Town of Hudson, NH

2006 Master Plan

Adopted January 4, 2006

With assistance from the

Nashua Regional Planning Commission

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CHAPTER I

INTRODUCTION AND GOALS

A. INTRODUCTION

Preparing a community master plan is one of the most important responsibilities of a Planning Board and is the basis for the ordinances, regulations and policies that guide development and growth in the Town. New Hampshire Revised Statutes Annotated 674:1-4 give the Planning Board the authority to prepare a master plan and describe the chapters, adapted to the needs of each community, that such a plan must contain. This Master Plan contains discussion and analysis of: 1) Goals; 2) Population and Housing; 3) Natural Resources; 4) Economic Development; 5) Transportation; 6) Existing Land Uses; 7) Historic Resources; 8) Community Facilities; 9) Future Land Uses.

The 2006 Master Plan is an update of the 1995 Master Plan. This plan update was developed by the Planning Board over the course of a three-year time period with the assistance of the Town staff, the Nashua Regional Planning Commission, other consultants, experts and professionals from various fields. The Planning Board met monthly from June 2002 through January 2006. All of the information provided in the Master Plan was distributed to the Planning Board and the text reflects the discussion, recommendations and conclusions from each of their meetings.

The result of the work of the Planning Board is a Master Plan that considers the Town's short and long-term housing, transportation, natural resource, economic, land use, historic, and community facility needs. The plan is intended to address short-term needs while also providing guidance as to how Hudson will function and look as it approaches buildout. A significant amount of time is devoted to the remaining resources in the Town and strategies that can be used to ensure their protection for the benefit of Hudson's residents.

B. GOALS

1. Population and Housing

- Provide for an acceptable rate of growth in relation to the regional rate of growth and in keeping with the ability of the town to provide essential facilities and services.
- Incorporate available demographic and population data into evaluations of municipal services to meet the needs of current and future residents of Hudson.
- Provide reasonable opportunities for the development of housing affordable to families and individuals of all income levels.
- Maintain the existing balance between single-family, two-family and multi-family housing units.
- Encourage the use of open space developments to provide attractive, cohesive neighborhoods with adequate parks and open space, that are designed with sensitivity to the landscape.

2. Economic Development

- Encourage growth in employment, particularly of high quality, higher-wage professional, managerial and manufacturing jobs, to reduce unemployment and increase economic opportunities for Hudson residents.
    i. Provide for the growth of commercial and light industrial uses in limited areas with adequate utility services and direct access to the State designated highway system.

ii. Restrict the development of commercial and other non-industrial uses in industrial districts to reserve land for industrial development.

iii. Conserve existing sewer capacity for future commercial and industrial development.

iv. Develop a strategy for developing appropriate portions of the Merrimack River to attract shops, restaurants and other commercial enterprises that make use of the riverfront, while retaining and promoting its beauty.

3. Natural Resources

- Discourage the development of wetlands, steep slopes, floodplains, prime and important farmland soils, ridgelines and other sensitive lands.
- Encourage the appropriate use, conservation and development of the Merrimack Riverfront.
- Protect existing and potential public drinking water supplies and on-site wells, groundwater, and recharge areas from harmful developments, land use practices, and roadway contamination.
- Develop watershed-based planning techniques that include intermunicipal coordination of land uses in each watershed that spans town boundaries, such as the Musquash Brook Watershed, to ensure effective management and protection of the water resource.
- Designate and provide extra protection to the Town's prime wetlands and wetlands of importance based on their location and the benefits they provide.
- Encourage land use boards to keep up to date on the status of the state instream flow rules.
- Protect surface water resources in areas of existing or anticipated increased density from additional pollutant loads and increased flow associated with development.
- Adopt a shoreline protection ordinance consistent with the state model to permit Hudson to continue to regulate shoreline development at the local level.
- Develop an inventory and monitoring system of prime habitats and areas of significant flora and fauna for future conservation.
- Protect existing Town-owned land that is not currently protected as conservation land and take appropriate action to ensure that these parcels are permanently protected from future development or any adverse activities on the parcels.

4. Community Facilities

- Provide cost effective, conveniently located community facilities including schools, recreation, public safety, library, solid waste disposal, public water and public sewer facilities based upon community need and the ability of the town to pay.
- Plan for the expansion of existing community facilities to meet the existing and future needs of Town residents.
- Ensure that new development pays for its proportional share of capital facility costs.
- Encourage the preparation of an active, well publicized Capital Improvements Program (CIP).

5. Transportation

- Provide for a safe and efficient transportation system based on a hierarchy of arterial, collector and local roadways.

  i. Promote the recommendations of the *Hudson-Litchfield Townwide Traffic Study*, 2002.

ii. Advocate for development of the proposed Nashua/Hudson Circumferential highway while pursuing alternatives to highway construction in the event that the project fails to be implemented.

iii. Revisit zoning standards and subdivision and site plan regulations to incorporate access management techniques to reduce the impact of new development and redevelopment on the circulation system.

- Encourage alternative transportation systems including provisions for bicycles, pedestrians and public transit.

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CHAPTER II

POPULATION AND HOUSING

A. INTRODUCTION

Effectively planning for a community requires an understanding of the existing and potential future size, composition, and distribution of population and housing is essential. In some cases, the factors that influence population change are beyond the control of the Town. In other cases, the Town can influence or manage future demographic changes through the adoption of policies based on community goals. In accordance with State law, this chapter is based on the Nashua Regional Planning Commission's *Regional Housing Needs Assessment,* 1999,[1] an analysis of the regional need for housing for people and families of all income levels. Where appropriate, Census 2000 and other more recent data is included in this chapter. The purpose of the *Regional Housing Needs Assessment* is to assist the region's municipalities in complying with NH RSA 674:2.III, which requires that master plans contain a housing section which:

> "*… analyzes existing housing resources and addresses current and future housing needs of residents of all levels of income of the municipality and region in which it is located, as identified in the regional housing needs assessment performed by the regional planning commission pursuant to RSA 36:47, II.*"

A description and analysis of existing demographic data as provided by the US Bureau of Census, the NH Office of Energy and Planning (OEP), and the Nashua Regional Planning Commission (NRPC), as well as background historical information from a variety of sources, is provided in this chapter. While it is essential to review relevant demographic information and to include it in the Master Plan, it should be emphasized that all such information should not be taken at face value. This is particularly true for population projections. This chapter provides data on: 1) population trends, population projections, Hudson's share of the region's population, population density, migration v. natural increase, race, age, marital status, educational attainment, persons with disabilities, households and median income; 2) housing units, types, tenure, affordability and sales; and 3) recommendations.

B. POPULATION

1. Historic Population Trends

Table II-1 and Figure II-1 illustrate historical growth trends in Hudson. Between 1790 and 1910, the population of Hudson remained relatively stable fluctuating between approximately 1,064 to 1,344 people. In the late 19th Century, rural communities in New Hampshire experienced migration into cities within the State and also to western states. Hudson was one of the few communities to experience population increases during this period, likely due to its proximity to an industrial employment base in the City of Nashua. Much of the growth was centered around the relatively urban Taylor's Falls Bridge area. After 1910, the population began to grow considerably and by 1960 Hudson's population had

[1] Nashua Regional Planning Commission, *Regional Housing Needs Assessment*, 1999. See Population and Housing Chapter of Nashua Regional Planning Commission, *draft NRPC Regional Plan,* 2002 for up to date statistics on regional population and housing.

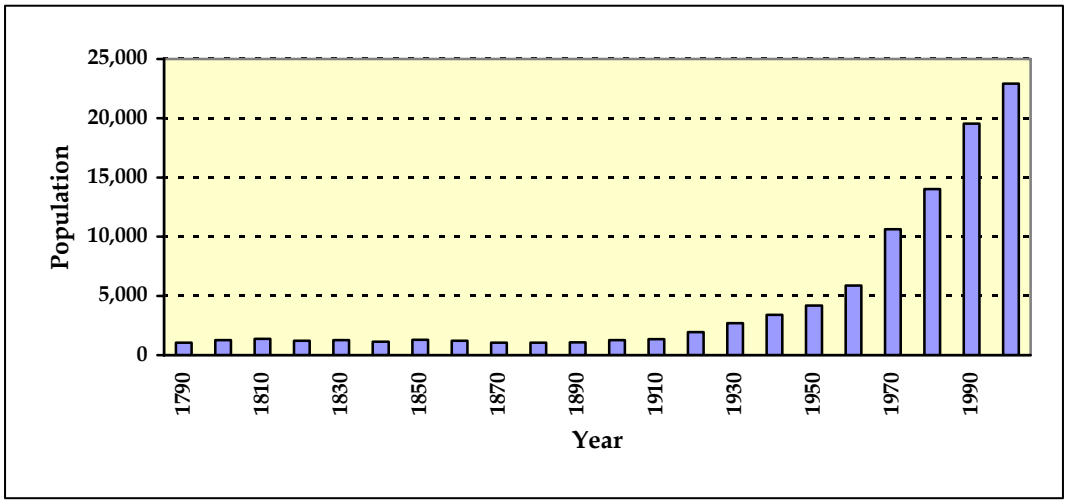
reached 5,876 people. The 1960's saw the beginning of a two-decade long period of extremely rapid population increase spurred by the growth of manufacturing and high-technology industries in both Hudson and Nashua, and by ex-urban expansions of the Boston metropolitan area made possible by major improvements to the State and Federal highway system. Between 1960 and 1970, Hudson grew by 81%, the fastest period of growth in the Town's history. From 1970 to 1980, the Town grew more moderately from a population of 10,638 to 14,022, an increase of 32%. From 1980 to 1990, the population expanded to 19,530, a 39% increase. Growth slowed somewhat in the 1990s, resulting in a population of 22,928 by 2000.

Table II-1. Comparative Population Growth, 1790-2000

Year	Hudson	% Change	NRPC Region	% Change	State of NH	% Change
1790	1,064	-	10,196	-	141,885	-
1800	1,267	19%	11,431	12%	183,858	30%
1810	1,376	9%	12,444	9%	214,460	17%
1820	1,227	-12%	13,003	4%	244,161	14%
1830	1,263	3%	14,461	11%	269,328	10%
1840	1,148	-6%	17,589	22%	284,574	6%
1850	1,312	14%	21,656	23%	317,976	12%
1860	1,222	-12%	22,423	4%	326,073	3%
1870	1,066	-15%	23,055	3%	318,300	-2%
1880	1,085	2%	25,103	9%	347,000	9%
1890	1,092	1%	30,998	23%	376,500	9%
1900	1,261	15%	36,731	18%	411,600	9%
1910	1,344	7%	38,467	5%	430,600	5%
1920	1,954	45%	40,796	6%	443,100	3%
1930	2,702	38%	45,347	11%	465,300	5%
1940	3,406	26%	48,214	6%	491,500	6%
1950	4,183	23%	52,010	8%	533,200	9%
1960	5,876	16%	63,216	22%	606,900	14%
1970	10,638	81%	100,862	60%	737,579	22%
1980	14,022	32%	138,089	37%	920,475	25%
1990	19,530	39%	171,478	24%	1,109,252	21%
2000	22,928	17%	195,788	14%	1,235,786	11%

Source: US Census

Figure II-1. Population by Decade, Hudson, 1790 - 2000



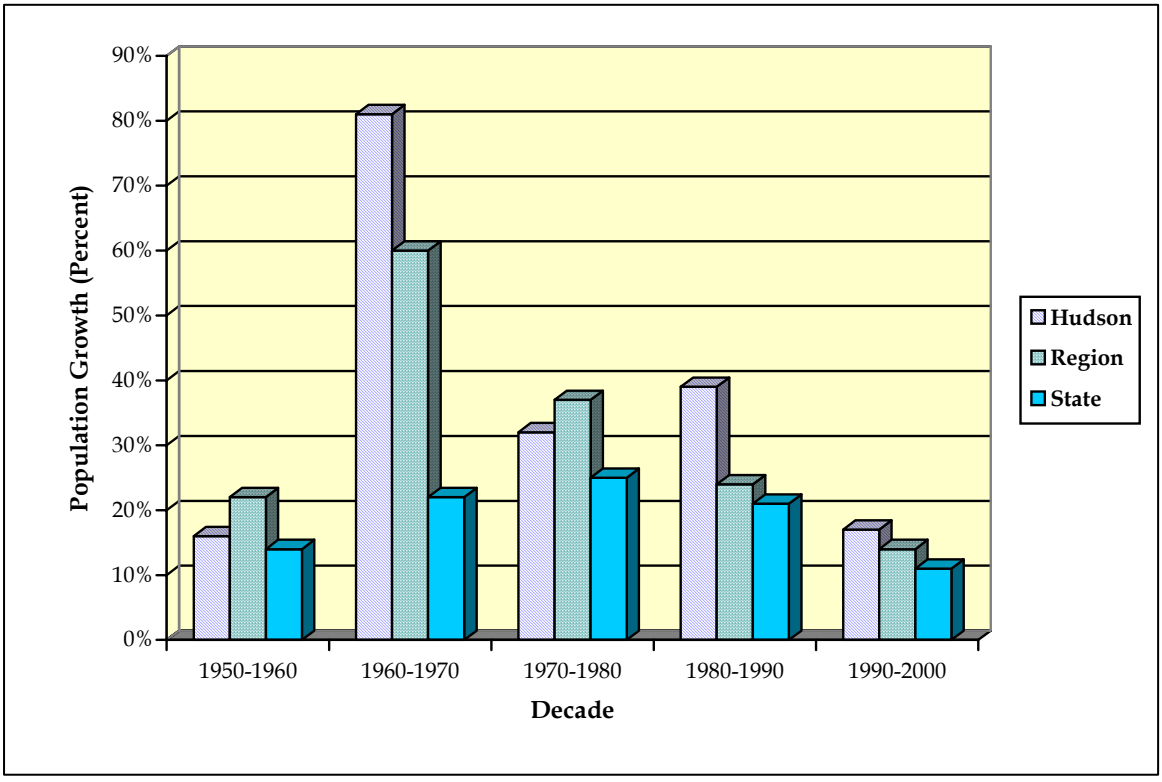
As shown in Table II-1 on the previous page, between 1920 and 1950, Hudson grew at a significantly higher rate than that of the region or State. After a decade of relatively slower increases in the 1950's, Hudson's population grew at a far higher rate than the region or the State, likely due to the demand for suburban housing near sources of employment. Since 1980, population growth slowed somewhat compared to the dramatic rate of the 1960's, but was still well above that of the region and State. Table II-2 and Figure II-2 compare the growth rates from 1950 through 2000 by decade for the Town, region and State.

Table II-2. Proportionate Growth by Decade, 1950-2000

Community	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000
Hudson	16%	81%	32%	39%	17%
Amherst	40%	125%	79%	10%	19%
Brookline	18%	47%	51%	36%	74%
Hollis	44%	52%	79%	22%	23%
Litchfield	69%	97%	192%	33%	33%
Lyndeborough	8%	33%	36%	21%	22%
Merrimack	57%	188%	79%	44%	13%
Milford	27%	59%	31%	36%	15%
Mont Vernon	44%	55%	59%	25%	12%
Nashua	13%	43%	22%	17%	9%
Pelham	98%	108%	50%	16%	16%
Wilton	4%	12%	17%	17%	20%
NRPC Region	**22%**	**60%**	**37%**	**24%**	**14%**
State of NH	**14%**	**22%**	**25%**	**21%**	**11%**

Source: US Census, derived by NRPC

Figure II-2. Proportionate Growth by Decade, 1950 - 2000



2. Population Projections

NH OEP's population projections for the Town, region and State are presented in Table II–3 and II-4. NH OEP's forecasting methodology is based on a community's historical share of its respective county's growth, and assumes that a community's share of growth, according to changes in the 1970 through 2000 population, will remain about the same into the future.

Table II-3. Population Growth, Actual and Projected, 1990-2020

Community	1990	2000	2010 Projected	2020 Projected
Hudson	19,530	22,928	26,200	29,330
Amherst	9,068	10,769	12,340	13,620
Brookline	2,410	4,181	5,030	5,800
Hollis	5,705	7,015	8240	9,300
Litchfield	5,516	7,360	9,300	10,930
Lyndeborough	1,294	1,585	1,850	2,050
Merrimack	22,156	25,119	29,140	32,490
Milford	11,795	13,535	15,600	17,320
Mont Vernon	1,812	2,034	2,380	2,620
Nashua	79,662	86,605	91,260	95,180
Pelham	9,408	10,914	14,750	18,350
Wilton	3,122	3,743	4,260	4,710
NRPC Region	**171,478**	**195,788**	**220,350**	**241,700**
State of NH	**1,109,117**	**1,235,786**	**1,385,210**	**1,523,680**

Source: US Censuses, 1990 – 2000 and NH OEP, 2003.

Hudson's population is projected to continue to increase by 1.4% per year over the next twenty years. If these projections hold true, an additional 6,402 persons will be added to Hudson's population by 2020. With an estimated population of 29,330 in 2020, Hudson will continue to reflect a suburban community with urban elements including non-residential and multi-family residential development.

Table II–4. Population Projections, 2020

Community	Population 2000	Projected Population 2020	Projected Net Increase 2000-2020	Projected Percentage Increase 2000-2020	Projected Annual Percentage Increase 2000-2020
Hudson	22,928	29,330	6,402	28%	1.4%
NRPC Region	**195,788**	**241,700**	**45,912**	**23%**	**1.2%**
State of NH	**1,235,786**	**1,523,680**	**287,894**	**23%**	**1.2%**

Source: US Census 2000 and NH Office of Energy & Planning, 2003.

A Buildout Analysis using the Town's 2002/2003 parcel-based Geographic Information System data may be useful in providing more accurate population projections. A Buildout Analysis considers the remaining undeveloped land in the Town and the constraints to development on that land, including soils, slopes, ownership and the provisions of the Hudson zoning ordinance. The Buildout Analysis estimates the number of housing units that will result when the Town is fully developed and can aid in determining the type and quantity of public facilities needed in the future.

3. Population Share

Table II-5 presents the percentage population share for each community in the NRPC Region. Hudson accounted for 11.7% of the Region's total population in 2000 and now comprises a substantially higher percentage of the region's population than it did in 1950. In contrast, the population of the City of Nashua comprised a steadily decreasing proportion of the region's population over the past five decades. This is consistent with national trend of population decentralization to suburban areas over the past 50 years.

Table II-5. Percentage Population Share, 1950-2000

Community	1950	1960	1970	1980	1990	2000
Hudson	8.0	9.3	10.5	10.1	11.4	11.7
Amherst	2.8	3.3	4.6	6.0	5.3	5.5
Brookline	1.3	1.2	1.2	1.3	1.4	2.1
Hollis	2.3	2.7	2.6	3.4	3.3	3.6
Litchfield	0.8	1.2	1.4	3.0	3.2	3.8
Lyndeborough	1.1	0.9	0.8	0.8	0.7	0.8
Merrimack	3.7	4.7	8.5	11.2	12.9	12.8
Milford	6.3	6.6	6.6	6.3	6.9	6.9
Mont Vernon	0.8	0.9	0.9	1.0	1.1	1.1
Nashua	66.7	61.8	55.3	49.1	46.5	44.2
Pelham	2.5	4.1	5.4	5.9	5.5	5.6
Wilton	3.7	3.2	2.2	1.9	1.8	1.9
NRPC Region	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: US Census.

4. Population Density

Table II-6 presents a comparison of the densities for each NRPC community, the NRPC region and the State. Because towns vary in size, population levels alone do not provide a sufficient indication of the extent to which the land in a community is developed; however, this information must be viewed cautiously. Certain communities, for example, may contain a relatively high overall density, but may still contain substantial rural or undeveloped areas. An example of this is the community of Milford, which contains a high concentration of population within a relatively small portion of the town.

Table II-6. Population Density, Persons per Square Mile, 1990, 2000 and 2020

Community	Area (sq. mile)	Population 1990	Density 1990	Population 2000	Density 2000	Projected Population 2020	Projected Density 2020
Hudson	29.2	19,530	669	22,928	785	29,330	1,004
Amherst	34.5	9,068	263	10,769	312	13,620	395
Brookline	20.1	2,410	120	4,181	208	5,800	289
Hollis	32.6	5,709	175	7,015	215	9,300	285
Litchfield	15.1	5,516	365	7,360	487	10,930	724
Lyndeborough	30.6	1,294	42	1,585	52	2,050	67
Merrimack	33.0	22,156	671	25,119	761	32,490	985
Milford	25.9	11,795	455	13,535	523	17,320	669
Mont Vernon	16.8	1,812	108	2,034	121	2,620	156
Nashua	30.6	79,662	2,603	86,605	2,830	95,180	3,110
Pelham	26.7	9,408	352	10,914	409	18,350	687
Wilton	26.1	3,122	120	3,743	143	4,710	180
NRPC Region	**321.2**	**171,478**	**534**	**195,788**	**610**	**241,700**	**752**
State of NH	**8,993.0**	**1,109,252**	**123**	**1,235,786**	**137**	**1,523,680**	**169**

Source: US Census, 1990 – 2000 and NH OEP, 1999; compiled by NRPC.

Table II-6 indicates that Hudson has the second highest overall population density in the region, and has a higher density than the regional average. Hudson's density levels rival those in Merrimack and are well above many of the more rural towns such as Lyndeborough, Mont Vernon or Wilton. This verifies that Hudson is increasingly becoming more of an urban community. Based on OEP population projections, Hudson's population density will increase substantially by the year 2020, still exceeding that of Merrimack, yet far below the density of the City of Nashua.

5. Migration vs. Natural Increase

Table II-7 presents the population growth attributed to natural increase (births) and in-migration (people moving from other communities). Between 1990 and 2000, natural increase accounted for 67% of Hudson's total population increase, which was similar to the region, but far less than for the State. Therefore, the majority of the population growth in the 1990's in Hudson was a result of births within the community rather than people arriving from other communities.

Table II-7. Population Growth, Migration vs. Natural Increase, 1990 - 2000

Community	Population 1990	Population 2000	Numeric Change	Numeric Natural Increase	Percent Natural Increase	Numeric Migration	Percent Migration
Hudson	19,530	22,928	3,398	2,273	67%	1,125	33%
NRPC Region	**171,478**	**195,788**	**24,310**	**16,204**	**67%**	**8,106**	**33%**
State of NH	**1,109,117**	**1,235,786**	**126,669**	**109,878**	**87%**	**16,791**	**13%**

Source: US Census 1990 – 2000 and NH Department of Heath and Human Services, *Vital Statistics*, 1990 – 2000.

6. Race

Table II-8 compares the racial diversity of Hudson to the region and the State. According to the US Census, 96.3% of Hudson's population reported their race as white only, compared to 90.5% for the region. The highest minority population consists of those of Hispanic origin[2], with 356 individuals, a significant 69% growth from the 211 individuals reported in 1990. Also significant is the number of Asian and Black/African American individuals in Hudson. The vast majority of the region's racial diversity is located in the City of Nashua.

Table II-8. Population by Race and Hispanic Origin, 2000

Community	White Only	Black or African-American Only	Asian Only	American Indian/ Alaska Native Only	Other (Only One)	Two or More Races	Hispanic Origin	Percent Non-White
Hudson	22,091	193	255	34	138	217	356	3.7%
NRPC Region	**183,081**	**2,428**	**4,592**	**461**	**3,014**	**2,212**	**6,618**	**6.5%**
State of NH	**1,186,851**	**9,035**	**15,931**	**2,964**	**7,791**	**13,214**	**20,489**	**4.0%**

Source: US Census, 2000.

7. Age

Table II-9 presents population by age. 35% of Hudson's population was between 35 to 54 years of age in 2000, forming the Town's largest age group. School-age children (5 to 19 years of age) were the Town's second largest age group, at 23%. The number of elderly people in Hudson (age 65 and over) grew by 44% from 1990 to 2000, and elderly people represented 7.9% of the town's population in 2000 compared to 6.5% in 1990. This is consistent with the national trend of the aging of the population.

Table II-9. Population by Age, 2000

Community	Under 5	5 to 19 (School Age)	20 to 34	35 to 54	55 to 64	65 and Over
Hudson	1,704	5,231	4,342	7,948	1,894	1,809
NRPC Region	**13,510**	**44,227**	**36,516**	**66,563**	**16,836**	**18,136**
State of NH	**75,685**	**268,480**	**228,827**	**405,165**	**109,659**	**147,970**

Source: US Census, 2000.

8. Marital Status

Table II-10a and II-10b present the marital status of the population age 15 and over for 1990 and 2000. Married people comprised 63.8% of Hudson's population in 2000, which is higher than the regional and State average. The number of people classified as "never married" is lower than the regional and State average, and has declined since 1990.

[2] Note that the US Census includes a count of Hispanic persons, which is considered an ethnic group, rather than a racial group. Therefore, Hispanics can be of any race.

Table II-10a. Marital Status, Count of Population Age 15 and over, 1990 and 2000

Community	Never Married		Married (not separated)		Married (separated)		Widowed		Divorced	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Hudson	3,707	3,762	9,448	11,146	196	314	618	545	1,056	1,709
NRPC Region	**33,567**	**35,970**	**80,558**	**90,936**	**1,986**	**2,405**	**6,627**	**7,120**	**10,406**	**14,360**
State of NH	**222,245**	**243,840**	**507,963**	**560,995**	**13,652**	**13,320**	**55,629**	**57,763**	**72,832**	**102,723**

Table II-10b. Marital Status, Percentage of Population Age 15 and over, 1990 and 2000

Community	Never Married		Married (not separated)		Married (separated)		Widowed		Divorced	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Hudson	24.7	21.5	62.9	63.8	1.3	1.8	4.1	3.1	7.0	9.8
NRPC Region	**25.2**	**23.9**	**60.5**	**60.3**	**1.5**	**1.6**	**5.0**	**4.7**	**7.8**	**9.5**
State of NH	**25.5**	**24.9**	**58.2**	**57.3**	**1.6**	**1.4**	**6.4**	**5.9**	**8.3**	**10.5**

Source: US Census.

9. Educational Attainment

Table II-11 presents educational attainment, by category, for 2000. The percentage of population age 25 and over with a high school diploma or higher in Hudson was 90% in 2000, slightly higher than that for the region and State. The percentage with a bachelor's degree or higher was 26%, compared to 33% for the region and 29% for the State.

Table II-11. Educational Attainment of Population 25 years and Over, 2000

Community	Total Age 25 and Over		<9th Grade		9th – 12th Grade No Diploma		High School Graduate	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Hudson	15,047	100	423	2.8	1,120	7.4	4,525	30.1
NRPC Region	**129,610**	**100**	**3,696**	**2.9**	**9,977**	**7.7**	**33,716**	**26.0**
State of NH	**823,987**	**100**	**32,426**	**3.9**	**71,328**	**8.7**	**247,723**	**30.1**

Community	Some College No Degree		Associate Degree		Bachelor's Degree		Graduate or Professional Degree	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Hudson	3,380	22.5	1,700	11.3	2,657	17.7	1,242	8.3
NRPC Region	**26,918**	**20.8**	**12,771**	**9.9**	**28,666**	**22.1**	**14,316**	**11.0**
State of NH	**164,634**	**20.0**	**71,722**	**8.7**	**153,874**	**18.7**	**82,230**	**10.0**

Source: US Census, 2000.
Note: % is percentage of population age 24 and over.

10. Persons with Disabilities

Table II-12 presents the number of individuals in Hudson with a disability in 2000, by age group. Disability is defined by the Census Bureau as "*…a long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business.*" Approximately 2.5% of the total population of Hudson had a disability in 2000. Over 11.9% of the elderly (age 65 and over) population were classified as having a disability.

Table II-12. Disability Status of the Civilian Non-Institutional Population, 2000

Community	Population 5 –20 years with Disability	Population 21 to 64 years with Disability	Population 65 and over with Disability	Total with Disability	Percent Total Population with Disability
Hudson	115	240	215	570	2.5%

Source: US Census, 2000.

In the 2000/2001 school year there were approximately 520 special needs students in the Hudson school system,[3] or 13% of the total enrollment. This is slightly lower than the statewide average of 14.6% of total enrollment.

11. Households

Table II-13 presents *total* households and the average number of persons per household type for 1990 and 2000. The Census breaks down households into "family" and "non-family" households. Family households include households with two or more related individuals, including single parent households. Non-family households include households with two or more unrelated members or individuals living alone. The number of households in Hudson grew by 21.2% from 1990 to 2000, a higher rate of growth than for the region or State. During this decade, the average household size for both total households and family households decreased, meaning that there are fewer people within each household. This is consistent with national trends in the growth of single person and single parent households.

Table II-13. Total Households, 1990 and 2000

Community	Total Household		% change	Average # of Persons per Total HH		Average # of Persons per Family HH	
	1990	2000		1990	2000	1990	2000
Hudson	6,630	8,034	21.2%	2.95	2.83	3.67	3.17
NRPC Region	**62,141**	**72,410**	**16.5%**	**2.76**	**2.85**	**3.72**	**3.20**
State of NH	**411,186**	**474,606**	**15.4%**	**2.70**	**2.53**	**3.79**	**3.03**

Source: US Census.

[3] Sources: Telephone conversation with Jane Ball, Hudson School Board, Special Education Department on October 16, 2002; and NH Department of Education at http://www.ed.state.nh.us/ReportsandStatistics/Enrollment/. Note: Special needs students may or may not be classified as persons with disabilities.

Household *composition* by "family" household is shown in Table II-14a (totals) and Table II-14b (percent of *total* households). These tables show data relating to family households of two or more people. The number of married people with no children, and the number of single mothers, in Hudson has slightly increased as a percentage of *total* family households from 1990 to 2000. The number of married people with children as a percentage of *total* family households has decreased somewhat from 1990 to 2000. Both of these trends are consistent with the national trend in decreasing household size.

Table II-14a. Total Number of Family Households, 1990 and 2000

Community	Total Family HH 1990	Total Family HH 2000	% change	Married no child		Married w/ child		Female w/ child	
				1990	2000	1990	2000	1990	2000
Hudson	5,318	6,261	17.7	2,002	2,538	2,579	2,666	337	440
NRPC Region	**46,057**	**52,146**	**13.2**	**18,256**	**21,357**	**20,746**	**20,012**	**3,139**	**4,066**
State of NH	**292,601**	**323,651**	**10.6**	**122,527**	**142,101**	**122,780**	**120,337**	**22,231**	**27,257**

Table II-14b. Family Households as Percentage of Total Households, 1990 and 2000

Community	Married no child		Married w/ child		Female w/ child	
	1990	2000	1990	2000	1990	2000
Hudson	30.2	31.6	38.9	33.2	5.1	5.5
NRPC Region	**29.4**	**29.3**	**33.4**	**27.6**	**5.1**	**5.6**
State of NH	**29.8**	**29.9**	**29.9**	**25.4**	**5.4**	**5.7**

Source: US Census.

Household *composition* by "non-family" household, by community, is shown in Tables II-15a (totals) and Table II-15b (percent of total population). These tables show data relating to households with unrelated members or individuals living alone. The number of non-family households in Hudson increased 35% from 1990 to 2000, a much greater rate of growth than for family households. However, the number of single people living alone in Hudson has remained relatively stable as a percentage of total population. The growth in total non-family households is therefore likely to be driven by an increase in number of households with unrelated members.

Table II-15a. Total Number of Non-Family Households, 1990 and 2000

Community	Total Non-Family HH 1990	Total Non-Family HH 2000	% change	1 Person H.H. Male Householder		1 Person H.H. Female Householder	
				1990	2000	1990	2000
Hudson	1,312	1,773	35.1	403	659	479	650
NRPC Region	**16,077**	**20,534**	**27.7**	**5,438**	**7,500**	**6,568**	**8,309**
State of NH	**118,585**	**150,955**	**27.3**	**38,035**	**52,788**	**53,329**	**63,236**

Table II-15b. Non-Family Households as Percentage of Total Population, 1990 and 2000

Community	1 Person H.H. Male Householder		1 Person H.H. Female Householder	
	1990	2000	1990	2000
Hudson	2.1%	2.9%	2.4%	2.8%
NRPC Region	**3.2%**	**4.4%**	**3.4%**	**4.2%**
State of NH	**3.4%**	**4.8%**	**4.3%**	**5.1%**

Source: US Census.

12. Median Income

Median household, median family income and per-capita income are presented in Table II-16 for 1989 and 1999. The numerical figures for 1999 are significantly higher than those for 1989. The figures are not directly comparable as they do not take into account inflation. When inflation is considered, the median household income in Hudson in 1989 was $65,408 (in 1999 dollars) compared to $64,169 in 1999, a slight drop over the decade.[4] This is significant considering the increase in housing costs. Median family income and per-capita income, however, remained stable over this period. Hudson continues to exhibit median household and family incomes higher than those for the Nashua Primary Metropolitan Statistical Area (PMSA) [5] and the State.

Table II-16. Income, 1989 and 1999

Community	Median Household Income			Median Family Income			Per-Capita Income		
	1989	1989 (1999 dollars)	1999	1989	1989 (1999 dollars)	1999	1989	1989 (1999 dollars)	1999
Hudson	$47,859	$65,408	$64,169	$50,714	$69,310	$71,313	$17,678	$24,160	$25,696
Nashua PMSA	**$45,789**	**$62,579**	**$60,082**	**$50,899**	**$69,563**	**$67,624**	**$18,725**	**$25,591**	**$26,851**
State of NH	**$36,329**	**$49,650**	**$49,467**	**$41,628**	**$56,892**	**$57,575**	**$15,959**	**$21,811**	**$23,844**

Source: US Census.

C. HOUSING

1. Housing Units

The most important unit of analysis for demonstrating the impact of growth is the housing unit, because it represents the household for which most State and local services are oriented. Data on housing can be found in the NRPC, *Regional Housing Needs Assessment*, updated every five years.[6] While the data directly correlates with the changes in population over time, household sizes have decreased significantly since the 1950's due to the increase in single parent households and the reduction in the number of children per household. In 1970, the average household size in Hudson was 3.77 persons whereas in 2000 the average household size was 2.83 persons. The implication of a dwindling household size is that fewer people per household require a greater number of housing units per capita, with obvious impacts on the environment and housing costs per capita.

Table II-17 presents housing unit growth from 1960 to 2000. During these four decades, Hudson experienced a significant increase in the total number of housing units. Hudson's housing unit growth (829%) during this timeframe outpaced regional (254%) and State growth (144%). The growth in housing units continued to outpace regional and State growth in the 1990's.

[4] Conversions to 1999 dollars may be applied using an inflation calculator such as the one at: www.westegg.com/inflation.

[5] In New England, a Primary Metropolitan Statistical Area (PMSA) is an area defined by the US Census, Office of Management and Budget, as a Federal statistical standard, comprised of one or more county subdivisions within a metropolitan area, having a population of 1,000,000 or more. The Nashua PMSA is within the Boston Metropolitan Statistical Area and includes the City of Nashua and the Towns of Hudson, Merrimack and Milford.

[6] Nashua Regional Planning Commission, *Regional Housing Needs Assessment*, 1999.

Table II-17. Housing Unit Growth, 1960-2000

Community	1960	1970	1980	1990	2000	% Increase 1960 - 2000	% Increase 1990 - 2000
Hudson	865	2,920	4,369	6,902	8,034	829%	16%
NRPC Region	**21,002**	**31,260**	**47,944**	**66,375**	**74,341**	**254%**	**12%**
State of NH	**224,440**	**280,962**	**386,381**	**502,247**	**547,024**	**144%**	**9%**

Source: US Census, 1960 – 2000.

2. Housing Type

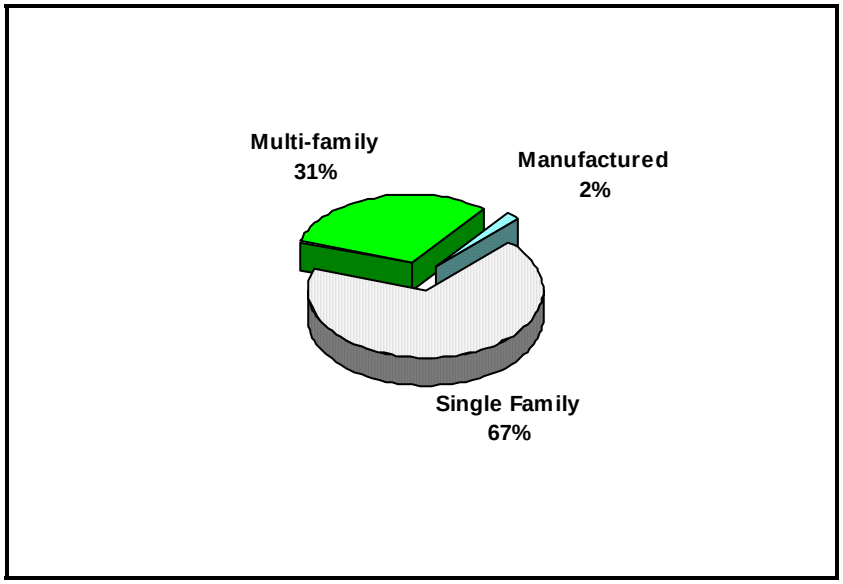
Table II-18 presents the housing stock by type. While the NRPC region's proportion of single family homes (61%) is identical to the State's, the Town of Hudson is slightly higher (66%) with the majority of the remainder in multi-family units. There are few manufactured housing units in the Town. Table II-19 presents a list of large multi-family developments in Hudson as of 2001.

Table II-18. Housing Stock by Type, 2000

Community	Single Family Units		Multi-Family (2+) Units		Manufactured Housing Units		Total Housing Units
	#	%	#	%	#	%	
Hudson	5,539	66%	2,525	31%	149	2%	8,213
NRPC Region	**45,680**	**61%**	**26,838**	**36%**	**2,655**	**3%**	**75,173**
State of NH	**343,630**	**61%**	**170,348**	**30%**	**47,689**	**9%**	**561,667**

Source: NH Office of Energy & Planning, 2000.
Note: Includes Census 2000 count plus year 2000 building permits – these figures will not match those in Table II-20a as the time period is different.

Figure II-3. Percentage Housing Stock by Type, 2000



Source: NH Office of Energy & Planning, 2000.

Table II-19. Large Multi-Family Developments, Hudson, 2001.

Complex Name	Location	Total # of Units
Brookside Apartments	18 Roosevelt Ave.	101+
Burns Hill Apartments	Burns Hill Road	88
Franklin D Estates	Roosevelt Ave	102
Abbott Farms	Abbott Farm Lane	106
Compass Point	Watson Road	84
Elmwood Village	Elmwood Drive	136
Fox Hollow	Fox Hollow Drive	240
Rolling Green	Riviera Road	125
Shepherd's Hill*	Kimble Hill Road	400
Terrace Condominiums	Oliver Drive	28
Willows	Willow Creek	38

Source: NRPC Survey, 2001.
*Under construction in 2002.

3. Housing Tenure

Housing units and housing tenure (owned or rented) for 1990 and 2000 are shown in Table II-20a (totals) and Table II-20b (percent of occupied units). The Census breaks down occupied housing units into owner occupied or rented. More detailed information on the vacant units is available from the Census Bureau. A majority (78%) of the housing units in Hudson were owner occupied in 2000, which is significantly higher than for the region or the State. In addition, the number of owner occupied housing units increased by about 3% since 1990. The vacancy rate in Hudson was extremely low in 2000, at 1.6%. The vacancy rate for the region dropped from 8.7% vacant in 1990 to 1% vacant in 2000, indicating strong demand for housing.

Table II-20a. Total Housing Units, 1990 and 2000

Community	Total Units		Occupied		Owner Occupied		Renter Occupied		Vacant		Seasonal/ Recreation/ Occasional Use*	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Hudson	6,902	8,165	6,630	8,034	4,967	6,249	1,663	1,785	272	131	11	36
NRPC Region	**66,375**	**74,341**	**62,141**	**72,680**	**42,720**	**50,991**	**19,421**	**21,689**	**4,234**	**1,661**	**363**	**549**
State of NH	**503,904**	**547,024**	**411,186**	**474,606**	**280,372**	**330,700**	**130,814**	**143,906**	**92,718**	**72,418**	**57,177**	**56,413**

* Included in Vacant Housing Units.

Table II-20b. Housing Units as Percentage of Occupied Housing Units, 1990 and 2000

Community	Owner Occupied		Renter Occupied	
	1990	2000	1990	2000
Hudson	74.9	77.8	25.1	22.2
NRPC Region	**68.7**	**70.2**	**31.3**	**29.8**
State of NH	**68.2**	**69.7**	**31.8**	**30.3**

Note: Percentages based on total Occupied Housing Units, *not* Total Housing Units.

4. Building Permits

Residential building permit activity by community is tracked each year by the NH OEP (formerly NH OSP). Table II-21 shows residential building permit activity in Hudson between 1990 and 2000.

Table II-21. Residential Building Permit Activity, 1990 – 2000

Year	# of Permits
1990	122
1991	99
1992	104
1993	99
1994	102
1995	83
1996	106
1997	118
1998	182
1999	197
2000	48

Source: NH Office of Energy & Planning.

5. Cost of Rental Housing

a. Median Rent

The NH Housing Finance Authority surveys the median monthly gross rent (including utilities) for different housing types each year.[7] In April 2002, the median monthly gross rent in the Nashua Primary Metropolitan Statistical Area (PMSA) was $949. The Nashua PSMA includes Hudson, Merrimack, Milford and the City of Nashua. The median monthly gross rent varied from $547 for a studio apartment to $1,130 for a three-bedroom housing unit in April 2002.

Table II-22 presents the wages and work hours at minimum wage necessary to afford fair market rent in the Nashua PMSA for 2001. The availability of housing affordable to individuals of all income levels is one of the region's most critical issues. According to data from the National Low Income Housing Coalition, the hourly wage needed to afford a two bedroom-type of rental housing in the Nashua PMSA is $2.39 per hour greater than the State level. In addition, individuals earning minimum wage need to work far greater hours to afford rental housing in the Nashua PMSA as opposed to the State average.

[7] NH Housing Finance Authority, *2002 Residential Rental Cost Survey*, July 2002 at: www.nhhfa.org/frd.htm.

Table II-22. Hourly Wage and Work Hours at Minimum Wage Needed to Afford Fair Market Rent, Nashua PMSA and State, 2001

Location	Hourly Wage Needed to Afford Fair Market Rent (@ 40 hrs./wk.)			Work Hours/Week Necessary at Minimum Wage ($5.15) to Afford Fair Market Rent		
	One Bedroom	Two Bedroom	Three Bedroom	One Bedroom	Two Bedroom	Three Bedroom
Nashua PMSA	$13.90	$17.25	$23.48	108	134	182
State of NH	$11.71	$14.86	$19.20	91	115	149

Source: National Low Income Housing Coalition, *Out of Reach*, 2001.

b. Assisted Housing

The US Department of Housing and Urban Development (HUD) defines assisted housing as housing units that are "*provided subsidies for the purpose of creating affordable units for low and very low income households*." *Low-income* households are those defined as being at 80% of median income or less. *Very low-income* households are those defined as being at 50% of median income or less. The HUD assigned median household income for the Nashua PSMA in 2002 was $71,100. Table II-23 shows the income limits for low and very low-income households, by household size for the Nashua PSMA in 2002.

Table II-23. Income Limits for Nashua PSMA, by Household Size, 2002

Income Limit	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person	8 Person
Low Income	$38,100	$43,500	$48,950	$54,400	$58,750	$63,100	$67,450	$71,800
Very Low Income	$24,900	$28,450	$32,000	$35,550	$38,400	$41,250	$44,100	$46,950

Source: NH Housing Finance Authority and US Department of Housing and Urban Development.

Using the income limits, HUD assigns rent limits. The rent limit is 30% of the adjusted income of a household. 30% is used as it is commonly assumed to be the amount of household income that can comfortably be spent on housing without compromising other basic needs such as food and transportation. The HUD rent limits for 2002 are shown in Table II-24.

Table II-24. Rent Limits for Nashua PSMA, by Housing Type, 2002.

Income Limit	Studio	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom	5 Bedroom	6 Bedroom
Low Income	$952	$1,020	$1,223	$1,414	$1,577	$1,740	n/a
Very Low Income	$622	$666	$800	$924	$1,031	$1,138	$1,244

Source: NH Housing Finance Authority and US Department of Housing and Urban Development.
Note: Low Income rent is 30% of the adjusted income of a household whose annual income equals 80% of the median income for the Nashua PSMA. Very Low Income rent is 30% of the adjusted income of a household whose annual income equals 50% of the median income for the Nashua PSMA.

Very little assisted housing is located in Hudson. In 2002, Hudson had a deficiency in the amount of assisted housing provided relative to the region and the State. Table II-25 presents the regional and State averages for percentage of assisted housing units in 2000 and compares them with Hudson. Both the regional and State average assisted housing provision were 3.0% and 3.1%, respectively, of total housing units. Hudson, at 0.8%, fell below these averages. The only registered assisted housing units are the 64 subsidized elderly housing units in the Buttercup Hill Development. However, it is important to note that Hudson provides a far greater diversity of

housing than many other communities in the Nashua region, and provides a significant proportion of the region's moderate-income housing.

Table II-25. Assisted Housing Units, 2000

Community	Elderly Assisted	Family Assisted	Other Assisted or Combined Types *	Total Assisted	Percent Assisted Units	(Shortfall)/ Excess
Hudson	64	0	0	64	0.8%	(181)
NRPC Region	**1,074**	**346**	**842**	**2,264**	**3.0%**	**-**
State of NH	**8,485**	**3,514**	**4,868**	**16,877**	**3.1%**	**-**

Source: NH Housing Finance Authority, *Directory of Assisted Housing*, 2001.
* Other or Combined includes group homes, mentally handicapped, physically handicapped, and developments containing both elderly and family housing.

c. Housing Need for *Low* and *Very Low Income* Households

About 525, or 31%, of Hudson's total rental households contributed over 30% of their income towards rent in 1999.[8] Of that number, 506, or 47% of Hudson's *low* and *very low* income rental households contributed over 30% of their income to rent in 1999. The median household income for the Nashua PMSA was $60,082 in 1999. Therefore, households earning between $30,041 (50% of median) and $48,065 (80% of median) were classified as *low income*. Therefore, a *low-income* household could pay a maximum of $1,201 in monthly rent to ensure it was not spending more than 30% of its income on housing. Households earning less than $30,041 (50% of median) were classified as *very low income*. Therefore, a *very low-income* household could pay a maximum of $751 in monthly rent to ensure it was not spending more than 30% of its income on housing. Given the rental vacancy rate of 1% and a median rent of $799 for all housing units in Hudson in 1999, it is likely that there was, and continues to be, a significant shortage of housing in Hudson that is affordable to *very low* income households.

6. Owner Occupied Housing

Table II-26 presents total residential sales (both new and existing) for 1998 and 2003. The annual housing sales in Hudson and the region have increased over these five years. Hudson had the third highest number of sales in the region in 2003.

[8] Source: US Census 2000, Table DP-4.

Table II–26. Total Residential Sales, NRPC Region, 1998 and 2003

Community	1998	2003
Hudson	**413**	**646**
Amherst	282	334
Brookline	108	82
Hollis	164	138
Litchfield	163	159
Lyndeborough	N/A	38
Merrimack	622	665
Milford	291	353
Mont Vernon	36	48
Nashua	1,496	1,874
Pelham	132	209
Wilton	85	**74**
NRPC Region	**3,792**	**4,620**

Source: New Hampshire Association of Realtors, compiled by NRPC, 1998; Real Data Corporation, compiled by NRPC, 2003.

Table II-27 presents the average residential sales price for 2003. The average residential sales price in Hudson in 2003 was $227,000 (both new and re-sale), slightly lower than the average residential sales price in the region of $235,000. The lower than average sales price in Hudson is likely a result of the higher than average number of multi-family units compared to surrounding towns, not including Nashua. Towns such as Hollis, Amherst, Litchfield and Pelham, with a much higher average residential sales price, are dominated by single family units.

Table II–27. Average Residential Sales Price, 2003

Community	2003
Hudson	**$227,000**
Amherst	$289,000
Brookline	$269,000
Hollis	$352,000
Litchfield	$246,000
Lyndeborough	$198,000
Merrimack	$210,000
Milford	$215,000
Mont Vernon	$272,000
Nashua	$221,000
Pelham	$326,000
Wilton	$206,000
NRPC Region	**$235,000**

Source: Real Data Corporation, compiled by NRPC.

D. METHODS TO ENCOURAGE HOUSING AFFORDABLE TO HUDSON'S RESIDENTS

Hudson's housing needs are broad and encompass a range of income groups and family types. Several methods for meeting these diverse housing needs are described in the following section, including incentives that can be provided through innovative local land use regulation as well as various state and federal government programs.[9]

1. A Note on Community Character

It is critical to balance the need for affordable housing with the desire to maintain Hudson's community character. Community character should never have to be sacrificed to achieve affordable housing goals. There are several simple principals that should be considered and applied when planning for affordable housing:

- Affordable housing developments should never out-scale the other nearby structures. If the typical structure in a neighborhood is a two story, 4,000 square foot home, then the affordable housing should be of a similar size.
- Affordable housing should blend with other housing in the neighborhood. The affordable housing should be constructed of materials that are typically found nearby. Affordable housing that does not blend with its surroundings can stigmatize the project.
- Affordable housing, particularly for very low income individuals and the elderly should be located within walking distance of services. Individuals without automobiles will be isolated in poorly sited affordable housing developments. Rather, such housing should be located close to stores and medical services.

2. Housing for Older Persons

Housing for older persons zoning (HOP) is increasingly becoming a method for communities to address the need for specialized housing for the elderly without allowing for general multi-family housing or overall density increases. The provision of housing for older persons zoning is authorized by NH RSA 354-A:15. This zoning usually takes the form of an overlay zone and rarely are actual parcels of land zoned for housing for older persons. In most cases, HOP zoning provides for a higher density than allowed in the underlying zone and contains a separate set of design criteria than those found in the underlying zoning districts. Some HOP zoning contains provisions for subsidized housing while others do not. The Town of Hudson Zoning Ordinance, 2002, provides for "Elderly Housing" at considerably higher density than for conventional housing, given Planning Board approval of a site plan. Such housing is allowed in all zoning districts except for the R-1 and Industrial districts. The Zoning Ordinance allows for lot sizes of 2,500 square feet per bedroom with Town water and sewer for housing limited to persons 62 or older. The lot size increases to 20,000 square feet without water and sewer for housing limited to persons 62 or older. Housing limited to at least one person 55 or older must meet the standard dimensional requirements of the Zoning Ordinance.

3. Accessory Living Unit

An accessory living unit (ALU) is generally defined as a small additional housing unit located within or adjacent to what is otherwise a single-family home. ALUs are increasingly allowed in traditional single family zoning districts as a means of providing inexpensive housing, usually for older or younger single relatives of the occupant of the principal residence. Because such units are

[9] See Benjamin Frost, Esq., *Law Lecture Series 2001 - Affordable Housing,* NH Municipal Association, 2001.

frequently intended for related individuals, they are sometimes known as "in-law apartments." Zoning ordinances allowing for ALUs usually include a number of restrictions on their development. Municipalities allowing for ALUs may do so by right in certain zoning districts or by special exception. Generally, such units have a maximum floor area requirement to discourage more than one resident in the unit. Provisions restricting the size of the unit, the entrance, utility provision and occupation to family members keep the unit from being rented as a traditional apartment thus maintaining the single-family character of the area.

ALUs provide a housing alternative that can serve a wide range of needs. For the elderly, an accessory apartment can allow the individual to maintain a degree of independence while still receiving the support of family members. The same is true for younger family members, especially recent graduates entering the workforce. For older or younger homeowners, the modest rent received for such a unit may make home ownership a possibility that would otherwise not exist. Furthermore, because such units are usually not separated from the principal residence, they can readily be reincorporated into the main dwelling. The Town of Hudson Zoning Ordinance, 2002, provides for Accessory Living Units within the principal dwelling unit by Special Exception. The ALUs can only be occupied by an immediate family member of the owner of record of the principal dwelling. Twenty-three (23) ALUs were approved in Hudson in the period 1995 – 2001.

4. Group Homes

Group homes are an important means of providing housing for the elderly and for special needs groups such as de-institutionalized individuals, the homeless, handicapped individuals and other special needs groups. Generally, a group home is a single-family home which houses several unrelated individuals with common needs. This allows for mutual support for people with common needs in a family type setting. The homes provide individual or shared bedrooms with common living areas. A provision for group homes usually requires a community to amend its zoning ordinance to provide a definition of "family" that would allow for a group home to be placed in a single family area. In the case of the Hudson Zoning Ordinance, a "dwelling unit" is considered "*…for the use of one or more individuals living as a single housekeeping unit*," which would likely allow for a group home in a residence. Because group homes are not subdivided, they are not considered to be multi-family housing. A typical ordinance may provide a definition, for example, that would allow ten unrelated elderly, disabled or de-institutionalized individuals to be considered a family for zoning purposes, provided that the home is not subdivided and that the individuals live together as a single housekeeping unit. An alternative would be to provide for group homes under a special exception provision.

The greatest impediment to providing for group homes is neighborhood resistance. Individuals purchasing homes in single-family areas have an expectation that the neighborhood will be maintained with a certain character. While a house that is purchased for a small group of older residents may pose little threat to neighbors, a home for de-institutionalized mental health patients or ex-convicts may well be a cause for alarm. Great care must be provided to avoid disruption of existing neighborhoods. Regulations that may mitigate some of the potential negative impacts associated with the group homes in single-family areas would be similar to those found in ordinances governing home-occupations and accessory housing. The intent should be to provide restrictions related to parking, entrances, and the appearance of the home to maintain the single-family character of the area.

5. Manufactured Housing

Manufactured housing, as defined in NH RSA 674:31, is a relatively new term that includes what are traditionally known as trailers or mobile homes. NH RSA 674:32 requires all municipalities to

provide for "…*reasonable opportunities for the siting of manufactured housing*." This is often due to aesthetic considerations as well as the association of manufactured housing with lower income groups. In general, manufactured housing is situated either in higher density "parks," on individual lots, or in manufactured housing subdivisions.

Manufactured housing parks can provide an important housing alternative for lower income groups. The purchase price is relatively low because the lots in the park must be rented. As a result, many residents in manufactured housing parks face eviction if the land is sold. The lack of new manufactured housing parks makes relocation nearly impossible unless the family can afford to purchase a lot. Mobile homes on individual lots or within subdivisions are only a limited form of affordable housing due to the very high land costs within the Nashua region. Although a manufactured home on an individual lot may be only 10% less expensive than a conventional home on a similar lot, this can make the difference in affordability for many moderate and middle income families. The Town of Hudson Zoning Ordinance, 2002, provides for "Manufactured Housing" subdivisions within the General Zoning District on a minimum 10 acre tract of land at the dimensional requirements for single family use.

6. State and Federal Governmental Programs

Most Federal and State housing programs in New Hampshire are administered through the NH Housing Finance Authority (NHHFA). The NHHFA programs are described below. In addition to these programs, Veterans Administration (VA) and Federal Housing Administration (FHA) loans are available through those agencies.

a. Section 8 Voucher Program

This rental assistance program provides a direct subsidy to the owner of rental housing to allow low-income families to occupy privately owned and maintained housing units without spending in excess of 30% of their total annual household income for shelter. Qualification is based on income and fair market rent guidelines established by the U.S. Department of Housing and Urban Development (HUD). The intent of the program is to allow for federal housing assistance to low-income households without building government owned and operated housing. The owner of a unit qualified under the program is paid the difference between what the tenant can pay and the actual rent. Limited funds have restricted the program to very low-income female-headed households and very low-income elderly households. The program is administered by HUD through the NHHFA.

b. Section 8 New Construction/Substantial Rehabilitation Program

Gradually replacing the voucher program, this program provides assistance to developers to rehabilitate existing rental housing or to construct new rental housing within HUD guidelines. Rather than allowing the Section 8 certificate to be used by a qualifying family to obtain housing in any qualifying rental unit, the program attaches the Section 8 certificate to the unit. This program encourages the construction of new rental housing for very low-income households. The voucher program merely provides a subsidy for existing units without increasing the housing stock available to low-income families.

c. Rental Rehabilitation Program

The Rental Rehab Program provides substantial incentives for the rehabilitation of existing buildings into rental housing for low-income families. Applicants can receive up to 50% of the rehabilitation cost. All units must be brought up to local, Federal and State standards. Seventy

percent (70%) of the units must be initially occupied by lower income tenants. Eligibility for the units themselves is based on the median income for the region rather than on HUD income guidelines. The program is administered through local housing authorities; if one does not exist, the program is then administered by the NHHFA and a local community development office.

d. 80/20 Mixed Income Rental Housing Program

The 80/20 Mixed Income Rental Housing Program is essentially a loan program that is designed to encourage inclusionary housing. The program provides tax exempt bond financing to developers in return for an agreement to maintain a portion of the units within a rental housing development for low-income households. Current Internal Revenue Service (IRS) guidelines require that 20% of the units be made available for families earning 50% or less of the median income or that 40% of the units be reserved for families earning 60% of the median income. These restrictive guidelines are the result of the Tax Reform Act of 1986. Prior to Federal tax reform, the program was far more viable and led to the development of a substantial number of rental units for lower income families which were privately owned, maintained and integrated with market rate housing.

e. Public Land/Affordable Rental Housing Program

The Public Land/Affordable Rental Housing Program is a State program passed by the General Court in 1986. The program allows surplus public land to be leased at no consideration to the NHHFA for the development of low-income housing. The intent of the program is to remove the land cost from the cost of development, to allow for the construction of low income housing that can be economically feasible. The NHHFA will self-finance, construct and manage the housing. The greatest limitation facing the program is the availability of properly zoned surplus lands.

f. Housing Development Trust

The Housing Development Trust is a broad based funding program that provides funding for either owner-occupied or rental housing to benefit lower income households. The program is intended to support projects that could be financed through conventional means. Funds appear to be targeted to very low-income groups and the NHHFA gives priority to projects meeting the following qualifying standards: 1) projects containing the highest percentage of housing units affordable to very low-income people; 2) projects based on the longest commitment to very low-income people; 3) projects addressing demonstrated housing needs; and 4) projects containing the highest possible proportion of units available for families with children. In addition to the criteria outlined above, the following types of projects are eligible for funding: a) multi-family limited equity cooperatives; b) manufactured housing cooperatives; c) group homes for the disabled; d) multi-family rentals; e) transitional housing for the homeless; f) emergency shelters; and g) elderly congregate care.

g. Single-Family Mortgage Program

The Single-Family Mortgage Program is by far the most significant State housing program. The program provides low-interest loans for first-time homebuyers within established housing price and income guidelines. The program is financed through the issuance of tax exempt bonds by the NHHFA. In general, a first-time homebuyer applies for a NHHFA loan through a conventional mortgage institution. If the applicant as well as the home qualifies, the NHHFA takes over the mortgage from the lending institution. The program provides assistance to a large number of first-time homebuyers; however, the limits placed on purchase prices together with stringent income guidelines excludes nearly all families below the median income level.

h. Federal Housing Administration and Veterans Administration Loans

These Federal Government programs are not administered through the NHHFA. Rather than provide low interest loans, the programs provide assistance to qualifying home buyers primarily by: 1) allowing for a higher percentage of household income to be devoted to housing costs; 2) providing mortgage insurance or guarantees; and 3) by allowing for down payments as low as 5%. Both of these programs are far less restrictive than NHHFA single-family home programs and are less limited in terms of funding. These programs provide essential assistance to moderate-income households throughout the nation.

E. RECOMMENDATIONS

- Conduct a Town buildout analysis using parcel-based Geographic Information System (GIS) technology. The buildout analysis can provide a more accurate estimate of the amount of developable land remaining in the Town. The results of the buildout analysis can be used to predict the level of public services required when the Town is fully developed.
- Continue to implement the Accessory Living Unit and Elderly Housing zoning, as amended from time to time, to provide for housing affordable to Hudson's residents.

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CHAPTER III

NATURAL RESOURCES

A. INTRODUCTION

The Town of Hudson lies on the eastern banks of the Lower Merrimack River in south central New Hampshire. The Town shares its southern border with the State of Massachusetts and its western border with the City of Nashua. As a result, Hudson has experienced significant suburban development as people realize that they can commute within the Greater Boston area and still live in a relatively rural town. Impacts from this growth make it important to understand, inventory and plan for the protection of the Town's remaining natural resources.

A unique set of constraints to development may exist on each parcel of land due to the specific topography, soils, water resources, and flora and fauna that could be present. In addition, the abundance and diversity of natural resources in Hudson, including wetlands, ponds, streams, fields and forests, provide opportunities for a variety of land uses while contributing to the overall quality of life in the community. The Natural Resources Chapter considers these constraints to development in planning for the future growth of the community. This chapter considers: 1) upland resources such as topography, soils and forest land; 2) water resources; 3) flora and fauna; 4) existing and potential conservation lands; and 5) recommendations.

B. UPLAND RESOURCES

1. Topography

Topography generally relates to the surface configuration of the land. The topography of an area can be described by two measurable characteristics — Elevation and Slope. A brief description of each of these factors is given below, along with an explanation of their importance in planning for land use and development within the Town.

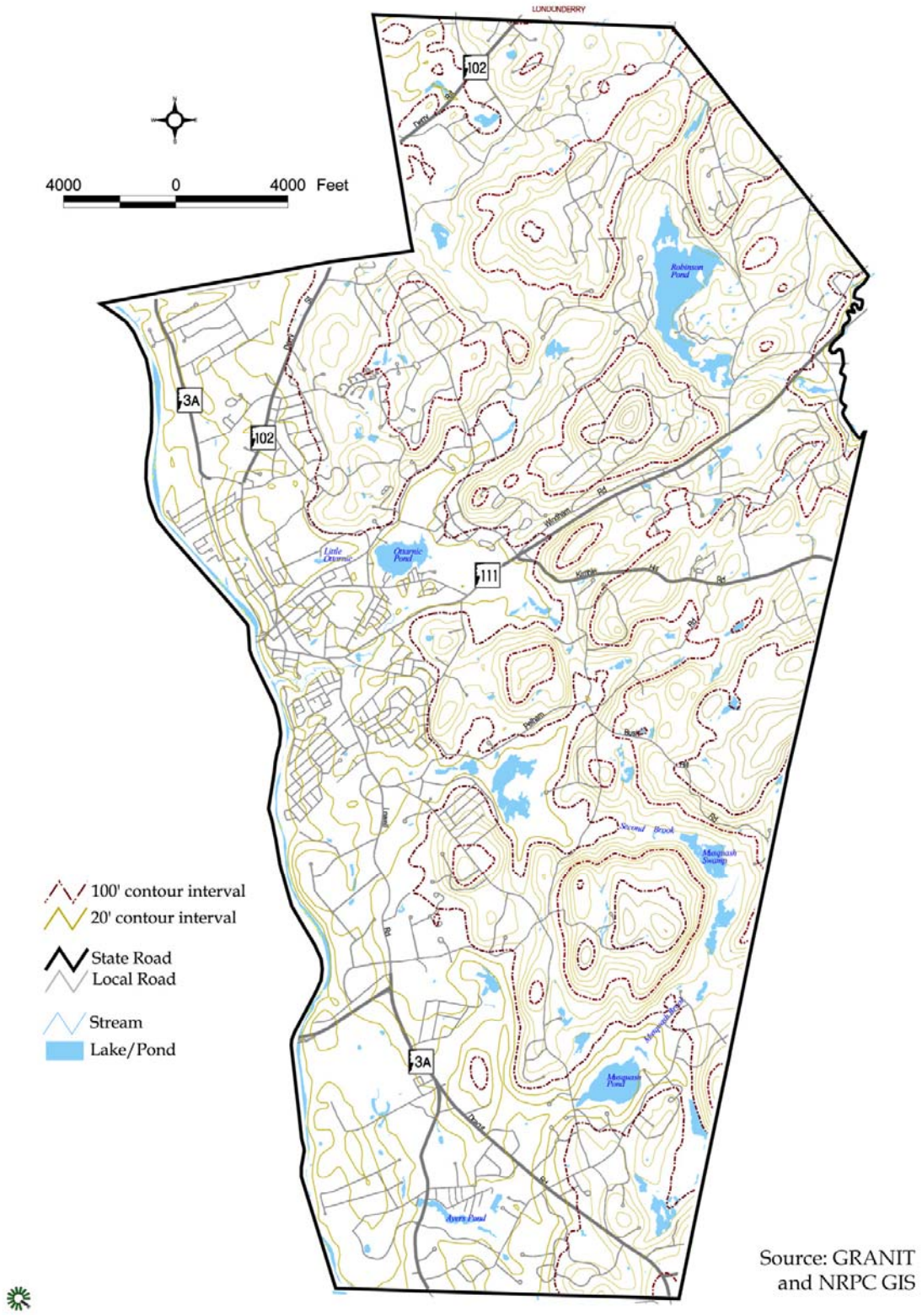
a. Elevation

Elevation defines the relative height of a piece of land at a given point. So that measures of elevation are comparable, they are expressed in terms of feet above Mean Sea Level (feet aMSL). Elevations in Hudson vary from the lowest point at 100 feet aMSL along the Merrimack River, to 510 feet aMSL in between Musquash Swamp and Pond in the southeast part of Town. The eastern half of the Town is dominated by higher elevations and steep slopes. The western half of the Town is slightly flatter, which indicates the former riverbed location during the glacial retreat and forms the watershed boundary for the Merrimack River mainstem. Map III-1 illustrates the topography for the Town of Hudson.

b. Slope

Slope refers to the relative steepness or pitch of a piece of land. Measurements of slope are expressed in percentages and are calculated by dividing the difference in elevation of two points by the distance between the points (i.e., change in elevation/distance = % slope). Thus, land with 0% slope has constant elevation and is perfectly level. Likewise, land with 100% slope has a pitch equivalent to a 45-degree angle. The mapping of slopes is a valuable tool in determining areas where slope conditions may require special design considerations or other precautionary measures. The following slope categories are recommended for consideration in planning for the future land uses in Hudson and are illustrated on Map III-2.

Map III-1. Topography



25+% Slope - Land areas in this category are among the most difficult to develop. A 25% slope represents a 25-foot vertical rise in elevation in a 100-foot horizontal distance. The central part of Hudson, near Musquash Swamp contains the few areas in Town where the slopes are 25% or greater. These areas will require extreme care and usually need special engineering and landscaping to be developed properly. The major problem of development on slopes of 25% or more is that in general steep slopes have a very shallow layer of soil covering bedrock. Proper safeguards must be applied to such sites to minimize hazards to downslope areas, and these safeguards usually mean costly and often problematic engineering and landscaping solutions.

For these reasons, active land uses on steep slopes should be avoided wherever possible, or approached with extreme caution and subjected to a thorough review by the Conservation Commission, Town Engineer and/or designated representative of the safeguards to be employed. The Minimum Lot Requirements for the Subdivision of Land require that, "the Minimum Lot Area…shall contain no slopes in excess of 25%".[1] In addition to the Minimum Lot Requirements, the Planning Board and Town should consider preserving such areas as open space and limiting their use for intensive development where possible. Where slopes in this category are to be developed, those involved should consult the principles, methods, and practices found in the Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire (1981 and amended in 1987), that has been prepared by the Hillsborough County Conservation District.[2]

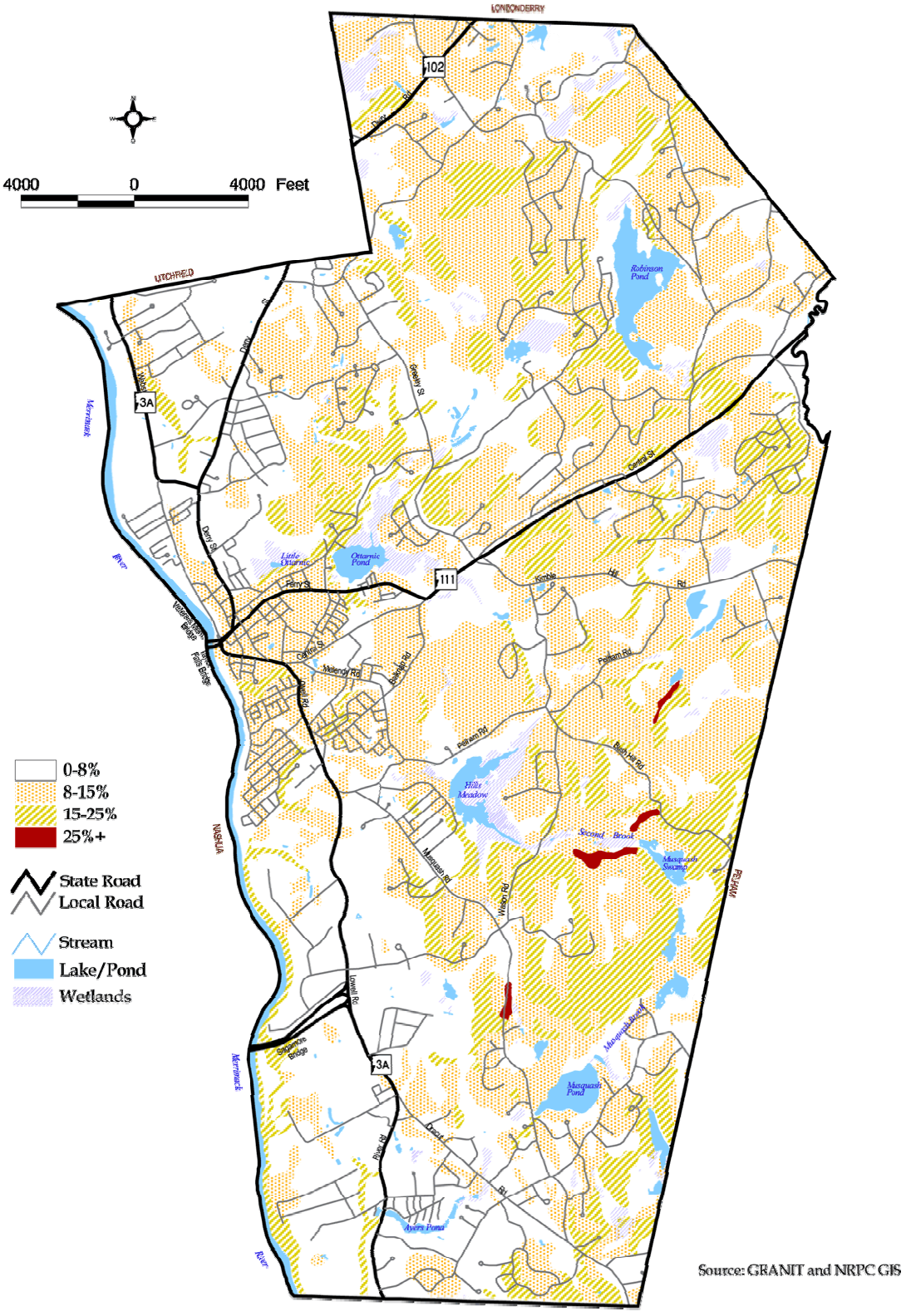
15-25% Slope - Areas in this slope category present similar challenges as areas with slopes greater than 25%. Development of these areas should only be undertaken with extreme care, recognizing the sensitivity of the environmental factors involved. In general, the steeper the slope, the shallower the soil layer covering bedrock. In addition, the velocity of surface water run-off can increase with the steepness of the slope, thereby increasing the potential for erosion and decreasing the potential for absorption of surface run-off.

The above conditions suggest that effective development of the site will increase the costs of on-site waste disposal, site stabilization and landscaping. Road construction is also more difficult and costly under these slope conditions and will result in increased volume and velocity of run-off to adjacent roadway areas. If proper safeguards are not applied, substantial hazards and potential damage to downslope property could result. For these reasons, active land uses should be avoided or approached with extreme caution.

Areas with 15-25% slopes are scattered throughout the Town, with three concentrations in the north central, central and southwestern part of Hudson. These areas are more suitable for open space. Preserving these areas as open space and maintaining the natural vegetative cover retains the absorptive capacity of the soil and minimizes the erosion potential.

[1] Town of Hudson, *2002 Zoning Amendments to the Hudson Zoning Ordinance,* 2001.
[2] Hillsborough County Conservation District, *Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire* , 1981 and amended in 1987.

Map III-2. Slope



8-15% Slope - Land areas with slopes in this category present many of the same problems that are associated with the 15%+ category. Here too, the high erosion susceptibility and the low absorption potential make site development and subsurface sewage disposal difficult. The severity of these conditions, however, may be less hazardous than on steeper slopes.

Overcoming site conditions may also be less costly and difficult on these slopes if approached with caution and sufficient foresight. Approximately one third of the Town is comprised of slopes in this category. A closer examination of specific parcels in this category will determine where problematic conditions may occur, and at what cost these conditions can be overcome.

0-8% Slope - Land areas in this slope category are generally considered to be well-suited for development. Land in this slope category is concentrated on the western side of Town along the banks of the Merrimack River and adjacent to many of the waterways in Hudson. These moderately sloping areas are preferred for active use. Their relative flatness does not pose severe erosion potential, and the velocity of the surface water run-off is sufficiently slow to allow absorption of the water into the soil. In addition, soil layers on slopes of 0-8% are usually of sufficient depth to allow for the absorption and purification of run-off and septic system effluent. (This will depend on the specific soil conditions found on particular sites with slopes in this category.) Overall, slopes of this nature are capable of supporting a wide variety of land uses.

One exception to the above comments, however, must be noted. Areas of 0-3% slope at low elevations, or with poorly or very poorly drained soils, have been found to have a high water table (at or near the surface) throughout a majority of the year. These areas pose substantial problems to site preparation, construction, and effective subsurface sewage disposal. But generally, flat, well-drained areas are usually quite suitable for active use and development.

The slope categories, as described above and shown on Map III-2 are intended to serve as a general guide to community planning. Local variations will require site inspection by the Town Engineer and/or designated representative to determine the existence and severity of problems to be overcome if developed. The slope data should be considered in conjunction with soils data and water resource data in determining the overall natural ability of the land to support development.

2. Soils

a. Soils in General and Limitations for Septic Systems

Soils are the most important determinant of the land's development capability, especially in unsewered areas. A soil's depth to water table, susceptibility to flooding, slope, depth to bedrock, stone cover, and permeability present potential constraints to the construction of roads, buildings and septic disposal systems.

The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS) has devoted extensive time and resources to compiling soil surveys, which analyze the physical and chemical properties of different types of soils. From this information they have determined the suitability of soils for use, and the limitations and potentials affecting the use of soils for particular purposes.

Soils with *high* limitations for septic systems comprise approximately 40% of Hudson's land area. Concentrations of these soils are located primarily in the northern and southern parts of Town, with scattered concentrations in the central part. Soils with *moderate* limitations for septic systems comprise approximately 40% of the Town's land area. Concentrations of these soils are located primarily in the central part of Town along the Merrimack River and in the northern area adjacent

to the Londonderry Town line, with scattered concentrations throughout the central part. Soils with *slight* limitations for septic systems comprise approximately 20%of the Town's land area. Concentrations of these soils are located in the central part of Hudson. Appendix III-1 lists soils by their limitations for septic systems. The soils are illustrated on Map III-3.

Hudson bases minimum lot sizes for residential development on the presence of both water and sewer service facilities.[3] A single-family residence on Town water and sewer, for example, requires a minimum lot size of 30,000 square feet (ft^2) or 0.70 acres. Without public water and sewer, the residence requires 43,560 ft^2 for a single family and 60,000 ft^2 for a duplex. The Town does not permit construction of multi-family houses without Town water and sewer.

b. Agricultural Soils

The importance of agricultural lands as a valuable, rapidly diminishing resource has increased at national, state and local levels. Nationally, the US Department of Agriculture (USDA) estimates that one million acres of farmland are lost each year to the advancing urban sprawl that is sweeping the country. In New Hampshire, more than two-thirds of the State's farmlands have been removed from agricultural production over the last fifty years.

The USDA has identified soil types that are best suited for crop production based on soil quality, growing season and moisture supply. The three agricultural soil classifications recognized by USDA in New Hampshire are discussed below. Specific agriculture soils having national or statewide importance are listed in Appendix III-2. The location of these soils is illustrated on Map III-4.

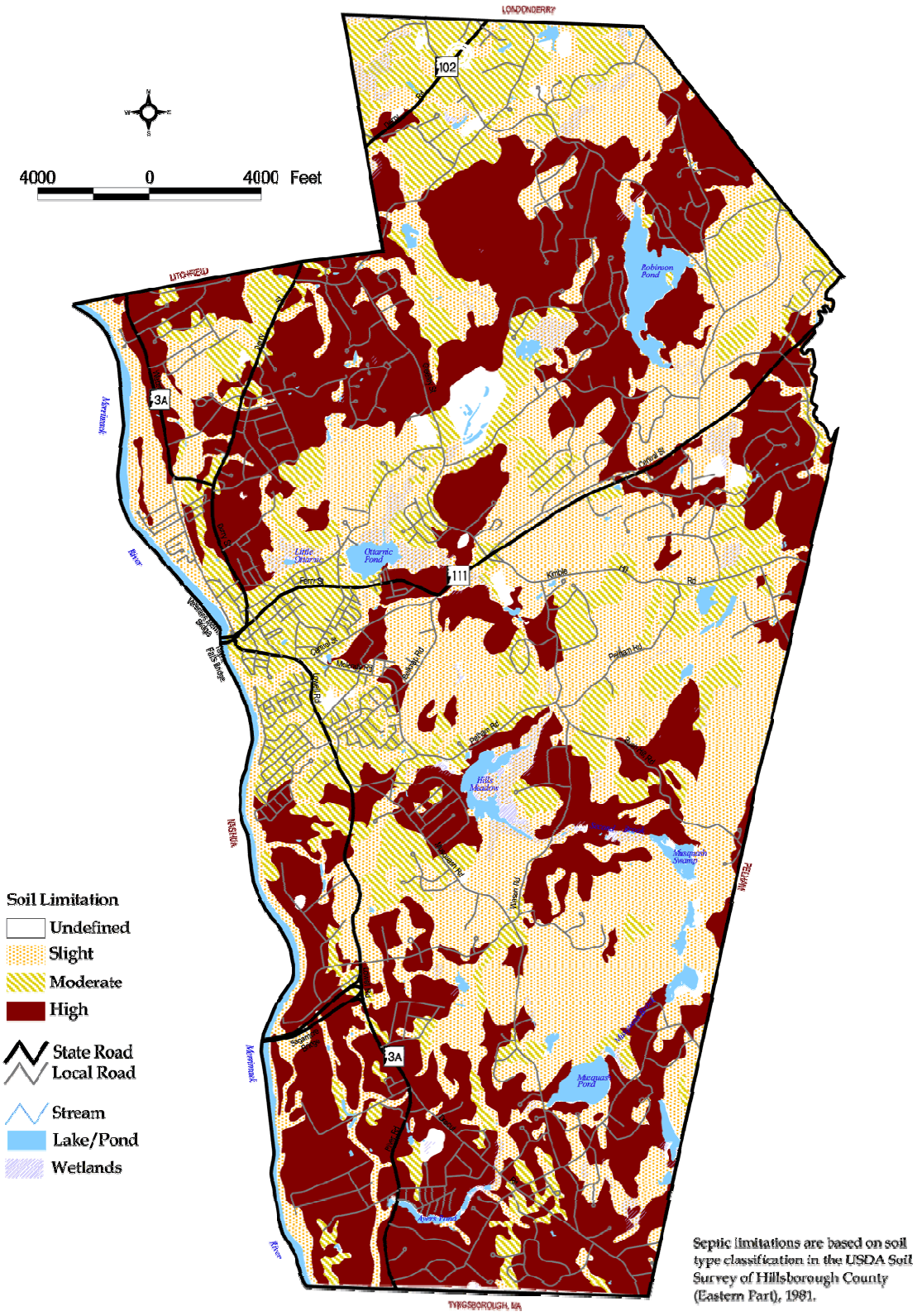
Prime Farmland - These lands are best suited for producing food, feed, forage, fiber or oil seed crops. Their soil quality, growing season, and moisture supply make them suitable for producing sustained high yields of crops economically when treated and managed according to modern farming methods. They can be farmed continuously without degrading the environment, and usually require little investment and energy for maintaining their productivity. These soils are rated among the best in the country for farming uses. Prime farmland soils are primarily located along the Merrimack River in the 500-year floodplain.

Farmlands of Statewide Importance - These lands are rated as being of statewide importance for the production of food, feed, fiber, forage and oilseed crops. They are important to agriculture in New Hampshire but exhibit some properties, which exclude them from Prime Farmland status such as erodibility or droughtiness. They can be farmed satisfactorily by greater input of fertilizer and erosion control practices, and will produce fair to good crop yields when managed properly. The Farmlands of Statewide Importance are scattered throughout Hudson and are commonly found adjacent to the wetlands in Town.

Farmlands of Local Importance - These lands are rated as having local importance because they are already being actively farmed. Since they are now under active farm management, they are important to the role agriculture plays in the Town's economic, cultural and conservation picture.

[3] *Town of Hudson Zoning Ordinance 2001, Chapter 334-27.1., General Requirements* states that, "*A lot with one or the other (water or sewage) will be treated as having neither.*"

Map III-3. Soil Limitations



Septic limitations are based on soil type classification in the USDA Soil Survey of Hillsborough County (Eastern Part), 1981.

Important agricultural soils are illustrated on Map III-4. These soils are limited in Hudson and located along the Merrimack River and scattered along the valleys. The ability to farm many of the areas that do contain important agricultural soils is also limited. Hudson limits agricultural activity to the Business District, the General District (formally the Rural District) and the General–One District. Most of these areas, however, have been developed for non-agricultural purposes or are not currently used for agricultural purposes. In addition, many of the important soils are not located in these districts (see Map III-4). For example, the land area adjacent to the Merrimack River in the northwest section of Hudson is identified as prime agricultural soil; however, it is in the Residential District in Hudson which does not allow for agricultural activity.

Although agriculture is not extensive in Hudson, the remaining areas are still an important resource that provide local seasonal produce and planting materials; provide open space; serve as an educational resource and contribute to the rural character of the Town. Efforts should be taken to encourage existing farmlands to remain in agricultural production. In addition to the existing farmlands, it is important to protect the important agricultural soils that are not currently in use, especially in districts where agriculture uses are not allowed. The Trust for New Hampshire Lands Program and the Land and Community Heritage Investment Program could provide resources to protect important agricultural lands through the acquisition of development rights on these properties.

c. Construction Materials

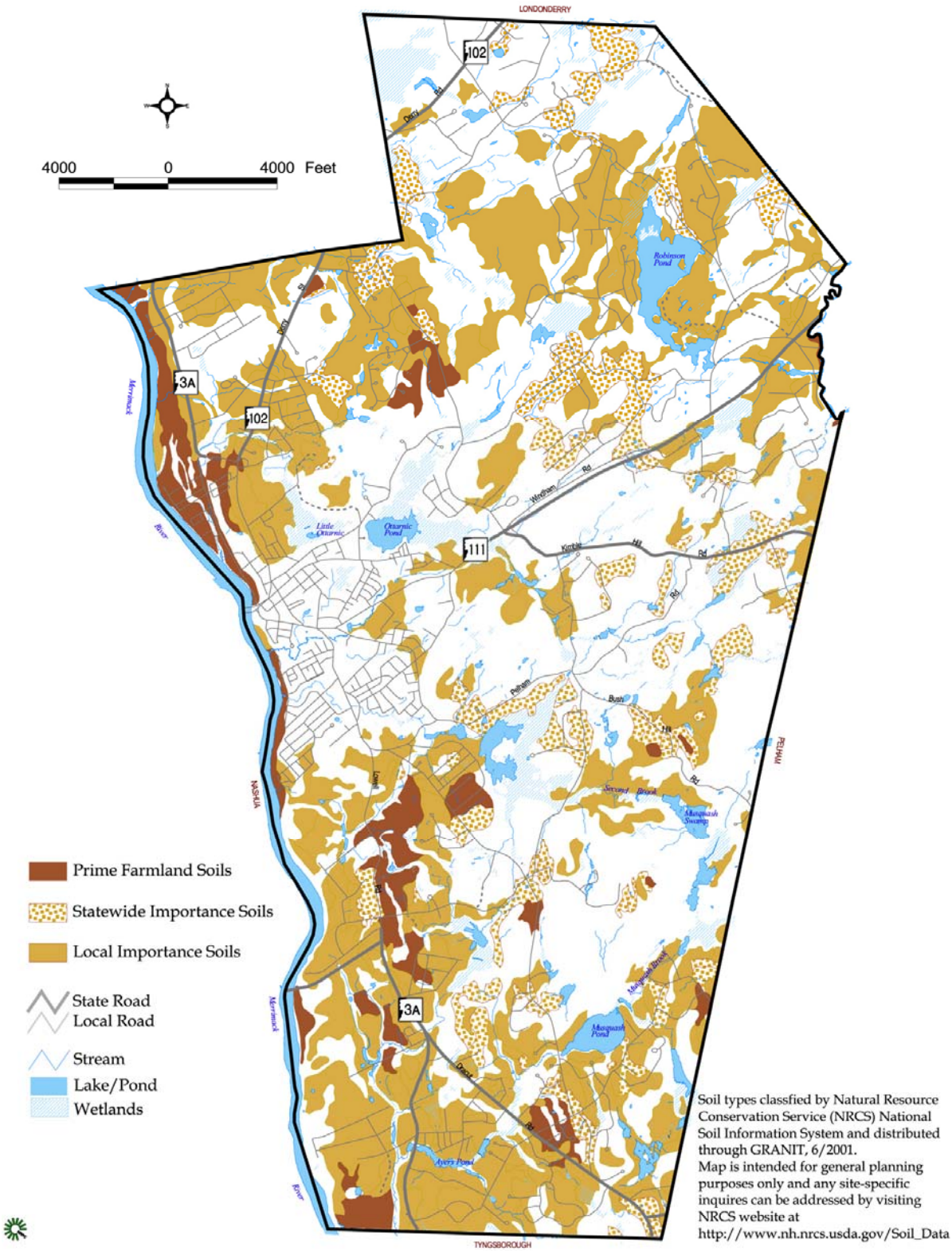
The NRCS rates the suitability of soils as sources of construction materials. Sand and gravel resources are particularly important materials for road construction; however, active excavation sites are few in Hudson. Most of the probable sources of sand and gravel deposits are within developed areas of Town. Hudson permits mining and quarrying in the Business District, the General District (formally Rural) and the General-One District.

New Hampshire Revised Statutes Annotated, Chapter 155-E, Local Regulation of Excavations, requires that communities provide "reasonable opportunities for excavation" of some of the commercial earth resources within their borders. The statute further requires that municipal master plans summarize known sources of construction materials and the location and estimated extent of existing excavation sites.

Excavation regulations adopted by the Planning Board in 1981 require a permit from the Planning Board for most clearing, grading, transporting, removal and excavation projects or other disturbance of land.[4] A copy of the application must also be sent to the Conservation Commission. Within 12 months after the expiration of the permit or completion of the project, the owner of the site must restore the site to meet a variety of minimum conditions such as: 1) spreading the original topsoil or strippings on disturbed areas to a minimum four-inch depth; 2) ensuring the area is left as free draining as practicable; 3) trees shall be planted with two-year old plants or plants furnished under a standard nursery order and shall be included in Trees and Shrubs in New Hampshire – A Guidebook for Natural Beauty Projects. Among the conditions of approval are adequate signage, parking and fencing; provisions for drainage during and after completion of operations; control of siltation, noise and dust; and limitations on standing water.

[4] *Town of Hudson, New Hampshire, Subdivision and Site Plan Regulations*. Chapter 200-3. Permit Required; exemptions.

Map III-4. Important Agricultural Soils



3. Forests

Forests were the dominant landscape characteristic after the retreat of the glaciers. Before 1623 and the colonization of New Hampshire, southern New Hampshire was 93% forested with the remaining 7% being marsh or ponds. By 1850, at the height of agricultural development in New Hampshire, only 20% was forest, while the remaining 80% of Hillsborough County was cleared for livestock grazing, growing livestock feed and raising crops for home consumption. Agriculture began to decline during the 1860's with the western migration and industrialization of the northeast. These fields slowly gave way to scrub trees and conifers generally took over the abandoned farmlands and meadows. During the 20th century, foreign disease and pests have changed forest composition and were responsible for the decline or destruction of the American Beech, American Elm and the American Chestnut. The introduction of the chestnut blight from Asia around 1904 killed most of the mature chestnuts within 20 years.

According to the Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Lands*,[5] reforestation began to stabilize during the 1960's. The peak and downturn of forest cover began in the 1970's and 1980's when population gains and development increased throughout the State. Around 1983, New Hampshire reached an estimated high of 87% forest cover, which has not been seen since 1700. Satellite analysis in 1993 indicated that the forest cover was approximately 83%. This makes New Hampshire the second most forested state in New England after Maine.

The area's climate is ideal for the growth of forest trees. South central New Hampshire receives approximately 43 inches of precipitation per year. Among the common tree species found in Hudson's forests are White Pine, White Oak, Red Oak, American Beech, White Birch, Black Birch, Sugar Maple, Red Maple and Eastern Hemlock.

White pine has been the predominant tree harvested since colonial times. Hillsborough County is still a leader in white pine saw log production while red oak and sugar maple command a good market price. Deciduous and mixed forest types are dominant in Hudson and are widely scattered throughout the Town as illustrated on Maps III-5 and III-6. Many species of birds and mammals require large, unbroken tracts of forest in order to sustain their populations. Preserving unfragmented forest blocks helps retain the Town's scenic beauty and provides wildlife corridors for larger mammals.

Silviculture activities in Hudson consist of predominately small Christmas tree and firewood sales. Small woodlots continue to be selectively cut as supplemental income. Performance standards and plan review for silvicultural activities are regulated by the State through timber harvesting and water quality laws. Regulation prohibits the placement of slash and mill waste in or near waterways and limits clear-cutting near great ponds and streams. These requirements may mitigate some water quality impacts associated with timber harvesting.

Table III-1 provides a summary of Hudson's forest facts derived from *New Hampshire's Changing Landscape*. The forest and habitat data provided in that report is derived from 1992 – 1993 Landsat satellite imagery, the most recently available data source on forest resources on a regional level. Forest blocks of greater than 10 contiguous acres are illustrated on Map III-5. Forest blocks of greater than 500 contiguous acres are illustrated on Map III-6.

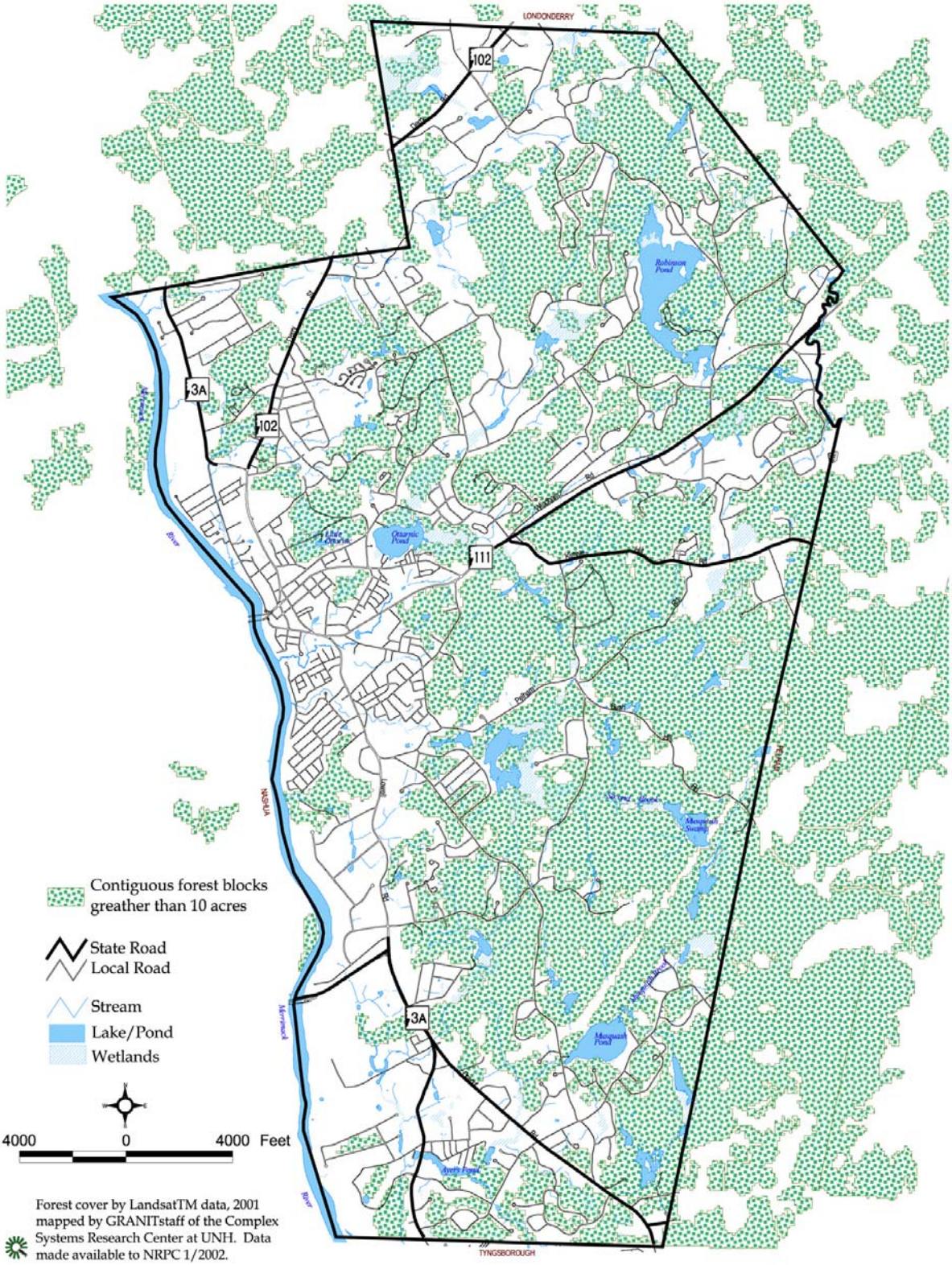
[5] The Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Lands*, 1999.

Table III-1. Hudson Forest Facts

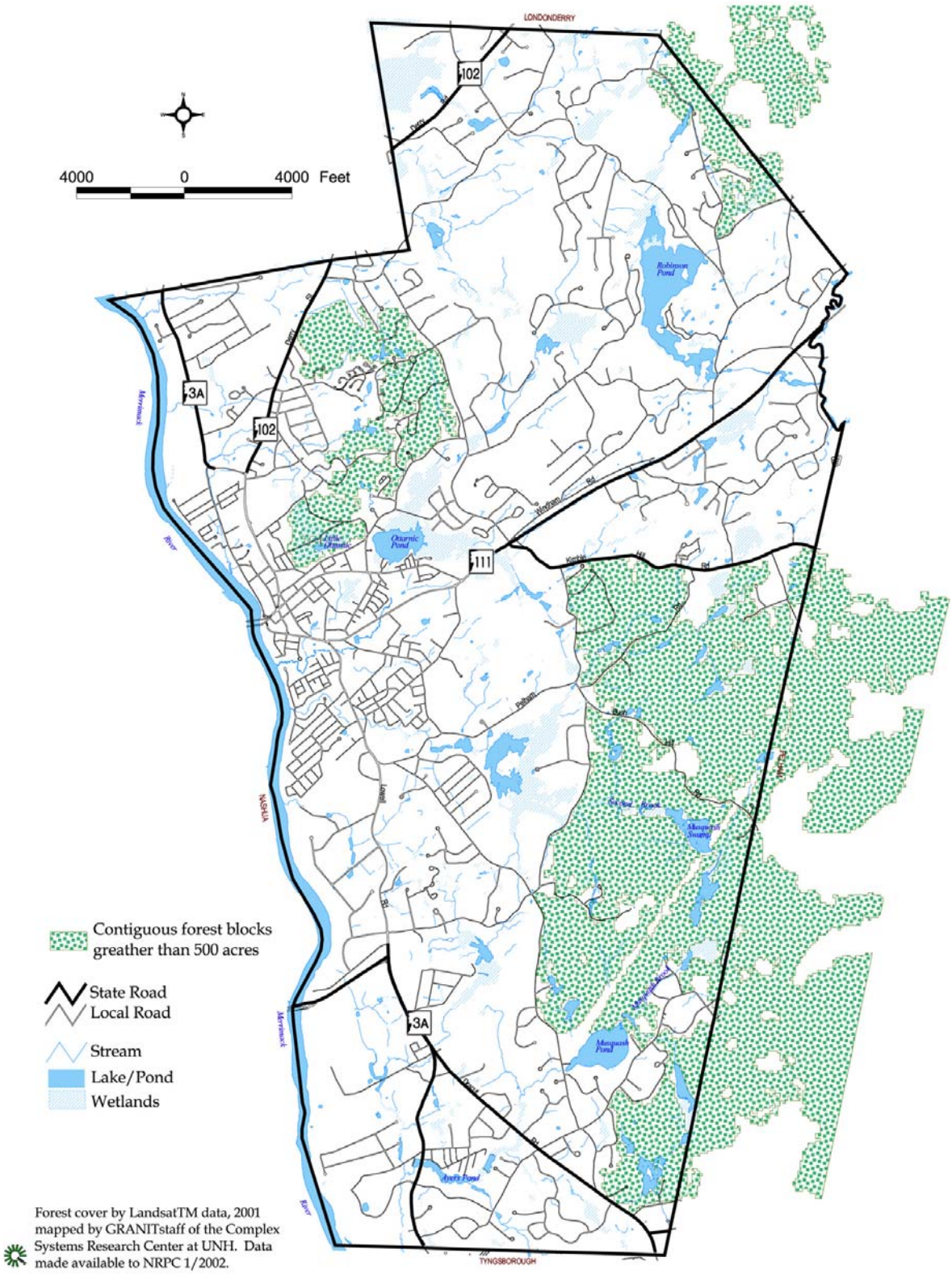
Area and Percentage in Forest (1993)	10,268.7 acres or 56.0%
Total area in Forest Blocks greater than 500 acres	2,837.20 acres
Number of Forest Blocks greater than 500 acres	3 forest blocks > 500 acres
Average and Median Size of all Forest Blocks	107.0 acre average and 38.1 acre median
Percentage of Forest Blocks greater than 10 acres that are protected	8.3 % blocks greater than 10 acres are protected
Predicted Decline in Forest Land Area by 2020	2,198.3 acres
Predicted % Decline in Forest Block Size by 2020	22.4% percent decline

Source: Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Landscape*, 1999, based on 1992-1993 Landsat Thematic Mapper data.

Map III-5. Forest Blocks Greater Than 10 Acres



Map III-6. Forest Blocks Greater Than 500 Acres



C. WATER RESOURCES

Water is essential to every element of community life. Like air, water is constantly in motion - running above and below the ground's surface across Town, State and national boundaries. The natural system of water in Hudson is extremely important in planning for growth. Above ground, water is used by residents for fishing, swimming and boating. Water is drawn from the ground to supply the entire Town with a potable drinking water source. Conscious and careful planning of the land uses in the Town must be adhered to if hazards to the health and well-being of community residents are to be avoided.

1. Surface Water Resources

Surface water resources provide storm drainage, storage, groundwater recharge, wildlife habitat, water supplies and active or passive recreation. Although surface water represents a small portion of land area, the water resources in Town form an extensive network that connects surface water with groundwater. Because of this interconnection, all of the Town's surface waters are important in order to protect local water supplies and need to be considered when planning for the Town's existing and future growth. The Town's water resources, including watershed boundaries, are illustrated on Map III-7.

Hudson's most prominent surface water resource is the Merrimack River. The Merrimack River forms the entire western boundary of the Town and serves as a regional water supply and recreational resource. The Merrimack River also receives discharge from several of the region's wastewater treatment plants (including the City of Nashua and the Town of Merrimack) and much of the stormwater system. The Merrimack River is one of 12 rivers in the state protected under the Rivers Management and Protection Act. Activities within one quarter of a mile of the River are regulated by the State and reviewed by the Lower Merrimack River Local Advisory Committee (LMRLAC).[6] The Town should develop a working relationship and maintain active membership with groups such as the LMRLAC and non-profits like the Merrimack River Watershed Council[7] to coordinate the development of the Merrimack River corridor.

Another important water resource in Hudson is Musquash Brook and its associated ponds and wetlands. Musquash Brook originates in western Pelham near the Town border and flows into Hudson through a series of ponds and into Limit Brook, which empties into the Merrimack River in Tyngsborough, Massachusetts. Single-family residences comprise nearly half of the land area within the Musquash and Limit Brook watersheds. Despite the increased development, however, this area constitutes one of Hudson's highest quality natural resources because of the diverse wildlife habitat and the numerous recreational opportunities available to the Town and the region.

One critical surface water resource that attracts a lot of community attention is Robinson Pond. Robinson Pond is the largest water body in Hudson. Residents of Hudson and nearby towns use the pond for swimming, boating, nature walks in the Town-owned conservation land, fishing, and bird watching. Much of the Robinson Pond watershed is developed which is contributing an increased amount of nutrients into the pond, resulting in a eutrophic condition. Efforts to improve the condition of the pond include regular water quality monitoring and outreach to residents in the Robinson Pond watershed encouraging them to adopt good stewardship practices.

[6] http://www.des.state.nh.us/rivers/rsa483.htm
[7] http://www.merrimack.org

This section of the natural resources chapter briefly examines Hudson's surface water resources, with an emphasis on water quality, including potential threats as well as solutions to safeguard and enhance water quality. In this endeavor, it has been discovered that a comprehensive watershed-based approach is the most effective in safeguarding water quality. Therefore, this discussion will start with a description of the major watersheds in Hudson, followed by a discussion of rivers, streams and other water resources located within the major watersheds.

a. Watersheds, Rivers and Streams

A watershed is defined as a geographic area consisting of all land that drains to a particular body of water. Watersheds vary in size, shape and complexity. Watersheds are delineated by identifying the highest topographic points in a given area, and determining the direction in which water will flow from these high points. All water bodies have their respective watersheds. Major rivers, such as the Merrimack River also typically contain many sub-watersheds and tributaries. All of the perennial streams identified in Table III-2 are tributaries in the larger Merrimack River watershed, with individual watersheds for each stream (see Map III-7).

Table III-2. Perennial Streams in Hudson

Name	Total Length (miles)	Length in Hudson (miles)	Dammed or Free Flowing	Class[8]
Musquash Brook	2.7	2.7	free	B
Limit Brook	2.6	2.6	free	B
Second Brook	2.5	2.5	dammed	B
First Brook	1.5	1.5	dammed	B
Merrill Brook	1.9	1.9	dammed	B
Glover Brook	1.0	1.0	dammed	B
Reeds Brook	2.1	2.1	free	B
Chase Brook	2.3	1.5	dammed	B
Merrimack River	116	6.8	dammed	B

Sources: NRPC, 2003 and *Hudson Conservation Plan, November 1990.*

Each of the perennial streams in Hudson has a watershed. The water quality in each of these streams is directly related to the land use and activities that take place within each watershed, which are not always defined by municipal boundaries. Because the drainage area of any given water body may extend beyond a town's borders, intermunicipal coordination of land uses in each watershed is important in ensuring effective management and protection of the water resource. One example is the Musquash Brook Watershed, which is located in both Hudson and Pelham, with about one-quarter of its watershed area in Pelham and the remainder in Hudson. Map III-7 illustrates each watershed area in Hudson. Table III-3 below provides area statistics for each watershed.

[8] The class represents the desired level of water quality for the stream and does not necessarily reflect actual conditions. The classification of B means the stream either meets or has a goal of achieving the fishable and swimmable criteria established under the Clean Water Act.

Map III-7. Water Resources

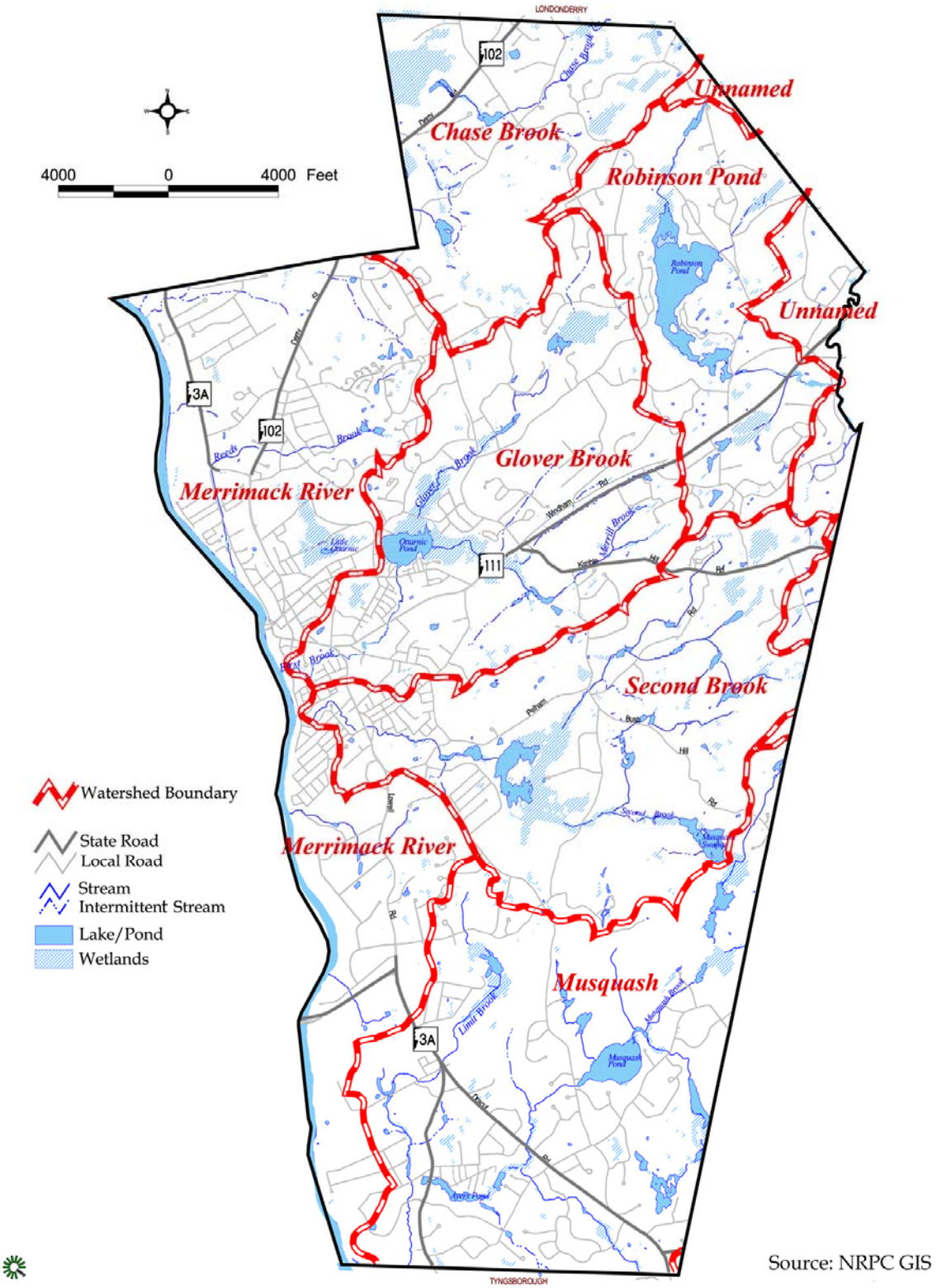


Table III-3. Watersheds in Hudson

Watershed	Acres in Hudson	Percentage of Hudson
Merrimack River primary watershed	3,999	21%
Musquash Brook watershed	3,840	20%
Unnamed watershed	580	3%
Second Brook watershed	3,323	18%
Glover Brook watershed	3,060	16%
Beaver Brook	107	1%
Chase Brook watershed	1,888	10%
Robinson Pond	1,976	11%
Total area	**18,773**	**100%**

Source: NRPC as delineated on USGS quadrangle maps.

Because all of these systems are connected in the greater Merrimack River watershed, it is important to remember that small disturbances in the perennial streams and their watersheds can alter water quality and quantity in the larger streams and rivers such as the Merrimack River. Erosion, flooding and contamination can occur in the smaller streams from stormwater. The cumulative impacts of development, from the smallest stream to the largest river, have an impact on both water quality and quantity in a community.

b. Lakes and Ponds

Hudson's lakes and ponds are also a very important surface water resource, providing wildlife habitat, water supply, flood control, and outdoor recreational opportunities. An inventory of Hudson's lakes and ponds is found in Table III-4.

Table III-4. Lakes and Ponds in Hudson

Name of Water	Area (acres)	Average Depth (feet)	Class	Trophic Class	Type
Ayers Pond	12	5.5	B	Eutrophic	Dammed
Benson's Pond	1.8	~ 6	B	NA	Dammed
Little Ottarnic Pond	2	NA	B	NA	NA
Ottarnic Pond	34	12	B	Eutrophic	Dammed
Melendy's Pond	1.5	NA	B	NA	NA
Musquash Pond	32	NA	B	NA	NA
Robinson Pond	88	29.5	B	Eutrophic	Natural
Unnamed Pond (Musquash Brook)	52.7	9.8	B	Eutrophic	Natural

Source: NH DES, *Survey Lake Data Summary*, November 2000.
Hudson Conservation Plan, November 1990.
Dave Clark, *Benson's Property Water Control Structures,* 2002.

The trophic class of a lake indicates its stage in the natural aging process, called eutrophication that all water bodies undergo. Generally, three classifications are used: oligotrophic - high transparency with low levels of nutrients and vegetation and high levels of dissolved oxygen; mesotrophic - elevated levels of nutrients and vegetation and decreased levels of dissolved oxygen; and eutrophic - low transparency, rich in nutrients, abundant aquatic vegetation and low levels of dissolved oxygen. All of the lakes and ponds in Hudson are classified as eutrophic. The natural aging process can be accelerated by excessive nutrient loading which encourages weed and algal growth, and in turn speeds up the deposition of decaying vegetation as organic sediments on the lake's bottom.

Robinson Pond is an example of the acceleration of eutrophication in a pond. The pond has become a popular location to build both summer camps and year-round single-family homes. Due to the intense development, increased amount of nutrients from lawn fertilizers, failing septic tanks and other natural conditions, Robinson Pond is experiencing high levels of phosphorous. Through support from the NH Department of Environmental Services members of the Friends of Hudson Natural Resources (the Friends) group are continually monitoring water quality in the pond and educating watershed residents on best management practices for septic maintenance, application of fertilizers, disposal of yard waste, buffers, and invasive species of aquatic plants. Communication between the Friends and the Planning Board and Conservation Commission is essential to improve and protect Hudson's surface water resources.

2. Groundwater Resources

A substantial portion of water in Hudson is below the ground's surface. Groundwater is water that is stored in the pore or fracture spaces between the individual particles of soil, sand, gravel, bedrock, etc. In essence then, the ground acts as a sponge (called an aquifer) which filters and stores large amounts of potable water. These supplies are tapped by drilling or digging wells to obtain water for domestic consumption. The amount of water which can be obtained in this manner is determined by the nature of the material holding the water. For example, per unit volume of material, sand and gravel deposits generally have a higher potential for yielding large amounts of water than do deposits of till and bedrock. The three different types of groundwater aquifers include: saturated stratified drift, saturated unconsolidated till and bedrock. Each source varies as to the quantity of groundwater present and how it moves. Each is described below and illustrated on Map III-8.

Stratified Drift Aquifers - Stratified drift aquifers are made up of sand and gravel materials. The materials were deposited by the melting of glacial ice similar to rivers that deposit sand or gravel bars today. The deposits may be quite extensive, and are layered or "stratified." Their course texture allows for large volumes of water to be stored and their high porosity allows groundwater to flow through quite readily. For these reasons, stratified drift aquifers are a prime source of water for municipal and other large-volume users. Water usage will vary depending on the type of development. In the absence of a municipal water supply system, the mapping of groundwater potential can be helpful in deciding where various land uses might be best located and limiting the maximum amount of growth.

Till Deposits - Till deposits contain a mixture of clays, sands and gravels of varying grain sizes. These deposits do not have the capacity to store or transmit large volumes of water; however, they can provide sufficient volumes to supply individual residences or small community wells.

Bedrock Aquifers - Bedrock aquifers are composed of fractured rock or ledge, where groundwater is stored in the fractures. These aquifers are very complex because bedrock fractures decrease with depth, "pinch out" over short distances, and do not carry much water. Wells drilled in bedrock that do not "hit" a fractured area will come up dry. If the well encounters an extensive fracture system,

then groundwater yields may be high. On the average, bedrock aquifers yield smaller volumes of groundwater than wells drilled in stratified drift.

Hudson has a nearly continuous stratified drift aquifer along the Merrimack River that measures approximately 10 square miles or 36% of the total land area in Town (see Map III-8). The most productive aquifer is located around Ottarnic Pond and extends northeast along Glover Brook and southwest to the Merrimack River.[9] This aquifer contains the largest volume of recoverable stored groundwater within Hudson. Several wells, with capacities ranging from 100 to 400 gallons per minute (gal/min), are located in this aquifer near Ottarnic and Melendys Ponds. The USGS study, *Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area*, describes the additional stratified drift aquifers in Hudson.[9]

The area along NH 102 near Alvirne High School in northern Hudson contains a permeable kame delta deposit which supplies water to individual households. According to Map III-8 this area has a moderate transmissivity rate of 2000-4000 square feet per day. Transmissivity is the ability of water to move through the ground. The higher the square footage per day, the more water the ground is carrying through it. Other permeable stratified drift aquifers, such as the one located adjacent to the border of Londonderry and another located on the border of Tyngsborough are medium yield but lack the aerial extent and saturated thickness to support large-municipal water systems requiring more than 100 gallons per minute.[10]

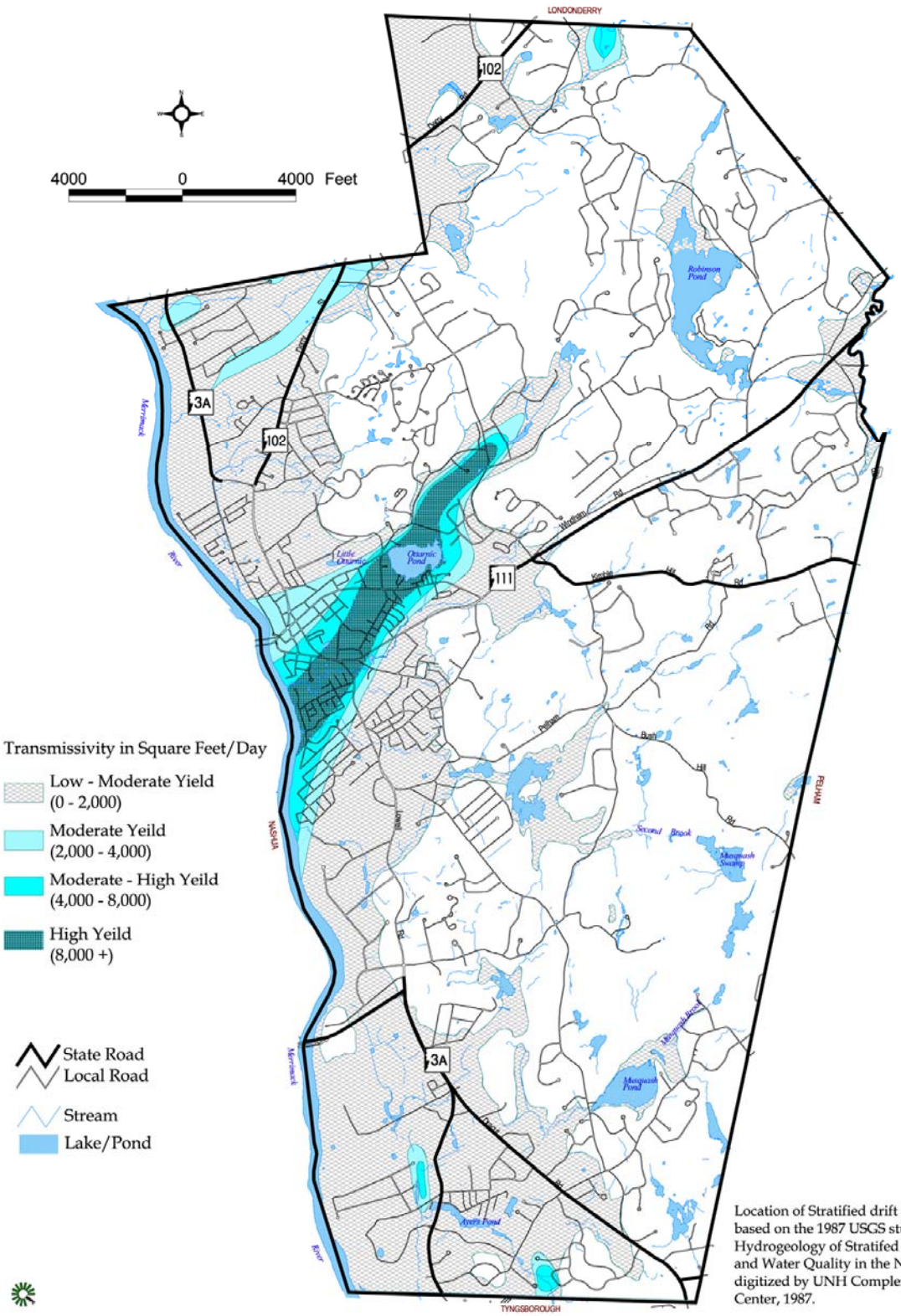
As mentioned previously, surface water and groundwater are interconnected. Precipitation falls in areas referred to as watersheds formed by a series of connecting ridges which create a basin. Surface water, flowing through a system of interconnected wetlands, brooks, streams, rivers, is encompassed by the drainage basin or watershed. A watershed can be subdivided into smaller subwatersheds.

In a watershed, groundwater is recharged in stratified drift aquifers in two ways. The area of direct recharge is the land surface directly overlying the stratified drift deposit. Water infiltrating the earth materials within this area has a "direct" route to the groundwater resource. The indirect recharge is the land surface outside the direct recharge area, but within the surrounding watershed, which contributes water to the groundwater system. Watershed management and protection can be used to provide a framework for a comprehensive water resource protection strategy, of which aquifer protection is a part.

In order to protect Hudson's groundwater resources, greater attention should be given to the location and extent of the aquifers in Town and action taken to protect these resources. One method of protecting groundwater resources is by adopting an aquifer conservation district. An aquifer conservation district protects existing and potential groundwater supplies and recharge areas from harmful developments or land use practices.

[9] United States Geological Survey, Water Resources Investigations Report 86-4358, *Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire, 1987.*
[10] Hudson Conservation Commission, *Hudson Conservation Plan, November 1990.*

Map III-8. Aquifers



3. Floodplains

Floodplains are areas adjacent to watercourses and water bodies, which are susceptible to the natural phenomenon of flooding during periods of high run-off. The unpredictable nature of flooding requires the application of precautionary measures to avoid substantial damage to life and property in areas susceptible to floods.

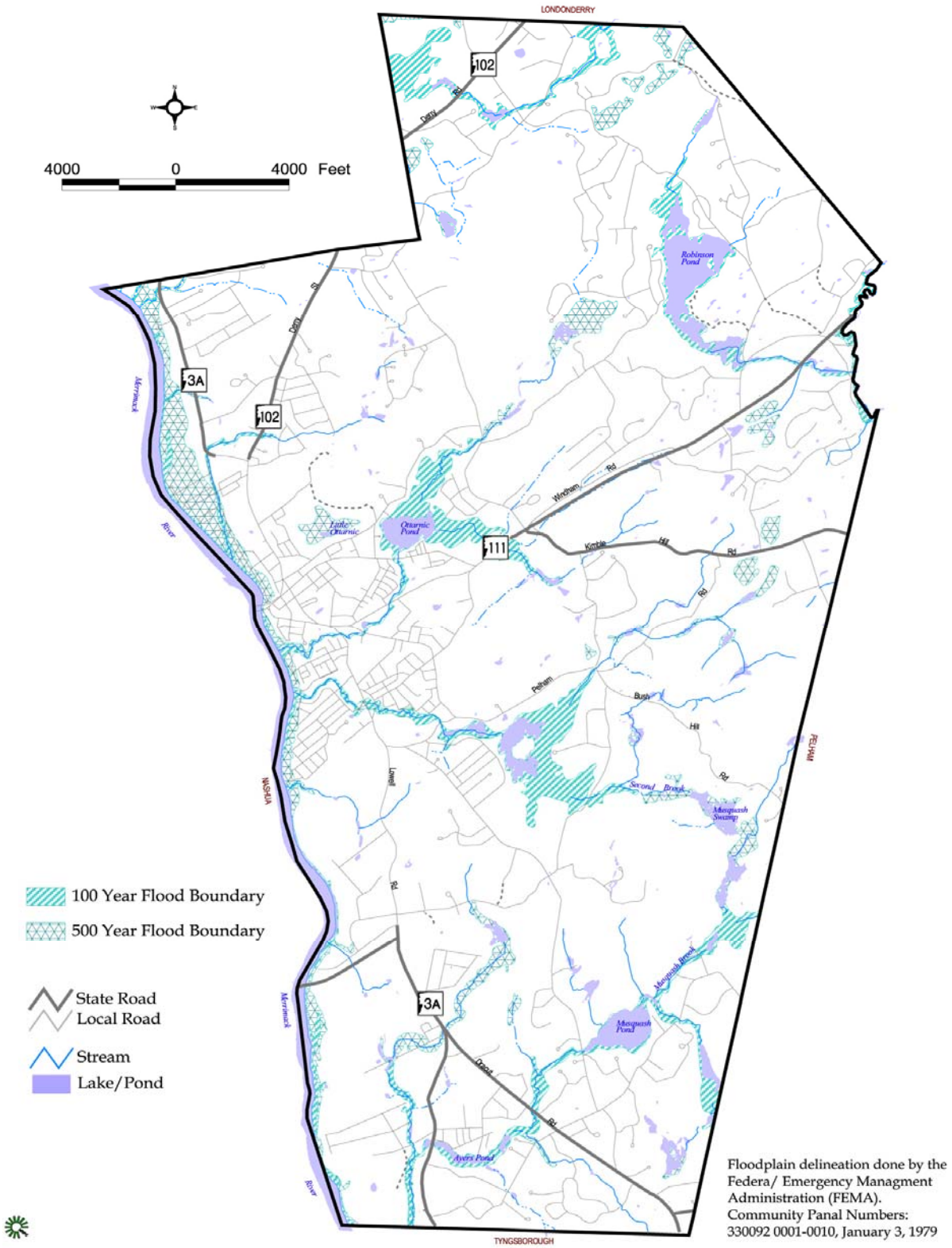
Two methods are available to avoid the problems presented by periodic flooding. Protective measures can be applied to structures already located, or proposed for location, on floodplain areas. Preventive measures can also be used to regulate the types of development permitted in these areas so as to minimize the potential hazards to life and property of community residents and landowners. To employ either approach requires the identification of affected properties.

Floodplain areas cover over 2,000 acres or approximately 11% of the area in Town. Most of the floodplain area is located along the east bank of the Merrimack River and in the Second Brook and Ottarnic Pond Watersheds as indicated on Map III-9. The only way to change the floodplain boundary is for the owner or the Town to submit a Letter of Map Revision and proof to the Federal Emergency Management Agency (FEMA) stating that the designated area is no longer subject to flooding, although it may have been at one time.

The Town of Hudson requires a floodplain permit for all proposed developments in any special flood hazard areas. The special flood hazard areas are determined by the various zones within the 100-year flood elevation as defined in the Community's Flood Insurance Study, the Federal Insurance Rate Map and the Flood Hazard Boundary Map. While the Town of Hudson allows development in special flood hazard areas upon approval, the applicant must also obtain permits required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972. These permits must be provided by the applicant prior to approval by the Town Engineer. In addition, there are certain qualifications that a structure or structures must meet in order to receive a building permit, including the following: 1) all new construction and substantial improvements of residential structures have the lowest floor, including the basement, elevated to or above the one-hundred-year flood level; and 2) proposed structures to be located on slopes in special flood hazard areas…shall include adequate drainage paths to guide floodwaters around and away from the proposed structures.[11]

[11] *Code of the Town of Hudson,* Chapter 218-4(E)(5) – Duties of the Engineer. http://www.ci.hudson.nh.us/

Map III-9. Floodplains



4. Wetlands

Wetlands have recently received much scientific and regulatory attention as recognition of their role in hydrologic and ecological processes has increased. Among the functions wetlands perform are aquifer recharge, flood control, erosion and sedimentation control, water purification, and provision of nursery grounds and habitat for numerous species of plants, animals and fish. A number of endangered and threatened species are found only in wetlands.

Wetland definitions vary according to the agency or organization delineating the wetland. The U.S. Fish and Wildlife Service definition of wetlands is based on the location of the water table and the presence of standing water, the presence of plant species commonly found in wetland habitats, and soil type. Four federal agencies (the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS), the Army Corps of Engineers and the Environmental Protection Agency) agreed in 1989 on a definition of wetlands that considers three parameters: soils, wetland vegetation and hydrology. The NH Wetlands Board uses a three-part definition for wetlands based on hydric (saturated) soils, hydrology (water table at or near the surface), and wetland vegetation. For purposes of regulation, Hudson, like many communities in New Hampshire, defines wetlands as areas of poorly and very poorly drained soils (see Table III-5). Wetland soils in Hudson are illustrated on Map III-10.

Table III-5. Very Poorly and Poorly Drained Soils in Hudson

Very Poorly Drained Soils	Poorly Drained Soils
Borohemists (BoA, BpA)	Leicester-Walpole Complex (LtA, LvA, LvB)
Chocorua Mucky Peat (Cu)	Pipestone (PiA, PiB)
Greenwood Mucky Peat (Gw)	Ridgebury (ReA, ReB, RbA)
Scarboro (So, Sr)	Rippowan (Rp)
	Saugatuck (Sn)

Source: US Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County New Hampshire, Eastern Part*, October 1981.

The proximity of these soils to low-lying areas or to surface waters is evidence supporting the sensitivity of these areas and their importance as wetlands. The amount and location of incoming run-off, slope, accessibility of natural drainage features, and seasonal wet conditions are all important points to consider in documenting the importance or sensitivity of a particular wetland.

Map III-10 illustrates that wetland areas are, for the most part, located adjacent to or close to open water, the Town's rivers, streams and ponds. This relationship is the result of a localized high water table and the source of greater quantities of soil water during periods of high stream flow. There are also some scattered pockets of wetland soils throughout the Town, usually at the bottom of low-lying areas or depressions.

The significant wetland systems in Hudson include: Musquash Brook-Pond, Second Brook-Mile Swamp, Ottarnic Pond-Glover Brook-Merrill Brook, Robinson Pond and Chase Brook.[12] Many of

[12] Hudson Conservation Commission. *Hudson Conservation Plan*. November 1990.

these wetlands form contiguous systems, designating them high in ecological value. The value of these connected systems are diminished, however, when land use alteration (such as filling) causes portions of these systems to become fragmented.

All of the wetlands along the Merrimack River are included in the 1987 Environmental Protection Agency Region I document, Priority Wetlands in New England. This document identifies high quality wetlands or wetlands that are vulnerable to environmental degradation. The document lists the following resource values for the Merrimack River wetlands: waterfowl, fisheries, flood storage and protection, habitat for anadromous fish (i.e., those that ascend rivers from the sea for breeding) and identification by the U.S. Fish and Wildlife Service as a key river in the anadromous fish restoration program.

Regulatory methods of protecting wetlands from pollution and destruction include requirements for erosion and sedimentation control plans and enforcement of those plans, minimum setbacks for buildings and septic system leachfields, minimum vegetative buffer requirements and prime wetland designation. Hudson's Wetland Conservation District zoning permits only the following uses: forestry and tree farming, agriculture (including grazing, cultivation and harvesting of crops), water supply wells, conservation areas and nature trails, and some uses that are permitted by special exception as long as they do not adversely affect wetlands.[13]

New Hampshire Revised Statutes Annotated, Chapter 482-A:15, enables a municipality (acting through its Conservation Commission) to designate certain areas as prime wetlands. Prime wetland designation accomplishes the following:

- Identifies wetlands considered important locally by virtue of their size, unspoiled character, uniqueness, fragility and/or other special characteristics.
- Notifies landowners, developers, and the NH Wetlands Board that the municipality strongly believes that certain wetlands should remain in their natural state.
- Provides assurance that the Wetlands Board will give special consideration to applications for dredge and fill permits in prime wetlands (as long as the Conservation Commission notifies the Board that the permit application is for a proposed project in a prime wetland.)

The New Hampshire Method of Evaluating Wetlands was developed in 1991.[14] A prime wetland is worthy of extra protection because of its unspoiled character, uniqueness or fragility. All prime wetlands must have over 50% hydric A soil, which are very poorly drained soils. The New Hampshire Method uses a ranking system based on 12 criteria. These criteria are as follows: Ecological Integrity, Wildlife Habitat, Fin Fish Habitat, Educational Potential, Aesthetic Quality, Water Based Recreation, Flood Control Potential, Groundwater Use Potential, Sediment Trapping, Nutrient Filtering, Urban Quality of Life Potential, and Historical Site Potential.

One step the Hudson Conservation Commission could take to protect wetlands is to perform a functional evaluation of the Town's wetlands, which may lead to designation of prime wetlands. The prime wetlands in Hudson do not currently receive additional protection under the Wetland Conservation District. Prime wetlands provide special services to the community which necessitate additional protection to preserve their value and function. Wetlands should be classified, mapped and evaluated separately within each watershed identified in Table III-3. This level of detail

[13] *Town of Hudson Zoning Ordinance 2001.* Article IX – Wetland Conservation District. Chapter 334-35. Uses within Wetland Conservation District.
[14] Amman, A., and A. L. Stone, *A Method for the Comparative Evaluation of Non-Tidal Wetlands in New Hampshire,* 1991.

regarding wetlands will assist the Town in making land use decisions that reduce or eliminate development impacts on natural resources.

The next step in protecting wetlands is to set the priority of wetland areas based on their location and the need for the benefits they provide. For example, wetlands adjacent to a stream may warrant a higher priority for protection than an isolated wetland "pocket." The outcome of these efforts would be a protection plan or strategy involving where and how protection is needed.

Other available methods to gain better control of important wetland areas is through Town regulations, conservation easements, deed restrictions, and the fee-simple purchase of development rights or land. Since overcoming the problems in the development of sites with these conditions is quite costly, and since hazardous conditions may result if improperly developed, these areas are recommended for use as open space. This restriction will allow these areas to continue their functions as unique wildlife habitats and as natural purification sites for the recharge-discharge of groundwater supplies.

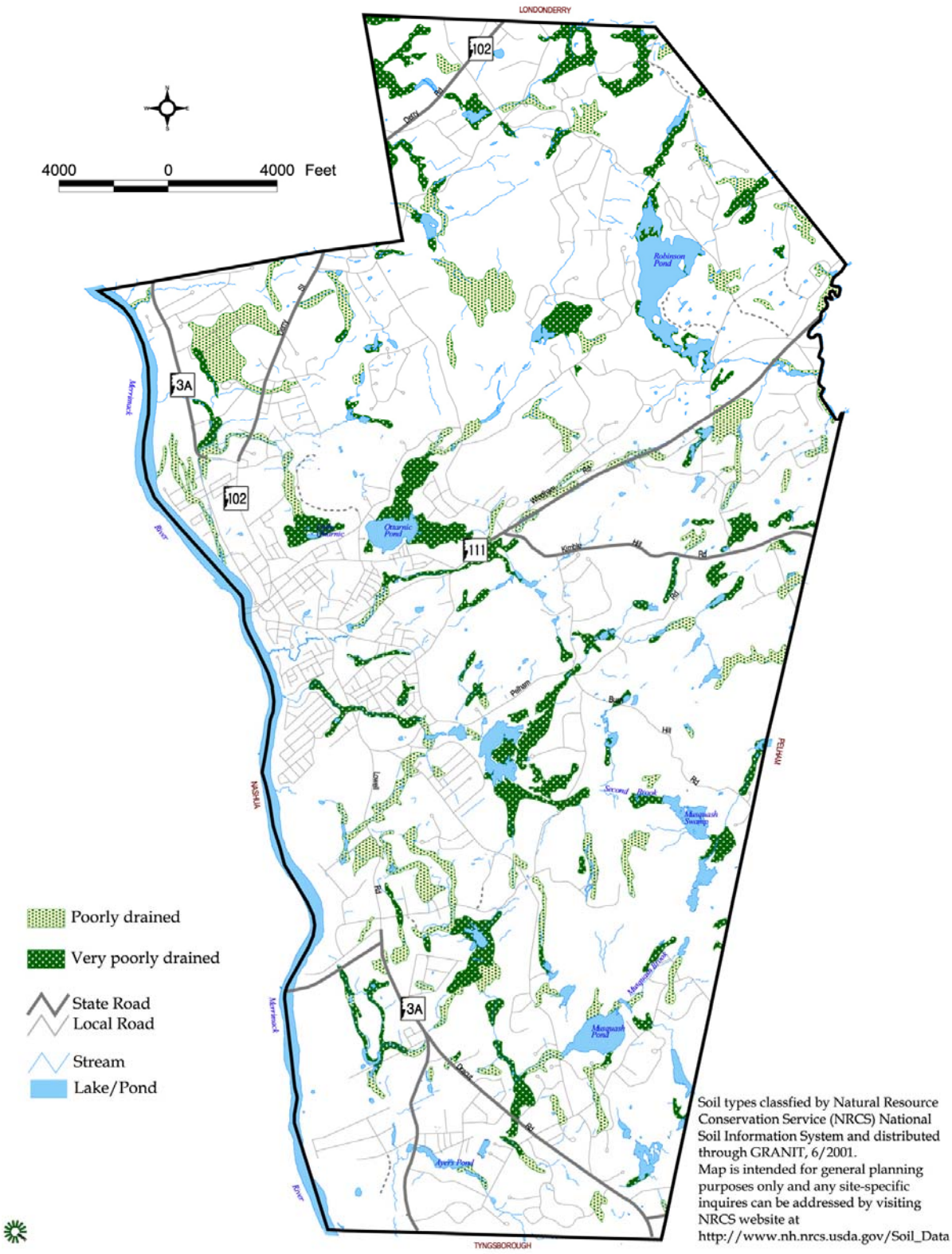
5. Water Supply

All water supplied to Town residents comes from groundwater sources. These sources are tapped by drilling or digging wells to obtain water for consumption. Hudson's public water supply comes from three wells (Dame, Ducharme and Weinstein) located in the Town of Litchfield. The Dame and Ducharme wells draw water from the Darrah Pond Aquifer in Litchfield. Pennichuck Water Works supplements Hudson's water supply with water from the treatment plant during periods of high demand through the Taylor Falls Pump Station at Ferry Street. Specific information regarding water supply in Hudson is discussed in detail in Chapter VIII: Community Facilities.

The presence and location of major groundwater supplies demand careful consideration in the Town's planning efforts. Map III-8 illustrates areas of groundwater favorability. It should be noted that all groundwater supplies are connected and thus have potential for both depletion and contamination. While water quality issues remain important, water quantity issues have recently become more pressing, especially in the southeastern portion of New Hampshire.

While no specific studies or activities can currently be referenced with regards to water supply within the Town of Hudson, issues relating to instream flow in the State are currently being addressed and may apply to the Merrimack River in the coming years. Keeping up-to-date on the instream flow rules will help the town adhere to any potential regulations that are passed.

Map III-10. Wetlands



6. Water Quality and Watershed Protection

A direct connection between surface and ground waters has been established which verifies the need for a more comprehensive approach to planning at the watershed level. Communities must take actions to eliminate potential pollution sources in all areas in the watershed including wetlands, floodplains, surface water bodies and water courses and adjacent lands and lands located over major groundwater sources. The most important step that can be taken by local officials to protect the quality of all surface and ground water supplies in the watershed is to minimize, if not eliminate altogether, polluting uses and activities on the land, especially those located directly adjacent to surface waters or over major groundwater supplies.

Activities and land uses which are known to be harmful to water quality in a watershed include: road salt storage and application; municipal and private landfill operations; salvage yards; subsurface sewage disposal systems (especially faulty or overused systems, and a concentrated number of systems in one location); underground storage of bulk oil, gas, or other polluting substance; and agricultural uses which entail cumulative pesticide and fertilizer use and concentrations of organic pollutants and residential application of yard products.

In the interest of protecting water quality, local officials may deem it beneficial to restrict or prohibit some or all of the above practices in certain areas of Town. These restrictions are invoked to protect the public health and well-being of present and future generations, and are imposed with the specific purpose and intent of protecting the public welfare. Examples of some of the restrictions that can be, or are currently being used are protective buffers and shoreland protection.

a. Buffers

The importance of surface water resources in the protection of water quality requires that they be treated with care in the land use planning process. It is recommended that land adjacent to surface water resources be protected by restricting their development from active use; however, these areas can be safely developed within a protective buffer to meet the community's needs for recreation and open space.

A protective buffer can be defined as the width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian buffer zones are typically undisturbed areas, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian corridor ecosystem from the impact of these land uses.[15] Buffers perform many functions such as:[16]

- Filter nutrients
- Regulate surface water flow
- Reduce sediments moving off-site
- Stabilize streambanks
- Provide flood protection
- Provide wildlife habitat

Buffers also provide protective greenways that minimize any land use impacts that may be created by permitted development. This not only protects the water quality, but also enhances

[15] State of Vermont, Agency of Natural Resources, *Riparian Buffer Procedure,* July 2001.
[16] Sohngen, Brent, Ohio State University, *What are the Benefits of Buffers?* March 2000.

the value of the surface water resources by allowing them to continue to support a community of wildlife within and around them. In addition, the connected surface water resource then serves as the basis for a natural system of open space around which development can occur.

The State of New Hampshire has not adopted a standard buffer width; however, current scientific literature and standards from other states define a "reasonable" minimum buffer width of 100 feet.[17] A larger buffer is recommended for sensitive wetlands (bogs, fens, white cedar swamps), prime wetlands, endangered or threatened species protection, or to support wildlife habitat more thoroughly.

The Town of Hudson Zoning Code, Wetlands Conservation District, protects a fifty-foot buffer around all wetland areas, surface water bodies and areas of poorly drained or very poorly drained soils. Intense land uses adjacent to the buffer may require additional evaluation. Consideration should be given to adopting a 100-foot buffer in existing high density areas or areas of anticipated increased density. A larger buffer will help protect the receiving waters from additional pollutant loads and increased flow associated with development.

b. Comprehensive Shoreland Protection Act

The Comprehensive Shoreland Protection Act establishes minimum standards for the future subdivision, use and development of shorelands of the state's public waters. When repairs, replacements, improvements, or expansions are proposed for existing development, the law requires these alterations to be consistent with the intent of the Act. Development within the protected shoreland must always comply with all applicable local and state regulations. Protected shoreland includes all natural fresh water bodies without artificial impoundments, artificially impounded fresh water bodies, rivers, coastal water, and all land located within 250 feet of the reference line of public waters. Natural woodland buffers must adhere to the following:

1. Where existing, a natural woodland buffer must be maintained within 150 feet of the reference line.
2. Tree cutting is limited to 50% of the basal area of trees, and maximum of 50% of the total number of saplings in a 20-year period.
3. A healthy, well-distributed stand of trees must be maintained.
4. Stumps and their root systems must remain intact in the ground within 50 feet of the reference line.

The Shoreland Protection Act only regulates activities along Ayers Pond, Ottarnic Pond, Robinson Pond, and an unnamed Pond along Musquash Brook.[18] A guide to developing community Shoreland Protection Ordinances is being developed by the Office of State Planning and participating Regional Planning Commissions to assist communities in protecting the surface waters that are not covered under the Shoreland Protection Act. The Town should remain aware of the progress of this guide and consider adopting a Shoreland Protection Ordinance to protect the remaining surface waters in Hudson.

[17] Schloss, Jeffrey and Frank Mitchell, University of New Hampshire, *Promoting Watershed Based Land Use Decisions in New Hampshire Communities: Geographic Information System Aided Education and Analysis,* October 2002.
[18] NH Department of Environmental Services: http://www.des.state.nh.us/asp/cspa/wb2.asp

7. Threats to Surface and Groundwater Resources

Rivers, streams, lakes, ponds and groundwater resources face a myriad of threats. The two main categories of pollution are point source and non-point source pollution. Point sources of pollution are those that can be traced back to an identifiable source, such as a pipe or sewer outfall. Non-point sources of pollution are more diffuse in origin, such as agricultural and urban stormwater runoff, septic system effluent, snow dumps, road salt, soil erosion, etc. The NH DES, *New Hampshire Non-Point Source Management Plan*, lists the various forms of non-point source pollution in order of priority for abatement efforts.

The list is based on the following factors:[19] 1) danger to public health; 2) magnitude and pervasiveness of the potential threat; 3) potential impacts to receiving waters; 4) professional judgement; 5) ability of existing regulatory programs to control pollution; 6) adequacy of existing education programs to promote pollution control; 7) public perception; and 8) comments of Non-Point Source Management Plan Subcommittee.

The list of non-point source pollution, in order of priority, is: 1) urban (stormwater) runoff; 2) hydrologic and habitat modifications; 3) subsurface waste disposal systems; 4) junk, salvage, and reclamation yards; 5) construction activities; 6) marinas; 7) road maintenance; 8) unlined landfills; 9) land disposal of biosolids; 10) land disposal of septage; 11) agricultural activities; 12) timber harvesting; 13) resource extraction; 14) storage tanks (above ground and underground); and 15) golf courses and landscaping.

In 1998, the Town of Hudson proposed a pilot *Groundwater Protection Program* to protect potential future sources of drinking water. The program identified numerous potential contaminant sources (PSCs) within the study area that was chosen near Little Ottarnic Pond. A potential contaminant source is defined as a human activity or operation upon the land surface that "*poses a reasonable risk that regulated contaminants may be introduced into the environment in such quantities as to degrade the natural groundwater quality.*"[20] Table III-6 contains a list of the 19 activities identified as PCSs in the Groundwater Protection Act of 1991. This list, in turn, was expanded into specific PSCs in the study area in Hudson. This list can be found in Appendix III-3. The list was developed in 1998, however, and should be updated to reflect changes in land uses. These and other threats to groundwater quality in Hudson are illustrated on Map III-11.

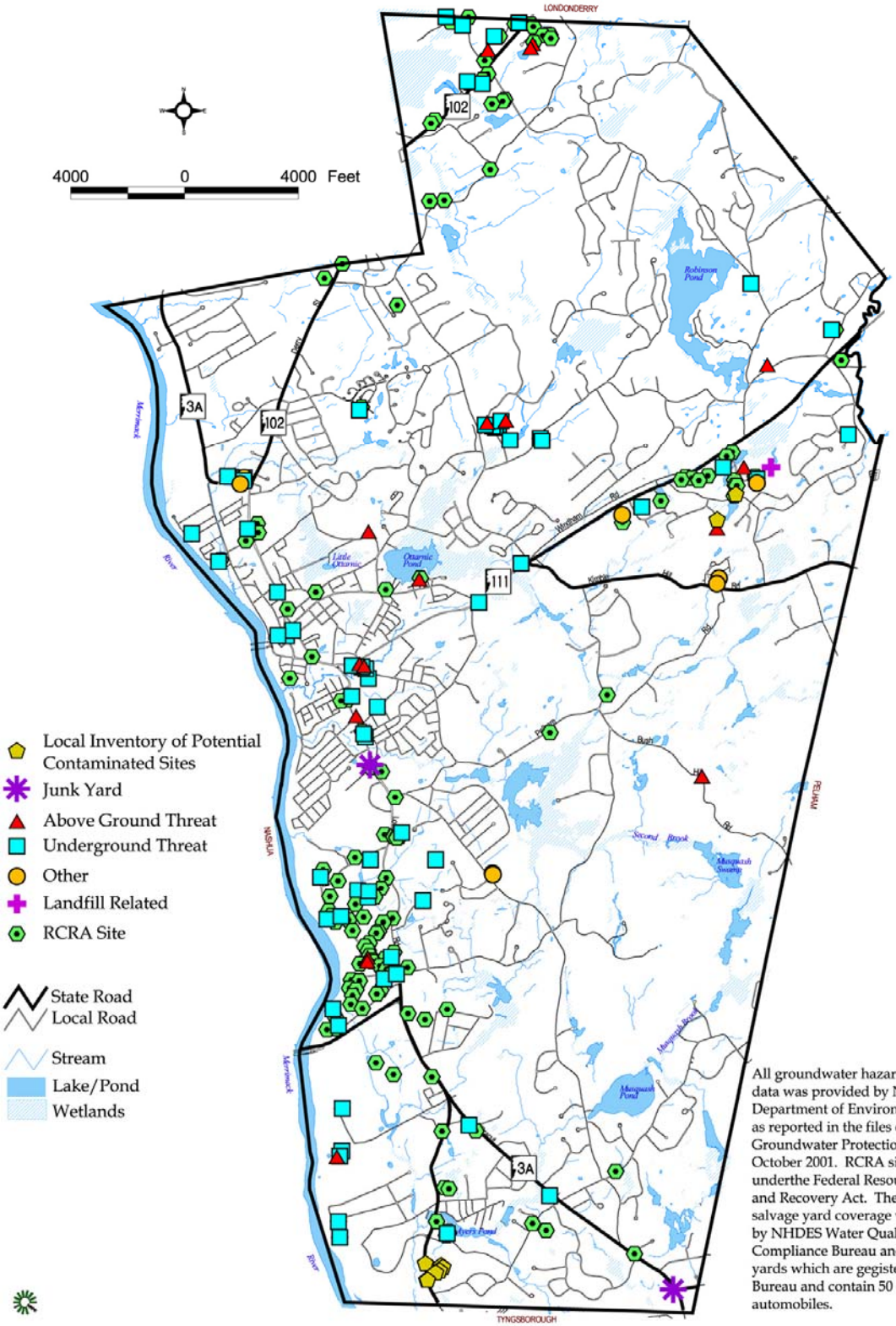
Table III-6. Categories of Potential Contaminant Sources

Vehicle service and repair shops	Salt storage and use
General service and repair shops	Snow dumps
Metalworking shops	Cleaning services
Manufacturing facilities	Food processing plants
Underground/above-ground storage tanks	Concrete, asphalt and tar manufacture
Waste and scrap processing and storage	Cemeteries
Transportation corridors	Hazardous waste facilities
Septic tanks	Stormwater infiltration ponds or leaching catch basins
Laboratories and certain professional offices (medical, dental, veterinary)	Fueling and maintenance of earth moving equipment
Uses of agricultural chemicals	

Source: *Town of Hudson Groundwater Protection Program*, NRPC, December 1998.

[19] NH Department of Environmental Services, *New Hampshire Non-Point Source Management Plan*, 1999.
[20] Nashua Regional Planning Commission, *Town of Hudson Groundwater Protection Program*, December 1998.

Map III-11. Potential Threats to Groundwater Quality



This section briefly examines some of the issues and trends in point and non-point source pollution and actions that can be taken to address this pollution. The focus is on non-point source pollution and urban runoff in particular, now acknowledged as being the most serious threat facing surface and groundwater resources today. The recommendations that follow this discussion will mention several "best management practices" (BMPs) that address non-point source pollution and stormwater runoff in particular. BMPs are variously defined as technical guidelines for preventing pollution caused by particular activities, and recommended treatment or operational techniques to prevent or reduce pollution. Some of the major sources of surface and groundwater contamination are discussed below.

a. Stormwater Runoff

The development of land for residential, commercial or industrial purposes increases the amount of impervious surface area within any given site due to the construction of buildings, roads, driveways, parking lots and other improvements. Impervious surfaces reduce the natural infiltration of stormwater into the ground, thereby, reducing recharge of groundwater resources. This is particularly true where stormwater is discharged into a storm drainage system that exports stormwater off of a site and out of a watershed. Increased imperviousness results in direct stormwater discharges into streams and rivers, which results in the alteration of the natural flow of the stream, causing erosion and sedimentation, loss of aquatic wildlife habitat and increased flood hazards.

Stormwater runoff is also a principal non-point contamination source of surface and groundwaters. Potential contaminants found in stormwater runoff include: nutrients such as phosphorous, nitrates, heavy metals, floatables and solids, pathogens such as viruses and bacteria, organic compounds including oils, grease, MTBE, and pesticides and herbicides. These materials can lead to the degradation of surface and groundwaters. The U.S. Environmental Protection Agency (US EPA), through a program called the *National Pollutant Discharge Elimination System* (NPDES),[21] aims to prevent and control non-point pollutant sources. The first phase of this program, appropriately referred to as the "Phase I Stormwater Rules," regulated the municipal stormwater systems and discharges of medium and large municipalities (those with populations greater than 100,000).

In May 2003, the EPA expanded the NPDES program to include stormwater systems within the urbanized areas of municipalities with populations less than 100,000.[22] These Phase II rules also impact construction activities between 1 and 5 acres, whereas Phase I regulated construction activities of greater than 5 acres. In order to comply with Phase II requirements, regulated municipalities are required to submit a Notice of Intent (NOI). This NOI includes a stormwater management plan that addresses the six minimum control measures required by the EPA.

The stormwater management plan was designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality and to satisfy the water quality requirements of the Clean Water Act. It contains 6 minimum control measures: 1) public education and outreach; 2) public participation and involvement; 3) illicit discharge detection and elimination; 4) construction site runoff control; 5) post-construction runoff control; and 6) pollution prevention and housekeeping.

[21] www.epa.gov/npdes.
[22] Comprehensive Environmental Inc., *Phase II Stormwater Rule Summary and How Municipalities Can Prepare for Compliance*; 2000.

In April 2002, the Planning Board amended the Town of Hudson Subdivision of Land Regulations, Section 289-20. Flood, Stagnant and Stormwater to require a Stormwater Management Report be prepared for any site or subdivision plan in Hudson. The report must provide, among other things, a stormwater drainage plan that is certified by a licensed professional engineer and proves that "all drainage shall be designed to achieve a zero increase in run-off for both peak and volume…".[23] In Hudson, the stormwater drainage plan is seen as the single most important element of the entire site plan.

b. Road Salt

Excessive salting of roads and improper salt storage create the potential for sodium, calcium and chloride contamination of the groundwater, which can pose health threats to humans, endanger animals and plants and corrode metal and concrete.

In order to avoid contamination of public water supplies, municipalities establish no-salt routes which encompass areas adjacent to public water supplies and areas where on-site wells are located near roadways. Other areas are treated with a mixture of salt and sand. A more expensive method is the use of Calcium Magnesium Acetate (CMA) which is biodegradable and non-toxic to the environment.

Another alternative is to identify critical portions of roads in Town that can be designated for a conversion to "low salt" or "no salt" status on a prioritized basis over a specified time period. The Town can also request that the State use alternative de-icers on certain state maintained roads in priority areas.

c. Subsurface Sanitary Waste Disposal

Septic system failures from improper design, installation, or maintenance allow nutrients, particularly nitrogen and sometimes bacteria and viruses to leach into water resources. The first receptor of these contaminants is often a nearby private well, but surface waters may also be affected. Septic system leachate, along with stormwater runoff, may contribute to excessive algae growth in surface waters which, in turn, decreases the amount of oxygen available to fish, decreases sunlight penetration and clogs waterways. In most cases, older septic systems and cesspools pose the greatest threat to groundwater and surface water quality. The EPA considers new systems meeting today's heightened standards to be passive and durable systems that can provide acceptable treatment despite a lack of attention by the owner.

d. Underground Storage Tanks

Leaks in improperly equipped underground storage tanks (USTs) are difficult to detect and may go unnoticed for a long time. Even a small leak of only a few gallons can contaminate millions of gallons of ground water. The State regulates USTs where the cumulative volume of all tanks at the facility is 1,100 gallons or more. Some tanks, including those containing non-petroleum based chemicals and those containing heating oil for on-site residential consumption are exempted. As of 2003, 68 USTs in Hudson were registered with the NH DES Subsurface Water Bureau.[24]

[23] *Town of Hudson, New Hampshire, Subdivision and Site Plan Regulations.* Chapter 289-20(C) – Flood, Stagnant Water and Stormwater.
[24] http://www.des.state.nh.us/asp/onestop/ORCB_Query.asp

D. WILDLIFE AND PLANTS

Hudson's natural resource base provides a habitat for many plant and animal species. A variety of habitats such as wetlands, forests, fields, rivers, and streams are essential to support a diversity of species in quantities healthy enough to ensure continuation of the species. Maintaining quality habitats is crucial to the continuation of all plant and animal species.

The New Hampshire Natural Heritage Inventory (NHI), a program of the Department of Resources and Economic Development, tracks threatened and endangered species and exemplary natural communities in the State. Using a ranking system developed by the Nature Conservancy, the NHI assesses the rarity of a species on a global and state level. State listing ranks are defined by New Hampshire Code of Administrative Rules (RSA 217-A:3). The NHI records list five terrestrial (forest) and two palustrine (wetland) exemplary natural communities in Hudson. Five of the seven listed are ranked as the highest importance in New Hampshire. The rating is based on a combination of how rare the community is and how large or healthy it is in the Town.

There are 170 natural community types described by the New Hampshire Natural Heritage Inventory Program. Natural communities are basically groupings of plants that occur together in recurring patterns based on water, soils, climate, and nutrients. These communities represent intact examples of New Hampshire's native flora (plants) and fauna (animals). Appendix III-4 provides a complete NHI listing of the 56 exemplary natural communities or rare species for Hudson.

It is recommended the Town take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects for a plant biodiversity survey. Documenting the flora and fauna in Hudson will allow the Town to plan around these resources, and provide them with protection from future development.[25] These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.

1. Mammals

Mammals commonly found in Hudson include: raccoons, opossums, skunks, muskrats, beavers, porcupines, woodchucks, white-tailed deer, squirrels, mice, bats, foxes, rabbits and other indigenous species that are adapted to living near humans and urban activities. Sightings of coyote, otter, black bear, ermine, mink and fisher cats have increased in Hudson as they have in other municipalities. Larger mammals that require extensive habitat areas or species that require solitude are occasionally sighted in the Town. It is recommended that the Conservation Commission and interested citizens participate in the "Keeping Track" Program.[26] This program uses animal tracks to identify habitats and feeding grounds in a systematic manner for a variety of mammals. The information gained can be the start of an inventory and a monitoring system of prime habitats for future conservation.

2. Birds

Bird species vary according to the season; however, they are also dominated by those species commonly found in southern New Hampshire. Doves, woodpeckers, chickadees, and jays are found throughout the year while warblers, sparrows, hummingbirds, wrens, swallows, robins, and several species of raptors are generally seasonal residents. In addition there are owls, wild turkeys, woodcocks, spruce grouse, blue herons, pileated woodpeckers, cardinals, bluebirds, and red-tail hawks. Other species such as ducks and geese may nest in the wetlands and ponds and many pass through the Town during spring and fall migrations.

[25] http://www.unh.edu/ppe/bluepages/05environmental.pdf
[26] www.keepingtrackinc.org.

3. Other Species

In addition to the highly visible species, habitats for other less visible species such as turtles, frogs, toads, salamanders, snakes and numerous insects are present in the Town. The NHI lists the Persius Dusky Wing (insect) and the Brook Floater (mollusk) as threatened or endangered in New Hampshire. The Eastern Box Turtle is also found in Hudson and is listed as a species with very high importance. A detailed listing of threatened or endangered plant species is provided in Appendix III-4.

4. Vernal Pools

Vernal pools or "spring" pools are essential for the life cycle of many invertebrates and amphibians. These temporary forested wetlands serve as a home to many of these species which feed on the nutrients from fallen leaves. Vernal pools can range in size from a few square feet to several acres. Vernal pools are generally associated with forested wetlands, but can also be found within larger wetlands, such as oxbows in river floodplains or scrub-shrub wetlands.

Most vernal pool animals do not live their entire lives in the pool but migrate in response to snow melt and early spring rains. The pools generally dry up by mid to late summer. Depending on the groundwater, some pools will refill in the autumn. Mole salamanders and wood frogs spend 90% of their lives in the surrounding uplands, perhaps as far as a quarter mile from the pool. Adults migrate to the pool for a few weeks to reproduce and surviving juveniles leave before the water dries.

Other organisms (e.g., snakes, turtles, insects, and birds) migrate from nearby wetlands to breed or feed in the productive pool waters. These animals return to more permanent wetlands. Other animals develop entirely in the pool and most survive the dry season. Fingernail clams and air-breathing snails burrow beneath the leaves that remain to await the return of water. Fairy shrimp deposit eggs in the dry pool that hatch after the pool refills.

5. Plants

Plant species in Hudson are again dominated by those species commonly found in southern New Hampshire. The NHI records indicate the presence of 13 plant species in Hudson that are either threatened, endangered or of special concern. A detailed listing of threatened or endangered plant species is provided in Appendix III-4. The Conservation Commission should consider developing an inventory and a monitoring system of the areas containing flora of special concern for future conservation.

6. Invasive Species

Invasive species are non-native plants or insects that were introduced to an area by visitors (humans and/or wildlife) from other continents, states, ecosystems and habitats. Invasive species are of concern because they reproduce rapidly, spread over large areas of the landscape and have few, if any, natural controls, such as herbivores/predators and disease, to keep them in check. Many invasive plants, in particular, share important characteristics including: 1) spreading aggressively; 2) producing a large number of seeds that survive to germinate; 3) dispersing seeds through various means such as wind, water, wildlife and people.[27] Some common invasive plants in New Hampshire include: Burning bush, Japanese barberry, Multiflora rose, Purple loosestrife, and Norway maple (see Appendix III-6 for a full list of invasive species that are proposed to be prohibited and restricted in the State of NH).[28] Some invasive plants are still sold in local nurseries,

[27] National Park Service/U.S. Fish and Wildlife Service, *Plant Invaders of Mid-Atlantic Natural Areas*, September 2002.
[28] University of New Hampshire Cooperative Extension, Forestry, Wildlife and Water Resources Programs

unbeknownst to the public. The Planning Board and Conservation Commission should pay special attention to reviewing landscaping plans to ensure that invasive species are not planted in Hudson.

E. EXISTING AND POTENTIAL FUTURE CONSERVATION LANDS

1. Existing Conservation Land

a. Land Protected through Public and Private Ownership or Zoning

Hudson contains very few permanently protected conservation lands. Approximately 1,100 acres, or 5.9% of Hudson's total land area of 18,773 acres is protected either through public ownership or private conservation efforts. The existing conservation land is illustrated in Map III-12. Many of these parcels currently have no permanent means of protection; however, they do provide opportunities for recreation and other important ecological functions. Research in the Assessing Department indicated that many of the Town-owned parcels in Hudson do not have deed restrictions for permanent protection as conservation land. All Town-owned and private land which is existing or potential conservation land is listed in Appendix III-5. The preservation of these parcels is of tremendous importance to the protection of watersheds, farms and forests, wildlife habitats, greenways, trails and scenic vistas in the Town. It is recommended that the Town take appropriate action to ensure that these parcels are permanently protected from future development or any adverse activities on the parcels.

The Town has an Open Space Development (OSD) Ordinance that encourages more efficient patterns of development which conserve open and green spaces, farmland, wildlife habitats, water resources, scenic areas and other natural resources. This is achieved by reducing the individual lots in a subdivision by up to 50% of the minimum lot size requirements established in the Zoning Ordinance. The remainder of the land after the lots are reduced "shall be dedicated to permanent open space, conservation land or recreation.[29] OSDs are allowed in any zoning district and may be designed for any use or combination of uses permitted in the district where the OSD is located. Off-site compensatory open space may also be permitted by the Planning Board in lieu of on-site open space as long as it is deemed ecologically, culturally, historically, and/or recreationally important.

The Open Space Development Ordinance has been very successful in Hudson. Eight open space developments have been implemented in Town within the past ten years, with an average of 20 acres of open space protected per subdivision. Two of the most notable OSDs in Hudson are the Pond View Subdivision on Greeley Street and Royal Oak Estates on Gabrielle Drive. Each OSD goes through a rigorous review process to determine the appropriate number of lots. OSDs not only protect open space in Hudson, but also reduce development costs related to utilities, roads and landscaping. The Planning Board should continue to encourage developers to consider OSDs as a means of protecting additional open space in Hudson.

b. Land in "Current Use"

The New Hampshire legislature has recognized the importance of open space and has found that its preservation is in the public interest:

It is hereby declared to be in the public interest to encourage the preservation of open space, thus providing a healthful and attractive outdoor environment for work and recreation of the State's citizens, maintaining the character of the State's landscape, and conserving the land, water, forest, agricultural and wildlife resources. It is further declared to be in the public interest to prevent the loss of open space due to property

Newsletter, *What is an Invasive Plant and Why Should We Care?*, Winter 2002.
[29] *Town of Hudson Zoning Ordinance 2003,* Article XI – Open Space Development, Chapter 334-51(A).

taxation at values incompatible with open space usage. Open space land imposes few if any costs on local government and is therefore an economic benefit to its citizens. (RSA 79-A:1)

The current use program provides reduced property assessments for forests, farmland and wetlands of 10 acres or greater and for active farms of less than 10 acres with a minimum $2,500 gross value of product; however, the program only provides short-term protection because open land enrolled in the program can easily be converted to other uses. Land coming out of current use is subject to a land use change tax of 10% of the fair market value at the time of the change. In Hudson, 100% of the tax is earmarked for use by the Conservation Commission to purchase land for conservation purposes; however, land use change monies collected need to be spent within the year they are collected or they are transferred into the General Fund. According to the Hudson Assessing Department, as of June 2003, approximately 3,798 acres of land in Hudson is in current use.[30]

c. Transfer of Development Rights

The Transfer of Development Rights (TDR) program is an alternative local zoning technique that addresses both growth and preservation of open space in municipalities. Through a town's zoning ordinance, landowners are given the option of preserving their property by selling (transferring) the development rights – instead of the land itself – to developers for projects in designated growth areas in the community. This allows communities to focus growth in specific areas of town (i.e., town centers) while preserving open space, farmland, environmentally sensitive areas, historic landmarks or other community assets without using public funds. It also allows landowners to retain ownership and use of their land while allowing developers to increase the density and profit of projects.

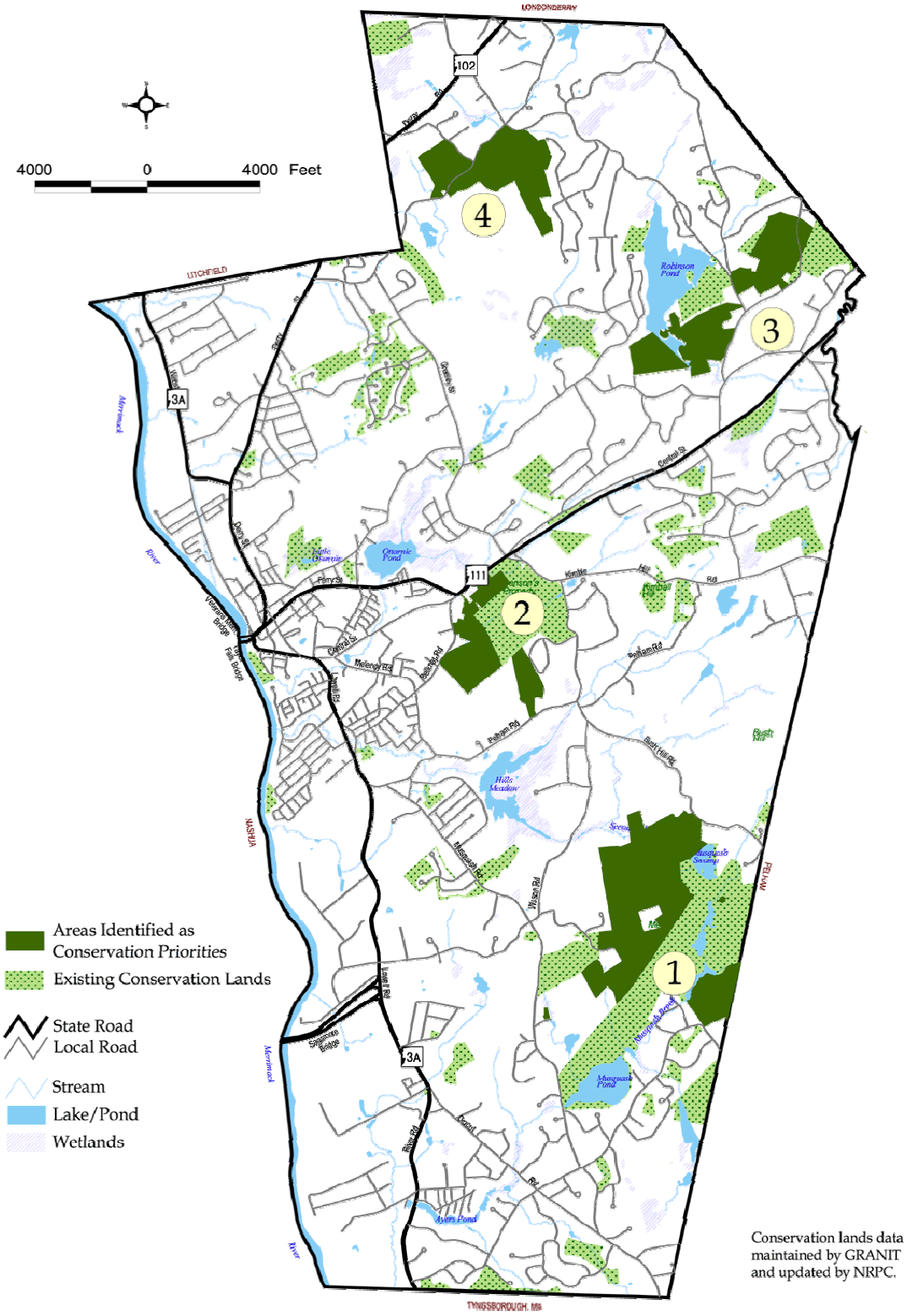
TDRs can be enacted in all of New Hampshire communities, but in order to be successful, a community must demonstrate the following conditions:[31]

- Be experiencing growth pressure, so there is sufficient demand for new development;
- Have public support for increasing density and providing infrastructure for the designated growth area(s);
- Have a united community vision and understanding of TDRs via thorough master planning and public participation;
- Set up a streamlined program to administer the TDR program.

In addition to these conditions, questions about market viability and expected TDR values, incentives, taxation, and permanency would need to be resolved. The NH Office of Energy and Planning (formerly Office of State Planning), NH DES and the Environmental Protection Agency New England provide information on establishing a TDR program and assist communities with developing local programs.

[30] Town of Hudson Assessing Department, June 2003.
[31] EPA New England, *Transferable Development Rights: Using Market Forces and Master Planning to Manage Growth and Environmental Quality*. February 2001.

Map III-12. Existing and Potential Future Conservation Land, 2003



2. Priorities for Future Conservation Efforts

Protecting open space is a high priority in the Town of Hudson. The 1990 Conservation Plan, the *1996 Hudson Master Plan*, and the 1998 Community Profile identified the protection of open space as a priority. The Town has made progress in this area over the past decade, with the acquisition of the Musquash Conservation Land and the purchase of development rights for the Bicentennial Farm. Voters supported the purchase of the Benson's Wild Animal Park property for use as a park and recreational trails. At the March 2003 Town Meeting, the Town voted overwhelmingly to support the purchase of a conservation easement on the Ingersoll Farm that was purchased with Land and Community Heritage Investment program (LCHIP) funds[32]. Voters also recently supported a number of other open space questions on the ballot, including an effort to pursue the purchase of the remaining part of the Nadeau Farm.

Land in Hudson is currently being prioritized for permanent protection through the efforts of the Hudson Conservation Commission and the Friends of Hudson Natural Resources. The following section discusses the methods being used to identify and permanently protect open space in Hudson.

a. The Regional Environmental Planning Program (REPP)

As part of a state-wide effort with funding provided by the NH Department of Environmental Resources (NH DES), the Nashua Regional Planning Commission has been working with member communities, regional and state organizations to identify the natural and cultural resource protection needs and priorities for the region.

The Regional Environmental Planning Program (REPP) has been a response to these statewide conservation efforts.[33] During Phase One of the program representatives of each of NRPC's member communities were provided a series of maps containing region-wide natural/cultural resource information, a base map of their own community, instructions and a summary of municipal conservation goals. Information collected from communities has been digitized and compiled into a first phase report that includes a map showing the location and type of resource. During Phase Two, the communities were asked to further prioritize the resources identified in the first phase. Phase Two asks each community to identify the top five natural and cultural resource priorities. Phases Three through Five were primarily devoted to creating detailed Geographic Information System (GIS) data layers. Phases Six and Seven will focus on updating the priorities set in Phase Two and assisting the communities in developing a more regional view of open space protection. Current conservation priorities for the Town of Hudson are shown in Table III-7 and illustrated on Map III-12.

Table III-7. Conservation Priorities

Number on Map III-12	Priority	Size in Acres	Description
1	1	440	Musquash Brook and Gumpas Pond Watersheds
2	2	140	Addition to Benson's Park
3	3	205	Robinson Pond Watershed
4	4	146	Nadeau Farm

Source: NRPC, *Regional Environmental Protection Program*, 2003 Update.

[32] Parcel information for the Ingersoll Farm Property was not available at the time of this writing.
[33] NRPC, *Regional Environmental Planning Program,* 2000.

b. Potential Wildlife and Recreational Corridors

Musquash Brook and Gumpas Pond Watersheds –These watersheds were chosen as the top regional priority for the Towns of Pelham and Hudson because they are significant in terms of water resources and wildlife habitat. The area contains a vast network of beaver ponds and wetlands and remains in a near natural condition. The New Hampshire Natural Heritage Inventory has identified several species, which are considered rare, threatened, or endangered in the state.

The site also contains historic resources and scenic vistas. This region was one of the first areas settled in Hudson. The area is dotted with old cellar holes, farm roads (including Old Stage Road in Pelham), stone walls, culverts and dams, and other significant historical resources. Native archeological sites have also been found in this area.

The Nash-Hamblett (a.k.a. Musquash Conservation Land, 416.5 acres) and Guertin (50 acres) properties already provide some protection to the watershed within Hudson. Pelham has several protected properties in this area, including the Fisher Family Trust and the newly acquired James and Diane Fisher parcel. The New England Forestry Foundation owns protected property in both towns that abuts the property proposed for protection.

The goal of both communities is to connect these existing conservation lands into a large, regional greenway, maintaining this relatively unfragmented wildlife habitat in its current undeveloped state. Another goal is to extend the protected area laterally, adding width to the long, narrow area that is currently protected. Extension of this protection to another Hudson priority, the Second Brook watershed (which also has some protection) would increase the value of this habitat even further

Addition to Benson's Park – The Town of Hudson is in the process of acquiring the 165-acre former Benson Wild Animal Farm from the NH Department of Transportation (NH DOT) for use as a passive recreation and natural resource education park. The Town is negotiating with the NH DOT for use of some portion of the Benson's property. The addition of all or portions of the only remaining open space adjacent to Benson Park will greatly enhance the quality of the Park for present and future generations, adding to the social, educational, and ecological benefits of the property.

Roughly 100 acres of additional land is the only remaining portion of the Merrill Brook watershed that has not been converted to residential or commercial development. The other 40 acres in the southern portion are in the Second Brook watershed. Approximately 65% of the land is steeply sloped oak-dominated forest interspersed with rock outcroppings and intermittent streams. The age of the older trees is probably in the 60-80 year range. A two-acre shrub-dominated pond is located at the higher elevation of the forested land. This pond is heavily vegetated with buttonbush and other wetland shrubs and supports an abundant and diverse frog population indicating a healthy ecosystem. The northern section of the land is at a lower elevation and is dominated by a mature red maple forested wetland.

Nadeau Farm – The Nadeau Farm was one of the last remaining working farms in a rapidly developing section of the State. The original farm is 197 acres. Three generations of dairy farmers have grown hay and silage for their herds on this land. The farmhouse, which was sold, served as an 18th century tavern and home of one of the founders of Hudson.

The property lies within a very rapidly growing area in the state. Residential development is the dominant land use near most of the Nadeau Farm boundary. The Nadeau Farm property is

being evaluated for residential development potential by several speculators. Approximately 51 acres of the farm have already been sold, with the potential for the remaining 146 acres to be developed as well. However, in March 2003, voters approved a petition article to support efforts by the Town to purchase the development rights to the property.

c. Land and Community Heritage Investment Program (LCHIP)

The Land and Community Heritage Commission (LCHC) was established under Senate Bill 493 in 1999 "…to determine the feasibility of a new public-private partnership to conserve New Hampshire's priority natural, cultural and historic resources." In 2000, Senate Bill 401 was presented in order to provide the LCHC with $3 million to begin a matching grant program for local land conservation efforts.

A program called the Land and Community Heritage Investment Program (LCHIP) will carry out the goals of Senate Bill 401 and the LCHC. The New Hampshire General Court created LCHIP in order to:

> *"…conserve and preserve this State's most important natural, cultural, and historical resources through the acquisition of lands, and cultural and historical resources, or interests therein, of local, regional, and statewide significance, in partnership with the State's municipalities and the private sector, for the primary purposes of protecting and ensuring the perpetual contribution of these resources to the State's economy, environment, and overall quality of life."*[34]

LCHIP was designed to achieve this mandate by providing grants to eligible applicants. Applicants must provide at least a 50% match (at least half of which must be in cash) to be eligible for funding through the program. Communities can use the conservation priorities established through the REPP process to propose parcels and projects for grant funding through LCHIP.

The Town of Hudson, in conjunction with the Towns of Windham and Londonderry, submitted an LCHIP application for the Ingersoll Tri-Town Tree Farm in the northern corner of Town. The three towns were successful in obtaining $300,000 to obtain an easement over 204 acres of land that is designated as a certified tree farm. The easement is being held by the Society for the Protection of New Hampshire's Forests.

[34] www.LCHIP.org

F. RECOMMENDATIONS

1. Topography

- Consider an amendment to the Zoning Ordinance, subdivision and site plan regulations to adopt a Slope Conservation Overlay District to protect the most severe slopes in Town from unsuitable development. Development of land with slopes greater than 15% should be approached with extreme caution, giving consideration to the problems presented by these slopes. Active use or development of slopes greater than 25% should be avoided. As these areas are best suited for open space, reserving them for that purpose will minimize the potential for erosion and allow for maximum absorption of surface water run-off thus protecting down-slope residents.
- New development should be focused in areas with slopes of less than 15%, giving consideration to the other factors which affect the development suitability of these areas.

2. Soils

- The Planning Board should continue to consider soil potentials and limitations when reviewing the intensity of development.
- The Town's agricultural lands are recognized as an important and endangered resource with few State or local incentives for keeping viable agricultural lands in production. To protect this valuable resource, the Town should take steps to protect active and idle agricultural lands from development for other uses and create incentives which encourage agricultural lands to be kept in, or returned to, productive farm use. The Trust for New Hampshire Lands Program or the Land and Community Heritage Investment Program may assist the Town in this endeavor.
- Farm protection should be pursued for existing or undeveloped lands with Prime or State designated soils.

3. Forests

- The Conservation Commission and interested citizens should consider participating in the "Keeping Track" Program. This program uses animal tracks to identify habitats and feeding grounds in a systematic manner for a variety of animals. The information gained can be the start of an inventory and a monitoring system of prime habitats for future conservation.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects. These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.

4. Water Resources and Watersheds

- Restrict and strictly monitor development of land adjacent to surface water resources. As these areas are a vital interface between surface and groundwater supplies, they are best suited for open space and have the potential for forming the basis of an open space system serving all developable areas of the community.
- Enforce the Shoreland Protection Act on all regulated water bodies in Hudson.
- Adopt a shoreline protection ordinance consistent with the state model to permit the regulation of shoreline development on non-regulated water bodies at the local level.
- Protect prime wetlands and important surface waters by amending the Wetlands Conservation District Ordinance to increase the 50-foot buffer to 100 feet from the edge of the wetland or surface water. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources. This should especially

be considered along surface water resources in areas of existing or anticipated increased density to protect the receiving waters from additional pollutant loads and increased flow associated with development.

- Continue to protect the Floodplain Hazard Areas to reduce losses due to flooding.
- Water supply wells located on till deposits are shallow in depth and very susceptible to land use related contamination (septic systems, fuel storage, fertilizers, road salt, etc.). The Town should consider increasing the setback of future land-uses to these water supply wells.
- Perform a functional evaluation of the Town's wetlands, leading to the designation of prime wetlands. This includes classifying, mapping and evaluation of all of the wetlands within each watershed in Town.
- Provide additional protection to prime wetlands under the Wetland Conservation District. Prime wetlands provide special services to the community that need additional protection in order to preserve their value and function.
- Encourage the appropriate use, conservation and development of the Merrimack Riverfront. This can be done in part by working with the NH DES Rivers Management and Protection Program, the Lower Merrimack River Local Advisory Committee and other protection groups.
- Adopt a Shoreland Protection ordinance consistent with the state model to protect water bodies not covered under the state Comprehensive Shoreland Protection Act.
- Adopt an aquifer conservation district to protect existing and potential future groundwater supplies and recharge areas from harmful developments or land use practices.
- Establish intermunicipal coordination of land uses in each watershed that spans Town boundaries, such as the Musquash Brook Watershed, to ensure effective management and protection of the water resource. This coordination might include delineation of watersheds that cross Town boundaries and coordinating reviews of land uses that may affect these watersheds.
- Develop a protection plan or strategy which identifies where and how to protect wetland areas based on their location and the benefits they provide.
- Encourage land use boards to keep up-to-date on the status of the instream flow rules which will help the Town adhere to any potential regulations that are passed.
- Update the Potential Contamination Sources list (Appendix III-3) developed for the Town of Hudson Groundwater Protection Program in December 1998 to reflect changes in land uses.
- Establish low salt/no-salt routes or consider the use of Calcium Magnesium Acetate in areas adjacent to public water supplies and where on-site wells are located near roadways.

5. Wildlife and Plants

- Maintain a 50-foot undisturbed, shady buffer around vernal pools.
- Consider legal easements on all Town Forests to preserve the land for recreation and permanently protect the land for forestry, recreation and wildlife habitat.
- Inventory all existing trails using a Geographic Positioning System (GPS) and create a trail system map and signage for all Town forests.
- Review all landscaping plans submitted with subdivision and site plans for invasive plant species.

6. Conservation

- Pursue the fee purchase, purchase of development rights or other conservation measures to protect the remaining open space properties. Legal easements should be placed on all conservation properties.
- Conduct thorough research on existing Town-owned land that is not currently protected as conservation land and take appropriate action to ensure that these parcels are permanently protected from future development or any adverse activities on the parcels.
- Encourage the Land Use Change Tax to be directed to the Conservation Fund. Eliminate the provision that requires Land Use Change Tax funds be transferred to the General Fund if not spent by the Conservation Commission on land purchases within the year the funds are collected. This will allow the Conservation Commission to accrue funds for land purchases from year to year.

APPENDIX III-I

Soil Limitations to Septic Systems for Hudson, NH

Slight Limitations to Septic Systems

Symbol	Soil Name and Slope	
CaB	Canton fine sandy loam	0-8%

Moderate Limitations to Septic Systems

Symbol	Soil Name and Slope	
CaC	Canton fine sandy loam	8-15%
CmB	Canton stony fine sandy loam	3-8%
CmC	Canton stony fine sandy loam	8-15%

Severe Limitations to Septic Systems

Symbol	Soil Name and Slope	
AgA	Agawam fine sandy loam	0-3%
AgB	Agawam fine sandy loam	3-8%
BaA	Belgrade silt loam	0-3%
BaB	Belgrade silt loam	3-8%
CaD	Canton fine sandy loam	15-25%
CmD	Canton stony fine sandy loam	15-25%
CmE	Canton stony fine sandy loam	25-35%
CnC	Canton very stony fine sandy loam	8-15%
CnD	Canton very stony fine sandy loam	15-35%
CpB	Chatfield-Hollis-Canton complex	3-8%
CpC	Chatfield-Hollis-Canton complex	8-15%
CsB	Chatfield-Hollis complex	3-8%
CsC	Chatfield-Hollis complex	8-15%
CtD	Chatfield-Hollis-Rock outcrop complex	15-35%
DeA	Deerfield loamy fine sand	0-3%
DeB	Deerfield loamy fine sand	3-8%
HsA	Hinckley loamy sand	0-3%
HsB	Hinckley loamy sand	3-8%
HsC	Hinckley loamy sand	8-15%
HsD	Hinckley loamy sand	15-35%
MoB	Montauk fine sandy loam	3-8%
NnA	Ninigret very fine sandy loam	0-3%
PbB	Paxton fine sandy loam	3-8%
PbC	Paxton fine sandy loam	8-15%
PfB	Paxton stony fine sandy loam	3-8%
PfC	Paxton stony fine sandy loam	8-15%
PfD	Paxton stony fine sandy loam	15-25%
PhB	Pennichuck channery fine sandy loam	3-8%
PhC	Pennichuck channery fine sandy loam	8-15%
PHd	Pennichuck channery fine sandy loam	15-25%
SsA	Scituate fine sandy loam	0-3%
SsB	Scituate fine sandy loam	3-8%
StA	Scituate stony fine sandy loam	0-3%
StB	Scituate stony fine sandy loam	3-8%
StC	Scituate stony fine sandy loam	8-15%
WdA	Windsor loamy sand	0-3%
WdB	Windsor loamy sand	3-8%
WdC	Windsor loamy sand	8-15%
WdD	Windsor loamy sand	15-35%
WoB	Woodbridge loam	3-8%
WvD	Woodbridge stony loam	3-8%

Source: US Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County, NH, Eastern Part*, 1980.

APPENDIX III-2

Important Agricultural Soils in Hudson, NH

Prime Farmlands

Symbol	Soil Name and Slope	
Om	Occum fine sandy loam	high bottom
PbB	Paxton fine sandy loam	3-8%
Pu	Pootatuck fine sandy loam	Unknown
WoA	Woodbridge loam	Unknown
WoB	Woodbridge loam	3-8%

Statewide Importance

Symbol	Soil Name and Slope	
CaB	Canton fine sandy loam	0-8%
CaC	Canton fine sandy loam	8-15%
PbC	Paxton fine sandy loam	8-15%
PhB	Pennichuck channery fine sandy loam	3-8%
PhC	Pennichuck channery fine sandy loam	8-15%
SsB	Scituate fine sandy loam	3-8%

Source: US Department of Agriculture, Soil Conservation Service, Soil Survey of Hillsborough County, New Hampshire, Eastern Part, 1980.

APPENDIX III-3

Identified Potential Contaminant Sources in Hudson

Business Name	Street Address	Tax Map#	Source	Threat Class	Verified Use	Public Sewer
Acme Pressure Washing	9 Melendy Rd	48-102	Hudson Employment List	PCS	N	Y
Autocrat Redesign	9 Winn Ave	48-20	RCRA Sites List	PCS	N	
Autoworld Of Nashua	120 Ferry St	57-125	Hudson Employment List	PCS	Y	Y
Bills Family Auto Center	64 Lowell Rd	48-64	Hudson Employment List	PCS	Y	
Brox Industries, Inc.	Barretts Hill Rd	30-9	AllSites List	AST	N	
Chamberlain, Thos. C. Dr.	49 Derry Rd	55-64	Hudson Employment List	PCS	Y	Y
Christ Robt T Dmd.	50 Derry Rd	55-19	Hudson Employment List	PCS	Y	Y
Cuff, Richard W. Dmd.	59 Ferry St	51-127	Site Observation	PCS	Y	Y
Drg Automotive Machine	76 Derry Rd	55-24	Hudson Employment List	PCS	N	Y
Dumont-Sullivan Funeral Home	50 Ferry St	51-106	Hudson Employment List	PCS	Y	Y
Dyna Tune	38 Ferry St	51-102	Hudson Employment List	PCS	Y	Y
Fashion Neckware Co Inc/Joshua Douglas	10 Roosevelt Ave	48-93	AllSites List	UIC	N	Y
Finish Exterior Systems	10 D St	48-67	Hudson Employment List	PCS	Y	Y
Gagnon, W. D. MD	182 Central St	58-5-1	Hudson Employment List	PCS	Y	Y
Hair We Are Face and Body Spa	28 Lowell Rd	48-52	Hudson Employment List	PCS	Y	Y
Heritage Hair Salon	188 Central St	58-5	Hudson Employment List	PCS	Y	Y
Hi-Lites Hair Salon	77 Lowell Rd	45-145-1	Hudson Employment List	PCS	N	Y
Hudson Alignment	32 Cross St	48-10-1	Hudson Employment List	PCS	Y	Y
Hudson Animal Hospital	208 Central St	20-18	Hudson Employment List	PCS	Y	Y
Hudson Dry Cleaner	30 Lowell Rd	48-11	Hudson Employment List	PCS	Y	Y
Hudson Hair Styling	23 Burnham Rd	58-6	Hudson Employment List	PCS	N	Y
Hudson Paving and Excavtion, Inc.	19 Barrett Hill Rd	30-11	RCRA Sites List	PCS	N	
Hudson Sunoco Inc	74 Lowell Rd	46-22	Hudson Employment List	LUST	Y	Y
Joks Auto Wholesale & General Auto	5 Lakeside Ave	57-112-1	RCRA Sites List	PCS	N	
Kays Home Style Laundromat	80 Lowell Rd	46-23	Hudson Employment List	PCS	N	
Li'l Squirt Car Wash	184 Central St	58-5-2	Hudson Employment List	PCS	Y	Y
Lowell Rd Pump Station Replacement (2 Sites)	Lowell Rd	47-95/47-85	AllSites List	SITEEVAL	N	
MacDuffie Petroleum	26 Derry Rd	50-28	Hudson Employment List	PCS	Y	Y
Micromatic Machine Co	28 Riverside Ave	47-8	RCRA Sites List	PCS	N	

APPENDIX III-3 (continued)

Identified Potential Contaminant Sources in Hudson

Business Name	Street Address	Tax Map#	Source	Threat Class	Verified Use	Public Sewer
Former location of Public Works Dept.	8 Melendy Rd	52-31	AllSites List	AST	Y	
Sunnyside Cemetery	Central St	52-124	Site Observation	PCS	Y	
Tates Garage	36 Lowell Rd	48-56	Hudson Employment List	PCS	Y	Y
Westview Cemetery	Ferry St	20-2,20-29	Site Observation	PCS	Y	
Willards Auto Radiator Shop	56 Lowell Rd	48-61	RCRA Sites list	PCS		

Source: Nashua Regional Planning Commission, Town of Hudson Groundwater Protection Plan, December 1998. Original list verified through the Verizon phonebook by NRPC staff, 2003.

Threat Class:

AST	Registered Aboveground Storage Tank Facility
LUST	Leaking Underground Storage Tank Project
OPUF	On-Premise Use Facility Containing Fuel Oil
SITEEVAL	Unsolicited Site Assessment
UIC	Underground Injection Control
PCS	Potential Contamination Source

****Verified use indicates whether or not the specific use was verified as present on –site.***

Note: Specific uses from the Hudson Employment list are consistent with the NH Groundwater Protection Act definition of a Potential Contamination Source (PCS) were selected from that list and added to an existing state-wide inventory of site remediation projects and groundwater hazards list (AllSites). Sites identified during a windshield survey are noted as Site Observation.

APPENDIX III-4

New Hampshire Natural Heritage Bureau Inventory

Rare Species and Exemplary Natural Communities List

			# Locations Listed in the last 20 Years		
Flag	Species or Community Name	Federal	State	Town	State
	Natural Communities – Terrestrial				
***	SNE Dry Central Hardwood Forest on Acidic Bedrock or Till	-	-	3	15
***	SNE Dry Central Hardwood Forest on Acidic Bedrock or Till	-	-	1	15
***	SNE Dry Rich Forest on Acidic/Circumneutral Bedrock or Till	-	-	3	11
***	SNE Floodplain Forest	-	-	1	47
**	SNE Rich Mesic Forest	-	-	1	12
	Natural Communities – Palustrine				
**	Atlantic White Cedar Basin Swamp	-	-	1	28
***	Inland New England Acidic Pond Shore/Lake Shore Community	-	-	1	12
	Plants				
	Arethusa (Arethusa bulbosa)	-	E	Historical	21
*	Atlantic White Cedar (Chamaecyparis thyoides)	-	-	1	44
**	Bird's-Foot Violet (Viola pedata var linearilobа)	-	T	2	12
	Blunt-Leaved Milkweed (Asclepias amplexicaulis)	-	T	Historical	12
*	Blunt-Lobe Woodsia (Woodsia obtusa)	-	T	2	8
***	Bulbous Bitter-Cress (Cardamine bulbosa)	-	E	1	5
**	Early Buttercup (Ranunculus fascicularis)	-	E	1	2
**	Fern-Leaved Foxglove (Aureolaria pedicularia var intercedens)	-	E	1	6
	Flaccid Sedge (Carex flaccosperma var glaucodea)	-	E	Historical	1
**	Four-Leaved Milkweed (Asclepias quadrifolia)	-	T	2	9
	Fringed Gentian (Gentiana crinita)	-	T	Historical	28
	Goat's-Rue (Tephrosia virginiana)	-	E	Historical	6
***	Hairy Bedstraw (Galium pilosum)	-	E	1	5
**	Hairy Stargrass (Hypoxis hirsuta)	-	T	3	13
***	Hoary Mt. Mint (Pycanthemum incanum)	-	E	4	5
	Inflated Sedge (Carex bullata)	-	E	Historical	5
	Long-Fruited Anemone (Anemone cylindrica)	-	-	Historical	11
	Maryland Tick-Trefoil (Desmodium marilandicum)	-	E	Historical	4
	One-Sided Rush (Juncus secundus)	-	E	Historical	6
	Pink Azalea (Rhododendron nudiflorum)	-	E	Historical	2
***	Prostrate Tick-Trefoil (Desmodium rotundifolium)	-	T	3	9
	Purple Milkweed (Asclepias purpurascens)	-	-	Historical	4
***	River Birch (Betula nigra)	-	T	1	12
**	Rue Anemone (Anemonella thalictroides)	-	T	2	5
	Siberian Chives (Allium schoenoprasum var sibiricum)	-	T	Historical	7
***	Sickle-Pod (Arabis canadensis)	-	T	3	7
***	Skydrop Aster (Aster patens var patens)	-	T	3	10
*	Slender 8-Flowered Fescue (Festuca octoflora var tenella)	-	E	1	3
	Slender 8-Flowered Fescue (Festuca octoflora var tenella)	-	E	Historical	3

continued, next page

APPENDIX III-4 (Continued)

New Hampshire Natural Heritage Inventory

Rare Species and Exemplary Natural Communities List

			# Locations Listed in the last 20 Years		
Flag	**Species or Community Name**	**Federal**	**State**	**Town**	**State**
	Plants ***(continued)***				
*	Slender Bush-Clover (Lespedeza virginica)	-	T	2	6
	Slender Knotweed (Polygonum tenue)	-	E	Historical	3
	Slender Pinweed (Lechea tenuifolia)	-	E	Historical	2
	Slender-Flowered Muhlenbergia (Muhlenbergia tenuiflora)	-	-	Historical	3
**	Small Bidens (Bidens discoidea)	-	E	1	9
**	Smooth-Forked Chickweed (Paronychia canadensis)	-	T	2	7
**	Smooth-Forked Chickweed (Paronychia canadensis)	-	T	4	7
	Spiked Needlegrass (Aristida longespica var geniculata)	-	E	Historical	4
*	Sprout Muhlenbergia (Muhlenbergia sobolifera)	-	T	1	6
***	Swamp Azalea (Rhododendron viscosum)	-	T	10	42
	Torry's Mountain Mint (Pycanthemum torrei)	-	E	Historical	1
*	White-Topped Aster (Sericocarpus linifolius)	-	T	1	6
**	Wild Garlic (Allium canadense)	-	E	1	5
	Wild Lupine (Lupinus perennis)	-	T	Historical	37
	Wild Senna (Cassia hebecarpa)	-	E	Historical	10
	Vertebrates – Reptiles				
**	Blanding's Turtle (Emydoidea blandingii)	-	-	1	57
	Eastern Box Turtle (Terrapene carolina)	-	-	Historical	6
	Vertebrates – Fish				
	Banded Sunfish (Enneacanthus obesus)	-	-	Historical	8
	Invertebrates – Mollusks				
**	Brook Floater (Alasmidonta varicosa)	-	E	1	30
**	Eastern Pondmussel (Ligumia nasuta)	-	-	1	4
	Invertebrates - Insects				
	A Geometrid Moth	-	-	Historical	2
**	Cobweb Skipper (Herperia metea)	-	-	1	5
**	Horace's Dusky Wing (Erynnis horatius)	-	-	1	1
	Persius Dusky Wing (Erynnis persius persius)	-	E	Historical	6
**	Wild Indigo Duskywing (Erynnis baptisiae)	-	E	1	1

Listed E = Endangered T = Threatened

Flags
**** = Highest Importance
*** = Extremely High Importance
** = Very High Importance
* = High Importance

These flags are based on a combination of: 1) how rare the species or community is, and 2) how large or healthy its examples are in that town. Please contact Natural Heritage Inventory at (603) 271-3623 for more information.

APPENDIX III-5

Existing and Potential Town-owned Conservation Land

Parcel	Parcel ID	Acres	Book/Page	Confirmed Conservation Land (Y/N or NC)	Type of Conservation Land
West Road Landfill	41-13	38 acres	N/A	N	
Robinson Road (two small lots)	38-8	0.93 acres	2647/0705	NC	
	38-10	1 acre	4804/1530	NC	
Griffin Road Bend	40-1	2.92 acres	3084/0717	NC	
Robinson Pond – Recreation area	36-5	45.7 acres	N/A	N	
Robinson Pond – Parker Preserve	? (not listed)	NA		N	
Robinson Pond – Outlet (not Town-owned)	31-80-17	2.85 acres	3442/0355	N	
Pinewood Drive	35-67-62	46 .28 acres	5273/1202	Y	Conservation Easement
Alvirne High School	29-18	45 acres	N/A	N	
	29-19	150 acres	N/A	N	
Little Ottarnic Pond	60-1	17 acres	5925/1401	N	
Claveau Wildlife Area (not Town-owned)	61-40	3.036 acres	6040/1458	N	
Merrifield Park	58-43	5.77 acres	2232/267	NC	
Merrill Park and Trail	47-139	9.3 acres	N/A	N	
	51-10	1.25 acres	N/A	N	
	51-11	0.91 acres	N/A	N	
George Street	57-67	4.5 acres	N/A	NC	
Lion's Hall	52-60	0.75 acres	6256/0309	N	
	52-72	8.84 acres	5640/585	N	
Benson's Park (not Town-owned yet)	20-25	165.81 acres	5351/1727	Not Yet	

Parcel	Parcel ID	Acres	Book/Page	Confirmed Conservation Land (Y/N or NC)	Type of Conservation Land
	20-13	22 acres	6745/1224	Not Yet	
Daniel Webster Drive	25-158	1.3 acres	N/A	NC	
Greeley Field	25-3-1	N/A	5557/0408	NC	
Industrial Drive	32-7	10.8 acres	6105/0398	N	
Town Forest	27-52	55 acres	N/A	Y	Needs more research, deed refers to Cons Comm
Jette Field	46-120	3.5 acres	N/A	NC	
	46-119	0.77 acres	N/A	NC	
Birchcroft Riverfront (2 parcels)	44-18	5.33 acres	N/A		
	45-9-1	1.9 acres	5595/261		
Radcliffe Drive	45-25-2	N/A	N/A	Y	Conservation Easement
	45-25-3	N/A	N/A	Y	
	45-25-4	N/A	N/A	Y	
	45-25-5	N/A	N/A	Y	
	45-25-6	N/A	N/A	Y	
Birchcroft Cluster	45-161-3	1 acres	N/A	NC	
	44-136	1.6 acres	N/A	NC	
	44-134	0.17 acres	N/A	NC	
	44-139	0.17 acres	N/A	NC	
	44-135	0.17 acres	N/A	NC	
	44-110-1	0.6 acres	N/A	NC	
	44-132	0.17 acres	N/A	NC	
	44-133	0.11 acres	N/A	NC	

Parcel	Parcel ID	Acres	Book/Page	Confirmed Conservation Land (Y/N or NC)	Type of Conservation Land
	44-137	0.75 acres	N/A	NC	
	44-138	1 acre	N/A	NC	
Glenn Drive	14-52	6.4 acres	2875/0453	NC	
	14-43	1 acre	N/A	NC	
Burns Hill Landfill	15-7	16.867 acres	N/A	N	
Guertin Parcel	11-59	49.97 acres	5193/0866	N	
Musquash Conservation Area	9-2	189 acres	5135/1646	More research needed	
	9-5	18 acres	5177/1025	N	
	16-3	50 acres	N/A	N	
	12-36-2	203.5 acres	N/A	N	
Hills Family Park	9-86	5.4 acres	N/A	NC	
	9-34-15	6.63 acres	3993/0028	N	
	9-88	1 acre	5103/1762	N	
	12-34	10.078 acres	2592/0702	NC	
Davenport Road	8-109	22.97 acres	5559/1880	N	
Schaeffer Circle	6-3	20.58 acres	2739/0041		
Country Woods Subdivision	6-42, 6-53	36.93 (total)	5107/0585	Y	Conservation and Access Easement
Winslow Farm	2-20	12 acres	5258/1828	N	
Rena Avenue	8-27	1.2 acres	2992/0016	NC	
	8-21	0.28 acres	N/A	NC	
Gordon Street Water Tower	2-13	2.46 acres	2886/0970	NC	
Ayers Pond Road	5-109	2 acres	3020/7780	NC	
	5-19-1	0.5 acres	3084/7210	NC	

Parcel	Parcel ID	Acres	Book/Page	Confirmed Conservation Land (Y/N or NC)	Type of Conservation Land
Wason Road	15-19	1.05 acres	3084/0720	NC	
	11-35-1	0.923 acres	N/A	NC	
Hardy Road	10-18	1.3 acres	6434/2147	NC	
Woodridge Drive	14-103	0.47 acres	6256/0310	NC	
Webster Street	54-3	1.183 acres	6230/0481	NC	
Bear Path Lane	21-6-14	4.66 acres	6292/0612	NC	
Woodland Drive	16-5-9	8.603 acres	6357/1607	Y	Open Space Subdivision
Derry Road	28-93	28.1 acres	6454/1407	N	

Source: Town of Hudson Assessor's Office.

APPENDIX III-6

Proposed New Hampshire Prohibited Species[35]

(* indicates that the species is currently regulated by the DES)

Plants

Ailanthus altissima	Tree of Heaven
Alliaria petiolata	Garlic Mustard
Berberis vulgaris	European Barberry
*Butomous umbellate**	Flowering Rush
*Cabomba caroliniana**	Fanwort
Celastrus orbiculatus	Oriental Bittersweet
Cynanchum nigrum	Black Swallow-wort
Cynanchum rossicum	Pale Swallow-wort
*Egeria densa**	Brazilian elodea
Elaeagnus umbellate	Autumn Olive
Heracleum mantegazzianum	Giant Hogweed
*Hydrilla verticillata**	Hydrilla
*Hydrocharis morsus-ranae**	European Frogbit
Iris pseudacorus	Water-flag
Ligustrum obtusifolium	Blunt-leaved Privet
Lonicera x bella	Showy Bush Honeysuckle
Lonicera japonica	Japanese Honeysuckle
Lonicer morrowii	Morrow's Honeysuckle
Lonicera tatarica	Tartarian Honeysuckle
Lythrum salicaria	Purple loosestrife
*Myriophyllum aquaticum**	Parrot Feather
*Myriophyllum heterophyllum**	Variable Milfoil
*Myriophyllum spicatum**	European Water-Milfoil
*Najas minor**	European Naiad
*Nymphoides peltata**	Yellow Floating Heart
*Phragmites australis**	Common Reed
Polygonum cuspidatum	Japanese Knotweed
*Potomogeton crispus**	Curly-leaf Pondweed
Rhamnus cathartica	Common Buckthorn
Rhamnus frangula	Glossy Buckthorn
Rosa multiflora	Multiflora Rose
*Trapa nutans**	Water Chestnut

[35] New Hampshire Department of Agriculture, New Hampshire Invasive Species Committee, http://www.state.nh.us/agric/pdf/topics/hyperlinks/proposed_restricted_(watch)_species_list.pdf

Proposed New Hampshire Prohibited Invasive Species List with Condition:

Plants

Euonymus alatus	Burning Bush
Acer platanoides	Norway Maple
Berberis thunbergii	Japanese Barberry

Proposed New Hampshire Prohibited Invasive Species List:

Insects

Acarapis woodi	Honeybee Tracheal Mite
Adelges tsugae	Hemlock Woolly Adelgid
Aeolesthes sarta	City Longhorned Beetle
Anoplophora glabripennis	Asian Longhorned Beetle
Callidellum rufipenne	Cedar Longhorned Beetle
Dendrolimus sibircus	Siberian Silk Moth
Fiorinia externa	Elongated Hemlock Scale
Hylurgus lingniperda	Redhaired Bark Beetle
Ips typographus	European Spruce Bark Beetle
Lymantria dispar	Asian Gypsy Moth
Popillia japonica	Japanese Beetle
Pyrrhalta viburni	Viburnum Leaf Beetle
Rhizotrogus majalis	European Chafer
Symantria monacha	Nun Moth
Tetropium fuscum	Brown Spruce Longhorn Beetle
Varroa destructor	Varroa Mite

PROPOSED NEW HAMPSHIRE RESTRICTED SPECIES

(WATCH SPECIES)

Plants

Ampelopsis brevipedunculata	Porcelain Berry
Centaurea maculosa	Spotted Knapweed
Circium arvens	Canada Thistle
Coronilla varia	Crown Vetch
Elaeagnus angustifolia	Russian Olive
Euonymus fortunei	Wintercreeper
Glyceria maxima	Sweet Reedgrass
Ligustrum vulgare	Common Privet
Lonicera maakii amur	Honeysuckle
Lysmachia nummularia	Moneywort
Microstegium vimineum	Japanese Stilt Grass
Phalaris arundinacea	Reed Canary Grass
Populus alba	White Poplar
Pueraria lobata	Kudzu
Robinia pseudoacacia	Black Locust
Ulmus pumila	Siberian Elm

APPENDIX III-7

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This chapter of the Hudson Master Plan update is intended to supplement, and not replace, the findings and recommendations of any earlier studies.

#220F-3

CHAPTER IV

ECONOMIC DEVELOPMENT

A. INTRODUCTION

Economic indicators suggest that the Town of Hudson continues to exhibit a relatively healthy economy and is in a position to continue to sustain and enhance economic growth. Hudson has evolved into one of the Nashua region's major employment centers over the past few decades as the number of jobs and the amount of non-residential development has increased considerably.

Hudson continues to exhibit an unemployment rate lower than that of the United States as a whole. However, the unemployment rate is somewhat higher than the average for the region and the state, likely caused by a significant loss in manufacturing jobs. The tax base is supported by one of the highest non-residential equalized assessments in the region due to a high quantity of developed commercial and industrial property. A challenge facing the Town includes providing opportunities for diverse, high wage jobs to meet local employment needs and reducing exposure to fluctuations in the national or state economy. In addition, it is essential that the Town maintain and enhance its tax base by attracting commercial, industrial and mixed-use development with a high assessed value per land area. This chapter provides a discussion of: 1) the existing state and local economic environment; 2) existing employment indicators; 3) commercial and industrial land use; and 4) recommendations.

B. THE EXISTING STATE & LOCAL ECONOMIC ENVIRONMENT

The New Hampshire economy grew significantly between 1993 and 2000, representing the state's second longest recorded period of economic growth. One of the driving forces behind the state's economy is the economic expansion in southern New Hampshire throughout the financial, construction, transportation, manufacturing, research and development and service sectors. The unemployment rate in New Hampshire reached a low of 2.7% in 1999 but had increased to 4.5% by June 2002. Similarly, Hudson's unemployment rate reached a low of 3.1% in 1998 but increased to 5.9% by June 2002. The increase in unemployment can be attributed to a statewide reduction of more than 13,800 jobs from 1st quarter 2001 to 1st quarter 2002. Manufacturing employment fell by 16,109 jobs during this time frame, driving the year's total job decline.[1]

1. New Hampshire's Economic Environment

Characteristics of New Hampshire's economy include the following:[2]

- The New Hampshire population grew 11.4% between 1990 and 2000. New Hampshire was the fastest growing state in New England during this period;[3]
- New Hampshire had the lowest tax burden in the nation in 2000;[4]
- New Hampshire had a median household income of $49,467 in 1999. This was $7,500 higher than the national median household income.

[1] Source: NH Employment Security, *Economic Conditions in New Hampshire, October 2002*, Volume 102, No. 10.
[2] Original Source: Public Service of New Hampshire, *2001 New Hampshire Economic Review*, 2001 and Business NH Magazine, *2001 New Hampshire Business Resource Directory*, 2001.
[3] Source: US Census 1990 and 2000.
[4] Source: US Census and US Bureau of Economic Analysis. Includes state and local government own source revenue as a percentage of personal income, 1999.

- New Hampshire's manufacturing Gross State Product (GSP) comprised 22.1% of the total state GSP in 2000. This was the highest percentage in New England and the tenth highest in the nation;[5]
- New Hampshire has enjoyed unemployment rates below national levels for the last nine years; and
- 29% of New Hampshire's population over the age of 25 had a bachelor's degree or higher in 2000. 87% had a high school diploma or higher.

2. Hudson's Economic Environment

Characteristics of Hudson's local economy include the following:

- Hudson had a median household income of $64,169 in 1999. This was $22,175 higher than the national median household income;
- 11,466 people were employed in Hudson in 2000. Hudson has the opportunity to further increase employment through continued development and redevelopment of commercial and industrial property;
- The average weekly wage in Hudson was $726.58 for all employment types in 2000. This is $109 higher than the average for the State of New Hampshire. Hudson has the opportunity to further increase average weekly wages by attracting and retaining employment in the high paying Finance, Insurance and Real Estate, and manufacturing sectors;
- Hudson's location is close to centers of commerce in the Merrimack Valley and Northern Massachusetts;
- 10% of the land area of Hudson is zoned exclusively for industrial and commercial uses;
- 26% of Hudson's population over the age of 25 had a bachelor's degree or higher in 2000. 90% had a high school diploma or higher; and
- The following long-term transportation improvements, included in the NH Department of Transportation, Ten Year Improvement Plan, will help to facilitate continued economic growth in Hudson: 1) the northern segment of the Circumferential Highway, including an interchange on NH Route 3 near the Nashua city line and an additional Merrimack River crossing; 2) expansion of Manchester Airport, including the Airport Access Road; and 3) extension of the Commuter Rail line from Lowell to South Nashua, with possible extension to Manchester. These projects are discussed in more detail in Chapter V, Transportation.

However, Hudson faces certain challenges to continued economic development:

- There are only a few major undeveloped parcels zoned exclusively for industrial or commercial uses left in the community, and those zoned for both residential and non-residential uses (the General and G-1 Zoning Districts) are mostly developing as residential due to challenging topography, a lack of public sewer facilities and the cost of improving roadways to accommodate greatly increased traffic counts;
- Hudson does not have a traditional, mixed-use Town Center, thereby excluding certain types of businesses;
- The quality of life will need to be maintained or enhanced in the face of increased development; and

[5] Source: U.S. Department of Commerce, Survey of Current Business.

- Potential expansion of the public water and sewer systems is limited. Limitations are discussed in more detail in Chapter VIII, Community Facilities.

C. EMPLOYMENT

1. Unemployment

Table IV-1 shows unemployment figures for Hudson and other geographic areas. Hudson maintained an unemployment rate above the rate of the Nashua Primary Metropolitan Statistical Area (PMSA)[6] throughout the 1990's. Hudson, the PMSA and the state experienced high rates of unemployment during the recession of the early 1990's and significant employment growth during the economic expansion of the late 1990's. Hudson, the Nashua PMSA, and New Hampshire have maintained unemployment rates significantly lower than the national average since 1993.

Table IV-1: Unemployment Rates, 1990- 2003

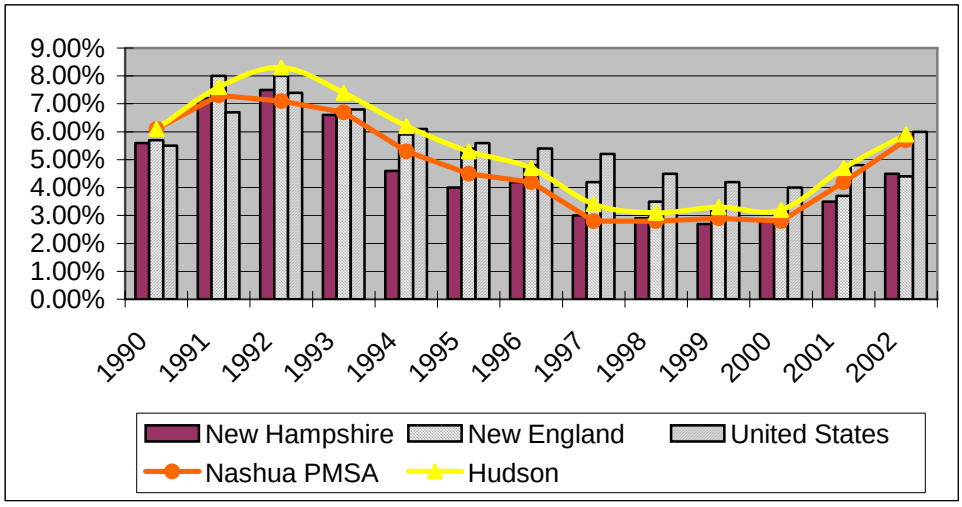
Year	Hudson	Nashua PMSA	NH	New England	US
1990	6.1%	6.1%	5.6%	5.7%	5.5%
1991	7.6%	7.3%	7.2%	8.0%	6.7%
1992	8.3%	7.1%	7.5%	8.0%	7.4%
1993	7.4%	6.7%	6.6%	6.8%	6.8%
1994	6.2%	5.3%	4.6%	5.9%	6.1%
1995	5.3%	4.4%	4.0%	5.4%	5.6%
1996	4.7%	4.2%	4.2%	4.8%	5.4%
1997	3.4%	2.8%	3.1%	4.4%	5.2%
1998	3.1%	2.8%	2.9%	3.5%	4.5%
1999	3.4%	2.9%	2.7%	3.3%	4.2%
2000	3.2%	2.8%	2.8%	2.8%	4.0%
2001	4.8%	4.2%	3.5%	3.7%	4.8%
2002	6.6%	6.2%	4.7%	4.8%	6.0%
2003	5.9%	5.4%	4.3%	5.4%	6.0%

Source: U.S. Bureau of Labor Statistics and NH Employment Security, March 2004.

There have been several major layoffs in the region and in Hudson since 2000, primarily in the manufacturing and high-tech sectors. From February 2003 to February 2004, over 200 jobs in the Nashua PMSA were lost, mostly in the trade, transportation and utilities and the manufacturing sectors[7]. These layoffs have lead to an increase in unemployment in Hudson. In just two years, the unemployment rate in Hudson doubled from 3.2% in 2000 to 6.6% in 2002.[8] Figure IV-1 illustrates that Hudson's unemployment rate in June 2002 was similar to that for the Nashua PMSA, higher than for the entire United States, and significantly higher than for New Hampshire and New England.

[6] In New England, a Primary Metropolitan Statistical Area (PMSA) is an area defined by the US Census, Office of Management and Budget, as a Federal statistical standard, comprised of one or more county subdivisions within a metropolitan area, having a population of 1,000,000 or more. The Nashua PMSA is within the Boston Metropolitan Statistical Area and includes the City of Nashua and the Towns of Hudson, Merrimack and Milford.
[7] Source: NH Employment Security, *Economic Conditions in New Hampshire, April 2004*, Volume 102, No. 10.
[8] Source: U.S. Bureau of Labor Statistics, April 2004. See: http://www.bls.gov/data/home.htm

Figure IV-1. Unemployment Rates, 1990 – 2002



Note: 2002 unemployment figure is for the month of June, 2002 and Hudson estimates for 1997-2002 are awaiting final review by the U.S. Bureau of Labor Statistics.

2. Local Employers

Table IV-2 shows employers and employees by employment sector in Hudson in 2000. Hudson had 609 operating businesses with a total of 11,467 employees in 2000. Forty-five percent (45%) of all employment in Hudson was in the manufacturing sector, accounting for 5,212 jobs. Employment in services (hotels, health care, vehicle services) accounted for 15% or 1,667 jobs in 2000. This was followed by the retail trade sector, which made up 12% of all jobs in Hudson in 2000. Major employers in Hudson now include Benchmark Electronics, Inc., BAE Systems, the Hudson School District, Electro Mechanisms, Wal-Mart, Hadco Corporation, the Nashua Telegraph, Market Basket, Teradyne Connection Systems, Lowell Shoe Inc., Presstek, Inc., Save-on-Wall Co., Inc., and Sam's Club. The majority of employers in Hudson, however, are small businesses.

Table IV-2. Employers and Employment by Employment Sector, Hudson, 2000

Employment Sector	Employers		Employees	
	#	%	#	%
Agriculture, Forestry and Fishing	N/A	N/A	N/A	N/A
Mining	N/A	N/A	N/A	N/A
Construction	63	10.3%	385	3.4%
Manufacturing	86	14.1%	5,212	45.5%
Transportation and Public Utilities	19	3.1%	309	2.7%
Wholesale Trade	77	12.6%	791	6.9%
Retail Trade	88	14.4%	1,377	12.0%
Finance, Insurance and Real Estate (FIRE)	13	2.1%	57	0.5%
Services	191	31.4%	1,667	14.5%
Government	N/A	N/A	N/A	N/A
Total	**609**	**100%**	**11,466**	**100%**

Source: NH Employment Security at http://nhetwork.nhes.state.nh.us/nhjs.
Note: N/A = not available as the information is either not tracked by NH Employment Security or Confidential.

3. Income

Table IV-3 shows the average annual employment (number of employees) and average weekly wages in Hudson, Nashua and New Hampshire for the manufacturing, non-manufacturing and government sectors in 2000. The table indicates that 51% of Hudson's industry was in the manufacturing sector in 2000. The table also indicates that manufacturing jobs pay considerably higher average wages than non-manufacturing or government jobs; however, the average wage for manufacturing jobs in Hudson appears to be lower than average wages for similar jobs in Nashua and throughout New Hampshire. In addition, the average wage for non-manufacturing and government jobs in Hudson appears to be lower than average wages for similar jobs in the City of Nashua. This trend is likely due to the large number of high paying jobs with Nashua employers such as BAE Systems and various medical facilities; however, the average wage for all jobs in Hudson was considerably higher than that for the state as a whole.

Table IV-3. Manufacturing and Non-Manufacturing Employment and Wages, 2000

Employment Type	Measurement	Hudson	Nashua	NH
Manufacturing	Average Annual Employment	5,855	12,773	106,337
	Average Weekly Wage	$864.41	$1,098.48	$893.43
Non-Manufacturing	Average Annual Employment	4,886	37,666	423,397
	Average Weekly Wage	$576.68	$668.16	$705.55
Government	Average Annual Employment	711	3,954	76,870
	Average Weekly Wage	$621.7	$800.25	$600.11
Total	**Average Annual Employment**	**11,466**	**54,336**	**591,200**
	Average Weekly Wage	**$726.58**	**$782.30**	**$617.88**

Source: NH Department of Employment Security, 2000 County Profile - New Hampshire's Counties, Cities, Towns, and Unincorporated Places, March 2002.

Table IV-4 shows per-capita income and the median household and family incomes in Hudson, the Nashua PMSA, and the state for 1989 and 1999. Hudson had a higher median household and family income in 1999 than the Nashua PMSA and the state. Therefore, on average, Hudson's employees have slightly more buying power than do those in some of the surrounding communities as well as the average employee in the state. Hudson's per-capita income in 1999 was slightly lower than that for the Nashua PMSA but higher than that for the state. This may be a result of the relatively higher percentage of family households (i.e., more persons per household) in Hudson than in the Nashua PMSA.

Table IV-4. Median Household Income, 2000

Community	Median Household Income		Median Family Income		Per-Capita Income	
	1989	1999	1989	1999	1989	1999
Amherst	$62,568	$89,384	$66,491	$97,913	$25,778	$35,531
Brookline	$55,858	$77,075	$57,372	$80,214	$19,564	$29,272
Hollis	$64,351	$92,847	$68,096	$104,737	$26,005	$44,936
Hudson	$47,859	$64,169	$50,714	$71,313	$17,678	$25,696
Litchfield	$49,946	$73,702	$52,438	$76,931	$16,592	$25,203
Lyndeborough	$42,208	$59,688	$46,250	$70,223	$16,690	$27,169
Merrimack	$52,798	$68,817	$55,844	$72,011	$19,129	$27,748
Milford	$38,792	$52,343	$43,628	$61,682	$16,547	$24,425
Mont Vernon	$49,650	$71,250	$52,740	$77,869	$19,273	$30,772
Nashua	$40,505	$51,969	$46,614	$61,102	$18,010	$25,209
Pelham	$50,187	$68,608	$51,147	$73,365	$17,715	$25,158
Wilton	$36,098	$54,276	$39,402	$61,311	$16,935	$26,618
Nashua PMSA	**$45,789**	**$60,082**	**$50,899**	**$67,624**	**$18,725**	**$26,851**
State	**$36,329**	**$49,467**	**$41,628**	**$57,575**	**$15,959**	**$23,844**

Source: US Census Bureau, 2000.

Table IV-5 shows the average weekly wage and wage growth for each employment sector in New Hampshire and the Nashua PMSA from 1995-2000. The fastest wage growth in the Nashua PMSA during this period was in the finance, insurance and real estate (FIRE) sector, followed by services and wholesale trade sectors. The highest average weekly wage in the Nashua PMSA for 2000 was in the FIRE sector, followed by wholesale trade and manufacturing sectors. The lowest average weekly wage in the Nashua PMSA for 2000 was in the retail trade sector. Growth in the FIRE, wholesale trade and manufacturing sectors in Hudson could therefore increase the average wage of Hudson's workers. In contrast, growth in the retail sector is likely to attract low paying jobs and could therefore decrease average wages.

Table IV-5. Average Weekly Wage Growth by Employment Sector, 1995-2000

Employment Sector	NH 1995	NH 2000	% Change 1995–2000	Nashua PMSA 1995	Nashua PMSA 2000	% Change 1995–2000
Agriculture, Forestry and Fishing	$340	$441	29.71%	$358	$495	38.27%
Mining	$618	$775	25.40%	$852	$886	4.00%
Construction	$548	$736	34.31%	$582	$830	42.61%
Manufacturing	$665	$893	34.29%	$830	$1,045	25.90%
Transportation and Public Utilities	$637	$786	23.39%	$531	$649	22.22%
Wholesale Trade	$761	$1,044	37.19%	$799	$1,154	44.43%
Retail Trade	$289	$371	28.37%	$304	$421	38.49%
Finance, Insurance and Real Estate (FIRE)	$646	$957	48.14%	$572	$1,470	156.99%
Services	$478	$640	33.88%	$522	$751	43.87%
Government	$527	$600	13.85%	$613	$703	14.68%
Total	**$551**	**$724**	**31.14%**	**$597**	**$840**	**40.70%**

Source: NH Employment Security, 1995 and 2000.

D. LAND USE

1. Regional Comparison of Commercial and Industrial Land

Table IV-6 shows the amount of land zoned *exclusively* for commercial and industrial use in the NRPC Region. Map IV-1 illustrates the location of these zoning districts. Zoning districts in Hudson correspond with the Business District and the Industrial District as enumerated in the Zoning Ordinance. Hudson has 1,185 acres of land zoned exclusively for industrial uses, or about one-third the amount as Merrimack or Nashua. Approximately 6% of the Town's land is zoned exclusively for industrial uses, which is about average for the NRPC Region as a whole but is significantly less than Merrimack or Nashua. Hudson has 740 acres of land zoned exclusively for commercial uses, or about two-thirds the amount in Milford or Nashua, and about half that of Litchfield. About 4% of the Town's land is zoned exclusively for commercial uses, which is slightly higher than average for the NRPC Region as a whole, but significantly lower than Litchfield.

It should be noted, however, that almost all commercial and industrial uses with the exception of heavy manufacturing are permitted uses within the G-1 and General Zoning Districts in Hudson. These districts make up much of the remaining undeveloped land within the Town; however, with some exceptions, these zoning districts appear to be developing with residential uses, likely due to challenging topography, a lack of public sewer facilities and the cost of improving roadways to accommodate greatly increased traffic counts. Public sewer facilities are discussed in detail in Chapter VIII, *Community Facilities*. Roadway limitations are discussed in Chapter V, *Transportation*.

Table IV-6. Generalized Commercial and Industrial Zoning, NRPC Region, 2002

Community	Total Area (acres)	Commercial Zoning (acres)	Commercial Zoning (percent)	Industrial Zoning (acres)	Industrial Zoning (percent)
Amherst	21,962	272	1%	603	3%
Brookline	12,714	396	3%	0	0%
Hollis	20,304	22	0%	0	0%
Hudson	18,773	740	4%	1,185	6%
Litchfield	9,538	1,503	16%	673	7%
Lyndeborough	19,261	0	0%	112	1%
Merrimack	20,995	561	3%	3,415	16%
Milford	16,256	1,144	7%	953	6%
Mont Vernon	10,752	59	1%	0	0%
Nashua	19,797	1,003	5%	3,771	19%*
Pelham	16,737	337	2%	518	3%
Wilton	16,375	60	1%	862	5%
NRPC Region	**203,464**	**6,065**	**3%**	**12,078**	**6%**

Source: NRPC GIS database, 2001.
* Includes all land designated "Northwest Conservation Land" not to be developed for industrial uses.

Map IV-1. Generalized Zoning, NRPC Region, 2002

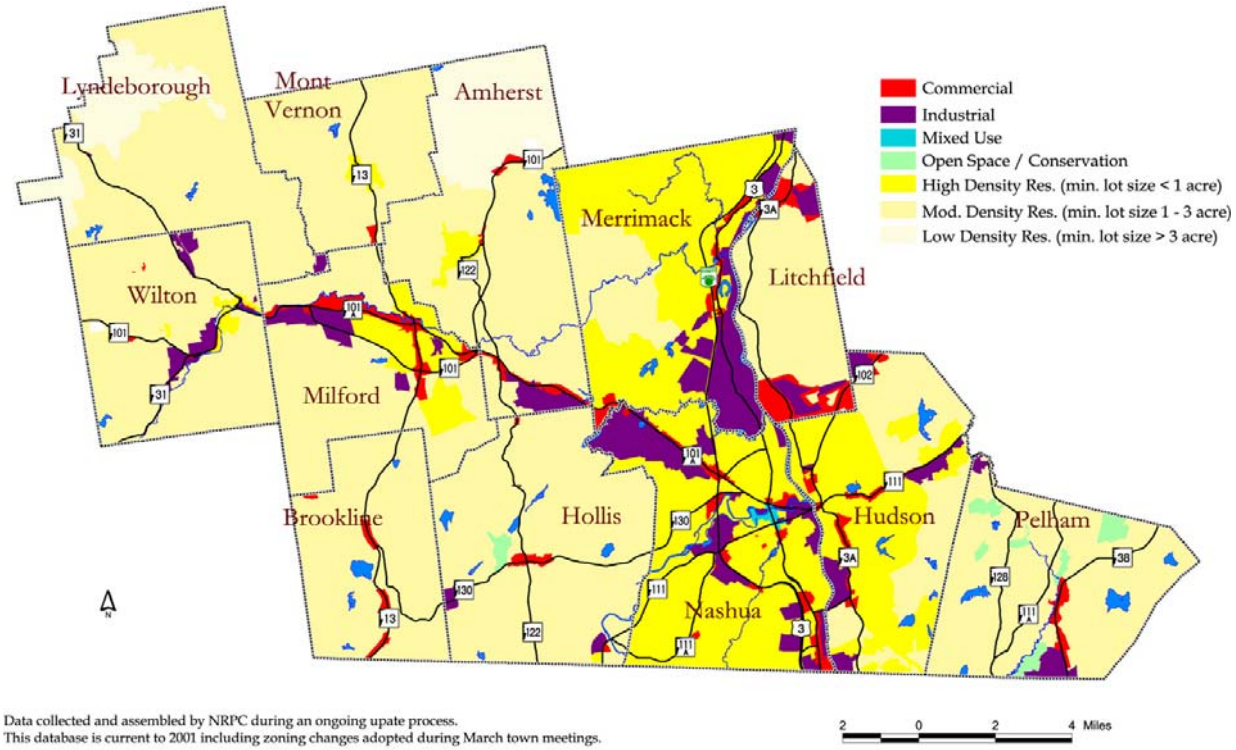


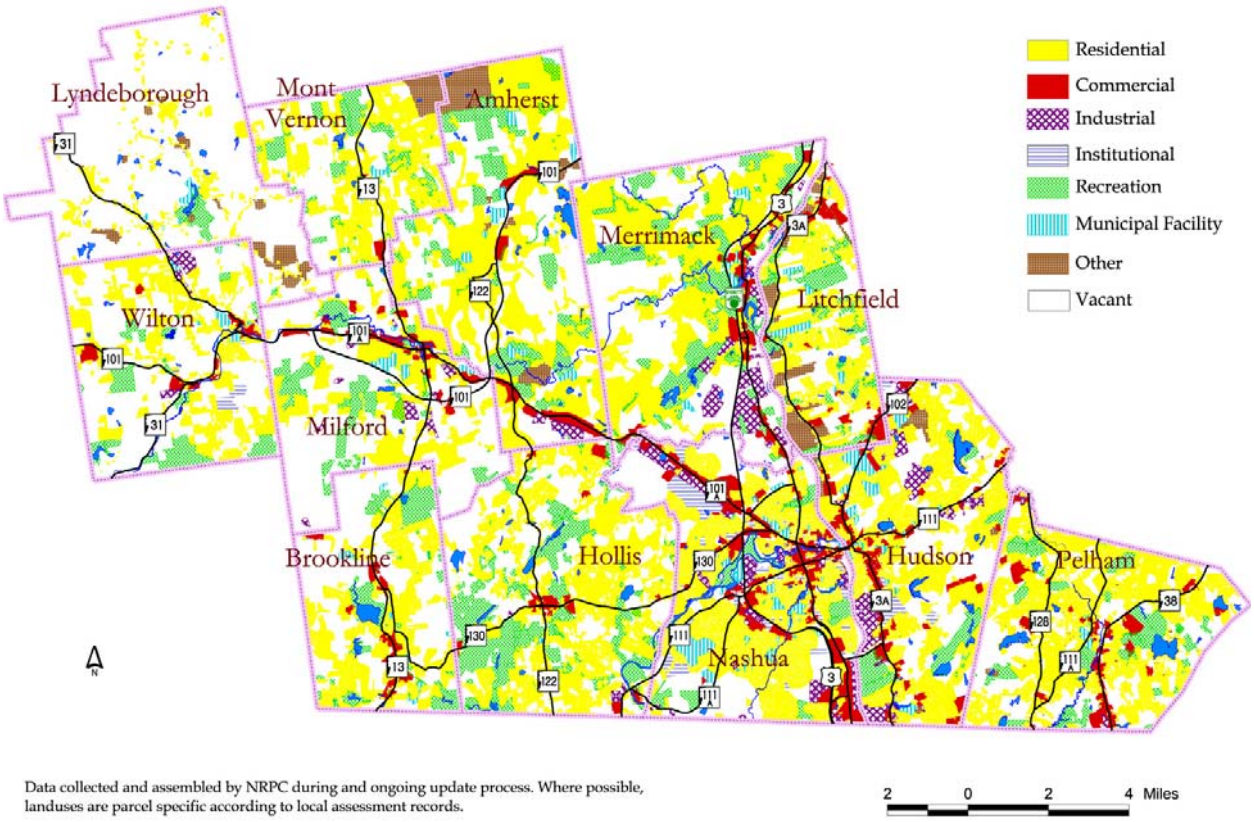
Table IV-7 shows the amount of developed commercial and industrial uses in Hudson in 2000. Map IV-2 illustrates the location of the uses. Most of the land zoned exclusively for industrial uses in Hudson is developed to some extent. In addition, approximately 73% of the land zoned exclusively for commercial use in Hudson is already developed. This means that much of the new commercial and industrial development in Hudson will likely occur through redevelopment of existing sites, unless commercial ventures are developed in the G-1 and General Zoning Districts.

Table IV-7. Developed Commercial and Industrial Uses, NRPC Region, 2000

Community	Total Area (acres)	Commercial Use (acres)	Commercial Use (percent)	Industrial Use (acres)	Industrial Use (percent)
Amherst	21,962	370	2%	192	1%
Brookline	12,714	222	2%	30	0%
Hollis	20,304	212	1%	61	0%
Hudson	18,773	516	3%	1,140	6%
Litchfield	9,538	304	3%	0	0%
Lyndeborough	19,261	1	0%	0	0%
Merrimack	20,995	403	2%	1,129	5%
Milford	16,256	291	2%	353	2%
Mont Vernon	10,752	42	0%	0	0%
Nashua	19,797	1,192	6%	1,128	6%
Pelham	16,737	457	3%	85	1%
Wilton	16,375	143	1%	278	2%
NRPC Region	**203,464**	**4,153**	**2%**	**4,396**	**2%**

Source: NRPC GIS Database, 2001.

Map IV-2. Generalized Land Use, NRPC Region, 2000



2. Regional Comparison of Tax Base

Table IV-8 shows the total equalized assessed value of all property in the NRPC Region. The table also shows the total equalized assessed value of commercial and industrial property in the NRPC Region. Given the amount of developed industrial and commercially zoned land in Hudson, it is not surprising that the town has one of the highest *non-residential* equalized assessments in the region, both in terms of dollar value and percentage. The Town also has the third highest *overall* assessment in the region. Commercial and industrial property make up 27.6% of the total assessed valuation in Hudson, which is slightly higher than the regional and state average.

Table IV-8. Non-Residential Equalized Assessments in the NRPC Region, 2000

Rank	Community	Total Equalized Value of Commercial and Industrial Property	Total Equalized Assessed Value	Percent Commercial and Industrial
1	Nashua	$2,042,010,051	$5,578,503,984	36.6%
2	Hudson	$437,325,000	$1,585,848,845	27.6%
3	Merrimack	$419,922,122	$1,765,633,898	23.8%
4	Milford	$255,327,849	$785,899,958	32.5%
5	Amherst	$113,348,500	$997,380,772	11.4%
6	Pelham	$86,023,785	$776,598,501	11.1%
7	Hollis	$52,051,758	$761,428,703	6.8%
8	Litchfield	$31,292,521	$408,738,442	7.7%
9	Wilton	$30,845,704	$226,312,943	13.6%
10	Brookline	$11,823,906	$253,617,400	4.7%
11	Lyndeborough	$1,968,955	$104,048,079	1.9%
12	Mont Vernon	$1,523,080	$146,107,478	1.0%
	NRPC Region	**$3,483,463,232**	**$13,390,119,003**	**26.0%**
	State	**$21,958,560,588**	**$86,703,541,057**	**26.0%**

Source: NH Department of Revenue Administration, Annual Report for FY2001, Appendix II at: http://webster.state.nh.us/revenue/publications/index.htm.

Note: "Commercial and Industrial" also includes value associated with property owned by utilities; the total assessed value is the total equalized valuation including utilities and railroads; non-residential portion of total assessed value derived by NRPC based on industrial and commercial land and building valuation and utility valuation.

Table IV-9 shows the equalized assessed valuation *per capita* for the NRPC Region. The table shows how much each member of the community contributes towards the tax base through property taxes. The higher the number, the greater amount each member of the community is contributing towards supporting community services through property taxes. The data in the table suggests that *residential* assessment has a strong effect on assessed valuation *per capita*. All five of the communities with higher assessed valuations per capita than Hudson have higher percentages of residential property in their assessments; however, average residential sales prices for four of them (Hollis, Amherst, Mont Vernon and Pelham) are significantly higher than that for Hudson (see Table II-27, Average Residential Sales Price, in Chapter II, *Population and Housing*). That is, although Hudson has a relatively high total assessed valuation, the contribution of each member of the community towards that valuation is no more than average. Therefore, Hudson relies more upon property taxes attributed to commercial and industrial property than other communities with significantly higher home prices.

Table IV-9. Equalized Assessed Valuation Per Capita in the NRPC Region, 2000

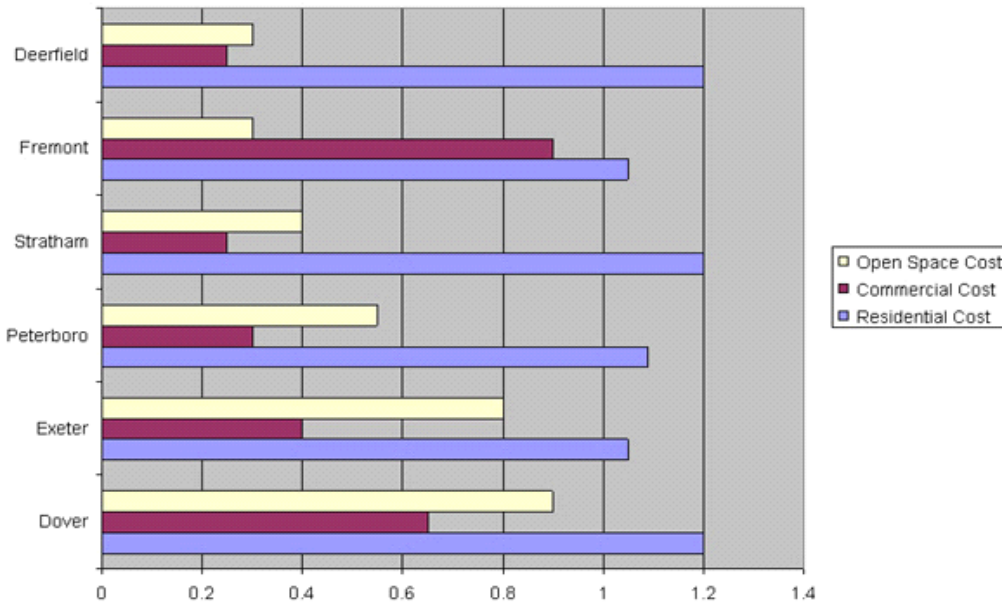
Rank 2000	Community	Total Equalized Assessed Valuation	Population	Equalized Assessed Valuation Per Capita	Rank 1990	Rank 1980
1	Hollis	$761,428,703	7,015	$108,543	1	4
2	Amherst	$997,380,772	10,769	$92,616	2	1
3	Mont Vernon	$146,107,478	2,034	$71,833	9	10
4	Pelham	$776,598,501	10,914	$71,156	11	11
5	Merrimack	$1,765,633,898	25,119	$70,291	3	3
6	Hudson	$1,585,848,845	22,928	$69,166	10	9
7	Lyndeborough	$104,048,079	1,585	$65,645	4	2
8	Nashua	$5,578,503,984	86,605	$64,413	6	7
9	Brookline	$253,617,400	4,181	$60,660	7	8
10	Wilton	$226,312,943	3,743	$60,463	5	5
11	Milford	$785,899,958	13,535	$58,064	8	6
12	Litchfield	$408,738,442	7,360	$55,535	12	12
	NRPC Region	**$13,390,119,003**	**195,788**	**$68,391**		
	State	**$86,703,541,057**	**1,235,786**	**$70,161**		

Source: Equalized Assessed Valuation from NH Department of Revenue Administration, *Annual Report for FY2001*, Appendix II; Population from 2000 US Census.

3. The Impact of Residential Development on the Tax Base

Residential development requires a much higher level of town supported services than other land uses. For example, school related expenditures typically represent over 60% of a town budget in New Hampshire. Commercial and industrial development and open space partially subsidize the services required by residents since residents require more town services such as schools, police and fire protection, libraries and recreational facilities. In addition to allowing for the development of non-residential uses in Hudson, the acquisition of open space is a cost-effective use of the land and can reduce the Town's overall tax burden. A study of six towns in southern New Hampshire (Deerfield, Dover, Exeter, Fremont, Peterborough and Stratham) concluded that open space and commercial development generated more revenue for the towns than it demanded in expenditures (see Figure IV-2). Conversely, residential development resulted in more expenditures than revenue. On average, for each tax dollar of revenue collected, towns spend $1.11 for residential development, 49 cents for commercial development and 57 cents for open space. The report's findings indicate that the acquisition of open space, in addition to the development of nonresidential uses, can not only cover the cost of the services they demand but also contribute towards the cost of services demanded by residential uses.

Figure IV-2. Costs of Community Services by Land Use



Source: American Farmland Trust, Cost of Community Services Study of the Towns of Deerfield, Dover, Exeter, Fremont, Peterborough and Stratham, 1997.

4. Existing Commercial and Industrial Uses

Table IV-10 shows each commercial and industrial use in Hudson and the contribution of each use to the tax base (assessed value). Industrial uses contribute the most to Hudson's tax base compared with other non-residential uses, comprising 38% of the total non-residential assessed value. Table IV-10 also shows the assessed value *per acre* for each non-residential use. The average assessed value per acre for commercial property in Hudson is $167,200 per acre. The average assessed value per acre for industrial property in Hudson is $283,900 per acre.

A high assessed value per acre indicates that the use contributes more to the local tax base per area of land than other uses. The three *generalized* land uses with the highest assessed value per acre are miscellaneous commercial uses, office uses and private school/childcare uses. *Specific* uses with the highest assessed value per acre include gas line rights-of-way, nursing homes, restaurants/bars, carwashes, auto parts stores and banks. Specific developed uses with the lowest assessed value per acre include sand/gravel plants and quarries, fish/game clubs, golf courses, discount stores and parking lots, all of which require large areas of land. Land uses that require large areas of land for private open space or parking generally have a lower assessed value per acre.

Table IV-10. Assessed Value for Commercial and Industrial Uses, 2003

Land Use	Quantity (parcels)	Total Assessed Value	Total Acreage	Assessed Value per Acre
Auto-Related	46	$19,299,000	81.9	$235,700
Institutional	4	$1,622,600	5.6	$289,200
Lodging	3	$5,816,000	5.6	$1,045,700
Office	60	$41,483,500	78.2	$530,200
Recreation	5	$5,723,100	516.6	$11,100
Retail	45	$60,785,700	139.4	$436,100
Storage	28	$16,528,500	77.4	$213,600
Total Commercial	**191**	**$151,258,400**	**904.7**	**$167,200**
Non-Utility Industrial	96	$180,411,200	564.7	$319,500
Utility/Communications	57	$57,292,600	272.6	$210,200
Total Industrial	**153**	**237,703,800**	**837**	**$283,900**

Source: Data compiled by NRPC from Hudson Assessor's Office records, August 2003.
Note: Totals for commercial and industrial parcels and acreage may differ from other tables because land used for exempt uses, roads, and waterbodies is excluded or the source data is different.

5. Future Commercial and Industrial Development

Tables IV-11 and IV-12 list all of the undeveloped commercial and industrial property in Hudson, respectively. It is important to note that commercial and industrial uses are permitted in the G-1 and General zoning districts, but limited public water and sewer facilities, challenging topography and poor access limit the demand for non-residential uses in these districts. There were a total of 82 acres of undeveloped commercial property in September 2003. Of significance is that all of these parcels are less than eleven acres in size, with most of them being around one acre. There were a total of 216 acres of undeveloped property in the Industrial Zoning District. All except five parcels are less than thirteen acres in size, with most of them being around five acres. There was one remaining undeveloped 35-acre parcel on West Road.

Table IV-11. Undeveloped Commercial Property in Hudson, September 2003

Address	Acres	Assessed Value	Type
11 Alpine Ave	0.4	$43,300	Commercial
19 Alpine Ave	0.2	$23,200	Commercial
4 Atwood Ave	0.3	$47,300	Commercial
14 Atwood Ave	1.1	$5,000	Commercial
1 Candy Lane	1.2	$150,400	Commercial
5 Candy Lane	1.3	$159,300	Commercial
7 Candy Lane	1.7	$213,900	Commercial
8 Candy Lane	5.7	$256,600	Commercial
255 Central St	2.0	$132,700	Commercial
226 Central St	0.4	$133,600	Commercial
200 Central St	0.7	$2,000	Commercial
197 Central St	1.5	$52,400	Commercial
10 Christine Dr	1.8	$137,100	Commercial
14 Christine Dr	1.4	$128,900	Commercial
1 Cliff Ave	0.1	$1,000	Commercial
345 Derry Rd	1.2	$128,300	Commercial
148 Ferry St	0.1	$8,700	Commercial
163 Ferry St	0.2	$3,200	Commercial
133 Ferry St	0.7	$12,600	Commercial
3 Flagstone Dr	0.8	$123,200	Commercial
Gambia St	0.3	$500	Commercial
Gambia St	0.3	$500	Commercial
13 Hill St	0.2	$55,400	Commercial
2 Iris Path	0.1	$4,300	Commercial
Lakeside St	0.1	$4,700	Commercial
Lakeside St	0.1	$3,500	Commercial
Lakeside St	0.0	$2,900	Commercial
Lakeside St	0.0	$2,000	Commercial
Lakeside St	0.2	$12,300	Commercial
Lakeside St	0.1	$10,700	Commercial
Lakeside St	0.0	$2,200	Commercial
Lakeside St	0.1	$11,900	Commercial
68 Lowell Rd	0.2	$115,000	Commercial
142 Lowell Rd	9.1	$605,000	Commercial
256 Lowell Rd	6.4	$1,932,500	Commercial
11 Melendy Rd	0.7	$102,500	Commercial
1 Rebel Rd	1.4	$127,900	Commercial
6 Ridge Ave	0.3	$1,300	Commercial
206 Robinson Rd	6.7	$197	Commercial
27 Roosevelt Ave	0.8	$45,000	Commercial
5 State St	0.6	$1,500	Commercial
5 Tracy Lane	0.1	$87,200	Commercial
3 Tracy Lane	0.1	$23,000	Commercial
1 Tracy Lane	0.8	$22,800	Commercial
6 Tracy Lane	1.5	$139,100	Commercial
8 Tracy Lane	1.2	$115,000	Commercial
10 Tracy Lane	1.2	$116,200	Commercial
4 Water Lily Path	0.1	$2,800	Commercial
108 Webster St	0.1	$7,600	Commercial
94 Webster St	0.2	$2,800	Commercial

24 Webster St	0.6	$3,500	Commercial
29 West Rd	9.0	$307,400	Commercial
19 West Rd	10.7	$295,200	Commercial
69 Windham Rd	1.4	$300	Commercial
55 Windham Rd	4.1	$2,800	Commercial
17 Windham Rd	0.5	$71,400	Commercial
15 Windham Rd	0.1	$9,600	Commercial
Total Commercial	**82.0**	**$6,011,197**	

Source: Assessment and Land Use Classification information from Hudson Assessor's Office. All data were collected during 2003.

Table IV-12. Undeveloped Industrial Property in Hudson, September 2003

Address	Acres	Assessed Value	Type
Flagstone Drive	0.4	$148,700	Industrial
4 Executive Driver	5.2	$7,700	Industrial
Friars Drive	12.3	$189,864	Industrial
126 Derry Rd	5.9	$454	Industrial
12 Constitution Drive	2.2	$181,600	Industrial
16 Constitution Drive	2.2	$180,900	Industrial
20 Constitution Drive	2.4	$181,600	Industrial
24 Constitution Drive	2.3	$183,800	Industrial
30 Constitution Drive	3.9	$182,900	Industrial
33 Constitution Drive	3.6	$181,900	Industrial
29 Constitution Drive	2.6	$199,200	Industrial
25 Constitution Drive	4.4	$228,500	Industrial
19 Constitution Drive	2.5	$168,500	Industrial
15 Constitution Drive	2.1	$193,100	Industrial
7 Clement Rd	2.7	$203,700	Industrial
5 Clement Rd	6.9	$85,900	Industrial
8 Wall St	4.4	$430	Industrial
297 Central St	1.4	$381,000	Industrial
7 Hudson Park Drive	6.2	$2,700	Industrial
4 Hudson Park Drive	1.7	$682,800	Industrial
1 Hudson Park Drive	4.5	$110,400	Industrial
353 Central Street	1.1	$171,100	Industrial
347 Central Street	14.0	$196,900	Industrial
3 Sullivan Rd	35.4	$12,700	Industrial
298 Derry Rd	33.7	$198,958	Industrial
300 Derry Rd	15.6	$750	Industrial
22 West Rd	36.1	$12,877	Industrial
43 Sagamore Park Rd	0.4	$164,500	Industrial
Total Industrial	**216.1**	**$4,453,433**	

Source: Assessment and Land Use Classification information from Hudson Assessor's Office; collected during 2003.

Table IV-13 shows recent commercial and industrial transactions in Hudson. Several major transactions during 2002 and 2003 suggest that there is continued interest in commercial and industrial real estate in Hudson. That interest and the small amount of remaining developable commercial and industrial land in Hudson suggests that an examination of existing zoning districts may be necessary to determine if there is enough non-residential land to meet future growth demands. Options may be to rezone certain areas for commercial, industrial or mixed uses, or consider incentives to redevelopment of existing, developed non-residential property.

Table IV-13. Commercial and Industrial Transactions in Hudson, January 2001 - July 2003

Location	Sale Price	Assessed Value	Description
83 River Road	$30,000	$326,400	Conv Market
99 River Road	$90,000	$162,500	Store
257 Lowell Road	$1,600,000	$1,140,900	Bank
25 Sagamore Park Road	$4,500,000	$4,030,100	R & D
25 Sagamore Park Road	$3,700,000	$4,030,100	R & D
29 Flagstone Drive	$4,937,000	$2,300,300	Industrial
14 River Road	$187,900	$177,100	Repair Garage
193 Lowell Road	$1,400,000	$1,178,000	Auto Dealership
2 Wentworth Drive	$1,200,000	$1,139,100	Light Industrial
27 Executive Drive	$1,000,000	$1,088,600	Industrial
23 Executive Drive	$250,000	$314,800	Industrial
14 Flagstone Drive	$1,225,000	$1,006,700	Light Industrial
21 Flagstone Drive	$1,150,000	$1,477,100	Light Industrial
2 - 4 Hampshire Drive	$285,000	$1,016,000	Light Industrial
185 Lowell Road	$565,000	$573,300	Gar/Office/Shop
134 Lowell Road	$465,000	$501,800	
5 Pelham Road	$1,100,000	$495,300	Repair Garage
230 Central Street	$900,000	$1,186,200	Conv Market
230 Central Street	$1,850,000	$1,186,200	Conv Market
8 Kimball Hill Road	$125,000	$121,800	Store
2 Hudson Park Drive	$159,000	$159,500	Repair Garage
21 Park Avenue	$650,000	$753,500	Light Industrial
13 Park Avenue	$850,000	$966,600	Light Industrial
14 Clement Road	$805,000	$628,700	Warehouse
8 Christine Drive	$180,000	$177,800	Light Industrial
209 Robinson Road	$275,000	$255,200	Ranch
11 Tracy Lane	$340,000	$363,900	Shop/Ctr-Nbh
329 Derry Road	$490,000	$235,800	R/M Shop
327 Derry Road	$510,000	$560,400	Vet Clinic
11 Rebel Road	$307,000	$585,300	Gar/Office/Shop
11 Rebel Road	$414,000	$585,300	Gar/Office/Shop
99 Lowell Road Unit 2	$335,000	$73,200	Condo-Office
99 Lowell Road Unit 3	$335,000	$70,800	Condo-Office
99 Lowell Road Unit 4	$335,000	$100,400	Condo-Office
99 Lowell Road Unit 5	$335,000	$55,300	Condo-Office
99 Lowell Road Unit 6	$335,000	$63,100	Condo-Office
68 Lowell Road	$32,000	$152,200	
7 Lowell Road	$110,000	$25,700	
5 Lowell Road	$110,000	$86,500	Store
57 Lowell Road	$85,000	$176,200	Store
2 Winnhaven Drive	$210,700	$411,000	Office
42 Lowell Road	$424,800	$458,800	Auto Dealership
3 Winn Avenue	$175,000	$174,600	Light Industrial
6 Able Street	$330,000	$397,200	Warehouse
15 Derry Street	$325,000	$334,500	Store
38 Ferry Street	$200,000	$185,700	Repair Garage
Ferry Street	$415,000	$434,400	Car Wash
71 Ferry Street	$448,000	$340,200	Multi-Conver
7 George Street	$114,000	$155,000	Office
182 Central Street	$250,000	$277,600	Office
86 Derry Street	$775,000	$564,100	Fast Food

Source: Hudson Assessor's Office, September 2003.

E. RECOMMENDATIONS

Hudson is well situated for continued economic growth because of its proximity to centers of commerce in the Merrimack Valley and northern Massachusetts, its convenient access to existing and planned highway, rail and air transportation infrastructure and continued interest in non-residential real estate. Challenges to economic growth include limited amounts of undeveloped land zoned exclusively for commercial and industrial development, limited public water and sewer facilities and a need to preserve the tax base while planning for residential growth. Based on the existing economic conditions in Hudson, there are a number of strategies that the Town can pursue in order to sustain and enhance economic growth for the foreseeable future. The key to sustained economic growth in Hudson is to: 1) support proposed transportation infrastructure projects; 2) retain and attract a diverse, high wage employment base; 3) focus on non-residential development that contributes significantly to the tax base; and 4) pursue the acquisition of undeveloped residential land for open space in order to reduce the tax burden.

- One of Hudson's strengths is its location near major existing and proposed transportation infrastructure. This infrastructure allows for easy access to Hudson's industrial and commercial base, as well as access to surrounding industrial and commercial centers of Nashua, Manchester and the Boston metropolitan area. The Town should therefore support enhanced road and rail transportation links in the Boston-Nashua-Manchester corridor in order to ensure convenient access to jobs and business services in Hudson. These include the extension of commuter rail to Nashua and the construction of the Airport Access Road and the Circumferential Highway.
- It is important to guard against economic fluctuations that can cause job losses. While the Town cannot control general economic forces and trends, it should promote the development of a diverse economic base. A diverse business and industrial base can help prevent economic downturns affecting certain sectors of the economy from having a disproportionate impact on the Town's overall economic health. Therefore, the Town should focus on attracting and retaining a diversity of high wage jobs in the Finance, Insurance, Real Estate (FIRE), wholesale trade and manufacturing sectors.
- In order to maintain and improve Hudson's tax base, the Town should focus on attracting and maintaining those non-residential uses that tend to have the highest assessed value. These include commercial development such as nursing homes, lodging, hardware stores, restaurants/bars, offices and banks, most industrial uses and utilities. Development to be avoided except to serve community needs include discount stores and sand and gravel operations. Office and light industrial uses appear to have the highest combined value since they are the most likely to result in the creation of high paying jobs in the FIRE and manufacturing sector, tend to represent a diversity of businesses and industries and tend to have relatively low land use impacts. Other uses, such as lodging, retail and bar/restaurant uses also tend to have a high tax value and can support industry, but typically generate lower paying jobs.
- Another strategy for maintaining and improving Hudson's tax base is to keep undeveloped residentially zoned land as open space. Studies show that open land generates more revenue for towns than it demands in expenditures. Therefore the Town should continue to pursue the acquisition of open space, or the purchase of development rights on this open space, in areas under residential development pressure.; however, care should be taken to ensure that adequate land remains available for non-residential development and/or redevelopment.

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CHAPTER V

TRANSPORTATION

A. INTRODUCTION

The inter-relationship between land use and transportation is an integral element in the spatial layout and growth of a community. The dominant use of the automobile has contributed to the transformation of the character of Hudson from rural to suburban over the past thirty years. The rise in motor vehicle use has enabled residents to commute longer distances, businesses to improve services for their customer base, and communities to broaden their tax bases through economic growth. The rise in motor vehicle use has also created traffic congestion problems, especially along major highway corridors. The situation is unlikely to change in the near future. The key to preserving and enhancing Hudson's transportation network is to ensure that roadway capacity and regional connections are enhanced and maintained and that incremental improvements to the alternative transportation network involving transit, sidewalks and bicycle routes, are implemented.

The purpose of the Transportation Chapter of the Master Plan is to develop strategies for an efficient and safe transportation system that will preserve the community's character, accommodate growth, and increase the availability of alternative transportation choices. This chapter includes a discussion of: 1) the existing transportation network, including the roadway classification system, existing traffic conditions, highway capacity, accidents, bridge conditions and travel patterns; 2) future traffic projections; 3) transportation solutions, including regulations, access management, community character guidelines, traffic calming and scenic road designation; 4) alternative transportation, including transit, bicycle and pedestrian facilities; and 5) recommendations.

B. EXISTING TRANSPORTATION NETWORK

1. Roadway Classification

Based on the New Hampshire Department of Transportation (NH DOT) road mileage inventory, there are 143.9 miles of roads in the Town of Hudson. The State of New Hampshire classifies roadways in two ways. The first is by a state funding category (the State Aid classification system) and the second is by federal funding category (the Functional classification system). The State Aid classification system was developed by the State of New Hampshire, as defined by RSA 229–231, to determine responsibility for construction, reconstruction and maintenance as well as eligibility for use of state aid funds. Descriptions of the State Aid classification system are included in Appendix V-1. The State Aid classification road mileage in Hudson is summarized in Table V-1 and illustrated on Map V-1.

Table V-1. State Aid Classification Road Mileage

State Class	Road Mileage	Percent of Total
Class I Primary State Highway	5.056	3.5 %
Class II Secondary State Highway	18.055	12.5 %
Class III Recreation Roads	0.000	0.0 %
Class IV Compact Section	35.449	24.7 %
Class V Rural Roads Local	82.054	57.0 %
Class VI Un-maintained	3.311	2.3 %
Total	**143.926**	**100.0 %**

Source: NH DOT, 2000.

NH 102 is an Arterial Roadway

The functional classification system was also developed by the State of New Hampshire as required by the Federal Highway Administration (FHWA). The Functional classes were set according to the criteria defined by the FHWA and the American Association of State Highway and Transportation Officials (AASHTO). This system classifies roads and highways into different categories according to their functions and was developed to define eligibility for funds under federal programs. Descriptions of the functional classification system characteristics are included in Appendix V-1. Arterial and Collector roadways in Hudson are listed in Table V-2 and illustrated on Map V-2.

Table V-2. Statewide Roadway Functional Classification*

Functional Classification	Roadways
Urban Other Principal Arterial	NH 111 NH 102 from Library Street to Litchfield Line Sagamore Bridge
Urban Minor Arterial	NH 102 from Litchfield Line to Londonderry NH 3A from NH 102 to Litchfield Line NH 3A from Mass. Line to Library Street Chase Street Dracut Road County Road from NH 3A to Belknap Road Belknap Road Central Street from Chase Street to NH 111
Urban Major Collector	Old Derry Road from NH 102 to Greeley Street Greeley Street Highland Street Kimball Hill Road Library Street Central Street from NH 111 to Chase Street Melendy Road from Central Street to Belknap Road Pelham Road from NH 3A to Burns Hill Road Burns Hill Road from Pelham Road to Wason Road
Local	All others

Source: NH DOT, 2000.

* Other classifications are used for the NH DOT, but do not apply to the Town of Hudson.

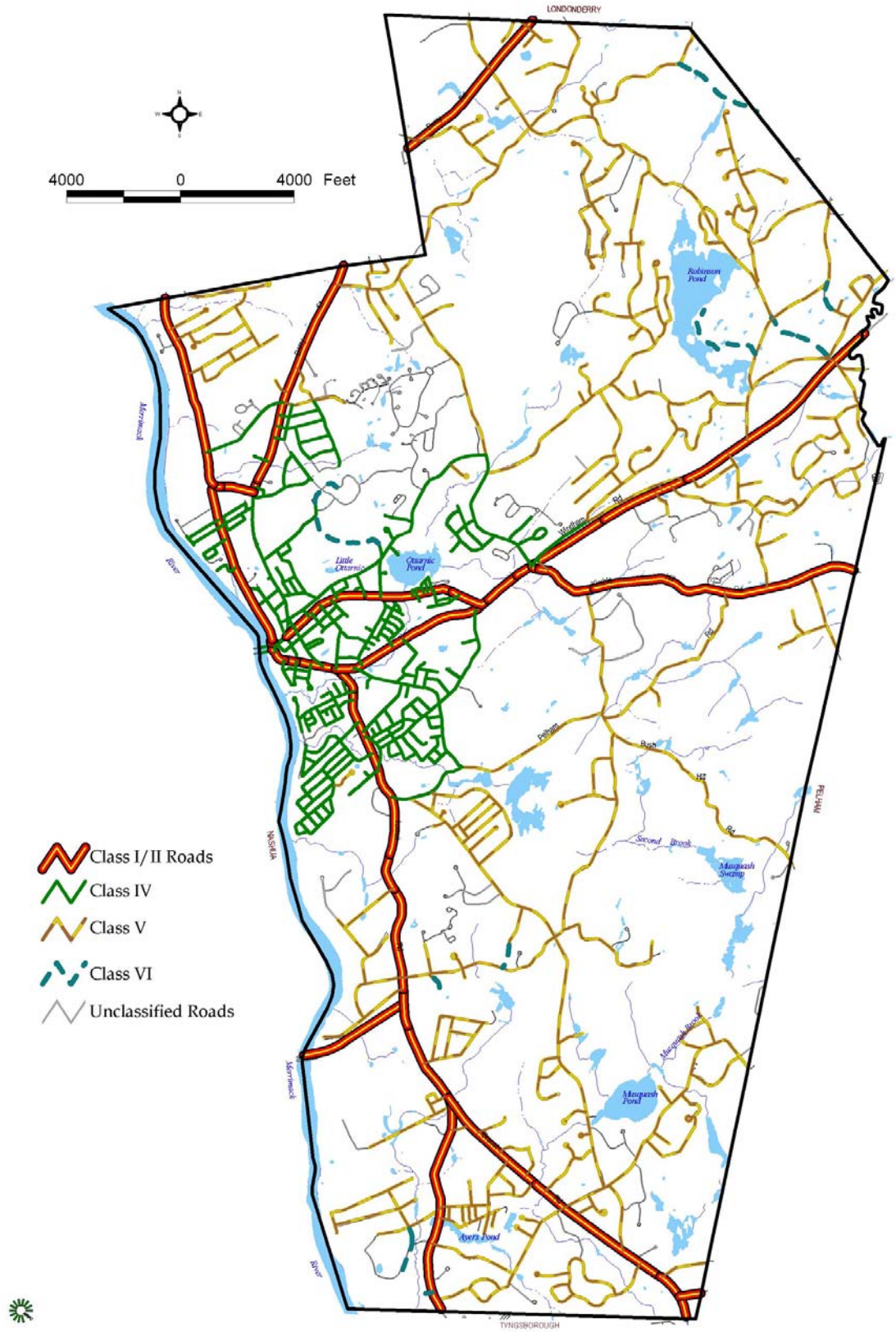
In addition to the statewide roadway classification, the Town of Hudson has adopted its own functional classification scheme within the Town's zoning ordinance for certain roads. Table V-3 summarizes the Town's official functional classification.

Table V-3. Town Designated Roadway Functional Classification

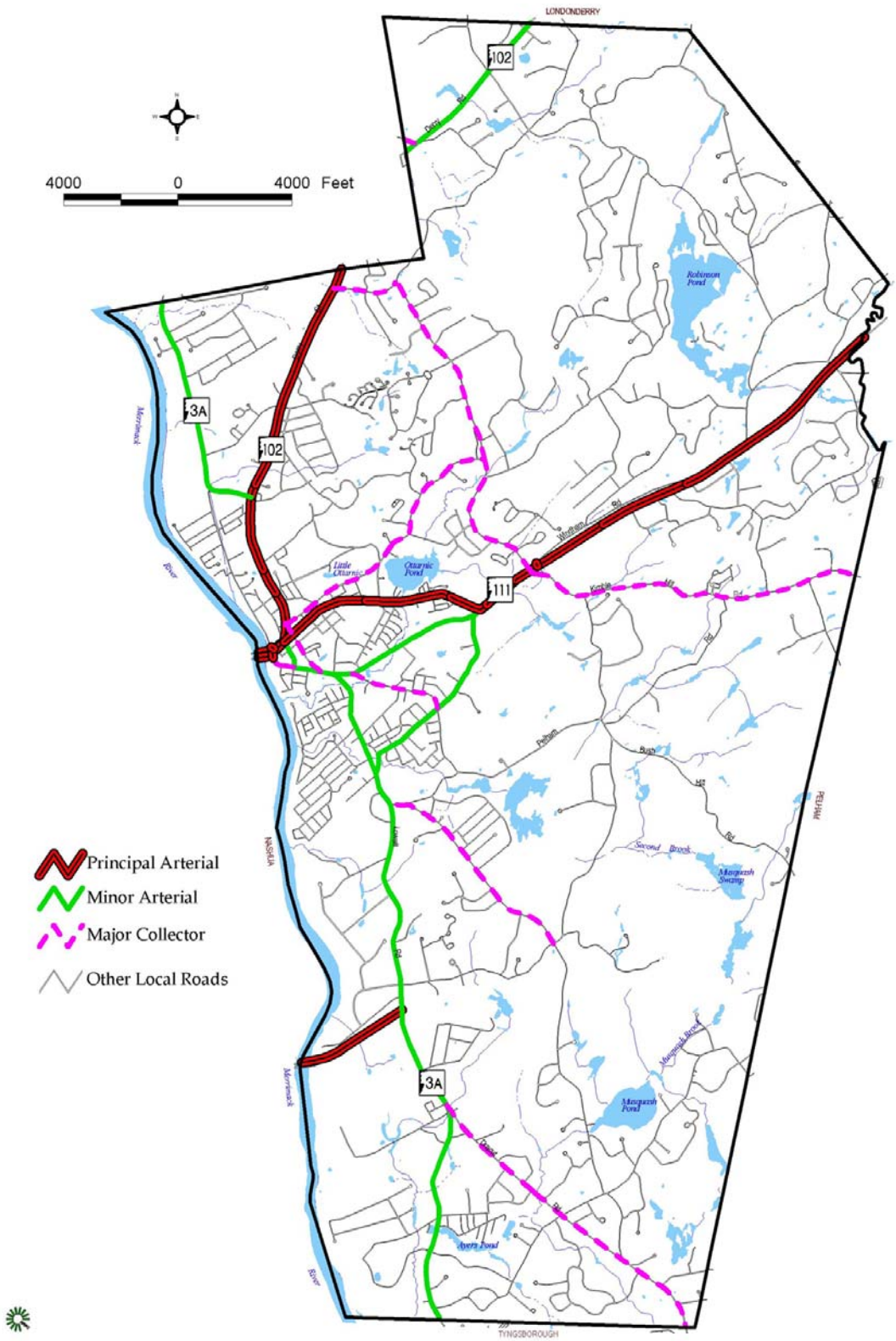
Functional Classification	Roadways
Arterial	1) NH 3A (Elm Street, Lowell Road, Webster Street and River Road). 2) NH 102 (Derry Street) 3) NH 111 (Central Street) 4) Dracut Road
Collector	1) Barretts Hill Road 2) Belknap Road 3) Burns Hill Road 4) Bush Hill Road 5) Greeley Street 6) Highland Street 7) Kimball Hill Road 8) Lawrence Road 9) Musquash Road 10) Old Derry Road 11) Pelham Road 12) Pine Road 13) Robinson Road 14) Wason Road 15) West Road 16) Windham Road

Source: Hudson Zoning Ordinance, 2002.

Map V-1. State Aid Classification of Roadways in Hudson



Map V-2. Statewide Functional Classification of Roadways in Hudson



2. Existing Traffic Conditions

Historic traffic volume data for the Town of Hudson has been compiled from both NH DOT and the Nashua Regional Planning Commission (NRPC). NH DOT collects traffic counts in accordance with federal guidelines under the Federal Highway Performance Monitoring System (HPMS). The HPMS guidelines describe federal procedures for sampling highway and road volumes. These procedures provide the Federal Highway Administration (FHWA) with highway volumes for design standards and meet the Environmental Protection Agency's (EPA) requirements for estimating vehicular highway travel. In addition to NH DOT's annual traffic counting program, NRPC maintains an ongoing traffic count program to validate the region's traffic model. NRPC also provides traffic counts for member communities upon request. Historic traffic trends for Hudson are shown in Appendix V-2. Map V-3 illustrates the Average Annual Daily Traffic (AADT) for roads of higher functional classification in Hudson. Table V-4 shows the AADT for key Hudson roads, based on NH DOT's HPMS archives.

The Taylor's Falls/Veterans Bridge and the Sagamore Bridge (also called the Circumferential Highway) both carry the heaviest traffic volumes in a 24-hour period. In 2001, the Taylor's Falls Bridge averaged 35,600 vehicles per day (vpd) and the Sagamore Bridge averaged 35,400 vpd. NH 3A, at a location north of the Sagamore Bridge and south of Wason Road, had the third highest AADT at 32,000 vpd in 2001. The AADT on NH 3A varies from a low of 8,900 vpd at the Massachusetts State Line to 32,000 vpd just north of the Sagamore Bridge. The AADT on NH 3A is generally at a level of just above 20,000 vpd. The AADT on NH 102 ranges between 15,000 to 17,000 vpd while traffic on NH 111 ranges in the 14,000 to 15,000 vpd range.

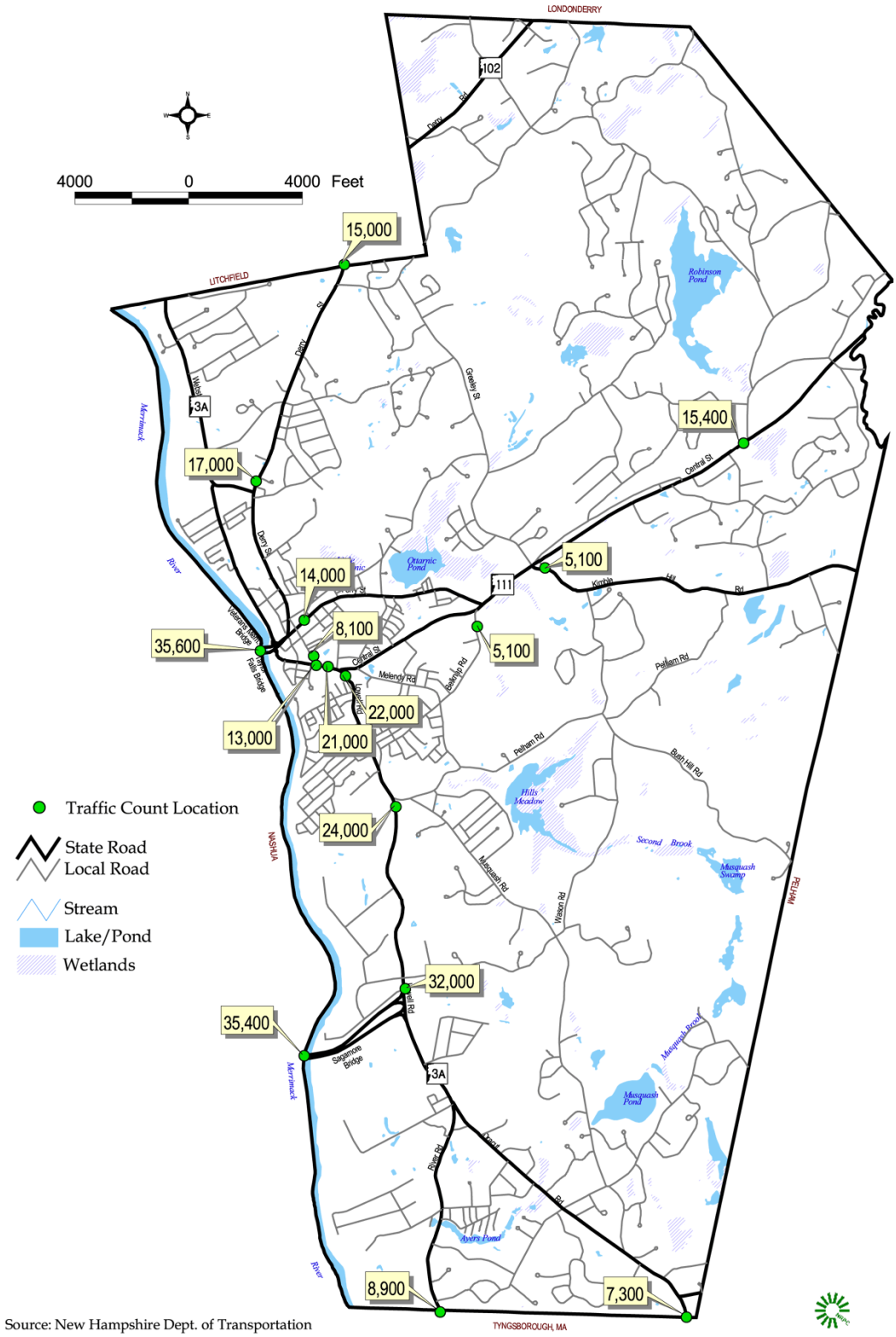
Table V-4. Average Annual Daily Traffic (AADT), 2001

Road Location	AADT (Vehicles per day)
NH 111 at Taylor's Falls/Veterans Bridge	35,600
Sagamore Bridge (Circumferential Highway) across the Merrimack River	35,400
NH 102 at Litchfield Town Line	15,000
NH 102 north of Elm Avenue (NH 3A)	17,000
NH 3A east of Library Street	21,000
NH 3A (Lowell Road) south of Central Street	22,000
NH 3A south of Burns Hill Road (north of Wason Road)	24,000
NH 3A (Lowell Road) north of the Sagamore Bridge	32,000
NH 3A south of Sagamore Bridge	22,000
NH 3A at Massachusetts State Line	8,900
Dracut Road at the Massachusetts State Line	7,300
NH 111 east of Library Street	14,000
NH 111 west of Park Avenue	15,400
Library Street	8,100
Kimball Hill Road south of NH 111	5,100
Central Street west of Library Street	13,000
Belknap Road south of Central Street	5,100

Source: NH DOT, 2001.

Historic traffic count trends show that traffic on many local and collector roads increased substantially due to residential growth. The traffic on Highland Street (north of George Street) grew from 2,112 vpd in 1984 to 4,068 vpd in 1999 (see Appendix V-2). Other local roads with collector functions for residential areas such as Kimball Hill Road, Wason Road and Greeley Street also showed marked increases in traffic. Kimball Hill Road, at a location just south of NH 111, grew from 4,931 vpd in 1990 to 6,001 vpd in 2001. Wason Road, at a location just east of NH 3A, shows an increase from 1,928 vpd in 1983 to 8,547 vpd in 2000. Greeley Street, at a location just south of Highland Street, increased from 2,524 vpd to 5,944 vpd in 2000.

Map V-3. Average Daily Traffic on Hudson Roads



Source: New Hampshire Dept. of Transportation

a. Hudson-Litchfield Traffic Study, 2002

At the request of the Towns of Hudson and Litchfield, a traffic study was completed to determine future impacts of the Circumferential Highway on traffic operations at various essential intersections within the local road network. The *Hudson-Litchfield Traffic Study, 2002* was funded through a grant from the NH DOT. The engineering consultant firm of Vollmer Associates was retained under contract to provide analysis in the evaluation of existing and future traffic conditions at those intersections. The main purpose of the study was to evaluate traffic conditions over a twenty-year horizon and to consider improvements needed as a result of the impacts of the Circumferential Highway and the Airport Access Road in Manchester. The study identified specific needed improvements at the study area intersections. Table V-5 summarizes the recommended improvements included in the Hudson Litchfield Traffic Study. Conceptual designs of these improvements from the study are provided in the *Hudson-Litchfield Traffic Study Final Report*, dated March 31, 2003.

Table V-5. Recommended Intersection Improvements in Hudson

Intersection Location	Recommended Improvements
NH 102/Robinson Road	Install traffic signals, add left turn lanes from NH 102 eastbound and westbound to side streets, add truck climbing lane to NH 102. Widen the West Road approach and add a right turn only lane.
NH 111/Chase Street	Add an additional left turn lane on the Chase Street northbound approach. Add sidewalk along the east side of Chase Street.
Central Street/Library Street	Install traffic signals, add right turn only lane to southbound approach, and add right turn only lane to Central Street westbound approach.
NH 3A (Lowell Road)/Central Street	Add an eastbound through lane on Central Street. Widen NH 3A and add a sidewalk to the west side of NH 3A.
NH 3A/County Road (south)	Install a traffic signal and add a northbound right turn lane on NH 3A. Add a traffic island on the northbound approach to channelize traffic. Add a left turn storage lane on the NH 3A southbound approach.
NH 3A/Wason Road	Add an exclusive left turn lane on the Wason Road westbound approach.
Belknap Road/County Road	Three alternative scenarios for improvements at this intersection; 1) Install a traffic signal at Belknap/County Road and NH 3A/County Road, *or* 2) Install a roundabout at Belknap/County Road and a signal at NH 3A/County Road, *or* 3) Extend Belknap Road to the Birch Street/NH 3A intersection to create a four-way, stop sign at intersection of Belknap and County Road. The NH 3A/Birch Street intersection should also be expanded to a four-way intersection with Belknap Road making up the eastbound approach. This third solution would eliminate the need for a traffic signal at the NH 3A/County Road (south) intersection.
NH 111/Greeley Street/Kimball Hill Road	Add an additional left turn storage lane on the NH 111 eastbound approach. Widen Greeley Street to accomodate the traffic from two left turn lanes from the NH 111 eastbound approach. Add a left turn lane to the Greeley Street southbound approach. Widen NH 111 through the intersection and add sidewalks to the north and south sides of NH 111. Add a pedestrian island and crosswalk across the eastbound approach of NH 111. Add a left turn lane on the Kimball Hill Road northbound approach.

Source: Vollmer Associates, *Hudson-Litchfield Traffic Study, 2002.*

b. New Hampshire State Transportation Improvement Program (STIP) in Hudson

i. NH 3A and NH 102 Widening

The New Hampshire State Transportation Improvement Program (STIP) includes a number of widening and improvement projects for the NH 3A and NH 102 corridor in Hudson. These projects are presently under various stages of construction and are summarized in Table V-6.

Table V-6. NH 3A and NH 102 Corridor Improvements

Location	Improvements
NH 102	Reconstruct NH 102 from Highland Street to McDonalds, including extending sidewalks on both sides of the road
NH 3A	Reconstruct 2,000 feet of NH 3A from Rena Street to Dracut Road
NH 3A	Construct sidewalks on NH 3A from Birch Street to Central Street
NH 3A	Reconstruct and widen 4,100 feet of NH 3A from Wason Road to Executive Drive

The STIP also currently includes projects underway for improvements at the NH 102/Robinson Road intersection (this project has been fast-tracked utilizing private developer funds) and the NH 3A/Wason Road intersection. Private developer funds have also been utilized for the Wason Road/NH 3A intersection improvements.

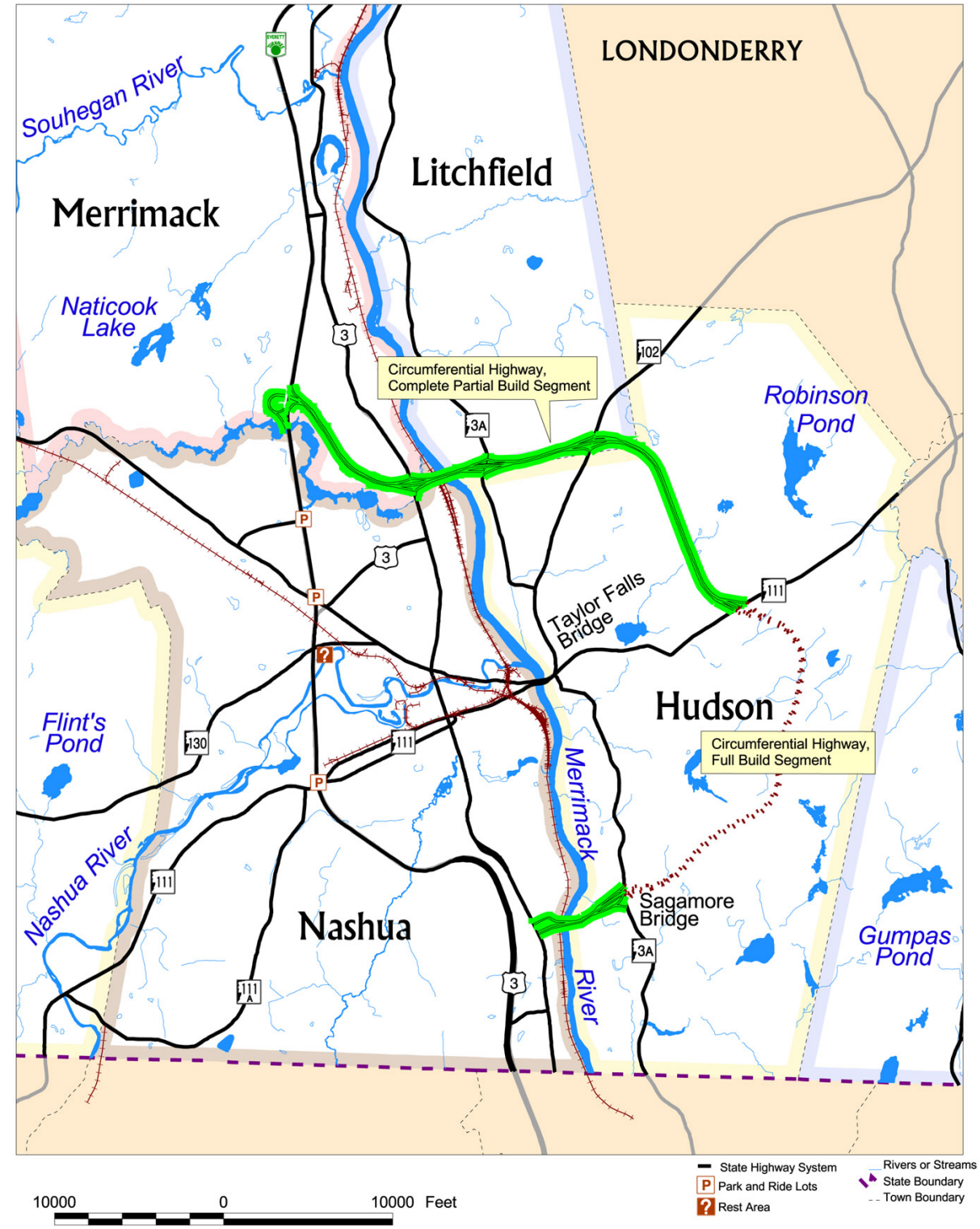
ii. Circumferential Highway

The Circumferential Highway was originally proposed to be a loop road extending around the south, east, and north sides of Hudson. The purpose of the project was to provide transportation improvements to assist east-west traffic movements across the Merrimack River. New crossings over the Merrimack River would reduce congestion on existing bridges and streets in and near the center of Hudson and in downtown Nashua. The project was proposed to have interchanges at NH 3A, NH 111 and NH 102 in Hudson. The project was to be funded solely through toll revenues from the New Hampshire turnpike system.

During the early 1990's NH DOT produced a draft Environmental Impact Statement (EIS) for the proposed project. Prior to completion of the EIS process the Environmental Protection Agency (EPA) filed a letter of intent to veto the highway. EPA cited concerns over the segmentation of wildlife habitat between NH 3A and NH 111 in Hudson that could result from the construction of the southern segment. NH DOT, after consultation with the EPA, revised the project and is now conducting a supplemental EIS for the Northern Segment Partial-Build. The Northern Segment involves the construction of a limited access, four-lane highway beginning from NH 111 in Hudson circling northerly then westerly just north of the Hudson town line in Litchfield, across the Merrimack River to a new Exit 9 on the F.E. Everett Turnpike in Merrimack. Map V-4 illustrates the Northern Segment Partial-Build of the Circumferential Highway. The Supplemental Environmental Impact Statement is expected to be completed in 2003.

If the project completes the EIS process and the required permitting processes, the Northern Segment Partial Build project will be constructed in three phases. NH DOT is committed to completing the entire Northern Segment from NH 111 in Hudson to the F.E. Everett Turnpike in Merrimack in the State's Ten Year Transportation Plan.

Map V-4. Circumferential Highway in Hudson



3. Accidents

Accidents for the Town's roads are compiled by the NH DOT based on local police reports. Table V-7 is based on NH DOT's accident database for the latest three years of available data (1999 - 2001).

As shown in Table V-7 the NH 111/NH 102/Derry-Chase Street intersection experienced the most accidents in the three-year period with 43 accidents. Twenty-nine of these accidents involved property damage only and 14 involved personal injuries. The NH 111/Library Street intersection and the NH 3A/Sagamore Bridge Road intersection both experienced the second highest number of accidents in the three-year period with 24 each. Other high accident intersections in Hudson include NH 102/Elm Ave (22 accidents), NH 111/Greeley/Kimball Hill Road (22 accidents), NH 3A/Birch Street (23 accidents), NH 3A/Wason Road (20 accidents), and Central Street/Library Street (22 accidents). Table V-7 also shows intersections on an accident rate basis using accidents per million entering vehicles in order to rate the accident exposure for locations. The intersections of Central Street/Library Street, Central Street/Chase Street, and NH 111/NH 102/Chase Street have the highest accident rates. These intersections have accident rates over 1.0 accident per million entering vehicles.

Table V-7. Three Year Accident Summary (1999-2001)

Intersection	Average Daily Traffic (vpd)	Million Vehicles Entering per Year	Total Property Damage Only	Total Personal Injury	Three Year Total	Accidents Per Million Entering Vehicles Per Year
Central Street/Library Street	14,000	5.11	13	9	22	1.44
Central Street/Chase Street	12,000	4.38	8	6	14	1.07
NH 111/NH 102, Derry-Chase	38,000	13.87	29	14	43	1.03
NH 102/West Road/Robinson Road	16,000	5.84	7	8	15	0.86
NH 111/Library Street	25,900	9.45	16	8	24	0.85
NH 3A/Birch Street	30,000	10.95	18	5	23	0.70
NH 111/Greeley/Kimball Hill Road	33,000	12.05	13	9	22	0.61
Library Street/School Street	10,800	3.94	5	2	7	0.59
NH 102/Elm Avenue	36,400	13.29	15	7	22	0.55
NH 3A/Wason Road	34,000	12.41	17	3	20	0.54
NH 3A/Central Street	31,500	11.50	14	3	17	0.49
NH 3A/County Road. S. intersection	31,400	11.46	13	4	17	0.49
NH 3A/Executive Drive	32,000	11.68	14	3	17	0.49
NH 3A/Sagamore Bridge Road	48,600	17.74	16	8	24	0.45
NH 102/Page Road	20,000	7.30	4	5	9	0.41
NH 3A/Flagstone Drive	32,000	11.68	10	3	13	0.37
NH 102/Library/ Highland Street	31,100	11.35	8	4	12	0.35
NH 3A/Pelham Road	29,000	10.59	8	2	10	0.31
Chase Street/School Street	12,000	4.38	4	0	4	0.30
NH 3A/Dracut Road	32,900	12.01	3	0	3	0.08

Source: NH DOT

The Town should consider further detailed studies for the highest accident rate intersections in order to develop improvements and strategies to reduce accidents. The Town of Hudson Highway Safety Committee should consider requesting that the NH DOT perform safety studies for the highest accident rate intersections. The studies should include collision diagrams and an analysis of the physical road features and traffic control, road conditions at the time of the accidents (latest three years), the severity of the accidents, and a summary tabulation of accidents. Any further detailed accident studies should include input from the public and include the following six steps:

1. Identify the locations that are candidates for improvements.
2. Quantify the main crash trend(s) at a particular location.
3. Determine the source of the problem(s).
4. Evaluate types of improvements to address the crash problem(s).
5. Obtain an expert opinion about safety improvement(s).
6. Obtain funding to implement a safety improvement.

4. Bridge Conditions

NH DOT inspects locally-owned bridges as well as state-owned bridges. NH DOT defines a bridge as a structure with a span of at least 10 feet. Inspection and maintenance of culverts and other structures that do not meet this 10-foot span definition on local roads are the responsibility of the town (NH RSA 234). NH DOT inspects bridges on Class IV and V roads (local roads) every two years and the records of these inspections must be kept by the town. The state inspections are a prerequisite for a town's participation in the State Bridge Aid program.

The municipality bears the responsibility for the installation of signs for posting load restrictions on local bridges, although the NH DOT recommends these load restrictions after inspection. The Town should develop routine inspection and maintenance for culverts and other structures on local roads that are not inspected or maintained by the state.

The State of New Hampshire lists ten bridges in the Town of Hudson that are regularly inspected and rated by the NH DOT. The “Structurally Deficient” rating for a bridge denotes that there are deficiencies in the bridge structure and a load restriction is recommended, or repairs for those bridges that need significant maintenance. The “Functionally Obsolete” rating refers to the bridge’s capacity for traffic operations in relation to the function of the approach road. NH DOT does not list any bridges in Hudson as “Structurally Deficient.” The NH DOT lists two bridges (Taylor's Falls/Veterans Bridge over the Merrimack River, both owned by the State) as “Functionally Obsolete.” The "Functionally Obsolete" status for the Taylor's Falls/Veterans Bridge refers to the fact that these bridges are not wide enough to provide the capacity needed to avoid traffic congestion based on the traffic demand at this location.

In addition to inspecting and rating bridges for weight restrictions, NH DOT publishes a list of bridges statewide that are included on its “red list.” NH DOT defines “red list” bridges as those bridges “…requiring interim inspections due to known deficiencies, poor conditions, weight restrictions, or type of construction. These structures are inspected twice yearly.” No bridges in Hudson are included on the “red list.” The NH DOT lists one bridge in Hudson in its "Bridge Aid Program Status Report" that is programmed for repairs and plans to rehab the County Road Bridge over Second Brook in 2006. The total cost of the project is estimated at $160,000. The State will provide 80% of funding for the cost and the Town will be responsible for 20% of the cost.

5. Travel Patterns

Information on commuting is available from the 2000 US Census and is shown in Tables V-8 and V-9, as compared to the 1990 Census. 87.7% of Hudson's workers commuted by single occupant vehicle in 2000, significantly higher than the national average of 75%. This also represents an increase of 5.1% over 1990. The mean travel time to work in 2000 was 27.6 minutes, which is slightly higher than the national average of 25.5 minutes and an increase of 3 minutes over 1990. The trends in commuting patterns show that Hudson commuters are traveling longer distances to work each year with increased dependence on the automobile. These trends contribute to the overall congestion on the local and regional road networks.

The Town should encourage alternative modes to single occupancy auto use to help decrease traffic congestion and provide greater choices for Hudson commuters. The Town should work with the NRPC and the NH DOT to plan for and promote alternative modes of transportation. Programs should include efforts to increase commuter participation in existing region-wide carpooling and vanpooling programs, commuter bus lines and commuter rail. In addition, the Town should work with the NRPC and the Nashua Transit System in extending the existing bus routes from Nashua to Hudson to provide for an alternative mode for commuting within the Nashua region. The Town should also support the NH DOT's region-wide effort to extend the commuter rail line from Boston and Lowell to Nashua. The commuter rail site chosen by the NH DOT on Daniel Webster Highway in South Nashua is just south of the Sagamore Bridge offering a short driving distance for most Hudson commuters. In addition to working and coordinating the alternative transportation effort with government agencies, the Town should also explore the option of working directly with large employers in the Town to coordinate the alternative modes initiative. Large employers have the single greatest impact on traffic in the Town and reduction in work trips to those locations will result in the greatest possible reduction in traffic.

Table V-8. Means of Transportation to Work, 1990 and 2000 (Workers 16 years and over)

Means of Transportation	1990 Census		2000 Census	
	Number	Percentage	Number	Percentage
Drove alone	9,025	82.6%	11,107	87.7%
Carpooled	1,344	12.3%	967	7.6%
Public transportation (incl. taxi)	42	0.4%	44	0.3%
Bicycle or walked	162	1.5%	109	0.9%
Motorcycle or other means	81	0.7%	52	0.4%
Worked at home	278	2.5%	387	3.1%
Total	**10,932**	**100%**	**12,666**	**100%**

Source: 2000 Census, Transportation Planning Package.

Table V-9. Travel Time to Work (Away From Home), 1990 and 2000

Travel Time	1990 Census		2000 Census	
	Number	Percentage	Number	Percentage
Less than 5 minutes	287	2.7%	260	2.1%
5 to 9 minutes	1,084	10.2%	1,004	8.2%
10 to 14 minutes	1,629	15.3%	1,402	11.4%
15 to 19 minutes	1,700	16.0%	1,754	14.3%
20 to 29 minutes	2,115	19.9%	2,718	22.1%
30 to 44 minutes	2,136	20.0%	2,746	22.4%
45 or more minutes	1,703	16.0%	2,395	19.5%
Mean Travel Time to Work (min.)	24.6	-	27.6	-

Source: 2000 Census, Transportation Planning Package.

C. FUTURE TRAFFIC PROJECTIONS

Future traffic forecasts can be estimated utilizing the NRPC regional traffic model. The NRPC model uses 20-year regional land use forecasts to estimate future trip generation and zones of trip attraction and production within the region. The road network in the model is revised to reflect changes in the system due to the completion of major road projects, such as the Circumferential Highway and the Broad Street Parkway, for future traffic estimation. The future revised road network, along with changes in land use assumptions, yields the future trips and trip distribution within the region. Model calibration is achieved by comparing ground counts taken in the field with a base year model run that reflects existing network and land use conditions. The model is then revised to reflect future network and land use conditions based on the planned road projects and the land use growth assumptions. One issue that must be emphasized is that the traffic model adjusts its forecast of traffic for the anticipated levels of congestion. As a roadway becomes highly congested, with traffic in excess of roadway volume, the model calculates the degree to which delay is resulting from the traffic congestion and switches traffic to alternate routes. These alternate routes are often longer mileage routes but, due to lower levels of congestion, they are actually the fastest path the model can find between an origin point and a destination.

Table V-10 shows the estimated forecasts for daily traffic volumes, in vehicles per day (24-hour period), for essential roads within the Town of Hudson, as compared with the existing average annual daily traffic. The Table V-10 forecasts are for a future road network that assumes the completion of the planned Northern Portion of the Circumferential Highway (from the F.E. Everett Turnpike in Merrimack to NH 111 in Hudson), the Broad Street Parkway in Nashua, the Airport Access Road in Manchester, the widening of I-93 in Londonderry and Windham, and the completion of Albuquerque Avenue in Litchfield.

Based on the forecasts, the highest increases in traffic volume on Hudson's roads are expected on NH 3A south of the Sagamore Bridge (+14,500), the Sagamore Bridge (+13,800), Kimball Hill Road south of NH 111 (+12,700), NH 111 west of Park Avenue (+12,500), NH 3A at the Massachusetts State Line (+8,000), and NH 3A north of the Sagamore Bridge (+5,600). These increases are due in part to increased residential development in Pelham and Hudson, increases in development in the I-93 corridor (due to the I-93 widening), and the lack of the southern portion of the Circumferential Highway between the Northern Portion terminus on NH 111 (north of Kimball Hill Road) and NH 3A and the Sagamore Bridge. The Town should consider further study of the NH 111 corridor due to growth and development, the lack of an outlet for the terminus of the Northern Portion of the Circumferential Highway and increased traffic from Londonderry due to the I-93 widening project. An additional study should also be considered for the southern portion of Hudson, including the NH 3A corridor due to increases in traffic on Dracut Road and NH 3A from Pelham and the use of the NH 3A corridor and the local road network as a connection between the Sagamore Bridge and the Circumferential Highway terminus on NH 111.

Table V-10. 20-Year Forecasted Weekday Traffic Volumes in Hudson

Road Location	AADT (vpd)	20-Year Forecast (vpd)	Change (vpd)
NH 111 at Taylor's Falls/Veterans Bridge	35,600	36,700	+ 1,100
Sagamore Bridge (Circumferential Hwy)	35,400	49,280	+ 13,880
NH 102 at Litchfield Town Line	15,000	19,100	+ 4,100
NH 102 north of Elm Ave (NH 3A)	17,000	10,300	- 6,700
NH 3A east of Library Street	21,000	24,800	+ 3,800
NH 3A (Lowell Road) south of Central Street	22,000	22,400	+ 400
NH 3A south of Burns Hill Road (N of Wason)	24,000	21,600	- 2,400
NH 3A (Lowell Road) N. of Sagamore Bridge	32,000	37,600	+ 5,600
NH 3A south of Sagamore Bridge	22,000	36,500	+ 14,500
NH 3A at Massachusetts State Line	8,900	16,900	+ 8,000
Dracut Road at the Massachusetts State Line	7,300	10,900	+ 3,600
NH 111 east of Library Street	14,000	15,900	+ 1,900
NH 111 west of Park Avenue	15,400	27,900	+ 12,500
Library Street	8,100	10,000	+ 1,900
Kimball Hill Road south of NH 111	5,100	17,800	+ 12,700
Central Street west of Library Street	13,000	13,600	+ 600
Belknap Road south of Central Street	5,100	7,900	+ 2,800

Source: NRPC Traffic Model.
Note: AADT = Average Annual Daily Traffic; VPD = vehicles per day.

D. TRANSPORTATION SOLUTIONS

1. Existing Regulations

a. Impact Fees

The Town of Hudson Zoning Ordinance currently assesses impact fees on developments in order to raise funds for the mitigation of traffic and transportation impacts attributable to the development. The Town impact fee ordinance states that the fees will be used to implement specific improvement projects outlined in the Town's Master Plan and Capital Improvements Program (CIP). The fees are assessed based on a schedule developed by the Planning Board which is reviewed annually for necessary revision and update. At present, the planned improvements for the Route 102/West Road intersection represents the only roadway project on the Town's CIP. The Town should consider adding improvement projects for the NH 111/Chase Street intersection, Belknap Road/County Road and County Road (south)/NH 3A intersection, and the NH 111/Kimball Hill Road/Greeley Road intersection to its CIP. These intersections have been recommended for improvements by both the Town's Planning Board and Board of Selectmen.

b. Road and Sidewalk Layout

At present, the Town's subdivision regulations require that the width of the right of way for a new residential street be at least 50 feet wide with a pavement width of 28 feet (Section 289-28). The subdivision regulations require that streets be laid out to intersect as nearly as possible at right angles and not less than 60 degrees. Street grades should not exceed 4% for major streets and 7% for local streets. In addition, the subdivision regulations require that sidewalks be constructed in new subdivisions where deemed essential by the Planning Board to provide access to schools, playgrounds, shopping centers and other community facilities. The sidewalks must be at least four feet wide and provide for pedestrian comfort and safety. New roads that are to be classified by the Town code as major streets, collector streets, and commercial streets are

required to have a pavement width of 36 feet. The definition of the Town code street classification scheme is included in the appendix.

A number of criteria should be considered in updating the design standards for local streets:[1]

- *Design and maintain street space for the comfort and safety of residents*. Local residential streets should be designed with consideration to the needs of children, pedestrians, and bicyclists. The main function of the local street is to provide access to adjacent residential properties. Long distance travel and high speeds are not priorities for local streets, therefore, the Town should reconsider its subdivision requirement for a 28 foot width for residential streets. A residential street with pavement width of 20 feet is sufficient to allow for emergency vehicle access with *no* on-street parking. A pavement width of 24 to 26 feet is.sufficient for a residential street to allow for emergency vehicle access *with* on-street parking.
- *Provide a well connected, interesting pedestrian network*. Convenient and safe pedestrian access to schools, shopping, recreation, employment and other destinations should be provided. This may include the development of an interconnected pedestrian pathway system. The Town should reconsider its 4 foot width requirement for sidewalks. The Americans' with Disabilities Act (ADA) guidelines call for a minimum sidewalk pavement width of at least five feet.[2] Sidewalks on high volume roads should be required to be at least eight feet wide with a three foot landscaped buffer between the curb and paved surface. This buffer provides a margin of safety between the pedestrian flow and high speed and high volume traffic.
- *Provide convenient access for people who live on the street, but discourage through traffic; allow traffic movement, but do not facilitate it*. Traffic control measures should be considered to eliminate extensive through traffic on local streets. The Town should consider traffic calming measures on streets that serve as cut throughs in neighborhoods. The traffic calming measures should be implemented with input from the Town Highway Safety Committee and the public.
- *Differentiate streets by function.* Streets should be clearly distinguished within the network in terms of the functional differences between local residential streets and major collectors or arterials in the overall street design.
- *Relate street design to the natural and historical setting*. Street design should relate to and express the terrain, natural character, and historic traditions of the locale. Irregularities of a site such as large rocks or trees and slopes should be incorporated rather than removed. Street details including curb design, sidewalk paving or signs must relate to the regional vernacular rather than being anonymous from a handbook.
- *Reduce impervious surfaces by minimizing the amount of land devoted to streets.* There are several factors that should shape a plan including a design concept, on-street parking needs, traffic volumes and land constraints (steep slopes, wetlands, etc.). Narrower residential streets reduce the amount of impervious surfaces and allow for better groundwater recharge.

[1] Southworth and Ben-Joseph, *Streets and Shaping of Towns and Cities*, page 143.
[2] United States Department of Justice, *Americans' with Disabilities Act Standards for Accessible Design, Excerpt from 28 CFR Part 36*, July 1, 1994 at: http://www.usdoj.gov/crt/ada/adastd94.pdf.

2. Access Management

Access Management "*…involves providing (or managing) access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity and speed.*"[3] The speed and volume of traffic on a roadway is greatly reduced due to vehicles entering and exiting side streets and driveways. In general, access management techniques involve the regulation of the number, spacing and width of access points, the design of those access points, and the provision of alternative transportation methods in order to reduce vehicle trips. The primary goal of access management is to preserve roadway capacity by reducing turning movement conflicts with through traffic.[4]

NH 3A and NH 102 represent the main north-south roadways in Hudson. NH 111 serves as the main corridor for east west travel. In order to preserve the existing road capacity, which has a theoretical limit, and to enhance safety for vehicles entering and exiting driveways, access management techniques should be applied to Hudson's major corridors including NH 3A, NH 102, NH 111 and Dracut Road. The Town should coordinate access management policies with NH DOT's access management initiatives. The following general access management techniques can be implemented through the subdivision, site plan and/or driveway regulations, and/or the zoning ordinance:

- Reduce the number of curb cuts along arterials and encourage the use of common driveways.
- Encourage the development of service roads parallel to arterials that allow for access to adjacent commercial developments.
- The minimum distance allowed between curb cuts along roads and arterials should be at least the minimum distances recommended in Table V-11. With the exception of a 100-foot minimum separation between driveways and intersections, there are no minimum driveway separation requirements in the subdivision or site plan regulations.

Table V-11. Minimum Access Separation Distances

Posted Speed (mph)	Spillback Rate*			
	5%	10%	15%	20%
30	335	265(a)	210(b)	175(c)
35	355	265(a)	210(b)	175(c)
40	400	340	305	285
45	450	380	340	315
50	520	425	380	345
55	590	480	420	380

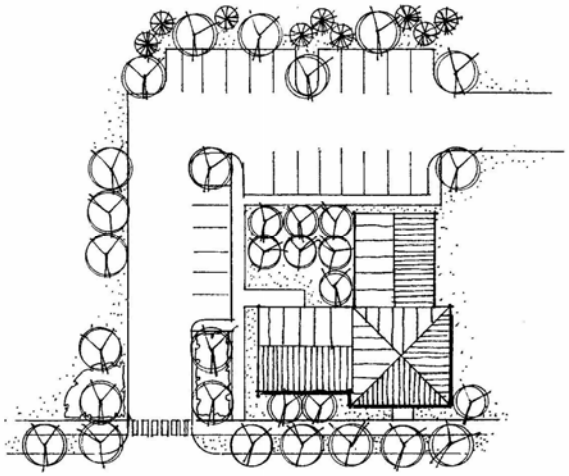
Source: Gluck, J.S., Haas, G., Levinson, H.S., and Jamal Mahmood, *Driveway Spacing and Traffic Operations*, TRB Circular E-C019, December 2000.

*Spillback occurs when a right-lane through vehicle is influenced by right-turn-in to or beyond a driveway upstream of the analysis driveway. The spillback rate represents the percentage of right-lane through vehicles experiencing this occurrence.
(a) Based on 20 driveways per mile; (b) Based on 25 driveways per mile; (c) Based on 30 driveways per mile.
*Based on an average of 30-60 right turns per driveway.

[3] AASHTO, *Policy on the Geometric Design of Highways and Streets*, 2001.
[4] Nashua Regional Planning Commission, *Access Management Guidelines*, April 2002.

- Require developers to fund road improvements such as turn lanes, medians, consolidation or alignment of access points and/or pedestrian facilities that reduce the impedance of through traffic.
- Place parking behind or beside buildings (Figure V-1) to allow for adequate driveway throat length and to screen parking when possible to make the building the focal point of the destination. Use green spaces to articulate the differences between driveways, parking and pedestrian areas.

Figure V-1. Parking to Rear and Side of Building



- Encourage easements between parcels for the interconnection of non-residential sites that allow employees and customers to move from site to site without repeatedly entering and exiting the roadway.
- Encourage easements or future right of way access between residential subdivisions in order to encourage an interconnected street system.
- Allow for pedestrian access between developments. Crossing points for pedestrians should be across driveways rather than through parking areas. Encourage separate sidewalks and walking paths in parking lots for non-residential uses.
- Enter into a Memorandum of Understanding (MOU) with NH DOT to coordinate review of access points. Until recently, NH DOT would issue permits with limited input from the local decision makers. To improve the coordination of local and state planning objectives along the state's road system, NH DOT has developed a MOU which is a formal agreement between NH DOT and the community to coordinate on the review and issuance of driveway permits to access state roads.

3. Community Character Guidelines

The adoption of "community character guidelines" for non-residential development can result in development that is compatible with the community's character, enhances traffic safety and preserves highway capacity. The NRPC publication, *Non-Residential Development Community Character Guidelines*,[5] includes guidelines relating to building orientation, building design, access management, parking lot landscaping, off site parking, site lighting guidelines, loading and service facilities guidelines, and public spaces and landscaping guidelines. The Town should assess existing site plan, subdivision and zoning requirements based on recommendations included in this document.

4. Traffic Calming

Excess traffic and speeding on local roads through residential neighborhoods have been a by product of growth experienced by the Town and the region as a whole. Traffic calming is an integrated approach to traffic planning that seeks to maximize mobility while reducing the undesirable effects of that mobility.[6] There are a number of techniques that are described to achieve the goals of traffic calming:

- Reduce the speed at which automobiles travel by altering roadway design. These techniques include speed bumps and speed tables, rumble strips or changes in the roadway surface, center medians, diagonal diverters, dead-end streets or cul-de-sacs, neck downs, chicanes, chokers and protected parking, narrower streets and roundabouts (see photos[7], below).
- Change the psychological feel of the street through design or redesign. The use of traffic control devices, signs, pavement markings and landscaping should enhance the image of the residential street as a place that is safe for pedestrians.
- Discourage the use of private motor vehicles. Encourage the use of alternative transportation.
- Create strong viable local neighborhoods. Create compact neighborhoods with a range of facilities on hand so that people can drive shorter distances to where they want to go and make more trips by foot, bicycle or public transportation.

A primary way to slow down traffic is to narrow the real or perceived horizontal width of the pavement. Streets can be narrowed in various ways. A so-called "curb extension" is generally the best and perhaps most widely used option. It slows down traffic, shortens the crossing distance for pedestrians and a sidewalk can be added along the road if necessary.[8]

Center Median **Speed Table** **Chicane** **Choker**

[5] Nashua Regional Planning Commission, *Non-Residential Development Community Character Guidelines*, 2000.
[6] Cynthia L. Hoyle, *Traffic Calming*, PAS Report 456, pg. 9.
[7] Photo Source: Fehr & Peers, Associates, Transportation Consultants at www.trafficcalming.org.
[8] Conservation Law Foundation, *Take Back Your Streets*, May 1995, pg. 32.

5. Scenic Road Designation

As New Hampshire's residential, commercial and industrial development has grown, so has the need to improve the road system, thereby reducing the number of country roads that constitute an important asset to the State. To prevent the elimination of scenic roads, communities are enabled by NH RSA 231:157 to designate roads other than state highways as Scenic Roads. This law protects such roads from repair or maintenance which would involve the cutting or removal of medium and large-sized trees, within the right of way, except with the written consent of an official body. The law is an important tool in protecting the scenic qualities of roads. The large trees and stone walls that line many rural roads are irreplaceable and contribute heavily to the New England character of the region's towns. There are no designated scenic roads in Hudson. Consideration should be given to designating appropriate routes.

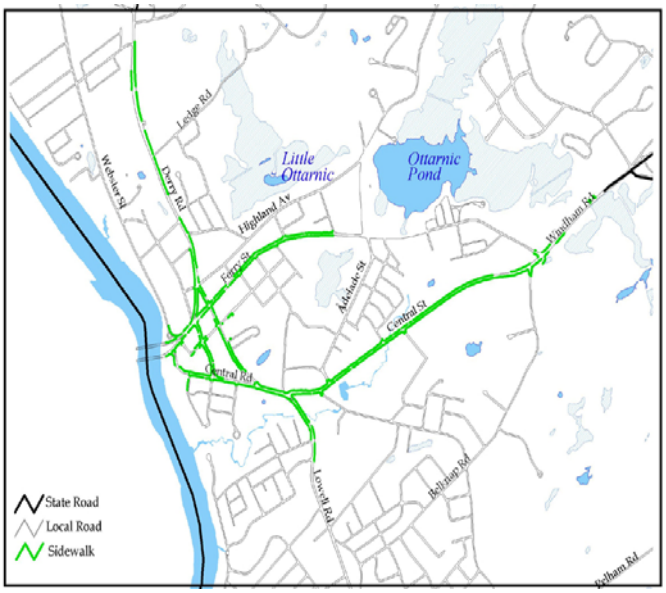
E. NON-MOTORIZED TRANSPORTATION

Although most trips in Hudson are taken by automobile, opportunities are available to enhance the provision of bicycle, pedestrian and public transit facilities. Each trip taken by bicycle, foot or transit removes one private vehicle from the roadway, thereby enhancing the capacity of the road network and providing options for those who cannot or do not wish to drive.

1. Bicycle and Pedestrian Facilities

The Town maintains seven miles of sidewalks and has a Town Center sidewalk program as illustrated on Map V-5. This includes maintaining sidewalks on Library Common and the following streets: Library, Chase, Central, Lowell Road from Central to Riverside Drive, Derry to the intersection of Elm and NH 102, and Ferry.

Map V-5. Town Center Sidewalks



Source: Town of Hudson Department of Public Works

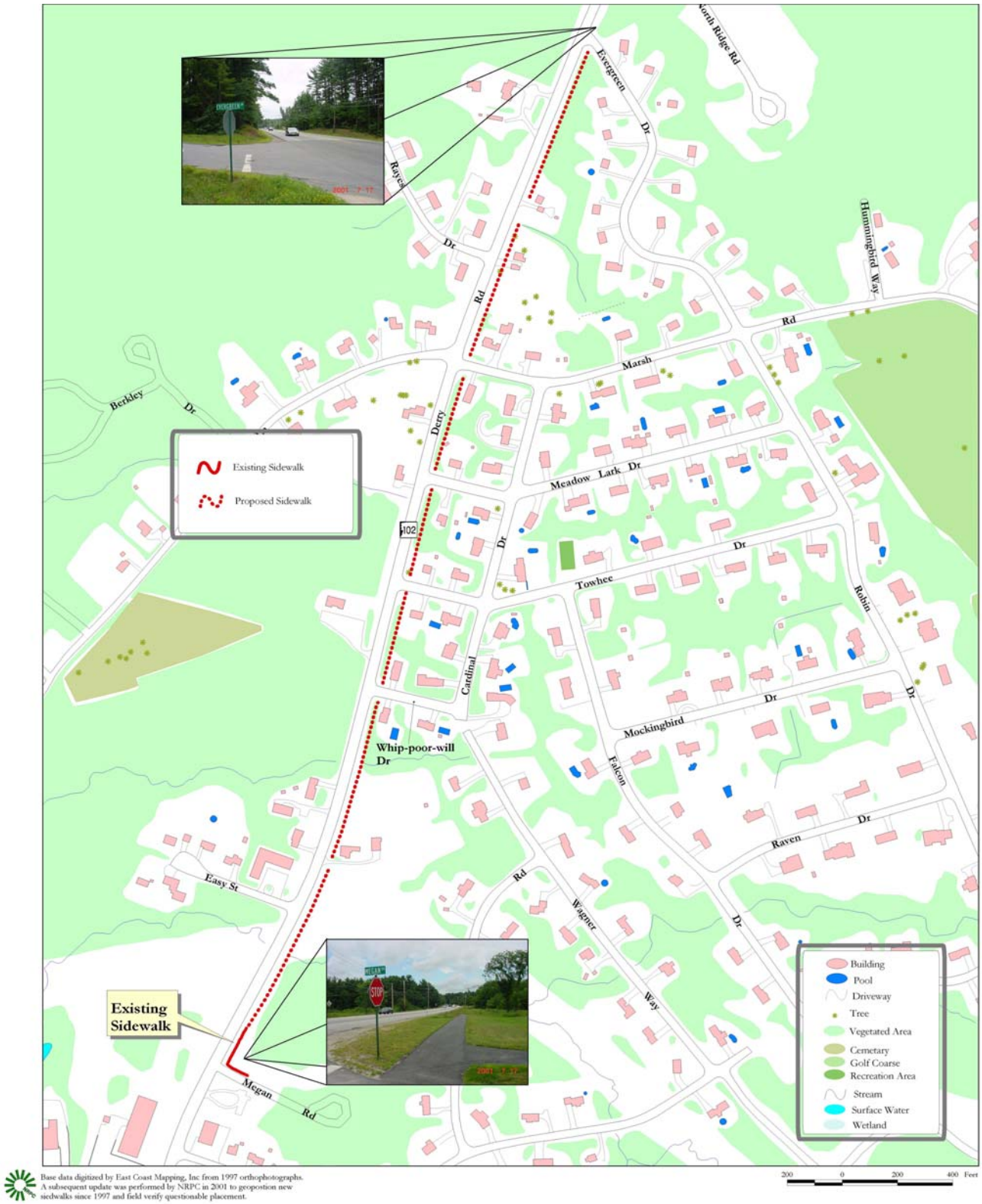
The Town also maintains the sidewalk on Ferry Street all the way across the Merrimack River. The Town should: 1) continue to consider widening and re-striping roadways for bicycle access whenever roadways are repaved or reconstructed; and 2) connect missing links in the Town Center sidewalk network. Crosswalks should be marked at all intersections on established routes to school where there is substantial conflict between drivers, bicyclists and pedestrian movements, where students are encouraged to cross between intersections, or where they would not otherwise recognize the proper place to cross.[9]

As of June 2003, one new sidewalk and bicycle route is planned for Hudson. This project is located on NH 102 between Evergreen Drive and Megan Drive. A 5-foot wide sidewalk and a 4-foot wide bicycle lane will be constructed in this location, as illustrated on Map V-6.

Additional bicycle and pedestrian routes are recommended in the Nashua Regional Planning Commission's, *Nashua Regional Bicycle and Pedestrian Plan* (NRBPP), 1995 and endorsed by member communities, including Hudson. The plan was created in order to provide guidance in the development and implementation of a comprehensive bicycle and pedestrian system within the region. The primary goal of the plan is to increase the incidence of bicycling and walking by establishing a continuous, coordinated non-motorized transportation network. NRPC is currently updating the NRBPP to incorporate 2000 Census data and the latest information from the National Personal Transportation Survey.

[9] U.S. Department of Transportation Federal Highway Administration, *Manual on Uniform Traffic Control Devices, Millennium Edition*, 2001.

Map V-6. NH 102 Sidewalk Enhancement Project



2. Developing a Bicycle and Pedestrian Network Plan

NRPC has developed a methodology for identifying proposed bicycle and pedestrian facilities that can be implemented in Hudson. The methodology involves identifying where bicyclists and pedestrians begin their trips, the destinations they want to go to and recommendations for suitable routes that will get them there. The methodology also involves establishing minimum standards for all streets and highways where bicyclists and pedestrians are permitted. This will ensure that even the streets not on designated routes would have minimum accommodations for bicyclists and pedestrians.

The methodology has been designed to be used in a Geographic Information System (GIS) environment and to be as quantitative as possible. The methodology assumes that demand for bicycle and pedestrian facilities is influenced by the location, type and intensity of land use throughout the region, as well as by the distribution of population. Factors such as directness, barriers, aesthetics and cost of improvements are also considered. The following six steps were used to develop a proposed bicycle and pedestrian network for Hudson:

1. Identify and Quantify Trip Productions (Origins of Travel)
2. Identify and Quantify Trip Attractions (Destinations)
3. Identify Desired Bicycle Travel Corridors
4. Apply Suitability Index to Select Alternative Routes
5. Evaluate Route Alternatives using Performance Criteria
6. Select Specific Routes

Bicycle and pedestrian trip productions (origins of travel) were determined using Census block population and trip generation rates. Major trip attractions (destinations) in Hudson were also identified. These attractions include the major employment centers, shopping areas, schools and recreation/park areas identified in Table V-12 and illustrated on Map V-7.

Table V-12. Inventory of Destinations in Hudson

Identification Number	Name of Attraction	Attraction Type
1	Alvirne High School	School
2	Hudson Memorial School	School
3	Dr. Smith Elementary School	School
4	Hills Garrison Elementary School	School
5	Library Street Elementary School	School
6	Nottingham West Elementary School	School
7	Presentation of Mary Academy	School
8	Bethel Christian School	School
9	Town Center District	Commercial
10	NH 102 South	Commercial
11	Lowell Road North	Commercial
12	Central Street East	Commercial
13	Lowell Road – Wal Mart	Commercial
14	NH 102 North	Commercial
15	Town Beach – Robinson Pond	Park/Recreation
16	Skate Board Park	Park/Recreation
17	Lion's Hall	Park/Recreation
18	Jette Field	Park/Recreation
19	Musquash Conservation Area	Park/Recreation
20	Benson's Wild Animal Park	Park/Recreation

Source: NRPC, 2000.

The suitability of the routes between productions and attractions was determined using the volume of traffic, road width and posted speed limit. The "suitability" number assigned to each segment of road is an indication of how appropriate that segment is for bicycling. Not surprisingly, portions of the State roads are only suitable for experienced bicycle riders in sections due to the high traffic volumes and speed limits. Attractions near the Town Center are appropriate for adolescents and inexperienced adults.

3. Development of a Preliminary Network

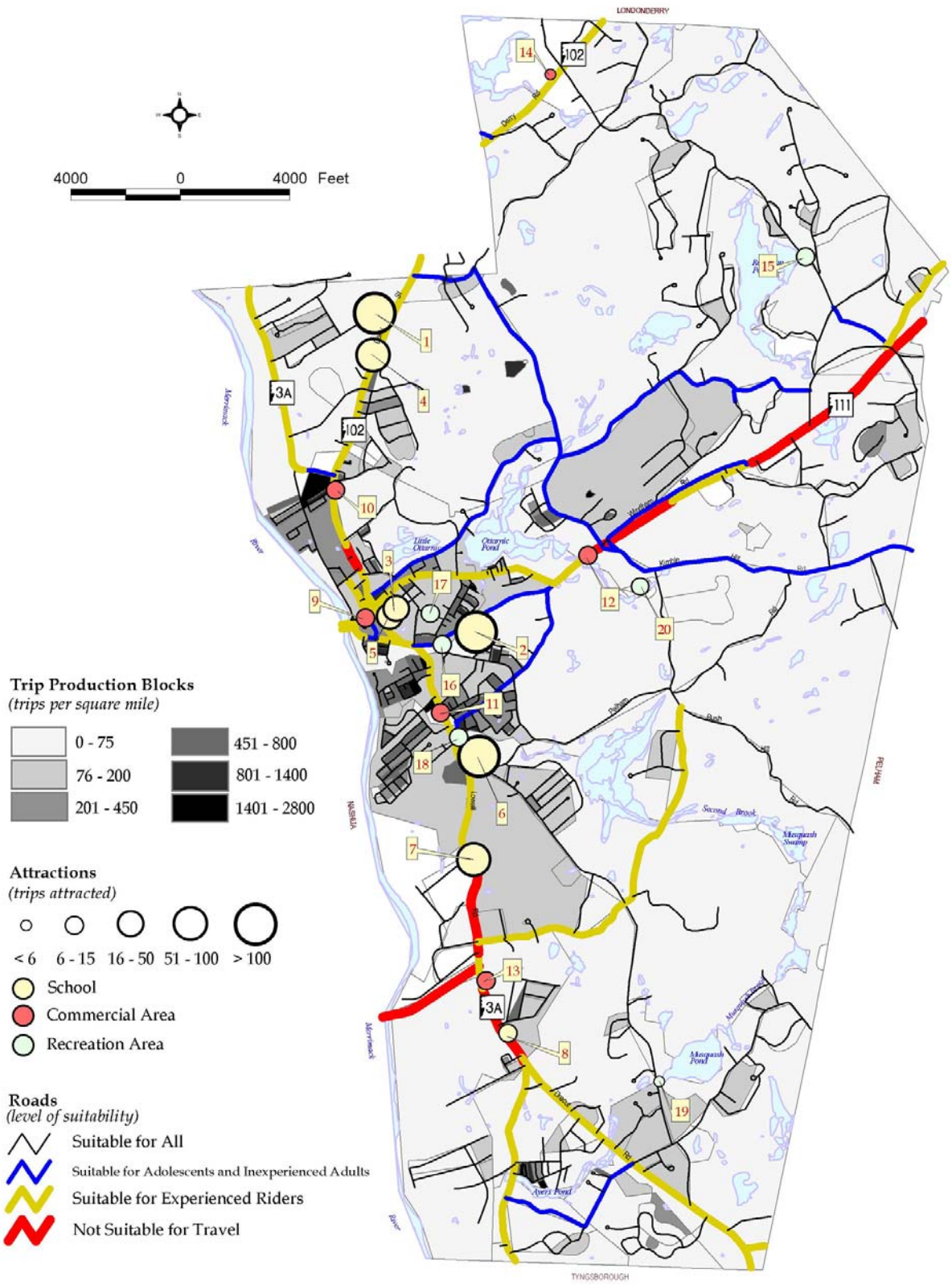
Map V-7 illustrates trip origins, the destinations listed in Table V-12, and suitability of roads connecting the points. Map V-8 illustrates a preliminary bicycle network based on the features identified on Map V-7. The proposed network attempts to connect all points by providing north-south and east-west travel between the origins and destinations. The segments illustrated by a solid red line on Map V-7 (NH Route 3A and NH Route 111 east of the Kimball Hill Road intersection) are not recommended for bicycling; however, there are no existing alternatives. The segments illustrated by a dashed red line on Map V-7 are gaps in the proposed network and should be field checked for the viability of building connections.

The proposed network illustrated on Map V-7 was then further refined in the field by applying specific performance criteria as follows:

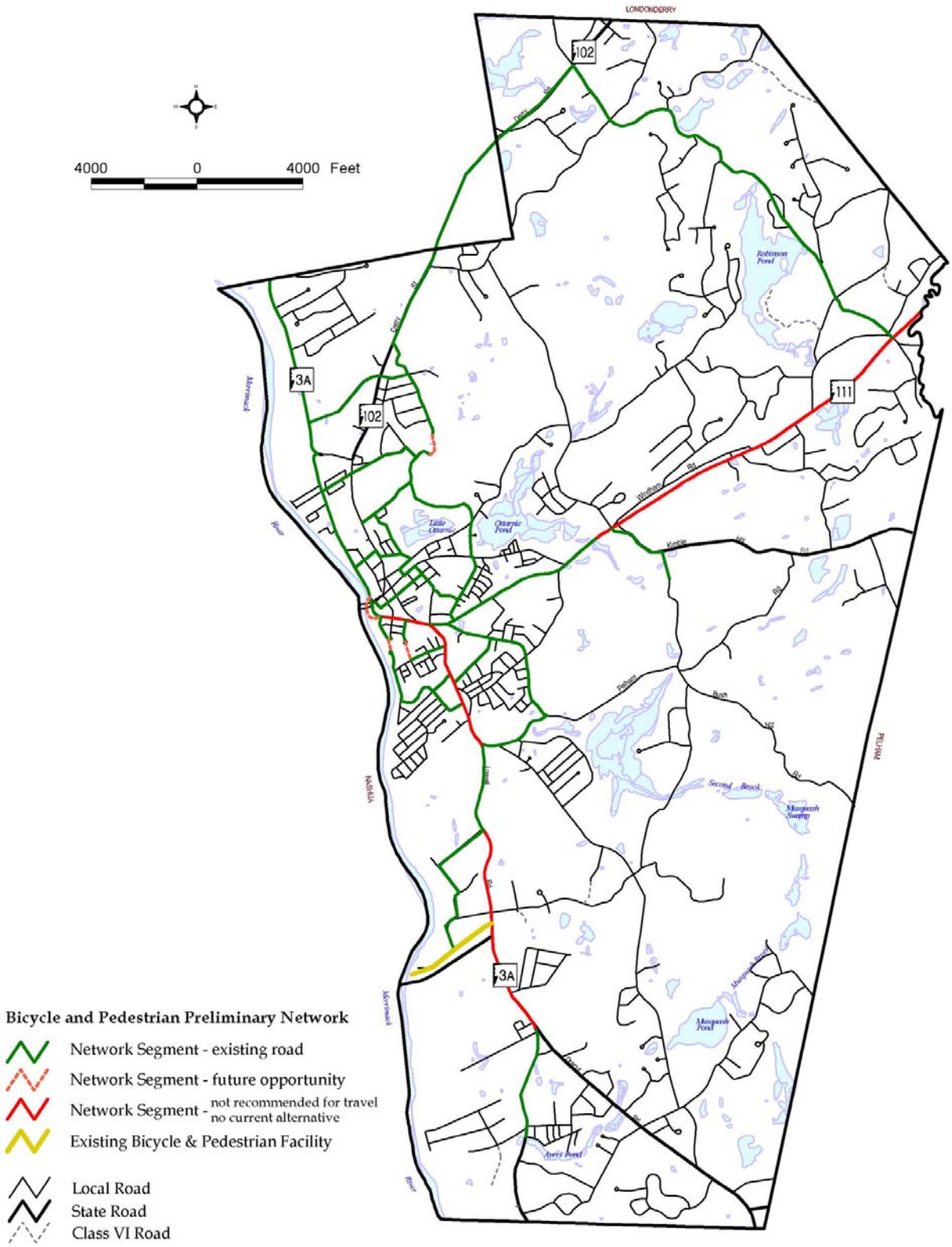
- **Accessibility:** This is measured by the distance a bicycle or pedestrian facility is from a specified trip origin or destination, the ease by which this distance can be traveled by bicycle or foot, and the extent to which all likely origins and destinations are served.
- **Directness:** Studies have shown that most bicyclists or pedestrians will not use even the best bicycle or pedestrian facility if it greatly increases the travel distance or trip time over a less desirable but more direct alternative.
- **Continuity:** The proposed network should have as few missing segments as possible. If gaps do exist, they should not include environments that are threatening to riders or walkers.
- **Usage:** This is the degree to which a specific route meets the needs of the anticipated users as opposed to an alternative route.
- **Aesthetics:** The network should be physically atractive.
- **Safety:** The route should present few confllicts between bicyclists, pedestrians and vehicles.
- **Cost:** When comparing route alternatives, the cost of implementation as well as maintenance should be considered.
- **Ease of Implementation:** Some proposed routes may be easier to implement than others. For example, a potential bicycle route may already have adequate shoulders and therefore only require proper pavement markings. This route could be implemented quickly and at little cost. Other potential routes may need more extensive and costly shoulder construction and could therefore take a long time to implement.
- **Pavement Condition:** The pavement will be observed for roughness, potholes and longitudinal and latitudinal cracking.

Specific recommendations are provided based on these criteria and the field work. These recommendations include such solutions as installation of crosswalks, signage and lane striping, etc. Town officials were consulted in May 2003 to further refine the recommendations.

Map V-7. Trip Production, Attractions and Suitability for Bicycle and Pedestrian Travel



Map V-8. Proposed Bicycle and Pedestrian Network



4. Recommendations for Bicycle and Pedestrian Network

a. Regional Routes

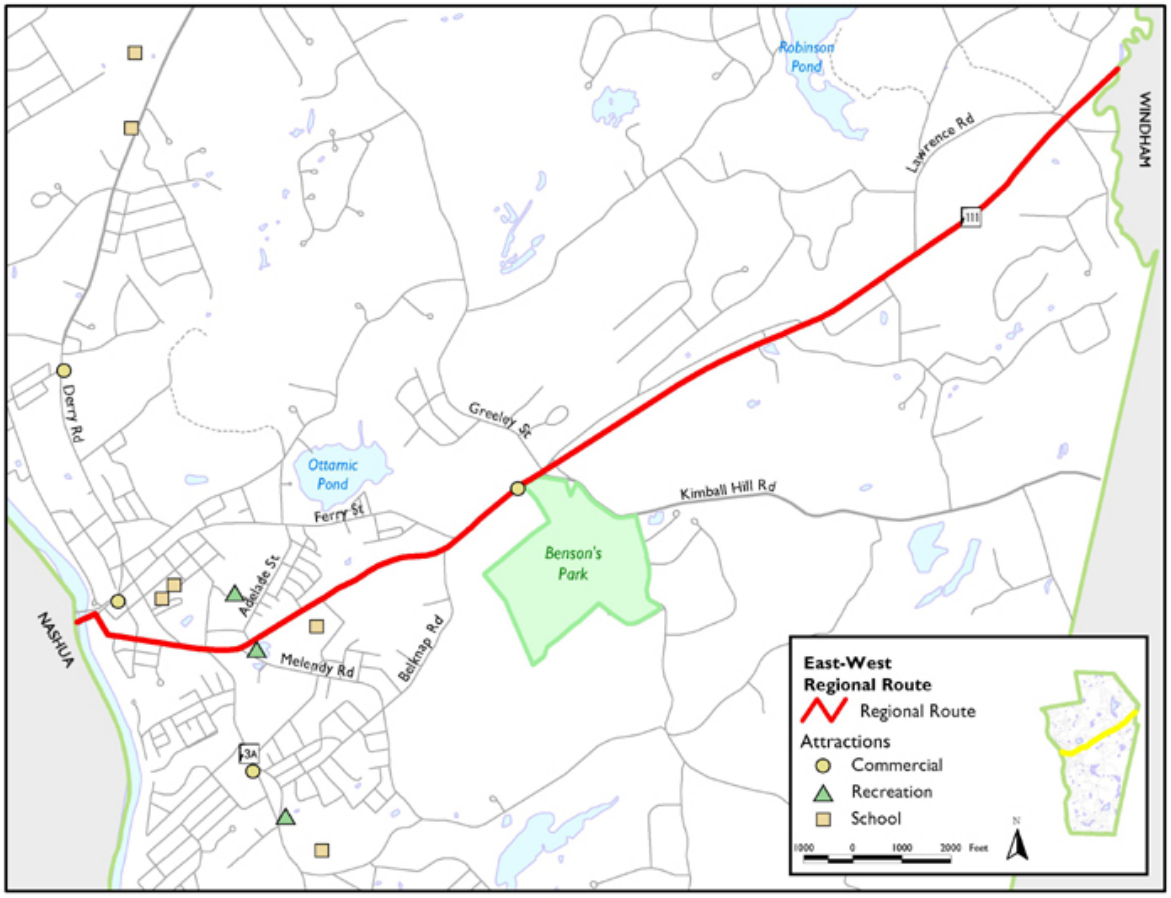
Regional routes are generally bicycle routes since they connect communities and/or town centers and involve greater distances than the average pedestrian would travel. Segments of the route may overlap with the major local destination bicycle and pedestrian routes. There are two regional routes within the Town of Hudson that connect the communities of Nashua to the west, Litchfield and Londonderry to the north, Pelham to the east and the state of Massachusetts to the south.

The recommended west to east route is NH Route 111 as illustrated on Map V-9. Specific recommendations are shown in Table V-13. After crossing the Taylor's Falls/Veterans Bridges, the route continues to Central Street to avoid the heavily congested intersection in the Town Center. Riders would proceed along Central Street to the intersection of NH 3A. Riders would travel through the intersection to continue in an easterly direction. Central Street becomes NH 111 at the Ferry Road intersection. NH 111 continues to the Windham town line. Although the suitability index scored this section of NH 111 as not recommended for travel, the entire route has a well maintained flat surface, good sight distance and shoulders ranging from 4-10 feet in width on both sides. It is recommended that a bicycle lane be striped to Greeley Street. The shoulder beyond Greeley Street to the Windham town line is 10 or more feet in width and does not require striping. As an alternative, riders going west could use Windham Road. This would allow them to ride parallel to NH 111 to the intersection of Greeley Street, NH 111 and Kimball Hill Road.

Table V-13. Regional West to East Route

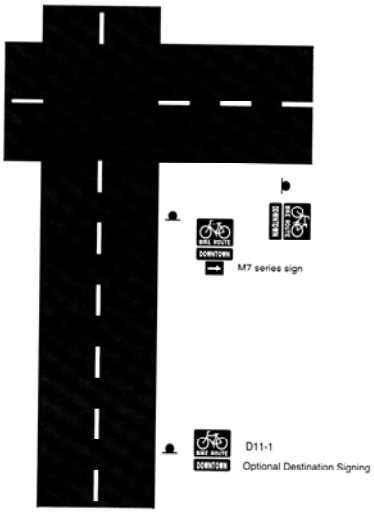
Road Segments from Points West	Recommendations
Taylor's Falls/Veterans Bridge on NH 111 along Central Street to NH 3A intersection	Sign for points east and south at NH 111 and Central Street intersection
NH 3A /Central Street intersection	Sign for points east and south (NH 3A).
Central Street/School Street intersection	Signage to proceed down School Street to Veterans Bridge (Travelers heading west to Nashua only)
From the NH 3A /Central Street intersection to Adelaide Street	Sign for Town Center, points north and east (NH 102 and NH 102).
Along Central Street through the Ferry Street/NH 111 intersection to Greeley Street	Continue sidewalks to Benson's property. Sign for points east (Pelham/Windham)
Along NH 111 through the Lawrence Road intersection to the Windham town line	Bicycle Crossing Warning painted on NH 111. Sign for Robinson Pond at Lawrence Road/Windham town line

Map V-9. Regional West to East Route



Source: NRPC GIS, 2002

The recommended north to south route is NH 102 and adjacent neighborhood streets as illustrated on Maps V-10 through 12. Specific recommendations are shown in Tables V-14 through 16. If used, Bicycle Route guide signs should be provided at decision points along designated bicycle routes, including signs to inform bicyclists of direction change and destination. Bicyclists approaching from the Albuquerque Avenue multi-use path in Litchfield will join NH 102 at the Cutler Road intersection. Riders will travel south along NH 102 to Marsh Road. Although the road has high volumes of traffic during peak commuting hours, the shoulders are wide and the sight distance is good. It is recommended that a bike crossing warning be painted on NH 102 and a bike route crossing sign be installed. The route continues through the neighborhoods surrounding Whip-Poor Will Golf Course. The route has adequate width and light traffic all the way to the Town Center area.



South of Central Street, traffic volume increases on Melendy Road and there is less than 1 foot of shoulder. It is recommended that a 1,400 foot long sidewalk be added along Melendy Road from Thorning Road to Central Avenue to connect the Hudson Memorial School to the skatepark and destinations in the Town Center area. Melendy Road and Roosevelt Avenue are good candidates for shoulder widening or re-striping. NH 3A has heavy traffic and multiple curb cuts which makes travel difficult and is recommended for experienced riders only. All alternate routes paralleling NH 3A have poor pavement conditions, sight distance and are limited in width.

Table V-14. North to South Regional Route - Northern Segment

Road Segments North of Town Center	Recommendations
From Litchfield town line (via Cutler Road) travelling on NH 102 to Marsh Road	Sign for Town Center and points south. Work with Litchfield to continue the bike lane to Cutler Road
From Marsh Road to Cardinal Drive	Sign to turn right on Cardinal Drive
From Cardinal Drive to Wagner Way	Connect the 20-foot segment with 5-foot asphalt path
From Wagner Way to Joel Path	Sign to continue forward
From Joel Path to Melissa Trail (private)	Sign to turn on Melissa Trail
From Melissa Trail to Ledge Road	Sign to continue forward
From Ledge Road to Lindsay Street	Sign to turn left on Lindsay Street
From Lindsay Street to Vernon Street	Sign to continue forward
From Vernon Street to Haverhill Street	Sign to turn left on Haverhill Street
From Haverhill Street to Highland Street	Sign to turn right on Highland Street

Map V-10. North to South Regional Route - Northern Segment

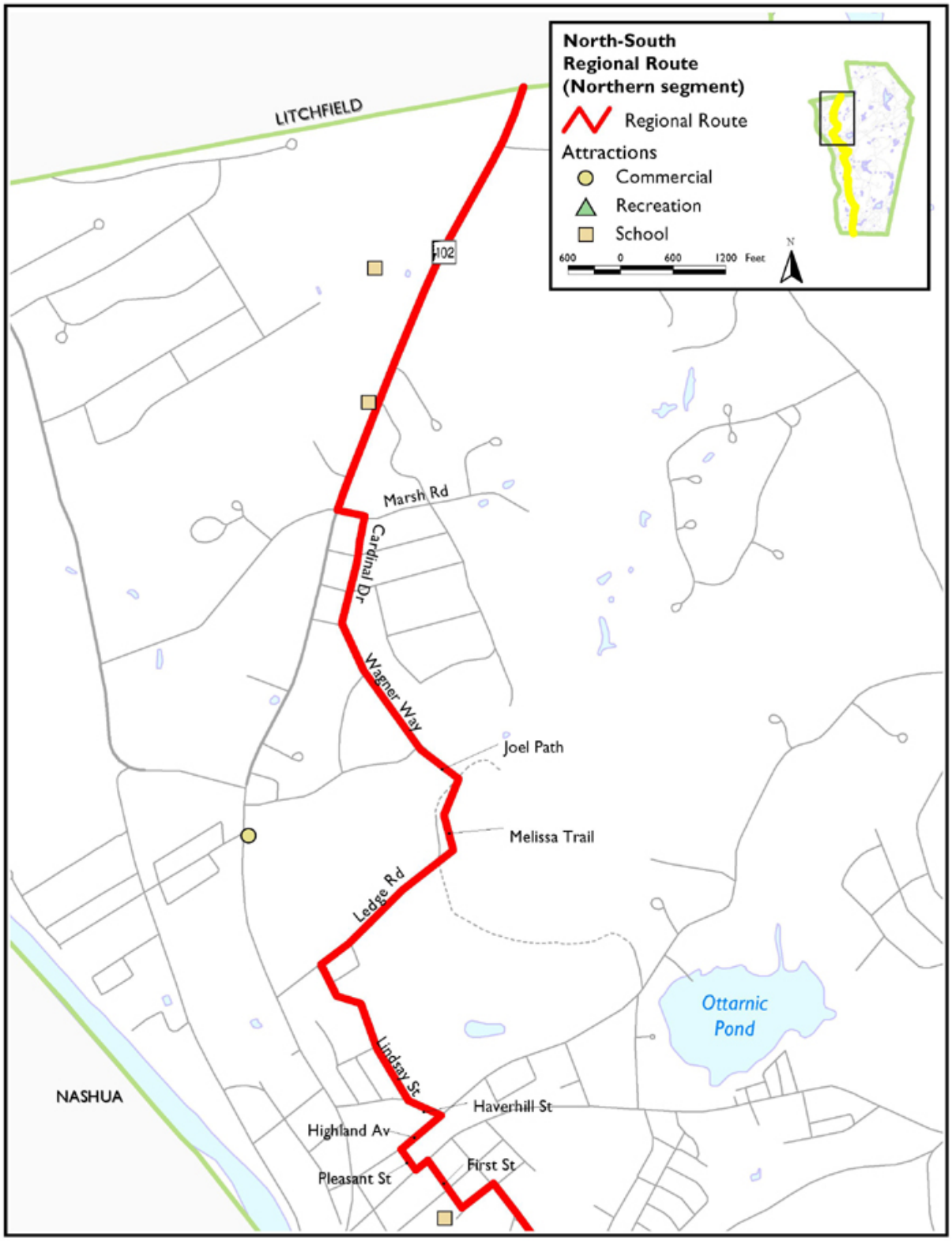
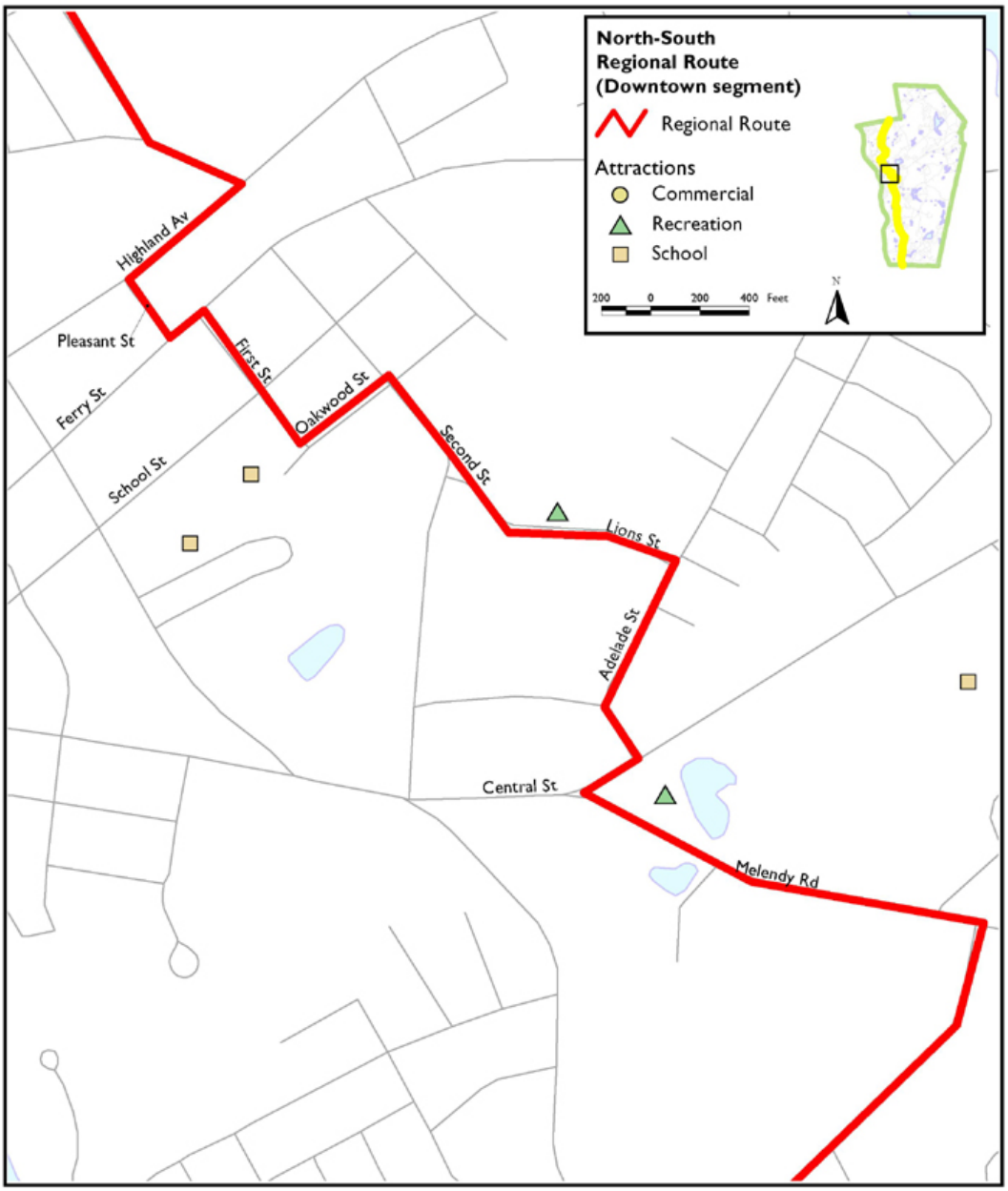


Table V-15. North to South Regional Route – Town Center Segment

Road Segments in Town Center	Recommendations
From Highland Street to Pleasant Street	Sign to turn left on Pleasant Street
From 1st Street to Oakwood Street	Sign to turn left on Oakwood Street
From Oakwood Street to 2nd Street	Sign to turn right on 2nd Street
From 2nd Street to Lions Street	Sign to turn left on Lions Street
From Lions Street to Adelaide Street	Sign to turn right on Adelaide Street
From Adelaide Street to Central Street	Sign to turn right on Central Street
From Central Street to Melendy Road	Bicycle Crossing painted on Central Street. Sign to turn left on Melendy Road.

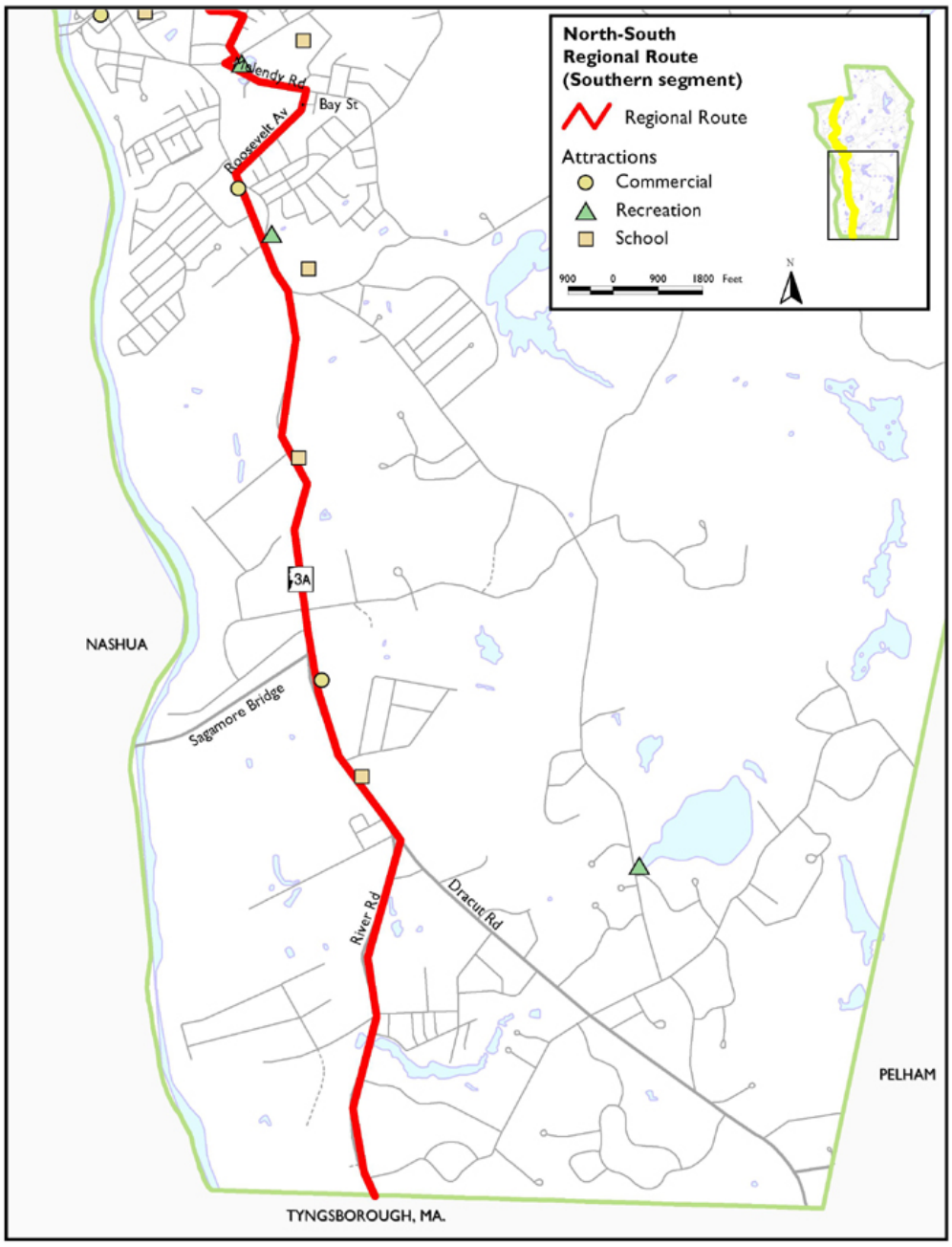
Map V-11. North to South Regional Route – Town Center Segment



TableV-16. North to South Regional Route - Southern Segement

Road Segments South of Town Center	Recommendations
From Melendy Road to Roosevelt Avenue	Sign to turn right on Roosevelt Avenue Extend shoulder/strip a bike lane when the road is improved
From Roosevelt Avenue to NH 3A	Bicycle Crossing Warning painted on NH 3A Sign to turn left on NH 3A Extend shoulder/strip for a bike lane when the road is improved
Along NH 3A to Massachusetts Line	Continue signs down NH 3A as needed

Map V-12. North to South Regional Route - Southern Segment



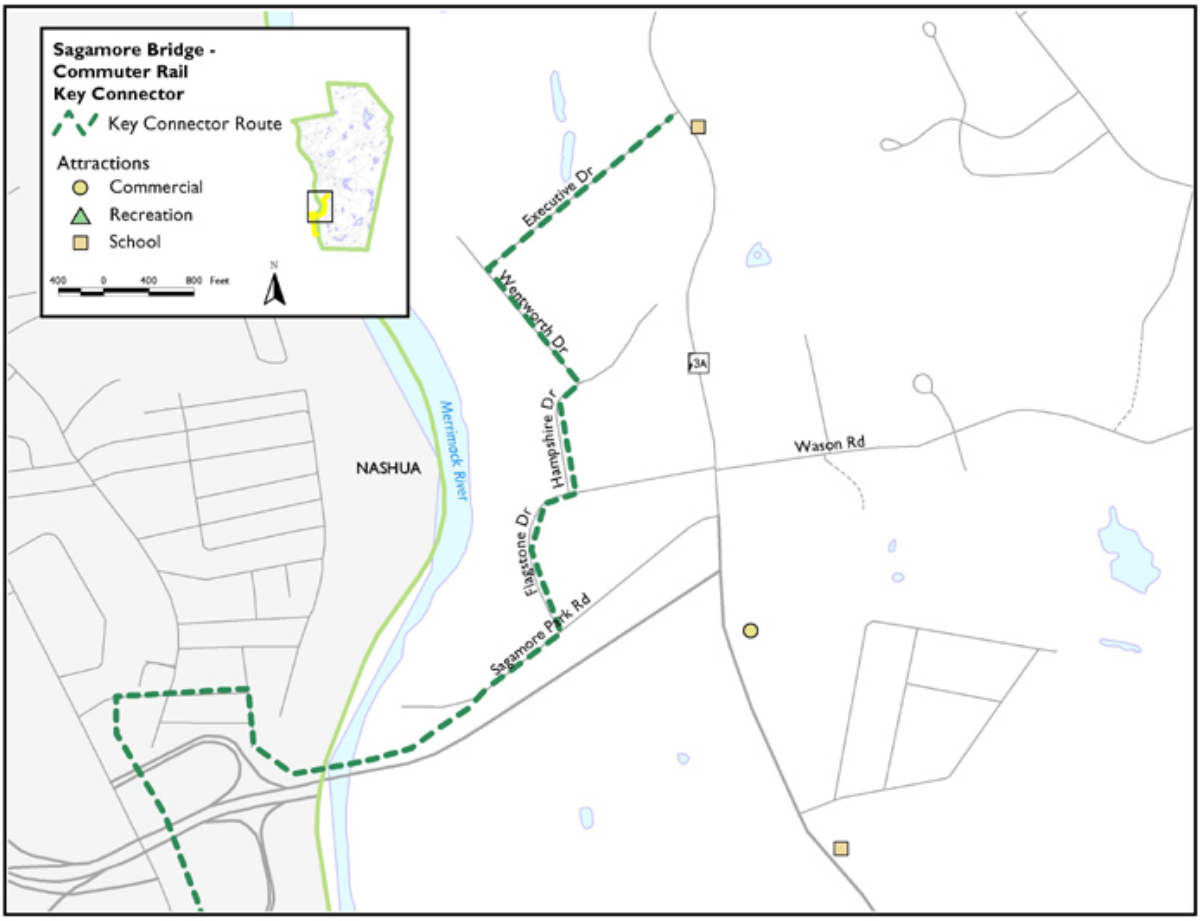
b. Key Connector Routes

Key connector routes are bicycle or pedestrian facilities that connect to regional routes within the municipality or to other regional routes/destinations in surrounding communities. The Sagamore Bridge-Commuter Rail Connector is an existing separated bicycle and pedestrian path across the Merrimack River on the Sagamore Bridge, as illustrated on Map V-13. Specific recommendations are shown in Table V-17.

Table V-17. Sagamore Bridge - Commuter Rail Key Connector

Road Segments to go West	Recommendations
Along NH 3A to Executive Drive intersection	Sign to Nashua and points west at intersection
Along Executive Drive to Wentworth Drive	Sign to turn left on Wentworth Drive
Along Wentworth Drive to Hampshire Drive	Sign to turn right on Hampshire Drive
Along Hampshire Drive to Flagstone Drive	Sign to turn right on Flagstone Drive
Along Flagstone Drive to Sagamore Park Drive	Sign to turn right on Sagamore Park Drive to Bike Trail over the Sagamore Bridge to Nashua

Map V-13. Sagamore Bridge - Commuter Rail Key Connector



c. Local Routes

Source: Dan Burden, Walkable Communities

Local routes are bicycle and pedestrian facilities that people would generally use to ride or walk to work, school, social visits, town facilities, shopping and/or recreation attractions. They include most local residential roads. Segments of these routes may overlap with the regional and/or key connector bicycle and pedestrian routes. Conducting a comprehensive sidewalk survey is recommended along with an education program to educate the community that it is a state law to yield to pedestrians in crosswalks and to share the road with bicycles. The cable channel and town website are good mediums for promoting this educational program.

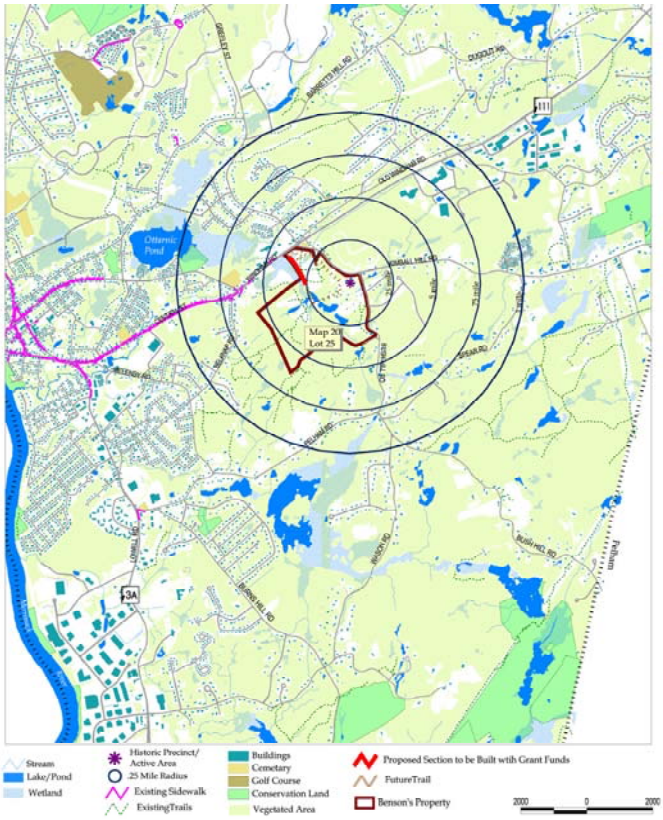
d. Class VI Roads

The Town presently contains 3.3 miles of Class VI roads (un-maintained). Opportunities for obtaining rights of way to develop a town-wide bicycle and pedestrian system are dwindling due to ongoing residential, commercial and industrial development. The Class VI un-maintained roads in the Town represent an opportunity to add to the recreational trail system in the Town and can provide both bicycle and pedestrian access at limited cost.

e. Benson's Site

The soon to be acquired Benson's site represents a significant opportunity for the Town to provide open space and recreational activities. It is important to provide access to the Benson's site by means other than just by personal vehicle. This will allow and encourage those who cannot drive to participate in recreational and educational activities as well as reduce traffic congestion and the need for excessive parking areas during larger events. The 168-acre property abuts two large tracts of land on the north and east destined for residential development. Sidewalks and a crosswalk to the main entrance of the site on Kimball Hill Road should be considered during any development of the northern site (Shepherd's Hill). In addition, Map V-14 illustrates walking and riding distance within a mile of the Park. Each circle represents a quarter of a mile. It is recommended that multi-use paths be considered for future development within this radius. See Chapter VIII, Community Facilities for additional detail on the Benson's site.

Map V-14. One Mile Radius of Benson's Site



f. Riverwalk

Another future opportunity is a proposed bicycle and/or pedestrian route along the Merrimack River. The Merrimack River Shoreline Assessment Phases I & II[10] investigated the possibility of developing a trail, a location for a boat ramp, and additional recreational opportunities along the river. The best location for a riverside boat ramp and/or park lies in north Hudson. The opportunity exists to secure recreation easements on two parcels (Map 23, Lot 5 and Map 23, Lot 4-1). The riverside trail could continue south through the "Riverwalk" elderly housing development where a trail is indicated on the site plan, and on through the existing easements in the Garrison Farms Subdivision. Due to the proximity of houses to the river bank, the trail would need to be diverted to Webster Street and go under the Taylor's Falls/Veterans Bridge (with some work on the existing 1.25 acre Town-owned property). The existing sewer easement on Map 47, Lots 136 and 138 may then suffice to connect a 0.05 acre piece of Town-owned land near the bridge to Merrill Park. First Brook will be difficult to cross due to the proximity of houses and the width of the floodplain. The trail could wind through the neighborhoods and join the existing sidewalks on Central Street. Once on the Central Street sidewalk system, pedestrians could access the Town Center area, Lions Hall, the skateboard park or the Benson's site.

PSNH easement on the Friary property

Bicyclists or pedestrians who wish to follow the river further south would turn down Riverside Street to Riverview Avenue. The Town owns 0.44 of an acre (Map 45, Lot 26-16) at the convergence of Second Brook and the Merrimack River. The route would continue down Radcliffe Drive, up Winnhaven Drive and along Birch Street to Lowell Road. The Birchcroft subdivision is directly on the river making it unfeasible to continue the route along the water. It is recommended that the Town consider acquiring a recreational easement along the northern property line of the former Friary property and investigate alternatives to connect the Birchcroft subdivision to the existing trail along the PSNH powerlines on the PressTek property. A 30-foot sewer easement does run through the Friary property and parts of it could possibly be used as a trail. There is a 15-foot ROW to Executive Drive within the Industrial/Technology Park between PressTek and Southeast Container Corporation. At the present time the Town is pursuing additional easements along the rivers edge to the south. The steepness of the banks increase at Atrium Medical, which currently has a recorded easement. The cost of construction may be prohibitive to continue along the waters edge any further. There is a separated bicycle/pedestrian path at the southern end of the industrial park that crosses the

[10] Nashua Regional Planning Commission, *Town of Hudson, Merrimack Riverwalk Shoreline Survey*, February, 2000 and *Merrimack River Shoreline Assessment Phase II*, December, 2000.

Merrimack River on the Sagamore Bridge into the City of Nashua. See NRPC's *Merrimack River Shoreline Assessment, Phase II*, December 2000, for more details and maps.

5. Funding for Bicycle and Pedestrian Facilities

Funding for bicycle and pedestrian facilities could be obtained through a Town pedestrian and/or bicycle facilities fund, the collection of impact fees, or through an application to the NH DOT Transportation Enhancements Program. The Federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 provided funds for transportation enhancement activities. 10% of the State of New Hampshire's apportionment of the Surface Transportation Program (STP) from the federal highway trust fund must be set aside for transportation enhancement activities. The 1998 Transportation Equity Act for the 21st Century (TEA-21) continued the enhancement program (Appendix V-4). The federal share for the program is a maximum 80% of the total cost and the applicant is responsible for supplying the local 20% match. Some of the projects eligible for the competitive enhancement funds include: bicycle and pedestrian facilities, acquisition of scenic easements, historic preservation, and scenic and transportation museum programs.

F. PUBLIC TRANSIT

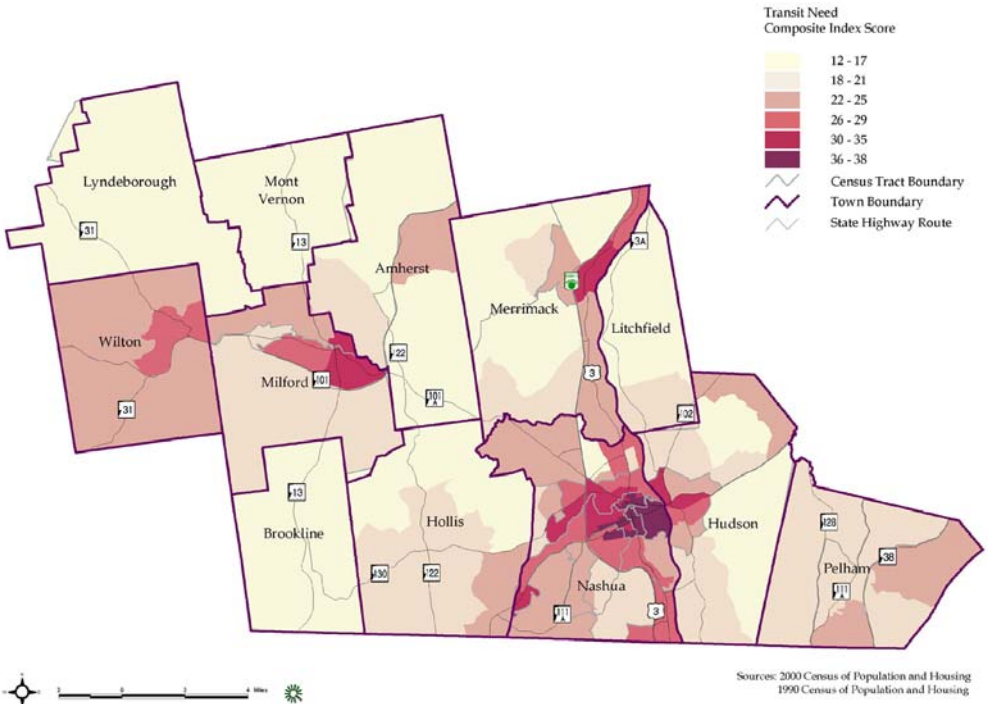
Areas with high densities, high populations of youth, elderly, and disabled persons as well as low median incomes, high poverty rates and lack of automobile availability typically have a significant need for public transit services. Hudson is comprised of three census tracts: tract 121, tract 122 and tract 123. Portions of tract 122, which includes the higher density traditional center of Hudson, ranks high in many of these categories and therefore exhibits a significant need for transit service. Introducing fixed route transit service in this area would facilitate mobility and increase access to employment opportunities, commercial and retail establishments, and future commuter rail service.

1. Transit Needs Index Score

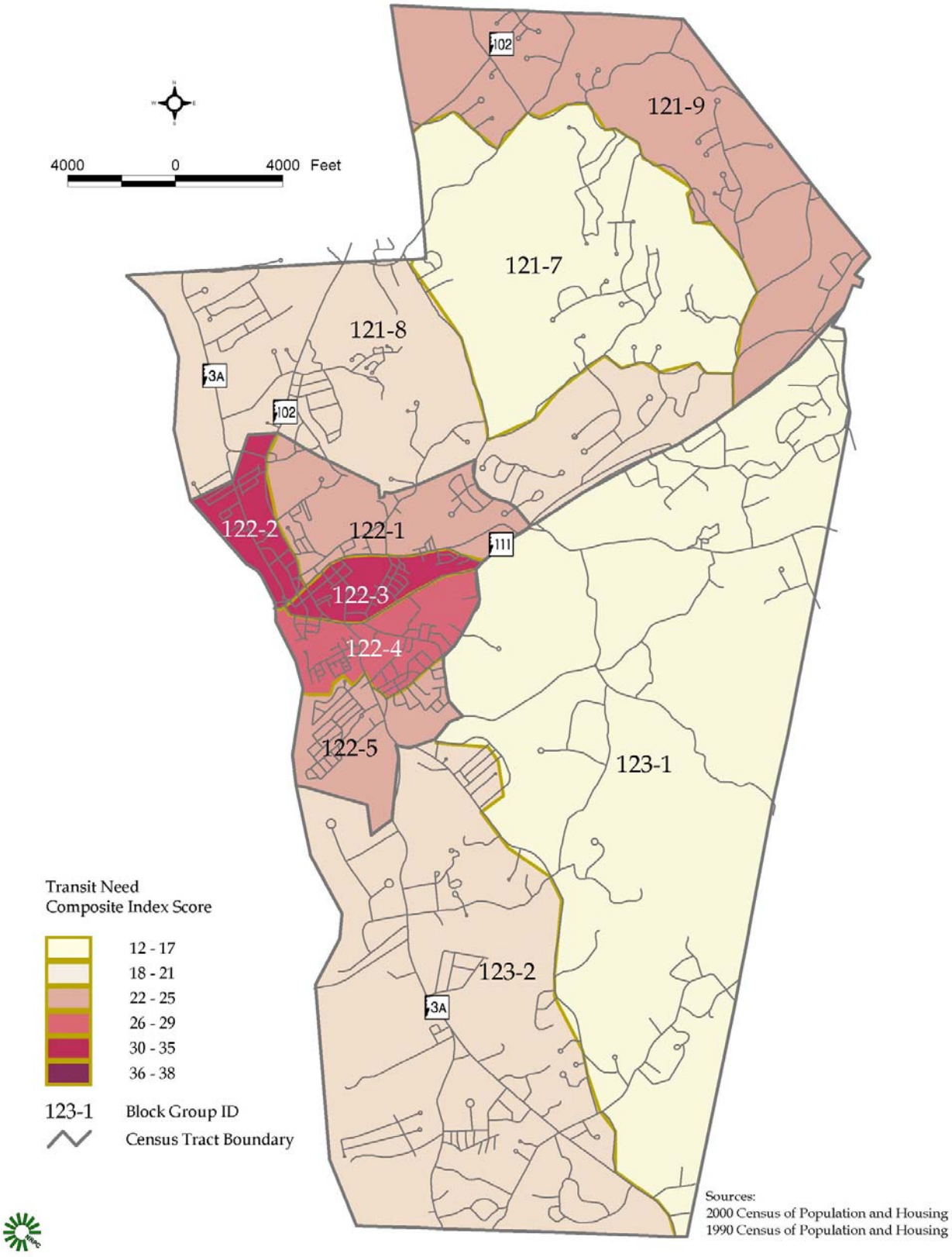
The Nashua Regional Planning Commission (NRPC) used the following methodology to develop a transit needs index and identify the areas of greatest transit need throughout the region. Each census block group (the smallest geographic area designated by the US Census Bureau) within the region was ranked by an index score to determine the geographic areas in greatest need of transit services. The index score was developed by assigning a rank to each block group based on seven transit needs factors as follows: 1) population density; 2) youth population; 3) elderly population; 4) disabled status; 5) median household income; 6) poverty status; and 7) automobile availability.

All of the block groups were assigned a number between 1 and 6 for each of the seven transit need categories. A ranking of 1 indicates a low transit need and 6 indicates a high transit need. For instance, higher densities can better support public transit, so a block group with a population density of 100 people per square mile would receive a 1, while a density of 10,000 people per square mile would receive a 6. The rankings of 1-6 were then totaled for each block group for a possible index score between 7 and 42. Map V-15 illustrates the composite index scores for all block groups within the region. Map V-16 illustrates the composite index scores for all block groups within Hudson. Index scores are shown in Table V-18. The highest index score indicates the greatest potential transit need while the lowest score indicates the lowest potential transit need.

Map V-15. Region Wide Transit Need Index Score



Map V-16. Hudson Transit Need Index Score



Maps V-15 and V-16 indicate that Hudson's Town Center has one of the highest transit needs in the region, especially along NH 102, NH 111, and NH 3A. Residents in the Town Center and surrounding areas have a high transit need based on a high concentration of elderly and disabled persons with median incomes between $39,500 and $52,000, as well as increased poverty rates and a large percentage of households with zero or one vehicle available. The Town Center's proximity to Nashua makes this an ideal location to create a transit connection and increase access between residences, retail establishments, and employment sites.

Table V-18. Index Scores by Block Group ID

Block Group ID	Pop. Density	Density Index	Median HH Income	Income Index	% In Poverty	Poverty Index	% Elderly	Elderly Index	% Youth	Youth Index	% Disabled	Disabled Index	% with 1-2 Cars	Cars Index	Total Index
121-7	484.31	2	$86,517	1	0.0	1	3.5	1	35.1	6	9.2	2	17.9	2	15
121-8	1071.34	3	$78,520	2	1.7	2	7.0	3	31.5	5	10.4	2	19.0	2	19
121-9	457.26	2	$61,677	4	5.0	5	4.8	1	35.4	6	10.7	2	23.4	3	23
122-1	1386.35	3	$55,930	4	4.9	5	11.8	5	25.8	2	12.6	3	29.1	3	25
122-2	3653.94	5	$39,500	5	6.2	5	10.0	4	28.3	3	13.3	3	51.4	5	30
122-3	2872.59	4	$43,321	5	2.9	3	14.3	6	25.3	2	21.4	6	33.9	4	30
122-4	2659.25	4	$47,500	5	2.8	3	8.1	3	27.1	2	18.1	5	46.8	5	27
122-5	2697.10	4	$60,650	4	2.6	3	9.1	3	26.7	2	14.3	4	29.6	3	23
123-1	379.33	2	$71,064	2	0.6	1	5.3	1	31.9	5	10.0	2	22.7	3	16
123-2	707.97	3	$74,464	2	1.8	2	9.6	4	30.3	4	10.1	2	17.0	2	19

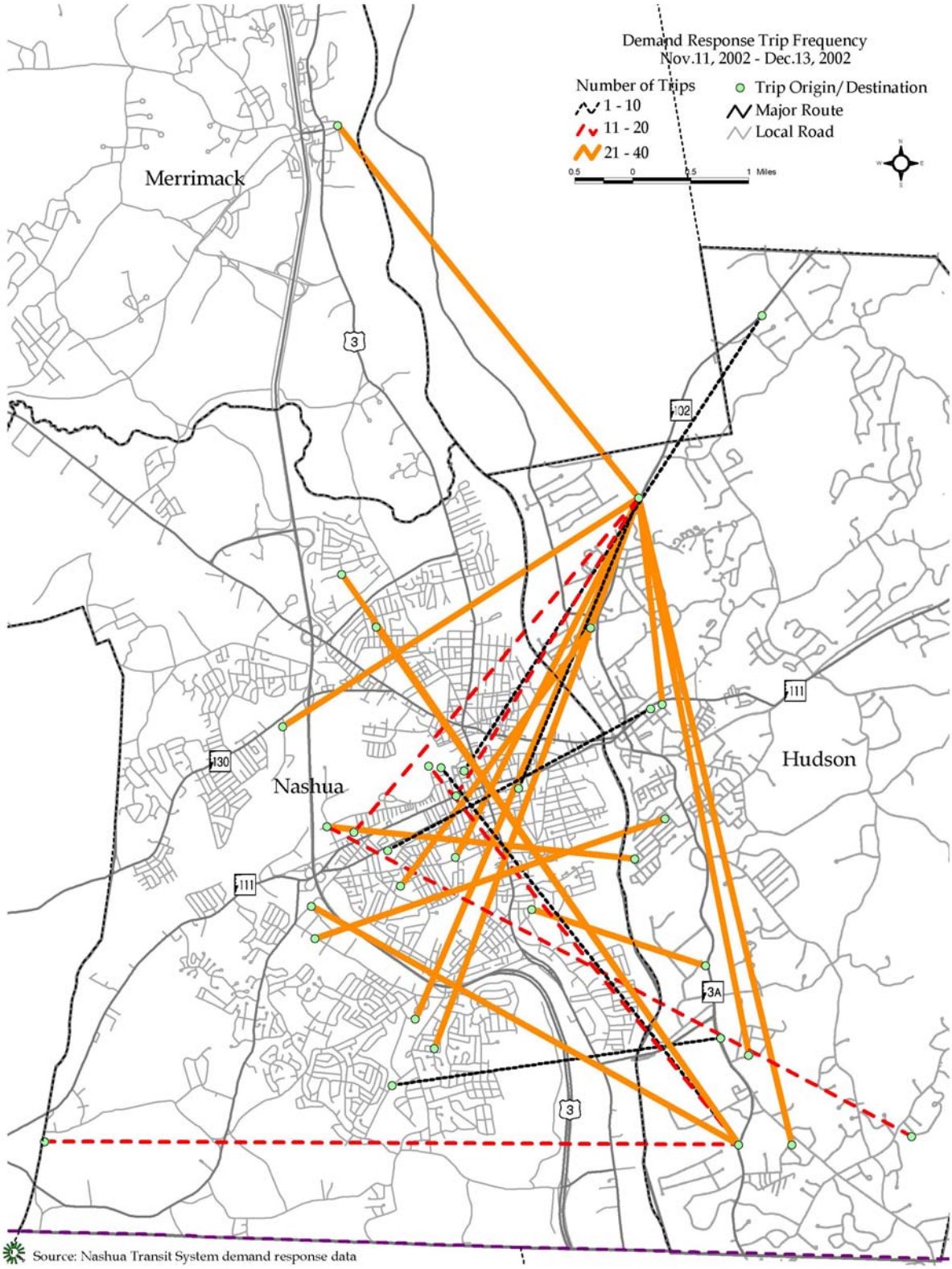
Source: NRPC, 2003.

2. Demand Response Service

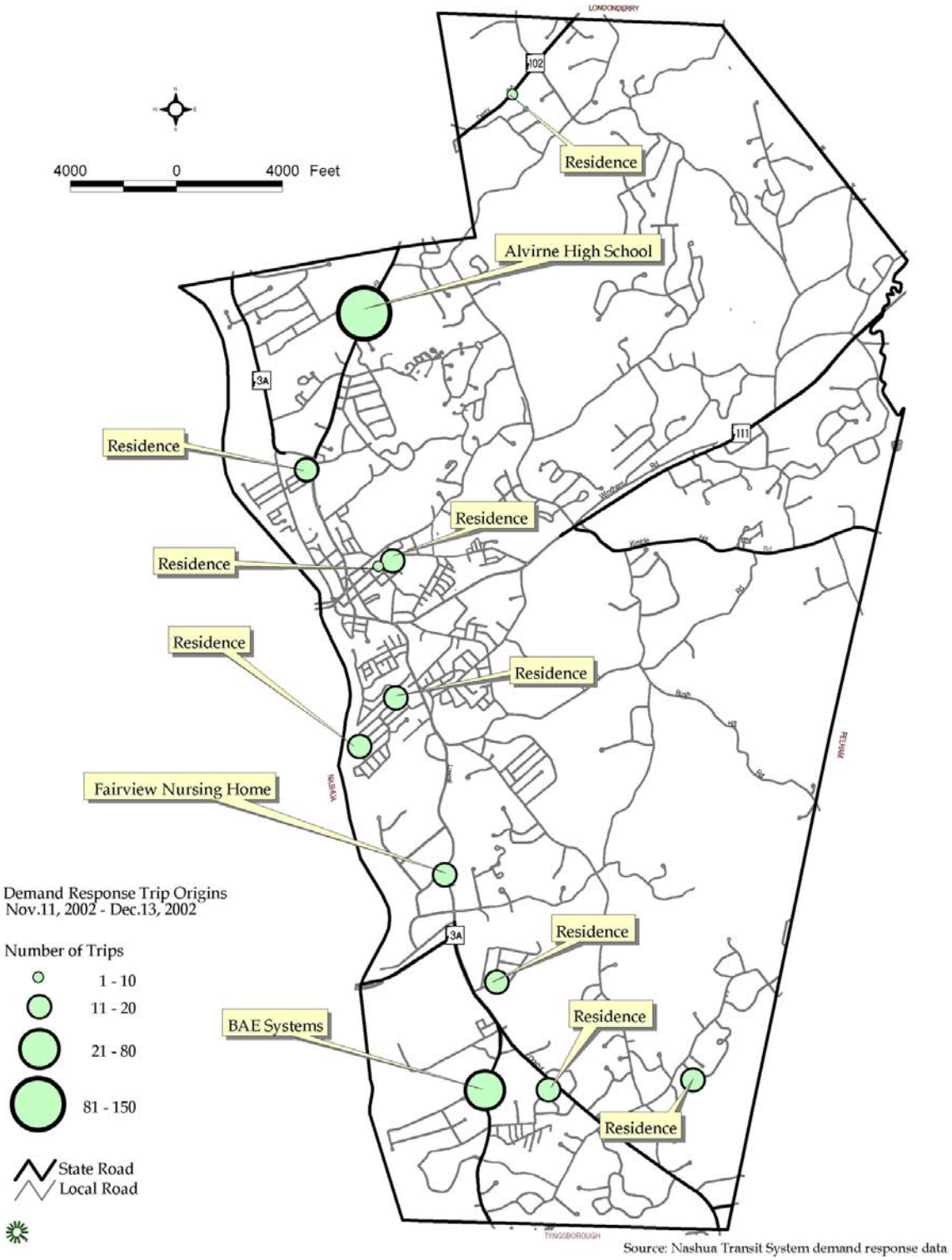
Demand response service currently operates in Hudson, Monday through Friday, between the hours of approximately 8:00 – 10:30AM and 1:00 – 3:30PM. All demand response trips during a four week period between November 11th – 22nd 2002 and December 2nd – December 13th 2002 have been counted and mapped to determine the total number of rides provided in Hudson as well as the most common origin and destination points within the Town.

Map V-17 uses different lines to depict the frequency of trips between each origin and destination point. Map V-18 illustrates the number of trips originating at demand response locations throughout Hudson. Map V-19 illustrates the number of trips terminating at demand response locations throughout Hudson. Alvirne High School and BAE Systems have the greatest number of trips originating and terminating at their locations. Over the four week period, 144 trips originated and 144 trips terminated at Alvirne High School, located at 200 Derry Road, for a total of 288 demand response trips. These trips are providing rides for adults who participate in the Adult Day Services program offered at the high school. BAE Systems, at 65 River Road, had the second largest number of trips with 76 trips originating and 65 trips terminating for a total of 141 demand response trips. A number of disabled adults work an early morning shift at BAE Systems. This shift starts too early to be accommodated by Citylift, so many riders only use demand response for their return trip home. This explains the greater number of demand response trips originating compared to terminating at BAE Systems.

Map V-17. Demand Response Trip Frequency, 2002

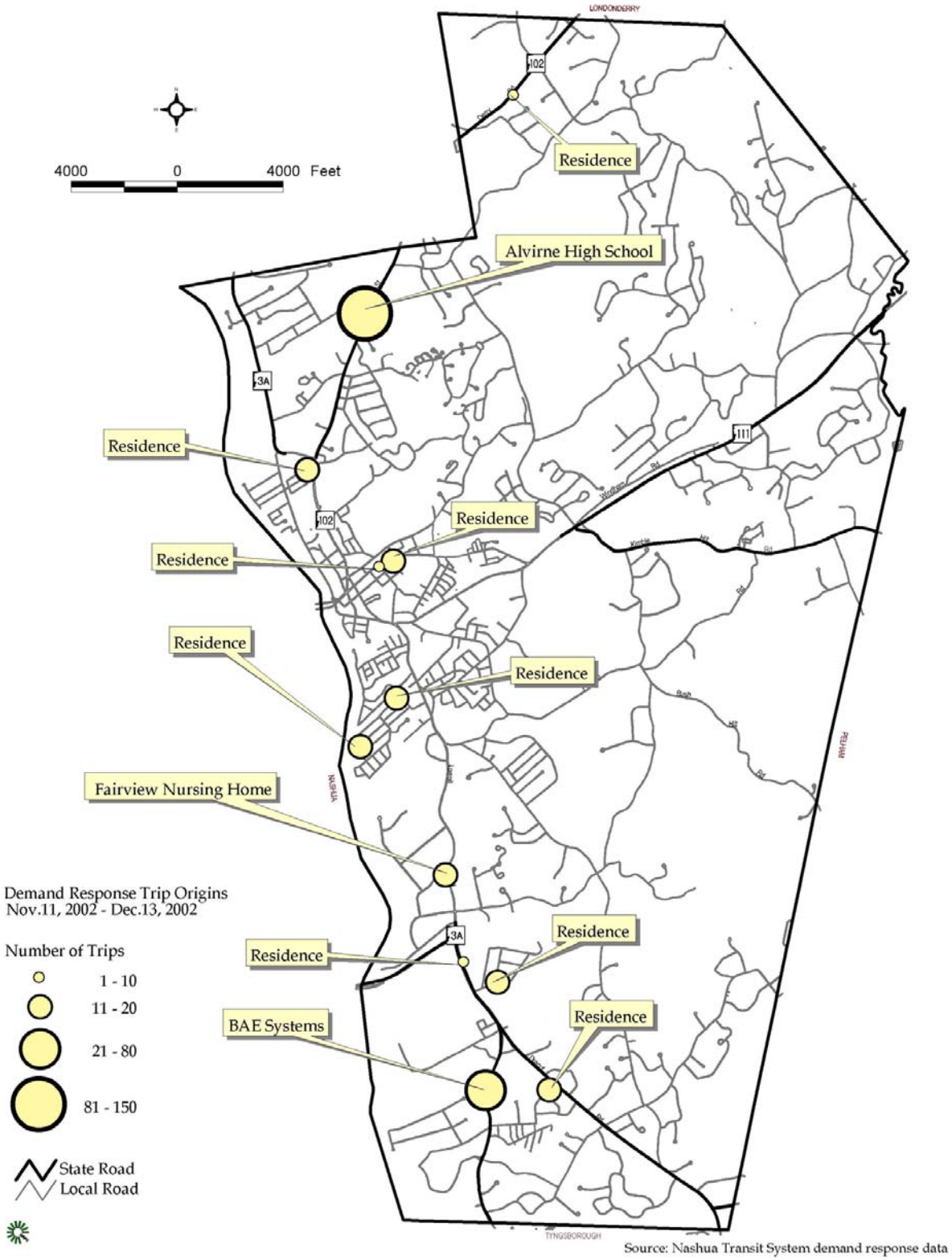


Map V-18. Demand Response Trip Origins



Source: Nashua Transit System demand response data

Map V-19. Demand Response Trip Destinations



Source: Nashua Transit System demand response data

Due to the lack of fixed route service in Hudson, demand response service is the only public transit service currently available to passengers. Although Hudson contributes to the cost of demand response service, the primary beneficiaries are Nashua residents traveling to the Adult Day Services program at Alvirne High School and Plus Company clients from Nashua traveling to BAE Systems. It would be more appropriate for the benefiting social service agencies to fund this service. This could be accomplished by direct contracts for services between the social service agencies and Nashua Transit System.

Qualifying disabled adults and children as well as senior citizens can use demand response service; however, the 2000 Census data indicates that a significant transit need also exists amongst the greater population. Census tract 122 has a median household income of $49,753, with 294 individuals in a state of poverty, 1,228 disabled persons and 189 households with no available vehicle. These findings suggest many Hudson residents would benefit from public transit service to access employment and commercial establishments. The most beneficial investment that Hudson could make in transit would be contributions to develop regularly scheduled transit service in the Town. The following describes a plan for transit service development in the community.

3. Suggestions for Future Service Improvements

Southern New Hampshire is one of the most populated and fastest growing areas of the state. Continued growth will increase the need for public transit services to facilitate access to employment and retail locations throughout the region. Demand response is currently the only public transit service available in the Town of Hudson, and serves elders and individuals with disabilities who cannot utilize fixed route service. Fixed route service would provide rides to the general public at established times. Below is a three phase scenario to integrate fixed route service into Hudson starting with the most cost effective option and ending with the highest service option. All proposed services will operate Monday through Friday and include the assumption of continued limited demand response service in Hudson. The proposed routes are illustrated on Map V-20.

a. Phase 1

- A single bus commuter service with limited designated stops; however, passengers may signal the bus to stop at safe locations along the route.
- Six round trips per day, three during peak morning hours and three during peak afternoon hours.
- The proposed loop would leave the transit center in downtown Nashua, cross over the Taylor's Falls/Veterans Bridge into Hudson center, travel south on Lowell Road past Wal-Mart and Sam's Club, circle around BAE systems, and head north again on Lowell Road, then west over the Sagamore bridge, and return to the transit center.
- Due to bridge traffic this run will travel eastbound on Bridge Street over the Taylor's Falls Bridge, south down Lowell Road and westbound over the Sagamore bridge during the morning runs, and in the reverse direction during afternoon runs.

b. Phase 2

- A single bus commuter service during the morning and afternoon peak hours with midday deviated fixed route service.
- Six round trips per day, three during peak morning hours and three during peak afternoon hours.

- The commuter service would travel the same route as discussed in Phase 1; however, the midday deviated fixed route service will travel solely within the Hudson town limits and will deviate within ¾ mile of either side of the fixed route.

c. Phase 3

- This level of service would require one bus designated for Hudson service only and an additional shared bus to extend the existing Nashua service to connect with Hudson's Town Center.
- A shelter would be located in Hudson's Town Center to serve as a transfer point between the two buses.
- The Hudson bus would run north and south between the Town Center and southern points on Lowell Road, while the extended Nashua service would cross the Taylor's Falls Bridge into Hudson's Town Center, head north on NH 102 and circle the Hudson Mall, stop at the transfer point and return to the Nashua transit station along the same route.
- Both routes would provide fixed route service during the NTS weekday hours of operation.
- Demand response service would operate within ¾ mile of either route.

The interconnection between Nashua and Hudson is constrained by traffic, especially at the Taylor's Falls/Veterans Bridge and Sagamore Bridge, making it difficult to maintain a regular schedule. Regularly scheduled service would be more feasible with the anticipated traffic relief associated with the construction of the Circumferential Highway bridge over the Merrimack River. Please note that the proposed transit services are intended to serve as a guide and specific service options will need to be jointly developed between the Town and Nashua Transit System.

4. Cost of Proposed Future Service Improvements

An estimate of the annual cost of the proposed future service improvements is shown in Table V-19. The *Total Project Cost* identifies the total cost of providing the service on a yearly basis, the *Percentage of Local Match* lists the percentage of the total expense that must be provided as a local match, and the *Total Local Cost* lists the total annual cost to Hudson to provide the service. The local match percentage is based on Section 5307 funds, which provide a 50% federal match and 50% local match. Congestion Mitigation and Air Quality (CMAQ) funds may provide additional funding opportunities. CMAQ monies are competitive grant funds and there are no guarantees that this project would receive these funds. CMAQ funds provide an 80% federal match and 20% local match for operating the first three years of a pilot transit project, after which time local communities would need to provide other funding sources for continued service.

Table V-19. Financial Analysis for Service Extensions to Hudson

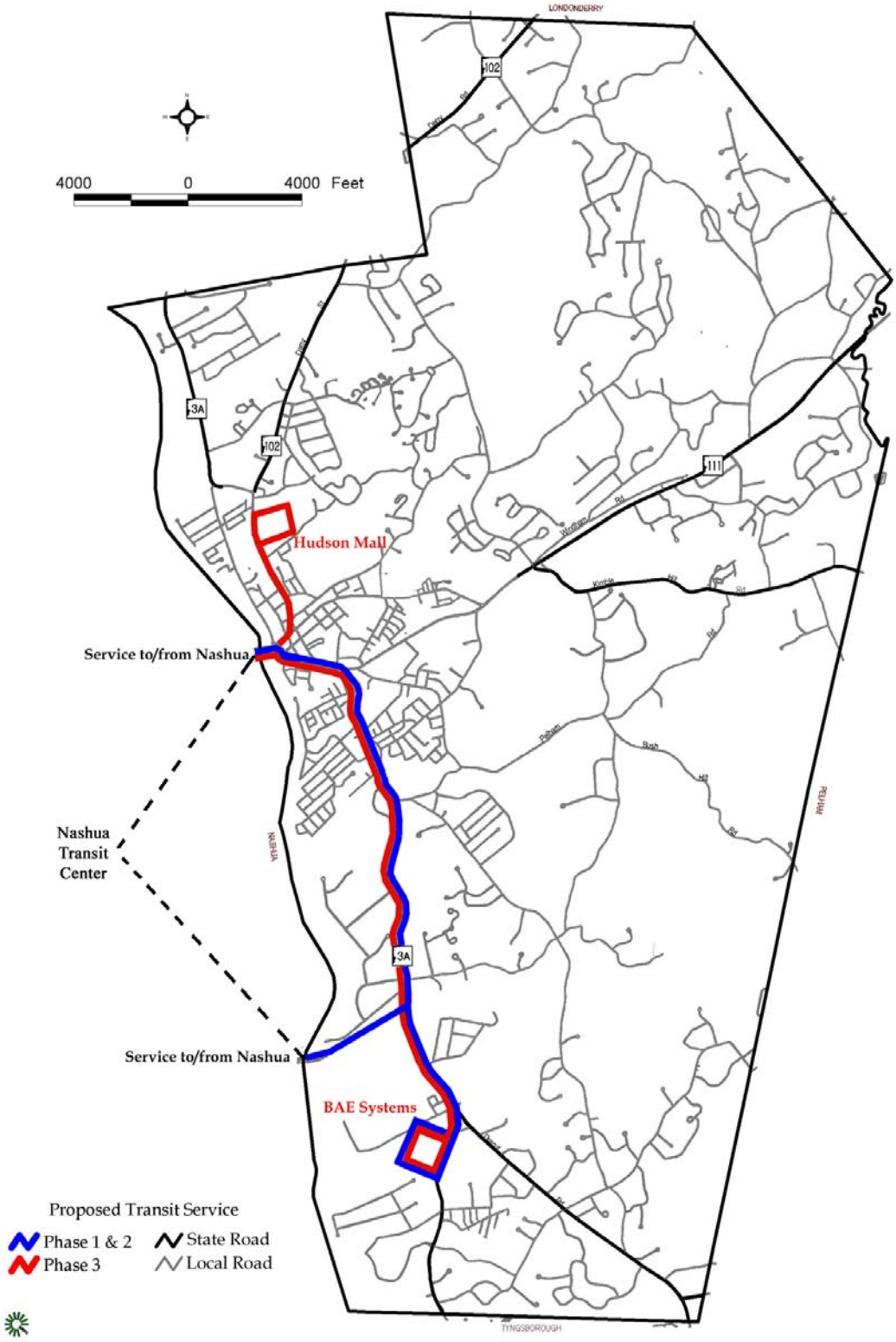
Type of Service	Phase 1	Phase 2	Phase 3
Fixed Route Loop	$75,000	$75,000	-
Midday Deviated Fixed Route*	-	$68,000	-
Fixed Route Hudson Mall	-	-	$62,500
Fixed Route Hudson only	-	-	$125,000
Demand Response**	-	-	$35,000
Total Project Cost	**$75,000**	**$143,000**	**$222,500**
Percentage of Local Match	50%	50%	50%
Total Local Cost	**$37,500**	**$71,500**	**$111,250**

Note: These numbers are estimates and based on Fiscal Year 2003 costs.

* Phase 2 Midday service will provide deviated fixed route service within ¾ mile of either side of the fixed route. This service will be limited to Hudson town limits and will operate during the midday, between the commuter service runs.

** Phase 3 Demand Response service cost assumes 6 hours of service, Monday through Friday, for the first year. Demand will determine future service hours and costs.

Map V-20. Proposed Future Transit Service



G. RECOMMENDATIONS

- The Town should budget for traffic improvements in its Capital Improvement Program and undertake a systematic transportation system improvement program. The Town should include in its CIP improvement projects for the NH 102/NH 111/Chase Road intersection, the NH 111/Kimball Hill Road/Greeley Road intersection and the NH 3A/County Road (south) and County Road/Belknap Road intersections. The Town should work closely with NH DOT and NRPC to secure federal funding for eligible road projects.
- The Town should develop further engineering studies to assess safety at high accident rate intersections.
- The Town should develop further traffic engineering studies to assess the impact of changing patterns of future traffic conditions, especially along the corridors of NH 3A, Dracut Road, and NH 111.
- The Town should encourage alternative commuting options for residents including fixed route bus routes, carpooling and vanpooling, and commuter rail.
- The Town should reconsider its pavement width requirements for local streets and sidewalks based on function and needs.
- The Town should employ access management techniques for the purpose of preserving roadway capacity and ensuring safe movement for vehicles entering and exiting curb cuts and side roads. These techniques should be applied to major corridors in the Town including NH 3A, NH 102, NH 111 and Dracut Road. Access management techniques that should be pursued include implementing minimum driveway separation distances based on roadway speed, entering into a Memorandum of Understanding with the NH DOT for review of access points and other techniques as recommended in the NRPC *Access Management Guidelines*, 2002.
- The Town should re-assess existing site plan, subdivision and zoning requirements based on recommendations included in the NRPC's, *Non-Residential Development Community Character Guidelines*, 2000. Any revisions based on these site design guidelines could also enhance the access management goals.
- The Town should utilize traffic calming measures where appropriate based on traffic flow and right of way constraints to direct and control traffic through neighborhoods.
- The Planning Board should maintain close contact with the NH DOT to ensure ample opportunity for public and Town input regarding any planned changes to state roads within Hudson or routes feeding traffic into Town.
- The Town should consider utilizing the State's scenic designation statute to preserve the rural integrity of specific roads, with input from the Town's Highway Safety Committee and the public.
- The Town should continue to consider widening and restriping roadways for bicycle access whenever roadways are repaved or reconstructed.
- The Town should connect the missing links in the Town Center sidewalk network.
- The Town should implement the recommended improvements necessary to develop a regional and key connector bicycle and pedestrian network, including the installation of signage, connector routes and crosswalks.
- The Planning Board should ensure that multi-use paths are considered for future development within a one-mile radius of the Benson's site.

- The Town should consider utilizing the remaining Class VI roads for bicycle and pedestrian access.
- The Town should continue to implement the recommendations of the *Town of Hudson, Merrimack River Shoreline Assessment*, *Phase II,* December 2000.

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APPENDIX V-I

Classification Schemes

State Aid Classification[11]

Class I, Primary State Highway System, consists 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, provided that the portions of turnpikes and interstate highways within the compact sections of those cities are Class I highways.

Class II, Secondary State-Highway System, consists 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. 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 State. All other bridges shall be maintained by the city or town until such improvement is made.

Class III, Recreational Roads, consist of all such roads leading to, and within state reservations designated by the Legislature. The NH DOT assumes full control of reconstruction and maintenance of such roads.

Class IV, Local Roads, consist of all local roads within the urban compact sections of cities and towns listed in RSA 229:5, V. The urban compact section of any such city or town shall be the territory within such city or town where the frontage on any road, in the opinion of the Highway Commissioner, is mainly occupied by dwellings or buildings in which people live or business is conducted, throughout the year. No highway reclassification from Class I or II to Class IV shall take effect until all rehabilitation needed to return the road surface to reputable condition has been completed by the State.

Class V, Rural Local Roads, consist of all other traveled roads which the town or city has the duty to maintain regularly.

Class VI, Local Roads, Not Maintained, consist of all other existing public ways, including roads subject to gates and bars, and roads not maintained in suitable condition for travel for five years or more.

[11] NH Department of Transportation, 2004.

APPENDIX V-1 (Continued)

Classification Schemes

Functional Classification[11]

Principal Arterial, provides corridor movement suitable for substantial statewide or interstate travel and provides continuity for all rural arterials which intercept the urban area. Serves the major traffic movements within urbanized areas such as between central business districts and outlying residential areas, between major inter-city communities or between major suburban centers. Serves a major portion of the trips entering and leaving the urban area, as well as the majority of the through traffic desiring to bypass the central city.

Minor Arterial, serves trips of moderate length at a somewhat lower level of travel mobility than principal arterials. Provides access to geographic areas smaller than those served by the higher system. Provides intra-community continuity, but does not penetrate identifiable neighborhoods.

Collector, collects traffic from local roads and channels it into the arterial system. Provides land access and traffic circulation within residential neighborhoods and commercial and industrial areas.

Local, comprise all facilities not on higher systems. Provides access to land and higher systems. Through traffic usage is discouraged.

Town of Hudson Street Classification

Major Streets - Streets designed, or required, to carry large volumes of traffic to, from, or through the Town.

Collector Streets- Streets designed, or required, to collect traffic from minor streets and distributing traffic to major streets.

Commercial Streets - Streets designed, or required, to serve industrial or mercantile concentrations and carry traffic to major streets.

Residential Streets - Streets designed, or required, to provide vehicular access to abutting residential properties.

Service Streets - Streets designed, or required, to provide vehicular access to abutting commercial or industrial properties.

Access Streets - Streets or minor ways**,** designed, or required, to provide vehicular access to off-street loading or off-street parking facilities.

[11] NH Department of Transportation, 2004.

APPENDIX V-2

Existing Weekday Traffic Counts and Historic Trends In Hudson

	Barrett Hill Road E. of Greeley Street 229034		Belknap Road S. of Central Street 229069		Bush Hill Road S. of Kimball Hill Road 229043	
Year	Month	Total	Month	Total	Month	Total
1983		1,965				
1984						
1985						
1986					5	3,004
1987	5	2,635		5,323		
1988	8	2,811				
1989			6	5,889		
1990						
1991	5	2,970				
1992			6	5,938	5	2,176
1993	7	3,435				
1994	7	4,004	5	6,005	5	2,357
1995	7	3,611	5	5,653		
1996					5	2,395
1997	7	3,395			7	2,492
1998			11	5,937		
1999						
2000					5	2,985
2001			8	5,976		

	Central Street E. of Adelaide Street 229053		Chase Street S. of School Street 229503		Country Road @ Brook 229085	
Year	Month	Total	Month	Total	Month	Total
1989						
1990			8	8,841		
1991						
1992	8	5,548			9	4,872
1993						
1994	7	5,330				
1995	7	4,451	10	9,539		
1996					9	4,689
1997	7	5,251				
1998			6	10,165		
1999					8	5,680
2000	5	5,818				
2001						

Weekday Traffic Count Trends in Hudson

	Dracut Road @ Massachusetts State Line 229054		Dracut Road 1 mile N. of Mass. S/L 229083		Dracut Road S. of NH 3A 229504	
Year	Month	Total	Month	Total	Month	Total
1984						7,300
1985						
1986						
1987						
1988	8	7,765				
1989					6	8,083
1990						
1991	5	6,392			6	8,456
1992	5	6,390				
1993	6	7,333			6	10,365
1994	8	7,245	6	10,544		
1995	7	7,065	7	9,738		
1996	8	7,669				
1997			7	11,031	5	11,018
1998	11	7,628				
1999	8	8,192				
2000			9	11,772		
2001	9	7,923				

	Flagstone Drive W. of NH 3A 229505		Greeley Street N. of NH 111 229519		Greeley Street S. of Highland Street 229033	
Year	Month	Total	Month	Total	Month	Total
1983	5	4,027				2,524
1984						
1985						
1986			5	4,442		
1987						
1988					8	3,751
1989					8	3,659
1990						
1991					5	3,652
1992	5	3,620				
1993						
1994					7	4,770
1995			5	5,148	7	4,461
1996						
1997					7	4,952
1998						
1999						
2000					5	5,944
2001						

Weekday Traffic Count Trends in Hudson

	Greeley Street N. of Highland Street 229084					
Year	Month	Total	Month	Total	Month	Total
1997	7	3,401				
1998						
1999						
2000	5	4,735				
2001						

	Highland Street N. of George Street 229032		Kimball Hill Road E. of Bush Hill Road 229072		Kimball Hill Road S. of NH 111 229060	
Year	Month	Total	Month	Total	Month	Total
1984		2,112				
1985						
1986				3,188		
1987	5	4,361				
1988			10	3,840		
1989						
1990	10	2,752			10	4,931
1991			10	3,762		
1992						
1993	9	3,151			9	4,950
1994						
1995	7	3,646	7	4,081	7	5,161
1996	8	3,447			8	5,407
1997						
1998			11	3,803	11	5,577
1999	8	4,068				
2000						
2001					8	6,001

Weekday Traffic Count Trends in Hudson

	Library Street N. of Central Street 229091		Library Street S. of School Street 229508		Melendy Road S. of Central Street (@Brook) 229068	
Year	Month	Total	Month	Total	Month	Total
1990			7	8,592	7	2,206
1991						
1992					9	2,612
1993					6	2,885
1994	7	8,975				
1995			10	9,128		
1996						
1997	7	8,738			5	2,720
1998						
1999						
2000	9	9,114			5	2,873
2001						

	Old Derry Road @ Londonderry T/L 229056		Old Derry Road E. of NH 102 229086		Pelham Road E. of NH 3A 229509	
Year	Month	Total	Month	Total	Month	Total
1983						696
1984						
1985						
1986						
1987						
1988						
1989					4	3,257
1990						
1991						
1992					5	3,972
1993						
1994			6	2,499	5	4,102
1995	7	432	7	2,730		
1996						
1997					8	3,634
1998	11	564	11	3,315		
1999						
2000						
2001			8	3,340		

Weekday Traffic Count Trends in Hudson

	Pelham Road E. of Melendy Road 229078		Sullivan Road S. of NH 111 229063		Wason Road E. of NH 3A 229038	
Year	Month	Total	Month	Total	Month	Total
1983						1,928
1984						
1985						
1986						
1987					5	2,808
1988					8	4,796
1989			7	1,705		
1990	10	1,036				
1991	5	1,023			5	6,131
1992			9	1,610		
1993			6	1,788	5	7,204
1994	7	985			7	7,691
1995	7	936			7	7,538
1996						
1997	7	1,013	7	1,546	7	8,811
1998						
1999						
2000	5	1,402	5	1,670	9	8,547
2001						

	Wason Road S. of Pelham Road 229037		Webster Street S. of NH 3A (Elm Avene) 229030		NH 102 @ Litchfield Town Line 229021	
Year	Month	Total	Month	Total	Month	Total
1983		895				
1984				811		
1985						
1986						
1987	5	2,412	5	2,142		
1988						
1989					9	16,261
1990					10	15,167
1991	5	1,762			5	15,947
1992			6	2,646	5	16,808
1993					6	16,907
1994						
1995			6	1,576	6	17,175
1996	9	3,030			5	18,208
1997					5	18,268
1998			6	1,396	7	17,905
1999	8	3,360				
2000						
2001			8	1,805	8	17,471

Weekday Traffic Count Trends in Hudson

	NH 102 @ Londonderry Town Line 229514		NH 102 N. of Easy Street 229041		Pelham Road W. of Bush Hill Road 229036	
Year	Month	Total	Month	Total	Month	Total
1983		13,805				
1984						
1985						
1986						
1987						
1988						
1989						
1990						
1991	9	12,517				
1992			5	18,835		
1993	8	12,990				
1994						
1995			5	19,028		
1996						
1997	7	15,221				
1998			7	19,268		
1999					8	1,180
2000						
2001			8	20,253		

	NH 102 N. of Ledge Street 229031		NH 102 N. of NH 111(Ferry Street) 229050		NH 111 @ Windham Town Line 229059	
Year	Month	Total	Month	Total	Month	Total
1983		24,444		16,659		
1984						
1985						
1986		28,800				
1987	5	32,107				
1988						
1989			4	20,582		
1990	10	28,957				
1991					9	14,682
1992	7	29,646			9	16,756
1993	6	31,544	6	21,869		
1994	8	30,196			8	16,471
1995	7	29,744				
1996	8	30,162				
1997			7	20,812	7	17,377
1998						
1999	8	31,386				
2000			5	22,030	5	17,154
2001						

Weekday Traffic Count Trends in Hudson

	NH 111 (Central Street) E. of Greeley Street 229035		NH 111 (Central Street) W. of Kimball Hill Road 229071		Clement Road S. of NH 111 229061	
Year	Month	Total	Month	Total	Month	Total
1983		13,593				
1984						
1985						
1986						
1987	5	16,111				
1988			8	22,447		
1989						
1990	10	16,639				
1991			5	22,395		
1992						
1993	6	18,192	7	22,426		
1994			5	24,395		
1995	5	19,412	7	23,061		
1996	5	18,362	9	23,459		
1997	5	16,755	7	23,237		
1998	7	18,276				
1999	8	18,527			9	818
2000			5	22,245		
2001						

	NH 111 (Ferry Street) E. of Library Street 229051		NH 111 (Ferry Street) N. of Central Street 229042		NH 3A (Central Street) E. of Library Street 229052	
Year	Month	Total	Month	Total	Month	Total
1983		12,619		10,046		
1984						
1985						
1986						
1987	5	13,099	5	10,546		
1988						
1989	6	15,834			8	23,187
1990						
1991	4	15,145				
1992	5	16,421	5	14,191		
1993	6	16,168	7	14,185		
1994	5	16,209			7	23,588
1995	5	15,518	7	14,667	7	23,476
1996	5	15,899				
1997	5	16,295				
1998	7	15,694	7	14,874	7	23,499
1999						
2000						
2001	9	15,571	9	13,468	9	23,061

Weekday Traffic Count Trends in Hudson

	NH 3A (Central Street) W. of Library Street 229044		NH3A (Lowell Road) N. of Pelham Road 229513		NH 3A (Lowell Road) N. of Sagamore Bridge 229039	
Year	Month	Total	Month	Total	Month	Total
1983		14,607				20,060
1984						
1985						
1986						
1987						
1988					8	20,733
1989	8	15,072	4	25,001	8	27,646
1990						
1991			5	26,064	8	27,136
1992	8	14,415				
1993			5	27,071	8	26,674
1994	8	14,952			5	26,145
1995					5	29,445
1996					5	31,589
1997			5	27,393	5	31,712
1998	6	16,201			7	29,622
1999						
2000					7	22,666
2001	9	14,126			11	35,212

	NH 3A (Lowell Road) S. of Central Street 229067		NH 3A (Lowell Road) S. of Pelham Road 229073		NH 3A (Lowell Road) S. of Sagamore Bridge 229049	
Year	Month	Total	Month	Total	Month	Total
1983		15,176				14,173
1984						
1985						
1986						
1987	5	25,441	5	24,541	5	21,305
1988						
1989					6	19,819
1990						
1991						
1992	5	25,365	5	24,794	6	23,593
1993	8	24,566				
1994					7	22,130
1995	8	25,433	5	25,899	7	22,682
1996					5	24,095
1997			7	25,927	5	25,202
1998			11	26,932	6	25,099
1999						
2000					7	27,388
2001	8	25,807	8	28,149	11	23,194

Weekday Traffic Count Trends in Hudson

	NH 3A (River Road) @ Massachusetts State Line 229055		NH 3A (River Road) S. of Dracut Road 229512		NH 3A (Webster Street) S. of Derry Lane 229040	
Year	Month	Total	Month	Total	Month	Total
1983		4,822				
1984				8,500		
1985		5,021				
1986						
1987	5	9,082				
1988						
1989	8	8,622	6	11,535		
1990	10	7,523				
1991	8	9,363	6	11,495		
1992	9	10,581				
1993	6	10,928				
1994	8	11,031			7	8,632
1995	8	11,336			7	8,031
1996			5	12,294	8	8,384
1997	7	10,859				
1998						
1999					8	8,907
2000						
2001	8	10,899				

Source: NRPC.

APPENDIX V-3

Federal Aid

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) significantly restructured the federal-aid transportation program. ISTEA was re-authorized and revised in 1998 (the Transportation Equity Act for the 21st Century, TEA-21). Descriptions of the various programs which emerged from these transportation bills are as follows:

National Highway System (NHS): This program funds projects on the designated national highway system on an 80% federal, 20% state/local basis. There are no highway routes in Hudson designated as part of the National Highway System

Surface Transportation Program (STP): This program targets the funding of projects by states and localities for any facility with a higher functional classification than rural minor collector. The flexibility of the STP also allows for funding of lower functional classification roadways at the discretion of states and localities. Funding is based upon an 80% federal and 20% state/local share. Projects selected by the Town using their allocated municipal funds or Enhancements require a 20% municipal match. There are four subcategories of STP funds as described below:

- STP < 200,000 - This category of STP exists to fund projects in small urban areas with a population under 200,000. There are statewide and municipal apportionments.
- STP Any Area - This category of STP funds may be used in urban or rural areas.
- STP Transportation Enhancements - This category funds projects submitted by municipalities and chosen through a statewide selection process. Eligible projects include: bicycle and pedestrian facilities, scenic improvements, and preservation of abandoned railroad corridors, historic preservation, rehabilitation of historic transportation facilities and mitigation of water pollution from highway runoff.
- STP Hazard Elimination - These funds are earmarked for minor projects designed to eliminate hazardous roadway or traffic conditions

Bridge Rehabilitation and Replacement: This category includes bridges which are on-system, i.e. those that are functionally classified as higher than local, and off-system, which are municipally owned. The 80% federal/20% local share applies to the bridge category.

Congestion Mitigation and Air Quality (CMAQ): CMAQ funds are eligible for transportation related projects in ozone and carbon monoxide non-attainment areas. Projects must contribute to meeting attainment of national ambient air quality standards, through reductions in vehicle miles traveled, fuel consumption, reduced delay or other factors. Construction of roadway capacity serving single occupancy vehicles is not eligible for CMAQ funding. Funding is 80% federal, 20% state/local.

#220F-5

CHAPTER VI

EXISTING LAND USE

A. INTRODUCTION

Population growth, housing needs, economic trends and the regulatory environment have resulted in direct changes to the Hudson landscape. The Town's existing natural features, roadways and built environment are the foundation for future development and conservation efforts. An examination of existing land use patterns provides a base for the future land use plan presented in Chapter IX. This chapter discusses: 1) historic development patterns; 2) existing land uses, including residential, recreational, commercial, industrial and agricultural land uses; 3) Hudson's existing zoning districts; and 4) an analysis of undeveloped land. Institutional uses are also covered in Chapter VIII, *Community Facilities*.

B. HISTORIC DEVELOPMENT PATTERN

Hudson, with an area of 29.2 square miles, is the sixth largest community in the Nashua region and has the second highest population density in the region (see Table II-6). Hudson has grown dramatically over the past few decades both as a bedroom community for Nashua and employment centers in Massachusetts as well as a center of employment in its own right. By the close of the 19th Century, most of Hudson's 1,200 residents were concentrated in the vicinity of the Taylor's Falls Bridge area. The remainder of the population was located in the old Hudson Center area on NH 111, on fertile farmlands along the Merrimack River, scattered along major roadways and on more isolated farmsteads throughout what was an overwhelmingly rural community. The Town's commercial uses were few and tended to be interspersed with residences to serve the local needs of a non-automobile oriented society. In rural areas, non-residential uses included farms as well as traditional rural industries such as sawmills, cooperages, inns and taverns. As the 20th Century progressed, fundamental technological, economic and social changes took place which would forever alter the landscape in all of the region's communities. Hudson, however, developed differently than most.

Aerial Photograph of Industrial and Commercial Development adjacent to the Merrimack River in Hudson

After World War II, most rural communities confronted development by becoming increasingly residential in character. Hudson, however, welcomed commercial and industrial growth along with residential development even though the Town had not historically been an employment center. Furthermore, although the Town's population grew rapidly, most housing development corresponded with the extension of public water and sewer which resulted in higher density residential development that was reasonably contained to the central and western portions of Town. As a result, much of the eastern portion of the Town has continued to be rural in character. With development of the Sagamore Bridge in south Hudson and improvements to the Town's highway network, commercial development sprawled along major routes such as Lowell Road (NH 3A), Derry Street (NH 102) and Central Street (NH 111). Industrial areas also developed which were to include some the region's largest employers such as Digital Equipment Corporation and Sanders Associates (now known as BAE Systems). The Town's commercial, industrial and residential development, however, consumed most of its rich

productive farmland, some of which was located along the Merrimack River.

C. EXISTING LAND USE

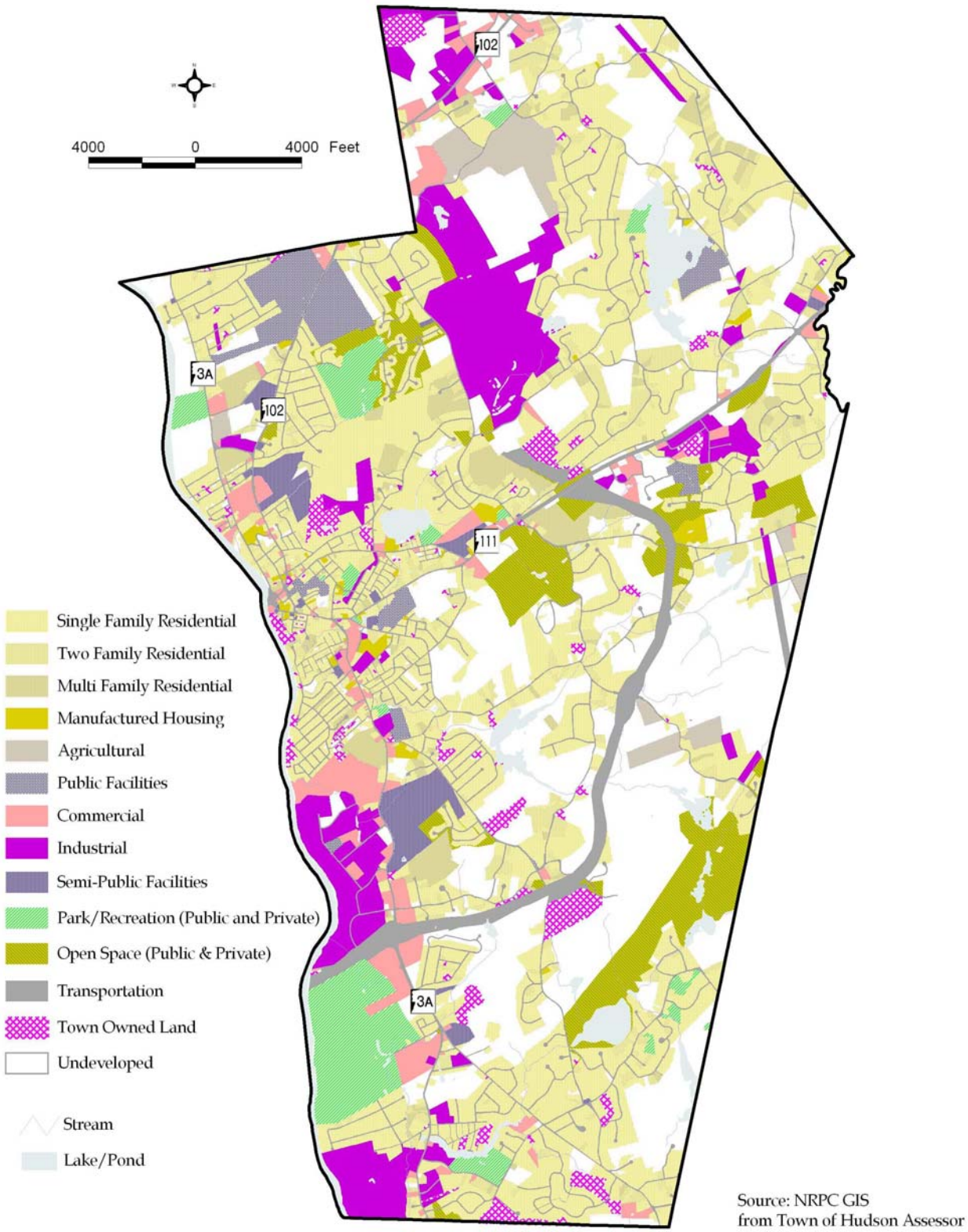
The Nashua Regional Planning Commission (NRPC) maintains a Geographic Information System (GIS) database for generalized land use in Hudson based on data provided by the Town of Hudson Assessor. This GIS database is a general representation of how land is being used and is broken down into various land use categories. The database is parcel specific: i.e., each property is assigned one use for the entire area of the property. These categories include: single family residential, two-family residential, multi-family residential, manufactured housing, park/recreation, commercial, industrial, institutional, agriculture and undeveloped land. The location of these categories is illustrated in Map VI-1 and the area of each category is shown in Table VI-1.

Table VI-1. Area of Generalized Land Use Types in Hudson

Land Use Category	Area (Acres)	Percent of Total Land Area
Single Family Residential	5,271	28%
Two-Family Residential	800	4%
Multi-Family Residential	707	4%
Manufactured Housing	104	0.5%
Commercial	625	3%
Industrial	1,411	8%
Semi-Public Institutional Facilities	283	2%
Public Institutional Facilites	395	2%
Open Space (Public & Private)	1,000	5%
Park/Recreation (Public & Private)	635	3%
Town-Owned	387	2%
Agricultural	290	1.5%
Undeveloped	5,040	27%
Transportation*	1,419	8%
Water	406	2%
Total	**18,773**	**100%**

Source: NRPC GIS parcel database for land use, 2003 and Town of Hudson Assessor, 2003.
* Transportation includes State and Local Roads, Circumferential ROW, Utility ROWs, Private Roads, Class VI Roads.

Map VI-1. Existing Land Use Categories in Hudson, 2003



D. ANALYSIS OF UNDEVELOPED LAND

As of August 2003, approximately 5,330 acres[1] of the total land area in Hudson remained undeveloped for various uses. A simple Buildout Analysis was conducted on this potentially developable land. A Buildout Analysis estimates the amount of developable land remaining in the Town and estimates the number of housing units and non-residential acres that could be developed. The Buildout Analysis considers issues of slope, wetlands and 100-year floodplains as development constraints. Table VI-2 shows the results of this simple Buildout Analysis. The table shows the amount of developable land remaining in the Residential-1, Residential-2, Business, Industrial, Town Residence, General and General-1 Districts. The locations of these Zoning Districts are illustrated on Map VI-2.

Table VI-2. Undeveloped and Developable Land by Zoning District, 2003

Zoning District	Total Area	Undeveloped* Land (acres)	Constrained Land** (acres)	Developable Land (acres)
Residential-1	1,328	65	35	30
Residential-2	4,544	1,079	336	743
Business	740	94	12	82
Industrial	1,185	215	78	137
Town Residence	966	33	6	27
General	2,618	859	282	577
General-1	7,392	2,985	795	2,190
Total	**18,773**	**5,330**	**1,544**	**3,786**

Source: NRPC GIS database, 2003.
* Undeveloped land includes 5,040 acres and 290 acres of agricultural land as defined in NRPC GIS database, 2003.
**NWI Wetlands, 100-year Floodplain, Steep Slope (>25%).

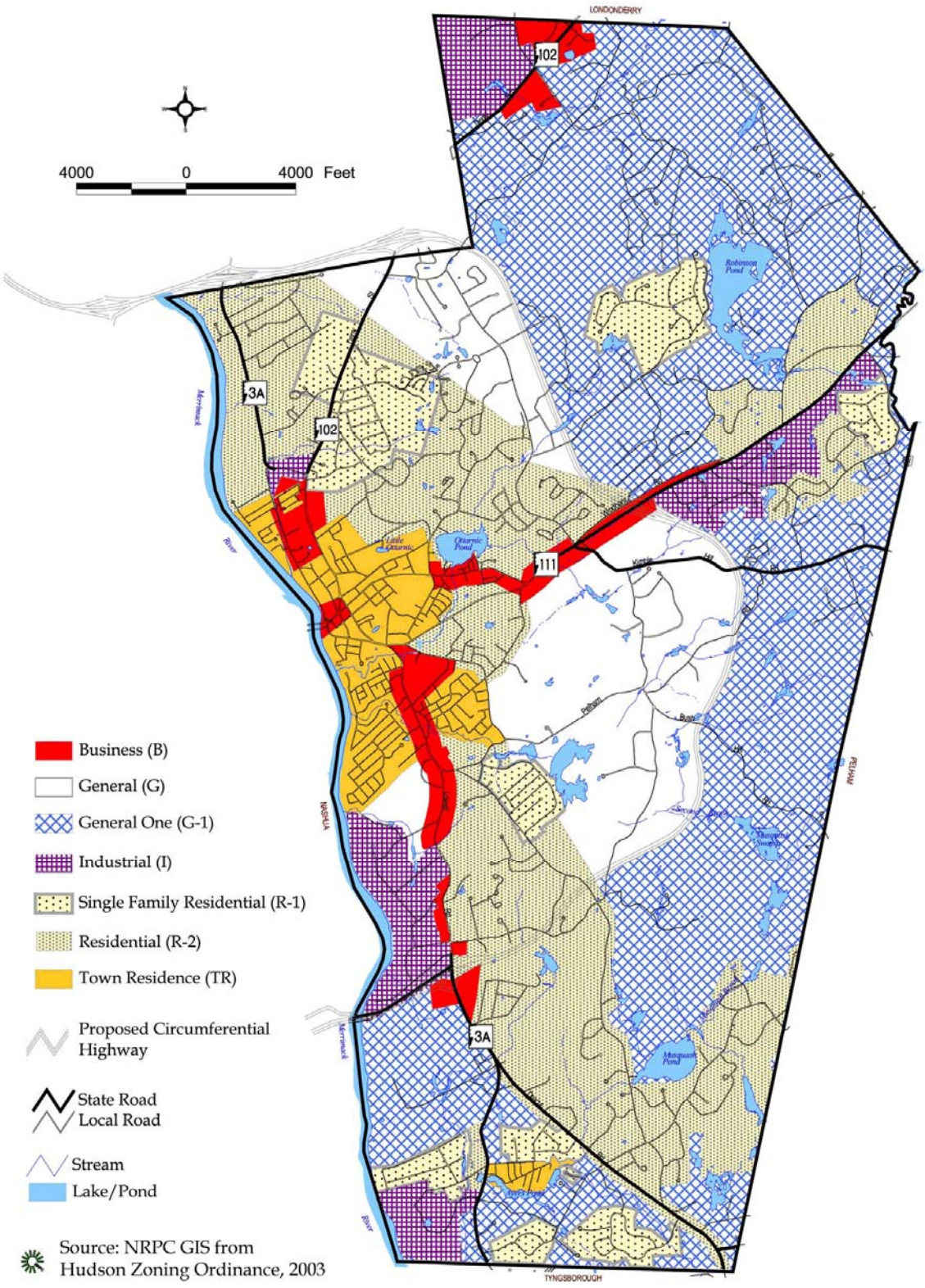
The results of the buildout analysis indicate that, of the total 5,330 acres of undeveloped land remaining in Hudson, there are 1,544 acres of constrained land. Constrained land is considered undevelopable due to the physical challenges it poses for development. This includes land that contains wetlands, 100-year floodplain, and/or steep slopes greater than 25%. After the constrained land is removed from consideration, approximately 3,786 acres throughout Hudson remain for future development.

In the Residential-1 District, of 1,328 acres approximately 30 acres of land remains developable. Potentially, an additional 30 one-acre single-family house lots or 43 three-quarter-acre lots could be constructed before this district is built out.[2] In the Residential-2 District, there is approximately 743 acres of developable land remaining. In the R-2 District, with water and sewer, an additional 1,079 three-quarter acre single-family house lots could be constructed by build-out. Similarly, 743 duplexes could be constructed on one-acre lots. However without water and sewer available, there is only a potential for 743 single-family lots and 539 duplexes to be constructed before the district is built out.

With the exception of multi-family housing units, all types of residential development are allowed in both the General and General 1-District. In the General District, approximately 577 acres of land is developable. In the General District, because of the 2-acre zoning, an additional 288 single family, two-family, manufactured, or elderly housing units could be constructed by buildout. In the General-1 District, approximately 2,190 acres of land is considered developable. Current zoning requires a

[1] The 5,330 acres of undeveloped land includes 5,040 acres of undeveloped and 290 acres of agricultural land.
[2] The potential number of buildable lots presented in each district is based on zoning and does not necessarily reflect what is built.

Map VI-2. Zoning Districts in Hudson, 2003



minimum lot size of 2 acres, with and without town water and sewer. Potentially, an additional 1,095 single family, two-family, manufactured, or elderly housing units could be constructed in the General 1-District.

The Town Residence District has the smallest buildable area remaining in Hudson, with 27 acres of developable land. But because this District allows smaller lots sizes, there is a potential for an additional 117 new single-family house lots that can be built. In total there is a potential for a maximum of an additional 2,270 new single-family residential housing units or 1,570 duplexes in Hudson before all remaining land is developed.

Similarly, the remaining 82 acres of developable land within the Business District could potentially support 340,632 square feet of development assuming the existing commercial development pattern, an average 4,105 square feet per acre, will continue.[3] Finally, 137 acres are available for development within the Industrial District, with a potential for 535,259 square feet of development assuming the existing industrial development pattern, an average 3,907 square feet per acre,[3] will continue. The results of this simple buildout analysis are utilized in the discussion of each land use category, below.

It should be noted that calculations for build-out presented above are based on the 2003 Zoning Ordinance and do not reflect what may actually be constructed in each District. In addition, the remaining residential land area is unlikely to develop at the exact density permitted by the Zoning Ordinance, given land constraints such as steep slopes and area needed for roads, utilities and/or open space, and density options for accessory dwelling units and housing for older persons. The estimates apply to future commercial and industrial developments, as it is likely that the average floor area ratio will increase as land values rise and redevelopment occurs. A more detailed buildout analysis may be useful as a planning tool to determine the full potential of the Town's land to accommodate future housing units and non-residential development.

E. Analysis of Developed Land

1. Residential Land Use

Residential uses encompass over 6,882 acres, or 37%, of Hudson's 18,773-acre total land area. Residential development is by far the largest land use category. Based on a 2003 total housing unit count of 8,559, residential uses are developed at an average density of approximately 1.25 units per acre in Hudson.[4]

Higher density housing in Hudson Center

Higher density neighborhoods are found in the vicinity of the Taylor's Falls Bridge. These areas, which developed primarily in the late 19th and early 20th Century, are made up of older homes situated on lots of one eighth to one quarter of an acre in area. Single family homes here are interspersed with some multi-family dwellings, commercial uses and community facilities. During the mid 20th Century, suburban neighborhoods comprised primarily of single family homes on quarter acre lots developed to the south and east of the Taylor's Falls Bridge area. The provision of public water and sewer concentrated development for most of the century, leaving most of Hudson's rural areas untouched until the building boom of the 1970s and 1980s. Development in the last thirty years has occurred largely in parts of the Town lacking water and

[3] Based on Hudson Assessing data, 2003.
[4] All housing unit counts from Town of Hudson Assessing data and U.S. Census, 2000-2003. All area figures from NRPC GIS parcel database.

sewer service. Due to the need for on-site septic systems and wells and more stringent development standards, single-family subdivisions in recent years have generally been of a lower density, approximately one acre per residence, and more scattered than in the past. This type of development pattern is not as an efficient use of land as the historic development patterns of the late 19th and 20th Century.

a. Single Family Residential Use

Single family residential uses encompass about 5,271 acres, or 28%, of Hudson's 18,773-acre total land area (Table VI-3). In 2003, 74%, or 6,328 housing units, were single family. Single family residential uses are developed at an average density of approximately 1.2 units per acre.

Table VI- 3. Number of Residential Units by Type in Hudson

Property Type	Number of Units	Total Acres
Single-family	6,328	5,271
Two-family *	1,000	800
Multi-family (3 +)	1,113	707
Manufactured Housing	158	104
Total	**8,599**	**6,882**

Source: NRPC GIS database, 2003.
* These numbers include ALUs – accessory living units – a.k.a. – in-law apartments.

b. Two-Family (Duplex) Residential Use[5]

Two-family, or duplex, residential uses encompass about 800 acres, or 4%, of Hudson's 18,773-acre total land area. In 2003, 12%, or 1,000 of the total housing units in Hudson were two-family. Two-family residential uses are developed at an average density of approximately 1.25 units per acre.

c. Multi-Family Residential Use[6]

Multi-family (3+ units per building) residential uses encompass approximately 707 acres, or 4%, of Hudson's 18,773-acre total land area. In 2003, 13%, or 1,113, of the total housing units were multi-family. Multi-family residential uses are developed at an average density of approximately 1.6 units per acre.

d. Manufactured Housing

Manufactured housing uses encompass approximately 104 acres, or 1%, of Hudson's 18,773-acre total land area. In 2003, 2%, or 158 units, were considered manufactured. Manufactured housing uses are developed at an average density of approximately 1.5 units per acre.

[5] Two-Family Housing – Includes all buildings containing two housing units which may be one above the other or side-by-side. As defined by the U.S. Census.
[6] Multi-Family Housing – Includes all buildings containing three or more housing units. As defined by the U.S. Census.

2. Commercial Land Use

Commercial uses encompass about 625 acres, or 3%, of Hudson's total land area. Based on a 2003 total floor area count of 2,565,949 square feet, commercial uses are developed at an average density of approximately 4,105 square feet per acre. The pattern of "strip development" that has characterized commercial development in Hudson gives the appearance that business uses encompass far more of the Town land area than is actually the case. This is particularly true since commercial development is located along major arterials and at prominent intersections. Hudson's most significant commercial areas are located along the NH 3A, NH 111 and NH 102 corridors. Under existing zoning, commercial uses are permitted in the Town's Business District and in the General District. A handful of commercial uses, such as restaurants, auto repair and offices/professional services are also permitted in the Industrial District. Many commercial uses have also been developed in Residential Districts either before zoning was adopted in Hudson or through variances granted by the Zoning Board of Adjustment. In 1994, the Town's zoning district map was amended to rezone some of the larger commercial developments so that they would be within the Business District; however, the process of realigning the zoning district boundaries to reflect existing land use patterns is not yet complete.

3. Industrial Land Use

Industrial land uses are the second largest land use category (next to Transportation) in Hudson, encompassing about 1,411 acres or 8% of the Town. It should be noted, however, that approximately 496 acres of the 1,411 acres devoted to industrial uses are earth excavation sites. Therefore, based on the 915 acres of developed industrial land and a 2003 total floor area count of 3,574,714 square feet, industrial uses are developed at an average density of approximately 3,907 square feet per acre.

As noted in Chapter IV, Economic Development, industry is an important component of Hudson's economy and of the region in general and many industrial uses tend to require large sites for their operations. Most of the Town's industrial uses are located between Lowell Road and the Merrimack River, on NH 102 near the Town line and on NH 111. As with commercial uses, the General District also permits industrial uses. In 2003, approximately 50% of the Town's industrially developed land, or 703 acres, was located in the General District and the General-1 District. Of this, only 9% is located in the General District.

4. Institutional Land Use

Institutional uses are generally divided into two categories: public and semi-public. Institutional uses encompass 678 acres, or 4%, of Hudson's total land area.

a. Public Institutional Facilities

Public institutional uses in Hudson include the Town offices, the DPW garage, the police and fire stations, the schools, the library, the post office, and any other local, state or federal facility not classified under other uses. These facilities encompass about 395 acres, or 2%, of Hudson's total land area.

b. Semi-Public Institutional Facilities

Semi-public uses are those uses which are generally open to the public but privately owned, such as a private hospital, or facilities which are open to the public on a less regular basis such as a private club or church. In Hudson, existing semi-public institutional uses include churches, cemeteries, and civic clubs such as the American Legion. Semi-public institutional uses encompass about 283 acres, or 2%, of the Town of Hudson. The largest of these uses is the 221-

acre Presentation of Mary Academy complex on Lowell Road. The remaining acres are scattered throughout the Town.

5. Park/Recreation Land Use

Park/Recreation uses encompass about 635 acres of Hudson's total land area. Parks and recreation lands encompass about 3% of the developed land in the Town. There are two types of park and recreation land uses in Hudson: private and public. Further discussion of parks and recreation can be found in Chapter VIII, Community Facilities.

a. Public Park/Recreation Land

Publicly owned park and recreation lands encompass about 69 acres in Hudson, or 11% of the total park and recreation land in the Town. Parcels in this category range in size from 0.3 to over 14.26 acres and include parks, playing fields (not located on school property), public beaches, and playgrounds. These parcels include the Merrifield Park (9 acres), Jette Field (4 acres), and Hills Family Park (24 acres).

b. Private Park/Recreation Land

Privately owned park and recreation land in Hudson encompasses about 566 acres, or 89% of the total park and recreation uses in the Town. Private park and recreation uses include golf courses, hunting clubs, and raceways. Parcels in this category range in size from 12 acres to 379 acres and include Green Meadow Golf Course (379 acres), Hudson Speedway (12 acres), and Hudson Fish and Game (39 acres).

6. Open Space Land Use

Open space is considered any land that is not developed and is protected in perpetuity through conservation easements or other deed restrictions. Open space land uses encompass about 1,000 acres, or 5%, of the total land area in Hudson. There are two types of open space in Hudson: public and private.

a. Public Open Space

Public open space land uses encompass about 811 acres, or 81%, of the total open space area in Hudson. Public open space land includes areas of passive recreation that requires limited or no maintenance. Parcels in this category range in size from 20.2 acres to 457 acres and include the Musquash Conservation Land (457 acres), Benson's Park (165 acres), the Town Forest on Kimball Hill Road (55 acres) and Parker Nature Area (20.2 acres).

b. Private Open Space

Private open space land uses encompass about 188 acres, or 19%, of the total open space area in Hudson. Private open space land includes all areas protected as common open space in open space subdivisions. Parcels in this category range in size from 0.65 acres to 44 acres and include the Pond View (43.59 acres), Provincial Heights (19.47 acres), and Royal Oak (21.81 acres) subdivisions.

7. Agricultural Land Use

While approximately 2,186 acres of prime and statewide significant farmland soils can be found in Hudson, it is estimated that active agriculture uses encompass only about 290 acres, or 1.5%, of Hudson's total land area in 2003, based on Town of Hudson Assessor data. An NRPC study estimated that 385 acres were in active agricultural use in 1998. This is a 70% loss from the 1974 estimate of 1,298 acres.[7] Much of the former agricultural land in Hudson has been converted to other uses, particularly along the Merrimack River. The remaining agricultural land in Hudson includes the Nadeau Farm.

8. Current Use Land

NH RSA 79-A, enacted in 1973, authorized current use taxation of property. Administered by the NH Department of Revenue Administration, the current use program is designed to "prevent the conversion of open space to more intensive use by the pressure of property tax values incompatible with open space usage" (RSA 79-A:1). Parcels of fieldland, farmland and forestland of ten acres or more; "natural preserves" or wetlands of any size; and farmland generating more than $2,500 annually are eligible for reduced property assessments under the program. Local officials must lower the assessed valuation of any property in the program to a prescribed level. When a parcel is removed from the program, the owner must pay a penalty (or "land use change tax") equal to 10% of the land's fair market value. In Hudson, 100% of this land use change tax is allocated toward the purchase of land for conservation purposes; however, these taxes need to be spent within the year they are collected or they are transferred into the General Fund. According to the Hudson Assessing Department, as of June 2003, approximately 3,798 acres of land in Hudson is in current use.[8]

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[7] NRPC, *Change in Agricultural Land Use in the NRPC Region, 1974- 1998*, 2002.
[8] Town of Hudson Assessing Department, June 2003.

CHAPTER VII

HISTORIC RESOURCES

A. INTRODUCTION

The quality of future planning can be enhanced in many ways by an appreciation of a community's past. Although Hudson's historic resources are overshadowed by the tremendous amount of new construction which has occurred in the past twenty five years, the historic buildings and sites which survive play a critical role in defining the town's character and connecting the present with the past. Like other environmental resources, historic resources are precious, fragile and nonrenewable and may be lost without awareness, respect and adequate protection.

According to data from the U.S. Census, in 2000 11% of the housing units in town were built before 1940, as compared to 16% in the region and 24% statewide.[1] In fact, as of 2000, Hudson was ranked fourth in the Nashua region for towns with the fewest historic housing units, on a percentage basis, behind Pelham, Merrimack and Litchfield. These statistics highlight how critical it is to identify, promote and protect significant historic resources in town before these important links to the past are lost forever.

The purpose of this chapter is to provide some background on the history and important historic structures and sites in Hudson, to summarize the status of preservation activity and to discuss the preservation tools available to local citizens. A wide range of preservation techniques may be used to help ensure that future growth is compatible with local design and land use traditions. These can range from non-regulatory options such as public education (school projects on local history, establishment of markers commemorating sites of historic interest) to intermediate measures such as nominating structures to the National Register of Historic Places or suggesting compatible design themes to a developer who might otherwise be unaware of options to integrate new structures with their surroundings. Finally, a community may opt to use regulatory techniques such as establishing local historic districts. It is up to the community to plan a program of historical and cultural protection, based on local needs and desires.

B. HISTORICAL BACKGROUND

The Town of Hudson was formerly part of the Town of Dunstable which was chartered in 1673 as an outpost of the Massachusetts Bay Colony. Parts of the old township broke away as separate entities beginning about 1730. Hudson was known as Nottingham West from 1746 until 1830 when residents petitioned the General Court for a name change to avoid confusion with another Nottingham, New Hampshire.

The settlement of what is now Hudson began about 1710. Early on three garrison houses (Blodgett, Taylor and Hills) were built within a half mile of the Merrimack River in the western part of the present town limits to withstand Indian attacks. Settlement in town did not begin in earnest until the end of Lovewell's War in 1725, and by 1733 there was a settlement of about ten families on the Joseph Hills Farm. The first meetinghouse was built in 1733 on the road leading from Dracut to Litchfield (later Musquash Road). When the boundary between new Hampshire and Massachusetts was established in 1746, the meetinghouse was no longer in the center of town so the citizens voted to build a new meetinghouse. The 1733 meetinghouse was then sold to the neighboring Town of Pelham, moved there

[1] U.S. Census, 2000. http://www.nashuarpc.org/census/demprofile00_hudson.pdf

and used as a meetinghouse until 1785. A new meetinghouse was constructed in Hudson Center in 1748; in 1778 it was sold and removed from the site.
Prior to the construction of the Taylor's Falls Bridge across the Merrimack River from Nashua to Hudson in 1827, one of the earliest and busiest ferries was established in 1729 at Cummings Farm in Hudson, running to a spot near the mouth of the Nashua River. At least two other ferries linked Hudson to Nashua including the Hills Ferry in the northern part of town and Little's Ferry at South Nashua.

Hudson Center developed rapidly in the late 18th and early 19th Century after the Presbyterian Church or North Meetinghouse was erected in 1771. By 1834, Hudson Center was the primary village center of the town. It contained a tavern, three small stores, a meetinghouse, a physician and eight or nine residences. Other than the small concentration of buildings at Hudson Center, there were no other village centers in town. The construction of several new buildings, including the Hudson Baptist Church in 1841 and the Town House in 1857 reinforced the importance of the village at the center, although by this time the importance of the Center was beginning to wane.

The area known as Hudson Bridge, at the eastern terminus of the Taylor's Falls Bridge, had begun to develop as a commercial center as early as 1837, when a store was established there, and continued to develop rapidly during the mid 19th Century due to its proximity to the industrial city of Nashua. By the early 20th Century, the business center of the town had moved from Hudson Center to "The Bridge". The post office moved to the Bridge area in 1910 and the town library moved to the Hills Memorial Library in 1909. The Hudson Volunteer Hose company constructed a hose carriage house at the Bridge in 1892. Library Park and the rest station was established in 1911 for those awaiting the electric cars at the southeast corner of the park. The advent of the electric railways in Hudson in 1895 simplified commuting to the mills in Nashua and accelerated the evolution of Hudson as a bedroom community for Nashua.

Agriculture continued to play a major role in the local economy well into the 20th Century. Local farms included both mixed family farms and larger production operations, primarily poultry, apples, and dairy. The U.S. Census indicates that there were 172 farms in Hudson in 1880, ranging from five to more than five hundred acres. In the early 20th Century, Hudson still retained many dairy farms, market gardens and extensive orchards. Even those who worked in Nashua or other urban centers typically kept small gardens and a few chickens.
The poultry industry was particularly significant in the 20th Century. The Jasper farm grew to become one of New England's largest breeding farms and Grant Jasper became one of the leaders of the New England poultry industry. At its peak the farm contained over three hundred acres, eighteen large hen houses, and more than 200 portable brooder houses and range shelters. The daily production was more than 25,000 eggs.

Lowell Road in particular illustrates Hudson's transition from agricultural community to suburban town. In the 1920s there were about twenty-five farms along the road but by the 1960s only half as many remained. As of 2003, there are only a handful of agricultural operations townwide. The construction of the Sagamore Park Bridge in 1974 brought new volumes of traffic to Lowell Road and much of the remaining farm land soon gave way to commercial strip development and lesser amounts of industrial development.

The building boom of the 1970s and 1980s, spurred in part by the availability of public sewer and water services, has changed the mix of housing in town, increasing the proportion of multi-family housing, particularly duplexes, while decreasing that of single family houses, particularly those of a historic nature. A number of large industrial park complexes have been built on Route 111, near the Windham

town line, while commercial development has been concentrated along major routes such as Lowell Road, Derry Road and Route 111. Much of the eastern portion of town continues to be more rural in character.

C. SIGNIFICANT LOCAL HISTORIC RESOURCES

Many of Hudson's historic resources are clustered in the two historic village centers, Hudson Bridge and Hudson Center. Although these areas comprise the most notable concentrations of historic resources in town, there is hardly an old road in town where an historic homestead or mill site cannot be found. Hudson's old roads still in use include Bush Hill Road, Derry Road, Kimball Hill Road, Lowell Road, Pelham Road and Robinson Road. The following is a brief summary of some of Hudson's historic resources.

1. Hudson Center

Furthered by its central location in town, Hudson Center developed rapidly in the late 18th and early 19th centuries. It was situated approximately two miles from the current Taylor's Falls Bridge in the area of Route 111 and Greeley Street. Construction of the Presbyterian Church or North Meetinghouse in 1771 provided an impetus for further development. The church was erected on the site of the present Town House (Wattanick Grange Hall). A town common and burying ground were laid out several years later. A cluster of buildings were constructed in the 1840s and 1850s in the then-popular Greek Revival Style. These include the Hudson Baptist Church (1841), the Greeley House next to the church (c.1840) and the Town House (1857). The Hudson Center School was constructed in 1908 and a number of houses were constructed over the years. The Route 111 bypass of the 1960s resulted in the relocation of several structures in Hudson Center and in the taking of a large part of the town common. A proliferation of commercial activity just west of the Hudson Center area and industrial areas to the east has isolated Hudson Center in recent decades. Today, with Benson's Animal Farm being redeveloped for recreational and conservation uses, and a number of houses boarded up, Hudson Center awaits new definition.

Hudson Center

2. Hudson Bridge

Hills Memorial Library

The area which developed adjacent to the Taylor's Falls Bridge crossing the Merrimack River became the dominant center in the late 19th and early 20th Century. The original bridge was built as a 16-foot wide covered toll bridge in 1827. It wasn't until the arrival of the electric railway in 1895 that a densely populated area had been settled at the bridge crossing.

Examples of a wide variety of architectural styles popular at the turn of the Century are visible in the houses and other buildings in this area. The Hills Memorial Library, dating to 1909, is a unique structure combining native stonework and Tudor style influences.

3. Hills House, Derry Road; Alvirne Chapel, Derry Road; Hills Memorial Library, School Street

Three of Hudson's most significant historic resources, the Hills House, Hills Memorial Library, and Alvirne Chapel, were constructed in the late 19th and early 20th Centuries by summer resident Dr. Alfred K. Hills (1840-1928), a descendant of Hudson's founding family. The Hills House, owned by the Hudson School District is an excellent example of the Shingle Style dating to 1890, designed by Boston architect Hubert Ripley. Also, designed by Ripley, the Hills Memorial Library was dedicated in 1909 as a gift to the Town of Hudson by Dr. Hills. As his last major building project, Dr. Hills had Alvirne Memorial Chapel constructed in 1909 in memory of his wife. The small stone chapel features a low gabled bell tower.

Hills House

Alvirne Memorial Chapel

D. Tools For Enhancement And Protection Of Historic Resources

There are various methods that can be used to encourage the preservation or restoration of historic resources. These include: 1) historic resources survey; 2) National Register of Historic Places; 3) local historic districts; 4) the Certified Local Government (CLG) program; 5) local heritage commissions; 6) historic building rehabilitation federal tax credits; 7) historic markers; 8) easements; 9) protection of archeological areas; 10) Scenic Road designation; 11) innovative land use controls; and 12) building code provisions.

1. Historic Resources Survey

Preservation through documentation is the most basic and essential of preservation strategies. There are several reasons for undertaking an historic resources survey. In addition to providing a permanent written and photographic record of a town's architecture, a good inventory is the foundation for other preservation tools. It can be of service to the historic district commission and can be used to prepare nominations for listing of historic structures in the National Register of Historic Places. Data gathered in a survey may encourage a greater appreciation of historic structures and sites by local citizens. Historic resource assessments are also necessary for accomplishing environmental reviews required in projects receiving federal funding, such as highway projects. As the beginning of a comprehensive historic preservation strategy, information gathered should act as a firm foundation for future decision making, by identifying buildings suitable for and worthy of preservation and/or rehabilitation.

A complete historic resources survey can help a community weigh proposed actions more carefully, so that it does not inadvertently expend its long-term assets in realizing immediate objectives. If a comprehensive town-wide survey is not feasible, Hudson would be wise to identify the historic resources and areas which may be impacted by future road improvements.

a. Historic Structures Report

The purpose of a historic structures report (HSR) is to develop an understanding of a building's physical history and condition, and provide specific, useable information for implementing a treatment plan. The New Hampshire Division of Historic Resources States that, "One of the first parts of a preservation project should be an historic structures report, which analyzes the physical evolution, condition and potential of an historic building as documented by historical, architectural and technological evidence."[2] Buildings that are important in the history of a community have potential to continue to serve that community in many ways after its original function is no longer viable. An HSR is a tool that analyzes that potential for the multiple values that a building represents, taking into consideration the meaning, use and cost to maximize the benefit to the community.

2. National Register of Historic Places

The National Register of Historic Places is the official list of the Nation's cultural resources worthy of preservation. Established by the National Historic Preservation Act of 1966 and administered by the National Park Service within the Department of the Interior, the Register lists properties of local, state and/or national significance in the areas of American history, architecture, archaeology, engineering and culture. Resources may be nominated individually, or in groups, as districts or as multiple resource areas and must generally be older than 50 years.

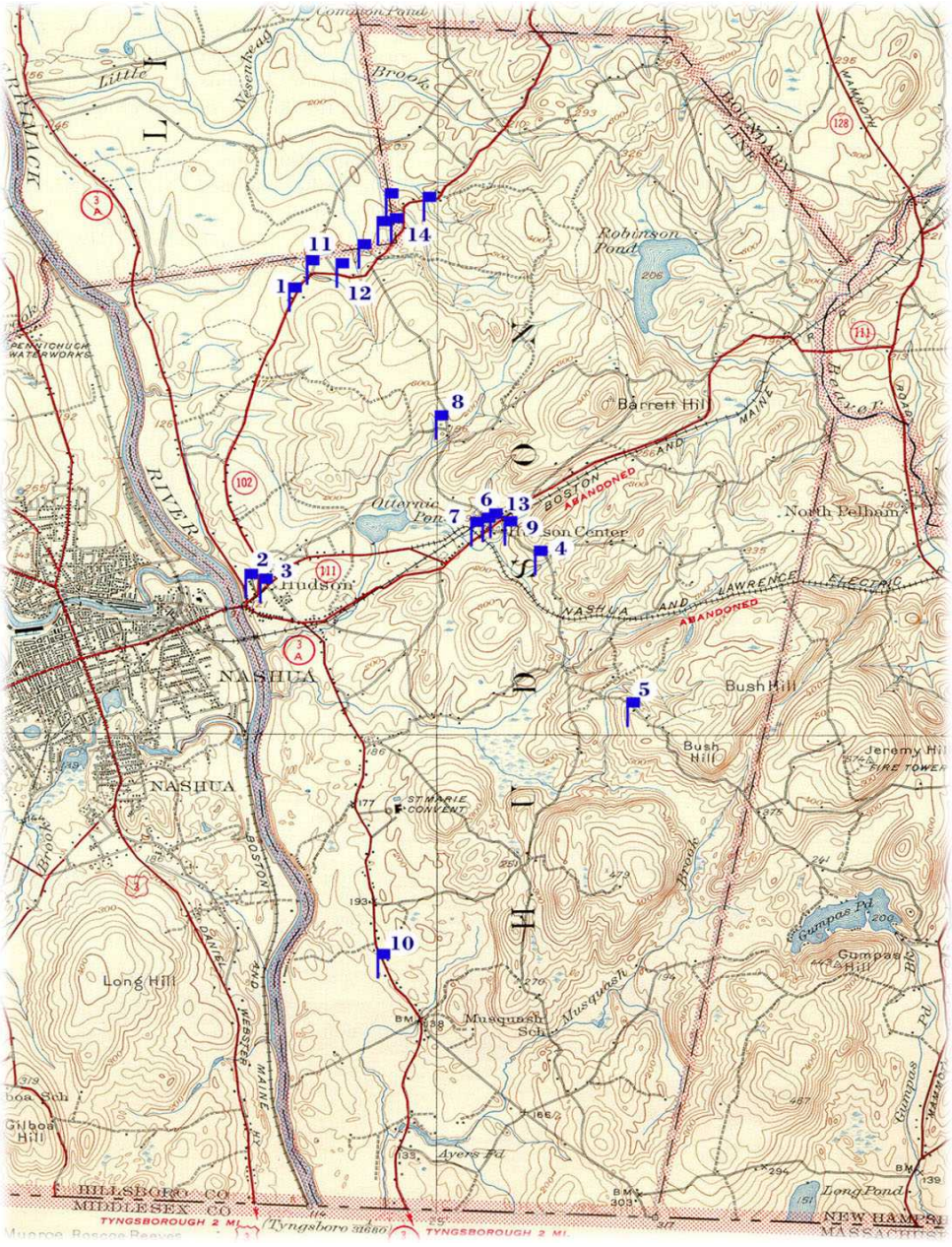
The primary benefit of National Register listing is the recognition it affords and the appreciation of local resources which is often stimulated through such recognition. The National Register also provides for review of effects which any federally funded, licensed or assisted project, most notably highway projects, might have on a property which is listed on the Register or eligible for listing. Register standing can also make a property eligible for certain federal tax benefits (investment tax credits) for the rehabilitation of income-producing buildings and the charitable deduction of donations or easements.

Contrary to many commonly held beliefs, National Register listing does not interfere with a property owner's right to alter, manage, dispose of or even demolish his property unless federal

[2] New Hampshire Land and Community Heritage Investment Program website – www.lchip.org. *Alterations, Addition and Architects (Historic Resource Information).* November 2002,

funds are involved. Nor does National Register listing require that an owner open his property to the public. A National Register district must have the approval of a majority of property owners in the district. For a single, privately owned property with one owner, the property will not be listed if the owner objects. National Register listing can be an important catalyst to change public perception and increase historic awareness but cannot in itself prevent detrimental alterations or demolition. Yet, it remains an important first step toward historic awareness, respect and protection. Statewide there are nearly five hundred National Register listings of which approximately fifty are districts. Twenty individual buildings or sites and four districts in the region are listed on the Register. Properties listed on the Register in Hudson are shown in Table VII-1 and illustrated on Map VII-1. Potentially eligible sites are also listed in the table and illustrated on the map.

Map VII- 1. Location of Properties Listed, or Having the Potential to be Listed, on the National Register of Historic Places



Source: NRPC GIS, 2004

Table VII-1. Properties Listed, or Having the Potential to be Listed, on the National Register of Historic Places

Number on Map VII-1	Name of Property	Listed on National Register	Potential to be Listed on National Register
1	Hills House, 211 Derry Road	YES	-
2	G.O. Sanders House, 10 Derry Road	YES	-
3	Hills Memorial Library, 16 Library Street	YES	-
4	Benson's Wild Animal Farm, Central Street. & Kimball Hill Road.	NO	YES
5	Davis-Cohen (Morrison) House, 101 Bush Hill Road	NO	YES
6	Hudson Baptist Church, 123 Central Street	NO	YES
7	Baptist Parsonage, 234 Central Street	NO	YES
8	Smith-Walch-Sinkiewiecz House, 79 Greeley Street	NO	YES
9	Hudson Center School, 10 Kimball Hill Road	NO	YES
10	Bartlett-Charbonneau House, 2 Old Derry Road	NO	YES
11	Hills-Murray House, 20 Old Derry Road	NO	YES
12	Hudson Townhouse/Wattannick Grange, 2 Windham Road	NO	YES
13	Old Derry Road Historic District: Houses at 34-36, 48, 53, and 62-66 Old Derry Road and No. 9 Schoolhouse at 82 Old Derry Road	NO	YES

Note: The list of properties with the *potential* for listing on the National Register is not all inclusive but is based on evaluations by the NH Department of Transportation for the Hudson-Nashua Circumferential Highway Project.

3. State Register of Historic Places

The State of New Hampshire Register of Historic Places program encourages the identification and protection of historical, architectural, archaeological and cultural resources. The program provides for listing in order to encourage awareness of the historical significance of the listed structure, but does not mandate protection. Benefits of listing include public recognition, consideration and advocacy in the planning of local and state funded projects, qualification for state financial assistance for preservation projects (i.e., LCHIP) and special consideration or relief in the application of some access, building and safety code regulations. Listing takes place through application to the NH Division of Historic Resources.[3] All buildings listed under the section on the National Register may be appropriate for listing under the state program. Three of the remaining structures on the Benson's Property are listed on the NH State Register.

4. Local Historic Districts

The term "historic district" can refer either to an historic district established by Town Meeting vote, previously discussed, or to a National Register Historic District. Both are useful preservation tools but differ in the way in which they are established and the protection they afford. An historic area may be both a locally designated historic district and a National Register District. Several communities within the region, including Amherst, Hollis, Mont Vernon and Nashua have enacted local historic district ordinances.

The most comprehensive preservation tool available to local governments under New Hampshire state law is the creation and administration of a local historic district (RSA 674:45). The purpose of

[3] Source: NH Division of Historic Resources, *The NH State Register of Historic Places*, February 8, 2001. See: www.state.nh.us/nhdhr.

an historic district is to protect and preserve areas of outstanding architectural and historic value from inappropriate alterations and additions which might detract from an otherwise distinctive character. Historic districts should not attempt to "freeze" time but should preserve what is significant to a district while accommodating change and new construction in accordance with regulations based on a local consensus.

Historic districting can be an effective technique for protecting the character of an area. Unlike zoning which focuses on land use, an historic district emphasizes exterior appearance and setting. Yet unlike site plan review, historic districts allow officials to exercise authority over construction and alteration of single family dwellings, however, buildings alone need not comprise a district. Effective district preservation should involve streetscapes, landscapes, contributing views and viewsheds as well as buildings. It should be noted that historic districting is not an appropriate method for protecting all historical resources in an area, especially where properties are widely scattered. Historic districting also may not be the most effective means of protecting a significant land area, but districting can be effectively combined with other techniques.

5. Certified Local Government (CLG) Program

The National Historic Preservation Act of 1966 provides for matching grants-in-aid to the states from the Historic Preservation Fund for historic preservation programs and projects. Federal law requires that at least ten percent of each state's Historic Preservation Fund grant be designated for transfer to eligible local governments which apply for the money. A local government can participate in the program once the State Preservation Office certifies that the community has established its own historic preservation commission, district and a program meeting certain federal and state standards. Matching grants are made each year to certified local governments for survey and planning projects, including preparation of National Register nominations and historic resource surveys. Currently, the CLG program represents the only source of state funds available for communities interested in preservation planning. In the Nashua Region, the only communities designated as CLGs are the City of Nashua and the Towns of Amherst and Hollis.

6. Local Heritage Commissions

In 1992, the Legislature enacted RSA 674:44-A to enable towns or cities to establish heritage commissions "for the proper recognition, use and protection of resources, tangible or intangible, primarily man-made, that are valued for their historic, cultural, esthetics or community significance within their natural, built or cultural contexts."

The statute defines the power of the commission and authorizes acquisition of property in the name of the town. Heritage commissions may, if authorized by the Town assume the composition and duties of historic district commissions or the municipality may choose to maintain separate and distinct commissions. If separate, the heritage commission is advisory to the historic district commission, the planning board and other local boards.

The Town may appropriate funds and the proper handling of these or other related funds is specified in the statute. The makeup of members is similar to other local boards, and a planning board member may be a member of the heritage commission. The requirements for meetings, disqualification of a member, abolition of heritage commissions, effect of abolition, transfer of documents are the same as for other local boards. The statute also amends the historic district statutes to incorporate references to cultural and community values as a public purpose, and authorizes creation of more than one district in a municipality.

7. Historic Building Rehabilitation Federal Tax Credits

The rehabilitation of older buildings, frequently less expensive than new construction, is a cost-effective solution benefiting the tax base while filling older structures with a new life. The Economic Recovery Act of 1981, as amended, provides incentives in the form of Federal investment tax credits for the substantial rehabilitation of income-producing older buildings. The act was passed to support preservation by eliminating certain tax incentives which encouraged the demolition of historic structures. In order to receive the credits, owners are required to furnish detailed rehabilitation plans for review and certification by the National Park Service. Municipally owned structures are not eligible for these credits.

Currently the tax incentives take two forms:

Credit	Building Use	Eligible Properties
10%	Commercial/Industrial	40 years and older
20%	Commercial/Industrial Income Residential	50 years and older

To be eligible for the larger federal tax credit, a building must be a certified historic structure, either listed individually on the National Register, or contributing to a National Register or certified local district. Certified rehabilitation work must adhere to the Secretary of the Interior's Standards for Rehabilitation, a list of ten standards developed to ensure that significant features of a building will not be compromised. In order to qualify for any of the tax credits, rehabilitation expenditures must exceed $5,000 or the adjusted basis of the property (cost of the building excluding the value of the land less depreciation), whichever is greater.

The investment tax credits provide some incentive to rehabilitate older buildings instead of undertaking new construction. Unfortunately because these credits do not cover privately owned, non-income producing residences which constitute the majority of Hudson's resources, their use in Town is somewhat limited. Larger structures with income-producing potential could benefit from the use of the credits, which would also insure the sympathetic rehabilitation of the buildings.

8. Historic Markers

Markers are an easy, inexpensive way to tell both residents and visitors about significant people, places and events in a community's past. The State Marker Program was originated by the New Hampshire Legislature in 1955. The aim of the program is the erection of appropriate markers designating events, people and places of historical significance to the State of New Hampshire. Communities who would like to be considered for a marker submit a request for consideration by the State Highway Department and Division of Historical Resources. There is generally no cost involved for a marker on a state-maintained road. There is a charge of $1,100 for a marker on a private road. Statewide there are approximately 160 historical markers. Few have been erected in NRPC communities. Hudson does not currently have any State markers.

The sole purpose of the marker program is recognition. The program is non-restrictive; it does not protect historic sites nor does it obligate owners in any way. The criteria which apply to marker selection are also much less stringent than those for getting a property listed on the National Register. A marker may be used to point out historic sites which have changed considerably over time or even to commemorate events for which there is no standing evidence, anything which has

historical significance to a community. For the simple recognition of an historic property, the historical marker program may be a better tool than the National Register, more readily visible and much easier to use. Another type of marker which has found widespread use involves the placement of wooden date markers on houses. Such a program was initiated in Hudson back in 1976 as part of the Bicentennial celebration.

9. Easements

Across the country, preservation easements have proven to be an effective tool for protecting significant historic properties. An easement is a property right that can be bought or sold through a legal agreement between a property owner and an organization eligible to hold easements. Just as a conservation easement can be used to protect open space, scenic areas, waterways, wildlife sanctuaries, etc. from incompatible use and development, an architectural easement protects the exterior appearance of a building. If properly administered, easements are a superior method of conserving and protecting land, water and historic resources; perhaps better and longer than zoning or locally designated historic districts.

Easements provide property owners with two important benefits. First, the character of a property is protected in perpetuity. In addition, the donation of an easement may make the owner eligible for certain tax advantages. If the property is listed in the National Register, in return for giving an easement, an owner is eligible under the Tax Treatment and Extension Act of 1980 to make a deduction from his taxes. Donation of an easement may also reduce estate and local property taxes.

Easements are also extremely beneficial to a community. The costs of acquiring easements may be significantly lower than buying properties outright to protect valuable resources, particularly when easements can be acquired by donation. Significant resources can remain in private hands but are protected from inappropriate alteration as the organization holding the easement is given the right to review any proposed change to the structure or property.

The proposed deed conveying the Benson's property to the Town of Hudson includes a preservation restriction on the historic property, which identifies the *Secretary of Interior's Standards for Rehabilitation and Guidelines of Historic Properties* as the principle standard for review. The preservation restrictions applied to the buildings and their settings "require that, where possible, repair, replacement, alterations and additions should be made "in-kind", with forms, design, materials, and workmanship that match or compliment and are compatible with the historic forms, design and materials."[4]

10. Protection of Archaeological Areas

Although much of this chapter deals specifically with architectural resources, it should be recognized that the preservation of areas of high potential for prehistoric and historic archaeological sites poses unique problems. In comparison to historic structures, archaeological resources are more difficult to identify and protect. Each site is unique and fragile. Once a site is disturbed, information is lost. While there is often an urgent need to keep the location of an important archaeological resource confidential, the same confidentiality will often preclude public awareness. Acquisition of the land or land development rights is often the only way to effectively preserve archaeological resources. Ironically, increased appreciation may also represent a very real threat to archaeological resources.

[4] U.S. Department of the Interior, National Park Service, Cultural Resources Stewardship and Partnerships, Historic Preservation Services, *Secretary of Interior's Standards for the Treatment of Historic Properties, with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings,* 1995.

Rapid growth is the greatest threat to archaeological resources. The few applicable laws that protect archaeological resources are primarily federal. As a result of these laws, large highway projects or projects which require review by a federal agency usually have a review of impacts to cultural resources. In addition, there are mining laws which allow review of projects for impacts and there is the possibility of review within the dredge and fill process.

Since much of the region's growth is from private rather than public sources, archaeological evaluation is not required. In some cases in the state, cooperative developers have permitted recording of archaeological data which would otherwise be destroyed. The State Division of Historical Resources has very limited ability to review private projects for impact on archaeological resources. Local officials should consult the Division if a proposal will impact a known archaeological resource or if a project is in a location with a high probability of archaeological potential such as areas with proximity to water. In extreme cases, the Town may wish to ask developers to fund recovery of archaeological data by hiring a professional archaeologist as a consultant to evaluate a property for archaeological potential and/or survey the area for unknown archaeological sites. This procedure is dictated by law in many neighboring states but is not currently required in New Hampshire.

11. Scenic Road Designations

New Hampshire State law enables a community to designate any road as scenic unless it is a Class I or II highway. A scenic road designation protects trees and stone walls located on the public right-of-way. After designation of a scenic road, any repair, maintenance, reconstruction or paving work, tree removal or stone wall removal cannot take place without prior written consent of the planning board or official municipal body.

Designation of a road as "scenic" will not affect the Town's eligibility to receive State aid for road construction. It does however give communities a way to protect an important statewide resource and may also help to preserve the scenic quality around historic structures and stimulate respect for the existing landscape. A number of communities within the region are currently taking advantage of this potential preservation tool. Currently, no roads in Hudson are designated as scenic.

12. Innovative Land Use Controls

The use of an “open space development” ordinance allows for development to be located away from sensitive areas, agricultural lands or historic areas. In the State of New Hampshire RSA 674:21 gives communities authority to adopt a variety of innovative land use controls which may support the preservation of community character and consequently historic resources. The concept of the transfer of development rights is another strategy that may be used to help a community retain its historic character.

Many communities also adopt historic preservation standards as a means of determining the effects of construction on areas of historic significance. The standards require that proposed construction, alteration, removal or demolition of a structure be evaluated for the effects on the historical, cultural or architectural value of a landmark or a historic preservation district. There are several criteria by which to apply these standards, which will vary by community.

In addition, impact fees can be used for the rehabilitation of both cultural and natural resources. During the site plan review and approval process, the Hudson Planning Board assessed a per unit impact fee on the Thurston’s Landing subdivision to be used specifically on the Benson’s Property. At the discretion of the Board of Selectmen, the money can be used for all types of improvements and rehabilitation. This would include, but not be limited to, the restoration of cultural resources

such as buildings and natural resources such as scenic walkways, stone walls, rustic bridges and landscaping.

13. Building Code Provisions

In seeking to protect the public's health and safety, standards such as building codes may present unique complications to the use or rehabilitation of an historic building. As a result, some communities have elected to amend local building codes to exempt historic structures from certain code requirements, other than life safety provisions. This allows historic buildings to continue to be used safely while not imposing a modern set of standards that are impossible for an older building to meet without a significant loss of integrity. It should be noted that Chapter 32 of the Basic Building Code of Building Officials and Code Administrators (BOCA), used by many of the region's communities including Hudson, specifically addresses the need for sympathetic treatment of historic structures. Under this section, buildings identified as historic buildings are not subject to the code when they are "judged by the building official to be safe and in the public's interest of health, safety and welfare regarding any proposed construction, alteration, repair, enlargement, relocation and location within fire limits."

E. RECOMMENDATIONS

1. Create the institutional structure necessary to effectively protect historical resources. This can be accomplished by:

- Creating a Heritage Commission or an Historic District Commission (see RSA 674:44a et seq for duties).
- Assuring that the Heritage or Historic District Commission would be part of the Town's Design Review Process.
- Applying for the CLG Program.

2. Complete an inventory and document the work needed to protect historic resources, including:

- Completing a historic resource inventory;
- Developing and maintaining a listing of resources qualifying for listing on the National Register of Historic Places; and
- Mapping significant archaeological sites, and allowing for their documentation.

3. Seek adoption of contemporary tools for the protection of historic resources, which includes:

- Establishing one or more historic districts within which the Heritage or Historic District Commission would have jurisdiction.
- Designating selected local roads for protection under the scenic road provisions of RSA 231:157, which provides protection for trees and stone walls lining such ways.
- Revising the Town sign regulations to make specific provisions for signage on historic properties in various districts.
- Providing more specific standards for design control as now authorized for the Planning Board under the Town's Zoning Ordinance.
- Adopting Historic Preservation Standards which could be applied to construction projects in the proximity of historic structures and/or districts.

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CHAPTER VIII

COMMUNITY FACILITIES

A. INTRODUCTION

The Town of Hudson has a responsibility to provide essential services to current and future residents and businesses. The provision of adequate community facilities is vital to maintaining the health, safety and welfare of the community. In order to meet the current and future demands for public services, the Town must plan for major municipal expenditures to prevent sudden and unanticipated capital needs. In addition, such planning for community facilities assists in the development of the Capital Improvements Program. This chapter examines the existing and estimated future level of service needs for each community facility based upon information derived from the 1996 Master Plan, various space needs studies, the FY2004 Capital Improvements Plan (CIP), the Town's annual reports and other studies. Although a variety of subjects are examined, a particular emphasis is placed on the space needs of each community facility.

The estimated future space needs of various community facilities are determined largely by the demand for the services they provide. Demand for services is objectively determined by the size of the community as measured by population, number of housing units and/or geographical size. Other factors also influence the demand for local government services, such as resident, State and Federal mandated programs and the local government's ability to pay for service expansions. While this last factor, financial capability, can be measured and maximized through a sound Capital Improvements Plan, other immeasurable factors, such as community character, should be considered. This chapter provides a discussion of: 1) Town Hall; 2) Library; 3) Police Department; 4) Fire Department; 5) Recreation; 6) Solid Waste; 7) Highway Department; 8) Public Schools; 9) Public Water Supply; and 10) Public Sewer. The location of existing public facilities is illustrated on Map VIII-1.

B. TOWN HALL FACILITIES

1. Existing Conditions

The Hudson Town Hall is located on a 1.4-acre site at 12 School Street. The building is 12,632 square feet (ft^2). The original building was constructed in 1965 in a modern adaptation of the Federal style.[1] Additions/ renovations were made in 1974, 1987 and 1998. Twenty five (25) off-street parking spaces are located on the south side of the Town Hall with 11 spaces in front of the building and 21 spaces to the rear. The basement of the building is subject to recurring floods. The Town Offices went through a major renovation project during the summer of 1987 when the original building interior was refitted with new office space and the east wing was added.

The number of employees in each department and their location in the Town Hall facility are shown in Table VIII-1. There are currently 29 full time employees and 14 part time employees for a full time equivalent of 36 employees. The 6,316 ft^2 first floor is utilized as office and storage space. The

[1] Town of Hudson Assessor's database. 6,316 ft^2 is building footprint and therefore interior floor area is estimated at twice this figure. The actual interior floor area is smaller. This figure does not include the Fire Station.

6,316-ft² basement floor is utilized for the Selectmen's meeting room, a small conference room, and additional meeting room and office space. Both floors are handicapped accessible via a combination of ramps, elevator and a staircase assistance device.

Table VIII-1. Town Hall Employees

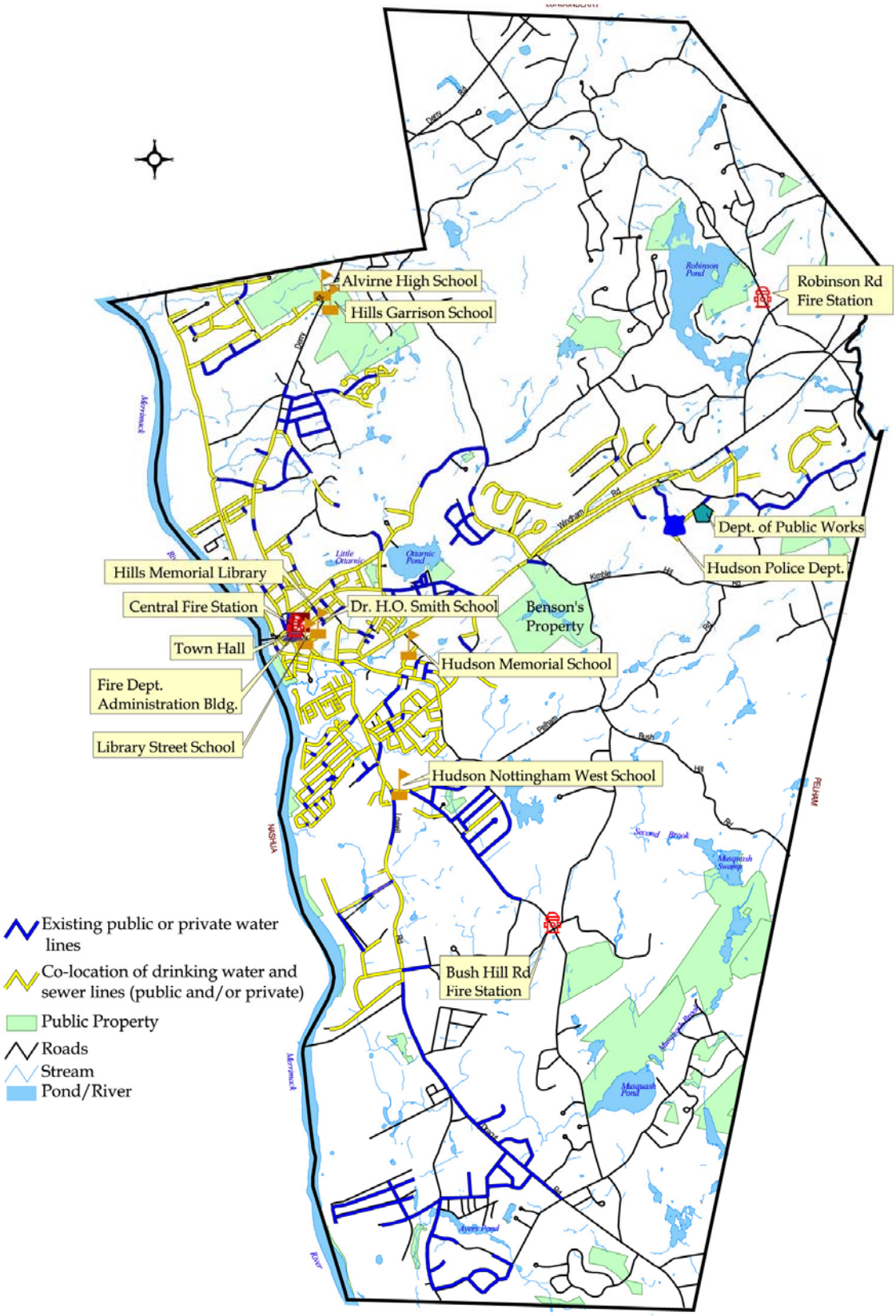
Department	Location	# of Employees		Full Time Equivalent Employees
		Full Time	Part Time	
Assessing	1st Floor	2	1	2.5
Board of Selectmen	1st Floor	3	5	5.5
Cable Coordinator	Basement	0	1	0.5
Planning, Zoning & Building	1st Floor	8	0	8.0
Engineering	Basement	3	0	3.0
Computer Services	Basement	2	0	2.0
Finance / I.T.	Basement	4	0	4.0
Sewer Utility	1st Floor	1	0	1.0
Supervisors of the Checklist	1st Floor	0	3	1.5
Town Clerk/Tax Collector	1st Floor	5	0	5.0
Treasurer	1st Floor	0	1	0.5
Trustees of Trust Funds	1st Floor	0	3	1.5
Water Utility	Basement	1	0	1.0
Total		**29**	**14**	**36**

Note: The employment figures listed above are for 2004.

Specific deficiencies with the Town Hall facility include:

- *Security*. There are three entrances to the Town Hall, two on the first floor and one to the basement floor, and no universal reception desk. The east wing is the only secure area and anyone can access the remainder of the building at will.
- *Parking*. On-site parking appears to be inadequate during large meetings or events. There is no surrounding on-street parking or shared parking lots that can be utilized during large meetings or events.
- *Space.* There is a floor area deficiency.
- *Storage*. There is insufficient storage throughout the building.
- *Flooding*. The basement is subject to repeated flooding.

Map VIII-1. Location of Existing Community Facilities



2. Existing and Future Needs

No formal space needs study has been conducted for the Town Hall. This section attempts to estimate the existing and projected space needs of all Town Hall employees but should not be used as a substitute for a full Town Hall Space Needs Analysis.

a. Existing Needs

A detailed analysis of floor area needs has been conducted for the Town Hall based on estimates of the usable floor area[2] requirements for various office workspaces, conference rooms and support areas. For the purpose of this analysis it is assumed that each Department Head will require 10 x 15 feet of enclosed office and support staff will each require a 9 x 12 feet semi-enclosed workstation. In addition, two large meeting rooms similar to the existing Selectmen's meeting room (approximately 1,600 ft² each) are included. The results of the floor area projections by department and support areas are shown in Table VIII-2.

Table VIII-2. Town Hall Space Needs

Facility	Full Time Equivalent Employees	Description	Estimated Floor Area (ft²)
Assessing	2.5	1 office, 2 workstations	556
Board of Selectmen	3.5	1 office	633
Cable Coordinator	0.5	1 office	228
Planning, Zoning & Building	8	3 office, 5 workstations	1,504
Engineering	3	1 office, 2 workstations	556
Computer Services	2	1 office, 1 workstation	392
Finance / I.T.	4	1 office, 3 workstations	720
Sewer Utility	1	1 office	228
Supervisors of the Checklist	.5	1 office, 1 workstation	228
Town Clerk/Tax Collector	5	2 office, 3 workstations	948
Treasurer	0.5	1 office	228
Trustees of Trust Funds	.5	1 office, 1 workstation	228
Water Utility	1	1 office	228
Meeting Rooms		2 public meeting rooms	3,200
Conference Room		1 20′ x 15′ room	423
Visitor Washrooms		2 washrooms	208
Staff Washrooms		2 washrooms	208
Kitchen		1 staff kitchen	228
Lunch Room		Staff seating for 20	320
Copier Room		1 copier room	228
Storage Room		1 40' x 40′ storage room	1,600
Reception Area		1 reception area plus 10 seats	558
Total	**32**		**13,650**

Source: Estimates compiled by Nashua Regional Planning Commission, October 2002.

[2] Davis Associates, Architects & Consultants, Inc. According to the Building Owners and Manager's Association (BOMA), the "usable floor area" in an office building is the floor area available for the tenant's use within his/her demised space. In general, it is measured from the glass line of the exterior wall to the centerline of demising partitions. The floor area occupied by structural elements and circulation space is included in the usable floor area. For example, a file cabinet will require floor area for the cabinet plus area to open the drawers plus circulation space in front of the drawers.

The detailed analysis of the existing Town Hall space needs presented in Table VIII-2 indicates that the existing 12,632 ft² building is approximately 1,048 ft² short of that required to serve the needs of Town Hall employees and is therefore deficient in space. In addition, building security and off-street parking supply need to be improved.

b. Future Needs

As the Town's population grows from 22,928 people in 2000 to a projected 31,656 by 2020, it is likely that additional employees may be needed in various departments. A specific analysis of the number of additional full time equivalent employees has not been conducted but could be projected in a more detailed space needs study. For the purposes of this section, it can be assumed that the number of full time equivalent employees will increase by 25% to 45 employees by 2020. Assuming all new employees are support staff, then an additional 9 x 12 foot semi-enclosed workstation will be required per person. These workstations will require an additional 972 ft² of space, for a total Town Hall space need of 14,622 ft². The existing Town Hall facility is incapable of accommodating this space without significant addition.

3. Solutions

The general analysis above indicates that Hudson's existing Town Hall facility is deficient in floor area, security, flood protection and parking provision and expansion must be considered. An Architectural firm should be procured to conduct a Town of Hudson Space Needs Study to pinpoint the exact amount of space required to accommodate existing and projected future employees. Options should be developed as to whether to: 1) expand on the existing site (may not be possible due to parking constraints and flooding issues); 2) purchase and rehabilitate an existing building, preferably near the existing facility; 3) construct a new facility, preferably near the existing facility; or 4) relocate to a different area of Town. If the Town Hall remains on or near the existing site, then parking shared with the library, or any library expansion, should be considered.

The Town Hall is often the center of community activity and therefore should reflect the community's character as well as provide for practical space needs. The existing Town Hall is of an architectural style and site design that reflects the surrounding residential area, despite being originally constructed in 1965. Any renovations to the existing Town Hall or construction of a new Town Hall should continue this tradition of reflecting Hudson's community character.

C. LIBRARY

1. Existing Conditions

The Hills Memorial Library is located on a 0.95-acre site at 18 Library Street. The building was constructed in 1909 and is historically significant in the Town of Hudson. The facility is supplemented by two separate annexes added in 1984 and 1990 which total 1,632 square feet. The facilities together provide 5,277 square feet of library space. The annexes are not connected to the main building. The library also has a bookmobile that houses approximately 4,000 pieces of material. The library accommodates 64,171 pieces of material with a circulation of 105,008. About 46% of the population, or 10,153 people, are registered borrowers.[3]

[3] Town of Hudson, *FY2003 Annual Report*.

2. Existing and Future Needs

Planning for an expanded library has been ongoing for nearly twenty-five years. In 2002, a follow up to the *1997 Needs Assessment and Building Program for the Hills Memorial Library* was completed. The study estimated the library floor area needed to serve the existing and future population of Hudson and accommodate an expanding collection.[4]

a. Existing Needs

The space needs study found that the current facility measures 3,688 net square feet, or 0.16 ft² per capita. According to the study, since the 1990s, most libraries that are being constructed exceed 1-1.25 net square feet[5] per capita for the current population. Based on this square footage and a population of approximately 23,000 people, the library facilities would need to be 23,000 – 28,750 net square feet. Therefore an additional 19,312 – 25,062 square feet are recommended to accommodate the current population.

b. Future Needs

The study also estimates that the Town will need approximately 29,449 gross square feet of library space to serve a design year population of 30,000, expected to occur in 2022. In addition to serving the current population, libraries are also facing requests to expand and diversify the collection as well as keep up with improvements in technology including Internet access and CD/DVD rentals. More space is needed to accommodate these needs.

3. Solutions

Based on the results of the study, the Library Trustees have proposed an addition and renovations at the current site of the library. Land acquisition has already begun to expand the total site from its current 0.95 acres to nearly 5 acres overall to accommodate an expanded facility and parking.[6] It has been obvious for many years that the current library is severely deficient in floor area and does not accommodate the needs of the existing nor future population of Hudson. Expansion of the existing library to 25,000 ft² has been programmed into the FY2007 Element of the Town of Hudson Capital Improvements Program for construction in 2008. The construction is planned to be funded through a bond issue that will be proposed in 2006 or 2007; however, this bond issue has repeatedly failed to pass at various Town Meetings and expansion of the library will be dependent upon the will of the voters.

D. POLICE DEPARTMENT

1. Existing Conditions

The Hudson Police Department is located on a 4.56-acre site at 1 Constitution Drive near the DPW facility. It contains the Emergency Operations Center, Animal Control Facility, and Kirby Building. The existing 14,200 ft² building was constructed in 1995 and was planned to meet the department's needs to 2005. The interior of the facility has been modified to accommodate additional staff since its construction. The number of employees in the Police Department is shown in Table VIII-3. As of 2003, there were 59 full time employees and 20 part time employees for a full time equivalent of 68.5 employees.

[4] Patience Kenney Jackson, *Needs Assessment and Building Program for the Hills Memorial Library*, February 2002.
[5] The actual gross square footage of the building is calculated using a standard multiplier of 1.25-1.30 to account for service areas, mechanical spaces, stairs, elevators, etc.
[6] Bruce C. Mayberry, Planning Consultant, *Public Library Impact Fees Methodology Update, Hudson, NH,* Oct. 2000.

Table VIII-3. Police Department Employees

Employee	# of Employees		Full Time Equivalent Employees
	Full Time	Part Time	
Chief	1	0	1.0
Secretaries	1	0	1.0
Record Clerk	3	0	3.0
Lieutenant	3	0	3.0
Detective Sergeant	1	0	1.0
Captain	2	0	2.0
Sergeant	5	0	5.0
Detectives	4	0	4.0
Legal	3	0	3.0
Patrol Officers	23	0	23.0
School Resource Officer	3	0	3.0
Animal Control Officer	1	1	1.5
Communication Dispatchers	7	4	9.0
School Crossing Guards	0	13	6.5
Information Services	1	1	1.5
Maintenance	1	1	1.5
Total	**59**	**20**	**68.5**

Source: Town of Hudson Police Chief, February 27, 2003.

2. Existing and Future Needs

The requirements for law enforcement service vary greatly from one locality to another based upon each jurisdiction's unique demographic traits and characteristics. A small community situated between two large cities, for example, may require a greater number of law enforcement personnel than a community of the same size that has no urban center nearby. Similarly, the needs of a community having a highly mobile or seasonal population may be very different from those of a city with a relatively stable population.

When attempting any comparison of law enforcement employee rates, the data user must consider differing service requirements and responsibilities. The US Department of Justice provides data that represent national, regional, and state averages; however, *they should be viewed as guides or indicators, not as recommended or preferred police staffing levels.* Adequate personnel for a specific locale can be determined only after a careful study, or manpower analysis report, of the various conditions affecting service requirements in that jurisdiction. According to a 2001 study by the U.S. Department of Justice,[7] the national average of full-time officers per 1,000 inhabitants in the United States was 2.4. The average for the northeast was 3.6 full-time officers per 1,000 inhabitants. In January 2003, the Hudson Police Department employed 43 full-time police officers, one full-time Animal Control Officer, one Police Prosecutor, 6 full-time Police Dispatchers and 5 full-time civilians. Of the 43 full-time officers, only 24 are assigned to the Patrol Division.

The Hudson Police Department conducts Manpower Analysis Reports each year to determine the staffing levels required to provide an adequate level of service. In doing so, it is necessary to determine the average amount of time (work) that will be available from each officer. This involves making allowances for the amount of time "lost" due to regular days off, vacation time, training time, sick leave and disability. The Hudson Police Department handled 38,565 calls for service from January to December 2001. By using the calculations provided by the International Association of

[7] US Department of Justice, *Crime in the United States, 2001.*

Chiefs of Police (IACP),[8] and after a careful review of the patrol staffing analysis, the Police Department determined that the department was understaffed by 5 Patrol Officers in 2003.

a. Existing Needs

The existing facility was designed to accommodate Police Department staff until 2005. Expansion of the facility will be necessary to accommodate future needs. A need for a dispatch center combined with the Fire Department has been identified.

b. Future Needs

A projection of Police Department staffing to 2020 is unavailable given that the US Department of Justice data cannot be used to predict recommended or preferred police staffing levels. It is anticipated that the existing facility, which was designed to accommodate the Police Department needs to 2005, will need to be expanded to accommodate new officers. A Police Department Space Needs Study was completed in 1994.[9] At the time, the study recommended that a 25,000 ft² facility be constructed to accommodate the needs of the department through approximately 2015. The Police Department has no immediate capital improvement needs scheduled in the FY2004 Element of the Town of Hudson Capital Improvements Program through 2008; however, a request has been made for a 13,000 to 15,000 ft² addition to the existing facility to be constructed in 2005/2006.

3. Solutions

The existing Police Department facility is likely to accommodate the needs of the department through 2005; however, a 13,000 to 15,000 ft² addition to the facility will likely be required to accommodate the department's expansion through 2015. In addition, a dispatch center combined with the Fire Department should be developed.

E. FIRE DEPARTMENT

1. Existing Conditions

The Hudson Fire Department utilizes four facilities: 1) the Administration Building on Ferry Street; 2) the Central Fire Station adjacent to Town Hall on School Street; 3) the Robinson Road Fire Station on Robinson Road; and 4) the Burns Hill Fire Station on Burns Hill Road. Emergency Medical Services (EMS) is a division of the Fire Department and operates out of the Central Station. The Fire Department, not including EMS, responded to 2,109 calls in 2001, a 5.7% increase from the 1,955 responses in 1998. The Fire Prevention Division conducted 6,380 activities, including plan reviews, inspections and education activities, in 2001. This is a 200% increase in activity from the 2,131 activities conducted in 1998.

The number of employees in the Fire Department are shown in Table VIII-4a and b. There are currently 44 full time employees (Table VIII-4a) plus 12 on-call Fire Fighters (Table VIII-4b). The EMS Division is comprised of EMTs from the full time Fire Department forces listed in Table VIII-4 and also the on-call force. All of the full time firefighters are dually trained as EMTs. Three ambulances are based in the Central Fire Station and also assist the Town of Litchfield. The ambulances responded to 1,827 calls in 2001, a 23% increase from the 1,490 responses in 1998. 169 responses were to assist the Town of Litchfield in 2001.

[8] www.theiacp.org/profassist/PatrolDeployment.pdf.
[9] Kaestle Boos and Associates, *Hudson Police Department Space Needs Analysis*, 1994.

Table VIII-4a. Full Time Fire Department Employees

Employee	Full Time Employees
Chief	1
Deputy Chief	2
Captain	5
Lieutenant	4
Fire Prevention Officer	1
Fire Inspector	1
Fire Fighter	24
Secretary	2
Dispatcher	4
Total	**44**

Source: Town of Hudson Fire Chief, January 5, 2005.

Table VIII-4b. On-Call Fire Department Employees

Employee	Full Time Employees
Captain	1
Lieutenant	1
Fire Fighter	10
Total	**12**

a. Administration Building

The Hudson Fire Department Administration Building is located on a 0.171-acre site at 39 Ferry Street. The existing 980 ft² building was constructed in 1957 and acquired by the Town in 1999. The use of this facility is limited to the Departments Administration and Fire Prevention Divisions. The purchase of this facility provided immediate additional floor area for existing needs when it was acquired. The facility was recently renovated with a new roof, HVAC system, flooring and windows. The existing parking is limited and provides for employee parking only. Customers for this facility must find off-site parking.

b. Leonard A. Smith Central Fire Station

The Central Fire Station, located on the 1.4 acre Town Hall site, was built in 1952. The existing 9,800 ft² facility was constructed before the Department had any full-time employees. The facility includes five bays, offices, sleeping quarters, and approximately 256 ft² for the Fire Department dispatch room. The facility also houses three Ambulances for the EMS Division.

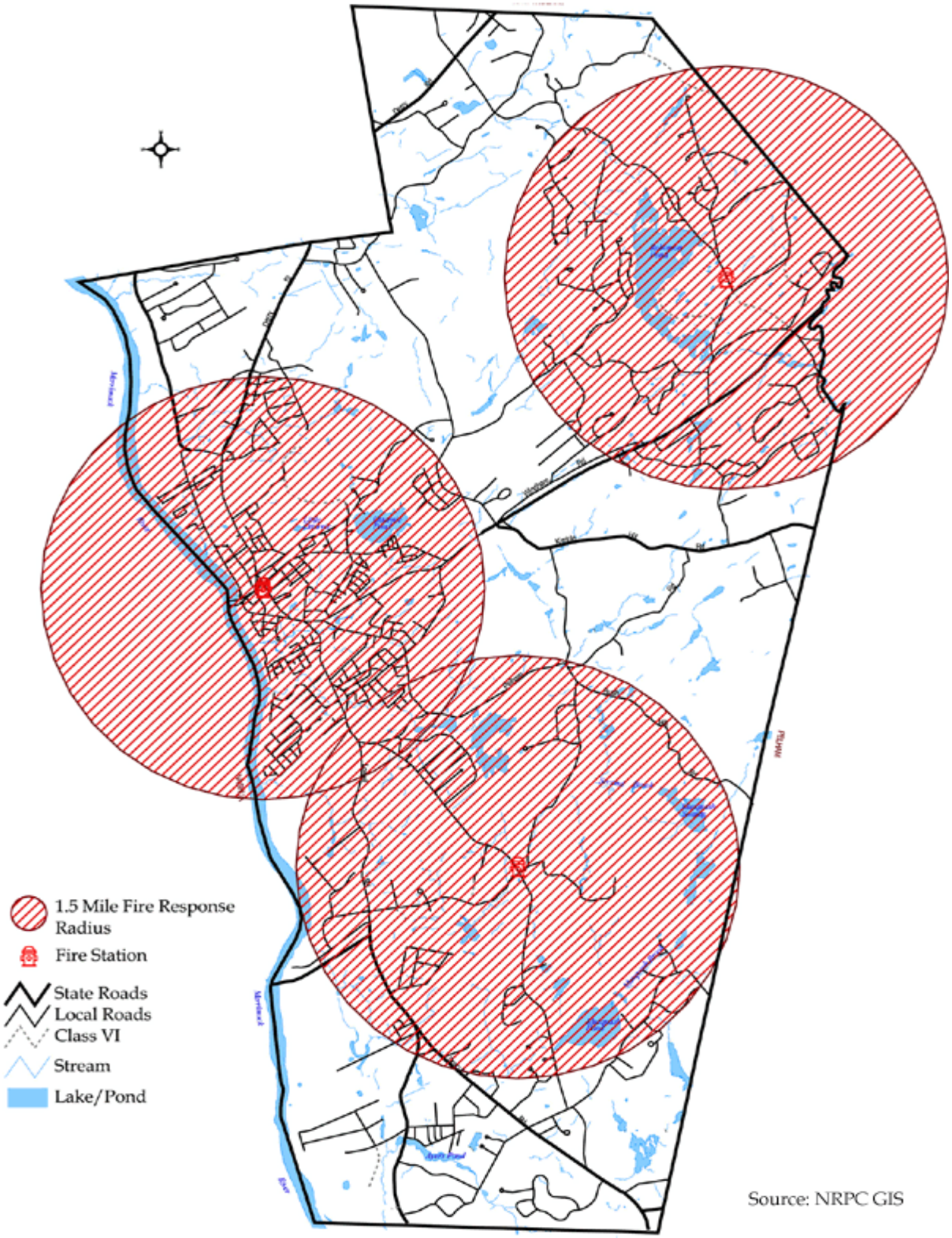
c. Robinson Road Fire Station

The Robinson Road Fire Station is located on a 45.7-acre site at 52 Robinson Road. The existing 5,890 ft² facility was constructed in 1982. The facility includes two bays, meeting room, office and storage space. The facility was recently renovated with a new pitch roof, HVAC system, electrical system, first floor interior, second floor storage and windows. The station is currently utilized by on-call employees but will need to be staffed full time in the next three to five years to accommodate call volume.

d. Burns Hill Fire Station

The Bums Hill Fire Station is located on a 0.923-acre site at 88 Burns Hill Road. The existing 2,880 ft² facility was constructed in 1980 when it was manned by on-call Fire Fighters. Since 2002, the Town has staffed this station with 3 full-time employees and the living space is inadequate. The one story facility includes three bays, office/bedroom and kitchen space. The facility was recently renovated with a new roof, windows, heating system, partial water purification/filtration system.

Map VIII-2. Fire Department Response Radius



2. Existing and Future Needs

Because there are so many variables involved (service radii, population, development density, traffic and response time), very few standards are available for long term planning of fire departments; however, the Insurance Services Office (ISO) provides some criteria for fire protection. The ISO standard recommends that municipalities have municipal water available within a 1½-mile radius from each fire station. This standard is set to ensure that all areas in a municipality are equally provided with water in case of fire emergencies. The 1½-mile radius around the three existing fire stations is shown on Map VIII-2. In addition, according to *Managing Fire Services*,[10] the NE average number of full time and on-call Fire Fighters is 23.4 per 10,000 population. This national average will be used as the standard for the purposes of this section.

a. Existing Needs

Relative to response, Map VIII-2 shows that there are sections of the north and south ends of town that are beyond the 1½-mile response radius around the three fire stations. The lack of an adequate water supply in the south end of Hudson is of concern to the Fire Department. An immediate, if temporary solution would be to add a 2,500 gallon Tanker to the Burns Hill station for emergency response. In addition, the lack of an adequate water supply in the north end of Hudson is also of concern to the Fire Department. Similarly, a temporary solution would be to add a 2,500-gallon Tanker to the Robinson Road Fire Station.

Relative to staffing, the national average of 23.4 Fire Fighters per 10,000 population can be used to estimate firefighting ability. Using the average, Hudson needed to provide 54 Fire Fighters to support its 2000 population. Hudson currently provides 38 full time and 12 on-call Fire Fighters, for a total of 50 Fire Fighters. The existing facilities currently accommodate these employees but are deficient in the following:

- The Central Fire Station is in need of major electrical and plumbing upgrades, additional employee and customer parking, larger apparatus bays to accommodate modem fire apparatus and additional space for storage, offices and living space. In addition, the current dispatch room is significantly undersized. The Central Fire Station is not accessible to people with disabilities.
- Newly hired Fire Fighters occupying the Burns Hill Fire Station require approximately 1,824 ft^2 of additional space for office, physical fitness, storage, sleeping quarters and associated domestic facilities.
- The Robinson Road Fire Station is currently manned by on-call Fire Fighters. The addition of a bulk propane facility, two bulk oil facilities and increased residential construction in the north end of Hudson requires full-time staffing of the Robinson Road Fire Station. Minimum full time staff should include one Officer and two Fire Fighters and should take place by 2008.
- The Town should develop a Combined Communications Center for the Fire and Police Departments. This concept has been used around the country to consolidate the two emergency call centers into one organization. The benefits include less duplication of efforts and better service to the public.

[10] Coleman, Ronny J. (Editor) and John A. Granito (Editor), *Managing Fire Services* (Municipal Management Series), 1988.

b. Future Needs

The national average of 23.4 Fire Fighters per 10,000 population can be used to estimate future fire fighting ability. Using the average, Hudson will need to provide 74 Fire Fighters to support its projected population in 2020. Hudson currently provides 38 full time and 12 on-call Fire Fighters, for a total of 50 Fire Fighters, and therefore will need to add 24 new Fire Fighters by 2020. Considerations for the growth of the Fire Department include:

- Planned future commercial and continued residential development in the north end of Hudson warrant the re-evaluation of the location of the Robinson Road Fire Station, the main corridors (NH 102 and 111) are not easily accessible from the current location. Any proposal for a new fire station should include floor area sufficient to accommodate additional Fire Fighters needed in 2020.
- There are significant response delays in the south end of Hudson. Future needs warrant the consideration of a new facility in this area and land should be pursued for this purpose. In addition, construction of a new South End Fire Station is also programmed for 2007. Construction is planned to be funded through a bond issue, subject to the will of the voters.

3. Solutions

The existing Fire Department facilities are not likely to accommodate the needs of the department through 2020 and are deficient in many ways to meet existing needs. There is a need to re-evaluate the location and floor area needs for the Fire Department Administration Building and the three Fire Stations. There do not appear to be any standards for the space needs of fire departments due to the widely varying nature of such departments and, therefore, a Town-specific space needs and location study should be conducted for all Fire Department facilities. It is likely that expansion and/or relocation of the Robinson Road and Burns Hill Fire Stations will be necessary, and there is a definite need for the expansion of the Central Fire Station on the existing site.

F. PARKS AND RECREATION

1. Existing Facilities

The Town of Hudson provides for various active and passive recreational opportunities at various locations. Facilities are provided at School Board and other publicly owned sites. The type and location of each recreational facility are listed in Table VIII-5. The Hudson Recreation Department, located in the 2,139 ft² Recreation Building on a 0.82-acre lot at 2 Oakwood Street, manages the Town's recreation programs and is staffed by one full time Recreation Director and a part time Recreation Assistant. The Town also owns the approximately 10,000 ft² Lions Hall on an 8.84-acre site at 12 Lion's Street. Both facilities are used for various recreation events.

Table VIII-5. Public Access Recreational Sites And Facilities

Facility	Alvirne High School	Dr. H. O. Smith School	Hills Garrison School	Library Street School	Memorial School	Nottingham West School	Robinson Pond Park	Claveau's Boat Landing	Greeley Field	Jette Field	Recreation Center	Merrifield Park	Other	Total School Facilities	Total Other Facilities
Baseball Field	3		1		1	1			1					6	1
Basketball Court	1			1	1	1			2		1			4	3
Beach							1							0	1
Boat Access							1	1						0	2
Football Field	1				1									2	0
Golf Course *													2.5*	0	2.5
Gymnasium	1	1	1	1	2	1								7	0
Hiking	1				1		1						1**	2	1
Ice Skating					1		1		1					1	2
Picnic Area							1				1	1		0	3
Playground		2	1				1		1		1	1		3	4
Running Track	1													1	0
Skate Park													1	0	1
Snowmobile Trail							1							0	1
Soccer Field	3		3		1	1								8	0
Softball Field	3	1			1					1				5	1
Tennis Court	4	2												6	0
Volleyball Court											1	1		0	2
X-Country Ski	1				1								2	2	2

Source: Brown & Rowe, *Landscape Architects and Planner, Hudson Master Park Plan,* March 18, 1988, updated by Town of Hudson Recreation Director and Planning Board in 2003.
* Golf course = Two 18-hole plus one 9-hole private facilities. **Musquash Hiking Trails

2. Existing and Future Needs

The NH Office of Energy and Planning (formerly the Office of State Planning), *Statewide Comprehensive Outdoor Recreation Plan* (SCORP), provides guidelines for the provision of various recreation facilities per 1,000 population. These guidelines are provided in Table VIII-6, along with the provision of existing facilities. The table also provides an estimate of facilities required to meet the needs of the existing population and the needs of the population in 2020. The tables do not include facilities planned for the Benson's property, the proposed Riverwalk trail along the Merrimack River or hiking trails at the Musquash Conservation Land.

Table VIII-6. Recommended Recreational Facility Needs, 2000 and 2020

Facility (quantity)	Guideline per 1,000 Population	Existing Facilities	Facilities Needed 2000	Facilities Needed 2020
Baseball Field	1.10	7	25	35
Basketball Court	0.80	7	18	25
Beach*	not applicable	1	1	1
Boat Access*	not applicable	2	1	1
Football Field	0.10	2	2	3
Golf Course *	0.04	2.5*	1	1
Gymnasium	0.25	7	6	8
Hiking	not available	3	not available	not available
Ice Skating	0.14	3	3	4
Picnic Area	not available	3	not available	not available
Playground	0.50	6	11	16
Running Track	0.04	1	1	1
Skate Park	not available	1	not available	not available
Snowmobile Trail	not available	1	not available	not available
Soccer Field	0.16	8	4	5
Softball Field	not available	6	not available	not available
Tennis Court	0.95	6	22	30
Volleyball Court	not available	2	not available	not available
X-Country Ski	0.10	4	2	3

Source: New Hampshire Office of State Planning and Hudson Recreation Director.
* Golf course = Two 18-hole plus one 9-hole private facilities.

a. Existing Needs

If the State guidelines are used, Hudson provides sufficient football field, gymnasium, ice skating rink, running track, skate park, soccer field and cross country skiing facilities to serve the 2000 population, but was deficient in the provision of all other facilities. The Town is particularly deficient in the provision of baseball fields, basketball courts, playgrounds and tennis courts.

In addition, the rated capacity of the existing Recreation Center is 200 people, which is too small to accommodate the 300 to 400 children that often attend indoor-outdoor events at the facility. Consideration should be made to relocating the recreation center to the Lion's Hall, which has a rated capacity of 400 people. Moreover, additional courts or playing field space could be accommodated on the larger Lion's Hall property. The Recreation Department is also considering a new playing field on the Nottingham West School property, and public access to a proposed playing field is being negotiated near NH 3A and Wason Road.

b. Future Needs

In 2020, additional recreation facilities will be required for all categories except cross-country ski, running track and soccer field facilities to meet the State guidelines. The Town will be particularly deficient in the provision of baseball field, basketball court, playground and tennis court facilities, however, the State guidelines are limited in that they do not account for local interests, conditions or participation levels. The SCORP provides only general projections of recreation facility needs. According to the National Recreation and Park Association (NRPA), a "*…standard for parks and recreation cannot be universal, nor can one [community] be compared with another even though they are similar in many respects.*"[11] The NRPA has moved away from the

[11] National Recreation and Parks Association, *Parks, Recreation, Open Space and Greenway Guidelines*, 1995, pg. 59.

concept of broad facility standards as used in the 1995 SCORP and referenced in Table VIII-6, above. Rather, the NRPA provides a step by step process that can be used to more accurately determine facility standards for each of Hudson's recreation facilities.[12] The NRPA recommends facility standards defined by customer's needs rather than an arbitrary standard such as 0.95 tennis courts per 1,000 population and the process requires considerable analysis of the use of each specific facility. This type of analysis is beyond the scope of this section due to a lack of data on the use of each facility.

c. Benson's Property

The 168-acre former Benson's Wild Animal Farm property presents a significant opportunity for the Town of Hudson to provide open space and recreational amenities to its citizens. The NH Department of Transportation acquired the property for the purpose of creating a wetland mitigation site for wetland impacts at various highway construction projects. It is anticipated that up to 40 acres of wetlands will be constructed or restored on the property. A *Benson's Property Master Plan*[13] was completed in 2002 and included for references as Appendix A.. A conceptual site plan and a phased capital improvements plan for the property was developed as part of the *Benson's Property Master Plan*.

The site plan includes the wetlands restoration area, a passive recreation area, an active recreation area and a historic buildings district. The capital improvements plan includes twelve phases for implementing various improvements within the latter three of these areas. Proposed improvements are generally geared towards creating a pastoral park setting, with restoration of contributing historic structures, redevelopment of open field area into multi-purpose play areas, building a system of trails that accommodates a variety of non-motorized activities, provision of vehicle access and parking for approximately 250 cars, development of new structures for picnicking/restrooms/concessions, an amphitheater with seating for approximately 500 people, and a warming house for winter ice skating and cross-country skiing. Full development of the improvements can contribute towards alleviating the existing and future deficiency in recreation facilities within Hudson.

3. Solutions

Estimates based on State guidelines suggest that Hudson is deficient in field space, playground and court facilities and will become further deficient in these facilities by 2020. Some facilities may be provided in the near future through development of the Benson's property and Recreation Department efforts. In order to determine more accurately the facility needs specific to the Town of Hudson, the Town should perform an in-depth study of existing and future recreation needs based on the NRPA process. The study should estimate the existing and future recreation needs for each type of facility and determine the land or floor area required to accommodate the needs. Once the study is completed, impact fees may then be an appropriate source of revenue for additional recreation facilities, pending further analysis.

[12] NRPA, pp. 69-89.
[13] Vanasse Hangen Brustlin, Inc., *Benson's Property Master Plan*, March 6, 2002.

G. SOLID WASTE

1. Solid Waste Disposal

The Town of Hudson closed and capped its landfill on West Road in 1991 due to leachate problems. Hudson residents are provided with curbside pickup of residential waste and recyclable materials through a private contractor. A Solid Waste Study Committee is responsible for recommending options for each contract cycle. In 2001, the Town residents generated 11,005 tons/year of solid waste. Of that total, 1,124 tons/year or 10.2% were recycled.

2. Household Hazardous Waste

The Nashua Regional Household Hazardous Waste/Small Quantity Generator Collection (HHW-SQG) Program is open to the residents of Hudson and surrounding communities. HHW comes from everyday products used in home, yard or garden and are corrosive, flammable, toxic or reactive. The program provides a location for residents to safely dispose of HHW during various days of the year at a central location at the Nashua Public Works Garage. Household participation rates have risen from 1,154 in 1996 to a peak of 2,520 in 1999, 2,208 households participated in the program in 2001.

H. HIGHWAY DEPARTMENT

1. Existing Facilities

The Hudson Highway Department consists of the Road Agent and the Street, Drain/Sewer and Maintenance Divisions. The Department is located on an 18.6-acre site at 2 Constitution Drive and 8.26 acres of the site are subject to a conservation easement. The 19,600 ft² facility was constructed in 2000 to replace various obsolete facilities. The facility includes a 15,400 ft² covered garage with maintenance functions, 2,000 ft² of office space and 2,000 ft² of mezzanine for storage. The site also includes a 3,600 ft² salt shed also constructed in 2000. The salt shed meets all existing environmental regulations for salt containment. The Highway Department currently has 1 part-time and 25 full time employees. A list of employees is provided in Table VIII-7.

Table VIII-7. Highway Department Employees

Department	# of Employees	
	Full Time	Part Time
Road Agent	1	0
Highway Dept. Supervisor	1	0
Foreman	2	0
Equipment Operators	5	0
Mechanic	1	0
Traffic Technician	1	0
Truck/Driver Laborers	13	0
Operation Assistant	1	0
Receptionist	0	1
Total	**25**	**1**

Source: Town of Hudson Road Agent, October 2002.

2. Future needs

The existing facility was constructed in 2000 to meet the needs of the Highway Department for the foreseeable future. Therefore, no further expansion is likely prior to 2020.

I. PUBLIC SCHOOLS

1. Existing Conditions

Public Schools in Hudson are governed by the five-member locally elected Hudson School Board supported by a Superintendent. The School Board offices are in the former Webster Street School at 20 Library Street. The Hudson School Board provides four Elementary schools, one Middle and one High school. They include: 1) Dr. H. O. Smith School; 2) Library Street School; 3) Nottingham West School; 4) Hills Garrison School; 5) Memorial Middle School; and 6) Alvirne High School. In addition, two private schools are located in Town but are not subject to the analysis of this section, the Presentation of Mary Academy and the Bethel Christian School. Current and projected enrollment figures for each grade can be seen in Table VIII-8. Projected enrollment figures are determined based on the Cohort Survival Technique and project a peak in the number of students at 4,125 in 2004/2005. From then, the enrollment begins to drop to approximately 3,887 by 2012/2013. The projected drop in the number of students may be attributed to various demographic factors, including the aging of the population and a reduction in household size.

Table VIII-8. Existing and Projected School Enrollment Figures

Existing Enrollment																
Year	**1**	**2**	**3**	**4**	**5**	**1-5**	**6**	**7**	**8**	**6-8**	**9**	**10**	**11**	**12**	**9-12**	**1-12**
2002-03	305	342	283	336	337	1,603	370	363	407	1,140	396	356	303	279	1,334	4,077
Projected Enrollment																
Year	**1**	**2**	**3**	**4**	**5**	**1-5**	**6**	**7**	**8**	**6-8**	**9**	**10**	**11**	**12**	**9-12**	**1-12**
2003-04	296	304	352	287	338	1,577	349	373	374	1,096	451	357	353	284	1,445	4,118
2004-05	276	295	313	359	289	1,532	350	352	384	1,086	415	407	354	331	1,507	4,125
2005-06	297	275	303	319	361	1,555	299	353	363	1,015	426	374	403	332	1,535	4,105
2006-07	307	296	283	309	321	1,516	373	301	364	1,038	403	384	371	378	1,536	4,090
2007-08	285	306	305	288	311	1,495	332	376	310	1,018	404	364	380	348	1,496	4,009
2008-09	289	284	315	311	290	1,489	322	335	388	1,045	344	364	361	357	1,426	3,960
2009-10	293	288	292	321	313	1,507	300	324	345	969	430	310	361	339	1,440	3,916
2010-11	298	292	296	297	323	1,506	324	302	334	960	383	388	307	339	1,417	3,883
2011-12	302	297	300	302	299	1,500	334	326	311	971	370	345	384	288	1,387	3,858
2012-13	307	301	306	306	304	1,524	309	337	336	982	345	334	342	360	1,381	3,887

Source: Hudson School District, October 2002.

2. Existing and Future Needs

The NH Department of Education (DoE) provides funding to communities for new schools through the Office of School Building Aid. In order to receive funding, schools must meet certain classroom floor area standards as defined by Section Ed 305.03 of the DoE Administrative Rules.[14] At the kindergarten level, classrooms must provide at least 1,000 ft² with a minimum of 50 ft² per pupil. In grades 1-8, a 900 ft² minimum classroom size is required, at a ratio not less than 30 ft² per pupil. At the grade 9-12 level, a minimum classroom size of 800 ft² is required, or 30 ft² per pupil, whichever is greater. These standards for classrooms, however, do not include the many other components of overall spatial needs within a school system. Other requirements include circulation areas, core facilities, media and resource rooms, administration space and other variables that depend on the local district's chosen instructional program and the size and quality of the core facilities the district is willing to support. Therefore, the best indicator of the local facility standard is a function of the overall floor area of existing school facilities divided by the rated capacity of the schools. The facility inventory and capacity of the six public schools are shown in Table VIII-9. The entire system provides a floor area per capacity of 118 ft² per student.[15]

Table VIII-9. Facility Inventory and Capacity

School	Location	Year Constructed	Acres	Grades Served	Floor Area (ft²)	Capacity (estimate)	Enrollment	Enrollment as % of capacity
Dr. H.O. Smith	33 School Street	1939	8.05	1-5	44,617	350	217	62%
Library Street	22 Library Street	1958	1.75	1-5	30,136	250	193	77%
Nottingham West	10 Pelham Road	1988	16.24	1-5	77,000	800	679	85%
Hills Garrison	190 Derry Road	2001	18.00	1-5	64,800	550	514	93%
Memorial	1 Memorial Drive	1966/2002	27.86	6-8	157,266	1,200	1,140	95%
Alvirne High/ Vocational Center	200 Derry Road	1948/1992	195.00	9-12	140,448	1,500	1,334	111%
Total			**266.90**		**514,267**	**4,350**	**4,077**	**94%**

Source: Hudson School District, October 2002.
Note: Floor Area of Alvirne High does not include Vocational Center.

Using the 2002-03 and the projected 2012-13 enrollment figures from Table VIII-8, and the floor area standard of 118 ft² per student, a projection of the classroom floor area required for each school can be made, and compared to the capacity for elementary, middle and high schools. This is summarized in Table VIII-10.

[14] NH Department of Education, Administrative Rules Ed 305.03 at: http://www.ed.state.nh.us/EdLaw/admini.htm
[15] Bruce C. Mayberry, Planning Consultant, *Impact Fee Needs Analysis and System Design for Public School, Library and Recreation Facilities, Final Report*, April 1, 1996 and Bruce C. Mayberry, Planning Consultant, *Update to the Hudson Impact Fee System for Public Schools and Public Library,* October 23, 2000. Enrollment and floor areas updated by NRPC with data from Hudson School Board, October 2002.

Table VIII-10. Existing and Projected Classroom Floor Area Requirements

Grade Level	Existing Floor Area (ft^2)	Enrollment 2002-03	Minimum Required Floor Area 2002-03 (ft^2)	Projected Enrollment 2012-13	Minimum Required Floor Area 2012-13 (ft^2)
Elementary	216,553	1,603	189,154	1,524	179,832
Middle	157,266	1,140	134,520	982	115,876
High	140,448	1,334	157,412	1,381	162,958
Total	**514,267**	**4,077**	**481,086**	**3,887**	**458,666**

Source: Hudson School Board, October 2002; compiled by NRPC.

The number of students in all grade groups is expected to decline from 2002/2003 to 2012/2013. With the construction of the new Hills Garrison School, the existing school buildings as a whole now provide sufficient capacity to serve existing and future needs. Therefore, the existing school buildings will provide for the needs of Hudson's students for the foreseeable future; however, the existing Alvirne High School is 10% over capacity and is projected to be 28% over capacity by 2006/2007. The over capacity is projected to continue through 2012/2013. Given that high school students should be contained within one facility separate from other grades, the School District may wish to consider a small scale expansion or reconfiguration of the existing Alvirne High School to accommodate approximately 22,500 ft^2 of additional floor area.

3. Solutions

Hudson's school facilities appear to provide a total floor area sufficient to serve the overall needs of students for the foreseeable future; however, a small-scale expansion or reconfiguration of the existing Alvirne High School may be necessary to alleviate capacity issues at the high school level. Impact fees are currently collected for elementary and middle school levels only. Given the projected decline in elementary and middle school enrollment, the Town should consider revisiting the impact fee schedule and reassign impact fees to the high school level.

J. PUBLIC WATER SUPPLY[16]

Hudson's public water supply system has two primary functions. The first is to supply water for domestic, commercial and industrial use and the second is to provide adequate fire protection. Consumers New Hampshire Water Company (CNHWC) previously owned the existing public water supply system. During the 1996 Annual Town Meeting, the Town of Hudson approved a measure to purchase the system and operate it as a municipal utility. The Town of Hudson now owns three water supply wells located in the Town of Litchfield and the water distribution system within the Town borders, including four public booster pumping facilities, two water storage facilities and over 500,000 linear feet of water distribution pipe. The following are discussed herein: 1) existing public water supply system; 2) existing and future water demand and capacity; and 3) recommended improvement plan.

[16] Source for most of the information in this section is from: 1) Weston & Sampson Engineers, Inc., *Town of Hudson, NH, Water Distribution System Study, Final Report,* January 2002; with more recent information in 2) Weston & Sampson Engineers, Inc., *Town of Hudson, NH, Dame and Ducharme Well Safe Yield Study, Final Report*, March 14, 2002.

1. Existing Public Water Supply System

a. Water Supply Wells

The Town is supplied with water pumped from three wells located in Litchfield. The three wells (Dame, Ducharme and Weinstein) have been identified as having a combined apparent safe yield of 1.89 million gallons per day (mgd) based on annualized usage. These wells provide water to the Towns of Hudson, Litchfield and Pelham. Water enters the Town through a newly metered 16-inch water main off Adam Drive. Table VIII-11 summarizes the apparent safe yield of the three wells.

Table VIII-11. Dame, Ducharme and Weinstein Wells

Well	Date Installed	Apparent Safe Annualized Yield (million gallons per day)
Dame	1985	Combined yield
Ducharme	1983	0.79[17]
Weinstein	1982	1.1
Total		**1.89**

Source: Weston and Sampson Engineers, Inc., 2002 and February 2003.

By contract, up to 15% of the safe yield of the three wells can be utilized by Pennichuck Water Works for the town of Litchfield and Pelham and small portion of Londonderry. Therefore 1.61 mgd is available from the wells for Hudson users. Pennichuck Water Works supplements Hudson's water supply with water from the Pennichuck Water Works (PWW) Treatment Plant during periods of high demand. This is metered through the Taylor's Falls pumping station meter station which is owned and operated by PWW.

The Dame and Ducharme wells draw water from what is known as the Darrah Pond Aquifer in Litchfield. In 2000, the NH Department of Environmental Services (NH DES) began to receive notice of falling water levels in Darrah Pond. As a result, interim pumping reductions were agreed to in the summer of 2000; however, this did not stem the reduced water levels and a study was conducted in 2001 on behalf of the Town of Hudson in order to determine an appropriate safe yield for these wells. The study concluded, that the maximum safe yield should be maintained at average annual withdrawals of 90% of available aquifer recharge. Available recharge was estimated at 0.88 mgd and therefore the wells safe yield was set at 0.79 mgd. It is possible to operate these wells at a maximum of 1.1 to 1.2 mgd for extended periods; however, exceeding the long-term annual safe yield could contribute to an overall lowering of ground water levels in the area of Darrah Pond during periods of low precipitation.

The Weinstein well aquifer appears to have a maximum yield capacity of 1.6 mgd on an annualized basis.[18] The study, however, recommends a safe yield of 1.1 mgd annualized with greater amounts available during periods of high water demand. The final recommendation in the study is that no more than 400 million gallons per year be pumped from the Weinstein well.

[17] Note: originally estimated at 1.2 to 1.3 mgd by Weston Sampson Engineers, Inc. in January 2002 study. Further study of the safe yield reduced this figure to 0.79 mgd average annual yield.
[18] Weston and Sampson Engineers, Inc., *Weinstein Sustainable Yield Study*, February 2003.

b. Storage Facilities

Two storage facilities provide 2.95 million gallons of water storage capacity in the main service system. The 2.0-mg Marsh Road tank is located off Marsh Road in the northwestern part of Town and the 0.95-mg Gordon Street Standpipe is located off Gordon Street near the geographic center of Town.

Two new storage facilities are included in the Capital Improvement Plan (CIP). The first will be located in south Hudson with a capacity 0.8 million gallons and the second will serve the Windham/Marsh Road area and be located on Barrett's Hill. This storage facility will have a capacity of 1.2 million gallons.

c. Booster Pumping Facilities

Three booster pump stations provide water to three separate areas with high topographic land elevation. There are also several privately owned and operated high elevation booster pump stations not included in this discussion. Table VIII-12 summarizes the hydraulic grade line and capacity of the three pump stations.

Table VIII-12. Marsh Road, Windham Road and Compass Point Pump Stations

Station	Date Installed	Average HGL (feet)	Capacity* (gallons per minute)
Marsh Road	1986	510	400
Windham Road	N/A	520	750
Compass Point	1996	440	750

Source: Weston and Sampson Engineers, Inc., 2002.
* Domestic Flow Capacity without Fire Pumps; HGL = Hydraulic Grade Line.

The Marsh Road station draws water from and is located adjacent to the 2.0 million gallon Marsh Road water storage tank. It was upgraded in 2001 to alleviate operation deficiencies and has adequate capacity. It is a below ground station and therefore has "confined space" limitations. The Windham Road and Compass Point stations have deficiencies which trigger fire pump start up capacity that can result in pressure surges in the system. The Compass Point system and the Windham Road system are slated for upgrades in the CIP.

d. Distribution System

The over 500,000 feet of water distribution system (pipeline) is relatively new and of generally good quality. The system is illustrated on Map VIII-1 on page VIII-3. Portions of the original water distribution system in the town center were constructed prior to 1930 and may be of inferior unlined cast iron pipe and in need of replacement. There is a need to locate and document all internal pipe conditions in the town center area and prioritize replacement.

New transmission mains are needed to deliver water to various sections of Hudson, especially south Hudson, and also to provide appropriate redundancy in the delivery system. Table VIII-13 summarizes the proposed new transmission mains.

Table VIII-13. Proposed New Transmission Mains

Street	From	To	Proposed Size (inches)	Length (feet)
Barrett's Hill Road	Rangers Drive	Greeley Street	12-inch	6,000
River Road	Lowell Road	End of pipe in River Road	12-inch	2,900
Lowell Road	Central Street	Birch Street	16-inch	3,250
Ferry Street	Webster Street	Library Street	16-inch	800
Lowell Road	Wason Road	River Road	12-inch	5,000
Patricia Drive	Laurant Drive	Alvirne Drive	16-inch	1,630
Alvirne Drive	Patricia Drive	End of Alvirne Drive	16-inch	770
Cross-country	End of Alvirne Drive	End of 16-inch pipe in Derry Road	16-inch	1,170
Sagamore Park Road	End of pipe on Sagamore Park Road	Lowell Road	12-inch	1,100
Pelham Road	Lowell Road	Burns Hill Road	12-inch	550

Source: Weston and Sampson Engineers, Inc., *Town of Hudson Water Distribution System Study*, January 2002.

2. Existing and Future Water Demand and Capacity

The 2001 *Town of Hudson Water Distribution System Study* examined existing and future water demand and capacity. An estimated 19,048 people were served by the water system in 2000 and an estimated 28,350 people will require service in 2020.

a. Water Demand

Table VIII-14 summarizes the average demand for 2000 (actual) and at five-year intervals to 2020 (projected).

Table VIII-14. Average Water Demand, Hudson 2000 - 2020

Year	Population Served	Average per Capita Demand (gallons per capita per day)	Average Daily Demand (million gallons per day)
2000	19,048	82.4	1.57
2005	22,950	86.3	1.98
2010	24,525	90.6	2.22
2015	26,550	95.2	2.53
2020	28,350	100.0	2.84

Source: Weston and Sampson Engineers, Inc., 2002.
Note: 2000 is actual demand. 2005 to 2020 is projected.

The average per capita demand projected for 2005 to 2020 in Table VIII-14 was determined by assuming that the trend of residents using more water per capita will continue into the future. This need not be the case given the implementation of appropriate water conservation measures; however, the more conservative figures are appropriate for the purpose of this analysis.

The average daily demand is not the only measure of water system demand. The peak day and peak hour demands, both expected to occur in the driest and hottest part of the summer, are also important. The maximum day demand is projected by multiplying the projected average day demand by a ratio of 1.5. The peak hour demand is projected by multiplying the maximum day demand also by 1.5. Peak demand is summarized in Table VIII-15.

Table VIII-15. Peak Water Demand, Hudson 2000 - 2020

Year	Max. Day Demand (million gallons per day)	Peak Hour Demand (million gallons per day)
2000	2.35	3.53
2005	2.97	4.46
2010	3.33	5.00
2015	3.80	5.69
2020	4.26	6.39

Source: Weston and Sampson Engineers, Inc., 2002.
Note: 2000 to 2020 is projected. 2000 actual not available.

b. Water Supply

The three wells in Litchfield are capable of supplying a safe yield of 1.89 mgd. Of that supply, approximately 15% is supplied through Pennichuck Water Works to the Towns of Litchfield, Pelham and Londonderry. Therefore, 1.61 mgd is available from the wells for Hudson users. Approximately 1.57 mgd was demanded by Hudson users in 2000 and the excess demand was supplied by Pennichuck Water Works Treatment Plant. Demand in 2020 is estimated to be 2.84 mgd, indicating that water supply above that available from the Litchfield wells will be needed. Therefore, Hudson should continue to look for potential supply as well as implement policies and procedures to decrease the per capita water use.

3. Solutions

By the year 2020, the demand for water in Hudson will exceed the amount of water available in the Litchfield wells. It is recommended that the Town of Hudson find potential well sites within the Town to address this deficiency. In the meantime, the Town can address current water issues by decreasing the per capita water use through various water-saving policies such as implementing Odd-Even Watering restrictions and requiring new site plans to include drought resistant landscaping.

In addition to local water issues, a number of events have occurred to illustrate the need for further water supply analysis on a regional basis. These events include a rising peak demand throughout the Merrimack Village District system,[19] the aforementioned concern with the impact of the Dame and Ducharme Wells on the water level in Darrah Pond[20] and the incidence of drought in recent years. To address these issues, the Nashua Regional Planning Commission is working with member communities, local water providers, the Public Utilities Commission, other Regional Planning Commissions, the NH DES, the NH Division of Fire Safety and Emergency Management and the US Geological Survey to secure funding for a comprehensive water supply and demand study for southern NH. A study committee has been formed which meets on a regular basis. The composition of the committee is expanding as more municipalities become interested in the topic. Hudson has been an active participant in these proceedings. Enabling legislation to allow for expanded inter-municipal bonding authority was passed in June 2003.[21]

[19] Merrimack Village District, *Ad Hoc Committee on Demand Strategy and Naticook Aquifer*, October 2000.
[20] Weston and Sampson Engineers, Inc., *Final Report Dame and Ducharme Well Safe Yield Study*, March 14, 2002.
[21] Legislation can be viewed at: http://www.gencourt.state.nh.us/legislation/2003/HB0361.html

K. PUBLIC SEWER

1. Existing Conditions

Hudson's public sewer infrastructure is owned by the Town and utilizes the City of Nashua wastewater treatment plant to process sewage. The Town has an agreement with the City of Nashua to utilize 12.58% of the capacity of the wastewater treatment plant. The agreement provides the Town with 2.0 million gallons per day (mgd) of treatment capacity.[22] The existing sewer infrastructure is limited to the more densely populated areas of Town along Ferry and School Streets, and the area bounded by Melendy Road, Pelham Road and the Merrimack River (see Map VIII-1). The sewer line capacity is approximately 4.0 mgd. The Town was processing approximately 1.0 mgd of sewage in 2002, down from approximately 1.5 mgd in 2000. The decrease in the amount of sewage is likely due to a drought and economic conditions.

The Town of Hudson Sewer Master Plan, as amended in 1999, indicated that there remains approximately 200,000 gallons of average daily flow available within the 2.0 mgd limit established by the inter-municipal agreement with the City of Nashua.[23] In order to fairly allocate the remaining sewer capacity among the land uses permitted in the zoning ordinance, new procedures for making sewer allocations were adopted by the Board of Selectmen in 2000.[21] These procedures generally reserve the remaining capacity for the area within the sewer service boundary (see Map VIII-3).

The limitations on sewer expansion due to limited capacity of the sewage treatment plant and the inter-municipal agreement can have significant impact on the type and scale of development within the Town. The limitations essentially ensure that new development in the outside the sewer service boundary will develop at a much lower density due to larger lot sizes needed to accommodate septic systems and as required by the zoning code.

2. Future Needs

The Town has undertaken a study as part of the Sewer Master Plan to evaluate methods to reduce infiltration and inflow into the Town's sewer system. Implementation of the recommendations of the study may result in some limited increase in sewer system capacity; however, any further geographical expansion of the sewer system will be dependent upon expansion of the City of Nashua wastewater treatment plant.

3. Solutions

In order to preserve the 2.0 mgd capacity of the sewer system, the Town should continue to enforce the sewer limitation allocation procedures and encourage the concentration of new development and redevelopment within the sewer system service boundary.

L. IMPACT FEES

Impact fees are a charge on new development that is proportional to the impact of that new development on the infrastructure needs of the community. Impact fees are considered an Innovative Land Use Control and are defined in NH RSA 674:21.V as "*… a fee or assessment imposed upon development, including subdivision, building construction or other land use change, in order to help meet the needs occasioned by that development for the construction or improvement of capital facilities owned or operated by the municipality, including and limited to water treatment and distribution facilities; wastewater treatment and disposal facilities; sanitary sewers; storm water, drainage and flood control*

[22] Town of Hudson, *Amendment to the Hudson Town Code Chapter 270, Sewers*, March 15, 2000.
[23] Nashua – Hudson Wastewater Treatment Agreement, December 1978.

facilities; public road systems and rights-of-way; municipal office facilities; public school facilities; the municipality's proportional share of capital facilities of a cooperative or regional school district of which the municipality is a member; public safety facilities; solid waste collection, transfer, recycling, processing and disposal facilities; public library facilities; and public recreational facilities not including public open space."

Impact fees were adopted in 1996 by an amendment to the Hudson Zoning Ordinance to enable the Town to levy the fees. The Town then developed an Impact Fee Schedule to determine the amount of the fees and to identify which capital improvements they would apply to. The Fee Schedule was updated in 2000[24] and involves an intensive study of the impact of new development, by type, on facilities scheduled in the Capital Improvements Program. Currently, impact fees in Hudson are used to raise funds for future public school facilities (grades 1 to 8), library facilities and for roadway improvements to NH 3A, 102 and 111. In 1996, the potential for impact fees to partially fund new recreation facilities was considered, but such fees were determined to be unfeasible as impact fees cannot be used to fund new facilities needed to serve the existing population. Impact fees may be useful for funding future Fire Department and/or High School facilities, pending further study.

M. RECOMMENDATIONS

1. Town Hall

- Procure an Architect to conduct a Town of Hudson Space Needs Study to pinpoint the exact amount of space required to accommodate existing and projected future employees.
- Consider the costs and benefits of whether to: 1) expand the existing Town Hall on the existing site; 2) purchase and rehabilitate an existing building, preferably near the existing facility; 3) construct a new facility, preferably near the existing facility; or 4) relocate to a different area of Town.
- The architectural treatment and site design of any expansion of the existing Town Hall or construction of a new facility should reflect Hudson's community character.

2. Library

- Expand the existing library to 25,000 ft^2 on the existing and adjacent sites.
- The architectural treatment and site design of the expansion of the existing Library should reflect the existing historically significant building and Hudson's community character.
- Consider shared parking for the expanded library and the Town Hall facility.
- Continue the use of impact fees as a source of revenue for new Library facilities required to accommodate future population growth.

3. Police Department

- Construct an approximately 13,000 to 15,000 ft^2 addition to the existing facility to accommodate the department's expansion through 2020.
- Develop a joint dispatch center with the Fire Department.

[24] Bruce C. Mayberry, Planning Consultant, *Impact Fees Methodology Update, Hudson, NH,* October 2000.

4. Fire Department

- Procure an Architect to conduct a Fire Department Space Needs Study to consider the floor area and location of each Fire Department facility needed to 2020.
- Investigate the need to construct a new Central Fire Station to accommodate the Fire Protection and EMS needs of the central part of Hudson to 2020.
- Continue planning for expanded or relocated facilities in the south and north ends of Hudson in order to limit response times and provide adequate space for additional Fire Fighters and a training facility.
- Develop a joint dispatch center with the Police Department.

5. Recreation

- Implement the Parks and Recreation Department Long-Range Plan.
- Continue planning for the design and construction of new recreation facilities based on the results of the study.
- Implement the *Benson's Property Master Plan*, including the development of additional playgrounds, playing fields, hiking trails and other recreation facilities as needed.

6. Solid Waste

- Continue to utilize private contractors for curbside solid waste and recycling pickup.

7. Department of Public Works

- None.

8. Public Schools

- None.

9. Public Water Supply

- Continue to actively participate in the process of regional water supply planning.
- Implement the recommendations of the 2001 *Town of Hudson Water Distribution System Study* as amended by the 2001 *Dame and Ducharme Well Safe Yield Study*, including finding potential well sites in Hudson.
- Implement policies and procedures to decrease per capita water use.
- Consider the use of impact fees as a source of revenue for new water supply facilities necessary to accommodate future population growth.

10. Public Sewer

- Continue to enforce the sewer limitation allocation procedures.
- Continue to encourage the concentration of new development and redevelopment within the sewer system service boundary within the limits of the sewer capacity.

CHAPTER IX

FUTURE LAND USE

A. INTRODUCTION

Planning for the future use of land within Hudson is the main component and culmination of the Master Plan. Each chapter in this Master Plan is essentially an element of a comprehensive land use plan that is implemented through the local zoning ordinance and land use regulations. Based upon an analysis of existing land use patterns and projected community needs, this chapter encourages land use patterns that will address the community's needs for the next twenty years. The chapter describes where those preferred land uses should be located, how they should function and how they might be implemented in Hudson. Future land uses are defined within the context of: 1) Residential Land Uses; 2) Natural Resource Protection; 3) Commercial and Industrial Development and Redevelopment; and 4) Economic Development.

B. FUTURE LAND USE ISSUES

1. Residential Land Use

Lower-density residential dwellings, which are predominately single-family houses, presently occupy 28% of the town's total land area and represent 74% of the total housing units in the Town. Multi-family residential development accounts for 707 acres, or approximately 4% of the town's 18,773 acres, and represents approximately 13% of total housing units (see Table VI-1 on page VI-2).

Opportunities are limited for the development of additional multi-family residential units in the Business District and higher density single family units in the Town Residence District. In 2003, multi-family residential developments, with the exception of housing for older persons, are permitted only in the town's Business District, if served by public water and sewer. Much of Hudson's multi-family development is now non-conforming with the greatest percentage located in the Residential-2 (R-2) District. Only 75.7 acres (10.2%) of the town's Business District is developed for multi-family residential use and there are 82 acres of developable land remaining in this District. Assuming the current ratio of multi-family residential to non-residential uses in the Business District remains constant, 8.4 acres of this developable land is likely to be developed for multi-family dwellings in the future.

Similarly, opportunities for the development of additional high-density single-family residential units in the Town Residence District are limited, as this district is fully developed and the original intent of this district is not to extend it beyond the existing boundaries.

With the balance shifted toward lower density residential development and single-family dwellings in particular, Hudson may experience relatively modest growth in total population as higher-density housing opportunities for small households and single individuals remain static or decline.

In addition, as land is consumed at a high rate due to low density residential development, increasing pressure will be placed on the remaining rural lands in town.

The buildout analysis (Chapter 6) indicates that there is a potential for a maximum of an additional 2,270 new single-family residential housing units or 1,570 duplexes in Hudson before all remaining appropriately zoned land is developed. These units would be primarily single family dwellings, together with a modest number of senior housing units and duplexes.

A variety in Hudson's housing stock has direct as well as indirect benefits. For example, every employee who works in Hudson but lives elsewhere needs transportation in and out of town. Since most people prefer driving their own vehicles to and from work, this places greater demand on the Town's street network, especially at peak hours. Maintaining reasonably priced housing in town will have the side-benefit of distributing traffic demand more evenly through the street network.

While considering the types of housing stock available to current and future residents in Hudson, it is important to take actions to ensure that Hudson does not become a transient community. Maintaining the community strengths and values through participation in community life, such as through schools or through community facilities that encourage community "roots", like the library, is important to a healthy community. Increasing housing costs and the decline in housing quality are two factors that can cause residents to seek housing elsewhere after a few years. Housing and other land-use regulations should reflect the community benefits that come from a stable base of long-term residents.

Any land area that is considered for multi-family housing should have municipal utility services available as well as reasonable access to local roads with capacity for projected additional traffic. The Town might consider creating sub-area plans for specific developable areas. Sub-area plans are well suited to determining whether specific locations should be designated high-priority for development, or whether constraints such as access or infrastructure availability place limits on housing potential.

2. Natural Resource Protection

A consistent focus in the Town of Hudson is the need to conserve the natural environment and open space, including forests, the remaining agricultural land, water bodies and wildlife. The view often expressed is that the natural environment must be protected to prevent irreversible damage that would forever change the character and quality of life within Hudson. Yet some level of development is inevitable, and measures must be taken to facilitate reasonable development. Following are a series of measures that the Town can undertake to ensure that development has minimal negative impacts upon the natural environment.

a. Open Space Planning

Conservation of open space protects air and water quality and wildlife habitat, and can preserve prime agricultural soils and other soils of importance. For all development, the use of buffers and integrated open space, with respect to environmental constraints, should be considered. The Town should strive to manage its present municipal lands by developing an open space plan that

would include recommendations on the use of Town-owned parcels, priorities for acquiring privately held land from willing sellers/owners, and incentives for private landowners to voluntarily place conservation easements on their land. A main goal of the plan would be to develop a connected array of green spaces, for the benefit of both wildlife and Town residents; an example might be protecting additional land in the Musquash Swamp area along the Hudson and Pelham town-line. A concurrent goal of the Town should be to maximize the size of other connected open space areas for the purpose of conserving and preventing further fragmentation of wildlife habitat.

To facilitate this planning approach, the Planning Board will need to undertake a cost-of-community-services study to demonstrate the relative value of open space based on a comparison of municipal service expenditures between land use categories. To further enable the acquisition of priority land, the Town should consider devoting 100% of the Land Use Change Tax (Current Use penalty) to the conservation fund. The Town should explore using the conservation fund or other monies to assist landowners who are interested in placing conservation easements on their lands.

b. Habitat Map/Natural Resources Inventory

A map identifying key habitat areas within Hudson should be developed, especially for rare, endangered, or protected species, as well as for other important habitats, for example, wildlife corridors and deer yards. This map, or set of maps, could be produced as part of a natural resources inventory. A natural resources inventory lists and describes important natural resources, such as wetlands, farmland and forestland, water resources, and geologic resources. Ideally, a natural resource inventory includes maps, associated data and information sources, and descriptive elements. The inventory would provide the Town and municipal boards with a strong foundation for more informed decision-making on land use issues. As a general rule, the section headings in Chapter III can serve as a category list for the natural resource inventory planning process.

c. Development Constraints Review

The Town's most current constraints overlay maps (delineating wetlands, waterways, special soils, steep slopes, and other sensitive areas) should be an integral part of the review of all development proposals. By using these maps early and routinely in the development process, all parties can evaluate and mitigate potential negative impacts, and conserve valuable resources more effectively. The Town should also be working with the Lower Merrimack River Local Advisory Committee to coordinate developments with the potential to impact (positively or negatively) the Merrimack River.

d. Site Disturbance Standards

Standards to restrict site disturbance during construction would assist with preserving the ecological integrity and scenic appearance of the landscape. More consistent and stricter enforcement of current landscaping and lighting requirements will ensure compatibility and attractiveness, and diminish the potential for sky glow and lighting impacts to others. Greater

enforcement efforts will require additional Town planning and zoning staff. The principles of conservation design should also be applied to industrial and commercial developments.

e. Water Resources Management Plan

The development and adoption of a water resources management plan would provide the tools to create ordinances and protect Hudson's surface and ground waters, and would help to locate and protect additional water supplies for future need. The Town should coordinate its efforts internally, among Town departments and land use boards, as well as with those towns that share the Merrimack River watersheds and ground water resources (i.e., Litchfield and Pelham). A Water Resources Management Plan would include "sustainable development" principles, often defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs. "[1] As Hudson continues to grow and demand on resources increases, the Town should ensure that development does not outstrip the environment's capacity for renewal.

f. Shoreland Protection District

Lands along water bodies must be protected against encroachment of buildings as well as from spills or releases of hazardous or toxic substances to maintain and improve water quality. The adoption of a shoreland protection district ordinance with appropriate development and use standards, such as building setbacks and vegetated buffers, would facilitate this process. Additionally, the update of the Lower Merrimack River Corridor Management Plan will provide a series of recommendations for communities to undertake to protect the Merrimack River. When the update has been completed to its satisfaction, the Hudson Planning Board should, ideally, formally adopt the management plan as part of the Town's Master Plan.

g. Wetlands Inventory

Protection of wetlands is vital to the integrity of the water supply, as well as providing flood protection and conserving irreplaceable wildlife habitat. The Town should conduct an inventory of its prime wetlands to strengthen special protection from encroachment by development. Some of the data are already available, with baseline information in the EPA Region I document *Priority Wetlands in New England*. This should be complemented by additional wetland resource identification in order to have a Town-wide prime wetlands database.

h. Access Points to the Merrimack River and Other Recreational Water Bodies

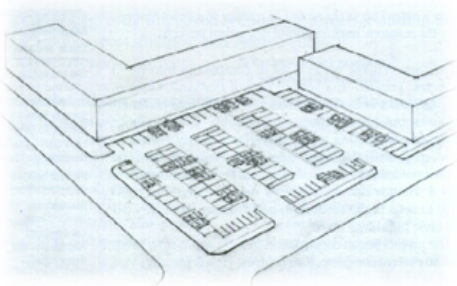
Rivers, streams, lakes and ponds are often commodity-type resources, but they are also valuable visual and recreational amenities. One way for a community to enhance the visual and recreational opportunities of our rivers, especially, is to provide public recreational areas adjacent to shoreline developments. By considering the Merrimack River

[1] World Commission on Environment and Development (WCED). *Our Common Future.* Oxford: Oxford University Press, 1987 p. 43.

an asset to every shoreline development, while also respecting it as a natural resource which should be protected, numerous recreational opportunities will be created for residents and visitors alike. Hudson has a number of water features that are worthy of recreational protection, such as the Merrimack River. It is recommended that a Shoreland Protection District ordinance be created to protect the ability of citizens to access and enjoy the Town's water resources, while protecting water quality and recognizing their hydrologic values and functions. Traditionally this has meant protection of existing access points (docks, etc.), but the plan should identify future points as well.

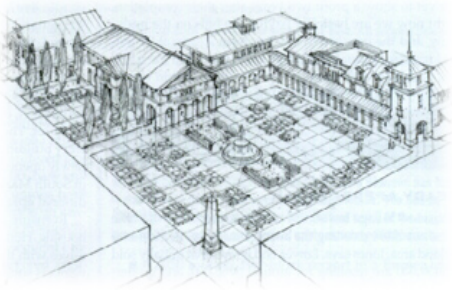
3. Commercial and Industrial

a. Redevelopment of Commercial Uses



Before Redevelopment

There are approximately 82 acres of undeveloped land remaining in the Business District, mostly located in narrow corridors along NH 102, 111, and 3A. The majority of the Business District was developed in the 1970's through 1990's with retail, automotive and restaurant uses typical of late 20th century strip development.



After Redevelopment?

Given the limited availability of undeveloped land and the relatively short design life of existing commercial buildings, there is opportunity for redevelopment in the next 20 years, especially along the aforementioned highway corridors.[2] Specifically, an access management plan may assist with maintaining the capacity of the roadways and improving access for all modes of transportation. The plan should include best practices for vehicle, bicycle and pedestrian circulation, urban design and stormwater management techniques such as Low Impact Development.

In addition, development of urban design guidelines for the Town of Hudson and amendments to the sign ordinance may assist in improving the aesthetics and function of the state highway corridors in Hudson. The Town might wish to consider adoption of urban design standards. Design standards are guidelines for private-sector property owners, to assist them in making decisions about how to develop or redevelop property in ways that make them compatible with neighboring land uses and in keeping with an overall conceptual framework and community character. Standards are different from regulations in that compliance would be encouraged rather than uniformly required, so private-property decision-making is respected; however, they are a good method to ensure that a business district or highway corridor is more than a collection of mismatched buildings and landscaped areas.

[2] Graphics courtesy of Congress for the New Urbanism, 2001. Photo courtesy of Mashpee Commons, MA website.

Current zoning permits a mix of multi-family and various commercial uses, in the Business District; however, existing development tends to be single use. Amendments to the District should be considered to encourage true mixed uses such as retail and service uses in industrial parks and, where feasible, multi-family housing.

b. State Highway Commercial Corridors

Redevelopment of commercial properties on Hudson's major state highways (NH 3A, 102, and 111) is a feasible alternative to expanding the Business District. Site development along these corridors should not be considered in isolation. There may be multiple opportunities for shared parking, shared access, façade improvements and mixed residential/retail/office uses as applications for redevelopment are received. Corridor property redevelopment is a specific example of how design standards might be effectively used by the Town and the private sector, working together.

Aside from the issue of design standards, the overall development standards by which existing properties were designed should be evaluated to determine their effectiveness and applicability. Flexibility in development regulations, such as minimum parking requirements and front setbacks, can result in more efficient land use as well as improve community appearance. The Town might consider conducting a land use study of the commercial areas along each of the three state highways for the purpose of determining better configurations of parking and off-highway traffic circulation. These studies could also evaluate the appropriateness of the zone boundaries, not for the purpose of expansion, but to match the zones with the actual land uses.

Similarly, pedestrian accessibility and safety in the state highway corridors in Hudson should be promoted. Although many people may still choose to use their vehicles, the lack of adequate pedestrian and bicycle facilities leave people no alternative mode of transportation.

c. Other Commercial Areas

The above discussion applies to Hudson's main commercial areas outside the central business area, but many of the same principles will apply to any commercial node or corridor in the Town, new or existing. Each corridor or node should ideally be evaluated in the context of its own plan, and the development of these place-specific plans would be a valuable addition to the Master Plan.

The Town should also address potential commercial development of large tracts of land that are currently used for other purposes but which might become available for commercial use in the future. Typical examples of such landholdings would be gravel-extraction operations or timber-producing tracts. Other municipalities have found that the entire community benefits from

proper advance planning to redevelop these large tracts when they become available. Similarly, the Town should consider planning for any potential major additions to the transportation network--for example, the Circumferential Highway. Hudson should inventory any such possibilities and plan accordingly to ensure that these projects serve as assets rather than detriments to the community character and overall quality of life in the Town.

4. Economic Development

a. Designation of Commercial and Light Industrial Growth Areas

Chapter IV (Economic Development) points out that, despite the perception that Hudson currently has adequate land zoned for commercial and industrial use, there are significant constraints on developing some of these properties. Constraints include: difficult or sensitive environmental features, poor road access, and difficult or costly infrastructure (water and sewer) needs. Two tasks are necessary to address these constraints: 1) the Town should reexamine current parcel zoning to determine whether the constraints of the land necessitate rezoning as open space or low-intensity development; and 2) the Town should identify and properly zone land that lacks these constraints and whose highest and best use is commercial/industrial. These tasks should run parallel with an examination of the zoning ordinance text so that zoning districts can be used to promote the commercial/light industrial mix.

b. Cost-of-Community-Services Study

The Town should consider conducting a cost-of-community-services study to help ascertain the fiscal impact of various types of development in different locations. A common conclusion to similar studies across New Hampshire is that commercial and industrial uses do not contribute any more value to the Town's tax base, on a net basis, than does open space, and that residential development is considerably more expensive. [3] The significance of this conclusion is that it supports the public acquisition of open space as a cost-saving measure—by purchasing land that might otherwise be developed, the Town would be reducing the potential services it would be required to provide. A cost-of-community-services analysis could also serve as a basis for calculating impact fees, particularly for school capital facilities.

c. Conserve Existing Sewer Capacity

Hudson should take steps to ensure that the Town's sewer infrastructure can accommodate future commercial and industrial development. The Community Facilities chapter points out that there is limited unused capacity in the system, and little opportunity to increase capacity unless the wastewater-processing agreement with the City of Nashua is revisited. The chapter also recommends that sewer-intensive development be restricted to the area within the existing network. Given these constraints, sewerage is one element for which impact fees or developer-financed initiatives can provide little relief. Conservation of a shrinking existing resource is the key, and specific designation of capacity for commercial/light industrial users will help achieve this goal.

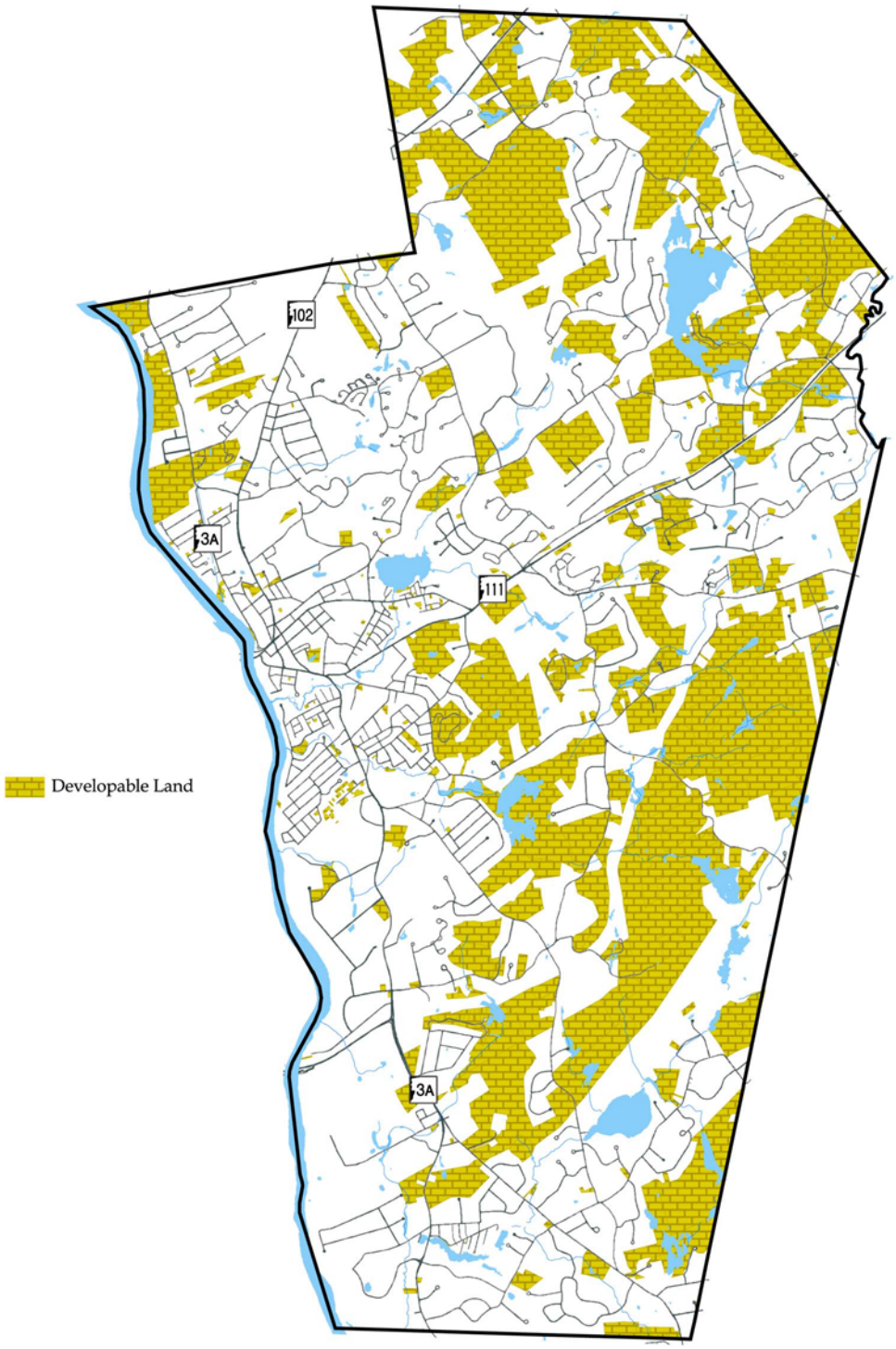
[3] *The Economic Impact of Open Space in New Hampshire*, Resource Systems Group (1999); *Does Open Space Pay?*, Phil Auger, 1995; *Saving Special Places: Community Funding for Land Conservation,* 2002.

d. Riverfront Development

Up through the mid-20th Century, the typical American city or town with river frontage regarded its waterway as a transportation route and a convenient source of water and energy. The result was often an industrial/warehousing district – economically sound in its day, but hardly picturesque. More recently, as manufacturing has declined and the service-sector economy, especially tourism, has boomed, riverfront communities are discovering that waterways like the Merrimack River are assets. There are many examples in New England of communities that have redeveloped their riverfronts with shops, restaurants, and entertainment venues that complement the river's natural beauty.

A Merrimack Riverfront District is a concept that Hudson should consider. A specific plan should be created to promote this possibility in the Town, with recommendations that can be implemented through zoning and economic development initiatives, among other tools. Specific elements should include public access, as discussed previously, and a pedestrian-friendly access network.

Map IX-1. Developable Land



Source: NRPC GIS, 2004

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