

State of Rhode Island Oil Spill Contingency Guide: Protection Strategies for Vulnerable Coastal Features



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STATE OF RHODE ISLAND
OIL SPILL CONTINGENCY GUIDE:
PROTECTION STRATEGIES FOR VULNERABLE
COASTAL FEATURES

Prepared for

Rhode Island Department of Environmental Management

By

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PROJECT TEAM

The cooperative efforts of many people were responsible for this guide. Victor Bell of the Department of Environmental Management coordinated the project. George Seavey and Stephen Sedgwick of the Coastal Resources Center developed the guide's format, made the site visits and wrote and produced the guide. Dennis Clark of the U.S. Coast Guard and Donald Squires and Sav Mancieri of the Department of Environmental Management's Division of Water Resources provided valuable technical guidance on oil spill containment and cleanup techniques. Debi Clarke of the Coastal Resources Center typed, edited, did the graphics for the maps and generally kept the project rolling along. Pete Brownell and his staff at the URI Printing Services provided timely, helpful advice on the printing of the various elements of the guide along with actually printing much of the publication.

In addition, a number of other people contributed information or assistance that made the project run smoothly. They are:
W. Edward Wood, James Fester, Robert Bendick, Richard Sisson, and Art Ganz of DEM, Lt. John Grenier and CWO Michael Scanlon, U.S. Coast Guard; John Lyons, Chairman of the Coastal Resources Management Council; Roger Buck of the Governor's Energy Office; Paul Hicks, R.I. Petroleum Association; Todd Bryan and Rick Enser, R.I. Natural Heritage Program; Don Robadue and Stephen Olsen, CRC; and Mickey Leonard, GSO Graphic Services.

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INTRODUCTION

- The Need For This Guide

The use of Rhode Island waters and shoreline as transport routes and storage areas for petroleum cargoes carries with it the threat of a large scale and potentially damaging oil spill. Oil of various types and quantities is now transported regularly by tanker and barge up the Bay's East Passage to the docks of Providence and Fall River. Vessel to vessel transfer occurs frequently off Jamestown's eastern shore. With exploratory drilling occurring in the Baltimore Canyon and Georges Bank areas, support boats from Davisville carrying fuel and other essential supplies daily ply the West Passage. Tankers and barges from New York bound for the ports of Boston and Portland often cross through Block Island and Rhode Island Sounds. Oil is not only stored at the large tank farms on upper Narragansett Bay, but many industrial commercial facilities hold oil in smaller storage units along the coastline. The oil spill potential of these activities is evident when one considers the history of spills in or near Rhode Island waters. The grounding of the Pennant in April 1973 in upper Narragansett Bay, the Barge 250 gasoline spill off Westerly, the spill of large amounts of stored oil from Quonset which came ashore on Jamestown, and the Argo Merchant scare, are recent examples of accidents that could have significantly damaged the Rhode Island coastline.

Small oil spills are a chronic problem particularly in the Providence River where accidents at tank farms appear to be almost unavoidable. In 1978, for example, approximately 50 spills of 100 gallons or less occurred in Rhode Island waters.

- Objectives of This Guide

In order to be an effective management tool, an oil spill contingency plan should be designed around a clear set of objectives. The following issues and corollary objectives have been developed by the project team in light of the current status of oil spill planning in Rhode Island.

1. Identification of Vulnerable Coastal Features

This guide identifies 97 vulnerable coastal features and provides site-specific information for 53 of them.

2. Containment/Cleanup Strategies

Although the variety of conditions under which an oil spill can occur is almost infinite, it is valid and useful to consider possible response options. Recognizing that the on-scene coordinator (OSC) must have great latitude to make decisions concerning containment and cleanup strategies during an oil spill emergency, this guide provides background information for making those decisions as well as general recommendations for initiating oil spill response activities.

3. Preparatory Measures (what can be done in advance)

A number of site-specific measures can be taken by the state and municipalities to prepare in advance for the threat of an oil spill. In addition, a review of existing equipment storage locations indicates that they are frequently some distance from areas that face the greatest threat. Response time will be shortened and equipment and manpower deployment made more effective if prepositioning of equipment is matched up with the new list of priority areas identified through this project

Under separate cover the project team presented to the Department of Environmental Management a series of recommendations designed to better prepare the responsible state agencies and municipalities for the possibility of an oil spill.

4. Public and Local Authority Awareness

The public agencies responsible for oil spill response in Rhode Island are effective but their functions and authority should be more clearly defined for the benefit of municipal and private interests. In addition, an awareness on the part of the public and local authorities with respect to the many variables that influence an appropriate oil spill response (such as weather, the type of oil, containment/cleanup technologies, the ecological system involved) appears to be desirable. By understanding the complexity of the situation confronting oil spill response personnel the public and local officials can contribute in a useful way to oil cleanup activities.

This guide contains a description of the public agencies involved in oil spill response and the many considerations they must take into account in an emergency.

- How To Use This Guide

The map in the pocket on the inside of the back cover identifies by number the coastal areas that have been classified as particularly vulnerable to oil contamination. The sites have been grouped into five zones to facilitate use of the guide.

The key component of this guide consists of the information sheets and accompanying maps which have been developed for 53 sites. The information sheets are divided into four headings. Identification, Characteristics, Site-Specific Factors, and Contingency Plan. They appear in the following format:

I. IDENTIFICATION

Site name

Waterbody

Municipality(s) and telephone number of local police station(s)

II. CHARACTERISTICS

Size

Ecosystem type

Water quality

Vulnerability - this entry is designed to give response personnel a clear description of the water connection between the site and waterbody from which oil may threaten.

III. SITE-SPECIFIC FACTORS

This section is not an exhaustive description of the site but rather a selective presentation of information that may be useful to the on-scene coordinator. Entries include: direction of maximum exposure and fetch, current speed in connecting channels, tidal ranges, type and amount of residential development, use patterns such as recreational boating, wildlife refuge, etc., significance of habitat for either plants or animal life, access points and routes, descriptive information on physical setting, and other amplifying information.

IV. CONTINGENCY PLAN

This section contains general guidelines for initiating site-specific oil spill response action. It is intended to get response personnel to the most likely cleanup locations quickly so that they can assess the particular requirements of the emergency and implement an effective cleanup strategy. Possible containment measures are identified.

Accompanying the site information sheets are maps that locate the specific points, access routes, facilities and other information described in the text.

Symbols that appear on the maps include:

-  potential cleanup activity site(s)
-  access route(s)
-  location of launching facilities or ramps
- /// outline of especially sensitive (ecological) areas
- ↑f direction of maximum fetch
- ↑N approximate north direction

The maps are reproduced at a scale of 1" = 1000' and are drawn from topographic maps produced by the U.S. Geological Survey.

OIL SPILL RESPONSE

Oil spill response is both complex and dynamic. The public agencies (U.S. Coast Guard, R.I. Department of Environmental Management, U.S. Environmental Protection Agency) formally charged with carrying out oil spill containment and cleanup face a difficult challenge. They must quickly assess and respond to a large number of variables including weather and tide conditions, the amount and type of oil spilled, the area in which the spill occurs, and the availability of equipment and personnel. All these variables must be considered and acted upon under intense public scrutiny with many interests clamoring for priority consideration.

• Organizational Responsibilities in Oil Spill Response

The responsibility for oil spill response is shared by several public agencies who work closely with private contractors when cleanup operations are required.

United States Coast Guard. When a discharge occurs in Rhode Island navigable waters the primary responsibility and liability for cleanup rests with the polluter. The agency primarily responsible for ensuring that this cleanup occurs is the U.S. Coast Guard.

The Coast Guard Captain of the Port, Providence, R.I. is the pre-designated on-scene coordinator for spills in the Rhode Island coastal region pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan. The Coast Guard on-scene coordinator must monitor the polluter's cleanup efforts and, if they are judged inadequate, must take charge and coordinate cleanup activities. This function is performed in the inland region by the Environmental Protection Agency. The Coast Guard administers a pollution revolving fund of up to thirty five million dollars, which is used to defray cleanup costs where the polluter cannot or will not effect cleanup, or where the polluter cannot be identified. The polluter must, when known and within certain liability limitations, reimburse this fund for the actual cost incurred by the U.S. Government.

The on-scene coordinator has the authority to alter the priorities of ongoing cleanup operations if he determines that redirection of manpower and equipment is necessary to protect newly threatened areas. The on-scene coordinator has direct control over all Coast Guard personnel, state or municipal manpower and equipment, and private contractors that respond to a Federally funded spill cleanup. Since it is Coast Guard policy to use only trained personnel during a spill, the on-scene coordinator can use his authority to prohibit volunteer activities when confusion or interference with professional cleanup crews would result.

The U.S. Environmental Protection Agency has primary responsibility for spills on inland waters and usually contracts the same cleanup contractors used by the Coast Guard. Marine spills are the responsibility of the Coast Guard.

R.I. Department of Environmental Management. The R.I. Department of Environmental Management's Division of Water Resources is the state

agency directly involved in oil spill cleanup. The primary responsibility of the Division is the maintenance of or improvement to the quality of state waters. Although much of the Division's work involves tidal waters (historically the Providence waterfront has been the scene of much of their activity), the Division's responsibilities are statewide and include fresh water systems. With a limited staff, wide ranging responsibilities, and a large number of small oil spills to contend with the Division is often under heavy pressure. The Division assists the Coast Guard in identifying the sources of pollution and the responsible party, and helps directly in cleanup efforts. Both the Coast Guard and the Division's staff must certify that an oil spill has been satisfactorily cleaned up.

Municipal Governments. Local governments have no formal responsibilities for oil spill cleanup. However, certain municipal departments such as Public Works and Police can provide valuable assistance to the Coast Guard and Division of Water Resources when a spill threatens the resources of particular concern or interest to the municipality. At the request of the on-scene coordinator communities can make equipment such as backhoes or graders available to assist in cleanup operations and to prevent infiltration of oil into fragile areas. Local police departments can be an effective force in oil spill response by controlling traffic, and by identifying and arranging for additional access routes to spill locations.

- Oil Spill Containment and Cleanup Procedures and Technology

A variety of techniques and equipment are available to oil spill response personnel. The effectiveness of the different types of equipment depends primarily on the conditions at the time and place of the spill.

Containment and Deflection Booms. One of the first activities undertaken when an oil spill occurs is to confine the oil in as small an area as possible and prevent its spread into vulnerable areas. Since many spills occur during poor weather conditions, containment is frequently difficult and sometimes impossible.

The first equipment normally employed is containment boom. Heavy duty, floating boom which extends approximately 3 feet into the water can be effective in containing oil in the open ocean so long as wave heights do not exceed 3 to 4 feet. Even in these conditions considerable loss of oil due to entrainment (oil forced under the boom) or overwash can result. Lighter duty booms are commonly used in calmer sea conditions and in shallow areas nearshore. This type boom is generally 18 inches in depth and can be used either to surround the spill for skimming, to block an entrance channel (if currents aren't too swift), or to deflect the oil to a less sensitive shoreline access point for land based pickup. Special training is necessary to deploy all types of boom effectively.

Heavy Equipment for Filling in Channels. In many places along the Rhode Island shore, it will be possible to protect fragile areas by temporarily filling in the entrance channels to embayments or tidal creeks. This option requires a good judgment as to its necessity and effectiveness given the conditions at the time. For example, if a small embayment is draining rapidly at the time an oil mass approaches, there is little, if any, potential for oil to enter the channel until the tide turns. By then, the oil may have moved on to some other area or been contained. It may be reasonable to hold off the filling operation. However, in many situations it may be necessary to fill in a channel with sand or some other unconsolidated material using heavy construction equipment to prevent oil infiltration. The use of heavy equipment on beach faces and salt marshes should be carefully controlled to minimize damage to the resource.

Cleanup of Spilled Petroleum. Depending on the circumstances, the cleanup of contained oil can be accomplished using skimmer vessels and trucks, absorbents and manual labor. A variety of sophisticated equipment is now available which can be used to skim the surface of oiled water. Among the options available to cleanup personnel are devices which vacuum the oil off the water surface such as floating suction heads and floating weirs which require the use of skimmer

pumps, and rotating drum and belt skimmers which absorb the oil and are motor driven. All are designed to deposit the oil in a containment vessel such as a sump tank, a barge or an onshore vacuum truck for later disposal at a dumpsite. Skimmers work most effectively on thick, heavy oil slicks. The sooner they can be used after a spill occurs, the better. Their efficiency is limited by rough seas and some cannot be used in shallow water. Since large amounts of water are taken up by skimmers which use pumps, separating the oil from the resulting emulsion is a problem. In general, if skimmers can be brought onto an oil spill scene rapidly, and if weather and tidal current conditions permit, they are effective in recovering oil.

Absorbents are materials designed to float on the water and absorb spilled oil. Oil adheres to the outside of the absorbent particle or is taken into the material by capillary action. The primary use of absorbents is for small or medium sized spills and for final cleanup of oil films after mechanical skimming operations. They are also used for mop-up of oiled shorelines and where the use of skimming equipment is difficult.

The Coast Guard's Oil Spill Training Manual states that absorbent materials should meet four basic criteria:

1. They should be easy to handle.
2. They should be nontoxic and nonpersistent in the environment.
3. They should be easily recoverable.
4. They should be easy to dispose.

Regardless of the type and severity of an oil spill, a considerable amount of physical labor is involved in cleanup operations. Boom deployment offshore, the application of absorbents, and skimming equipment all require trained personnel. If oil comes ashore the manpower requirements rise dramatically. In some cases heavy equipment will be needed to remove oiled sands on beaches. In other instances, effective cleanup can be accomplished by the use of rakes and shovels. In all instances, the most efficient cleanup efforts are those involving trained personnel. Numerous accounts of well intentioned but uninformed

attempts at oil spill cleanup, resulting in confusion and a worsening of the situation, attest to the wisdom of using professional oil spill response personnel.

Chemical Agents. Chemicals can under certain circumstances be applied to oiled waters (especially large spills at sea) to lessen the effects of oil pollution. These chemicals may assist in the chemical-biological breakdown of oil or serve as ignition agents to burn a slick off. Dispersants are probably the most commonly known of the chemical agents. They break the oil down so that it mixes with the water permitting biological breakdown by water-borne bacteria.

The use of all chemical agents is strictly regulated by the EPA because improper use of inappropriate chemical substances can cause as much if not more environmental damage than the spilled oil. Dispersants are currently prohibited for use in Rhode Island marine waters.

- The Oil Spill Threat

The on-scene coordinator, response personnel, and the equipment they employ must be flexible enough to handle a wide range of oil spill emergencies. A number of factors--the type and amount of oil spilled, weather conditions, location--contribute to the uncertainty which response personnel face when handling an oil spill emergency.

Types of Petroleum Products. Light, low viscosity oils as well as thick, heavy oils are transported and stored in Rhode Island. All are refined oils, and while all can damage vulnerable coastal features, some are longer lasting and have a more severe impact. The lighter weight oils include naphtha, gasoline, diesel fuel, kerosene and No. 2 heating oil. Many of these fuels will evaporate when exposed to air, but even small amounts of these light weight, toxic oils can have a lasting impact on wetlands or other fragile environments. Diesel and similar fuels are considered by the Coast Guard to be particularly damaging, because they do not evaporate rapidly and are difficult to recover once they impact a land area.

Crude oil is rarely transported into Rhode Island because there are no refineries. However, crudes are occasionally transported close to our shores through Rhode Island and Block Island Sounds.

Heavy, No. 6 oils are regularly brought to terminals in Providence and Tiverton. This oil does not penetrate as easily as the lighter fuels, but it can be particularly messy to clean up and can smother small organisms and marsh grasses. The heavier oils have a tendency to sink below the water surface where they are moved by sub-surface currents. Cleanup activities are often hampered by difficulties in following the oil's movement. As a result, cleanup cannot be completed in some cases until weeks or months after the spill occurred. Slow chemical deterioration and biological breakdown are characteristics of #6 type oils.

Nature of the Spill. The amount of oil spilled and the speed with which it is introduced into the marine environment also affect the decisions of the on-scene coordinator. A large amount (several thousand gallons) of oil normally presents a more difficult challenge than a small spill. Similarly, the sudden release of oil from a collision generally causes more problems for response personnel than the slow leakage of oil from a crack in the hull of an oil tanker.

Once the oil enters the water, weather and tidal conditions begin to play a large role in the direction and speed of oil movement. In general the wind controls the spill's movement except where fast currents, such as those found in breachways, are a major influence. Not only does the wind control the movement of oil, but the stronger it blows the larger the waves and the more difficult it becomes to use cleanup equipment.

The time delay between the occurrence of an oil spill and the initiation of containment action can be a major factor in determining the amount of damage done by a spill. The sooner the alarm is sounded the better the chances are that the response team can control the spill and minimize its impact.

Transport Routes and Storage Locations. Certain areas in Rhode Island are more vulnerable to a potential oil spill than others because they are located in proximity to oil transport routes, storage farms, or transfer terminals.

Although oil is transported regularly through Block Island and Rhode Island Sounds, carrying with it the potential to contaminate large areas of our south shore and Block Island, the most immediate threat is to areas within Narragansett Bay. The East Passage between Jamestown and Newport and east of Prudence Island is the major tanker and barge route to the oil terminals on the upper Bay. There is a vessel to vessel transfer station east of Jamestown Island which adds to the vulnerability of the East Passage. From Prudence, vessels either head northwest to the Port of Providence or they turn easterly under the Mount Hope Bridge to Fall River or the Tiverton oil terminal. Shorelines close to these routes are highly vulnerable.

Smaller, localized spills originating from onshore are an ever present possibility near urban or industrial centers such as Newport, East Greenwich, or Quonset/Davisville. Small land-based spills along the Providence waterfront are a chronic problem.

Certain portions of the Bay appear to have little potential for oil spills. The Sakonnet River, the West Passage, and sheltered, remote tidal reaches such as the Hundred Acre Cove in Barrington and the Palmer River in Warren are relatively safe from the threat of an oil spill.

Storage facilities at Tiverton and Fall River on Mount Hope Bay and along the Providence and East Providence waterfronts are a permanent if small threat to the surrounding water. Storm sewer overflows in the upper bay, drainage culverts and outfalls at numerous locations around the bay are a source of chronic oil contamination.

- Shoreline Types and Their Susceptibility to Oil

The primary concern in the event of an oil spill in Rhode Island waters is the protection and cleanup of the coastline. There will be emergencies where the personnel and equipment are not available to protect everything, and decisions will have to be made about what to protect first, and what areas may have to be ignored. This guide identifies those areas which could be significantly damaged by oil, which are the

most fragile of our coastal environments and which should be considered as priority candidates for protection. These areas include important recreational and scenic resources as well as valuable natural habitat.

The public agencies involved in oil spill cleanup recognize that they have a responsibility to protect as much of the coast as they can.

Four major factors were considered in selecting areas for detailed contingency planning:

1. Risk of spill damage
 - a. Proximity to oil routes and transfer and storage areas.
 - b. History of past spills in the area.
2. Ability to protect an area
 - a. Size and type of opening, rate of flushing.
 - b. Accessibility to site from land and water.
3. "Value" of an area
 - a. Ecological sensitivity and diversity.
 - b. Economic considerations.
 - c. Social and aesthetic importance.
4. Recoverability
 - a. Natural capacity to recover if affected by oil contamination.
 - b. Difficulty of performing adequate cleanup.

Based on these factors and on a consensus among personnel who worked on this project from the Coast Guard, the Department of Environmental Management and its Division of Water Resources and Fish and Wildlife and the Rhode Island Natural Heritage Program, the following shoreline types were selected for detailed contingency planning:

Salt Marshes. Salt marshes and other coastal wetlands periodically inundated by tidal waters are highly sensitive to contamination by oil. Although most marshes are sheltered and totally inundated only during extremely high tides, oil entering feeder streams or tidal creeks can do serious damage to marsh grasses, peat substrate, and benthic organisms. The contribution which salt marshes make as nursery grounds for juvenile fish and shellfish and as wildlife habitat is widely recognized. Once a salt marsh has been infiltrated by oil, cleanup is always difficult, frequently impossible, and can often do more damage

than the oil. Marshes, however, are often the easiest system to protect, either by booming off the entrance channel(s) or simply by temporarily filling them in with sand until the danger has passed. Access to the entrance channels is frequently complicated due to the remoteness of many marshes.

Coastal Pond/Barrier Beach System. The series of coastal lagoons along Rhode Island's south shore are another type of coastal feature needing specific contingency planning. Many of Rhode Island's coastal lagoons are important for recreational and commercial fishing and appear to be important to offshore fish populations. Others are valuable waterfowl habitat and are among the state's important scenic resources. Coastal ponds are separated from the open ocean by a barrier beach. The variation in the size and configuration of the breachways leading from the ocean into the pond require that distinct protection alternatives are developed for each one. Permanent or periodic breachways provide varying degrees of tidal flushing. The permanently stabilized breachways are particularly difficult to protect due to the swift currents that are generally present. If oil cannot be kept out of these channels, containment may have to take place in less turbulent areas inside the pond. Channels which breach only occasionally can often be blocked using on-site sand or cobble.

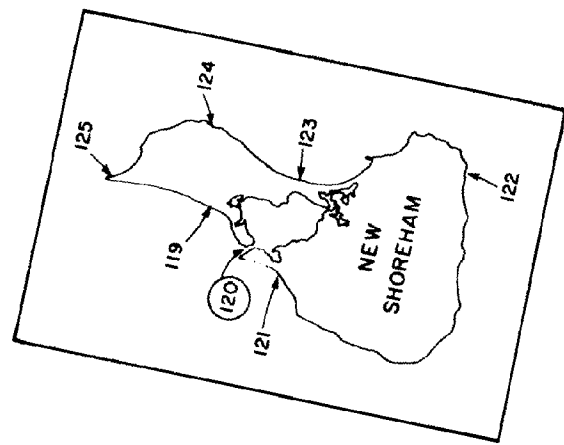
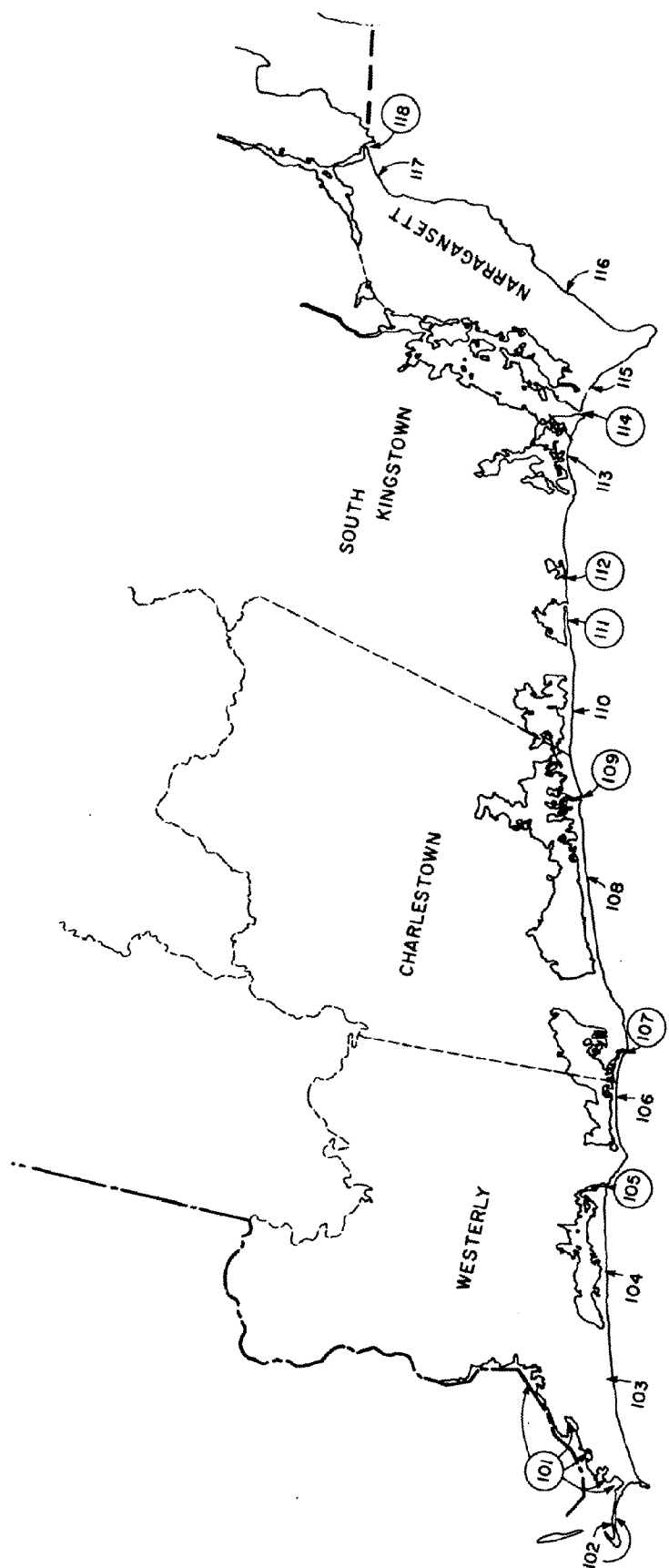
While the barrier beaches fronting the ponds are extremely vulnerable to an oil spill and are valuable recreational resources, the beaches naturally cleanse themselves over a period of several months and little, if any, permanent damage appears to take place. They are therefore, for purposes of this study, considered to be less sensitive to oil contamination.

Other Coves, Embayments and Estuaries. There are many small coves and estuaries within Narragansett and Little Narragansett Bays which could be severely impacted by oil. They contain wetlands and tidal flats valuable for fishery resources. Entrances are frequently wide, necessitating substantial containment and cleanup operations. Priority attention has been given to areas having the highest natural qualities, under the assumption that oil impacts would be more severe in relatively clean systems than in those already containing elevated levels

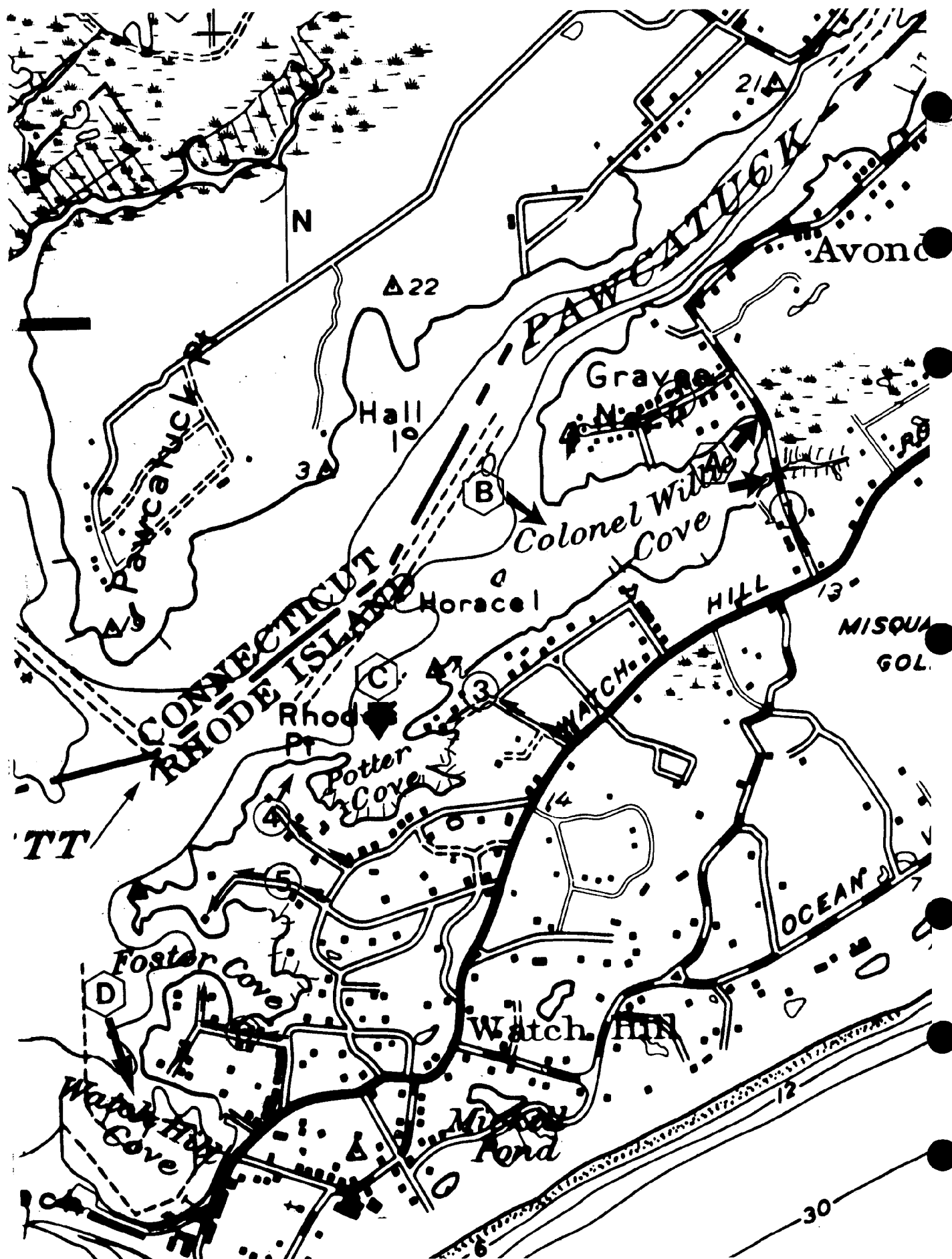
of petroleum based hydrocarbons

Rocky Shorelines, Tide Pools and Intertidal Flats. Rocky shorelines, cliffs and outcrops along the coast appear to suffer the least harmful impact from oil contamination. They also cleanse themselves quite rapidly. While several of these coastal environments have been identified, site specific plans have not been developed for them because of their lower sensitivity.

Tide pools and intertidal flats support diverse biological communities and should be given attention by cleanup personnel. However, they are difficult to identify and in the case of intertidal flats change frequently. Local knowledge can be a valuable aid to response personnel in identifying and protecting these areas.



ZONE 1



I. IDENTIFICATION

Site Name: Pawcatuck River coves and marshes

Waterbody: Pawcatuck River/Little Narragansett Bay

Municipality: Westerly (Police Dept.: 596-2022)

II. CHARACTERISTICS:

Size: several separate areas 2 to 100 acres

Ecosystem type: estuary with small embayments and marshlands

Water quality: SB/SC

Vulnerability: entrance to river from Little Narragansett Bay
approximately 1/4 mile across and exposed to
SW winds

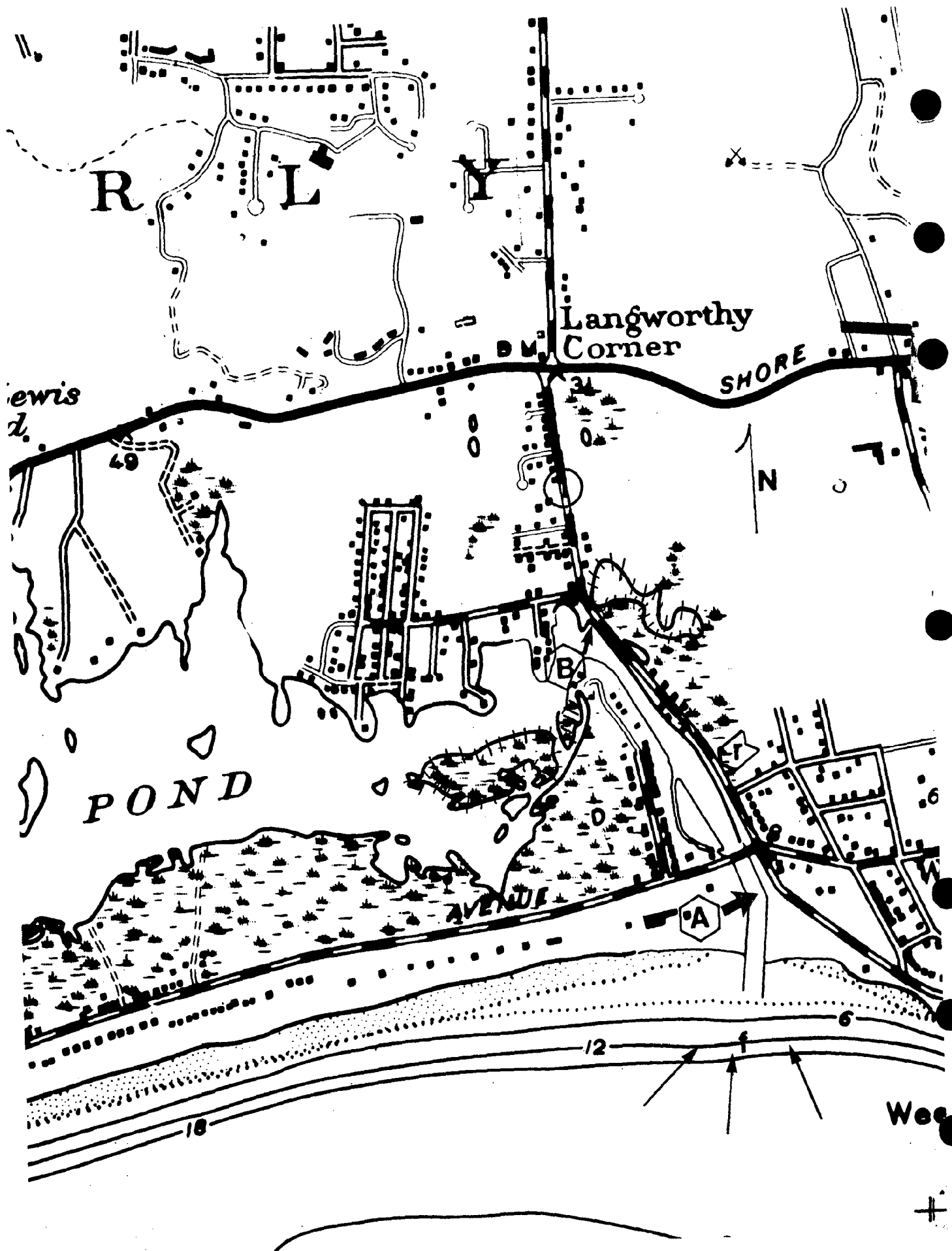
III. SITE-SPECIFIC FACTORS

- Consists of several small coves, inlets, and marshes along the river shoreline.
- Currents can exceed 1.5 knots. Entrainment of oil is a potential problem all along the river.
- Mean tidal range is approximately 3.5 feet.
- Potentially rough sea conditions decrease as you move up the river.
- Urban area and oil storage facilities in the upper river (Westerly, R.I., and Pawcatuck, Conn.) have greatest potential to cause oil spill contamination.
- Salt marshes along the Connecticut side of the river are equally exposed to oil spill contamination.
- Entire bay and river entrance are given high natural protection from the possibility of an offshore oil spill by the Napatree Point barrier beach.

IV. CONTINGENCY PLAN

High priority should be given to the protection of an extensive salt marsh at the northeast extension of Colonel Willie Cove $\text{\textcircled{A}}$. This should be easily accomplished by blocking two culverts, 3 to 4 feet in diameter, which run under Avondale Road adjacent to the Cove (off Watch Hill Road) $\text{\textcircled{1}}$. Additional efforts should

be made to prevent oil from entering Colonel Willie Cove and other small coves along the river by booming off the entrance roughly parallel to the general coastal trend **B** , **C** , and **D** . These other coves include Watch Hill Cove, Foster Cove, and Potter Cove. Although boom deployment would be best accomplished by boat, land access to the coves can be obtained by access routes **2** through **6** .



I. IDENTIFICATION

Site name: Winnapaug Pond

Waterbody: Block Island Sound

Municipality: Westerly (Police Dept. 596-2022)

II. CHARACTERISTICS

Size: approximately 440 acres

Ecosystem type: coastal lagoon/salt marsh

Water quality: SA

Vulnerability: breachway approximately 110 to 130 feet wide with slight dogleg of 25° to the left. Breachway is approximately 1/2 mile long.

III. SITE-SPECIFIC FACTORS

- Entrance to the breachway is exposed to extremely high SE-S-SW winds and wave action due to unlimited fetch across Block Island Sound.
- Currents range up to 4.0 knots in the breachway at maximum ebb and flood.
- Mean tidal range in breachway is approximately 2 feet.
- The roads on both sides of the breachway have moderate to heavy private development, although access points are available.
- The salt marsh extending west from breachway on the side of the pond is especially fragile.
- The pond is considered an important natural resource in Rhode Island because it supports numerous fish and wildlife.
- Recreational shellfishing is a significant activity in the pond.
- Recreational boating facilities, including launching, are located in the breachway.

IV. CONTINGENCY PLAN

The same general situation prevails in the Winnapaug Breachway as in the other south shore ponds. Conducting C/C operations outside the breachway is likely to be difficult in most conditions. Inside the breachway the currents are swift, leading to an entrainment problem.

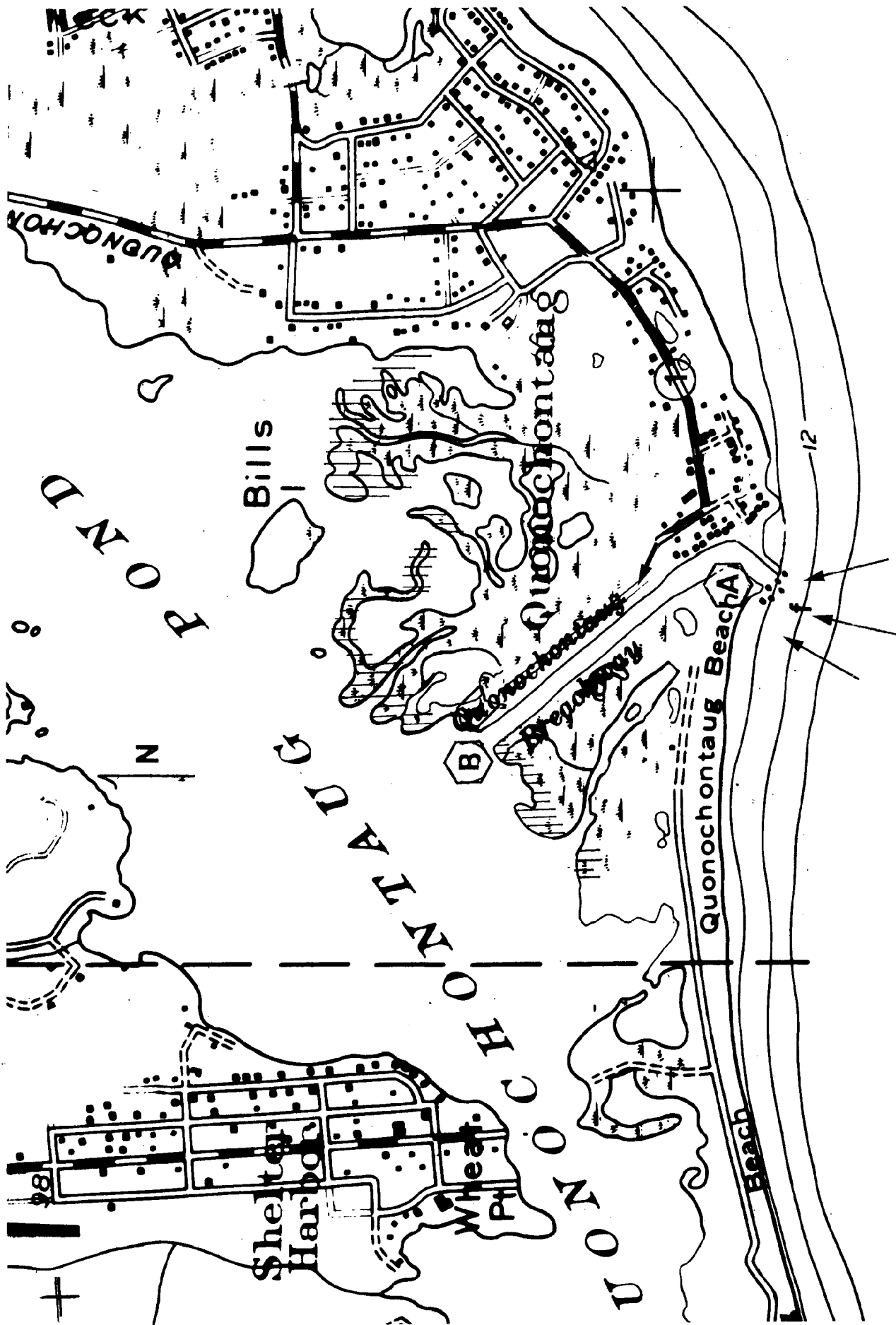
The open area  on the east side of the breachway is accessible and might be used to slow down the oil flow for collection and to start collecting it.

Location **B**, which is adjacent to the road, might be used as an oil collection point, as the wind conditions and flooding tide that would drive oil up into the pond would tend to pile it up there.

The primary objective should be to contain the oil before it turns the corner and threatens the salt marsh. There is a culvert at **B** leading into a marsh on the eastern side of the access road which should also be closed.

Launching facilities are available at **r**. The large salt marsh along the pond's southern shoreline should be boomed off at tidal creeks and mosquito ditches if a threat should develop.

Access **1** is the best route for getting to the several locations along the breachway where C/C operations can be conducted.



I. IDENTIFICATION

Site name: Quonochontaug Pond

Waterbody: Block Island Sound

Municipality: Charlestown/Westerly (Police Depts.: C - 364-3811/
W - 596-2022)

II. CHARACTERISTICS

Size: approximately 730 acres

Ecosystem type: coastal lagoon/salt marsh

Water quality: SA

Vulnerability: riprapped breachway approximately 120 feet wide,
8 to 10 feet deep. The breachway has a sharp dog-
leg to the left of approximately 75°.

III. SITE-SPECIFIC FACTORS

- Entrance is exposed to extremely high SE-S-SW winds and wave action due to unlimited fetch across Block Island Sound. The entrance is strewn with boulders, making it treacherous for boats.
- Currents range up to 4.0 knots in the breachway at maximum ebb and flood.
- Mean tidal range is approximately 2 feet.
- There is a small, heavy residential concentration on the east side of the breachway at the ocean front. The east side provides the best access (1) for equipment. The remainder of the barrier beach west of the breachway is in quasi-public ownership, and access to the breachway is poor.
- The pond is a recreational fin and shellfish area.
- The pond is considered an important natural resource in Rhode Island because it supports large concentrations of fish and wildlife.
- Salt marsh areas are present on either side of the breachway with the largest area to the east of the breachway.

IV. CONTINGENCY PLAN

The presence of numerous boulders off the entrance to the breachway will probably make it very difficult to conduct C/C operations in the open ocean immediately off the breachway.

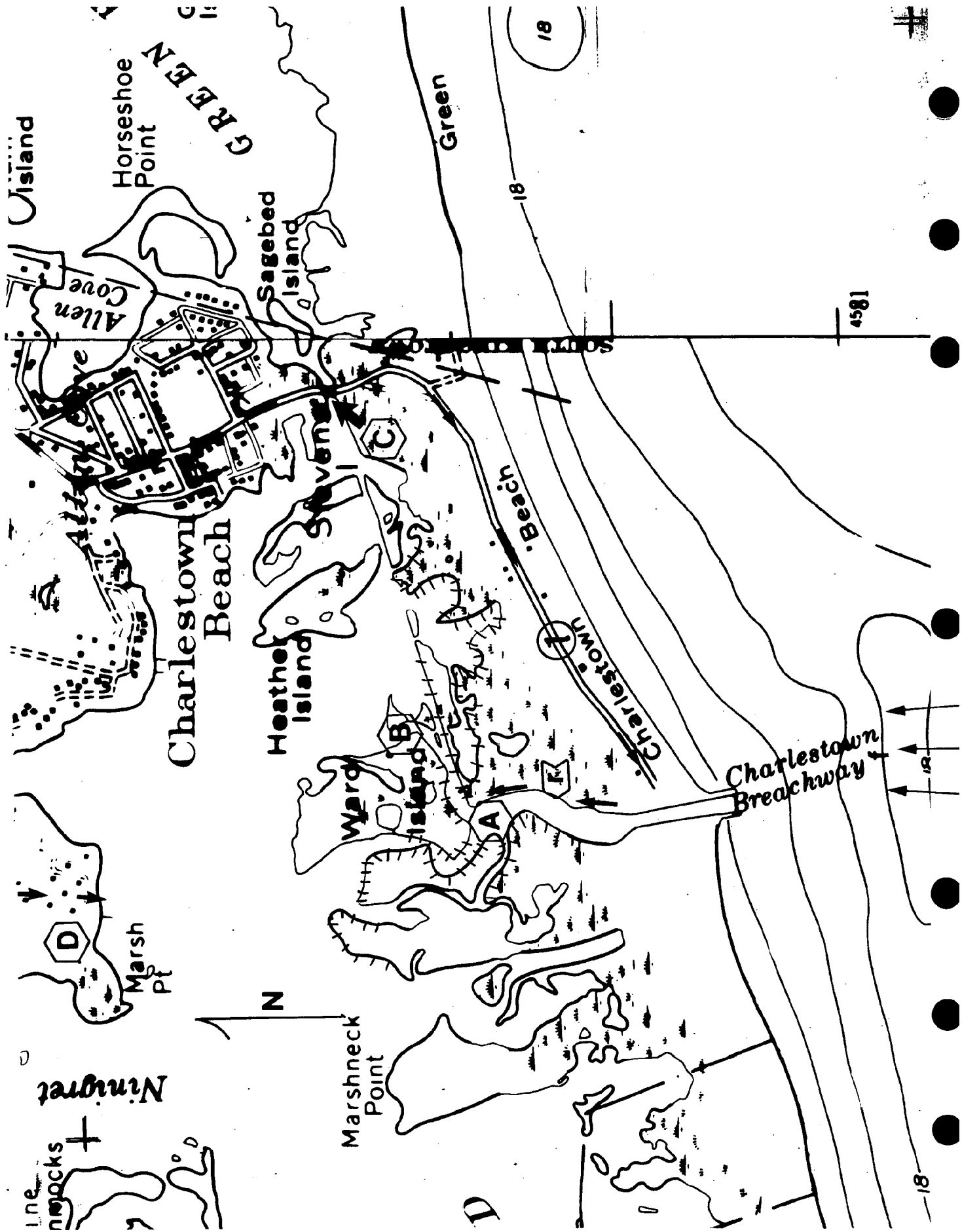
The dogleg in the breachway may provide an opportunity for collecting and vacuuming up oil that enters the breachway. Wind conditions that would drive oil into the breachway would tend to

pile it up in the elbow of the dogleg .

However, any containment effort at the location will have to contend with the likelihood of fast currents. Launching facilities for small boats and access for heavy equipment are available to the north of the dogleg.

A backup position for C/C operations is the area  where the breachway empties into the pond and where the currents start to dissipate.

Should it be impossible to contain the oil at the breachway and the oil enters the pond proper, secondary containment positions should be established at the tidal creek entrances to the salt marshes.



I. IDENTIFICATION

Site name: Charlestown/Green Hill Ponds
 Waterbody: Block Island Sound
 Municipality - Charlestown (Police Dept.: 364-3811)

II. CHARACTERISTICS

Size: approximately 1,700 acres
 Ecosystem type: coastal lagoon with salt marsh
 Water quality: SA
 Vulnerability: breachway approximately 100 to 125 feet wide,
 2 to 6 feet deep, with stone jetties extending
 150 to 200 feet into Block Island Sound. Breach-
 way divides into several natural channels approxi-
 mately 1/4 miles from the entrance.

III. SITE-SPECIFIC FACTORS

- Entrance is exposed to extremely high SE-S-SW wind and wave action due to unlimited fetch across Block Island Sound.
- Currents range up to 4.0 knots in the breachway at maximum ebb and flood. Currents dissipate quite rapidly outside channel.
- Mean tidal range in breachway is approximately 2 feet.
- Residential development on the Charlestown Beach side of the breachway will not inhibit C/C operations. Area around breachway is state-owned. Launching ramp is available ☒ .
- Charlestown Pond is a significant recreational finfish and shellfish area and supports commercial finfish and shellfish activity.
- Recreational boating takes place within the pond during the boating season.
- The ponds are considered important natural resources in Rhode Island because of their large fish and wildlife populations.
- Barrier beaches on both sides of the breachway are primary recreational resources.
- A state highway depot and a former auxiliary naval base are located on the north side of the pond.
- The access road to the breachway may be closed after severe fall or winter storms.
- Portions of the pond shoreline are under state and federal management as conservation areas and wildlife refuge.

IV. CONTINGENCY PLAN

The location of salt marsh to the east-north-west of the man-made breachway at Charlestown Pond makes it important to contain an oil spill as close to the entrance as possible. However, the exposure of the breachway entrance makes it a difficult place from which to conduct C/C operations. The prevailing SW winds regularly exceed 10 knots, resulting in waves of 2 to 4 feet at the entrance.

In the breachway the currents can exceed 4.0 knots, which would result in a severe entrainment problem.

Assuming that the oil cannot be kept out of the breachway altogether, the best containment strategy appears to be to slow down and deflect the oil in the breachway and collect it where the breachway widens and shallows (A). There is good access for heavy equipment, and boat launching facilities are available.

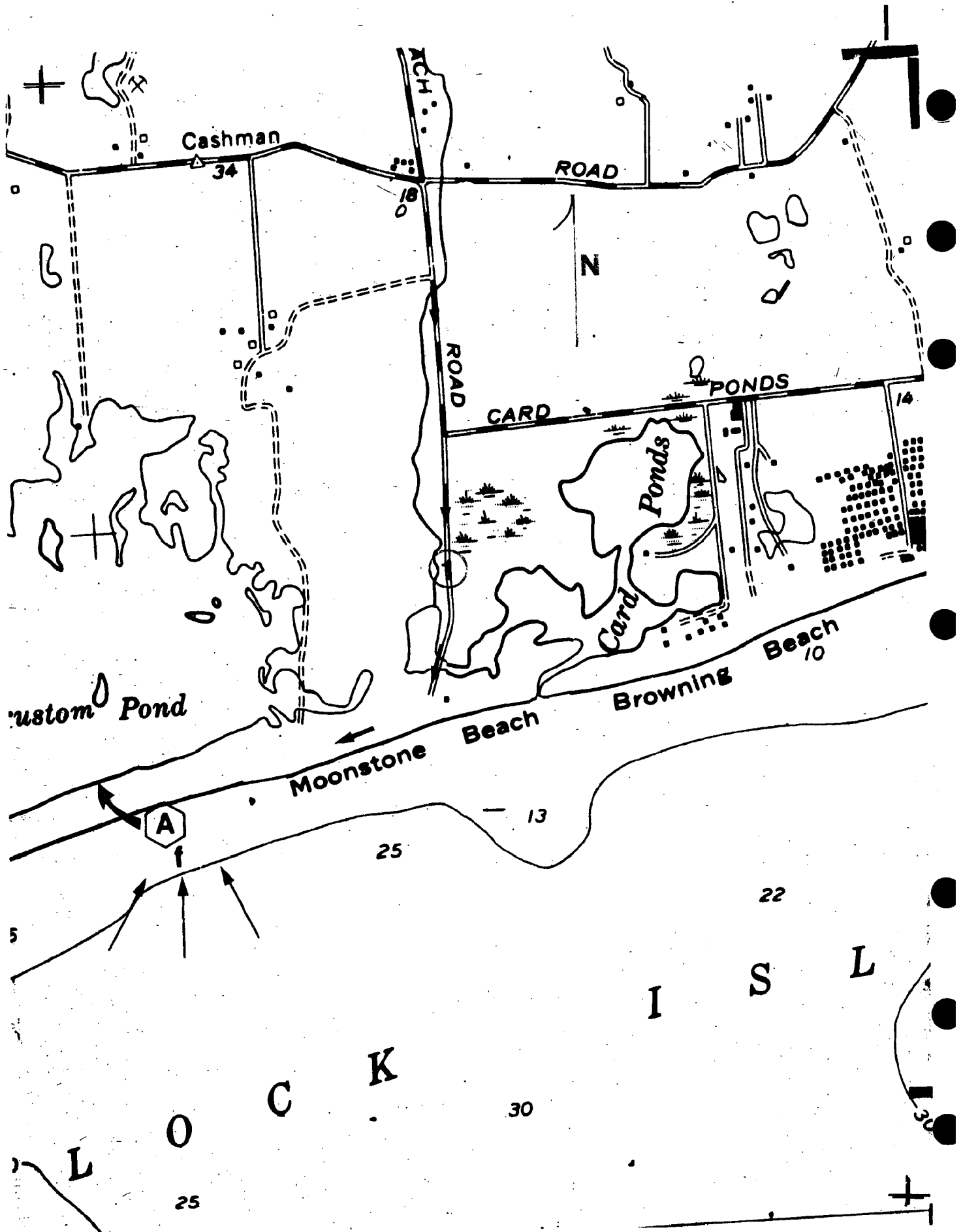
Booming or filling the channel to Green Hill Pond should be considered if oil cannot be kept out of the main body of Ninigret Pond. Filling or booming if necessary should be undertaken at (B). Point (C) also provides good access for C/C operations. If oil enters the pond, as much salt marsh as possible should be protected.

Sand and other unconsolidated material is available in the area for blocking small channels, and state-owned earth-moving equipment is available at the Charlestown Depot.

If oil were to get through into the pond, the Marsh Point area (D) provides access for backup C/C actions.

There is a very small danger of a spill emanating from one of several marinas on the pond. The tremendous range of possible conditions suggests the OSC can best handle the situation as it develops.

Access route (1) is the Charlestown Beach Road leading off of U.S. Rte. 1.



I. IDENTIFICATION

Site name: Trustom Pond

Waterbody: Block Island Sound

Municipality: South Kingstown (Police Dept. 783-3341)

II. CHARACTERISTICS

Size: approximately 200 acres

Ecosystem type: coastal lagoon/barrier beach

Water quality: SA

Vulnerability: generally low due to complete separation from
sound by barrier beach under normal conditions

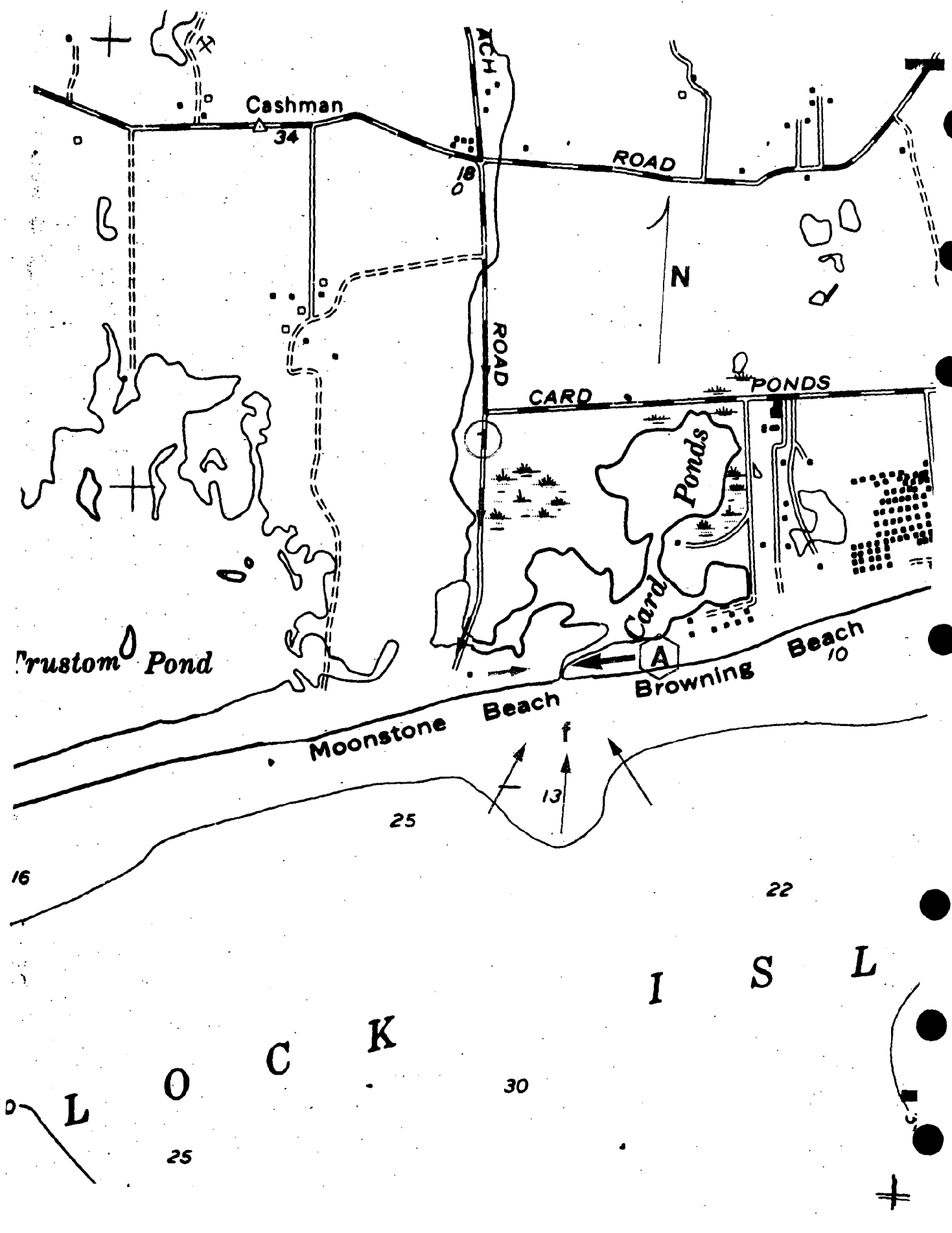
III. SITE-SPECIFIC FACTORS

- Pond is one of the most valuable wildlife refuges in Rhode Island; habitat for several uncommon bird and plant species.
- Barrier beach is prone to washovers during heavy surf.
- Barrier is breached manually once or twice yearly to drain the pond of high water levels.
- Pond shoreline almost entirely undeveloped; oil contamination originating from pond shoreline is unlikely.

IV. CONTINGENCY PLAN

There is little possibility that an oil spill in Block Island Sound would enter and contaminate Trustom Pond. However, should a spill occur during a period of exceptionally high tides or wave energies, the barrier could easily breach, thus permitting oil to enter. The pond would also be vulnerable during the time that the seasonal man-made breach remains open. Should this occur, especially during the late fall or winter months, many waterfowl could be oiled. In the case of an oil spill threat, the breachway should be checked to see if it is open.

The best contingency plan for the pond, if the breachway is open, would be to close the breachway (A) with heavy equipment using sand from the surrounding areas but not the dunes and to simultaneously create noise to force the birds into unaffected areas. Access for heavy earth-moving equipment can be obtained along Moonstone Beach Road (1).



I. IDENTIFICATION

Site name: Card Ponds

Waterbody: Block Island Sound

Municipality: South Kingstown (Police Dept.: 783-3341)

II. CHARACTERISTICS

Size: approximately 80 acres

Ecosystem type: coastal lagoon/barrier beach

Water quality: SA

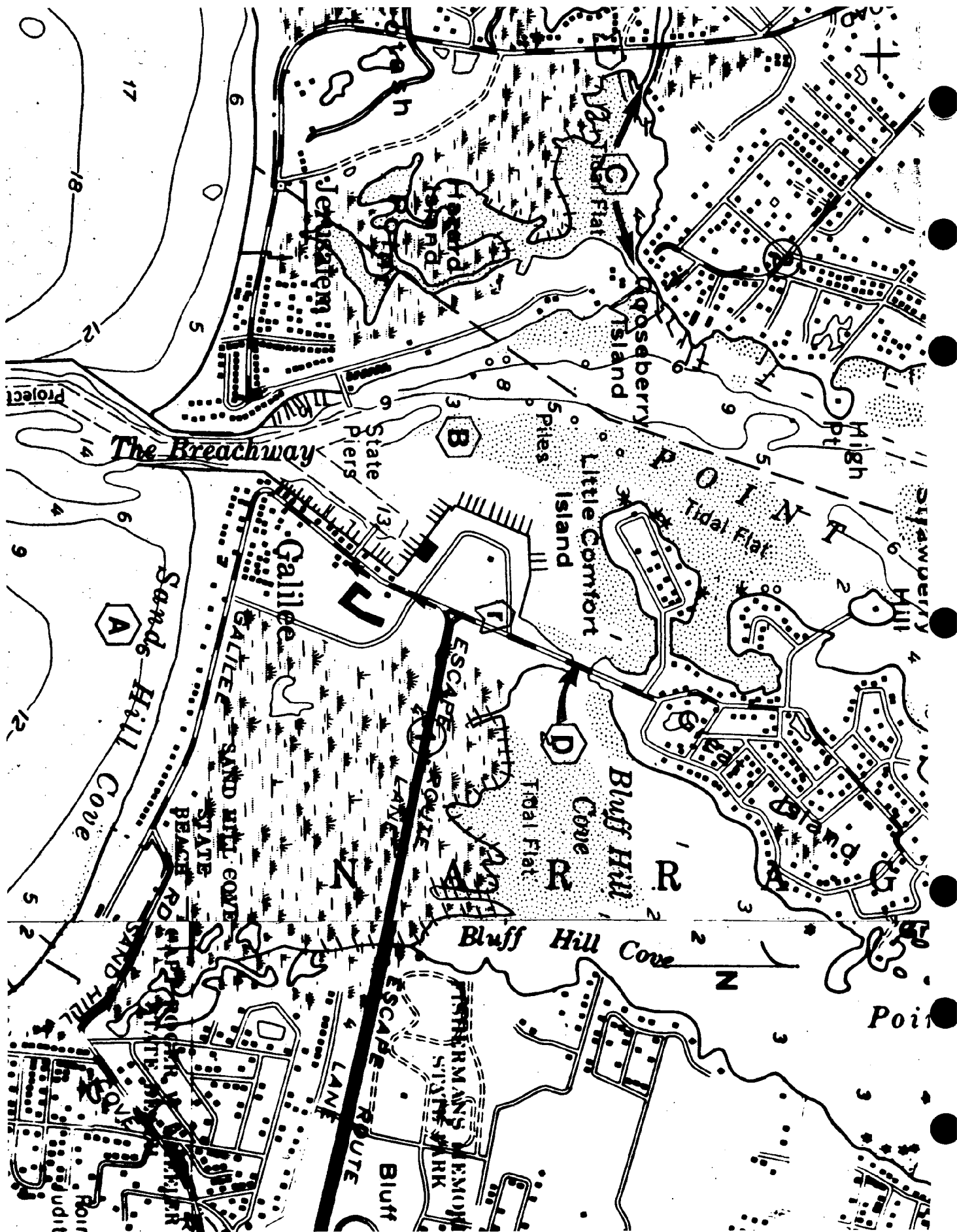
Vulnerability: generally low due to complete separation from
sound by barrier beach under normal conditions

III. SITE-SPECIFIC FACTORS

- Small series of interconnected ponds adjacent to barrier beach and Trustom Pond.
- Beach prone to washovers during heavy surf.
- Waterfowl often use the pond for feeding and resting.
- Pond shoreline largely undeveloped; oil contamination originating from pond shoreline unlikely.

IV. CONTINGENCY PLAN

If an oil spill threat exists to the general area, the Card Ponds breachway should be checked to see if it is open. Should the barrier beach entrance to the pond **A** be open at the time an offshore oil spill occurs, heavy equipment should be used to fill it in with sand from the surrounding beach. It is desirable not to disturb the dunes unless absolutely necessary. Access is obtained along Moonstone Beach Road **1**.



I. IDENTIFICATION

Site name: Point Judith Pond/Potter Pond

Waterbody: Block Island Sound

Municipality: South Kingstown and Narragansett

(Police Depts.: SK 783-3341/ N 789-1011)

II. CHARACTERISTICS

Size: approximately 1,500 acres

Ecosystem type: coastal lagoon, salt marshes, and tidal flats

Water quality: SA/SC

Vulnerability: deep 300 foot wide permanently reinforced breach-way to Block Island Sound

III. SITE-SPECIFIC FACTORS

- Wide, south-facing channel is largely protected from high wave energies by Harbor of Refuge breakwater.
- Mean tidal range is approximately 3 feet.
- Currents in the 300 foot-wide channel can exceed four knots.
- Major commercial fishing port.
- Ponds are valuable as fish and wildlife habitats. They support heavy recreational fishing and boating.
- Heavy residential and commercial development along much of the pond shoreline, but access is generally good.
- Due to commercial activities and the large freshwater input to Point Judith Pond, the threat of oil contamination originating from the shore is high.
- Strong currents in the channel to Potter Pond will complicate containment efforts in this area.
- Galilee marsh is habitat for several significant plant and animal species.
- Succotash Marsh, the marshes north and south of Escape Road, and recreational shellfishing flats are especially sensitive areas.

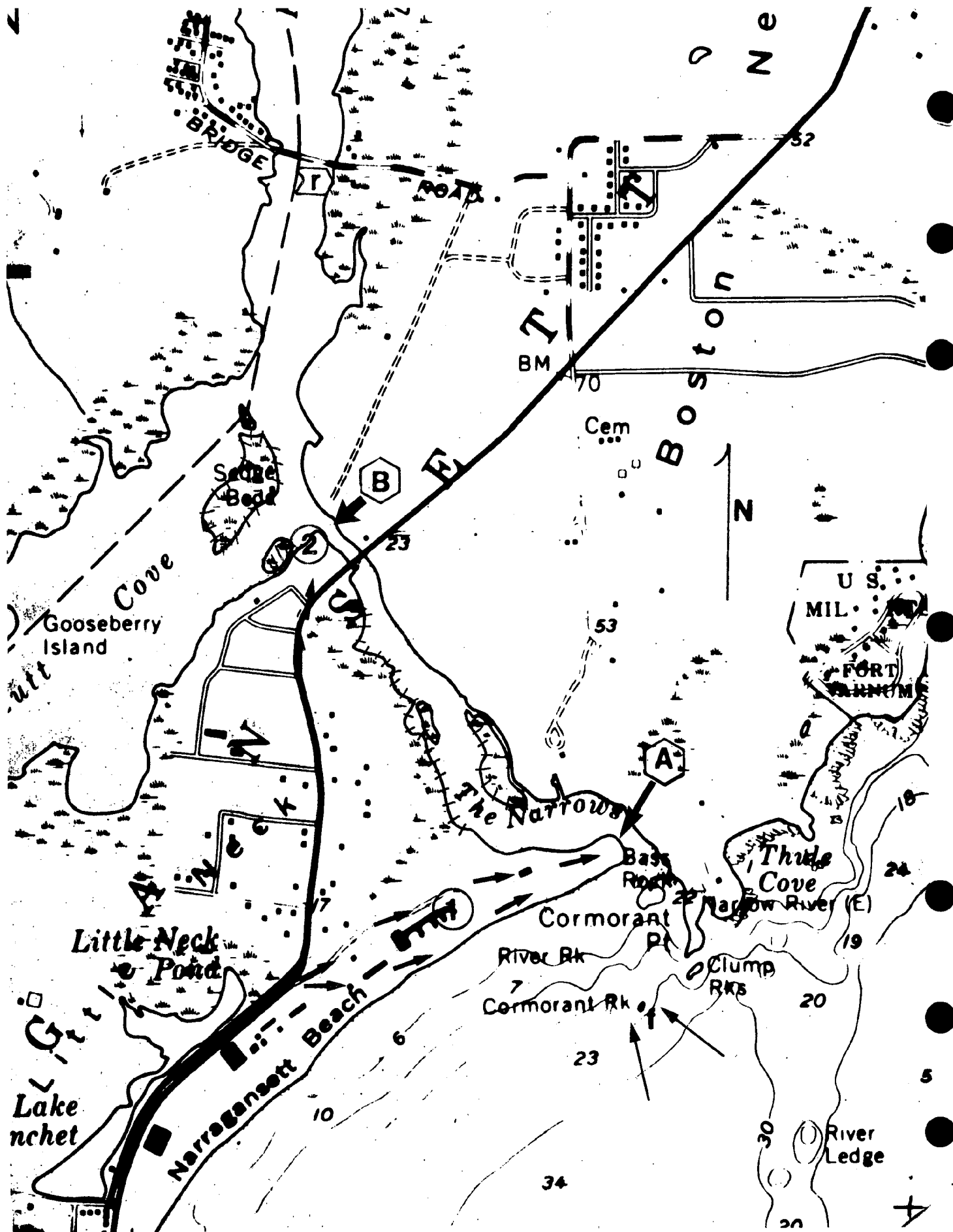
IV. CONTINGENCY PLAN

The Harbor of Refuge breakwater outside the breachway will lessen the potential impact of an offshore spill. The outer Harbor **(A)** is relatively calm under most conditions, and C/C operations can be conducted quite effectively in this area.

Should oil enter the pond, attempts should be made to contain the oil in the area of the state piers **(B)**. However, there is substantial fishing boat traffic and strong currents in this area which will complicate C/C operations. One possible containment strategy in this area would be to divert oil to the beach on the western side of the channel for cleanup.

If oil is forced further up the pond, the Succotash Marsh-Potter Pond entrance channels **(C)** and the Bluff Hill Cove entrance channel **(D)** should be boomed off to protect the marsh areas. There are valuable shellfish beds north of High Point, and efforts should be made to contain oil within the channel if it gets that far north.

Access to the breachway area is along the Point Judith escape road off Rte. 108 **(1)**. Access **(2)** will get response personnel to the Snug Harbor area. The west side of the breachway can be reached by the Succotash Road off U.S. Rte. 1.



I. IDENTIFICATION

Site name: Pettaquamscutt River (Narrow River)

Waterbody: Rhode Island Sound

Municipality: Narragansett, North Kingstown, and South Kingstown
(Police Depts.: N 789-1011; NK 294-3311; SK 783-3341)

II. CHARACTERISTICS

Size: seven miles long; 50 to several hundred yards wide along its length

Ecosystem type: tidal estuary/salt marsh

Water quality: SA

Vulnerability: open channel 75 feet wide at low tide, 450 feet wide at high tide; mid-channel depth greater than 3 feet; large rock outcrops on north side of channel entrance

III. SITE-SPECIFIC FACTORS

- High exposure to SE-S winds with fetch in excess of six miles. Fetch and shoaling at entrance can lead to extremely treacherous sea conditions at mouth of river.
- Current is greater than 1 knot at maximum ebb and flood.
- Mean tidal range is approximately 3.2 feet.
- Residential development is low density at entrance, but surrounding land is held in large estates making access difficult.
- Sand bars at entrance are prone to shifting.
- Large meander at mouth of river may provide shelter for booming.
- Best access on upper reaches of river is available at three bridges.
- Area contains extensive wetlands and tidal flats and one of the state's largest alewife runs.

IV. CONTINGENCY PLAN

The physical configuration, land ownership patterns, and exposure to weather will make C/C operations difficult at the mouth of the river. In the case of sustained winds from E-SE or S, which are the conditions most likely to push oil toward the river, the entrance might be unworkable due to the breaking surf and rock outcrops.

In the channel, currents of two knots or better on the ebb and flood will cause an entrainment problem. The north side of the river entrance is a short steep rock face, and access is made difficult by the long private way leading to the river.

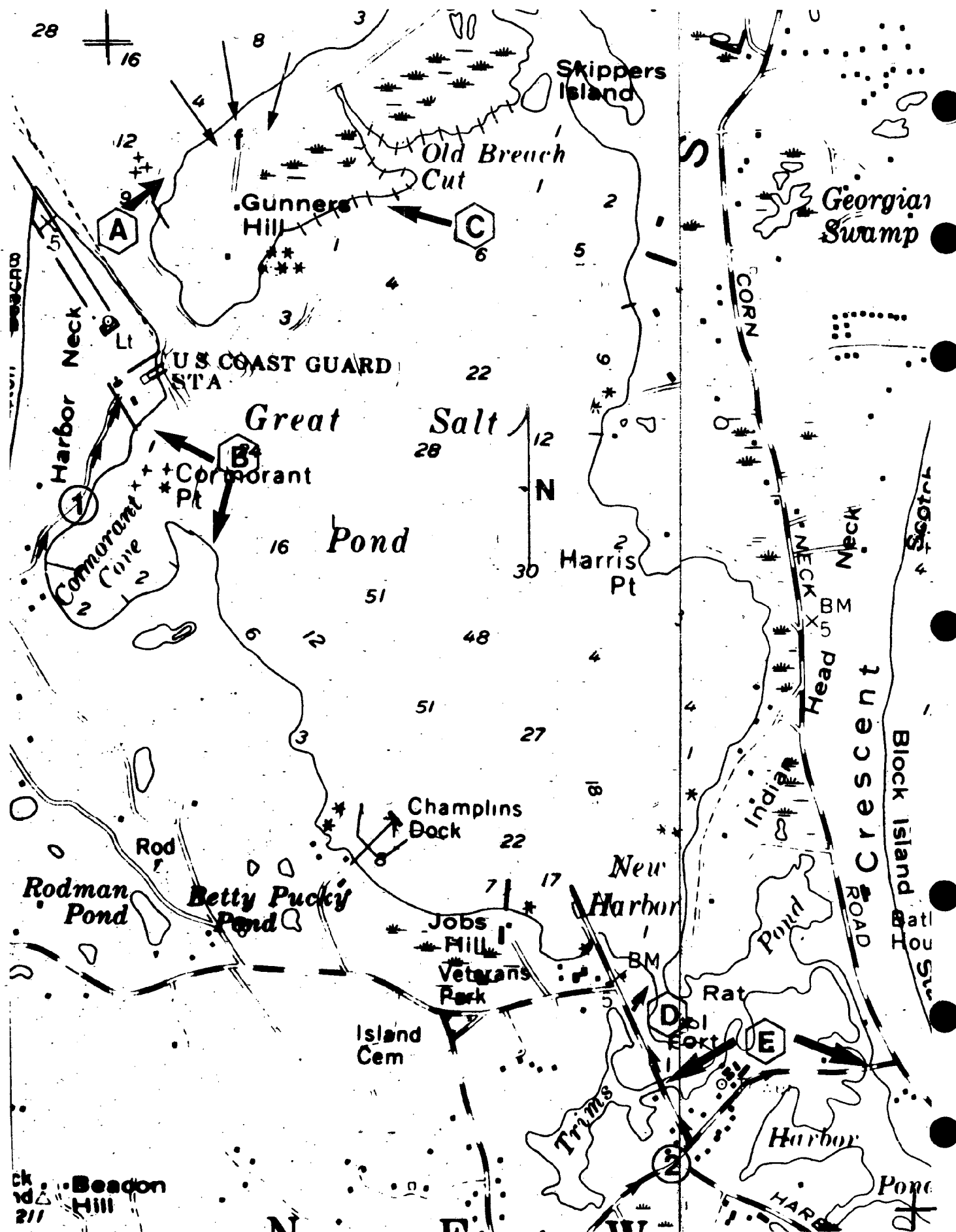
C/C operations might be most effective working behind the dunes on the south side of the river entrance, where the river widens and takes a sharp bend to the south (A). The area is well protected from surf, and the current dissipates.

Access to the area can best be gained across the Dunes Club property or from the Narragansett Town Beach (1). Booming, vacuuming, and ditching operations all appear to be feasible at (A).

A backup location for C/C operations at the Pettaquamscutt River is just north of Sprague Bridge (B). The River is approximately 100 feet wide at this point. A small staging area accessible by a short dirt road (2) is located on the south side of the River. Heavy equipment can be used in this area and small boats launched. The current will cause an entrainment problem.

If oil is carried up the river beyond this point, the containment problem becomes much more difficult due to access problems. It would be best to conduct operation by boat in area (B).

In the case of a small, localized spill originating in the upper reaches of the River, access for cleanup is available at several bridges crossing the River and along many of the streets on the west side of the River.



I. IDENTIFICATION

Site name: Great Salt Pond

Waterbody: Block Island Sound

Municipality: New Shoreham (Police Dept. 466-2340)

II. CHARACTERISTICS

Size: approximately 1,000 acres

Ecosystem: coastal lagoon/barrier beach/marsh system

Water quality: SA/SB

Vulnerability: open channel to Block Island Sound approximately
250 feet wide at low tide, 300 feet wide at high
tide

III. SITE-SPECIFIC FACTORS

- Wide, permanently open channel is exposed to NW-NNW-N winds with fetch greater than 5 miles.
- Currents exceed 1 knot during ebb and flood.
- Mean tidal range is approximately 2.6 feet.
- Pond used extensively for recreational boating and commercial fishing, and is site of major ferry transport terminal.
- Pond contains two smaller embayments (Trims Pond and Harbor Pond) in southeast corner.
- Shoreline development is moderate; access to containment areas is good.
- Moderate oil threat from upland sources near small petroleum storage station and marinas on eastern side of the pond.
- March bordering north shore has been identified as a significant wildlife resource.

IV. CONTINGENCY PLAN

It would be nearly impossible to keep oil entirely out of Great Salt Pond should a spill occur near the channel opening during northerly or northwesterly winds and an incoming tide. This is due to the extensive NW fetch, fast currents, and the wide, deep channel into the pond. Deflection of oil away from the channel (A) should be attempted, but large amounts could enter the pond anyway. C/C crews should be prepared to conduct large-scale operations just inside the channel east of the CG station, where protection is greatest and surface currents and waves subside (B).

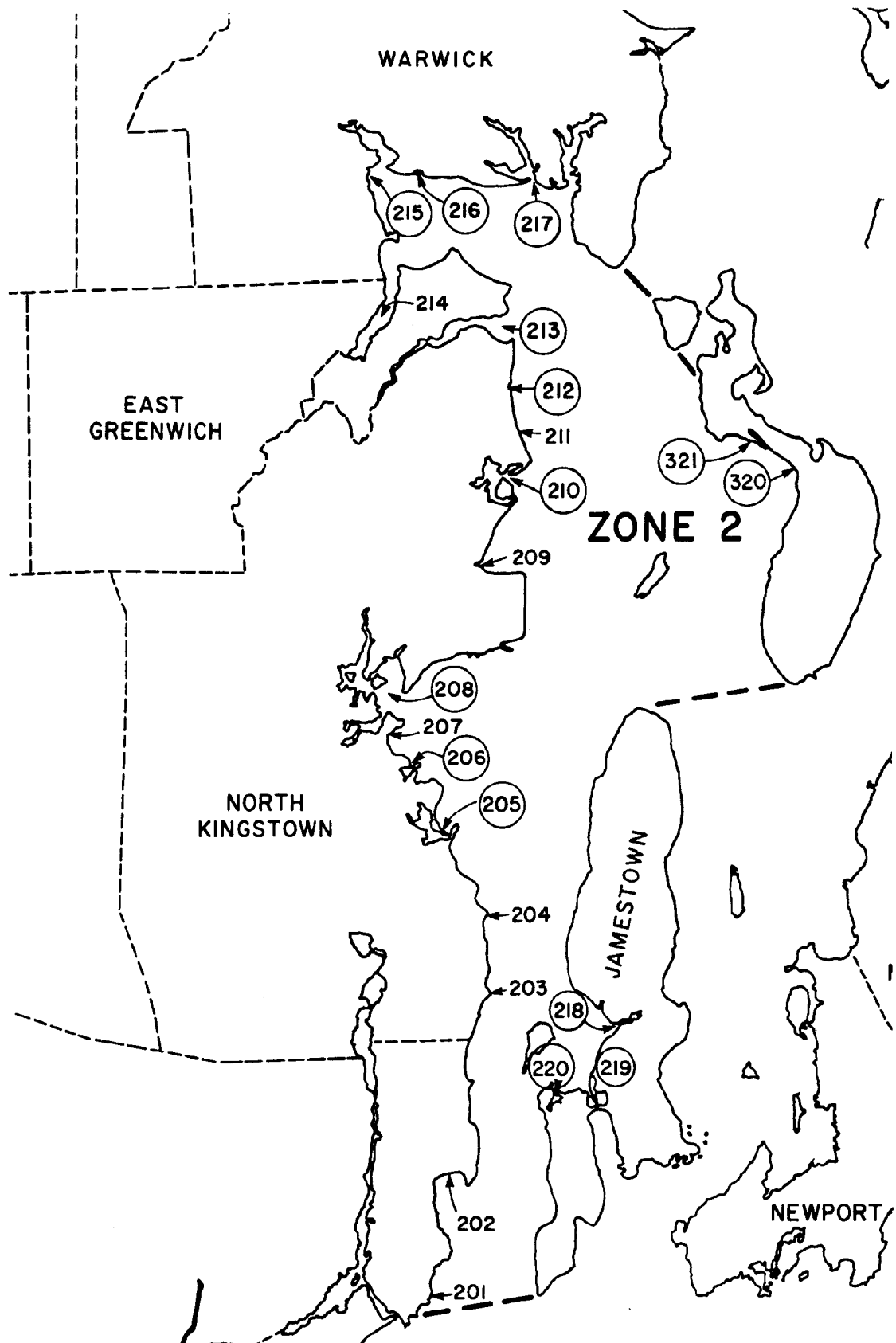
Oil should be skimmed from the water surface if possible. If this cannot be accomplished, the oil should be directed to a beach or rocky shoreline area on the south side of the pond (B), away from small pocket salt marshes or other wetlands in that area. It is of utmost importance to keep oil away from the more extensive marshes on the pond's northern shore, Gunner's Hill to Skipper's Island on map (C), due to its recognized wildlife significance. Secondary harbor booming of this marsh and smaller ones along the eastern shore is advisable.

Potential for shoreline spills exist near marinas and storage facilities in New Harbor in the southeast section of the pond and just inside the entrance to Trims Pond (D). Infiltration of oil into the inner portions of Trims and Harbor Pond (E) can be blocked at bridges at Beach Avenue, West Road, and at the Great Salt Pond/Trims Pond 25-yard-wide connector channel. Access to the main pond entrance channel (A)(B) is best via the route to the Coast Guard station at Harbor Neck (1). Access to the inner pond closure areas (D)(E) is best via (2).

ZONE 1

- 102 Napatree Point barrier beach and marsh
- A 1 1/2 mile long barrier beach extending westward from the mainland at Watch Hill. The beach provides storm protection to Little Narragansett Bay. A small salt marsh is located at the western end.
- 103 Maschaug Ponds barrier beach
- A 1 mile long barrier beach separating two brackish coastal ponds from Block Island Sound.
- 104 Winnapaug Pond barrier beach
- Heavily developed barrier beach and dune fronting a large coastal pond. Misquamicut State swimming beach is situated on the western portion of this 2 mile long barrier.
- 106 Quonochontaug Pond barrier beach
- An undeveloped barrier containing extensive dunes and salt marsh protecting Quonochontaug Pond. It is approximately 2 miles in length.
- 108 Charlestown Pond barrier beach
- Rhode Island's longest (4 miles) barrier beach fronting Charlestown salt pond. The undeveloped portion west of the breachway contains the state's Ninigret Conservation Area and the Ninigret National Wildlife Refuge.
- 110 Green Hill Pond barrier beach
- A low elevation, partially developed barrier fronting Green Hill Pond, which empties into Charlestown Pond.
- 113 Potter Pond barrier beach
- A small, predominately cobble beach forms the south border of Potter's Pond. East Matunuck State Beach is situated here.
- 115 Point Judith Pond barrier beach
- Commercially and residentially developed barrier beach at Galilee. Site contains Roger Wheeler State Beach.
- 116 Scarboro State Beach
- Heavily used recreational swimming beach in Narragansett.

- 117 Narragansett Beach
- Municipal and private swimming beach near the entrance to the Pettaquamscutt River.
- 119 West Beach barrier beach
- Extensive undeveloped beach and large dunes complex extending northward from the breachway at Great Salt Pond to Sandy Point on Block Island.
- 121 Coast Guard barrier beach
- 1/2 mile long barrier starting at the south side of the breachway at Great Salt Pond and adjacent to the Block Island Coast Guard Station.
- 122 Mohegan Bluffs
- Extensive, scenic clay bluffs as much as 90 feet high along the southern shore of Block Island.
- 123 Block Island State Beach
- Part of Crescent Beach barrier which forms the eastern border of Great Salt Pond at Old Harbor.
- 124 Clay Head Bluffs
- Steep clay cliffs along the northeastern shore of Block Island.
- 125 Sandy Point
- A sand spit at Block Island's north end, containing a nationally registered historic lighthouse and providing protection to brackish Chagum Pond.



I. IDENTIFICATION

Site name: Rumstick Point salt marsh

Waterbody: upper Narragansett Bay/entrance to Warren River

Municipality: Barrington (Police Dept.: 245-3101)

II. CHARACTERISTICS

Size: approximately 20 acres

Ecosystem type: salt marsh/tidal creek

Water quality: SB

Vulnerability: entrance channel approximately 25 feet wide at low tide and 75 feet wide at high tide

III. SITE-SPECIFIC FACTORS

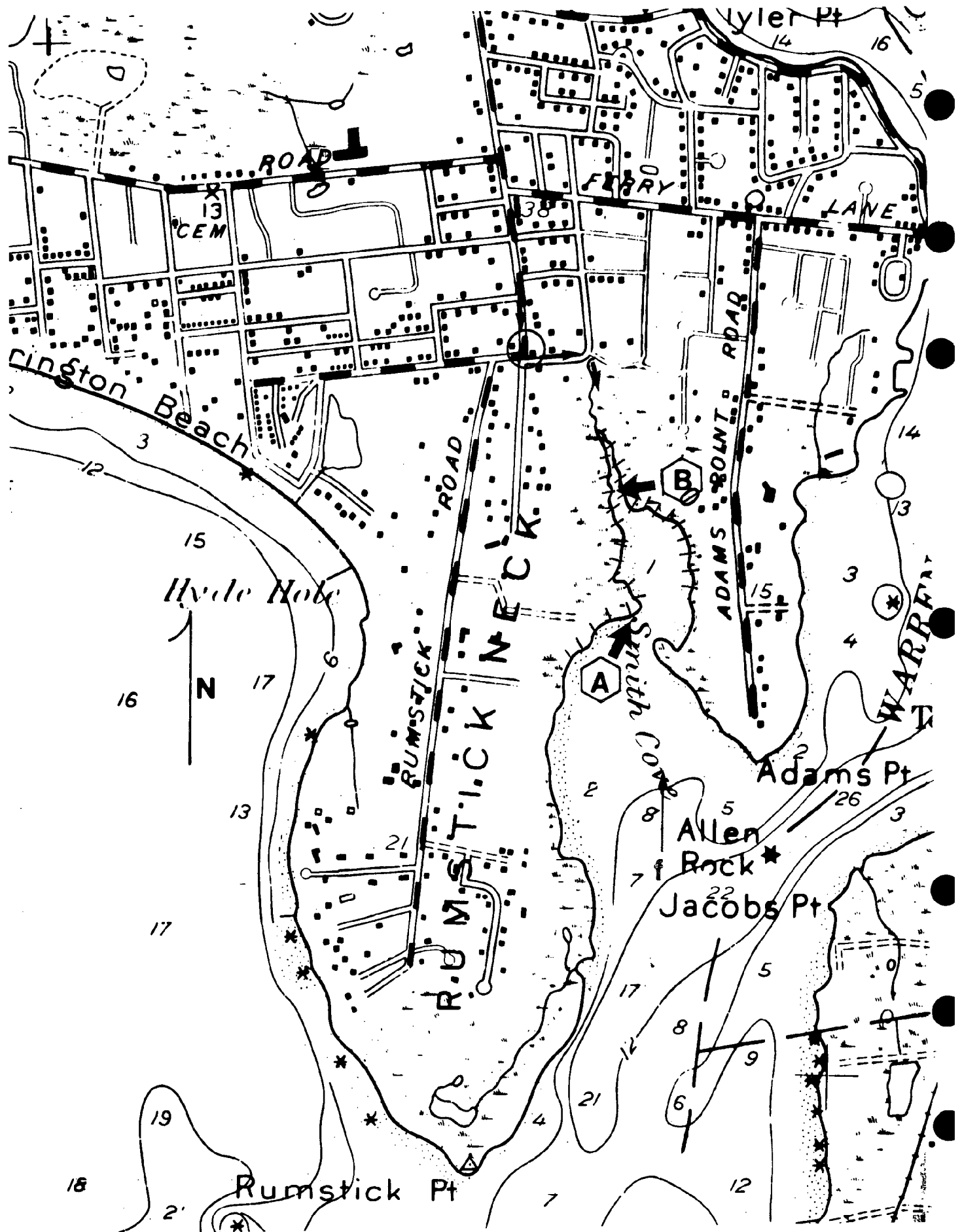
- Entrance channel located on eastern shore of entrance to the Warren River and faces in easterly direction .
- Tidal range is approximately 4.5 feet.
- Marsh located at tip of Rumstick Point.
- Protective beach and low dune bordering southerly shore is exposed to southerly fetch of over 3 miles and does occasionally overwash.
- A portion of marsh north of the entrance channel is largely unprotected by beach or dune and is highly vulnerable to contamination.
- High residential development adjacent to marsh.
- Access roads come close to marsh but crossing private land is required.

IV. CONTINGENCY PLAN

Rumstick Point marsh is situated approximately one mile north-northeast of the main shipping channel to Providence. Should a spill occur near this location during high tide and strong S-SSW-SW winds, this marsh would be vulnerable because waves occasionally overtop the protective beach berm around the southern border of the marsh. Under less than storm conditions, the barrier should be sufficient to protect the marsh. Oil flowing up the Warren River would probably be pushed beyond the entrance channel  because its easterly orientation provides a large degree of natural protection.

Oil flowing down the Warren River toward the open bay is perhaps a greater threat to the marsh channel, especially if it is taking in water at the time of oil passage. An extensive portion of marsh on the north side of the channel is particularly endangered due to the lack of any dune or beach barrier separating it from open water.

Due to the size of the breachway opening, attempts to fill it in would be difficult if not futile. Booming would appear to be the best alternative, with one boom outside of the channel (A), a secondary boom further up the channel (B). C/C operations would be most effectively accomplished by boat in this location, with some land-based personnel to provide spot protection from shore and to reinforce potential overwash. Access to the marsh by land is difficult but can be attained by crossing a 100-foot-long right-of-way (unofficial) between private yards and shrubby area from a cul-de-sac at the end of Stone Tower Lane, which runs off Apple Tree Lane and Rumstick Road (1).



I. IDENTIFICATION

Site name: Smith's Cove

Waterbody: upper Narragansett Bay/lower Warren River

Municipality: Barrington (Police Dept.: 245-3101)

II. CHARACTERISTICS

Size: approximately 50 acres

Ecosystem type: salt marsh/tidal creek

Water quality: SB

Vulnerability: marsh borders a small embayment, which faces south into the lower Warren River and is approximately 200 feet wide at the entrance

III. SITE-SPECIFIC FACTORS

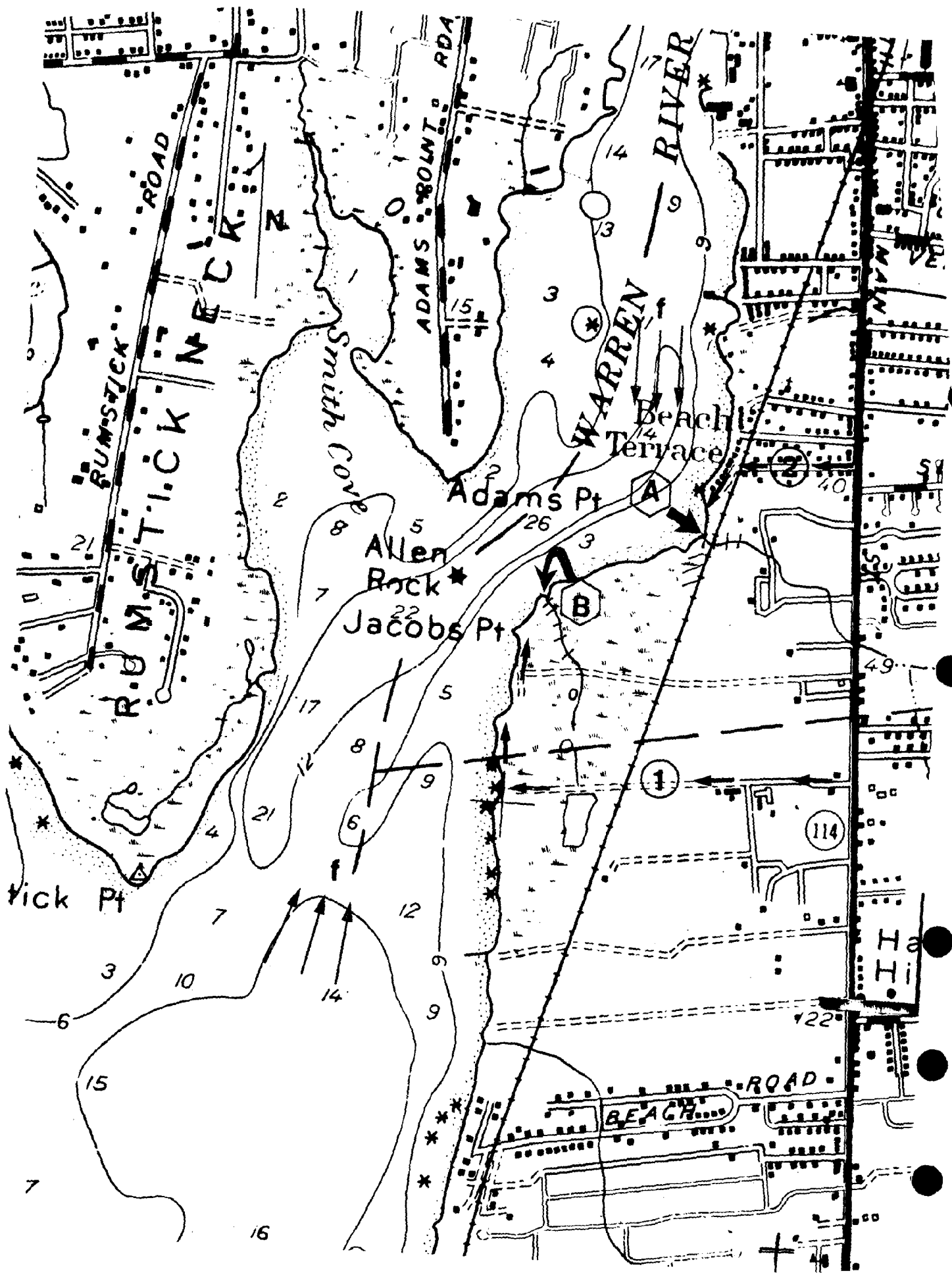
- Southerly fetch exceeds two miles; funnel shape of cove makes it highly vulnerable to storm surge.
- Tidal range is approximately 4.5 feet.
- Entrance channel to marshland is unprotected by beach or dune system.
- Creek narrows to 4 to 5 feet at northerly limit, while vegetated portions of marsh maintain width of approximately 200 feet.
- Medium-density residential development inland of the marsh.

IV. CONTINGENCY PLAN

Because of its funnel shape and its southern exposure, Smith's Cove is particularly vulnerable to an oil spill that would be forced into the Warren River entrance from the upper bay. The northern cove portion has a permanently exposed tidal creek entrance channel at least 200 feet wide, and the marshlands are unprotected by beach, dune, or other elevated barriers. Storm surge from the south could cause considerable water pileup and infiltration of oil.

There appears to be little that can be done to protect the area completely, but it may be possible to capture and clean up much of the spill outside the cove entrance (A) and to simultaneously block some of the small tidal creeks inside the marsh (B). Should winds blow from other than a S direction, the cove would probably not be endangered by oil contamination.

As is the case with adjacent Rumstick Point marsh, boom deployment here would be most easily accomplished by boat. However, direct land access to the marsh can be attained from Quincy Adams Road, which borders the marshes' north side off Rumstick Point Road (1).



I. IDENTIFICATION

Site name: Jacob's Point salt marsh

Waterbody: upper Narragansett Bay/lower Warren River

Municipality: Bristol/Warren (Police Depts.: B 253-6900/
W 245-1311)

II. CHARACTERISTICS

Size: approximately 80 acres

Ecosystem type: salt marsh/tidal creek

Water quality: SB

Vulnerability: a tidal creek (A) 5 feet wide at low tide and 90 feet wide at high tide connects the marsh to lower Warren River at the marsh's northeast corner. Another creek (B) approximately 3 feet wide opens from the marsh on the western shore.

III. SITE-SPECIFIC FACTORS

- Fetch from SW direction exceeds 3 miles; N winds can also result in considerable wave impact.
- Tidal range is approximately 4.5 feet.
- The large salt marsh grades into brackish marsh, cattail marsh, and freshwater wooded swamp on the inland side.
- Higher elevations within the salt marsh contain numerous trees and other woody vegetation.
- An old elevated railroad embankment borders the eastern edge of the marsh and can be used for access.
- Town line between Warren and Bristol crosses through the marsh and is marked by a stone wall.
- An extensive cobble beach and vegetated dune gives considerable protection to western shoreline of the marsh.
- Land access is difficult; C/C operations from boat could be more rapid and effective.

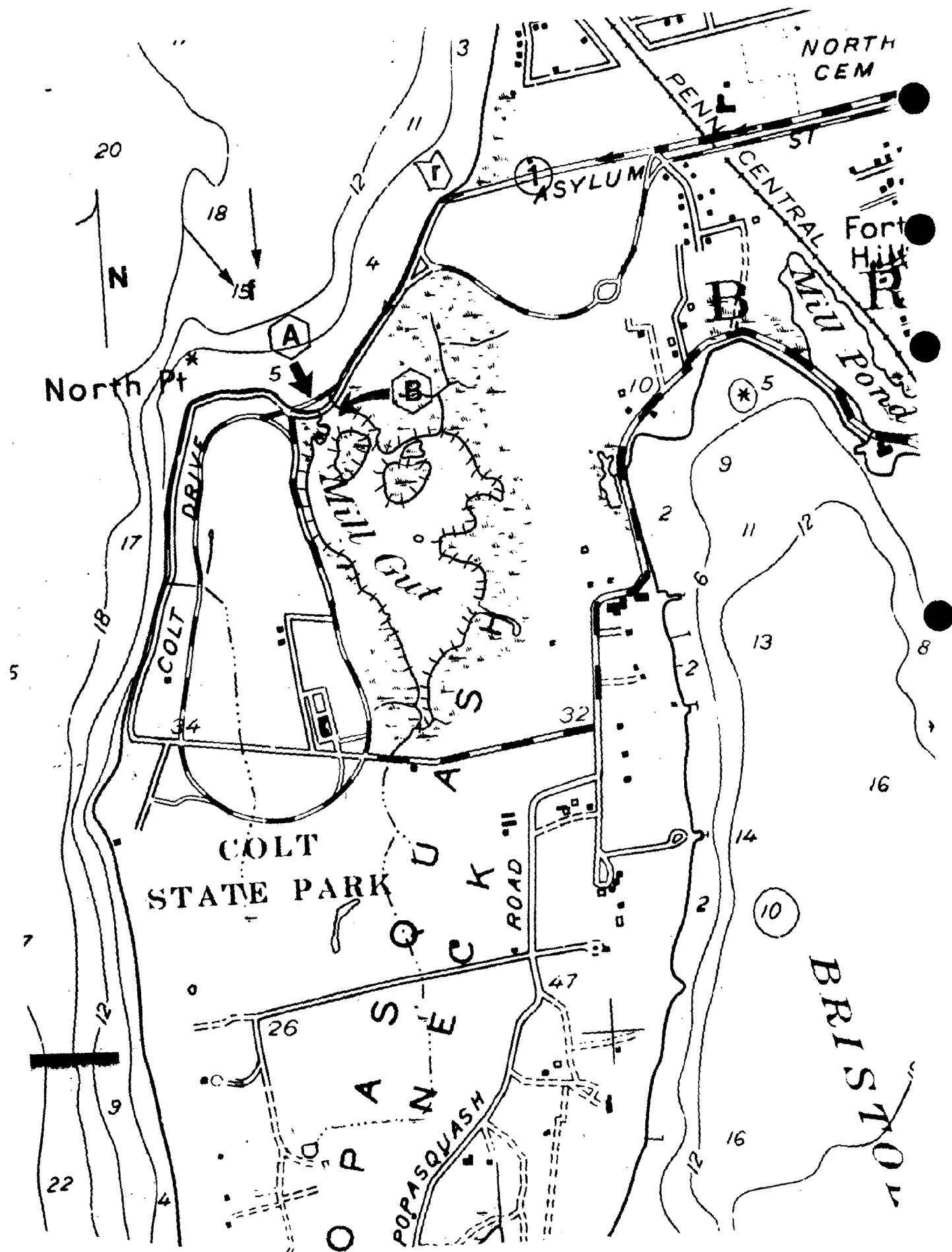
IV. CONTINGENCY PLAN

The marsh can be threatened by oil from two directions. A spill moving down the Warren River would pose a threat as would one occurring offshore in the upper bay. A large channel opening in the northeast corner of the marsh (A) would be directly threatened

by southward-moving oil from upriver. Oil entering the marsh at this point would contaminate a large area of the marsh.

Should a spill encroach from the bay, the northeastern opening would be largely bypassed. However, oil could enter the marsh through a narrower opening on the western shore (B), but this one could be easily closed by heavy equipment, if equipment could be brought on scene in time. Since land access is difficult, the use of booms deployed from boat would be preferable. This is especially true since it is recommended that adjacent areas at Rumstick Point and Smith's Cove, both situated in the lower Warren River, could also be protected by the utilization of booms deployed from boats. The channels to Jacob's Point might be adequately protected using boom to deflect the oil to a less fragile shoreline area for cleanup, rather than trying to string the boom directly across the marsh-entrance channels.

If access by land is necessary for C/C activities, the western inlet (B) and southern portion of the marsh is accessible by passing through the North Farm condominium development off Hope Street (Rte. 114) (1) and crossing over the beach to the north. The northern inlet is reached by taking Maple Street (2) west off Hope Street to its end and then traveling south down the railroad right-of-way a short distance to the marsh entrance (A).



I. IDENTIFICATION

Site name: Mill Gut

Waterbody: upper Narragansett Bay

Municipality: Bristol (Police Dept.: 253-6900)

II. CHARACTERISTICS

Size: approximately 80 acres

Ecosystem type: salt marsh/tidal flats

Water quality: SA

Vulnerability: northwest-facing, permanently open channel 60 feet wide connects marsh and small open lagoon to upper Narragansett bay

III. SITE-SPECIFIC FACTORS

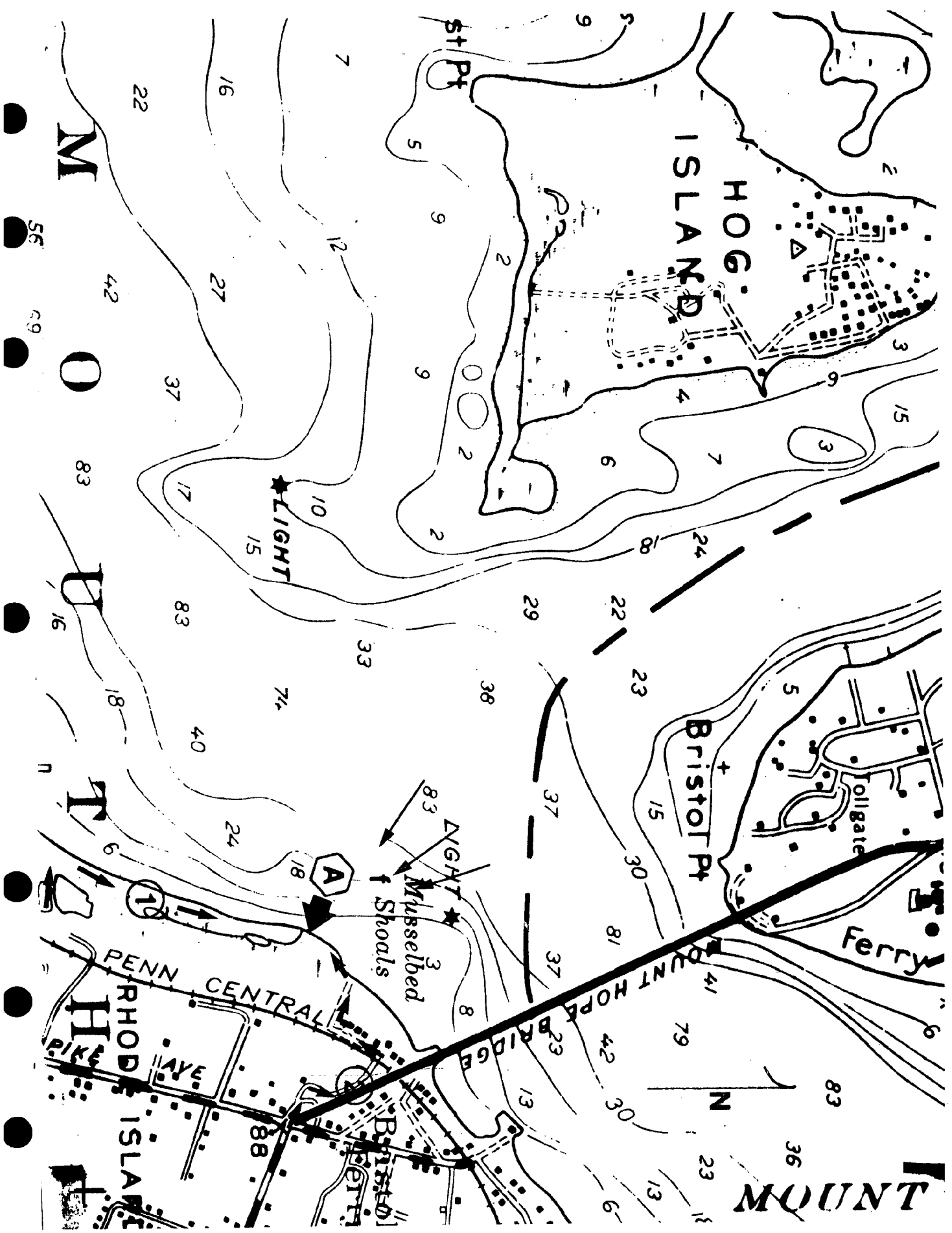
- Entrance highly exposed to N-NNW-NW winds, with a fetch exceeding 3 miles; currents can exceed 1 knot.
- Tidal range is approximately 4 feet.
- Mill Gut channel is approximately 1 nautical mile from the main navigation channel to Providence.
- Entrance is stabilized with riprap and passes under two bridges before opening up into the marsh system.
- Mill Gut is publicly owned as part of Colt State Park.
- Marsh and open waters within are particularly attractive and valuable to waterfowl.

IV. CONTINGENCY PLAN

Mill Gut is particularly vulnerable to an upper bay oil spill that might occur north of northwest of Colt State Park when winds are coming from those directions. Because of the size of the opening and its permanently stabilized condition, there is no way to close the breachway temporarily to encroaching oil. Although sea states can be severe at the entrance due to the large fetch, a primary heavy-duty boom several hundred feet in length might be deployed outside the entrance  to block off as much oil as possible. This can best be accomplished by boats, which can be launched at a ramp several hundred feet to the north of the channel.

Inside the bridges, secondary but lighter-duty booms should be deployed, since some oil is nearly certain to pass through the channel. The open water area (B) is large and protected enough so that total containment should be possible, thus preventing infiltration into the vegetated portions of the marsh. This secondary boom could be deployed from land, although small working skiffs would be preferable if water depth was sufficient at the time. Of utmost importance in this and other similar type areas is the adequacy of the response time. Under the conditions outlined above, response must be very rapid to provide full protection to this area.

Access to the channel entrance is good via Colt Drive off Rte. 114 in Bristol (1); boat launching facilities are available near the Mill Gut entrance (r).



I. IDENTIFICATION

Site name: Weyerhaeuser salt marsh

Waterbody: Narragansett Bay, East Passage near entrance to Mount Hope Bay

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 25 acres

Ecosystem type: salt marsh and tidal creek

Water quality: SA

Vulnerability: marsh entrance channel through beach berm is 5 feet wide at low tide and up to 30 feet wide at high tide

III. SITE-SPECIFIC FACTORS

- Entrance channel is particularly exposed to N and NW winds.
- Tidal range is approximately 4.0 feet.
- Channel location near Mount Hope Bridge is adjacent to tanker routes to Fall River, Mass.
- Except for the channel entrance, the marsh is separated from the bay by sand beach and small dunes. Marsh occupies a narrow depression between the beach and the uplands.
- Largely undeveloped shoreline; little chance of contamination from upland sources.

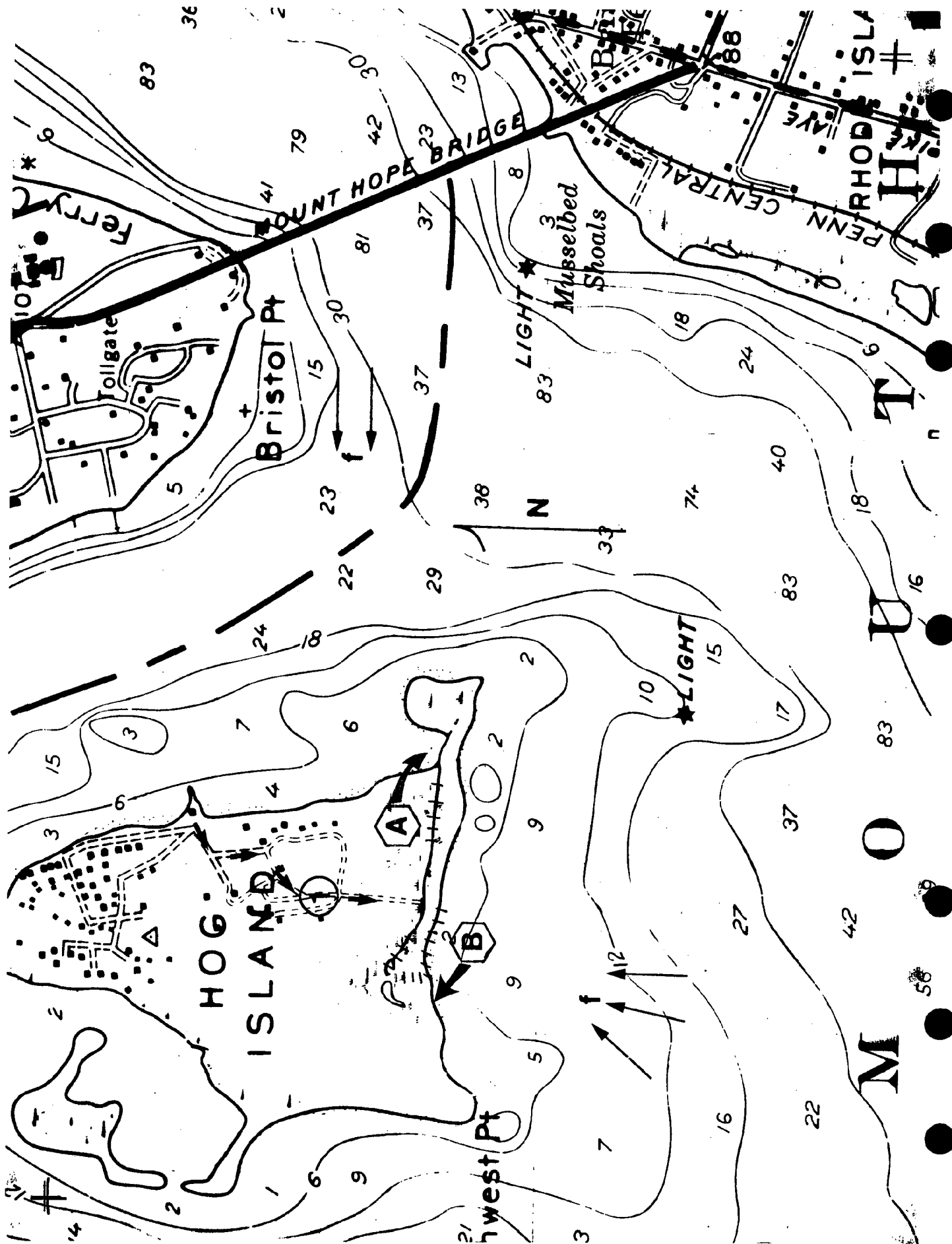
IV. CONTINGENCY PLAN

This marsh is so named because of its proximity to the Weyerhaeuser Lumber Company. A high threat exists to this salt marsh due to its location near a heavily used oil barge and tanker route to Fall River and Tiverton. The permanently open channel  could quickly be affected by oil under certain tide and wind conditions.

It may be possible to protect this area by deploying boom at the channel entrance if the equipment can be deployed quickly enough. The best solution would be to fill in the channel manually at a point on the beach where the channel narrows, just before the vegetated portion of the marsh begins. If time permits, heavy

equipment can accomplish the same purpose. As is the case with most salt marshes, if the marsh is draining as the spill approaches shore, it may be best to let the marsh complete the draining process and to then block the entrance channel. This would help keep oil away from the entrance.

Access to this marsh is possible at its western end near Weyerhaeuser Lumber (Porter Lane) ①, but it would be necessary to cross the length of the beach to reach the channel entrance. Access to the eastern end is via a small dirt roadway ② near the Mount Hope Bridge and a turn to the left after crossing the railroad tracks. From here it would be necessary to cross the yard of a private home to reach the marsh entrance ①A.



I. IDENTIFICATION

Site name: Hog Island salt marsh

Waterbody: Narragansett Bay, East Passage

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 20 acres

Ecosystem type: salt marsh

Water quality: SA

Vulnerability: two tidal channels, one (A) approximately 30 feet wide at high tide and open to the northeast, the other (B) approximately 10 feet wide, open to the south, and in the western portion of the marsh. There is also extensive exposure of salt marsh peat along the southern shore.

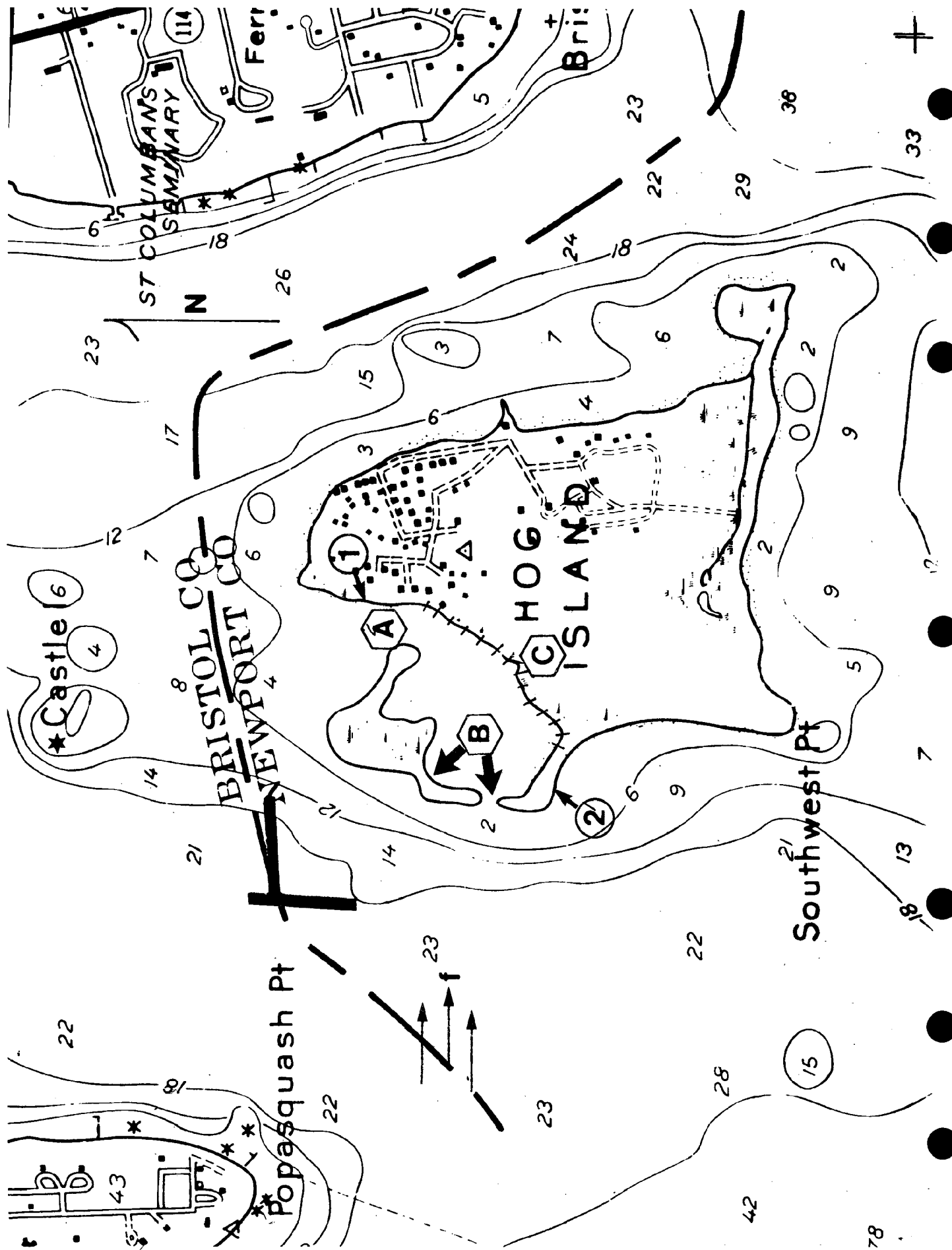
III. SITE-SPECIFIC FACTORS

- Main channel opening faces northeast and is located at eastern end of marsh (A).
- Eastern channel is naturally protected by sand spit extending to the east toward Mount Hope Bay.
- Western channel exposed to long fetch of over 5 miles from the south.
- Mean tidal range is approximately 4.0 feet.
- Marsh is located along the southern shore of Hog Island.
- Severe erosion on southern shore has exposed large expanses of old salt marsh peat.
- Erosion has caused dune rollover which has partially separated the western and eastern sections of the marsh. The western portion has cut a new channel opening through the protective cobble beach barrier (B).
- Overwash has filled some tidal creek channels with sand.
- Access to Hog Island is obtained by boat.
- Threat of oil contamination is greatest to western portion (B) and to exposed peat on southern shoreline.

IV. CONTINGENCY PLAN

In the event of an oil spill in the East Passage south of Mount Hope Bridge, portions of this marsh could be severely impacted. The direct exposure of a three-foot-thick, 100-yard-long layer of peat on the south shore greatly increases the potential for contamination. Due to the isolation of the marsh, frequent high wave energies, and lack of access for equipment, it may be impossible to provide complete protection to this area.

Attempts should be made to keep oil from reaching the shoreline through the use of deflection booms deployed by boat off the southern shore (B). Oil should be directed, if possible, away from entrance channel (B) and the extensive peat exposures to the east for containment and pickup. Both channel openings (A) (B) should be closed if possible using available equipment, although access for heavy earth-moving equipment is very poor. The Bristol Ferry can be used to transport heavy equipment from the mainland (1). Channel closures might be accomplished easily at the narrow western marsh inlet, but will be difficult at the main channel on the eastern portion. The use of deflection boom to protect the eastern channel should be considered, since waves are unlikely to inhibit boom deployment. Approximately 75 to 150 feet of boom might be required.



I. IDENTIFICATION

Site name: Hog Island Cove

Waterbody: Narragansett Bay, East Passage

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 20 acres

Ecosystem type: coastal embayment/tidal flats/salt marsh

Water quality: SA

Vulnerability: tidal inlet on north side of embayment is approximately 90 feet wide. High tides regularly overwash beach into embayment at westerly and north-westerly corners.

III. SITE-SPECIFIC FACTORS

- Low beach "barrier" surrounding embayment is easily overwashed by waves. Westerly fetch exceeds 2.5 miles.
- Tidal range is approximately 4.0 feet.
- Area prone to contamination from spill occurring in East Passage tanker route 1 mile to the west.
- Tidal flats in embayment are heavily used by recreation shellfishermen.
- Salt marsh bordering uplands highly vulnerable if oil should enter embayment.

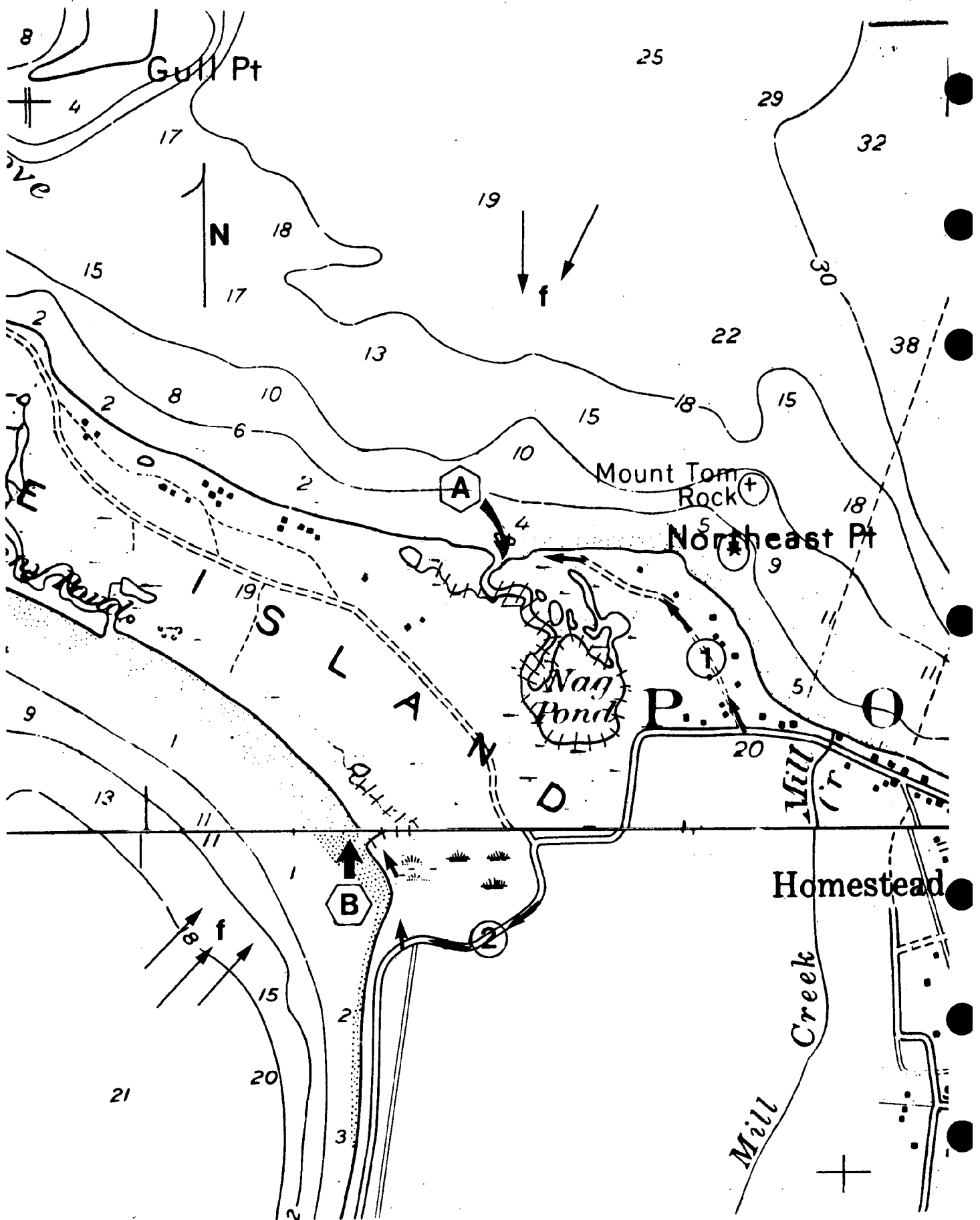
IV. CONTINGENCY PLAN

The main channel opening to the cove (A) is oriented toward the north into Bristol Harbor. The lack of any major oil source in Bristol Harbor makes it unlikely that the cove will be impacted under most conditions. However, a spill originating on the East Passage tanker route and driven toward the island by W winds could infiltrate the embayment if tides and waves overwashed the protective barrier. Continued erosion of the barrier increases this threat.

If oil enters the cove across the barrier, boom should be deployed within the embayment (B) in order to keep oil from washing up onto vegetated marsh areas (C). The two low areas in the protective barrier should be given priority attention. There does not appear to be any potential at this location for cutting

off oil infiltration by filling in the channels using heavy equipment.

The only access to Hog Island is by boat, and any C/C activities in the cove will have to be conducted largely by small boat operations. Two of the better landing areas are at (1) and (2). Local shellfishermen might provide useful assistance in light of their familiarity with the area. Approximately 250 to 400 feet of boom would be required to close all three channels into the cove.



I. IDENTIFICATION

Site name: Nag Creek

Waterbody: Narragansett Bay, central portion

Municipality: Portsmouth (Prudence Island) (Public Works

Dept.: 683-1936)

II. CHARACTERISTICS

Size: 150 to 175 acres

Ecosystem type: salt marsh and tidal creek network

Water quality: SA

Vulnerability: the marsh is connected to the bay by two natural channels through the beach. The largest and most threatened **A** is on the northeast shore of Prudence Island and is 4 feet deep, 25 feet wide at low tide, up to 7 feet deep, and 90 feet wide at high tide. The southern channel **B** on the West Passage is 10 feet wide.

III. SITE-SPECIFIC FACTORS

- Northern portion open to bay's East Passage. Southern portion opens into Pine Hill Cove on opposite side of island. It is virtually impossible for them both to be affected by the same oil spill.
- North sector exposed to N. and NE winds. South sector exposed to S and SW winds.
- Tidal range is approximately 4.0 feet.
- Marsh is located on the narrow, low-elevated neck of Prudence Island in mid-Narragansett Bay.
- Marsh is separated into two distinct halves by a dirt road at 1-foot elevation above the marsh surface.
- Extensive mosquito ditches in upper marsh areas are silted in and revegetated.
- Prudence Island dump is located just to the east of the northern channel.
- Public works garage is located approximately 3/4 mile from the northern entrance to the marsh.
- Surrounding residential development is low.

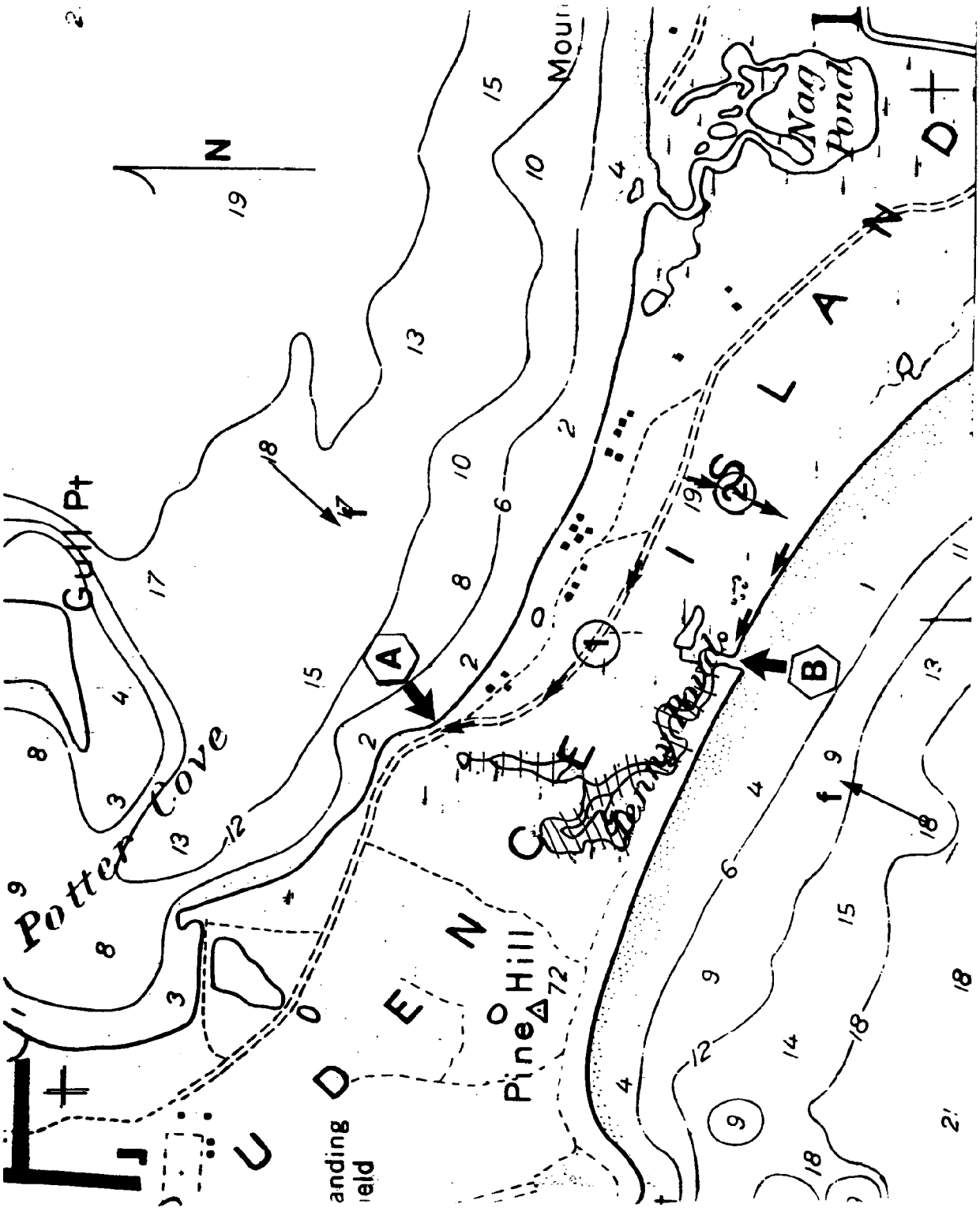
IV. CONTINGENCY PLAN

The northern sector of this marsh (A) is the most exposed to an oil spill threat due to its location on the East Passage tanker route to Providence. The channel orientation, exposure, large size, and lengthy fetch (over 5 miles) from the north and north-east magnify this potential threat.

In case the containment of oil in open waters north of the marsh is not possible, attempts should be made to fill in the marsh channel (A), using heavy equipment after the marsh has completed its draining cycle. Some earth-moving equipment is kept at the public works garage near the marsh. The best access to the channel is gained through the dump and then along a short traverse of the beach (1).

If a spill occurs on an incoming tide, it may not be possible to block the entrance channel by filling. In such circumstances side channels should be blocked if possible. Vegetated portions of the marsh surrounding the lagoon should be boomed off to prevent oil penetration onto the marsh grasses.

The southern sector of the marsh is distinct from the northern half. It is separated by the road and has its own entrance channel (B). It is significantly less threatened by oil due to its smaller size and location on the West Passage, away from the major tanker route. However, it is exposed to severe wave action when there are S and SW winds, which could drive oil originating in the lower West Passage into the channel and the adjacent protective beach. A spill would probably be broken up considerably by the time it reached the inlet. The best option here is to block the entrance channel temporarily through filling with beach sediments. Access to the channel is best gained off the dirt road which passes down the west side of the island (2).



I. IDENTIFICATION

Site name: Jenny Creek

Waterbody: Narragansett Bay, central portion

Municipality: Portsmouth (Prudence Island) (Public Works

Dept.: 683-1936)

II. CHARACTERISTICS

Size: approximately 40 acres

Ecosystem type: salt marsh and tidal creek network

Vulnerability: the marsh is connected to the bay on both the northern and southern shores of Prudence Neck. The northern opening (A) is a culvert which houses a manually operated open/shut valve for controlling water flow to a pond aquaculture operation. The southern tidal inlet (B) on Pine Hill Cove is approximately 35 feet wide at low tide with a sharp bend to the northwest.

III. SITE-SPECIFIC FACTORS

- Northern inlet is exposed to NE winds, with fetch of 2.5 miles. Southern inlet is exposed to SW winds, with fetch of 6 to 7 miles.
- Tidal range is approximately 4.0 feet.
- Northern end of marsh is being utilized for intensive private oyster aquaculture.
- The owner and operator, Luther Blount, has constructed a pier (landing facility) at the northern inlet of the marsh system.
- Little or no residential development surrounding the marsh.
- Access to the northern opening is obtained at (A) and to the southern opening at (B). There is virtually no chance of a single spill threatening both inlets.
- Some earth-moving equipment is available at public works garage 1 1/2 miles south of the aquaculture site. (See Nag Creek information sheet and map.)

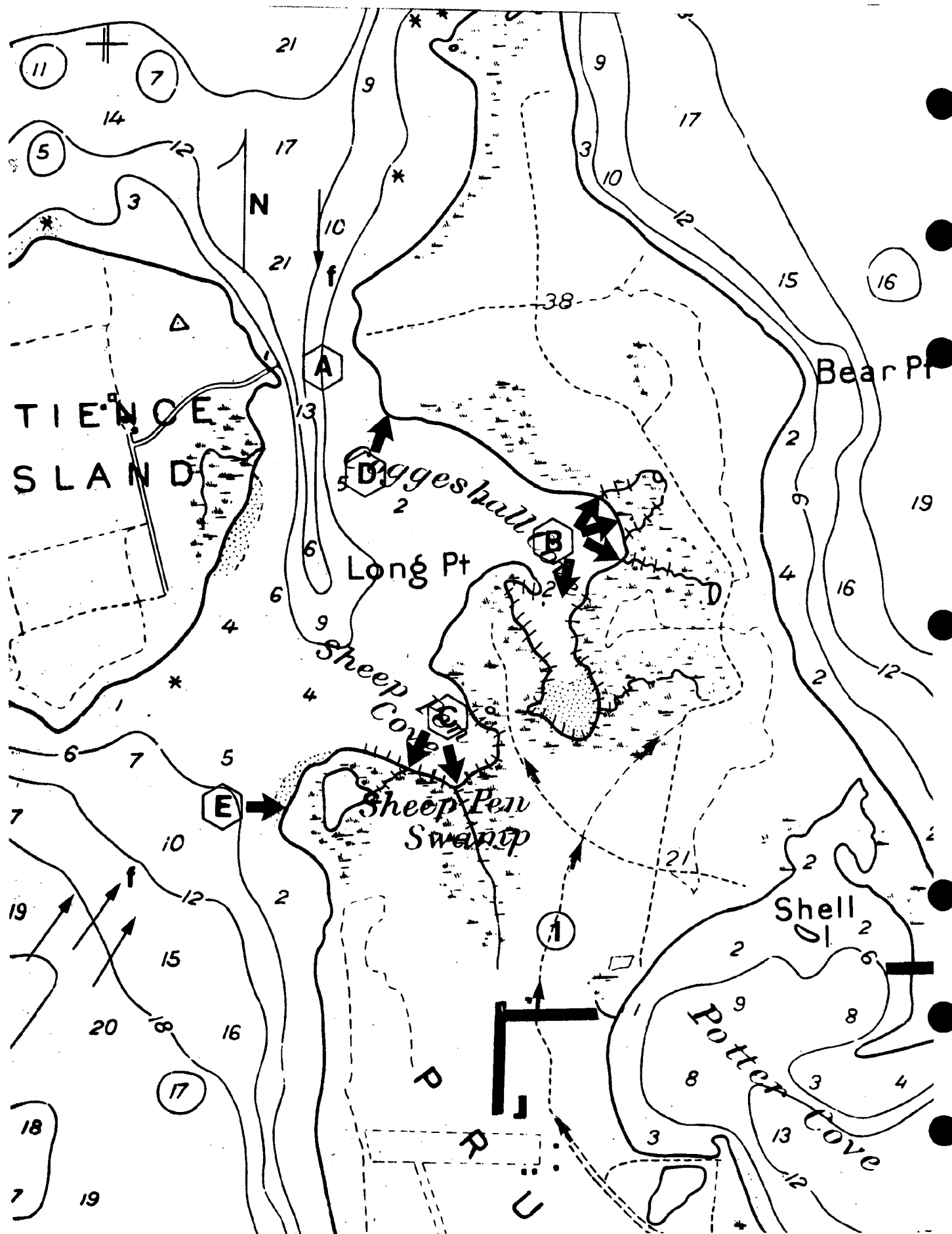
IV. CONTINGENCY PLAN

In case of a spill in the East Passage which threatened the northern end of Prudence Island, Luther Blount should be notified.

He should be requested to close the stop valve in the culvert connecting the marsh with the bay **A**. Access is along unpaved road **1**.

The chief threat to the southern inlet **B** would arise from an oil spill in the middle part of the West Passage from the Quonset/Davisville area. SW winds and an incoming tide would tend to drive the spill toward Prudence Island.

Most of the spill could break up before reaching Prudence, but if a threat developed to Jenny Creek, the most feasible option appears to be to fill in the channel **B** utilizing the earth-moving equipment available at the public works garage. The best access is along the unpaved road **2** and then along the beach. The southern inlet to Nag Creek can also be reached in this way.



I. IDENTIFICATION

Site name: Coggeshall and Sheep Pen Coves

Waterbody: Narragansett Bay, central portion West Passage

Municipality: Portsmouth (Prudence Island) (Public Works

Garage: 683-1936)

II. CHARACTERISTICS

Size: approximately 80 acres

Ecosystem type: embayment/salt marsh/tidal creek networks

Water quality: SA

Vulnerability: entire embayment is exposed for 3/4 mile on the west. Each cove has several points of vulnerability. Coggeshall Cove: tidal inlets range from the southernmost, which is approximately 180 feet wide, to several small ones between 10 to 20 feet wide. Sheep Pen Cove: much of the marsh is directly exposed to open water, with one primary tidal inlet approximately 90 feet wide located on southern side of cove.

III. SITE-SPECIFIC FACTORS

- Embayment is exposed to both N and SW winds and fetch.
- Tidal range is approximately 4.0 feet.
- Coves are located in north Prudence state management area.
- Embayment is shallow, 1 to 4 feet deep, with several rock and boulder outcrops.
- Land access is extremely difficult for other than hikers.
- No residential development.

IV. CONTINGENCY PLAN

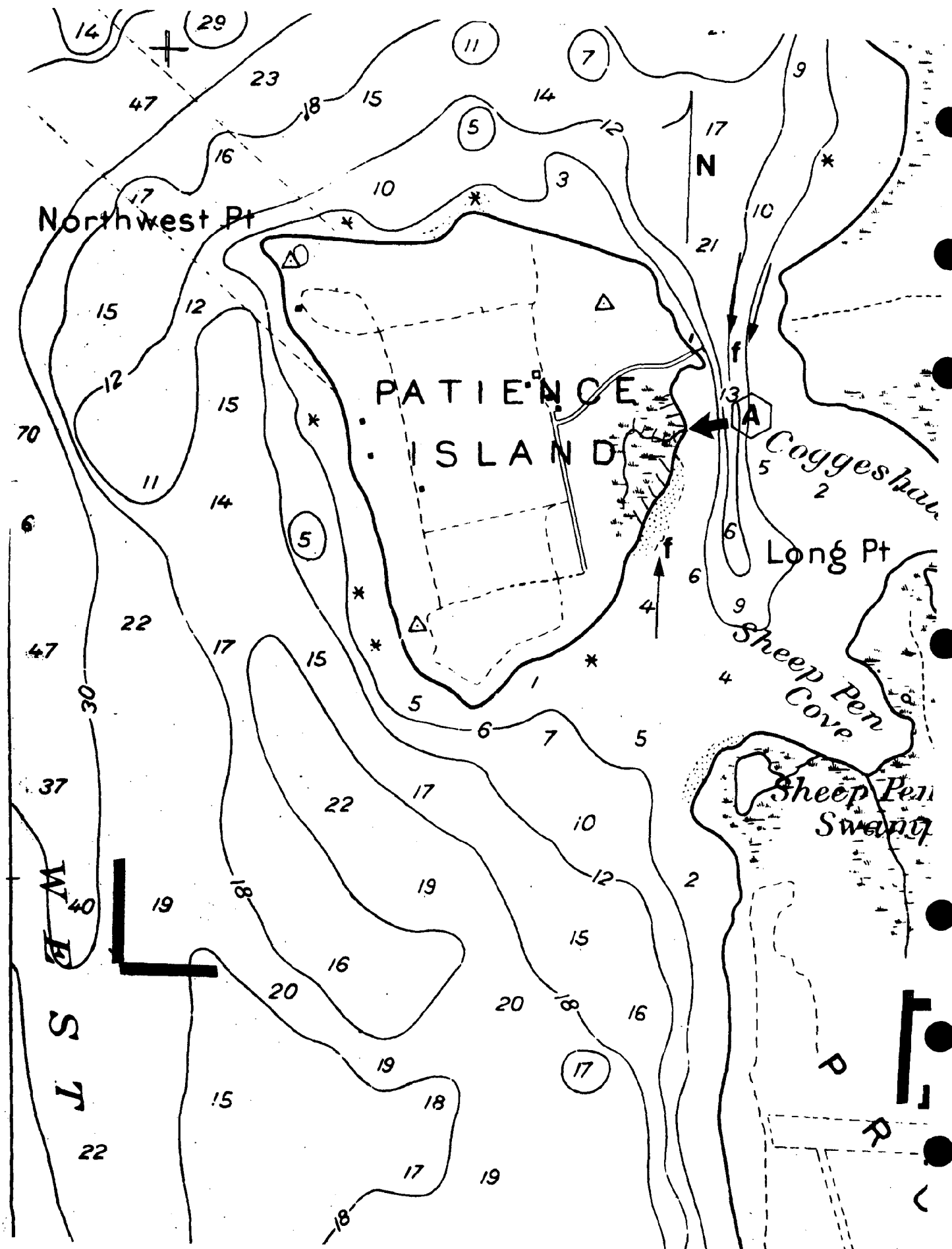
Spill from the north. The two coves are afforded good natural protection from oil infiltration due to their geographic configuration. However, if oil were spilled in the upper bay and driven by N winds toward the channel between north Prudence and Patience Islands, the coves and associated marshes might be in jeopardy, particularly Sheep Pen Cove.

While a first line of defense might be to deploy deflection boom between the two islands (A) in an attempt to channel the oil to the rocky shore on Patience Island, the chances are high that sea conditions would not allow it.

Each of the several tidal inlets located in area (B)(C) could be protected by deploying sections of boom 15 to 100 yards wide as necessary. Access is best obtained by small boat, since the embayment is shallow. Even then, C/C personnel will have to work in the water.

Another alternative would be to deploy deflection boom from the northern shore of Coggeshall Cove south (D) trying to divert the oil out between the islands.

Spill from the south. The spill threat from the south is relatively small because of the distance (approximately 4 miles) from the most likely origin point at Quonset. If a spill was pushed along by SW winds and incoming tide, the best strategy might be to use deflection boom to keep the oil away from Sheep Pen Point (E) and toward Patience Island, to be collected up on the Patience Island shore. C/C operations would be most effectively carried out from boats in this area, as land access for personnel and/or equipment is extremely difficult. However, land access can be obtained by the dirt road which enters the management area (1).



I. IDENTIFICATION

Site name: Patience Island marsh

Waterbody: Narragansett Bay

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 15 acres

Ecosystem type: salt marsh and tidal creek

Water quality: SA

Vulnerability: small tidal creek approximately 10 feet wide connects marsh to bay; extremely high tides can overwash protective beach

III. SITE-SPECIFIC FACTORS

- Small marsh located adjacent to Narrows on east side of Patience Island.
- Mean tidal range is approximately 4.0 feet.
- Shoreline development is low; no onshore oil spill threat.
- Access is by boat; large dock and landing area located on north side of marsh.

IV. CONTINGENCY PLAN

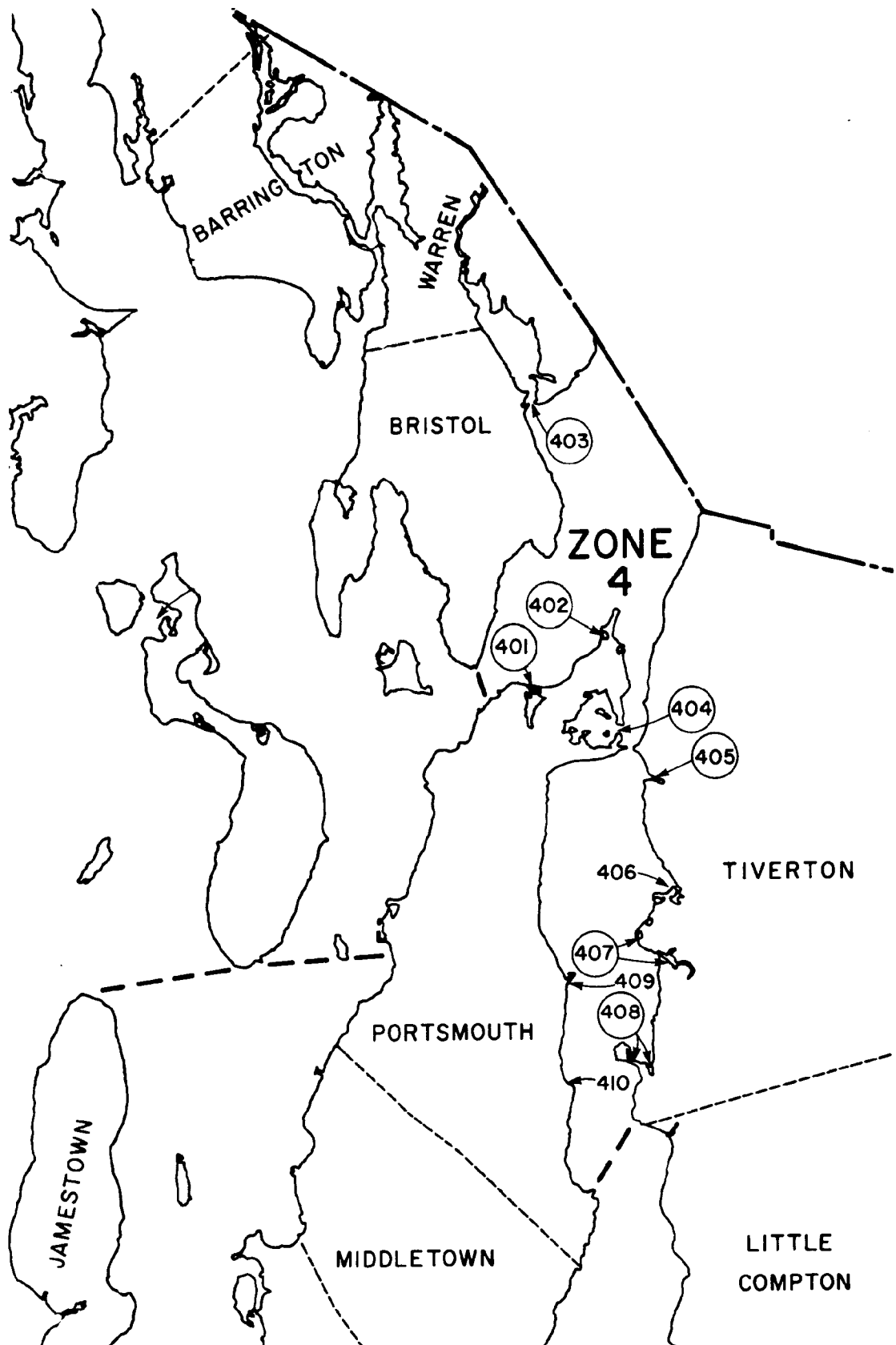
This small salt marsh is situated on the narrow, shallow channel which separates Prudence and Patience Islands. It is in close proximity to the Coggeshall Cove/Sheep Pen Cove marshes and should be considered as part of any C/C strategy for these areas.

Although this marsh is fed by a small entrance creek (A), high waters can overwash protective sand or cobble beach berm and completely inundate the marsh. A lengthy fetch exists from both north and south. Quick response and adequate offshore containment is important. Manual filling of the tidal creek should be considered along with the deployment of boom offshore. Access is by boat only.

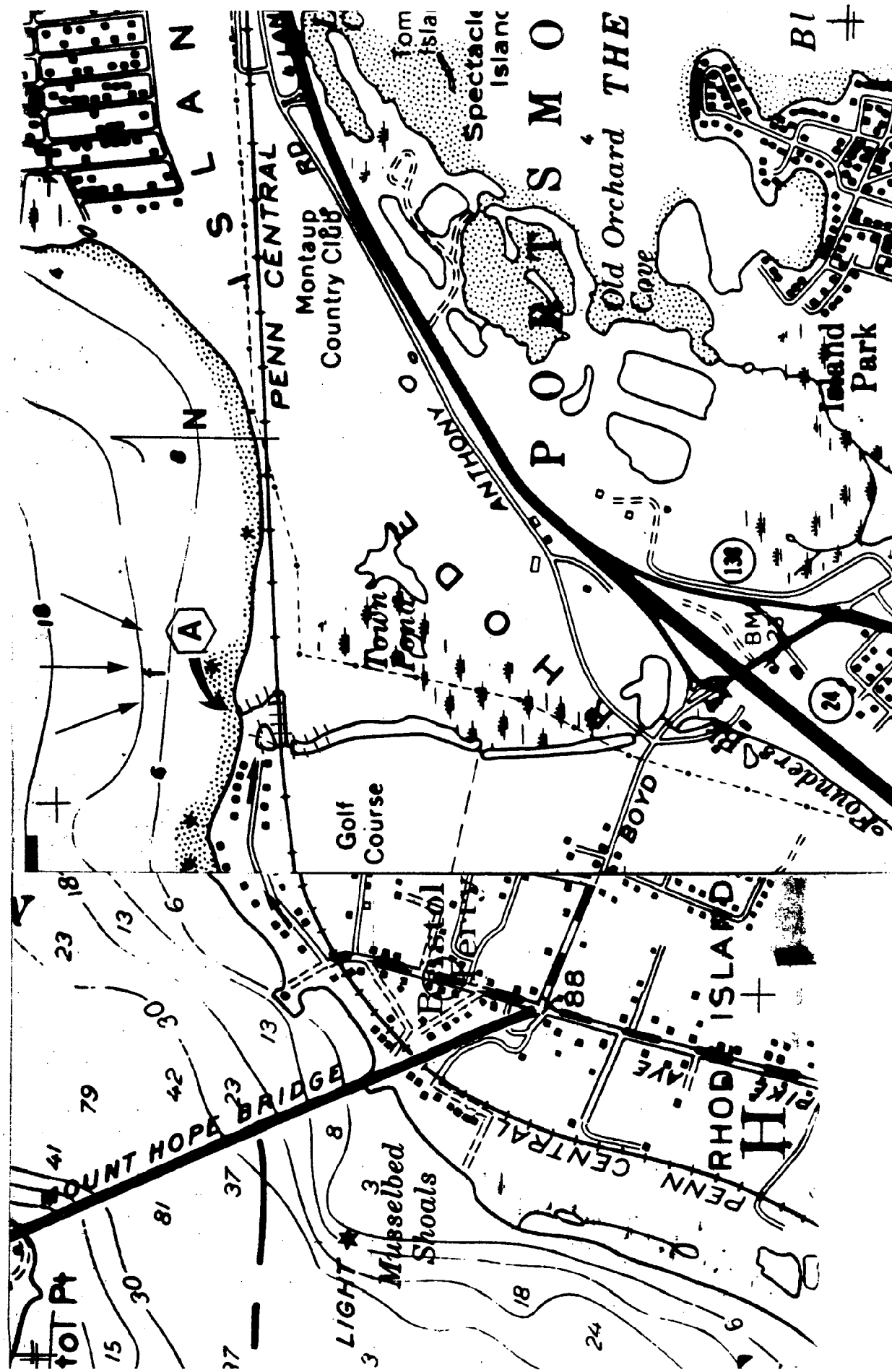
Since no permanent response capability is situated on the island, and no containment equipment is stored there, C/C assistance should be coordinated through the public works garage on Prudence Island.

ZONE 3

- 302 Conimicut Point
- Large cusped beach in the upper bay. Partially encloses the entrance to Mill Creek.
- 304 Gaspee Point
- Large cusped beach in the upper bay.
- 309 Barrington Town Beach
- Municipal swimming beach east of Nayatt Point salt marsh.
- 312 Upper reaches Barrington/Warren River
- Estuarine areas containing extensive salt marsh acreage in the towns of Barrington and Warren.
- 315 Mill Pond
- Small tidal embayment at the head of Bristol Harbor.
- 316 Silver Creek
- Small tidal inlet connected to the east side of Bristol Harbor.



- 301 MILL CREEK
- 302 CONIMICUT POINT
- 303 OCCUPESSATUXET COVE
- 304 GASPEE POINT
- 305 PASSEONQUIS COVE
- 306 WATCHEMOKET COVE
- 307 MUSSACHUK CREEK
- 308 NAYATT POINT MARSH
- 309 BARRINGTON TOWN BEACH
- 310 RUMSTICK POINT MARSH
- 311 SMITH COVE
- 312 UPPER REACHES BARRINGTON/WARREN RIVER
- 313 JACOB'S POINT MARSH
- 314 MILL GUT
- 315 MILL POND
- 316 SILVER CREEK
- 317 WEYERHAUSER MARSH
- 318 HOG ISLAND MARSH
- 319 HOG ISLAND COVE
- 320 NAG CREEK MARSH
- 321 JENNY CREEK
- 322 COGGESHALL/SHEEP PEN COVES
- 323 PATIENCE ISLAND MARSH



I. IDENTIFICATION

Site name: Boyd's Marsh

Waterbody: Mount Hope Bay

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 30 acres

Ecosystem type: tidal creek/salt marsh/brackish wetlands

Water quality: SB

Vulnerability: tidal creek inlet approximately 5 feet wide at low tide and 20 to 25 feet wide at high tide. Inlet is shallow and meandering

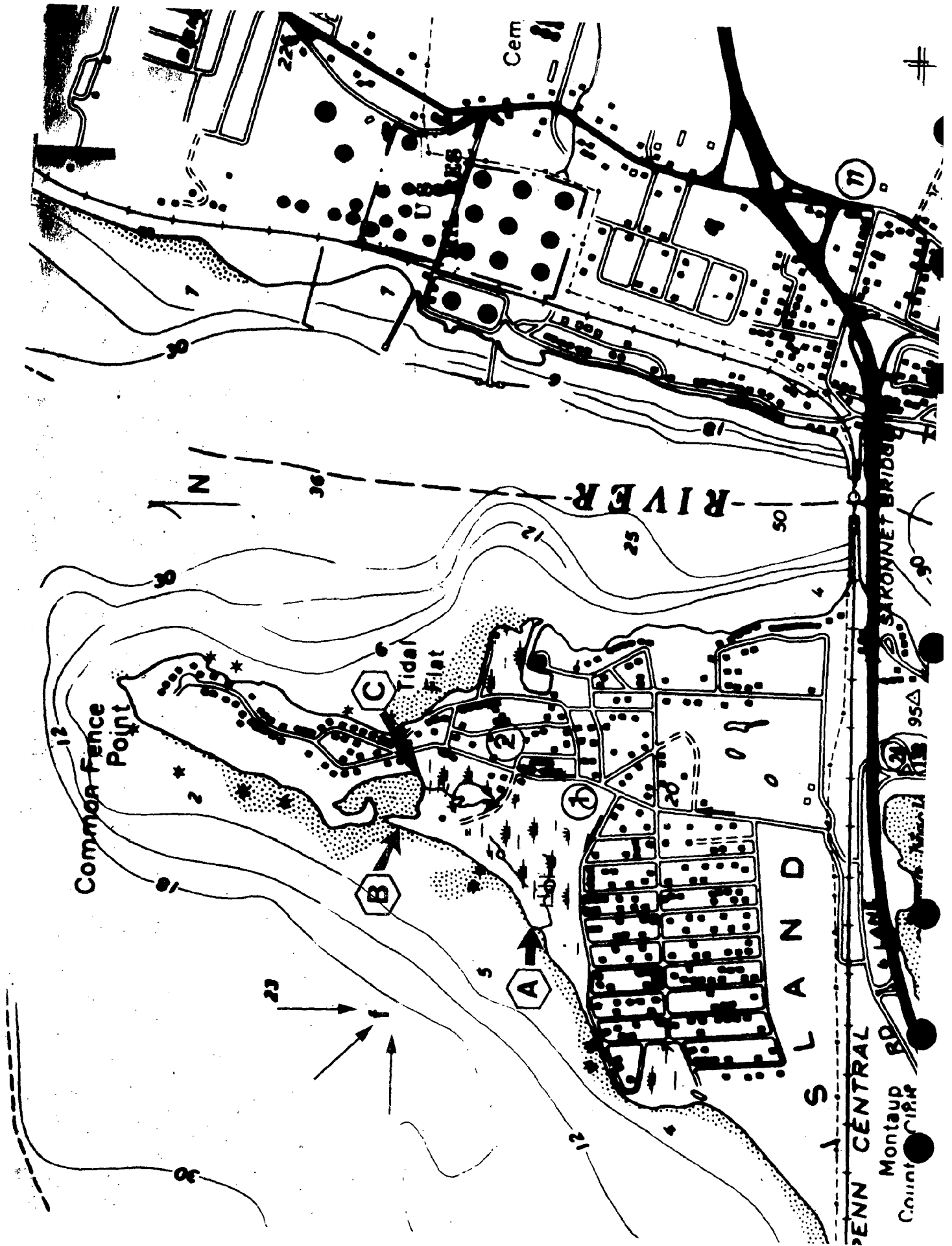
III. SITE-SPECIFIC FACTORS

- Entrance is exposed to NW-N-NE winds, although fetch is limited, so waves will rarely exceed 1 to 2 feet.
- Mean tidal range is approximately 4.0 feet.
- Currents can exceed 1 knot but are generally less.
- Tidal flat plus vegetation at entrance will provide some protection against oil infiltration of marsh.
- Access is gained to entrance at the end of heavily developed residential area on Bayview Avenue (1).
- If heavy equipment is needed, it will have to cross private property.
- Marsh system is elongated and extends 3/4 mile back from the entrance.
- Marsh extensively used as a dredge spoil disposal area in the past; natural vegetation considerably altered.
- Location on major tanker route makes marsh vulnerable.

IV. CONTINGENCY PLAN

The creek and marsh system would be especially vulnerable if a spill occurred in Mount Hope Bay and winds were out of the north. As a first option, C/C personnel could deploy a containment boom at the relatively flat entrance area (A) requiring 50 to 75 feet of boom. Smaller lengths of boom could be deployed as backups in the tidal creek.

Filling of the creek should be considered if the amount of oil or weather conditions make the use of oil boom ineffective. Sufficient unconsolidated material exists in the area of the creek entrance to be used in closing it if required. Access for heavy equipment is possible although difficult because of the heavy residential development at the end of (1).



I. IDENTIFICATION

Site name: Common Fence Point salt marshes

Waterbody: Mount Hope Bay

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 30 acres

Ecosystem type: tidal creeks and salt marsh

Water quality: SB

Vulnerability: has two channels. The northern channel runs the full length of marsh, 1/4 to 1/3 mile long and is inundated at high tide. At low tides the channel is about 10 to 15 feet wide. The southern channel is 30 to 40 feet wide and 6 1/2 feet deep at high tide, and 5 feet wide and approximately 3 feet deep at low tide.

III. SITE-SPECIFIC FACTORS

- Both channels are exposed to W-NW-N winds, with maximum fetch from the northwest of approximately three miles.
- Mean tidal range is approximately 3.1 feet.
- The marshes are located within 3/4 mile of the traffic lanes used by oil tankers and barges going to Tiverton and Fall River.
- Heavy residential development rings the marsh to the east and south.

IV. CONTINGENCY PLAN

The two channels present entirely different problems for oil spill C/C response. The southern channel is reached along Common Fence Boulevard (1) and can be filled in quickly with earth material from the surrounding beach front. As an added precaution, boom might be deployed at the mouth of the channel (A).

The northern marsh area and enclosed embayment will be difficult to protect. At high tides the entire beach face of the marsh is inundated for a length of approximately 1/3 mile (B). The part of the marsh and small embayment adjacent to Mount Hope Bay may have to be sacrificed to concentrate on protecting the upper marsh

inland of the embayment **C**. The inland marsh may be protected by closing off the tidal channel approximately 150 yards back from the beach face of the marsh. The deployment of containment boom at **C** is possible. Access to this area is obtained along **2**, which is unpaved road.

The proximity of the area to the oil tanker routes will likely require a rapid response time.



I. IDENTIFICATION

Site name: Kickamuit River

Waterbody: Mount Hope Bay

Municipality: Bristol/Warren (Police Depts.: B 253-6900/W 245-1311)

II. CHARACTERISTICS

Size: approximately 800 acres

Ecosystem type: tidal estuary with several salt marshes located along its length

Water quality: SA

Vulnerability: connection to Mount Hope Bay is through Bristol Narrows, which is approximately 750 feet wide at its narrowest but widens rapidly to greater than 1/2 mile to the north of the constriction. Water depth is approximately 5 to 7 feet at low water. Current exceeds 1 knot at ebb and flood.

III. SITE-SPECIFIC FACTORS

- Exposure of the river mouth is to the east-southeast with a fetch of 3 1/2 miles.
- Tidal range is approximately 4.0 feet.
- River extends approximately 3 miles to the northwest from the mouth.
- Oil tank farms in Tiverton are located across Mount Hope Bay to the southeast.
- Sections of the Kickamuit shore are heavily developed.
- Recreational activity (boating, swimming) is heavy during the summer.
- Cove is relatively shallow, averaging 4 to 7 feet in depth.
- Moderate waterfowl activity, especially during the fall and winter months.

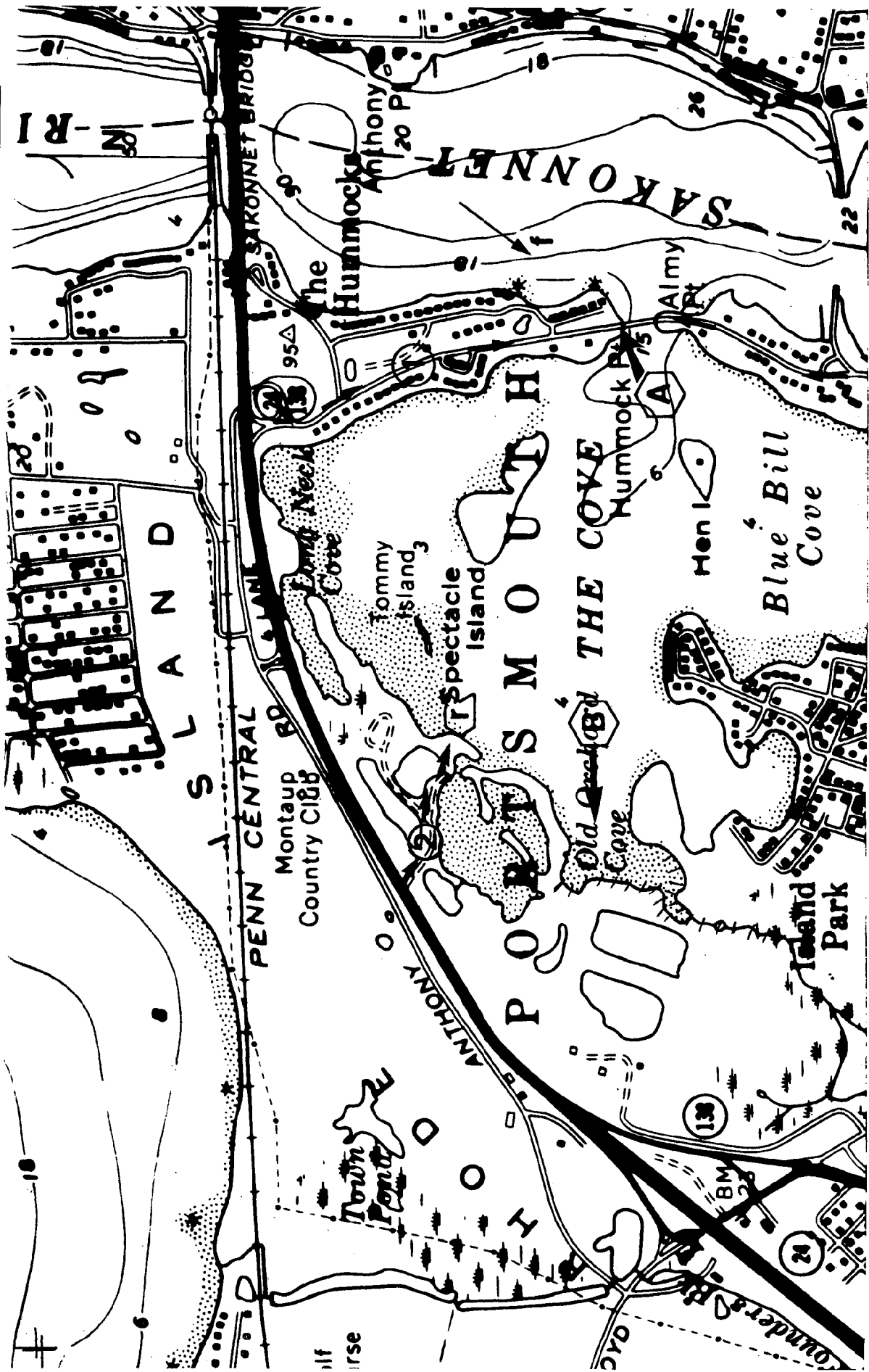
IV. CONTINGENCY PLAN

The relatively wide mouth, fast currents, and shallow water at the mouth of the river will make C/C activities difficult if the area is threatened by oil contamination. Strong SE winds, an incoming tide, and an accident in the shipping channel to Fall River, Mass., or at one of the tank farms in Tiverton would present the severest threat.

C/C personnel could work from access points **A** and **B** reached at the end of the Narrows Road in Bristol **1** or from Circuit Drive in Warren **2** as well as from boats to deploy deflection booms with the objective of diverting the oil to either the eastern or western rocky beach shorelines for cleanup. Trying to contain the oil in the narrows might be ineffective because of the strong currents. Several thousand feet of boom might be required to deflect oil away from the mouth.

If oil infiltrates the river, the sensitive salt marsh areas in Chace Cove and elsewhere along the eastern shoreline should be protected, if possible, by the placement of boom along their peripheries and at the entrances to the tidal creeks. Access can be obtained at the end of Asylum Road **3** and by crossing private lands, but small boat operations might be more effective in this area.

Several boat launching areas are available on the river **r** .



I. IDENTIFICATION

Site name: Blue Bill Cove

Waterbody: upper Sakonnet River near Mount Hope Bay

Municipality: Portsmouth (Police Dept.: 683-2422)

II. CHARACTERISTICS

Size: approximately 400 acres

Ecosystem type: coastal embayment with tidal flats and salt marshes

Water quality: SA

Vulnerability: 250-foot-wide channel under a bridge at Point Road on the cove's east side connects the cove with the upper Sakonnet River

III. SITE-SPECIFIC FACTORS

- Cove frequently exposed to high winds from the northeast.
- Tidal range is approximately 3.8 feet.
- Current can exceed 1 knot in channel.
- Cove supports multiple-use activities, including recreational boating, fishing, and wildlife support.
- Recent history of sand and gravel extraction in the western section of the cove, which also contains extensive salt and brackish wetlands.
- Some shoreline sections are heavily developed: residential on southern shore, and highways on northern and eastern shore.
- Area has been impacted by oil in the past.

IV. CONTINGENCY PLAN

The cove's proximity to the Mount Hope Bay tanker route, the Tiverton oil terminal, numerous marinas, Rtes. 24 and 77, and residential areas place it in a moderate to high oil spill danger zone. Oil has penetrated the cove within the past three years, requiring an organized cleanup activity. Threats exist from sources outside the cove in the Sakonnet River and from a highway or residential spill on the cove's surrounding shoreline.

Although the channel to the cove is wide, containment of oil from an exterior spill may be possible by deploying boom in a wide arc on the cove side of Point Road Bridge from one side of

the channel to the other (A). Approximately 400 to 500 feet of heavy-duty boom would be necessary. Access is best by boat but can, if necessary, be obtained from shore at the Point Road Bridge (1). Secondary, lighter duty booms should also be deployed along the wetlands on the west side of the cove (B). In the case of a shoreline spill from the highways or adjacent housing, the wetland areas should be of primary concern and the first area in which to deploy booming and C/C equipment. Access to the marshes is available from numerous roads in the Island Park vicinity and from a boat launching facility off Rte. 138 (2).

I. IDENTIFICATION

Site name: Nannaquaket Pond

Waterbody: Sakonnet River

Municipality: Tiverton (Police Dept.: 624-3222)

II. CHARACTERISTICS

Size: approximately 250 acres

Ecosystem type: coastal embayment

Water quality: SA

Vulnerability: deep, (5 to 8 feet), swift-running channel approximately 200 feet wide, open to the north and northeast

III. SITE-SPECIFIC FACTORS

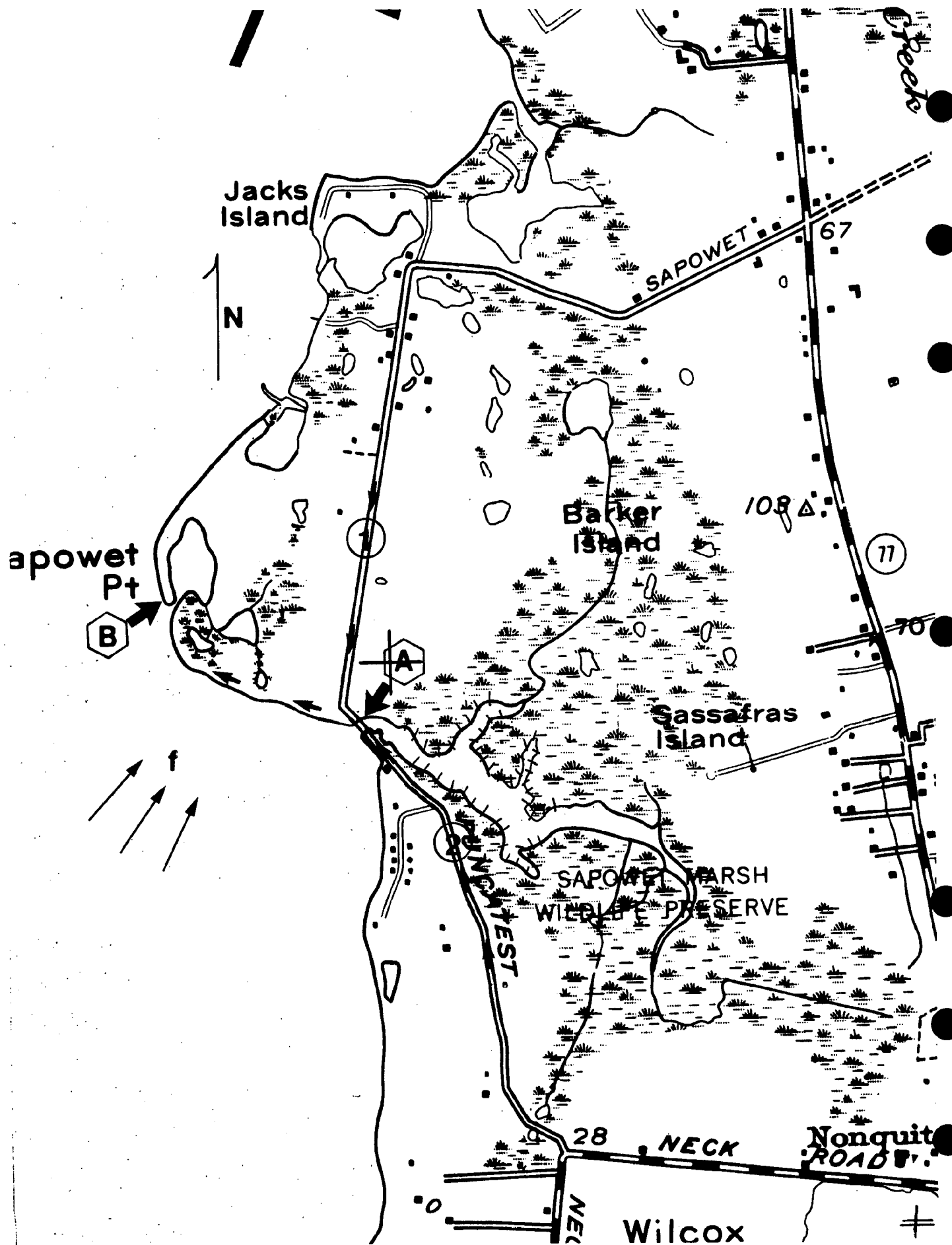
- Limited fetch to NW of approximately 1/2 mile will cause little or no wave problems.
- Current in the connecting channel to Sakonnet River can run at more than 2 knots.
- Mean tidal range is approximately 3.5 feet.
- Channel is steep-sided and/or built up with rock.
- Moderate residential development.
- Geography of area helps protect the pond from a direct threat from the upper reaches of the Sakonnet River beyond the stone bridge.
- Access is possible at the bridge **A** to Nannaquacket Neck and at the northern end of the channel on Rte. 77 **B**.

IV. CONTINGENCY PLAN

Nannaquacket Pond is relatively safe from oil contamination because of the physical orientation of the channel, which opens to the northwest. Oil spilled in the upper reaches of the Sakonnet River would tend to be driven past the channel entrance by northerly winds.

If circumstances developed that posed a threat to the pond, the deployment of deflection boom from the north side of the channel **B** toward the south to keep oil from getting into the channel is recommended.

Access to both points **A** **B** is gained along Rte. 77 **1**. Small boats would probably be required to carry out this procedure. They can be launched at Teddy's Beach Landing on the west side of the Sakonnet River.



I. IDENTIFICATION

Site name: Sapowet salt marshes (two separate areas)

Waterbody: Sakonnet River

Municipality: Tiverton (Police Dept.: 624-3222)

II. CHARACTERISTICS

Size: approximately 200 acres in one area and 20 in the other

Ecosystem type: tidal creek and extensive salt marsh

Water quality: SA

Vulnerability: main salt marsh (A) is connected to Sakonnet River by a channel 4 to 6 feet deep, 20 to 30 feet wide running under a road bridge at the entrance to the marsh. Smaller marsh area (B) at Sapowet Point is connected to Sakonnet River by shallow channel 15 feet wide at low tide and 40 feet wide at high tide.

III. SITE-SPECIFIC FACTORS

- Exposure is to the southwest.
- Currents exceed one knot in both channels at ebb and flood tides.
- Mean tidal range is approximately 3.5 feet.
- Most of the marshes are a designated state management area; small portions are in private ownership.
- Marsh starts right at the entrance to the channel.
- Access to both channels is gained by either access road (1) or (2).

IV. CONTINGENCY PLAN

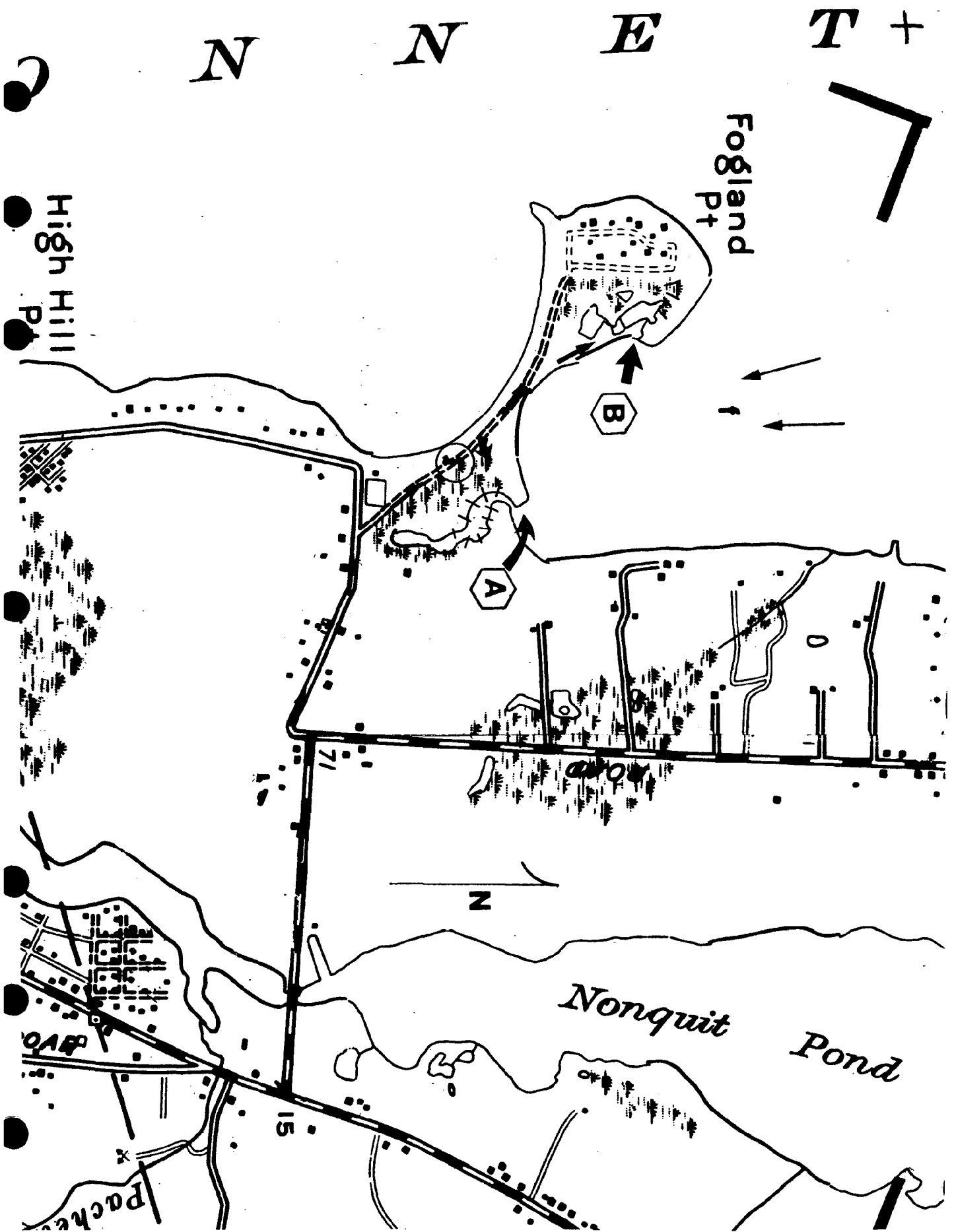
The location of the Sapowet marsh far up the Sakonnet limits the possibility of oil contamination from an offshore spill. However, a major spill driven by strong S winds might pose a threat.

A spill at the Tiverton Oil Storage Farm might also pose a threat from the north, but the orientation of the two channels toward the west minimizes the potential.

If oil contamination threatened the marshes, C/C operations could be staged at the entrances to both areas. For the smaller area to the north , filling of the channel with material from the surrounding beach appears to be most feasible. The deployment of deflection booms outside the channel for the collection of oil on the beach to the south of the channel is also possible.

The creek entrance to the larger area is relatively deep and wide, and the currents are swift. If strong S winds were pushing oil up the Sakonnet, it would be difficult to work outside the mouth of the creek. Just inside the creek entrance at point  on the east side of the road bridge there is a good staging area for C/C operations, where wave energies are lower. Deflection booms could be deployed to channel the oil to the north side of the creek for collection and vacuuming.

While the threat to these areas is small, the size and quality of the salt marsh makes containment of the oil outside or close to the entrances to the creeks imperative.



I. IDENTIFICATION

Site name: Fogland marshes (two sites)

Waterbody: Sakonnet River, east shore

Municipality: Tiverton (Police Dept.: 624-3222)

II. CHARACTERISTICS

Size: each marsh approximately ten acres

Ecosystem type: salt marsh and associated tidal creeks

Water quality: SA

Vulnerability: both tidal creek openings approximately 20 feet wide.

III. SITE-SPECIFIC FACTORS

- Marshes are exposed to N and NW winds, with fetch of several miles, and could entrap oil coming from the upper Sakonnet River or the Tiverton Tank Farm.
- Mean tidal range is approximately 3.5 feet.
- Consists of two small salt marshes adjoining the north side of a small spit leading to Fogland Point.
- Marshes are protected from high wave energies from the south.

IV. CONTINGENCY PLAN

These two small marshes situated along a narrow spit leading to Fogland Point could be particularly vulnerable to an oil spill from the north. Under certain wind and tide conditions, oil would be forced into the small cove formed between the spit and the mainland. Should such a threat develop, the small entrance channels to the marshes (A)(B) should be closed by filling with beach material. Heavy earth-moving equipment would be required.

Access to the area is gained via Fogland Road, which branches to the north from Pond Bridge Road running west off Rte. 77 (1).

ZONE 4

406 Ruecker marsh/Jack's Island

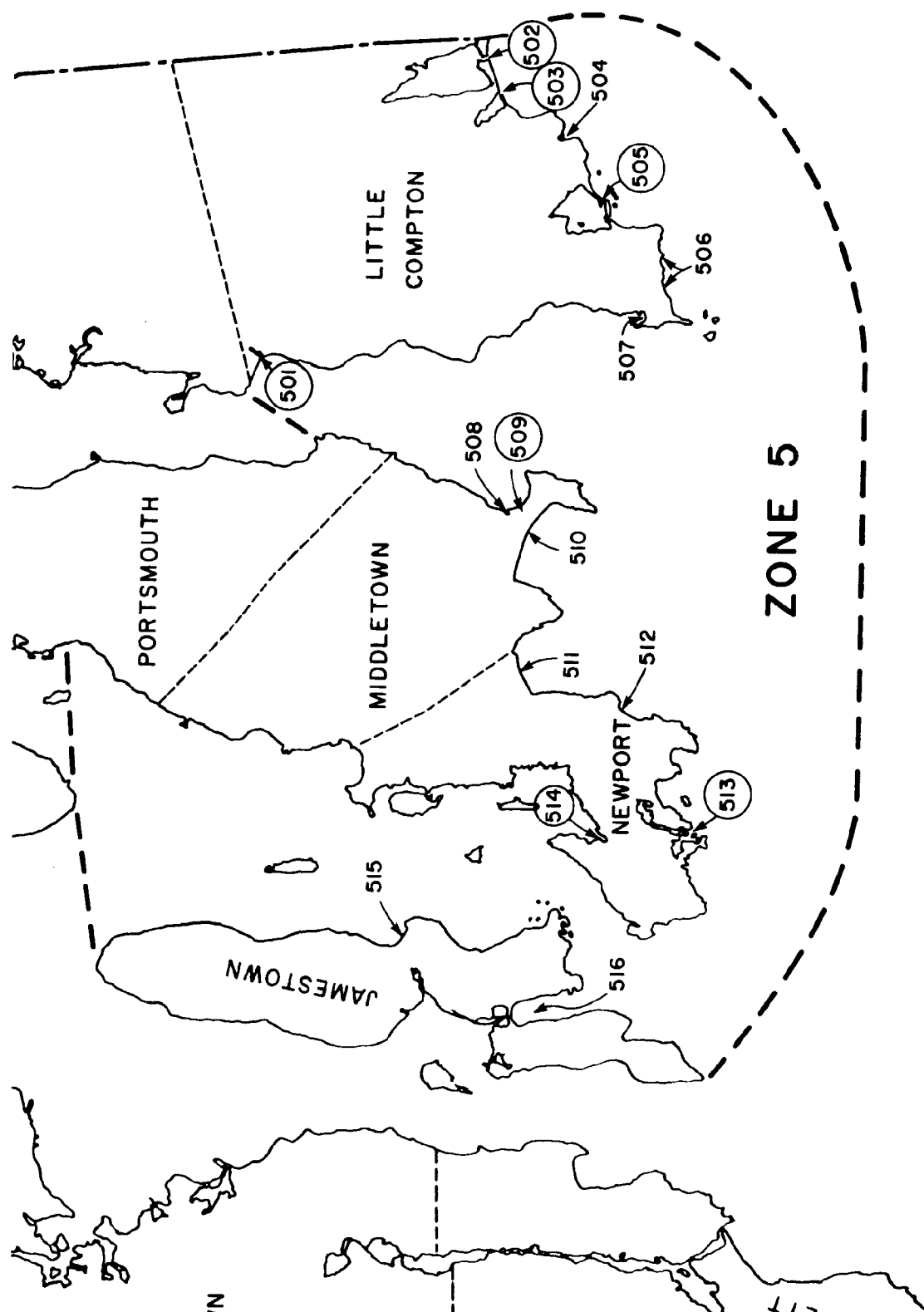
- Small unditched pocket salt marshes on east side of Sakonnet River.

409 McCurry's Point

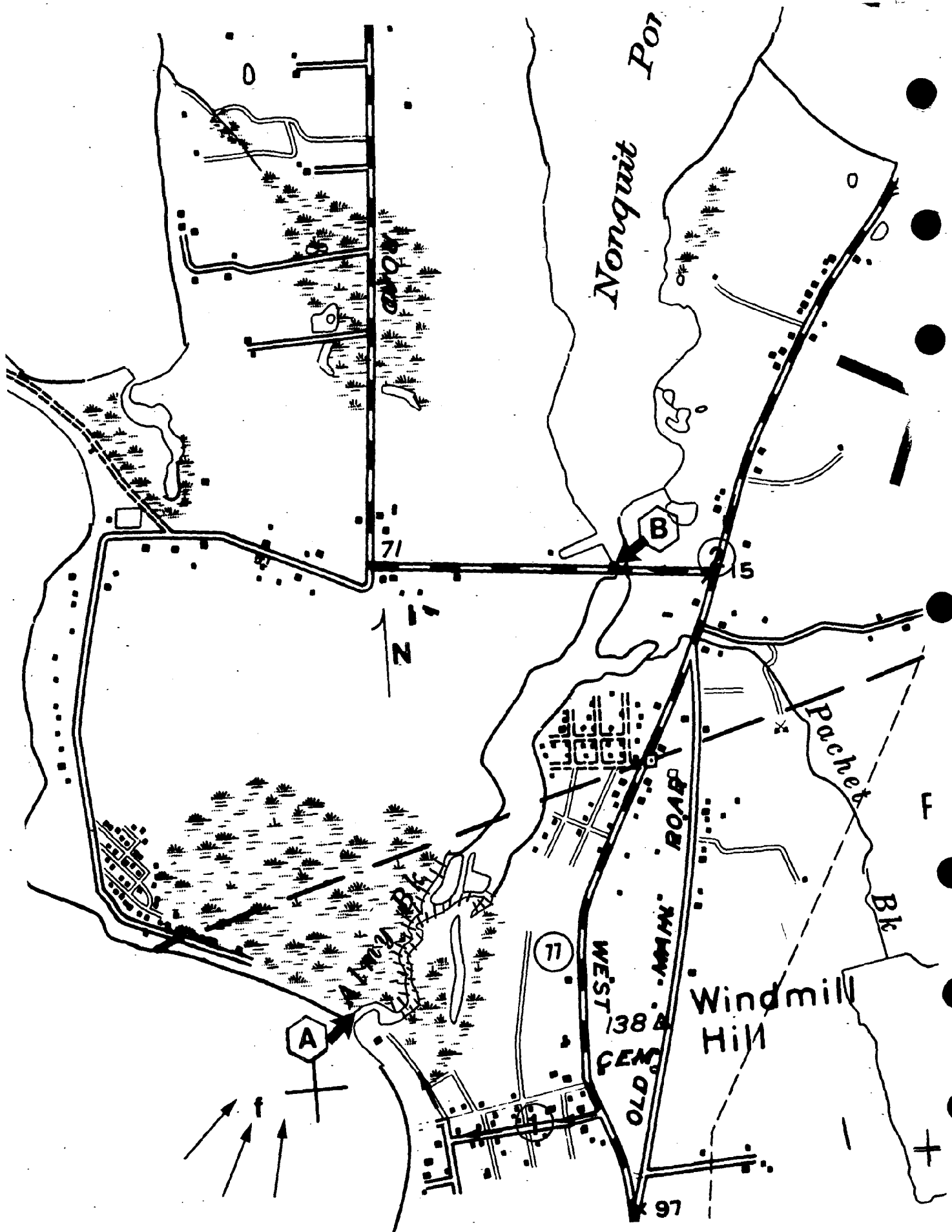
- Small cusped beach on Sakonnet River.

410 Sandy Point Town Beach

- Municipal beach for the Town of Portsmouth.



- (401) BOYD'S MARSH
- (402) COMMON FENCE POINT
- (403) KICKAMUIT RIVER
- (404) BLUE BILL COVE
- (405) NANNAQUAKET POND
- 406 RUECKER MARSH/JACK'S ISLAND
- (407) SEAPOWET MARSH
- (408) FOGLAND MARSHES
- 409 McCURRY'S POINT
- 410 SANDY POINT TOWN BEACH



I. IDENTIFICATION

Site name: High Hill Marsh

Waterbody: Sakonnet River

Municipality: Tiverton/Little Compton (Police Depts: T 624-3222/
LC 635-2311)

II. CHARACTERISTICS

Size: approximately 100 acres

Ecosystem type: salt marsh and extensive tidal creek system

Water quality: SA

Vulnerability: tidal creek channel 20 feet wide, 1 to 2 feet deep
at low tide, and 120 feet wide, 3 to 4 feet deep
at high tide, connects marsh directly to Sakonnet
River

III. SITE-SPECIFIC FACTORS

- South-facing channel exposed to S-SW winds and fetch of 4 miles; waves of 1 to 2 feet can be common.
- Channel currents can exceed 1 knot.
- Marsh tidal range is approximately 3.0 feet.
- Extensive marsh commences immediately inside narrow sand and cobble beach.
- Marsh has high wildlife value.
- Marsh under ownership of State of Rhode Island and the Nature Conservancy.
- Shoreline in moderate residential development and agricultural land.
- Extensive alewife run through area up to Nonquit Pond, which is dammed at Pond Bridge Road.

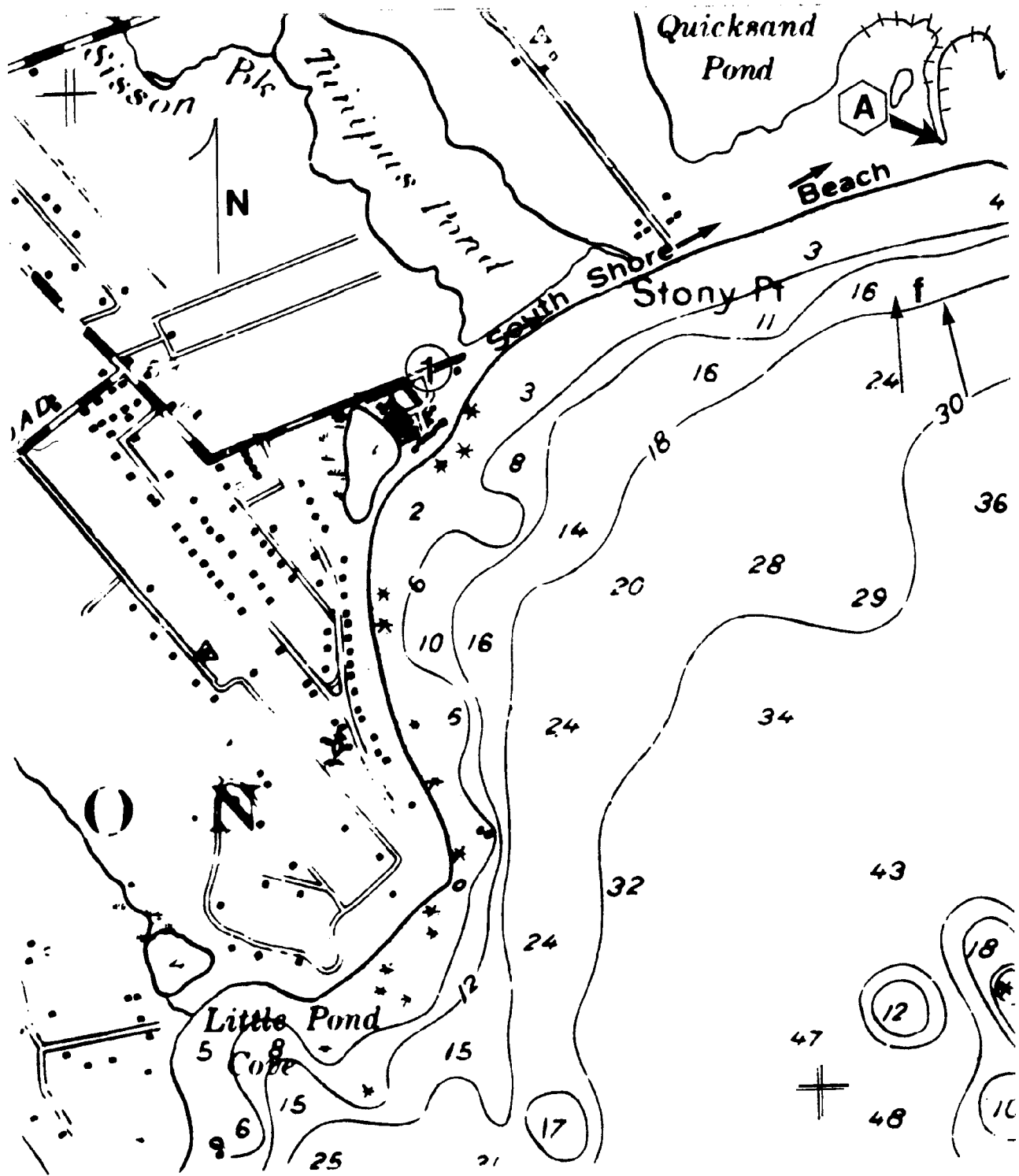
IV. CONTINGENCY PLAN

Due to the lack of oil transport on the Sakonnet River, the threat of oil contamination is lower than in most areas of Narragansett Bay. However, a major spill off the mouth of the Sakonnet could be propelled by incoming tides and S winds, posing a threat to the marsh.

The first option to consider in protecting the marsh would be to use heavy equipment to fill in the channel opening (A) as it passes through the beach. Swift currents and high wave energies may make this difficult, however, and could wash away material as fast as it is put in. An on-scene assessment would have to be made at the time as to the potential effectiveness of this option. Beach material is plentiful directly adjacent to the channel opening.

It may be possible to deflect oil using booms deployed outside the channel entrance in order to direct it to points either north or south of the breachway for cleanup. Access for equipment and personnel is best along a small tarred road west off Rte. 77, just south of the Compton Steak House (1). Near the end of that road, a dirt road branches off to the right and leads directly to the marsh.

A third option for regulating water passage into the marsh might be effective and should be considered. By opening the Nonquit Pond dam (B) and permitting greater water movement to pass downstream, it would provide a head of water which could force water out of the system even under incoming tidal conditions, thus preventing oil infiltration into the marsh. Access to the dam control station is by access route (2).



I. IDENTIFICATION

Site name: Quicksand Pond

Waterbody: Rhode Island Sound, east of Sakonnet Point

Municipality: Little Compton (Police Dept.: 635-2311)

II. CHARACTERISTICS

Size: approximately 375 acres

Ecosystem type: coastal brackish pond/barrier beach/salt marsh/
tidal flats

Water quality: SA

Vulnerability: periodic breaching occurs through barrier beach
connecting the pond with Rhode Island Sound; breach
width can approximate 120 to 150 feet when open

III. SITE-SPECIFIC FACTORS

- Strong southerly winds combining with long offshore fetch can cause overtopping of barrier, forming an active channel up to 150 feet wide.
- Breach is normally closed under most weather conditions.
- Pond shoreline is largely undeveloped; moderate probability of oil contamination from upland sources due to numerous freshwater stream inflows.
- Pond contains a natural oyster population and other shellfish, and is important to migratory waterfowl.
- Salt marsh and tidal flats form the barrier beach's northern shoreline.
- Access to the breach is best obtained from a town beach parking area to the west (1); easterly access crosses the Rhode Island/Massachusetts state line, which borders the east end of the barrier beach.

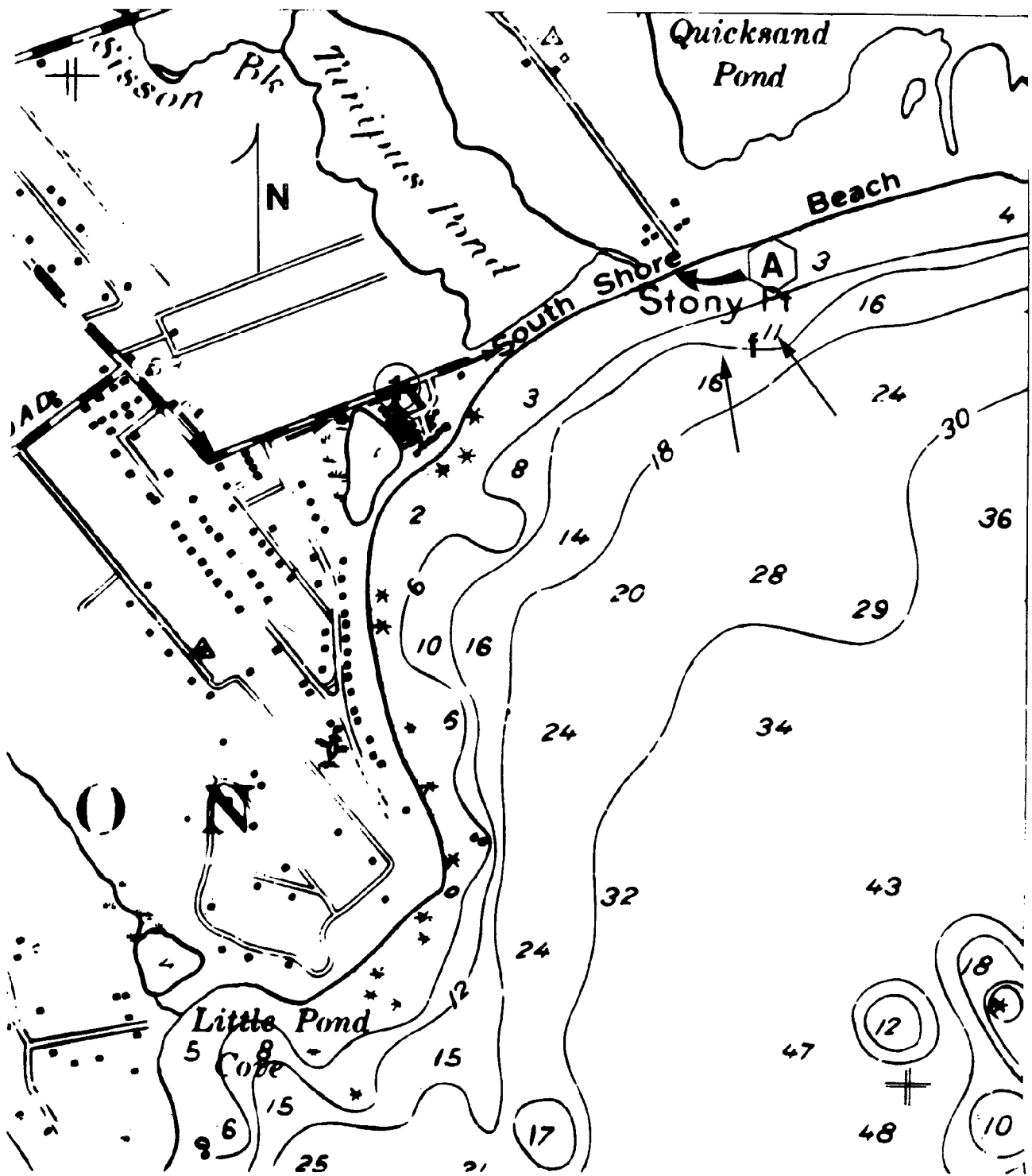
IV. CONTINGENCY PLAN

The breachway connecting the pond to the sound is closed under normal conditions, thus preventing oil infiltration should an offshore spill occur. However, the barrier does breach at point (A) when storm conditions and high tides are combined, and when the pond level rises due to freshwater drainage from upland sources.

In the case of an oil spill in Rhode Island Sound that threatens the shoreline from Sakonnet Point eastward to the Massachusetts line, the breachway should be checked to see if it is open.

The best method of protecting this pond is to fill in the breachway with sand or cobble with the use of earth-moving equipment. Overwash into the pond when it breaches is usually small enough and slow enough so that filling by bulldozer or backhoe would be effective. Equipment should not be moved across vegetated dunes or the back dune area if possible, to avoid weakening the barrier in other areas.

Access for heavy equipment is available at the Little Compton Town Beach (1), located at the west end of Tunipus Pond barrier beach. It is approximately 1/2 mile across a cobble beach from there to the Quicksand Pond breachway.



I. IDENTIFICATION

Site name: Tunipus Pond

Waterbody: Rhode Island Sound, east of Sakonnet Point

Municipality: Little Compton (Police Dept.: 635-2311)

II. CHARACTERISTICS

Size: approximately 50 acres

Ecosystem type: coastal pond and barrier beach

Water quality: SA

Vulnerability: 20-foot-wide breachway that opens infrequently,
allowing tidal exchange between the pond and Rhode
Island Sound

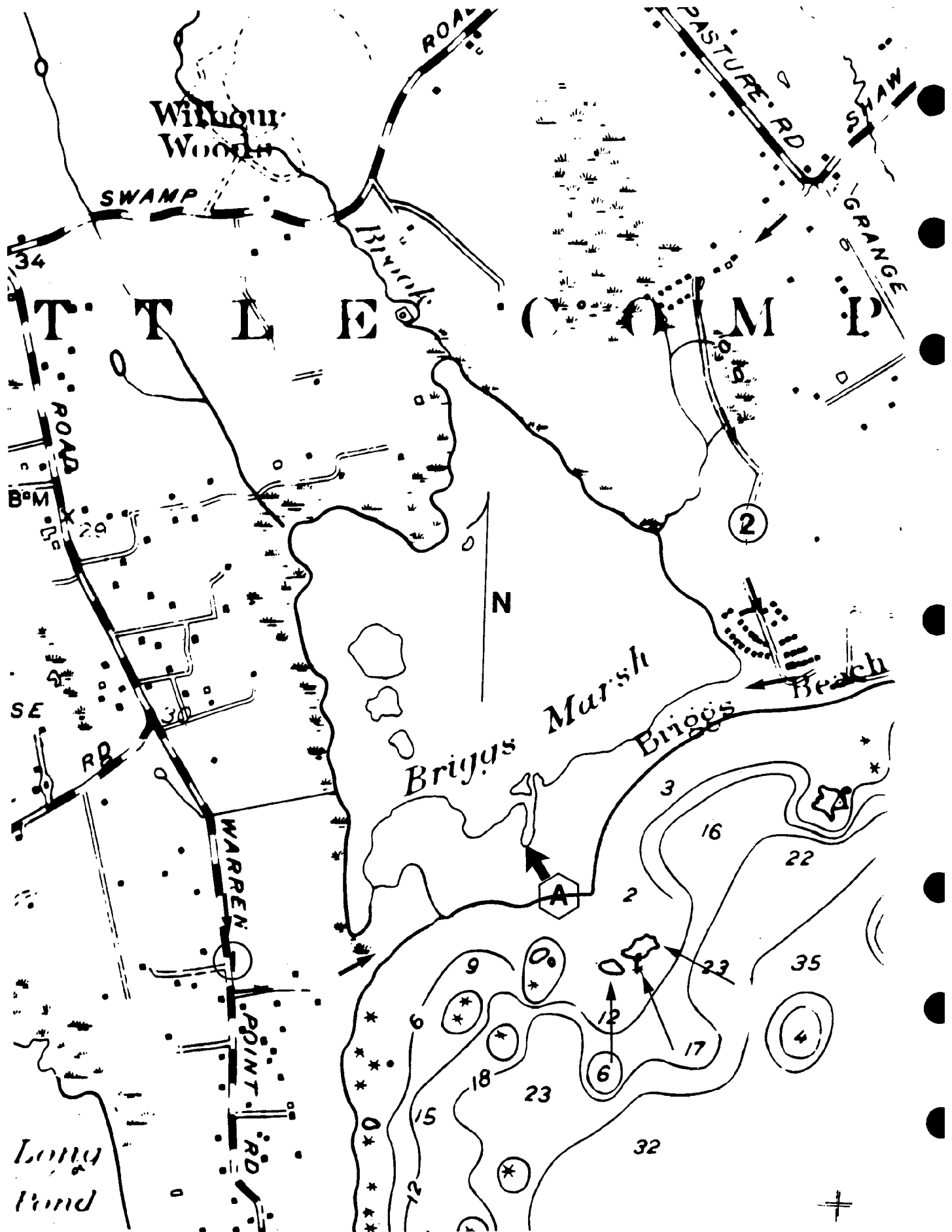
III. SITE-SPECIFIC FACTORS

- Tidal exchange occurs during storms, with SE to S winds, especially at high tides; pond drainage through the breachway can occur when the water in the pond is high.
- Breachway is a long, narrow channel running along the beach/upland border from the pond's southeastern corner.
- Due to infrequent exchange and freshwater inflow from two streams, the pond is largely a freshwater pond.
- Shoreline development around the pond is low.
- Barrier beach is used primarily as the town's bathing beach.
- Pond used moderately by migrating waterfowl.

IV. CONTINGENCY PLAN

In the event of an oil spill in the sound off Little Compton, the breachway to Tunipus Pond should be checked to see if it is open. If it is open or in danger of being opened by high wave energies, thus exposing the pond to oil, it should be filled at its most southern extremity by earth-moving equipment, using sand or cobble material from the beach face . Only small amounts of material would be needed, since the breach is approximately 20 feet wide. After danger has passed, the breachway can then be opened once again.

Ready access is available for equipment by a road which leads to the Little Compton Town Beach at the west end of Tunipus Pond barrier ①. The adjacent Quicksand Pond breachway can best be reached from the same access point.



I. IDENTIFICATION

Site name: Briggs Marsh

Waterbody: Rhode Island Sound, east of Sakonnet Point

Municipality: Little Compton (Police Dept.: 635-2311)

II. CHARACTERISTICS

Size: approximately 200 acres

Ecosystem type: coastal pond/barrier beach, with associated brackish marsh and dune complex

Water quality: SA

Vulnerability: 100 feet wide, intermittently open breachway that exchanges water between the pond and the Sound

III. SITE-SPECIFIC FACTORS

- Exposure to E-SE-S winds and long fetch. Heavy surf conditions (3 to 6 feet) are possible at the breach.
- Breach is closed most of the time, but can open under storm conditions.
- Marsh is a valuable wintering area for waterfowl, and barrier beach is an important nesting area for shorebirds.
- Residential development is of low intensity around the pond.
- Access is obtainable to the breach from both the east and west across private property. The western access point is closer to the breach and preferable.
- The pond has a water depth of approximately 1 foot where marsh is not actually exposed.
- Several bedrock outcrops are located offshore of the breachway.

IV. CONTINGENCY PLAN

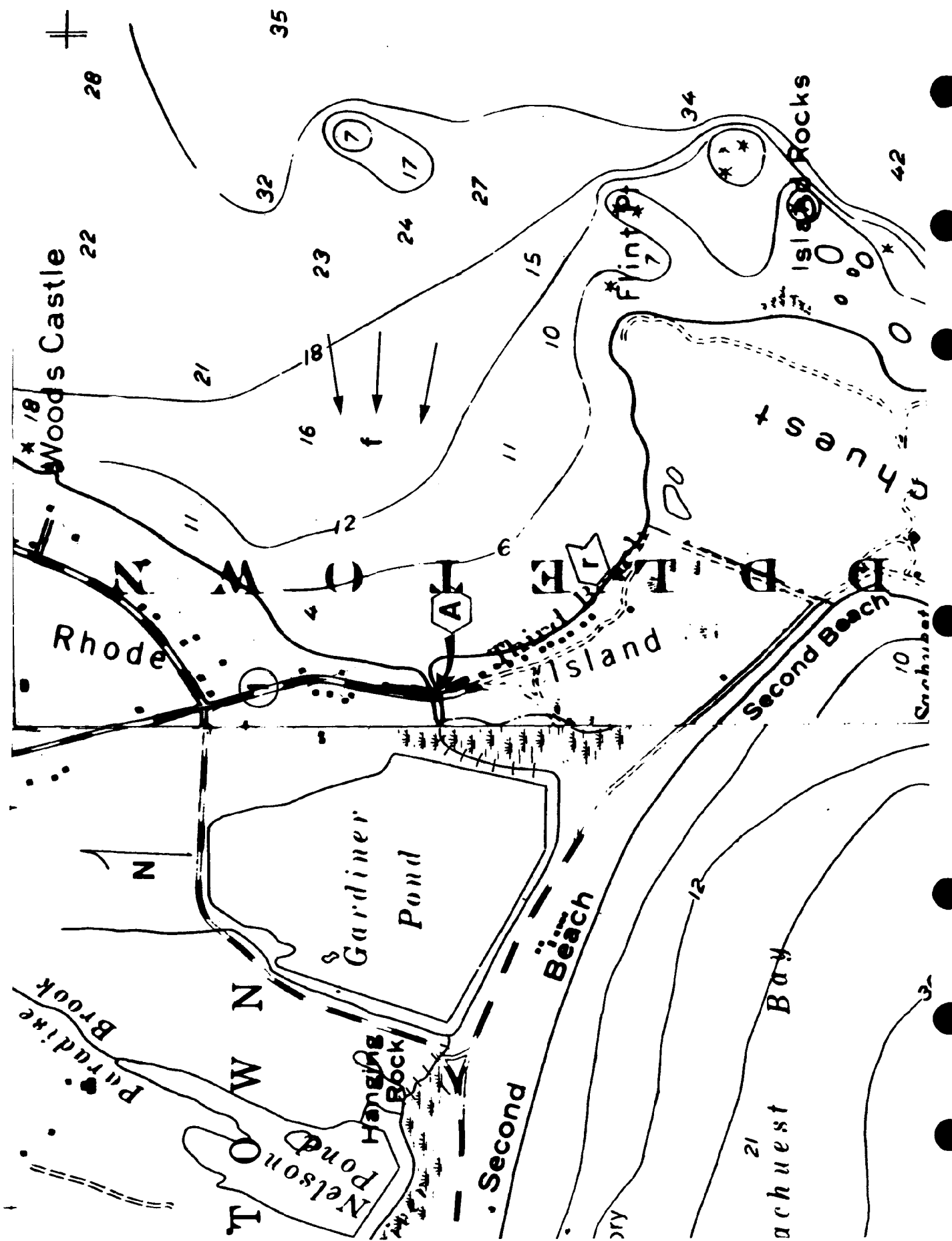
Under most conditions, the breach is closed and no direct threat exists to the pond from oil contamination. However, when high tide and storm conditions are combined, the breach is open and exchange occurs. Breaching can also occur when pond levels become high from freshwater drainage inland.

In the case of an oil spill on Rhode Island Sound that threatens the Rhode Island shore from Sakonnet Point eastward, the breach  should be checked to see if it is open.

The most feasible method of closing the breach to prevent oil intrusion is through the use of earth-moving equipment to build up the sand dike in the breach. Material is available on the beach. All earth materials used to close the breachway should be taken from the unvegetated beach face if at all possible. All vehicles or earth-moving equipment brought onto the barrier beach should avoid disturbing vegetated dunes or the back dune.

Access for heavy equipment is available at (1) with permission of the landowners. Access is possible at (2), but a 3/4-mile transit of the beach is necessary to reach the breachway.

There appears to be little or no threat of a spill from an upland source adjacent to the pond.



I. IDENTIFICATION

Site name: Sachuest Point tidal creek

Waterbody: Sakonnet River, west side

Municipality: Middletown (Police Dept.: 846-1104)

II. CHARACTERISTICS

Size: approximately 20 acres

Ecosystem type: tidal creek/salt marsh

Water quality: SA

Vulnerability: well-defined channel 25 feet wide that cuts through the beach

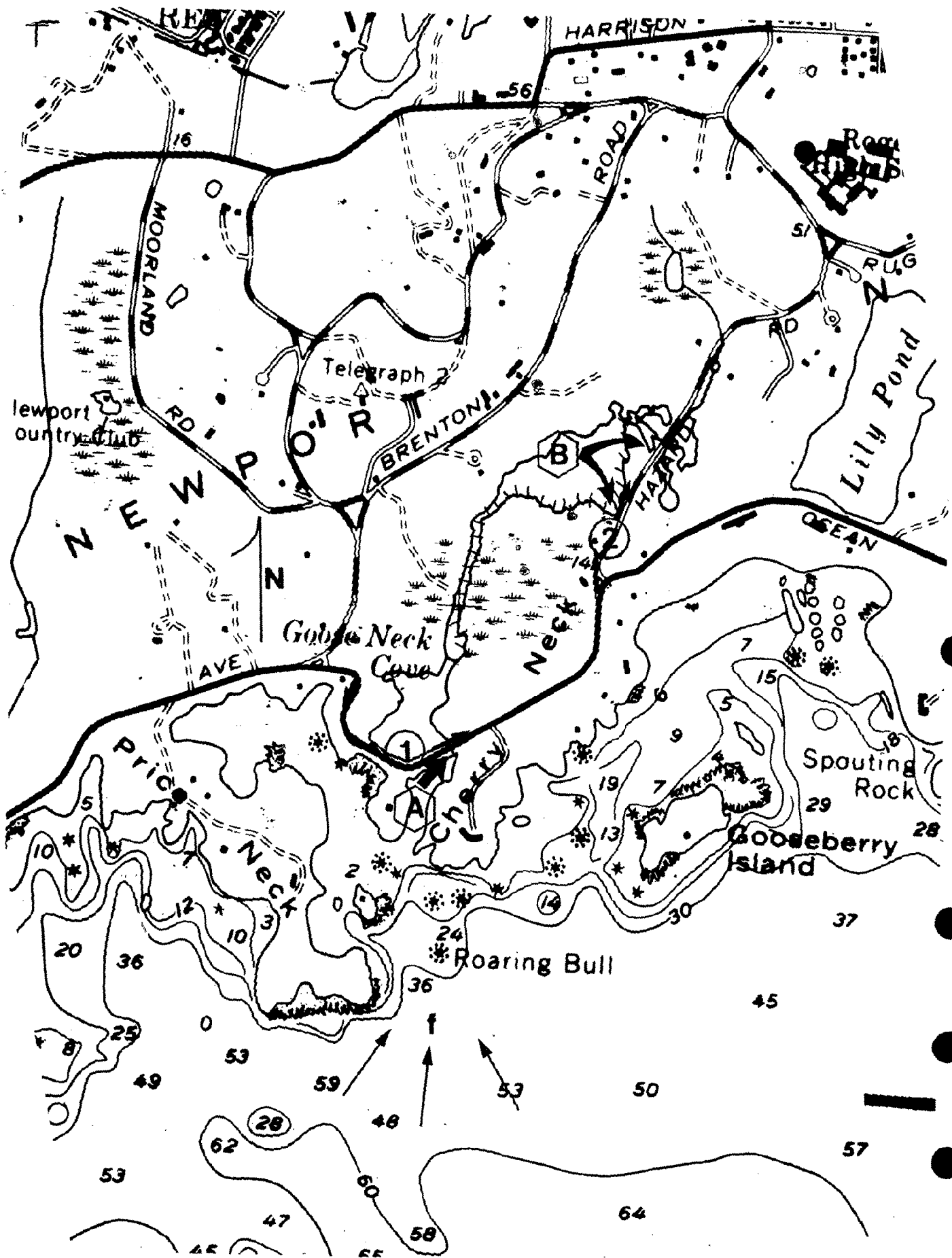
III. SITE-SPECIFIC FACTORS

- Exposure is to the northeast-east-southeast across the Sakonnet River.
- Currents can exceed 1 knot at the inlet.
- Tidal range is approximately 3.0 feet.
- Creek runs for approximately 2 miles to the west.
- Creek and associated marsh are a wildlife refuge.
- No residential development along the creek.
- Access is best at the bridge.

IV. CONTINGENCY PLAN

The Sachuest Point tidal creek is relatively safe from oil infiltration because of its location. However, a large spill off the Sakonnet River driven by S-SE winds and incoming tide might pose a threat.

Filling of the channel with earth materials (sand, rocks) is feasible at $\triangle A$. Access for heavy equipment is possible along $\textcircled{1}$, and there is plenty of materials available on the surrounding beach. If possible, the channel should be filled when the tide has ebbed, minimizing the flooding problem.



I. IDENTIFICATION

Site name: Goose Neck Cove

Waterbody: Rhode Island Sound

Municipality: Newport (Police Dept.: 847-1212)

II. CHARACTERISTICS

Size: approximately 150 acres

Ecosystem type: tidal embayment with bordering salt marsh

Water quality: SA

Vulnerability: tidal flow to inner parts of cove is through two culverts of 4 to 5 feet in diameter under a bridge on Ocean Drive

III. SITE-SPECIFIC FACTORS

- Exposure is to winds out of the SE-S-SW.
- Currents exceed 1 knot through culverts under bridge.
- Tidal range is approximately 3.5 feet.
- Area consists of long, narrow inlet extending 1 mile inland from Rhode Island Sound.
- Shoreline consists largely of bedrock outcrops near entrance and shrubland and woodland in interior sections; extensive wetlands border the open water in the well-protected interior.
- Sparse shoreline development is held mostly in large estates.
- Access is good at Ocean Drive near the cove entrance (A) and at Hazard Avenue near the interior (B).
- Heavy seasonal use by waterfowl near salt and fresh marshes in inner cove.

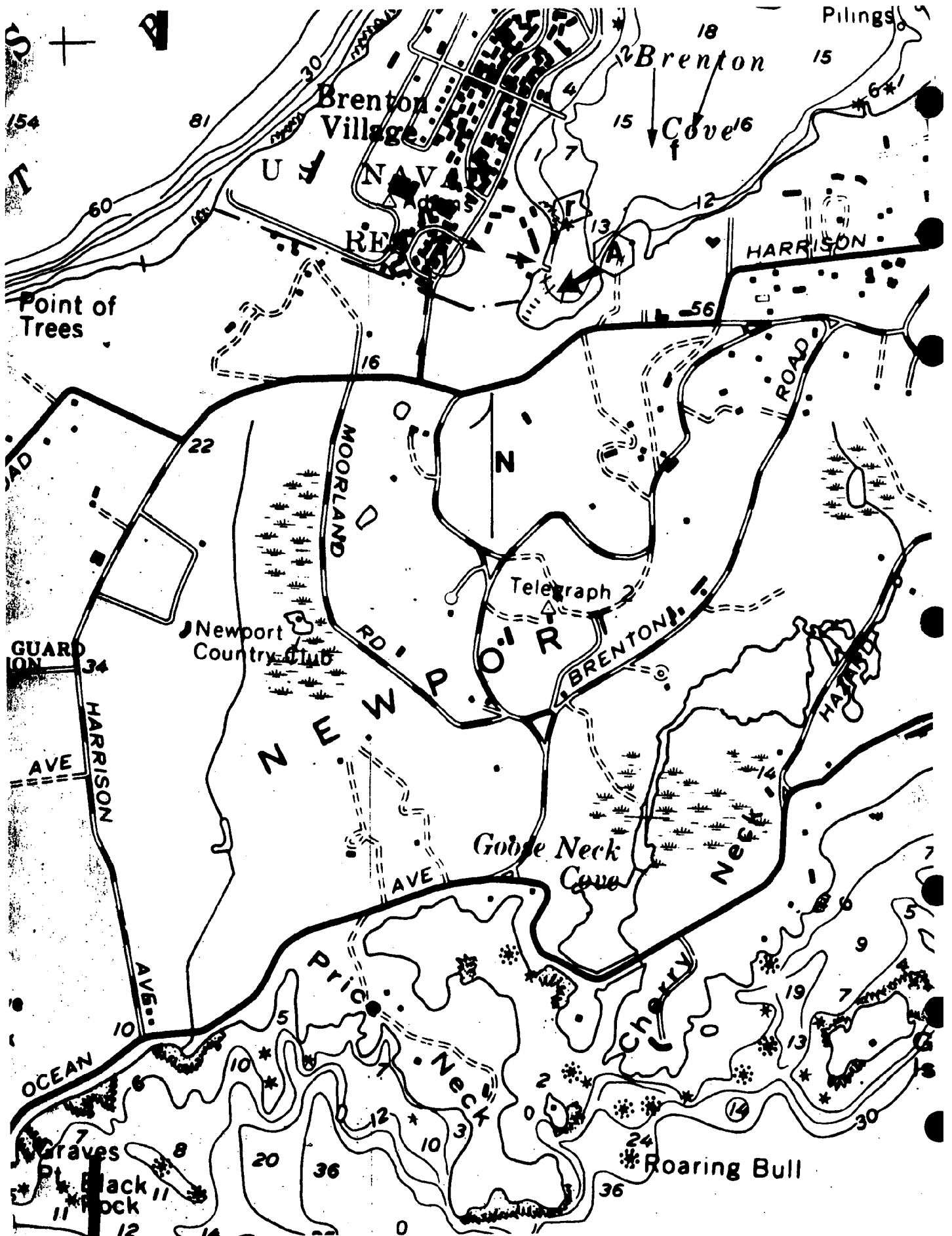
IV. CONTINGENCY PLAN

Goose Neck Cove could be rapidly inundated with oil, particularly the outer sections south of Ocean Drive, should a spill occur close to shore in Rhode Island Sound. On an incoming tide, extensive amounts of oil could penetrate marshlands in the interior north of Ocean Drive.

Due to high wave energies at the mouth and the presence of rocks, containment or any form of cleanup would be extremely difficult at this location. However, immediately inside the mouth the waters are well protected due to the high-ledge outcrop walls along the shore. A series of booms could be used in this calmer water to direct as much oil as possible to the side of the inlet (A) adjacent to Ocean Drive for cleanup. Oil should be kept away from the culverts under the bridge if at all possible. Equipment can be brought directly to the site via Ocean Drive (1).

The culverts under Ocean Drive can be blocked to prevent contamination of the inner cove area. Two sections of thick 5-foot-square plywood or similar material placed over the culvert openings during incoming tides could effectively block the passage of oiled water. Regardless of the size of the spill, the culvert blockage should continue until all danger of contamination is past. Although it is possible to permit some water flow while blocking surface-riding oil using this method, high currents in this area could force oil below the blockade and into the inner cove. Thus, a temporary but total blockade is the safest alternative.

Should oil enter the inner cove, waters are usually calm enough to permit effective booming and containment operation on the north side of the culverts. Special care should be given to protecting the bordering salt and fresh marshlands along the shore. Access to this northern section can be gained at Ocean Drive or at Hazard Avenue (2) at the extreme northern end of the cove (B).



I. IDENTIFICATION

Site name: Brenton Cove marsh

Waterbody: Newport Harbor

Municipality: Newport (Police Dept.: 847-1212)

II. CHARACTERISTICS

Size: approximately 5 acres

Ecosystem type: salt marsh

Water quality: SB

Vulnerability: marsh is open to Newport Harbor by a narrow
3-foot channel through a beach berm at low tide,
which can widen to 20 feet or more at high tide

III. SITE-SPECIFIC FACTORS

- Cove physiography can cause water buildup at or onto marsh through funneling effect. Exposure to N and NE winds compounds this funneling effect.
- Tidal range is approximately 3.5 feet.
- Shoreline consists of steep-sided rocky ledge, making heavy equipment access by land difficult.
- Beach berm is frequently overtopped resulting in sand covering over growing marsh grass, with peat exposure and erosion on seaward side.
- There is extensive boating anchorage to the north of the marsh.

IV. CONTINGENCY PLAN

This marsh is in great danger if an oil spill occurred in Newport Harbor when winds were from the N. The marsh is located at the southern apex of the cove, and oil would be funneled toward the marsh. Prompt containment efforts would be necessary to avoid even moderate contamination. Since it is nearly impossible to get access for heavy equipment to the marsh channel opening, efforts should be made to close the entrance (A) manually with beach sand using shovels or similar equipment.

Access can be gained through the entrance to Fort Adams State Park (1). Containment boom should also be strung across the cove to the north of the beach berm.

ZONE 5

- 504 Ship Pond Cove barrier beach
- A small, low barrier beach protecting a small coastal pond in Little Compton.
- 506 Long and Round Pond barrier beaches
- Sand and cobble barrier beaches with well-developed dunes separating two coastal ponds from Rhode Island Sound.
- 507 Sakonnet salt marsh
- Small salt marsh inside of Sakonnet Harbor fed through a culvert under Sakonnet Point Road.
- 508 Third Beach barrier
- 1/2 mile long barrier beach situated on the lower Sakonnet River. It is part of a tombolo which connects Sachuest Point to Aquidneck Island.
- 510 Second Beach barrier
- Part of the same barrier as Third Beach barrier but on the Ocean side. It helps protect Gardiner Pond and contains the municipal beach for the Town of Middletown.
- 511 Easton's Beach
- Easton's, or First Beach, is a 1 mile long barrier which serves as the City of Newport's recreational beach.
- 512 Cliff Walk
- A 3 mile long stretch of rocky cliffs and outcrops along Newport's eastern shore. It has been designated as a National Recreational trail.
- 515 Potter Cove
- A small protected cove on the eastern shore of Jamestown north of the Newport Bridge. It contains a small municipal swimming beach and helps protect the Round Swamp salt marsh which lies to the west.
- 516 Mackerel Cove
- A lengthy cliff bordered cove on the southern end of Jamestown adjacent to the East Passage. The Mackerel Cove barrier beach, Jamestown's town beach, is located at the cove's northern end.

- 501 HIGH HILL MARSH
- 502 QUICKSAND POND
- 503 TUNIPUS POND
- 504 SHIP POND COVE BARRIER BEACH
- 505 BRIGG'S MARSH
- 506 LONG AND ROUND POND BARRIER BEACHES
- 507 SAKONNET SALT MARSH
- 508 THIRD BEACH BARRIER
- 509 SACHUEST POINT TIDAL CREEK
- 510 SECOND BEACH BARRIER
- 511 EASTON'S BEACH
- 512 CLIFF WALK
- 513 GOOSE NECK COVE
- 514 BRENTON COVE MARSH
- 515 POTTER COVE
- 516 MACKEREL COVE

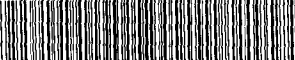
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