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Durham Comprehensive Plan

Appendix A Existing Conditions

Part 1 Demographics and Economics

Durham City-County Planning Department

The Durham Comprehensive Plan

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Appendix A, Existing Conditions

Part 1: Demographics & Economics

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Part 1: Demographics and the Economy

Introduction

The Existing Conditions Report provides quantitative and qualitative data used as a basis for the goals, objectives, and policies of the Durham Comprehensive Plan. The report examines a wealth of information about Durham’s place in the region, its population, economy, and its built and natural environments. The report is divided into three sections:

Part 1: Demographics and Economy
Part 2: The Built Environment; and
Part 3: The Natural Environment

Part 1, Demographics and Economy, places Durham in its regional context as part of the Research Triangle and the Durham-Chapel Hill Metropolitan Statistical Area (MSA). The report also utilizes historic demographic and employment data to project population, housing, employment, and land use demand through the year 2035.

Regional Context

Durham County comprises less than one percent of the total land area of the State of North Carolina. However, in 2010 Durham’s population was almost three percent of the state’s population, while employment in Durham comprised nearly six percent of total jobs in the state. The City of Durham was the 5th largest municipality in the State in 2010.

Durham is a part of the Research Triangle Region. Research Triangle Park is the hub of the region, providing jobs, tax base, prestige and an international reputation for corporate technological innovation. While “the Park” is the identifier in the minds of outsiders, the Region is much more. The Research Triangle Region boasts beautiful rural landscapes, quiet suburban neighborhoods, busy shopping malls, historic in-town neighborhoods, renowned higher education institutions, high tech jobs, parks, and museums. While all share a common cultural and

geographic heritage, Triangle communities each have their distinctive character.

Durham is also part of the Durham-Chapel Hill Metropolitan Statistical Area (MSA), as defined by the U.S. Census Bureau. The other counties of the Durham-Chapel Hill MSA are Chatham, Orange, and Person Counties.

Communities in the Region

The Triangle Region is over 4,025 square miles with almost 1,465,000 people living and working in rural neighborhoods, small towns and medium-sized cities. On average 74 new residents per day move to the Triangle Region to take advantage of all the area's assets. Almost 750,000 new residents are expected to move into the region over the next generation (by 2030), equal to the combined current populations of Raleigh, Durham, Chapel Hill, and Cary.

The Triangle J Council of Governments (TJCOG) is an important vehicle for regional planning in this area. The TJCOG is a voluntary organization of municipal and county governments in North Carolina's Region J. It includes seven counties: Chatham, Durham, Johnston, Lee, Moore, Orange and Wake. It also includes 23 municipalities: Apex, Benson, Broadway, Carrboro, Cary, Chapel Hill, Clayton, Durham, Fuquay-Varina, Garner, Goldston, Hillsborough, Holly Springs, Knightdale, Morrisville, Pittsboro, Raleigh, Rolesville, Sanford, Smithfield, Wake Forest, Wendell and Zebulon.

Two organizations provide regional planning for transportation. The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHCMPO) prepares a regional, multi-jurisdictional transportation plan for the western portion of the Region. Likewise, the Capital Area Metropolitan Planning Organization (CAMPO) prepares a regional, multi-jurisdictional transportation plan for the eastern portion of the Region.

In each MPO, a transportation advisory committee, made up of elected officials from each local government and representatives from transit providers, guides planning. These MPOs, along with the NC Department of Transportation (NCDOT) must jointly approve regional transportation plans and regular transportation related capital improvement programs.

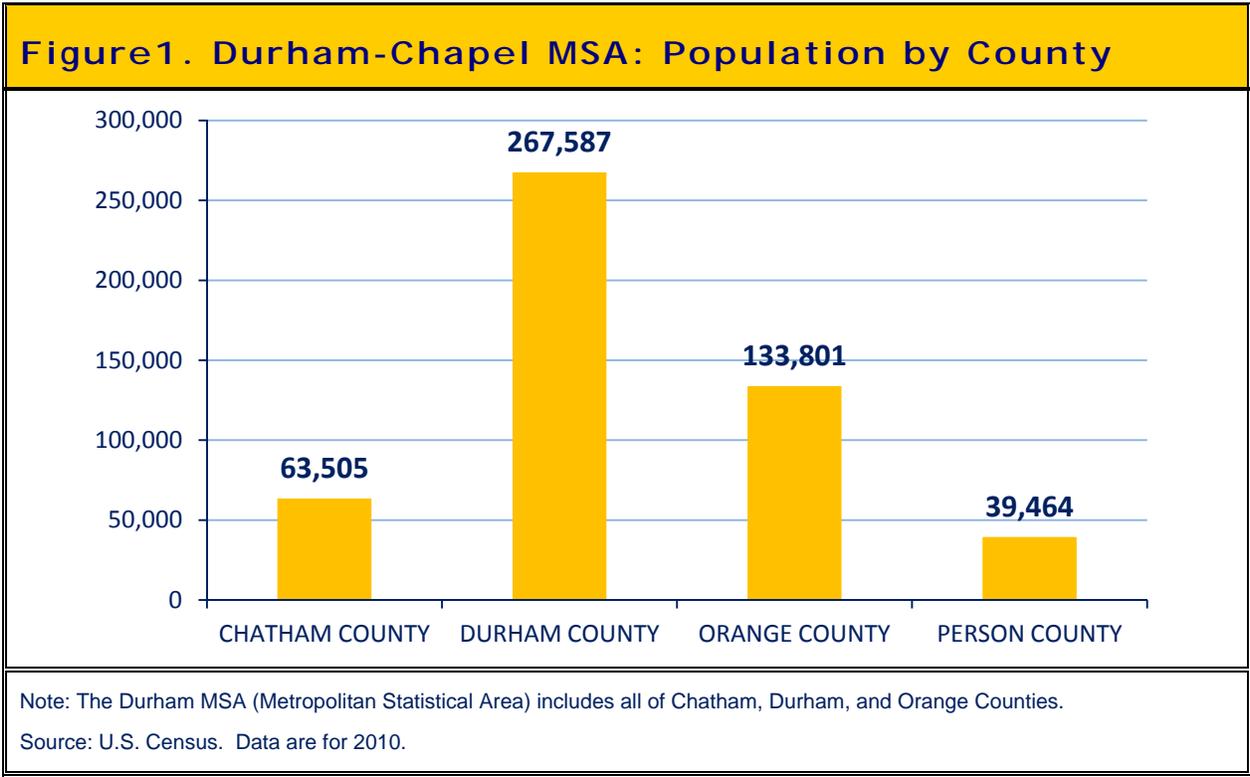
Durham in the Region

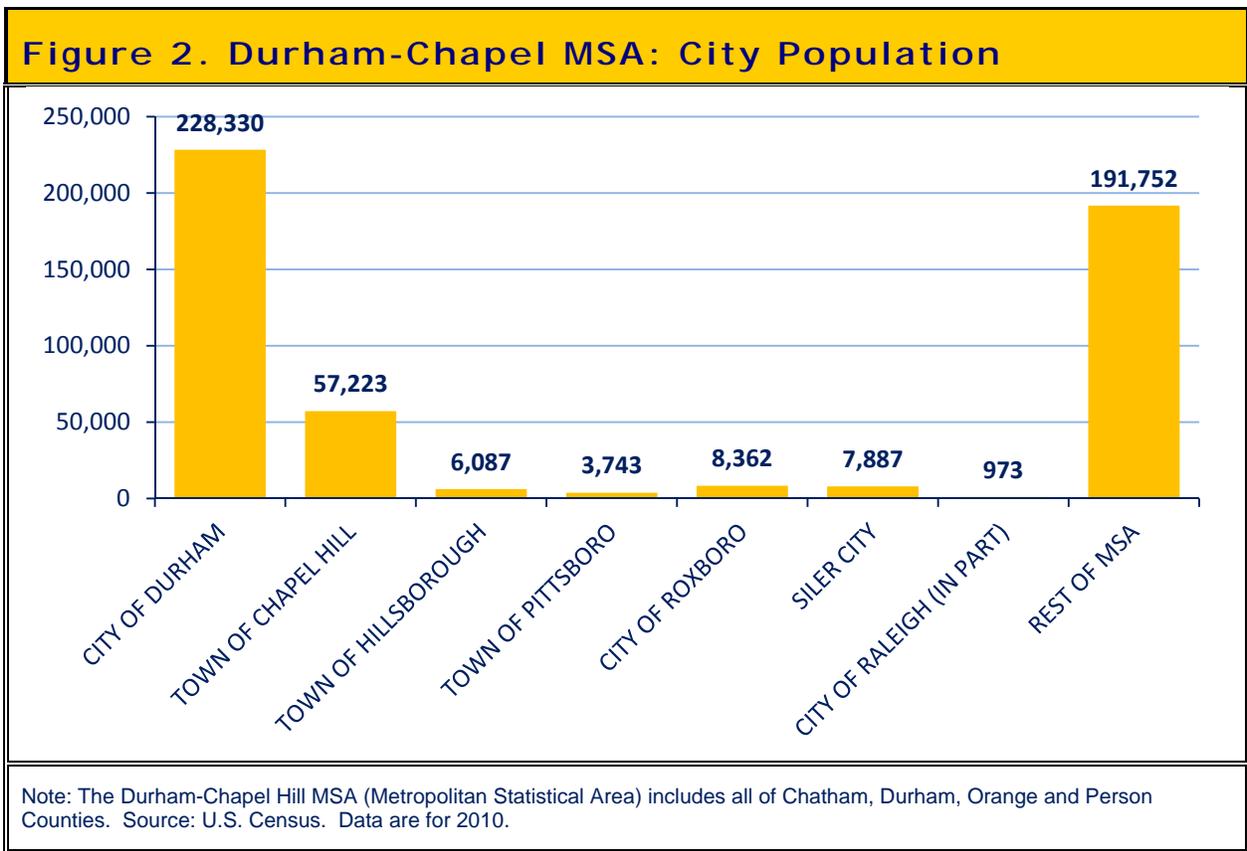
The Durham-Chapel Hill Metropolitan Statistical Area (MSA), which was created after the 2000 U.S. Census, hosted a population of 426,493 in 2000. The MSA's population rose to 504,357 by April 2010, a growth rate of over 18 percent. Of the four counties in the MSA, Durham County's population is the largest, about 53 percent of the total

population of the MSA. Orange County accounts for about 27 percent of the MSA population, while Chatham and Person counties account for 13 percent and eight percent, respectively. See Figure 1, County Population in the MSA. In addition to the City of Durham, the County hosts seven other growing municipalities, including a small portion of the City of Raleigh.

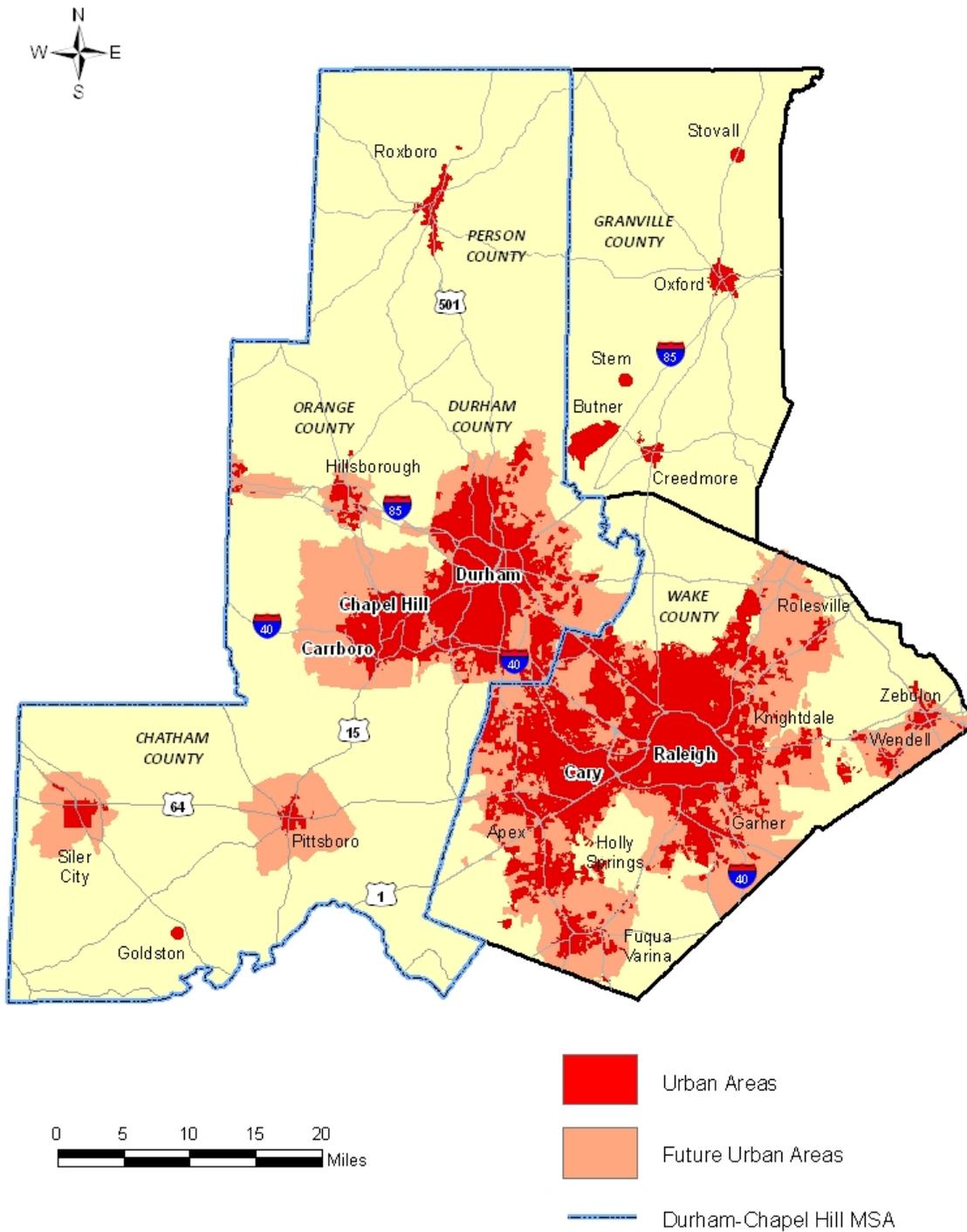
The City of Durham is the MSA’s largest city, with 228,330 people in April 2010. Durham’s population grew by 22 percent from 2000 to 2010, matching the growth rate for the state of North Carolina. The City of Durham’s population was 45 percent of the MSA’s total, and Durham and Chapel Hill together accounted for 57 percent of the population. The remainder was distributed among the MSA’s small towns, its non-municipal suburban area and rural countryside. See Figure 2, City Population in the MSA.

The four counties in the Durham-Chapel Hill MSA cover about 1,765 square miles (See Map 1, Durham in the Region.) The seven cities and towns in the region account for about almost 390 square miles, or 12 percent of the land area. Outside of the municipalities, many have identified extra-territorial areas or urban growth areas into which they expect to expand urban uses.





Map 1. Durham and the Research Triangle Region



Note: Source is Durham City-County Planning Department, 2011

Regional Development Principles

In the late 1990s, TJCOG along with the Greater Triangle Regional Council prepared the Regional Development Choices Project. The intent was to develop realistic alternative scenarios for the future development of the Research Triangle Region and spur community dialogue. Three scenarios were unveiled, depicting different ways that the Region might grow. Each scenario was made up of principles related to the design and character of urban and rural communities, transportation, parks and open space and regional cooperation.

After a yearlong public dialogue about these choices, eight principles were distilled from the scenarios and community dialogue. The following set of principles was offered as a framework for improving conservation, development and mobility in the Region.

- **Smart Pattern of Development.** Define land areas that are appropriate for development, as well as environmentally sensitive, historic, natural or recreational land areas that need protection.
- **Walkable Communities.** Design new and preserve existing neighborhoods and communities to foster walkability, safety and a sense of place.
- **Affordable Living.** Ensure that the costs of living in the region are affordable to all.
- **Green Space.** Preserve more natural areas and open space, and provide for their local and regional interconnection.
- **Integrated Transportation.** Provide a seamless, regional, multi-modal transportation system, which interlinks new and existing residential, employment, commercial and recreational areas.
- **Enhanced Civic Realm.** View the civic realm as a legacy to future generations.
- **Mixed Use Activity Centers.** Promote different, mixed-use centers at different scales for each city, town and crossroads in the Triangle to serve as centers of civic, social, educational, cultural and economic life, and as transportation hubs.
- **Shared Benefits.** Share the region's resources to improve the quality of life for all Triangle citizens.

Regional Issue

Over the past few years, Triangle local governments have made great strides in opening and maintaining communications about matters of mutual interest. However, the Triangle Region needs to engage in more extensive regional planning to better address common problems related to growth and development. Regional cooperation could

expand in the areas of transportation planning, recreation and open space planning, water supply and wastewater treatment, among others.

Population

Population Profile



*Population Profile
Population Growth*

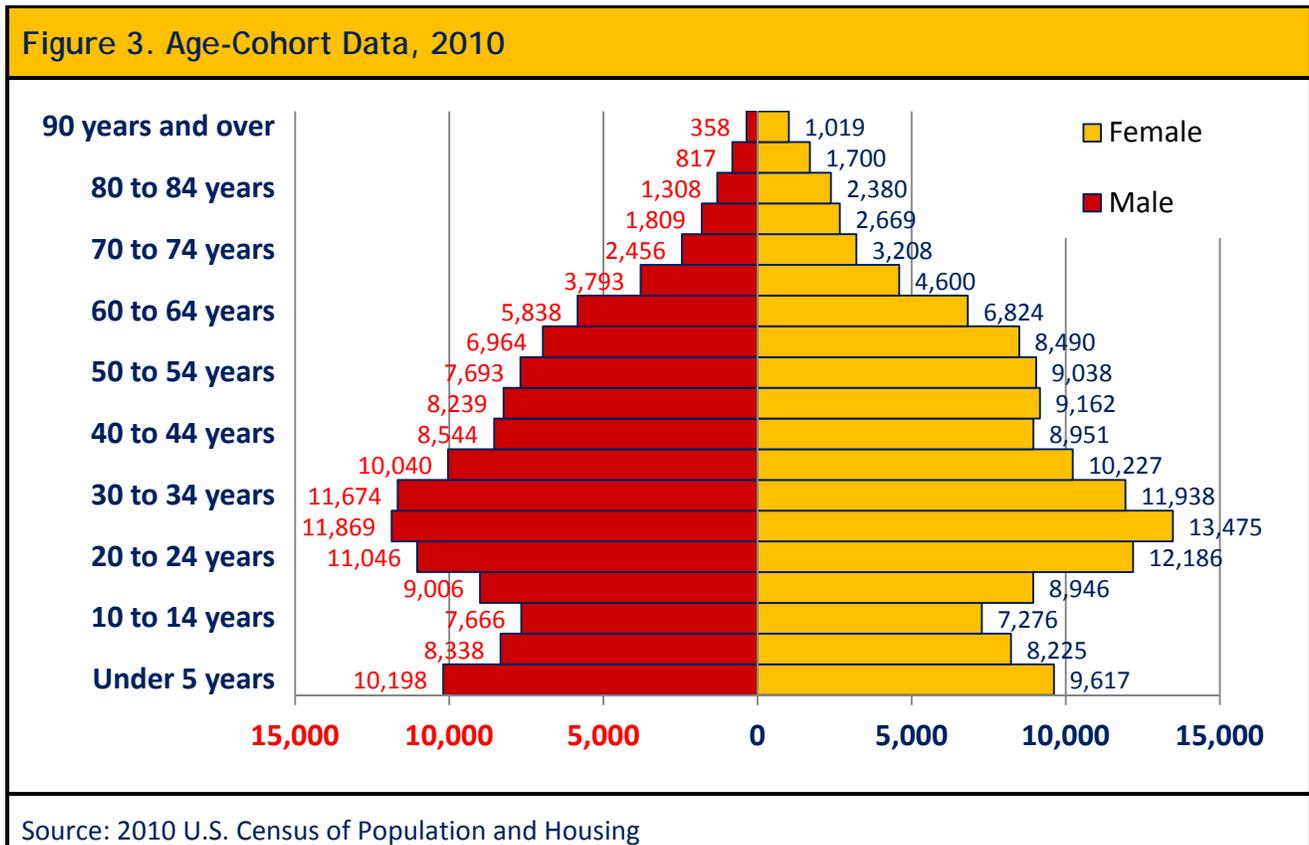
In some ways, Durham’s population is different from the region as a whole. Table 1, Population by Sex and Race/Ethnicity, highlights one aspect of Durham’s population that is unique to the region. Durham, unlike its neighboring counties, is a community of minorities, with no racial or ethnic population holding a majority.

Table 1. Population by Race/Ethnicity										
	MALE	FEMALE	NOT HISPANIC							HISPANIC OR LATINO (OF ALL RACES)
			WHITE	BLACK OR AFRICAN AMERICAN	NATIVE AMERICAN	ASIAN	PACIFIC ISLANDER	SOME OTHER RACE	MULTI-RACE	
CITY OF DURHAM	108,000	120,330	86,446	92,352	611	11,475	129	646	4,230	32,441
DURHAM COUNTY	128,174	139,413	112,697	100,260	722	12,180	135	700	4,816	36,077
CHATHAM COUNTY	31,585	31,920	45,185	8,272	163	694	15	129	819	8,228
ORANGE COUNTY	63,957	69,844	94,671	15,722	383	8,996	35	316	2,661	11,017
PERSON COUNTY	19,384	20,080	26,354	10,599	244	115	4	51	504	1,593
DURHAM-CHAPEL HILL MSA	243,100	261,257	278,907	134,853	1512	21,985	189	1,196	8,800	56,915
CITY OF DURHAM	47.3%	52.7%	37.9%	40.4%	0.3%	5.0%	0.1%	0.3%	1.9%	14.2%
DURHAM COUNTY	47.9%	52.1%	42.1%	37.5%	0.3%	4.6%	0.1%	0.3%	1.8%	13.5%
CHATHAM COUNTY	49.7%	50.3%	71.2%	13.0%	0.3%	1.1%	0.0%	0.2%	1.3%	13.0%
ORANGE COUNTY	47.8%	52.2%	70.8%	11.8%	0.3%	6.7%	0.0%	0.2%	2.0%	8.2%
PERSON COUNTY	49.1%	50.9%	66.8%	26.9%	0.6%	0.3%	0.0%	0.1%	1.3%	4.0%
DURHAM-CHAPEL HILL MSA	48.2%	51.8%	55.3%	26.7%	0.3%	4.4%	0.0%	0.2%	1.7%	11.3%

Durham also has a higher percentage of Hispanic residents than surrounding counties and the growth of its Hispanic population over the past decade has been one of the more significant demographic changes. In 2000, Hispanics made up over seven percent of Durham’s population. The 2010 U.S. Census of Population revealed that Hispanics now

account for over 14 percent of the City of Durham’s population and 13.5 percent of the county’s population.

Durham’s 2010 age-cohort data are shown in Figure 3. A significant shift in Durham’s “population pyramid” occurred during the 2000-2010.



Over the past decade, the fastest growing segments of the population were the 55-59 and 60-64 age-cohorts. The percentage of the population 85 years and older also saw a significant rise (see Table 2). An aging population may have far-reaching impacts on Durham’s economy as the demand for specific goods and services, transportation options, and type of housing, change and the market responds to demand shift.

Table 2. Growth Rates by Age Cohort, 2000-2010		
Age-Cohort	Male	Female
Under 5 years	29.2%	26.6%
5 to 9 years	10.5%	15.5%
10 to 14 years	9.5%	8.8%
15 to 19 years	18.6%	22.0%
20 to 24 years	4.8%	15.7%
25 to 29 years	5.6%	21.8%
30 to 34 years	16.0%	19.8%
35 to 39 years	12.8%	7.4%
40 to 44 years	6.6%	0.4%
45 to 49 years	16.0%	12.0%
50 to 54 years	25.6%	29.8%
55 to 59 years	61.7%	77.2%
60 to 64 years	89.7%	87.1%
65 to 69 years	49.3%	46.6%
70 to 74 years	17.8%	1.7%
75 to 79 years	1.6%	-8.6%
80 to 84 years	22.9%	12.4%
85 years and older	58.1%	33.7%
Source: 2000 and 2010 U.S. Census of Population and Housing		

The characteristics of Durham's households were similar to those of the MSA as a whole but noticeably differed in some ways from the State of North Carolina. Durham had a far higher percentage of non-family households and single-person households than did the state (see Table 3.)

Table 3. Household Characteristics				
HOUSEHOLDS BY TYPE	STATE OF NORTH CAROLINA	DURHAM-CHAPEL HILL MSA	DURHAM COUNTY	CITY OF DURHAM
Family households (families)	66.7%	61.1%	59.3%	56.8%
With own children under 18 years	29.7%	28.7%	28.9%	29.0%
Married-couple family	49.1%	44.1%	39.7%	35.7%
With own children under 18 years	19.5%	18.7%	17.4%	16.3%
Male householder, no wife present, family	4.3%	4.4%	4.9%	5.2%
With own children under 18 years	2.3%	2.3%	2.5%	2.6%
Female householder, no husband present, family	13.2%	12.6%	14.7%	15.9%
With own children under 18 years	7.9%	7.6%	9.0%	10.1%
Nonfamily households	33.3%	38.9%	40.7%	43.2%
Householder living alone	27.7%	30.3%	32.5%	34.6%
65 years and over	8.7%	6.8%	6.4%	6.5%

Source: U.S. Census Bureau, 2010 Census of Population

Durham’s mean household and family incomes exceeded the state averages. However, these Durham’s numbers lagged somewhat behind averages for the MSA (see Table 4.)

Table 4. Income				
	STATE OF NORTH CAROLINA	DURHAM-CHAPEL HILL MSA	DURHAM COUNTY	CITY OF DURHAM
Mean Household Income	\$59,700	\$68,593	\$65,054	\$61,985
Mean Family Income	\$69,958	\$83,288	\$78,168	\$74,676
per Capita Income	\$23,803	\$27,664	\$26,529	\$25,814

Source: U.S. Census Bureau, 2009 American Community Survey

Similarly, Durham educational attainment figures exceeded state average for residents with college degrees but slightly lagged behind the MSA. Interestingly, the City of Durham also exceeded the state average for persons with less than a ninth grade education (see Table 5.)

Table 5. Educational Attainment				
	STATE OF NORTH CAROLINA	DURHAM-CHAPEL HILL MSA	DURHAM COUNTY	CITY OF DURHAM
Population 25 years and over				
Less than 9th grade	5.9%	5.2%	5.9%	6.8%
9th to 12th grade, no diploma	9.7%	7.9%	8.2%	8.0%
High school graduate (includes equivalency)	27.3%	18.7%	17.6%	15.4%
Some college, no degree	22.0%	18.1%	17.5%	17.6%
Associate's degree	8.5%	5.8%	5.7%	5.4%
Bachelor's degree	17.7%	22.5%	24.2%	24.9%
Graduate or professional degree	8.8%	21.8%	20.8%	21.8%

Source: U.S. Census Bureau, 2009 American Community Survey

Population Growth

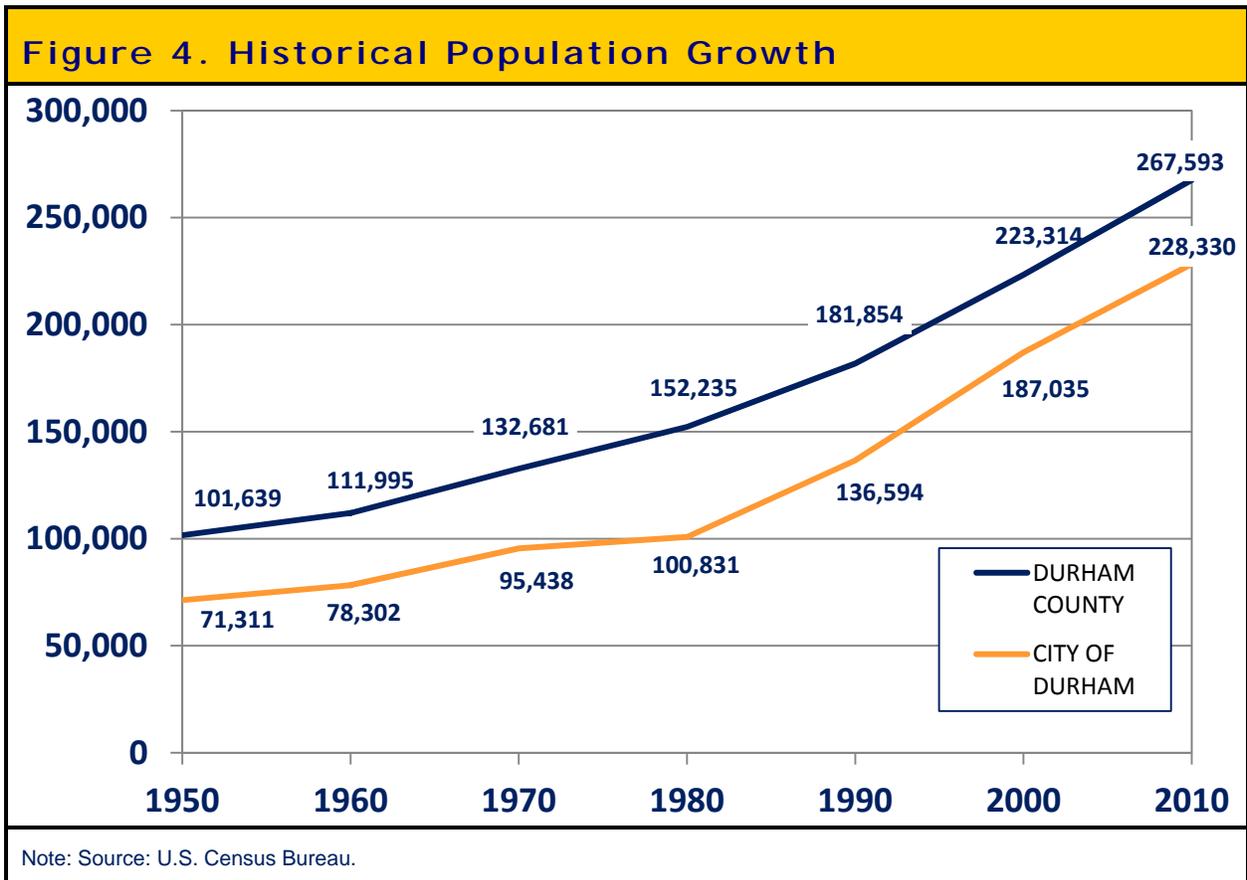
The population of Durham County in 2010 was 267,587. Over the previous decade, the County’s population grew by almost 41,500, representing an increase of about 20 percent. This increase represents eleven new residents and five new households for every day of the past ten years. Natural growth, (births minus deaths) accounted for a little more than one-third of the increase, while net migration (in-migration minus out-migration) accounted for a little less than two-thirds.

Much of Durham County’s growth occurred within the City of Durham. The City population grew over the past decade from 187,035 to 228,330, representing a decade-long increase of 22 percent. The City also expanded in size from about 98 square miles in 2000 to over 106 square miles in 2011.

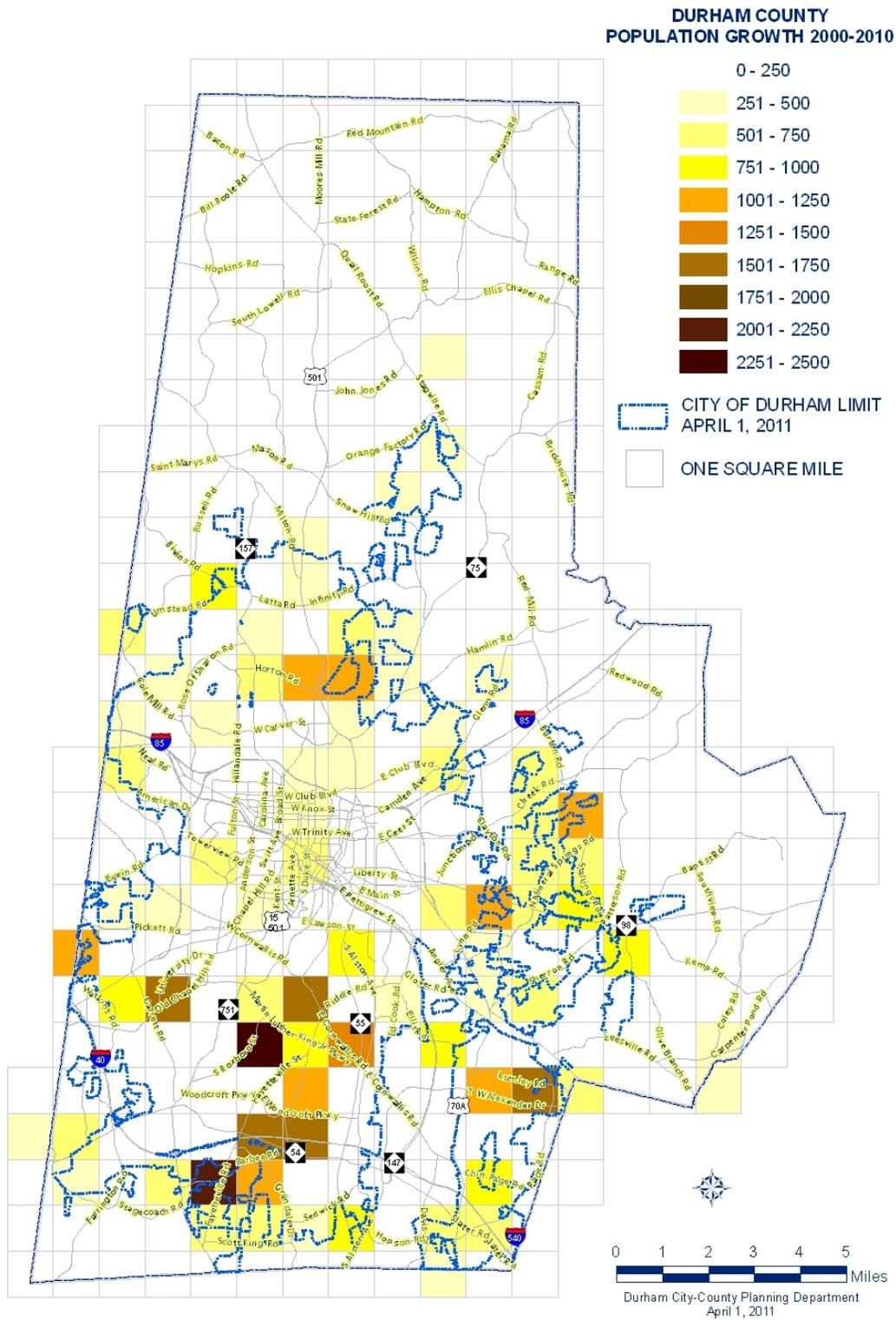
Population growth over the past decade was, of course, not evenly distributed across Durham’s landscape, with some areas within Durham seeing much more growth than others (see Map 2). Areas of relatively high growth included the Interstate 40 corridor in south Durham. Population within the City of Durham’s downtown area also showed significant growth after several decades of decline.

Durham County’s population grew at a moderate rate over the past 30 years. Growth rates for the 1970s, 1980s and 1990s were 15 percent, 19 percent and 23 percent, respectively. The growth rate for the first decade of the 21st century was 20 percent. The 3 percent decline in growth rate from 2000 to 2010 reflects the national economic downturn of the past few years, as demonstrated by a comparison of annual growth rates for the periods 2000-2005 and 2005-2010. From 2000 to 2005, the annual growth rate was 2.2 percent. The annual growth rate from 2005 to 2010 declined to 1.8 percent. Growth rate can be

expected to increase as the economy recovers (See Figure 4, Historical Population Growth.)



Map 2. Distribution of Population Growth, 2000-2010



Source: Durham City County Planning Department, 2011.

Population projections are estimates about the size of the population in a future year or years. They indicate what population changes might occur and are based upon a set of assumptions underlying the projections. Three different techniques have been used for the Durham Comprehensive Plan, providing a low, medium and high projection of future population.

The Triangle is projected to continue to be an attractive area for both new businesses and new people. This creates continued demand for new homes, office buildings, shopping centers and industries. Likewise, new business and families impose additional demands on public facilities, especially schools, roads, parks and utilities. How effectively Durham responds to these growth pressures will have a major influence on the quality of life of the community.

Durham County's population is expected to grow significantly over the next three decades. The medium growth projections indicated that Durham County would grow from 223,314 in 2000 to about 328,600 by 2030. (See Figure 5, Future Population Growth and Table 6, Durham County Population Projections.) The increase of almost 105,300 new residents represents about a growth rate of about 47 percent over three decades. It represents an annual average increase of about 1.29 percent. The low growth projection indicates an annual average rate of 1.14 percent while the high growth projection indicates an annual average rate of 1.58 percent.

Durham County's population density increased significantly during the past two decades, reflecting population growth of the City and County. Population density for the County in 1980 was 512.3 persons per square mile (or 0.80 persons per acre). By 2000, the density had increased to 748.9 persons per square mile (or 1.17 persons per acre). Higher population density indicates that the County is becoming more suburban and less rural in character. (See Table 7, Change in Population Density.)

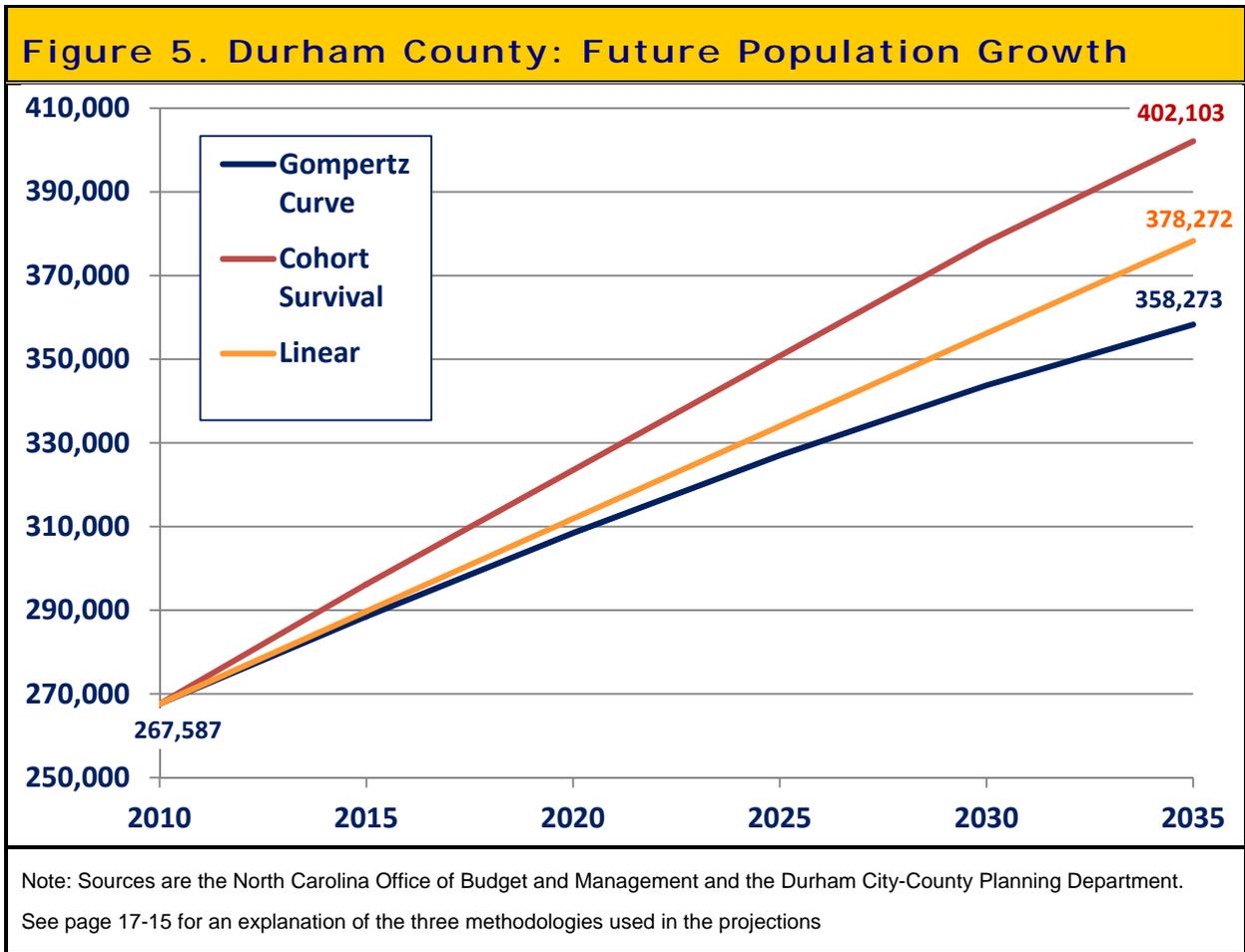


Table 6. Durham County Population Projections

	2010	2015	2020	2025	2030	2035
Method A: Linear	267,587	289,724	311,861	333,998	356,135	378,272
Method B: Cohort-Survival	267,587	296,200	323,474	350,749	378,024	402,103
Method C: Gompertz Curve	267,587	288,497	308,450	327,013	343,758	358,273

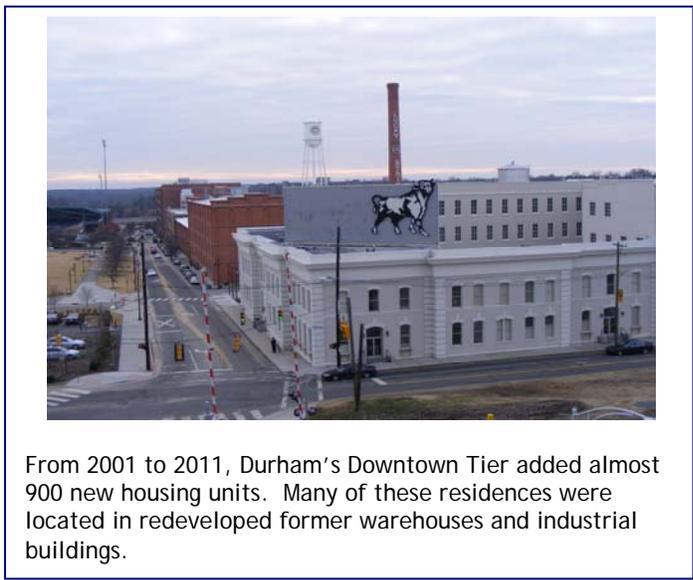
Note: Sources are the NC Office of State Budget and Management and the Durham City-County Planning Department.

Over this period, the City’s population density has declined, reflecting the development pattern of suburban areas that the City has annexed. The City population density in 1980 was 2,388.3 persons per square mile (3.73 persons per acre) but had dropped to 1,883.8 persons per square mile (2.94 persons per acre) by 1990. By 2000, the population density increased to 1905.6 persons per square mile (2.98 persons per acre).

Table 7. Change in Population Density				
	Year	Population	Area (Square Miles)	Population Density (Persons per Square Mile)
Durham County	1980	152,785	298.2	512.3
	1990	181,835	298.2	609.7
	2000	223,314	298.2	748.9
	2010	267,593	298.2	897.4
City of Durham	1980	100,535	42.1	2,387.5
	1990	136,611	72.5	1,883.8
	2000	187,035	98.2	1,905.6
	2010	228,330	107.5	2124.0

Note: Source: Durham City-County Planning Department.

As indicated earlier, net in-migration accounted for about 63 percent of Durham’s growth during the 1990s. Many new residents found homes in an expanding ring of suburban subdivisions within the City but outside the urban core. Population density, indicated in persons per square mile, increased in east and south Durham. Population density rose as formerly rural lands were converted to suburban residential uses.



During the period 2001-2011, the trend toward suburbanization was partially offset by redevelopment of former commercial and industrial structures within Durham’s downtown as medium to high density residential. By June 2011, there were 1,672 housing units within the Downtown Tier, compared to 879 housing units in 2001. The growth rate for housing in the Downtown Tier during the decade was over 90 percent. Many of these new units were condominiums and apartments in former warehouses.

The desire of people to move into Durham reflects well on the community’s quality of life; however, large population increases place new demands on the community. New housing, shopping centers and business parks to support new residents can stress Durham’s natural environment. The public sector’s ability to provide all the necessary public facilities and services is challenged. How Durham

responds to these pressures will largely determine the future quality of life in the community.

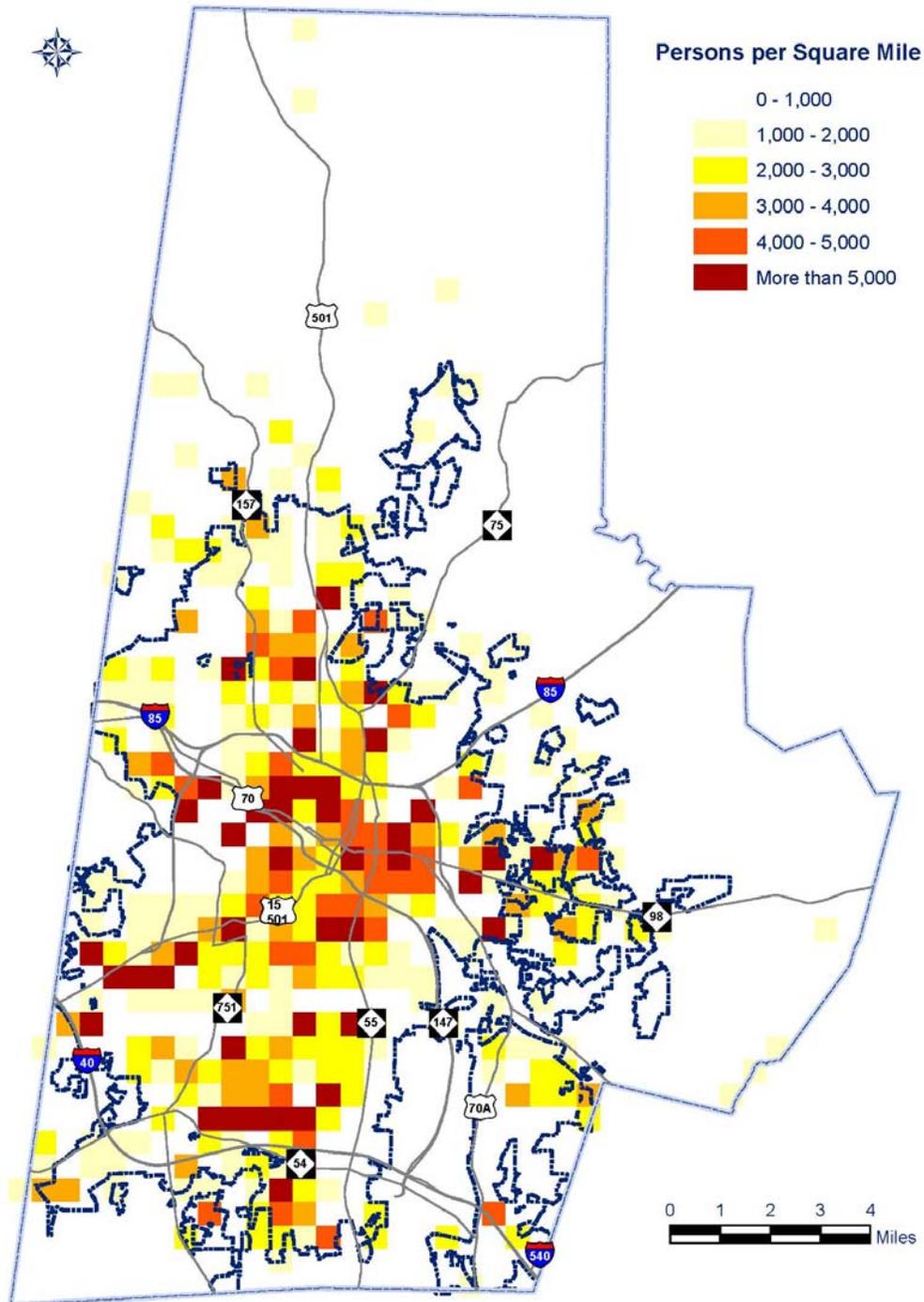
Population Projection Methods

Three methods were used to project Durham County's population through the year 2035. The simplest was **Method A, Linear Projection**. This method utilizes an average number of persons added over a given time period. In this case, average number of persons added between 1990 and 2010 was used to project population as a straight line. Linear projection yielded a population of approximately 378,000 in 2035. The major weakness of this method is that population rarely grows in a straight line for any significant period of time.

Method B, Cohort-Survival projections utilize the existing age profile of a community, as well as live birth and death rates to project population. The first step is to age each cohort or age group (e.g. age 0 to 4, age 5 to 9, age 10 to 14, etc.) ten years. Rates of live birth for specific female age-cohorts and mortality rate by age cohort are used to derive the natural population increase during the 2000 to 2010 period. Migration rates by age-cohort are used to project population increase through immigration. The process is then repeated for the 2010 to 2020, 2020 to 2030 and 2030 to 2035 time periods. The method projected Durham's population as approximately 402,000 in 2035. Cohort-survival is one of the more sophisticated methods used in projecting population and can often prove quite accurate. The method holds migration rates constant and this can sometimes be a problem if migration rate is rapidly evolving.

Method C, Gompertz Curve is a form of geometric curve that uses past rates of growth to project population. Unlike a geometric curve, a Gompertz curve recognizes that growth has finite limits and assumes a slowly declining rate of growth as "buildout" is approached. In this case, the growth rate from 1990 to 2010 was used to derive an average decline in growth rate. This method yielded a population of 358,273 in 2035, the lowest figure calculated. In a sense, the Gompertz curve projection can be considered a pessimistic view of Durham's future growth because the economic slowdown pertaining from 2006-2010 skewed the average decline in growth rate.

Map 3. Population Density



Note: Source is the US Census, 2010

Economy



*Overview
Economic Profile
Structure of the
Economy
Change in Economic
Structure*

Changes in the economy are as important as changes to the population for guiding a community’s development. Economic changes can help determine the types of land use patterns that are required to accommodate employment. They can also suggest forms of infrastructure required to support economic growth, as well as provide an indication of the nature of housing required in the community.

Durham is at the center of the region, geographically and in terms of employment. The location of Research Triangle Park and Duke University within Durham provides a strong employment base for the community, providing employment opportunities for residents of the community as well as for residents of other counties in the surrounding region. This suggests that Durham provides economic growth to accommodate its own population as well as the employment needs of surrounding communities.

The following section provides a general overview of Durham’s economy, beginning with an economic profile of Durham. An examination of the employment base of the community is presented, both in relation to the larger region and to the state. Changes in Durham’s economy over the past ten years are discussed, along with the wage structure of the community and recent economic trends. At the conclusion is an identification of general land use issues that are suggested by Durham’s economy.

Economic Profile

Durham County had a workforce of 141,849 in 2010. (See Table 8, Economic Profile.) This represents about 54 percent of the Durham-Chapel Hill Metropolitan Statistical Area’s employment and about 3 percent of the employment in the state. The unemployment rate for Durham County was 8.0 percent in late 2010. This rate is significantly lower than the 10.6 percent rate for the state. However, the rate was much higher than Durham County’s rate of 4.4 percent in 2005. The jump in unemployment reflects the lingering effects of a nationwide economic downturn that began in 2006.

The median family income for Durham County in 2010 was over \$61,000. This income was greater than the median family income for the Durham-Chapel Hill MSA and North Carolina, and was virtually the same as for the U.S. as a whole, reflecting the general prosperity of the County.

Table 8. Economic Profile					
	City of Durham	Durham County	Durham-Chapel Hill MSA	North Carolina	United States
Workforce, 2010	na	141,849	263,299	4,512,770	156,044,453
Unemployment Rate, 2010	na	8.0%	7.7%	10.6%	9.9%
Median Family Income, 2009	\$57,200	\$61,030	\$59,405	\$54,288	\$61,082
Per Capita Income, 2009	\$25,814	\$26,529	\$24,698	\$23,576	\$26,409

Note: The Durham-Chapel Hill, NC Metropolitan Statistical Area (MSA) includes all of Chatham, Durham, Orange, and Person Counties. Sources: US Census, 2009 American Community Survey; NC Employment Security Commission.

The Structure of the Economy

A fundamental tool for the examination of an area’s economic structure is economic base analysis. This statistical tool evaluates employment in a defined area as a component of the employment in a larger area, generally assuming that the employment in the smaller area should naturally reflect the employment pattern in the larger area. The comparison is typically based upon the percentage of employees within a particular industry in a defined region measured against total employment in the region. That percentage can then be compared to a larger geographic area which encompasses the region of interest to ascertain whether the smaller area simply reflects the pattern of the larger area or enjoys perceived competitive advantages with regard to some components of the economy.

If the smaller area simply reflects the larger area, its economic structure should mirror that of the larger area; differences between the two are suggestive of local advantages. Industries in which the ratio of employment within the smaller area exceeds that of the larger area are considered basic industries. Basic industries are those that bring capital into the smaller area due to their production of goods and services in excess of what the smaller area might be expected to require.

In order to analyze Durham’s economic base, 2009 data provided by the U.S. Department of Commerce, Bureau of Economic Analysis for North Carolina and Durham County was compared. The data included the number of employees within each of the industries identified by North American Industrial Classification System (NAICS) codes. Table 9 indicates the results of the comparison. Each industry in which the ratio of employment within Durham exceeds that of the state is identified in the last column of the table; these industries are represented by a value of 1.00 or more.

As shown in Table 9, Durham's economy is in some ways quite different from the state's economy as a whole. In four areas (educational services; professional, scientific, and technical services; administrative, support, waste management, and remediation services; and manufacturing), employment in Durham exceeds the level that would be anticipated considering the employment pattern in the state as a whole. These industries, then, may be considered as the driving forces in Durham's economy and economic growth.

The significance of these industries to Durham's economy is reflected in the presence of the County of several of the most significant non-governmental employers within the Triangle region. These employers include:

- Duke University and Health System, with 33,750 employees. In addition to being the largest non-governmental employer in the region, Duke is the largest non-governmental employer in North Carolina.
- IBM, with 10,000 employees. IBM is the third largest non-government employer in the state.
- Glaxo Smith Kline, with 4,500 employees.
- Blue Cross & Blue Shield of North Carolina, with 2,437 employees.
- RTI International, with 2,200 employees.

Health care is an economic cornerstone to Durham, contributing to a significant employment base. Durham's nickname, "City of Medicine," is reflective of the presence of Duke University Hospital, the largest hospital in the state, with 1,124 beds and approximately 1,400 medical doctors in Durham.

Though health care is not readily identified as a basic industry in Durham County, it should not be dismissed as a major contributor to the region's economy. The Economic Census only captures paid employees, and as a result, sole practitioners and some medical professionals are not included in its numbers. In addition, some of the medical employment in the County is associated with Duke University, and

thus contributes to the importance of educational services in the community's economy.

The health care industry's importance to Durham's economy may also be seen in the presence in the community of many biotechnology companies, pharmaceutical industries, and research organizations. The pharmaceutical firm, Glaxo Smith Kline with approximately 4,500 employees, chose to maintain dual headquarters in Durham and



The Duke University Medical Center provides excellent health care and employment opportunities for Triangle residents.

Philadelphia suggesting the importance of the community in the industry. The firm is complemented by the presence of the world’s largest contract research company, Quintiles, which employs approximately 1,500 people. This company specializes in doing product research for drug companies. In addition, many smaller companies involved in medical research and technology are located in the Triangle area.

Personal income can also be used to measure economic trends. By evaluating the extent to which different industries contribute to the income of the area, rather than the number of employees, additional information about the relative importance of different industries to the economy can be ascertained.

Table 9. Economic Census of NC and Durham County						
Industry	NAICS Code	North Carolina		Durham County		Basic Industries
		Employees	Percent of Total	Employees	Percent of Total	
Manufacturing	31-33	465,971	11.0%	29,880	14.9%	1.35
Wholesale Trade	42	185,451	4.4%	7,563	3.8%	0.86
Retail Trade	44-45	529,988	12.5%	15,671	7.8%	0.62
Real Estate and rental and leasing	53	218,879	5.2%	8,103	4.0%	0.78
Professional, Scientific, and Technical Services	54	289,401	6.8%	26,430	13.2%	1.93
Admin., Support, Waste Management, and Remediation Services	56	312,815	7.4%	12,502	6.2%	0.84
Educational Services	61	107,102	2.5%	15,424	7.7%	3.04
Health Care and Social Assistance	62	531,224	12.5%	37,787	18.8%	1.50
Arts, Entertainment, and Recreation	71	104,928	2.5%	3,818	1.9%	0.77
Accommodation and Food Services	72	360,731	8.5%	13,066	6.5%	0.77
Other Services	81	283,792	6.7%	10,157	5.1%	0.76
Government and Government Enterprises		855,628	20.2%	20,566	10.2%	0.51
Total	--	2,425,720	--	200,967	--	--

Note: Source is the U.S. Department of Commerce, Bureau of Economic Analysis. Data are for 2009.

Table 10, Source of Durham County Personal Income presents a view of the how various industries contribute to the total earned income within Durham County, using information from the Bureau of Economic Analysis’s Regional Economic Information System.

In Durham County in 2009, about 36 percent of all wage income was from workers in the service industries, making this the single most significant sector of the economy in terms of income. It should be noted that the service Industry sector includes a range of activities such as health care, legal services and other professional services as well as hotel workers, and repair services. The manufacturing of durable goods is the next largest at 30%. These two sectors dominate the Durham economy.

Table 10. Source of Durham County Personal Income		
	Income, 2009 (x 1,000)	Percent of Total Income, 2009
Government	\$ 1,367,607	13 %
Service industries	\$ 3,759,300	36 %
Retail trade	\$ 400,900	4 %
Finance, insurance, and real estate	\$ 860,604	8%
Construction	\$ 380,572	4 %
Transportation and public utilities	na	Na
Wholesale trade	\$ 785,896	8 %
Durable goods manufacturing	\$ 2,950,871	28 %
Non-durable goods manufacturing	\$ 1,248,053	12 %
Agricultural services	na	na

Source: U.S. Department of Commerce, Bureau of Economic Analysis Regional Economic Information System. Data are for 2009.

Changes in Economic Structure

Information about growth and change in Durham’s economy is important in planning for the community’s future. Changes provide further information about the perceived competitive advantage of the community in the larger community, especially when evaluated against similar changes in the larger economy.

The relative strength of an area’s economy can be measured through a shift-share analysis. This type of analysis indicates whether economic growth in a community reflects its capture of its share of the larger region’s growth. It can also indicate whether growth represents an

economic change greater than that of the region, suggesting a shift in favor of the community and a competitive advantage for the smaller area.

Data were collected to measure Durham’s growth in the first decade of the 21st century against the economy of North Carolina. A comparison of data from 2001 and 2009 indicate that the economies of Durham County and the state of North Carolina were measurably impacted by the recession that affected national growth during the period 2006-2009. However, employment figures shown in Table 11, Shift-Share Analysis, reveal that Durham was less severely affected by the recession than the state as a whole. Durham saw considerable growth of employment wholesale trade and finance, insurance and real estate over the past ten years but these gains were partially offset by a significant decline in manufacturing jobs.

Table 11. Durham Shift-Share Analysis					
	2001 Employment	2009 Employment	County Growth 2001-2009	North Carolina Growth	Difference
Total Employment	201,956	229,690	13.7%	7.5%	6.2%
Government	17,562	20,566	17.1%	14.7%	2.4%
Services	96,588	120,514	24.8%	25.5%	-0.7%
Retail Trade	16,188	15,671	-3.2%	-1.1%	-2.1%
Wholesale Trade	4,092	7,563	84.8%	6.0%	78.8%
Finance, Insurance & Real Estate	10,552	19,479	84.6%	32.0%	52.6%
Construction	8,249	8,227	-0.3%	-4.6%	4.3%
Manufacturing	39,534	29,880	-24.4%	-35.0%	10.6%

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Nortel Networks reduced its Durham labor force by 2,500 and IBM dropped more than 300 jobs during the decade. The Triangle took a smaller proportion of job cuts compared with other parts of the world. For example, Nortel laid-off approximately 50 percent of its work force worldwide but only 30 percent of workers in the Triangle, perhaps recognizing the long-term vibrancy of the Durham economy.

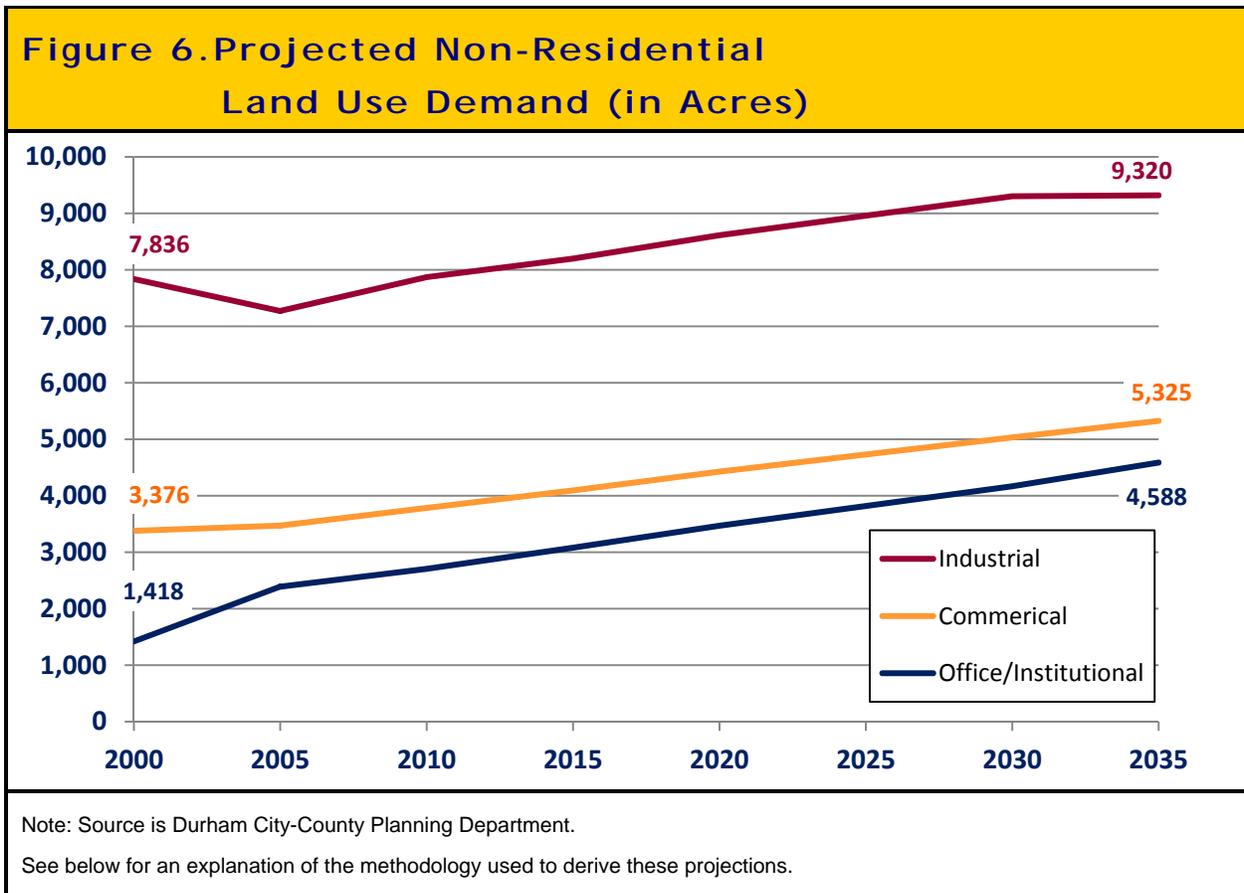
Analysis of Durham’s economy suggests that the long-term need is not for retail space, since Durham is not a regional retail leader. For the moment, retail space may simply be calculated based upon resident demand without consideration of regional retail demands.

In the future, there is likely to be a growing need for industrial and office space. These segments of the local economy are not dependent upon demand solely within Durham but provide employment opportunities as well as produce goods for consumption in a larger market. The supply of office and industrial land should be re-evaluated based upon these factors as well as the specific location factors, including access of industries within the community. New employment centers may need to be provided but should be placed in locations that will not undermine downtown renewal efforts.

Economic Issues

The presence of the universities in the community has enabled Durham to enjoy high levels of technology-related employment, particularly in the health care field. This employment sector is “knowledge based” and typically demands first class educational facilities at all levels. What can Durham do to maintain and reinforce the excellence and reputation of its institutions of higher learning?

Durham faces a growing need for land located and zoned for non-residential uses. Estimated demand by land use is shown in Figure 6.



How much demand for commercial, office and industrial land should Durham expect and accommodate? Where are the best locations in Durham for expansion of commercial, office and industrial activities? How can these land uses be accommodated without adverse impact on surrounding neighborhoods?

Summary

Durham County accounts for over 50 percent of the population within the Durham-Chapel Hill MSA, 53 percent of the workforce, and 64 percent of the jobs within the region. The county is therefore a net importer of labor.

Population and employment grew by average annual rates of 2.2 percent and 1.2 percent, respectively, from 2000 to 2010.

The fastest growing segment of the population is persons between the ages 55-64. An aging population appears to be a long-term trend.

Professional, scientific and technical services, educational services, and health care accounted for a far larger percentage of employment in Durham than in these sectors did within the state's economy as a whole.

Projecting Non-Residential Land Use Demand

Planning staff projected employment by land use through 2035 by using historical employment data for Durham County to derive trend lines. Staff then used current employment by land use, occupied square feet by land use (industrial, office, and institutional), and acreage by land use to calculate square feet demand per employee (sf/employee) and average floor-area ratio (FAR) for industrial, office and institutional uses. The employment projections were then multiplied by sf/employee and FAR to derive the acres needed to accommodate employment.

The method for projecting commercial demand was similar. Average FAR for commercial land use was calculated using data on occupied commercial space in Durham and acreage dedicated to commercial uses. Commercial uses vary greatly in square feet per employee demand, so per capita demand for commercial square feet was derived by dividing occupied commercial square feet by current population. Population projections were then multiplied by per capita demand (80 square feet of commercial space for each resident of Durham) and FAR to derive commercial land use demand in the future.



Updated, April 2012

Durham Comprehensive Plan

Appendix A Existing Conditions

Part 2 The Built Environment

Durham City-County Planning Department

The Durham Comprehensive Plan

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- Chapter 1. Introduction and Administration Element
- Chapter 2. Land Use Element
- Chapter 3. Housing Element
- Chapter 4. Community Character and Design Element
- Chapter 5. Historic Preservation Element
- Chapter 6. Economic Development Element
- Chapter 7. Conservation and Environment Element
- Chapter 8. Transportation Element
- Chapter 9. Water Utilities Element
- Chapter 10. Parks and Recreation Element
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Part 2: The Built Environment

Land Use



- Overview*
- Land Use Profile*
- Location of Housing and Employment*
- Zoning*
- Pace of Development*
- Land Supply*
- Future Land Demand*
- Issues*

How people in Durham use land is a significant contributor or detractor to the community’s quality of life. Land is used for homes, businesses, community facilities and farming. Land that most people would consider “un-used” can also be important for passive recreation, wildlife habitat and aesthetic enjoyment. While Durham is one of North Carolina’s smallest counties, it houses the state’s fifth largest city.

Table 1, Present Land Uses, provides information about how land is used in the City and County. Durham County is approximately 191,300 acres in size, or a little less than 300 square miles. (Approximately 980 acres of Durham County is within the Town of Chapel Hill and is not included in this discussion.) About 88 percent of the land in Durham County is classified as “developed,” although some developed land is dedicated to open space and recreation and may not look developed to the casual observer. Developed land also includes land used for public rights-of-way.

Agricultural land uses represent about one-quarter of the County’s developed land area, while residential uses constitute about 30 percent. Most of the residential land is used for either very low density or low-density housing. Commercial, office, industrial and utility uses together account for a little more than 11 percent of developed County land, including Durham’s portion of Research Triangle Park.

Open space and recreation lands comprise almost one-fourth of Durham’s land area. These lands include the Corps of Engineers land around the Falls of the Neuse and Jordan Reservoirs, the NC State University Hill Forest, the NC National Guard’s Camp Butner, Eno River State Park, Duke University and Duke Forest.

The City of Durham encompasses about 69,187 acres or a bit over 108 square miles, representing more than one-third of the County. About 89 percent of this land is classified as “developed.” Residential uses accounted for about one-third of developed land in the City, with land developed at low density residential accounting for half of that. Land developed for commercial, office, industrial and utility uses comprises about 7,110 acres or 12 percent of total developed land in the City.

Table 1. Present Land Use				
Land Use	City (Acres)	Proportion of Developed	Durham County (Acres)	Proportion of Developed
Agriculture	4,243	6%	39,767	21 %
Residential	22,930	33%	51,342	27%
Very Low Density	6,846	10%	30,423	16%
Low Density	11,273	16%	16,003	8%
Medium Density	4,005	6%	4,090	2%
High Density	806	1%	826	0%
Commercial	2,880	4%	4,201	2%
Office/Institutional	1,080	2%	1,454	1%
Public/ Recreation and Open Space	16,573	24%	45,806	24%
Industrial and Utility	3,108	5%	13,129	7%
Rights of Way	8,363	12%	15,524	8%
Total Developed	59,177	88%	155,699	82%
Vacant	7,983	12%	19,392	10%
Total	69,187	--	190,615	--

Note: Source is Durham County Tax Assessor’s records, July 2011. For residential land uses, very low density means, less than 1.0 dwelling unit per acre, low density means from 1 to 4 dwelling units per acre, medium density means from 4 to 8 dwelling units per acre and high density means greater than 8 dwelling units per acre. Does not include Town of Chapel Hill land in Durham County.

The relative location of housing and employment activities in a community is a major factor in travel demand. Well-integrated land uses can reduce travel demand from work trips, while dramatically segregated land uses increase work related travel demand. Map 1, Non-Residential Land Uses, shows where jobs are located in the Durham community. Several areas of employment concentration are evident. The map clearly shows the industrial and research land uses associated with the Research Triangle Park and environs in southeast Durham. The vicinity of Duke University, Duke University Medical Center and the Veterans Administration Hospital show up as another employment concentration. Downtown Durham and various retail concentrations are also evident.

Likewise, Map 2, Housing Land Uses shows generally by density where housing is located. Very low density housing is prominent in rural areas of Durham County. Low density and medium density areas are well distributed in the built-up portions of Durham. High density housing is located along I-40 in south Durham, along University Drive and Chapel

Hill Boulevard area in southwest Durham, west of Duke University, along NC 147, in north Durham along Carver Street and Horton Road and in other isolated sites in southeast Durham.

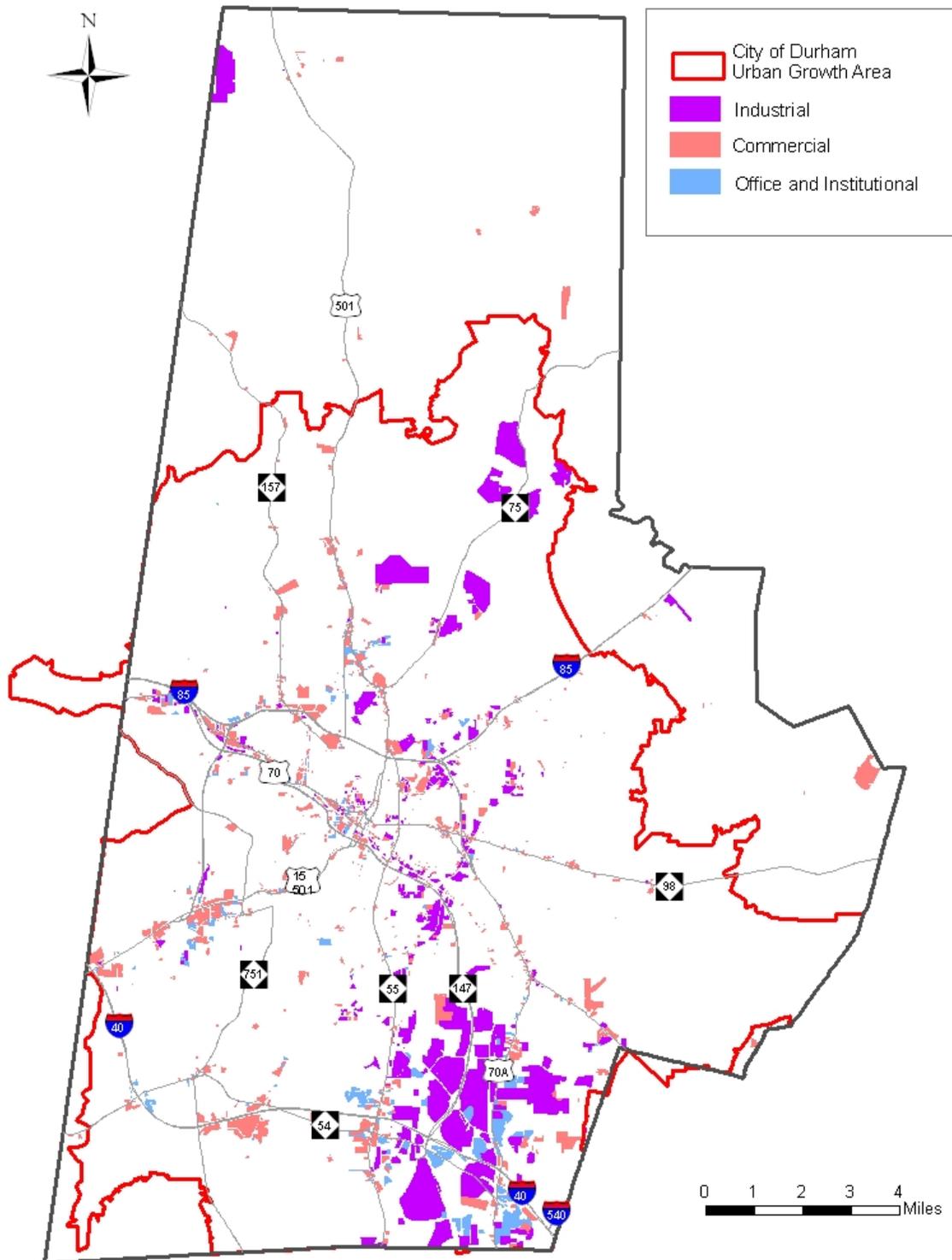
Table 2, Non-Residential Building Area by Land Use provides another picture of how land is used. Building area in square feet is shown for commercial, industrial and office land uses. In Durham County, commercial land uses fill a little more than one-third of the total building space, while office land uses fill about one-quarter of total building space. Industrial uses also consume more than one-third of building space. Note that over 90 percent of the square footage in each of these three land use categories is located in the City of Durham.

Zoning is the set of rules and procedures by which local governments regulate how land is used. Local governments adopt zoning ordinances to implement their long range land use plans and to direct development and redevelopment into areas that minimize conflict between land uses. The City and County of Durham merged their Zoning Ordinance in 1993. This Zoning Ordinance was superseded by the Unified Development Ordinance (UDO) in 2006. The UDO governs development in both the City and County jurisdictions.

Table 2. Non-Residential Building Area by Land Use		
Land Use	County (Sq. Ft.)	Proportion
Commercial	22,699,863	31%
Office	15,884,181	22%
Institutional	10,969,735	15%
Industrial	23,412,279	32%
Total	59,410,000	100%

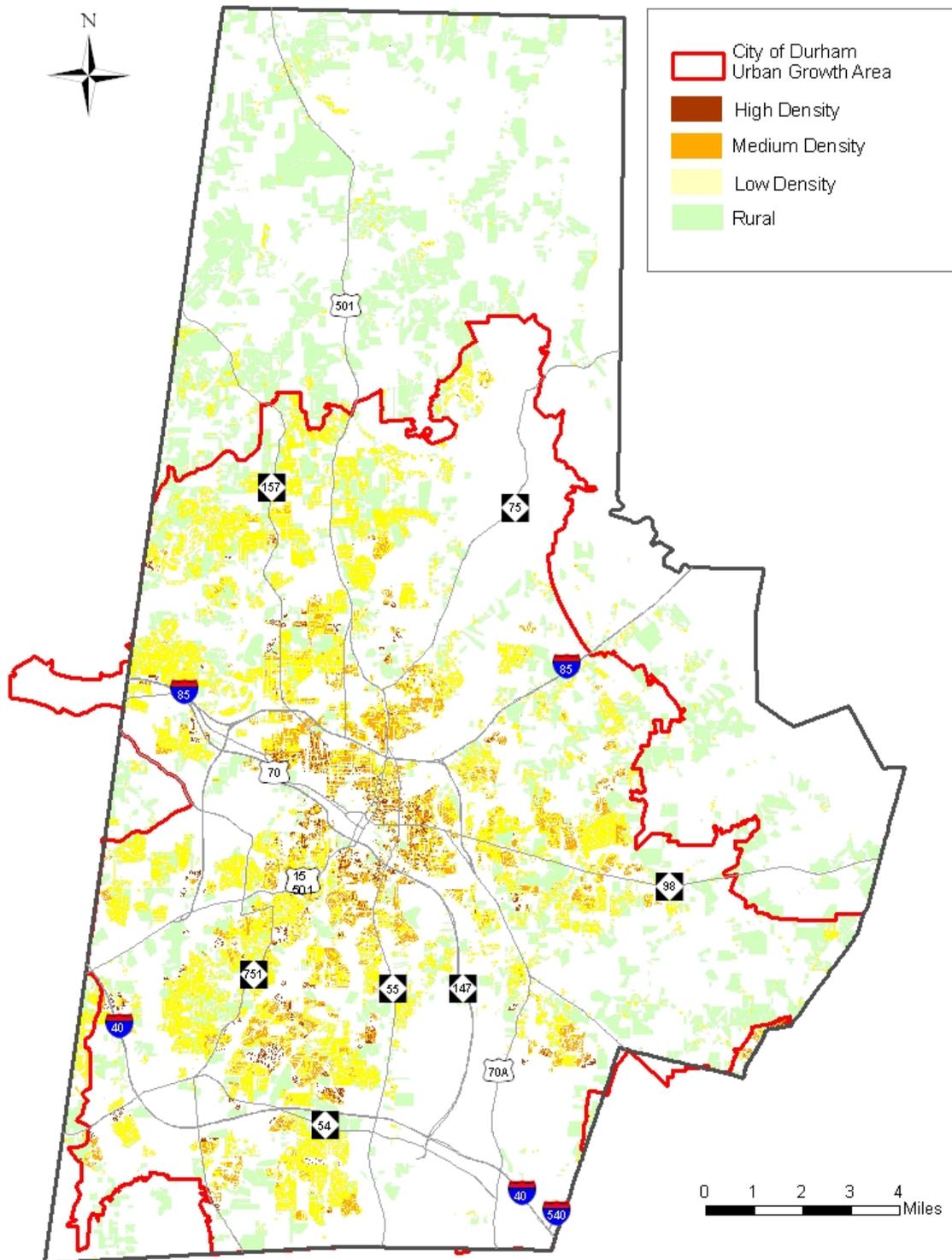
Note: Source is Durham City-County Planning Department, July 2009.

Map 1. Non-Residential Land Uses



Note: Source is Durham City-County Planning, August 2011

Map 2. Housing Land Uses



Note: Source is Durham City-County Planning, August 2011

Table 3, Present Zoning, displays how land is zoned in Durham City and County. The table combines Durham’s 22 zoning districts into nine categories and indicates the amount of acres zoned for each. For Durham County, the most prominent zoning category is Rural, constituting more than half of the total land. Almost one-third of the land in Durham County is zoned for residential uses. A little less than 10 percent is zoned for industrial and research uses, most of which is the Research Triangle Park and the Treyburn development. Generalized zoning for Durham County is shown in Map 3.

Table 3. Present Zoning				
Land Use	City (Acres)	City Proportion	Total County (Acres)	County Proportion
Rural	3,403	5%	100,437	54%
Residential, Total	47,916	71%	60,758	32%
Commercial	3,780	6%	4,719	3%
Office	2,768	4%	2,978	2%
Industrial and Research	7,700	12%	17,200	9%
Mixed Use	510	1%	673	0%
Design District	730	1%	730	0%
Total	66,835	100%	187,495	100%

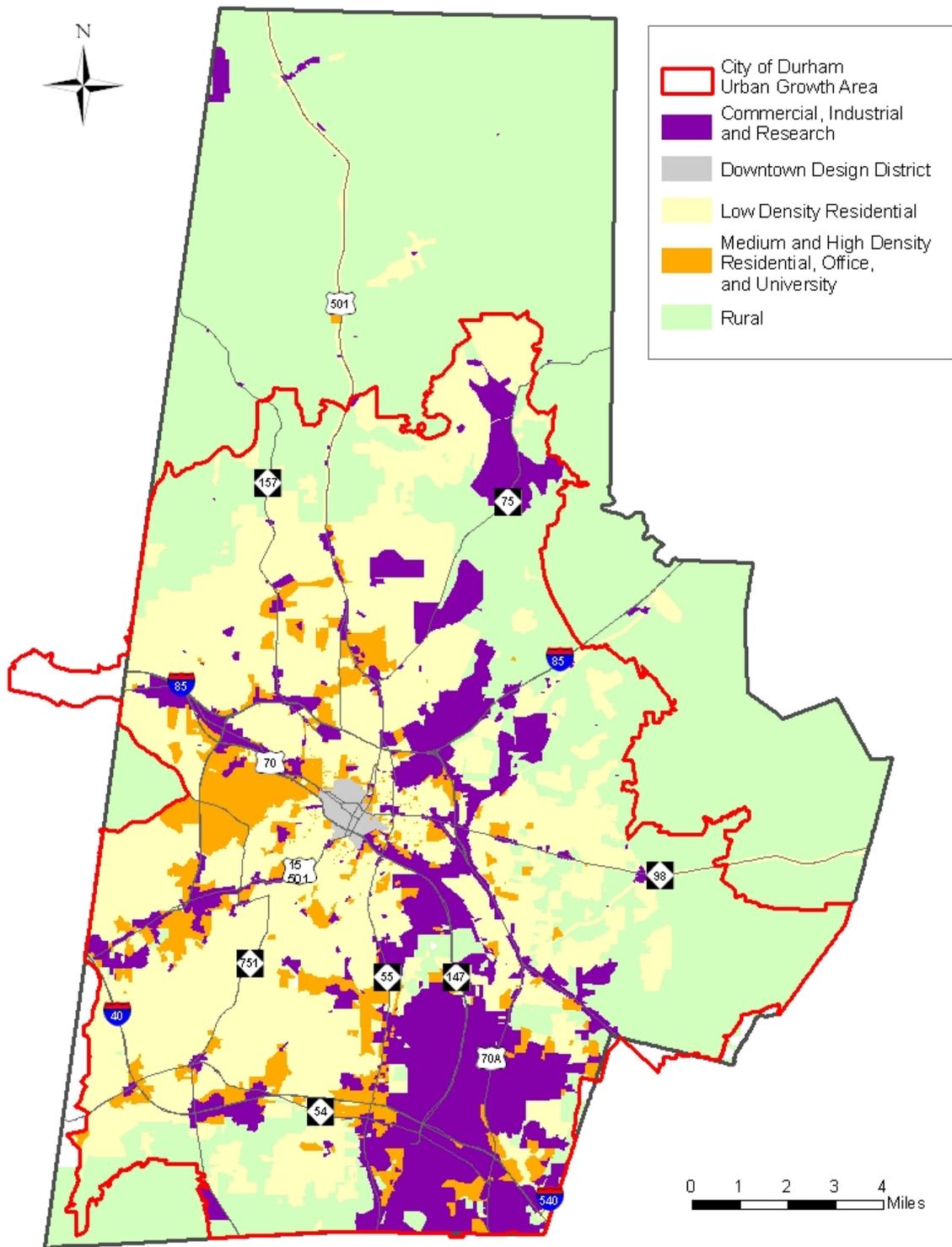
Note: Rural includes Rural Residential, RR, which allows agricultural and residential uses. Does not include Town of Chapel Hill land in Durham County.

The most common zoning in the City is residential, representing a little less than three-quarters of the City area. Of this, almost one half is devoted to zoning that allows development at one to four dwelling units per acre. Commercial and office zoning accounts for about 11 percent of the total area, while industrial and research accounts for about 12 percent. Rural Residential zoning applies to most of the County area outside of the Urban Growth Area. Rural Residential zoning also applies to some of the land inside the Urban Growth Area, indicating that this land is likely to be subject to requests to change the zoning to a higher intensity.

The most prominent type of zoning in the Urban Growth Area is low density residential (defined as zones that allow between one and four dwelling units per acre). The ragged edge of rural and low density uses on the outskirts of Durham defines the gradual suburbanization of the County. Areas of commercial, industrial and research zoning are shown on the map with the darkest shading pattern. The concentration of these uses in the southeastern corner of the County suggests the impact

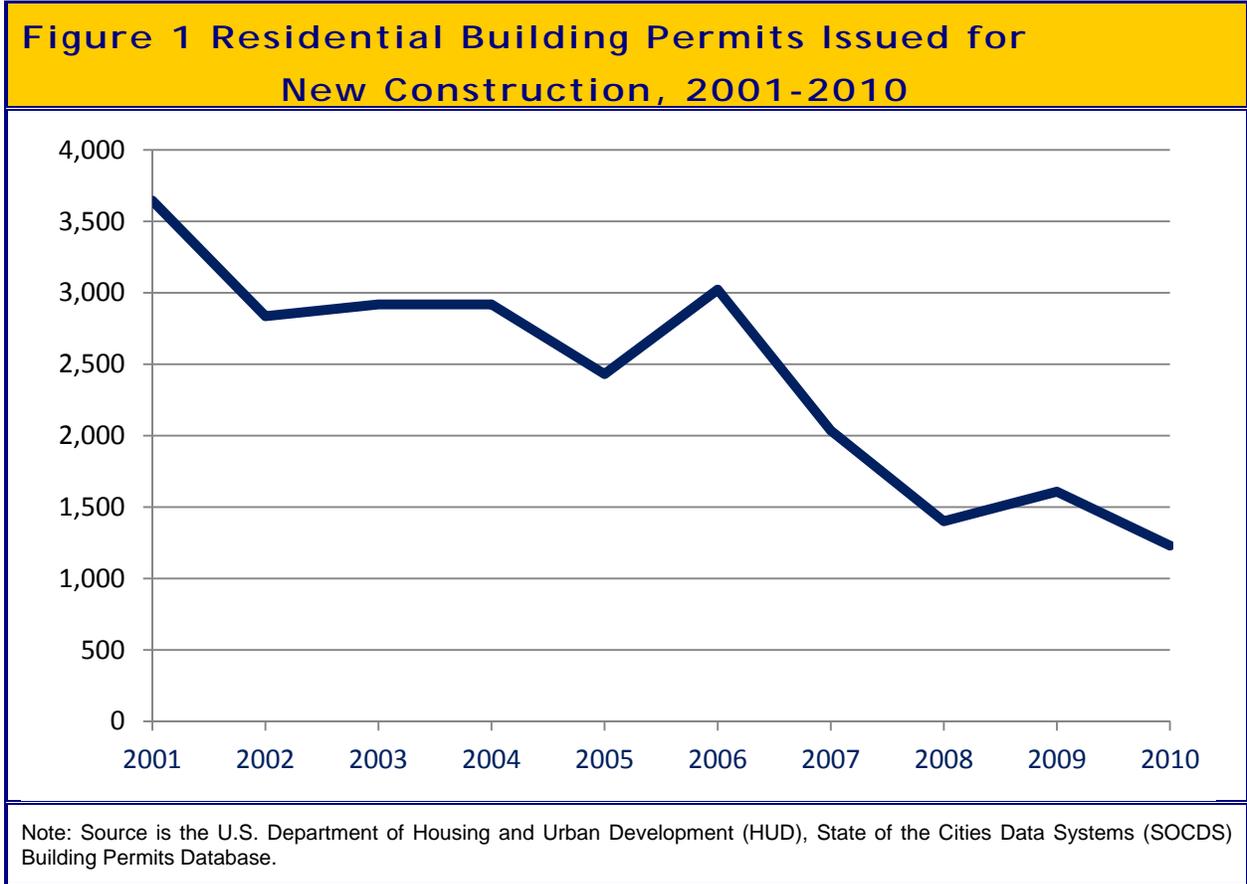
on Durham of growth within the Region but outside the County. East and northeast Durham also show large areas zoned for these uses.

Map 3. Generalized Zoning



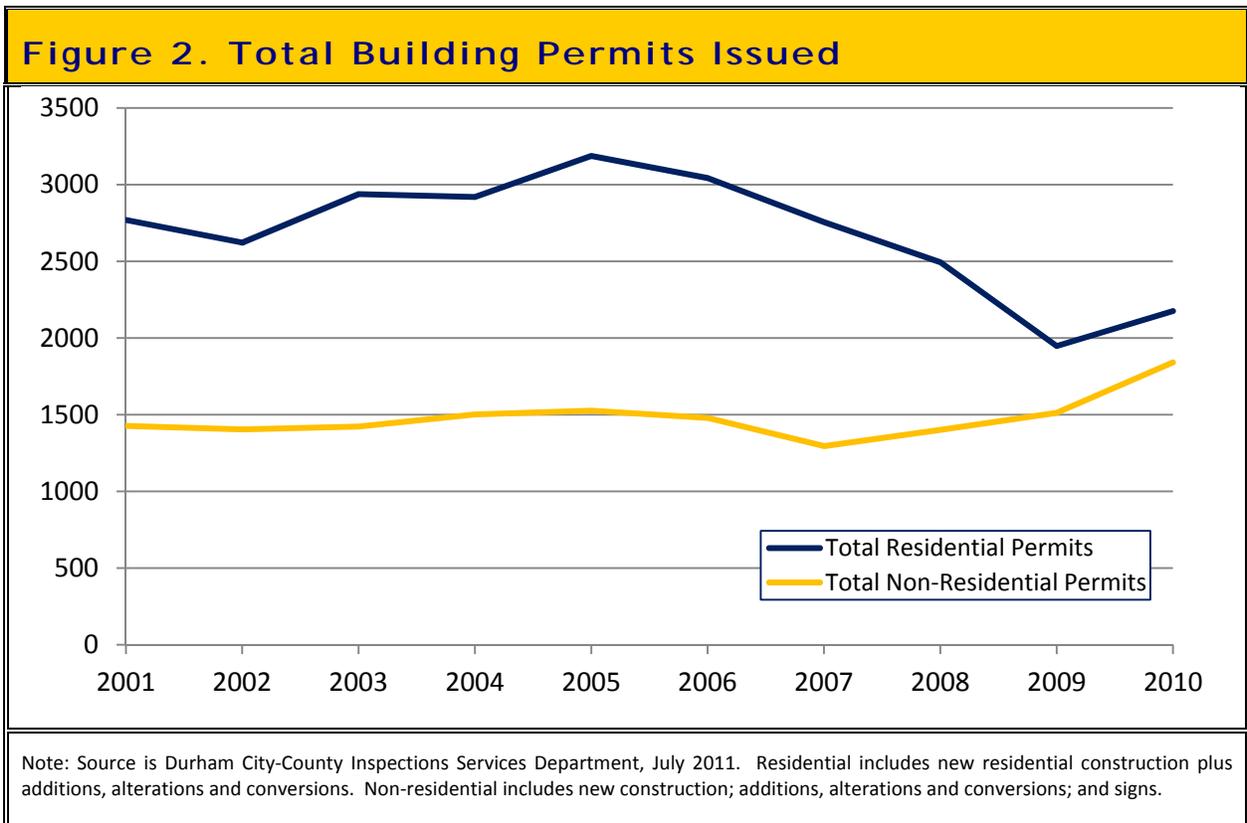
Note: Source is Durham City-County Planning, July 2011.

Development activity declined during the nationwide economic recession that began in 2006 and has not rebounded to levels of activity seen in the earlier half of the decade. The effects of the slowdown are clearly reflected in a graph of residential building permits for new construction, issued during the period 2001-2010 (See Figure 1.) The rate of decline averaged 1.2 percent annually.



An important purpose of land use planning is to ensure that a community provides sufficient land to meet future needs. The additional population Durham expects over the coming decades will require land for new housing, businesses, schools and other public facilities. Prudent planning involves projecting how much land Durham will need for various land uses and identifying appropriate locations for those land uses within our community.

One method of projecting land needed for residential purposes uses historical rates of growth. During the 1990s, acreage used for residential purposes grew by over 5,200 acres. This represents a growth rate of about 11.8 percent. The rate of growth for low density residential land uses during that period was 11.1 percent, while the rate of growth for medium and high density residential land uses was significantly higher at 17.1 percent.



If these rates of growth in residential land use apply to the next three decades, Durham will need about 20,500 additional acres in residential land by 2035. (See Table 4, Residential Land Demand.) Low density residential development will need about 16,600 acres, while medium and high density residential development will need about 3,900 acres. This projection methodology relies on the demand for residential land uses over a single decade that saw relatively rapid growth and should be used with caution.

An alternative method of projecting future residential land demand more consistent with Smart Growth principles would be to base the demand for land on population growth. This is the methodology recommended by the Smart Growth Network and the National Association of Counties.

Table 4. Residential Land Demand						
	2000 Land Use (Acres)	2010 Land Use (Acres)	1990 to 2000 Rate of Increase	2000 to 2010 Rate of Increase	2035 Projected Land Use (Acres)	Needed Increment (Acres)
Low Density Residential	44,800	46,427	11.1 %	3.6%	61,400	16,600
Medium and High Density Residential	3,499	4,916	17.1 %	40.5%	10,300	3,900
Total Residential Demand	51,200	51,343	--		71,700	20,500
Note: Source is Durham City-County Planning Department, July 2011.						

Durham’s population in 2010 was 267,587. It is projected to increase over the next 25 years by about 30 to 50 percent, depending upon the projection methodology used. The trend suggests a need to accommodate between 91,000 and 135,000 more people than lived in the City and County in 2010. For planning purposes, a linear population projection that yielded a 2035 population of approximately 379,000 (an increase of nearly 110,000 people) was selected as the most appropriate tool to use, given that it suggested a rate of growth between the extremes of the other projection methodologies (see Existing Conditions Report, Part 1, Table 6).

Smart Growth principles would dictate that long range plans show how that additional increment of population would be accommodated. This effort would entail converting population increases into an increased demand for land. To do that, it is necessary to consider how the increased population may be reflected in households. Knowing the number of expected households can lead to a projection of the total acreage required for residential development, making basic assumptions about the relative densities that may be seen in the future.

The 2000 Census reported an average household size of 2.4 persons per household for Durham County. Assuming that this figure holds true over the next 30 years, Durham must modify its long term plans to designate land to accommodate approximately 43,900 additional dwelling units.

The actual acreage required to accommodate this increase in population is a reflection of the densities that the City and County determine are appropriate. For example, if the decision is made to emphasize low density development (no more than 4 units per acre), a midpoint density in this range would yield a demand for almost 22,000 acres of low density residentially designated land. Conversely, if the decision is made to accommodate the bulk of that increase through high density development (development greater than 8 units per acre), an average high density of 10 units per acre would yield a demand for 4,390 additional acres of land with a high density designation.

Other policy factors will also impact the manner in which the demand for residentially designated land can be met. For example, if the definition of low density development is decreased from its current provisions (no more than 4 units per acre) to permit densities no greater than 2 units per acre, the demand for additional land with a residential designation will dramatically increase. This is a reflection of the fact that, at present, two-thirds of the residentially designated land in Durham is shown as low density, suggesting that such a change would dramatically reduce the number of people who could be accommodated under existing designations. The failure to approve zonings changes that are consistent with the long range Plan could also impact Durham’s ability to absorb expected population.

While these factors must all be evaluated in determining how to meet the demand for additional residentially designated land as the Plan progresses, it is safe to acknowledge that there is a need for more land to be designated and subsequently developed in a residential pattern.

Projection methodologies for non-residential land uses generally attempt to forecast demand for different types of space considering population growth, consistent with Smart Growth principles. As a general rule, this entails consideration of the past employment trends within various sectors of the economy and making assumptions about future growth within each sector (see Table 5).

Table 5. Employment by Land Use, 2001-2010										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	285	269	267	265	256	261	251	246	242	237
Industrial	55,228	49,661	48,364	49,664	50,463	52,192	55,165	54,943	53,610	54,614
Commercial	37,902	39,787	39,508	40,069	41,168	42,073	43,848	44,335	43,260	44,070
Office	71,253	70,877	70,199	72,521	73,306	77,324	82,184	85,399	83,328	84,888
Institutional (Including Government)	37,217	39,258	41,931	44,542	46,534	48,289	50,488	50,999	49,762	50,694
Total:	201,885	199,852	200,269	207,061	211,727	220,139	231,936	235,922	230,201	234,504

Source: U.S. Department of Commerce, Bureau of Economic Analysis and Durham City-County Planning Department.

It should be noted that commercial and industrial land uses typically include some employees in offices. To address this, the office/non-office employment ratios established by the Urban Land Institute were applied to estimate the percentage of commercial and industrial employees that should be assigned to the office category. A similar adjustment was made to account for the governmental employees who cannot be included in with office employment. Both Tables 5 and 6 reflect this adjustment.

Table 6. Employment Projections by Land Use				
	2001	2010	2020	2030
Agriculture	285	237	187	141
Commercial	37,902	44,070	52,517	59,560
Office	71,253	84,888	107,083	126,409
Institutional (Includes Govt.)	37,217	50,694	70,373	86,115
Industrial	55,228	54,614	59,272	63,711
Total	201,885	234,503	289,432	335,936

Note: Sources are US Department of Commerce, Bureau of Economic Analysis and Durham City-County Planning Department.

The Urban Land Institute (ULI) publication *1997 Dollars and Cents of Shopping Centers* suggests that the demand for retail space is a reflection of the sales per square foot of various retail sales categories. In a healthy local economy, the amount of retail space provided should be determined by looking at the amount of space provided on a per capita basis, rather than by growth in retail employment, reflecting that customers drive the amount of space for retail sales rather than the number of employees. The ULI further suggests that, on a national average, the retail square foot demand per capita multiplier is likely to be around 65 square feet per capita on an overall basis.

In order to determine if this multiplier holds true for Durham, Durham County Tax Assessor data for 2010 were reviewed to determine the total square feet of commercial space in Durham and Durham County. The total square footage was multiplied by the most recent available data on occupancy rate and divided by the total population in 2010 to calculate the appropriate retail square foot demand per capita multiplier. As shown in Table 7, Retail Square Foot per Capita Multiplier, the resulting figure was 84 square feet.

Table 7. Retail Square Foot per Capita Multiplier	
2010 Population	267,745
2010 Occupied Retail Square Feet	21,419,600
Retail Square Foot per Capita Multiplier	84

Note: Source is Durham County Tax Assessor and the Durham City-County Planning Department, July 2011.

Development of this multiplier permits a projection of the future demand for retail square footage in Durham, based upon the projected population growth of the community. The resulting square footage can be converted to an estimate of the acreage required, through use of an assumption regarding the Floor Area Ratio (FAR) typically built in

Durham. For planning purposes, the FAR was assumed to be 0.156, or a built floor area of a site equivalent to 15.6 percent of the total site area. Table 8, Commercial Land Demand indicates that approximately 4,200 acres of commercial space will be required to meet the demand through 2030.

Table 8. Projected Commercial Land Demand				
	2000	2010	2020	2030
Population Projection	223,314	267,745	323,474	378,024
Commercial Demand in Square Feet	19,428,300	21,419,600	27,171,816	31,754,016
Acreage Required to Meet Demand	2,859	3,308	3,999	4,673
Note: Source is Durham City-County Planning Department, January 2003. Assumes 84 square feet per capita and FAR 0.156.				

The distribution of that acreage should be determined based upon the nature of the retail space provided. The Urban Land Institute suggests that retail space be broken down into components of neighborhood, community, and regional space. Each of these types of retail serves a different size market with some variation in uses. Neighborhood commercial centers, for example, typically serves a population of around 10,000 people in centers no more than 100,000 square feet with uses such as grocery stores, drug stores, barber shops, and dry cleaners. Community centers serve a population of around 50,000 in centers of up to 300,000 square feet, which would add uses such as variety stores and florists to the neighborhood uses. Centers larger than 300,000 square feet are considered regional centers and typically include one or more department stores.

Unlike commercial space, office demand is a factor of the number of employees within the office sector of the economy. Accordingly, the demand for additional office space can be calculated through use of a fixed multiplier for the square feet per employee and the projected growth in office employment. The Urban Land Institute reports that the average office space per employee in new office buildings is 200 square feet or less (*Office Development Handbook*, Second Edition, June 1998). Examination of the actual situation for Durham suggests that this multiplier is high, however, with the actual numbers in Durham showing approximately 123 square feet per employee.

Durham will need approximately 2,408 acres of office land through 2030, as shown in Table 9, Office Land Demand. This calculation uses the multiplier calculated specifically for Durham and an average Floor Area Ratio of 0.1865 (which reflects Durham County Tax Assessor data for developed office sites).

Table 9. Projected Office Land Demand				
	2000	2010	2020	2030
Employment Projection	71,253	84,888	107,083	126,409
Office Demand in Square Feet	9,597,683	12,903,032	16,276,652	19,214,209
Acreage Required to Meet Demand	1,390	1,709	2,058	2,408

Note: Source is Durham City-County Planning Department, July 2011. Assumes 152 square feet per employee and FAR 0.1865.

Like office demand, industrial demand is typically a reflection of the number of employees within the sector and the projection of industrial space will use this factor. This procedure ensures that demand for this type of space includes the regional employment provided as well as the local employment.

In order to calculate the demand for industrial space, a multiplier must be developed for the square feet per employee for both warehouse and non-warehouse industrial uses. This was accomplished for Durham by calculating the number of employees in the industrial sector, as shown in Table 8, Employment by Land Use, and dividing that number by the total square footage of industrial buildings identified in the Durham County Tax Assessors’ records. These calculations assume that the square footage per employee identified in 2010 will hold constant through the planning period. The per employee square footage multiplier is 243 square feet for non-warehouse uses and 2,900 square feet for warehouse uses.

Projections of industrial land demand assume that the floor area ratio will be 0.25 for warehouse uses and 0.0461 for non-warehouse uses. These FARs reflect the Durham County Tax Assessor data for developed industrial sites. Table 10, Projected Industrial Land Demand indicates that Durham will need approximately 7,126 acres of industrial land through 2030, which represents an increase of about 1,200 acres.

Table 10. Projected Industrial Land Demand				
	2000	2010	2020	2030
Employment Projection, Warehousing	2,659	3,009	3,665	4,189
Warehousing Demand (Square Feet)	7,690,456	8,701,740	10,600,004	12,113,453
Warehousing Acreage Required to Meet Demand	706	799	973	1,112
Employment Projection, Non-Warehousing	45,628	51,606	55,215	59,523
Non-Warehousing Demand (Square Feet)	12,683,547	12,540,155	13,512,370	14,464,022
Acreage Required to Meet Demand	5,823	5,710	6,153	6,586
Total Industrial Acreage Required to Meet Demand	6,529	6,509	7,126	7,698

Note: Source is Durham City-County Planning Department, July 2011. For warehousing, assumes 2,892 square feet per employee and FAR 0.25. For non-warehousing, assumes 241 square feet per employee and FAR 0.05.

Future increases in population and employment will increase demand for land development. Housing demand will be reflected in proposals for new subdivisions, apartment complexes and adaptive reuse of older structures. Businesses will need land and buildings for retail activities, offices, personal and professional services, research and manufacturing. How Durham plans for the changing uses of land to accommodate our expected growth will significantly influence our community’s future quality of life.

Fundamental questions about growth and development abound. How much building space and land will Durham need for shopping centers and business parks? Where can we locate new employment activities in order to minimize commute to work times? Can infill or redevelopment of existing sites satisfy a significant portion of our land demand?

If we ensure that developments will be attractive, can we mix housing and business land uses more than we have in the past? Can Durham accommodate development while preserving the natural resources that make this an attractive place to live and work? What levels of infrastructure is Durham willing and able to provide to support new development? Projecting future land demand, locating in the community the types of land we will need, and planning for the public infrastructure to support it is the central focus of the Durham Comprehensive Plan.

For years, Durham has used the Urban Growth Area (UGA) boundary as a tool to manage its physical growth. In general, the UGA has been

drawn in northern Durham County to keep urban and suburban development out of Durham's drinking water supply watersheds. In southeast and southwest Durham, the UGA was drawn to reflect utility services and annexation agreements.

Watershed protection policies and adjacent jurisdictions represent real limits to Durham's physical expansion. Some capacity exists to expand in eastern and northwestern Durham, but that may mean the loss of some rural areas to more suburban patterns of development with attendant increases in infrastructure and service delivery costs.

Durham's UGA represents a growth management system where land is either inside the boundary and allowed to be served with public utilities or outside of the boundary where public utilities are not provided. However, Durham determined that a more complex approach better served its growth management needs, and growth tiers and special growth areas were adopted via the 2005 Comprehensive Plan and through the UDO in 2006.

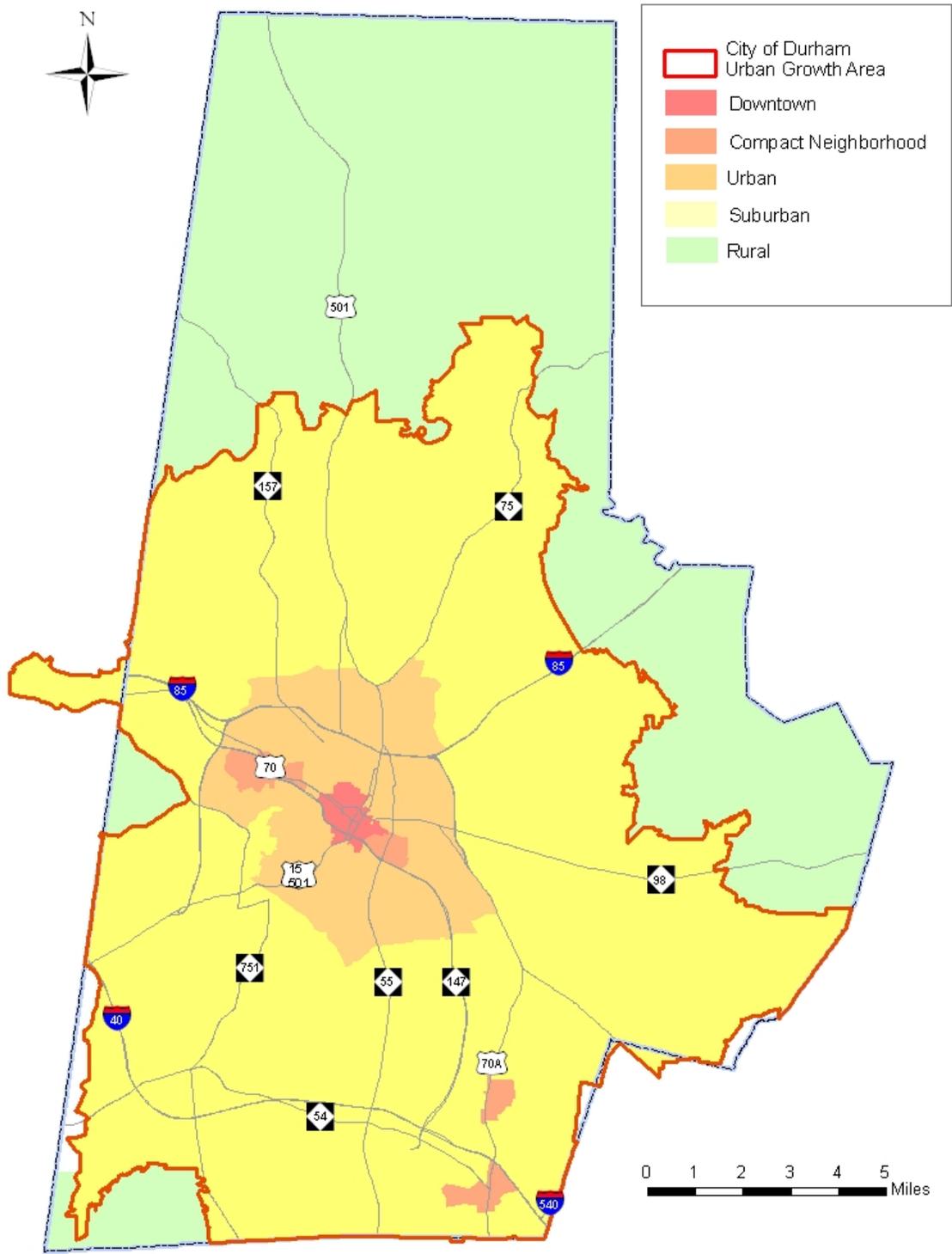
Development Tiers were established to guide growth and development in distinctive parts of the Durham community. New development and redevelopment activities appropriate to each Tier were encouraged through policies and development regulations that recognized the distinct character of each Tier (See Map 4, Development Tiers).

Durham is building its future around distinct community types, such as downtown, urban neighborhoods, suburban neighborhoods, rural areas and natural resource protection areas. Criteria specific to each area for future land use, levels of service for public facilities, and development design standards guide growth. Thus, the Comprehensive Plan defines the specific goals, objectives, and policies most appropriate for each of these communities within the greater community.

Triangle Transit is proceeding with plans to construct a Regional Rail system. The Durham 2020 Comprehensive Plan embraced rail transit as an organizing element for new in-town development, proposing Compact Neighborhoods around regional transit stations. These are characterized by higher intensity and mixed land uses, exceptional pedestrian and bicycle accessibility, interconnections with local transit services, a network of urban open spaces and community design appropriate to their intensity and location.

The Unified Development Ordinance, adopted in 2006, incorporated principles of smart growth and established a regulatory environment favorable to transit-oriented developments. Durham has continued to enhance its regulatory environment with regard to transit-oriented development by adopting 2010's downtown zoning update and other form-based code amendments to the UDO. An update of regulations for mixed use development is currently in progress.

Map 4. Development Tiers



Note: Source is Durham City-County Planning, November 2011.

As indicated in the previous discussion about regional context, Durham is one of several communities in the Triangle Region. For many years, the various communities in the Triangle were separated by largely undeveloped rural land. Over the past two decades, growth on the edges of the region's communities has brought them into contact with one another.

Today, the City of Durham shares borders with Chapel Hill, Raleigh and Morrisville, and will probably share a border with Cary in the not-too-distant future. Land use and development decisions made by these neighbors directly affect Durham. Likewise, how Durham plans for and approves development affects its neighbors. How should Durham locate shopping and employment centers given land use patterns in neighboring jurisdictions? How can transportation planning between jurisdictions be improved for better efficiency of road or transit improvements?

For areas in east Durham, a formal process is in place for sharing information about current development proposals between Durham and Raleigh. For areas in west Durham, Chapel Hill and Durham are mutually sharing planning information based on a formal agreement. The Planning staffs from Durham and Cary informally share information about future development plans. While these relationships are valuable, they need to be reinforced. Enhanced coordination of long range planning is in the interest of each jurisdiction in the Region, as the communities grow closer together.

Housing



*Overview
Housing Profile
Housing Assistance
Issues*

Housing Profile

Provision for health, safety and general welfare is a basic requirement for good governance. Ensuring an adequate supply of safe, affordable shelter for its citizens is a part of the local government’s responsibility in meeting this requirement.

Durham County had 120,217 dwelling units in 2010, about 86 percent of which were in the City. Within the City, renter-occupied housing accounted for about 50 percent of all housing in 2010, compared to 46 percent in the County (see Table 11). It should be noted that the rate of renter-occupied housing for the City of Durham is comparable to similar sized cities throughout North Carolina and the United States. Single-family, detached dwellings make up the majority of owner-occupied dwellings. Rental units tend to be more diverse in character, ranging from older detached single-family homes to recently constructed apartment complexes containing several hundred units.

The residential vacancy rate was 9.5 percent for the City and 9.0 percent for the County in 2010. These vacancy rates are comparable to the MSA’s rate of 9.1 percent but lower than the 13.5 percent vacancy rate for North Carolina and 11.4 percent for the United States.

During the period 2000-2010, Durham witnessed an increase in its housing stock of 28 percent for the City and 26 percent for the County. For both jurisdictions, the proportion of owner-occupied housing increased slightly. The median value of housing was approximately \$173,000 for both the City and the County in 2010. This value was lower than the median value of housing for the MSA of \$179,000 but higher than the median value of housing for the state (\$143,000).

During the same period, household income grew by 42 percent within the County and 52 percent within the City. A comparison between the growth rates for income and housing costs suggests that housing choices available to moderate, low and very low-income households, chiefly in the rental market, may be shrinking at a time when the overall housing supply has expanded to meet a growing population’s demand.

The 1990s saw a construction boom in housing, in Durham and the region as a whole. An economic slowdown that began in 2001 was reflected in a decline of housing starts. Multiple Listing Service statistics for 2001 reflect a strong housing market and Durham Planning Department projections also indicate strong market. The housing market rebounded during the middle of the decade but the national recession that began in late 2008 again slowed the housing market.

Metropolitan Statistical Area

The Metropolitan Statistical Area (MSA) is a geographical area defined by the Federal government for reporting demographic, housing and economic information. The Durham-Chapel Hill, NC MSA includes the counties of Chatham, Durham, Orange and Person.

Table 11. Housing Profile					
	City of Durham	Durham County	Durham-Chapel Hill MSA	North Carolina	United States
Dwelling Units, 2010	103,221	120,217	222,760	4,327,528	131,704,730
Proportion of Owner-Occupied Units	50%	54%	60%	67%	65%
Proportion of Renter-Occupied Units	50%	46%	40%	33%	35%
Vacancy Rate	9.5%	9.0%	9.1%	13.5%	11.4%
Change in Dwelling Units, 2000 to 2010	+ 28%	+ 26%	--	+ 23%	+ 14%
Median Value of Owner-Occupied Housing, 2009	\$173,100	\$173,200	\$179,300	\$143,200	\$185,400
Median Household Income in 2010	\$45,525	\$47,401			
Percent of Housing Units Lacking Complete Plumbing Facilities	0.70%	0.66%	1.0%	1.8%	1.7%

Notes: Source is United States Census Bureau, Census of Population and Housing, 2000 and 2010 and 2009 American Community Survey.

Durham’s housing growth occurred largely within an expanding suburban ring along the City of Durham’s periphery. Much of this growth occurred in proximity to the region’s largest employment center, Research Triangle Park (RTP), and near major transportation arteries connected to RTP.

Median monthly costs for homes with mortgages for the City and County were \$1,116 and \$1,118, respectively (see Table 12, Housing Cost). These figures are lower than for the MSA, at \$1,199, but higher than median monthly costs for homes with mortgages for North Carolina and the United States, at \$985 and \$1,088, respectively. Median monthly rents were \$657 for the City and \$658 for the County. Again, these rents are lower than median monthly rent for the MSA, at \$686, but higher than for the state and nation, at \$548 and \$602, respectively. Housing in Durham is relatively more affordable than in the Region but less affordable than around the state or nation.

Table 12. Housing Cost					
	City of Durham	Durham County	Durham-Chapel Hill MSA	North Carolina	United States
Median Monthly Costs, Mortgaged Units, 2009	\$1,412	\$1,409	\$1,416	\$1,216	\$1,486
Change in Median Monthly Costs, Mortgaged Units, 2000 to 2009	+ 27%	+ 26%	--	+ 24%	+ 37%
Median Monthly Gross Rent	\$780	\$786	\$779	\$702	\$817
Change in Median Monthly Gross Rent, 2000 to 2009	+ 19%	+ 20%	--	+ 28%	+ 36%

Notes: Source is US Census Bureau, 2000 Census of Population and Housing and 2009 American Community Survey.

Housing may be regarded as affordable if the annual costs for housing do not exceed 30 percent of the household’s annual income. In 2000, housing costs represented about 33 percent of annual income for the City of Durham, 31 percent for Durham County and almost 30 percent for the MSA.

Households earning between 60 and 80 percent of the median household income for the community are defined as moderate-income. Households earning between 35 and 60 percent of median household income are defined as low-income. Very low-income households earn less than 35 percent of the community’s median household income.

Table 13, Housing Affordability shows the median household income for the City and County. It also shows the number of housing units that were affordable to moderate, low income, and very low income households. In 2000, 39,365 housing units, or approximately 41 percent of Durham County’s housing stock, was affordable to moderate income households. Twenty three percent of Durham County’s housing was affordable to households with low income, representing about 20,269 dwelling units. Only six percent, or less than 5,700 units, was affordable to households with very low incomes.

Affordable housing is not evenly distributed around the Durham community. Map 5, Affordable Housing Location shows that current housing affordable to low-income households is concentrated within a relatively small number of areas within the City of Durham. Inner city neighborhoods to the south and east of downtown were areas where in 2000 affordable housing constituted 62 percent or greater of the area’s housing stock.

Table 13. Housing Affordability		
Median Household Income		
City of Durham		\$47,384
Durham County		\$49,928
Estimated Number of Affordable Housing Units	Number of Units	Proportion of Total County Dwelling Units
Units Affordable to Moderate Income Households	49,289	41%
Units Affordable to Low Income Households	27,650	23%
Units Affordable to Very Low Income Households	7,213	6%
Notes: Source is US Census Bureau, 2009 American Community Survey and the Durham City-County Planning Department. .		

Much of Durham’s subsidized housing is concentrated within the inner City neighborhoods. All subsidized housing is located within the City limits. Map 6, Location of Subsidized Housing shows the location of housing that is publicly subsidized. The City adopted a subsidized location policy in 2003. The policy was incorporated into the Comprehensive Plan adopted in 2005.

Approximately 0.5 percent of homes in Durham County, or 430 units, had incomplete plumbing facilities and/or kitchen facilities in 2000. The percentage of units with incomplete plumbing was similar to the percentage found in the MSA. Somewhat surprisingly, 87 percent of Durham County’s units with incomplete plumbing occurred within the City.

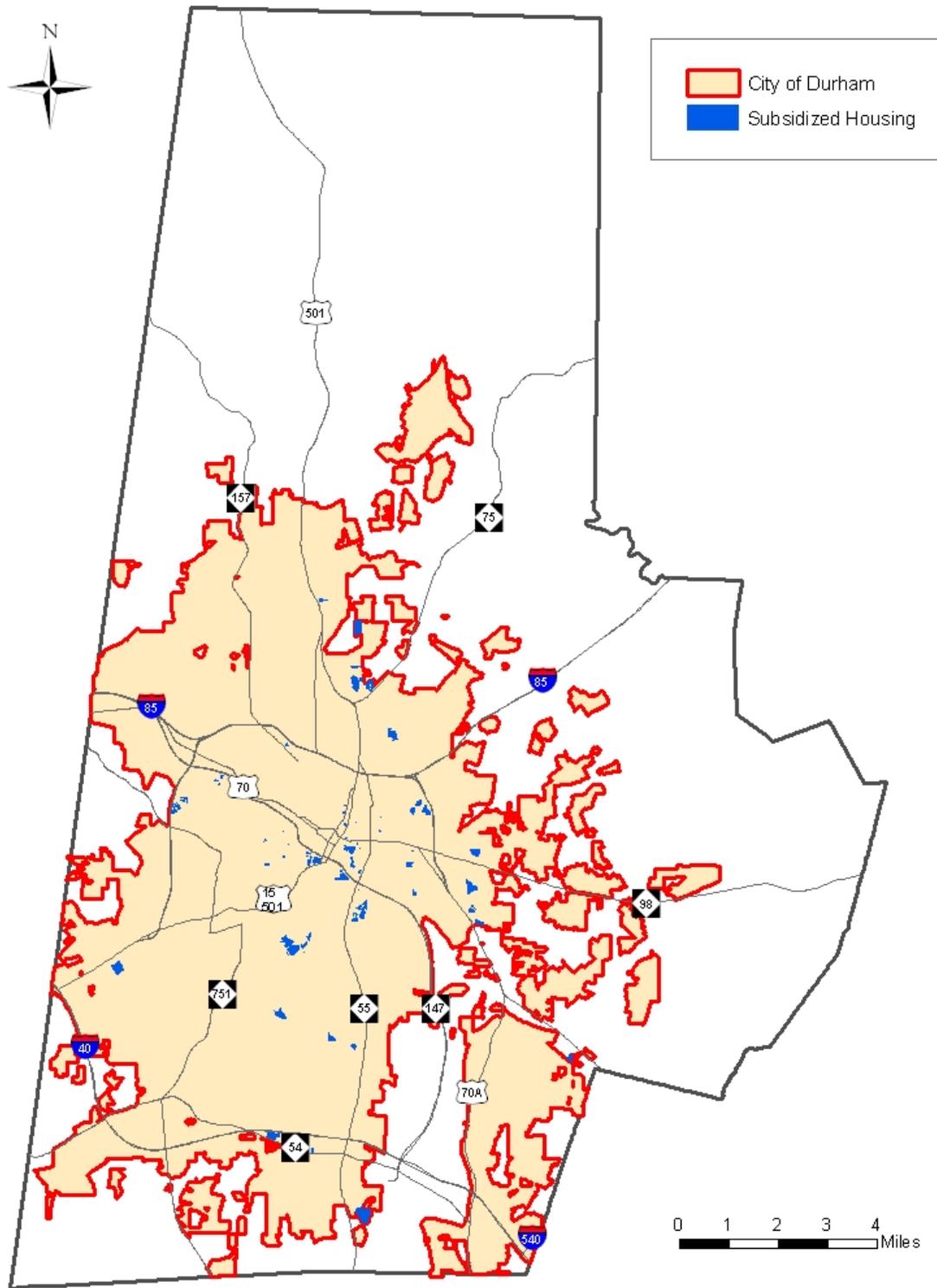
Housing Assistance

Numerous community organizations, both public and private, provide support for housing in Durham. These organizations provide affordable housing for low-income families, assistance programs for first-time buyers and assistance with housing rehabilitation and repair.

The Durham Housing Authority (DHA) is a nonprofit municipal corporation created to address the housing needs of persons with limited income. DHA strives to increase the level of resident self-sufficiency and break the cycle of poverty by providing traditional public housing as well as Section 8 housing choice vouchers.

The City of Durham operates several programs to increase the supply of affordable housing in the community. Federal funding sources include the Community Development Block Grant Program and the HOME Investment Partnership Program. Local funding sources are primarily general funds and housing bond program income. Locally administered funds are often used to leverage other resources, such as Low Income Housing Tax Credits and other programs administered by the North Carolina Housing Finance Agency.

Map 6. Location of Subsidized Housing



Note: Source is Durham City-County Planning Department., July 2011.

Community Design and Character

Existing Community Character

The Durham community is characterized by a diversity of landscapes and neighborhoods. Downtown is the civic and geographic center, featuring employment, cultural attractions and government offices. Urban neighborhoods have grid streets, smaller lots and older homes, along with limited new construction on previously passed over lots. Urban neighborhoods provide the households to support established commercial areas along major arterials.

Suburban neighborhoods feature curvilinear streets and cul-de-sacs, newer homes on larger lots. At strategic locations on major roadways around suburban neighborhoods, residents will find strip shopping centers, fast food restaurants and office buildings. Rural areas represent portions of Durham County where farms and forests are more common than subdivisions and shopping centers. All through these distinctive neighborhood types are precious natural resource areas, with stream corridors and important wildlife habitats. This diversity of community and neighborhood types makes Durham a special place.

Durham's rural character is still clearly displayed in locations far from the push of urban development. Farms in northern Durham bring to mind the agrarian way of life that was predominant decades ago. Historic homesteads show the lifestyle that was once common among County residents. Isolated rivers and streams exhibit indigenous plant and animal habitats. Remnants of gristmills tell the story of early economic activity that was once the center of rural community life.

Durham residents have expressed the desire to identify and preserve the rural resources and landscapes that are the County's heritage. Historic districts and landmarks provide tools to encourage preservation of historic resources in rural communities. Farmland preservation efforts, still in their infancy in Durham, hold promise for long-term care of farms and farming. Durham's open space plans attempt to coordinate public and private actions in rural preservation. They set priorities and focus attention on preservation efforts.

The public realm of residential neighborhoods and commercial districts is the streetscape. The front facades of buildings along the street delineate the streetscape, so it includes private property visible from the street as well as the public right-of-way.

Alterations of the streetscape can come from renovation or new development on private property adjacent to the right-of-way. Likewise, alteration can come from public actions. Some may be designed to consciously enhance the visual appearance, such as the installation of new benches, lighting or landscaping. Other alterations may be the unintended consequences of street maintenance or utility

repair.

Infill is a planning term meaning the development of vacant land, usually individual lots or leftover properties, within areas that are already largely developed. Infill is an important way to accommodate future increases in population without pushing new development into the rural fringe. Infill sites utilize developable land that “fills in” the fabric of an urban or suburban neighborhood. In many cases, infill sites benefit from existing public infrastructure, requiring little capital improvement.

Infill development can become a design problem. New development on infill sites works well if it is architecturally compatible with its existing context. Existing residents resist infill when the size and scale or architectural details are out of character with the neighborhood. Development standards for infill sites must recognize the context in which infill development will occur.

Design of New Development

New development poses the most noticeable and dramatic change to community appearance. The design of new development is influenced by national and local market trends, and by Durham’s development regulations. In some cases, new development design is a function of design standards of national franchise retail stores. Durham’s development regulations contain standards for the number of parking spaces, parking lot landscaping, tree preservation and replacement, vegetated buffers between incompatible uses and signage.

Durham’s development regulations require buffers between incompatible land uses. Buffers provide a space to separate uses, reduce the visual impact of development, and retain natural plant materials on site. Buffers can be areas of natural vegetation, earthworks and fences. They can be designed to block access, noise, light and glare and air pollution as well as to provide aesthetic benefits.

In 2010, Durham amended its development regulations to significantly enhance tree protection.

Also included in the UDO are standards for the provision of street trees and protecting existing trees. Street trees are to be provided in new developments, with one tree planted for every 30 feet of right-of-way. This standard applies to non-residential developments throughout the County and to residential developments inside the Urban Growth Area (UGA).

Tree protection standards include protection of the root zone of any tree to be preserved. The root protection zone is a circle around the trunk with the diameter determined to be 1 foot for every inch of tree trunk diameter. Tree protection fencing must be provided. Storage of materials and equipment, and vehicle parking is prohibited in the root protection zone.

The design and use of the built environment affects human behavior.

How the public spaces are designed influences the perception of safety as well as the perception of opportunity for criminal activity. Crime prevention through environmental design (CPTED) is defined as the proper design and effective use of the built environment that can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life. (National Crime Prevention Council)

CPTED is based on three principles: natural access control, natural surveillance, and territorial reinforcement. Natural access control employs design elements and landscaping to deny admission to a crime target. It enhances the perception of risks associated with criminal behavior. Natural surveillance uses design features to increase the visibility of a property or building. The proper placement and design of windows, lighting and landscaping increases visibility and deters criminal behavior. Territorial reinforcement uses design features and landscaping to define public and private spaces. This helps users establish ownership of spaces and sends a “hands off” message to would-be offenders.

Durham is in the process of crafting a Unified Development Ordinance (UDO) to merge the Zoning Ordinance and the Subdivision Ordinance. The UDO will modernize Durham’s development regulations, upgrading standards, increasing flexibility and enabling digital access to its users. The UDO will be an important tool for implementing the goals and objectives of Durham’s new Comprehensive Plan.

Issues

Durham’s development regulations have a direct influence on the design of new development. Because much new development over the past decades has been suburban in character, Durham’s development standards are geared toward suburban development standards. Increasingly, community leaders have called for amendments to the development regulations that will produce more attractive new development that is appropriate to its context. How should Durham regulate new development in order to secure attractive and functional built environments?

While the appearance of new development is a central focus of community design and character, the on-going maintenance of Durham’s built environment makes a greater visual impression. Public agencies and private citizens have a responsibility to maintain the community’s housing stock, commercial buildings, and many types of public facilities. How can Durham best encourage private property owners to maintain their buildings and land? How can the City and County maintain their public rights-of-way, buildings and grounds to enhance the visual appearance of the community?

Citizens are concerned that Durham’s rural areas are threatened by encroaching urban and suburban development. Which aspects of its rural character should Durham preserve and where should preservation activities be focused? How can Durham preserve some of its valuable

rural character in an increasingly urban county?

City and County leaders have expressed interest in improving the appearance of major entryways into the Durham community. The visual images of US 70, NC 98, I-85, Roxboro Road, Chapel Hill Boulevard, NC 54 and other major thoroughfares contribute in part to visitors' impressions of the Durham community. What steps can Durham take to improve the appearance of road corridors and entryways into Durham? How much is Durham willing to invest in physical improvements necessary to create positive images of the community for residents and visitors alike?

Durham's development ordinances presently require a certain amount of vegetation retained or planted on site. However, community leaders have expressed concerns that the regulatory requirements are not achieving the objective of securing new development with greater tree coverage. How can Durham increase its incentives or decrease its disincentives for developers to preserve natural vegetation and existing tree canopy on new development sites?

Crime prevention through environmental design involves site design with safety in mind. How can Durham best integrate CPTED principles in the design of new development? What regulatory provisions should be established to ensure that safety is appropriately considered in development design? What is the right balance between landscaping to enhance the visual appearance of new development and limiting landscaping in order to improve safety?

Durham's existing street trees are a pleasant and attractive amenity for many of its older neighborhoods. Graceful oaks along City streets add to the visual quality and environmental health of the area. Yet many of Durham's majestic street trees may reach the end of their natural life over the next two decades. How should Durham address this potential loss of street tree canopy?

Historic Preservation

Durham is a community rich in history. Its heritage of tobacco processing is displayed in the progression of historic industrial buildings in the American Tobacco campus in downtown. Durham's antebellum history is presented in its older historic homes and the Stagville Preservation Center, a State Historic Site. The Trading Indian Path that traverses the County represents its colonial and pre-colonial history. Excellent examples of preserved downtown commercial buildings and simple homes testify to Durham's appreciation of its vernacular architecture.

Historic Inventories

In the late 1970s, the City of Durham and the Historic Preservation Society of Durham, with the help of Community Development Block Grant funds, undertook a historic architectural inventory in its jurisdiction. The inventory was published as The Durham Architectural and Historic Inventory. With the inventory information, the City nominated thirteen districts and eighteen individual properties to the National Register of Historic Places.

The Indian Trading Path was a major thoroughfare for trade between the James River area of Virginia to the Indian towns in the Carolinas, Tennessee and Georgia. The Path was used before as well as after the colonization of this country. It snaked through what is now Durham County from the northeast to the west. Various encampments and towns were located along this corridor and their remains are historically valuable archaeological sites and reflect the cultural heritage of Native Americans and early settlers of the southeast.

The County undertook a county-wide inventory in 1987 with the help of federal funds from the Certified Local Government Program. Today there are fifty-five National Register listings of districts and properties throughout the City and County representing thousands of historic structures. There are over 425 historically significant properties identified in the Durham County Architectural Inventory. The Inventory includes two potential National Register Historic Districts, Bahama and Rougemont.

In Durham, sections of the trail are visible and located within major developments, such as Treyburn, where the sites are protected by covenants. Making the other sites known to the general public opens up the potential for the areas to be vandalized or otherwise disturbed. On the other hand, keeping the sites secret may cause their disturbance as well through new development and construction.

Historic Districts

Property owners and developers often regard historic preservation as a hindrance to planned development projects. In reality, economic and societal benefits accrue from projects that preserve Durham's history. Both the City of Durham and Durham County have long used critical tools to preserve and protect our historic architectural resources.

Local historic districts are special zoning overlay districts used by Durham to preserve and protect historic heritage. The historic district designation is applied to a residential neighborhood or commercial area that has special prehistoric, historical, architectural or cultural significance.

In a historic district, property owners cannot make changes to the exterior of buildings that are not in keeping with the historic character of Durham. Durham has seven local historic districts: Cleveland Street, Downtown Durham, Fayetteville Street, Holloway Street, Morehead Hill Trinity Heights, and Watts-Hillandale. These are shown on Map 7, Local Historic Districts. Local historic districts are common in North Carolina; local governments have found them to be useful tools to preserve historic resources.

Local Historic Landmarks

Local historic landmarks are similar to historic districts but the area designated is a single building or site, rather than a neighborhood or commercial areas. Like districts, Durham's elected bodies bestow historic landmark status on properties for their special prehistorical, historical, architectural or cultural significance. And like districts, an owner of a historic landmark cannot make exterior changes without review and consent of the Historic Preservation Commission.

Unlike historic districts, historic landmark status is voluntary and landmarks receive special property tax treatment. Fifty percent of the property tax assessment for historic landmarks is deferred as long as the historic landmark status remains in effect. Owners of historic landmark properties receive this benefit in return for the additional cost in maintaining a historic landmark.

The National Register of Historic Places was created to recognize and protect properties of historic and cultural significance. National Register listing is primarily an honor. For a private owner, the chief practical benefit of National Register listing is eligibility for a 20 percent federal investment tax credit that can be claimed against the cost of a certified rehabilitation of an income producing historic building. The listing of a property places no obligation or restriction on a private owner using private resources to maintain or alter the property.

Numerous properties in Durham have been listed in the National Register of Historic Places. Along with individual properties, a number of districts in Durham have been listed as on the National Register.

Historic Restoration Tax Credits

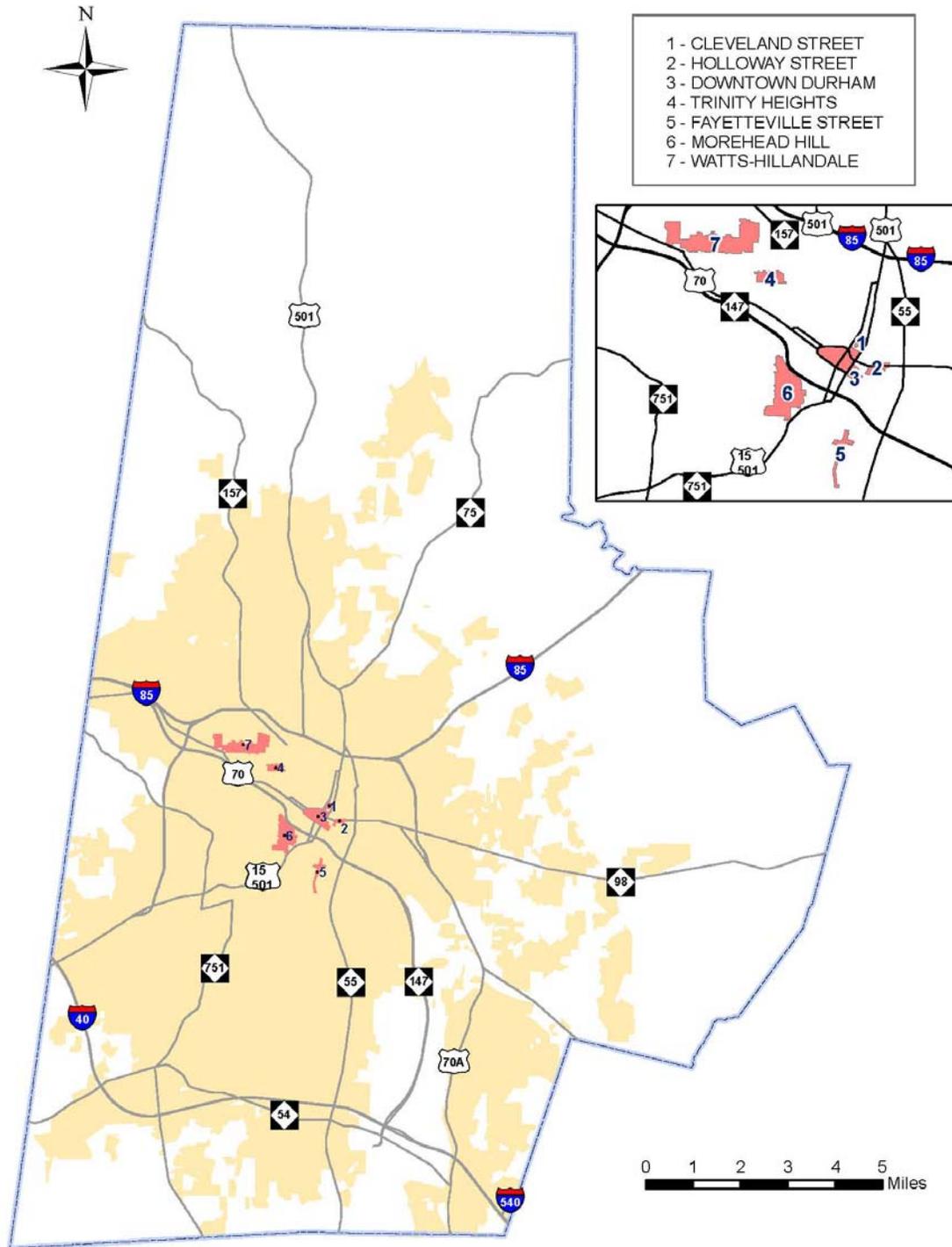
Federal and State historic restoration tax credits have over the years played an increasingly important role in Durham. Brightleaf Square and the West Village complex are just two of the many projects that have been made possible by these tax credits for restoring historically significant structures for income producing uses.

Another important tax credit for historic structures is available today as well. The advent of the State's 1998 law establishing a non-income producing tax credit for home owners of historically significant residences has had a major impact on the requests for National Register designations (part of the criteria for receiving the credits).

Over the years, Durham has seen an increase in tourism dollars spent in our community. The number one reason cited for visitation in the state is historic preservation, and Durham is no exception. The three State historic sites in Durham are visited by thousands of people each year. Downtown attractions include the restored County Courthouse, the Arts Council Building and the Carolina Theater.

While the renovations of Brightleaf Square, West Village, the American Tobacco campus and the surrounding developments created from former tobacco buildings house many successful businesses, they also draw visitors simply because of their history and architecture.

Map 7. Local Historic Districts



Note: Source is Durham City-County Planning Department.

Table 14. Local Historic Landmarks			
SITE ADDRESS	NAME	LOCAL DISTRICT	NATIONAL DISTRICT
1012 W KNOX ST	HACKNEY HOUSE & ERWIN COTTAGE		TRINITY
105 W KNOX ST	WRIGHT HOUSE		OLD NORTH DURHAM
1702 VISTA ST	MASON-JONES HOUSE		
1204 W MARKHAM AVE	WHITTED HOUSE	TRINITY HEIGHTS	TRINITY
101 W MARKHAM AVE			OLD NORTH DURHAM
1307 N MANGUM ST	GAMBLE HOUSE		OLD NORTH DURHAM
112 W LYNCH ST	WILLIAM AND MARGARET LYNCH HOUSE		OLD NORTH DURHAM
119 W LYNCH ST	MABEL & G. FRANK WARNER HOUSE		OLD NORTH DURHAM
117 W LYNCH ST	DR. HICKMAN & ETHEL RAY HOUSE		OLD NORTH DURHAM
410 N BUCHANAN BLVD	BASSETT-BROWN HOUSE		TRINITY
504 WATTS ST	CROWELL HOUSE		TRINITY
1503 PETTIGREW ST	POWE HOUSE		
911 N MANGUM ST	J. S. MANNING HOUSE		OLD NORTH DURHAM
220 W GEER ST	EPHPHATHA CHURCH BUILDING		
501 WASHINGTON ST	CITY GARAGE AND FIRE DRILL TOWER		
300 LIGGETT ST	BRODIE L. DUKE WAREHOUSE		BRIGHT LEAF
210 N DUKE ST	WEST VILLAGE COMPLEX		BRIGHT LEAF
809 CLEVELAND ST	LEARY-COLETTA HOUSE	CLEVELAND STREET	CLEVELAND STREET
401 N MANGUM ST	WILSON REINHARDT BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
0 MAIN ST	FORMER HERALD SUN COMPLEX	DOWNTOWN DURHAM	DOWNTOWN DURHAM
331 W MAIN ST	SNOW BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
302 W MAIN ST	TEMPLE BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM

SITE ADDRESS	NAME	LOCAL DISTRICT	NATIONAL DISTRICT
212 W MAIN ST	TEERMARK BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
111 N CORCORAN ST	HILL BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
315 W MAIN ST	KRONHEIMER BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
307 W MAIN ST	OLD HILL BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
104 W PARRISH ST	CLEMENTS BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
213 W MAIN ST	1915 COMMERCIAL BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
123 W MAIN ST	FIRST NATIONAL BANK BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
111 W MAIN ST	111 W MAIN ST COMMERCIAL BLDG	DOWNTOWN DURHAM	DOWNTOWN DURHAM
107 W MAIN ST	BALDWIN BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
513 HOLLOWAY ST	CREIGHTON HALL	HOLLOWAY STREET	HOLLOWAY STREET
101 W MAIN ST	KRESS BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
104 E MAIN ST	MANGUM-WILSON BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
514 S DUKE ST	JOURDAN HOUSE		
510 HOLLOWAY ST	PERCY READE HOUSE	HOLLOWAY STREET	HOLLOWAY STREET
311 E MAIN ST	FORMER LIBRARY BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
206 N DILLARD ST	C. C. THOMAS HOUSE	HOLLOWAY STREET	HOLLOWAY STREET
310 E MAIN ST	FORMER PUBLIC SERVICE BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
914 VICKERS AVE	COBB-TOMS HOUSE	MOREHEAD HILL	MOREHEAD HILL
1552 HERMITAGE CT	BRANSON-UMSTEAD HOUSE		
900 E MAIN ST	GOLDENBELT MANUFACTURING COMPLEX		GOLDEN BELT
804 HERMITAGE COURT DR	C. R. HARRIS HOUSE		
318 S DRIVER ST	FORMER FIDELITY BANK BUILDING		EAST DURHAM
7222 FAYETTEVILLE RD	MASSEY CHAPEL		

SITE ADDRESS	NAME	LOCAL DISTRICT	NATIONAL DISTRICT
905 W MAIN ST	WATTS & YUILLE TOBACCO WHSE		
1005 CALVIN ST	WRIGHT'S AUTO MACHINERY BLDG		
1017 W TRINITY AVE	BASSETT HOUSE		TRINITY
1401 FORESTVIEW ST	EVANS HOUSE		
0 N DUKE ST	BULLINGTON WAREHOUSE		BRIGHT LEAF
1622 UNIVERSITY DR	S. PARKS ALEXANDER HOUSE		
1817 CHAPEL HILL RD	SESSOMS-MARKHAM HOUSE		
918 N MANGUM ST	OREN BELVIN HOUSE		OLD NORTH DURHAM
6404 AMED RD	AMED TILLEY FARM		
219 HARDSCRABBLE DR	HARDSCRABBLE		
600-710 W MAIN ST	FORMER LIGGETT AND MYERS TOBACCO CO COMPLEX		BRIGHT LEAF
1415 NORTH GREGSON STREET	PLYLER-RABA HOUSE		TRINITY
305 EAST CHAPEL HILL ST	FORMER PALMS RESTAURANT BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
2024 W MAIN ST	ERWIN SQUARE MILL BUILDING	WEST DURHAM	
2020 W MAIN ST	GREY BUILDING	WEST DURHAM	
115 N DUKE ST	PASCHALL'S BAKERY and STUDEBAKER BUILDING		
807 HERMITAGE CT DR	SIMPSON-UMSTEAD HOUSE		FOREST HILLS
302 WATTS ST	ORIGINAL WATTS HOSPITAL		TRINITY
1009 BURCH AVE	M WEBB THOMPSON HOUSE		
111 E CHAPEL HILL ST	PENNY FURNITURE BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
209 N CHURCH ST	DURHAM LAUNDRY	DOWNTOWN DURHAM	DOWNTOWN DURHAM

SITE ADDRESS	NAME	LOCAL DISTRICT	NATIONAL DISTRICT
107 E PARRISH ST	L D ROGERS FURNITURE STORE	DOWNTOWN DURHAM	DOWNTOWN DURHAM
200 N MANGUM ST	ROBGRERS DRUGS BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
102 CITY HALL PLAZA	TEMPEST BUILDING	DOWNTOWN DURHAM	DOWNTOWN DURHAM
302 E PETTIGREW ST	VENABLE CENTER	DOWNTOWN DURHAM	DOWNTOWN DURHAM
204 N BUCHANAN	KING'S DAUGHTERS HOME		TRINITY
801 GLBERT ST	JOHN O'DANIEL HOSIERY MILL BUILDING		
613 RIGSBEE AVE	LIBERTY WAREHOUSE		
323 FOSTER ST	CLARK & SORRELL BUILDING		
1110 MINERVA AVE	W W CARD HOUSE		
43 BEVERLY DR	DILLARD AND MILDRED TEER HOUSE		FOREST HILLS
1111 N MANGUM ST	MAYNARD MANGUM-RICE DIET HOUSE		NORTH DURHAM/DUKE PARK
2009 W CLUB BLVD	PASCHALL-THOMAS HOUSE	WATTS-HILLANDALE	WATTS-HILLANDALE

Archeological Resources

The North Carolina State Historic Preservation Office (SHPO) has identified nearly 700 significant archaeological sites in Durham. Some of these sites are on public lands and are protected to some limited degree. Many sites are in private ownership and are vulnerable. In many cases, the property owners are unaware of the existence and importance of archeological resources on their land.

Local governments often struggle over the issue of how to protect these archaeological sites and Durham is no exception. In northern Durham County a State bridge construction crew uncovered an early Indian village or encampment site along a river some years ago. The local print media picked up the story and gave directions to the site on a Friday after archaeologist began their work. During the weekend following the articles, numerous people swarmed the site located on public and private lands. By the time neighbors alerted the Durham County Sheriff's Department, much of the site, including the portions on private land, was destroyed and valuable artifacts and fragments lost.

Historic Preservation Issues

Durham has a wealth of historic resources in its rural areas. Many historic properties are in particular jeopardy of being overtaken and significantly altered or destroyed by the impacts of new development. What steps should Durham take to protect the most vulnerable of its historic resources? How can Durham marshal the fiscal resources to initiate effective protection actions?

Triangle Transit is planning its Regional Rail transit services through the heart of Durham. Four of its rail stations along the line are located adjacent to some of Durham's most valued historic neighborhoods. Regional transit stations, especially the station in Downtown Durham will be a major draw for new large-scale development. How can Durham attract valuable new higher density transit-oriented development without adversely affecting the historic integrity of nearby neighborhoods? How can the design of new development minimize its visual impact on surrounding historic neighborhoods?

Each year across the state, hundreds of archaeological sites are lost due to rural development, construction projects and unscrupulous collectors. While state law protects cemetery sites, other types of archaeological sites are not as protected, especially those on private lands. Which archaeological sites in Durham are the most important to preserve? How can the existence and importance of archaeological resources be appropriately integrated into Durham's processes for reviewing new development?

Remnants of the Indian Trading Path in north Durham represent a piece of the historic heritage of Native Americans and early settlers in North Carolina. How can Durham best highlight the Path and its importance to the County's heritage? What measures can Durham take to protect the Path from the impacts of development and unauthorized disturbance?

Water Utilities

Water Supply

A reliable source of high quality drinking water is critical for a healthy and sustainable community. Durham is fortunate to have two high quality surface water sources to supply most of its raw water needs. Lake Michie, built in 1926, supplied approximately 19 million gallons per day (MGD) of water to the City's service area for over 80 years. To meet the needs of the growing community, the City constructed the Little River Reservoir and Dam in 1988 to provide an additional 18 MGD of water, giving the City a combined capacity (safe yield) of 37 MGD. In 2002, the City of Durham obtained an allocation of approximately 10 MGD per day from Jordan Lake, another local high quality water source. Currently, Durham accesses this water on an as-needed basis via the Town of Cary's water system.

The quality of water from Lake Michie and Little River is generally excellent. Both reservoirs' drainage basins are relatively undeveloped with very few point sources of discharge. In recognition of their value as water supplies, Durham City and County and other jurisdictions in the Region have adopted special land use controls in the drainage basins. Watershed protection rules restrict land uses and require that any development maintain a relatively low density with limited impervious surfaces. Low amounts of impervious surfaces minimize storm water runoff that may impair water quality in the reservoirs. Watershed protection rules have been in place since the mid-1980s.

Durham's two drinking water facilities provide water through 1,241 miles of distribution lines to approximately 246,180 citizens according to the 2010 census. The oldest facility is the Williams Water Treatment Plant on Hillandale Road which was built in 1917. It has been expanded and upgraded a number of times and has a current capacity of 22 MGD. The Brown Water Treatment Plant on Infinity Road was built in 1977 and has a current capacity of 30 MGD. Both plants operate using optimized conventional water treatment processes and are currently undergoing significant upgrades to meet future water quality standards. The Brown Water Treatment Plant is also being expanded to treat an additional 12 MGD, for a total capacity of 42 MGD at this facility.

On-site storage and four other water tanks around the City allow storage of 20 MG of treated water. Another 3 MG elevated tank is in the design phase and is anticipated to be in service within three years.

Interconnections with Cary, Chatham County, Hillsborough, the Orange Water and Sewer Authority, and Raleigh allow each to share water in times of emergency.

The City of Durham is the major provider of water services in Durham County. The Orange Water and Sewer Authority (OWASA) provides services within the Chapel Hill town limits in southwest Durham County. The City of Raleigh provides water services in a small area of

southeastern Durham County.

By 2030, Durham’s service area population is expected to be about 329,421, creating an average daily demand for water of about 37.0 MGD. This projected demand is based on a 60 gallon per capita per day (gpcd) usage, combined with a 41gpcd usage for employees in the industrial/commercial/institutional sector. Per capita usage in the region generally, and Durham specifically, has been trending down for the last decade; this is attributable to a number of factors which include heightened awareness of water supply (drought response), highly visible water conservation/efficiency programs and new construction/plumbing standards for water use devices and appliances.

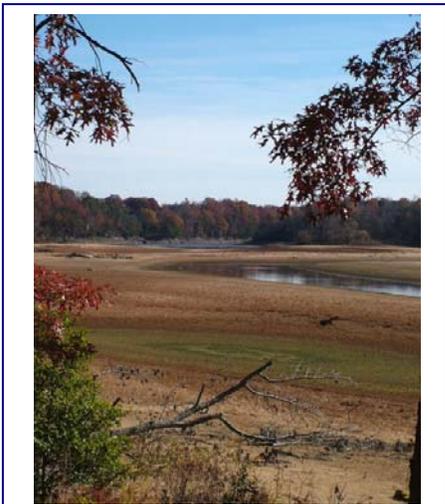
Identifying and developing additional water supplies to meet demand in the coming years will become more critical as safe yields from Lake Michie and Little River have been reduced based on their response(s) to the extreme droughts in 2001-02 and 2007-08. Modeling and evaluation of the two supplies show that the current combined safe yields for the reservoirs is now 34.4 MGD; applying a widely accepted safety factor of 20% reduces the reliable yield to 27.5 MGD. In combination with the Jordan Lake allocation of 10 MGD, the reliable supply for the Durham service area is currently 37.5 MGD.

Durham has several options to address future raw water demand. The City acquired Teer Quarry in northern Durham for use as an off-line storage facility for raw water. The quarry site is relatively watertight and could provide storage of up to 1.5 billion gallons with a safe yield of from 7 to 9 MGD. Permanent facilities to access additional storage are in the design phase. Once construction is complete, Durham will be able to take advantage of high flow in the Eno River, and perhaps in the Flat and Little River basins - during wet weather months for use at later times.

Another option is the collaborative regional planning effort with members of the Jordan Lake Partnership to evaluate additional use/allocation of Jordan Lake. This process includes evaluating a new shared intake in the western portion of the lake and potentially a new water treatment facility in the vicinity.

Increasing the size of Lake Michie has been in Durham’s long range planning for quite a while. A new dam could be constructed immediately downstream of the present dam, resulting in a reservoir with a water surface elevation about 24 feet higher than present. This would increase the safe yield of the reservoir to approximately 37 MGD. Raising the level of Lake Michie would inundate approximately 440 additional acres. The major advantage of Lake Michie expansion would take advantage of its good water quality. The primary disadvantage of expanding Lake Michie would be potential environmental impacts.

Finally, Durham, Raleigh, and Cary have investigated Kerr Lake as a



Severe droughts in 2001-02 and 2007-08 highlighted Durham’s need for additional sources of public water in the future.

potential source of raw water. This 50,000-acre lake extends 39 miles from the dam up the Roanoke River and straddles the Virginia-North Carolina border. It is owned and operated by the US Army Corps of Engineers for flood control, hydroelectric power, water supply and recreation. One of the advantages of Kerr Lake as a water supply is the fact that the reservoir already exists and that by partnering with one or more neighboring utilities, costs may be shared. Disadvantages include its distance from Durham (about 50 miles) and significant interlocal and interstate issues associated with approval of its use.

Wastewater

The City of Durham is located on a ridgeline that cuts through the heart of the community and separates two major river basins, the Neuse River and Cape Fear River basins. 1067 miles of gravity sewer pipes and 60 pump stations and force mains send wastewater to the City's two wastewater treatment facilities, serving more than 246,000 people in Durham.

The City owns and operates two water reclamation facilities (WRFs). The North Durham Water Reclamation Facility (NDWRF), located on East Club Boulevard, treats wastewater collected from residences, businesses and industries north of the ridge line (roughly along Highway 147). NDWRF's effluent is discharged into Ellerbe Creek, a tributary to Falls Lake in the Neuse river basin. The plant's design capacity is 20.0 MGD; presently it treats just under half of that amount on an average day basis. The maximum monthly flow is about 11.97 MGD or 60 percent of capacity. In order to ensure sufficient capacity and uninterrupted service, upgrades to wastewater treatment facilities are recommended when the maximum month flow reaches about 90 percent of design capacity.

Wastewater treatment facilities in the Cape Fear River basin include the South Durham Water Reclamation Facility (SDWRF) located on Farrington Road and the Triangle Wastewater Treatment Plant, located on NC 55. The SDWRF, which is owned and operated by the City of Durham, discharges effluent into New Hope Creek, a tributary of Jordan Lake. Like its sister facility, is also designed to treat 20.0 MGD, but currently treats about half of that amount on an average day basis. The maximum monthly flow is about 12.91MGD or 64 percent of design capacity.

The Triangle Wastewater Treatment Plant (WWTP) provides services to southeast Durham and discharges into Northeast Creek, also tributary to Jordan Lake (Cape Fear basin). Most of the Research Triangle Park (RTP) is in the plant's sewer drainage basin; the Triangle WWTP also serves about 10,000 residential, business, and institutional users east and west of RTP. After recent upgrades and expansion, the Triangle WWTP is now designed to treat 12.0 MGD. Currently the plant treats approximately 50 percent of the design flow on a daily basis. This facility and the 11 pump stations and 109 miles of sewer system that

deliver flow to the treatment facility is owned and operated by Durham County.

Table 15. Wastewater Treatment Capacity			
	Design Capacity	2010 Wastewater Flows, Average Day Flow	2010 Wastewater Flows, Maximum Month Flow
North Durham Water Reclamation Facility	20.0 MGD	9.0 MGD	12.0 MGD
South Durham Water Reclamation Facility	20.0 MGD	10.0 MGD	13.0 MGD
Triangle Wastewater Treatment Facility	12.0 MGD	5.2 MGD	5.3 MGD
Total	52.0 MGD	24.2 MGD	34.1 MGD
Percent of Total Capacity	--	46 percent	74 percent

Notes: (1) MGD is million gallons per day. (2) Projected wastewater demand shows the cumulative treatment capacity of the three wastewater treatment plants in Durham. It also shows the projected cumulative demand of all three plants in maximum flow and average daily flow.
Sources: Water and Sewer Utility Strategic Plan, March 2000; Final Environmental Assessment, Durham Triangle Wastewater Treatment Facility Upgrade and Expansion, February 19, 2001.

The recent adoption of the Falls and Jordan Lake Rules impose stringent reductions of nutrient discharges into the lakes which will have a significant impact on the water reclamation facilities. The NDWRF has a number of process improvements and facility upgrades under way to facilitate meeting reductions of discharges of nitrogen and phosphorus in two phases; Stage 1 reductions are due January 1, 2016 and assessment of water quality will take place before final reductions of Stage 2 become effective in 2036. Similarly, the SDWRF has a number of scheduled plant improvements – both underway and planned – to enable the facility to reduce discharges of phosphorus and nitrogen. The South Durham facility is currently meeting phosphorus limits and the projects noted will enable the facility to meet the compliance deadline of 2018 for nitrogen. Based on updated flow projections, there are no current plans for increased plant capacity at either facility.

Outside of public utility service areas, Durham residents rely on on-site septic systems to handle household waste. The Durham County Health Department, Division of Environmental Health, approves and issues permits for new septic systems. All new systems are required to be sited in suitable soils and have sufficient land area available for a future repair drain field.

Durham County has generally poor soils for on-site septic systems. Aging systems and those not benefiting from regular maintenance are subject to failure. Especially problematic is the potential for stream contamination from about 5,200 older discharging sand filter systems in Durham. Failing septic systems can pollute ground waters, surface waters and water supply reservoirs. They can represent health hazards to nearby residents, especially young children.

The Upper Neuse Watershed Management Plan has recognized the potential water quality problems of on-site septic systems. The Plan recommends that Durham create a program to inspect and certify septic tanks once every 5 years. Such a program would represent a significant new environmental protection effort for Durham.

Stormwater Management

Non-point sources of water pollution, such as runoff from construction, urban streets, and parking lots, can contribute significantly to water quality problems. State and federal laws require that Durham and Durham County develop, adopt, and enforce comprehensive storm water management programs. Durham's storm water management program includes reviewing proposed new development, managing storm water infrastructure and implementing water quality programs.

The Storm Water Management Division of the City's Public Works Department and the County Engineering Department review new development proposals for compliance with storm water management requirements. Developers are required to prepare a storm water impact analysis for each new development. If the proposed development results in an increase in the rate of storm water runoff in excess of 10 percent (from the 2-year or 10-year storm), then on-site storm water facilities or improvement may be required. The City or County Engineer may also require storm water facilities or improvements to address off-site impacts.

Durham's storm water management program includes managing a system of storm water facilities, consisting of pipes, catch basins, ponds and discharge points. The City also manages a variety of programs aimed at maintaining and improving water quality.

- The City sweeps curb-and-gutter streets on a regular basis to remove debris and improve the flow of storm water runoff.
- The City provides regular opportunities for citizens to properly dispose of household hazardous wastes.
- The City operates a program to detect and eliminate illicit discharges to the storm water system.
- The Pollution Reporting Hotline (550-SWIM) provides citizens a way to report what appears to be improper discharge of pollution into area streams.
- The City operates several water and stream quality monitoring programs.

The Neuse River Nutrient Sensitive Waters Strategy is the State's comprehensive approach for reducing pollutants and nutrients in the Neuse River basin and the Pamlico Sound. The Strategy established a goal of reducing nitrogen levels in the lower basin by 30 percent within five years. In order to achieve this goal, new developments throughout the basin are required to control storm water runoff in order to reduce

the nitrogen that they contribute to the basin's waterways. The City and County's review of new developments proposals ensure that they comply with these requirements.

Water Resource Issues

Durham will need to develop new supplies of raw water to serve expected future populations. Several options are available, each with distinct advantages and disadvantages. Some are relatively inexpensive short-term solutions that increase available raw water and delay future expenditures. Others are long-range solutions that involve significant expense.

The majority of the Little River watershed drainage area is within Orange County. The majority of the Flat River watershed is within Person County. Durham regulations to protect these two primary water supplies are based on the recommendations from a technical evaluation of each reservoir's present and future water quality. These watershed studies pointed out the vulnerability of the water supplies to impacts from our upstream local governments. Durham must continue to work with Orange and Person counties on local regulations that can preserve the present water quality, while taking into account the needs and concerns of these communities.

As indicated above, Durham is exploring sharing water treatment with Cary. Regional water treatment arrangements such as this can benefit both parties and maximize the efficiency of the jurisdiction's public infrastructure. What other opportunities exist for regional cooperation? Perhaps Durham can share facilities and services to mutual advantage with adjacent public utility providers, such as the Orange Water and Sewer Authority or the City of Raleigh.

Water conservation programs are aimed at reducing the use of potable water for residences and businesses. How effective are the water conservation programs that the City of Durham now manages? What other approaches to water conservation could Durham implement to reduce water demand?

Future growth and development in Durham depends on sufficient wastewater treatment capacity. Treatment facilities must be able to handle the expected future volume of wastewater flow, while treating the wastewater to State standards for effluent quality. One of Durham's three wastewater treatment plants needs and is undergoing improvement. Projected treatment demand is expected to reach 90 percent of plant capacity at Durham's other two wastewater treatment plants by 2017 and 2025. Providing additional capacity by then, either through plant upgrade or building new facilities will be needed. Wastewater treatment facilities are large capital expense items for local government, so Durham needs to actively plan and budget for facility improvements over the coming years.

In addition to plant expansions, Durham may face more stringent effluent standards at its wastewater treatment facilities. Tighter state-

mandated effluent standards generally mean greater expense for wastewater treatment. Durham needs to recognize that expensive upgrades to existing wastewater treatment facilities may be required before capacity improvements are needed.

Older poorly maintained on-site septic systems pose a potential health and water quality problem for Durham. Discharging sand filter systems, in particular, have the potential for stream contamination. How much should Durham get into the business of systematic monitoring and managing on-site waste disposal systems?

As indicated above, the State's strategy for reducing nitrogen in the Neuse River and Pamlico Sound includes on-site storm water management and standards for nitrogen export. While this type of requirement is not yet imposed on new development in the Cape Fear River basin, the State is considering enacting similar regulations. When this takes place, all of Durham County will be required to meet these additional state standards for maintain high water quality.

Community Facilities and Services

Solid Waste Management

In 2008, Durham County produced over 305,000 tons of solid waste. Houses contributed about 25 percent, businesses contributed about 35 percent, and industries contributed about 41 percent. This amounts to about 1.21 tons per person per year, or about 6.6 pounds per person per day. (These figures do not include approximately 10,100 tons of land clearing and inert debris (LCID) disposed of annually in the City of Durham Rubble Landfill or an unknown amount disposed of in private landfills.) Characterizations of the waste stream suggest that this pattern of solid waste generation is typical.

Solid Waste Services

The City's Solid Waste Management Department and several private haulers provide solid waste disposal services in Durham. The City provides rollout cart collection, yard waste collection, waste reduction and recycling, and stationary container collection. About 56,000 single-family homes and small business are served by rollout cart collection. Large businesses and multifamily housing development use stationary containers, which are picked up by private waste haulers.

The Department collects and delivers to the Waste Disposal and Recycling Center on East Club Boulevard about 110,000 tons of solid waste annually. About 82 percent, or 90,000 tons per year of solid waste, are destined for a landfill, while the remainder is recycled. Durham County hosts no active solid waste landfills, so solid waste is compacted and shipped by rail to a landfill in Lawrenceville, Virginia. The City has a long-term contract to dispose of solid waste in this manner. The City can extend the contract for up to 18 years. Durham has no active plans to locate a solid waste landfill locally.

Several years ago, Durham prohibited several types of materials from its landfills operations. Materials that must be recycled include aluminum and steel cans, glass bottles and jars, newspapers and corrugated cardboard. Durham diverts and recycles approximately 18 percent, or 20,000 tons of solid waste.

The City faces two challenges in solid waste. The first is to collect and dispose of the waste materials in an efficient, environmentally safe and cost-effective manner. The second is to reduce the amount of solid waste being disposed. In accordance with State statutes, Durham prepared a 10-year *Comprehensive Solid Waste Management Plan* and updated it in 2000. The major goal of the Plan is to reduce the waste produced by the community. The reduction goal was 10 percent (over the 1988-1989 amount) over the 10-year time frame of the Plan. Waste reduction approaches recommended in the Plan include source reduction, recycling, reuse, composting, and special waste programs (such as household hazardous waste disposal programs, and tire

recycling).

The City presently operates several waste reduction programs: curbside and drop-off recycling, commercial cardboard recycling, yard waste composting, household hazardous waste disposal, and source reduction education. A waste reduction coordinator works with the community, other governmental agencies, and the commercial and industrial sectors to develop these programs and financing options for implementation.

Parks and Recreation

The Durham City Parks System includes over 60 park facilities covering almost 3,000 acres (see Map 8, Parks and Greenways). Park facilities are diverse. Large regional parks attract users from all over the Triangle region and may offer hiking trails, boating, recreation centers, ball fields, basketball and tennis courts, playgrounds, picnicking, restrooms, and special events. Examples are West Point on the Eno and Piney Woods Park.

Community parks are generally between 5 and 45 acres. They attract users from all parts of the City. Community parks may offer recreation centers, ball fields, basketball and tennis courts, playgrounds, picnic areas, and restrooms. Fine examples of community parks in Durham include Rock Quarry Park and Campus Hills Park. Portions of Durham within two miles of community parks are shown in Map 9, Community Parks Two-Mile Service Area.

Neighborhood parks attract users from the immediate area and are generally one to five acres in size. They may provide ball fields, basketball and tennis courts, playgrounds, and picnic areas. Some small parks are referred to as mini-parks and are only an acre or two, providing little more than playground equipment for young children. The City's Parks and Recreation Department and Property and Facilities Management Department manage most parks facilities and recreation programs in Durham.

Durham County does not have a parks and recreation department. Nevertheless, the County developed, in conjunction with Orange County, the Little River Regional Park. This facility, which provides passive recreation opportunities, is located in northwest Durham County (see Map 8).

Trails and Greenways

Durham County has completed 2.5 miles of trail in the New Hope Creek Corridor near Githens Middle School. Trails associated with the Little River Regional Park will add another 10 to 12 miles when completed.

For both City and County, land acquisition for trails is continuing through the regular land development dedication process. The City also funds land acquisition through expenditures of recreation impact fee funds.

Durham has supported trails and greenways in several ways. The City

Council approved in 1986 an initial allocation of \$400,000 to acquire land and construct trails. Durham voters have approved two bond issues for trails, one in 1990 and another in 1996. The City Council and County Board of Commissioners supported the creation and continuing operation of a citizens’ advisory board on open space and trails, the Durham Open Space and Trails Commission (DOST). Several matching grants have been received for trails projects, including from state and federal sources.

Durham City and County approved a plan for a trails and greenways system in 1988, and most recently updated the plan in 2011. The *Durham Trails and Greenways Master Plan* identifies approximately 118 miles of on-road and off-road trails in Durham and Durham County. It makes distinctions between:

- A trail—a discrete section of hard-surfaced pathway;
- A sidewalk trail section—an 8- to 10-foot paved section immediately adjacent to a road right-of-way;
- A street trail—a designated connector between trails, consisting of a standard sidewalk and a bike lane on the roadway; and
- A recreation trail—an unpaved trail or a smaller paved trail within a park.

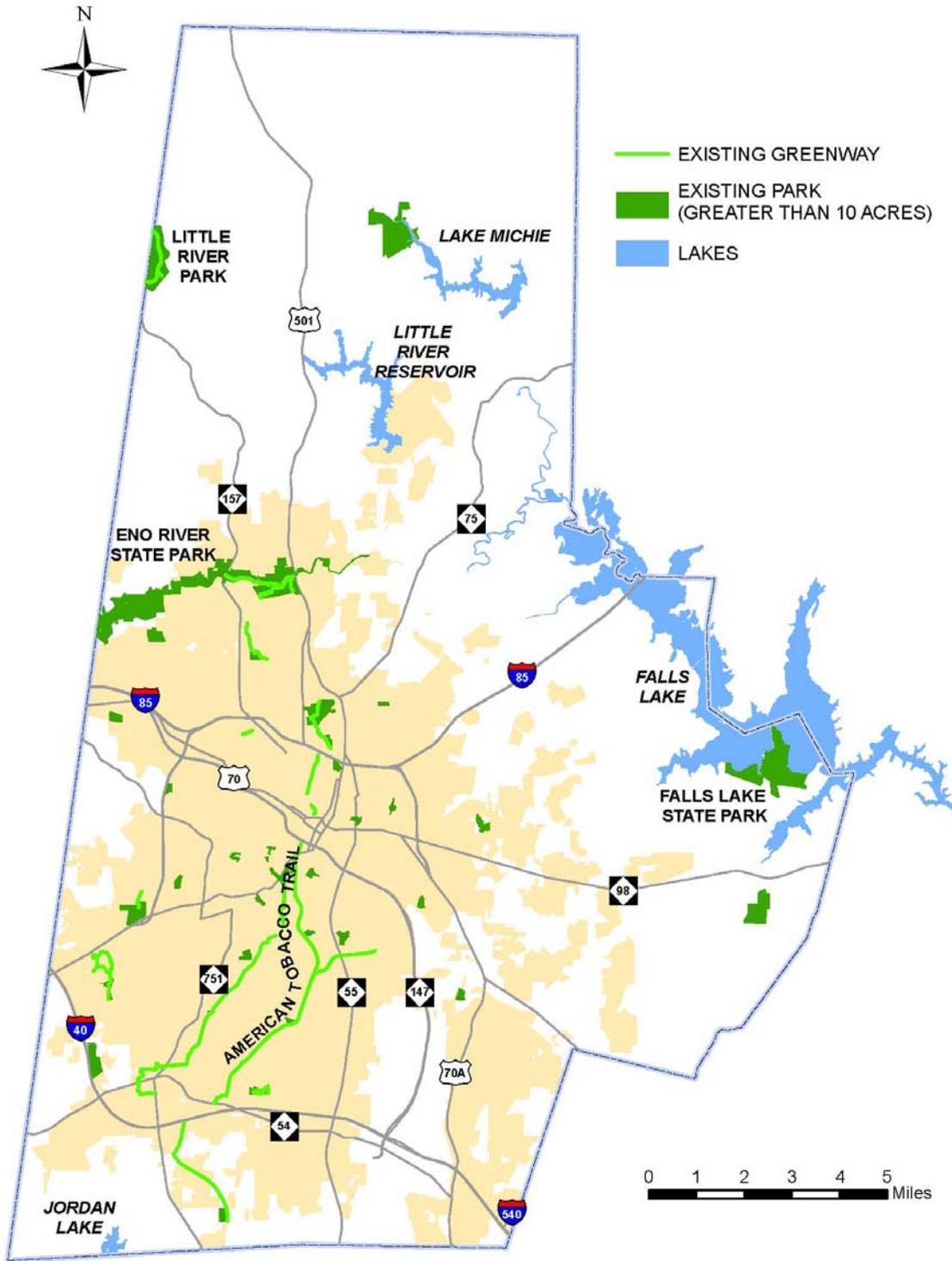
The Master Plan gives a full list of the different types in the City and County. Standards for construction and signage are established for each of the types, as are maintenance and management standards.

The American Tobacco Trail (ATT) is a Durham’s section of The East Coast Greenway, an almost 3,000 mile trail that will eventually connect major cities from Maine to Florida. The ATT is now largely completed from downtown Durham to its boundary with Chatham County. Construction of a pedestrian bridge spanning Interstate Highway 40 remains to be accomplished. As of August 2011, the City’s General Services Department was soliciting bids for the project.



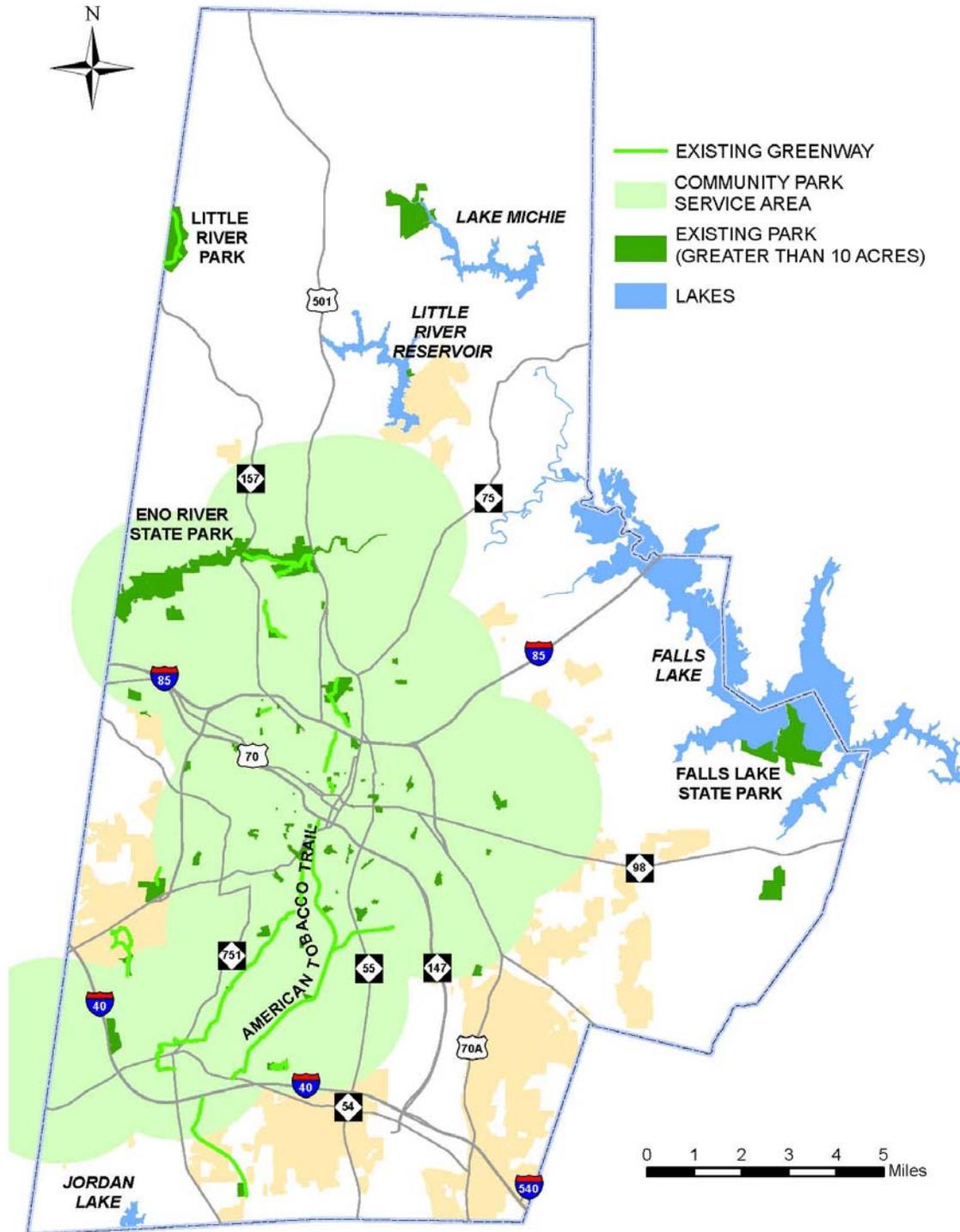
The southern portion of the American Tobacco Trail will soon be completed by construction of a bridge spanning Interstate Highway 40.

Map 8. Parks and Greenways



Note: Source is Durham City-County Planning Department.

Map 9. Community Park Two-Mile Service Area



Note: Source is Durham City-County Planning Department.

Durham Public Schools

The Durham Public Schools (DPS) provide educational services to over 31,000 students in Durham County. DPS operates 43 schools: 27 elementary, 10 middle, and 6 high schools (Not included in these figures are the special programs of the Lakewood Accelerated Lab and the Hospital Schools). These schools and more than 50 other buildings represent almost 5 million square feet of school and support space. Some schools follow a traditional calendar, while others are year-round schools.

DPS school facilities are described in Table 16, School Capacity. DPS schools are shown in Map 10, High Schools, Map 11, Middle Schools and Map 12, Elementary Schools. Durham has several magnet schools that attract students from outside their normal attendance zones. Table 15, School Capacity shows the 20th day enrollment at each school for this academic year, the school capacity (without relocatable units), the proportion of capacity used, and the number of relocatable units on each school site. Present enrollment in DPS schools is 30,510, while the buildings have capacity to handle 29,939 students.

In general, high schools have sufficient capacity to handle enrollment today, with most facilities operating at or under capacity. As a group, middle schools operate at 107 percent of capacity without relocatable classrooms, while elementary schools operate at 104 percent of capacity without relocatable classrooms. Mobile units used for classrooms provide some relief, but additional classrooms place stress on core building facilities, such as the gyms, cafeterias and restrooms.

The primary purpose of relocatable classrooms is flexible and mobile space. Relocatability is perhaps the only advantage of mobile classrooms. Mobile classrooms are expensive to relocate and place a financial burden on utilities and other infrastructure, particularly at aging school facilities. Mobile classrooms present safety issues for faculty and students during severe weather and potentially suffer from security problems due to their frequent location out of site of main school offices.

Due to a strong economy and high rate of population growth in Durham, it is likely that there will continue to be a need for mobile classrooms into the foreseeable future. Nevertheless, DPS is implementing its Long Range Facilities Plan in an effort to significantly decrease its reliance on portable classrooms. This multi-phase \$204 million capital improvements program will involve new facilities, additions and renovations to add new permanent classrooms space while bringing all school conditions up to today's standards. New elementary schools are needed in southeast and southwest Durham. Figure 28, Elementary Schools also shows areas within which DPS has been searching for new elementary school sites. These improvements will provide only a modest amount of additional capacity beyond present needs. The Long Range Facilities Plan will help ensure that

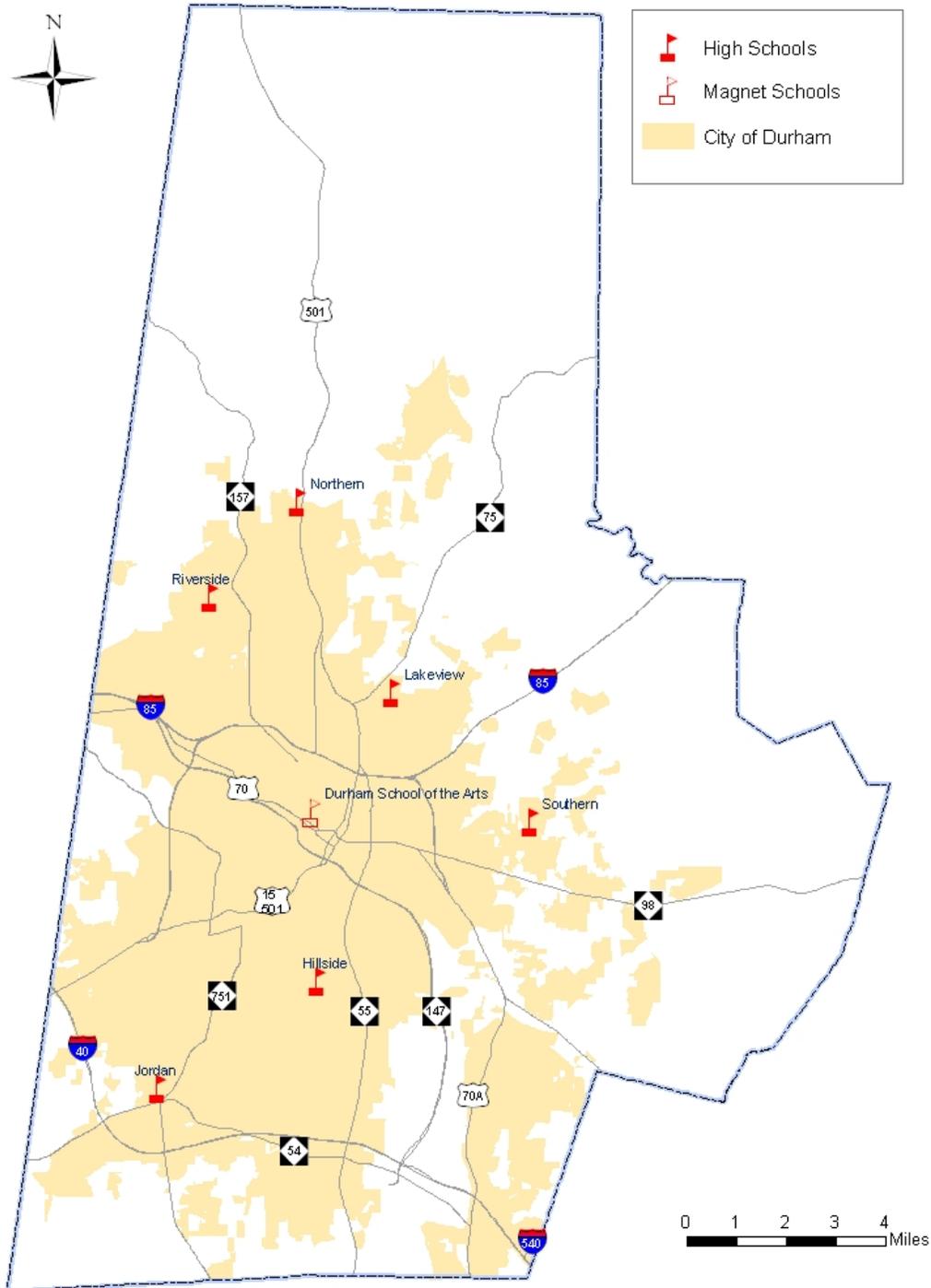
Durham provides the best possible physical environment for fostering student achievement.

Table 16. School Capacity					
Elementary (Pre K, K-5)					
School	Location	20th Day Enrollment 10-11	Capacity in 2010	Percent Capacity	*2020 Projected ADM
Bethesda	2009 S Miami Blvd	726	712	102.0%	1,092
Burton	1500 Mathison Ave	358	376	95.2%	376
Club Boulevard	400 W Club Blvd	510	398	128.1%	492
Creeside	5321 Ephesus Church Rd	861	601	143.3%	1,345
Easley	302 Lebanon Cir	609	522	116.7%	710
Eastway	610 Alston Ave	505	408	123.8%	595
Eno Valley	107 Milton Rd	669	638	104.9%	840
Fayetteville St	2905 Fayetteville St	304	316	96.2%	323
Forest View	3007 Mt Sinai Rd	615	659	93.3%	708
Glenn	2415 E Geer St	655	591	110.8%	877
R.N. Harris	1520 Cooper St	392	376	104.3%	376
Hillandale	2730 Hillandale rd	637	689	92.5%	664
Holt	4019 Holt School Rd	595	585	101.7%	654
Hope Valley	3005 Dixon Rd	714	628	113.7%	758
Lakewood	2520 Vesson Ave	474	302	157.0%	434
Little River	2315 Snow Hill Rd	646	658	98.2%	781
Mangum	9008 Quail Roost Rd	486	408	119.1%	593
Merrick-Moore	2325 Cheek Rd	713	584	122.1%	740
Morehead	909 Cobb St	245	222	110.4%	222
Oak Grove	3810 Wake Forest Hwy	556	794	70.0%	619
Parkwood	5207 Revere Rd	616	648	95.1%	647
W.G. Pearson	3501 Fayetteville St	618	628	98.4%	629
Pearsontown	4915 Barbee Rd	880	836	105.3%	836
E.K. Powe	913 9 th St	383	404	94.8%	409
Sandy Ridge	1417 Old Oxford Rd		630		
Y.E. Smith	2410 E Main St	358	290	123.4%	396
Southwest	2320 Cook Rd	602	585	102.9%	711
C.C. Spaulding	1531 Roxboro Rd	273	388	70.4%	280
Spring Valley	2051 Northern Durham Pkwy	613	638	96.1%	1126
George Watts	700 Watts St	390	340	114.7%	340
New School "C"	906 Scott King Rd		630	To be completed in 2015	
New School "E"				To be completed in 2017	
Middle (Grades 6-8)					
Brogden	1001 Leon St	679	815	83.3%	671
Carrington	227 Milton Rd	1,182	1,262	93.7%	1,187
Chewing	5001 Red Mill Rd	530	706	75.1%	483
School of the Arts	400 N Duke St	616	600	102.7%	690

Githens	4800 Chapel Hill Rd	965	810	119.1%	1,036
Lakewood Montesori	2119 Chapel Hill Rd				300
Lowe’s Grove	4418 S Alston Ave	642	780	82.3%	806
Neal	201 Baptist Rd	612	826	74.1%	838
W.G. Pearson	600 E Umstead St	312	360	86.7%	360
Rogers-Herr	911 Cornwallis Rd	639	644	99.2%	644
Shepard	2401 Dakota St	436	338	129.0%	546
Middle “B”	923 Snow Hill Rd		644		
High (Grades 9-12)					
Durham School of the Arts	400 N Duke St		800		920
J.D. Clement Early College	1801 Fayetteville St	327	400	81.8%	300
Hillside	3727 Fayetteville St	1,253	1,535	81.6%	1,696
Jordan	6806 Garrett Rd	1,839	1,810	101.6%	1,799
Lakeview	3705 Dearborn Dr		125	0.0%	108
Middle College	1637 Lawson St				100
Northern	117 Tom Wilkinson Rd	1,488	1,790	83.1%	1,520
Riverside	3218 Rose of Shannon Rd	1,887	1,540	122.5%	1,797
Southern	800 Clayton Rd	1,054	1,540	68.4%	1,360

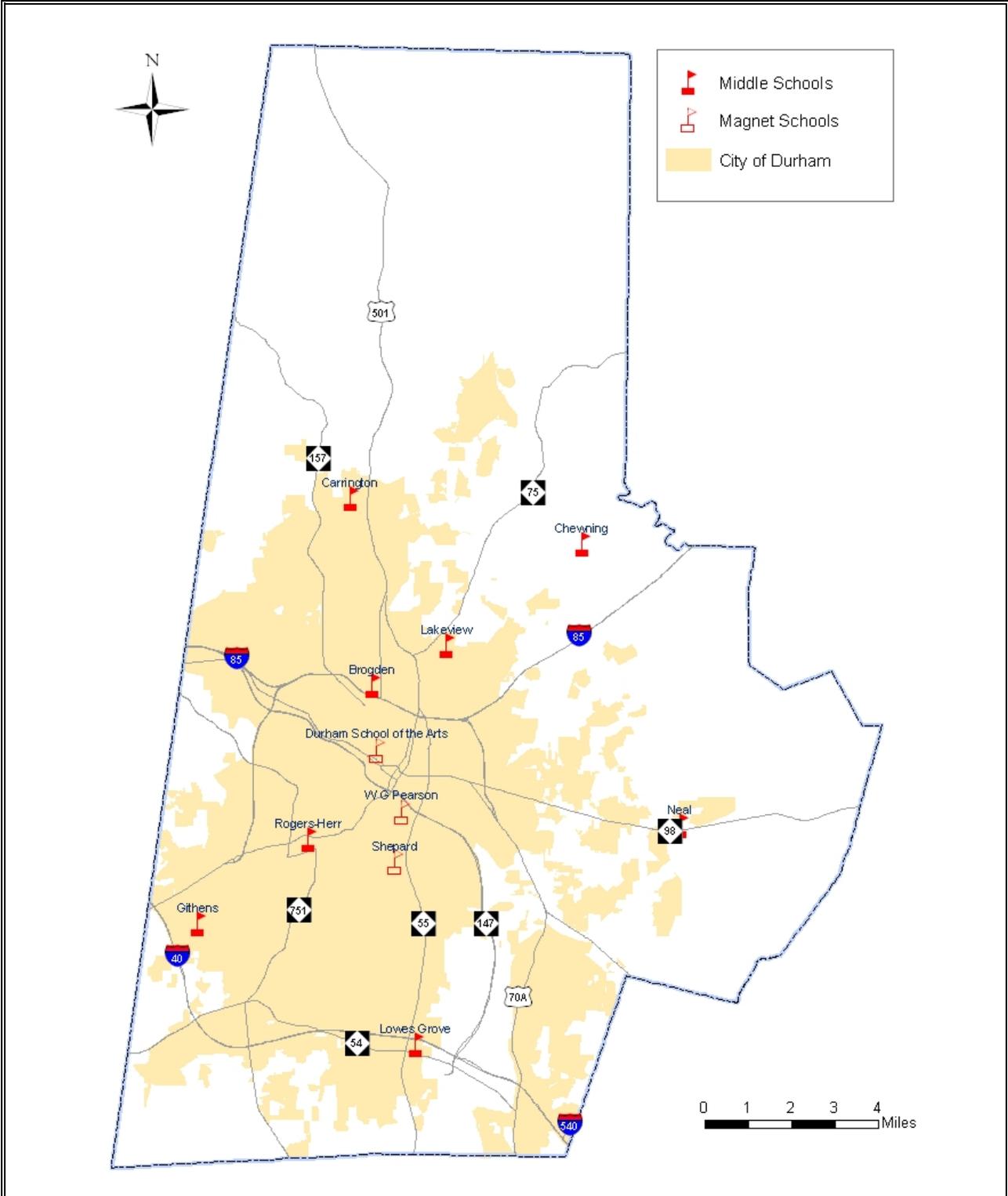
bringing all school conditions up to today’s standards. New elementary schools are needed in southeast and southwest Durham. These improvements will provide only a modest amount of additional capacity beyond present needs. The Long Range Facilities Plan will help ensure that Durham provides the best possible physical environment for fostering student achievement.

Map 10. High Schools

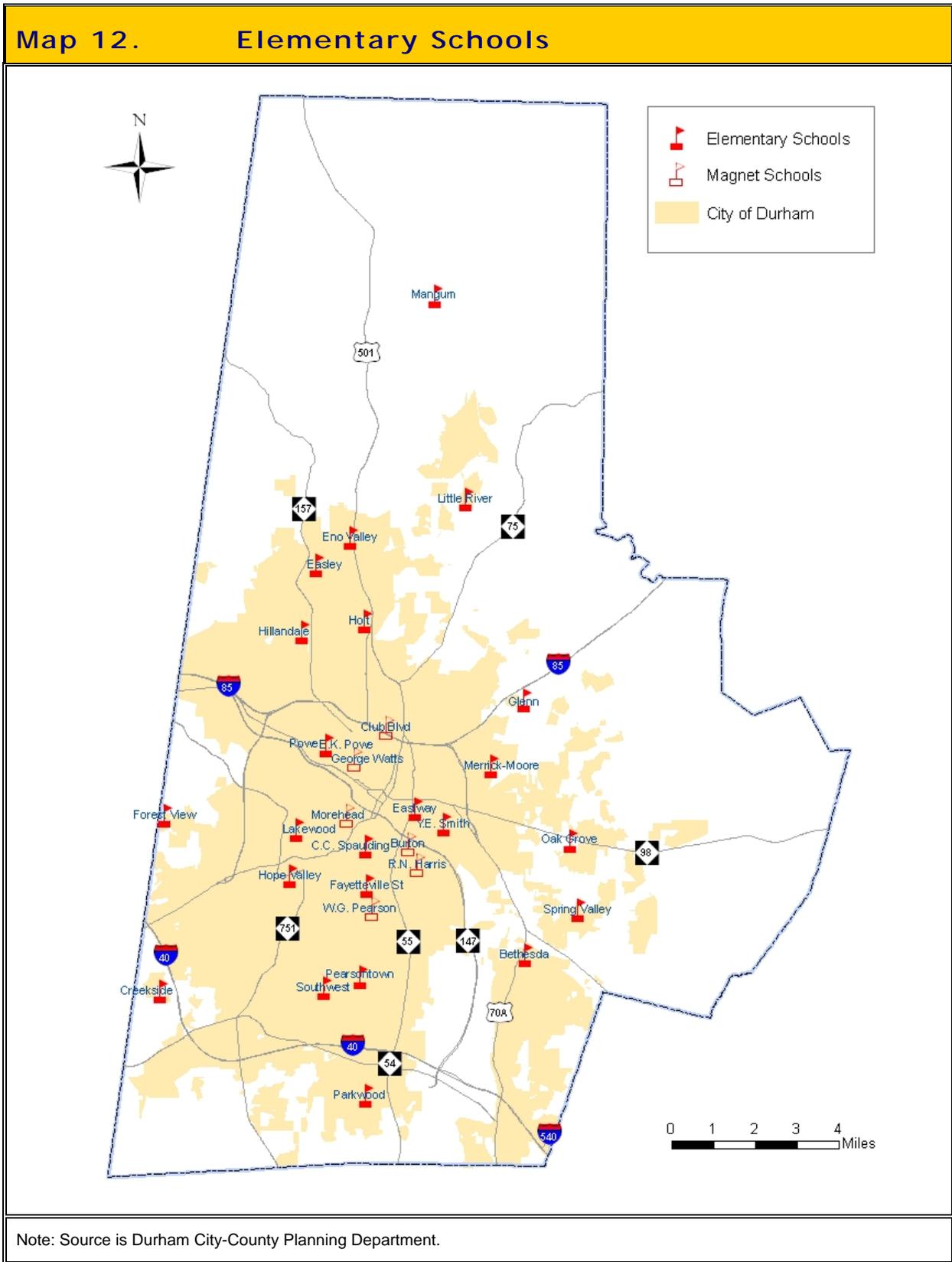


Note: Source is Durham City-County Planning Department.

Map 11. Middle Schools



Note: Source is Durham City-County Planning Department.



Fire Protection

Fire protection services in the City of Durham are provided by the Durham Fire Department and in Durham County by several volunteer fire departments. The Durham Fire Department's employees strive to provide a cost-effective level of service designed to protect and prevent the loss of life and property to the citizens of Durham from the adverse effects of fires, medical emergencies, or exposure to dangerous conditions created by either man or nature. It offers fire education and fire suppression programs, enforces state and City fire codes, investigates arson and the causes of fires, provides basic training skills to recruits and in-service personnel, and conducts a preventive fire maintenance program to ensure equipment is dependable and efficient.

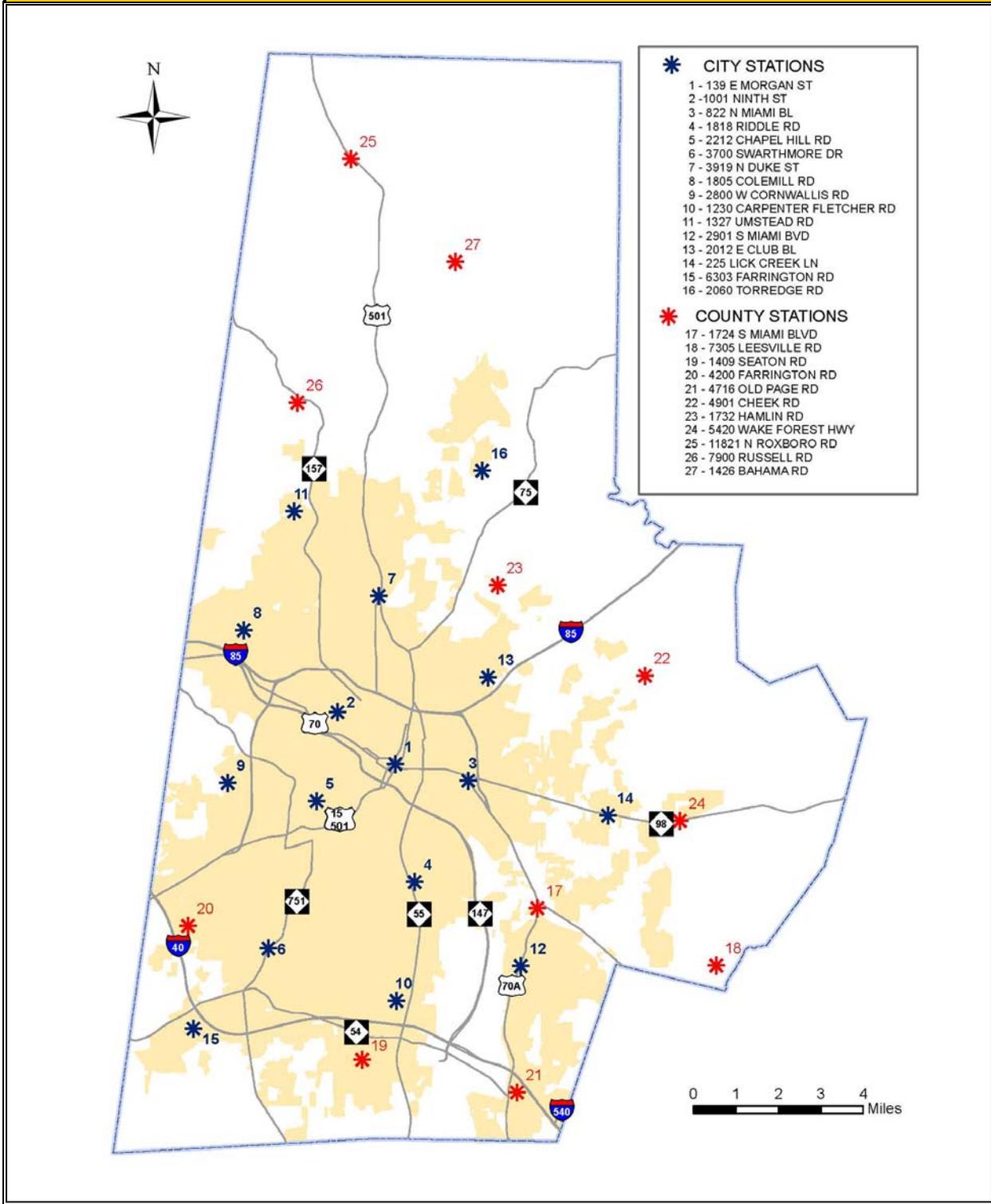
The administrative offices are located at the Fire Training Academy, 2008 East Club Blvd. The locations of the Department's 16 fire stations are listed below and shown on Map 13, Fire Stations.

- Station #1, 139 E. Morgan St.
- Station #2, 1001 Ninth St.
- Station #3 and #8, 822 N. Miami Blvd.
- Station #4, 1818 Riddle Rd.
- Station #5, 2212 Chapel Hill Blvd.
- Station #6, 3700 Swarthmore Rd.
- Station #7, 3919 N. Duke St.
- Station #9, 2012 E. Club Blvd.
- Station #10, 1805 Cole Mill Rd.
- Station #11, 2800 W. Cornwallis Rd.
- Station #12, 1230 Carpenter Fletcher Rd
- Station #13, 2901 S. Miami Blvd.
- Station #14, 1327 Umstead Rd.
- Station #15, 2060 Torredge Rd.
- Station #16, 6303 Farrington Rd.

Five volunteer fire departments (VFD) provide fire suppression, ambulance and first responder assistance throughout the County. They generally cover areas outside the City of Durham. The County's volunteer fire departments and their stations are listed below and shown on Map 13, Fire Stations.

- Bahama VFD Station #1, 1426 Bahama Road Station #2, 11819 Roxboro Rd
- Bethesda VFD: Station #1. 1724 S. Miami Blvd Station #2, 7305 Olive Branch Rd
- Lebanon VFD Station #1, Milton Road Station #2, Russell Rd
- Parkwood VFD Station #1, 1409 Seaton Road Station #2, 4700 Old Page Road Station #3, 4900 Farrington Rd
- Redwood VFD Station #1, 4801 Cheek Road Station #2, 1730 Hamlin Rd

Map 13. Fire Stations



Note: Source is Durham City-County Planning Department, September 2011.

Public Safety

Police services for the City are provided by the Durham Police Department. The Police Department's Headquarters is at the intersection of South Duke Street and Chapel Hill Streets. The Police Department uses substations to increase police presence in the neighborhoods and to improve administrative efficiency. The five substations and their districts are listed below and shown on Map 14, Police and Sheriff's Substations.

- District One Substation provides patrol coverage to the eastern portions of the City and is located at 2400 Holloway St, Joyland Shopping Center.
- District Two Substation provides patrol coverage to the northern portions of the City and is located in Northgate Mall.
- District Three Substation provides patrol coverage to the southwest portions of the City and is located at 2000 Chapel Hill Road in the Shoppes of Lakewood.
- District Five Substation provides patrol coverage to the central portion of the City and is located at 505 West Chapel Hill Street in the Durham Police Headquarters.

Increased growth of the City in east Durham will likely require an additional Police substation.

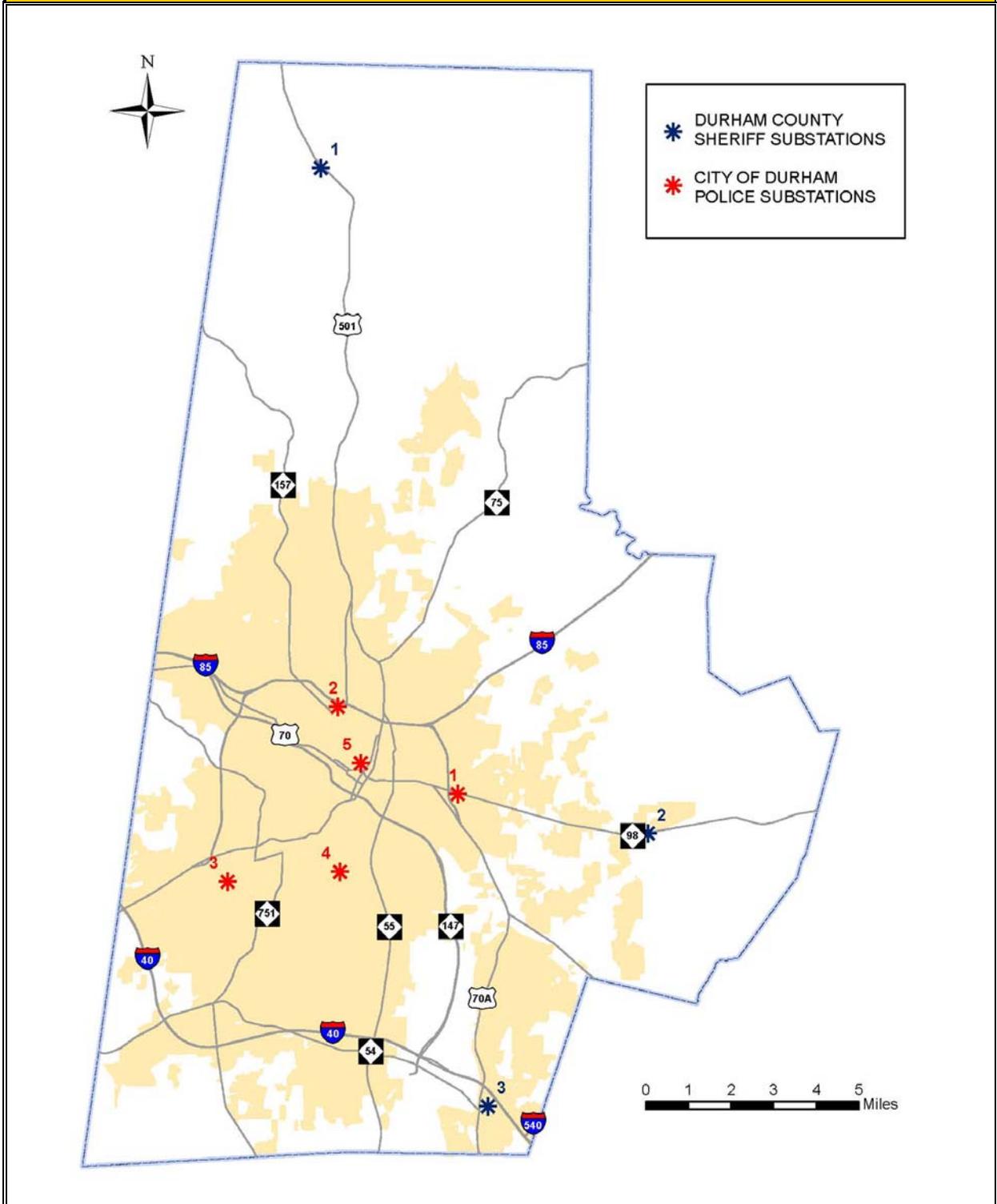
The Office of the Sheriff provides Sheriff's services for Durham County. In addition, the Sheriff's office maintains 204 detention officers and 18 civilians at the Detention Center. The Sheriff's Office performs its duties through three main divisions: Operations, Support Services, and Detention. The Operations Division manages communication related, records, juvenile services, adult services, and the Sheriff's Community Oriented Policing Effort.

The Support Services Division handles the service of civil process, which is the formal delivery of civil papers to people in Durham County. The Division also maintains security at all courtrooms in operation at the Durham County Judicial Facility, providing officers who serve as Bailiffs for the District and Superior Courts. Finally, the Division also houses the Sheriff's Anti-Crime/Narcotics unit and the certified and accredited training academy for law enforcement officers and detention staff.

The Durham Sheriff's Office maintains three satellite stations to carry out its law enforcement functions (also shown on Figure 30, Police and Sheriff's Substations):

- East Satellite Station, 5323 Waked Forest Highway (NC98)
- North Satellite Station, 11821 US 501 North
- South Satellite Station, 4716 Old Page Road

Map 14. Police and Sheriff Substations



Note: Source is Durham City-County Planning Department.

and staff. The Durham County Detention Facility, located in downtown Durham, opened in the summer of 1996 with a capacity of 576 single cells. Bunk beds have been added since then to increase the facility's capacity to 736. A portion of the Center is a 48bed housing unit currently leased to the NC Department of Corrections. At a cost of \$40 million, the Detention Center was one of the most significant capital projects ever developed by Durham County.

Construction of Durham County's justice center is nearing completion. The facility will house the court services of the 14th Judicial District, including the Superior Court, the District Court, the Clerk of Superior Court, Trial Court Administration, and related courts services.

The Durham County Emergency Medical Services (EMS) Department provides emergency medical services in Durham. Paramedic services are provided from five primary sites within the City while the City Fire Department provides first responder services. Duke Rescue, a student-run volunteer service provides first responder assistance on the Duke University campus.

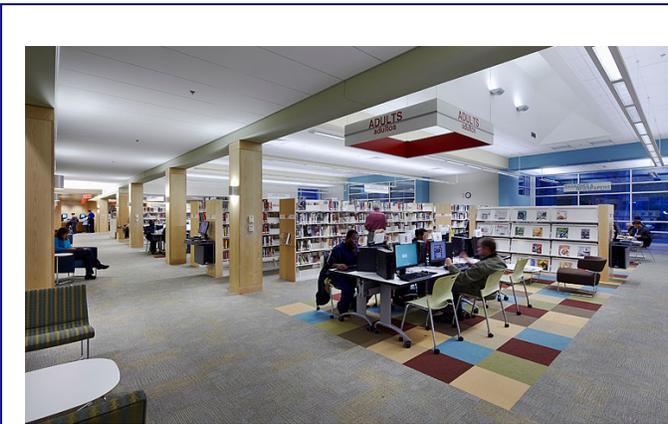
Outside the City, first responder services are provided in conjunction with five volunteer fire departments, including the Bahama, Lebanon, Redwood, Bethesda and Parkwood Volunteer Fire Departments). The volunteer departments provide an ambulance, station, and a driver. Durham County EMS provides a paramedic and related equipment for advanced life support responses in those districts.

Durham County EMS also provides patient accounting and educational programs. The EMS services administration is housed at the main EMS facility on the Durham Regional Hospital campus. Over 140 full and part time staff provides these emergency services to Durham citizens.

Libraries

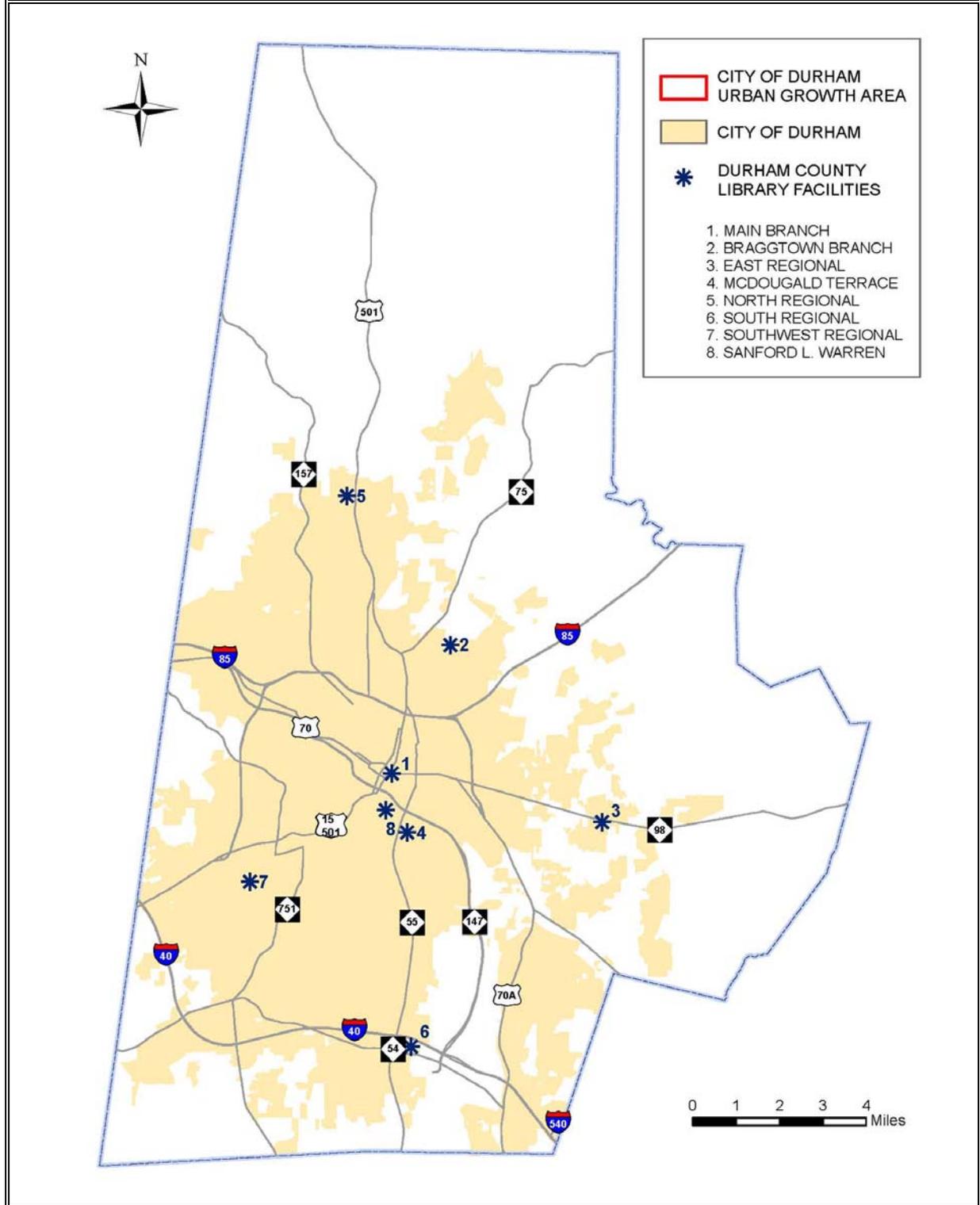
The Durham County Library has been a valuable resource for the Durham community for over a century. From its origins as the first free, tax-supported public library in North Carolina to offering World Wide Web access and CD ROMs, the Library has well served the community.

The Durham County Library system consists of the Main Branch and 7 branch library facilities. Map 15, Library Facilities shows the location of existing library facilities. The Main Branch, located in downtown Durham, houses a collection of over 460,000 titles, 900 magazine titles, an auditorium seating about 200 visitors, children's materials, audio-visual materials, the North Carolina collection and Library administration.



The South Durham Regional Library was completed in 2010. It has a collection capacity of 100,700 and offers many services, including 20 public access work stations.

Map 15. Library Facilities



Source: Durham City-County Planning Department, August 2011.

The Stanford L. Warren Branch is a little less than 9,500 square feet and offer collections of between 30,000 and 62,000 titles.

Three new 25,000 square foot library branches were completed during the period 2005-2010, at a cost of approximately \$6 million each. The North Durham branch is located on Milton Road near Carrington Middle School and replaced the north Durham facility in the Riverview Shopping Center. A new south Durham branch library is located at 4504 South Alston Avenue was completed in 2010. Finally, a new east Durham branch is planned for the vicinity of NC 98 and Mineral Springs Road. Durham County expects that all three will be completed by 2005.

Other Public Services

Durham County has recognized the need to plan for growth of general government functions as the County population grows in the future. In 2000, Durham County performed a needs analysis to determine future space needed to support County administration, health and human services, and public safety/justice functions. The needs assessment concluded that by 2020, the County would need to provide about 170,000 square feet of building space in addition to its present occupied building space of about 400,000 square feet.

From the needs assessment emerged a long-range plan for County government facilities. It employs a strategy of constructing new facilities to house County offices, renovating selected other County-owned buildings and reducing the amount of County-leased building space. The Plan envisions construction of a new justice center (mentioned above), co-location of public health, mental health and social services in a new building on East Main Street, new parking garages, and renovation of other buildings. This Plan is intended to meet County building space needs for general government purposes through the year 2020.

Community Facilities Issues

As Durham's population increases over the next decades, so will the amount of solid waste the community generates. Durham operates no solid waste landfill facilities in the area, so solid waste is presently collected, compacted, transferred to rail cars, and sent to a sanitary landfill in Virginia.

Continued growth in the City's population will necessitate expanding existing parks or developing new ones. A long-range plan for park facilities is needed to ensure that future park facilities are coordinated with other public improvements.

Parks standards are an explicit statement of government policy about what park facilities the community intends to provide for its citizens. They offer a guide for determining how much land and what types of park facilities are needed to support future populations—they relate community growth to needed capital improvements. Level of service standards will determine the types of park facilities to be provided in

the future.

The rapid pace of development in Durham over the past two decades has placed unusual pressure on the DPS system. The student population is currently increasing at a rate of about 1.25 to 1.5 percent annually, bringing in about 750 new students each year. Student population is projected to reach 36,000 students by 2008. While DPS has set out an assertive plan to alleviate its present overcrowding by 2007, growth in Durham's population will continue. DPS needs to continue and enhance its long-range facility planning to address facility needs over the next two decades.

As Durham grows, so will the need for City and County fire protection, emergency medical services, and public safety services. Critical questions for Durham to address in its long-range planning include: Are appropriate service standards adopted for each type of service? What and how many new facilities will be needed and where should they be located to best serve present and future populations? What opportunities exist for combining these facilities with other government buildings and sites, such as libraries and recreation centers?



Updated, April 2012

Durham Comprehensive Plan

Appendix A Existing Conditions

Part 3 Natural Resources

Durham City-County Planning Department

The Durham Comprehensive Plan

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Chapter 2.	Land Use Element
Chapter 3.	Housing Element
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Chapter 7.	Conservation and Environment Element
Chapter 8.	Transportation Element
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Appendix A, Existing Conditions Part 3: Natural Resources

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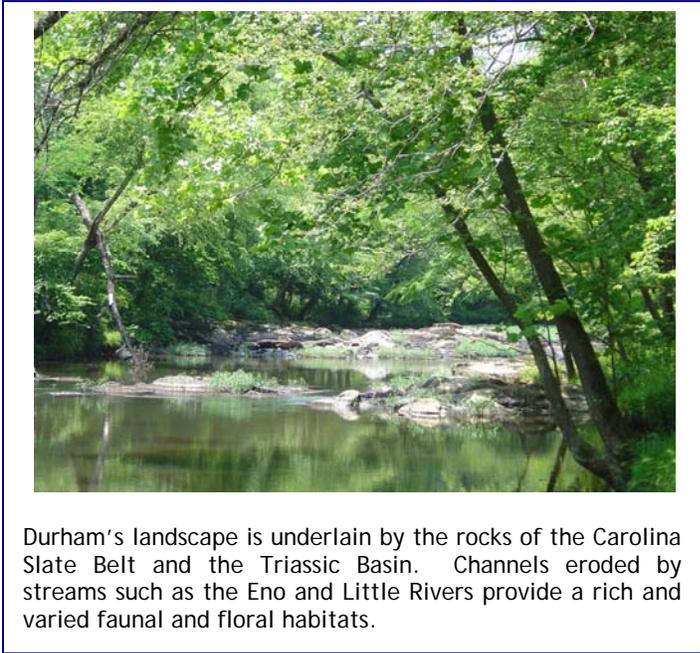
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Part 3: Natural Resources

Environment Profile

Durham is located in the heart of North Carolina’s Piedmont region. Two major geologic provinces have given rise to several opportunities and constraints to Durham’s development. The Triassic Basin is a generally low and flat band sedimentary rock formed about 200 million year ago. It traverses most of the southern portion of Durham County



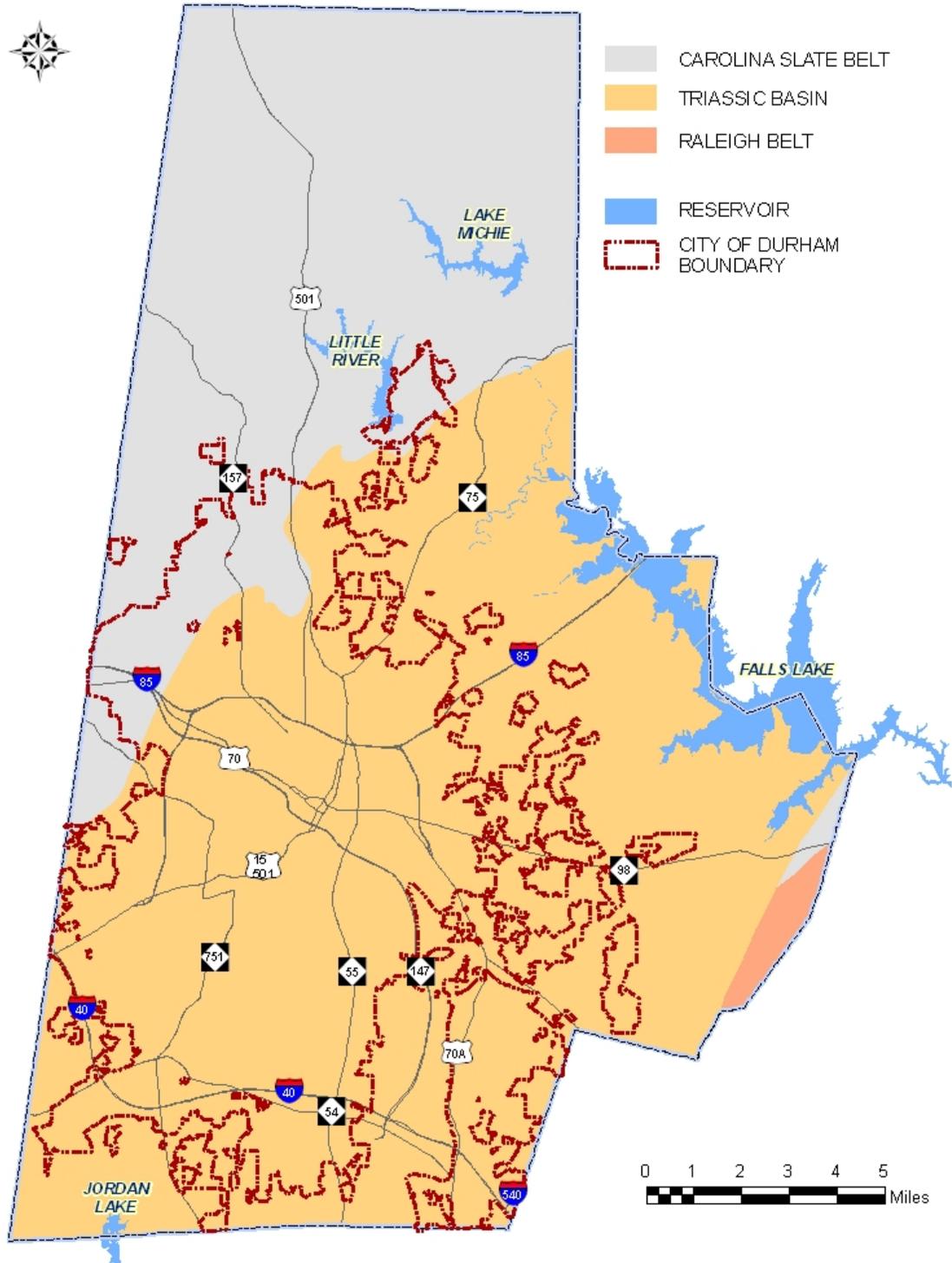
from southwest to northeast. The Carolina Slate Belt underlies the northwest third of the County (see Map 1). The Slate Belt is comprised largely of metamorphosed volcanic and sedimentary rocks, originally formed during late Proterozoic and Cambrian time (between 600 million and 400 million years ago).

Gorges cut into the Slate Belt by the Eno River, the Little River and the Flat River in northern Durham County, particularly along the boundary between the Slate Belt and the Triassic Basin, offer interesting wildlife habitat, especially on their cool north slopes.

The center of Durham is located on a ridgeline that separates the Cape Fear River basin and the Neuse River basin.

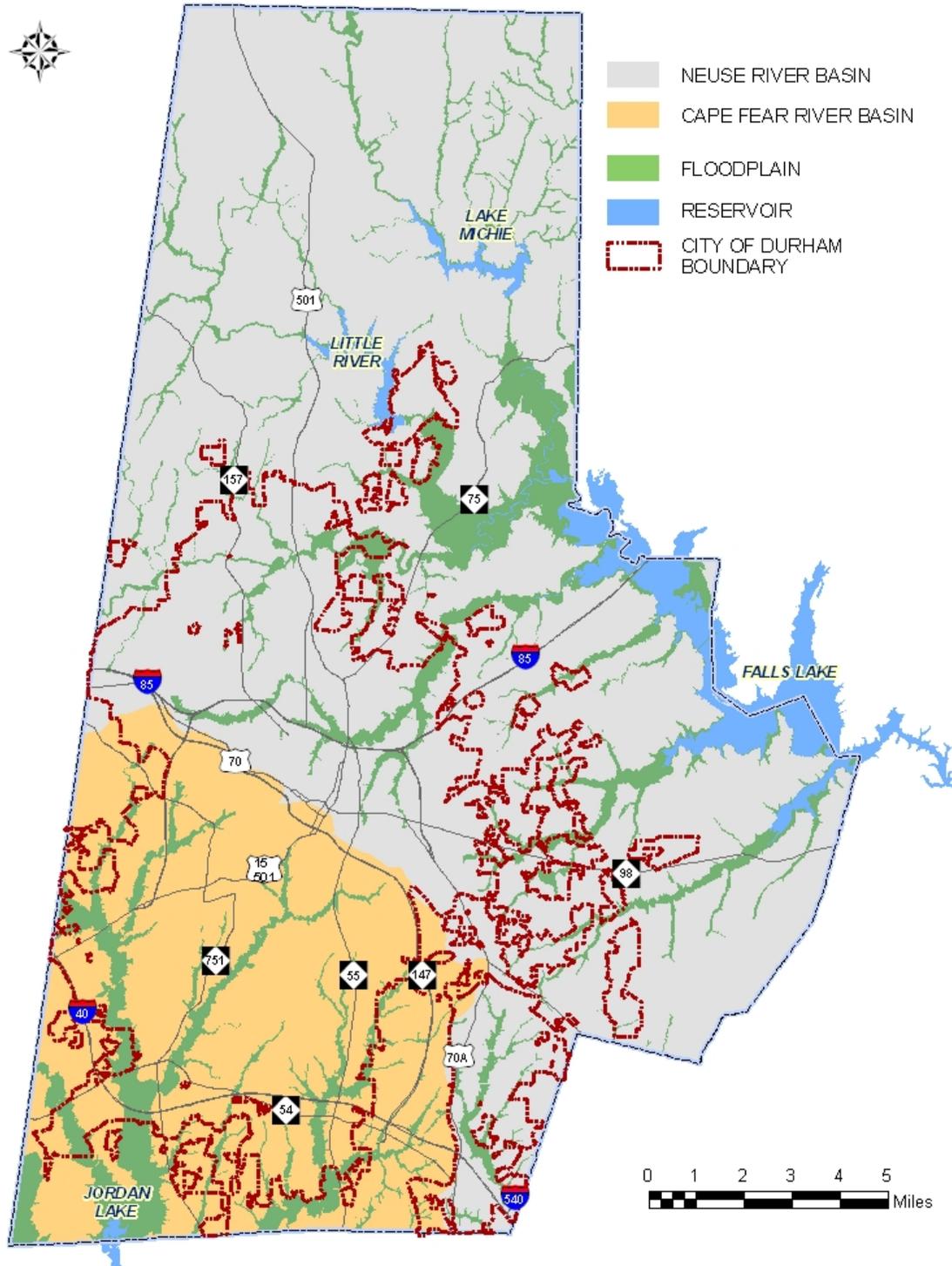
The location of Durham on the ridgeline means that surface waters flow away from the center of the town. Major streams, and gravity flow sewer lines, flow generally east on the Neuse Basin side of the ridge and south on the Cape Fear Basin side of the ridge (see Map 2).

Map 1. Generalized Geology of Durham County



Note: Source is Durham City-County Planning, January 2012

Map 2. The Neuse and Cape Fear River Basins



Note: Source is Durham City-County Planning, January 2012

Natural Features and Important Habitats

Durham's rolling topography is comprised of flat areas, hills, small streams and larger creeks and rivers. Within the City, many existing undeveloped natural lands are along steep slopes, floodplains and low-lying creek areas, since these historically were less desirable for development. Major creeks within the City limits include Third Fork, Ellerbee, Little Lick, and Northeast Creeks. These creeks all contain major floodplains.

Floodplains are the natural bottomlands adjacent to perennial streams and rivers where flooding can be anticipated to occur. They perform valuable natural functions:

- Floodplains absorb and hold floodwaters, slowly releasing them and thereby reducing the intensity of downstream flooding;
- Floodplains allow natural recharge of water back into the ground;
- Floodplains maintain water quality by filtering storm water before it reaches the stream; and
- Floodplains provide important wildlife habitat.

Durham presently has floodplain regulations that prohibit most new

development in floodplain areas. Perennial and intermittent streams also receive some protection through Durham's stream buffer requirements.

Wetlands are typically found in floodplain areas and in the low areas that surround streams. Wetlands offer a natural buffer between upland habitat and watercourses and serve many similar functions as floodplains. Wetlands that are preserved in new developments require a 25-foot naturally vegetated buffer maintained around them if they are one acre in size or greater.

Durham revised its development regulations in 1999 to better address protection of environmentally significant features. The City and County approved a

series of amendments to its zoning and subdivision ordinances to address, stream buffers, floodplains, steep slope wetlands, and tree protection measures.



Floodplains and wetlands not only serve as important faunal and floral habitat, they also provide natural storage for storm water runoff, thus enhancing flood protection.

More stringent environmental resource protection was accomplished through adoption of the Unified Development Ordinance (UDO) in 2006. In the past five years, Durham has adopted a number of text amendments to the UDO in order to further enhance environmental protection. These enhancements addressed development within special flood hazard areas, sedimentation and erosion control, riparian buffers, and tree protection (See Table 1).

Table 1. Environmental Enhancements to the UDO			
UDO Text Amendments		Board of County Commissioners Date of Adoption	City Council Date of Adoption
TC05-04	Flood Damage Protection Standards	4/24/2006	5/6/2006
TC06-05	Sedimentation and Erosion Control	6/26/2006	6/19/2006
TC06-10	Septic Tank Lot Sizes	11/27/2006	12/3/2006
TC07-09	FIRM Technical Changes	7/23/2007	7/19/2007
TC07-05	Floodplain Fill	8/13/2007	8/6/2007
TC09-07	Sedimentation and Erosion Control	11/23/2009	12/7/2009
TC08-02	FIRM update	5/12/2008	5/5/2008
TC07-21	Stormwater	6/9/2008	6/2/2008
TC09-08	Riparian Buffers	11/8/2010	11/4/2010
TC10-03	Tree Protection	4/11/2011	3/21/2011
TC10-07	Riparian Buffers Technical Revision	4/11/2011	3/21/2011

Source: Durham City-County Planning Department

The *Durham County Inventory of Important Natural Areas, Plants and Wildlife* identifies 45 sites within Durham County. These sites provide a high diversity of plant and animal species, support populations of rare plants and animals, and serve as critical open space corridors for animal movements. The rare species identified in the Inventory range from the federally-listed Bald Eagle, to rare aquatic mussels and to sun-loving rare prairie species. These Inventory sites are located in Map 3, Natural Resources and listed in Table 2, Natural Inventory Sites.

The Natural Heritage Program ranks sites based on the variety and rarity of species found in these areas. Of the 34 sites, 23 are ranked as “significant” at the state or national level. Another seven are ranked as “regionally significant.” These areas are located primarily along Durham’s river and stream corridors and upland areas that border these bottomlands. Historically, the land along rivers and

streams has been less disturbed by development or agricultural activities, and so retains more native plant and animal habitat. The stream corridors are also important habitats because they provide opportunities for animal movement between large core areas of habitat.

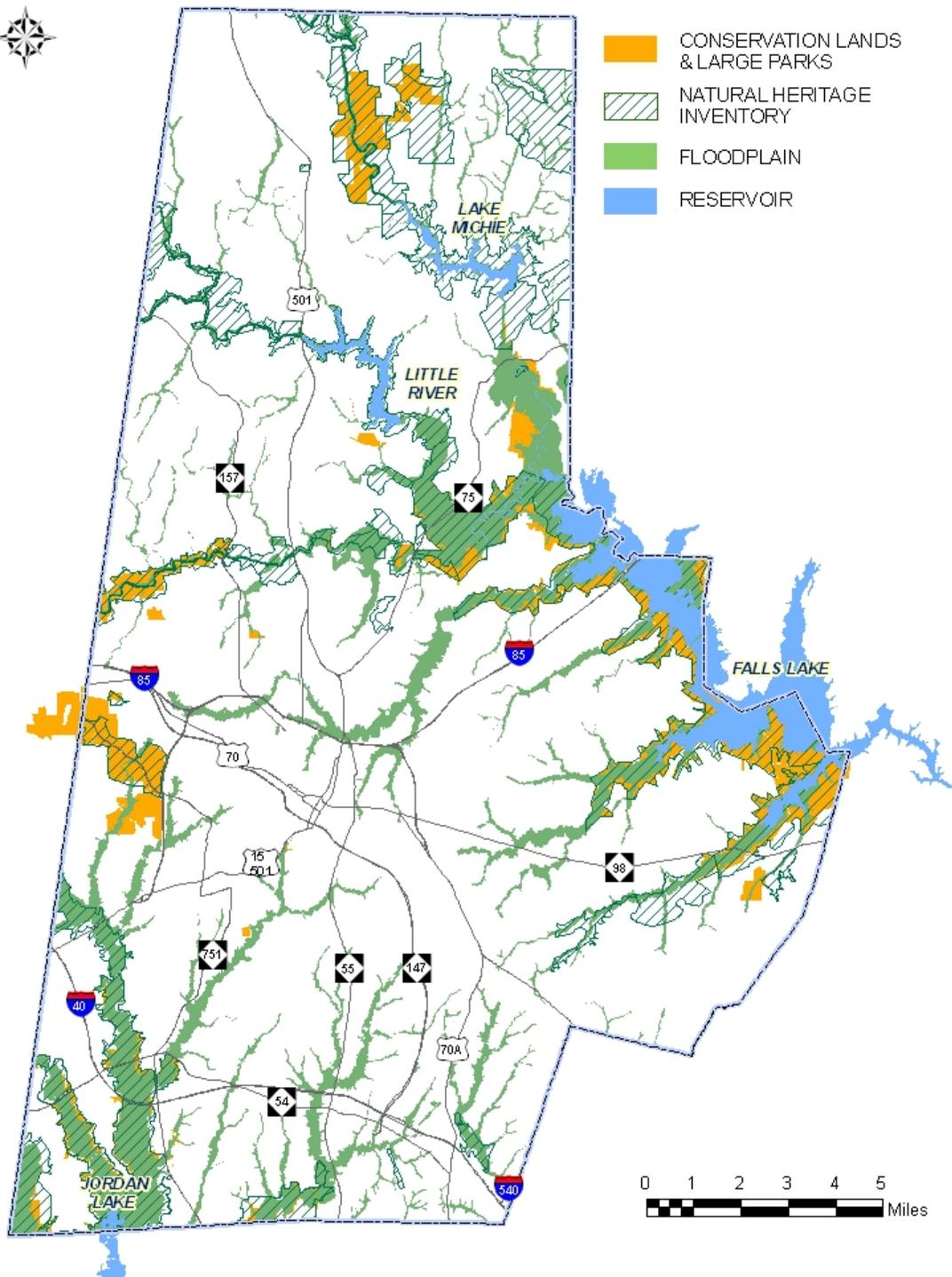
Table 2. Natural Inventory Sites	
Site	Acres
Bennett Place Upland Forest	41.75
Big Oak Woods	56.57
Cabin Branch Creek Bottomland-Swamp	196.47
Camp Butner Game Land	2043.27
Catsburg Natural Area	110.15
Dry Creek/Mount Moriah Bottomland	438.97
Duke Forest Oak-Hickory Upland	423.32
Eno River Aquatic Habitat	7.23
Eno River Blue Wild Indigo Slope	44.49
Eno River Diabase Sill	7748.07
Falls Lake Shoreline and Tributaries	17.41
Flat River Aquatic Habitat	2504.26
Flat River Bend Forest	642.06
Flat River Slopes above Lake Michie	241.28
Flat River Slopes below Lake Michie	204.99
Gate 4 Mafic Forests	1.10
Gate 9 Pond	90.11
Hebron Road Remnant Glade	206.53
Hebron Road Remnant Glade	1247.45
Hill Forest Chestnut Oak/Shortleaf Pine Forest	41.33
Hill Forest Dial Creek Hardwood Forest	5995.28
Jenkins Road Diabase Dike	66.69
Jordan Lake Bald Eagle Habitat	1883.00
Knap of Reeds Creek Beaver Ponds and Swamp	159.02
Lake Michie Corridor	1743.79
Leatherwood Cove	1126.32
Lick Creek Bottomland Forest	320.96
Little River (Durham) Corridor	1213.89

Little River (Orange/Durham) Aquatic Habitat	2157.02
Little River Gorge	1422.76
Little River Uplands	408.00
Lower Eno River/Little River Bottomlands	2123.81
Lower New Hope Creek Floodplain Forest and Slopes	2572.04
Middle Eno River Bluffs and Slopes	964.59
Middle Lick Creek Bottomlands	819.93
Morgan Creek Floodplain Forest	325.22
New Hope Creek Bottomland Forest	16.93
Northeast Creek Floodplain Forest	226.54
Pennys Bend/Eno River Bluffs	22.48
Quail Roost Oak Uplands	18.00
Red Mountain/Flat River Slopes	199.87
Redwood Road Remnant Glade	144.70
Stirrup Iron Creek Marsh and Sloughs	221.60
Stirrup Iron Creek Marsh and Sloughs	265.02
Third Fork Creek Wetlands	148.91
Source: Durham City-County Planning Department	

Durham County also includes rare upland habitats. Durham and Granville Counties include locations of unusual diabase soils that are more common in the Great Plains. These basic soils support a variety of rare plants, including the smooth coneflower, which is federally-listed as an endangered species. Another 24 diabase-loving species are state-listed as “rare.”

The Eno, Flat, and Little Rivers contain populations of eight mussel species that are state-listed as “rare” or “significantly rare.” Maintaining good water quality is particularly important for the continued long-term presence of these species in Durham. Aquatic plant and animal species are particularly vulnerable to water quality changes. Sedimentation can have disastrous effects on mussels, which are unable to relocate during periods of heavy sedimentation, and are additionally vulnerable as filter feeders. Likewise, the City’s proposal to expand Lake Michie could threaten aquatic habitat. The expansion would likely inundate over a mile of river upstream from the present lake boundaries, which could have a serious impact on any mussel species living in this stretch of the river.

Map 3. Natural Resources



Note: Source is Durham City-County Planning, January 2012

Twenty-six of the Inventory sites are at least partially protected by virtue of their public or institutional ownership. That status alone does not ensure that the values of the site will be protected. The remainder of the Inventory sites are in private ownership and vulnerable to development impacts that would degrade their habitat value.

Durham's development regulations do not require the preservation of Inventory sites. New developments frequently do not incorporate identified natural features into the development design. Floodplain restrictions and stream buffers provide some degree of protection, since many sites are associated with watercourses. However, protection of Inventory sites is not a standard requirement of new development. The upland Inventory sites not associated with watercourses face the greatest threat from development impacts.

Water Quality

As indicated previously, Durham County is divided into two major drainage basins, both of which supply water for the Region's drinking water reservoirs. The southern third of the County drains into Jordan Reservoir and the Cape Fear River basin. The northern two-thirds of the County drains into the Falls of the Neuse Reservoir and the Neuse River basin. All of the major watercourses in Durham County drain to water supply reservoirs and affect the quality of their waters.



Lake Michie and Little River Reservoir in northern Durham County were created by damming the Flat and Little Rivers. These reservoirs serve as public water supply for the City of Durham

The Flat River and Little River in northern Durham County have been dammed for the Little River and Lake Michie drinking water reservoirs for the City of Durham. These two watersheds, plus the Eno River, Ellerbe, Lick and Little Lick Creeks all drain into Falls Lake, a drinking water supply for the City of Raleigh. The streams in Durham County within the Cape Fear basin drain into Jordan Reservoir, a water supply for Apex and Cary, and a potential future water supply for Durham. These watercourses include Little, New Hope, Third Fork, Crooked, and Northeast Creeks.

The NC Division Water Quality (DWQ) classifies streams according to their best-intended uses. Surface waters, including streams, lakes, and estuaries, are rated as fully

supporting, partially supporting or not supporting their intended uses. Intended uses could include water supply, aquatic life protection and swimming or other recreation. The DWQ has determined that several streams in Durham County do not support their intended uses. These streams include New Hope, Third Fork, and Northeast Creeks in the Cape Fear basin and Ellerbe, Little Lick, and Lick Creeks in the Neuse basin. All have impaired water quality.

Durham applies special zoning regulations for the purposes of water supply watershed protection. Industrial land uses are prohibited on land near water supply reservoirs, reducing the probability of spills of toxic materials. The intensity of development is kept relatively low on land near water supply reservoirs in order to minimize pollution from storm water runoff. Preventing water pollution is usually preferable and less costly than removing pollutants from water prior to urban uses.

Durham's watershed protection regulations use several techniques for preventing water supply pollution. First, the regulations establish limits on that amount of impervious surfaces allowed in a new development. Impervious surfaces are hard surfaces such as driveways, parking lots and rooftops that do not allow water to naturally infiltrate into the soil. Allowed impervious surfaces can vary from 6 percent in sensitive areas to 70 percent in less sensitive areas.

Second, new development must preserve undisturbed naturally vegetated areas on each side of most streams. Stream buffers can be from 50 feet in width on each side of the stream to 150 feet in width. Finally, the regulations establish minimum lot sizes for all new development. The minimum can vary from 2 acres in sensitive watershed down to 20,000 feet in less sensitive watersheds, with provisions for smaller lots in clustered developments.

The degree of land use regulation applied to a particular site varies within the County and depends upon:

- Which water supply reservoir's drainage basin the site is in;
- Whether a site is within 1 mile or 5 miles from the reservoir;
- Whether engineered storm water controls (also called best management practices) are provided on-site; and
- Whether the site is inside or outside of the Urban Growth Area.

In general, the rules are most restrictive in north Durham areas close to Lake Michie and the Little River Reservoir, both considered sensitive watersheds. The rules are least restrictive in the portions of the Falls Reservoir and Jordan Reservoir basins that are well away from the lakes' edges.

Durham's watershed protection regulations prohibit community

scale wastewater treatment systems in areas outside the Urban Growth Area. Community scale wastewater treatment systems serve multiple homes and rely on a common septic system or a package treatment plant.

In 1997, the State of North Carolina adopted a comprehensive strategy for reducing pollutants in the Neuse River basin and the Pamlico Sound. The Nutrient Sensitive Waters Management Strategy for the Neuse River Basin established a goal of reducing nitrogen levels in the lower basin by 30 percent within five years. Nitrogen is a nutrient commonly found in storm water runoff and wastewater. In large quantities, nitrogen has a negative impact on water quality.

The Management Strategy proposes to meet the 30 percent reduction by distributing the nitrogen reduction goal between wastewater dischargers, developers, farmers and fertilizer applicators. Ten municipalities and five counties, including the City of Durham and Durham County, are required to address the nitrogen levels in storm water runoff from new developments. New developments are required to capture the storm water from the one-year 24-hour storm, and to limit the nitrogen export from new development. The Management Strategy also requires that all streams within the Neuse River basin provide a 50-foot stream buffer.

While similar regulations are not yet in place in the Cape Fear River basin, the state is considering enacting such regulations. Should this take place, Durham City and County will both be required to meet these additional state standards to maintain high water quality.

The Upper Neuse River Basin covers about 770 square miles of the North Carolina Piedmont and is home to a diverse variety of wildlife, nine drinking water supplies and significant urban development. Protecting the basin's water resources is essential to the health, safety and vitality of the region's people, economy and environment. The Upper Neuse River Basin Association (UNRBA) is a coalition of counties, municipalities and soil and water conservation districts. With the assistance many local and state agencies, the UNRBA prepared an Upper Neuse Watershed Management Plan.

The Management Plan recognizes that increasing population and development in the basin over the next two decades will continue to impact the water quality of streams, rivers and reservoirs in the basin. It notes that that several important point and non-point source control measures are already in place. Through its analysis of the basin and potential growth, the Plan indicated that these measures, if fully implemented and enforced, will be sufficient to meet targets for drinking water in 2025. Present water quality protection measures may not be sufficient for protection beyond

that time frame and they will be insufficient to protect aquatic habitat.

The Management Plan identifies five management techniques for use by municipalities and counties in the basin:

- Controlling the quality and quantity of water running off future development site through density and impervious surface limits and enhanced peak flow requirements;
- Enhanced monitoring and enforcement programs to ensure proper performance and maintenance of wastewater, storm water and septic systems;
- Education and Citizen Stewardship programs to increase citizens' and developers' awareness of and participation in watershed management efforts;
- Point source control efforts to upgrade existing wastewater treatment systems and phase out older systems; and
- Stream and wetland restoration projects to restore some of the natural functions and characteristics of impaired bodies of water.

These techniques, when used together, can address existing pollution problems and minimize future problems. Local governments in the upper Neuse River basin and the Board of the UNRBA are reviewing the draft to assess the effectiveness and cost of implementing the Management Plan's recommendations.

In 2002, the North Carolina Wetlands Restoration Program targeted Ellerbe Creek for a local watershed plan. The goal of the Plan is to produce specific recommendations that could improve water quality within the Ellerbe Creek drainage area. The watershed plan for this degraded stream drew together the efforts from many City, County, regional and state agencies. In particular, the Plan will assist the Wetlands Restoration Program in locating sites for wetlands projects that can provide the greatest water quality benefit. Portions of New Hope Creek may be targeted for a similar watershed plan in the future.

Air Quality

People living in areas with poor air quality are more susceptible to asthma and a host of other breathing related disorders. The American Lung Association tracks air quality trends nationwide. In its most recent ranking, the Raleigh-Durham area tied with Philadelphia for the rating of the 10th worst air quality in the nation. Although Raleigh-Durham rankings higher than larger cities, such as Los Angeles, Houston and Atlanta, it indicates poorer air quality than a number of larger urban areas such as Dallas-Fort Worth, New York City, San Diego and Pittsburgh.

The air quality in Durham is affected by both local sources and by

the quality of air that comes into the Triangle Region. Local sources of air pollution come primarily from auto emissions and from individual stationary sources, such as industrial plants and some commercial businesses, such as dry cleaners.

The Environmental Protection Agency (EPA) has established standards for common air pollutants. A geographic area that meets or exceeds the standard for a particular air pollutant is called an "attainment area." Likewise, an area that does not meet the standard is called a "nonattainment area." Standards are set for a number of pollutants, including ozone, nitrous dioxide and carbon monoxide. An area could be an attainment area for some pollutants and a non-attainment area for others.

When air quality does not meet federally-mandated standards, the non-attainment status can directly affect the community's economic development efforts. Federal funding for transportation improvements may be delayed. Industrial development proposing to emit air pollutants may be prevented from locating in the jurisdiction. Non-attainment status for one or more pollutants affects potential employment growth, and perhaps more indirectly, affects our quality of life.

Ozone is a problem air pollutant in Durham and the Triangle Region. Ozone is created by a chemical reaction between volatile organic compounds (VOCs) and nitrous oxide with heat. Between 1999 and 2001, the Triangle Region averaged almost 21 days, mostly during the summer, when ozone levels exceeded the federal standard. During these days, residents were urged to limit their exposure to the outside air, and encouraged to reduce car trips and refueling during peak times.

Since ozone is directly related to automobile combustion and emission, expected increases in travel over the next two decades will also result in increased ozone levels. More travel will have a negative impact on Durham's air quality, increase health problems, and possibly jeopardize federal transportation funds without concerted efforts to improve the situation.

An urban heat island is a localized microclimate created by a concentration of paved surfaces in an urban area that absorbs heat from the sun during the day and releases the heat slowly during the night. Heat islands can be downtown areas or large shopping centers with expanses of un-shaded parking. Urban heat islands raise ambient temperatures and help to trigger the chemical reactions that produce ozone. The higher temperatures require greater energy consumption to cool interior spaces. Durham does not have a coordinated policy to address heat island issues.

Greenhouse gases occur naturally in the atmosphere, while others result from human activities. Naturally occurring greenhouse gases

include water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Certain human activities, however, add to the levels of most of the naturally occurring gases. Carbon dioxide is released into the atmosphere when fossil fuels and other materials are burned. Methane is emitted during the production and transport of fossil fuels and from the decomposition of organic wastes. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Powerful greenhouse gases that are not naturally occurring include hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride, which are generated in a variety of industrial processes. Each of these greenhouse gasses is noted for its ability to absorb heat in the atmosphere.



The Durham Area Transit Authority placed 20 diesel-electric hybrid buses in operation in 2010.

In response to concerns about global warming and air quality, Durham adopted a *Greenhouse*

Gas Emissions Reduction Plan in 2007. The Plan is administered through the County's Engineering and Environmental Services Department. The Plan calls for a 30 percent reduction from 2005 emissions levels by 2030 for local government operations. The Plan also includes the following recommendations:

- Implementation of a green building policy for all new construction and major renovations;
- Efficiency improvements to water and sewage operations;
- Expand energy conservation in commercial, residential, and industrial sectors via education and awareness campaigns, partnerships, energy audits, and design standards;
- Expand land use planning strategies that control suburban sprawl and encourage mass transit use; and
- Promote the use of alternative vehicles and fuels.

Environmental Issues

New development can significantly impact natural features, such as floodplains, streams, steep slope areas, wetlands and natural vegetation. Land use regulations try to strike a balance between achieving broader community objectives of environmental protection while recognizing the rights of private property owners.

Typical of many communities, Durham faces the problem of how to accommodate new development while protecting its natural heritage. Many of the Natural Inventory sites are protected: at least partially in public or institutional ownership and managed as natural

areas, forestlands or wildlife habitat.

Durham faces two potentially conflicting public objectives. The City needs to develop a new and cost-effective raw water supply to address anticipated future needs. At the same time, Durham may also want to take steps to prevent degradation of the habitat of these important species.

Poor air quality resulting from increases in ozone levels can be anticipated due to increases in vehicle miles traveled. Poorer air quality can have an impact on Durham's quality of life for many residents who exercise or have sensitivity to air quality. Poor air quality can also affect Durham's ability to recruit new businesses.

Open Space and Farmland

Natural and Urban Open Spaces

Open space can refer to lands that are largely undeveloped and natural in character. They can be floodplain areas, steep slope areas, tree preservation areas, wetlands, parks for passive recreation, research forests, and natural land around institutions and facilities. Vegetative buffers between different land uses offer small areas of natural open space. Some natural open spaces may allow public access and provide recreational opportunities—a place to hike, bird watch, fish or picnic. Other natural open spaces may restrict public access. Natural open spaces adjacent to watercourses help to reduce sedimentation into streams, protecting downstream water quality. Rivers and streams provide homes for fish and other aquatic species. The lowlands and slopes adjacent to rivers and streams often provide prime habitat for birds and other wildlife.

Developed open space can refer to farms, golf courses, and parks for active recreation. Many residents view agricultural fields and horse farms, sometimes termed "working lands," as a desirable landscape feature. Farms contribute jobs, money and produce to Durham's local economy. The City has a long history of developing open spaces. The City owns hundreds of acres of extensive park facilities for sports, such as softball, soccer and even frisbee golf.

In urban areas, developed open space can also refer to parks, plazas, parkways, pedestrian spaces and even cemeteries. Urban open spaces provide causal opportunities to socialize and contribute a neighborhood's character and appeal. Like natural areas, urban open spaces can be publicly owned or privately owned, but are generally accessible to the public. Urban open spaces are discussed in the section of this report on Community Character and Design.

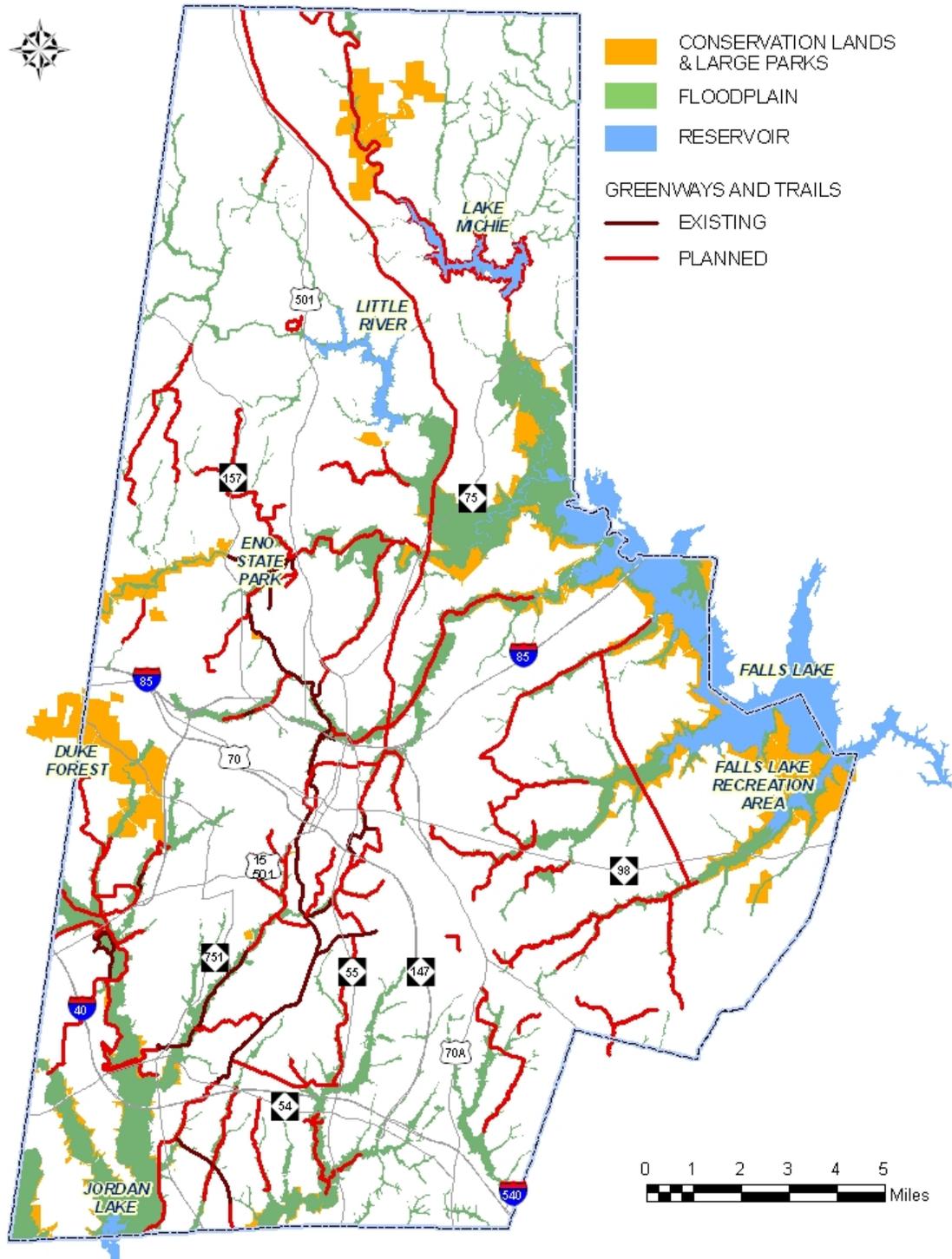
In the 1992 and early 1993, the County and City adopted *The Durham County Open Space Corridor System: A Program for Natural*

Areas and Passive Recreation. This document recommended developing a County-wide system of open space corridors. It focused primarily on corridors along the Eno River, the Little River, the Flat River, New Hope Creek, Lick Creek and the Falls Lake shoreline (see Map 17-22, Open Spaces and Corridors). State parks, City parks, Corps land and other public open spaces already protect portions of these corridors. Over the next few years, corridor plans were created and adopted for New Hope Creek in southern Durham and the Little River in northern Durham. Other corridor plans are yet to be prepared.

The Flat River is one of three rivers that flows through northern Durham County to the Falls of the Neuse Lake. Much of the land along the Flat River is protected because it is in public ownership. The US Army Corps of Engineers owns land near the Lake and allows recreational uses. The City of Durham owns land around Lake Michie. North Carolina State University owns the Hill Forest research area upstream of Lake Michie. Durham has targeted this corridor for further planning efforts to ensure coordinated public and private protection all along the River.

Little Lick Creek in east Durham flows to the Falls of the Neuse Lake. This stream corridor is relatively undeveloped, but faces development pressures over the next decades. Durham County has also targeted the Little Lick Creek corridor for an open space planning effort.

Map 4. Recreation and Open Space



Note: Source is Durham City-County Planning, January 2012

New Hope Creek flows south between Durham and Chapel Hill. It meanders along a broad flat floodplain of hardwood swamp forest. In the early 1990s, The City of Durham, Durham County, the Town of Chapel Hill and Orange County recognized value of the Creek corridor as open space. The four jurisdictions wanted to preserve open spaces to connect New Hope Creek with the Eno River to the north and to the Corps land and Jordan Lake on the south. The New Hope Creek Corridor Open Space Master Plan was adopted by all four jurisdictions to provide wildlife habitat, environmental benefits, recreational opportunities and aesthetic enjoyment, and as a means of shaping the area's urban form.

The Master Plan sets out a broad program for preserving open spaces:

- Acquisition from willing sellers of about 1,103 acres of floodplain land, 45 acres of steep slope area and 554 acres of uplands;
- Development of about 20 miles of trails and nine trail access points; and
- Establishment of a permanent, joint New Hope Corridor Open Space Advisory Committee to monitor and advise elected boards about implementation of the Master Plan.

The four jurisdictions share responsibilities and project costs for implementing the Master Plan. Since the Plan's adoption, both the City of Durham and Durham County have actively worked to implement the Plan through the parks acquisition, trail development and open space acquisition.

The Little River corridor in northwestern Durham displays farms, woodlands, pasturelands, historic home sites and meandering streams. The Little River itself is both beautiful and environmentally significant. Upstream from the Little River Reservoir, the River is characterized by scenic gorges, rocky riffle sections, steep rocky bluffs and wooded scenery. Steep north-facing slopes create a cool microclimate that supports rhododendron and mountain laurel groves more typical of the mountains. The River's water quality is highly rated by the NC Environmental Management Commission.

The goals of the Little River Corridor Open Space Plan include preserving wildlife habitat and movement corridors, protecting the area's natural beauty, protecting water quality, and accommodating existing uses and future development. Citizens in the area expressed a strong desire to preserve the special places in the Little River corridor, but preferred that any public acquisition be on a voluntary basis.

In order to accomplish its goals, the Plan recommends numerous

public and private actions, including:

- Developing five parks for active recreation;
- Developing five canoe and kayak access points along the River;
- Developing parks and greenway trails for passive recreation;
- Preserving through public acquisition or private efforts numerous wildlife habitat areas and corridors along the Little River and its key tributaries.
- Open space education and site stewardship programs to increase citizen awareness of the River and its environs.

Public interest in the Little River corridor and the Plan has been broad. A group of citizens has formed an organization, Little River Corridor Citizens' Advisory Committee, for the specific purpose of raising awareness of the corridor and monitoring implementation of the Plan.

Durham County and Orange County have taken a major step to implement the Plan in acquiring and developing the Little River Regional Park. Straddling the County line, the Regional Park encompasses 307 acres along the western bank of the North Fork of the Little River. Purchase was accomplished through a joint agreement of Durham County, Orange County, the Triangle Land Conservancy, and the Eno River Association. A \$365,000 grant from the NC Clean Water Management Trust and a \$262,000 grant from the NC Land and Water Conservation Fund covered part of the acquisition cost. The Regional Park will be developed to accommodate passive recreation: picnicking, horse trails, hiking trails and mountain bike trails. A grant of \$250,000 from the NC Parks and Recreation Trust Fund will assist with development costs. When operational, the Regional Park will be managed by Orange County.

Farmland Preservation

Farming has historically been an important part of Durham's rural heritage and economic base. Farms add to our rural character. They can provide local sources of fresh foods, and open spaces important for wildlife and water quality.

The majority of farms in Durham exist outside the Urban Growth Area (UGA) in northern and eastern Durham County. Soils identified as ideal for agricultural use are scattered throughout the County, but are more heavily found in northern Durham. A significant proportion of prime soils are found within the UGA where suburban residential development has been taking place.

Most active farmland is located in areas that are zoned Rural District (RD). Rural District zoning permits residential development and

agricultural uses. Single-family development is allowed by right through the zoning and subdivision ordinances. Some traditional rural and agricultural uses require additional reviews. Roadside stands, summer camps and equestrian facilities are permitted uses but require use permits from the Board of Adjustment.

The importance of farming to Durham's economy has changed considerably over the past three decades. As Durham's economic base has grown dramatically in the medical, high tech, and service-related sectors, farmland that used to produce tobacco or row crops has been allowed to go fallow or been converted to development. Data provided by the US Census of Agriculture finds that the number of farms in Durham County declined from 350 to 159 between 1978 and 1997. During the same time, the amount of farm acreage has declined by over half, from 50,010 acres in 1978 to 22,238 acres in 1997.

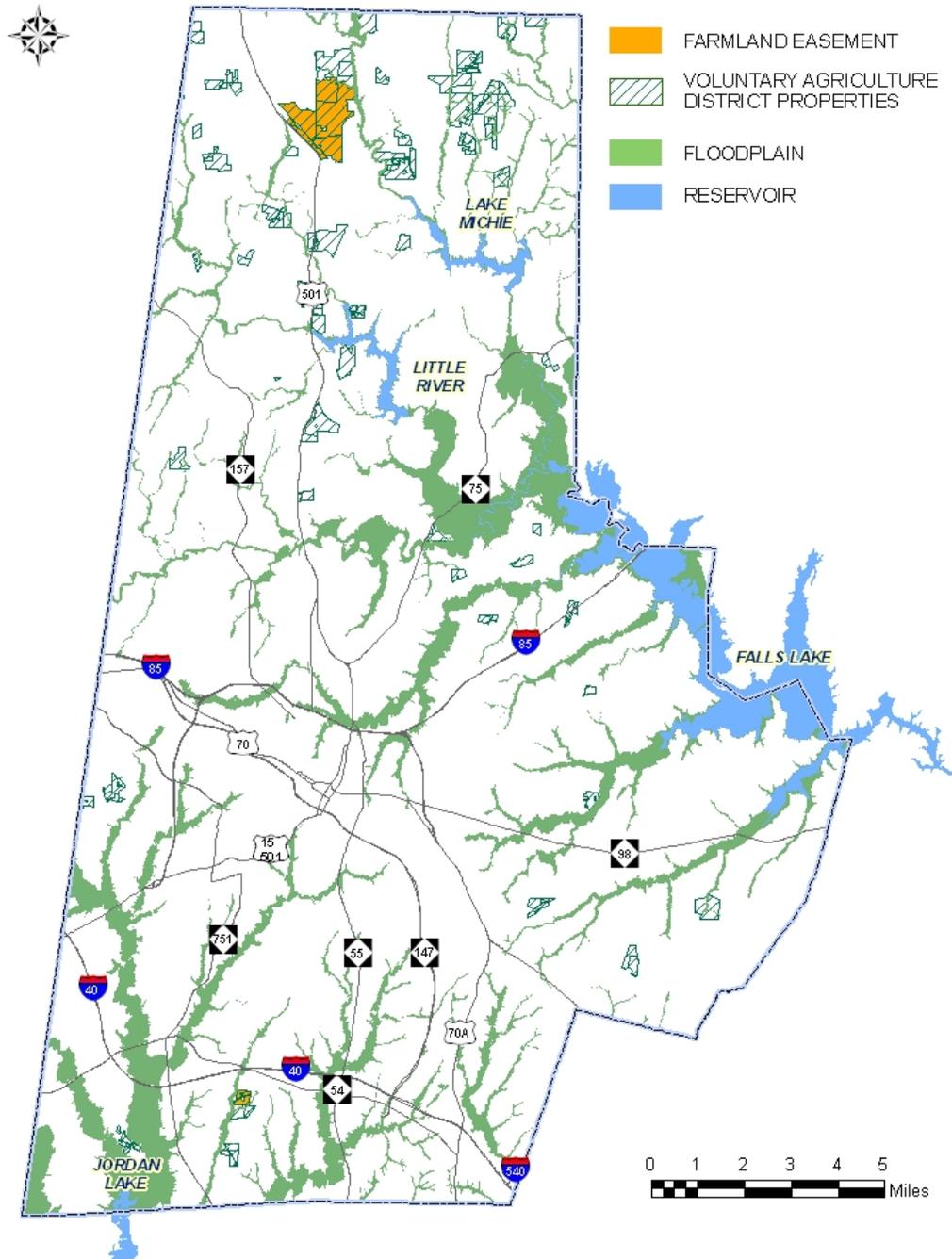
The nature of farming in the Triangle is changing. In general, traditional agriculture, such as dairying and row crop cultivation of tobacco and grains, is on the decline while specialty farming is growing rapidly. Tobacco quotas in the Triangle Region have been reduced by about 50% since 1996. The number of dairy herds has dropped steadily. In contrast, income from nursery and greenhouse production as well as fruits and vegetables has increased rapidly. Beef cattle and hay production are also on the rise, in part as a replacement for tobacco.

The average age of farm operators is increasing. The average farmer in the region is now more than 55 years old. Fewer young people are getting into agriculture, driving the average age of farmers steadily upward. What farmers decide to do with their land when they retire will have a major impact on the long-term prospects for farming in the region.

Existing farmland has fiscal benefits in addition to retaining a portion of our rural character. Farmland adds to the local economy and requires few public services. In recent years, both Chatham and Wake Counties have performed "cost of community service" studies. These studies evaluated the cost of providing public services to farmland and other types of residential and non-residential land use. The Chatham County study found that for every dollar farmland contributed, it only required \$0.92 in services, even under the present use value program. By contrast, residential land uses required on average \$1.12 in services for every dollar contributed in taxes. The Wake County study, completed in June 2001, produced similar results.

One tool Durham County uses to encourage preservation of farmland is the Present Use Value program. North Carolina statutes allow counties to tax certain agricultural, horticultural or forestry lands on their present value rather than on their (usually higher)

Map 5. Voluntary Agriculture District Properties and Farmland Easements



Note: Source is Durham City-County Planning, January 2012

market value. In order to qualify, agricultural land must be at least 10 acres in size and produce an average gross income of \$1,000; forestry land must be at least 20 acres and in commercial tree production. For farmers, inclusion in the program can mean significantly lower tax burden and less incentive to sell farmland for development purposes. Durham County lists 441 parcels in its Present Use Value program for agricultural uses, representing 18,611 acres of land (see Table 3, Present Use Valuation Program). Another 491 parcels are in the Present Use Value program for forestry uses

Table 3. Present Use Valuation Program		
	Number of Parcels	Area (in Acres)
Present Use Agriculture	374	14,297
Present Use Forestry	218	11,733
Source: Durham County Tax Assessor records.		

Durham County created a Farmland Protection Board in 1994. The Board’s purpose is to support farmland protection efforts and the continuation of farming in Durham. This Board has helped to develop a Voluntary Agriculture District (VAD) program based on state guidelines.

Participating farms must have at least 20 contiguous acres. Farmers voluntarily agree to not develop their acreage for a minimum of 10 years. The benefits to VAD farms include:

- Participating farms receive a waiver of water and sewer assessments on their land if they do not use the service;
- A notice is placed on County maps warning potential neighbors of noise, odor, dust, and slow-moving vehicles;
- Participating farms have the right to a public hearing if a public entity considers condemnation of a portion of the property.

While the benefits are modest, participants are more motivated by the statement of commitment to farming. Durham presently has 24 farms participating in the VAD program, totaling 1,763 acres. These are shown on Figure 7, Farmland Preservation.

Durham has used conservation easements as another tool for protecting farmland. Conservation easements can be purchased by local governments or donated by private property owners. Under a conservation easement, the farmer retains ownership of the land but voluntarily restricts the ability to develop the farm for non-farm usage in perpetuity. These restrictions guarantee that the property will remain in farming and open space. Figure 34, Farmland

Preservation shows the location of conservation easement that Durham has acquired for farmland protection.

The Herndon Farm was the first farm to grant permanent conservation easements to Durham County. The easement covers a 55 acre portion of the farm located in fast growing southern Durham County near The Streets of Southpoint shopping center and the Research Triangle Park. This farm was also awarded a \$250,000 state farmland preservation grant in 2001 to partially reimburse for the lost value in potential development rights.

Quail Roost Farm in northern Durham became the second property to donate a conservation easement for farmland protection purposes. A 32-acre portion of the Farm was donated in March 2002.

The Durham County Farmland Protection Program Guidelines specify that Agricultural Priority Areas should be established by Durham County. The priority areas would provide the basis where more concerted efforts to preserve farmland could be directed, including the purchase of conservation easements. These priority areas have not yet been adopted by Durham County.

Open Space and Farmland Issues

Open space corridor plans help Durham to identify and prioritize actions that government and private property owners can take to protect valuable open spaces from negative impacts of development. Preservation plans have been prepared for four important open space corridors in Durham County. Plans for the Flat River corridor remains to be completed.

Durham has expressed a desire to preserve important open spaces along its major river and stream corridors. Each open space preservation plan carries with it public and private responsibility for implementation. Durham City and County have budgeted and spent fund to acquire land and develop recreational facilities.

Farming in Durham has faced development pressure due to the value of land for suburban development, combined with lowered economic returns for farming. Although the pressure has been somewhat ameliorated over the by the lingering effects of a national recession, it is anticipated that redevelopment pressure will again increase as the economy rebounds.