

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

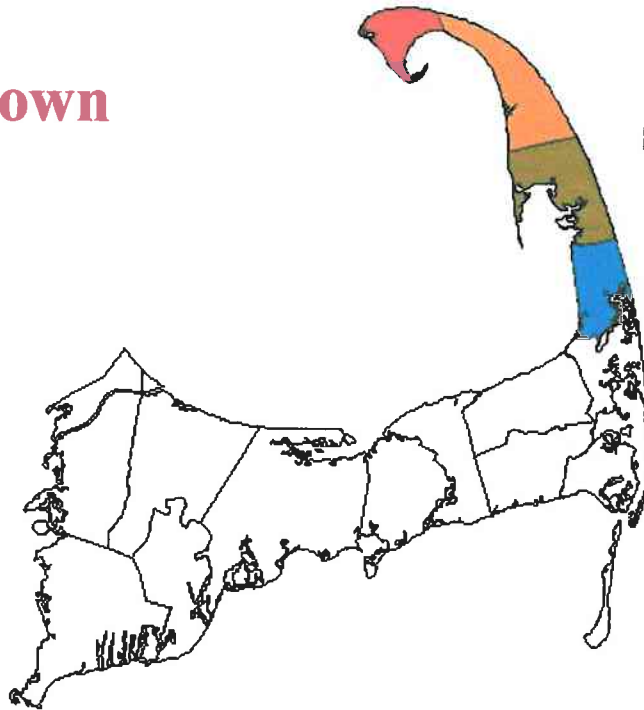
Outer Cape Cod - North

Provincetown

Truro

Wellfleet

Eastham



July 6, 2009

Prepared for:

**Massachusetts Department of
Conservation and Recreation
Hingham, Massachusetts**

Presented by:

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Franklin, Massachusetts**

In Association With:

Applied Coastal Research & Engineering

MASSACHUSETTS COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT PROJECT

Outer Cape Cod - North

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Section I

Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

PURPOSE

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

***Massachusetts Coastal Infrastructure
Inventory and Assessment Project
Coastal Hazards Commission***

Section I – Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

The Project and Client

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

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

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

Consultant Team

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

PURPOSE

Study Purpose

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

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

Goals of Study

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

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

Limit of Study

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

- All property ownership was taken as presumed. No legal investigation of ownership was performed during the project. Property ownership is based on town assessor maps. Where structures were located outshore of assessor map defined property lines, it was assumed to be Town land unless other information indicated otherwise. Where structures were located outshore of Mean Low Water, property is assumed to be State owned.
- The structure ownership was based on assessor maps and research at the local, state and federal levels. Where there was indication of public work on a structure on Town land or on private property, the structure was presumed to be Town owned. Where the structure was on state property, the structure was presumed to be state owned. Where ownership of the structure was not clear but was located on private property, the structure ownership was defined as unknown.
- The study included town and state owned structures as it was assumed that most town owned structures received state funding at some level for construction and/or maintenance.
 - Structures that were determined to be private were not included.
 - Undocumented structures considered to be on private land, but having the potential to have been publicly built and/or maintained, were identified as having an "unknown ownership".
- The prioritizing of structures was based primarily on risk to general infrastructure and density of housing. Infrastructure included was buildings. The study did not consider all infrastructure issues including:
 - No consideration on utility impacts – water, electrical, sewer, gas
 - No consideration of roadway and bridge protection
 - Evacuation routes were not considered within the investigation
 - Location of Emergency Shelters were not included in priority assessments
- Research was performed at the local, state and federal levels. The local research was limited to location and documenting available coastal structure contract drawings. Research at DCR was restricted to available historic construction plans for coastal structures at the MA-DCR Waterways office in Hingham, MA, and MA-DCR Division of Urban Parks and Recreation in

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

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

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

Database Attributes

- Attribute Descriptions/Definitions

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

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

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

CCC-MMM-BBB-PPP-SSS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- **Concrete Seawalls** – These walls were assumed to be gravity structures with the volume of concrete used based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from \$350 to \$630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.
- **Stone Seawalls** - These walls were treated the same as concrete seawalls and assumed to be gravity structures with the volume of the structure based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from \$350 to \$630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.
- **Steel Bulkheads** – Steel bulkheads were presumed to be constructed with steel sheet piling. Tie back systems were presumed for structures 10 feet or greater in height. Shorter walls were assumed to have a cantilever design. The total depth of sheeting was presumed to be two times the exposed height. The cost for construction varied from \$40 per square foot to \$60 per square foot plus the cost of excavation and demolition.
- **Timber Bulkheads** – Timber bulkheads were presumed to be constructed with timber piles at eight foot on center, horizontal wales and vertical four inch sheathing. The unit costs for installed materials used were \$1,500 per pile and \$7.50 per bfm.

Revetment Structures – Revetment structures were presumed to be constructed of dry placed (no concrete) stone with a two on one slope and a horizontal toe and crown equal to the thickness layer established for each height condition. The total thickness of the revetment layers varied from six to ten feet with the cost of armor and under-layer stone assumed to be \$50 per ton and the crushed stone base to be \$15 per ton.

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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

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CZM SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT 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	\$185	\$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	\$1,483
		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
REVTMENT	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	\$1,480
		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

Provincetown

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Provincetown

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	3		\$ 66,495	\$ 1,254,000			\$ 1,320,495
Revetment	3		\$ 54,054	\$ 1,953,600			\$ 2,007,654
Breakwater	2		\$ 2,669,000				\$ 2,669,000
Groin / Jetty	3			\$ 116,200	\$ 1,500,550		\$ 1,616,750
Coastal Dune							\$ -
Coastal Beach							\$ -
	11	\$ -	\$ 2,789,549	\$ 3,323,800	\$ 1,500,550	\$ -	\$ 7,613,899

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Provincetown

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Town Owned	10		\$ 2,789,549	\$ 3,323,800	\$ 1,500,550		\$ 7,613,899
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership	1						\$ -
	11	\$ -	\$ 2,789,549	\$ 3,323,800	\$ 1,500,550	\$ -	\$ 7,613,899

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 Provincetown'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.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Provincetown

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	3		\$ 66,495	\$ 1,254,000			\$ 1,320,495
Revetment	3		\$ 54,054	\$ 1,953,600			\$ 2,007,654
Breakwater	2		\$ 2,669,000				\$ 2,669,000
Groin / Jetty	3			\$ 116,200	\$ 1,500,550		\$ 1,616,750
Coastal Dune							\$ -
Coastal Beach							\$ -
	11	\$ -	\$ 2,789,549	\$ 3,323,800	\$ 1,500,550	\$ -	\$ 7,613,899

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Provincetown

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Town Owned	10		\$ 2,789,549	\$ 3,323,800	\$ 1,500,550		\$ 7,613,899
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership	1						\$ -
	11	\$ -	\$ 2,789,549	\$ 3,323,800	\$ 1,500,550	\$ -	\$ 7,613,899

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

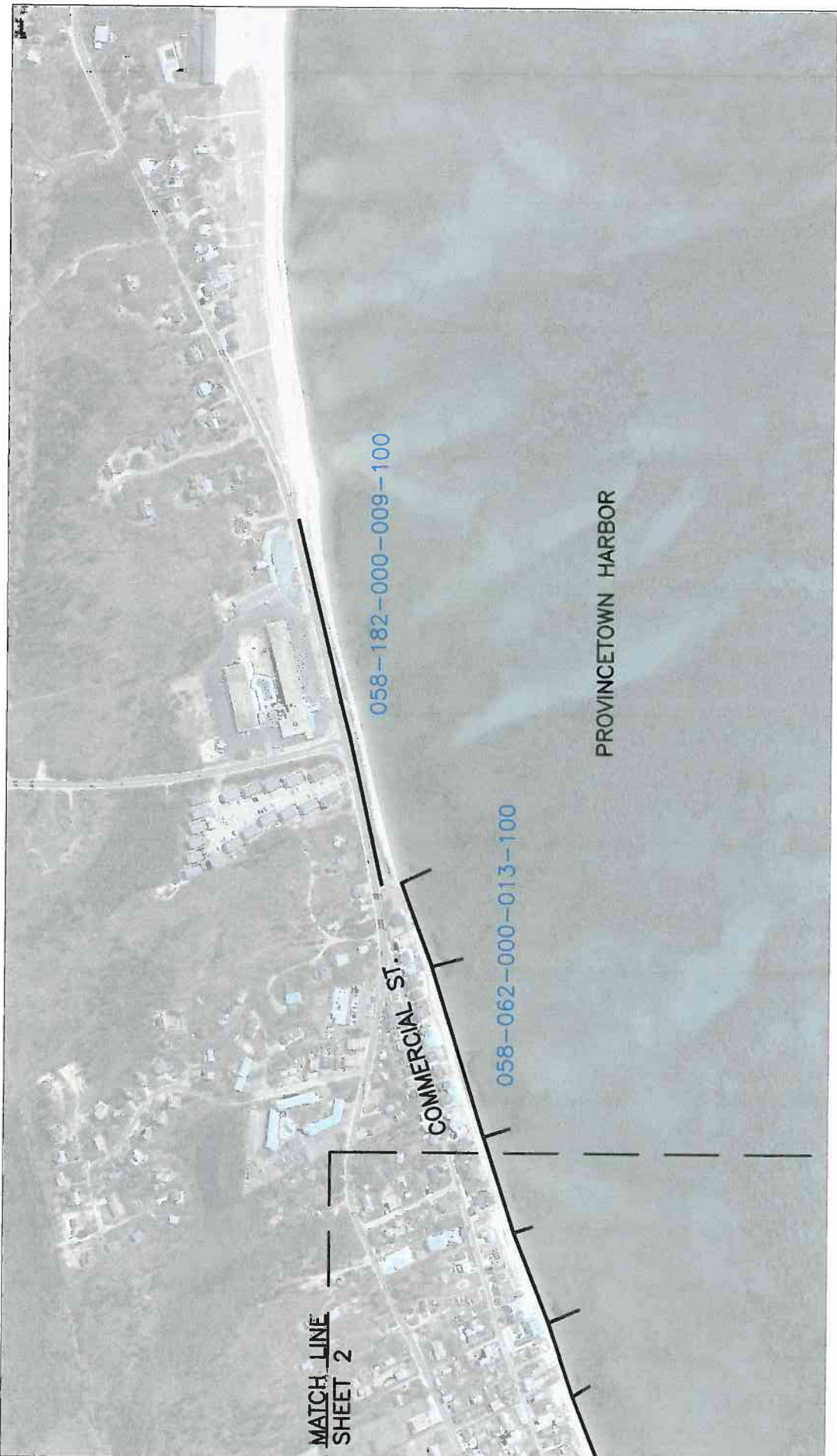
The enclosed reports and associated documents reflects the Town of Provincetown's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term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

Part B

Structure Assessment Reports

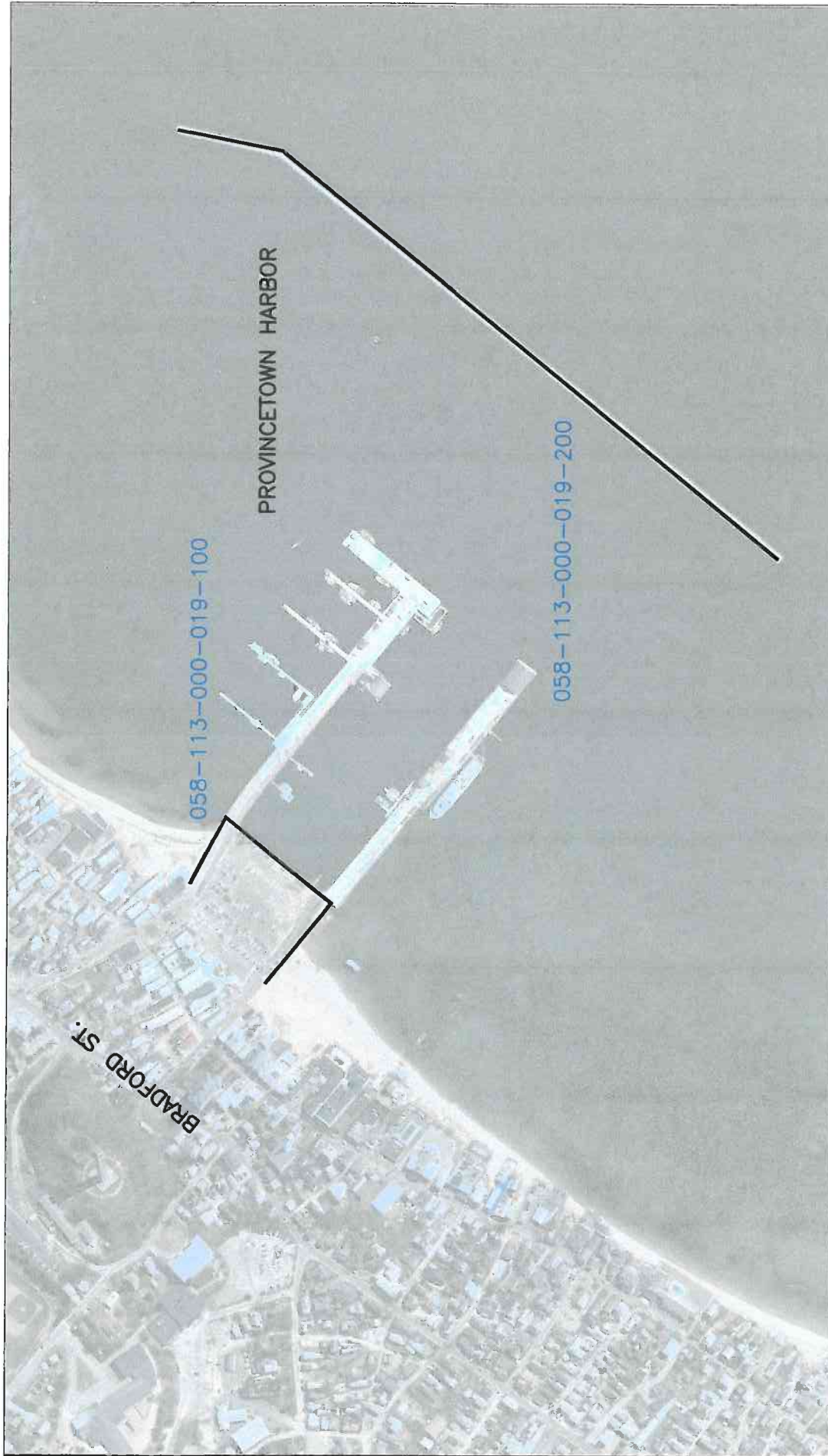


COASTAL STRUCTURE LOCATION PLAN

TOWN OF PROVINCETOWN
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**
Bourne Consulting Engineering
200 West Main Street
Provincetown, MA 01905
TEL (508) 552-0000 FAX (508) 552-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF PROVINCETOWN
 COASTAL INFRASTRUCTURE INVENTORY
 AND ASSESSMENT PROJECT
 NOVEMBER 2007



BCE Bourne Consulting Engineering
 7 West Street
 Provincetown, MA 01970
 TEL: (508) 553-0000 FAX: (508) 553-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF PROVINCETOWN
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'



COASTAL STRUCTURE LOCATION PLAN

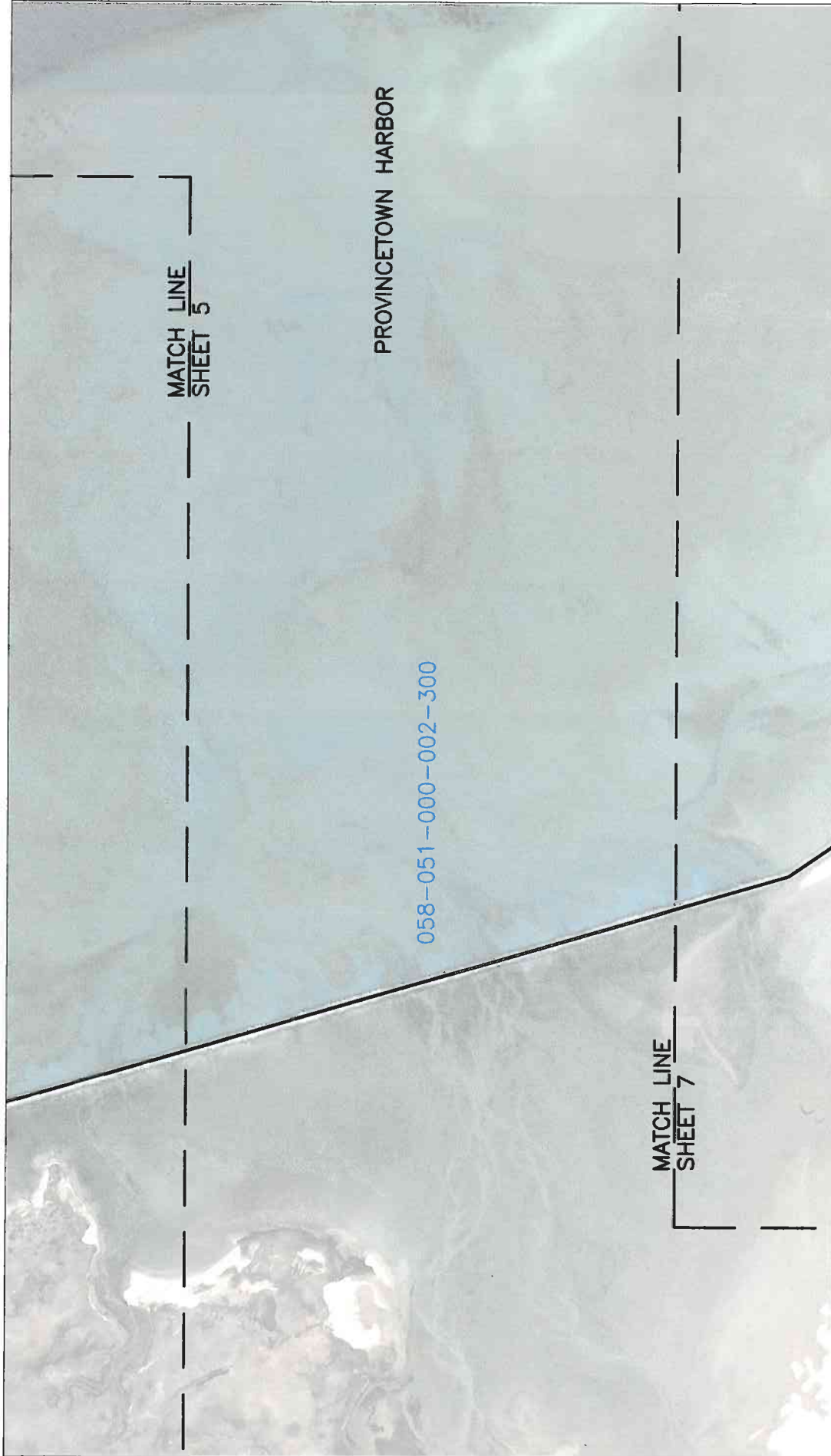
TOWN OF PROVINCETOWN
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'

**BCE**

Bourne Consulting Engineering
3 Pond Street
Provincetown, MA 01952
TEL: (508) 533-6666 FAX: (508) 533-6666



COASTAL STRUCTURE LOCATION PLAN

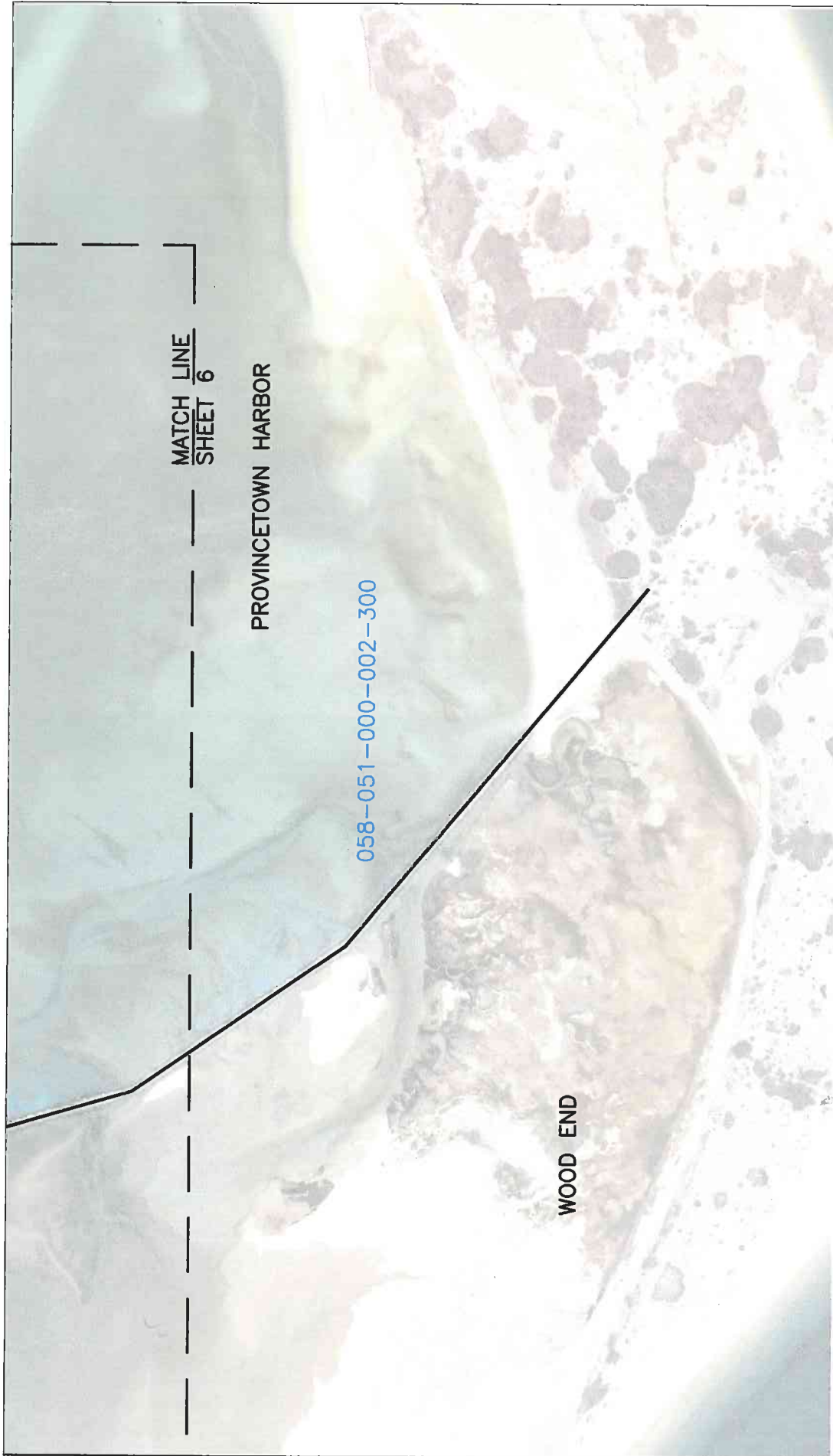
TOWN OF PROVINCETOWN
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT

NOVEMBER 2007



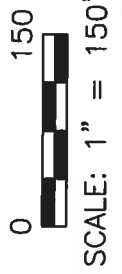
SCALE: 1" = 150'





COASTAL STRUCTURE LOCATION PLAN

TOWN OF PROVINCETOWN
 COASTAL INFRASTRUCTURE INVENTORY
 AND ASSESSMENT PROJECT
 NOVEMBER 2007



	Bourne Consulting Engineering <small>3 Acad Street Provincetown, MA 01970 TEL (508) 553-0000 FAX (508) 553-0000</small>
	SHEET 7

Structure Assessment Form

Town: Provincetown

Structure ID: 058-051-000-002-100

Key: community-map-block-parcel-structure

Property Owner:

Private

Location:

Pilgrims First Landing Park

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

1956

Estimated Reconstruction/Repair Cost:

\$976,800.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1250	9	V4	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone riprap at a 1 on 2 slope. Stones are 3 feet by 2 feet by 2 feet on average. No visible scour. There has been many asphalt and concrete repairs. Behind is a hotel.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

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

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

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

Structure Images:

058-051-000-002-100-PHO1A.jpg

Structure Documents:

USACE

November 1

Proposed Fill in

058-051-000-002-100-COE1A

Structure Assessment Form

Town: Provincetown

Structure ID: 058-051-000-002-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Long Point Marshes

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$54,054.00

Length:

450

Feet

Top Elevation:

6

Feet NAVD 88

FIRM Map Zone:

V4

FIRM Map Elevation:

13

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone riprap at a little slope. Stones are 3 feet by 2 feet by 2 feet on average. No visible scour or erosion. There is a road, a few houses, and a park behind.

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

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

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

Structure Images:

058-051-000-002-200-PHO2A.jpg

058-051-000-002-200-PHO2B.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-051-000-002-300

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Long Point Marshes

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$1,884,000.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
6000	5	V4	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Breakwater

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone dike with stones that are 3 feet by 2 feet by 2 feet on average. Minor stone movement and no visible scour. Provincetown Harbor is in front and there is marsh behind.

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

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

058-051-000-002-300-PHO3A.jpg

058-051-000-002-300-PHO3B.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-062-000-013-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Commercial Street

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

1934

Estimated Reconstruction/Repair Cost:

\$1,062,336.00

Length: 800 Feet
 Top Elevation: Feet NAVD 88
 FIRM Map Zone: V4
 FIRM Map Elevation: 14 Feet NGVD

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



Structure Summary :

Set of dumped stone groins. The stones are coming unravelled. There are signs of stone movement and section loss. The groins are in front of houses.

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

Structure Images:

058-062-000-013-100-PHO1A.jpg

Structure Documents:

MA-DCR	May 1934	Proposed Stone	058-062-000-013-100-DCR1A
MA-DCR	August 1938	Proposed Shore	058-062-000-013-100-DCR1B

Structure Assessment Form

Town: Provincetown

Structure ID: 058-062-000-013-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Commercial Street

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$116,200.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
175	7	V4	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Set of 3 dumped stone groins. There is moderate stone movement and section loss. The stones are on average 4 feet by 3 feet by 3 feet in size. There appears to be relics of old groins along the coast also.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

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

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

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

Structure Images:

058-062-000-013-200-PHO2A.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-062-000-013-300

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Commercial Street

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$438,214.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
330	8	V4	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groyne/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Set of 6 dumped stone groins. Moderate to heavy stone movement and section loss. Stones are 4 feet by 3 feet by 3 feet on average. There appears to be relics of old groins along the coast.

Condition

D

Rating

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

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

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

Structure Images:

058-062-000-013-300-PHO3A.jpg

058-062-000-013-300-PHO3B.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-062-000-020-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Boat Ramp

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$18,975.00

Length:

125

Feet

Top Elevation:

11

Feet NAVD 88

FIRM Map Zone:

V4

FIRM Map Elevation:

11

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Concrete wall with sand beach in front. Parking lot and houses behind. No visible signs of erosion.

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

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

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

Structure Images:

058-062-000-020-100-PHO1A.jpg

058-062-000-020-100-PHO1B.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-062-000-020-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Boat Ramp

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

1976

Estimated Reconstruction/Repair Cost:

\$47,520.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
150	9	V4	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

10 to 15 Feet

Secondary Type:

Revetment

Secondary Material:

Concrete

Secondary Height:

Under 5 Feet



Structure Summary :

Concrete wall with sand beach in front. Parking lot and houses behind. No visible signs of erosion. Has ramp and riprap in front. There are concrete slabs in front of the riprap and stone. The slabs are 4 feet by 4 feet. Minor cracking on wall.

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

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

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

Structure Images:

058-062-000-020-200-PHO2A.jpg

058-062-000-020-200-PHO2B.jpg

058-062-000-020-200-PHO2C.jpg

Structure Documents:

DEP

April 23, 197

Plan Accompanying

058-062-000-020-200-LIC2A

Structure Assessment Form

Town: Provincetown

Structure ID: 058-113-000-019-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

MacMillan Wharf

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

1956

Estimated Reconstruction/Repair Cost:

\$1,254,000.00

Length:

1000

Feet

Top Elevation:

10

Feet NAVD 88

FIRM Map Zone:

V4

FIRM Map Elevation:

15

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Sheetpile bulkhead is cased with concrete. There is moderate cracking and spalling on the concrete. Attached to the bulkhead is two piers. Behind is parking and buildings.

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

V

Rating

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:

058-113-000-019-100-PHO1A.jpg

Structure Documents:

USACE	November 1	Proposed Fill in	058-113-000-019-100-COE1A
USACE	July 1974	Proposed Bulkhead	058-113-000-019-100-COE1C
USACE	December 1	Proposed Sheet	058-113-000-019-100-COEB
DEP	February 19	Plan Accompanying	058-113-000-019-100-LIC1A
DEP	July 1961	Plan Accompanying	058-113-000-019-100-LIC1B
DEP	March 21, 20	Plan Accompanying	058-113-000-019-100-LIC1C

Structure Assessment Form

Town: Provincetown

Structure ID: 058-113-000-019-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Provincetown Harbor Breakwater

Date:

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$785,000.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
2500		N/A	N/A
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Breakwater

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Detached dumped stone breakwater located in Provincetown Harbor. Stones are 6 feet by 3 feet by 3 feet on average. Minor to moderate stone movement.

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

V

Rating

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:

058-113-000-019-200-PHO2A.jpg

058-113-000-019-200-PHO2B.jpg

Structure Documents:

Structure Assessment Form

Town: Provincetown

Structure ID: 058-182-000-009-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mayflower Heights

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Provincetown

Earliest Structure Record:

Unkown

Estimated Reconstruction/Repair Cost:

\$976,800.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1250	10	V2	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Dumped stone riprap. Stones are 3 feet by 2 feet by 1 foot on average. No visible scour. Moderate section loss and stone movement are visible. Behind is road into town and buildings

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

V

Rating

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:

058-182-000-009-100-PHO1A.jpg

058-182-000-009-100-PHO1B.jpg

Structure Documents:

Section II - Provincetown

Part C

Structure Photographs

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
058-051-000-002-100	058-051-000-002-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-051-000-002-200	058-051-000-002-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-051-000-002-200	058-051-000-002-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-051-000-002-300	058-051-000-002-300-PHO3A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-051-000-002-300	058-051-000-002-300-PHO3B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-013-100	058-062-000-013-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-013-200	058-062-000-013-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-013-300	058-062-000-013-300-PHO3A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-013-300	058-062-000-013-300-PHO3B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-020-100	058-062-000-020-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-020-100	058-062-000-020-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-020-200	058-062-000-020-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-020-200	058-062-000-020-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-062-000-020-200	058-062-000-020-200-PHO2C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-113-000-019-100	058-113-000-019-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-113-000-019-200	058-113-000-019-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
058-113-000-019-200	058-113-000-019-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
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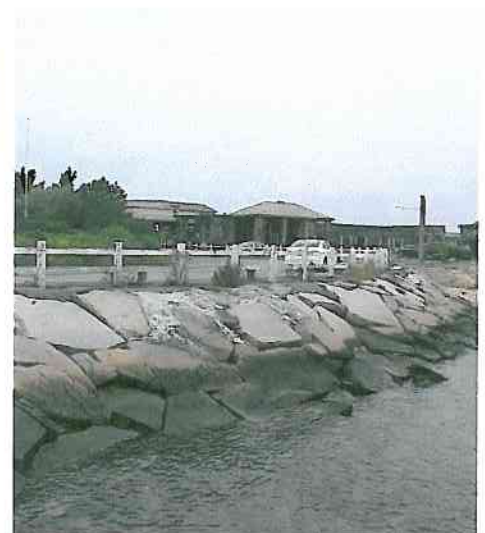
Massachusetts Coastal Infrastructure and Assessment



058-051-000-002-100-PHO1A



058-051-000-002-200-PHO2A



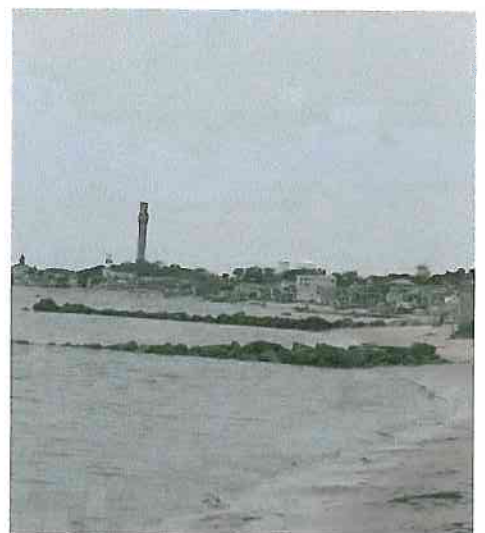
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058-051-000-002-300-PHO3A



058-051-000-002-300-PHO3B



058-062-000-013-100-PHO1A



058-062-000-013-200-PHO2A



058-062-000-013-300-PHO3A



058-062-000-013-300-PHO3B

Massachusetts Coastal Infrastructure and Assessment



058-062-000-020-100-PHO1A



058-062-000-020-100-PHO1B



058-062-000-020-200-PHO2A



058-062-000-020-200-PHO2B



058-062-000-020-200-PHO2C



058-113-000-019-100-PHO1A



058-113-000-019-200-PHO2A



058-113-000-019-200-PHO2B



058-182-000-009-100-PHO1A



058-182-000-009-100-PHO1B

Section II - Provincetown

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: PROVINCETOWN
SOURCE: Town of Provincetown
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Provincetown

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

TOWN: PROVINCETOWN

SOURCE: MA-DCR

LOCATION: MA-DCR BOSTON and HINGHAM, MA

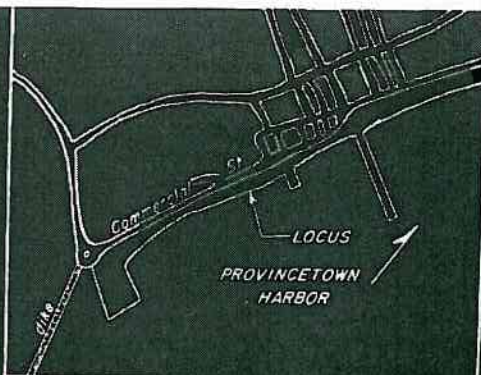
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
058-062-000-013-100	058-062-000-013-100-DCR1A	406	MA-DCR	Provincetown	May 1934	Proposed Stone Jetties - Bathing Beach - Province Lands - Provincetown - Prepared for the DPW of Massachusetts - Division of Waterways	1	Bathing Beach	Stone Jetties
058-062-000-013-100	058-062-000-013-100-DCR1B	543	MA-DCR	Provincetown	August 1938	Proposed Shore Protection - Provincetown - Prepared for the DPW of Massachusetts - Division of Waterways	1	Saint Mary of the Harbor Episcopal Church Area	Groins

TOWN: PROVINCETOWN
 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
058-062-000-020-200	058-062-000-020-200-LIC2A	108	DEP	Provincetown	April 23, 1976	Plan Accompanying Petition of the Town of Provincetown to Maintain as Built a Reinforced Concrete Boat Ramp with Reinforced Concrete Retaining Walls in Provincetown Harbor at Provincetown, County of Barnstable, Massachusetts	1	Provincetown Harbor	Retaining Walls Around Boat Ramp
058-113-000-019-100	058-113-000-019-100-LIC1A	4055	DEP	Provincetown	February 1958	Plan Accompanying Petition of Town of Provincetown to Drive Sheet Steel Bulkhead and Fill in Provincetown Harbor at Provincetown	1	Town Pier	Fill with Bulkhead
058-113-000-019-100	058-113-000-019-100-LIC1B	4460	DEP	Provincetown	July 1961	Plan Accompanying Petitions of Town of Provincetown and Monument Fish Co. Inc. to Maintain Sheet Steel Bulkhead and Fill in Provincetown Harbor	1	Town Pier	Fill with Bulkhead
058-113-000-019-100	058-113-000-019-100-LIC1C	8821	DEP	Provincetown	March 21, 2000	Plan Accompanying Petition of Town of Provincetown to License, Reconstruct and Maintain Macmillan Pier, Dredge and Perform Beach Nourishment in Provincetown Harbor, Town of Provincetown Harbor, Town of Provincetown	22	Provincetown Harbor	Beach Nourishment

058-062-000-020-200

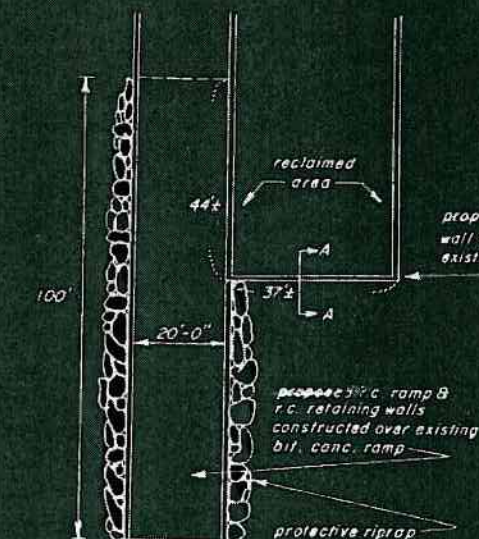
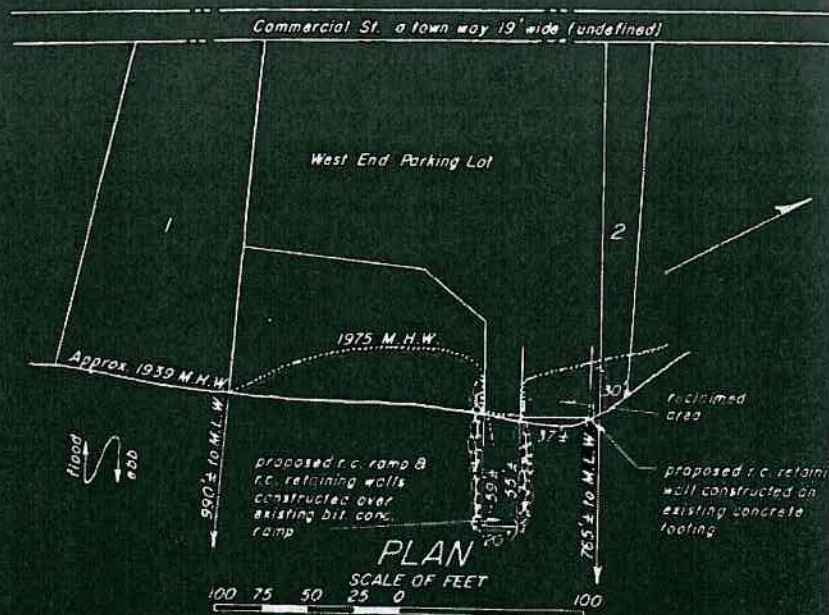


Scale: 1"=2000'

Ref. U.S.G.S. Quadrangle AMS 6966 II SW Series V814

1) EDWARD DAHILL ET UX
51 COMMERCIAL ST.
PROVINCETOWN, MASS.

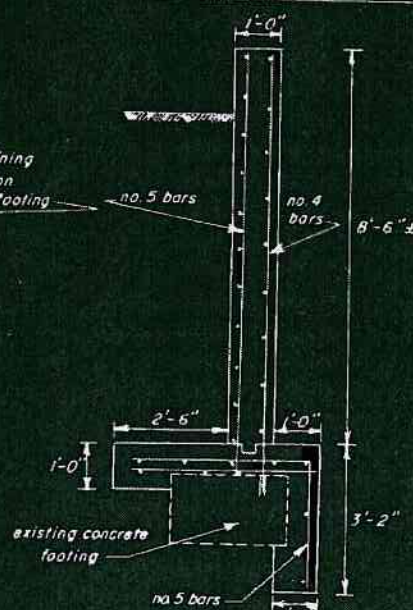
2) RAPHAEL A. MERRILL ET UX
59 COMMERCIAL ST.
PROVINCETOWN, MASS.



PLAN

SCALE OF FEET

20 10 0 20 40 60



SECTION A-A

SCALE OF FEET

2 1 0 1 2 3 4 5



William M. Rogers II

PLAN ACCOMPANYING PETITION OF THE
TOWN OF PROVINCETOWN

to maintain as built a

REINFORCED CONCRETE BOAT RAMP
WITH REINFORCED CONCRETE
RETAINING WALLS

IN PROVINCETOWN HARBOR
AT PROVINCETOWN

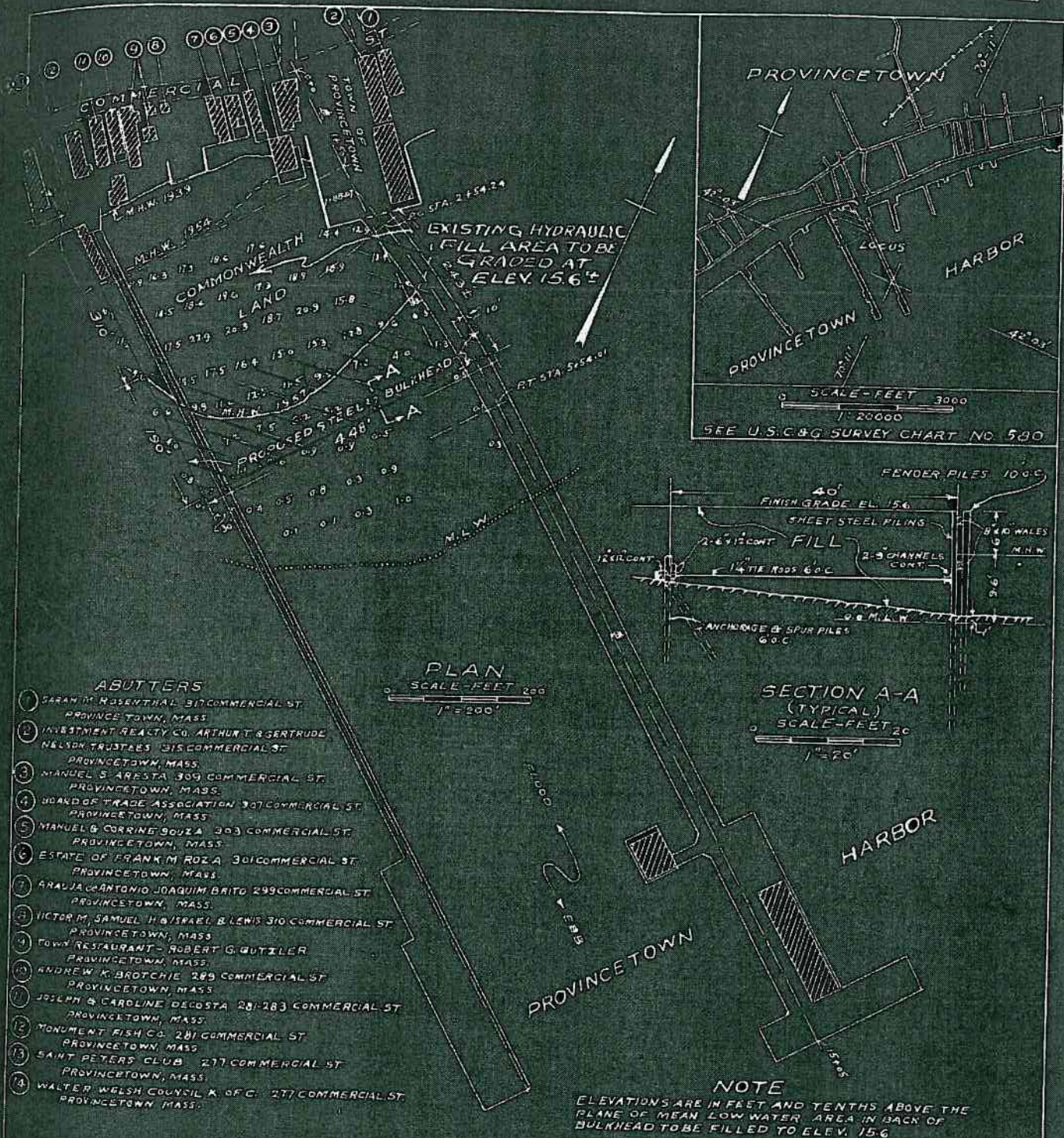
COUNTY OF BARNSTABLE, MASSACHUSETTS
JUNE, 1975

LICENSE PLAN NO. 108
APPROVED BY DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
OF MASSACHUSETTS
APRIL 23, 1976

David Standley

058-113-000-019-100

DEPARTMENT OF PUBLIC WORKS



PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN
TO DRIVE SHEET STEEL BULKHEAD & FILL
IN
PROVINCETOWN HARBOR
AT
PROVINCETOWN
DECEMBER 1957

LICENSE PLAN NO 4055
APPROVED BY DEPARTMENT OF PUBLIC WORKS
FEBRUARY 24, 1958

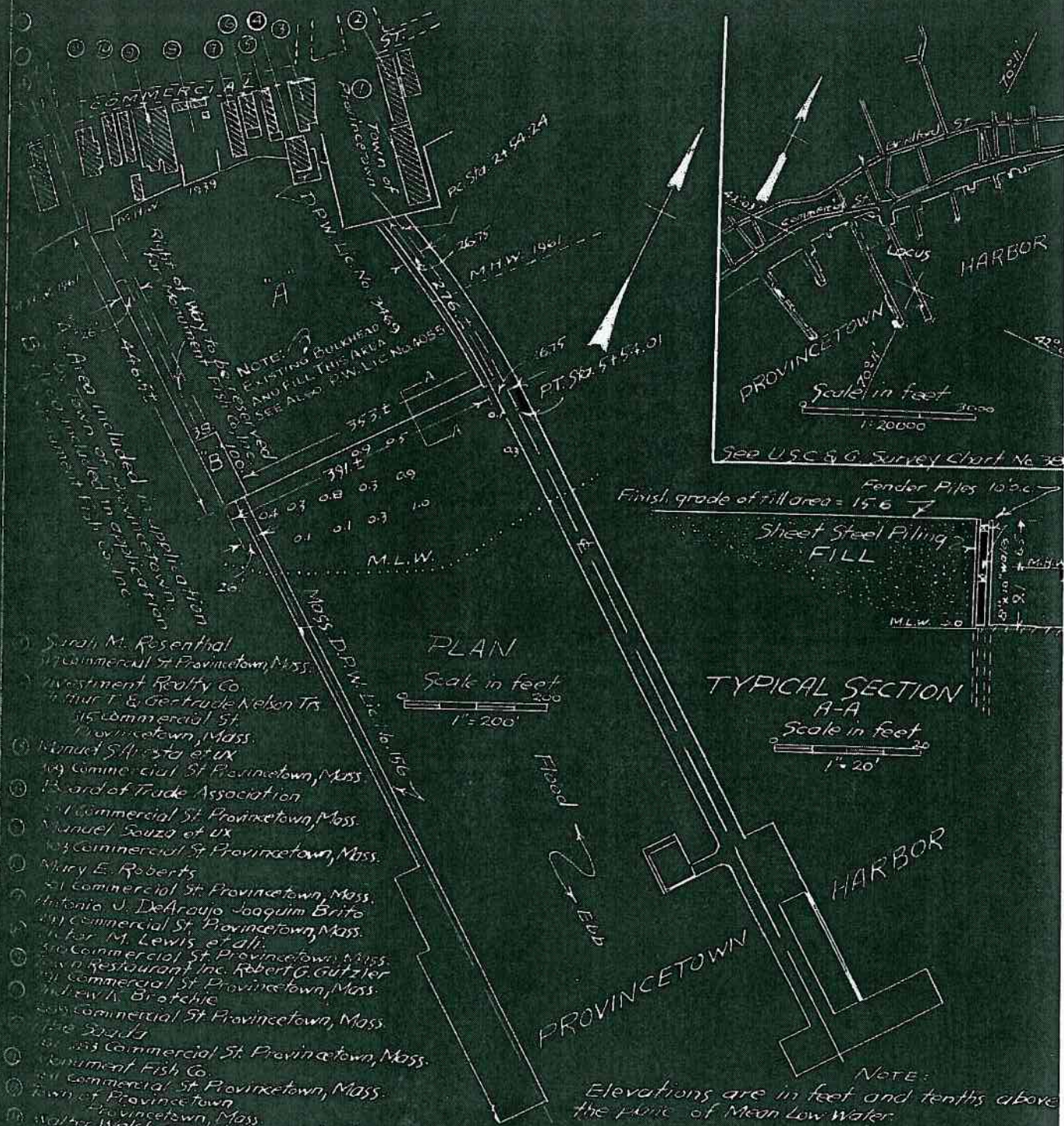
Fred B. Dole

ACTING
COMMISSIONER OF
PUBLIC WORKS

James J. [Signature]
W. [Signature]

ASSOCIATE
COMMISSIONERS
DIRECTOR DIVISION
OF WATERWAYS

058-113-000-019-100



- 1 Sarah M. Rosenthal
17 Commercial St Provincetown, Mass.
- 2 Investment Realty Co
100 Commercial St Provincetown, Mass.
- 3 Arthur T. & Gertrude Nelson Trs
105 Commercial St Provincetown, Mass.
- 4 Manuel S. Silva et al
109 Commercial St Provincetown, Mass.
- 5 Board of Trade Association
111 Commercial St Provincetown, Mass.
- 6 Manuel Souza et al
103 Commercial St Provincetown, Mass.
- 7 Mary E. Roberts
101 Commercial St Provincetown, Mass.
- 8 Antonio J. DeArcojo Joaquim Brito
107 Commercial St Provincetown, Mass.
- 9 Walter M. Lewis et al
100 Commercial St Provincetown, Mass.
- 10 Town Restaurant Inc. Robert G. Gutzler
101 Commercial St Provincetown, Mass.
- 11 Andrew K. Bratchie
105 Commercial St Provincetown, Mass.
- 12 The Souza
103 Commercial St Provincetown, Mass.
- 13 Monument Fish Co.
101 Commercial St Provincetown, Mass.
- 14 Town of Provincetown
Provincetown, Mass.
- 15 Walter Welsh Council No. 2476 K of C
101 Commercial St Provincetown, Mass.
- 16 Saint Peter's Club
101 Commercial St Provincetown, Mass.

ACCOMPANYING PETITIONS OF
TOWN OF PROVINCETOWN
&
MONUMENT FISH CO. INC.
To Maintain Sheet Steel Bulkhead & Fill
IN
PROVINCETOWN HARBOR

LICENSE PLAN NO. 4460
APPROVED BY DEPARTMENT OF PUBLIC WORKS
JULY 10, 1961

Frederic B. Dale
George C. [Signature]
COMMISSIONER OF PUBLIC WORKS
ASSOCIATE COMMISSIONER

PROVINCETOWN

42°-03'

LOCUST POINT

70°-11'

PROVINCETOWN HARBOR

VICINITY MAP

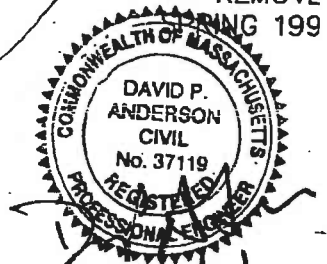
SCALE 1" = 3 MILES

1. CONTOURS AND ELEVATIONS ARE REFERENCED TO MEAN LOW WATER EL 0.0
2. SEE SHEET 16 FOR BEACH NOURISHMENT SITE.

PROVINCETOWN
HARBOR

EXISTING PIE
DEP LIC
NO. 1383

PORTIO
OF EXIS
WHAF
REMOVE
RING 199



MARCH 21, 2000
~~AUGUST 27, 1999~~

(REVISED)

3 | 21 | 00
SHEET 1 OF 2

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON MASS

LICENSE PLAN NO. 8621

Approved by Department of Environmental Protection
of Massachusetts

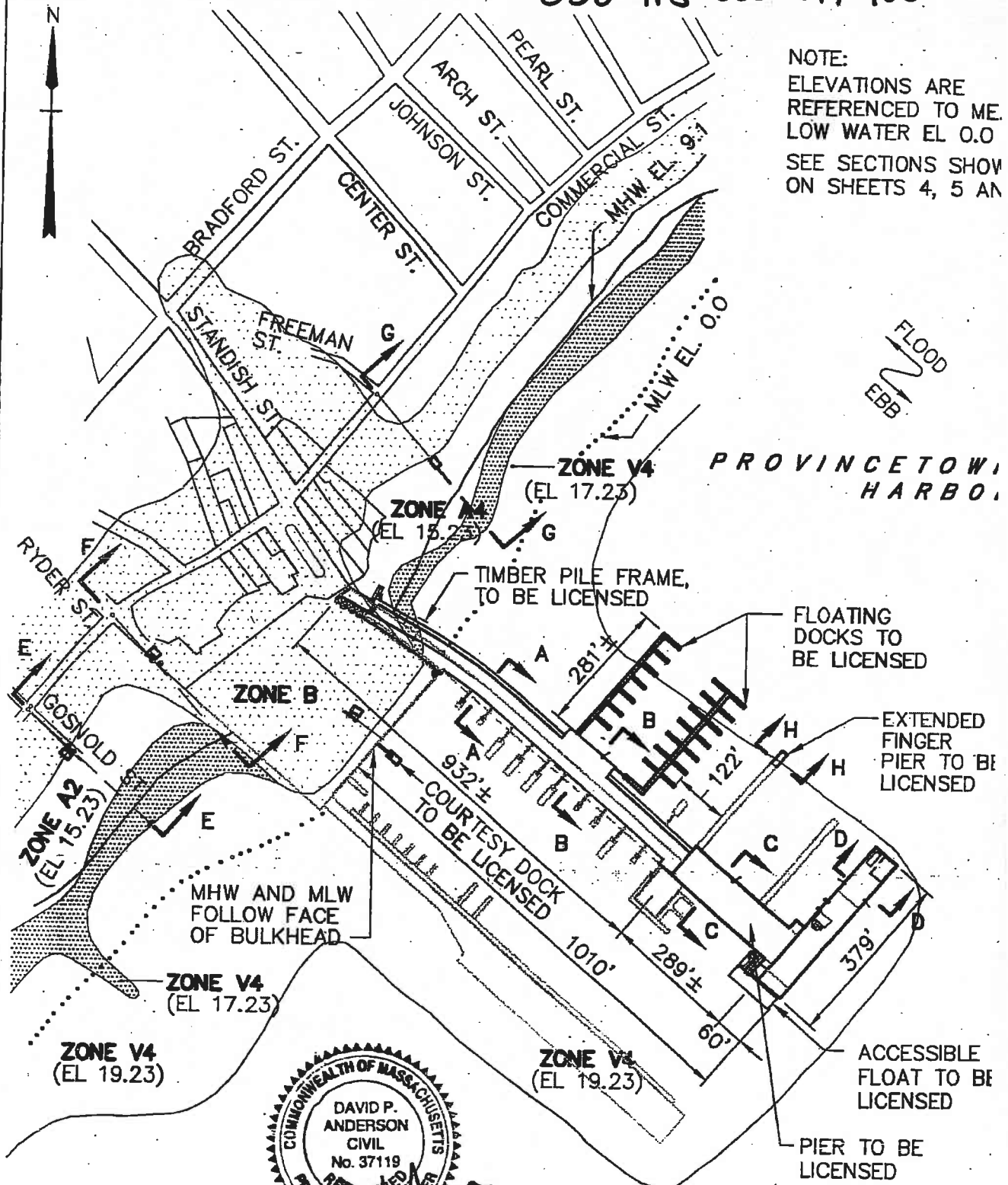
Irene J. Davies
Stroud, W. Va.

QNT 7 R 0000

058-113-000-019-100



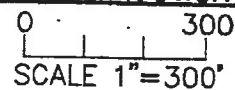
NOTE:
ELEVATIONS ARE
REFERENCED TO ME.
LOW WATER EL. 0.0
SEE SECTIONS SHOW
ON SHEETS 4, 5 AND



LICENSE PLAN NO. 8621

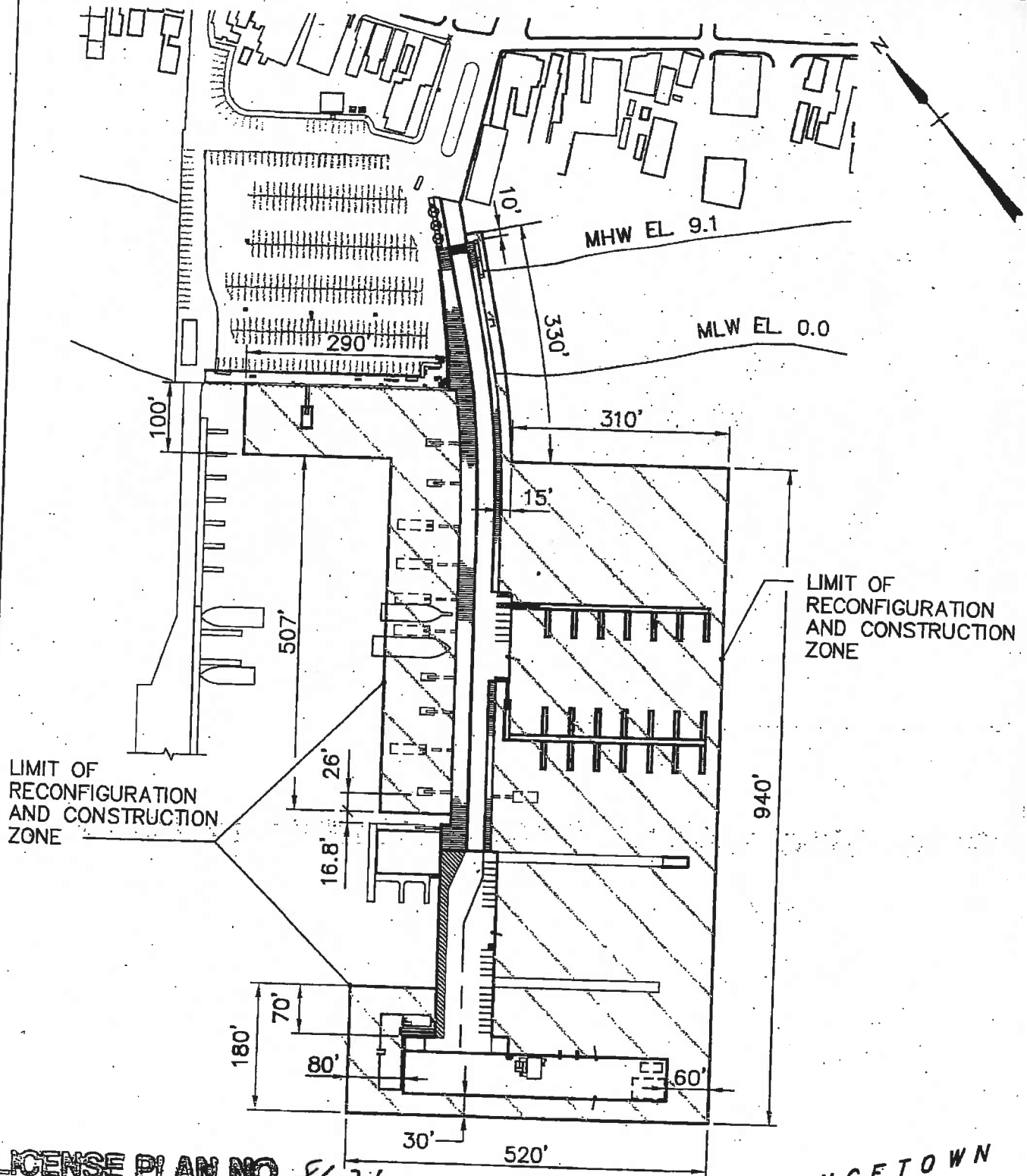
Approved by Department of Environmental Protection
Date **OCT 16 2000**

PIER RECONSTRUCTION PLAN



PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.

MARCH 21, 2000 (REVISED)
AUGUST 27, 2000 SHEET 2 OF 2



LICENSE PLAN NO. 8621

Approved by Department of Environmental Protection
Date OCT 16 2000

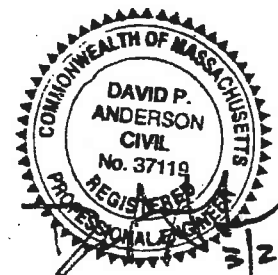
**PLAN OF RECONFIGURATION
AND CONSTRUCTION ZONE**

0 200

SCALE: 1"=200'

**PROVINCETOWN
HARBOR**

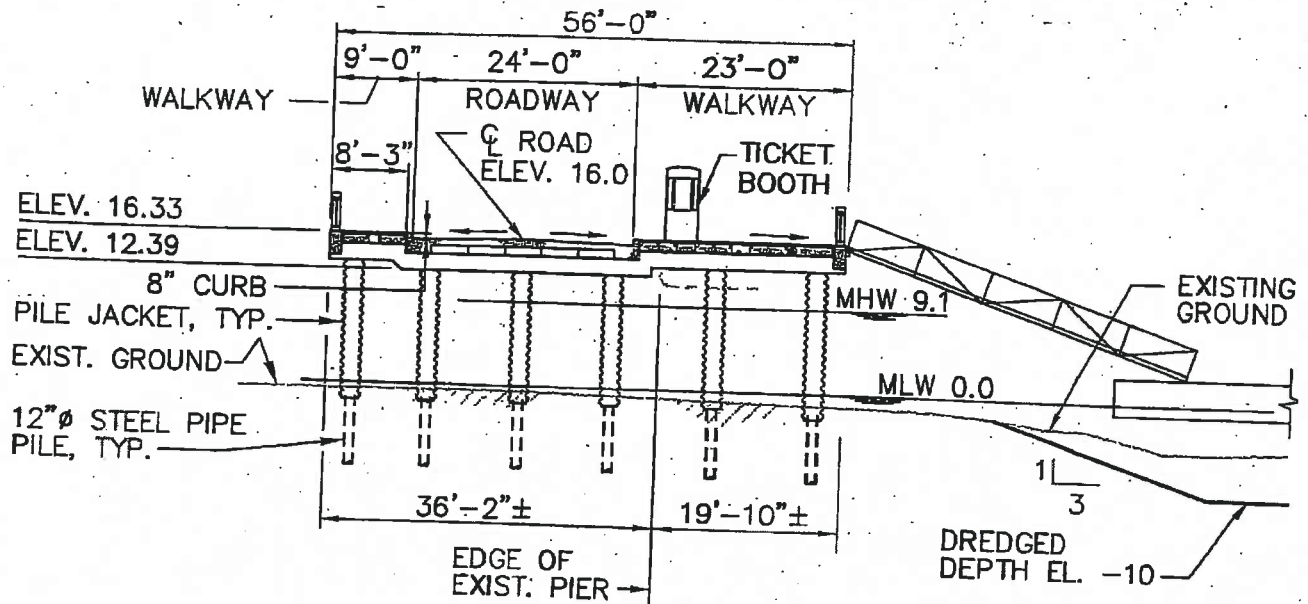
PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DRÉDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
DUBLINGTON, MASS.



MARCH 21, 2000

(REVISED)

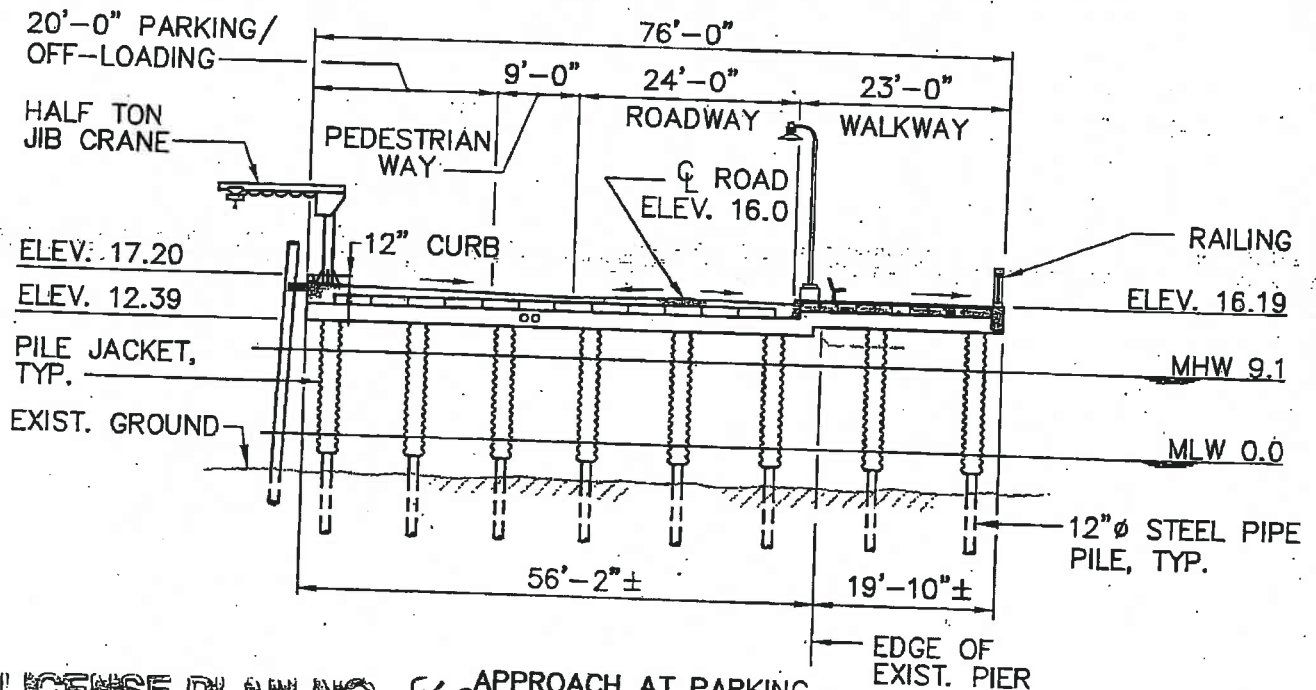
3/21/00



APPROACH
SECTION A-A

0 20'

SCALE: 1"=20'



LICENSE PLAN NO. 8621 APPROACH AT PARKING
SECTION B-B

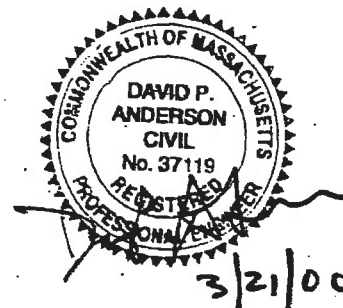
Approved by Department of Environmental Protection

Date OCT 16 2000

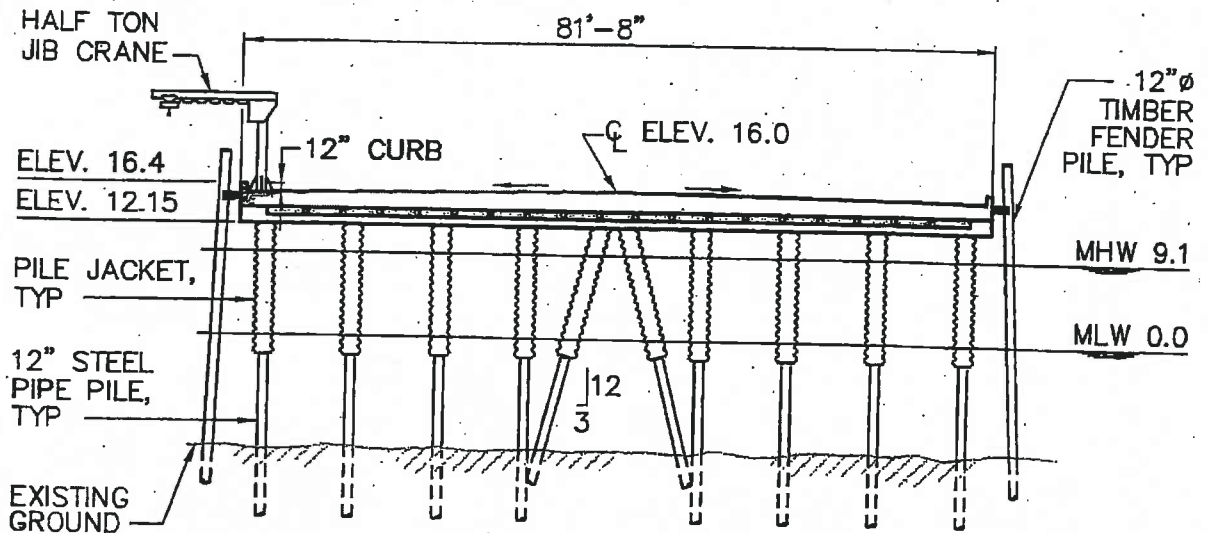
0 20'

SCALE: 1"=20'

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON MASS

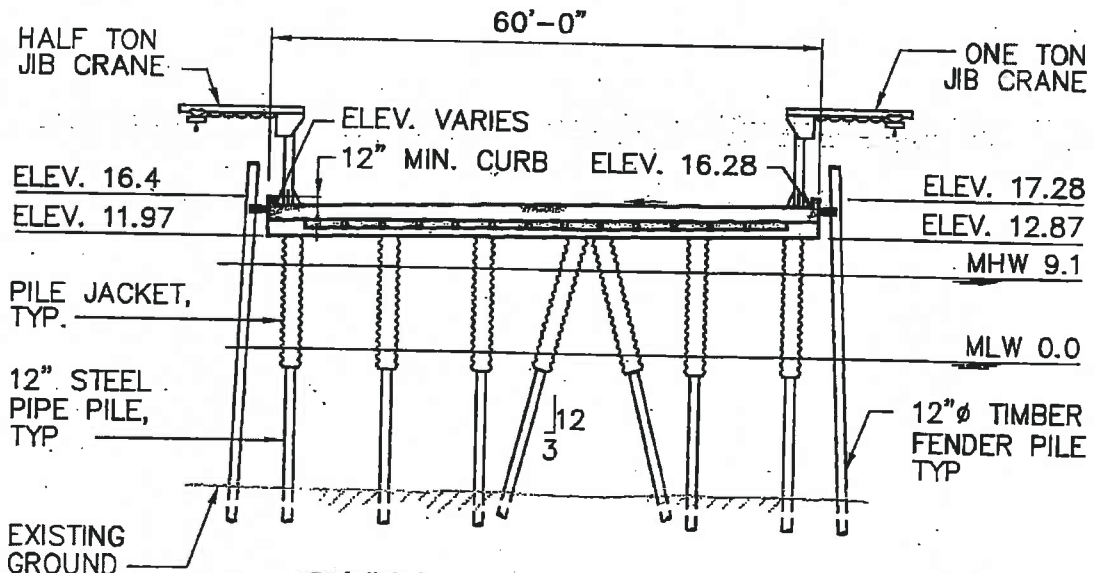


MARCH 21, 2000 (REVISED)

**MAIN PIER PILES**

146 STEEL PIPE PILES TOTAL
66 TIMBER PILES TOTAL

MAIN PIER
SECTION C-C
0 20'
SCALE: 1"=20'



LICENSE PLAN NO. 8621

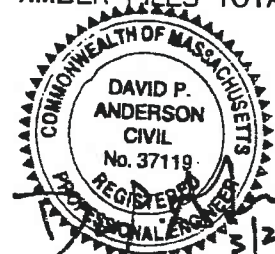
Approved by Department of Environmental Protection
Date OCT 16 2000

TEE SECTION
SECTION D-D
0 20'
SCALE: 1"=20'

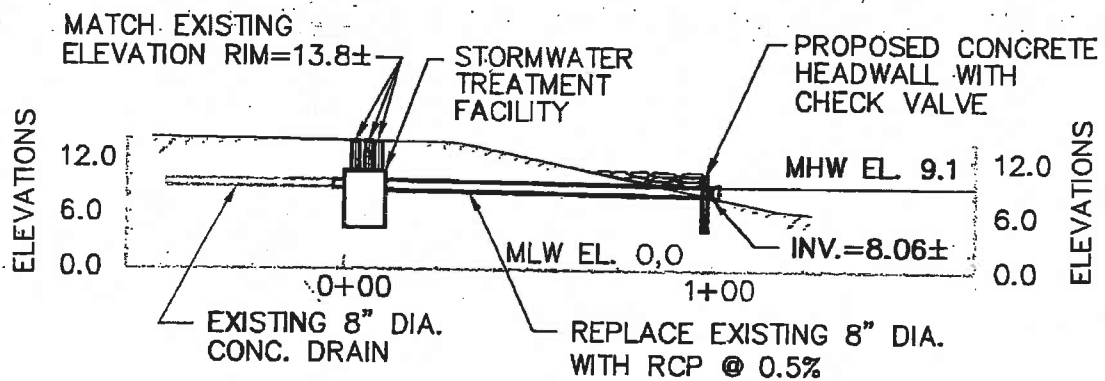
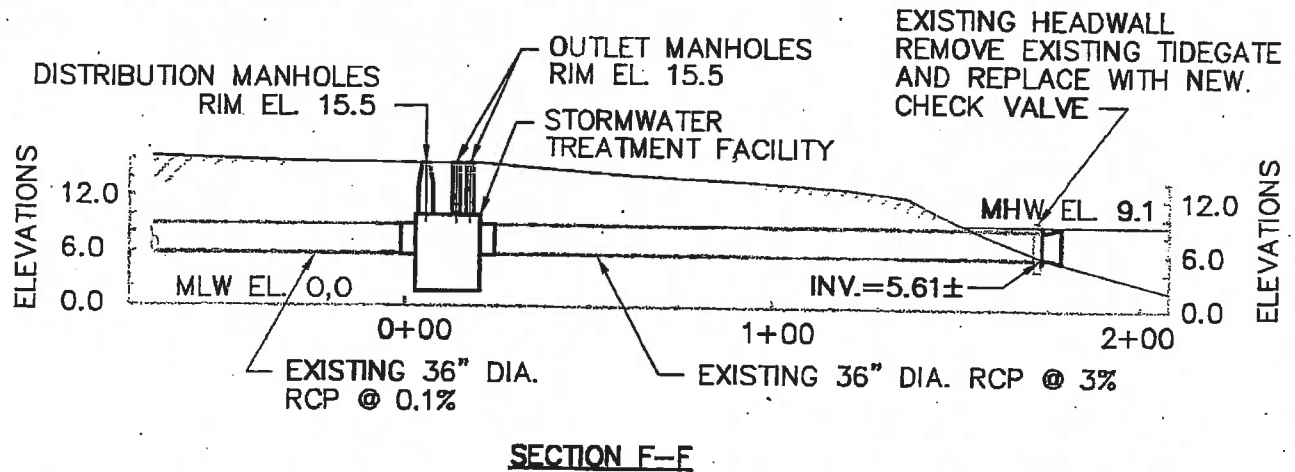
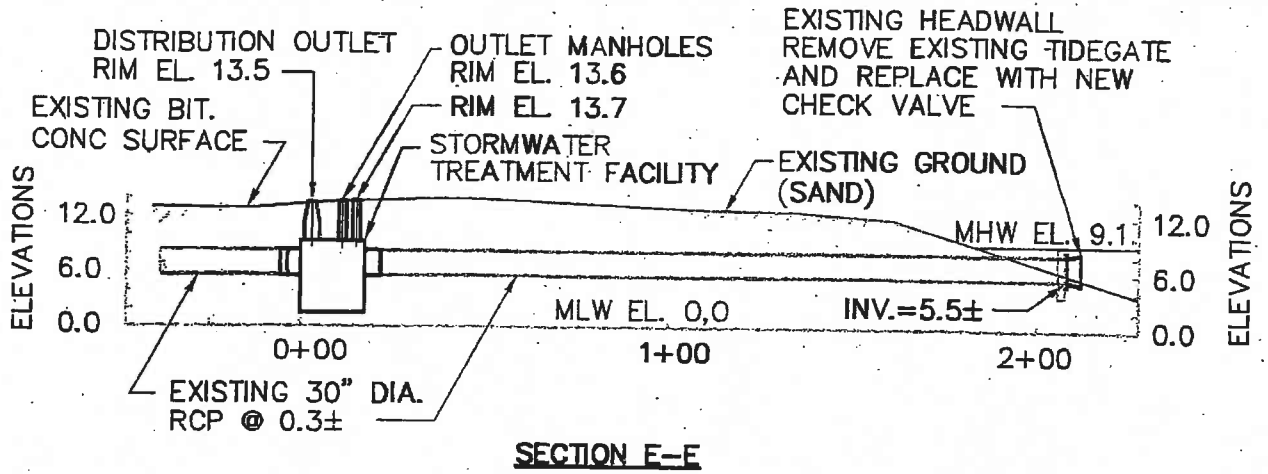
TEE SECTION PILES

128 STEEL PIPE PILES TOTAL
120 TIMBER PILES TOTAL

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS

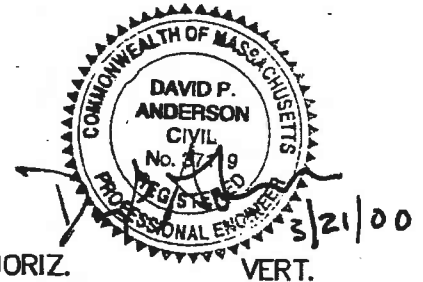


MARCH 21, 2000 (REVISED)





LICENSE PLAN NO. 8621
 Approved by Department of Environmental Protection
 Date **OCT 16 2000**

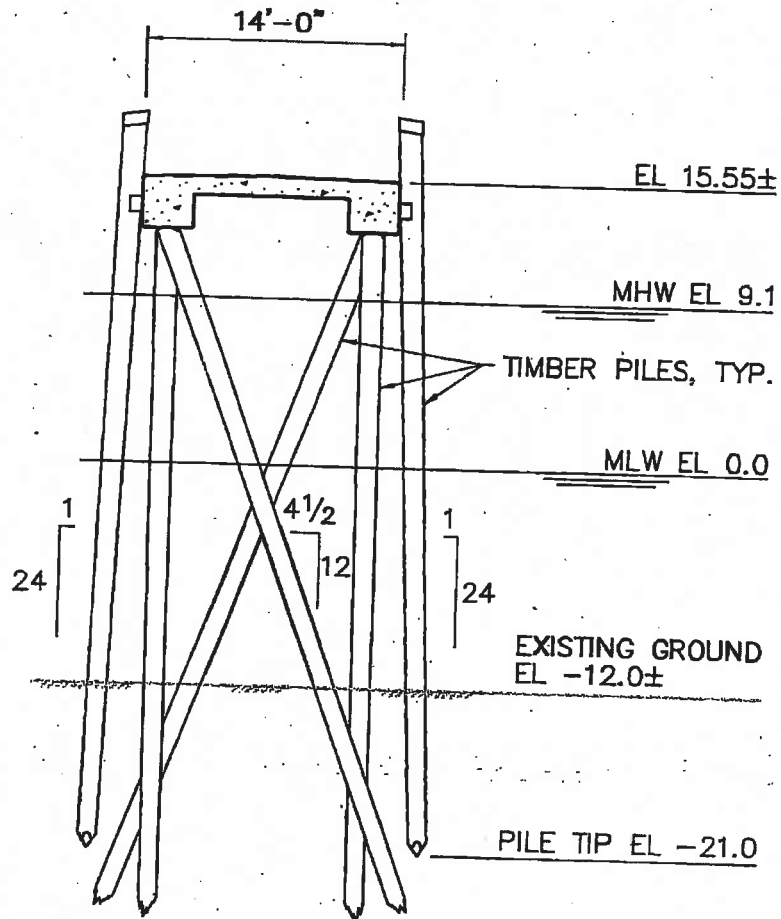
SECTION G-G



PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS

HORIZ.  VERT. 
 SCALES: SCALE: 1"=50' SCALE: 1"=20'

DATUM: MEAN LOW WATER EL. 0.0
MARCH 21, 2000 (REVISED)



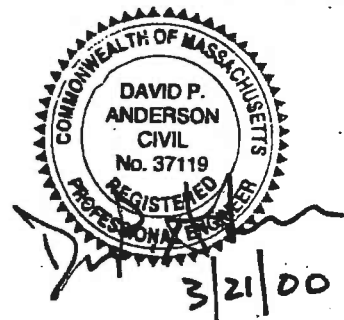
SECTION H-H
FINGER PIER EXTENSION
 0 10'
 SCALE: 1"=10'

LICENSE PLAN NO. 8621

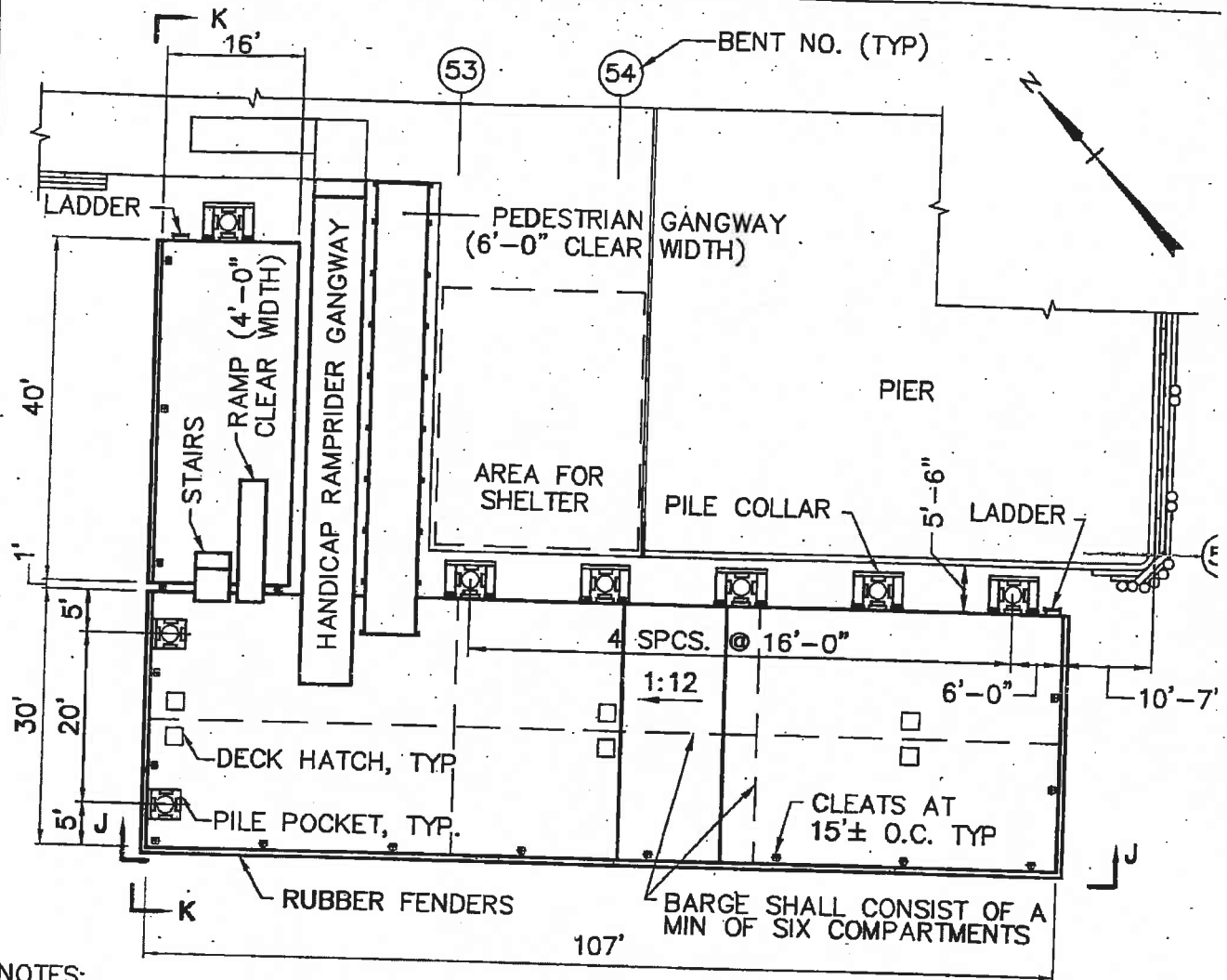
Approved by Department of Environmental Protection

Date **OCT 16 2000**

PLAN ACCOMPANYING PETITION OF
 TOWN OF PROVINCETOWN TO LICENSE,
 RECONSTRUCT AND MAINTAIN
 MACMILLAN PIER, DREDGE AND PERFORM
 BEACH NOURISHMENT IN PROVINCETOWN
 HARBOR, TOWN OF PROVINCETOWN
 FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS



MARCH 21, 2000 (REVISED)

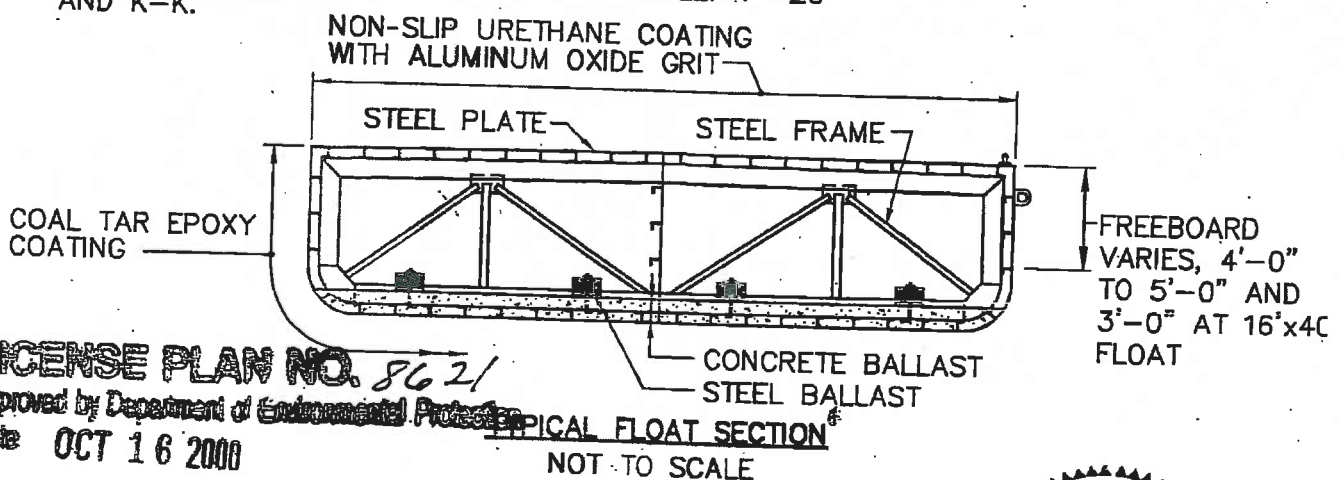


NOTES:

1. 8 STEEL PIPE PILES TOTAL
2. SEE SHEET 9 FOR ELEVATIONS J-J AND K-K.

PLAN - ACCESSIBLE FLOAT

0 20'
SCALE: 1"=20'

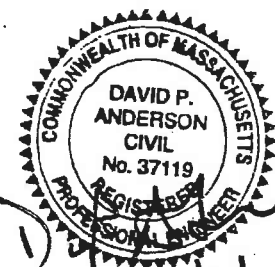


LICENSE PLAN NO. 8621

Approved by Department of Environmental Protection

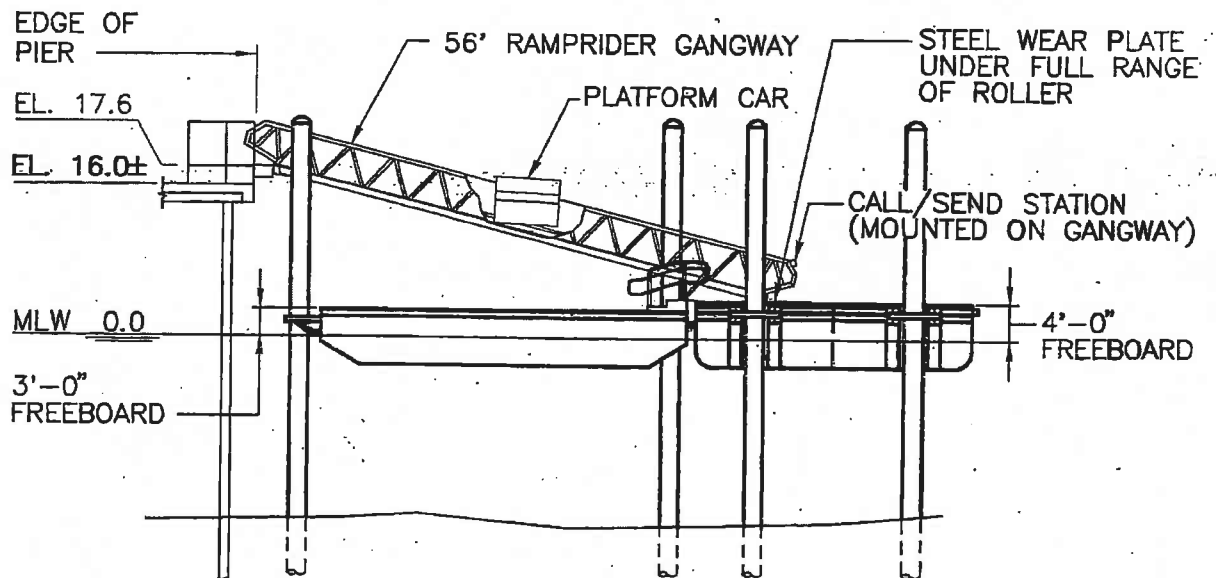
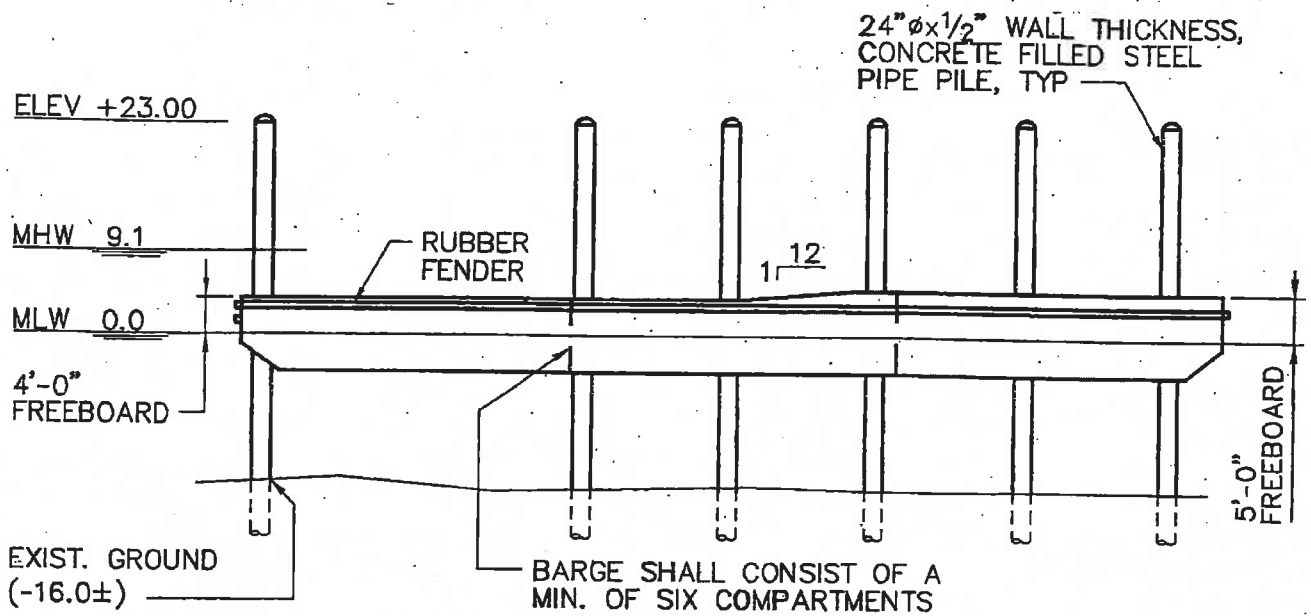
Date OCT 16 2000

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.



MARCH 21, 2000

(REVISED)



LICENSE PLAN NO. 8621

Approved by Department of Environmental Protection
Date OCT 16 2000

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
DUNSTON, MASS.

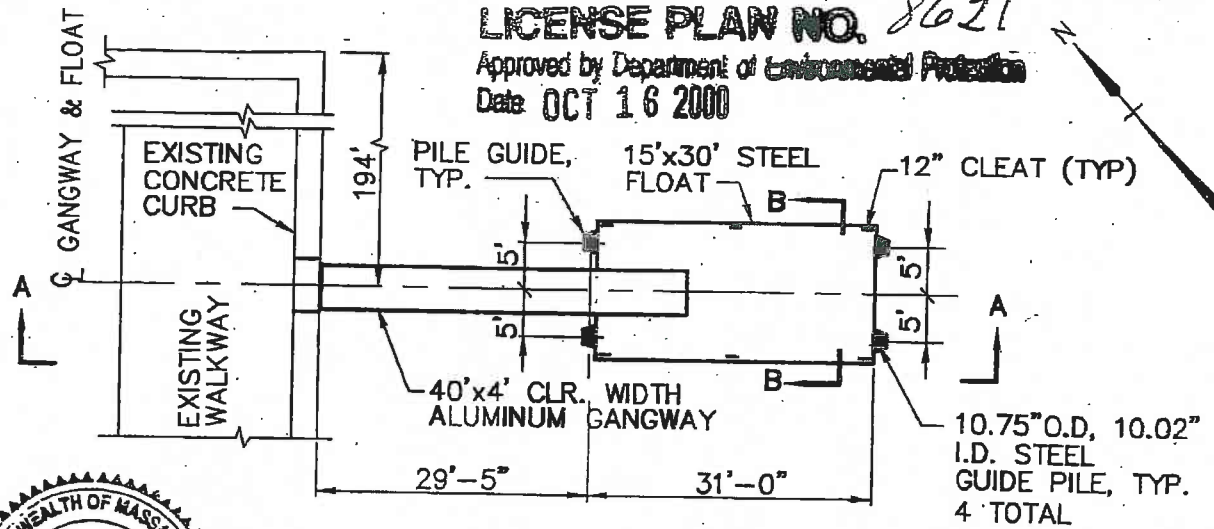


MARCH 21, 2000 (REVISED)

LICENSE PLAN NO. 8621

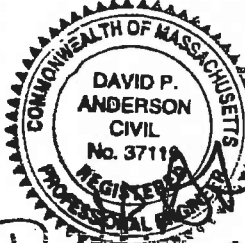
Approved by Department of Environmental Protection

Date OCT 16 2000

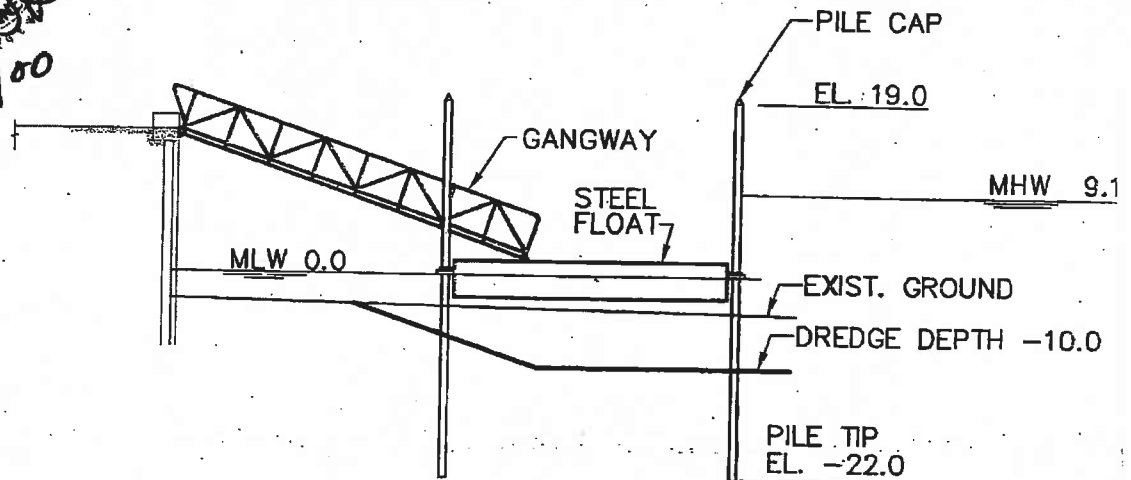


PLAN - COURTESY DOCK

0 20'
SCALE: 1"=20'



8/25/00

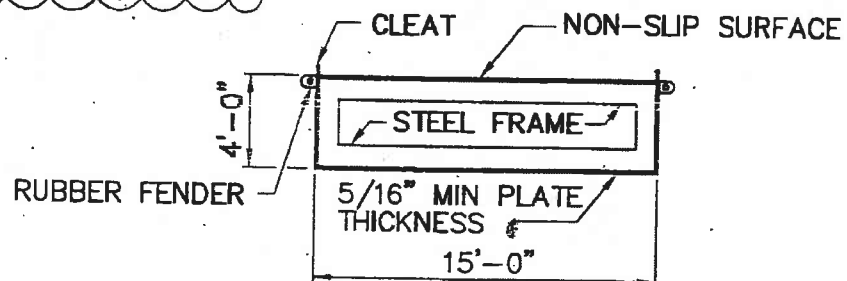


ELEVATION A-A

0 20'
SCALE: 1"=20'

NOTE:

THE COURTESY FLOAT AND GANGWAY SHOWN WILL BE REVISED TO AN ACCESSIBLE FLOAT WITH A NON-MECHANICAL RAMP/GANGWAY SYSTEM.



COURTESY DOCK SECTION B-B

0 8
SCALE: 1/8"=1'-0"

PLAN ACCOMPANYING PETITION OF TOWN OF PROVINCETOWN TO LICENSE, RECONSTRUCT AND MAINTAIN MACMILLAN PIER, DREDGE AND PERFORM BEACH NOURISHMENT IN PROVINCETOWN HARBOR, TOWN OF PROVINCETOWN FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS BURLINGTON, MASS

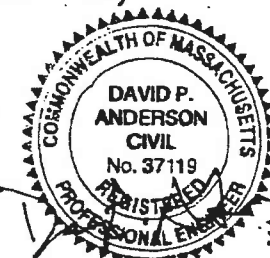
AUGUST 25, 2000 (REVISED)
MARCH 21, 2000 (REVISED)
AUGUST 27, 2000 (REVISED)



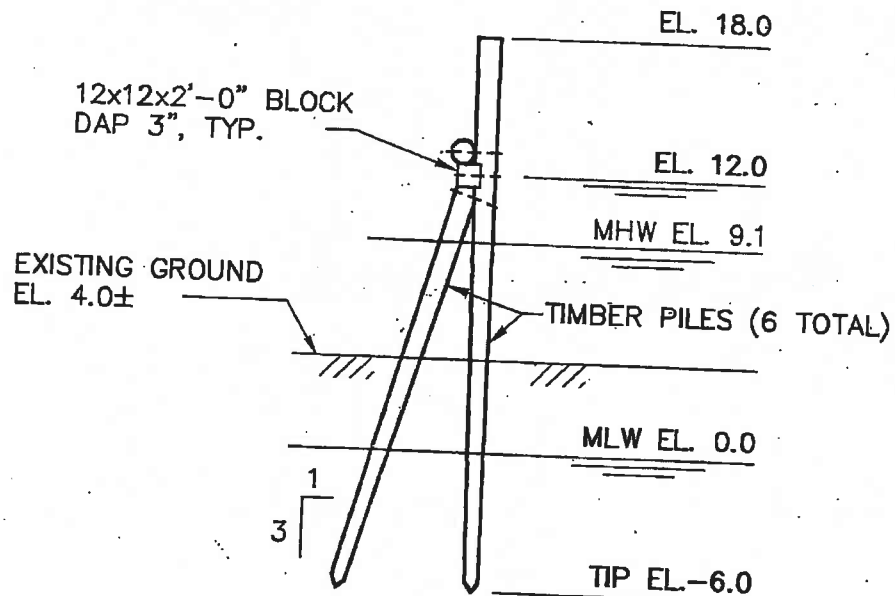
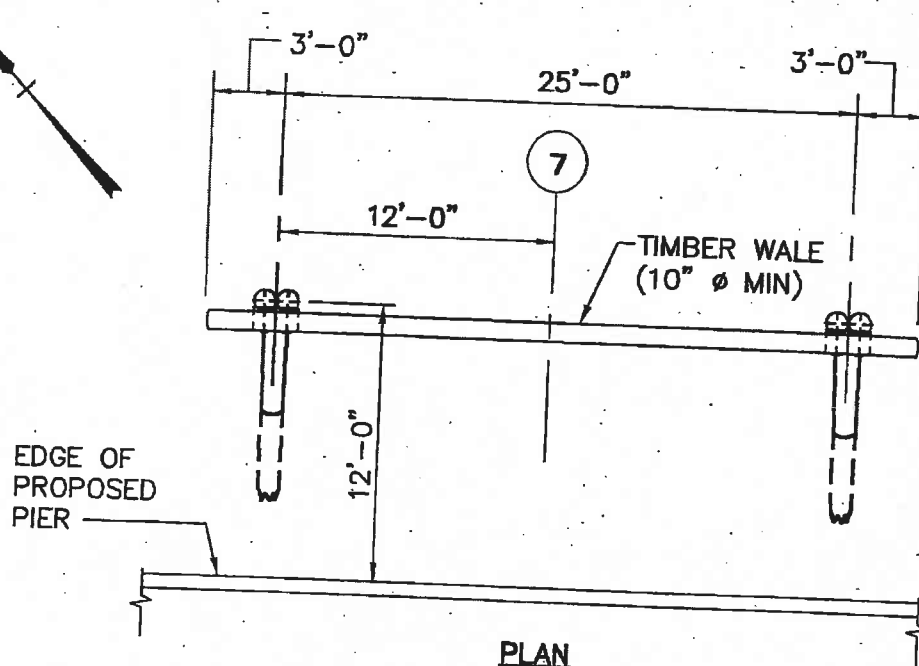
LICENSE PLAN NO. J621

LEGEND

- PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.



MARCH 21, 2000 (REVISED)



LICENSE PLAN NO. 8621

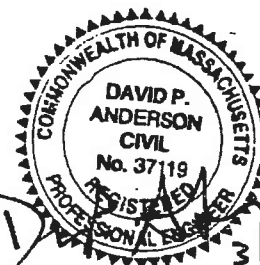
Approved by Department of Environmental Protection

Date

OCT 16 2000

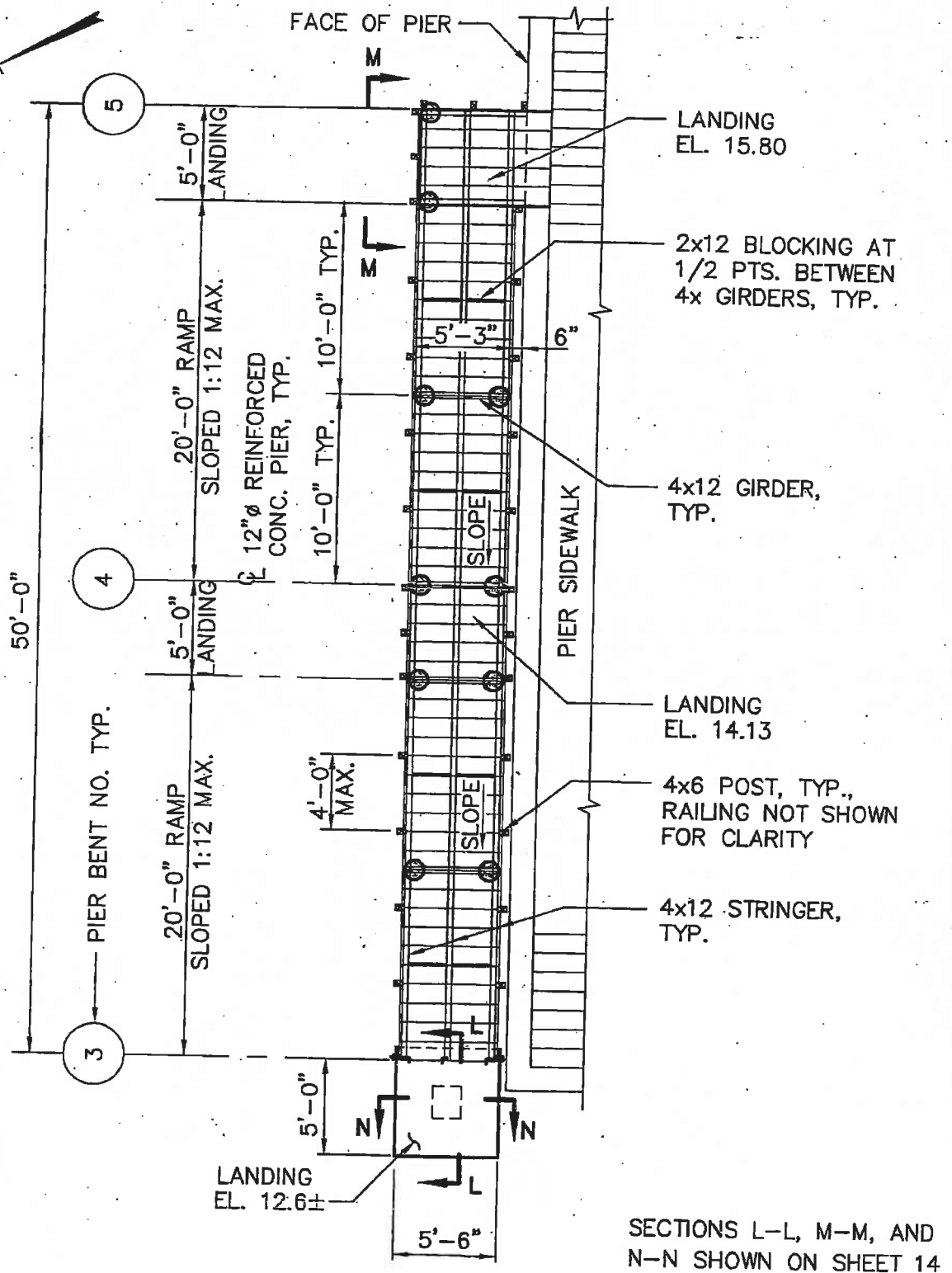
VESSEL GROUNDING FRAME

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS



MARCH 21 2000

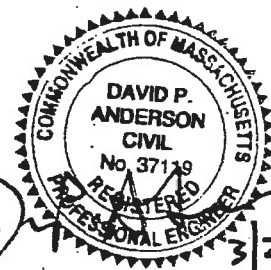
3/21/00



FRAMING PLAN - HANDICAP BEACH ACCESS RAMP

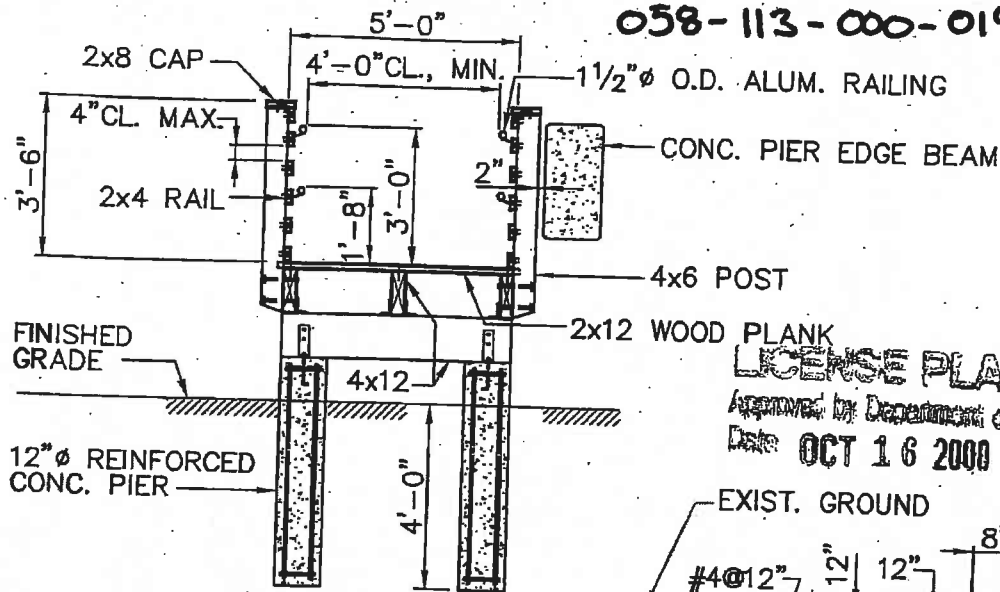
0 8
SCALE: $\frac{1}{8}" = 1' - 0"$

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.



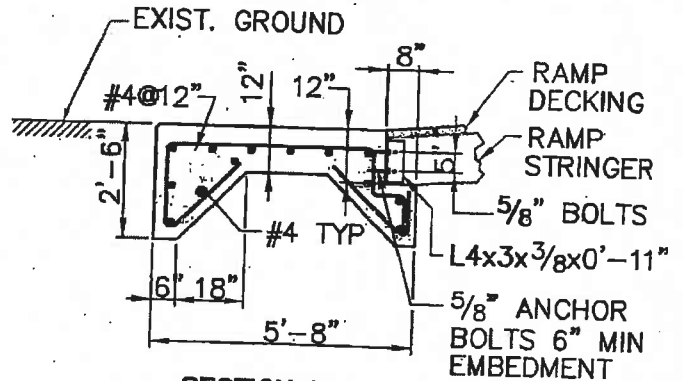
MARCH 21, 2000 (REVISED)

058-113-000-019-100

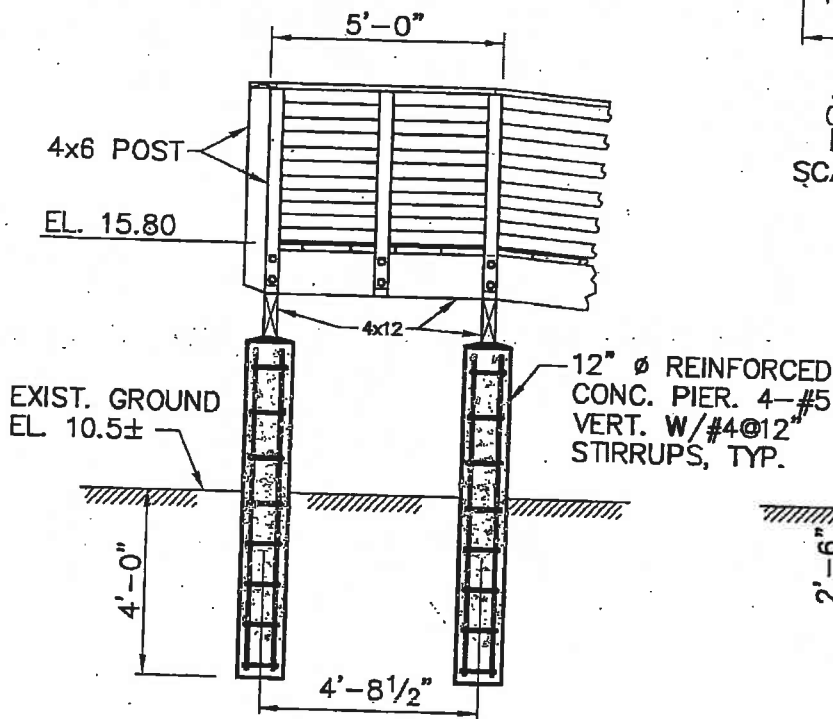


TYPICAL RAMP SECTION

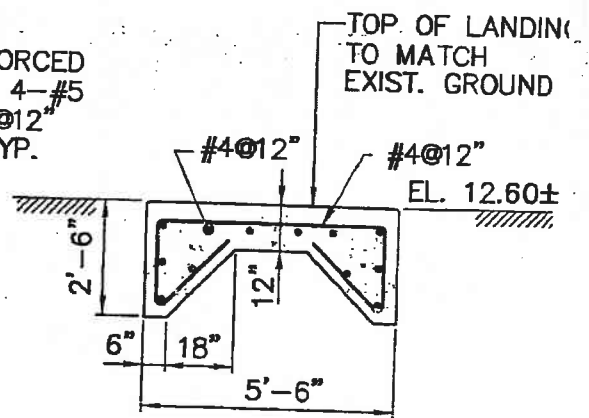
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SCALE: 1/4"=1'-0"



SECTION L-L
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SCALE: 1/4"=1'-0"

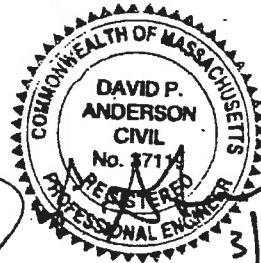


ELEVATION M-M
0 4
SCALE: 1/4"=1'-0"

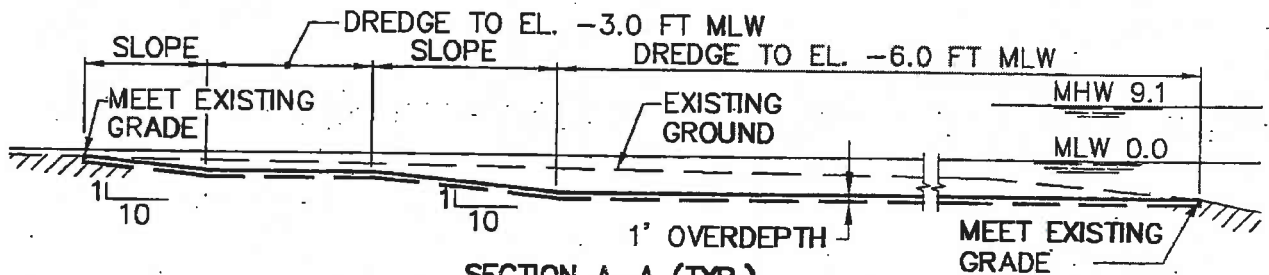
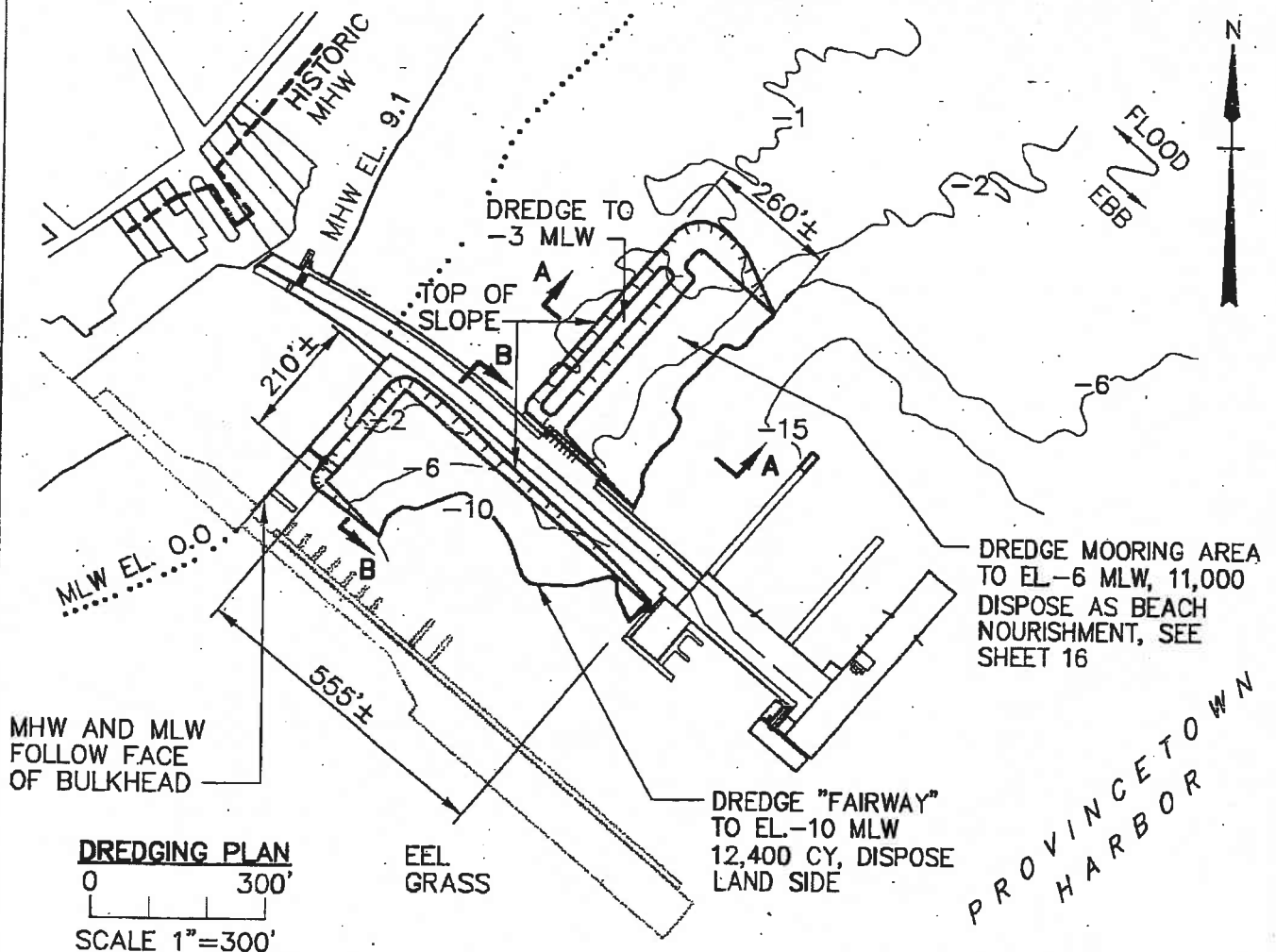


SECTION N-N
0 4
SCALE: 1/4"=1'-0"

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON. MASS



MARCH 21, 2000 (REVISED)



SECTION A-A (TYP.)

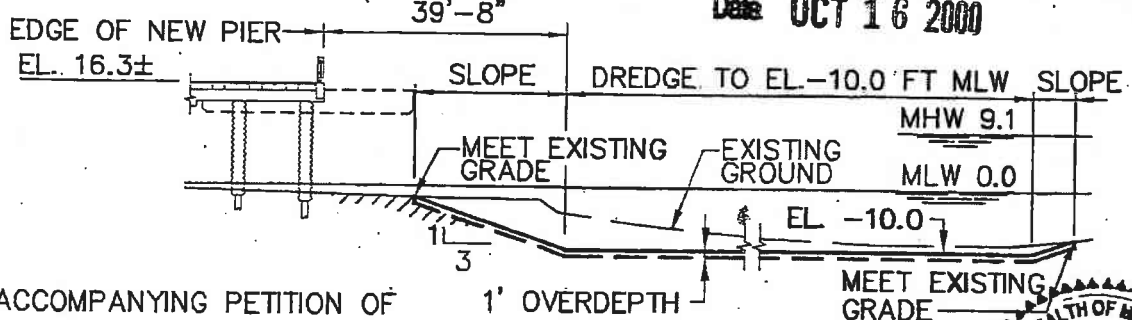
0 30'

SCALE: 1"=30'

LICENSE PLAN NO. 8627

Approved by Department of Environmental Protection

Date OCT 16 2000

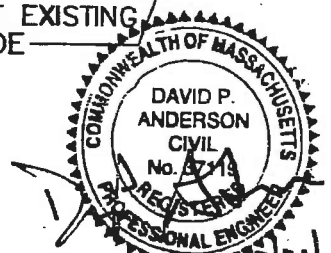


SECTION B-B (TYP.)

0 30'

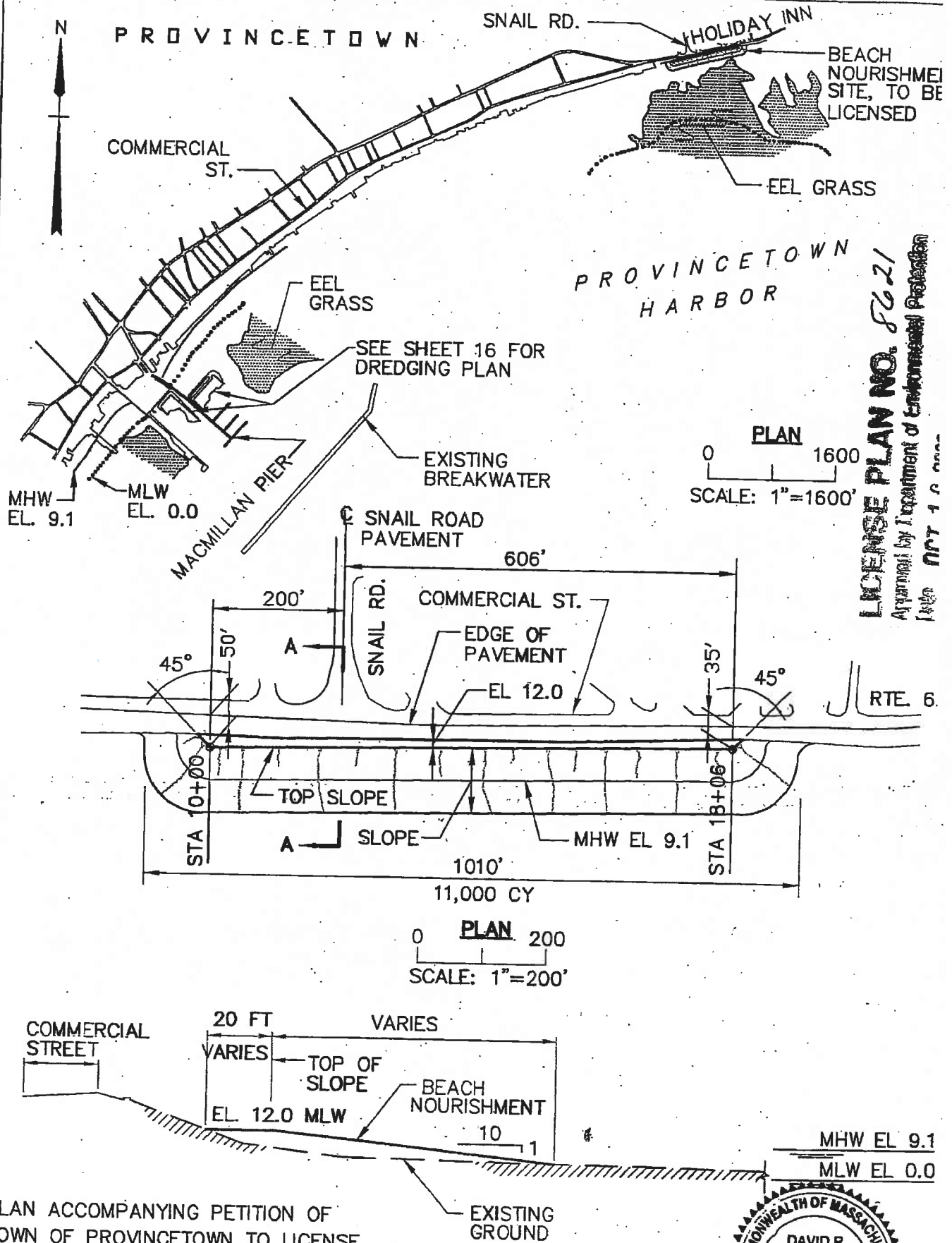
SCALE: 1"=30'

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.



MARCH 21, 2000
AUGUST 27, 1999

(REVISED) 3/21
SHEET 15 OF 2



LICENSE PLAN NO. 8621
 Approved by Department of Environmental Protection
 Date NOT 10 2000

PLAN ACCOMPANYING PETITION OF
 TOWN OF PROVINCETOWN TO LICENSE,
 RECONSTRUCT AND MAINTAIN
 MACMILLAN PIER, DREDGE AND PERFORM
 BEACH NOURISHMENT IN PROVINCETOWN
 HARBOR, TOWN OF PROVINCETOWN
 FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
 BURLINGTON, MASS.

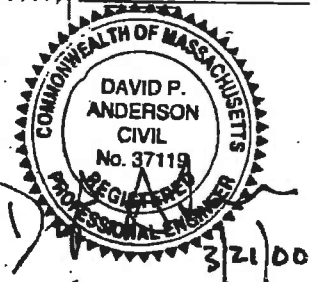
SECTION A-A

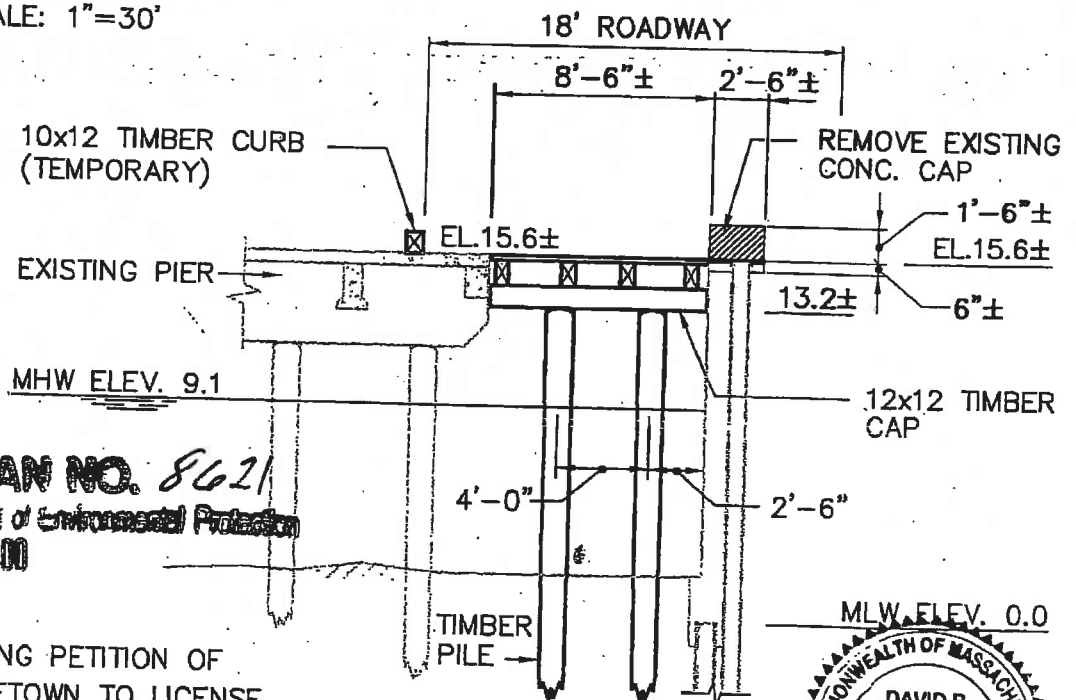
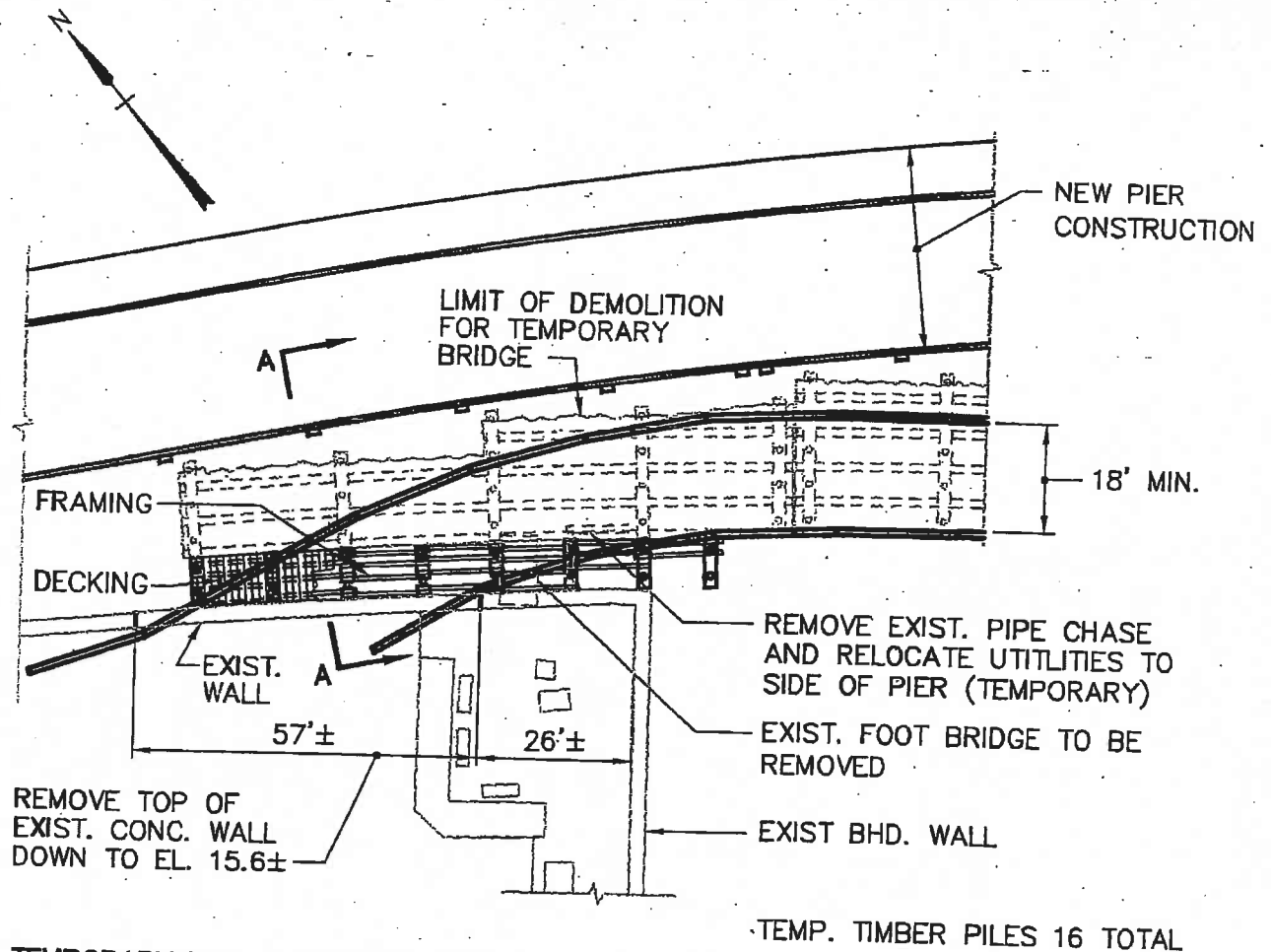
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SCALE: 1"=40'

MARCH 21, 2000

(REVISED)



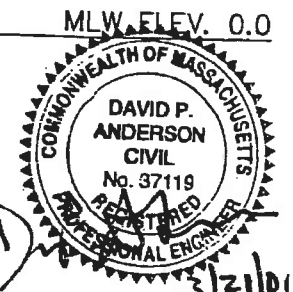


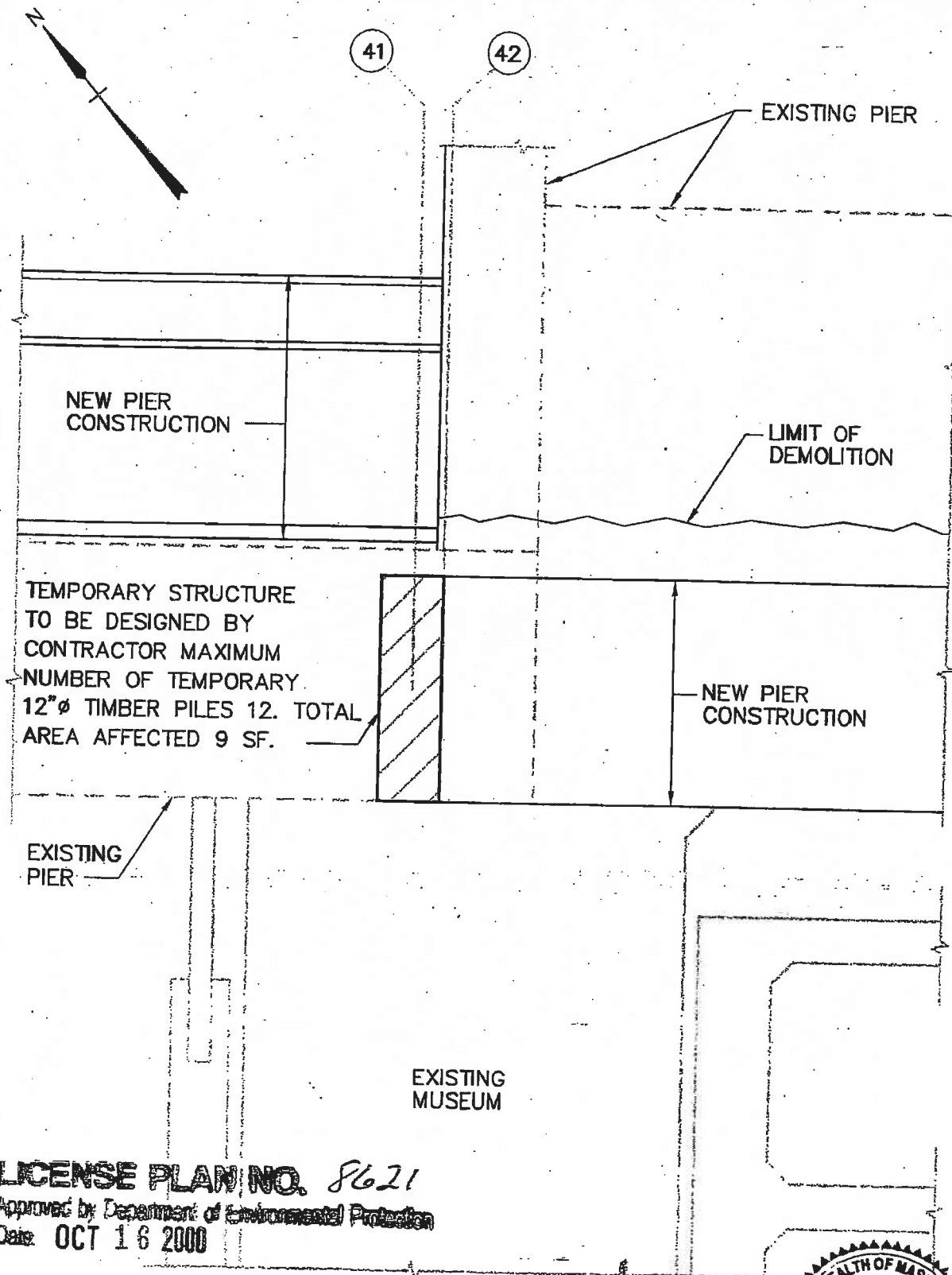
LICENSE PLAN NO. 8621
 Approved by Department of Environmental Protection
 OCT 16 2000

PLAN ACCOMPANYING PETITION OF
 TOWN OF PROVINCETOWN TO LICENSE,
 RECONSTRUCT AND MAINTAIN
 MACMILLAN PIER, DREDGE AND PERFORM
 BEACH NOURISHMENT IN PROVINCETOWN
 HARBOR, TOWN OF PROVINCETOWN
 FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
 BURLINGTON MASS

MARCH 21, 2000
 AUGUST 27, 2000

(REVISED)





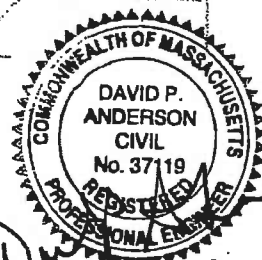
LICENSE PLAN NO. 8621

Approved by Department of Environmental Protection
Date: OCT 16 2000

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.

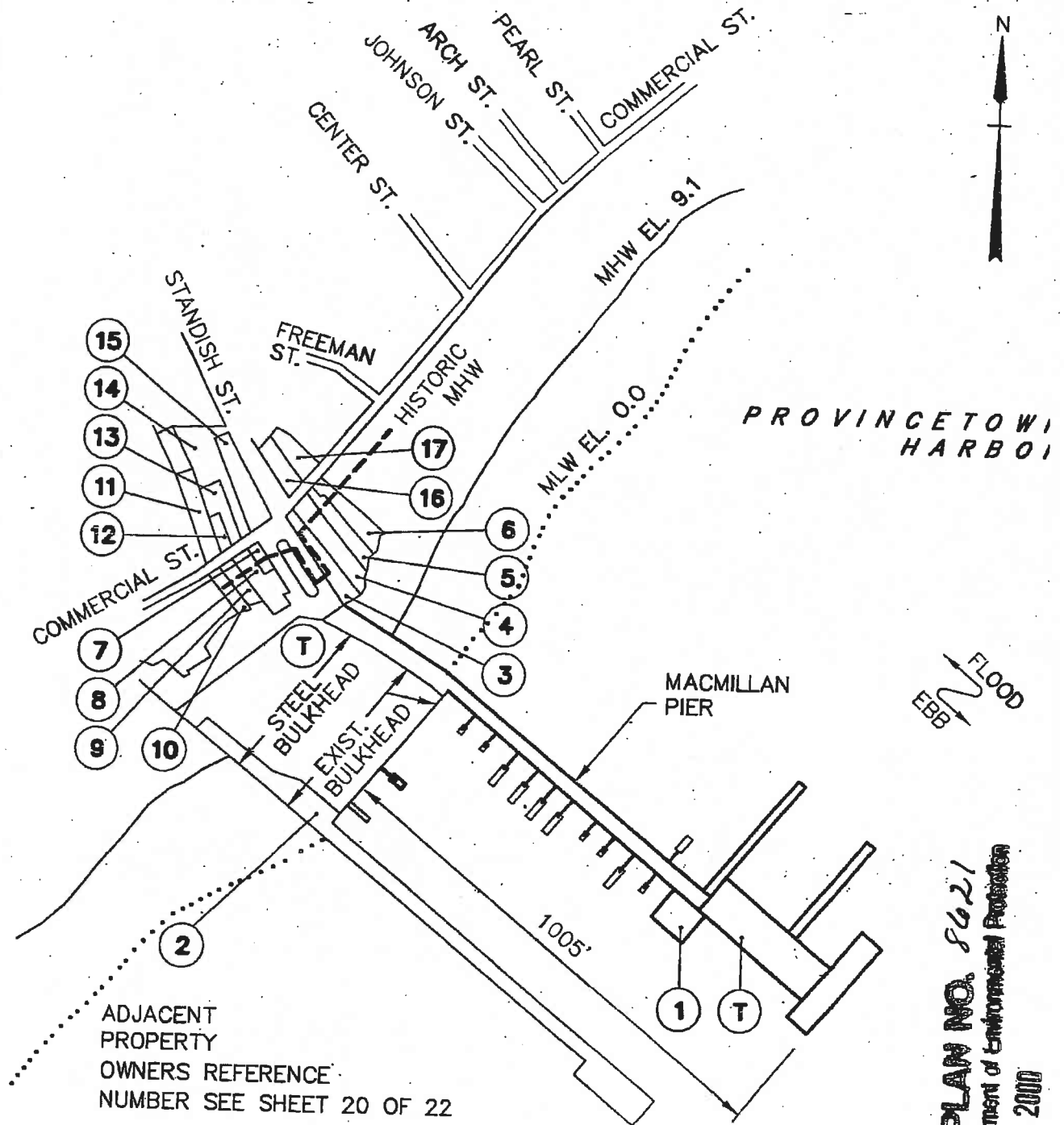
PLAN

0 20
SCALE: 1"=20'

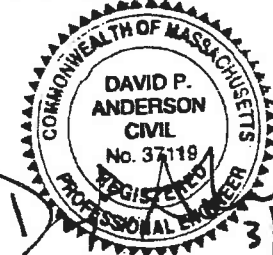


MARCH 21, 2000
AUGUST 27, 1999

(REVISED)
SHEET 18 OF 21



PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.



MARCH 21, 2000
AUGUST 27, 1999

(REVISED)
SHEET 10 OF 20

LICENSE PLAN NO. 8621
Approved by Department of Environmental Protection
Date: OCT 16 2000

LIST OF ABUTTERS

- | | |
|--|--|
| <p>① LAZIER ROBERT T
C/O KIT WILLIAMS
PO BOX 1325
VAIL, CD 81658</p> <p>② CABRAL ENTERPRISES, INC
FISHERMENS WHARF
PROVINCETOWN, MA 02657</p> <p>③ DDK INC
PO BOX 337
PROVINCETOWN, MA 02657</p> <p>④ LUCO REALTY INC
32 CONANT ST
PROVINCETOWN, MA 02657</p> <p>⑤ 321 COMMERCIAL ST REALTY TRUST
321 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> <p>⑥ LUCO REALTY INC
32 CONANT ST
PROVINCETOWN, MA 02657</p> <p>⑦ GRACE JOHN T ET. AL
PO BOX 658
PROVINCETOWN, MA 02657</p> <p>⑧ PROVINCETOWN BOARD OF TRADE
PO BOX 1017
PROVINCETOWN, MA 02657</p> <p>⑨ SCHLOSBERG PHYLLIS E
5 WEBSTER PL
PROVINCETOWN, MA 02657</p> | <p>⑩ ROBERTS MARGARET RUTH LEAF
ESTATE OF MARY MORAN
7034 COPPERWOOD WAY
COLUMBIA, MD 21046</p> <p>⑪ JANOPUS MICHAEL J JR
6 BROWNE ST
PROVINCETOWN, MA 02657</p> <p>⑫ BROTHIE MARY M
1001 NW 2ND AVE
BOCA RATON, FL 33432</p> <p>⑬ INVESTORBANK OF AMERICA, INC
178 BRADFORD ST
PROVINCETOWN, MA 02657</p> <p>⑭ SMALLS COURT REALTY TRUST
PO BOX 384
OSERVILLE, MA 02655</p> <p>⑮ LEWIS ALAN I. ET AL
50 CONGRESS ST #60
PROVINCETOWN, MA 02657</p> <p>⑯ MURIEL COILL REVOCABLE
TRUST/MUREL COILL TTEE
50 CONGRESS ST SUITE 615
BOSTON, MA 02109</p> <p>⑰ GOV WILLIAM BRADFORD
REALTY TRUST
314 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> <p>⑱ GOV WILLIAM BRADFORD
REALTY TRUST
314 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> |
|--|--|

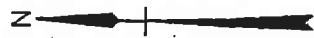
LICENSE PLAN NO. 8621
 Approved by Department of Environmental Protection
 Date OCT 16 2000

PLAN ACCOMPANYING PETITION OF
 TOWN OF PROVINCETOWN TO LICENSE,
 RECONSTRUCT AND MAINTAIN
 MACMILLAN PIER, DREDGE AND PERFORM
 BEACH NOURISHMENT IN PROVINCETOWN
 HARBOR, TOWN OF PROVINCETOWN
 FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
 BURLINGTON, MASS.



MARCH 21, 2000
 AUGUST 27, 1999

(REVISED)
 SHEET 20 OF 22



MHW EL. 9.1

31

34

33

32

30

ADJACENT
PROPERTY

OWNERS REFERENCE

NUMBER SEE SHEET 22 OF 22

29

28

27

PROVINCETOWN
HARBORBEACH
NOURISHMENT
SITEFLOOD
EBB

SNAIL ROAD

COMMERCIAL ST.

26

25

24

23

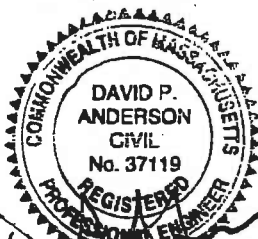
22

21

20

19

18



3/21/00

PLAN ACCOMPANYING PETITION OF
TOWN OF PROVINCETOWN TO LICENSE,
RECONSTRUCT AND MAINTAIN
MACMILLAN PIER, DREDGE AND PERFORM
BEACH NOURISHMENT IN PROVINCETOWN
HARBOR, TOWN OF PROVINCETOWN
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
BURLINGTON, MASS.

ABUTTERS PLAN

0 250'

SCALE: 1"=250'

MARCH 21, 2000
AUGUST 27, 1999(REVISED)
SHEET 21 OF 2

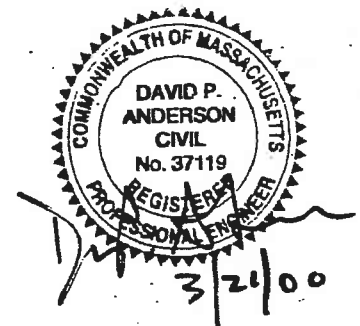
LICENSE PLAN NO. 8621
Approved by Department of Environmental Protection
Date OCT 16 2000

LIST OF ABUTTERS

- | | |
|---|--|
| <p>18 LISA, ROSE, FABIEN LUSTIGMAN
8 SUNNYFIELD
LONDON NW7 4RG ENGLAND</p> <p>19 LISA, ROSE, FABIEN LUSTIGMAN
8 SUNNYFIELD
LONDON NW7 4RG ENGLAND</p> <p>20 CHARLES S. MCKENZIE, ET AL
RIPLEY FAMILY TRUST
64288E GOLDEN SPUR CT.
TUCSON AZ 85739</p> <p>21 SUSAN SWEENEY ET AL
915 LAWTON ST.
MCLEAN, VA 22101</p> <p>22 ELIZABETH SCHWARZ
676 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> <p>23 ROGER S. LOCKE
682 COMMERCIAL ST.
PROVINCETOWN, MA 02657</p> <p>24 ROGER S. LOCKE ET AL TTEES
682 COMMERCIAL ST.
PROVINCETOWN, MA 02657</p> <p>25 OWNER'S UNKNOWN
686 COMMERCIAL ST.
PROVINCETOWN, MA 02657</p> <p>26 THOMAS VASILOS ET UX
STEPHANIE VASILOS
72 COTTAGE PARK ROAD
WINTHROP, MA 02152</p> | <p>27 BEACH POINT REALTY TRUST
FRED E. SATERIALE TTEE
P.O. BOX 392
PROVINCETOWN, MA 02657</p> <p>28 BEACH POINT REALTY TRUST
FRED E. SATERIALE TTEE
P.O. BOX 392
PROVINCETOWN, MA 02657</p> <p>29 TIMPAM REALTY TRUST
TIMOTHY F. MCNULTY TTEE
742 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> <p>30 HEIDI J. SCHMIDT
730 COMMERCIAL ST
PROVINCETOWN, MA 02657</p> <p>31 DONALD J. SLATER ET UX
VALERIE P. SLATER
6916 HICKORY CREEK
PLANO, TX 75023</p> <p>32 KATHERINE E. BACHMAN ET AL
KATHERINE F. THURMOND
12 THORNDIKE ST.
BROOKLINE, MA 02146</p> <p>33 LEONARD H. ALBERTS MD
P.O. BOX 276
PROVINCETOWN, MA 02657</p> <p>34 HALCYONE HTASHA
P.O. BOX 993
PROVINCETOWN, MA 02657</p> |
|---|--|

LICENSE PLAN NO. 8621
 OFFICE OF THE REGISTER OF DEEDS
 OCT 16 2000

PLAN ACCOMPANYING PETITION OF
 TOWN OF PROVINCETOWN TO LICENSE,
 RECONSTRUCT AND MAINTAIN
 MACMILLAN PIER, DREDGE AND PERFORM
 BEACH NOURISHMENT IN PROVINCETOWN
 HARBOR, TOWN OF PROVINCETOWN
 FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS
 BURLINGTON, MASS.



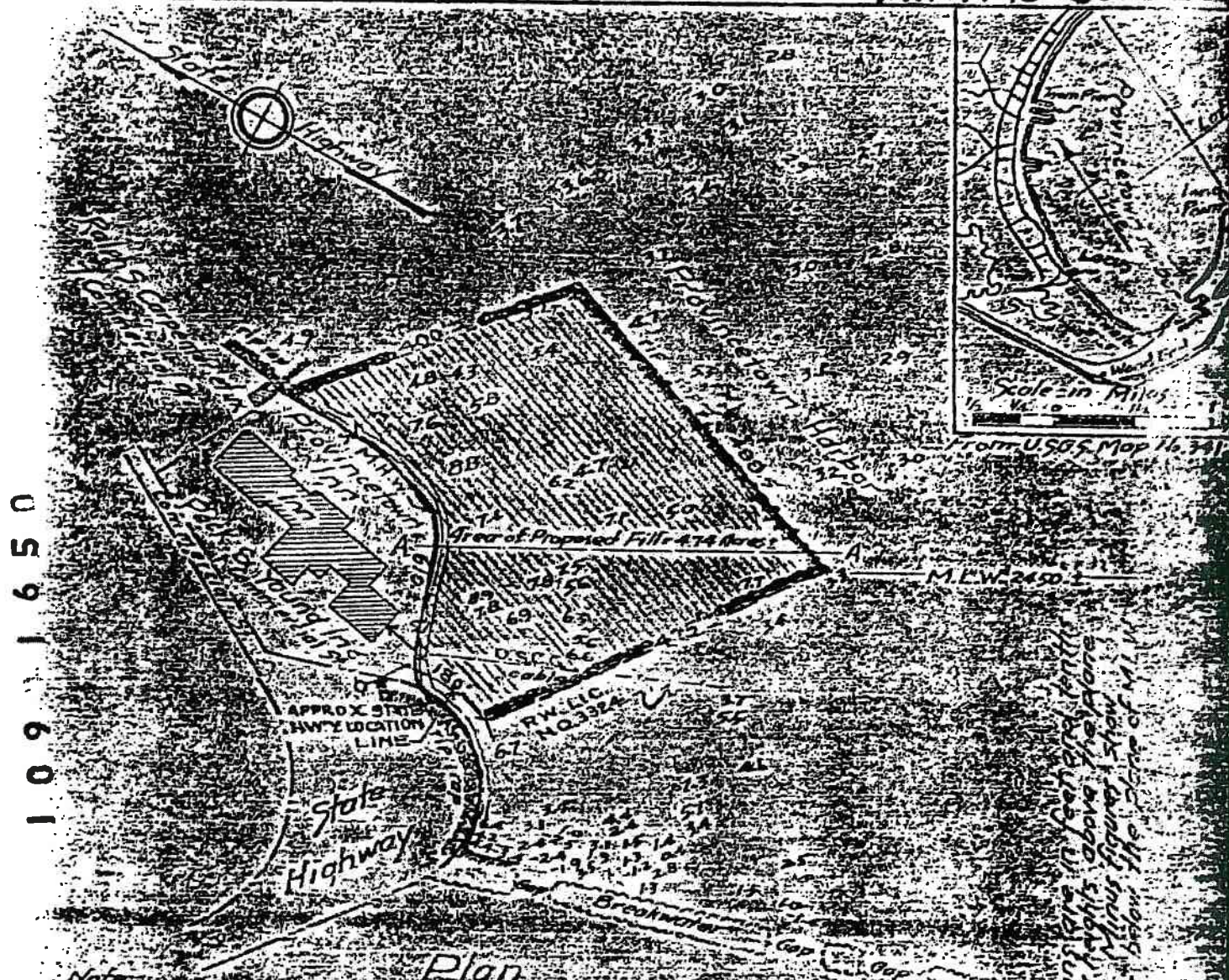
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
058-051-000-002-100	058-051-000-002-100-COE1A	61-223	USACE	Provincetown	November 1956	Proposed Fill in Provincetown Harbor at Provincetown, Massachusetts, County of Barnstable	4	Commercial Street	Fill with Bulkhead Adjacent to Breakwater
058-113-000-019-100	058-113-000-019-100-COE1A	58-147	USACE	Provincetown	December 1957	Proposed Sheet Steel Bulkhead and Fill in Provincetown Harbor - Provincetown, Mass. - Application by Town of Provincetown	1	Town Pier	Fill with Bulkhead
058-113-000-019-100	058-113-000-019-100-COE1B	61-223	USACE	Provincetown	November 1956	Proposed Fill in Provincetown Harbor at Provincetown, Massachusetts, County of Barnstable	4	Town Pier	Fill with Bulkhead
058-113-000-019-100	058-113-000-019-100-COE1C	75-90	USACE	Provincetown	July 1974	Proposed Bulkhead Modification in Provincetown Harbor at Provincetown, County of Barnstable, Massachusetts	3	Town Pier	Fill with Bulkhead

058-051-000-002-100

058-113-000-019-100

20 DEC 56

MA PRD-86-305



Note: Material for fill to be obtained from sand dunes 1/2 mile from beach on northerly side of state highway. Bench mark Massachusetts Geodetic Survey Station 501 Elev. 10.39.

Elev. 14.00 Top of fill

Scale in feet

Hor. 200 100 0 100 200

Ver. 20 10 0 10 20

Profile at AA (Typical Section)

Surface of bottom

M.H.W. Elev. 9.1

16.5



PROPOSED FILL in Provincetown Harbor or at Provincetown, Mass. County of Barnstable, Mass. Application by Provincetown Inn and Peck and Young, Inc. REVISED Nov. 19, 1956.

058-051-000-002-100

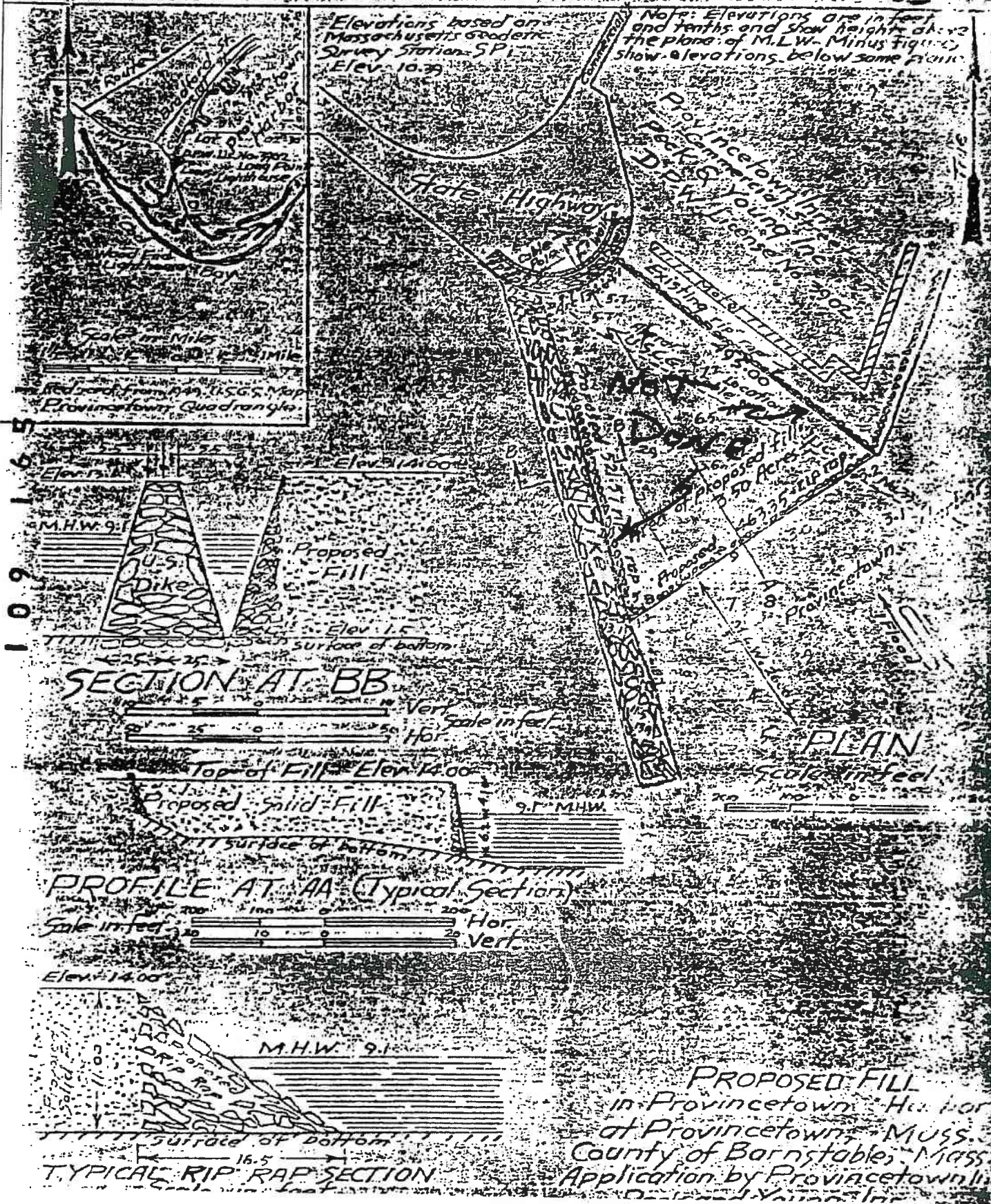
058-113-000-019-100

MAR 63

MA PR 70-63-42

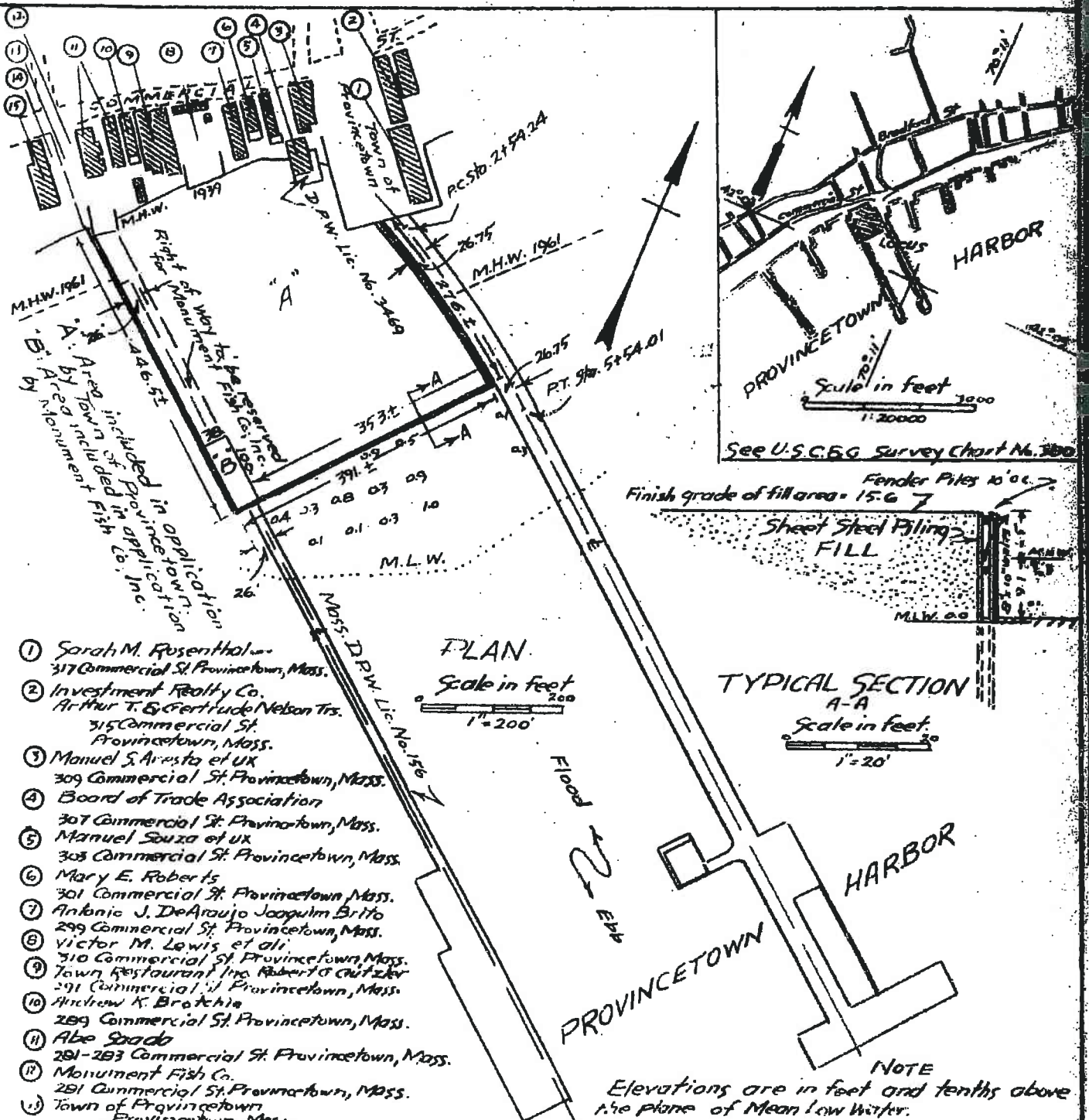
Elevations based on
Massachusetts Geodetic
Survey Station SP1
Elev. 10.39

Note: Elevations are in feet
and tenths and show heights above
the plane of M.L.W. minus figure
show elevations below same plane

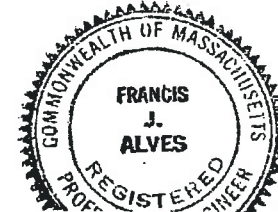


080 148

058-051-000-002-100
058-113-000-019-100



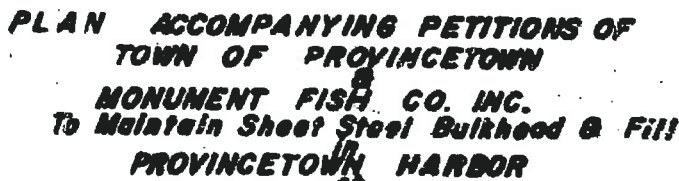
- ① Sarah M. Rosenthal - 317 Commercial St. Provincetown, Mass.
- ② Investment Realty Co. Arthur T. & Gertrude Nelson Trs. 315 Commercial St. Provincetown, Mass.
- ③ Manuel S. Arista et ux 309 Commercial St. Provincetown, Mass.
- ④ Board of Trade Association 307 Commercial St. Provincetown, Mass.
- ⑤ Manuel Souza et ux 303 Commercial St. Provincetown, Mass.
- ⑥ Mary E. Roberts 301 Commercial St. Provincetown, Mass.
- ⑦ Antonio J. De Araujo Joaquin Brito 299 Commercial St. Provincetown, Mass.
- ⑧ Victor M. Lewis et al 310 Commercial St. Provincetown, Mass.
- ⑨ Town Restaurant Inc. Robert A. Outzler 291 Commercial St. Provincetown, Mass.
- ⑩ Andrew K. Brochia 289 Commercial St. Provincetown, Mass.
- ⑪ Abe Spade 281-283 Commercial St. Provincetown, Mass.
- ⑫ Monument Fish Co. 281 Commercial St. Provincetown, Mass.
- ⑬ Town of Provincetown Provincetown, Mass.
- ⑭ Walter Welsh Council No. 2476 K. of C. 279 Commercial St. Provincetown, Mass.
- ⑮ Saint Peter's Club 277 Commercial St. Provincetown, Mass.



PLAN ACCOMPANYING PETITIONS OF TOWN OF PROVINCETOWN
MONUMENT FISH CO. INC.
To Maintain Sheet Steel Bulkhead & Fill
PROVINCETOWN HARBOR
PROVINCETOWN, MASS.

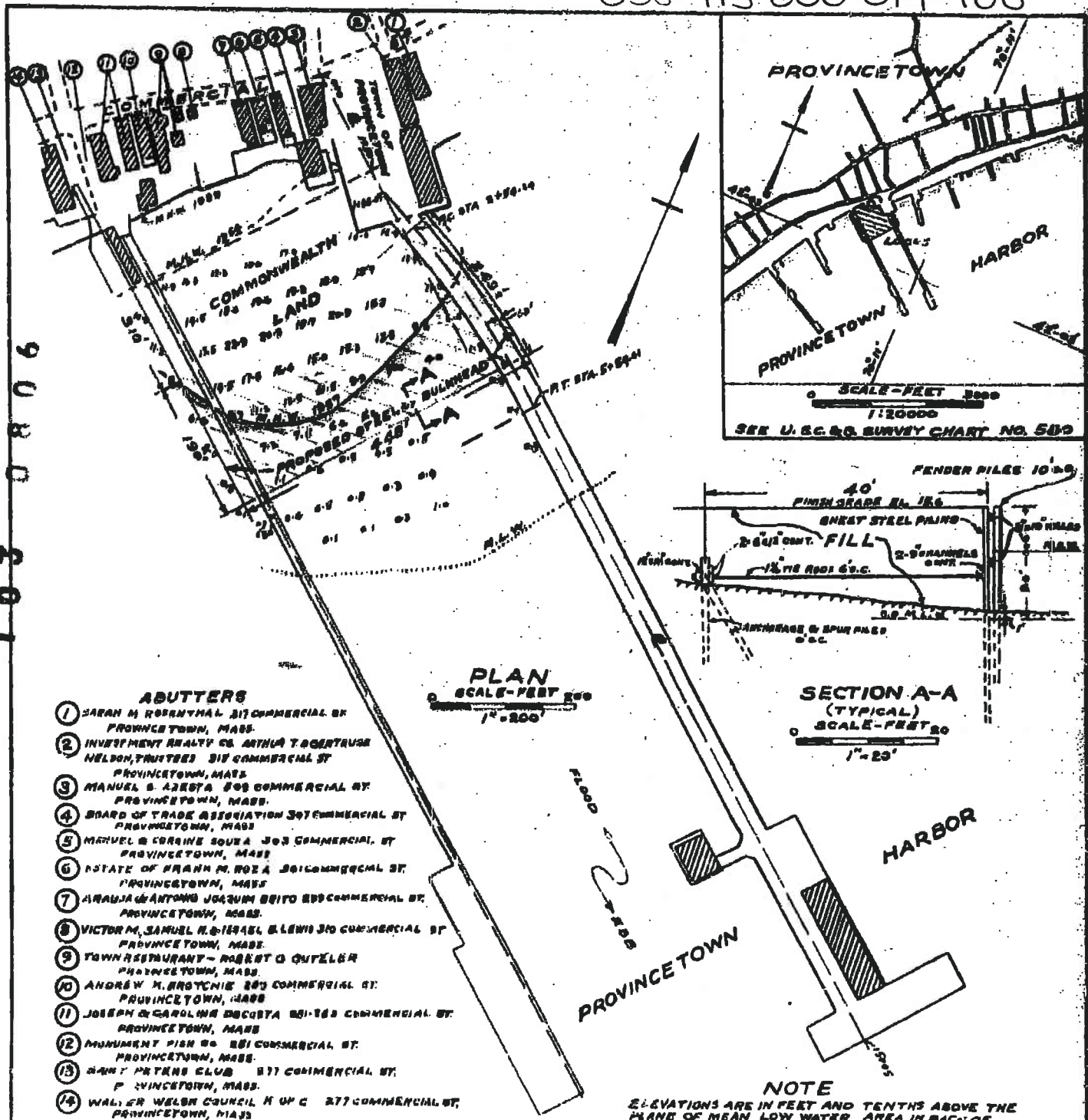
25910601

058-113-000-019-100



0850065

058-113-000-019-100



PROPOSED SHEET STEEL BULKHEAD & FILL
IN
PROVINCETOWN HARBOR
PROVINCETOWN MASS.
APPLICATION BY
TOWN OF PROVINCETOWN
DECEMBER 1957

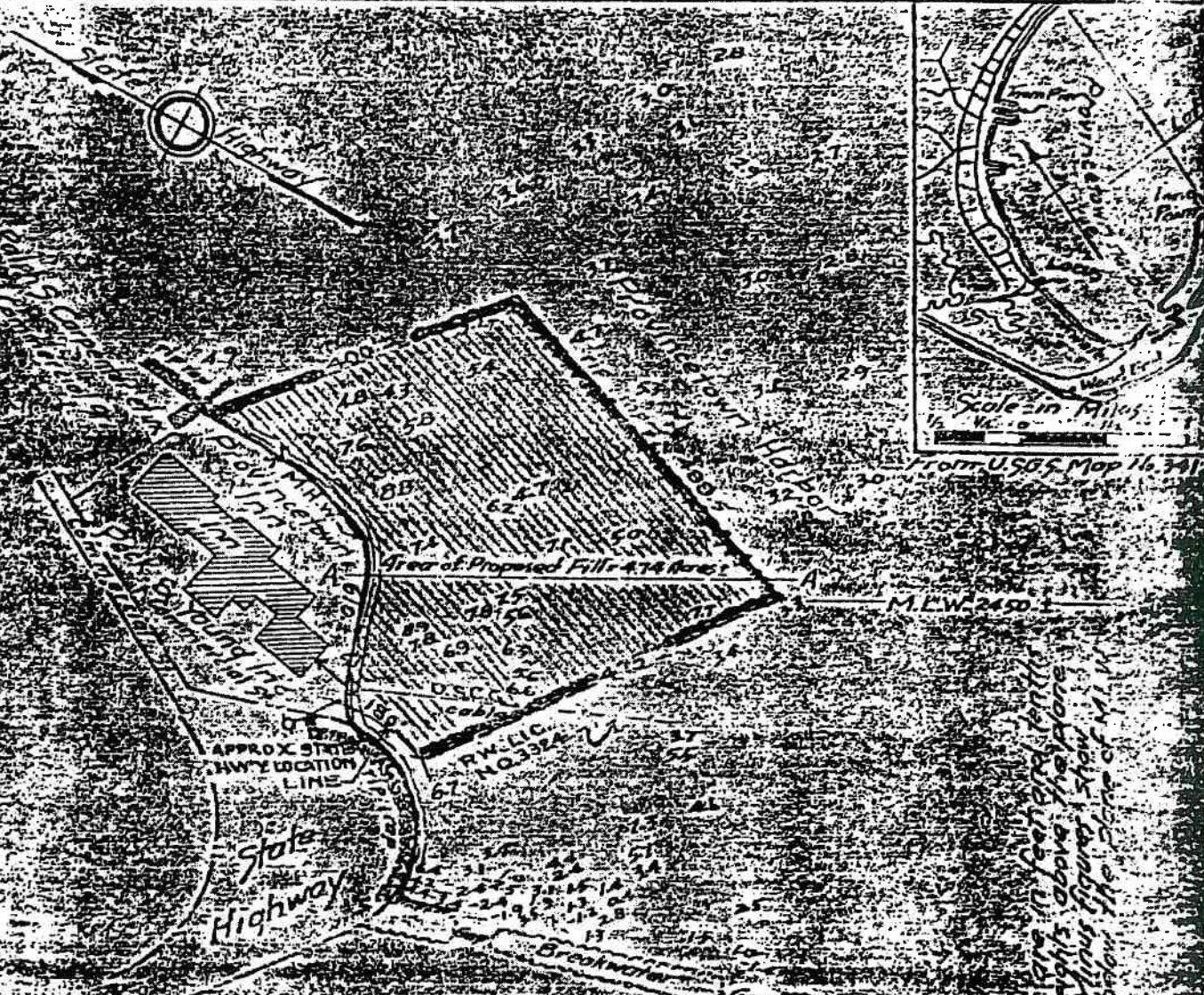
058-051-000-002-100

058-113-000-019-100

20 DEC 56

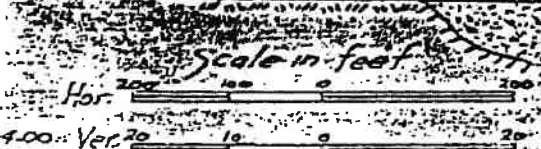
MA PRD-86-305

109 1650



Note: Material for fill to be obtained from sand dunes 1/2 mile from beach on northerly side of state highway. Bench mark Massachusetts Geodetic Survey Station SP1 Elev. 10.39

Elev. 14.00 Top of fill



Profile at AA (Typical Section)



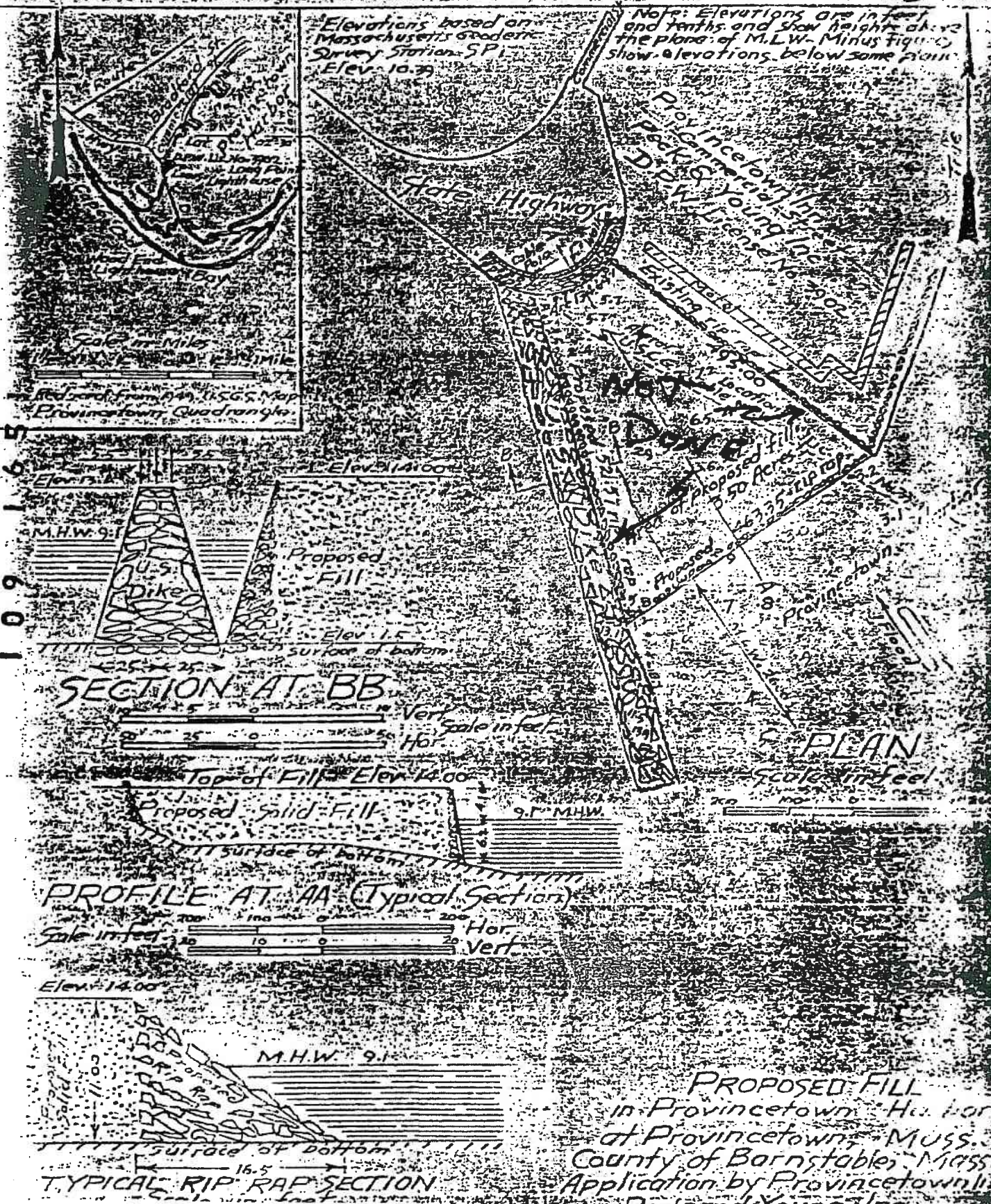
PROPOSED FILL in Provincetown Harbor or at Provincetown, Mass. County of Barnstable, Mass. Application by Provincetown, Inc. Peck and Young Inc.

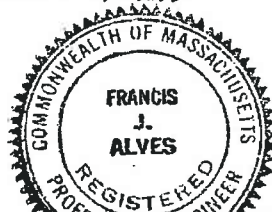
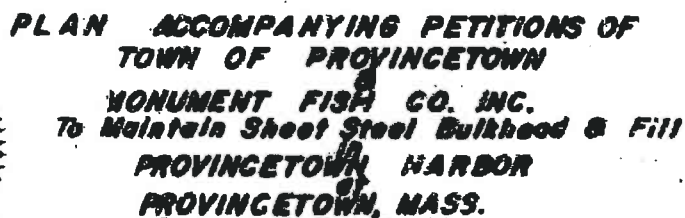
RELEASED Nov 19, 1956

058-113-000-019-700

44-38861-63

MA PR 70-63-42

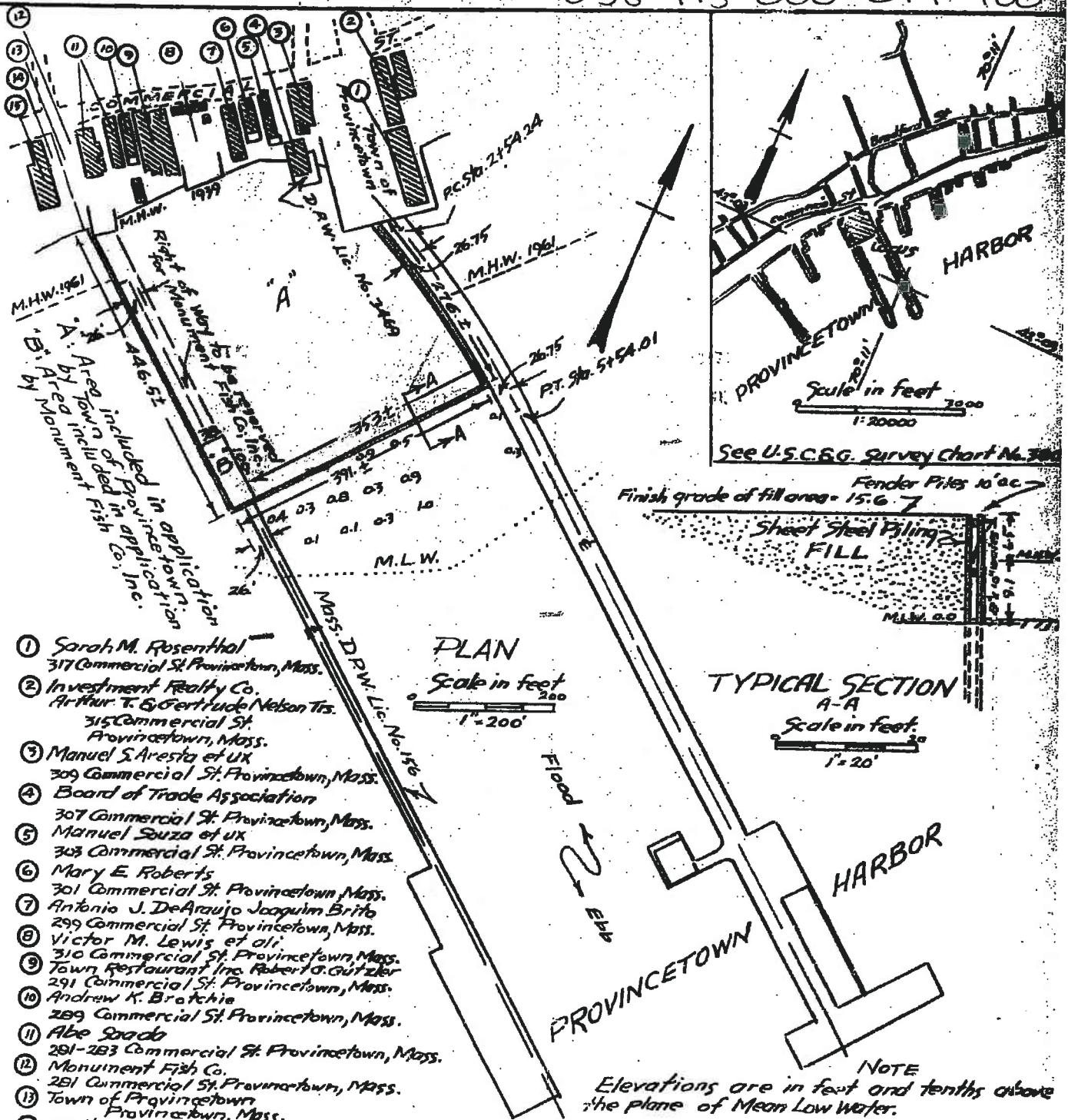




080 149

058-051-000-002-100

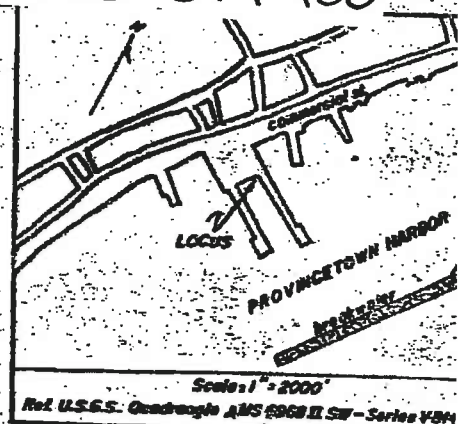
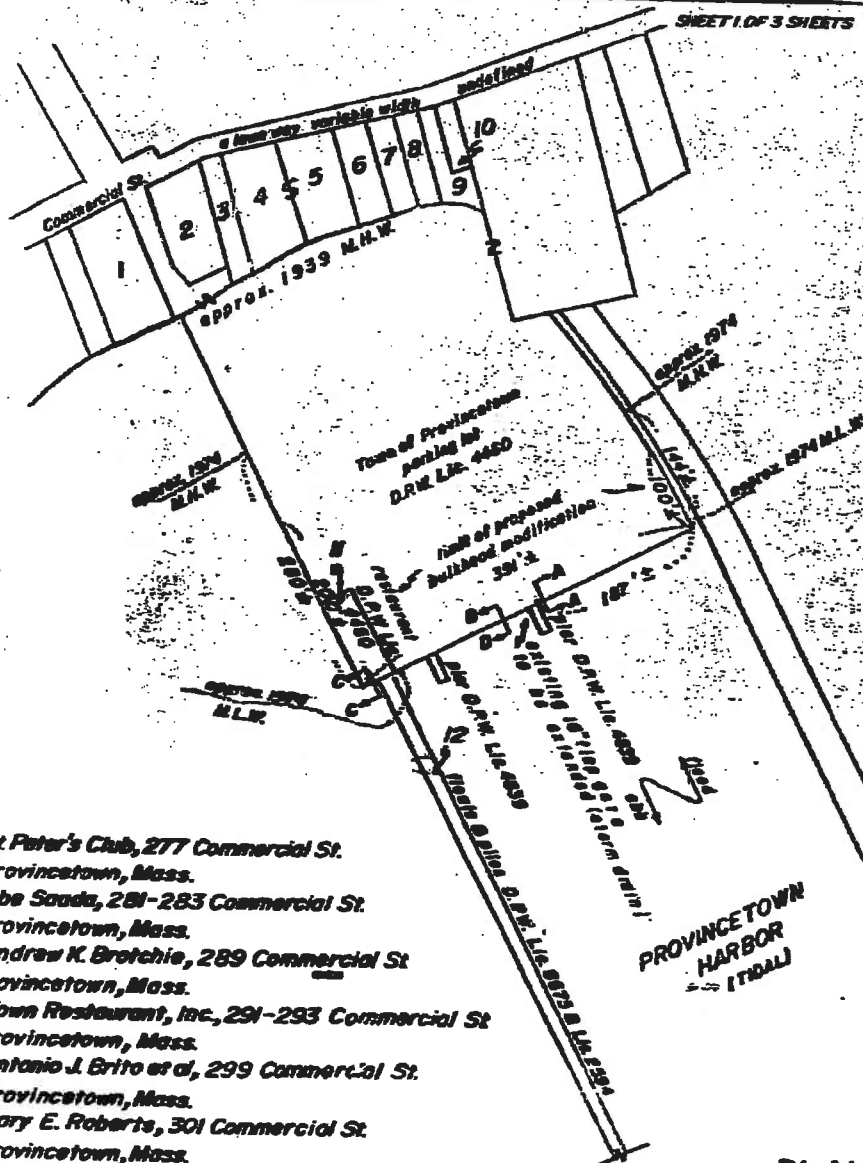
058-113-000-019-100



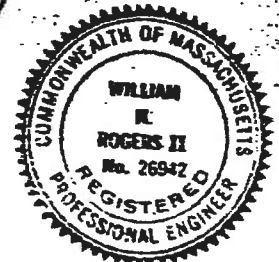
- ① Sarah M. Rosenthal
317 Commercial St. Provincetown, Mass.
- ② Investment Realty Co.
Arthur T. & Gertrude Nelson Trs.
315 Commercial St.
Provincetown, Mass.
- ③ Manuel S. Aresta et ux
309 Commercial St. Provincetown, Mass.
- ④ Board of Trade Association
307 Commercial St. Provincetown, Mass.
- ⑤ Manuel Souza et ux
303 Commercial St. Provincetown, Mass.
- ⑥ Mary E. Roberts
301 Commercial St. Provincetown, Mass.
- ⑦ Antonio J. De Araujo Joaquim Brito
299 Commercial St. Provincetown, Mass.
- ⑧ Victor M. Lewis et al.
310 Commercial St. Provincetown, Mass.
- ⑨ Town Restaurant Inc. Robert A. Gutzler
291 Commercial St. Provincetown, Mass.
- ⑩ Andrew K. Bratchie
289 Commercial St. Provincetown, Mass.
- ⑪ Abe Szabo
281-283 Commercial St. Provincetown, Mass.
- ⑫ Monument Fish Co.
281 Commercial St. Provincetown, Mass.
- ⑬ Town of Provincetown
Provincetown, Mass.
- ⑭ Walter Welsh Council No. 2476 K. of C.
279 Commercial St. Provincetown, Mass.
- ⑮ Saint Peter's Club
277 Commercial St. Provincetown, Mass.

**PLAN ACCOMPANYING PETITIONS OF
TOWN OF PROVINCETOWN
MONUMENT FISH CO. INC.
To Maintain Sheet Steel Bulkhead & Fill
PROVINCETOWN HARBOR**

SHEET 1 OF 3 SHEETS



- 1) St Peter's Club, 277 Commercial St.
Provincetown, Mass.
- 2) Abe Sade, 281-283 Commercial St.
Provincetown, Mass.
- 3) Andrew K. Brochie, 289 Commercial St.
Provincetown, Mass.
- 4, 5) Town Restaurant, Inc., 291-293 Commercial St.
Provincetown, Mass.
- 6) Antonio J. Brito et al, 299 Commercial St.
Provincetown, Mass.
- 7) Mary E. Roberts, 301 Commercial St.
Provincetown, Mass.
- 8) Phyllis Schlesberg, 303 Commercial St.
Provincetown, Mass.
- 9) Provincetown Board of Trade Association
307 Commercial St., Provincetown, Mass.
- 10) Joseph P. Cannistraro et al, 309 Commercial St.
Provincetown, Mass.
- 11) Howard R. Dykeman, Cannon Hill Rd.
Wellfleet, Mass.
- 12) Cee Jay Corporation, Robert Cabral
4 Wharf's Ct., Provincetown, Mass.



William T. Rogers Jr

PLAN

SCALE OF FEET
100 200 300 400

**PROPOSED BULKHEAD MODIFICATION
IN PROVINCETOWN HARBOR
AT PROVINCETOWN
COUNTY OF BARNSTABLE, MASSACHUSETTS
APPLICATION BY TOWN OF PROVINCETOWN
JULY, 1974**

3 SHEETS

SHEET 2 OF 3 SHEETS



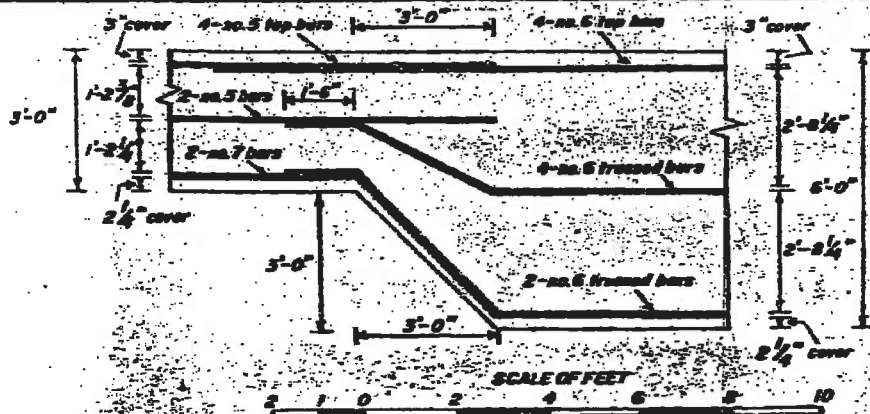
SECTION D-D



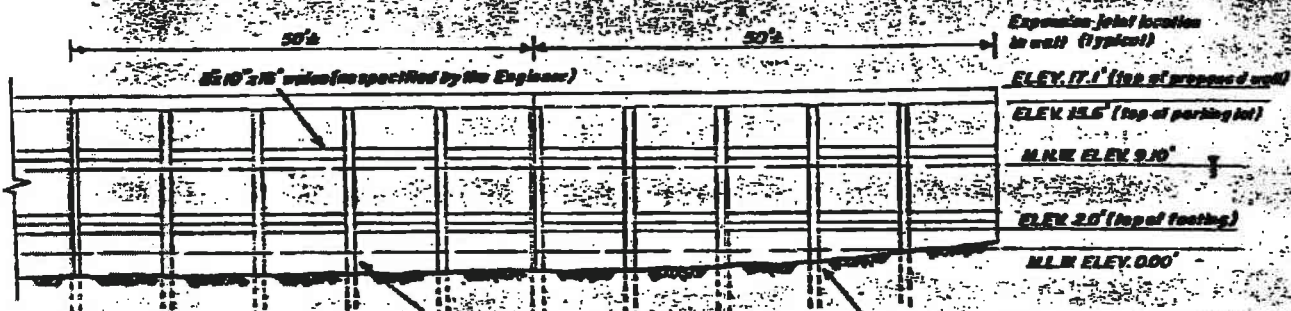
William T. Rogers Jr

058-113-000-019-100

SHEET 3 OF 3 SHEETS



TRANSITION FOOTING
BETWEEN SECTIONS
C-C & D-D



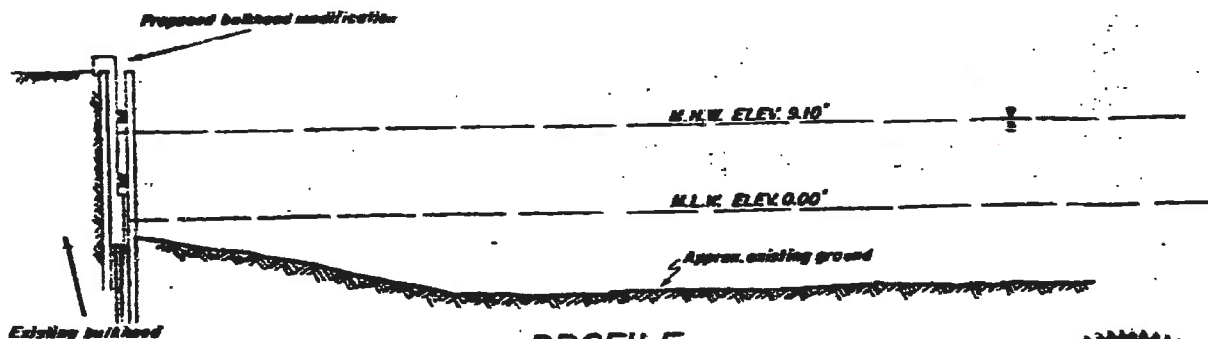
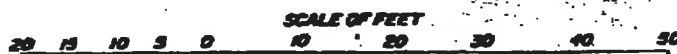
NOTE: Locate construction joints midway between expansion joints.
Footing expansion joints as specified by the Engineer

Reinforcing bars 10-0" o.c.

Approximate grade existing ground

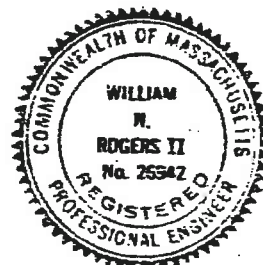
NOTE: Transition footing shall extend 5'-0" from the west corner of the front face and 15'-0" from the east corner of the front face.

FRONT ELEVATION



PROFILE

SECTION A-A
SCALE OF FEET



William H. Rogers II

Section III

Truro

Section III – Community Findings – Town of Truro

COMMUNITY DESCRIPTION

The Town of Truro consists of a land area of 21.06 square miles out of a total area of 26.32 square miles and had a population of 2,087 in the 2000 census. The Town is located in Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 26 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Truro, there were 5 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 - Town of Truro

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Length
		A	B	C	D		
Bulkhead / Seawall							
Revetment	2			2			1050
Breakwater							
Groin / Jetty	3			2	1		1840
Coastal Dune							
Coastal Beach							
	5			4	1		2890

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 Truro's case there are a total of 5 structures which would require approximately \$ 2.7 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 \$ 720,000 would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Truro

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Bulkhead / Seawall							\$ -
Revetment	2			\$ 675,840			\$ 675,840
Breakwater							\$ -
Groin / Jetty	3			\$ 1,283,005	\$ 720,720		\$ 2,003,725
Coastal Dune							\$ -
Coastal Beach							\$ -
	5	\$ -	\$ -	\$ 1,958,845	\$ 720,720	\$ -	\$ 2,679,565

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Truro

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Town Owned	5			\$ 1,958,845	\$ 720,720		\$ 2,679,565
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership							\$ -
	5	\$ -	\$ -	\$ 1,958,845	\$ 720,720	\$ -	\$ 2,679,565

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

SUMMARY

The enclosed reports and associated documents reflects the Town of Truro'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 - Truro

Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF TRURO
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'



SHEET 1



COASTAL STRUCTURE LOCATION PLAN

TOWN OF TRURO
 COASTAL INFRASTRUCTURE INVENTORY
 AND ASSESSMENT PROJECT
 NOVEMBER 2007





COASTAL STRUCTURE LOCATION PLAN

TOWN OF TRURO
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'

BCE Bourne Consulting Engineering
2 Pond Street
Plymouth, MA 01959
TEL: (508) 833-0000 FAX: (508) 833-0000

Structure Assessment Form

Town: TruroStructure ID: 075-008-000-026-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Beach Point

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Truro

Earliest Structure Record:

1936

Estimated Reconstruction/Repair Cost:

\$700,520.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
<u>1055</u>	<u>5</u>	<u>V2</u>	<u>19</u>
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Set of 7 dumped stone groins. Stones are 3 feet by 2 feet by 2 feet on average. Stones have moderate stone movement and section loss. Behind there are many houses and a beach.

*Condition*C*Rating*Fair*Level of Action*Moderate*Description*

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

*Priority*III*Rating*Moderate Priority*Action*

Consider for Active Project Improvement Listing

Description

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

Structure Images:

075-008-000-026-100-PHO1A.jpg075-008-000-026-100-PHO1B.jpg

Structure Documents:

MA-DCRAugust 1936Proposed Stone075-008-000-026-100-DCR1AMA-DCRJuly 1937Proposed Stone075-008-000-026-100-DCR1BMA-DCRAugust 1938Proposed Shore075-008-000-026-100-DCR1CMA-DCRJuly 1974Proposed Shore075-008-000-026-100-DCR1D

Structure Assessment FormStructure ID: **075-049-000-016-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pamet Harbor - North Jetty

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Truro

Earliest Structure Record:

1950

Estimated Reconstruction/Repair Cost:

\$720,720.00

Length:

300

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V4

FIRM Map Elevation:

17

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone jetty at the inlet of Pamet Harbor. Structure is heavily deteriorated. There is visible stone movement and section loss. Stones are 3 feet by 2 feet by 2 feet on average.

*Condition***D***Rating***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***I***Rating***None***Action***Long Term Planning Considerations***Description*

No Inshore Structures or Residential Dwelling Units Present

Structure Images:**075-049-000-016-100-PHO1A.jpg****075-049-000-016-100-PHO1B.jpg****Structure Documents:****USACE****November 1****Proposed Stone Jetty****075-049-000-016-100-COE1A****MA-DCR****October 195****Proposed Stone****075-049-000-016-100-DCR1A****MA-DCR****November 1****Proposed Stone****075-049-000-016-100-DCR1B**

Structure Assessment Form

Town: Truro

Structure ID: 075-049-000-019-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pamet Harbor - South Jetty

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Truro

Earliest Structure Record:

1950

Estimated Reconstruction/Repair Cost:

\$582,485.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
485		V4	17
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone jetty at the inlet of Pamet Harbor. Stones are 3 feet by 2 feet by 2 feet on average. There is moderate stone movement and section loss

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

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

075-049-000-019-100-PHO1A.jpg

075-049-000-019-100-PHO1B.jpg

Structure Documents:

USACE

November 1

Proposed Stone Jetty

075-049-000-019-100-COE1A

MA-DCR

October 195

Proposed Stone

075-049-000-019-100-DCR1A

MA-DCR

November 1

Proposed Stone

075-049-000-019-100-DCR1B

Structure Assessment Form

Town: TruroStructure ID: 075-049-000-032-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pamet Harbor

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Truro

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$195,360.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
<u>250</u>		<u>A4</u>	<u>12</u>
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Dumped stone riprap at water line of old train tracks. Stones are 3 feet by 2 feet by 2 feet on average. Moderate stone movement.

*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***I***Rating***None***Action***Long Term Planning Considerations***Description*

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

075-049-000-032-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: **Truro**Structure ID: **075-050-000-018-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pamet Harbor Boat Ramp

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Truro

Earliest Structure Record:

1988

Estimated Reconstruction/Repair Cost:

\$480,480.00

Length: **800** Top Elevation: FIRM Map Zone: **A2** FIRM Map Elevation: **11**
 Feet Feet NAVD 88 Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed stone riprap. Stones are 2 feet by 2 feet by 2 feet. There are many areas of concrete and asphalt repair. There are signs of stone movement, undermining and minor scour. There is a boat ramp in the middle of the structure.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

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

*Priority***III***Rating***Moderate Priority***Action*

Consider for Active Project Improvement Listing

Description

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

Structure Images:

075-050-000-018-100-PHO1A.JPG**075-050-000-018-100-PHO1B.JPG**

Structure Documents:

DEP**May 1988****Plans Accompanying****075-050-000-018-100-LIC1A**

Section III - Truro

Part C

Structure Photographs

TOWN: TRURO
 SOURCE: BCE - 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
075-008-000-026-100	075-008-000-026-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-008-000-026-100	075-008-000-026-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-049-000-016-100	075-049-000-016-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-049-000-016-100	075-049-000-016-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-049-000-019-100	075-049-000-019-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-049-000-019-100	075-049-000-019-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-049-000-032-100	075-049-000-032-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-050-000-018-100	075-050-000-018-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
075-050-000-018-100	075-050-000-018-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

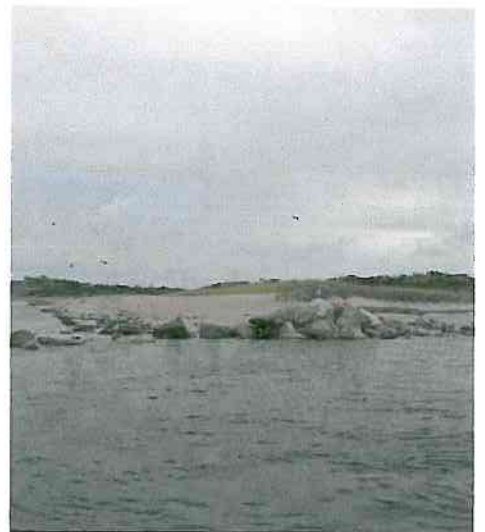
Massachusetts Coastal Infrastructure and Assessment



075-008-000-026-100-PHO1A



075-008-000-026-100-PHO1B



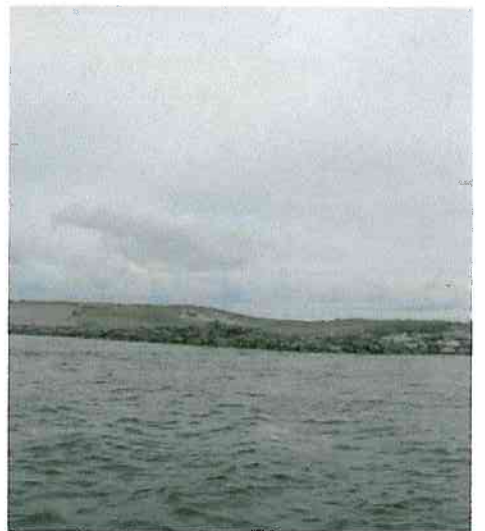
075-049-000-016-100-PHO1A



075-049-000-016-100-PHO1B



075-049-000-019-100-PHO1A



075-049-000-019-100-PHO1B



075-049-000-032-100-PHO1A



075-050-000-018-100-PHO1A



075-050-000-018-100-PHO1B

Section III - Truro

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: TRURO
SOURCE: Town of Truro
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Truro

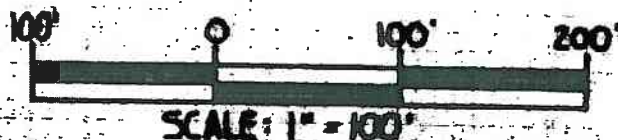
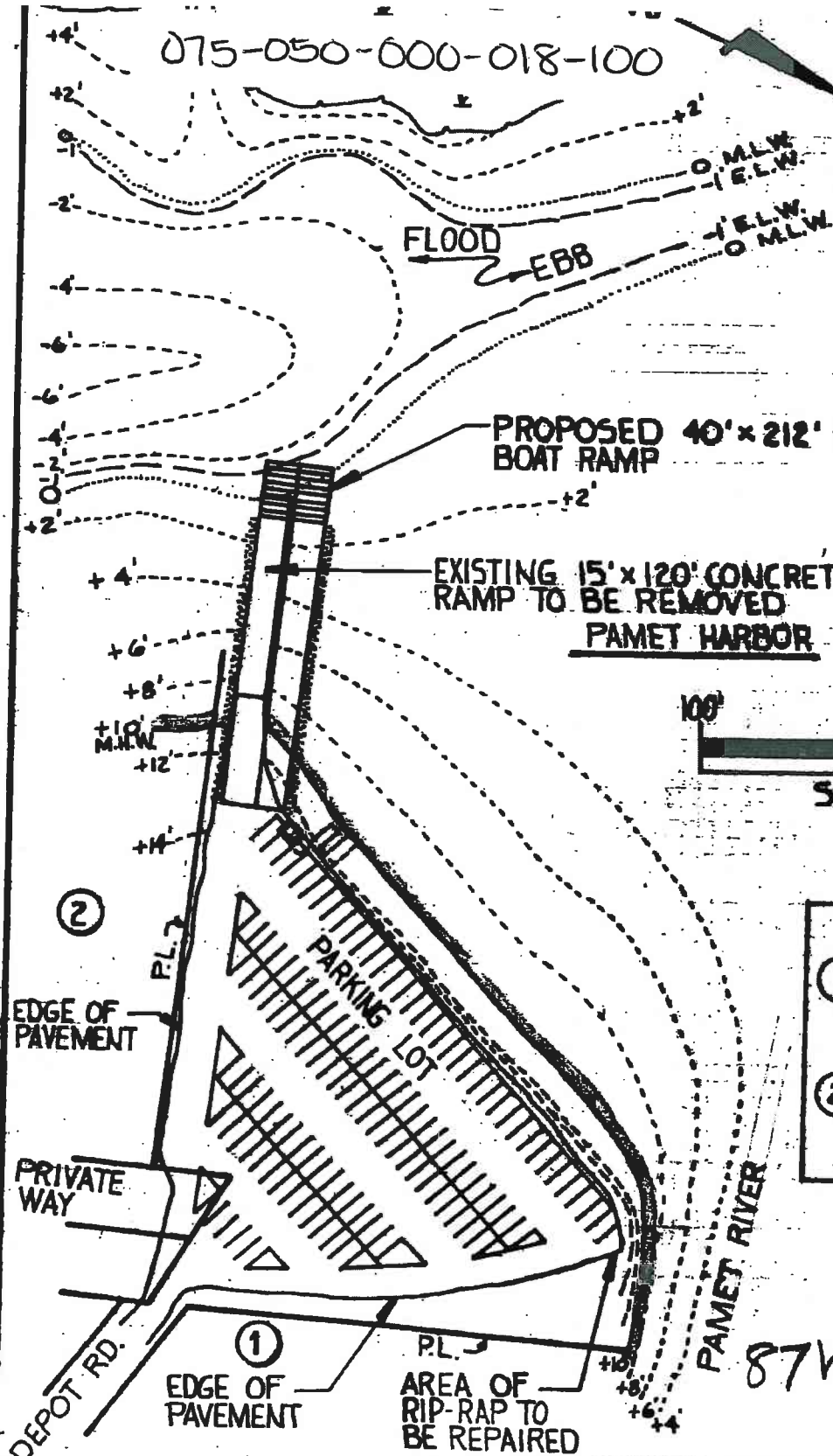
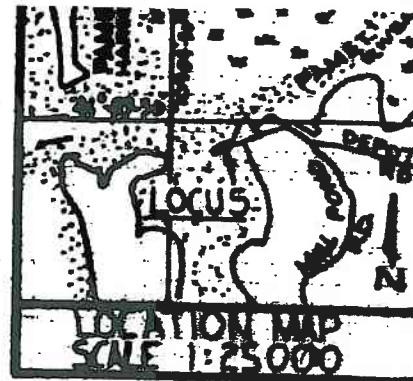
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
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TOWN: TRURO
 SOURCE: MA-DCR
 LOCATION: MA-DCR BOSTON and HINGHAM, MA
 DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
075-008-000-026-100	075-008-000-026-100-DCR1A	473	MA-DCR	Truro	August 1936	Proposed Stone Jetties - Pilgrim Beach - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pilgrim Beach	Groins
075-008-000-026-100	075-008-000-026-100-DCR1B	503	MA-DCR	Truro	July 1937	Proposed Stone Jetties - Pilgrim Beach - Truro, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pilgrim Beach	Stone Groins
075-008-000-026-100	075-008-000-026-100-DCR1C	543	MA-DCR	Truro	August 1938	Proposed Shore Protection - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pilgrim Lake	Groins
075-008-000-026-100	075-008-000-026-100-DCR1D	2797	MA-DCR	Truro	July 1974	Proposed Shore Protection Stone Groins - Pilgrim Beach - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pilgrim Beach	Groins
075-049-000-016-100	075-049-000-016-100-DCR1A	1154	MA-DCR	Truro	October 1950	Proposed Stone Jetty - Pamet Harbor - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pamet Harbor	Jetty
075-049-000-016-100	075-049-000-016-100-DCR1B	1188	MA-DCR	Truro	November 1951	Proposed Stone Jetty - Pamet River - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pamet River	Jetty
075-049-000-019-100	075-049-000-019-100-DCR1A	1154	MA-DCR	Truro	October 1950	Proposed Stone Jetty - Pamet Harbor - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pamet Harbor	Jetty
075-049-000-019-100	075-049-000-019-100-DCR1B	1188	MA-DCR	Truro	November 1951	Proposed Stone Jetty - Pamet River - Truro - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pamet River	Jetty

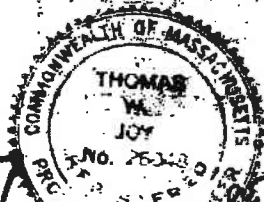
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
075-050-000-018-100	075-050-000-018-100-LIC:1A	1797	DEP	Turo	May 1988	Plans Accompanying Petition of Public Access Board, Mass. Dept. of Fisheries, Wildlife and Environmental Law Enforcement for Reconstruction of Concrete Boat Ramp Pamet River Public Access Facility - Turo, Mass.	3	Pamet River Boat Ramp	Riprap Along Boat Ramp and Parking Lot

075-050-000-018-100



ABUTTERS LIST

- ① WILLIAM WORTHINGTON
40 THOMASTON ST.
HARTFORD, CT. 06112
- ② CHRISTOPHER WORTHINGTON
187 DOWNER AVE.
HINGHAM, MA. 02043



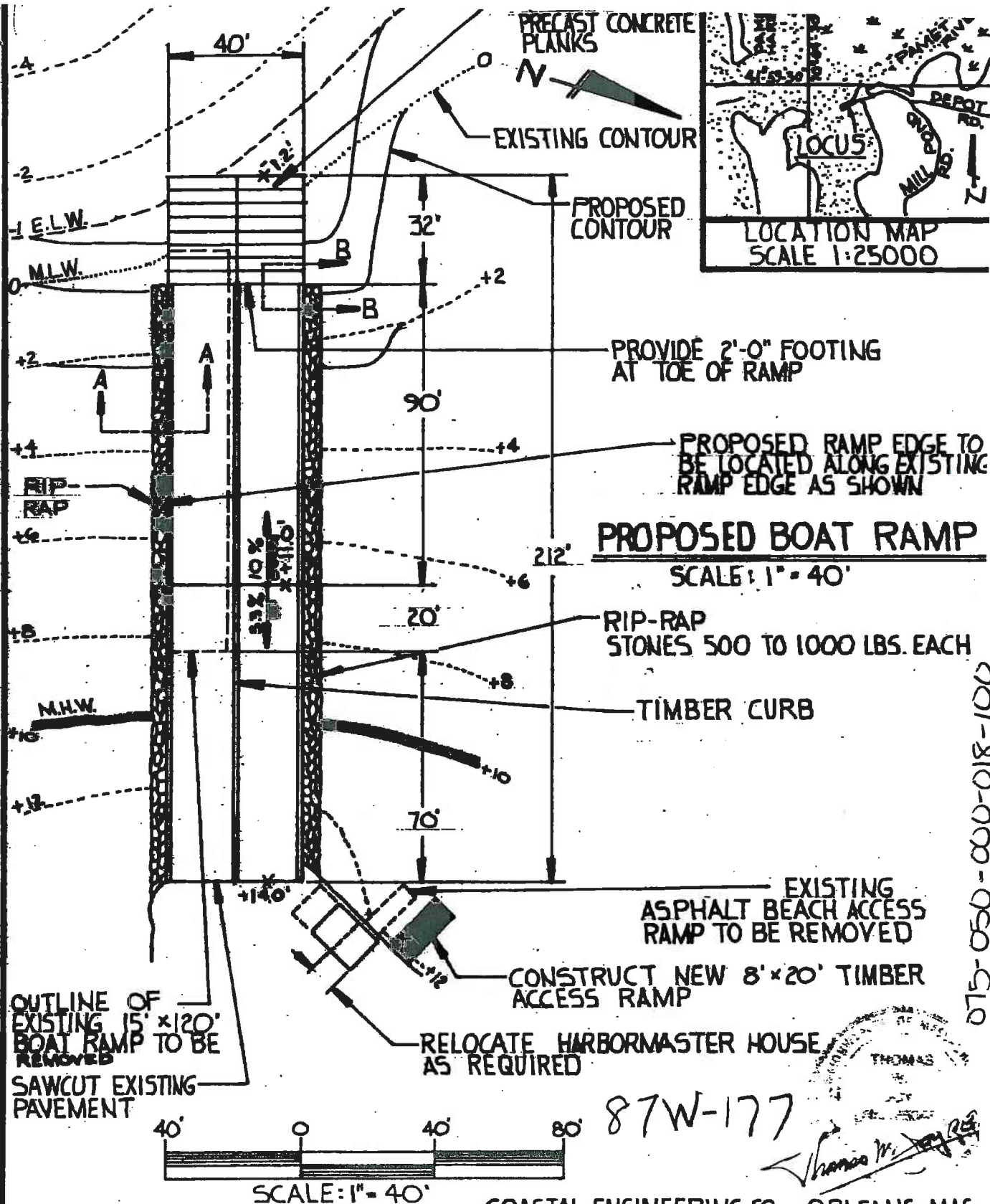
87W-177

PLANS ACCOMPANYING PETITION OF:
PUBLIC ACCESS BOARD
MASS. DEPT. OF FISHERIES, WILDLIFE
AND ENVIRONMENTAL LAW ENFORCEMENT
FOR RECONSTRUCTION OF:
CONCRETE BOAT RAMP
PAMET RIVER PUBLIC ACCESS FACILITY
TRURO, MASS.

6-10-87 C10-458 SHEET 1 OF 3

COASTAL ENGINEERING CO., ORLEANS, MASS.

LICENSE PLAN NO. **1797**
Approved by Department of Environmental Quality Engineering
of Massachusetts
Thomas W. Joy
COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
DATE **MAY - 9 1988**

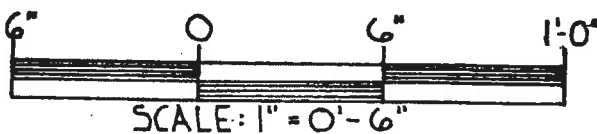
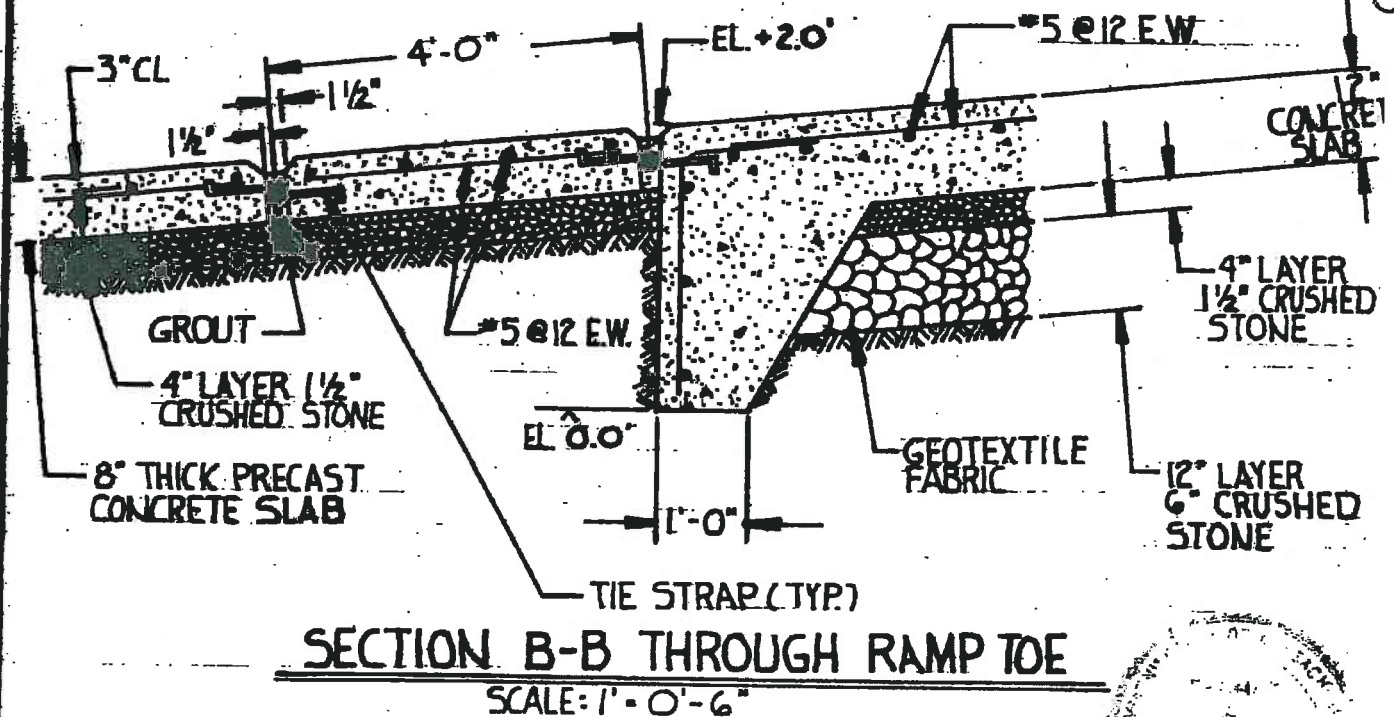
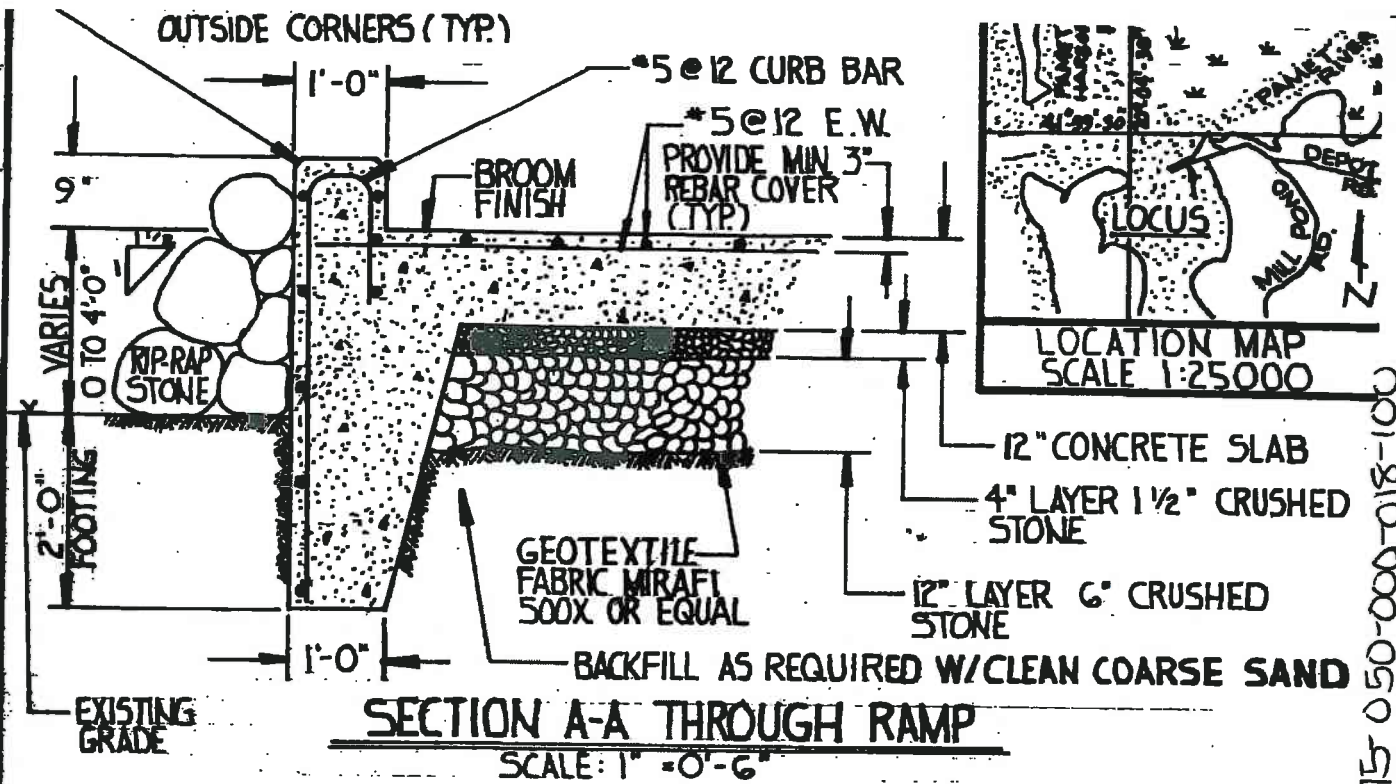


PLANS ACCOMPANYING PETITION OF:
PUBLIC ACCESS BOARD
MASS. DEPT. OF FISHERIES WILDLIFE
AND ENVIRONMENTAL LAW ENFORCEMENT
FOR RECONSTRUCTION OF:
CONCRETE BOAT RAMP
PAMET RIVER PUBLIC ACCESS FACILITY
TRURO, MASS.

COASTAL ENGINEERING CO., ORLEANS, MASS.

LICENSE PLAN NO. 1797

Approved by Department of Environmental Quality Engineering
Date MAY - 9 1988

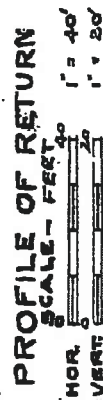
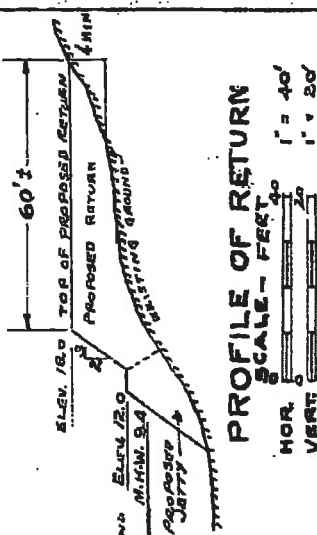
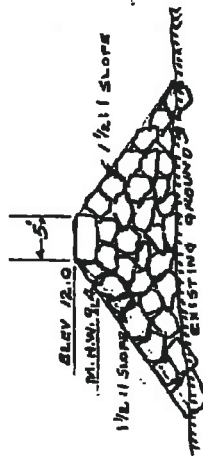
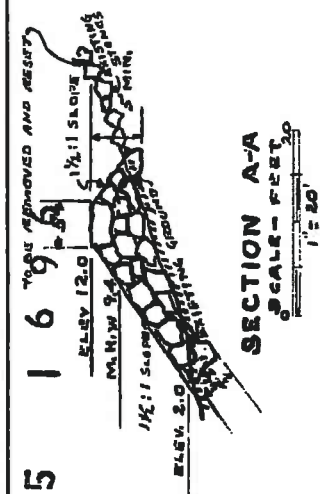
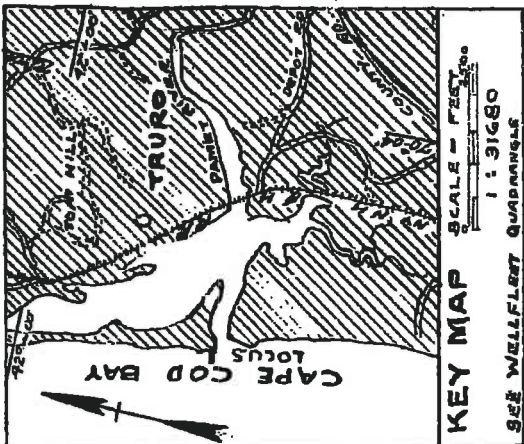


PLANS ACCOMPANYING PETITION OF:
PUBLIC ACCESS BOARD
MASS. DEPT. OF FISHERIES, WILDLIFE
AND ENVIRONMENTAL LAW ENFORCEMENT
FOR RECONSTRUCTION OF:
CONCRETE BOAT RAMP
PAMET RIVER PUBLIC ACCESS FACILITY
TRURO, MASS.

COASTAL ENGINEERING CO., ORLEANS, MASS.

PROJECT PLAN NO. **1797**
Approved by Department of Environmental Quality Engineering
Date: MAY - 9 1988

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
075-049-000-016-100	075-049-000-016-100-COE1A	51-205	USACE	Truro	November 1951	Proposed Stone Jetty at Pamet Harbor - Truro, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	1	Pamet Harbor	North Jetty
075-049-000-019-100	075-049-000-019-100-COE1A	50-225	USACE	Truro	November 1950	Proposed Stone Jetty at Pamet Harbor Truro, Mass - Application by DPW of Massachusetts - Division of Waterways	1	Pamet Harbor	South Jetty

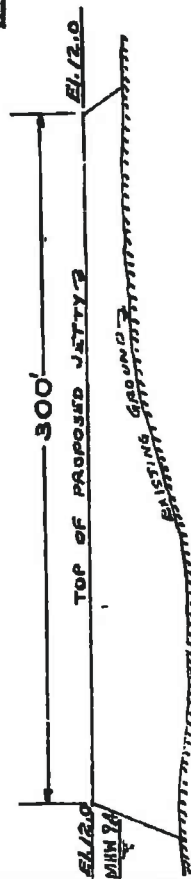
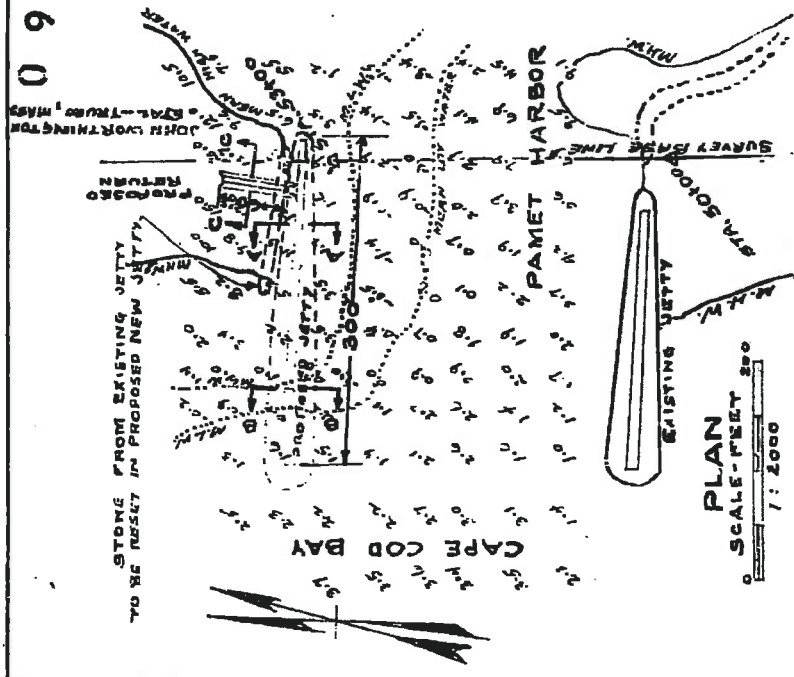


PROPOSED STONE JETTY
AT
PAMET HARBOR
TRURO, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER 1951

W. J. Heston
DISTRICT WATERWAYS ENGINEER

ACC. 02914



PROFILE OF JETTY

SCALE - FEET

HOR. 1" = 80'

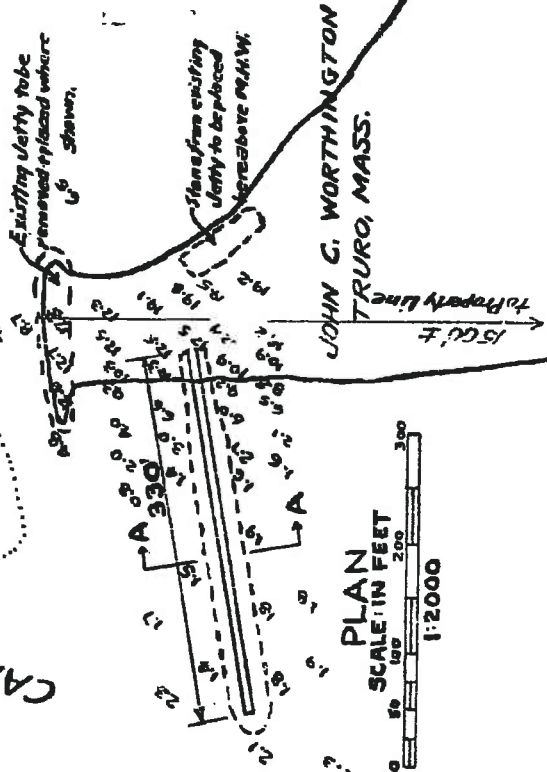
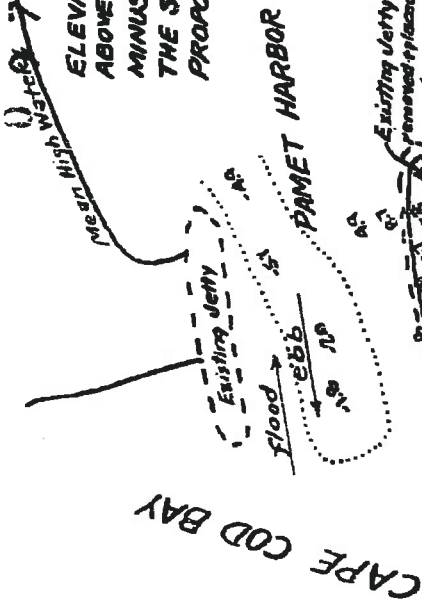
VERT. 1" = 20'

2014

PROPOSED WORK SHOWN IN 1 D
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE
PLANE OF MEAN LOW WATER, MINUS PICTURED SHOW
DEPTHS BELOW THE SAME PLANE.

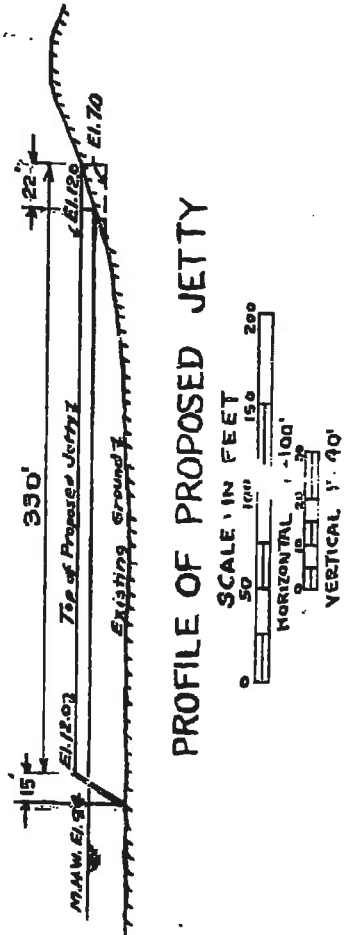
0960

NOTE 3
 ELEVATIONS ARE IN FEET AND TENTHS
 ABOVE THE PLANE OF MEAN LOW WATER.
 MINUS FIGURES SHOW DEPTHS BELOW
 THE SAME PLANE.
 PROPOSED WORK SHOWN IN RED.



PLAN
 SCALE IN FEET
 1:2000

PROFILE OF PROPOSED JETTY



SCALE IN FEET
 HORIZONTAL 1" = 100'
 VERTICAL 1" = 40'

PROPOSED STONE JETTY AT PAMET HARBOR TRURO, MASS.

APPLICATION BY
 DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
 DIVISION OF WATERWAYS
 NOVEMBER 1950

Edward M. Hartigan
 DISTRICT WATERWAYS ENGINEER

Section IV

Wellfleet

Section IV – Community Findings – Town of Wellfleet

COMMUNITY DESCRIPTION

The Town of Wellfleet consists of a land area of 19.84 square miles out of a total area of 35.36 square miles and had a population of 2,749 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 15 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Wellfleet, there were 12 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 4 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 - Town of Wellfleet

Primary Structure (1)	Total Structures		Structure Condition Rating				Total Length
		A	B	C	D	F	
Bulkhead / Seawall	4		2	2			545
Revetment	2	1		1			2735
Breakwater	1		1				1
Groin / Jetty	2		1	1			410
Coastal Dune							
Coastal Beach	3		2	1			2735
	12	1	6	5			6426

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 Wellfleet's case there are a total of 11 structures which would require approximately \$ 3.3 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 of which Wellfleet has none.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Wellfleet

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	4	\$	59,350	\$	363,990		\$ 423,340
Revetment	2			\$	413,457		\$ 413,457
Breakwater	1	\$	213,600				\$ 213,600
Groin / Jetty	2	\$	40,920	\$	66,400		\$ 107,320
Coastal Dune							\$ -
Coastal Beach	3	\$	39,917	\$	2,158,200		\$ 2,198,117
	12	\$ -	\$ 353,787	\$ 3,002,047	\$ -	\$ -	\$ 3,355,834

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Wellfleet

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Town Owned	12	\$	353,787	\$	3,002,047		\$ 3,355,834
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership							\$ -
	12	\$ -	\$ 353,787	\$ 3,002,047	\$ -	\$ -	\$ 3,355,834

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 IV-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Wellfleet'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 - Wellfleet

Part B

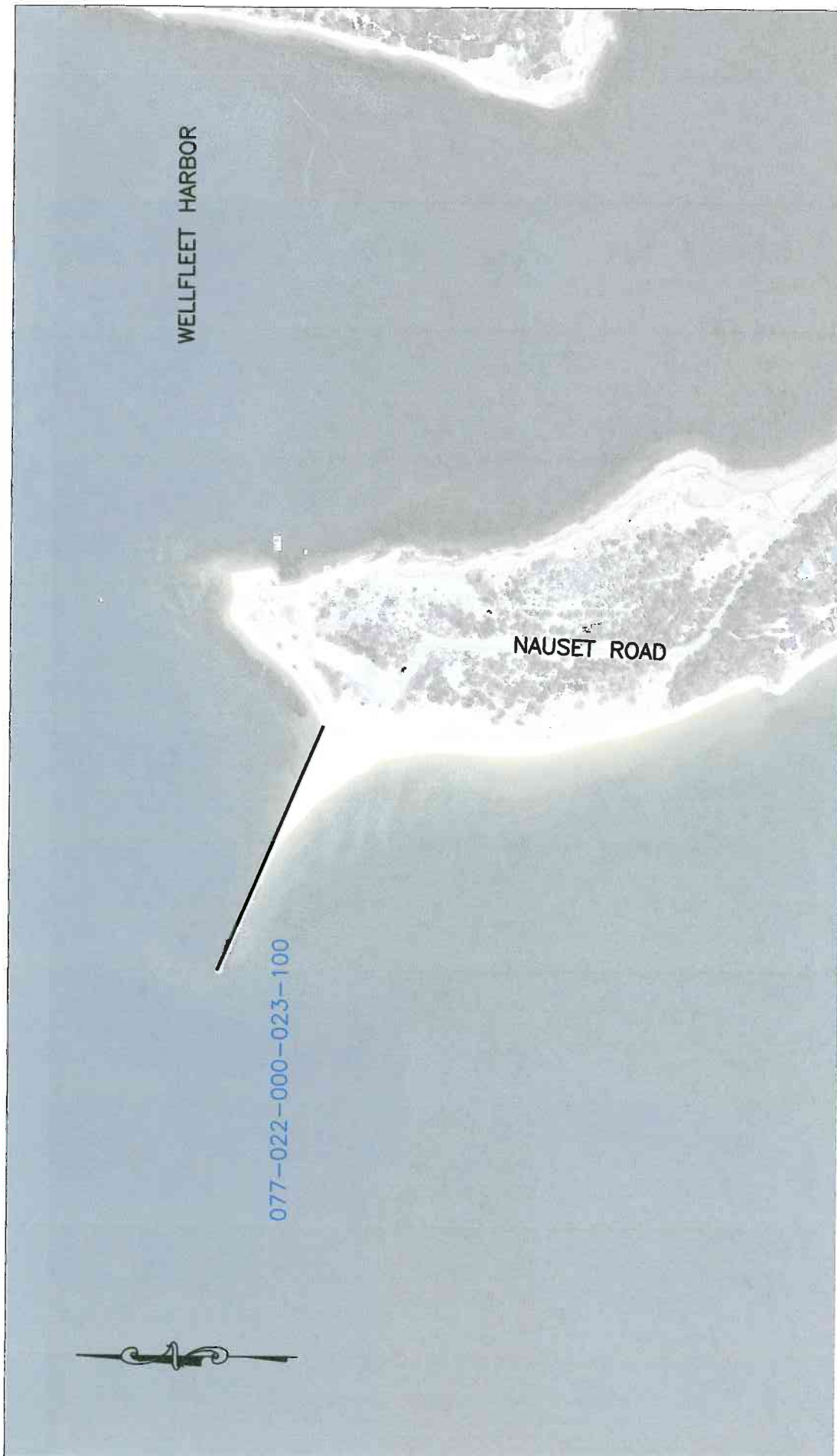
Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF WELFLEET
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007





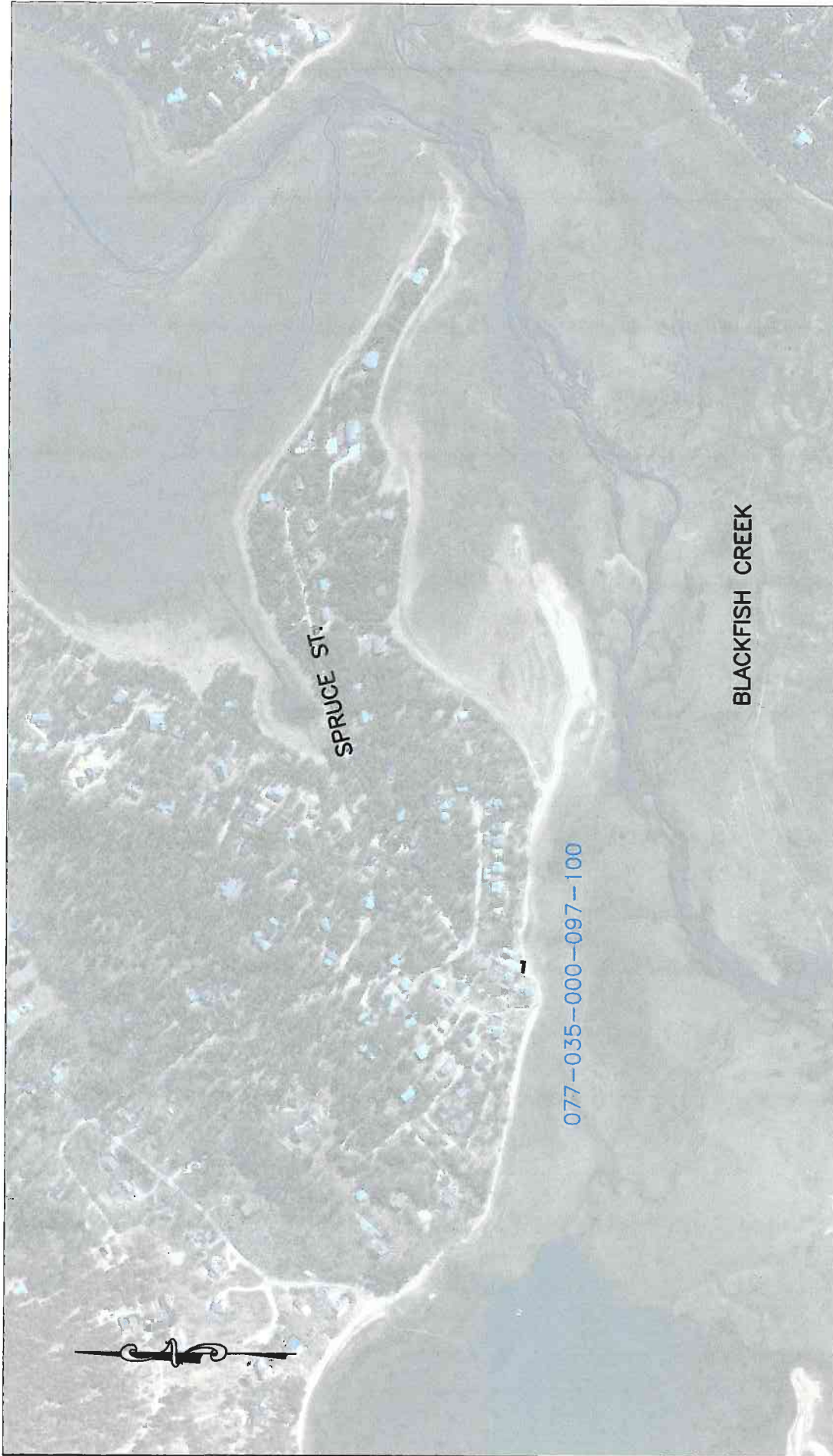
077-022-000-023-100

COASTAL STRUCTURE LOCATION PLAN

TOWN OF WELLFLEET
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**Bourne Consulting Engineering**
2 Acad Street
Framingham, MA 01901
TEL: (508) 535-6888 FAX: (508) 535-6889



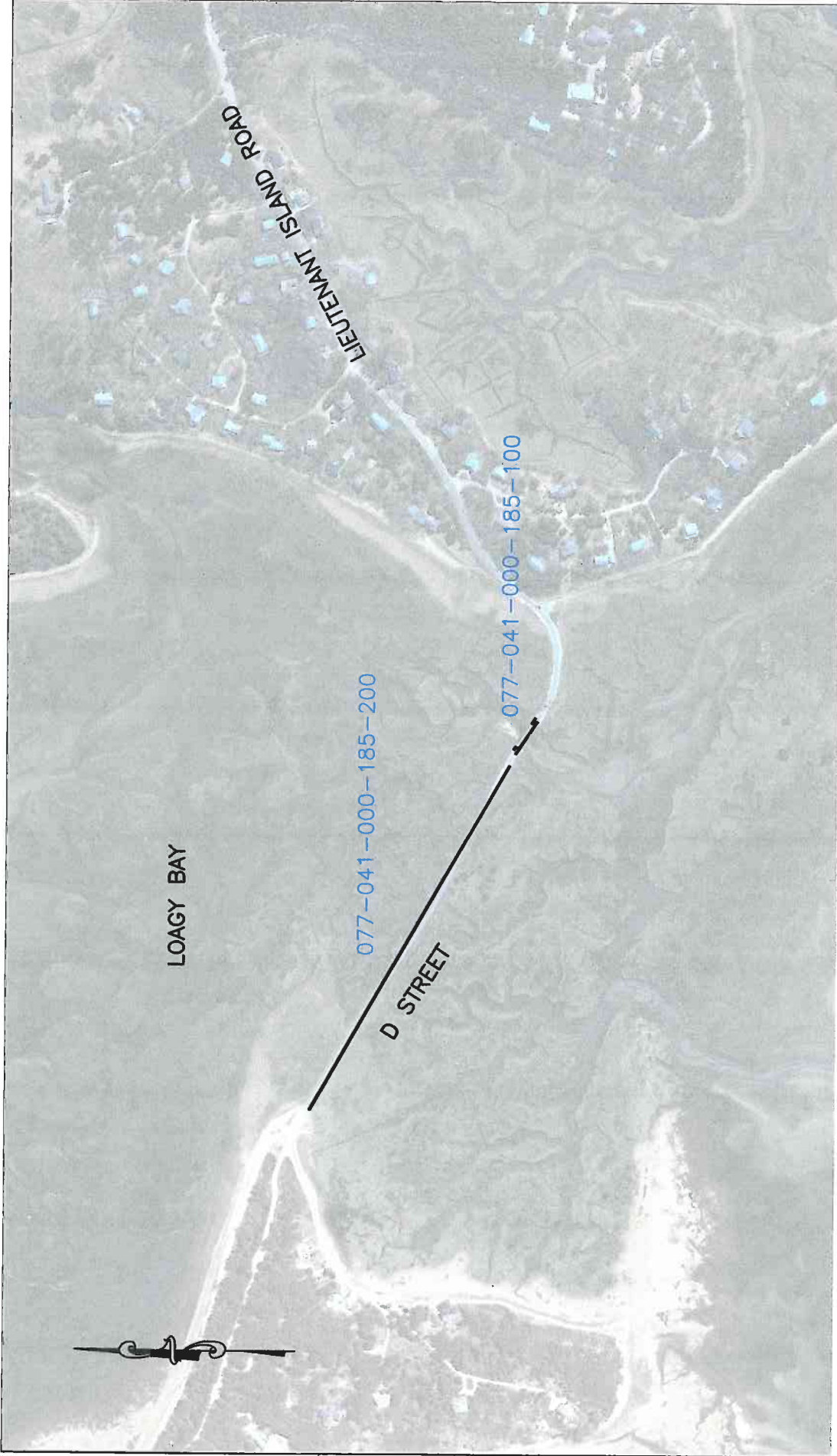
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COASTAL STRUCTURE LOCATION PLAN

TOWN OF WELFLEET
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
OCTOBER 2007

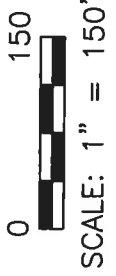


BCE Bourne Consulting Engineering
3 Pond Street
Bourne, MA 01939
TEL: (508) 833-6888 FAX: (508) 833-6889



COASTAL STRUCTURE LOCATION PLAN

TOWN OF WELFLEET
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
OCTOBER 2007



BCE Bourne Consulting Engineering
3 Paul Street
Bourne, MA 01939
TEL: (508) 533-4400 FAX: (508) 533-4400

Structure Assessment FormStructure ID: **077-020-000-004-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Pier

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

1952

Estimated Reconstruction/Repair Cost:

\$52,510.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
260		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The timber bulkhead is in good condition. There is no visible deterioration. The timber piles and overlapping wales are in front to support the bulkhead. Gangways extend off the timber cap. A rail is along the cap. A parking lot with gas pump and storage for the boats is behind the structure.

*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***I***Rating***None***Action***Long Term Planning Considerations***Description*

No Inshore Structures or Residential Dwelling Units Present

Structure Images:**077-020-000-004-100-PHO1A.JPG****077-020-000-004-100-PHO1B.JPG****077-020-000-004-100-PHO1C.JPG****Structure Documents:****USACE****June 1953****Proposed Retaining****077-020-000-004-100-COE1A****MA-DCR****February 19****Proposed Timber****077-020-000-004-100-DCR1A****MA-DCR****March 1955****Proposed Harbor****077-020-000-004-100-DCR1B****MA-DCR****January 195****Proposed Harbor****077-020-000-004-100-DCR1C****MA-DCR****June 1985****Proposed Harbor****077-020-000-004-100-DCR1D**

Structure Assessment FormStructure ID: **077-020-000-004-200**

Key: community-map-block-parcel-structure

Property Owner:

Location:

Date:

Local

Town Pier

10/29/2007

Presumed Structure Owner:

Based On Comment:

Local

Owner Name:

Earliest Structure Record:

Estimated Reconstruction/Repair Cost:

Wellfleet

1953

\$0.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
2400		A3	12
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 :**

The placed stones are well placed. The slope is 1 on 4. It is currently being constructed to continue around the entire pier and replace structure 077-021-000-106-100. The Harbor Master's office and parking are located above it. The stones are on average 1 foot by 2 feet by 3 feet.

Condition

A

Rating

Excellent

Level of Action

None

Description

Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

077-020-000-004-200-PHO2A.JPG

077-020-000-004-200-PHO2B.JPG

Structure Documents:

USACE

June 1953

Proposed Retaining

077-020-000-004-200-COE2A

USACE

November 1

Proposed Mooring

077-020-000-004-200-COE2B

MA-DCR

April 1956

Proposed Harbor

077-020-000-004-200-DCR2A

DEP

November 1

Plan Accompanying

077-020-000-004-200-LIC2A

DEP

December 1

Plans Accompanying

077-020-000-004-200-LIC2B

Structure Assessment FormStructure ID: **077-020-000-005-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Kendrick Avenue and Commercial Street

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

1952

Estimated Reconstruction/Repair Cost:

\$326,040.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
190		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

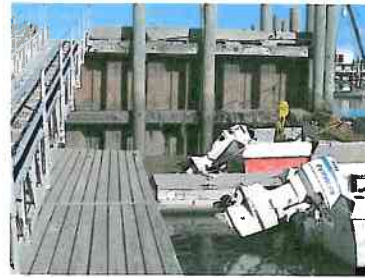
Primary Height:

Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The steel bulkhead is stabilized by timber piles and wales in front of it. There is growth along the tidal zone. The steel is corroding along the top of the bulkhead. A gangway extends to the floats from the top of the cap. There is erosion behind the bulkhead in the parking lot. The timber cap is 1 foot by 1 foot.

*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***I***Rating***None***Action***Long Term Planning Considerations***Description*

No Inshore Structures or Residential Dwelling Units Present

Structure Images:**077-020-000-005-100-PHO1A.JPG****077-020-000-005-100-PHO1B.JPG****Structure Documents:**

USACE	March 1952	Proposed Approach	077-020-000-005-100-COE1A
USACE	June 1953	Proposed Retaining	077-020-000-005-100-COE1B
USACE	December 1	To Construct a Steel	077-020-000-005-100-COE1C
MA-DCR	June 1985	Proposed Harbor	077-020-000-005-100-DCR1A
DEP	June 24, 198	Plan Accompanying	077-020-000-005-100-LIC1A

Structure Assessment Form

Property Owner:

Local

Location:

Kendrick Beach

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$2,158,200.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1090		AE	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Coastal Beach	Sand	Over 15 Feet
Secondary Type:	Secondary Material:	Secondary Height:



Structure Summary :

The beach is at a 1 on 5 slope out to mean high water where it slowly becomes a 1 on 20 grade. There are seashells and grass scattered throughout the beach. A parking lot and restaurant are inshore of the beach. Adjacent to the beach is the town pier.

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:

077-020-000-006-100-PHO1A.JPG

077-020-000-006-100-PHO1B.JPG

077-020-000-006-100-PHO1C.jpg

Structure Documents:

Structure Assessment FormStructure ID: **077-020-000-006-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Kendrick Beach

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unkown

Estimated Reconstruction/Repair Cost:

\$66,400.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
100		A3	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The single stone jetty is comprised of placed stones. The stones are on average 1 foot by 1 foot by 3 feet. The jetty extends from mean high water to mean low water. The stones are buried half way by the sand on either side of the jetty.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

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

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

077-020-000-006-200-PHO2A.JPG

Structure Documents:

Structure Assessment FormStructure ID: **077-020-000-022-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mayo Beach

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$39,917.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
315		A3	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Beach

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The well graded beach has fine brown sand. Sand dunes with debris are inshore. There is a road and houses located inshore also.

*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***IV***Rating***High Priority***Action*

Consider for Next Project Construction Listing

Description

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

Structure Images:**077-020-000-022-100-PHO1A.JPG****077-020-000-022-100-PHO1B.JPG****077-020-000-022-100-PHO1C.JPG****Structure Documents:**

Structure Assessment Form

Town: **Wellfleet**

Structure ID: 077-020-000-022-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mayo Beach

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$40,920.00

Length:

310

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A3

FIRM Map Elevation:

11

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The stone groins extend from the inshore edge of the beach out to mean low water. The stones have been dumped into place. The average stone size is 1 foot by 1 foot by 3 feet.

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:

077-020-000-022-200-PHO2A.JPG

Structure Documents:

Structure Assessment Form

Structure ID: 077-021-000-106-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Commercial Street

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

1958

Estimated Reconstruction/Repair Cost:

\$413,457.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
335		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The dumped stone revetment has minor stone movement. The road located behind the revetment is paved into the top stones. There is a guardrail along the top. There are multiple drain pipes coming out of the stones. A restaurant is located across the road.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

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

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

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

Structure Images:

077-021-000-106-100-PHO1A.JPG

077-021-000-106-100-PHO1B.JPG

077-021-000-106-100-PHO1C.JPG

Structure Documents:

MA-DCR

November 1

Proposed Harbor

077-021-000-106-100-DCR1A

Structure Assessment Form

Town: **Wellfleet**

Structure ID: 077-022-000-023-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Nauset Road

Date:

11/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

1957

Estimated Reconstruction/Repair Cost:

\$213,600.00

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

Primary Type:

Breakwater

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The breakwater consists of armor stones that vary from 4 to 8 tons. The structure is in good condition. There is no visible scour. There is sand build up against the armor, except at the head. Crest elevation is level.

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:

077-022-000-023-100-PHO1A.JPG

077-022-000-023-100-PHO1B.JPG

077-022-000-023-100-PHO1C.JPG

077-022-000-023-100-PHO1D.JPG

Structure Documents:

MA-DCR

June 1957

Proposed Harbor

077-022-000-023-100-DCR1A

Structure Assessment FormStructure ID: **077-035-000-097-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pleasant Point Landing

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unkown

Estimated Reconstruction/Repair Cost:

\$37,950.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
50		V4	15
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

The cast in place wall has minor cracking throughout. There is a good amount of deterioration at places of rebar. Multiple PVC drains located at top of wall. A fence is on top of the wall with a staircase to the marsh outshore. The wall is located at the very end of the road. The adjacent houses have private bulkheads in front of them. The sand has drifted to one side of the wall, leaving the corner of the wall more exposed.

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

Structure Images:**077-035-000-097-100-PHO1A.JPG****077-035-000-097-100-PHO1B.JPG****Structure Documents:**

Structure Assessment Form

Town: **Wellfleet**Structure ID: **077-041-000-185-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

D Street Bridge

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Wellfleet

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$6,840.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
45		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

Under 5 Feet

Secondary Type:

Revetment

Secondary Material:

Stone

Secondary Height:

Under 5 Feet



Structure Summary :

The timber bulkhead is in good condition. There is no visible scour. The riprap is 6 inches in diameter. The stones have been dumped under the timber bridge to stabilize the embankment. There is minor stone movement. The bridge is the only access road from the island to mainland.

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

V

Rating

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:

077-041-000-185-100-PHO1A.jpg

077-041-000-185-100-PHO1B.jpg

077-041-000-185-100-PHO1C.jpg

077-041-000-185-100-PHO1D.jpg

077-041-000-185-100-PHO1E.jpg

Structure Documents:

Structure Assessment Form

Structure ID: 077-041-000-185-200

Key: community-map-block-parcel-structure

Property Owner:

Location:

Date:

Local

D Street Causeway

10/29/2007

Presumed Structure Owner:

Based On Comment:

Local

Owner Name:

Earliest Structure Record:

Estimated Reconstruction/Repair Cost:

Wellfleet

Unknown

\$69,160.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1330		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Coastal Beach	Sand	Under 5 Feet
Secondary Type:	Secondary Material:	Secondary Height:



Structure Summary :

The causeway is the only access/egress on Lieutenant Island. The causeway is covered at high tide. The edges of the causeway have no slope to them.

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

V

Rating

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:

077-041-000-185-200-PHO2A.jpg

Structure Documents:

Section IV - Wellfleet

Part C

Structure Photographs

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
077-020-000-004-100	077-020-000-004-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-004-100	077-020-000-004-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-004-100	077-020-000-004-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-004-200	077-020-000-004-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-004-200	077-020-000-004-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-005-100	077-020-000-005-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-005-100	077-020-000-005-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-006-100	077-020-000-006-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-006-100	077-020-000-006-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-006-100	077-020-000-006-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-006-200	077-020-000-006-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-022-100	077-020-000-022-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-022-100	077-020-000-022-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-020-000-022-200	077-020-000-022-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-021-000-106-100	077-021-000-106-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-021-000-106-100	077-021-000-106-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-021-000-106-100	077-021-000-106-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-022-000-023-100	077-022-000-023-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-022-000-023-100	077-022-000-023-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-022-000-023-100	077-022-000-023-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-022-000-023-100	077-022-000-023-100-PHO1D.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-035-000-097-100	077-035-000-097-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
077-035-000-097-100	077-035-000-097-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-100	077-041-000-185-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-100	077-041-000-185-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-100	077-041-000-185-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-100	077-041-000-185-100-PHO1D.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-100	077-041-000-185-100-PHO1E.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-200	077-041-000-185-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
077-041-000-185-200	077-041-000-185-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

Massachusetts Coastal Infrastructure and Assessment



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077-020-000-004-100-PHO1B



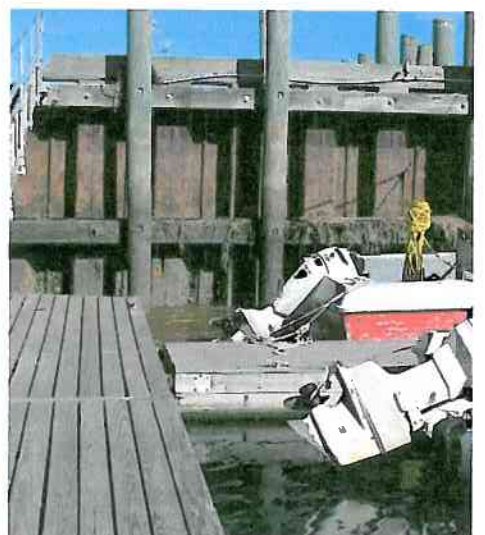
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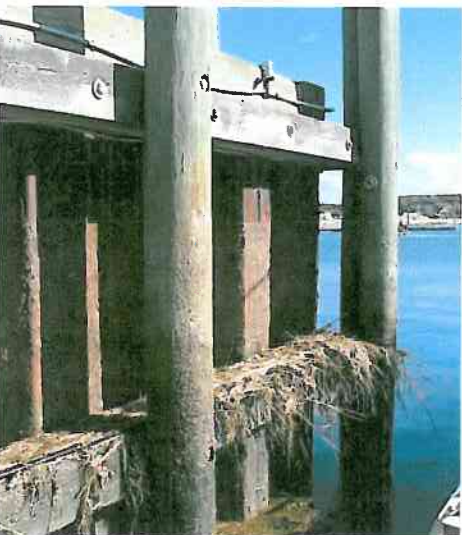
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077-020-000-005-100-PHO1B



077-020-000-006-100-PHO1A



077-020-000-006-100-PHO1B

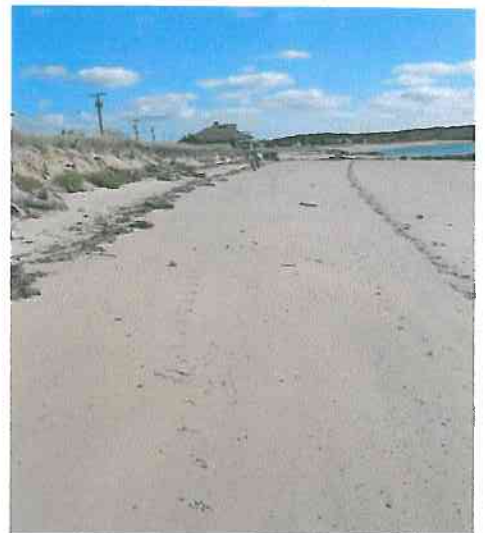
Massachusetts Coastal Infrastructure and Assessment



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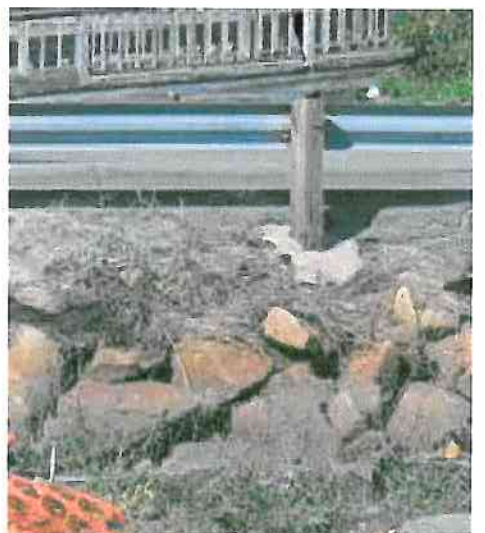
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077-020-000-022-200-PHO2A



077-021-000-106-100-PHO1A



077-021-000-106-100-PHO1B



077-021-000-106-100-PHO1C



077-022-000-023-100-PHO1A

Massachusetts Coastal Infrastructure and Assessment



077-022-000-023-100-PHO1B



077-022-000-023-100-PHO1C



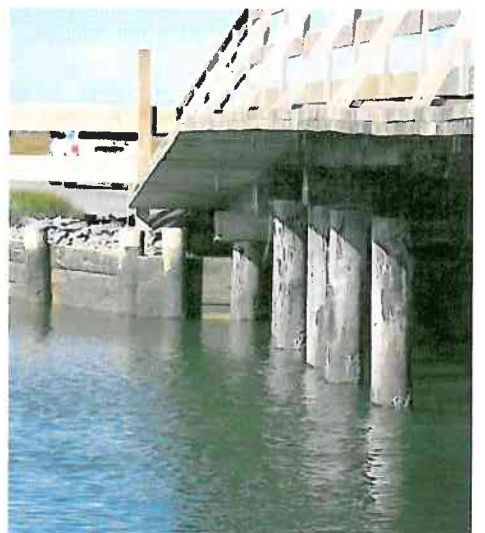
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077-035-000-097-100-PHO1A



077-035-000-097-100-PHO1B



077-041-000-185-100-PHO1A



077-041-000-185-100-PHO1B



077-041-000-185-100-PHO1C



077-041-000-185-100-PHO1D

Massachusetts Coastal Infrastructure and Assessment



077-041-000-185-100-PHO1E



077-041-000-185-200-PHO2A



077-041-000-185-200-PHO2B

Section IV - Wellfleet

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: WELFLEET
 SOURCE: Town of Welfleet
 LOCATION: TOWN
 DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
077-020-000-004-200	077-020-000-004-200-TWN2A	1208	Harbor Master	Welfleet	Feb-52	Proposed Timber Pier and Bulkhead - Welfleet Harbor - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	3	Town Pier	Bulkhead
077-020-000-004-200	077-020-000-004-200-TWN2B	1372	Harbor Master	Welfleet	Mar-54	Proposed Stone Protection - Construction of Stone Revetment - Welfleet Harbor - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	1	Town Pier	Revetment
077-020-000-004-200	077-020-000-004-200-TWN2C	1478	Harbor Master	Welfleet	Mar-55	Proposed Harbor Development - Dredging and Timber Bulkhead - Welfleet Harbor - Town Pier to Shifra Point - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	4	Town Pier	Timber Bulkhead
077-020-000-004-200	077-020-000-004-200-TWN2D	1567	Harbor Master	Welfleet	Jan-56	Proposed Harbor Development - Timber Quay/Wharf and Bulkhead - Welfleet Harbor - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	3	Town Pier	Bulkhead
077-020-000-004-200	077-020-000-004-200-TWN2E	3088	Harbor Master	Welfleet	Jun-58	Proposed Harbor Improvements - Bulkhead Extension and Dredging at Town Pier - Welfleet Harbor - Welfleet, Massachusetts	2	Town Pier	Bulkhead
077-020-000-004-200	077-020-000-004-200-TWN2F	1858	Harbor Master	Welfleet	Sep-58	Proposed Harbor Improvements - Dredging and Marina Extension - Prepared for the DPW of Massachusetts - Division of Waterways	4	Town Pier	Revetment
077-020-000-004-200	077-020-000-004-200-TWN2G	1975	Harbor Master	Welfleet	Nov-58	Proposed Harbor Improvements - Stone Revetment and Groin - Welfleet Harbor - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	1	Town Pier	Revetment
077-020-000-006-200	077-020-000-008-200-TWN2A	494	Harbor Master	Welfleet	May-37	Proposed Stone Protection - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	1	Mayo and Kendrick Beach	Groins
077-020-000-022-200	077-020-000-022-200-TWN2A	494	Harbor Master	Welfleet	May-37	Proposed Stone Protection - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	1	Mayo and Kendrick Beach	Groins
077-022-000-023-100	077-022-000-023-100-TWN2A	1768	Harbor Master	Welfleet	Jun-57	Proposed Harbor Development - Stone Breakwater and Groin - Welfleet Harbor - Welfleet - Prepared for the DPW of Massachusetts - Division of Waterways	4	Nauset Road	Breakwater

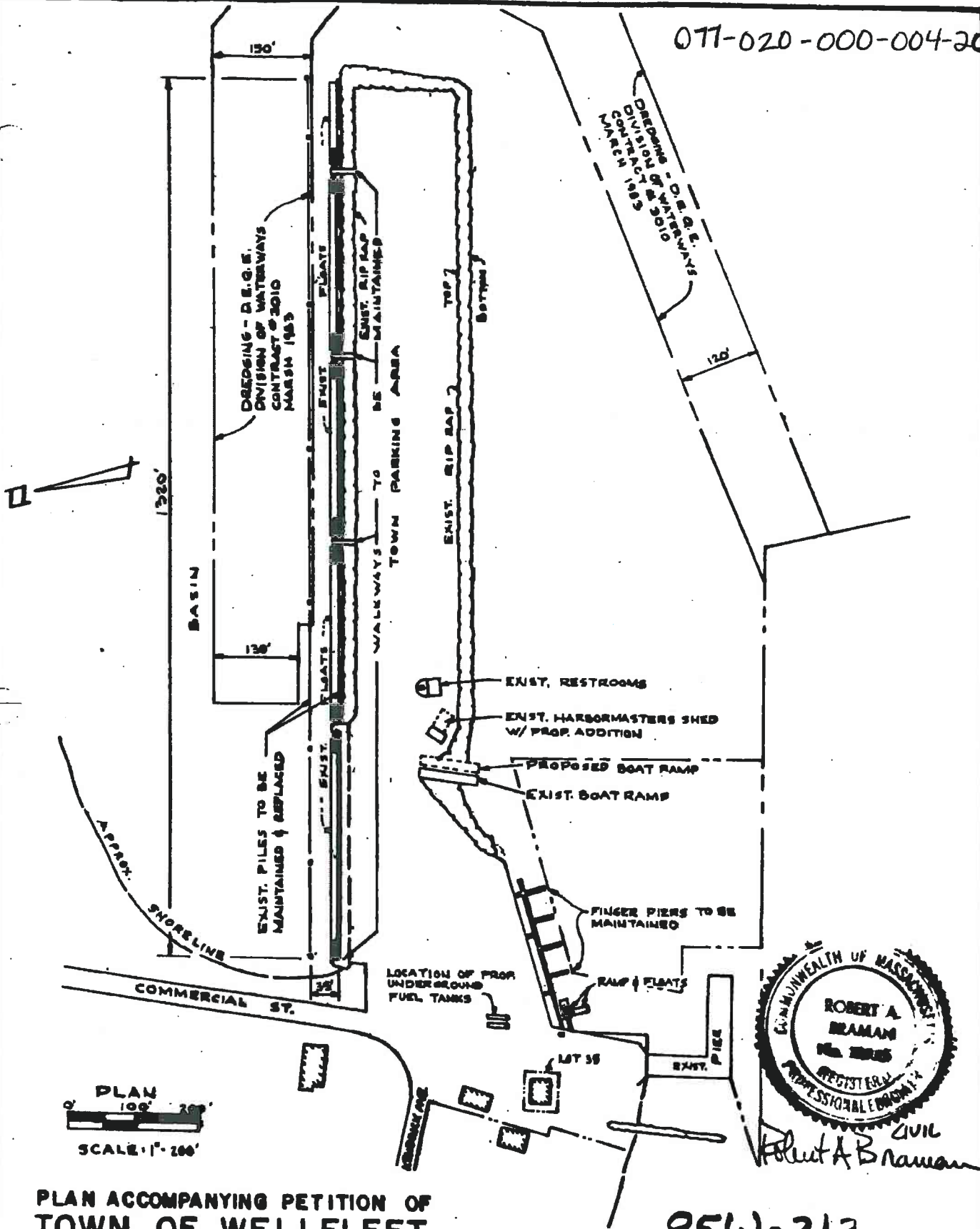
TOWN: WELFLEET
 SOURCE: MA-DCR
 LOCATION: MA-DCR BOSTON and HINGHAM, MA
 DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
077-020-000-004-100	077-020-000-004-100-DCR1A	1208	MA-DCR	Welfleet	February 1952	Proposed Timber Pier and Bulkhead - Welfleet Harbor, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	3	Mayos Beach Road	Timber Pier and Bulkhead
077-020-000-004-100	077-020-000-004-100-DCR1B	1478	MA-DCR	Welfleet	March 1955	Proposed Harbor Development - Dredging and Timber Bulkhead - Welfleet Harbor - Town Pier to Shirltail Point, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	4	Town Pier	Timber Bulkhead
077-020-000-004-100	077-020-000-004-100-DCR1C	1567	MA-DCR	Welfleet	January 1956	Proposed Harbor Development - Timber Quay Wharf and Bulkhead - Welfleet Harbor, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	3	Commercial Street	Bulkhead
077-020-000-004-100	077-020-000-004-100-DCR1D	3086	MA-DCR	Welfleet	June 1985	Proposed Harbor Improvements - Bulkhead Replacement and Dredging at Town Pier - Welfleet Harbor, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	3	Town Pier	Bulkhead
077-020-000-004-200	077-020-000-004-200-DCR2A	1606	MA-DCR	Welfleet	April 1956	Proposed Harbor Development - Concrete Boat Ramp - Welfleet Harbor - Vicinity of Town Pier - Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	1	Town Pier	Boat Ramp with Stone
077-020-000-005-100	077-020-000-005-100-DCR1A	3086	MA-DCR	Welfleet	June 1985	Proposed Harbor Improvements - Bulkhead Replacement and Dredging at Town Pier - Welfleet Harbor - Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	3	Shirltail Point	Bulkhead
077-021-000-106-100	077-021-000-106-100-DCR1A	1975	MA-DCR	Welfleet	November 1958	Proposed Harbor Improvements - Stone Revetment and Grading - Welfleet Harbor, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	1	Commercial Street	Revetment
077-022-000-023-100	077-022-000-023-100-DCR1A	1768	MA-DCR	Welfleet	June 1957	Proposed Harbor Development - Stone Breakwater and Groin - Welfleet Harbor, Welfleet - Prepared for DPW of Massachusetts - Division of Waterways	4	Welfleet Harbor	Breakwater

TOWN: WELLFLEET
 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
077-020-000-004-200	077-020-000-004-200-LIC2A	1395	DEP	Wellfleet	November 1995	Plan Accompanying Petition of Town of Wellfleet - To Construct a Boat Ramp and Maintain Timber Walkways, Finger Piers and Piles - Wellfleet Harbor - Wellfleet, Mass.	4	Town Pier	Existing Riprap
077-020-000-004-200	077-020-000-004-200-LIC2B	9497	DEP	Wellfleet	December 16, 2002	Plans Accompanying Petition of the Town of Wellfleet to Reconstruct the Existing Boat Ramp License # (DPW Contract 1606) And Provide Pile Mounted Boarding Floats. Located within Wellfleet Harbor, Barnstable County, Wellfleet, MA.	5	Wellfleet Harbor	revelment
077-020-000-005-100	077-020-000-005-100-LIC1A	1263	DEP	Wellfleet	June 24, 1995	Plan Accompanying Petition of Department of Environmental Management Division of Waterways to Construct a Steel Bulkhead Dredge and Dispose of Dredge Material in Wellfleet Harbor, Wellfleet, MA	4	Wellfleet Harbor	Bulkhead

077-020-000-004-200



PLAN ACCOMPANYING PETITION OF
TOWN OF WELFLEET
TO CONSTRUCT A BOAT RAMP & MAINTAIN
TIMBER WALKWAYS, FINGER PIERS AND PILES
WELFLEET HARBOR
WELFLEET, MASS.

NOV. 26, 1985

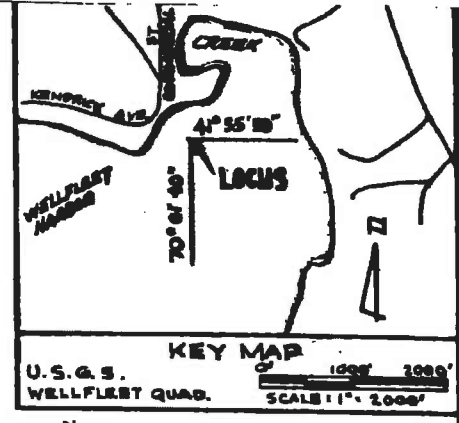
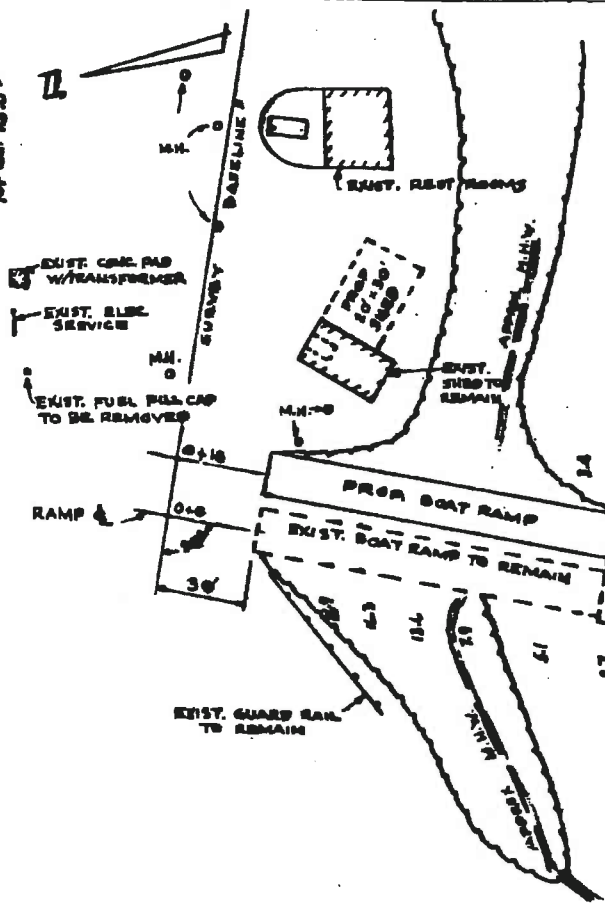
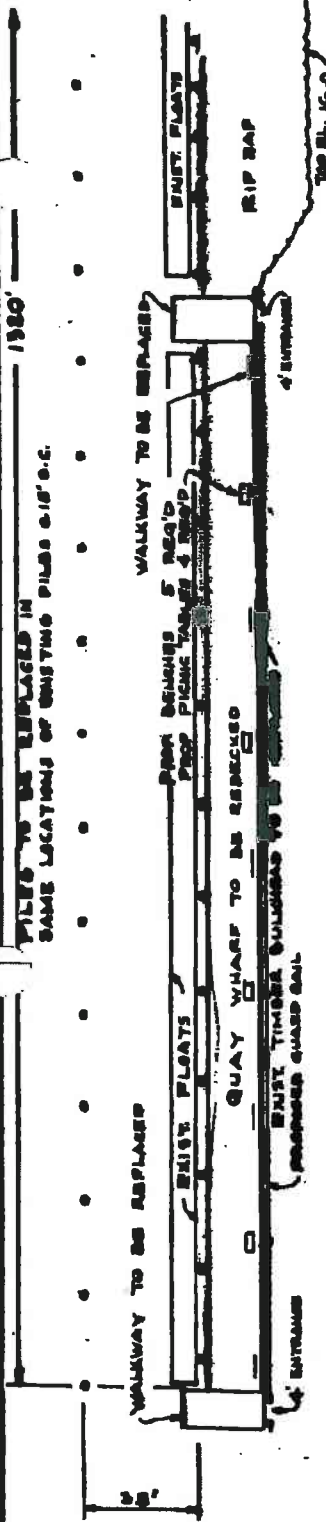
SHEET 1 OF 4

BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & ARCHITECTS

85W-212

LICENSE PLAN NO. 1395
Approved by Department of Environmental Quality Engineering
of Massachusetts
[Signature]
COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF

PILES TO BE REPLACED IN SAME LOCATIONS OF EXISTING PILES 6" x 6" S.C.



NOTES:

- 300 PILES REQUIRED TO REPLACE EXIST. FLAT PILES AND FLOAT PILES W/ BATTER PILES. EXISTING SPACING TO REMAIN UNCHANGED.
- ELEVATIONS ARE IN FEET AND TENTHS AND ARE BASED ON THE PLANE OF MEAN LOW WATER. MINUS FIGURES REPRESENT DEPTHS BELOW THAT SAME PLANE.
- IT IS PROPOSED TO REPLACE 15 LIGHT POLES. LOCATION TO BE DETERMINED IN THE FIELD.
- ALL TIMBERS TO BE CCA TREATED @ 1.0 p.c.f.
- ALL TIMBER PILES TO BE CCA TREATED @ 2.5 p.c.f.



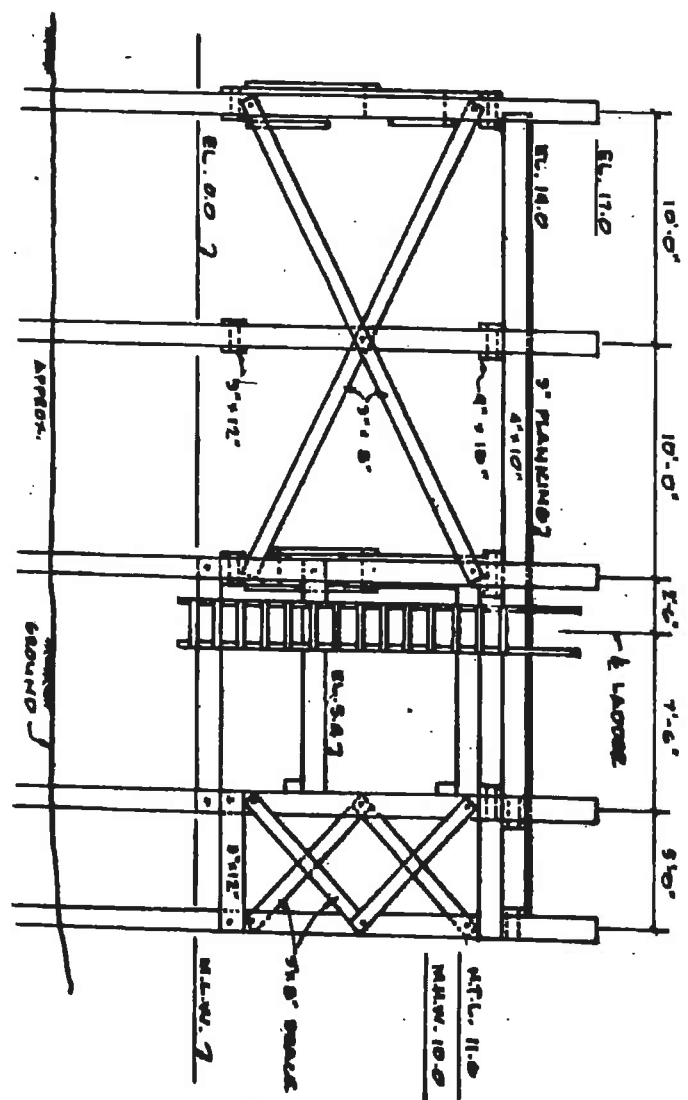
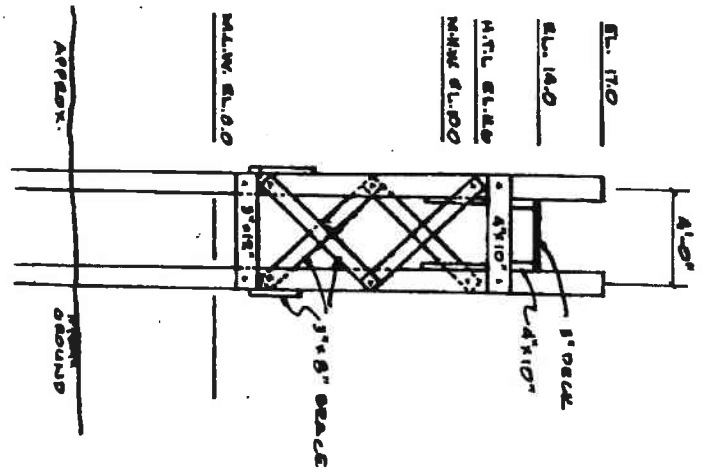
LICENSE PLAN NO. 7375
 Approved by Department of Environmental Quality Engineering
 Date:

Robert A. Braman

85W-212

077-020-000-004-200

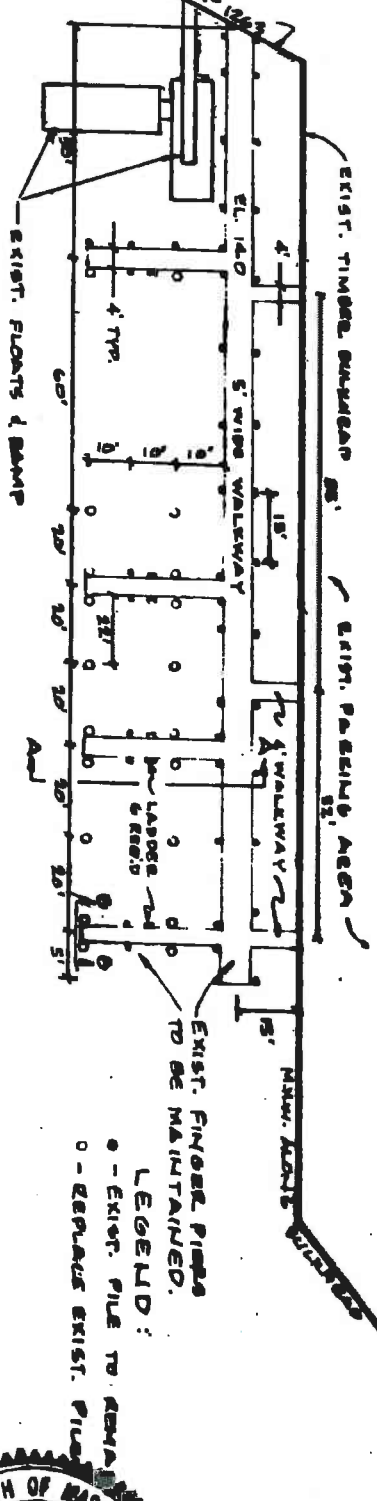
002-H00-000-020-110



SECTION B-B

FINNER PIER DETAILS
SCALE: 1/8" = 1'-0"

SECTION A-A



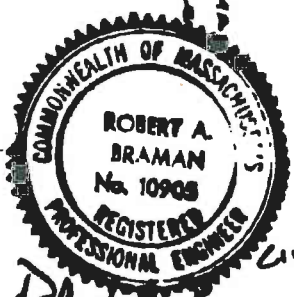
FINNER

PIER

PLAN

SCALE: 1" = 40'

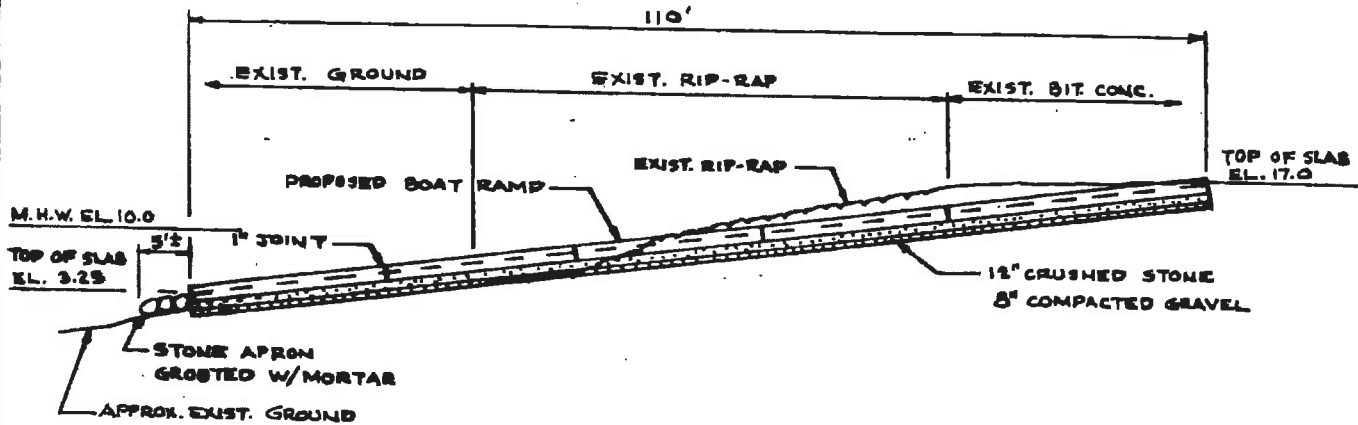
EXIST. FINNER PIER
TO BE MAINTAINED.
LEGEND:
○ - EXIST. PILE TO REMAIN
○ - REPLACE EXIST. PILE



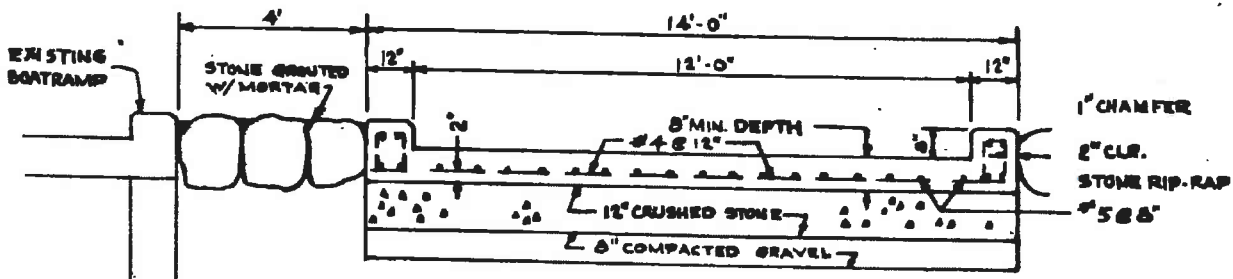
LICENSE PLAN NO. 1395
Approved by Department of Environmental Quality Engineering
Date

85W-212

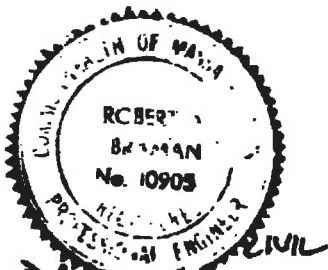
Robert A. Braman



PROFILE OF BOATRAMP
SCALE: 1" = 20'



SECTION OF BOATRAMP
SCALE: 1" = 4'



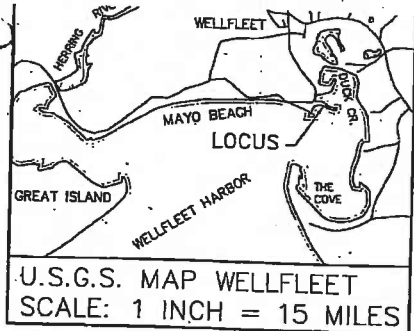
Robert A. Branan

LICENSE PLAN NO. 1375

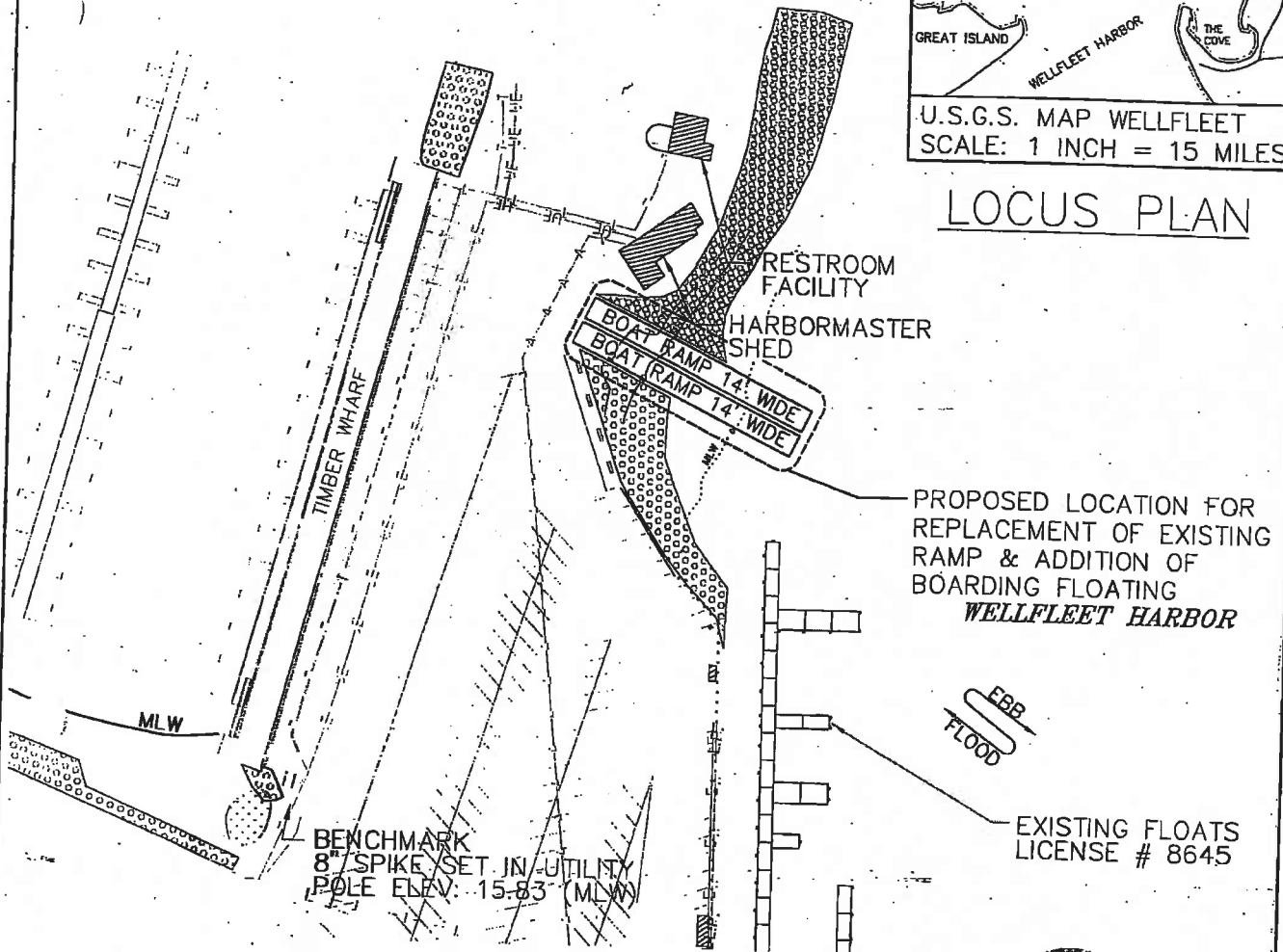
Approved by Department of Environmental Quality Engineering
Date:

85W-212

077-020-000-004-200



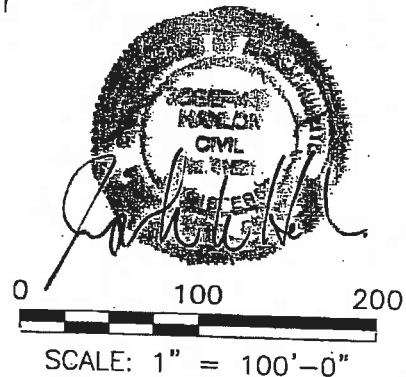
LOCUS PLAN



LEGEND:

- W — WATER LINE
- T — BURIED TELEPHONE LINE
- E — ELECTRICAL LINE
- UE — BURIED ELECTRICAL LINE
- A — BURIED FUEL ALARM CABLE

REVISED: 2/22/00



PLANS ACCOMPANYING PETITION OF THE TOWN OF WELFLEET TO RECONSTRUCT THE EXISTING BOAT RAMP LICENSE # (DPW CONTRACT 1606) AND PROVIDE PILE MOUNTED BOARDING FLOATS. LOCATED WITHIN WELFLEET HARBOR, BARNSTABLE COUNTY, WELFLEET, MA.

APRIL 2002
SHEET 1 OF 5

LICENSE PLAN NO. 9497
 Approved by Department of Environmental Protection
 of Massachusetts
Michael J. Ciancina
James C. Turner DEC 16 2002

W02-0529

077-020-000-004-200

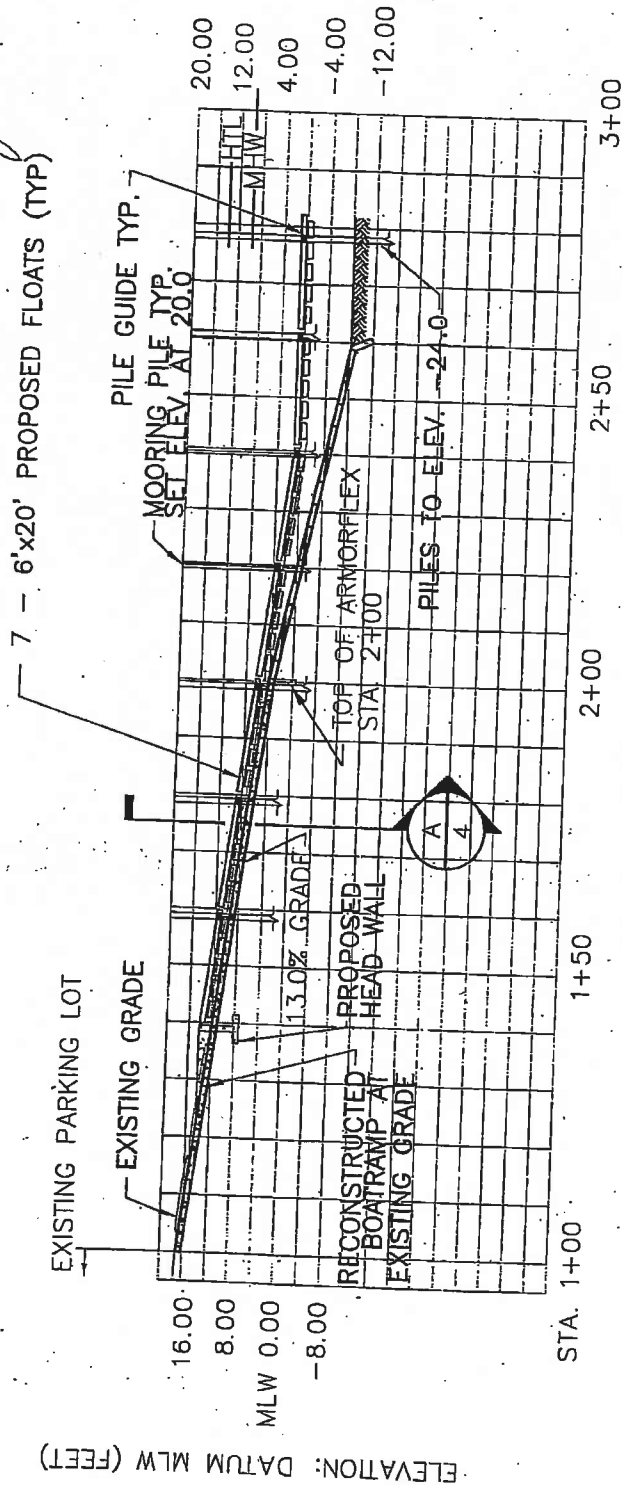
NOTES:

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077-620-000-004-200



EXISTING AND PROPOSED BOATRAMP



CROSS SECTION FOR PROPOSED BOATRAMP

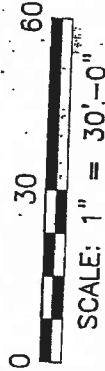


SCALE: 1" = 30'-0"

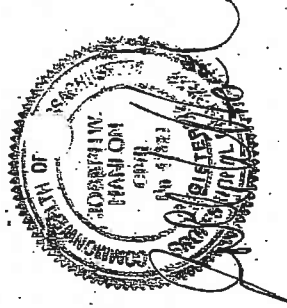
LICENSE PLAN NO. 9497

Approved by Department of Environmental Protection

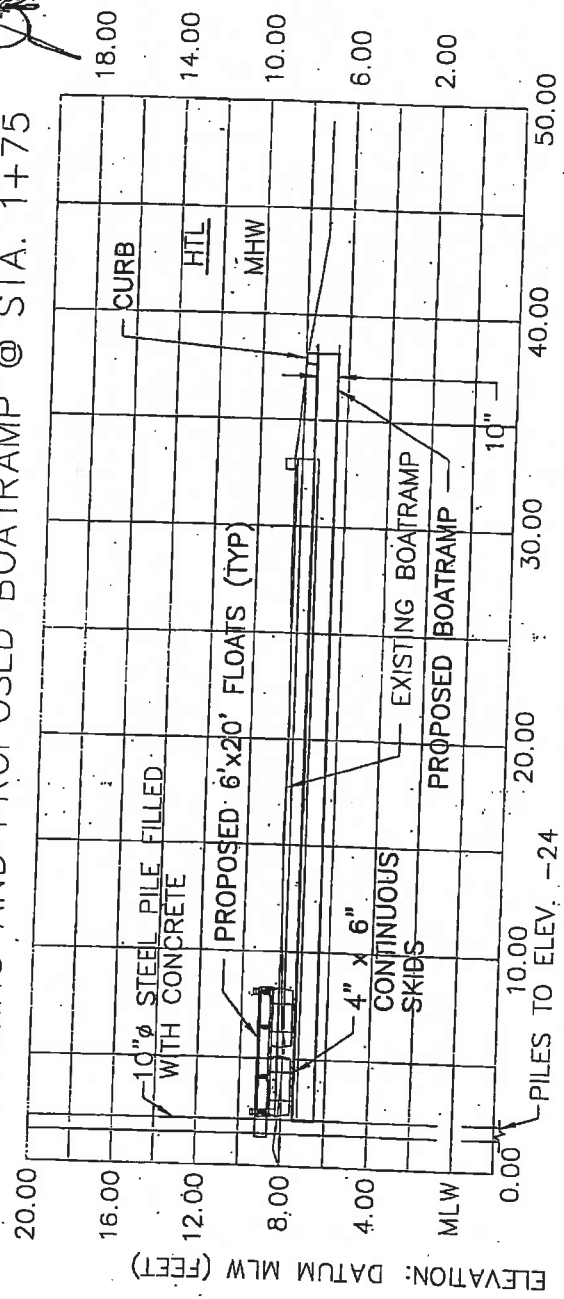
DEC 19 2002



077-020-000-004-200



EXISTING AND PROPOSED BOATRAMP @ STA. 1+75



CROSS SECTION FOR PROPOSED BOATRAMP



SCALE: 1/8" = 1'-0"

LICENSE NO. 9497
Approved by Department of Environmental Protection
Date: DEC 19 2002

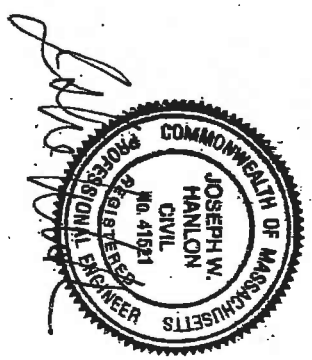
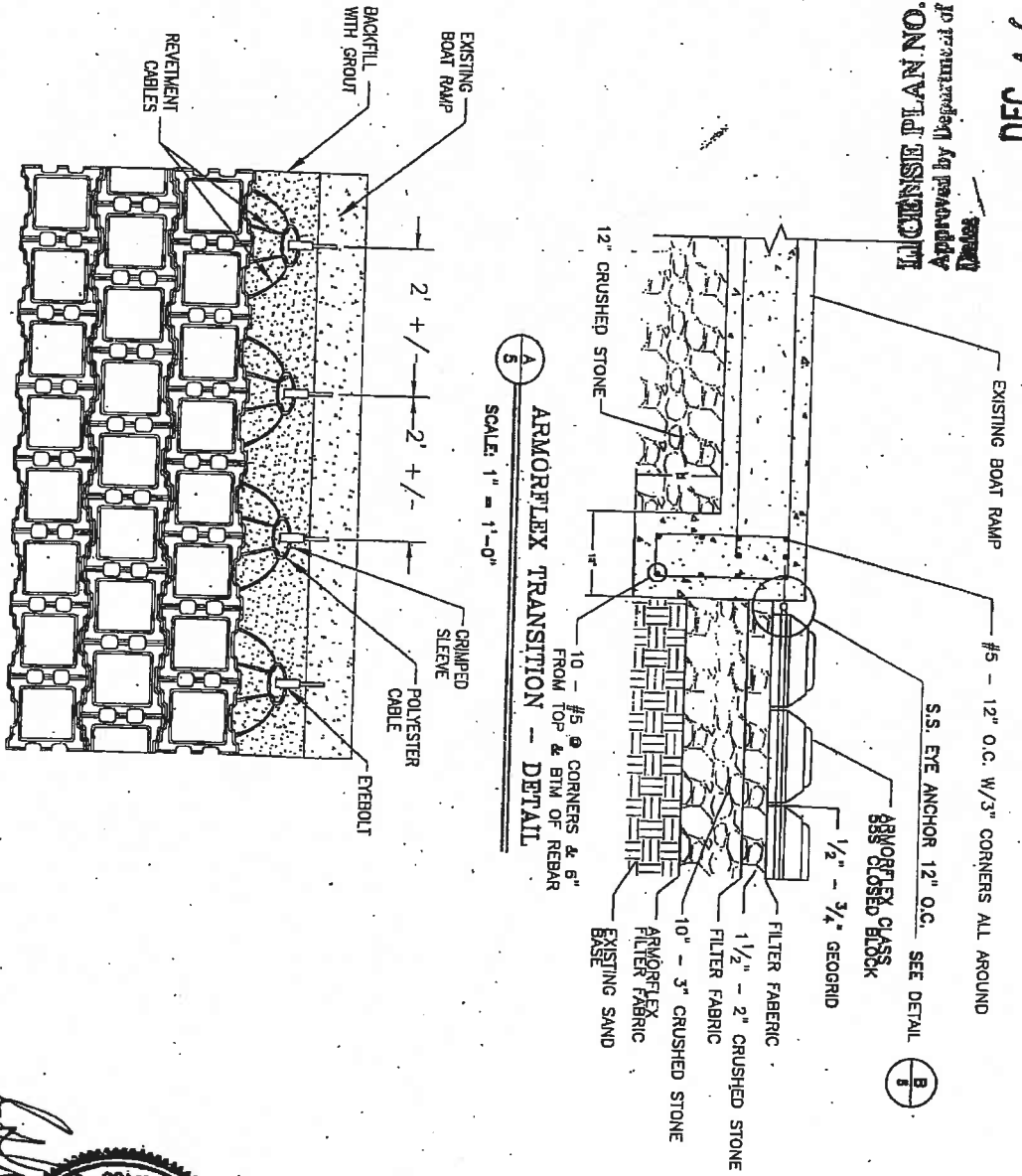


DEC 16 2002

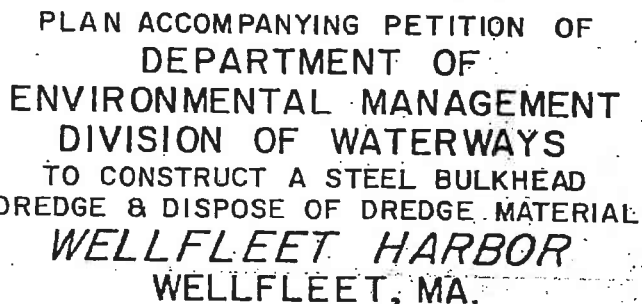
LICENSE PLAN NO. 69497
Approved by Department of Environmental Protection
Date

002-400-000-020-LL0

APRIL 2002
SHEET 5 OF 5



1. Elevations are in feet and tenths above the plane of Mean Low Water. Minus figures represent depths below that same plane.
2. All timbers to be CCA treated @ 2.5%/C.F.
3. 2550 cu³ to be dredged. 350 cu³ of clean sandy material to be placed behind prop bulkhead; where required. 400 cu³ of clean sandy material to be placed at prop disposal site on Mayo Beach. Dredge material not suitable for beach disposal is to be trucked and dumped at the town disposal site. Located on Coles Neck Road. Approx. 1300 cu³



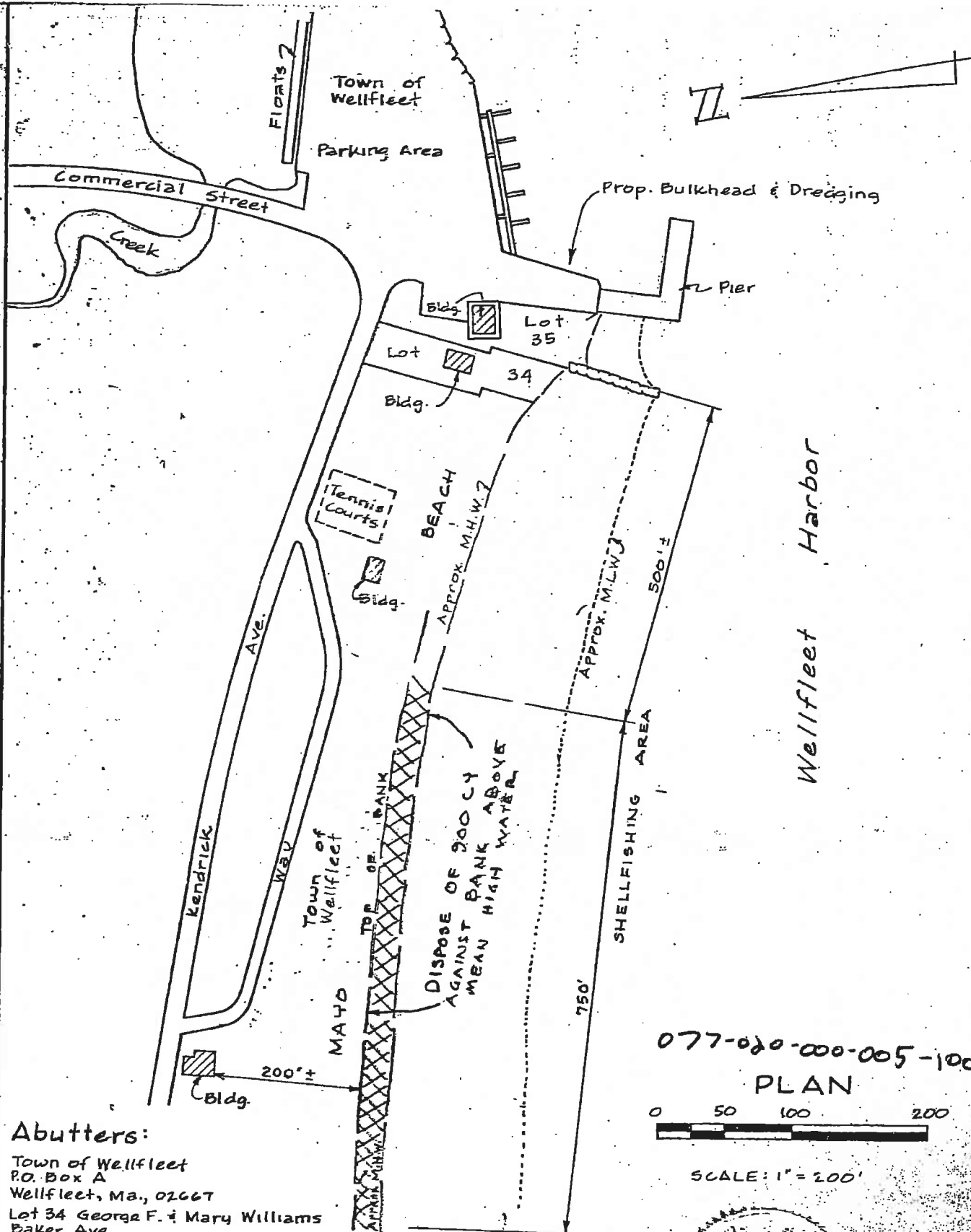
SHEET 1 OF 4

BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS

85 W-017

Approved by Department of Environmental Quality Engineering
of Massachusetts JUNE 24, 1985

W. Marshall Hy 2 COMMISSIONER
John Zorn CHIEF ENGINEER



Abutters:

Town of Wellfleet
P.O. Box A
Wellfleet, Ma., 02667
Lot 34 George F. & Mary Williams
Baker Ave.
Wellfleet, Ma., 02667
Lot 35 Albert & Bertha Larsen
West Main Street
Wellfleet, Ma., 02667

LICENCE PLAN NO. 1263

85W-017

Approved by Department of Environmental Quality Engineering

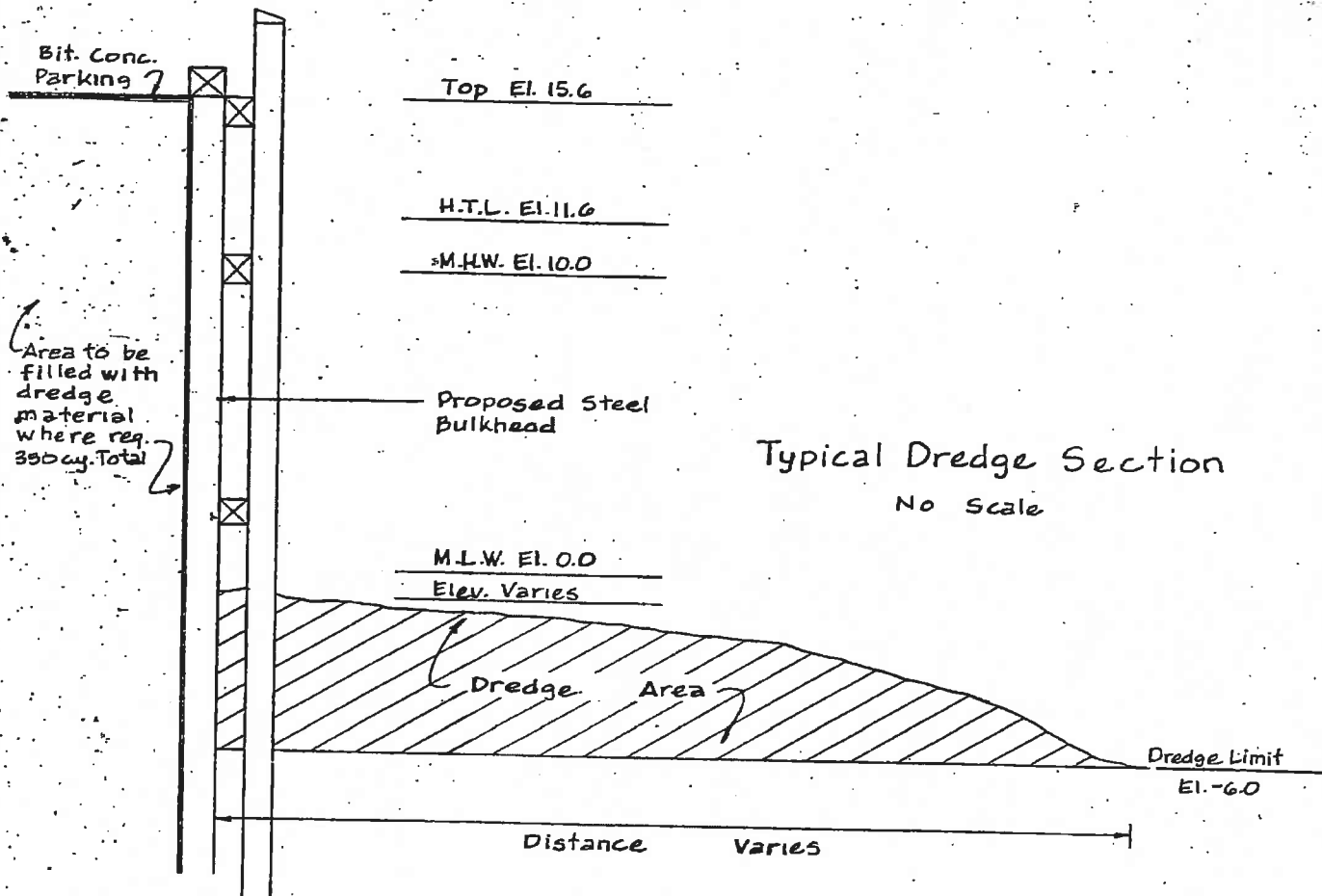
JUNE 24, 1985

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

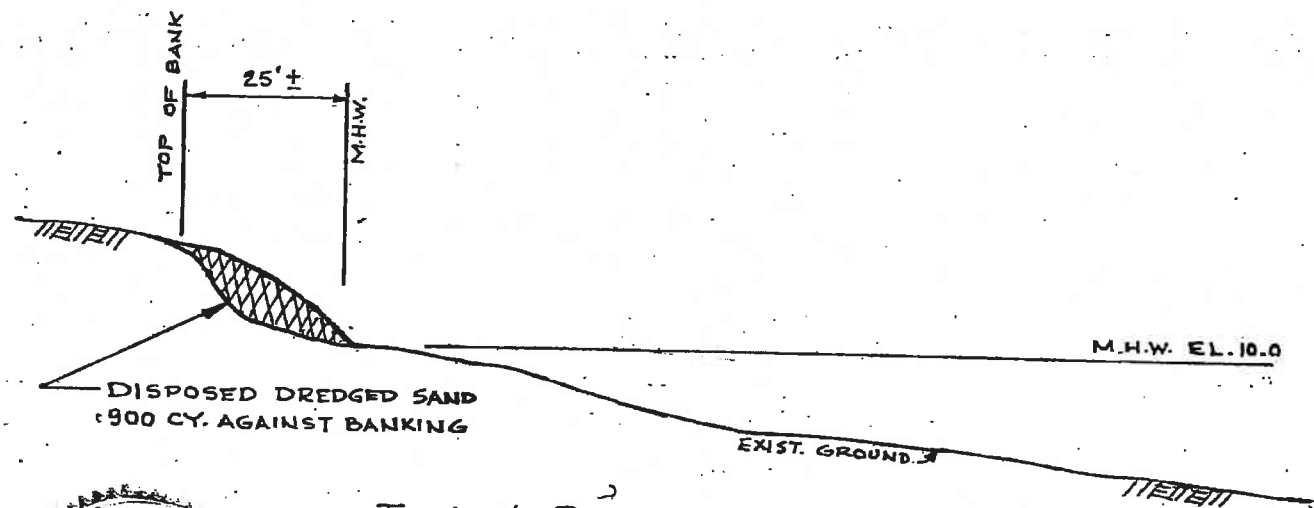
REV. 6/20/85



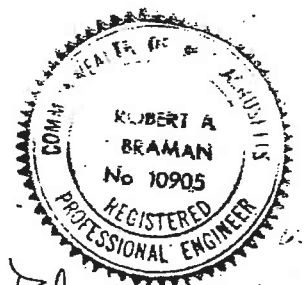
Robert A. Bruman



Typical Dredge Section
No Scale



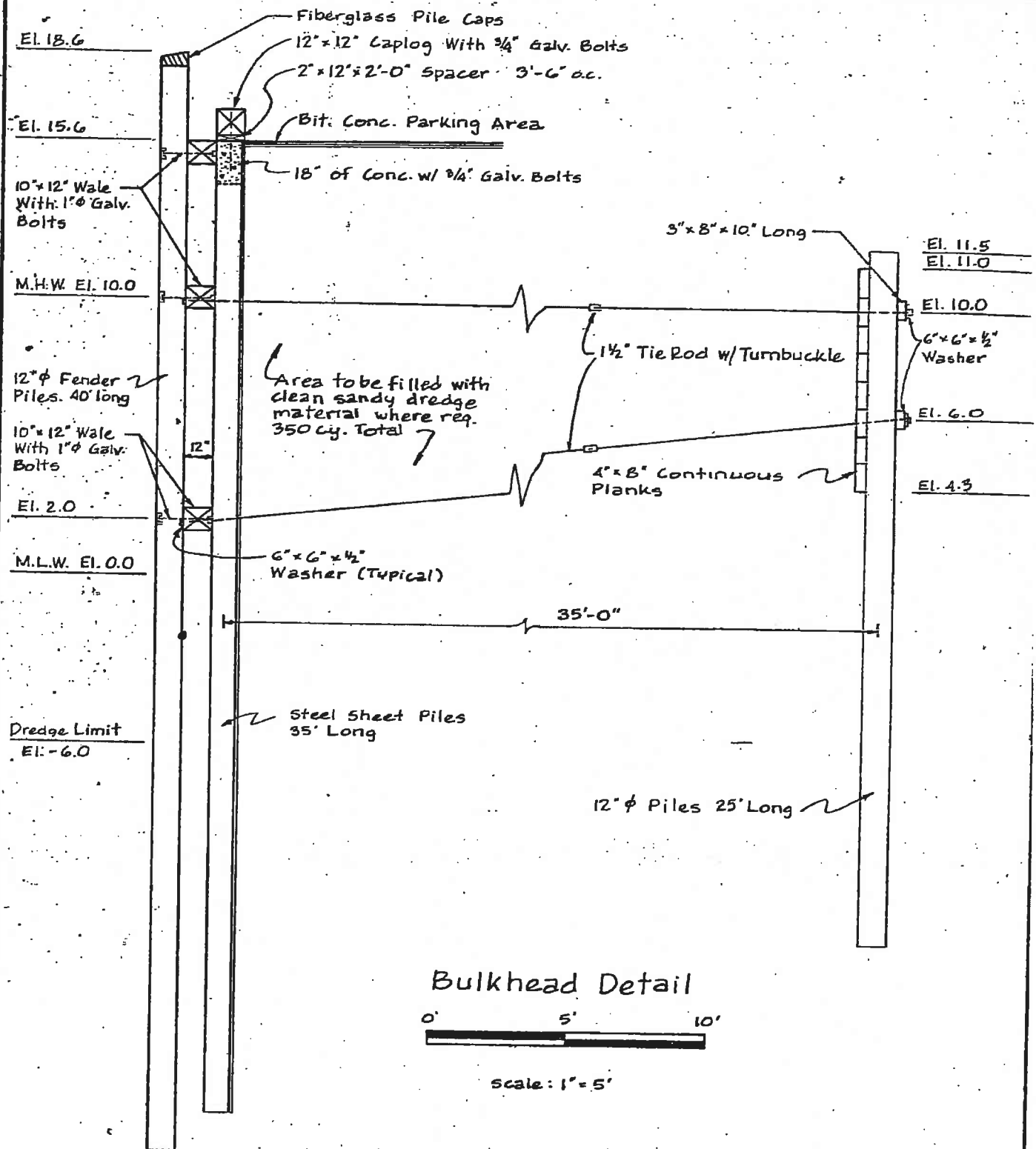
Typical Disposal Section
No Scale



Robert A. Braman

077-020-000-005-100
LICENSE PLAN NO. 1263

Approved by Department of Environmental Quality Engineering
JUNE 24, 1985



LICENSE PLAN NO. 1263

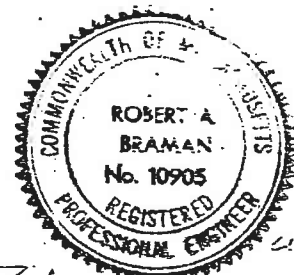
Approved by Department of Environmental Quality Engineering

JUNE 24, 1985

077-020-000-005-100

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT REV. 6/20/85

85W-017



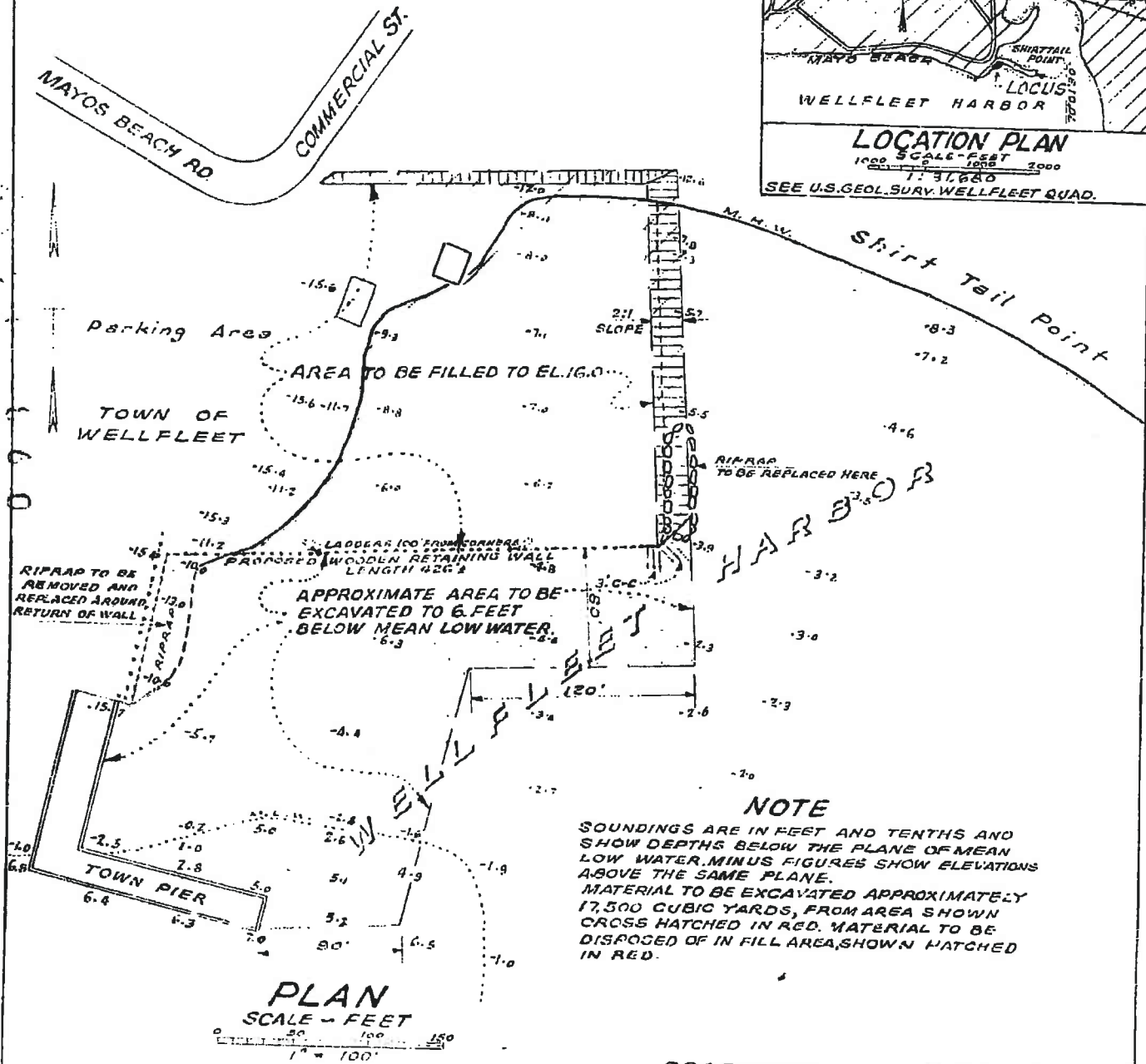
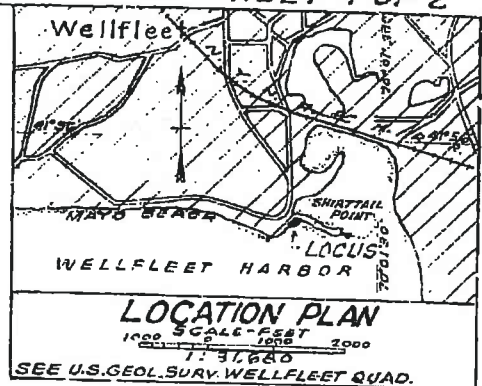
Robert A. Braman

TOWN: WELLFLEET
 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
077-020-000-004-100	077-020-000-004-100-COE1A	53-144	USACE	WELLFLEET	JUN 1953	Proposed Retaining Wall - Wellfleet Harbor, Wellfleet, MA - DPW of Massachusetts - Division of Waterways	2	Town Pier	Wood Bulkhead
077-020-000-004-200	077-020-000-004-200-COE2A	53-144	USACE	WELLFLEET	JUN 1953	Proposed Retaining Wall - Wellfleet Harbor, Wellfleet, MA - DPW of Massachusetts - Division of Waterways	2	Town Pier	Wood Bulkhead
077-020-000-004-200	077-020-000-004-200-COE2B	59-4	USACE	WELLFLEET	NOV 1958	Proposed Mooring Piles, Revetment, Marina, Dredging - Wellfleet Harbor, Wellfleet MA - DPW of Massachusetts - Division of Waterways	2	Town Pier	Proposed Revetment Slope
077-020-000-005-100	077-020-000-005-100-COE1A	52-78	USACE	WELLFLEET	MAR 1952	Proposed Approach Road, Timber Pier and Bulkhead - Wellfleet Harbor, Wellfleet	2	Adjacent to Town Pier	Bulkhead
077-020-000-005-100	077-020-000-005-100-COE1B	53-144	USACE	WELLFLEET	JUN 1953	Proposed Retaining Wall - Wellfleet Harbor, Wellfleet, MA - DPW of Massachusetts - Division of Waterways	2	Town Pier	Wood Bulkhead
077-020-000-005-100	077-020-000-005-100-COE1C	85-133	USACE	WELLFLEET	DEC 1984	To Construct a Steel Bulkhead, Dredge and Dispose of Dredge Material - Wellfleet Harbor - Wellfleet, Barnstable Co., MA	5	Adjacent to Town Pier	Steel Bulkhead

093 0083

077-020-000-004-100
077-020-000-004-200
077-020-000-005-100
SHEET 1 OF 2



NOTE
SOUNDINGS ARE IN FEET AND TENTHS AND SHOW DEPTHS BELOW THE PLANE OF MEAN LOW WATER, MINUS FIGURES SHOW ELEVATIONS ABOVE THE SAME PLANE.
MATERIAL TO BE EXCAVATED APPROXIMATELY 17,500 CUBIC YARDS, FROM AREA SHOWN CROSS HATCHED IN RED. MATERIAL TO BE DISPOSED OF IN FILL AREA, SHOWN HATCHED IN RED.

**PROPOSED RETAINING WALL
WELLFLEET HARBOR
WELLFLEET, MASS.**
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1953
SCALES SHOWN

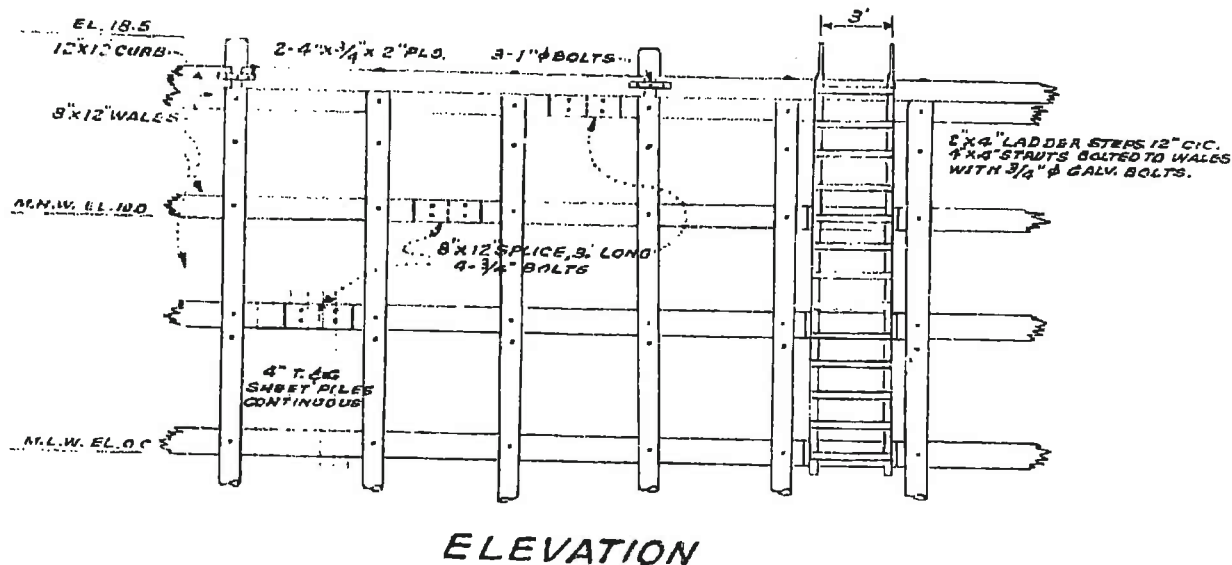
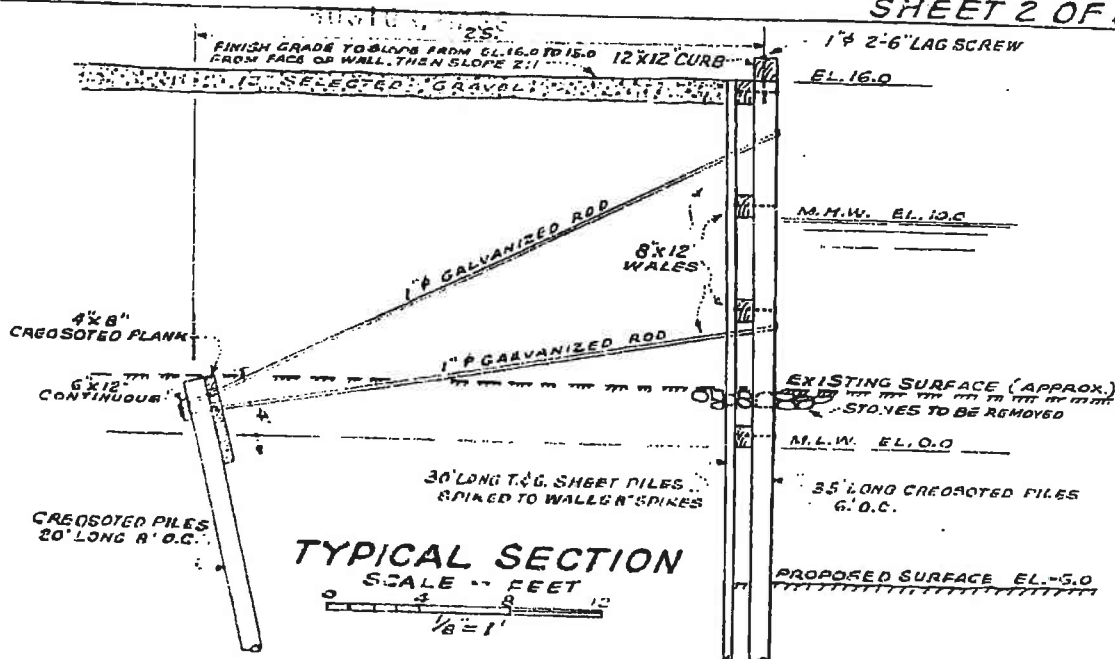
John D. B. [Signature]
ACTING DISTRICT WATERWAYS ENGINEER

ACC. 03115-4

0 9 3 0 0 8 9

1953

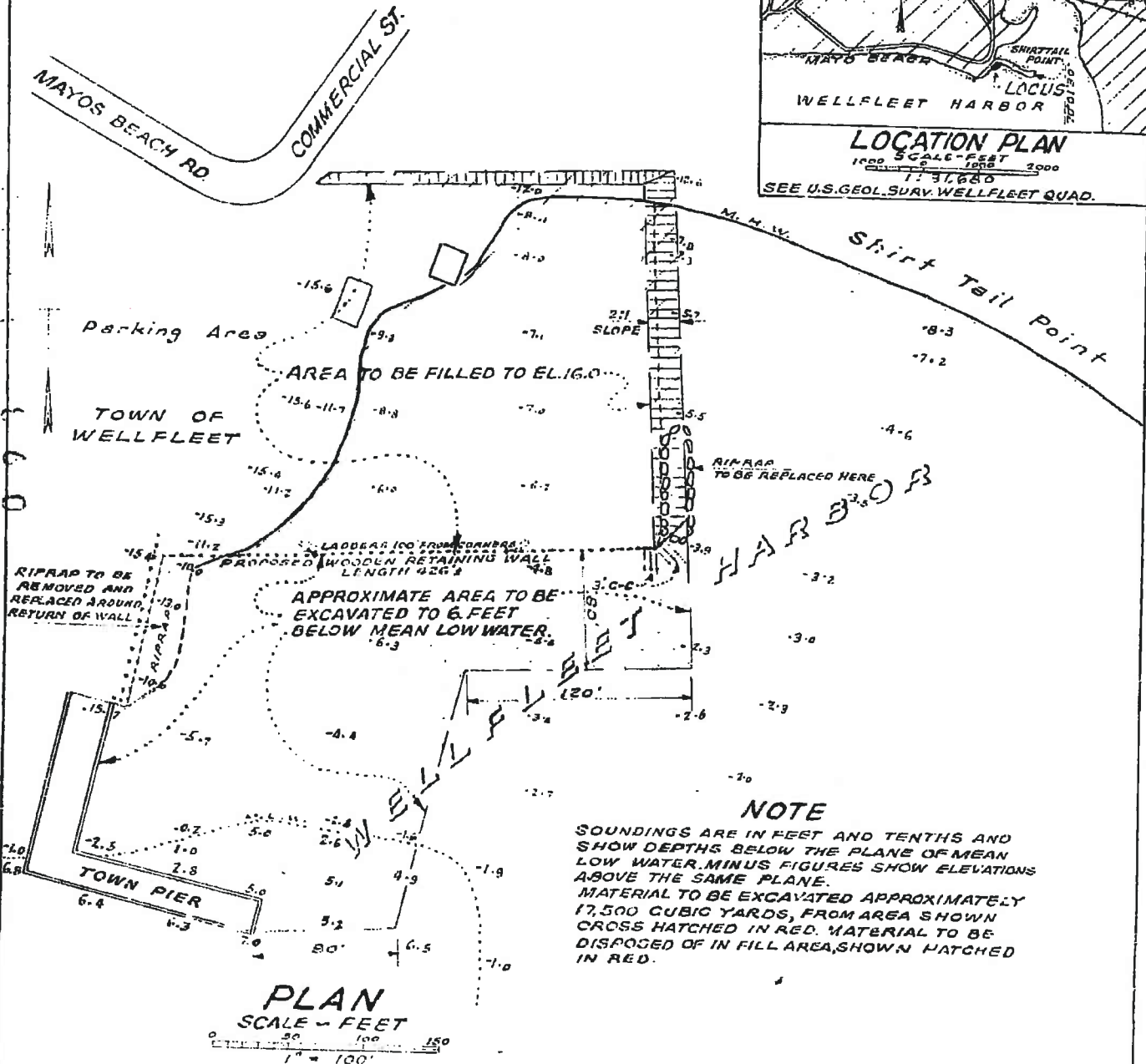
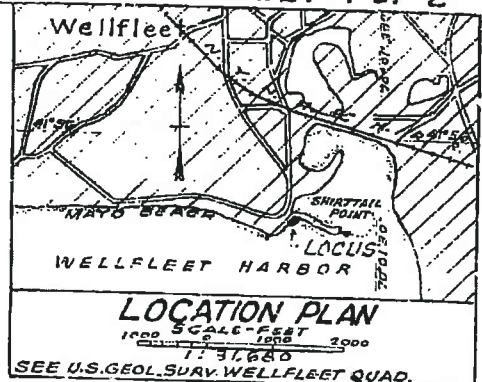
077-020-000-004-100
077-020-000-004-200
077-020-000-005-100
SHEET 2 OF 2



PROPOSED RETAINING WALL
WELLFLEET HARBOR
WELLFLEET, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1953
SCALES SHOWN
John D. Brundage

093 0083

077-020-000-004-100
077-020-000-004-200
077-020-000-005-100
SHEET 1 OF 2



PROPOSED RETAINING WALL
WELLFLEET HARBOR
WELLFLEET, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1953
SCALES SHOWN

John R. Blandford
ACTING DISTRICT WATERWAYS ENGINEER

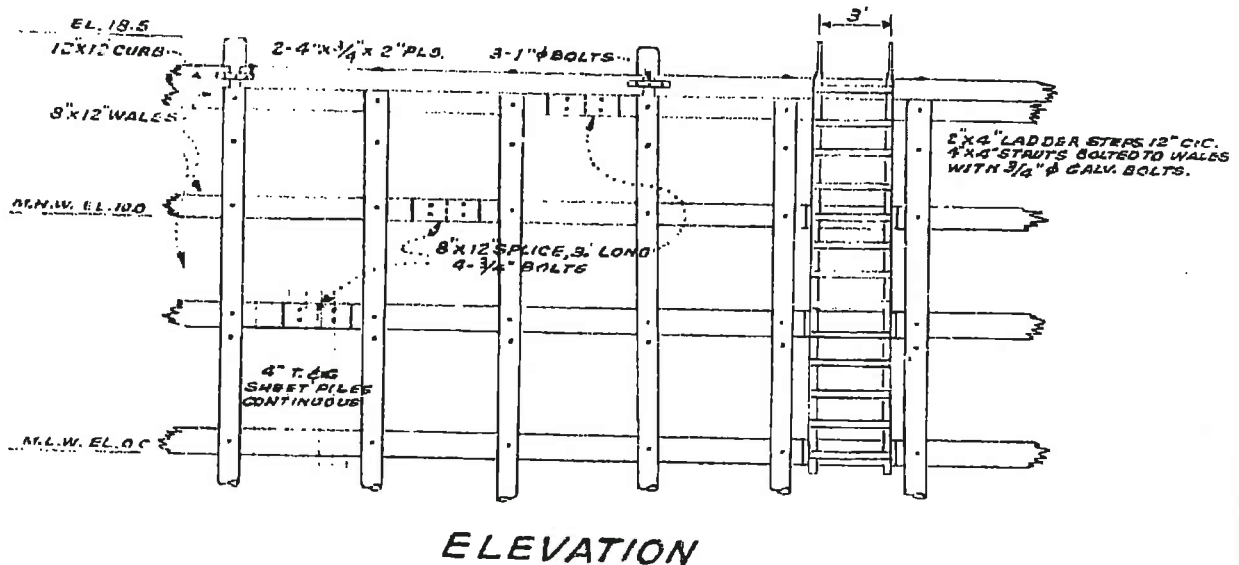
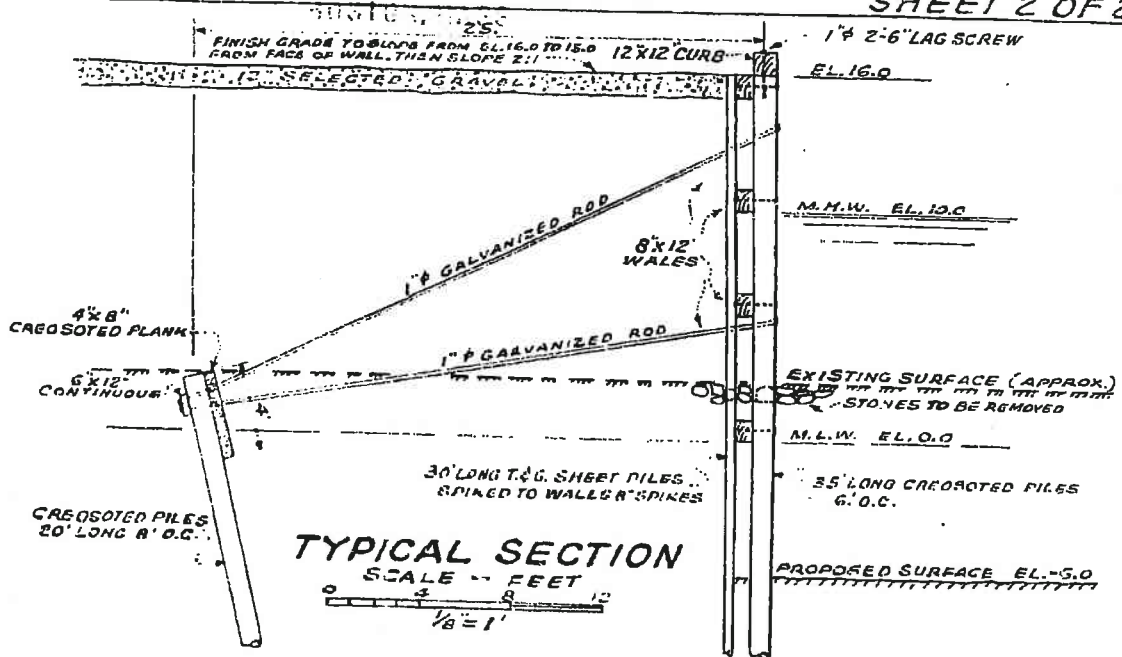
ACC. 03115-A

093 0089

1412 9 30 1953

077-020-000-004-100
077-020-000-004-200
077-020-000-005-100

SHEET 2 OF 2



PROPOSED RETAINING WALL
WELLFLEET HARBOR

WELLFLEET, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

JUNE 1953

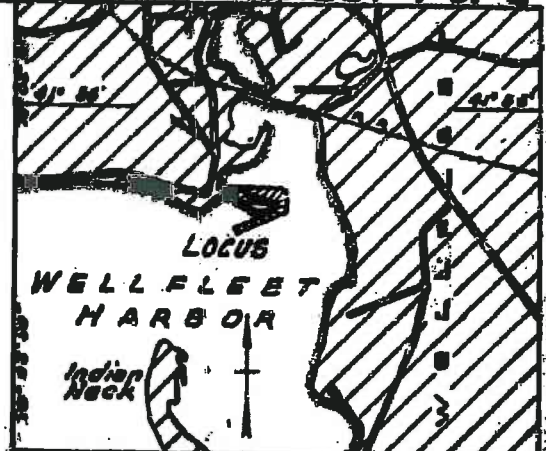
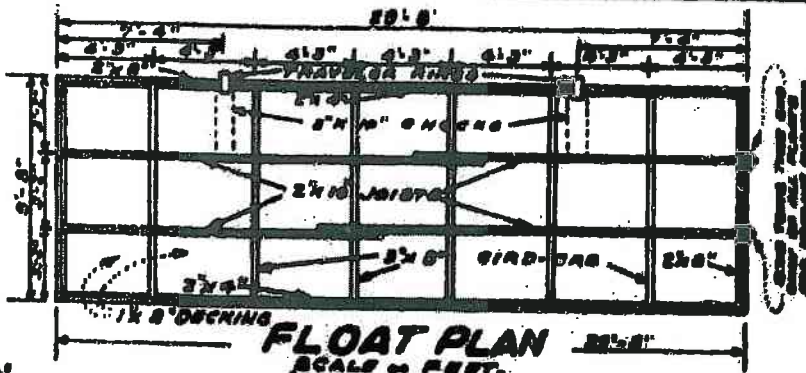
SCALES SHOWN

John D. Brundford

083 0197

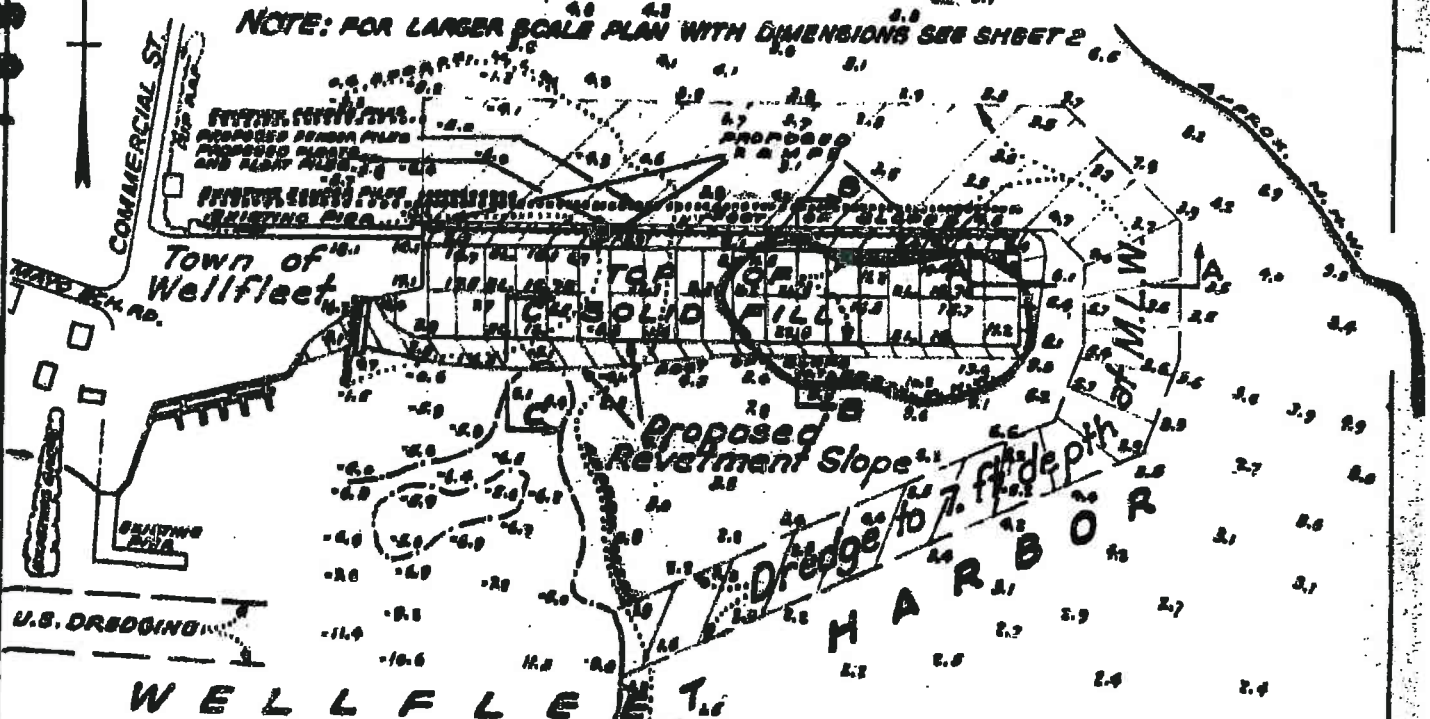
077-020-000-004-200

SHEET 1 OF 2



SEE U.S. GEOL. SURV. WELLFLEET QUAD.

NOTE: FOR LARGER SCALE PLAN WITH DIMENSIONS SEE SHEET 2



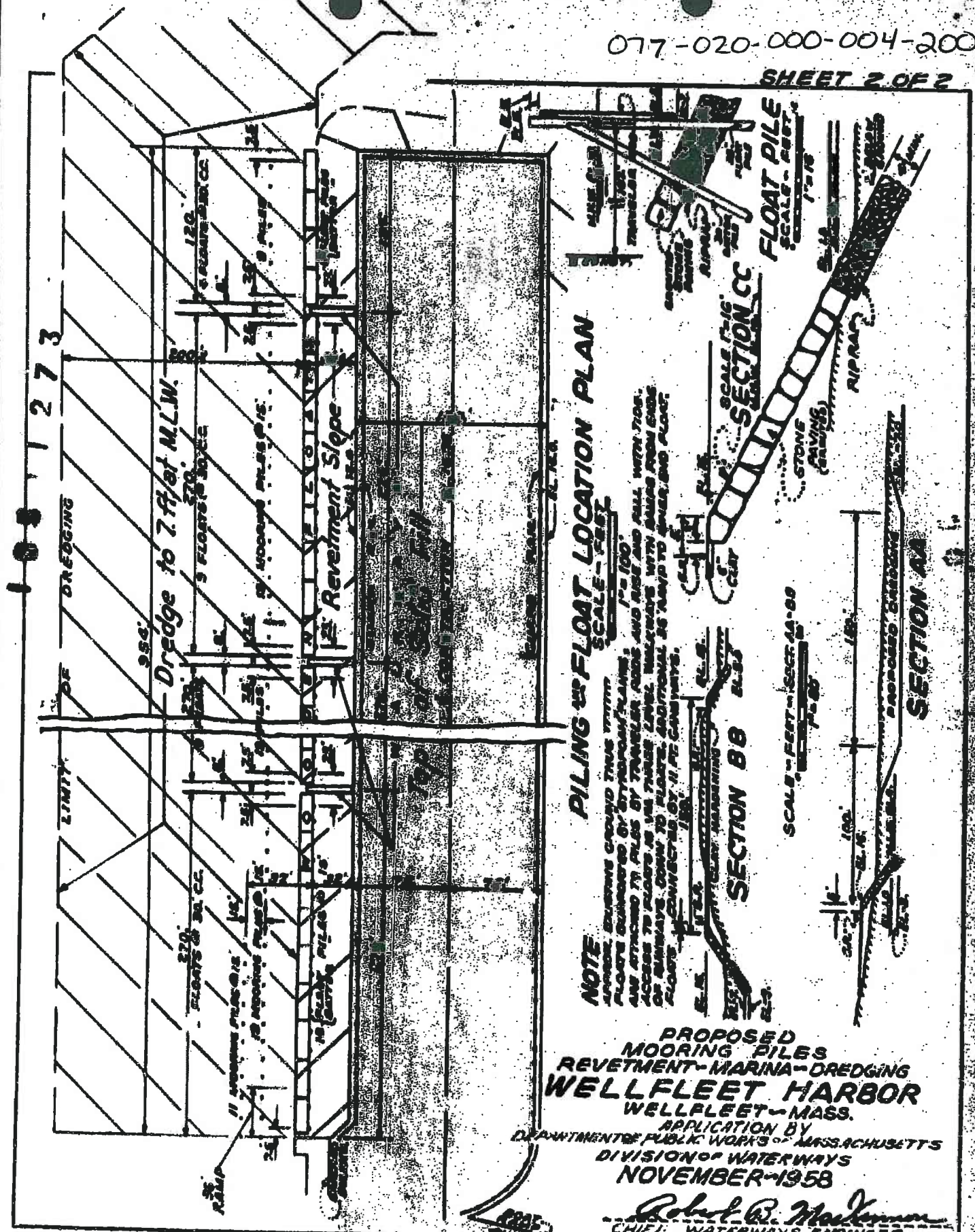
NOTE
ELEVATIONS ARE IN FEET AND
TENTHS AND REFER TO PLANE OF
MEAN LOW WATER, MINUS FIGURES
SHOW DEPTHS BELOW SAME PLANE.
DREDGED MATERIAL, APPROX. 100,000
CY TO BE DISPOSED OF IN "SOLID FILL"
AREA AND ANY EXCESS PLACED ABOVE
M.L.W. ON TOWN LAND AT INDIAN NECK.
APPROX. EXISTING GRADE TRUE
SLOPE FOR STONE PAVING (BAGGERS) AND
RIPRAP TO BE 1:6 TO 1:8 OR FOR SHARP RISE
MAY BE 1:6 TO 2:1
LOCATION OF PROPOSED WORK IS IN RED

PROPOSED
MOORING PILES
REVELMENT - MARINA - DREDGING
WELLFLEET HARBOR
WELLFLEET - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER 1958
Robert B. MacKenzie

083 0198

077-020-000-004-200

SHEET 2 OF 2



PILING & FLOAT LOCATION PLAN

NOTE

EXISTING GROUND THIS WITH
FLOATS NUMBERED BY SYMBOLIC PLANS
AND ATTACHED TO PILES BY TRAVELER RIGS AND RISE AND FALL. WITH
ACCESS TO FLOATS IS VIA TRAVELER LEVEL. TRAVELER WITH RIGS FROM
OF RAMPWAYS, DOWN TO FLOATS. ADDITIONAL IS RAMP TO RAMP AND FLOAT
FLOATS CONNECTED BY 1/2 FT. CABLES.

PROPOSED
MOORING PILES
REVELMENT-MARINA-DREDGING
WELLFLEET HARBOR
WELLFLEET-MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER 1958

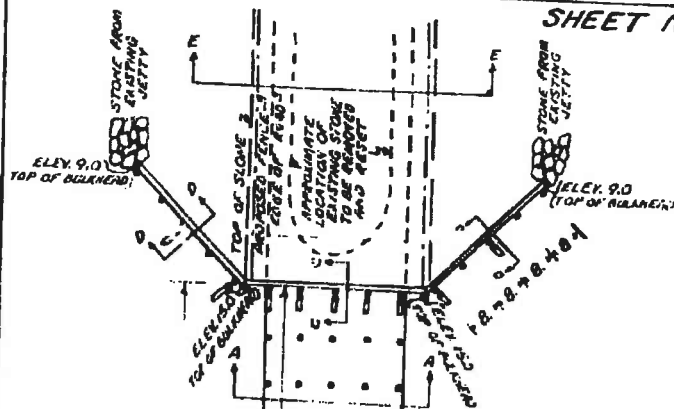
Robert B. MacKinnon
CHIEF WATERWAYS ENGINEER

ACC. 03925-B

0 9 3 2 0 2 5

077-020-000-005-100

SHEET NO. 1 OF 2



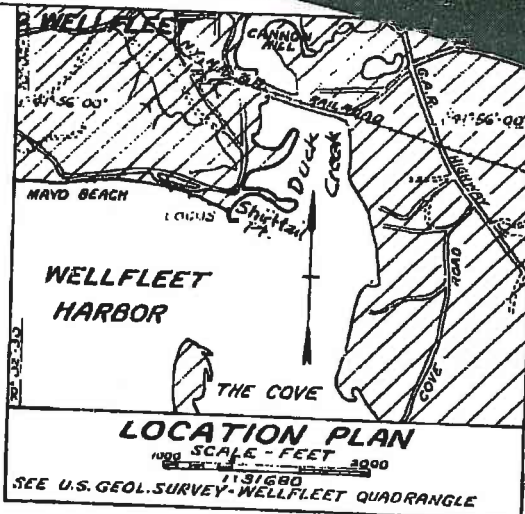
ENLARGED PLAN

SCALE - FEET
1" = 40'

NOTE - SEE SHEET NO. 2
FOR SECTIONS

120.

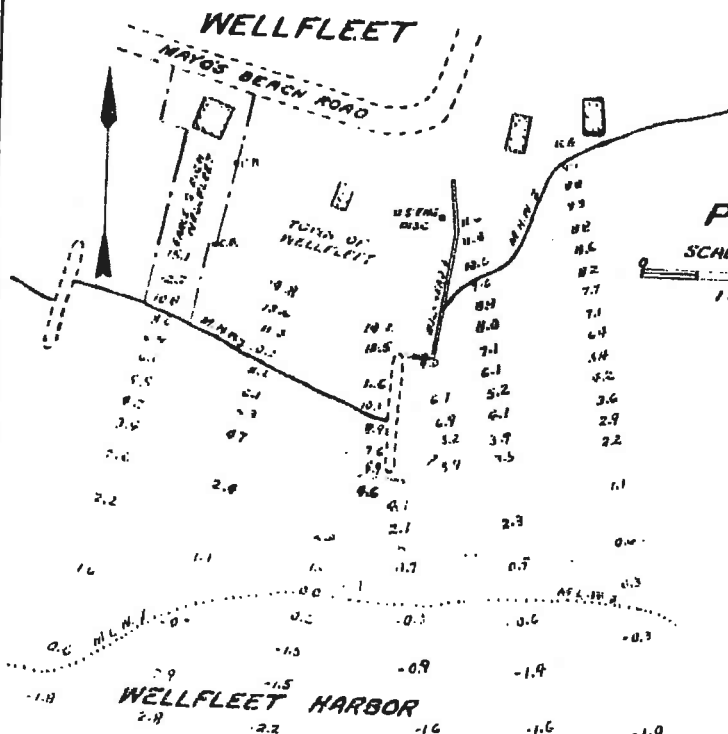
13 BENTS - 10' O.C.



LOCATION PLAN

SCALE - FEET

SEE U.S. GEOL. SURVEY - WELLFLEET QUADRANGLE



PLAN

SCALE - FEET
1" = 2000

NOTE

PROPOSED WORK SHOWN IN RED.
ELEVATIONS ARE IN FEET AND TENTHS
ABOVE THE PLANE OF MEAN LOW
WATER. MINUS FIGURES SHOW
ELEVATIONS BELOW THE SAME PLANE.

PROPOSED APPROACH
ROAD, TIMBER PIER & BULKHEAD
WELLFLEET HARBOR
WELLFLEET

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1952

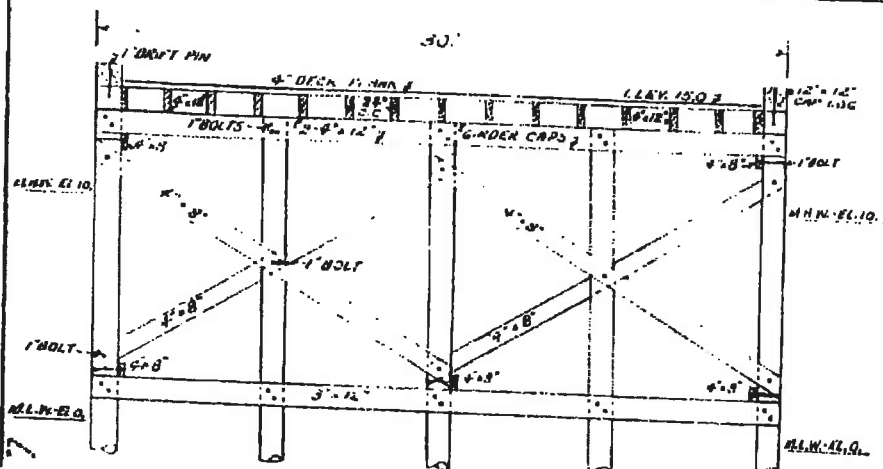
Ernest W. Huberman
DISTRICT WATERWAYS ENGINEER

ACC. NO. 02944A

093 290 26

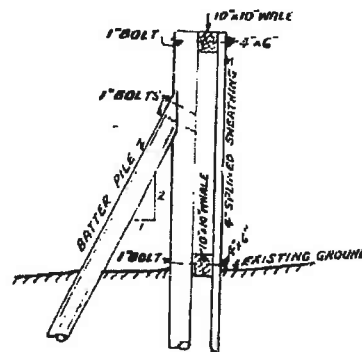
077-020-000-005-100

SHEET NO. 2 OF 2



SECTION A-A

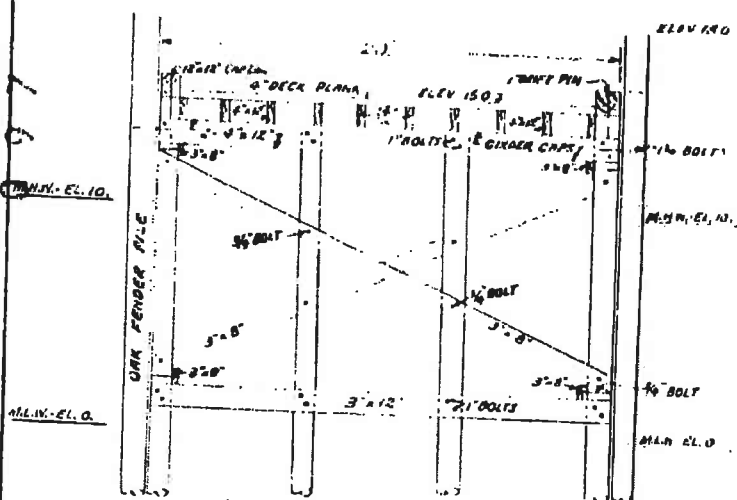
SCALE - FEET



SECTION D-D

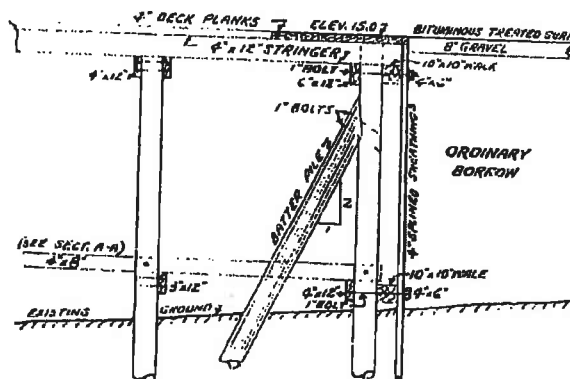
SCALE - FEET

1/8" = 1'



SECTION B-B

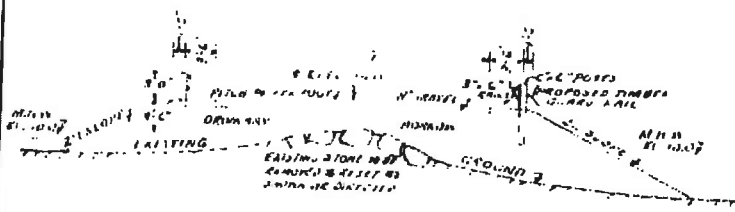
SCALE - FEET



SECTION C-C

SCALE - FEET

1/8" = 1'



SECTION E-E

SCALE - FEET

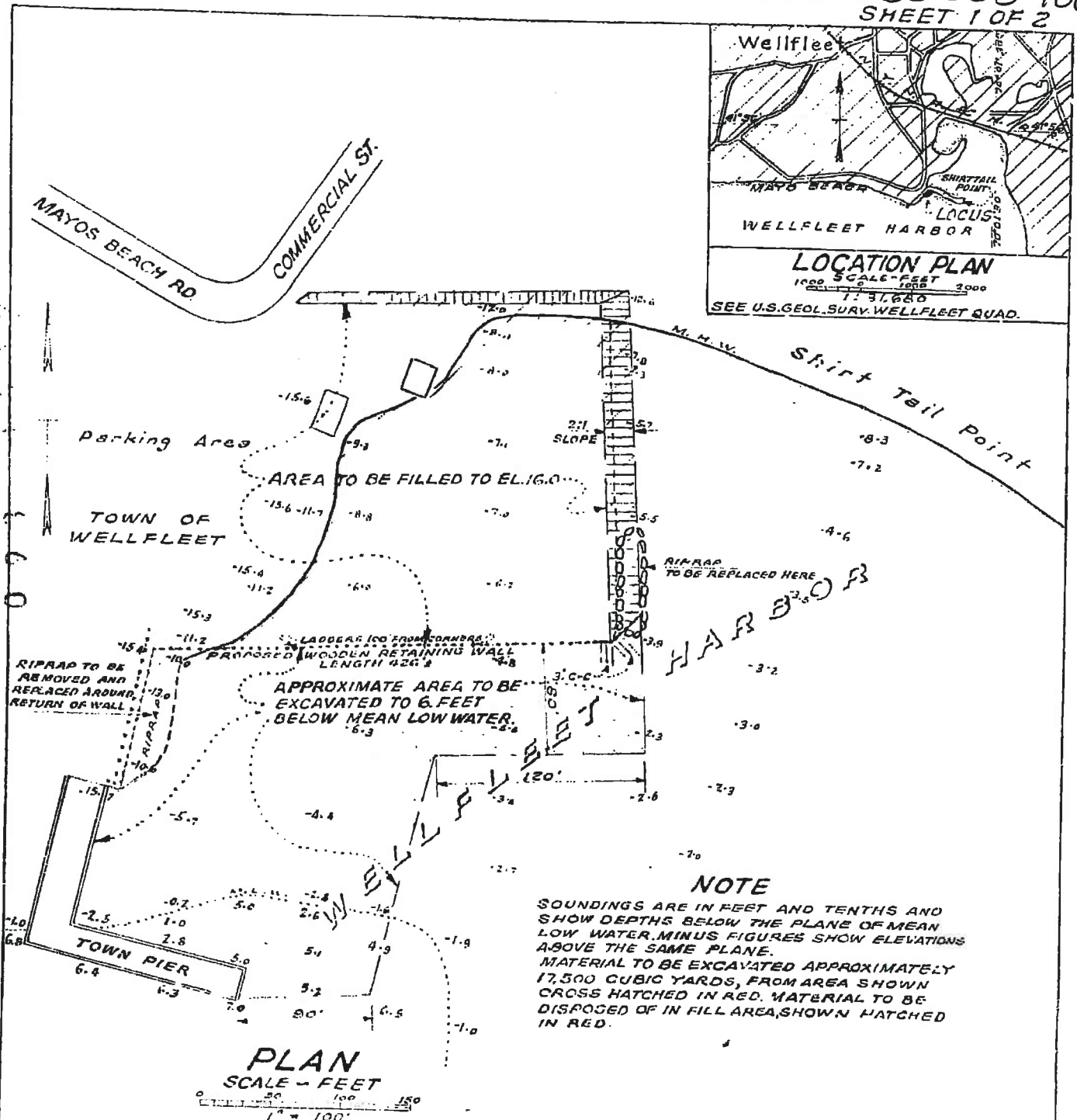
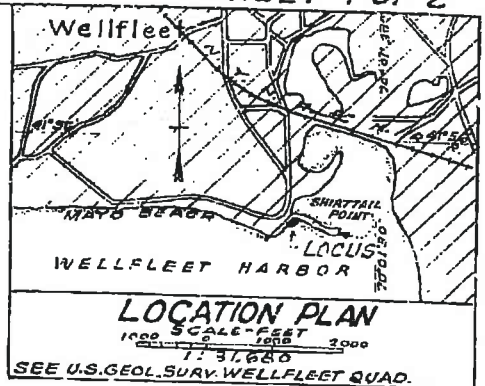
PROPOSED APPROACH ROAD, TIMBER PIER & BULKHEAD WELLFLEET HARBOR WELLFLEET

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1952

Edward M. Hutchinson
DISTRICT WATERWAYS ENGINEER

093 0083

077-020-000-004-100
077-020-000-004-200
077-020-000-005-100
SHEET 1 OF 2



**PROPOSED RETAINING WALL
WELLFLEET HARBOR
WELLFLEET, MASS.**
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE 1953
SCALES SHOWN

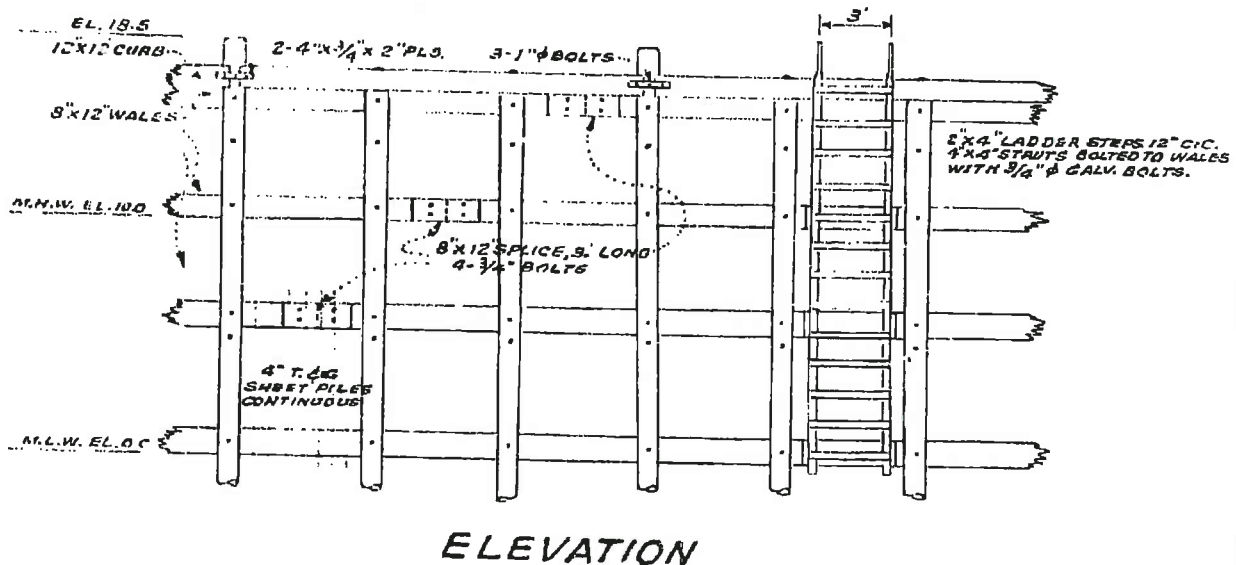
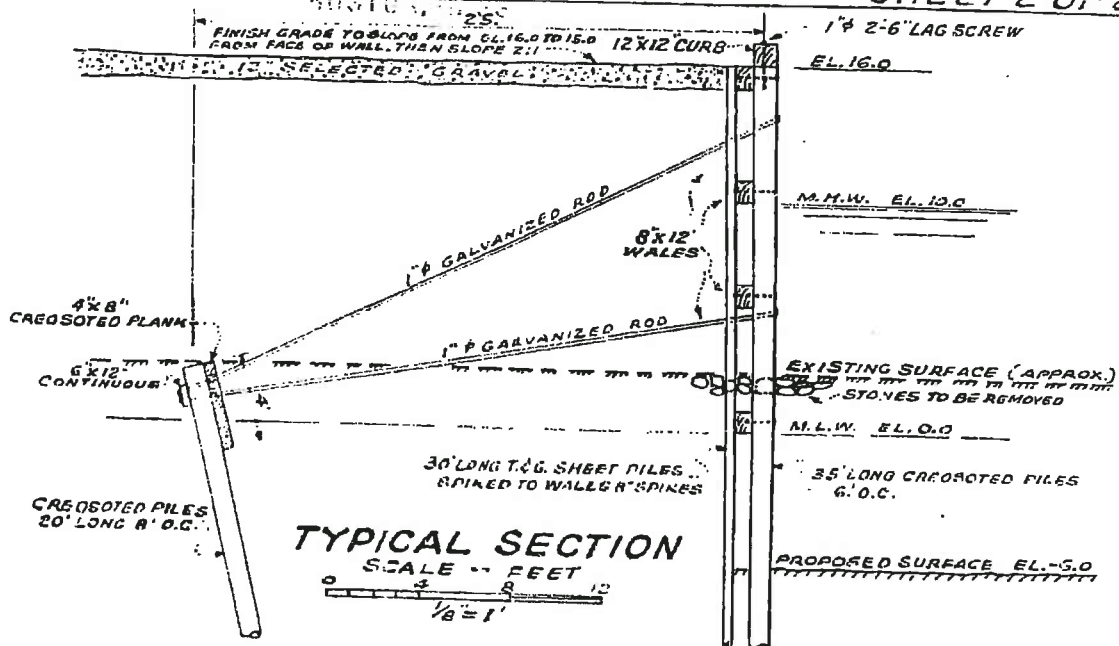
John A. B. [Signature]
ACTING DISTRICT WATERWAYS ENGINEER

ACC. 03115-A

0 9 3 0 0 8 9

077-020-000-004-100
077-020-000-004-200
077-020-000-005-100

SHEET 2 OF 2



PROPOSED RETAINING WALL
WELLFLEET HARBOR

WELLFLEET, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

JUNE 1953

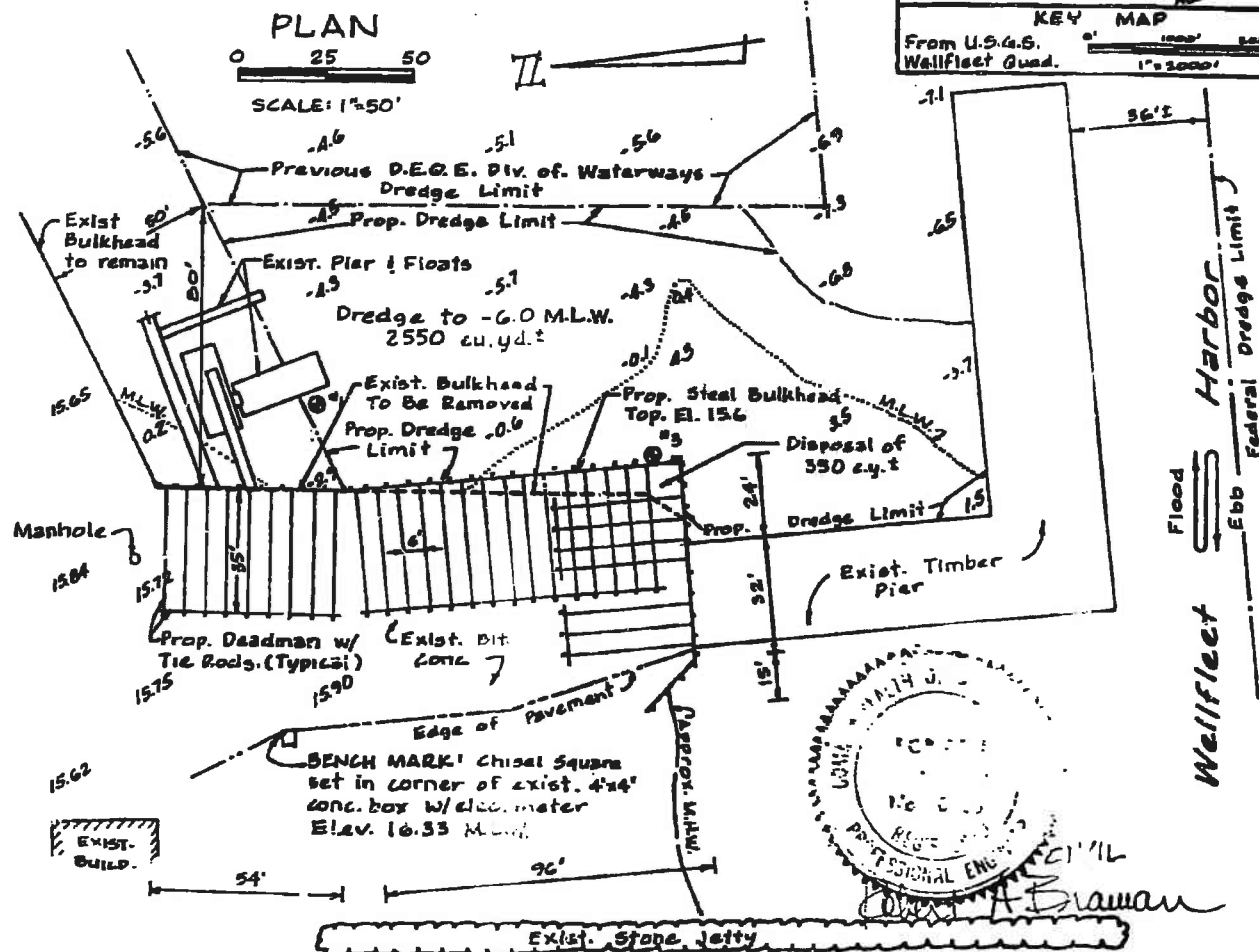
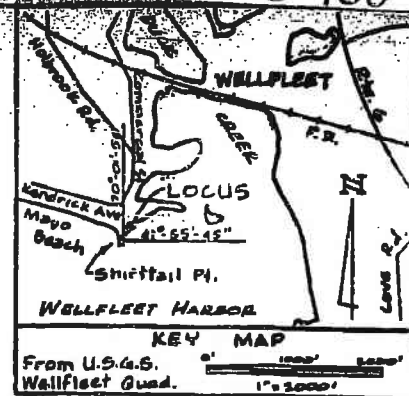
SCALES SHOWN

John D. Brandford.

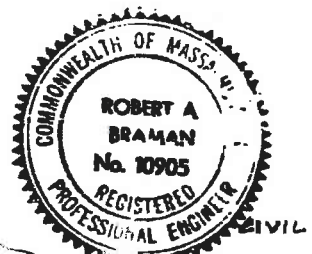
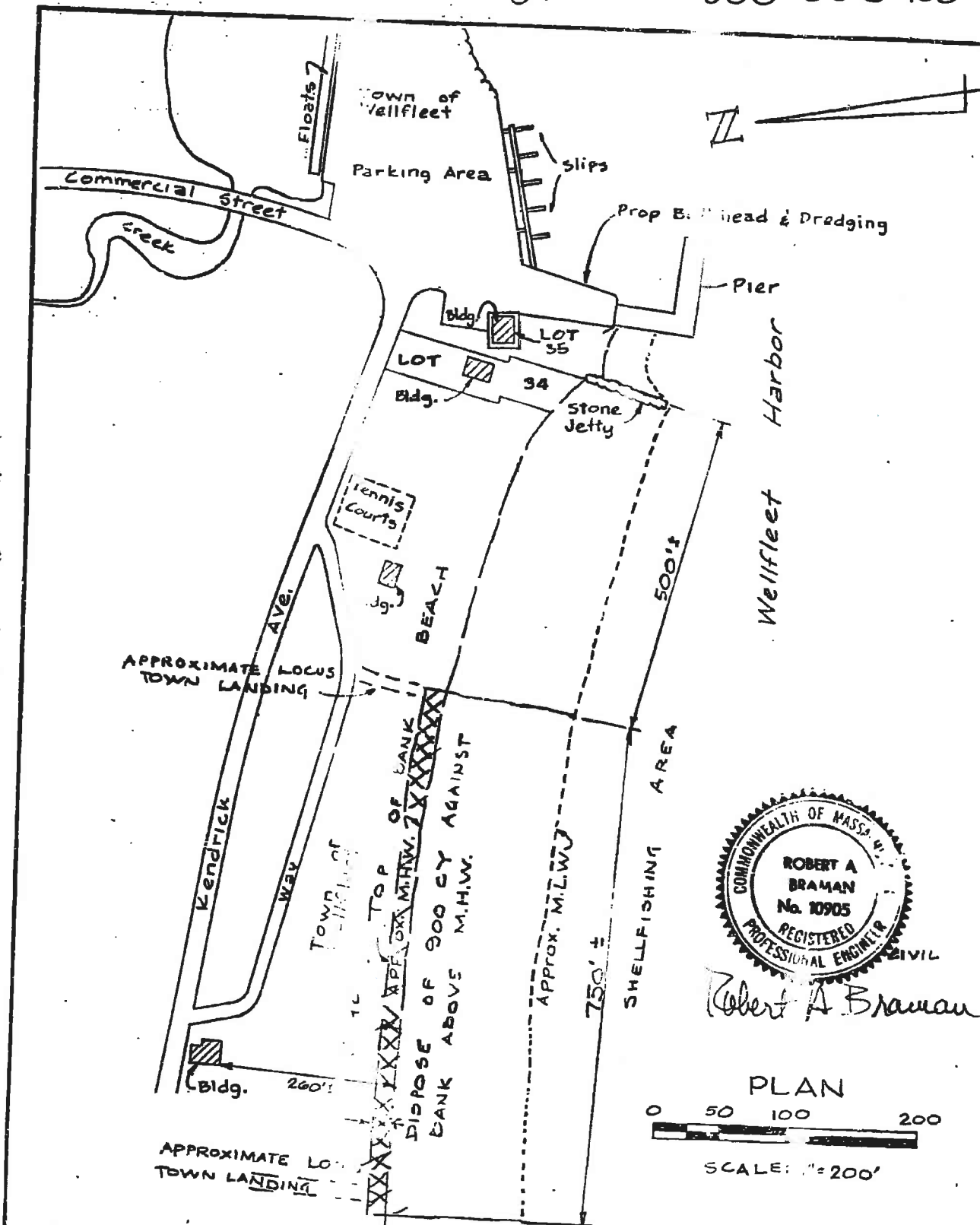
077-020-000-005-100

Notes:

1. Elevations are in feet and tenths above the plane of Mean Low Water. Minus figures represent depths below that same plane.
2. All timber to be CCA Treated @ 2.5 #/c.f.
3. 2550 cu.yd. to be dredged. 350 cu.yd. of clean sandy material to be placed behind prop. bulkhead, where required. 1450 cu.yd. of clean sandy material to be placed at prop. disposal site on Mayo Beach. Dredge material not suitable for beach disposal is to be trucked and dump at the town disposal area. Located on Coles Neck Road. Approx. 750 cu.yd.
4. ① - Denotes sample number and.

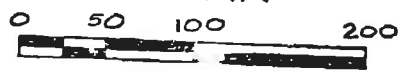


077-020-000-005-100



Robert A. Braman

PLAN



SCALE: 1" = 200'

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
DIVISION OF WATERWAYS

REVISED FEB. 5, 1985
DEC 14, 1984

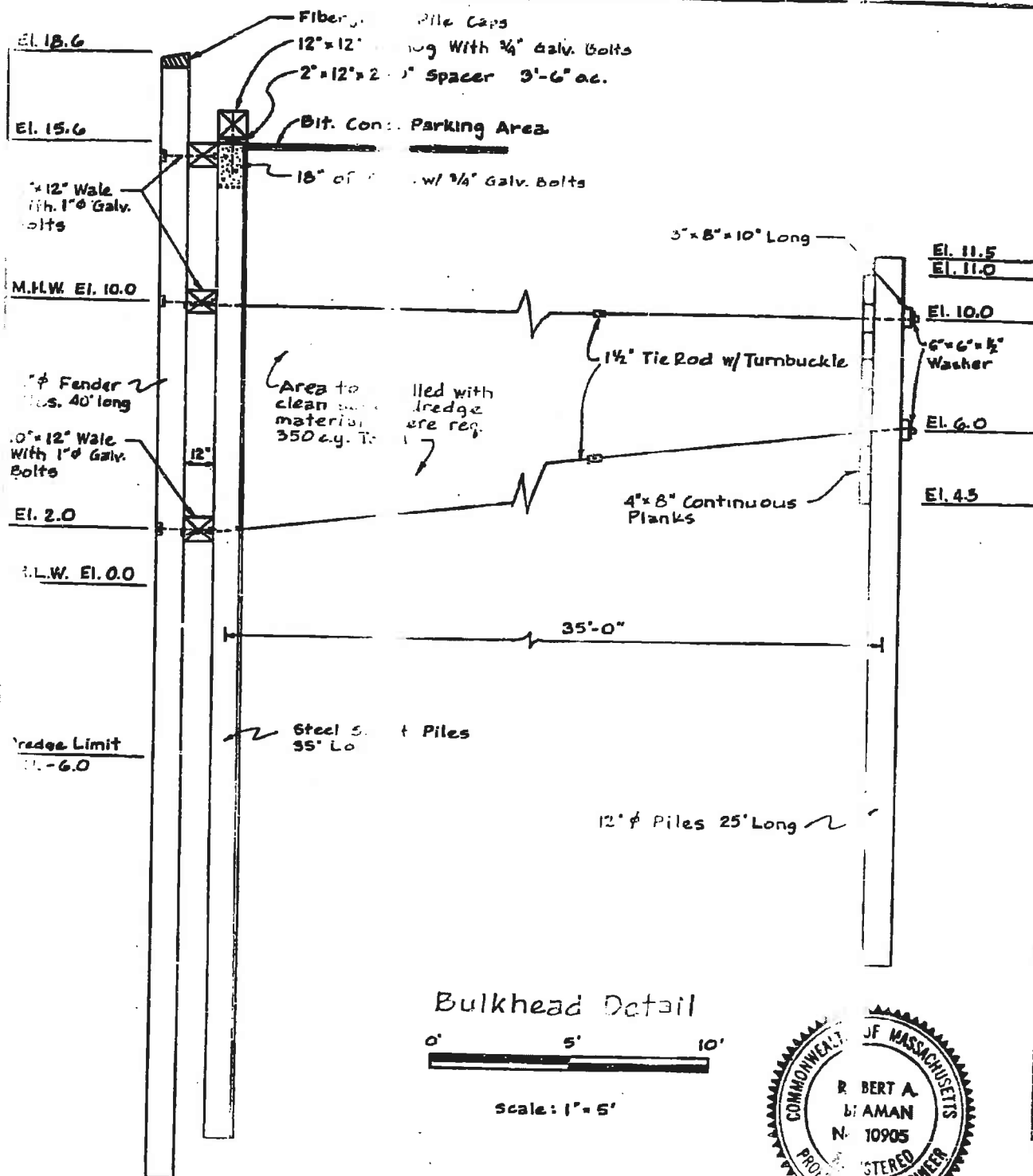
2 OF 3

Rec'd 6/4/85

C.E.-2

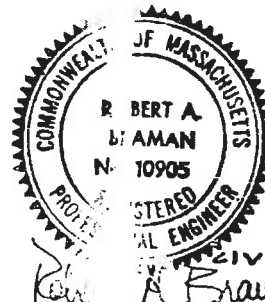
954 0008

077-020-000-005-100



Bulkhead Detail

Scale: 1" = 5'



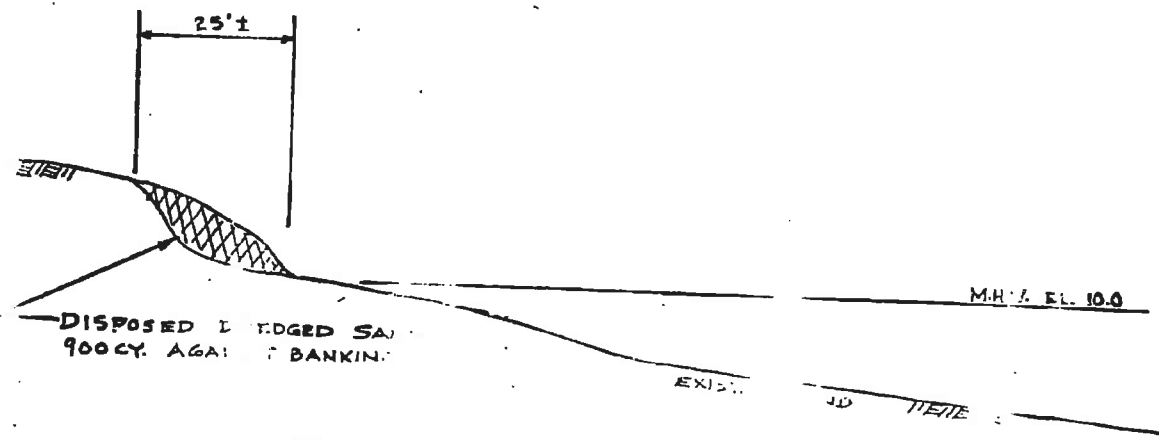
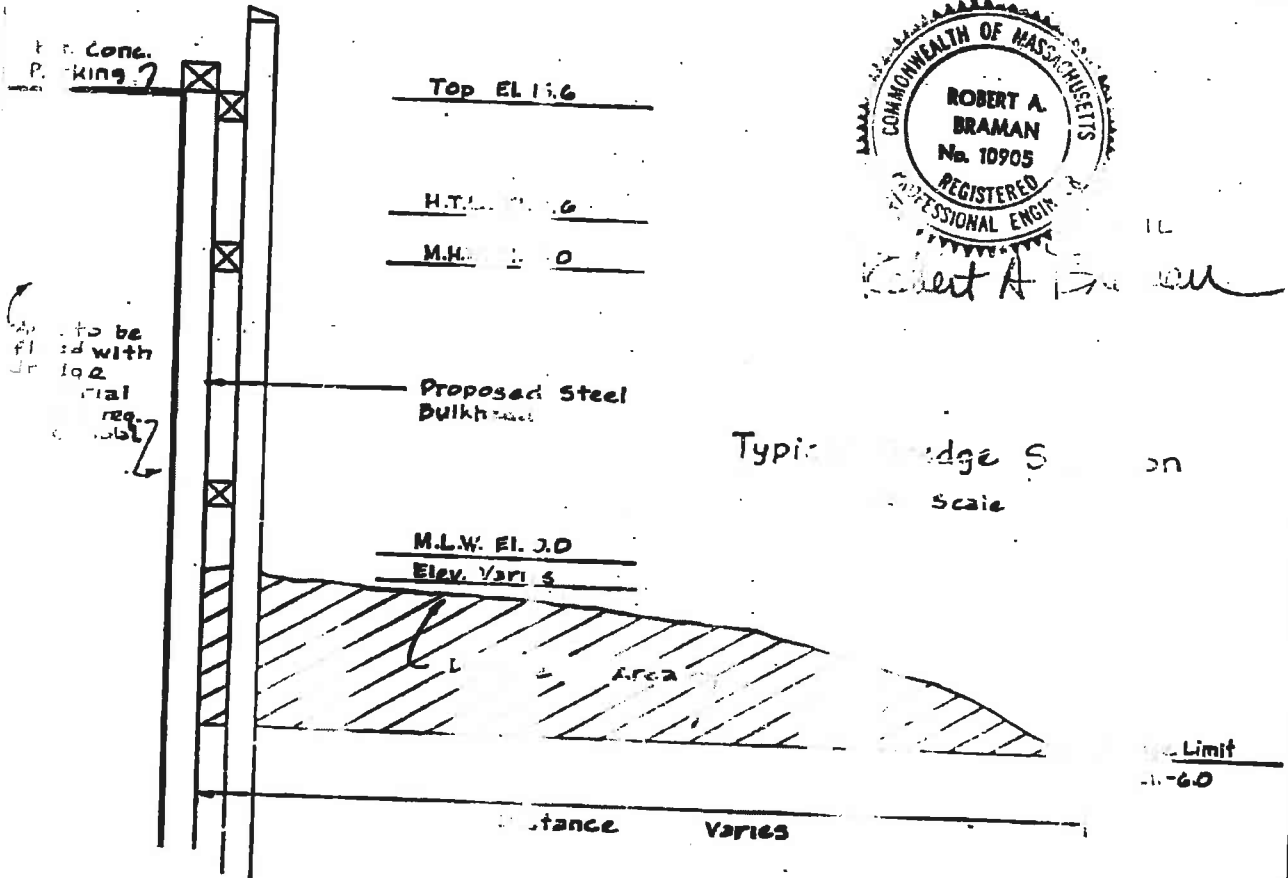
RECEIVED
CIVIL
A. Brown

DEC. 14, 1984

3 OF 5

152

077-020-000-005100



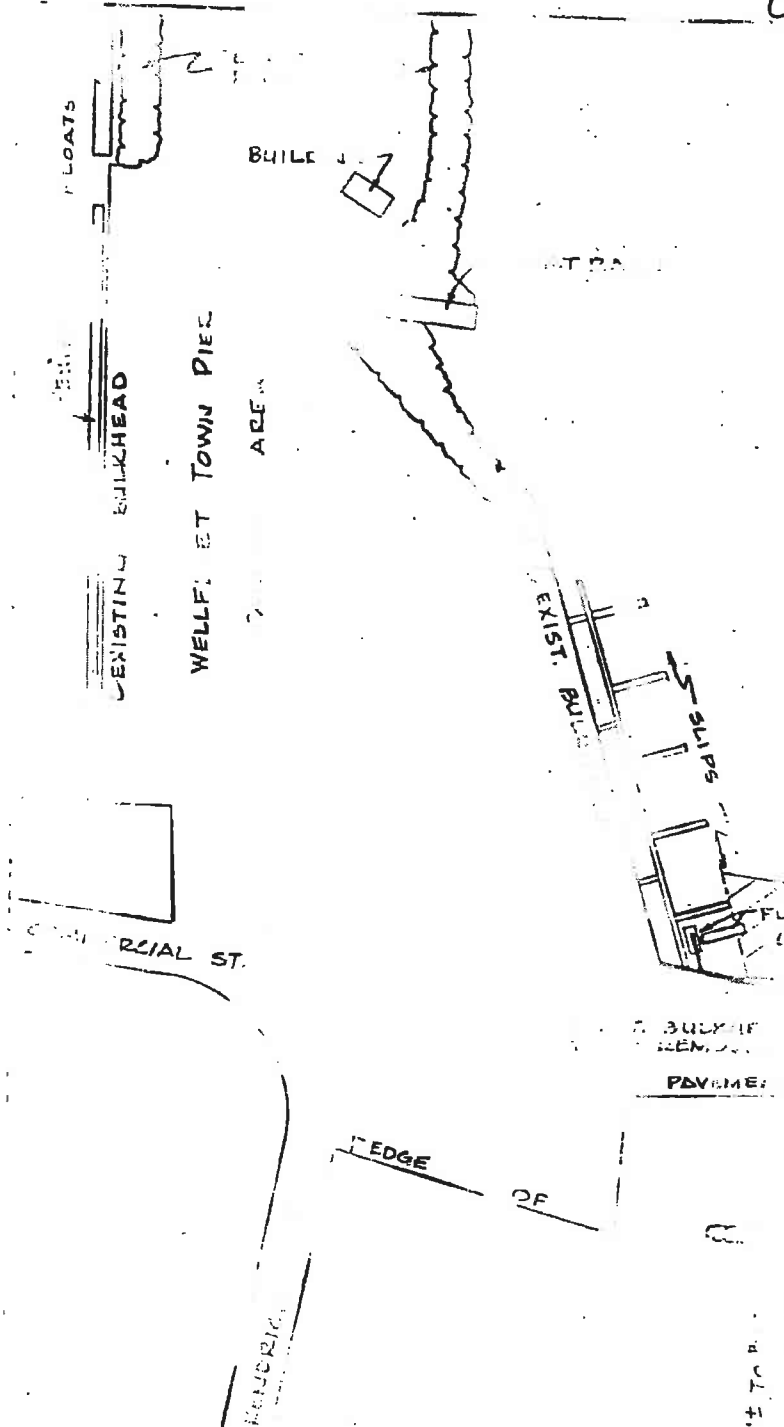
DEPARTMENT OF ENVIRONMENT
DIVISION OF WATER

MANAGEMENT

DEC. 1984

4 OF 5

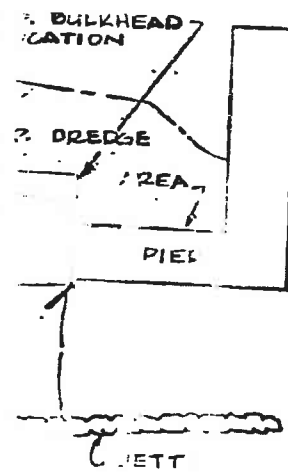
077-020-000-005-100



AREA PLAN



SCALE: 1"=100'



WELFLEET HARBOR

LYO BEACH
W. SHORE

Section V

Eastham

Section V – Community Findings – Town of Eastham

COMMUNITY DESCRIPTION

The Town of Eastham consists of a land area of 13.99 square miles out of a total area of 27.26 square miles and had a population of 5,453 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 13 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Eastham, there were 8 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 4 in Section V-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 Eastham

Primary Structure (1)	Total		Structure Condition Rating				Total Length
	Structures	A	B	C	D	F	
Bulkhead / Seawall	1			1			150
Revetment	3	1		2			220
Breakwater							
Groin / Jetty	3		1	1	1		520
Coastal Dune	1			1			100
Coastal Beach							
	8	1	1	5	1		990

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 Eastham's case there are a total of 7 structures which would require approximately \$ 542,000 to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated \$ 212,500 would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Eastham

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	1			\$ 63,756			\$ 63,756
Revetment	3			\$ 73,339			\$ 73,339
Breakwater							\$ -
Groin / Jetty	3		\$ 62,800	\$ 106,240	\$ 212,467		\$ 381,507
Coastal Dune	1			\$ 23,800			\$ 23,800
Coastal Beach							\$ -
	8	\$ -	\$ 62,800	\$ 267,135	\$ 212,467	\$ -	\$ 542,402

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

STRUCTURE OWNERSHIP / REPAIR COST - Town of Eastham

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Town Owned	7		\$ 62,800	\$ 110,999	\$ 212,467		\$ 386,266
Commonwealth of Massachusetts				\$ 49,896			\$ 49,896
Federal Government Owned							\$ -
Unknown Ownership	1			\$ 106,240			\$ 106,240
	8	\$ -	\$ 62,800	\$ 267,135	\$ 212,467	\$ -	\$ 542,402

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 V-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Eastham'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 V - Eastham

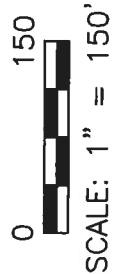
Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF EASTHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



BCE Bourne Consulting Engineering
3 Paul Street
Bourne, MA 01939
TEL (508) 533-4444 FAX (508) 533-4444



COASTAL STRUCTURE LOCATION PLAN

TOWN OF EASTHAM
 COASTAL INFRASTRUCTURE INVENTORY
 AND ASSESSMENT PROJECT
 NOVEMBER 2007



BCE *Bourne Consulting Engineering*

2007
 1000 Main Street
 Bourne, MA 01906
 TEL: (508) 635-0000 FAX: (508) 635-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF EASTHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'



SHEET 3

Structure Assessment Form

Town: EasthamStructure ID: 019-001-000-097-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Sunken Meadow Beach

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham

Earliest Structure Record:

1978

Estimated Reconstruction/Repair Cost:

\$23,800.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
<u>100</u>		<u>V4</u>	<u>17</u>
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Dune

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Coastal dune with retention fences in front of it. The dune is uniform and has minor erosion. There is dune grass on top and houses behind it.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

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

*Priority***III***Rating***Moderate Priority***Action*

Consider for Active Project Improvement Listing

Description

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

Structure Images:

019-001-000-097-100-PHO1A.jpg019-001-000-097-100-PHO1B.jpg

Structure Documents:

Structure Assessment Form

Town: **Eastham**Structure ID: **019-001-000-101-100**

Key: community-map-block-parcel-structure

Property Owner:

Unknown

Location:

Harmes Way

Date:

10/25/2007

Presumed Structure Owner:

Unknown

Based On Comment:

Owner Name:

Earliest Structure Record:

1967

Estimated Reconstruction/Repair Cost:

\$106,240.00

Length: **160** Top Elevation: **17** FIRM Map Zone: **V4** FIRM Map Elevation: **17**
 Feet Feet NAVD 88 Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Set of three dumped stone groins. Stones are two feet by two feet by two feet on average.

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

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

019-001-000-101-100-PHO1A.jpg

019-001-000-101-100-PHO1B.jpg

Structure Documents:

USACE

August 1967

Proposed Groin

019-001-000-101-100-COE1A

USACE

January 197

Proposed Shore

019-001-000-101-100-COE1B

MA-DCR

August 1967

Proposed Shore

019-001-000-101-100-DCR1A

MA-DCR

November 1

Proposed Shore

019-001-000-101-100-DCR1B

MA-DCR

August 1971

Proposed Shore

019-001-000-101-100-DCR1C

MA-DCR

November 1

Proposed Shore

019-001-000-101-100-DCR1D

Structure Assessment Form

Structure ID: 019-007-000-321-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Campground Road

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$0.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
40		V4	17
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Dumped stone revetment at the end of a road. Stones are 3 feet by 2 feet by 1 foot on average. There are a few houses behind the structure and a sand beach in front.

Condition

A

Rating

Excellent

Level of Action

None

Description

Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

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

Structure Images:

019-007-000-321-100-PHO1A.jpg

019-007-000-321-100-PHO1B.jpg

Structure Documents:

Structure Assessment FormStructure ID: **019-007-000-521-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Bay Road

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$23,443.00

Length: **30** Top Elevation: FIRM Map Zone: **V3** FIRM Map Elevation: **20**
 Feet Feet NAVD 88 Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

Dumped riprap. Stones are 3 feet by 2 feet by 2 feet on average. Structure has moderate to heavy undermining and erosion. There are voids in the stones in some sections.

*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:**019-007-000-521-100-PHO1A.jpg****Structure Documents:**

Structure Assessment Form

Town: **Eastham**Structure ID: **019-007-000-521-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Bay Road

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$212,467.00

Length:

160

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V3

FIRM Map Elevation:

20

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Set of dumped stone groins. Stones are 12 inches to 24 inches in diameter. Stones are scattered and show signs of heavy stone movement.

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

Structure Images:

019-007-000-521-200-PHO2A.jpg**019-007-000-521-200-PHO2B.jpg****019-007-000-521-200-PHO2C.jpg**

Structure Documents:

Structure Assessment Form

Town: **Eastham**Structure ID: **019-019-000-120-100**

Key: community-map-block-parcel-structure

Property Owner:

State

Location:

Rock Harbor

Date:

10/25/2007

Presumed Structure Owner:

State

Based On Comment:

Enacted on November 7, 1995

Owner Name:

State Public Access Board

Earliest Structure Record:

1966

Estimated Reconstruction/Repair Cost:

\$49,896.00

Length:

150

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A4

FIRM Map Elevation:

12

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Dumped stone along the edge of a boat ramp. Stones had scattered. Stone size is 12 inches to 24 inches.

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

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

019-019-000-120-100-PHO1A.jpg

019-019-000-120-100-PHO1B.jpg

Structure Documents:

USACE

July 1966

Proposed Access

019-019-000-120-100-COE1A

MA-DCR

October 197

Proposed Shore

019-019-000-120-100-DCR1A

Structure Assessment Form

Property Owner:

Local

Location:

Rock Harbor Inlet

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham/State of Massachusetts

Earliest Structure Record:

1972

Estimated Reconstruction/Repair Cost:

\$62,800.00

Length:

200

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A4

FIRM Map Elevation:

12

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

Placed stone mound jetty. Stones are 6 feet by 4 feet by 3 feet on average. Crest is one stone wide. No visible sign of stone movement.

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**I****Rating****None****Action****Long Term Planning Considerations****Description****No Inshore Structures or Residential Dwelling Units Present****Structure Images:****019-019-000-120-200-PHO2A.jpg****Structure Documents:****USACE****August 1972****Proposed Shore****019-019-000-120-200-COE2A**

Structure Assessment Form

Town: **Eastham**Structure ID: **019-020-000-113-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Collins Landing

Date:

10/25/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Eastham/Private

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$63,756.00

Length:

150

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A8

FIRM Map Elevation:

11

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Cast in place concrete wall with parking lot behind and deteriorated boat ramp behind. Moderate cracking and spalling. No visible scour.

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

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

019-020-000-113-100-PHO1A.jpg

019-020-000-113-100-PHO1B.jpg

Structure Documents:

Section V - Eastham

Part C

Structure Photographs

TOWN: EASTHAM
 SOURCE: BCE - 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
019-001-000-097-100	019-001-000-097-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-001-000-097-100	019-001-000-097-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-001-000-101-100	019-001-000-101-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-001-000-101-100	019-001-000-101-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-321-100	019-007-000-321-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-321-100	019-007-000-321-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-521-100	019-007-000-521-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-521-200	019-007-000-521-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-521-200	019-007-000-521-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-007-000-521-200	019-007-000-521-200-PHO2C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-019-000-120-100	019-019-000-120-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-019-000-120-100	019-019-000-120-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-019-000-120-200	019-019-000-120-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-020-000-113-100	019-020-000-113-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
019-020-000-113-100	019-020-000-113-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

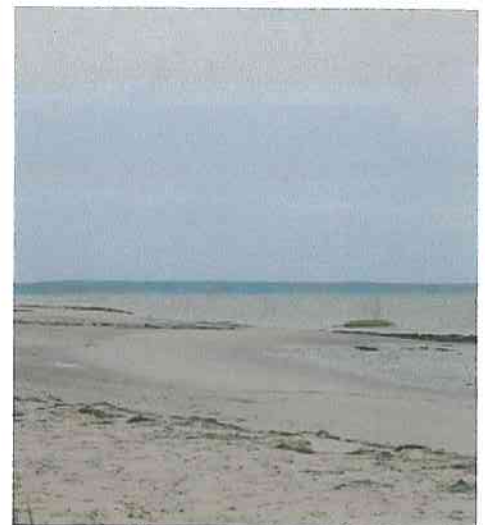
Massachusetts Coastal Infrastructure and Assessment



019-001-000-097-100-PHO1A



019-001-000-097-100-PHO1B



019-001-000-101-100-PHO1A



019-001-000-101-100-PHO1B



019-007-000-321-100-PHO1A



019-007-000-321-100-PHO1B



019-007-000-521-100-PHO1A



019-007-000-521-200-PHO2A



019-007-000-521-200-PHO2B

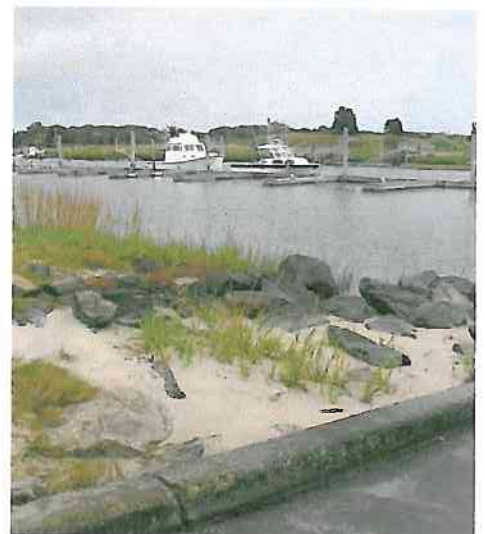
Massachusetts Coastal Infrastructure and Assessment



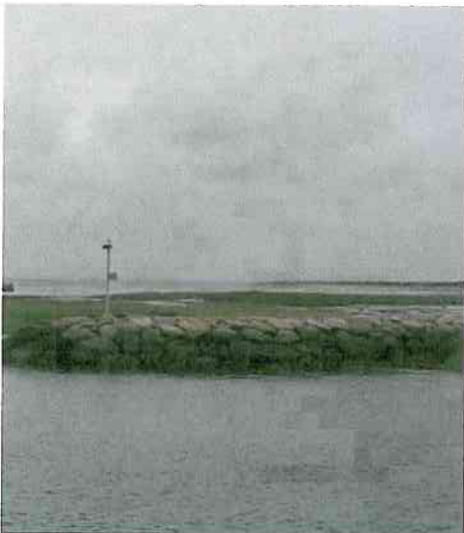
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019-019-000-120-100-PHO1A



019-019-000-120-100-PHO1B



019-019-000-120-200-PHO2A



019-020-000-113-100-PHO1A



019-020-000-113-100-PHO1B

Section V - Eastham

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: EASTHAM
SOURCE: Town of Eastham
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Eastham

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
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BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
019-001-000-101-100	019-001-000-101-100-DCR1A	2609	MA-DCR	Eastham	August 1967	Proposed Shore Protection, Stone Groin Construction, Sunken Meadow Beach - Prepared for the DPW of Massachusetts - Division of Waterways	1	Sunken Meadow	Groins
019-001-000-101-100	019-001-000-101-100-DCR1B	2688	MA-DCR	Eastham	November 1969	Proposed Shore Protection, Stone Mound Construction - Sunken Meadow Beach - Prepared for the DPW of Massachusetts - Division of Waterways	1	Sunken Meadow	Groins
019-001-000-101-100	019-001-000-101-100-DCR1C	2742	MA-DCR	Eastham	August 1971	Proposed Shore Protection Stone Groin - Sunken Meadow Beach	1	Sunken Meadow Beach	Stone Groin
019-001-000-101-100	019-001-000-101-100-DCR1D	2813	MA-DCR	Eastham	November 1974	Proposed Shore Protection, Stone Mound - Sunken Meadow Beach - Eastham - Prepared for the DPW of Massachusetts - Division of Waterways	1	Sunken Meadow Beach	Groins
019-019-000-120-100	019-019-000-120-100-DCR1A	2747	MA-DCR	Eastham	October 1972	Proposed Shore Protection - Stone Jetty - Rock Harbor	1	Entrance to Rock Harbor	Jetty

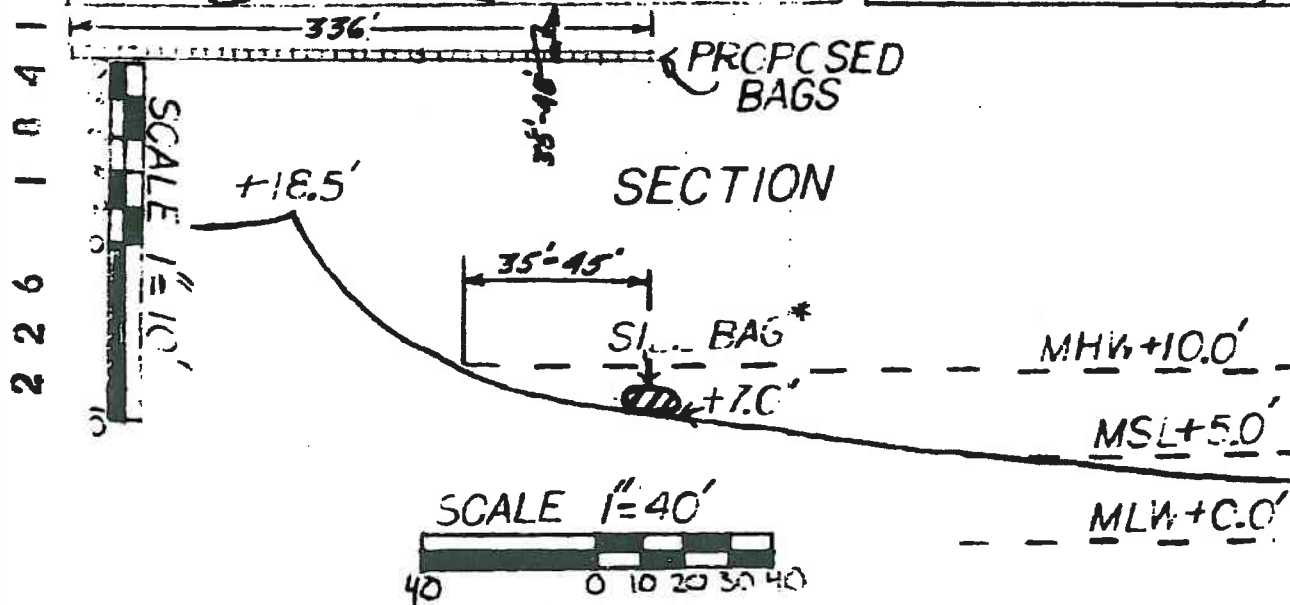
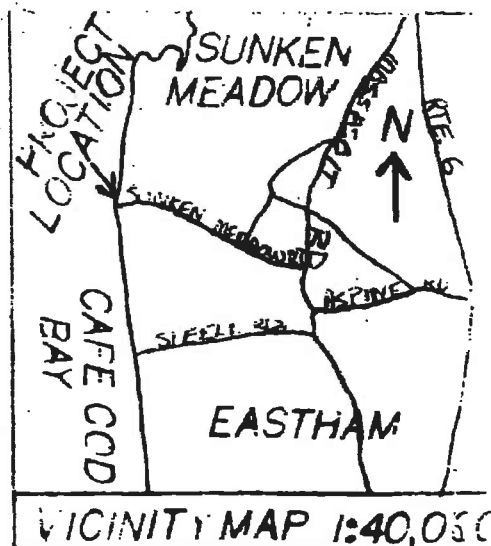
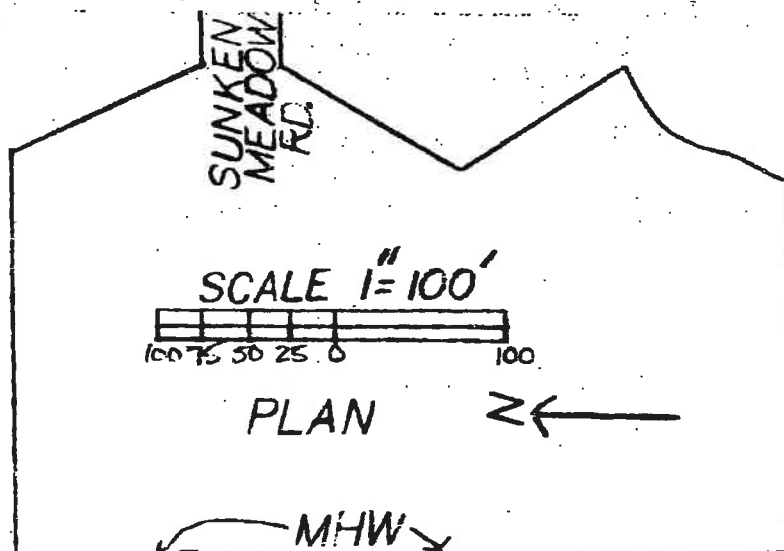
TOWN: EASTHAM
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

No DEP Ch. 91 Licenses for the Town of Eastham

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
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BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
019-001-000-097-100	019-001-000-101-100-COE1A	78-226	USACE	Eastham	June 1978	Proposed Perched Beach - Sunken Meadow Beach, Eastham	3	Sunken Meadow Beach	Perched Beach
019-001-000-101-100	019-001-000-101-100-COE1A	67-242	USACE	Eastham	August 1967	Proposed Groin Construction - Sunken Meadow Beach - Cape Cod Bay - Eastham, Mass. - Application by the DPW of Massachusetts - Division of Waterways	2	Sunken Meadow Beach	Groins
019-001-000-101-100	019-001-000-101-100-COE1B	72-73	USACE	Eastham	January 1972	Proposed Shore Protection - Stone Groin - Sunken Meadow Beach - Eastham, Mass. - Application by the DPW of Massachusetts - Division of Waterways	1	Sunken Meadow Beach	Groins
019-019-000-120-100	019-019-000-120-100-COE1A	66-218	USACE	Eastham	July 1966	Proposed Access Ramp and Facilities - Rock Harbor, Eastham, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Stone Revetment Around Boat Ramp
019-019-000-120-200	019-019-000-120-200-COE2A	73-31	USACE	Eastham	August 1972	Proposed Shore Protection - Stone Jetty - Rock Harbor, Eastham and Orleans, Application by the DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Jetty

019-001-000-097-100



* SILL BAG DIMENSIONS:

H: ~2'

L: ~12'

W: ~5'

PROPOSED FERCHED BEACH
SUNKEN MEADOW BEACH
EASTHAM, MA

APPLICATION BY TOWN OF
EASTHAM

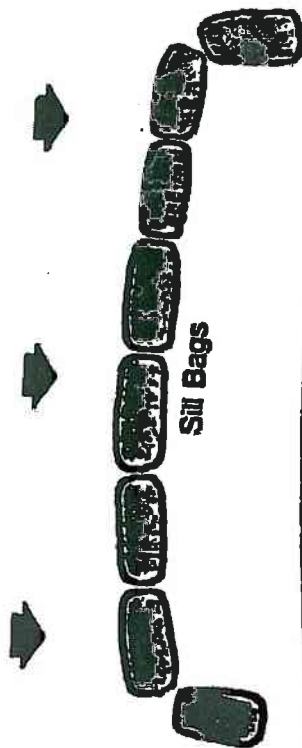
SHEET 1 OF 1

6/29/76

019-001-000-097-100

The Perched Beach Plan

Onshore Sediment Transport



Longshore
Transport

Bank Erosion

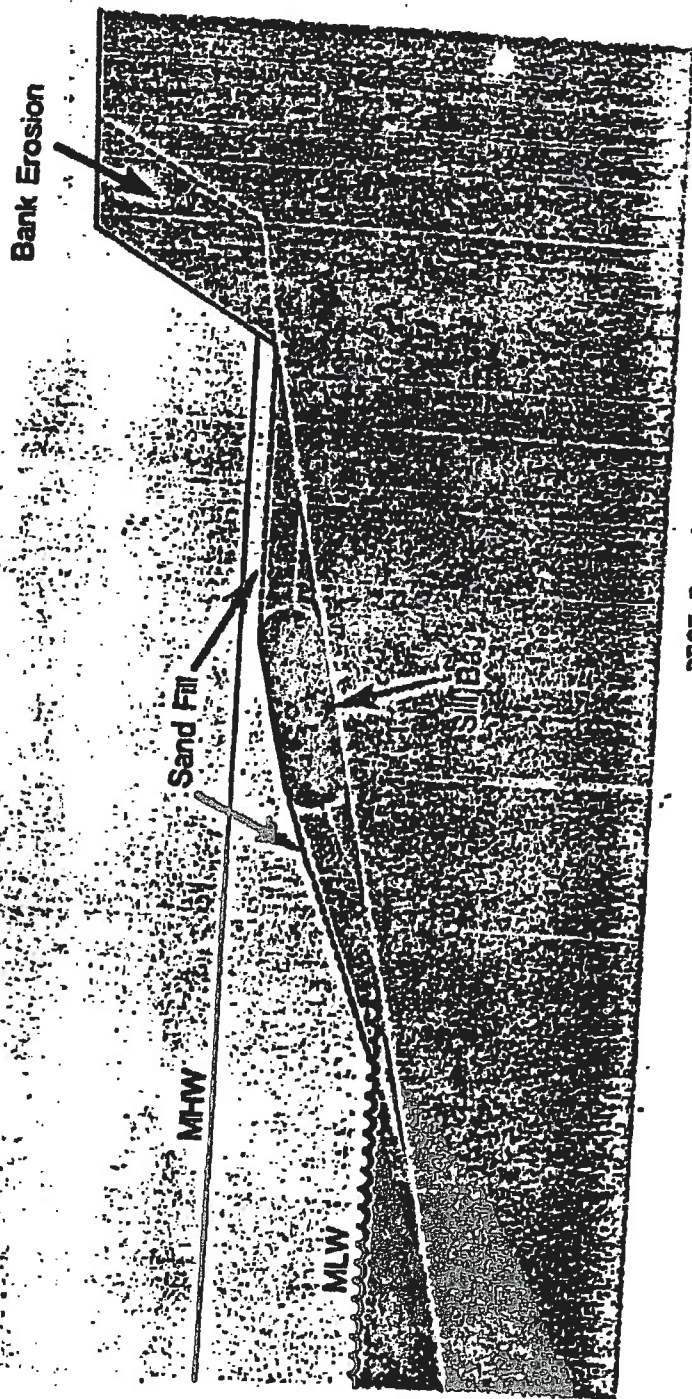
Eroding Shoreline

DEQE Permit No. 46

2 2 6 1 0 4 2

019-001-000-097-100

The Perched Beach

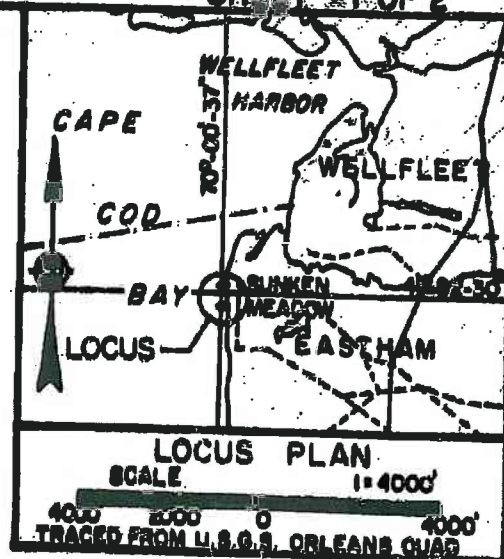


DEQE Permit No. 46

2 2 6 1 9 4 3

019-001-000-101-100

SHEET 1 OF 2



NOTE:

ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO THE PLANE OF MEAN LOW WATER. LOCATION OF PROPOSED WORK SHOWN IN RED.

**PROPOSED GROIN CONSTRUCTION
SUNKEN MEADOW BEACH
CAPE COD BAY**

EASTHAM, MASS.

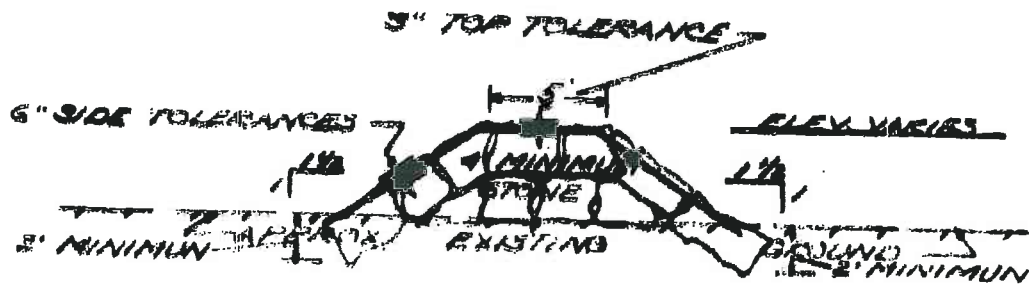
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
AUGUST 1967

RETIRED AIR ENGINEER FOR WATERWAYS

067 733

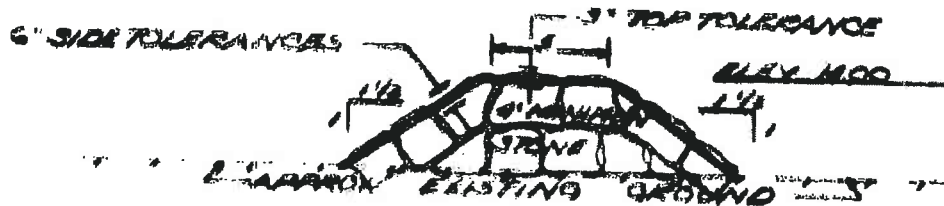
019-001-000-101-100

SHEET 2 OF 2



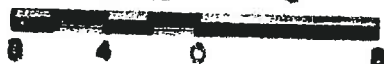
TYPICAL SECTION A-A

SCALE 1" = 8'



TYPICAL SECTION B-B

SCALE 1" = 8'



PROFILE OF GROINS

SCALE 1" = 40'



PROPOSED GROIN CONSTRUCTION
SUNKEN MEADOW BEACH
CAPE COD BAY
EASTHAM, MASS

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
AUGUST 1967

John T. ...
DEPUTY CHIEF ENGINEER FOR WATERWAYS

019-001-000-101-100-COE1B

This permit could not be copied due to the quality of the original document.

#72-73

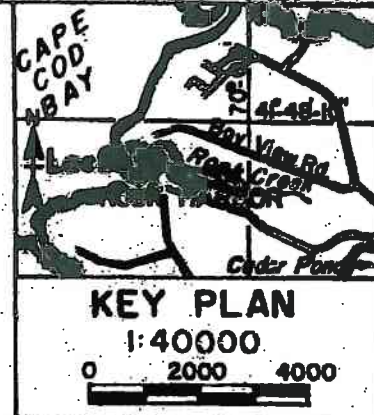
**Proposed Shore Protection
Stone Groin
Sunken Meadow Beach
Eastham, Mass
Application by the DPW of Massachusetts
Division of Waterways**

January 1972

0701119

019-019-000-120-100

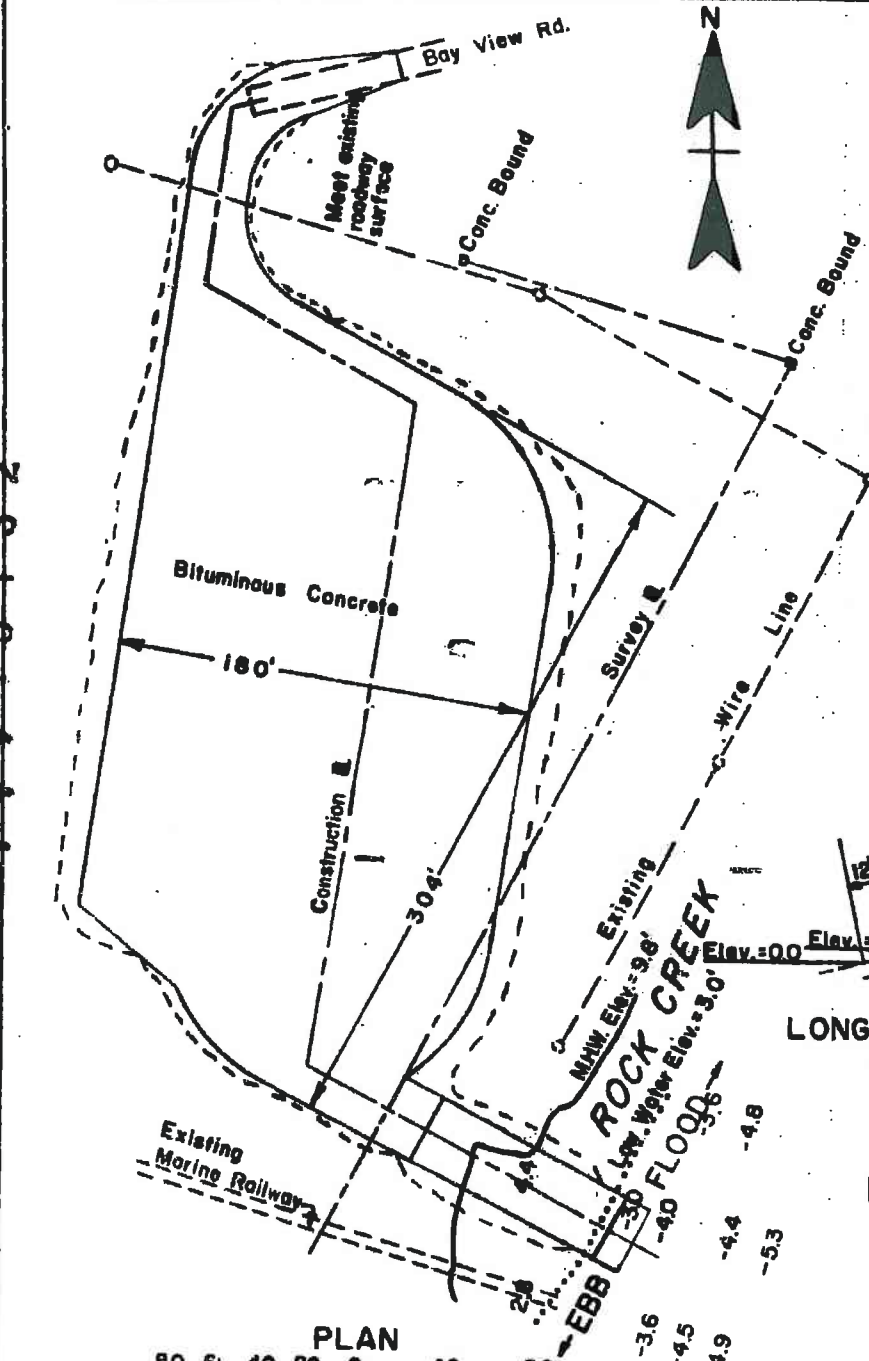
SHEET 1 OF 1



NOTE:

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

LOCATION OF PROPOSED
WORK SHOWN IN RED.



LONGITUDINAL SECTION RAMP B



**PROPOSED ACCESS RAMP
AND FACILITIES
ROCK HARBOR
EASTHAM MASS.**

Application By

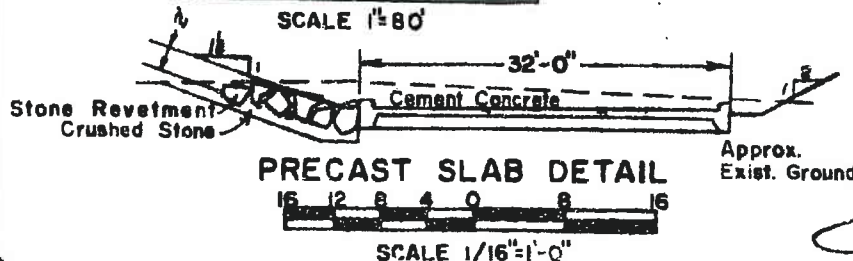
DEPARTMENT OF PUBLIC WORKS
OF MASSACHUSETTS

DIVISION OF WATERWAYS

JULY 1966

John J. Harrison
DEPUTY CHIEF

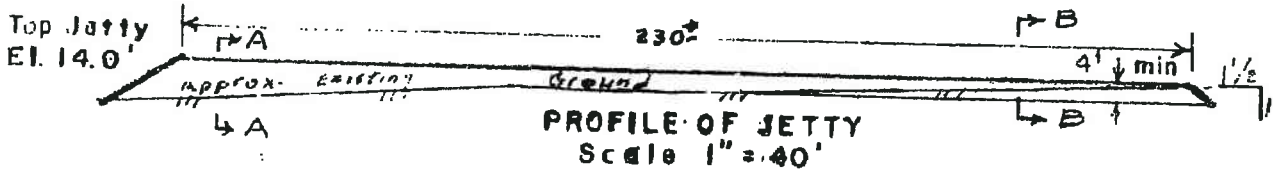
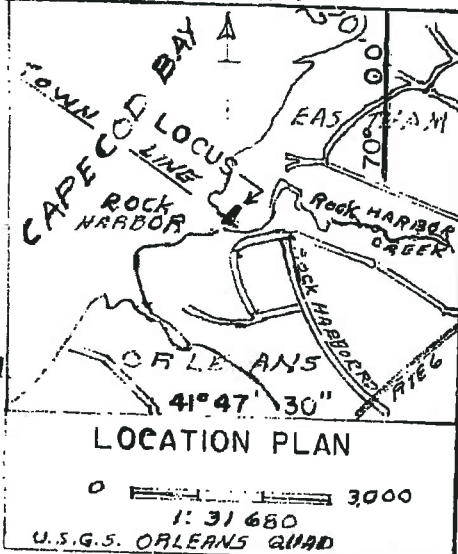
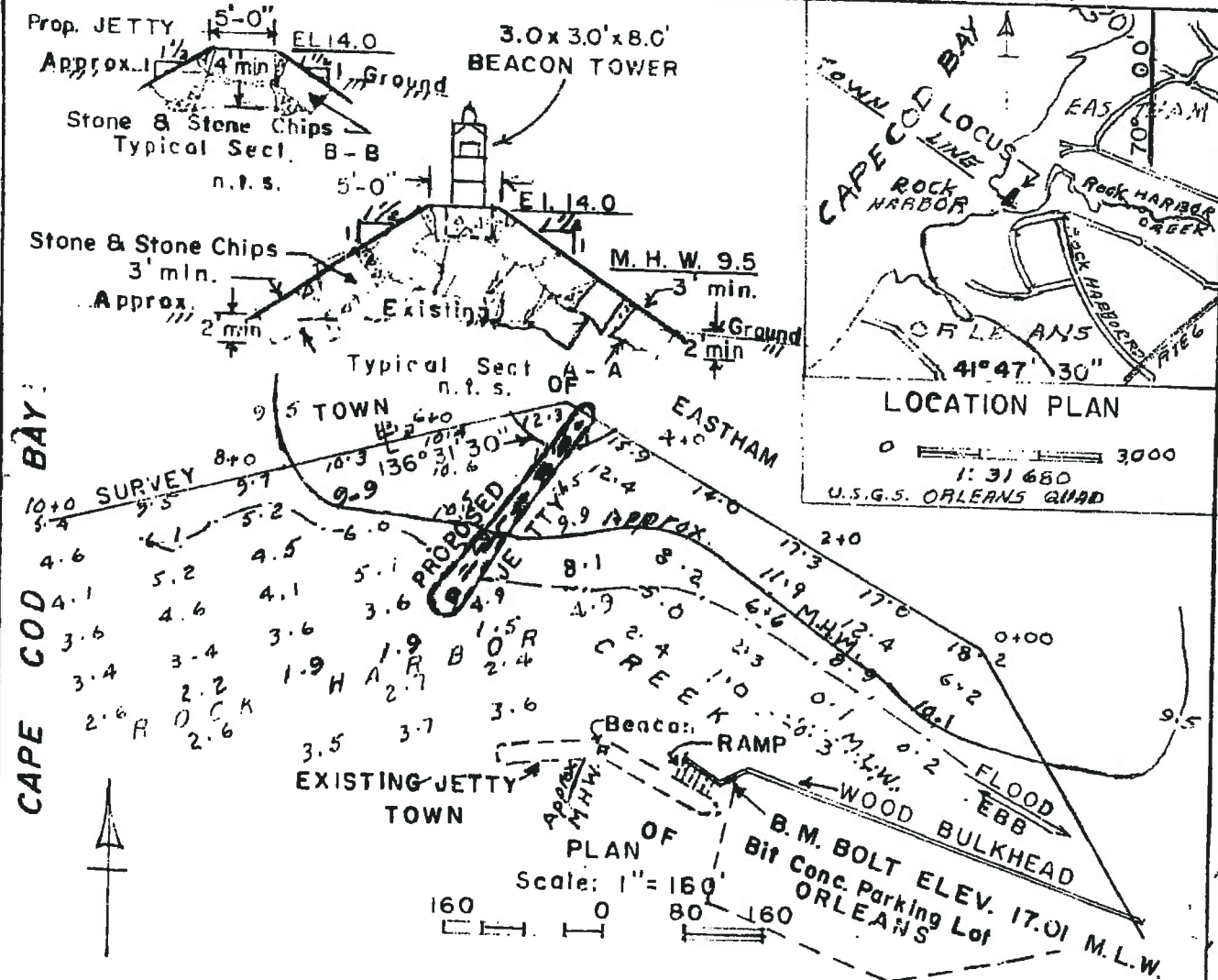
ENGINEER-WATERWAYS



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SHEET 1 of 1



NOTE:
Elevations are in feet and tenths and refer to the plane of mean low water. Minus figures indicate depths below that plane.
Date of Survey: March, 1971
Contract No. 2747
Locations of proposed work shown in red

PROPOSED SHORE PROTECTION
STONE JETTY
ROCK HARBOR
EASTHAM - ORLEANS
Application By
Department of Public Works of Mass.
Division of Waterways
AUGUST 1972
Fred C. Schwelm
DEPUTY CHIEF ENGINEER - WATERWAYS

ACC. NO. 04955