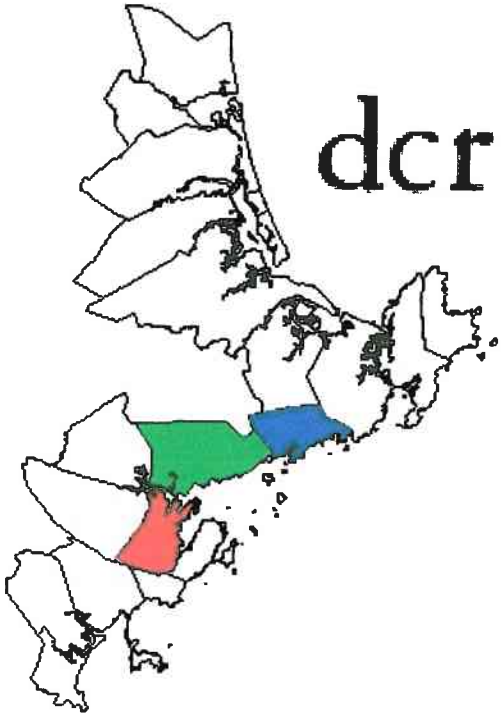
Massachusetts Coastal Infrastructure
Inventory and Assessment Project
Massachusetts Department of Conservation and Recreation
Office of Waterways

North Shore - North

Manchester
Beverly
Salem



dcr

July 6, 2009

Prepared for:

Massachusetts Department of Conservation and Recreation
Hingham, Massachusetts

Presented by:
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Franklin, Massachusetts

In Association With:
Waterfront Engineers

BCE **Bourne Consulting Engineering**
Waterfront Engineers

MASSACHUSETTS COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT PROJECT

North Shore - North

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Part A - Community Findings

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Section I

Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

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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 Massachusetts coastline has been broken up into 4 major regions consisting of the North Shore, Boston, South Coast, and the Cape and Islands. The South Shore (the Towns of Hull, Cohasset, Seekonk, Hingham, Plymouth, Kingston, Scituate and Duxbury) was previously evaluated by Bourne Consulting Engineering as a demonstration project in 2006.

Consultant Team

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

PURPOSE

Study Purpose

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

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

Goals of Study

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

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

Limit of Study

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

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

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

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

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

- Research was performed at the local, state and federal levels. The local research was limited to location and documenting available coastal structure contract drawings. Research at DCR was restricted to available historic construction plans for coastal structures at the MA-DCR Waterways office in Hingham, MA, and MA-DCR Division of Urban Parks and Recreation in

Boston, MA. No investigation of state archives was performed. Research at MA DEP Chapter 91 and USACE was limited to recorded permits and licenses found in their files. No investigation was performed at the Registry of Deeds.

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

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

Database Attributes

- Attribute Descriptions/Definitions

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

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

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

CCC-MMM-BBB-PPP-SSS

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

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

Structure Ownership: The ownership of all structures is presumed as no verification of ownership was performed. Ownership of the structure was determined by research into historic state and federal

permits and the entity indicated on the permits as the applicant. Where no other information was found, the following was utilized:

- Structures located on private land but appearing to be significant structures were identified as owned by the Town or as "Unknown". Unknown was used 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

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

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

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

The cost implications for each rating condition are as follows:

- A Rating Structures not requiring any maintenance, repair or rehabilitation cost and would not be expected to experience damage if subject to a major coastal storm event
- B Rating Structures requiring limited or no repair and would be expected to experience only minor damage if subject to a major coastal storm event. The value of these maintenance costs is assumed to be 10 percent of the construction cost.
- C Rating Structures requiring moderate to significant level of repair or reconstruction and would be expected to experience significant damage if subject to a major coastal storm event. The structure is presumed to be effective under a major storm event. The value of the repair costs is assumed to be 50 percent of the construction cost.
- D Rating Structures requiring significant level of rehabilitation or total reconstruction and would be expected to experience significant damage or possibly fail if subject to a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost.

- F Rating Structures requiring complete reconstruction and would expect to provide little or no protection from a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost plus a cost for removal/disposal of the original structure.

Height of Structure – Height of a structure is a major factor in the structure cost and therefore was identified as a significant factor 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.

EXHIBIT A

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. 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. 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 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. 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 Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	Immediate

EXHIBIT B

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	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	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	$132	$664	$1,328	$1,460
		5 To 10 Feet	$0	$240	$1,201	$2,402	$2,600
		10 To 15 Feet	$0	$314	$1,564	$3,128	$3,392
		Over 15 Feet	$0	$494	$2,468	$4,937	$5,333

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

Section II

Manchester

Section II – Community Findings – Town of Manchester

COMMUNITY DESCRIPTION

The Town of Manchester consists of a land area of 7.84 square miles out of a total area of 18.25 square miles and had a population of 5228 in the 2000 census. The Town is located on the North 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 12 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 Manchester, there were 21 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 5 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 - Town of Manchester

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Length
Bulkhead / Seawall	12		3	8	1		2490
Revetment	9		1	5	2	1	4585
Breakwater							
Groin / Jetty							
Coastal Dune							
Coastal Beach							
	21		4	13	3	1	7075

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 Manchester's case there are a total of 21 structures which would require approximately $ 9.3 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 $ 6.3 million would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Manchester

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Bulkhead / Seawall	12		$ 205,920	$ 1,978,112	$ 189,750		$ 2,373,782
Revetment	9		$ 135,762	$ 724,522	$ 5,340,192	$786,621	$ 6,987,097
Breakwater							$ -
Groin / Jetty							$ -
Coastal Dune							$ -
Coastal Beach							$ -
	21	$ -	$ 341,682	$ 2,702,634	$ 5,529,942	$ 786,621	$ 9,360,879

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 Manchester, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Manchester

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Town Owned	21		$ 341,682	$ 2,702,634	$ 5,529,942	$786,621	$ 9,360,879
Commonwealth of Massachusetts							$ -
Federal Government Owned							$ -
Unknown Ownership							$ -
	21	$ -	$ 341,682	$ 2,702,634	$ 5,529,942	$ 786,621	$ 9,360,879

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

SUMMARY

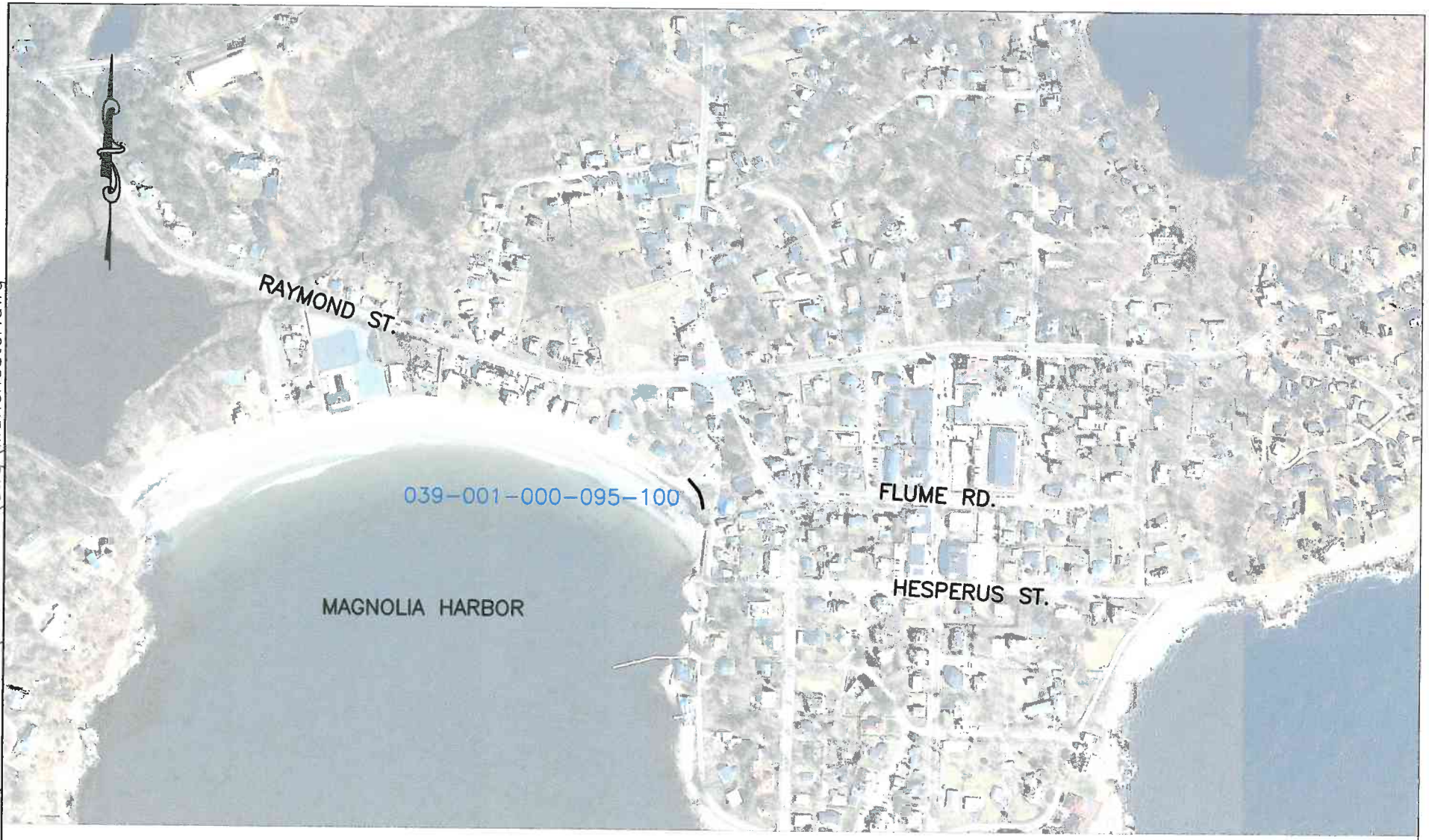
The enclosed reports and associated documents reflects the Town of Manchester's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term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

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

Section II - Manchester

Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

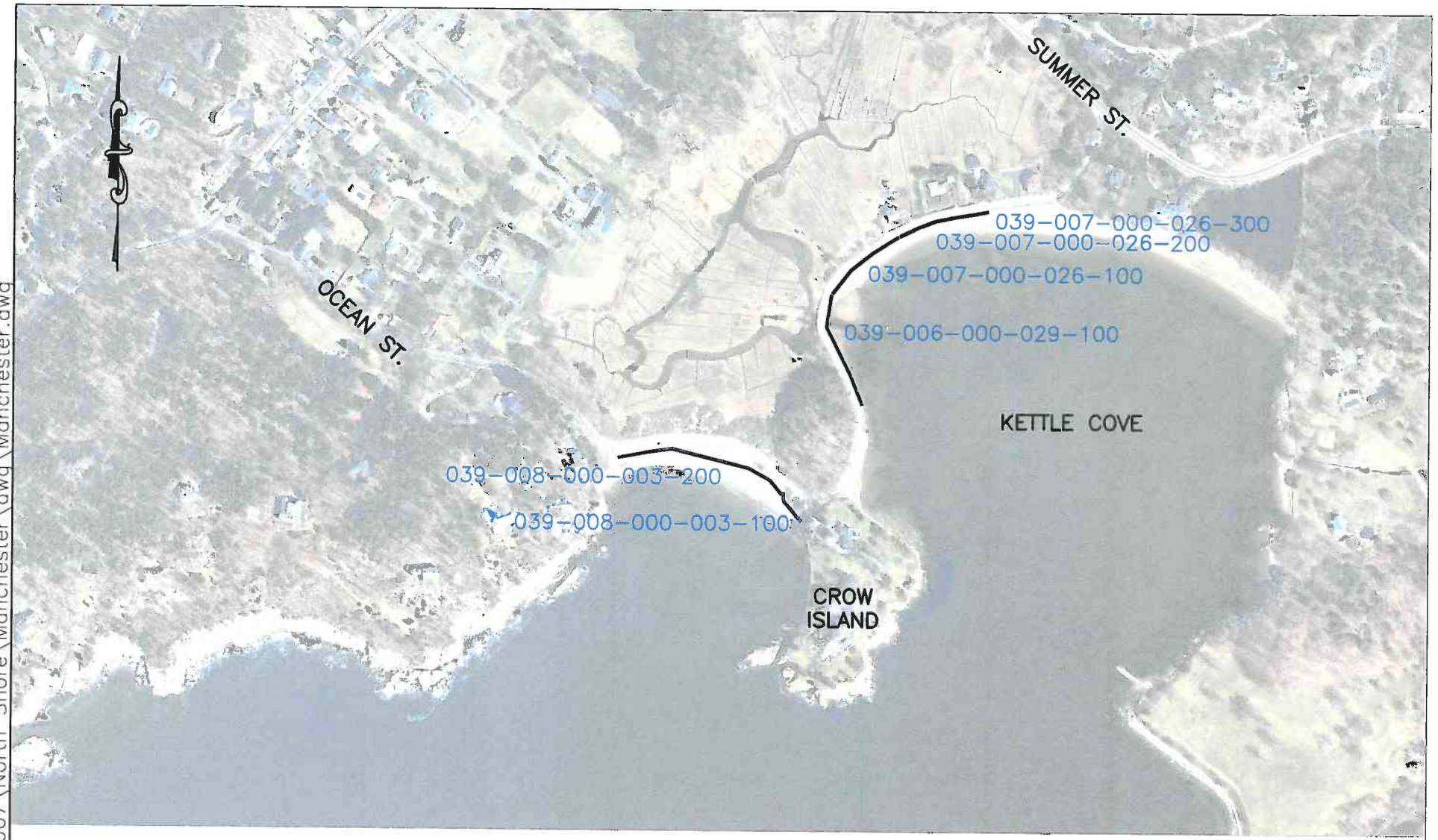
TOWN OF MANCHESTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150
SCALE: 1" = 150'-0"

BCE Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4000 FAX. (508) 533-4001

SHEET 1

File: X:\27652-\27667\North Shore\Manchester\dwg\Manchester.dwg



COASTAL STRUCTURE LOCATION PLAN

TOWN OF MANCHESTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150
SCALE: 1" = 150'-0"

BCE Bourne Consulting Engineering

SHEET 2

File: X:\27652-\27667\North Shore\Manchester\dwg\Manchester.dwg

COASTAL STRUCTURE LOCATION PLAN

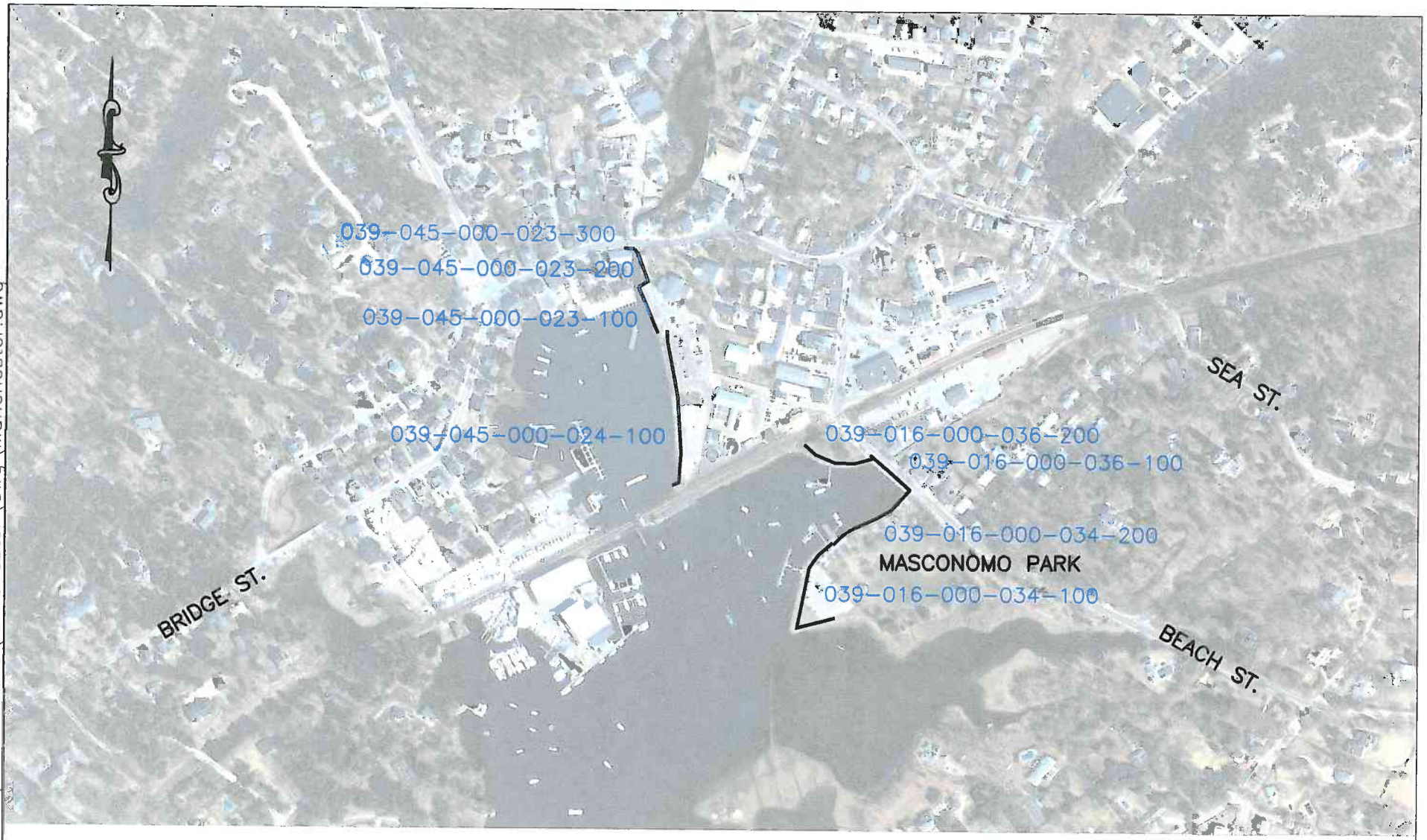
TOWN OF MANCHESTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150
SCALE: 1" = 150'-0"

BCE Bourne Consulting Engineering
3 Pond Street
Franklin, MA 02038
TEL. (508) 553-4000 FAX. (508) 553-4000

SHEET 3

File: X:\27652-\27667\North Shore\Manchester\dwg\Manchester.dwg



COASTAL STRUCTURE LOCATION PLAN

TOWN OF MANCHESTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

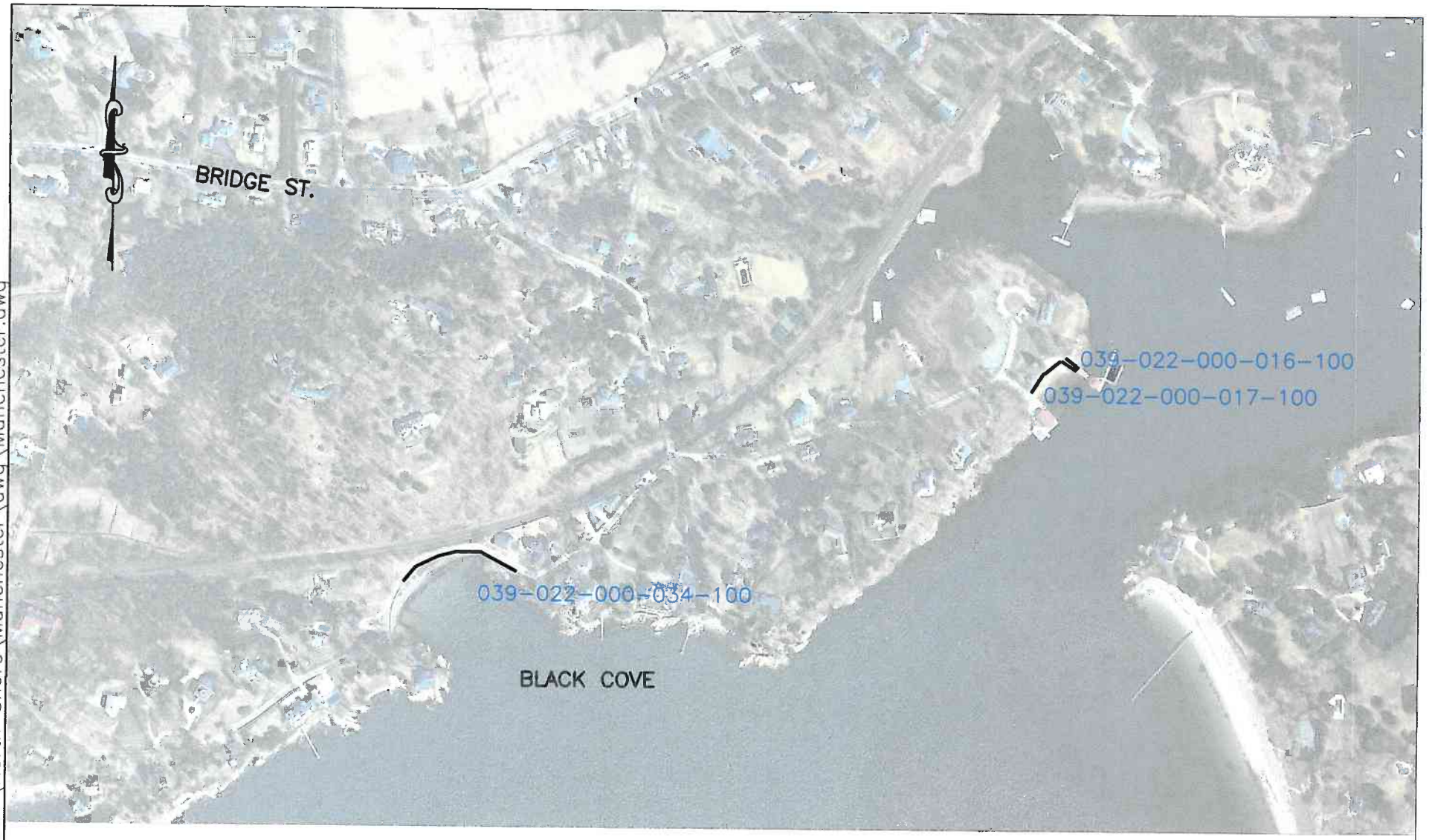
0 150

SCALE: 1" = 150'-0"

BCE Bourne Consulting Engineering

SHEET 4

File: X:\27652-\27667\North Shore\Manchester\dwg\Manchester.dwg



COASTAL STRUCTURE LOCATION PLAN

TOWN OF MANCHESTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150'-0"

Bourne Consulting Engineering

SHEET 5

File: X:\27652-\27667\North Shore\Manchester\dwg\Manchester.dwg

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-001-000-095-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lobster Lane	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$72,072.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
120 Feet	25 Feet NAVD 88	V2	17 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone revetment at the top of beach, in fair condition. The toe is unravelled and there is a lawn area behind the revetment.

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

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

Structure Images:

039-001-000-095-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-006-000-029-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Black Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$514,140.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
410 Feet	6 Feet NAVD 88	V2	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone rubble seawall along the road, in fair condition. The concrete toe is exposed in some areas. Some overtopping damage with recent pavement patching is apparent and some missing mortar causing backfill loss.

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

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

Structure Images:

039-006-000-029-100-PHO1A.JPG

039-006-000-029-100-PHO1B.JPG

039-006-000-029-100-PHO1C.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-007-000-026-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Black Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$366,366.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
305 Feet	9 Feet NAVD 88	V2	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone revetment with significant overtopping crest damage, in poor condition, causing reduced protection for the roadway.

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

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

Structure Images:

039-007-000-026-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-007-000-026-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Black Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	1973	$151,536.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
200 Feet	Feet NAVD 88	V2	14 Feet NGVD

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

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

Structure Summary :

A cast in place concrete seawall with toe stone revetment adjacent to the road that may fail in a storm. There is apparent overtopping with the wall footing exposed. There is an under cut void up to 1.5 feet high at the west end.

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

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

Structure Images:

039-007-000-026-200-PHO2A.JPG

Structure Documents:

MA-DCR	March 1973	Proposed Shore	039-007-000-026-200-DCR2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-007-000-026-300

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Black Beach

Date: 6/22/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Manchester

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $39,917.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
120 Feet	Feet NAVD 88	V2	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone rubble revetment adjacent ot the road, in fair condition. There is overtopping damage with dislodged crest stones.

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

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

Structure Images:

039-007-000-026-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-008-000-003-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Ocean Street White Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$189,750.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
125 Feet	9 Feet NAVD 88	V2	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone seawall in poor condition. The upper wall failed in 2 locations, approximately 25 linear feet each. There are numerous horizontal cracks to indicate it likely to fail more significantly in another storm. It appears to be a relatively new wall.

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

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

Structure Images:

039-008-000-003-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-008-000-003-200

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Ocean Street White Beach

Date: 6/22/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Manchester

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $786,621.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
605 Feet	10 Feet NAVD 88	V2	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone revetment along top of beach with typical overtopping damage. The middle 1/3 of the revetment is totally destroyed and random stones are scattered. Anticipate future damage to the adjacent road unless it is rebuilt.

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

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

Structure Images:

039-008-000-003-200-PHO2A.JPG

039-008-000-003-200-PHO2B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-016-000-034-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Mascomono Park

Date: 6/22/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Manchester

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $363,370.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
465 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone rubble revetment in fair condition at the edge of the park . There is some erosion and crest stone movement.

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

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

Structure Images:

039-016-000-034-100-PHO1A.JPG

039-016-000-034-100-PHO1B.JPG

Structure Documents:

DEP	March 20, 20	Plan Accompanying	039-016-000-034-100-LIC1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-016-000-022-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Proctor Street	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$181,830.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
145 Feet	Feet NAVD 88	V2	11 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone seawall with granite block cap adjacent to the street, in fair condition in a residential area. Some cap stones are loose. There is some mortar loss and one missing toe stone adjacent to the road.

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

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

Structure Images:

039-016-000-022-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-016-000-034-200

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Mascomono Park

Date: 6/22/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Manchester

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $413,820.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
330 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block wall in fair condition at park entrance road. There is differential stone movement, block settling, wall bulges and a slight offshore lean to the wall.

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

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

Structure Images:

039-016-000-034-200-PHO2A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-016-000-036-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Mascomono Park	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$73,260.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
185 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dry rubble stone wall with granite block cap in satisfactory condition. It is adjacent to Beach Street with two areas of bituminous sidewalk with some slight subsidence.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

039-016-000-036-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-016-000-036-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Mascomono Park	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$199,267.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
255 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

An armor stone revetment in overall fair condition. Some stones have settled locally and there is crest erosion. The armor is set on 1 inch crushed stone which is washing out. There is localized damage in the park lawn area.

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

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

Structure Images:

039-016-000-036-200-PHO2A.JPG

039-016-000-036-200-PHO2B.JPG

039-016-000-036-200-PHO2C.JPG

Structure Documents:

DEP	March 20, 20	Plan Accompanying	039-016-000-036-200-LIC2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-017-000-024-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Singing Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	1947	$4,973,826.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
2015 Feet	16 Feet NAVD 88	V2	18 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone revetment that is failing. It has a single layer of placed stone armor on exposed geogrid over undersized stone underlayer. There is some loss of small underlayer stone which is typical. There are some armorstone subsidence areas due to underlayer loss. It is in poor condition and may fail in a storm.

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

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

Structure Images:

039-017-000-024-100-PHO1A.JPG

039-017-000-024-100-PHO1B.JPG

039-017-000-024-100-PHO1C.JPG

Structure Documents:

MA-DCR	January 194	Proposed Shore	039-017-000-024-100-DCR1A
MA-DCR	April 1965	Proposed Shore	039-017-000-024-100-DCR1B

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-018-000-025-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lobster Cove	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$68,006.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
160 Feet	13 Feet NAVD 88	V2	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone block wall on concrete footing adjacent to a street, in satisfactory condition. There is some mortar loss and some concrete cracking.

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

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

Structure Images:

039-018-000-025-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-022-000-016-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Tucks Point	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$53,130.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
125 Feet	Feet NAVD 88	V2	11 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall with granite cap in fair condition. There are a few areas with missing mortar and the mortar is typically cracked. The wall forms an access to park pier.

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

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

Structure Images:

039-022-000-016-100-PHO1A.JPG

039-022-000-016-100-PHO1B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-022-000-017-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Tucks Point	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$49,896.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
150 Feet	Feet NAVD 88	V2	11 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block revetment with toe undercut at west end. There is a void up to 8 inches high under the toe for approximately 10 feet. Overall, it is in fair condition. The park toilet building is nearby.

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

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

Structure Images:

039-022-000-017-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-022-000-034-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	West Main Beach	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$551,760.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
440 Feet	Feet NAVD 88	V2	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall adjacent to the road in fair condition. The face of wall is cracked with exposed embedded stones at a few locations. Some repair patching is apparent and this wall may actually be a concrete veneer over stone wall or cyclopean concrete.

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

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

Structure Images:

039-022-000-034-100-PHO1A.JPG

039-022-000-034-100-PHO1B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-045-000-023-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Hall	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$69,300.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
175 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dry set granite block wall with concrete cap in satisfactory condition. There is minor deteriorating of the concrete cap and some loss of bedding under stone steps, with the steps in poor condition. A police station is approximately 100 feet away.

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

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

Structure Images:

039-045-000-023-100-PHO1A.JPG

039-045-000-023-100-PHO1B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-045-000-023-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Hall	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$63,360.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
160 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall in satisfactory condition. There are a few cracks in cap. A police station is approximately 100 feet away.

Condition Rating	B Good	*Priority Rating*	III Moderate Priority
Level of Action	Minor	*Action*	Consider for Active Project Improvement Listing
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

039-045-000-023-200-PHO2A.JPG

039-045-000-023-200-PHO2B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-045-000-023-300

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Town Hall - Wall at Central Street

Date: 6/22/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Manchester

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $43,890.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
35 Feet	Feet NAVD 88	A3	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone seawall at Central street, skim coated with mortar above high waterand with a granite cap. The wall acts as a stream dam for the adjacent stream and there is seepage between stones. In fair condition.

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

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

Structure Images:

039-045-000-023-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Manchester

Structure ID: 039-045-000-024-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Hall Parking Lot	6/22/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Manchester	Unkown	$135,762.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
550 Feet	Feet NAVD 88	A2	9 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone revetment with large stone face parallel with slope in good condition. This structure is adjacent to the wastewater treatment plant.

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

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

Structure Images:

039-045-000-024-100-PHO1A.JPG

Structure Documents:

DEP	August 21, 1	Plan Accompanying	039-045-000-045-100-LIC1A

Prepared By: Bourne Consulting Engineering

Section II - Manchester

Part C

Structure Photographs

TOWN: MANCHESTER
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: AUGUST 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
039-001-000-095-100	039-001-000-095-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-006-000-029-100	039-006-000-029-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-006-000-029-100	039-006-000-029-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-006-000-029-100	039-006-000-029-100-PHO1C.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-007-000-026-100	039-007-000-026-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-007-000-026-200	039-007-000-026-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-007-000-026-300	039-007-000-026-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-008-000-003-100	039-008-000-003-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-008-000-003-200	039-008-000-003-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-008-000-003-200	039-008-000-003-200-PHO2B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-022-100	039-016-000-022-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-034-100	039-016-000-034-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-034-100	039-016-000-034-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-034-200	039-016-000-034-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-036-100	039-016-000-036-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-036-200	039-016-000-036-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-036-200	039-016-000-036-200-PHO2B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-016-000-036-200	039-016-000-036-200-PHO2C.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-017-000-024-100	039-017-000-024-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-017-000-024-100	039-017-000-024-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-017-000-024-100	039-017-000-024-100-PHO1C.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-018-000-025-100	039-018-000-025-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

TOWN: MANCHESTER
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: AUGUST 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
039-022-000-016-100	039-022-000-016-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-022-000-016-100	039-022-000-016-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-022-000-017-100	039-022-000-017-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-022-000-034-100	039-022-000-034-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-022-000-034-100	039-022-000-034-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-023-100	039-045-000-023-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-023-100	039-045-000-023-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-023-200	039-045-000-023-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-023-200	039-045-000-023-200-PHO2B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-023-300	039-045-000-023-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
039-045-000-024-100	039-045-000-024-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

039-001-000-095-100-PHO1A

039-006-000-029-100-PHO1A

039-006-000-029-100-PHO1B

039-006-000-029-100-PHO1C

039-007-000-026-100-PHO1A

039-007-000-026-200-PHO2A

039-007-000-026-300-PHO3A

039-008-000-003-100-PHO1A

039-008-000-003-200-PHO2A


039-008-000-003-200-PHO2B


039-016-000-022-100-PHO1A


039-016-000-034-100-PHO1A


039-016-000-034-100-PHO1B


039-016-000-034-200-PHO2A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039-017-000-024-100-PHO1B


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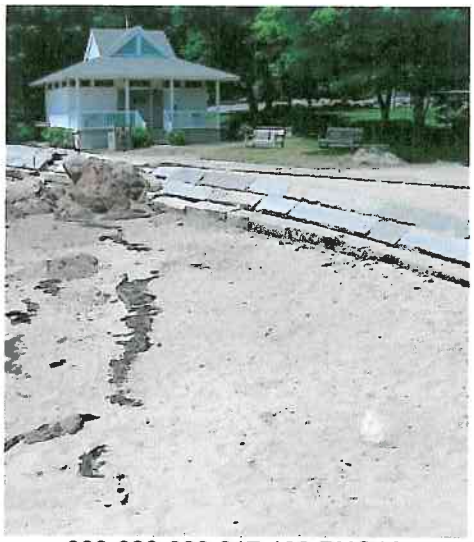
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039-022-000-034-100-PHO1A


039-022-000-034-100-PHO1B

039-045-000-023-100-PHO1A

039-045-000-023-100-PHO1B

039-045-000-023-200-PHO2A

039-045-000-023-200-PHO2B

039-045-000-023-300-PHO3A

039-045-000-024-100-PHO1A

Section II - Manchester

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: MANCHESTER
SOURCE: Town of Manchester
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Manchester

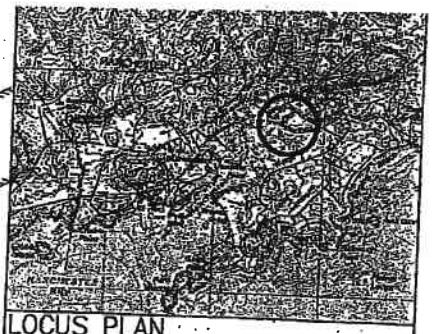
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description

TOWN: MANCHESTER
SOURCE: MA-DCR
LOCATION: MA-DCR BOSTON and HINGHAM, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
039-007-000-026-200	039-007-000-026-200-DCR2A	2771	MA-DCR	Manchester	March 1973	Proposed Shore Protection - Kettle Cove - Ocean Street Seawall Reconstruction	1	Ocean Street	Seawall
039-017-000-024-100	039-017-000-024-100-DCR1A	961	MA-DCR	Manchester	January 1947	Proposed Shore Protection - Singing Beach - Manchester - Prepared for the DPW of Massachusetts - Division of Waterways	1	Singing Beach	Riprap
039-017-000-024-100	039-017-000-024-100-DCR1B	2460	MA-DCR	Manchester	April 1965	Proposed Shore Protection - Stone Revetment - Singing Beach - Manchester - Prepared for the DPW of Massachusetts - Division of Waterways	1	Singing Beach	Stone Revetment

TOWN: MANCHESTER
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
039-016-000-034-100	039-016-000-034-100-LIC1A	11715	DEP	Manchester	March 20, 2007	Plan Accompanying Petition of Town of Manchester - Masconomo Park, Beach Street, Manchester, MA 01944 to License and Maintain Existing Riprap	4	Masconomo Park	Riprap
039-016-000-036-200	039-016-000-036-200-LIC2A	11715	DEP	Manchester	March 20, 2007	Plan Accompanying Petition of Town of Manchester Masconomo Park, Beach Street Manchester, MA to License and Maintain Existing Riprap	4	Manchester Harbor	Riprap
039-045-000-024-100	039-045-000-045-100-LIC1A	2226	DEP	Manchester	August 21, 1940	Plan Accompanying Petition of Town of Manchester to Maintain Extend and Fill Solid a Dike in the Inner Harbor	1	Inner Harbor	Dike



LOCUS PLAN
MANCHESTER QUAD
N.T.S.

BEACH STREET

N/F Estate Of Johanna Nahatis

N/F Christos G. Nahatis

N/F John A. Bartlett

EXISTING RIP-RAP TO BE LICENSED

MANCHESTER HARBOR

039-016-000-036-200
039-016-000-034-100

LIMIT OF 100-YEAR FLOOD ZONE
(ZONE A-2) (BASED ON ELEVATION 9)

MASCONOMO PARK

COMMONWEALTH OF MASSACHUSETTS
CARLOS G. PEÑA
CIVIL
No. 36206
REGISTERED
PROFESSIONAL ENGINEER

MANCHESTER HARBOR

SITE PLAN VIEW
GRAPHIC SCALE

0 50 100

1INCH=100 FEET

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING RIP-RAP

IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

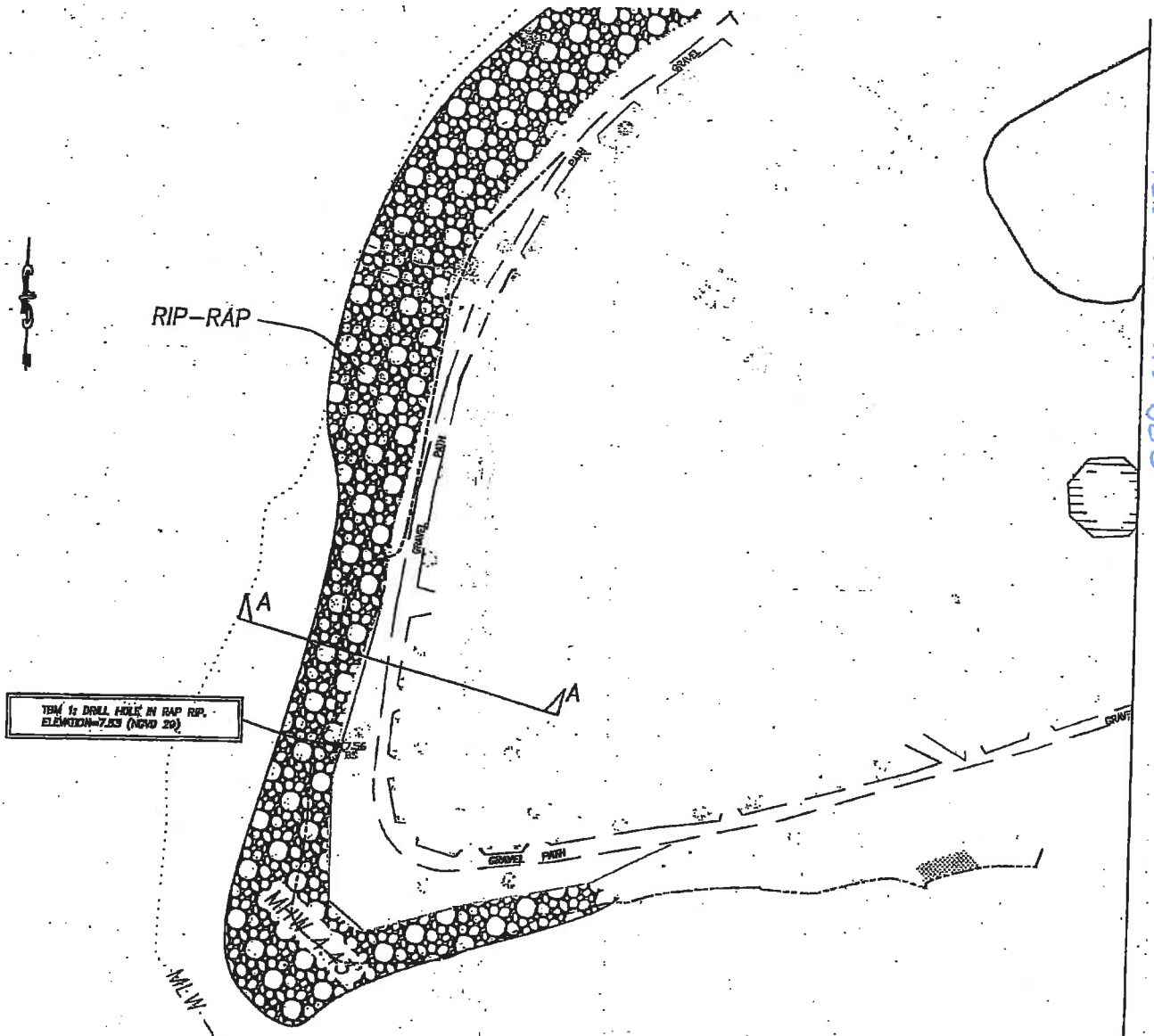
PAGE 1 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715

Approved by Department of Environmental Protection
of Massachusetts

MAR 20 2007

06-1727



039-016-000-036-200
039-016-000-034-100

CARLOS G. PEÑA CIVIL No. 36206 REGISTERED PROFESSIONAL ENGINEER

SITE PLAN VIEW
GRAPHIC SCALE

0 25 50

1INCH=50 FEET

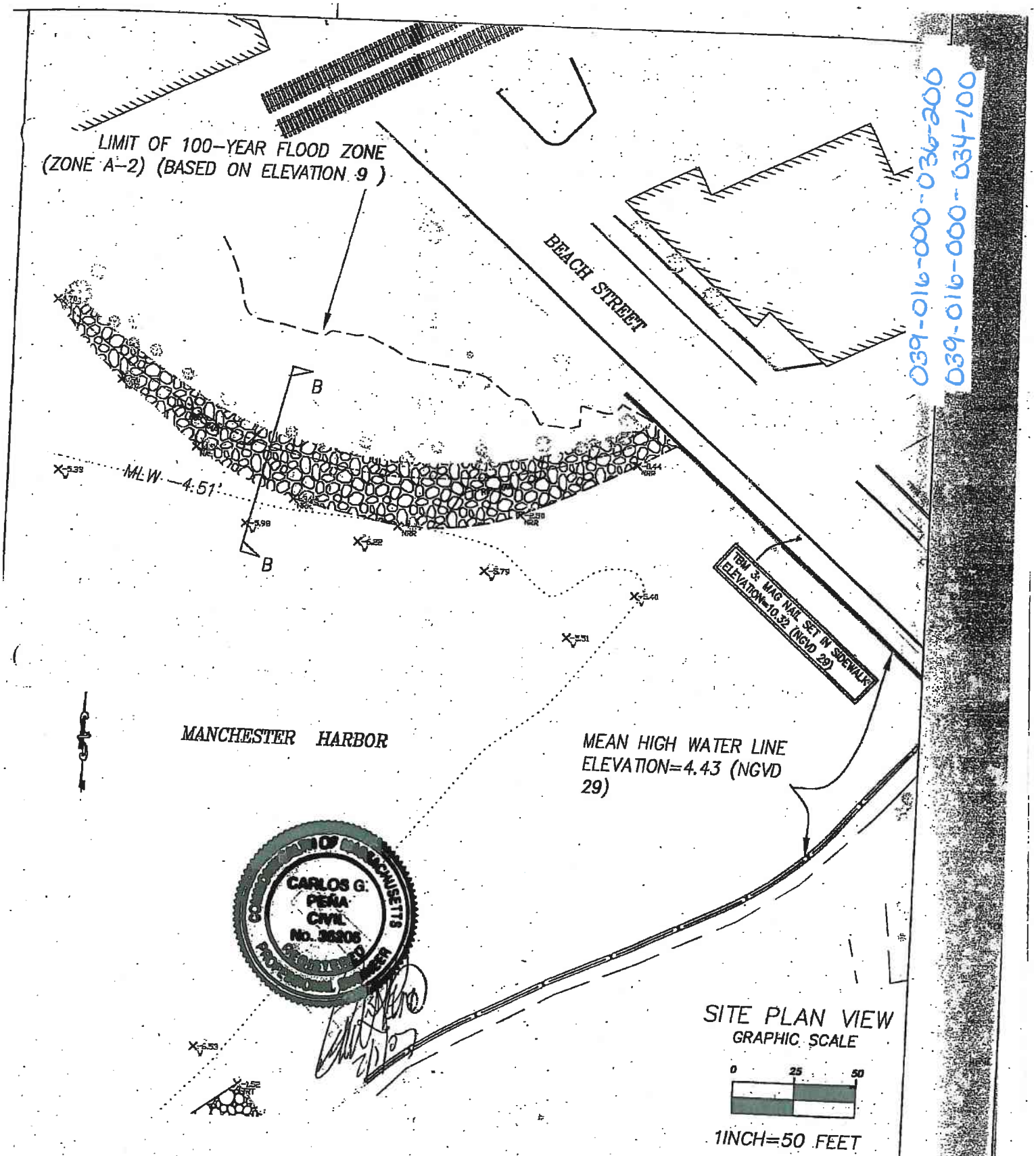
PAGE 2 OF 4 DATE 08/08/06

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING RIP-RAP

IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
Date:
MAR 20 2007



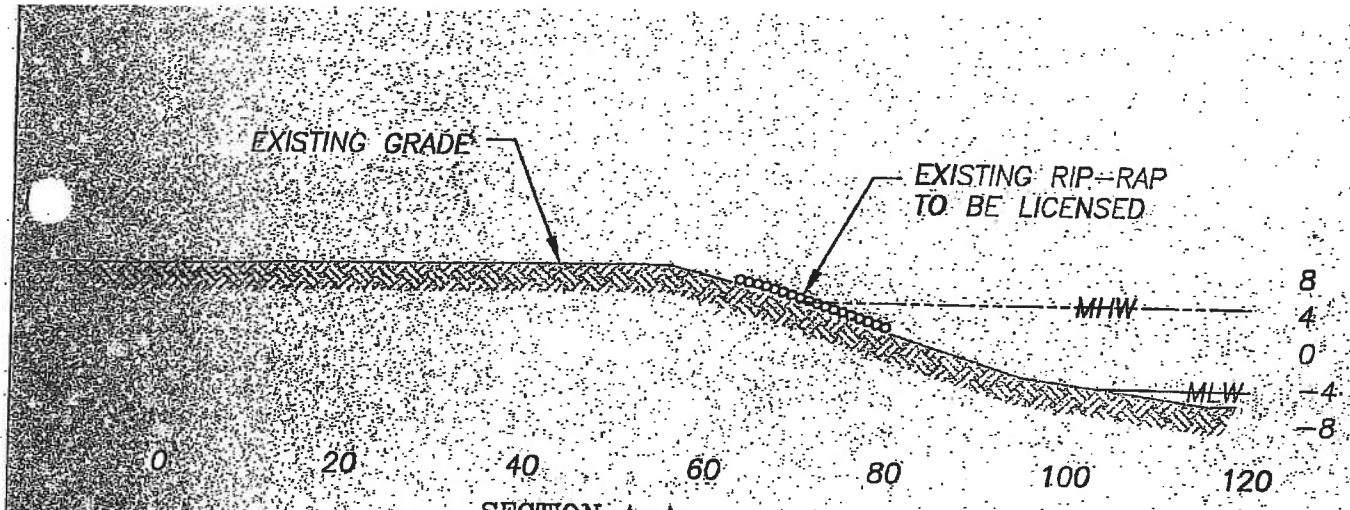
039-016-000-036-206
039-016-000-034-100

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING
RIP–RAP

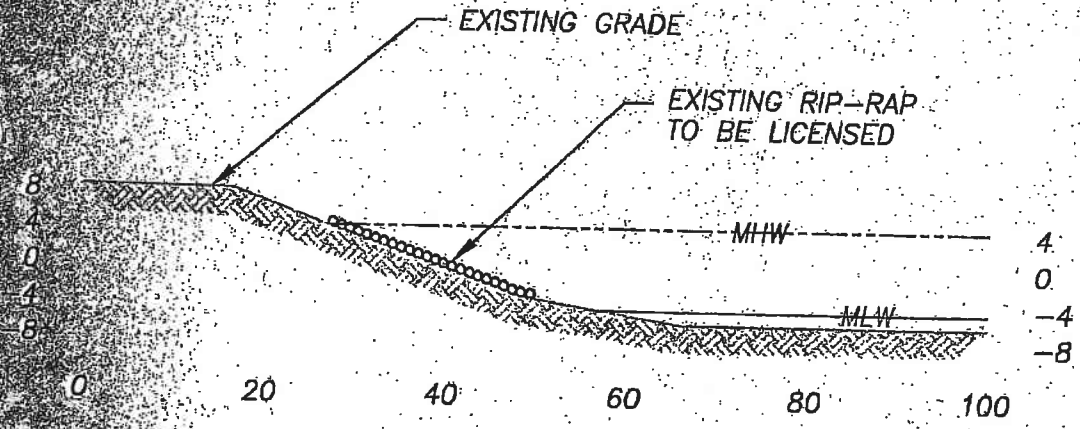
PAGE 3 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
Date: MAR 20 2007



SECTION A–A

SCALE
H: 1" = 20'
V: 1" = 20'



SECTION B–B

SCALE
H: 1" = 20'
V: 1" = 20'

CROSS SECTIONS
GRAPHIC SCALE

0 20 40

1 INCH = 20 FEET

039-016-006-036-300
039-016-008-034-100

COMMONWEALTH OF MASSACHUSETTS
CARLOS G PEÑA
CIVIL
NO. 36206
REGISTERED PROFESSIONAL ENGINEER

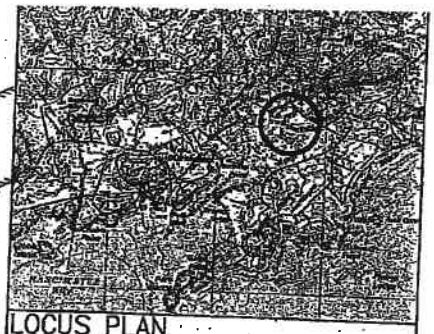
PLAN ACCOMPANYING PETITION OF
TOWN OF MANCHESTER
(SCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING
RIP-RAP

IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

PAGE 4 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
MAR 20 2007



LOCUS PLAN
MANCHESTER QUAD
N.T.S.

BEACH STREET

N/F Estate Of Johanna Nahatis

N/F Christos G. Nahatis

N/F John A. Bartlett

EXISTING RIP-RAP TO BE LICENSED

MANCHESTER HARBOR

LIMIT OF 100-YEAR FLOOD ZONE (ZONE A-2) (BASED ON ELEVATION 9)

039-016-000-036-200
039-016-000-034-100

MASCONOMO PARK

CARLOS G. PEÑA CIVIL No. 34804 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

MANCHESTER HARBOR

SITE PLAN VIEW
GRAPHIC SCALE

0 50 100

1INCH=100 FEET

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING RIP-RAP

IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

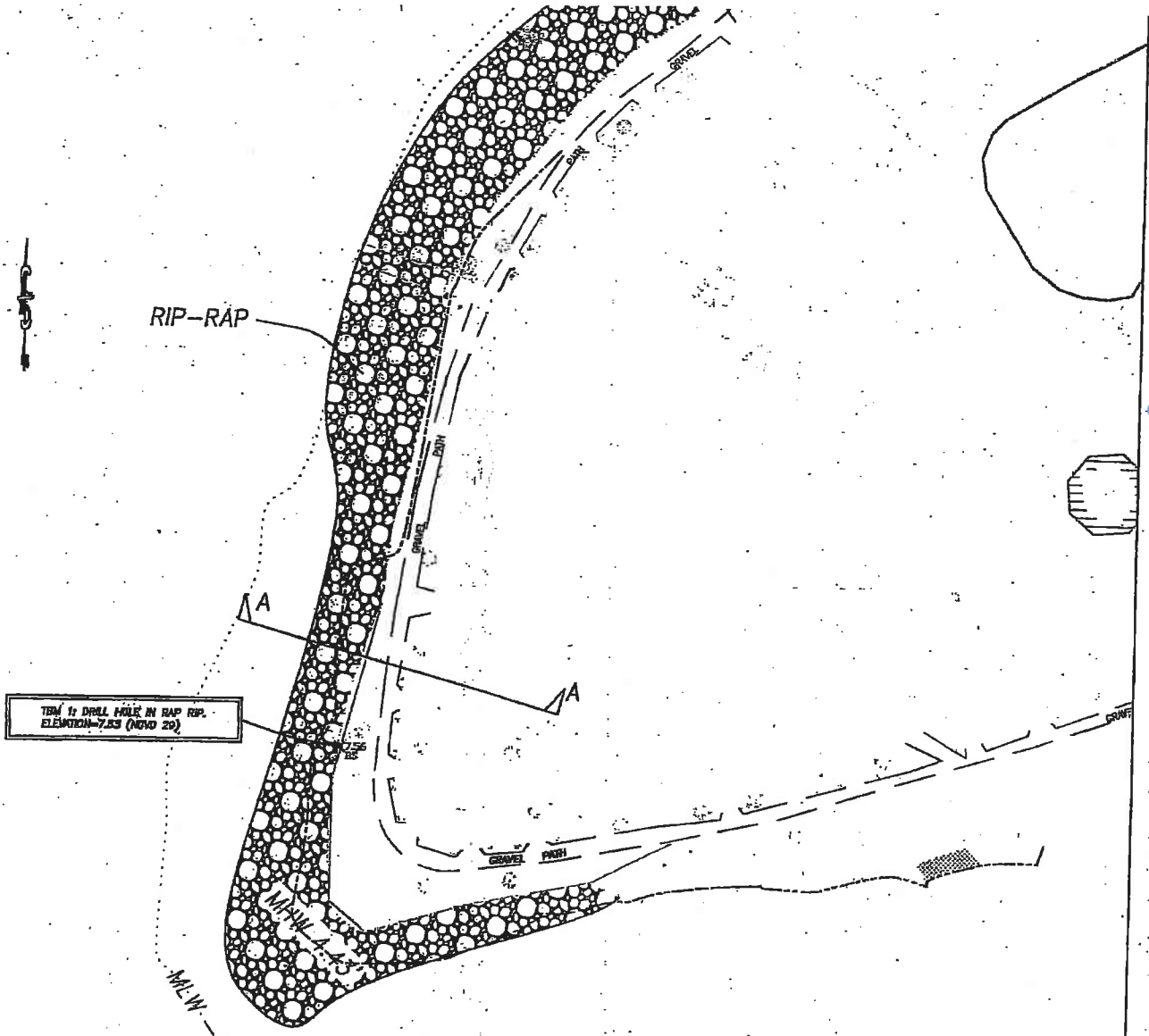
PAGE 1 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715

Approved by Department of Environmental Protection

MAR 20 2007

006-1727



039-016-000-036-200
039-016-000-034-100

COMMONWEALTH OF MASSACHUSETTS
CARLOS G. PEÑA
CIVIL
No. 36206
REGISTERED PROFESSIONAL ENGINEER

SITE PLAN VIEW
GRAPHIC SCALE

0 25 50

1INCH=50 FEET

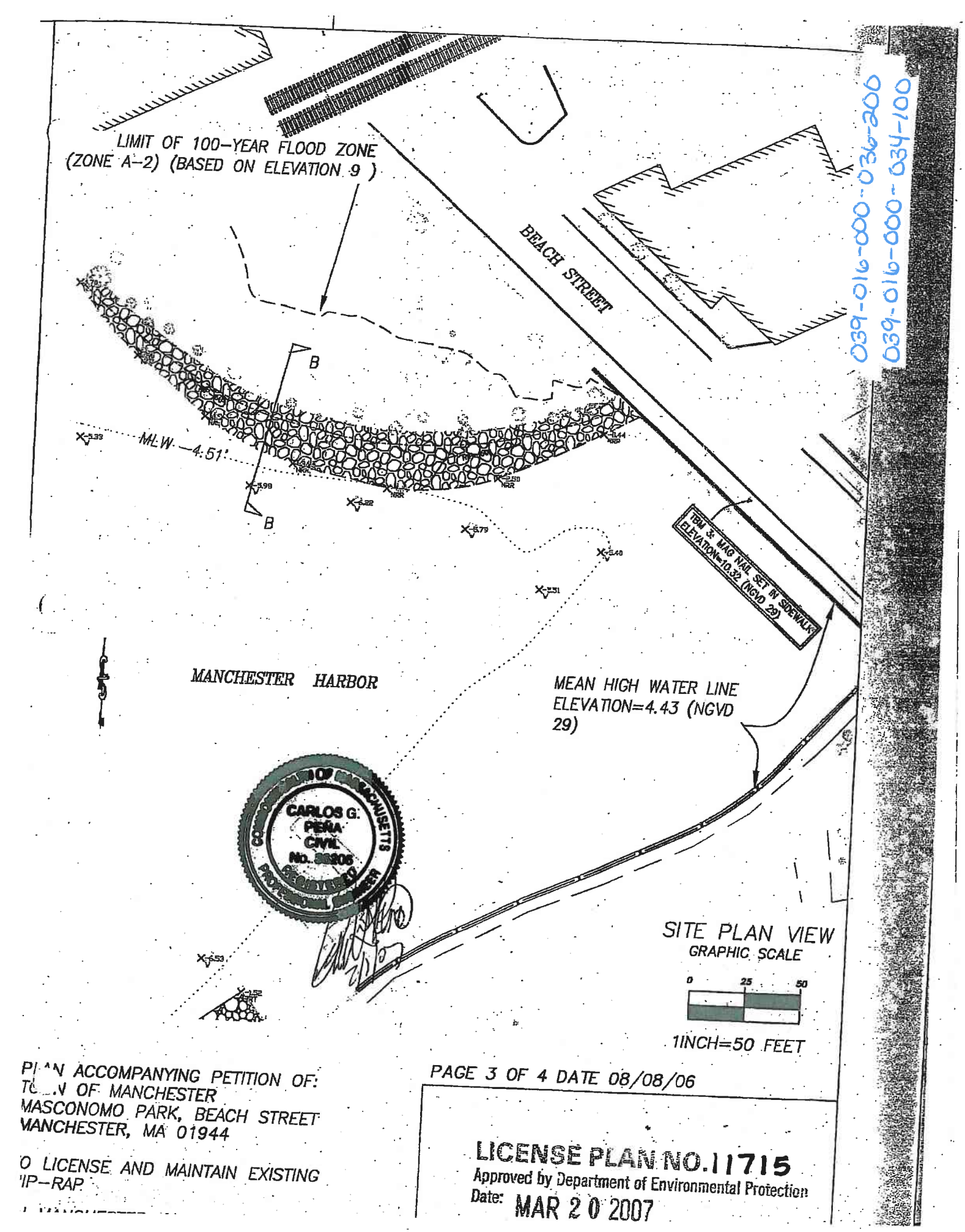
PAGE 2 OF 4 DATE 08/08/06

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING RIP-RAP

IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
Date:
MAR 20 2007



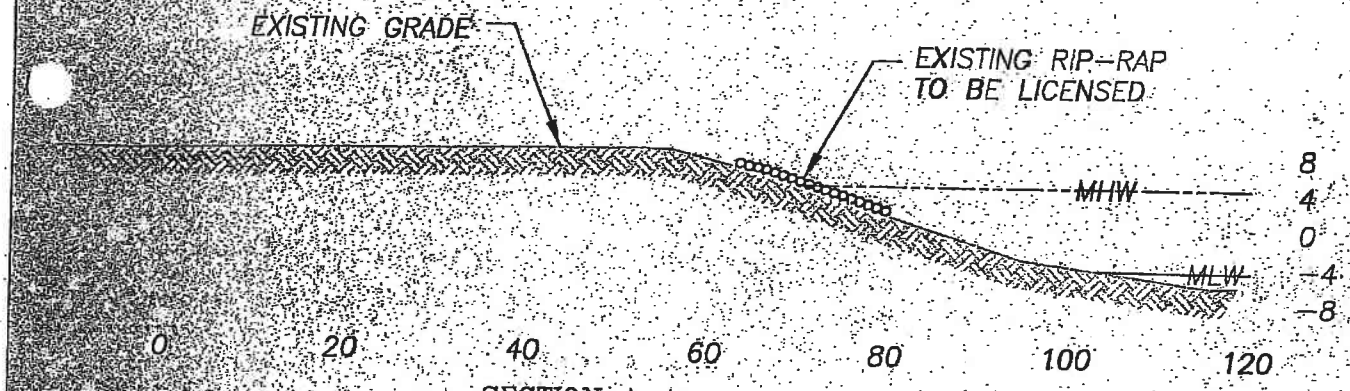
039-016-000-036-200
039-016-000-034-100

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
MASCONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING
RIP-RAP

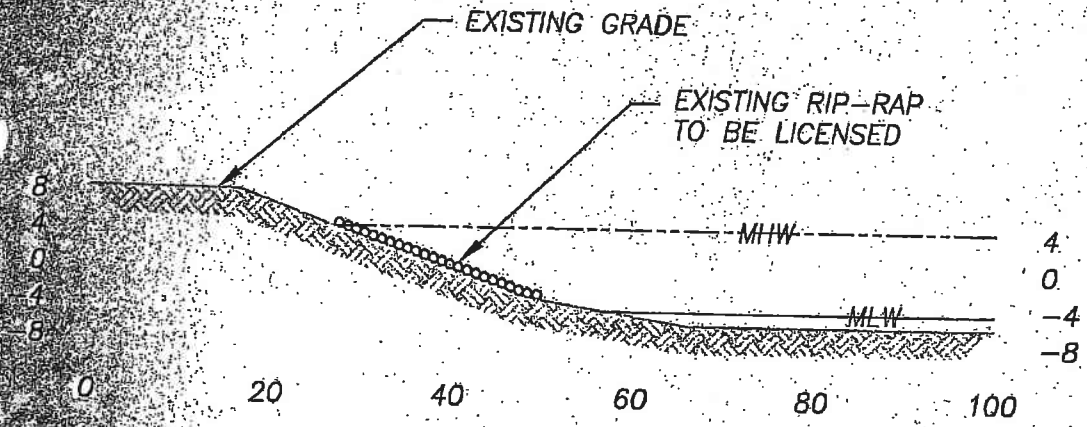
PAGE 3 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
Date: MAR 20 2007



SECTION A–A

SCALE
H: 1" = 20'
V: 1" = 20'



SECTION B–B

SCALE
H: 1" = 20'
V: 1" = 20'

CROSS SECTIONS
GRAPHIC SCALE

1INCH=20 FEET

COMMONWEALTH OF MASSACHUSETTS
CARLOS G. PEÑA
CIVIL
NO. 36206
REGISTERED PROFESSIONAL ENGINEER

PLAN ACCOMPANYING PETITION OF:
TOWN OF MANCHESTER
ECONOMO PARK, BEACH STREET
MANCHESTER, MA 01944

TO LICENSE AND MAINTAIN EXISTING RIP-RAP

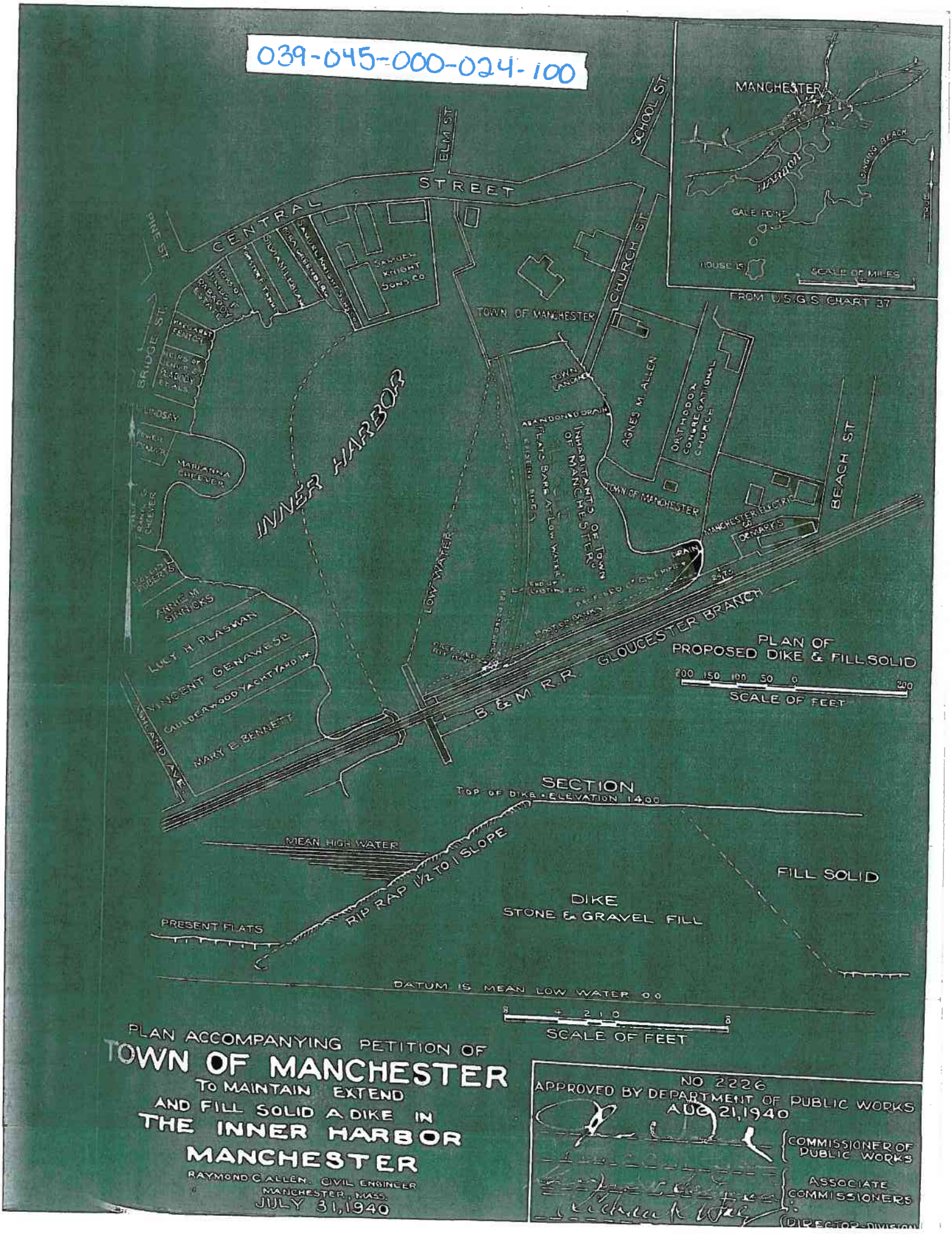
IN MANCHESTER HARBOR, MANCHESTER, MA
ESSEX COUNTY, MA

PAGE 4 OF 4 DATE 08/08/06

LICENSE PLAN NO. 11715
Approved by Department of Environmental Protection
MAR 20 2007

039-016-000-036-300
039-016-000-034-100

039-045-000-024-100



PLAN ACCOMPANYING PETITION OF

TOWN OF MANCHESTER

TO MAINTAIN EXTEND

AND FILL SOLID A DIKE IN

THE INNER HARBOR

MANCHESTER

RAYMOND C ALLEN. CIVIL ENGINGER
MANCHESTER, MASS.
JULY 31, 1940

NO 2226

APPROVED BY DEPARTMENT OF PUBLIC WORKS

AUG 21, 1940

COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

DIRECTOR-DIVISION

TOWN: MANCHESTER
SOURCE: US ACOE
LOCATION: CONCORD, MA
DATE OF RESEARCH: AUGUST 2007

No USACE Permits for the Town of Manchester

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

Section III

Beverly

Section III – Community Findings – City of Beverly

COMMUNITY DESCRIPTION

The City of Beverly consists of a land area of 15.44 square miles out of a total area of 22.75 square miles and had a population of 39,862 in the 2000 census. The City is located on the North 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 7 miles with the remaining shoreline semi-protected by offshore structures or landforms. 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 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 INVENTORY

Within the City of Beverly, there were 20 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 3 in Section III-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - City of Beverly

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Length
Bulkhead / Seawall	16		4	10	2		4805
Revetment							
Breakwater							
Groin / Jetty	3		3				520
Coastal Dune							
Coastal Beach	1		1				755
	20		8	10	2		6080

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 Beverly's case there are a total of 20 structures which would require approximately $ 6.8 million to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated $ 1.5 million would be required to upgrade the City's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - City of Beverly

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Bulkhead / Seawall	16		$ 418,361	$ 4,561,101	$ 1,474,268		$ 6,453,730
Revetment							$ -
Breakwater							$ -
Groin / Jetty	1		$ 153,290				$ 153,290
Coastal Dune							$ -
Coastal Beach	3		$ 169,422				$ 169,422
	20	$ -	$ 741,073	$ 4,561,101	$ 1,474,268	$ -	$ 6,776,442

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 Beverly, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - City of Beverly

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Town Owned	20		$ 669,465	$ 4,561,101	$ 1,474,268		$ 6,704,834
Commonwealth of Massachusetts							$ -
Federal Government Owned							$ -
Unknown Ownership							$ -
	20	$ -	$ 669,465	$ 4,561,101	$ 1,474,268	$ -	$ 6,704,834

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

SUMMARY

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

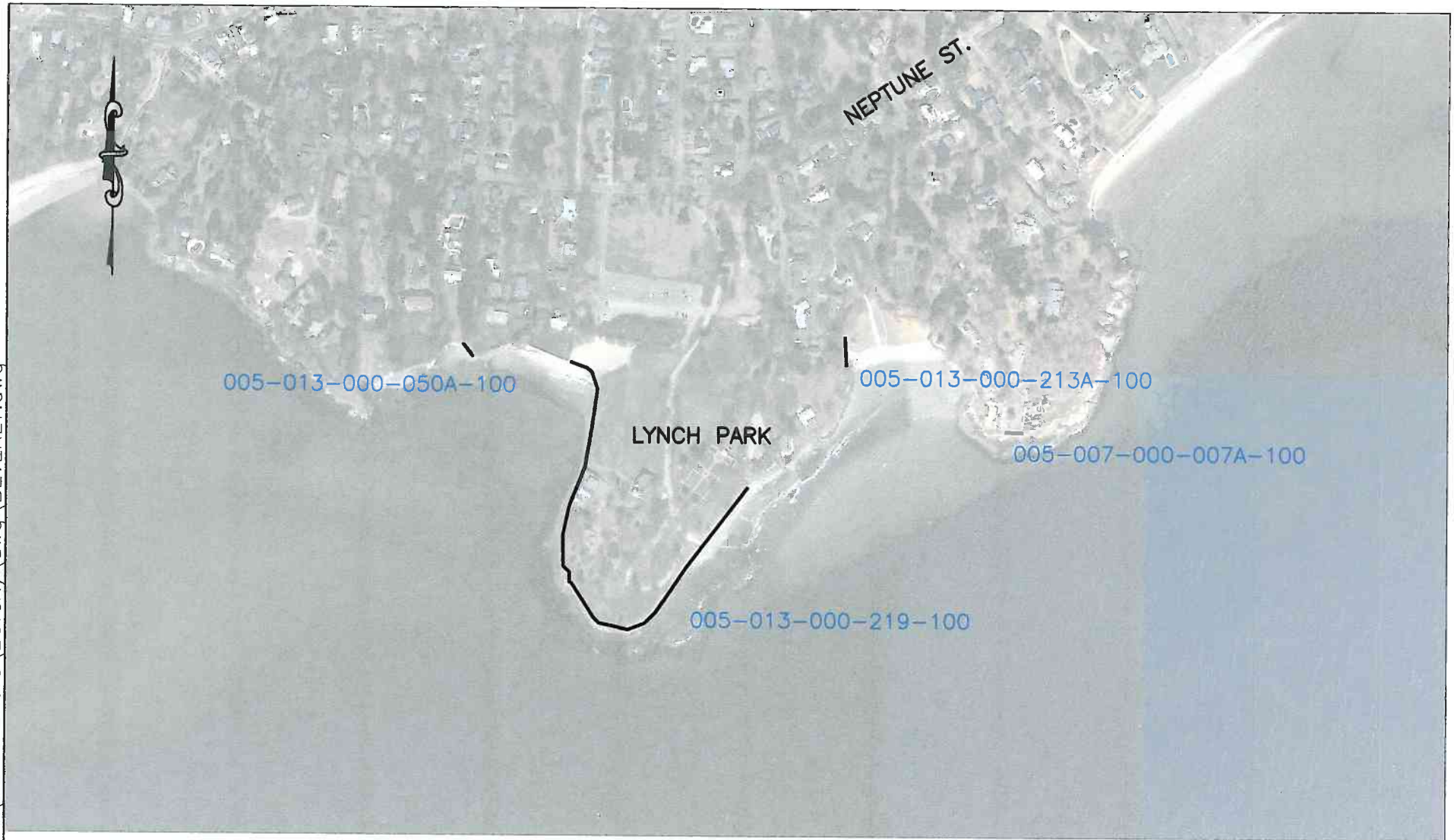
This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section III - Beverly

Part B

Structure Assessment Reports

BCE



COASTAL STRUCTURE LOCATION PLAN

CITY OF BEVERLY
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Pond Street
Franklin, MA 02038
TEL. (508) 533-0666 FAX. (508) 533-0669

SHEET 1

File: X:\27652-\27667\North Shore\Beverly\dwg\BEVERLY.dwg

COASTAL STRUCTURE LOCATION PLAN

CITY OF BEVERLY
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150
SCALE: 1" = 150-0"

Bourne Consulting Engineering

SHEET 2

File: X:\27652-\27667\North Shore\Beverly\dwg\BEVERLY.dwg

COASTAL STRUCTURE LOCATION PLAN

CITY OF BEVERLY
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4005 FAX. (508) 533-4009

SHEET 3

File: X:\27652-\27667\North Shore\Beverly\dwg\BEVERLY.dwg

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-001-000-085-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Harbor Center East

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: 1981

Estimated Reconstruction/Repair Cost: $1,197,068.00

Length: 215 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V4

FIRM Map Elevation: 13 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Concrete

Primary Height: Over 15 Feet

Secondary Type: Bulkhead/ Seawall

Secondary Material: Wood

Secondary Height: 10 to 15 Feet

Structure Summary :

A dry rubble stone wall with timber fender piles in poor condition. The top of the wall is leaning out. There is concrete rubble backfilled and under building, horizontal timbers behind piles and a portion with a mass concrete overlay repair. Sandbags fill a sinkhole at the building, 2 feet by 5 feet, and another sinkhole is filled with crushed stone. The building appears to be on the pile supported pier.

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

Priority Rating	V Immediate / Highest Priority
Action	Consider For Immediate Action Due to Public Safety and Welfare Issues
Description	Critical Inshore Structures Present with Potential for Infrastructure Damage and/or High Density Residential Dwellings Condition 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)

Structure Images:

005-001-000-085-100-PHO1A.JPG

005-001-000-085-100-PHO1B.JPG

005-001-000-085-100-PHO1C.JPG

Structure Documents:

USACE	July 1982	Proposed Riprap	005-001-000-085-100-COE1A
DEP	November 1	Plan Accompanying	005-001-000-085-100-LIC1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-001-000-086-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Beverly Harbor	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$277,200.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
70 Feet	Feet NAVD 88	V4	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A rubble stone seawall with mortared stone cap in poor condition. The stones appear to be moving with dislodged stones that are loose, typically with no chinking and rounded unstable stones. A parking lot is behind this structure.

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

Priority Rating	V Immediate / Highest Priority
Action	Consider For Immediate Action Due to Public Safety and Welfare Issues
Description	Critical Inshore Structures Present with Potential for Infrastructure Damage and/or High Density Residential Dwellings Condition 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)

Structure Images:

005-001-000-086-100-PHO1A.JPG

Structure Documents:

DEP	March 23, 19	Plan Accompanying	005-001-000-086-100-LIC1A
DEP	November 1	Plan Accompanying	005-001-000-086-100-LIC1B

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-001-000-087-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Beverly Harbor	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$485,100.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
245 Feet	Feet NAVD 88	V4	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block seawall with concrete cap in satisfactory condition. There are a few fallen blocks (small). There is a sinkhole at the pier abutment 1 foot by 4 feet. The harbormaster office is adjacent to wall, resulting in the high priority rating.

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

Priority Rating	V Immediate / Highest Priority
Action	Consider For Immediate Action Due to Public Safety and Welfare Issues
Description	Critical Inshore Structures Present with Potential for Infrastructure Damage and/or High Density Residential Dwellings Condition 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)

Structure Images:

005-001-000-087-100-PHO1A.JPG

005-001-000-087-100-PHO1B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-002-000-091-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Quincy Park East

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $18,810.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
15 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A concrete parged seawall in satisfactory condition overall, but there is exposed rebar at the toe and concrete deterioration. There are several houses near the wall.

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

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

Structure Images:

005-002-000-091-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-002-000-094-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Quincy Park West

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $10,032.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
40 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A concrete seawall with wave return face in satisfactory condition. There are several houses near the wall.

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

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

Structure Images:

005-002-000-094-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-002-000-118-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Water Street	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1947	$61,230.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
195 Feet	Feet NAVD 88	V4	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Groin/ Jetty	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A quarry stone groin over sewer outfall in satisfactory condition, but it is functioning adequately. There are a few smaller dislodged stones along the crest.

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

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

Structure Images:

005-002-000-118-100-PHO1A.JPG

Structure Documents:

USACE	June 1952	Proposed Dredging	005-002-000-118-100-COE1A
MA-DCR	February 19	Proposed Stone	005-002-000-118-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-004-000-040-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Ward Two Playground	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$920,700.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
465 Feet	Feet NAVD 88	A2	10 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone rubble wall above beach in fair condition. There is some localized cracking, one small cap stone missing at stairs, localized missing mortar but no signs of wall movement. This is a high retaining wall with a playground behind.

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

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

Structure Images:

005-004-000-040-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-005-000-459-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Washington Street	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1954	$79,332.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
50 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

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

Structure Summary :

A granite block seawall with mortared joints and a toe stone revetment; both fair condition. There are mortar repairs on the wall. There are houses in the vicinity.

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

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

Structure Images:

005-005-000-459-100-PHO1A.JPG

Structure Documents:

MA-DCR	November 1	Proposed Shore	005-005-000-459-100-DCR1A
MA-DCR	July 1958	Proposed Shore	005-005-000-459-100-DCR1B

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-005-000-462-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Indepedence Park

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: 1947

Estimated Reconstruction/Repair Cost: $95,634.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
630 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared granite block park seawall in satisfactory condition. The railing is missing along the length of the wall.

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

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

Structure Images:

005-005-000-462-100-PHO1A.JPG

Structure Documents:

MA-DCR	February 19	Proposed Stone	005-005-000-462-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-005-000-462-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Wilson Avenue	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1952	$59,660.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
190 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Groin/ Jetty	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A quarry stone groin in generally satisfactory condition with some unravelling of armor stone at outer end. This groin retains sand and covers a drain outfall. There is a house nearby.

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

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

Structure Images:

005-005-000-462-200-PHO2A.JPG

Structure Documents:

USACE	June 1952	Proposed Dredging	005-005-000-462-200-COE2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-005-000-462-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Wilson Avenue	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$22,770.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
30 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block seawall in fair condition with some missing mortar and chinking. There is a sinkhole behind the wall, 2 feet by 5 feet by 1 foot deep and a house nearby.

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

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

Structure Images:

005-005-000-462-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-006-000-031-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Ocean Avenue

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: 1954

Estimated Reconstruction/Repair Cost: $50,160.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
40 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:
Revetment	Stone	

Structure Summary :

A concrete seawall with footing exposed and undercut in areas. The toe stone is unravelled. The stairs end 3 feet above current beach level, indicating significant sand loss. Fair overall condition with concerns of possible damage or failure due to footing undermining. There are houses in the vicinity.

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

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

Structure Images: 005-006-000-031-100-PHO1A.JPG

Structure Documents: MA-DCR | November 1 | Proposed Shore | 005-006-000-031-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-006-000-035-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Abbott Street

Date: 6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Beverly

Earliest Structure Record: 1958

Estimated Reconstruction/Repair Cost: $75,240.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
60 Feet	Feet NAVD 88	V2	16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block seawall with mortared joints and some mortar missing; in fair condition. There are houses in the vicinity.

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

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

Structure Images: 005-006-000-035-100-PHO1A.JPG

Structure Documents:

MA-DCR	July 1958	Proposed Shore	005-006-000-035-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-007-000-007A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Bay View Avenue	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$138,600.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
70 Feet	Feet NAVD 88	V2	25 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block seawall with dislodged cap blocks at the east end for 6 linear feet. No other signs of distress and it is founded on bedrock. In fair condition.

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

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

Structure Images:

005-007-000-007A-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-012-000-238-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lyons Park Beach	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1957	$304,247.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
985 Feet	Feet NAVD 88	V4	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:
Revetment	Stone	10 to 15 Feet

Structure Summary :

A concrete and stone park seawall (mortared stone with concrete cap) in satisfactory condition. One portion of the seawall is all concrete, some minor cracking cap, some minor spalling at the east end on the cap. A stone toe revetment is adjacent at the west end.

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

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

Structure Images:

005-012-000-238-100-PHO1A.JPG

Structure Documents:

MA-DCR	March 1957	Proposed Shore	005-012-000-238-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-012-000-238-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lyons Park	6/7/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1957	$32,400.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
135 Feet	Feet NAVD 88	V2	16 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A quarry stone groin in a park setting, in satisfactory condition.

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

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

Structure Images: 005-012-000-238-200-PHO2A.JPG

Structure Documents:

MA-DCR	March 1957	Proposed Shore	005-012-000-238-200-DCR2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-012-000-238-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lyons Park Beach	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	Harbor Master

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1957	$169,422.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
755 Feet	Feet NAVD 88	V4	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Coastal Beach	Sand	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A reported beach nourishment with sand typically in place, but no sand and exposed toe stone revetment at the western end.

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

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

Structure Images:

005-012-000-238-300-PHO3A.JPG

Structure Documents:

MA-DCR	March 1957	Proposed Shore	005-012-000-238-300-DCR3A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-013-000-050A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Woodbury	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$25,502.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
60 Feet	Feet NAVD 88	V4	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone street end wall in fair condition with some cracked mortar, holes in mortar, and one sinkhole behind that is 1 foot by 3 foot by 1.5 feet deep in pavement.

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

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

Structure Images:

005-013-000-050A-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-013-000-213A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Ober Street	3/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	Unkown	$8,448.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
100		V4	14
Feet	Feet NAVD 88		Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall with irregular batter, in overall satisfactory condition.

Condition Rating	B Good	*Priority Rating*	I 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 life of structure.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

005-013-000-213A-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Beverly

Structure ID: 005-013-000-219-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lynch Park	6/7/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Beverly	1963	$2,744,887.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1730 Feet	Feet NAVD 88	V4 and V2	14,15,16 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

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

Structure Summary :

A mortared stone rubble park seawall with granite block cap stones in fair condition. There are some mortar joints cracked, one area with some 12 inch riprap and erosion areas inshore of wall.

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

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

Structure Images:

005-013-000-219-100-PHO1A.JPG

005-013-000-219-100-PHO1B.JPG

Structure Documents:

MA-DCR	August 1963	Proposed Shore	005-013-000-219-100-DCR1A

Prepared By: Bourne Consulting Engineering

Section III - Beverly

Part C

Structure Photographs

CITY: BEVERLY
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
005-001-000-085-100	005-001-000-085-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-001-000-085-100	005-001-000-085-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-001-000-085-100	005-001-000-085-100-PHO1C.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-001-000-086-100	005-001-000-086-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-001-000-087-100	005-001-000-087-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-001-000-087-100	005-001-000-087-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-002-000-091-100	005-002-000-091-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-002-000-094-100	005-002-000-094-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-002-000-118-100	005-002-000-118-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-004-000-040-100	005-004-000-040-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-005-000-459-100	005-005-000-459-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-005-000-462-100	005-005-000-462-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-005-000-462-200	005-005-000-462-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-005-000-462-300	005-005-000-462-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-006-000-031-100	005-006-000-031-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-006-000-035-100	005-006-000-035-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-007-000-007A-100	005-007-000-007A-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-012-000-238-100	005-012-000-238-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-012-000-238-200	005-012-000-238-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-012-000-238-300	005-012-000-238-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-013-000-050A-100	005-013-000-050A-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-013-000-213A-100	005-013-000-213A-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

CITY: BEVERLY
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
005-013-000-219-100	005-013-000-219-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
005-013-000-219-100	005-013-000-219-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

005-001-000-085-100-PHO1A

005-001-000-085-100-PHO1B

005-001-000-085-100-PHO1C

005-001-000-086-100-PHO1A

005-001-000-087-100-PHO1A

005-001-000-087-100-PHO1B

005-002-000-091-100-PHO1A

005-002-000-094-100-PHO1A

005-002-000-118-100-PHO1A


005-004-000-040-100-PHO1A


005-005-000-459-100-PHO1A


005-005-000-462-100-PHO1A

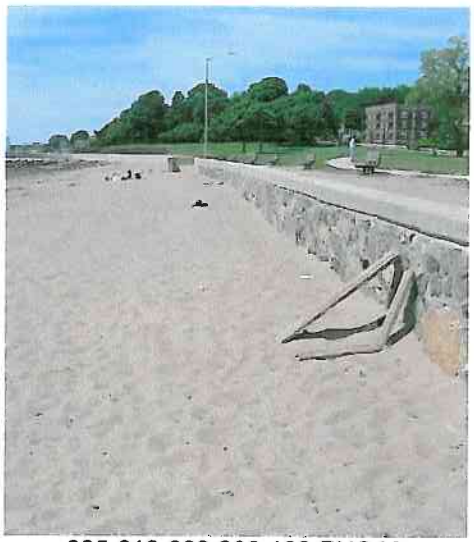

005-005-000-462-200-PHO2A


005-005-000-462-300-PHO3A


005-006-000-031-100-PHO1A


005-006-000-035-100-PHO1A


005-007-000-007A-100-PHO1A


005-012-000-238-100-PHO1A

005-012-000-238-200-PHO2A

005-012-000-238-300-PHO3A

005-013-000-050A-100-PHO1A

005-013-000-213A-100-PHO1A

005-013-000-219-100-PHO1A

005-013-000-219-100-PHO1B

Section III - Beverly

Part D

Structure Documents

CITY DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

CITY: BEVERLY
SOURCE: City of Beverly
LOCATION: CITY
DATE OF RESEARCH: JULY 2007

No City Documents for the City of Beverly

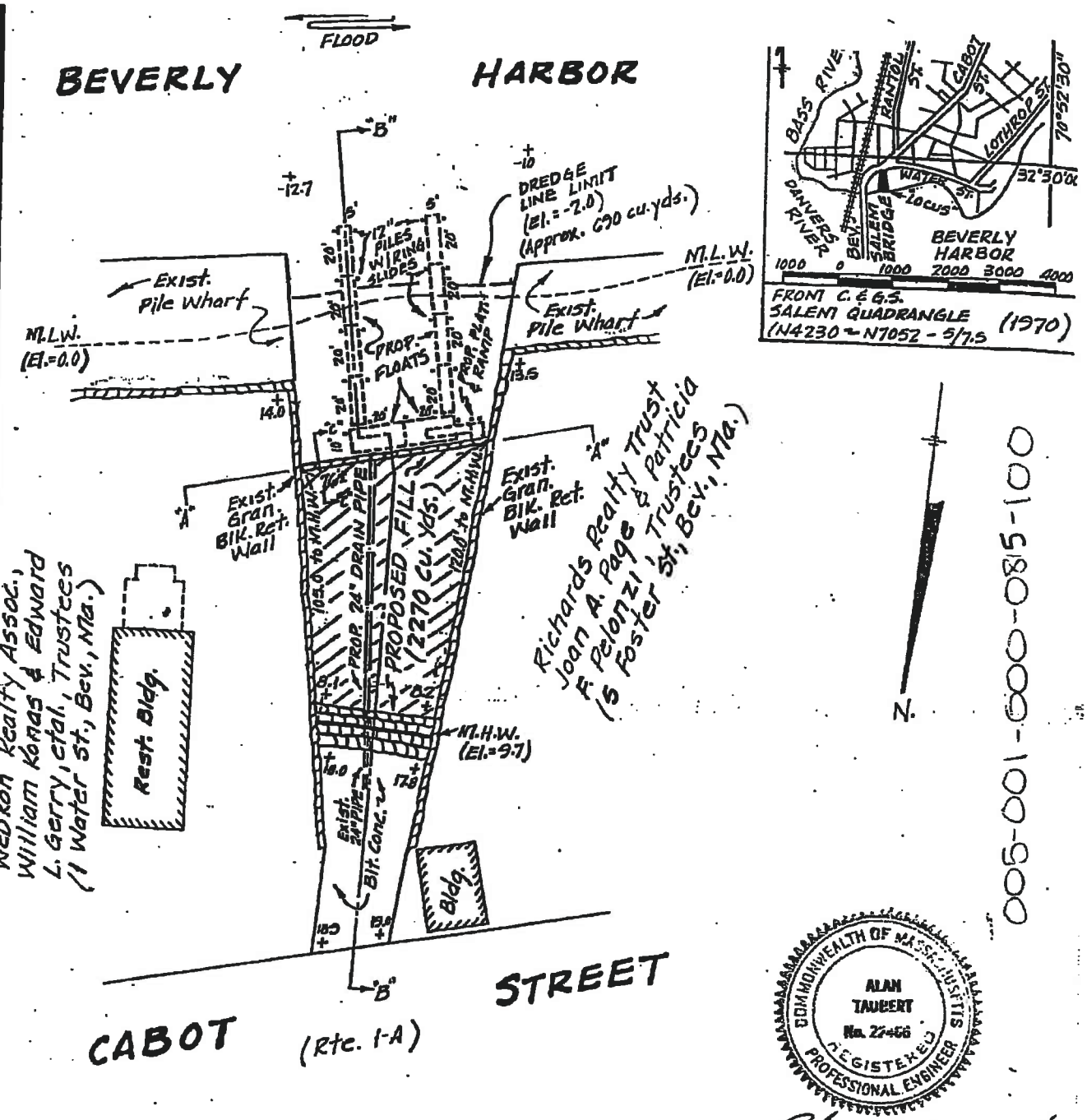
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description

CITY: BEVERLY
SOURCE: MA-DCR
LOCATION: MA-DCR BOSTON and HINGHAM, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
005-002-000-118-100	005-002-000-118-100-DCR1A	967	MA-DCR	Beverly	February 1947	Proposed Stone Jetties - Beverly Shore - Adjacent to Lothrop Street - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Wilson Avenue and Water Street	Groins
005-005-000-459-100	005-005-000-459-100-DCR1A	1447	MA-DCR	Beverly	November 1954	Proposed Shore Protection - Seawall Repairs and Earth Fill - Beverly Harbor Shore - Washington and Oceans Streets - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	4	Washington and Ocean Street	Seawall Repairs
005-005-000-459-100	005-005-000-459-100-DCR1B	1960	MA-DCR	Beverly	July 1958	Proposed Shore Protection - Stone Mound and Seawall Reconstruction - Vicinity of Abbott Street - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Central Street to Abbott Street	Stone Mound and Seawall
005-005-000-462-100	005-005-000-462-100-DCR1A	967	MA-DCR	Beverly	February 1947	Proposed Stone Jetties - Beverly Shore - Adjacent to Lothrop Street - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Wilson Avenue and Water Street	Groins
005-006-000-031-100	005-006-000-031-100-DCR1A	1447	MA-DCR	Beverly	November 1954	Proposed Shore Protection - Seawall Repairs and Earth Fill - Beverly Harbor Shore - Washington and Ocean Streets - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	4	Washington and Ocean Streets	Seawall Repairs
005-006-000-035-100	005-006-000-035-100-DCR1A	1960	MA-DCR	Beverly	July 1958	Proposed Shore Protection - Stone Mound and Seawall Reconstruction - Vicinity of Abbott Street - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Central Street to Abbott Street	Stone Mound and Seawall
005-012-000-238-100	005-012-000-238-100-DCR1A	1744	MA-DCR	Beverly	March 1957	Proposed Shore Protection - Stone Groin and Seawall Repairs - Dane Street Beach - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Dane Street Beach	Groins and Seawall
005-012-000-238-200	005-012-000-238-200-DCR2A	1744	MA-DCR	Beverly	March 1957	Proposed Shore Protection - Stone Groin and Seawall Repairs - Dane Street Beach - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Dane Street Beach	Groins and Seawall
005-012-000-238-300	005-012-000-238-300-DCR3A	1744	MA-DCR	Beverly	March 1957	Proposed Shore Protection - Stone Groin and Seawall Repairs - Dane Street Beach - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Dane Street Beach	Groins and Seawall
005-013-000-219-100	005-013-000-219-100-DCR1A	2358	MA-DCR	Beverly	August 1963	Proposed Shore Protection - Seawall Repairs - Lynch Park - Beverly - Proposed Shore Protection - Stone Groin and Seawall Repairs - Dane Street Beach - Beverly - Prepared for the DPW of Massachusetts - Division of Waterways	1	Lynch Park	Seawall Repairs

CITY: BEVERLY
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
005-001-000-085-100	005-001-000-085-100-LIC1A	798	DEP	Beverly	November 1981	Plan Accompanying Petition of the City of Beverly - To Construct a Granite Block Retaining Wall, Platform, Ramp, Pile Held Floats, to Dredge, and to Fill in Beverly Harbor, Beverly, Massachusetts	2	Water Street	Granite Retaining Wall
005-001-000-086-100	005-001-000-086-100-LIC1A	798	DEP	Beverly	November 1981	Plan Accompanying Petition of the City of Beverly to Construct a Granite Block Retaining Wall, Platform, Ramp, Pile Held Floats, to Dredge, and to Fill in Beverly Harbor, Beverly, Mass.	2	Cabot Street	Granite Block Retaining Wall
005-001-000-086-100	005-001-000-086-100-LIC1B	932	DEP	Beverly	November 12, 1982	Plan Accompanying Petition of The City of Beverly to Construct a Rip-Rap Slope, Ramp, Pile Held Floats, To Dredge and To Fill In Beverly Harbor, Beverly, Mass	2	Cabot Street	Rip-Rap Slope



COMMONWEALTH OF MASSACHUSETTS
ALAN TAUBERT
No. 22456
REGISTERED
PROFESSIONAL ENGINEER

Alan F. Taubert

(Sheet 1 of 2 sheets)

8W-084

PLAN:

0 60 120

(SCALE IN FEET)

PLAN ACCOMPANYING PETITION OF THE

CITY OF BEVERLY

To construct a Granite Block Ret. Wall, platform, ramp, Pile held floats, to dredge, and to fill in Beverly Harbor, Beverly, Mass.

County of Essex, Mass.

Rev.: Mar. 23, 1981

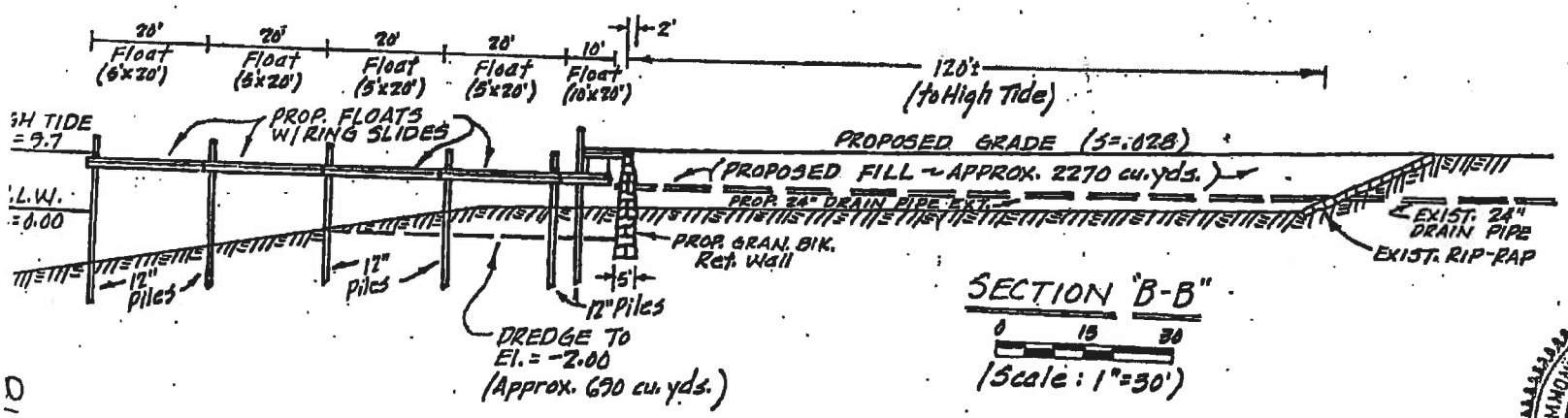
Scale - 1" = 60'

LICENSE PLAN NO. 798

Approved by Department of Environmental Quality Engineering of Massachusetts NOVEMBER 18, 1981

COMMISSIONER

CHIEF ENGINEER



SECTION "B-B"

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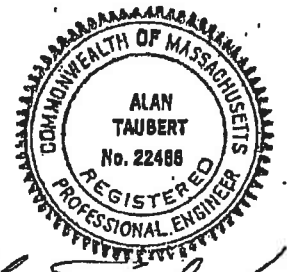
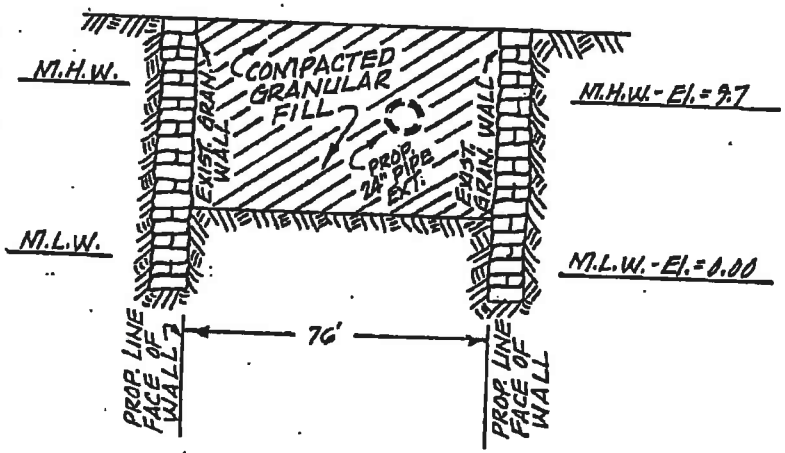
(Scale : 1"=30')

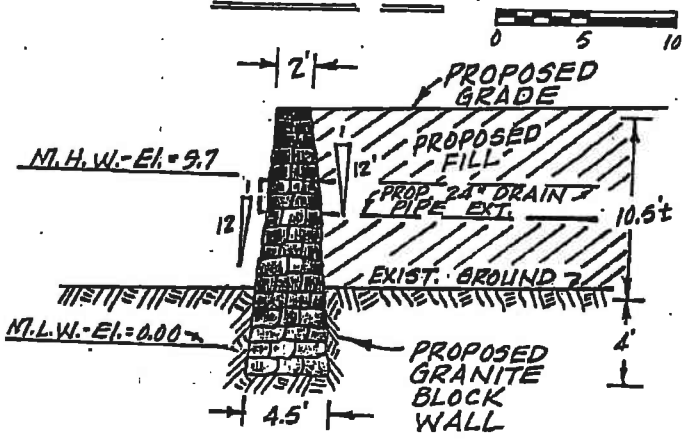


SECTION "A-A" (N.T.S.)



SECTION "C-C" (Scale : 1"=10')

0 5 10



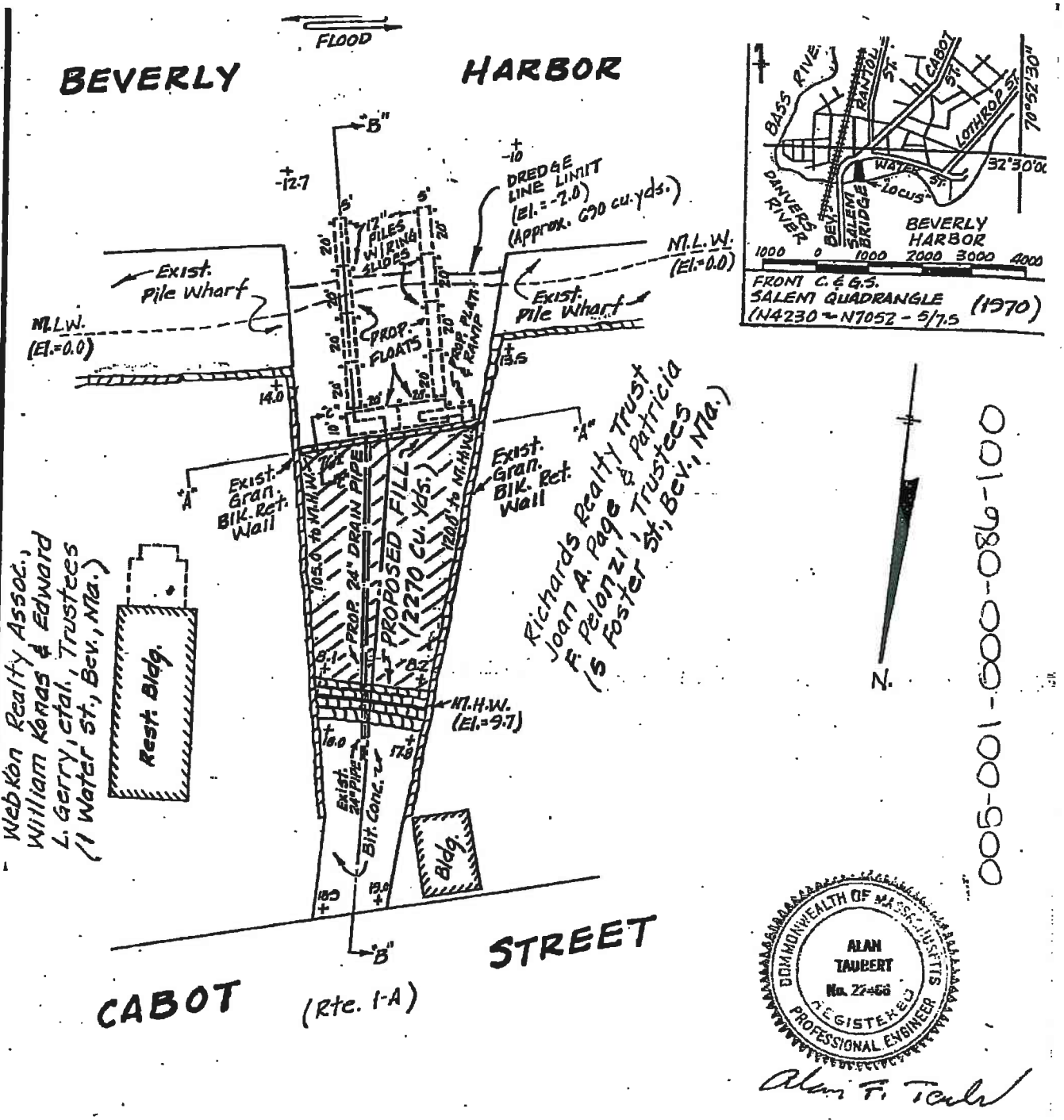
005-001-000-085-100

LICENSE PLAN NO. 798

Approved by Department of Environmental Quality Engineering

NOVEMBER 18, 1981

(Sheet 2 of 2 Sheets)



005-001-000-080-100

COMMONWEALTH OF MASSACHUSETTS
ALAN TAUBERT
No. 27456
REGISTERED PROFESSIONAL ENGINEER

Alan F. Taubert

(Sheet 1 of 2 sheets)

8IW-084

PLAN:

0 60 120

(SCALE IN FEET)

PLAN ACCOMPANYING PETITION OF THE

CITY OF BEVERLY

To construct a Granite Block Ret. wall, platform, ramp, Pile held floats, to dredge, and to fill in Beverly Harbor, Beverly, Mass.

County of Essex, Mass.

Rev.: Mar. 23, 1981

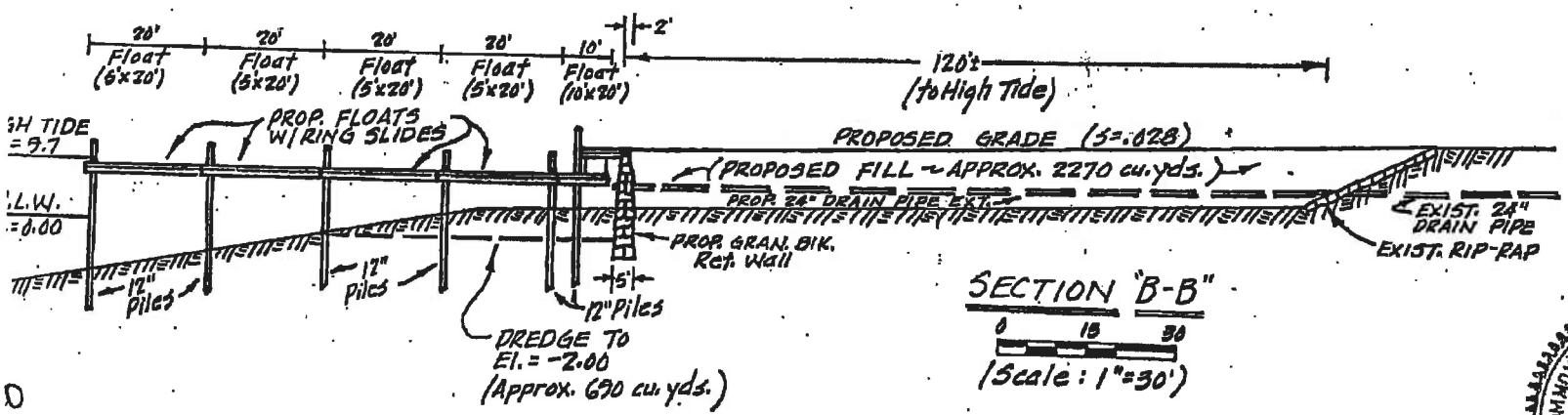
Scale: 1" = 60'

LICENSE PLAN NO. 798

Approved by Department of Environmental Quality Engineering of Massachusetts NOVEMBER 18, 1981

COMMISSIONER

CHIEF ENGINEER



SECTION "B-B"

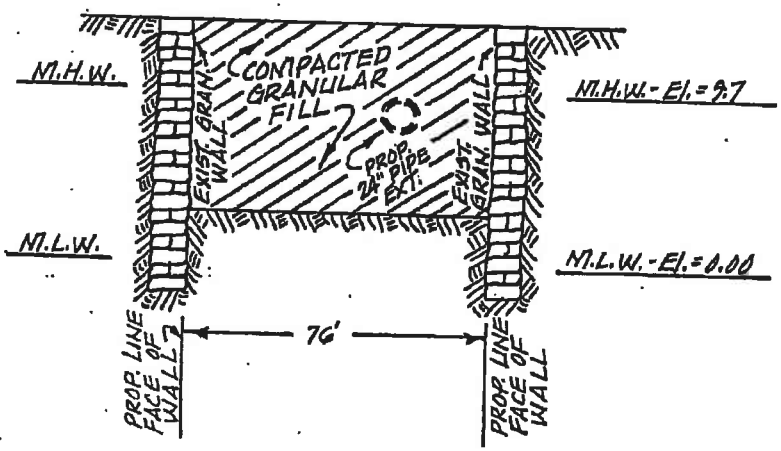
0 15 30

(Scale : 1"=30')

COMMONWEALTH OF MASSACHUSETTS
ALAN TAUBERT
No. 22486
REGISTERED PROFESSIONAL ENGINEER

Alan Taubert

SECTION "A-A" (N.T.S.)



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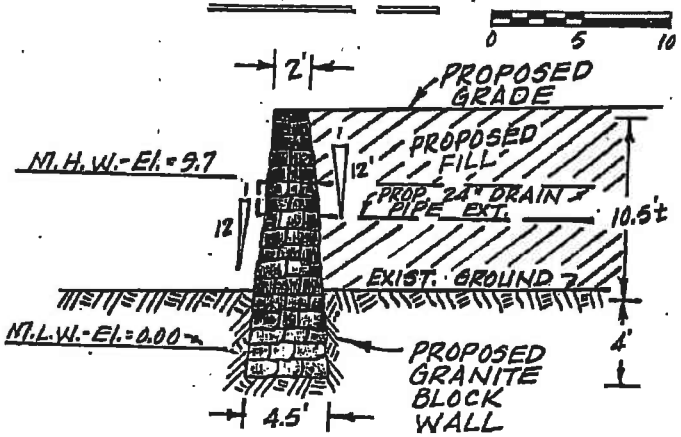


005-001-000-086-100

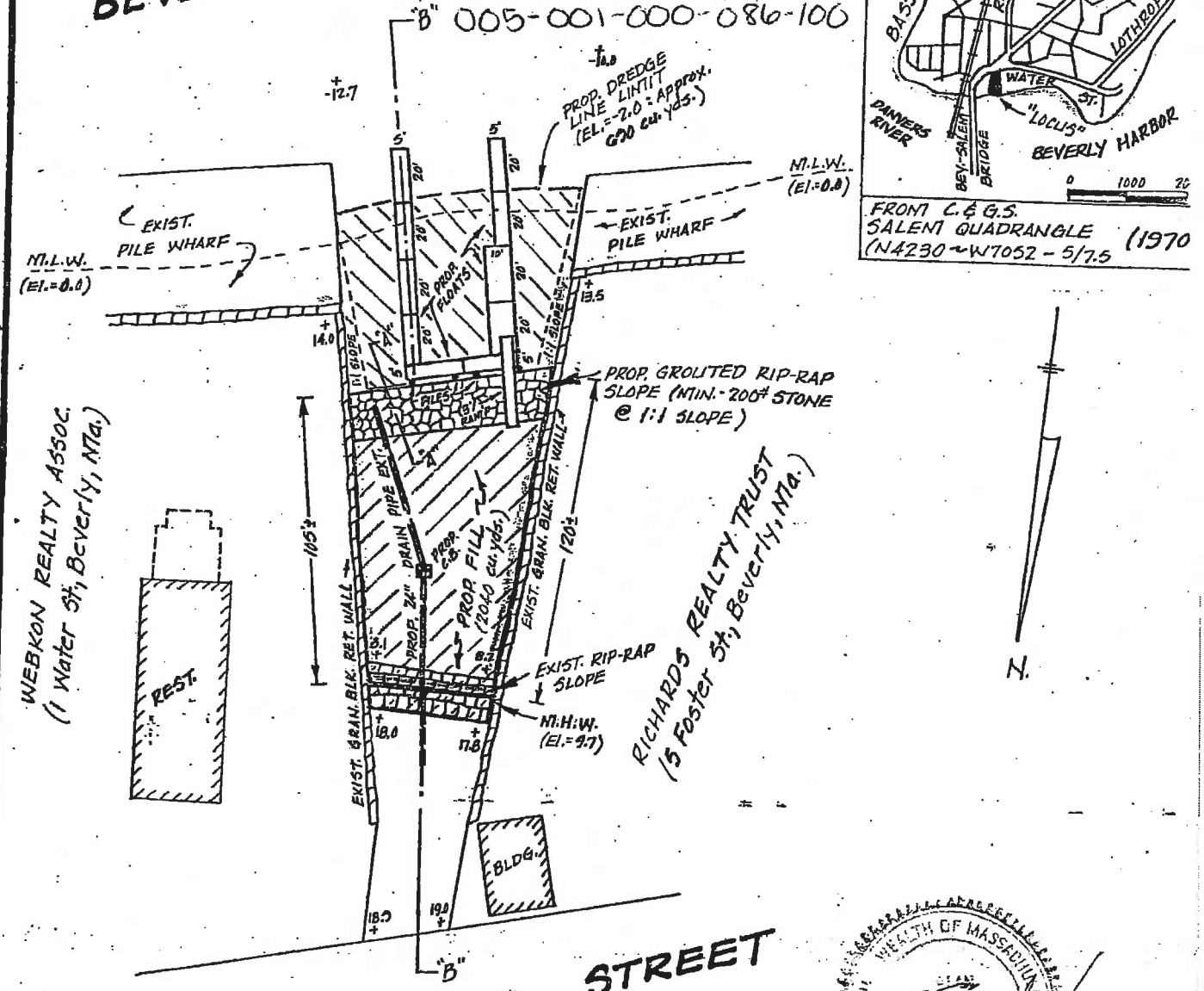
LICENSE PLAN NO. 798

Approved by Department of Environmental Quality Engineering

NOVEMBER 18, 1981

(Sheet 2 of 2 sheets)

BEVERLY HARBOR



FROM C. & G.S. SALEM QUADRANGLE (1970 (N4230-W7052.5-5/7.5

(Sheet 1 of 2 sheets)

BZW-111

PLAN ACCOMPANYING PETITION OF THE

CITY OF BEVERLY

To construct a Rip-Rap Slope, ramp, pile held floats, to Dredge and to fill in Beverly Harbor, Beverly, Mass.

County of Essex, Mass.

Scale: 1" = 60'

Aug. 15, 1980
Rev: Mar. 23, 1981
Rev: July 27, 1982

PLAN:

0 60 120

(Scale in feet)

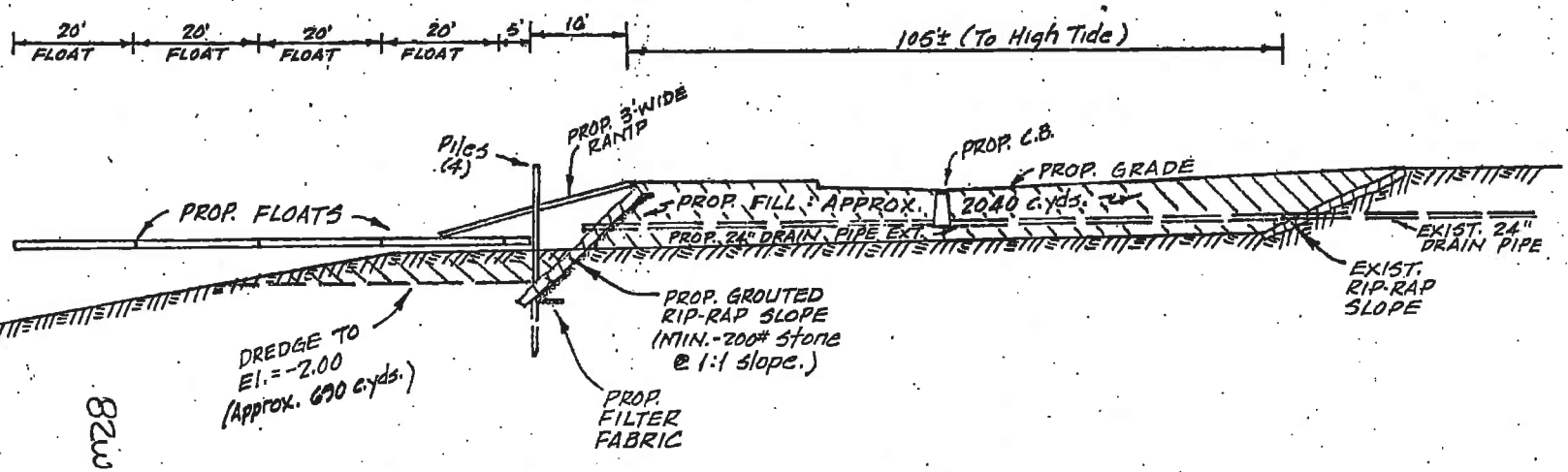
LICENSE PLAN NO. 932

Approved by Department of Environmental Quality Engineering of Massachusetts

NOVEMBER 12, 1982

COMMISSIONER

CHIEF ENGINEER



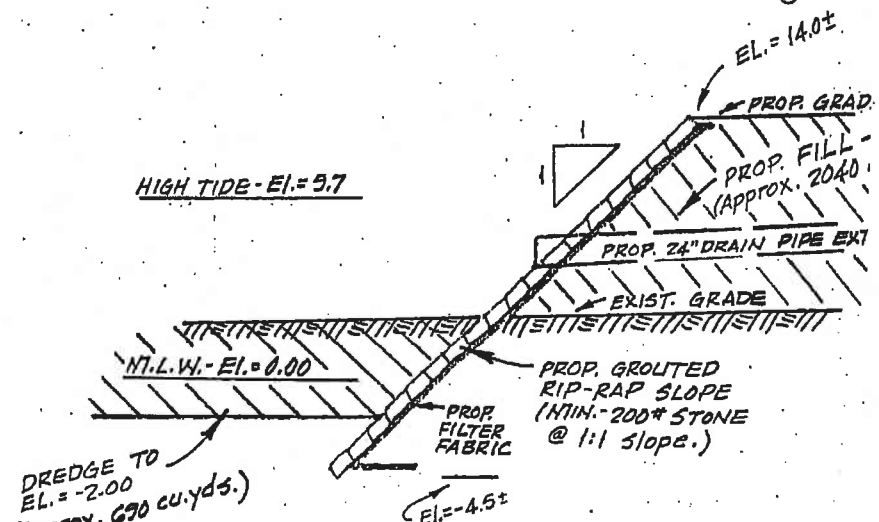
SECTION "B-B"

0 15 30

(Scale : 1" = 30')

82W-111

005-001-000-086-100



SECTION "A-A" (scale : 1" = 10')

LICENSE PLAN NO. 932

Approved by Department of Environmental Quality Engineering

NOVEMBER 12, 1982

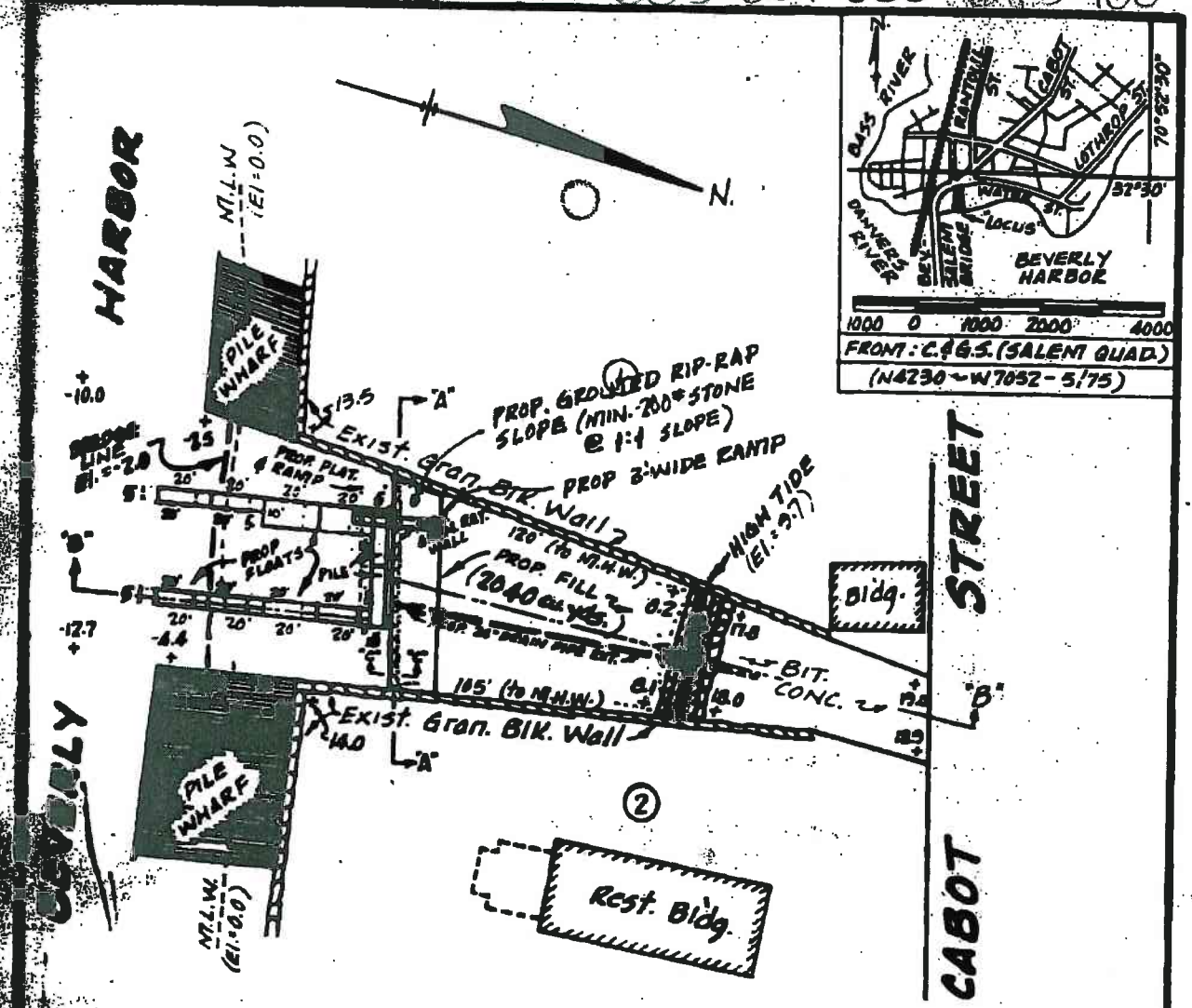
(Sheet 2 of 2 Sheets)

REVISED - July 27, 1982

CITY: BEVERLY
SOURCE: US ACOE
LOCATION: CONCORD, MA
DATE OF RESEARCH: AUGUST 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
005-001-000-085-100	005-001-000-085-100-COE1A	82-469	USACE	Beverly	July 1982	Proposed Riprap Slope, Fill, Ramp and Pile Held Floats	2	Water Street	Proposed Riprap Slope
005-002-000-118-100	005-002-000-118-100-COE1A	52-165	USACE	Beverly	June 1952	Proposed Dredging and Jetty Construction - Beverly Harbor - Beverly, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Lothrop Street	Jetty Construction
005-005-000-462-200	005-005-000-462-200-COE2A	52-165	USACE	Beverly	June 1952	Proposed Dredging and Jetty Construction - Beverly Harbor - Beverly, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Lothrop Street	Jetty Construction

005-001-000 - RS-100



Alan F. Cole

PURPOSE: PARKING AND RECREATION FACILITY
DATUM: MEAN LOW WATER
ADJACENT PROPERTY OWNERS:
① RICHARDS REALTY TRUST
② WEBKON REALTY ASSOC.

PROPOSED GRANITE ~~BLOCK~~ WALL
FILL, RAMP & PILE HELD FLOATS
IN: Beverly Harbor
AT: Beverly, Mass.
County of Essex State of Mass.
Application by: The City of Beverly
Revised: 7/1/81
Sheet 1 of 2 sheets Date: 8/15/80
Revised 7/27/82

005-001-000 085-100

PROPOSED GRANITE BLOCK WALL
FILL, RAMP & PILE HELD FLOATS

IN: Beverly Harbor
AT: Beverly, Mass.
County of Essex State of Mass.
Application by: The City of Beverly
Sheet 2 of 2 Sheets Revised: 7/1/81
Date: 8/15/80

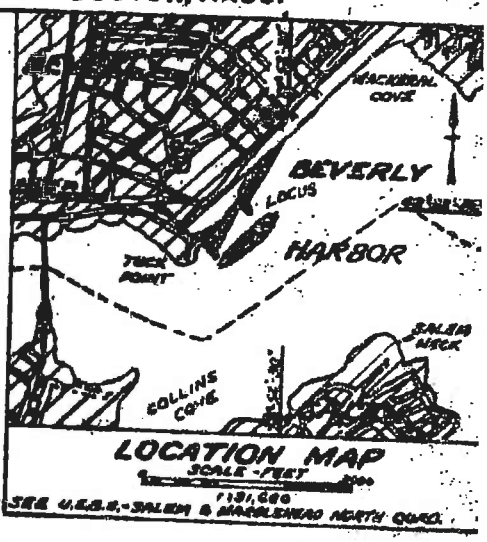
Revised 7/27/82

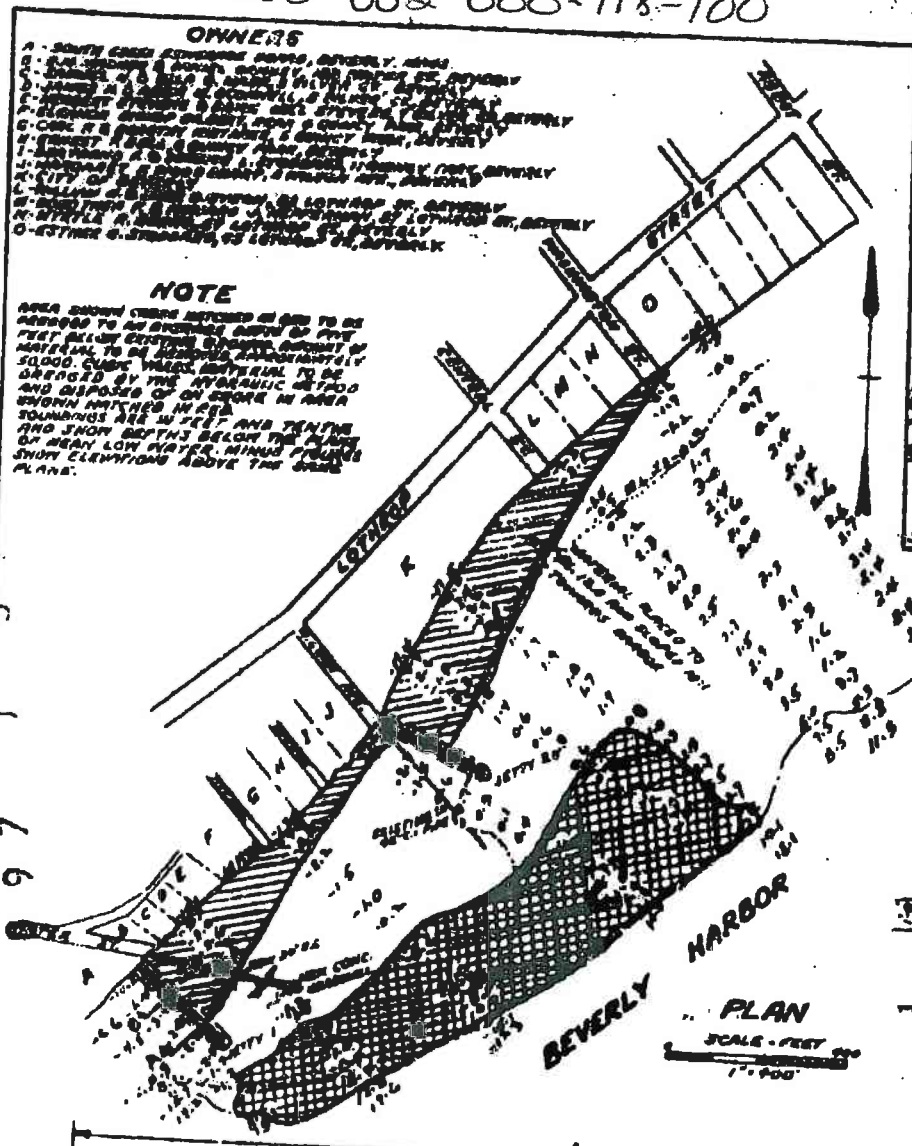
094 7794

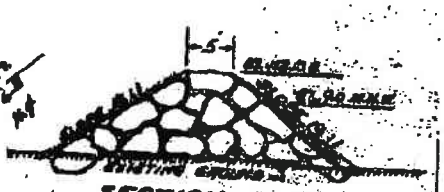
005-005-000-462-200

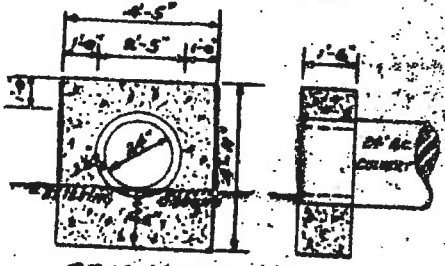
005-002-000-118-100

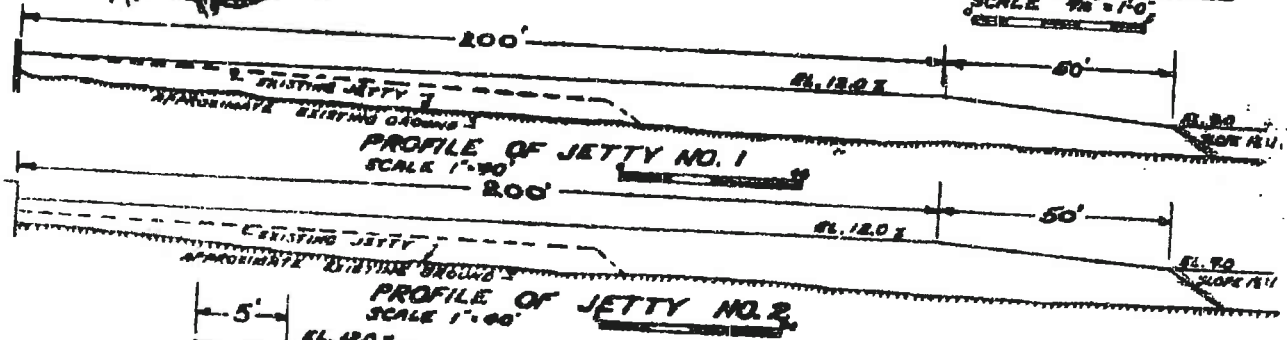
BOSTON, MASS.

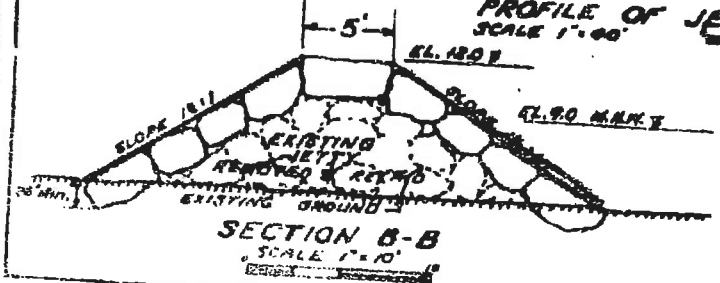












PROPOSED DREDGING & JETTY CONSTRUCTION
BEVERLY HARBOR
BEVERLY - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1952

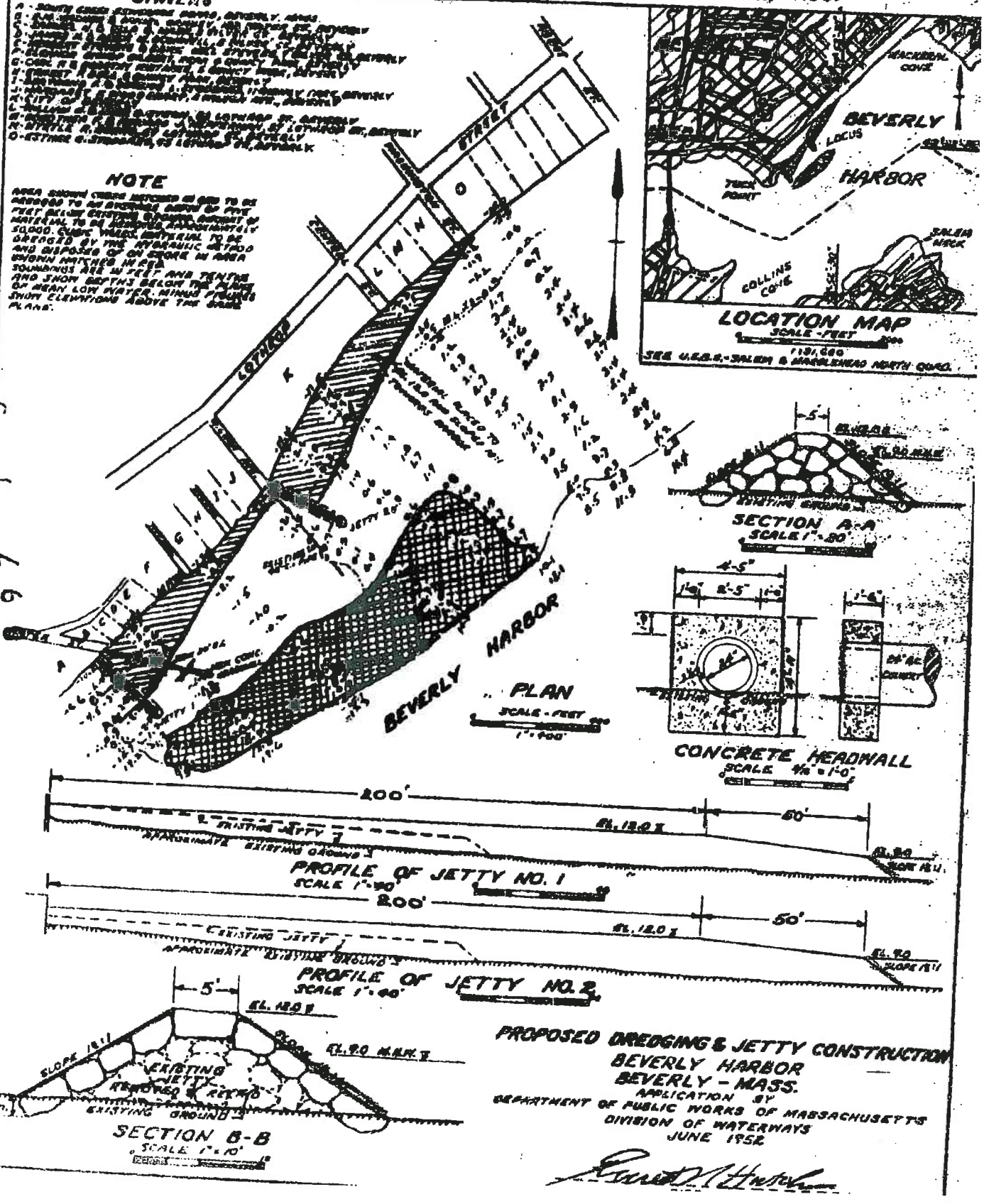
Ernest W. Hunt

094 7794

005-005-000-462-200

005-002-000-118-100

BOSTON, MASS.



PROPOSED DREDGING & JETTY CONSTRUCTION
BEVERLY HARBOR
BEVERLY - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1952

Ernest W. Hunter

Section IV

Salem

Section IV – Community Findings – City of Salem

COMMUNITY DESCRIPTION

The City of Salem consists of a land area of 8.1 square miles out of a total area of 18.05 square miles and had a population of 40,407 in the 2000 census. The City is located on the North 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 2 miles with the remaining shoreline semi-protected by offshore structures or landforms. 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 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 INVENTORY

Within the City of Salem, there were 42 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 8 in Section IV-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - City of Salem

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Length
Bulkhead / Seawall	28		14	9	5		6540
Revetment	14		6	6	2		8030
Breakwater							
Groin / Jetty							
Coastal Dune							
Coastal Beach							
	42		20	15	7		14570

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 Salem's case there are a total of 42 structures which would require approximately $ 11.7 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 $ 6.7 million would be required to upgrade the City's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - City of Salem

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Bulkhead / Seawall	28		$ 521,347	$ 1,946,182	$ 3,519,912		$ 5,987,441
Revetment	14		$ 950,174	$ 1,563,414	$ 3,206,115		$ 5,719,703
Breakwater							$ -
Groin / Jetty							$ -
Coastal Dune							$ -
Coastal Beach							$ -
	42	$ -	$ 1,471,521	$ 3,509,596	$ 6,726,027	$ -	$ 11,707,144

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 Salem, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - City of Salem

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Town Owned	29		$ 1,398,631	$ 2,696,001	$ 6,726,027		$ 10,820,659
Commonwealth of Massachusetts	2		$ 64,178	$ 355,555			$ 419,733
Federal Government Owned							$ -
Unknown Ownership	11		$ 8,712	$ 458,040			$ 466,752
	42	$ -	$ 1,471,521	$ 3,509,596	$ 6,726,027	$ -	$ 11,707,144

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

SUMMARY

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

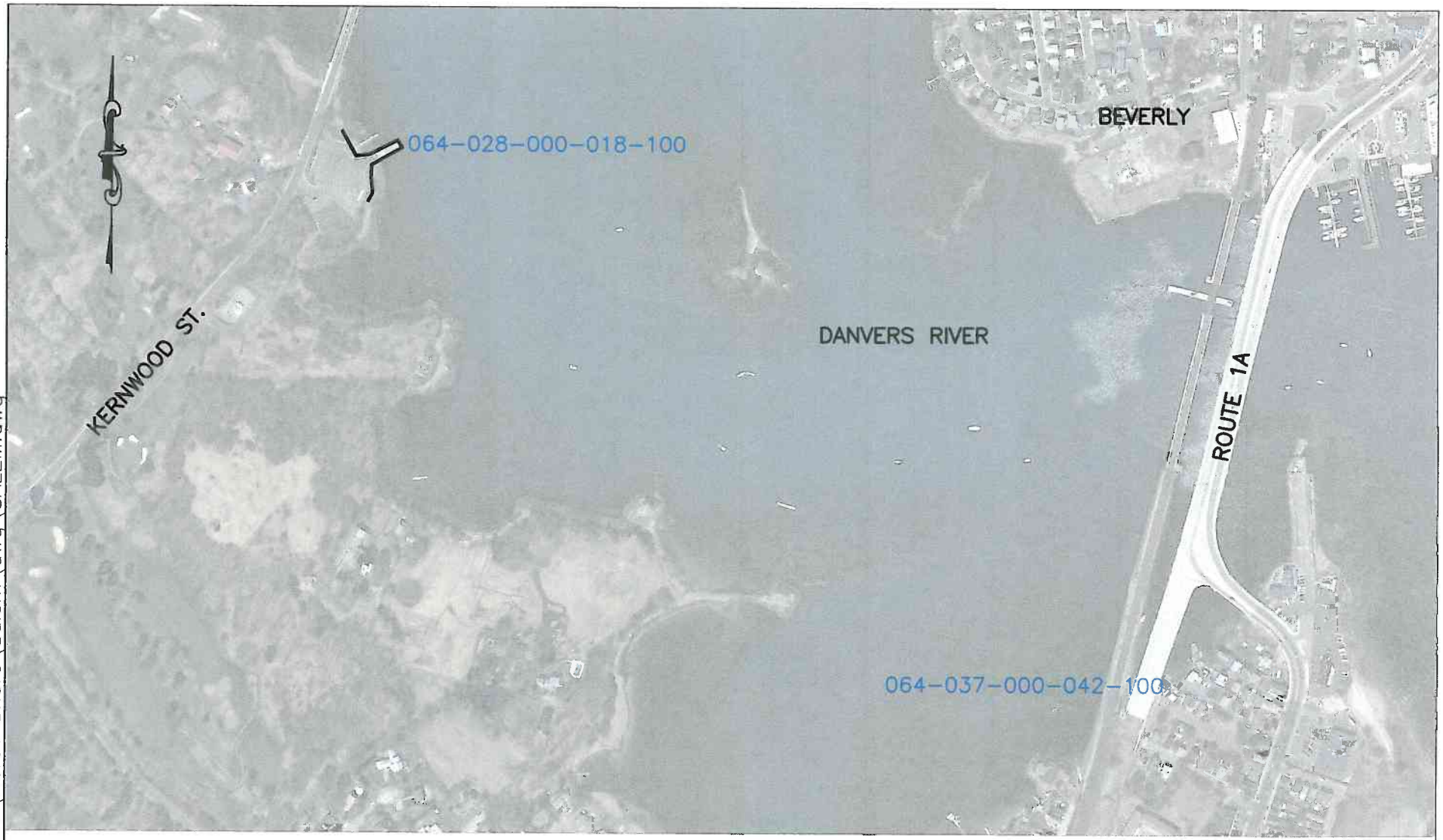
This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section IV - Salem

Part B

Structure Assessment Reports

BCE



COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Bank Street
Franklin, MA 02038
TEL. (508) 533-0666 FAX (508) 533-0669

SHEET 1

File: X:\27652-\27667\North Shore\Salem\dwg\SALEM.dwg

COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4000 FAX. (508) 533-4009

SHEET 2

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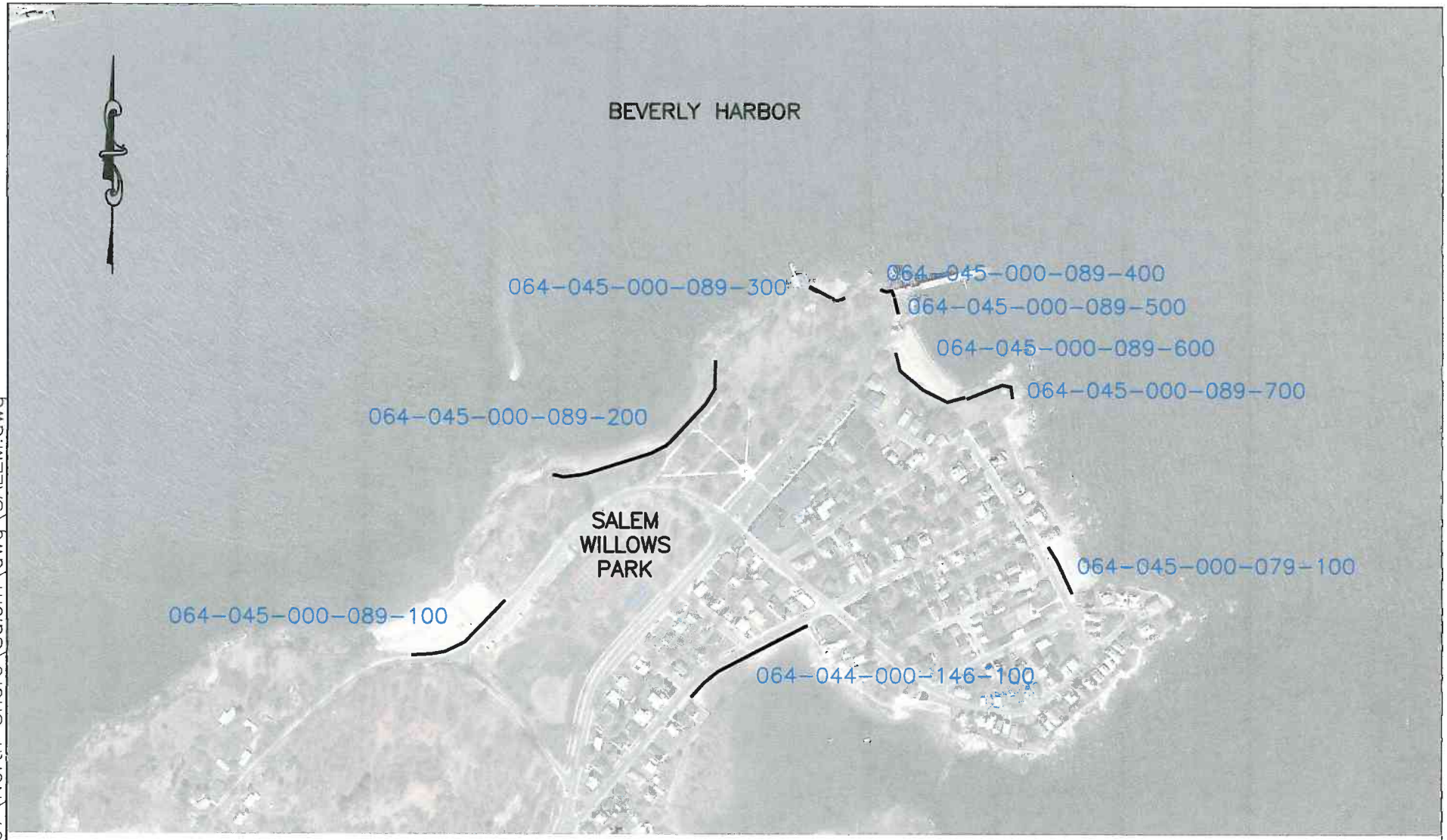

COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150
SCALE: 1" = 150-0"

Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4888 FAX (508) 533-4889

SHEET 3

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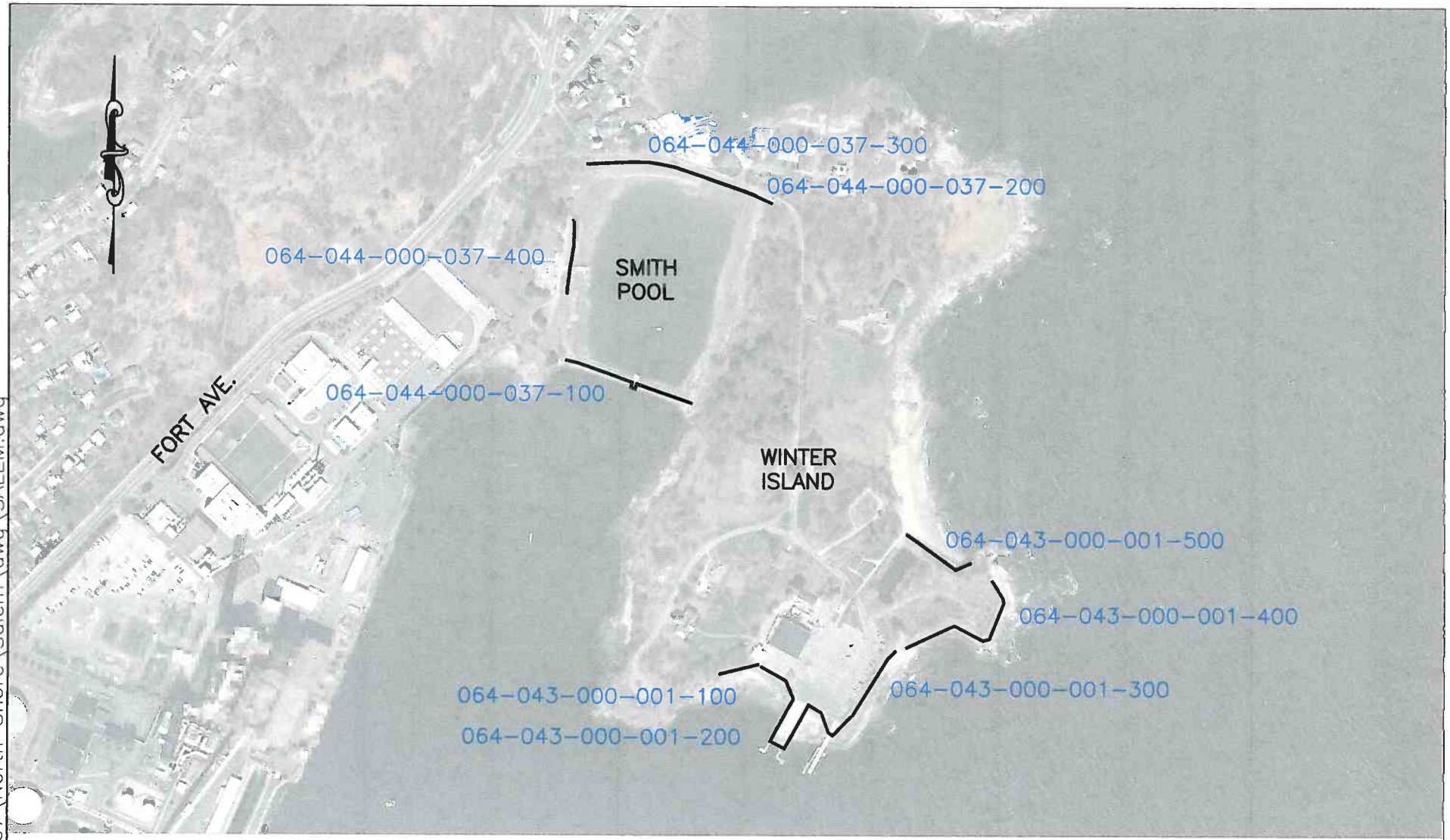

COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4004 FAX (508) 533-4009

SHEET 4

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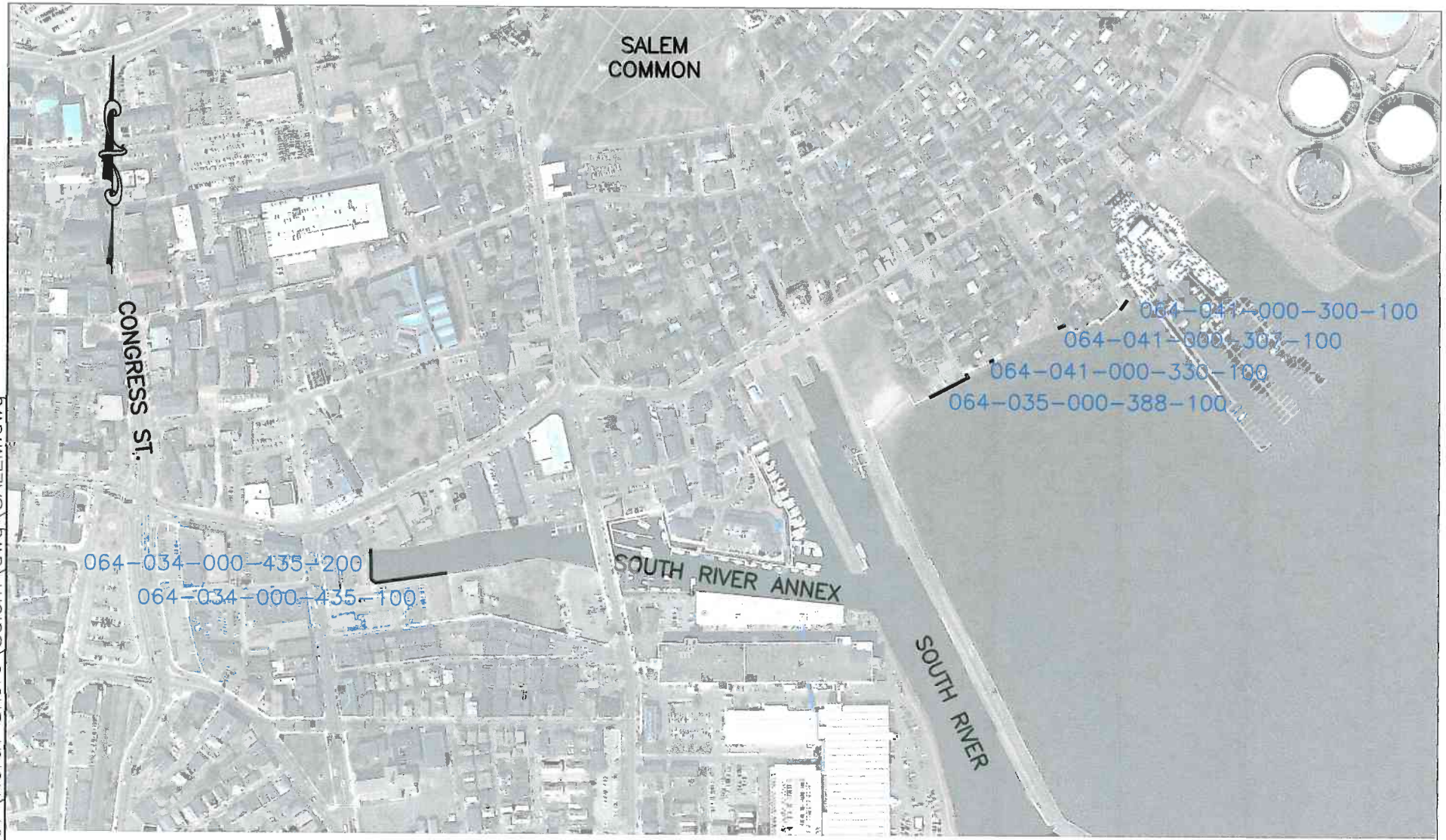


COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

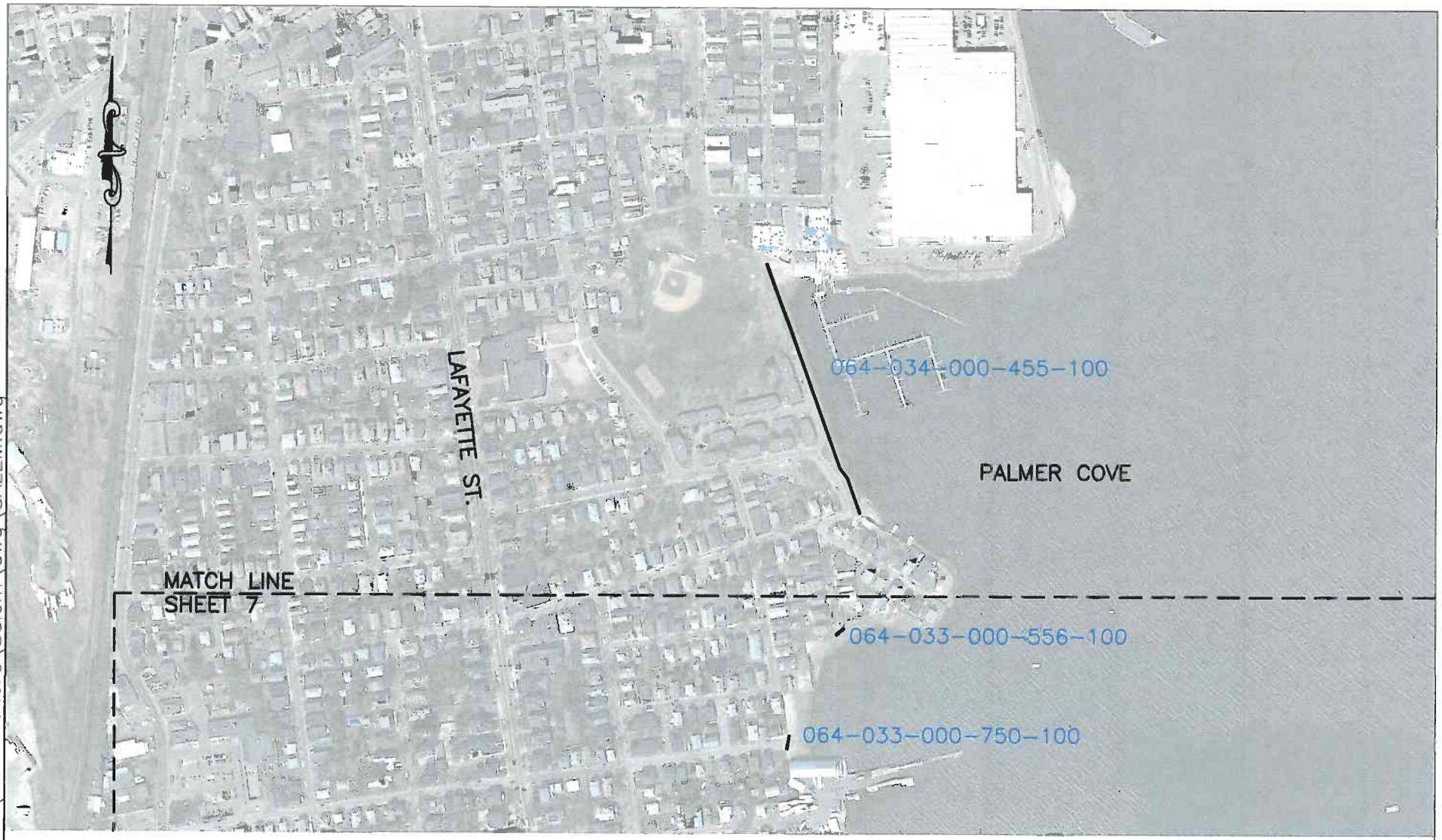
0 150

SCALE: 1" = 150-0"

Bourne Consulting Engineering

SHEET 5

File: X:\27652-\27667\North Shore\Salem\dwg\SALEM.dwg



COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Bond Street
Franklin, MA 02038
TEL. (508) 533-4888 FAX. (508) 533-4889

SHEET 6

File: X:\27652-\27667\North Shore\Salem\dwg\SALEM.dwg

COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

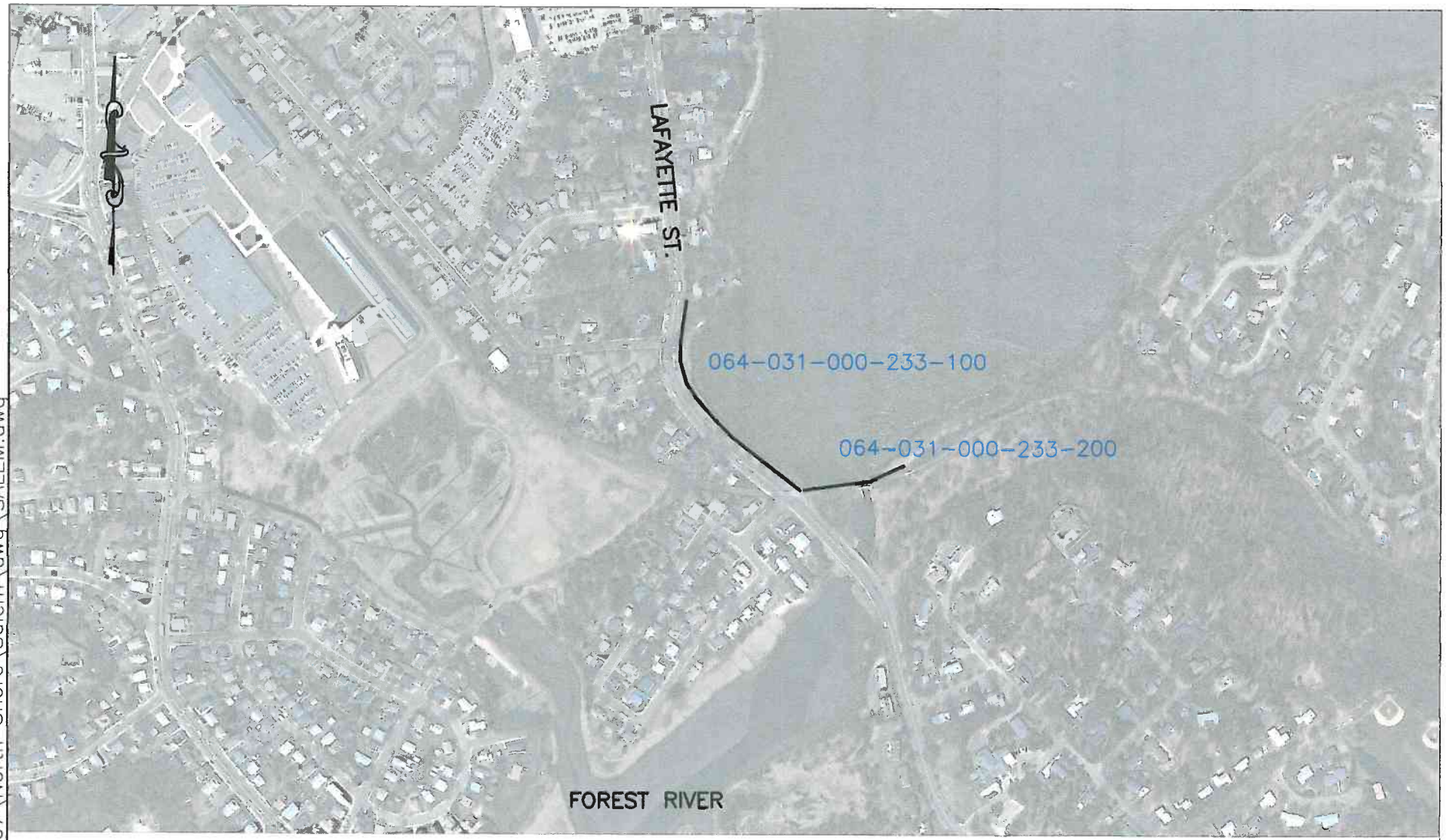
0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering
3 Boot Street
Franklin, MA 02038
TEL. (508) 553-0000 FAX. (508) 553-0000

SHEET 7

File: X:\27652-\27667\North Shore\Salem\dwg\SALEM.dwg



COASTAL STRUCTURE LOCATION PLAN

CITY OF SALEM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
DECEMBER 2007

0 150

SCALE: 1" = 150-0"

BCE Bourne Consulting Engineering

SHEET 8

File: X:\27652-\27667\North Shore\Salem\dwg\SALEM.dwg

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-027-000-471-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Franklin Street Park

Date: 7/12/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $398,376.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
600 Feet	Feet NAVD 88	A2	10 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dumped stone revetment in front of a park lawn, with over topping erosion typical. There is significant erosion.

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

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

Structure Images:

064-027-000-471-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-028-000-018-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Kernwood Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1967	$321,321.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
535 Feet	Feet NAVD 88	A2	10 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dumped rubble stone and concrete debris revetment and a dumped rubble stone and debris revetment also alongside boat ramp and edge of parking lot. There is some localized unravelling of revetments.

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

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

Structure Images:

064-028-000-018-100-PHO1A.JPG

Structure Documents:

USACE	July 1967	Proposed Access	064-028-000-018-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-031-000-233-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lafayette Street	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$271,682.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
820 Feet	Feet NAVD 88	V3	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:
Bulkhead/ Seawall	Stone	Under 5 Feet

Structure Summary :

A flat face placed stone revetment parallel to slope, in good condition, but with localized crest erosion at west end. The mortared granite block cap wall has minor mortar loss and cracking. The wall is in satisfactory condition. Adjacecent to the main road.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

064-031-000-233-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-031-000-233-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Old Railroad Bed	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$88,862.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
360 Feet	Feet NAVD 88	V3	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dumped stone revetment with overgrown tree/shrub covered crest; in satisfactory condition.

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

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

Structure Images:

064-031-000-233-200-PHO2A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-556-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Glover Street

Date: 6/29/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $17,002.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
40 Feet	Feet NAVD 88	V3	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared granite block seawall leaning offshore at the top. A few blocks are dislodged, and sinkholes (5 feet long by 2 feet wide and 2 feet deep) and (3 feet long by 1 foot wide and 1 foot deep) are visible. It may fail in a major storm event. A large sewer main passes under wall. In fair condition.

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

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

Structure Images:

064-033-000-556-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-743-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Forest River Park	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$46,754.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
110		V3	14
Feet	Feet NAVD 88		Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall along the municipal pool wall with previously broken areas and patched in several locations. There is exposed electrical conduit at base of the wall in one location.

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

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

Structure Images:

064-033-000-743-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-743-200

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Forest River Park

Date: 6/29/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $840,180.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
335 Feet	Feet NAVD 88	V3	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone seawall that is undercut and likely to fail soon on the south side. It is in the park with lawn and is a low priority risk.

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

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

Structure Images:

064-033-000-743-200-PHO2A.JPG

064-033-000-743-200-PHO2B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-743-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Forest River Park	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$446,292.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
525		V3	14
Feet	Feet NAVD 88		Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall with toe undercut at the east end. A section of wall is broken and leaning offshore, approximately 40 linear feet long, with other sections also leaning offshore. This is a park area.

Condition Rating	D Poor	*Priority Rating*	I None
Level of Action	Major	*Action*	Long Term Planning Considerations
Description	Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

064-033-000-743-300-PHO3A.JPG

064-033-000-743-300-PHO3B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-748-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Unknown	Ocean Avenue	6/29/2007

Presumed Structure Owner:	Based On Comment:
Unknown	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Unknown	Unkown	$420,090.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
335 Feet	Feet NAVD 88	V3	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A stone seawall with concrete cap wall in fair condition. The cap has minor hairline cracking and typical scaling. There is missing mortar from lower face stones and the stone steps are severely damaged. The street is adjacent with houses in the vicinity.

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

Structure Images:

064-033-000-748-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-033-000-750-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Unknown	Willow Avenue	6/29/2007

Presumed Structure Owner:	Based On Comment:
Unknown	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Unknown	Unkown	$37,950.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
50 Feet	Feet NAVD 88	V3	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared granite block seawall above the beach. Some mortar is cracked and missing, and a stone dislodged. It is in fair condition. At a street end with some houses in the vicinity.

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

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

Structure Images:

064-033-000-750-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-034-000-435-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Peabody Street

Date: 6/29/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $1,049,400.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
265 Feet	Feet NAVD 88	A2	10 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	Over 15 Feet
Secondary Type:	**Secondary Material:**	**Secondary Height:**

Structure Summary :

A granite block seawall with missing stones, misallignment and bulges; in poor condition. One sinkhole 2 feet long by 6 feet wide and 4 feet deep. Remnants of steel sheet pile toe wall with corrosion holes through the sheets. Located on a vacant lot.

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

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

Structure Images:

064-034-000-435-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-034-000-435-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	South River Annex	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$180,180.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
105 Feet	Feet NAVD 88	A2	10 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Steel	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A steel U sheetpile bulkhead with cast in place concrete cap in fair condition. There are high water corrosion holes in webs and flanges at the tie rod elevation.

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

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

Structure Images:

064-034-000-435-200-PHO2A.JPG

Structure Documents:

DEP	June 11, 194	Plan Accompanying	064-034-000-435-200-LIC2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-034-000-455-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lafayette Place	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$301,501.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
910		V3	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

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

Structure Summary :

A granite block revement with concrete cap wall. A longitudinal buckle in revetment slope paving is apparent mid slope, along with joint mortar loss on the lower half of the slope. There is some pavement subsidence behind cap wall, approximately 1 inch, and a few localized areas of cap wall spalling. Adjacent to a street and in satisfactory condition.

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

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

Structure Images:

064-034-000-455-100-PHO1A.JPG

Structure Documents:

DEP	July 31, 194	Plan Accompanying	064-034-000-455-100-LIC1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-035-000-388-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Daniel Street

Date: 7/12/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: 1997

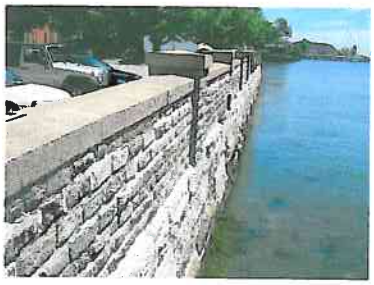
Estimated Reconstruction/Repair Cost: $65,340.00

Length: 165 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V3

FIRM Map Elevation: 13 Feet NGVD



Primary Type: Bulkhead/ Seawall

Primary Material: Stone

Primary Height: Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A mortared granite block seawall with parapet wall at a street end. Some lower blocks dislodged and patching repairs are apparent. There is a parking lot behind wall and some mortar cracks in parapet wall. The condition is satisfactory.

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

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

Structure Images: 064-035-000-388-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-036-000-473-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Collins Cove Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1958	$174,570.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
230 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared granite block wall with concrete cap. The mortar is cracked, some mortar is missing and toe concrete is exposed. One stone has fallen out near east end. There is a lawn behind wall.

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

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

Structure Images:

064-036-000-473-100-PHO1A.JPG

Structure Documents:

MA-DCR	September 1	Proposed Shore	064-036-000-473-100-DCR1A
DEP	June 1985	Plan Accompanying	064-036-000-473-100-LIC1A
DEP	September 2	Plan Accompanying	064-036-000-473-100-LIC1B

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-036-000-473-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Collins Cove Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$147,147.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
245 Feet	Feet NAVD 88	V3	13 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A granite block revetment in front of a park baseball field. Crest stones have rotated, and there is some loss of joint fill stones with localized crest subsidence. It is in fair condition.

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

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

Structure Images:

064-036-000-473-200-PHO2A.JPG

Structure Documents:

DEP	September 2	Plan Accompanying	064-036-000-473-200-LIC2A
DEP	August 9, 19	Plan Accompanying	064-036-000-473-200-LIC2B
DEP	June 12, 198	Plan Accompanying	064-036-000-473-200-LIC2C

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-036-000-473-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Collins Cove Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1958	$299,284.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
395 Feet	Feet NAVD 88	V3	13 Feet NGVD

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

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

Structure Summary :

A precast wave return concrete seawall with rubble stone toe protection that has unravelled in some areas. There are some voids under the concrete wall. It is at a park,and in fair condition.

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

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

Structure Images:

064-036-000-473-300-PHO3A.JPG

Structure Documents:

MA-DCR	September 1	Proposed Shore	064-036-000-473-300-DCR3A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-036-000-473-400

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Collins Cove Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1958	$74,382.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
175 Feet	Feet NAVD 88	V3	13 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall with missing mortar, with a sinkhole 20 feet by 4 feet, also a sinkhole in street patched, and a sinkhole in pavement 8 feet by 3 feet. It is in fair condition. Located at a street end park.

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

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

Structure Images:

064-036-000-473-400-PHO4A.JPG

Structure Documents:

MA-DCR	September 1	Proposed Shore	064-036-000-473-400-DCR4A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-036-000-474-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Collins Street	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1958	$695,970.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
555 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall with 4 foot high concrete cap with some mortar loss. There is some cap cracking and spalling. It is in fair condition with some damage to the stairs. The street is located behind the wall.

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

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

Structure Images:

064-036-000-474-100-PHO1A.JPG

Structure Documents:

MA-DCR	September 1	Proposed Shore	064-036-000-474-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-037-000-042-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Hubon Street

Date: 7/12/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $37,950.00

Length: 25 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A2

FIRM Map Elevation: 10 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Stone

Primary Height: 5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A mortared granite block wall that is failing, leaning offshore and stones are falling out with sinkholes behind. The building on top of wall immediately adjacent to the north end has cracks in concrete block joints at building corner over wall.

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

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

Structure Images:

064-037-000-042-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-041-000-300-100

Key: community-map-block-parcel-structure

Property Owner: Unknown

Location: Turner Street

Date: 7/12/2007

Presumed Structure Owner: Unknown

Based On Comment:

Owner Name: Unknown

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $8,712.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
40 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

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

Structure Summary :

A mortared granite block wall with granite block revetment, in satisfactory condition. Some revetment stones may have rotated. The revetment is in fair condition.

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

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

Structure Images:

064-041-000-300-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-041-000-307-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Hardy Street

Date: 7/12/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $6,270.00

Length: 25 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V3

FIRM Map Elevation: 13 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Stone

Primary Height: 10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A dry set granite block wall at a street end, in satisfactory condition with a few chinking stones missing.

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

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

Structure Images:

064-041-000-307-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-041-000-330-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Daniels Court	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$3,267.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
15 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

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

Structure Summary :

A mortared granite block seawall with rubble toe stone revetment at a street end. The wall is in satisfactory condition and the revetment in fair condition.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

064-041-000-330-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-042-000-003-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Szetela Lane	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$2,807,739.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1795 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dumped stone rubble revetment with unravelled areas. It has crest over topping erosion and a lawn and path behind.

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

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

Structure Images:

064-042-000-003-100-PHO1A.JPG

064-042-000-003-100-PHO1B.JPG

Structure Documents:

DEP	September 1	Plan Accompanying	064-042-000-003-100-LIC1A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-043-000-001-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Winter Island	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$21,252.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
140 Feet	Feet NAVD 88	V3	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone seawall with concrete cap. There is some mortar deterioration, efflorescence and vegetation. There is also some concrete cap deterioration/spalls. It is in a park and in satisfactory condition.

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

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

Structure Images:

064-043-000-001-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-043-000-001-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Winter Island	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	1995	$192,535.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
780		V3	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A placed stone revetment along park shore and boat ramp, in good condition.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

064-043-000-001-200-PHO2A.JPG

Structure Documents:

DEP	June 1995	Plan to Accompany	064-043-000-001-200-LIC2A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-043-000-001-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Winter Island	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$162,162.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
270 Feet	Feet NAVD 88	V2	14 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A dumped rubble stone revetment with a lawn area behind. There is some soil erosion along crest and dislodged stones. It is in fair condition.

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

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

Structure Images:

064-043-000-001-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-043-000-001-400

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Winter Island	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$418,070.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
535 Feet	Feet NAVD 88	V2	18 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A small stone placed revetment in fair condition. There is a park lawn behind with some toe unravelling.Some overtopping erosion with two localized unravelled areas, approximately 10 feet by 15 feet each.

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

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

Structure Images:

064-043-000-001-400-PHO4A.JPG

064-043-000-001-400-PHO4B.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-043-000-001-500

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Winter Island	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$159,159.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
265 Feet	Feet NAVD 88	V2	18 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A placed stone revetment with toe typically unravelled and crest unravelled with over-topping erosion. There is a park shrub area behind and the revetment is in fair condition.

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

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

Structure Images:

064-043-000-001-500-PHO5A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-044-000-037-100

Key: community-map-block-parcel-structure

Property Owner: State

Location: Salem State College Marine Lab

Date: 6/29/2007

Presumed Structure Owner: State

Based On Comment:

Owner Name: Salem State College Marine Lab

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $355,555.00

Length: 455 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A4

FIRM Map Elevation: 11 Feet NGVD

Primary Type: Revetment

Primary Material: Stone

Primary Height: 10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A tidal dam at Cat Cove. A stone dike with concrete cap and with some steel sheet pile at the weir structure. It is missing some revetment joint concrete between stones and there is some scaling on concrete, and one spall. In fair condition.

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

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

Structure Images: 064-044-000-037-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-044-000-037-200

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Cat Cove

Date: 6/29/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $100,320.00

Length: 400 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A2

FIRM Map Elevation: 10 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Concrete

Primary Height: 10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A cast in place concrete seawall with cantilever sidewalk in satisfactory condition. There are a few cracks and scaling. The wall cap has some spalls and delamination with rebar exposed. The wall is adjacent to the road.

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

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

Structure Images:

064-044-000-037-200-PHO2A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-044-000-037-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Cat Cove	6/29/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$101,970.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
250 Feet	Feet NAVD 88	A2	10 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:
Revetment	Stone	10 to 15 Feet

Structure Summary :

A mortared stone seawall with concrete cap, cracks in cap, and a sidewalk subsidence behind the wall. The wall continues inland away from water along the road and is not mapped. It has a toe stone revetment. Both are in satisfactory condition.

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

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

Structure Images:

064-044-000-037-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-044-000-037-400

Key: community-map-block-parcel-structure

Property Owner: State

Location: Cat Cove

Date: 6/29/2007

Presumed Structure Owner: State

Based On Comment:

Owner Name: Salem State College

Earliest Structure Record: Unkown

Estimated Reconstruction/Repair Cost: $64,178.00

Length: 260 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: A2

FIRM Map Elevation: 10 Feet NGVD

Primary Type: Revetment

Primary Material: Stone

Primary Height: Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A stone revetment with smaller toe stone and possible a repair overlay of smaller stone. It is near a driveway and lab buildings. It is in satisfactory condtion.

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

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

Structure Images:

064-044-000-037-400-PHO4A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-044-000-146-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Columbus Avenue	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$71,346.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
470 Feet	Feet NAVD 88	A2	10 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall with some cracked mortar; in satisfactory conditon. There are 6 small sinkholes in the bituminous walk, approximately 6 inches in diameter. There is a walk and grass strip, then road behind.

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

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

Structure Images:

064-044-000-146-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-079-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Beach Avenue	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$15,206.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
180 Feet	Feet NAVD 88	V2	15 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone seawall with concrete cap in good condition. A sidewalk and street are behind with one cap spall and some mortar cracking.

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

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

Structure Images:

064-045-000-079-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$32,525.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
385 Feet	Feet NAVD 88	V3	12 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall at top of beach in good condition. The sidewalk and street are behind. There is one vertical crack with a few minor spalls.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

064-045-000-089-100-PHO1A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	2007	$1,146,090.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
755 Feet	Feet NAVD 88	V3	12 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared stone rubble seawall with concrete and granite cap. It is under repair. There are sinkholes and it is leaning offshore. There are some stones displaced and it is in poor condition.

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

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

Structure Images:

064-045-000-089-200-PHO2A.JPG

Structure Documents:

Salem | April 2007 | Seawall Plan & | 064-045-000-089-200-TWN

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$20,493.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
135 Feet	Feet NAVD 88	V3	12 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A mortared rubble stone wall in satisfactory condition. The lawn and path are behind the wall.

Condition Rating	B Good	*Priority Rating*	I 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 life of structure.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

064-045-000-089-300-PHO3A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-400

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$12,276.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
60		V2	15
Feet	Feet NAVD 88		Feet NGVD

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

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

Structure Summary :

A granite block seawall with granite block placed stone revetment with concrete infill. It is in satisfactory condition and includes the pier abutment.

Condition Rating	B Good	*Priority Rating*	I 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 life of structure.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

064-045-000-089-400-PHO4A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-500

Key: community-map-block-parcel-structure

Property Owner: Local

Location: Willows Park

Date: 7/12/2007

Presumed Structure Owner: Local

Based On Comment:

Owner Name: Salem

Earliest Structure Record: 1958

Estimated Reconstruction/Repair Cost: $13,794.00

Length: 55 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V2

FIRM Map Elevation: 15 Feet NGVD

Primary Type: Bulkhead/ Seawall

Primary Material: Concrete

Primary Height: 10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

Structure Summary :

A cast in place concrete seawall with repair mass concrete in front of the original spalled concrete. It is in a park area and is in satisfactory condition.

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

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

Structure Images:

064-045-000-089-500-PHO5A.JPG

Structure Documents:

MA-DCR	September 1	Proposed Shore	064-045-000-089-500-DCR5A

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-600

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$48,576.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
320 Feet	Feet NAVD 88	V2	15 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A cast in place concrete seawall with park road behind. It has weathered concrete, with some cracks and toe exposed at south end. It is in satisfactory condition.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
Description	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

064-045-000-089-600-PHO6A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Salem

Structure ID: 064-045-000-089-700

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Willows Park	7/12/2007

Presumed Structure Owner:	Based On Comment:
Local	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Salem	Unkown	$31,416.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
200 Feet	Feet NAVD 88	V2	15 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

A rubble stone revetment in front of park lawn area in satisfactory condition.

Condition Rating	B Good	*Priority Rating*	I 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 life of structure.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

064-045-000-089-700-PHO7A.JPG

Structure Documents:

Prepared By: Bourne Consulting Engineering

Section IV - Salem

Part C

Structure Photographs

CITY: SALEM
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-027-000-471-100	064-027-000-471-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-028-000-018-100	064-028-000-018-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-031-000-233-100	064-031-000-233-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-031-000-233-200	064-031-000-233-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-556-100	064-033-000-556-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-743-100	064-033-000-743-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-743-200	064-033-000-743-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-743-200	064-033-000-743-200-PHO2B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-743-300	064-033-000-743-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-743-300	064-033-000-743-300-PHO3B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-748-100	064-033-000-748-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-033-000-750-100	064-033-000-750-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-034-000-435-100	064-034-000-435-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-034-000-435-200	064-034-000-435-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-034-000-455-100	064-034-000-455-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-035-000-388-100	064-035-000-388-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-036-000-473-100	064-036-000-473-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-036-000-473-200	064-036-000-473-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-036-000-473-300	064-036-000-473-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-036-000-473-400	064-036-000-473-400-PHO4A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-036-000-474-100	064-036-000-474-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-037-000-042-100	064-037-000-042-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

CITY: SALEM
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-041-000-300-100	064-041-000-300-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-041-000-307-100	064-041-000-307-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-041-000-330-100	064-041-000-330-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-042-000-003-100	064-042-000-003-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-042-000-003-100	064-042-000-003-100-PHO1B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-100	064-043-000-001-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-200	064-043-000-001-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-300	064-043-000-001-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-400	064-043-000-001-400-PHO4A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-400	064-043-000-001-400-PHO4B.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-043-000-001-500	064-043-000-001-500-PHO5A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-044-000-037-100	064-044-000-037-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-044-000-037-200	064-044-000-037-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-044-000-037-300	064-044-000-037-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-044-000-037-400	064-044-000-037-400-PHO4A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-044-000-146-100	064-044-000-146-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-079-100	064-045-000-079-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-100	064-045-000-089-100-PHO1A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-200	064-045-000-089-200-PHO2A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-300	064-045-000-089-300-PHO3A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-400	064-045-000-089-400-PHO4A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-500	064-045-000-089-500-PHO5A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

CITY: SALEM
SOURCE: WFE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-045-000-089-600	064-045-000-089-600-PHO6A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
064-045-000-089-700	064-045-000-089-700-PHO7A.JPG		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey


064-027-000-471-100-PHO1A


064-028-000-018-100-PHO1A


064-031-000-233-100-PHO1A


064-031-000-233-200-PHO2A


064-033-000-556-100-PHO1A


064-033-000-743-100-PHO1A


064-033-000-743-200-PHO2A


064-033-000-743-200-PHO2B


064-033-000-743-300-PHO3A


064-033-000-743-300-PHO3B


064-033-000-748-100-PHO1A


064-033-000-750-100-PHO1A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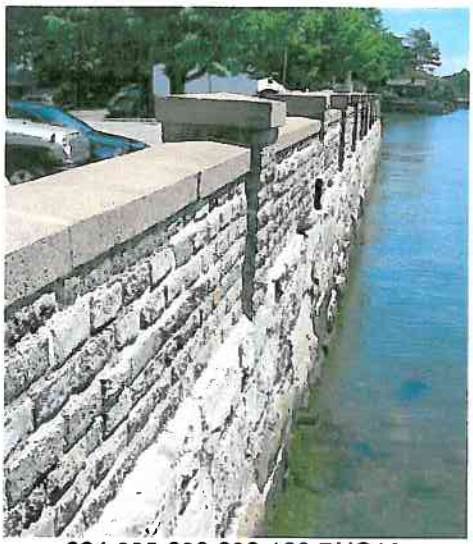
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064-036-000-473-300-PHO3A


064-036-000-473-400-PHO4A


064-036-000-474-100-PHO1A


064-037-000-042-100-PHO1A


064-041-000-300-100-PHO1A


064-041-000-307-100-PHO1A


064-041-000-330-100-PHO1A


064-042-000-003-100-PHO1A


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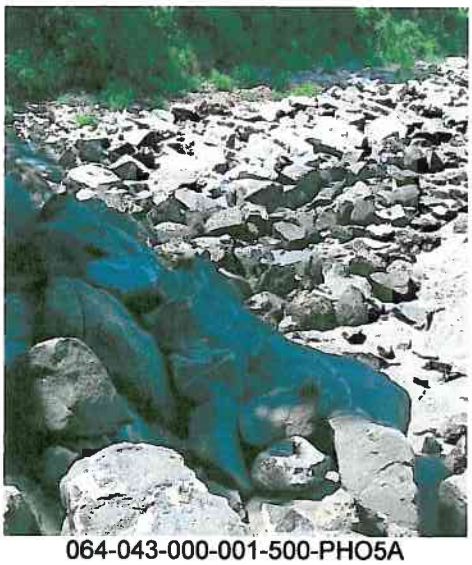
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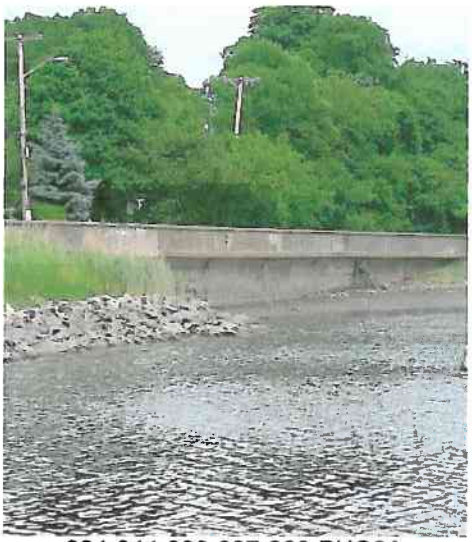
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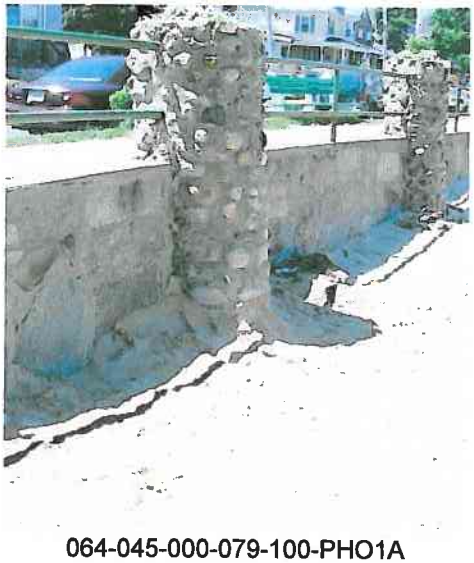
064-044-000-037-300-PHO3A


064-044-000-037-400-PHO4A


064-044-000-146-100-PHO1A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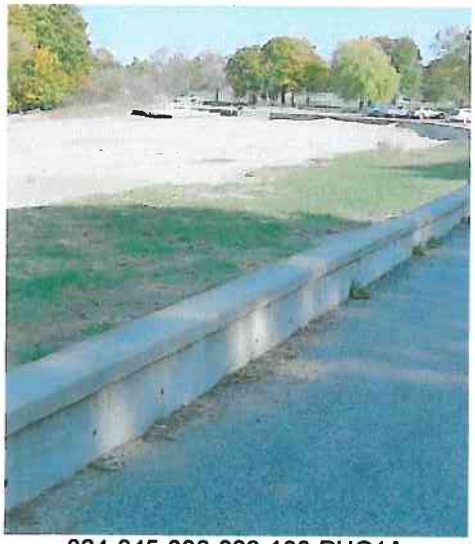
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064-045-000-089-200-PHO2A


064-045-000-089-300-PHO3A


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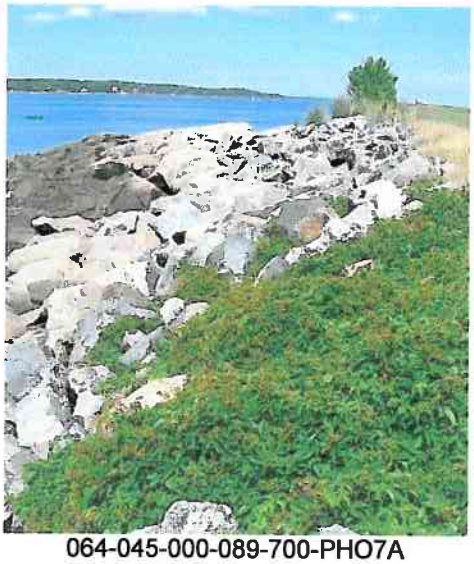
064-045-000-089-500-PHO5A


064-045-000-089-600-PHO6A



064-045-000-089-700-PHO7A

Section IV - Salem

Part D

Structure Documents

CITY DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

CITY: SALEM
SOURCE: City of Salem
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-045-000-089-200	064-045-000-089-200-TWN		Salem	Salem	April 2007	Seawall Plan & Profile; Seawall Improvement Project; Salem Willows Park	2	Willows Park, Salem	Vine Associates full size drawings generally depicting seawall reconstruction at Salem Willows Park - field observation incidated this project is currently under construction.

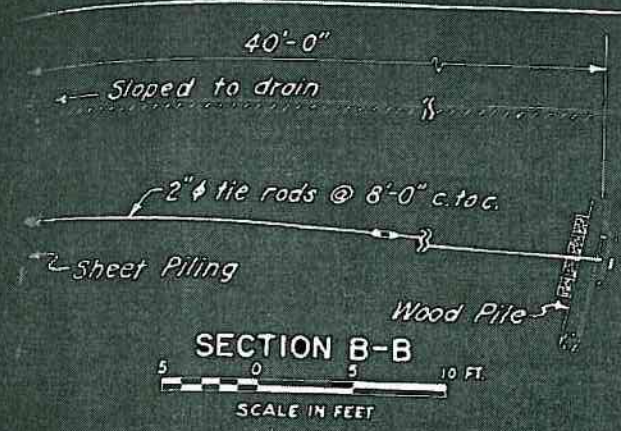
CITY: SALEM
SOURCE: MA-DCR
LOCATION: MA-DCR BOSTON and HINGHAM, MA
DATE OF RESEARCH: JULY 2007

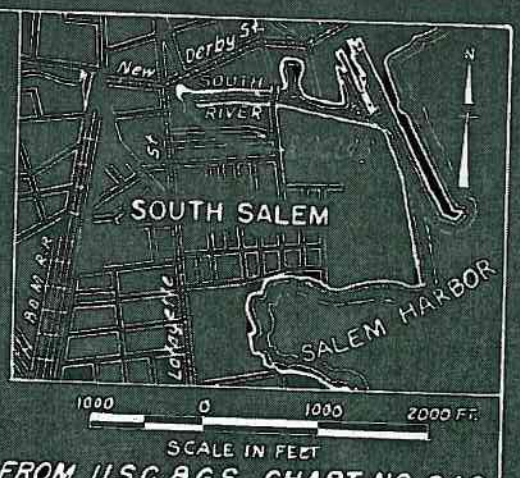
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-036-000-473-100	064-036-000-473-100-DCR1A	1998	MA-DCR	Salem	September 1958	Proposed Shore Protection - Salem, Massachusetts - New Concrete Wall and Repairs to Existing Stone Seawall - Collins Cove - Prepared for the DPW of Massachusetts - Division of Waterways	3	Collins Cove	Seawalls
064-036-000-473-300	064-036-000-473-300-DCR3A	1998	MA-DCR	Salem	September 1958	Proposed Shore Protection - Salem, Massachusetts - New Concrete Wall and Repairs to Existing Stone Seawall - Collins Cove - Prepared for the DPW of Massachusetts - Division of Waterways	19983	Collins Cove	Seawalls
064-036-000-473-400	064-036-000-473-400-DCR4A	1998	MA-DCR	Salem	September 1958	Proposed Shore Protection - Salem, MA - New Concrete Seawall and Repairs to Existing Stone Seawall - Collins Cove - Prepared for the DPW of Massachusetts - Division of Waterways	3	Collins Cove	Seawalls
064-036-000-474-100	064-036-000-474-100-DCR1A	1998	MA-DCR	Salem	September 1958	Proposed Shore Protection - Salem, MA - New Concrete Wall and Repairs to Existing Stone Seawall - Collins Cove - Prepared for the DPW of Massachusetts - Division of Waterways	3	Collins Cove	Seawalls
064-045-000-089-500	064-045-000-089-500-DCR5A	1999	MA-DCR	Salem	September 1958	Proposed Shore Protection - Salem, MA - Concrete Seawall at Pier - Prepared for the DPW of Massachusetts - Division of Waterways	4	Salem Willows	Seawall

CITY: SALEM
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

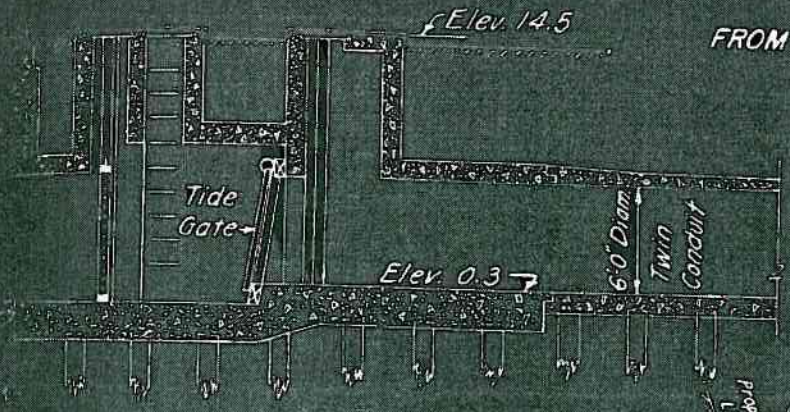
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-034-000-435-200	064-034-000-435-200-LIC2A	2372	DEP	Salem	June 11, 1941	Plan Accompanying Petition of City of Salem To Construct a Steel Sheet Pile Bulkhead, Concrete Conduit, Tide Gate Chamber and Solid Filling In South River	1	South River	Bulkhead
064-034-000-455-100	064-034-000-455-100-LIC1A	2219	DEP	Salem	July 31, 1940	Plan Accompanying Petition of City of Salem For Riprap Fills and Pier Palmers Cove	2	Palmers Cove	Riprap
064-036-000-473-100	064-036-000-473-100-LIC1A	1254	DEP	Salem	June 1985	Plan Accompanying Petition of City of Salem, Massachusetts - To Construct and Maintain Stone Riprap In Collins Cove, City of Salem, County of Essex, Mass.	1	Collins Cove	Riprap
064-036-000-473-100	064-036-000-473-100-LIC1B	2002	DEP	Salem	September 27, 1938	Plan Accompanying Petition of Salem to Build Wall and Fill Flats	1	Collins Cove	Seawall
064-036-000-473-200	064-036-000-473-200-LIC2A	2002	DEP	Salem	September 27, 1938	Plan Accompanying petition of City of Salem to build Wall and Fill Flats Collins Cove	1	Collins Cove	Revetment
064-036-000-473-200	064-036-000-473-200-LIC2B	2102	DEP	Salem	August 9, 1939	Plan Accompanying Petition of City of Salem To Build Wall, Float and Fill Flats Collins Cove	2	Collins Cove	Revetment
064-036-000-473-200	064-036-000-473-200-LIC2C	1254	DEP	Salem	June 12, 1985	Plan Accompanying Petition of City of Salem, Mass to Construct and Maintain Stone Riprap In Collins Cove	1	Collins Cove	Riprap
064-042-000-003-100	064-042-000-003-100-LIC1A	2525	DEP	Salem	September 1, 1942	Plan Accompanying Petition of City of Salem to Make Solid Fill In Collins Cove	1	Collins Cove	Revetment
064-043-000-001-200	064-043-000-001-200-LIC2A	4729	DEP	Salem	June 1995	Plan to Accompany Petition of Commonwealth of Massachusetts Public Access Board - To Construct and to Maintain Concrete Boat Ramp, Riprap, Piles and Float Systems at Winter Island in Salem Harbor, City of Salem, Essex County, Massachusetts	3	East of Cat Cove	Riprap

064-034-000-435-200

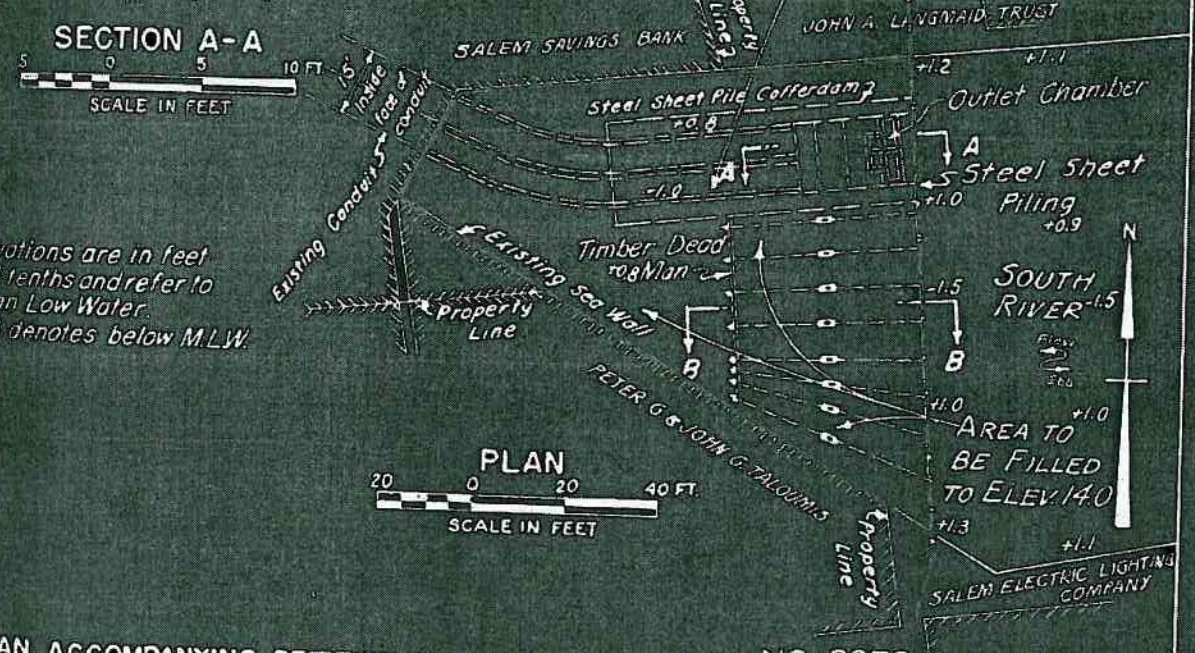




FROM U.S.C.&G.S. CHART NO. 240



All necessary rights will be acquired by the City of Salem.



All Elevations are in feet and tenths and refer to Mean Low Water.
-1.3 denotes below M.L.W.

PLAN ACCOMPANYING PETITION OF
CITY OF SALEM
TO CONSTRUCT A STEEL SHEET PILE BULKHEAD, CONCRETE CONDUIT, TIDE GATE CHAMBER AND SOLID FILLING IN SOUTH RIVER
SALEM, MASS.
Sanford & Thorndike, Engineers, Boston, Mass.
MAY 1941

NO. 2372
APPROVED BY DEPARTMENT OF PUBLIC WORKS
JUNE 11, 1941

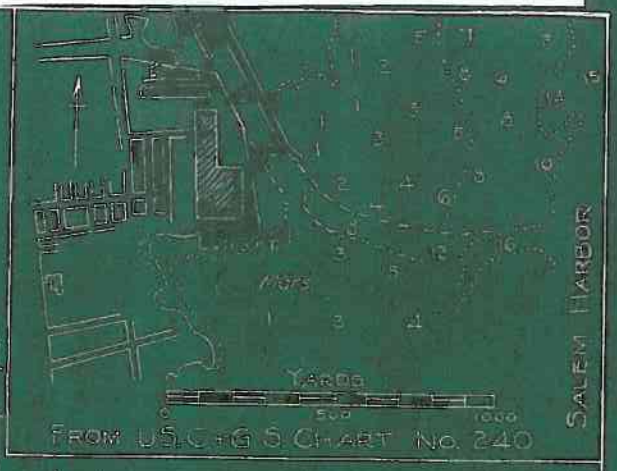
COMMISSIONER OF PUBLIC WORKS

Paul C. Ryan
ASSOCIATE COMMISSIONERS

Richard Weir
DIRECTOR—DIVISION OF WATER WAYS

064-034-000-455-100

SHEET 1 OF 2 SHEETS



CONGRESS ST.

LEAVITT ST.

SALEM ST. EXT.

Charles Theriault 70 Leavitt St

38

MEAN HIGH WATER

Proposed Pier Ramp & Float

CITY OF SALEM

See Permit No. 1492
Dept. Public Works
For Present Bulkhead & Fill

PALMERS COVE

MEAN LOW WATER

Present Bulkhead

Proposed Riprap Fill

GREEN ST. EXT.

LEACH ST.

Sadie Lavoie
97 Leach St

Scale
100 50 0 100 200

IN ACCOMPANYING PETITION OF
CITY OF SALEM
FOR RIPRAP FILL & PIER
PALMERS COVE
SALEM, MASS.

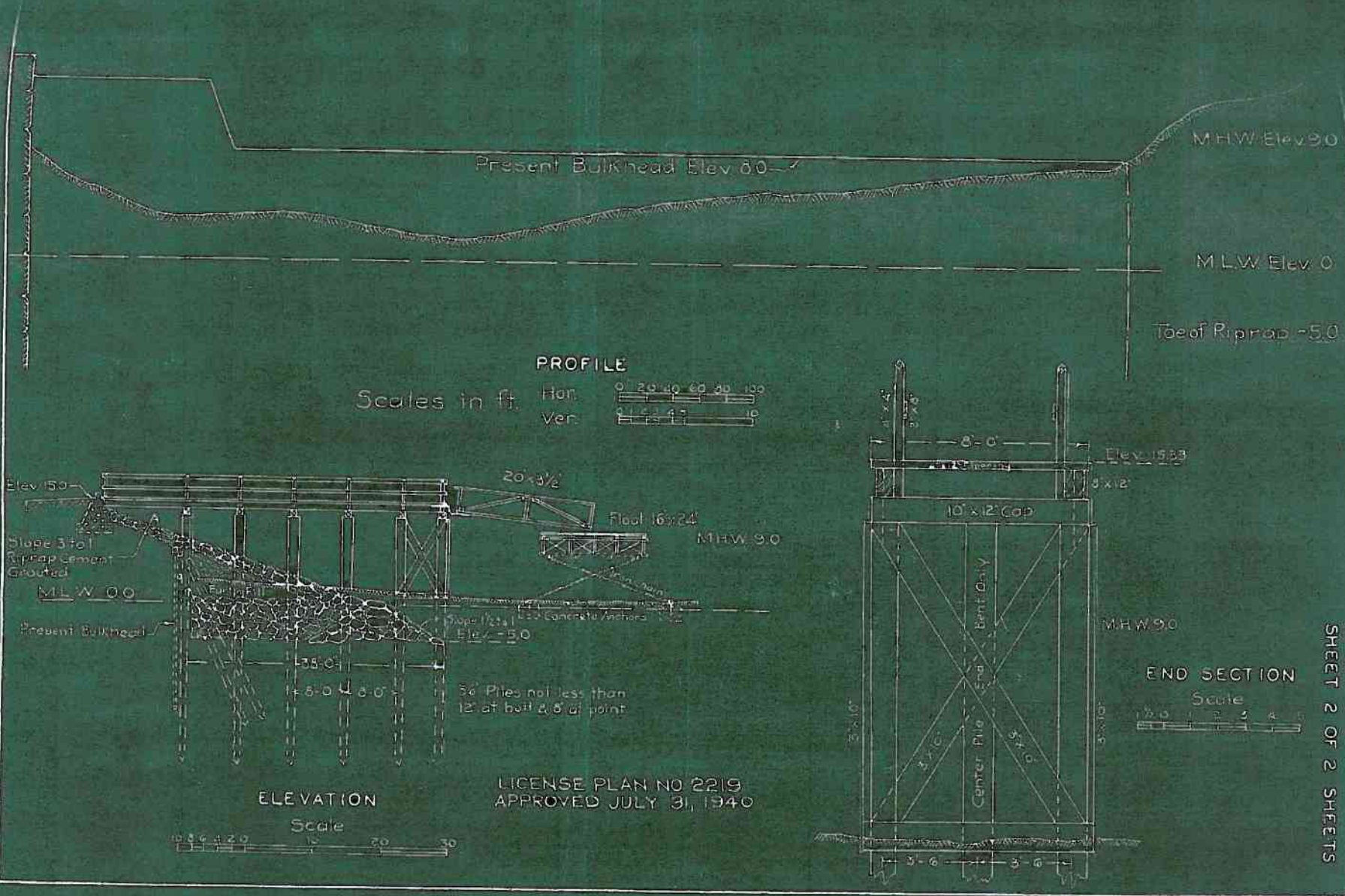
Frank Amero
CITY ENGINEER

NO. 2219
APPROVED BY DEPARTMENT OF PUBLIC WORKS
JULY 31, 1940

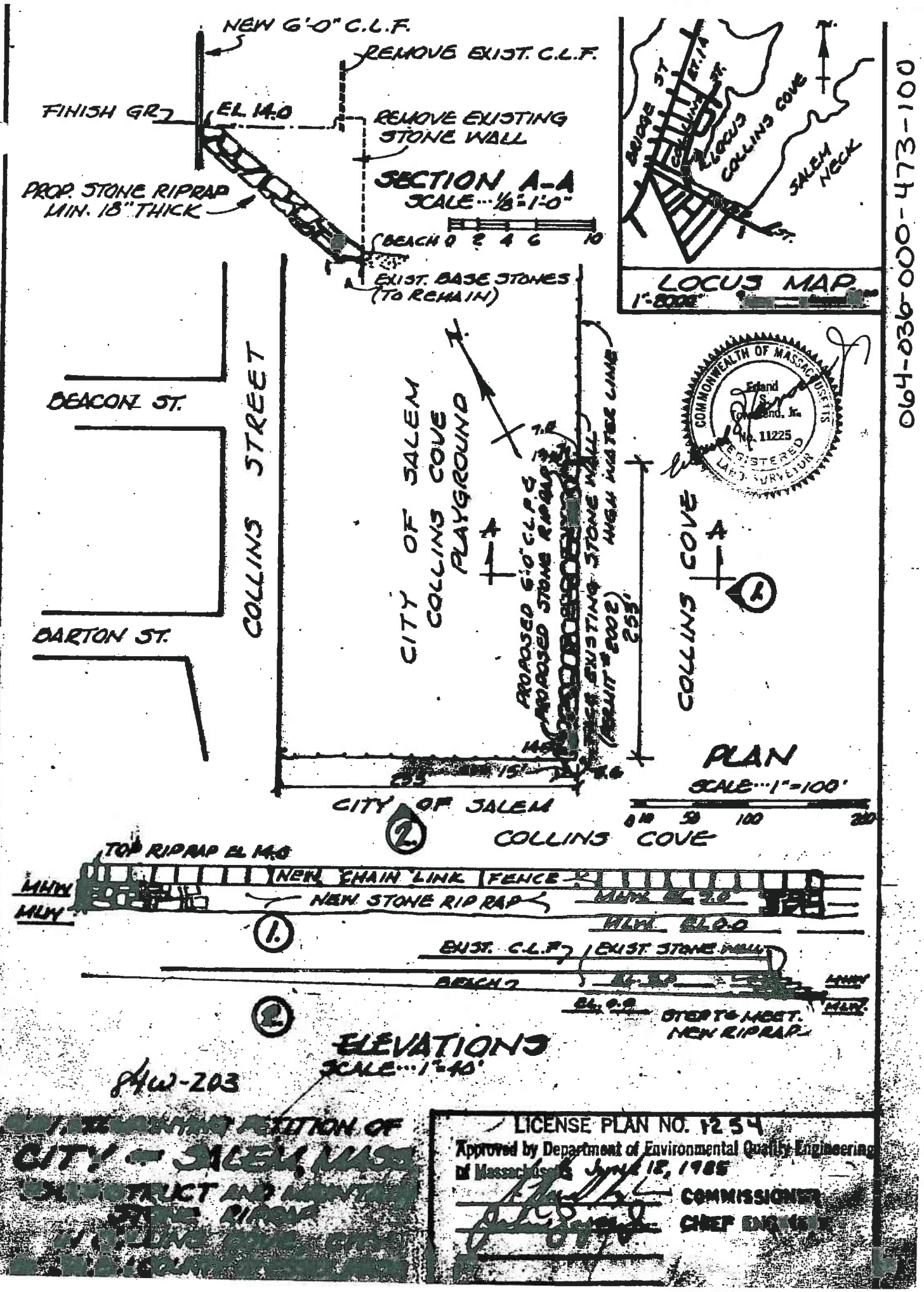
COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

DIRECTOR - DIVISION OF WATERWAYS

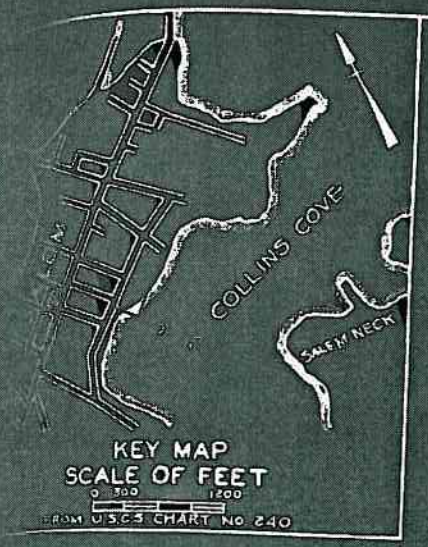


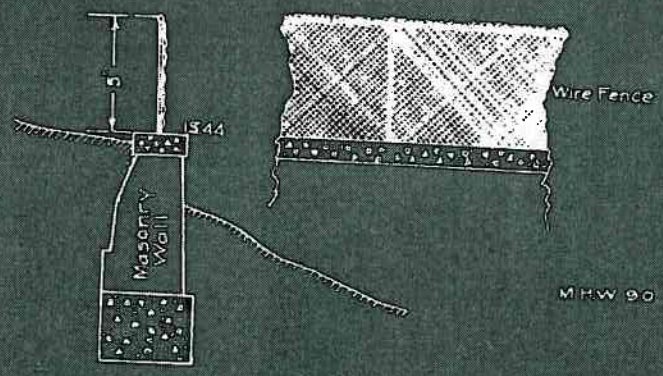
OW-034-000-455-100


NEW 6'-0" C.L.F.
REMOVE EXIST. C.L.F.
FINISH GR.
EL. 14.0
REMOVE EXISTING STONE WALL
PROP. STONE RIPRAP MIN. 18" THICK
SECTION A-A
SCALE ... 1/8"=1'-0"
BEACH
EXIST. BASE STONES (TO REMAIN)
LOCUS MAP
1"=800'
BRIDGE ST.
COLLINS ST.
LOCUS
COLLINS COVE
SALEM NECK
064-036-000-473-100
BEACON ST.
COLLINS STREET
BARTON ST.
CITY OF SALEM COLLINS COVE PLAYGROUND
PROPOSED 6'-0" C.L.F.
PROPOSED STONE RIPRAP
EXIST. EXISTING STONE WALL
HIGH WATER LINE
(RESULT = 8002)
253'
COMMONWEALTH OF MASSACHUSETTS
Edward S. Cleveland, Jr.
No. 11225
REGISTERED LAND SURVEYOR
COLLINS COVE
PLAN
SCALE ... 1"=100'
CITY OF SALEM
COLLINS COVE
TOP RIPRAP EL 14.0
NEW CHAIN LINK FENCE
NEW STONE RIPRAP
MHW
MLW
MLW EL 0.0
EXIST. C.L.F.
EXIST. STONE WALL
BEACH
EL. 0.0
STEP TO MEET NEW RIPRAP
ELEVATIONS
SCALE ... 1"=40'
84W-203
LICENSE PLAN NO. 1254
Approved by Department of Environmental Quality Engineering
of Massachusetts June 12, 1985
COMMISSIONER
CHIEF ENGINEER

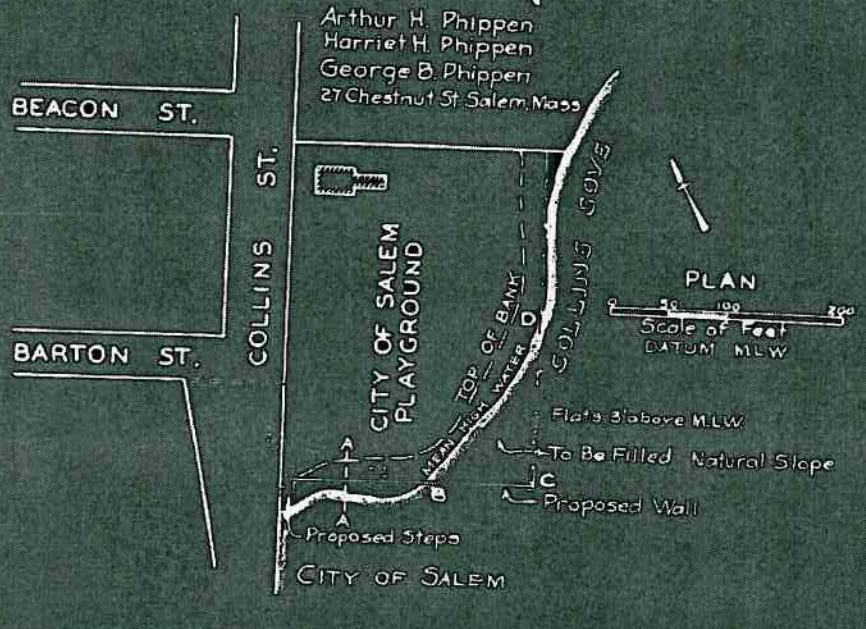
064-036-000-473-100
064-036-000-473-200

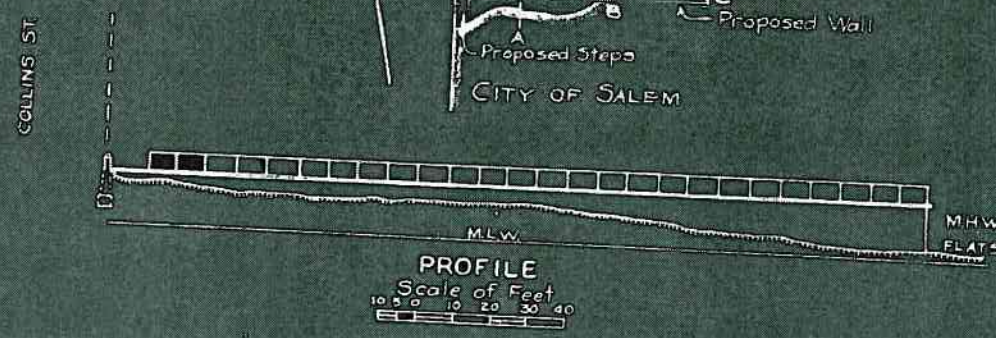
SHEET 1 OF 1 SHEETS





M.L.W.





PLAN ACCOMPANYING PETITION OF

CITY OF SALEM

TO BUILD WALL & FILL FLATS

COLLINS COVE

SALEM, MASS.

NO. 2002

APPROVED BY DEPARTMENT OF PUBLIC WORKS

SEPTEMBER 27, 1938

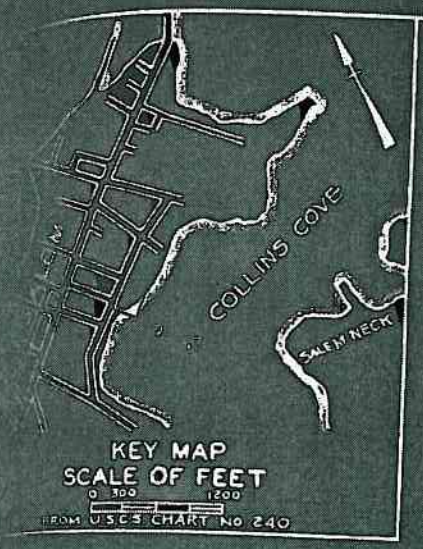
COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

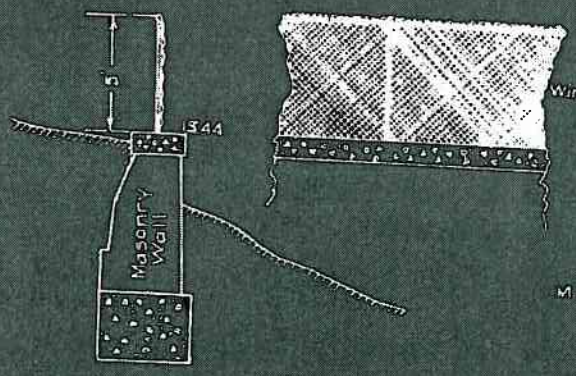
Frank O. Moss
CITY ENGINEER

064-036-000-473-100
064-036-000-473-200

SHEET 1 OF 1 SHEETS



KEY MAP
SCALE OF FEET
0 300 1200
FROM U.S.C.S. CHART NO 240



SECTION A-A
1 0 1 2 3 4 5
Scale of Feet
MLW.

Arthur H. Phippen
Harriet H. Phippen
George B. Phippen
27 Chestnut St Salem Mass

BEACON ST.

BARTON ST.

COLLINS ST.

CITY OF SALEM PLAYGROUND

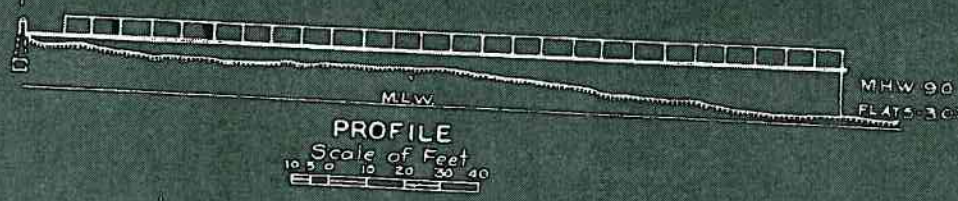
TOP OF BANK

MEAN HIGH WATER

COLLINS COVE

Flats 3' above M.L.W.
To Be Filled Natural Slope
Proposed Wall
Proposed Steps
CITY OF SALEM

COLLINS ST.



PROFILE
Scale of Feet
10 5 0 10 20 30 40

PLAN ACCOMPANYING PETITION OF

CITY OF SALEM

TO BUILD WALL & FILL FLATS
COLLINS COVE
SALEM, MASS.

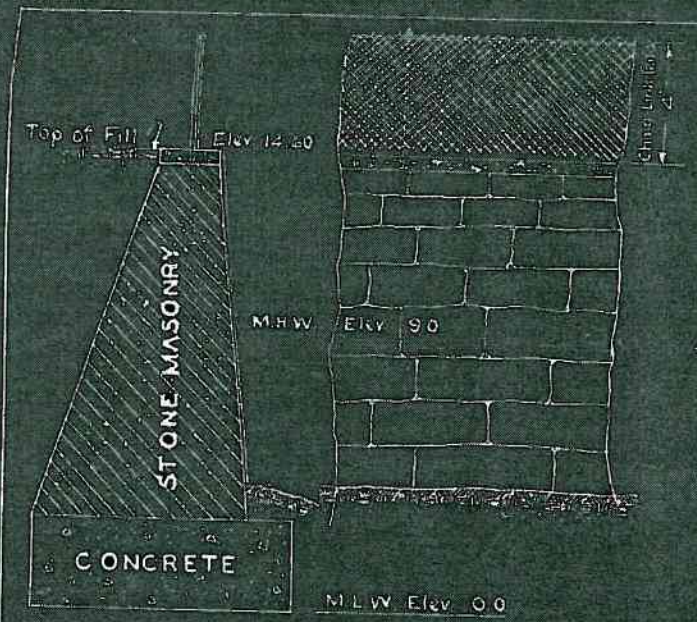
NO. 2002
APPROVED BY DEPARTMENT OF PUBLIC WORKS
SEPTEMBER 27, 1938

COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

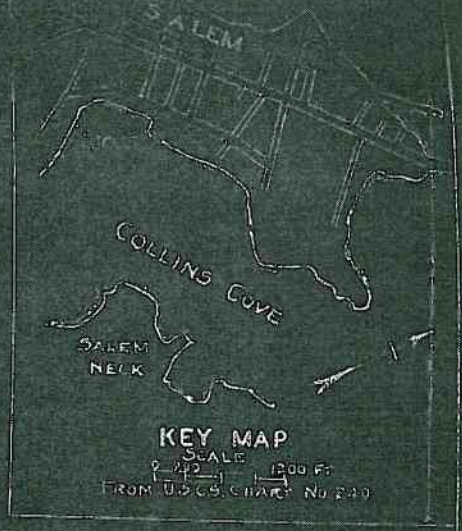
Frank P. Morse
CITY ENGINEER

SHEET 1 OF 2 SHEETS



SECTION A-A ELEVATION

SCALE 0 1 2 3 4 5 6 FT.



PLAN

SCALE 0 50 100 200 Ft.

DATUM M.L.W.

PROFILE

0 5 10 15 20 30 40 FT.

PLAN ACCOMPANYING PETITION OF

CITY OF SALEM

TO BUILD WALL, FLOAT & FILL FLATS

COLLINS COVE

SALEM, MASS.

Frank O. Moore
CITY ENG.

NO. 2102

APPROVED BY DEPARTMENT OF PUBLIC WORKS

AUGUST 9, 1939

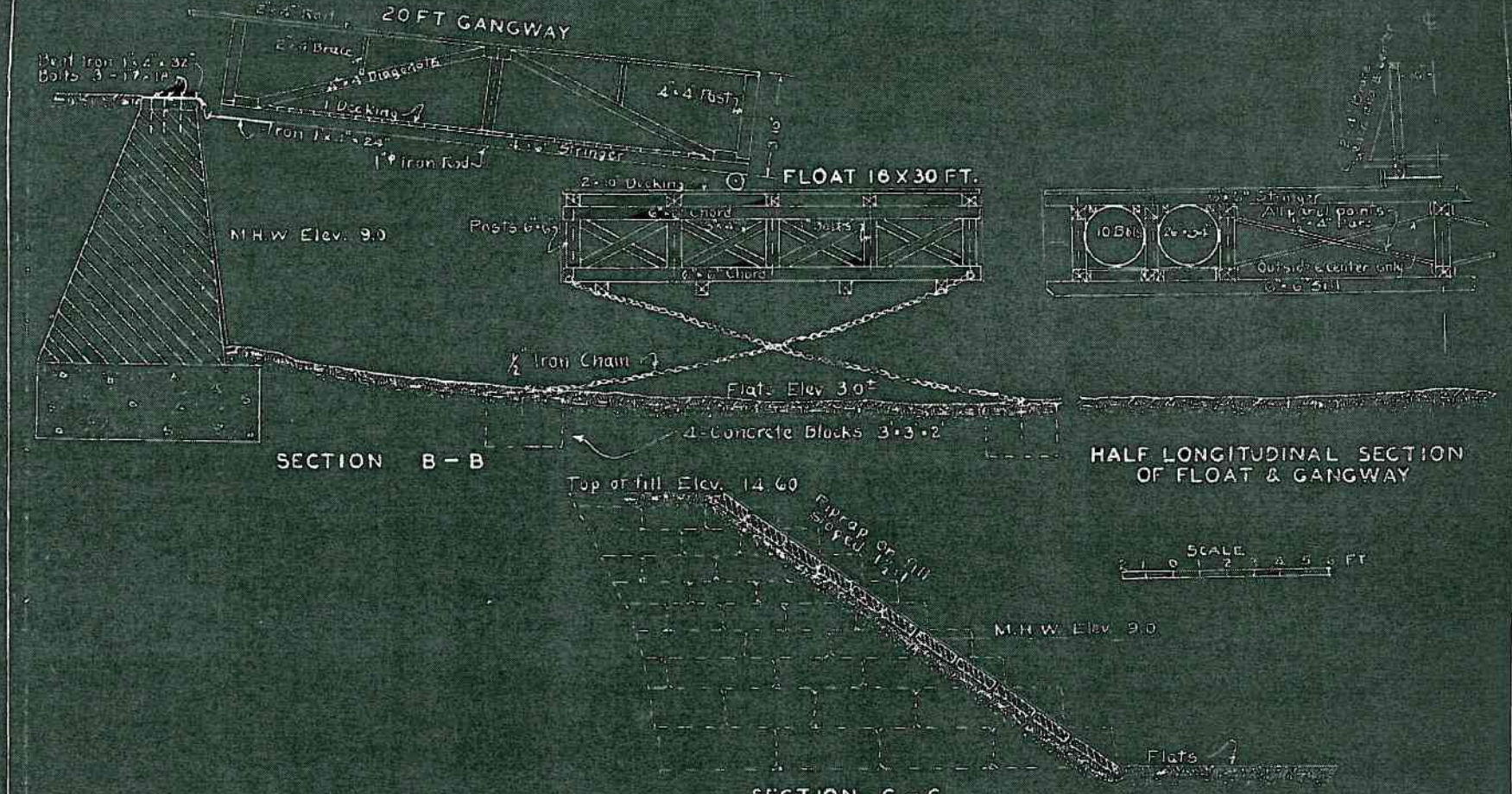
COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

DIRECTOR - DIVISION OF WATERWAYS

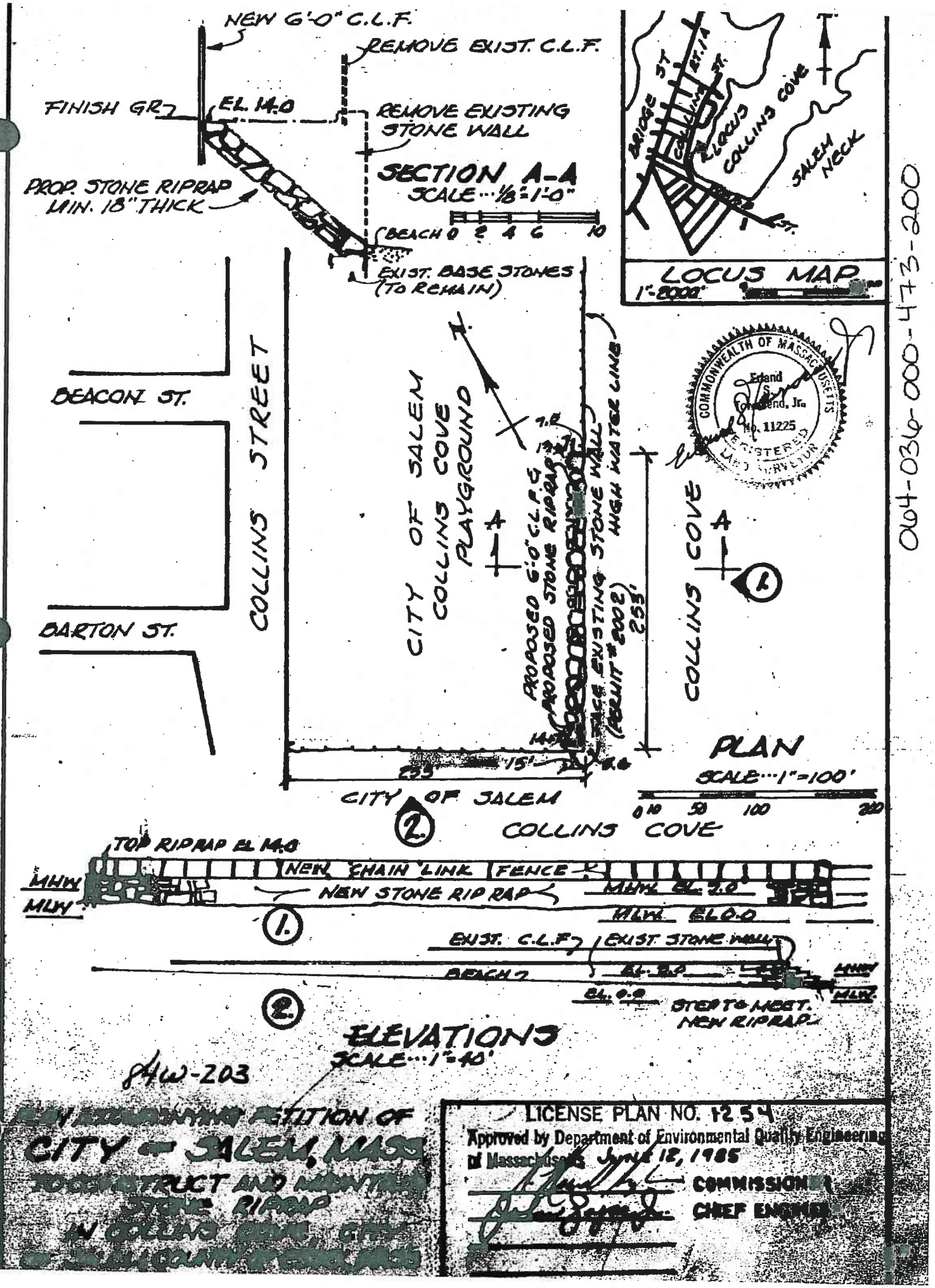
064-036-000-473-300

SHEET 2 OF 2 SHEETS



LICENSE PLAN NO. 2102
APPROVED AUGUST 9, 1939.

064-036-000-473-20



004-036-000-473-200

84W-203

[illegible] PETITION OF

CITY OF SALEM, MASS.

[illegible] CONSTRUCT AND MAINTAIN [illegible] STONE RIPRAP IN COLLINS COVE, CITY OF SALEM, ESSEX COUNTY

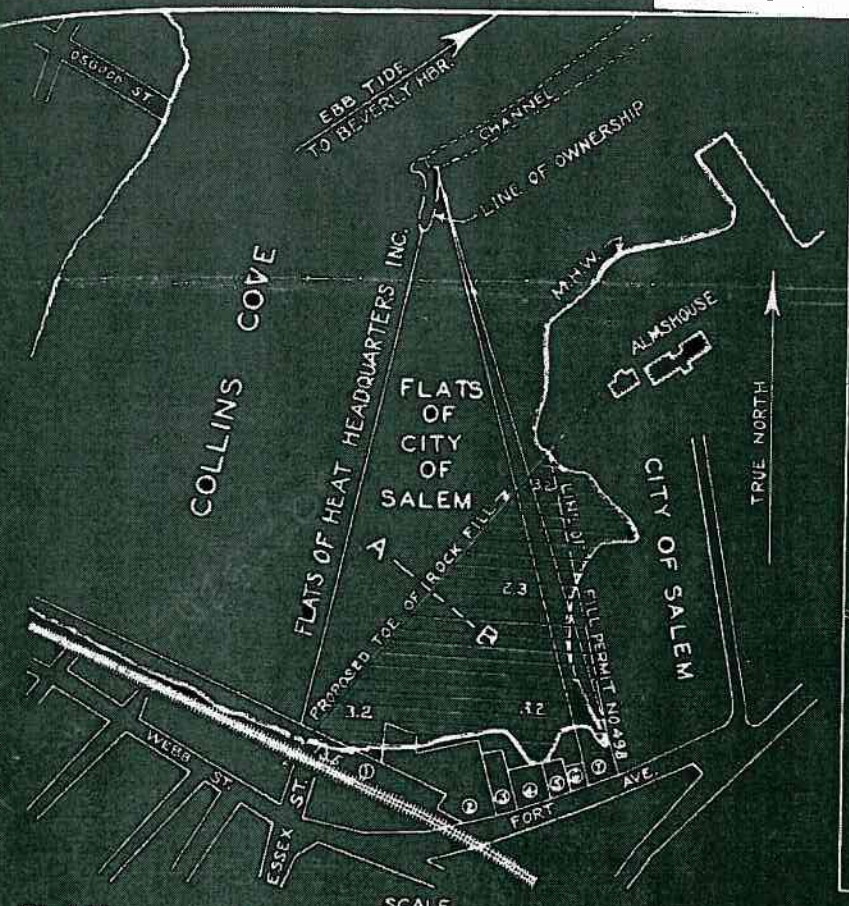
LICENSE PLAN NO. 1254

Approved by Department of Environmental Quality Engineering of Massachusetts, June 12, 1985

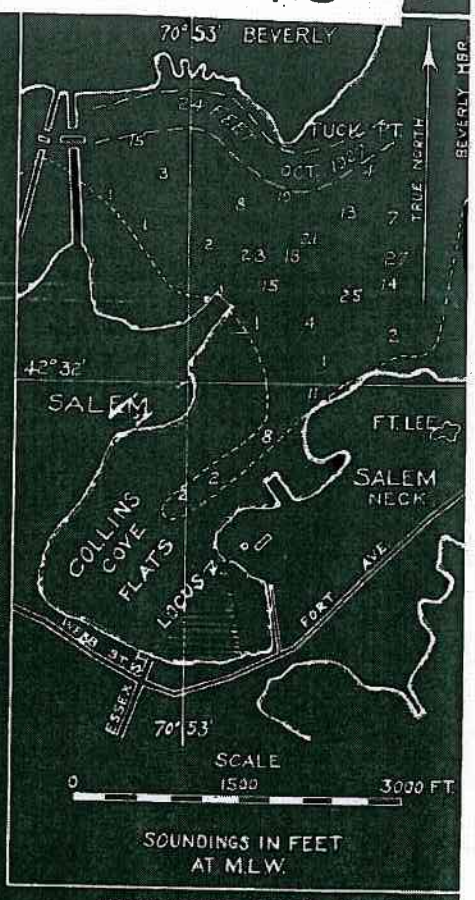
COMMISSIONER

CHIEF ENGINEER

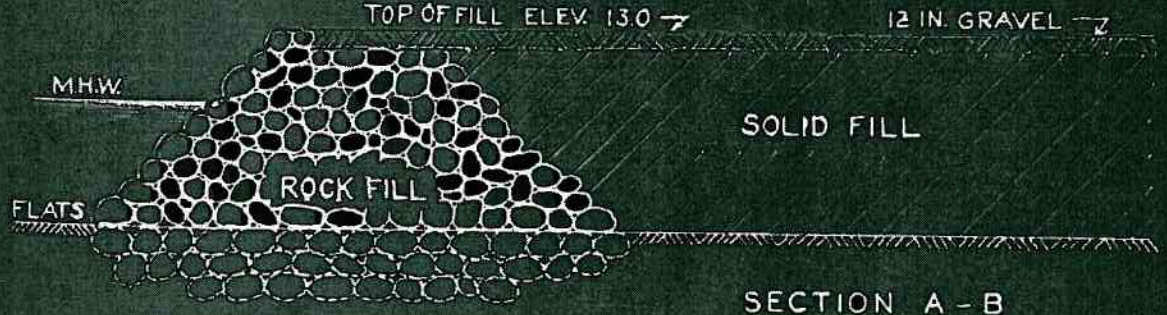
064-042-000-003-100



ELEVATIONS ABOVE M.L.W.



FROM C.&G.S. CHART NO. 240
SALEM MASS.



SECTION A - B
SCALE
0
10
20 FT.

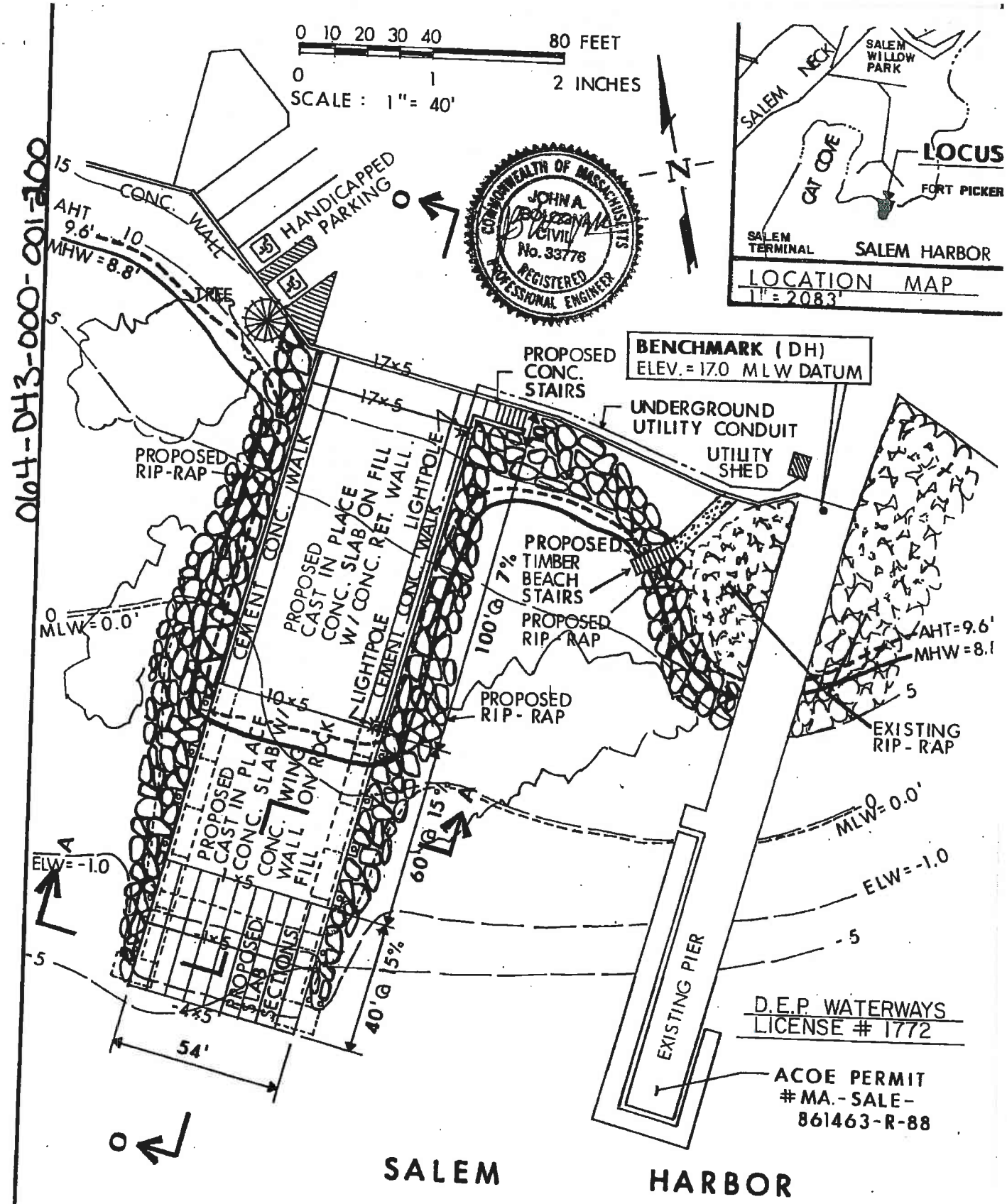
NAMES OF OWNERS

STON & MAINE R.R.	NORTH STATION, BOSTON, MASS.
RAHAM LIVINGSTON	271 LAFAYETTE ST., SALEM, MASS.
NKLIN B. BAKER ET AL	5 WARREN AVE., DANVERS, MASS.
N J. O'BRIEN	25 WISTERIA ST., SALEM, MASS.
LIAM H. BAGLEY	11 FORT AVE., SALEM, MASS.
HN A. WILLIAMS	13 FORT AVE., SALEM, MASS.
LIAM A. HARRIGAN ET AL	BLOCK HOUSE SQ., SALEM, MASS.

NO. 2525
APPROVED BY DEPARTMENT OF PUBLIC WORKS
SEPTEMBER 1 1942
J. Herman Thomas
COMMISSIONER OF PUBLIC WORKS
George M. Schnurer
Elias C. Pinkham
ASSOCIATE COMMISSIONERS
DIRECTOR - DIVISION

PLAN ACCOMPANYING PETITION OF CITY OF SALEM TO MAKE SOLID FILL IN COLLINS COVE SALEM, MASS.

Frank P. Morse



0164-043-000-001-100

PLAN TO ACCOMPANY PETITION OF
COMMONWEALTH OF MASSACHUSETTS
PUBLIC ACCESS BOARD
TO CONSTRUCT AND TO MAINTAIN CONCRETE BOAT RAMP, RIP-RAP, PILES & FLOAT SYSTEMS AT
WINTER ISLAND IN **SALEM HARBOR**, CITY OF **SALEM**, **ESSEX COUNTY**, **MASSACHUSETTS**
NOVEMBER, 1994
COASTAL ENGINEERING CO., INC.
ORLEANS, MASSACHUSETTS

LICENSE PLAN NO. 4729 SHT. 1 OF 3 SHTS.

Approved by Department of Environmental Protection
of Massachusetts

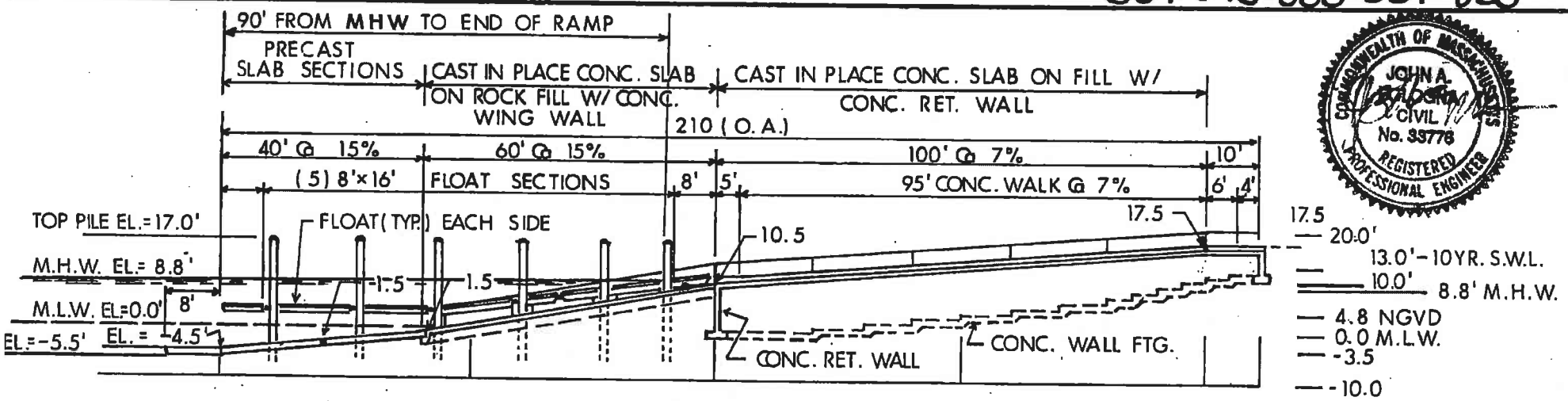
COMMISSIONER

DIVISION DIRECTOR

SECTION CHIEF

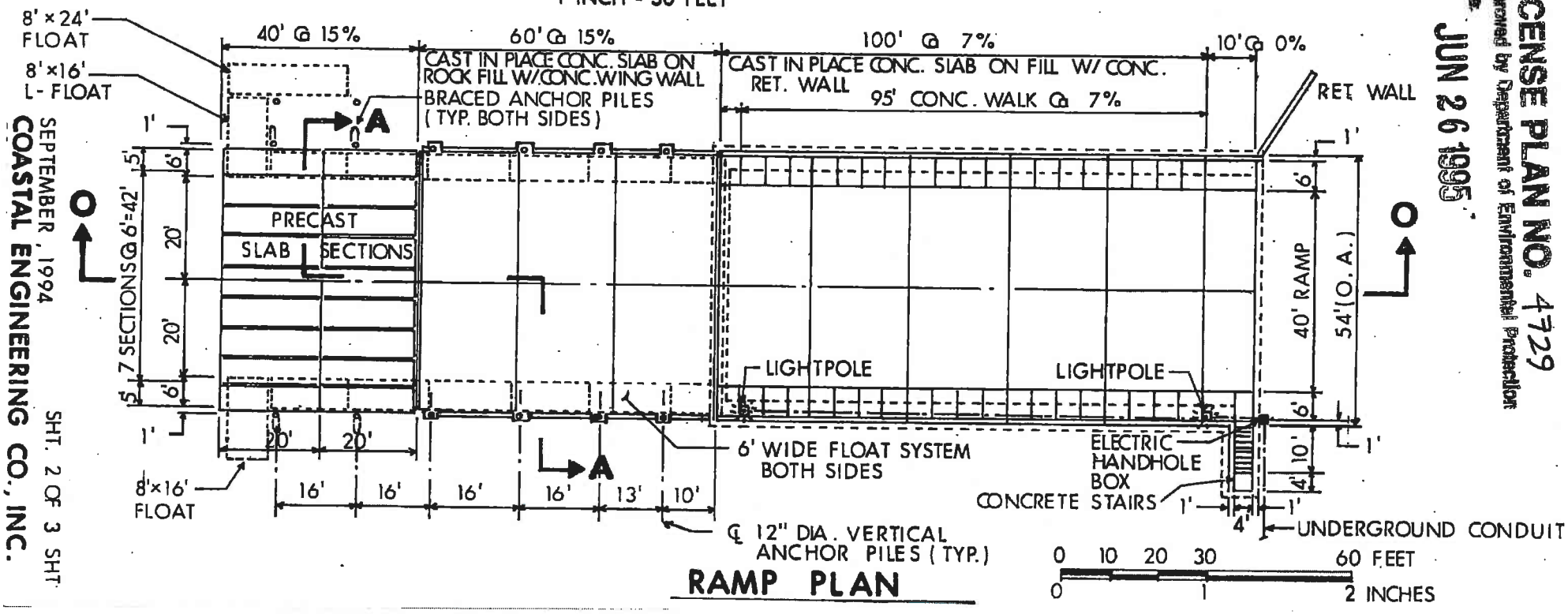
JUN 26 1995

064-043-000-001-200



RAMP PROFILE - SECTION 0.0

1 INCH = 30 FEET



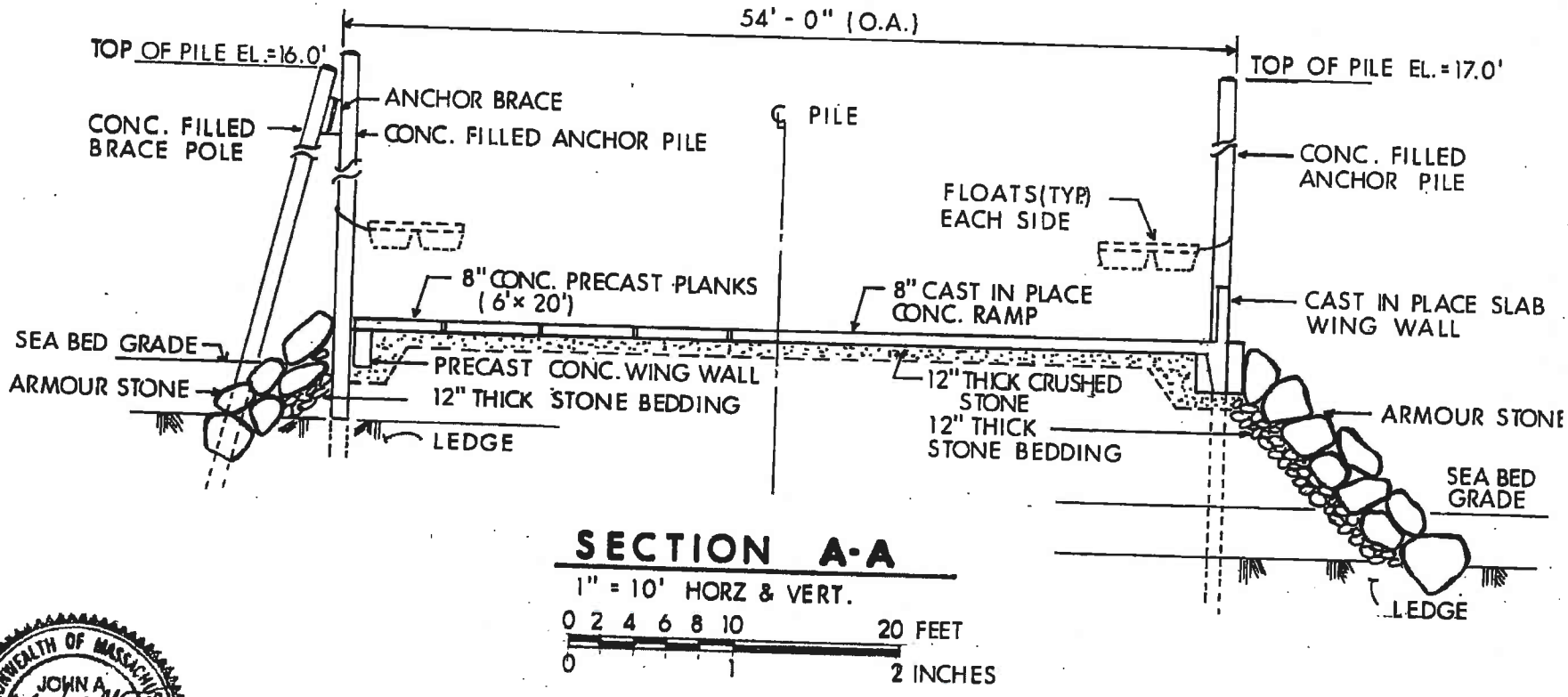
RAMP PLAN

LICENSE PLAN NO. 4729
Approved by Department of Environmental Protection
Date: JUN 26 1995

SEPTEMBER, 1994
COASTAL ENGINEERING CO., INC.
SHT. 2 OF 3 SHT.

064-043-000-001-200

NOVEMBER, 1994
COASTAL ENGINEERING CO., INC.
ORLEANS, MASSACHUSETTS



SECTION A-A

1" = 10' HORZ & VERT.

0 2 4 6 8 10 20 FEET

0 1 2 INCHES

LICENSE PLAN NO. 4729
Approved by Department of Environmental Protection
Date: JUN 26 1995

COMMONWEALTH OF MASSACHUSETTS
JOHN A. GOLDEN
CIVIL
No. 33776
REGISTERED
PROFESSIONAL ENGINEER

CITY: SALEM
SOURCE: US ACOE
LOCATION: CONCORD, MA
DATE OF RESEARCH: AUGUST 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
064-028-000-018-100	064-028-000-018-100-COE1A	67-221	USACE	Salem	July 1967	Proposed Access Ramp and Facilities - Danvers River - Salem, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	2	Kernwood Avenue	Revetment

0670198

064-028-000-018-100

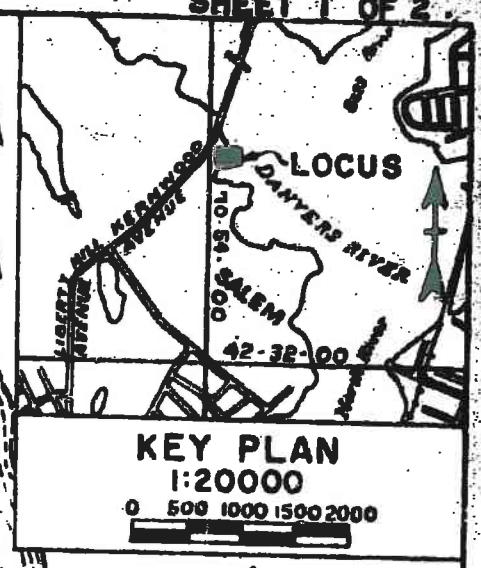
SHEET 1 OF 2

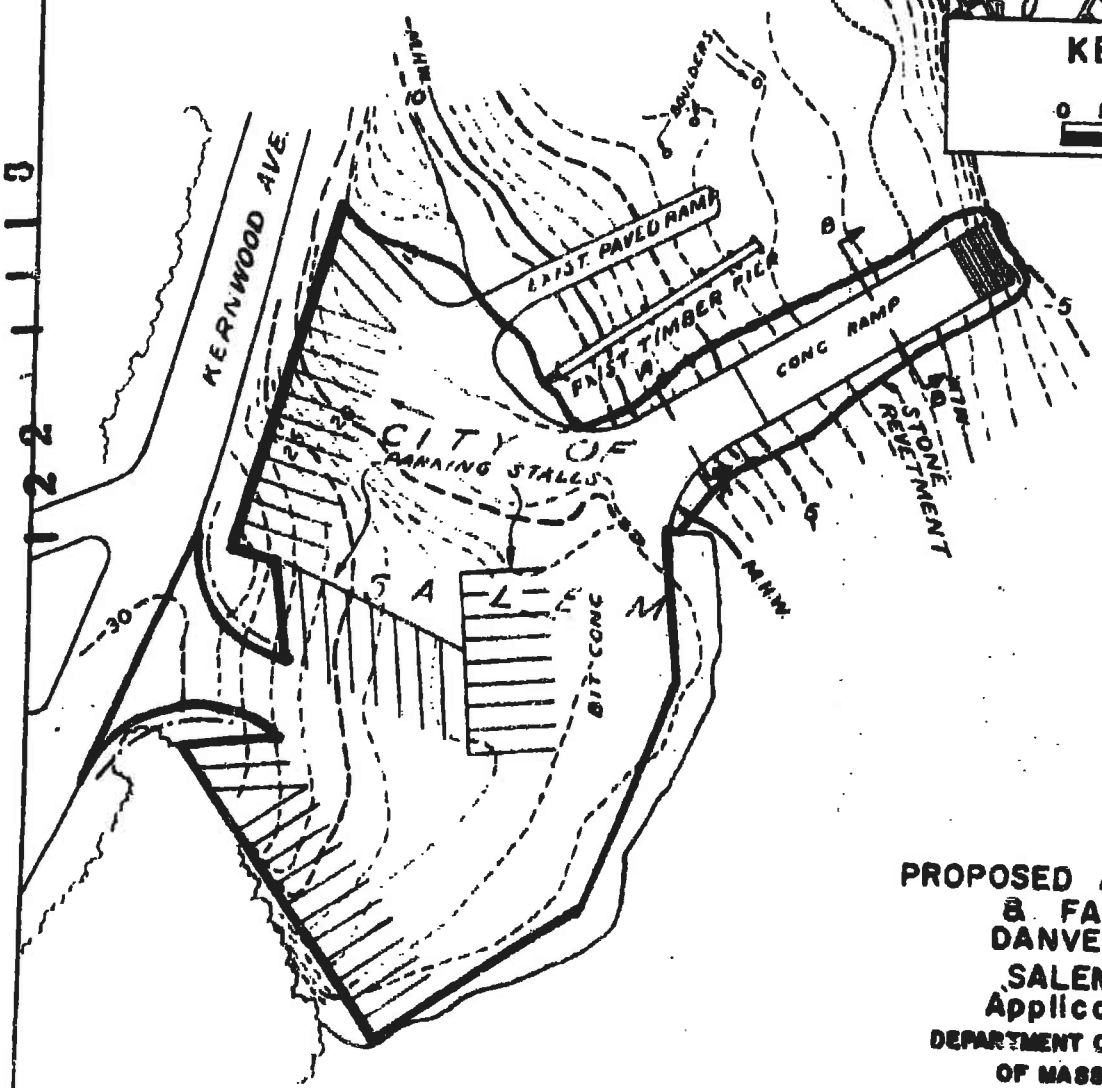
NOTE

ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER

MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE

LOCATION OF PROPOSED WORK SHOWN IN RED





PROPOSED ACCESS RAMP & FACILITIES
DANVERS RIVER
SALEM. MASS
Application By
DEPARTMENT OF PUBLIC WORKS
OF MASSACHUSETTS
DIVISION OF WATERWAYS

JULY 1967

PLAN

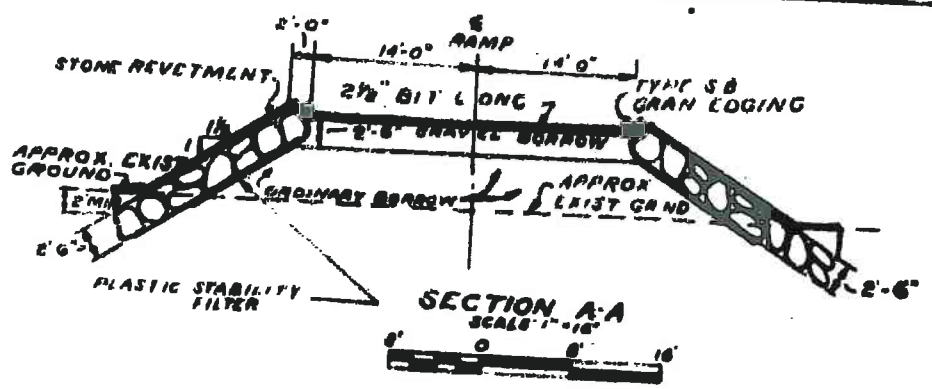
SCALE 1"=80'

DEPUTY CHIEF

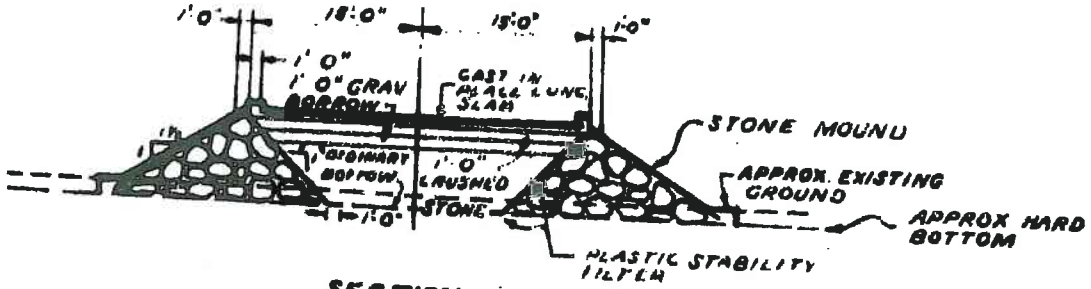
0 6 7 1 9 9

064-028-000-018-100

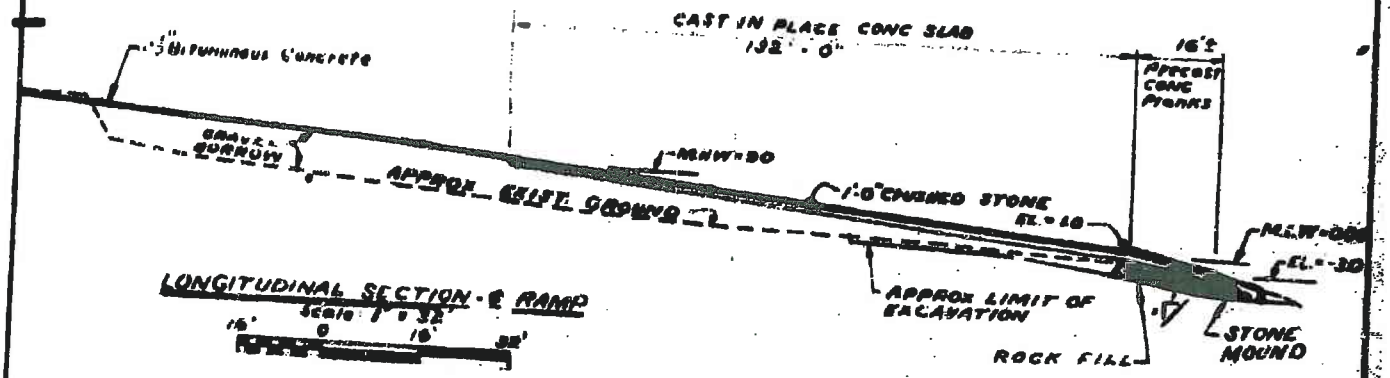
SHEET 2 OF 2



SECTION A-A
SCALE 1"=16'



SECTION B-B
SCALE 1"=16'



LONGITUDINAL SECTION - ℄ RAMP
SCALE 1"=32'

PROPOSED ACCESS RAMP & FACILITIES
DANVERS RIVER
SALEM MASS
Application By
DEPARTMENT OF PUBLIC WORKS
OF MASSACHUSETTS
DIVISION OF WATERWAYS

JULY 1967

DEPUTY CHIEF
ENGINEER WATERWAYS

ACC. NO. 04656-B