

**TOWN OF MERRIMACK
BUILDOUT STUDY
Revised - October 2001**

PRELUDE

A buildout study is a statistical analysis and a planning tool used to determine the future development characteristics of a community. The information within this report can be used to assist the Town in evaluating local land use regulations, infrastructure improvements, and community needs such as conservation or recreation. However, this analysis is not intended to address many quality of life issues related to a community buildout nor does it recommend specific infrastructure improvements. This report seeks to better quantify existing development patterns and indicate possible locations of future development in town. The estimated financial impact of future development upon municipal services is based upon current municipal information (service costs, tax rate, etc.) and is measured in current dollars.

BUILDOUT METHODOLOGY

A buildout analysis follows a three-part process. Part one determines the amount of vacant land remaining in town. Part two determines how much of that vacant land is unconstrained, therefore developable. Part three applies a reasonable density estimate to new development.

This analysis identifies the land that is constrained or in use, and the land that is vacant and unconstrained. Constraints mapping was used to determine where development is less likely to occur due to the presence of natural or man-made features (see Map 7). For the purposes of this analysis, development constraints include wetlands (hydric soils), 100-year floodplains, areas already developed, and publicly owned land (protected). Once the constraints are removed from consideration, other factors controlling the type, location and density of development such as zoning or the availability of public services were considered. The geographic information systems (GIS) datalayers used in the constraints mapping are listed in Table 1.

**Table 1
Geographic Information Systems (GIS) Datalayers**

Data Layer	Source	Description
Soils	NRCS soil maps	Includes soil types, attributes
Land use	NRPC/Merrimack	Land use types
Floodplains	UNH Granit Project	Based upon FEMA/FIRM mapping
Roads	UNH Granit Project	Based on USGS Digital Line Graph
Rivers	UNH Granit Project	Based on USGS Digital Line Graph
Public Sewer & Water	NRPC	Based on road network & proximity of sewer and water lines to the road
Traffic Analysis Zones	NRPC/Merrimack	Traffic analysis zones developed by NRPC.
Town Boundary	UNH Granit Project	Based on USGS Digital Line Graph
Zoning Districts	NRPC/Merrimack	Based on 1998 Merrimack Zoning Ordinance

BUILDOUT ASSUMPTIONS

The following are assumptions used in this analysis about the amount, location and cost of future residential and non-residential development. These assumptions were agreed upon for the purposes of this analysis and need to be reviewed and modified as the community develops over time. Changes in any of these assumptions could result in variations in the buildout analysis.

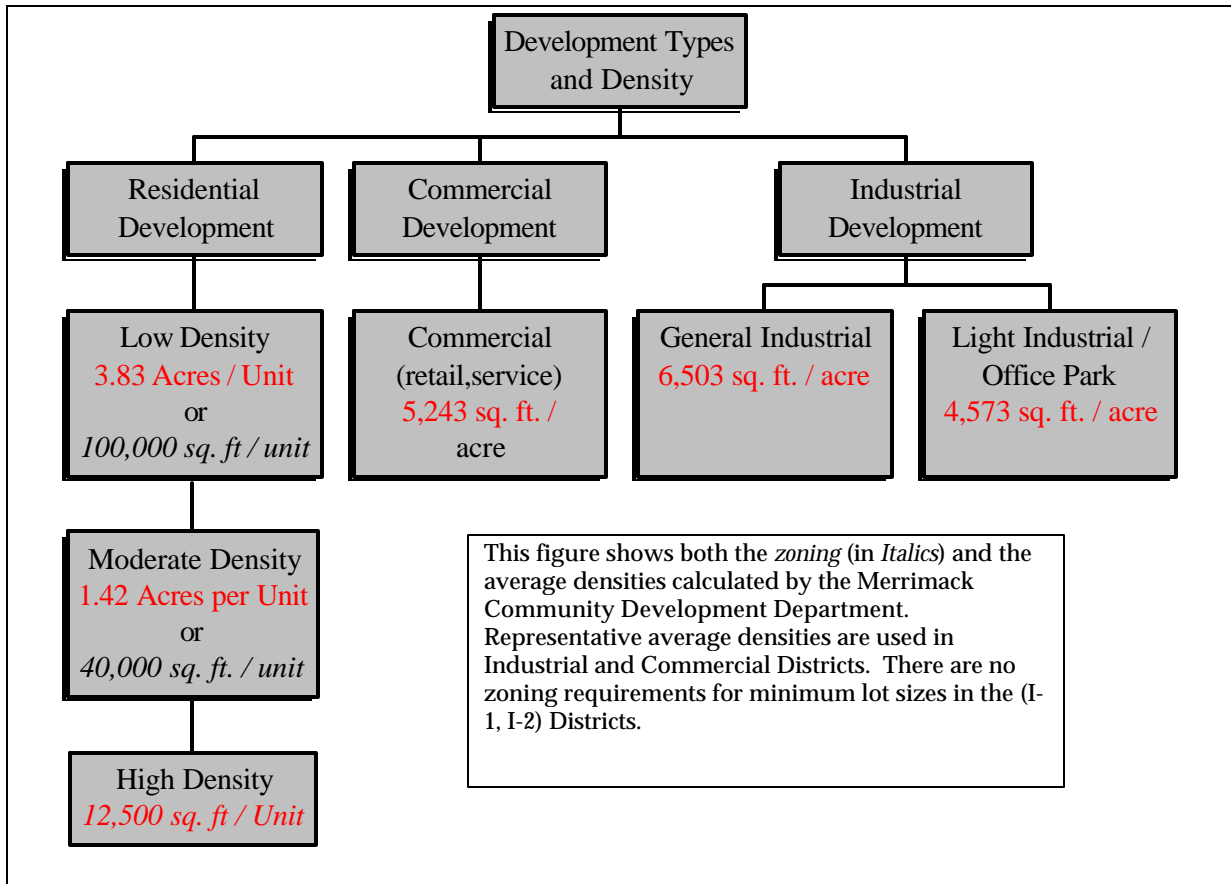
- Zoning controls the type, location, and density of development and Merrimack's zoning regulations will not change between now and buildout.
- The substantial presence of soils that have severe limitations for septic systems and the lack of public sewer service in western portions of Merrimack will result in larger lots and lower residential densities.
- Redevelopment of existing residential or non-residential developments will not result in an expansion of the number of housing units or building space.
- The multipliers used to calculate future resident and student populations will remain constant until buildout.
- The amount of land dedicated to municipal use, parks, conservation or recreation will remain constant until buildout.
- Residential development is defined as single family or multi-family while non-residential development falls into three sub-groups: commercial, light industrial and general industrial.

DENSITY OF DEVELOPMENT

Density of development can be defined as the concentration and scale of buildings or dwelling units in relation to the total area of the parcel. The buildout results throughout this analysis show two possible buildout scenarios that use different density values for new residential development. The buildout scenario referred to as the "average" density buildout applies an average lot size identified through a representative sample of recent development in Merrimack. As a condition of development, zoning often prescribes a maximum density by establishing a minimum lot size. The "zoning" buildout densities reflect the current lot size requirements as indicated in the *Merrimack Zoning Ordinance and Building Code, 1998*. The ordinance establishes residential lot sizes based in part upon soil type and the availability of public sewer service. Considering that in many areas soil conditions west of the Everett Turnpike severely limit opportunities for residential septic systems, 100,000 square feet per residence was applied in areas that are not likely to be sewered by the Town. A density of 40,000 square feet per residence was applied to areas currently sewered or areas that may reasonably be sewered by the Town before buildout. A high-density value of 12,500 square feet per residence was applied to those residentially zoned areas east of the F.E. Everett Turnpike.

Average density is calculated using the average lot size for residential development or the average gross floor area (GFA) for recently approved non-residential developments. Average residential densities of 3.83 acres (166,834 square feet) and 1.42 acres (61,855 square feet) per dwelling unit reflect the Town's current zoning requirements for building setbacks, road frontage as well as soil conditions. The zoning buildout scenario accounts for only the lot size requirements of the zoning ordinance. Figure 1 illustrates the density values assigned to general land use activities.

Figure 1
Development Densities by General Use

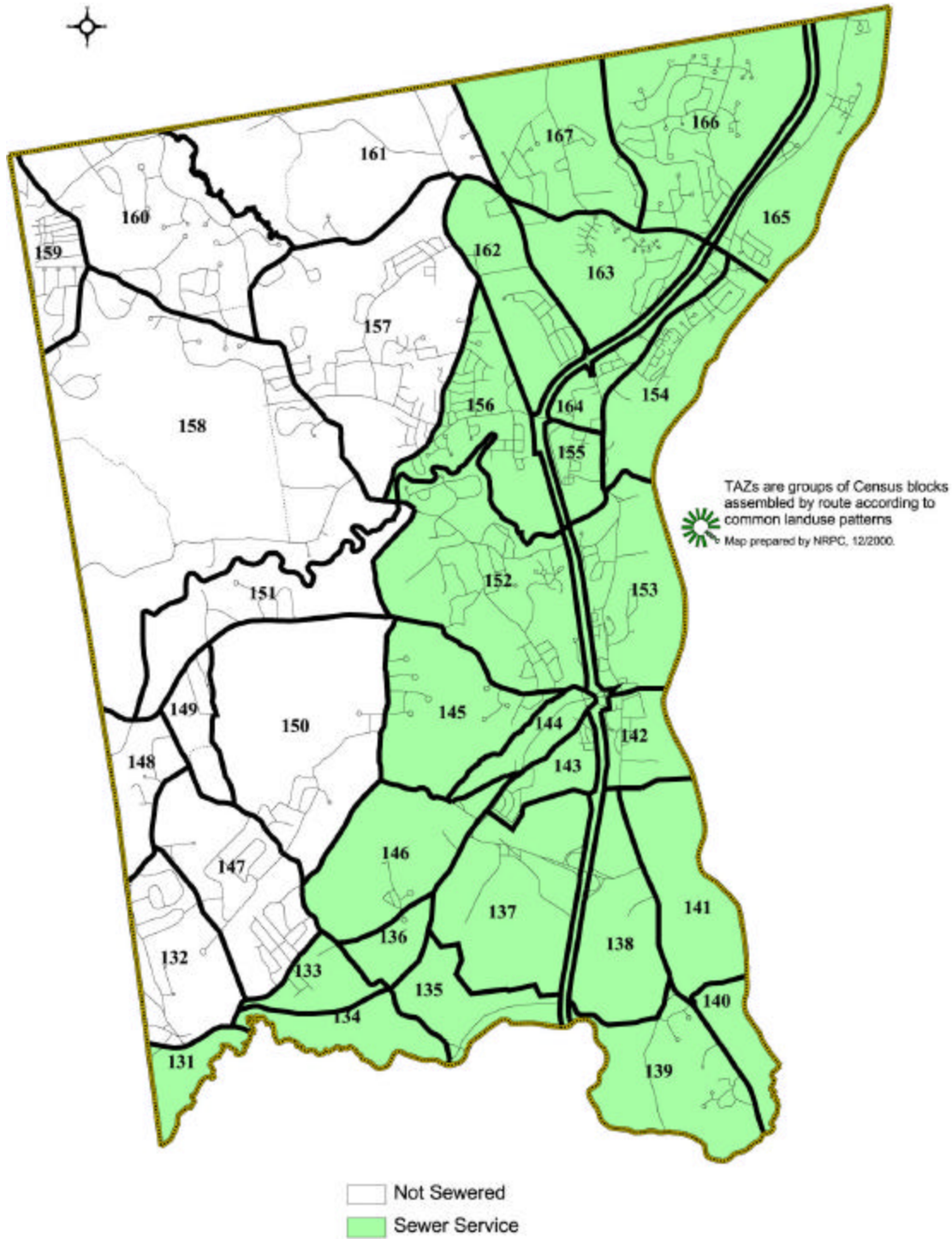


Future non-residential development is divided into three categories: commercial, general industrial and light industrial/office park. Non-residential densities are based upon plans recently submitted to the Town of Merrimack and are measured in total square feet of interior building space per acre. General Industrial uses such as Chem-Fab or Nashua Corp. tend to use more building space on average for production and warehousing of materials. Light industrial developments, (such as Fidelity) utilize "campus" style designs and use less building space on average, approximately 4,573 square feet per acre. Commercial development including most retail and service activities require on average 5,243 square feet of interior building space per acre.

UNIT OF ANALYSIS: TRAFFIC ANALYSIS ZONES

A traffic analysis zone or TAZ is a geographic portion of town that usually follows existing road development or natural barriers. There are thirty-seven (37) TAZs in Merrimack used by NRPC to estimate traffic volumes. The buildout analysis divides the Town into "sewered" and "unsewered" TAZs. The categories also define the boundary between low density and moderate density residential development. Unsewered residential development is not allowed on lots less than 40,000 square feet, the moderate density value used in this analysis. The Town estimates that it will eventually extend sewers west to Naticook Road, Meetinghouse Road and Joppa Road. On Map 1 this would be the western boundary of TAZs 131, 133, 145, 146, 152, 156, 162 and 167. This line forms the edge of the estimated future sewer service area. Buildout results will be reported by TAZ allowing for the analysis of smaller regions or corridors composed of one or several TAZs.

Map 1
Estimated Future Sewer Service by TAZ



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Reading Table 2 from left to right, the first column is the TAZ identification number (131-167). The next column labeled “Public Sewer” indicates whether that TAZ is either currently sewered or the report assumes it will be sewered when built out. “Non-Residential Density (Average)”, “Residential Density (Zoning)”, and “Residential Density (Average)” are the density values applied to each TAZ to calculate final values for the number of new dwelling units and the amount of new commercial or industrial building space. Maps 2 and 3 show how the density values have been applied by TAZ.

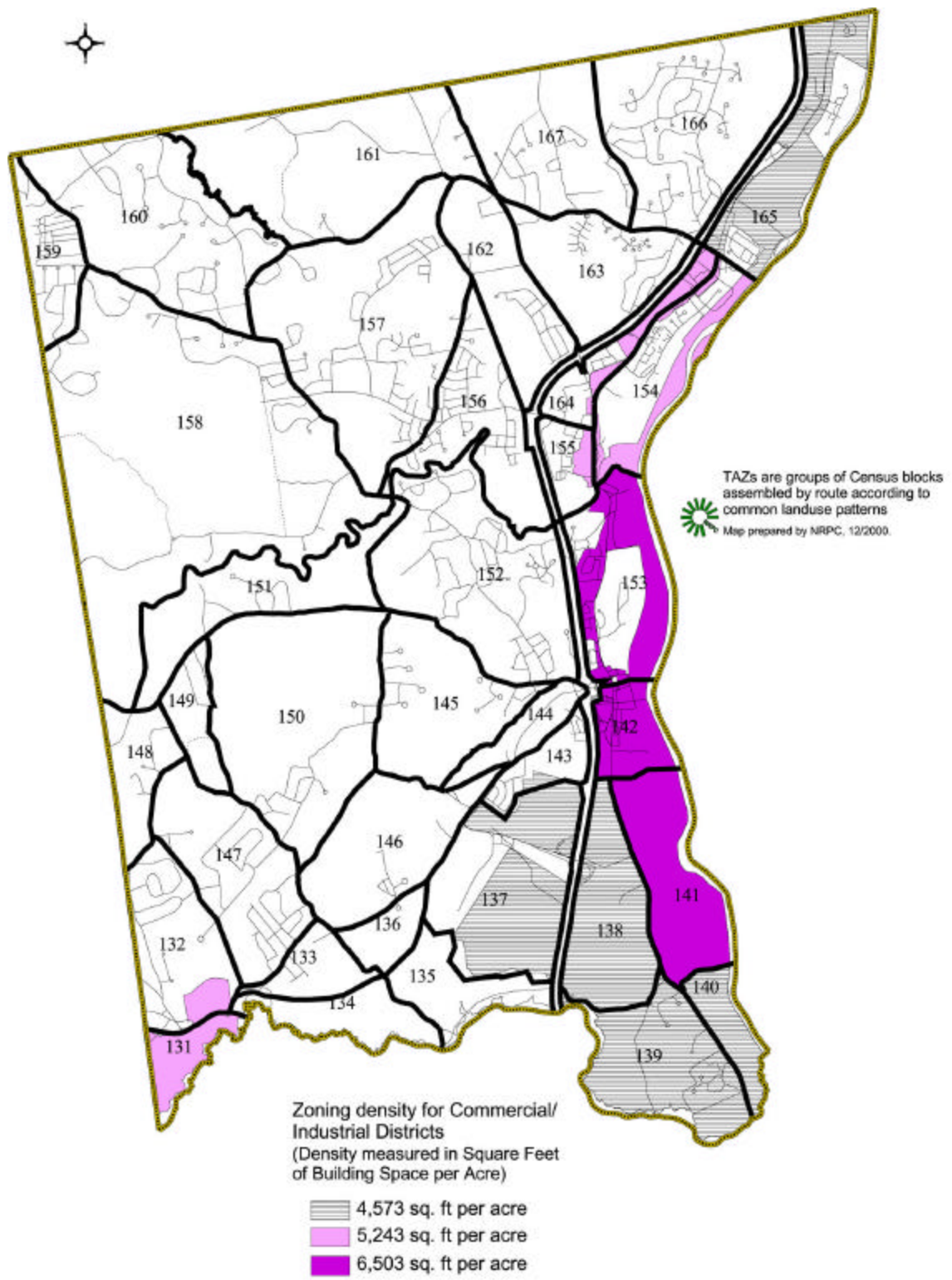
**Table 2
Summary of Residential & Non-Residential
Density Factors by TAZ**

TAZ #	Public Sewer	Non-Residential Density (Average) Sq. Ft.	Residential Density (Zoning) Sq. Ft.	Residential Density (Average) Sq. Ft.
131	YES	5,243	40,000	N/A
132	NO	5,243	100,000	166,834
133	YES	N/A	40,000	61,855
134	YES	N/A	40,000	61,855
135	YES	N/A	40,000	61,855
136	YES	N/A	40,000	61,855
137	YES	4,573	40,000	61,855
138	YES	4,573	N/A	N/A
139	YES	4,573	40,000	61,855
140	YES	4,573	N/A	N/A
141	YES	6,503	N/A	N/A
142	YES	6,503	N/A	N/A
143	YES	4,573	40,000	61,855
144	YES	4,573	40,000	61,855
145	YES	N/A	40,000	61,855
146	YES	N/A	100,000	166,834
147	NO	N/A	100,000	166,834
148	NO	N/A	100,000	166,834
149	NO	N/A	100,000	166,834
150	NO	N/A	100,000	166,834
151	NO	N/A	100,000	166,834
152	YES	N/A	40,000	61,855
153	YES	6,503	12,500	12,500
154	YES	5,243	12,500	12,500
155	YES	5,243	12,500	12,500
156	YES	N/A	40,000	61,855
157	NO	N/A	100,000	166,834
158	NO	N/A	100,000	166,834
159	NO	N/A	100,000	166,834
160	NO	N/A	100,000	166,834
161	NO	N/A	100,000	166,834
162	YES	N/A	40,000	61,855
163	YES	N/A	40,000	61,855
164	YES	5,243	12,500	N/A
165	YES	4,573	12,500	N/A
166	YES	N/A	61,855	61,855
167	YES	N/A	61,855	61,855

(N/A) indicates that the density value is not applicable because the use is not allowed in that zoning district.

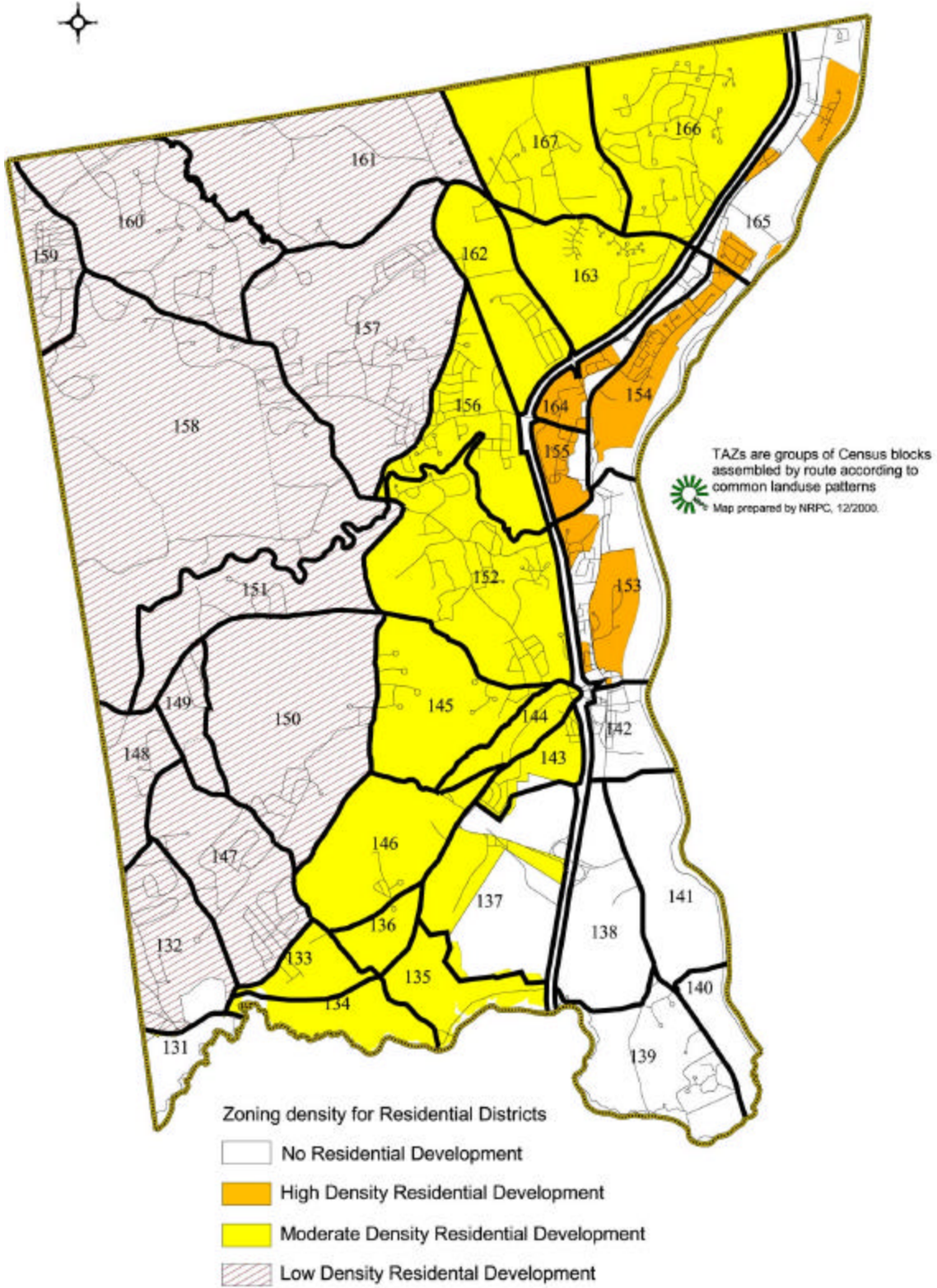
Source: NRPC GIS Databases; Merrimack Community Development Department (2001).

Map 2
Projected Non-Residential Development Density by TAZ



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Map 3
Projected Residential Development Density by TAZ



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INFRASTRUCTURE AND DENSITY OF DEVELOPMENT

Infrastructure costs, including sewer and water line extensions, significantly influence the economic feasibility and the resulting density of development. The availability of public sewer determines residential density to a great degree west of the Everett Turnpike since a majority of the soils there have severe limitations for septic systems. (Soil Survey of Hillsborough County New Hampshire, Eastern Part, Table 10, United State Department of Agriculture, Soil Conservation Service, 1981). The municipal sewer system runs an estimated 66.4 miles throughout eastern and central portions of town. The sewer system is gravity fed and processes on average 3.8 million gallons per day (gpd) with a capacity of approximately 5,000,000 (gpd). The remaining available capacity is 1.2 million gpd. According to the Merrimack DPW, each single family home generates about 230 gpd. Based on the amount of wastewater generated per household (230 gpd), an estimated 503,240 gpd would be added to the waste stream under the average density scenario. This leaves approximately 696,760 gpd for additional non-residential uses.

Much of Merrimack east of the F.E. Everett Turnpike is sewerred and zoned for Industrial and Commercial use. Major employers such as Fidelity and BAE Systems continue to expand operations while new businesses are seeking locations near the F.E. Everett Turnpike. This analysis assumes that all new non-residential development will be able to connect to the existing public sewer system.

The residential densities mentioned earlier are based upon the projected availability of public sewer services (see Map 1). Average and zoning density values are provided for low and moderate residential development.

- *Low density residential development* of 100,000 (zoning) or 166,835 (average) square feet (3.83 ac.) per dwelling unit, is projected to occur primarily west of the estimated future sewer service area.
- *Moderate density residential development* of 40,000 (zoning) or 61,885 (average) square feet (1.42 ac.) per dwelling unit is expected in the area west of the Everett Turnpike and within the future sewer service area.
- *High-density residential development* of 12,500 square feet per dwelling unit is expected east of the Everett Turnpike. All new residential development in this area will be sewerred. There is no alternative average density for this area and only the 12,500 square foot figure will be used to represent density in this area.

In examining lot sizes for residential development, it is evident that the average density for most residential development west of the F.E. Everett Turnpike is lower than the minimum lot size as required by the zoning ordinance. The average density values incorporate the Town's lot size requirements as well as the subdivision or site plan density controls, the suitability of the land for development, and infrastructure requirements. In contrast, the zoning density values only reflect the lot size requirements as provided within the zoning ordinance.

MERRIMACK LAND USE

Land use mapping and building permit activity provide some information about the extent and concentration of development in a community. NRPC maintains a GIS database for generalized land-use in Merrimack. This GIS database is a general representation of how land is being used (e.g. residential, commercial, industrial), and does not report the specific nature of that activity (e.g. pizza shop, grocery, etc.). Following review by the Merrimack Community Development Director, eleven (11) land use categories were identified (these categories differ from those in use by the Merrimack Assessing Department). These eleven land use categories can be further simplified into “developed” or “vacant.” The database is parcel specific, i.e. each property is assigned one use for the area of the entire property. Roads and water bodies are treated

as unique uses. Table 3 identifies the eleven generalized land use classes as currently found in this database. Map 4 illustrates the location of each land use.

Table 3
General Land Use Types in Merrimack

Land Use (parcel-based)	Total Acres	Percent Total Land Area
Commercial	518	2.4%
Industrial	1,028	4.8%
Mixed Use	20	0.1%
Multi Family Residential (includes Condominium Units)	1,271	5.9%
Municipal/Public	761	3.5%
Park/Rec/Open Space	1,175	5.5%
Private Open Space Areas	1,495	7.0%
Residential	6,625	30.9%
Road	1,695	7.9%
Vacant	6,243	29.1%
Water	644	3.0%
Total:	21,475	100%

Source: NRPC GIS Database for Landuse, 2001.

Today, approximately 6,243 acres or 29% of the total land area in Merrimack remains vacant or unused. Of the 6,243 acres of vacant land, 1,560 acres are wetlands or floodplains, leaving approximately 4,683 acres throughout Merrimack to be developed according to the development conditions in place today.

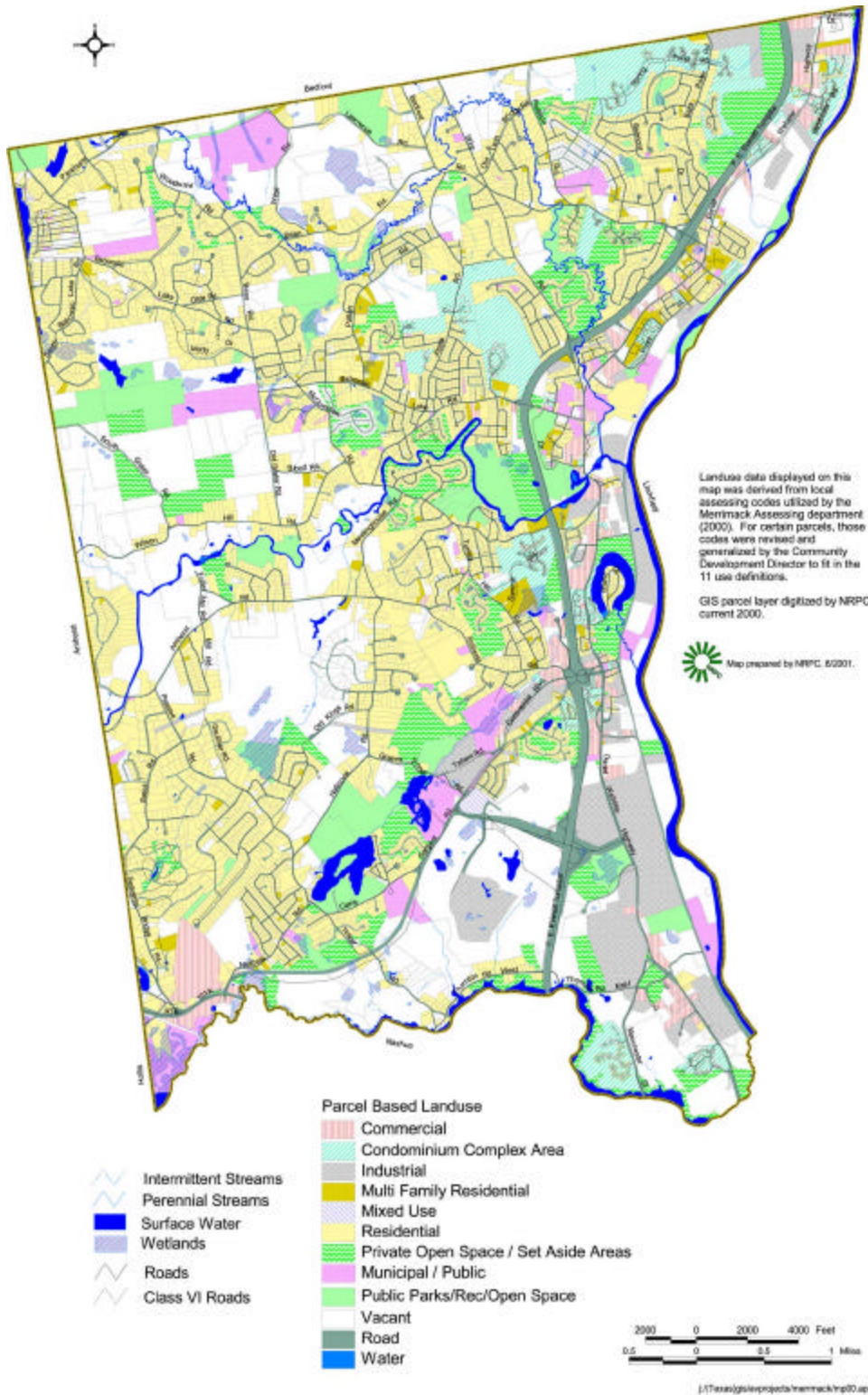
Table 4
Net Developable Land Area

Buildout Category	Acreage
Vacant Lands	6,243
Floodplain & Wetlands Constraints	1,560
Net Developable Land Area:	4,683

Source: NRPC GIS Databases for Landuse, Floodplains, and Soils, 2000.

A review of the land use map, Map 4, indicates few areas of vacant land east of the F.E. Everett Turnpike available for residential development. Most of the remaining vacant land in this area is zoned for non-residential uses (Industrial-1, Commercial-1 or Commercial-2). West of the Everett Turnpike, which is primarily zoned for residential use, there remain some significant tracts of vacant land off of Amherst Road, South Grater Road and Wilson Hill Road.

Map 4
Land Use Classes in Merrimack, NH, 2000



BUILDOUT ESTIMATES FOR RESIDENTIAL DEVELOPMENT

Using the GIS land-use information, it is estimated that 6,243 acres of land remain vacant throughout Merrimack, and 4,683 acres do not contain wetlands or floodplains. The majority of these 4,683 acres are zoned for residential use. The net buildable available acreage indicated below (5,102) differs from this GIS-derived figure (4,683) because it comes from a different source, in this case, assessment records. Data sourced from the assessment records will be used in all subsequent analyses. Using average density values, buildout would occur after an additional 2,188 new residential units are constructed, 1,096 less than at maximum densities allowed under the zoning ordinance. Based on the average density values, residential development would be 25% greater at buildout (see Map 6).

Table 5
New Residential Development at Buildout

TAZ	Zoning Density	Average Density	Acres	HU 2000	Additional HU/w Zoning	Additional HU/w Average	% Increase Zoning	% Increase Average
131	100,000	166,835	0	9	0	0	0.0	0.0
132	100,000	166,835	107.8	78	47	28	60.0	36.0
133	40,000	61,855	57.6	83	63	41	76.0	49.0
134	40,000	61,855	173.4	7	189	117	2700.0	1671.0
135	40,000	61,855	138.3	39	151	98	387.0	251.0
136	40,000	61,855	40.4	31	44	29	141.0	94.0
137	40,000	61,855	208.7	0	227	147	*	*
138	NA	NA	0	1	0	0	0.0	0.0
139	40,000	61,855	88.0	200	96	62	48.0	31.0
140	NA	NA	0	11	0	0	0.0	0.0
141	NA	NA	0	0	0	0	0.0	0.0
142	NA	NA	0	168	0	0	0.0	0.0
143	40,000	61,855	4.3	178	4	3	2.0	2.0
144	40,000	61,855	5.6	44	6	4	14.0	9.0
145	100,000	166,835	100.7	147	43	26	29.25	17.7
146	100,000	166,835	20.9	79	9	5	11.4	6.3
147	100,000	166,835	139.4	513	61	36	12.0	7.0
148	100,000	166,835	62.7	58	27	16	47.0	28.0
149	100,000	166,835	82.7	33	36	22	109.0	67.0
150	100,000	166,835	737.2	178	321	192	180.0	108.0
151	100,000	166,835	269.0	101	117	70	115.0	69.0
152	40,000	61,855	30.1	770	33	21	4.0	3.0
153	NA *	NA *	21.5	442	14	14	3.2	3.2
154	NA *	NA *	56.0	568	336	336	59.0	59.0
155	NA *	NA *	4.4	36	4	4	11.0	11.0
156	40,000	61,855	1.9	737	2	2	1.0	1.0
157	100,000	166,835	113.6	825	49	29	6.0	3.5
158	100,000	166,835	1577.8	354	687	412	194.0	116.0
159	100,000	166,835	9.6	248	4	3	1.0	1.0
160	100,000	166,835	134.9	310	59	35	19.0	11.0
161	100,000	166,835	367.8	143	160	96	112.0	67.0
162	40,000	61,855	28.5	100	31	20	31.0	20.0
163	40,000	61,855	48.6	356	53	34	15.0	10.0
164	40,000	40,000	9.6	165	10	10	6.0	6.0
165	NA *	NA *	47.0	765	45	45	25.0	25.0
166	40,000	61,855	97.6	832	106	69	13.0	8.0
167	40,000	61,855	229.6	176	250	162	142.0	92.0
	TOTALS		5,015.2	8,785	3,284	2,188	37.4	25.0

Source: NRPC GIS Databases. "HU" equals housing units.

Not all TAZs will continue to residentially build out due to zoning restrictions or lack of developable land.

* The number of possible additional units for these TAZs were determined using a lot by lot analysis.

BUILDOUT ESTIMATES OF NON-RESIDENTIAL DEVELOPMENT

Non-residential development is concentrated primarily in eastern and southern Merrimack, from the Everett Turnpike east to the Merrimack River, the north-eastern portion of Continental Boulevard and Industrial Drive (Exit 10) and along Route 101A. The buildout indicates that there are 1,312 acres (see Table 6) of vacant unconstrained land in the industrial or commercial zoning districts in Merrimack. This would translate into 6,584,489 square feet of new building space if all of this land were developed according to the average densities provided by the Merrimack Community Development Department (see Map 5). It should be noted that this figure does not include possible expansion or redevelopment of existing sites.

Table 6
New Non-Residential Development at Buildout

TAZ	Bldg. Space/ Acre	Zoning District	Developable Land Area (DLA)	Estimated New Bldg. Space
131	5,243	C-2	2.5	13,108
132	5,243	C-2	3.5	18,350
137	4,573	I-2	351.0	1,605,123
138	4,573	I-1	28.4	129,873
139	4,573	I-1	250.4	1,145,079
140	4,573	I-1	73.0	333,829
141	6,503	I-1	190.0	1,235,570
142	6,503	C-2	4.2	27,313
142	6,503	I-1	81.8	531,945
143	4,573	I-2	8.9	40,646
153	6,503	C-1	0.2	1,301
153	6,503	C-2	3.0	19,509
153	6,503	I-1	1.5	9,755
154	5,243	I-1	34.5	180,884
164	5,243	C-2	23.7	124,259
165	4,573	C-1	2.3	10,518
165	4,573	C-2	24.2	110,667
165	4,573	I-1	228.9	1,046,760
			1,312.0	6,584,489

Source: Based upon NRPC GIS databases for landuse, zoning, soils and floodplains.

Non-residential densities provided by the Merrimack Community Development Department 1998.

Table revised August 2001 to account for development since 1998.

Currently, 6,795,700 square feet of non-residential development exist in Merrimack (Assessor, 2001). Buildout would result in a 51% increase in the total amount of non-residential building space.

TOWN POPULATION

According to the 2000 US Census, Merrimack's population currently stands at 25,119. Between 1970 and 1990 Merrimack's population growth rate exceeded that of both Hillsborough County and the State, a trend that is projected to continue between 2000 and 2020 by OSP. Between 1990 and 2000, Merrimack's rate of population growth was 13.4%, which is slightly above both the State and County absolute percentage changes in population. Table 7 summarizes 1990 and 2000 US Census, OSP population estimates and projections.

Table 7
Population of Merrimack

	1990 Census	2000 Census	1990 - 2000 % Rate of Growth	2010 OSP Proj.	2020 OSP Proj.	2000 - 2020 % Rate of Growth
Merrimack	22,156	25,119	13.4%	28,126	32,886	30.9%
Hillsborough Co.	336,073	380,841	13.3%	414,763	466,967	22.6%
State of NH	1,109,117	1,235,786	11.4%		1,527,873	

Source: Office of State Planning, October, 1999, and US Census Bureau, 2001.

There are two factors that can be used to determine the estimate of population at buildout: *density of development* and the *population multiplier*. At buildout between 2,188 and 3,284 new residential dwelling units will be added to the housing stock, depending upon whether the average density values or zoning ordinance are used in the calculation, respectively. These dwelling units will likely contain three or four bedrooms per unit. A local population multiplier to convert the number of dwelling units to the number of residents is not available. Population multipliers for single and multi-family units are taken from the American Housing Survey (*Bureau of the Census, US Dept. of Housing and Urban Development, 1987*) and have been used in Table 8 to estimate the population increases at buildout based upon the number of new single-family detached or multi-family units.

Multi-family units (blended category includes duplex, triplex, quadplex) east of the Everett Turnpike are estimated to generate 2.3213 persons per unit while single family detached units are expected to generate 3.3065 persons per dwelling unit. The number of additional residents at buildout may range from 6,776 to 10,336. Adding this to the 2000 population of 25,119, Merrimack could expect to have between 31,895 and 35,455 residents at buildout. This is within the range given by the 2020 OSP projection of 32,886.

Table 8
Population Estimates by TAZ

TAZ	Additional HU w/ Zoning	Additional HU w/Average	Population Multiplier	Zoning Population	Average Population
132	47	28	3.3065	155	93
133	63	41	3.3065	208	135
134	189	117	3.3065	604	387
135	151	98	3.3065	498	322
136	44	29	3.3065	145	94
137	227	147	3.3065	751	486
139	96	62	2.3214	223	144
143	4	3	3.3065	15	9
144	6	4	3.3065	20	13
145	43	26	3.3065	142	86
146	9	5	3.3065	29	16
147	61	36	3.3065	200	120
148	27	16	3.3065	90	54
149	36	22	3.3065	119	71
150	321	192	3.3065	1,061	636
151	117	70	3.3065	388	232
152	33	21	3.3065	108	70
153	14	14	2.3214	32	32
154	336	336	2.3214	780	780
155	4	4	2.3214	9	9
156	2	2	3.3065	7	7
157	49	29	3.3065	162	95
158	687	412	3.3065	2,271	1,363
159	4	3	3.3065	14	10
160	59	35	3.3065	195	117
161	160	96	3.3065	529	317
162	31	20	3.3065	102	66
163	53	34	3.3065	175	113
164	10	10	2.3214	23	23
165	45	45	2.3214	104	104
166	106	69	3.3065	350	227
167	250	162	3.3065	827	535
	3,284	2,188		10,336	6,776

Source: Population multipliers 3.3065 and 2.3214 (Northeast Region, blended from Exhibit 11.1: Regional and National Demographic Multipliers for Common Configurations of Standard Housing Types for Total Household Size; American Housing Survey, 1987).

The population multipliers from the American Housing Survey (1987) have recently been used in fiscal impact studies presented to the Planning Board. Since multipliers are identified by housing type and number of bedrooms, they could be reviewed in the context of current housing trends. Multipliers of 3.940 (3 bedroom) and 4.965 (4 bedroom) persons per household in The New Practitioners Guide to Fiscal Impact Analysis were reviewed but not used as the information is based upon the 1980 Census and does not represent the demographics of Merrimack in 1998. 2000 Census information produces a population multiplier of 2.8 persons per unit (25,119 pop./8,959 housing units). However, this is a composite value that mixes all housing types currently in town and represents past, not future, housing trends.

STUDENT POPULATION ESTIMATES

The current student population in Merrimack is 4,944 (SAU, 2001). Table 9 summarizes the estimated number of new students generated by TAZ under both buildout scenarios. The number of school aged children added to the Merrimack school system at buildout is based upon the number of estimated new dwelling units and the multipliers chosen to represent typical residential households in Merrimack in 1998. Local multipliers, derived from 1993-94 school enrollment information for school aged children do exist and will be used in this analysis. The multiplier document entitled *Enrollments of 1993-1994 Subdivisions School Yr. 1993-1994*, January 20, 1995, is used to establish a blended (single family, single-family cluster) student multiplier of (0.641) students per housing unit. This multiplier is used later in the fiscal impacts section of the report. Buildout at average density would result in a twenty-eight percent (28%) increase in total student population from 4,944 to 6,346 students. Table 9 indicates the number of additional students that will be generated at buildout by TAZ.

Table 9
Distribution of Students at Buildout by TAZ

TAZ	HU w/ Zoning	HU w/ Average	Students Per TAZ Zoning	Students Per TAZ Average
132	47	28	30	18
133	63	41	40	26
134	189	117	116	75
135	151	98	97	63
136	44	29	28	19
137	227	147	146	94
139	96	62	62	40
143	4	3	3	2
144	6	4	4	2
145	43	26	27	16
146	9	5	5	3
147	61	36	39	23
148	27	16	17	10
149	36	22	23	14
150	321	192	206	123
151	117	70	75	45
152	33	21	21	13
153	14	14	9	9
154	336	336	215	215
155	4	4	2	2
156	2	2	1	1
157	49	29	31	18
158	687	412	440	264
159	4	3	3	2
160	59	35	38	23
161	160	96	102	61
162	31	20	20	13
163	53	34	34	22
164	10	10	6	6
165	45	45	29	29
166	106	69	68	44
167	250	162	161	104
	3,284	2,188	2,105	1,402

Source: NRPC GIS Databases for landuse, floodplains and zoning (2000).

CURRENT AND FUTURE WATER AND SEWER USE

The Town of Merrimack's annual water usage in 2000 was 743 million gallons, of which approximately 80% (594 million gallons) was consumed by residential uses, while 20% (149 million gallons) was utilized by non-residential activities (Merrimack Village District, 2001). Using the 2000 Census population of 25,119 people, each Merrimack resident consumed an average of 23,647 gallons of water over the course of one year while non-residential development used 21.9 gallons of water per year per square foot of existing building space (6,795,700 sq. ft.). Under the average density buildout scenario, adding an additional 6,776 residents and 6,584,489 square feet of non-residential building space, water usage could increase by 304,432,381 gallons per year from 743 million gallons to 1.047 billion gallons of water per year at buildout.

The sewer system is gravity fed and processes on average 3.8 million gallons per day (gpd) with a capacity of approximately 5,000,000 gpd. The remaining available capacity is 1.2 million gallons per day. According to the Merrimack DPW, each single family home generates about 230 gallons per day. Based on the amount of wastewater generated per household (230 gpd), an estimated 503,240 gallons per day would be added to the waste stream under the average density scenario. This leaves approximately 696,760 gpd for additional non-residential uses.

FISCAL IMPACT UPON SERVICES AT BUILDOUT

The fiscal impact analysis is a cost-benefit analysis measuring what the Town's financial condition would be due to the additional development at buildout. The financial impacts estimated within this section are based on current conditions and trends that affect municipal spending and revenue, such as educational spending, the property tax rate, and property assessments. Furthermore, the analysis is based on current dollars that have not been adjusted for inflation.

The analysis is based upon the total number of new dwelling units and non-residential building space as determined at buildout. This section estimates the additional municipal costs at buildout using an average costing approach which assumes a linear relationship between municipal costs and growth. This approach utilizes a per capita multiplier method for projecting the impact of population changes on local costs and revenues for public services. A basic assumption of the per capita multiplier method is that over the long run, current average operating costs per capita or per student are the best estimates of future operating costs.

The 2000 net municipal assessment of \$8,867,381 (2000 Annual Town Report) represents the amount of tax revenue raised from property taxes to meet the cost of providing municipal services to Merrimack in that year. This figure includes both residential and non-residential uses. There is no information available that separates the overall cost of municipal services associated with residential versus non-residential development in Merrimack. Several reports submitted to the Planning Board during the late 1990s separate the costs by using the percentage of assessed value and the percentage of lots in residential or non-residential use to allocate the total costs of municipal services. These reports attribute a range of 15.8% to 27.9% of the total cost of municipal services to non-residential development; conversely 72.1% to 84.2% would be attributable to residential uses. Table 10 allocates cost based only upon the percentage of lots in residential or non-residential use and the percentage valuation of non-residential and residential development.

Table 10
Non-Residential and Residential Percentage Cost Allocation Method

	% of Town Lots	% of Town Valuation	% Combined Average
Residential	91.4	77.0	84.2
Non-Residential	8.6	23.0	15.8

Source: Fiscal Impact Analysis, Bower's Landing, Merrimack NH, August 1997.

Another similar approach is based upon a methodology from *The Fiscal Impact Handbook*, 1978, referred to as the "*Proportional Valuation Fiscal Impact Method*". Table 11 illustrates an example of the *Proportional Valuation Method* using Merrimack's most current figures.

Table 11
Proportional Valuation Allocation of Non-Residential Costs

Proportional Valuation Fiscal Impact Variables		Values
Step 1.	Net municipal assessment	\$8,867,381 ⁽¹⁾
Step 2.	Total local real property value	\$1,643,048,010 ⁽¹⁾
Step 3.	Total number of land parcels	10,071 ⁽²⁾
Step 4.	Total non-residential real property value	\$394,726,795 ⁽²⁾
Step 5.	Total number of non-residential land parcels	497 ⁽²⁾
Step 6	Proportion of non-residential to total local real property value (4/2)	0.24
Step 7.	Average real property value per parcel (2/3)	\$163,146.50
Step 8.	Average non-residential real property value per parcel (4/5)	\$794,218.90
Step 9.	Real property value average non-residential parcel to average Non-residential real property value local parcel (8/7)	4.86
Step 10.	Refinement Value	1.25

Source: (1) 2000 Annual Town Report; (2) Town Assessor's office, includes mixed-use lots;
(3) Fiscal Impact Handbook, 1987.

The calculation of non-residential share of municipal expenditures based upon the Proportional Valuation method is as follows:

Table 12
Proportional Valuation Method Estimate of Non-Residential Costs

Total Existing Municipal Expenditures Attributable to Non-Residential Uses	Total Municipal Expenditures ('00) (net municipal assessment)	Proportion of Non-Residential Value to Total Local Real Property Value	Refinement Coefficient
\$2,660,214 =	\$8,867,381	(x) 0.24	(x) 1.25

Source: Based on values from the 2000 Annual Town Report; Methodology taken from the Fiscal Impacts Handbook, 1987.

The proportion of non-residential value to total local real property value is (0.24) or 24%, however this is increased when multiplied by the refinement coefficient to 30.0% (24% x 1.25). The refinement coefficient depicts the relationship of the non-residential real property value to the average value of all local real property based upon case studies (*Fiscal Impact Handbook*, 1987, pg. 123). According to the Proportional Valuation Method 30.0% of municipal costs can be attributed to non-residential uses. (*The average of 15.8% [See Table 10] and 30% is 22.9% and this value is used in this analysis to represent the percentage of costs attributable to non-residential uses.*)

PER CAPITA AND PER SQUARE FOOT COSTS

Of the \$11,811,260 raised in 2000 for municipal and county services, \$2,704,778 (22.9%) can be attributed to non-residential uses and \$9,106,481 (77.1%) to residential uses. Dividing \$9,106,481 by the 2000 population for Merrimack, (25,119), the per capita cost for residential services would equal \$362.53.

The municipal cost associated with non-residential development can be calculated in a similar manner. The current “per square foot” cost of municipal services for non-residential space is equal to the estimated cost (\$2,704,778) divided by the current number of non-residential square feet (6,795,700 sq. ft.), or approximately \$0.40 cents per square foot. Table 13 summarizes the per capita and per square foot costs of development.

Table 13
Current Residential and Non-Residential Unit Costs

Municipal and County Assessments 2000	Amount Attributed to Residential or Non-Residential Uses	Resident Population or Total Non-Residential Square Footage	Per Capita or Per Square Foot Cost
\$11,811,260	\$9,106,481 (77.1%)	25,119	\$362.53 per capita
	\$2,704,778 (22.9%)	6,795,700	\$0.40 per sq. ft.

Source: Merrimack Town Report, 2000. (\$11,811,260 is the municipal and county assessment added together.)

Table 14 calculates the municipal costs incurred at buildout based upon the unit costs identified in Table 13.

Table 14
Additional Costs for Municipal Services as Buildout

	Population Based on Zoning	Population Based on Average
A. Added Population at Buildout	10,336	6,776
B. Per Capita Cost	\$362.53	\$362.53
C. Additional Cost to Municipal Services for Residential Development (A x B)	\$3,747,110	\$2,456,503
D. Additional Cost to Municipal Services for Non-Residential Development (\$0.40) x 6,584,489 sq. ft.)	\$2,633,795	\$2,633,795
E. Total Additional Cost to Municipal Services at Buildout	6,380,905	5,090,298

Source: Based on assessments from the Annual Town Report, 2000.

SCHOOL AGED CHILDREN

The Town of Merrimack operates a total of five schools with a 2001 enrollment of 4,944: Mastricola Elementary School, Reeds Ferry Elementary School, Thorntons Ferry Elementary School, Mastricola Middle School and Merrimack High School. The 2000 net school assessment was \$14,246,029 (local and state), or \$2,881.48 per student.

The number of new students at buildout depends upon future housing types (i.e. single family, duplex, etc.) and the number of bedrooms. The multiplier document entitled *Enrollments of 1993-1994 Subdivisions School Yr. 1993-1994*, January 20 1995, is based upon local data for this time period. In this analysis a blended (single family, single-family cluster) average multiplier of (0.641) students per single family unit is used to determine the total number of new students at buildout. In comparison, all residential development in Merrimack would yield a lower multiplier of (0.55) students per dwelling unit. (4,944 students/8,959 dwelling units). The multiplier for single family cluster is (.689), and is the highest locally derived multiplier for all housing types in Merrimack. The multiplier is based on enrollment information from fifteen developments in Merrimack with a sample size of 615 units. These multipliers, however, do not distinguish between the number of bedrooms in each housing unit and are instead broken down by

housing types such as single family cluster, single family, multifamily attached (clusters), and Planned Unit Development (PUD/PRD). It is assumed that the development of single family homes will continue to predominate into the future. Just over 71% of all housing in Merrimack is single family (U.S. Census, 2000).

Table 15
Housing Types In Merrimack, 2000

Housing Types	Number of Units	Percentage of Total
1 Unit (single family)	6,294	68.5
2 Units (duplex)	236	2.56
3 Units	21	.23
4 to 8 Units	60	.65
8 or more Units	403	4.4
2 Houses/Lot	14	.15
Manufactured Housing	150	1.63
Condos/Other*	2,014	21.9
Total Number of Units	9,192	100%

*Other" includes condominium units of all types and boarding houses.

Source: Town Assessor, 2001

Table 16 summarizes the projected costs for education based upon the two density alternatives. The 2000 Merrimack school assessment was \$14,246,029. If residential development continues at the average densities, the additional funds necessary for public school services would equal \$2,589,494. If development occurs at the maximum density allowed under the zoning ordinance, the additional cost for public school services would equal \$3,887,935.

Table 16
Additional Students and Educational Costs at Buildout

	A	B	C	D	E
	Units	Multiplier ⁽¹⁾	Additional School Age Children	Per Unit Cost	Additional Cost to School Budget Total
Zoning Density	3,284	(0.641)	2,105	\$1,847	\$ 3,887,935
Average Density	2,188	(0.641)	1,402	\$1,847	\$ 2,589,494

Source: (0.641) student/unit multiplier from Enrollments of 1993-1994 Subdivisions, January, 1995.

The (.641) student per dwelling unit average blends the single family cluster and single family housing types.

The total number of single family and single family cluster units sampled was 389.

Reading across, column A represents the "UNITS" of additional single family homes at buildout, the "MULTIPLIER" of 0.641 is the single family average number of students per home, "ADDITIONAL SCHOOL AGE CHILDREN" in column C, is the product of columns A and B, column D is the cost per dwelling unit, and column E is the "ADDITIONAL COST TO SCHOOL BUDGET", is the product of columns C and D.

In summary, the increased cost of municipal services attributable to residential uses at buildout is estimated to be between \$2,456,503 to \$3,747,110, the increased cost attributable to non-residential uses is estimated at \$2,633,795 under both scenarios, and the increase in the school budget is estimated to be \$2,589,494 and \$3,887,935. Therefore the total additional costs for public services at buildout is estimated to range between \$7,679,792 and \$10,268,840. Using the average densities in which 2,188 residential units are added at buildout, the cost for public services related to residential development would be \$3,510 per unit (\$7,679,792/2,188 units).

Table 17
Summary of Municipal Costs at Buildout

	Average Density Buildout	Zoning Density Buildout
Municipal Costs (res. and non-res)	\$5,090,298	\$6,380,905

Education Costs	\$2,589,494	\$3,887,935
Total Costs	\$7,679,792	\$10,268,840

ADDITIONAL REVENUES AT BUILDOUT

The average assessment for a single-family house built between 1995 and 1997 was estimated at \$175,000 to \$180,000 (Town Assessor, 1998). This is significantly higher than the average assessment for all existing single family dwellings in Merrimack. Between 1995 and 1997 the average assessment for all existing single family units was \$116,445. In 2000, the average assessment for all single-family homes was \$162,000. This assessment reflects the re-evaluation of FY 2000. This figure (\$162,000) will be used in the analysis that follows.

Table 18
Residential Development Cost-Benefit Per Single Family House, 1997

	Single Family Average Assessment Value	Estimated Cost of Public Services	Estimated Property Tax Revenue Per Home	Net Revenue Per Home
Houses Prior to 1997	\$116,445	\$3,305 ⁽¹⁾	\$2,498	-\$807
Ave. assessment all SF Homes in 2000	\$162,000	\$3,305	\$3,475	+\$170

Source: Merrimack Town Assessor, 1998.

⁽¹⁾Based on Municipal, County and School Assessments, 2000.

Using the current tax rate of \$21.45 per \$1,000, approximately \$3,475 of property tax revenue will be generated per unit. Using average densities and the current average assessment, each residential unit now requires \$3,305 in public services, resulting in an estimated +\$170 (\$3,475 - \$3,305) gain per unit. At the current tax rate, a single family home assessed at \$154,000 would cover the cost for municipal services.

Non-residential development often produces tax revenue sufficient to pay for the costs it incurs for municipal services. Merrimack currently has 6,795,700 square feet of non-residential development with an assessed value of \$350,092,400 (Town Assessor, 2000). This results in approximately \$7,509,482.0 of tax revenues or \$1.10 of property tax revenue per square foot. At buildout an additional 6,584,489 square feet of non-residential development would generate \$7,242,938. If the non-residential cost to municipal services is \$0.40 per square foot (see page 18), then the total annual cost of an additional 6,584,489 square feet of non-residential building space would equal \$2,633,795. Table 19 summarizes the cost and revenue associated with non-residential development at buildout.

Table 19
Non-Residential Development Cost-Benefit

	Total Non-Residential Building Space (Sq. Ft.)	Assessed Value (\$21.45/\$1,000)	Property Tax Revenue	Cost To Public Services (\$0.40)/Sq. Ft.	Net Property Tax Revenue
Existing Non-Residential Development	6,795,700	\$350,092,400 *	\$7,509,482	\$2,718,280	\$4,791,202
Added Non-Residential Development at Buildout	6,584,489	\$290,507,655 ⁽¹⁾	\$6,231,389	\$2,633,795	\$3,597,594
Total	13,380,139	\$640,600,055	\$13,740,871	\$5,352,075	\$8,388,796

Source: Merrimack Town Assessor, Merrimack Community Development Department, 1998 & 2001

* Provided by the Merrimack Town Assessor, 2000.

(1) Estimated future value based on current per square foot value for non-residential property in Merrimack.

The potential for additional non-residential development would appear to be a tremendous asset in terms of providing supplemental revenue for public services. The amount of surplus will depend on many economic and demographic factors as well as the Town's success in managing long term growth in a cost-effective manner.

The strength of the future tax base can be viewed in terms of the value of taxable property per person or per student. At buildout the total value of property in today's dollars is estimated at over \$2.29 billion dollars resulting in \$71,847 of taxable property per person, up from the current amount of \$65,410. Expressed in terms of the number of students, the per student value rises from the current value of \$341,661 per student to \$361,102 based on the average density buildout scenario. Table 20 compares the current equalized assessed value per student and per capita with the same values estimated at buildout under the average density scenario.

Table 20
Per Capita and Per Student Assessed Value

	Assessed Value	Student Population	Per Student Assessed Equalized Value	Resident Population	Per Capita Assessed Equalized Value
2000	\$1,643,048,010	4,809	\$341,661	25,119	\$65,410
Average Density Buildout	\$2,291,552,145 ⁽¹⁾	6,346	\$361,102	31,895	\$71,847

Estimated assessed value based on current average residential (\$162,000) and non-residential property values (\$51.52/sq. ft.)

Another way to examine the fiscal impacts of buildout is to measure the change in the tax rate, which is a function of how much revenue the Town must raise for services and the total assessed property valuation. Additional costs for municipal (\$5,090,298), education (\$2,589,494) and county services (\$1,277,506) are estimated at \$8,957,298 under the average density buildout scenario. Adding \$8,957,298 to \$35,127,907 (current property tax to be raised, 2000 Town Report), the total amount of revenue necessary at buildout for public services is estimated at \$44,085,205. Table 21 compares the current and estimated tax rate under the average density buildout scenario.

Table 21
Impact upon the Property Tax Rate

	Property Tax to be Raised	Total Assessed Valuation	Tax Rate
2000	\$35,127,907	\$1,643,048,010	\$21.45 per \$1,000
Average Density Buildout	\$44,085,205	\$2,291,552,145	\$19.44 per \$1,000

Table 21 indicates that the tax rate would drop from \$21.45 to \$19.24 per \$1,000 of property value at buildout, representing a \$2.01 drop in the tax rate. The estimated public revenue necessary at buildout is probably underestimated because the cost at buildout for municipal, county and educational services is based on current expenditures by the town and does not account for many intervening cost factors.

This analysis rests on a number of assumptions: the cost of public services remains proportional; new construction will have at least a value comparable to the average value over the last three (3) years; the buildout scenario will reflect average densities; and there is a purely linear relationship between the number of residences or non-residential building space and the cost of municipal services and schools. The relationship between development and municipal costs is, in fact, far more variable, and is influenced by economies of scale, interest rates, employee contracts, statutory minimum levels of service, and the periodic need to engage in capital improvements, both to maintain service levels and to upgrade facilities to meet new levels of demand, and there are no adjustments for inflation.

CONCLUSIONS

The buildout population is projected to be between 31,895 (average density) to 35,455 (zoning density), similar to estimates provided by OSP for the year 2020 (32,886). These residents would occupy an estimated 10,973 to 12,069 housing units and generate between 6,346 to 7,049 students requiring educational services. As mentioned earlier, the Town issued an average of one hundred and two (102) single family residential building permits a year between 1990-1996, and most of this single family construction has been west of the Everett Turnpike at densities significantly lower than required by the zoning ordinance. Although there is no way to forecast the time necessary to achieve buildout it is reasonable to assume that Merrimack within the next twenty to thirty years will have very little land for residential development if today's trends continue. This will be the culmination of seventy-five to eighty years of suburban development beginning after World War II.

The Town has a significant stock of land zoned for industrial or commercial uses with relatively few natural constraints, easy access to major transportation routes and flexible zoning regulations. The buildout study estimates that the potential for 6.5 million (6,584,489) square feet of new non-residential building space given the vacant developable land zoned for non-residential development.

Non-residential development appears to be a significant source of supplemental tax revenue for the community and the key to managing the fiscal impacts that revolve around the management of residential and non-residential development by the Town. Non-residential development provides \$1.10 in tax revenue per square foot, yet the cost for public services per square foot is forty (\$0.40) cents.

FUTURE STUDY & REFINEMENT

In general the buildout study could be used to evaluate decisions related to infrastructure and development regulations, or to develop different scenarios of future growth and the resulting impacts. One important question not addressed in this study is how quickly non-residential development may occur over the next twenty to thirty years until buildout? This is an important question as non-residential development provides needed tax revenue. Another question for study is, what are the full range of impacts related to buildout? Some may not easily be quantified, so how are they to be measured?

Modifying the Buildout: The buildout could be applied to analyze a variety of infrastructure questions related to roads, sewer, and schools for a smaller portion of the community. For example, TAZ 150 is estimated to contain enough buildable land to develop between 192 and 321 dwelling units. The buildout lays a template from which to ask questions based upon the estimated number of new homes, such as:

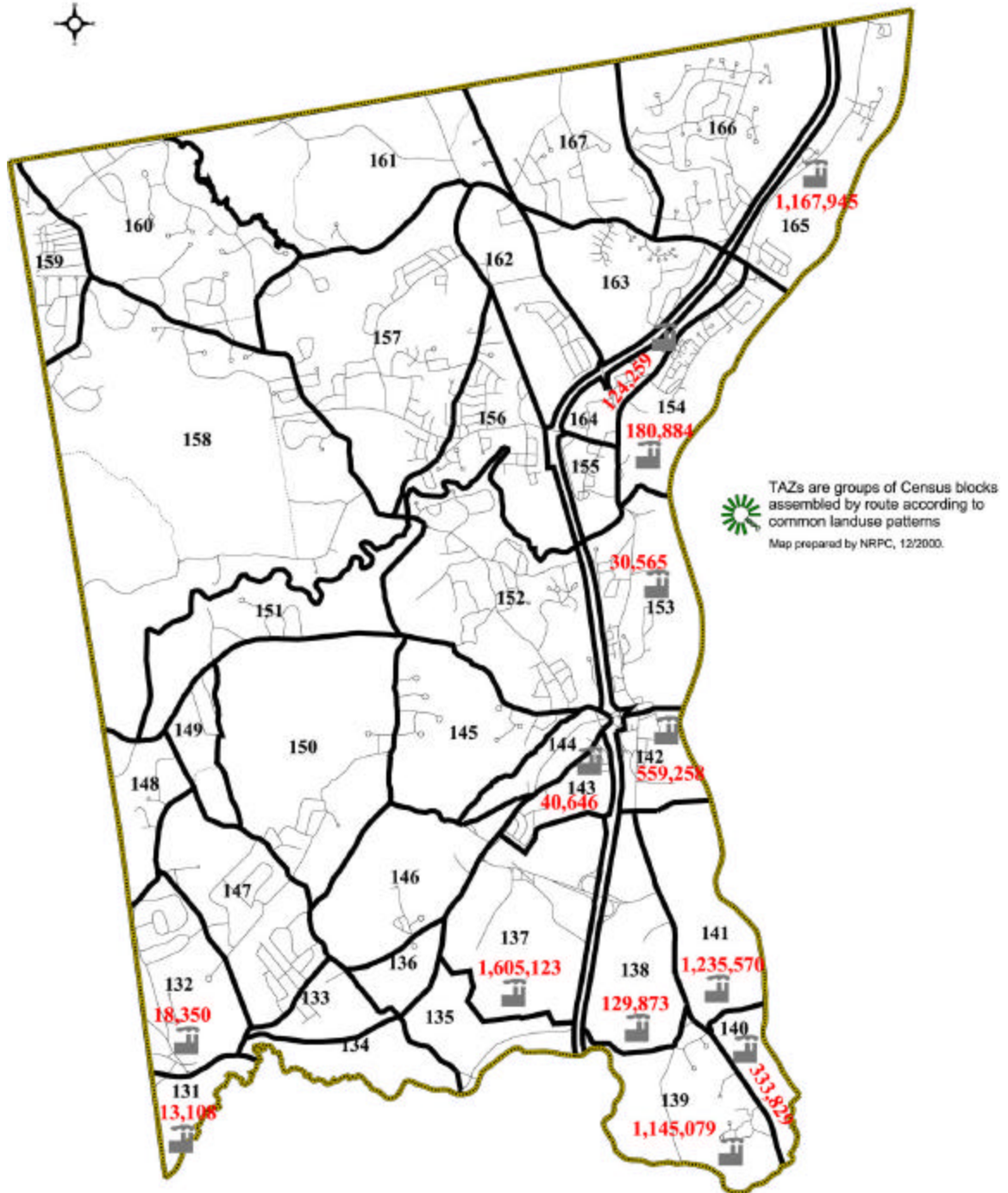
- What impact will the additional traffic have at peak times along the adjacent roads?
- What percentage of these dwelling units will be connected to the public sewer system?
- Where will the students from these homes go to school?
- What recreation facilities will be used or may be necessary to develop?
- Are there important resources that should be conserved in the area?
- Should changes be made to land use policy?

The buildout is essentially a database that can be altered to reflect changes in constraints, zoning, or multipliers. For example, if the Town changes the density of a zoning district, the buildout results are easily modified in the database to reflect a new district, density change or limitation of use.

Community Development Policy: Community plans, such as master plans, often reference or use portions of a buildout to support land use policies that in turn support and are consistent with the Town's zoning ordinance. This document may be used in the master planning process, or to develop long-term land use policies. It provides a baseline of textual and mapped information for the entire community. Buildouts by their nature present information about the whole community and allow for planning at this level. The results often guide community leaders in formulating zoning changes that address growth concerns. Although not the focus of this report, further study could be done concerning adopting land-use policies and regulations to address growth concerns and help achieve community development goals. The buildout study may be useful in discussing issues ranging from limiting the expansion of public infrastructure, changing the density requirements of a zoning district, road improvements, or conservation strategies. Deciding on adopting new policies and regulations is a public process and the exact nature of these should be determined at the local level.

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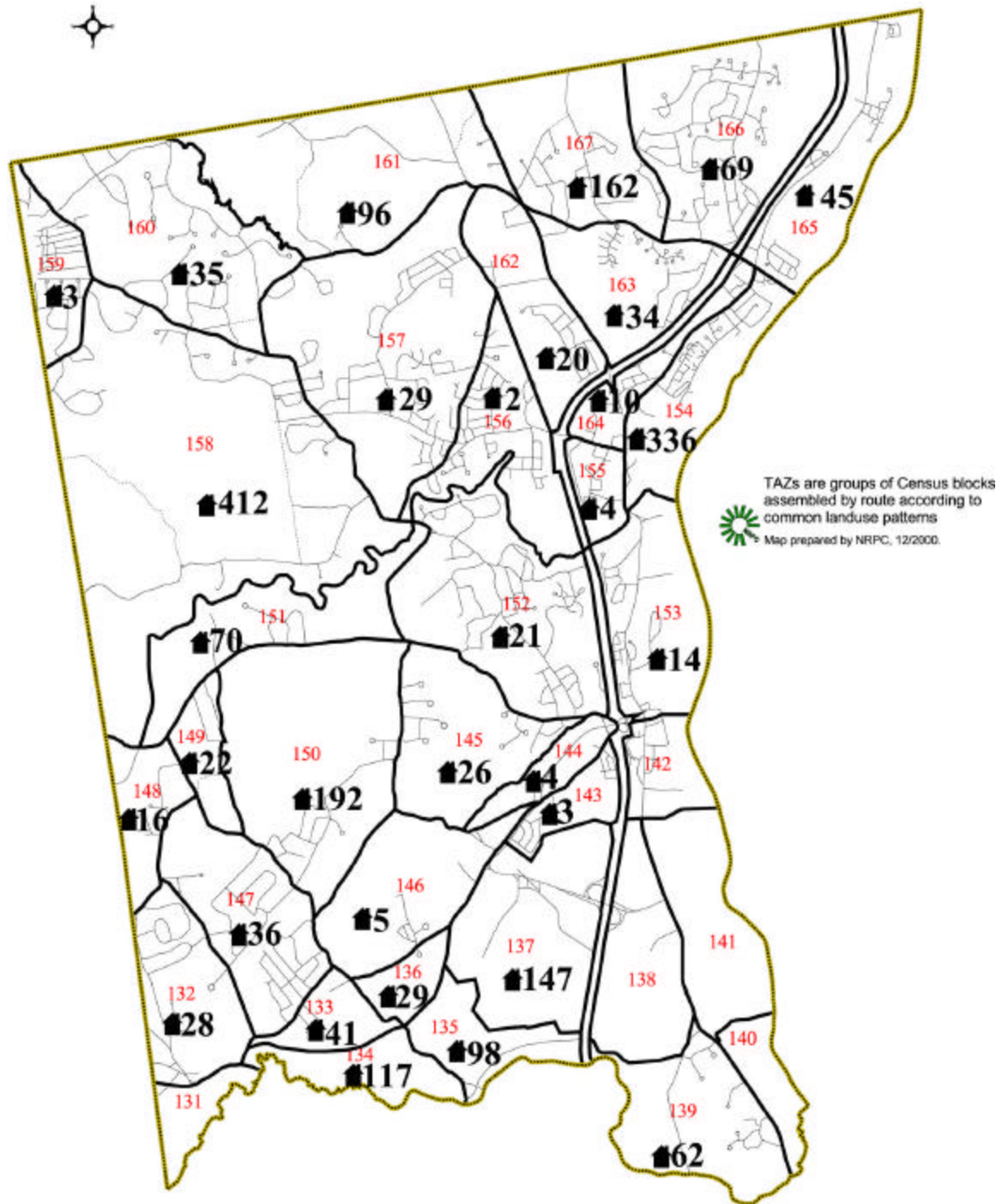
Map 5
Potential Non-Residential Development by TAZ
(Estimated Number of Additional Square Feet)




Potential Non-Residential Development at buildout
(Measured in Square Feet)

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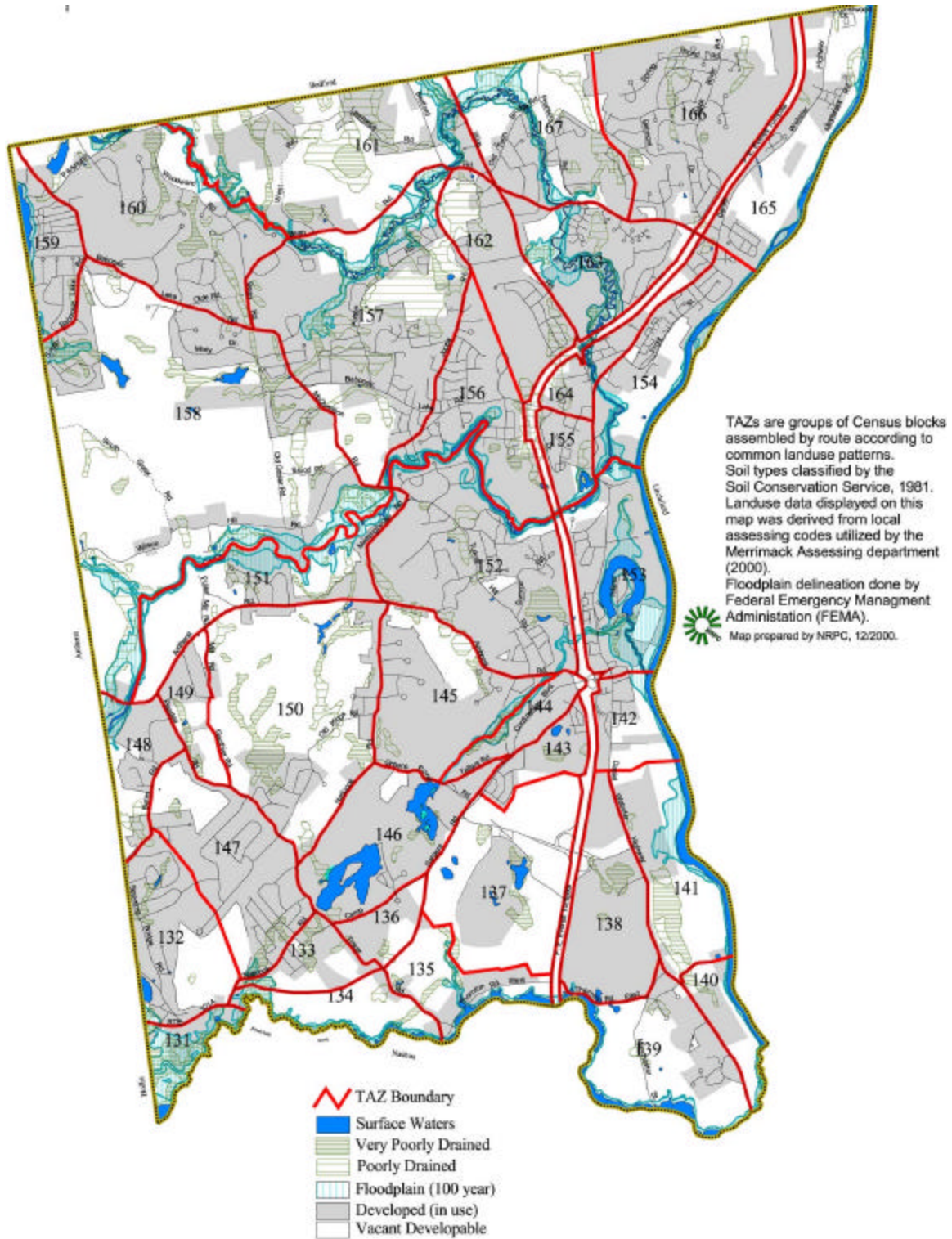
Map 6
Potential Residential Development by TAZ
(Estimated Number of Additional Dwelling Units)



 Potential Residential Development at buildout
(Number of dwelling units)

(1) Based on Average Densities

Map 7
Constraints Map of Merrimack
(Based upon Landuse, Soil, and Floodplain GIS Databases)



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