

Part I: Existing Conditions



*Rowley Master Plan
Final Report*

June 2003

2. LAND USE

Land use refers to the pattern of residential, commercial, industrial, and public development, as well as agriculture, forest, and other undeveloped lands in a community. Land use forms the basis for comprehensive planning and determines, to a large extent, the need for transportation infrastructure, public facilities, and environmental protection measures. This section provides an overview of Rowley's existing land use, as well as an assessment of how land use is likely to change in the future under the Town's current zoning.

Community Assessment: Land Use & Growth Management	
Assets	Liabilities
<ul style="list-style-type: none">• Rowley still retains its rural community character and appearance.• Large tracts of land in the Town are undeveloped woodlands, farms, and open space.• The Town has taken several positive steps to control and manage growth including recent zoning changes and land acquisitions.• For future economic development, 348 acres of undeveloped land exist on Route 1 in the Retail and Business/Light Industry Districts.	<ul style="list-style-type: none">• Rowley is losing its rural character and appearance.• Under current zoning, the majority of new development will occur in the outlying or rural area of Town and will be residential in nature.• Approximately 3,300 acres of residentially-zoned developable land exists in Rowley.• Under current zoning, 1,990 new homes and more than a million square feet of new commercial, retail, and industrial development could occur in Town.• Additional housing units beyond the 1,990 could be added through the comprehensive permit (Chapter 40B) process.• Poorly planned or excessive development could endanger Rowley's water supply.• New development, if incompatible with the Town's historical development patterns, could significantly alter the look and feel of the community.• The Town does not have a professional Town Planner on staff.• Design standards for commercial and industrial development do not exist.

2.1 Regional Context

The Town of Rowley is approximately 19 square miles in area and is located 32 miles north of Boston on Massachusetts' North Shore. Its bordering communities include Ipswich to the south, Boxford to the southwest, Georgetown to the west, and Newbury to the north. The Mill River and Mud Creek form the Town's northern boundary. The Atlantic Ocean comprises the Town's eastern border and the Rowley River its southeastern border. Also to the east are the Parker River National Wildlife Refuge and Plum Island.

In recent years, it has become increasingly apparent that previously-held beliefs regarding the Town's growth limitations were not accurate. The 1963 Master Plan indicated that the Town's wetlands, soil conditions, mosquito and fly problems, and other constraints would make it impossible for more than 15% of the Town to *ever* be developed. The 1998 Open Space and Recreation Plan (OSRP) pointed to the obsolescence of this assessment given recent technological advances in construction and on-site

wastewater treatment. Between 1991 and 2000, more than 300 acres were developed as single-family homes, while an additional 29 acres were converted from open space to industrial and commercial uses.¹

2.2 Existing Land Use Inventory and Analysis

Rowley is fortunate to have relatively up-to-date land use information from MassGIS.² Land use in 1999 is shown in **Map 2-1** and **Table 2-1**. MassGIS compiled the information listed in **Table 2-1** using data created by interpreting aerial photographs. The land use discussions in this section are based on actual land use, which does not necessarily match the Town's zoning districts. **Table 2-1** includes a breakdown of both developed and undeveloped land for the years 1991 and 1999. Generally, Rowley has experienced significant decreases in the amount of forested land, farmland, and open space. Conversely, the amount of land dedicated to residential uses has increased significantly.

Table 2-1
Land Use in Rowley, 1991 and 1999

Land Use ^a	1991		1999		Change 1991-1999	
	Acres	%	Acres	%	Acres	%
Agriculture	909	7.7	843	7.1	-65	-7.2%
Forest	5,936	50.2	5,690	48.1	-246	-4.1%
Freshwater Wetland ^b	275	2.3	275	2.3	0	0.0%
Saltwater Wetland	2,248	19.0	2,241	19.0	-7	-0.3%
Open Land	465	3.9	422	3.6	-43	-9.3%
Multi-Family Residential	30	0.3	30	0.3	0	0.0%
Medium Density Residential ^c	313	2.6	462	3.9	149	47.6%
Low Density Residential ^d	1,182	10.0	1,336	11.3	154	13.0%
Commercial	112	0.9	112	0.9	0	0.0%
Industrial	46	0.4	75	0.6	29	63.0%
Recreation	123	1.0	123	1.0	0	0.0%
Water (excludes ocean)	64	0.5	64	0.5	0	0.0%
Other (transportation & util.)	124	1.1	153	1.3	29	23.4%
Total	11,826	100.0	11,826	100.0	0	NA

^a MassGIS classifies land use in Massachusetts using a 21-category classification system. This system has been simplified to 13 categories in this table.

^b Includes unforested freshwater wetlands only. Forested wetlands are included under the "Forest" category.

^c Lot size of ¼-acre to ½-acre.

^d Lot size of more than ½-acre.

Source: MassGIS.

In comparing the changes that have occurred over the eight-year period, several significant trends become evident. These trends are discussed in detail below.

¹ Merrimack Valley Planning Commission Buildout Analysis (2000).

² Massachusetts Geographic Information System (MassGIS) is the state agency charged with creating, collecting, and distributing geographic information for Massachusetts.

Developed Land Uses

Developed land includes land occupied by residential, commercial, and industrial uses. In 1991, approximately 1,680 acres were devoted to residential, commercial, and industrial uses. By 1999, the number had increased by 330 acres to slightly more than 2,000 acres. The overwhelming majority of this development was residential.

- **Residential:** Rowley has experienced a significant increase in residential development, as indicated by a population increase of 1,047 between 1990 and 2000 (see **Table A-1** in **Appendix A**). Rowley's oldest neighborhoods, located in and near the town center, house the Town's most densely developed residential areas. The majority of recent development has occurred in the outlying sections of Town on larger lots (minimum lot size in the Outlying District increased from 40,000 square feet to 60,000 square feet in 1999). In 1999, residential land use accounted for 15.5% of the Town's total land area compared to 12.9% in 1991. During that eight-year period, 427 additional acres of land were converted to residential use.
- **Commercial:** Commercial land uses occupy approximately 0.9% of Rowley's land area. In the last two decades, significant commercial development has occurred, mainly in the vicinity of the Route 1/Route 133 intersection. Prior to the late 1980s, most of Rowley's retail and service businesses primarily served Town residents. However, more recent business developments, such as restaurants and a supermarket, are intended to serve a wider sub-regional population. Aside from the Route 1/Route 133 area, smaller-scale commercial development exists in the town center as well as on scattered sites throughout the Town.
- **Industrial:** Industrial uses occupy approximately 0.6% of Rowley's land area. The majority of this land is located on Route 1. Other, smaller industrial uses are scattered throughout the Town.

Undeveloped Land Uses

Undeveloped land includes lands dedicated to agricultural and recreational uses, as well as lands covered by forests, wetlands, fields, and other uses.

- **Agriculture:** In 1999, 843 acres of croplands, pastures, orchards, and nurseries existed in Rowley. The Chapter 61A tax abatement program classifies 925 acres of land as actively farmed. The Chapter 61A acreage is higher because it can include land that is part of a farmed parcel but not in production (such as wetlands). The largest concentrations of farmland are located west of Route 1, between Route 133 and Wethersfield Street, and near the center of Town, along Main Street (Route 1A), Hammond Street and Central Street. In the past eight years, 65 acres (an average of 8 acres per year) of farmland were converted to other uses. Most of this land has been converted to residential uses. Two dairy farms in Town comprise approximately 290 acres of land or about one-third of the Town's farmland. In addition, much of the remaining farmland in Rowley produces hay for these two farms.
- **Forest:** Forested lands represent almost 50% or 5,690 acres of the Town's land area. Of the 5,690 acres, the Chapter 61 tax abatement program classifies approximately 328 acres as actively managed for eventual harvesting. The largest continuous forestlands can be found along the Town's western edge (including 388 acres in the Georgetown/Rowley State Forest); in the center on either side of Route 1 (including the Spar and Spindle Girl Scout Camp); and in the north, just south of the Mill River (including land controlled by the Massachusetts Division of Fisheries, Wildlife and Environmental Law Enforcement). Approximately 246 acres (31 acres per year) of

forested land were converted to other uses between 1991 and 1999. Again, most of this land was converted to residential use. At this rate, Rowley can expect to see more than 300 acres of additional forested land converted to other uses over the next decade.

- **Wetlands:** The Town has 275 acres of unforested freshwater wetlands and 2,241 acres of saltwater wetlands. The saltwater wetlands are located in the eastern part of Town, primarily within the Parker River/Essex Bay Area of Critical Environmental Concern (ACEC). Other wetlands are scattered throughout the Town. The total acreage of wetlands remained relatively constant through the 1990s, attesting to the efficacy of wetland protection regulations in preventing large-scale wetland alteration.
- **Recreation:** This category includes 123 acres of playgrounds, ball fields, golf courses, and other similar facilities, as well as spectator recreation sites and water-based recreation sites. The largest privately-owned recreation property is the Rowley Country Club located on Dodge Road. A detailed description of the Town's recreation facilities is included in the Open Space, Recreation, and Natural Resources inventory in this report.
- **Open Land:** This category includes utility corridors, cemeteries, farms that are reverting to woodland, and other unforested, undeveloped lands. This category includes both public and private lands. Over the eight-year period (1991 – 1999), 43 acres of open land were converted to other uses.
- **Other:** This miscellaneous category includes land used for waste disposal, transportation, and mining.

Land Use Trends Since 1991

As a result of improved regional transportation networks, a scarcity of available developable lands, and escalating costs for existing sites in Boston and the inner suburbs, development has spread outward from the inner suburbs to communities like Rowley. As shown in **Table 6-6**, the number of new residential building permits over the past seven years has averaged approximately 31 permits per year, with peaks in 1998 (68 permits) and 1999 (62 permits). The geographic distribution of new development from 1991 to 2001 is graphically depicted in **Map 2-2**. A closer examination of recent growth reveals several important trends. Specifically:

- Development is dispersed throughout the central area of Town on both sides of the Newburyport Turnpike (Route 1). Development is sparse in the northeastern part of the Town due to the area's saltwater wetlands and flood plains.
- Much of the residential development in recent years has consisted of single-lot frontage development along existing roadsides. This development is also known as "Approval Not Required" (ANR) development because it does not require Planning Board approval. However, as the supply of potential ANR development sites diminished during the 1990s, more and more new residential development occurred in the form of subdivisions.
- Since 1991, the Town has seen significant new industrial development and some redevelopment of existing commercial/industrial properties such as the Ipswich Bay Glass Company, Mydata Automation, Inc., and Porter International.

2.3 Existing Land Use Laws

Zoning and other land use laws constitute a town's "blueprint" for its future. Rowley's leaders and citizens should expect that the Town's existing land use will continue to look more and more like its zoning map over time as development occurs. Almost 90% of the Town is zoned for residential uses. Based on the existing zoning, the vast majority of new development in Rowley will be residential in nature. Rowley's existing land use laws are described below. The buildout analysis that follows discusses the implications of development according to these laws.

2.3.1 Base Zoning Districts

Rowley has 5 base zoning districts and 3 overlay districts. The base districts, including the Residential District, Outlying District, Central District, Business/Light Industry District, and Retail District, define the allowed uses and dimensional requirements throughout the Town. The overlay districts provide for additional restrictions in certain areas.

Table 2-2 and **Map 2-3** summarize the use and dimensional requirements of these districts. Provisions of these zoning districts are summarized in **Table 2-3**.

Table 2-2
Rowley Zoning Districts^a

District	Intended Uses	Acres	% of Town
Residential District	Low density residential (single and multi-family)	251	2.1%
Outlying District	Rural uses, low-density residential (single-family)	10,334	87.5%
Central District	Residential (single-family), business, semi-public, government	542	4.6%
Business/Light Industry District	Commercial, retail, industrial, and service uses	521	4.4%
Retail District	Retail business	165	1.4%
Total Area		11,813^a	100.0%

^a Totals differ among tables due to rounding and small errors in the geographic data.
Source: Town of Rowley and Merrimack Valley Planning Commission.

Residential District

Permitted uses in the Residential District include single-family houses, as well as houses containing more than one unit subject to additional dimensional and intensity requirements. Other allowed uses include accessory buildings and home occupations or professional offices provided such activities are conducted by a resident of the house. "Accessory in-law" apartments are allowed by special permit from the Zoning Board of Appeals, but must be occupied by a relative of the main structure's owner. The District allows multi-family housing by special permit, subject to dimensional requirements, as well as numerous design and siting considerations.

Table 2-3
Dimensional Requirements in Rowley Zoning Districts

District	Min. Lot Size (s.f.)	Min. Frontage (s.f.)	Min. Lot Width (s.f.)	Min. Yards (ft.)	Max. Lot Coverage (%)	Max. Building Height (ft.)
Central District						
Single-family	30,000	125	100	50' front;	25%	35
Multi-Family Housing	a	a	-	15' side	25%	35
Non-Residential Uses	30,000	125	100	and rear	25%	35
Residential District				50' front;		
Single-family	60,000	150	100	15' side	25%	35
Multi-Family Housing	b	b	-	and rear	25%	35
Outlying District				50' front;		
Single-family	60,000	150	100	15' side	25%	35
				and rear		
Retail District				50' front;		
Single-family	Not	Not	Not	15' side	50%	35
All Other Uses	Specified	Specified	Specified	and rear	50%	35
Business/Light Industry District				50' front;		
Single-family	Not	Not	Not	15' side	50%	35
All Other Uses	Specified	Specified	Specified	and rear	50%	35

Notes:

^a Lot size: 20,000 s.f. for the first unit and 10,000 s.f. for each additional unit. Maximum of four units per structure. Building must be 75' from public way and 25' from property line. Note that multi-family housing is not identified as an allowed use in this district.

^b Lot size: Minimum lot size of 20 acres with 40,000 s.f. for the first unit and 10,000 s.f. for each additional unit. Maximum of 16 units per structure. Building must be 75' from public way and 50' from property line.

Source: Rowley Zoning Bylaw.

Outlying District

The Outlying District includes low-density residential, recreation, conservation, agriculture, and similar uses compatible with rural areas. The district provisions allow for the conversion of single-family dwelling units to multiple dwelling units, subject to dimensional and intensity requirements. In addition to customary home occupations and professional offices, other permitted uses include agriculture, floriculture, viticulture, fish farms, and animal husbandry, with several exceptions. Special permit uses include “accessory in-law” apartments, recreational uses such as country clubs and day camps, landing fields, and accessory buildings or uses.

Central District

The Central District generally encompasses the historic village area of the town center. The intent of the district is to provide for business, semi-public, and government uses normally found in a town center. Permitted uses include single-family houses, building conversions accommodating more than one dwelling unit, and customary home occupations. A special permit is required for “Accessory in-law” apartments. Contingent on site plan approval by the Planning Board, other permitted uses include museums, libraries, and research facilities. Subject to site plan approval by the Planning Board, as-of-right uses also include retail and service businesses. In addition, subject to site plan approval by the Planning Board *and* a special permit by the Board of Selectmen, other permitted businesses include: automotive and vehicle sales, automotive and vehicle repair, commercial garages and gas stations, restaurants, and hotels/motels.

Retail District

The Retail District is located adjacent to the intersection of Routes 1 and 133 and is designated for automobile-accessible retail businesses. The intent of the district is to provide for local, not regional, retail needs. Therefore, the maximum business size is limited to uses less than 40,000 square feet. The Retail District permits retail and service establishments, gift shops, antique shops, and restaurants (with indoor dining only and exclusive of live entertainment) provided the Planning Board approves a site plan.

The Planning Board issues special permits for uses such as office parks, shopping centers, research laboratories, manufacturing establishments, and adult entertainment establishments. The Board of Selectmen issues special permits for uses such as gas stations; places of amusement and entertainment; arcades; skating rinks and dance halls; restaurants, bars and taverns with live entertainment; and theaters.

Business/Light Industry District

The Business/Light Industry District is located primarily along Route 1. A small district is also located on Route 133 near I-95. The district provides a location for offices, professional buildings, and light industrial uses. The Planning Board issues special permits for uses such as research laboratories, office buildings, office parks, and storage facilities. The Board of Selectmen issues special permits for uses such as automotive repair and service establishments, and gas stations.

Uses Permitted in All Districts

Massachusetts General Laws, Chapter 40A, exempts several uses from local zoning controls, thereby allowing them in any district. These include daycare facilities; nonprofit religious and educational institutions, subject to site plan approval; and agriculture, floriculture, and viticulture uses on five acres or more. Other uses permitted in all districts include cemeteries, municipal buildings and uses, and conservation areas.

Recent Zoning Amendments

Over the past few years, the Town adopted several significant revisions to the Protective Zoning Bylaws. In 1996, the Town adopted a Phased Growth Bylaw that limits the number of dwelling units constructed within a 12-month period to 24 single-family units townwide, and the number of permits issued in each development to 6 within a 12-month period.

In 1999, Town Meeting increased the minimum lot size in the Central District from 20,000 square feet to 30,000 square feet, and the minimum lot size in both the Residential and Outlying Districts from 40,000 square feet to 60,000 square feet. The Town also increased the open space requirement in the Commercial District from 30% to 50% of lot area. A maximum height restriction of 35 feet was added for single-family and non-residential uses. The Town adopted a new Open Space Residential Development (OSRD) Bylaw. The OSRD allows “clustered” subdivisions by special permit provided that (1) 50% of the site remains as open space, and (2) the developer follows the cluster guidelines. The bylaw also provides bonus incentives if the development includes substantial buffers, public improvements, or bedroom limitations. In 1999, the Town also adopted regulations to control the type and intensity of lighting in commercial and multi-family developments, as well as additional regulations on the lighting of outdoor signs. In 2000, the Town increased the minimum setback for commercial structures and parking. The Town adopted a Personal Wireless Service Facilities Bylaw to regulate the

construction of communication towers. Finally, in 2001 the Town further refined its Outdoor Lighting regulations.

2.3.2 Overlay Zoning Districts

Rowley's existing three overlay districts provide an additional level of land use regulation in sensitive areas. These overlay districts include the Flood Plain and Watershed Protection District, the Municipal Water Supply Protection District, and the Historic District.

Flood Plain and Watershed Protection District

The Flood Plain and Watershed Protection District is an overlay district intended to protect natural resources and control development in areas subject to flooding. This district includes (1) all areas below the elevation of 15 feet above the mean sea level that border salt water or salt marsh, or are adjacent to the Parker River, Mill River, Rowley River, or Mud Creek; (2) certain areas near streams and ponds; and (3) areas subject to the Massachusetts Wetlands Protection Act (M.G.L. Chapter 131). Construction in this district is allowed only by special permit from the Board of Selectmen following review by the Board of Health and the Rowley Conservation Commission. Any buildings occupied by humans must have floor levels at least 15 feet above mean sea level.

Concerns have been raised relative to the Town's ability to properly enforce this bylaw due to the imprecise definition of the district boundaries. Massachusetts General Laws, Chapter 40A, Section 4, states "Districts shall be shown on a zoning map in a manner sufficient for identification. Such maps shall be part of zoning ordinances or bylaws." Typically, towns describe their flood plain district to include all special flood hazard areas designated as Zone A, A1-30, and V1-V30 on the Town's Flood Insurance Rate Maps (FIRM), and the Flood Boundary and Floodway Maps. These maps are then incorporated into the bylaw by reference.

Municipal Water Supply Protection District

The Municipal Water Supply Protection District is an overlay district intended to:

- 1) Promote the health, safety, and general welfare of the community by ensuring an adequate quality and quantity of drinking water for the residents, institutions, and businesses of the Town of Rowley;
- 2) Preserve and protect existing and potential sources of drinking water;
- 3) Conserve the Town's natural resources;
- 4) Ensure compliance with the Massachusetts Department of Environmental Protection Wellhead Protection regulations; and
- 5) Prevent temporary and permanent contamination of the environment.

Map 2-3 shows the extent of this district. Prohibited uses include a number of potentially toxic uses including landfills, sludge storage, and septage storage; motor vehicle service and repair; dry cleaning; commercial furniture stripping/refinishing; metal working; chemical and bacteriological laboratories; junk and salvage yards; truck and bus terminals; commercial car washes; industrial/commercial uses that discharge processed wastewater on-site; stockpiling or storage of salt-laden snow and ice from outside the district; use of septic system cleaners that contain toxic or hazardous chemicals. Additional uses are

prohibited with some exceptions. These include: storage of liquid petroleum products; certain individual sewage disposal systems; storage of de-icing chemicals; storage of animal manure; earth removal; facilities that generate, treat, store, or dispose of hazardous waste; and storage of commercial fertilizers and soil conditioners. In addition, treatment works are subject to specific requirements.

A special permit from the Zoning Board of Appeals is required for any use that will render 15% or 2,500 square feet (whichever is greater) of any lot impervious; the enlargement or alteration of existing non-conforming uses; application of pesticides and fertilizers for non-domestic or non-agricultural uses; and the creation of dams or other water-control devices.

Discussions with the Town Administrator, Building Inspector, and Conservation Agent indicate that the bylaw is being enforced. However, lengthy lists of prohibited uses and special permit uses are included in the bylaw and the existing Town staff is not able to conduct a thorough review for compliance.

2.3.3 Other Zoning Provisions

Other sections of the Zoning Bylaw guide the amount and style of development that is allowed in the Town. These include:

- **Open Space Residential Development (OSRD):** The purpose of the OSRD bylaw is to allow residential development that will preserve open space and natural areas, reduce infrastructure and site development costs, respect and enhance existing neighborhoods, and promote attractive designs consistent with the Town's character. The bylaw was updated in 1999. The Planning Board also recently proposed an affordable housing density bonus provision for the bylaw, but this provision was rejected by Town Meeting.

An OSRD requires a special permit from the Planning Board. To obtain a special permit, an applicant must have a parcel of at least 5 acres in single ownership, and present an OSRD design that is superior to a conventional subdivision plan in (1) protecting open space for conservation and recreation; (2) preserving natural features of the land; (3) allowing for more efficient streets, public utilities, and other public services; and (4) providing a high degree of design quality. As noted previously, the bylaw also includes a development bonus for up to 20% additional units, contingent on specific design-related qualities (buffers, public improvements, and bedroom limitations). In addition, the minimum dimensional requirements may be waived to achieve the maximum open space area. Units must be grouped in clusters of no more than 8 single-family or two-family units or 4 multi-family units, and clusters must be separated by at least 50 feet. A minimum of 50% of the OSRD parcel should be devoted to open space completely devoid of any structure or development.

To date no OSRDs have been proposed in the Town. While many factors may be responsible for the lack of interest in this bylaw, developers are often reluctant to undergo a special permit process unless there is a substantial incentive to do so. Some towns address this issue by requiring the submittal of both a conventional and an open space development plan for any residential subdivision over a certain size.

- **Accessory In-Law Apartments.** This bylaw allows the creation of in-law apartments within single-family properties in the Central, Outlying, and Residential Districts to meet the special housing needs of parents and children of families owning and occupying properties in Rowley. A

special permit from the Zoning Board of Appeals allows accessory in-law apartments only within single-family houses on lots that existed prior to January 1, 1990 where the owner is a resident of the house. Accessory in-law apartments cannot be constructed or provided as a separate structure on the same lot as the primary dwelling.

- **New Dwelling Unit and Phased Development Limitations:** This regulation limits the number of building permits that may be issued for the construction or conversion of any single-family units within a twelve-month period to 24 units townwide. The bylaw also limits the number of units that may be constructed within a subdivision to a maximum of 6 per year. The bylaw was established in 1996 and will remain in effect for a period of 10 years, expiring in 2006. A number of subdivision plans were submitted prior to the adoption of this provision. Subdivisions filed prior to the adoption of a new bylaw receive “grandfathered” protection for 8 years. The development of these grandfathered properties is not subject to the limitation. The adoption of the building rate limitations and the creation of a number of grandfathered lots could be partially responsible for the increase in building permits issued for 1998 (68 units) and 1999 (62 units).
- **Soil Suitability Bylaw:** Section 7.1.1 of the Zoning Bylaw requires that any structure or paved parking area proposed on an area of Medisaprists, Scarboro, Ipswich or Westbrook soils requires a special permit from the Board of Selectmen. Permit applicants must submit an evaluation of the soil present in the proposed construction area. Section 7.1.1 does not include any criteria for evaluating a special permit application; however, the Rowley Conservation Commission provides recommendations to the Board of Selectmen on special permit applications. As a condition of approval, the Board of Selectmen regularly imposes conditions relating to drainage and erosion control. In practice, this bylaw effectively functions as a *de facto* local wetland regulation, since it regulates land with those soil types commonly associated with wetlands.

2.3.4 Other Town Bylaws

In addition to the Zoning Bylaw, Rowley has several other regulations that affect land use and development. These include:

Rowley Historic District Bylaw

The Town has established 2 historic districts: the Rowley Central Historic District and the Glen Mills Historic District. The Rowley Central Historic District generally includes the Town Common area in Rowley Center, while the Glen Mills Historic District includes the Glen Mills area located at the intersection of Glen Street and the Newburyport Turnpike (see **Map 2-3**).

The intent of the Historic District Bylaw is to preserve buildings and sites in Rowley’s historic districts as landmarks in the history of architecture and as tangible reminders of the old Rowley village as it existed in the early days of the Commonwealth. The bylaw establishes a 7-member Historic District Commission appointed by the Board of Selectmen. The Historic District Commission reviews proposed projects to determine how they will affect the appearance and character of historic districts. See **Section 4** for additional discussion of the Historic District Bylaw and Historic Districts.

Community Preservation Bylaw

In conjunction with the approval of the Community Preservation Act (CPA), the Town adopted a Community Preservation Bylaw in 2001. The Community Preservation Bylaw as adopted by the Town

establishes a 3% surcharge on all local property taxes. The State contributes matching funds to the Town. Properties owned and occupied by a person who qualifies as low-income (earning less than 80% of the area wide median income) or by low or moderate-income seniors are exempt. The CPA allows the Town to dedicate funds for historic preservation, community housing, and open space. At least 10% of the funds must be allocated to each of the 3 categories. The Community Preservation Committee may allocate the remaining 70% for any of the three categories or for active recreation at the Town's discretion. The Town anticipates collecting nearly \$400,000 in local and State funds next year through the CPA.

The bylaw established a Community Preservation Committee to consult with other Town boards, commissions, and committees, and make recommendations to the Town Meeting for using the Community Preservation funds. The 7-member Committee consists of representatives from the Conservation Commission, Historical Commission, Planning Board, Recreation Committee, Housing Authority, Open Space Committee, and one member appointed by the Board of Selectmen.

Earth Removal Bylaw

Earth removal or sand and gravel operations are not allowed in the Town. However, development for other purposes often involves the removal or re-grading of land. The Rowley Earth Removal Bylaw requires a review by the Board of Selectmen of all earth removal. A public hearing is required for the removal of more than 75 cubic yards of material.

Board of Health Regulations

The Board of Health regulations contain provisions for on-site sewage treatment, private water supply, and floor drain regulations. The regulations require a 125-foot separation between wells and septic system leaching areas. Septic systems must also be set back 30 feet from lot lines, 100 feet from wetlands, and 200 feet from the Mill River. The floor drain regulations are consistent with the Department of Environmental Protection guidelines for protecting groundwater.

Subdivision Rules and Regulations

The Subdivision Rules and Regulations establish the construction standards for subdivisions and new private roads. Rowley's regulations, which also include provisions to guarantee the proper installation of all road and subdivision improvements, include the following:

- Require a right-of-way width of 55 feet for minor streets and 65 feet for major streets.
- Establish a 500-foot maximum length for a dead-end street.
- Require a sidewalk on both sides of any new roads and may require bikeways and walkways. In practice, one sidewalk is often waived.
- Require a paved road width of 26 feet for minor streets and up to 48 feet for major streets.
- Require granite curbing at intersections, roadways exceeding 5% slope, curves, and drainage inlets.

Wetlands Bylaw

In 1990, the Conservation Commission proposed the adoption of a local wetlands protection bylaw to supplement the wetland protection provided by the State's Wetlands Protection Act. Town Meeting tabled action on this bylaw.

2.4 Buildout Analysis

The buildout analysis is a study that answers the question:

What could Rowley look like if all the Town's buildable land is developed in accordance with the current zoning?

This question is important for several reasons: First, the buildout analysis determines how much of Rowley's land area is developed, how much is legally or environmentally constrained, and how much is available for new development. Second, the buildout provides a picture of where Rowley may be headed under its current regulations and this can help its citizens evaluate whether this direction matches the community's vision for the future. If the buildout scenario is undesirable, modifications to current land use policies and regulations may be necessary. Finally, the buildout estimates the possible impact of new development in terms of its demand on municipal services, environmental resources, and transportation systems. This information can help in the fiscal and physical planning of new facilities to accommodate future development.

The buildout analysis provides a picture of the potential fully-developed state of a town; it does not attempt to determine the rate of future development, or how quickly buildout occurs. Because development in Rowley is so closely tied to regional and national market conditions, it is difficult to predict how rapidly the Town will grow. Historical rates of development as documented in the land use trends described above may provide a reasonable estimate for future development rates, at least for the near term. However, fluctuations in development such as the recent slowing of the economy create varying growth rates.

Finally, the residential buildout numbers do not attempt to predict the potential impact of the Chapter 40B of the General Laws, the Comprehensive Permit process. Significant additional residential development could occur through this process. The Comprehensive Permit process is discussed in more detail in **Section 6** of the Master Plan.

2.4.1 Buildout Methodology and Results

The Merrimack Valley Planning Commission (MVPC) prepared the Rowley buildout analysis with funding from the Massachusetts Executive Office of Environmental Affairs (EOEA) in 2000. The buildout analysis consisted of four steps:

1. Determine the amount of vacant developable land in Rowley. This number is calculated by subtracting from the Town's total land area all lands that are already developed or are unavailable for development for a variety of reasons. **Map 2-4** shows lands in Rowley that are developed, constrained, and available for development.

Total Rowley land area	11,826 acres
<u>less developed & constrained land³</u>	<u>-8,433 acres</u>
= Total developable land	3,393 acres

- Determine the amount of developable land in each zoning district. **Map 2-4** shows the location of developable land in each zoning district.

Table 2-4
Developable Land by Zoning District

Developable Land in Residential District	92 acres
Developable Land in Outlying District	2,956 acres
Developable Land in Central District	164 acres
Developable Land in Retail District	31 acres
Developable Land in the Business/Light Industry District	150 acres
Total Developable Land*	3,393 acres

* This figure includes lands that have partial constraints, such as lands between 100 and 200 feet of a river, which are subject to the Rivers Protection Act.
Source: MVPC Buildout Analysis.

- Determine the intensity of development allowed in each zoning district under current zoning regulations. Multiply these intensity formulas by the total amount of buildable land in each district to arrive at the overall buildout. The results of this analysis are provided in **Table 2-5**.⁴

Table 2-5
Residential Buildout Calculations

Zoning District	Developable Acres⁵	Buildout Formula⁶ Dwelling Units/Acre	Total Buildout (Dwelling Units)
Residential District	92	0.583 du/acre	54
Outlying District	2,956	0.575 du/acre	1,700
Central District	164	0.845 du/acre	139
Total Dwelling Units:			1,893

Source: MVPC Buildout Analysis, 2000, modified to reflect new developments and zoning changes through 2002.

Note: For the Outlying and Residential Districts, 100% of the new development was assumed to consist of single-family residential development. For the Central District, the mix of uses was assumed to be 40% retail/service, 40% single-family residential, and 20% multi-family residential.

³ Constrained land includes protected open space, utility corridors, and certain lands where environmental regulations prohibit development.

⁴ The MVPC buildout study calculated commercial and industrial buildout in addition to residential buildout. However, the commercial and industrial buildout estimates are no longer valid since the Town made significant changes to its business zoning in 2002. Therefore, only the residential buildout estimates are provided here.

⁵ This figure includes land with certain "partial development constraints" such as floodplains, wetlands and steep slopes. However, the buildout intensity formula for lands with partial constraints is substantially lower than for unconstrained land.

⁶ This intensity formula represents an aggregate of the formulas for unconstrained land and partially constrained land.

4. Estimate the potential impact of the buildout on public services, environmental resources, and transportation infrastructure by using standard formulas.

Table 2-6
Potential Impacts of Buildout Development

Potential Impact Area	Total Impact
New Developed Land	3,393 acres
New Residential Dwelling Units	1,893
Total Additional Residential Water Demand	418,700 gallons per day ^a
Total Additional Solid Waste	3,370 tons ^b
<i>Additional Non-Recyclable Solid Waste</i>	2,030 tons ^c
New Residents	5,580 ^d
New Students	1,015 ^e
New Residential Subdivision Roads (miles)	31.4 ^f

Notes:

^a Residential Water Consumption is based on 75 gallons per person per day.

^b Commercial and Industrial Water Consumption is based on 75 gallons per day per 1,000 square feet of floor space.

^c Solid Waste is based on 1,206 pounds per person per year. All waste estimates are for residential uses only.

^d Non-Recyclable Solid Waste is a subset of Solid Waste and is based on 730 pounds per person per year ending in a landfill or incinerator.

^e The number of residents at buildout is based on the persons per household figure derived from 1990 U.S. Census.

^f The number of students at buildout is based on a student per household ratio taken from 1990 U.S. Census data.

^g New Residential Subdivision Roads are based on the assumption that 60% of the new residential lots will have required frontage on new subdivision roads.

Source: MVPC Buildout Analysis, 2000, modified to reflect new developments and zoning changes through 2002.

2.4.2 Discussion of Buildout Analysis Results

The buildout analysis represents a snapshot of the potential amount of development that could occur under the zoning controls in place at the time of the study (2000). In fact, it is unlikely that the actual buildout will be exactly as predicted because the Town is continually in the process of modifying its local regulations, acquiring land, and conducting other activities that would modify the buildout analysis. Other factors such as Chapter 40B (the Comprehensive Permit Law) and the state of the economy also may alter this scenario. In addition, as the Town gets closer and closer to reaching its buildout capacity, remaining development sites will become increasingly constrained and unattractive to developers. Thus, in more developed communities, the rate of new development tends to slow considerably as buildout is approached (although considerable redevelopment may take place).

The buildout scenario for Rowley presents several challenges and implications for future planning in the Town. Specifically:

- Buildout of the Town would result in a more than 100% increase in its population, from approximately 5,500 persons to more than 11,000, with commensurate increases in the demand for water and sewage disposal, schools and other public services, and solid waste disposal. Of the potential 2,052 new housing units, most will be single-family homes.
- The Town has considerable potential to accommodate new commercial and industrial development. Most of the buildable commercial and industrial land is located along Route 1,

where it is estimated that more than four million square feet of new space could potentially be developed. By comparison, a large modern supermarket is typically about 60,000 square feet.

- At the time of the study, the Town contained approximately 3,835 acres of vacant buildable land, or about 32% of the Town's total land area. This is a sufficiently large amount of land that the Town will not be able to protect all of it through local and State land protection efforts. If the Town wishes to protect its open space and its rural character, it will need to couple land purchases and other land protection strategies with effective regulatory and design tools to maintain the character of the Town as development occurs.

Limitations of the Study

The buildout analysis was prepared using a standard buildout methodology developed by EOEa. However, determining the development capacity of a town is a somewhat inexact science, given the large number of variables involved. For example, the presence of steep slopes is not usually an *absolute* constraint to development, but it may be a *partial* constraint to development in the sense that it might prevent developers from building at the maximum density allowed by zoning. In addition, the buildout study did not consider soil characteristics. However, soils can function as a substantial impediment to new development, especially in communities that rely on septic systems for their waste disposal needs.

3. OPEN SPACE, RECREATION, AND NATURAL RESOURCES

In 1998, Rowley adopted its most recent Open Space and Recreation Plan (OSRP) in compliance with the guidelines established by the State's Division of Conservation Services. The plan provides a comprehensive analysis of Rowley's natural environment, as well as a detailed strategic plan for protecting the Town's natural resources and open space. Much of the material in this section is drawn directly from that plan, with updated information included where available.

The 1998 OSRP documented the rapid and intensive growth that occurred in the Town between 1987 (the date of the previous Open Space Plan) and 1998. During that period, more than 720 acres of open space were developed for residential (641 acres) and commercial/industrial (81 acres) uses. The OSRP cited the rapid rate of growth as a major concern to the future of the Town.

Community Assessment: Open Space, Recreation, and Natural Resources	
Assets	Liabilities
<ul style="list-style-type: none">• 3,370 acres of land in Rowley consists of permanently protected open space.• More than 800 acres of farmland still exist in the Town.• In recent years, the Town has successfully protected several priority open space properties.• The Town has a diverse natural landscape that includes rivers, streams, wetlands, salt marshes, hills, and forests.• The quality of the Town's groundwater is excellent.• Through the Community Preservation Act, Rowley will raise funds for open space.• The Town landing provides ocean access for Rowley residents.	<ul style="list-style-type: none">• 3,835 acres in Town consists of developable unprotected land. Protecting all remaining significant open space will be virtually impossible.• 1,439 acres have been identified as high priority land needing protection.• On average, almost 40 acres of forest and farmland are converted to other uses (mostly residential) each year.• New development threatens natural and water resources as a result of increased non-point water pollution, habitat fragmentation, erosion, and other impacts.• Rowley has limited outdoor and indoor recreational facilities. The Town currently needs additional facilities, and future residential growth will stimulate the need for more recreational facilities.

The OSRP established five open space and recreation goals for the Town to pursue between 1998 and 2003. These are:

- Preserve and protect the Town's water resources.
- Preserve and protect the Town's natural resources.
- Preserve and protect the Town's scenic quality and rural character.
- Provide diverse recreation opportunities for residents of all ages and abilities.
- Educate residents about the availability, use, and protection of the Town's open space and recreation resources.

In 1997, the Conservation Commission established a subcommittee to function as a permanent Open Space Committee. The Rowley Open Space Committee has worked to implement the plan's recommendations. Specific achievements include:

- The permanent protection of more than 365 acres of land, including the Pingree Farm Road well field and some of the adjacent land above the aquifer, Hunsley Hills, the Pikul Farm, and the Minister's Wood Lot. The Open Space Committee protected these parcels through partnerships with State agencies, non-profit organizations, departments within the Town of Rowley, and private donors. Strategies included outright acquisition, the purchase of conservation restrictions, the purchase of an agricultural preservation restriction, and private land donations.
- In 2001, the Town adopted a Community Preservation Act, establishing a 3% surcharge on property taxes that the Community Preservation Committee can use for open space protection, historic preservation, and affordable housing. Local adoption of the CPA establishes a dedicated Fund, the Community Preservation Fund (CPF), to pay for these programs. Each year the State will match money collected by the Town. Rowley anticipates collecting close to \$400,000 annually in the first few years of the program, including the State match. The CPA will provide an important source of funds for acquiring and otherwise protecting critical open space in the future.
- In 2000, the Town adopted a new Open Space Residential Development Bylaw that offers developers the flexibility to reduce lot sizes in subdivisions in exchange for the preservation of key natural resources and open space.
- The Town purchased 1.16 acres of land adjacent to Pine Grove School to develop playing fields.
- The State Department of Environmental Management (DEM) awarded the Open Space Committee a grant to develop a trail plan for Hunsley Hills. The Town received another grant from a private foundation to help implement the trail plan and trail development is underway. The Historic Commission received a grant from Americorp, which provided two weeks of labor to develop trails on the Minister's Wood Lot. This project is complete.
- The Water Department received State certification of the Zone II areas for each well field. The Zone II designation formerly establishes the aquifer recharge areas for the wells, and, in conjunction with the Water Supply Protection District, limits the types of uses allowed within the aquifer recharge area.
- The Town, in collaboration with the Massachusetts Office of Coastal Zone Management, continues to work with a local dairy farmer to implement best management practices to reduce the negative impacts of chemical and animal waste runoff on the Mill River.
- The Town commenced this master planning process.

The successes documented above are critical steps in protecting Rowley's natural environment. At the same time, several setbacks to open space and natural resource protection have occurred. These include:

- The loss of more than 720 acres of open space to development from 1987 to 1998.
- The filing of Comprehensive Permits for the development of large housing developments on two parcels targeted as priorities for protection by the Open Space Committee.
- The development of Sunset Rock, an important geological feature and priority parcel listed for acquisition in the 1998 OSRP.
- The failure of the Town to provide adequate funds to hire a professional planner.
- The failure of the Town to pass a wetlands protection bylaw.

3.1 Unique Resources and Environments

Table 3-1 lists several important scenic and cultural sites in Rowley. The following section discusses many of these features.

3.1.1 Regional Resources

Rowley shares several important natural and recreational resources with neighboring towns. The Mill River and Rowley River watersheds include land in Ipswich, Boxford, Newbury, and Georgetown. Runoff from development and other activity in these towns directly affects the quality of these rivers and the coastal salt marshes (the Great Marsh in particular) into which they empty. The protection of these important natural resources is a major issue that requires a regional approach.

The Parker River National Wildlife Refuge, which Rowley shares with Newbury and Ipswich, is a natural resource not just of regional significance, but also of national importance. Nature enthusiasts from around the country, particularly bird watchers, visit the Refuge. The Refuge is on the flyway for several migratory waterfowl, and is an important nesting area for numerous species, including the endangered Piping Plover.

The Georgetown-Rowley State Forest offers hiking, cross-country skiing, mountain biking, and wildlife observation opportunities to residents of Rowley and neighboring towns. Trails through the Georgetown-Rowley State Forest are part of the Bay Circuit Committee's efforts to link Rowley with 50 other Massachusetts communities through an interconnecting trail system of 200 miles. The Massachusetts Audubon Society has accessible natural areas along the salt marsh, and the Essex County Greenbelt Association also owns publicly-accessible natural areas in the salt marsh located at the end of Stackyard Road and in other locations in Town.

3.1.2 Scenic Landscapes and Unique Features

Rowley is characterized by large expanses of coastal, river, farmland, and forest scenery. The Parker River Wildlife Refuge on Plum Island offers sweeping vistas of the Atlantic Ocean and the salt marshes, and provides opportunities for bird watching and wildlife observation. Important coastal vegetation communities exist throughout the Refuge.

The salt marsh defines Rowley's eastern side, where the salt marsh is visible from roads (Route 1A), footpaths, and waterways. The views change from season to season, and from tide to tide. Spring and summer vegetation, fall foliage, and winter snows provide dramatic landscapes across the marshes. Stacks of drying salt marsh hay recall earlier times. Artists and photographers frequently use the salt marsh as the subject of their work.

Inland from the marsh, the landscape is characterized by drumlins, country roads, historic architecture, farmlands, and forests. Five hills lie within the Town's boundaries including Prospect, Long, Hunsley (Hunslow), Ox Pasture and Smith Hills. These dominate Rowley's topography. The Town's five hills provide spectacular vistas of Rowley, the surrounding communities, and the ocean. On clear days, views from the top of Prospect Hill can reach as far as Maine to the north and downtown Boston to the south.

In 1999, the area around Sunset (Symonds) Rock was developed. Sunset Rock was a large outcropping of granite at the junction of Wethersfield and Hillside Streets. Many generations of Rowley residents had climbed the rock to watch the sunset from the summit, to picnic, or to just enjoy the view. Many long-time residents feel the loss of this important geological feature.

Table 3-1
Partial List of Scenic Areas and Cultural Sites in Rowley

Site Name/Location	Special Features
Prospect Hill	Views of 20,000 acres of estuarine marsh, flats, and riparian forest against the Atlantic Ocean and views of Maine and New Hampshire
Ox Pasture Hill	Livestock pastures, ocean vistas
Smith Hill on Bradford Street	Pastoral vistas
Hunsley (Hunslow) Hills	Ocean vistas
Long Hill	Woodlands, hills
Mill River	Riparian forest, waterfowl, marsh
Rowley River	Salt marsh, historic bridge
Ox Pasture Brook	Wildlife, wetlands
Bachelor Brook	Wildlife, wetlands, woodlands
Mansion Drive	Ocean, salt marsh, agriculture
Hammond St. - End to Paradise Spring	Land of King's Grant, salt marsh
Dodge Road	Agriculture, wetlands, river
Morgan (Pingree) Farm off Boxford Rd.	Agriculture, Rowley water supply protection
Wethersfield Street	Fields, woodlands (Spar and Spindle GS Camp), river
Red Gate Road	Agriculture, salt marsh
Pingree Farm Road	Pastoral fields, woodlands
Boxford Road	Woodlands, State Forest
Pulpit Rock	Historic rock and woodlands, burying grounds
Nelson Island	Duck blinds, tidal pools, wetlands, Plum Island Sound, wildlife
Town Recreation Ball Fields	Water supply protection
Unnamed Brook, west of Rte. 1A, North of Railroad Tracks	Wildlife, Woodlands
Sandy Bridge	Woodlands
Spar and Spindle Girl Scout Camp	Woodlands, wildlife
Harris Wood Lot	Views of Upper Mill Pond

Source: Open Space and Recreation Plan, 1998.

3.2 Geology and Soils

3.2.1 Geology

Rowley's geology consists of an undulating bedrock surface ("ledge"), overlain by a wide assortment of glacial and marine deposits consisting of till, sand and gravel, marine silts and clays, and fresh and salt water muck and peat. The thickness of these sediments corresponds, to a large degree, to the relief and

configuration of the underlying bedrock. For the most part, the deepest deposits (generally of marine clay or sand and gravel) are found in the low-lying, pre-glacial stream valleys that were incised into the bedrock surface. Thinner deposits, typically of till, occur in the uplands, where the bedrock is at shallower depth.

3.2.2 Soils

Soil characteristics are often the most important natural resource factor used to determine development suitability, especially where on-site sewage disposal is required. Soil surveys prepared by the U.S. Department of Agriculture Soil Conservation Service identify a variety of soil associations that can be used to evaluate a particular area's use-limiting conditions such as high water table, shallow depth to bedrock, steepness, layers of hardpan, or poor drainage. In Rowley, there are nine major soil associations, as shown in **Table 3-2**. **Appendix C** includes a detailed description of the Soil Associations.

Table 3-2
Inventory of Soils

General Soil Association/Group	Area (Acres)	Area (%)	Location	Development Suitability
Hinckley-Windsor-Canton-Muck	680	7.2	Boxford/Newbury Road, Route 1 (south) and between Ox Pasture Hill and Mill River	Fair: groundwater & slope limitations
Deerfield-Wareham-Scarboro	1,055	11.2	West of Boxford Road between Hunslow Hill and Wilson Pond and west of Prospect and Smith Hill	Good, except where the water table is high
Canton-Charlton-Hollis	1,490	15.8	Gently rolling terrain and rounded hilltops 50 to 130 feet above sea level	Good, except where shallow to bedrock
Windsor-Hinckley-Merrimack	2,235	23.7	Along stream terraces, outwash plains, low hills, kames, and eskers	Good
Paxton-Millis	1,170	12.4	Throughout Town on gently rolling to hilly terrain	Poor: drainage problems and hardpan
Muck-Biddeford	1,150	12.2	Swamps and flood plains	Poor: drainage and clay
Charlton-Hartland-Hollis	435	4.6	Rolling terrain around Ox Pasture Hill	Fair to poor: slow drainage and some hardpan
Tidal Marsh	425	4.5	Throughout the eastern third of the Town	Poor: drainage problems
Charlton-Hollis-Belgrade-Buxton	800	8.5	Small knolls and marine plans	Poor: shallow bedrock and fluctuating water tables
Total Area Surveyed	9,440	100.0		

Source: Soils and Their Interpretation for Various Land Uses - Town of Rowley, Massachusetts, USDA Soil Conservation Service, 1969.

3.3 Water Resources

3.3.1 Surface Water Resources

As shown in the water resources map (**Map 3-1**), Rowley benefits from an array of interconnected streams, ponds, and wetlands that serve important ecological functions and offer a variety of opportunities for recreational enjoyment. Foremost among these are:

- **Mill River**, which flows from a series of wetlands in the northwest corner of the Town and flows northeast to the Parker River above the Town's northern border;
- **Upper and Lower Mill Ponds**, two elongated impoundments created by a broadening of the Mill River channel;
- **Great Swamp Brook**, a southeast-flowing tributary of Mill River;
- **Mud Creek**, which flows through the salt marsh into Plum Island Sound;
- **Bachelder and Ox Pasture Brooks**, which emerge from wetlands in the central part of Town and flow north to Mill River;
- **Rowley River**, a tidal waterway that forms the Town's southeast boundary and provides important shellfish habitat; and
- **Plum Island Sound**, a broad estuary on the Town's eastern edge fed by the Parker and Rowley Rivers.

Vernal pools are another important water resource in Rowley. Vernal pools are small, seasonal water bodies occurring in isolated basins, which are usually wet during the spring and early summer and dry up during the later summer months. They are isolated seasonal wetland inhabited by many wildlife species that are dependent on vernal pools for their survival. Vernal pools typically lack fish populations, making them excellent breeding habitat for many amphibian species, and larval and adult habitat for many insect species, as well as other wildlife. The wood frog (*Rana sylvatica*) and all species of mole salamanders (genus *Ambystoma*) that occur in Massachusetts breed exclusively in vernal pools. Areas in the immediate vicinity of the pool also provide these species with important non-breeding habitat functions, such as feeding, shelter, and overwintering sites.

Local volunteers inventory vernal pools resources, and staff from the Massachusetts Natural Heritage and Endangered Species Program (NHESP) review and certify these pools. The Wetlands Protection Act protects Certified Vernal Pools for their wildlife habitat value, provided they are large enough to constitute Areas Subject to Flooding (as defined by the Massachusetts Wetlands Protection Act). However, State law does not protect smaller Certified Vernal Pools (as well as those that have not been identified). These pools are seasonal and are easily developed unless they have been certified with the NHESP and have protection under the Wetlands Protection Act.

The State has identified several Potential Vernal Pools in Rowley. The Open Space Committee, after researching several Potential Vernal Pools located on public property and submitting vernal pool certification applications to NHESP, has received State certification for eleven of these pools. The protection of vernal pool habitat is essential for the continued survival of wildlife species that depend upon this unique type of wetland. The rapid rate of development in Rowley makes it imperative that

additional vernal pools be proactively certified and mapped so as to steer proposed development projects away from these critical habitats.

3.3.2 Groundwater Resources

Rowley also has important groundwater aquifers, which are the Town's sole supply of drinking water. An aquifer is a geologic formation capable of yielding significant quantities of potable water. Aquifers are generally found in sand and gravel deposits where pores in the soil allow water to collect. Groundwater enters the aquifer through sand and gravel soils, wetlands, and surface water bodies, and slowly percolates through the ground in a down-gradient direction.

To date, three groundwater sources have been developed for municipal use, although only two remain active (see **Map 3-1**). The Town identified a fourth well site (Well #4), which voters rejected at Town Meeting due to its proximity to the Ipswich Country Club. The Town is currently developing a fifth well which is undergoing pumping tests. Well #5 will share its aquifer recharge area with Well #3. See **Section 7** for additional information.

3.3.3 Existing Protection for Water Resources

Several Federal, State, and local environmental regulations protect freshwater resources against filling, inappropriate development, and other forms of alteration. The following are some of the most important environmental regulations that apply within Rowley.

Wetlands Protection

Wetlands have both human and ecological importance for pollution control, flood control, storm damage protection, wildlife habitat, fisheries, and groundwater supply. The Massachusetts Wetlands Protection Act (310 CMR 10.00) regulates wetlands in Massachusetts.

The Massachusetts Wetlands Protection Act applies to activity within 100 feet of bordering wetlands (wetlands bordering ponds, streams, the ocean, and other water features) and within certain isolated wetlands. The Rowley Conservation Commission administers this law, and considers applications for activities in wetlands and buffer zones. Generally, the Wetlands Protection Act allows wetland alteration in small areas when there are no feasible alternatives, and is subject to the condition that an equivalent amount of wetland must be replicated elsewhere. In wetland buffer zones, work is often allowed, subject to an Order of Conditions from the Conservation Commission. Although the Conservation Commission has some discretion in deciding how much development to allow in wetlands and buffer zones, the Massachusetts Department of Environmental Protection has the authority to override any Conservation Commission decision. The Wetlands Protection Act does *not* provide protection for many small isolated wetlands, or for many vernal pools.

Many Massachusetts communities have adopted local wetlands protection bylaws to supplement the State Act. The purpose of these regulations is to provide additional protection for isolated wetlands not included in the State act, to allow greater control over proposed projects in the buffer zone, and to give greater review authority to the local Conservation Commission. The Conservation Commission continues to work on a local wetlands protection bylaw that would strengthen the Town's ability to protect water resources and wetlands. The Town also uses the Soil Suitability Bylaw to review and regulate work in wetland areas. **Section 2.3.3** describes the soil suitability bylaw in greater detail.

Rivers Protection

According to recent scientific studies, the area within 200 feet of a riverbank can play an important ecological role by serving as the recharge area for rivers; providing a complementary habitat for riparian species requiring upland resources; and allowing riparian corridors to serve as effective migration corridors for species requiring larger habitat areas. The Massachusetts Rivers Protection Act, incorporated into the Massachusetts Wetlands Protection Act in 1996, regulates development within 200 feet of perennial rivers and streams (defined provisionally as those streams which appear as solid blue lines on USGS topographic maps). The Rowley Conservation Commission administers this Act. Typically, the Commission allows development within 100 feet of streams only under extraordinary circumstances but, for certain types of development, the Commission sometimes allows development between 100 and 200 feet of streams.

Groundwater Protection

Rowley has adopted two overlay districts to help protect groundwater resources: the Flood Plain and Watershed Protection District and the Municipal Water Supply Protection District. See **Section 2.3.2** for discussions of both districts.

3.4 Habitats and Ecosystems

3.4.1 Sensitive Habitat Areas

NHESP provides an inventory of rare and endangered species and their habitats throughout the Commonwealth. This inventory includes the following classifications:

- **Estimated Habitat for Rare Wildlife:** These areas consist of wetlands and adjacent upland habitats used by State-listed rare animal species. The Massachusetts Wetlands Protection Act regulates these areas. Anyone proposing a project within an Estimated Habitat must undergo project review by the NHESP. The 1999 – 2001 Natural Heritage Atlas includes six separate areas in Rowley as Estimated Habitats for Rare Wildlife (see **Map 3-2**).
- **Priority Habitat for State-Listed Rare Species:** These areas indicate the most important habitats for *all* State-listed rare species, including both upland and wetland species, and both plant and animal species. These areas have been created for land planning purposes only and do not confer any protection under State law. Rowley contains four Priority Habitats, all of which correspond at least in part to the Estimated Habitats (see **Map 3-2**).

Large unfragmented areas of open space are necessary to provide habitats for many of Rowley's native plant and animal species, particularly larger mammals and certain amphibian species, whose feeding and migration patterns are affected severely by the presence of roads, houses, and other development. Providing large contiguous open space areas and corridors linking various habitat areas is an important strategy to help maintain the diversity and vitality of Rowley's natural ecosystems. **Map 3-2** shows areas of contiguous (as well as fragmented) forest and wetland habitat that are relevant for conservation planning.

3.4.2 Vegetation

Rowley contains a diverse mixture of vegetation types, ranging from dense stands of hardwoods in the upland areas and on hill slopes to broad expanses of salt marsh grasses and reeds on the coast (see **Map 3-2**). In-between is an assortment of mixed hardwood and softwood forests, inland wetlands, and abandoned and active farms, the latter of which include open land for hay, pasture, apple orchards, ornamental nursery plants, and vegetables. Dominant tree species include white and yellow pine, prevalent in the west central part of Town; oaks, beech, and sugar maple on the drumlin hills and well-drained uplands; and red “swamp” maple in the freshwater wetlands. Associated understory species include barberry, black cherry, Virginia creeper, honey locust, sweet fern, alder, viburnum, and sumac in the uplands; and sweet pepperbush, highbush blueberry, winterberry holly, and sensitive and cinnamon fern in the wetlands.

In the Town’s southwest corner is the 1,112-acre Georgetown-Rowley State Forest (297 acres in Rowley). DEM maintains this land for forest stand improvement. Though primarily devoted to timber production and the preservation of wildlife habitat, the forest offers excellent opportunities for hiking, nature observation, and other forms of passive recreation compatible with timberland management.

The eastern end of Town consists of a broad salt marsh dotted with low-rising knolls and crisscrossed by numerous small tidal creeks. Throughout the growing season, this area supports dense growths of *Spartina* grass, spike grass, and other estuarine plants that provide food and habitat for numerous species of resident and migratory birds and wildlife. Ecologists have recognized the salt marsh environment as one of the most efficient and productive ecosystems in the world. On average, it produces ten tons of biomass per acre per year or about 30% more biomass than the best wheat fields in the world. As the interface between the land and the ocean, the salt marsh receives fresh water, nutrients, and sediments from the land, and saline water and other sediments and nutrients from the sea. This continuous exchange created by the rising and falling tides replenishes oxygen supplies, assimilates water-borne pollutants, flushes out accumulated metabolic wastes, and carries food and other vital nutrients to the marsh’s diverse plants and animals.

Field surveys conducted by NHESP botanists identified several plant species classified as “rare” or “uncommon” in the Commonwealth. These plants, which are listed in **Table 3-3**, occur in several locations that NHESP personnel have asked not be publicized to prevent losses from collection or habitat destruction.

Table 3-3
Endangered Plant Species

Common Name	Scientific Name	Federal Status	State Status	Year Last Observed
Seabeach Needlegrass	<i>Aristida Tuberculosa</i>	-	SC	1995
Hairy Wild Rye	<i>Elymus Villosus</i>	-	T	1896
New England Blazing Star	<i>Liatris Scariosa</i> Var. <i>Novae-Angliae</i>	-	SC	1836
Estuary Arrowhead	<i>Sagittaria Calycina</i> Var. <i>Spongiosa</i>	-	E	1981
Long-Styled Sanicle	<i>Sanicula Odorata</i>	-	T	1881
Small Bur-Reed	<i>Sparganium Natans</i>	-	E	1957

Key: SC = Special Concern; T = Threatened; E = Endangered

Source: Commonwealth of Massachusetts, Division of Fisheries and Wildlife

3.4.3 Wildlife Species and Native Fish

Wildlife abounds in Rowley due to both the abundance and diversity of the Town's open spaces. In general, the species of birds and mammals present are characteristic of those found throughout much of the rural Northeast, and include both resident and migrant populations. Some can be found in large numbers throughout much of the Town; others are rare and confined to a few small, localized habitats.

Mammals

Table 3-4 lists the most common mammal species in Rowley. The largest of these are the white-tailed deer, which inhabit mixed and deciduous woodlands with an understory, forest edges, and farms. In the past, residents have spotted an occasional moose or black bear but these are transient, not permanent, residents.

The eastern cottontail is the most abundant species of rabbit in the region. The New England cottontail and varying hare are also present, especially in the region's wooded upland areas. Raccoons, weasels, and skunks live throughout the region. The latter are present even in developed areas because of their ability to eat almost any kind of food and to inhabit virtually any place that will afford shelter.

Predators such as bobcats and gray and red fox inhabit the region, although their local populations are never large. Fishers are present, but rare. There is evidence that the New England coyote is increasing its range and abundance in the State, but detailed knowledge about this species is sparse. Local sightings have not been documented, although several have been reported in recent years.

In terms of actual numbers, the area's most successful mammals are the rodents. The largest of these are the beaver and muskrats, which live in the area's undisturbed streams, ponds, and wetlands. Squirrels and mice live in nearly all habitats, including those of man. Mice are especially prevalent in areas of active farming.

Table 3-4
Mammals of Essex County, Massachusetts

Family	Common Name	Scientific Name	Status
Cervidae	Whitetail Deer	<i>Odocoileus virginianus</i>	C
Leporidae	Eastern Cottontail	<i>Sylvilagus floridanus</i>	C
	New England Cottontail	<i>S. nutalli</i>	C
Mustelidae	Varying Hare	<i>Lepus americanus</i>	C
	Striped Skunk	<i>Mephitis mephitis</i>	C
	Short-tailed weasel	<i>Mustela erminea</i>	C
	Long-tailed weasel	<i>Mustela frenata</i>	C
	Mink	<i>Mustela</i>	C
	Otter	<i>Lutra canadensis</i>	P
	Fisher	<i>Martes pennanti</i>	R/A
Procyonidae	Raccoon	<i>Procyon lotor</i>	C
Didelphidae	Opossum	<i>Didelphis marsupialis</i>	P
Felidae	Bobcat	<i>Lynx Rufus</i>	P
Canidae	New England Coyote	<i>Canis latrans</i>	R/A
	Gray Fox	<i>Urocyon cinereoargenteus</i>	C
	Red Fox	<i>Vulpes fulva</i>	C
Sciuridae	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	C
	Red Squirrel	<i>Tamiasciurus judsonicus</i>	C
	Eastern Chipmunk	<i>Tamias striatus</i>	C
	Woodchuck	<i>Marmota monax</i>	C
	Northern Flying Squirrel	<i>G. sabrinus</i>	C
	Southern Flying Squirrel	<i>Glaucomys volans</i>	C
Castoridae	Beaver	<i>Crstar canadensis</i>	C
Erethizontidae	Porcupine	<i>Erethizon dorsatum</i>	P
Cricetidae	White-footed mouse	<i>Peromyscus leucopus</i>	C
	Red-backed vole	<i>Clethrionomys gapperi</i>	C
	Meadow vole	<i>Microtus pennsylvanicus</i>	C
	Pine vole	<i>Pitmys pientorum</i>	C
	Muskrat	<i>Oudatra zibethica</i>	C
	Meadow jumping mouse	<i>Zapus hudsonius</i>	C
Zapodidae	Woodland jumping mouse	<i>napaeozapus insignis</i>	C
Muridae	Norway rat	<i>Rattus norvegicus</i>	C
	House mouse	<i>Mus musculus</i>	C
Talipidae	Eastern mole	<i>Scalopus aquaticus</i>	C
	Hairytaile mole	<i>Parascalops breweri</i>	C
	Starnose mole	<i>Condylura cristata</i>	C
Soricidae	Masked shrew	<i>Sorex cinereus</i>	C
	Shorttail Shrew	<i>Blarina breveccuda</i>	C

Key: P = present, status uncertain; C = common; R = rare; A = absent

Source: Merrimack Wastewater Management - Key to a Clean River - Northeastern United States Water Supply Study.
Appendix IV-B, Biological Impacts, Volume I. New England Division, US Army Corps of Engineers, November 1974.

Table 3-5 lists endangered animals found in the Town.

Table 3-5
Endangered Animals of Rowley

Common Name	Scientific Name	Federal Status	State Status	Last Observed
Blue-Spotted Salamander	<i>Ambystoma Laterale</i>	-	SC	1983
Spotted Turtle	<i>Clemmys Guttata</i>	-	SC	1986
Wood Turtle	<i>Clemmys Insculpta</i>	-	SC	1900
New England Siltsnail	<i>Cincinnatia Winkley</i>	-	SC	1986
Coastal Barrens Buckmoth	<i>Hemileuca Maia Maia</i>	-	T	1934
Coastal Marsh Snail	<i>Littoridinops Tenuipes</i>	-	SC	1986
Spadefoot Toad	<i>Scaphiopus holbrookii</i>	-	T	1978

Key: SC = Special Concern; T = Threatened

Source: Massachusetts Natural Heritage and Endangered Species Program (NHESP).

Birds

Table 3-6 lists bird species that have been observed in Rowley. These species commonly are associated with four plant communities found throughout eastern Massachusetts:

- Orchard, Field, Pasture, and Cultivated Land
- White Pine - Hemlock - Northern Hardwood Association
- Fresh and Salt Water Marshes
- Yellow Pine - Hardwood Association

Among the habitats cited above, the greatest species diversity is encountered in the agricultural areas, where as many as 60 types of birds may be present. This diversity is largely attributable to the number and variety of introduced plants that comprise the Orchard-Field-Pasture-Cultivated Land habitat, offering a wide range of food, nesting sites, and protective cover. There is evidence that the number of birds in these areas is actually greater now, despite man's presence, than when the European settlers first arrived.

The second most important plant community in Rowley is the White Pine-Hemlock-Northern Hardwood forest, which supports over 40 bird species. This forest is mostly cut over and populated with sprout or second growth trees and various ground cover flora. Such habitats are highly productive of bird (and mammal) life, more so than the undisturbed mature forests which originally occupied the region.

The Fresh and Salt Water Marsh environments support some 35 species of birds. These habitats are especially important to wildlife as they provide protected breeding areas for resident species as well as stopover points and wintering grounds for a number of migratory birds and waterfowl.

The Yellow Pine-Hardwood Forests are somewhat lower in species diversity, with about 30 bird species present. These areas are characterized by smaller trees and shrub thickets and a floor that is often nearly bare or matted with pine needles.

Table 3-6
Bird Species Observed in Rowley

Broad-winged Hawk	Red-tailed Hawk	Rough-legged Hawk
American Kestrel	Merlin	Peregrine Falcon
Ring-necked Pheasant	Ruffed Grouse	Northern Bobwhite
Clapper Rail	King Rail	Virginia Rail
Sora	Common Moorhen	American Coot
Black-bellied Plover	Lesser Golden-Plover	Semipalmated Plover
Piping Plover (endangered)	Killdeer	Greater Yellowlegs
Lesser Yellowlegs	Solitary Sandpiper	Willet
Spotted Sandpiper	Whimbrel	Hudsonian Godwit
Marbled Godwit	Ruddy Turnstone	Red Knot
Sanderling	Semipalmated Sandpiper	Western Sandpiper
Least Sandpiper	White-rumped Sandpiper	Baird's Sandpiper
Pectoral Sandpiper	Dunlin	Stilt Sandpiper
Buff-breasted Sandpiper	Ruff	Short-billed Dowitcher
Long-billed Dowitcher	Common Snipe	American Woodcock
Wilson's Phalarope	Laughing Gull	Bonaparte's Gull
Ring-billed Gull	Herring Gull	Iceland Gull
Lesser Black-backed Gull	Glaucous Gull	Great Black-backed Gull
Roseate Tern	Common Tern	Arctic Tern
Least Tern	Black Tern	Rock Dove
Mourning Dove	Black-billed Cuckoo	Yellow-billed Cuckoo
Eastern Screech Owl	Great Horned Owl	Snowy Owl
Barred Owl	Great Grey Owl	Western Grebe
Long-eared Owl	Short-eared Owl	Northern Saw-whet Owl
Common Nighthawk	Whip-poor-will	Chimney Swift
Ruby-throated Hummingbird	Belted Kingfisher	Yellow-bellied Sapsucker
Downy Woodpecker	Hairy Woodpecker	Northern Flicker
Pileated Woodpecker	Olive-sided Flycatcher	Eastern Wood-Pewee
Yellow-bellied Flycatcher	Least Flycatcher	Eastern Phoebe
Great Crested Flycatcher	Western Kingbird	Eastern Kingbird
Horned Lark	Purple Martin	Tree Swallow
N. Rough-winged Swallow	Bank Swallow	Cliff Swallow
Barn Swallow	Blue Jay	American Crow
Black-capped Chickadee	Boreal Chickadee	Tufted Titmouse
Red-breasted Nuthatch	White-breasted Nuthatch	Brown Creeper
Carolina Wren	House Wren	Winter Wren
Marsh Wren	Golden-crowned Kinglet	Ruby-crowned Kinglet
Blue-gray Gnatcatcher	Veery	Gray-checked Thrush
Swainson's Thrush	Hermit Thrush	Wood Thrush
American Robin	Gray Catbird	Northern Mockingbird
Brown Thrasher	Water Pipit	Cedar Waxwing
Northern Shrike	Loggerhead Shrike	European Starling
White-eyed Vireo	Solitary Vireo	Yellow-throated Vireo

Warbling Vireo	Red-eyed Vireo	Blue-winged Warbler
Golden-winged Warbler	Tennessee Warbler	Orange-crowned Warbler
Nashville Warbler	Northern Parula	Yellow Warbler
Chestnut-sided Warbler	Magnolia Warbler	Cape May Warbler
Black-throated Blue Warbler	Yellow-rumped Warbler	Black-throated Green Warbler
Blackburnian Warbler	Pine Warbler	Prairie Warbler
Palm Warbler	Bay-breasted Warbler	Blackpoll Warbler
Black-and-white Warbler	American Redstart	Ovenbird
Northern Waterthrush	Louisiana Waterthrush	Connecticut Warbler
Common Yellowthroat	Wilson's Warbler	Canada Warbler
Yellow-breasted Chat	Scarlet Tanager	Northern Cardinal
Rose-breasted Grosbeak	Indigo Bunting	Rufous-sided Towhee
American Tree Sparrow	Chipping Sparrow	Field Sparrow
Vesper Sparrow	House Sparrow	Savannah Sparrow
Sharp-tailed Sparrow	Seaside Sparrow	Fox Sparrow
Song Sparrow	Swamp Sparrow	White-throated Sparrow
White-crowned Sparrow	Dark-eyed Junco	Lapland Longspur
Snow Bunting	Bobolink	Red-winged Blackbird
Eastern Meadowlark	Rusty Blackbird	Common Grackle
Brown-headed Cowbird	Orchard Oriole	Northern Oriole
Pine Grosbeak	Purple Finch	House Finch
Red Crossbill	White-winged Crossbill	Common Redpoll
Pine Siskin	American Goldfinch	Evening Grosbeak
Dovekie	Western Tanager	Ash-Throated Flycatcher
Fulvous Whistling Duck	Wild Turkey	Golden Eagle
Three-Toed Woodpecker	Red-Bellied Woodpecker	Sandhill Crane
Foster's Tern		

Source: Direct observation by Town residents using Mass. Audubon Society Checklist

Table 3-7 lists birds observed in Rowley that are listed by the NHESP.

Table 3-7
Endangered Birds of Rowley

Common Name	Scientific Name	Federal Status	State Status	Last Observed
American Bittern	<i>Botaurus Lentiginosus</i>	-	E	1990
Red Knot	<i>Calidris Canutus</i>	-	WL	1978
Piping Plover	<i>Charadrius Melodus</i>	LE, LT	T	1997
Common Moorhen	<i>Gallinula Chloropus</i>	-	SC	1982
Least Bittern	<i>Ixobrychus Exilis</i>	-	E	1988
Loggerhead Shrike	<i>Lanius Ludovicianus</i>	-	E	1976
Pied-billed Grebe	<i>Podilymbus Podiceps</i>	-	E	1974
King Rail	<i>Rallus Elegans</i>	-	T	1982
Least Tern	<i>Sterna Antillarum</i>	-	SC	1992
Common Tern	<i>Sterna Hirundo</i>	-	SC	1996
Golden-winged Warbler	<i>Vermivora Chrysoptera</i>	-	E	1906

Key: E=Endangered; T=Threatened; SC=Special Concern; WL=Unofficial Watch List; LE=Federally Endangered; LT=Federally Threatened

Source: Massachusetts Natural Heritage and Endangered Species Program (NHESP).

Fisheries

Plum Island Sound, the Great Marsh, and tidal estuaries within Rowley provide a rich environment for marine wildlife. Of particular economic and recreational importance are the shellfish beds, from which clammers harvest soft-shell clams. Surf clams, blue mussels, and oysters also inhabit these areas. High levels of fecal coliform bacteria regularly threaten Rowley's shellfish beds after heavy rainfalls, which require the closure of clam flats to clammers on occasion. The estuary also provides a habitat for numerous finfish including striped bass, winter flounder, windowpane, white perch, alewife, blueback herring, hake, American eel, and American smelt.¹

In July 1996, the Massachusetts Division of Fisheries, Wildlife, and Environmental Law Enforcement (DFWELE) conducted field sampling along the Mill River to identify fish species present. **Table 3-8** lists fish found in the Mill River at that time. In addition, according to a local naturalist, two anadromous species (blueback herring and smelt) spawn in the river each spring. DFWELE stocks the river with brook, brown, and rainbow trout, some of which become anadromous and spend part of their lives in the estuary and ocean.

¹ Jerome, William C., Jr., Arthur P. Chesmore, and Charles O. Anderson, Jr., *A Study of the Marine Resources of the Parker River-Plum Island Sound Estuary*, Massachusetts Department of Natural Resources, Division of Marine Fisheries, Monograph Series 6, March 1968.

Table 3-8
Fish Species of the Mill River, Rowley

American eel	Golden shiner
White sucker	Blue gill
Pumpkinseed	Redfin pickerel
Sea lamprey ammocetes	Creek chub sucker
Bridle shiner	Largemouth bass
Brown bullhead	Brown trout
Yellow bullhead	Fallfish
Common shiner	

Source: Ken Simmons, Ph.D., Massachusetts Division of Fisheries and Wildlife,
Letter to Bob Gouthro, October 8, 1996.

3.5 Areas of Critical Environmental Concern

In 1979, the Executive Office of Environmental Affairs (EOEA) designated the Parker River/Essex Bay area an Area of Critical Environmental Concern (ACEC). This area includes land and water within Rowley, Newbury, Essex, Ipswich, and Gloucester. It includes all of the Parker River Wildlife Refuge and Plum Island Sound, as well as parts of the Rowley and Mill Rivers and Ox Pasture Brook. All of the salt marsh within Rowley is included in the ACEC. The Parker River/Essex Bay ACEC includes virtually all of the seventeen significant resources considered in the ACEC designation process. Of particular note are barrier beaches (including Plum Island), salt marsh, dunes, beach, shellfish, estuaries, anadromous fish runs, floodplains, erosion and accretion areas, coastal-related recreation, historic sites, significant wildlife habitats, and significant scenic sites.

Despite its ACEC designation, the Parker River/Essex Bay area continues to be threatened by pollution from agricultural uses, failing septic systems, and storm water runoff. In 1994, Massachusetts Audubon North Shore conducted the Plum Island Sound/River System study to evaluate water quality issues affecting this area. Bacterial monitoring conducted as part of the study found evidence of both point and non-point water pollution. Due to high bacterial counts after rainfall, regulators close the shellfish beds in Plum Island Sound after rainfalls of just ½ inch. The study further reports that “high fecal coliform counts, measured by the Town of Rowley ... within the [area] reveal potential threats to sole sources of local public drinking supplies” even in dry weather.²

In addition to the State-designated ACEC, there are several additional areas of environmental concern within the Town of Rowley. These include:

- **Existing Well Fields and Potential New Well Sites:** In particular, there is concern that the Municipal Water Supply Protection Overlay District is inadequate and that new development may harm the Town’s aquifers.
- **The Mill River and Rowley River Watersheds:** The Mill and Rowley River watersheds include land in Ipswich, Boxford, Newbury, and Georgetown. Protection of these watersheds will require

² Cooper, Andrea and Robert Buchsbaum, *Plum Island Sound/Rivers System Final Action Plan*, Massachusetts Audubon: North Shore, Massachusetts Bay Minibays Project, October 1994.

cooperation from adjacent municipalities to prevent harmful runoff from development and other activities.

- **Farmlands:** Within the past decade, several hundred acres of farmland have disappeared in Rowley, replaced by subdivisions. Agriculture is an important part of Rowley’s history, culture, and character. As farmland is consumed for development, it becomes more and more difficult for the remaining farmers to operate profitably in Town.
- **Woodlands:** As with farmlands, development replaced hundreds of acres of woodlands over the past decade. Rowley’s woodlands provide important wildlife habitats and recreational opportunities, as well as help to define the Town’s rural character.
- **Hilltops:** Rowley’s five hills are prominent features in the Town’s landscape. The hills provide sweeping vistas of the salt marsh, woodlands, and agricultural activities in the Town and beyond. They also provide substantial opportunities for hiking, cross-country skiing, and nature observation.

3.6 Open Space Inventory

This section provides an inventory of lands in Rowley that are of interest for open space and/or recreation. Open space is defined as undeveloped land that is permanently protected from development, temporarily protected from development, or unprotected but currently providing a recognized conservation or recreation function. Open space lands in Rowley include a number of Town-owned parcels as well as parcels owned by the State, the Federal government, private conservation groups, and other private parties. **Map 3-3** displays Rowley’s open space and recreation assets, while **Table 3-9** provides a summary of open space and recreation parcels by ownership. A description of major public and private open spaces follows the table.

Table 3-9
Protected and Unprotected Open Space in Rowley

Owner/Manager	Number of Parcels	Total Acres	% of Town
Permanently Protected Open Space			
Town of Rowley, Conservation Land	17	339.0	2.9%
Town of Rowley, Water Department Land	8	89.5	0.8%
State of Massachusetts	29	1,083.5	9.2%
U.S. Fish & Wildlife Service	1	928.7	7.9%
Essex County Greenbelt Association	45	353.3	3.0%
Private Land, Conservation Restriction	25	211.4	1.8%
Private Land, Agricultural Preservation Restriction	30	240.1	2.0%
Permanently Protected Open Space Subtotal	155	3,245.5	27.5%
Temporarily Protected Open Space			
Chapter 61 (Forestry) Land	26	326.5	2.8%
Chapter 61A (Agriculture) Land	134	1,174.0	9.9%
Chapter 61B (Recreation) Land	4	11.6	0.1%
Temporarily Protected Open Space Subtotal	164	1,512.1	12.8%
Unprotected Public Open Space			
Town of Rowley, Unprotected Land	35	186.7	1.6%
Essex County Greenbelt Association	4	28.8	0.2%
State of Massachusetts	4	34.4	0.3%
Essex County	2	8.1	0.1%
Unprotected Public Open Space Subtotal	45	258.0	2.2%

Sources: MassGIS, Rowley Assessors Office.

^a Open space created as part of cluster subdivisions, pursuant to the Town's cluster development/open space residential development zoning bylaw.

3.6.1 Town-Owned Parcels

The Town of Rowley owns a number of protected and unprotected parcels, including the following.

Protected Open Space

- Parcels managed by the Conservation Commission:** The Rowley Conservation Commission has jurisdiction over 13 parcels totaling approximately 339 acres that are scattered throughout the Town. These include the recently-acquired 27.6-acre Pingree Farm and the 104-acre Hunsley Hill property located on Haverhill Street. In 1999, the Conservation Commission acquired the 34-acre Pingree Farm Road parcel as part of a joint acquisition with the Water Board to protect the Town's new well field. Also in 1999, the developer of the Forrest Ridge Business Park donated 20 acres of wetlands adjacent to existing conservation land to the Conservation Commission. In addition, the Conservation Commission's holdings include 60 acres in two large parcels behind the Eiras Park recreation area; two parcels across from the Town landing; and various other unmarked parcels. Residents may use the sites for hiking, wildlife observation, picnicking, and other passive recreation activities. Trail networks exist on some sites, but none

have picnic facilities or sanitary facilities available. Residents could make better use of these parcels for passive recreation if additional trails and better public access are provided.

- **Parcels managed by the Water Department:** The Water Department owns eight parcels in Rowley, of which six are primarily undeveloped. These include four well fields, the water tank site on Prospect Hill, and parcels around the well fields (including the site of Haley Field). In 1999, the Water Department acquired a 16-acre site adjacent to the Pingree Farm Road parcel and the Georgetown-Rowley State Forest. This parcel is the site of Well #5, which currently is under development. Because of the need to protect the water supplies, no recreation activities are provided on these sites, except for the pre-existing ball field at Haley Field.

Unprotected Town-Owned Land

- **Eiras Park Recreation Area:** Located behind the Police Station on Haverhill Street (Route 133), Eiras Park is a 17.5-acre parcel adjacent to Well Field #2. The Recreation Committee manages the site, which presently includes soccer fields, two baseball fields, and the Kids' Kingdom Playground. The Recreation Committee is studying potential expansion plans, although funding for improvements is uncertain. The park's unpaved parking area is not large enough to accommodate peak demand and can be impassable when muddy. The Town has made no specific improvements for handicap accessibility, and rented portable lavatories are the only sanitary facilities.
- **Pine Grove School:** Built on the site of a former baseball field, the Pine Grove School is situated on a 16-acre parcel near the town center. The Triton Regional School Committee manages the building and grounds. The school facilities include two indoor gyms, a playground, and basketball courts. During school hours, these facilities are dedicated to school use. During non-school hours the facilities are in great demand, hosting youth basketball, adult basketball, or volleyball games most weeknights. The school district plans to develop additional outdoor recreation space on property located behind the school building. In addition, the school is interested in developing a nature trail that would include a (yet-to-be-certified) vernal pool, located between the basketball courts and the Congregational Church property to the south. The school provides adequate public parking and handicap access.
- **Town Landing:** The Town Landing is a ½-acre parcel on the Rowley River with a boat launch and boat dock. The Harbormaster oversees use of Town Landing, which experiences heavy summer use from recreational boaters, and year-round use from the local clammers. The small parcel affords no room for parking, so boaters use the conservation land across the street for car and boat trailer parking. Boaters need a resident sticker to park boat trailers at the landing, and the site has no handicap parking. While residents at one time used the landing for swimming, swimming has been prohibited recently due to pollution. The new pump-out boat for marine toilets and planned shore-side toilet facilities might result in better water quality and allow for future swimming at the landing.
- **Town Common:** This central site in the heart of the historic district is a two-acre parcel across from Town Hall. The Board of Selectmen maintains the Common and schedules events there including use of the baseball diamond. The Common is heavily used for a wide variety of purposes including concerts at the bandstand, youth soccer, and adult softball. Bike and running clubs make this their start, finish, or water stop, and the Recreation Committee hosts Rowley's

annual 4th of July family festivities. Despite the heavy use, more recreation activity could occur here, especially with the addition of park benches, picnic tables, and toilet facilities.

- **Miscellaneous Town-owned parcels:** The Town owns several additional parcels, which range from forest on the west side of Town to open marshland on the east side of Town.³ There are three Town-owned cemeteries: the Rowley Burial Grounds behind Town Hall (active), the Smallpox Cemetery on Trowbridge Circle (historic), and the Pulpit Rock Burial Ground off Leslie Road (historic). Some parcels are largely landlocked such as the 21-acre forest off Boxford Road, and the smaller pieces off Daniels Road and Wethersfield Street. Others are located along tidal creeks, including the 24-acre peninsula formed where Low Country Creek meets the Rowley River. While residents use some of these areas for passive recreation activities, some could be used more extensively. Public access varies from parcel to parcel: the three cemeteries are all accessible by car, while many of the remaining sites are accessible only by foot, and lack maintained trails.

3.6.2 State and Federally-Owned Land

The State and Federal government own several large, important open space areas in the Town:

- **Massachusetts Department of Environmental Management:** DEM holds the 27 acres of the Willowdale State Forest that are within Rowley, 388 acres of the Georgetown-Rowley State Forest adjacent to I-95, and the 97-acre Prospect Hill parcel on Haverhill Street. Trails and fire roads traverse these parcels, which are frequented by wildlife observers, hikers, horseback riders, mountain bikers, cross country skiers, and snowmobilers. The Willowdale State Forest is generally approached through Ipswich. Two trailheads on Boxford Road and Pingree Farm Road provide access to the Georgetown-Rowley State Forest. A DEM sign at the base marks the Prospect Hill parcel, with a small area for parking.
- **Massachusetts Division of Fisheries, Wildlife and Environmental Law Enforcement:** DFWLE owns the Mill Creek Wildlife Management Area on the east side of town. Hikers, horseback riders, and hunters frequent the wooded portions of this land, while the marshland areas are less visited because they are unmarked, inaccessible, and frequently crossed by creeks and drainage ditches. Public access ranges from limited to none.
- **U.S. Fish and Wildlife Service:** The Parker River Wildlife Refuge on Plum Island and the surrounding marshes include more than 900 acres within the Town's borders, both on the island and on the mainland at the end of Stackyard Road. People use the acreage on Plum Island for a variety of passive and active recreation activities, including hiking, swimming and sunbathing, bird watching, biking, and fishing, while visitors use the mainland portion of the refuge for hiking, fishing, bird watching, and clamming. The Plum Island portion is a fee-for-use area with extensive programs and handicap facilities. The Stackyard Road land is unpaved with minimal parking and no provisions for handicap accessibility.

³ This total includes parcels taken for non-payment of taxes, some of which may not have substantial open space, recreation, or resource protection value.

3.6.3 Private Open Space

Important private open spaces in Rowley include the following:

Protected Private Open Space

- **Non-Profit Land Trusts:** The Essex County Greenbelt Association, a not-for-profit land trust, owns about 353 acres of protected open space in Rowley, the majority of which is marshland on the east side of town. Visitors use both the marshland and the 31-acre wooded Ewell Reservation on Haverhill Street for hiking and wildlife observation. Some of the marshland properties are best reached by boat, and much of the land is subject to flooding at the twice-monthly extra high tides.
- **Private Ownership with Restrictions:** In 2001, the Massachusetts Department of Food and Agriculture, Massachusetts Audubon Society, Essex County Greenbelt, and the Town of Rowley purchased an Agricultural Preservation Restriction (APR) on 150 acres of the Pikul Dairy Farm on Route 1A. The APR allows the landowner to develop two house lots in the future but prohibits all other development on the property. In 2000, the Town, Massachusetts Audubon Society, and Essex County Greenbelt purchased, with the help of a private donor, a Conservation Restriction (CR) on the 17-acre Minister's Wood Lot property on Stackyard Road. This property, owned by the Congregational Church, is the site of the wood lot used by Ezekial Rodgers, the founder of Rowley. The CR prohibits future development of the site.

Unprotected Private Open Space

- **Chapter 61, 61A, and 61B Lands:** Private landowners control a significant portion of the Town's open spaces. Historically, Rowley was a farming community and several large working farms in Town remain. At present, about 1,512 acres on 164 parcels of private land are being actively used for agricultural, horticultural, or forestry production, or are managed to provide specific recreational opportunities (see **Table 3-9**). These parcels are eligible for a reduced property tax rate under Chapters 61, 61A, and 61B of the Massachusetts General Laws, which provide tax credits to landowners who retain their land in forestry, agricultural, or recreational uses, respectively, rather than selling or developing the land. Rowley has numerous Chapter 61A (farming) parcels, but also a handful of managed woodlots (Chapter 61) and one golf course (the Rowley Country Club) enrolled in Chapter 61B. Many of these parcels have recreational potential for activities including hiking, horseback riding, bird watching, and cycling. Land owners can sell these parcels for development at any time by paying the Town five years in back taxes and offering the Town 120 days to purchase the land at fair market value. Many of the recent subdivisions in Rowley have been built on land taken out of Chapter 61A, illustrating that this form of protection is quite limited and temporary. Many of the key sites identified by the Town as prime land for protection are Chapter 61 or 61A parcels.
- **Spar and Spindle Girl Scout Camp:** The Spar and Spindle Girl Scout Council owns a 189-acre parcel south of Wethersfield Street that stretches down to the Water Department land and Eiras Park on Haverhill Street (Route 133). As one of the largest remaining undeveloped parcels in Rowley, the Girl Scout property, known as Camp Penacook, potentially could accommodate a wide variety of recreation activities including hiking, cross country skiing, horseback riding, wildlife observation, and biking. Developers have approached the non-profit Council on several occasions, and the Council could sell this parcel for development at any time. However, in 1998,

the Girl Scout Council developed a master plan for their holdings throughout the region, sold off excess land, and designated Camp Penacook as a centerpiece of its program. The Council currently has no plans to dispose of the property, but the Town could consider entering into an agreement with the Girl Scouts that would give the Town first right of refusal should the property become available for sale.

- **Other Large Privately-Held Parcels:** A considerable number of sensitive parcels in Rowley are owned privately and are not under the Chapter 61 program. These include the three King's Grant properties located in the eastern portion of the Town, which currently are not protected in any way.

3.6.4 Provisions for Open Space Protection

Local and State environmental regulations offer some protection for certain open space areas. Regulations prohibit most development on and/or near wetlands, streams, ponds, and, in some situations, floodplains. Limited restrictions also apply to areas with rare species habitat, high groundwater, and other environmental constraints. However, environmental regulations do not provide complete protection for sensitive areas since the laws are subject to change and may be circumvented in certain circumstances.

In 2001, the Town adopted the Community Preservation Bylaw (discussed in **Section 2**), which will provide a self-renewing fund for open space protection, historic preservation, and community housing. In 2000, the Town adopted a new Open Space Residential Development Bylaw that provides developers the flexibility to reduce lot sizes in subdivisions in exchange for preserving key natural resources and open space.

In 1997, the Town established the Rowley Open Space Committee, a subcommittee of the Conservation Commission. While the Committee does not have any regulatory power, its members have worked diligently in recent years to inventory open space resources in Town and identify strategies to protect open space. The Open Space Committee spearheaded the efforts to save the Pingree Farm, Pingree Farm Road, and Hunsley Hills properties, and was involved in the efforts to secure an APR on the Pikul Farm and a CR on the Minister's Wood Lot. In addition, the Open Space Committee spearheaded the successful campaign for the adoption of the CPA. The Committee has obtained several grants and has succeeded in implementing more than half of the recommendations included in the 1998 Open Space and Recreation Plan.

3.6.5 Priorities for Open Space Protection

The Open Space Committee maintains a list of priority lands that merit protection from development. The Committee selects properties for inclusion in the inventory based on the following criteria:

- Critical environmental concern
- Scenic views, especially roadside
- Hilltops
- Watershed or wellfield protection
- Potential greenbelt, wildlife corridor, and trail ways
- Riverside (including tributaries and other waterways) open space and access
- Agricultural lands

- Passive and active recreation lands
- Large contiguous open space parcels
- Open space with historic significance
- Forested land
- Land abutting existing protected space
- Land at risk for development
- Willingness of owner to conserve the property

In 2001, DFWELE completed the BioMap project, which identifies the most important land for protecting biological diversity in the Commonwealth. Biological diversity refers to the full range of species, habitats, and ecosystems native to Massachusetts. **Map 3-2** shows the BioMap core habitat areas within Rowley. Various groups have protected a large portion of the eastern section of Rowley. This area is included in the BioMap core habitat. Another BioMap focus area within Rowley is located in the western portion of Town in the vicinity of the Rowley-Georgetown State Forest. Significant single-family residential development has occurred here in recent years as the Town has not done much to protect large portions of this area.

3.7 Recreation Facilities

Rowley has a number of recreational facilities used for organized sports, pick-up games, and casual recreation. These include:

- **Eiras Park:** Eiras Park, described in **Section 3.6.1** above, is Rowley's primary facility for organized youth and adult sports. Adult league baseball and Babe Ruth (youth) baseball use the lower field of the park. Little League baseball and girls' softball use the upper field. Eiras Park is also the site of the Kids Kingdom Playground.
- **Haley Field:** Haley Field is located on Route 133 just west of Route 1. Little League baseball uses this field.
- **Pine Grove Elementary School Outdoor Basketball Court:** While no leagues use this facility, many residents (both youths and adults) use it for pick-up games, particularly in the evening.
- **Pine Grove Elementary School Indoor Gym:** This facility is used by a winter basketball league, and for early spring practice for girls' softball. After-school cheerleading practice also takes place at this facility.
- **Town Landing:** Boaters, fishermen, and clambers use this facility. Residents can no longer swim at the landing due primarily to concerns about water quality.
- **Rowley Town Common:** This facility includes a softball field, which residents use for pick-up games. Various groups hold concerts on the Common during summer months, and other group and community activities, such as craft fairs, occur here.
- **Georgetown-Rowley State Forest and Prospect Hill:** While not used for organized active recreation, people hunt, hike, cross-country ski, picnic, etc in the State Forest and at Prospect Hill.

- **Triton Regional High School:** Rowley middle school and high school students attend this facility located just beyond the Rowley town line in Newbury. There are soccer fields, outdoor track facilities, baseball fields, and tennis courts at Triton. Teams affiliated with the school dominate use of the fields.

Five organized leagues use the facilities listed above:

- Rowley Youth Baseball – 186 Rowley children participating in 2002
- Triton Babe Ruth Baseball - 90 children from the Triton region participating in 2002
- Triton Youth Soccer – 600 children from the Triton region participating in 2002
- Rowley Softball – 85 children participating in 2002
- Rowley Rams Baseball – 15 children participating in 2002.

According to participants in these organized sports programs, there is a shortage of fields in Rowley. While participation in these sports increases substantially every year, neither the Town nor the school district has constructed additional facilities in more than a decade. Property purchased adjacent to Pine Grove School for fields has never been improved. Competition exists between baseball leagues and youth soccer teams for use of the fields. It is unsatisfactory to allow both sports on a single field because the cleats worn by soccer players damage the field, ruining the fields for baseball and softball. Currently, the shortage of fields means that fields cannot be “rested” on a periodic basis.

3.8 Environmental Problems

3.8.1 Erosion

There are few areas in Rowley that are subject to significant erosion. However, in recent years, many developers have bypassed subdivision review by developing “Form A”, or ANR lots. While developers generally provide construction-period erosion control plans, few, if any, prepare post-construction plans. The Town currently has no erosion controls established for Form A developments. Recent Form A developments along steeply graded hills (e.g., Wethersfield Street at Sunset Rock) have resulted in moderate erosion. Given the Town’s current pace of development, it is imperative that the Town adopt procedures to allow careful review of all developments with an eye toward the potential for erosion, particularly in areas adjacent to the Town’s water supply and surface water resources.

3.8.2 Chronic Flooding

Several areas in Town are subject to chronic flooding caused by heavy rains. These include Wethersfield Street at Bachelder Brook, Hillside Street at Great Swamp Brook, Route 133 at Cedarwood Lane, and several areas on the west side of Town south of Route 133, including Boxford Road, Leslie Road, and Newbury Road. These old roads, built across floodplains associated with streams, were constructed at existing grade, and therefore can be underwater during flood times. Two factors affect the amount of flooding: total water volume and rate of runoff. The Wetlands Protection Act and Planning Board regulations address water volume by requiring the retention of natural water volume storage. New roads must be raised above the floodplain, with culverts sized to allow the stream to pass through. When floodplain areas are filled, an equal volume of flood storage space must be excavated as compensation.

Regulations address the runoff rate only for subdivisions and commercial development. When naturally vegetated landscape is changed to impervious roofs, driveways, parking areas or quickly draining lawns, rainfall and snowmelt leave the site more quickly than before development occurred, causing problems downslope. Single lots (ANR lots) are not subject to any regulations addressing runoff rate. The Town may wish to consider a bylaw to prevent off-site flooding from all types of development.

3.8.3 Sedimentation

Both the Mill River and Ox Pasture Brook have suffered from sedimentation and erosion of their banks as a result of development and stormwater runoff. Sedimentation in these waterways has caused a deterioration of fisheries and general aquatic habitats. Potential means to address sedimentation include requiring developers to provide better construction and post-construction sedimentation controls, and including funds in the Town Highway Department budget to ensure that road sanding, street sweeping ,and catch basin cleanout are accomplished regularly.

3.8.4 Development Impact

The rapid pace of development in Rowley has inevitably had negative impacts on the Town's open space and recreational resources. These impacts include:

- increased surface runoff and non-point source pollution problems;
- increased demand on the Town's already strained recreational facilities;
- loss of the Town's open space resources, including agricultural uses, forests, trails, and fields;
- increased demand on the Town's already strained water supply;
- alteration of the Town's scenic character, as features such as stone walls and hillsides are demolished for new development; and
- increased demand on all services, including fire protection, infrastructure, and schools.

3.8.5 Water Pollution

The primary threat to water resources in Rowley is "nonpoint source pollution," or polluted runoff. Nonpoint source pollution derives from many small, individual sources, including roads, farms, lawns, and gardens, golf courses, septic systems, parking lots, and other developed land uses. Nonpoint source pollution can adversely affect lakes, streams, aquifers, and coastal waters, and is the cause of the majority of shellfish area closures in Massachusetts. Specific nonpoint source pollutants of concern include:

- **Sediment:** Sedimentation occurs when particles of silt, soil, and sand are washed from exposed soils at construction sites, gravel operations, farms, landscaped areas, roads, and other altered areas. Sedimentation tends to increase the turbidity of lakes, streams, and the ocean, thus reducing habitat and recreational value. In addition, sedimentation clogs wetlands and riparian zones, reducing their flood storage capacity.
- **Phosphorous and Nitrogen:** Phosphorus and nitrogen are major constituents of wastewater effluent (human wastes, detergents, etc.) as well as chemical fertilizers. Because phosphorous and nitrogen are both critical plant nutrients, increasing the amount of these chemicals in the environment can cause algae blooms, reduced levels of dissolved oxygen, and changes in aquatic

and terrestrial species composition. Nitrate (a form of nitrogen commonly found in groundwater that can contaminate drinking water supplies) is also a suspected carcinogen.

- **Metals:** Various metals are commonly found in runoff from developed land. Many metals are toxic to plants, wildlife and humans, and may also increase water treatment costs for public water supplies.
- **Pesticides and Herbicides:** Agricultural and horticultural chemicals derive not just from farms, but from lawns, gardens, and golf courses, which may use as much or more of these compounds per acre than farms. Most pesticides and herbicides are toxic to plants and animals (including humans) other than those that they are specifically intended to kill. Many pesticides and herbicides are very persistent in the environment and tend to “bioaccumulate” in the food chain (i.e., concentrations of the toxins are magnified in carnivores, such as birds of prey).
- **Pathogens – Bacteria and Viruses:** Biological contaminants derive from farms, urban runoff, septic systems, and improper waste disposal. These organisms can cause a host of public health problems, necessitate additional treatment for water supplies, and impair recreational resources such as swimming beaches. In addition, biological contaminants in runoff are a primary cause of closed fisheries and shellfisheries.
- **Salts:** Salts are used to de-ice roads and parking lots, but may have serious ecological consequences if used improperly or excessively. Often, the presence of salt will kill certain plant species, while favoring other, salt-tolerant invasive species, such as the Phragmites reed. Salts can also reduce the quality of drinking water sources.

Another potential threat to water resources is development’s resultant increase in impervious surface areas. Impervious and semi-pervious surfaces increase the amount of pollutants washed into streams, lakes, and the ocean. In addition, impervious cover prevents water from infiltrating the ground, and may therefore reduce the level of groundwater aquifers. Recent scientific studies indicate that impervious cover in excess of 10% significantly alters watershed functions.⁴

In 1991, Massachusetts Audubon Society: North Shore (Audubon), with support from the Town of Rowley, received a five-year grant from the Massachusetts Bays Program to identify sources of pollution to Plum Island Sound and to identify remediation strategies to manage those identified sources. From 1991-1995, Audubon worked with the Rowley Board of Health, Highway Department, Conservation Commission, citizens, and farm/stable owners on a water quality-sampling program, shoreline surveys, and designs for best management practices and pollution reduction strategies.

By 1995, results of the water quality-sampling program showed that fecal coliform was contributing contamination to rivers, tributaries, the estuary, and shellfish beds. Stormwater runoff (from impervious surfaces and agricultural land uses) and failing septic systems caused high fecal coliform counts in various locations in the Mill River Watershed in Rowley. The study found that the biggest “hot spot” for fecal coliform was where Ox Pasture Brook crosses under Central Street between Main Street and Wethersfield Street. Through soil tests, septic system inspections, and shoreline surveys, Audubon concluded that failing septic systems caused the pollution. Audubon worked with a team of State and Federal officials to design a

⁴ See, for example, Chester L. Arnold, Jr. and C. James Gibbons, “Impervious Surface Coverage: The Emergence of a Key Environmental Indicator,” *Journal of the American Planning Association*, Spring 1996.

wastewater management program. The program recommended a community shared septic system on Town property (Center School) to alleviate septic pollution in that area. The Board of Health, Massachusetts Department of Environmental Protection (DEP), and residents supported the program, but Town officials declined to seek funding to install the shared system.

The study identified another major hot spot on School Street. This pollution resulted from a municipal drainage system that channeled all runoff to Ox Pasture Brook. Through another grant, Audubon worked with the Rowley Highway Department, Massachusetts Coastal Zone Management (CZM), and the U.S. Natural Resources Conservation Service (NRCS) to implement the Mill River Watershed Non-Point Source Project. The scope of the project was to design a municipal drainage system to treat water quality problems before entering the brook. The Highway Department installed a *StormTreat* System in 1996.

The Audubon study also found various hot spots along the main stem of the Mill River, on the west side of Rowley, off Dodge Road and Wethersfield Street. Agricultural runoff from farms and stables along the riverbank caused these problem areas. Under the Mill River Watershed Project, Audubon, NRCS, and CZM worked with the Herrick Farm and stable owners to discuss and implement best management practices for reducing animal waste pollution.

Rowley has supported and participated in both the Plum Island Sound Project and the Mill River Project. Although some advances have been made, fecal coliform bacteria counts remain high, indicating pollution of water resources, aquatic life, fisheries, and shellfish beds.

Recommendations from the Plum Island Sound Project that have not been fully implemented include:

- completing a wastewater management plan to upgrade failing septic systems, including an investigation of alternative technologies;
- developing an agricultural management program, working with farmers and stable owners to obtain funding to install best management practices;
- continuing to address water quality when reconstructing roads and drainage systems; and
- adopting growth management strategies to protect open space, prevent sprawl, and reduce the likelihood of increased pollution.

4. HISTORIC RESOURCES

Incorporated in 1639, Rowley is one of the oldest communities in the Commonwealth, established as the 5th town in Essex County and the 16th in the Bay Colony. Although none of the first period homes of the very first settlers remain, there are numerous houses in Rowley dating from 1660-1830. Most of these homes are situated on the original lots granted to the first settlers. It was estimated in the mid-1970s that more than 100 Rowley homes dated from 1660-1830, with at least six dating back to the 1600s. While the Rowley Historical Commission (RHC) placed historic markers on many buildings throughout the years, recent activities have been somewhat limited. With funding from the State in 1996 and 1997, the Town completed a survey of more than one hundred historic structures. More recently, in conjunction with the Essex National Heritage Area program, the Town funded the placement of numerous historic markers.

Community Assessment: Historic Resources	
Assets	Liabilities
<ul style="list-style-type: none">• The Town has two historic districts (Center Historic District and Glen Mills Historic District) containing more than 150 properties.• The Town has inventoried hundreds of historic buildings and sites including homes from the 17th and 18th centuries.• Rural roads, stonewalls, and historic structures add to the rural feel of the Town.• Through the Community Preservation Act, Rowley will raise funds for historic preservation.	<ul style="list-style-type: none">• Vacant and underutilized historic structures are threatened by lack of maintenance and use.• New growth could alter or destroy the historic fabric of the town center.• New growth in the outlying residential areas could diminish the rural appearance of Rowley's roads.• New development is destroying stonewalls and street trees.

4.1 Town History

A group of Puritans from Rowley, Yorkshire, England, led by the Reverend Ezekiel Rogers, a dissenting clergyman, founded Rowley in 1639. That so many early settlers were from Yorkshire made the Town unique in New England, as it was the only town where “Yorkshire folk predominated.”¹ The group sailed to the new world on the “John of London,” bringing with them the first printing press to be used in America. This was the famous “Daye Press” which was eventually set up in Cambridge.

After the addition of the middle section of Plum Island in 1649, Rowley was bounded on the north by Newbury, on the east by the Atlantic Ocean, on the south by Ipswich and Salem, and on the west by Andover and the Merrimack River. The land area of Rowley originally included the Towns of Boxford, Bradford (part of Haverhill), Georgetown, Groveland, and a part of Middleton.

Primarily an agricultural town at first, the Town gradually developed an industrial base, manufacturing products such as shoes, boots, heels, flour, lumber, wagons and wheels. The King Grant, Bradstreet Farm, owned by the Humphrey Bradstreet family since the 1600s, is the nation's second oldest working farm to be continuously owned and occupied by the same family. Although lacking a harbor, Rowley

¹ Town of Rowley Annual Report, 1976.

was at one time home to a shipbuilding industry. Since many of the Town's earliest settlers were weavers and clothiers, the first fulling mill in the colonies was established in Rowley in 1643. As the supplies from England often failed to arrive, the fulling mill was established out of necessity, but it soon grew in significance, as it was the only one existing in the colonies for a period. This marked the beginning of the textile industry in the colonies, and eventually proved to be a contributing factor to the War of Independence, as the mill was perceived as a threat to England's dominance in supplying wool to the colonies.

4.2 Historic Resources

Rowley contains two historic districts and numerous historic buildings and sites. **Map 4-1** shows these resources and the following section describes some of the most significant historic sites in Town.

4.2.1 Historic Districts

Rowley Central Historic District

The Rowley Central Historic District consists of approximately 150 properties in and around the town center. The district is generally bounded by Main Street on the southeast, Central Street on the east, Wethersfield Street on the north, Bradford Street on the west, and Summer Street on the southwest. The district includes the Rowley Common (the original training field known as "The Training Place") and numerous sites of activities dating from the 17th century, including the 1639 Burial Ground and the site of the First Parish House. The district also includes downtown churches and business establishments as well as many significant 17th, 18th, and 19th century homes surrounding the Common. The district incorporates the unspoiled backland to the original house lots of the first settlers. These lands extend out to Town Brook, which supported numerous tanneries in the early 19th century. The district also includes the earliest roads laid out in the Town, and the 1640 Bay Road, which was the first road ordered laid out in the colonies by the General Court. This segment now includes Main Street to Central Street; Central Street to Glen Street, as far as the Rowley-Newbury town line; and past Mill River and the Glen Mills area.² This early road runs through the Glen Mills Historic District.

Glen Mills Historic District

The Glen Mills Historic District encompasses the Glen Mills area located in the vicinity of the Glen Street/Route 1 intersection. This district consists of seven buildings and numerous historic sites. Previously known as Pearson's Mills, the Glen Mills District is primarily significant as the site of the First Fulling Mill in America, built in 1642-43 by John Pearson. Other resources within the area are the Mill River Dam on the old Mill River, formerly called Easton's River; the site of Thomas Nelson's early grist-mill and sawmill operations, and later the Glen Mills Cereal Company's mill operations; the 1643 Stone Arch Bridge; the Capt. John Pearson House (1714); the Pearson-Dummer House (1780); the Old Boarding House (1790); and the Jewel Mill (1940). The Jewel Mill, with its overshot water wheel, occupies part of the original foundation of the fulling mill. The old 1640 Bay Road winds through the center of the Glen Mills area; a portion of this road is now called Glen Street. Although the original buildings no longer exist, the area surrounding the site of the First Fulling Mill has remained relatively

² Ibid.

unchanged. In 1930, the Massachusetts Bay Colony Tercentenary Commission erected a metal marker at the site commemorating its important historical significance.³

4.2.2 Structures Listed on the State and National Register of Historic Places

The National Register's "First Period Buildings of Eastern Massachusetts" Thematic Resource Area contains a multiple listing of structures that includes 113 properties located in 46 towns and cities throughout the eastern part of the Commonwealth. The Thomas Lambert House in Rowley is part of this National Register Thematic Resource Area. In addition, the following four properties in Rowley are listed on both the National Register of Historic Places as well as the State Register.

Agawam Diner

The Agawam Diner, located on Route 1, at 166 Newburyport Turnpike, is part of a Diners of Massachusetts Multiple Property Listing and was listed on the National Register on September 22, 1999. Constructed in 1954, the diner is a prefabricated structure built by the Fodero Dining Car Company in Bloomfield, New Jersey and transported to Rowley. It is the only prefabricated diner in Massachusetts and one of only four Fodero-built diners in the State. The Fodero Dining Car Company built prefabricated manufactured diners from 1933 until 1981.

Thomas Lambert House

The Thomas Lambert House is located at 142 Main Street across from the Town Hall. Constructed by the Hon. Thomas Lambert in 1699, the Lambert family owned the home for nearly 300 years. Located within the Rowley Center Historic District, this structure is also on the State Register.

Platts-Bradstreet House

The Platts-Bradstreet House, located at 233 Main Street within the Rowley Central Historic District, is listed on the State and National Registers of Historic Places. Constructed prior to 1677 by Samuel Platts, this structure now serves as the headquarters for the Rowley Historical Society and is opened to the public for tours. The Platts family owned the house until 1771, when the Bradstreet family took ownership, which they maintained until 1906.

Chaplin-Clarke House

The Chaplin-Clarke House at 109 Haverhill Street (Route 133), built in 1671, is Rowley's oldest dwelling. This building has a central chimney built on a stone foundation. There is a slight overhang on both the first and second stories on the east end, but none in front. The building also has a lean-to, a very early addition, and the house is the only one in Rowley that has both an overhang and a lean-to. Richard Clarke and one of his children died of smallpox in 1730, and their unmarked graves lie west of the house by the stonewall. Both the National and State Registers of Historic Places list the Chaplin-Clarke House.

4.2.3 Other Historic Sites

Rowley has identified many historic sites --approximately 180 sites and structures have been surveyed for the Massachusetts Historical Commission. The following are some of the more noteworthy.

³ Ibid.

Town Brook Area

Settlers drew original house lots in Rowley's downtown area extending to the Towne Brook, later called the "Tan House Brook," as the brook was the early settlers' only source of water. Landowners were responsible for keeping their section of the brook clear of debris.

Old Stone Arch Bridge

Rowley is home to one of the nation's oldest stone arch bridges, built in 1643, located near the site of the fulling mill, in Glen Mills. Richard Holmes, a millwright and early settler of Rowley, is thought to have built the bridge.

First Fulling Mill in America

A marker placed in 1930 identifies the site above the Old Stone Arch Bridge, on the east side of Glen Street, as the site of the First Fulling Mill in America. The Jewel Mill occupies part of the original foundation of the fulling mill, which stood on the south side of the canal. The Jewel Mill building, with its overshot water wheel, is a landmark of the area and is often the subject of paintings by artists.

Town Common/Training Place

Rowley's triangular-shaped Town Common, bordered by Main Street, Summer Street, and Independent Street, is the site of the Training Place. During the pre-revolutionary period, the Town of Rowley's local militia would train here eight days each year.⁴ A table marks September 15, 1775, when a battalion of Benedict Arnold's musket men encamped at this site while en route to Quebec during the Revolutionary War.⁵ An attractive park with shade trees, benches, garden plantings, and a Civil War monument, many 18th and 19th century homes still exist along the perimeter of the Common.

First, Second, and Third Meetinghouses

Central Street (formerly Holme Street) includes the site of the First, Second, and Third Meetinghouses, built, respectively, in 1639, 1697, and 1749. These structures were all torn down. Henry Boynton purchased the lumber from the Second Meeting House to construct his new house located at the corner of Pleasant and Main Streets. A tablet placed by the Town at the time of its tercentenary in 1939 marks the site which now houses the Center School, part of the Town Hall Annex. The present Meeting House, which was constructed in 1842, is located on Main Street.

The Rowley Burial Ground

The Rowley Burial Ground, located on Main Street at the northern end of the Common, is the burial site of Ezekiel Rogers as well as other town founders and early ministers, and many of the original Rowley settlers who rest in unmarked graves. Some of the early settlers returned to England while others settled in outlying districts that eventually became separate towns.

Linebrook Burial Ground and Pulpit Rock

Located at the corner of Leslie and Meetinghouse Roads, this burial ground contains nearly 100 graves dating from as far back as 1747. The Rowley Historical Society placed a granite marker to commemorate

⁴ Ibid.

⁵ Jewett, Amos Everett and Emily Mabel Adams Jewett, *Rowley, Massachusetts "Mr. Ezechi Rogers Plantation" 1639-1870*, Newcomb and Gauss, Co., Printers: Salem, Massachusetts, 1946.

the spot in 1939. Pulpit Rock, located a few yards west of the burial ground at the junction of Leslie Road and Meetinghouse Lane, is said to have been the site of a 1770 sermon conducted by the Reverend George Whitfield and attended by 2,000 people.

Metcalf Rock Pasture Burial Ground

A historic smallpox cemetery, the Metcalf Rock Pasture Burial Ground, is located on Trowbridge Circle. The site marks the graves of twelve smallpox victims who died during an epidemic between 1775 and 1781. A granite marker placed by the Rowley Historical Society identifies the site.

Minister's Wood Lot

The 22-acre Minister's Wood Lot located off Main Street (Route 1A) at Stackyard Road is one of the oldest unchanged private lots in continuous use in America. Ezekiel Rogers, the Town's founder and first minister, acquired the land in 1660 for the purpose of providing future ministers with firewood as well as land to grow vegetables and graze livestock. A conservation restriction purchased in 2000 protects the site from development.

The Bradstreet Farm

The Bradstreet Farm, a King Grant property and believed to be one of the oldest continuously family-operated farms in America is located to the east of Main Street. The Town of Ipswich granted the land to Humphrey Bradstreet in 1635 and in 1785 it was annexed to Rowley. The other original King Grant property, the Cross-Hammond-Harris-Savage farm, also continues to exist in Town. These farms still remain in the same families that received the original King Grant.

Old Nancy

The Revolutionary War cannon, "Old Nancy," is one of the town's most prized possessions. Rowley soldiers took the cannon from the British ship "Nancy," captured off Gloucester. Left by Revolutionary War major Eben Boynton to his two sons, one a Rowley resident and the other a New Rowley (Georgetown) resident, the cannon has spent time in both Towns. Both Towns claim to have Old Nancy in their possession. Old Nancy makes appearances at special events and exhibits in Rowley.

4.3 Historic Resource Preservation Efforts

Recognizing the importance of the Town's wealth of historic resources, Rowley has taken numerous steps to preserve them in the past. The following is a summary of the Town's historic preservation efforts.

4.3.1 History of Preservation Efforts

At a Special Town Meeting in 1975, Rowley passed a resolution to consider the preservation of some of its historically significant buildings and places by establishing a Historic District Study Committee. Using the Massachusetts Historical Commission's (MHC's) *Guidelines for Establishment of Historic Districts*, the committee began its study to determine those areas with the greatest concentration of buildings, structures, and sites of historical and architectural significance. The Town inventoried approximately 55 historic structures at that time. After completing its inventory, the committee submitted a report to MHC and the Rowley Planning Board recommending the creation of two historic districts (the Rowley Central Historic District and Glen Mills Historic District) and the adoption of a Rowley Historic District Bylaw (see **Section 4.11.2** below). MHC approved both historic districts in 1987.

In the 1987 Open Space and Recreation Plan, the Town reaffirmed the need to protect and preserve its historic structures. Town residents voted in favor of the two proposed districts and the present bylaw in 1987, and both went into effect in August 1988. In 1997, the Town conducted a Historic Resources Survey, funded through the Massachusetts Preservation Projects Fund and the National Park Service. With this funding, the Town was able to hire a preservation consultant to work with local volunteers to complete survey forms documenting historic resources not inventoried earlier. As a result of the two inventory efforts in the 1970s and the 1990s, the Town was able to document more than 180 historic structures and sites, of which several are listed in the National Register of Historic Places. The committee compiled and bound the survey forms, which are located in the Town Library. In addition, local residents collected historic photographs, some of which are on display at the new commuter train station.

4.3.2 Historic District Bylaw

In 1988, the Town adopted the Historic District Bylaw for the purposes of (1) promoting the educational, cultural, economic, and general welfare of the public by preserving historic districts, and (2) maintaining the historic districts as landmarks in the history of architecture and as a tangible reminder of the old Rowley village as it existed in the early days of the Commonwealth. In addition to finalizing the delineation of the two historic districts, the Historic District Bylaw created a seven-member Historic District Commission (HDC) appointed by the Board of Selectmen.

Historic District Commission

Through the HDC, the community can affect decisions relating to the physical appearance and form of the districts, including decisions concerning highways, power lines, street signs, and new development. The Historic District Bylaw requires that new development or major physical changes are consistent with the general appearance of the historic districts. In addition, the HDC is charged with the responsibility of overseeing the placement of historic markers; arranging, preparing, and publishing maps and promotional materials describing the Town's historic resources; and working with other Town departments and agencies on matters involving historic sites and buildings. They also cooperate with State, Federal, and non-governmental agencies involved in historic resource protection and advise property owners on methods of historic preservation.

Town Historic District Review

The Historic District Bylaw applies to land within both historic districts, and provides guidelines for making improvements to properties within the districts to ensure that their historic character is maintained. These guidelines foster development that respects the historic, rural, and natural environment of Rowley. Within the districts, no building or structure may be constructed or altered in any way that affects its exterior architectural features unless the commission first issues a certificate of appropriateness, a certificate of nonapplicability, or a certificate of hardship for the project. The bylaw applies to any additions, new construction, or alterations that are visible from public ways or public parks; any demolition of structures or exterior features; or any permanent signs, satellite dishes, or solar panels.

4.3.3 National and State Register

Listing on the National or State Register of Historic Places or a local historic inventory provides some protection for historic resources. Projects that affect listed historic properties may be required to undergo

review by the Massachusetts Historical Commission and/or the Massachusetts Environmental Policy Act (MEPA) office if they exceed other review thresholds. However, despite this review, most privately-owned historic structures ultimately are not protected from demolition or alteration.

4.3.4 Essex National Heritage Area

Designated in 1996 by the U.S. Congress, the Essex National Heritage Area covers 500 square miles of eastern Massachusetts north of Boston. Congress designated the Essex National Heritage Area because of its abundance of historic, cultural, and natural resources related to three nationally significant themes, or “trails”: the Early Settlement Trail, the Maritime Trail, and the Industrial Trail. These themes are loosely formed into trails that cross the region. The mission of the Essex National Heritage Commission, through the Essex National Heritage Area, is to promote partnerships and educational opportunities that enhance, preserve, and encourage regional awareness of the historic, cultural, and natural resources and traditions of Essex County. All the communities located within Essex County, including Rowley, are part of the Essex National Heritage Area.

Recently, the State has been in the process of providing partial funding to the communities of the Essex National Heritage Area for the placement of additional Heritage Area signs. Many of these signs are to be placed along Route 1A, with additional signs being placed on the waterfront.

4.3.5 Rowley Historical Society

In addition to the Town’s Historic District Commission and the Historical Commission, Rowley has a very active Historical Society. The Historical Society prints brochures describing the Town’s various historic resources, runs a Christmas-time open house at the Platts-Bradstreet House, and occasionally operates summer bus tours of the Town’s historic homes. The Historical Society also houses one of the largest collections of early New England farm tools. The Rowley Historical Society and the Town library both attract people nationwide to research genealogy. The Town has often been the site of national family reunions, with hundreds of people converging at Rowley to tour the Town where their ancestors lived.

4.4 Potential Threats to Historic Resources

Protecting historic resources requires time, money, and commitment. In many cases, historic buildings must not only be protected against character-altering changes, but also actively maintained or used by the community. Current threats and challenges for preserving historic resources include:

- **Insufficient Volunteers:** One hindrance to the Town’s historic preservation efforts is the lack of volunteers to participate in both the Historical Commission and the Historic District Commission. Since all the individuals on the Historical Commission are also members of the Historic District Commission, the two commissions combine their meetings. The members generally address Historic District Commission items first, conducting the public hearings and allowing the needs of the general public to be addressed, and then address the Historical Commission items. Due to time constraints, the Historical Commission has only been able to devote limited efforts to new historic preservation endeavors. As a result, while the Town previously has been very active in submitting nomination forms for the National Register, creating historic districts, and placing markers at historically-important sites, less has been done in recent years. The Historic District Commission/Historical Commission members have focused on administering the Historic District Bylaw, and have been less able to take on new initiatives.

- **Inappropriate Development:** While the Historic District Commission helps protect against inappropriate development affecting buildings located within the Historic Districts, other areas of Town do not have such protections. Encroaching development threatens scenic vistas, former farmlands, and apple orchards. While these lands previously helped imbue Rowley with much of its rural character, the development of houses along the road frontages today threatens that aspect of the Town's identity.
- **Vacant and Underutilized Structures in the Town Center:** Small and compact in nature, Rowley's town center includes only a few commercial establishments. Its identity as an early colonial community is still preserved. While the town center presently houses several well-maintained independent businesses, it also houses several vacant, deteriorating structures. Built in 1760, Reindeer Tavern is the most historically-noteworthy vacant building. It served as a tavern for a number of years. The Tavern was a gathering place for soldiers returning from the French and Indian Wars. Later, the building was used as a residence and came to be known as the Gage-Todd House. Unfortunately, this structure as well as two of its neighbors has stood vacant and only minimally maintained for the past 10 to 15 years.

Several of the Town's historic resources are facing imminent threats as a result of deterioration or character-altering development in the vicinity. These resources include:

- **Maugerville Migration Cellar Holes:** The Maugerville Migration Cellar Holes are located at the site where Tories lived prior to the signing of the Constitution. While none of the homes remain, cellar holes and the houses' stone foundations still exist. Recent residential development has altered the character of the area, particularly the land surrounding Wilson Pond. The cellar holes should have markers identifying their historical significance. Limited funding prevented the completion of an archaeological study of the site.
- **Daniels Wagon Wheel Factory:** An 1863 wheel factory that once employed 30 local residents, this facility has deteriorated since the late 1990s despite the fact that it was operational until quite recently. As a result of several broken windows, the building, as well as the many early wheel-manufacturing tools and equipment still housed inside, remain unprotected from the weather. Recently, Ford Museum in Michigan acquired some of the early tools for preservation purposes. In addition, residential development has occurred on much of the land surrounding the Daniels Wagon Wheel Factory, further compromising the site's historic character.
- **1643 Stone Arch Bridge:** Rowley's 1643 Stone Arch Bridge was threatened several years ago by constant vehicular traffic, particularly tractor-trailers. The street has since been designated off-limits to all vehicular traffic. The State recently discovered that the roots of some of the older trees in the area have become intertwined with some of the stones in the bridge. As a result, the State recommended that none of the trees be removed for fear of disturbing the stability of the bridge.
- **While recognized for their significance, the following sites need additional Historical Markers:**
 - Town animal pound site located on Central Street (formerly Holme Street) is not marked and is regarded as a priority for identification
 - Malt kiln site located on Kiln Lane (now Independent Street)

- Town landing and warehouse landing
- Stickney Dummer mill site on the Mill River from the Revolutionary Period
- Pulpit Rock located off Route 133 and Leslie Road. A sign directs visitors to the site, but no marker exists at the site. Through its current signing program, the Town is proposing a sign at Pulpit Rock.
- **Establishing Additional National Register Sites:** While numerous candidates exist, consideration should be given to the Margaret Scott House (1676) and the Glen Mills Historic District for listing on the National Register of Historic Places. The town should actively work to identify other resources eligible for consideration.

4.5 Heritage Tourism

Heritage tourism promotes an area based upon its cultural and historical sites, rather than focusing on large-scale amusement parks or entertainment centers. Since heritage tourism emphasizes real, existing resources, it offers a feasible approach to encouraging tourism in small communities that do not have substantial financial resources for capital expenditures. Heritage tourism can often serve a dual purpose, in that it encourages economic development through money spent on dining, accommodations, and local purchases while also helping to solidify a program of conservation for the area's natural and historical resources.

The potential for heritage tourism in Rowley is substantial since the Town has so many historic structures in excellent condition, some dating as far back as the 1660s. The Town also has much potential, given its unique role during the pre-Revolutionary period as the site of the First Fulling Mill in the colonies, and its other array of "firsts." Its early settlers brought the first printing press to the new world and the Town houses possibly the oldest single stone arch bridge in the country (constructed 1642-43).

5. ECONOMIC DEVELOPMENT

The Town of Rowley has a rich and diverse economic history. At the time of its founding, Rowley was a self-sufficient farming community. Over time, the Town became a leading manufacturer of clothing, shoes, boots, heels, flour, lumber, wagons, and wheels. The Town housed a shipbuilding industry at one point, while other water-based industries such as fishing and shellfishing were also important to the local economy.

Until the middle part of the 20th century, Rowley remained predominantly self-sufficient. In the 1950s, the Federal Government built I-95, providing access to jobs in Boston and the inner suburbs, and Rowley began to transform into a bedroom community. However, since the mid-1990s, competitive land costs have made Rowley attractive to commercial developers, and substantial new commercial and industrial development has occurred in the Town, resulting in a diversification of the Town's economic base.

Community Assessment: Economic Development	
Assets	Liabilities
<ul style="list-style-type: none">• Good road access provided by I-95, Route 1, and Route 133 is an important asset for attracting and retaining businesses.• The Town's existing economic base includes a diverse mix of commercial, retail, industrial, and agricultural businesses.• Excellent water and electric utilities are available in Rowley's Business/Light Industry District.• Attentive and responsive public safety departments and town boards create a business-friendly environment.• Competitive land costs and available development sites facilitate industrial and commercial growth.• Rowley's location, historic resources, and natural beauty represent potential assets for tourism businesses.	<ul style="list-style-type: none">• Many businesses have difficulty finding and retaining skilled workers, especially for entry-level jobs.• Vacant buildings exist in the town center.• The town center's lack of visibility, and direct accessibility from major routes (I-95 and Route 1) may limit redevelopment options for the area.• Existing dimensional and setback standards in the zoning bylaw may limit or prevent enhancements to town center properties.

5.1 Industrial Profile

Table 5-1 shows employment by major industry sector in the Town for each year from 1991 through 2000. Over the ten-year period, employment in Rowley increased from approximately 1,152 to 1,969, or 71%. Major business sectors in the Town include:

- **Wholesale/Retail Trades Sector:** The wholesale/retail trades sector added the largest number of jobs during the 1990s, adding 494 jobs to a base of 451 for a total of 945 jobs (+110%). This increase reflects expansion of both the Rowley Market Place and the Dunkin' Donuts Plaza, as well as the addition of major wholesale/distribution facilities, such as Schilling International. These facilities generally provide low wage jobs for unskilled workers, although these businesses have created some managerial and skilled positions.

- **Construction Sector:** The construction sector also has experienced significant growth over the past decade, increasing employment to 299 jobs (a 398% increase from 1991). This increase in construction employment undoubtedly reflects the extensive building boom that has occurred in Rowley and surrounding communities. The construction sector is very cyclical, however, and is likely to decline during periods of recession.
- **Manufacturing Sector:** While the manufacturing sector grew by only 16% over the period, adding 36 jobs, the growth of this sector is significant given that manufacturing is an important component of the Town's economic base. Several new manufacturing facilities, including Ipswich Bay Glass, Mydata Automation, Inc., and Porter International are responsible for the strong performance of manufacturing in Rowley, despite decreases in manufacturing in other parts of Massachusetts and the U.S. These firms decided to locate in Rowley in part due to the availability of several development sites within the Town's expanded Route 1 corridor. Manufacturing businesses are important to the Town insofar as they expand the employment base and offer employment opportunities ranging from lower paying unskilled jobs to higher paying skilled jobs (e.g., machinists and technicians).
- **Government:** The only sector to have decreased employment during the 1990s is government. However, the government sector remains an important part of the Town's economy, providing more jobs than any other sector except wholesale/retail trade.
- **Farming and Fishing:** It is important to note that, although farming and fishing do not represent large employers, several residents of the Town still rely on these industries for their livelihoods. These industries also contribute significantly to Rowley's history and early development. Two large dairy farms remain in operation in the community, and the Town is working with both farms to ensure that they remain in business. Shellfishing in the clam-flats of Rowley and the surrounding communities is an important source of income for several Rowley residents. In 2001, the Rowley Town Clerk issued eleven commercial shellfish licenses. Unfortunately, pollution and runoff problems resulting from increased development threaten the shellfish beds annually.

Table 5-1
Employment by Industry, 1991-2000

Industry	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Change	Percent Change
Agriculture, Forestry, Fishing	23	30	33	37	46	52	64	70	65	43	20	87%
Government	389	306	282	278	307	295	295	296	327	349	-40	-10%
Construction	60	96	89	83	155	182	181	216	335	299	239	398%
Manufacturing	220	192	220	246	239	218	249	261	248	256	36	16%
TCPU ^a	9	9	6	5	9	20	32	39	42	56	47	522%
Wholesale/Retail Trade	451	414	550	584	610	679	668	766	861	945	494	110%
Finance, Insurance, Real Estate	b	b	b	b	b	19	23	24	26	21	-	-
Total	1,152	1,047	1,180	1,233	1,366	1,465	1,512	1,672	1,904	1,969	796	71%

Source: Massachusetts Division of Employment and Training.

^a Transportation, Communication, and Public Utilities.

^b Not provided, to avoid disclosing data about individual businesses.

5.2 Rowley Businesses

Rowley has a diverse business base that includes manufacturers, retailers, distribution firms, government, and small offices. **Table 5-2** lists the largest employers in the Town. Many of these employers have been located in Rowley since 1990. These include DeMoulas Market Basket, which attracts repeat shoppers from as far as Gloucester; Ipswich Bay Glass Company (1998); Porter International (1997); Schilling Associates, Inc. (1999); and Mydata Automation, Inc. (1998).

Table 5-2
Selected Large Employers in Rowley, 2001

Company	Type of Business	# Employees
Market Basket	Supermarket	225-250
Ipswich Bay Glass Company	Glass/steel Manufacturing/installation	150
Seaview Retreat	Nursing Home	100
Pine Grove Elementary School	Elementary school	100
Town of Rowley	Municipal Government	90
Imtran Industries	Commercial Printing	75
Schilling Associates, Inc.	Toy Distributors	45
Mydata Automation Inc.	Wholesale Electronic Chip Mounters	40
Spuds Restaurant	Restaurant and Lounge	37
Village Pancake House	Restaurant and Lounge	35
Agawam Restaurant	Diner	35
Backstage Salon & Day Spa	Beauty Shop	35
Eastern Science Co., Inc.	Precision Machine Parts	25

Company	Type of Business	# Employees
Merry Chase Livery	Local Passenger Transportation	25
RamCo	Machine Shop	25
J. Stone and Son	Restaurant Equipment Distribution	20-25
Tru Form Industries	Precision Grinding	21
Dunkin' Donuts	Donut Sales	20
Winfreys Olde English Fudge, Inc.	Candy Mfg.	20
Carl W. Savage Seafood Inc.	Wholesale Seafood	20
Cassidy Bros. Forge, Inc.	Mfg. Architectural Ironwork	20
PDC Machine Inc.	Precision Machine Shop	18
Didax Incorporated	Wholesale Teaching Aids	17
Porter International	Sewing Machine Manufacturing	22

5.3 Labor Force

Table 5-3 shows the occupations of Rowley residents in 2000 (the last year for which data is available) compared to that for residents of Essex County, the State, and the nation. The occupational distribution of Rowley residents does not mirror the distribution of either the County, or the State. Approximately 44% of Rowley residents were employed in managerial, professional, or technical occupations in 2000. These occupations often require college or graduate level degrees, and pay above-average salaries.

Table 5-3
Occupation of Rowley Residents, 2000

Occupation Type	Rowley %	Essex Co. %	State %	U.S. %
Management, professional, and related	44.4	39.4	41.1	33.6
Service occupations	10.1	13.6	14.1	14.9
Sales and office occupations	23.5	27.0	25.9	26.7
Farming, fishing, and forestry occupations	1.1	0.3	0.2	0.7
Construction, extraction, and maintenance occupations	9.1	7.3	7.5	9.4
Production, transportation, and material moving occupations	11.8	12.4	11.3	14.6
Total Civilian Residents Employed	3,034	349,835	3,161,087	129,721,512

Source: U.S. Census Bureau, 2000.

As shown in **Table 5-4**, the labor force in Rowley in 2000 totaled 3,134 persons, an increase of 18% since 1991. Over the same period, the State's labor force grew by only 2%. In 1990, the labor force totaled 2,425 persons, of whom only 471 (19.4%) worked in Rowley according to the U.S. Census Journey-to-Work data. The remainder commuted to jobs outside the Town. (See **Table A-8** in **Appendix A**.) While the 2000 Census Journey-to-Work data are not yet available, demographic trends suggest that the portion of the Rowley labor force commuting to jobs outside Rowley has increased over the past decade.

Unemployment in Rowley has tracked below the State average each year over the past decade. Following State trends, unemployment rates have consistently declined from 7.3% in 1991, to a low of 1.5% in 2000.

Table 5-4
Average Annual Labor Force and Unemployment, 1991-2000

Year	-----Rowley-----			-----Massachusetts-----		
	Labor Force	Unemployed	Rate (%)	Labor Force	Unemployed	Rate (%)
1991	2,647	194	7.3	3,161,800	286,200	9.1
1992	2,735	182	6.7	3,145,100	269,300	8.0
1993	2,828	118	4.2	3,164,100	218,700	6.9
1994	2,911	117	4.0	3,172,500	190,700	6.0
1995	2,888	105	3.6	3,164,100	169,800	5.4
1996	2,944	97	3.3	3,171,600	136,600	4.3
1997	3,064	100	3.3	3,261,600	130,800	4.0
1998	3,111	74	2.4	3,277,900	104,800	3.2
1999	3,172	64	2.0	3,284,100	105,000	3.2
2000	3,134	46	1.5	3,236,600	85,600	2.6
% Change	18%			2%		

Source: Massachusetts Division of Employment and Training. Local Area Unemployment Statistics, U.S. Bureau of Labor Statistics.

5.4 Industrial and Commercial Areas

Rowley has three business zoning districts: the Central District, the Retail District, and the Business/Light Industry District. The Central District is located in and near the town center. The Retail District is located in the vicinity of the Route 1/Route 133 intersection. The Business/Light Industry District is located along Route 1 from the Ipswich border north almost to Wethersfield Street and along Route 133 near its interchange with I-95. (See **Map 2-3.**)

5.4.1 Central District

The Central District is intended “to provide for business, semi-public, and government uses normally found in a town center.”¹ Allowed uses include libraries and museums, retail businesses and services, and, by special permit, automobile sales, repair and storage, restaurants, and overnight lodging, as well as residential uses. Currently, establishments in the town center include the Rowley Pharmacy, the U.S. Post Office, the Old Town Bread Company, Rowley Realty, a bank, several antique stores, Town Hall, a liquor store, an auto repair shop, and an auto broker.

¹ Protective Zoning Bylaw of the Town of Rowley, 1986, revised 1991.

The Town is constructing a new library on a lot adjacent to the Town Hall, which will include space to accommodate public meetings. The Town also plans to renovate the second floor of Town Hall to make it handicap-accessible, and make the facility available for meetings and other public functions.

Three prominent vacant buildings in the town center represent important opportunities for attracting additional small retail or service establishments to the area. The current library, located in a historic schoolhouse within walking distance of Main Street, offers an opportunity for redevelopment or reuse.

5.4.2 Business/Light Industry District

Commercial zoning is in place along Route 1 from the Ipswich town line to 0.4 miles south of Wethersfield Street, as well as in the vicinity of the I-95 interchange. The commercial/industrial area was expanded in 1997. The majority of the new commercial/industrial development in Rowley has located along Route 1. Two industrial parks—Forrest Ridge and Rowley Business Park—have been developed since 1999, offering a total of approximately 137 acres of improved industrial and commercial land. Individual companies including Ipswich Bay Glass, Schilling, Mydata Automation, Inc., and Porter International have purchased and developed sites along Route 1. In 2002, the Town separated the Commercial District into a Business/Light Industry District and a Retail District, to focus denser retail development near the intersection of Routes 1 and 133. Less dense office and light industrial development is allowed in the remaining areas of the former Commercial District. **Table 5-5** shows the amount of land new commercial and industrial developments have occupied since 1996. These developments consumed 253 acres and resulted in an additional 375,925 square feet of commercial and industrial building area in Rowley.²

In recent years, vacancy rates have been low, with space in industrial parks often leasing prior to completion. However, the recent economic downturn has slowed the number of new businesses appearing before the Planning Board for approvals. The pace of development at existing business parks also has slowed considerably.

In response to the rapid rate of commercial and industrial development in recent years, the Planning Board has worked to improve the Zoning Bylaw to ensure that new development respects the character of the Town, limits impacts on Town services and infrastructure, and includes design requirements that result in attractive projects. Additional work to improve these bylaws would be beneficial. One approach put forth by the President of the Chamber of Commerce is to consider adopting a zoning bylaw that would allow for flexibility in lot size dependent on the environmental characteristics of the development site.

² There is no inventory of the total square footage of commercial and industrial space in Rowley prior to 1996. However, a site review leads to the conclusion that the amount of commercial/industrial square footage in Town has more than doubled between 1996 and 2001.

Table 5-5
Major Commercial/Industrial Developments in Rowley, 1996-2001

Development Name	Location	Type of Development	Acres	Sq. Ft.
Forrest Ridge Ind. Park	Newburyport Tpk.	Business Park	105	None
Rowley Business Park	Newburyport Tpk.	Business Park	25	
Ipswich Bay Glass	420 Newburyport Tpk.	Warehouse/Lt. Mfg	21.3	118,000
The Market Place	303 Haverhill St.	Retail and Office	9.5	12,425
Porter International	388 Newburyport Tpk.	Office/Lt. Mfg/Warehouse	14.54	88,000
Mydata Automation, Inc.	320 Newburyport Tpk.	Office/Lt. Mfg/Warehouse	10.4	26,000
Schilling and Assoc.	306 Newburyport Tpk.	Office/Lt. Mfg/Warehouse	60.9	72,000
Rowley Plaza	144 Newburyport Tpk.	Retail/Warehouse	6.2	59,500
Total			253	375,925

5.5 Tax Base

Table 5-6 shows total property values in Rowley by major use categories for 1992, 1997, and 2002. Surprisingly, despite the amount of commercial and industrial development that has occurred in the Town during the past decade, the value of residential property as a percentage of all property in Town has changed very little over the ten-year period. In 1992, residential property comprised just under 87% of the value of all real property in the Town, compared to just over 87% in 2002. The value of commercial property as a percentage of all property decreased by just under 2%, as the value of industrial property grew by approximately the same amount. The decrease in commercial property values as a percentage of total property values does not reflect a decrease in the overall value of commercial property. Commercial property values simply did not increase at the same rate as industrial property or residential property (+60% for commercial property versus +192% for industrial and +88% for residential).

Because commercial/industrial properties represent a small portion of the tax base, Rowley has elected to maintain a single tax rate that applies to all use categories. Since the relative proportions of values among uses have not changed considerably, it is not clear whether the Town would benefit from a split tax rate at this time.

Table 5-6
Total Assessed Property Values by Major Use Categories

Use Category	Total Valuation (Dollars)	Total Taxes Assessed (Dollars)	Percent of Total %
1992^a			
Residential	271,399,799	2,936,546	86.85
Open Space	908,760	9,833	0.29
Commercial	31,784,302	343,906	10.17
Industrial	8,391,700	90,798	2.69
1992 Totals	312,484,561	3,381,083	100.00
1997^b			
Residential	278,409,951	4,081,490	87.75
Open Space	153,720	2,254	0.05
Commercial	31,362,983	459,781	9.89
Industrial	7,351,660	107,775	2.32
1997 Totals	317,278,314	4,651,300	100.00
2002^c			
Residential	509,391,605	5,939,506	87.03
Open Space	704,100	8,210	0.12
Commercial	50,730,345	591,516	8.67
Industrial	24,496,650	285,631	4.19
2002 Totals	585,322,700	6,824,863	100.00

^a Tax rate = \$10.82 per \$1,000 assessed value.

^b Tax rate = \$14.66 per \$1,000 assessed value.

^c Tax rate = \$11.66 per \$1,000 assessed value.

Change in Total Assessed Property Values by Major Use Categories, 1992 - 2002

Use Category	Total Valuation Percent Change, 1992 - 2002	Total Taxes Assessed Percent Change, 1992 - 2002
Residential	88%	102%
Open Space	-23%	-17%
Commercial	60%	72%
Industrial	192%	215%
Total	87%	102%

Source: Massachusetts Department of Revenue
Tax Rate Recapitulation, Town of Rowley 1992, 1997, 2002

5.6 Employment and Training Programs

The Lower Merrimack Valley Workforce Investment Board oversees and implements workforce development activities in fifteen towns, including Rowley. The Board, which is composed of business people as well as labor, education, and community leaders, helps connect employers with job seekers.

The Board's ValleyWorks One-stop Career Center provides workforce and training assistance to job seekers and employers in the Merrimack Valley. It provides people who are currently working, as well as those seeking employment, with the training they need. Eligibility for specific programs offered by the Center is based on the needs and profile of the individual applying for services. Basic job search services include job matching, resume development, career counseling, veterans' services, and information and referral to State, Federal, and private resources as well as to education and training programs. The Center offers access to the Internet, newspapers and periodicals, fax and copy machines, and other tools that aid in searching for jobs. Workshops are available on computer basics, resume development, interviewing skills, business etiquette, and job search strategies.

The Workforce Investment Board also serves as a conduit for Federal and State workforce development funds, including the State's Workforce Training Fund. This fund is financed through employer payroll deductions, and is available to any business in the Commonwealth to help with workforce retraining.

The Whittier Vocational Technical High School and the Northern Essex Community College offer career training and certificate programs in several trades and service professions (ranging from computer sciences to welding to cosmetology.) These institutions are valuable resources for providing job skills to the region's residents.

6. HOUSING

The Housing section provides an overview of Rowley's existing housing stock, current and potential future housing needs, and strategies for providing an appropriate mix of housing types. The data and analyses in this part are based on information from the Town, the State, and the 2000 U.S. Census.

An evaluation of housing stock should consider three important aspects: the housing structures themselves, the population that inhabits the housing, and the environments in which the housing is located. The following sub-sections examine Rowley's housing stock in terms of age, condition, cost, and availability, and consider the demographic trends affecting housing needs, as well as the specific needs of different population groups in the Town.

Community Assessment: Housing	
Assets	Liabilities
<ul style="list-style-type: none">• Many unique and historic homes exist throughout the community.• The Town encourages alternatives to conventional development such as open space development.• Through the Community Preservation Act, Rowley will raise funds for community housing.	<ul style="list-style-type: none">• The Town does not have a wide range of housing opportunities.• Much new development is occurring through the Chapter 40B (Comprehensive Permit) process on small lots and in less appropriate areas of Town.• Alternatives to the existing septic systems in the densely developed town center may have to be considered.• Only a limited number of homes are placed on the market each year, which limits housing availability and choice in the Town.

6.1 Existing Conditions and Housing Stock

Housing has become a major issue in the Eastern Massachusetts region in recent years, as housing demand and prices have climbed and availability has been at an all-time low. The regional housing market has favored the construction of large, expensive, single-family dwellings. This trend has been attributed, in part, to the expansion of high technology businesses in the region, the scarcity of land near Boston, and the migration of more affluent families from the inner suburbs to semi-rural communities.

As of 2000, there were 2,004 housing units in Rowley.¹ This is an increase of 431 housing units, or 27.4%, over the 1990 total of 1,573 units. In comparison, the number of housing units grew by only 5.6% in Essex County and 6.0% statewide during the 1990s. The Town's housing growth rate far exceeded the Essex County and State averages, corresponding to an annual increase of nearly 3% over the ten-year period. **Map 6-1** shows the location and type of housing in Rowley while **Map 2-2** illustrates recent housing development trends.

¹ U.S. Census Bureau, 2000.

6.1.1 Age and Condition of Housing Stock

Table 6-1 presents information on the age of the Town's housing stock. Approximately 21% of the Town's housing stock was constructed prior to 1940, another 21% between 1940 and 1969, and 22% between 1970 and 1979. As was noted in **Section 4**, many homes built prior to 1940 actually date back to the late 18th and early 19th centuries. About 36% of the Town's housing (735 units) was built during the past 20 years. This increase closely corresponds to the community's population growth. Field investigations of the Town's residential areas reveal that most of Rowley's housing stock is in very good condition.

Table 6-1
Age of Housing Stock in Rowley, 2000

Year Built	Total Units	%
1939 or Earlier	410	20.5
1940 to 1959	205	10.2
1960 to 1969	216	10.8
1970 to 1979	438	21.9
1980 to 1989	319	15.9
1990 to 2000	416	20.7
Total	2,004	100.0

Source: U.S. Census Bureau, 2000.

6.1.2 Housing Stock by Type

Table 6-2 summarizes Rowley's housing stock by type. Consistent with national trends, single-family detached housing comprises the majority of the Town's housing inventory. While the growth rate for new housing in Rowley was 27.5% during the 1990s, the growth rate for both attached and detached single-family homes was approximately 33.3%. The only housing segment to experience a decline was two-family units, or duplexes, which decreased by 11.3%. The fastest-growing residential segment was for three or four unit structures, which increased by 137.5%. Other types of multifamily housing also experienced increases, including units in structures containing 20+ units, five-to-nine units, and ten-to-nineteen units. While the number of mobile homes within the Town increased at a high rate (28.6%), the actual numeric change was very small.

Recent housing trends in Eastern Massachusetts have seen the construction of larger-sized homes. In 1990, approximately 78% of the Town's 1,573 housing units (1,230 units) had seven or less rooms, while only 22% had eight or more rooms. In 2000, 71% of units had seven or less rooms, while 29% had eight or more rooms. In 1990, 8% of Rowley's housing had nine or more rooms; in 2000, this figure was up to 14%. New single-family homes throughout the Town have averaged three or four bedrooms, with many of these homes having large master bedroom suites as well. Conversely, very few new housing alternatives exist for seniors or small households.

Table 6-2
Types of Units, 1990 and 2000

Type of Structure	1990 Units	2000 Units	% Change
Single-family (detached)	1,147	1,530	33.4
Single-family (attached)	27	36	33.3
Two-family units	71	63	-11.3
Three or four units	24	57	137.5
Five to nine units	75	83	10.7
Ten to nineteen units	167	173	3.6
Twenty or more units	39	53	35.9
Mobile Home	7	9	28.6
Other	16	-	-
Total Units	1,573	2,004	27.4

Source: U.S. Census Bureau, 1990 and 2000.

6.1.3 Vacancy Rate and Housing Occupancy

Vacancy rate indicate the availability of housing in a community. In general, an ideal vacancy rate is 5% because it allows the population to move freely in the marketplace. A vacancy rate below 5% indicates that there is demand for additional housing. A vacancy rate greater than 5% may indicate that a community has a problem with underutilization, has an overabundance of rundown properties, or lacks an effective redevelopment/reinvestment policy. Although the housing market in Essex County as well as the State has been extremely tight in recent years, with very low vacancy rates, the vacancy rate in Rowley has been even lower. The 2000 vacancy rate for homeowner units in Rowley was 0.1%, down from 1.3% in 1990.² The vacancy rate for rental units was 2.4%, down from 5.3% in 1990. This figure is lower than both Essex County and the State (see **Table 6-3**). Such a shortage of vacant housing increases the demand for the units that do become available, which often increases housing sale prices.

Table 6-3
Vacancy Rate, 1990 and 2000

Vacancy Rate	Rowley		Essex County		Massachusetts	
	1990	2000	1990	2000	1990	2000
Homeowner Units	1.3	0.1	1.6	0.5	1.7	0.7
Rental Units	5.3	2.4	8.8	3.0	6.9	3.5

Source: U.S. Census Bureau, 1990 and 2000.

While the *vacancy rate* identifies the availability of units for rent or for sale, the percentage of *vacant or unoccupied units* also includes dwelling units that are not available for rent or sale because they are abandoned, dilapidated, or otherwise not suitable for habitation, as well as structures that are for seasonal, recreational, or occasional use only. In 2000, Rowley contained 46 vacant units, or 2.3% of the Town's housing stock. Comparatively, Essex County (2.6%) and the State (3.2%) both have a higher percentage of vacant units. The low vacancy rate and percentage of vacant units indicates that Rowley has a limited

² These figures exclude units used for seasonal, recreational, or occasional dwelling purposes.

supply of housing stock for sale and, as so much of it is occupied, that the overall condition of the housing is comparatively good.

Table 6-4 compares 1990 and 2000 housing occupancy rates in Rowley. Since 1990, the percentage of owner-occupied units has increased while the percentage of renter-occupied decreased. Again, the limited number of vacant housing units is an indicator of a tight housing market.

Table 6-4
Housing Occupancy, 1990 and 2000

Category	1990		2000	
	Number	%	Number	%
Total Housing Units	1,573	100.0	2,004	100.0
Occupied Housing Units	1,507	95.8	1,958	97.7
Owner-Occupied Units	1,129	74.9	1,507	77.0*
Renter-Occupied Units	378	25.1	451	23.0*
Vacant Housing Units	66	4.2	46	2.3
For Seasonal, Recreational, or Occasional Use	6	0.4	19	0.9
Other Vacant Housing Units	60	3.8	27	1.4

Source: U.S. Census Bureau, 1990 and 2000.

Note: "Occupied housing units" was used as the denominator in deriving the percentages for owner-occupied units and renter-occupied units. Total Housing Units was used as the denominator for all other calculations.

6.1.4 Ownership

Consistent with national trends, the rate of home ownership has increased within Rowley during the past ten years. As shown in **Table 6-4**, approximately 77.0% (1,507 units) of the Town's occupied units were owner-occupied in 2000 as compared to 74.9% (1,129 units) in 1990. Thus, while new rental units are being created in Rowley, the majority of new residential developments within the Town consist of ownership units. In contrast, while the number increased, the *percentage* of units occupied by renters has decreased, from 25.1% in 1990 to 23.0% in 2000.

6.1.5 Length of Residency

Table 6-5 shows the length of residency for Rowley residents as compared to Essex County residents and residents statewide for both 1990 and 2000.

At the time of the 1990 Census, a majority of Rowley households, an estimated 61.3%, were relatively new, having moved into their homes sometime within the previous ten years. This figure was 59.1% for Essex County and 59.2% for the State. Approximately 38.7% of the Town's residents had lived in their units for more than ten years as compared to 41.0% for Essex County and 40.8% for the State. Only 16.9% of households had been in their units for more than 20 years, as compared to 23.6% for Essex County and 22.7% for the State.

In 2000, the Town paralleled both Essex County and the State in percentage of residents living in their units 10 years or less (60.1% for Rowley as compared to 60.4% for Essex County and 60.0% for the State). The Town had a larger portion of householders that have lived in the same house for 11 to 20 years (20.8% for Rowley as compared to 15.9% for Essex County and 16.1% for the State). The share of

residents that had resided in their homes for more than 20 years was 19.1% for Rowley, 23.7% for Essex County, and 23.9% for the State.

It should be noted that responses to the Master Plan questionnaire differed slightly from the 2000 Census. Approximately 48% of respondents identified themselves as having been residents for less than ten (10) years. Approximately 25% had been residents of Rowley between ten (10) and twenty (20) years and approximately 28% had been Rowley residents for more than twenty (20) years.

Table 6-5
Length of Residency by Householder, 1990

Length	Town of Rowley		Essex County	Massachusetts
	Number	%	%	%
One year or less	166	11.0	16.8	17.2
Two to five years	479	31.8	27.2	27.3
Six to ten years	279	18.5	15.1	14.7
Eleven to twenty years	328	21.8	17.4	18.1
Twenty-one to thirty years	116	7.7	10.7	10.4
Thirty-one years or longer	139	9.2	12.9	12.3
Total Householders	1,507	100.0	251,285	2,247,110

Source: U.S. Census Bureau, 1990.

Length of Residency by Householder, 2000

Length	Town of Rowley		Essex County	Massachusetts
	Number	%	%	%
One year or less	310	15.8	15.5	16.4
Two to five years	504	25.7	29.3	28.0
Six to ten years	364	18.6	15.6	15.6
Eleven to twenty years	407	20.8	15.9	16.1
Twenty-one to thirty years	178	9.1	9.9	10.5
Thirty-one years or longer	195	10.0	13.8	13.4
Total Householders	1,958	100.0	100.0	2,443,580

Source: U.S. Census Bureau, Census 2000.

¹ This total reflects the total number of occupied units, not total number of housing units.

6.2 Residential Development Patterns and Housing Trends

Many factors influence how residential development occurs. These include historical development patterns, local zoning regulations, and the forces of supply and demand. This section provides an overview of the Town's residential zoning regulations as well as historical development patterns and more recent residential trends. **Section 2.3.1** of the Master Plan describes in detail the three residential zoning districts—Central, Residential, and Outlying.

6.2.1 Residential Development

Historically a rural community, Rowley has several environmental characteristics that have severely limited its buildable land area in the past. The saltwater wetlands in the eastern half of Town are the most prominent limiting factor. Previous studies attributed the slow rate of development before 1970 to what was long regarded as the Town's "poor soils," that is, soils not suitable for the construction of septic systems. However, with technological advancements in septic system design, poor soils are no longer a significant deterrent to development.

The Town's earlier development was concentrated primarily in the town center, in the area bounded by Route 1A, Route 133, Bradford Street, Wethersfield Street, and Central Street. The land development pattern in this area is relatively dense, with many homes constructed on 5,000 to 15,000 square foot lots. Unlike much of the remainder of the Town, portions of the Central District have sidewalks. A part of this district coincides with the Rowley Central Historic District and contains many of the Town's oldest homes and buildings.

More recently, much of the Town's new residential growth has occurred in a dispersed pattern throughout the central and western parts of Rowley. It is not a coincidence that these areas have the best access to I-95. In addition, increased growth occurred as larger parcels were further subdivided and infill development occurred in the older residential developments north of the town center. Large former farmland parcels have been subdivided in the western half of Town, with numerous new developments being built along Route 133, Daniels Road, Leslie Road, Dodge Road, and Wilson Pond Lane.

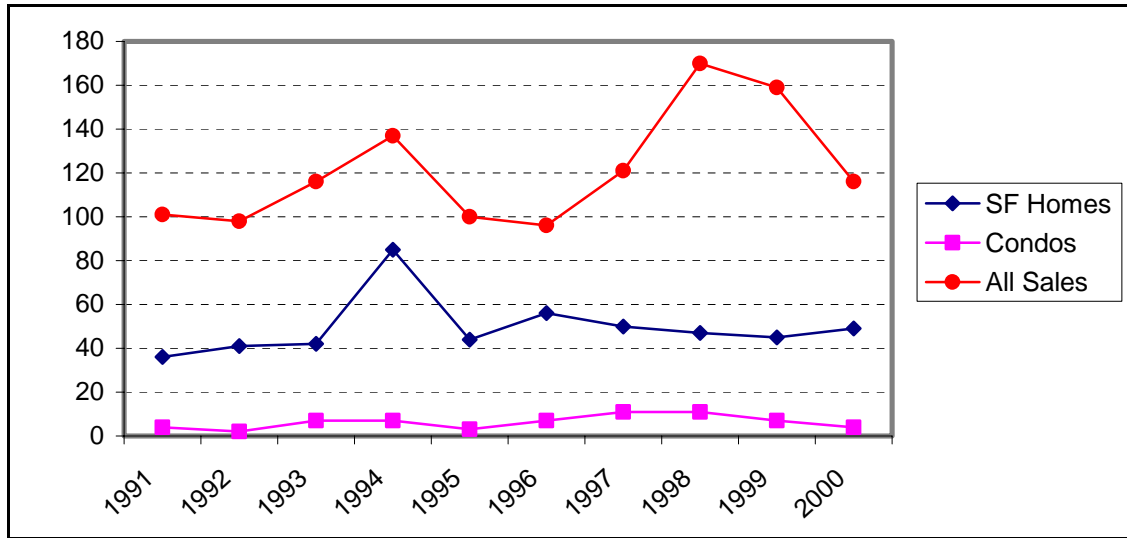
6.2.2 Recent Home Sales Activity

Home sales remained consistent in Rowley from 1991-2000, with an average of 50 single-family homes and approximately 6 condominiums sold each year. The peak of sales activity was in 1994, with the sale of 85 single-family homes; the lowest point was 1991 with only 36 homes sold.³ Rowley has a limited condominium market with fewer than a dozen condominium sales occurring each year of the ten-year period. However, approximately 10% of the condominium stock changes ownership each year. The most units were sold in 1997 and 1998, with 11 condominiums sold each of those two years. (See **Figure 6-1**.)

The "All Sales" category in **Figure 6-1** includes all property transactions with a sales price greater than \$100 as recorded by the Registry of Deeds. This would include, in addition to single-family homes and condominiums, all commercial, industrial, and other non-residential property sales. Sales activity peaked in Rowley in 1998, with 170 transactions recorded. This corresponds closely with the height of the building and development boom, which was pervasive within the Boston and eastern Massachusetts region during the late 1990s.

³ Source: Warren Information Services, a publishing and information services organization that provides services to professionals working in the fields of real estate, banking, and commerce.

Figure 6-1
Single-Family, Condominium, and All Sales in Rowley, 1991-2000



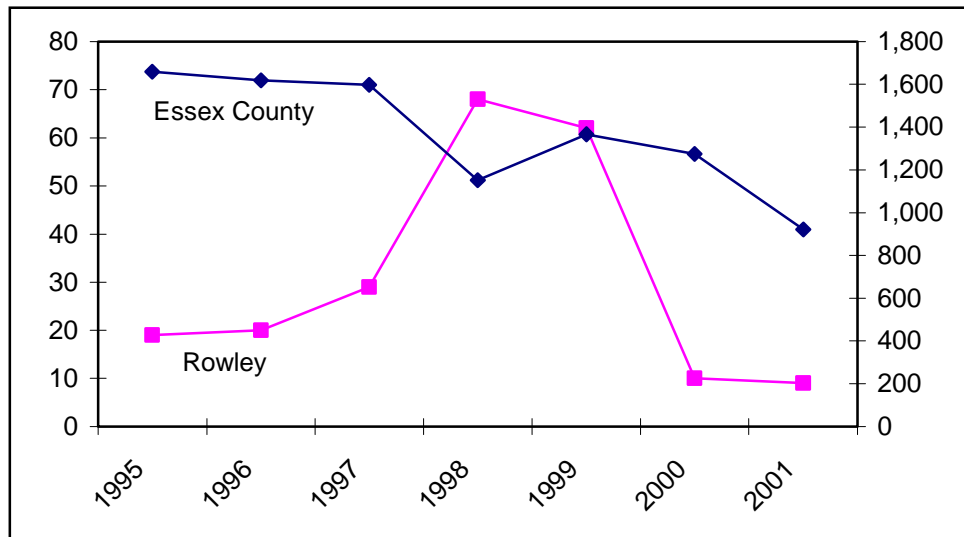
Source: Warren Information Services, 2001.

6.2.3 Housing Permit Data and Construction Trends

In reviewing housing permit data from 1995 through 2001, a number of trends become apparent. First, while the cost of single-family houses being constructed in Rowley has historically been substantially lower than the cost of new houses constructed in Essex County overall, this gap has lessened considerably in the past few years. Homes constructed in Rowley cost 12.5% less than the Essex County average in 1995; this difference has fallen to about 2% as of 2001. **Figure 6-2** shows construction cost for single-family homes in Rowley and Essex County from 1995 to 2000. Size is likely responsible for the increasing construction costs. In 1990, only 22% of homes in Rowley had eight or more rooms; by 2000 this figure was up to more than 29%. Land acquisition costs are not included in the **Figure 6-2** numbers.

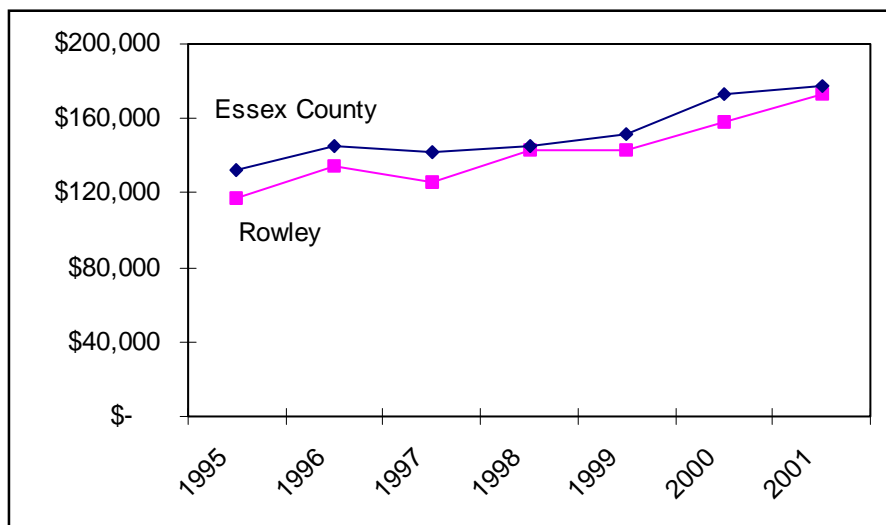
As demonstrated in **Table 6-6**, Rowley was averaging only 23 housing permits annually from 1995 through 1997. In 1998 and 1999, the number jumped to an average of 65 per year. In 1996, the Town created a New Dwelling Unit Limitation Bylaw. Just prior to the bylaw's adoption, property owners submitted a number of subdivisions that received grandfathered protection from the building limitation. Development of many of these lots occurred during the late 1990s. Interestingly, housing permit trends in Rowley do not closely parallel those of Essex County. Essex County experienced its highest housing permit rates in recent years in 1995, 1996, and 1997. Rowley's peak year was 1998 with 68 permits; for Essex County, 1998 corresponded to its lowest rate of housing permit issuance of the past six years. Reflecting the national economic slowdown, the issuance of housing permits in 2000 and 2001 decreased substantially from their previous highs, both in Rowley and in Essex County.

Figure 6-2
Number of Residential Building Permits Per Year
Rowley and Essex County, 1995-2001



Source: MISER/Mass. State Data Center, Residential Building Permits.

Figure 6-3
Average Construction Cost for Single-Family Homes
Rowley and Essex County, 1995-2001



Source: MISER/Mass. State Data Center, Residential Building Permits.

Table 6-6 compares the same building construction cost and building permit numbers as the previous figures for single-family units in tabular form.

Table 6-6
Building Construction Cost of Single-Family Units
Rowley and Essex County, 1995-2001

Year	Rowley			Essex County		
	Total Cost	Number of Units	Average Cost/Unit	Total Cost	Number of Units	Average Cost/Unit
1995	\$2,231,000	19	\$117,421	\$219,119,617	1,659	\$132,079
1996	\$2,695,500	20	\$134,775	\$234,426,498	1,618	\$144,887
1997	\$3,640,000	29	\$125,517	\$225,895,282	1,597	\$141,450
1998	\$9,756,638	68	\$143,480	\$167,635,294	1,152	\$145,517
1999	\$8,836,100	62	\$142,517	\$206,992,484	1,367	\$151,421
2000	\$1,581,000	10	\$158,100	\$220,970,485	1,276	\$173,174
2001	\$1,562,100	9	\$173,567	\$194,337,420	1,098	\$176,992

Source: MISER/Mass. State Data Center, Residential Building Permits. To develop Essex County totals, it was necessary to use reported plus imputed data. For Rowley, reported data was used as it was available.

While multi-family units constitute a significant portion of housing permits issued in Essex County (ranging roughly from 8% to 30% of total permits issued in the past six years), limited multi-family housing has been developed in Rowley. Multi-family housing in Rowley consists of several building complexes as well as larger, older single-family houses renovated to accommodate multiple units. Currently, a 12-unit townhouse project is slated for development on Morphew Avenue.

6.2.4 Potential for Future Residential Growth

Section 2.4 of this report discusses the 2000 MVPC buildout analysis in more detail. At the time of the study, MVPC estimated that the Town had 3,835 acres of vacant land available for potential development. According to the study, full buildout of all viable, residentially-zoned areas would result in more than a 100% increase in the Town's population, from approximately 5,500 to more than 11,000. Of the 2,052 estimated new housing units identified in the analysis, it was estimated that most would be single-family homes. The remaining developable residential lands are located primarily in the central and western areas of the Town.

6.3 Housing Affordability Analysis

Housing affordability is a critical factor that determines who will be able to live in Rowley and, in turn, what type of community Rowley will be. This section provides an analysis of housing costs and affordability, as well as existing programs and policies for providing affordable housing in the Town.

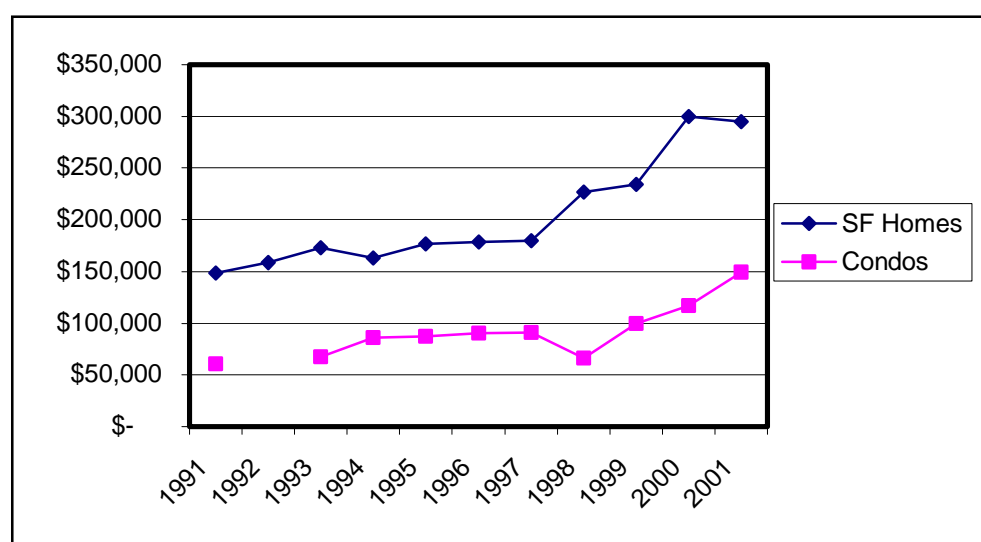
6.3.1 Housing Costs

This sub-section evaluates housing costs for the two main sectors of the housing market: homeownership units and rental housing.

Cost of Homeownership Units

According to the Warren Information Services, the median sales price for single-family houses sold in Rowley in 2001 was \$294,950, while the median price for condominiums sold was \$149,000. In comparison, the 2001 median sales price for single-family houses was \$319,000 in Georgetown, \$480,000 in Boxford, \$325,000 in Ipswich, and \$411,000 in Topsfield. The price of single-family homes in Rowley actually experienced a slight decline in 2001, as the single-family home median sales price was as high as \$300,000 in 2000. The median for condominiums continued to rise, reaching \$149,000 by the end of 2001 from \$117,000 the year before. Generally, Rowley's housing stock is more affordable than many of its neighboring communities. See **Figure 6-4** for a history of median home sales prices in Rowley.

Figure 6-4
Median Home Sales Price in Rowley, 1991-October 2001



Source: Warren Information Services, 2001.

Note: Prices are in current dollars; they have not been adjusted for inflation.

Table 6-7 shows median and mean sales prices for selected homes sold in 1998, 1999, and 2000. These “selected” data reflect only those homes sold through and recorded by real estate agents affiliated with the Multiple Listing Services (MLS), an association of real estate brokers. With that caveat, this information does provide some additional insight that the Warren data do not: (1) mean value as well as median value, and (2) breakdown of house prices by number of bedrooms.

Table 6-8 shows median and mean sales prices for selected condominium units sold in 1998, 1999, and 2000. Sales from January 1998 through 2000 included only four one-bedroom and ten two-bedroom condominium units. Trends are not easy to discern, given the small overall number of condominiums in the Town. Furthermore, the price of a unit can vary greatly due to condition, size, and location. However, based on the sales that did occur, the cost of both one- and two-bedroom condominium units appear to have increased by about 45% over the three-year period.

According to the data, most homes sold in Rowley in recent years have had either three or four bedrooms; very few have only one or two bedrooms. Condominium units, which often constitute a substantial

portion of a community's affordable housing stock, is quite limited due to the small number of condominiums. In fact, the Town has only 114 condominium units according to the Assessor's database.

Table 6-7
MLS Home Sales of Single-family Units in Rowley, 1998-2000

Type of Unit	1998			1999			2000		
	Median	Mean	No. of Units	Median	Mean	No. of Units	Median	Mean	No. of Units
1-BR	160,000	-	1	211,000	-	1	NA	NA	NA
2-BR	166,000	170,967	6	162,450	-	2	167,500	-	1
3-BR	263,950	252,399	27	242,450	267,900	30	313,550	301,120	35
4-BR	331,250	327,235	27	355,250	349,656	45	376,950	379,261	22
5-BR	NA	NA	NA	206,000	-	1	357,000	-	1
6-BR	242,000	-	1	NA	NA	NA	NA	NA	NA

Source: Multiple Listing Services Property Information Network.

Note: This table lists information related to homes being sold through real estate brokers that are on the Multiple Listing Services (MLS) only; homes sold through real estate agents not affiliated with the MLS or through private sales are not reflected in this table. Prices are in current dollars; they have not been adjusted for inflation.

Table 6-8
MLS Home Sales of Condominiums in Rowley, 1998-2000

Type of Unit	1998			1999			2000		
	Median	Mean	No. of Units	Median	Mean	No. of Units	Median	Mean	No. of Units
1-BR	66,250	-	2	82,000	-	1	96,500	-	1
2-BR	94,500	95,500	4	105,900	106,380	5	137,500	-	1

Source: Multiple Listing Services Property Information Network.

Note: This table lists information related to homes being sold through real estate brokers that are on the Multiple Listing Services (MLS) only; homes sold through real estate agents not affiliated with the MLS or through private sales are not reflected in this table. Prices are in current dollars; they have not been adjusted for inflation.

While the small number of transactions taking place within the Town makes generalizations about housing sales trends within Rowley difficult, some observations can be made. Housing costs, for all types of units, rose significantly in 2000 from the costs of previous years. This is especially true of three- and four-bedroom houses. Rowley's housing stock is becoming as expensive as many surrounding communities. The number of affordable housing opportunities in Rowley is rapidly diminishing.

Cost of Rental Housing

Rental housing in eastern Massachusetts has become much more expensive in recent years. Although rents in outlying areas have risen more slowly in the past, the pressure on rental markets is increasing in outlying suburbs, as housing availability grows tighter in the city and its immediate suburbs. In 1990, the median gross rent in Rowley was \$670 per month, compared to the Essex County median of \$597 and the statewide median of \$580. In 2000, the median gross rent in Rowley was \$819 per month, compared to a County median of \$665 and a statewide median of \$684. The fact that Rowley rental costs exceeded both

the County and State figures is likely due to the paucity of rental units in the Town. Since rental units typically represent a community's most affordable housing opportunities, an expensive rental market often results in a lack of affordable housing.

According to a local realtor,⁴ the rental costs of many of the previously more affordable units have increased in recent years. The largest rental complex, Millwood Apartments, has a total of 99 two-bedroom units located in three buildings. Depending on size and layout, these units currently rent for \$925 to \$950 per month; they previously rented in the \$700-\$800 range. As of March 2002, there was a waiting list of twelve households with no available units expected until at least July 2002. Townhouse developments advertised off Boxford Road offer units for \$1,200-\$1,500 per month. With a limited number of rental units and rents that generally exceed regional rent prices, the supply of affordable rental units will continue to be limited in Rowley.

6.3.2 Housing Affordability Indices

Definition of Affordability

The definition of affordability considers both the price of the housing unit and the income of the household living in it. Affordable housing is not the same thing as subsidized housing for persons of low and/or moderate income, although subsidized housing is one type of affordable housing.

A generally-accepted standard used to define affordability is that monthly housing cost should not exceed 30% of household income. The Department of Housing and Urban Development (HUD) considers families who pay more than 30% of their income for housing "cost-burdened" and may have difficulty affording necessities such as food, clothing, transportation and medical care.⁵ A guideline used by banks when evaluating home mortgage applications is that monthly payments should not exceed 30%-33% of household income.

In 2000, it was estimated that approximately 17.3% of Rowley homeowners spent 35% or more of their household income on housing costs, while an additional 9.2% spent between 30% and 34.9%. Of renters, it was estimated that at least 26.7% of renter households spent 35% or more of their monthly income on housing costs, while another 4.2% spent between 30% and 34.9%.⁶

Homebuyers Affordability Index

The National Association of Realtors (NAR) calculates a Homebuyer's Affordability Index (HAI) each quarter, comparing median household incomes and median home prices.⁷ According to NAR, a family in the Northeast in 2001 earning \$38,832 could qualify to buy a home costing \$156,600, the median price of

⁴ Pauline C. White, Rowley Realty

⁵ U.S. Department of Housing and Urban Development, Community Planning and Development website, "Who Needs Affordable Housing?" <http://www.hud.gov/offices/cpd/affordablehousing/index.cfm>.

⁶ Source: U.S. Bureau of the Census, 2000. These numbers are not 100% accurate due to the fact that housing costs as a percentage of household income were not computed for some respondents. For homeowners, the percent of households that was non-computed was 0.0% of respondents; for renters, the non-computed figure was 13.4%.

⁷ The HAI measures whether or not a typical family could qualify for a mortgage loan on a typical home. A typical home is defined as the national median-priced, existing single-family home as calculated by NAR. The typical family is defined as one earning the median family income as reported by the U.S. Census Bureau. The prevailing mortgage interest rate is the effective rate on loans closed on existing homes from the Federal Housing Finance Board and HSH Associates, Butler, NJ.

existing single-family homes in the region, assuming a 20% down payment and a qualifying ratio of 25%. Extrapolating from the Northeast estimate, a family would need to earn \$73,140 per year to afford a \$294,950 house—the 2001 median sales price in Rowley.⁸

Based on information from the Rowley assessor's database and the NLIHC's Area Median Income for Massachusetts, **Table 6-9** provides a breakdown of the number of units existing within various price ranges. Daylor estimated the price ranges using the NLIHC's Area Median Income (**\$65,200**) and the NAR formula for determining housing affordability. This table indicates both the number and percentage of units that are affordable to families with various income levels.

According to **Table 6-9**, more than 40% of the Town's single-family homes are affordable only to households earning 120% or more of the Area Median Income (\$78,240). These houses cost approximately \$315,520 or more. Approximately 47% of the single-family houses in Rowley are considered middle-priced housing, i.e., affordable to households earning between 80% and 120% of the Area Median Income. Approximately 10.4% of the single-family houses are affordable to moderate-income households, or those earning between 50% and 80% of the Area Median Income (\$32,600 - \$52,160). Finally, only 1.7% of the single-family homes are affordable to low or very low-income households, those earning less than 50% of the Area Median Income, or \$32,600 and less. Comparing the affordable units to households earning less than \$50,000 per year (households that qualify for affordable housing) shows that almost 36% of Rowley's households qualify as affordable by income, yet only 12.1% of the housing stock is considered affordably-priced.

While a larger percentage of the condominiums within the Town are considered affordable, condominium units make up a very small portion of the housing stock. More than 35% of the condominium units (40 units) are affordable to low or very low-income households while another 25%, or 29 units, are affordable to moderate-income households. Another 28%, or 32 units, are considered middle-income housing, affordable to those earning between 80% and 120% of the Area Median Income. Only 11% are affordable only to those earning 120% or more of the Area Median Income.

⁸ According to Warren Information Services. See **Section 6.3.1**.

Table 6-9
Approximate Cost of Homeownership Units in Rowley, 2000

Home Price Range	Affordability Range (% of Median Household Income)	Single-Family Units Available in Home Price Range		Condominium Units Available in Condo Price Range	
		Number	%	Number	%
Less than \$131,470	Less than 50% (Less than \$32,600)	27	1.7	40	35.1
\$131,470 - \$210,350	50% - 80% (\$32,600 - \$52,160)	161	10.4	29	25.4
\$210,350 - \$262,950	80% - 100% (\$52,160 - \$65,200)	399	25.7	17	14.9
\$262,950 - \$315,520	100% - 120% (\$65,200 - \$78,240)	333	21.4	15	13.2
\$315,520 - \$473,280	120% - 180% (\$78,240 - \$117,360)	560	36.0	12	10.5
More than \$473,280	More than 180% (More than \$117,360)	75	4.8	1	0.9
Total		1,555	100.0	114	100.0

Source: Town of Rowley Assessor's Database. Consistent with standard practice, assessed value is assumed to be 93% of actual value or potential sale price.

Another estimation of housing affordability in Rowley comes from Northeastern University's Center for Urban and Regional Policy (CURP). In October 2002, CURP released a housing study evaluating the eastern Massachusetts housing market and the growing lack of housing affordability. The study, which analyzed each of the communities located within the Boston Metropolitan Statistical Area (MSA) sought to identify each community's Affordability Gap, or the difference between the median single-family home price⁹ and the price an existing median household income could afford. The study estimated median household income for 2001 by increasing 1999 household income (from the 2000 U.S. Census Bureau) by 10%. Based on assumptions discussed above, the 2001 median household income in Rowley was estimated to be \$68,498. Assuming no more than 33% of household income is spent on housing, the maximum home price a Rowley household could afford in 2001, according to CURP, was \$243,823.¹⁰ According to the report, the 2001 median single-family home price was \$294,950, \$67,950 (30%) *more* than the 1998 median of \$227,000 and \$51,127 (21%) *more* than what an existing Rowley household would be able to afford.

⁹ Banker and Tradesman.

¹⁰ The study derived the maximum value by assuming that: households spent 1/3 of their income on housing; a mortgage interest rate of 6.875% (plus PMI) for a 90% loan, the average SF tax bill for each community, and homeowner insurance premiums based on sample info.

6.4 Massachusetts General Law Chapter 40B

6.4.1 What is Chapter 40B?

Chapter 40B of the Massachusetts General Laws mandates that communities must have 10% of their total housing units dedicated to households with low- and moderate-incomes. To qualify as affordable under Chapter 40B, housing units must be subsidized by the State or Federal government. Initially, “subsidized” in the context of Chapter 40B was taken to mean financial subsidies only. As a result, communities had little incentive to undertake housing initiatives not involving direct State or Federal financial assistance, even if they were otherwise consistent with the intent of the statute. This changed in 1989, when a special legislative commission recommended that programs providing subsidies in-kind or through technical assistance or other supportive services be considered subsidies within the intent of Chapter 40B. Because of this broadened definition of “subsidies,” several non-traditional subsidy programs came into wide use during the 1990s. These include DHCD’s Local Initiative Program (LIP), the Federal Home Loan Bank of Boston Affordable Housing Program (AHP), and the New England Fund (NEF).

Communities that do not have 10% of their total housing units dedicated to households with low- and moderate-incomes may nevertheless comply with Chapter 40B’s affordable housing requirement based on the land area dedicated to affordable housing. Chapter 40B’s “General Land Area Minimum” allows a municipality to meet its Chapter 40B obligations if 1.5% of the total land area available for residential, commercial, and industrial uses is dedicated to low- and moderate-income housing. The calculation excludes many unbuildable lands as well as publicly-owned lands. Additionally, only sites of low- and moderate-income housing units inventoried by DHCD or established according to 760 CMR 31.04(1)(a) as occupied, available for occupancy, or under permit are allowed to be included toward the 1.5% minimum. As of 2002, DHCD had not fully established the rules that govern the land area minimum. See **Appendix B**, which provides additional information on Chapter 40B and Rowley’s affordable housing inventory.

6.4.2 Rowley Comprehensive Permits

In communities that have less than 10% affordable housing, Chapter 40B allows private developers who construct affordable housing to circumvent local zoning and subdivision control regulations through the Comprehensive Permit process. This process allows developers to submit a single application to the Zoning Board of Appeals, and requires that the Board approve the application unless it presents serious health or safety risks. A project must contain at least 25% affordable housing to be eligible for a Comprehensive Permit.

Developers have submitted four Comprehensive Permit applications totaling 176 units (132 market rate and 44 affordable units) to the Rowley Zoning Board of Appeals:

- *The Village at West Ox Pasture* – The Village at West Ox Pasture project is located off Route 1. The developer filed the project several years ago and revised it several times. The project consists of 40 single-family units (30 market rate and 10 affordable). Final approval is pending.
- *The Villages at Hunsley Hill* – The Villages at Hunsley Hill project is located off Kathleen Circle. The project consists of 44 condominium units (33 market rate and 11 affordable). The proponent

is proposing a restriction requiring that at least one resident of each unit be over the age of 55. The project is currently under review by the Zoning Board of Appeals.

- *The Benoit Property* – The Benoit Property is located off Haverhill Street. The project consists of 56 condominium units (42 market rate and 14 affordable). The proponent is proposing a restriction requiring that at least one resident of each unit be over the age of 55. At the request of the developer, this project is on hold while the developer explores other possible development alternatives.
- *Hillside Crossing* – Hillside Crossing is located at the intersection of Wethersfield and Hillside Streets, adjacent to the Mill River. The project consists of 36 condominium units (27 market rate and 9 affordable) on 12 acres of land. All residents of the project must be 55 or older.

6.4.3 Qualifying Chapter 40B Affordable Housing

Rowley's Housing Inventory Map (**Map 6-1**) identifies the location of various housing types in Rowley. In 1997, approximately 5.0% of Rowley's housing, or 78 units, qualified as affordable housing under Chapter 40B. As of October 2001, the number of qualifying units continues to be 78 but the percentage of units as a proportion of total housing has dropped to 3.9%. The average for the 15-community MVPC region is 5.6%; eight MVPC communities have averages higher than Rowley's, while six have lower averages. None of Rowley's 78 affordable units is a single-family dwelling. See **Table 6-10** for a breakdown of the qualifying units located in Rowley.

Publicly Created Qualifying Affordable Housing

Funded through DHCD, the Rowley Housing Authority is responsible for the administration of two State-subsidized housing programs (see **Table 6-10**). These include DHCD Chapter 667 (Elderly Low Income Housing) and DHCD Chapter 705 (Family Low Income Housing). At present, there are no plans to construct additional housing units under either program. Although many of the rental units and apartment complexes in Town accept Section 8 Federal housing assistance vouchers, the Rowley Housing Authority does not administer the Section 8 voucher program and the exact number of residents using Section 8 housing vouchers is unknown.

The Town has 54 units identified as Conventional State Public Housing units in the DHCD Community Profile. This inventory includes 42 one-bedroom units funded through the DHCD Chapter 667 Program located in seven buildings on Plantation Drive off Central Street. Although these are primarily elderly units, State law allocates 13.5% for non-elderly residents. Income is the basis for the tenant selection for the non-elderly units. The Housing Authority also maintains, through the DHCD Chapter 705 Program, twelve family housing units in six duplexes on Depot Way. The development includes two 2-bedroom units, nine 3-bedroom units, and one 3-bedroom ADA-accessible apartment.

Privately-Owned Qualifying Affordable Housing

Mill River is a privately-developed, mixed-population housing complex that provides affordable, income-based housing to tenants aged 62 or over, handicapped or disabled. Constructed under the U.S. Department of Agriculture's Rural Development (RD) Section 515 program, Mill River is 100% subsidized by the Federal government. Located on Haverhill Street, Mill River is a 3-building, 24-unit development. All the units are one-bedroom. As of April 2002, there was a 30-household waiting list for

Mill River. The Andover Management Company (AMC), based in Middleton, Massachusetts, operates the development.

Table 6-10
Chapter 40B Qualifying Housing Inventory

Location	Agency/Program	Type of Units	Total Units
Plantation Drive	DHCD Chapter 667	Elderly/non-elderly	42
		<i>Elderly</i>	36
Depot Way	DHCD Chapter 705	<i>Non-elderly</i>	6
		Family housing	12
		<i>Two bedrooms</i>	2
		<i>Three bedrooms</i>	9
		<i>Three bedrooms/ADA accessible</i>	1
Mill River	AMC/USDA RD 515	Elderly/non-elderly	24
Total Units			78

Source: Rowley Housing Authority, Andover Management Corporation.
Italicized rows are subsets of the preceding row.

6.5 Housing Needs

Several factors will determine future housing needs in Rowley: the existing housing stock and housing deficiencies; projected demographics; local and regional market forces; and the needs of particular groups. The following section discusses these factors. Overall, the greatest housing needs in Rowley are for additional affordable family housing, more housing for senior citizens and “empty nesters,” and smaller units suitable for a smaller household size.

6.5.1 Changing Demographics

Several demographic trends will influence the need for various types of housing in Rowley. **Appendix A** includes a complete Demographic Profile of the Town.

Rowley Population and Age Trends

Demographic changes and projections reveal an aging population with periodic “bulges” in school-aged population based on generational cycles. According to the 2000 Census, the greatest population growth in Rowley between 1990 and 2000 was among persons aged 45 to 64. This age cohort grew by 76.9%, representing 24.3% of the Town’s total population in 2000, up from 16.9% in 1990. The Town also experienced a strong increase in the number of school-aged children (aged 5 to 17), which grew by 42.7% from 1990 to 2000, and a lesser increase in the 65+ population, which grew by 24.7%. The 25-44 age group increased slightly (3.5%). From 1990 to 2000, proportional and absolute decreases occurred in the number of persons aged 18-24 and under 5 (see **Appendix A**).

As generations age and migrations occur, there will be periodic shifts in the various age groups. However, the overall trend is toward an older population—and this trend is quite apparent in Rowley. The median age in Rowley increased from 33.0 in 1990 to 37.7 in 2000.

Rowley Household Trends

While Rowley's population grew by 24% between 1990 and 2000, the number of households grew by 30%, indicating a decrease in the average household size. The number of non-family households in Rowley increased from 19% of all households in 1990 to 25% in 2000. This trend mirrors State and national trends toward a greater number of smaller households, often comprised of individual elderly householders or single adults living alone. Nevertheless, in 2000 the average household size in Rowley (2.77) was larger than that for Essex County (2.57) or the State (2.51).

6.5.2 Affordable and Subsidized Housing

Given Rowley's total housing stock of 2,004 dwelling units, the Town would need about 200 qualifying units (122 additional units) to meet the State mandated goal of 10% affordable units. Only certain affordable units (primarily those constructed with State or Federal assistance) count toward meeting the requirements of Chapter 40B. Towns that have 10% affordable housing gain more control over their local planning and land use since they are able to deny Comprehensive Permit applications in many more situations. **Table 6-11** illustrates how new development affects the number of new units in the Town that must be affordable (as defined by Chapter 40B) for the Town to meet its 10% quota in the future. **Table 6-11** includes several scenarios to illustrate the difficulty of complying with the 10% requirement unless the Town and/or developers embark on an aggressive program to build affordable housing. For example, if the total number of new homes increases by 612 units, 30% would have to be affordable to reach the State mandated goal of 10%. To comply with the Chapter 40B requirements at full buildout, the Town must create at least 300 new affordable housing units, or 15% of the new housing developed.

Table 6-11
Alternatives for Meeting the Chapter 40B 10% Affordable Housing Requirement

If Rowley's total units count is:	And this % of the new units are affordable	Then this number of new affordable units would be created	Rowley's total affordable units count would be	Does it meet 40B's 10% requirement?
2,004 (current)	--	--	78 (3.9%)	No
2,614 (612 new)	30%	184	262 (10%)	Yes
2,820 (816 new)	25%	204	282 (10%)	Yes
3,228 (1,224 new)	20%	245	323 (10%)	Yes
4,056 (buildout)	15%	308	385 (9.5%)	No
4,056 (buildout)	10%	205	283 (7.0%)	No

6.5.3 Senior Housing and Special Needs Housing

Mirroring regional trends, Rowley will see an increase in its share of elderly residents, especially those over 65: the Metropolitan Area Planning Council (MAPC) estimates that this age group will increase to represent 19% of the Town's total population by 2020. The Town should plan to address the needs of this group by allowing for the development of appropriate senior housing. In addition to senior citizens, people needing special housing include physically- and mentally-handicapped persons of all ages, and persons with debilitating illnesses. Some common types of housing for seniors and other persons with special needs include age-restricted townhouses or condominiums, assisted living complexes, congregate living, in-law or accessory apartments, and single-room occupancy units.

According to the 1990 Census, there were 65 persons in Rowley over the age of 65 who claimed to have mobility and/or self-care limitations. An additional 64 residents under the age of 65 had such disabilities. The 2000 Census identifies 64 individuals under age 20 as having a disability; another 362 between 20 and 64 as having a disability; and 186 individuals over the age 65 (more than a third of the 65+ population) as having a disability. Although not all of these individuals may be candidates for special-needs housing, these statistics, and the fact that Rowley's population above age 65 is expected to grow significantly, indicates that the need for additional senior housing and special-needs housing options do exist.

6.6 Housing Resources

6.6.1 Affordable Housing Policies and Programs

Existing local and State policies designed to encourage private developers to build affordable housing in Rowley include the Rowley Open Space Residential Development Bylaw, the Chapter 40B/Comprehensive Permit process, and the Community Preservation Act.

Rowley Open Space Residential Development Bylaw

In 1998, Rowley adopted the Cluster Development Bylaw. The Town revised the bylaw in 1999, re-naming it the Open Space Residential Development Bylaw. While this bylaw currently does not directly encourage the creation of affordable housing, it does allow the Planning Board to grant a discretionary density bonus of up to 20% for the creation of attached townhouse dwellings including no more than two bedrooms per unit and constructed in a New England Village style of architecture. In addition, the bylaw allows two-family and multi-family housing styles. While multi-family housing and small townhouse units are likely to be considerably less expensive than large, single-family detached houses, it is not clear that the OSRD Bylaw provides private developers with enough incentive to build this type of unit, which usually generates a smaller profit margin. While the creation of affordable housing is not the main intent of the bylaw, the Town could use the OSRD Bylaw to provide an incentive to a developer to create affordable housing on smaller lots. The Planning Board has proposed language to encourage affordable housing through the Open Space Residential Development Bylaw by allowing one additional bonus unit for each 1.5 affordable units created. However, this may not provide sufficient incentive to convince developers to build affordable housing.

M.G.L. Chapter 40B and Comprehensive Permits

As discussed above, Chapter 40B of the General Laws allows private developers to construct housing projects with an affordable component through the Comprehensive Permit process. This process allows developers to submit a single application to the Zoning Board of Appeals, and requires that, in any community that has not attained its 10% affordability requirement, the board must approve the application unless the development presents serious health or safety risks. In recent years, the Chapter 40B process has resulted in the creation of a substantial amount of affordable housing throughout the Boston area. However, the ability to circumvent local planning and zoning controls through a Chapter 40B Comprehensive Permit has meant that much of this housing was built in areas that lack the infrastructure or environmental resources to support it.

Community Preservation Act

As noted previously, the Town adopted the Community Preservation Act in 2001. The Town must allocate a minimum of 10% and a maximum of 80% of the funds collected through the Act to provide affordable housing in the Town. The Town can use the revenues generated from the Act to purchase land for development or to leverage other programs to generate additional affordable housing opportunities in the community.

6.6.2 North Shore HOME Consortium

Rowley is a charter member of the North Shore HOME Consortium, which was created in 1993 for the primary purpose of developing affordable housing. Funded through the Federal government, the consortium's 27 cities and towns along Massachusetts' North Shore elect whether or not they want to participate in the program.

The consortium, based out of Peabody, holds monthly meetings and invites each of the member communities to attend these meetings. At these meetings, community representatives discuss the housing needs of the region and share information about recent developments. In addition to the HOME program, the Consortium is charged with providing funding to residents requiring transitional assistance. To conduct these additional activities, the Consortium has an additional program, the McKinney Program, which provides homeless shelter grants.

The HOME program can fund new construction, although this is difficult in communities with high land and home prices. The program can also provide assistance to first-time homebuyers purchasing an affordable home.¹¹ The program can also be used to provide rental subsidies to income-eligible applicants. This function has never been used in Rowley, due in part to the limited amount of rental housing in Rowley.

The HOME program can be used to rehabilitate eligible dwelling units owned by income-eligible individuals. An eligible dwelling is one in which rehabilitation activities will not result in the dwelling's value exceeding \$239,250, or the Federal definition of "affordable." The program could be used to conduct activities that are necessary to bring the house up to code, such as repairing a leaky roof or upgrading the home's electrical system. The community assists the homeowner in obtaining bids on the activities, and then the Consortium transfers the money to the community, which in turn pays the contractor upon completion of services. Given the rising house values in the region overall, the difficulty lies in finding qualifying homes. In the past, Rowley has participated in the HOME program on an irregular basis, largely as a result of the Town's limited staff.

Since Rowley is a member of the Consortium, money is set aside each year for the Town, based on its number of low- and moderate-income residents. The Consortium currently allocates approximately \$12,000 annually to the Town of Rowley. The Consortium banks these funds in an account for the Town to use on appropriate projects or to leverage other programs. However, if a community does not use its allocated HOME funds in a timely fashion, the funds are eventually returned to the program. Although there is no set timeframe for the return of unused funds, as of January 2002, for example, the Consortium

¹¹ The current Federal definition of an "affordable" home is one that does not exceed \$239,250, regardless of square footage or number of bedrooms.

was in the process of returning the monies allocated to Rowley during the 1997 and 1998 fiscal years.¹² The Consortium sends out periodic notifications to communities informing them that their set-asides are being sent back to the Federal government.

In the past eight years, Rowley has used the program to provide rehabilitation assistance to one qualifying resident. The Rowley Housing Assistance Committee assisted the resident, working with contractors and the Consortium. Approximately \$20,000 in assistance was provided. Unfortunately, the administrative details proved very time-consuming for the Committee's volunteers. The Committee has disbanded and the Town has not been active in the HOME program since.

¹² Conversation with Kevin Hurley, Executive Director of North Shore HOME Consortium, January 2002.

7. PUBLIC FACILITIES AND SERVICES

Growth in a community places new demands on public services, facilities, and infrastructure. Conversely, the development of new public facilities and the provision of services may influence how much growth occurs, and where. This section discusses Rowley's public facilities, services, and infrastructure based on information from previous studies and reports, as well as from discussions with Town officials. The purpose of this section is not to undertake a thorough analysis of the Town's facilities and services (some of which is being done through other studies), but to integrate this information into the overall master planning process so that the Town's public investment decisions are consistent with the community's overall vision for the future.

Community Assessment: Public Facilities	
Assets	Liabilities
<ul style="list-style-type: none">Residents recognize that the Town provides quality educational opportunities for its citizens.Rowley's Police, Fire, and Public Works departments provide for a safe community in which to live and work.A new library facility is currently under construction.The Town has a safe and adequate water supply for the next 10 to 15 years.The Town is exploring and addressing its long-term public school and public safety needs.Competitive land costs and available development sites facilitate industrial and commercial growth.	<ul style="list-style-type: none">Future growth will place increased demands on town services and the school system.The cost of additional services and facilities may increase taxes.Rowley's water supply is not adequate to address the Town's long-term needs. The development of alternative water sources will be challenging and costly.Rowley's Town government includes more than 30 committees and commissions and several independently-elected, autonomous departments and officials.

7.1 Town Government

The Town does not have a Town Charter. A charter is essentially a town's constitution. It establishes the basic framework from which a community operates. It establishes the form, structure, and organization of the Town, including the powers and duties of various officials. Currently, Town government operates under existing State laws and Town bylaws. The Town has 45 elected officials and more than 30 independent, volunteer committees and boards, each charged with overseeing various and sometimes overlapping elements of town government. The Town has never reviewed the basic governmental framework under which it operates.

7.2 Schools

Rowley's dramatic population growth has prompted concerns over the adequacy of the Pine Grove Elementary School to accommodate an anticipated surge in school-aged children in coming years. The leadership of the Triton Regional School District, comprised of Rowley, Newbury, and Salisbury, has pro-actively sought to address the anticipated increase.

With the assistance of Pine Grove's School Council, a Request for Proposals [RFP] was issued in the Fall of 2001 soliciting responses from architectural firms familiar with school renovation projects. A crucial aspect of the RFP, inserted at the insistence of Pine Grove's School Council, was its requirement that the proposers go beyond conventional thinking in fashioning their responses.

Assessment of the building will include its suitability for the 21st century taking into account current best practices in curriculum and instruction, state minimum standards and leading edge educational facilities planning. Programmatic needs should drive the design of any recommended changes to current school facilities.

--excerpted from the Request for Proposals

A well-known Boston architectural firm that specializes in school projects, Earl B. Flansburgh and Associates, was selected to conduct the feasibility study in December 2001. The firm began work on the project under the guidance of a Building Needs Committee that includes members from the district administration and school committee, Pine Grove faculty, parents, and general citizenry appointed by the Superintendent.

An enrollment projection specialist prepared a study of the town's demographics with an emphasis on the impact on enrollment in the pre-Kindergarten through grade 6 age groups, which are served by Pine Grove. The study revealed that, while Rowley's dramatic population increase would affect enrollment at Pine Grove, it would not be as adverse as originally feared. Although this study somewhat lessened the Town's sense of urgency, there remains a clear need for the Town to continue planning for the future, both to meet long-term needs as well as the short-term needs, including infrastructure upgrades.

A final draft of the Feasibility Study was completed in December 2002. The Study included a comprehensive Existing Conditions Report and assessment of Pine Grove's aging infrastructure.¹ Through the Feasibility Study, the Building Needs Committee identified a preferred concept alternative. The Triton School Committee has also approved this alternative. While not yet formally endorsed by Rowley, the State's Department of Building Assistance has preliminarily reviewed the recommended alternative in anticipation of the Town's future endorsement. The Town had originally planned to seek a tax override at the May 2003 Town Meeting to secure the funds necessary to complete the Pine Grove expansion and renovation. However, this item has been put on indefinite hold due to the recent state budget cutbacks.

It was determined early on that renovating the existing school facility would be preferable to constructing a new facility. Two primary determinants were the cost and difficulty associated with securing an appropriate development site and the fact that the State gives funding priority to renovation of existing facilities over construction of new ones. The recommended alternative, if accepted by the Town, would add approximately 30,000 square feet of educational space, including a state of the art media center, and science classrooms. In addition, the project would include development of an auditorium suitable for community use, reconfigured drop-off areas for the pre-K children, and enhanced gym facilities. The project would also ensure the technology upgrades necessary to meet State standards and would bring all infrastructure up to current code.

¹ A major focus of this discussion was the school's septic system, which failed repeatedly throughout the years.

Consistent with the State's reimbursement procedures and guidelines, specifics regarding the program's philosophies and priorities have yet to be determined. An extensive public outreach process focusing on the importance of a high quality education for Rowley's children will be initiated prior to the 2003 Town Meeting. As school renovations require a long lead time, there should be ample time for all interested stakeholders to be involved in the visioning process, developing a framework of educational goals that reflects the Town's core values.

The challenges the children will face mandate that every effort be made to insure that the education they receive at Pine Grove prepares them for a life of responsible citizenry, and that the curriculum they are offered reflects the best practices available to them. Instilling the Town's younger generations with knowledge of the significance of civic responsibility is important as demographic data and results of the resident survey confirm that Rowley's families tend to stay in the Town for a long time. Current residents report that they are committed to the Town and intend to remain.

This Master Plan Committee recommends the Town's leaders take the necessary steps to insure that voters embrace Pine Grove's much-needed renovation. The Committee also urges that the District's administration provide Rowley's students with an opportunity for a world-class education, including access to the best available resources.

7.3 Public Works

7.3.1 Highway Department

The Highway Department includes a staff of four full-time employees and one part-time seasonal employee. A Highway Surveyor manages the department. Approximately 51.5 miles of roads exist in the Town of Rowley: 38.1 miles of paved public ways, 3.3 miles of gravel public ways, and 10.1 miles of private ways.²

The Town, using Chapter 90 funding, conducts the majority of road repair and improvements on an as-needed basis. The Massachusetts Legislature appropriates these funds to communities on a yearly basis. Chapter 90 establishes the level of funding for a community based on a formula that includes the number of miles of public ways, employment, and population of a given community. The level of funding available through this program has decreased steadily over the past few years.

Rowley maintains approximately 315 catch basins throughout Town. Private contractors clean these catch basins on a yearly basis. Due largely to new development, the Town recently accepted responsibility for the maintenance of 35 additional catch basins, bringing the total to 350. These new catch basins are located primarily within new subdivisions. The Massachusetts Highway Department (MassHighway) also addresses stormwater drainage issues on a year-to-year basis based on the availability of funds.

MassHighway regularly inspects all bridges and many culverts located in the State. While the State has not declared any of Rowley's bridges or culverts to be structurally unsafe, several culverts and bridges located in the Town need maintenance and repairs. A 1996 flood caused damage to the Dodge Road

² Source: Scott Leavitt, Highway Surveyor.

Bridge. The Town repaired the bridge on a temporary basis but it requires permanent repairs or replacement. Maintenance work on Taylor Bridge located on Wethersfield Street last occurred in 1988, and since then the condition of the bridge has deteriorated. The Glen Street Bridge, a culvert located in the vicinity of Glens Mill, also needs repairs. See more on bridge repairs in **Section 8.2.3**.

As new subdivision roads are completed, the Town accepts them as public ways. These new roads place additional demands on the department for routine maintenance and snow plowing. Further, development on existing substandard public ways increases the demand for addition maintenance and improvements. For example, over the past few years, residential development occurred on West Ox Pasture Lane, a gravel way. Additional road grading is now necessary as a result of the increased use of this way. In addition, property owners have expressed a desire to have the road upgraded and paved.

The Highway Department is located in a 100-foot by 60-foot, 4-bay garage located at 40 Independence Street. The building previously housed both the Highway and Water Departments. The Water Department recently purchased and moved to a new building at 401 Central Street. The Highway Department now uses the bay previously used by the Water Department. The facility is adequately-sized to address the Department's needs for the foreseeable future.

Currently, the Town does not have a long-term roadway infrastructure maintenance program for its roads, bridges, and culverts, nor does it have a capital improvement program. The department repairs or upgrades infrastructure and equipment on a yearly or as-needed basis.

7.3.2 Cemetery Department

The Town maintains three cemeteries: the Rowley Burial Grounds (Main Street Cemetery) adjacent to Town Hall; the Lyme Brook Cemetery (Pulpit Rock Burial Ground) off Leslie Road; and the Smallpox Cemetery on Trowbridge Circle. The Town has enough cemetery land at the Main Street Cemetery to meet the needs of the community for the next 15 to 20 years.³

7.3.3 Solid Waste

Residents and businesses dispose of solid waste through private trash haulers. The Town also contracts with private haulers to dispose of municipal and school solid wastes.

7.4 Water Department

Rowley's municipal water department supplies nearly 1,600 customers from a system of groundwater wells shown in **Table 7-1** and on **Map 3-1**. Two active wells supply water to the community: Well #2 and Well #3. Both wells pump water to a holding tank at the top of Prospect Hill, where it is mixed together. The mixing of water guarantees the dilution of any remaining contaminants caused by the seepage of trichloroethylene into Well #2 in 1979 to levels deemed safe for drinking water.⁴ A new well, Well #5, is now under development in the Pingree Farm Road area. Well #1, located on Route 133 near the intersection with Route 1A, was abandoned in 1998 due to sand fill.

³ According to the Chairman of the Cemetery Commission, John Cook.

⁴ The source of the contamination has been cleaned up, and the State has approved the cleanup.

Table 7-1
Town Water Supply Sources in Rowley

Designation	Location	Type	Safe Yield (gpd)
Well #1 (abandoned)	Northeast Prospect Hill (near 1A & 133)	Tubular Field	
Well #2	Haverhill Street (near Route 1)	Gravel Packed	600,000
Well #3	Boxford Road	Gravel Packed	600,000
Well #4 (not developed)	Near Kent Corner		
Well #5 (under development)	Pingree Farm Road	Gravel Packed	600,000

Source: S. Miller, Haley and Ward Engineers, Inc., Personal Communication

The development of additional drinking water sources will be a challenge for the community. The Water Department identified a fifth potential well site (Well #4) located near the Ipswich town line in the vicinity of Route 1 (Kent Corner). However, the Town has not developed the well site due to concerns of potential contamination from abutting land uses. Rowley's options for new water sources beyond this site are limited because the majority of the land in Town, located generally north of Haverhill Street, consists of either marine clay soils or has a shallow depth to bedrock. Soils consisting of marine clay are dense and severely limit groundwater flow. Shallow bedrock completely restricts groundwater flow. If the Town needs additional water sources in the future, it might explore the feasibility of developing deep rock wells. These wells tend to be more than 700 feet deep and are expensive to develop. Furthermore, there is no certainty as to the quality and quantity of water generated from such wells.

Table 7-2 compares water supply and demand for past and future time periods. As shown in this table, the new well (Well #5) should satisfy near-term demand from new development with a comfortable excess daily capacity. Generally, to accommodate daily fluctuations and peak demands, a water system should be able to provide double the daily average water consumption. The Town needs excess water capacity to ensure a safe and adequate water supply for fire emergencies, periods of high customer demand, and drought conditions. In addition, multiple water sources allow wells to go off-line temporarily for maintenance and repairs.

However, as shown in **Table 7-2**, full buildout (if the Town ever reaches buildout) reduces the excess capacity considerably. Each of the Town wells (the two existing wells and the one under development) has a safe daily yield of approximately 600,000 gallons per day. If one of the three wells is not operating, the Town's total safe yield is reduced by a third from 1,800,000 gallons per day to 1,200,000 gallons per day. At full buildout, the average daily water demand will be 1,270,000 gallons per day (430,000 gpd current demand plus 840,000 new demand). However, these numbers do not take into account usage during droughts and other times of high use. At full buildout, the Town would require a peak use water supply of 2,540,000 gpd or more to provide double the daily pumping rate, as recommended. Without new water supplies, the Town's 1,800,000 gpd system will fall short of meeting peak demand by 740,000 gpd.

Table 7-2
Projected Water Services 2000 through 2015

Year	Services	Consumption MG/Y⁵	Supply MG/Y	Peak Daily Consumption MG/D⁶	Excess Daily Capacity⁷
1997	1500	147	438	.805	39%
1998	1536	153	438	.838	36%
2000	1590	157	438	.860	34%
2005	1730	171	657	.937	86%
2010	1870	185	657	1.014	79%
2015 ⁸	2010	199	657	1.090	71%
Buildout ⁹	--	464	657	2.540	(41%)

Source: Haley and Ward, Inc., Waltham, Massachusetts

The municipal water system serves approximately 90% of the Town. The remaining 10% use private wells as a water source. The water for municipal wells as well as the private wells originates from the same aquifer. Approximately 85% of the public water service connections are for residential customers, 10% are for commercial businesses, and the remaining 5% are for industrial uses. Originally constructed by the Town in 1948, the delivery system currently consists of approximately 40 miles of water lines and is generally in good condition.

Currently, the Town has only 65% of the recommended water storage capacity. The Town needs to provide additional storage capacity for peak demand periods and to ensure an adequate supply for fire suppression. The storage capacity is based on the need to provide 3,000 to 4,000 gallons per minute for fire flow for a 10-hour period during a time of peak water demand. Based on the current shortfall and additional growth, the Town needs an additional one million gallons of storage capacity. The Town has identified a potential site for a new water storage facility on Hunsley Hill. However, the development of this facility has not progressed beyond the planning stages. The addition of the storage facility would provide adequate water storage for Rowley through the year 2015.¹⁰

Future Needs and Programs

The existing water supply is not adequate to meet Rowley's long-term needs. Rowley will have to consider developing alternative water management strategies and continue to search for new water sources to ensure the Town can continue to supply its drinking water needs over the long-term. As the Town acquires additional open space, it should consider areas identified as potential well and storage tank sites.

Many new homes include lawn irrigation systems. This trend compounds water supply and delivery issues especially during summer drought conditions. The Town encourages the implementation of water

⁵ Millions of gallons per year

⁶ Twice the average daily consumption.

⁷ Compared to the peak day consumption.

⁸ Assumes a population of 7,400 in 2015.

⁹ Based on MVPC total buildout projections.

¹⁰ Haley and Ward, Inc., Rowley's water consultant.

conservation measures such as installing water-saving devices and fixtures, replacing older water meters, and periodically testing lines for leaks. An aggressive water conservation program can significantly reduce the need for major capital up-grades to the water system

The Water Department is in the early phases of establishing a 20-year repair, expansion, and maintenance plan for the water system.

7.5 Wastewater Disposal

Rowley has no municipal sewer system and no plans to construct one. All homes and businesses dispose wastewater through on-site wastewater systems maintained by the property owners. Local haulers transport septage to disposal facilities in other towns. The State Department of Environmental Protection (DEP) requires that all new septic systems meet the requirements of Title 5. This law restricts, to a certain extent, where development can occur, and requires that remodeling projects that affect a septic system must upgrade the system to comply with Title 5. Furthermore, before selling a property, DEP requires the inspection of the septic system to determine compliance with Title 5 regulations.

The State has forced some towns to construct municipal sewer systems as a result of failing septic systems. Currently, Rowley does not have serious problems with on-site wastewater systems; however, conditions such as multiple failing septic systems on School Street could someday require the Town to find a wastewater treatment solution for this area, whether through sewers or decentralized management. If the Town were to be sewerred, many parcels currently deemed undevelopable would become available for development. However, new technologies such as shared or clustered septic systems are increasingly allowing towns and groups of property owners to solve wastewater treatment problems without constructing a municipal sewer.

7.6 Public Safety Facility

In May 2002, a Proposition 2½ override attempt to appropriate \$4.6 million to design and construct a new Public Safety Facility at 477 Haverhill Street (Route 133) failed. The proposed facility would house the Police Department, Fire Department, Dispatch/Communications, and Emergency Management Operations. The Town rejected two previous Proposition 2½ override attempts to fund the construction of this facility. To reduce construction costs, the Town reduced the building size from 19,860 square feet to 17,750 square feet. Office space was eliminated and replaced with an open floor plan with cubicles.

The Rowley Public Safety Building Committee prepared a Public Safety Facility Study for the Town dated April 8, 1999. The following section summarizes the results of this study. If a new facility is constructed, the existing structure will be available for re-use by the Town. The Town selected the site on Haverhill Street (west of Route 1) in part because it is centrally-located and addresses the dispersed development pattern occurring in Rowley, especially west of Route 1.

Constructed in 1985, the existing Police Station contains 1,930 square feet on the first floor and 1,430 square feet in the basement. Portions of the foundation probably need extensive repairs and the mechanical system is nearing the end of its useful life. The Dispatch/Communication Center does not have an independent mechanical back-up system as required by code. The facility lacks space for meeting, office, interview, and training rooms. A separate and secure prisoner entry point does not exist.

In addition, the Police Department uses a 56-foot by 12-foot mobile office trailer, located behind the main building, to meet the need for additional temporary office and meeting space. The current police force consists of the Police Chief, 13 police officers, and 6 reserve officers, and clerical support staff.

The existing Fire Department facility is located at 7 Hammond Street and is in poor to fair condition. It lacks a ventilation system, floor drains, dormitory space, decontamination facilities, adequate storage space, handicap parking, and adequate parking. Again, in response to the dispersed development occurring in Rowley and based on response time studies, the best scenario for fire protection includes a Fire Station Headquarters at the Haverhill Street site, along with continued use of the present Fire Station as backup. Keeping several pieces of apparatus housed at Hammond Street will reduce the need for space at the new facility and maintain existing response times to the eastern section of Town.

The Fire Department presently consists of a Fire Chief, two full-time firefighters, and 28 on-call firefighters. The report does not project the future equipment or manpower needs of the Fire Department, but does note that the Fire Department will need additional resources to address future development in the Town. In the early 1990s, the on-call fire force consisted of approximately 40 firefighters. Over the past several years, that number has dwindled to 28 for a variety of reasons.¹¹ A number of older call firefighters have retired, several have relocated to other communities, and many residents cannot serve as call firefighters because they work out of town and are not able to respond to daytime emergencies. In addition, the level of mandated training has increased over the years. According to the Fire Chief, a call firefighter can expect to devote 24 hours or three 8-hour days a month to training and responses to emergencies. If the number of call firefighters continues to decline, the Town may need to hire additional full-time firefighters. The Rowley Volunteer Fire Department privately owns the Hammond Street building. The Fire Department also trains firefighters as Emergency Medical Technicians (EMTs).

Based on an estimated population of 8,236 in the year 2023, the proposed new facility would meet Rowley's needs for the next 20 to 25 years. To service the Town's future population, the 1999 Public Safety Facility Study projects future Police Department staffing needs to be 30 officers (full and part-time). The proposed Haverhill Street facility abuts an existing Town recreational facility. If the Town funds a new Public Safety Facility, the design will have to address potential conflicts between the facility and the abutting recreational use, and incorporate shared parking and access into the plan.

7.7 Rowley Free Public Library

In 1968, the Town renovated the Ezekiel Rogers School for use as the public library. It consists of 3,450 square feet on two floors. The facility does not comply with current Americans with Disabilities Act requirements, has no room for the expansion of Rowley's book collection, has no meeting or program space, and has limited parking. As a result of these constraints, the Town approved the funding necessary to construct a new library in 1999.

Rowley is in the process of constructing a new 13,000 square foot library facility, which is expected to open in the fall of 2003. The library is being funded by a combination of state (\$1.29 million) and local (\$1.74 million) money. The new facility was designed to provide space to service a population of 9,000.

¹¹ Information is based on an interview with James Broderick, Rowley's Fire Chief.

The library projects that the building will meet the community's needs for the next 20 years.¹² The new facility will include a cultural center, meeting room, practice rooms, quiet room, and reading room.

7.8 Municipal Light Plant

In accordance with Massachusetts General Law, Chapter 164, Rowley's Municipal Lighting Plant operates under the supervision of the Rowley Electric Light Board. The Electric Light Board sets all financial and operating policies associated with the purchase and delivery of electricity to residents and businesses in Rowley. Ratepayers cover all costs associated with the purchase of electricity as well as the maintenance and improvement of the delivery system.

Rowley's Municipal Lighting Plant purchases all of the electric power used in the Town from outside sources. The plant purchases approximately 85% to 90% of the power through the Massachusetts Municipal Wholesale Electric Company¹³ (MMWEC) using long-term contracts with power generators. The Municipal Lighting Plan purchases the remaining 10% to 15% through MMWEC as demand dictates and at varying rates.

The Lighting Plant is in the process of upgrading its Route 1 substation by doubling its current capacity from 20 megavolt-amperes (Mva) to 40 Mva. To handle the projected increase in industrial and commercial demand, the plant will install additional circuits and feeder lines along Route 1 and Route 133. In the future, to increase the distribution system's reliability, the Lighting Plant hopes to loop the existing townwide distribution system.

Current and Future Usage

The Municipal Lighting Plant has approximately 2,150 residential customers, 200 small commercial users, and seven large commercial/industrial users. Once developed, the Forest Ridge Industrial Park could be the largest user of electric power in Town. An actual breakdown of consumption by various uses is not available. However, current electric consumption by residential customers is small compared to industrial consumption.¹⁴ Even if the residential electric demand doubled it would not have a major impact on the Town's distribution system.

Table 7-3 projects Rowley's future electric power demand. The Municipal Lighting Plant projects the need for electric power to double over the next 15 years. The commercial land located in Rowley will generate half of the projected energy demand increase.

¹² The Rowley Free Public Library Building Program, January 1997, prepared by Marjorie L. Judd, Building Consultant, Middleborough, Massachusetts.

¹³ Through Chapter 775 of the Acts of 1975, the State Legislature created MMWEC, a non-profit, public corporation and political subdivision of the Commonwealth. The purpose of the act was to make the 40 Massachusetts municipal utilities more competitive with the State's investor-owned utilities.

¹⁴ According to Carl Benson, Rowley's Municipal Lighting Plant General Manager

Table 7-3
Electric Consumption Forecast for Rowley, 1999 through 2015^a

Year	Total Use (Mwh)	% Change from Previous Yr.	Winter Peak (Kw)	Load Factor^b	Summer Peak (Kw)	Load Factor^b
1999	35,481	---	7,226	0.56	7,179	0.56
2000	37,265	5.0	7,463	0.57	7,596	0.56
2001	43,372	16.4	8,686	0.57	8,841	0.56
2002	49,530	14.2	9,920	0.57	10,096	0.56
2003	51,792	4.6	10,372	0.57	10,557	0.56
2004	54,067	4.4	10,828	0.57	11,021	0.56
2005	56,317	4.2	11,278	0.57	11,479	0.56
2006	58,771	4.4	11,769	0.57	11,979	0.56
2007	61,242	4.2	12,264	0.57	12,483	0.56
2008	63,762	4.1	12,770	0.57	12,998	0.56
2009	66,504	4.3	13,318	0.57	13,557	0.56
2010	69,254	4.1	13,869	0.57	14,116	0.56
2011	71,849	3.7	14,390	0.57	14,645	0.56
2012	74,450	3.6	14,909	0.57	15,175	0.56
2013	74,950	0.7	15,010	0.57	15,277	0.56
2014	75,568	0.8	15,134	0.57	15,403	0.56
2015	76,080	0.7	15,237	0.57	15,509	0.56

Abbreviations: Mwh = megawatt hours. Kw = kilowatts.

^a Assuming buildout of industrial parks over the next 12 years with an increase of 1,250 kw/year during 2001 and 2002, and an increase of 500 kw/year from 2003 to 2012, for a total demand of 7,500 kw from 2001-2012.

^b Excess available capacity

Source: Massachusetts Municipal Wholesale Electric Company, November 2000.

Other Issues

The Planning Board currently requires that all line utilities be installed underground in new subdivisions. In residential and smaller commercial developments, underground utilities eliminate the need for unsightly overhead lines. The electric power needs can vary greatly for different types of industrial uses (for example, a standard warehouse verses a frozen food storage facility). Underground three phase electric power systems are extremely costly to install, especially if the future occupants of the development are unknown. Furthermore, the need to upgrade inadequate underground systems could discourage the re-use of vacant industrial property. The Town should consider balancing the need for economic development against the aesthetic benefits of underground utilities on a case-by-case basis.

8. TRANSPORTATION

Note: The Transportation inventory and recommendations sections (Sections 8 and 16 of the Master Plan) were prepared by Merrimack Valley Planning Commission.

Transportation systems are important to the quality of life within a community as they play a significant role in providing access to employment and recreation. Rowley can be best described as a bedroom community, which is well-served by roadways and rail service leading to regional employment centers. The Town has large amounts of undeveloped land zoned for both residential and commercial uses. Future land development likely will have an impact on Rowley's transportation infrastructure. However, the magnitude of impact will depend on the type, density, and location of future development.

This transportation section includes an inventory of existing transportation facilities and services, the safety of the transportation network, an analysis of existing traffic demands placed upon the most congested locations, a projection of the location and impacts of future traffic demands, and a discussion of specific recommendations and the process for developing future solutions to identified transportation problems.

Community Assessment: Transportation	
Assets	Liabilities
<ul style="list-style-type: none">Rowley benefits from convenient access to various New England destinations via I-95 and Route 1.Commuter rail service provides convenient access to Boston.Many of Rowley's roads retain their scenic appearance.	<ul style="list-style-type: none">New residential and commercial growth will add congestion to Rowley's roadways.Development is occurring in areas of Town with inadequate roadways.Sidewalks and walkways are lacking throughout the community.New subdivision roads are often incompatible in character with Rowley's older historic roads.Few viable transportation alternatives to single occupancy vehicles exist.

8.1 Regional Context

Rowley is located on the North Shore, approximately 32 miles north of Boston and approximately 7 miles south of Newburyport. Rowley is part of the Merrimack Valley planning region and is located on the fringe of the Boston Urbanized Area as defined in the 2000 Census, with ties to the former Lawrence/Haverhill urbanized area.

The Merrimack Valley Metropolitan Planning Organization (MPO) conducts regional transportation planning for 15 communities within the Merrimack Valley Planning Commission area, of which Rowley is one. The MPO is the Federally-designated transportation planning organization, which is comprised of the following members:

- Merrimack Valley Planning Commission (MVPC)
- Merrimack Valley Regional Transit Authority

- Massachusetts Highway Department (MassHighway)
- Executive Office of Transportation and Construction
- Mayor of Lawrence
- Mayor of Haverhill
- Chief officials of two urban communities in the Valley
- Chief officials of two non urban communities in the Valley

The MPO is responsible for prioritizing transportation improvement projects within the region for funding, conducting planning studies, and developing a long-range transportation plan to coordinate regional transportation actions. Perhaps the two most important planning documents are the Regional Transportation Plan and the Transportation Improvement Program.

Merrimack Valley Region 2000 Transportation Plan

The Merrimack Valley Region 2000 Transportation Plan describes and evaluates the existing regional transportation system including all the major modes of transportation such as highways, mass transit, freight, rail, bicycle and pedestrian travel. It also identifies transportation improvements that are needed to address any existing transportation needs as well as those projected to take place over the next 25 years.

Under Long-Range Transportation Projects, the Merrimack Valley Region 2000 Transportation Plan lists the reconstruction of Route 133 between Route 1 and the Route 1A at an estimated cost of \$2.1 million. This project, if undertaken, would basically complete the reconstruction of Route 133 throughout the community, which was started with the reconstruction of Route 133 between the Georgetown Line and Route 1.

Also identified in the 2000 Regional Transportation Plan are recommendations and observations made regarding the status of on-road bike routes in the Town. These are explained below under Transportation Facilities in **Section 8.4**.

Transportation Improvement Program

The region's FY 2003-2007 Transportation Improvement Program (TIP) includes one project in Rowley, which is the reconstruction of the Route 1A Bridge over the Parker River. This project is estimated to cost \$1.8 million and should be ready to be advertised for construction during Federal Fiscal Year 2003. One of the key issues surrounding the design of this project is the effort to provide access to the Parker River for the general public from the north (Newbury) side of the bridge.

Journey to Work Information

Data on work trip origins/destinations from the 2000 Census is not yet available. Listed below are the towns where many Rowley residents worked as was reported during the 1990 Census.

Table 8-1
1990 Journey to Work Data

Community	Number of Rowley Workers
Rowley	474
Danvers	223
Boston	191
Beverly	161
Ipswich	144
Newburyport	118
Salem	102
Lynn	98
Peabody	80
Haverhill	72
Gloucester	63
Andover	62

Source: U.S. Census Bureau, 1990.

The figures in **Table 8-1** show that most Rowley residents either worked in Town or traveled to communities on the North Shore and to Boston.

Data from the 2000 Census is available regarding the mode of transportation used by Rowley residents to travel to their place of employment. This is shown below:

Table 8-2
2000 Commuting to Work Data

Travel Mode	% Of Workers
Drive Alone	84.1
Carpool	7.1
Public Trans.	2.1
Walked	1.1
Other	1.3
Worked at Home	4.2

Source: U.S. Census Bureau, 2000.

Table 8-2 shows that a large majority of Rowley residents drive alone in their vehicles to work. The percentage of persons doing so is slightly higher than the Essex County average (78.7%) and can be explained in part by the fact that so many Town residents work in Danvers and other communities along the North Shore and that there are no transit services available to these areas.

8.2 Inventory of Existing Transportation Facilities and Services

8.2.1 Roadway Network

Roadway Classification

Roadways are generally classified into one of three functional categories: arterials, collectors, and local roads. Arterials provide the highest level of service to through vehicles by providing the greatest speed over the longest uninterrupted distance. Collectors provide a less highly developed level of service at lower speeds and at shorter distances. Collectors generally collect traffic from local roads and deliver it to arterials. Local roadways provide access to abutting land uses with little or no through capability.

Rowley's roadways are classified according to their function and the character of service that they provide. This classification is important as it may allow certain roadways to be eligible for Federal-aid for reconstruction or transportation improvement projects. As mandated by the Federal Highway Authority (FHWA), MassHighway's Bureau of Transportation Planning and Development, with input from Rowley officials and MVPC, has determined the functional classification of roadways within the community. The most recent realignment of the Federal-aid system of roads within Rowley occurred in 1993. This realignment was prompted by the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the re-drawing of Federal-aid Urban boundaries as a result of the 1990 Census.

All roads in Rowley are within a Federal-aid Rural area. According to the realigned Federal-aid system, there are approximately 0.62 miles of interstate highway, 7.96 miles of minor arterials, 8.82 miles of major collectors, and 2.3 miles of minor collectors within Rowley. The remaining roadways, which make up the bulk of the roadway mileage, are local roads. **Table 8-3** provides a listing of all roadways other than local ones and their associated functional class.

It should be noted, however, that since the 2000 Census has identified urbanized areas within the Town, some sections of roadways, such as Route 1 and Route 1A, will be reclassified as urban when the next update to the region's functional classification of roadways is completed sometime in 2003.

Table 8-3
Functional Classification of Rowley's Roads

Functional Class	Roadway	Length (Miles)
Interstate	Interstate 95	0.62
Minor Arterials	Route 1 (Newburyport Turnpike)	3.56
	Route 1A (Main Street) from Route 133 to Ipswich Line	0.13
	Route 133 (Haverhill Street)	4.27
Major Collectors	Bradford Street	0.42
	Central Street	2.10
	Central Street Extension to Wethersfield Street	0.05
	Church Street	0.10
	Fullingmill Road	0.06
	Glen Street from Fullingmill Road to Newbury Line	0.82
	Route 1A (Main Street) from Rte. 133 to Newbury Line	3.54
	Wethersfield Street from Route 1 to Route 1A	1.73
Minor Collector	Wethersfield Street from Route 1 to Georgetown Line	2.10
Total Length		19.50

Source: Massachusetts Highway Department (MassHighway).

There are approximately 0.62 miles of I-95 that run through Rowley and are part of the Federal-aid system called the National Highway System (NHS). Funding from the Surface Transportation Program (STP) is available for improvement projects on all arterials and major collectors in Rowley, including Routes 1, 1A, and 133, Bradford Street, Central Street, Church Street, Glen Street, and Wethersfield Street from Route 1 to the Georgetown town line. Capital improvement projects on all arterials and collectors in Rowley are also eligible for State-Aid. Likewise, all Town-accepted local roads are eligible for partial reimbursement for capital improvement projects under the State-Aid program.

Roadway Jurisdiction

Most roadways in Rowley are under one of two jurisdictions: MassHighway and the Town of Rowley. I-95, Route 1 (Newburyport Turnpike) and Route 1A (Main Street) are owned and maintained by the State. All other roads are under local jurisdiction or are privately maintained.

There are a total of approximately 47.04 miles of roadway in Rowley, according to the 1997 Road Inventory File, produced by MassHighway. Approximately 7.85 miles of roadway are under State jurisdiction (or approximately 16.5%), 38.11 miles are Town-accepted roads, and 1.08 miles are unaccepted roads. On a lane-mile basis, approximately 22% of the roadways are under State jurisdiction. **Table 8-4** provides a summary of roadway jurisdiction in Rowley and the number of lane miles.

Table 8-4
Jurisdiction of Rowley's Roads

Jurisdiction	Functional Class	Length^a	Lanes^b	Lane Miles
State	Interstate	0.62	8	4.96
	Minor Arterials	3.69	2	7.38
	Major Collectors	3.54	2	7.08
Local	Minor Arterials	4.27	2	8.54
	Major Collectors	5.28	2	10.56
	Minor Collector	2.10	2	4.20
	Local	17.48	2	34.96
	Local	8.98	1	8.98
Private	Local	0.17	2	0.34
	Local	0.91	1	0.91
Total Length		47.04		87.91

^a Source: Road Inventory File - 1997, Massachusetts Highway Department. Length is in miles.

^b Source: Road Inventory File - 1997, Massachusetts Highway Department.

Roadway Traffic Volumes

MassHighway and MVPC maintain a database of daily traffic volumes for roadways in Rowley. **Table 8-5** presents a historical summary of the Average Daily Traffic (ADT) volumes for Rowley's roadways. All roadways listed are part of the Federal-aid system and are either functionally classified as collectors or arterials. The historical traffic volume data presented for the arterial roads, including Routes 1 and 133 and Route 1A at the Ipswich town line, shows traffic growth due to development within Rowley and the region. The historical volume data presented for the collector roads, which are the remaining roads on the list, shows traffic growth due exclusively to development within Rowley. Daily traffic volumes from MVPC are unfactored and reflect unadjusted average weekday traffic volumes. Daily traffic volumes from MassHighway are adjusted with factors that account for seasonal variations and heavy vehicle traffic and then rounded to produce an annual average daily traffic volume.

**Table 8-5
Historical Average Daily Traffic on Rowley's Roads**

Roadway	Count Location	ADT ^a							
		1993	1994	1995	1996	1997	1998	1999	2001
Route 1	at Ipswich line north of Route 133 south of Central St. north of Central St.	11,136 10,884	11,294	11,468	11,687	12,227	12,363 <i>7,500</i> <i>8,400</i>	12,991	15,173
Route 133 (Haverhill St)	at Georgetown line west of Route 1 east of Route 1	11,296 10,017	8,999 9,430			10,843		13,003	13,042
Route 1A (Main Street)	at Ipswich line north of Perley Av.	12,303	15,082 6,943	14,146	13,235	14,475	14,588 6,438		18,617 <i>7,000</i>
Bradford St.	north of Route 133	2,884					3,207		
Central Street	east of Route 1 north of School St.		3,993				<i>3,700</i>	6,427	
Glen Street	west of Route 1					1,841	<i>2,000</i>		<i>1,800</i>
Wethersfield	east of Route 1		1,334					1,575	

^a Average daily traffic volumes in vehicles per day (vpd). No traffic volume data is available for the year 2000. Volumes not italicized are average weekday daily traffic volumes from MVPC. Volumes in italics are average annual daily traffic volumes provided by Massachusetts Highway Department.

8.2.2 Pedestrian Linkages

Existing Sidewalks

Sidewalks adjacent to roadways serve pedestrians traveling to and from densely developed residences, businesses, and public gathering places within the downtown area, such as the Pine Grove Elementary School, the Town Hall, and the old Center School. According to the road inventory file, compiled by MassHighway in 1997, and observations of aerial photographs, taken in 2001, the following roadways have sidewalks:

- Farnham Road
- Brook Street
- Forest Street
- Hammond Street
- Summer Street
- Church Street
- School Street

- Pleasant Street
- Plantation Drive
- Wethersfield Street, from Main Street to Bradford Street
- Central Street, from Main Street to Cross Street
- Jellison Road, from Main Street to Cross Street
- Railroad Avenue, from Main Street to Ocean Avenue
- Main Street, from the Ipswich town line to north of Warehouse Lane

Existing Municipal Policies for New Roads and Sidewalks

When building new roads, commercial and residential subdivision developers are held to a minimum standard as defined by the Planning Board in its *Rules and Regulations Governing the Subdivision of Land*, which was adopted on July 22, 1987. *Section 5.1* of the *Rules* describes how and by whom a roadway should be designed. *Section 5.2* describes how the roadway should be constructed, how the grading and preparation for pavement should be conducted, what the pavement width should be, what pavement materials should be used, how side embankments should be made, and how the areas disturbed by construction should be treated. *Section 5.2.2* provides a table of minimum widths of pavement: 40-48 feet for a major street, 30-40 feet for a secondary street, and 26 feet for a minor street. If a new roadway is built to these standards, the Town may accept the road as a public way and receive Chapter 90 State funds for most reconstruction projects.

Developers of new residential subdivisions must include sidewalks adjacent to new roads in their plans. The *Rules and Regulations Governing the Subdivision of Land* holds the developers of these subdivisions responsible for the construction of sidewalks. In *Section 4.10.1* of the *Rules* the board states that sidewalks “shall be provided ...for the full length of the street” on at least one side of a new street. *Section 5.5.2* requires a minimum sidewalk width of 4 feet for minor and secondary streets, 5 feet for major residential streets, and 6 feet for non-residential streets.

8.2.3 Bridge Conditions

MassHighway maintains an inventory of bridges throughout the Commonwealth with periodic and regular inspections of their conditions. Within the inventory is the bridge in Rowley that carries Route 1A, Main Street, over the Massachusetts Bay Transportation Authority (MBTA) railroad tracks. The bridge was constructed in 1907 and had its last major reconstruction in 1931. According to the most recent inspection, the overall structure evaluation rates a 5, with the deck rating fair, the superstructure rating fair, and the substructure rating satisfactory. According to MassHighway, an overall rating of 5 means that it is “somewhat better than minimum adequacy to tolerate being left in place as-is”. The bridge scores a 66.5 out of 100 in the American Association of State Highway and Transportation Officials (AASHTO) bridge sufficiency rating. The bridge is not structurally deficient, however is functionally obsolete. A bridge is functionally obsolete when the deck geometry, load carrying capacity, vertical or horizontal clearance, or approach roadway alignment is such that the bridge no longer meets the usual criteria for the system of which it is an integral part. For example, the travel lanes may be narrower than today’s standard.

8.2.4 Public Transportation

The MBTA began commuter rail service to Rowley in 1998, after the railroad tracks were refurbished between Ipswich and Newburyport. A new station was constructed in Rowley off Railroad Avenue and contains 282 parking spaces and 7 handicapped spaces. An observation of the parking lot's usage was made on Wednesday, April 17, 2002, when approximately 49 cars were parked in this lot at 10:30 AM. The MBTA charges \$1.00 to park all day at the station.

There are 13 daily train trips inbound to Boston from the station and 13 daily trips outbound from Boston. **Table 8-6** lists the times of the trains departing from Rowley and Boston.

Table 8-6
MBTA Commuter Rail Schedule^a

Inbound			Outbound		
Train Number	Time Departing Rowley	Time Arriving Boston	Train Number	Time Departing Boston	Time Arriving Rowley
152	5:34 AM	6:32 AM	151	6:30 AM	7:22 AM
154	6:07 AM	7:05 AM	153	8:05 AM	9:02 AM
156	6:37 AM	7:37 AM	161	9:45 AM	10:39 AM
158	7:07 AM	8:02 AM	165	11:15 AM	12:09 PM
162	8:02 AM	9:00 AM	169	1:15 PM	2:09 PM
164	9:43 AM	10:37 AM	175	3:15 PM	4:11 PM
168	11:13 AM	12:07 PM	177	4:30 PM	5:29 PM
172	1:13 PM	2:07 PM	181	5:10 PM	6:08 PM
176	2:55 PM	3:51 PM	183	5:37 PM	6:36 PM
178	4:42 PM	5:39 PM	185	6:45 PM	7:42 PM
182	5:52 PM	6:49 PM	187	7:30 PM	8:22 PM
186	8:46 PM	9:41 PM	189	9:30 PM	10:24 PM
98	10:51 PM	11:55 PM ^b	143	10:40 PM	11:51 PM ^c

^a Source: MBTA. Schedule effective April 29, 2002.

^b Requires a transfer at the Beverly station.

^c Requires a transfer at the Beverly station.

As shown in **Table 8-4**, a train trip takes between 52 and 60 minutes; the duration depending on when the trip is made. One-way fare is available at a cost of \$4.50. Monthly commuter passes can be purchased for \$153 and twelve-ride passes can be purchased for \$49.50.

Bus Services

Currently, no private bus carriers serve the community. The closest such service is operated by the Coach Company, which provides three (3) morning inbound to and five (5) evening outbound trips from Boston and Logan Airport with a stop at Pearsons Plaza in Byfield.

The Town of Rowley is a member of the Merrimack Valley Regional Transit Authority (MVRTA), which is the primary provider of local and regional transit service in the Merrimack Valley region. Currently, the Town receives no services from the Authority. However, the MVRTA has recently initiated a new

demand-response service, Ring and Ride, which is available to the general public in the communities of Georgetown and Salisbury. The Georgetown service allows residents of Georgetown to commute within Georgetown with additional service to Haverhill, Lawrence General Hospital, Anna Jacques Hospital and the Rowley Commuter Rail Station. Residents may reserve a trip 24 hours before they intend to travel, where a van will come to their door. This service operates between 5:00 a.m. and 7:00 p.m. on weekdays and 9:00 a.m. and 6:00 p.m. on Saturdays. As a MVRTA member, the Town of Rowley may request that the Authority initiate this or a similar service and the Town would then be assessed for the net cost of its operation. Such a service, rather than a traditional fixed route bus service, would be a more appropriate transit option for the town to consider given its rural/suburban development pattern.

8.2.5 Bicycle Transportation

The Merrimack Valley Regional 2000 Transportation Plan lists several roadways in Rowley that have been identified as part of bike routes on a 1986 statewide bike map that was prepared by MassHighway. These are:

- Route 1A (Main Street), from the Ipswich line to the Newbury line.
- Route 133 (Haverhill Street), from the Ipswich line to Daniels Road; Daniels Road from Route 133 to Dodge Road; Dodge Road from Daniels Road to Long Hill Road.

In addition, MVPC staff recommended that the following roadways be studied by the Town to determine their feasibility as part of a community and regional level bicycling network:

- Route 133 (Haverhill Street), from- Daniels Road to the Georgetown line.
- Pingree Farm Road, from the Georgetown line-to Route 133.
- Wethersfield Street, from the Georgetown line-to Bennett Hill Road; Bennett Hill Road, from Wethersfield Street to Central Street.
- Route 1, from the Ipswich line to the Newbury line.
- Central Street, from Route 1 to Church Street; Church Street, from Central Street to Route 1A.
- Cross Street, from Central Street to Jellison Road; Jellison Road, from Central Street to Railroad Avenue; Railroad Avenue, from Jellison Road to Oyster Point Road and the MBTA Commuter Rail Station.
- Boxford Road, from Route 133-to the Boxford line.
- Hillside Street, from Wethersfield Street to Glen Street; Glen Street from Wethersfield Street to the Newbury line.
- Stackyard Road, from Route 1A (Main Street) to Nelson Island and the Parker River National Wildlife Refuge.
- Newbury Road, from Boxford Road to the Ipswich line.
- Dodge Road, from Route 133 to Daniels Road.

8.3 Transportation Network Safety

8.3.1 Vehicular Crashes

Increased traffic volumes, congestion, and traffic speeds are some factors that contribute to the increased incidence of automobile crashes and reduced safety of roadway users. Certain measures can be taken to increase safety of the roadway users, including: (1) improving the design of highways and intersections, and (2) increasing the enforcement of speed limits.

Historical traffic crash data was obtained for the intersections in Rowley from MassHighway computer files. The data was reviewed over a ten-year period, from 1991 to 2000, to determine crash trends. **Table 8-7** provides a summary of the highest crash locations. **Table A-1** of the Appendix shows the crash trends for those same locations on a year-by-year basis.

Table 8-7
Rowley Intersection Crash Summary
Ten Year Summary of the Highest Crash Locations (1991 to 2000)^a

Intersection	Number of Crashes	Crash Type ^b					Severity ^c			Roadway Condition		
		CM	RE	HO	ROR HFO	Unkn/ Other	PD	PI	F	Dry	Wet	Ice
Route 1 at Route 133	140	75	38	4	6	17	92	48	0	104	31	5
Route 1 at Glen Street & Central Street	51	30	11	4	2	4	25	26	0	41	9	1
Route 1A at Route 133	32	10	17	2	1	2	18	13	1	21	10	1
Route 1 at Wethersfield Street	28	21	4	1	1	1	13	15	0	20	5	3
Route 1A at Jellison Rd. & Railroad Ave.	11	6	0	1	3	1	9	2	0	9	1	1

^a Source: Massachusetts Highway Department crash database.

^b Crash Type: CM = Cross-Movement or angle type; RE = Rear-End; HO = Head-On; ROR/HFO = Ran Off Road or Hit Fixed Object; and Unkn = Unknown type.

^c Crash Severity: PD = Property Damage only; PI = Personal Injury; F = Fatal.

According to an analysis of the intersection data and as shown in **Table 8-7**, the location with the highest number of crashes is Route 1 at Route 133. This intersection experienced a total of 140 crashes over a ten-year period or an average of approximately 14.0 crashes per year. Over the ten-year study period, this signalized intersection experienced approximately 75 angle-type collisions and 38 rear-end collisions. There were approximately 92 collisions involving property damage only and 48 collisions involving

personal injury. Not shown in **Table 8-7** are the approximate 64 crashes (or approximately 45%) occurring during the evening peak period between 3:00 and 7:00 PM, which is a time of increased congestion. It should be noted that approximately four years ago improvements were made to the signal control of this intersection, including the addition of protected/permitted left-turn phasing for the Route 1 and Route 133 westbound approaches. Since that time the annual number of crashes has decreased. For the years 1999 and 2000, there have been an average of approximately 7.0 crashes per year. For the years prior to the signal improvement, from 1991 to 1998, there was an average of approximately 15.7 crashes per year.

The unsignalized intersections of Rowley experiencing the highest numbers of crashes are:

- Route 1 at Glen Street and Central Street with an average of 5.1 crashes per year;
- Route 1A at Route 133 with an average of 3.2 crashes per year;
- Route 1 at Wethersfield Street with an average of 2.8 crashes per year; and
- Route 1A at Jellison Road and Railroad Avenue with an average of 1.1 crashes per year.

Of interesting note is the fact that the two intersections of Route 1 at Glen Street and Central Street and Route 1A at Route 133 both have more crashes involving personal injury than they have involving property damage only. The intersection of Route 1A at Route 133 has more rear-end type collisions than any other collision types, a condition atypical for unsignalized intersections. Not shown in **Table 8-7** is that over the ten-year study period 14 of the 17 rear-end collisions, or approximately 80%, occurred on the Haverhill Street (Route 133) approach to the intersection, which is the controlled approach.

The number of crashes at the intersections have also been reviewed against intersection traffic volumes and then compared to the rate of crashes for other intersections. MassHighway reports that for the year 2000, the latest year available, there is a statewide average rate of 0.98 crashes per million entering vehicles (mev) for signalized intersections and 0.70 crashes per mev for unsignalized intersections. The intersection of Route 1 at Route 133 has a crash rate of approximately 1.50 crashes per mev, a rate that is approximately 50% higher than that of the statewide average rate for signalized intersections. The intersection of Route 1 at Glen Street and Central Street has a crash rate of approximately 1.10 crashes per mev, a rate that is also approximately 50% higher than that of the statewide average rate for unsignalized intersections. According to Town officials, the intersection of Route 1 at Glen Street and Central Street experienced a fatal automobile crash in 2001.

Specific design measures can be taken at intersections to improve and enhance safety. Some of these measures include:

- signalization of intersections to control traffic at a congested intersection in a more orderly fashion;
- widening of intersections for the provision of turn lanes to allow through traffic to bypass vehicles waiting to turn; and
- realigning intersecting roads or grading corners to improve corner sight distances.

As with other roadway improvement projects, engineering studies must be conducted prior to these projects to weigh both the positive and negative impacts of proposed changes. All studies and designs

should consider accommodation of pedestrians and bicyclists, two groups that often share the roadways with automobiles, especially during the summer months. Providing better facilities for these users will also improve the safety of automobile drivers as well.

8.3.2 Pedestrian Crashes

According to MassHighway's crash data files, over the ten-year period between 1991 and 2000, there have been six (6) recorded pedestrian crashes in Rowley, all of which involved personal injury. No trend in the crashes could be determined, as all the accidents were located in different locations. Only two of the six accidents occurred on roadways downtown that had sidewalks; the remaining four occurred at locations that had no sidewalks. The MassHighway crash data also indicates that there have been eight (8) recorded bicycle crashes over that same time period, seven of which involved personal injury. The crashes all occurred between the months of May and October. Like the pedestrian crashes, all of the bicycle crashes occurred at different locations.

8.4 Analysis of Existing Congested Transportation Facilities

Existing traffic volumes on the arterial roads in Rowley, such as Route 1, vary by season. According to data from MassHighway's Permanent Count Station #5128 on Route 1 in nearby Newbury, daily traffic volumes in June and July are approximately 13% higher than the monthly average daily traffic (ADT) volumes. Daily traffic volumes in April and October closely approximate the monthly ADT volumes.

A detailed existing conditions inventory of geometry and traffic volumes was completed for the most congested locations in Rowley, as identified by officials of the Town. The data was then used to analyze the operations of those locations.

8.4.1 Geometrics

Roadways

Route 1 is a two-lane arterial that runs on a fairly tangent alignment from south to north through Rowley, almost bisecting the Town. The roadway parallels Interstate I-95, to the west, and consists of 1 travel lane plus a paved shoulder, 6- to 10-feet in width and delineated by a painted single white solid edge line, in each direction. A painted double yellow centerline separates the two travel lanes over its entire length in Rowley. Land uses adjacent to Route 1 consist primarily of commercial developments south of Wethersfield Street, and less densely developed commercial and residential uses, north of Wethersfield Street. There are two signalized intersections on Route 1 in Rowley: one at its intersection with Route 133 (Haverhill Street), and one at its intersection with the Market Basket Plaza driveway, which is approximately 1,300 feet north of the Haverhill Street intersection.

Intersections

Route 1 at Route 133 (Haverhill Street)

Route 133 (Haverhill Street) intersects Route 1 from the east and west to form a four-legged, signalized intersection. Both Route 1 approaches consist of one 13- to 13.5-foot wide through lane and a 12- to 12.5-foot wide left turn lane pocket, approximately 50- to 75-feet in length. Right-turning vehicles are channelized onto Route 133 from Route 1 in both directions by delta-shaped traffic islands. The island on the northwest corner is approximately 450 square feet in size and is covered with cement concrete. The other island is approximately 1,800 square feet in size and is covered with grass. Both Route 133

intersection legs consist of 5-foot wide bituminous concrete center median islands. The island on the west side is approximately 50-feet long and on the one on the east side is approximately 125-feet long. The eastbound approach is approximately 20-feet wide and is used as two lanes, generally as a left-turn lane and a through/right-turn lane. The westbound approach consists of one 11.5-foot wide exclusive left-turn lane, approximately 100-feet in length and one 13-foot wide through/right-turn lane. Route 133 has a short radius horizontal curve from its northeast to southwest alignment to its east to west alignment approximately 150 feet back from the intersection.

Traffic at the intersection is controlled by a four-phase, fully actuated signal. Protected and permitted left-turn phasing is provided for Route 133 westbound approach and both Route 1 approaches. Signal heads are mounted on mast arm supports as well as posts. Curb cuts exist on both Route 1 and Route 133 at the intersection for three corner land uses: a vacant building, which was formerly a car dealership, in the northeast corner; the Rowley Mall in the northwest corner; and the Agawam Diner in the southwest corner. Wide-open curb cuts exist to the diner from Route 1. The southeast corner is covered with grass and is used as a parking area for school buses.

Route 1 at Glen Street and Central Street

Glen Street and Central Street intersect Route 1 from the west and east, respectively, to form a four-legged, unsignalized intersection. Route 1 consists of one travel lane per direction, separated by a painted double solid yellow centerline, as it passes Glen and Central Streets. Likewise, both Glen Street and Central Street consist of one travel lane per direction, separated by a painted double yellow centerline. The Route 1 approaches to the intersection are on upgrades with the crest of the vertical curve at the intersection. The Central Street approach is on a downgrade. Post-mounted STOP signs and painted STOP bars exist on the Glen and Central Street approaches. To supplement this control, a beacon supported by a mast arm, flashes yellow for the Route 1 approaches and red for the Glen and Central Street approaches. Wooded buffers to residences exist on the northeast and northwest corners of the intersection. A single-family residence exists on the southwest corner and an acupuncture business exists on the southeast corners. Access to these uses is provided solely on Glen and Central Streets. A ledge outcrop on the northeast corner and a stone retaining wall on the southeast corner restrict stopping sight distances to approximately 400 feet to the north and 350 feet to the south.

8.4.2 Traffic Volumes

MVPC gathered traffic volume data in March, April, and July of 2002. Daily traffic volumes were obtained by Automatic Traffic Recorders (ATRs), which were placed on Route 1, north and south of Route 133 in March. Weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) commuter peak period turning movement and classification counts (TMCs) were conducted at the intersections of Route 1 at Route 133 and Route 1 at Glen and Central Streets in April. A Saturday midday (12:00 to 2:00 PM) peak period was also conducted at the intersection of Route 1 at Route 133 in July. Daily and peak period traffic volume data are provided in the appendix of this plan.

Table 8-8 presents the daily and peak hour traffic volumes on Route 1, north and south of Route 133.

**Table 8-8
Route 1 Traffic Volume Summary**

Location	Average Weekday Daily Traffic Volume^a	Peak Hour	Peak Hour Traffic Volume^b	K- Factor^c	Directional Distribution
Route 1, north of Route 133	12,500	Morning	847	6.8	51.2 % Southbound
		Evening	1199	9.6	51.1 % Northbound
Route 1, south of Route 133	12,700	Morning	1086	8.6	59.6 % Southbound
		Evening	1389	10.9	57.1 % Northbound

^aAverage Weekday Daily Traffic (AWDT) volume in vehicles per day (vpd). March volumes were increased approximately 6.7% to reflect monthly average traffic volumes.

^bPeak hour traffic volume in vehicles per hour (vph).

^cK-Factor is the percent of daily traffic occurring during the peak hour; expressed as a percentage.

As shown in **Table 8-5**, Route 1 carries approximately 12,500 vehicles per day (vpd) on an average weekday north of Route 133, and approximately 12,700 vpd, south of Route 133. The predominant direction of travel is southbound during the weekday morning peak hour and northbound during the weekday evening peak hour. As evidenced by the increased directional distributions on Route 1, south of Route 133, much of the commuter traffic destined to the south during the morning peak hour originates from Route 133. Conversely, during the evening peak hour, much of the commuter traffic originating from the south is destined for Route 133. During the weekday evening peak hour, Route 1 carries between 9.6% and 10.9% of its daily traffic volume.

8.4.3 Operations Analysis Methodology

The operations of the unsignalized intersection of Route 1 at Glen and Central Streets and the signalized intersection of Route 1 at Route 133 were conducted by the methodology presented in the 2000 *Highway Capacity Manual*.

Level of Service

A primary result of operations analyses is the assignment of level of service to traffic facilities under various traffic flow conditions. Level of service is a qualitative measure describing operational conditions within a traffic stream and the perception of these conditions by motorists and/or passengers. A level of service definition provides an index to the quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing the worst.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no delay to minor street traffic.
- *LOS B* represents a condition with short delays to minor street traffic.
- *LOS C* represents a condition with average delays to minor street traffic.
- *LOS D* represents a condition with long delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with long delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme delays resulting.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very small delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively small delay; however, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher delays. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Evaluation Criteria

Evaluation criteria used in the capacity analyses are described below.

Unsignalized Intersections

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2000 *Highway Capacity Manual*. Level of service (LOS) is measured in terms of average control delay, which is the delay caused by traffic control, such as a STOP sign. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average stopped delay for any controlled movement is mathematically a function of the volume-to-capacity ratio for that particular movement. **Table 8-9** summarizes the relationship between LOS and expected delay.

Table 8-9
Level-of-Service Criteria For Unsignalized Intersections^a

Level of Service	Average Control Delay (seconds per vehicle)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

^a Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000; page 17-2.

Signalized Intersections

LOS designations for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*. This method assesses the effect of signal type, timing, phasing, progression, vehicle mix, and geometrics on delay. LOS designations are based solely on the criterion of calculated control delay, also known as signal delay. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Delay can also be a measure of driver discomfort, frustration, fuel consumption, and increased travel time. **Table 8-10** summarizes the relationship between LOS and delay. The tabulated delay criterion may be applied in assigning LOS designations to individual lane groups, intersection approaches, or to entire intersections.

Table 8-10
Level-of-Service Criteria For Signalized Intersections^a

Level of Service	Average Control Delay (seconds per vehicle)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000; page 16-2.

8.4.4 Operations Analysis Results for Congested Locations

Unsignalized Intersections

Table 8-11 presents the results of the operations analysis results for the unsignalized intersection of Route 1 at Glen and Central Streets.

Table 8-11
Operations Analysis Results for Route 1 at Glen and Central Streets

Peak Hour	Movement ^a	Demand ^b	AD ^c	LOS ^d	Queue ^e
Weekday Morning	Route 1 northbound LT	14	7.9	A	0.0
	Route 1 southbound LT	91	7.9	A	0.2
	Glen Street LT/TH/RT	146	21.6	C	2.0
	Central Street LT/TH/RT	132	14.4	B	1.0
Weekday Evening	Route 1 northbound LT	49	8.0	A	0.1
	Route 1 southbound LT	97	8.4	A	0.3
	Glen Street LT/TH/RT	89	22.5	C	1.3
	Central Street LT/TH/RT	210	32.5	D	4.6

^a LT = Left Turn; TH = Through movement; RT = Right Turn.

^b Demand is in vehicles per hour (vph).

^c Average Control Delay is in seconds per vehicle.

^d Level of Service.

^e 95th percentile queue is in vehicles.

As shown in **Table 8-11**, the left-turns from Route 1 operate at LOS A, with little delay, during the weekday morning and evening peak hours. Traffic on the STOP-sign controlled approach of Glen Street operates at LOS C during both the weekday morning and evening peak hours. Traffic on the controlled approach of Central Street operates at LOS B during the weekday morning peak hour and at LOS D during the weekday evening peak hour. During the evening peak hour, traffic on the Central Street approach is delayed an average of 32.5 seconds and the maximum queue is approximately five (5) vehicles.

Signalized Intersections

Table 8-12 presents the results of the operations analysis results for the signalized intersection of Route 1 at Route 133.

Table 8-12
Operations Analysis Results for Route 1 at Route 133

Peak Hour	Movement/Total ^a	V/C ^b	AD ^c	LOS ^d	Queue ^e	Length ^f
Weekday Morning	Route 1 NB LT	0.46	31.7	C	4.2	105
	Route 1 NB TH	0.42	19.2	B	9.3	233
	Route 1 SB LT	0.38	37.1	D	1.6	40
	Route 1 SB TH	0.70	29.2	C	14.4	360
	Route 133 EB LT	0.29	15.7	B	3.2	80
	Route 133 EB TH/RT	0.70	22.1	C	16.5	413
	Route 133 WB LT	0.52	19.1	B	4.5	113
	Route 133 WB TH/RT	0.38	16.3	B	8.1	203
	Intersection	0.66	22.4	C		
Weekday Evening	Route 1 NB LT	0.56	19.2	B	6.6	165
	Route 1 NB TH	0.80	33.8	C	20.4	510
	Route 1 SB LT	0.22	16.5	B	2.3	58
	Route 1 SB TH	0.74	30.4	C	18.3	458
	Route 133 EB LT	0.41	22.7	C	4.8	120
	Route 133 EB TH/RT	0.67	27.5	C	14.0	350
	Route 133 WB LT	0.33	14.7	B	3.5	88
	Route 133 WB TH/RT	0.42	15.3	B	11.2	280
	Intersection	0.84	25.3	C		
Saturday Midday	Route 1 NB LT	0.50	17.9	B	5.7	143
	Route 1 NB TH	0.84	37.3	D	22.2	555
	Route 1 SB LT	0.19	16.4	B	2.0	50
	Route 1 SB TH	0.73	29.8	C	17.8	445
	Route 133 EB LT	0.45	23.1	C	5.3	133
	Route 133 EB TH/RT	0.91	46.1	D	22.6	565
	Route 133 WB LT	0.51	17.5	B	4.6	115
	Route 133 WB TH/RT	0.41	15.2	B	10.7	268
	Intersection	0.95	30.1	C		

^a NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = Left Turn; TH = Through movement; RT = Right Turn.

^b Volume to Capacity ratio.

^c Average Control Delay is in seconds per vehicle.

^d Level of Service.

^e 95th percentile queue is in vehicles.

^f Length of queue is in feet; assumes 25 feet per vehicle.

As shown in **Table 8-12**, the intersection of Route 1 at Route 133 operates at LOS C during the weekday morning, weekday evening, and Saturday midday peak hours. During the Saturday midday peak hour, the critical movements of the intersection are currently operating near capacity. According to the analysis, the longest maximum vehicle queues on Route 1 are approximately 555 feet in the northbound direction during the Saturday midday peak hour and approximately 458 feet in the southbound direction during the

weekday evening peak hour. The longest maximum vehicle queue on the eastbound Route 133 approach occurs during the Saturday midday peak hour and is approximately 565 feet long.

8.4.5 Traffic Signal Warrants Analysis

A traffic signal warrants analysis was conducted for the intersection of Route 1 at Glen and Central Streets using traffic volume data gathered from the TMCs collected in April. Certain thresholds for the warrant or need for an intersection to be signalized have been determined by experienced transportation officials over the years, and these thresholds are used today by transportation engineers and planners as a guideline.

This warrants analysis assumes the existing geometry of the intersection including one lane on the major street approaches and one lane on the minor street approach and the 85th percentile speed of the major street traffic greater than 70 km/h (40 mph). The major street is Route 1 (Newburyport Turnpike) and the volumes are the totals for both directions under 2002 existing traffic volume conditions. The minor street is Central Street and the volumes are the total approach volume under 2002 existing traffic volume conditions.

The analysis tested for the following warrants of the *Manual on Uniform Traffic Control Devices* (MUTCD):

- Warrant 1, Condition A, Minimum Vehicular Volume
- Warrant 1, Condition B, Interruption of Continuous Traffic
- Warrant 2, Four-Hour Vehicle Volume
- Warrant 3, Peak Hour Volume

Warrant 1, Eight-Hour Vehicle Volume, Condition A, Minimum Vehicular Volume, is satisfied for any hour if the total vehicles per hour on both approaches of the major street is at least 350 and the higher-volume minor street has at least 105 vehicles. These thresholds must be satisfied for at least eight hours of the day to meet Warrant 1. Warrant 1, Eight-Hour Vehicle Volume, Condition B, Interruption of Continuous Traffic, is satisfied for any hour if the total vehicles per hour on both approaches of the major street is at least 525 and the higher-volume minor street has at least 53 vehicles. These thresholds must be also satisfied for at least eight hours of the day to meet Warrant 1. Warrant 2, Four-Hour Vehicle Volume, is met when, for any four hours of the day, plotted traffic volumes fall above the appropriate curve shown in Figure 4C-2 on page 4C-7 of the MUTCD. Warrant 3, Peak Hour, is met when, for any one hour of the day, plotted traffic volumes fall above the appropriate curve shown in Figure 4C-4 on page 4C-9 of the MUTCD.

Table 8-13 presents the results of the warrants analysis.

Table 8-13
Traffic Signal Warrants Analysis
Route 1 at Glen Street and Central Street

Hour	Traffic Volumes (vph) ^a		1A	1B	2	3
	Major Street	Minor Street				
7:00 – 8:00 AM	550	141	Yes	Yes	Yes	No
8:00 – 9:00 AM	580	116	Yes	Yes	Yes	No
9:00 – 10:00 AM	536	81	No	Yes	No	No
12:00 – 1:00 PM	646	117	Yes	Yes	Yes	No
1:00 – 2:00 PM	643	114	Yes	Yes	Yes	No
2:00 – 3:00 PM	702	115	Yes	Yes	Yes	No
3:00 – 4:00 PM	799	125	Yes	Yes	Yes	Yes
4:00 – 5:00 PM	828	166	Yes	Yes	Yes	Yes
5:00 – 6:00 PM	802	125	Yes	Yes	No	Yes
Signal Warrant Met?						

^a Vehicles per hour.

The traffic signal warrants analysis indicates that installation of a signal at the intersection of Route 1 at Glen and Central Streets is warranted under existing traffic volume conditions.

8.5 Buildout Analysis

MVPC conducted a buildout analysis of the remaining developable land in the Town of Rowley, to satisfy some of the requirements of Massachusetts Executive Order Number 418, issued by the governor on January 21, 2000. The Order directs the Department of Housing and Community Development (DHCD), the Executive Office of Environmental Affairs (EOEA), the Executive Office of Transportation and Construction (EOTC), and the Department of Economic Development (DED) to provide assistance to cities and towns within the State for community planning.

The tally of developable land in Rowley excluded land that is considered permanently protected open space or is protected by the Wetlands Protection Act or the Rivers Protection Act. Also, land that is constrained due to severe physical conditions, such as adverse topography, was excluded. The most intensive by-right development, in accordance with the Town's zoning requirements, was assumed to occupy all of the developable land that was not absolutely constrained. The analysis also assumed that there would be no new development on property that is currently developed. Assuming that all of the area of land that is developable is developed, certain impacts to municipal services were calculated including: the anticipated new population, the new number of students, and the projected new water usage.

8.5.1 Buildout Trip Generation

Taking the buildout analysis one step further, average daily vehicle trips were generated for the most intensive land uses assumed. **Table 8-14** presents a summary of the trip generation analysis. As shown in **Table 8-14**, there remains the potential for over 2,000 residential dwelling units and over 3 million

square feet of commercial floor space to be constructed within Rowley. If Rowley is completely built out with these developments, there will be an increase of a total of 57,654 vehicle trips (28,821 entering and 28,821 exiting) generated by these developments.

However, not all vehicle trips that will be generated by some of the anticipated commercial developments represent new vehicle trips on the roadway network. Studies have shown that for retail developments, a substantial portion of the site generated vehicle trips are either already present in the adjacent passing stream of traffic (impulse trips) or are diverted from another route to the development. Depending on the type of land use and its location, impulse traffic can account for up to 60% of the total site-generated trips. Conservatively, for this plan and what is typically the standard in planning, only 25% of the total site-generated trips were considered to be impulse trips. For this reason 75% of all of the trips to and from developments in the Retail zoning district and 75% of vehicle trips to and from the retail developments in the Central district are considered as new trips to the roadway network. The last column of **Table 8-14** shows that, as projected, if Rowley is completely built out, there will be a total of 51,792 new daily vehicle trips added to Rowley's roadways.

Table 8-14
Buildout Analysis Trip Generation Summary

Zoning District^a	Raw Area of Developable Land (acres)^b	Potential No. Of Dwelling Units^c	Potential New Commercial/ Industrial Space (sq. ft.)^d	Total Daily Vehicle Trips^e	New Daily Vehicle Trips^f
Retail	34.06		408,108	16,898	12,674
Business/Light Industrial	157.81		1,960,260	10,110	10,110
Central	170.71	144	790,798	12,900	11,262
Residential	96.91	56		536	536
Outlying	3,144.82	1,805		17,210	17,210
Rowley Total	3,604.31	2,005	3,159,166	57,654	51,792

^a New town zones adopted at the May, 2002 Town meeting. Mix of uses assumed in zones: 100% retail in Retail, 60% manufacturing and 40% office in Business/Light Industrial, 40% retail, 40% single-family residential, and 20% multi-family residential in Central, and 100% single-family residential in Residential and Outlying districts.

^b Area of developable land includes land unconstrained and land constrained by the Rivers Protection Act 200 ft. buffer. Developable land in constrained areas and their zoning districts: 3.0 acres in Retail, 8.0 acres in Business/Light Industrial, 6.0 acres in Central, 5.0 acres in Residential, and 189.0 acres in Outlying district.

^c Number of both single-family and multi-family dwelling units.

^d Gross square footage of space.

^e Average daily vehicle trips.

^f Trips for retail development assumed to consist of a mix of 25% impulse trips and 75% new trips.

The trip generation rates for the various land uses identified in the above table were based on data developed by the Institute of Transportation Engineers (ITE). In the 6th Edition of ITE's *Trip Generation Manual*, there are daily (weekday, Saturday, and Sunday) average trip rates for retail centers, office developments, manufacturing or industrial facilities, and residential developments.

For the trip generation analysis, trip rates were used for land uses identified within the *Trip Generation Manual*, which most closely approximated the anticipated developments in Rowley and which had the most comprehensive trip data. A formula of 5 times the weekday daily trip rate plus the Saturday rate and the Sunday rate divided by the seven days of the week was used to derive an average daily rate for all of the land uses. For the anticipated retail development, the average daily trip rates for Land Use Code (LUC) 820, Shopping Center, were used. The rates were applied to 408,108 square feet of potential developable floor space in the Retail district and 158,160 square feet of retail space in the Central district. The trip rates for LUC 710, General Office Building, were applied to 784,104 square feet of office floor space that could be built in the Business/Light Industry district and 632,638 square feet of developable office space in the Central district. For the 1,176,156 square feet of industrial floor space that could be built in the Business/Light Industry district, the trip rates for LUC 140, Manufacturing, were used. There are 80 dwelling units that could potentially be built as part of multifamily residential developments in the Central district and the trip rates for LUC 230, Residential Condominium/Townhouse, were used for those units. For single-family residences, there are 64 dwelling units that could be constructed in the Central district, 56 units that could be built in the Residential district, and 1,805 units that could be built in the large Outlying district. The trip rates for LUC 210, Single-Family Detached Housing, were applied to the single-family residential units in those districts. **Table 8-15** presents a summary of the vehicle trip generation by land use types and zoning districts.

Table 8-15
Trip Types

Zoning District^a	Retail Daily Vehicle Trips^b	Office Daily Vehicle Trips^c	Indust. Daily Vehicle Trips^d	Resid. Daily Vehicle Trips^e	Total Daily Vehicle Trips
Retail	16,898				16,898
Business/Light Industrial		6,544	3,566		10,110
Central	6,550	5,284		1,066	12,900
Residential				536	536
Outlying				17,210	17,210
Rowley Total	23,448	11,828	3,566	18,812	57,654

^a New town zones adopted at the May, 2002 Town meeting.

^b Retail vehicle trips generated by the ITE *Trip Generation Manual*, 6th Ed., LUC 820, Shopping Center, average trip rates applied to 408.108 ksf in the Retail district and 158.160 ksf in the Central district.

^c Office trips generated by the ITE *Trip Generation Manual*, 6th Ed., LUC 710, General Office Building, average trip rates applied to 784.104 ksf in the Business/Light Industry district and 632.638 ksf in the Central district.

^d Light Industrial vehicle trips generated by the ITE *Trip Generation Manual*, 6th Ed., LUC 140, Manufacturing, average trip rates applied to 1,176.156 ksf in the Business/Light Industry district.

^e Residential vehicle trips generated by the ITE *Trip Generation Manual*, 6th Ed., LUC 230, Residential Condominium/Townhouse, average trip rates applied to 80 dwelling units in the Central district, and LUC 210, Single-Family Detached Housing, average trip rates applied to 64 dwelling units in the Central district, 56 dwelling units in the Residential district, and 1,805 dwelling units in the Outlying district.

As shown in **Table 8-15**, with Rowley fully built out, it is projected that there will be an increase of approximately 23,448 daily vehicle trips to and from anticipated retail developments, with 11,724 vehicles entering and 11,724 vehicles exiting those developments. There will be an increase of 11,828

and 3,566 daily vehicle trips to and from anticipated office and industrial developments, respectively. For all new potential housing units, there will be a projected average daily trip generation of 18,812 vehicles per day.

8.5.2 Buildout Trip Distribution

To project where the traffic from the anticipated developments within Rowley will be coming from and where it will be going to, the most recent survey data sampled from Rowley residents and workers was used. The United States Department of Transportation has compiled journey-to-work data from the results of the 1990 U.S. Census in its *Census Transportation Planning Package*, published by its Bureau of Transportation Statistics. The journey-to-work data for Rowley shows that, in 1990, approximately 85% of Rowley's residents that were employed, made trips to and from workplaces outside Rowley, with the remainder working for employers inside Rowley. The data also shows that approximately 75% of workers for employers inside Rowley made trips to work from residences outside Rowley, while the remaining 25% came from residences within Rowley. The distribution of workers and residents from this data was applied to the projected vehicle trips expected to be generated by residential, office, and industrial developments. It was assumed that the retail development in the Retail district on Route 1 would have more of a regional draw with approximately 75% of its trips originating from outside Rowley, while the retail development in the Central district would have more of a local draw with approximately 50% of its trips originating from outside Rowley. **Table 8-16** presents a summary of the vehicle trip-ends by land use type. As shown in **Table 8-16**, there will be an increase of approximately 39,498 vehicles per day on the roadways entering and exiting Rowley.

Table 8-16
Trip Origin/Destination

Trip Type	Total Daily Vehicle Trips	New Daily Vehicle Trips	New Trips with Both Trip-Ends Inside Rowley^a	New Trips with One Trip-End Outside Rowley
Retail (Local)	6,550	4,912	2,456	2,456
Retail (Regional)	16,898	12,674	3,168	9,506
Office	11,828	11,828	2,956	8,872
Industrial	3,566	3,566	892	2,674
Residential	18,812	18,812	2,822	15,990
Rowley Total	57,654	51,792	12,294	39,498

^a Percentage of office, industrial and residential trips originating from and destined to points within Rowley is based upon Journey to Work data compiled from the 1990 U.S. Census by the U.S. Department of Transportation.

The 1990 journey-to-work data was again consulted to assign the vehicles, which will be generated by the anticipated developments, to Rowley's roadway network. From the data, the relative percentage of Rowley residents that work in each of the surrounding communities was determined. A map showing the location of remaining land that could be developed into housing was also consulted. By knowing where the new housing will be located in Rowley and where those people will most likely be commuting to work, the roadway network assignment of the residential vehicle trips was then determined. Likewise, the journey-to-work data also showed the relative percentage of where the people who work in Rowley come from. A map showing where land in Rowley (mostly along Route 1) could be developed into commercial space was also consulted. Knowing where the new workplaces will be located in Rowley and where the

workers will most likely come from, the roadway network assignment of the office and industrial vehicle trips was then determined. The distribution of retail trips was based upon a cordon count of existing traffic around Rowley. **Table 8-17** presents a summary of the distribution of trips on Rowley's roads, near the town lines, by the various trip types.

Table 8-17
Trip Distribution and Border Roadway Assignment

Trip Type	To/From South			To/From North		To/From West		
	Route 1	Route 1A	Other Roads	Route 1	Route 1A	Route 133	Glen Street	Wethersfield Street
Retail (Local) ^a	25.0%	30.0%	0.0%	15.0%	10.0%	20.0%	0.0%	0.0%
Retail (Regional) ^b	50.0%	10.0%	0.0%	20.0%	5.0%	15.0%	0.0%	0.0%
Office/Industrial ^c	30.0%	5.0%	0.0%	15.0%	5.0%	30.0%	12.5%	2.5%
Residential ^d	30.0%	15.0%	17.5%	7.5%	2.5%	22.5%	2.5%	2.5%

^a Retail development within the Central district was assumed to attract clientele from Rowley and population centers in the communities nearest Rowley. Distribution based on a cordon of the traffic on roads surrounding Rowley.

^b Retail development within the Retail district was assumed to attract clientele from population centers surrounding Rowley.

^c Trip distributions for office and industrial development within Rowley was based on Journey to Work data compiled from the 1990 U.S. Census by the U.S. Department of Transportation.

^d Trip distributions for residential development within Rowley was based on Journey to Work data compiled from the 1990 US Census by the U.S. Department of Transportation.

8.5.3 Buildout Daily Traffic Volumes

The trips generated by the anticipated retail, office, industrial, and residential developments were distributed onto Rowley's roadways. **Table 8-18** presents a summary of the projected increase in average daily traffic volumes on Rowley's roads at or near the town lines. As shown in **Table 8-18**, with Rowley built out some time in the future, traffic volume increases are projected to be in the order of between 25% and 100% on Rowley's roads. Route 1 at the Ipswich town line is projected to increase from its existing average daily traffic volume of 15,173 vehicles per day to 28,805 vehicles per day when Rowley is built out sometime in the future. This means that by its current hourly distribution of traffic, this two-lane section of Route 1 will be at capacity during the weekday evening peak hour. However, it should be noted that these projections do not include any growth in background traffic, due to land development, population increases, and increased economic activity outside Rowley, which effectively increase these traffic projections.

Table 8-18
Buildout Analysis Results
Projected Average Daily Traffic on Rowley's Border Roads

Roadway	Location	Existing ADT^a	ADT Increase	Buildout ADT	Percent Increase
Route 1	at the Ipswich line	15,173	13,632	28,805	90
	north of Central Street	8,400	5,200	13,600	62
Route 133 (Haverhill Street)	at the Georgetown line	13,042	8,978	22,020	69
Route 1A (Main Street)	at the Ipswich line	18,617	4,660	23,277	25
	at the Rowley line	4,553	1,698	6,251	37
Glen Street	west of Route 1	1,836	1,842	3,678	100
Wethersfield Street	west of Route 1	NA	690	NA	NA
Other roadways	in southern Rowley	NA	2,798	NA	NA
Rowley Town Line Total			39,498		

^a Average daily traffic volumes in vehicles per day (vpd).

NA = Data not available/ not applicable.