SOILS

INTRODUCTION

Soil is one of the most important, yet oftentimes overlooked, natural resources. It is the ingredient of the land itself -- the ground on which land use happens. Because it is the foundation for all uses, the condition of the soil is an important factor in all land use decisions. Current and accurate soil information provides the Planning Board with another tool with which to make an informed decision on land use.

CURRENT SOIL INFORMATION

Hampton's soil survey map was completed in April of 1982, which is in the same time period as the rest of the communities in Rockingham County. The map was developed according to National Cooperative Soil Survey standards by soil scientists working for the Soil Conservation Service (SCS) of the U.S. Department of Agriculture. A soil survey map indicates the soil type and slope conditions that are predominant in a given area. Over the years, soil scientists have analyzed and observed the characteristics and behavior of many different soil types. Knowing the distinctive properties of the different soils allows soil scientists to make predictions about the suitability of a soil for different uses.

One of the more important characteristics of a soil is its drainage class. Each soil is ranked as to how well it drains, which is an important consideration when determining the presence or absence of wetlands, as well as identifying potential storm water drainage problems for a proposed development. The depth to the seasonal high water table is also relevant when judging the wetness of a lot and its suitability for development. Soil types provide an indication as to the capacity of land to absorb water, which is an important consideration when planning for stormwater drainage.

Consideration of these soil factors is critical in preventing future development from experiencing structural groundwater and stormwater problems. The Planning Board can use the accumulated knowledge of characteristics and behavior of soils to identify potential problems or to locate favorable soil conditions for development.

GENERAL SOIL CONDITIONS

Traditionally, soil scientists have utilized a soils rating system that ranked the soils based on their limitations. In a turnabout from this more negative approach, SCS and the Rockingham County Conservation District developed a new system for rating soil based on their development potential. This approach classifies soils on the basis of the relative ease or difficulty of placing dwelling units, septic systems, and local roads

Attachment 93.3.1.2

on any given soil type. The key difference between the two approaches is that soil potential ratings take into consideration the fact that limiting soil characteristics can oftentimes be overcome through common engineering design and construction techniques. Soils potentials offer a more realistic perspective on land capability.

While soil potential ratings are important to many towns, their importance in Hampton is diminished because of the extensive water and sewer systems in town. In the developed areas of town, the value of the soil potential rating system is limited because the lot size is not dependent on the need for a septic system leach field. Soil conditions are most important in the undeveloped areas that are not served by water and sewer lines. If development in these areas, especially west of Interstate 95, occurs before sewer and water lines are extended that far, the potential of the soils to handle septic systems will be vital information and should become the basis for determining the location and density of such development.

SOIL POTENTIAL RATINGS

Using the current soil map, each soil type was measured to determine its total area in acres. Each soil type, along with its potential rating, drainage class, acres and percent of the total soils, is listed in Table S-1. In addition, there is an indication if the soil is an important farmland soil. Each soil is given a soil potential rating in four categories - septic systems, dwellings with basements, local roads and streets, and development, which is a composite of the three categories. The soils are rated from very high to very low, based on the performance expected of a soil for that use.

Based on the soil potential rating system, 468 acres (6%) of Hampton's land area are considered to have a very high potential for development. A very high rating means that the soils' performance is at or above local standards because of favorable soil conditions. The costs associated with the installation of septic systems are very low relative to other soil categories.

About 1,121 acres (14%) are classified as having high potential for development, meaning soil performance is at or above local standards. The cost associated with overcoming limitations are low due to favorable soil conditions and few limitations.

Approximately 2,071 acres (25%) have a medium potential, meaning that soil limitations add significantly to the cost of development.

Only 236 acres (3%) of land are ranked as having a low potential. In those areas, overcoming soil limitations is very costly.

In almost 3,160 acres (38%) of the local land area, the soil potential for development is considered to be very low. In these areas, wet soils or severe slopes cause development to be economically unfeasible. A large portion of this area is the Hampton salt marshes.

TABLE S-1 HAMPTON SOIL TYPES AND CONDITIONS

KEY

Slope Classes	Soil Potential Ratings: Septic Systems	Dwellings With Basements	Local Roads and Streets	Development	Drainage Class
A = 0 - 3%	1 = Very High	1 = Very High	1 = Very High	1 = Very High	EWD: excessively well drained
B = 3 - 8%	2 = High	2 = High	2 = High	2 = High	WD: well drained
C = 8-15%	3 = Medium	3 = Medium	3 = Medium	3 = Medium	MWD: moderately well drained
D = 15-25%	4 = Low	4 = Low	4 = Low	4 = Low	PD: poorly drained
E = 25%	5 = Very Low	5 = Very Low	5 = Very Low	5 = Very Low	VPD: very poorly drained
					TVP: very poorly/tidal
					nr: not rated/too variable

Symbol	Soil Name	Soil Potential Ratings: Septic Systems	Dwellings With Basements	Local Roads and Streets	Development	Drainage Class	Important Farmland Soils	Percent of Total Soils	Acres
26A	Windsor Loamy Sand	2	1	1	1	EWD		0.3%	21
26B	Windsor Loamy Sand	2	1	1	1	EWD		0.1%	11
29A	Woodbridge Fine Sandy Loam	3	2	1	3	MWD	YES	0.0%	2
29B	Woodbridge Fine Sandy Loam	3	2	1	3	MWD	YES	0.2%	18
32A	Boxford Silt Loam	4	2	2	3	MWD	YES	1.1%	89
32B	Boxford Silt Loam	4	2	2	3	MWD	YES	0.6%	50
33A	Scitico Silt Loam	5	5	3	5	PD		5.6%	459
38A	Eldridge Fine Sandy Loam	3	2	1	3	MWD	YES	2.0%	162
38B	Eldridge Fine Sandy Loam	3	2	1	3	MWD	YES	1.2%	103
42B	Canton Gravelly Fine Sandy Loam	1	1	1	1	WD	YES	2.5%	208
43B	Canton Gravelly Fine Sandy Loam, Very Stony	1	2	1	1	WD		2.0%	167
43C	Canton Gravelly Fine Sandy Loam, Very Stony	2	3	2	2	WD		0.1%	7
44B	Montauk Fine Sandy Loam	3	2	1	2	WD	YES	0.6%	49
45B	Montauk Fine Sandy Loam, Very Stony	3	2	1	2	WD		0.2%	16
45C	Montauk Fine Sandy Loam, Very Stony	3	3	2	3	WD		0.1%	7
45D	Montauk Fine Sandy Loam, Very Stony	3	2	2	3	WD		0.1%	7
62B	Charlton Fine Sandy Loam	1	1	1	1	WD	YES	0.7%	55
62C	Charlton Fine Sandy Loam	2	2	2	2	WD	YES	0.0%	4
63B	Charlton Fine Sandy Loam, Very Stony	1	2	1	1	WD		0.1%	5
63C	Charlton Fine Sandy Loam, Very Stony	2	3	2	2	WD		0.1%	9
66B	Paxton Fine Sandy Loam	3	2	1	3	WD	YES	0.4%	37
67B	Paxton Fine Sandy Loam, Very Stony	3	2	1	3	WD		0.6%	49
67C	Paxton Fine Sandy Loam, Very Stony	3	3	2	3	WD		0.1%	9
97	Greenwood and Ossipee Soils, Ponded	5	5	5	5	VPD		0.0%	2
115	Scarboro Muck	5	5	5	5	VPD		0.5%	38
125	Scarboro Muck, Very Stony	5	5	5	5	VPD		0.1%	11
129B	Woodbridge Fine Sandy Loam, Very Stony	3	2	2	3	MWD		1.0%	81
134	Maybid Silt Loam	5	5	5	5	VPD		0.8%	66
140B	Chatfield-Hollis-Canton Complex, Very Stony	3	4	3	3	WD		11.8%	972
140C	Chatfield-Hollis-Canton Complex, Very Stony	4	4	3	4	WD		2.5%	202
295	Greenwood Mucky Peat	5	5	5	5	VPD		2.9%	237

TABLE S-1 HAMPTON SOIL TYPES AND CONDITIONS

KEY

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A = 0 - 3%	1 = Very High	1 = Very High	1 = Very High	1 = Very High	EWD: excessively well drained
B = 3 - 8%	2 = High	2 = High	2 = High	2 = High	WD: well drained
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D = 15-25%	4 = Low	4 = Low	4 = Low	4 = Low	PD: poorly drained
E = 25%	5 = Very Low	5 = Very Low	5 = Very Low	5 = Very Low	VPD: very poorly drained
					TVP: very poorly/tidal
					nr: not rated/too variable

Symbol	Soil Name	Soil Potential Ratings: Septic Systems	Dwellings With Basements	Local Roads and Streets	Development	Drainage Class	Important Farmland Soils	Percent of Total Soils	Acres
298	Pits, Sand and Gravel	nr	nr	nr	nr	NR		1.1%	93
299	Udorthents, Smoothed	nr	nr	nr	nr	NR		4.5%	373
305	Lim-Pootatuck Complex	5	5	4	5	PD		0.4%	30
313A	Deerfield Fine Sandy Loam	3	2	1	3	MWD		1.8%	147
313B	Deerfield Fine Sandy Loam	3	2	1	3	MWD		1.0%	81
314A	Pipestone Sand	5	5	3	5	PD		2.2%	180
395	Chocorua Mucky Peat	5	5	5	5	VPD		0.3%	26
397	Ipswich Mucky Peat	5	5	5	5	TVPD		16.0%	1318
446A	Scituate-Newfields Complex	3	2	1	2	MWD	YES	0.2%	15
447A	Scituate-Newfields Complex, Very Stony	3	2	1	3	MWD		1.7%	137
447B	Scituate-Newfields Complex, Very Stony	3	2	2	3	MWD		0.9%	72
495	Ossipee Mucky Peat	5	5	5	5	VPD		2.3%	192
497	Pawcatuck Mucky Peat	5	5	5	5	TVPD		1.3%	104
510A	Hoosic Gravelly Fine Sandy Loam	3	1	1	2	EWD	YES	6.5%	534
510B	Hoosic Gravelly Fine Sandy Loam	3	1	1	2	EWD	YES	5.9%	489
510C	Hoosic Gravelly Fine Sandy Loam	3	2	2	3	EWD	YES	0.6%	49
510D	Hoosic Gravelly Fine Sandy Loam	4	4	4	4	EWD		0.4%	33
538A	Squamscott Fine Sandy Loam	5	5	3	5	PD		2.5%	208
547A	Walpole Very Fine Sandy Loam, Very Stony	5	5	3	5	PD		0.9%	73
547B	Walpole Very Fine Sandy Loam, Very Stony	5	5	3	5	PD		0.7%	57
597	Westbrook Mucky Peat	5	5	5	5	TVPD		0.1%	12
599	Urban Land-Hoosic Complex	nr	nr	nr	nr	NR		4.9%	403
657B	Ridgebury Very Fine Sandy Loam, Very Stony	5	5	3	5	PD		0.4%	30
699	Urban Land	nr	nr	nr	nr	NR		1.4%	112
799	Urban Land-Canton Complex	nr	nr	nr	nr	NR		2.6%	214
997	Ipswich Mucky Peat, Low Salt	5	5	5	5	TVPD		1.5%	120
	TOTAL ACRES							100.0%	8251

Source: "Soils Potentials for Development - Rockingham County" Rockingham County Conservation District, May 1987.

The remaining 1,195 acres (14%) of Hampton's land area is considered to be non-classifiable due to alterations of natural soil conditions. This land includes gravel pits, areas of urban land, road construction and the landfill. On-site inspections would be necessary to determine actual soil potential.

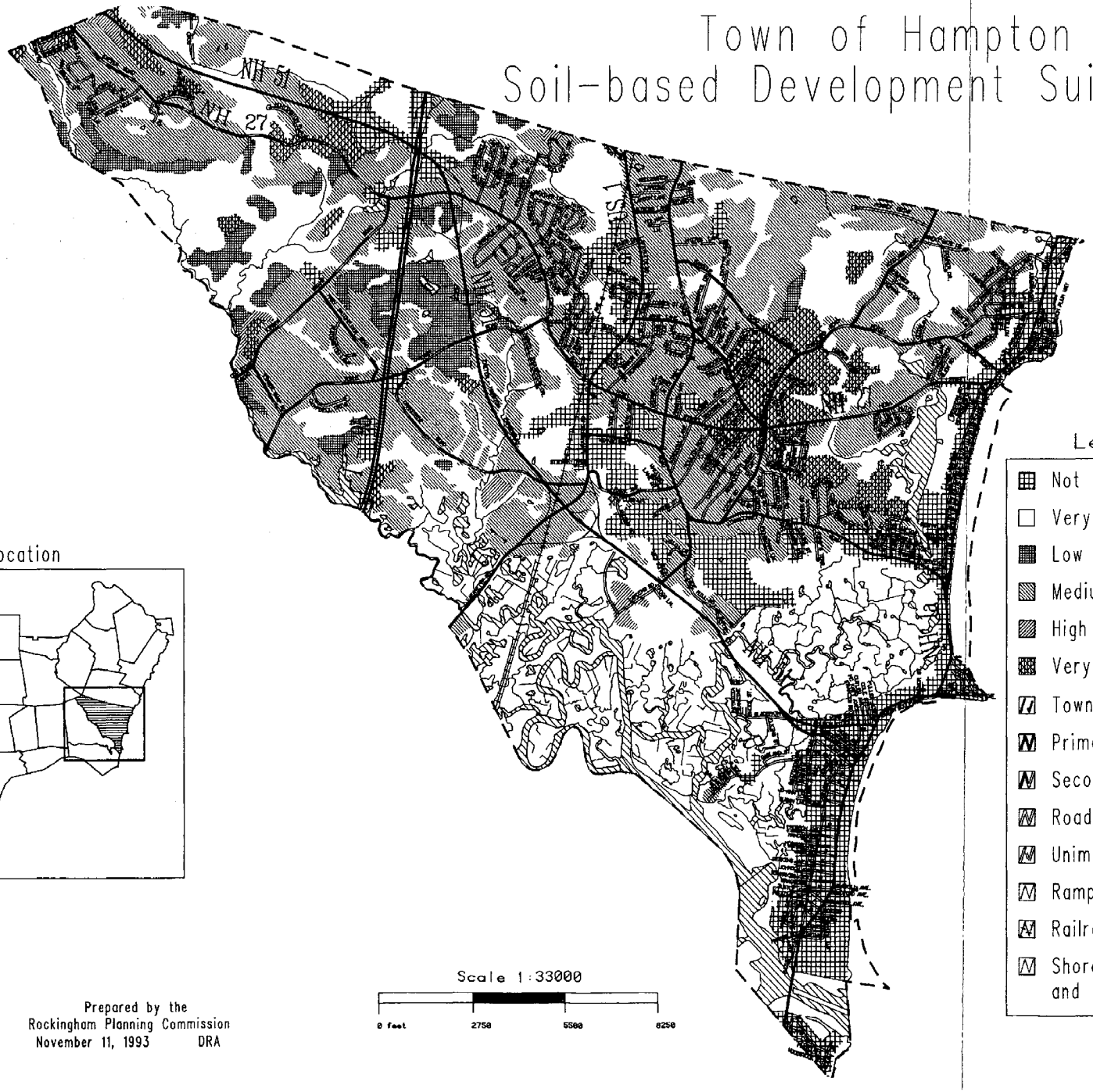
FUTURE SOIL USE

The most desirable land and soil is most always developed first, so that as the years go by, the best land is used up, leaving only the moderate and lesser quality land available. Hampton is approaching that stage in its development; therefore, pressure to develop on the poorer soils is likely to increase.

As more of the poorer quality land is used as part of building lots, the problems of wet soils and flooding could increase. Hampton's land use regulations may need to be updated to address this concern.

In the areas of Hampton that are not served by the municipal sewer system, the ability of the soil to handle septic systems is an important consideration. In order to analyze the nonsewered areas, a map entitled "Town of Hampton - Soil-based Development Suitability" was prepared using the RPC's geographic information system and the county soils data. The map shows that the areas west of Interstate 95 and along Drakeside Road are a mixture of all soil ratings for septic systems, but the two most prevalent types are medium and very low. There are large wetland areas associated with Old River and Line Swamp, Ash Brook, Drakes River, and Taylor River that make portions of the area unsuitable for development. As the remaining land in the sewered areas is developed, the land in the nonsewered areas will come under development pressure.

Town of Hampton
Soil-based Development Suitability



Prepared by the
Rockingham Planning Commission
November 11, 1993 DRA

WATER RESOURCES

INTRODUCTION

The protection and wise use of water resources are of critical concern to Hampton. With the entire population dependent on groundwater, from both private wells and the Hampton Water Works wells, the quantity and quality of this resource must be protected from excessive depletion and/or contamination. Other water resources such as swamps, ponds, rivers, streams, and wetlands are important not only because of their hydrological connection to groundwater resources, but also because they provide ecological, scenic, and recreational value to the community 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 habitat and interfere with scenic and recreational value. It is, therefore, the responsibility of the Town to take reasonable precautions to protect common water resources from incompatible uses and, in so doing, protect the health and general welfare of the community.

SURFACE WATER BODIES

Surface water systems are any type of water resource located above the ground on the earth's surface. Examples of surface water systems include: streams, rivers, marshes, ponds, bogs, lakes, wetlands, etc. Surface water systems are more dynamic than groundwater systems, in that they are influenced by the effects of wind, rain, and temperature. They are also subject to varying rates of flow, such as the difference between the flow rate of a river as opposed to that of a pond.

Since surface water systems flow over the land's surface, they are more susceptible to pollution caused either by hazardous materials located in close proximity to the system, or by pollutants discharged directly into the water. There are two types of pollution source categories: nonpoint sources and point sources. A nonpoint pollution source travels over or under the land to the water resource, whereas a point pollution source discharges directly into the water resource, for example, a malfunctioning sewage treatment plant.

Surface water resources function as holding areas for flood waters and seasonal high waters. In addition they serve as recharge areas and discharge points for groundwater resources. The point of discharge is where the surface water resource and the groundwater resource are hydrologically connected. Most commonly, a surface water resource will act as a discharge point for groundwater. Such a discharge can replenish surface water resources as well as individual water wells during the dryer summer months. However, if dry periods are prolonged, the result can be an overall lowering of the water table.

A. WATERSHEDS

The watershed is the principal focus in describing a surface water system. A watershed is the land area within a series of connecting higher ridges that drain surface water to the lowest point, which is where a stream or river flows out of the watershed. The network formed by rivers, streams, lakes, and ponds is known as the drainage system of the watershed.

The Town of Hampton is located within two regional watersheds - the Coastal watershed and the Great Bay watershed. The watershed boundaries shown on Map A - "Regional Watersheds" - were delineated by the Rockingham Planning Commission using 7.5 minute topographic maps from the U.S. Geological Survey. As the map shows, only a small portion of the northwest part of Hampton is located within the Great Bay watershed. Most of the town is in the Coastal watershed.

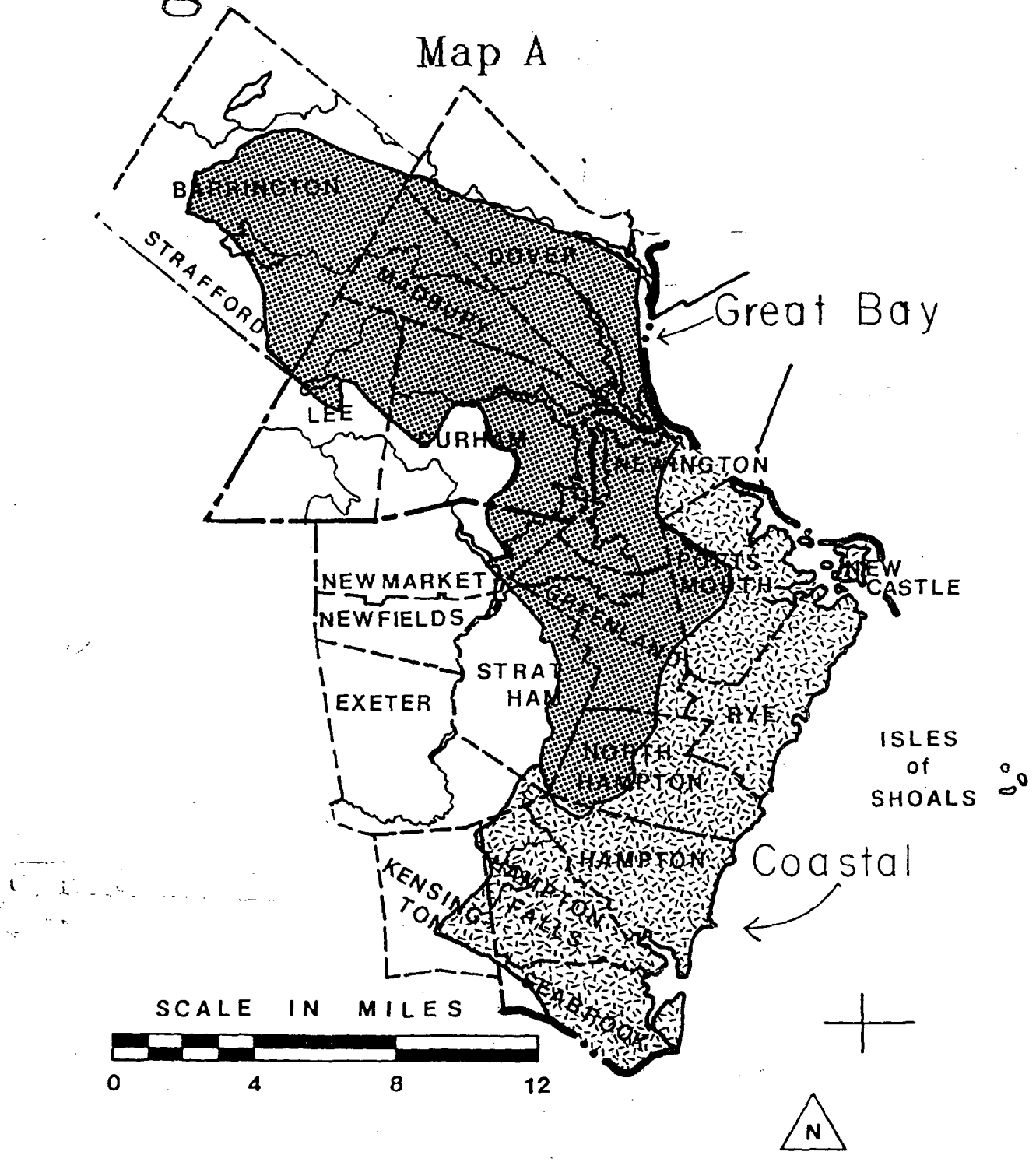
The Hampton portion of the Great Bay watershed is so small that it has no sub-watersheds. The Coastal watershed has many sub-watersheds, including three that contain portions of Hampton (see the Surficial Hydrology and Watersheds Map). The characteristics of these sub-watersheds are described below.

1. Taylor River/Hampton River Sub-watershed: The largest sub-watershed in Hampton is the Taylor River/Hampton River sub-watershed, which is part of the Coastal watershed. It extends into portions of Exeter, Kensington, and Hampton Falls. Within this sub-watershed there are seven named perennial watercourses, including Drakes River, Landing Brook, Nudd's Canal, Blind Creek, Tide Mill Creek, Eel Ditch, and Nilus Brook. There are many other unnamed watercourses with the area also. The sub-watershed also contains four surface water bodies - Batchelders or Coffin Pond, Lamprey Pond, Mill Pond, and Meadow Pond.

2. Old River Sub-watershed: The next largest sub-watershed is the Old River sub-watershed, which is part of the Coastal watershed. It extends into portions of Exeter and North Hampton. Within this sub-watershed there are two perennial watercourses, the Ash Brook and Old River, which has several unnamed tributaries. The only surface water body in the sub-watershed is Car Barn Pond.

3. Little River Sub-watershed: Only a small portion of the Little River sub-watershed is in Hampton. Located in the northeast corner of Hampton, the majority of the sub-watershed extends into North Hampton and Rye and is part of the Coastal watershed. Within this sub-watershed there are two unnamed perennial watercourses, one a branch of the Little River and one a tributary of Garland Brook in North Hampton. The sub-watershed contains six very small surface water bodies that are part of the Little River Swamp.

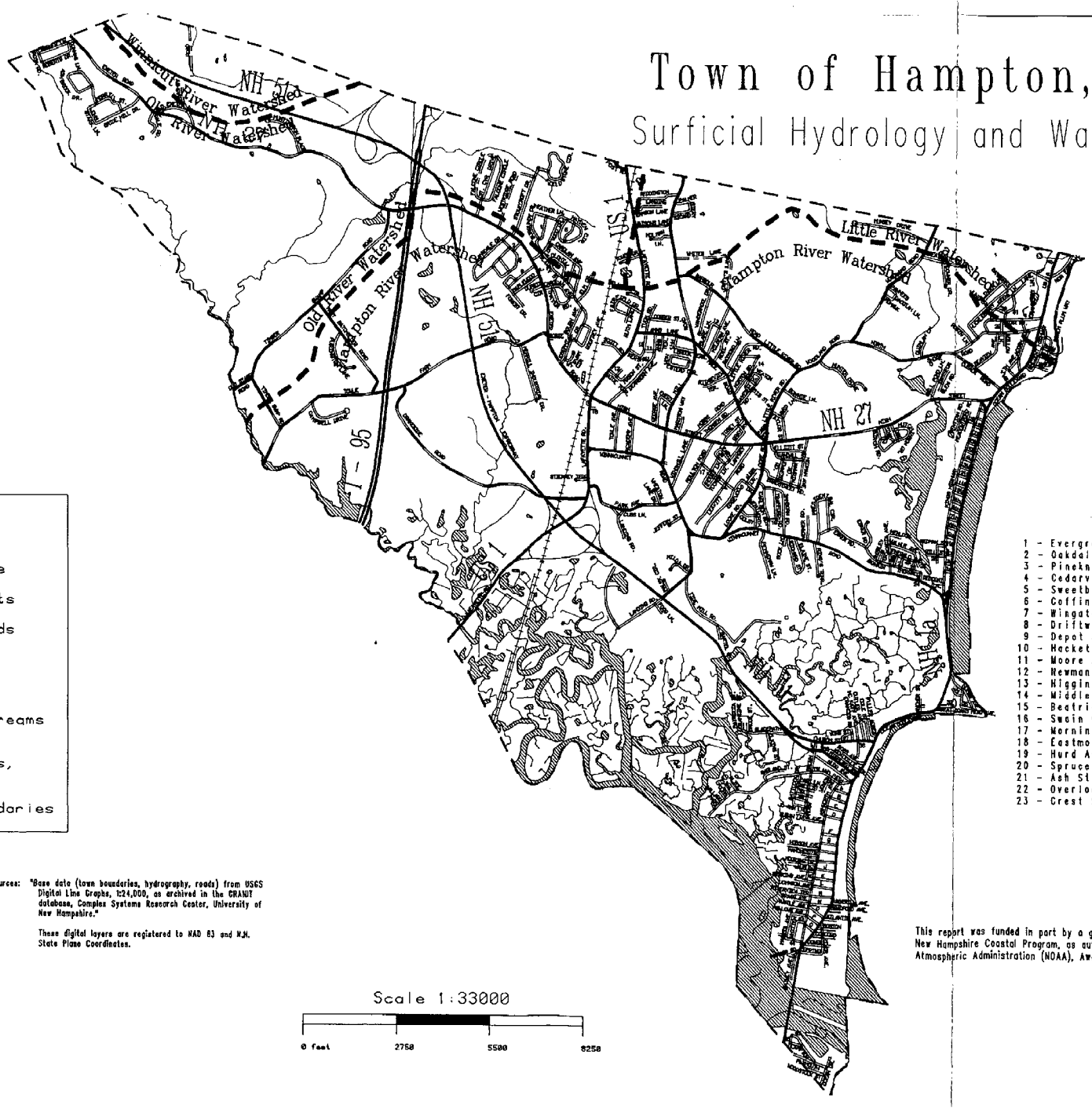
Regional Watersheds



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

Town of Hampton, N.H.

Surficial Hydrology and Watersheds



Legend

- Town boundary
- Primary Route
- Secondary Route
- Roads or Streets
- Unimproved Roads
- Ramps
- Railroad
- Shorelines, Streams and Brooks
- Rivers, Streams, Lakes or Ponds
- Watershed Boundaries

1 - Evergreen Rd.
2 - Oakdale Ave.
3 - Pineknoll Rd.
4 - Cedarview Ln.
5 - Sweetbriar Ln.
6 - Coffin Dr.
7 - Wingate
8 - Driftwood Rd.
9 - Depot Square
10 - Hackett Ln.
11 - Moore Ave.
12 - Newman St.
13 - Higgin Ln.
14 - Middle Rd.
15 - Beatrice Rd.
16 - Swain Ct.
17 - Morningside Dr.
18 - Eastmor Ln.
19 - Hurd Ave.
20 - Spruce St.
21 - Ash St.
22 - Overlook St.
23 - Crest St.
24 - Viking St.
25 - Sapphire Ave.
26 - Pearl St.
27 - Victor Rd.
28 - Greene St.
29 - Lancaster St.
30 - Moccasin Ln.
31 - Wild Rose Ln.
32 - Boars Head Ter.
33 - Anchor Ct.
34 - Sunsurf Ave.
35 - Cliff Ave.
36 - Charles St.
37 - Williams Ave.
38 - Chase St.
39 - Bittersweet Ln.
40 - Diane Ln.
41 - Keefe Ln.
42 - Auburn Ave. Ext.
43 - Dow Ave.
44 - Duston Ave.
45 - Thornton St.
46 - Portsmouth Ave.

Sources: "Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

Scale 1:33000

0 feet 2750 5500 8250

This report was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Award Number NA37OZOX77-01.

Prepared by the
Rockingham Planning Commission
September 26, 1994 DRA

4. Winnicut River Sub-watershed: The northwest corner of Hampton is in the Winnicut River sub-watershed, which is part of the Great Bay watershed. It extends into portions of Stratham, Exeter, North Hampton, and Greenland. This sub-watershed contains the Line Swamp, which is the origin of the Winnicut River and some its tributaries. There are no surface water bodies in this sub-watershed.

Hampton contains approximately 830 acres of water area; this represent 9.1% of the entire town. Most of this is salt water. ,Mill Pond, Car Barn Pond, Batchelder (Coffin) Pond and Lamprey Pond comprise most of the freshwater area. None of these ponds are used to any great extent for recreational purposes, except for ice skating in the winter. One reason is that most of the ponds are very shallow. Nearly all of the water recreation takes place along the six miles of Hampton's ocean shoreline.

B. WETLANDS

Hampton has a large number of significant wetland areas. Wetlands, defined by the Soil Conservation Service as those areas having poorly or very poorly drained soils, occupy approximately 38% of the total land area. Of that total, 12.2% are classified as poorly drained, while 7.3% are very poorly drained, and 18.8% are very poorly drained tidal wetlands. Most of the wetlands are found around the complex river system in the southern third of the Town and to the rear of the beaches.

The tidal marsh covers 1,554 acres of land along the Hampton and Taylor Rivers. This area is subject to daily tidal flooding and is unable to support heavy loads. These qualities present limitations to the building of roads and other structures on marsh soils. The prolonged exposure of marsh soils to air produces sulfur in acid form which has the potential to corrode metal and concrete materials.

The remaining 1,613 acres of wetlands are freshwater wetlands which are not subject to tidal flooding. These areas are located in the more interior sections of Hampton. Wetlands of this type are the ones expected to come under increasing development pressure as the land best suited for development is used up.

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:

a. providing habitat and reproduction areas for plants, fish and wildlife;

b. absorbing and utilizing nutrients from associated lakes or streams;
c. helping maintain groundwater levels;

d. acting as flood water storage areas;

e. absorbing (settling out) silt and other sediments caused by upstream erosion.

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

There is an ongoing need to protect wetlands in Hampton. Although the State of New Hampshire has laws and regulations in place, (RSA 482-A, administered by the Wetlands Board, and RSA 485-A, administered by the New Hampshire Water Supply and Pollution Control Division) they do not always provide the degree of protection needed. For these reasons, local control over the use of wetlands is recommended. A wetland conservation district ordinance, prepared by the Conservation Commission and endorsed by the Planning Board, was adopted at the 1985 Town Meeting. This ordinance, which has had minor amendments over the years, should provide the extra degree of protection for wetlands in Hampton.

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

The information from the Normandeau report was used to prepare the Wetlands Map, which shows the location of wetlands in Hampton. The original Normandeau maps and the wetlands map contained in this plan are useful for townwide planning purposes, but should not be utilized for on-site planning for specific development proposals. Field mapping of wetlands should be done to accurately identify the wetland boundaries.

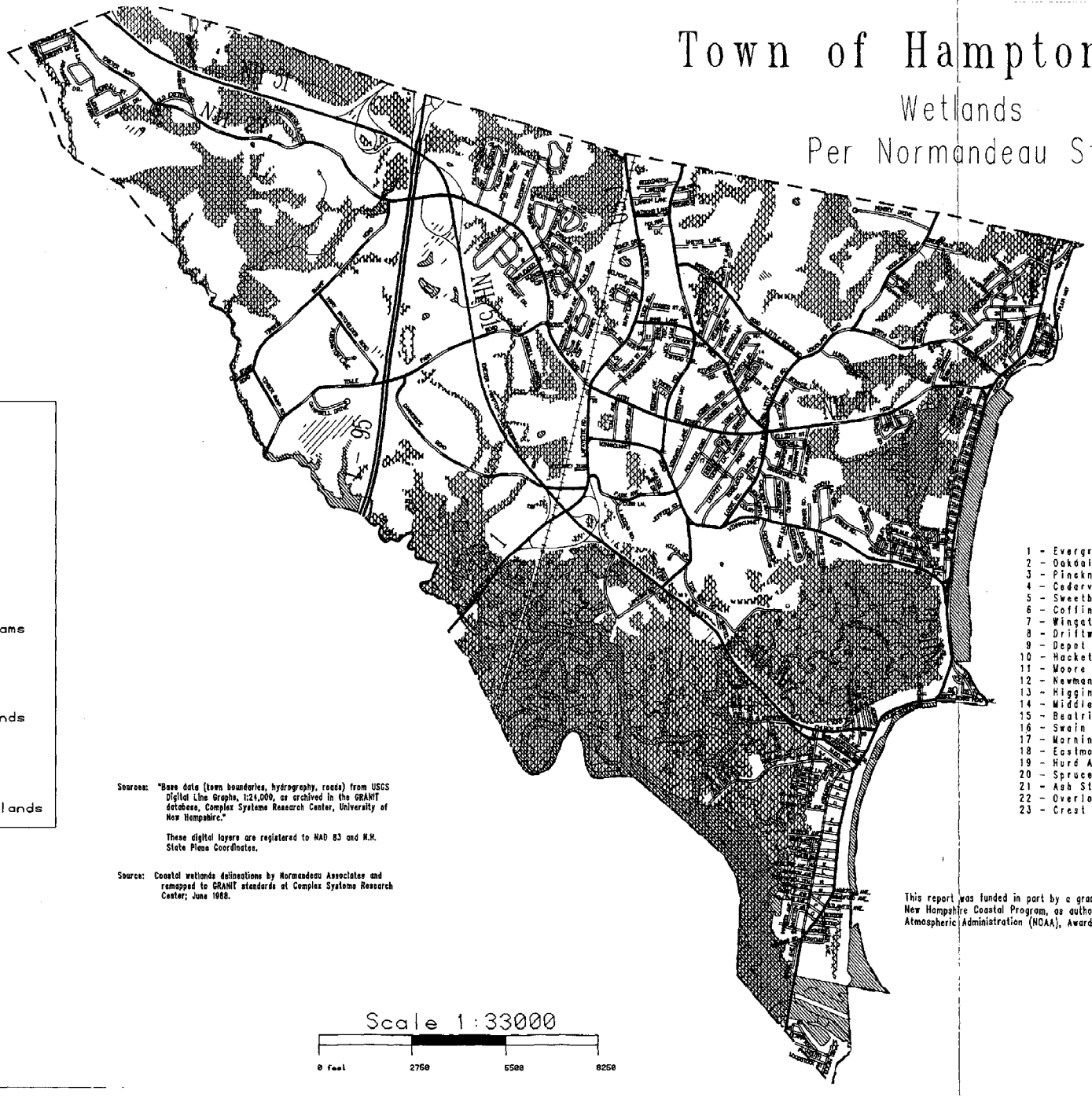
C. FLOOD HAZARD AREAS

A Flood Insurance Rate Map was prepared for the Town by the Federal Emergency Management Agency (FEMA) in 1986. The National Flood Insurance Program, administered by FEMA, allows residents living in flood hazard areas to purchase flood hazard insurance at subsidized rates, however, the insurance is only made available to communities which participate in the program. In order to maintain the town's participation in the program, the Zoning Ordinance was amended in 1987 to adopt the required model floodplain development ordinance.

The Flood Insurance Rate Map, dated July 3, 1986, shows the estimated extent of inundation during a 100-year frequency flood, including areas affected by wave action near the coast. Many homes and businesses are located in flood prone areas. Development in flood prone areas is problematic in three ways:

Town of Hampton, N.H.

Wetlands
Per Normandeau Study



Legend

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- Secondary Route
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- Unimproved Roads
- Ramps
- Railroad
- Shorelines, Streams and Brooks
- Rivers, Streams, Lakes or Ponds
- Classified Wetlands
- Surface Water
- Upland Areas
- Unclassified Wetlands

N

1 - Evergreen Rd.
2 - Oakdale Ave.
3 - Pineknoll Rd.
4 - Cedarview Ln.
5 - Sweetbrier Ln.
6 - Coffin Dr.
7 - Wingate
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Sources: "Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

Source: Coastal wetlands delineations by Normandeau Associates and remapped to GRANIT standards at Complex Systems Research Center; June 1988.

This report was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Award Number NA37OZ0277-01.

Scale 1:33000

0 feet 2750 5500 8250

Prepared by the
Rockingham Planning Commission
September 28, 1994 DRA

1. it risks damage to life and property;

2. it reduces flood storage capacity of the floodplain, thus worsening flood conditions elsewhere; and,

3. the inundation of developed areas can contribute to water quality problems.

These problems can be controlled through the adoption of floodplain regulations as part of the National Flood Insurance Program. These regulations require any development to meet strict federal building codes specific to construction in flood hazard areas. This discourages unsound development in the flood hazard areas.

GROUNDWATER RESOURCES

Groundwater is a concentration of subsurface water, occurring in saturated soils and geological formations. It is resupplied through precipitation and surface water discharge. The water infiltrates the ground through an aerated zone where impurities are filtered out. The water then moves to a saturated zone where the pore spaces between soil particles are filled by the water. These saturated zones are called aquifers. It is very important that the earth's surface be able to transmit water so that a certain percentage can be stored underground as "groundwater". If excessive compaction or extensive covering of the earth's surface occurs, the amount of water that can reach the saturated zone and become groundwater is reduced.

Aquifers (concentrations of groundwater) are found where saturated layers are permeable and the storage and transmission of water can take place. Aquifers having medium to high potential to yield groundwater occur in the New Hampshire seacoast area as alluvial deposits of sand and gravel (unconsolidated deposits) or in bedrock fractures (consolidated deposits). The major source of recharge to the aquifers of the seacoast area is through precipitation directly onto the aquifer's surface. In terms of the hydrologic cycle, approximately one-half of the average annual precipitation in the seacoast area is returned to the atmosphere as evapotransporation. The other half is split between surface water discharge and groundwater storage.

The unconsolidated deposits, also called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. They are found primarily along valley bottoms. These materials have abundant pore space to store water, in fact, these pore spaces can account for more than 30% of the deposit's total volume. Consequently, these stratified drift deposits of sand and gravel have become good sources of medium to high volume aquifers.

Bedrock fractures normally do not yield the same quantity of ground-water that stratified drift deposits do, however, they cannot be overlooked in terms of contributing to a community's water supply needs. Bedrock fractures are more productive when the bedrock has a layer of sand and gravel over it. This allows recharge to occur directly from above. Bedrock fractures are usually adequate for domestic wells serving a small population. In

contrast, a till aquifer is usually lower yielding and can have a short well life. This is due to a mixture of clay, silt, gravel and boulders which tends to compact due to the different soil particle sizes. The transmission and storage of water is greatly reduced in this type of aquifer.

Stratified Drift Aquifers

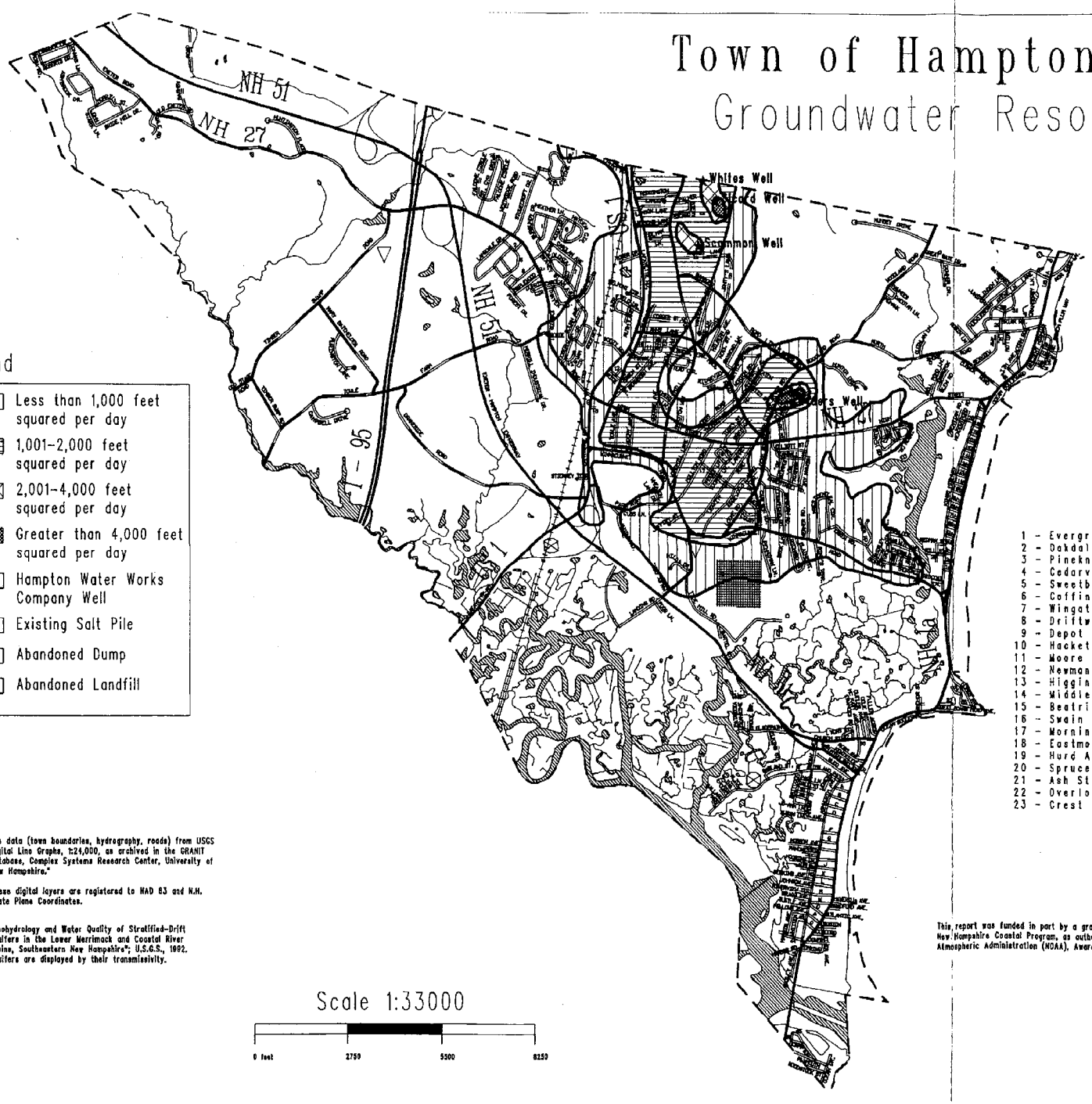
In 1993 the United States Geological Survey (USGS) completed the most through and accurate study of the region's groundwater resources to date. The report is entitled, Geohydrology and Water Quality of Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern NH. The report identified one large stratified drift aquifer in Hampton. A brief description of the identified aquifer follows and its general locations can be seen on the Groundwater Resources Map.

The stratified drift aquifer was identified by the USGS study as being located in the center of the town. The aquifer extends into North Hampton and is 110 acres in size. The saturated thickness, which is defined as the thickness of an aquifer below the water table, ranges from less than 20 feet to more than 40 feet. The transmissivity of the aquifer varies depending on the location. Transmissivity is the rate at which water is transmitted through the aquifer. Most of the aquifer is estimated to have a transmissivity of less than 1,000 feet squared per day or between 1,000 and 2,000 feet squared per day. As the Groundwater Resources Map shows, there are three small areas with a transmissivity between 2,001 and 4,000 feet squared per day, and two small areas with a transmissivity of greater than 4,000 feet squared per day. It is not surprising to note that all four of the Hampton Water Works Company wells in Hampton are located in areas with a transmissivity of greater than 2,000. The aquifer is a coarse-grained stratified drift, with materials ranging principally from medium to sand to cobble gravel.

A large part of this aquifer area is already urbanized, but the threat of groundwater contamination is somewhat lessened because these areas are almost entirely served by municipal sewer lines. However, because of the high water table and lateral groundwater flow, an isolated pollution source could be spread underground. Soils don't have as long to filter out the contamination because the water table is so high.

In an effort to more accurately define the recharge areas of their water supply wells, the Hampton Water Works Company hired Leggette, Brashears & Graham, Inc., consulting groundwater geologists. A report entitled, Evaluation of Recharge Areas for Water Supply Wells of the Hampton Water Works Company July 1987 was prepared by the firm. Figure 3 on page 9 of the report delineates the primary recharge area for the wells in Hampton. This information was transferred onto the Groundwater Resources Map. Hampton Water Works Company has five wells within the identified recharge area, four in Hampton and one in North Hampton. The proximity of these wells to commercial development along Route One and the airfield make the potential for contamination a great concern. Based upon the information in this and previous studies, the need for protecting Hampton's aquifers is as great as ever.

Town of Hampton, N.H.
Groundwater Resources



Legend

- Town boundary
- Primary Route
- Secondary Route
- Roads or Streets
- Unimproved Roads
- Ramps
- Railroad
- Shorelines, Streams and Brooks
- Rivers, Streams, Lakes or Ponds
- Landfill
- Less than 1,000 feet squared per day
- 1,001–2,000 feet squared per day
- 2,001–4,000 feet squared per day
- Greater than 4,000 feet squared per day
- Hampton Water Works Company Well
- Existing Salt Pile
- Abandoned Dump
- Abandoned Landfill

1 - Evergreen Rd.
2 - Oakdale Ave.
3 - Pineknoll Rd.
4 - Cedarview Ln.
5 - Sweetbrier Ln.
6 - Coffin Dr.
7 - Wingate
8 - Driftwood Rd.
9 - Depot Square
10 - Hackett Ln.
11 - Moore Ave.
12 - Newman St.
13 - Higgin Ln.
14 - Middle Rd.
15 - Beatrice Rd.
16 - Swain Ct.
17 - Morningside Dr.
18 - Eastmor Ln.
19 - Hurd Ave.
20 - Spruce St.
21 - Ash St.
22 - Overlook St.
23 - Crest St.
24 - Viking St.
25 - Sapphire Ave.
26 - Pearl St.
27 - Victor Rd.
28 - Greene St.
29 - Lancaster St.
30 - Moccasin Ln.
31 - Wild Rose Ln.
32 - Boars Head Ter.
33 - Anchor Ct.
34 - Sunsurf Ave.
35 - Cliff Ave.
36 - Charles St.
37 - Williams Ave.
38 - Chase St.
39 - Bittersweet Ln.
40 - Dione Ln.
41 - Keefe Ln.
42 - Auburn Ave. Ext.
43 - Dow Ave.
44 - Duston Ave.
45 - Thornton St.
46 - Portsmouth Ave.

Sources: "Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Geohydrology and Water Quality of Stratified-Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern New Hampshire"; U.S.G.S., 1982. Aquifers are displayed by their transmissivity.

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Prepared by the
Rockingham Planning Commission
September 22, 1994 DRA

Existing and potential sources of groundwater pollution in the aquifer areas should be identified. One obvious area of concern should be the landfill, which is partially within the aquifer. These issues will be addressed in the closure plan for the landfill, which is currently being finalized. Other areas of potential pollution could include abandoned dump sites, salt piles, or even salt runoff from the major state highways. High density developments in unsewered areas of town could also cause groundwater pollution.

The Coakley Landfill in North Hampton, a superfund site, is a potentially serious source of groundwater contamination. Since Hampton relies on wells in North Hampton for a portion of its water supply, developments at the site could affect Hampton. Groundwater is a regional concern.

WATER SUPPLY

Public water supply is provided to the Town by the Hampton Water Works Company, an investor-owned and operated public utility that is a division of the American Water Works Company. In addition to Hampton, it also provides water service to North Hampton and to the Rye Beach and Jenness Beach sections of Rye. The company serves 7,500 customers in all three towns.

The water supply system serves all major developments in Hampton. Areas not served include: west of Interstate 95, North Shore Road, and south of Route 51. Water supply lines are usually extended wherever necessary to serve newly developed areas. According to the 1990 US Census data, the company serves 8,024 of the 8,602 housing units in Hampton. About 93% of the households receive their water from the company. The remaining population obtains water from private wells.

Hampton Water Works depends upon ten wells, located in Hampton (4), North Hampton (5), and Rye (1) for its water supply. All the wells are gravel packed except one in North Hampton that is a rock well. The total estimated safe yield of the wells is 4.35 million gallons a day (mgd). On the average day, the company supplies Hampton with 2.15 million gallons of water. However, user demand increases about 200% during the summer months because of the large influx of people who take advantage of the recreational opportunities in the area. The estimated 66,000 summer residents cause the maximum day demand to exceed 5 mgd. In 1983, the maximum demand was 3.95 mgd, and by July of 1993 it reached 4.76 mgd.

The following is a list of Hampton Water Works Company wells:

Well	Location	Pumping Capacity
Ryders	Hampton	936,000 gpd
Scammon	Hampton	864,000 gpd
Sicard Street	Hampton	1,008,000 gpd
Whites Field	Hampton	518,000 gpd

Crenshaw	North Hampton	792,000 gpd
Rock Well-13A	North Hampton	432,000 gpd
Coakley	North Hampton	432,000 gpd
Marston Spring	North Hampton	180,000 gpd
Dalton Well 14	North Hampton	144,000 gpd
Jenness Beach	Rye	120,000 gpd

In addition to the wells, the company has three water towers located in Hampton. These are important because not only do they store large quantities of water to back up the wells, but they also help maintain water pressure throughout town. They are also valuable water sources for fire protection. One water tower is located on Mill Road and has a storage capacity of 300,000 gallons. The beach area is served by a 500,000 gallon water tower on Church Street. The third tower is located on Exeter Road near Interstate 95. It was built in 1983 and has a capacity of 750,000 gallons. The location is logical considering the potential for development in the western section of town.

The company also installs and maintains fire hydrants, of which there are over 236 in Hampton and a total of 428 in the company's franchise area. Although expansion of the hydrant system is costly, it should keep pace with the expansion of the water supply system.

Water rates are computed by metered volume charges after an initial minimum charge. In an effort to conserve water resources, the company undertakes a leak detection investigation twice a year. In recent years, the water company has had to institute voluntary water bans during the high demand summer months.

Hampton Water Works Company should continue to grow and expand, parallel to the growth of Hampton. Currently, the company is continuing to explore for additional water supplies in their franchise area.

TRANSPORTATION

The condition of the transportation system in Hampton and the region is an important factor in determining the Town's future development and has an impact on the quality of life for the citizens. The challenge will be for the Town and the state and federal government to respond to an increase in travel demands. Due to the seasonal fluctuation in the traffic, consideration must also be given to handling the summer traffic as well. Maintenance and expansion of the regional highway system, the local street system, parking and pedestrian facilities, and public transportation will all play a role in the future growth of Hampton.

As with most other communities in the area, the primary mode of transportation in Hampton is by automobile on the road network. According to figures from the N.H. Department of Transportation (NHDOT), there are 90 miles of roadway in Hampton. About 25% of the roads are maintained by the State of New Hampshire. Major highways within the state primary system are Route 1 (Lafayette Road), Route 51 (Exeter-Hampton Expressway), Route 27 (Exeter Road and High Street), Route 101E (Winnicunnet Road), Route 1A (Ocean Boulevard), Interstate 95, and a very small portion of Route 151 (Post Road). Route 1, Route 1A, and Interstate 95 are north-south highways; while Route 51, Route 27, and Route 101E are east-west highways. Interstate 95 has exit 2 and the tollbooths in Hampton. Due to the location of the tollbooths, some northbound motorists use exit 1 in Seabrook to get off of Interstate 95 and use Route 1 in Hampton to avoid the tolls.

Hampton has 12 Town roads that could be considered residential collector streets, meaning they collect residential traffic off smaller, low traffic streets that are used primarily by the residents of the street. Collector streets may also provide for travel from one neighborhood to another and into other communities. Hampton's collector streets are Timber Swamp Road, Towle Farm Road, Drakeside Road, Mill Road, Ann's Lane, Mace Road, Woodland Road, Little River Road, North Shore Road, Barbour Road, King's Highway, and Ashworth Avenue. The balance of Hampton's roads are minor collector or access roads which provide access to state highways or service roads which serve only adjacent property owners and accommodate little or no through traffic.

Classification of Streets and Highways

New Hampshire has a road classification system for the purpose of assigning construction and maintenance responsibilities. The system is divided into the following seven categories:

> **Class I, Trunk Line Highways**, consist of all existing or proposed highways on the primary state highway system, excepting all portions of such highways within the compact sections of towns and cities of 7,500 inhabitants and over. The state assumes full control and pays cost of construction, reconstruction and maintenance of its sections; the portions in compact areas controlled by the towns and cities

under Class IV highways. Interstate 95, the portions of Route 1 not in the compact section, Route 51, Route 101E, and the northern section of Route 1A fall within this class and total 18.35 miles in Hampton.

Class II, State Aid Highways, consist of all existing or proposed highways on the secondary state highway system, excepting portions of such highways within the compact sections of towns and cities of 7,500 inhabitants and over, which are classified as Class IV highways.

All sections improved to the satisfaction of the commissioner are maintained and reconstructed by the State. All unimproved sections, where no state and local funds have been expended, must be maintained by the town or city in which they are located until improved to the satisfaction of the highway commissioner.

All bridges improved to state standards with state aid bridge funds are maintained by the city or town until such improvement is made. All Class II roads are maintained by the state. There are 4.25 miles of Class II highways in Hampton, which include Route 27 and the southern section of Route 1A.

Class III, Recreational Roads, consist of all such roads leading to, and within, State Reservations designated by the Legislature. The State Highway Department assumes full control of reconstruction and maintenance of such roads. There are no Class III roads in Hampton.

Class IV, Town and City Streets, consist of all highways within the compact sections of towns and cities of 7,500 inhabitants and over. Extensions of Class I and Class II highways through these areas are included in this classification. At present there are 13 cities and 9 towns in this category. Presently there are 31.43 miles of Class IV roads in Hampton.

Class V, Rural Highways, consist of all other traveled highways which the town or city has the duty to maintain regularly. There are 33.95 miles of Class V roads in Hampton.

Class VI, Unmaintained Highways, consist of all other existing public ways, including highways discontinued as open highways, highways closed subject to gates and bars, and highways not maintained in suitable condition for travel for five years or more. There are 2.02 miles of Class VI roads in Hampton.

Other, consists of U.S. Forest Service roads and state secondary roads maintained by the U.S. Forest Service, also other toll highways not on the state turnpike system, (i.e. private toll road, Mt. Washington toll road, Monadnock toll road). There are none of these roads in Hampton.

Street and Highway Conditions

Overall the road conditions in Hampton are good. Approximately 25 percent of the roads are state highways and are in good condition, thereby relieving the Town of considerable maintenance responsibilities. The Department of Public Works budget is supplemented with money from the state's Highway Block Grant Program, which totaled $164,974 in 1993. Each year the Director of Public Works determines which roads are most in need of repair and improves as many as possible with the available funding.

The traffic conditions along Route 1 have been a major concern of many people for a number of years. The state's permanent traffic counter at the Hampton/North Hampton line indicates that the average daily traffic has increased from 11,382 in 1979 to 16,350 in 1992. In 1990 the traffic reached its highest level at 17,576. It is clear that something has to be done to accommodate the traffic on Route 1.

In 1988 the State of New Hampshire contracted with Kimball Chase Co. to study Route 1 and develop recommendations. The study, entitled U.S. Route 1 Feasibility Study, was released in September of 1989. The reader is referred to the study for a complete analysis of Route 1. Regarding Hampton, the study identified the Route 27 and Route 1 intersection as a problem area. A capacity analysis of the intersection indicated average delays of 46 seconds during the PM peak hour. In 1988 the intersection operated at a level of service of "E", meaning that there was unstable traffic flow, the traffic volumes were approaching the capacity of the intersection and that delays of 40 to 60 seconds would be encountered. The study made the recommendation that additional through/right turn lanes for both northbound and southbound Route 1 approaches be added to improve the capacity level to "B", which would reduce delays to less than 15 seconds.

The study also identified the Winnicunnet Road and Route 1 intersection as a problem area. The unsignalized, unconventional intersection exhibited a level of service of "F" during PM peak hour due to the excessive side street demand and had a high accident rate due to geometry-related conflicts. Signalization and reconfiguration of the intersection to a standard "T" was recommended by the study.

In 1994, the town appropriated funds to repave the urban compact portion of Route 1/Lafayette Road in an effort to upgrade the condition of the road. Since 1985, traffic signals have been installed by developers on Route 1 at the intersections with Stickney Terrace and Kershaw Avenue. Hampton officials should work closely with the State so that proposed improvements outside the urban compact area will be compatible with Hampton's plans for its section of Route 1.

Traffic Volumes

Traffic flow data is traditionally collected by placing automatic traffic counters along the desired roadway. The state's only permanent traffic counter in Hampton is located at the tollbooth on Interstate 95. Since this counter does not include the vehicles entering and exiting I-95 at exit 2, the counts are lower than the total number of vehicles passing

through Hampton on I-95. The state has done some non-permanent traffic counts on I-95 in Hampton Falls at the Hampton town line. The closest traffic counter on Route 1 is installed in North Hampton, just north of the Hampton town line. Traffic counts adjusted for the average day are presented in Table 1 for all locations that NHDOT has placed non-permanent counters from 1987 to 1992.

The growth in traffic on the state highways has been increasing slowly or in some cases, remaining level. Traffic on I-95 in Hampton increased by 7% between 1987 and 1992. Traffic on Route 1 has remained steady at three counter locations, ranging between 20,000 and 21,000 vehicles per day. Table 2 contains traffic data for the permanent counter locations at the I-95 tollbooth and Route 1 at the North Hampton town line. These counts are from 1979 to 1992 and include the yearly percent change in traffic volumes. 1985 and 1986 showed the largest increases in traffic counts.

Additional traffic count data from the NHDOT and the Rockingham Planning Commission from 1994 is presented in Table 3. These counts are not yearly averages, but are for monthly or weekly time periods. There are weekday and weekend counts for each location and some counts include data for each direction of travel. As expected, the summer weekend counts for Interstate 95 and Route 1 are the highest. For I-95, the July traffic is more than double the January traffic. The July traffic on Route 1 is more than four times the traffic in January. During the summer months, Winnicunnet Road and High Street carry close to 10,000 vehicles per day.

The Route 1 Feasibility Study indicates that traffic on Route 1, south of the Route 51 interchange, averaged more than 22,000 vehicles a day, while the traffic near the center of town averaged more than 23,000 vehicles per day and the traffic near the North Hampton town line dropped to less than 20,000 vehicles a day. By the year 2000, the study predicts the average daily traffic volumes on Route 1, south of the Route 51 interchange will be almost 32,000 vehicles per day. In the center of town, the study predicted a traffic volume of more than 33,000 and near the North Hampton line the average daily traffic was predicted to be more than 28,000.

In October of 1989 the State increased the tolls on Interstate 95 to $1.00 for through traffic. Local officials expected that this would result in a traffic increase on Route 1 due to people avoiding the tolls. The data collected at the permanent counter near the Hampton/North Hampton line did indicate an increase from 1989 to 1990, but since then the volumes have actually deceased yearly. The economic downturn in the region has obviously had an impact on the traffic volumes.

Compounding roadway capacity problems are the number of access and egress points and pedestrian crossings along the roadways. Of the major corridors identified, only Interstate 95 and Route 51 are limited access highways and do not suffer from these problems. In particular, in the Hampton Beach area, an extremely high pedestrian volume reduces the available roadway capacity leading to major vehicular delays.

HAMPTON MASTER PLAN TABLE 1 9/29/94

NHDOT NON-PERMANENT TRAFFIC RECORDER DATA

Town	Route	Location	1987 AADT	1988 AADT	1989 AADT	1990 AADT	1991 AADT	1992 AADT
HAMPTON								
	NH 1A	Seabrook TL	10943	10320	10578	9819	11746	9139
	I-95 RAMP SB	TO NH 51	4000	NA	NA	12000	NA	NA
	NH 51 RAMP	TO I-95 SB	4000	NA	NA	11000	NA	NA
	I-95 RAMP SB	TO NH 51 EB & WB	3600	NA	NA	10000	NA	NA
	NH 51 RAMP	TO I-95 NB	4200	NA	NA	12000	NA	NA
	Mace Rd	E of Mill Rd	NA	3500	3600	4300	4000	NA
	NH 27	S of Carolina Ave	NA	10700	NA	NA	NA	NA
	North Shore Rd	E of Quinlan Lane	NA	1900	2000	1400	NA	NA
	Mill Road	N of Ann's Lane	NA	4000	4100	3700	3700	NA
	N Beach Rd	W of NH 1A	NA	1000	1100	1100	600	NA
	NH 51	E of NH 101D	NA	19000	19700	18000	NA	NA
	US 1	N of NH 101E	NA	20600	21300	21000	NA	NA
	NH 51	E of US 1	13000	14300	14700	12000	11800	NA
	NH 51	W of US 1	11000	11900	12300	8800	9000	7100
	NH 51	W of Glade Path & Church St	NA	NA	14700	15000	NA	NA
	Barbour Rd	E of Milbern Ave	NA	800	NA	NA	NA	NA
	NH 1A	S of NH 101E	10700	11100	11500	11000	NA	NA
	NH 1A	S of NH 101E TOT TRAF	NA	NA	NA	NA	NA	8800
	US 1	N of Ann's Lane	NA	NA	NA	20000	NA	NA
	NH 27	W of US 1 near bridge	NA	11500	11900	11000	NA	NA
	US 1	S of Ramp to NH 51	NA	NA	NA	20000	20200	NA
	NH 27	E of US 1	NA	9000	9300	8100	NA	NA
	I-95 NH TPK	Hampton toll booth-thru traf	46236	48442	49201	48000	48187	49263
HAMPTON FALLS								
	I-95 NH TPK	Hampton TL	49700	51500	54200	56000	NA	61000

TABLE 2

NHDOT PERMANENT TRAFFIC RECORDER DATA

NORTH HAMPTON/US 1			HAMPTON TOLL/I-95 thru traff		
YEAR	AADT	GAIN/LOSS	YEAR	AADT	GAIN/LOSS
1978	11382	NA	1979	26192	NA
1980	11438	0.5%	1980	26238	0.2%
1981	12139	6.1%	1981	27859	6.2%
1982	13184	8.6%	1982	30359	9.0%
1983	13764	4.4%	1983	33202	9.4%
1984	12765	-7.3%	1984	35584	7.2%
1985	14720	15.3%	1985	39505	11.0%
1986	16350	11.1%	1986	43317	9.6%
1987	15810	-3.3%	1987	46236	6.7%
1988	16483	4.3%	1988	48442	4.8%
1989	16696	1.3%	1989	49201	1.6%
1990	17576	5.3%	1990	48000	-2.4%
1991	16482	-6.2%	1991	48187	0.4%
1992	16350	-0.8%	1992	49263	2.2%

AADT = Adjusted Average Daily Traffic

*All data is taken from 1991 and 1992 NHDOT Traffic Volume Reports

TABLE 3

1994 TRAFFIC COUNTS IN HAMPTON

Town	Route	Location	Count Dates	Sunday (AWT)	Weekday Counts	Saturday Counts	Daily (ADT)
HAMPTON							
	* I-95	NB at Tolls	Jan-94	15898	16703	16812	16519
	* I-95	NB at Tolls	Feb-94	18165	18890	21771	19198
	* I-95	NB at Tolls	Mar-94	19995	19471	23527	20062
	* I-95	NB at Tolls	Apr-94	23439	22535	25527	23154
	* I-95	NB at Tolls	May-94	32755	22599	23658	24374
	* I-95	NB at Tolls	Jun-94	26904	27633	33541	28324
	* I-95	NB at Tolls	Jul-94	34555	35026	49144	37227
	* I-95	SB at Tolls	Jan-94	25234	16194	15490	17539
	* I-95	SB at Tolls	Feb-94	26195	18192	18474	19376
	* I-95	SB at Tolls	Mar-94	29333	18302	20957	20068
	* I-95	SB at Tolls	Apr-94	29632	21325	22790	22677
	* I-95	SB at Tolls	May-94	23739	23612	30269	24492
	* I-95	SB at Tolls	Jun-94	42518	24531	26508	27193
	* I-95	SB at Tolls	Jul-94	51296	32755	36187	36299
	* US 1	NB at Seabrook TL	Jan-94	2609	1902	2564	2123
	* US 1	NB at Seabrook TL	Feb-94	3920	2153	3426	2587
	* US 1	NB at Seabrook TL	Mar-94	4266	2502	4418	2977
	* US 1	NB at Seabrook TL	May-94	6678	4346	8451	5252
	* US 1	NB at Seabrook TL	Jun-94	8138	6157	9831	6791
	* US 1	NB at Seabrook TL	Jul-94	9852	8456	10742	9049
	* US 1	SB at Seabrook TL	Jan-94	2873	2029	2801	2290
	* US 1	SB at Seabrook TL	Feb-94	4370	2313	3569	2787
	* US 1	SB at Seabrook TL	Mar-94	4714	2721	4704	3234
	* US 1	SB at Seabrook TL	May-94	8846	4947	9411	6152
	* US 1	SB at Seabrook TL	Jun-94	11396	7316	10818	8327
	* US 1	SB at Seabrook TL	Jul-94	12899	10171	12327	10959
	* I-95	NB on ramp from NH 51	5/11to5/17/94	3622	5186	4624	4861
	* I-95	NB off ramp to NH 51	5/11to5/17/94	4346	4263	5003	4372
	* I-95	SB on ramp from NH 51	5/11to5/17/94	6626	4416	4811	4823
	* I-95	SB off ramp to NH 51	5/11to5/17/94	3797	4826	3918	4543
	* NH 27 (High St.)	E. of US 1	6/22to6/27/94	9246	9843	8527	9588
	* NH 51	E. of NH 111	6/22to6/27/94	18965	21069	16406	20167
	* Mill Rd	NB N. of Ann's Lane	6/22to6/27/94	1692	2130	2041	2060
	* Mill Rd	SB N. of Ann's Lane	6/22to6/27/94	1687	2163	1991	2077
	# Woodland Rd	NB N. of Little River	7/5/to7/11/94	1322	1490	1543	1471
	# Woodland Rd	SB N. of Little River	7/5/to7/11/94	1321	1443	1374	1411
	# Towle Farm Rd	WB Over I-95	7/5/to7/11/94	1075	1386	1173	1298
	# Towle Farm Rd	EB over I-95	7/5/to7/11/94	1026	1340	1188	1262
	# Tidemill Rd	Near Hampton Public Works	8/5to8/15/94	69	413	108	295
	# Tidemill Rd	Near Landing Rd	8/3 to8/15/94	235	721	337	587
	# Winnicunnet Rd	EB W. of Locke Rd	8/10to8/15/94	4887	5661	6147	5613
	# Winnicunnet Rd	WB W. of Locke Rd	8/10to8/15/94	4792	5068	5364	5071
NORTH HAMPTON							
	* US 1	N. of B&M RR Bridge	Jan. 94	10323	13813	12015	12960
	* US 1	N. of B&M RR Bridge	Feb. 94	11275	14470	14618	14034
	* US 1	N. of B&M RR Bridge	Mar-94	12455	15316	16507	15101
	* US 1	N. of B&M RR Bridge	Apr-94	12751	17119	17332	16572
	* US 1	N. of B&M RR Bridge	May-94	14631	17654	18633	17271
	* US 1	N. of B&M RR Bridge	Jun-94	14787	18742	17893	18101
	* US 1	N. of B&M RR Bridge	7/1 to 7/6/94	16064	18325	18274	17952

* Information from 1994 NHDOT Traffic Count Data

\# Information from Rockingham Planning Commission Traffic Count Data

Beyond the problems associated with multiple access and egress points, capacity problems are also intensified on Routes 1 and 1A by the presence of on-street parking. In these two corridors, motorists must not only be aware of turning vehicles and pedestrians in the street, but also moving vehicles entering or leaving parking spaces.

In order to reduce the traffic congestion on Route 1, Hampton favors increased access to Interstate 95 to serve traffic to and from North Hampton and Rye.

Financing Road Improvements

Hampton's road network is eligible to receive four forms of financing made available by the Federal and State governments:

1. State Aid Construction Funds are provided for improvement of uncompleted sections of state secondary, Class II highways. The ratio of state to town matching funds is based on the assessed valuation of the municipality and varies from a 2 to 1 ratio in small towns to a 1 to 1 ratio in the large municipalities. Application must be made to the Administrator, Bureau of Municipal Highways by May 1 of each year, but preliminary discussions about such projects should begin well in advance of this date (RSA 235).

2. State Aid Reconstruction Funds are available for improvement of completed sections of state secondary, Class II highways when the town or city wishes to advance the priority of construction for special types of work such as improved drainage, riding surface or elimination of sharp curves. The matching ratio is the same as for State Aid Construction Funds and application is made in the same manner (RSA 235).

3. Highway Block Grant Aid Funds are apportioned to all cities and towns on a yearly basis for the construction, reconstruction, and maintenance of Class IV and V highways on the following basis:

   Apportionment A. These funds are allocated from an annual apportionment of not less than 12% of the total highway revenues collected the preceding fiscal year. The amount distributed is based on one-half mileage and one-half population as the city/town factors bear to the state total.

   Apportionment B. These funds are allocated from an annual apportionment of $400,000; the amount available to towns is based on a formula using equalized valuation and Class V mileage designed to give the greatest benefit to the low valuation towns with high road mileage.

   Block Grant Aid payments are made as follows: 30 percent in July; 30 percent in October; 20 percent in January; and 20 percent in April. Unused balances may be carried over to the following municipal fiscal year (RSA 235.)

4. Federal Aid Bridge Replacement Funds are available for replacement or rehabilitation of town bridges over 20 feet in length. Bridge Aid funds may be used for matching these funds. Application is made to the Administrator, Bureau of Municipal Highways in the same manner as aid under the Bridge Aid Program.

Another possible funding source which many communities across the country, including ones in New Hampshire, are utilizing are road impact fees. These are fees collected from the developer to pay for part of the cost of infrastructure, in particular roads. The recent trend of shifting the burden to the private sector can be attributed to not only reduced federal assistance but also to the realization by municipal officials that new development is not paying its way, resulting in the burden being placed upon the residents of a community instead.

In 1991 the state Legislature passed enabling legislation allowing communities to assess impact fees under certain conditions, which are detailed in RSA 674:21 V. Due to the administrative burden associated with assessing impact fees, very few communities have adopted an impact fee ordinance. However, a number of communities in New Hampshire are negotiating with developers based on a rational nexus or proportionate benefit concept as was upheld in an important New Hampshire court case - Land/Vest Properties, Inc. v. Town of Plainfield.

Essentially, future deficiencies are identified by traffic and fiscal impact studies, and in turn are the basis for the community to negotiate with the developer about a financial contribution that would be used to pay for improving roads or other infrastructure which would ultimately be needed by those residing in the development.

Scenic Roads

Another transportation issue is scenic roads, which is addressed in RSA 231:157. In order to designate any road in town as scenic, other than a Class I or Class II highway, 10 persons (voting or non-voting) owning land abutting the proposed road can petition the town to do so. In turn, the town votes on it at any regular or special Town Meeting. Voters can also rescind the designation of a scenic road at a regular meeting upon petition.

By designating a road scenic, there are two benefits the town can enjoy. First, it establishes a procedure for protecting the rural landscape within a public right-of-way. Secondly, it can demonstrate the public's interest to preserve the rural qualities of a road.

The effects of designating a road scenic are detailed in RSA 231:158. Included are restrictions upon the repair, maintenance, reconstruction or paving work which is done to the road. Two important facets of the designation are that it does not affect the eligibility of the Town to receive construction, maintenance, or reconstruction funds, or affect the rights of any land owner with respect to work on his own property.

The only road designated as a scenic road by Hampton is Timber Swamp Road in the western part of town.

Commuting Patterns

Being a largely residential community, many of Hampton's citizens commute out of town to go to work. According to the data from the 1990 U.S. Census, 4,975 of the 6,559 workers residing in Hampton, worked outside of the Town. In addition, 2,430 residents worked outside of Rockingham County and 1,965 worked outside of New Hampshire. The major work destinations for Hampton workers are listed below in Table 4. Even though Hampton is considered by some to be a "bedroom community" for the Boston metropolitan area, Table 4 shows that only six of the thirteen work destinations (excluding Hampton) are to the south.

TABLE 4
COMMUTING PATTERNS

Work Place	No.	Work Place	No.
Hampton	1584	Newburyport, MA	150
Portsmouth	994	Newington	148
Seabrook	424	Manchester	126
Exeter	259	Kittery, ME	115
North Hampton	247	Rye	113
Boston, MA	230	Hampton Falls	111
Haverhill, MA	219	Andover, MA	88

Source: 1990 U.S. Census

According to the 1990 U.S. Census, the median travel time to work for Hampton Falls' workers was 20 to 24 minutes. The most common travel time to work was 5 to 9 minutes. For 79 workers, their travel time was 90 or more minutes. Also, 154 residents worked at home.

Parking

Two areas of town are generally understood to suffer significant parking problems -- Hampton Beach (served by 3 municipal lots and numerous private parking lots) and the downtown area (served by 1 municipal lot). For years, business interests within both areas have expressed the desire for increased parking.

Accepting the need to address the parking problem, there are two choices -- increase ground-level parking, or construction of a parking garage. Additional space for ground-level parking in both the downtown and the beach area is difficult to find given the scarcity of open, buildable land in both locations. The municipal lot in the downtown could be expanded southward behind the businesses along Route 1 if that land could be obtained by the Town. This option would depend on the cooperation of the merchants in this area. In 1993, the town redesigned the parking space layout in the lot to increase the number of spaces.

The option of building a parking garage has been discussed for many years. A study conducted in the mid-1980's found that the cost of building a parking garage in the beach area does not appear justifiable, as a municipal investment, to address only a seasonal demand. While a parking garage located downtown would be used year-round, this option appears to be impractical because of the lack of available land to locate such a structure and the fact that it would be out of character with the rest of the downtown. A parking garage in the downtown would not be suited for use by beachgoers since it would require them to enter the downtown, causing greater traffic congestion.

A compromise solution could be to locate a parking lot in an off-beach area and provide a shuttle bus system to the beach and downtown. By charging a smaller fee than at a beach lot and providing inexpensive and frequent bus service to the beach, people would be encouraged to use an off-beach lot. This proposal would help alleviate the parking shortage at the beach.

Public Transportation

Expanding public transportation is one way to alleviate a portion of Hampton's seasonal traffic congestion problem. Mass public transit, such as buses and taxies, are available on a limited basis in Hampton at this time. According to the 1990 U.S. Census, only 13 residents use the bus to travel to work. Coach Company operates a bus service between Portsmouth and downtown Boston, with stops at the state park and ride lot on the corner of Exeter Road and Timber Swamp Road in Hampton and the Newburyport park and ride lot. This service makes two round trips per day. Hampton Shuttle runs a six passenger executive van to Logan Airport ten times a day, with stops in Portsmouth, Exeter, Hampton and Seabrook. Lamies Tavern on Lafayette Road is the location of the Hampton stop. The Seacoast Trolley services the seacoast communities of North Hampton, Hampton, Seabrook, Salisbury, and Newburyport. The service carries people on two fixed routes; one route travelling between Hampton Beach and Newburyport and the other route travelling between Hampton Beach and North Hampton shopping centers.

Studies conducted to consider establishing passenger train service along the existing Hampton branch railroad tracks have concluded that such a proposal would not be feasible at this time. The rail line is used only for occasional freight service to businesses along the line in Hampton. The rail line in Hampton Falls has been removed.

As Hampton and the surrounding communities continue to grow, mass transit developed as a regional system should be an important consideration. In 1994, a proposal to establish passenger rail service from Boston to Portland, Maine was approved. Train stations are being planned for Haverhill, Ma., Exeter, and Dover, with a seasonal stop in Durham. Residents of Hampton could utilize the Exeter or Haverhill sites to travel to Portland or Boston. With only three runs a day initially, it is unlikely that the train will be used by commuters on a regular basis.

Air transportation is an important part of the overall transportation picture. The present Hampton Airport located both in Hampton and North Hampton is not adequate to provide

air commuter service, except for those that are pilots themselves. Expansion of the airport is unlikely and undesirable due to the highly congested nature of the surrounding land. Commuter plane service out of the Pease International Tradeport was started in 1992. The distance from Hampton to Portsmouth decreases the likelihood of residents using the airport for commutes to Boston, but it may be an attractive alternative for longer trips along the eastern seaboard.

According to the 1990 U.S. Census, 814 out of 6,110 (13%) Hampton's workers who drive to work participate in a carpool. A two-person carpool is used by 702 workers, a three-person carpool is used by 79 workers, and 33 workers use a four-person carpool. Interestingly enough, 157 workers walk to their job and 18 use a bicycle to get to work.

As part of a regional effort to reduce our dependance on motor vehicles and to improve air quality, the Seacoast Metropolitan Planning Organization has developed a regional bike plan that proposes the location of bicycle routes in the region. In Hampton the plan proposes establishing bike routes along Route 1A and Route 27. Many details still need to be worked out regarding design and funding prior to the bike plan can be implemented.

State and Federal Transportation Projects

The major transportation project in Hampton and the seacoast is the completion of Route 101/51 from Epping to Hampton. Construction of the four lane highway will require the reconstruction of bridges and the acquisition of land along the highway in Hampton. The impact is minimized because the highway stays within the existing right-of-way. The four lane section of the highway will transition into a two lane highway near Towle Farm Road. Reconstruction of the bridges has already begun for the project.

There are two public transportation projects that were approved for funding during the 1994 Congestion Mitigation and Air Quality (CMAQ) application round that will impact Hampton. CMAQ funds are available for transportation projects in ozone and carbon monoxide non-attainment areas, which Hampton is in. Projects must demonstrate that they will improve air quality through a reduction in vehicle miles traveled, fuel consumption, or other factors. CMAQ projects require a 20 percent match from the local applicant.

The Hampton Shuttle will receive funds of $39,837 in 1995 to operate a passenger shuttle service every two hours between Manchester and the Seacoast area, including Hampton and Portsmouth. The project would provide passenger and package connection between the Manchester Airport and the Pease Trade Center Airport.

The other CMAQ project is Timberlane Coach Company's proposal to expand the operation of the Seacoast Trolley to include destinations in Portsmouth and Pease Tradeport as well as park-n-rides in Portsmouth and Newburyport. Scheduled to be started in 1995, the total project cost will be $61,425, with CMAQ funds of $49,140.

Other Transportation Issues

As Hampton and the area grows, additional truck traffic can be expected on local roads. In order to ensure that trucks use the proper roads, the town should enforce RSA 47:17, Section VIII "Traffic Devices and Signals" (made applicable to Selectmen by RSA 41:11), which empowers the Board of Selectmen:

> "To make special regulations as to the use of vehicles upon particular highways, except as to speed, and to exclude such vehicles altogether from certain ways; to establish stop intersections, erect and provide for the control of traffic by, stop signs or other traffic devices or signals which shall conform to standards set by the highway commissioner and shall be approved by him as to type, size, installation and method of operation."

This RSA allows Hampton to adopt an ordinance restricting vehicles above certain weights from designated town roads during seasonally wet periods.

As part of the Capital Improvement Program, the Department of Public Works and Board of Selectmen should prepare a prioritized list of roads in need of repairs. In 1990, the Town prepared a road condition report that described the condition of each town-maintained road. This report should be keep up to date and be used to prioritize the future spending on road improvements. This will not only provide a long term improvement plan but it would assist the Planning Board in assessing developers their fair share of future road improvements.

There are approximately many dead-end roads in Hampton, built before 1986, when the Planning Board adopted an amendment to the Subdivision Regulations which limits the length of dead-end roads to 1,200 feet. Not only are long dead-end roads an inefficient road design and require police and postal service vehicles to retrace their routes, but they can also present a safety concern. Too many houses served by only one access point increase the risk of emergency vehicles not being able to respond because the one road entrance is blocked for some reason. For these reasons, the Planning Board should maintain and enforce the limit on the length of dead-end streets.

The traffic problems on Route 1 will likely continue to grow as development occurs. One problem is the number of driveways onto the highway. In reviewing site plans for development along Route 1, the Planning Board should carefully scrutinize the driveway design. Not only should the number of access points be reduced but the installation of curbing to properly direct the vehicles to follow the traffic flow pattern is crucial. Within the urban compact area, driveways are issued by the Hampton Public Works Department. Outside the urban compact area, driveway permit are issued by the NHDOT. Hampton should work closely with NHDOT to require proper driveway designs in these areas. Hampton has an active Highway Safety Committee composed of citizens. All developers proposals that have the potential to cause traffic problems should continue to be reviewed by the Highway Safety Committee. The Planning Board should review their recommendations before making any final decisions.

RECOMMENDATIONS

Highways

1. U.S. Route 1 -- (Short Range): The Town has hired a consultant to study the intersection of Route 1 and High Street. Improved signalization at this intersection, including additional signal phasing (add left turn phases) is necessary. This would alleviate the safety hazards created by left turns crossing opposing traffic and help alleviate congestion. Limit driveway access points along Route 1 and require deceleration lanes at major driveways.

   (Long Range): Consider the addition of signals at Route 1 at the intersection with Winnacunnet Road and Ann's Lane to alleviate traffic congestion created by left turning traffic, and traffic exiting these streets. Construction of a full interchange with Route 51 to alleviate traffic from having to cross the traffic flow on Route 1 to reverse direction.

2. NH Route 51 -- (Short Range): Construction of an interchange along Route 51 to provide direct access to the Merrill Industrial Drive Industrial Park and the rest of the industrially-zoned land in the area.

   (Long Range): No expansion of Route 51 to a 4-lane limited access highway unless steps are taken to improve the distribution of traffic exiting into the beach area. If expansion is required, construction of interchanges at Route 1 (full interchange) and Landing Road (half diamond) should be undertaken.

3. Interstate 95 -- (Short Range): Hampton should request that the State construct a gravel crossover through the median of Interstate 95, south of the State Liquor Store, so that emergency vehicles can have access to the opposite lane without having to travel to Seabrook to turn around.

4. Long Range: Hampton should undertake a study to determine methods of increasing pedestrian and bicyclist safety. The study should assess the feasibility of constructing sidewalks and bikepaths.

Parking

1. Short Range: a. Expand off-street parking in commercial districts.
   b. Work with the NHDOT to improve access to and expand the Exeter Road park-n-ride lot in Hampton.

   Long Range: a. Construct an off-beach parking facility and provide shuttle bus service to the beach.
   b. Expand the High Street municipal parking lot.

Public Transportation

1. Participation in a regional transportation program to provide public transportation to Hampton. Support the implementation of the Seacoast Metropolitan Organization's regional bike plan.

2. Operation of a shuttle bus system connecting the beach, the downtown, and any off-beach parking facility to alleviate some traffic congestion. A shuttle bus would also provide the Town with an answer to its beach area parking problems.