | Stone | $4,780,800 |
| 5 | Plymouth | Local | Manomet Point | Revetment | Concrete | $60,050 |
| 5 | Quincy | Local | Rockland Street | Seawall | Stone | $275,880 |
| 5 | Rockport | Local | Pigeon Cove | Revetment | Stone | $203,320 |
| 5 | Salem | Local | Hubon Street | Seawall | Stone | $37,950 |
| 5 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $850,980 |
| 5 | Scituate | Local | Collier Rd. | Revetment | Stone | $379,516 |
| 5 | Winthrop | Local | Sargent Street | Seawall | Concrete | $98,670 |
| 5 | Winthrop | Local | Plumber Avenue | Seawall | Concrete | $24,288 |
| 6 | Scituate | Local | Peggotty Beach | Coastal Beach | Sand | $2,422,504 |
| 7 | Oak Bluffs | Local | Sea view Avenue | Coastal Beach | Sand | $105,600 |
| 7 | Salisbury | State | Salisbury Beach Dune | Coastal Dune | Sand | $561,680 |
| 8 | Beverly | Local | Beverly Harbor | Seawall | Stone | $485,100 |
| 8 | Boston | Local | Long Island | Seawall | Stone | $613,800 |
| 8 | Hull | Local | Stony Beach | Seawall | Stone | $163,200 |
| 8 | Marblehead | Local | Marblehead Electric Light | Seawall | Stone | $653,400 |
| 8 | New Bedford | State | State Pier | Seawall | Stone | $2,376,000 |
| 8 | Oak Bluffs | Local | Lake Avenue | Seawall | Steel | $1,716,000 |
| 8 | Oak Bluffs | Local | Sea view Avenue | Seawall | Concrete | $2,074,800 |
| 8 | Provincetown | Local | MacMillan Wharf | Seawall | Steel | $1,254,000 |
| 8 | Provincetown | Local | Mayflower Heights | Revetment | Stone | $976,250 |
| 8 | Quincy | Local | Moon Island | Revetment | Stone | $4,451,700 |
| 8 | Quincy | Local | Moon Island | Revetment | Stone | $2,733,500 |
| 8 | Revere | Local | North Shore Road | Revetment | Stone | $150,250 |
| 8 | Revere | Local | North Shore Road | Revetment | Stone | $730,215 |
| 8 | Revere | State | Raymond Carney Memorial Traffic Circle | Seawall | Concrete | $797,650 |
| | | | **YEAR FOUR TOTALS** | | | **$30,788,163** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR FIVE

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 8 | Winthrop | State | Winthrop Shore Drive | Seawall | Concrete | $7,384,800 |
| 8 | Winthrop | State | Charles Street | Seawall | Concrete | $445,200 |
| 8 | Winthrop | Local | Grover's Avenue | Seawall | Concrete | $1,573,770 |
| 8 | Winthrop | State | Short Beach | Seawall | Concrete | $647,745 |
| 9 | Barnstable | Local | Hyannis Inner Harbor | Seawall | Steel | $846,450 |
| 9 | Boston | State | George's Island | Seawall | Stone | $545,490 |
| 9 | Boston | Local | East Boston - Border Street and Condor Street | Revetment | Stone | $153,255 |
| 9 | Boston | Local | Charlestown - Medford Street | Seawall | Steel | $326,040 |
| 9 | Boston | Local | Charlestown - Fifth Avenue | Seawall | Stone | $94,050 |
| 9 | Boston | Local | Charlestown - Eighth Street | Seawall | Steel | $827,640 |
| 9 | Bourne | Local | Harbor Place | Revetment | Stone | $1,591,860 |
| 9 | Chatham | Local | Town Fish Pier | Revetment | Stone | $161,505 |
| 9 | Chatham | Local | Town Fish Pier | Seawall | Steel | $451,440 |
| 9 | Chatham | Local | Town Fish Pier | Seawall | Concrete | $288,420 |
| 9 | Dartmouth | Local | Plummer Memorial Bridge | Revetment | Stone | $89,815 |
| 9 | Dartmouth | Local | Plummer Memorial Bridge | Revetment | Stone | $78,100 |
| 9 | Dennis | Local | Dr. Bottero Road | Revetment | Stone | $406,120 |
| 9 | Dennis | State | Route 28 at Bass River | Revetment | Stone | $48,080 |
| 9 | Dennis | State | Route 6 at Bass River | Revetment | Stone | $306,510 |
| 9 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $21,250 |
| 9 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $519,792 |
| 9 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $268,686 |
| 9 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $594,048 |
| 9 | Fall River | Local | Route 79 | Revetment | Stone | $462,770 |
| 9 | Falmouth | Local | Wild Harbor | Revetment | Stone | $71,595 |
| 9 | Falmouth | Local | Wild Harbor | Seawall | Wood | $221,200 |
| 9 | Falmouth | Local | Woods Hole | Seawall | Stone | $273,240 |
| 9 | Falmouth | Local | Surf Drive Beach | Revetment | Stone | $168,280 |
| 9 | Falmouth | Local | Falmouth Heights | Revetment | Stone | $549,915 |
| 9 | Falmouth | Local | Menauhant Road at Green Pond | Revetment | Stone | $178,155 |
| 9 | Gloucester | Local | Washington Street | Seawall | Stone | $758,670 |
| 9 | Gloucester | Local | Wonson Cove | Seawall | Stone | $125,235 |
| 9 | Harwich | Local | Herring River | Revetment | Stone | $30,050 |
| 9 | Harwich | Local | Herring River | Revetment | Stone | $33,055 |
| 9 | Hingham | Local | Downer Ave. | Seawall | Stone | $322,575 |
| 9 | Hull | Local | Highland Ave. | Seawall | Concrete | $53,125 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | Hull | Local | James Ave. | Seawall | Stone | $34,850 |
| 9 | Hull | Local | Stony Beach | Revetment | Stone | $1,973,587 |
| 9 | Hull | Local | Nantasket Ave. | Seawall | Stone | $139,656 |
| 9 | Hull | Local | Nantasket Ave. | Seawall | Concrete | $1,045,902 |
| 9 | Hull | Local | Fitzpatrick Hwy | Revetment | Stone | $1,188,682 |
| 9 | Hull | Local | Nantasket Beach | Seawall | Concrete | $664,700 |
| 9 | Hull | Local | Caddish Ave. | Seawall | Concrete | $72,105 |
| 9 | Hull | Local | Crescent Beach | Seawall | Concrete | $410,619 |
| 9 | Hull | Local | Crescent Beach | Seawall | Concrete | $998,988 |
| 9 | Hull | Local | Crescent Beach | Seawall | Concrete | $533,170 |
| 9 | Lynn | Local | Lynnshore Drive | Seawall | Concrete | $8,301,125 |
| | | | **YEAR FIVE TOTALS** | | | **$36,281,315** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR SIX

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 9 | Marshfield | Local | Bay Ave. | Seawall | Concrete | $884,520 |
| 9 | Marshfield | Local | Bay Ave. | Seawall | Concrete | $1,135,680 |
| 9 | Marshfield | Local | Ocean St. | Seawall | Concrete | $417,450 |
| 9 | Marshfield | Local | Ocean St. | Seawall | Concrete | $875,145 |
| 9 | Marshfield | Local | Ocean St. | Seawall | Concrete | $910,800 |
| 9 | Marshfield | Local | Ocean St. | Seawall | Concrete | $68,970 |
| 9 | Marshfield | Local | Ocean St. | Revetment | Stone | $812,240 |
| 9 | Marshfield | Local | Green Harbor Point | Seawall | Concrete | $671,550 |
| 9 | Marshfield | Local | Green Harbor Point | Seawall | Concrete | $1,455,025 |
| 9 | Marshfield | Local | Green Harbor Point | Revetment | Stone | $1,375,910 |
| 9 | Mashpee | Local | Seconsett Island Road | Revetment | Stone | $177,295 |
| 9 | Nahant | Local | Willow Road | Seawall | Stone | $1,498,530 |
| 9 | Nahant | State | Nahant Road | Seawall | Concrete | $1,006,590 |
| 9 | Nahant | State | Nahant Road | Revetment | Stone | $3,327,060 |
| 9 | Nahant | State | Nahant Road | Revetment | Stone | $462,770 |
| 9 | Nahant | State | Nahant Road | Seawall | Concrete | $788,375 |
| 9 | Oak Bluffs | Local | Circuit Avenue Extension | Seawall | Steel | $943,800 |
| 9 | Plymouth | Local | Atlantic Ave. | Revetment | Stone | $158,175 |
| 9 | Plymouth | Local | Caswell Lane | Revetment | Stone | $360,600 |
| 9 | Plymouth | Local | Town Wharf | Revetment | Stone | $136,675 |
| 9 | Plymouth | Local | Warren Cove | Revetment | Stone | $4,896,000 |
| 9 | Plymouth | Local | Manomet Point | Revetment | Stone | $1,048,900 |
| 9 | Plymouth | Local | Manomet Point | Revetment | Stone | $324,115 |
| 9 | Plymouth | Local | White Horse Beach | Revetment | Stone | $591,985 |
| 9 | Plymouth | Local | Harlow's Landing | Revetment | Stone | $1,116,830 |
| 9 | Provincetown | Local | Pilgrims First Landing Park | Revetment | Stone | $976,250 |
| 9 | Quincy | Local | Prescott Terrace | Seawall | Stone | $273,240 |
| 9 | Quincy | Local | Dorchester Street | Seawall | Concrete | $3,882,800 |
| | | | **YEAR SIX TOTALS** | | | **$30,577,280** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR SEVEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 9 | Quincy | Local | Moon Island - Boston Fire Academy | Seawall | Stone | $2,128,500 |
| 9 | Quincy | Local | Moon Island | Revetment | Stone | $661,100 |
| 9 | Revere | State | Winthrop Parkway | Seawall | Concrete | $2,912,350 |
| 9 | Rockport | Local | Old Granite Pier | Revetment | Stone | $1,727,600 |
| 9 | Rockport | Local | White Wharf | Seawall | Stone | $1,089,000 |
| 9 | Rockport | Local | Long Beach | Seawall | Concrete | $10,927,600 |
| 9 | Scituate | Local | Glades Rd. | Revetment | Stone | $24,975 |
| 9 | Scituate | Local | Glades Rd. | Seawall | Concrete | $1,435,720 |
| 9 | Scituate | Local | Glades Rd. | Seawall | Concrete | $2,735,968 |
| 9 | Scituate | Local | Glades Rd. | Seawall | Concrete | $662,640 |
| 9 | Scituate | Local | Surfside Rd. | Revetment | Stone | $253,622 |
| 9 | Scituate | Local | Surfside Rd. | Revetment | Stone | $171,820 |
| 9 | Scituate | Local | North Scituate Beach | Seawall | Concrete | $1,239,920 |
| 9 | Scituate | Local | North Scituate Beach | Seawall | Concrete | $1,211,740 |
| 9 | Scituate | Local | North Scituate Beach | Seawall | Concrete | $1,382,160 |
| 9 | Scituate | Local | North Scituate Beach | Seawall | Concrete | $389,301 |
| 9 | Scituate | Local | Egypt Beach | Seawall | Concrete | $332,982 |
| 9 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $329,375 |
| 9 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $2,413,320 |
| | | | **YEAR SEVEN TOTALS** | | | **$32,029,693** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR EIGHT

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 9 | Scituate | Local | Egypt Beach | Revetment | Stone | $1,322,200 |
| 9 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $917,150 |
| 9 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $407,000 |
| 9 | Scituate | Local | Turner Rd. | Seawall | Concrete | $510,058 |
| 9 | Scituate | Local | Turner Rd. | Seawall | Concrete | $2,543,750 |
| 9 | Scituate | Local | Cedars Point | Seawall | Concrete | $356,730 |
| 9 | Scituate | Local | Cedars Point | Seawall | Concrete | $214,038 |
| 9 | Scituate | Local | Cedars Point | Seawall | Concrete | $183,150 |
| 9 | Scituate | Local | First Cliff | Revetment | Stone | $1,337,853 |
| 9 | Scituate | Local | Edward Foster Rd. | Seawall | Concrete | $68,425 |
| 9 | Scituate | Local | Edward Foster Rd. | Revetment | Stone | $2,071,886 |
| 9 | Scituate | Local | Second Cliff | Revetment | Stone | $425,645 |
| 9 | Scituate | Local | Third Cliff | Revetment | Stone | $5,515,980 |
| 9 | Scituate | Local | Humarock Beach | Seawall | Concrete | $859,350 |
| 9 | Scituate | Local | Humarock Beach | Seawall | Concrete | $665,550 |
| 9 | Tisbury | State | Steamship Wharf | Seawall | Steel | $514,800 |
| 9 | Weymouth | Local | Wessagussett Road | Seawall | Concrete | $962,660 |
| 9 | Weymouth | Local | Wessagussett Road | Seawall | Concrete | $432,630 |
| 9 | Weymouth | Local | Fore River Avenue | Seawall | Concrete | $644,280 |
| 9 | Weymouth | Local | Saunders Street | Revetment | Stone | $19,980 |
| 9 | Yarmouth | Local | River Street | Revetment | Stone | $78,130 |
| 9 | Yarmouth | Local | Off Pleasant Street at Route 28 | Revetment | Stone | $75,125 |
| 9 | Yarmouth | State | Route 6 Bridge | Revetment | Stone | $285,475 |
| 10 | Barnstable | Local | Ocean View Avenue | Seawall | Concrete | $68,000 |
| 10 | Barnstable | Local | Veteran's Memorial Beach | Seawall | Concrete | $342,125 |
| 10 | Barnstable | Local | Barnstable Marina | Seawall | Steel | $463,980 |
| 10 | Barnstable | Local | Millway Road | Revetment | Stone | $91,575 |
| 10 | Barnstable | Local | Barnstable Marina | Revetment | Stone | $264,440 |
| 10 | Beverly | Local | Quincy Park East | Seawall | Concrete | $18,810 |
| 10 | Boston | Local | Long Island | Revetment | Stone | $1,487,475 |
| 10 | Boston | Local | Long Island | Revetment | Stone | $109,890 |
| 10 | Boston | Local | Long Island | Seawall | Concrete | $795,600 |
| 10 | Boston | Local | Charlestown - Terminal Street | Seawall | Stone | $2,100,450 |
| 10 | Boston | Local | Charlestown - Eighth Street | Seawall | Stone | $1,899,810 |
| 10 | Boston | State | East Boston - Chelsea Street | Revetment | Stone | $15,025 |
| 10 | Boston | State | East Boston - Chelsea Street | Seawall | Stone | $296,010 |
| 10 | Boston | Local | Boston - Long Wharf | Seawall | Stone | $513,315 |
| 10 | Boston | State | Dorchester - Springdale Street | Seawall | Stone | $426,360 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | Boston | Local | East Boston - Meridian Street | Revetment | Stone | $132,220 |
| 10 | Boston | Local | South Boston - Summer Street | Seawall | Concrete | $708,510 |
| 10 | Bourne | Local | Sagamore Road | Revetment | Stone | $12,020 |
| 10 | Bourne | Local | Red Brook Landing | Seawall | Concrete | $53,125 |
| 10 | Chatham | Local | Ryder Cove Road | Seawall | Wood | $96,480 |
| 10 | Chatham | Local | Town Fish Pier | Revetment | Stone | $18,315 |
| 10 | Chatham | Local | Bridge Street | Revetment | Stone | $27,045 |
| 10 | Chatham | Local | Bridge Street | Revetment | Stone | $27,045 |
| 10 | Chatham | Local | Stage Harbor Road | Seawall | Wood | $183,280 |
| 10 | Chelsea | State | Eastern Avenue | Revetment | Stone | $93,720 |
| 10 | Cohasset | Local | Border St. | Seawall | Stone | $220,110 |
| 10 | Cohasset | Local | Border St. | Seawall | Stone | $341,550 |
| 10 | Dennis | Local | Sesuit Harbor | Seawall | Steel | $62,700 |
| 10 | Dennis | Local | Sesuit Harbor | Revetment | Stone | $228,380 |
| | | | **YEAR EIGHT TOTALS** | | | **$31,509,239** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR NINE

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 10 | Dennis | Local | West Dennis Beach | Seawall | Wood | $1,846,835 |
| 10 | Dennis | Local | West Dennis Beach | Seawall | Wood | $464,520 |
| 10 | Dennis | Local | Haigis Beach | Revetment | Stone | $234,300 |
| 10 | Dennis | State | Route 28 at Swan River | Revetment | Stone | $18,315 |
| 10 | Dennis | State | Route 28 at Swan River | Revetment | Stone | $18,315 |
| 10 | Fairhaven | State | Steamship Authority Warehouses | Seawall | Stone | $1,379,400 |
| 10 | Fall River | Local | Route 79/Taunton River | Revetment | Stone | $601,000 |
| 10 | Fall River | State | Heritage State Park | Revetment | Stone | $192,320 |
| 10 | Fall River | State | Battleship Cove | Seawall | Stone | $196,400 |
| 10 | Fall River | State | Battleship Cove | Seawall | Concrete | $258,400 |
| 10 | Falmouth | Local | Megansett Harbor | Revetment | Stone | $228,380 |
| 10 | Falmouth | Local | Megansett Harbor | Seawall | Stone | $26,565 |
| 10 | Falmouth | Local | Old Silver Beach | Revetment | Concrete | $523,710 |
| 10 | Falmouth | Local | Trunk River Beach | Revetment | Stone | $321,535 |
| 10 | Falmouth | Local | Trunk River Beach | Revetment | Stone | $552,920 |
| 10 | Falmouth | Local | Surf Drive Beach | Seawall | Steel | $73,710 |
| 10 | Falmouth | Local | Central Park Beach | Seawall | Concrete | $582,250 |
| 10 | Falmouth | Local | Great Pond | Revetment | Stone | $168,280 |
| 10 | Falmouth | Local | Great Pond | Revetment | Stone | $258,430 |
| 10 | Falmouth | Local | Menauhant Road at Green Pond | Revetment | Stone | $228,105 |
| 10 | Falmouth | Local | Falmouth Inner Harbor | Seawall | Concrete | $91,080 |
| 10 | Gloucester | State | University of Massachusetts - Marine Station | Seawall | Stone | $790,020 |
| 10 | Gloucester | State | University of Massachusetts - Marine Station | Seawall | Stone | $131,670 |
| 10 | Gloucester | Local | Lanes Cove | Seawall | Stone | $796,290 |
| 10 | Gloucester | State | University of Massachusetts - Marine Station | Revetment | Stone | $1,314,210 |
| 10 | Harwich | Local | Allens Harbor | Seawall | Wood | $104,280 |
| 10 | Harwich | Local | Allens Harbor | Revetment | Stone | $27,045 |
| 10 | Harwich | Local | Central Avenue | Revetment | Stone | $18,030 |
| 10 | Harwich | Local | Wychmere Harbor | Seawall | Wood | $116,920 |
| 10 | Harwich | Local | Saquatucket Harbor | Seawall | Concrete | $398,475 |
| 10 | Harwich | Local | Saquatucket Harbor | Seawall | Concrete | $197,340 |
| 10 | Harwich | Local | Wychmere Harbor | Revetment | Stone | $435,725 |
| 10 | Harwich | Local | Allens Harbor | Revetment | Stone | $27,045 |
| 10 | Hingham | Local | Martins Lane | Seawall | Stone | $120,700 |
| 10 | Hingham | State | Weymouth Back River | Revetment | Stone | $137,028 |
| 10 | Hingham | Local | Otis St. (Rt. 3A) | Revetment | Stone | $495,224 |
| 10 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $283,404 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Concrete | $781,440 |
| 10 | Hull | Local | Nantasket Ave. | Seawall | Stone | $56,525 |
| 10 | Hull | Local | Mariners Park | Revetment | Stone | $546,700 |
| 10 | Hull | Local | Bay St. | Revetment | Stone | $658,383 |
| 10 | Hull | Local | Stony Beach | Revetment | Stone | $217,118 |
| 10 | Kingston | Local | Braintree Ave. | Seawall | Stone | $42,500 |
| 10 | Marblehead | Local | Crown Way | Seawall | Concrete | $68,310 |
| 10 | Marblehead | Local | Cliff Street Boat Yard | Seawall | Stone | $603,900 |
| 10 | Marblehead | Local | Lovis Cove | Seawall | Stone | $53,130 |
| 10 | Marblehead | Local | Fort Beach | Seawall | Stone | $803,995 |
| 10 | Marshfield | Local | Bay Ave. | Revetment | Concrete | $99,875 |
| 10 | Marshfield | Local | Green Harbor Breakwater | Seawall | Wood | $212,090 |
| 10 | Marshfield | Local | Town Landing | Seawall | Concrete | $425,040 |
| 10 | Marshfield | Local | Ocean St. | Revetment | Stone | $87,145 |
| 10 | Marshfield | Local | Ocean St. | Seawall | Concrete | $55,250 |
| 10 | Nahant | Local | Marginal Road | Seawall | Concrete | $372,735 |
| 10 | Nahant | Local | Marginal Road | Revetment | Stone | $1,338,890 |
| 10 | New Bedford | Local | Coal Pocket Pier | Seawall | Concrete | $595,650 |
| 10 | Newburyport | State | Gillis Bridge | Seawall | Stone | $176,770 |
| 10 | Orleans | Local | Rock Harbor Inlet | Revetment | Stone | $180,300 |
| 10 | Plymouth | Local | High Cliff | Revetment | Stone | $103,973 |
| 10 | Plymouth | Local | Town Wharf | Revetment | Stone | $175,725 |
| 10 | Plymouth | Local | Water St. | Revetment | Stone | $370,975 |
| 10 | Plymouth | Local | Water St. | Seawall | Stone | $946,275 |
| 10 | Plymouth | Local | Water St. | Seawall | Stone | $189,750 |
| 10 | Plymouth | State | State Pier | Revetment | Stone | $1,174,354 |
| 10 | Plymouth | State | State Pier | Revetment | Stone | $460,790 |
| 10 | Plymouth | State | Pilgrim Memorial State Park | Revetment | Stone | $741,950 |
| 10 | Plymouth | Local | Stephens Field | Revetment | Stone | $49,950 |
| 10 | Quincy | Local | Post Island Phase I | Seawall | Concrete | $7,513,575 |
| | | | **YEAR NINE TOTALS** | | | **$32,761,239** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR TEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 10 | Quincy | Local | Post Island Phase II | Seawall | Concrete | $7,513,575 |
| 10 | Quincy | Local | Commander Shea Boulevard | Revetment | Stone | $273,455 |
| 10 | Quincy | Local | Commander Shea Boulevard | Revetment | Stone | $354,590 |
| 10 | Salem | Local | Forest River Park | Seawall | Concrete | $46,750 |
| 10 | Salem | State | Salem State College Marine Lab | Revetment | Stone | $355,355 |
| 10 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $311,220 |
| 10 | Scituate | Local | Front St. | Seawall | Concrete | $1,628,000 |
| 10 | Scituate | Local | Front St. | Revetment | Stone | $162,270 |
| 10 | Truro | Local | Pamet Harbor Boat Ramp | Revetment | Stone | $480,800 |
| 10 | Wellfleet | Local | Commercial Street | Revetment | Stone | $413,390 |
| 10 | Wellfleet | Local | Pleasant Point Landing | Seawall | Concrete | $37,950 |
| 10 | Westport | Local | Main Road | Seawall | Stone | $221,958 |
| 10 | Westport | Local | Main Road | Seawall | Stone | $34,155 |
| 10 | Weymouth | Local | Wessagusett Road | Seawall | Concrete | $153,000 |
| 10 | Winthrop | Local | Shirley Street | Revetment | Stone | $381,635 |
| 10 | Winthrop | Local | Town Landing | Revetment | Stone | $1,089,495 |
| 10 | Winthrop | Local | Shirley Street | Seawall | Concrete | $393,120 |
| 10 | Winthrop | Local | Shirley Street | Seawall | Concrete | $717,255 |
| 10 | Winthrop | Local | Morton Street | Revetment | Stone | $629,370 |
| 10 | Yarmouth | Local | Bass Hole | Revetment | Stone | $41,625 |
| 10 | Yarmouth | Local | Mill Creek | Revetment | Stone | $134,865 |
| 10 | Yarmouth | Local | Thacher's Beach | Revetment | Stone | $117,195 |
| 10 | Yarmouth | Local | Parkers River Beach | Revetment | Stone | $291,485 |
| 10 | Yarmouth | Local | Bass River Beach | Revetment | Stone | $249,415 |
| 11 | Bourne | Local | Gilder Road | Coastal Beach | Sand | $431,120 |
| 11 | Westport | State | Horseneck Beach | Coastal Beach | Sand | $10,144,000 |
| 12 | Boston | State | Dorchester - Malibu Beach | Coastal Beach | Sand | $491,350 |
| 12 | Chatham | Local | Oyster Pond | Coastal Beach | Sand | $164,840 |
| 12 | Chatham | Local | Strong Island Road | Coastal Dune | Sand | $11,900 |
| 12 | Chatham | Local | Scatteree Beach | Coastal Dune | Sand | $23,800 |
| 12 | Chatham | Local | Andrew Harding Lane | Coastal Beach | Sand | $221,900 |
| 12 | Eastham | Local | Sunken Meadow Beach | Coastal Dune | Sand | $23,800 |
| 12 | Wareham | Local | Point Independence Beach | Coastal Beach | Sand | $157,740 |
| 13 | Rockport | Local | Pigeon Cove Breakwater | Breakwater | Stone | $1,579,840 |
| 14 | Dartmouth | State | Demarest Lloyd Beach | Coastal Beach | Sand | $5,701,500 |
| | | | **YEAR TEN TOTALS** | | | **$34,772,285** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR ELEVEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 15 | Plymouth | Local | Harlow's Landing | Groin/ Jetty | Stone | $511,000 |
| 15 | Sandwich | Local | Old Sandwich Harbor | Groin/ Jetty | Stone | $2,069,120 |
| 16 | Falmouth | Local | Davisville Road | Revetment | Stone | $25,550 |
| 16 | Falmouth | Local | Menauhant Road at Bournes Pond | Revetment | Stone | $284,700 |
| 16 | Manchester | Local | Ocean Street White Beach | Revetment | Stone | $786,500 |
| 16 | Plymouth | Local | Stephens Field | Revetment | Stone | $335,800 |
| 16 | Quincy | State | Squantum Point Park | Seawall | Steel | $4,227,300 |
| 16 | Yarmouth | Local | Webster Street | Revetment | Stone | $91,250 |
| 17 | Barnstable | Local | Dead Neck | Groin/ Jetty | Stone | $1,104,920 |
| 17 | Barnstable | Local | Dead Neck | Groin/ Jetty | Stone | $792,660 |
| 17 | Falmouth | Local | Bournes Pond | Groin/ Jetty | Stone | $660,550 |
| 17 | Falmouth | Local | Bournes Pond | Groin/ Jetty | Stone | $564,470 |
| 17 | Falmouth | Local | Eel Pond/Childs River | Groin/ Jetty | Stone | $600,500 |
| 17 | Falmouth | Local | Waquoit Bay | Groin/ Jetty | Stone | $2,987,240 |
| 17 | Marshfield | Local | Blackmans Point | Groin/ Jetty | Stone | $1,489,240 |
| 17 | Mashpee | Local | Waquoit Bay entrance | Groin/ Jetty | Stone | $1,873,560 |
| 17 | Oak Bluffs | Local | Oak Bluffs Harbor | Breakwater | Stone | $813,280 |
| 17 | Provincetown | Local | Commercial Street | Groin/ Jetty | Stone | $438,240 |
| 17 | Provincetown | Local | Commercial Street | Groin/ Jetty | Stone | $1,062,400 |
| 17 | Sandwich | Local | Scorton Creek | Groin/ Jetty | Stone | $792,660 |
| 18 | Barnstable | Local | Old Shore Road | Seawall | Concrete | $97,750 |
| 18 | Boston | Local | Charlestown - Medford Street | Seawall | Stone | $1,717,980 |
| 18 | Boston | State | Dorchester - Mount Vernon Street | Revetment | Stone | $1,235,560 |
| 18 | Boston | Local | South Boston - East First Street | Revetment | Stone | $531,760 |
| 18 | Bourne | Local | Clark Road | Revetment | Stone | $120,100 |
| 18 | Bourne | Local | Pocasset River Bridge | Revetment | Stone | $42,035 |
| 18 | Bourne | Local | Ocean Avenue | Revetment | Stone | $29,880 |
| 18 | Dennis | Local | Sesuit Harbor | Revetment | Stone | $522,435 |
| 18 | Falmouth | Local | Woods Hole | Revetment | Stone | $624,520 |
| 18 | Manchester | Local | Black Beach | Revetment | Stone | $366,305 |
| 18 | Manchester | Local | Singing Beach | Revetment | Stone | $4,973,020 |
| | | | **YEAR ELEVEN TOTALS** | | | **$31,772,285** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR TWELVE

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 18 | Marblehead | Local | Parkers Boat Yard | Seawall | Stone | $831,600 |
| 18 | Marshfield | Local | Town Landing | Seawall | Concrete | $261,840 |
| 18 | Nahant | State | Nahant Road | Revetment | Stone | $1,465,220 |
| 18 | Nahant | Local | Castle Road | Revetment | Stone | $216,180 |
| 18 | Nahant | State | Nahant Road | Revetment | Stone | $2,549,320 |
| 18 | Quincy | Local | Moon Island | Seawall | Stone | $1,584,000 |
| 18 | Wareham | Local | Wareham River - Main Street | Seawall | Steel | $759,000 |
| 18 | Winthrop | Local | Court Road | Seawall | Stone | $371,910 |
| 18 | Winthrop | Local | Court Road | Revetment | Concrete | $14,412 |
| 18 | Yarmouth | Local | Bass River | Seawall | Stone | $75,240 |
| 19 | Bourne | Local | Tahanto Road - Pocasset River | Coastal Beach | Sand | $47,970 |
| 19 | Wellfleet | Local | D Street Causeway | Coastal Beach | Sand | $34,580 |
| 20 | Edgartown | Local | Katama Beach | Coastal Beach | Sand | $1,841,500 |
| 20 | Wellfleet | Local | Mayo Beach | Coastal Beach | Sand | $40,005 |
| 21 | Bourne | Local | Barlow's Landing | Coastal Beach | Sand | $29,845 |
| 21 | Braintree | Local | Lieutenant G. Murray Smith Beach | Coastal Beach | Sand | $14,560 |
| 22 | Bourne | Local | Lewis Point Road | Coastal Beach | Sand | $586,450 |
| 22 | Chatham | Local | Cockle Cove | Coastal Beach | Sand | $507,200 |
| 22 | Chatham | Local | Cotchpinicut Road | Coastal Dune | Sand | $5,580 |
| 22 | Chatham | Local | Claffin Landing | Coastal Beach | Sand | $126,800 |
| 22 | Wareham | Local | Shell Point | Coastal Beach | Sand | $570,600 |
| 22 | Wellfleet | Local | Kendrick Beach | Coastal Beach | Sand | $2,158,200 |
| 22 | Westport | Local | Westport Point | Coastal Beach | Sand | $871,750 |
| 23 | Hull | Local | Stony Beach | Groin/ Jetty | Stone | $553,776 |
| 23 | Rockport | Local | Inner Breakwater | Breakwater | Stone | $1,382,080 |
| 24 | Barnstable | Local | Kalmus Beach | Groin/ Jetty | Stone | $1,182,985 |
| 24 | Dennis | Local | Sesuit Harbor | Groin/ Jetty | Stone | $1,595,280 |
| 24 | Falmouth | Local | Falmouth Harbor | Groin/ Jetty | Stone | $875,840 |
| 24 | Falmouth | Local | Falmouth Harbor | Groin/ Jetty | Stone | $138,115 |
| 24 | Gloucester | Local | Lanes Cove | Breakwater | Stone | $2,233,540 |
| 24 | Plymouth | Local | Plymouth Harbor | Breakwater | Stone | $4,535,600 |
| 25 | Barnstable | Local | Ocean View Avenue | Groin/ Jetty | Stone | $53,120 |
| 25 | Barnstable | Local | Dowses Beach | Groin/ Jetty | Stone | $858,715 |
| 25 | Barnstable | Local | Ocean Avenue at Stewarts Creek | Groin/ Jetty | Stone | $378,315 |
| 25 | Dennis | Local | Sesuit Harbor | Groin/ Jetty | Stone | $2,690,080 |
| | | | **YEAR TWELVE TOTALS** | | | **$31,441,208** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR THIRTEEN

| Overall Priority | Town | Owner | **Location** | Primary Type | Primary Material | **Estimated Repair Costs 2006 Value** |
|---|---|---|---|---|---|---|
| 25 | Dennis | Local | Swan River Inlet | Groin/ Jetty | Stone | $720,600 |
| 25 | Dennis | Local | Sea Street Beach | Groin/ Jetty | Stone | $192,560 |
| 25 | Falmouth | Local | Wild Harbor | Groin/ Jetty | Stone | $294,245 |
| 25 | Falmouth | Local | Megansett Harbor | Breakwater | Stone | $726,605 |
| 25 | Falmouth | Local | West Falmouth Harbor | Groin/ Jetty | Stone | $324,270 |
| 25 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $126,105 |
| 25 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $90,075 |
| 25 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $99,600 |
| 25 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $106,240 |
| 25 | Falmouth | Local | Great Pond | Groin/ Jetty | Stone | $318,265 |
| 25 | Falmouth | Local | Great Pond | Groin/ Jetty | Stone | $222,185 |
| 25 | Falmouth | Local | Green Pond | Groin/ Jetty | Stone | $342,285 |
| 25 | Falmouth | Local | Green Pond | Groin/ Jetty | Stone | $486,405 |
| 25 | Gloucester | Local | Lanes Cove | Breakwater | Stone | $1,135,280 |
| 25 | Harwich | Local | Wychmere Harbor | Breakwater | Stone | $1,814,240 |
| 25 | Hull | Local | Gun Rock | Breakwater | Stone | $625,600 |
| 25 | Marshfield | Local | Green Harbor Breakwater | Groin/ Jetty | Stone | $864,720 |
| 25 | Marshfield | Local | Ocean St. | Groin/ Jetty | Stone | $180,150 |
| 25 | Provincetown | Local | Commercial Street | Groin/ Jetty | Stone | $116,200 |
| 25 | Sandwich | Local | Scorton Creek | Groin/ Jetty | Stone | $252,210 |
| 25 | Truro | Local | Beach Point | Groin/ Jetty | Stone | $700,520 |
| 25 | Winthrop | Local | Beacon Street | Groin/ Jetty | Stone | $216,180 |
| 25 | Winthrop | Local | Wave Way | Groin/ Jetty | Stone | $166,000 |
| 25 | Yarmouth | Local | Englewood beach | Breakwater | Stone | $205,840 |
| 25 | Yarmouth | Local | Parker's River | Groin/ Jetty | Stone | $1,225,020 |
| 25 | Yarmouth | Local | Bass River Beach | Groin/ Jetty | Stone | $204,170 |
| 26 | Boston | State | George's Island | Seawall | Stone | $3,183,840 |
| 26 | Boston | State | Lovell's Island | Seawall | Stone | $1,835,460 |
| 26 | Boston | State | Rainsford Island | Seawall | Stone | $4,752,000 |
| 26 | Boston | State | Gallops Island | Seawall | Stone | $5,088,675 |
| 26 | Fairhaven | Local | Fort Phoenix Beach | Seawall | Stone | $445,500 |
| 26 | Falmouth | Local | Menauhant Road at Bournes Pond | Seawall | Wood | $14,910 |
| 26 | Falmouth | Local | Menauhant Road at Bournes Pond | Seawall | Wood | $14,910 |
| 26 | Lynn | Local | Blossom Street Extension | Seawall | Steel | $2,170,395 |
| | | | **YEAR THIRTEEN TOTALS** | | | **$29,261,260** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR FOURTEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 26 | Lynn | Local | Riley Way Extension | Seawall | Wood | $5,117,000 |
| 26 | Mattapoisett | Local | Old Mattapoisett Neck Road | Revetment | Stone | $73,000 |
| 26 | Nahant | State | Nahant Road | Revetment | Stone | $266,450 |
| 26 | Swampscott | Local | Ocean Avenue - Phillips Beach | Seawall | Concrete | $260,495 |
| 26 | Wareham | Local | Shell Point | Seawall | Stone | $466,925 |
| 27 | Aquinnah | Local | Menemsha Inlet | Revetment | Stone | $500,480 |
| 27 | Boston | State | George's Island | Revetment | Stone | $777,420 |
| 27 | Boston | State | George's Island | Seawall | Stone | $257,400 |
| 27 | Boston | State | George's Island | Seawall | Stone | $3,471,120 |
| 27 | Bourne | Local | Homestead Avenue | Revetment | Stone | $24,680 |
| 27 | Fairhaven | Local | Union Wharf | Seawall | Stone | $303,600 |
| 27 | Fall River | Local | Ferry Street | Seawall | Stone | $300,960 |
| 27 | Falmouth | Local | Silver Beach | Seawall | Concrete | $106,250 |
| 27 | Gloucester | Local | Robinson Landing | Seawall | Stone | $601,920 |
| 27 | Hingham | State | Stodders Neck | Revetment | Stone | $375,913 |
| 27 | Hull | Local | Wharf Ave. | Revetment | Concrete | $64,854 |
| 27 | Lynn | Local | Bates Street | Revetment | Stone | $375,160 |
| 27 | Lynn | Local | Riley Way Extension | Revetment | Stone | $5,878,520 |
| 27 | Manchester | Local | Ocean Street White Beach | Seawall | Stone | $189,750 |
| 27 | Marblehead | Local | Cove Lane | Seawall | Stone | $37,950 |
| 27 | Marblehead | Local | Peabody Lane | Seawall | Stone | $12,750 |
| 27 | Nahant | State | Nahant Road | Revetment | Stone | $78,200 |
| 27 | Orleans | Local | Rock Harbor Inlet | Seawall | Steel | $2,471,040 |
| 27 | Orleans | Local | Smuggler's Path | Revetment | Stone | $19,920 |
| 27 | Rockport | Local | Rockport Harbor | Revetment | Stone | $211,140 |
| 27 | Salem | Local | Forest River Park | Seawall | Stone | $840,180 |
| 27 | Salem | Local | Forest River Park | Seawall | Concrete | $446,250 |
| 27 | Salem | Local | Peabody Street | Seawall | Stone | $1,049,400 |
| 27 | Salem | Local | Szetela Lane | Revetment | Stone | $2,807,380 |
| 27 | Salem | Local | Franklin Street Park | Revetment | Stone | $398,400 |
| 27 | Salem | Local | Willows Park | Seawall | Stone | $1,146,090 |
| 27 | Swampscott | Local | Atlantic Avenue at Town Line | Seawall | Concrete | $761,320 |
| 27 | Swansea | Local | Lands End Way | Seawall | Stone | $220,110 |
| 28 | Boston | State | Charlestown - Warren Ave | Seawall | Concrete | $174,240 |
| 28 | Boston | State | Dorchester - Interstate 93 Northbound | Revetment | Stone | $328,130 |
| 28 | Boston | State | Dorchester - Interstate 93 Northbound | Revetment | Stone | $292,805 |
| 28 | Fairhaven | Local | Goulart Memorial Drive | Revetment | Stone | $48,180 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 28 | Fairhaven | Local | Goulart Memorial Drive | Revetment | Stone | $73,800 |
| 28 | Gloucester | Local | Rocky Neck Avenue | Seawall | Concrete | $150,700 |
| 28 | Gloucester | Local | Rocky Neck Avenue | Revetment | Stone | $57,305 |
| 28 | Hull | Local | Main St. | Seawall | Stone | $139,384 |
| 28 | Hull | Local | Windmill Point | Seawall | Concrete | $419,832 |
| | | | **YEAR FOURTEEN TOTALS** | | | **$31,596,403** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR FIFTEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 28 | Hull | Local | Newport Rd. | Seawall | Concrete | $1,289,280 |
| 28 | Marblehead | Local | The Causeway - Ocean Avenue | Seawall | Concrete | $489,450 |
| 28 | Newburyport | Local | Harbor Master Building | Revetment | Stone | $29,880 |
| 28 | Oak Bluffs | Local | Sea view Avenue | Seawall | Concrete | $630,500 |
| 28 | Oak Bluffs | Local | Sea view Avenue | Revetment | Stone | $111,150 |
| 28 | Quincy | Local | Taffrail Road | Seawall | Concrete | $86,110 |
| 28 | Quincy | State | Neponset Bridge | Revetment | Stone | $47,100 |
| 28 | Revere | Local | Roughan's Point | Seawall | Concrete | $1,227,660 |
| 28 | Wellfleet | Local | D Street Bridge | Seawall | Wood | $6,840 |
| 28 | Winthrop | Local | Tafts Avenue | Seawall | Concrete | $159,120 |
| 29 | Boston | Local | Charlestown - Fifth Avenue | Seawall | Steel | $67,770 |
| 29 | Boston | Local | Charlestown - Fifth Avenue | Seawall | Concrete | $63,400 |
| 29 | Boston | State | Dorchester - University of Massachusetts | Revetment | Stone | $355,680 |
| 29 | Boston | State | Dorchester - University of Massachusetts | Seawall | Stone | $95,040 |
| 29 | Boston | State | Dorchester - University of Massachusetts | Revetment | Stone | $1,183,130 |
| 29 | Bourne | State | Academy Drive | Revetment | Stone | $16,171 |
| 29 | Bourne | State | Academy Drive | Revetment | Stone | $124,815 |
| 29 | Bourne | State | Academy Drive | Seawall | Concrete | $291,160 |
| 29 | Braintree | Local | Braintree Yacht Club | Seawall | Steel | $17,820 |
| 29 | Chatham | Local | Andrew Harding Beach | Revetment | Stone | $52,595 |
| 29 | Chatham | Local | Champlain Road | Seawall | Steel | $68,510 |
| 29 | Dartmouth | Local | Bridge Street | Revetment | Stone | $23,550 |
| 29 | Dartmouth | Local | Bridge Street | Revetment | Stone | $23,550 |
| 29 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $112,924 |
| 29 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $85,512 |
| 29 | Duxbury | Local | Duxbury Beach | Seawall | Concrete | $137,864 |
| 29 | Falmouth | Local | Woods Hole | Seawall | Stone | $37,240 |
| 29 | Falmouth | Local | Woods Hole | Revetment | Stone | $223,725 |
| 29 | Falmouth | Local | Great Pond | Revetment | Stone | $98,250 |
| 29 | Gloucester | Local | Niles Beach | Seawall | Concrete | $68,400 |
| 29 | Gloucester | Local | East Main Street | Seawall | Stone | $42,670 |
| 29 | Gloucester | Local | State Fish Pier | Seawall | Stone | $69,300 |
| 29 | Gloucester | Local | Stacey Boulevard - East | Seawall | Concrete | $752,310 |
| 29 | Hingham | Local | Bell Air Rd. | Seawall | Concrete | $57,120 |
| 29 | Hingham | Local | Bell Air Rd. | Revetment | Stone | $182,400 |
| 29 | Hingham | State | Lincoln St. (Rt. 3A) | Revetment | Stone | $55,264 |
| 29 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Concrete | $48,192 |
| 29 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $112,950 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 29 | Hull | Local | Windmill Point | Seawall | Concrete | $323,544 |
| 29 | Hull | Local | Highland Ave. | Seawall | Stone | $38,388 |
| 29 | Hull | Local | Highland Ave. | Revetment | Stone | $9,240 |
| 29 | Hull | Local | Pemberton | Seawall | Concrete | $189,720 |
| 29 | Hull | Local | Stony Beach | Revetment | Stone | $130,938 |
| 29 | Hull | Local | James Ave. | Seawall | Stone | $114,648 |
| 29 | Hull | Local | James Ave. | Seawall | Stone | $52,440 |
| 29 | Hull | Local | Point Allerton Seawall | Seawall | Concrete | $525,232 |
| 29 | Hull | Local | Fitzpatrick Hwy | Revetment | Stone | $56,316 |
| 29 | Hull | Local | ALLERTON BLUFF | Revetment | Stone | $51,810 |
| 29 | Hull | Local | ALLERTON BLUFF | Revetment | Stone | $96,330 |
| 29 | Hull | Local | Caddish Ave. | Revetment | Stone | $25,212 |
| 29 | Hull | Local | Sunset Ave. | Seawall | Stone | $564,672 |
| 29 | Hull | Local | Newport Rd. | Revetment | Stone | $55,575 |
| 29 | Hull | Local | Nantasket Beach | Seawall | Stone | $9,408 |
| 29 | Hull | Local | Sunset Point | Revetment | Stone | $115,395 |
| 29 | Hull | Local | Hampton Hill | Seawall | Concrete | $5,460 |
| 29 | Hull | State | Nantasket Beach | Seawall | Concrete | $52,640 |
| 29 | Hull | State | Nantasket Beach | Seawall | Concrete | $625,600 |
| 29 | Hull | State | Nantasket Beach | Seawall | Concrete | $32,072 |
| 29 | Hull | State | Nantasket Beach | Seawall | Concrete | $88,160 |
| 29 | Hull | Local | Atlantic Ave. | Seawall | Concrete | $6,232 |
| 29 | Hull | Local | Atlantic Ave. | Seawall | Concrete | $164,688 |
| 29 | Hull | Local | Atlantic Ave. | Seawall | Stone | $23,864 |
| 29 | Hull | Local | Crescent Beach | Seawall | Concrete | $16,800 |
| 29 | Lynn | Local | Beach Road | Seawall | Concrete | $841,500 |
| 29 | Lynn | Local | Lynnway Drive and Washington Street | Revetment | Stone | $308,505 |
| 29 | Marblehead | Local | Beacon Street | Seawall | Concrete | $5,880 |
| 29 | Marshfield | Local | Foster Ave. | Seawall | Concrete | $120,460 |
| 29 | Marshfield | Local | Foster Ave. | Seawall | Concrete | $527,805 |
| 29 | Nahant | State | Nahant Road | Seawall | Concrete | $520,740 |
| 29 | New Bedford | Local | South Pier | Seawall | Concrete | $391,560 |
| 29 | New Bedford | Local | North Terminal Bulkhead | Seawall | Concrete | $237,600 |
| 29 | New Bedford | Local | North Terminal Bulkhead | Seawall | Concrete | $247,500 |
| 29 | Oak Bluffs | Local | Sea view Avenue | Seawall | Concrete | $210,000 |
| 29 | Oak Bluffs | Local | Sea view Avenue Extension | Seawall | Concrete | $190,400 |
| 29 | Plymouth | Local | Caswell Lane | Revetment | Stone | $59,400 |
| 29 | Plymouth | Local | White Horse Beach | Revetment | Stone | $20,410 |
| 29 | Plymouth | Local | White Horse Beach | Revetment | Stone | $86,400 |
| 29 | Plymouth | Local | White Horse Beach | Revetment | Stone | $33,755 |
| 29 | Provincetown | Local | Town Boat Ramp | Seawall | Concrete | $19,000 |
| 29 | Provincetown | Local | Town Boat Ramp | Seawall | Concrete | $87,600 |
| 29 | Quincy | Local | Palmer Street | Seawall | Concrete | $174,750 |
| 29 | Quincy | Local | Nut Island Avenue | Seawall | Concrete | $53,040 |
| 29 | Quincy | State | Quincy Shore Drive | Revetment | Concrete | $74,045 |
| 29 | Quincy | State | Quincy Shore Drive | Revetment | Stone | $178,195 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $52,500 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $4,452,140 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $13,860 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $51,240 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $52,080 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $52,080 |
| 29 | Revere | State | Revere Beach | Seawall | Concrete | $12,600 |
| 29 | Revere | Local | Roughan's Point | Revetment | Stone | $4,587,670 |
| 29 | Revere | Local | Roughan's Point | Seawall | Concrete | $8,400 |
| 29 | Rockport | Local | Lumber Wharf | Seawall | Stone | $251,460 |
| 29 | Rockport | Local | Middle Wharf | Seawall | Stone | $82,830 |
| 29 | Rockport | Local | Bearskin Neck | Seawall | Stone | $134,640 |
| 29 | Salisbury | State | Gillis Bridge | Revetment | Stone | $33,755 |
| 29 | Scituate | Local | Minot Beach | Seawall | Concrete | $658,070 |
| 29 | Scituate | Local | Minot Beach | Seawall | Concrete | $117,855 |
| 29 | Scituate | Local | Minot Beach | Seawall | Concrete | $1,848 |
| 29 | Scituate | Local | Glades Rd. | Seawall | Concrete | $21,280 |
| 29 | Scituate | Local | Glades Rd. | Seawall | Concrete | $35,700 |
| 29 | Scituate | Local | Glades Rd. | Seawall | Concrete | $77,400 |
| 29 | Scituate | Local | Surfside Rd. | Seawall | Concrete | $23,595 |
| 29 | Scituate | Local | Surfside Rd. | Seawall | Concrete | $412,800 |
| 29 | Scituate | Local | Surfside Rd. | Seawall | Concrete | $272,250 |
| 29 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $134,160 |
| 29 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $53,040 |
| 29 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $296,208 |
| 29 | Scituate | Local | Turner Rd. | Seawall | Concrete | $37,944 |
| 29 | Scituate | Local | Cedars Point | Revetment | Stone | $203,640 |
| 29 | Scituate | Local | Front St. | Seawall | Concrete | $206,400 |
| 29 | Scituate | Local | Beaver Dam Rd. | Seawall | Steel | $116,213 |
| 29 | Scituate | Local | First Cliff | Seawall | Concrete | $196,425 |
| 29 | Scituate | Local | Edward Foster Rd. | Seawall | Concrete | $47,712 |
| 29 | Scituate | Local | Edward Foster Rd. | Seawall | Concrete | $375,480 |
| 29 | Swansea | Local | Route 195 | Revetment | Stone | $83,980 |
| 29 | Swansea | Local | Route 195 | Revetment | Stone | $79,040 |
| 29 | Wareham | Local | Bayview Park | Seawall | Steel | $170,680 |
| 29 | Westport | State | Route 88 Bridge | Revetment | Stone | $370,500 |
| 29 | Westport | State | Route 88 Bridge | Revetment | Stone | $160,550 |
| 29 | Weymouth | Local | Wessagussett Beach | Seawall | Concrete | $59,220 |
| 29 | Weymouth | Local | River Bank Road | Seawall | Concrete | $180,000 |
| 29 | Weymouth | Local | Gilmore Street | Revetment | Stone | $18,810 |
| 29 | Weymouth | Local | Route 3A/Bridge Street | Seawall | Concrete | $105,730 |
| 29 | Winthrop | Local | Main Street | Revetment | Stone | $9,600 |
| 29 | Winthrop | Local | Pleasant Street | Seawall | Concrete | $47,040 |
| 29 | Winthrop | Local | Bay View Avenue | Revetment | Stone | $124,030 |
| 29 | Winthrop | State | Grand View Avenue | Seawall | Concrete | $182,240 |
| 30 | Barnstable | Local | Dowses Beach | Revetment | Stone | $13,200 |
| 30 | Barnstable | Local | Hyannis Inner Harbor | Seawall | Steel | $37,950 |
| 30 | Beverly | Local | Quincy Park West | Seawall | Concrete | $10,040 |
| | | | **YEAR FIFTEEN** | **TOTALS** | | **$31,033,216** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR SIXTEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 30 | Boston | Local | Long Island | Seawall | Stone | $1,994,000 |
| 30 | Boston | Local | Long Island | Revetment | Stone | $96,330 |
| 30 | Boston | Local | Long Island | Revetment | Stone | $85,215 |
| 30 | Boston | State | East Boston - McArdle Bridge | Revetment | Stone | $22,260 |
| 30 | Boston | Local | Boston - Eastern Avenue | Seawall | Stone | $232,175 |
| 30 | Boston | Local | Charlestown - Medford Street | Seawall | Stone | $234,685 |
| 30 | Boston | State | Charlestown - Warren Avenue | Revetment | Stone | $39,600 |
| 30 | Boston | State | East Boston - Saratoga Street Bridge | Seawall | Concrete | $70,490 |
| 30 | Boston | Local | Boston - Long Wharf | Seawall | Stone | $308,712 |
| 30 | Boston | State | Dorchester - William T. Morrissey Boulevard | Revetment | Stone | $403,860 |
| 30 | Boston | State | Dorchester - William T Morrissey Boulevard | Revetment | Stone | $97,340 |
| 30 | Boston | Local | South Boston - Seaport Boulevard | Seawall | Stone | $74,045 |
| 30 | Boston | Local | South Boston - Seaport Boulevard | Seawall | Stone | $28,865 |
| 30 | Braintree | Local | Braintree Yacht Club | Seawall | Concrete | $7,140 |
| 30 | Braintree | Local | Braintree Yacht Club | Seawall | Stone | $25,200 |
| 30 | Braintree | Local | Quincy Ave Bridge Next to Braintree Yacht Club | Seawall | Stone | $43,550 |
| 30 | Cohasset | Local | Jerusalem Rd. | Revetment | Stone | $30,000 |
| 30 | Cohasset | Local | Nichols Rd. | Revetment | Stone | $114,240 |
| 30 | Cohasset | Local | Atlantic Ave. | Seawall | Stone | $175,440 |
| 30 | Cohasset | Local | Border St. | Seawall | Concrete | $120,480 |
| 30 | Dennis | Local | West Dennis Beach | Revetment | Stone | $115,200 |
| 30 | Dennis | Local | Loring Avenue | Revetment | Stone | $3,300 |
| 30 | Dennis | Local | Lower County Road at Swan River | Revetment | Stone | $7,200 |
| 30 | Dennis | Local | Sea Street Beach | Revetment | Stone | $58,200 |
| 30 | Dennis | Local | Union Wharf Road | Revetment | Stone | $2,355 |
| 30 | Dennis | Local | Loring Avenue | Revetment | Stone | $3,300 |
| 30 | Duxbury | Local | Massasoit Rd. | Seawall | Stone | $13,524 |
| 30 | Fall River | State | Heritage State Park | Seawall | Stone | $188,480 |
| 30 | Falmouth | Local | Wild Harbor | Revetment | Stone | $33,600 |
| 30 | Falmouth | Local | Old Silver Beach | Seawall | Concrete | $45,600 |
| 30 | Falmouth | Local | Chapoquoit Beach | Revetment | Stone | $121,800 |
| 30 | Falmouth | Local | Woods Hole | Seawall | Stone | $70,680 |
| 30 | Falmouth | Local | Woods Hole | Seawall | Stone | $11,800 |
| 30 | Falmouth | Local | Falmouth Harbor | Seawall | Wood | $51,435 |
| 30 | Falmouth | Local | Falmouth Harbor | Seawall | Wood | $109,855 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 30 | Falmouth | Local | Falmouth Harbor | Seawall | Wood | $58,420 |
| 30 | Falmouth | Local | Little Pond | Revetment | Stone | $4,290 |
| 30 | Falmouth | Local | Little Pond | Revetment | Stone | $6,930 |
| 30 | Gloucester | State | University of Massachusetts - Marine Station | Seawall | Stone | $96,635 |
| 30 | Gloucester | State | State Fish Pier | Revetment | Stone | $338,390 |
| 30 | Gosnold | Local | Town Pier | Seawall | Stone | $20,520 |
| 30 | Hingham | Local | Scudder St. | Revetment | Stone | $157,785 |
| 30 | Hingham | Local | Bell Air Rd. | Seawall | Concrete | $40,432 |
| 30 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $78,888 |
| 30 | Hull | Local | Main St. | Seawall | Stone | $19,992 |
| 30 | Hull | Local | Nantasket Ave. | Seawall | Concrete | $81,056 |
| 30 | Hull | Local | Fitzpatrick Hwy | Seawall | Concrete | $28,560 |
| 30 | Hull | State | Washington Blvd. | Revetment | Stone | $276,960 |
| 30 | Hull | Local | Green Hill | Seawall | Concrete | $22,344 |
| 30 | Kingston | Local | Rocky Nook Ave. | Revetment | Stone | $159,355 |
| 30 | Kingston | Local | Sunset Rd. | Revetment | Stone | $15,000 |
| 30 | Manchester | Local | Town Hall Parking Lot | Revetment | Stone | $135,850 |
| 30 | Manchester | Local | Town Hall | Seawall | Stone | $69,300 |
| 30 | Manchester | Local | Town Hall | Seawall | Concrete | $63,360 |
| 30 | Marblehead | Local | Surf Street | Seawall | Concrete | $20,520 |
| 30 | Nahant | Local | Cliff Street and Nahant Road | Seawall | Concrete | $204,330 |
| 30 | Nahant | State | Nahant Road | Seawall | Concrete | $89,000 |
| 30 | Nantucket | State | Steamship Wharf | Seawall | Steel | $802,400 |
| 30 | New Bedford | Local | West Rodney French Boulevard | Seawall | Concrete | $542,820 |
| 30 | New Bedford | Local | West Rodney French Boulevard | Seawall | Concrete | $63,840 |
| 30 | New Bedford | Local | Between Leonard's Wharf and Homer's Wharf | Seawall | Stone | $43,560 |
| 30 | New Bedford | Local | Homer's Wharf | Seawall | Steel | $411,600 |
| 30 | New Bedford | Local | Fisherman's Wharf | Seawall | Steel | $294,925 |
| 30 | Orleans | Local | Elli's Creek | Seawall | Wood | $33,400 |
| 30 | Plymouth | Local | High Cliff | Revetment | Stone | $63,600 |
| 30 | Plymouth | Local | Water St. | Revetment | Stone | $33,755 |
| 30 | Plymouth | Local | Town Wharf | Revetment | Stone | $61,200 |
| 30 | Plymouth | Local | Town Wharf | Revetment | Concrete | $12,160 |
| 30 | Plymouth | Local | Town Wharf | Revetment | Stone | $42,175 |
| 30 | Provincetown | Local | Long Point Marshes | Revetment | Stone | $54,000 |
| 30 | Quincy | Local | Southern Artery | Revetment | Stone | $59,400 |
| 30 | Quincy | Local | Southern Artery | Seawall | Concrete | $37,240 |
| 30 | Quincy | Local | Rock Island Road | Seawall | Concrete | $1,088,000 |
| 30 | Quincy | Local | Edgewater Drive | Seawall | Concrete | $428,400 |
| 30 | Quincy | Local | Island Avenue | Revetment | Stone | $39,000 |
| 30 | Quincy | Local | Orchard Beach | Seawall | Concrete | $146,880 |
| 30 | Quincy | State | Quincy Shore Drive | Seawall | Concrete | $10,500 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 30 | Rockport | Local | Bradley Wharf | Seawall | Stone | $267,300 |
| 30 | Salem | Local | Cat Cove | Seawall | Stone | $102,000 |
| 30 | Sandwich | Local | Sandwich Marina | Revetment | Stone | $100,800 |
| 30 | Sandwich | Local | Sandwich Marina | Revetment | Stone | $194,400 |
| 30 | Scituate | Local | Surfside Rd. | Seawall | Concrete | $466,480 |
| 30 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $92,208 |
| 30 | Scituate | Local | Ocean Side Drive | Seawall | Concrete | $106,080 |
| 30 | Swansea | Local | Route 103 | Revetment | Stone | $86,450 |
| 30 | Swansea | Local | Route 103 | Revetment | Stone | $113,620 |
| 30 | Westport | Local | Main Road | Revetment | Stone | $27,475 |
| 30 | Westport | Local | Gooseberry Neck | Revetment | Stone | $132,000 |
| 30 | Westport | Local | Gooseberry Neck | Revetment | Stone | $192,000 |
| 30 | Weymouth | Local | Regatta Road | Revetment | Stone | $60,000 |
| 30 | Weymouth | Local | Bridge Street | Seawall | Concrete | $18,060 |
| 30 | Weymouth | Local | Evans Street | Seawall | Concrete | $222,600 |
| 30 | Winthrop | Local | Somerset Avenue | Seawall | Concrete | $26,355 |
| 30 | Winthrop | Local | Cottage Park Road | Seawall | Concrete | $6,080 |
| 30 | Winthrop | Local | Woods Drive | Seawall | Concrete | $287,280 |
| 30 | Winthrop | Local | Grover's Avenue | Seawall | Concrete | $491,575 |
| 30 | Winthrop | Local | Grover's Avenue | Seawall | Concrete | $126,140 |
| 30 | Yarmouth | Local | Sea view Beach | Revetment | Stone | $16,800 |
| 31 | Barnstable | Local | Sea View Avenue | Revetment | Stone | $144,240 |
| 31 | Beverly | Local | Bay View Avenue | Seawall | Stone | $138,600 |
| 31 | Beverly | Local | Wilson Avenue | Seawall | Stone | $22,770 |
| 31 | Beverly | Local | Washington Street | Seawall | Stone | $79,350 |
| 31 | Beverly | Local | Abbott Street | Seawall | Stone | $75,240 |
| 31 | Beverly | Local | Ocean Avenue | Seawall | Concrete | $81,400 |
| 31 | Boston | Local | East Boston - East Eagle Street | Revetment | Stone | $111,185 |
| 31 | Boston | State | Dorchester - Mount Vernon Street | Revetment | Stone | $1,731,730 |
| 31 | Boston | State | Dorchester - William T Morrissey Boulevard | Revetment | Stone | $265,525 |
| 31 | Boston | State | Dorchester - Victory Road | Seawall | Stone | $56,925 |
| 31 | Boston | State | Dorchester - Victory Park | Revetment | Stone | $114,190 |
| 31 | Boston | State | Dorchester - Victory Park | Revetment | Stone | $763,270 |
| 31 | Boston | State | Dorchester - Taylor Street | Seawall | Stone | $269,610 |
| 31 | Boston | State | Dorchester - Taylor Street | Seawall | Stone | $495,330 |
| 31 | Boston | Local | South Boston - Summer Street | Seawall | Steel | $257,400 |
| 31 | Boston | Local | South Boston - Summer Street | Seawall | Concrete | $162,800 |
| 31 | Bourne | Local | Pocasset River Bridge | Revetment | Stone | $33,055 |
| 31 | Braintree | Local | Watson Park | Seawall | Stone | $12,750 |
| 31 | Brewster | Local | Paines Creek Beach | Revetment | Stone | $181,485 |
| 31 | Chatham | Local | Barn Hill Road | Seawall | Steel | $156,750 |
| 31 | Dennis | Local | Nobscussett Harbor | Seawall | Wood | $148,695 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 31 | Dennis | Local | Glendon Road Beach | Seawall | Wood | $198,260 |
| 31 | Dennis | Local | Bass River - South of Route 6 | Seawall | Stone | $43,890 |
| 31 | Eastham | Local | Bay Road | Revetment | Stone | $23,430 |
| 31 | Fall River | Local | Bicentennial Park | Revetment | Stone | $270,450 |
| 31 | Fall River | State | Heritage State Park | Revetment | Stone | $168,280 |
| 31 | Fall River | State | Heritage State Park | Seawall | Stone | $485,760 |
| 31 | Fall River | State | Heritage State Park | Seawall | Stone | $303,600 |
| 31 | Gloucester | Local | Crescent Beach | Revetment | Stone | $667,755 |
| 31 | Harwich | Local | Grey Neck Road | Revetment | Stone | $30,050 |
| 31 | Hingham | Local | Otis St. (Rt. 3A) | Revetment | Stone | $258,430 |
| 31 | Hingham | State | Lincoln St. (Rt. 3A) | Revetment | Stone | $135,894 |
| 31 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $315,744 |
| 31 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $916,674 |
| 31 | Hull | Local | Highland Ave. | Seawall | Stone | $32,637 |
| 31 | Manchester | Local | Town Hall - Wall at Central Street | Seawall | Stone | $43,890 |
| 31 | Manchester | Local | Tucks Point | Revetment | Stone | $49,950 |
| 31 | Manchester | Local | Black Beach | Seawall | Stone | $514,140 |
| 31 | Manchester | Local | Black Beach | Seawall | Concrete | $151,600 |
| 31 | Manchester | Local | Black Beach | Revetment | Stone | $39,960 |
| 31 | Manchester | Local | Proctor Street | Seawall | Stone | $181,830 |
| 31 | Manchester | Local | Mascomono Park | Seawall | Stone | $413,820 |
| 31 | Marblehead | Local | Nahant Street | Seawall | Stone | $37,950 |
| 31 | Marblehead | Local | Drain Outfall Near Flint Street | Revetment | Stone | $201,335 |
| 31 | Marblehead | Local | Cliff & Commercial | Seawall | Stone | $138,600 |
| 31 | Marblehead | Local | Cliff Street Boat Yard | Revetment | Stone | $24,040 |
| 31 | Marblehead | Local | Parker's Yacht Yard | Revetment | Stone | $30,050 |
| 31 | Marshfield | Local | Green Harbor Breakwater | Revetment | Stone | $39,960 |
| 31 | Marshfield | Local | Town Landing | Revetment | Stone | $141,525 |
| 31 | Mattapoisett | Local | Water Street | Seawall | Stone | $451,440 |
| 31 | Mattapoisett | Local | Old Mattapoisett Neck Road | Seawall | Stone | $1,203,840 |
| 31 | Nahant | State | Nahant Road | Revetment | Stone | $882,530 |
| 31 | Nantucket | Local | Easy Street | Seawall | Wood | $79,000 |
| 31 | Nantucket | Local | Petrel Landing | Seawall | Stone | $151,800 |
| 31 | New Bedford | Local | West Rodney French Boulevard | Seawall | Concrete | $45,540 |
| 31 | New Bedford | Local | West Rodney French Boulevard | Seawall | Stone | $106,260 |
| 31 | New Bedford | Local | North Terminal Bulkhead | Seawall | Steel | $3,946,800 |
| | | | **YEAR SIXTEEN TOTALS** | | | **$32,461,445** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR SEVENTEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 31 | New Bedford | Local | East Rodney Boulevard | Revetment | Stone | $33,300 |
| 31 | New Bedford | State | West Rodney French Boulevard | Revetment | Stone | $180,300 |
| 31 | Newburyport | Local | Simons Beach | Seawall | Stone | $57,375 |
| 31 | Newburyport | Local | Simons Beach | Revetment | Stone | $66,600 |
| 31 | Newburyport | Local | Simons Beach | Seawall | Stone | $72,105 |
| 31 | Newburyport | Local | Railroad Avenue | Seawall | Steel | $918,060 |
| 31 | Oak Bluffs | Local | Eastville Point | Revetment | Stone | $154,250 |
| 31 | Orleans | State | Pleasant Bay | Revetment | Stone | $138,230 |
| 31 | Plymouth | Local | Caswell Lane | Revetment | Stone | $116,550 |
| 31 | Plymouth | Local | Eel River | Seawall | Concrete | $382,500 |
| 31 | Rockport | Local | Granite Street | Seawall | Stone | $524,700 |
| 31 | Salem | Local | Ocean Avenue | Seawall | Stone | $420,090 |
| 31 | Salem | Local | Willow Avenue | Seawall | Stone | $37,950 |
| 31 | Salem | Local | Glover Street | Seawall | Stone | $17,000 |
| 31 | Salem | Local | South River Annex | Seawall | Steel | $180,180 |
| 31 | Salem | Local | Kernwood Park | Revetment | Stone | $321,535 |
| 31 | Salem | Local | Collins Cove Park | Seawall | Stone | $74,375 |
| 31 | Salem | Local | Collins Street | Seawall | Stone | $695,970 |
| 31 | Saugus | Local | Route 107 | Revetment | Stone | $96,160 |
| 31 | Saugus | Local | Route 107 | Revetment | Stone | $96,160 |
| 31 | Swampscott | Local | Kings Beach | Seawall | Concrete | $2,848,520 |
| 31 | Swampscott | Local | Blaney Beach - West Wall | Seawall | Concrete | $930,600 |
| 31 | Swampscott | Local | Blaney Beach - East Wall | Seawall | Stone | $99,875 |
| 31 | Swampscott | Local | Cassidy Park | Seawall | Stone | $728,840 |
| 31 | Swansea | Local | Ocean Grove Beach | Revetment | Stone | $214,775 |
| 31 | Tisbury | Local | Beach Road | Seawall | Concrete | $2,584,000 |
| 31 | Wareham | Local | Wareham River/Main Street | Seawall | Stone | $91,080 |
| 31 | Wareham | Local | Onset Avenue Bridge | Seawall | Stone | $32,760 |
| 31 | Wareham | Local | Onset Avenue Bridge | Seawall | Stone | $27,300 |
| 31 | Wareham | Local | Onset Avenue Bridge | Revetment | Stone | $58,575 |
| 31 | Winthrop | Local | Woodside Avenue and Bartlett Street | Seawall | Concrete | $37,950 |
| 31 | Winthrop | State | Seawall Avenue | Seawall | Concrete | $1,584,400 |
| 31 | Yarmouth | Local | Willow Street | Revetment | Stone | $39,065 |
| 31 | Yarmouth | Local | North Cove Landing | Revetment | Stone | $9,015 |
| 32 | Barnstable | Local | Wianno Avenue | Revetment | Stone | $7,800 |
| 32 | Boston | Local | East Boston - Border Street | Seawall | Stone | $247,520 |
| 32 | Boston | Local | Charlestown - Alford Street | Seawall | Stone | $141,360 |
| 32 | Boston | Local | Charlestown - Medford Street | Revetment | Stone | $167,990 |
| 32 | Boston | State | East Boston - Belle Island | Seawall | Concrete | $81,620 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Park | | | |
| 32 | Boston | Local | East Boston - Condor Street | Revetment | Stone | $23,550 |
| 32 | Boston | Local | East Boston - Condor Street | Revetment | Stone | $30,000 |
| 32 | Boston | Local | East Boston - Condor Street | Revetment | Stone | $20,400 |
| 32 | Boston | Local | East Boston - Condor Street | Revetment | Stone | $45,000 |
| 32 | Boston | Local | Boston - Long Wharf Park | Seawall | Stone | $114,205 |
| 32 | Boston | Local | Boston - Congress Street Bridge | Seawall | Stone | $45,180 |
| 32 | Boston | State | Dorchester - Neponset Avenue | Seawall | Concrete | $90,360 |
| 32 | Boston | State | Dorchester - Neponset Avenue | Revetment | Stone | $43,800 |
| 32 | Boston | State | Dorchester - Neponset Avenue | Revetment | Stone | $79,200 |
| 32 | Boston | Local | South Boston - Sleeper Street | Seawall | Stone | $2,280 |
| 32 | Boston | Local | South Boston - Summer Street | Revetment | Stone | $30,615 |
| 32 | Boston | State | South Boston - Summer Street | Revetment | Stone | $174,195 |
| 32 | Boston | Local | South Boston - Summer Street | Revetment | Stone | $359,530 |
| 32 | Boston | State | South Boston - Fort Independence Park | Seawall | Stone | $396,580 |
| 32 | Boston | State | South Boston - Fort Independence Park | Revetment | Stone | $165,635 |
| 32 | Boston | State | South Boston - City Point Beach | Revetment | Stone | $138,160 |
| 32 | Boston | State | South Boston - Fort Independence Park | Revetment | Stone | $36,110 |
| 32 | Boston | State | South Boston - Fort Independence Park - Egg Island | Seawall | Stone | $148,090 |
| 32 | Boston | State | South Boston - Fort Independence Park | Revetment | Stone | $306,150 |
| 32 | Boston | State | South Boston - Fort Independence Park | Seawall | Concrete | $196,900 |
| 32 | Boston | State | South Boston - Fort Independence Park | Revetment | Stone | $75,360 |
| 32 | Boston | State | South Boston - Fort Independence Park | Seawall | Stone | $189,505 |
| 32 | Boston | State | South Boston - William J Day Boulevard | Seawall | Stone | $453,055 |
| 32 | Boston | State | South Boston - William J Day Boulevard | Seawall | Concrete | $466,240 |
| 32 | Boston | State | South Boston - Carson Beach | Seawall | Concrete | $1,265,875 |
| 32 | Bourne | Local | Gardenier Avenue | Seawall | Concrete | $9,660 |
| 32 | Bourne | State | Main Street Bridge | Revetment | Stone | $25,200 |
| 32 | Bourne | Local | Barlow's Landing | Seawall | Stone | $85,340 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 32 | Braintree | Local | Watson Park | Seawall | Stone | $44,520 |
| 32 | Chatham | Local | Barn Hill Road | Revetment | Stone | $10,800 |
| 32 | Chelsea | State | Eastern Avenue | Seawall | Concrete | $22,440 |
| 32 | Chelsea | State | O'Malley Park | Seawall | Stone | $414,200 |
| 32 | Chelsea | Local | Justin Drive | Revetment | Stone | $12,210 |
| 32 | Cohasset | Local | Government Island | Seawall | Stone | $140,560 |
| 32 | Cohasset | Local | Government Island | Revetment | Stone | $39,600 |
| 32 | Dennis | Local | Lighthouse Road | Revetment | Stone | $3,630 |
| 32 | Dennis | Local | Raycroft Parkway | Revetment | Stone | $8,400 |
| 32 | Dennis | Local | Lighthouse Road | Revetment | Stone | $3,300 |
| 32 | Fairhaven | Local | Route 6 | Seawall | Stone | $87,300 |
| 32 | Fall River | Local | Bicentennial Park | Seawall | Stone | $97,280 |
| 32 | Fall River | State | Heritage State Park | Seawall | Stone | $63,080 |
| 32 | Falmouth | Local | Silver Beach | Seawall | Concrete | $2,100 |
| 32 | Falmouth | Local | Old Silver Beach | Revetment | Stone | $15,600 |
| 32 | Gloucester | Local | St. Peter's Marina | Revetment | Stone | $38,285 |
| 32 | Gloucester | Local | Crescent Beach | Seawall | Stone | $34,200 |
| 32 | Gloucester | Local | Lanes Cove | Revetment | Stone | $8,635 |
| 32 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $131,273 |
| 32 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $77,810 |
| 32 | Hingham | Local | Summer St. (Rt. 3A) | Seawall | Stone | $93,024 |
| 32 | Hull | Local | Highland Ave. | Seawall | Concrete | $32,088 |
| 32 | Hull | Local | Spring St. | Seawall | Stone | $65,208 |
| 32 | Manchester | Local | Mascomono Park | Seawall | Stone | $73,260 |
| 32 | Marblehead | Local | Cliff and Chestnut Street | Seawall | Stone | $11,760 |
| 32 | Marblehead | Local | State Street Landing | Seawall | Stone | $77,220 |
| 32 | Marblehead | Local | Front Street | Seawall | Concrete | $420 |
| 32 | Marblehead | Local | Dolliber Cove | Seawall | Concrete | $23,560 |
| 32 | Marblehead | Local | Grace Olivers Beach | Seawall | Stone | $143,075 |
| 32 | Marblehead | Local | Cliff Street Boat Yard | Seawall | Stone | $29,355 |
| 32 | Marshfield | Local | Town Landing | Revetment | Concrete | $27,360 |
| 32 | Marshfield | Local | Town Landing | Seawall | Concrete | $21,000 |
| 32 | Mattapoisett | Local | Water Street | Seawall | Concrete | $135,540 |
| 32 | Mattapoisett | Local | Water Street | Seawall | Concrete | $125,500 |
| 32 | New Bedford | Local | Fort Rodman | Revetment | Stone | $413,725 |
| 32 | New Bedford | Local | East Rodney French Boulevard | Seawall | Concrete | $92,400 |
| 32 | New Bedford | Local | East Rodney French Boulevard | Seawall | Stone | $180,720 |
| 32 | New Bedford | Local | Leonard's Wharf | Seawall | Steel | $261,040 |
| 32 | New Bedford | State | West Rodney French Boulevard | Revetment | Stone | $36,000 |
| 32 | New Bedford | State | West Rodney French Boulevard | Seawall | Stone | $20,080 |
| 32 | New Bedford | State | West Rodney French Boulevard | Seawall | Stone | $20,080 |
| 32 | Newburyport | Local | Harrison Street Joppa Park | Seawall | Concrete | $184,620 |
| 32 | Newburyport | Local | Fish Coop | Seawall | Steel | $96,040 |
| 32 | Newburyport | Local | Railroad Avenue | Seawall | Steel | $109,760 |
| 32 | Newburyport | Local | Railroad Avenue | Seawall | Steel | $80,605 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 32 | Newburyport | Local | Cashman Park | Revetment | Stone | $70,200 |
| 32 | Newburyport | Local | Cashman Park | Revetment | Stone | $52,800 |
| 32 | Newburyport | Local | Harbor Master Office Area | Seawall | Steel | $27,440 |
| 32 | Plymouth | Local | White Horse Beach | Revetment | Stone | $283,800 |
| 32 | Plymouth | Local | White Horse Beach | Revetment | Stone | $283,800 |
| 32 | Quincy | Local | Spring Street | Seawall | Stone | $123,300 |
| 32 | Rockport | Local | Old Granite Pier | Seawall | Stone | $269,280 |
| 32 | Rockport | Local | Pigeon Cove | Seawall | Stone | $50,200 |
| 32 | Rockport | Local | T-Wharf | Seawall | Stone | $376,200 |
| 32 | Rockport | Local | Old Garden Beach | Seawall | Stone | $19,272 |
| 32 | Salem | Local | Lafayette Street | Revetment | Stone | $271,420 |
| 32 | Salem | Local | Lafayette Place | Revetment | Stone | $301,210 |
| 32 | Salem | Local | Cat Cove | Seawall | Concrete | $100,400 |
| 32 | Salem | State | Cat Cove | Revetment | Stone | $64,220 |
| 32 | Salem | Local | Willows Park | Seawall | Concrete | $32,340 |
| 32 | Salem | Local | Willows Park | Seawall | Concrete | $48,640 |
| 32 | Salem | Local | Beach Avenue | Seawall | Stone | $15,120 |
| 32 | Salem | Local | Columbus Avenue | Seawall | Stone | $71,440 |
| 32 | Salem | Local | Winter Island | Seawall | Stone | $21,280 |
| 32 | Salem | Local | Winter Island | Revetment | Stone | $192,660 |
| 32 | Salem | Local | Turner Street | Seawall | Stone | $19,400 |
| 32 | Salem | Local | Hardy Street | Seawall | Stone | $6,275 |
| 32 | Salem | Local | Daniels Court | Seawall | Stone | $7,275 |
| 32 | Salem | Local | Daniel Street | Seawall | Stone | $65,340 |
| 32 | Salisbury | Local | First Street | Seawall | Stone | $100,980 |
| 32 | Salisbury | State | Merrimac River | Revetment | Stone | $62,400 |
| 32 | Scituate | Local | North Scituate Beach | Revetment | Stone | $298,300 |
| 32 | Scituate | Local | Jericho Rd. | Seawall | Concrete | $137,088 |
| 32 | Scituate | Local | Edward Foster Bridge Ave. | Revetment | Stone | $18,000 |
| 32 | Scituate | Local | Edward Foster Bridge Ave. | Revetment | Stone | $15,600 |
| 32 | Somerset | Local | Main Street | Seawall | Stone | $25,840 |
| 32 | Somerset | State | Route 6 Bridge | Revetment | Stone | $6,600 |
| 32 | Swampscott | Local | Blaney Beach - Center Wall | Seawall | Stone | $41,800 |
| 32 | Swampscott | Local | East Lincoln House Avenue | Seawall | Concrete | $20,520 |
| 32 | Wareham | State | Tempest Knob Boatramp | Revetment | Stone | $35,640 |
| 32 | Wareham | Local | Main Avenue Bridge | Seawall | Stone | $51,000 |
| 32 | Wareham | Local | Main Avenue Bridge | Seawall | Stone | $81,600 |
| 32 | Wareham | State | Tempest Knob Boatramp | Revetment | Stone | $21,600 |
| 32 | Westport | State | Bridge Road | Seawall | Concrete | $80,580 |
| 32 | Weymouth | Local | River Street | Seawall | Concrete | $42,840 |
| 32 | Weymouth | Local | Beach Road | Revetment | Stone | $33,000 |
| 32 | Weymouth | Local | Prospect Hill Drive | Revetment | Stone | $459,420 |
| 32 | Winthrop | State | Seawall Avenue | Revetment | Stone | $14,915 |
| 32 | Winthrop | Local | Frances Avenue | Seawall | Concrete | $53,040 |
| 32 | Winthrop | Local | Frances Avenue | Revetment | Stone | $25,200 |
| 32 | Yarmouth | Local | Bass River Gold Course | Revetment | Stone | $15,000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 32 | Yarmouth | Local | Wilbur Park | Revetment | Stone | $23,400 |
| 33 | Beverly | Local | Lyons Park Beach | Coastal Beach | Sand | $169,120 |
| 33 | Boston | State | East Boston - Constitution Beach | Coastal Beach | Sand | $67,990 |
| 33 | Boston | State | Dorchester - Savin Hill Beach | Coastal Beach | Sand | $384,810 |
| 33 | Boston | State | Dorchester - Tenean Street | Coastal Beach | Sand | $149,225 |
| 33 | Boston | State | South Boston - Pleasure Bay Beach | Coastal Beach | Sand | $56,810 |
| 33 | Boston | State | South Boston - Fort Independence Park | Coastal Beach | Sand | $120,650 |
| 33 | Boston | State | South Boston - Fort Independence Park | Coastal Beach | Sand | $140,843 |
| 33 | Boston | Local | South Boston - M Street Beach | Coastal Beach | Sand | $264,805 |
| 33 | Boston | State | South Boston - Moakley Fields | Coastal Dune | Sand | $231,200 |
| 33 | Boston | State | South Boston - Moakley Fields | Coastal Beach | Sand | $84,400 |
| 33 | Boston | State | South Boston - Moakley Fields | Coastal Beach | Sand | $142,240 |
| 33 | Bourne | Local | Monument Beach - Shore Road | Coastal Beach | Sand | $232,960 |
| 33 | Edgartown | Local | South Beach | Coastal Beach | Sand | $735,330 |
| 33 | Fairhaven | Local | Fort Phoenix Beach | Coastal Beach | Sand | $203,200 |
| 33 | Newbury | Local | Plum Island Boulevard | Coastal Beach | Sand | $17,145 |
| 33 | Newbury | Local | Plum Island - Dartmouth Way | Coastal Beach | Sand | $26,035 |
| 33 | Orleans | State | Namskaket - Wildflower Lane | Coastal Dune | Sand | $21,330 |
| 33 | Salisbury | State | Salisbury Beach | Coastal Dune | Sand | $45,030 |
| 33 | Wareham | Local | Onset Beach | Coastal Beach | Sand | $139,700 |
| 33 | Wareham | Local | Onset Beach - West | Coastal Beach | Sand | $254,000 |
| 34 | Bourne | Local | Tower Lane | Coastal Beach | Sand | $172,260 |
| | | | **YEAR SEVENTEEN TOTALS** | | | **$31,238,031** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR EIGHTEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 34 | Newbury | State | Plum Island | Coastal Dune | Sand | $790,000 |
| 34 | Salisbury | State | Salsbury Beach South Dune | Coastal Dune | Sand | $94,010 |
| 35 | Chatham | Local | Mill Creek | Groin/ Jetty | Stone | $564,400 |
| 35 | Chatham | Local | Mill Creek | Groin/ Jetty | Stone | $576,480 |
| 35 | Newbury | Local | Plum Island - Dartmouth Way | Groin/ Jetty | Stone | $139,440 |
| 35 | Oak Bluffs | Local | Oak Bluffs Harbor | Groin/ Jetty | Stone | $1,477,230 |
| 35 | Plymouth | Local | Eel River | Groin/ Jetty | Stone | $3,054,400 |
| 35 | Plymouth | Local | Manomet Bluffs | Groin/ Jetty | Stone | $1,294,800 |
| 35 | Wareham | Local | Indian Neck - Wassen Point | Groin/ Jetty | Stone | $168,140 |
| 35 | Westport | Local | Bridge Road | Breakwater | Stone | $86,320 |
| 35 | Yarmouth | Local | Beachwood Road | Groin/ Jetty | Stone | $398,400 |
| 36 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $204,400 |
| 36 | Falmouth | Local | Surf Drive Beach | Breakwater | Stone | $423,400 |
| 36 | Plymouth | Local | Plymouth Beach | Groin/ Jetty | Concrete | $401,500 |
| 36 | Plymouth | Local | Fisherman's Lane | Groin/ Jetty | Stone | $73,000 |
| 36 | Weymouth | Local | River Street | Groin/ Jetty | Stone | $58,400 |
| 37 | Barnstable | Local | Stewarts Creek at Ocean Avenue | Groin/ Jetty | Stone | $66,400 |
| 37 | Boston | State | Lovell's Island | Groin/ Jetty | Stone | $2,502,400 |
| 37 | Dennis | Local | Nobscussett Harbor | Breakwater | Stone | $1,777,480 |
| 37 | Eastham | Local | Bay Road | Groin/ Jetty | Stone | $212,480 |
| 37 | Fairhaven | Local | Little Bay/Nashetucket River | Groin/ Jetty | Stone | $216,180 |
| 37 | Falmouth | Local | Falmouth Heights | Groin/ Jetty | Stone | $112,880 |
| 37 | Falmouth | Local | Menauhant Road at Bournes Pond | Groin/ Jetty | Stone | $119,520 |
| 37 | Falmouth | Local | Jewelers Road | Groin/ Jetty | Stone | $411,680 |
| 37 | Gosnold | Local | Cuttyhunk South Jetty | Groin/ Jetty | Stone | $398,400 |
| 37 | Harwich | Local | Central Avenue | Groin/ Jetty | Stone | $166,000 |
| 37 | Hull | Local | Pemberton | Groin/ Jetty | Stone | $302,652 |
| 37 | Kingston | Local | Braintree Ave. | Groin/ Jetty | Stone | $112,880 |
| 37 | New Bedford | Local | Fort Rodman | Groin/ Jetty | Stone | $612,510 |
| 37 | Oak Bluffs | Local | Eastville Point | Groin/ Jetty | Wood | $31,625 |
| 37 | Plymouth | Local | White Horse Beach | Groin/ Jetty | Stone | $796,800 |
| 37 | Sandwich | Local | Town Beach | Groin/ Jetty | Stone | $1,912,320 |
| 37 | Truro | Local | Pamet Harbor - North Jetty | Groin/ Jetty | Stone | $720,600 |
| 37 | Weymouth | Local | Prospect Hill Drive | Groin/ Jetty | Stone | $53,120 |
| 37 | Yarmouth | Local | Thacher's Beach | Groin/ Jetty | Stone | $99,600 |
| 38 | Gloucester | Federal | Dog Bar Breakwater | Breakwater | Stone | $1,111,500 |
| 38 | Provincetown | Local | Provincetown Harbor | Breakwater | Stone | $785,000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Breakwater | | | |
| 38 | Rockport | Local | Pigeon Cove | Breakwater | Stone | $314,000 |
| 38 | Rockport | Local | Headlands Breakwater | Breakwater | Stone | $56,810 |
| 38 | Tisbury | Local | Vineyard Haven Harbor | Breakwater | Stone | $592,800 |
| 38 | Winthrop | Local | Five Sisters | Breakwater | Stone | $1,076,920 |
| 39 | Plymouth | Local | Lookout Point | Groin/ Jetty | Stone | $99,000 |
| 40 | Beverly | Local | Lyons Park | Groin/ Jetty | Stone | $32,400 |
| 40 | Braintree | Local | Lieutenant G. Murray Smith Beach | Groin/ Jetty | Stone | $7,920 |
| 40 | Braintree | Local | Lieutenant G. Murray Smith Beach | Groin/ Jetty | Stone | $13,860 |
| 40 | Dennis | Local | West Dennis Beach | Groin/ Jetty | Stone | $401,920 |
| 40 | Dennis | Local | Haigis Beach | Groin/ Jetty | Stone | $51,600 |
| 40 | Falmouth | Local | Old Silver Beach | Groin/ Jetty | Stone | $79,200 |
| 40 | Falmouth | Local | Old Silver Beach | Groin/ Jetty | Stone | $53,520 |
| 40 | Falmouth | Local | Old Silver Beach | Groin/ Jetty | Stone | $17,160 |
| 40 | Falmouth | Local | Trunk River Beach | Groin/ Jetty | Stone | $19,200 |
| 40 | Falmouth | Local | Trunk River Beach | Groin/ Jetty | Stone | $19,200 |
| 40 | Falmouth | Local | Little Pond | Groin/ Jetty | Stone | $33,000 |
| 40 | Falmouth | Local | Little Pond | Groin/ Jetty | Stone | $26,400 |
| 40 | Hingham | Local | Bell Air Rd. | Groin/ Jetty | Stone | $8,580 |
| 40 | New Bedford | Local | West Rodney French Boulevard | Groin/ Jetty | Stone | $168,000 |
| 40 | New Bedford | Local | West Rodney French Boulevard | Groin/ Jetty | Stone | $120,000 |
| 40 | Quincy | Local | Post Island | Groin/ Jetty | Stone | $519,600 |
| 40 | Quincy | Local | Edgewater Drive | Groin/ Jetty | Stone | $45,540 |
| 40 | Weymouth | Local | Fore River Avenue | Groin/ Jetty | Stone | $90,420 |
| 40 | Dartmouth | Local | Padamaran Harbor Breakwater | Breakwater | Stone | $223,200 |
| 40 | Nantucket | Local | Town Pier | Breakwater | Steel | $75,240 |
| 41 | Falmouth | Local | West Falmouth Harbor | Breakwater | Stone | $834,695 |
| 41 | Revere | Local | Roughan's Point | Breakwater | Stone | $4,261,900 |
| | | | **YEAR EIGHTEEN TOTALS** | | | **$31,568,432** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR NINETEEN

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 42 | Beverly | Local | Lynch Park | Seawall | Stone | $2,745,510 |
| 42 | Beverly | Local | Woodbury | Seawall | Stone | $25,500 |
| 42 | Beverly | Local | Ward Two Playground | Seawall | Stone | $920,700 |
| 42 | Boston | State | George's Island | Seawall | Stone | $532,950 |
| 42 | Boston | State | George's Island | Seawall | Concrete | $376,200 |
| 42 | Boston | State | George's Island | Seawall | Stone | $803,500 |
| 42 | Boston | State | Lovell's Island | Revetment | Stone | $1,487,990 |
| 42 | Boston | Local | Spectacle Island | Revetment | Stone | $289,535 |
| 42 | Boston | State | Gallops Island | Revetment | Stone | $619,030 |
| 42 | Boston | State | Gallops Island | Seawall | Stone | $61,625 |
| 42 | Boston | State | Lovell's Island | Revetment | Stone | $99,900 |
| 42 | Boston | State | Lovell's Island | Revetment | Stone | $141,525 |
| 42 | Boston | State | George's Island | Seawall | Stone | $265,650 |
| 42 | Bourne | Local | Pocasset River | Seawall | Concrete | $266,805 |
| 42 | Chilmark | Local | Menemsha Creek | Revetment | Stone | $60,100 |
| 42 | Chilmark | Local | Squibnocket Beach | Revetment | Stone | $253,825 |
| 42 | Cohasset | Local | Government Island | Seawall | Stone | $60,720 |
| 42 | Dennis | Local | Nobscussett Harbor | Revetment | Stone | $291,485 |
| 42 | Dennis | Local | Aunt Julia Anns Road | Seawall | Wood | $110,600 |
| 42 | Duxbury | Local | Howards Landing | Revetment | Stone | $15,626 |
| 42 | Eastham | State | Rock Harbor | Revetment | Stone | $49,950 |
| 42 | Eastham | Local | Collins Landing | Seawall | Concrete | $63,750 |
| 42 | Edgartown | Local | Mattakesett Bay Boat Ramp | Revetment | Stone | $180,300 |
| 42 | Edgartown | Local | Daggert Street Ferry Landing | Seawall | Stone | $125,400 |
| 42 | Fairhaven | Local | Main Street/Church Street | Seawall | Stone | $129,030 |
| 42 | Fairhaven | Local | Pilgrim Avenue | Seawall | Concrete | $87,285 |
| 42 | Fall River | Local | Remington Avenue | Seawall | Stone | $112,860 |
| 42 | Fall River | Local | Route 79/Taunton River | Revetment | Stone | $1,262,100 |
| 42 | Gloucester | Local | Lanes Cove | Seawall | Stone | $401,280 |
| 42 | Gloucester | Local | Solomon Jacobs Park | Seawall | Stone | $263,340 |
| 42 | Gloucester | Local | Lobster Pier | Seawall | Steel | $559,625 |
| 42 | Gloucester | Local | Town Landing | Seawall | Stone | $200,640 |
| 42 | Gosnold | Local | Town Pier | Revetment | Stone | $60,100 |
| 42 | Hingham | State | Weymouth Back River | Seawall | Concrete | $664,620 |
| 42 | Hingham | Local | Otis St. (Rt. 3A) | Revetment | Stone | $108,180 |
| 42 | Hull | Local | Newport Rd. | Revetment | Concrete | $48,025 |
| 42 | Kingston | Local | River St. | Seawall | Stone | $231,990 |
| 42 | Kingston | Local | Braintree Ave. | Seawall | Stone | $85,000 |
| 42 | Kingston | Local | Braintree Ave. | Seawall | Stone | $74,375 |
| 42 | Lynn | Local | Riley Way | Seawall | Stone | $514,800 |
| 42 | Lynn | Local | Riley Way Extension | Revetment | Stone | $445,170 |
| 42 | Manchester | Local | West Main Beach | Seawall | Concrete | $551,760 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 42 | Manchester | Local | Tucks Point | Seawall | Stone | $53,125 |
| 42 | Manchester | Local | Lobster Lane | Revetment | Stone | $72,120 |
| 42 | Manchester | Local | Lobster Cove | Seawall | Stone | $68,000 |
| 42 | Manchester | Local | Mascomono Park | Revetment | Stone | $363,165 |
| 42 | Manchester | Local | Mascomono Park | Revetment | Stone | $199,155 |
| 42 | Marblehead | Local | Castle Rock Wall | Seawall | Stone | $91,080 |
| 42 | Marblehead | Local | Harvard Street | Seawall | Stone | $17,000 |
| 42 | Marblehead | Local | Parker Lane | Seawall | Stone | $15,180 |
| 42 | Marblehead | Local | Crocker Park | Seawall | Stone | $56,925 |
| 42 | Marblehead | Local | Fort Seawall Lane | Seawall | Concrete | $468,355 |
| 42 | Marblehead | Local | Harding Lane | Seawall | Stone | $4,250 |
| 42 | Marblehead | Local | Jersey Street | Seawall | Concrete | $35,910 |
| 42 | Marblehead | Local | Beacon Street Ramp | Seawall | Stone | $23,375 |
| 42 | Marion | Local | Island Wharf | Seawall | Steel | $363,600 |
| 42 | Marion | Local | Silver Shell Beach | Seawall | Stone | $51,000 |
| 42 | Marion | Local | Island Wharf Road | Seawall | Stone | $148,750 |
| 42 | Marion | Local | Island Wharf Road | Seawall | Stone | $45,540 |
| 42 | Mattapoisett | Local | Water Street | Seawall | Stone | $990,660 |
| 42 | Nahant | Local | Bass Point Road | Revetment | Stone | $617,000 |
| 42 | Nahant | Local | Willow Road | Revetment | Stone | $678,700 |
| 42 | Nahant | Local | Willow Road and Wharf Street | Revetment | Concrete | $181,830 |
| 42 | Nahant | Local | Summer Street | Seawall | Stone | $110,055 |
| 42 | Nahant | Local | Summer Street | Seawall | Stone | $653,400 |
| 42 | New Bedford | Local | East Rodney French Boulevard | Revetment | Stone | $270,450 |
| 42 | New Bedford | Local | Gifford Street | Revetment | Stone | $153,180 |
| 42 | Newburyport | Local | Water Street | Seawall | Stone | $36,125 |
| 42 | Oak Bluffs | Local | Highland Drive | Seawall | Wood | $321,800 |
| 42 | Orleans | Local | Meeting House Pond | Revetment | Stone | $8,325 |
| 42 | Orleans | Local | Mill Pond | Revetment | Stone | $14,985 |
| 42 | Quincy | Local | Taffrail Road | Revetment | Stone | $208,125 |
| 42 | Quincy | State | Squantum Point Park | Seawall | Steel | $388,740 |
| 42 | Salem | Local | Collins Cove Park | Seawall | Stone | $174,570 |
| 42 | Salem | Local | Collins Cove Park | Revetment | Stone | $147,245 |
| 42 | Salem | Local | Collins Cove Park | Seawall | Concrete | $299,410 |
| 42 | Salem | Local | Winter Island | Revetment | Stone | $162,270 |
| 42 | Salem | Local | Winter Island | Revetment | Stone | $417,835 |
| 42 | Salem | Local | Winter Island | Revetment | Stone | $159,265 |
| 42 | Somerset | Local | Waterfront Park | Seawall | Stone | $379,500 |
| 42 | Somerset | Local | Waterfront Park | Revetment | Stone | $60,100 |
| 42 | Somerset | Local | Mallard Point | Seawall | Concrete | $50,160 |
| 42 | Somerset | Local | Mallard Point | Revetment | Stone | $315,350 |
| 42 | Somerset | Local | Mallard Point | Revetment | Stone | $315,350 |
| 42 | Swampscott | Local | Whales Beach | Seawall | Concrete | $280,830 |
| 42 | Tisbury | Local | Lagoon Harbor Park | Revetment | Stone | $255,425 |
| 42 | Truro | Local | Pamet Harbor | Revetment | Stone | $195,250 |
| 42 | Wellfleet | Local | Kendrick Avenue and Commercial Street | Seawall | Steel | $326,040 |
| 42 | Westport | State | Gooseberry Neck | Revetment | Stone | $66,600 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 43 | Beverly | Local | Ober Street | Seawall | Stone | $8,400 |
| 43 | Beverly | Local | Lyons Park Beach | Seawall | Concrete | $304,365 |
| 43 | Beverly | Local | Indepedence Park | Seawall | Stone | $95,760 |
| 43 | Boston | State | George's Island | Seawall | Concrete | $79,800 |
| 43 | Boston | State | George's Island | Seawall | Stone | $111,672 |
| 43 | Boston | Local | Spectacle Island | Seawall | Concrete | $89,050 |
| 43 | Boston | State | Gallops Island | Seawall | Stone | $275,010 |
| 43 | Boston | State | Charlestown - Warren Avenue | Seawall | Concrete | $2,940 |
| 43 | Boston | State | East Boston - Belle Island Park | Seawall | Concrete | $840 |
| 43 | Boston | State | South Boston - Bayside Expo Center | Revetment | Stone | $28,260 |
| 43 | Bourne | Local | Tide Way | Seawall | Wood | $7,620 |
| 43 | Bourne | Local | Circuit Avenue | Revetment | Stone | $15,180 |
| 43 | Chilmark | Local | Basin Road | Revetment | Stone | $15,700 |
| 43 | Chilmark | Local | Menemsha Creek | Seawall | Steel | $205,800 |
| 43 | Chilmark | Local | Menemsha Creek | Seawall | Steel | $68,600 |
| 43 | Chilmark | Local | Menemsha Beach | Seawall | Wood | $15,050 |
| 43 | Cohasset | Local | Border St. | Seawall | Stone | $60,240 |
| 43 | Cohasset | Local | Government Island | Revetment | Concrete | $50,200 |
| 43 | Dennis | Local | Stephen Phillip Road | Revetment | Stone | $3,140 |
| 43 | Dennis | Local | Captain Harding Lane | Seawall | Concrete | $24,320 |
| 43 | Duxbury | Local | Long Point | Seawall | Concrete | $24,000 |
| 43 | Duxbury | Local | Long Point | Revetment | Concrete | $7,560 |
| 43 | Duxbury | Local | Howards Landing | Seawall | Stone | $9,880 |
| 43 | Edgartown | Local | Edgartown Lighthouse | Revetment | Stone | $39,250 |
| 43 | Edgartown | Local | Chappaquiddick Road Ferry Landing | Seawall | Wood | $10,750 |
| 43 | Edgartown | Local | Memorial Wharf | Seawall | Steel | $62,750 |
| 43 | Fairhaven | Local | Pease Park | Seawall | Stone | $37,380 |
| 43 | Fairhaven | Local | Goulart Memorial Drive | Seawall | Concrete | $340,000 |
| 43 | Fairhaven | Local | Goulart Memorial Drive | Seawall | Concrete | $299,200 |
| 43 | Fairhaven | Local | Shore Drive | Revetment | Stone | $9,900 |
| 43 | Fall River | Local | Route 79/Taunton River | Seawall | Stone | $29,640 |
| 43 | Gloucester | Local | Head of the Harbor | Revetment | Stone | $29,640 |
| 43 | Gloucester | Local | Cripple Cove Public | Seawall | Stone | $50,200 |
| 43 | Gloucester | Local | Cripple Cove Public Landing | Revetment | Stone | $10,200 |
| 43 | Gosnold | Local | Blue Herring Drive | Revetment | Stone | $13,200 |
| 43 | Gosnold | Local | Cuttyhunk Harbor | Revetment | Stone | $98,125 |
| 43 | Hingham | Local | Martins Lane | Revetment | Stone | $14,850 |
| 43 | Hingham | Local | Stodders Neck | Revetment | Stone | $55,200 |
| 43 | Hingham | Local | Summer St. (Rt. 3A) | Revetment | Concrete | $44,536 |
| 43 | Hull | Local | Nantasket Rd. | Seawall | Concrete | $1,104,240 |
| 43 | Kingston | Local | River St. | Revetment | Concrete | $22,800 |
| 43 | Kingston | Local | Braintree Ave. | Revetment | Concrete | $4,200 |
| 43 | Lynn | Local | Lynnway Drive and Washington Street | Seawall | Concrete | $21,335 |
| 43 | Lynn | Local | Riley Way | Seawall | Steel | $78,890 |
| 43 | Marblehead | Local | Chandler Hovey Park | Revetment | Stone | $8,645 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 43 | Marblehead | Local | Chandler Hovey Park | Revetment | Stone | $16,055 |
| 43 | Marblehead | Local | Fort Sewall | Seawall | Concrete | $9,900 |
| 43 | Marblehead | Local | Village Street | Seawall | Stone | $2,100 |
| 43 | Marion | Local | Old Landing | Seawall | Stone | $142,120 |
| 43 | Marion | Local | Delano Road | Revetment | Stone | $5,610 |
| 43 | Marion | Local | Silver Shell Beach | Revetment | Stone | $5,610 |
| 43 | Mattapoisett | Local | Ned's Point Road | Revetment | Stone | $78,000 |
| 43 | Mattapoisett | Local | Water Street | Revetment | Stone | $36,110 |
| 43 | Mattapoisett | Local | Route 101 | Seawall | Concrete | $27,825 |
| 43 | Mattapoisett | Local | Route 101 | Seawall | Concrete | $53,795 |
| 43 | Mattapoisett | Local | Mattapoisett Neck Road | Seawall | Stone | $12,600 |
| 43 | Mattapoisett | Local | Old Mattapoisett Neck Road | Revetment | Stone | $5,610 |
| 43 | Mattapoisett | Local | Water Street | Seawall | Concrete | $6,720 |
| 43 | Nahant | Local | Willow Road and Wharf Street | Seawall | Stone | $29,820 |
| 43 | Nantucket | Local | Polpis Harbor Bulkhead | Seawall | Wood | $28,175 |
| 43 | New Bedford | Local | Fort Rodman | Revetment | Stone | $39,600 |
| 43 | Newburyport | Local | Cashman Park | Revetment | Stone | $103,800 |
| 43 | Oak Bluffs | State | Edgartown-Oak Bluffs Road | Revetment | Stone | $96,000 |
| 43 | Oak Bluffs | State | Inlet to Sengekontacket Pond | Revetment | Stone | $39,000 |
| 43 | Oak Bluffs | Local | Beach Road Bridge | Revetment | Stone | $60,000 |
| 43 | Oak Bluffs | Local | Beach Road Bridge | Revetment | Stone | $30,000 |
| 43 | Oak Bluffs | Local | East Chop | Revetment | Stone | $30,000 |
| 43 | Orleans | Local | Asa's Landing | Revetment | Stone | $1,320 |
| 43 | Orleans | Local | Town Cove - Eastham Town Line | Seawall | Wood | $26,565 |
| 43 | Quincy | State | Squantum Point Park | Seawall | Concrete | $27,610 |
| 43 | Salem | Local | Old Railroad Bed | Revetment | Stone | $88,920 |
| 43 | Salem | Local | Willows Park | Seawall | Stone | $20,520 |
| 43 | Salem | Local | Willows Park | Seawall | Stone | $12,240 |
| 43 | Salem | Local | Willows Park | Seawall | Concrete | $13,805 |
| 43 | Salem | Local | Willows Park | Revetment | Stone | $31,400 |
| | | | **YEAR NINETEEN TOTALS** | | | **$29,359,621** |

# 20 YEAR MAINTENANCE AND REPAIR
# YEAR TWENTY

| Overall Priority | Town | Owner | Location | Primary Type | Primary Material | Estimated Repair Costs 2006 Value |
|---|---|---|---|---|---|---|
| 43 | Salisbury | State | State Park | Seawall | Concrete | $560,320 |
| 43 | Saugus | Local | Vitale Memorial Park | Revetment | Stone | $36,600 |
| 43 | Somerset | Local | South Street Culvert | Revetment | Stone | $9,000 |
| 43 | Somerset | Local | Dublin Street | Revetment | Stone | $5,400 |
| 43 | Tisbury | Local | Lagoon Pond | Revetment | Stone | $72,000 |
| 43 | Wellfleet | Local | Town Pier | Seawall | Wood | $41,064 |
| 43 | Weymouth | Local | Beach Road | Revetment | Stone | $36,110 |
| 43 | Weymouth | State | Grape Island | Seawall | Wood | $13,335 |
| 43 | Winthrop | Local | Kennedy Road | Revetment | Stone | $132,000 |
| 44 | Bourne | Local | Arthur Avenue | Coastal Beach | Sand | $4,290 |
| 44 | Bourne | Local | Circuit Avenue | Coastal Beach | Sand | $116,840 |
| 44 | Mashpee | State | South Cape Beach | Coastal Beach | Sand | $1,098,550 |
| 44 | Nantucket | Local | Polpis Harbor | Coastal Beach | Sand | $15,600 |
| 44 | Nantucket | Local | Pocomo Head | Coastal Beach | Sand | $43,550 |
| 44 | Oak Bluffs | Local | Eastville Point | Coastal Beach | Sand | $224,000 |
| 44 | Oak Bluffs | State | Joseph Sylvia State Beach | Coastal Beach | Sand | $1,388,800 |
| 44 | Somerset | Local | Pierce Park | Coastal Beach | Sand | $10,120 |
| 44 | Tisbury | Local | Herring Creek | Coastal Beach | Sand | $33,600 |
| 45 | Barnstable | Local | Veteran's Memorial Beach | Groin/ Jetty | Stone | $192,560 |
| 45 | Brewster | Local | Paines Creek Beach | Groin/ Jetty | Stone | $330,275 |
| 45 | Chatham | Local | Forest Beach | Groin/ Jetty | Stone | $252,320 |
| 45 | Dennis | Local | Glendon Road Beach | Groin/ Jetty | Stone | $262,280 |
| 45 | Falmouth | Local | Silver Beach | Groin/ Jetty | Stone | $358,560 |
| 45 | Falmouth | Local | Surf Drive Beach | Groin/ Jetty | Stone | $345,280 |
| 45 | Falmouth | Local | Central Park Beach | Groin/ Jetty | Stone | $265,600 |
| 45 | Falmouth | Local | Little Pond | Groin/ Jetty | Stone | $156,130 |
| 45 | Falmouth | Local | Great Pond | Groin/ Jetty | Stone | $215,800 |
| 45 | Falmouth | Local | Vineyard Street | Groin/ Jetty | Stone | $354,295 |
| 45 | Gosnold | Local | Town Pier | Groin/ Jetty | Stone | $156,400 |
| 45 | Marshfield | Local | Ocean St. | Groin/ Jetty | Stone | $696,580 |
| 45 | Marshfield | Local | Ocean St. | Groin/ Jetty | Stone | $66,400 |
| 45 | New Bedford | Local | East Rodney French Boulevard | Groin/ Jetty | Stone | $540,450 |
| 45 | Newburyport | Local | Cashman Park | Groin/ Jetty | Stone | $30,025 |
| 45 | Plymouth | Local | Ellisville Harbor | Groin/ Jetty | Stone | $76,360 |
| 45 | Quincy | Local | Prescott Terrace | Groin/ Jetty | Stone | $99,600 |
| 45 | Wareham | Local | Little Harbor Beach | Groin/ Jetty | Stone | $79,680 |
| 45 | Wellfleet | Local | Kendrick Beach | Groin/ Jetty | Stone | $66,400 |
| 45 | Winthrop | Local | Frances Avenue | Groin/ Jetty | Stone | $36,520 |
| 45 | Yarmouth | Local | Parkers River Beach | Groin/ Jetty | Stone | $119,520 |
| 46 | Aquinnah | Local | Menemsha Inlet | Groin/ Jetty | Stone | $125,600 |
| 46 | Beverly | Local | Water Street | Groin/ Jetty | Stone | $61,230 |
| 46 | Beverly | Local | Wilson Avenue | Groin/ Jetty | Stone | $59,660 |
| 46 | Bourne | Local | Monument Beach - Shore | Groin/ Jetty | Stone | $24,000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Road | | | |
| 46 | Chilmark | Local | Menemsha Inlet | Breakwater | Stone | $147,580 |
| 46 | Dartmouth | Local | Mosher Street | Groin/ Jetty | Stone | $24,000 |
| 46 | Marshfield | Local | Brant Rock | Groin/ Jetty | Stone | $62,040 |
| 46 | Mashpee | Local | Seconsett Island Road at Hamblin Pond | Groin/ Jetty | Stone | $64,020 |
| 46 | New Bedford | Local | East Rodney French Boulevard | Groin/ Jetty | Stone | $72,000 |
| 46 | New Bedford | Local | East Rodney French Boulevard | Groin/ Jetty | Stone | $60,000 |
| 46 | Newbury | Local | Plum Island Boulevard | Groin/ Jetty | Stone | $96,330 |
| 46 | Salisbury | State | Gillis Bridge | Groin/ Jetty | Stone | $19,760 |
| 46 | Wellfleet | Local | Mayo Beach | Groin/ Jetty | Stone | $40,920 |
| 46 | Wellfleet | Local | Nauset Road | Breakwater | Stone | $213,600 |
| 46 | Westport | State | Horseneck Point | Groin/ Jetty | Stone | $43,560 |
| 46 | Westport | Local | Bridge Road | Groin/ Jetty | Stone | $12,000 |
| 47 | Barnstable | Local | Kalmus Beach | Groin/ Jetty | Stone | $139,440 |
| 47 | Boston | State | George's Island | Groin/ Jetty | Stone | $192,160 |
| 47 | Boston | State | George's Island | Groin/ Jetty | Stone | $298,800 |
| 47 | Dennis | Local | Nobscusett Harbor | Groin/ Jetty | Stone | $43,160 |
| 47 | Dennis | Local | Nobscussett Harbor | Groin/ Jetty | Stone | $199,200 |
| 47 | Dennis | Local | West Dennis Beach | Groin/ Jetty | Stone | $126,160 |
| 47 | Eastham | Local | Harmes Way | Groin/ Jetty | Stone | $106,240 |
| 47 | Edgartown | Local | Cape Poge Wildlife Refuge | Groin/ Jetty | Stone | $240,200 |
| 47 | Fairhaven | Local | Shore Drive | Groin/ Jetty | Stone | $168,140 |
| 47 | Falmouth | Local | Stoney Beach | Groin/ Jetty | Stone | $172,640 |
| 47 | Falmouth | Local | Great Pond | Groin/ Jetty | Stone | $139,440 |
| 47 | Falmouth | Local | Menauhant Road East of Bournes Pond | Groin/ Jetty | Stone | $169,320 |
| 47 | Harwich | Local | Red River Beach | Groin/ Jetty | Stone | $285,520 |
| 47 | Hingham | State | Lincoln St. (Rt. 3A) | Groin/ Jetty | Stone | $108,090 |
| 47 | Ipswich | State | Plum Island | Groin/ Jetty | Stone | $86,320 |
| 47 | Kingston | Local | Braintree Ave. | Groin/ Jetty | Stone | $33,200 |
| 47 | New Bedford | Local | Fort Rodman | Groin/ Jetty | Stone | $300,250 |
| 47 | Oak Bluffs | Local | Eastville Point | Breakwater | Stone | $720,600 |
| 47 | Oak Bluffs | State | Joseph Sylvia State Park | Groin/ Jetty | Stone | $390,325 |
| 47 | Salisbury | State | State Park | Groin/ Jetty | Stone | $320,840 |
| 47 | Truro | Local | Pamet Harbor - South Jetty | Groin/ Jetty | Stone | $582,485 |
| 47 | Weymouth | Local | Regatta Road | Groin/ Jetty | Stone | $216,180 |
| 47 | Weymouth | Local | Regatta Road | Groin/ Jetty | Stone | $43,160 |
| 48 | Boston | State | Gallops Island | Breakwater | Stone | $308,750 |
| 48 | Bourne | Local | Cape Cod Bay | Groin/ Jetty | Stone | $346,800 |
| 48 | Bourne | Local | Pocasset Inlet | Groin/ Jetty | Stone | $110,400 |
| 48 | Bourne | Local | Pocasset Inlet | Groin/ Jetty | Stone | $48,000 |
| 48 | Bourne | Local | Barlow's Landing | Groin/ Jetty | Stone | $19,200 |
| 48 | Bourne | Local | Circuit Avenue | Groin/ Jetty | Stone | $36,000 |
| 48 | Chilmark | Local | Menemsha Beach | Groin/ Jetty | Stone | $19,800 |
| 48 | Cohasset | Local | H. Gleason Rd. | Groin/ Jetty | Stone | $28,800 |
| 48 | Dennis | Local | Trotting Park Road | Groin/ Jetty | Stone | $20,460 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Extension | | | |
| 48 | Eastham | Local | Rock Harbor Inlet | Groin/ Jetty | Stone | $62,800 |
| 48 | Fairhaven | Local | Fort Phoenix | Groin/ Jetty | Stone | $72,000 |
| 48 | Gosnold | Local | Cuttyhunk North Jetty | Groin/ Jetty | Stone | $157,000 |
| 48 | Harwich | Local | Pleasant Road Beach | Groin/ Jetty | Stone | $12,540 |
| 48 | Harwich | Local | Earle Road | Groin/ Jetty | Stone | $11,880 |
| 48 | Mattapoisett | Local | Water Street | Groin/ Jetty | Stone | $9,900 |
| 48 | Oak Bluffs | Local | Sea view Avenue | Groin/ Jetty | Stone | $16,500 |
| 48 | Oak Bluffs | Local | Sea view Avenue | Groin/ Jetty | Stone | $66,000 |
| 48 | Oak Bluffs | Local | Sea view Avenue | Groin/ Jetty | Stone | $26,400 |
| 48 | Orleans | Local | Rock Harbor Inlet | Groin/ Jetty | Stone | $38,400 |
| 48 | Provincetown | Local | Long Point Marshes | Breakwater | Stone | $1,884,000 |
| 48 | Quincy | Local | Shore Avenue | Groin/ Jetty | Stone | $14,520 |
| 48 | Salisbury | State | State Park | Groin/ Jetty | Stone | $9,600 |
| 48 | Scituate | Local | MISSING | Groin/ Jetty | Stone | $132,000 |
| 48 | Tisbury | Local | Lake Tashmoo | Groin/ Jetty | Stone | $117,750 |
| 48 | Tisbury | Local | Osprey Lane | Groin/ Jetty | Stone | $62,800 |
| 48 | Tisbury | Local | Beach Road | Groin/ Jetty | Stone | $33,000 |
| 48 | Weymouth | Local | Wessagussett Beach | Groin/ Jetty | Stone | $43,560 |
| N/A | Swansea | Local | Ocean Grove Beach | Coastal Beach | Sand | $0 |
| N/A | Bourne | Local | Gardenier Avenue | Coastal Beach | Sand | $0 |
| N/A | Nantucket | Local | Children's Beach | Coastal Beach | Sand | $0 |
| N/A | Salisbury | State | Driftway Street | Coastal Beach | Sand | $0 |
| N/A | Salisbury | State | Broadway | Coastal Beach | Sand | $0 |
| N/A | New Bedford | Local | West Rodney French Boulevard | Groin/ Jetty | Stone | $0 |
| N/A | Bourne | Local | Barlow's Landing | Groin/ Jetty | Stone | $0 |
| N/A | Marion | Local | Silver Shell Beach | Groin/ Jetty | Stone | $0 |
| N/A | Marion | Local | Silver Shell Beach | Groin/ Jetty | Stone | $0 |
| N/A | Mattapoisett | Local | Brandt Island Shores | Groin/ Jetty | Stone | $0 |
| N/A | New Bedford | Local | Merchant Mariner Memorial Walkway | Groin/ Jetty | Stone | $0 |
| N/A | Oak Bluffs | State | Joseph Sylvia State Park | Groin/ Jetty | Wood | $0 |
| N/A | Tisbury | Local | Lake Tashmoo | Groin/ Jetty | Stone | $0 |
| N/A | Boston | Local | Spectacle Island | Seawall | Stone | $0 |
| N/A | Boston | State | Dorchester - Bayside Expo Center | Revetment | Stone | $0 |
| N/A | Hingham | State | Lincoln St. (Rt. 3A) | Seawall | Concrete | $0 |
| N/A | Hull | Local | Spring St. | Revetment | Stone | $0 |
| N/A | Marblehead | Local | Tucker's Wharf | Seawall | Stone | $0 |
| N/A | Nantucket | Local | Jackson Point Boat Ramp | Seawall | Wood | $11,550 |
| N/A | Quincy | Local | Chickatabot Road | Seawall | Concrete | $88,245 |
| N/A | Boston | State | Dorchester - Mount Vernon Street | Seawall | Concrete | $0 |
| N/A | Boston | State | Dorchester - Mount Vernon Street | Revetment | Stone | $0 |
| N/A | Gloucester | Local | Stacey Boulevard - West | Seawall | Stone | $0 |
| N/A | Hull | Local | Highland Ave. | Revetment | Stone | $0 |
| N/A | Hull | Local | James Ave. | Seawall | Concrete | $0 |
| N/A | Hull | Local | Point Allerton | Seawall | Concrete | $0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| N/A | Hull | Local | Point Allerton Seawall | Seawall | Concrete | $0 |
| N/A | Hull | Local | Caddish Ave. | Revetment | Stone | $0 |
| N/A | Oak Bluffs | Local | Sea view Avenue Extension | Seawall | Concrete | $312,800 |
| N/A | Oak Bluffs | Local | Circuit Avenue Extension | Seawall | Steel | $0 |
| N/A | Quincy | State | Quincy Shore Drive | Seawall | Stone | $0 |
| N/A | Quincy | State | Quincy Shore Drive | Seawall | Concrete | $0 |
| N/A | Quincy | State | Quincy Shore Drive | Seawall | Concrete | $0 |
| N/A | Quincy | State | Quincy Shore Drive | Revetment | Stone | $0 |
| N/A | Rockport | Local | Beach Street | Seawall | Stone | $0 |
| N/A | Rockport | Local | Beach Street | Seawall | Concrete | $0 |
| N/A | Scituate | Local | Glades Rd. | Seawall | Concrete | $0 |
| N/A | Scituate | Local | Beaver Dam Rd. | Seawall | Concrete | $0 |
| N/A | Boston | State | Charlestown - Warren Avenue | Seawall | Concrete | $0 |
| N/A | Dennis | Local | Bridge Street | Seawall | Wood | $0 |
| N/A | Dennis | Local | Uncle Freemans Road | Seawall | Wood | $0 |
| N/A | Dennis | Local | Bridge Street | Seawall | Wood | $0 |
| N/A | Eastham | Local | Campground Road | Revetment | Stone | $0 |
| N/A | Hingham | State | Weymouth Back River | Seawall | Concrete | $0 |
| N/A | Hull | Local | Caddish Ave. | Revetment | Stone | $0 |
| N/A | Hull | State | Nantasket Beach | Seawall | Concrete | $586,576 |
| N/A | Hull | Local | Hampton Hill | Revetment | Stone | $0 |
| N/A | Quincy | State | Quincy Shore Drive | Seawall | Concrete | $0 |
| N/A | Boston | Local | East Boston - Sumner Street | Seawall | Stone | $0 |
| N/A | Boston | Local | Boston - East India Row | Seawall | Stone | $0 |
| N/A | Boston | Local | East Boston - Condor Street | Revetment | Stone | $0 |
| N/A | Dennis | Local | Ferry Street landing | Seawall | Wood | $0 |
| N/A | Dennis | Local | Cove Road | Seawall | Wood | $0 |
| N/A | Fall River | State | State Pier | Seawall | Concrete | $0 |
| N/A | Falmouth | Local | Quickset Harbor | Seawall | Wood | $0 |
| N/A | Hull | Local | Nantasket Beach | Revetment | Stone | $0 |
| N/A | Marblehead | Local | Parker's Yacht Yard | Seawall | Concrete | $0 |
| N/A | Mattapoisett | Local | Water Street | Revetment | Stone | $0 |
| N/A | Nantucket | Local | Children's Beach | Seawall | Wood | $0 |
| N/A | Newburyport | Local | Railroad Avenue | Seawall | Steel | $0 |
| N/A | Boston | Local | Spectacle Island | Revetment | Stone | $0 |
| N/A | Bourne | Local | Arthur Avenue | Seawall | Concrete | $0 |
| N/A | Dennis | Local | Sea Street | Revetment | Stone | $0 |
| N/A | Dennis | Local | Sea Street | Revetment | Stone | $0 |
| N/A | Gloucester | Local | Fort Point | Seawall | Concrete | $125,970 |
| N/A | Marion | Local | Planting Island Road | Revetment | Stone | $0 |
| N/A | Marion | Local | Island Wharf Road | Revetment | Stone | $0 |
| N/A | Marion | Local | Old Landing | Seawall | Concrete | $9,240 |
| N/A | Mattapoisett | Local | Mattapoisett Neck Road | Revetment | Stone | $0 |
| N/A | Mattapoisett | Local | Mattapoisett Neck | Revetment | Stone | $0 |
| N/A | Mattapoisett | Local | Mattapoisett Neck | Revetment | Stone | $0 |
| N/A | Mattapoisett | Local | Old Mattapoisett Neck | Revetment | Stone | $0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Road | | | |
| N/A | Nahant | State | Nahant Road | Revetment | Stone | $0 |
| N/A | Oak Bluffs | Local | Sea view Avenue | Revetment | Stone | $0 |
| N/A | Wellfleet | Local | Town Pier | Revetment | Stone | $0 |
| | | | **YEAR TWENTY TOTALS** | | | **$24,618,497** |