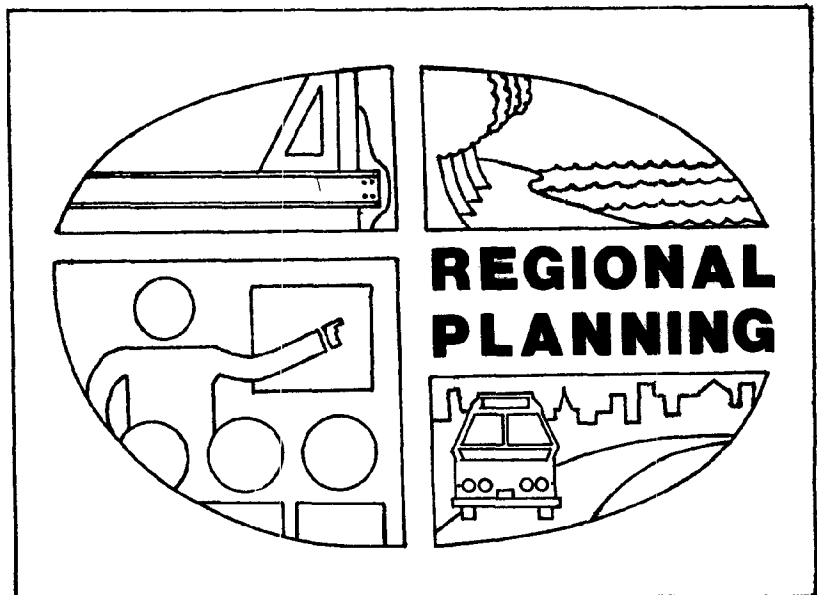
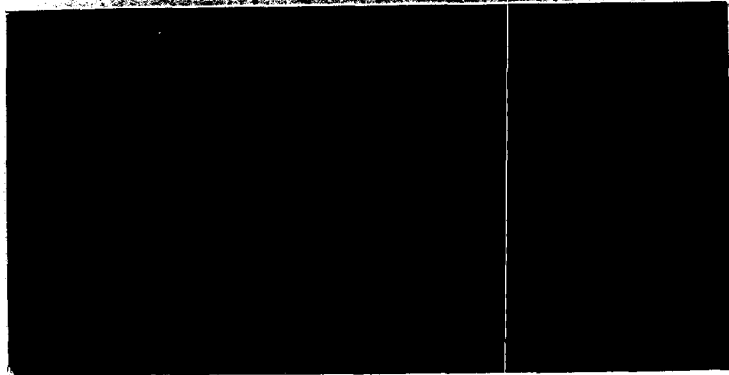


Rockingham
Planning
Commission

121 Water Street, Exeter, N.H. 03833 (603)-778-0885



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ATTACHMENT # 21

**WATER RESOURCE MANAGEMENT
AND PROTECTION PLAN**

North Hampton Master Plan

**Rockingham Planning Commission
June 30, 1989**

The New Hampshire Coastal Program provided a grant for the preparation of this document which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration.

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WATER RESOURCE MANAGEMENT AND PROTECTION PLAN

Introduction

This component of the Town of North Hampton Master Plan addresses the requirements, established by the New Hampshire Office of State Planning under the authority of RSA 4-C:20, I, for the preparation of local water resource management and protection plans.

The purposes of this chapter are to identify and describe surface and groundwater resources: to identify existing and potential threats to these resources; to evaluate the adequacy of water resources to meet the current and future needs of the Town; to evaluate existing local programs which have the potential to impact water resources; and to identify regulatory and nonregulatory programs that could further enhance water resource management and protection efforts.

The protection and wise use of water resources are of critical concern to the Town of North Hampton. With a large majority of the Town dependent on groundwater, from both private wells and the Hampton Water Works Company wells, the quantity and quality of this resource must be protected from depletion and/or contamination. Other Town water resources, such as swamps, ponds, rivers, streams, and wetlands, are important not only because they are often hydrologically related to groundwater, but because they provide ecological, scenic and recreational value to the Town as a whole.

In general, there is a direct relationship between land use and water quality. The right use in the wrong area, or the right use carried out in the wrong way can degrade and contaminate both surface and groundwater, increase flood hazards, destroy water-based wildlife and interfere with scenic and recreational values. It is the responsibility of the Town to take reasonable precautions to protect all water resources from incompatible uses and, in so doing, protect the health and general welfare of the community.

I. DESCRIPTION OF THE SURFACE WATER RESOURCES

Watersheds

The Town of North Hampton contains two regional watersheds - the drainage areas for Great Bay and the New Hampshire Coast. These watersheds were identified on the "New Hampshire Hydrologic Unit Map" (source: U.S. Department of Agriculture, Soil Conservation Service, May 1982). The watershed boundaries shown on Map A - "Regional Watersheds" - were delineated by the Rockingham Planning Commission using 7.5 minute topographic maps (source: Newmarket Quadrangle, NH; and Portsmouth Quadrangle, NH - ME; Kittery Quadrangle, NH - ME; Exeter Quadrangle, NH; Hampton Quadrangle, NH; Newburyport West Quadrangle, MA - NH; and Newburyport East Quadrangle, MA - NH; 7.5 Minute Topographic Maps; U.S. Geological Survey, 1973).

The following paragraphs provide a general description of each regional watershed.

- a. Great Bay watershed: The Great Bay estuarine system, covering approximately 17 sq. mi. is one of the largest estuaries along the east coast of the United States. This system is formed by the conveyance of seven rivers: the Salmon Falls, Cocheco, Bellamy, Oyster, Lamprey, Squamscott, and Winnicut with a total watershed area of 930 sq.mi.

In order to isolate a meaningful drainage area the Great Bay watershed was delineated to cover portions of twelve towns (as shown on Map A-1). The watershed area is approximately 74,930 acres (510 sq. mi.). The land area of the Great Bay watershed contained within North Hampton is about 3,598 acres (5.6 sq.mi.).

- b. Coastal watershed: The receiving water bodies of the Coastal Watershed are the Piscataqua River and the Atlantic Ocean. The Piscataqua River originates in Rollinsford, NH and is fed by the Salmon Falls, Cocheco, and Bellamy Rivers. The Piscataqua River is tidal and flows along the shores of Newington, Portsmouth, and New Castle for about seven miles before emptying into the Atlantic Ocean. New Hampshire's ocean-front shoreline is approximately 18 miles long. The area of the Coastal watershed is about 50,097 acres (78 sq.mi.). The area of the Coastal watershed within North Hampton is about 5,351, acres (8.4 sq.mi.).

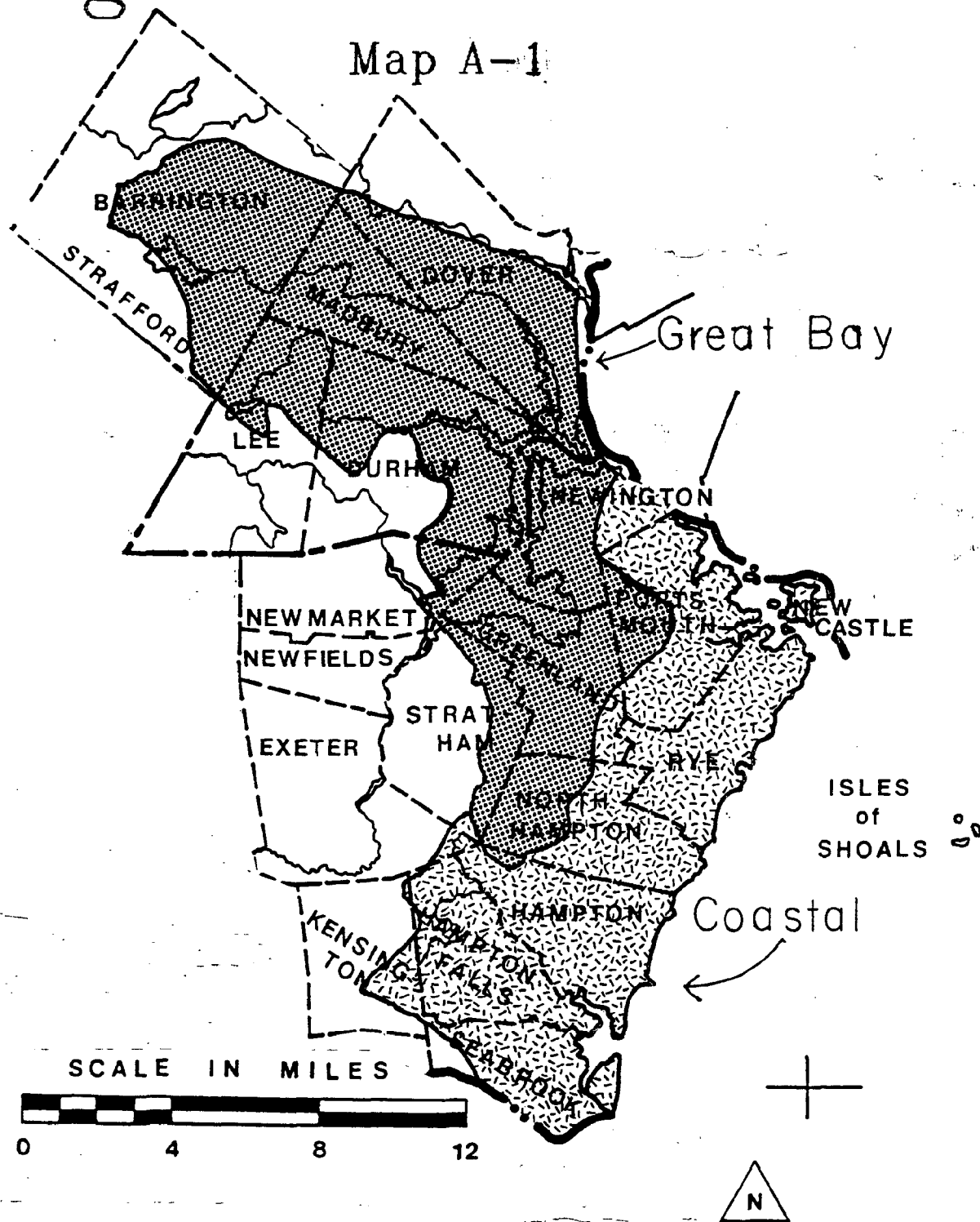
Watersheds Within the Municipal Boundaries

North Hampton's portion of the Great Bay watershed is drained by the Winnicut River. The Coastal watershed was divided into four sub-watersheds within Town: Little River, Philbricks Pond, Berry's Brook, and Bailey Brook. These sub-watersheds are depicted on Map A-2 "Watersheds, Perennial Water Bodies, and Water Service Area."

The characteristics of each sub-watershed is described below. All of North Hampton's water bodies have a legislative classification of "B" (see "Potential Surface Water Supplies" of this section for more detail).

Regional Watersheds

Map A-1



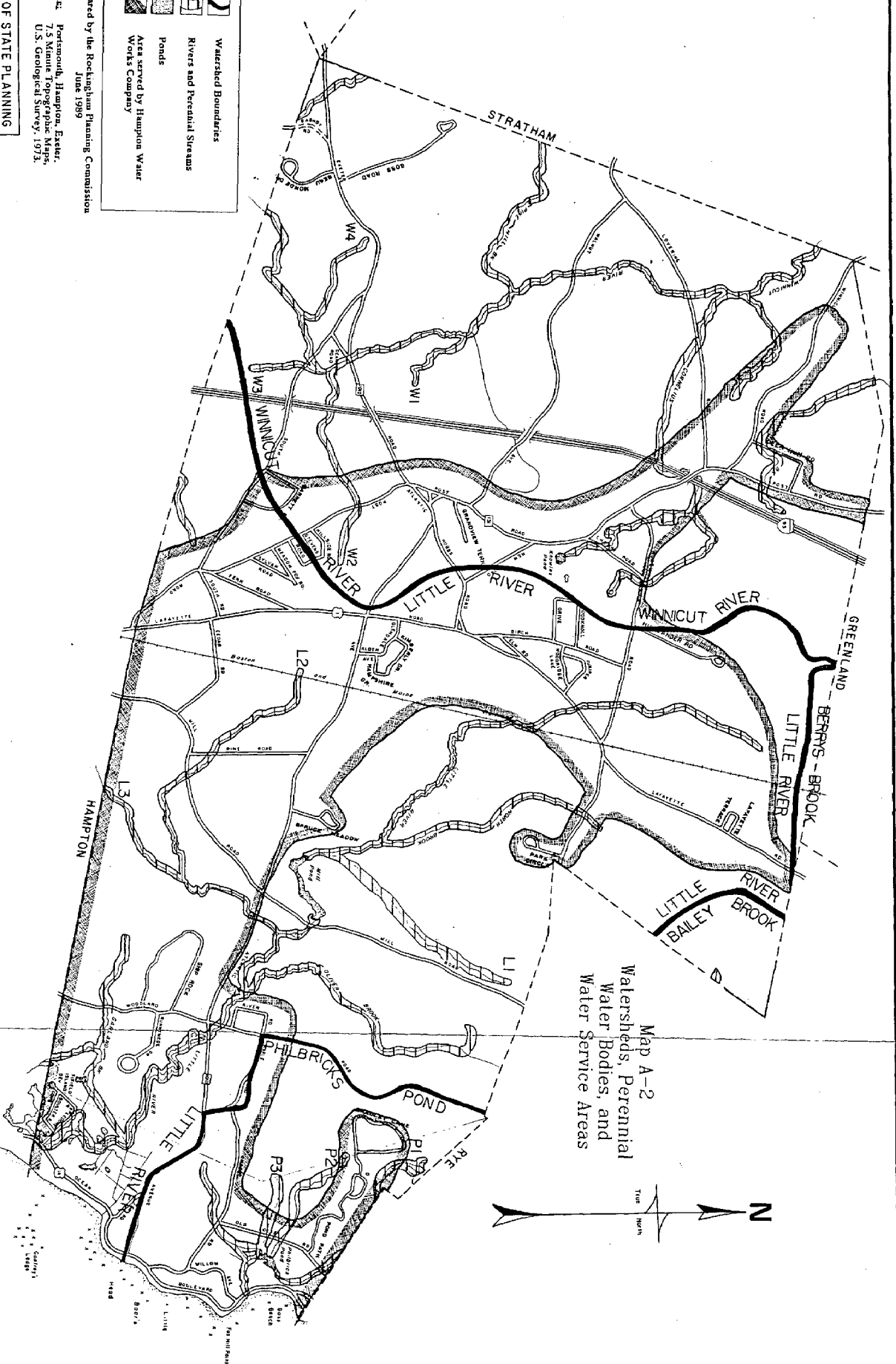
Source: U.S.D.A./S.C.S. Hydrologic Unit Map.

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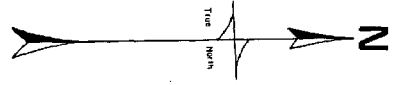
OFFICE OF STATE PLANNING
 DRAWN BY: ANNE S. CULLEN Date: 3/7/79
 CHECKED BY: JAMES W. HARRIS Date: 4/10/79
 SOURCE: State and Economic Development
 ACCEPTED BY: 7/28/79
 1:25,000 Scale
 1:50,000 Scale
 1:100,000 Scale

Prepared by the Rockingham Planning Commission
 June 1969
 Sources: Portsmouth, Hampton, Exeter,
 7.5 Minute Topographic Maps,
 U.S. Geological Survey, 1973.

	Watershed Boundaries
	Rivers and Perennial Streams
	Ponds
	Area served by Hampton Water Works Company



Map A-2
 Watersheds, Perennial
 Water Bodies, and
 Water Service Areas



"The New Hampshire Coastal Program provided a grant for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the National Oceanic and Atmospheric Administration."

- a. Winnicut River: Within North Hampton, the sub-watershed is 3,598 acres (5.6 sq. mi.). The Winnicut River is one of seven major rivers which empty into the Great Bay. The Winnicut River flows for three miles within North Hampton, from south to north, until it enters Greenland. At one point it dips down into Hampton for a short distance then enters Town again. Within Town, the river drops from an elevation of 70 feet to 35 feet above mean sea level (MSL). It is a free-flowing river with no dams or impoundments in North Hampton.

Within the Town of North Hampton, the Winnicut River is fed by seven perennial tributaries, three of which are named: Cornelius Brook Barton Brook, and Pine Hill Brook. The four unnamed tributaries are coded as W-1 through W-4 on Map B and Table 1.

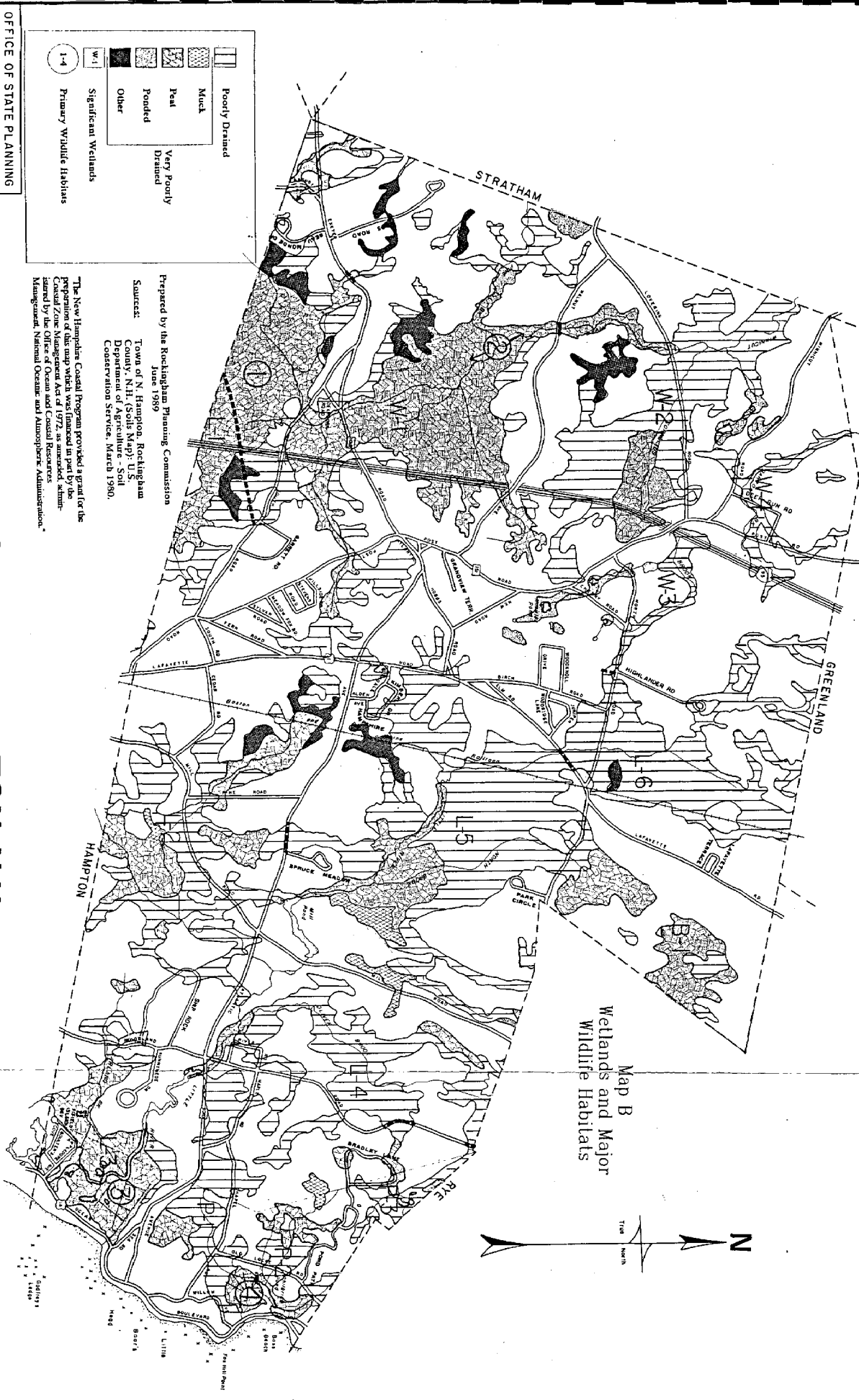
- 1) Cornelius Brook: At its origin near Knowles Pond, Cornelius Brook is 80 feet MSL. The Brook flows for two miles west, and drops to 50 feet MSL at the Winnicut River.
- 2) Barton Brook: At its origin in the northwest part of North Hampton, Barton Brook is 60 feet MSL. The Brook flows for one mile northwest and drops to 25 feet MSL at the Greenland border.
- 3) Pine Hill Brook: At its origin at the Stratham Town line, Pine Hill Brook is 95 feet MSL. The Brook flows for 4500 feet east, and drops to 50 feet MSL at the Winnicut River.

North Hampton's Winnicut River watershed also contains Knowles Pond, a 1.2 acre water body at 80 feet MSL. Knowles Pond is not connected to Cornelius Brook.

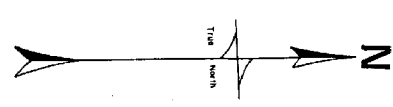
- b. Little River: The Little River sub-watershed is 4,488 acres (7 sq.mi.). Little River flows easterly from its origin in northern North Hampton at 70 feet MSL to the Atlantic Ocean. Along its 4.5 mile course the Little River is dammed near Mill Road at Mill Dam. It is considered a Class "A" dam by the N.H. Water Resources Board meaning it has a "low hazard potential". In the case of failure, it would result in any of the following: no expected loss of life, minimal economic loss to occasional structures or agriculture; and/or damage to minor town roads (source: N.H. Code of Administrative Rules Wr 101.15).

Little River is fed by six perennial streams: North Brook, Oliver Brook, Garland Brook and three unnamed streams (coded as L-1, L-2, and L-3 on Map B and Table 1).

- 1) North Brook: North Brook originates just above North Road at 70 feet MSL, and flows for one mile southerly to Little River at an elevation of 50 feet MSL.
- 2) Oliver Brook: At its origin near the Rye border, Oliver Brook is 50 feet MSL. It flows for 1.8 miles southerly to Little River at an elevation of 15 feet MSL.
- 3) Garland Brook: Garland Brook originates just west of Woodland Road in North Hampton at 15 feet MSL, and flows for one mile easterly to Little River at an elevation of 5 feet MSL.



Map B
Wetlands and Major
Wildlife Habitats



- Poorly Drained
- ▨ Much
- ▩ Peat
- ▧ Very Poorly Drained
- ▦ Other
- Significant Wetlands
- Primary Wildlife Habitats

Prepared by the Rockingham Planning Commission
June 1989

Sources:
Town of N. Hampton, Rockingham
County, N.H. (Soils Map); U.S.
Department of Agriculture - Soil
Conservation Service, March 1980.

The New Hampshire Coastal Program provided a grant for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources, Management, National Oceanic and Atmospheric Administration.

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TOWN OF NORTH HAMPTON, N.H.

Table 1. Unnamed Perennial Streams

<u>Stream</u>	<u>Location</u>	<u>Length (ft)</u>	<u>Elevation (ft)</u>
W-1	West	2000	55 to 45
W-2	Central	5200	70 to 55
W-3	S. West	1200	55 to 50
W-4	S. West	2600	55 to 50
L-1	N. East	6000	70 to 50
L-2	S. East	10200	80 to 30
L-3	S. East	3000	60 to 50
P-1	N. East	2800	40 to 10
P-2	N. East	4400	20 to 10
P-3	N. East	2000	20 to 10

Note: "Length" is the length of the stream within North Hampton. "Elevation" is the stream's elevation above mean sea level, within North Hampton.

North Hampton's Little River watershed also contains one manmade pond - Mill Pond. Located northwest of the intersection of Mill Road and Atlantic Avenue, Mill Pond is approximately 9.3 acres and is at an elevation of 45 feet MSL. As explained earlier, the pond was formed by a dam constructed along the Little River.

- c. Philbrick Pond: The Philbrick Pond sub-watershed is 693 acres (1.1 sq. mi.). Located between Central Road, Route 1A and Chapel Road, it is approximately 4.5 acres and is at an elevation of 10 feet MSL. The pond is fed by Chapel Brook and three unnamed perennial streams (coded as P-1, P-2, and P-3 on Map B and Table 1). Philbrick Pond is connected to the Atlantic Ocean and is affected by tidal action.

1) Chapel Brook: At its origin just north of Atlantic Avenue, Chapel Brook is 15 feet MSL. It flows 3000 feet easterly to Philbrick Pond at an elevation of 10 feet MSL.

- d. Berry's Brook: Within North Hampton the Berry's Brook sub-watershed occupies only 46 acres (0.07 sq.mi.). The land area is located along the Rye Town line between Route 1 and the Boston and Maine Railroad tracks. None of Berry's Brook or any other water body is actually located in North Hampton.

- e. Bailey's Brook: Within North Hampton the Bailey's Brook sub-watershed occupies only 124 acres (0.19 sq.mi.). The land area is located east of Route 1 along the Rye Town line. Bailey's Brook flows easterly at 75 feet MSL for only 200 feet before it enters the Town of Rye. No other water bodies are located within this watershed.

Table 2 - "Total Acreage of Wetlands and Floodplain Areas", presents a breakdown of the acreage of floodplain areas, and poorly drained and very poorly drained soils within North Hampton's five sub-watersheds. The areas for muck and ponded soils, both of which are classified as very poorly drained soils are also inventoried.

Table 2. Acreage of Wetlands and Floodplain Areas

<u>Regional Watersheds</u>	<u>Great Bay</u>		<u>Coastal</u>		
<u>Sub-Watersheds</u>	<u>Winnicut River</u>	<u>Little River</u>	<u>Philbricks Pond</u>	<u>Berrys Brook</u>	<u>Bailey Brook</u>
Poorly Drained Soils	650	1278	172	7	15
Very Poorly Drained Soils	827	624	93	0	48
Muck	0	34	7	0	0
Peat	694	505	82	0	48
Ponded	45	25	4	0	0
Other	88	60	0	0	0
Floodplain	795	393	112	0	0

Map B - "Wetlands", depicts the locations of wetland areas throughout North Hampton. This information was taken from an SCS County Soil Survey Map (source: USDA Soil Conservation Service, May 1980). Wetlands are defined as poorly and very poorly drained soils. Much of these wetlands are contained in North Hampton's 100-year flood zones, which are depicted on Map C - "Flood Hazards and Bedrock Geology." Flood hazard boundaries are those shown on the Town of North Hampton "Flood Insurance Rate Map" (effective date: June 3, 1986), published by the Federal Emergency Management Agency (FEMA). In general, the 100-year flood zone surrounds the major water courses throughout Town. The three largest contiguous flood areas surround the Winnicut River, Little River and Philbrick Pond.

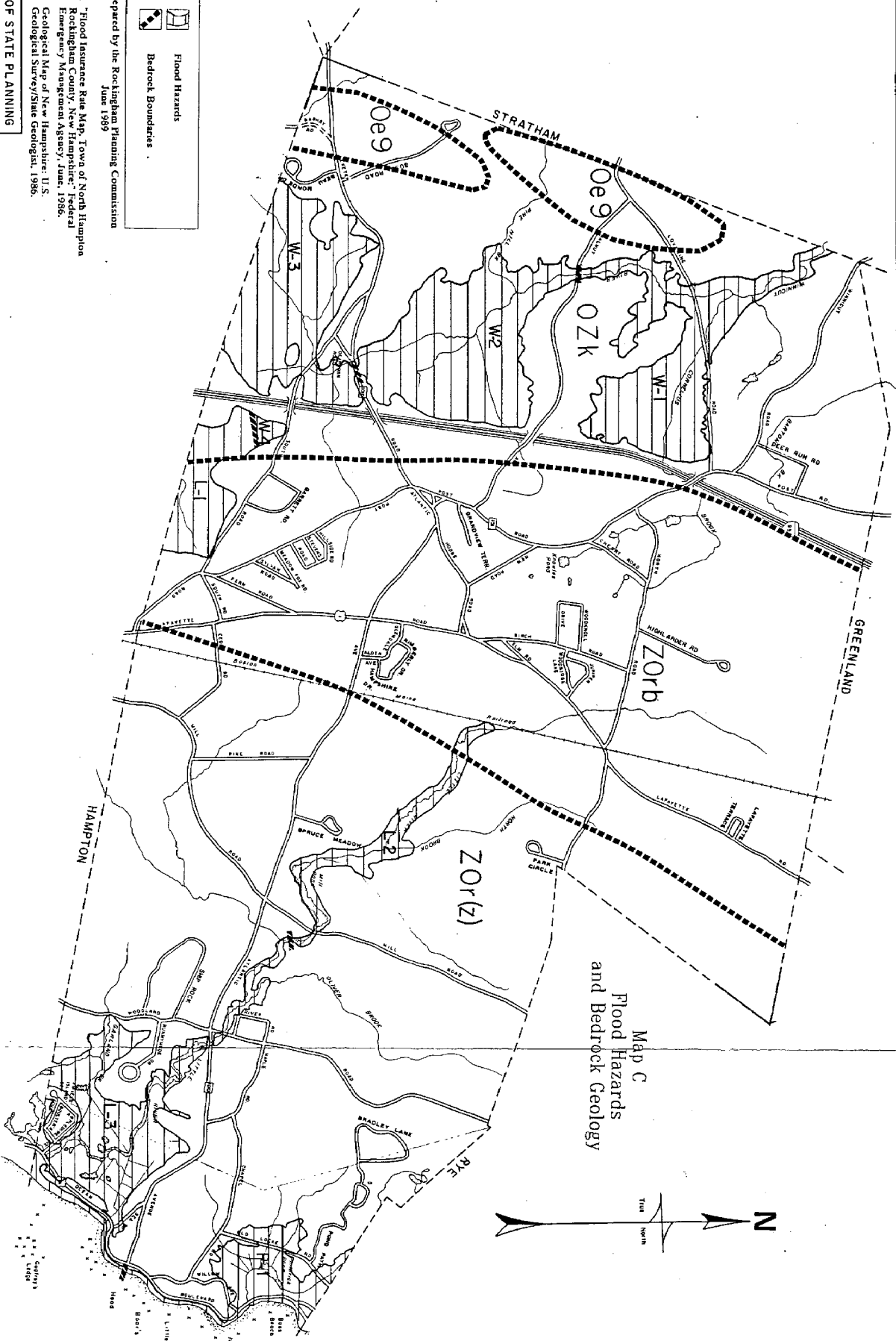
Table 3 - "Areas of Significant Wetlands and Floodplains," presents the approximate acreage of each significant concentration of wetlands within North Hampton's five sub-watersheds. A "significant concentration" of wetland is herein defined as a contiguous and localized area of 20 acres or more. The wetland area codes correspond to those depicted on Map B. In the same fashion, Table 3 lists the approximate acreage of each floodplain area within North Hampton's sub-watersheds, as depicted on Map C.



Table 3. Areas of Significant Wetlands and Floodplains

<u>Wetland Area</u>	<u>Acreage¹</u>	<u>Floodplain Area</u>	<u>Acreage²</u>
W-1	845	W-1	245
W-2	431	W-2	285
W-3	36	W-3	256
W-4	57	W-4	9
L-1	124	L-1	88
L-2	391	L-2	73
L-3	171	L-3	232
L-4	248	P-1	112
L-5	651		
L-6	247		
P-1	116		
P-2	63		
P-3	36		
B-1	62		

¹See Map B
²See Map C

TOWN OF NORTH HAMPTON, N.H.



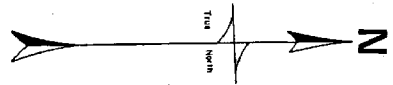
 Flood Hazards
 Bedrock Boundaries

Prepared by the Rockingham Planning Commission
 June 1989
 Sources: "Flood Insurance Rate Map, Town of North Hampton
 Rockingham County, New Hampshire," Federal
 Emergency Management Agency, June, 1986.
 Geological Map of New Hampshire, U.S.
 Geological Survey/State Geologist, 1986.

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Map C
 Flood Hazards
 and Bedrock Geology



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Development should be located away from wetlands and floodplains. The filling of and use of wetlands for building construction not only destroys wetlands and their benefits, but may also lead to groundwater contamination. Building within a flood zone may also reduce the floodplain's capacity to absorb and retain water during periods of excessive precipitation and runoff. Moreover, in regard to building within floodplains, contamination may result from flooding damage to septic systems. Without specific flood-proofing design and construction, development within floodplains poses threats to public health, safety, and welfare.

In accordance with N.H. Code of Administrative Rules (Wr700), the Water Management Bureau (of the Water Resources Division, N.H. Department of Environmental Services (DES)) compiles data on all water users throughout the State which withdraw or discharge more than 20,000 gallons of water per day. According to the Bureau, the Town of North Hampton presently has no major users of surface water.

Potential Surface Water Supplies

The two largest rivers in North Hampton, the Winnicut River and the Little River, have a legislative classification for water quality of "B" which means they would require adequate treatment before being suitable for public consumption. According to the 1988 New Hampshire Water Quality Report to Congress 305 (b), Winnicut River and Little River are in compliance with the water quality standards set by their legislative classification. However, due to their small flows, these rivers are unsuitable as a public drinking water supply within North Hampton. Furthermore, none of the Town's ponds are of sufficient size to be used as a municipal water supply.

At this time, the most economical and practical source for public water in North Hampton continues to be from groundwater, which requires much less treatment. The Hampton Water Works Company, which services North Hampton, obtains its water from eight gravel-packed wells and one bedrock well, four of which are located in North Hampton.

II. DESCRIPTION OF GROUNDWATER RESOURCES

Stratified Drift Aquifers

The U.S. Geological Survey Aquifer Delineation Maps for the Lower Merrimack/Coastal Area, which includes North Hampton, have not been published as of this date. Therefore, other previous studies and sources have to be utilized.

One important source is a study from the U.S.G.S. entitled Availability of Groundwater in the Piscataqua and Other Coastal River Basins, Southeastern New Hampshire, by John E. Cotton, Water-Resource Investigations 77-70. This study identified areas of high, medium or low potential to yield significant quantities of groundwater (see Map D). The reference map provides the following narrative with respect to the delineated aquifers:

TOWN OF NORTH HAMPTON, N.H.

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 ACCEPTED BY TOWN: 04/11/89

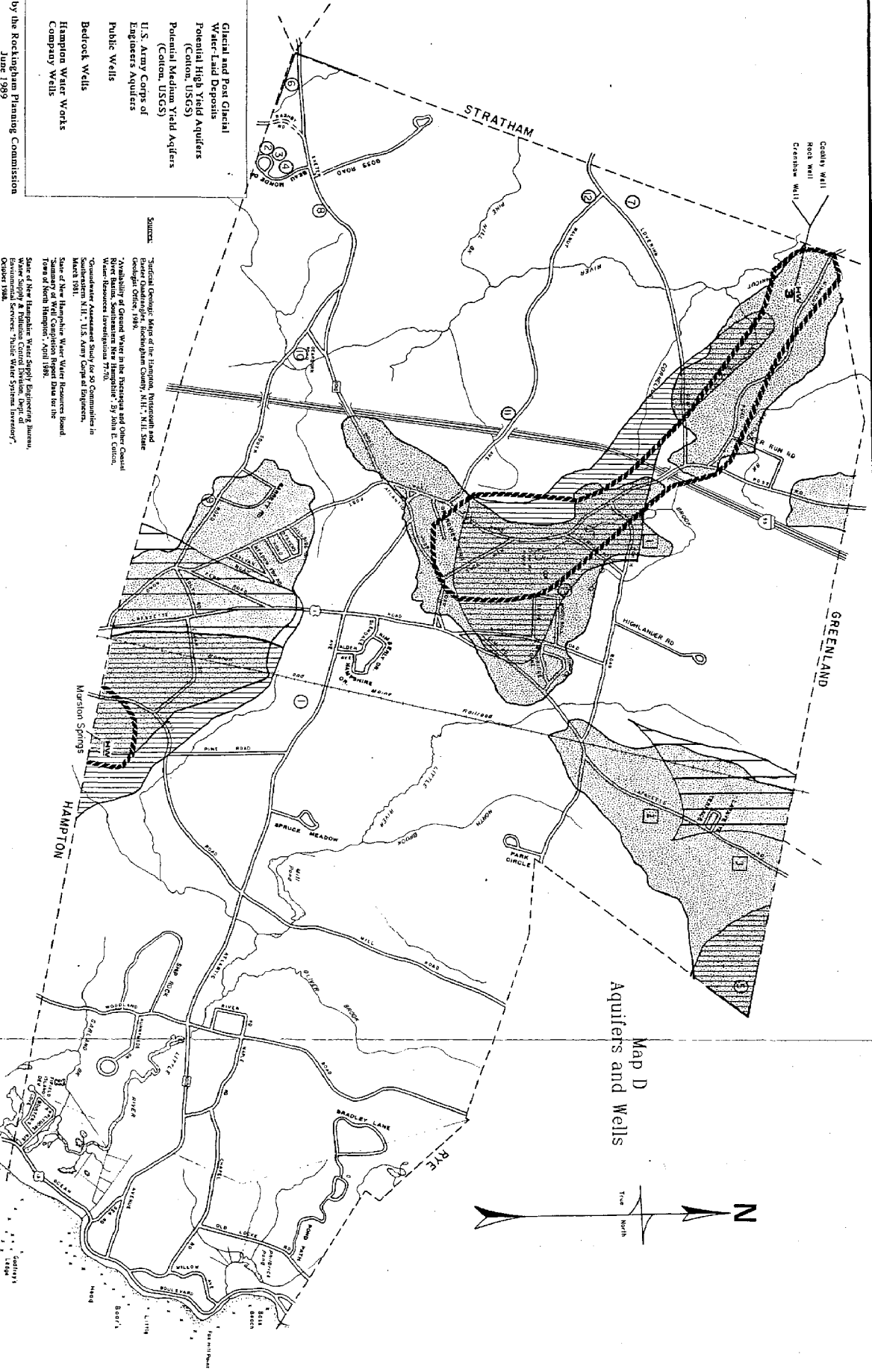
Prepared by the Rockingham Planning Commission
 June, 1989

	Glacial and Post Glacial Water-Land Deposits
	Potential High Yield Aquifers (Cotton, USGS)
	Potential Medium Yield Aquifers (Cotton, USGS)
	U.S. Army Corps of Engineers Aquifers
	Public Wells
	Bedrock Wells
	Hampton Water Works Company Wells

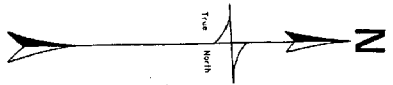
Sources:

- "Statistical Geologic Map of the Hampton, Portsmouth and Dover Quadrangle, Rockingham County, N.H.", K.H. Sizer
- "Availability of Ground Water in the Hampton and Dover Coastal River Basins, Southern New Hampshire", by John E. Cotton, Water-Resource Investigation 77-70
- "Groundwater Assessment Study for 50 Communities in Southern New Hampshire", U.S. Army Corps of Engineers, Water-Resource Investigation 77-70
- "Study of the Hampton Water-Water Resources Board Summary of Well Completion Report Data for the Town of North Hampton", April 1981
- "State of New Hampshire Water Supply Engineering Bureau, Water Supply & Pollution Control Division, Dept. of Environmental Services, "Water System Inventory", October 1988

The New Hampshire Coastal Program provided support for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration.



Map D
 Aquifers and Wells



Potential High Yield Aquifers - "Areas inferred to be underlain by medium to very coarse sand or sand and gravel with sufficient saturated thickness to have high potential to yield water. Included are areas with fine-grained surficial deposits, which are inferred to be underlain by medium to very coarse sand or sand and gravel. Wells located by systematic ground-water exploration within these areas should yield sufficient quantities to meet or augment municipal and industrial requirements. Deposits are thinner and wells would be less productive along the margins of these areas. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer."

Potential Medium Yield Aquifers - "Areas inferred to be underlain by relatively thin saturated sections of medium to very coarse sand or sand and gravel that have medium potential to yield water. Shallow wells and infiltration galleries located by systematic groundwater exploration within these areas may yield sufficient quantities of water for small municipal and rural water districts and commercial and light industrial use. Deposits are thinner and wells would be less productive along the margins of these areas, except where they border areas of high potential. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer."

Potential Low Yield Aquifers - "Areas inferred to be underlain by fine and very fine sand, silt, and clay that have low potential to yield water. These deposits may yield sufficient water to wells for domestic and light commercial use. In places, thin lenses of coarse sand and gravel with higher potential yield may occur within or underlie these deposits, but these lenses may or may not have adequate storage or recharge to provide large sustained well yields. Pumping wells adjacent to streams, lakes, or tidewater may induce surface water to infiltrate the aquifer."

Map D identifies three high yield aquifer areas, and two medium yield aquifer areas. Due to the unlikelihood of yielding water supplies adequate enough for municipal use, the low yield aquifers were not included on Map D. A large part of North Hampton is shown to have potential to yield significant groundwater supplies.

Another source of groundwater information is the U.S. Army Corps of Engineer's report entitled, Groundwater Assessment Study for 50 Communities in Southeastern New Hampshire. This report identified two aquifers, one wholly within town and a smaller one on the Hampton town line (see Map D). The larger aquifer, which stretches from the New Road/Knowles Pond area to the point where the Stratham, Greenland and North Hampton town lines meet, is 397 acres in size. This aquifer, which is recharged by the Winnicut River and precipitation was estimated by the study to have a safe sustained yield of 0.47 MGD (million gallons day). Located within the Winnicut River watershed, this aquifer is the location of three Hampton Water Works Company wells, which are estimated by the company to have an estimated safe yield of 1.42 MGD.

The smaller aquifer, which extends into Hampton, is 224 acres in total, with only 46 acres in North Hampton. Marston Springs Well, owned by the Hampton Water Works Company is located within the North Hampton portion of the aquifer. Precipitation is the source of recharge for this aquifer.

The latest and most reliable source of information concerning stratified drift aquifers is from the N.H. State Geologist's Office which is in the process of finalizing surficial geology maps for the Exeter, Portsmouth and Hampton quadrangles. Identified as "glacial and postglacial water-laid deposits" these stratified drift aquifers are identified according to their general location in North Hampton. (Hereinafter, these aquifers will be referred to as the "northwest" aquifer, "northcentral" aquifer, "northeast" aquifer, "central" aquifer and "southern" aquifer.) Until the U.S.G.S. Aquifer Delineation Maps are published in 1990, these surficial geology maps provide the most accurate delineation of North Hampton's stratified drift aquifers. In areas where the U.S.G.S. aquifer maps are finished, they have matched the findings from the surficial geology maps very closely.

According to the State Water Management Bureau, North Hampton has no major users of groundwater. However, the Hampton Water Works Company's records indicate that each of their four wells in Town withdraw more than 20,000 gallons a day. Each of the wells are located with the stratified drift aquifers. Three wells are located in the "northwest" aquifer and one is in the "southern" aquifer. As of 1988 the four wells combined to pump a maximum of 1.64 MGD.

According to the Water Resources Division of the N.H. Department of Environmental Services (DES), 27 wells were reported as being completed between January 1984 and February 1988. The well log data is presented in the "Summary of Well Completion Report Data for the Town of North Hampton, dated April 18, 1989, and is contained herein as Appendix I.

Map D depicts the locations of 13 of these wells which were mapped by the Water Well Board of the N.H. DES (denoted by circles). Of these, three are located within a stratified drift aquifer as identified by the N.H. State Geologist. All of the wells are bedrock wells with depths ranging from 120 to 180 feet. Two of the wells had discharges of 50 gallons per minute while the third had 20 gallons per minute.

Map D shows three other well locations, all of which are classified as public water systems by the Water Supply and Engineering Bureau of the DES Water Supply and Pollution Control Division (denoted by squares). These water systems are labelled A, B, and C and are indexed by name in Appendix II, "Public Water Systems Inventory". The Hampton Water Works Company reports that water service is available to the King Motel, but it is not utilized.

Bedrock and Till Aquifers

The State Geologist map (previously cited), which depicts North Hampton's surficial geology, contains information regarding the location and extent of till (and marine sediment) formations. In general, till material has poorly sorted grain sizes, which results in limited porosity, transmissivity and hydraulic conductivity. Given these qualities, till formations would not be suitable for municipal water supply wells. Hence, these areas have not been delineated in this plan.

The bedrock geology of North Hampton was determined using the "Interim Geologic Map of New Hampshire", U.S. Geological Survey/State Geologist (1986), prepared at a scale of one inch equals approximately four miles. As previously stated, Map D depicts the bedrock wells which were mapped by the Water Well Board. In addition, the fault lines of different formations are shown on Map C, "Flood Hazards and Bedrock Geology".

North Hampton has four general types of bedrock geology:

1. Rye Gneiss (metamorphic)
 - a) ZOr (z) - light colored to gray schists, and gneisses, quartzites, and amphibolites;
 - b) ZOrb - Breakfast Hill member, quartz-feldspar granitic gneiss and blastomylonitic migmatite;
2. Kittery Formation (metamorphic)
 - a) OZK - well bedded and grade-bedded purple and green phyllite and tan calcareous siltstone;
3. Ordovician Plutons (igneous)
 - a) Oe9 - proxene and pyroxene - hornblende diorite and gabbro, with minor granodiorite and granite;
4. Devonian Rocks of the Plutonic Suite (plutonic)
 - a) Dlm - two mica granite of northern and southeastern N.H.

Appendix I includes a list of well log data for North Hampton. Map D depicts the locations of the 10 wells that are located outside the stratified drift aquifers previously identified. Each of these 10 wells are drilled in bedrock at depths ranging from 80 to 425 feet. Discharges from these wells ranged from 3 to 40 gallons per minute.

Radon

Radon contamination in water from bedrock wells has recently become a concern throughout the U.S. Radon is a colorless, odorless, cancer-causing gas produced as uranium (typically occurring in trace amounts) decays. This gas escapes from water once it is brought up from the ground. For example, when a shower is used in a home with radon-containing water, radioactive gas diffuses into the air.

Several years ago New England was surveyed for its susceptibility to radon using remote sensing techniques. A map was produced from this project entitled: "Generalized Bedrock Geologic Map of New England with Emphasis on Uranium Endowment and Radon Production," W.J. Olszewski, Jr. UNH, 1986. Around this time the U.S.G.S. drafted a map (unpublished, but available for inspection at the State Geologist Office) showing the uranium concentration in rocks throughout New England. In April 1989, the State Geologist devised a "radon susceptibility rating" system for the bedrock types in the region, based on the probability of radon occurrence. This rating system ranged from "Very Low" to "Very High". The bedrock types listed above and shown on Map C have been rated as follows:

ZOr(z) = High

ZOrb = Medium

OZK = Medium

Oe9 = Very Low

Dim = Very High

Potential Groundwater Supplies

Groundwater is a very valuable resource for the Town of North Hampton. For decades, it has been the source of water for individual wells and the Hampton Water Works Company. Groundwater has the potential to provide the Town with drinking water for many generations to come. However, as North Hampton has learned from experience, the resource is vulnerable to contamination or depletion if not properly managed and protected.

Groundwater quality can be impaired by a variety of materials. Sources of groundwater contaminants include landfills, commercial and industrial wastes, agricultural fertilizers, human sewage, road salting, etc. Groundwater quantity is reduced by contamination of available groundwater supplies, over-pumping in the aquifer zone, and increasing impervious surfaces such as roof tops and parking lots, thereby preventing recharge of the aquifer. These threats to groundwater are discussed further herein (see Section III).

Each of the four Hampton Water Works Company wells in North Hampton and three public water systems are located within the Town's aquifer areas. The "northwest aquifer" contains three of the Hampton Water Works Company wells; the "northeast aquifer" contains two public water systems; the "central aquifer" contains one public water system; and the "southern aquifer" contains one of the Hampton Water Works Company wells. Otherwise, the groundwater within the aquifer areas is primarily used for private homes and some businesses.

North Hampton's "northeast" aquifer also contains several potential pollution threats directly within its boundaries. These include: the Coakley Landfill; a State of New Hampshire covered salt pile just over the Rye Town line; and two concentrations of subsurface sewage disposal (from the North Hampton Mobile Home Park and Granite Post Green Mobile Home Pa).

North Hampton's "central" aquifer also contains several potential pollution threats near its periphery. These include pesticide application on the Sagamore Hampton Golf Club on the northern edge of the aquifer; the concentration of subsurface sewage disposal (from the Shel-Al Mobile Estate); and several active gravel pits.

Aside from several gravel pits, the remaining aquifers have no potential threats located within their boundaries. A full description of these threats is presented within Section III, entitled "Identification of Potential Threats to Water Resources", and on Map E "Existing Potential Pollutant Sources", contained herein.

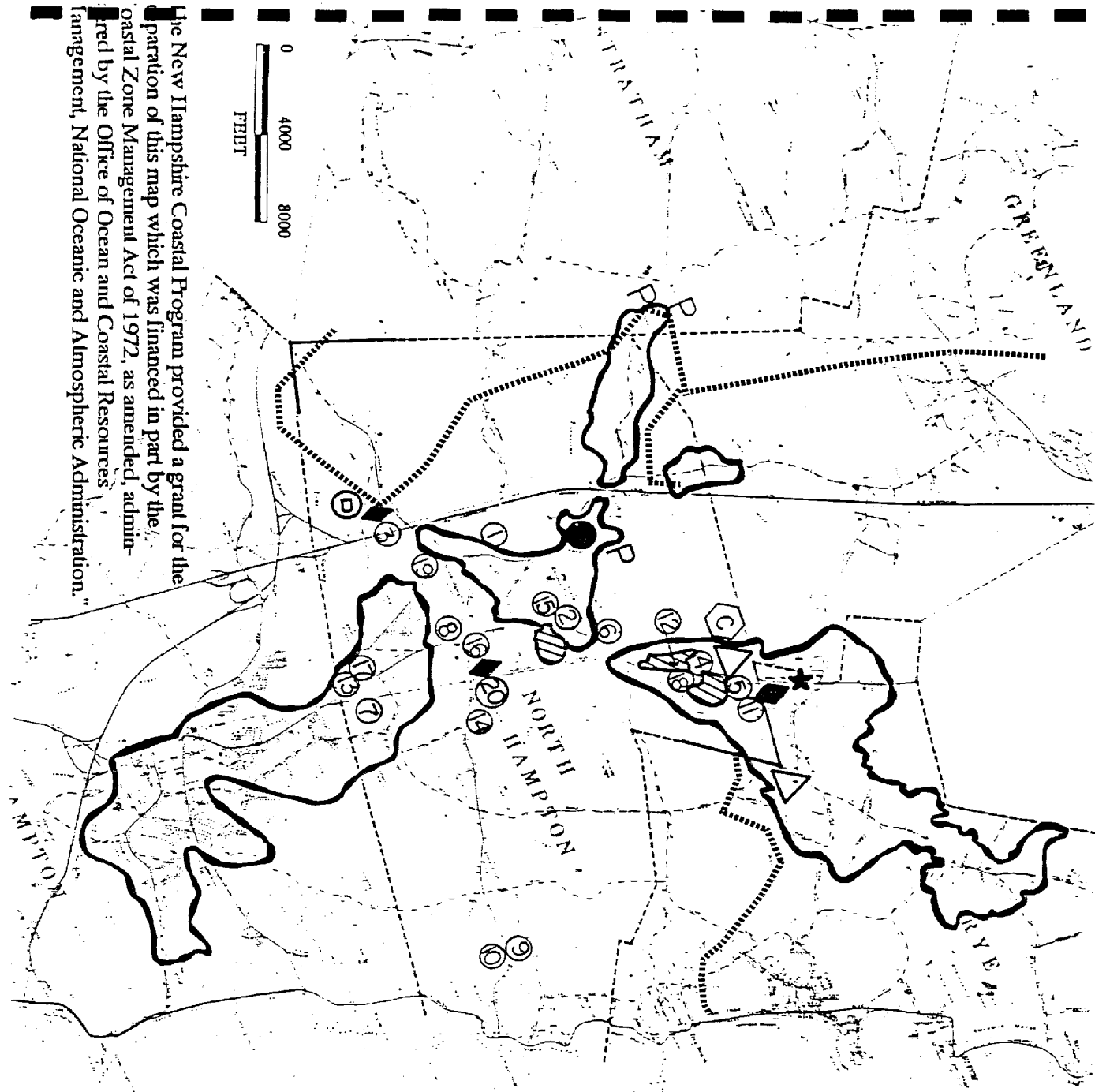
Map F "Generalized Zoning" shows that North Hampton's Industrial Business Zone overlays most of the "northeast" aquifer, about half of the "southern" aquifer and a portion of the "central" aquifer. Given the extent of vacant land within these aquifer areas, and the rapid development along Lafayette Road which runs through three of the aquifers, there is high potential for further commercial, industrial, and residential development. Map G "Generalized Future Land Uses" indicates that no expansion of the Industrial Business Zone into known aquifers is planned. Low density residential is the preferred use of the aquifer areas not already covered by commercial or industrial uses. The Town should continue to closely scrutinize and monitor development in these areas in order to prevent potential groundwater contamination or depletion.

As the Hampton Water Works Company continues to expand its water system, it seems likely that additional wells would be located within the "northwest" "northcentral" or "central" aquifers. The company is presently drilling test wells in the "northwest" and "central" aquifers exploring for viable well sites. Contamination plumes from the Coakley Landfill site may reduce the feasibility of using the "central" aquifer because large withdrawals may speed up the plume's migration toward this area.

The USGS expects to publish information regarding North Hampton's aquifer sometime during 1990. This report will quantify important pumping factors, such as water table elevation, saturated thickness, transmissivity, direction of groundwater flow, and water quality. This data will assist in determining which aquifers are best suited for additional water supplies. Also the U.S. Environmental Protection Agency is expected to complete its study of the Coakley Landfill and recommend remedial actions to be taken. This information will have a definite impact on the potential use of the aquifer.

North Hampton's most practical source for additional water supplies is from its aquifers because of their accessibility and, in certain cases, their relative purity. It is therefore necessary for the Town to protect its aquifers by enforcing measures which will promote groundwater recharge and reduce the risk of contamination. This course of action will help to safeguard an excellent source of drinking water for the future residents of North Hampton.

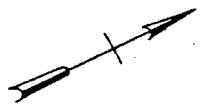
Map E Existing Potential Pollutant Sources



●	Brush Dump
⊙	Abandoned Dump
⊠	Closed Landfills
△	Active Dump
★	Covered Salt Piles
◆	Subsurface Disposal Concentrations
▨	Pesticides Permits
P	River
~	Aquifer
○	Underground Tank Sites
⊕	Cockley Landfill
⊖	Hazardous Waste Site





Prepared by the Rockingham Planning Commission
June 1989

Sources: Waste Site Inventory; Waste Management Div. N.H. Department of Environmental Services, November 1986.
Inventory of Groundwater and Surface Water Potential Nonpoint Pollution Sources; N.H. Dept. of Environmental Services, February 1982.

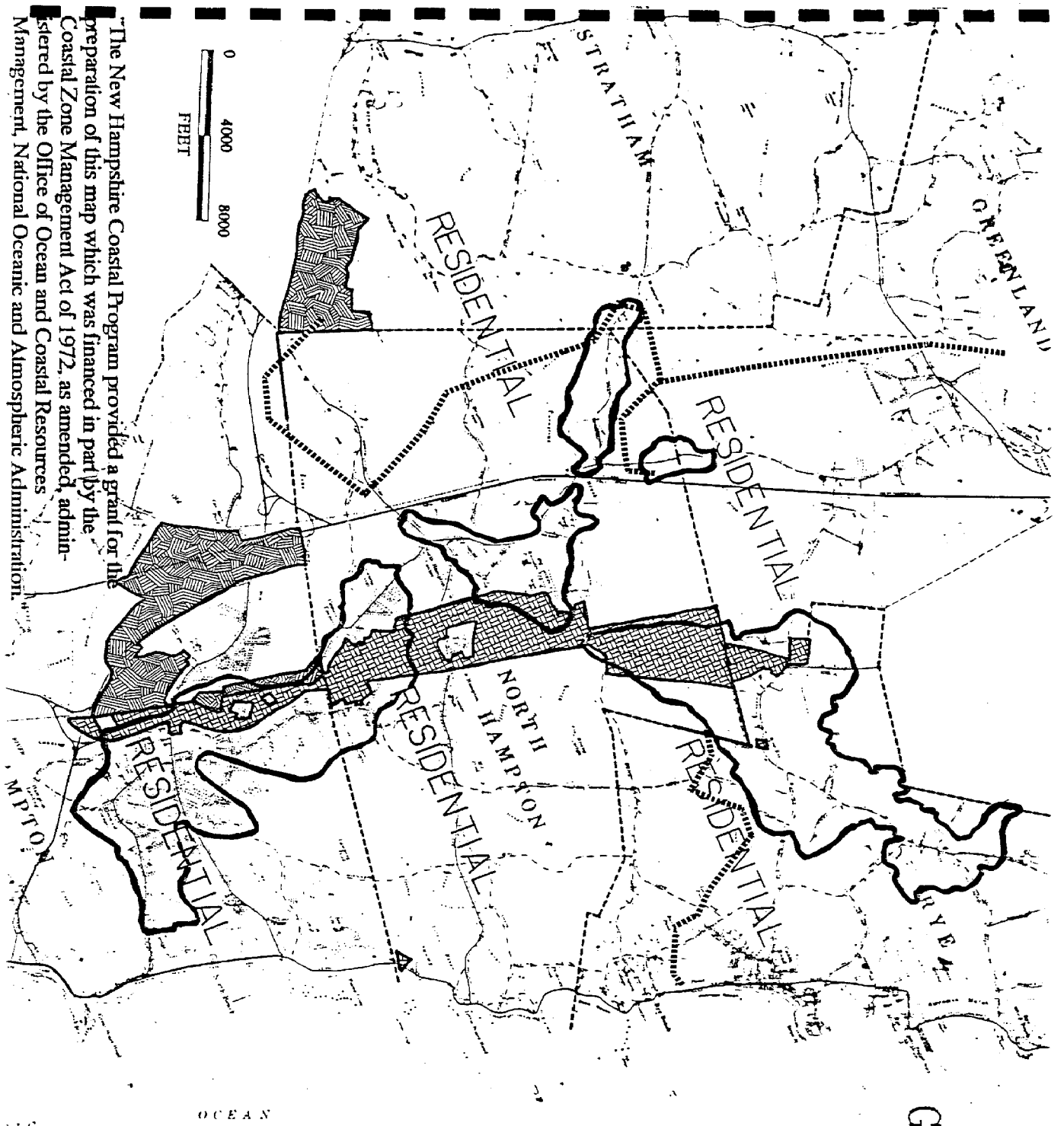


The New Hampshire Coastal Program provided a grant for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration.

Map F Generalized Zoning

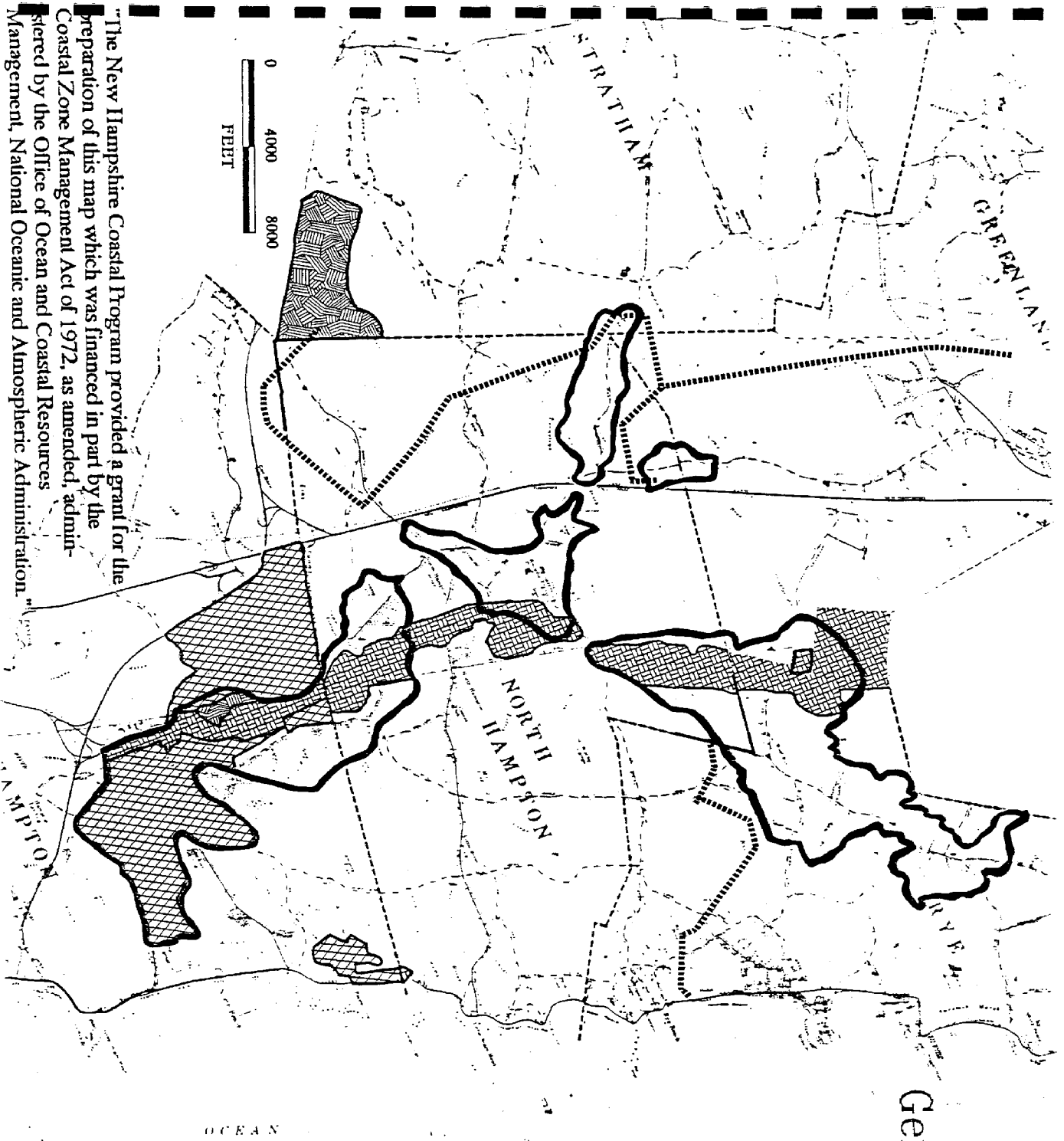
	Industrial Zone
	Commercial Zone
	River
	Aquifer

Prepared by the Rockingham Planning Commission
 June 1989
 Sources: Town Zoning Ordinances.



The New Hampshire Coastal Program provided a grant for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration.

Map G Generalized Future Land Uses



- Industrial
- Commercial
- Medium Density Residential
- Low Density Residential
- River
- Aquifer

Prepared by the Rockingham Planning Commission
June 1989

Sources: Town Master Plans

"The New Hampshire Coastal Program provided a grant for the preparation of this map which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration."

III. IDENTIFICATION OF POTENTIAL THREATS TO WATER RESOURCES

Potential Nonpoint Pollutant Sources

A. Within North Hampton

1. Existing Potential Pollutant Sources:

Nonpoint sources of pollution involve the diffuse discharge of wastes from sources which are widely spread, difficult to identify, and hard to control. Nonpoint pollution is typically produced from land runoff during times of rain and snowmelt.

The following is a general list which briefly describes potential nonpoint pollution sources, and their associated mitigation techniques, within the Town of North Hampton:

**Table 4
Nonpoint Pollutant Sources and Remedies**

<u>Source</u>	<u>Remedy</u>
subsurface sewage disposal	replacement and/or relocation;
agricultural runoff	best management practices, e.g., concrete manure pits, no winter manure-spreading, etc.;
road salt storage and approval	salt sheds, decrease salt to sand ratio, emphasize mechanical snow removal using plows, graders, etc., reduce frequency of application; increase use of calcium chloride and other de-icing chemicals;
storm runoff from construction sites	erosion control measures e.g., haybales, silt fences, straw mulch, etc.;
storm runoff from parking lots	catch basins which trap grit, oil and/or grease;
sediments from silted-in catch basins and detention ponds	maintenance programs
application of lawn fertilizers and pesticides	integrated pest management, e.g., soil testing, biological pest control, timing of lawn care, etc.
runoff/leachate from junkyards and abandoned landfills	drainage collection/treatment systems, and proper disposal of hazardous materials, e.g. battery acid, gasoline, etc. with a certified hauler;
leaking underground storage tanks	remove abandoned tanks, monitor and regulate existing tanks;

snow dumping into water bodies prohibit snow dumping in or near surface waters (as well as wetlands, aquifer recharge areas, or gravel pits).

The following paragraphs describe the potential nonpoint source pollutant categories which were evaluated for the Town of North Hampton in the "Inventory of Groundwater and Surface Water Potential Nonpoint Pollution Sources," (Water Supply and Pollution Control Division, New Hampshire Department of Environmental Services, February 1982).

Information was also taken from the "Waste Site Inventory", maintained by the Waste Management Division of the New Hampshire Department of Environmental Services, dated September 1987 (the most recent inventory available). Examples of specific existing land uses that represent potential nonpoint pollutant sources are depicted on Map E, "Existing Potential Pollutant Sources".

a. Primary Groundwater Impacts

1. Subsurface Disposal Concentration: A concentration of subsurface sewage disposal was identified at the North Hampton Mobile Home Park and the Shel-Al Mobile Estates. Since that study was completed a third mobile home park, Granite Post Green, was built. All three parks are located along the northern half of Route 1.

2. Waste Disposal Sites:

Coakley Landfill: The site, near the Rye town line west of Route 1, was formerly used for solid waste disposal. From 1972 until 1982, the landfill accepted municipal solid waste from North Hampton, Portsmouth, Rye and New Castle. From 1983 to 1985, Pease Air Force Base deposited incinerator ash at the site. The facility was closed in 1985 after volatile organic compounds were found in nearby private wells. The landfill is on the Environmental Protection Agency's Superfund cleanup list. Monitoring wells are in place around the closed landfill and the N.H. Department of Environmental Services ordered in May of 1989 that a six inch layer of gravel be used to cover exposed piles of ash.

The reader is referred to the numerous studies prepared by the EPA concerning the Coakley Landfill, copies of which are available for inspection at the North Hampton Town Library and Town Offices.

Dumps: The former Town dump is located off South Road west of Route 95. For many decades this dump was the site of open burning. According to the State Solid Waste Plan, the dump has not been properly closed. The land is now owned by the State. In addition, a 5.74 acre parcel of land off of Cherry Road serves as a brush dump for the Town.

3. Salt Pile: North Hampton has two salt piles located in the community. Approximately 100 tons of salt used for Town roads is stored in a concrete shed near the Public Works garage. The State Department of Transportation has a covered salt pile in a shed at its garage on South Road, west of Route 95.
4. Salted Roads: North Hampton has a policy to use as little salt as possible on all their roads. A mixture of salt and sand is used on major roads during severe storm conditions. (State maintained highways (N.H. Routes 95, 1, 1A, 101D, 151, Winnicut Road, Walnut Avenue, Hobbs Road, and Mill Road-south of Atlantic Avenue) are salted as necessary during the winter months.)

b. Primary Surface Water Impacts

5. Erosion Sites: Construction sites covering a large area (i.e. greater than one or two contiguous acres) can cause significant erosion problems if control measures are not properly placed throughout the site, especially on sloping land.
6. Snow Dumps: The 1982 "Inventory ..." identified a Town snow dumping location near the Town Offices, however, that practice has been discontinued. No snow dumping now takes place in North Hampton.
7. Pesticides: The only holder of a permit from the N.H. Department of Agriculture for pesticide application is the Sagamore-Hampton Golf Club on North Road.

2. Future Potential Pollutant Sources

- a. Near Term - The North Hampton Planning Board has recently given approval to the following plans:
 - 1) A 13,900 square foot retail building on Lafayette Road along with the removal of 3300 yards of loam;
 - 2) Renewal of a permit for a gravel pit on Birch Road which is in the "central" aquifer;
 - 3) Renewal of a permit for a gravel pit on Lovering Road which is in the "northeast" aquifer;
- b. Long Term - Map F, "Generalized Zoning" shows that a short section of the Little River runs through land that is zoned as Industrial Business. In addition three of North Hampton's aquifers are within the Industrial Business District to varying degrees. When reviewing future developments within this district, runoff from commercial and industrial sites should be considered as potential sources of nonpoint pollution to groundwater and surface waters.

Generalized future land uses for North Hampton are shown on Map G, "Generalized Future Land Uses". The Future Land Use Chapter does not recommend any expansion of the Industrial-Business District, so no new commercial or industrial uses would be allowed in any new areas over identified aquifers. The plan does recommend the adoption of an aquifer protection district to provide protection to these areas. Nothing proposed in the plan would increase the potential pollutant hazards in North Hampton.

B. Contributing Areas Outside of North Hampton

In determining the areas outside of North Hampton which exhibit potential threats to the Town's water resources, it was appropriate to categorize North Hampton's water resources into surface water and groundwater.

1. Surface Water - Winnicut River and Little River Watersheds

a. Existing Potential Pollutant Sources

The Towns of Hampton and Stratham have the greatest impact on the Winnicut River before it flows into Greenland and back into Stratham. The Hampton portion is low density residential areas (1 acre per dwelling) and undeveloped woodlands and wetlands. The Stratham portion contains a large industrial park which is connected to the Exeter public sewer and water systems. The remaining portion of Stratham is undeveloped woodlands and wetlands and low density residential areas (minimum 1 acre per dwelling).

For the most part, Little River starts in North Hampton and therefore has no identified pollution problems outside of Town. The one un-named branch that begins in Hampton runs through an undeveloped area.

b. Future Potential Pollutant Sources

Hampton's 1985 Master Plan identifies the future land uses of the areas affecting the Winnicut River as being low density residential (1 dwelling per acre) and conservation/open space areas. Hampton has a Special Flood Hazard Area Ordinance and a Wetlands Conservation District (which identifies poorly and very poorly drained soils and establishes buffer areas within 50' of wetlands), both of which protect land in this area. In 1988 the Hampton Board of Selectmen proposed to rezone this area to industrial at the request of the Hampton Industrial Development Commission. This amendment was defeated by the voters by a wide margin after being strongly opposed by some Hampton residents who lived in the area and by many North Hampton citizens and officials.

Stratham's 1985 Master Plan identifies the land along its border with North Hampton as being industrial in the south and low density residential in the north. Without careful setting and control of industrial uses, surface runoff and process wastes can present a potential threat to the water quality of an abutting river. Stratham's water resources are protected by a Floodplain District Ordinance, a Wetland Conservation District Ordinance and a Shoreline Protection Ordinance that includes the land within 150' of the Winnicut River.

2. Groundwater

a. Existing Potential Pollutant Sources

North Hampton's aquifers extend into Rye, Greenland, Stratham and Hampton. The aquifer areas contained within these four communities consist primarily of low density residential development with the exceptions of commercial development along Route 1 in Rye and Hampton. The Stratham and Greenland portions have no public water or sewer service, while Hampton has public water and sewer service and Rye's portion has public water from the Rye Water District.

The Town of Rye has the greatest impact on North Hampton's "northeast" aquifer. According to the Waste Site Inventory (previously cited), Rye has three potential threats within 0.5 miles from the North Hampton Town line:

- 1) A State of New Hampshire covered salt pile just over the Town line;
- 2) An abandoned landfill which operated for more than 50 years;
- 3) An active dump that has been ordered closed by the State of New Hampshire;

The Town of Stratham has two potential threats near the "northeast" aquifer. Both are pesticide application sites in the Winnicut Hills area (identified by the N.H. Department of Agriculture).

All of the communities surrounding North Hampton participate in the Seacoast Area Mosquito Control (SAMC) program. The spraying of insecticides along residential streets is considered to be a potential non-point pollution source, as identified by the 1982 Inventory (previously cited). Even though the chemical used has a half-life of only 90 minutes, the use of a non-toxic insecticide should be considered within the aquifer areas.

b. Future Potential Pollutant Sources

Future land use information for aquifers extending beyond North Hampton's boundaries is based on the master plans and zoning ordinances of Hampton, Stratham, Greenland, and Rye.

The "southern" aquifer shared with Hampton is zoned as commercial, multi-family residential and medium density single-family residential, and is recommended to continue as such in its Master Plan. However, the Hampton Master Plan recommended the adoption of an aquifer protection district in this area and this was approved at the 1989 town meeting.

North Hampton's "northwest" aquifer is shared with Greenland and Stratham, and the "northcentral" with just Greenland. Their master plans recommend low density residential (one unit per acre) in Stratham and medium density residential (two units per 60,000 square feet) in Greenland.

A large portion of North Hampton's "northeast" aquifer extends into Rye. The Future Land Use section of Rye's Master Plan recommends this aquifer area to be used for highway oriented commercial along Route 1, rural residential (1 1/2 acres per dwelling unit), and semi-rural (1 acre per dwelling unit).

Point Pollution Sources

Information provided by the Water Supply and Pollution Control Division in May 1989 indicates that there are no permits issued in North Hampton under the National Pollutant Discharge Elimination System (NPDES) for surface water discharges.

Information provided by the Groundwater Division in May 1989 indicates that no permits have been issued in North Hampton for groundwater discharges under the N.H. Code of Administrative Rules (Ws 410).

Underground Storage Tanks

As of April 1989, the N.H. Department of Environmental Services has identified 47 underground fuel storage tanks, at 20 sites throughout North Hampton. The capacity of these tanks range from 500 to 10,000 gallons, while the ages range from brand new to 7 years.

Detailed data relative to tank location (by street address), owner's name, tank number, capacity, type of product stored, and the tank's age is presented in Appendix III, "Inventory of Underground Storage Tanks." The underground storage tanks within North Hampton are single-walled and have no leak detection systems. All of the tanks are constructed of asphalt-coated steel. See Map E for the location of the 20 underground storage tank sites.

IV. ASSESSMENT OF GROWTH IN DEMAND FOR WATER

Projected Growth in Demand for Water

In June 1987, the Water Management Bureau, of the N.H. Department of Environmental Services' Water Resource Division, initiated the Water User Registration and Reporting Program. The objective of the program is to gather accurate data on the major uses of the State's water and the demands placed upon aquifers, streams, and rivers. To accomplish this objective, all facilities which use an average of 20,000 gallons (or more) of water per day must register with the Division. According to the Bureau's latest list, (October 1988), the Town of North Hampton has no users of 20,000 gallons of water per day.

The lack of detailed data on water usage makes it extremely difficult to quantify water consumption and to identify changing trends in water use. An attempt was made to calculate the gross daily consumption from residences using household and population data published by the N.H. Office of State Planning. In 1987, North Hampton's estimated population was 3,799 persons with approximately 2.7 persons per household; which translates into 1407 households. Assuming that the average household contains three bedrooms, and using one standard of 150 gpd per bedroom (source: "Subdivision and Individual Sewage Disposal System Design Rules", N.H. DES, Water Supply and Pollution Control Division, April 1987), North Hampton residences used 633,150 gallons of water per day in 1987. The same calculation was used to project residential water demand for the year 2000. With a projected population of 5,629, an average household size of 2.43 persons, and 2,316 households, North Hampton residences will use 1,042,200 gpd during the year 2000.

The water demand for the non-residential sectors will be entirely dependent upon the types of commercial or industrial uses located within North Hampton and whether or not they are water-intensive uses. A vast majority of the existing non-residential uses are connected to the public water system. At this point, however, it is assumed that the residential water demand will account for the majority of North Hampton's water usage during the next 10 to 20 years. During this time, the bulk of North Hampton's water demand will be met by the Hampton Water Works Company.

At present, there are three public water systems in North Hampton, none of which are considered to be "community" water systems by the N.H. Water Supply Engineering Bureau. There are no residential community water systems in Town and none are expected because of the availability of water from the Hampton Water Works Company. Private wells are expected to continue to serve the low density residential uses outside of the public water system service area.

V. DESCRIPTION OF THE INFRASTRUCTURE

A. Septic System Usage

Using 1987 OSP population estimates, approximately 3,799 residents are served by septic systems. North Hampton has no municipal sewer system and is not planning on developing one in the foreseeable future. According to the North Hampton Health Officer, the number of permits issued to repair failed septic systems was 2 in 1989 (May); 20 in 1988 and 32 in 1987. In addition, the Town, with the assistance of the University of New Hampshire, is investigating the presence of high coliform counts in stormdrains in the Route 1 and Atlantic Avenue area. Identifying the source and correcting the problem is a high priority for North Hampton.

North Hampton has a high potential for growth in its number of septic systems. Given the expense of wastewater treatment facility construction, and the diffuse development pattern in much of Town, it is probable that all future development (during the next 10 years) will be served by septic systems. In May 1989, the possibility of the Town of Rye connecting into the Town of Hampton's wastewater treatment plant by running a line through North Hampton along Route 1A was discussed by the Boards of Selectmen of the respective communities. Preliminary information indicates the need for the construction of a pump station in North Hampton and the capability of residences along Route 1A to be able to tie into the system. Obviously this proposal involves complex negotiations between the communities and could take years to arrange if it occurs at all. Once this option has been decided, this section of the plan should be updated.

North Hampton's zoning prohibits septic system or leaching field construction within 75 feet of any wetland. The large amount of wetlands in Town will restrict the placement of septic systems in many locations.

North Hampton's future land use map shows the areas along the Little River and Winnicut River being planned as "Conservation/Open Space". This area would most likely exclude septic systems as well.

B. Soil Potential Ratings

In March 1980, the USDA Soil Conservation Service (SCS) and the Rockingham County Conservation District (RCCD) developed a manual entitled: "Soils Information For Resource Planning - North Hampton, New Hampshire." This manual provided guidelines for land use based on soil types.

Using national standards, virtually all of North Hampton's soil types have received a "severe" rating for septic system development. In fact, there are only a few soils throughout Rockingham County that are not classified as having "severe" limitations for septic system development. In light of this, the Rockingham County Conservation District and the USDA Soil Conservation Service developed a more meaningful set of land use guidelines based on soil types.

In May 1987, the "Soil Potentials for Development - Rockingham County" manual was published. Five soil potential classes were provided: very high, high, medium, low and very low. Low potential is assigned to those soils having severe soil limitations, with costs of design measures extremely high or prohibitive.

Map H, "Soils Suitability for Septic Systems" depicts the general areas of North Hampton which have different soil potentials for septic system development. Soils with low and very low potential were mapped because they had limitations due to steep slopes or high water tables (as well as high shrink-swell properties, short depths to bedrock, and stoniness).

C. Solid Waste Disposal

The Town of North Hampton operates a stump/brush dump on a 5.74 acre parcel on Cherry Road. All other solid waste is transferred to the Maine Energy Recovery Corporation (MERC) waste-to-energy plant in Biddeford, Maine by private haulers that provide curb-side pick up. The stump/brush dump has a life expectancy of 1 to 5 years according to the State's Solid Waste Management Plan (1988). No closure plan has been completed for the site.

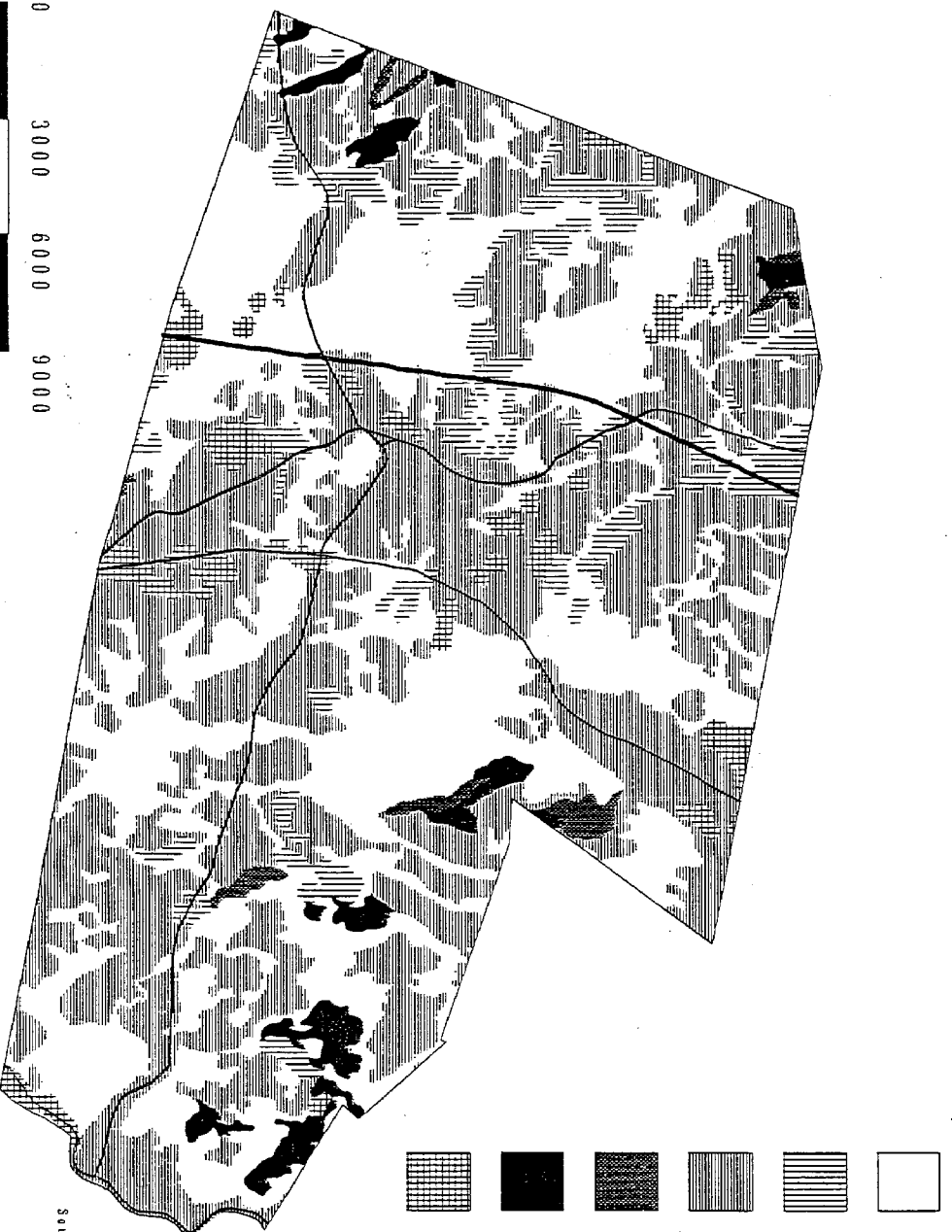
The Coakley Landfill, now closed, was the site formerly used for solid waste disposal. From 1972 until 1982, the landfill accepted municipal waste. From 1983 to 1985, Pease Air Force Base deposited incinerator ash at the site. The facility was closed in 1985 after volatile organic compounds were found in nearby private wells. The landfill is on the Environmental Protection Agency's Superfund cleanup list. Monitoring wells are in place around the closed landfill and the N.H. Department of Environmental Services ordered in May of 1989 that a six inch layer of gravel be used to cover exposed piles of ash.

D. Public Water Supply

Map D shows the location for three public water systems, all of which draw from groundwater. None of these systems is considered to be a community water system as defined by the N.H. Water Supply Engineering Bureau. Each of these systems are within the service area of the Hampton Water Works Company and could tie in if they desired.

North Hampton's most significant public drinking water supply, in terms of service area and persons served, is the water system operated by the Hampton Water Works Company. Three gravel-packed wells and one bedrock well are located in North Hampton and along with four wells in Hampton and one in Rye, they combine to provide the water source for the entire system. The safe yield of the wells in North Hampton totals 1.77 million gallons a day (MGD) while the total for all the system's wells is 4.47 MGD. Due to the lack of precipitation in recent years and heavy summer usage, the demand at peak times exceeds the capacity. Restrictions on water use have been imposed during the past two summers because of the problem. The water company is actively searching for new groundwater supplies to alleviate the situation. In June of 1989 an additional well site was located off of Exeter Road, behind the tennis courts in North Hampton. Early estimates indicate a possible safe yield from this gravel-packed well of 0.3 MGD. Even if this well goes on line during 1989, it will not eliminate the deficit. Future demand for water can only be met by developing additional water sources.

Town of North Hampton Soil Suitability for Septic Systems



Very Low Suitability

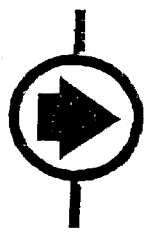
Low Suitability

Medium Suitability

High Suitability

Very High Suitability

Not Rated/Too Variable



Map H

Sources: "Soils Potential for Development -
Rockingham County"; U.S.D.A. - Soil
Conservation Service and Rockingham
County Conservation Dist. - May 1987.
Rockingham County, N.H. Soils Map;
U.S.D.A. - Soil Conservation Service.
Preliminary Data - Subject to Change.
Prepared by the Rockingham Planning
Commission, May 1989. SRG

In a report entitled, "The Hampton Water Works Company Comprehensive Planning Study - October 1985", the water quality of the supply is discussed. Water quality for all wells is described as "generally good". In North Hampton the Crenshaw well and the Coakley well show slightly elevated levels of iron and manganese but low enough not to require removal. These two wells are treated with sodium hexametaphosphate and all the wells are treated with sodium hypochlorite.

The service area of the system within North Hampton is shown on Map A-2. The system serves 923 homes and businesses in the central part of town. Three storage tanks in Hampton and one in Rye provide storage capacity for the system. The total capacity for the system is 2.065 million gallons. No problems with water pressure in North Hampton were cited in the 1985 water company planning study previously referenced. Fire flows are also considered to be more than adequate. The water system is fully metered and meters are replaced when they are more than 10 years old. A leak detection program is in place using company owned equipment. A survey is done twice a year and when a leak is suspected. Customer costs are based on a constant rate of \$1.784 per 100 cubic feet of water used as determined by the meter reading, plus a service charge based on meter size.

The Hampton Water Works Company's plan for expansions and upgrade of facilities is outlined in it's 1985 planning study. Plans to construct an elevated storage tank off of Mill Road in northern North Hampton are in the design phase. Construction of an additional well near Exeter Road has previously been explained and the plan calls for a future well between Cherry Road and Birch Road. Also several mains are scheduled to be enlarged to improve the distribution system.

Regarding possible future interconnections with other systems, the planning study suggests working with the municipal systems in Rye and Seabrook to develop interconnections that would be beneficial to all parties. Connections to the Exeter municipal water system is less likely because of the distance between mains.

VI. DESCRIPTION OF EXISTING PROGRAMS AND POLICIES

Each ordinance and regulation in North Hampton was reviewed for the purpose of identifying the elements of each which have the potential to impact on any of the following eight water resource parameters (WRP):

- 1) Erosion and sedimentation;
- 2) Surface water flows;
- 3) Groundwater recharge;
- 4) Management of existing and potential contaminant sources;
- 5) Flood storage;
- 6) Encroachment on wetlands;
- 7) Nutrients levels; and
- 8) Wildlife and fisheries habitat.

Zoning Ordinance

Wetland Conservation Areas (Article IV, Section 409): This section limits the use of and encroachment on wetlands which have been identified as tidal wetlands or inland wetlands (very poorly and poorly drained soils) using the standards of High Intensity Soil Survey (HISS) mapping for New Hampshire. Adopted in 1979, the ordinance has been amended on two occasions, the last being 1988. The intention of the ordinance is to accomplish the following selected purposes which relate specifically to water resources:

- a) To prevent the destruction of natural wetlands which provide flood protection, recharge the ground water supply, and the augmentation of stream flow during dry periods (WRP #1, 2, 3, 5, and 6);
- b) To control the development of structures and land uses on naturally occurring wetlands which would contribute to pollution of surface and ground water by sewage (WRP #1, 4, 6, and 7); and
- c) To preserve wetlands for other ecological reasons such as those cited in RSA 483-A (WRP #1, 2, 3, 5, 6, 7, and 8).

One section of the wetlands ordinance that is especially important to the protection of water resources is section 409.4, which provides for a 75-foot buffer between wetlands and structures or impermeable surfaces. The North Hampton Wetlands Ordinance has the potential to impact each of the eight water resource parameters.

District Regulations (Article IV, Section 410): These provisions require a 75 foot buffer between any wetland and a septic system or leaching field and requires state approval of a septic system and leach field prior to a building permit being issued. This pertains to WRP #4 by managing potential contaminant sources (namely septic systems). Potential nutrient levels (WRP #7) in ground and surface waters may also be reduced through this provision.

Filling of Non-Wetland (Article IV, Section 412): Any filling of land of more than 5000 cubic yards must be approved by the Planning Board. The purpose is to "... protect its ecology, water supply and natural aesthetics ...". This provision allows control of erosion and sedimentation (WRP #1) and may also be helpful in preventing negative impacts upon flood storage (WRP #5) and encroachment on wetlands (WRP #6).

Quarries, Gravel Pits and Sand Pits (Article V, Section 511): Regulates excavation activities and requires Planning Board approval and annual renewal of permits. Applicants must provide information on details on drainage and "the elevation of the highest annual ground water table within or next to the proposed excavation". The regulation of potentially harmful activities in sand and gravel areas can impact on groundwater recharge and management of potential contaminant sources which in this case could be gasoline or oil from machinery in the pit leaking into the groundwater (WRP #3 and 4).

Subdivision Regulations

Authority (Section I B): This section requires a subdivision plat to show surface drainage and utility services that conform to Town standards (WRP #1, 2, 4 and 7).

Issuance of Decision - Disapproval (Section III J3): This section permits the Planning Board to disapprove a plat that would involve danger or injury to health, safety or prosperity by reason of the lack of water supply and drainage, among others (WRP #1 and 2).

Specific Requirements (Section III M): This regulation requires that all drainage and sewerage facilities be installed in accordance with specifications and that an "as built" plan be provided. A surety is required to cover the cost of making these improvements (WRP #1, 2, 4, and 7).

Other Requirements (Section IV D(5)): Requires appropriate measures to be taken so that uses will not aggravate flood hazards (WRP #5).

Other Requirements (Section IV D(6)): Requires connection to public sewer if available or prove that the area of each lot is adequate to permit the installation and operation of an individual sewerage disposal system (WRP #4 and 7).

Other Requirements (Section IV D(7)): This section requires the installation of adequate drainage facilities (WRP #1 and 2).

The Preliminary Layout (Section V): The preliminary plan must show water courses, ponds, standing water, existing water mains, sewers, culverts, drains, means of providing water supply, disposal of sewerage and surface drainage and culvert designs (WRP #2, 3, 4, 6 and 7).

Street, Drain and Sidewalk Construction Standards (Section VII A-5, 6, 8): This section details the construction standards for storm drainage including design standards, pipe sizes, catch basin designs and inspection requirements (WRP #1, 2, and 5).

Mobile Home Parks (Section VII): Among the standards for mobile home parks are the requirements that each space shall have an attachment for water from a supply source that meets local and state regulations and an attachment for sewage disposal that is in compliance with all local and state regulations (WRP #4 and 7).

Site Plan Review Regulations

Section II-8: This section requires site plans to contain information on existing and proposed elevations and elevations for the first and second stories of the proposed structure if located in a flood prone area (WRP #1 and 5).

Section II-9: The site plan must contain information on storm water and roof drainage, how runoff will be contained and assurances that additional runoff will not adversely affect abutters (WRP #1 and 2).

Section II-10: The septic plan must be shown on the site plan (WRP #4 and 7).

Building Code

North Hampton's building code is included in the Zoning Ordinance. All construction must comply with the last revisions of the BOCA Building Code and Fire Prevention Code. The building code has no substantial direct impact on water quality or quantity.

Health Ordinance

The Town of North Hampton does not have a health ordinance per se. However, there are many ordinances and regulations which pertain to public health, i.e. standards for septic systems. In addition, the Town has an appointed Health Officer and Assistant Health Officer who assist in the administration of these local health-related laws, as well as State regulations in accordance with RSA 147.

VII. ANALYSIS

Analysis Regarding Water Supplies

The task of assessing whether the existing water supplies are adequate for the next 5 to 10 years is complicated by the fact that the Hampton Water Works Company (HWWC) is a private company serving three communities. As calculated in Section IV, entitled "Assessment of Growth in Demand for Water", North Hampton is projected to need over a million gallons of water a day in the year 2000 just to serve its residential population. If the new well off of Exeter Road produces as expected, the safe yield from the five wells in North Hampton will be approximately two million gallons per day. Even if commercial and industrial water demands dramatically increase in North Hampton, there should still be a surplus of water in Town. However, this analysis ignores the fact that water pumped in North Hampton is part of a three town system and likely ends up serving HWWC customers outside of North Hampton. Also to be considered is the possibility that one or more of the existing wells could be rendered unusable by contamination.

As the HWWC's planning study (previously referenced) and Section IV D explains, the company does have expansion plans. The limits of expansions for the company are tied to the number of potential customers per unit of distance and the associated economics of such an expansion. Availability of water could also be a variable. The summary of well completion reports in Appendix III indicates that, of 27 wells reported as being completed between January 1984 and February 1988, 89 percent of these wells had yields of three or more gallons per minute, generally accepted as being sufficient for typical domestic needs. Since the majority of wells are outside of the identified aquifers, it must be concluded that adequate groundwater supplies exist in virtually all areas of North Hampton.

Analysis Regarding Other Water Resource Purposes

- a. Discharges: Section III described two significant sources of potential groundwater contamination: Coakley Landfill and the former Town Dump on South Road. Each of these sources warrant groundwater monitoring, in order to assess whether or not their discharges are significantly contaminating the surrounding groundwater. Groundwater monitoring wells are already in place around the Coakley Landfill, but none have been installed at the dump site.

The potential septage problem in the area around the intersection of Route 1 and Atlantic Avenue (discussed in Section V-A) raises the possibility of serious assimilation difficulties in at least this one section of Town. The results of the UNH study should help to expand the scope of knowledge regarding potential contamination problems in similar situations. In the case of groundwater discharge little is generally known about groundwater flow, volume and withdrawal.

There is little information available regarding potential assimilation problems for North Hampton's surface water bodies. The assimilative capacity of a waterbody is calculated based on its physical and biological characteristics and the character of the proposed discharge.

Detailed studies of the assimilative capability of groundwater and surface water would logically fall under the State's duties since it issues discharge permits and has greater technical and financial capacities than municipalities.

- b. Recreation: In 1977, the N.H. Office of State Planning published a study entitled: "Wild, Scenic, and Recreational Rivers for New Hampshire." Out of 67 other rivers being classified throughout the State, the study classified the Winnicut River as a "Recreational River." The study defined recreational rivers as those: which provide outstanding recreational opportunities in natural surroundings. These rivers should be protected for their natural qualities which can provide for a wide range of active and passive outdoor recreation activities. Recreational rivers should: be readily accessible; have high water quality; have enough water to provide for fishing and canoeing; and be at least five miles long. Fishing, canoeing and swimming are the most common recreational uses of the rivers and streams in North Hampton.

The recreational opportunities, which are very valuable to North Hampton are outlined in detail in the Recreation Chapter of the Master Plan.

- c. Wetlands: There are several different types of wetlands, which include: tidal marshes, meadows, shrub and wooded swamps, and bogs. Wetlands are important, valuable, natural resources and worthy of protection from inappropriate use. They have been found, in general, to provide critical ecological and socially valuable functions, including:

- 1) provide habitat and reproduction areas for plants, fish and wildlife;
- 2) help maintain ground and surface water levels;
- 3) act as flood water storage areas;
- 4) absorption and filtration of pollutants and sediments (caused by up-stream erosion);
- 5) provide opportunities for recreation and education;
- 6) visual aesthetics.

The filling of and use of wetlands for building construction not only destroys wetlands and their benefits, but may lead to groundwater contamination as well. Leaching fields constructed in filled areas are likely to be placed too near the seasonal high water table below and to have an inadequate receiving layer for proper treatment of the septic system's effluent.

There is an ongoing need to protect wetlands in North Hampton. Statewide, wetlands are under increasing development pressure due to the depletion of the most developable land. Although the State of New Hampshire has laws and regulations in place (RSA 483-A, administered by the Wetlands Board and RSA 149 8:a, administered by the N.H. Water Supply and Pollution Control Commission), they do not always provide the degree of protection needed. For these reasons, local control over the use of wetlands should remain in effect indefinitely. The Town of North Hampton has recognized the importance of preserving wetlands, and has acted accordingly by establishing a Wetland Conservation Area Ordinance.

North Hampton is fortunate to have had prepared for it, through the N.H. Office of State Planning Coastal Program, a series of aerial photographs depicting wetlands at a scale of 1" = 200'. The maps and an accompanying report are entitled, "Phase 2 Report, Town of North Hampton, the Coastal Wetlands Mapping Program, New Hampshire," prepared for the N.H. Coastal Program Office of State Planning by Normandeau Associates, Inc., June 30, 1986.

- d. Fisheries: The Little River is the most commonly fished water in North Hampton. Each Spring the N.H. Fish and Game Department stocks the river with either Eastern Brook Trout, Rainbow Trout, Brown Trout, or a combination of the three. The Brown Trout is an anadromous fish, meaning it migrates up the river from the Atlantic Ocean to breed in fresh water. Although not currently stocked in its North Hampton portion, the Winnicut River in Greenland and the Great Bay are stocked with trophy fish such as Pacific Salmon, Steelhead, Brown Trout and Atlantic Salmon.

North Hampton must safeguard its surface water quality in order to provide the opportunity of sports fishing for present and future townspeople.

- e. Wildlife Habitat: River, stream, and wetland corridors provide the richest habitat for the greatest number of fish, wildlife, and flora. Fish and wildlife populations cannot succeed within limited habitat confines. Native wildlife must have travel lanes within their range, and waterfowl and other birds need ground-level nesting habitat. Protection of these linear corridors is essential to the stability of wildlife populations.

Riparian corridors (i.e., shorelands) also contribute much in terms of recreational benefits, i.e. canoeing, hiking, fishing, birding, horse trails, cross country skiing, picnicking, etc. Shorelands are also sensitive due to flooding, erodibility, and proximity to open water. Moreover, soil type and percent slope typically limits the development potential of a shoreland area.

Areas of Town that have prime wildlife habitat potential are listed below and shown on Map B as 1-4.

1. the Line Swamp area west of Route 95 and south of South Road;
2. the Winnicut River corridor;
3. the Little River Swamp; and
4. the area around Philbrick Pond.

- f. Hydropower: There are no hydropower producing dams in North Hampton, nor are there plans for any in the future. The hydropower market is not as strong as it was ten years ago (during the height of the nation's energy shortage) because of uncertain markets for electricity, environmental restrictions, and alternative power sources which are more economical.

Harnessing hydropower is not always benign to the fish, animals, and people which use the impacted river. Hydro development can result in the loss of productive habitat, degrade water quality, and cause direct mortality of fish (especially juvenile fish traveling downstream) and other aquatic organisms.

If any hydropower facilities are proposed in the future, no decision should be made by Town officials until a thorough site review and evaluation is performed. The cumulative impacts of hydropower dams along the river should also be considered.

- g. Fire Protection: As previously discussed in Section V D, the fire flow provided by the HWWC water system is considered to be more than adequate. Also plans to construct an additional elevated storage tank off of Mill Road will provide better water pressure and storage capacity.

The Planning Board sends all large development plans to the North Hampton Fire Department for their review and recommendations. This process is helpful in insuring adequate fire protection.

- h. Conflicting Uses: The only known potential conflict that exists between competing uses involves the contamination plumes exiting the Coakley Landfill and possible future sites for HWWC wells. This depends on exactly where the plumes of pollution are headed and what effect large groundwater withdrawals may have on the migration pattern. Plans to contain the contamination are still being finalized.

Management of Potential Threats

Section III, "Identification of Potential Threats to Water Resources", presents a full discussion of existing and permitted future land uses which pose threats to water resources within North Hampton. A brief discussion of the Town's primary potential threats to identified water resources, including mitigation measures, is presented below.

1. Landfills and dumps: The Coakley Landfill has the potential to pollute more private wells than has already occurred, depending on the direction the contamination plumes take. Cleanup of this site will be a lengthy and expensive process that will be done under the direction of the EPA. Town officials should continue to closely monitor the situation.

The former Town dump off South Road should be properly closed to prevent any possible off-site contamination problems. Placement of monitoring wells around the site should be considered.

2. On-site sewage disposal: Three concentrations of on-site sewage disposal were identified in Section III. Each of these mobile home parks are located in an identified aquifer. Since no municipal sewer system is planned, these septic systems should undergo strict inspection and maintenance.

3. Road salting: A significant number of roads which overlay aquifer areas are being salted during winter months. Of particular concern is Winnicut Road which travels over the "northwest" aquifer for its entire length, and is less than 500 feet from three of the HWWC wells. In addition Route 1 travels through the three most eastern aquifers and is 3000 feet from the fourth HWWC well. Also Post Road travels through all of the aquifers, except the "northeast" aquifer, as it winds its way through Town. The potential well site behind the Town Recreation area on Exeter Road is less than 1000 feet from Post Road. Since all these roads are maintained by the State, the Board of Selectmen would have to work with Department of Transportation officials to address the problem. Road salting should be minimized, employing methods described in Table 4, especially along roads that overlay aquifer areas.

Additional management and protection techniques for water resources are described in the following section.

VIII. RECOMMENDATIONS FOR NEW OR REVISED POLICIES AND PROGRAMS

Nonregulatory Programs

It is recommended that the Town of North Hampton employ the following nonregulatory programs in order to manage and protect its water resources:

1. Educational and informational programs should be developed in order to provide the general public with an understanding of the operation, proper use, and maintenance of septic systems and leach fields (i.e., regularly pumping out septic tanks, avoiding disposal of hazardous or harmful wastes, etc.) This would likely prevent unnecessary system contamination and failures, thereby protecting surface and groundwater resources.
2. Develop a septic system inspection program, especially for aquifer recharge zones, in order to ensure that these systems are adequately maintained.
3. Continue to promote and participate in the annual Household Hazardous Waste Collection, sponsored by the Rockingham Planning Commission. For this past year's collection, North Hampton's share of the costs was provided from its dues to the Southeast Regional Solid Waste District.
4. Continue to appropriate money to the Conservation Commission's land acquisition fund to be used for the protection of land and water resource conservation areas. There are generally five different methods for protecting these natural areas:
 - a) Land Purchase;
 - b) Option of Right of First Refusal;
 - c) Purchase and Resale;
 - d) Bargain Purchase;
 - e) Easements - Conservation Restrictions and/or Purchase of Development Rights

At the 1989 Town Meeting it was voted to deposit 100 percent of the revenues collected from the current use change tax in the Conservation Fund. Conservation funds enable the Town to act on short notice when a valuable parcel of land is threatened. This land may be of critical importance for protecting significant wetlands, shoreland, wildlife habitat, or recreational areas.

5. The Conservation Commission should also seek land acquisition funding through State and Federal grants (e.g. Trust for New Hampshire Lands, The Land and Water Conservation Fund, and the Pitman-Robertson Fund through the N.H. Fish and Game Department).
6. The Conservation Commission should continue to work with people who own land having conservation potential by promoting the tax incentives associated with the donation of land or easement restrictions. The Current Use Assessment Program also provides tax abatements on parcels of 10 acres or more or on "natural preserves" of any size.
7. The North Hampton Planning Board should work with their counterparts in surrounding towns to promote land use planning practices which are mutually beneficial to protect common watersheds, wetlands, and aquifers. North Hampton may choose to develop intermunicipal agreements (pursuant to RSA 53-A) to protect these shared resources. During the 1989 session, the N.H. Legislature approved Senate Bill 161 which authorizes agreements between municipalities to develop water resources management plans.
8. Develop a program to reduce the amount of road salt used, especially in aquifer recharge areas. The following methods should be employed:
 - a) Emphasize mechanical snow removal;
 - b) Mix sodium chloride with calcium chloride and/or sand to reduce the total amount of sodium chloride applied;
 - c) Periodically re-calibrate salt spreaders so that they apply the correct amount of salt/sand mix; and
 - d) Post areas where reduced salting is practiced, which will encourage drivers to reduce speeds and drive more cautiously.
9. Develop a program to inspect and maintain drainage control facilities, (e.g. catch basins and detention ponds, and culverts) throughout Town. If these devices become filled with sediment, they can no longer perform their function.
10. Work with the Hampton Water Works Company to develop a program emphasizing water conservation, especially in homes and businesses served by the water system.
11. Encourage farms to employ Best Management Practices (BMP's) as prescribed by the Soil Conservation Service. BMP's include storage of manure in concrete pits, and more efficient and better timed application of fertilizer and pesticides.
12. Develop a water quality data base for monitoring contamination events in both surface and ground waters throughout Town.

13. The Planning Board should be kept informed by the Rockingham Planning Commission regarding the availability and appropriateness of regional or State water resource data.

The costs of instituting these nonregulatory programs are expected to be variable, but relatively low. For example, any assistance provided by the Rockingham Planning Commission is either at reduced cost or no cost, as part of North Hampton's annual membership in the Commission.

Costs associated with land conservation efforts involving donations of land and easements would involve survey, legal, and recording fees. The outright purchase of these lands or the purchase of development rights would obviously entail substantially greater costs. Land conservation is discussed in greater detail in the Conservation and Preservation chapter of the Master Plan.

Household Hazardous Waste collection and disposal costs, which can be expensive even in a regional program, will likely be covered by the dues paid to the Southeast Regional Solid Waste District. Matching funds are available from the Waste Management Division of the N.H. Department of Environmental Services.

These nonregulatory programs could probably be carried out by existing voluntary and paid manpower. It should not be necessary to hire additional personnel to conduct or supervise any of these activities with the possible exception of #2, establishing a septic system inspection program.

Regulatory Programs

The Town of North Hampton enforces a zoning ordinance, a building ordinance (BOCA), subdivision regulations, and site plan review regulations. All have been reviewed and found to contain provisions specifically pertaining to water resource protection.

All options for regulatory programs required by the Rules were considered, and the following new or revised regulatory programs are recommended in order to improve and/or enhance existing local water resource management and protection mechanisms:

1. An Aquifer Protection Ordinance should be adopted by North Hampton to protect aquifers identified on Map D as "Glacial and Postglacial Water-laid Deposits". As explained in Section II, this information is from the N.H. State Geologists office and its surficial geology maps. This information should be the source for delineating aquifers until the USGS Aquifer Delineation Maps are published in 1990, at which time they should be the primary source.

The Planning Board, in consultation with the Conservation Commission and the Hampton Water Works Company, should decide which, if not all, of the five identified aquifer areas should be included in the overlay district. An examination of the aquifer ordinance, recently adopted by Hampton, should be made to insure a similar approach to protecting aquifers is maintained. Assistance in preparing the ordinance can be obtained from the Rockingham Planning Commission, which helped Hampton write their ordinance.

2. North Hampton should adopt a Shoreland Protection Ordinance to insure the proper protection of shorelands and associated water bodies. This ordinance would establish a minimum setback for specific uses from the mean water mark of the Town's primary rivers and streams. The establishment of a minimum standard will promote the following objectives:

- 1) Provide a safety zone to avoid flood damage;
- 2) Protect public waters from pollution;
- 3) Prevent erosion;
- 4) Conserve and protect aquatic and terrestrial habitat associated with riparian areas; and
- 5) Preserve and enhance those aesthetics values associated with natural shoreland areas.

The North Hampton Citizen Survey done in July 1988 revealed that, of those persons responding, 45 percent rated protecting rivers as very important, the highest ranking of the twelve possible capital expenditures.

3. A Cluster/Open Space ordinance allows a development to concentrate a higher density of dwelling units in exchange for committing an adjacent area to be common open space in perpetuity. The Town should adopt such an ordinance so that development can be directed away from areas of high aquifer recharge, shorelands, flood zones and wetlands. For a detailed discussion of this concept, refer to the Housing Chapter.
4. Erosion and sedimentation control regulations should be adopted by the Planning Board. These regulations provide standards and guidelines for development planning, for the purpose of controlling erosion and preventing sediment transport to wetlands and streams. The Rockingham County Conservation District has developed a model ordinance which the Town could use as a starting point.
5. North Hampton should develop its own Underground Storage Tank (UST) regulations. Requirements to be considered are as follows:
 - a) Require the removal of all abandoned tanks;
 - b) Ban all new underground heating oil tanks with a capacity of less than 1,100 gallons. These tanks need not be registered with the N.H. Water Supply and Pollution Control Division, thereby making them difficult to monitor and regulate;
 - c) Amend the Site Plan Review regulations to require development plans to identify the location, type, content and capacity of each proposed inground petroleum and chemical storage tanks in order to maintain a current inventory.

The N.H. Water Resources Action Project has developed other such guidelines which North Hampton could use to develop and administer a local UST regulatory program (source: "Guidelines for Controlling Underground Storage Tanks", Tools for Community Water Supply Protection, N.H. Water Resources Action Project, 1985, prepared by Sharon F. Francis, N.H. Natural Resources Forum, Sky Farm, Box 341, Charlestown, NH 03603).

6. Many communities have developed septic system regulations to tighten the State's requirements. North Hampton should consider amending its zoning ordinance to require septic system be designed to standards more stringent than the State. Because of North Hampton's soil conditions which can result in the rapid percolation of on-site sewage through sands and gravels, and the potential for nitrate contamination, certain design requirements for septic system construction should be made more stringent. Decisions on which standards to increase and to what extent should be made in consultation with septic system design experts.
7. A State septic system inspector will issue a permit for a system that has been evaluated (before covering) and found to operate properly. North Hampton should grant a certificate of occupancy only after this State permit has been received.
8. Amend the Zoning Ordinance to include a maximum coverage percentage for commercial and industrial lots. This would provide for surface runoff water to infiltrate into the ground and recharge local groundwater supplies.
9. Large subdivisions and the associated roads and drainage facilities can have a negative impact on the environment, including water resources. The Subdivision Regulations should be amended to require an environmental impact study for large subdivisions to insure that the damage to the environment is minimized.
10. Amend the Subdivision and Site Plan Review regulations as follows:
 - a) Promote the use of catch basins designed to trap oil and sediments;
 - b) Encourage road designs which require less use of de-icing chemicals (e.g. roads with minimal slope and/or turning radius, etc.);
 - c) Require that runoff be retained on-site and that no degradation of water quality shall occur. This will provide for groundwater recharge through the infiltration of retained water. This provision will also safeguard abutting properties from increased flows which can cause flooding and erosion damage.
11. North Hampton should amend its Zoning Ordinance to include the latest floodplain development standards as required by the Federal Emergency Management Agency.
12. The North Hampton Conservation Commission should consider mapping and documenting the prime wetlands as authorized under RSA 483-A:7, and subsequently, recommend that their adoption as part of the Zoning Ordinance in accordance with RSA 675:3. The State of New Hampshire Wetlands Board is required to give special consideration to prime wetlands during their review of dredge and fill permit applications. The wetland maps from the State, prepared by Normandeau Associates are very helpful in identifying areas to study. Field checking the accuracy of the maps and prioritizing wetland values are the main tasks the Conservation Commission would have to undertake.

13. The North Hampton Planning Board should consider requiring the minimum lot size in certain sections of Town to be determined by ability of the soils to handle the sewage. This would require amending the Zoning Ordinance to specify that lot sizes would be a one acre minimum but could be larger depending on the lot size required in the Subdivision Regulations, which would also be amended.

Generally, the cost of preparing proposed amendments to regulations and ordinances is minimal. Technical assistance can be provided at low or no cost by the Rockingham Planning Commission or the Rockingham County Conservation District. There would be some expense involved with complying with the statutory requirements for the publication of hearing notices. The Town should not need to hire any personnel for the preparation of the proposed amendments to regulations and ordinances.

Since the goal of the surface and groundwater portions of this Plan is to assure that local land use decisions resulting from this planning process are based upon the most comprehensive and reliable scientific and technical information available, it is important that all implementing ordinances and regulations should include (1) a process which allows applicants for local approvals to present documented scientific and technical information which differs from the information used to prepare this Plan; and (2) the implementing ordinances and regulations should also include mechanisms which will enable local decision makers to consider the scientific and technical information submitted by the applicants prior to making a final decision.

APPENDIX I

SUMMARY OF WELL COMPLETION REPORT DATA FOR THE TOWN OF NORTH HAMPTON

8/10/18

Map D	MRN	NAME	ROAD	LATITUDE	LONGITUDE	ELEV	DEPTH	USE	RRI	TYPE	TOD	BOD	CASING	YTH	YTD	YTO	SIL	OVERBORN	GC	NOTE
1	180.0023	H. Carter	202 Atlantic Ave	429815	704939	80.0	86/10/12	1	1	1	142.0	32.00	42.00	3	1.00	6.00		123	2	
2	180.0013	A. Westermark	8 Beau Monde Dr	429808	705943	70.0	85/09/24	1	1	1	200.0	2.00	21.00	3	1.00	40.00		2	2	YL
3	180.0010	F. Malone	Beau Monde Dr	429811	705942	70.0	85/10/10	1	1	1	425.0	5.00	20.00	3	1.00	3.00		3	2	YL
4	180.0003	D. Bodi	Beau Monde Dr	429814	705937	80.0	85/06/17	1	1	1	250.0	8.00	20.50	3	1.00	10.00		2	2	YL
5	180.0005	M & J Bldrs	Birchwood Dr	429956	704806	100.0	85/06/11	1	1	1	140.0	9.00	21.00	3	1.00	50.00		2	1	
6	180.0005	F. Nelson	28 Cedar Rd	429814	705936	60.0	87/10/04	1	1	1	305.0	40.00	32.00	3	1.00	14.00		12-4	2	
7	180.0007	R. Overstreet	Greer Rd	429814	705936	60.0	85/08/07	1	1	1	140.0	13.00	23.00	3	1.00	5.00		4	2	YL
8	180.0026	Lanmark Bldg's Inc	Gess Rd	429833	705924	80.0	88/02/17	1	1	1	700.0	23.00	40.00	3	1.00	0.25		124	2	
9	180.0012	D. Knight	Lovering Rd	429833	705924	80.0	85/10/11	1	1	1	160.0	7.00	20.00	3	0.25	40.00		10.00	4	
10	180.0017	J. Woodworth	Hill Rd	429811	705942	70.0	86/04/25	1	1	1	200.0	13.00	20.00	3	1.00	6.00		2	2	
11	180.0015	R. Layin	North Rd	429814	705937	80.0	86/07/17	1	1	1	100.0	45.00	35.00	3	1.00	15.00		2	2	
12	180.0020	J. Kaech	Post Rd	429822	705923	60.0	86/09/11	1	1	1	300.0	20.00	35.00	3	1.00	3.00		2	2	
13	180.0027	Tom Eckert Const	Post Rd	429822	705923	60.0	88/01/14	1	1	1	205.0	25.00	35.00	3	1.00	4.00		20.00	4	
14	180.0008	D. Smith	Ree 1010	429754	705943	100.0	85/07/19	1	1	1	180.0	23.00	36.00	3	1.00	25.00		2	2	
15	180.0004	C. Pearson	76 South Rd	429815	705937	60.0	85/09/10	1	1	1	180.0	55.00	63.00	3	1.00	20.00		2	2	
16	180.0018	R. Pearson	South Rd	429815	705937	60.0	86/06/02	1	1	1	610.0	30.00	35.00	3	1.00	3.00		4-26	2	
17	180.0024	A. Eaton	South Rd	429815	705937	60.0	87/03/25	1	1	1	500.0	40.00	68.00	3	1.00	1.00		2	2	
18	180.0011	Hesperian Patrol Svcs	South Rd	429815	705937	60.0	85/06/04	9	2	1	300.0	40.00	60.00	3	0.25	3.00		20.00	4	
19	180.0022	N. Donalds	46 Mainst Ave	429806	705918	60.0	84/08/22	1	1	1	120.0	60.00	60.00	3	1.00	7.00		5	3	
20	180.0019	S. Acmond	98 Mainst Ave	429823	705927	100.0	86/11/20	1	1	1	200.0	5.00	19.00	3	1.00	30.00		1	2	YL
21	180.0006	B. Kenman	Mainst Ave	429823	705927	100.0	86/08/09	1	1	1	80.0	5.00	81.00	3	1.00	30.00		1	2	
22	180.0016	8. Noble	Mainst Ave	429823	705927	100.0	86/02/18	1	1	1	200.0	72.00	82.00	3	1.00	5.00		1-4	2	
23	180.0022	8. Noble	Winlock Rd	429814	705914	100.0	87/09/28	1	1	1	120.0	117.00	140.00	3	1.00	5.00		2	2	
24	180.0009	J. Knoules	154 Woodcreek Dr	429814	705914	100.0	87/09/28	1	1	1	300.0	30.00	64.00	3	1.00	50.00		2	2	
25	180.0014	M. Grossman	Woodland Rd	429814	705914	100.0	84/07/05	1	1	1	300.0	9.00	24.00	3	1.00	5.00		4	2	
26	180.0021	R. White	Woodland Rd	429814	705914	100.0	86/09/05	1	2	1	362.0	12.00	30.00	3	1.00	60.00		3	2	YL
27	180.0001	J. Gavin	Woodland Rd	429814	705914	100.0	84/01/03	1	1	1	182.0	12.00	30.00	3	1.00	13.00		3	3	

APPENDIX II

TOWN: NORTH HAMPTON

DATE: 10/88

PUBLIC WATER SYSTEMS INVENTORY
 Water Supply Engineering Bureau
 Water Supply & Pollution Control Div.
 Dept. of Environmental Services

EPA #	SYSTEM NAME	LATITUDE/LONGITUDE	OWNER'S NAME	OWNER'S MAILING ADDRESS	TOWN	TELEPHONE
1, N1777020	SAGMORE-HAMPTON GOLF CLUB	0425935/0705025	R.D. LUFF	101 NORTH ROAD	NORTH HAMPTON	NH 964-5341
2, N1778030	PINE HAVEN MOTEL	0425936/0704900	WALTER WILHELM	183 LAFAYETTE ROAD	NORTH HAMPTON	NH 964-8187
3, N1778040	KING MOTEL	430004/704832	LINDOLN HARRINGTON	223 LAFAYETTE ROAD	NORTH HAMPTON	NH 964-8183

ELETER AND HAMPTON UNDERGROUND STORAGE TANK DATA - 12 APR 1989

TANK.....	Facility Location City	Facility Location Name	Facility Location Street	Tank Age	Tank Capacity	Tank Status	Product Description	Material of Construction	Tank MONTH Test WELLS Perf
01128164001 1a	NORTH HAMPTON	BERRY TRANSPORTATION CO., INC.	24 WALNUT AVENUE	08	6,000	Now In Use	Petroleum - Diesel	STEEL	
01128164002 1b	NORTH HAMPTON	BERRY TRANSPORTATION CO., INC.	24 WALNUT AVENUE	06	3,000	Now In Use	Petroleum - Gasoline	STEEL	
01128164003 1c	NORTH HAMPTON	BERRY TRANSPORTATION CO., INC.	24 WALNUT AVENUE	04	1,400	Now In Use	Petroleum - Gasoline	STEEL	
01121474001 2a	NORTH HAMPTON	COMMUNITY MOTORS	110 LAFAYETTE ROAD	15	3,000	Temp. Out-of-Use	Petroleum - Gasoline	STEEL	
01121474002 2b	NORTH HAMPTON	COMMUNITY MOTORS	110 LAFAYETTE ROAD	15	3,000	Temp. Out-of-Use	Petroleum - Gasoline	STEEL	
01131424001 3a	NORTH HAMPTON	D.O.T. NORTH HAMPTON GARAGE	RTE 101D	15	4,000	Now In Use	Petroleum - Gasoline	STEEL	
01131424002 3b	NORTH HAMPTON	D.O.T. NORTH HAMPTON GARAGE	RTE 101D	15	4,000	Now In Use	Petroleum - Diesel	STEEL	
01131424003 3c	NORTH HAMPTON	D.O.T. NORTH HAMPTON GARAGE	RTE 101D	15	2,000	Now In Use	Petroleum - Kerosene	STEEL	
01131424004 3d	NORTH HAMPTON	D.O.T. NORTH HAMPTON GARAGE	RTE 101D	15	500	Now In Use	Petroleum - Used Oil	STEEL	
01135274001 4a	NORTH HAMPTON	DRIVE IN GAS & MINI MART	180 LAFAYETTE RD.	6	10,000	Now In Use	Petroleum - Gasoline	STEEL	N
01135274002 4b	NORTH HAMPTON	DRIVE IN GAS & MINI MART	180 LAFAYETTE RD.	6	10,000	Now In Use	Petroleum - Gasoline	STEEL	N
01135274003 4c	NORTH HAMPTON	DRIVE IN GAS & MINI MART	180 LAFAYETTE RD.	6	10,000	Now In Use	Petroleum - Diesel	STEEL	N
01135274004 4d	NORTH HAMPTON	DRIVE IN GAS & MINI MART	180 LAFAYETTE RD.	6	5,000	Now In Use	Petroleum - Gasoline	STEEL	N
01127494001 5a	NORTH HAMPTON	G & M CONST. CORP.	205 LAFAYETTE ROAD	07	2,000	Now In Use	Petroleum - Diesel	STEEL	
01127494002 5b	NORTH HAMPTON	G & M CONST. CORP.	205 LAFAYETTE ROAD	07	3,000	Now In Use	Petroleum - Diesel	STEEL	
01101444001 6	NORTH HAMPTON	GIANT LIFT EQUIPMENT CO., INC.	136 LAFAYETTE ROAD	8	4,000	Now In Use	Petroleum - Kerosene	STEEL	
01128504001 7a	NORTH HAMPTON	HAMPTON AIRFIELD INC.	ROUTE 1	0	5,000	Now In Use After 5/8/85	Petroleum - Gasoline	STEEL	U
01128504002 7b	NORTH HAMPTON	HAMPTON AIRFIELD INC.	ROUTE 1	0	10,000	Now In Use After 5/8/85	Petroleum - Gasoline	STEEL	U
01116784001 8a	NORTH HAMPTON	HC MOBIL	RT #1 70 LAFAYETTE STREET	01	6,000	Now In Use	Petroleum - Gasoline	STEEL	
01116784002 8b	NORTH HAMPTON	HC MOBIL	RT #1 70 LAFAYETTE STREET	15	5,000	Now In Use	Petroleum - Gasoline	STEEL	
01116784003 8c	NORTH HAMPTON	HC MOBIL	RT #1 70 LAFAYETTE STREET	15	4,000	Now In Use	Petroleum - Gasoline	STEEL	
01116784004 8d	NORTH HAMPTON	HC MOBIL	RT #1 70 LAFAYETTE STREET	02	500	Now In Use	FUEL OIL	STEEL	
01129614001 9	NORTH HAMPTON	LAMPREY BROS. INC.	63 ATLANTIC AVE.	07	4,000	Now In Use	Petroleum - Gasoline	STEEL	
0220224001 10a	NORTH HAMPTON	LAMPREY BROTHERS BULK PLANT	ATLANTIC AVE.	14	1,000	Now In Use	Petroleum - Gasoline	STEEL	U

EXETER AND HAMPTON UNDERGROUND STORAGE TANK DATA - 12 APR 1989

TANK.....	Facility Location City	Facility Location Name	Facility Location Street	Tank Age	Tank Capacity	Tank Status Description	Product Description	Material of Construction	Tank HDMIT Test Wells Perf
02202241002 10b	NORTH HAMPTON	LAMPREY BROTHERS BULK PLANT	ATLANTIC AVE.	27	500	Now In Use	#2 FUEL OIL	STEEL	U
01181011001 11	NORTH HAMPTON	LINCOLN HARRINGTON	223 LAFAYETTE ROAD	15	2,000	Perma. Out-of-Use	#2 FUEL OIL	STEEL	U
02202841001 12	NORTH HAMPTON	MCFARLAND REALTY	178 LAFAYETTE RD	1	1,000	Now In Use	Petroleum - Used Oil	STEEL	U
011233901001 13a	NORTH HAMPTON	MEL'S TRUCK SALES, INC.	8 LAFAYETTE ROAD	8	3,000	Now In Use	Petroleum - Diesel	STEEL	N
011233901002 13b	NORTH HAMPTON	MEL'S TRUCK SALES, INC.	8 LAFAYETTE ROAD	8	3,000	Now In Use	Petroleum - Gasoline	STEEL	N
01107721001 14	NORTH HAMPTON	NORTH HAMPTON ELEM. SCHOOL	210 ATLANTIC AVENUE	19	5,000	Now In Use	#4 OIL	STEEL	
01111891001 15a	NORTH HAMPTON	NORTH HAMPTON GETTY	RTE 1	15	2,000	Now In Use	Petroleum - Gasoline	STEEL	
01111891002 15b	NORTH HAMPTON	NORTH HAMPTON GETTY	RTE 1	15	2,000	Now In Use	Petroleum - Gasoline	STEEL	
01111891003 15c	NORTH HAMPTON	NORTH HAMPTON GETTY	RTE 1	01	8,000	Now In Use	Petroleum - Gasoline	STEEL	
01111891004 15d	NORTH HAMPTON	NORTH HAMPTON GETTY	RTE 1	15	5,000	Now In Use	Petroleum - Diesel	STEEL	
01111891005 15e	NORTH HAMPTON	NORTH HAMPTON GETTY	RTE 1	15	2,000	Now In Use	Petroleum - Kerosene	STEEL	
01126081001 16a	NORTH HAMPTON	NORTH HAMPTON SUNOCO	JCT. US ROUTE 1 & ATLANTIC AVE.	15	5,000	Now In Use	Petroleum - Diesel	STEEL	
01126081002 16b	NORTH HAMPTON	NORTH HAMPTON SUNOCO	JCT. US ROUTE 1 & ATLANTIC AVE.	15	5,000	Now In Use	Petroleum - Gasoline	STEEL	
01126081003 16c	NORTH HAMPTON	NORTH HAMPTON SUNOCO	JCT. US ROUTE 1 & ATLANTIC AVE.	15	5,000	Now In Use	Petroleum - Gasoline	STEEL	
01126081004 16d	NORTH HAMPTON	NORTH HAMPTON SUNOCO	JCT. US ROUTE 1 & ATLANTIC AVE.	15	5,000	Now In Use	Petroleum - Gasoline	STEEL	
01131361001 17a	NORTH HAMPTON	NORTHEAST CARRIAGE CO. INC.	SOUTH RD.	10	5,000	Now In Use	Petroleum - Diesel	STEEL	
01131361002 17b	NORTH HAMPTON	NORTHEAST CARRIAGE CO. INC.	SOUTH RD.	10	5,000	Now In Use	Petroleum - Diesel	STEEL	
01131361003 17c	NORTH HAMPTON	NORTHEAST CARRIAGE CO. INC.	SOUTH RD.	10	1,000	Now In Use	Petroleum - Diesel	STEEL	
01131361004 17d	NORTH HAMPTON	NORTHEAST CARRIAGE CO. INC.	SOUTH RD.	10	1,000	Now In Use	Petroleum - Gasoline	STEEL	
01102311001 18	NORTH HAMPTON	PINE HAVEN MOTEL	183 LAFAYETTE ROAD	7	2,000	Now In Use	HEATING OIL	STEEL	
01108901001 19a	NORTH HAMPTON	POST ROAD GROCERY	92 POST ROAD	02	2,000	Now In Use	Petroleum - Gasoline	STEEL	
01108901002 19b	NORTH HAMPTON	POST ROAD GROCERY	92 POST ROAD	02	3,000	Now In Use	Petroleum - Gasoline	STEEL	

28391001 09 NORTH HAMPTON TOWN OF WOODBURY HAMPTON ATLANTIC AVENUE 04 3,010 Now In Use Petroleum - Gasoline STEEL

