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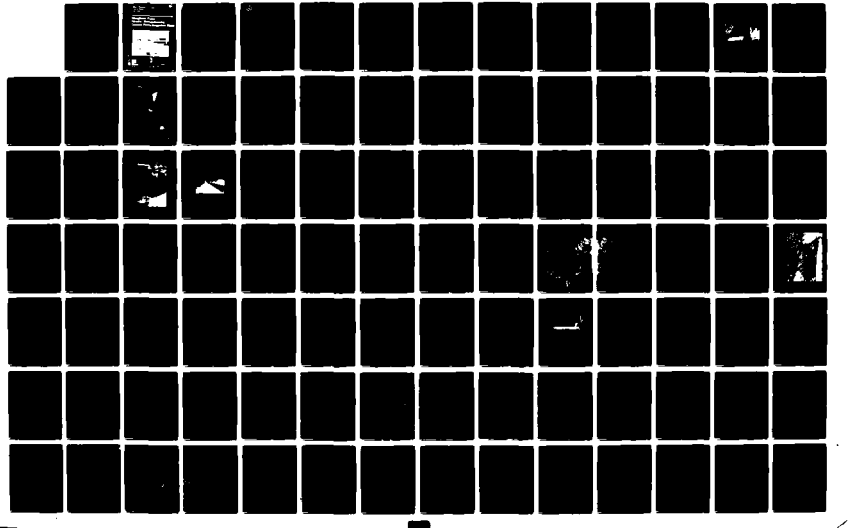

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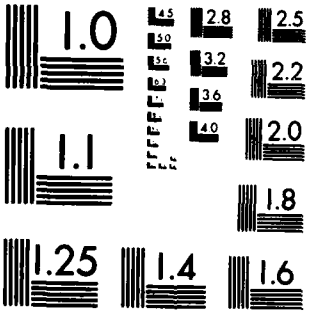

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A125 761	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ROUGHANS POINT, REVERE, MASSACHUSETTS, COAST FLOOD PROTECTION STUDY; VOL. 1 MAIN REPORT		5. TYPE OF REPORT & PERIOD COVERED WATER RESOURCES INVESTIGATION INTERIM REPORT
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION 424 TRAPELO ROAD, WALTHAM, MASS. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS NEDPL 424 TRAPELO ROAD WALTHAM, MASS. 02254		12. REPORT DATE DECEMBER 1982
		13. NUMBER OF PAGES 160
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

UNLIMITED DISTRIBUTION: APPROVED FOR PUBLIC RELEASE

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Title; Revere Coastal Flood Protection Study, Roughans Point
A feasibility investigation study

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Flood control	Coastal engineering
Flood forecasting	Coastal berms
Floods	Coasts

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report is an interim response to the flood protection needs of Roughans Point. The recommended flood protective measure involves rugged rock berm sloping seaward along Roughan's Point shore to dissipate incoming waves. This plan provides a 500-year protection over 300 structures in the flood plain. The BCR is 1.1 to 1.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

ROUGHANS POINT
REVERE, MASSACHUSETTS

COASTAL FLOOD PROTECTION STUDY

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REVERE COASTAL
FLOOD PROTECTION STUDY

ROUGHANS POINT

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APPENDIX D - REAL ESTATE CONSIDERATIONS
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ACKNOWLEDGEMENTS

The New England Division (NED), U.S. Army Corps of Engineers prepared this report under the overall direction of Colonel Carl B. Sciple, Division Engineer and Joseph L. Ignazio, Chief of the Planning Division. The Basin Management Branch (BMB) of the Planning Division has overall responsiblity for the study under the supervision of its Chief, William F. McCarthy. Study management is provided by the Comprehensive River Basin Section (CRBS) headed by Arthur F. Doyle of BMB.

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This report was prepared for publication by NED's Word Processing Center under the supervision of Patricia A. Wysocki, assisted by Camille R. Santi, Anna V. Parfenuk, and Laraine A. Bogosian.

Thanks are extended to the city of Revere's Department of Planning and Community Development. Frank Stringi and Paul Rupp helped significantly with the study's public involvement program.

Additional thanks are in order to the Workshop Committee, especially Ellen Haas whose cooperation and dedication were invaluable.

Gerald Salemme of Congressman Markey's Office should also be recognized for his coordination efforts which contributed to the progress of the study.

The Metropolitan District Commission (MDC), the Division of Waterways, the Office of Coastal Zone Management (CZM), and the Massachusetts Environmental Policy Unit (MEPA) of the Commonwealth of Massachusetts are acknowledged for their continuing cooperation in NED activities.

EXECUTIVE SUMMARY

Revere, Massachusetts is a coastal community located immediately north of Boston and Winthrop. Flooding, due to storm tides and wave overtopping, is a constant concern. An initial study completed in 1980 found that coastal flood protection appeared to be economically feasible.

The Revere area is divided into four separate zones: Roughans Point, Point of Pines, Revere Beach, and Backshore areas. This report is an interim response to the flood protection needs of Roughans Point - the neighborhood suffering the most damage. Feasibility studies of flood damage reduction opportunities for the other zones in Revere will be submitted separately.

Annual flood losses for Roughans Point are over $1.0 million. A recurrence of the "Blizzard of February 1978", the flood of record, would result in nearly $11.0 million in damages. Over 300 structures, of which 291 are homes, would be inundated with up to 8 feet of water!

The Corps evaluated many alternative protective measures to reduce flood losses at Roughans Point. Input from the public involvement program, along with close coordination with the city of Revere, helped establish the necessary criteria leading to recommendation of a particular plan. The public desires a comprehensive solution offering a high degree of protection.

The recommended plan involves a rugged rock berm sloping seaward along the Roughans Point shore to dissipate incoming waves. Additional features include interior drainage provisions and a new pumping station with an auxiliary power source. Two road intersections would also be raised to prevent backwater flooding. This plan provides 500-YR protection to over 300 structures in the flood plain. The project would prevent 97 percent of the potential damages at an estimated investment of $12.0 million. The BCR is 1.1 to 1.

The costs, as presented, are considered conservative. The proportion allotted for contingencies and post-feasibility engineering is cautions. This proportion will be refined as project design is finalized after Congressional authorization during Continuation of Planning and Engineering (CP&E). In addition, a 50-year amortization period was used in plan evaluation. Application of a 100-year period would lower annual charges.

ROUGHANS POINT
REVERE, MASSACHUSETTS
COASTAL FLOOD PROTECTION STUDY

VOLUME I

MAIN REPORT

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ROUGHANS POINT

SECTION I

INTRODUCTION

SECTION I

INTRODUCTION

An initial study performed under the special continuing authority of Section 205 of the 1948 Flood Control Act, as amended, determined the impact of the February 1978 flood of record and evaluated the extent of damages experienced. During the Section 205 investigation, the Revere area was separated into four separate zones shown on Plate 1: (1) Roughans Point, (2) Revere Beach (3) Point of Pines, and (4) Oak Island and vicinity. That initial investigation determined that no flood control projects in the four zones of Revere could be recommended under the Section 205 authority, as all alternatives studied had project first costs that exceeded the Federal limitation at that time of $3 million (declared disaster areas) allowed by Section 205. Because of flooding hardships caused by northeast storms (particularly those of February 1978, February 1972 and December 1959) and initial findings that flood control improvements appeared to be economically justified, further study of the Revere coastal flooding area was initiated in FY 1980 under the ongoing Southeastern New England (SENE) authorization.

A. STUDY AUTHORITY

The December 1975 findings of the comprehensive study of the SENE area recommended that comprehensive flood management programs, making use of nonstructural solutions wherever possible, be investigated by the Corps of Engineers. The eastern coast of Massachusetts was an area idenfitied as warranting early consideration.

The SENE Study was authorized by a resolution adopted 12 September 1969 by the Committee on Public Works of the United States Senate providing for a study to determine ". . . the feasibility of providing water resource improvements for flood control, navigation and related purposes in Southeastern New England . . . with due consideration for enhancing the economic growth and quality of the environment." The resultant study of the SENE Water and Related Land Resources was completed in 1975 under the direction of the New England River Basins Commission, since dissolved. It identified the critical problems of tidal flooding even before the disastrous blizzard of February 1978, and recommended protection emphasizing nonstructural measures to be used wherever possible.

B. PURPOSE AND STUDY PROCESS

The Revere Coastal Flood Protection study is a feasibility investigation. This report is an interim response to study authority. Feasibility studies of flood damage reduction for other sites in the study area will be submitted as separate documents. Results will be available for local, State and Federal use in determining the advisability of improvements for flood damage reduction and related water resources needs. Data from previous water resources studies were

updated and utilized in this investigation. Additional data were gathered and correlated where no existing information was available.

This flood protection study was planned in three stages: Stage 1 - which culminated in the Reconnaissance Report in June 1981; Stage 2 - Development of Intermediate Plans in September 19..; and Stage 3 - Development of Final Plans.

This document presents findings and recommendations of the study through Stage 3. Efforts consisted of executing the four functional planning tasks during each stage of the planning process. These tasks are problem identification, formulation of alternatives, impact assessment and evaluation.

Each iteration of these tasks incorporated a higher level of effort, detail and refinement. Re-iteration also allowed the study team to consider additional information as the study progressed. A detailed description of the standard study process follows:

Stage 1. The initial stage of the study effort evaluates the advisability of continuing with more detailed study. Efforts at this stage provide a clear indication of the scope of needs, the area's planning objectives and constraints, and indication scheduling the necessary management of subsequent planning activities. The reconnaissance report is the product of Stage 1 work.

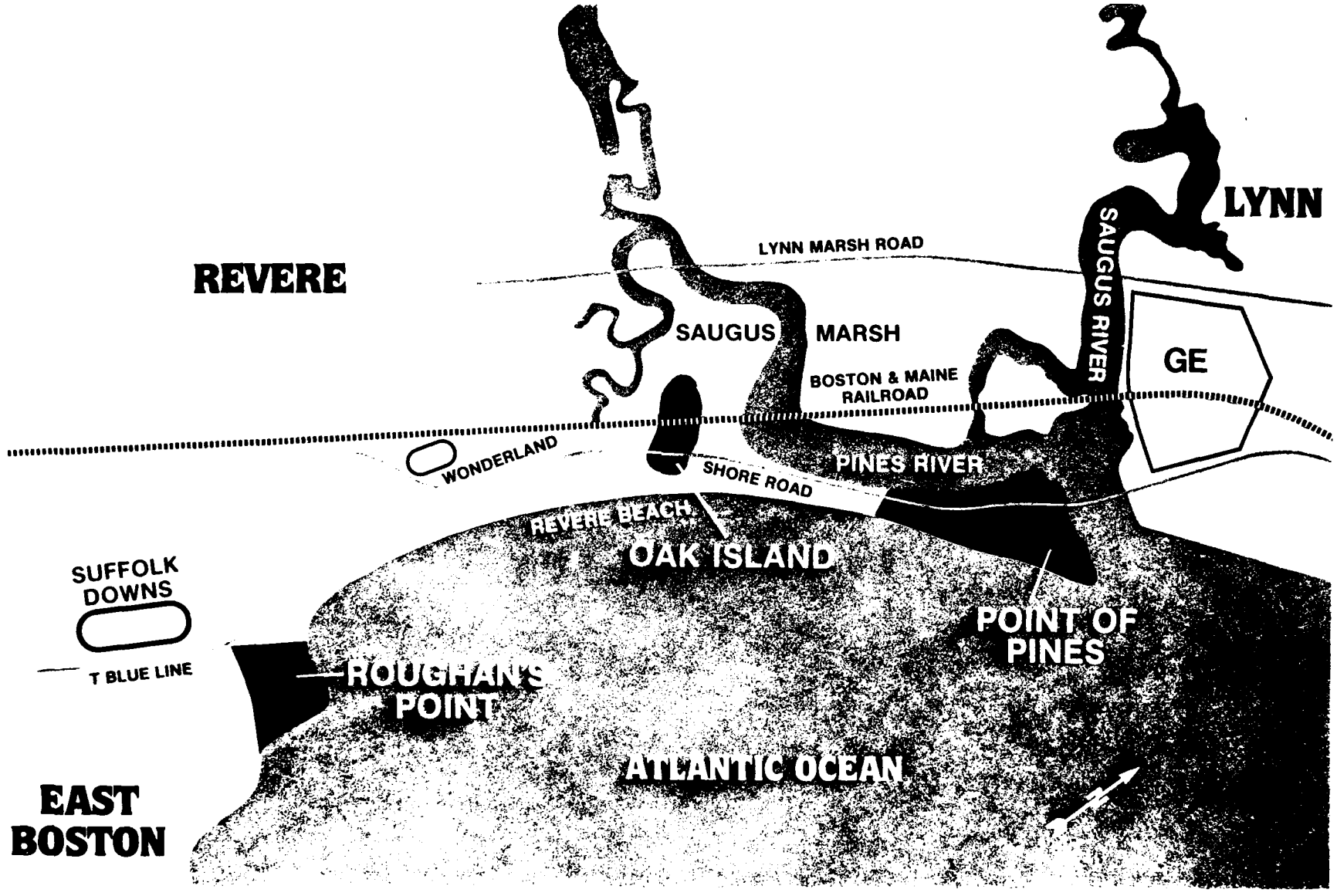
Stage 2. Developing the intermediate plans requires a more detailed analysis of the problems. Stage 2 work brings forth an initial range of solutions at a general level of detail and evaluation. The final product of this stage determines the scope and direction of Stage 3 planning efforts.

Stage 3. Development of final plans concentrate on developing a select number of more detailed alternative flood protection plans. Extensive public involvement and professional evaluation determines which plan warrants recommendation.

C. PUBLIC INVOLVEMENT

The public consists of all non-Corps of Engineers entities: Federal, State, local and regional agencies as well as public and private organizations and the general public. The public was categorized into three distinct groups consisting of the Governmental sector, special interest groups and the general public.

The primary objective of the public participation program was to provide continuous two-way communication throughout the overall planning process. By keeping the public informed about the study's progress, interested persons could assist in the making of decisions affecting them. Major decisions made throughout the study were based upon the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LYNN
SAUGUS RIVER
SAUGUS MARSH
GE
BOSTON & MAINE RAILROAD
WONDERLAND
SHORE ROAD
PINES RIVER
REVERE BEACH
OAK ISLAND
SUFFOLK DOWNS
T BLUE LINE
POINT OF PINES
ROUGHAN'S POINT
ATLANTIC OCEAN
EAST BOSTON

PLATE I

expressed needs and objectives of all local, State and regional officials and members of the general public.

Coordination has been maintained throughout the study with representatives of Federal, State and local agencies as well as concerned individuals. The Massachusetts Water Resources Commission is the State's coordinating agency. Numerous meetings have been held to exchange information regarding flood problems and their potential solutions.

Involvement with various agencies of the Commonwealth of Massachusetts peaked during the last few months. Separate meetings were held with the Metropolitan District Commission (MDC), Coastal Zone Management (CZM), Massachusetts Environmental Policy Act (MEPA) Unit, and Water Resources Commission (WRC). Coordination with these local governmental entities was considered critical to the planning process.

The MDC is responsible for the Revere Beach Reservation just north of the study area and operates the existing pumping station at Roughans Point. A portion of the study area falls within the MDC's jurisdiction. All plans in and around the study area should model the MDC's Master Plan for the region.

CZM is charged with review for policy consistency for proposals within the coastal boundaries of the Commonwealth. The MEPA Unit coordinates public review of the Environmental Notification Form (ENF). The ENF for the recommended plan as filed by the city of Revere, as project proponent, in fulfillment of requirements under MEPA. The ENF is included in Section VIII, Correspondence.

The WRC is the Commonwealth of Massachusetts' coordinating agency for projects of this nature. The non-Federal Letter of Intent is derived from this entity, in cooperation with the city of Revere. The Letter of Intent is also included in Section VIII, Correspondence.

The study was structured to provide the public with a better understanding of the entire planning process as the study progressed from one stage to the next. During problem identification, public involvement efforts were directed toward information and collection of data to assist in the identification and description of flood protection problems, concerns and opportunitites. Information concerning the public's environmental, social and economic desires were solicited. Use of a social survey was one mechanism for communicating with citizens of the Roughans Point neighborhood. The objectives of the survey were to collect data describing resident's experience with flooding, activities taken to protect themselves and their homes from flooding, and to learn of their preference toward various protective measures.

Public involvement aided in assuring that the alternatives developed addressed the full range of problems and concerns as perceived by the public in response to the study objectives. Informing the public and

obtaining their feedback about the various technological and managerial measures available was needed to insure this.

Public involvement during impact assessment concentrated on identification and measurement of the impacts of flood protection plans as they relate to the entire study area and the general public. The elements and impacts of each alternative plan were evaluated with consideration to the significance of impacts to each affected public. Specific public involvement objectives during the evaluation of alternative plans included determining the alternative plans' acceptability and ability to be implemented.

The study's Draft Interim Response was distributed to residents of the study area, governmental entities of the Commonwealth of Massachusetts, the city of Revere, local Federal agencies and the Office of the Chief of Engineers (OCE) for their review and comment. The review period ran from June through September 1982.

Concerns that were identified focused primarily on operation and maintenance, environmental impact, and alternative evaluation. A Finding of No Significant Impact has been included in the Environmental Assessment. In addition, the Commonwealth of Massachusetts has determined that an Environmental Impact Report is not required, but that comments provided be addressed (see Section VIII, "Correspondence").

D. PRIOR STUDIES

Within Revere a number of Federal, State, regional and local agencies have engaged in water resources investigations. Extensive use was made of these studies and reports to avoid duplication of effort. The following prior reports address flood problems along Revere Beach and the Saugus and Pines Rivers.

. The Division Engineer's report on Restoration of Revere Beach was submitted to the Chief of Engineers on 1 June 1949. It was later printed in House Document No. 146, 82nd Congress, 1st Session. The 1954 River and Harbor Act authorized a Federal project for the protection and improvement of the shore of Revere Beach Reservation between Northern Circle (Carey Circle) and a point near Shirley Avenue. The Metropolitan District Commission (MDC) constructed part of the project during 1954, but it was not completed because of technical difficulties.

. A report on Flood Control for Saugus Branch Brook, Linden Brook and Town Line Brook, dated 15 March 1955, was prepared by a consulting engineer for the MDC. The work proposed for the Saugus River

Basin included (1) a reinforced concrete conduit along the upper portion of Town Line Brook and a paved open channel for the lower portion and (2) a reinforced concrete conduit along the lower reach of Linden Brook. Both improvements conveyed flows to a common pumping station with an outlet conduit to the Pines River. The recommended measures have been completed with the exception of the pumping station.

. A report on a Pines River Detention Basin was prepared by a consulting engineer and submitted to the MDC in January 1965. This report considers the merits of a detention basin near the confluence of the Town Line and Linden Brooks in lieu of the pumping station recommended in the 1955 report. This proposed plan has not been implemented at this time.

. A Beach Erosion Control Report on Cooperative Study of Revere and Nantasket Beaches, Massachusetts, was submitted by the Corps of Engineers in March 1968. It was later printed in House Document No. 211, 91st Congress, 2nd Session. The 1970 River and Harbor Act authorized Federal participation in widening Revere Beach by placement of suitable sandfill along 13,000 feet of beach fronting the MDC Reservation, thus furnishing a recreational and protective beach averaging 195 feet in width above the mean high waterline. During preconstruction planning, it was found in 1981 that Federal participation was not warranted.

. A report entitled Flood Control and Navigation, Saugus and Pines Rivers Basin was submitted by the Division Engineer in June 1970 to the Chief of Engineers. The report focused on flood problems in the 47-square-mile Saugus River Basin (including the Pines River) and along 6.5 miles of tidal shorefront in Revere and Lynn. It was recommended that no structural improvements for the reduction of flood damages be undertaken at that time.

. A master plan for the restoration of the Revere Beach Reservation was prepared for the MDC by a consultant and submitted 1 December 1978. Land and Water Conservation funds are being used to develop a linear park system. The plan emphasizes preservation and extension of the beach landscape as a predominantly naturalized seaside parkland. It recommends flooding, storm drainage, and traffic improvements as the backbone of development while also calling attention to the festive highlights of Revere Beach's lively and colorful past. Contemporary facilities will complement restorations of historic structures in order to accommodate beach safety, food, sanitary, bathhouse, amusement, police, and maintenance requirements. Work has been started on portions of the plan, but temporarily halted due to funding constraints.

. Improvements to alleviate periodic flooding, along Sales Creek, near the Revere-East Boston boundary, were initiated by the

Massachusetts Department of Environmental Quality Engineering (DEQE) in 1980. These flood control works were studied and proposed for the city of Revere by consulting engineers in 1978. The proposed major facilities consist of a pumping station at Bennington Street (at the point of Sales Creek discharge into Belle Isle Inlet), replacement and enlargement of most existing drainage culverts in the creeks, excavation of sediment and removal of debris from many of the existing drainage channels, and enclosure of two channel reaches of the creek in pipe conduits.

. The initial study (summarized earlier) of coastal flood protection problems and needs of Revere performed under Section 205 of the 1948 Flood Control Act, as amended, was submitted by the Division Engineer to the Chief of Engineers in February 1980. This preliminary study provided the impetus for further investigations by the Corps of Engineers.

. Flood protection needs for Point of Pines are currently being studied by the New England Division. Alternatives being considered include rock revetments covered in part by rebuilt sand dunes along the southeasterly shore, and earth dikes along the southern bank at the mouth of the Saugus River. Preliminary studies show the protection to be economically justified. Detailed studies scheduled for completion in FY 84 will consider additional options.

. A preliminary study of recreational navigation needs in the Pines River area, by the New England Division under Section 107 of the 1960 River and Harbor Act, as amended, resulted in approval of a reconnaissance report by the Chief of Engineers in September 1979. Preparation of a detailed project report is currently underway, with completion contingent upon the availability of funds.

. A reconnaissance study of recreational navigation needs at Winthrop Harbor, under Section 107 of the 1960 River and Harbor Act, as amended, is scheduled to be transmitted to local interests for review in the spring of 1983.

E. STUDY MANAGEMENT

Strong study management was needed to assure a sound and orderly process. In order to achieve this, study management was provided by the Corps of Engineers. The Revere Beach Citizen's Advisory Committee (CAC) and the Revere Office of Planning and Community Development assisted in study coordination and plan formulation.

The Commander and Division Engineer, New England Division, U.S. Army Corps of Engineers had overall responsibility for the conduct and management of the Revere Coastal Flood Protection Study. A multidisciplinary unit made up the study team. Study coordination was accomplished by the Planning Division, Basin Management Branch, augmented by expertise provided by other offices in the Division organization. The day-to-day operation of the study was the responsibility of the study manager.

SECTION II

PROBLEM IDENTIFICATION

SECTION II

PROBLEM IDENTIFICATION

This section identifies the problems, needs, and opportunities associated with flooding in the Roughans Point area along the Revere coast. The objectives and any planning constraints that plan formulation must address are also outlined.

A. NATIONAL AND STATE OBJECTIVES

Plans were evaluated with regards to the goals of enhancing national economic development and environmental quality. Economic development is enhanced by increasing the value of the Nation's output of goods and services and by improving national economic efficiency. The quality of the environment is enhanced by the improved management, conservation, preservation, creation or restoration of certain natural and cultural resources and ecological systems.

In addition, Section 73 of the Water Resources Development Act of 1974 mandates:

> "(a) In the survey, planning or design by any Federal Agency of any project involving flood protection, consideration shall be given to nonstructural alternatives to prevent or reduce flood damages including, but not limited to, floodproofing of structures; flood plain regulation; acquisition of flood plain lands for recreation, fish and wildlife, and other public purposes; and relocation with a view toward formulating the most economically, socially and environmentally acceptable means of reducing or preventing flood damages."

The Corps seeks plans that reduce flood damages and enhance environmental quality within the study area. Water resources planning conducted by the Corps must develop, through public involvement, plans solving flood problems in conjunction with other urban planning programs. This interactive planning process involved:

- Addressing specific flood problems, issues and concerns identified by the public;

- Being flexible in accommodating changing economic, social and environmental patterns and technologies;

- Integrating and complementing other urban development and management programs;

. Coordinating with affected public agencies, interest groups and individuals;

. Developing plans through an orderly, structured and open planning process;

. Ensuring plan implementation, with respect to financial and institutional capabilities and public consensus; and

. Where applicable, receiving approval by appropriate state and Federal agencies.

In 1978 the Massachusetts Water Resources Study identified certain state objectives with regard to flooding and wetlands. The Commonwealth of Massachusetts wishes to reduce flood damage to existing properties by reducing their susceptibility to flooding. It wants to improve the economy by guiding development away from flood-prone areas.

Increased flood damage must be avoided. The Commonwealth prefers non-structural measures be pursued, wherever possible, as the means toward this end. Reduction of future flood damage can be accomplished by directing development to flood-free areas.

B. EXISTING CONDITION

The city of Revere is located in Suffolk County on the Massachusetts coast about 2 miles northeast of the East Boston section of the city of Boston. About one-fifth of its area is a salt marsh adjacent to the Pines River estuary, and about one-third of the city, including the marsh area, is below elevation 10 feet, National Geodetic Vertical Datum (NGVD - formally mean sea level). The study area is the coastal region of Revere. Four sites have been identified as being particularly flood prone. They are Roughans Point, Revere Beach, Point of Pines, and the Oak Island areas. This report focuses on the problems, needs and opportunities at Roughans Point. Other areas are also under study and will be discussed in subsequent reports.

The remainder of the city is gently rolling with a few steep hills, the highest elevation being at the reservoir on Fennos Hill at about 192 feet NGVD. Most of the land above 10 feet NGVD is fully developed and, for all practical purposes, any new development could be expected only at the expense of existing uses. The population of the city is about 42,000. In addition, beach erosion studies conducted by the Corps last year found that and on peak summer days more than 16,000 people visit the 3.5-mile-long Revere Beach for recreation.

(1) Study Area. Roughans Point is a low-lying, ocean front area in the Beachmont section of Revere consisting primarily of summer and permanent residences. The area has 55 acres which lie below elevation 10 feet NGVD. Roughans Point also receives drainage from about 30 acres of

the higher level Beachmont area to the south, making up a total interior drainage area of about 85 acres (see Plate 2).

Existing limited storm drainage facilities in the area generally drain to the west (away from the ocean) discharging to Sales Creek through a 42-inch-diameter drain beneath Revere Beach Parkway. There is also an 18-inch flap-gated storm drain at the south end of Broad Sound Avenue that discharges through the line of protection to the ocean, tide level permitting. The capacity of the entire existing system is affected by the ocean tide. During storm tides there is no gravity drainage from the area. Interior runoff, plus any wave overtopping, ponds throughout the low level area. Temporary ponding depths of 1 to 2 feet are reported to be an annual event. Depths as great as 6 to 8 feet were experienced in February 1978. A pumping station was built by the MDC in 1975 on Broad Sound Avenue for the purpose of pumping ponded waters from the street to the ocean. The station has a capacity of 48 cubic feet per second (cfs), but is reportedly limited to about 39 cfs with its present inlets and outlets. This capacity is supplied by 3 pumps, a million gallon per day (MGD) pump and 2-15 MGD pumps. This station proved quite inadequate and ineffective during the February 1978 event due to the high rates of wave overtopping.

Sales Creek, which receives most of the normal interior drainage from Roughans Point, is a tidal estuary draining generally to the south, a distance of about 2 miles, outletting to Boston Harbor. The DEQE is presently constructing a tide gate structure and pumping station on Sales Creek about one mile south of Roughans Point in an effort to reduce flooding along the upper reaches of Sales Creek. The operation of this facility in the future during storm tides may facilitate gravity drainage from Roughans Point to the creek, if local drainage facilities are improved and the conveyance capacity of the creek is adequate and maintained.

The existing shore protection features along Roughans Point, which are subjected to significant wave overtopping during coastal storms, consists of six different types or configurations of structures, and for descriptive purposes have been designated as Reach A thru F. (See Plate 3.) Reach A is at the northern end of the area and Reach F is at the southern end; those reaches in between are in alphabetical order. A description of the structure in each section follows.

Reach A. Reach A consists of about 775 feet of vertical concrete seawall near Eliot Circle. The top of the wall is at elevation 15.3 ft. NGVD with a top width of 1'-10". The top 2 feet of the wall forms a parapet 2 feet above a concrete sidewalk, 12 feet wide on the landside of the wall. The wall thickness below the sidewalk and the foundation elevation are undetermined. The exposed face on the seaward side varies from 10 feet high at the center of the reach to 3 feet at each end.

Reach B. Reach B projects seaward at a right angle to the southern end of Reach A and consists of about 250 feet of riprap revetment type seawall. The top varies from elevation 12 ft. NGVD at Reach A to elevation 11 ft. NGVD at Reach C. The revetment contains a single layer of cover stone about 2' - 6" thick placed on a 1 on 1.5 slope. The average weight of the cover stone is 2 to 4 tons. Smaller size bedding stone of unknown thickness can be seen beneath the cover stone. The exposed height of the revetment varies from zero feet at Section A to 13 feet at Reach C. A bituminous concrete driveway runs along the top of the revetment. Soil erosion through the voids in the cover stone has created numerous cavities along the driveway edge, some of which have been partially filled with crushed stone.

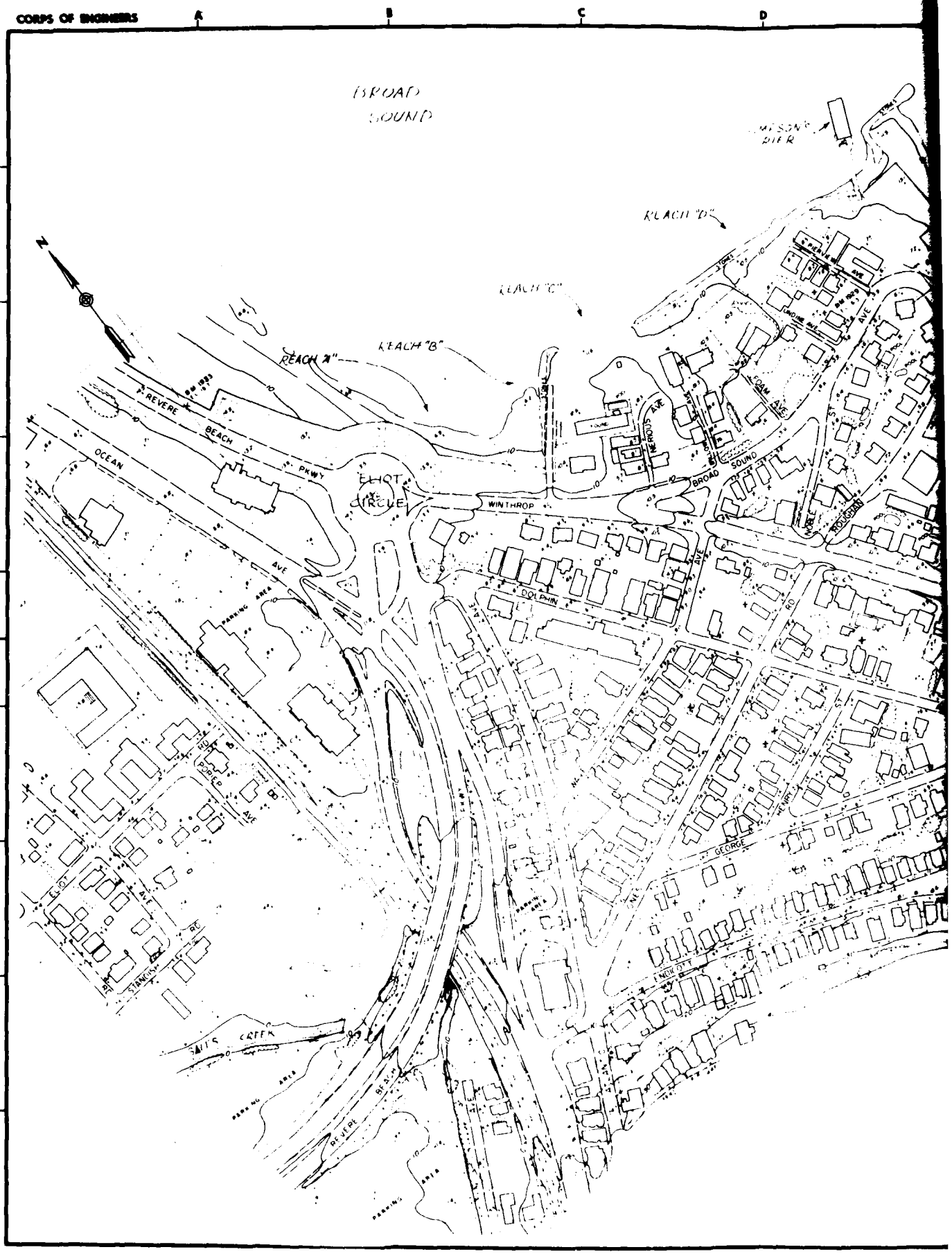
Reach C. Reach C consists of a vertical cut stone granite masonry wall about 200 feet long and 4 feet thick running in an easterly direction from the end of Reach B. The top of the wall is at elevation 13.7 ft. NGVD. The exposed face on the seaward side is about 12 feet high. The foundation elevation is undetermined. Two of the cut stones are missing on the face of the wall. At one time, the joints were mortared but at present most of the mortar has deteriorated.

Reach D. Reach D is a continuation of the shore protection in an easterly direction and consists of about 600 feet of riprap revetment type seawall with the top at about elevation 10.5 ft. NGVD. The revetment has a crest width of 3'-6" with a 1 on 1.5 front slope, and a 1 on 1 back slope. The revetment contains a single layer of cover stone about 2'-6" thick with an average weight from 2 to 4 tons. The exposed face on the ocean side is about 9 feet high. Smaller size bedding stone of unknown thickness can be seen beneath the cover stone. Some of the cover stones have been displaced and the front slope has broken down near its junction with Reach E. The landside has recently been filled to within 1 to 2 feet of the crest with random building materials, including broken concrete block, pavement and sidewalk slabs.

Reach E. Reach E continues easterly about 100 feet and then makes a 90-degree bend to the right and continues in a southerly direction about 1700 feet to Winthrop Parkway. Reach E was constructed about 1936 by the Massachusetts Department of Public Works, and consists of a steel sheet pile wall with the exposed surface covered by 6 inches of concrete.

The top of the wall is at elevation 17.6 ft. NGVD. An earth berm about 10 feet wide, with the top elevation about 4 feet below the top of wall, tends along the landside of the wall. The exposed seaward side is about 12 feet high with stone weighing 1 to 2 tons at the toe. These stones are sparsely placed and act more as individual units rather than a riprap mass. Considerable gouging of the concrete surface has occurred due to movement of these stones during storm conditions.

This wall was damaged during a coastal storm in February 1972 and repaired by the Corps of Engineers in 1973 under authority of the Federal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PUBLIC
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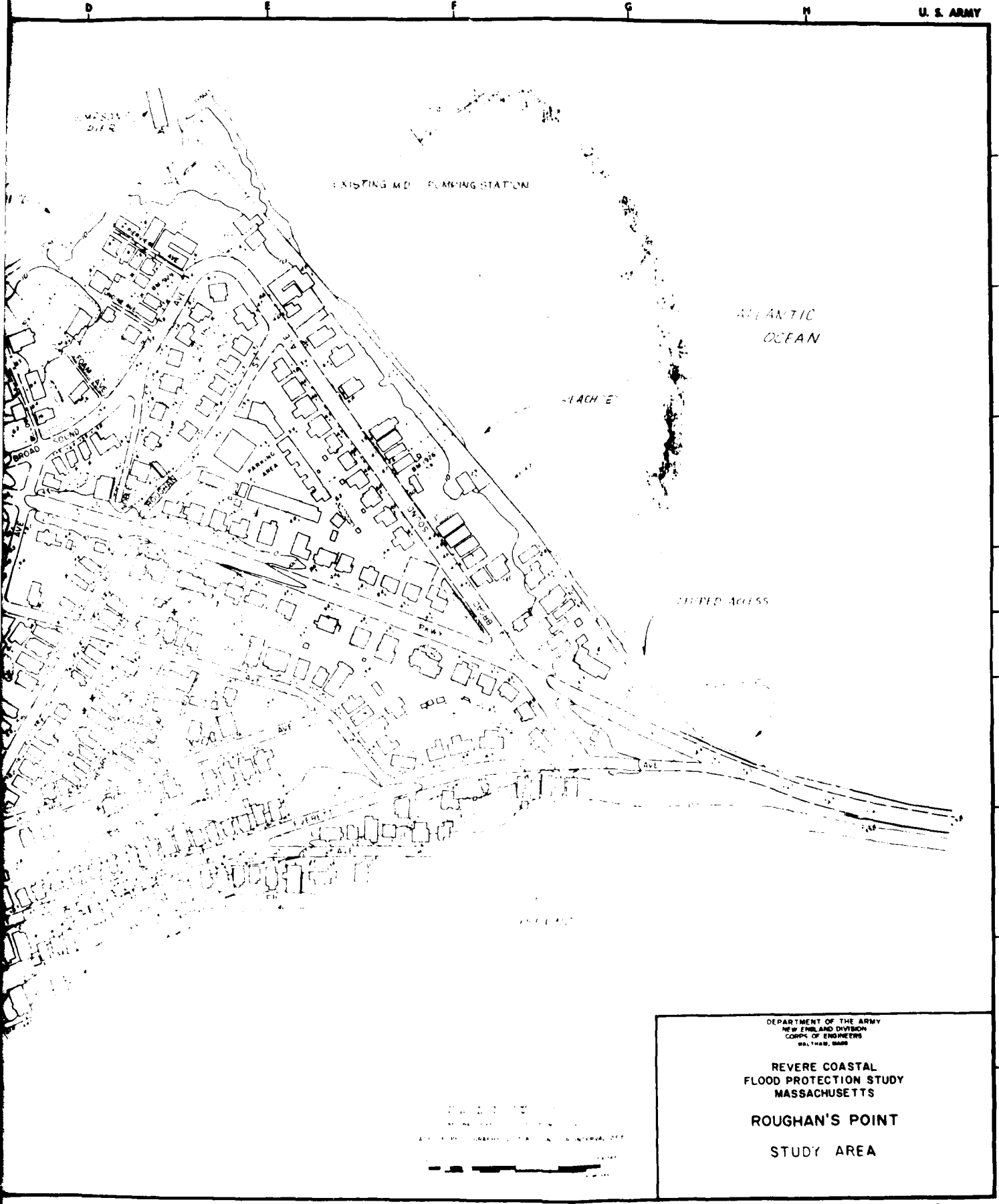
STANDISH
SAUK CREEK
GEORGE
HENRY
NECK CITY
NOBLE
ROUGHAN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U. S. ARMY
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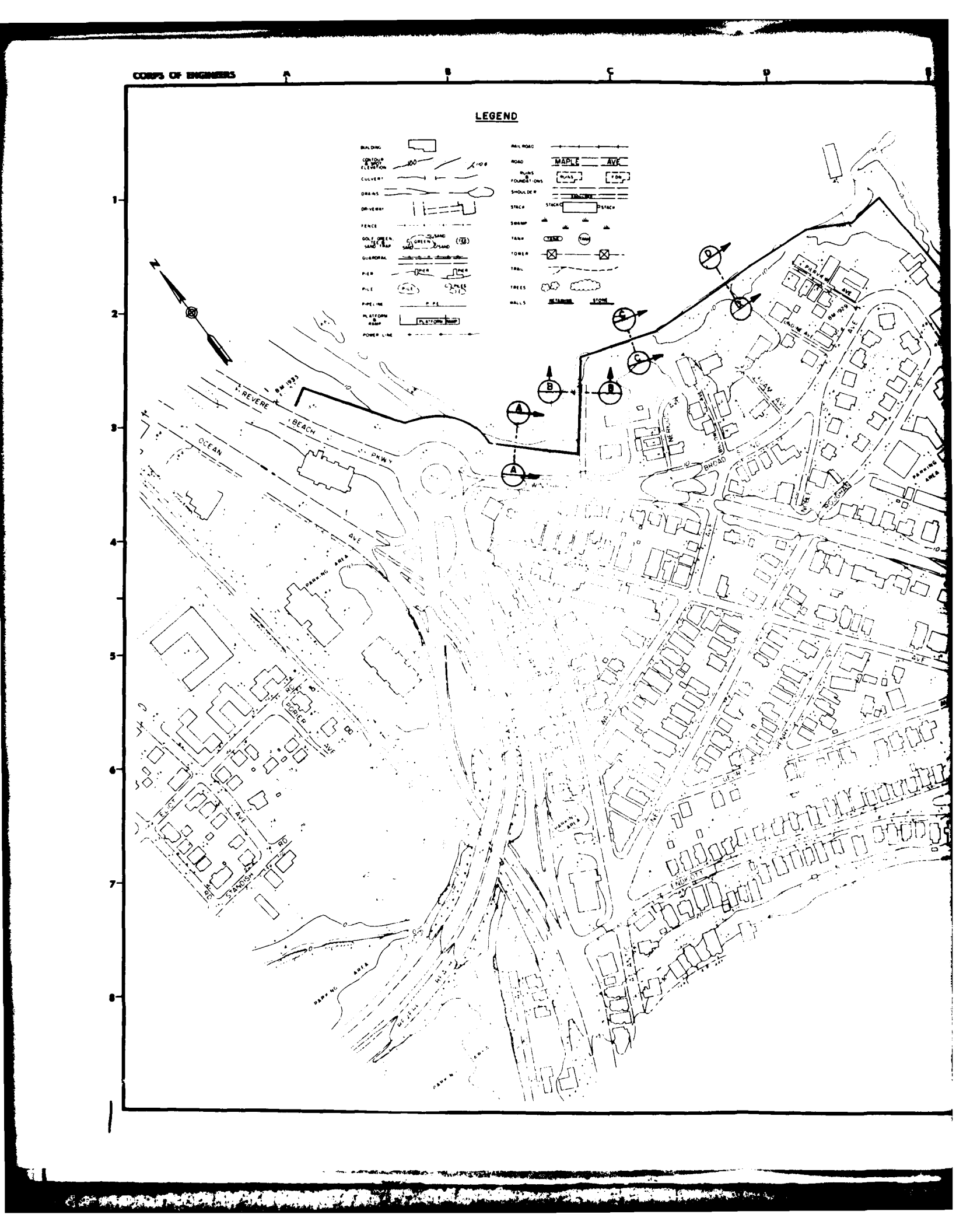
EXISTING M.D. PUMPING STATION
ATLANTIC OCEAN
BEACH
BROAD SOUND AVE
PARKING AREA
RAILROAD
PUMP
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHAN'S POINT
STUDY AREA

PLATE 2

2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LEGEND
BUILDING
CONTOUR & SPOT ELEVATION
CULVERT
DRAINS
DRIVEWAY
FENCE
GOLF GREEN, SAND TRAP
GUARDRAIL
PIER
PILE
PIPE LINE
PLATFORM & RAMP
POWER LINE
RAILROAD
ROAD
MAPLE AVE
RUINS & FOUNDATIONS
SHOULDER
STACK
SWAMP
TANK
TOWER
TRAIL
TREES
WALLS
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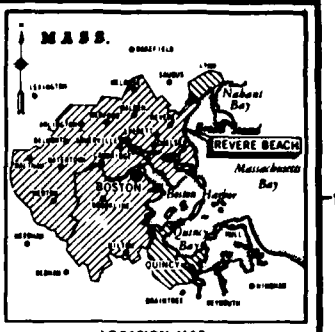


LOCATION MAP

ATLANTIC OCEAN

COASTAL FLOOD PROTECTION

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS

REVERE COASTAL FLOOD PROTECTION STUDY MASSACHUSETTS

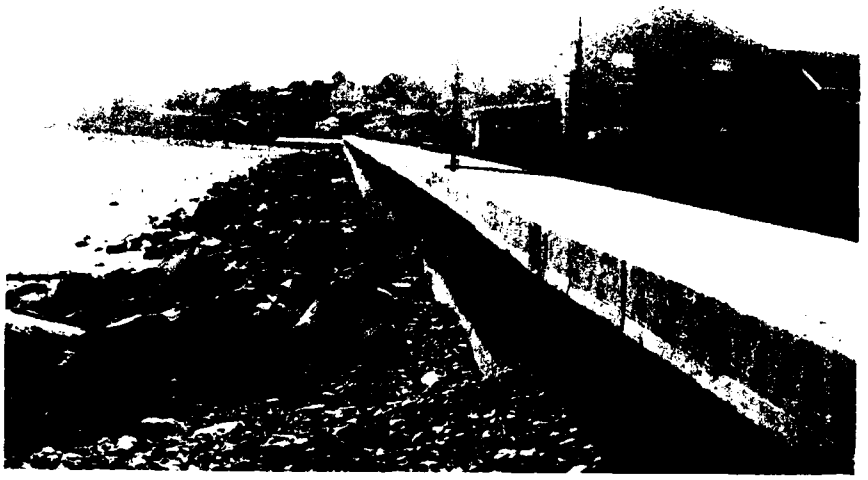
ROUGHAN'S POINT

GENERAL PLAN

PLATE 3

ROUGHANS POINT
REACH B

ROUGHANS POINT
REACHES C AND D



ROUGHANS POINT
REACH E

Emergency Management Agency (formerly Federal Disaster Assistance Administration). The repair work consisted of an 8-inch reinforced concrete veneer anchored to the old concrete.

Reach F. Reach F extends in a southerly direction for about 500 feet along the ocean side of Winthrop Parkway. The existing protection is a concrete seawall constructed by the MDC. The top of the wall is at elevation 17.5 ft. NGVD and extends about 4 feet above the parkway. On the seaward side 10 feet of the wall is exposed above stone at the toe. These stones are placed similarly to those in Reach E. About 250 feet of this wall was repaired in 1978 by the MDC. The repairs consisted of reinforcing the wall foundation on the seaward side by anchoring a block of concrete to the existing wall, and installing a steel sheet pile cutoff extending 12 feet below the concrete block.

(2) Geotechnical Conditions.

. Topography. The Roughans Point area is located within the seaboard lowland section of the New England physiographic province. The area is characterized by a relatively flat, seaward-sloping region, predominantly under 100 feet NGVD (National Geodetic Vertical Datum). Glacial features, such as drumlins, usually provide higher relief in the area.

. Geology. In the regions of higher elevation, the overburden consists primarily of glacially derived material. Till, an unsorted mixture of clay, sand, gravel, and boulders is common and generally overlies bedrock. Glacially-derived, stratified sand and gravel deposits are occasionally found overlying the till. A relatively recent sequence of lagoonal silts and clays, peat and organic silt, and beach deposits of sand and gravel overlies the glacial deposits.

The principal bedrock type in the area is the Cambridge slate, also known as the Cambridge argillite. It is a thinly-bedded to massive, sedimentary rock composed of clay-sized particles. Igneous intrusions and volcanics are also found in this region. The available subsurface information indicates that bedrock along the existing shore protection is found to be deeper than 30 to 40 feet below ground surface.

. Seismicity. The Roughans Point area is located within Zone 3 of the seismic zone map of the United States. This is a modification of the seismic risk map developed by the Environmental Science Administration and the U.S. Coastal and Geodetic Survey and is contained in Engineering Regulation 1110-2-1806, dated April 1977. In accordance with this directive and ETL 1110-2-256, dated 24 June 1981, a coefficient of 0.10g is recommended for use in any evaluation of seismic stability of structures in final design.

. Foundation Investigations. No subsurface explorations or soil testing program were conducted by the New England Division for this

project. Thirty-seven (37) logs of borings performed for the Massachusetts Department of Public Works (MDPW), the Metropolitan District Commission (MDC), and other interests were used in analyzing foundation conditions. A plan and profile of available explorations are shown on Plates 4 and 5, respectively

Twenty-seven (27) of the borings were completed prior to 1936, with the remaining ten borings completed in 1962, 1973, and 1977. The graphic logs completed prior to 1936 give a general soil description but do not indicate any blow count information. The graphic logs completed in 1962, 1973, and 1977 are more complete and indicate the sampling method and blow count information. A subsurface exploration and soil testing program is required prior to final design of any proposed coastal flood protection project to further identify the foundation parameters and enable refinement of the design.

. Foundation Conditions. Evaluation of the existing boring logs indicate that the soil profile in the project area is fairly consistent. In a general sense, the 37 graphic logs indicate in order of increasing depth from one to 20 feet of surficial sand and gravel with boulders (fill), from 6 to 24 feet of peat or peat with silt, with 0 to 24 feet of medium to hard, blue clay, and an undetermined thickness of compact, gravelly, clayey sand.

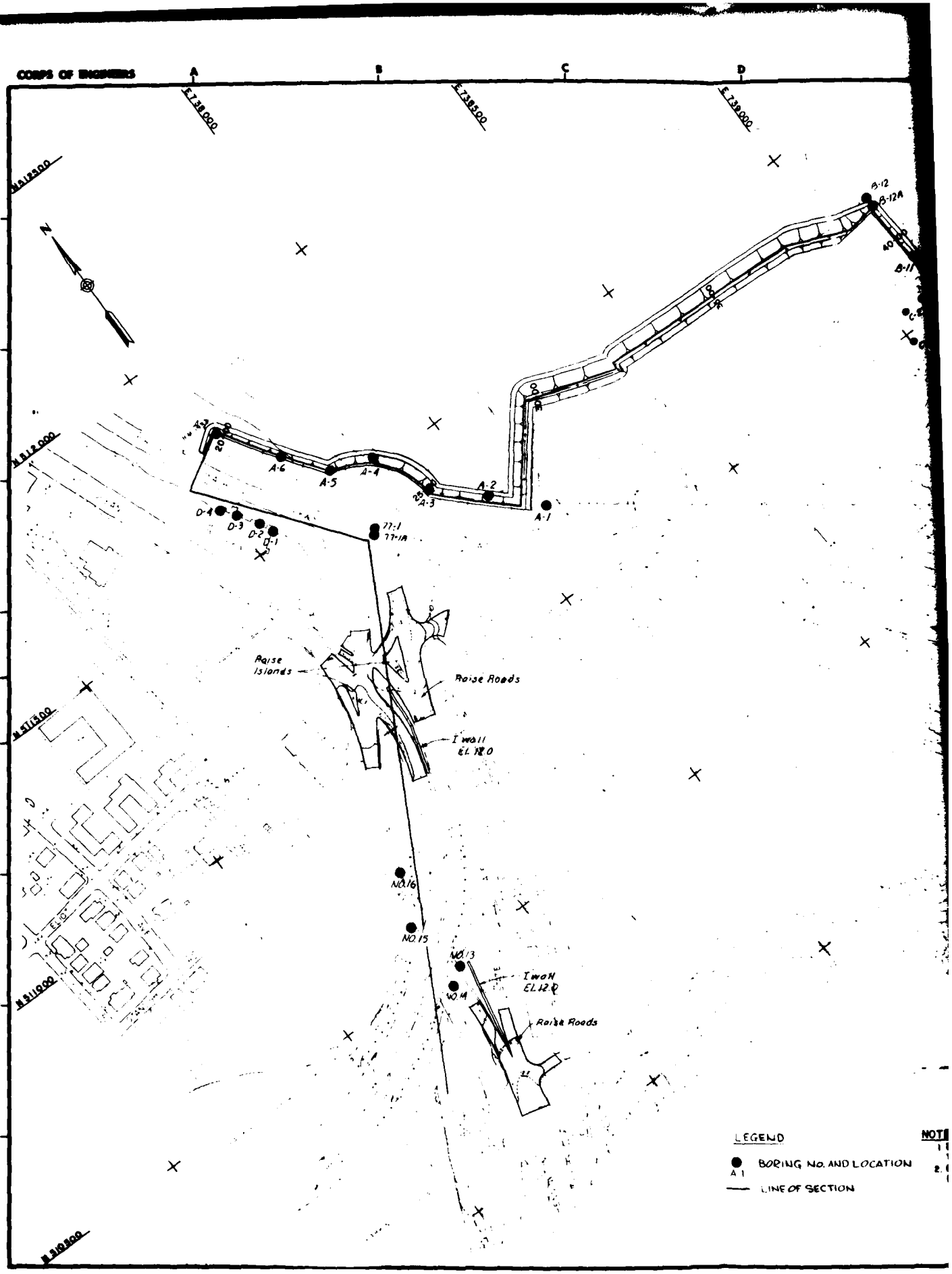
The average ground elevation along the existing protection ranges from 0 to +5 feet NGVD. The available graphic boring logs indicate that surficial sand, gravel, and boulders are found above approximately 0 feet NGVD; various thicknesses of peat, and peat and silt are found between elevations +2 and -24 feet NGVD; medium to hard clays are found between -10 and -40 feet NGVD; and an undetermined thickness of compact, gravelly, clayey sand are found below the clay layer.

. Groundwater Conditions. Groundwater levels in the study area are controlled by tidal action. The normal tide range at Roughans Point fluctuates between elevation -4.6 and +4.9 feet NGVD.

. Design Considerations. In view of the lack of detailed design plans for the existing facilities, visual observation of the site, inability of the existing protection system to meet current Corps of Engineers design criteria, and the assumed foundation conditions, the existing protection system is considered unstable for the design stillwater elevations and wave heights being considered in this study.

. Construction Materials. Anticipated construction materials will be sands and gravel for fill materials, concrete aggregate, and rock for the stone berms. All of these materials are available from commercial suppliers within a 40-mile radius of the project area.

(3) Climatology. The climate of Revere is typical of lower coastal New England--variable and characterized by periods of heavy precipitation.


CORPS OF ENGINEERS
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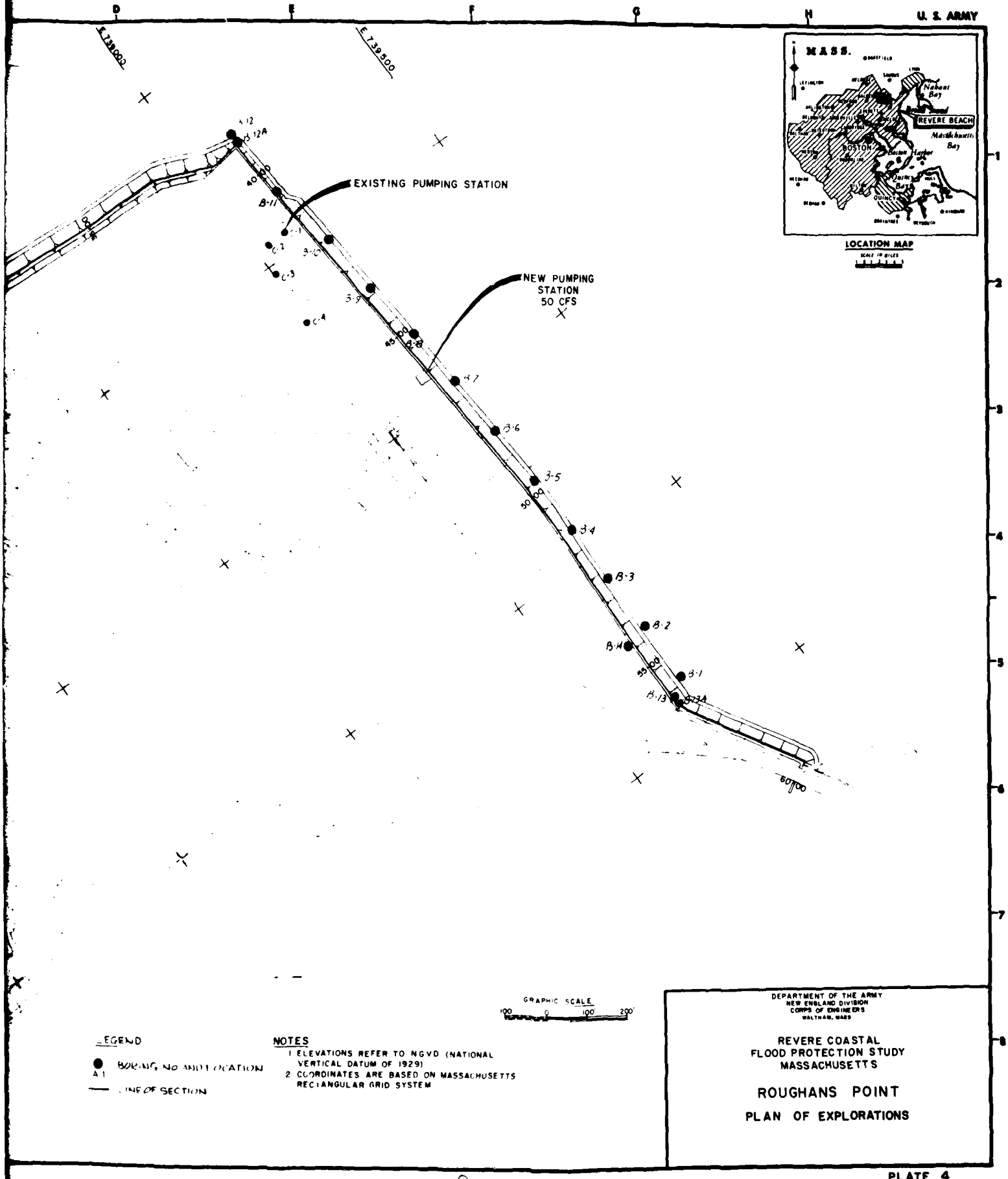
A-2
A-1
D-4
D-3
D-2
D-1
77+1
77+1A
Raise Islands
Raise Roads
I wall EL 12.0
NO.16
NO.15
NO.13
NO.14
I wall EL 12.0
Raise Roads
LEGEND
BORING NO. AND LOCATION
A 1
LINE OF SECTION



GRAPHIC SCALE
100 0 100 200

LEGEND

● B-1 BORING NO AND LOCATION

— LINE OF SECTION

NOTES

1 ELEVATIONS REFER TO NGVD (NATIONAL VERTICAL DATUM OF 1929)
2 COORDINATES ARE BASED ON MASSACHUSETTS RECTANGULAR GRID SYSTEM

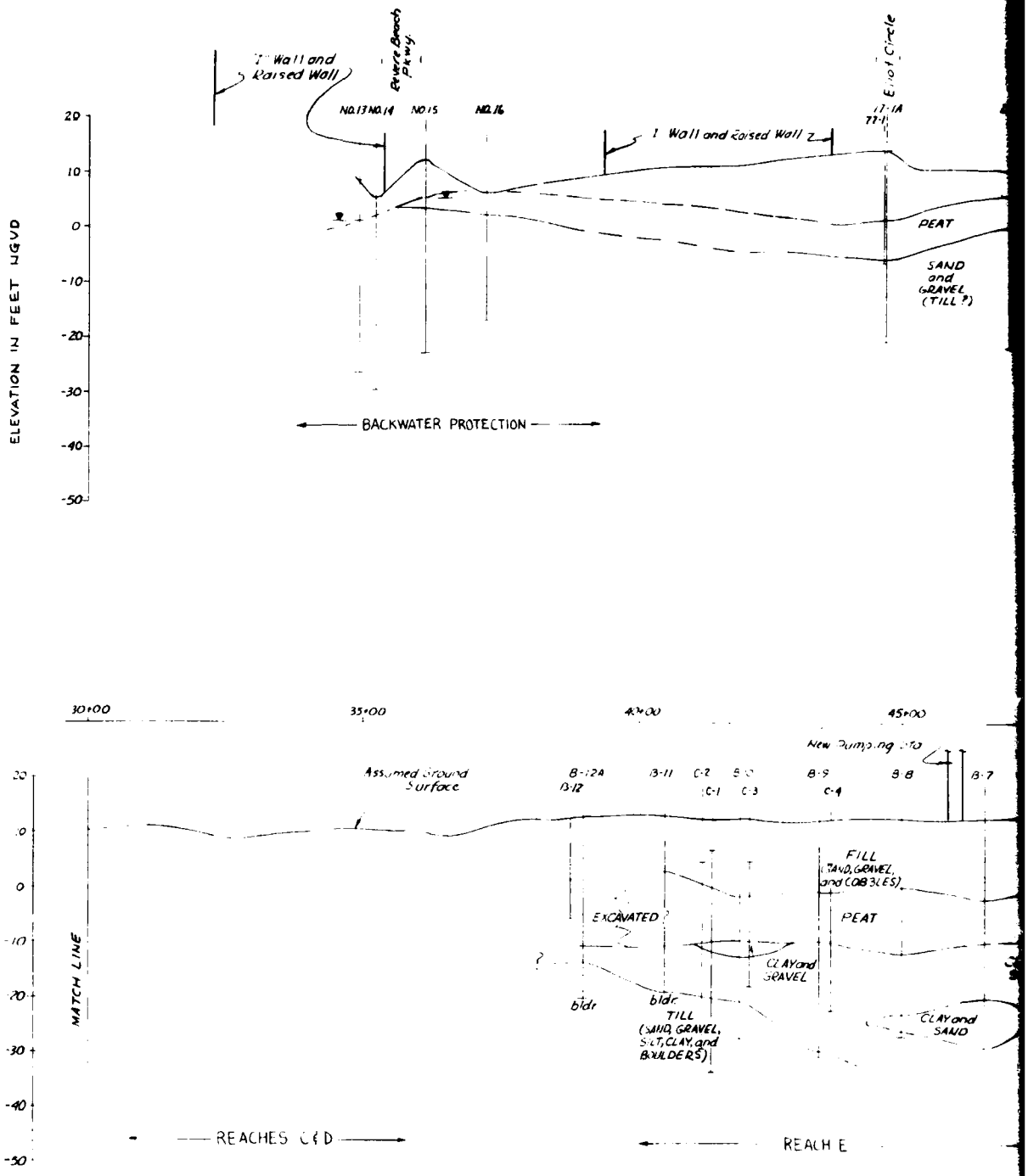
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS

REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHANS POINT

PLAN OF EXPLORATIONS

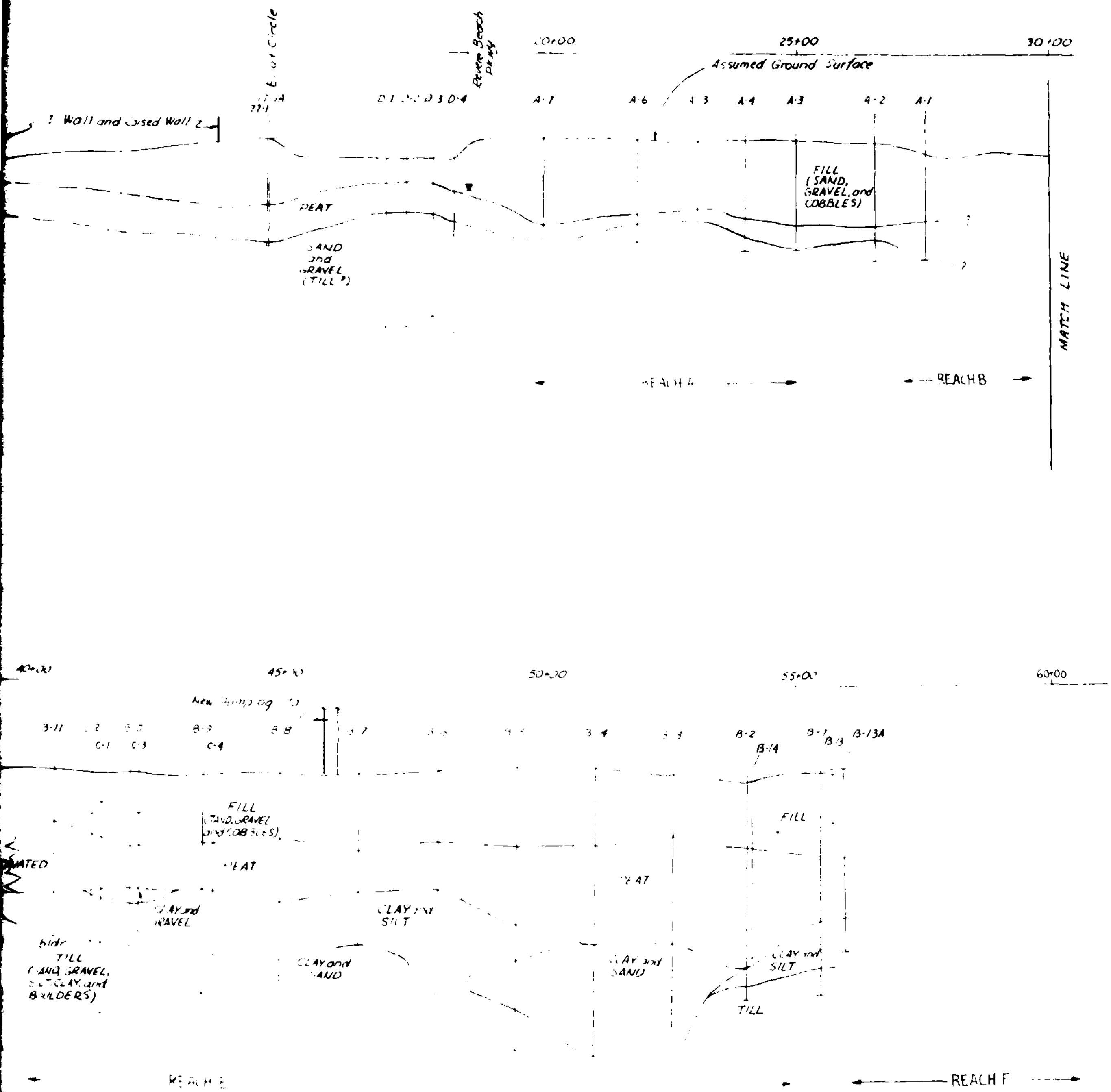
PLATE 4



BORING SERIES	NOTES YEAR	ORGANIZATION
"A"	1910	MASS. DEPT. PUB. WKS. (?)
"B"	1936	MASS. DEPT. PUB. WKS.
"C"	1973	MET. DIST. COMM.
"D"	1962	NEW ENG. TEST BORING CO.
"NO"	1932	MET. DIST. COMM. (?)
"77"	977	FAY, SPOFFORD, & THORNDIKE

LEGEND

- ▼ Water Level (Tidal)
- – – – Assumed material boundary
- ——— Material boundary determined by boring
- ? Lack of correlatable subsurface data
- A-1 Boring, indicating number and depth.



LEGEND

Water Level (date)

Assumed material boundary

Material boundary defined by boring

Lack of correlatable subsurface data

Boring and coring number and depth

GRAPHIC SCALES

HORIZONTAL 0 100' 200'

VERTICAL 0 10' 20'

NATIONAL GEODETIC VERTICAL DATUM OF 1929

O MLW = -4.6 FEET NGVD

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHANS POINT
PROFILE OF EXPLORATIONS

PLATE 5

Eastern Massachusetts is located within the North Temperate Zone, whose climatology is typical of its latitude and location on the easterly side of a large continent.

New England is influenced by constant conflicts between cold dry air masses flowing out of the great subpolar region to the northwest and the warmer moisture-bearing tropical air from the south. The tendency of most of the general cyclonic disturbances to skirt the polar front brings their paths of movement through the region and results in a somewhat regular succession of biweekly storms. The most active precipitation-producing storms are those in which the moist southwest or east winds flow over the uplands and are forced aloft over cold resident air to condensation levels.

Severe coastal disturbances occur when deep low-pressure areas pass offshore from the area. A storm of extra-tropical origin may reach the area at maximum intensity, causing extremely high winds varying from the southeast to north as it skirts the New England Coast. These storms, locally known as "nor'easters," because of their strong northeast winds, are heavily laden with moisture from the ocean and can cause very high ocean levels, waves and precipitation at Revere. Hurricanes and tropical storms rarely threaten the study area with tidal flooding. However, they can drop substantial amounts of precipitation.

Coastal areas such as Revere are subjected to considerable maritime influence because of their proximity to the Atlantic Ocean. Winters are warmer and summers pleasantly cooler than locations slightly inland of the ocean's tempering effects. This results in smaller diurnal temperature ranges. Winter coastal storms often bring rainfall to Revere, in contrast to snow in interior portions of the state. Orographic influences on the climate are minor, due to the relatively small extremes of elevation within the area. Severe northeast storms can occur, however, particularly from November through April. Hurricanes and tropical storms also can occur from August through October.

The highest temperature of the year is 90 to 95° Fahrenheit (F). During the summer, nights are usually cool with readings in the 50's and 60's. The average temperature in summer (June - August) is 68°F and varies little from year to year. The average winter (December - February) temperature is about 29°F. During some winters, the temperature may never fall below zero, and yet during others, as many as 20 days with subzero temperatures may occur.

Although the month-to-month average precipitation is fairly constant, and no "wet" and "dry" seasons exist as such, there is a notable decrease in precipitation during summer. The May through August period averages about 2.5 to 3 inches per month, whereas the winter and spring months receive about 4 inches each. Rarely does any month experience more than 10 inches of precipitation or less than 1 inch. Short periods of drought may occur in any season. The annual precipitation, averaging about 43

inches, is fairly constant from year to year and usually provides enough water to combat drought.

The bulk of snowfall occurs from December through March, although measurable amounts fall in April, October, and November. The amount of annual snowfall is subject to wide variation from year to year and from location to location in the Boston metropolitan area.

Flooding in Revere is not a new problem. It has been experienced since the area was first settled over 200 years ago. Damages occur on an annual basis, with severe flooding on an average of every 8 years. Because of the physical character of Roughans Point, interior flood elevations are usually higher than the event's associated stillwater tide level.

The more notable storms with record tides, resulting in significant flooding, are described below. Actual recorded damages are sketchy at best. Losses due to the more recent events are documented wherever possible.

26 December 1909. The "Christmas Gale" produced a tide of 9.9 feet NGVD at Boston. Historical records indicate that a wind velocity of about 85 miles per hour was experienced.

4 March 1931. This "nor'easter" brought severe winds and high seas. A maximum tide of 8.8 feet NGVD was recorded in Boston during this storm.

21 April 1940. The storm of 1940 brought high tides and strong winds. Boston Harbor recorded maximum stillwater tide heights to be 8.9 feet NGVD.

30 November 1944. The tide elevation observed in Boston was 8.8 feet NGVD. This storm was classified as a "nor'easter" with strong winds prevailing from the north and northeast.

29 December 1959. During the northeaster of 1959, tides rose to 9.3 feet NGVD, causing extensive damage at Revere Beach with considerable loss of sand and undermining along the seawall due to heavy wave action. Major damage occurred at Roughans Point (45 homes), Point of Pines (120 homes), and the Riverside area (30 homes). Also many commercial establishments were affected due to overtopping of beaches and walls causing flooding in low areas. Revere suffered about $1 million in damages at 1959 price levels. This would approximate $4 million in today's dollars.

26 May 1967. This storm came especially late in the season. The northeaster's movement was slow due to a blocking high pressure ridge, and coincident spring tides combined with gale force winds causing extensive beach erosion. In Boston, maximum tide heights reached 8.9 feet NGVD.

19 February 1972. A deep low-pressure area moving at about 25 miles per hour over outer Cape Cod produced storm surges of 4.0 feet at

Boston, superimposed on the coincident spring tides. Observed maximum tidal elevations in Boston reached 9.1 feet NGVD. Revere suffered almost $1.1 million in damages to public facilities alone. This would be about $2 million at today's price levels.

7 February 1978. While areas were still in the process of recovering from the effects of a 20 January 1978 blizzard, New England was struck by one of the most intense, persistent, severe winter storms of record. The storm moved slowly eastward just south of New England as a circular upper atmospheric low moved over the surface circulation. It produced intensely strong winds including recorded gusts of 79 mph and great amounts of snow over most of southern New England. Tidal elevations in Boston Harbor reached the highest recorded at 10.3 feet NGVD. It is estimated that this storm produced a stillwater tide level at Revere with an approximate frequency of occurrence of once in 100 years. At Roughans Point, interior flood elevations reached 11.8 feet NGVD, due principally to entrapment of water from wave overtopping the existing seawalls. The damages caused by this "Great Blizzard" are discussed later.

21 January 1979. Heavy rains and strong onshore winds from the northeast created high tides and flood conditions in Revere. Interior flood elevations reached 7.2 feet NGVD. However, just before the high tide, winds unexpectedly shifted and flood losses were thereby reduced.

Climatology and tidal hydrology are further discussed in the Support Documentation. There, the methodology used to develop the stillwater tide level frequency relationship for Roughans Point, shown on Plate 6, is explained. Tide levels reported below for Boston Harbor are, for all practical purposes, the same for the Revere area.

(4) Environment. As described earlier Roughans Point is a low-lying point of land at the south end of Revere Beach in the Beachmont section of Revere, Massachusetts. The area is comprised of approximately 500 households in 300 residential structures bounded by Eliot Circle, Atlantic Avenue, Endicott Avenue and the ocean. Thirty-three acres of the Point's area are subjected to flooding on almost a yearly basis and sustained Revere's heaviest losses during the February 1978 flood.

Coastal storm protection is currently provided by a concrete seawall on the easterly shore and a stone dike on the northerly shore. The seaward side of the seawall and dike is a strip of sand and large stones. Cherry Island Bar, a stretch of rocks exposed at low tide, extends from the easternmost tip of the point to a breakwater 2,000 feet offshore.

This 30-acre bar provides habitat for several species of shellfish, including soft shell clams and blue mussels. The area has been closed to harvesting since 1926, due to pollution. While the area continues to serve as a seed source for other shellfish areas in the region, the Cherry Island Bar is considered of marginal value as a shellfish resource.

The Revere Beach area, from Roughans Point to Lynn, and the Saugus and Pines Rivers have historically been popular fishing areas. Indians once fished here for abundant salmon, trout, alewives and bass. Early colonists established commercial fishing for bass, herring and cod. By the nineteenth centruy, commercial fishing in the area expanded to include haddock, mackerel, cunner and eels. The area still supports popular sport fishing activities. There are 31 species of finfish in the area. No endangered species have been identified. Planning aid letters from the Fish and Wildlife Service are included later.

(5) Recreation. The adjacent Revere Beach, stretching nearly 3 miles to the north from Roughans Point, is the primary recreation resource to the region. Recent construction of a new waterfront park by the MDC at the site of the former amusement park along Revere Beach is part of a program to revitalize and increase the region's recreational resource value.

With the proximity of Revere Beach, the need for recreational facilities in Roughans Point is very localized. The rocky character of the shoreline and limited public access to the water restrict current recreational use. At low tide some beach area is exposed, permitted by easy access along the shoreline, making it possible to walk the entire length of the Roughans Point shoreline. It is also possible to walk out to the offshore breakwater. Several acres of clam flats are also exposed at low tide. At high tide, shoreline access is greatly restricted by large boulders at the foot of the seawall and frequently dangerous waves.

The coastal waters of Revere, including Broad Sound, are subject to highly variable water quality conditions. Water quality samples taken by the Metropolitan District Commission each summer at Revere Beach have usually been rated at less than 100 MPN (most probable number of E. Coli per 100 ml). This rating makes the area suitable for swimming. However, Lynn Harbor, which adjoins Broad Sound to the north, is the location of a raw sewage outfall which discharges 20 million gallons per day. The discharge at Lynn, as well as discharge at Nahant to the northeast, make the Broad Sound area unsuited for harvesting of shellfish.

At Eliot Circle, the low seawall also serves as a seating wall overlooking the ocean, with convenient adjacent parking for visitors. West of Eliot Circle are highrise apartments, restaurants, night clubs, associated parking lots and the tracks of the MBTA's "Blue Line."

(6) Social Environment.

. History. The Revere area was originally settled by Europeans about 1626. Revere, originally called Rumney Marsh, joined the city of Boston in 1634, at which time land was given out to seven families who established farms there. In 1739 the community became part of Chelsea. The study area was called North Chelsea in 1846, and was changed to Revere in 1871.

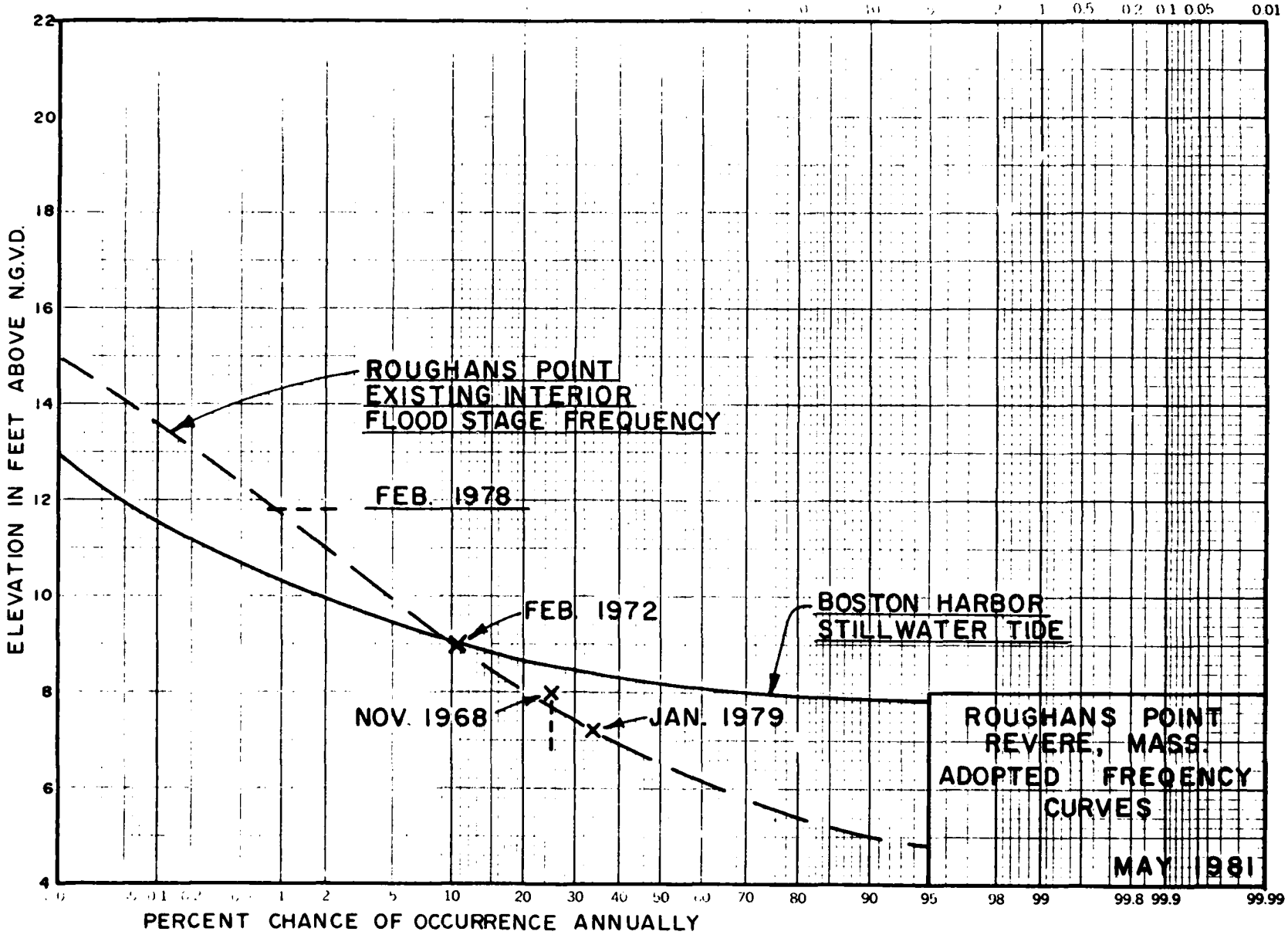

ELEVATION IN FEET ABOVE N.G.V.D.
22
20
18
16
14
12
10
8
6
4
0.5
0.2
0.1
0.05
0.01
ROUGHANS POINT
EXISTING INTERIOR
FLOOD STAGE FREQUENCY
FEB. 1978
FEB. 1972
BOSTON HARBOR
STILLWATER TIDE
NOV. 1968
JAN. 1979
ROUGHANS POINT
REVERE, MASS.
ADOPTED FREQENCY
CURVES
MAY 1981
1
2
5
10
20
30
40
50
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT CHANCE OF OCCURRENCE ANNUALLY

PLATE 6

"Rumney Marsh" supported a farming community until the 19th century. Completion of the Boston, Revere Beach and Lynn railroad (the "Narrow Gauge") in the 1870's signaled rapid development of the Revere Beach area as a summer resort community. Small summer homes were built in the vicinity of the beach and a hotel, a great pier, dance halls and other recreational facilities were developed.

Not only did the railroad make it possible for people to travel to Revere for recreation, but also for people to reside in Revere and work in Boston and other communities. Residential development began to occur all along the rail right-of-way, particularly at Roughans Point and Oak Island.

Additionally, completion of the railroad made the city accessible to a regional market. Realizing the potential for tourism and employment, a fantasy-type amusement area called "Wonderland Park" was developed in 1906 adjacent to the railroad right-of-way, directly west of the Revere Beach residential area. The park provided the impetus for further recreational development of the beach and adjoining properties.

The beach and amusements continued to flourish as a major attraction until the 1940's when the quality of the beach and structures began to decline. Increasing public mobility, changing tastes and recreational attitudes, and falling profits all contributed to this downward trend. The deteriorated condition of Revere Beach in recent years, as well as the growing need for quality public recreation areas within the metropolitan region, has forced a renewed interest in reversing this pattern and reclaiming one of Boston's most accessible natural resources.

The residential growth of Revere continued and reached another period of rapid development in the Post-World War II period of the 1950's. Most of the housing in the western and northern sections of Revere was constructed during this period.

Because Revere is so close to Boston, heavy traffic conditions, particularly in the peak commuter hours, are a daily characteristic of the city. Several major highways and arteries pass through Revere providing direct access to the Boston central business district area.

As in the case of many older urban centers, Revere is coping with a variety of problems including a declining youth population, deteriorating public utilities, neglected neighborhoods, older housing in need of rehabilitation, and a declining tax base.

. Population and Economy. The city of Revere is considered to have a stable population base with regards to total inhabitants. Over the 30-year period between 1950 and 1980, Revere netted a population increase of only 15 percent.

TABLE 1

CITY OF REVERE
PAST POPULATION

1950	1955	1960	1965	1970	1975	1980
36,800	39,600	40,100	42,400	43,200	41,300	42,400

Population projections compiled by the Metropolitan Area Planning Council (MAPC) indicate that Revere's historic trend of a stable population will continue (see below). No great change is expected for the next 50 years.

TABLE 2

CITY OF REVERE
PROJECTED POPULATION

1990	2000	2020
42,600	43,500	44,500

Significant changes in the age structure of Revere's population did occur between 1950 and 1970. During that 20-year span, the population growth of the 65 and older bracket increased by 70 percent while the overall population grew 18 percent. During the same time, Revere lost residents between the ages of 25 and 44. It appears then that the younger, more active, and prosperous members of the population have been replaced by residents 65 years of age and older.

The Beachmont section, which includes Roughans Point, is one of ten neighborhoods within the city. Beachmont's population for 1975 was 5,282, averaging 23 people per acre. This section ranks third in the city in terms of population density.

The Roughans Point area is comprised of approximately 500 households in 300 residential structures. The population of Roughans Point as of January 1979 (list of residents 17 years and older) was 1,355. Roughans Point has long been described as a very stable section of Revere with little fluctuation in population due to this location's desirability as a seaside, residential area.

The Beachmont neighborhood has approximately 532 residents 65 and older, 300 of whom reside in Roughans Point. Approximately 50 percent of the Revere population is of Italian descent. Other nationalities represented are Russian and Canadian, but each has only about 10 percent representation.

Revere offers a variety of mixed land uses, but is predominantly residential. The census figures for 1980 reveal that there are 17,176

housing units in the city. This is an increase from the 14,635 units in 1970. Based on city estimates for January 1980, 40 percent of the total housing units were considered substandard and deteriorated. Approximately 54 percent of total housing units are owner occupied, 38 percent of which are single family units. Almost two-thirds of the housing was built prior to 1940.

Based on 1970 U.S. Census Tract Information, Beachmont contains 1,826 year-round housing units, with thirteen additional units listed as seasonal or migratory. Of the total number of housing units 764, or 42 percent, are owner occupied, and 537 or 34 percent, are single family houses. The vast majority of total housing units, 1,478 or 81 percent, were built prior to 1940.

There are 309 structures within the floodplain, 291 residences and 18 commercial or public structures. A market value survey was done of the Roughans Point area east of Winthrop Parkway. The findings are included in the Support Documentation, Volume II. Market values average $59,100 per residential ownership.

Roughans Point has long been considered a stable neighborhood characterized by houses on small lots with little or no room for expansion. This is not likely to alter in the future. A social attitude survey compiled last year indicates that 47 percent of the 117 renters and homeowners who responded to the questions concerning length of residency have resided in Roughans Point an average of 17 years. This exceeds the national average for length of residency.

Many Revere residents work in Boston or its suburbs. The Massachusetts Division of Employment Security estimates that there was about a 6.3 percent unemployment rate statewide in 1981. This correlates with a 1981 Revere labor force of 23,007 people - 21,193 of whom were employed. The unemployment rate for Revere in 1981 was 7.9 percent.

The reported number of available jobs in Revere can employ only 40 percent of the city's labor force. Therefore, a minimum of 60 percent of the labor force works outside city limits (not adjusting for commuters who work in Revere and live elsewhere or for part-time jobs which make up full-time equivalents). This comparison has been made to illustrate that Revere is basically a commuter suburb.

In 1980, 595 firms in Revere reported to the Massachusetts Division of Employment Security an average employment of 7,644 people. Employment in Revere is heavily concentrated in the wholesale and retail trade sections employing over 40 percent of Revere's employment total. Service establishments and governmental agencies each employ about 20 percent of the labor force. This is explained both by Revere's character as a residential community and a resort and entertainment center that includes Revere Beach, Suffolk Downs Race Track, and Wonderland Dog Track. Manufacturing plays a minor economic role.

The median income for 1980 was approximately $14,800. The table below offers a comparison of the total number of people employed in Revere per industry for 1969 and 1979.

TABLE 3

Employment in Revere
1969 and 1979

Category	1969	1979
Agriculture, Forestry, Fishing	54	20
Mining	0	0
Construction	361	209
Manufacturing	630	477
Transportation, Communication Utilities	171	434
Trade	2,839	3,435
Finance, Insurance, Real Estate	44	295
Service	1,461	1,470
Total	5,560	6,340

Source: Massachusetts Division of Employment Security, December 1980

An examination of Revere's finances illustrates that Revere does not have a surplus of funds available for new flood protection facilities and drainage improvements. Any future major improvements or flood protection facilities would probably require a bond issue, substantial State and/or Federal aid.

(7) Cultural and Natural Resources. Man entered New England in the wake of the retreating glaciers, and the earliest known cultural site in this immediate region is the Bull Brook site near Ipswich (about 20 miles to the northeast), dated around 9000 B.C. Many prehistoric sites of more recent age have been found in this region. The earlier sites represent people with a hunting, fishing, and gathering adaptation. Limited agriculture began to be practiced about 1000 AD. Boston Harbor may have been one of the environmentally richest areas in New England, with its abundant coastal, estuary, river, and land resources. The long span of occupation and considerable prehistoric population is reflected in the wealth of archaeological sites that have been found here. Unfortunately, many of these sites have been destroyed by the activities of the historic period. A number of burial sites of the late prehistoric and contact periods have been found over the years along Revere Beach, primarily during construction projects.

There are no sites within the study area listed in the National Register of Historic Sites. Due to historic periodic ground disturbance, adverse effects on cultural resources from any proposed project appear

unlikely. However, consultation with the Massachusetts Historic Commission indicates that an archaeological survey may be required before a finding of effect can be determined.

Modern demolition and construction in the vicinity has obliterated most of the 19th century resort development and any new flood protection measures are unlikely to affect any significant historic resources.

The existing aesthetic features of the environment are deteriorated. Urbanization has contributed greatly to this condition. However, the aesthetic potential of seashore property is the study area's principal value. It should be remembered that the Revere Beach area was once a resort area.

The assets of Revere are numerous, beginning with its location. Situated just 5 miles north of the city of Boston, Revere has direct highway and transit access to every portion of the metropolitan region. Five major highways pass through Revere, linking the city to the northern portions of Massachusetts and New England, and south to Boston and Interstate Routes 95 and 93. The Massachusetts Bay Transportation Authority's (MBTA) Blue Line, which terminates in Revere at the Wonderland Station, connects the three Revere stops to Logan International Airport, downtown Boston and the other MBTA transit lines.

(8) Land Use. Revere has approximately 7 miles of beach and ocean shoreline. Revere Beach, owned and operated by the MDC, was the first public beach in the country. The beach is still a major recreational resource for the city and the entire metropolitan region. Although the city is densely developed, much of the area is still characterized by open water and tidal marsh. The Pines River forms approximately 500 acres of marshland just west of Revere Beach, Point of Pines and Oak Island.

This Saugus/Pines River marsh is the largest tract of undeveloped land in Revere. Pressures for filling and developing the marsh increase daily. The Seaplane Basin in north Revere was partially filled in preparation for construction of Route I-95. Although the highway construction was halted years ago, the fill material remains.

Revere has a land area of approximately 7 square miles or 4,000 acres. Three thousand acres of this area is buildable land, of which 83 percent has been developed primarily for residential use. The remaining 1,000 acres of land is not suitable for development. Revere's growth over the years has been as a residential, entertainment centered community with little land developed for major industrial use. Any new development would occur primarily as replacement or conversion of structures on vacated land. The table below displays the present land use pattern in Revere.

TABLE 4

Revere Land Use

Category	Percentage
Residential	46.9
Commercial and Industrial	12.5
Streets and Transportation	33.1
Recreation	7.5

Source: Environmental Assessment, Revere Master Plan, 1978.

C. THE WITHOUT CONDITION

This section describes the most probable future condition for the city of Revere. These projections assume no new Federal water resources projects in the Roughans Point area. Alternative measures presented elsewhere in this report are assessed and evaluated by comparing the "with" to the "without project" condition.

Revere has experienced a very slow rate of growth over the past 30 years. In fact, 1980 census figures indicate that the city lost some 800 people between 1970 and 1980. Population projections predict minimal growth for the city through the year 2020 (see Tables 1 and 2). The population of Roughans Point is expected to remain nearly constant. Some residents have converted properties to multi-apartment dwellings, allowing a slight population increase.

Due to the severe flooding caused by the February 1978 storm, and, to a lesser extent, the January 1979 storm, many homes have undergone flood-proofing measures through the Massachusetts Coastal Floodproofing Program. This program was funded by the Department of Housing and Urban Development, which provided grants and technical advice to low and moderate income homeowners. Some 57 homes in Revere have received financial assistance in raising homes or utilities as a flood damage reduction measure. In Roughans Point, 31 homeowners of the 57 were involved in this program. Additionally, few people have sold their homes in the area after these storms.

(1) Development. Revere is currently considering a number of economic revitalization plans. The objectives of the city's general development strategy as outlined in their Recreation Recovery Action Plan include the stabilization of neighborhoods and the tax base; the expansion of industrial and commercial efforts; development of the city's 3-mile long beachfront, its greatest asset; and the overall improvement of public facilities.

Future plans directly related to the study area include:

. Cleaning and restoration of Sales Creek to improve drainage in the lower Beachmont area. Phase 1 of the city's multiphase plan has been completed. Work on other phases is ongoing and will be completed pending availability of funding. This flood control work is being coordinated by DEQE.

. Development of the Revere Beach plan, a large scale redevelopment plan involving a private developer, the MDC, and the city of Revere. The plan involves new apartment and condominium complexes, improved traffic patterns, the upgrading of Wonderland Station and existing parking facilities and a commercial area between the complexes. Realization of this plan has been temporarily postponed pending funding availability.

. Construction of a new waterfront park by the MDC along the site of the former amusement complex. These improvements to the Revere Beach Reservation have also been temporarily tabled pending allocation of funds.

. Renovation of two abandoned schools in the Beachmont section of Revere for conversion into elderly housing complexes. These, however, are not in the Roughans Point study area.

Roughans Point has been an established residential area since the late 1800's. There is little available space for new growth and development. The area will continue to experience almost yearly economic losses due to flooding without protection. In fact, many homeowners have instituted floodproofing measures on their own. This factor has been included in potential damage information used in this investigation.

(2) Flood Threat. As evidenced by the severe flooding caused by the February 1978 storm and the losses suffered on an annual basis, the study area is insufficiently protected by existing flood protection facilities. Plate 7 shows the extent of flooding at Roughans Point during this "Blizzard of 78" - approximately the 100-year flood event.

The city remains very much concerned about the flood situation. Without flood protection, occurrence of a storm the magnitude of the "Blizzard of '78" would mean significant damage in Roughans Point as well as other coastal neighborhoods. It is assumed that growth will be controlled within the flood plain as required with participation in the National Flood Insurance Program and the 1972 Clean Water Act. This implies that Revere would not develop a structural flood protection alternative without Federal participation.

Under the Flood Insurance Program, flood losses would be only partially covered as there are no existing provisions for compensating policyholders for nonphysical losses, such as expenses for lodging during dwelling repairs or loss of income or profit while a commercial or

manufacturing firm is temporarily closed. Other emergency expenses not covered include evacuation, food, clothing, restoration of public utilities and clean up operations. Undoubtedly, some residents would incur permanent losses in savings and irreplaceable personal belongings. Flood insurance alone merely indemnifies property owners for flood losses but does not reduce physical damages.

Section 404 of the Clean Water Act established a permit program, administered by the Secretary of the Army acting through the U.S. Army Corps of Engineers, to regulate the discharge of dredged material or fill material into waters of the United States. Applications for permits are evaluated, including opportunity for public hearing and comment. Violations of the Clean Water Act without the required permit under Section 404 can result in civil and criminal fines.

These programs do not, however, comprehensively address the flood hazards of waves overtopping the existing protection and the characteristic of the study area to retain flood waters for long durations after a storm event. Roughans Point will continue to be flooded on almost a yearly basis, without protection against severe ocean storms. The risk to some residential property can be diminished by individual floodproofing measures.

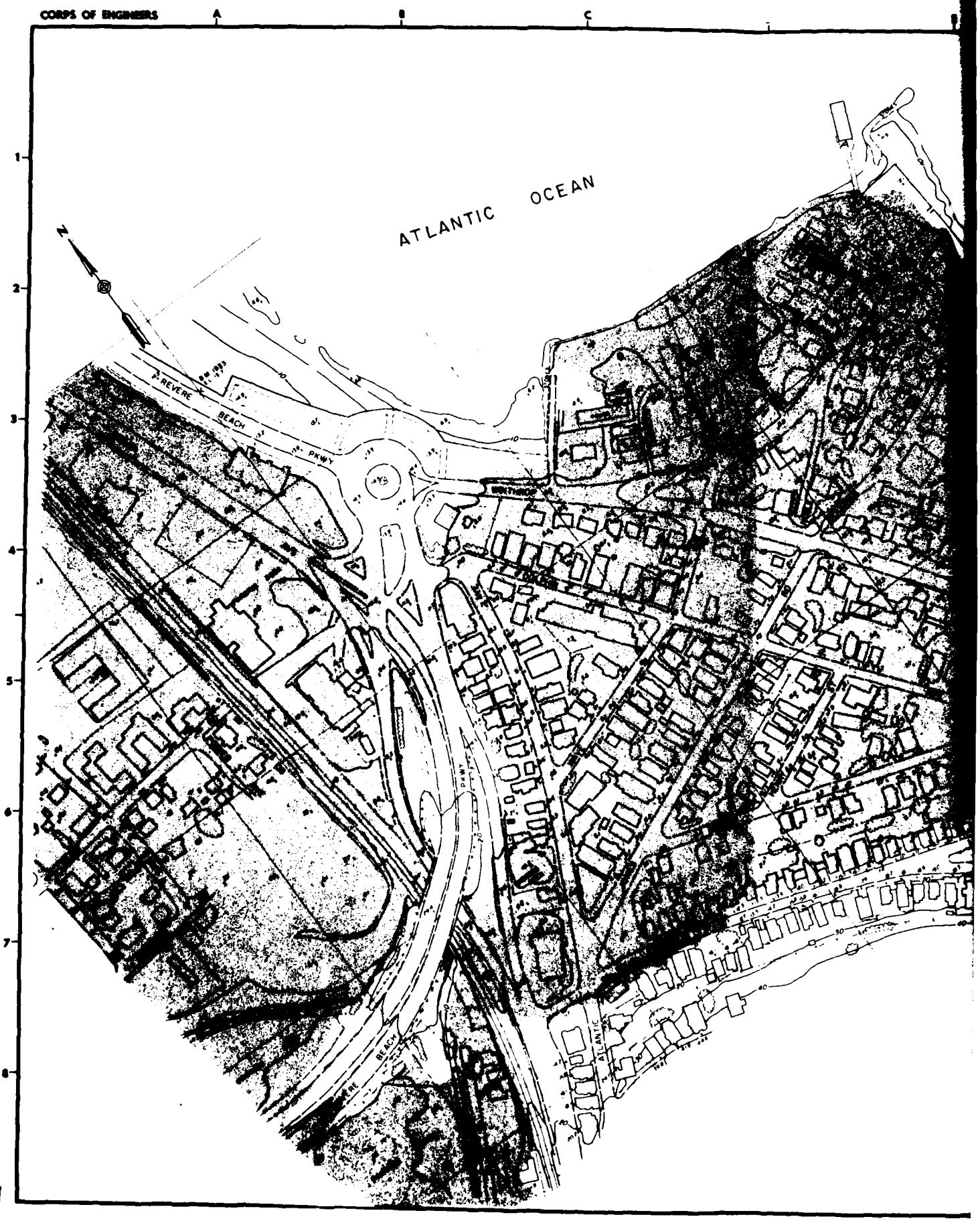
D. PROBLEMS, NEEDS AND OPPORTUNITIES

The 1980 U.S. Census reported 17,163 residential structures in Revere. In the 1978 storm about 1555 homes, or approximately 9 percent, were damaged. Estimated flood damage for a recurrence of the 1978 flood would be catastrophic. Losses to residences alone represent about 73 percent of the damage.

The 1978 flood, used as the index for measuring the severity of damages in Revere, came directly after a severe blizzard. When the damage survey specialists from the Army Corps of Engineers assessed damages they separated these flood losses into two types--physical and nonphysical. Physical losses include such things as damage to structures and contents. Nonphysical losses take into account a wide variety of losses attributable to flooding, such as loss of work and costs of temporary housing and food.

The flood of record at Roughans Point was that resulting from the Blizzard of 1978. This storm produced a 100-year event with an interior flood elevation of 11.8 ft. NGVD. Flood damage was extensive throughout Revere, although Roughans Point was damaged more severely than other sections. Recurring losses for the 1978 storm at Roughans Point are $11.0 million affecting 301 structures with an approximate population of 1000. In some cases (18 percent of the total population) people were unable to return to their homes in 1978 for over 2 weeks.

The recurring losses for Roughans Point are shown in the following table for 1-foot increments. The dollar amount of losses and the number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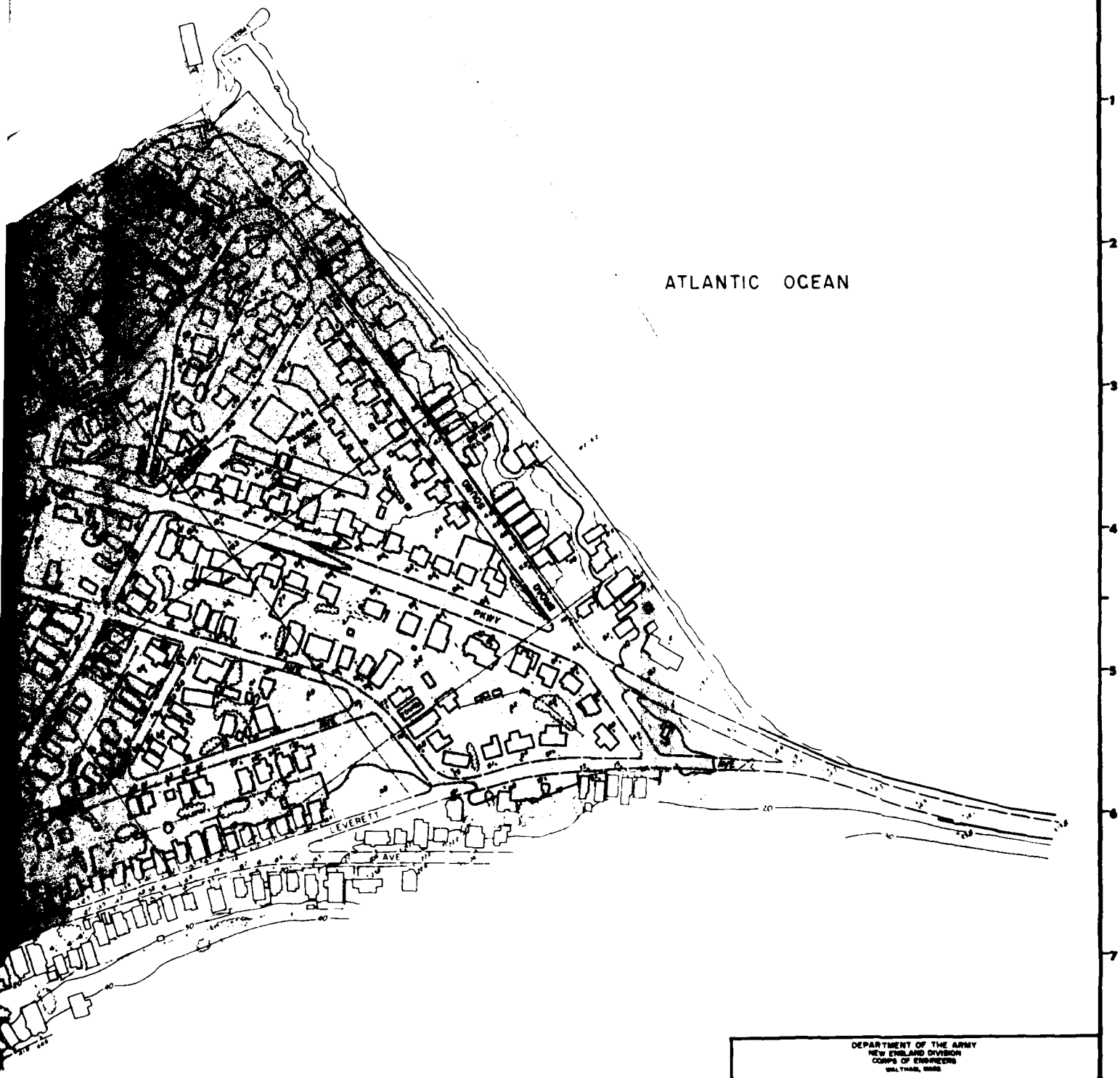

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHAN'S POINT

BLIZZARD OF 78

100 YEAR FLOOD

PLATE 7

of homes affected are shown for specific events including the 100-year and the 500-year. Plate 6, shown earlier, depicts the relationship between stillwater tide levels surrounding Roughans Point and the associated stages of flooding within the interior portion of the study area.

TABLE 5

RECURRING LOSSES*
ROUGHANS POINT

Interior Flood Elevation Feet (NGVD)	Return Frequency (Years)	No. of Structures Affected by Flooding	February 1982 P.L. $ Damages
0.0	-	-	-
1.0	-	-	800
2.0	-	-	5,200
3.0	-	-	10,800
4.0	1	-	15,200
5.0	1.11	45	39,300
6.0	1.66	90	142,700
7.0	2.5	124	452,900
8.0	5	167	1,366,100
9.0	10	231	3,077,400
10.0	20	284	6,012,800
11.0	50	297	8,684,300
12.0	100	301	10,987,100
13.0	500	305	13,255,700
14.0	2,000	309	15,681,500
15.0	10,000	309	18,219,600

*Excludes emergency costs.

Other expenses are associated with severe flooding. In addition to the measured damages previously discussed, one-time losses associated with flooding are accountable as damages. These costs include the expenditures by the 20 Federal, State, and local emergency assistance programs that were put into action. These expenses result from emergency activities prior to, during, and after a flood, and include: flood emergency centers, communication facilities not otherwise needed, temporary evacuation assistance, flood fighting materials and personnel, additional police and fire protection, and public clean-up. At least some of these expenditures would be prevented by additional protection. Table 6 provides a partial list of the agencies involved in emergency operations during the 1978 storm and in the subsequent rehabilitation operations.

An impact associated with severe flooding and extensive property damage is the psychological pressure exerted upon individuals during such a crisis situation. Project Concern* was instituted in temporary response

to these needs of the storm victims. It provided crisis counseling for emotional and psychological problems associated with blizzard/flood of February 1978. The program was sponsored by the National Institute for Mental Health and the Federal Disaster Assistance Administration and implemented by the Massachusetts Departments of Mental Health and Research for Social Change, Inc. Over 415 people from Revere received professional help from case workers. Residents' problems encountered by the staff included stress, phobic reactions, anxiety, displacement and personal loss.

Details regarding project economies including flood losses and benefits are included in the Support Documentation, Volume II.

Flooding has been a serious problem at Roughans Point for many years as evidenced by the construction of the existing seawalls and rock berms to protect the area. The existing flood protection measures are not effective. Interior drainage is handled by an MDC pumping station, although it has been proven inadequate for major flooding situations.

TABLE 6

ORGANIZATIONS INVOLVED IN EMERGENCY OPERATIONS
REVERE 1978

1. Housing and Urban Development (HUD)
   - Temporary Housing
   - Federal Insurance Administration
   - Minimal Repair Program

2. Small Business Administration (SBA)
   - Home and Personal Loans
   - Business Loans

3. Department of Labor (DOL)
   - Disaster Unemployment Insurance

4. Department of Agriculture (DOA)
   - Food and Nutrition Service (Food Stamps)
   - Farmers Home Administration

5. Federal Disaster Assistance Administration (FDAA)

6. Internal Revenue Service (IRS)
   - Casualty Loss

ROUGHAN'S POINT

11 FEBRUARY 1978

TABLE 6 (Cont.)

ORGANIZATIONS INVOLVED IN EMERGENCY OPERATIONS
REVERE 1978

7. Community Services Administration (CSA)
   Grants to Local Communities
   Action Agencies for Food and Fuel

8. Health, Education and Welfare (HEW)
   Offices on Aging Grants for Special Needs of Elderly and Education

9. Federal Highway Administration (FHA)
   Federal Aid for Roads and Highways

10. U.S. Army Corps of Engineers (CE)
    Operation and Maintenance
    Emergency Rehabilitation of Flood Projects

11. U.S. Army, Massachusetts
    Massachusetts National Guard

12. U.S. Economic Development Administration
    Massachusetts Disaster Recovery Team
    (Operation and Coordination)

13. Mission Assignments, Massachusetts (Reimbursed by FDAA)
    U.S. Army Corps of Engineers
    U.S. Army New England Division, Corps of Engineers
    Environmental Protection Agency
    Federal Aviation Agency
    Federal Highway Administration
    General Services Administration

14. U.S. Coast Guard, Massachusetts
    Minor Aids to Navigation

E. STUDY OBJECTIVES AND CONSTRAINTS

The Corps of Engineers seeks plans that provide solutions for existing flood problems and also offer the potential for reducing future flood damage within the study area. Wherever possible, these plans will incorporate features that enhance the area's environmental quality. Based upon a preliminary assessment of the flood problems, needs and opportunities in the study area, the following study objectives have been developed.

. Reduction of potential flood damage measured economically in the Roughans Point section of Revere. Target reduction is 90 percent protection.

. Reduction of the flood threat at Roughans Point.

. Development of a flood damage reduction program which contributes to the environmental quality of Roughans Point including enhancement of the recreational value of its adjoining shoreline and facilities.

Planning efforts should not render ineffective the objectives of other planning agencies. Any plan should complement regional long range management plans. Formulation of a plan, for example, must be in agreement with the Commonwealth of Massachusetts' Coastal Zone Management Program, or the environmental provisions of Section 404 of the 1972 Clean Water Act.

The Coastal Zone Management Program provides that:

> "Each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs."

Another example of a possible constraint to Corps' planning efforts would be the inability of the State to complete flood control work on Sales Creek. This would affect interior drainage improvements for Roughans Point as presented here. This work has been included in the study analysis.

A survey of Roughans Point residents conducted last year and meetings with local interests throughout the study have identified a desire for a high degree of protection. A constraint of 90 percent protection was applied in alternative evaluation.

SECTION III

PLAN FORMULATION

SECTION III

PLAN FORMULATION

The formulation and analysis of alternative plans is based, in part, on careful review of the existing situation and the problems, needs, and opportunities of the study area. At Roughans Point it is clear that should a flood occur, substantial damage would be sustained to existing structures.

Alternative measures were investigated to meet the objective of preventing future flood damages. The associated probable social and environmental impacts were evaluated. Each measure was investigated to determine its economic and engineering feasibility, the associated impacts resulting from its implementation, and the public attitudes toward it. This section describes the alternatives and plans that were studied and the iterative process used to screen them.

A. MANAGEMENT MEASURES

Measures addressing flood damage prevention fall into two general categories. Some modify the extent of flooding by altering the natural environment, such as breakwaters, seawalls, revetments and other techniques described below. Others reduce flood damage vulnerability through floodplain regulations, flood insurance, floodproofing, relocation and/or acquisition.

Alternative Flood Damage Prevention Measures

Modify Floods	Reduce Vulnerability
Breakwaters	Floodproofing
Seawalls	Flood Warning and Evacuation
Revetments	Flood Plain Regulations
Beach Restoration and Nourishment	Flood Insurance
Dikes and Walls	Public Acquisition of Floodplain Land

(1) Modify Extent

. Breakwaters. A breakwater is a structure protecting a shore area, harbor, anchorage or basin from waves. Beaches and flood-prone areas along the coast can be protected by an offshore breakwater that reduces the wave energy reaching the shore.

Breakwaters can have both beneficial and detrimental effects on the shore. Offshore breakwaters are usually more costly than onshore structures, such as seawalls or revetments, and are seldom built solely for shore protection. The elimination of wave action reduces the movement of sand along the shore and reduces nourishment of the downdrift beaches.

Breakwaters are generally some variation of an offshore rubble stone mound structure which is adaptable to almost any depth and can be exposed to severe waves. In some instances, both cellular steel and concrete caissons have been used. Breakwaters of these types can only be used where storm waves are not too severe.

. Seawalls. Protection of shore development can be accomplished when the natural protection is lost to the environment. Shorefront owners can and have resorted to shore armoring by constructing wave-resistant walls of various types.

Seawalls may have vertical, curved or stepped faces and can be constructed of many different types of materials. While seawalls may protect development, they can also create a local problem. The downward forces created by waves striking the wall can rapidly remove sand from in front of it. A stone apron is often necessary to prevent this excessive scouring and undermining.

. Revetments. Sloping revetments armor the seaward face of a shoreline with one or more layers of stone or concrete. This sloping protection dissipates wave energy, with a less damaging effect on the shore. Two types of structural revetments are used for coastal protection: the rigid, cast-in-place concrete type and the stone armor unit type.

. Beach Restoration and Nourishment. Beaches are very effective in dissipating wave energy. When maintained to adequate dimensions, they can afford protection for the adjoining backshore. When conditions are suitable, long reaches of shore may be protected by artificial nourishment at a relatively low cost. The resultant widened beach also has added value as a recreational feature.

. Dikes and Walls. With this measure, walls or levees (small earth dikes) can be built around vulnerable structures or groups of structures. However, in this particular study, walls and levees were primarily considered where flood depths were 5 feet or less. This height limit was used because of the aesthetically unpleasing nature of having a high wall or levee placed around structures.

(2) Reduce Vulnerability

. Floodproofing. This encompasses a body of techniques for preventing damages due to floods, requiring action both to structures and to building contents. It involves keeping water out, as well as reducing the effects of its entry. Such adjustments can be applied by the individual, or as part of a collective action, either when buildings are under construction or during remodeling of those existing. They may be permanent or temporary.

Floodproofing, like other methods of preventing flood damages, has its limitations. It can generate a false sense of security and discourage the development of needed flood control and other actions. Indiscriminately used, it can tend to increase the uneconomical use of flood plains resulting from unregulated flood plain development. Each measure must be evaluated for its specific application in the reduction of flood damages, and only then can it be decided if that particular measure is feasible -- physically and economically.

Floodproofing measures can be classified into three broad categories. First are permanent measures which become an integral part of the structure or land surrounding it. Second are temporary or standby measures which are used only during floods, but which are constructed and made ready prior to any flood threat. Third are emergency measures which are carried out during flood situations in accordance with a predetermined plan. In recent years, floodproofing has come to be known as "nonstructural" to be distinguished from "structural" which is traditionally associated with major flood control works.

Nonstructural flood damage reduction measures have an important role alongside traditional structural measures. Continued occupancy of developed flood plain sites, and even new development of such sites, may be necessary in some low-lying places - especially in certain urban areas where a shortage of land may offer no other realistic alternative. Typical nonstructural measures include closures for openings (doors, windows, etc.), waterproof sealants for walls and floors, utility valves to prevent backflow of sewer and plumbing facilities, and sump pumps. Another technique is raising existing structures above flood levels.

Within an existing or group of structures, damageable property can often be placed in a less vulnerable location or protected in-place. It is something every property owner can do to one degree or another. Furnaces and appliances can be protected by raising them off the floor. Damageable property can be moved from lower to higher floors, or other less flood-prone sites. Important mechanical and/or electrical equipment can be flood-proofed by inclosing them in a watertight utility cell or room.

A consideration that must be included is that residual damage to both the structure and contents will remain even when the most vulnerable property is rearranged or protected. Measures such as these are usually considered when other measures are either not physically or economically feasible, or the depth of flooding is relatively shallow.

Elimination of flood damages can also be accomplished by relocation of existing structures and/or contents. There are basically two options for removing property to a location outside the flood hazard area. One is to remove both structure and contents to a flood-free site; the second is to remove only the contents to a structure located outside the flood hazard area, and demolish or reuse the structure at the existing site. In

each case, the purpose is to take advantage of the existing property in a manner compatible with the flood hazard.

. Flood Warning and Evacuation. Flood forecasts, warning and evacuation is a strategy to reduce flood losses by charting out a plan of action to respond to a flood threat. The strategy includes:

- A system for early recognition and evaluation of potential floods.
- Procedures for issuance and dissemination of a flood warning.
- Arrangements for temporary evacuation of people and property.
- Provisions for installation of temporary protective measures.
- A means to maintain vital services.
- A plan for postflood reoccupation and economic recovery of the flooded area.

Flood warning is the critical link between forecast and response. An effective warning process will communicate the current and projected flood threat, reach all persons affected, account for the activities of the community at the time of the threat (day, night, weekday, weekend) and motivate persons to action. The decision to warn must be made by responsible agencies and officials in a competent manner to maintain the credibility of future warnings.

An effective warning needs to be followed by an effective response. This means prompt and orderly evacuation and/or action. This includes:

- Establishment of rescue, medical and fire squads.
- Identification of rescue and emergency equipment.
- Identification of priorities for evacuation.
- Surveillance of evacuation to insure safety and protect property.

. Flood Plain Regulations. Through proper land use regulation, flood plains can be managed to insure that their use is compatible with the severity of a flood hazard. Several means of regulation include: zoning ordinances, subdivision regulations, building and housing codes. Their purpose is to reduce flood losses by controlling the future and existing uses of flood plain lands.

Zoning regulates the use of structures and land, the height and bulk of building, and the size of lots and density of use. It is usually based upon some broad land use plans to guide the growth of the community. Subdivision regulations guide the division of large parcels of land into smaller lots for development. Subdivision regulations with special reference to flood hazards often (1) require installation of adequate drainage facilities, (2) require filling of a portion of each lot to provide a safe building site at an elevation above the selected flood height, and (3) require the placement of streets and public utilities above a selected flood protection elevation. Building and Housing Codes

neither regulate where development takes place nor the type of development, but rather specify building design and materials.

. Flood Insurance. Flood insurance is not really a flood damage reduction measure; rather it provides protection from financial loss suffered during a flood. The National Flood Insurance Program was created by Congress in an attempt to reduce, through more careful planning, the annual flood losses and to make flood insurance protection available to property owners. Prior to this program, the response to flood disaster was limited to the building of flood control works and providing disaster relief to flood victims. Insurance companies would not sell flood coverage to property owners, and new construction would often overlook new flood protection techniques.

The National Flood Insurance Program is conducted by the Federal Insurance Administration (FIA) under the direction of the Federal Emergency Management Agency (FEMA) -- formerly the Department of Housing and Urban Development, Flood Insurance Administration. The program provides local officials with a usable tool in protection of their flood plains. A flood-prone community, once on the regular program, must enact floodplain zoning in accordance with minimum guidelines established by FEMA. Failure to enact or enforce such legislation could be penalized by forfeiture of all Federal funding assistance.

Flood insurance is an option for all owners of existing buildings in a community identified as flood-prone. It is compulsory for all new buyers of property in the FEMA designated 100-year flood plain where Federally insured mortgages or mortgages through Federally connected banks are involved.

In order to qualify, a community must adopt preliminary flood plain management measures including floodproofing for all proposed construction or other development. They must be reviewed to assure that sites are reasonably free from flooding. All structures in flood-prone areas must be properly anchored and made of materials that will minimize flood damage: new subdivisions must have adequate drainage; and new or replacement utility systems must be located to prevent flood loss.

. Public Acquisition of Flood Plain Land. Public control over the flood plain may be obtained by purchasing the title or some lesser rights such as development or public access rights. Acquisition of the title is better suited for undeveloped or sparsely developed land in the flood plain. It is a very desirable means, however, of protecting and/or providing for environmental and wildlife protection, public open space and recreation or other purposes.

B. PLANS OF OTHERS.

A variety of Commonwealth of Massachusetts activities and programs have direct bearing on water and related land uses in the study area. Those relevant to this study are described here.

. The Department of Environmental Quality Engineering (DEQE) is currently constructing improvements along Sales Creek, southwest of Roughans Point. These improvements were initiated in 1980 for the purpose of alleviating the creek's periodic flood problems and are near completion. Measures include a pumping station at Bennington street where Sales Creek empties into Belle Isle Inlet, replacement and enlargement of most of the existing culverts, excavation of sediment and removal of debris from the channel and enclosure of two reaches in pipe conduits.

. The Division of Waterways under DEQE is responsible for maintenance of the existing seawall at Roughans Point. They have, in the past, replaced riprap armor that had been moved out of place by wave action and repaired the concrete seawall at the southern end of the Point.

. The Coastal Zone Management Program (CZM) offers technical assistance to communities, provides for Federal consistency with policies, and above all, sets a high priority on placing the State's regulatory and management programs in order and making them work in a more assured, timely and consistent manner. The Massachusetts CZM program protects the coastline's natural resources and insures that the environmental and economic values of the coastal zone be sustained, and even enhanced.

. The Statewide Comprehensive Outdoor Recreation Plan (SCORP) prepared by the Department of Environment Management (DEM), recommends that recreational needs be met where demand is greatest and supply most deficient, and that priority be placed on satisfying the needs for the most widely demanded recreational activity. The plan identifies swimming as the most popular recreational activity and finds that urban areas, particularly the greater Boston area, have the highest need for new recreational facilities.

. The State Growth Policy Plan, prepared by the Office of State Planning (OSP), recommends that new growth and development be channeled to existing urban centers or to regional development centers, and that State programs of public investments adhere to the policy and support urban development.

. Plans have been prepared by the city of Revere, the MDC, and private concerns for redevelopment of the beach area to the north of Roughans Point. These include the construction of two residential complexes, one to be luxury apartments and an elderly housing project, and the other to be condominiums. The MDC is building a park on its Revere Beach Reservation and the MBTA is planning to extend its Blue Line public transportation system, rebuild the Wonderland Station, and construct a parking garage. Rehabilitation of the beach area has been initiated. However, completion of the comprehensive plan is contingent on the availability of funding.

During the Blizzard of '78, water from waves overtopping the seawall runs down Leverett Avenue in Revere, MA. (photograph courtesy of The Boston Globe)

C. RATIONALE

During the course of the study, preliminary plans were evaluated for feasibility in satisfying flood protection needs and economic justification. These plans were formulated to decide if further studies should continue.

The existing interior stage freqeuncy curve was developed from an analysis of known historical levels and through field interviews. For example, the record 7 February 1978 event produced experienced levels generally ranging from 11 to 12 feet NGVD, with an average of about 11.8 feet NGVD. Similarly, based on available information and interviews, the 19 February 1972, 12 November 1968, and 21 January 1979 events produced interior levels of approximately 9.0, 8.0, and 7.2 feet NGVD, respectively. The plotting positions of these experienced events, plus the statement of residents, that ponding of 1 to 2 feet (4-5 feet NGVD) in the streets occurred annually, was the basis for adopting the interior frequency curve. This curve is shown on Plate 6. The interior flood elevation of the SPN is 15.0 ft. NGVD, the 500-year event is 13.0 ft. NGVD, and the 100-year flood is 11.8 ft. NGVD.

Where damages from large floods would be catastrophic, the Standard Project Flood (SPF) is the goal for the level of protection. The SPF is a flood that might be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the region involved, excluding extraordinarily rare combinations. This policy is particularly applicable to projects involving urban areas.

In the case of Roughans Point in Revere, the stillwater tide levels and waves produced by a very severe northeast storm would be the criteria defining the SPF -- that is, the Standard Project Northeaster (SPN). Since the SPN tide level has never been formally developed, it was decided to use an approximation of this level through Stage 3 planning. The actual SPN development, requiring extensive computer modeling, will ensue so that results will be available during the post-authorization design period.

The complete record (1922 - present) of the National Ocean Survey (NOS) tide gage at Boston Harbor was analyzed to determine the maximum recorded storm surge (observed level minus predicted level). This analysis was performed by the U.S. Weather Bureau for data up to 1960 and by the National Weather Service from then to the present. The maximum surge was found to be 5.1 feet.

The maximum surge of record was then added to the maximum probable high tide, resulting in an approximate SPN tide level of about 13 feet NGVD. Such an estimate appears reasonable when compared to the 6-7 February 1978 storm tide level of 10.3 feet NGVD, which is the greatest observed tide in Boston and which has a 1.0 percent chance of occurrence

(100-year recurrence interval). Additional information on the approximation of the SPN tide level is contained in the Support Documentation.

Theoretical wave overtopping for tidal floods with selected maximum tide levels were developed using maximum likely waves and a design onshore wind speed of 60 MPH. This was done for both existing and proposed protection. It was found that applying the theoretical overtopping rates to the existing facilities produced interior flood stages much higher than those of the outside stillwater tide. Since overall wave height and wind speed would likely increase with increasing storm tide level, overtopping was made a percentage of the theoretical overtopping. The percentage was determined by correlation with the interior curve. This relationship was then used in examining interior flooding for alternative solutions.

Where interior flood levels from overtopping exceeded the minimum height of protection, it was assumed water would flow back out to the ocean over the wall 50 percent of the time. A step routing of the storm tide and overtopping was made to determine the resulting peak interior elevation.

This approach resulted in developed of modified interior stage vs. frequency curves. Details of the interior hydrologic analysis are explained in the Support Documentation.

D. SCREENING OF PLANS

Several different measures of flood damage reduction were screened for feasibility in satisfying the needs of Roughans Point. Below is a brief synopsis of the results of evaluation to date.

Floating breakwaters, anchored offshore, to intercept incoming waves were determined as not being implementable. Such a breakwater should not be subjected to a design wave with a period of 4 seconds or more, or a wave height greater than 4 feet (Technical Report HL-80 Floating Breakwater). The design wave height for Roughans Point is 9.0 feet; therefore, this design is not applicable to the study area.

Beach restoration and nourishment were ruled out early as impractical because of the high degree of protection sought for the area. Such measures are usually more applicable where the severity of the wave attack is not as great.

Another alternative called for creation of a sand dune system over those existing walls and revetments with top elevations below 17.0 ft. NGVD. To properly construct and maintain sand dunes, it is necessary that they be located far enough inland to be away from frequent wave attack. At Roughans Point, high tide reaches the existing wall and berms; thus there is insufficient room for any dunes. Therefore, a sand dune system would not be feasible or practical.

Acquisition of properties in the Roughans Point flood plain was ruled infeasible due to the prohibitive cost. An estimate of the real estate value and acquisition costs for structures east of Winthrop Parkway, about half of the total in the flood plain, is $11 million. It was assumed that this figure would increase greatly if applied to the study area's entire flood plain. Other alternatives being considered are far less expensive while providing a comparable level of protection.

Other measures studied in Stage 2 were grouped as Plans A, B, C and D. Plan A called for raising the existing walls and rock dikes to the same height as the southern concrete seawall. A rock berm to dissipate incoming waves, sloping seaward 1 on 3, would be added to stabilize the facilities to ensure their longevity. Plan B considered nonstructural solutions including warning and evacuation and physical protection, such as floodproofing, raising, and constructing walls and dikes, of individual and groups of structures. Plan C involved improving Plan A by extending the rock berm out farther, at a 1 on 4 seaward slope, to prevent even more wave run-up. Plan D incorporated a fixed offshore breakwater to intercept incoming waves supplemented by the stabilization needs outlined in Plan A.

These were evaluated and compared using a 50-year project life and a 7-3/8 percent (later stage efforts used 7-5/8 percent) Federal interest rate. The only economic benefits considered for Stage 2 were flood damage and flood insurance overhead reduction and affluence. Intensification, location, floodproofing, cost reduction, land market value restoration and employment benefits were developed during this Stage 3 effort.

In addition, selection of alternatives to proceed into more detailed Stage 3 study was governed by the objective of providing a high degree of protection. A 90-percent level of damages prevented, measured economically, was chosen as the minimum acceptable to meet the study's objective. This was determined in workshop meetings with the residents of Roughans Point and in coordination with the City of Revere.

Of the 26 alternatives comprising Plans A, B, C and D in Stage 2, all but two had benefit-to-cost ratios greater than unity. An incremental analysis was conducted for each alternative to determine if individual measures were justified on a "last added" basis. The only combination of structural improvements which was incrementally justified, both "first" and "last added," was a system calling for a 1 on 3 seaward sloping rock berm at top elevation 14.0 ft. NGVD combined with a 50 cfs pumping station. That alternative was dropped, however, due to its high level of residual damages. Details regarding economic analysis of the alternative matrix is included in stage 2 documentation.

A nonstructural and four structural alternatives from the 26 were chosen for continuation into Stage 3. These were further screened to two early in Stage 3 -- a structural solution and a nonstructural solution. The detailed efforts of this report focused primarily on these.

Consideration was given to the development of a flood damage reduction program which contributed to the environmental quality of the study area by reducing the threat of serious flooding. Enhancement of the recreational value of the resources at Roughans Point was sought wherever possible. Minimization of project impact and maximization of the level of protection was paramount in the selection process.

One of the four structural alternatives initally chosen for Stage 3 included a solution incorporating a fixed breakwater 500 feet offshore. Cost estimates for this approach were made during Stage 2 efforts. Project first costs, not including lands and damages nor pre-contruction planning costs, ranged from about $13 million to over $26 million. After discussion with local sponsors, early in Stage 3, regarding prospective cost-sharing arrangements, protection involving a breakwater was dropped from further evaluation because of the expense.

Initially an offshore breakwater was strongly supported by the Roughans Point residents because of its "intangible" level of confidence offered by its visual presence. However, the decision to eliminate it from more detailed study was influenced by the fact that other, less expensive plans of protection offered comparable levels of protection. Follow-up workshops with the residents focused on explaining the implications of project implementation and assuring them of the comparable levels of protection offered by the other alternatives.

The other three structural plans of protection included rugged rock berms sloping seaward to dissipate incoming waves in combination with interior drainage improvements and measures preventing "backwater flooding." Two of these called for the revetment at a 1 on 4 slope. One offered a 500-year level of protection while the other only a 100-year.

These two alternatives were eliminated on the basis that similar protection is provided, with less environmental impact, by the fourth structural solution surviving Stage 2. This latter alternative is comprised of the wave dissipating rock berm with a top elevation 17.0 ft. NGVD sloping seaward 1 on 3 together with interior drainage improvements and backwater provisions. This system maximizes net benefits for plans offering a 500-year level of protection and displaces less beach area.

During Stage 2 studies interior drainage systems were analyzed with 0, 50, 100 and 200 cfs supplemental pumping capacity. The cost of supplemental pumping was weighed principally against the incremental cost of equivalent seawall improvements. The analysis demonstrated that supplemental pumping was not incrementally justified. However, 50 cfs supplemental pumping was not ruled out since it would serve as a backup to the existing system, and provide for some small amount of wave splash and increased interior discharge capacity. Fifty cfs of supplemental capacity would provide a total pumping capacity of nearly 100 cfs, equivalent to a runoff rate of about 1 inch per hour, the 10 percent annual chance (10 yr freq.) maximum rainfall-runoff rate. Relationships between interior

runoff, ponding levels and pumping capacities are outlined in the Support Documentation.

Finally, the "A" alternative above was joined by the nonstructural approach "B" for the detailed analysis of Stage 3. The nonstructural plan would have been eliminated earlier, because of its inability to prevent flooding, had its consideration not been mandated by legislation. Because of the nature of nonstructural measures, the maximum level of protection considered was the 100-year. Stage 2 efforts indicated potentially high residual flood damages under this alternative.

Early in Stage 3, the specific nonstructural measures recommended for further evaluation in Stage 2 were screened with the aid of public involvement and technical up-to-date input. New cost data, along with recent field experience throughout the Corps were used.

We found that walls greater than five feet high, surrounding one or more structures, are aesthetically and socially unacceptable. Homes surviving this critiera were then subjected to a benefit-to-cost analysis. None were determined economically justified. This measure was dropped from further consideration.

Closures were also eliminated early in Stage 3. Such a measure is regarded as impractical for depths of flooding as great as those suffered by Roughans Point. Construction of utility cells and rooms and home raising were also re-evaluated. Those considered feasible are outlined in the next section.

Although the nonstructural plan does not meet the study's objective of at least 90 percent of the potential losses prevented, it was carried into Stage 3 to fulfill the intent of the planning process. It was found that such a solution would not be acceptable nor supported by the residents of Roughans Point. The severity of the flood problem, depths of inundation and the characteristics of the study area make some nonstructural measures impractical.

SECTION IV

DETAILED PLANS

SECTION IV
DETAILED PLANS

A. STRUCTURAL PLAN

This plan provides 500-year protection for Roughans Point and consists of stabilizing the existing facilities along the shore with a rugged berm to dissipate incoming waves. The berm would extend from a point 400 feet north of Eliot Circle southerly to a point 200 feet south of the intersection of Winthrop Parkway and Leverett Avenue. The plan also calls for "backwater" protection by raising the road net at the intersection of Ocean Avenue and the Revere Beach Parkway. An I-wall will tie into the high ground of the Revere Beach Parkway bridge abutment. The intersection of State Road and Endicott Avenue will also be raised and tied into high ground in a similar fashion.

Interior drainage improvements will consist of a trunkline storm drain from Sales Creek running easterly along George Avenue to Broad Sound Avenue, and then northerly to the additional pumping station and extending to the existing MDC pumping station. Another storm drain will be installed along Broad Sound Avenue and run easterly to the MDC pumping station. Plate 8, depicting the general plan, follows.

1. Rock Berms

Section Sta. 19+20 to Sta. 27+25, shown on Plate 9, is called Reach A and consists of adding 1.7 feet to the top of the existing concrete wall, bringing the top elevation to 17.0 ft. NGVD An armor stone revetment is placed in front of the existing wall. This revetment will have a top width of 5 feet at elevation 14.0 ft. NGVD and a seaward slope of 1 on 3 down to the existing ground surface, with a 10-foot toe. A 6-foot-thick armor stone layer will cover a 3 foot layer of underlayer stone. This latter layer covers 1.5 feet of bedding stone placed on 1.5 feet of gravel.

Reach B, sta. 27+25 to sta. 29+95 is shown on Plate 9 and consists of steel sheet piling as a "cut-off" barrier driven along the centerline of an armor stone revetment. This new structure will be 10 feet wide at elevation 17.0 ft. NGVD also with a seaward slope of 1 on 3 down to the beach, with a 10-foot toe. The landside of the revetment is sloped 1 on 2 down to the original ground surface. The section is composed of rock layers similar to Reach A.

The existing granite wall comprises Reach C and runs from sta. 29+95 to sta. 32+00 and is shown on Plate 9. The section is similar to Reach B's, except that the sheet piling is driven along the face of the existing wall. The top of this berm is also at elevation 17.0 ft. NGVD.

Reach D, running from sta. 32+00 to sta. 38+45 is shown on Plate 10, and has a steel sheet pile wall and berm set 15 feet on the ocean side of the existing stone revetment. This new revetment is 10 feet wide at top elevation 17.0 ft. NGVD. The armor, underlayer, bedding stone and gravel layers are all similar to Reach B.

The concrete seawall from sta. 38+45 to sta. 56+25 makes up Reach E, shown on Plate 10, and consists of stone protection in front of the vertical face of the existing concrete wall. This rock berm will be 5 feet wide at top elevation 14.0 ft. NGVD, with a seaward slope of 1 on 3 to the existing ground surface with a 10-foot toe. The rock layers are the same as the previous reaches.

Lastly, Reach F runs from sta. 56+25 to sta. 60+00 and completes the shore protection. The section is shown on Plate 10 and is identical to Reach E.

2. Concrete Cap

Along Reach A, a concrete cap 1.7 feet high will be added to the existing concrete wall, bringing the top elevation to 17.0 ft. NGVD - continguous with the rest of the system to provide the 500-year design level of protection.

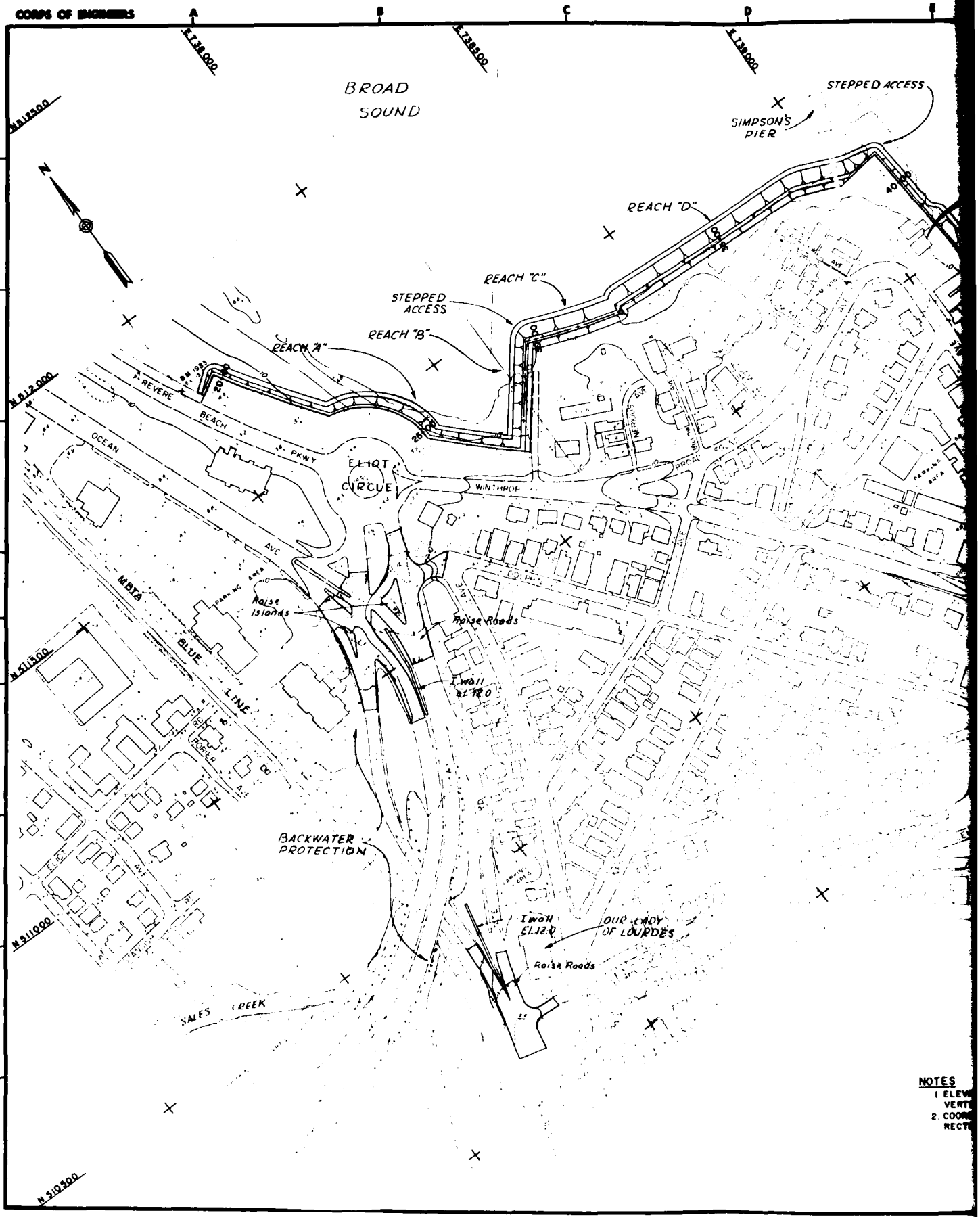
Two rows of holes, 3 feet on center, will be drilled into the existing wall. Number 6-reinforcing steel bars will be grouted into these holes to anchor the concrete cap.

3. Backwater Protection

The intersection of State Road and Endicott Avenue will be raised 1.0 feet and tapered off to existing ground east along Endicott Avenue, north along State Road and north and south along Bennington Street. From the junction of Bennington Street and State Road a concrete I-wall will be placed in the median strip extending north 210 feet and tying into high ground at the bridge abutment. The top of this wall will be at elevation 12.0 ft. NGVD and is shown in Section on Plate 9.

The road net along with two traffic islands at the intersection of Ocean Avenue and the Revere Beach Parkway will be raised 1.5 feet. This increase in elevation will be tapered off, north and south along Revere Beach Parkway, north and south along Bennington Street and north along Ocean Avenue. A concrete I-wall, like above, will be constructed in the median strip of the Revere Beach Parkway and run south 220 feet into the bridge abutment. The top of this wall will also be at elevation 12.0 ft. NGVD and is shown in section on Plate 9.

The height of this Backwater Protection was chosen commensurate with the 500-year design level of protection. Since this portion of the facilities would not be subject to wave overtopping, the design elevation of 12.0 feet NGVD is based on the 500-year stillwater tide level of 11.2 feet NGVD plus 0.8 foot of freeboard.


CORPS OF ENGINEERS
A
B
C
D
E
E 738000
E 738500
E 739000
N 512500
N 512000
N 511500
N 511000
N 510500
1
2
3
4
5
6
7
8
BROAD SOUND
STEPPED ACCESS
SIMPSON'S PIER
REACH "D"
REACH "C"
STEPPED ACCESS
REACH "B"
REACH "A"
REVERE BEACH PKWY
OCEAN AVE
ELIOT CIRCLE
WINTHROP
MBTA BLUE LINE
Raise Islands
Raise Roads
I wall EL 12.0
BACKWATER PROTECTION
I wall EL 12.0
OUR LADY OF LOURDES
Raise Roads
SALES CREEK
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1 ELEV
VERT
2. COOR
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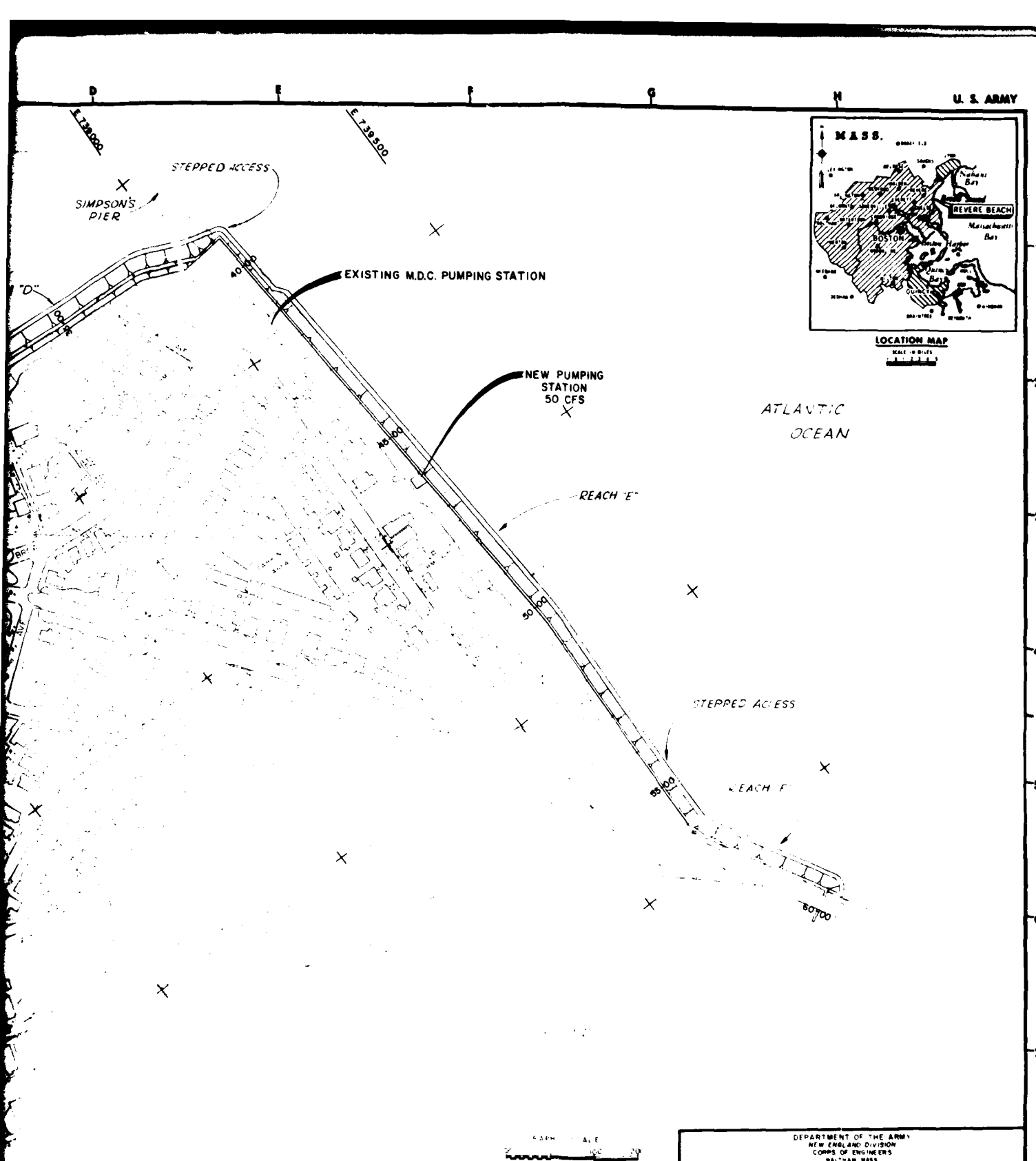

NOTES

1 ELEVATIONS REFER TO NGVD (NATIONAL VERTICAL DATUM OF 1929)

2 COORDINATES ARE BASED ON MASSACHUSETTS RECTANGULAR GRID SYSTEM

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FLOOD PROTECTION STUDY
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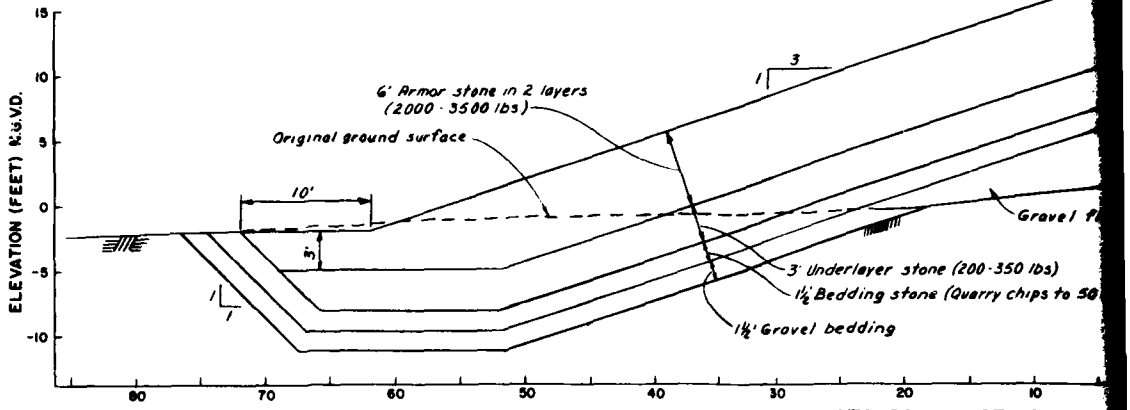
ROUGHANS POINT

PLAN "A"- STRUCTURAL PLAN
GENERAL PLAN

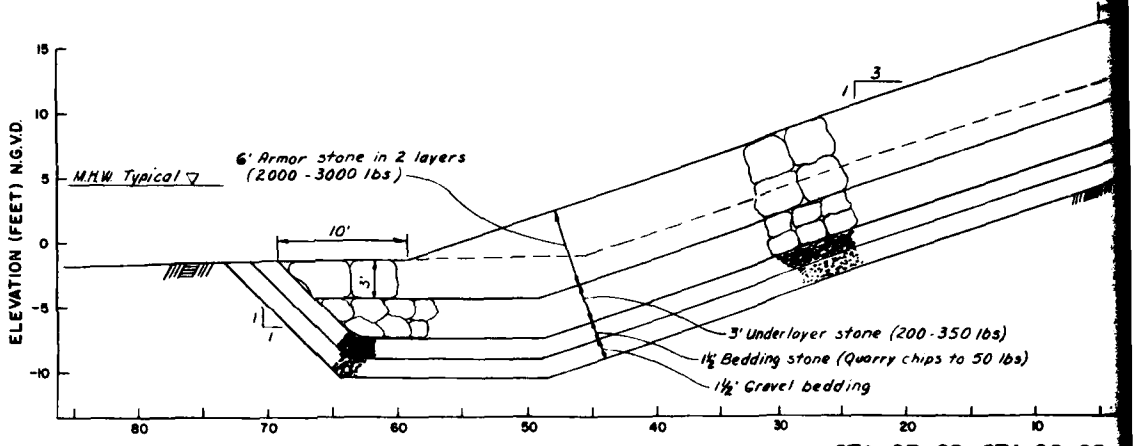
PLATE 8

2



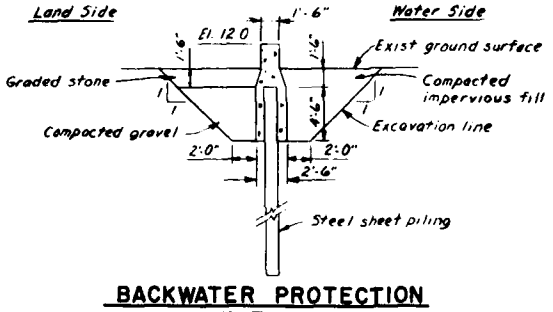
STA 29+95 - STA 32+00

REACH C



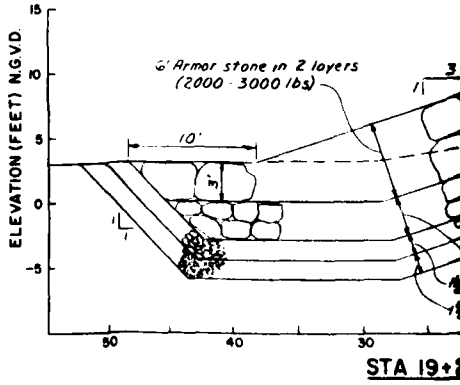
STA 27+25 - STA 29+95

REACH B



BACKWATER PROTECTION

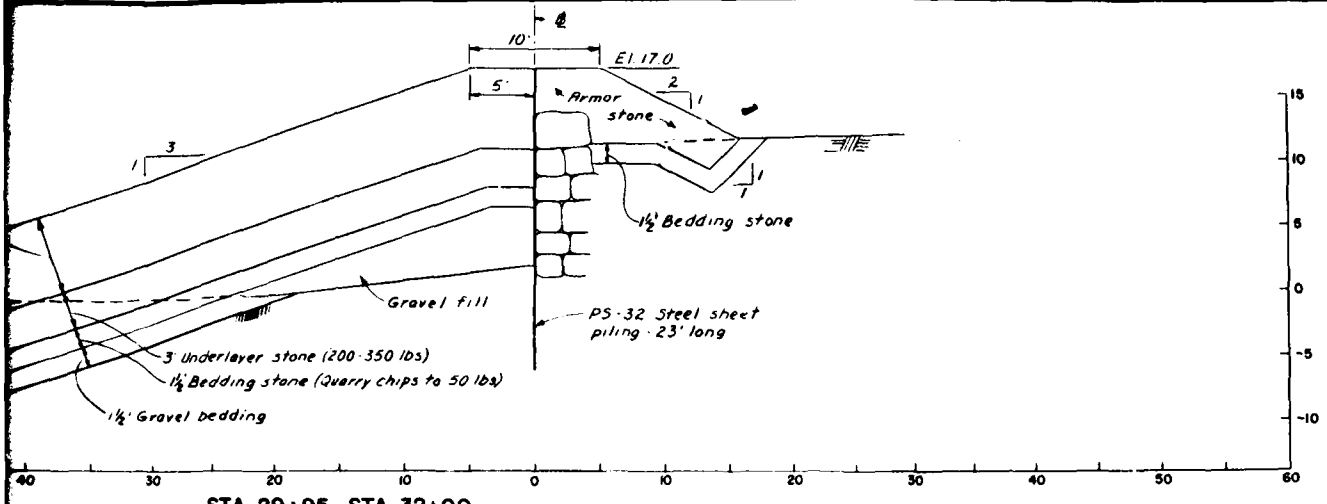
CONCRETE I-WALL



STA 19+2

R

TYPICAL SECTIONS



STA 29+95 - STA 32+00

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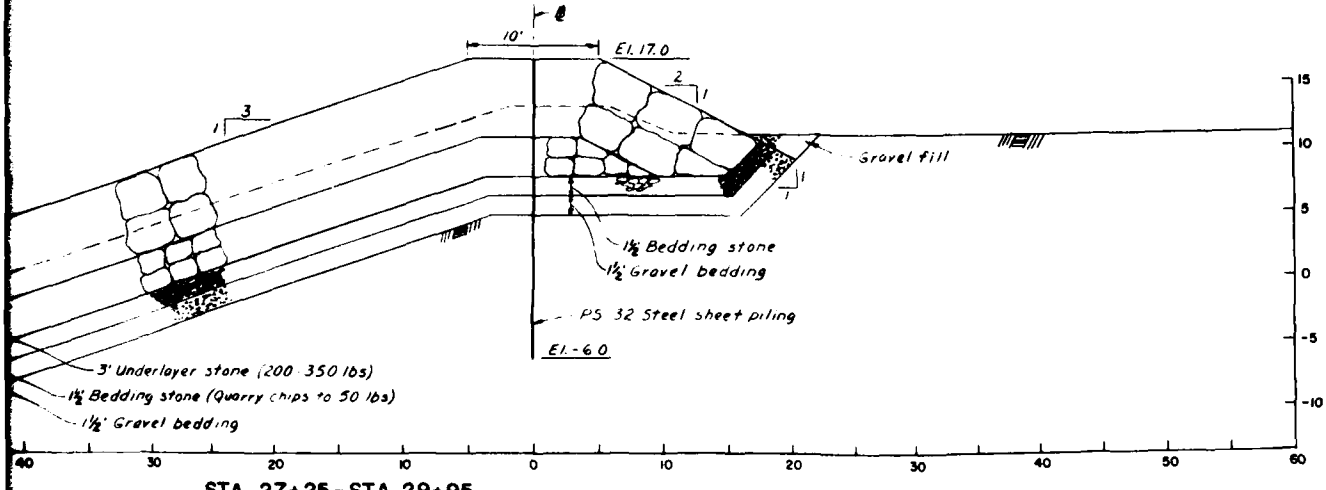
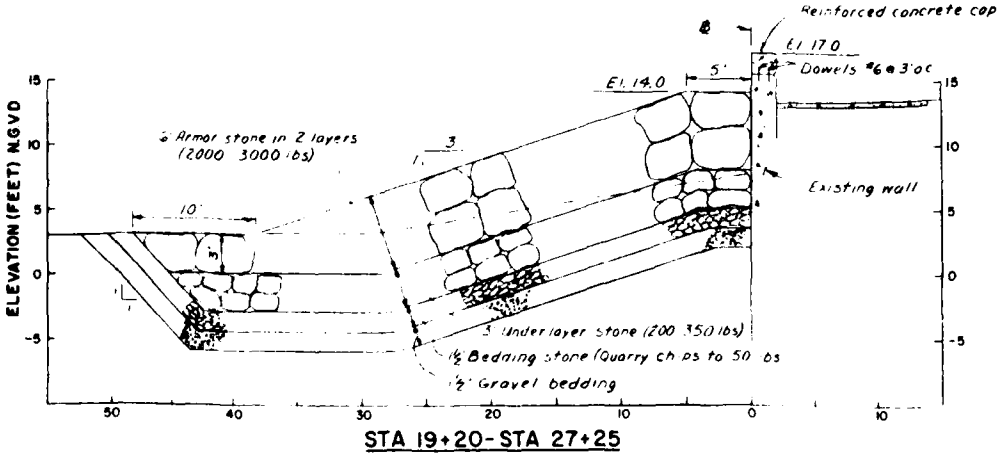


STA 27+25 - STA 29+95

REACH B



STA 19+20 - STA 27+25

REACH A

GRAPHIC SCALE

0 5 10

0 4 8 12

AL SECTIONS

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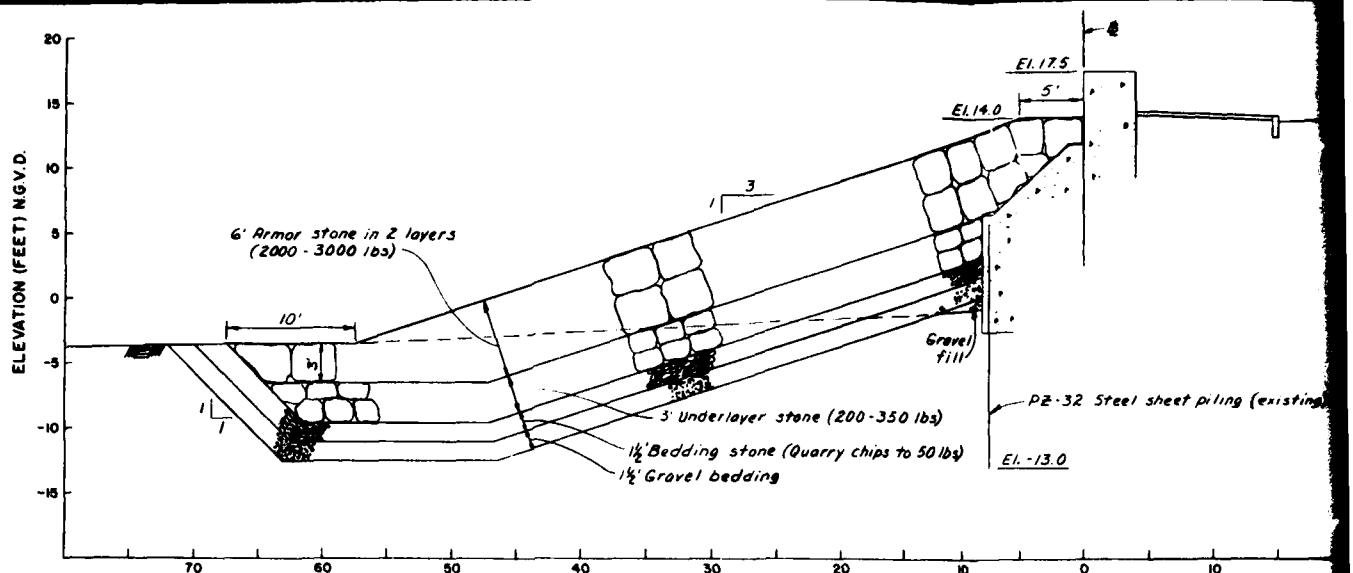
SECTIONS NO. 1

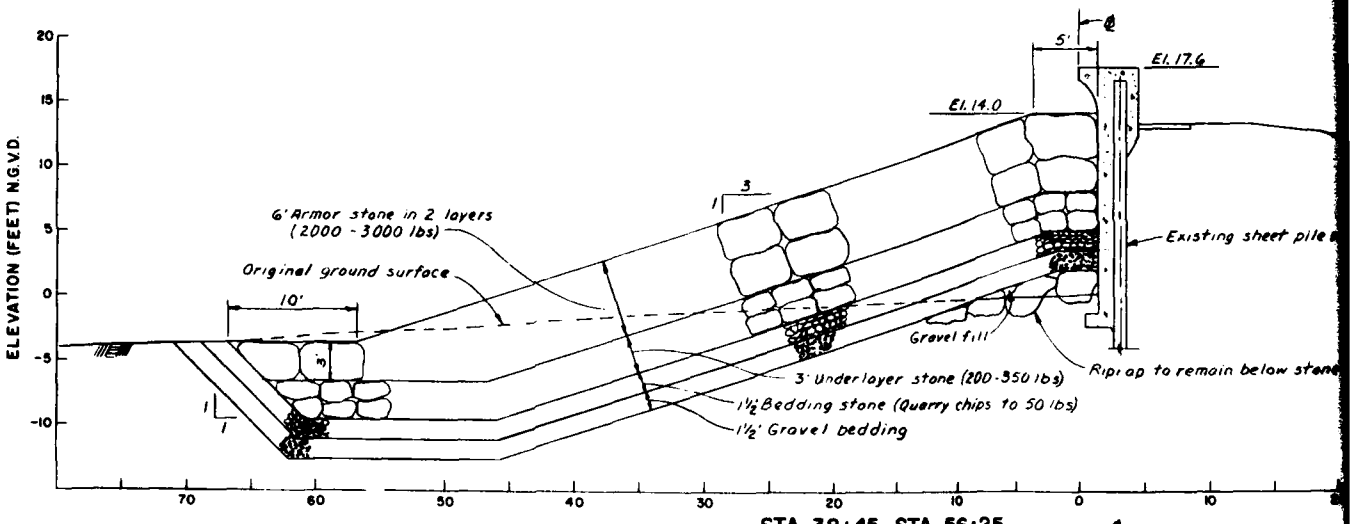
PLAN "A" - STRUCTURAL PLAN

PLATE 9



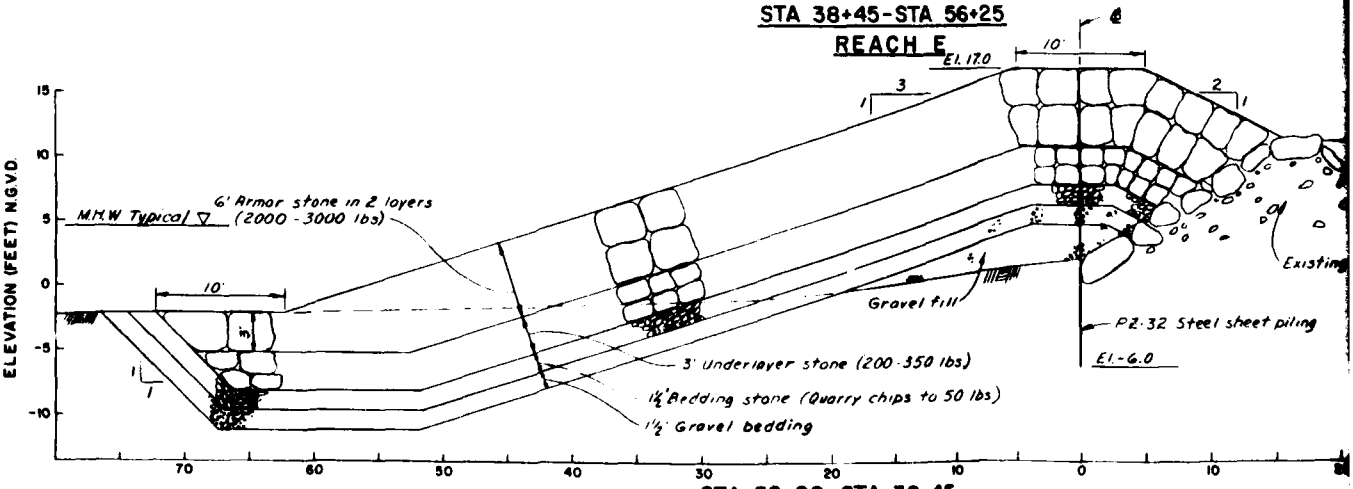
STA 56+25-STA 60+00

REACH F



STA 38+45-STA 56+25

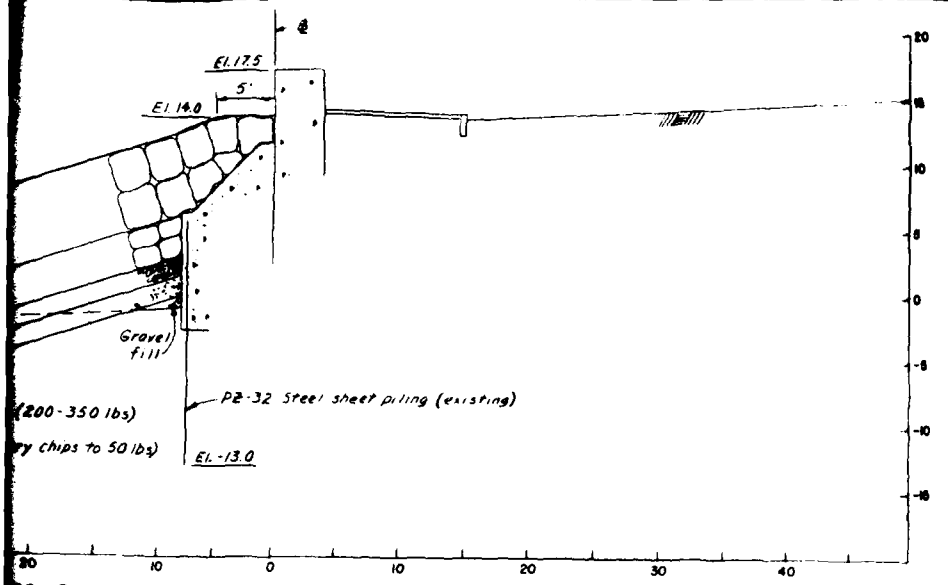
REACH E



STA 32+00-STA 38+45

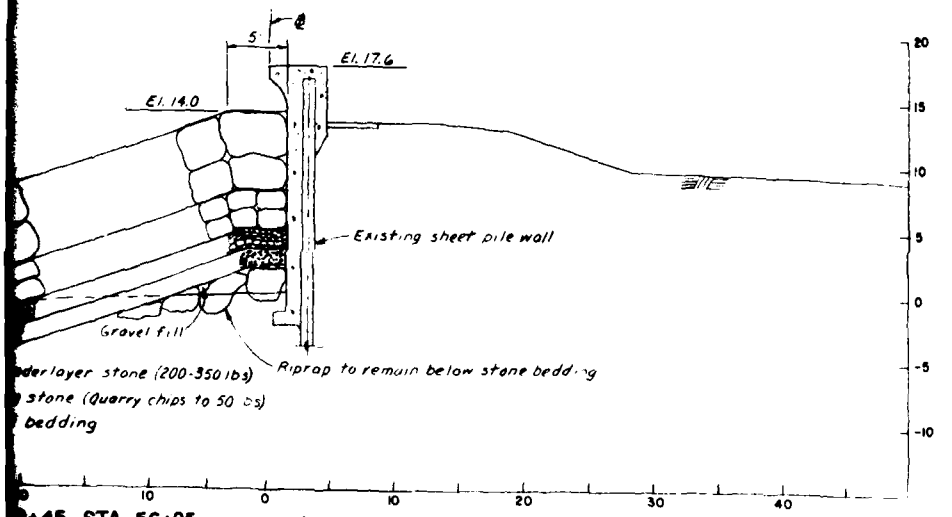
REACH D

TYPICAL SECTIONS



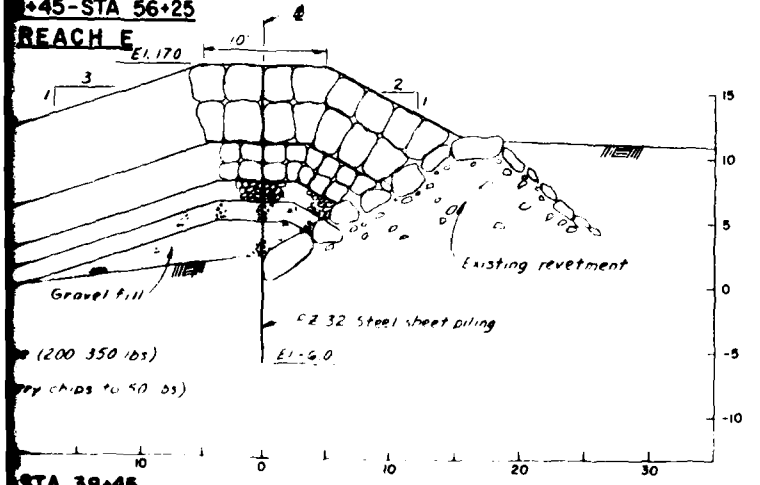
6+25-STA 60+00

REACH F



+45-STA 56+25

REACH E



STA 38+45

H D

ECTIONS

GRAPHIC SCALE

5' 0 5' 10'

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SECTIONS NO. 2

PLAN "A" - STRUCTURAL PLAN

PLATE 10

4. Interior Drainage

Interior drainage provisions will consist of a 42-inch trunkline storm drain from the existing drain under the Revere Beach Parkway, extending east to the southerly end of Broad Sound Avenue near the latter's intersection with Winthrop Parkway, and then continuing north with a 48-inch drain along Broad Sound Avenue to an additional 50 cfs capacity pumping station and the existing 48 cfs capacity MDC pumping station. This new line will have surface inlets and serve as a main outlet for existing feeder drains. It will have a very flat gradient with drainage normally to the west to Sales Creek. However, during intense runoff conditions, drainage could be both to Sales Creek and the Broad Sound Avenue pumping stations. A sluice gate will be provided at Sales Creek to control this. The gate could be closed and flow reversed to the pumping stations. These measures are shown on Plate 11.

5. Pumping Station

The additional pumping station will be located landside of the shore protection line at sta. 46+00 along Reach E. It will be founded on steel bearing piles and be 30 feet by 30 feet. Two pumps with a design total capacity of 50 cfs, along with a diesel powered generator, are the main features of the facility. The generator will be installed as a back-up in case of a local power failure. Access to the station will be from Broad Sound Avenue. Two 48-inch-diameter lines will conduct the interior drainage to the station. Discharge to the ocean will be through a gated concrete box conduit during conditions of normal tide. During storm tides the gate on the gravity conduit will be closed and the drainage pumped to the ocean.

6. Construction Procedures

To construct the rock revetment, an easement will be required on the landside of the existing facilities. Along Reach A this easement is on MDC property. The working zone needed for Reaches B through E is in an open area and away from local traffic interference. The 400-foot Reach F along Winthrop Parkway will require some type of traffic control. Along the backwater protection, raising the grades and installation of the I-walls will require some traffic detours. Construction of the revetment should start at the southern end of the system and proceed northward. Placement of the stone layers will be accomplished from a working surface on the seaward side.

7. Construction Materials

Construction materials will be gravel for fill materials and rock for slope protection. Gravel can be obtained from commercial suppliers within a 30-mile radius of the study area. Rock can be obtained from commercial suppliers within a 40-mile radius of the study area.

8. Environmental Quality Enhancement

At various locations along the proposed revetment, steps will be set into the armor stone to provide access to the water and flats, and used by

sunbathers. The sites are expected to be near the southern end of Broad Sound Avenue, Simpson's Pier, and Reach C. These steps will be 20 feet wide and will drop from a top elevation of 17.5 ft. NGVD to the existing ground surface.

9. Construction Facilities

a. Contractor's Facilities

The construction of the structural plan will require a moderate size work force with varied construction skills, largely in the heavy equipment and semiskilled trades. Within the greater Boston area, there is a sufficient number of workers who could commute to work and not require housing near the project.

There would be a need for administration, mobilization and storage at the project site. Three locations have been investigated, for such areas. These are at sta. 30+00 at Reaches B and C, sta. 40+00 at Simpson's Pier, and sta. 42+00 at the site of the additional pumping station. Temporary facilities required by the contractor would be removed at the conclusion of work and the site(s) restored, or finished, as required.

b. Government Facilities

A field office would be required in the vicinity of the proposed project. A winterized office trailer would be furnished as an ancillary obligation under the construction cost.

10. Schedule Of Construction

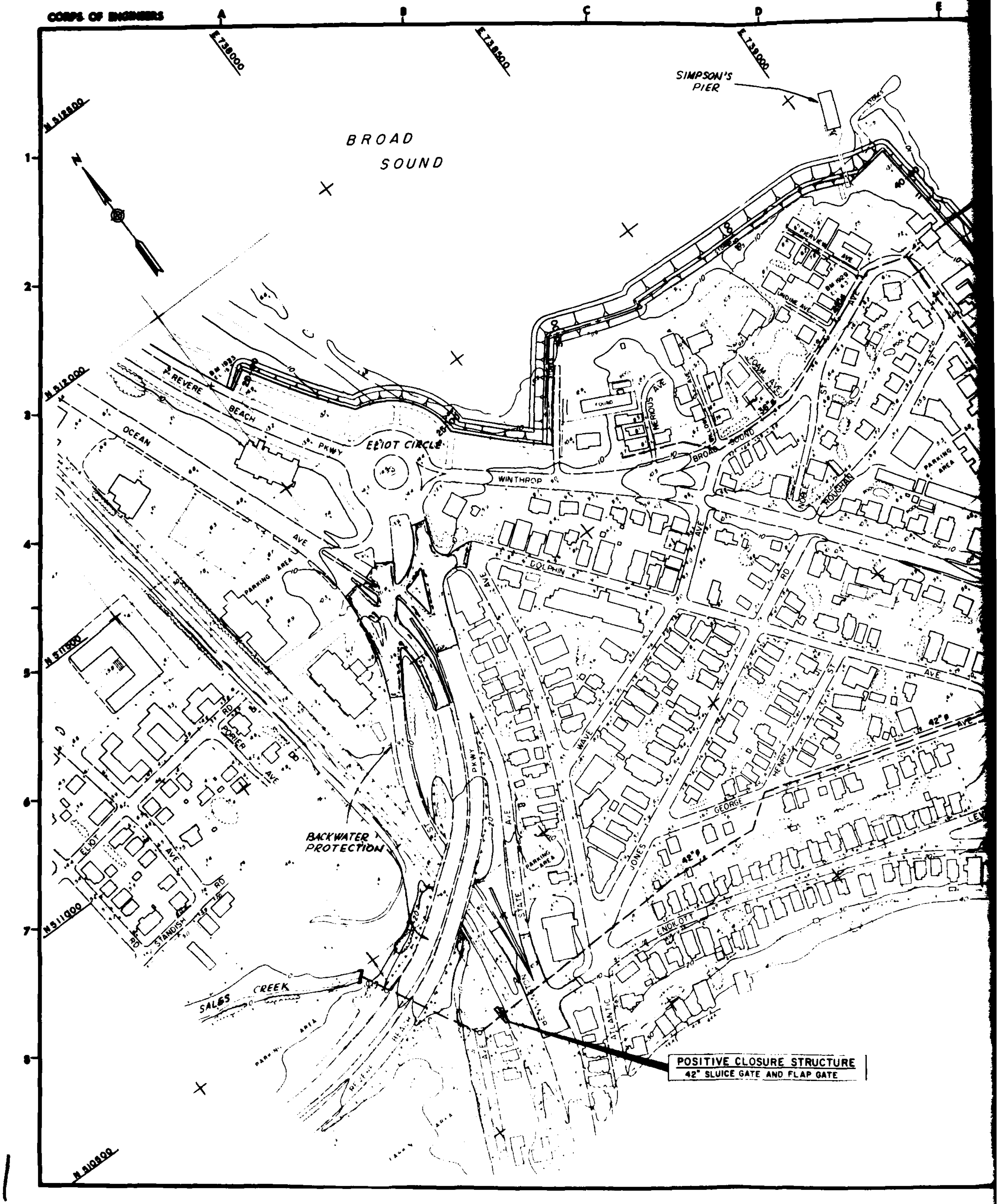
Construction of the shore and backwater protection and interior drainage improvements will be accomplished under a single continuing contract to be awarded at the start of a construction year. It is estimated it will take two years to complete.

11. Estimate Of Cost

TABLE 7

ESTIMATE OF COST
COASTAL PROTECTION
(FEBRUARY 1982 PRICE LEVELS)

Description	Quantity	Unit	Unit Price	Amount
08. ROADS - BACKWATER PROTECTION				
Preparation of Site	1	Job	L.S.	$ 17,000
Gravel Fill	1,100	C.Y.	10.00	11,000
Random Fill	10,000	C.Y.	3.00	30,000


CORPS OF ENGINEERS
A
B
C
D
E
E 738000
E 738500
E 739000
N 512500
N 512000
N 511500
N 511000
N 510500
SIMPSON'S PIER
BROAD SOUND
REVERE BEACH PKWY
ELIOT CIRCLE
OCEAN AVE
WINTHROP
BROAD SOUND
DOLPHIN
PARKING AREA
NERIOUS AVE
FOAM AVE
UNDINE AVE
PIERVIEW AVE
WAVE
STATE AVE
JONES
GEORGE
ENDICOTT
ATLANTIC
PKWY
SALES CREEK
BACKWATER PROTECTION
STANDISH RD
ELIOT AVE
POIRIER RD
POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE

D E F G H

E 739000

E 739500

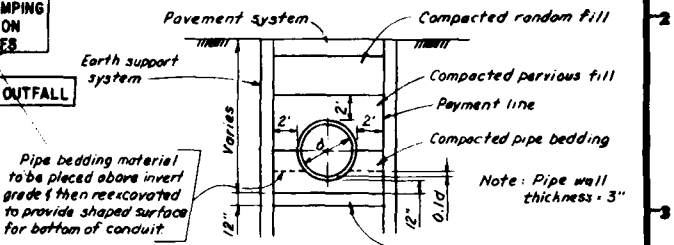
SIMPSON'S PIER

ATLANTIC OCEAN

EXISTING MDC PUMPING STATION

NEW PUMPING STATION 50 CFS

GRAVITY OUTFALL



TYPICAL SUPPORTED TRENCH

POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE

GRAPHIC SCALE
100' 0 100' 200'
0 5' 10'

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INTERIOR DRAINAGE

PLAN A - STRUCTURAL PLAN

PLATE 1

7

TABLE 7 (Cont.)

Description	Quantity	Unit	Unit Price	Amount
Topsoil	50	C.Y.	12.00	600
Seeding	200	S.Y.	1.00	200
Steel Sheet Piling	9,000	S.F.	23.00	207,000
Concrete	300	C.Y.	200.00	60,000
Remove and Replace Curb	3,300	L.F.	10.00	33,000
Bituminous Concrete Pavement	7,600	S.Y.	8.00	60,800
Concrete Sidewalk	400	S.Y.	25.00	10,000
Sub-Total - 08. ROADS - BACKWATER PROTECTION				$429,600
Contingencies (25%)				$107,400
TOTAL - 08. ROADS - BACKWATER PROTECTION				$537,000

10. SHORE PROTECTION

Preparation at Site	1	Job	L.S.	$ 2,000
Excavation General	50,000	C.Y.	5.00	250,000
Armor Stone	59,000	C.Y.	35.00	2,065,000
Underlayer Stone	27,000	C.Y.	30.00	810,000
Bedding Stone	14,300	C.Y.	20.00	286,000
Gravel Bedding	15,500	C.Y.	10.00	155,000
Gravel Fill	6,000	C.Y.	10.00	60,000
Random Fill	1,000	C.Y.	3.00	3,000
Compacted Pervious Fill	4,200	C.Y.	8.00	33,600
Steel Sheet Piling	26,000	S.F.	23.00	598,000
Steel Dowels	1,600	lb.	1.00	1,600
Concrete	100	C.Y.	200.00	20,000
Sub-Total -10. SHORE PROTECTION				$4,284,200
Contingencies (25%)				1,071,050
TOTAL - 10. SHORE PROTECTION				$5,355,250

13. INTERIOR DRAINAGE

Preparation of Site	1	Job	L.S.	$ 1,000
Excavation General	1,000	C.Y.	5.00	5,000
Dewatering Trenches	1	Job	L.S.	55,000
Pipe Bedding	3,000	C.Y.	15.00	45,000
Modify Manholes	1	Job	L.S.	2,500
Manholes	32	ea.	800.00	25,600
Earth Support System	1	Job	L.S.	785,000

TABLE 7 (Cont.)

Description	Quantity	Unit	Unit Price	Amount
36" Pipe	460	L.F.	45.00	20,700
42" Pipe	2,250	L.F.	54.00	121,500
48" Pipe	1,650	L.F.	65.00	107,250
Sluice Gate and Box Conduit	1	Job	L.S.	95,000
Pumping Station	1	Job	L.S.	520,000
Cofferdam	1	Job	L.S.	150,000
Sub-Total -13. INTERIOR DRAINAGE				$1,933,550
Contingencies (25%)				$ 483,400
TOTAL -13. INTERIOR DRAINAGE				$2,416,950

TOTAL ESTIMATED CONSTRUCTION COST	Amount
Backwater Protection	$ 537,000
Shore Protection	5,355,250
Interior Drainage	2,416,950
	$8,309,200
TOTAL ESTIMATED CONSTRUCTION COST	$8,310,000

TOTAL FIRST COST	Amount
Construction Cost	$8,310,000
Engineering and Design (15%)	1,247,000
Supervision and Administration (10%)	831,000
Real Estate	635,000
TOTAL FIRST COST	$11,023,000

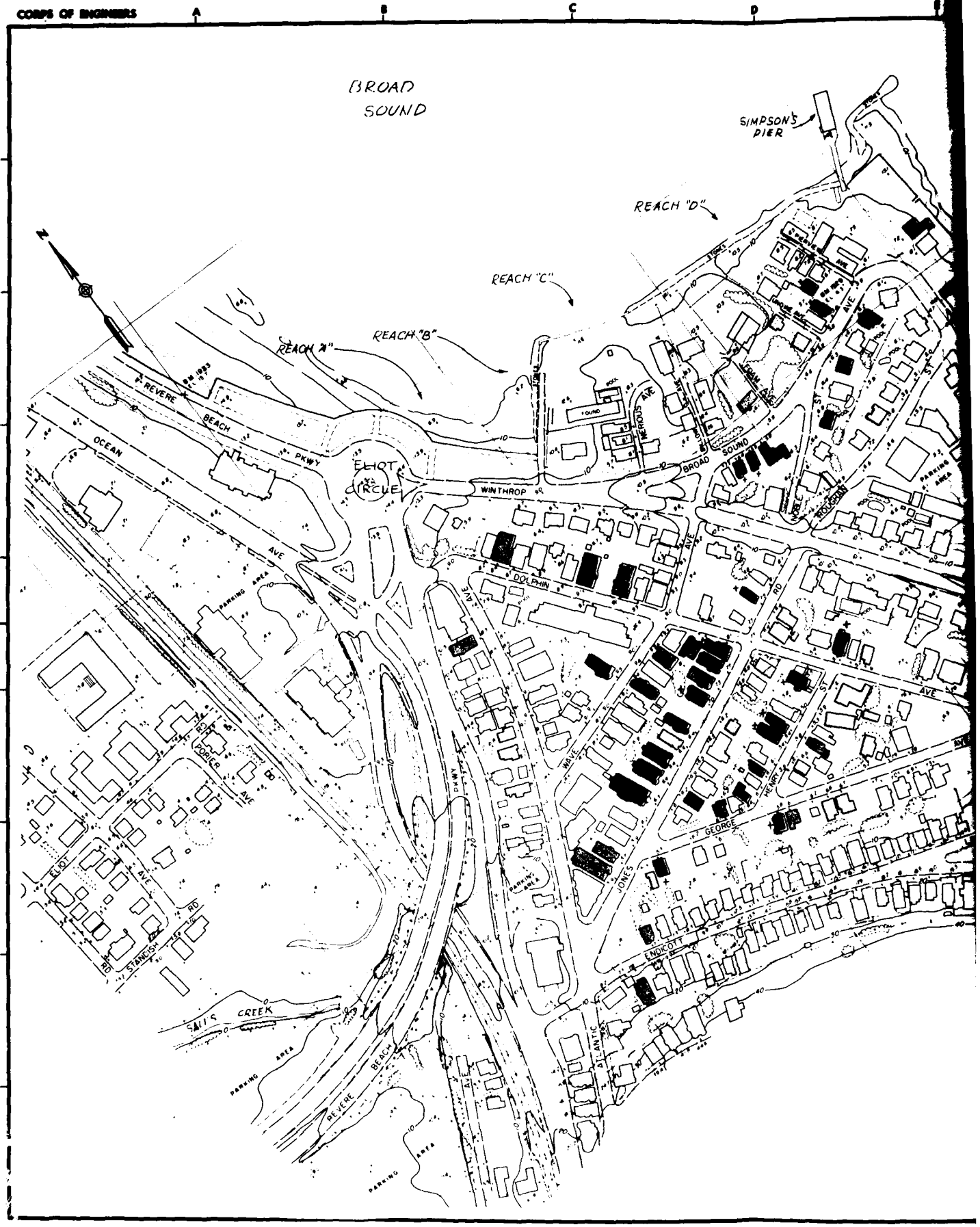
B. NONSTRUCTURAL PLAN

The nonstructural plan provides 100-year protection and consists of construction of utility cells or rooms for certain homes and raising other selected structures. These floodproofing measures along with administrative actions comprise Plan B and are shown on Plate 12.

1. *Floodproofing.*

Utilities can be protected in one of two ways, either by a watertight utility cell or by elevating the utilities in a room above the flood level. Stage 2 efforts identified 60 of the 99 residential structures with first floors below the 100-year flood stage as deserving further analysis for utility cells. Stage 2 also reported that 53 of the 127 homes with first floors above the 100-year flood stage merit Stage 3 investigation for utility rooms.

Up-to-date benefit and cost data were applied to the 60 utility cell and 53 utility room cases. Cells and rooms were found feasible for 24 and


CORPS OF ENGINEERS
A
B
C
D
BROAD SOUND
SIMPSON'S PIER
REACH "D"
REACH "C"
REACH "B"
REACH "A"
N
REVERE BEACH PKWY
OCEAN AVE
ELIOT CIRCLE
WINTHROP
BROAD SOUND
DOLPHIN AVE
PARKING AREA
PORTER RD
ELIOT AVE
STANDISH RD
SAILS CREEK
REVERE BEACH PARKING AREA
PKWY
WEST
HENRY
GEORGE
JONES
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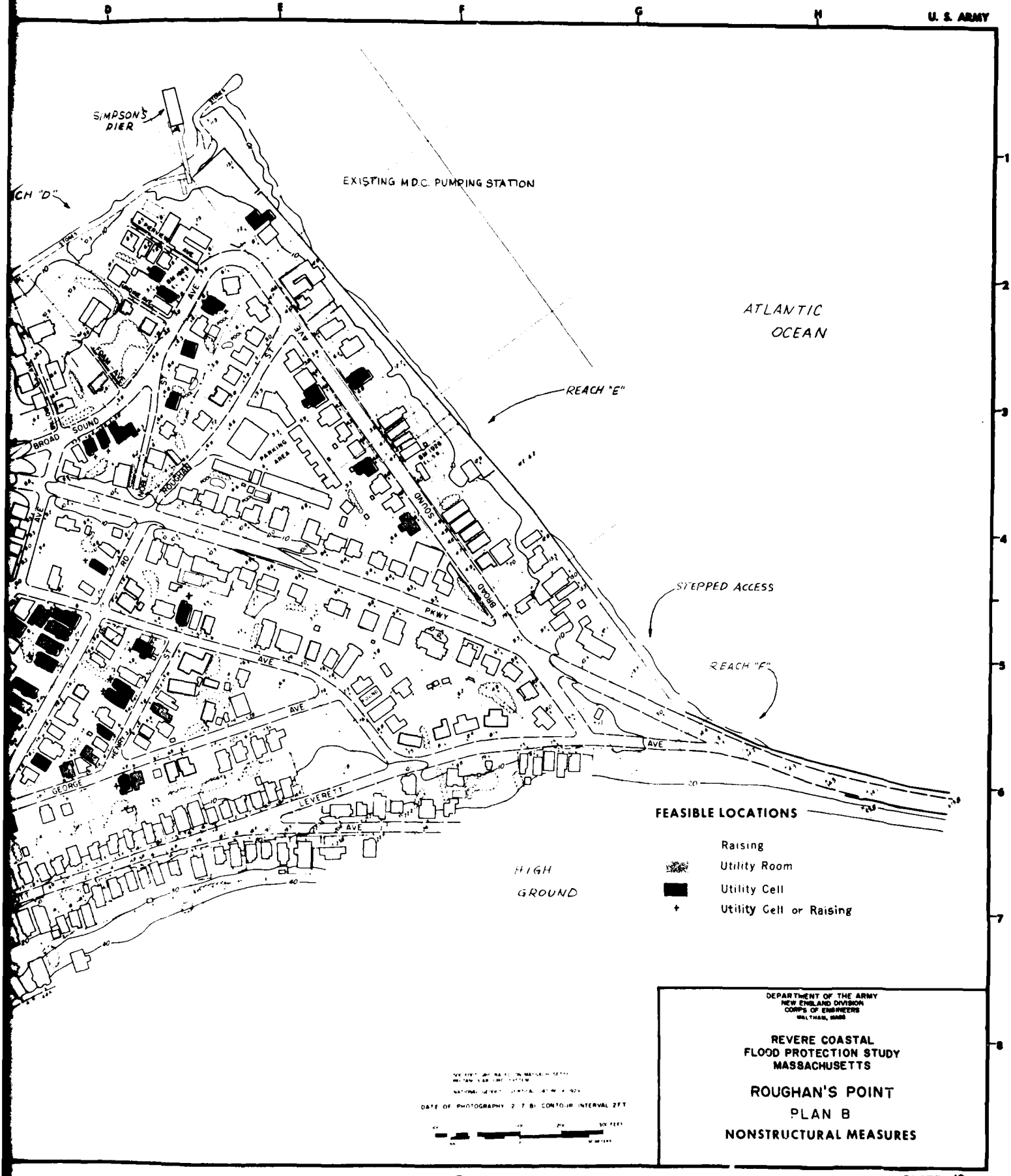
U. S. ARMY
SIMPSON'S PIER
EXISTING M.D.C. PUMPING STATION
REACH "D"
ATLANTIC OCEAN
REACH "E"
STEPPED ACCESS
REACH "F"
BROAD SOUND
ROUGHAN PARKING AREA
PKWY
AVE
GEORGE
LEVERETT
HIGH GROUND
FEASIBLE LOCATIONS
Raising
Utility Room
Utility Cell
Utility Cell or Raising
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHAN'S POINT
PLAN B
NONSTRUCTURAL MEASURES
PLATE 12

21 structures, respectively. Theses are outlined in Table 8 and 9 following. Annual costs reflect ammortization at 7-7/8 percent over a 50-year project life; costs include Engineering and Design (E&D) and Supervision and Administration (S&A), estimated at 15 and 10 percent of the construction cost respectively. Since individual structures are involved, real estate requirements were considered negligible.

Raising of 91 residences, single family or small two family homes with first floors below the 100-year flood stage, were evaluated during Stage 2. Of the 68 recommended for Stage 3 studies, 50 were found potentially economically justified. These are listed in Table 10. Annual costs reflect ammortization at 7-7/8 percent over a 50-year project life. E&D and S&A are considered as they were for utility room and cell analysis. Real Estate needs were considered negligible.

TABLE 8

Plan B
Utility Cell Feasibility
(February 1982 price level)

Address	Annual Benefits ($1000)	Annual Cost ($1000)	BCR
33 Broad Sound Ave.	1.85	1.28	1.45
35 Broad Sound Ave.	1.53	1.28	1.20
70 Broad Sound Ave.	1.71	1.28	1.34
74 Broad Sound Ave.	1.92	1.28	1.50
77 Broad Sound Ave.	1.28	1.28	1.00
133 Broad Sound Ave.	2.87	1.28	2.24
134 Broad Sound Ave.	3.55	1.28	2.77
153 Broad Sound Ave.	1.92	1.28	1.50
30 Dolphin Ave.	2.05	1.28	1.60
83 Dolphin Ave.	2.79	1.28	2.18
92 Dolphin Ave.	2.35	1.28	1.84
5 George Ave.	1.39	1.28	1.09
35 George Ave.	1.95	1.28	1.52
6 Henry St.	1.53	1.28	1.20
18/18A Henry St.	2.32	1.28	1.81
20 Henry St.	2.07	1.28	1.62
32/34 Jones Rd.	1.37	1.28	1.07
40 Jones Rd.	2.62	1.28	2.05
44 Jones Rd.	2.26	1.28	1.77
52 Jones Rd.	1.70	1.28	1.33
58 Jones Rd.	2.35	1.28	1.84
84 Jones Rd.	2.90	1.28	2.27
26 Wave Ave.	2.08	1.28	1.63
27/29 Wave Ave.	1.75	1.28	1.37

TABLE 9

Plan B
Utility Room Feasiblity
(February 1982 Price Level)

Address	Annual Benefits ($1000)	Annual Costs ($1000)	BCR
39/41 Broad Sound Ave.	2.09	0.74	2.82
90 Broad Sound Ave.	1.04	0.74	1.41
171 Broad Sound Ave.	0.74	0.74	1.00
12 Dolphin Ave.	1.08	0.74	1.46
38 Dolphin Ave.	0.92	0.74	1.60
59 Dolphin Ave.	0.74	0.74	1.00
61 Dolphin Ave./ 70 Jones Rd.	2.72	0.74	3.68
9/11 Endicott Ave.	0.98	0.74	1.32
16 Endicott Ave.	0.74	0.74	1.00
22 George Ave.	1.15	0.74	1.55
39 George Ave.	1.44	0.74	1.95
2 Henry St.	1.10	0.74	1.49
21 Henry St.	1.36	0.74	1.84
12 Jones Rd.	4.41	0.74	5.96
14 Jones Rd.	4.47	0.74	6.04
39 Jones Rd.	1.02	0.74	1.38
64 Jones Rd.	1.75	0.74	2.36
66 Jones Rd.	1.25	0.74	1.69
25 Noble St.	0.74	0.74	1.00
37 Noble St.	1.15	0.74	1.55
37 Wave Ave.	1.56	0.74	2.11

TABLE 10

Plan B
House Raising Feasibility
(February 1982 Price Level)

Address	Annual Benefits ($1000)	Annual Costs ($1000)	BCR
104 Atlantic Ave.	1.64	1.59	1.03
114 Atlantic Ave.	1.70	1.54	1.10
118 Atlantic Ave.	1.57	1.54	1.02
30 Broad Sound Ave.	4.69	1.89	4.37
33 Broad Sound Ave.	3.52	1.53	2.30
35 Broad Sound Ave.	3.36	1.53	2.20
36 Broad Sound Ave.	2.67	1.89	1.41
62 Broad Sound Ave.	2.73	1.71	1.60

TABLE 10 (Cont.)

Address	Annual Benefits ($1000)	Annual Costs ($1000)	BCR
70 Broad Sound Ave.	5.64	1.29	4.37
74 Broad Sound Ave.	9.70	1.80	5.39
77 Broad Sound Ave.	3.26	1.74	1.87
106 Broad Sound Ave.	4.79	1.89	2.53
112 Broad Sound Ave.	4.69	2.10	2.23
148/150 Broad Sound Ave.	4.26	1.59	2.68
154 Broad Sound Ave.	5.63	2.27	2.48
170 Broad Sound Ave.	2.94	2.39	1.23
174 Broad Sound Ave.	2.40	1.68	1.43
176 Broad Sound Ave.	3.48	1.89	1.84
188 Broad Sound Ave.	4.55	2.15	2.12
77 Dolphin Ave.	4.24	2.64	1.61
83 Dolphin Ave.	11.90	2.74	4.34
92 Dolphin Ave.	6.44	1.42	4.54
97 Dolphin Ave.	3.79	2.44	1.55
100 Dolphin Ave.	1.78	1.34	1.33
101 Dolphin Ave.	10.35	1.80	5.75
128 Dolphin Ave.	2.97	1.90	1.56
152 Dolphin Ave.	3.11	2.77	1.12
10 Foam Ave.	2.45	1.53	1.60
1A George Ave.	2.45	1.78	1.38
5 George Ave.	4.11	2.01	2.04
35 George Ave.	5.37	1.89	2.84
45 George Ave.	4.64	2.30	2.02
47 George Ave.	3.81	2.30	1.66
58 George Ave.	2.69	1.90	1.42
6 Henry St.	10.68	1.80	5.93
13 Henry St.	2.88	1.33	2.17
18/18A Henry St.	6.42	2.39	2.69
20 Henry St.	4.04	1.59	2.54
25 Henry St.	4.23	2.44	1.73
39 Jones Rd.	2.26	1.64	1.38
48 Jones Rd.	2.09	1.53	1.37
57 Jones Rd.	2.23	1.17	1.91
58 Jones Rd.	10.13	1.66	6.10
84 Jones Rd.	8.82	2.32	3.80
85 Jones Rd.	1.59	1.59	1.00
87 Jones Rd.	2.22	1.59	1.40
48 Leverett Ave.	3.25	2.86	1.14
56 Leverett Ave.	3.14	2.83	1.11
30/30A Roughan St.	1.96	1.83	1.07
12 Undine Ave.	1.66	1.66	1.00

2. Relocation of Goods

Permanent protection of building contents in private homes and commercial/industrial establishments is largely the responsibility of the occupant. In Roughans Point, it is possible to move some of the vulnerable items to high elevations or areas not inundated by floodwaters.

Relocation of goods is a measure which cannot stand alone. It must be coordinated with the flood forecast, warning, and evacuation plan and a technical assistance program. The technical assistance program should be geared to inform residential or industrial occupants of the specific anticipated flood levels at their location and the options available to them.

3. Flood Plain Zoning

The basic objective of flood plain zoning as a flood damage measure is to minimize future flood damage by limiting the types of activities within the flood plain. The costs and benefits of effective land use control in the flood plain can be viewed in various ways. From a national perspective, benefits accrue because a reduction or elimination of flood damages to structures which are built in the flood plain or built differently because of regulation. The expenses are the incremental costs of floodproofed construction on the flood plain or building at a site off the flood plain.

At the present time, Revere does not have a flood plain zoning ordinance. This will change in late 1982 or early 1983 when Revere is scheduled to join the regular phase of the National Flood Insurance Program, which requires land use restrictions in the flood plains of all member communities. Basically, these are:

1. All new residences built in the flood plain will be elevated so that the first habitable floor is above the 100-year flood stage;

2. All new commercial and industrial structures will be floodproofed or elevated above the 100-year flood stages, and

3. New construction resulting in more than a 1-foot rise in the 100-year flood stage will not be permitted.

A key problem with these measures is they only consider flood damages up to the 100-year event. The 100-year elevation criteria of the Flood Insurance Program was adopted by Congress as a minimum standard, but floods of greater magnitudes can occur. For this reason consideration should be given to expanding the flood plain development regulations.

In Roughans Point, the principal development in flood-prone areas would be in filling or development. The majority of the study area is heavily developed with no large tracts of land suitable for future

development. Because of this fact, flood plain zoning will have no significant effect in reducing flood damages in Roughans Point. However, a flood plain zoning ordinance should be implemented to reduce what limited potential for future flood losses exist. The question facing Revere is whether or not it would adopt standards that exceed the National Flood Insurance Program's minimum requirements in order to insure that future development does not sustain significant flood damages.

The value of the National Flood Insurance Program as a flood damage reduction measure is twofold. First, the program provides a mechanism for individual property owners to recover their losses to a greater extent than available prior to the program. Although insurance does not cover all possible losses, it does cover damage to household contents and personal possessions to a much greater degree than disaster relief, thus reducing the financial impact on the victims of the flood. An attitude survey performed by the Corps of Engineers showed approximately 85% of the flood plain property owners had found flood insurance to be an attractive way to recoup flood losses. Total coverage in Revere currently is over $55 million with 1320 flood insurance policies in effect.

It must be noted that a large number of these policies were taken out after the flood in February 1978, the record event. A summary of the National Flood Insurance Program's involvement in Revere is given below.

TABLE 11

National Flood Insurance Program
Paid Claims for Revere, Massachusetts
As of April 30, 1981

Year	Number	Amount
1974	54	$ 43,666
1975	1	478
1976	7	7,387
1977	18	30,280
1978	281	2,526,729
1979	451	1,315,614
1980	7	7,297

The program's other value is its reduction of the potential for additional future losses. This is accomplished by requiring participating communities to establish land use controls on future development in areas vulnerable to the 100-year flood.

The Flood Insurance Program will be implemented regardless of this study. However, there is a need to improve flood plain residents' understanding so they will be fully aware of the program and better able to decide whether or not to purchase insurance.

4. Flood Forecast, Warning, and Evacuation

The city of Revere, at the present time, does not have a structured flood warning and evacuation plan. The city does have an Emergency Operational Plan which was designed to provide general guidance for necessary actions during a disaster. However, the plan does not address specific actions to be taken during a flood episode. Early recognition and warning of a potential flood episode can save lives and property if proper actions are taken.

The only method of warning residents is the Revere Audible warning system, designed to warn of a possible military attack through a series of sirens. This system does not alert the public concerning the type of emergency or provide any guidance and instruction for the particular action. A provision should be added to the plan to allow for localized warning of residents in flood-prone areas either by house to house visits or by police cars patrolling the area. These areas should include not only those that will be flooded but also the evacuation routes.

Once the flood warning has been disseminated, residents should be given specific information on:

1. The seriousness of the expected flooding;

2. The actions currently being taken;

3. The actions they should take; and,

4. What the process will be, should evacuation become necessary.

Accomplishing the evacuation as smoothly as possible requires that specific routes and tight coordination between city departments is established. It is also necessary to insure that evacuees be provided with adequate food and shelter during the emergency. The shelters should have ample capacity, proximity to the areas so they can be reached quickly, and accessibility along routes that are safe from flooding.

The existing plan addresses the need for the maintenance of these vital services. However, it does not contain specific information with regard to the actual process of maintaining these services.

In summary, Revere's emergency operations plan can be expanded, with minimal effort, to include:

- Development of a flood warning system

- Determination of safe evacuation routes

- Provisions of adequate emergency shelters

. Methods to provide vital services

Including these items in the existing plans will make them more effective in reducing potential flood damages. The cost of implementing these techniques is relatively small, consisting primarily of administrative expenses.

5. Summary

Limited nonstructural flood damage reduction measures appear feasible in Roughans Point. Measures such as raising and construction of utility cells and rooms are economically and physically implementable for a select number of structures. Small walls and closures were ruled out as not practical.

A breakdown of the feasibility and total cost of each measure, if totally implementable, is provided in Table 12 below. There are 14 structures for which both utility cells or raising are justified. Eighty-one homes are provided physical protection under this plan.

TABLE 12

Nonstructural Cost Estimate
(February 1982 Price Level)

Measure	Feasible Number of Structures	Total First Cost
Utility Cells	24*	$ 159,000
Utility Rooms	21	220,000
House Raising	50	1,204,000
Total Protected	81*	$1,583,000

*14 homes are feasible for both utility cells and house raising. For analysis of total investment, only house raising costs were considered for those structures.

6. Impacts

The nonstructural analysis for Roughans Point yielded many structures which can be offered 100-year protection. The area will continue, however, to be subject to deep flooding. Protection of these properties will significantly reduce the impacts of flooding to those whose home is included. Other residents must still be evacuated when the area is inundated. A negative impact will temporarily exist during implementation of these measures.

Implementation of any nonstructural measure is not anticipated to have major negative environmental impacts. No actions will be taken to alter the existing conditions along the shoreline, resulting in no adverse environmental impact there.

7. Implementation

Nonstructural measures for selected homes in Roughans Point can be implemented with Federal involvement, although local participation will be necessary also. As a matter of policy, the local share of costs for non-structural measures is 20 percent of the first cost, with Federal interests contributing the remaining 80 percent to the project. As is the case with structural projects, operation and maintenance are the responsibility of local interests.

Improving the flood forecast, warning and evacuation plan by Revere will require technical assistance from a number of sources during the initial implementation. Revere and its residents should maintain familiarity with this program especially if there is a long interval between flooding episodes.

Finally, Revere will join the regular phase of the National Flood Insurance Program in the near future, thus, the city will implement flood plain zoning. The city may want to implement zoning ordinances more restrictive than required by the NFIP, but these ordinances must be enforced if they are to effectively control development in the flood plain.

8. Public Views

As attitude survey performed in the Roughans Point area during Stage 2 showed structural measures to be favored more than nonstructural measures. Respondents in favor of the nonstructural measures greatly outnumbered those opposed. The public agrees that the neighborhood should be protected and future development controlled to limit future damage potential. However, public involvement during Stage 3 indicated that a high degree of protection is of paramount concern. The depths of flooding at Roughans Point are so severe that many non-structural measures are impractical to implement and unacceptable.

SECTION V

PLAN IMPLEMENTATION

SECTION V
PLAN IMPLEMENTATION

A. ECONOMICS

1. Costs. Construction costs are based on February 1982 price levels and an interest rate of 7-7/8 percent. The costs, as presented, are considered conservative. The proportion allotted for contingencies and postfeasibility engineering is cautious. This proportion will be refined as project design is finalized after Congressional authorization during Continuation of Planning and Engineering (CP&E). In addition, a 50-year amortization period was used in plan evaluation. Application of a 100-year period would lower annual charges.

In addition, recent guidance requires that Interest During Construction (IDC) need not be included in investment costs. The estimated construction time for both plans is two years. Operation and maintenance (O&M) costs of the structural plan are estimated at $13,000, annually. This is about 1.5 percent of the total first cost amortized over the life of the project. Real estate items total $635,000. O&M charges for nonstructural measures are considered negligible.

Tables 13 and 14 present a summary of project investment reflecting consideration of the current interest rate of 7-7/8 percent and interest during construction.

TABLE 13

ESTIMATED TOTAL INVESTMENT
(February 1982 Price Level)

	Structural Plan	Nonstructural Plan
Construction	$ 6,647,350	$ 1,013,000
Contingencies (25%)	1,662,650	253,000
SUBTOTAL	$ 8,310,000	$ 1,266,000
Engineering and Design (15%)	$ 1,247,000	$ 190,000
Supervision and Administration (10%)	831,000	$ 127,000
Real Estate	635,000	-
TOTAL FIRST COST	$11,023,000	$ 1,583,000
Interest During Construction	998,000	127,000
TOTAL INVESTMENT	$12,021,000	$ 1,710,000

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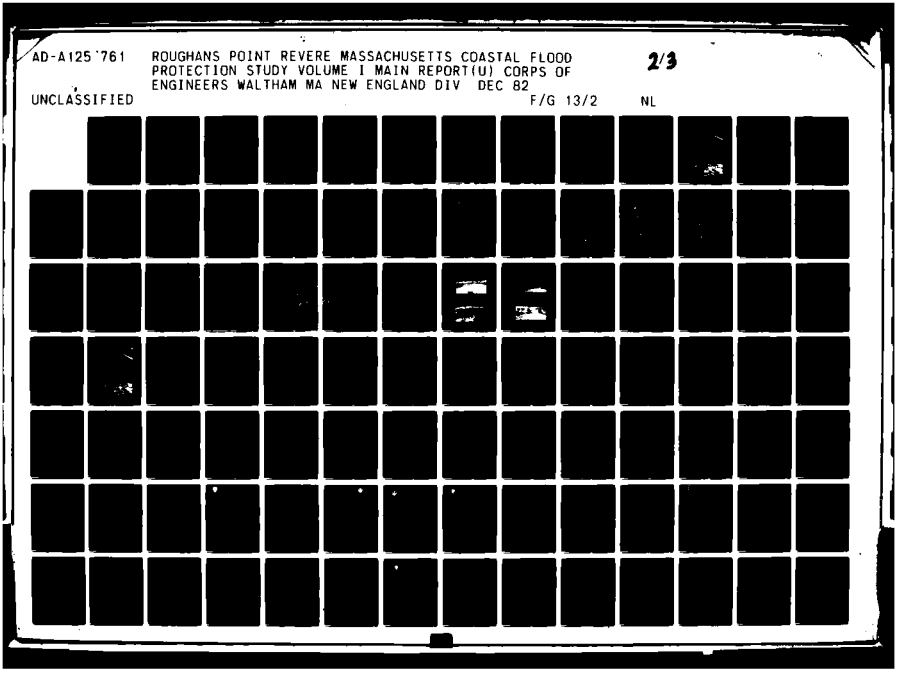

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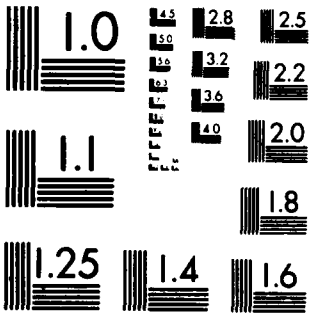


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

TABLE 14

ESTIMATED ANNUAL COSTS
(February 1982 Price Level)

	Structural Plan	Nonstructural Plan
Interest and Amortization (7-7/8%, 50 years)	$968,500	$138,000
Operation and Maintenance	13,000	-
TOTAL ANNUAL COST	$981,500	$138,000

2. Benefits. Flood control benefits from implementation of protective measures are derived from losses prevented. These benefits include flood inundation, affluence, emergency expenses, insurance administration and other intangibles.

Flood inundation costs are separated into two types - physical and nonphysical. Physical losses include the expected damage to structures and their contents. Nonphysical losses take into account such items as loss of work and costs of temporary housing and food.

Affluence benefits are based on the idea that as real per capita income increases, the real value of residential contents will increase. As contents' values grow the potential dollar amount of damages grows.

Emergency costs are defined as expenditures which result from emergency activities prior to, during, and after a flood. Emergency costs include expenses for flood emergency centers, communication facilities not otherwise needed, temporary evacuation assistance, flood fighting materials and personnel, additional police and fire protection, and public clean-up.

A national cost for the flood insurance program is its administrative costs. The cost of servicing flood insurance policies is determined based upon the average cost per policy, including agent's commission, and the cost of servicing and adjusting claims. This benefit is considered for all structures eligible for flood insurance.

In addition to those previously described, intangible benefits would accrue if the project is implemented. These benefits include a reduction in health hazards caused by polluted floodwaters and a potential improvement in the social and economic well-being of residents and economic activities in the area. The threat of flooding would be eliminated.

Table 15 shows a summary of estimated annual benefits from implementation of the recommended plan. Those attributable to affluence reflect the current interest rate of 7-7/8 percent.

TABLE 15

ESTIMATED ANNUAL BENEFITS
(February 1982 Price Levels)

	Structural Plan	Nonstructural Plan
Flood Inundation Reduction	$ 972,000	$ 275,000
Affluence	39,000	-
Emergency	74,000	-
Insurance Administration	12,000	3,000
TOTAL	$1,097,000	$ 278,000

3. Justification. The Benefit-to-Cost Ratio (BCR) indicates whether or not a project is economically justified. This comparison is done on an annual basis. The total estimated annual benefits are shown above for both plans. The total estimated annual costs are presented in Table 14. The BCR's are 1.12 and 2.01 for the structural and nonstructural plans respectively. Both projects are economically justified. That is, the benefits outweigh the costs of implementation. It is noted here that evaluation of project justification using 100-year economic life, in lieu of the 50-year life applied herein, results in BCR's of 1.14 and 2.06 for the structural and nonstructural plans respectively.

B. INSTITUTIONAL REQUIREMENTS

1. Cost Allocation. All measures considered are single purpose flood control, thus, all costs for these measures are allocated to flood control.

2. Cost Apportionment. General legislation authorizing implementation of water resource projects, the most recent being the Water Resources Development Act of 1976, generally contained local cooperation requirements established by enactment of various laws. This report contains information based upon application of these traditional requirements. The Administration is reviewing project cost sharing and financing across the entire spectrum of water resource development functions and has proposed a revised policy. The basic principle governing the development of specific cost-sharing policies is that whenever possible the cost of services produced by water projects should be paid for by their direct beneficiaries. It also is recognized that the Federal Government can no longer bear the major portion of the financing of water projects.

New sources of project financing, both public and private, will have to be found. While specific policies applicable to the Roughans Point project have not yet been established, non-Federal interests can expect that, under the Administration's financing and cost-sharing principles, the level of their financial participation will need to be significantly greater than in the past.

It has been traditional Corps policy for structural protection to recommend the Federal share be limited to a maximum of 70 percent. Nonstructural protection is shared at up to an 80 percent Federal share. Acquisition of necessary lands, easements, and rights-of-way are credited toward the minimum non-Federal share. Operation and maintenace of the project are non-Federal responsibilities.

The Federal and non-Federal share for each plan follow. All costs are February 1982 price level.

TABLE 16

Cost Apportionment

Interest	Structural Plan	Nonstructural Plan
Federal	$ 7,716,000	$1,266,000
Non-Federal	3,307,000	317,000
Total First Cost	$11,023,000	$1,593,000

C. RESPONSIBILITIES

1. Federal. The Federal Government would design and prepare detailed plans, construct the project, and share in the cost of the proposed project as set forth above. Construction would be contingent on Congressional authorization and funding and on the receipt of the non-Federal share of the total project cost.

2. Non-Federal. Formal assurances of local cooperation must be furnished by the city of Revere. The local sponsor must agree to:

a. Contribute in cash the local share of project construction cost.

b. Provide without cost to the United States, all necessary lands, easements, rights-of-way, and relocations required for construction of the project.

c. Hold and save the United States free from claims for damages which may result from construction and subsequent maintenance of the project, except damages due to the fault or negligence of the United States or its contractors.

d. Assure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based during the economic life of the project.

e. Assure maintenance and repair during the useful life of the works as required to serve the project's intended purpose.

f. Provide and maintain necessary access roads, parking areas and other public use facilities open and available to all on equal terms.

D. SELECTION

The public involvement program has been coordinated throughout the study with local and state interests. Workshop meetings with the residents along with a social survey conducted last year have provided valuable input in the evaluation of alternative plans.

Survey responses regarding alternative flood damage reduction measures by Roughans Point residents indicate:

. Primarily structural measures were preferred by more than 90 percent of the respondents.

. With the exception of the "purchase and clearance of buildings" alternative, more than two-thirds of respondents endorse community-applied nonstructural measures.

. A majority of respondents might individually implement a nonstructural flood damage reduction measure if necessary.

. Ten percent think nothing should be done.

Interpretation of the survey results indicated that residents of Roughans Point want and need flood protection as soon as possible. Structural approaches were particularly favored. Apparently, respondents are more comfortable and supportive of these types of solutions to their flood problems.

The community-applied flood damage reduction measures are generally endorsed by respondents, particularly the development of a flood-warning and evacuation plan. Although such a plan is apparently in-place, it would be productive to communicate details of the plan to residents.

The higher percentage of survey respondents (75 percent) in favor of increasing flood insurance coverage is interesting because so many people were covered prior to the '78 flood and received some reimbursement. This result can be interpreted as dissatisfaction with the existing level of coverage. However, given the frequency of flooding at Roughans Point, complete coverage without controls might be considered to be an inducement for continued losses. Indeed, an equal percentage of respondents seems to have accepted the need to regulate land use and future development through local government action.

Attendees at workshops held during Stage 3 again reinforced their preference for structural flood protection. A high degree of confidence is desired in the level of protection to be provided. Although many residents have implemented and endorse nonstructural measures on their own, they feel that a comprehensive solution is still more desirable.

The non-Federal sponsors endorse the structural plan for recommendation and has indicated the willingness to enter into an agreement regarding the terms of local cooperation. Letters of endorsement signed by local residents were received by NED. In this correspondence, the Corps was urged to pursue whatever actions necessary to expedite the process. The structural plan was specifically supported.

E. PROCEDURE

This interim report was submitted in draft form to the Office of the Chief of Engineers (COE) and public agencies for review and comment. When the Division Engineer issues the public notice announcing his final study recommendations, he sends the report document and supporting papers to the Board of Engineers for Rivers and Harbors (BERH). The Board reviews the report and comments received in response to the noice and sends its recommendations to the Chief of Engineers who solicits formal review and comment by the Governor and interested Federal and State agencies.

Following the State and interagency review and after receipt of comments of the Office of Management and Budget regarding the relationship of the project to the program of the President, the final report of the Chief of Engineers will be forwarded by the Secretary of the Army to Congress.

If all reviews find the project to be favorable, Congressional authorization of the proposed project will be required and the report will be submitted to the appropriate Congressional committee for consideration. Congressional procedure normally includes review and hearing by the Public Works Committees and authorization by inclusion in a Water Resources Development Act. Presidential approval of this act concludes the authorizing actions.

When Congress appropriates the necessary funds, detailed engineering and design will begin. Plans, specifications, and detailed estimates will be completed prior to advertising for bids and awarding a construction contract.

Once the construction funds are appropriated, local interests will be called upon to satisfy the requirements of local cooperation, including execution of a contract stating the local cooperation requirements and their legal and financial capability to provide them. After all necessary lands have been furnished, relocations completed and any necessary cash contributions furnished, a construction contract will be awarded and the project will be carried to completion.

SECTION VI

RECOMMENDATIONS

SECTION VI
RECOMMENDATIONS

Analysis of alternative flood damage reduction measures during Stage 3 investigations for Roughans Point in Revere indicate that protection is feasibile, both technically and economically, and socially acceptable. Below are concise statements relating some of the conclusions developed during the study:

A. EXISTING CONDITIONS

- Serious threat of flooding with potential damage in the millions of dollars. Roughans Point residents suffer $1.0 million in flood losses on an annual basis. A recurrence of the "Great Blizzard of 1978," a 100-year event, would result in losses of $11.0 million to 301 structures.

- Many homeowners have taken it upon themselves to initiate flood-proofing techniques using their own and any other available financing.

- Public desire measures offering a high degree of protection.

B. WITHOUT CONDITION

- Roughans Point is expected to remain the stable neighborhood it already is. Growth is expected to be insignificant due to the lack of available developable land.

- The threat of flooding and its associated damages will continue to exist.

- Any reduction in potential flood losses resulting from nonstructural measures taken by individual homeowners is not anticipated to be significant.

- The city of Revere's plans for the Beachmont Section, which includes Roughans Point, calls for the construction of two elderly-apartment complexes and an upgrading of existing recreational facilities. These would not, however, increase the flood losses in the study area.

C. ALTERNATIVES

Two alternatives from the five surviving Stage 2 were investigated in detail. They are primarily structural and nonstructural plans. The structural plan offers a high degree of protection and eliminates severe flooding. The nonstructural plan provides protection to only a portion of those suffering flood damage and does not reduce the flood threat. When presented to the public, the structural plan was supported and accepted for recommendation. This selection has been endorsed by the Commonwealth of Massachusetts, city of Revere and the Citizen's Workshop Committee.

D. IMPACTS

TABLE 17

Comparative Impacts

Resource Evaluated	Structural Plan	Nonstructural Plan	No Action
Vegetation	Slight impact during Construction	Minimal impact.	No impact.
Fisheries	Temporary turbidity during construction only.	No impact.	No impact.
Shellfish	Loss of less than one-acre of clam flat.	No impact.	No impact.
Recreation	Minimal loss of shore-front beach and shore-line access.	No impact.	No impact.
Aesthetics	Rock slope revetment will alter character of shoreline. Increase of structure height in some areas will restrict ocean views.	Elevating structures or floodproofing will alter physical character of some areas.	No impact.
Flood Protection	Protection of 55 acres, acres, including 291 homes.	Limited protection of 81 structures.	No protection.
Historical Sites	Survey may be required.	No impact.	No impact.

E. RECOMMENDATIONS

I have considered all significant aspects in the overall public interest including environmental, social, and economic effects and engineering feasibility in concluding that the structural plan of protection described herein is the best implementable alternative meeting the objectives of this investigation.

This plan involves a rugged berm, sloping seaward 1 vertical on 3 horizontal, along the Roughans Point shore. Additional features include interior drainage provisions and a new pumping station with an auxiliary power source. Two road intersections would also be raised to prevent backwater flooding. The plan provides 500-year protection to over 300

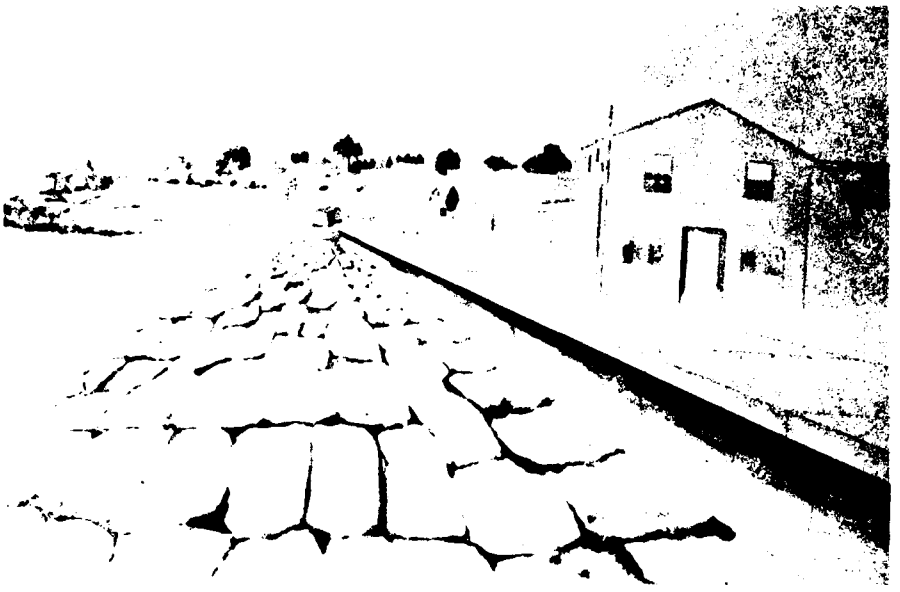
structures in the flood plain. The project would prevent 97 percent of the potential damages.

I recommend this structural plan of coastal flood protection with such modifications thereof as in the discretion of the Chief of Engineers may be advisable. The estimated total first cost and annual operation and maintenance costs of the structural plan are $11,023,000 and $13,000, respectively.

I recommend construction authorization of the Roughans Point project in Revere, Massachusetts, subject to cost sharing and financing arrangements with the responsible non-Federal agencies sponsoring the project which are satisfactory to the President and Congress. The non-Federal sponsors shall, prior to implementation, in addition to the general requirements of law for this type project, furnish assurances satisfactory to the Secretary of the Army that they agree to comply with the required items of local responsibility listed previously.

15 Dec '82
DATE

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer



ARTIST'S RENDITION
STRUCTURAL PLAN - EASTERN SHORE

ARTIST'S RENDITION
STRUCTURAL PLAN - NORTHERN SHORE

SECTION VII

ENVIRONMENTAL ASSESSMENT

ROUGHANS POINT

COASTAL FLOOD PROTECTION STUDY

REVERE, MASSACHUSETTS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

TABLE OF CONTENTS

LIST OF FIGURES

I. NEED FOR ACTION

A. Project Description

The coastal flood protection study for Roughans Point area of Revere, Massachusetts has evaluated numerous alternative plans for providing reduction or prevention of recurring flood damages. Roughans Point is a low lying shorefront residential section of the city of Revere. Revere is located 5 miles north of downtown Boston, on the Massachusetts coast (See Figure EA-1). Roughans Point is located at the southern end of the 3-mile-long Revere Beach, a popular public recreation facility owned and maintained by the Metropolitan District Commission (MDC). The Roughans Point neighborhood includes approximately 55 acres located no higher than 10 feet above mean sea level. Because of its low lying coastal location, Roughans Point is subject to flooding by coastal storms. Flooding is particularly severe when northeast winds combine with storm driven high tides to produce wave overtopping of existing seawalls and subsequent flooding of inland areas. Recent severe flooding occurred in December 1959, February 1972 and most recently in February 1978, during the "Blizzard of '78".

Existing protection includes a concrete seawall from Simpson's pier south, with a top elevation of about 17 feet above National Geodetic Vertical Datum (NGVD). West of Simpson's Pier, shoreline protection is only provided by a stone dike with a top elevation of 10 to 12 feet NGVD. At Eliot Circle another seawall rises to 15.3 feet. Existing flooding results primarily from storm-driven high tides and accompanying waves which overtop these structures. Tidal fluctuations on the Revere coast are normally about 9 feet. With strong northeast winds, tides can increase 2 to 4 feet above average high tide elevation. Flooding is compounded by inadequate pumping facilities to handle seawater trapped behind the existing walls and dikes along the shorefront.

Flood damage reduction measures which have been studied included various types of new or modified seawalls, walls with rock slope protection, an offshore breakwater and nonstructural measures such as raising buildings, floodproofing, and permanent evacuation.

B. Authorization

A comprehensive study of southeastern New England (SENE) for the purpose of investigating the need for water resource improvements for flood control, navigation and related purposes was initiated under the authority of the Water Resources Planning Act of 1965 and a resolution adopted by the Committee on Public Works of the U.S. Senate in 1969. The resulting study completed in 1975 identified the critical need for flood prevention.

Following the February 1978 storm, a detailed study of the Revere area was initiated under the special continuing authority of Section 205 of the 1948 Flood Control Act. Because of Federal funding limitations specified in the act, no flood control projects could be recommended under the Section 205 authority.

In 1980, further study of the Revere coastal flooding area was begun under the existing authorization of the 1969 U.S. Senate resolution. This assessment addresses the Roughans Point section of this study, an area which suffers most critically from recurring flooding.

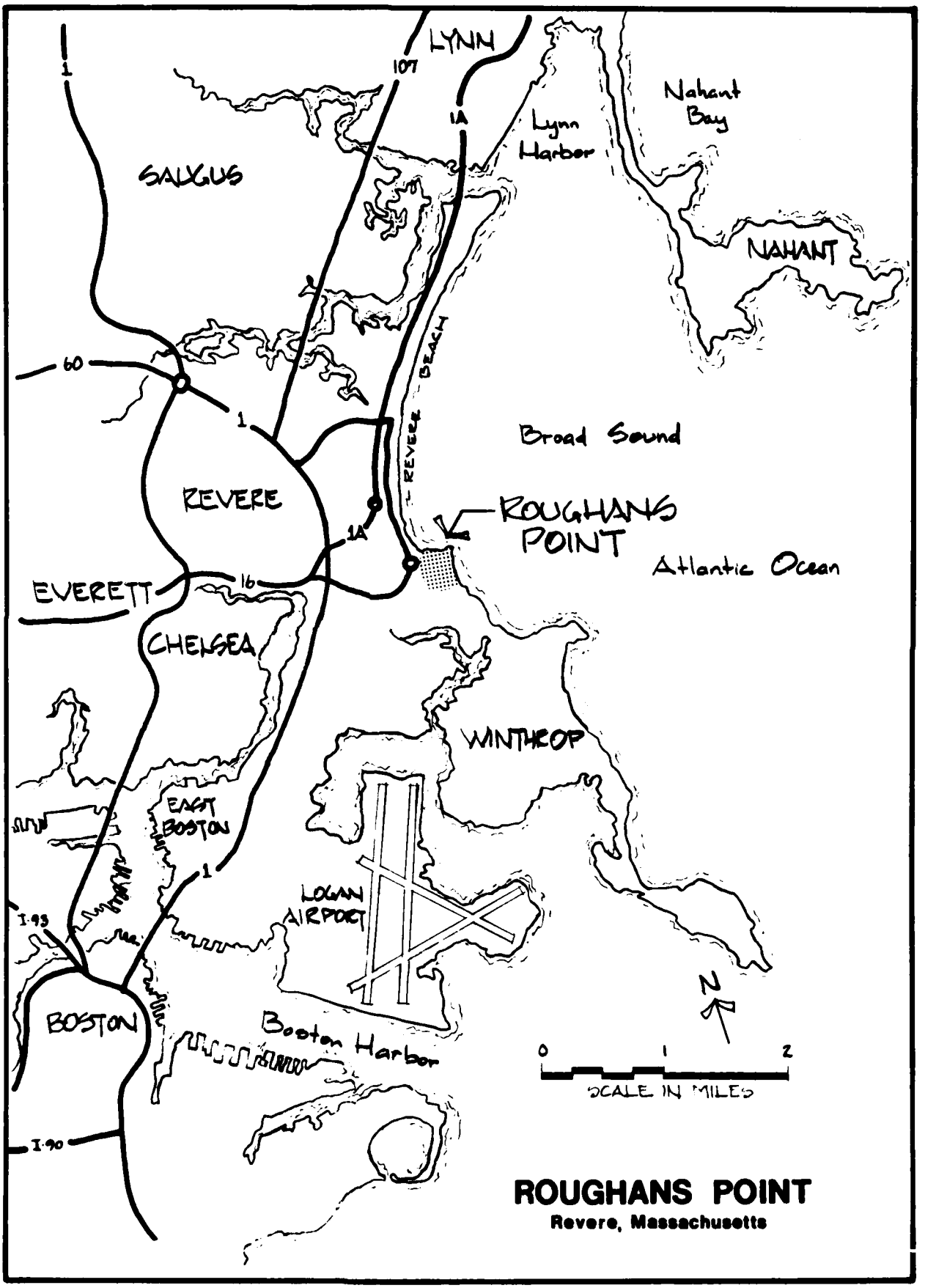

LYNN
107
1A
Lynn Harbor
Nahant Bay
SALUGUS
NAHANT
60
1
REVERE BEACH
Broad Sound
REVERE
ROUGHANS POINT
1A
Atlantic Ocean
EVERETT
16
CHELSEA
WINTHROP
EAST BOSTON
1
I-93
LOGAN AIRPORT
BOSTON
Boston Harbor
I-90
N
0
1
2
SCALE IN MILES
ROUGHANS POINT
Revere, Massachusetts

Figure EA-1

II. ALTERNATIVES

A. Structural Plan

The structural plan provides for 500-year protection by stabilizing the existing structures and raising the vertical height of structures to a contiguous elevation of at least 17.0 ft NGVD. The plan also provides for backwater protection by elevating existing ground features and constructing I-wall sections along the low lying areas of the westerly limits of the project area. Interior runoff will be controlled by an improved interior drainage system and an additional pumping station.

The existing coastal structures will be stabilized with a riprap revetment type berm consisting of several layers of stone and gravel fill with a 5-foot-wide crest, at el. 14.0 ft NGVD, and a 1 on 3 seaward slope. The existing wall along Reach A will be raised to el. 17.0 ft NGVD by adding 1.7 feet of reinforced concrete anchored with drilled dowels. Reaches E and F are already at, or above, el. 17.0 ft NGVD. In Reaches B, C, and D, the revetment crest and the top of the steel sheet pile cutoff wall will be raised to el. 17.0 ft NGVD. This system is shown in plan and profile in the following figures.

To prevent flanking of the coastal flood protection works by backwater entering from Boston Harbor, up Sales Creek sections of roadway, namely the intersection of Bennington Street and State Road with Endicott Avenue, and the intersection of Revere Beach Parkway and Ocean Avenue, will be raised to el. 12.0 ft NGVD. Construction of I-wall sections, also with top elevation of 12.0 ft NGVD, will complete the closure along the westerly bounds of the project area.

The improved interior drainage system will consist of a 42" trunkline stepping up to a 48" line before connecting to the existing MDC pump station. Another 50 cfs pump station will be constructed to assist in times of intense runoff. The trunkline will have surface inlets and will serve as a main outlet for existing feeder drains with ultimate discharge at either Sales Creek (equipped with a flap gate) or, in times of intense runoff, the pumping stations along Broad Sound Avenue. A diesel generator in the additional pumping station will provide emergency power supplementing existing sources. The interior drainage is depicted on Figure EA-9.

B. Nonstructural Plan

The nonstructural plan would consist of floodproofing measures to protect structures and their contents against the 100 year event. Raising existing homes and constructing utility cells and rooms will provide protection for 81 structures shown in Figure EA-10. Other nonstructural measures will include the implementation of an early warning and evacuation plan and public awareness programs with regards to flood insurance and floodplain management.

III. AFFECTED ENVIRONMENT

A. General

The project study area in Revere extends from the Eliot Circle rotary at the southern end of Revere Beach on the north, to the intersection of Winthrop Parkway and Leverett Avenue on the south, and from the coastal shoreline to the upland of Beachmont to the south (see Figure EA-1).

Roughans Point is a low lying point of land extending seaward from a glacial drumlin called Beachmont, which rises 100 feet above the shoreline. The point is underlain by glacial clay and till. A thick layer of peat under surface fill material indicates that much of the area was once salt marsh. The entire point has now been altered by residential development and construction of seawalls and rock berms along the shoreline.

B. Fisheries

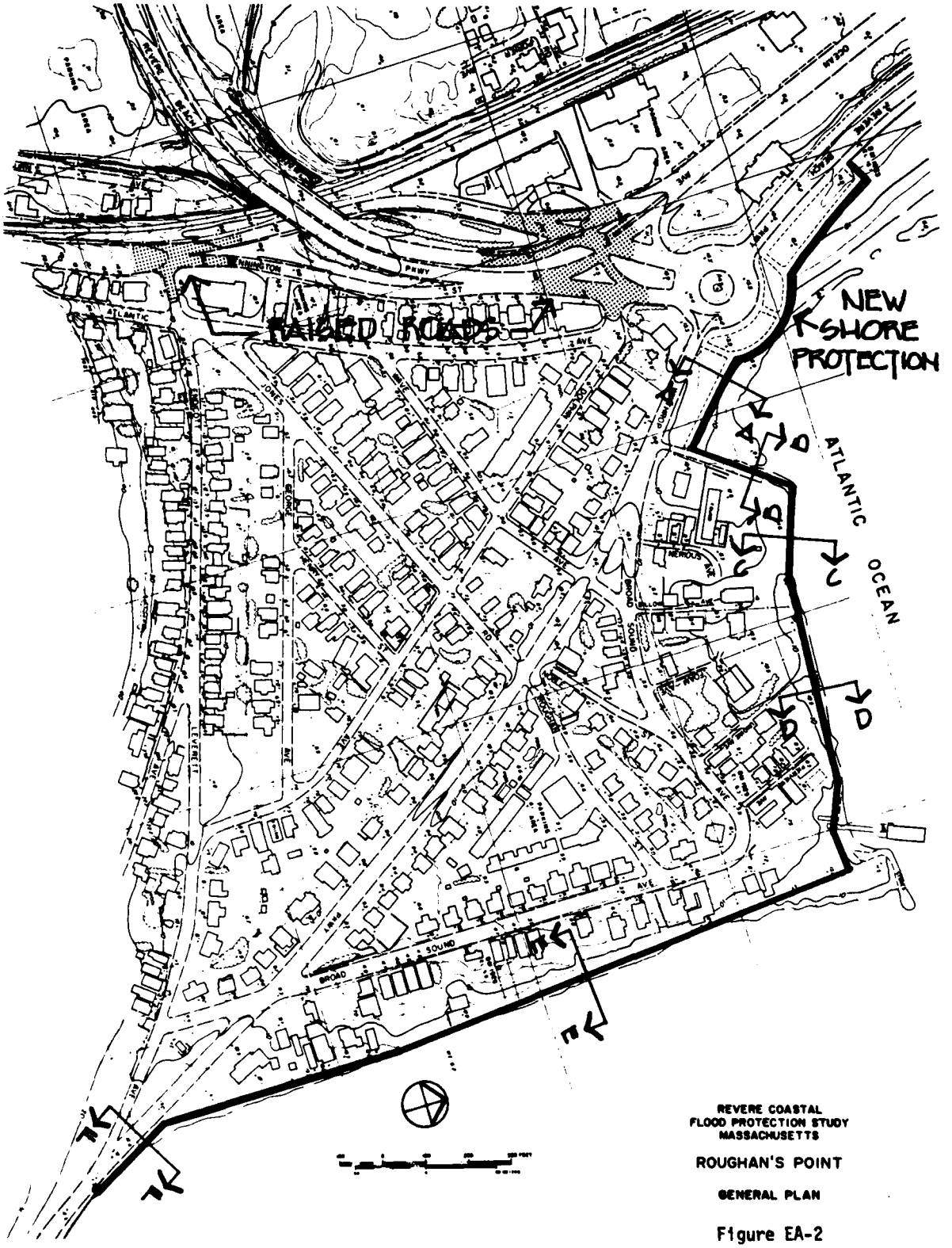
The Revere Beach area, from Roughans Point to Lynn, and Saugus and Pine Rivers have historically been popular fishing areas. Indians once fished here for abundant salmon, trout, alewives and bass. Early colonists established commerical fishing for bass, herring and cod. By the nineteenth century, commercial fishing in the area expanded to include haddock, mackerel, cunner and eels. The area still supports popular sport fishing.

C. Shellfish

The Lynn-Saugus Harbor area, including Revere, the Saugus and Pines Rivers, and Nahant, contains approximately 440 acres of productive soft shell clam habitat, or clam flats (see Figure EA-11). This area was the primary source for soft shell clams in the early twentieth century, but increasing pollution resulted in harvest restrictions in most of the area by 1926. Only the waters and tidal flats of the Pines River, including Diamond Creek, lying northwesterly of Route 107, remain open to shellfish harvest.

The offshore area of Roughans Point, called Cherry Island Bar (see Figure 14), includes approximately 30 acres of clam flat. Due to water pollution, the flat is classified as grossly contaminated, and is closed to harvesting of shellfish.

A survey of the flat on 1 March 1982 conducted by Rusty Iwanowicz, Massachusetts Division of Marine Fisheries, concluded that the shoreline area that would be impacted by the structural plan is primarily composed of large boulders and gravel, a poor substrate habitat for shellfish (see Figures EA-12 & EA-13). The more suitable sand and mud areas are mostly farther offshore. The surface of the flats south of the existing breakwater is highly rippled at low tide, indicating a high energy wave

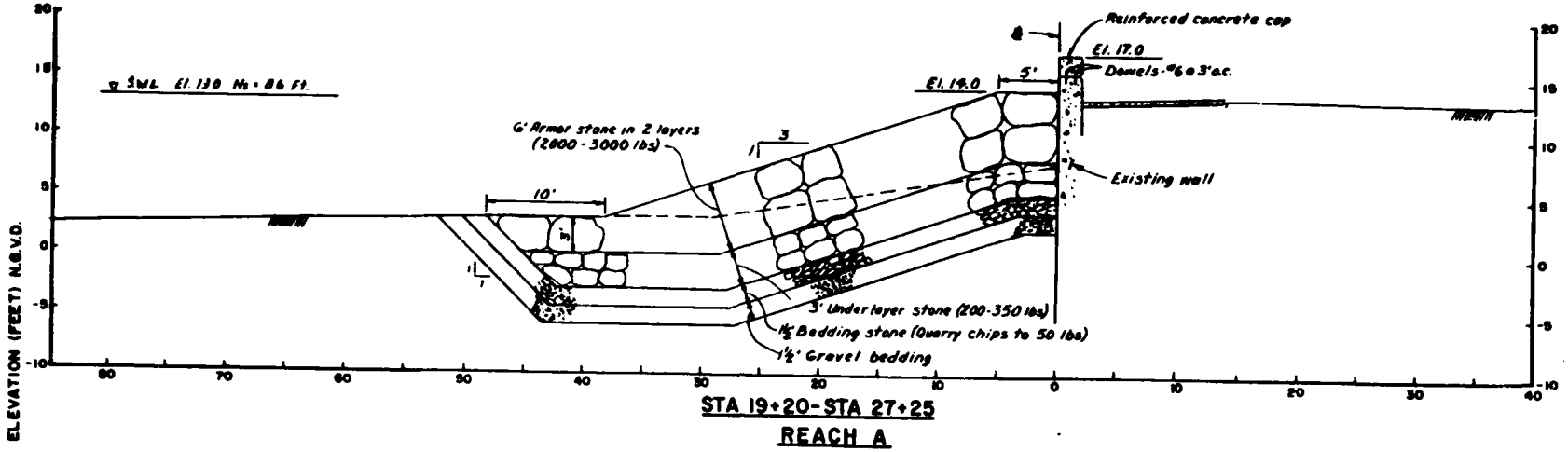


REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHAN'S POINT

GENERAL PLAN

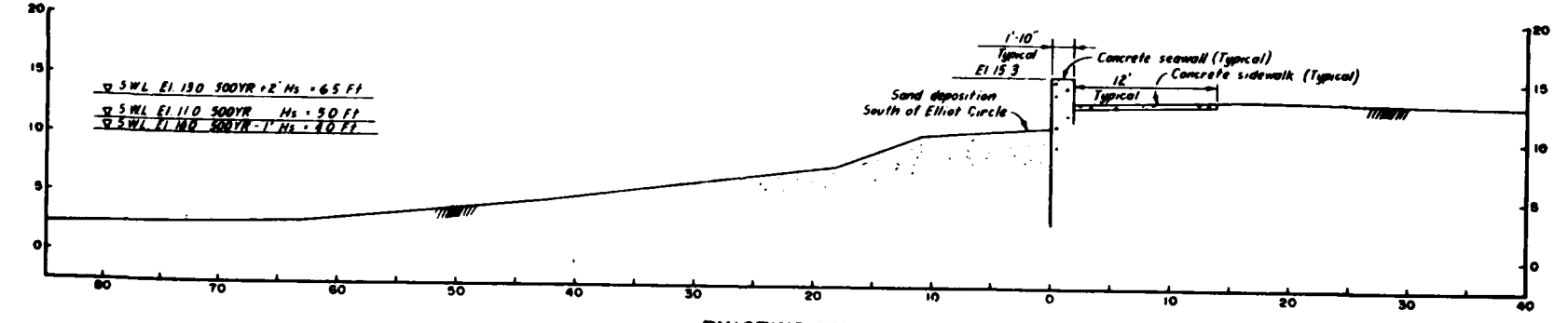
Figure EA-2



STA 19+20 - STA 27+25

REACH A

PLAN "A" - STRUCTURAL PLAN



EXISTING CONDITION

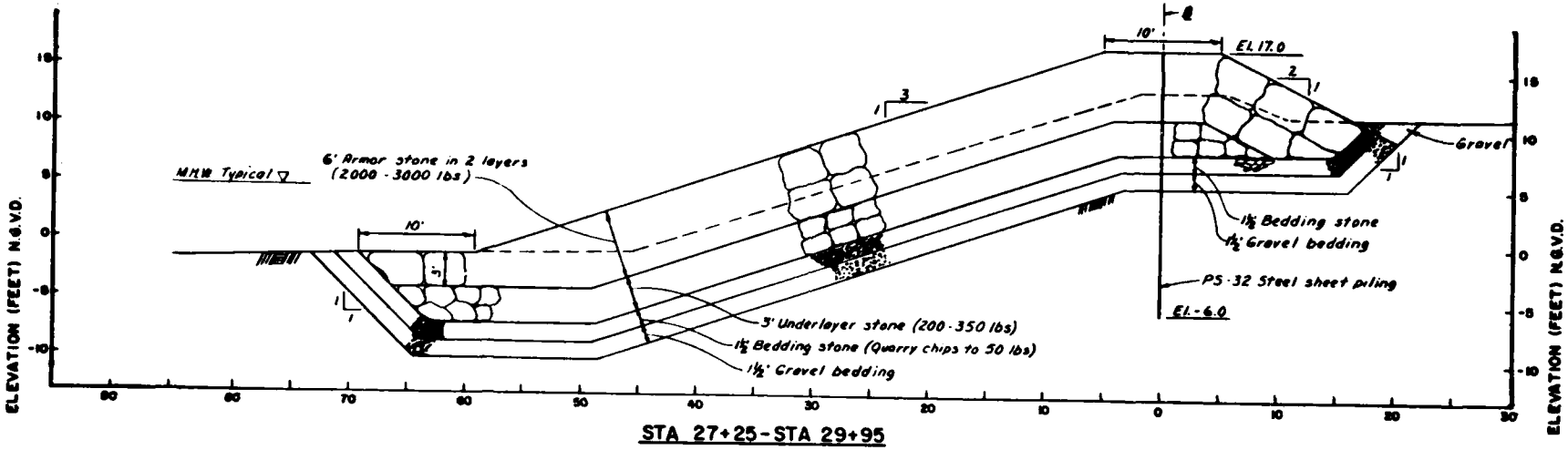
1"=5'

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHAN'S POINT

REACH A

Figure EA-3



STA 27+25 - STA 29+95

REACH B

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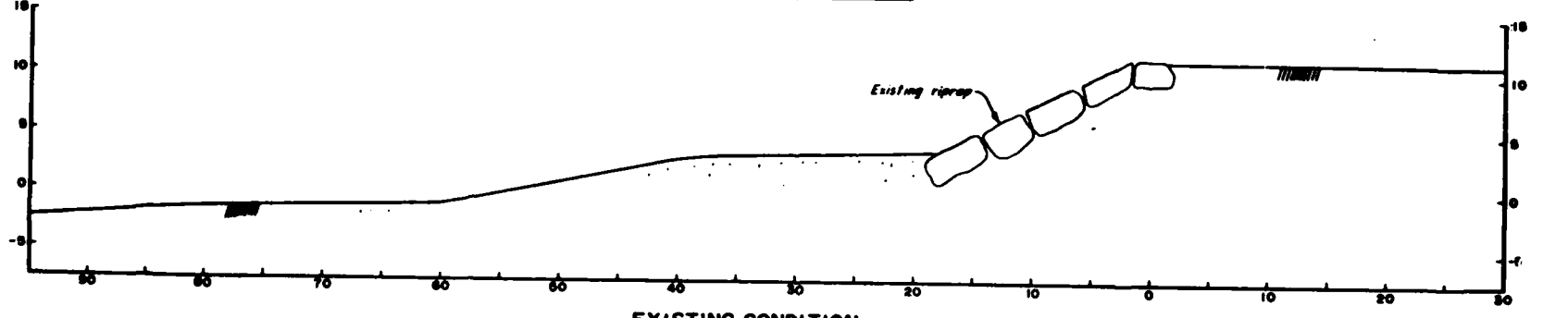


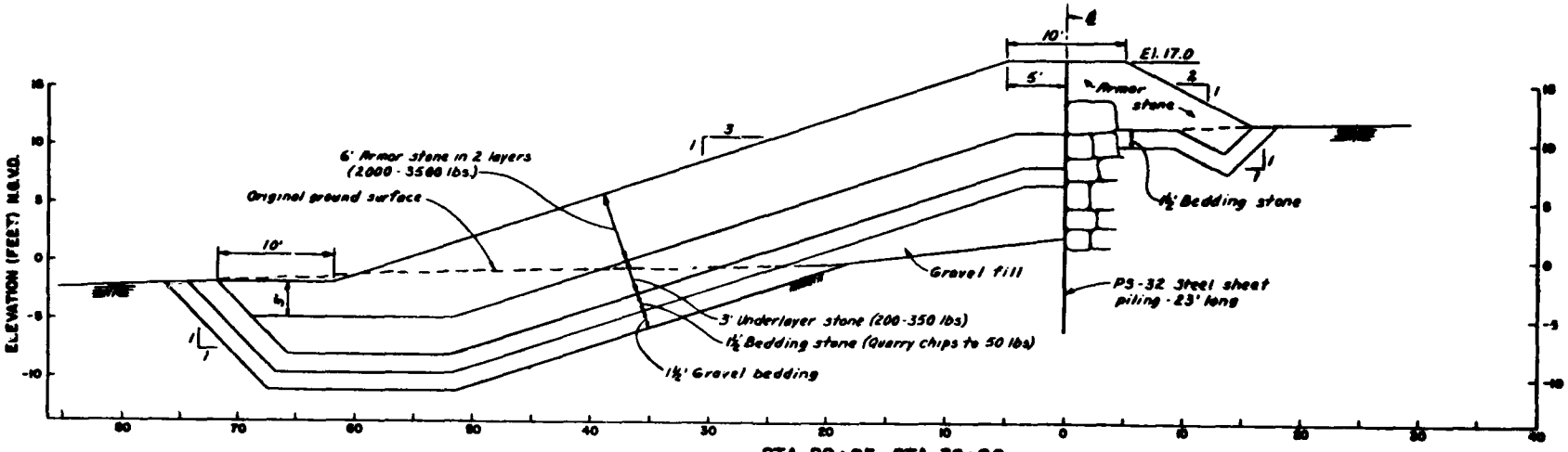
EXISTING CONDITION

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHAN S POINT

REACH B

Figure EA-4



STA 29+95 - STA 32+00

REACH C

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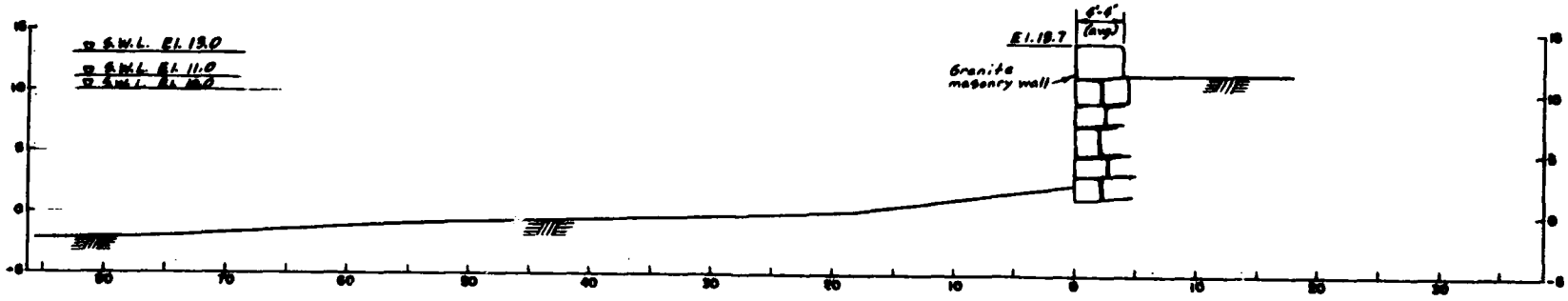


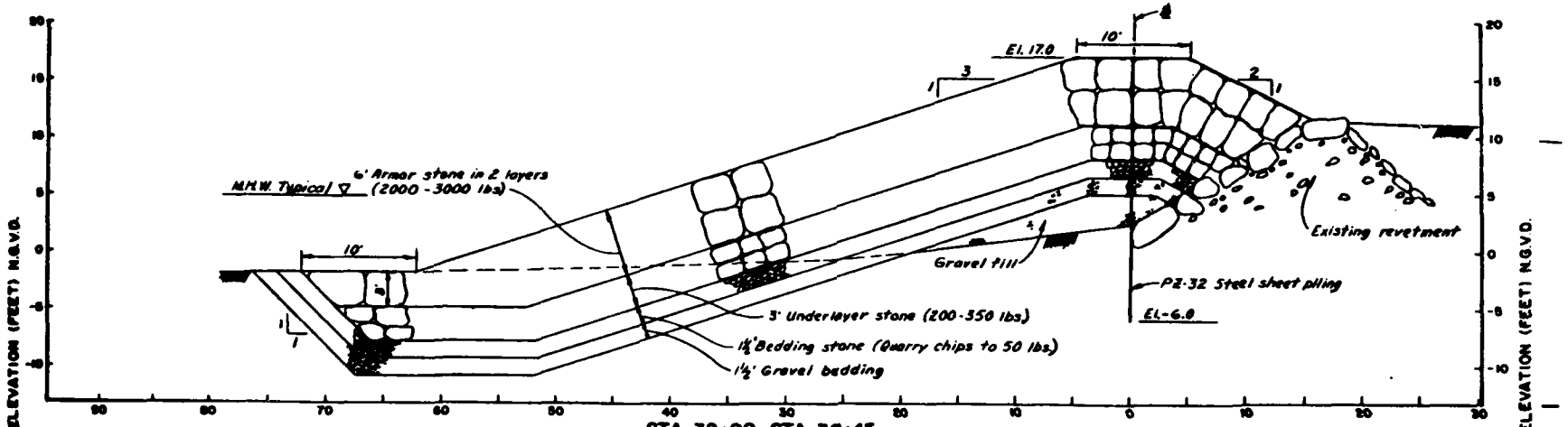
EXISTING CONDITION

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHAN'S POINT

REACH C

Figure EA-5



STA 32+00 - STA 38+45

REACH D

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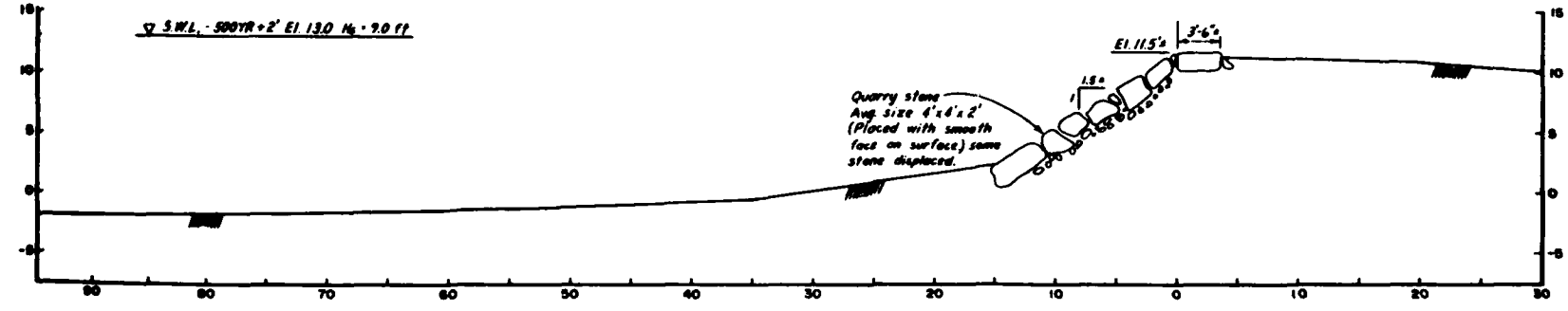


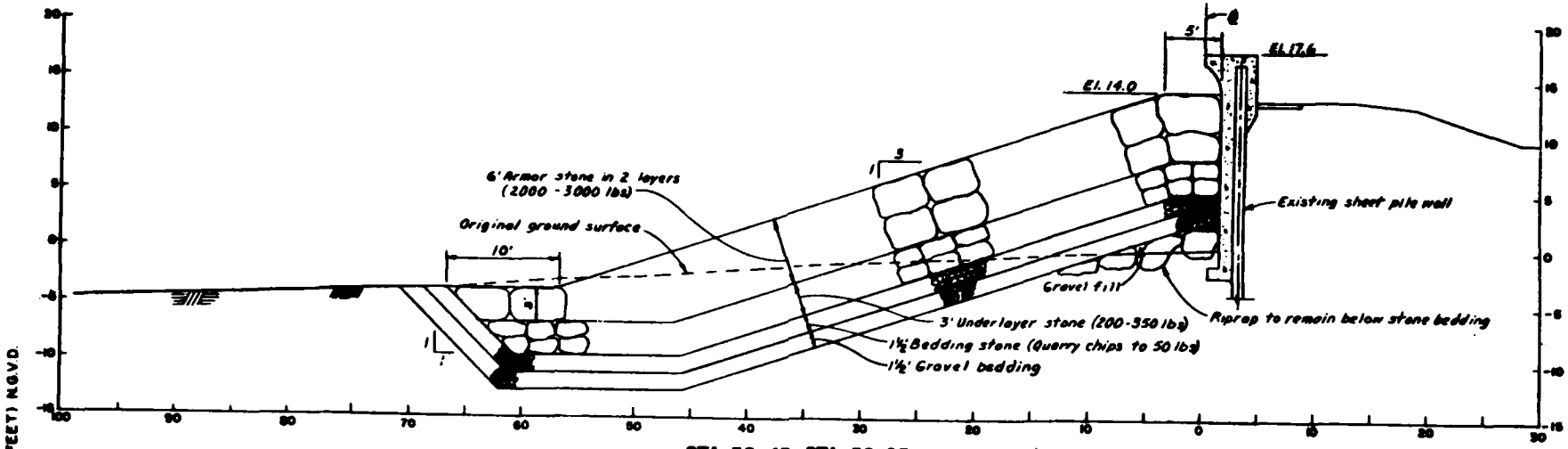
EXISTING CONDITION

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS

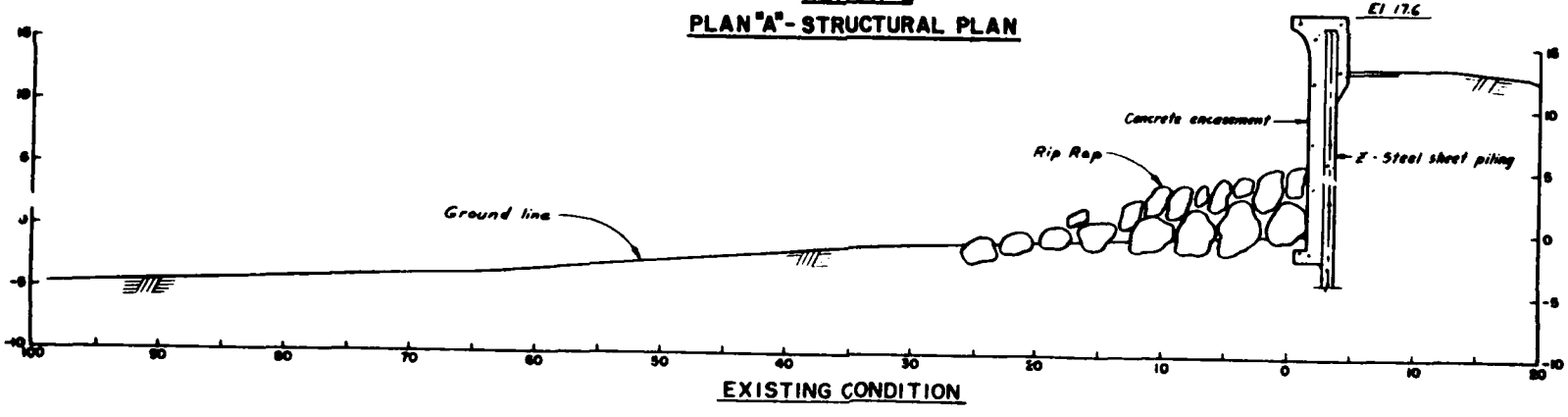
ROUGHAN'S POINT

REACH D

Figure EA-6



STA 38+45-STA 56+25
REACH E
PLAN "A"- STRUCTURAL PLAN

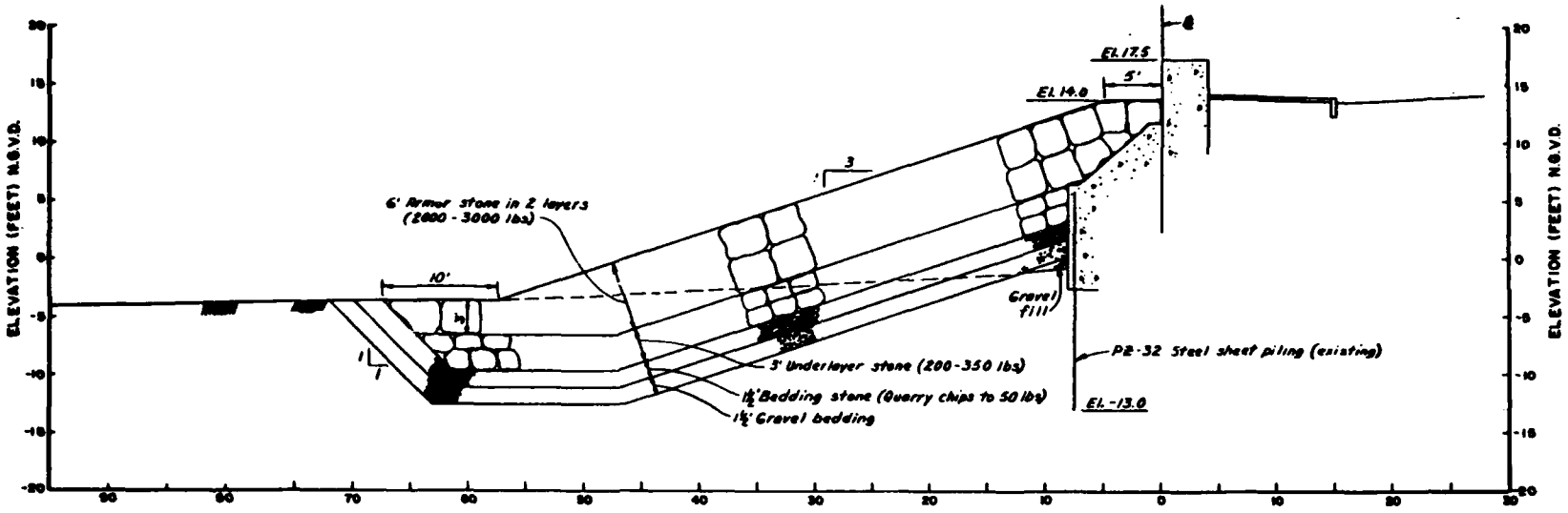


EXISTING CONDITION

1"=5'

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHAN'S POINT
REACH E

Figure EA-7



STA 56+25 - STA 60+00

REACH F

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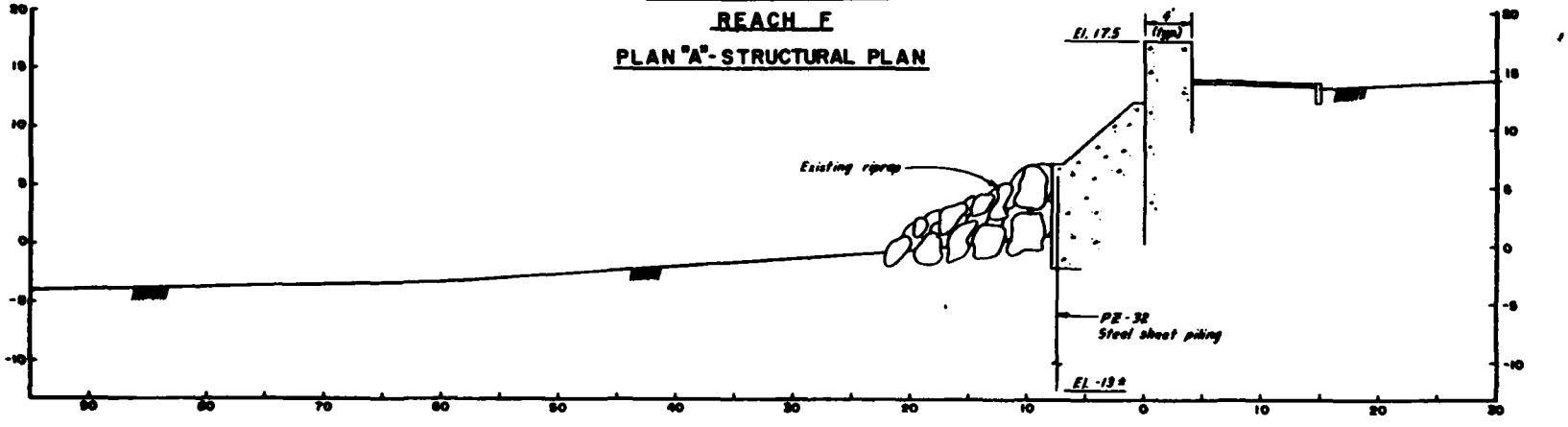
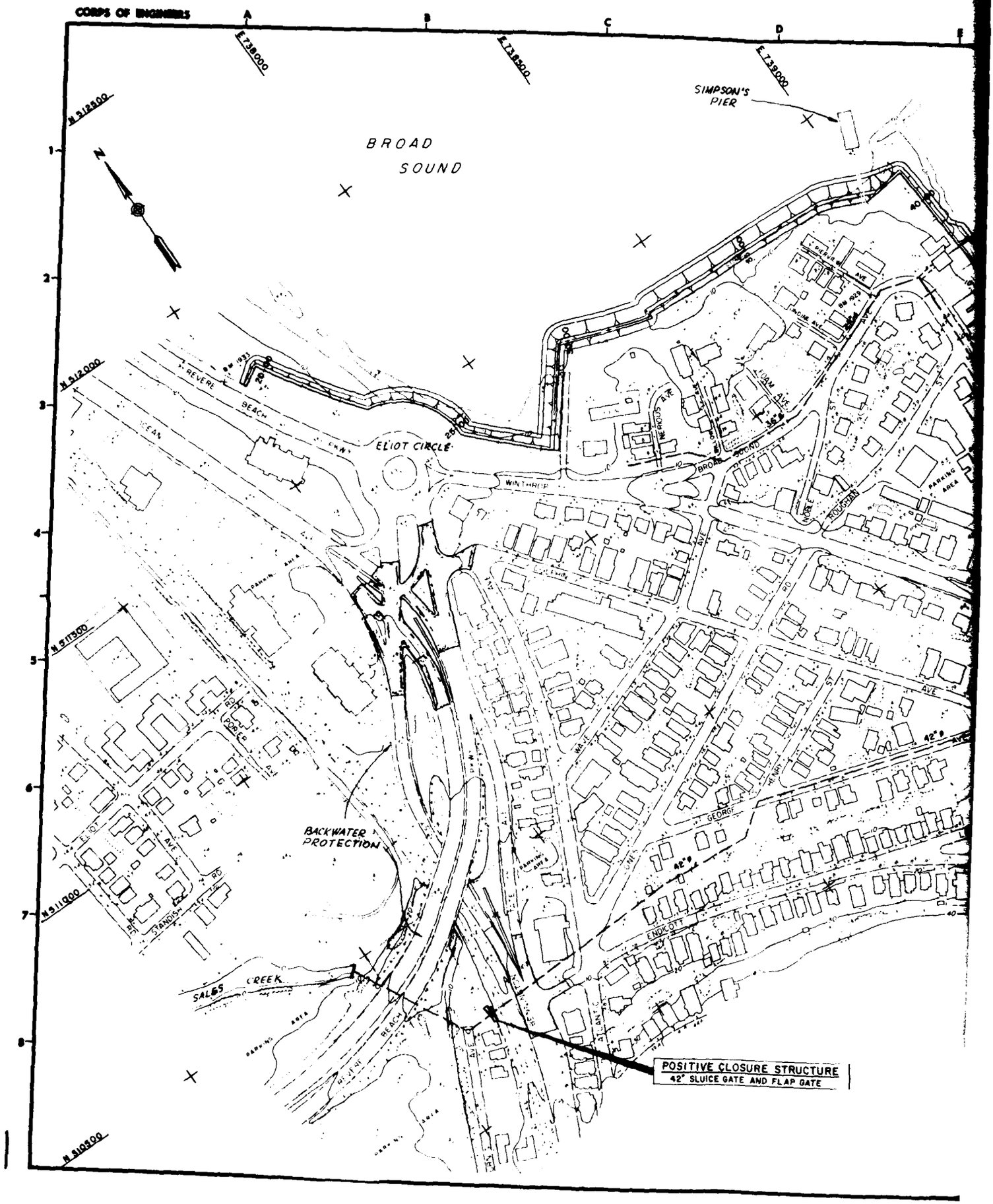


EXISTING CONDITION

REVERE COASTAL FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHAN'S POINT
REACH F

Figure EA-8


CORPS OF ENGINEERS
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N 912500
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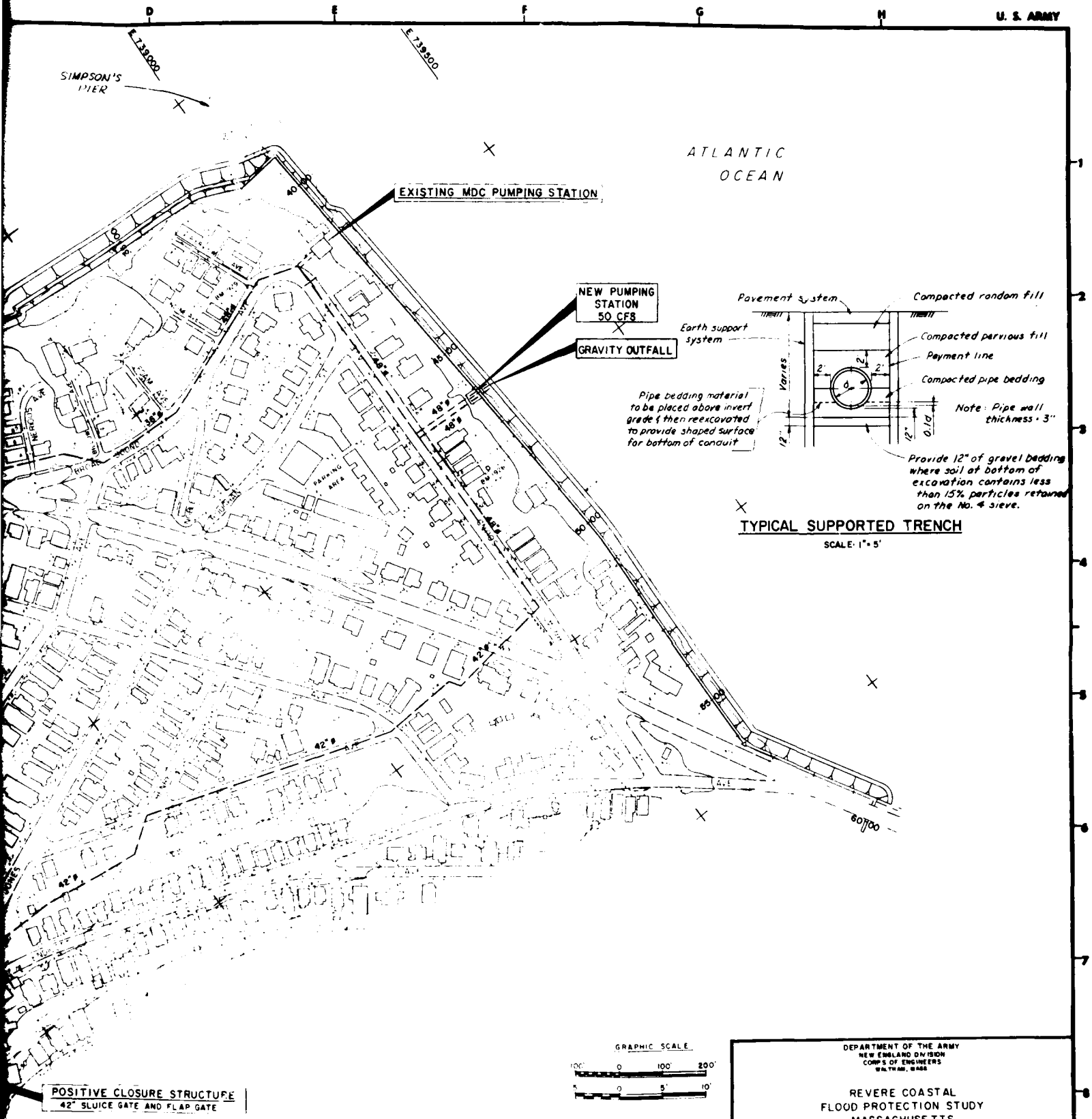
N 910500
SIMPSON'S PIER
BROAD SOUND
REVERE BEACH
ELIOT CIRCLE
WINTHROP
BROAD SOUND
PARKING AREA
BACKWATER PROTECTION
SALEM CREEK
POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE



TYPICAL SUPPORTED TRENCH

SCALE: 1" = 5'

GRAPHIC SCALE

100' 0 100' 200'

0 5' 10'

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

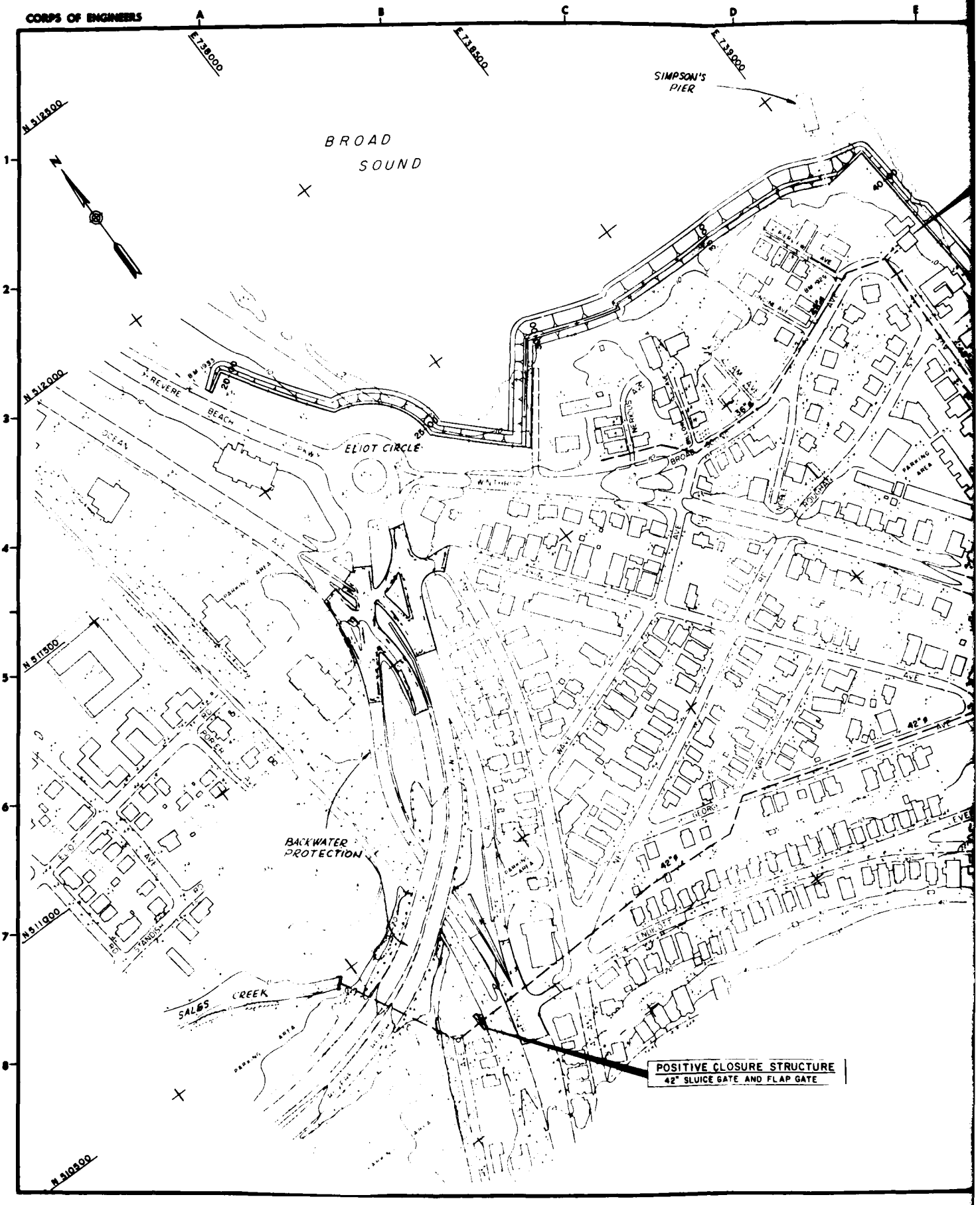
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHANS POINT

INTERIOR DRAINAGE

PLAN A - STRUCTURAL PLAN

FIGURE EA-9


CORPS OF ENGINEERS
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B
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N 512500
N 512000
N 511500
N 511000
N 510500
1
2
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4
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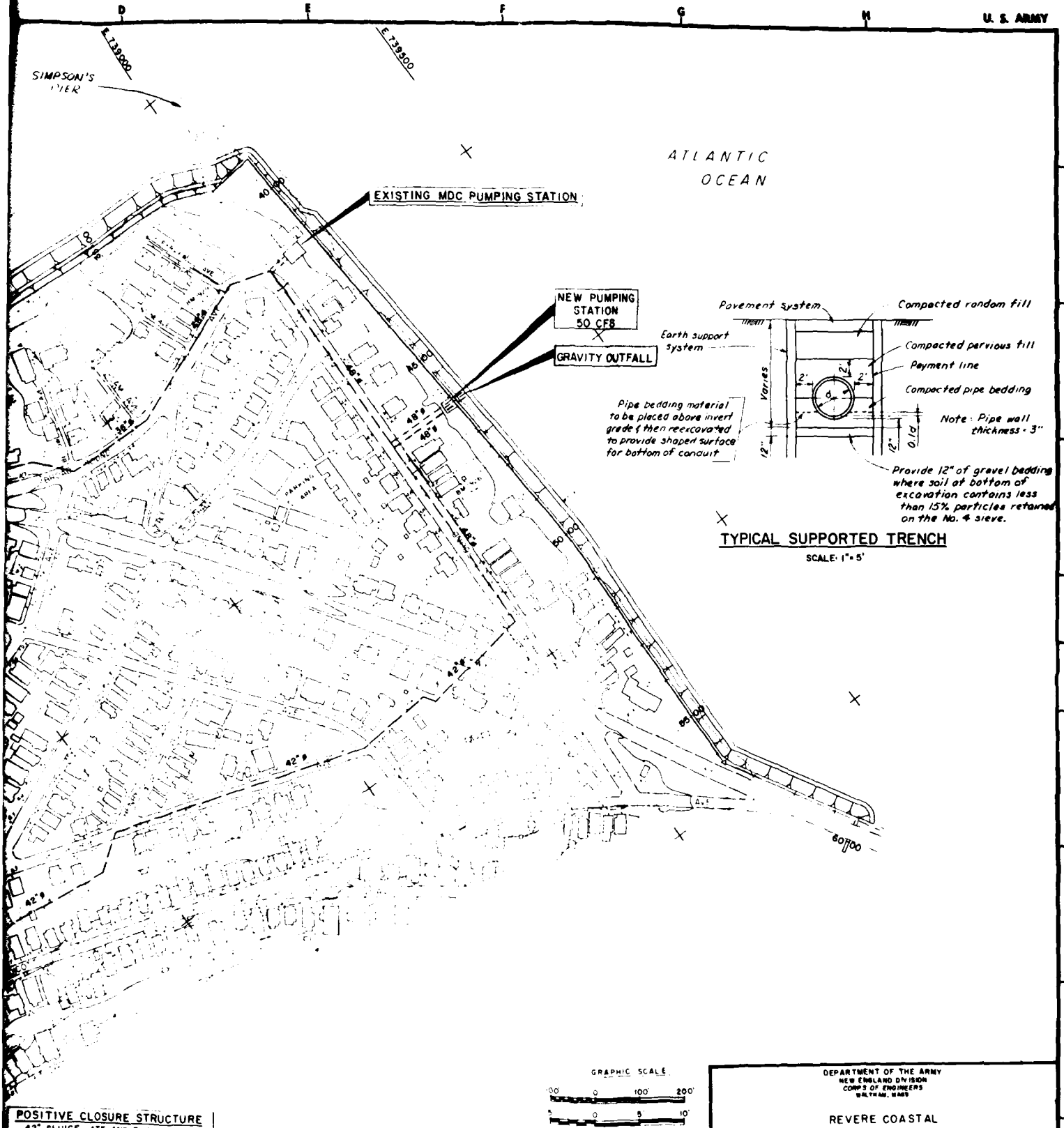
6
7
8
SIMPSON'S PIER
BROAD SOUND
N
REVERE BEACH
OCEAN
ELIOT CIRCLE
BACKWATER PROTECTION
SALEM CREEK
POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS

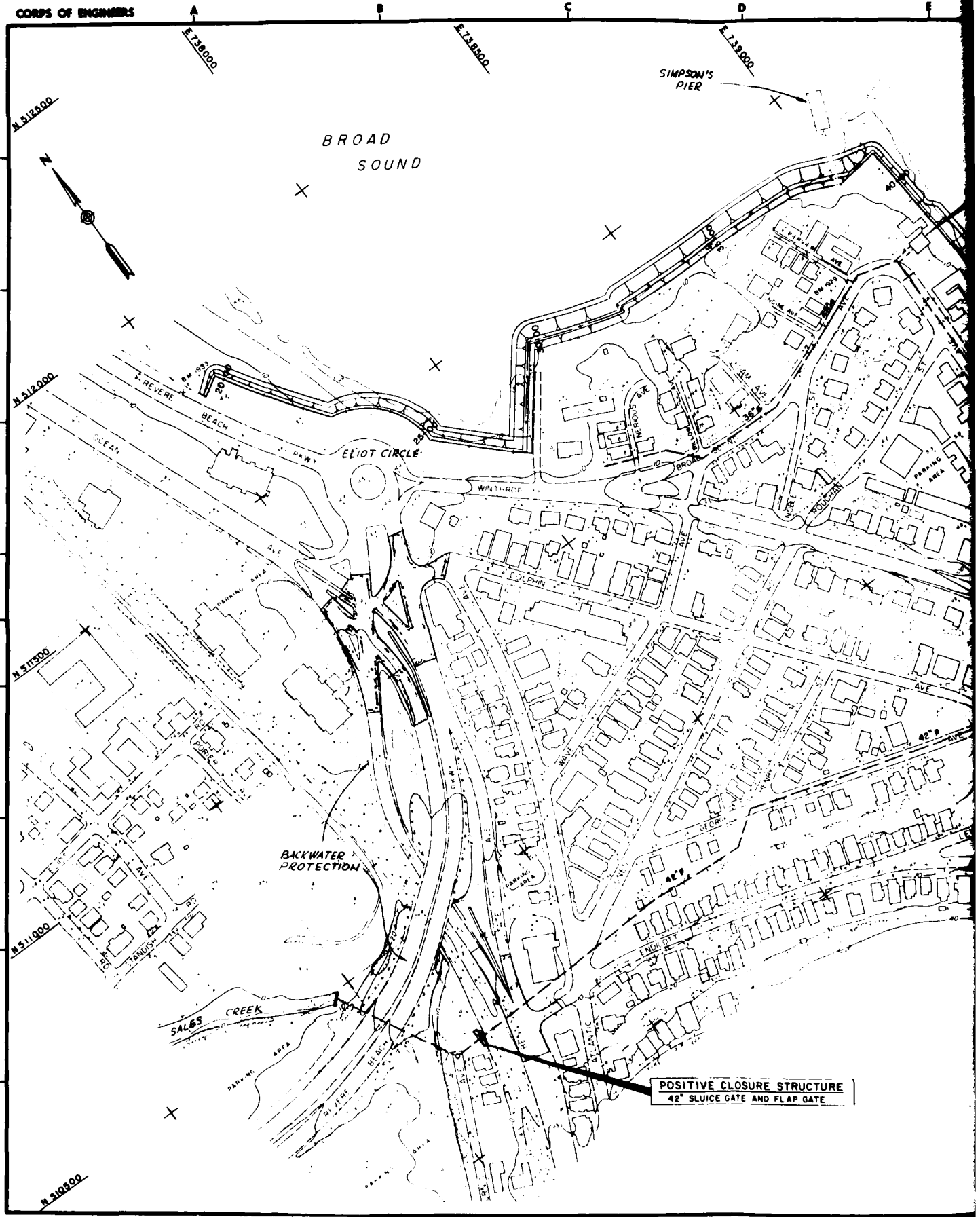
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS

ROUGHANS POINT

INTERIOR DRAINAGE

PLAN A - STRUCTURAL PLAN

FIGURE EA-9


CORPS OF ENGINEERS
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SIMPSON'S PIER
BROAD SOUND
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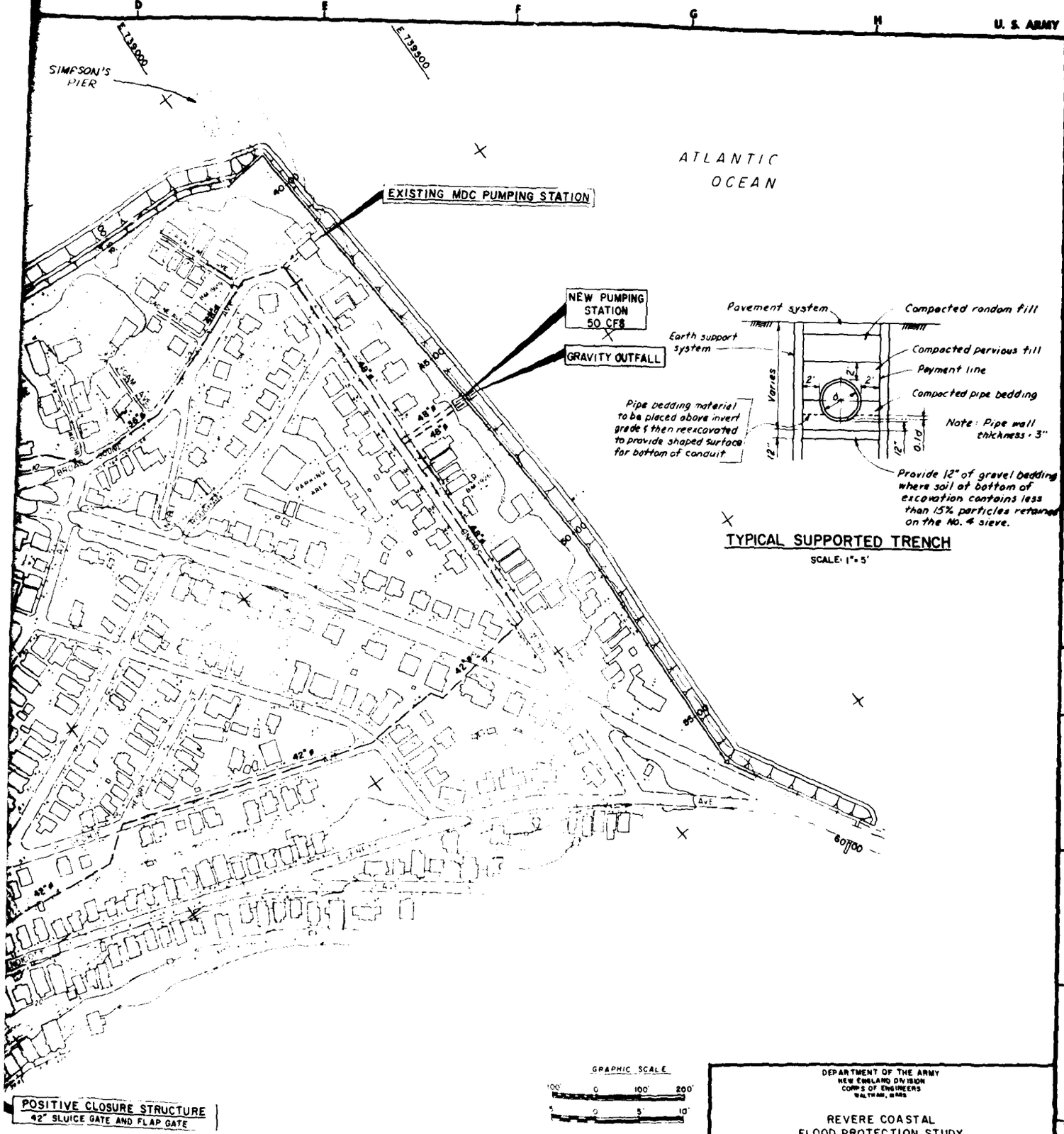
REVERE BEACH
OCEAN
ELIOT CIRCLE
WINTHROP
BROAD
MERIDIAN
DOLPHIN
ATLANTIC
ENGLISH
STANDISH
SALEM
BACKWATER PROTECTION
SALEM CREEK
PARKING AREA
POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE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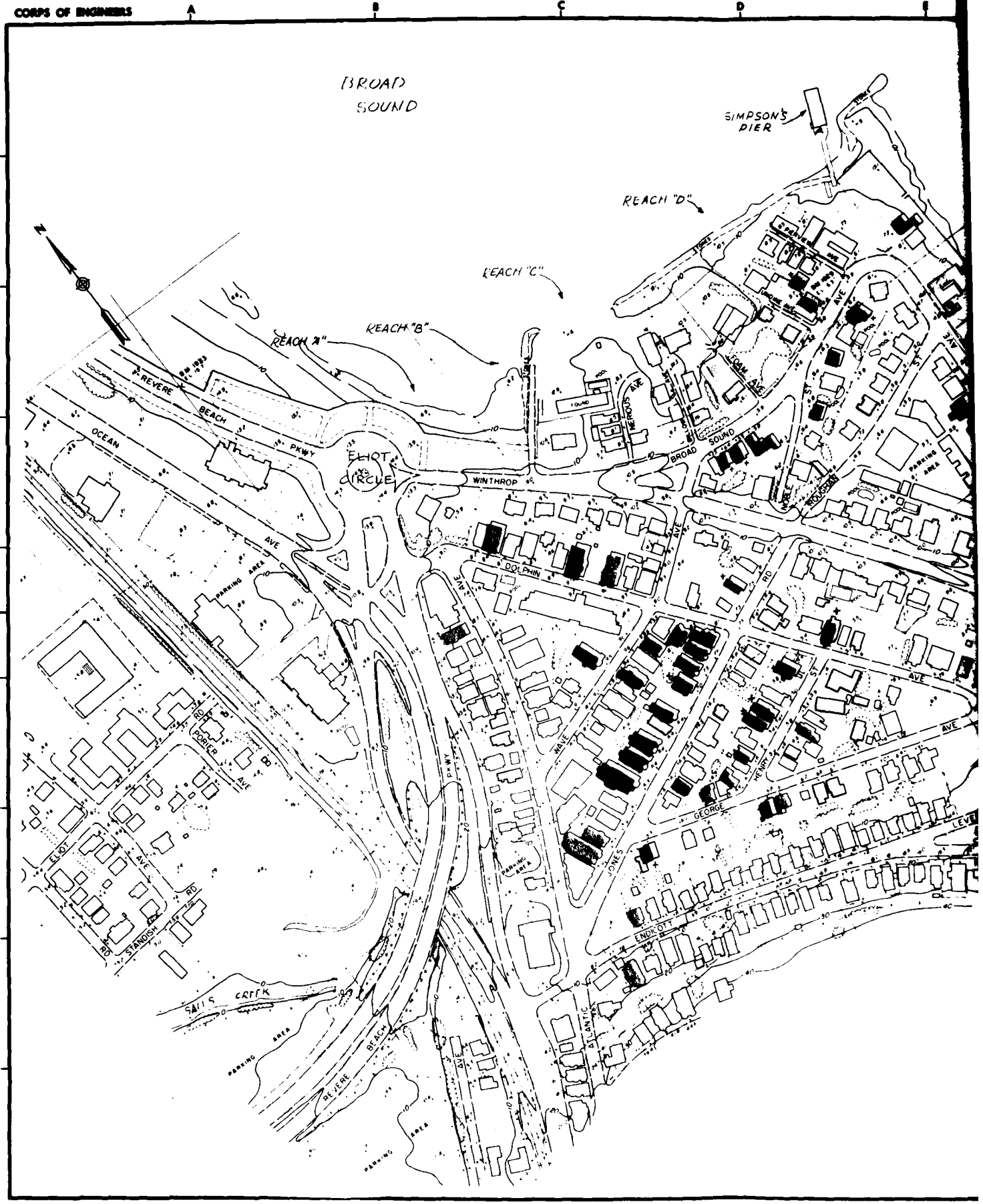
SIMPSON'S PIER
ATLANTIC OCEAN
EXISTING MDC PUMPING STATION
NEW PUMPING STATION 50 CFS
GRAVITY OUTFALL
Pavement system
Compacted random fill
Earth support system
Compacted pervious fill
Payment line
Compacted pipe bedding
Pipe bedding material to be placed above invert grade & then re-excavated to provide shaped surface for bottom of conduit
Note: Pipe wall thickness - 3"
Provide 12" of gravel bedding where soil at bottom of excavation contains less than 15% particles retained on the No. 4 sieve.
TYPICAL SUPPORTED TRENCH
SCALE: 1" = 5'
GRAPHIC SCALE
POSITIVE CLOSURE STRUCTURE
42" SLUICE GATE AND FLAP GATE
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHANS POINT
INTERIOR DRAINAGE
PLAN A - STRUCTURAL PLAN

FIGURE EA-9


CORPS OF ENGINEERS
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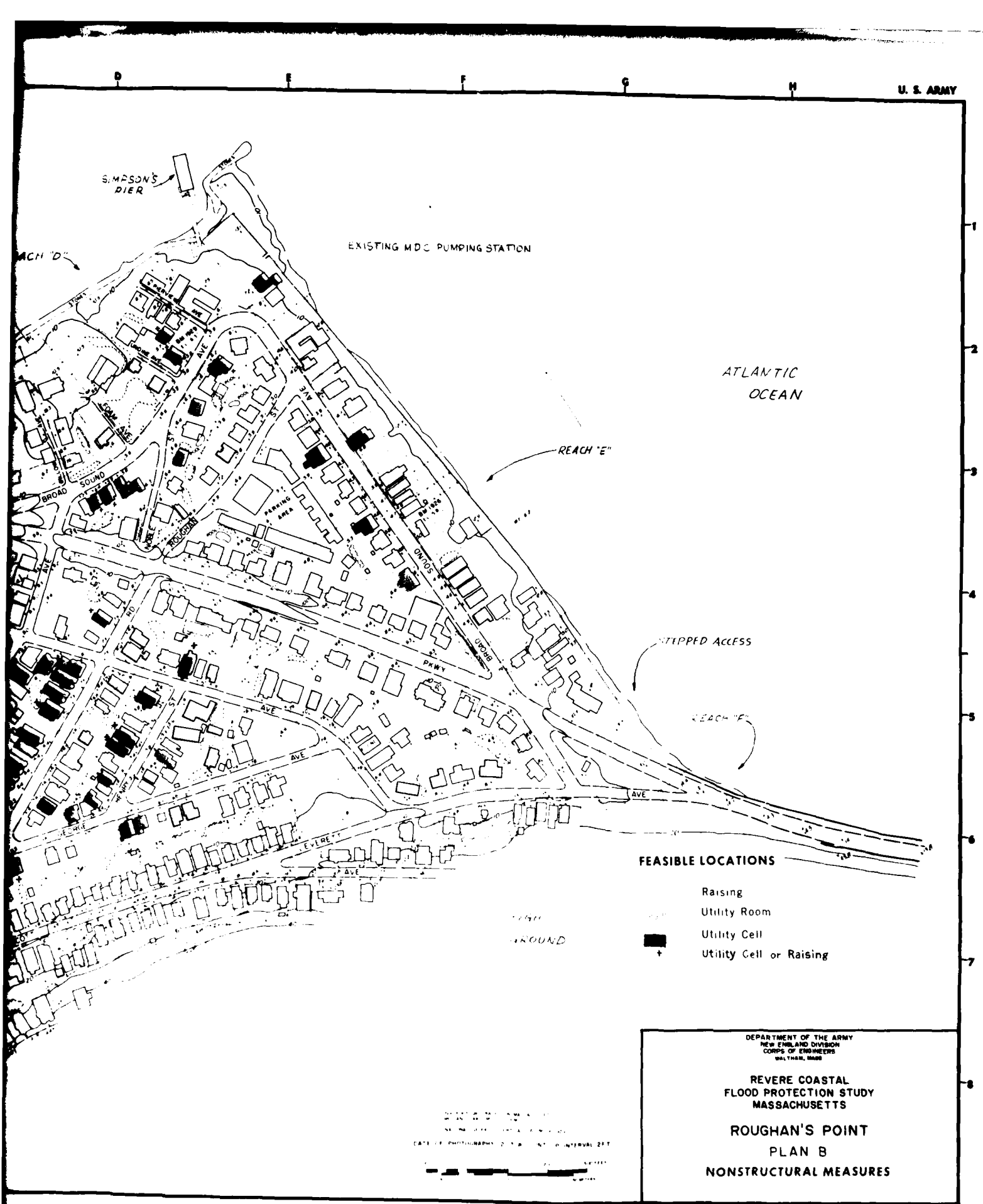
BROAD SOUND
SIMPSON'S PIER
REACH "D"
REACH "C"
REACH "B"
REACH "A"
N
REVERE BEACH PKWY
OCEAN AVE
REVERE BEACH
ELIOT CIRCLE
WINTHROP
BROAD SOUND
NEPTUNE AVE
LOCUST AVE
ROWENA
DOLPHIN
PARKING AREA
PORTER RD
ELIOT AVE
STANDISH RD
SALT CREEK
PARKING AREA
REVERE BEACH PKWY
JONES AVE
HENRY AVE
GEORGE
ENDICOTT
ATLANTIC AVE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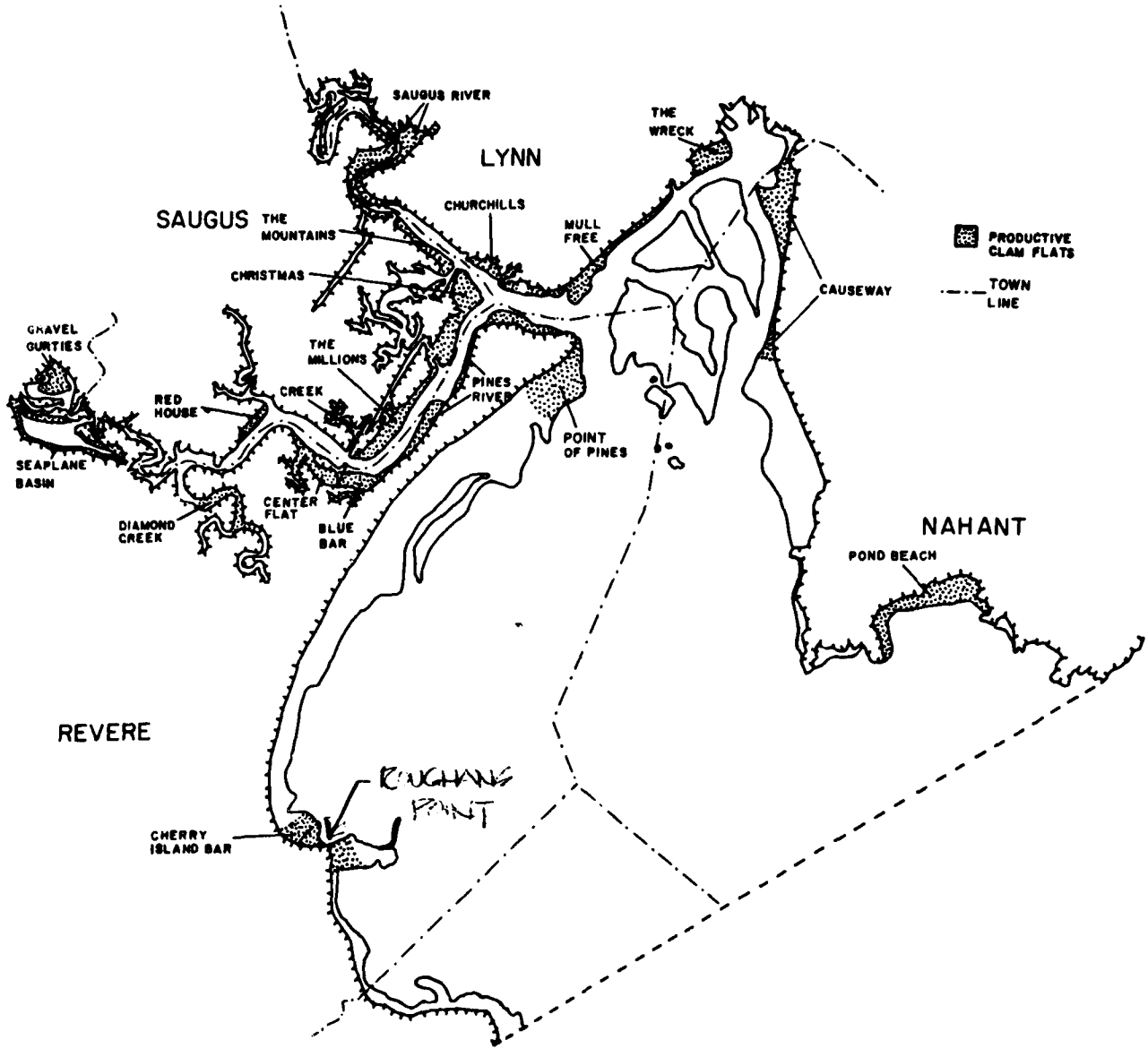
U. S. ARMY
SIMPSON'S PIER
EXISTING MDC PUMPING STATION
ATLANTIC OCEAN
REACH "E"
REACH "F"
STEPPED ACCESS
BROAD SOUND
PKWY
AVE
FEASIBLE LOCATIONS
Raising
Utility Room
Utility Cell
Utility Cell or Raising
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS
REVERE COASTAL
FLOOD PROTECTION STUDY
MASSACHUSETTS
ROUGHAN'S POINT
PLAN B
NONSTRUCTURAL MEASURES

FIGURE EA-10



Location of the productive soft shell clam habitat in Lynn-Saugus Harbor, 1968-1969.

Source: Chesmore, A.P., D.J. Brown and R.D. Anderson. A Study of the Marine Resources Of Lynn-Saugus Harbor. Massachusetts Dept. of Natural Resources, Div. of Marine Fisheries, Monograph Series No. 11. 1972

FIGURE EA-11

Figure EA-12. Roughans Point shore south of Simpson's Pier.

Figure EA-13. Shorefront west of Simpson's Pier.

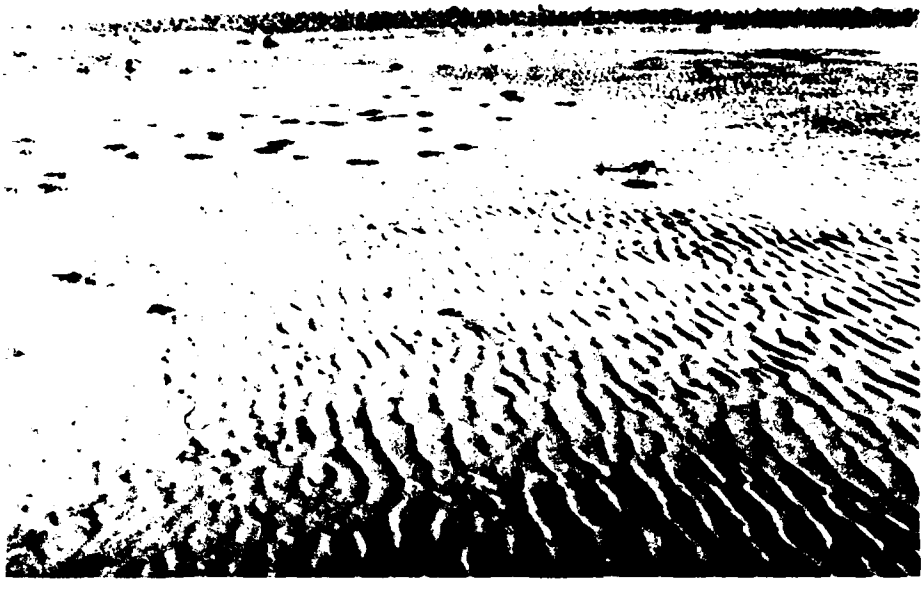


Figure EA-14. Exposed Cherry Island Bar at low tide, showing rippled sand surface.

Figure EA-15. Shoreline at low tide along the eastern shore seawall, showing gravel and boulders.

environment also not favorable to shellfish. Actual sampling of the flat found only a sparse population of surf clams, Spisula solidissimma, softshell clams, Mya arenaria, and razor clams, Ensis directus.

D. Vegetation

Roughans Point is a densely developed residential neighborhood with very little remaining area of native vegetation. Most existing vegetation is typically exotic and ornamental varieties common to the area. Structural modifications to the shoreline have all but eliminated any native dune or coastal vegetation. The area that would be impacted by the structural plan contains no trees or other significant vegetation.

E. Recreation

Roughans Point is located immediately south of the Revere Beach Reservation, an MDC facility which incorporates a 3 mile long sandy beach open to public use since 1895. Convenient access is provided by an adjacent mass transit railway stop. Revere Beach was once a popular public recreation facility for the Boston metropolitan area, and included an amusement park, bars, arcades, and restaurants. The area is now being restored under a master plan completed in 1978. The master plan proposes new residential and commercial development and a linear park system, incorporating traffic improvements, as well as restoration of historic structures to accommodate food concessions, sanitary facilities, bathhouses, amusements, police and maintenance requirements.

With the proximity of Revere Beach, the need for recreation facilities in Roughan's Point is very localized. The rocky character of the shoreline and limited public access to the water restrict the use of the shoreline for recreation. At low tide, a sandy beach is exposed, making it possible to walk the entire length of the Roughan's Point shoreline. It is also possible to walk out to the offshore breakwater. Several acres of clam flats are also exposed at low tide. At high tide, shoreline access is greatly restricted by large boulders at the foot of the seawall and by frequently dangerous waves.

F. Water Quality

The coastal waters of Revere, including Broad Sound, are subject to highly variable water quality conditions. Water quality samples taken by the Metropolitan District Commission each summer at Revere Beach have usually been rated at less than 100 MPN (most probable number of E. Coli per 100 ml). This rating makes the area suitable for swimming. However, Lynn Harbor, which adjoins Broad Sound, is the location of a city of Lynn raw sewage outfall which discharges 20 million gallons per day. The discharge at Lynn, as well as a discharge at Nahant, make the Broad Sound area unsuited for harvesting of shellfish. Only upstream areas on the Pines River are suitable for shellfish harvesting, and then only with proper purification.

TABLE 7 (Cont.)

Description	Quantity	Unit	Unit Price	Amount
36" Pipe	460	L.F.	45.00	20,700
42" Pipe	2,250	L.F.	54.00	121,500
48" Pipe	1,650	L.F.	65.00	107,250
Sluice Gate and Box Conduit	1	Job	L.S.	95,000
Pumping Station	1	Job	L.S.	520,000
Cofferdam	1	Job	L.S.	150,000
Sub-Total -13. INTERIOR DRAINAGE				$1,933,550
Contingencies (25%)				$ 483,400
TOTAL -13. INTERIOR DRAINAGE				$2,416,950

TOTAL ESTIMATED CONSTRUCTION COST	Amount
Backwater Protection	$ 537,000
Shore Protection	5,355,250
Interior Drainage	2,416,950
	$8,309,200
TOTAL ESTIMATED CONSTRUCTION COST	$8,310,000

TOTAL FIRST COST	Amount
Construction Cost	$8,310,000
Engineering and Design (15%)	1,247,000
Supervision and Administration (10%)	831,000
Real Estate	635,000
TOTAL FIRST COST	$11,023,000

B. NONSTRUCTURAL PLAN

The nonstructural plan provides 100-year protection and consists of construction of utility cells or rooms for certain homes and raising other selected structures. These floodproofing measures along with administrative actions comprise Plan B and are shown on Plate 12.

1. Floodproofing.

Utilities can be protected in one of two ways, either by a watertight utility cell or by elevating the utilities in a room above the flood level. Stage 2 efforts identified 60 of the 99 residential structures with first floors below the 100-year flood stage as deserving further analysis for utility cells. Stage 2 also reported that 53 of the 127 homes with first floors above the 100-year flood stage merit Stage 3 investigation for utility rooms.

Up-to-date benefit and cost data were applied to the 60 utility cell and 53 utility room cases. Cells and rooms were found feasible for 24 and

The filling of marshes and low areas accompanied this development. Revere as a resort community peaked in the early 20th century. Hotels, dance halls and amusements lined the Metropolitan Parks Commission beach reservation. Two ocean piers jutted out from Roughans Point, providing ferry service to the beach.

The piers, as well as the majority of structures associated with the resort period of Revere Beach have been removed. Only a few structures in the Metropolitan District Commission's reservation remain and are being rehabilitated. New arcades, food establishments and apartment buildings have replaced such things as the Thunderbolt, Derby Racer, the Roller Coaster, Nautical Gardens and the Breakers Hotel.

IV. ENVIRONMENTAL EFFECTS

Principal environmental effects of the structural plan are a direct result of construction of the rock slope revetment, modification of existing walls, raising two city street intersections, and reconstructing the interior drainage system. Long term impacts would be the change in aquatic habitat in the area of rock fill, less accessible shoreline at low tide, and some restriction of water views due to increasing the height of shore protection structures along Reaches A through D.

The proposed rock structure will cover approximately 5 acres of shorefront. The impacted area includes areas of previously constructed riprap protection, dumped rock, and natural sand, mud and gravel. Most of this area is not highly favorable shellfish habitat, due to rocky substrate and high wave energy. Therefore, this impact is considered minor.

The location and extent of the rock berm will significantly restrict access to the shoreline. The 1 on 3 slope of the seaward face of the rugged rock revetment is too hazardous for public use. To provide access over the rock to the water and to the Cherry Island Bar, wide steps may be constructed at various locations along the alignment. These steps would provide both access and areas for seating or sunbathing. Access is currently limited by lack of public property along the Roughans Point shoreline.

At Eliot Circle, raising the existing wall 1.7 feet will restrict views of the beach and the water. This increase in wall height will practically eliminate the function of the wall for seating. Rock placed on the seaward side of the wall will eliminate a portion of the sandy beach. However, the area to be lost is a very small portion of the total available beach.

In Reaches B, C and D, the structural plan will raise shoreline structures 3.3 to 5.5 feet affecting water views for residences in this area. Along Reach A, the additional 1.7 ft of wall will restrict somewhat the view from the parking area at Eliot Circle.

Construction activity associated with implementing the structural plan would result in a temporary increase in turbidity in local waters and a disruption of shoreline habitat. Turbidity increases are expected to have minimal short term impact, as the shoreline is frequently subject to high levels of turbidity from storm wave action.

Placement of about 123,000 yds of revetment stone, gravel and random fill will require an estimated 15,400 round trips by trucks from an undetermined quarry site to the construction site (assuming 10 yard trucks with 20% voids for an effective haulage of 8 yards). If construction

takes 18 months, the result would be over 850 trips per month or about 40 trips per day (21 working days per month). The area is presently congested and subject to frequently heavy traffic. This impact is also expected to be minor.

Raising the elevation of the Revere Beach Parkway, State Road and Ocean Avenue intersection will result in a temporary disruption of traffic. Existing alternate routes and phasing of work should minimize this disruption.

The 1978 Revere Beach Reservation Master Plan calls for redesign of this intersection and the Eliot Circle rotary to improve traffic safety and to accentuate this location as a formal entrance to the Reservation. This plan has not yet been implemented due to MDC funding constraints. Should the structural plan be implemented, coordination with the MDC will insure that economically feasible portions of the master plan proposed for the intersection are incorporated in the Corps plans during final engineering and design.

Reconstruction of storm drainage pipes throughout Roughans Point will result in construction activity disruption of the neighborhood. This disruption and accompanying noise and dust will be a short term minor impact.

Cultural resources could be adversely affected during excavation for flood protection structures or drainage systems. There are no known historic or prehistoric sites within the Roughans Point project boundaries. However, given the generally high archaeological sensitivity of the entire coastal area and the number of sites already destroyed, any undisturbed area must be considered a potential site, until proven otherwise by archaeological survey.

The Masschusetts Historic Commission feels that there may be some undisturbed areas within the interior drainage right-of-way. During later design phases, any such area will be avoided where possible. Where avoidance of undisturbed areas is not possible, an archaeological survey may be required to evaluate their archaeological sensitivity. Timely coordination with the Massachusetts Historic Commission will be required for the rapid and efficient determination of specific project impacts on historic and archaeological resources.

Implementation of nonstructural measures would involve some construction activity. House raising would require temporary vacancy of about one week. Other measures however would not require removal of residents.

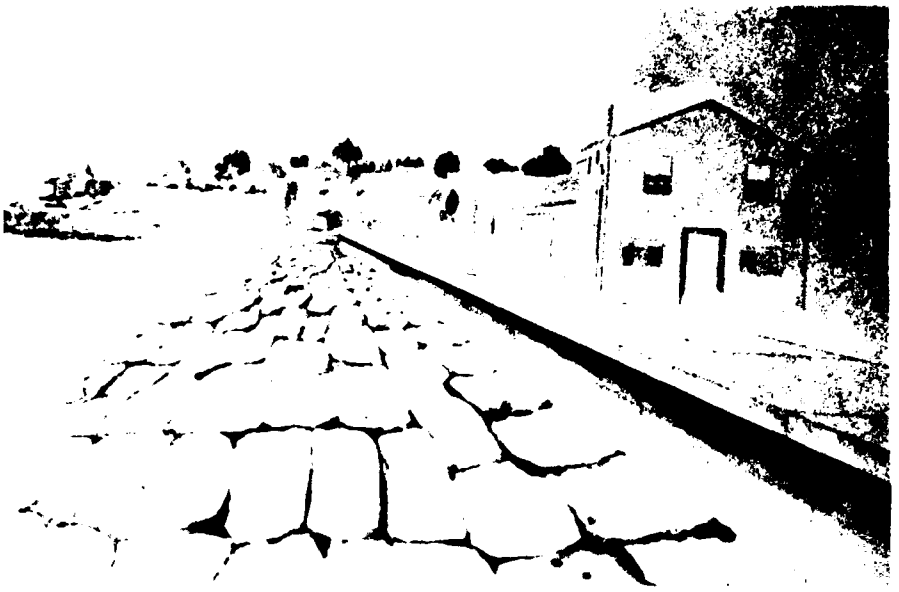
Over the long term, nonstructural measures would help reduce flood losses. However, with deep inundation, evacuation will still be necessary. Those who remained would be isolated.

The following Table EA-1 outlines in comparative form the impacts of each alternative and the impacts of taking no action.

TABLE EA-1

COMPARATIVE IMPACTS

Resource Evaluated	Structural Plan	Nonstructural Plan	No Action
Vegetation	Slight impact during construction.	Minimal impact.	No impact.
Fisheries	Temporary turbidity during construction only.	No impact.	No impact.
Shellfish	Loss of less than one acre of clam flat.	No impact.	No impact.
Recreation	Minimal loss of shorefront beach and shoreline access.	No impact.	No impact.
Aesthetics	Rock slope revetment will alter character of shoreline. Increase in structure height in some areas will restrict ocean views.	Elevating structures or floodproofing will alter physical character of some areas.	No impact.
Flood Protection	Protection of 55 acres, including 291 homes.	Limited protection of 81 structures.	No protection.
Historical Sites	Survey may be required.	No impact.	No impact.



ARTIST'S RENDITION
STRUCTURAL PLAN - EASTERN SHORE

ARTIST'S RENDITION
STRUCTURAL PLAN - NORTHERN SHORE

V. COORDINATION

The Corps of Engineers has consulted with several organizations and agencies to gather information for the study and to inform these groups as to the nature of the alternatives investigated. This coordination will be continued up through the time of project implementation. Table EA-2 summarizes the findings of this coordination.

TABLE EA-2

RELATIONSHIP OF PLANS TO ENVIRONMENTAL REQUIREMENTS PROTECTION STATUTES

Federal Statutes	Structural Plan	Non-Structural Plan
Archaeological and Historic Preservation Act, as amended, 16 U.S.C. 469 et seq.	FC	FC
Clean Air Act, as amended, 42 U.S.C. 7401, et seq.	FC	FC
Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251 et seq.	FC	NA
Coastal Zone Management Act, as amended, U.S.C. 1451, et seq.	FC	NA
Endangered Species Act, as amended, 16 U.S.C. 1531, et seq.	FC	FC
Estuary Protection Act, 16 U.S.C. 1221, et seq.	NA	NA
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), et seq.	NA	NA
Fish and Wildlife Coordination Act, as amended, U.S.C. 661, et seq.	PC	PC
Land and Water Conservation Fund Act, as amended, 22 U.S.C. 4601 - 4601-11, et seq.	NA	NA
Marine Protection, Research and Sanctuaries act, 22 U.S.C. 1401, et seq.	NA	NA
National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq.	FC	FC
National Environment Policy Act, as amended, 42 U.S.C. 4321, et seq.	FC	FC
Rivers and Harbors Act, 33 U.S.C. 401, et seq.	FC	NA
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	NA	NA
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.	NA	NA
Executive Orders, Memoranda, etc.		
Flood Plain Management (E.O. 11988)	FC	FC
Protection of Wetlands (E.O. 11990)	FC	FC
Environmental Effects Abroad of Major Federal Actions (E.O. 12114)	NA	NA
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum 30 Aug. 76)	NA	NA

NOTES: The compliance categories used in this table were assigned based on the following definitions:

a. Full compliance (FC) - All requirements of the statute, E.O., or other policy and related regulations have been met.

b. Partial compliance (PC - Some requirements of the statute, E.O., or other policy and related regulations remain to be met when plan is authorized for construction.

c. Not Applicable (NA) - N/A statute, E.O., or other policy not applicable.

FINDING OF NO SIGNIFICANT IMPACT

The proposed Roughans Point Coastal Flood Protection Project, Revere, Massachsuetts will involve structural measures to reduce coastal flooding. The structural plan will include widening existing flood protection structures by the seaward addition of 50 to 70 feet of stone riprap revetment. Placement of this rockfill will result in the loss of less than 1 acre of the 30-acre Cherry Island Bar clam flat. This clam flat is grossly contaminated and not open for legal clam harvesting. This loss of habitat is not considered significant.

The nonstructural alternative would provide a reduction in flood damages to property, but would not reduce flooding and its associated disruption.

The alternative of taking no action would result in continued flooding of the area with recurring damage to property and possible loss of life.

In my evaluation, the proposed project will not have any significant impacts which would necessitate the preparation of an Environmental Impact Statement.

15 Dec '82
DATE

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

SECTION 404(b) FACTUAL DETERMINATION

AND FINDING OF COMPLIANCE

ROUGHANS POINT COASTAL FLOOD PROTECTION STUDY

REVERE, MASSACHUSETTS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

1982

Section 404(b) Factual Determination
and Finding of Compliance
for
Roughans Point Coastal Flood Protection Study
Revere, Massachusetts

1. References.

a. Section 404(b) of Public Law 92-500, Clean Water Act.

b. 40 CFR 230 subparts B, C, D, E, F, G and H, dated 24 December 1980.

c. EC 1105-2-104, Appendix C, dated 30 September 1980.

2. The Proposed Plan.

The Roughans Point (Beachmont) section of Revere, Massachusetts is experiencing recurring flooding during times of severe coastal storms. The low elevation of the area, combined with surrounding higher ground, and inadequate pumping facilities to remove interior ponding of flood waters, results in severe damage to approximately 300 structures. The proposed structural plan would be a rock revetment barrier along the existing shoreline to reduce wave energy and overtopping, and to provide structural protection to the existing seawall and revetments. This project would require placement of rockfill fifty to seventy feet seaward of existing walls and revetments. Existing storm drainage and pumping facilities would also be improved.

A nonstructural plan involves floodproofing of structures by measures such as raising above flood level, construction of utility cells and rooms; implementation of a flood warning and evacuation plan; and floodplain management measures such as zoning and building codes.

3. Project Authority.

The coastal flood protection project study is authorized under the Water Resources Planning Act of 1965 and a resolution adopted by the Committee on Public Works of the U.S. Senate in 1969.

4. Environmental Concerns

As proposed, the project will have minimal temporary impacts on the local aquatic environment. No significant or persistent adverse impacts are expected for several reasons. For further information on temporary impacts, refer to the environmental assessment prepared by the Corps of Engineers and accompanying this document.

a. If construction of the revetment is implemented, some of the sand, mud and rock environment will be removed. Some organisms inhabiting the area will be destroyed. However, this will not significantly affect the aquatic ecosystem and the overall food web in the project area. Existing substrate will be replaced with an open-jointed rock structure with greater surface area suitable for colonization. This will permit greater biological diversity and biomass.

b. There will be a temporary increase in turbidity to local waters as a result of the shoreline revetment work. The increase in the level of turbidity will be minimal causing a short term impact to the aquatic ecosystem.

c. The fill material will come from an inland quarry site. This material will be free of all possible contaminants.

d. Construction activities are expected to destroy benthic organisms inhabiting the intertidal and subtidal habitats in the immediate work area. After project completion, organisms similar to the present biological community will begin to re-establish themselves through migration from the surrounding area.

e. Placement of fill would result in the loss of less than 1 acre of a 30 acre clam flat. This clam flat is considered grossly contaminated due to water pollution. Loss of approximately 3% of this flat is not considered significant.

5. Restrictions on Discharge (Section 230.10)

There is no practical or economical alternative to the proposed placement of fill which would have fewer adverse impacts on the aquatic ecosystem and still be capable of achieving the same level of flood damage reduction. Fill material would meet the Massachusetts Water Quality standards, and it would not cause or contribute to significant degradation of waters of the United States.

The nonstructural alternative would have no impact upon aquatic ecosystems, but would not achieve the full level of flood protection afforded by the structural plan.

The "no action" alternative is not acceptable as this would continue the present level of risk of future flooding with resulting damage and destruction of private property.

6. Finding of Compliance (Section 230.12)

a. On the basis of these guidelines (Subparts C through G) the proposed disposal site for the discharge of fill material has been specified as complying with the requirements of these guidelines.

b. The factual determinations required by Section 230.11 are presented on page 4.

7. Conclusion

Determinations

a. An ecological evaluation has been made following guidance in 40 CFR 230, Subparts B through G. In addition, Subpart H was reviewed to determine applicability to the proposed project.

b. Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge.

c. Consideration has been given to the need for the proposed project, the availability of alternative sites, methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law.

d. In order to provide flood control along Roughans Point, Revere, Massachusetts, clean fill will be placed in appropriate areas.

Findings

The proposed discharge site for the proposed flood control project at Roughans Point has been specified through the application for the Section 404(b)(1) guidelines.

The project files and Federal regulations were reviewed to properly evaluate the objectives of Section 404 of Public Law 92-500. A public notice with respect to the 404 Evaluation will be issued accompanying this document. Based on information presented in the 404 Evaluation, I find that the project will not result in unacceptable impacts to the environment.

15 Dec 82
DATE

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

Factual Determination
of
Potential Effects from the Proposed
Placement of Fill Material Along
Roughans Point
Revere, Massachsusetts

230.11 (a) Physical Substrate Determination

The proposed disposal site will undergo a change in characteristics of the substrate due to the proposed construction. The existing surface of the project area varies from sand and mud to rock. The fill material would be rock which will come from a suitable inland site.

If the rock revetment construction is implemented, those areas that have a sand and mud substrate would be changed to one of rock. The organisms of the sand and mud substrate will be destroyed and will not repopulate this area. However, similar organisms do exist in the surrounding area in sufficient numbers not to significantly affect the surrounding ecosystem and the ultimate food web.

The newly created rock and sand substrate of the rock revetment will be inhabited by organisms from neighboring communities. The rock surface of the revetment will provide a stable habitat which will increase the biological diversity and biomass of the project's environment.

(b) Water Circulation, Fluctuation, and Salinity Determination

Current patterns, circulation and normal water fluctuation will not be altered in such a manner as to result in adverse affects to the environment.

Impacts on the water chemistry, salinity, clarity, color, odor, taste, dissolved gas levels, and temperature should be minimal. The reason is the large particle size of the fill material and the fact that the material will be free of contaminants.

(c) Suspended Particulate/Turbidity Determination

As a result of construction, a temporary minimal increase in suspended particulate and turbidity levels is expected. Any particles that do go into suspension will settle out before the next release of fill material. Thus no problem is anticipated.

(d) Contaminant Determination

All material proposed for discharge will be clean. It will come from a suitable inland site and be free of harmful contaminants that might adversely impact the aquatic environment or render Roughans Point unsuitable for human use.

(e) Aquatic Ecosystem and Organism Determination

Slow moving or immobile organisms inhabiting the immediate construction area are expected to be destroyed. Increasing the area of rock substrate will extend the tide line seaward, effectively removing the once intertidal substrate from the aquatic environment. However, once construction is completed the "new" intertidal area would provide a stable substrate for establishment of a new biological community with nearby communities providing recruitment for colonization.

(f) Proposed Disposal Site Determination

Not applicable. This section addresses the acceptability of and impacts associated with mixing zones. Mixing zones apply to open water disposal techniques. No open water disposal of fill material would occur in conjunction with the proposed project.

(g) Determination of Cumulative Effects on the Aquatic Ecosystem

There would be no cumulative effects on the aquatic ecosystem. The minimal turbidity and suspended particulates produced form a single discharge is expected to subside before the next discharge takes place. Any other temporary impacts from a single discharge are also expected to cease before the next discharge.

(h) Determination of Secondary Effects on the Aquatic Ecosystem

Possible secondary impacts that could be associated with construction might include interference with spawning or reproductive processes of fish and shellfish. In order to avoid this problem, construction would occur during a predetermined time period.

REFERENCES

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SECTION VIII

CORRESPONDENCE

A. ENVIRONMENTAL NOTIFICATION FORM

10.20: Severability.

(1) If any provision of these regulations (301 CMR 10.00 through 10.99) or the application thereof is held to be invalid by a court of competent jurisdiction, such invalidity shall not affect other provisions or the application of any part of these regulations not specifically held invalid, and to this end the provisions of these regulations thereof are declared to be severable.

(301 CMR 10.21 through 10.29: Reserved)

10.30: Appendix A - Environmental Notification Form

ENVIRONMENTAL NOTIFICATION FORM

I. SUMMARY

A. Project Identification
1. Project Name Roughans Pt. Flood Protection Plan

2. Project Proponent Dept. of Planning & Community Development
Address Revere City Hall, Revere, MA 02151

B. Project Description: (City/Town(s) Revere
1. Location within city/town or street address Roughans Point

2. Est. Commencement Date: 1985 (spring) Est. Completion Date: 1986 (fall)
Approx. Cost $ 11,000,000.00 Current Status of Project Design: _____% Complete

C. Narrative Summary of Project
Describe project and give a description of the general project boundaries and the present use of the project area. (If necessary, use back of this page to complete summary).

The recommended Roughans Point Coastal Flood Protection is a structural solution and consi
f stabilizing the existing facilities along the Roughans Point shore with a rugged rock berm
loping seaward 1 vertical on 3 horizontal beginning from a point 400 feet north of Elliot
ircle southerly to a point 200 feet south of the intersection of Winthrop Parkway and Leverett
venue (see plan #3). The plan also calls for "backwater" protection by raising the road
et at the intersection of Ocean Avenue and the Revere Beach Parkway. An I wall will tie
nto the high ground of the Revere Beach Parkway Bridge abutment. The intersection of State
oad and Endicott Avenue will also be raised and tied into high ground in a similar fashion.

Interior drainage improvements will consist of a trunkline storm drain from Sales Creek
nning easterly along George Avenue to Broadsound Avenue, and then northerly to the additiona
mping station and extending to the existing MDC pumping station. Another storm drain will
installed along Broadsound Avenue, and run easterly to the MDC pumping station.

Roughans Point is a low lying point of land of about 35 acres extending seaward just
uth of Revere Beach. The entire point has now been altered by residential development and
nstruction of seawalls and rock berms along the shoreline. The entire neighborhood suffers
equent flooding from both coastal storms and intense rainfall events.

cont'd on page two

Copies of this may be obtained from:
Name: Frank Strini Firm/Agency Dept. of Planning & Community Developme
Address: Revere City Hall, Revere, MA 02151 Phone No 284-3600 xt. 111

10.30: continued

P. 2

Use This Page to Complete Narrative, if necessary.

The proposed rock structure will cover approximately 4 acres of shorefront. The impacted area includes areas of previously constructed rip rap protection, dumped rock, and natural sand, mud and gravel. Most of this area is not highly favorable shellfish habitat, due to rocky substrate and high wave energy. It should be noted that the offshore area of Roughans Point beyond the project impact area includes approximately 30 acres of clam flat which is classified as grossly contaminated due to water pollution and is closed to haveresting of shellfish.

This project is one which is categorically included and therefore automatically requires preparation of an Environmental Impact Report: YES_____ NO__X__

D. Scoping (Complete Sections II and III first, before completing this section.)

1. Check those areas which would be important to examine in the event that an EIR is required for this project. This information is important so that significant areas of concern can be identified as early as possible, in order to expedite analysis and review.

	Construction Impacts	Long Term Impacts		Construction Impacts	Long Term Impacts
Open Space & Recreation	____	X	Mineral Resources	____	____
Historical	____	____	Energy Use	____	____
Archaeological	____	____	Water Supply & Use	____	____
Fisheries & Wildlife	____	____	Water Pollution	X	____
Vegetation, Trees	____	____	Air Pollution	____	____
Other Biological Systems	____	____	Noise	X	____
Inland Wetlands	____	____	Traffic	X	____
Coastal Wetlands or Beaches	X	X	Solid Waste	____	____
Flood Hazard Areas	____	____	Aesthetics	____	X
Chemicals, Hazardous Substances, High Risk Operations	____	____	Wind and Shadow	____	____
Geologically Unstable Areas	____	____	Growth Impacts	____	____
Agricultural Land	____	____	Community/Housing and the Built Environment	____	____
Other (Specify)_____				____	____

2. List the alternatives which you would consider to be feasible in the event an EIR is required.

All other alternative plans are not considered feasible since they would not provide the same degree of flood protection as this plan.

10.30: continued

E. Has this project been filed with EOEA before? Yes _____ No X
If Yes, EOEA No. _____ EOEA Action? _____

F. Does this project fall under the jurisdiction of NEPA? Yes X No _____
If Yes, which Federal Agency? Corps of Engineers NEPA Status? Assessment included in report

G. List the State or Federal agencies from which permits will be sought:

Agency Name	Type of Permit
U.S. Army Corps of Engineers	Sec. 404 Clean Water Act

H. Will an Order of Conditions be required under the provisions of the Wetlands Protection Act (Chap. 131, Section 40)?
Yes _____ No X
DEQE File No., if applicable: _____

I. List the agencies from which the proponent will seek financial assistance for this project:

Agency Name	Funding Amount
Undetermined (Special legislation would have to be introduced)	$3.307,000

II. PROJECT DESCRIPTION

A. Include an original 8½ x11 inch or larger section of the most recent U.S.G.S. 1:24,000 scale topographic map with the project area location and boundaries clearly shown. Include multiple maps if necessary for large projects. Include other maps, diagrams or aerial photos if the project cannot be clearly shown at U.S.G.S. scale. If available, attach a plan sketch of the proposed project.

B. State total area of project: 5 acres
Estimate the number of acres (to the nearest 1/10 acre) directly affected that are currently:

1. Developed	0 acres	4. Floodplain	2 acres
2. Open Space/Woodlands/Recreation	0 acres	5. Coastal Area	3 acres
3. Wetlands	0 acres	6. Productive Resources	
		Agriculture	0 acres
		Forestry	0 acres
		Mineral Products	0 acres

C. Provide the following dimensions, if applicable:
Length in miles 4,020 ft. Number of Housing Units NA Number of Stories NA

	Existing	Immediate Increase Due to Project
Number of Parking Spaces	NA	____
Vehicle Trips to Project Site (average daily traffic)	NA	____
Estimated Vehicle Trips past project site	NA	____

D. If the proposed project will require any permit for access to local or state highways, please attach a sketch showing the location of the proposed driveway(s) in relation to the highway and to the general development plan; identifying all local and state highways abutting the development site; and indicating the number of lanes, pavement width, median strips and adjacent driveways on each abutting highway; and indicating the distance to the nearest intersection.

10.30: continued

III. ASSESSMENT OF POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS

Instructions: Consider direct and indirect adverse impacts, including those arising from general construction and operations. For every answer explain why significant adverse impact is considered likely or unlikely to result.

Also, state the source of information or other basis for the answers supplied. If the source of the information, in part or in full, is not listed in the ENF, the preparing officer will be assumed to be the source of the information. Such environmental information should be acquired at least in part by field inspection.

A. Open Space and Recreation

1. Might the project affect the condition, use or access to any open space and/or recreation area?
Yes X No ____

Explanation and Source:

Project is immediately south of the Revere Beach Reservation and will affect approximately 500 linear feet of this beachfront. The remaining project area, approximately 3400 linear feet, however, is characterized by a rocky shoreline and limited access to the water restricts the use of this shoreline for recreation.

Source: Recreation Recovery Action Plan - City of Revere
Roughans Point Coastal Flood Protection Study - U.S. Army Corps of Engineers

B. Historic Resources

1. Might any site or structure of historic significance be affected by the project? Yes ____ No X

Explanation and Source:

None of the properties which are listed in the National Register of Historic Places or any local or state registers are located within the project boundaries.

Source: Historical Commission - City of Revere

2. Might any archaeological site be affected by the project? Yes ____ No X

Explanation and Source:

Project area is located within the tidal zone and prior development of seawalls and rock revetments have already disturbed the area.

C. Ecological Effects

1. Might the project significantly affect fisheries or wildlife, especially any rare or endangered species?
Yes ____ No X

Explanation and Source:

The shoreline area that would be impacted by the structural plan is primarily composed of large boulders and gravel, a poor substrate habitat for shellfish. The more suitable sand and mud areas are further off shore. These offshore shellfish beds, however, are highly polluted and have been closed to harvesting for many years.

Roughans Point Coastal Flood Protection Study - U.S. Army Corps of Engineers

10.30: continued

P.5

2. Might the project significantly affect vegetation, especially any rare or endangered species of plant?
Yes ____ No X
(Estimate approximate number of mature trees to be removed: ____)

Explanation and Source:

Structural modification to the shoreline have all but eliminated any native dune or coastal vegetation. The area that would be impacted by the structura plan contains no trees or other significant vegetation.

Roughans Point Coastal Flood Protection Study - U.S. Army Corps of Engineers

3. Might the project alter or affect flood hazard areas, inland or coastal wetlands (e.g., estuaries, marshes, sand dunes and beaches, ponds, streams, rivers, fish runs, or shellfish beds)? Yes X No ____

Explanation and Source:

The shoreline area that would be impacted is primarily rocky in character composed of large boulders and gravel and therefore, with the implementation of this plan would not be significally altered from its present condition. However, at low tide there will be a loss of approximately 30 to 40 ft. of beach along the entire reach of the project shoreline due to the seaward extension of the rock berm. There will be minimal loss of beach at high tide in reaches A and E. (see Plan #3)

4. Might the project affect shoreline erosion or accretion at the project site, downstream or in nearby coastal areas? Yes ____ No X

Explanation and Source:

Project is intended to prevent shoreline erosion and will not interrupt the natural flow of sand in what is currently a high wave energy environment.

5. Might the project involve other geologically unstable areas? Yes ____ No X

Explanation and Source:

No geologically unstable areas exist within the project area. Subsurface information indicates bedrock (Cambridge slate) is found deeper than 30 to 40 ft. overlain be glacially derived till and stratified sand and gravel deposits. A relatively recent sequence of clays, peat, and beach deposits of sand and gravel overlies the glacial deposits.

Source: Roughans Point Flood Protection Study

D. Hazardous Substances

1. Might the project involve the use, transportation, storage, release, or disposal of potentially hazardous substances?
Yes ____ No X

Explanation and Source:

No hazardous substances will be used or generated by this project.

10.30: continued

E. Resource Conservation and Use

1. Might the project affect or eliminate land suitable for agricultural or forestry production?
Yes _____ No X
(Describe any present agricultural land use and farm units affected.)

Explanation and Source:

Project area is a rocky shoreline where no agriculture or forestry production currently exists.

2. Might the project directly affect the potential use or extraction of mineral or energy resources (e.g., oil, coal, sand & gravel, ores)? Yes _____ No X

Explanation and Source:

There are presently no known mineral or energy resources within the project area.

3. Might the operation of the project result in any increased consumption of energy? Yes _____ No X

Explanation and Source:
(If applicable, describe plans for conserving energy resources.)

Project will not result in any increased consumption of energy since it will not require any operational function.

F. Water Quality and Quantity

1. Might the project result in significant changes in drainage patterns? Yes _____ No X

Explanation and Source:

The project will not alter any interior drainage patterns as its main function is to dissipate wave energy and reduce tidal surge. Supplemental interior drainage provisions to those already existing will alleviate interior flooding.

2. Might the project result in the introduction of pollutants into any of the following:
(a) Marine Waters ..... Yes _____ No X
(b) Surface Fresh Water Body ..... Yes _____ No X
(c) Ground Water ..... Yes _____ No X

Explain types and quantities of pollutants.

The project will not generate any pollutants.

10.30: continued

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3. Will the project generate sanitary sewage? Yes _____ No X
If Yes, Quantity: _____ gallons per day
Disposal by: (a) Onsite septic systems ..... Yes _____ No _____
(b) Public sewerage systems ..... Yes _____ No _____
(c) Other means (describe) _____

4. Might the project result in an increase in paved or impervious surface over an aquifer recognized as an important present or future source of water supply? Yes _____ No _____

Explanation and Source:

Project involves coastal flood protection over a shoreline where no known aquifer or water source exists.

5. Is the project in the watershed of any surface water body used as a drinking water supply?
Yes _____ No X
Are there any public or private drinking water wells within a 1/2-mile radius of the proposed project?
Yes _____ No X

Explanation and Source:

There are no public or private wells and no watershed used for a drinking water supply in the project area. Local drinking water is derived from the MDC water distribution system.

6. Might the operation of the project result in any increased consumption of water? Yes _____ No X
Approximate consumption _____ gallons per day. Likely water source(s) _____ _____

Explanation and Source:

Project will not require any consumption of water.

7. Does the project involve any dredging? Yes X No _____
If Yes, indicate:
Quantity of material to be dredged 51,000 c.y.
Quality of material to be dredged clay, sand and gravel
Proposed method of dredging undetermined
Proposed disposal sites undetermined
Proposed season of year for dredging undetermined

Explanation and Source:

Clay, sand and gravel will be excavated at the base of the structure and replaced with layers of armor stone and gravel for slope and toe protection.

Source: Coastal Flood Protection Study.

10.30: continued

G. Air Quality

1. Might the project affect the air quality in the project area or the immediately adjacent area?
Yes _____ No X

Describe type and source of any pollution emission from the project site. _____

Project will not generate any pollution other than dust during construction.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any pollution emissions caused by the project, including construction dust? Yes X No _____

Explanation and Source:

The shorefront residential properties adjacent to the proposed structure would be subject to dust generation traditionally associated with construction activity.

3. Will access to the project area be primarily by automobile? Yes _____ No X

Describe any special provisions now planned for pedestrian access, carpooling, buses and other mass transit.

To provide access over the rock to the water, wide steps will be constructed at three or more locations along the alignment. Access is currently limited by lack of public property along the shoreline and rocky character of the shoreline.

H. Noise

1. Might the project result in the generation of noise? Yes X No _____

Explanation and Source:
(Include any source of noise during construction or operation, e.g., engine exhaust, pile driving, traffic.)

Noise will be generated during construction activity due to the increase in truck traffic through the neighboroood.

2. Are there any sensitive receptors (e.g., hospitals, schools, residential areas) which would be affected by any noise caused by the project? Yes X No _____

Explanation and Source:

The Roughans Point neighborhood would be subject to noise generated by the truck traffic during construction activity.

10.30: continued

P.9

I. Solid Waste

1. Might the project generate solid waste? Yes X No ____

Explanation and Source:
(Estimate types and approximate amounts of waste materials generated, e.g., industrial, domestic, hospital, sewage sludge, construction debris from demolished structures.)

Approximately 51,000 c.y. of sand, mud and gravel will be excavated and will be disposed of at an approved land fill site.

J. Aesthetics

1. Might the project cause a change in the visual character of the project area or its environs?
Yes X No ____

Explanation and Source:

The project area would change slightly in visual character, as the proposed rock structure would extend seaward 40 to 60 ft. from the existing shoreline. The rocky character of the shoreline would not be changed.

2. Are there any proposed structures which might be considered incompatible with existing adjacent structures in the vicinity in terms of size, physical proportion and scale, or significant differences in land use?
Yes ____ No X

Explanation and Source:

The plan will raise shoreline structures to a comporable height of existing adjacent structures.

3. Might the project impair visual access to waterfront or other scenic areas? Yes X No ____

Explanation and Source:

In reaches B, C and D (Plan #3) the plan will raise shoreline structures up to 5 ft. affecting water views for residences in this area.

Source: Roughans Point Coastal Flood Protection Study

K. Wind and Shadow

1. Might the project cause wind and shadow impacts on adjacent properties? Yes ____ No X

Explanation and Source:

The project will not cause any major wind or shadow impacts on adjacent properties.

10.30: continued

IV. CONSISTENCY WITH PRESENT PLANNING

A. Describe any known conflicts or inconsistencies with current federal, state and local land use, transportation, open space, recreation and environmental plans and policies. Consult with local or regional planning authorities where appropriate.

There are no known conflicts or inconsistencies with current federal, state or local plans and policies.

V. FINDINGS AND CERTIFICATION

A. The notice of intent to file this form has been/will be published in the following newspaper(s):

(Name) Revere Journal (Date) August 4, 1982

B. This form has been circulated to all agencies and persons as required by Appendix B.

Aug. 11, 1982 Frank Stringe
Date — Signature of Responsible Officer or Project Proponent

Frank Stringi
Name (print or type)

Address Dept. of Planning & Comm. Dev.
Revere City Hall, Revere, MA 02151
Telephone Number 284-3600, ext. 111

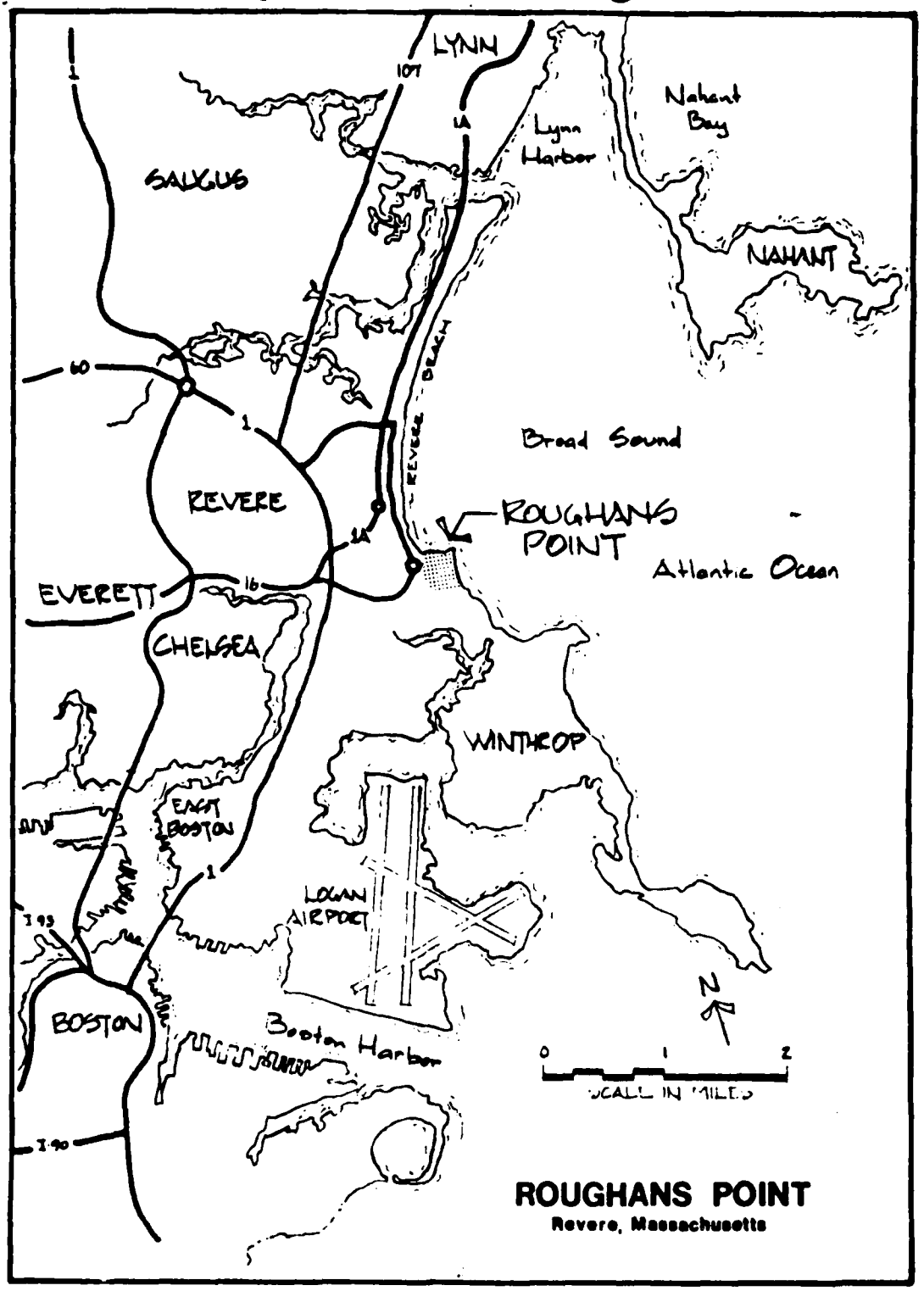
Date — Signature of person preparing ENF (if different from above)

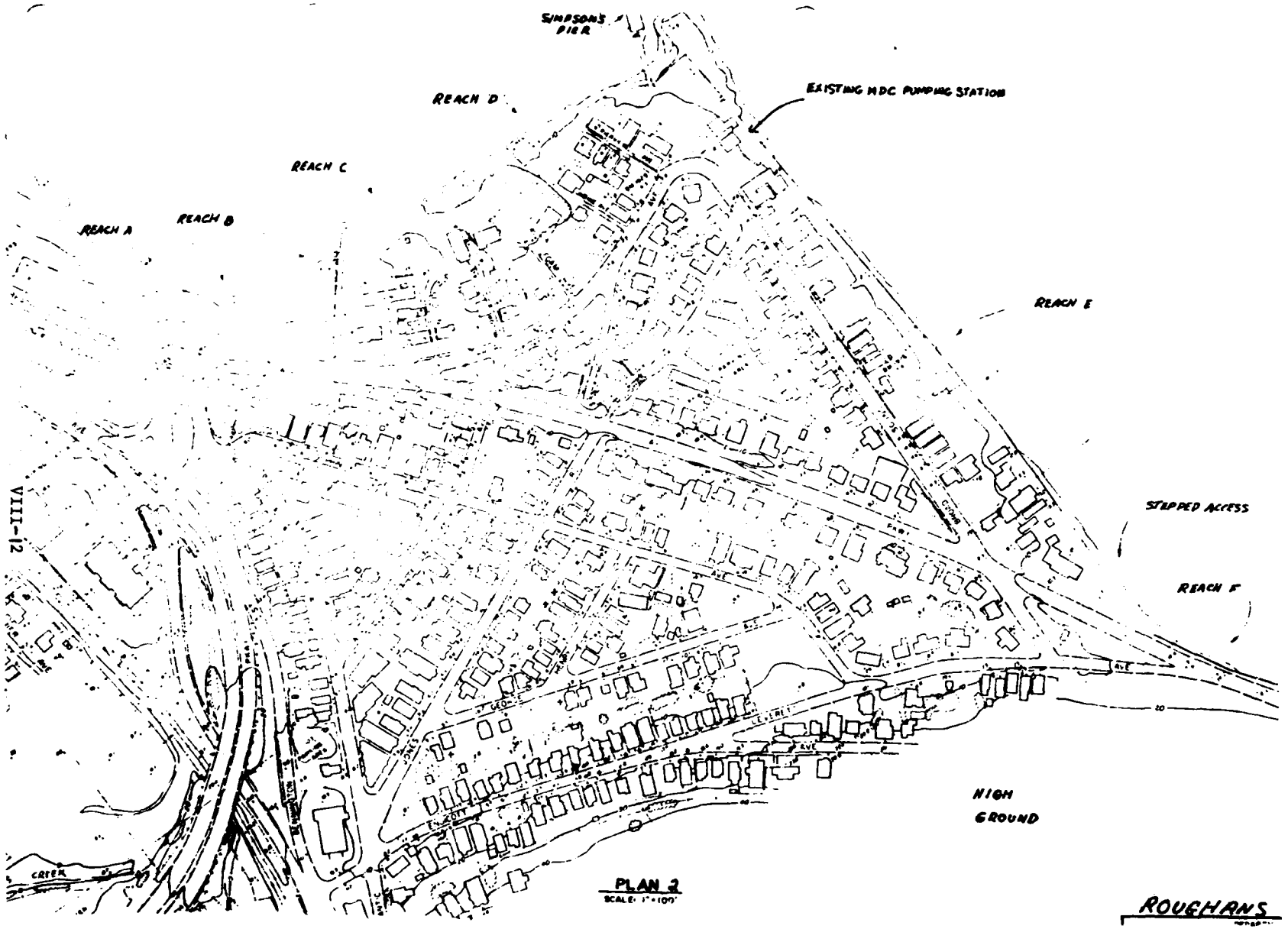
Name (print or type)

Address

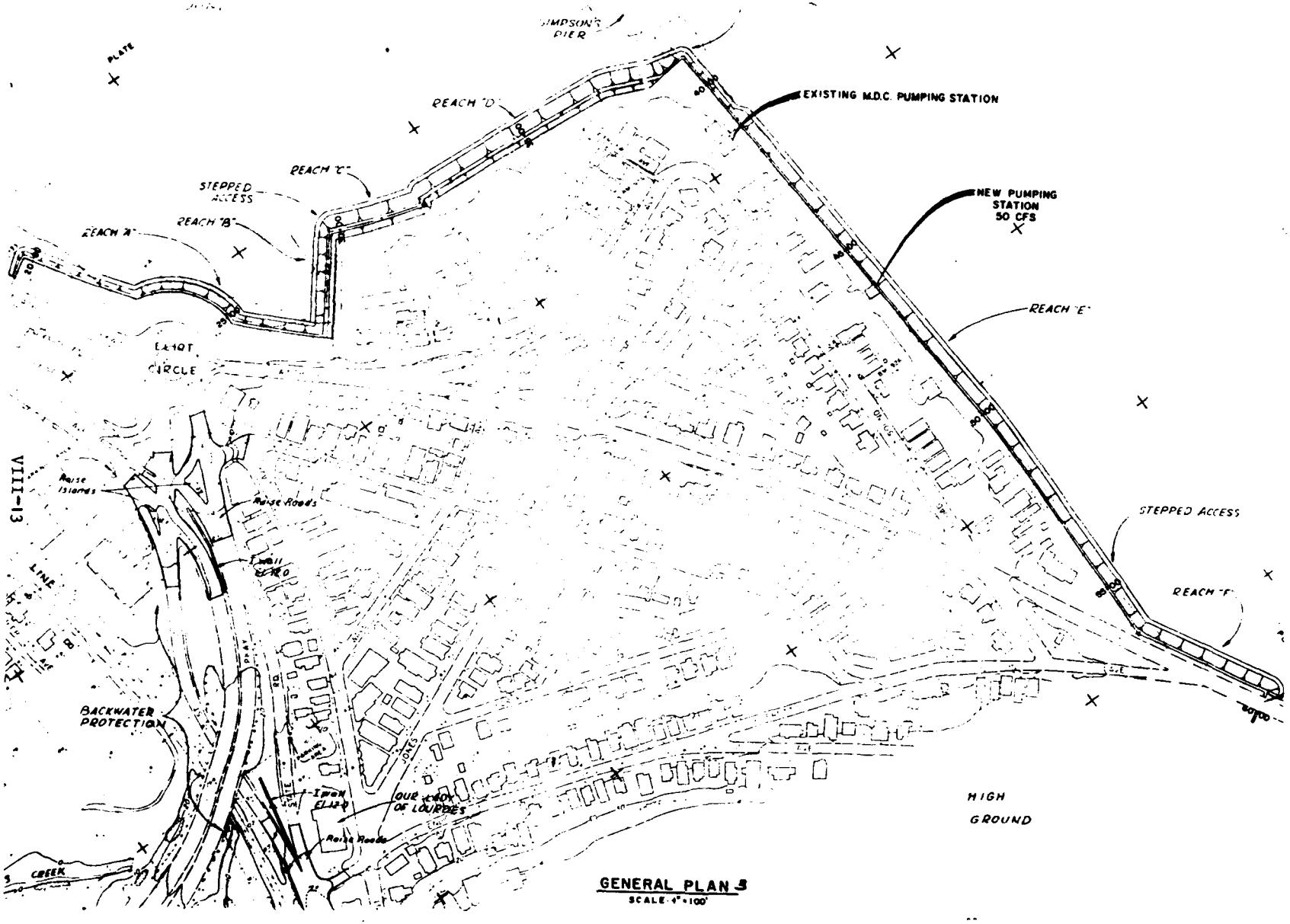
Telephone Number

PLAN I


LYNN
107
1A
Lynn Harbor
Nahant Bay
SAUGUS
NAHANT
60
1
REVERE BEACH
Broad Sound
REVERE
ROUGHANS POINT
Atlantic Ocean
EVERETT
16
CHELSEA
WINTHROP
EAST BOSTON
LOGAN AIRPORT
I 93
BOSTON
Boston Harbor
I-90
0 1 2
SCALE IN MILES
ROUGHANS POINT
Revere, Massachusetts


SIMPSONS PIER
REACH D
EXISTING MDC PUMPING STATION
REACH C
REACH A
REACH B
REACH E
STEPPED ACCESS
REACH F
HIGH GROUND
CREEK
PLAN 2
SCALE: 1"=100'

ROUGHANS



GENERAL PLAN 3
SCALE: 1" = 100'

B. COMMENTS AND RESPONSES

The Commonwealth of Massachusetts
Water Resources Commission
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

November 17, 1982

Colonel Carl B. Sciple
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Dear Colonel Sciple:

The Massachusetts Water Resources Commission, on November 8, 1982, acting pursuant to Chapter 21, Section 9 of the Massachusetts General Laws relating to State-Federal cooperation in flood prevention programs, considered the Roughans Point, Revere, Massachusetts, Coastal Flood Protection Study and the proposals contained in the Interim Response of May 1981.

Recurring damage resulting from coastal storms has imposed economic burdens on individual households, the City of Revere, and those State agencies whose programs relate to storm damage protection. The Federal interest is especially great in this area because of the heavy reliance on National Flood Insurance to restore repeatedly damaged properties.

The planned rock berm, together with improved drainage and pumping facilities will greatly reduce damages and has strong local support. The Commission will endorse legislation that provides a reasonable sharing of the local cost between the City of Revere and The Commonwealth. Final arrangements to determine local operation and maintenance responsibilities will be formulated during the Continuation of Planning and Engineering (C.P. and E.).

The final plan must comply with requirements of those State agencies whose facilities are affected, and with the requirements of the Massachusetts Environmental Policy Act, and The Massachusetts Coastal Zone Program. We anticipate that at the conclusion of C.P. and E., The Commonwealth and the City of Revere will enter into an agreement to provide a reasonable non-Federal share of project costs.

This committment must of course, be conditioned on satisfactory resolution of existing ambiguities in the Federal cost-sharing formula, and a reaffirmation of the final design's economic and environmental viability.

The City of Revere and The Commonwealth of Massachusetts will thereafter seek to devise a formula by which they may equitably share the non-Federal costs of the project. The Water Resources Commission will continue to make available its good offices to help resolve the several remaining issues to be addressed in the final engineering and planning stage.

Sincerely yours,

George V. Colella, Mayor
City of Revere

Co-Chairman, Massachusetts
Water Resources Commission
Commissioner of The Department
of Environmental Management

Co-Chairman, Massachusetts
Water Resources Commission
Commissioner of The Department of
Environmental Quality Engineering

EDWARD J. MARKEY
7TH DISTRICT, MASSACHUSETTS

COMMITTEES:
ENERGY AND COMMERCE
INTERIOR AND INSULAR AFFAIRS
CHAIRMAN
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

Congress of the United States
House of Representatives
Washington, D.C. 20515

403 CANNON HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-2836

DISTRICT OFFICES:
2100A JOHN F. KENNEDY BUILDING
BOSTON, MASSACHUSETTS 02203
(617) 223-2781

464B SALEM STREET
MEDFORD, MASSACHUSETTS 02155
(617) 396-4600

7 September 1982

Colonel Carl B. Sciple
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Sciple:

I am once again writing in regard to the coastal flood protection study undertaken by the Army Corps of Engineers for the Roughan's Point area of Revere, Massachusetts.

I have reviewed the Corps' most recent report on this project and would like to pledge my full support. The success of the engineering proposal now depends on the Corps' immediate action. It is essential that the plans be implemented as expeditiously as possible to assure the safety of the community and prevent the repetition of the severe damage caused by the "Blizzard of '78."

As you know, the flood control project has been of special interest to me over the past few years. The Corps and the city of Revere can be assured of my continued support and assistance at any time in the future.

Please keep me informed of any future developments with this project.

Thank you in advance for your time and attention.

Sincerely,

Ed Markey

EDWARD J. MARKEY
Member of Congress

EJM/kjr

COMMONWEALTH OF MASSACHUSETTS
State Senate
Committee on Ways and Means
STATE HOUSE, BOSTON 02133

SEN. CHESTER G. ATKINS
MIDDLESEX-WORCESTER DISTRICT
CHAIRMAN

Room 312
TELEPHONE
722-1481

November 5, 1982

Senator Francis D. Doris
Massachusetts Senate
Room 313
State House
Boston, MA 02133

RE: Roughans Point Coastal Flood Protection

Dear Fran:

Thank you for bringing me up to date on the Roughans Point Flood Protection project. The project appears to me to have merit, and I look forward to working with you in the next year in obtaining for it an appropriate level of state funding.

Please call me if I can be of further assistance on this matter.

Sincerely,

Chester G. Atkins
Chairman
Senate Committee on
Ways and Means

CGA:kb

THE COMMONWEALTH OF MASSACHUSETTS
MASSACHUSETTS SENATE
STATE HOUSE, BOSTON 02133

HON. FRANCIS D. DORIS
SUFFOLK-ESSEX-MIDDLESEX DISTRICT
ROOM 313
TEL. 722-1650

CHAIRMAN
JOINT LEGISLATIVE COMMITTEE ON FEDERAL FINANCIAL ASSISTANCE

CHAIRMAN
SPECIAL COMMISSION ON THE CONCERNS OF THE VIETNAM VETERAN

COMMITTEES:
INSURANCE
VICE CHAIRMAN
NATURAL RESOURCES AND AGRICULTURE
STATE ADMINISTRATION
URBAN AFFAIRS

November 5, 1982

Charles F. Kennedy, Director
Massachusetts Water Resource Commission
100 Cambridge Street
Room 2106
Boston, MA 02202

Dear Mr. Kennedy:

I am in receipt of a recent correspondence from George Colella, Mayor of The City of Revere, regarding the Roughan's Point Coastal Flood Protection Project, and would like to take this opportunity to express my views and concerns to your office.

Please be assured that, as the Senator representing Revere, I fully support the position of the local city government, and will do all that I can to secure the necessary state funding. The City of Revere is well prepared to enter into a firm agreement with the Commonwealth, in order to provide the appropriate non-federal share of product costs.

Completion of this project will have a profound positive impact upon both the local Rougan's Point neighborhood and the City of Revere as a whole.

An endorsement from the Massachusetts Water Resource Commission prior to the submission of the main report to the Chief Federal Engineers is the final stage before actual work can take place. You immediate attention to this matter will be greatly appreciated.

Sincerely yours,

Francis D. Doris
SENATOR
Suffolk, Essex, Middlesex
District

FDD/kaz

The City of Revere Massachusetts City Hall
281 BROADWAY
REVERE, MA 02151
284-3600

Revere Beach Citizens Advisory Committee

March 24, 1982

Colonel C. E. Edgar
Division Engineer
Army Corp of Engineers
424 Trapelo Road
Waltham, Ma. 02154

Dear Colonel Edgar:

The Revere Beach Citizens Advisory Committee endorses and supports the N.E. Division's recommendation of structured protection for the Roughan's Point area currently being studied.

During the many meetings held by this committee and the corps jointly, the people of the neighborhood have insisted on the highest degree of flood protection possible.

The berming and complete enclosure of the sea wall and the new pumping station with a more widespread system for the removal of water has the support of our committee and area residents.

The non-structural plan was completely unsatisfactory to all as it did not appear to prevent flooding and the ensuing hardships.

We have observed the N.E. division of the Corps at work over the past three years and have been most impressed by the time and effort they have made in our behalf. Their most assuring practice of listening to the people and always being available when asked to attend meetings is greatly appreciated by all.

If we can be of further assistance to the Corps, please be assured of our full cooperation.

Sincerely,

Ellen Haas, Chairperson
R.B.C.A.C.
10 Pierview Avenue
Revere, Ma. 02151

jc

GEORGE V. COLELLA
MAYOR

THE CITY OF
REVERE, MASSACHUSETTS

OFFICE OF THE MAYOR
CITY HALL

October 6, 1982

Mr. Joseph L. Ignazio, Chief
Planning Division
Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

RE: Roughan's Point Flood
Protection Plan

Dear Mr. Ignazio:

As you are aware, the City of Revere recently submitted an Environmental Notification Form to the Executive Office of Environmental Affairs for the above mentioned project pursuant to Massachusetts General Laws, Chapter 30, Section 62A and 10.04 (1) of the regulations governing the implementation of the Massachusetts Environmental Policy Act.

On September 22, 1982, the City of Revere received a Certification of Action from the Secretary of Environmental Affairs stating that the project does not require an Environmental Impact Report. However, attached to the Certification of Action were comments from the Massachusetts Policy Act unit and Massachusetts Coastal Zone Management.

Since the substance of these comments pertain more to the information provided by the Corp of Engineers in their environmental assessment and involve more detail than the scope of the Environmental Notification Form prepared by the City, the City of Revere is requesting that the Corp of Engineers respond specifically to these comments (attached).

Once again, the Corp of Engineers time, consideration and dedication towards this most important flood protection project, is greatly appreciated.

Very truly yours,

George V. Colella
Mayor

GVC/lf
Attachment

cc: Paul Rupp, Director DPCD
Joseph Bocchino, Corp of Engineers

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A. BEWICK
SECRETARY

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS

ON

ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME:	Roughan's Point Flood Protection Plan
PROJECT LOCATION:	Revere
EOEA NUMBER:	4500
PROJECT PROPONENT:	Dept. of Planning & Community Development
DATE NOTICED IN MONITOR:	August 23, 1982

Pursuant to M.G.L., Chapter 30, Section 62A, and 10.04(9) of the Regulations Governing the Implementation of the Massachusetts Environmental Policy Act, I hereby determine that the above referenced project does not require an Environmental Impact Report.

However, the following comments and those enclosed from MDC, CZM, MAPC and the Massachusetts Historical Commission should be clearly addressed in the supplement to the Roughan's Point Revere, Massachusetts, Coastal Flood Protection Study, Volumes I and II, currently under preparation.

It is not clear from the documents presented that all of the damage ascribed to the 1978 blizzard was due to flooding. It would appear that wind damage and water damage due to the wind damage might have been included. This point should be clarified. Additionally, the numbers and/or locations of structures which are inundated at various flood levels should be ascertained. The 1978 blizzard severely damaged a total of 309 structures. In evaluating the desired degree of protection, the number of structures per foot of elevation would be useful. At what elevations are the 28 homes which have received protection since 1978? At what elevations are the homes which could be protected by non-structural means?

Inasmuch as a number of years will lapse from now to the date when construction could begin, how many of the most exposed structures are expected to be at least partially protected by their owners prior to construction?

By presenting only an average overtopping rate for the entire project area, the proponent has failed to provide sufficient documentation of the need for the extent of protection proposed for each reach of the project. Since differing reaches face different compass points and have different lengths of fetch, the degree of protection needed may vary by reach. This becomes important for two reasons: the impact on resources and the total cost of the project. If a lesser structure on reaches A, B, C, and D would give equal protection to that proposed for the more exposed reaches (E and F), the added impacts, financial and environmental, are not justified.

The environmental impacts of the revetment include loss of MDC beach along reach A, possible loss of shellfish and their habitat, loss of some visual access to the seascape and an increase in difficulty in reaching the foreshore , an area open to the public.

Several areas germane to the needed Ch. 131, s. 40, filing need amplication. These include: (1) Are there sufficient concentrations of shellfish in the footprint of the proposed revetments to require their relocation? (2) Will the placement of the revetment affect nearshore bathymetry ? (3) Will the improved drainage system impact negatively the hydrology of Sales Creek?

The MDC outfall would need to be relocated and must be designed to support the revetment materials.

Public access to the foreshore needs to be discussed.

The existing and proposed flood water intake system should be designed to function when land and marine debris collects at the inlets, in that cleaning is difficult under storm conditions.

September 22, 1982
DATE

Samuel G. Myatt, for
JOHN A. BEWICK, SECRETARY

METROPOLITAN AREA
PLANNING COUNCIL
110 TREMONT ST.
BOSTON, MA 02108
Tel. (617) 451-2770

RECEIVED
SEP 14 1982
OFFICE OF THE SECRETARY OF
ENVIRONMENTAL AFFAIRS

September 14, 1982

The Honorable John A. Bewick
Secretary of Environmental Affairs
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Attention: MEPA Unit, David E. Shepardson

RE: Roughans Point Flood-Protection Plan, Revere Department of Planning and Community Development (MAPC #ENF-82-128, received August 23, 1982) EOEA #4500.

Dear Secretary Bewick:

In accordance with the provisions of Chapter 30, Section 62 of the Massachusetts General Laws, the Council has reviewed the above-referenced Environmental Notification Form and offers the following comments.

The proposed project consists of structural flood-control measures, costing over $3 million, for approximately 600 feet of coastal frontage along Roughans Point. The ENF identifies the impacts resulting from the project, including traffic, noise, water pollution, open space and recreation, and coastal wetlands.

While we recognize that there is presently a need for coastal flood protection in this area, we note this present situation was, in part, caused by lack of sufficient attention to flood-control when earlier development decisions were made in the area. Further alteration of this area, including structural flood controls, could now contribute to additional problems, such as continual maintenance, more development, and changes in littoral drift, resulting in erosion or sedimentation in other areas.

Therefore, the Council recommends that the following information be required prior to approval of this project:

1. The ENF indicates that an Order of Conditions will not be required, but the project appears to be within the jurisdiction of the Wetlands Protection Act. The locus map does not indicate whether or not the project area is within 100 feet of Winthrop's coastal wetlands, but

the project is likely to impact Sales Creek. The Winthrop Conservation Commission should be asked if it intends to issue an Order of Conditions.

2. The Office of Coastal Zone Management should be asked to review this project for consistency with their policies and recommendations.

3. The ENF indicates that alternative plans would not provide the same degree of flood protection, but no alternative plans are described. Alternatives should be considered, and the preferred alternative should be based on engineering design, environmental impacts, and cost.

4. The City of Revere should be encouraged to acquire the remaining lands within the coastal floodplain. MAPC would endorse applications to the Division of Conservation Services to help fund such an acquisition program.

Thank you for the opportunity to comment on this notification form.

Sincerely,

Jonathan G. Truslow
Executive Director

JGT:sjf
cc: Revere Dept. of Planning & Community Development
Mayor George V. Colella, MAPC Representative, Revere
Arleen O'Donnell, MAPC Staff

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

December 9, 1982

REPLY TO
ATTENTION OF:

Planning Division
Basin Management Branch

SUBJECT: Revere Coastal Flood Protection Study - Roughans Point

Mr. John A. Bewick, Secretary
Executive Office of
Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. Bewick:

Receipt is acknowledged of a copy of your attached certificate, dated September 22, 1982, regarding the subject project. This certificate was sent from your office to the City of Revere in response to the Environmental Notification Form (ENF) filed by the City, as project proponent, in fulfillment of requirements under the Massachusetts Environmental Policy Act (MEPA). You determined that an Environmental Impact Report (EIR) was not required, but that comments received should be addressed.

The City of Revere, by letter dated October 6, 1982, requested that we answer in its behalf. The certificate outlined review comments, forwarded to your MEPA Unit, of our plan selection for recommendation. Meetings were held on October 18, 1982 and November 1, 1982, between members of our respective staffs, including Coastal Zone Management (CZM) and the MEPA Unit, and the City of Revere to discuss the items you identified.

The enclosed attachment summarizes our responses referenced to each comment identified in your certificate. Since the Metropolitan District Commission (MDC) transmitted their review to us, we responded to them directly. This is outlined in the enclosed attachment. Our response to CZM's concerns was also coordinated directly with their staff. Copies were sent under separate cover to your MEPA Unit. Finally, it is our understanding that the Metropolitan Area Planning Council (MAPC) reviewed the ENF without considering the information presented in earlier study documents. Upon realization of this, they were satisfied that their comments had been adequately addressed.

Efforts during the next phase of the project, Continuation of Planning and Engineering (CP&E), will be coordinated with your office to ensure mutual satisfaction. Your staff has been most cooperative during this feasibility investigation of coastal flood protection for the Roughans Point area of Revere, Massachusetts. We thank you, and look forward to maintaining this spirit of cooperation as the study comes to an end. If you have any further questions, please contact Mr. Joseph Bocchino of my staff at (617) 647-8538.

Sincerely,

Joseph L. Ignazio
Chief, Planning Division

Attachments

Copy Furnished:
Mr. Jeff Benoit, CZM
Mr. Michael Penney, CZM
Mr. George Brocke, CZM
Mr. Emerson Chandler, Mass. Water Resources Commission
Mr. Dave Shepardson, MEPA

RESPONSES
TO
ENF COMMENTS

1. Flood Damage and Nonstructural Protection

The methodology used in determining damages caused by flood inundation is included on pgs. E-2 through E-18 of Appendix E, "Economics", in Volume II of the Draft Interim Response. The following is offered in an effort to clarify the sampling and its application.

The residential properties in Roughans Point were separated into 20 categories (see Table 1). A sample (less than 6 structures) from each was then surveyed in detail providing a representative stage damage relationship for that particular category of homes. These stage damage relationships indicate the expected damages at various levels, ranging from no flooding to complete inundation. That is why such items as ceilings and roofing were included in the sampling.

Knowing at what elevation inundation would begin for each individual home, flood damages were then calculated across the full range of events - from the frequent to the rare - for that home using its category's representative stage damage relationship. These were then aggregated to determine the benefits attributable to flood inundation reduction.

The number of structures located at various interior flood levels are listed in Table 5, page II-19 of the Draft Interim Response's Volume I. Thirty-one (31) homes in the study area have received protection under the Massachusetts' Coastal Floodproofing Program (see Table 2). Three (3) of those have been found to warrant additional nonstructural measures, and a fourth (15 George Avenue) was protected subsequent to preparation of the Draft Interim Response. These latter 4 were included in the homes identified in Plan B, the Nonstructural Plan. Table 3 below lists the first floor elevations of those homes in Plan B (not including 15 George Avenue). It is our understanding that significant floodproofing by individual homeowners is not an on-going process.

2. Wave Analysis

The wave anlaysis accomplished for the subject study is quite extensive and complete for feasibility level investigations, as discussed in the November 1, 1982, meeting. The recommended plan's features were influenced by the existing foundation conditions, as well as design wave energy dissipation needs. More detailed wave refraction, geotechnical, and sand replenishment (along Reach A) studies are planned for the next phase, Continuation of Planning and Engineering (CP&E).

TABLE 1

ROUGHANS POINT
SAMPLING CATEGORIES

1.	Modern 2 Family 2 Story	
2.	Colonial 1 Family or 2 Family, 2-2-1/2 Story	
3.	Contemporary Tri-level 1 Family or 2 Family	
4.	Split Level 2 Family	
5.	Cottage 1 Family	NO BASEMENT
6.	Summer Cottage 1 Family	NO BASEMENT
7.	Summer Duplex Cottage 2 Family	NO BASEMENT
8.	Duplex Garrison 2 Story 2 Family	NO BASEMENT
9.	3 Family Frame 3 Story Flat Roof	
10.	Cape (medium) 1-1/2 Story 1 Family	
11.	Ranch Modified to Garrison 1 Family	
12.	Ranch Modified to Colonial 1 Family	
13.	Bungelow (jacked)	
14.	Bungelow small 1 Family	
15.	Mobile (converted) 1 Family	
16.	Special Frame 2 Story 2 Family	
17.	Ranch (medium)	
18.	Ranch (small)	
19.	Ranch (large)	
20.	Raised Ranch 1 and 2 Family	

TABLE 2

ROUGHANS POINT
HOMES PROTECTED UNDER
MASSACHUSETTS COASTAL FLOODPROOFING PROGRAM

ADDRESS	FIRST FLOOR ELEVATION (ft. NGVD)
71 Broadsound Avenue	10.4
86 Broadsound Avenue	19.5
95 Broadsound Avenue	14.2
121 Broadsound Avenue	15.3
137 Broadsound Avenue	13.1
143 Broadsound Avenue	11.4
147 Broadsound Avenue	17.8
156 Broadsound Avenue	14.8
157 Broadsound Avenue	12.1
162 Broadsound Avenue	7.0
163 Broadsound Avenue	9.4
171 Broadsound Avenue	13.1
172 Broadsound Avenue	9.2
210 Broadsound Avenue	9.5
22 Dolphin Avenue	12.9
96 Dolphin Avenue	13.1
112 Dolphin Avenue	9.5
134 Dolphin Avenue	10.7
146 Dolphin Avenue	12.4
28 Endicott Avenue	12.6
15 George Avenue	6.3
21 Henry Street	12.1
22 Henry Street	12.3
23 Henry Street	12.9
71 Jones Road	9.9
42 Leverett Avenue	12.4
30 Roughan Street	9.9
102 Winthrop Parkway	12.3
145 Winthrop Parkway	13.2
153 Winthrop Parkway	13.1
181 Winthrop Parkway	13.9

TABLE 3

ROUGHANS POINT
HOMES FEASIBLE FOR
NONSTRUCTURAL PROTECTION

ADDRESS	FIRST FLOOR ELEVATION (ft. NGVD)
104 Atlantic Avenue	11.8
114 Atlantic Avenue	10.9
118 Atlantic Avenue	10.9
30 Broadsound Avenue	9.7
33 Broadsound Avenue	11.2
35 Broadsound Avenue	11.2
36 Broadsound Avenue	7.5
39/41 Broadsound Avenue	13.9
62 Broadsound Avenue	9.9
70 Broadsound Avenue	11.0
74 Broadsound Avenue	10.2
77 Broadsound Avenue	10.0
90 Broadsound Avenue	14.7
106 Broadsound Avenue	9.3
112 Broadsound Avenue	7.7
133 Broadsound Avenue	8.1
134 Broadsound Avenue	7.8
148/150 Broadsound Avenue	9.8
153 Broadsound Avenue	8.8
154 Broadsound Avenue	5.9
170 Broadsound Avenue	9.4
171 Broadsound Avenue	13.1
174 Broadsound Avenue	10.0
176 Broadsound Avenue	9.7
188 Broadsound Avenue	7.5
12 Dolphin Avenue	13.9
30 Dolphin Avenue	10.7
38 Dolphin Avenue	13.3
59 Dolphin Avenue	13.4
61 Dolphin Avenue/70 Jones Road	12.6
77 Dolphin Avenue	9.9
83 Dolphin Avenue	9.5
92 Dolphin Avenue	10.5
97 Dolphin Avenue	8.9
100 Dolphin Avenue	10.5
101 Dolphin Avenue	9.5
128 Dolphin Avenue	9.6
152 Dolphin Avenue	8.7

TABLE 3 (continued)

ADDRESS	FIRST FLOOR ELEVATION (ft. NGVD)
9/11 Endicott Avenue	18.0
16 Endicott Avenue	12.6
10 Foam Avenue	11.5
1A George Avenue	8.4
5 George Avenue	8.9
22 George Avenue	12.0
35 George Avenue	9.4
39 George Avenue	12.1
45 George Avenue	7.5
47 George Avenue	7.2
58 George Avenue	10.3
2 Henry Street	12.5
6 Henry Street	9.7
13 Henry Street	10.4
18/18A Henry Street	9.4
20 Henry Street	11.7
21 Henry Street	12.1
25 Henry Street	8.7
12 Jones Road	11.9
14 Jones Road	12.3
32/34 Jones Road	10.8
39 Jones Road	11.5
40 Jones Road	11.2
44 Jones Road	11.8
48 Jones Road	10.8
52 Jones Road	11.3
57 Jones Road	11.3
58 Jones Road	10.1
64 Jones Road	12.2
66 Jones Road	12.4
84 Jones Road	8.3
85 Jones Road	9.8
87 Jones Road	10.4
48 Leverett Avenue	8.6
56 Leverett Avenue	9.2
25 Noble Street	11.8
37 Noble Street	12.6
30/30A Roughan Street	9.9
12 Undine Avenue	10.0
26 Wave Avenue	10.0
27/29 Wave Avenue	11.6
37 Wave Avenue	12.2

3. Environmental Impacts

We met with the Metropolitan District Commission (MDC) on October 4, 1982, to discuss the recommended plan. Maximization of the aesthetic potential along Reach A, the entrance to the Revere Beach Reservation (under the MDC's jurisdiction), was of prime concern. Replacement (or reduction) of the rock berm with sand replenishment is to be further studied during CP&E. The MDC's Master Plan for this area will be modelled in an effort to preserve the seascape view. Details regarding incorporation of the existing pumping station's outfall into the rock berm protection and use of elongated inlet grates to guard against debris blockage are also to be included during CP&E.

In an effort to assess the impact of the recommended plan on shellfish resources at Roughans Point, we met with the Massachusetts Division of Marine Fisheries (DMF) and the U.S. Department of the Interior's Fish and Wildlife Service. As stated on page EA-4 of the Draft Interim Response's Volume I, a survey of the project area was conducted by Rusty Iwanowicz, DMF, and Charles Freeman of my staff.

In this survey, five test holes were dug seaward of the area of project impact in areas which Mr. Iwanowicz felt would indicate the productivity of the clam flat. Two holes revealed no shellfish, and the best hole produced two razor clams, two softshell clams and a surf clam. Mr. Iwanowicz indicated that the area to be impacted by the proposed project, a strip 50 to 75 feet seaward of existing rip rap or walls, is primarily too coarse a substrate for shellfish (note figures EA-13 and EA-15 in Volume I of the Draft Interim Response). The habitat at Cherry Island Bar is presently degraded by poor water quality in Broad Sound, and by its exposed location which makes much of the flat subject to high wave energy (note figures EA-14 in Volume I of the Draft Interim Response).

We believe that the new rugged rock protection material will provide a more stable environment and increased surface area for a fouling community (the collection of organisms found on rocks, pilings and piers in salt water). This fouling community has the potential to produce a greater biomass than the lost shoreline community. (Nixon, S. W., et al. "Ecology of Small Boat Marinas", Marine Technical Report, Series No. 5, University of Rhode Island, 1973, p. 13.) Therefore, the impact on the existing ecosystem should be slight, if not beneficial.

Public access will be provided over the protection to the foreshore as described on pgs. IV-3&4 in Volume I of the Draft Interim Response. Subsequent feedback identified a desire for additional access points. These will be determined during CP&E. However, as outlined in our meetings, access along the top of the protection will not be recommended for safety considerations. Lateral access is prohibited because of the rugged (rough) nature of the rock berm needed to dissipate wave energy.

No adverse impacts to the nearshore bathymetry are anticipated with implementation of the recommended plan. Reference is made to page EA-17 under "Water Circulation, Fluctuations, and Salinity Determination" in Volume I of the Draft Interim Response. The recommended plan's rock berm would displace the nearshore range up to 75 feet seaward. This impact is not expected to be negative, since mean high water currently abutts much of the shoreline. In addition, the project is toed in at its seaward edge to prevent scouring.

The flood control efforts by the Massachusetts Department of Environmental Quality Engineering (DEQE) at Sales Creek have been taken into account in development of the proposed plan. As explained in the meeting November 1, 1982, implementation of the recommendation is not expected to adversely affect the hydrology of Sales Creek. Reference is made to pgs. A-16&17 in Volume II of the Draft Interim Response.

The Commonwealth of Massachusetts
Metropolitan District Commission
Parks Division
20 Somerset Street, Boston 02108

September 8, 1982

Department of the Army
New England Division - Corp. of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254
Attn: Joseph C. Ignazio

Dear Mr. Ignazio:

Our comments of February 5, 1982 included a general review of the various plans proposed for flood protection of Roughans Point.

We have now reviewed your specific proposal in the Draft Interim Response of May 1982, and have the following comments and questions.

The proposed rock berm sloping seaward at Eliot Circle should be made smaller since it would take a 50' wide strip of Revere Beach. The proposed 1'-7" high concrete cap on the seawall at Eliot Circle should be eliminated since this seawall is also a seatwall for the public viewing the ocean. Wave overtopping still has not been observed at Eliot Circle.

The Eliot Circle portion of the Revere Beach M.D.C. Master Plan realigns and simplifies the roadways and intersections and eliminates the rotary at Eliot Circle. The Flood Protection plan should include this in the raising of the roadways near Eliot Circle. We request more detailed engineering information at this location.

The M.D.C. Broadsound Avenue pumping station presently drains part of Broadsound Avenue from two street drains. The proposed flood protection plan adds a trunk drain line from Winthrop Shore Drive down Broadsound Avenue to Sales Creek and a new pumping Station an Broadsound Avenue.

We also request more engineering information including the following:

1. Who will operate the new pumping station?

2. Which station will be the lead station ?

3. Will the old and new station, be operated together and if so, how?

4. How will the M.D.C. pumping station be connected into the proposed drain trunk line?

5. How will the M.D.C. outfall be extended because of the proposed rip-rap berm?.

6. What provisions will be made to keep drain inlets free of debris and seaweed during storm operations.

Prior M.D.C. Comments on sand bag closure indicated that sand bags are difficult to put in place during storm conditions and difficult to maintain. We, therefore, request that the sand bag closure at the end of Reach "F" be eliminated and some other design approach be considered.

Easements will be required from the M.D.C. for the portion of the proposed plan affecting M.D.C. land. While M.D.C. generally agrees to the proposed flood protection plan for Roughans Point, we will require design approval for those areas of the plan effecting M.D.C. land, properties and operations.

If you have further questions kindly contact my project engineer Henry Higgott at 727-7220.

Very truly yours,

Francis H. McCarran Jr.,
Director of Parks

HH/nem

cc: Joseph Capone
Julia O'Brien

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDPL-BC 29 October 1982

SUBJECT: Roughans Point, Revere Coastal Flood Protection Study

Mr. Francis H. McCarran, Jr.
Director of Parks
Metropolitan District Commission
20 Somerset Street
Boston, Massachusetts 02108

Dear Mr. McCarran:

Receipt is acknowledged of your attached letter, dated 8 September 1982, regarding the subject project. In this letter you outlined the Metropolitan District Commission's (MDC) review of our plan selection for recommendation. It is our understanding that this same letter was provided to the Executive Office of Environmental Affairs' Massachusetts Environmental Policy Act (MEPA) Unit as comments to the Environmental Notification Form (ENF) for the subject project. This ENF was filed by the City of Revere as project proponent. The MEPA Unit determined that an Environmental Impact Report was not required, but that comments received should be addressed.

A meeting was held 4 October 1982 between members of our respective staffs and the City of Revere to discuss the issues identified in your letter. Mr. Emerson Chandler was also in attendance representing the Water Resources Commission. The following summarizes agreements made for resolution of those issues and responses to questions raised about operation and maintenance (O&M) of the proposed project.

Your staff indicated a desire in preserving the "view of the seascape" from and aesthetically enhancing the Eliot Circle portion of the protection (Reach A - the northern section of Roughans Point). The MDC suggested that the proposed rock berm be smaller and the concrete cap be eliminated along this reach in an effort to retain its "seatwall" use. We concur that this be pursued but that the design level of protection be maintained. Replacement (or reduction) of the rock berm with sand replenishment was offered for study.

Our final recommendation as presented in the addendum to the Draft Report will specify that sand replenishment be further analyzed during the Continuation of Planning and Engineering (CP&E) phase of the project. If found to be not feasible, then Reach A's "seatwall" use and "view of the seascape"

will be retained by raising of the complete road network at Eliot Circle to compensate for the proposed capping of the existing wall. Specific attention will be given to maximize the aesthetic potential of this entrance to Revere Beach. Your Master Plan for this intersection will be modelled.

A request to eliminate the sand bag provisions at Winthrop Parkway as included in our recommendation was forwarded. These were included as a precautionary measure to prevent residual wave overtopping from flanking the protection. They are expected to be implemented only during extreme storm events, and would not be needed for the more common events. A grated street drain was proposed as a potential compromise by your staff.

O&M for the project is traditionally a non-Federal responsibility. The City of Revere has recommended that the Commonwealth of Massachusetts provide for these efforts. Your staff recommended that the MDC not be identified as the responsible agency. We agree that our report not indicate which governmental entity should be responsible for O&M. This issue should be resolved by negotiation between the Commonwealth of Massachusetts and the City of Revere as part of an arrangement to meet the project's cost sharing requirements. It is our understanding that coordination in this regard is on-going and that final determination will be made prior to construction.

You asked which pumping station would be lead station. Reference is made to page A-22 of the subject project's Support Documentation, Volume II of the Draft Report, under Supplemental Pumping:

> ". . . such supplemental pumping would serve as a backup to the existing pump plus provide capacity for some wave splash overtopping . . ."

The additional station would become operational when the existing station reached its capacity. Both stations would then operate together. During periods of receding tide, a gravity drain through the line of protection would facilitate discharge of any ponding. Also, a diesel generator is provided in the additional station as a backup power source for both pumping stations. Specific procedures will be outlined in an O&M Manual developed during CP&E.

Details regarding the connection of the existing MDC station to the proposed interior drainage trunkline, incorporation of the station's outfall into the rock berm protection and provision of sand bags or a grated street drain at Winthrop Parkway will be worked out during CP&E. Use of elongated inlet grates to guard against debris blockage was recommended by your staff. This, also, can be included during CP&E. These items are not considered significant, however, in determination of the project's feasibility.

NEDPL-BC
Mr. Francis H. McCarran, Jr.

29 October 1982

Finally, provision of a backup cooling system, using pumped water, for the two stations was suggested by your staff. Our final recommendation will reflect inclusion of this into the selected plan.

Efforts during CP&E will be coordinated with your office to ensure mutual satisfaction. Your staff has been most cooperative during this feasibility investigation of coastal flood protection for the Roughans Point area of Revere, Massachusetts. We thank you, and look forward to maintaining this spirit of cooperation as the study comes to an end.

If you have any further questions, please contact Mr. Joseph Bocchino of my staff at (617) 647-8538.

Sincerely,

Incl
as stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:
Mr. Henry Higgot, MDC
Mr. Joseph Capone, MDC
Ms. Julia O'Brien, MDC
Mr. Emerson Chandler, Water Resources Commission
Mr. Paul Rupp, City of Revere

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State
294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

MASSACHUSETTS
HISTORICAL
COMMISSION

RECEIVED
AUG 18 1982
OFFICE OF THE SECRETARY
OF ENVIRONMENTAL AFFAIRS

Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

July 29, 1982

Attention: Joseph Bocchino, Building 112 North

RE: Revere Coastal Flood Protection Study - Roughans Point

Dear Mr. Bocchino:

Thank you for submitting a copy of the Draft Interim Response for the Roughans Point Coastal Flood Protection Study to this office for review.

The response adequately describes the archaeological sensitivity of the Roughans Point area on pages EA-6 and 7 of Volume I, and recommends that project impacts to archaeological sites be avoided (Volume I, page E-9). The discussion of MHC recommendations on page EA-9 of Volume I is accurate and needs no alteration.

In order to facilitate the project's completion schedule, the ACE should contact MHC when preliminary design plans for the drainage system are finalized. At that time, the MHC can offer recommendations for the scope of an archaeological assessment, if one is required.

If you have any questions concerning this review, please contact Brona Simon of MHC staff.

Sincerely,

Valerie Talmage

Valerie Talmage
State Archaeologist
Acting State Historic Preservation Officer
Massachusetts Historical Commission

xc: John Wilson, ACE

VT/pg

NEDPL-I 25 February 1982

Ms. Patricia Weslowski
Executive Director
Massachusetts Historic Commission
294 Washington Street
Boston, Massachusetts 02108

Re: Revere Coastal Flood Protection
Study: Rougham's Point.
Interior Drainage Plan.

Dear Ms. Weslowski:

In an earlier correspondence between our offices, we considered the sea wall portions of the Rougham's Point Flood Protection Project (25 Aug 81). At that time your staff concurred with our finding of no adverse effect on cultural resources.

Our cultural resources staff is now reviewing the interior drainage portion of the project. Enclosed is a plan of a proposed drainage system. Some sections follow existing drainage systems while others will traverse areas between structures as well as following current roadways.

During a conversation between Marie Rourassa of our staff and Val Talmadge of your staff on 16 February 1982, Ms. Talmadge indicated that an archaeological survey will most likely be required along several sections before a finding of effect can be determined.

In light of this opinion, we suggest that:

1) Coordination with your office be continued to a later design stage, when the pipeline route is to be finalized.

2) Efforts consist of a) identifying relatively undisturbed areas, b) adjusting the pipeline route, as much as is feasible, to avoid these undisturbed areas, and c) developing a scope of work for an archaeological survey for areas that cannot be avoided.

Ms. Bourassa/mm/347

MEDPL-I 25 February 1982
Ms. Patricia Waslowski

We hope this plan will be satisfactory to you and your staff. If you have any questions, please call Marie Bourassa at (617) 894-2400, ext. 347. Thank you very much.

Sincerely,

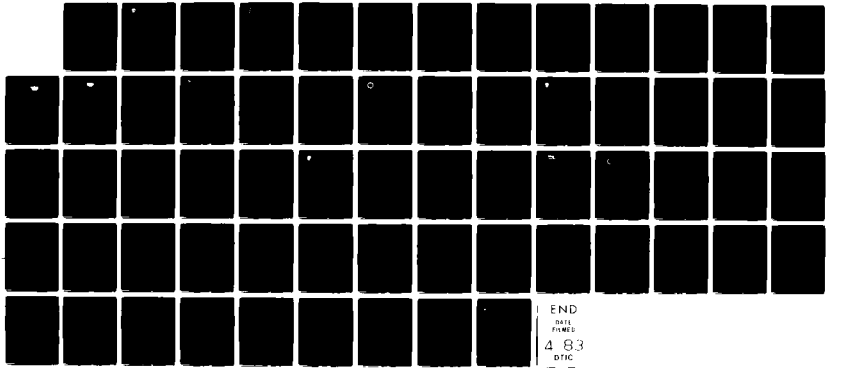
Incl
As stated

JOSEPH L. IGNAZIO
Chief, Planning Division

cc: Mr. Bocchino
Mr. Freeman
Ms. Bourassa
Planning Div Files
Reading File

AD-A125 761 ROUGHANS POINT REVERE MASSACHUSETTS COASTAL FLOOD PROTECTION STUDY VOLUME I MAIN REPORT(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV DEC 82 3/3

UNCLASSIFIED F/G 13/2 NL



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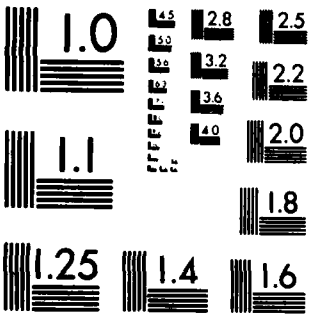

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

M E M O R A N D U M

TO: Sam Mygatt, MEPA Unit

FROM: Richard F. Delaney, CZM Director

DATE: September 15, 1982

SUBJECT: Roughans Point Flood Protection.

The Massachusetts Office of Coastal Zone Management has reviewed the Roughans Point Flood Protection Study Volume I and II and I would like to submit the following comments for your consideration. Responses to the comments and questions below are vital to completion of our federal consistency review. Therefore, a supplement to the Corps Environmental Assessment should be prepared.

1. The non-structural alternatives have not been adequately addressed. The acquisition alternative only recommends acquisition of all homes in the area and does not consider the possibility of acquiring only those homes that cannot be flood proofed. Since the process of flood proofing is continuing privately, this may well be feasible. Also, it has been stated that most of the homes in Roughans Point can not be economically flood proofed on an individual basis but collectively they justify the expenditure of 11 million dollars. A clarification of this rationale is necessary. At a minimum, this should include number of floodproofed homes, what characteristics made it economical, how many to floodproof other homes having similar characteristics are in the area, and the current rate of private floodproofing.

2. Damage estimates used for the cost/benefit analysis include reimbursements for roofs and other items damaged by non-wave induced flooding. The supplemental to the Corps Environmental Assessment should include a discussion of why prevented damages that are unrelated to the flood proofing alternatives are used in the cost/benefit analysis.

3. The selection process leading to the preferred plan relys heavily on public involvement. It has been stated on several occasions by Corps representatives that the residents of Roughans Point favor structural protection because it will remove the "emotional stress" created by repeated flooding. However, the study documents the result of a social survey" (Pg. V-2, Vol I) which states . . . "more than two-thirds of respondents endorse community - applied non-structural measures." The survey continues - "A majority of respond ents might individually implement a non-structural flood damage reduction measure if necessary." Also at a recent FEMA workshop a resident of Roughans Point, who lives directly behind the existing wall, made it very clear that ever since her home was elevated, she has felt no "stress" during periods of flooding as she previously had. These statements seem to contradict the reasoning for selection of the preferred plan. The applicant should conduct a new detailed survey of public support for flood control in this area. The survey should be designed to present neutral choices on the structural and non-structural measures and to determine attitudes toward the timing of project implementation, given the current funding climate, this last question may be particularly important. If a structural solution is too far in the future. respondents may prefer more easily, quickly implemented non-structural measures.

4. Although the flooding at Roughans Point is caused by both wave overtopping and rain fall. the damage figures used in the cost/benefit analysis do not appear to seperate the two. This seperation of damage into rain, tidal and wave overtopping components to determine should be clearly presented and the amounts and costs of physical damage should be placed into these three categories.

5. The environmental assessment does not address changes to the nearshore bathymetry that may result after construction of the wall. An assessment of this impact should be presented.

6. There has been no evaluation of the focus of wave energy along the existing wall that may be the cause of the waves to over-top the wall. If there is a segment of the shoreline that is more subject to overtopping, this flooding component may be more easily reduced.

7. Although the plans refer to public access being supplied at several locations, it must be clearly documented that the general public does actually have access to these points. Access to the general public along the top of the wall, as well as at distinct locations, is important to preservation of reserved public rights to the forshore. MCZM would strongly oppose any plan that did not allow safe, easy public access that preserved public rights to the foreshore. It would be particularly inappropriate for the state to consider funding even part of such a plan.

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDPL-BC

6 December 1982

Mr. Richard F. Delaney, Director
Massachusetts Coastal Zone
Management Program
100 Cambridge Street
Boston, Massachusetts 02202

RE: Revere Coastal Flood Protection
Study - Roughans Point

Dear Mr. Delaney:

Receipt is acknowledged of a copy of your attached memorandum, dated 15 September 1982, regarding the subject project. This memorandum was sent from your office to the Massachusetts Environmental Policy Act (MEPA) Unit in response to the Environmental Notification Form (ENF) filed by the City of Revere as project proponent. The MEPA Unit determined that an Environmental Impact Report (EIR) was not required, but that comments received should be addressed.

The City of Revere, by letter dated 6 October 1982, requested that we answer in its behalf. In your memorandum, Coastal Zone Management's (CZM) review of our plan selection for recommendation was outlined. Meetings were held on 18 October 1982 and 1 November 1982 between members of our respective staffs and the City of Revere to discuss the items you identified.

The inclosed attachment summarizes our responses referenced to each comment by number. Efforts during the next phase of the project, Continuation of Planning and Engineering (CP&E), will be coordinated with your office to ensure mutual satisfaction. Your staff has been most cooperative during this feasibility investigation of coastal flood protection for the Roughans Point area of Revere, Massachusetts. We thank you, and look forward to maintaining this spirit of cooperation as the study comes to an end.

If you have any further questions, please contact Mr. Joseph Bocchino of my staff at (617) 647-8538.

Sincerely,

Incls
as

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:
Mr. Jeff Benoit, CZM
Mr. Michael Penney, CZM
Mr. George Brocke, CZM
Mr. Emerson Chandler, Mass. Water Resources Commission
Mr. Dave Shepardson, MEPA

ATTACHMENT
RESPONSES
TO
COASTAL ZONE MANAGEMENT COMMENTS
NOVEMBER 1982

Comment 1 - In light of feedback from the public involvement program (Reference the subject study's Vol. I of the Draft Interim Response, pages IV-14 and V-2 and 3), we feel that nonstructural alternatives have been adequately addressed. It is our understanding that significant flood proofing by individual homeowners is not an on-going process.

Thirty-one (31) homes have received protection under the Massachusetts Coastal Floodproofing Program (see Table 1). Three (3) of those have been found to warrant additional nonstructural measures, and a fourth (15 George Avenue) was protected subsequent to preparation of the Draft Interim Response. To prevent double counting, these 4 have been subtracted from 112 (81 identified in Plan B and the 31 above) to total 108 homes applicable to traditional nonstructural protection. There are 291 homes affected by flooding within Roughans Point.

Acquisition of only those homes (183) that cannot be flood proofed is estimated at $10.8 million. This together with the nonstructural plan (B) identified in the Draft Interim Response would cost about $12.5 million ($10.8M + $1.7M). We consider this conservative since this is based on average market value alone.

Reference is made to Appendix H, "Nonstructural Measures", of the subject study's Stage 2 Documentation, dated September 1981, regarding an in depth discussion of structure characteristics associated with successful implementation of particular nonstructural measures. Rationale influencing analysis of nonstructural protection is outlined on pages III-10 and 11, under "Screening of Plans", and the Stage 2 findings are summarized on pages IV-6 and 7, under "Flood Proofing", in Volume I of the Draft Interim Response.

Comment 2 - The methodology used in determining damages caused by flood inundation is included on pages E-2 through E-18 of Appendix E, "Economics", in Volume II of the Draft Interim Response. The following is offered in an effort to clarify the sampling and its application.

The residential properties in Roughans Point were separated into 20 categories (see Table 2). A sample (less than 6 structures) from each was then surveyed in detail providing a representative stage damage relationship for that particular category of home. These stage damage relationships indicate the expected damages at various levels, ranging from no flooding to complete inundation. That is why such items as ceilings and roofing were included in the sampling.

Using detailed topographic mapping, the elevation where inundation would begin for each individual home was determined. Flood damages were then calculated across the full range of events, from the frequent to the rare, for that home using its category's representative stage damage relationship. These were then aggregated to determine the benefits attributable to flood inundation reduction.

TABLE 1

ROUGHANS POINT
HOMES PROTECTED UNDER
MASSACHUSETTS COASTAL FLOODPROOFING PROGRAM

71 Broadsound Avenue
86 Broadsound Avenue
95 Broadsound Avenue
121 Broadsound Avenue
137 Broadsound Avenue
143 Broadsound Avenue
147 Broadsound Avenue
156 Broadsound Avenue
157 Broadsound Avenue
162 Broadsound Avenue
163 Broadsound Avenue
171 Broadsound Avenue
172 Broadsound Avenue
210 Broadsound Avenue
22 Dolphin Avenue
96 Dolphin Avenue
112 Dolphin Avenue
134 Dolphin Avenue
146 Dolphin Avenue
28 Endicott Avenue
15 George Avenue
21 Henry Street
22 Henry Street
23 Henry Street
71 Jones Road
42 Leverett Avenue
30 Roughan Street
102 Winthrop Parkway
145 Winthrop Parkway
153 Winthrop Parkway
181 Winthrop Parkway

TABLE 2

ROUGHANS POINT
SAMPLING CATEGORIES

1.	Modern 2 Family 2 Story	
2.	Colonial 1 Family or 2 Family, 2-2-1/2 Story	
3.	Contemporary Tri-level 1 Family or 2 Family	
4.	Split Level 2 Family	
5.	Cottage 1 Family	NO BASEMENT
6.	Summer Cottage 1 Family	NO BASEMENT
7.	Summer Duplex Cottage 2 Family	NO BASEMENT
8.	Duplex Garrison 2 Story 2 Family	NO BASEMENT
9.	3 Family Frame 3 Story Flat Roof	
10.	Cape (medium) 1-1/2 Story 1 Family	
11.	Ranch Modified to Garrison 1 Family	
12.	Ranch Modified to Colonial 1 Family	
13.	Bungelow (jacked)	
14.	Bungelow small 1 Family	
15.	Mobile (converted) 1 Family	
16.	Special Frame 2 Story 2 Family	
17.	Ranch (medium)	
18.	Ranch (small)	
19.	Ranch (large)	
20.	Raised Ranch 1 and 2 Family	

Comment 3 - It is true that public involvement has played an integral part in the selection of the recommended plan. We feel that the social survey taken in the Spring of 1981, feedback from citizen workshop meetings and correspondence received to date are adequate in assessing the preference and acceptability of alternative plans of flood protection.

Public involvement efforts subsequent to the social survey focused on describing the implications of the alternatives. The timing associated with potential implementation has been identified to the public throughout the study process. Although more than two-thirds of survey respondents endorse nonstructural measures, of paramount concern is a high degree of protection--for the whole of Roughans Point.

With nonstructural measures the neighborhood would continue to be subject to deep flooding. Damage to those homes included in such a plan would be reduced; however other residents would still need to be evacuated. This constant threat of danger to those not fortunate enough to be protected is unacceptable.

You referred to a Roughans Point resident who stated at a recent Federal Emergency Management Agency (FEMA) workshop that she feels no "stress" during periods of flooding since her home had been raised. This is understandable, since the social survey indicated that not only was structural protection preferred by more than 90 percent of the respondents, but that 10 percent think nothing should be done.

Comment 4 - Reference is made to the response offered above to Comment 2 regarding the methodology used in calculation of flood inundation damage. However, in the meeting of 18 October 1982, your staff indicated a concern with the hydrology of the study area. In the follow up discussions of 1 November 1982, our technical staff clarified the procedure undertaken in determining the flood threat at Roughans Point. This procedure is described in Appendix A, "Hydrology and Hydraulics", of the Draft Interim Response's Volume II (Support Documentation).

Comment 5 - No adverse impacts to the nearshore bathymetry are anticipated with implementation of the recommended plan. Reference is made to page EA-17 under "Water Circulation, Fluctuations, and Salinity Determination" in the Draft Interim Response's Volume I.

The recommended plan's rock berm would displace the nearshore range up to 75 feet seaward. This impact is not expected to be negative, since mean high water currently abuts much of the shoreline. In addition, the project is toed-in at its seaward edge to prevent scouring.

Comment 6 - The wave analysis accomplished for the subject study is quite extensive and complete for feasibility level investigations, as discussed in the 1 November 1982 meeting. The recommended plan's features were influenced by the existing foundation conditions, as well as design wave energy dissipation needs. More detailed wave refraction and geotechnical studies are planned for the next phase, Continuation of Planning and Engineering (CP&E).

Comment 7 - Public access will be provided over the protection to the foreshore as described on pages IV-3 and 4 in Volume I of the Draft Interim Response. Subsequent feedback identified a desire for additional access points. These will be determined during CP&E. However, as outlined in our meetings, access along the top of the protection will not be recommended for safety considerations. Lateral access is prohibited because of the rugged (rough) nature of the rock berm needed to dissipate wave energy.

The Commonwealth of Massachusetts
Water Resources Commission
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

RECEIVED
AUG 18 1982
OFFICE OF THE SECRETARY OF
ENVIRONMENTAL AFFAIRS

August 17, 1982

Mr. Joseph L. Ignazio, Chief
Planning Division
Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

RE: Revere Coastal Flood
Protection Study
Roughans Point

Dear Mr. Ignazio:

The Massachusetts Water Resources Commission, at its regular meeting on August 9, 1982, discussed the Draft Interim Response for the Roughans Point portion of your Revere Coastal Protection Study. Your letter of June 8, 1982, indicates a desire to receive formal comments by September 10, 1982. Until the State MEPA review pursuant to Chapter 30, Section 62B, is completed, the Water Resources Commission cannot formally take a position on this project. We also are awaiting the review of The CZM office, which in turn is awaiting the MEPA review.

We can again acknowledge our interest in finding a solution to the problem of frequent serious storm damage to this area. However, several Commission members were disappointed that a comprehensive cost-effective, non-structural plan was not identified. We cannot assume that State cost-sharing would be available for the proposed structural measures, should the project survive further environmental review. There clearly is a Federal interest in eliminating the chronic costs of paying damage claims under the federally subsidized Flood Insurance Program. Some modest State savings might accrue in the form of reduced costs for maintaining existing State-owned shore protection structures. A lion's share of the direct benefits will accrue to individual property owners and the City of Revere. If and how a local cost share could be allocated and appropriated is clearly an unresolved question. No agency has funds available at this time.

Mr. Joseph L. Ignazio August 17, 1982

While this response is admittedly most equivocal, the early stage of State environmental review, and the reluctance to assume financial burdens not clearly supportable in terms of benefits to the payors make this stance understandable. We support additional study, especially if it will clarify the issues relative to environmental impacts and cost-sharing.

Sincerely yours,

William F. M. Hicks

William F. M. Hicks
Co-Chairman,
Mass. Water Resources Comm.
Commissioner of The Department
of Environmental Management

Anthony D. Cortese

Anthony D. Cortese
Co-Chairman
Mass. Water Resources Comm.
Commissioner of The Departmen
of Environmental Quality
Engineering

EHC/cac

Copy Furnished:

Mr. Sameul Mysatt - MEPA Unit
Mr. Paul Rupp, City of Revere
Mr. Richard Delaney, CZM
Commission Members

NEDPL-BC 30 August 1982

SUBJECT: Revere Coastal Flood Protection Study - Roughans Point

Mr. Anthony D. Cortese, Co-Chairman
Mass. Water Resources Commission
Commissioner of the Department of
Environmental Quality Engineering
100 Cambridge Street
Boston, Massachusetts 02202

Mr. William F. M. Hicks, Co-Chairman
Mass. Water Resources Commission
Commissioner of the Department of
Environmental Management
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. Cortese:

Receipt of your 17 August 1982 letter regarding the Commonwealth's position on the subject project is acknowledged. We have reviewed the concerns identified by the Commission and offer the following in response - and hopefully clarification:

1. Disappointment was cited in our finding that a "comprehensive cost-effective, nonstructural plan" is not acceptable for Roughans Point. Such protection was analyzed in detail and found feasible, both from an economic and engineering perspective, but only for 84 of the 300 plus homes in the study area. This plan prevents only 36 percent of the potential annual losses and was not selected because the threat of serious flooding remains and protection is not comprehensive. In addition, feedback obtained from follow-up public workshops and correspondence received support this conclusion. Reference is made to discussion presented in the Main Report on pages III-2 through III-5 under Reduce Vulnerability, III-9 through III-11 under Screening of Plans, pages IV-6 through IV-14 under Nonstructural Plan, pages V-2 and V-3 under Selection, and Table 14 on page VI-2.

2. Division of benefits, that is reduction in potential damages, was questioned. This is addressed in detail in Appendix E, Economics, in the Support Documentation. Of the $1.1 million in annual benefits associated with the recommended plan (97 percent reduction in potential damages), $0.8 million are attributed to residential properties. The balance, $0.3 million, is credited to the "public" and includes properties, highways, utilities and emergency costs.

BOCCHINO:kab:538

NEDPL-BC
Mr. William F. F. M. Hicks, Co-Chairman
Mr. Anthony D. Cortese, Co-Chairman

30 August 1982

3. Eventual appropriation of the non-Federal share was identified as being of particular concern. Many meetings have been held with representatives of the various agencies of the Commonwealth and the City of Revere, the project proponent, to discuss cost-sharing responsibilities. Specific legislation to be filed by the project proponent, as illustrated by that enacted for the Westfield Local Protection (Acts, 1962 - Chapter 638), was introduced as an avenue worth pursuing.

4. Finally with regards to the project status, there are no plans for additional feasibility study. The Environmental Assessment, included in the Main Report, outlines a Finding of No Significant Impact and concludes Federal responsibility in this area. The City of Revere, as project proponent, has filed an Environmental Notification Form (ENF), in fulfillment of the Commonwealth's requirements under the Massachusetts Environmental Policy Act (MEPA).

Our recommendation will be finalized upon compilation of comments and responses received during the Review Period (June through September 1982), and submitted to the Board of Engineers for Rivers and Harbors (BERH) for approval. The procedure leading to construction authorization is outlined in the Main Report, pages V-3 and V-4.

For our feasibility reports to proceed through the Washington review process, we need a letter of the willingness and ability of non-Federal interest to participate at some future date in the items of local cooperation. Since the State is usually the cooperating agency, a letter acknowledging their understanding of the financial cost is necessary, a so-called letter of intent. Specific cost sharing arrangements will be determined pending Congressional resolution. It should be noted that a binding commitment on the estimated contribution toward the cost of construction will be required subsequent to Congressional authorization as a basis for the Corps to initiate construction, but the letter of intent is not binding and does not obligate future legislatures.

We are willing to meet with key officials of the Commonwealth to answer any questions and explain details as soon as convenient.

Sincerely,

JOSEPH L. IGNAZIO
Chief, Planning Division

cc:
Mr. J. Bocchino
Planning Division File

WINTHROP PLANNING BOARD

WINTHROP, MASSACHUSETTS 02152

November 24, 1982

Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Re: Roughans Point Pumping Station

Gentlemen:

The Winthrop Planning Board appreciates the fact that you sent a representative from your office so promptly to explain the Roughans Point Project. Mr. Bocchino made a very fine presentation, and cleared up many questions. Based on his presentation the Planning Board understands that the proposed Roughans Point Pumping Station will not have the capability of adding any additional water to the Sales Creek area by means of pumping.

Because of the conditions currently existing today in the Roughans Point area, we understand that it takes a lengthy time to drain out this area under its present drainage conditions. Under this project a new 42" pipe will be installed to expedite the runoff on the West side of Winthrop Parkway at normal conditions.

May we suggest rather than introducing the already existent draining conditions into this new 42" pipe which would drain into Sales Creek, we would like to see a connection of the West side of Winthrop Parkway to the East side of the Winthrop Parkway which would in turn alleviate any water entering Sales Creek and would divert such drainage to the new pumping station designed for Roughans Point.

If you feel that our suggestions are not valid, and you wish to continue with this project under the conditions as outlined in this report -- then we will have to demand that this new 42" pipe at Roughans Point, which will discharge into Sales Creek, not be constructed until the Sales Creek project is completed as described in the initial invironmental impact report of the D.E.Q.E. 1976.

We reiterate our concern for and support of measures to alleviate the flooding problems of our neighbors in the Roughans Point section of Revere, but those measures must not adversly affect the ecological balance of Belle Isle marsh.

Very truly yours,

Robert L. Driscoll

ROBERT L. DRISCOLL, Chairman
Winthrop Planning Board

RLD:I:C

CC: Conservation Commission
Board of Health
Representative Alfred Saggese

WINTHROP PLANNING BOARD

WINTHROP, MASSACHUSETTS 02152

November 9, 1982

Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Re: Roughans Point Coastal Flood Protection Study
Revere, Massachusetts

Gentlemen:

The Winthrop Planning Board presents the following comments on the Roughans Point Project:

The Planning Board is aware of the flood problem in the Roughans Point area, and is in favor of measures to alleviate that flooding condition. However, the Board has the responsibility of bringing some pertitent points to your attention.

We understand from the report that the pumping station has the capacity to reverse the pumps with the water flowing into Sales Creek. As you are probably aware there is another pumping station currently being constructed in the Revere/East Boston area relative to Sales Creek. The Town of Winthrop is protesting that pumping station due to the possibility of an adverse impact in the condition of the ecological balance in the Belle Isle marsh and Winthrop shore line.

The reverse flow capabilities at Roughans Point would further impact the ecological balance in the Belle Isle marsh. Also it would endanger Winthrop property by an increase in the water level at Belle Isle, therefore, this Board strenously objects to the reverse flow feature of the pumping station.

We also bring to your attention the sand bag closure on Winthrop Parkway as shown on plate 8 of your report. We fear this closure would bring additional water directly back into Belle Isle marsh.

Of special interest to the Town of Winthrop is the comment made on Page II-3, second full paragraph of the report with reference to the M.D.C. being involved in the construction of a pumping station on Sales Creek. We have been informed that the M.D.C. is not involved in this project at this time. The Town would like this apparent inconsistency explained.

This study on Roughans Point was not brought to the attention of the Town of Winthrop until last week, and we were not participants in the Environmental Process. As abutters to the City of Revere and possible recipents of the water, we feel our not being notified was an oversight on the part of some official agency. Because of this we can only submit this brief analysis, but we would be very glad to meet with you to discuss this project in detail. Please contact our secretary, Mrs. Carr (846-5500) to arrange a time that we can meet.

Very truly yours,
Robert L. Driscoll
ROBERT L. DRISCOLL, Chairman
Winthrop Planning Board

RLD:C

CC: See attached

TOWN OF WINTHROP

Mary A. Kelley, Chairman
Lois A. Baxter
Mary E. Corcoran
Earl Cross
Duncan Fitzgerald
Peter Martino
Thomas McCarthy

CONSERVATION COMMISSION

TOWN HALL
WINTHROP, MASS. 02152

November 9, 1982

Mr. Joseph Bocchino
Department of the Army
N.E. Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

RE: Roughans Point Flood Protection Plan, Revere

Dear Mr. Bocchino:

The Winthrop Conservation Commission at this time is opposed to the Roughans Point Flood Protection Plan. Though we understand the storm drainage problem in the area, the Conservation Commission has strong reservations regarding possible connections into the East Boston Pumping Station and any resulting pollution of the Belle Isle Marsh. We feel a complete investigation should be made into all the ecological ramifications of this project.

Please continue to keep us informed.

Yours truly,

Mary A. Kelley

Mary A. Kelley
Chairman

lb
cc: Secretary John A. Bewick, EOEA
Mr. Sterling Wall, DEQE
Ms. Sheryl Breen, CZM
Revere Conservation Commission
Mr. Paul Rupp, DPCD, Revere
Mayor George V. Colella, Revere
Winthrop Board of Selectmen
Winthrop Planning Board
Representative Alfred Saggese

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. BOX 1518
CONCORD, NEW HAMPSHIRE 03301

Colonel Carl B. Sciple
Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

SEP 3 1982

Dear Sir:

This is our fish and wildlife planning aid report concerning your plans for flood protection at Roughans Point, Revere, Massachusetts and supplements our reports of June 4 and June 10, 1981, and our letter of October 20, 1981. It is submitted in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The impacts of the recommended project on fish and wildlife resources appear to be adequately described in the Main Report, Environmental Assessment and Section 404(b) Factual Determination and Finding of Compliance. The anticipated loss of slightly less than one acre of poor quality clam flat is discussed, but no mitigation measures are proposed for avoiding, minimizing, or compensating for this loss. Even though the area involved is polluted and the habitat quality is poor, it provides habitat for surf clam, razor clam and soft shell clam reproduction that contributes to the resources of Lynn Harbor, Broad Sound and the Saugus-Pines Rivers since shellfish larvae are distributed by tidal currents over large areas.

We believe there are opportunities to improve degraded habitat at Cherry Island Bar by spreading sand or a sand-silt mixture. This action could mitigate the loss at Roughans Point and enhance shellfish resources, depending on the amount of habitat affected. Suitable materials might remain after the seawall construction which could be used for this purpose. This would save the cost of removal to an off-project disposal site. Your report should include the possibility of enhancing clam habitat so that the discharge of fill material is covered under Section 404.

We have no objections to the flood control measures selected for implementation, but we would appreciate notification at the commencement of planning for construction so that we can evaluate your selected mitigation plan.

Sincerely yours,

Gordon E. Beckett

Gordon E. Beckett
Supervisor

NEDPL-I 12 October 1982

Mr. Gordon E. Beckett
Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
P.O. Box 1518
Concord, New Hampshire 03301

Dear Mr. Beckett:

In response to your planning aid report of 3 September 1982 concerning the Roughans Point, Revere Coastal Flood Protection Study, we would like to clarify the subject of shellfish resources within the study area.

As stated on page EA-4 of the environmental assessment, a survey of the project area was conducted on 1 March 1982 by Rusty Ivanowicz, Massachusetts Division of Marine Fisheries, and Charles Freeman of my staff. In this survey, five test holes were dug seaward of the area of project impact in areas which Mr. Ivanowicz felt would indicate the productivity of the clam flat. Two holes revealed no shellfish, and the best hole produced two razor clams, two softshell clams and a surf clam. Mr. Ivanowicz indicated that the area to be impacted by the proposed project, a strip 50 to 75 feet seaward of existing rip rap or walls, is primarily too coarse a substrate for shellfish (Note figures EA-13 and EA-15).

The habitat at Cherry Island Bar is presently degraded by poor water quality in Broad Sound, and by its exposed location which makes much of the flat subject to high wave energy (note figure EA-14). Spreading sand or a sand-silt mixture will not improve either of these conditions and would increase the area of project impact by covering existing shellfish habitat.

NEDPL-I 12 October 1982
Mr. Gordon E. Beckett

We believe that the new rugged rock protection material will provide a more stable environment and increased surface area for a fouling community (the collection of organisms found on rocks, pilings and piers in salt water). This fouling community has the potential to produce a greater biomass than the lost shoreline community. (Nixon, S.W., et al. "Ecology of Small Boat Marinas", Marine Technical Report, Series No. 5, University of Rhode Island, 1973, p. 13.) Therefore, the impact on the existing ecosystem should be slight, if not beneficial.

Should you desire additional information on this matter or wish to have a meeting at the site of the proposed project, please contact Mr. Charles Freeman of my staff at FTS 839-7347.

Sincerely,

JOSEPH L. IGNAZIO
Chief, Planning Division

cc: Mr. Freeman
Mr. McCarthy
Mr. Bacchino ✓
Mr. Pronovost
Mr. Morowitz
Plng Div File
Reading File

GEORGE V. COLELLA
MAYOR

THE CITY OF
REVERE, MASSACHUSETTS

OFFICE OF THE MAYOR
CITY HALL

September 7, 1982

Mr. Joseph L. Ignazio, Chief
Planning Division
Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Ignazio:

The City of Revere has completed its review of the Roughans Point Coastal Flood Protection Study Main Report dated May, 1982. We are in complete agreement with the findings of this report, which rationalizes the need for a structural plan with interior drainage improvements for attaining the most comprehensive flood protection possible in the Roughans Point section of the community.

The City of Revere, however, recommends that maintenance of the structure be borne by the Commonwealth, whose jurisdiction covers structures adjacent to this project to the north and south.

The City also requests that additional access to the beach be afforded to the residents along Broadsound Avenue at Reach "D" and Reach "E".

A number of state agencies are currently reviewing the Environmental Notification Form (ENF) which was prepared by the City. Once the MEPA compliance process is complete, the City and State will begin working on an agreement for financing the local cost sharing requirement. My staff will continue to keep Mr. Joseph Bocchino, Project Manager, up to date with the progress of our meetings with the State.

We thank you for your continued cooperation in this matter and for your invaluable efforts on behalf of the City of Revere, the residents of Roughan's Point in particular.

Very truly yours,

George V. Colella
Mayor

GVC/lf

cc: Edward M. Kennedy, Senator
Paul E. Tsongas, Senator
Edward J. Markey, Congressman
Rita Singer, Councillor
Paul Rupp, Director, DPCD

BOCCHINO:dms:538

NEDPL-EC 22 September 1982

Honorable George V. Colella
Mayor
City Hall
Revere, MA 02151

RE: Roughans Point, Revere
Coastal Flood Protection Study

Dear Mayor Colella:

Receipt is acknowledged of your letter dated 7 September 1982 regarding the subject project. You identified particular concern over operation and maintenance responsibility for the project and access to the beach along its alignment.

Operation and maintenance of the project is traditionally a non-Federal responsibility. We concur with your recommendation that the Commonwealth of Massachusetts bear this portion of the non-Federal interest. In particular, we suggest the Metropolitan District Commission (MDC) be identified as the agency charged with these efforts; since the MDC has jurisdiction for its Revere Beach Reservation to the study area's north and the existing pumping station within Roughans Point itself.

An agreement of this nature, however, must be negotiated with the Commonwealth of Massachusetts as part of an arrangement to meet the project's cost sharing requirements. It is our understanding that coordination in this regard is on-going and that final determination will be made prior to construction.

The specific location and number of access points over the proposed protection are to be identified during detailed engineering and design. Request for additional access will be reflected in our final recommendation.

It has been a pleasure to work with your staff, and we look forward to continuing this spirit of cooperation in the days ahead as the Roughans Point Coastal Flood Protection Study comes to an end. Your continued support and assurances will be needed as our recommendation proceeds towards implementation.

Sincerely,

cc: Mr. Bocchino
Reading File
Planning Division File

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:
Emerson Chandler, Mass. Water Resources Commission
Francis H. McCarran Jr., MDC
Paul Rupp, City of Revere

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

50 High Street, Boston, MA 02110

September 8, 1982

Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Attention: Joseph L. Ignazio
Chief, Planning Division

Re: Revere Coastal Flood Protection Study
Roughans Point

We have reviewed the two (2) documents entitled "Water Resources Investigation Interim Response; Main Report - Volume I and Support Documentation - Volume II".

We concur with the selection of the structural protective system as opposed to the nonstructural system for protection against flooding, and also concur with redesign and relocation of the backwater cutoff wall which will now cause minimal interference with the operation of our Blue Line.

We will await the submittal of the Draft Survey Report which is the final report and will, at that time, provide the Corps of Engineers with our final review of this project.

Sincerely,

John J. White
Director of Operations

AKM/mk

cc: R.L. Duvall
E.F. Smith

COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

February 12, 1982

Mr. Joseph Bocchino
Corps of Engineers
New England Division
Building 112 North
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Mr. Bocchino:

The Massachusetts Coastal Zone Management Program (MCZMP), in conjunction with the FEMA funded State Assistance Program, has reviewed the Stage 2 document entitled "Roughans Point Revere, Massachusetts - Coastal Flood Protection Study" and would like to submit comments at this time. Since the project is still in the planning stages, we feel this is an excellent opportunity to provide substantive comments which should receive full consideration and implementation by you in your effort to assist the residents in reducing future flood damage losses.

The MCZM Office requests that you submit a consistency determination for the Stage 3 Report when it is developed. In reviewing your determination, we will focus attention on the degree that our suggestions for modification of the Stage 2 Report have been adopted. We feel very strongly that the comments made below support the choice of a combined structural/nonstructural alternative for its consistency with Policy 1 (protection of wetlands), Policy 4 (construction of flood control works in water bodies) and Policy 17 (funding nonstructural measures).

We would like to present several general comments and suggestions in an effort to have the Stage 3 Document reflect: 1) up-to-date information on the National Flood Insurance Program and 2) the need for improved coordination with state agencies. We have suggested additional factors for your consideration in the analysis of structural and nonstructural alternatives.

General Comments

The Stage 2 Documentation Report presents a fairly thorough and detailed analysis of many alternatives. However, in an effort to have the Stage 3 Report be more complete and accurate, several other recommendations are presented below for your review:

1) The table on page G-13 needs to be changed to reflect new, increased insurance rates as of October 1, 1981;

2) In view of the fact that the MDC has been reorganized, there is a particular need for improved coordination with the state agency concerning the pumping of interior drainage;

3) Consider alignment improvements for wall section at the Leverett St. - Winthrop Beach Parkway. The area seems to act as a point of convergence for waves and tidal surge acting to overtop the wall at higher rates than elsewhere along the wall;

4) Continue to give "widespread applicability of nonstructural measures ... " and provide updated information on the non-structural statistics as stated in Stage 2. Our concern lies with the fact that the Floodplain Management Section will not be involved in Stage 3;

5) Expand on the environmental impact of the structural alternatives; and

6) Consider the receptiveness of a costly structural project by the Congress and communicate with the town on the likelyhood of their preferred alternative being successfully approved.

Evaluation of the Nonstructural Alternative

Given the experience gained in the field of floodplain management and in recognition of the current economic demands placed on any type of construction, policies are beginning to place greater emphasis on nonstructural alternatives that minimize the need for expensive, environmentally damaging structural solutions. This is reflected in the Stage 2 Report where it cites federal regulations, regional recommendations, state study conclusions and federal agency correspondence.

It is interesting to note that the residents of Roughan's Point have recognized their susceptibility to flood damages to the extent that many have pursued floodproofing and elevaton of structures with the use of publicly funded grants. Other nonstructural measures such as acquisition have been considered to the extent that half of those interviewed have considered selling. As reflected in the report, it is apparent that the residents recognize a long-term flooding problem and would support the nonstructural alternative if it would reduce the extent of flood damages. Therefore, the ongoing floodproofing program and commitment of federal and state funds for nonstructural solutions at Roughan's Point cannot be overlooked.

In addition to what is stated in the report, Policy no. 17 of the MCZMP plan states, in part: " ... structural solutions should only be implemented if: 1) non-structural measures ... have been evaluated and rejected as being too costly, ineffective, or legally infeasible ... ". Part of our federal consistency review by the MCZM Office for the Roughans Point solution will recognize this policy.

The section in the report entitled "Statements of Problems and Opportunities" briefly states the three objectives of the study but fails to summarize how each of the alternatives relate to those objectives. The traditional cost/benefit ratio is utilized throughout the report to justify alternatives; however, it relates to only one of the three objectives. Very little reference it made to the other two objectives. To present additional support for the nonstructural alternative (Plan B), each of the three objectives are stated below and a discussion is presented.

1. Reduce potential flood damage by 90%.

The report states: "the combination maximizing net benefits is a 200 cfs. pump added to the without condition and no construction of a seawall. However, this has large residual damage and does not meet the ... 90% structural plan protection". Apparently no calculations were made to intergrate plan B with the added pumping capability. By utilizing the figures given in Table 10 of the report, the 90% target protection is met by integrating the pumps with plan B, as shown below:

a) Compute difference in % of total annual losses between alternatives A1 and A4.

Alternative	%
A1 - 14' - 1:3	49
A4 - 14' - 1:3; 200 cfs	88
	difference = 39% increase

b) Add the difference in % of total annual losses between alternatives A1 and A4 to B. Resultant % represents integrated Plan B(1).

Alternative	%
B - nonstructural	53
B(1) - nonstructural; 200 cfs	53 + 39 = 92%

(Note: A1 is compared to B since both have similarly low % total annual losses.)

By a similar analysis of the $1,000 Units Residual losses in Table 10, Plan B with 200 cfs would contribute to a further reduction of 77%. Recognition of interior drainage improvements accomplished by pumping would be an integral part of Plan B and would necessitate the alternative to be labled as a combined structural and nonstructural plan.

2. Reduction of exposure to flood-related psychological tensions.

No data or information is provided in the report to directly address this objective. It is unsubstantiated that "floodproofing generates a false sense of security". It is our feeling that a similar statement could be made about shore protection structures. The seawalled sections of Cedar Point in Scituate, Massachusetts, for example, offered a minimal level of security during the 1978 Blizzard. One tangible means of reducing tension may be related to the formulation and communication of a flood-warning and evacuation plan for the residents. The report identifies this as a major shortcoming but does not recommend its implementation with any of the alternatives. Flood-warning and evacuation are standard nonstructural techniques.

3. Develop a program contributing to environmental quality and enhancement of recreational value.

There is no dispute that plan B meets this objective and that structural plans A, C and D clearly do not. A temporary hinderance to recreation and permanent loss of 60-70 feet of beach are both short and long term adverse impacts of the structural plans. In addition the report states, "Plans will be developed in the interest of achieving the two coequal goals of enhancing National Economic Development Development (NED) and Environmental Quality (EQ)". The sole reference to this statement, found later in the report, is that plan B (nonstructural) should be considered prime candidate for the EQ plan. Part of the federal consistency review by the MCZMP will consider the loss of beach and the negative impact on marine productivity by addressing Policies 1 and 4 of the MCZM plan.

Conclusion

The interior drainage solution requiring increased pumping capacities was not considered with the nonstructural alternative, apparently because pumping is not classified as a nonstructural measure. Perhaps an alternative combining structural and nonstructural techniques could be pursued.

Utilization of the proposed low-cost nonstructural measures combined with an upgrading of the existing pumping capacity and network of the MDC Broad Sound Avenue station would be the lowest cost, most environmentally sound, beneficial and effective means of reducing flood damage. Therefore, we recommend the combined alternative be closely examined in the Stage 3 Report.

Thank you for the opportunity to comment on the Stage 2 Report. It is clear that the project area of Roughan's Point has a significant flood damage problem which needs public assistance. It is an opportunity for the NED of the Corps to sponsor a project that modifies the extent of flooding damages (nonstructurally) rather than modifying the extent of flooding (structurally). Our office will be looking forward to receiving a copy of Stage 3 Report and making a review for federal consistency.

Please feel free to contact our office for assistance in developing your consistency determination as you near completion of the Report.

Sincerely yours,

Richard F. Delaney

Richard F. Delaney
Director, MCZMP

RFD:SMH:bam

cc: Bob Krinchky, City of Revere
Mark Signore, City of Revere
Sterling Wall, N.E. DEQE
Francis McCarren, M.D.C. Parks
Henry Higgot, M.D.C. Parks
Emerson Chandler, Water Resources Commission
Edward Thomas, FEMA

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDPL-BC

22 June 1982

Mr. Richard F. Delaney, Director
Massachusetts Coastal Zone
Management Program
100 Cambridge Street
Boston, Massachusetts 02202

RE: Revere Coastal Flood Protection
Study - Roughans Point

Dear Mr. Delaney:

Inclosed please find a copy of the Draft Interim Response for the Roughans Point portion of our Revere Coastal Flood Protection Study. This initiates a 90-day review period. Other public agencies, including the City of Revere, have received the report to review. We request that you review our Federal Consistency Determination on the subject project.

The study text is provided in two volumes - the Main Report (Volume I) and Support Documentation (Volume II). The Main Report includes an Environmental Assessment and compares structural and nonstructural flood protection alternatives for Roughans Point. The Support Documentation is technical backup information developed during the study.

We have selected for recommendation a structural protective system consisting of a rugged rock berm sloping seaward 1 vertical on 3 horizontal along the Roughans Point shore. An additional pumping station, auxiliary power source and associated interior drainage provisions are also included. Flooding from backwater would be prevented by raising two road intersections. The total project is estimated to cost $11.0 million and has a benefit-to-cost ratio of 1.3 to 1.0.

The project will directly affect the Massachusetts Coastal Zone in the Roughans Point, Revere area and we seek your preliminary concurrence that the project is consistent to the maximum extent practicable with the Massachusetts Coastal Zone Management (MCZM) Program. We hope to expedite recommendation finalization with prompt coordination of all comments and concerns.

A Draft Survey Report will be compiled to include comments received during the review period. Your preliminary concurrence is requested by 10 September 1982. This will then be distributed for final review. Conclusion of study efforts are scheduled for December 1982 with issue of the Division Engineer's public notice announcing his final study recommendations and submission of the report to the Board of Engineers for Rivers and Harbors for approval.

NEDPL-BC 22 June 1982
Mr. Richard F. Delaney, Director

Your letter of 12 February 1982, included in the report, outlined MCZM's review of our preliminary screening of alternative flood protection plans for Roughans Point. We have incorporated many of the suggestions as shown in Attachment A, and addressed the applicable consistency policies and how the selected plan relates to them in Attachment B.

If you have any questions, please contact Mr. Joseph Bocchino the project manager, at 894-2400, extension 538 or Mr. Charles Freeman, who coordinated the environmental investigation for this study, at extension 257. We look forward to your continued coordination and response.

Sincerely,

Incls
as stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:

Mr. Emerson Chandler, Massachusetts Water Resource Commission

Mr. Henry Higgot, Metropolitan District Commission

Mr. Jeff Benoit, Coastal Zone Management

Mr. David Shepardson, Coastal Zone Management

Mr. Gerald Salemme, Congressman Markey's Office

cc:
Mr. Bocchino
Mr. Freeman
Reading File
Planning Division File

ATTACHMENT A

RESPONSES TO
GENERAL COMMENTS

1. A display of current flood insurance rates was not included in this report. Reference is made to discussion provided on pages IV-10 and IV-11 under Flood Plain Zoning in the Main Report and E-26 under Benefits From the Reduction in Insurance Overhead in the Support Documentation.

2. The study is being closely coordinated with the Metropolitan District Commission (MDC) and the Department of Environmental Quality Engineering (DEQE). Both offices have been sent the report to review. Other agencies participating in the review include the Massachusetts Historic Commission, the Massachusetts Bay Transit Authority (MBTA) and the Metropolitan Area Planning Council (MAPC).

3. The seawalls at Leverett Avenue and Winthrop Parkway are designated reaches E and F. Under existing conditions the top elevation of wave run-up for the 500-year event (the selected plan's level of protection) is 28.5 feet NGVD. This is reduced to 19.5 feet NGVD when modified by the proposed measures. Reference is made to Tables A-9 and A-10 in the Support Documentation regarding the average effect of the rock berm under various storm conditions.

4. The feasibility of nonstructural flood protection was re-analyzed by members of the Comprehensive River Basin Section (CRBS) with the help of the Flood Plain Management Section (FPMS). Both organizations are components of the Basin Management Branch within Planning Division. Study management is provided by CRBS.

Reference is made to discussion presented in the Main Report on pages III-2 through III-5 under Reduce Vulnerability, III-9 through III-11 under Screening of Plans, pages IV-6 through IV-14 under Nonstructural Plan, pages V-2 and V-3 under Selection, and Table 14 on page VI-2. Such protection was found feasible for 84 of the 300 plus homes in Roughans Point but this plan was not selected because the threat of flooding remains and protection is not comprehensive. In addition, feedback obtained from follow-up workshops and correspondence received indicate the non-acceptability of the nonstructural plan.

5. The environmental impact of the structural plan is addressed in the Environmental Assessment, Section VII of the Main Report. This includes the Finding of No Significant Impact and Section 404 Evaluation.

6. The City of Revere has been communicating with Congressman Markey regarding plan implementation, and is cognizant of the procedure leading to construction authorization outlined in the Main Report, pages V-3 and V-4. A meeting is being arranged with the City, the Massachusetts Water Resources Commission and the MDC to discuss potential cost-sharing implications.

STUDY OBJECTIVES

Study objectives were refined as a result of responses to the preliminary screening. Plan selection was made with regards to how well the alternatives achieved these objectives.

1. Reduction in potential flood damages by at least 90 percent.— More detailed analysis of the nonstructural plan revealed that roughly 36 percent are prevented with its full implementation. The structural plan prevents 97 percent.

Determination of the damages prevented by combination of the nonstructural plan with a 200 cfs pump and other interior drainage provisions cannot be done as shown in your letter. Damages prevented by each of these on an individual basis are not additive since a portion of the benefits are attributable to both measures - resulting in "double counting". Even if optimistic levels were taken, the net effect would be far less than the target of 90 percent reduction.

2. Reduction of the flood threat.— The level of protection offered can be directly associated with the flood threat. The severity of the flood problem at Roughans Point limited the feasibility of many nonstructural measures. The comprehensive protective nature and the level of support demonstrated for the structural plan indicates satisfaction of the objective.

Recommendations to the City of Revere have been made with regards to flood warning and evaluation to expand their Emergency Operations Plan as outlined on pages IV-12 and IV-13 in the Main Report. These actions can be implemented without being involved in a flood protective system. It was found that many of the residents of Roughans Point already take measures on their own to prevent flood loss. This has been considered in the study.

3. Contribution to environmental quality and enhancement of recreational value.— The nonstructural plan, as stated in your letter, does meet this objective. During detailed planning, the structural plan was revised to include 20 foot wide stepped access at three locations to contribute to this objective. Reference is made to pages IV-3 and IV-4 and Plate 8 in the Main Report.

ATTACHMENT B

FEDERAL CONSISTENCY DETERMINATION

Policy 1. Protection of Wetlands.

The proposed project provides for flood control and reduction of storm wave damage, and thus is in the interest of the Wetlands Protection Act. Placement of structural fill will result in the actual loss of less than one acre of the 30 acre Cherry Island Bar clam flat. Reference is made to pages EA-4 and EA-5, EA-8 through EA-10 and the 404(b) Evaluation in the Main Report.

Policy 4. Construction of Flood Control Works in Water Bodies.

The proposed project will have no significant or persistent adverse impacts on the local aquatic environment or on adjacent or downcoast areas. Reference is made to pages EA-14 through EA-18 of the Main Report.

Policy 10. Conformance with Existing State and Federal Discharge Requirements.

The Corps will conform with appropriate State and Federal water quality requirements. If necessary, a state water quality certificate would be sought. The proposed project is not expected to violate air or water pollution standards nor will it substantially impact on productive coastal wetlands.

Policy 13. Review of Proposals Near Public Recreation Sites.

Revere Beach is adjacent to the northern portion of the study area. Placement of fill for project structures will result in the loss of about one acre of the beach. This area receives minor public usage and is only 5 percent of the 3 mile long beach. Loss of this small portion of Revere Beach is considered insignificant. Our findings and recommendations are being coordinated with the MDC as outlined in Attachment A.

Policy 15. Proposals Do Not Promote Development in Damage Prone Areas.

The Roughans Point area does not have a significant amount of developable land available. The City of Revere's participation in the National Flood Insurance Program will protect against unwise future development. Thus, the proposed project is not expected to encourage unwanted growth.

Policy 17. Funding for Protection from Flooding and Erosion, and Use of Nonstructural Measures.

Our findings regarding the nonstructural plan are outlined in Attachment A.

The Commonwealth of Massachusetts
Metropolitan District Commission
Engineering Division
20 Somerset Street, Boston 02108

February 5, 1982

SUBJECT: Revere Coastal Flood
Protection Study - Roughans Point

Department of the Army
New England Division - Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02254 Attn: Mr. Joseph Bocchino

Gentlemen:

The study has been reviewed with the following comments. The MDC has a direct interest only in the seawall at Eliot Circle and the MDC pumping station at Broad Sound Avenue. Other areas involve other State or local agencies.

In general the MDC would prefer to see the study continued on the more minimal treatments of flood protection.

The Non-structural (Plan B) involves the individual private property owners only.

The Breakwater (Plan D) would be expensive to build and it is difficult to predict changes to the shoreline caused by the breakwater.

500 Year Protection (Plan A-5 and C-5) The level of protection seems excessive. A backwater cut-off wall is unsightly and gates and closures would be difficult to operate and maintain.

Additional protection is not needed at the Eliot Circle Seawall since wave overtopping has not been observed here. Changes to the internal drainage system should not add additional water to be pumped by the MDC Pumping Station since this station already operates at capacity.

100 Year Protection (Plan C-1) The level of protection in this plan seems more appropriate as a solution for flood protection. Again wave overtopping has not been observed at Eliot Circle and the MDC Pumping Station is operating at capacity.

Please contact this office if we can be of further assistance. My telephone number is 727-5264.

Very truly yours,

Francis H. McCarran, Jr.
Director of Parks

HAH/mod
cc: J. Capone

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO ATTENTION OF

NEDPL-BC

8 June 1982

Mr. Francis H. McCarran, Jr.
Director of Parks
Metropolitan District Commission
Engineering Division
20 Somerset Street
Boston, Massachusetts 02108

RE: Revere Coastal Flood Protection Study - Roughans Point

Dear Mr. McCarran:

Inclosed please find a copy of the Draft Interim Response for the Roughans Point portion of our Revere Coastal Flood Protection Study. This initiates a 90 day Review Period. Other public agencies, including the City of Revere, have received the report to review. Your formal comments are requested no later than 10 September 1982.

The study text is provided in two volumes - the Main Report (Volume I) and Support Documentation (Volume II). The Main Report includes an Environmental Assessment and compares structural and nonstructural flood protection alternatives for Roughans Point. The Support Documentation is technical backup developed during the study.

We have selected for recommendation a structural protective system consisting of a rugged rock berm sloping seaward 1 vertical on 3 horizontal along the Roughans Point shore. An additional pumping station, auxiliary power source and associated interior drainage provisions are also included. Flooding from backwater would be prevented by raising two road intersections. The total project is estimated to cost $11.0 million and has a benefit to cost ratio of 1.3 to 1.0.

Your letter of 5 February 1982, included in the report, outlined the Metropolitan District Commission's (MDC) review of our preliminary screening of alternative flood protection plans for Roughans Point. You indicated then that the 100-year protection offered by Plan C-1 "seems more appropriate" since wave overtopping at Eliot Circle "has not been observed." The plan selected for recommendation offers 500-year protection. This was chosen because of a local desire and Traditional Corps policy for the highest degree of protection possible. In addition, the decision is supported by the lesser environmental impact associated with the selected plan.

NEDPL-BC 8 June 1982
Mr. Francis H. McCarran, Jr.

The backwater cut-off wall has been re-designed in accordance with your comments regarding the difficulty of operation and maintenance of street gates and closures. The proposed concrete wall along the western edge of the study area is eliminated and replaced by provisions outlined above. A sand bag closure is still recommended for the Winthrop Parkway at the extreme southern end of the project.

The selected plan calls for a new pumping station and interior drainage to supplement the existing system. The station will also be located on Broad Sound Avenue and house two pumps with a total design capacity of 50 cfs, along with a diesel generator. This latter auxiliary measure will also be connected to your pumping station providing emergency power to both stations if needed. Please reference Appendix A, "Hydrology and Hydraulics", in the inclosed Support Documentation (Volume II) for more details.

A meeting is being planned with the City of Revere and the Massachusetts Water Resource Commission to discuss potential cost-sharing implications. This is to be held sometime within the Review Period. We hope to expedite recommendation finalization with prompt coordination of all comments and concerns. Your views regarding this will be appreciated.

A Draft Survey Report will be compiled to include comments received during the Review Period. This will then be distributed for final review. Conclusion of study efforts are scheduled for December 1982 with issue of the Division Engineer's public notice announcing his final study recommendations and submission of the report to the Board of Engineers for Rivers and Harbors for approval. The procedure leading to construction authorization is outlined in the Main Report (Volume I), pages V-3 and V-4.

If you have any further questions please contact Mr. Joseph Bocchino of my staff at (617) 894-2400, extension 538.

Sincerely,

Incl
as stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:

Mr. H. Higgot, MDC
Mr. J. Capone, MDC
Mr. Emerson Chandler, Mass. Water Resource Commission

cc: Mr. Bocchino
PDF

MASSACHUSETTS HISTORICAL COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State
294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

January 11, 1982

Mr. Joseph L. Ignazio, Chief
Planning Division
Army Corps of Engineers
424 Trapelo Road
Waltham, Mass

RE: Revere, Massachusetts Coastal Flood Protection Study: Roughan's Point

Dear Mr. Ignazio:

Thank you for the supplying the Massachusetts Historical Commission with a second copy of your letter of 8/25/81 regarding the proposed project listed above. The original copy was, unfortunately, mislaid. MHC staff have reviewed the information and concur with the findings of your staff that it is unlikely that significant prehistoric or historic archaeological resources remain with the proposed project area.

If you have any further questions, please feel free to contact Eric Johnson at 727-8470.

Sincerely,

Patricia L. Weslowski

Patricia L. Weslowski
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

xc: Marie Bourassa
U.S. Army corps of Engineers

PLW/lk

GEORGE V. COLELLA
MAYOR

THE CITY OF
REVERE, MASSACHUSETTS

OFFICE OF THE MAYOR
CITY HALL

RECEIVED
JUL 27 9 10 AM
MAYORS OFFICE
COMMUNITY
DEVELOPMENT

July 26, 1982

Emerson H. Chandler, Executive Coordinator
Water Resources Commission Environmental Management Department
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts

Dear Mr. Chandler:

It is our understanding that the Water Resources Commission, at its August 9, 1982 meeting, will consider a recommendation that the Commonwealth of Massachusetts support a proposed coastal flood protection project for the Roughan's Point section of Revere. This proposal has been recently advanced by the U.S. Army Corps of Engineers after lengthy studies initiated at the request of the City with the aid of Congressman Edward J. Markey.

As I am sure you are aware, the Roughan's Point section is one of several densely populated low-lying coastal neighborhoods in the City of Revere which have experienced serious flooding problems over the years. In terms of repetition and severity of such occurrences, and in terms of the magnitude of human suffering and attendent property damage however, the Roughan's Point area remains the most serious local flooding control priority. Thus, the City of Revere and the Army Corps of Engineers share the belief that the flood control recommendations for Roughan's Point proceed separately from Revere's overall flood control studies and be placed on an accelerated implementation schedule.

The success of this strategy however, will of course be contingent upon the willingness of the Commonwealth to both support the Roughan's Point Plan, and to agree to participate in cost sharing with regard to the local share required by federal law.

It is our sincere hope that the Water Resources Commission will recognize the pressing need for this flood control project, will endorse the plan, and hopefully will coordinate the functions of the various state agencies which are, or should be involved in project review and planning, in an effort to expedite its implementation.

Finally, the City of Revere will of course provide any and all assistance necessary in this effort, including but not limited to, requesting our state legislative delegation to introduce legislation to provide capital improvement funds to meet the federal cost-sharing requirement.

We appreciate the support and efforts of the staff of the Department of Environmental Management on behalf of the City of Revere to date, and sincerely hope that we

can anticipate a continuance of that support on the part of the Water Resources Commission.

Thank you for your consideration and cooperation in our attempts to resolve a long-standing problem in Revere.

Very truly yours,

George V. Colella
Mayor

GVC/lf

cc: Governor Edward J. King
Secretary John Bewick
Jerry Salemme, Congressman Markey's office
Senator Francis D. Doris
Representative Angelo Cataldo
Representative Alfred Saggese
Paul Rupp, Director, DPCD
Frank Stringi, Assistant Director, DPCD
Joseph Bocchino, U.S. Army Corps of Engineers
Rita Singer, City Councillor

TO: John J. Hannon, P.E.

FROM: Eugene F. Cavanaugh, Supervising Civil Engineer

DATE: July 19, 1982

SUBJECT: Revere - Roghan's Point Federal Project

On the above date I met with the following people to discuss the Corps proposed Flood Protection Project at Roghan's Point

Emerson Chandler - Water Resource Commission
Joseph Boschino - Corps of Engineers
William McCarthy - " " "
Herbert Heggott - M.D.C.
Jeff Benoit - CZM
Michael Penny - CZM
George Brocke - CZM
Paul Rupp - City of Revere Planning
Frank Stringi - City of Revere Planning
Shel Shapiro - F.H.M.P.

The project consists of the construction of 4000 linear feet of stone berm (reveted mound) from Winthrop Shore Boulevard at the southerly end of the project to Elliott Circle. It is to elevation 17.0 MSL (13.0 MLW) with a front side slope of 13. 1. Also included in the project is a Pumping Station to supplement the existing MDC Pumping Station and interior drainage system. Please see Attachment No. 1 identifying the costs and levels of protection. Attachment No. 2 shows the level funding based on existing and projected cost sharing percentages.

Our concern in this matter is in the funding of the local share and as caretakers of the easement along a portion of the project. CZM is currently reviewing the consistency requirements and environmental concerns. It was obvious from the representatives of the MDC, WRC and the City that we have no moneys available for tl local share of the pr ect and legislation will be required. The area on which the structure is to be built is on easements controlled by MDC, DEQE (Waterways) and the City of Revere.

I explained that our current policy of maintaining the existing structure consists of requesting funding on an as needed basis. We have experienced great difficulty in obtaining maintenance costs in the past as we experienced in our recent emergency project. The stone mound completed by us in 1979 was built utilizing a special appropriation and was only a short term solution to reconstruct the aged stone mound that was totally destroyed by the storm in February 1978. The existing concrete seawall on the southern portion of their proposal was built in 1936 ± and periodically repaired over the years by us and with a concrete face and cap built by the Corps in 1970 (Storm Damage Project).

The existing wall consists of a concrete cap on steel sheeting with scattered stone revetment in front of it, We can anticipate maintenance in the near future since the age is currently approaching 50 years. The Corps proposed mound will relieve or redirect the structural dependency of the wall as it is seaward of our wall; however, we would still have to periodically repair the exposed concrete cap and since maintenance after construction will be a local responsibility we will have to periodically rapair the stone mound.

It is the writer's opinion that the project is a benefit to us as it will greatly reduce our future maintenance cost; however, I can see great difficulty in attempting to administer a portion of this project as would be the case if we allowed the ownership to continue as it is now. I believe it would make more sense to have either the City or the MDC be the local agency for this project. They have labor forces required for the operation and maintenance of this proposal. Additionally, the easements should be obtained by the one agency who will be the local agent.

I was advised that the Water Resource Commission is to discuss this subject at their August 9th meeting therefore Commissioner Cortese should be advised of our position in this matter prior to the meeting. Emerson Chandler would like to receive our comments prior to that meeting, so he can have the responses from all state agencies for their discussion. I suggest you meet with the Commissioner as early as possible on this matter.

EFC:em
Attachments

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDPL-BC
MEMORANDUM

9 June 1982

TO: Member, Citizens' Workshop Committee

FROM: Mr. Joseph Bocchino, Corps of Engineers

SUBJECT: Revere Coastal Flood Protection Study - Roughans Point

1. Inclosed for your information is a copy of the Draft Interim Response for the Roughans Point portion of our Revere Coastal Flood Protection Study. This initiates a 90 day Review Period. The Commonwealth of Massachusetts, City of Revere and other public agencies have also received the report to review.

2. We have selected for recommendation a structural protective system consisting of a rugged rock berm sloping seaward 1 vertical on 3 horizontal along the Roughans Point shore. An additional pumping station, auxiliary power source and associated interior drainage provisions are also included. Flooding from backwater would be prevented by raising two road intersections. The total project is estimated to cost $11.0 million and has a benefit to cost ratio of 1.3 to 1.0.

3. The study text is provided in two volumes - the Main Report (Volume I) and Support Documentation (Volume II). The Main Report, the inclosed blue cover document, includes an Environmental Assessment and compares structural and nonstructural flood protection alternatives for Roughans Point. The Support Documentation is technical backup developed during the study, and is available upon request.

4. A workshop is planned for Thursday night, 29 July 1982 at the Our Lady of Lourdes hall at 1 Endicott Avenue. The meeting will run from 7:00 to 9:00 p.m. Discussion will focus on plan selection and any questions you may have regarding the report.

5. Your views are requested before 10 September 1982. We have provided a self addressed envelope and response form for this purpose. Please indicate if you would like a copy of the Support Documentation (Volume II). We hope to expedite recommendation finalization with prompt coordination of all comments and concerns.

6. The Final Survey Report will be compiled to include comments received during the Review Period. Study efforts conclude with issue of the Division Engineer's public notice announcing his final study recommendations and submission of the report to the Board of Engineers for Rivers and Harbors for approval. The procedure leading to construction authorization is outlined in the Main Report (Volume I), pages V-3 and V-4.

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

It would be great To keep our beach the way it is, but I know we need protection. You are doing a great job, and we agree with you. Just make sure we have an access to the water at Pierview Ave. My family has been coming here every summer for 5 generations & it has been an important part of our lives. The same as it has for most of my surrounding neighbors who have come for 4 & 5 generations. We have such a great neighborhood We now live here all year.

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: The Furlong Family

ADDRESS: 13 Pierview Ave.

September 2, 1982 -

Colonel C. E. Edgar III Division Engineer
Army Corps of Engineers
424 Trapelo Road
Waltham, MA. 02154

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

Dear Colonel Edgar -

I attended the last meeting conducted by Associates of the Army Corps of Engineers held at Beachmont on Thursday evening, July 29, 1982. It was very interesting.

I am in accord with the recommendations made by your Engineers as set forth in letter sent to you by my sister, Marion C. Noone Flynn for the Noone Family.

I shall await notification of your next meeting.

Sincerely yours,
Dominick C. Noone

✓ I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: D. Charles Noone

ADDRESS: 15 Essex Street, Medford, MA. 02155

Colonel C. E. Edgar III, Division Engineer
Army Corps of Engineers
424 Trapelo Road
Waltham, MA. 02154

September 2, 1982

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

Dear Colonel Edgar-

Thank you for the splendid and comprehensive Draft of the Roughans Point, Revere, Mass. Coastal Flood Study, Volume I which was mailed to us.

We appreciate the time and effort that your Staff has dedicated to this Cause and we endorse all that you have recommended.

On Thursday evening, July 29th, our family attended a meeting in the Cronin Hall of Our Lady of Loudes Church, Beachmont where your Mr. Joseph Bocchino presented some new sketches of the improvements now decided upon. The charts also were fully explained and the proposed improvements were very interesting. We were pleased to meet and talk with your Mr. Arthur Doyle and Mr. Bocchino.

Good Luck in your endeavors to secure the approval of a National Grant and a State Appropriation for this very important Project. We shall await notification of the next meeting.

Sincerely yours,

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: Marion C. Noone Flynn, Admnx. of the Estate of Maria D. Noone

ADDRESS: 16 Essex Street, Medford MA. 02155

Summer residents - 17 Ocean View Avenue Beachmont, MA. 02151

Property in the "Noone" name for 50 years.

Colonel C. E. Edgar III Division Engineer Sept 2, 1982
Army Corps of Engineers
424 Trapelo Road
Waltham, MA. 02154

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

Dear Colonel Edgar,-

We have read the Roughan Point Revere, Mass Coastal Flood Protection Study - Main Report Vol. I prepared by the U.S. Army Corps of Engineers (New England Division) It is a masterful report.

We are in favor of the recommendations of a (1) structural protective system consisting of a rugged rock berm, sloping seaward along the Roughans Point shore (2) an additional pumping station, with interior drainage provisions (3) raising two road intersections.

We attended a meeting, July 29th, in Cronin Hall, Lady of Lourdes Church. Mr. Joseph Bocchino ably presided and we were pleased to meet him and Mr. Arthur F. Doyle. The subject - Revere Coastal Flood Protection Study - Roughans Point was well presented and discussed by those present.

We sincerely hope that this protective and most necessary project will get the financial support from the Federal State + City governments. We shall write to Senators Kennedy and Tsongas and Congressman Markey.

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: Helen L Moone Esther N. Hayes

ADDRESS: 16 Essex St. Medford, MA. 02155 31 Johnson Rd Cedarville 02174

Summer residents - 17 Ocean View Ave. Beachmont, MA. 02151

We have enjoyed this area for fifty years.

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

As a resident of Roughans Point Area in Revere, Mass. I feel the structural plan, with a seaward sloping berm is the best plan we could hope for; also the additional pumping station.

The Government would save much money in flood insurance, if they backed this plan.

Sincerely
Jacqueline F. Donato.

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: Jacqueline F Donato

ADDRESS: 96 Dolphin Ave.
Revere, MASS. 02151

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

August 27, 1982

COMMENT: OBJECTION TO WALL 17' HIGH

In 1979 the year following the Blizzard of 1978, a completely new, WIDER AND HIGHER WALL was erected at Roughan's Point.

We have had no flood problems since.

In back of the new wall inland, the ground level is 5, 6, and 7 ft. below top of new wall.

Back up this new wall with rock and solid fill, starting the grade at a point of about 1 feet below the top of the new wall and grade upward 3 or 4 feet inland to a distance of about 50 feet.

Improve your drainage system and pumping station.

I most emphatically object to a 17 ft. wall, which will take away, forever, the beautiful, relaxing view of the ocean.

Very truly yours,

Bill Ash

Bill Ash
78 Winthrop Parkway
Revere, Mass. 02151

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME:

ADDRESS:

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

August 26, 1982

OBJECTION TO HEIGHT OF 17' WALL

COMMENT:

My name is Pat Morelli and I live at 23 Billow Avenue in Revere, Massachusetts.

I have lived here since 1962. My house faces the ocean. I have witnessed and experienced all the storms of the last 20 years.

A new wall was constructed after the blizzard of 1978 and I back-filled my land to height of new wall. The new wall is more than adequate.

You are over-reacting.

The ocean area between Nerious Avenue and Pierview Avenue does not get the full impact of the waves. The waves only side-swipe the coast line.

I MOST VIGOROUSLY OBJECT TO A WALL 17' HIGH, WHICH WILL OBSTRUCT THE OCEAN VIEW. THAT HEIGHT IS NOT NEEDED.

It is important to note that there has been no flooding since the new wall was built in the summer of 1979.

Sincerely,

Pat Morelli

Pat Morelli
23 Billow Avenue
Revere, Mass. 02151

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME:

ADDRESS:

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

COMMENT:

I am in favor of the Revere Coastal Flood Protection Plan, as explained at the workshop of 1-29-82.

Re: Rock Berm —
Additional MDC
Pumping Station

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: B. COLASANTE

ADDRESS: 58 DOLPHIN AV.
REVERE, MA. 02151

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

RE: OUR 14½YR. OLD HOME
71 JONES ROAD
REVERE, MASS.
.02151.

COMMENT:

APTER ATTENDING THE LAST MEETING OF THE ABOVE WORKSHOP, I WALKED AWAY WITH, FINALLY, A "RAY OF HOPE" IN THAT A PLAN MIGHT BE PUT INTO THE WORKS TO SAVE OUR HOMES IN THE BEACHMONT AREA - WHICH, ALL TOO OFTEN, HAVE BEEN HIT WITH "SALT" WATER OCEAN FLOODING, AND IN SOME CASES HEAVY RAINFALL FLOODING.

I HAVE LIVED HERE SINCE JANUARY OF 1972, WITH MY FIRST EXPERIENCE OF FLOODING WHILE WE WERE JUST ABOUT MOVED IN - NAMELY, FEB. 19, 1972. WE WERE WITHOUT FUNDS, NO INSURANCE, AND BECAME FRANTIC AND PARANOID ABOUT OUR FUTURE AND OUR LOSSES....WE HAVE HAD THREE SUCH FLOODS AFTER THAT - 1974, 1978, & 1979.

DURING A 10-YEAR PERIOD, I FEEL THAT BETWEEN SBA LOANS, NATIONAL FLOOD INSURANCE PAYMENTS TO NOT ONLY MYSELF, BUT ALSO TO TENENTS WHO RENT OUT A 3-ROOM WALK-IN APARTMENT IN MY HOME, ABOUT $85,000. to $100,000. IN CONSTHUCTION REPAIRS AND CONTENTS HAVE BEEN EXPENDED FOR THIS ONE ABODE... MULTIPLY THE POSSIBLE SIMILAR COSTS FOR OTHER HOMES DURING THIS PERIOD (only 10-YEARS) PLUS THE BLOOD, SWEAT, SICKNESS & TEARS, ISN'T IT WORTHY TO PUT OUR FINAL PLAN TO TASK AS SOON AS POSSIBLE?

I UNDERSTAND THIS IS FOR A 100-YEAR PLAN, AND FEEL THAT IT WILL PAY FOR ITSELF IN NO TIME IF YOU MULTIPLY THE 10-YEAR COST FOR FLOODING PURPOSES ON MY ONE HOME($85,000. to $100,00.) TIMES TEN 10-YEAR PERIODS OF THE SAME COSTS, COMING UP WITH A POSSIBLE $1,000,000.00 BEING SPENT ON ONE HOME FOR FLOODING DAMAGES DURING A 100-YEAR PERIOD.

THE PROPOSED PLAN THAT MR. JOSEPH BOCCHINO, ARMY CORP. OF ENGINEERS, HAS PRESENTED TO THE COMMITTEE IS THE BEST WE HAVE HEARD YET!!!! - A 97% PREVENTIVE DAMAGE PROJECT...WE COULD CERTAINLY SLEEP NIGHTS WITH THIS PROJECT IN EFFECT.

PLEASE, PLEASE, GIVE US SOME HOPE, AS WE HAVE, PERSONALLY GONE TO MEETINGS, SEMINARS, AND MORE MEETINGS REGARDING THIS FLOODING PROBLEM FOR 10 YEARS NOW. WE WOULD LIKE TO THINK EVERYTHING WE HAVE BEEN THROUGH HAS NOT BEEN IN VAIN. WE BEG YOU TO PUT THE PROPSED PLAN IN THE WORKS.....THANK YOU,

MRS. PAUL ZISKIND
Tel. #284-6772
8/12/82

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: MRS. EDITH ZISKIND
ADDRESS: 71 JONES ROAD
REVERE, MASSACHUSETTS
.02151.

P.S. WOULD LIKE COPY OF "GREEN" REPORT (RESPONSE TO FEMA MEETING).

Dear Mr. Bocchino. Aug 4-82

I was very sorry I was one person that should have been there. I have been at some of your meetings at the church. But this time I did not hear about it. I was one person a widow In Dec 21-1975. Some neighbor called me and said we were going to have a flood. I told my husband he put his boots on and moved his car because we lost a car Feb 19-1972. After he moved his car in 1975. He came in asked for a cup of Coffee. I brought it to him in the living room + he was died. Come to find out it was a Joke to this person said watch them move the Cars. to me it was a tragety ~~also~~ a lost of a good husband. I am now 73 years old. Three years later the 1978 Blizzard. 6½ feet of water in cellar and 18 in up stairs. Lost everything. even my clothes and bedding + furniture. I have pictures. Then I took sick. Now I have High Blood pressure brought on from the Blizzard on medicine for life. So you see Sir what ever you can do for us on the Henry ST. would help. It has left me with a loan to pay

had each month $170.00 for 30 years I had $27000.00 worth of damage. The loan people wanted to give me that amount. But I couldn't pay that high monthly payment So I took the $5.000. My house is raised 3 feet hope we dont get it again. Here I am alone and work from day to day. So please help us. I know you can a lot of help. I have picutre of the damage I have Also feel free to call me if you want.

God Bless You. Thanking You

Mrs Marion Cataldo
23 Henry ST
Revere Mass. 02151

My phone number is
289-1000

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

July-30-'82

COMMENT:

If the present plan, developed by the Army Corps of Engineers, will prevent 97% of the damage caused by the Blizzard of 1978, then let's do everything to get this plan built. Flooding is a serious threat in the Roughan Point area - so let's eliminate the threat as soon as possible.

Rev. John E. Colahan
1 Endicott Ave.
Revere - 02151

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: REV. JOHN E. COLAHAN

ADDRESS: Our Lady of Lourdes Parish
One Endicott Avenue
Beachmont (Revere) Mass. 02151

ROUGHANS POINT
DRAFT INTERIM REPONSE

RESPONSE FORM

7/29/82

COMMENT:

All Things being equal - all (or any) plans to alleviate, this situation - can only be for the better.

Time is of the essences - the sooner this plan is augmented is for the Common Good

Paul Dix

I WOULD LIKE TO RECEIVE A COPY OF THE SUPPORT DOCUMENTATION SENT TO THE ADDRESS INDICATED BELOW. (Not necessary if you do not want the support documentation).

NAME: Paul Dix

ADDRESS: 16 Pierrer Ave Revere Mass 02151

July 20, 1982

New England Division, Corps. of Engineers
434 Trapelo Road
Waltham, Mass. 02154

Re: Roughans Point, Revere, Mass. - Coastal Flood Protection Study - Draft Interim Response

Gentlemen:

Comment: My objection to height of wall at 17 ft.
My recommendations.

My name is Richard Karem and I reside and own the property at #50 Broadsound Avenue, Revere, Mass. I am located between Foam Avenue and Undine Avenue. My home is bounded by the Atlantic Ocean with an ocean frontage of about 85 feet. Because of my location I have seen not merely hundreds of high tides but thousands since I first resided here in 1949.

When I first moved here up to after the blizzard of 1978, there existed a wall in name and not in fact. It consisted of large, irregular rock placed disorderly one over the other - the grade of the top of the wall was not uniform, having many breaks and openings in it from 2 ft. to 3 ft. along the top - the wall was low and narrow. Opposite Billow Avenue there was no wall at all for about 20 ft. - this 20 ft. gap was closed after the storm of 1972.

Recognizing the ineffectiveness of this wall and taking into consideration that there was no back-up fill, I, at my own expense, about 1952, had constructed two concrete walls - 24" wide and about 70 ft. long, running along the east and west boundary of my land at right angles to the so-called ocean wall, the grade of the two walls starting near the top of the ocean wall and pitching upward and inland from the ocean to a grade 3 ft. higher than the ocean wall.

I then had solid fill consisting mostly of broken concrete and cement slabs fill the cavity. As a result, when thewaves overlapped the ineffective ocean wall, the water would flow back into the ocean. During very unusual storms, the sea water would pass around my elevated land and onto the lower land.

I have never had any sea water flow over my property until the blizzard of 1978.

After the blizzard of 1978, the old ineffective wall was replaced with a new wall - a <u>higher</u> wall, a <u>wider</u> wall and - a wall erected with <u>uniformity</u>, every rock and stone fitted with <u>care</u> and precision, like fitting a jig-saw puzzle.

When it was completed, I requested that solid fill of rock and fill be placed on my land and back up the new wall. This was done to some degree, but not enough to satisfy my over-all plan.

July 20, 1982

The present new wall is one in fact and not in name.
I offer the following recommendations:

(1) Pour concrete upon the top and into the new wall solidifying all the joints.

(2) Back fill the new wall with rock and solid fill having the grade starting at one foot below the top of the wall and grade upward 3 ft. inland to a distance of about 50, 60, or 70 ft. (There are always available many contractors repairing roads in the area who are seeking a dump area for their concrete, blocks, pavement and sidewalk slabs.)

(3) Improve your pumping station and drainage system and/or add a new pumping station.

We do not need your proposed 17 feet high wall and eleven million dollar plan.

We have a new wall constructed after the blizzard of 1978. Give the new wall a chance to prove its effectiveness.

Recommendations #(1) and #(2) would cost very little -- only a few thousand dollars and not eleven million dollars.

The recommendation of a wall 17 ft. high is a most outrageous, ridiculous plan, predicated upon over-reaction to reality. Obstructing the view of the ocean for 500 years -- because we got a storm that occurs once in 100 years.

All the king's horses and all the king's men wouldn't contain the storm of the blizzard of 1978.

Please note that the waves in the area between Nerious Avenue and Pierview Avenue do not slam or splash against the wall -- straight-on or at a right angle, but rather approach side-swiping the wall at a slight angle - probably about a 10 degree angle.

After the blizzard of 1978 conditions have changed:

(a) New Wall Constructed.

(b) Almost all homes on Broadsound Avenue have been raised.

(d) Flood Insurance Coverage available and taken advantage of.

I most emphatically object to any 17 ft. wall or wall erected any higher than the present new wall because it will not only completely obstruct the view of the ocean but also it is absolutely unnecessary.

July 20, 1982

The study report is misleading and incorrect in that it states that the stone wall west of Simpson's Pier has top elevation of 10 or 12 feet, when in reality it is 12 to 14 feet. I believe the study report was referring to the old wall.

Also, the study report fails to state that a new stone wall was erected after the blizzard of 1978 and, furthermore, that there is no evidence that it would not be satisfactorily effective!

I urge that a representative of your office telephone me for a personal interview at my home so that I could personally explain to him in more detail and clarity my plan and recommendation.

I also request that this letter of objection and recommendation be incorporated in your final report for consideration by the other offices and agencies who review your report.

Very truly yours,

Richard A. Karem

RICHARD A. KAREM
50 Broadsound Avenue
Revere, Mass. 02151
Telephone: 289-9860

RAK:S
Certified Mail -
Return Receipt Requested.

ROUGHANS POINT

DRAFT INTERIM REPORT - REPONSE FORM

COMMENTS

July 10,1982

DEAR COMMANDER:

Please accept this informal note with my comments as requested. I wish to go on record as opposed to any kind of structural solution involving a rugged rock berm. I am in favor of nonstructural solutions for all the reasons given by FEMA on pages VIII-4 to VIII-6 of the "Roughan Point, Revere, Massachusetts-Coastal Flood Protection Study."

The fact that many of the residents signed for this form of flood protection is no reason for it to be implemented. This area, as all you know, is not comprised of intellectuals. It is the responsibility of the Corps to take all factors into consideration for now and for future use.

My suggestion is to implement the nonstructural plan, with some other structural techniques and preserve the environmental quality of this area which is its greatest value. A plan could be implemented to relocate those who do not want the non-structural solution. Bear in mind also that those with beach frontage are usually opposed to those without it when the true nature of a project is fully understood(understanding as opposed to knowing about).

Also beware that estimates of the value of some of the valuation of real estate can be more complicated than indicated. Also....environmental groups may have interest in preserving the area for beach uses.

I shall attend the meeting on the 29th, and may elaborate on these issues.

Thank you.

Dorothy Scholzin (Mrs)

February 12, 1982

Colonel C.E. Edgar, Division Engineer
Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Edgar:

As residents of the Roughans Point area in Revere, MA, we strongly urge the Army Corps of Engineers to pursue whatever actions are necessary to speed up the process for providing Roughans Point with the highest degree of protection possible against flooding.

After deliberating over many preliminary plans at public meetings we feel the time has come to act on the most effective structural plan possible. It is highly evident that Roughans Point needs structural reinforcement for its existing seawalls, new seawalls to replace inadequate stone revetments, and additional stone berms on the ocean side of the walls. A plan of this scope, if designed to its highest capacity of effectiveness, appears to be the most realistic and suitable flood protection plan for our area.

A structural plan of this nature, with a seaward sloping berm, is the plan we stand behind, and is the plan we would like to see implemented as soon as possible.

We appreciate the time and effort the Army Corps of Engineers staff has dedicated to this area, but as property owners who are living with the memory of the Blizzard of 1978 still fresh in our minds and more urgently, with the genuine possibility of witnessing a re-occuring event, we can't stress enough how important it is to have this project materialize from hope to a reality.

For these reasons, we reiterate our total endorsement of the above mentioned plan of action and urge that everything possible be done so that these efforts can proceed immediately.

Respectfully Submitted
Residents of Roughans Point

NAME	ADDRESS
Grace M. Duggan	15 Pierview Ave, Revere, Mass.
Daniel H. Duggan	15 Pierview Ave, Revere, Mass.
John P Walsh	15 Undine Ave Revere, Mass
Virginia Walsh	15 Undine Ave Revere Mass
15 John P. Walsh	15 Undine ave. Revere, MA.
Michelle M Walsh	15 Undine Ave Revere, MA
Mr. James E Powers	106 Broadsound Ave. Rev

Wm. J. McLaughlin	" "
Ann M. McLaughlin	109 Broadsound Ave.
Richard J. McLaughlin	" "
James F. Knight Co	116 Broadsound Ave
Virginia A. Knight	" " "
Thomas McLaughlin	82 Broadsound Ave
Marion McLaughlin	82 Broadsound Ave
Thomas McLaughlin Jr	" " "
Katherine T. O'Connor	8 Billow Ave
Richard J. O'Connor	8 Billow Ave. Revere
Mary Keegan	8 Nereus Ave
James O Connor	8 Billow Ave
Charles E Bussey	9 Billow Ave, Revere
Bernadette M. Bussey	9 Billow ave, Revere
Mary K Sheehan	36 Broadsound Ave. Revere
Bernadette F Sullivan	36 Broadsound Ave, Revere
Nellie E. Finnegan	36 Broadsound Ave Revere
Bernard M King	10 Foam Ave
Phyllis T	31 Noble St. Revere
Lawrence Ball	31 Noble St. Revere
Audrey Ball	31 Noble St Revere
Douglas Ball	31 Noble St. Revere
[illegible] Sophia	70 Broadsound Ave Revere

February 12, 1982

Colonel C.E. Edgar, Division Engineer
Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Edgar:

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After deliberating over many preliminary plans at public meetings we feel the time has come to act on the most effective structural plan possible. It is highly evident that Roughans Point needs structural reinforcement for its existing seawalls, new seawalls to replace inadequate stone revetments, and additional stone berms on the ocean side of the walls. A plan of this scope, if designed to its highest capacity of effectiveness, appears to be the most realistic and suitable flood protection plan for our area.

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We appreciate the time and effort the Army Corps of Engineers staff has dedicated to this area, but as property owners who are living with the memory of the Blizzard of 1978 still fresh in our minds and more urgently, with the genuine possibility of witnessing a re-occuring event, we can't stress enough how important it is to have this project materialize from hope to a reality.

For these reasons, we reiterate our total endorsement of the above mentioned plan of action and urge that everything possible be done so that these efforts can proceed immediately.

Respectfully Submitted
Residents of Roughans Point

NAME	ADDRESS
Warren G Hass	10 Beachview ave Revere Mass
Ellen M. Hass	" " " " "
Arthur G Hass III	" " " " "
D. Nelson Fox	16 Prescott Ave Revere
Paul Fox	" " " "
[illegible]	13 [illegible] Ave. Revere

Arthur A Stubbs Jr.	" " "
Edmund C Bell	7 PIERVIEW AVE
Edna M Bell	7 Pierview Ave
Linda M. Bell	7 Pierview ave
Dorothy L Donahue	7 Coral St
[illegible]	12 Broadsound [illegible]
Mary E [illegible]	120 Broadsound [illegible]
Lillian Smith	121 Broadsound Av.
Joseph Giannino	133 Broadsound Ave
Charles Keljikian	162 Broadsound Ave
Matthew Desmond	168 Broadsound Ave
Dorothy Ferriani	174 Broadsound Ave
Henry Ferriani	174 Broadsound Ave.
Joseph Creydon	176 Broadsound Ave
Catherine Desmond	168 Broadsound Ave
Esther Smith	163 Broadsound Ave.
Robert Smith	163 Broadsound Ave
Richard Conley	15 Pierview Ave.
Catherine F McCann	~~114 [illegible]~~ 14 Nevins Ave
John J M. Carran	14 Nevins Ave Revere
Christopher Fallon	74 Broadsound Ave Revere
Cheryl A. Fallon	74 Broadsound Ave. Revere, Ma.
Doris Simpson	Simpson's Pier Revere, Ma.

City of Revere
City Council

City Council Order No. 81-301

Offered By Councillor s Singer and Haas

Date: June 22, 1981

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF REVERE AS FOLLOWS:

That the Massachusetts Congressional Delegation be contacted and urged to support and pursue the continuation and completion of the U.S. Army Corps of Engineers Flood Protection Projects for the City of Revere, whereas based on extensive investigation by the Corps of Engineers it has been concluded that, "due to the severe flooding and extreme hardships suffered by the residents of Revere during the February 1978 Blizzard, and again to a lesser degree during the January 1979 coastal storm, there is sufficient economic justification to allow Federal participation in the construction of coastal flood protection projects."

Further, that the Massachusetts Delegation be urged and encouraged to do all in its power to secure the necessary budget appropriations in the U.S. Congress as expeditiously as possible at the time the Corps of Engineers seeks the next stage of funding, for the Revere Flood Protection Project.

In City Council June 22, 1981
ORDERED on an affirmative vote
Attest: John J. Henry, City Clerk

APPROVED by Mayor George V. Colella
June 26, 1981

Attest:

John J Henry

City Clerk