South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project Coastal Hazards Commission

Town of Kingston

Prepared for: Office of Coastal Zone Management Boston, MA

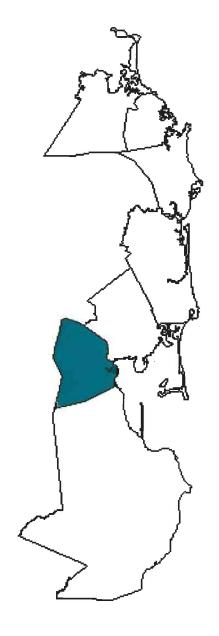
February 28, 2007

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Waterfront Engineers

TABLE OF CONTENTS

TABLE OF CONTENTS

Section I - Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

PURPOSE

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES
DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

Section II - Community Findings

COMMUNITY DESCRIPTION
STRUCTURE INVENTORY
SUMMARY OF FINDINGS

Section III – Structure Assessment Reports

Section IV - Structure Photographs

Section V - Structure Documents

TOWN DOCUMENT LIST

Document Table

MA DCR - DOCUMENT LIST

• Document Table

MA DEP - Chp. 91 DOCUMENT LIST

- Document Table
- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Document Table
- Copies of Permit Documents

Section I

Town of Kingston

Coastal Hazards Infrastructure and Assessment Program



South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project Coastal Hazards Commission

Section I - Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

The Project and Client

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

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

The 20-Yr Infrastructure Working Group is led by Representative Frank Hynes with CZM as the lead State Agency overseeing the management of the project. The region included in the demonstration project was identified as the South Shore and included the eight communities of Hingham, Hull, Cohasset, Scituate, Marshfield, Duxbury, Kingston and Plymouth.

Consultant Team

The consultant team that performed the demonstration project was led by Bourne Consulting Engineering (BCE) of Franklin, MA who was responsible for overall project management, research and field assessments. Assisting BCE was Applied Coastal Research and Engineering, Inc. of Mashpee, MA who was responsible for field assessments and GIS data conversion. Alpha Land Surveying and Engineering of Middleboro, MA also supported the Team with field GPS survey.

PURPOSE

Study Purpose

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

As this is a demonstration project, it will serve as the basis for development of a statewide inventory and assessment of all Commonwealth coastal structures and the needs for their maintenance and/or repair. Incorporated into this project will be the identification of issues and limitations of the investigation and

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assessment to achieve the overall goals and what should be included in future investigations/assessments of coastal structures for the other regions.

Goals of Study

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

- To be used as the model to go forward for assessment of coastal structures for the remainder of the coastal regions
- To identify areas of research and/or assessment that need to be modified for future phases that were not included within the demonstration project
- Complete the study with the final report by November 15, 2006 for submission to the Coastal Hazards Commission
- To identify all the coastal structures the state either owns or has responsibility to maintain for the eight communities included within the study
- Of the structures identified, determine the structure location and characteristics, the structure condition relative to providing coastal protection and the structure importance in relation to what it is protecting.
- To the degree possible, identify the structure elevation and the FIRM mapping flood elevation and category.
- To the degree possible, identify structure owner and available documents from local, state and federal agencies.
- To establish an estimated cost to rehabilitate the coastal structures to provide the level of project established in the structure's original design.
- Provide the information in a format compatible for incorporation into the MassGIS system

Limit of Study

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

- All property ownership was taken as presumed. No legal investigation of ownership was
 performed during the project. Property ownership is based on town assessor maps. Where
 structures were located outshore of assessor map defined property lines, it was assumed to be
 Town land unless other information indicated otherwise. Where structures were located outshore
 of Mean Low Water, property is assumed to be State owned.
- The structure ownership was based on assessor maps and research at the local, state and federal levels. Where there was indication of public work on a structure on Town land or on private property, the structure was presumed to be Town owned. Where the structure was on state property, the structure was presumed to be state owned. Where ownership of the structure was not clear but was located on private property, the structure ownership was defined as unknown.
- The study included town and state owned structures as it was assumed that most town owned structures received state funding at some level for construction and/or maintenance.
 - o Federal structures were identified but no assessment of conditions or priority was performed.
 - o Structures that were determined to be private were not included.
 - O Undocumented structures considered to be on private land, but having the potential to have been publicly built and/or maintained, were identified as having an "unknown ownership".

I -2

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- The prioritizing of structures was based primarily on risk to general infrastructure and density of housing. Infrastructure included was buildings. The study did not consider all infrastructure issues including:
 - No consideration on utility impacts water, electrical, sewer, gas
 - o No consideration of roadway and bridge protection
 - o Evacuation routes were not considered within the investigation
 - o Location of Emergency Shelters were not included in priority assessments
- Research was performed at the local, state and federal levels. The local research was limited to location and documenting available coastal structure contract drawings. Research at DCR was restricted to available historic construction plans for coastal structures at the MA-DCR Waterways office in Hingham, MA. No investigation of state archives was performed. Research at MA DEP Chp 91 and USACE was limited to recorded permits and licenses found in their files. No investigation was performed at the Registry of Deeds.

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

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

Database Attributes

Attribute Descriptions/Definitions

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

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

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

CCC-MMM-PPP-BBB-SSS

Where: CCC DEP Community Number

MMM Community Map Number

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BBB Block Number (000 if no block numbering system)

PPP Community Parcel Number

SSS Structure Number



<u>Property Ownership:</u> 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 the state.

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

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

<u>Basis of Ownership</u>: 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

<u>Structure Owner's Name:</u> 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.

<u>Earliest Structure Record:</u> 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.

<u>Primary Structure</u> / <u>Secondary Structure</u>: 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.



<u>Structure Material</u>: The identification of the coastal structure's material of construction was performed and represents the primary material. Stone structures consisted of both mortared and non-mortared conditions.

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

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

Structure Condition: A preliminary assessment of the condition for each structure was performed by the field teams. This was by visual observation only and no detailed investigation was performed. The condition assessments were based on a predefined five level rating system that ranged from Rating A for Excellent Condition to Rating F for Critical Condition. A detailed listing of the conditions and their definitions can be seen in Exhibit A.

<u>Priority Rating:</u> In order to account for the need for protection at any one site, a five level priority rating system was established. This allowed for consideration of public infrastructure protection, density of residential housing for development of structure overall importance for coastal protection. The ratings range from Level 1 for no infrastructure or residence protection to Level 5 for critical inshore infrastructure protection and/or high density residential. The detailed listing and definitions for the priority categories can be seen in Exhibit B.

Structure Repair / Reconstruction Cost: A preliminary estimation of construction costs to maintain or repair structures was made based on the preliminary field assessment of the structures. A Repair Cost Matrix was developed based on structure type, condition, height and material and can be seen in Exhibit C. Once each structure's type, height, and material classifications were determined, the cost per foot for the structure was 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.

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

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

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

<u>FEMA Zone and Elevation:</u> 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.

<u>Pictures:</u> At the time of the field assessments, digital photographs were taken to provide a general overview of the structure. The number of pictures were 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.

<u>Town Documents:</u> Town documents represent the structure information that could be found in the Town's DPW/Engineering Department records. Where particular records could be found, a table of document information was developed and included within the database with limited descriptions.

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

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

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

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

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

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

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



I-6

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.

<u>Height of Structure</u> – 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

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

<u>Bulkhead / Seawall Structures</u> – 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.

<u>Groins and Jetties</u> – 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.

<u>Coastal Beaches</u> – 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.

<u>Coastal Dunes</u> – 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.

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

<u>Engineering and Regulatory Approvals</u> – A ten percent increase to the cost matrix prices was assessed to represent the engineering design and regulatory approval requirements for the restoration of these structures.



EXHIBIT A

Structure Condition Table – 5 Level Rating System

Co	liminary ndition essment	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.	None
		Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm	
	Cont	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present.	
В	Good	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.	Moderate
		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	
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.	Major
		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.	
		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	
F	Critical	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.	Immediate
		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.	



EXHIBIT B Priority Rating System - 5 Level Rating System

Pri	eliminary ority Level ssessment	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
н	Low Priority	Inshore Structures Present with Limited potential for Significant Infrastructure Damage	Future Project Consideration
ш	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	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



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	A	B ST	RUCTURE CONDITION R	ATING 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
	1166	10 To 15 Feet	\$0	\$251	\$1,254	\$2,508	\$2,772
	EIV.	Over 15 Feet	\$0	\$343	\$1,716	\$3,432	\$3,795
	STONE	Under 5 Feet	\$0	\$84	\$425	\$850	\$983
	N.	5 To 10 Feet	\$0	\$152	\$759	\$1,518	\$1,782
		10 To 15 Feel	\$0	\$251	\$1,254	\$2,508	\$2,970
	<u> </u>	Over 15 Feet	\$0	\$396	\$1,980	\$3,960	\$4,752
	WOOD	Under 5 Feet	\$0	\$86	\$431	\$862	\$994
	HE SEED OF THE	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
	SAND	Under 5 Feet	\$0	\$26	\$132	\$264	\$264
OASTAL BEACH		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
	■ SAND	Under 5 Feet	\$0	\$18	\$93	\$186	\$186
OASTAL DUNE	188	5 To 10 Feet	\$0	\$48	\$238	\$476	\$476
		10 To 15 Feet	\$0	\$79	\$395	\$790	\$790
	1024	Over 15 Feet	\$0	\$132	\$660	\$1,320	\$1,320
EVETMENT	STONE	Under 5 Feel	\$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 Feel	\$0_	\$247	\$1,234	\$2,468	\$2,666
ROIN	STONE	Under 5 Feet	\$0	\$157	\$664	\$1,328	\$1,460
		5 To 10 Feel	\$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.



I-11

Section II

Town of Kingston

Community Findings



Section II - Community Findings - Town of Kingston

COMMUNITY DESCRIPTION

The Town of Kingston consists of a land area of 18.5 square miles out of a total area of 20.4 square miles and had a population of 11,780 in the 2000 census. The Town is located on the South Shore of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline that is directly exposed to open ocean waves is 3.2 miles with the remaining shoreline semi-protected by offshore structures or landforms. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Kingston, there were 10 publicly owned structures identified which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 3 in Section III 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	۱-٦	Fown	of	Kingston
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	Total	Stru	cture Condi	tion Rating		Total Length
Primary Structure (1)	Structures A	В	С	D	F	(feet)
Bulkhead / Seawall	4		4			660
Revetment	4	4				1340
Groin / Jetty	2		1	1		135
Coastal Dune						
Coastal Beach						
	10	4	5	1		2135

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

The development of repair costs has been included by structure type and by condition. In the Town of Kingston's case there are a total of 10 structures which would require approximately \$776,000 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 \$113,000 would be required to upgrade the Town's coastal protection.



 Π - 1

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Kingston

	Total		Stre	ıctı	re Condi	ion Rating			
Primary Structure (1)	Structures	A	B		С	D	F	T	otal Cost
Bulkhead / Seawall	4			\$	433,884			\$	433,884
Revetment	4		\$195,769					\$	195,769
Groin / Jetty	2			\$	33,198	\$112,873		\$	146,071
Coastal Dune								\$	-
Coastal Beach								\$	-
	10	\$ -	\$195,769	\$	467,082	\$112,873	\$ 	- \$	775,724

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Kingston

	Total		Stru	ıctı	re Condit	ion Rating	 	-	
Primary Structure (1)	Structures	A_	В		c	D	F		otal Cost
Town Owned Commonwealth of Massachusetts Federal Government Owned Unknown Ownership	10		\$195,769	\$	467,082	\$112,873		\$ \$ \$ \$	775,724 - - - -
	10	\$-	\$195,769	\$	467,082	\$112,873	\$ -	\$	775,724

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

SUMMARY

The enclosed reports and associated documents reflects the Town of Kingston'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.



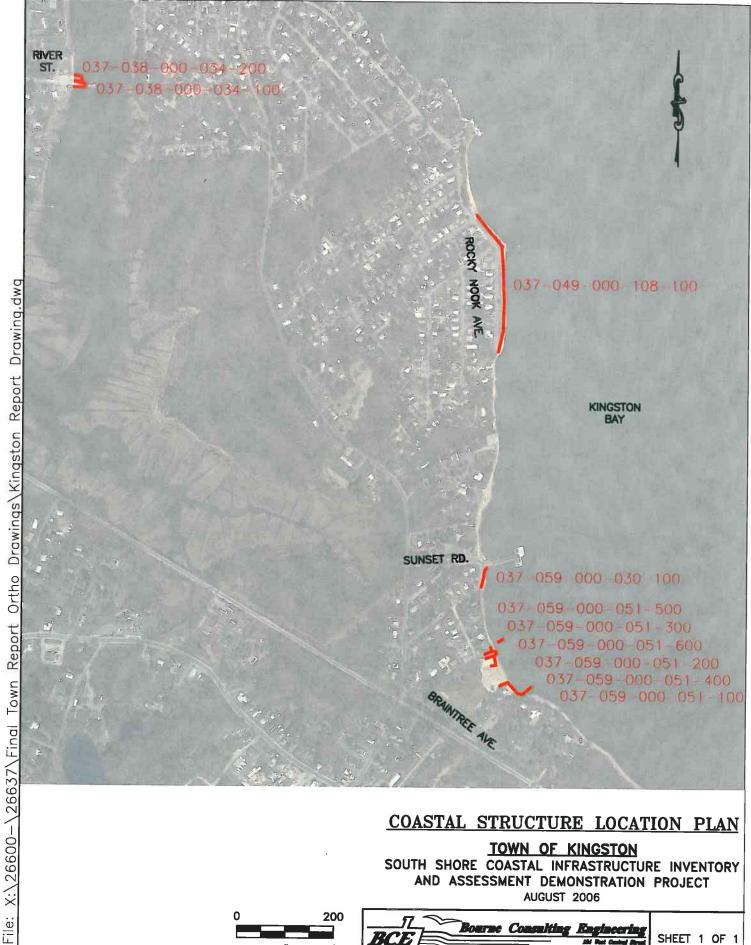
II - 2

Section III

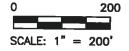
Town of Kingston

Structure Assessment Reports





SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT DEMONSTRATION PROJECT AUGUST 2006





SHEET 1 OF 1

Structure Assessment Form

Town: Kingston
Structure ID: 037-038-000-034-100

Local		Location:	h+ Nabhaidhu, vyilny 4434-yii shhababad sahis birsh-shirkudususu	Date:			
1		River St.		9/1/2006			
Presumed Structur	e Owner:	Based On Comment: Property Ownership					
Local							
Owner Name:		Earliest Struct	ıre Record:	Estimated Reconstruction/Repair Cost:			
Kingston	/		0	\$231,990.00			
Length: Top E	levation: FIRM Map Zone:	FIRM Map Elevati	Helentika sekkatajangang-ter 1924-ben halat en ekanyakan kelasar pipi, munt IP III di Kalifornia menganah (n k k di Kalifornia sekan alam alah angan sekanya DN:				
185	A2		10				
Feet Feet N	AVD 88	Feet NGV	'D				
Primary Type:	Primary Material:	Primary Height:					
Bulkhead/ Seawall	Stone	10 to 15 Feet					
Secondary Type:	Secondary Material:	Secondary Height	:				
Structure Summary	/:						
Condition Rating Level of Action Description	Fair Moderate Structure is sound but may exhibit deterioration, section loss, crackin undermining, and/or scour. Structut to withstand major coastal storm with moderate damage. Actions taken structure to provide full protection coastal storm and for extending life structure. Moderate wind or wave landform exists. Landform may not to fully protect shoreline during a material for full protection and extending for full protection and extending the structure.	g, spalling, ure adequate vith little to to reinforce from major e of damage to t be sufficient najor coastal dition	Priority Rating Action Description	None Long Term Planning Considerations No Inshore Structures or Residential Dwelling Units Present			
	The first of the second	overstaterball Felial für Mittale stade desember auf det aufür der stade stade stade stade stade stade stade s Land der Stade	derf heldt Vorkelline betreit der gegenhold i findersiche der Gestells von der der der der der der der der der Alle Wilderführer Beschicklicht der der weit in der				

Structure Assessment Form

Town: Kingston
Structure ID: 037-038-000-034-200

ry Material: ete lary Material:		re Record: 0 on: 0 n of pavement. Priority	Date: 9/1/200 Estimated Reconstruction/Repair Cost: \$18,018.00
ry Material: ete lary Material: eside town wharf.	Earliest Structure: FIRM Map Elevation: Feet NGV Primary Height: 5 to 10 Feet Secondary Height:	re Record: 0 on: 0 n of pavement. Priority	the state of the s
ry Material: ete lary Material: eside town wharf.	Earliest Structu FIRM Map Elevation Feet NGV Primary Height: 5 to 10 Feet Secondary Height:	on: 0 on: 0 pon: 0	the state of the s
ry Material: ete lary Material: eside town wharf.	FIRM Map Elevation Feet NGV Primary Height: 5 to 10 Feet Secondary Height:	on: 0 D n of pavement. Priority	the state of the s
ry Material: ete lary Material: eside town wharf.	FIRM Map Elevation Feet NGV Primary Height: 5 to 10 Feet Secondary Height:	on: 0 D n of pavement. Priority	the state of the s
ry Material: ete lary Material: eside town wharf.	Feet NGVI Primary Height: 5 to 10 Feet Secondary Height:	n of pavement.	
ry Material: ete lary Material: eside town wharf.	Feet NGV Primary Height: 5 to 10 Feet Secondary Height:	n of pavement. Priority	
ete lary Material: eside town wharf.	Primary Height: 5 to 10 Feet Secondary Height:	n of pavement. Priority	
ete lary Material: eside town wharf.	5 to 10 Feet Secondary Height:	n of pavement. Priority	
lary Material:	Secondary Height:	n of pavement. Priority	
eside town wharf.		n of pavement. Priority	
	Moderate deterioration	Priority	
	Moderate deterioration	Priority	
oned to oxhibit up		The second secon	
anyad to aybibit ya		The second secon	
anyod to oxhibit ya			I N
anyod to ovhibit wa		Rating	None
erved to extribit ve	ry minor	Action Description	Long Term Planning Considerations No Inshore Structures or Residential Dwelling
erficial in nature. present. Structu rovide protection t with no damage. nit future deteriora e.	re / landform from a major Actions taken		Units Present
St	ructure Document		
	St	Structure Document	Structure Documents:

Structure Assessment Form

Town: Kingston

Structure ID: 037-049-000-108-100

Property Owner:	eft of the filt of the filter	Location:	alim bilade-delizibiosoliphotospopus-proprysidativus aarbmät edizibilatitatisatase	interiorium de tribulationis - tratas unha manatarum in militarium transcritulus de televisione appealis un are in musicul Date:	kridat risse spiller som fillster om de klisterien met enderste med er her i
Local	CONTRACTOR OF THE PROPERTY OF	Rocky Nook Av	e.		9/1/2006
Presumed Structure	e Owner:	Based On Com	ment:		
Local		DCR - Contrac			A STATE OF THE STA
		1			
Owner Name: Kingston	enta promoto de la constanción del constanción de la constanción d	Earliest Structure Record: 1959		Estimated Reconstruction	
ningstorr	g.	Statistic and the state makes the State and Angle of the State and Angle of the State and Angle of the State	1959		\$159,436.00
ength: Top E	levation: FIRM Map Zone:	FIRM Map Elevation	on:	The second section of the second seco	
1015	V2	1	.5		
Feet Feet N	AVD 88	Feet NGV	D		
Primary Type:	Primary Material:	Primary Height:			
Revetment	Stone	10 to 15 Feet			
Secondary Type:	Secondary Material:	Secondary Height:		GENERAL PROPERTY.	
		, riagita			
Structure Summary	, .			2 2 20 20 20 20 20 20 20 20 20 20 20 20	
Rating Good Level of Action Minor Description Structure observed to exhibit very a problems, superficial in nature. Min to landform is present. Structure adequate to provide protection from coastal storm with no damage. Act to prevent / limit future deterioration life of structure.		nor erosion / landform m a major ctions taken	Rating Action Description	Moderate Priority Consider for Active Project Improve Listing Inshore Structures with potential for Infrastructure Damage and/or Limite Residential Dwellings (<1 dwelling 100 feet of shoreline)	ed
tructure Image 37-049-000-108-1 37-049-000-108-1 37-049-000-108-1	00-PHO1A.jpg MA 00-PHO1B.jpg 00-PHO1C.jpg	octure Document		POSED SHORE 037-049-000-108-1	00-DCR1A

Structure Assessment Form

Town: Kingston
Structure ID: 037-059-000-030-100

Property Owner:	re damenteen etaksi. Asidadan jalka ja Singerude dilajan-idiselikikan etaksi Teksenderidilidiksi. 1992 serrake augusian adamba la	Location:	to-Artifelessen BANSSES et i SANSSESSES Et en mes were extraplibles	Date:
Local	The state of the s	Sunset Rd.		9/1/2006
Presumed Structure	e Owner:	Based On Com	ment:	
Local	The state of the s	Property Owne		
Owner Name:		Earliest Structu	ire Decord:	Estimated Reconstruction/Repair Cost:
Kingston		Edinest Struct	0	\$15,015.00
	levation: FIRM Map Zone:	FIRM Map Elevation		
Feet Feet N	IAVD 88		13	
		Feet NGV	D	
Primary Type: Revetment	Primary Material: Stone	Primary Height: 5 to 10 Feet		
Secondary Type:	Secondary Material:	Secondary Height:	-1	
		- June 1 / Height		
Structure Summary	(:			
Rating Level of Action Description	Good Minor Structure observed to exhibit very problems, superficial in nature. Mit to landform is present. Structure adequate to provide protection fror coastal storm with no damage. At to prevent / limit future deterioratio life of structure.	nor erosion / landform m a major ctions taken	Priority Rating Action Description	Moderate Priority Consider for Active Project Improvement Listing Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)
Structure Image 037-059-000-030-10 037-059-000-030-10	00-PHO1A.jpg	cture Document		

Structure Assessment Form

Town: Kingston

Structure ID: 037-059-000-051-100

Property Owner:	asimete deldaris ta zirendata di peterminata iza erusa saruhunuato etenterro esenti frederio troti adalistic i Internet	Location:	et are visenske trase skilaterakijoskelenkantakijoskelentaki		ear-6660.cb mailed - cook of the formation of the cook of the
Local		Braintree Ave.		Date.	9/1/2006
Presumed Structure	e Owner:	Based On Comr			5, -, -
Owner Name:		Earliest Structur	re Record:	Estimated Reconstru	ction/Repair Cost:
Kingston		CONTROL THE STORY IN CONTROL TO THE STORY IN CONTROL T	O		\$85,008.00
Feet Feet N Primary Type: Bulkhead/ Seawall Secondary Type: Structure Summary	Secondary Material:	FIRM Map Elevatio 1 Feet NGVI Primary Height: Under 5 Feet Secondary Height:	3	any small voids and much exocion is	
Condition	II (dry set) with beach outshore. Sn	ack bar building and		lany small voids and much erosion in	nshore.
Rating	Fair		Priority Rating	None	
Level of Action	Moderate		Action	Long Term Planning Considerate	tions
Description	Structure is sound but may exhibit deterioration, section loss, crackin undermining, and/or scour. Structuto withstand major coastal storm with moderate damage. Actions taken is structure to provide full protection coastal storm and for extending life structure. Moderate wind or wave landform exists. Landform may not of fully protect shoreline during an storm. Actions taken to provide admaterial for full protection and extending the structure of the structure of the structure.	g, spalling, ure adequate vith little to to reinforce from major e of damage to t be sufficient najor coastal dition	Description	No Inshore Structures or Reside Units Present	ential Dwelling
Structure Image 037-059-000-051-1 037-059-000-051-1	00-PHO1A.jpg	cture Document			

Structure Assessment Form

Town: Kingston
Structure ID: 037-059-000-051-200

Local	Control of the second of the s	Location:	THE LOCAL CONTRACT OF THE CONT	Date:
10001		Braintree Ave.		9/1/200
Presumed Structure	e Owner:	Based On Com	nment:	
Local		Property Own	ership	Committee of the section of the sect
Owner Name:		Earliest Structo	uro Docord	Estimated December attack December 2
Kingston	/	Larilest Structi	0	Estimated Reconstruction/Repair Cost \$74,382.00
	in land to the second of the s	et v. alabadan pasavagitagi. 1854 kitäiler-vär väht 100 min kest productigistätistät för fyr varanuutu. Ar hir tulatti kaltti ja välyattionen ja saat olektiiteksi kitti viinnesia aa alaka kitäisiä tassaisin on täyt	y where did timbel in his common was now placed the first shore the second was now a consensual to the first of the second to th	red for value data-data-data-data-data-data-data-data
Length: Top E	levation: FIRM Map Zone	_	2.55.5	
	NAVD 88		13	
		Feet NGV	טי	
Primary Type: Bulkhead/ Seawall	Primary Material: Stone	Primary Height: Under 5 Feet	- 	Committee of the latest of the
	•			
Secondary Type:	Secondary Material:	Secondary Height	<u>:</u>	
		2		
Structure Summary	vise of stone blocks with 4 inch	to Q inch works dumma	diad	
one 2 look high co	disc of storic blocks with 4 men	to a men rocks dumper	u inshore of it. Er	osion of material insnore.
Condition	С		Priority	ı
Rating	Fair		Rating	None
Level of Action	Moderate		Action	Long Term Planning Considerations
Description	Structure is sound but may exh deterioration, section loss, crac undermining, and/or scour. Struto withstand major coastal storm moderate damage. Actions take structure to provide full protectic coastal storm and for extending structure. Moderate wind or wallandform exists. Landform may to fully protect shoreline during storm. Actions taken to provide material for full protection and extending storms.	king, spalling, acture adequate a with little to en to reinforce on from major a life of ave damage to not be sufficient a major coastal addition	Description	No Inshore Structures or Residential Dwelling Units Present
Structure Image 937-059-000-051-20		tructure Document	ts:	and the second s

Structure Assessment Form

Town: Kingston

Structure ID: 037-059-000-051-300

Property Owner:	Nieder Edinkuleinnum opgopmunde freihölderder agsett die geleichte. Nie Studieblichte Jung Vor Addriegt mit überkensten ein die geleichte zum zu weben zu weben zum der schreiben zu weben zu weben zu der schreiben zu der schre	Location:	illisatlassitti vistorilisastavaturijangiamojin filis pirasittikkilaisis pirastinayasvatilijanajannisis.	Date	disentaneous stad traditional reasons are represented by a reason of the reasons are a reason of the
Local		Braintree Av	/e.		9/1/2006
Presumed Structur	re Owner:	Based On Co	omment:	,	
Local		Property Ov	vnership		The Control of the Co
Owner Name:		Earliest Stru	cture Record:	Estimated Reconst	ruction/Repair Cost:
Kingston	/		0	Estimated Records	\$42,504.00
Length: Top E	Elevation: FIRM Map Zone	: FIRM Map Elevi	ilimitationeri in der ir retektibe kaltitelination mooret, ir motieteline vietele, abtaatiteline ir Riversit retekti, sisseesitelin litterieri horitigisch respecialering segessaatitelist de seest zesta. Atton:	Apparatury (2006/05/05/05) or the characteristic for any or with control of the control of the characteristic for	intendigmant 2000 bit of holine unique in some non recommendation of the first some and a some of the some and the some an
100	V	4	13		
Feet Feet N	NAVD 88	Feet N	GVD		
Primary Type:	Primary Material:	Primary Height:			
Bulkhead/ Seawall		Under 5 Feet		Variety.	
Secondary Type:	Secondary Material:	Secondary Heig	ht:		- 10 TA
		ſ			
Structure Summar	v :				
	e al ong e dge of boat ramp and re	esidentiai propoe rty.	500 to 1500 lb. sto	ne. Erosion at top of slope.	
Condition	C		Priority	III	
Rating	Fair		Rating	Moderate Priority	
Level of Action	Moderate	h:4!	Action	Consider for Active Project In Listing	provement
Description	Structure is sound but may exhideterioration, section loss, cract undermining, and/or scour. Struto withstand major coastal storm moderate damage. Actions take structure to provide full protectic coastal storm and for extending structure. Moderate wind or wallandform exists. Landform may to fully protect shoreline during storm. Actions taken to provide material for full protection and extending the storm of the storm of the storm of the storm.	king, spalling, cture adequate n with little to en to reinforce on from major life of we damage to not be sufficient a major coastal addition	Description	Inshore Structures with poten Infrastructure Damage and/or Residential Dwellings (<1 dw 100 feet of shoreline)	Limited
Structure Image 037-059-000-051-3 037-059-000-051-3	800-PHO3A.jpg	ructure Docume	ents:	Balland principles of the control of	

Structure Assessment Form

Town: Kingston
Structure ID: 037-059-000-051-400

	Location:		Date:
	Braintree Ave	2.	9/1/2006
Owner:	Based On Cor	mment:	•
	Property Owr	nership	
	Earliest Struc	ture Record:	Estimated Reconstruction/Repair Cost:
7		0	\$112,873.00
evation: FIRM Map Zone:	FIRM Map Eleval	1 O sementar Pro-sa salaki Ordak fajasa kejdyak indak angelang senera tanah normanan Project Angelang selak di disemberah pengan Project Angelang di disemberah pengan Project Angela	
V4		13	and the second
NVD 88	Feet NG	VD	
Primary Material:	Primary Height:		
Stone	Under 5 Feet		
Secondary Material:	Secondary Heigh	t·	
The state of the s	Secondary rieign		
	h. Several gans in	structure and diclo	daed stones
- present along ougo of torm boat	on ocverar gaps in	su detare and disio	aged stories.
D		Priority	1
Poor		Rating	None
Major		Action	Long Term Planning Considerations
deterioration, section loss, crackir undermining, and/or scour. Struc strong risk of significant damage a failure during a major coastal ston should be monitored until repairs/reconstruction can be initiataten to reconstruct structure to re capacity to resist a major coastal Landform eroded, stability threater	ng, spalling, ture has and possible m. Structure ated. Actions egain full storm. ned.	Description	No Inshore Structures or Residential Dwelling Units Present
during major coastal storm. Actior recreate landform to adequate lim	ns taken to its for full		
and the second section of the second second second second section second se	en e	karrin (20 Sement 1964) (1965) men Spirrent (Spirit gerit gerit gerit errin State film et spirit gerit er frei S	and the second of the second o
	Primary Material: Stone Secondary Material: e placed along edge of town bead primary Material: e placed along edge of town bead proof Major Structure exhibits advanced levels deterioration, section loss, cracking undermining, and/or scour. Structure exhibits advanced levels deterioration, section loss, cracking undermining, and/or scour. Structure to major coastal store should be monitored until repairs/reconstruction can be initial taken to reconstruct structure to recapacity to resist a major coastal Landform eroded, stability threate Landform not adequate to provide during major coastal storm. Action recreate landform to adequate lim	vation: FIRM Map Zone: V4 V4 VD 88 Feet NG Primary Material: Stone Primary Height: Under 5 Feet Secondary Material: Secondary Heigh Primary Heigh Primary Heigh Primary Heigh Secondary Heigh Primary Heigh Secondary Heigh Primary Heigh Secondary Heigh Primary Heigh Primary Heigh Primary Heigh Primary Heigh Secondary Heigh Primary Heigh Primary Heigh Secondary Heigh Primary H	Property Ownership Earliest Structure Record: 0 vation: FIRM Map Zone: FIRM Map Elevation: V4 13 Feet NGVD Primary Material: Primary Height: Under 5 Feet Secondary Material: Secondary Height: Under 5 Feet Secondary Material: Secondary Height: Primary Height: Primary Height: Primary Height: Under 5 Feet Secondary Height: Priority Rating Action Description Priority Rating Action Description

Structure Assessment Form

Town: Kingston
Structure ID: 037-059-000-051-500

Property Owner:	t vor die Maadhandisse van eer van dat die die eeu ver te van aande 1800 het bekenseel een geen voor ver die van bekendie een die verde van bekendie een die verde van bekendie een die verde van die	Location:	ant 49 th Ball the Facility and All 1984 A Ball II I	Date:
Local		Braintree Ave.		9/1/2006
Presumed Structur	re Owner:	Based On Com	ment:	
Local		Property Owne	ership	
Owner Name:		Earliest Structu	re Record:	Estimated Reconstruction/Repair Cost:
Kingston	/		0	\$33,198.00
ongthu Ton E	Elevation: FIRM Map Zone:	BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB	den gift i ernet ret för sette "konsekterer vorserer, sar delat 1998 blansskledgate ätte. Besklessett till det til til konsekningen en og oppsektil blad det stanssklettelle sekter som	10. SECURIO SE ESTA ANDRES DE CARRO DE CONTRETA DE LA CARRO DE CAR
ength: Top E	Elevation: FIRM Map Zone:	FIRM Map Elevation	on: .3	A STATE OF THE STA
	NAVD 88	Feet NGV		
Primary Type:	Primary Material:	Primary Height:		
Groin/ Jetty	Stone	Under 5 Feet		
Secondary Type:	Secondary Material:	Secondary Height:		
				AND THE REST.
Structure Summan	y: 00 to 1000 lb. stone) along edge o			1984 17
Level of Action Description	Moderate Structure is sound but may exhib deterioration, section loss, cracki undermining, and/or scour. Structo withstand major coastal storm moderate damage. Actions taker structure to provide full protection coastal storm and for extending listructure. Moderate wind or wav landform exists. Landform may n to fully protect shoreline during a storm. Actions taken to provide a material for full protection and ex	ing, spalling, ture adequate with little to n to reinforce n from major ife of e damage to ot be sufficient major coastal ddition	Action Description	Long Term Planning Considerations No Inshore Structures or Residential Dwelling Units Present
Structure Image 37-059-000-051-5		ucture Document		

Structure Assessment Form

Town: Kingston
Structure ID: 037-059-000-051-600

Location Date:	0/1/2004			Location:			wner:	Property Ow
Downer Name: Earliest Structure Record: Estimated Reconstruction/Rel	9/1/2006			Braintree Ave.				Local
Owner Name: Kingston Earliest Structure Record: Top Elevation: FIRM Map Zone: FIRM Map Elevation: Feet NGVD Feet NGVD Primary Type: Primary Material: Concrete Under 5 Feet Secondary Type: Secondary Material: Secondary Height: Secondary Type: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete of Action Rating Good Rating Good Rating Good Rating Good Rating Good Level of Action Minor Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend		,	ment:	Based On Comment:		e Owner:	Structure	Presumed S
Kingston Length: Top Elevation: FIRM Map Zone: FIRM Map Elevation: 50	and the same of the same	The state of the s	rship	Property Owne			to at the system of the system.	Local
Length: Top Elevation: FIRM Map Zone: FIRM Map Elevation: 50	nair Coct	Estimated Peconstruction/Pon	re Record:	Farliest Structur			ne:	Owner Nam
Feet Feet NAVD 88 Feet NGVD Primary Type: Primary Material: Primary Height: Revetment Concrete Under 5 Feet Secondary Type: Secondary Material: Secondary Height: Structure Summary: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete of the first priority of the first priority of the first problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend	3,300.00		And the second second second		/			Kingston
Feet NAVD 88 Feet NGVD Primary Type: Primary Material: Primary Height: Revetment Concrete Under 5 Feet Secondary Type: Secondary Material: Secondary Height: Structure Summary: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete emergency boat ramp with precast concrete curb around outshore end. Note a concrete end just above mean high was concrete outs around outshore end. Outshore end just above mean high was concrete outs around outshore end. Outshore end just above mean high was concrete outs around outshore end. Outshore end just above mean high was condition. Priority Rating None Rating None Action Long Term Planning Considerations Description No Inshore Structures or Residential Dw Units Present Units Pr	Model to the sound			The state of the s	47.554.4	levation:	Top Ele	
Primary Type: Primary Material: Primary Height: Revetment Concrete Under 5 Feet Secondary Type: Secondary Material: Secondary Height: Structure Summary: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was condition B Rating Good Rating None Level of Action Minor Action Long Term Planning Considerations Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend				į.	V4	JAVD 88	Feet NA	
Revetment Concrete Under 5 Feet Secondary Type: Secondary Material: Secondary Height: Structure Summary: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was condition. Priority Rating Good Rating None Level of Action Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend			,		v Material			
Structure Summary: Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was Condition B Rating Good Rating None Level of Action Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend			1		The state of the s			
Structure Summary : Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was above mean high				_	ary Material:	Secondar	Type:	Secondary T
Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was a condition B Rating Good Rating None Level of Action Minor Action Long Term Planning Considerations Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend		. 3		The state of the s				
Bituminudious concrete emergency boat ramp with precast concrete curb around outshore end. Outshore end just above mean high was a condition B Rating Good Rating None Level of Action Minor Action Long Term Planning Considerations Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend						/:	Summary :	Structure Su
Rating Good Rating None Level of Action Minor Action Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend	ter.	nore end just above mean high wat	arouna outshore er	cast concrete curb a	Doal ramp with pre	u ete emergency (ous concr	Dicuminuui0
Rating Good Rating None Level of Action Minor Action Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend						B	10	Condition
Level of Action Minor Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend Action Description No Inshore Structures or Residential Dw Units Present Units Present			•					
Description Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend			_			Minor	Action	
		Present	•	nor erosion / landform n a major tions taken	present. Structure a ovide protection fror with no damage. Ac it future deterioration	to landform is pr adequate to prov coastal storm wi to prevent / limit	1 6 1	
Structure Images: Structure Documents:			s:	cture Documents	Stru			
37-059-000-051-600-PHO6A.jpg 37-059-000-051-600-PHO6B.jpg								

Section IV

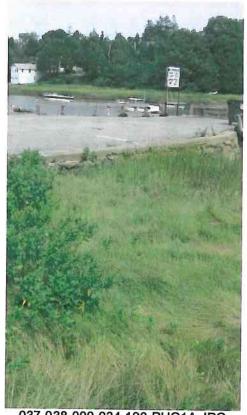
Town of Kingston

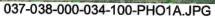
Structure Photographs



TOWN: KINGSTON SOURCE: BCE - FIELD PHOTOGRAPHS LOCATION: Bourne Consulting Engineering DATE OF RESEARCH: AUGUST 2006

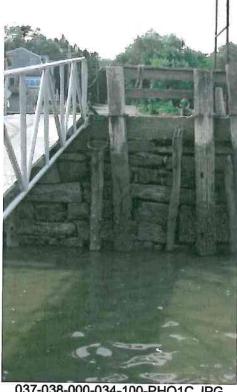
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BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
037-038-000-034-100	037-038-000-034-100-PHO1A.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condition Photo at Time of Survey
037-038-000-034-100	037-038-000-034-100-PHO1B.jpg		Bourne Consuliting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condtion Photo at Time of Survey
037-038-000-034-100	037-038-000-034-100-PHO1C.jpg		Bourne Consullling Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Conditon Photo at Time of Survey
037-038-000-034-100	037-038-000-034-100-PHO1D.Jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condtion Photo at Time of Survey
037-038-000-034-200	037-038-000-034-200-PHO2A.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Conditon Photo at Time of Survey
037-049-000-108-100	037-049-000-108-100-PHO1A.jpg		Bourne Consuliting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Conditon Photo at Time of Survey
037-049-000-108-100	037-049-000-108-100-PHO1B.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condiion Photo at Time of Survey
037-049-000-108-100	037-049-000-108-100-PHO1C.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condtion Photo at Time of Survey
037-049-000-108-100	037-049-000-108-100-PHO1D.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condtion Photo at Time of Survey
037-059-000-030-100	037-059-000-030-100-PHO1A.Jpg		Bourne Consulling Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condtion Photo at Time of Survey
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037-059-000-051-100	037-059-000-051-100-PHO1B.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Conditon Photo at Time of Survey
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037-059-000-051-300	037-059-000-051-300-PHO3A.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condlion Photo at Time of Survey
037-059-000-051-300	037-059-000-051-300-PHO3B.jpg	_	Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condition Photo at Time of Survey
037-059-000-051-400	037-059-000-051-400-PHO4A.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condlion Photo at Time of Survey
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037-059-000-051-600	037-059-000-051-600-PHO6B.jpg		Bourne Consullting Engineering	KINSTON	August 2006	DIGITAL IMAGE	-	Structure Location	Structure Condition Photo at Time of Survey







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037-038-000-034-100-PHO1C.JPG



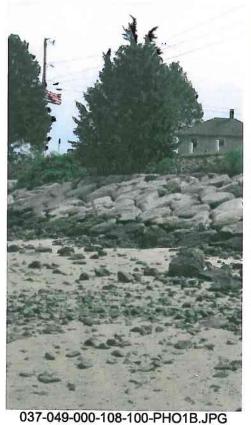
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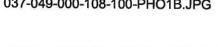


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037-059-000-051-100-PHO1A.JPG





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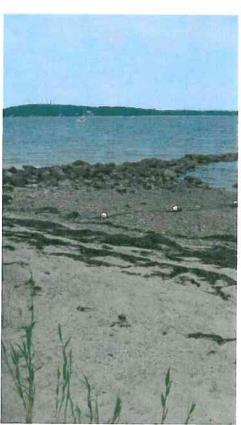
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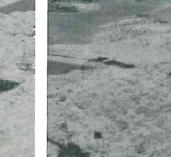


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037-059-000-051-500-PHO5A.JPG





037-059-000-051-600-PHO6A.JPG

037-059-000-051-600-PHO6B.JPG

Section V

Town of Kingston

Structure Research

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP - Chp 91 DOCUMENT LIST

• Copies of License Documents

USACE - PERMIT DOCUMENT LIST

• Copies of Permit Documents



NO DRAWINGS AVAILABLE AT THE TOWN

TOWN: KINGSTON SOURCE: TOWN OF KINGSTON LOCATION: KINGSTON MA DATE OF RESEARCH: AUGUST 2006

		Description
		Portinon
	Sheets	
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	Date	
	Municipality	
	Entity	
Contract	Drawing Number	
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TOWN: KINGSTON SOURCE: MA-DCR - OFFICE OF WATERWAYS LOCATION: MA-DCR - OFFICE OF WATERWAYS, HINGHAM, MA DATE OF RESEARCH: AUGUST 2006

	Document	Dondinger		STONE MOUND AND BOAT RAMP
	Location			COLE STREET, SOUTH 1000 FEET
	Sheets			-
	Title		PROPOSED SHORE PROTECTION, STONE MOUND.	IROCK NECK
	Date		SEPT 1858	
	Municipality			
	Entity			
Contract	Contract/ Drawing Number			
	Document No	27 040 000 401 000	ALL TOTAL TO	
100	DCE SUUCIURE NO	037-049-000-108-100	001-001-000-00	

NO DRAWINGS AVAILABLE AT DEP

TOWN: KINGSTON SOURCE: MA-DEP CHAPTER 91 LICENSE LOCATION: MA-DEP MAIN OFFICE, BOSTON, MA DATE OF RESEARCH: AUGUST 2006

		Description
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	THE	
	Date	
	Municipality	
	Entity	
Contract	Drawing	Number
	Document No	
	BCE Structure No	

NO DRAWINGS AVAILABLE AT USACE

TOWN: KINGSTON
SOURCE: U.S. - ARMY CORPS OF ENGINEERS
LOCATION: U.S.A.C.E. - NEW ENGLAND DISTRICT, CONCORD, MA
DATE OF RESEARCH: AUGUST 2006

	Description	
	Location	
	Sheets	
	Title	
	Date	
	Municipality	
	Entity	
Contract	Drawing	Number
	Document No	
	BCE Structure No	

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