

MORRISVILLE TRANSPORTATION PLAN

2009 - 2035



Morrisville Transportation Plan 2009



Town of Morrisville, North Carolina Transportation Plan 2009 - 2035

Adopted March 24, 2009



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EXECUTIVE SUMMARY

In 2007, the Town of Morrisville had tripled in population since its existing Land Use Plan was prepared and was rapidly growing toward its full build-out potential. About a quarter of the area inside the Town's planning jurisdiction remained undeveloped, and there was no opportunity for outward expansion due to the shared boundaries with the Town of Cary and other jurisdictions (Research Triangle Park, Raleigh-Durham International Airport, and Umstead State Park). In response to this challenge, from 2007 through 2009, the Town of Morrisville completed major updates of both the existing Land Use Plan (1999) and Transportation Plan (2002) for the Town.

The two Plans were developed simultaneously because current land use, and anticipated future land use, are inextricably tied to how the transportation system connects the land and people of Morrisville together. Similarly, the way in which the transportation system develops significantly influences land development practices, property values, and how convenient it is to travel from one place to another using different modes of travel (car, bus, rail, walking, or bicycling). This Executive Summary describes how the Plans were developed, the key recommendations, and where in the document to access additional information. Section Two (Background), Section Four (Policy Direction) and Section Seven (Action Items) are identical in both plans.



Developing the Plans

Extensive communication with the general public was a focal point throughout the planning process, both to provide basic inputs into the content and recommendations of the Plans, but also to provide opportunities for people to comprehend the meaning of the Plans and provide feedback on the recommendations. An extensive plans update website, three public workshops, seven Plan Advisory Committee (PAC) meetings, three focus group meetings, a paper and internet survey, and a phone hotline were important parts of the planning process. Every single comment submitted could not be included in the final Plans, but many of the common themes of the comments and how they were addressed by the Plans are included in Appendix C.

Town staff worked with a team of consultants, who were charged with the difficult task of balancing various interests and comments by the public and PAC members, then translating that information into a specific set of action items to effect change (Section Seven). The action items were developed in order to implement the vision, goals and policies of the Plans, which were derived from the Town Council, public comments, Plan Advisory Committee, and the 1999 Land Use Plan (Section Four).

A participant presents her small group's ideas at the first public workshop, on October 29, 2007.

The Land Use Plan

The 2009 Land Use Plan seeks to capitalize on the opportunities in Morrisville (strong population growth and interest in residential development, an advantageous location in the heart of the Triangle) while maintaining the Town's historic roots and "small town feel." Morrisville has experienced rapid development recently, with most major tracts of land available for residential development having been built for subdivisions (Section Three). A key to the Plan is the balance of the desire for low density residential development (single family detached houses) with the need for overall economic growth as well as nearby shopping and work opportunities for the Town's residents. This balance is addressed in the Plan by recommending activity centers with a mix of commercial, office and (in some cases) higher density residential uses where there is greater access to transportation infrastructure (such as major intersections), and allowing much of the remainder of the Town to be developed for low density residential uses or master-planned to take advantage of large undeveloped areas and the Town Center (Section Five). Designating land uses in Morrisville is complicated by the RDU Airport Noise Overlay District, which covers 22% of the town's planning jurisdiction including about 40% of the developable area, and restricts residential and other noise-sensitive uses.



Members of the Plan Advisory Committee discuss what they like and would like to change about Morrisville at the October 16, 2007 meeting.

The Plan integrates transportation by linking land uses with appropriate transportation facilities that offer opportunities for walking, biking or driving. The Plan also seeks to provide an opportunity for new lifestyle and development options by establishing a Transit Oriented Development floating district, which can be applied voluntarily by a property owner to take advantage of planned bus and rail routes through Morrisville. Section Six examines in more detail different Community Areas of Morrisville and illustrates some of the land use and transportation recommendations.

To complement the recommended future land uses, examples of good design are provided for each land use type. Specific action items include the development of various ordinances to strengthen the environmental and quality of life elements of the Town, such as reducing stormwater runoff, encouraging higher-quality, sit-down style restaurants, and continue and expand upon past efforts to preserve the historic character of important places like the Shiloh Community.

The Transportation Plan

Morrisville's geographic position in the Triangle Region – surrounded by people who would like to get from their homes to major attractions like the employment centers of Research Triangle Park, Raleigh-Durham

International Airport, and the cities of Durham and Raleigh – create a situation in Morrisville that demands consideration of high volumes of "through" traffic that seldom stops in Morrisville. This kind of traffic presents interesting technical issues for providing adequate vehicle capacity while maintaining the aforementioned small-town atmosphere. Simply widening roadways with no end in sight could temporarily alleviate traffic congestion, but

EXECUTIVE SUMMARY, CONT'D

might ruin local quality of life and community cohesion in the process. This Plan prioritizes connectivity (providing multiple, redundant routes between origins and destinations), and the provision of alternative modes (bus, bike, walk and rail) to decrease dependence on car trips. Together these strategies hope to address the traffic congestion on and poor level of service provided by Morrisville's current roadways (Section Three).

A key recommendation is that the backbone of the transportation system, NC 54, should be widened to accommodate high traffic volumes, while including facilities for bicyclists and pedestrians and respecting existing development in the Town Center. Many of Morrisville's future roadways will be four lanes, with a landscaped median, 8-foot multi-use paths (wide sidewalks) along both sides and 4-foot bicycle lanes (Section Five). Providing direct connections to complementary land uses, like homes, shopping, and places of work or education, is a critical factor in determining how well traffic is distributed and the level of opportunity that will exist for people to use other modes of transportation besides a car for some of their trips.

Design standards for roadways, transit, bicycle and pedestrian facilities and intersections are included in Section Six in order to provide guidance in implementing the multi-modal recommendations to most effectively fit within the context of the town. Recommendations include developing a transit system in concert with the Town of Cary and Triangle Transit, existing operators with a proven record of success that already have services in the area. The Town should continue to collaborate on developing automated transit and regional transit services in conjunction with its nearby partners and regional organizations. Pursuing Transit Oriented Development as a future development option is a key component of both the Transportation and Land Use Plans because it integrates the development of land uses that are complementary to bus and rail services. Action items in the plan include not only fully implementing the detailed recommendations, but also a set of standards and policies that will support and enhance the recommended improvements, such as a policy for sidewalk connections between residential and commercial areas, a policy to require adequate and safe bicycle parking, a policy for access management (reducing driveways on a road to reduce accidents, among other benefits), and a policy to provide for bicycle and pedestrian accommodations during construction.

Summary: The Future of Morrisville

So what is the future of Morrisville, according to these Plans? Tree-lined streets used for driving, walking, and cycling; meaningful public transport that carries people safely and conveniently to major destinations in Town and nearby; a more collaborative atmosphere to work with neighboring entities to create opportunities that Morrisville would not be able to create or create as well on its own; a low-density lifestyle interspersed with areas that provide neighborhood- or town-scale shopping, and employment opportunities that work together with the transportation alternatives. The plans can be best summarized by how they answer two critical questions:

How do the Plans respond to the challenge of building and maintaining a community in a growing region?

- By balancing uses to meet the needs of different groups and locating land uses where they make sense. For example, placing major nonresidential uses at major intersections with greater transportation access and using the remaining undeveloped land not covered by the noise overlay for residential use.
- By prioritizing connectivity rather than simply widening roadways.
- By prioritizing the integration of non-auto modes of transportation through the option for Transit Oriented Development and the incorporation of bicycle and pedestrian facilities on every major and minor roadway.
- By enhancing Morrisville's sense of community and community identity through the provision of amenities such as parks, protected environmental resources, gateway features, a vibrant Town Center and a protected Shiloh historic area.

How do the Plans support the development of Morrisville as an "innovative crossroads"?

- By striving to be a premier example of collaboration between jurisdictions and regional partner organizations. The development of the Plans themselves incorporated these qualities by involving representatives of these groups as active participants in the planning process (see Appendix C), and the Plans call for a continuation of this kind of cooperation to implement many of the recommendations.
- By thinking in terms of the big picture and considering how land use and transportation interact and fit together to create an efficient, highly-functional community.
- By focusing on tangible results through the incorporation of concrete, timeline-driven action items to implement the vision, goals and policies of the Plans.



The first public workshop was attended by over 80 people on October 29, 2007.

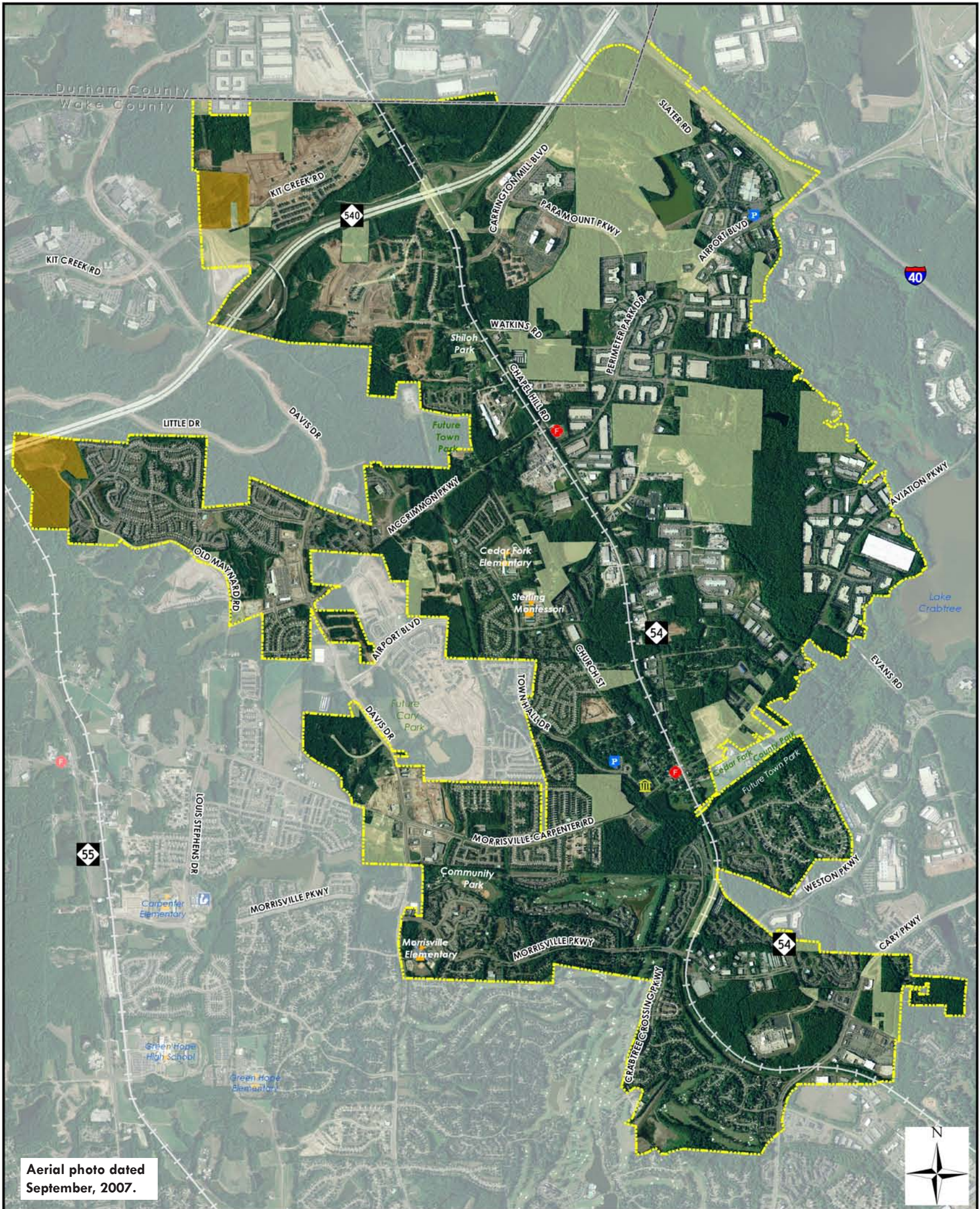







Figure 1.1 Town of Morrisville

-  Town Hall
-  Library
-  Police Station
-  Fire Station
-  Schools
-  County Boundary
-  Morrisville Planning Jurisdiction
-  Morrisville Extra Territorial Jurisdiction (ETJ)
-  Morrisville Short-Range Urban Services Area
-  Railroad

Morrisville Transportation Plan
2009



Updated March 24, 2009

1.0 INTRODUCTION

1.1 Purpose

The updated Transportation Plan for the Town of Morrisville is the foundation of the Town's transportation policies and projects, and provides additional guidance on best practices for the design of roadways, transit facilities, and bicycle-pedestrian facilities and programs. The Town has authority over streets that it owns (e.g., Town Hall Drive), but many streets are owned and maintained by the North Carolina Department of Transportation (NCDOT) (e.g., NC 54). However, the Town exercises additional authority during the development review process for new, private developments.

The purpose of the Transportation Plan is to create a system of roads and pathways that not only accommodate travel through and within the town, and also respect and enhance adjacent land uses. The current Plan covers the period 2009 - 2035 and supersedes the 2002 *Transportation Plan* with new standards, recommendations, and a complete overhaul of approach and format.

1.2 Transportation Plan Format

The Plan focuses on three principal elements, for those riding in cars, taking public transit, walking, or riding a bicycle:

- The existing conditions that people experience as they travel in and around Morrisville (Section Three);
- A set of recommendations that evolves from the current transportation system to a more efficient and safe network through a series of roadway widenings, new roadways, bicycle lanes, public transit service, pedestrian, and intersection improvements (Section Five); and
- A set of design guidelines that complement existing engineering standards, and are to be adhered to whenever possible and appropriate (Section Six).

1.3 Relationship to Other Town Planning Documents

As mentioned previously, this Transportation Plan is a significant update from the 2002 Transportation Plan. To prepare the current Plan, a number of other documents were researched or consulted, including the following:

- Morrisville's Design and Construction Ordinance (2008);
- Morrisville Town Center Plan (2007);
- Morrisville Parks, Greenways, and Open Space Master Plan (2006); and
- Various standard engineering texts, such as the Manual on Uniform Traffic Control Devices (MUTCD) and Highway Capacity Manual.

The 2009 *Land Use Plan* is being adopted concurrently with the Transportation Plan. The two documents were developed using the same methodology and public involvement process, and share three identical sections (Section Two: Background; Section Four: Policy Direction; Section Seven: Action Items). The Town created the plans concurrently in recognition of the interconnected nature of transportation and land use. By planning them jointly, the Town has an opportunity to more effectively guide its future.

1.4 Transportation Plan Review and Update Process

The 2009 *Transportation Plan* process was conducted from 2007 through 2009 and is the product of work by citizens, the Plan Advisory Committee, the Planning and Zoning Board, the Town Council, Town staff and consultants. The Land Use and Transportation Plans are reviewed by both the Planning and Zoning Board and Town Council.

The 2009 *Transportation Plan* was prepared with extensive citizen involvement. Considerable effort was made to ensure that people interested in participating in the plan review and update process had the opportunity to do so. The public process involved at least 179 individuals with a broad geographic representation from different areas within the Town. The Plan review process was accompanied by an ambitious community-involvement strategy that provided ready access both to new information and to the process.

The process included three public workshops, conducted in October 2007, January 2008, and March 2008, that were attended by over 80 attendees each. The public workshops emphasized both information dissemination from staff and consultants as well as the active participation of citizens. Each workshop featured a group exercise that allowed participants to share their views of the future Morrisville in a structured, engaged manner. The workshops were heavily advertised via flyers, newsletter notices and the citizen email list-serv. The latter two workshops were also advertised by postcards sent to all of Morrisville's 6,700 households and businesses (see example at right).

In addition, a series of seven Plan Advisory Committee (PAC) meetings were conducted to solicit in-depth input from committee members, who represented a broad spectrum of the community leaders and stakeholders. Three focus group meetings were held to target key groups that might not attend the larger meetings, including youth, residents of the North Morrisville-Shiloh area, and transit users. A public survey was conducted from January through March 2008, garnering 180 responses. A project website available throughout the planning process offered a way to find any meeting materials, the current schedule of meetings and events, and a way to provide input via an online discussion board. A project hotline was also available for citizens to leave comments or questions for project staff.

The public process integrated with a robust technical process, with each providing feedback to the other. While public safety, mobility, and accessibility sometimes trumped individual concerns, most of the recommendations in this Plan can be traced to the broad concerns identified by the public. A more detailed description of public engagement in the planning process appears in Appendix C.

Figure 1.1 on the opposite page offers an overview of the Town of Morrisville, showing color aerial photographs from September 2007 and the planning jurisdiction as a yellow dashed line. The planning jurisdiction includes the town limits as well as the town's Extra Territorial Jurisdiction (ETJ) (yellow shading) and Short-Range Urban Services Area (SRUSA) (orange shading) and comprises the area subject to the policies included in this plan document. Although most of Morrisville's planning jurisdiction falls in Wake County, several parcels in Durham County have been annexed into the town.



Citizens get involved in transportation planning at the third public workshop, held on March 27, 2008.



Postcard sent to Morrisville households advertising the March 27, 2008 public workshop.

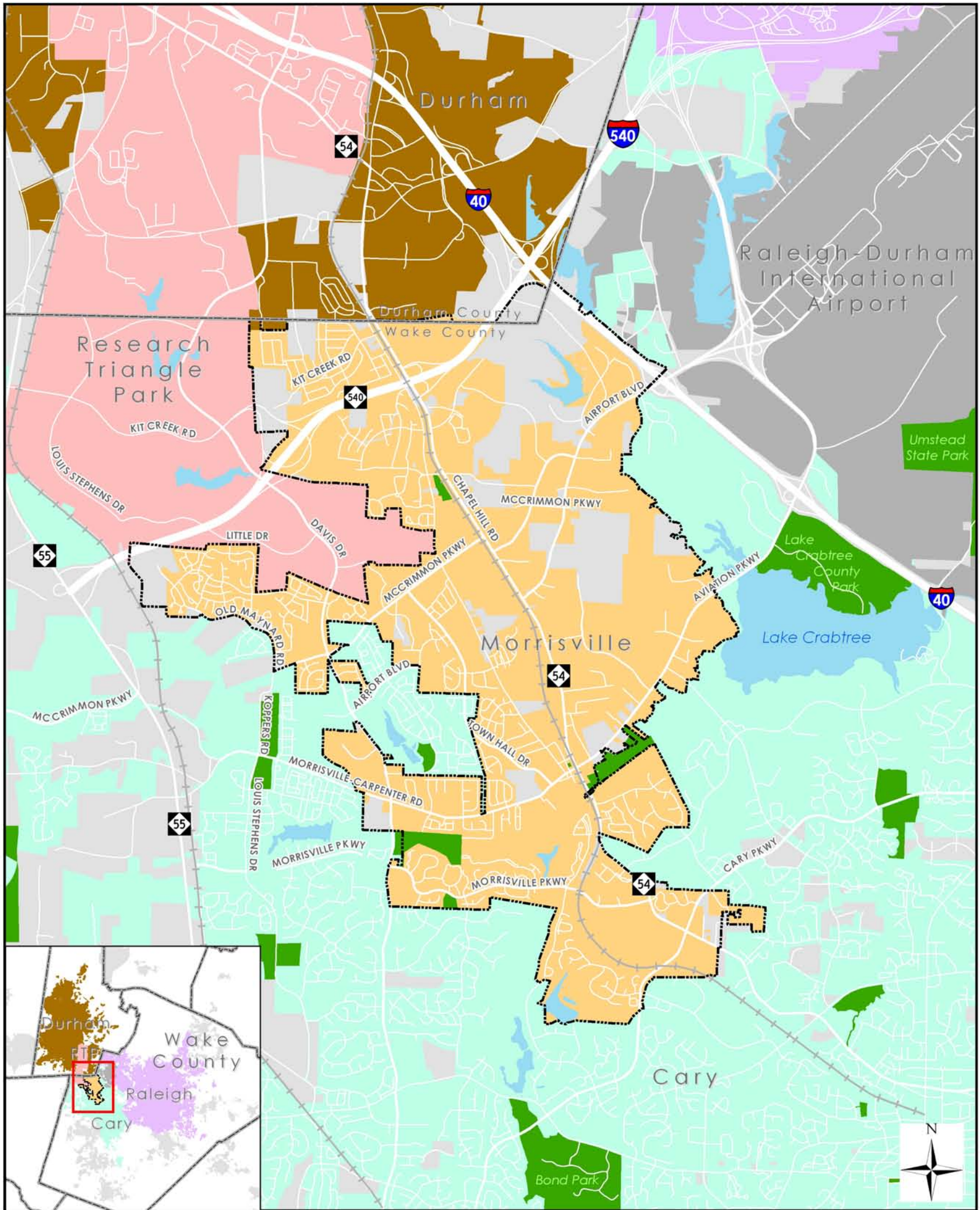
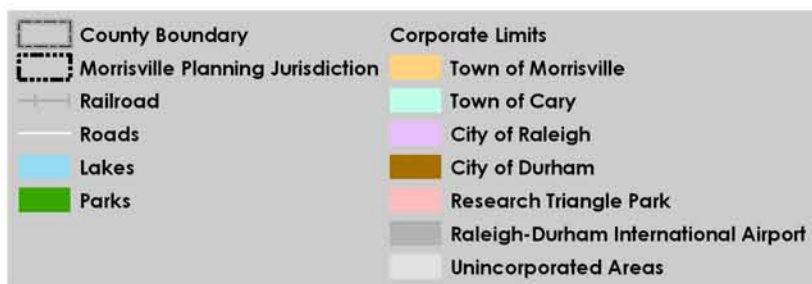


Figure 2.1 Regional Context



2.0 BACKGROUND

2.1 Regional Context

The Town of Morrisville is located in northwest Wake County, just south of the boundary with Durham County (see Figure 2.1 on opposite page). Morrisville is truly the “heart” of the Triangle Region, which is composed of Raleigh to the east, Durham to the north and Chapel Hill to the northwest. Research Triangle Park (RTP), home to research, technology and biotechnology corporate campuses since 1959, is located adjacent to Morrisville’s western boundary. RTP covers 7,000 acres (see map to the right) and currently employs more than 39,000 people in 160 companies. Another regional employment and transportation hub is the Raleigh-Durham International Airport, located adjacent to Morrisville to the northeast. The Town of Cary, which surrounds Morrisville’s southern half, has enjoyed tremendous growth in recent years as it serves as home to many worldwide company headquarters.

Interstate 40, adjacent to Morrisville, serves as the major east-west corridor for the state of North Carolina, and the newly constructed NC 540 is in the process of improving traffic circulation around the City of Raleigh. The proposed Triangle Parkway will potentially further link Morrisville with employment centers in Research Triangle Park. NC 54, which runs north-south through the center of Morrisville, was the main link between Raleigh and points west until I-40 was built in the 1980s, and still carries heavy commuter traffic to RTP.

Among the benefits of Morrisville’s location within the region is the fact that Morrisville residents have easy access to all the best of the Triangle’s amenities. These include Lake Crabtree and Lake Crabtree County Park, Umstead State Park and the American Tobacco Trail. An opportunity exists to link the trails at Lake Crabtree with the American Tobacco Trail, through Morrisville Town Center, helping to create a truly regional off-road trail system. Morrisville residents are also located close to major employers in Research Triangle Park, the City of Durham and the City of Raleigh. Indeed, the success of Morrisville’s business community has been in part due to the overall economic success of the region and RTP.

Along with the benefits come challenges, one of which is the town’s location adjacent to Raleigh-Durham International Airport. Noise from the airport restricts land use in the town, limiting residences, schools and other sensitive uses to the western half of the town. As a result, Morrisville has experienced a geographic separation between residential and non-residential uses, which has implications for quality of life (e.g., not being able to walk to work) and traffic congestion.

An additional planning challenge is the boundary of Morrisville itself. Figure 2.1 shows the planning jurisdiction boundary of Morrisville as a dotted black line. The planning jurisdiction includes the town limits as well as the town’s Extra Territorial Jurisdiction (ETJ) and Short-Range Urban Services Area (SRUSA), and comprises the area subject to the policies included in this plan document. The planning jurisdiction also includes several parcels annexed by agreement with Durham County. The town limits of Morrisville omit several areas within the planning jurisdiction, shown as light gray unincorporated areas in the figure. Since Morrisville is surrounded by adjacent entities, its planning jurisdiction is essentially fixed at the current ten square miles, with no opportunities for future annexation.

The planning jurisdiction boundary of Morrisville is irregular, essentially surrounding portions of Cary and RTP on the town’s western side. Some roads meander, crossing into and out of jurisdictions in their path, such as Davis Drive. This situation is complicated by the overall growth in the region, which means that communities have become effectively contiguous in some places with little indication to a casual observer that they have passed from one jurisdiction to another.

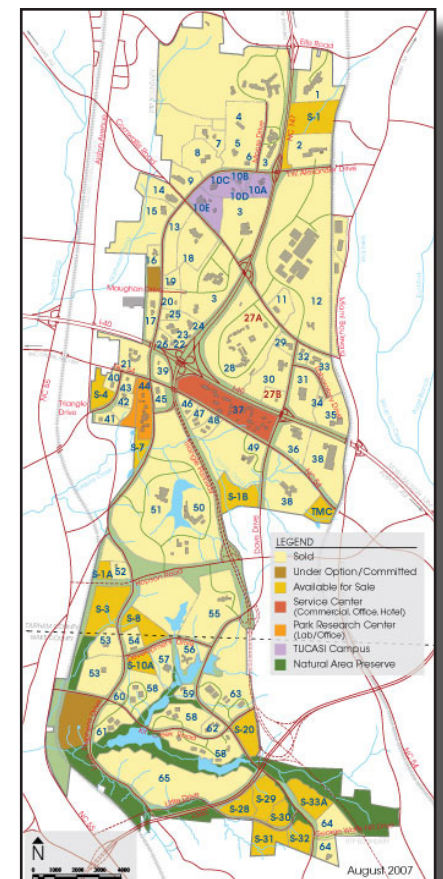
Planning for Morrisville is challenging because each jurisdiction’s planning and development actions impact the adjacent municipalities. This plan therefore calls for increased communication, and joint planning where appropriate, with neighboring jurisdictions. Through the process of creating this plan, staff and consultants received input from representatives of all of the surrounding jurisdictions, plus the North Carolina Department of Transportation, North Carolina Turnpike Authority, RDU Airport Authority, Triangle Transit, Capital Area Metropolitan Planning Organization (CAMPO), North Carolina Railroad Company, and others (see a detailed list and descriptions in Appendix C). By working within the regional context, while taking action to preserve Morrisville’s history and enhance its sense of community, Morrisville can more effectively plan for the future.

2.2 Brief History of Land Use and Transportation in Morrisville

The history of a community’s growth and development over time quite often parallels the historical development of modes of transportation. As society and technology evolved from a “horse and buggy” age to a railroad age, and then to the automobile and air travel eras, they have left imprints on cities, towns and villages that reflect these same eras.

The Town of Morrisville is no exception, and the evolution of the community form of Morrisville is closely interwoven with the evolution of transportation technology and its impact on the settlement patterns of the Town. From its beginnings as a rural crossroads community, to its days as a railroad stop, to its current expansion reflecting from the twin impacts of automobile and air travel, the Town’s character and form are intricately linked to the main eras of transportation change.

During the mid 1700s, early settlers came to Central North Carolina in search of abundant farmland and to escape the control of England. Once settled, they found themselves amongst corrupt officials preventing them from obtaining the rich farmland they came in search of. Violence erupted between the early settlers, known as “Regulators” and the governing officials around the area of Alamance County. In 1771, Governor Tryon and his Army set out to the



This map of Research Triangle Park shows the locations of its 160 companies.

Extra Territorial Jurisdiction (ETJ): An ETJ is the area adjacent to and outside the town limits in which the municipality has authority to exercise planning, zoning, building and subdivision regulation.

Short-Range Urban Services Area (SRUSA): Land that (a) is projected and intended to be urbanized and served by municipal services in the next 10 years; and (b) is not located within a water supply watershed, as designated by the State. Although the SRUSA is currently under Wake County (rather than Town) jurisdiction, the parcels would be annexed to the town limits or ETJ prior to development requiring extension of public utilities.



This 1790s Wake County map shows “Col. Jones” living in the area that would become Morrisville.
Source: Ernest Dollar

2.2 Brief History of Land Use and Transportation in Morrisville, cont'd

Much of this history of Morrisville draws on the work of Ernest Dollar, *Images of America: Morrisville*, Arcadia Publishing, 2008.



Billy Hartness in front of his former home, the historic Pugh house built in 1870, being moved to a new location. Needed road improvements threatened the structure, so Town staff worked with Mr. Hartness to find another location.

area to calm the revolt. Along the way he stopped and set up camp at what is thought to be the earliest residence in Morrisville, the home of Colonel Tignal Jones along Crabtree Creek. Gov. Tryon continued to lead his Army to the revolt and nine days later, on May 16, 1771, the Battle of Alamance occurred, one of many events that contributed to the American Revolutionary War. Wake County was formed as a result of the fighting and an early Morrisville resident, Col. Jones became one of the earliest leaders for the County.

In the nineteenth century many settlers recognized that the Town known as Morrisville today was located in a promising area. It was nestled in between the two larger communities of Raleigh and Durham. Major roads began to develop connecting the two hubs and many settled into the Morrisville area for its convenient location. The future Chapel Hill Road (NC 54) followed a ridgeline between two watersheds, while the future Morrisville-Carpenter Road, on the other hand, skirted the higher ground at the edge of the Crabtree Creek floodplain and crossed Chapel Hill Road at a point where the Town Center is now located. Until I-40 was built in the 1980s, NC 54 was the main link between the State's university in Chapel Hill and the State capital in Raleigh, a key factor in the development of Morrisville as a center of activity in the region.

Large farms were settled in the Morrisville area, with names like Morris, Allen, Scott, and Barbee. In the late 1820s, the Shiloh community north of Morrisville was settled by freeborn African Americans and freed former slaves. The defining moment for the Town of Morrisville was the construction of the rail line and depot that eventually connected the coastal areas to Wake County in the mid 1850s. The railroad was part of a grand civic project to connect Charlotte and Goldsboro through the Piedmont and spur economic development in the state. The rail line naturally followed the high ground for ease of construction and closely paralleled Chapel Hill Road. A local resident and Morrisville's namesake, Jeremiah Morris, donated several acres to the rail company for the construction of a rail yard and depot. The rail stop in Morrisville allowed the community to trade crops with areas outside Morrisville as well as to obtain goods and materials to rebuild the community. The skirmish at Morrisville, which occurred near the end of the Civil War in 1865, caused significant physical damage in the area. The railroad tracks served as a unifying or centralizing influence on the growth of the rural settlement. By the 1870s Morrisville became a popular stop along the rail line due to the growing number of businesses in the area and its location at the crossroads. The Town of Morrisville incorporated in 1875 with a population of 165 residents.

The rail line continued to be a necessity for the flourishing of Morrisville, but the residents and businesses also relied on automobile travel through the town. In 1924, the first road in town, Highway 10, was paved and many businesses grew along the road for the convenience of travelers. The economy had begun to flourish for the town, but the depression of the 1930's brought on hardships. The Town's charter was repealed in 1933 and wasn't restored until 1947. For nearly forty years, the Town did not see much change until the creation of the Research Triangle Park (RTP), an area developed just northwest of Morrisville in 1959. RTP sought to attract high-tech research and development companies such as IBM and GlaxoSmithKline. Morrisville's economy improved as businesses supporting RTP companies and the shipping activity through Raleigh-Durham International Airport located in the town. Major residential development came later, as employees of the research companies moving into RTP made Morrisville their home due to its convenient location. By 2000, the population of Morrisville had grown to 5,208 and in 2006 the population had more than doubled to 13,501.

As Morrisville's commercial and residential neighborhoods filled in over recent years, there developed a distinct network of local roads tied into the primary roadways. A characteristic of the local road network is that it is generally composed of short, unconnected segments – essentially many dead end roads connecting to the major arterials. The railroad tracks continue to form a barrier to east-west circulation in town and the Crabtree Creek floodplain forms a north-south barrier. One of the consequences of this pattern has been to put more traffic pressure on the arterial and collector roadways, with gradually increasing congestion on some segments and intersections – especially when combined with the great increase in through traffic from Cary and surrounding areas.



The railroad through Morrisville today.

This trend has also given Morrisville its own distinct urban form in the past decade or two. Its form is generally one of multiple, broad 'main streets' (such as NC 54, Aviation Parkway, Davis Drive, etc.) interspersed with self-contained residential or commercial subdivisions that relate to one another only through the main roadways. The rail line continues to carry rail cars daily through the town. AMTRAK operates two passenger lines, the Carolinian and the Piedmont, through Morrisville that carry more than 330,000 passengers annually, but there are no stops in town (Durham and Cary are the closest stations). Though the tracks currently serve primarily as a freight corridor separating the Town into two halves, there is a future potential for them to once again exert a centralizing influence on Morrisville's urban form.

Looking at Morrisville's history in the big picture, there have been three phases: Office and light industrial growth spurred by RTP, RDU Airport, and Interstate 40; residential development for RTP workers and those who want to be in the center of the region; and retail development to serve the growing residential population. Morrisville is just beginning to see major redevelopment as vacant land dwindles. The form of the Town has primarily evolved as a response to the dominant transportation technologies of the time. As Morrisville plans for its future land use and transportation patterns, it will be important to both look at – and look beyond – the current transportation and built infrastructure in order to establish a vision for the future form and character of the Town.

2.3 Demographics

Population

Morrisville faces challenges for the future as it tries to maintain quality of life and community integrity in the face of rapid growth. Understanding the growth and demographic trends of the Town will offer an understanding of where the area is going in the future and offer assistance in planning for infrastructure for current and future citizens of Morrisville.

Morrisville has experienced accelerated growth since 1990 as residential neighborhoods have developed (Figure 2.2). Between 1990 and 2000, the population grew from 1,489 to 5,208, an increase of 13.3% a year. By 2007, the population had risen to 14,308, an average growth rate of 15.5% per year. This is significantly greater than the 4.1% annual growth rate for Wake County and statewide annual growth rate of 1.7% for 2000 to 2007. The North Carolina State Demographer lists Morrisville as the seventh fastest growing municipality in the state for the period 2000 to 2007. The recent growth is visible in the town. Major housing subdivisions developed over the last several years include Breckenridge, Providence Place and Kitts Creek. In 1990, there were 778 housing units compared with 3,210 units in 2000 and 6,274 in 2004.

Although the population has increased over the last 19 years, the relative proportion of the age of residents has remained about the same. Children under the age of 18 represented about 22% of Morrisville's population in 2004. Adults 65 and over represented just 4% of the population, versus 7% for Wake County and 12% nationwide. These statistics indicate that Morrisville's population is relatively young, with many young families, which will be useful information for identifying amenities to the area such as schools, parks, senior centers and other facilities that Morrisville residents need.

The Town is predominantly identified as white, with about 66% of the population in 2004. More than 18% of the population in the Town was identified as Asian, and 11% identified as African-American. About 5% of Morrisville residents identified themselves as Hispanic or Latino. Morrisville's median household income in 2000 was \$56,548, which is slightly higher than Wake County's \$54,988 median income and the national average of \$41,994. In addition, 56% of Morrisville residents 25 years and older had a bachelor's degree or higher in 2000, versus 44% in Wake County and 24% nationwide.

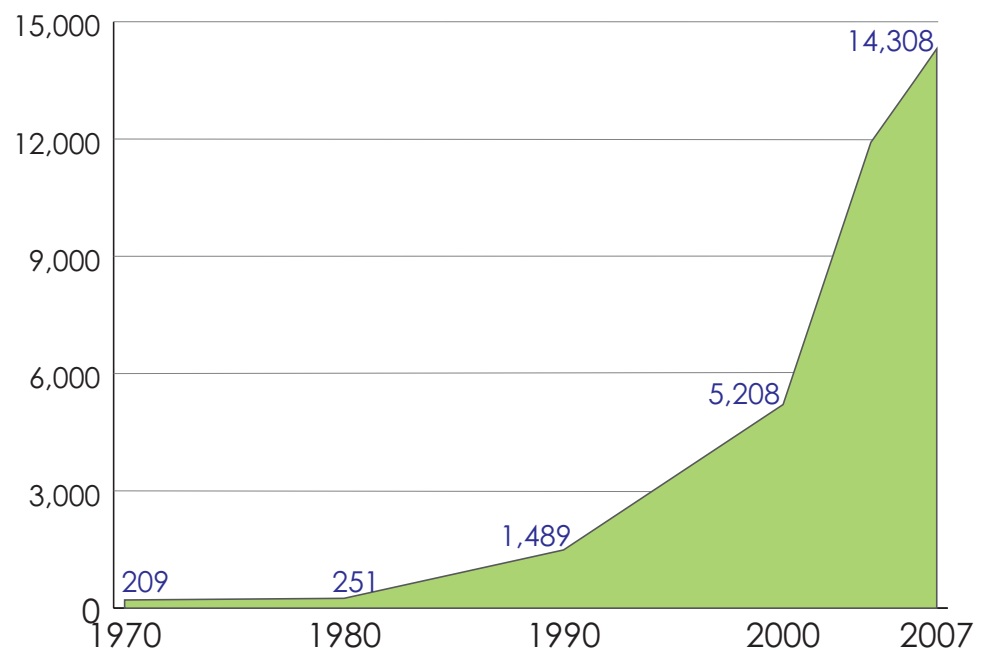
Projecting the future population of Morrisville, as with any community, is a difficult task due to the number of unknown factors that can affect population growth. One way of thinking about it is to consider the land available for residential development in Morrisville. By adding the current population, the estimated population from housing units already approved for development but not yet built, and applying recommended densities to the few remaining undeveloped residential parcels, we can calculate a general estimate of the "build-out" population for Morrisville. This calculation comes to about 24,500 people and could increase if the Town Council approves additional residential development within Regional Activity Centers or the Southern Activity Center. It is important to remember that this figure includes population in the entire planning jurisdiction, rather than simply the town limits as the census figures do. When Morrisville will reach the "build-out" population is uncertain and depends on many different factors, including regional and local economic development, the housing market, and local policies that may encourage or discourage development.

Employment and Commuting Patterns

The precise "daytime population," or number of people employed by Morrisville businesses, is difficult to determine. Several different sources provide employment data, but based on different methods of calculation and different geographies (e.g., some use town limits, others use zip codes containing Morrisville). Estimates range from 435 to 611 businesses in the Town, employing between 8,800 and 12,500 people. The various sources agree that the largest sector of employment in Morrisville is professional, scientific and technical services, with transportation and warehousing; administration and support; retail trade; and manufacturing as other important sectors.

In 2004, an employment survey by the U.S. Census Bureau indicated that only 7% of employed Morrisville residents worked in Morrisville; 22% commuted to Raleigh, 13% to Cary, 10% to other locations in Wake County, 21% to Durham County (which includes RTP), 4% to Orange County, and the remainder to other locations. These data highlight that Morrisville residents work throughout the region, not just in RTP. The U.S. Census Bureau reported that in 2000, 85% of vehicle owners in Morrisville drive to work alone, 9% used a carpool or vanpool system, and less than 2% of the working population walked or cycled to work. Figure 2.3 shows the average commute for residents of Morrisville, compared to residents of Wake County as a whole for 1990 and 2000. The average travel time for Morrisville residents is lower than for Wake County residents, and Morrisville residents did not experience as much of an increase in travel time between 1990 and 2000. More Morrisville residents than Wake County residents have a very short commute to work, and fewer have a very long commute. Although the number of vehicles per household declined slightly from 1.9 in 1990 to 1.6 in 2000, the overall increase in population during that time period resulted in a total vehicle increase of 300% in Morrisville.

Figure 2.2 Population Growth in Morrisville 1970 - 2007



Sources: US Census Bureau, North Carolina State Demographer



Traffic backs up on Morrisville-Carpenter Road heading east to I-40.

Figure 2.3 Commute Time for Morrisville Residents 1990 - 2000

	Morrisville 1990	Morrisville 2000	Wake County 1990	Wake County 2000
Less than 10 minutes	9%	11%	13%	10%
11- 34 minutes	82%	77%	75%	67%
35 minutes or more	7%	10%	10%	18%
Average travel time to work (minutes)	19.3	21.1	20	24.7

Source: US Census Bureau

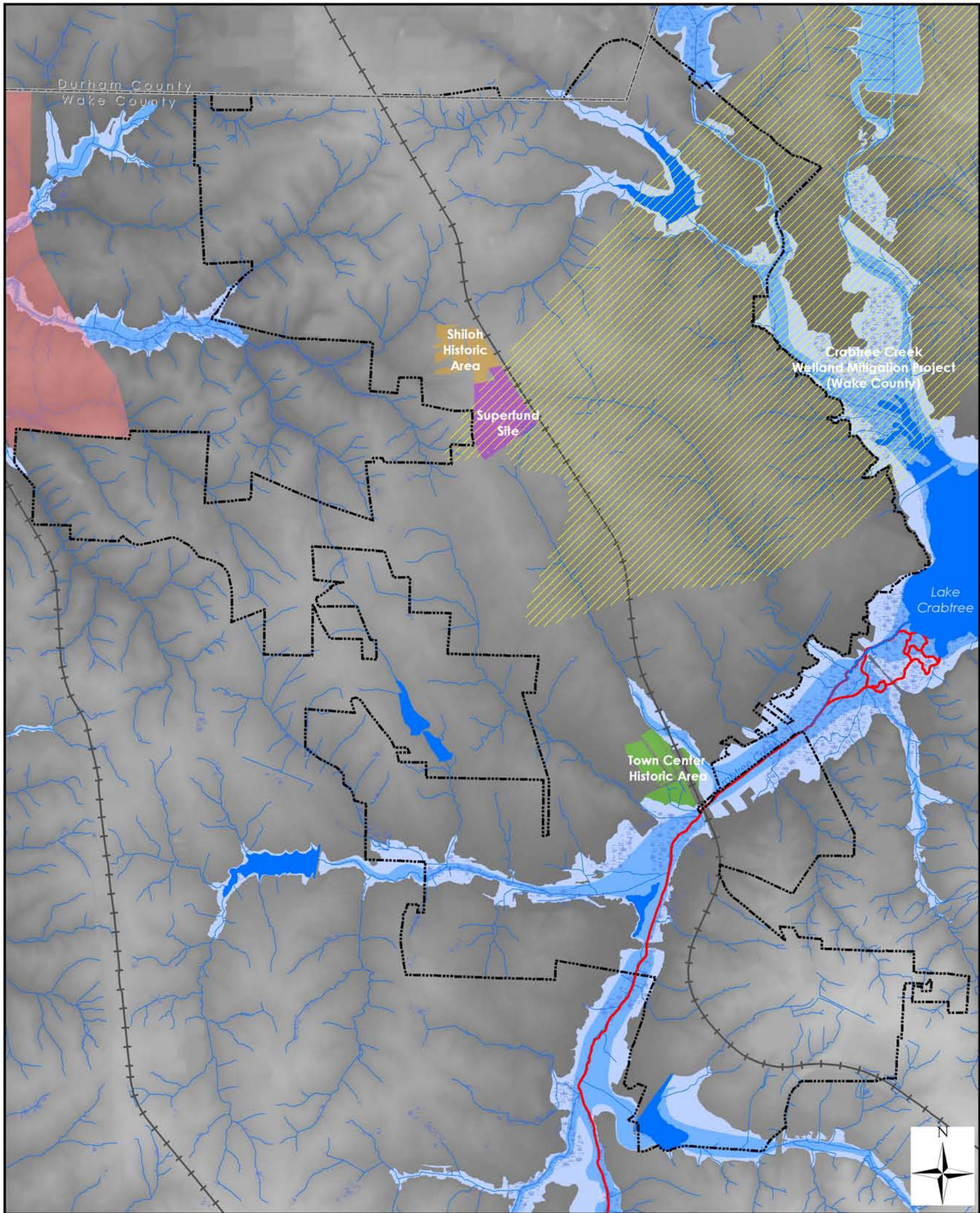
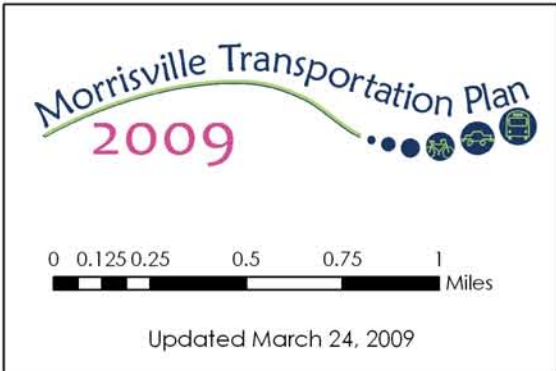
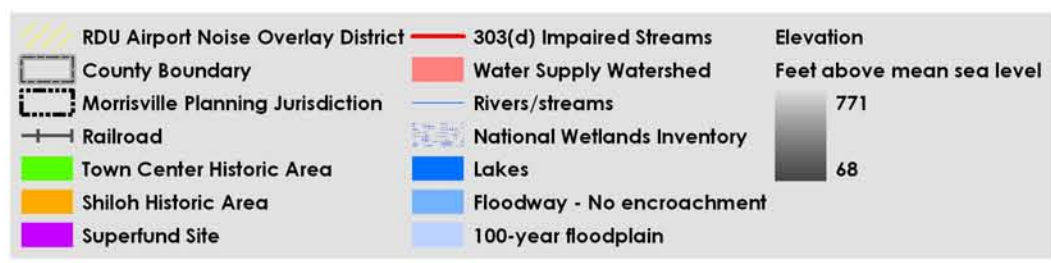


Figure 2.4 Development Constraints



2.4 Development Constraints

Understanding Morrisville's development constraints prior to beginning the planning process can avoid unnecessary negative impacts on the environment and capitalize on the assets of the community.

Water Features

Lake Crabtree, a major man-made lake, is located just east of Morrisville (Figure 2.4). A County Park on the north side of the lake provides boating and recreation access (see photo at right). Crabtree Creek flows east into Lake Crabtree, crossing through the southern portion of Morrisville. Topography in Morrisville gently slopes down to Crabtree Creek, with few steep slopes. The tributary streams of Indian Creek and Sawmill Creek feed Crabtree from the north, forming broad floodplains and wetlands along the eastern and southern portions of the Town. Wake County has preserved much of the wetland and floodplain land northwest and southwest of Lake Crabtree as part of a wetland mitigation project, restricting it from any future development. Two smaller lakes, one near the Airport Boulevard interchange at I-40 and one adjacent to the Preston Golf Course, are also owned by Wake County.

Crabtree Creek has been identified by the North Carolina Department of Natural Resources (NCDENR) as a 303(d) impaired stream, which means that the water quality does not meet Environmental Protection Agency (EPA) water quality standards. As a result, NCDENR has created a specific management plan for this stream in order to improve the water quality. This management plan may affect how much and where development can occur near Crabtree Creek.

Airport Noise Overlay

Raleigh-Durham International Airport (RDU) is located adjacent to Morrisville's eastern boundary, on the opposite side of Interstate 40. Several of the airport's flight patterns cross over Morrisville, creating substantial noise. To avoid negative impacts, RDU has been working with neighboring jurisdictions for years to restrict sensitive land uses in noise impacted areas. These restrictions are in acknowledgement of the fact that excessive noise has been shown to cause hearing and other physical problems over a long period of exposure. In addition to protecting its citizens, Morrisville's implementation of the Airport Noise Overlay District protects it from legal liability for allowing substantial negative impacts to occur. Generally speaking, residences, schools and other sensitive uses like daycares, should not be located in areas with greater than 65 decibels of airport noise (shown by yellow diagonal lines in Figure 2.4). For Morrisville, this area covers approximately 26% of the town, much of which remains undeveloped. Nonresidential uses, such as offices, retail and industrial facilities are allowed in these areas. Hotels are permitted if soundproofing is installed. The Town Council has recently changed the Town's ordinance to permit residential uses within the 65 decibel areas west of NC 54 if soundproofing is installed and the right to overflight is granted.

Railroad Corridor

The railroad through the center of Morrisville, as described earlier, has been an integral part of the town's history and success. The tracks currently separate the town into two halves, with limited crossings restricting automobile, pedestrian and bicycle traffic. The North Carolina Railroad Company owns the rail corridor and has taken the position that there can be no expansion of auto traffic crossing the railroad at-grade (without an overpass), and that no sidewalks or greenways may cross at-grade. Thus, east-west connectivity is limited in the town until funds can be secured to build additional overpasses.

Areas of Historical Significance

Morrisville has two areas of historical significance, neither of which has yet been given a formal designation, such as inclusion on the National Register of Historic Places. The Shiloh area near the north end of town is a historically black community dating from the 1820s, with a church and other historical buildings. The Shiloh Heritage Preservation Area was established by the town through the adoption of the North Morrisville-Shiloh Small Area Plan on January 6, 2003.

In addition, there are numerous historic buildings in the Town Center area, the preservation of which have been addressed in more detail in the Town Center Plan, adopted in 2007.

Superfund Site

Just south of the Shiloh area, on the northwest corner of McCrimmon Parkway and NC 54 is the former Koppers Co., Inc. plant. The plant, which dates to 1896, processed and treated wood products, releasing contaminants into the soil, groundwater and surface water. Contamination at the site was discovered by the EPA in 1980, and cleanup was performed from 1990 to 1997. Cleanup involved removal of contaminated soil; bioremediation, carbon adsorption and filtration to treat water onsite; and revegetation. The property is being actively monitored by EPA before it can be formally removed from the Superfund list, but there is currently no environmental hazard at the site. The site is currently owned by two companies, with part of the site actively operating as a wood laminating facility, while the other is vacant. Now that the site has been cleaned up, it represents an opportunity to find a more appropriate community-oriented use.



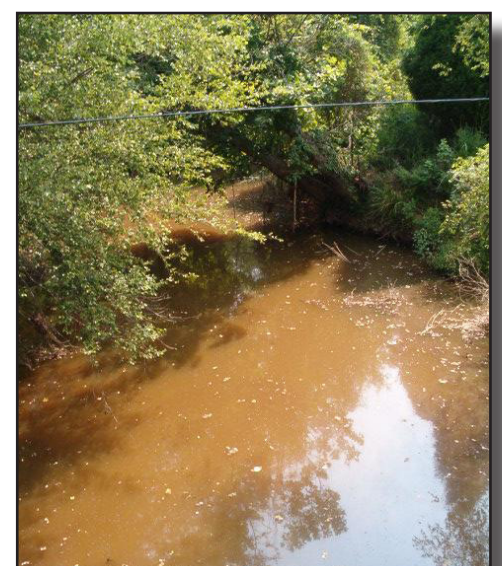
Lake Crabtree, from Lake Crabtree County Park.

Development Restrictions

Floodway: Undevelopable

100-year Floodplain: 1% chance of flooding in any given year. Development is acceptable if building is located at least 2 feet above base flood elevation (FEMA elevation certificate is required).

National Wetlands Inventory: Require permits from state agencies for any major development, such as subdivisions or commercial development. May require developers to mitigate wetland losses.



Crabtree Creek, just east of the crossing with NC 54.

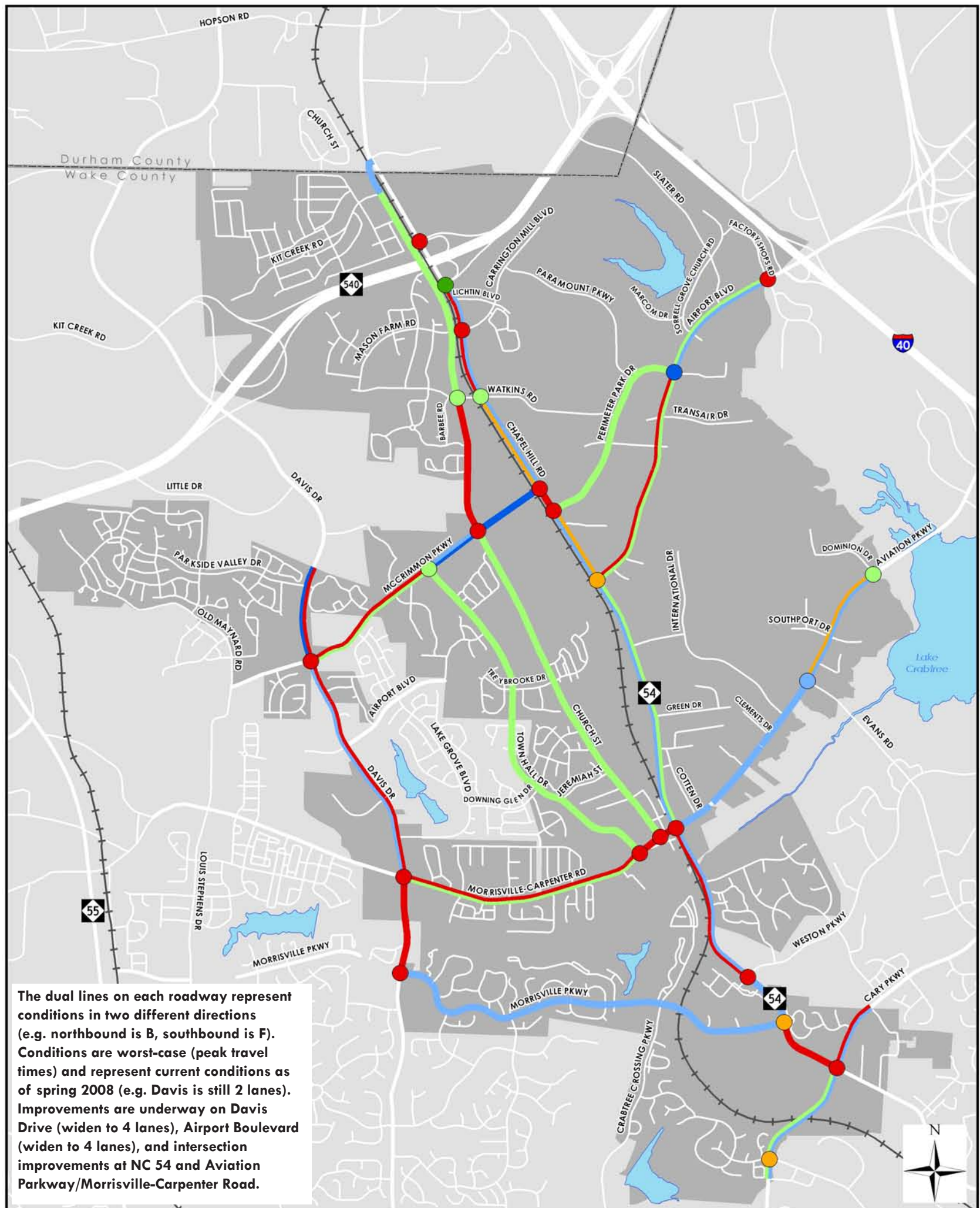
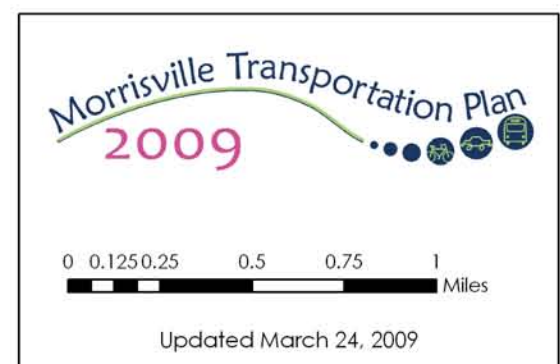
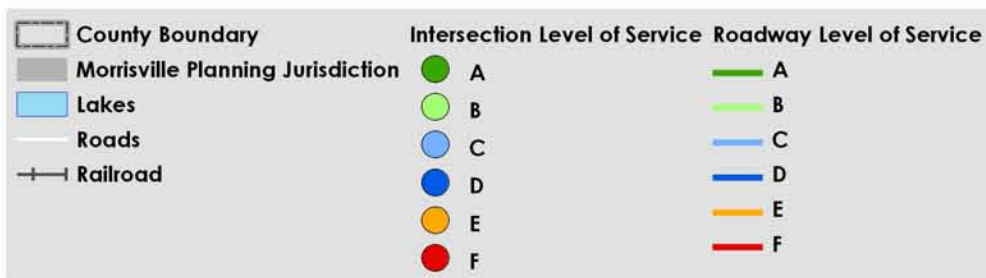


Figure 3.2 Roadway Level of Service



3.0 EXISTING CONDITIONS

3.1 Roadways

The people of Morrisville live in a place that many other people are going through on the way to someplace else: Research Triangle Park, Raleigh-Durham International Airport, and the municipalities of Raleigh, Cary, and Durham. This statement was particularly true until the turn of the millennium, when the night-time, residential population of the Town started to catch up with the day-time, employee population. Many of these new residents are accommodated in residential subdivisions that exemplify disconnected development patterns. Figure 3.1 compares the suburban land use and transportation pattern of Morrisville to the more connected patterns of other cities. Morrisville's development is the product of rural heritage and suburban location. However, it has the option of development patterns that are more connected, which could allow for shorter trips between work, home and shopping.



Boston, MA **Portland, Oregon** **Morrisville, NC**

The impact of the suburban development pattern is to funnel nearly all trips onto a few major (arterial) roads. Combined with Morrisville's rapid development and the fact that more than 90% of all trips in Morrisville are made by private automobile (the vast majority with just one person in the car), this pattern has led to substantial traffic congestion and delays. Moreover, the Triangle Region's municipalities, including Morrisville, perennially exceed Environmental Protection Agency (EPA) limits for major air quality pollutants like ozone, partially due to the reliance on private automobile travel.

Level of Service

Traffic specialists and engineers typically measure transportation performance in two ways: traveler delay (especially during "peak" morning and evening rush periods) and the number of traffic accidents. Figure 3.2 illustrates recent data for the former. Note that the Level-of-Service letter codes are simply a shorthand way of discussing traffic in terms of traveler delays. Like a grade received in school, 'A' is great, indicating that the vehicle traffic is within the roadway capacity and flows freely, but 'F' is bad, indicating that vehicle traffic greatly exceeds the design capacity for that road, leading to significant delays (Figure 3.3 below provides more detail). The grades are given based on the worst conditions on a roadway, during peak times, and can be different for different directions (e.g., northbound is rated 'A' but southbound is rated 'C'). These reflect current conditions as of spring 2008, with ongoing widening projects unaccounted for.

Figure 3.1 Example Land Use and Transportation Patterns

A. (above) Photos and graphics illustrate the different land use patterns of cities. Note the connected patterns of both Boston and Portland, characteristic of older cities. More recent forms are less planned and more focused on separating land uses from each other. B. (below) Diagrams compare Connected and Separated land use and transportation patterns. These patterns have implications for development costs, traffic congestion, and the ability to travel to basic needs by car, foot, transit, or bicycle.

Figure 3.3 Basic Level-of-Service (LOS) Descriptions

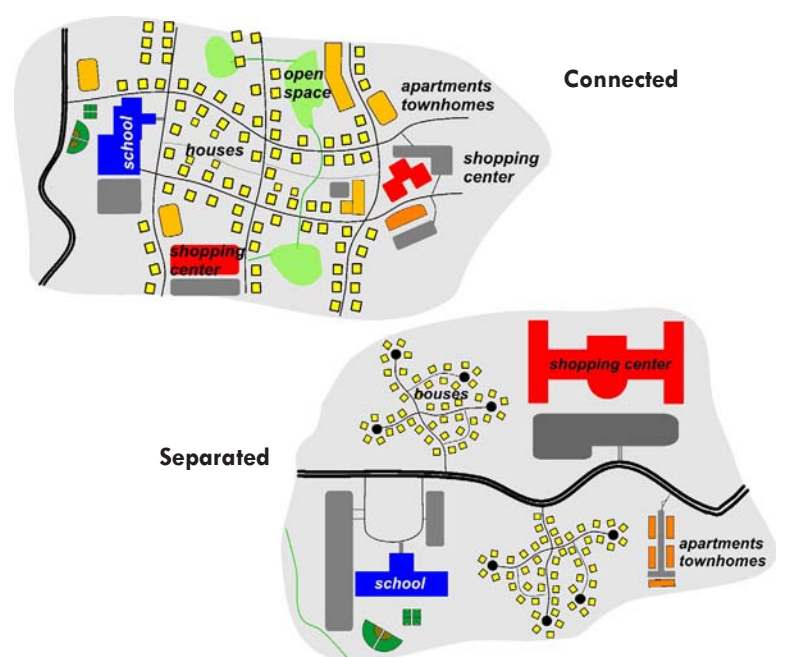
LOS	Street ¹	Car Intersection ²	Bike ³	Pedestrian ⁴	Example Morrisville Locations
A	>80%	<10	<10	<10	Eastbound ramp to NC 540 from NC 54
B	65-80	10-20	10 - 20	10 - 20	Town Hall Drive
C	50-65	20-35	20 - 30	20 - 30	Eastbound Aviation Parkway
D	40-50	35-55	30 - 40	30 - 40	Perimeter Park Drive at Airport Boulevard
E	25-40	55-80	40 - 60	40 - 60	Morrisville Parkway at NC 54
F	<25	>80	>60	>60	Aviation Parkway at NC 54

(1) Percent of free-flow vehicle speed on road. E.g., if the speed you drive in free-flowing traffic (no delays) is 45 mph, then the roadway receives an 'A' if the speed at peak times is greater than 36 mph (80%).

(2) Intersection delay, in seconds.

(3) Bicycle delay at intersection, in seconds.

(4) Pedestrian delay at intersection, in seconds.



3.1 Roadways cont'd

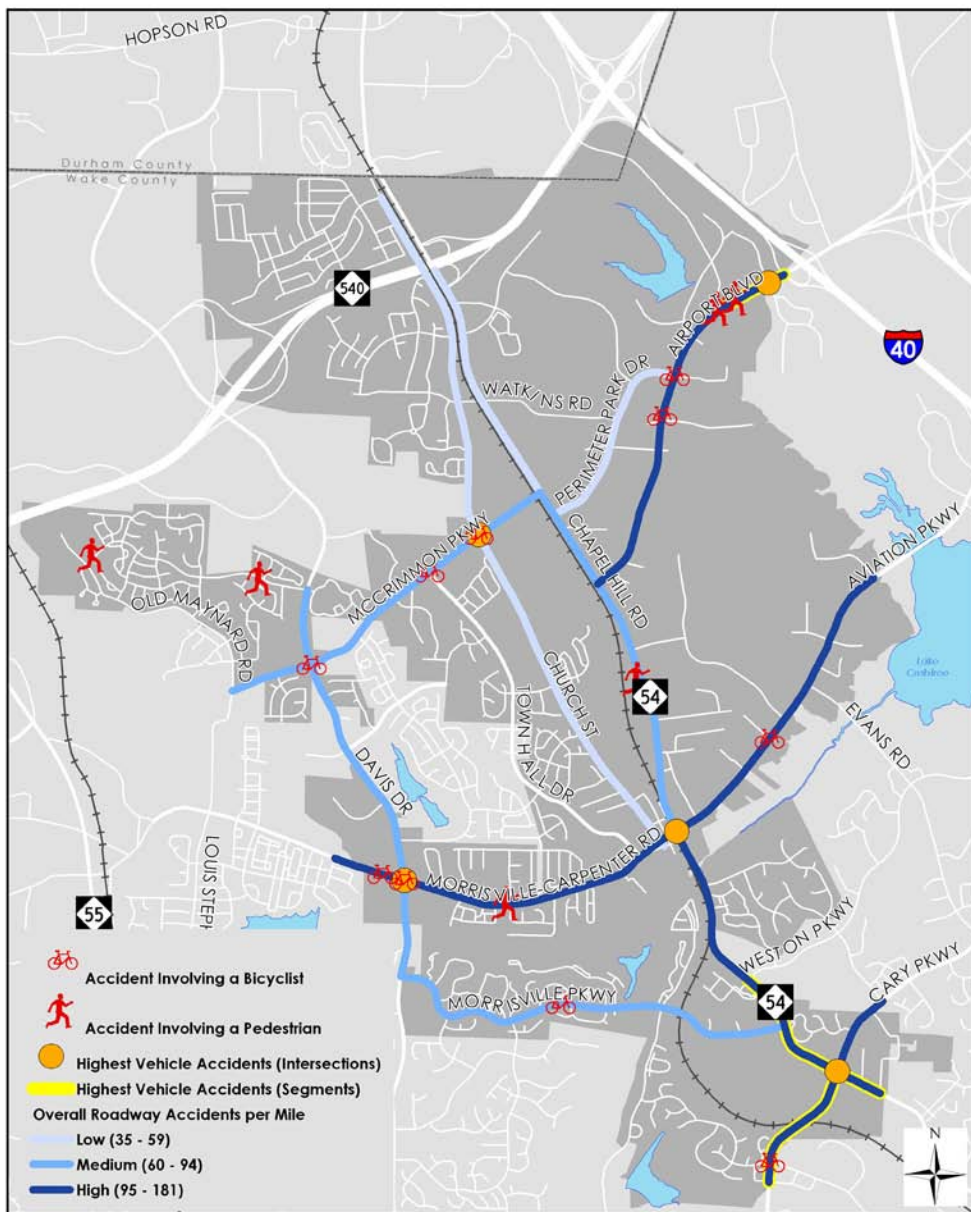


Figure 3.4 High Accident Locations

Level of service (LOS) of 'D' or above is generally considered acceptable. Roadways and intersections with an LOS of 'E' or 'F' are considered unacceptable and should be targeted for improvements. Current level of service in Morrisville, as illustrated in Figure 3.2, could then be considered unacceptable for many main roadways, such as Davis Drive, Morrisville-Carpenter Road, and some segments of NC 54. Problematic intersections are similar, including those in the Town Center, along Davis Drive and Cary Parkway, several locations along NC 54, McCrimmon Parkway at Church Street, and Airport Boulevard and Factory Shops Road.

Accidents

Vehicle accidents in Morrisville, as shown in Figures 3.4 and 3.5, are highest along Cary Parkway, segments of NC 54, Airport Boulevard, Aviation Parkway and Morrisville-Carpenter Road. Since these roadways also carry the heaviest traffic through the town and rank among the worst level of service, this data is not surprising. The specific locations with the highest number of accidents include Airport Boulevard at Factory Shops Road and near Cary Parkway and NC 54. More detailed accident data is provided for major roadways as part of the roadway inventory in Appendix E.

Accidents involving collisions between vehicles and bicyclists or pedestrians are of particular concern in terms of targeting locations where improvements could have the most safety benefits. Figure 3.4 also shows the locations of those accidents, which are distributed around the town, with some concentration along Airport Boulevard, McCrimmon Parkway, and Morrisville-Carpenter Road. Parkside Valley Drive, a residential collector through a major subdivision, shows two pedestrian-related accidents which occurred prior to the 2007 improvements to that roadway. Those improvements included high-visibility crosswalks and narrowing the roadway by adding striped bike lanes. This data will inform the discussion of bicycle/pedestrian recommendations in this Plan.

Intersections

In addition, during the first public workshop held as part of the transportation planning process, participants were asked to tell us the most problematic intersections in Morrisville (Figure 3.6). These intersections largely match those with poor levels of service in Figure 3.2. Along with accident data, this input was then used to select intersections for more detailed study (Appendix F), which then informed the recommendations in Section Five.

Figure 3.5 High Vehicle Accident Locations in Morrisville 2002-2007

Highest Vehicle Accident Intersections	Accidents 2002-2007
NC 54 & Cary Parkway	60
Airport Boulevard & Factory Shops Road	59
NC 54 & Aviation Parkway/Morrisville-Carpenter Road	53
Davis Drive & Morrisville-Carpenter Road	53
Church Street & McCrimmon Parkway	50

Highest Vehicle Accident Segments	Accidents 2002-2007
NC 54 between Weston Parkway and Cary Parkway	50
Airport Boulevard between I-40 and Slater Road	39
Cary Parkway between NC 54 and Darrington Road	34
NC 54 between Cary Parkway and Wilson Road	19

Overall Roadway Accidents (Intersections + Segments)	Accidents per mile 2002-2007
NC 54 south of Aviation Parkway	181
Cary Parkway	143
Aviation Parkway	135
Airport Boulevard	135
Morrisville-Carpenter Road	121
Davis Drive	94
NC 54 from McCrimmon Parkway to Aviation Parkway	81
McCrimmon Parkway	77
Morrisville Parkway	66
NC 54 from NC 540 to McCrimmon Parkway	59
Perimeter Park Drive	57
Church Street	35

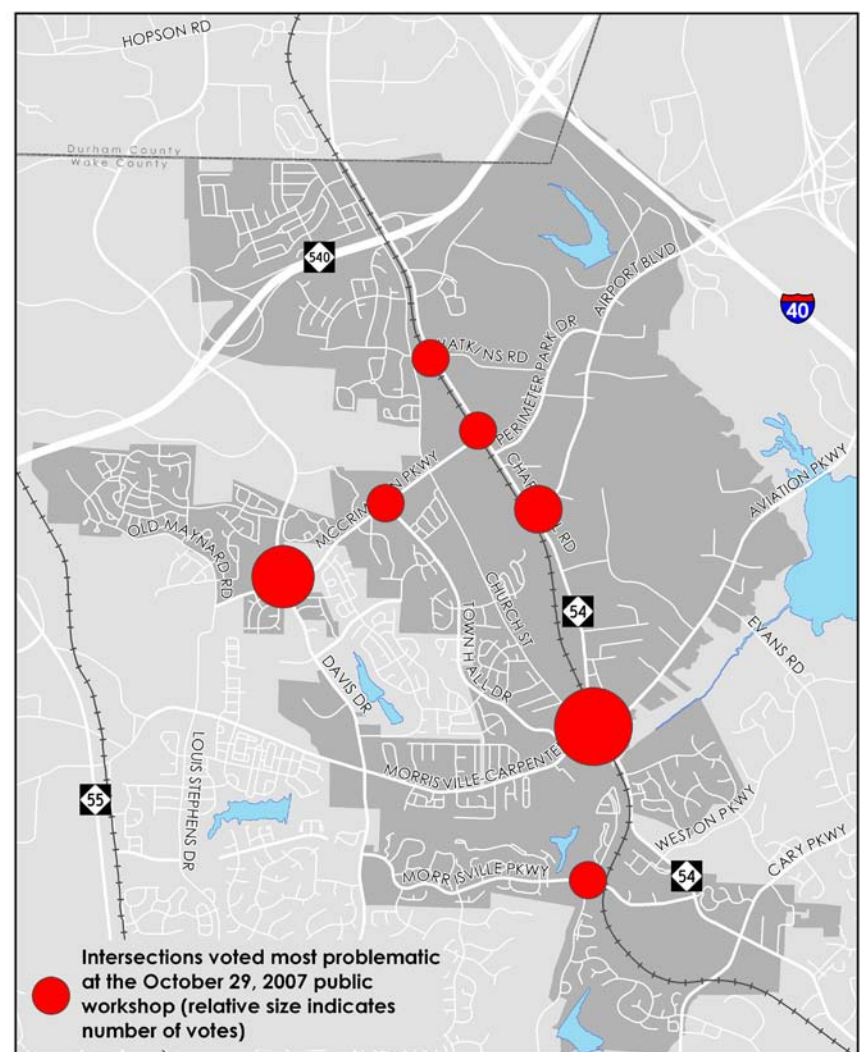


Figure 3.6 Most Problematic Intersections

3.1 Roadways cont'd

While Figure 3.2 tells a story about the travel conditions in Morrisville, it doesn't tell a complete story about the other parts of a transportation system that have to work together to achieve the goals of a community. The design of the streets, how well they interact with the neighboring homes and businesses, how friendly they are to cyclists, pedestrians, public transportation patrons; and how well they can accommodate the needs of changing demographics and external forces must also weigh heavily in any recommendation to make improvements to the street system. Following are brief descriptions of the east-west corridors in Morrisville, as well as the neighborhoods that they serve (Figure 3.7). For detailed information on current conditions for major roadways, including lane widths and adjacent land uses, please see Appendix E.

North-South Corridors

NC 54 (Chapel Hill Road) is the major north-south route through town and some segments operate at a low level of service during the peak rush-hour periods. The roadway is bounded by a railroad (Norfolk Southern) on the west, often lying entirely within the right-of-way of the rail company. The most congested intersections are along this most congested of roadways, especially Aviation Parkway/Morrisville-Carpenter Road. This intersection has been redesigned and is slated for improvements that include carrying four lanes across the railroad.

Davis Drive, Town Hall Drive and Church Street comprise the remainder of the local north-south corridors. Although only small portions of Davis Drive are within the Town limits, it nevertheless connects commercial areas at intersections (Areas H and E in Figure 3.7) and provides access to Research Triangle Park to the north and Cary to the south. Davis Drive is planned to eventually become a six-lane roadway with parallel bicycle/pedestrian multi-use paths, but it is currently being widened to four lanes. Town Hall Drive is a four-lane boulevard (portions with a narrow median) connecting McCrimmon Parkway and Morrisville-Carpenter Road. Town Hall Drive serves as the primary connector for the governmental uses in Area F, residences in the Shiloh Area (I), and Cedar Fork and Montessori Elementary Schools near Area G. Church Street is one of the oldest streets in town, with two lanes connecting quiet residential neighborhoods in the south, under NC 540 to the Kitts Creek Subdivision (Area A) and into Durham. Conflicts with the railroad and poor geometry at the NC 54 intersection in Durham have prompted the eventual closing of the street to direct access to NC 54, with significant ramifications for the residents in Area A. Finally, **Interstate 40**, although not within the Town limits, serves a bypass function similar to that of Davis Drive. Apart from carrying heavy loads of through-traffic around NC 54, this road currently serves Route 301, the Triangle Transit's regional bus route with service to Morrisville.

East-West Corridors

Although Morrisville is well-served by north-south routes, east-west connectivity remains a major issue with the transportation system. The effect of the barrier created by the Norfolk Southern rail line cannot be overstated; currently the Town is limited to at-grade crossings at Church Street (soon to be closed), Barbee Road (soon to be closed), McCrimmon Parkway, Aviation Parkway/Morrisville-Carpenter Road, and Morrisville Parkway. **NC 540** and **Cary Parkway** cross the railroad on grade separated bridges, but can only be reached at the far north and south ends via the most congested roadway in the Town (NC 54). The NC 540 grade separation does not allow drivers on Church Street to cross the railroad because all ramps to NC 540 are accessed from the east side of NC 54.

McCrimmon Parkway is a two-lane road that connects residential Areas I and G, and provides access to residents of Area A across the railroad and to NC 54. Many travelers make the "S-shaped" movement onto **Perimeter Park Drive** to reach Airport Boulevard and then I-40. While McCrimmon Parkway will eventually have four lanes of traffic, it is currently an over-capacity, two-lane facility.

Morrisville-Carpenter Road and **Morrisville Parkway** each connect (generally) residential communities not only in Morrisville but also the rapidly growing northwest area of Cary. Morrisville-Carpenter Road is a two-lane road that is developing sporadically into a four-lane roadway, while the four-lane Morrisville Parkway's median-divided cross-section mirrors that of Cary Parkway to the east. Cary Parkway is within the town limits for only a short stretch, but provides access for Morrisville and Cary residents to major existing and upcoming retail shopping in Area D.

Aviation Parkway and Airport Boulevard are transitioning two-lane roadways that will eventually become four lanes. Aviation Parkway connects the Town Center Plan area (Area C) to offices and Lake Crabtree County Park to the northeast and I-40. A major "choke point" is the causeway crossing of Lake Crabtree just east of the Town limits, which currently has two lanes with no shoulder or sidewalk. Airport Boulevard has a high concentration of retail shopping (Morrisville Outlet Mall in Area B) and hotels to serve airport customers, but is anchored by gas stations at the western terminus with NC 54.

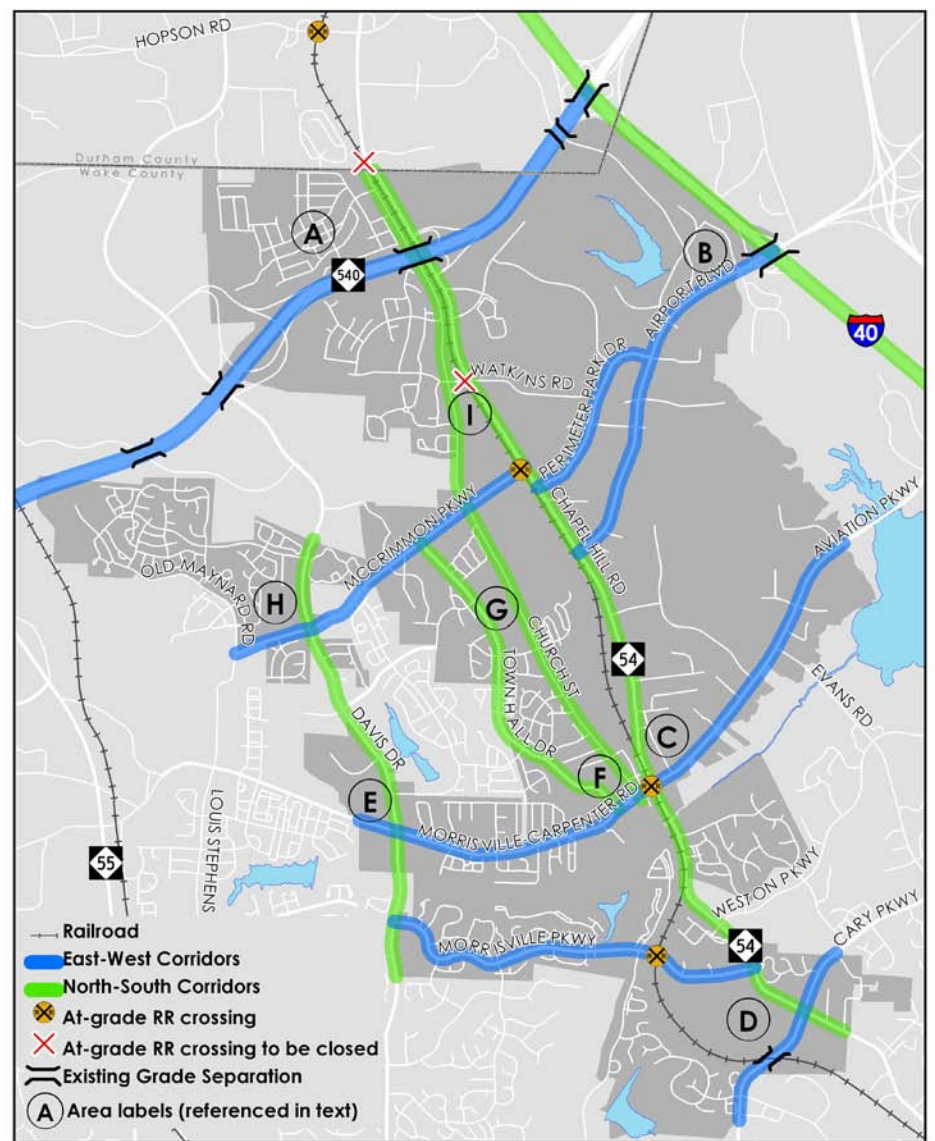


Figure 3.7 Major Roadway Corridors

Area Labels:

- Area A - Kitts Creek Subdivision
- Area B - Morrisville Outlet Mall
- Area C - Town Center
- Area D - Cary Parkway at NC 54
- Area E - Davis Drive @ Morrisville-Carpenter Road
- Area F - Town Government buildings
- Area G - Cedar Fork and Montessori schools
- Area H - Davis Drive @ McCrimmon Parkway
- Area I - Shiloh Historic Area



Widening of Davis Drive to four lanes in spring 2008.

3.2 Public Transportation

Not many residents of Morrisville ride public transit: probably less than two percent of all trips are made using public transportation (a little more if school-age bus trips are included). As fuel prices and the average age of the general public increase, the convenience of public transit begins to look more attractive to a broader audience. Many people have moved to Morrisville without the expectation of convenient public transit services and have found a place with plenty of free parking and (relatively) moderate traffic levels. However, some newcomers have lived in places where riding public transportation systems is more common than is currently the case in Morrisville or the Triangle Region in general.

Figure 3.8 Public Transit Services in Morrisville

Provider	Weekday Hours	Weekday Fares	Senior Fares (Age)	Morrisville Connection	Upcoming Changes
Triangle Transit	6am-10:30pm	\$2.00 (\$2.50 express)	Half-Price (age 65)	Morrisville Outlet Mall	Five-Year Transit Plan may alter routes and services
C-Tran	6am-7pm (peak: 6am to 9am; 3pm-7pm)	\$1.00 (\$0.50 9am-3pm for seniors; \$2.00 in-town and \$4.00 out-of-town for door-to-door service to elderly and disabled)	Half-Price (age 55)	None	Short-Term changes will extend and split both the north-south and east-west fixed route services; senior age will go to 60 years; service extensions likely for northwest and south Cary
TRACS	6am-11am and 1pm-6pm (Mon.-Sat.)	\$2.00 one-way (\$4.00 out-of-zone)	N/A	Demand Responsive	Current service hours are six days per week but level of service is dependent upon annual grants

Sources:

Triangle Transit <http://www.triangletransit.org>

C-Tran <http://www.townofcary.org/ctran/ctranoverview.htm>

TRACS <http://www.wakegov.com/humanservices/adult/transportation/default.htm>

Public transit service in Morrisville is limited currently to two public service providers: Triangle Transit and Wake County Coordinated Transportation Service Transportation and Rural Access (TRACS); Cary transit service (C-Tran) also operates both fixed-route and door-to-door transit service for the elderly and disabled along Harrison Avenue and Maynard Loop Road just outside Morrisville. Durham Area Transit Authority (DATA), Capital Area Transit System (Raleigh) and Wolfline (NC State University) are also public transit operators with services in the general vicinity. In addition, there are private operators, such as Classy Transportation, White Horse Transportation, Inc., and airport shuttle services to some of the hotel properties located on Airport Boulevard. Figure 3.8 compares the service characteristics of the current systems, and a brief description follows.

Triangle Transit

Services. Triangle Transit (formerly Triangle Transit Authority) was chartered by the State

Legislature in 1989, and currently operates bus, vanpool, and carpool services in the Triangle Region. Fixed-Route service in the vicinity of Morrisville is provided by Route 301 and Route 105, both stopping at the Morrisville Outlet Mall off Airport Boulevard near Interstate 40 (Figure 3.9). Route 301 connects with downtown Cary, Harrison Avenue (and C-Tran service) and downtown Raleigh (and CAT service). Route 105 connects with downtown Raleigh (and CAT service), as well as Hillsborough Street and NC State University (and Wolfline service). Shuttle services complement existing routes by providing additional connector service to/from Research Triangle Park. On-bus bicycle racks are available on all fixed-route Triangle Transit buses. The regional service to Durham, Cary, and Raleigh is attractive to Morrisville residents, but the few stops in Morrisville is a deterrent to additional ridership at this point.

Hours of Operation and Fare Structure. Hours of operation are generally 6am to 10:30pm on weekdays; and from 8am to 5:30pm on Saturdays. Fares are usually \$2.00 for a one-way trip; \$2.50 for express service routes. Half-price fare options are available to seniors (over 65 years of age) and the disabled; children under 10 years of age ride for free. Various day and package pass options are also available that reduce the price of the general fare. Transfers between Triangle Transit buses and from Triangle Transit to C-Tran buses are free.

Town of Cary (C-Tran)

Services. The Town of Cary provides both fixed-route and door-to-door services for its residents every day of the week except Sunday. There are currently three fixed routes with coverage of Maynard Road (loop including Walnut Street), Harrison Avenue-Kildaire Farm Road (north-south), and High House Road-Chatham Street (east-west) (Figure 3.9). Future plans call for splitting the north-south and east-west routes into separate routes, as well as extending service into the rapidly growing northwest area of Cary (west of Morrisville). Cary no longer provides the general public door-to-door service that it initiated in 2001. However, people aged 55 or over (soon to be 60 and over) and the disabled are still eligible for door-to-door service from Cary to anywhere in Wake County for medical and employment trips. Morrisville should strongly consider any long-term transit option aligning with the policy, fare, and route structures of C-Tran to help ensure more seamless coordination between the two systems. Bicycle racks are available on all fixed-route buses.

The performance of the C-Tran system is worth further examination (Figure 3.10), since it is the only local public transportation service provider in close proximity to Morrisville. The Town of Apex is currently partnering with Cary and is a good model for future cooperation between the towns. Over the period 2002 through 2005, C-Tran has enjoyed an average of 50% growth in ridership, and a drop in general fund subsidization of 20% each year (thanks in large part to becoming eligible to receive federal funding). Plans are now underway to split and expand the north-south and east-west routes to

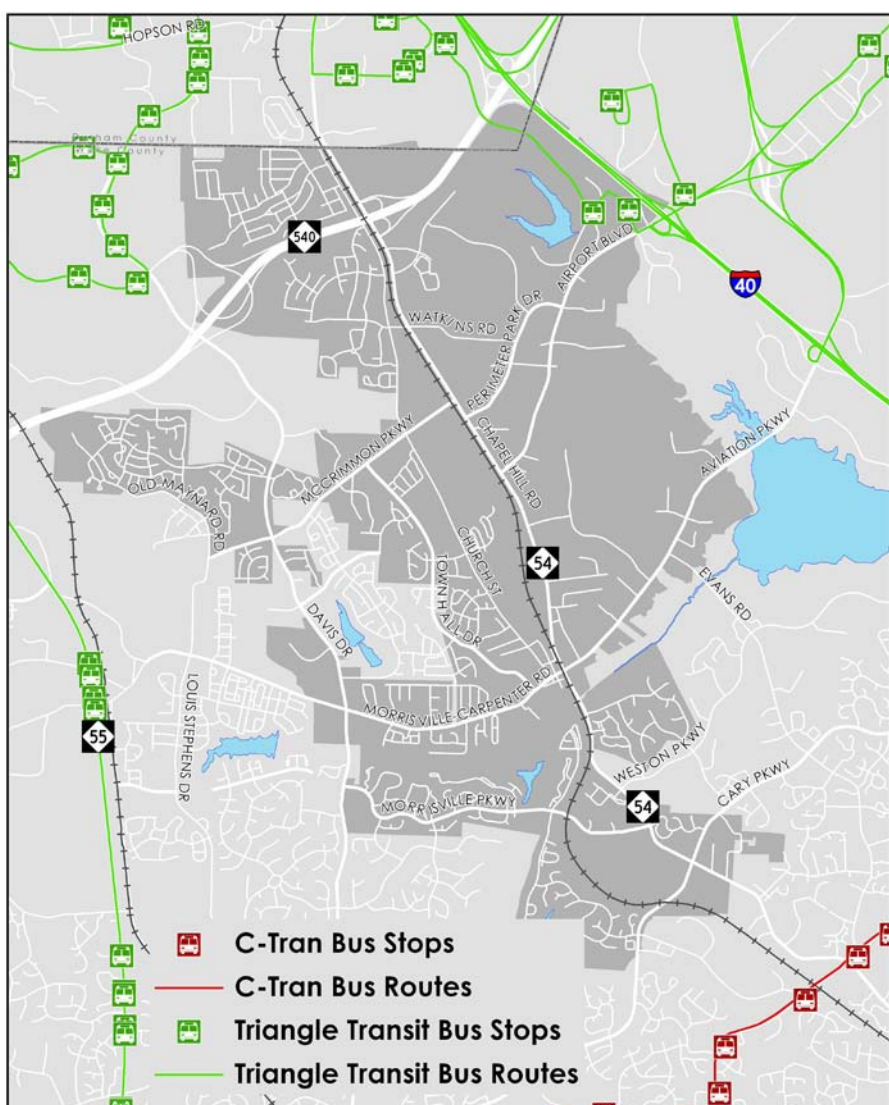


Figure 3.9 Existing Transit Services

3.2 Public Transportation, cont'd

improve service frequency and coverage.

Hours of Operation and Fare Structure. Peak period frequencies (30 minute headways) occur from 6am to 9am and from 3pm to 7pm; off-peak frequencies are one hour and occur from 9am to 3pm. One-way fares are generally \$1.00 each, but \$.50 for seniors and disabled in the off-peak period. Children six years of age and younger ride for free; children must be at least 12 years old to ride unaccompanied by an adult. C-Tran will accept senior (over 55) and disabled riders originating from Morrisville if the pick-up and drop-off locations are in Cary. Packages are available that reduce the cost of fares, including monthly and 11-day pass tickets. Transfers within C-Tran are free, and C-Tran accepts Triangle Transit transfers and monthly passes without any additional cost.

Door-to-door service reservations can be made from 24 hours to two weeks ahead of the trip; riders must be 55 years old or older, or disabled to be eligible. Door-to-door service is available from 7am to 7pm, Monday through Saturday. One-way trips in-town are \$2.00 in peak periods, and \$1.00 in off-peak periods. One-way, out-of-town trips cost \$4.00 each.

Wake Coordinated Transportation Service Transportation and Rural Access (TRACS)

Services. Wake County operates TRACS as an open-door, demand-responsive service to any citizen in Wake County beginning or ending in a non-urbanized area (e.g., a trip cannot begin and end in either Cary or Raleigh). Service through TRACS is provided both through a 42-van fleet purchased by Wake County, as well as three private operators. Wake County operates other services, including a service for elderly and disabled citizens. Customers must make a reservation with TRACS at least 24 hours in advance. The service is not guaranteed, and TRACS has recently not been able to keep pace with the increasing requests for service. The pick-up and drop-off times are supposed to be within one hour of the customer's desired reservation times. Currently, Morrisville pays \$5,000 annually to TRACS to guarantee that three seats per day are available to the citizens of Morrisville; the TRACS manager does not believe that they are turning away many riders from Morrisville at this time. While the service is extremely flexible and can literally provide door-to-door service to anyone in Morrisville to any place in Wake County for a reasonable fare, the service is not entirely reliable, and the one-hour window for pick-ups and limited days of availability may deter time-sensitive riders.

Hours of Operation and Fare Structure. The hours of operation are generally limited on TRACS to Monday - Saturday service between 6am to 11am and 1pm to 6pm. Level of service is dependent upon annual grants; the number of days per week may change if funding is reduced. Notably, service is provided on a first-come, first-serve basis which has translated into TRACS turning away approximately 25% of the requests in fiscal year 2007-2008 due to capacity shortfalls.

Durham Area Transit Authority (DATA)

The City of Durham operates a city-wide bus service (DATA - Durham Area Transit Authority) with seven-day service, a comparative rarity in the Triangle Region. Service hours run from 5:30am to 12:30am during weekdays and Saturdays; from 6:30am to 7:30pm on Sundays. The regular fare is \$1.00; Seniors and Youth under 12 ride for free. The closest point that any of the 19 routes come to Morrisville is Route 12, which has a turnaround point at the intersection of Davis Drive and NC 54.

Two additional projects currently underway have the potential to impact future transit services in Morrisville:

Special Transit Advisory Commission (STAC)

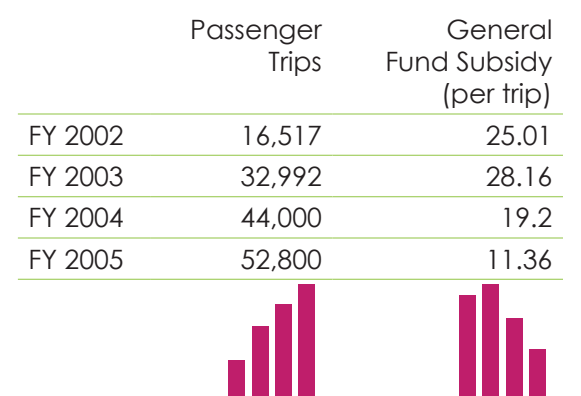
The Special Transit Advisory Commission (STAC) is a collaboration of the Region's two metropolitan planning organizations, Triangle Transit, North Carolina Department of Transportation (NCDOT), and the Triangle J Council of Governments to establish long-range, regional transit priorities. At the time of this writing, the final recommendations were not known, but following are key draft recommendations that may impact Morrisville (updated information is available at: www.transitblueprint.org/stac.shtml):

- A regional bus system would connect Morrisville with Durham to the north and Cary to the south with a route along Davis Drive.
- A regional rail service using diesel-powered locomotives is proposed through Morrisville (paralleling NC 54 / Chapel Hill Road) would connect Durham, Morrisville, and Raleigh. Minimum station spacing is one mile.
- A circulator service connecting the RDU Airport, Research Triangle Park, and Durham through Morrisville was noted as a "high priority" in the draft plan. The service and technology proposed would be high-frequency, curb-guided bus, although this is not a certainty.

North Carolina Railroad Shared Corridor Track Expansion Study

The North Carolina Railroad (NCRR) is completing a study to investigate the feasibility and costs of implementing passenger service between Burlington and Goldsboro, part of which would presumably occupy the current line paralleling NC 54 / Chapel Hill Road. NCRR leases freight rail rights from Norfolk Southern in Morrisville. As this report was not available for viewing, only limited information is known about its contents. However, the service assumptions for passenger service are four trains in the morning period and four in the evening. Significant freight and passenger (eight Amtrak trains/day) travel this corridor now, so any future passenger rail service locally would need to compete with freight, interstate passenger train service, and, in the future, proposed high-speed passenger rail service.

Figure 3.10 Recent C-Tran Performance (FY 2002 - FY 2005)



Triangle Transit bus with a bicycle on the front rack.

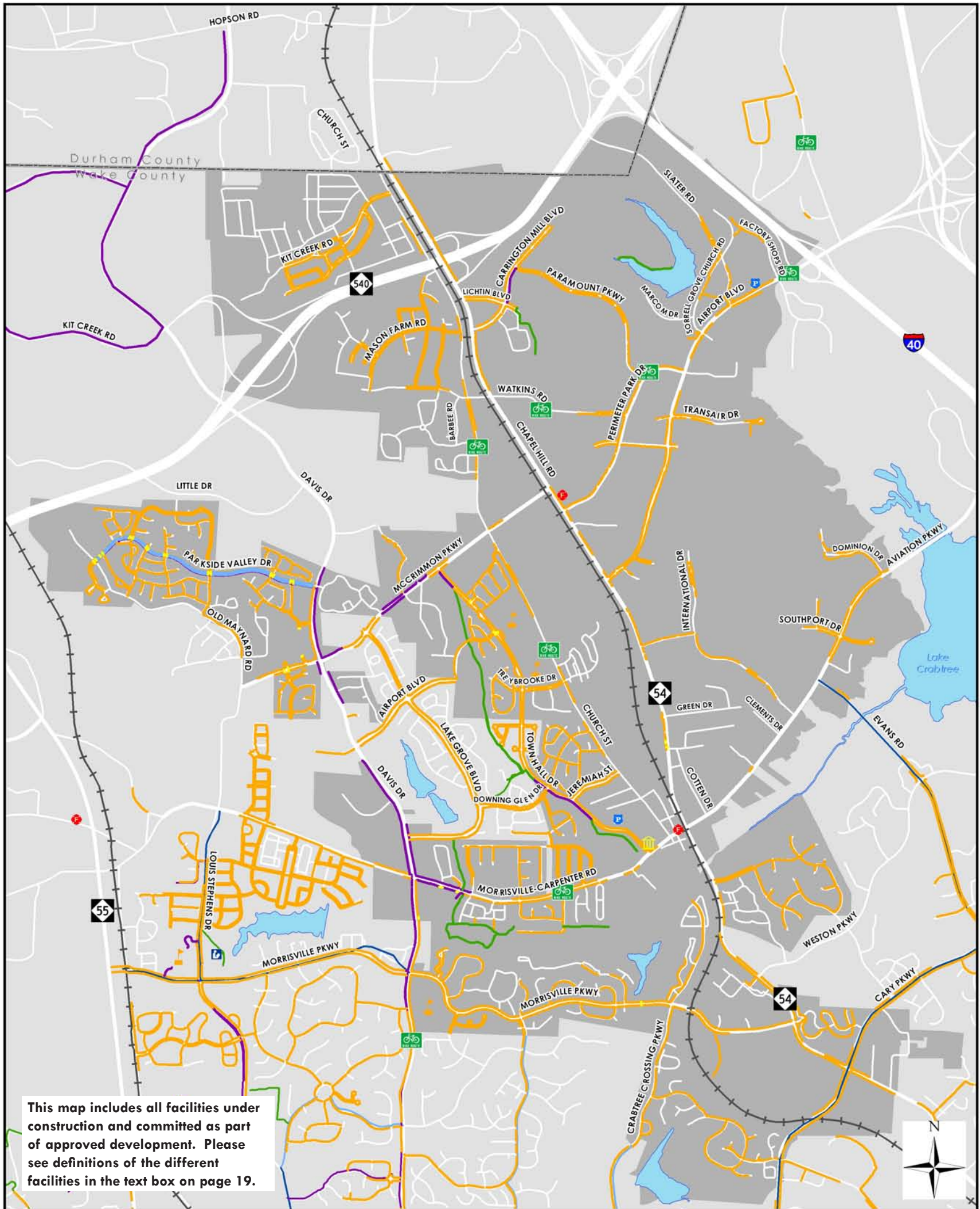


Figure 3.11 Existing Bicycle/Pedestrian Facilities

Town Hall	Existing Bike/Ped Facilities
Library	Crosswalk, high visibility
Police Station	Sidewalk
Fire Station	Greenway
Schools	Multi-use Path
County Boundary	Bike Lane
Morrisville Planning Jurisdiction	Wide Outside Lane
Lakes	NC State Bike Route
Railroad	
Roads	

Morrisville Transportation Plan
2009

Updated March 24, 2009

3.3 Bicycle and Pedestrian Network

Morrisville's pedestrian and bicycling systems, although just beginning, are actively developing. Greenways are listed as the top priority item in Morrisville's Long Range Financial Plan. Figure 3.11 illustrates current and committed or under-construction bicycle and pedestrian facilities in Morrisville. The two systems are often grouped together, but they are two distinct modes of travel with different emphases on operating characteristics, user skills, and facility needs.

When deciding which bicycle facilities are appropriate, the needs of typical users of the facility should be considered. Different levels of cyclist may be used to or feel safer on different kinds of facilities or in different conditions. A list of common cyclist types is below,¹ and the list to the right defines common facility types²:

- *Fast Commuter (Type A Cyclist)* - Confident in most on-road situations and will use a route with significant traffic volumes if it is more direct than a quieter route
- *Other Utility Cyclist (Type A Cyclist)* - May seek some segregation at busy junctions and on links carrying high-speed traffic
- *Inexperienced Utility, Commuter and Leisure Cyclist (Type B Cyclist)* - May be willing to sacrifice directness in terms of both distance and time, for a route with less traffic and more places to stop and rest. May travel more slowly than regular cyclists
- *Child (Type C Cyclist)* - May require segregated, direct routes from residential areas to schools, even where an on-road solution is available. Design needs to take account of personal security issues. Child cyclists should be anticipated in all residential areas and on most leisure cycling routes

Morrisville's bicycle facilities include Parkside Valley Drive, a residential collector street in the northwest corner of town, which was re-stripped to include bicycle lanes in 2007, in part to control speeding traffic by narrowing the lanes.

Two state-designated bicycle routes, marked as "NC State Bike Route" in Figure 3.11, traverse Morrisville. The Carolina Connection and Mountains-to-Sea routes come together at High House Road and Davis Drive in Cary. They then follow Davis Drive north to Morrisville-Carpenter Road, east to Church Street, north to Barbee Road/Watkins Road, east to Perimeter Park Drive, northeast to Airport Boulevard, and across I-40 to Pleasant Grove Church Road. Having a signed bike route does not imply that any accommodations (other than signage) have been made for cyclists. Indeed, the conditions for cycling on some of the designated bike route streets are problematic for all but the most experienced riders. For example, Church Street is currently two lanes with no shoulder.

NCDOT is planning changes in the state bike routes in order to address changes in roadways and the upcoming closing of the railroad crossing at Barbee Road/Watkins Road. The proposed (not yet official) new route would take riders around Morrisville along High House Road to Cary Parkway, then to Evans Road, Weston Parkway, and through Umstead State Park.

Bicycling in North Carolina is regulated the same way, in most respects, as the operation of a motor vehicle. However, dedicated on-road and off-road facilities can greatly improve the cycling environment. The same holds true of pedestrian facilities, especially in terms of intersection improvements. Morrisville's intersections are generally transitioning from rural, two-lane crossroads into much wider and faster four-lane intersections.

Morrisville's pedestrian facilities include sidewalks and multi-use paths in many locations, more common on residential streets than major roadways. In addition, Morrisville is in the process of constructing the Indian Creek Greenway, which will run north-south along Town Hall Drive from Morrisville-Carpenter Road to McCrimmon Parkway. Additional planned segments would extend the greenway nearly to NC 540.

Currently, the same standards for pedestrian accommodations apply throughout the town, regardless of whether the street in question is a high-volume major arterial or a low-volume collector or residential street. Morrisville requires new developments to construct sidewalk inside as well as outside each new development. This practice often leads to "gaps" in the sidewalk system as new sidewalk constructed as part of new development stops at the parcel boundary with another, undeveloped (or developed during a time period when sidewalks were not required) parcel. Adjacent developments seldom have connecting pedestrian facilities as they are developed, making future connections very difficult and otherwise accessible opportunities for shopping and recreation out of convenient reach. Morrisville also requires developers to reserve right-of-way for, but not construct, greenways traversing a new development.

Great opportunities exist in Morrisville to better accommodate pedestrians and cyclists of all types via bike lanes, wide outside lanes, sidewalks, multi-use paths and greenways. This plan will incorporate recommendations from the 2006 Morrisville Parks, Recreation and Greenways Plan, as well as recommend on-road bicycle facilities on key roadways, and specific pedestrian improvements.

Bicycle/Pedestrian Facility Definitions²

Bike Lane - A portion of the roadway that has been designated by striping, signing and pavement markings for the preferential and exclusive use of bicyclists.

Multi-use Path - Physically separated from motor vehicle traffic, usually within the roadway right-of-way. Wider than a sidewalk, typically 8 to 10 feet wide.

Greenway - Similar to a Multi-use Path, but contained in an independent right-of-way, separated from roadways.

Signed Bicycle Route - Designated route with directional and informational markers.

Designated along more lightly traveled residential or secondary roads where additional facilities are not necessary.

Wide Outside Lane - The through lane closest to the curb is wider (generally 14 feet, rather than 12 or 11 feet), allowing cars to more safely pass bicyclists.

Sharrow - Sharrows are streets marked with bicycle symbols to denote that bicycles "share" the travel lane with motorized traffic.



NCDOT State Bike Route signs in Morrisville.

¹ The Highway Agency, "The Geometric Design of Pedestrian, Cycle and Equestrian Routes." Vol. 6, Sec. 3, Design Manual for Roadways and Bridges. February, 2005. <http://www.standardsforhighways.co.uk/dmrb/vol6/section3/ta9005.pdf>.

² North Carolina Department of Transportation, as distributed by Capital Area Metropolitan Planning Organization. http://www.campo-nc.us/BPSG/BPSG_Home.htm.



Morrisville Road Race, 2007.

4.0 POLICY DIRECTION

4.1 Vision

From January 26th through January 28th of 2007, the Town Council and staff conducted a retreat to establish a future Vision and Goals to serve as a shared understanding of the challenges the Town of Morrisville faces today, and a collective sense of the direction in which the Town would like to focus its resources. Through a collaborative planning process, seven Town goals with associated initiatives were established.

On February 26, 2007, the Morrisville Town Council unanimously approved those goals and initiatives for FY 2007. These goals and initiatives were used as a starting point for the Vision and Land Use Plan Goals and Policies listed below. In addition to the Town Council's Vision, the input of the citizens and the Plan Advisory Committee were incorporated into the final Goals and Policies for this Plan.

The Vision for Morrisville established by the Town Council is as follows:

The Town of Morrisville will be an innovative crossroads where cultural heritage meets the next generation nurturing vibrant communities of thriving families and businesses while preserving small-town values.

Innovation is one of the central themes of this Plan, and is a necessity to provide services and opportunity to a diverse and increasingly older range of citizenry. Providing non-motorized transportation and housing options are important factors in establishing opportunities for aging baby boomer populations around the country, and in Morrisville.

4.2 Goals and Policies

The development of goals is crucial to the land use and transportation planning process. Adopted goals and policies form the framework for adding or amending ordinances and regulations that guide the development of land within the Town's planning jurisdiction. Goals are unifying statements of a community's preferred future direction. Policies attached to Goals provide a means for translating Vision into action, and represent a set of guidelines for decision making for the Town on land use and transportation issues, programs and projects in the future.

It is expected that the Goals and Policies in this Plan will be used by the Town as a framework for many future decision-making processes and actions, including:

- Decisions on rezoning and special use permit applications
- Funding and fiscal priorities
- Departmental priorities and action plans

All elements of the Morrisville Land Use and Transportation Plans must be administered fairly, equitably and consistently in order to ensure that the Town's goals are met. The intent of these goals is to preserve and enhance community character, encourage pride in our community, and augment the quality of life desired by the Town's citizens. In order to fully implement the Plans, the goals are accompanied by targeted Action Items (Section Seven) to ensure that the future Vision will be realized.

The goals from the Board's Vision were used as the primary basis for developing the Goals and Policies. In addition, the input from the public workshops, the Plan Advisory Committee and the goals from the existing 1999 Land Use Plan were also used to establish the following comprehensive set of land use goals and policies for the future of the Town.

Growth and Development Pattern

Goal 1: Ensure a diverse development pattern that sustains livability and the environment by encouraging future development and public infrastructure that is complementary with existing development.

- Policy 1A: Promote growth and development that contributes to and builds upon the Town's overall image as a well-planned, attractive, livable, and unique community in the Triangle Region.
- Policy 1B: Promote and plan for the future of Morrisville as an environmentally friendly and energy efficient community.
- Policy 1C: Plan, develop and support vibrant, walkable gathering places at Morrisville's historic crossroads.
- Policy 1D: Concentrate higher-density, mixed-use development near existing and proposed transit centers, and at activity centers to provide services to Town citizens and daytime employees in a pedestrian-friendly environment.
- Policy 1E: Develop and re-develop with detached residential land use outside activity centers when in context with surrounding uses.
- Policy 1F: Implement strategies that minimize threats to life and property from natural and man-made disasters.

Character and Quality of Development

Goal 2: Ensure that Morrisville retains a small town atmosphere by integrating attractively and sustainably designed communities of complementary uses.

- Policy 2A: Promote development that fosters a sense of place by improving the character of the built environment, including visually appealing buildings, streetscapes, amenities, and public spaces.
- Policy 2B: Protect water quality and quantity in the Town's streams, lakes, and groundwater and consider the potential regional impacts on water supply and wastewater management of proposed developments.



Unveiling of the Shiloh Historic Marker, October 14, 2006.

4.2 Goals and Policies, cont'd

- Policy 2C: Provide a system of interconnecting greenways and natural corridors that link parks, natural areas, and open space, as well as residential and non-residential destinations.
- Policy 2D: Clearly communicate the character of development that is encouraged in the Town, including land use, design and development standards, utility extensions, and transportation needs/design.
- Policy 2E: Promote lifecycle housing options that allow residents to continue to live in our community even as their needs change over time.

Transportation and Land Use Integration

Goal 3: Improve transportation mobility by integrating land uses with transportation infrastructure.

- Policy 3A: Establish development patterns supportive of a walkable, multi-modal community, including higher-density residential development and complementary land uses in the Town Center and around planned and potential transit and activity centers.
- Policy 3B: Actively encourage pedestrian-oriented development through site design, building orientation, interconnected parking facilities, and streetscape improvements.
- Policy 3C: Encourage infill and redevelopment of existing areas as a way to promote compact, efficient development, and support transportation options.
- Policy 3D: Provide a variety of recreational opportunities connected to residential areas and places of employment by streets, greenways, sidewalks, and bicycle facilities that protect and enhance sensitive environmental areas.
- Policy 3E: Encourage interconnected street patterns in new development and redevelopment that promote effective circulation of car, transit, bicycle, and foot traffic.
- Policy 3F: Ensure that transit provisions, such as turn-outs, shelters, right-of-way, and good pedestrian connections are accommodated.
- Policy 3G: Consider acquiring control of streets within the Town where it is fiscally prudent to expand the opportunities available for designing and creating travelways that complement and support adjacent land uses.



Day at the Park, 2006.

Community Facilities and Services

Goal 4: Provide community services and public infrastructure to maintain and enhance the quality of life for Town citizens of today; the elderly that have enriched our past, and future generations.

- Policy 4A: Incorporate an understanding of the tax revenue and fee benefits of potential new development in land use decisions; ensure that these benefits are balanced against the infrastructure and service costs needed to serve various kinds of new development and redevelopment.
- Policy 4B: Encourage building and site design that conserves water and energy; reduces wastewater; reduces future infrastructure costs; and lengthens the lifespan of existing and future infrastructure.
- Policy 4C: Ensure that Morrisville has adequate resources and prepared responses for potential natural or man-made emergencies, such as evacuation plans and hazard response programs.
- Policy 4D: Provide excellence in educational opportunities that are accessible to all citizens, including convenient access to libraries, schools, and other institutional and cultural arts facilities that serve as community focal points, as well as sponsoring unique educational opportunities for citizens of all ages.
- Policy 4E: Provide parks, recreation and cultural opportunities for citizens of all ages.

Cooperation and Coordination

Goal 5: Foster a collaborative environment internally and with relevant local, regional, state, and federal partners to develop new opportunities for Morrisville's residents and business community.

- Policy 5A: Encourage cooperation/coordination with other governments and agencies to ensure that sufficient land areas are retained for future needs of schools, parks, greenways, streets and other public purposes.
- Policy 5B: Consider the consolidation of services and sharing of expenses with other agencies and surrounding communities, including mutual agreements for fire, transit, and police services.
- Policy 5C: Work closely with and take into consideration other local government and regional plans when making day-to-day and long-term land use and transportation decisions.
- Policy 5D: Take a lead in creating a joint development review process that describes how Morrisville and neighboring entities can review and comment on developments along the borders of the Town and their anticipated impact to services and facilities.
- Policy 5E: Continue to create meaningful public involvement opportunities in town government programs and processes that are responsive to public input.
- Policy 5F: Ensure the availability of information and the transparency of town government actions and functions.



Civil War Re-Encampment, March 15, 2008.

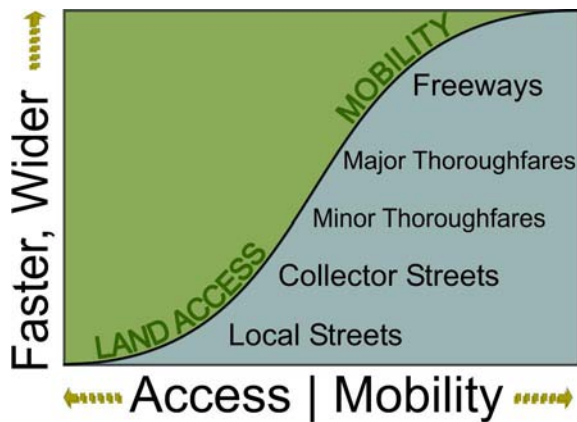


Figure 5.1 Access vs. Mobility

There is an inherent tradeoff between land access and mobility in roadways. Local streets with many driveways and lots of intersections contrast with freeways that have limited access ramps but increased speeds. Streets that were intended to provide high degrees of mobility often slow down with street intersections, driveways, and traffic signals. This degradation causes the access/mobility curve to shift towards more land access, but causes problems for people who want to reach their destination safely and quickly.

About the Travel Demand Model

The Triangle Regional Model (TRM) models all of the Triangle Region, including Wake, Durham, and parts of surrounding counties. The TRM is a type of four-step assignment model, whereby trips are artificially estimated from a land use description containing information on population and employment by five basic types. This information is distributed to various destinations, called traffic analysis zones (TAZs). The TRM then estimates how many people will ride alone in cars, carpool, take the bus or other transit service before finally assigning all of these trips in a four-hour morning, four-hour evening, and 16-hour off-peak period to a network that represents streets in our region (and Morrisville). The results were used to help our consultants think about where to plan for future roadway improvements. This is not a straightforward process, since our modeling work suggests that adding more capacity to some of Morrisville's streets – convenient routes between the big employment generators to the north and the big residential communities to the south – simply adds more cars without relieving congestion. Not all streets in Morrisville are included in the TRM, nor are the forecasts of land uses to the year 2035 going to be without error. Continuous re-examination of the model is the key to keeping its results relevant. Morrisville participates in the modeling process by submitting their best forecast of future land uses in the town.

5.0 RECOMMENDATIONS

5.1 Land Use and Transportation Relationships

Nearly everyone alive requires transportation – to get to food, buy shoes, attend a church, have a baby, or get to work to pay for it all. It is easy to overlook transportation and the systems that comprise it simply because we live in an era where the “friction” of travel is pretty low; the distance we can cover in one hour is a multiple of the distance traveled in several days just 150 years ago.

This section will briefly cover several concepts that will provide a sound underpinning for the current discussion of transportation recommendations. Especially important are connections between what happens within street rights-of-way (the area owned, usually, by a state or public agency) and on the adjacent lands. Following is a quick overview of major concepts that should be considered in addition to traffic performance and safety issues; each topic's importance varies according to the situation and specific context of the area in which a transportation facility resides.

Access vs. Mobility

One of the most-established concepts in the modern era of road-building is that roadways should have a lot of capacity for vehicles or provide good access to adjacent land parcels – but not both on the same road (see Figure 5.1). Freeways allow high-speed travel for many cars at the same time; the local street where we reside carries few cars but allows us to park a car close to the front door. Often, there is pressure to develop alongside major thoroughfares that should be carrying many cars but with restricted access. This creates a situation with a lot of traffic congestion and the potential for safety problems, or “conflict points.” Managing access, through shared driveways, medians, street / driveway spacing standards, and other techniques, helps to conserve the traffic capacity of the roadway system.

Build It and They Will Come

There is no urban area in the United States that has been both growing rapidly and has managed to construct enough roadway capacity to create free-flowing traffic conditions in peak rush hours. Simply widening the streets, while important, is insufficient to create easy traffic movement for a long period of time in our region. Redundancy (having more than one option for how to get to your destination) is a key to an efficient transportation system because it allows travelers to choose an alternative path when one is stopped (e.g. accident or construction). Alternatives are also critical for police, fire and other public services to quickly reach all areas in town. An efficient system allows for short trips to be made by walking, bicycling or by car without taking up capacity on thoroughfares and longer trips to be made with a transit option for many people, rather than the few served by transit currently. Providing information to travelers before they set out and removing accidents in a timely manner will help reduce delays. Regardless, traffic congestion is a fact of life: just as water seeks low ground, people will certainly seek out lightly-used routes to save time. Providing a good system is not just a nice thing to do for a few people, but critical to providing an efficient transportation system.

What Has Been May Not Always Be

Twenty-five years ago, few people owned cell phones, in part because they were as big as a football. Twenty years ago, people said that individual recycling programs would never work because no one would take the time to separate out their trash into bins and take them down to the curb. Ten years ago, the idea of tolling roadways to help pay for them was a foreign idea in North Carolina, and one that was received with near-universal hostility. As fuel prices continue to surge with no end in sight, as sustainable energy practices gain momentum all over the state and the country, we would be well-advised to remember these changes and not plan for the last trend but instead prepare for the next one. Transit use has been increasing in the first decade of the new century: Wake County now turns away 25% of requests for transit service due to limited capacity, and C-Tran, Cary's transit service, has seen 50% annual growth over the past three years. The incredible increases in the demand for road capacity – as well as the inability of governments to pay for their rapidly escalating costs – may soon reach a zenith, a concept that even a few years ago was unthinkable.

Get Creative

In part as a result of changes in lifestyle, awareness of environmental issues, oil shortages, and other external factors, we are capable of considering bolder changes in crafting this Plan. Coordinated signal systems that provide signal priority to buses; multi-purpose roadways that move cars, bicycles, pedestrians, and transit vehicles with similar ease; “new urbanist” designs that are calling for lower speeds and greater connectivity between neighborhoods; traffic calming facilities in neighborhoods; street designs that respect the context of the natural and built environments; greenways and sidewalks as commuter corridors to job center; allowing expanded home occupations in residential areas; these are just a few of the possibilities that are now becoming a part of mainstream transportation planning and engineering.

The following recommendations take into account a number of considerations, many more than can be derived from a computer travel model or straightening out a bend in the roadway. The roadway, transit, and bicycle/pedestrian recommendations are shown separately, but serve each other and the adjacent lands they touch.

To choose doubt as a philosophy of life is akin to choosing immobility as a means of transportation

- Yann Martel, *The Life of Pi*

5.2 Roadways

In order to determine which roadways would be recommended for adding lanes, modifying intersections, or would require new, parallel roadways, a number of factors were considered. Each of the following factors (Figure 5.2) was considered in the context of the whole, and their importance may vary according to the specific context of the surrounding environment.

One important concept is the travel demand model, which allows analysts to “test” various roadway and land use configurations, and then see the results in terms of traffic on the simulated “streets.” However, this is only one aspect of transportation planning. Too often, the travel demand modeling exercise has served as a substitute for common sense. Constraints produced by financial limitations, context of the roadway, topography, and desirable land use interactions should serve a much greater role in determining what can and should be recommended. In this Plan, the travel demand model results were blended with public and staff input, as well as physical considerations to create a more balanced set of recommendations.

As with the review of the Existing Conditions (Section Three), the recommendations for roadway and intersection improvements are described briefly in the body of this section in terms of their north-south and east-west connectivity, as well as connecting major destinations within Morrisville. However, detailed, street-by-street and intersection recommendations are provided in Appendices E and F, which can be used for guiding development requirements.

North-South Corridors

As shown in Figure 5.3, NC 54, I-40, Davis Drive, and NC 55 are all forecasted to be operating under severe traffic congestion in 2035, with the volume-of-cars-to-capacity-of-roadways (V/C ratio) at 1.0 or greater. This congestion is predicted despite the numerous planned capacity improvements. Figure 5.4 provides a summary of the results of the Triangle Regional Model (TRM), and several significant points are noted below:

- NC 540 (Western Wake Freeway), six new lanes of freeway capacity, is lightly used;
- Davis Drive, widened to six lanes, still has significant delay on the roadway throughout its length in the Morrisville area;
- NC 54 is assumed to be four lanes instead of the current two;
- New McCrimmon Parkway Extension has been constructed; and
- New separated-grade overpasses of NC 54 and the Norfolk Southern Railroad at both Airport Boulevard and McCrimmon Parkway are included.

The fact that the TRM is still predicting significant delays on nearly all major north-south roadways despite massive capacity increases verifies a truth that has been borne out in many places at many times over the past decades: simply adding more capacity in a growing area is a temporary solution at best, and needs to be carefully weighed against the goals of the community.

Figure 5.4 Level of Service Summary for Travel Modes for Transportation Scenarios (Derived from the Triangle Regional Model)

Location/Roadway	Model Year	Car	Bike	Ped
				
Morrisville-Carpenter Road	2035 trend	F	E	E
	2035 proposed	E	C	B
NC 54	2035 trend	F	F	F
	2035 proposed	E	C	A
Aviation Parkway	2035 trend	B	F	E
	2035 proposed	B	B	B
Airport Boulevard	2035 trend	C	E	E
	2035 proposed	C	B	B
Town Hall Drive	2035 trend	C	D	A
	2035 proposed	C	E	B
McCrimmon Parkway	2035 trend	E	E	D
	2035 proposed	D	C	B
Davis Drive	2035 trend	F	E	E
	2035 proposed	F	B	B

For a definition of level of service categories, please see Figure 3.3.

Figure 5.2 General Roadway Improvement Factors

Existing Congestion Levels	⇒	How long does it take now?
Future Congestion Levels	⇒	How long will it take later?
Public and Plan Advisory Committee Involvement	⇒	What did the public say about this?
Number and Type of Accidents	⇒	How many preventable accidents have there been?
Land Use Interactions v. Street Functions Now	⇒	What is the land use in the area like now?
Land Use Interactions v. Street Functions Later	⇒	What will the land use in the area be like later?
Bicyclist and Pedestrian Facilities and Safety	⇒	What are the conditions for cycling & walking?
Future Modes of Travel	⇒	What will the street be used for later (transit riders, cyclists, walkers?)
Roadway Geometry	⇒	Are there physical or natural constraints?

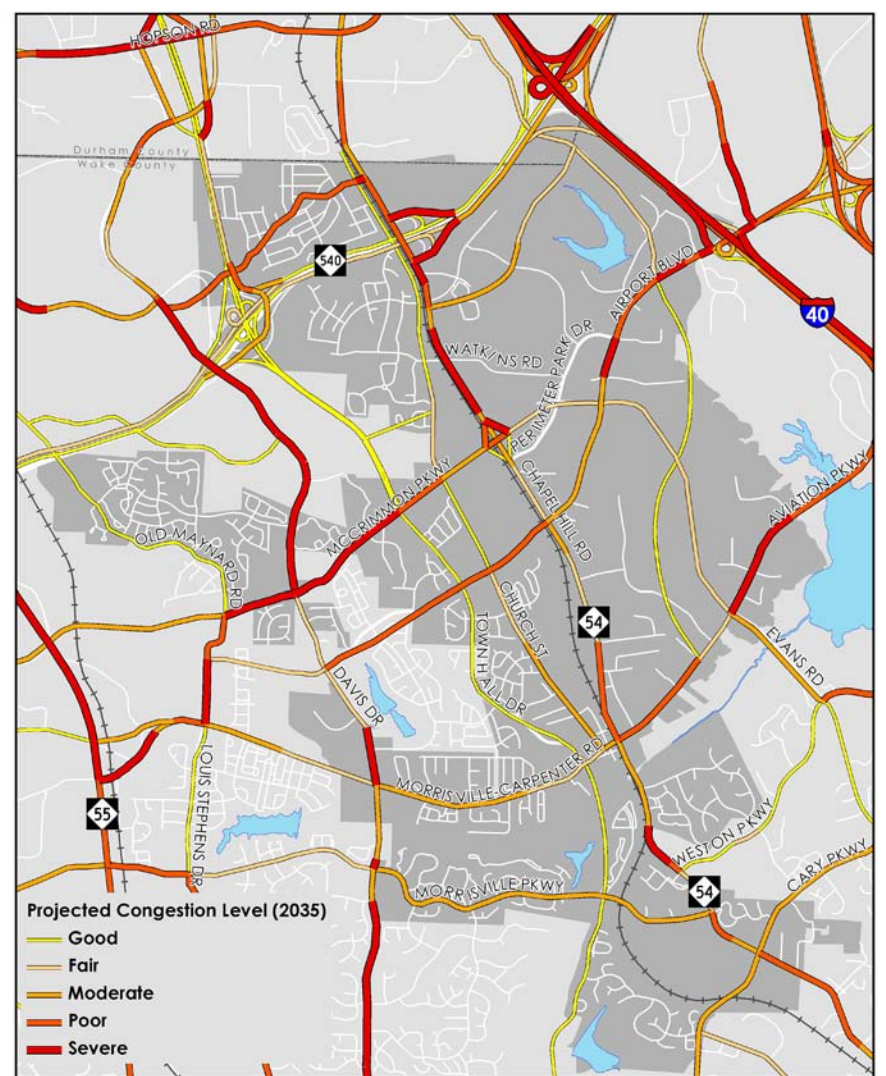


Figure 5.3 Projected Congestion Levels, 2035

NC 54, Davis Drive, I-40, Airport Boulevard, and Aviation Parkway show high congestion levels in this forecasted map in spite of large improvements. Sample modeling suggests that even with more lanes (six) and additional capacity on NC 540 and other roads, congestion levels will remain high in the peak periods of the day. Levels indicated are derived from volume-to-capacity ratios. New roadways shown as present/connected in the map were included in the model.

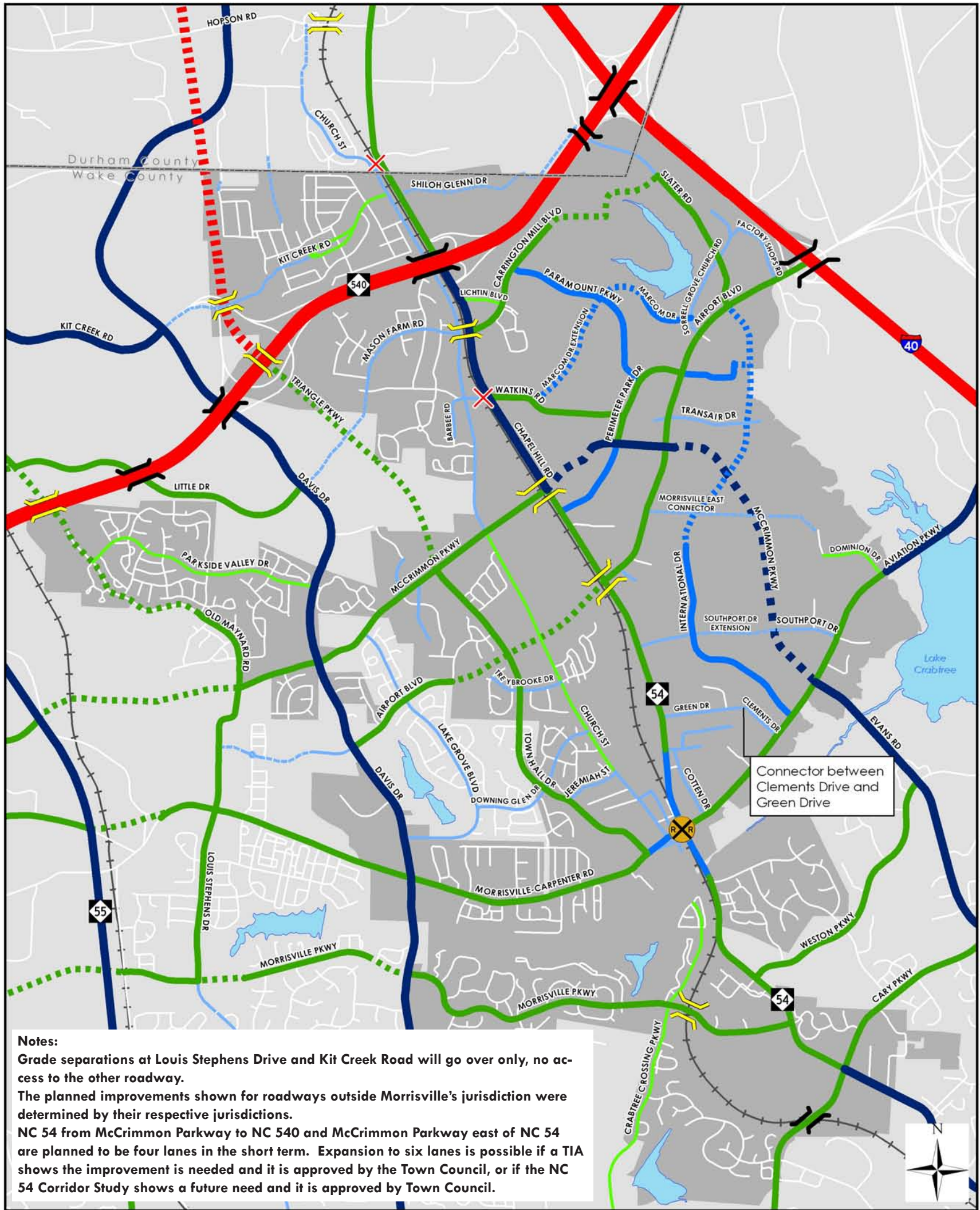
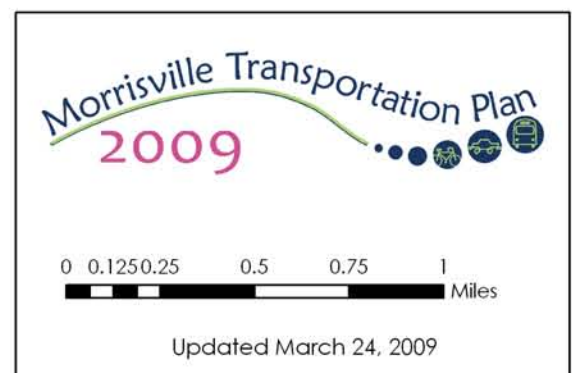


Figure 5.5 Future Roadways



5.2 Roadways, cont'd

Morrisville has planned for many roadway improvements (Figure 5.5; text describes the changes in greater detail on the following pages). Getting projects on the ground is a complicated process, with a variety of different entities in control of different road segments, and public funding in short supply. The shortage of public funds to develop major transportation projects, whose costs continue to escalate at a rapid pace, places a premium on smaller projects. Hence, while a larger, higher-benefit project may be a clear priority, it is very likely that smaller, more easily constructed projects will be completed before a more costly project. In addition, private development has and will play an increasing role in the development of transportation projects in Morrisville in the foreseeable future. Therefore, the projects shown in Figure 5.6 are prioritized initially by feasibility, and secondly by their importance to the community and transportation system.

The Town of Morrisville has three primary methods that it can influence the roadway improvement process: 1) Through investments using local resources, which are typically focused on local roads that the Town controls; 2) Through input that the Town provides in the regional and state transportation improvement process, which is generally focused on major thoroughfares controlled by the NC Department of Transportation or by entities such as the NC Turnpike Authority; and 3) Through improvements that the Town requires of developers as part of new development projects which, under the state and federal legal framework, are largely focused on road segments adjacent to the proposed development.

The projects in Figure 5.6 have not been assigned a specific score or weight, but are qualitatively assigned from short- to long-term con-

struction potential based on several factors, the importance of each varying according to the project. The considerations are as follows:

- **Constructability.** The construction of the project may impact wetland areas or important man-made resources such as historic areas or park land. When more impacts need to be mitigated or avoided, the project is less viable due to costs or opposition. Conversely, a project already partially constructed or designed has a higher constructability value, all other factors being equal. The ease of construction is also measured in part by the project cost: higher per mile costs equate to lower constructability. Detailed, project-level cost estimates may reveal a different cost than the estimates shown here.
- **Public Opinion.** The opinion of the public, expressed through workshops and at Plan Advisory Committee (PAC) meetings, as well as surveys and other contact with staff, provide an indicator of the project support. Many comments were received during the course of the planning study, with some comments supporting (High) or not supporting (Low) certain projects.
- **Implementation.** This column indicates which entity is most likely to finance the project: state/NC DOT, Town of Morrisville, NC Turnpike Authority, and/or private developer action. Note that while many improvements can and should be provided as a part of new private development, these typically are focused on short lengths of roadway along property frontage. Only those with potentially the largest contributions from private development are denoted as having private participation.

Figure 5.6 Recommended Roadway Improvements Timeline

Term	Roadway	From	To / Across	Length (mi.)	Cost (\$1,000s) (1)	Constructability	Public Opinion	Implementation (2)	Town MTIP Input	STIP Listing (3)
Short-Term (0-5 Years)	Airport Blvd Widening	NC 54	I-40	1.9	4,100	High	High	State		Y
	NC 54 Widening (4)	NC 540	McCrimmon Pkwy	1.2	1,000	High	High	State/Private	1	
	Davis Dr (North) Widening	McCrimmon Pkwy	N. Town Limits	0.7	1,500	High	Med	State		Y
	Davis Dr (South) Widening	S. Town Limits	S. of Airport Blvd	1.1	2,400	High	Med	State		Y
	Triangle Pkwy	NC 540	NC 147	1.0	4,300	High	Med	NCTA		Y
	Louis Stephens Dr	NC 540	Louis Stephens Dr (RTP)	0.9	3,960	High	Med	Cary/RTP	6	P
	Kit Creek Rd Reconnection	Davis Dr	Kit Creek Rd	0.3	2,000	Low	Med	NCTA	7	
	McCrimmon Pkwy Widening	Louis Stephens Dr	NC 54	1.7	3,600	Med	Med	State	3	
	Morrisville-Carpenter Rd Widening	W. Town Limits	NC 54	1.4	3,000	Med	High	State	2	
	Morrisville Carpenter Rd @ Town Hall Dr Intersection Improvements	Church Street	Morrisville Square Way	0.5	1,900	Med	High	Town		
	Aviation Pkwy Widening	NC 54	E. Town Limits	1.6	3,400	Med	High	State	4	U
	International Dr Ext	International Dr (north)	Airport Blvd	1.2	5,100	Med	High	Town/Private		
	McCrimmon Pkwy Ext (4)	Airport Blvd	International Dr Ext	0.3	1,440				3	
	Morrisville East Connector	Airport Blvd	International Dr Ext	0.2	1,070	High	High	Town/Private		
	McCrimmon Pkwy Ext (4)	NC 54	Perimeter Park Dr	0.3	1,230				3	
	Grade Separation	Airport Blvd	NC 54	NA	18,000	Low	High	State	5	
	Airport Blvd Ext	Airport Blvd in Cary	NC 54	0.6	2,600	High	Low	State	5	
	NC 54 Widening	McCrimmon Pkwy	Sunset Ave	1.3	2,840	Med	High	State	1	
	Shiloh Glenn Dr	Slater Rd	NC 54	0.9	3,900	High	Med	Private		
	Watkins Rd Widening	NC 54	Perimeter Pkwy	0.7	1,300	High	Med	State/Private		
Grade Separation	McCrimmon Pkwy	NC 54	NA	18,000	Low	High	State	3		
Long-Term (11+ Years)	NC 54 Widening	Sunset Ave	Keybridge Dr	0.6	1,340	Low	High	State	1	
	McCrimmon Pkwy Ext (4)	International Dr Ext	Aviation Pkwy	1.1	4,510	Med	Med	State	3	U/P
	Morrisville East Connector	International Dr Ext	McCrimmon Pkwy Ext	0.3	1,300	High	Med	Town/Private		
	Morrisville East Connector	McCrimmon Pkwy Ext	Nova Dr	0.3	1,400	High	Med	Town/Private		
	Triangle Pkwy	NC 540	McCrimmon Pkwy	1.3	5,500	High	Low	State		
	Church Street Widening	Morrisville-Carpenter Rd	N. Town Limits	3.5	7,400	Med	High	Town/State		
	NC 54 Widening	Keybridge Dr	Cary Pkwy	1.2	2,450				1	
	NC 54 Widening	Cary Pkwy	S. Town Limits	0.2	940				1	
	Grade Separation	Carrington Mill Blvd	NC 54	NA	18,000	Low	Med	State		
	Little Dr	Davis Dr	Mason Farm Rd	0.6	2,400	High	Med	Town/State		
	Southport Dr Ext	Southport Dr (west)	NC 54	0.5	2,200	High	Med	Town/State		
	Marcom Dr Ext	Marcom Dr	Watkins Rd	0.8	3,520	High	Med	Private		
	Carrington Mill Blvd Ext	Carrington Mill Blvd	Slater Rd	0.6	2,640	High	Med	Private		
	International Dr Widening	Aviation Pkwy	International Dr (north)	1.0	4,400	High	High	Town		
	Slater Rd Widening	Sorrel Grove Church Rd	NC 540	1.1	1,980	High	Med	Town/Private		
Grade Separation	Morrisville Parkway	Railroad	NA	18,000	High	Med	State			
Town Hall Dr (Planted median and Restripe for Bike Lanes)	McCrimmon Pkwy	Treybrooke Dr	1.5	800	High	Med	Town			

(1) Note: All costs are rough estimates and are presented in 2008 dollars. Assume a 10% annual rate of inflation for construction through 2015; 6% annual rate of inflation from 2015 through 2020. A "Low" cost is a positive influence. Costs include sidewalks or multi-use paths and bike lanes where applicable. Design of the roadway and costs to acquire right-of-way are included in the cost estimates. The Town has already acquired right-of-way from developers in some places, which might reduce the costs for some projects.

(2) Note: Most projects will have the potential for significant contributions by private sector development actions.

(3) Note: (U) = Unfunded; (P)=Partially funded or funded for part of the project length; and (Y)=Yes (project is listed and funded in 2009-2015 STIP)

(4) NC 54 from NC 540 to McCrimmon Parkway and McCrimmon Parkway east of NC 54 are planned to be four lanes in the short term. Costs included here are for widening to four lanes with median, on 124' ROW which would allow for future expansion to six lanes. Expansion to six lanes is possible if a TIA shows the improvement is needed and it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council. See Appendix page E-17 for more information about NC 54 segments and cross-sections.

5.2 Roadways, cont'd

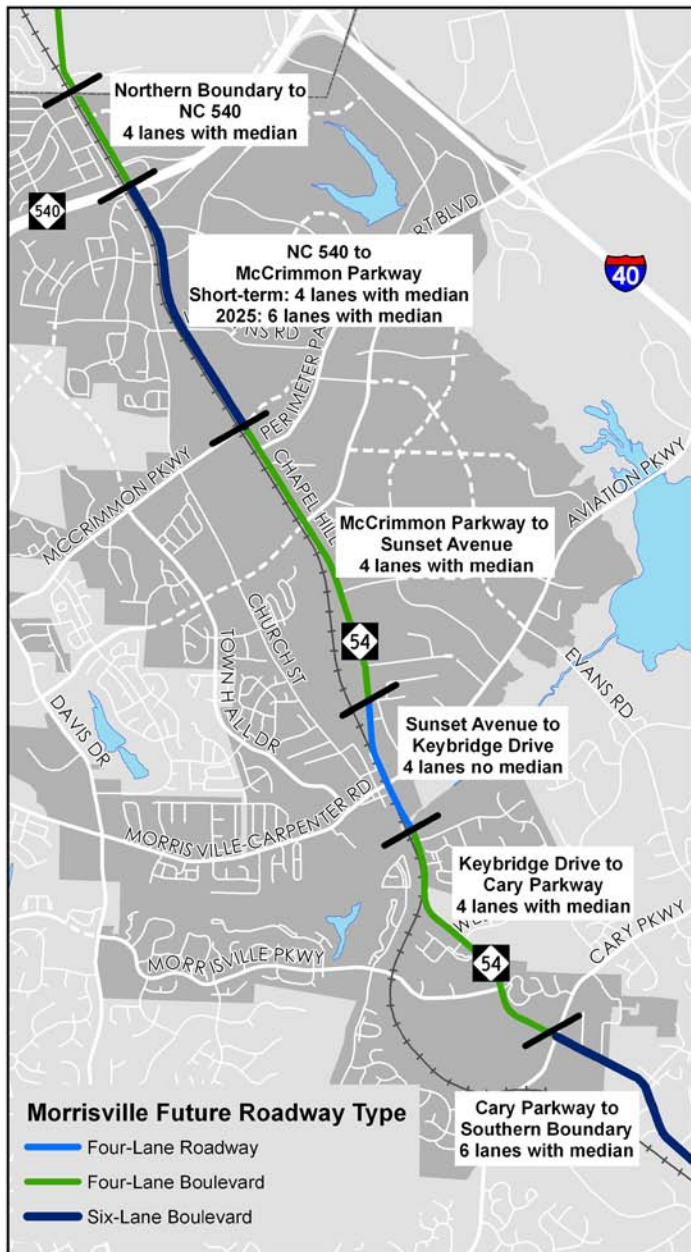


Figure 5.7 Proposed NC 54 Improvements

- *Town MTIP Input.* The rankings shown are those that were provided by the Town to the Capital Area Metropolitan Planning Organization (CAMPO) during the last round of prioritization.
- *MTIP Ranking.* The numbers indicate the priority rank of these projects relative to all the CAMPO roadway projects in the 2007 Project Priority Report of the Metropolitan Transportation Improvement Program (MTIP).
- *STIP Listing.* The letter codes (3) indicate if and how the project is shown on the 2009-2015 Statewide Transportation Improvement Program (STIP).

NC 54. This road was the most-cited among the roadways in Morrisville for needing improvements. Improvements are currently underway for two sections of NC 54: widening to four lanes north of Watkins Road at the north end of town, and widening to four lanes south of Weston Parkway at the south end of town. Intersection improvements at NC 54 and Aviation Parkway/Morrisville-Carpenter Road are underway in 2009 to facilitate traffic movement by allowing four lanes of traffic over the railroad tracks. Long-term, this intersection will remain at-grade, while other intersections along NC 54 are planned to be grade separated: McCrimmon Parkway, Airport Boulevard and Carrington Mill Boulevard.

Morrisville has already been reserving 124' of right-of-way when properties adjacent to the road are developed, in anticipation of a wider cross-section. Widening the roadway requires a delicate balance of providing vehicle capacity and maintaining a small town feel and pedestrian-friendly areas. Particularly in the Town Center, special attention needs to be paid to avoiding impacts to existing buildings. This plan proposes to address these challenges by:

- Widening NC 54 in the near term to four lanes (six lanes south of Cary Parkway) with cross-sections that respect their location
- Maintaining the future option to widen further or incorporate other strategies
- Incorporating an action item (3.21) that identifies specific actions for staff to pursue making improvements, including an NC 54 Corridor Study that will determine phasing of improvements and if/when additional widening is necessary, and additional coordination with neighboring jurisdictions and regulatory and state agencies to continue planning for improvements
- Including additional recommendations such as access management that can help facilitate traffic flow without additional infrastructure
- Adding substantial bicycle and pedestrian facilities, including a wide 10' walkway along the east side of the roadway, a 5' sidewalk on the west side and 6' striped bike lanes on both sides (4' in the Town Center). Pedestrian havens, crosswalks and signals will also improve the pedestrian-friendliness of the wider roadway.

Figure 5.7 delineates the different segments of NC 54 within Morrisville's jurisdiction and their planned improvements. Page E-17 in the Appendices illustrates the different cross-sections. Three sections will be widened to four lanes with a median: NC 540 to the northern boundary with Durham, McCrimmon Parkway to Sunset Avenue, and Keybridge Drive to Cary Parkway. Figure 5.8 shows what this might look like. One section (Cary Parkway to the southern boundary with Cary) will be widened to six lanes to match the cross-section in Cary. In the Town Center (Sunset Avenue to Keybridge Drive), NC 54 will have a narrower cross-section with no median to minimize impacts to existing buildings.

NC 54 from NC 540 to McCrimmon Parkway planned to be four lanes in the short term. Expansion to six lanes is possible if a TIA shows the improvement is needed and it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council.



Additional Treatments. Signal spacing is currently too far apart for coordination. Access management on the west side is accomplished by the presence of the railroad and existing development. The east side of the roadway still has residential driveways; it is recommended that an access management policy be created that emphasizes the need for creating access off existing side streets with no additional connections from NC 54 wherever possible to reduce conflict points. Additional information on access management is included in Section Six. Turning bays and minimum 30' (maximum: 50') turning radii should be standard at all street and driveway intersections to facilitate vehicles turning at higher speeds. Other design features contained in the NCDOT Policy on Access Management should be adhered to during the design process. Finally, a reduction in speed limit from 55mph to 45mph is strongly recommended for this corridor to increase reaction times and promote safer driving conditions.

Figure 5.8 NC 54 Streetscape Illustration

This example shows the redevelopment potential along NC 54. Planted medians and street trees complement the new roadway environment and corridor commercial land uses fill in to support increased pedestrian use.

5.2 Roadways, cont'd

Church Street. Church Street is anticipated to undergo numerous changes, all of them in connection with its close proximity to the railroad on its east side (Figure 5.9). Hopson Road in Durham will eventually have a grade separation under the railroad, connecting to NC 54, and Church Street will connect northward to Hopson Road in Durham County. The roadway connecting to Church Street north of the county line is currently named Keystone Park Drive, but discussions are underway with NCDOT and Durham County to rename it Church Street. The current access from Church Street across the railroad to NC 54 in Durham will be severed at that time, due in large part to poor sight distance and roadway / railway geometry that, when combined with high traffic volumes, makes the intersection unsafe. In addition, the railroad crossing at Barbee Road/Watkins Road will also be closing, cutting off direct access to NC 54 for residential areas along northern Church Street.

Church Street is being sporadically widened to accommodate a three-lane section now, and the south end will eventually become a RIRO (right-turn in, right-turn out) intersection with Morrisville-Carpenter Road following the reconstruction of the NC 54/Morrisville-Carpenter Road intersection to the east. Church Street is an NCDOT-owned road, so NCDOT controls the speed limit and limits median plantings.

Church Street will serve a more localized function in the future, with the potential to become a beautiful and simpler, more pedestrian-oriented version of Town Hall Drive. The recommendation for this street is a two-lane boulevard with a planted median and multi-use path (Figure 5.10). Median crossovers should be limited to major street intersections. Through the Town Center south of Jeremiah Street, and the Shiloh Historic Area north of McCrimmon Parkway, the median will be removed and roadway narrowed to minimize impacts. A roundabout at Jeremiah Street is planned to slow traffic and signal the entrance into the Town Center.

Additional Treatments. The speed limit on Church Street should be 25mph to conform to the local design of the street and to set it apart from the higher-level traffic functions of Town Hall Drive to the west and NC 54 to the east.

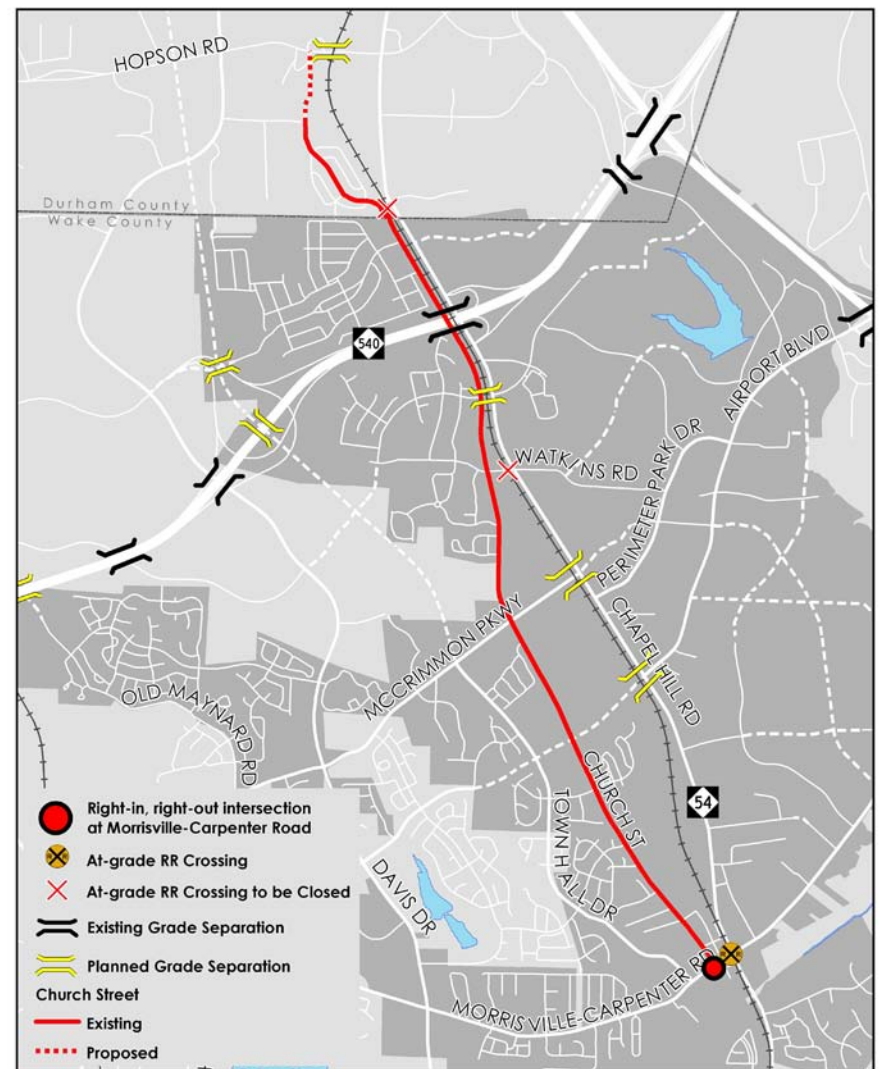


Figure 5.9 Upcoming Church Street Changes

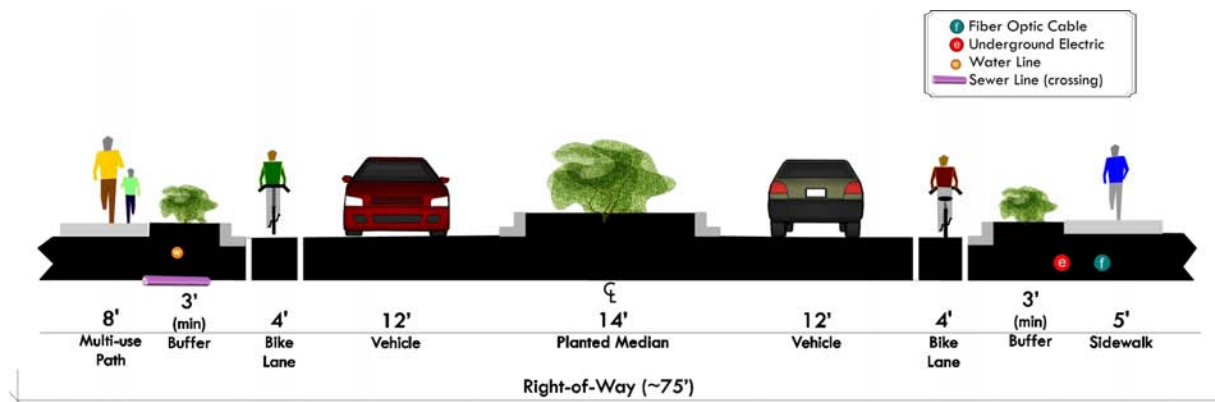


Figure 5.10 Recommended Church Street Ultimate Cross-Section

Recommendations for other major, north-south streets are as follows (see detailed recommendations and diagrams in Appendix E):

Town Hall Drive is currently a five-lane (4 lanes plus center turn lane) facility in most areas, although the southern end is four lanes with a grass median. The recommendation calls for the entire roadway to be a four-lane, median-divided facility with striped bike lanes. The lane width will be narrowed somewhat to permit these changes within the current pavement and right-of-way. **Triangle Parkway** is planned to provide an additional route into Research Triangle Park by connecting NC 147, NC 540 and McCrimmon Parkway. The section north of NC 540 is scheduled to be constructed by the North Carolina Turnpike Authority by 2012, with a four-lane expressway design; the section south of NC 540, ending at the intersection of Town Hall Drive and McCrimmon Parkway, will be a four-lane, median-divided boulevard. Although the southern section is included on the Transportation Improvement Program (TIP), it has not yet received funding. **Davis Drive** is currently being constructed as a four-lane facility, with ultimate expansion to a six-lane boulevard (right-of-way for six lanes has been reserved). There will be a parallel 8' multi-use path on both sides in Morrisville, which will align with the Research Triangle Park trail system.

The extension of **McCrimmon Parkway** from Airport Boulevard to Evans Road (on new location) will be four lanes, with a planted median, bike lanes, and parallel multi-use paths. The same cross-section applies to the short connection of McCrimmon Parkway between NC 54 and the existing portion of the road to the east. While McCrimmon Parkway east of NC 54 is planned to be four lanes in the short term, expansion to six lanes is possible if a traffic impact analysis shows the improvement is needed and it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council. **Slater Road** connects from Airport Boulevard north to NC 540 and will be improved as a four-lane, median-divided roadway. **Old Maynard Road**, located in the far western part of Morrisville bordering the Breckenridge subdivision, is planned to be renamed **Louis Stephens Drive** and connected northwest into Research Triangle Park by 2010, providing a north-south alternative to Davis Drive. Initially, this roadway will be two lanes without curb and gutter or sidewalk (except where it exists in Morrisville's jurisdiction). By 2020, it is

5.2 Roadways, cont'd

expected to be improved to a four-lane, median-divided roadway with bike lanes. The Town of Cary and RTP are constructing these improvements, so the Town of Morrisville will work with them to address the safety and traffic concerns of residents in Breckenridge.

The most important traffic relief for through traffic in Morrisville will be Davis Drive and the extension of NC 54 west and south of its current location, the former mostly beyond the Town limits and the latter entirely outside the Town. **NC 540** is planned to be a six-lane freeway; if funding can be achieved sooner through the application of a 30-year tolling scheme, then the Town supports this option to provide the roadway sooner.



Approaching NC 54 from westbound Aviation Parkway, showing the at-grade railroad crossing just west of the intersection. This intersection is currently being improved to facilitate traffic flow.

The north-south connection between **Town Hall Drive** and **Crabtree Crossing Parkway**, which had been included on the 2002 Transportation Plan, has been removed. See Appendix G for more information.

East-West Corridors

Six roadways – Morrisville Parkway, Morrisville-Carpenter Road/Aviation Parkway, McCrimmon Parkway, Airport Boulevard, Cary Parkway and more recently NC 540 – have carried vehicular traffic across the railroad and NC 54. While this situation will remain unchanged in the short term, several improvements are recommended to facilitate the flow of traffic east-west across town.

Morrisville Parkway will continue to be a four-lane, median-divided roadway along its length, with no major changes planned for vehicle capacity. A grade separation of Morrisville Parkway and the railroad is planned to improve safety. The Town of Cary has plans to extend Morrisville Parkway in its jurisdiction to the west of Morrisville, connecting some existing portions between Davis Drive and NC 55 by 2010, and extending it west of NC 55 longer-term. **Little Drive** will also extend west to NC 55 through Cary.

Morrisville-Carpenter Road, which is currently in the process of becoming a four-lane, median-divided roadway through various developer-related improvements, will be a four-lane median-divided road with bike lanes west of Town Hall Drive. At Town Hall Drive, the roadway will narrow, with no median, to avoid impacts to existing development. Intersection improvements at NC 54 and Aviation Parkway/Morrisville-Carpenter Road are underway in 2009 to facilitate traffic movement by allowing four lanes of traffic over the railroad tracks. Long-term, this intersection will remain at-grade. East of NC 54 the road is named **Aviation Parkway**, which is eventually planned to be a four-lane, median-divided facility with bike lanes. Interim improvements on Aviation Parkway will accommodate more southbound turning lanes onto Evans Road (this intersection will also acquire a fourth "leg" with the McCrimmon Parkway extension). The Town of Cary plans to widen the causeway of Aviation Parkway across Lake Crabtree eventually to six lanes. West of Morrisville, the Town of Cary plans to extend McCrimmon Parkway to connect to NC 55 in the near term and realign Morrisville-Carpenter Road to Carpenter Fire Station Road and grade separate it from the railroad tracks.

Airport Boulevard is currently undergoing widening to four lanes from NC 54 east to McCrimmon Parkway. Future plans include widening the remainder of the road east to I-40 to include a planted median and bike lanes, and extending the road on new location west of NC 54 to Davis Drive and Louis Stephens Drive. Sections of this planned extension have already been constructed within the Town of Cary in the Twin Lakes subdivision. The Town of Morrisville has acquired right-of-way within the THC development. In addition, an extension of International Drive is planned to connect with Airport Boulevard near the interchange with I-40. **International Drive** currently intersects Aviation Parkway but is home to many of the industrial distribution and warehouse facilities in Morrisville. The extension of International Drive to Airport Boulevard will offer an alternative path for heavy truck traffic, effectively removing it from most of Airport Boulevard and Aviation Parkway. The extension, which will be a four-lane collector road, has been prioritized by the Morrisville Town Council to receive dedicated transportation funds starting in 2014. This is the earliest available funding, but sections of the road go through undeveloped parcels, so it could be built sooner if it is funded by developers.



Airport Boulevard, just east of NC 54, in the process of being widened by NCDOT in the summer of 2008.

McCrimmon Parkway between Old Maynard Road and NC 54 is currently two-lanes in some locations, four-lanes in others. The recommendation is for a four-lane boulevard with planted median, bike lanes, and multi-use paths. A turn lane from westbound McCrimmon Parkway to northbound Church Street is currently being designed and will alleviate some traffic congestion at that intersection.

McCrimmon Parkway and Airport Boulevard will provide new east-west connectivity by being grade-separated over the railroad (with ramp access to NC 54). Detailed engineering drawings of both the McCrimmon Parkway and Airport Boulevard grade separations are included in Appendix F. An additional east-west grade-separated railroad crossing is recommended at **Carrington Mill Boulevard/Mason Farm Road**, which would connect residential areas (via two-lane Mason Farm Road) on the west side of NC 54 with retail and office land uses to the east (via four-lane Carrington Mill Boulevard). Perhaps more importantly, this grade separation could provide additional connectivity to Research Triangle Park, with an extension of Little Drive in RTP's jurisdiction. Currently, a Little Drive extension through RTP would necessitate crossing steep topography and encroach slightly on one area of currently undeveloped land in RTP. Since these conditions have not been negotiated with RTP, the grade separation of Carrington Mill Boulevard across NC 54 is a longer-term recommendation.

Finally, the construction of the future Triangle Parkway toll facility from I-40 to NC 540 near

5.2 Roadways, cont'd

Kit Creek Road will allow the severed pieces of Kit Creek Road to be re-connected. The potential for "cut-through" traffic in the Kitts Creek community is small, especially with traffic calming measures in place. The road would be considered a residential collector, similar to Parkside Valley Drive. This connection is critical for effective public safety access to the Kitts Creek subdivision since other connections, such as the railroad crossings at Church Street and Barbee Road, are planned to be severed. The reconnection is planned to be a two-lane roadway with four-foot bicycle lanes and five-foot sidewalks on both sides. Although North Carolina Turnpike Authority is slated to build the connection, the Town of Morrisville has provided extensive input to minimize the impact on properties and to have pedestrian and bicycle facilities included in the design.

Gateway Markers

Partly as a result of the Town of Morrisville's irregular town limits, roadways that cross into and out of different jurisdictions, and close proximity to neighboring jurisdictions, visitors to Morrisville often don't know they are in Morrisville. Three small gateway markers currently exist, along Aviation Parkway, Airport Boulevard and NC 54. This Plan calls for those gateway markers to be made more visible and attractive to visitors, and to add additional markers at other entrances to the town (Figure 5.11). The intersection of Aviation Parkway and Evans Road has been identified as a potential "feature intersection" that could become an enhanced gateway to the town. New markers have been being designed as part of the Shiloh Crossing development (see drawing at right). These markers will cost an estimated \$7,500 to \$9,500 each to create and install.

5.3 Public Transportation

Assessing the market for transit in Morrisville is complicated by several factors: many of its residents are relatively new to the area and therefore may not adhere to the more ingrained travel habits of longer-term residents; the proximity to regional traffic attractors/generators in the form of Research Triangle Park and Raleigh-Durham International Airport; and the still-changing travel patterns created by the influx of new residents and businesses in northwest Cary and Morrisville. Nevertheless, there are generally three markets for those who choose to use public transportation:

- (1) People who do not own or who cannot operate a private car; and
- (2) People for whom the current public transportation options are cheaper and/or faster than using a privately-owned vehicle; and
- (3) People who prefer not to drive.

Until recently, the key assumption for developing public transportation options in small urban or rural areas was that group number (1) comprised a hugely disproportionate share of existing – and nearly all future – transit riders. However, that assumption is being challenged as fuel costs continue to rise. It is possible that the state of personal travel and the short-term future of public transportation itself are in a state of flux, further complicating long-term recommendations. To explore the costs of providing a basic public transportation service, a case study examining the feasibility of Morrisville providing its own transit service is provided. Based on the outcome of this example, the recommendations for future transit service rely on expanding Morrisville's involvement with existing transit providers.

Case Study: Starting a New Public Transportation System

Appendix H describes how Morrisville could start its own bus service. The service described would be provided six days per week including holidays. Both daily, fixed-route and Americans with Disabilities Act (ADA) complementary demand response service would be provided. Funding sources, yearly capital and operating budgets, and transit system operations and management are also discussed. The full case study presented in Appendix H is an example system, not necessarily what would be implemented by the town, and it is presented to offer a comparison of cost/benefit, feasibility, service quality, performance, and ridership with alternative transit options. The results of the case study are included below along with several other transit service options.

Recommendations

The costs for Morrisville to create an independent fixed-route service such as that described in the case study is compared to several other options in Figure 5.13. Project recommendations include the following items, illustrated in Figure 5.12 and described in Figure 5.14.

Chief among these recommendations are:

- Support to shift Triangle Transit Route 301 over to NC 54 (from its current location along I-40 with stops at Morrisville Outlet Mall)
- Provide bus stops near residential neighborhoods in Morrisville
- Work closely with Cary to expand the C-Tran service in Morrisville. Cooperation with C-Tran will initially include discussions on establishing a C-Tran bus stop at Park West Village on NC 54 and at Morrisville Manor on Cary Parkway, which would allow better access for Morrisville residents to planned C-Tran service along Cary Parkway and Weston Parkway. Future discussions with C-Tran will explore the possibility of adding future routes along NC 54 (north-south) and Airport Boulevard (east-west).

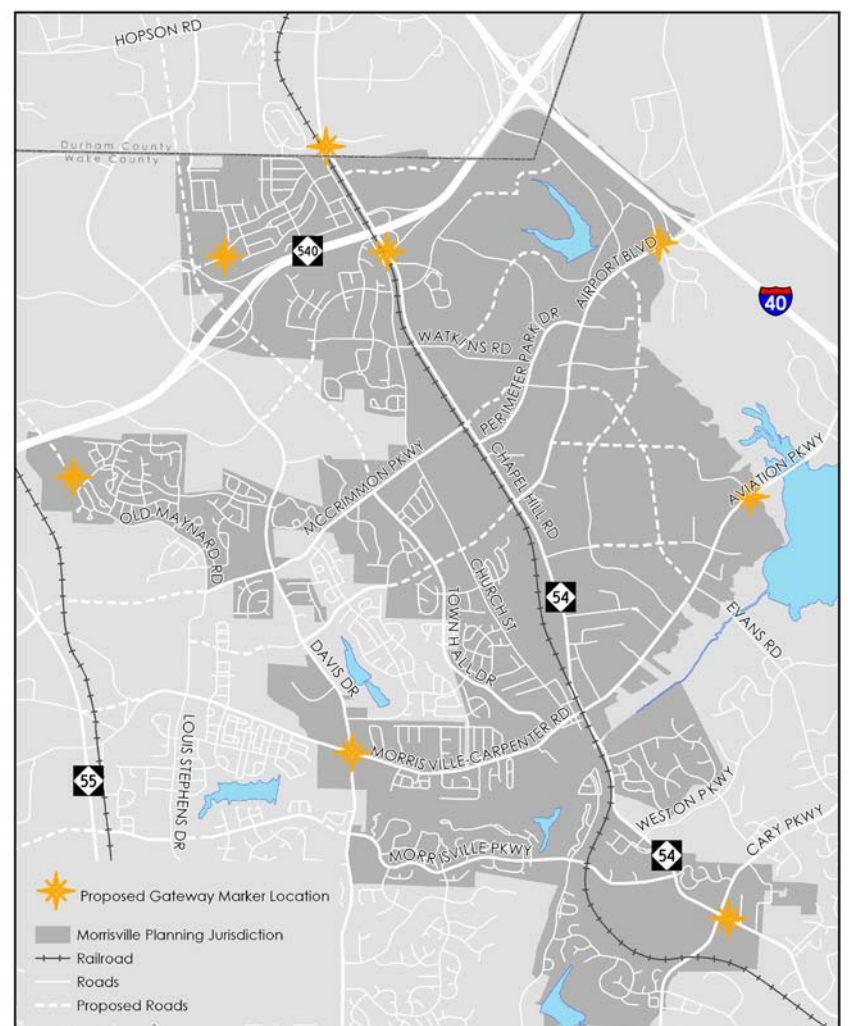
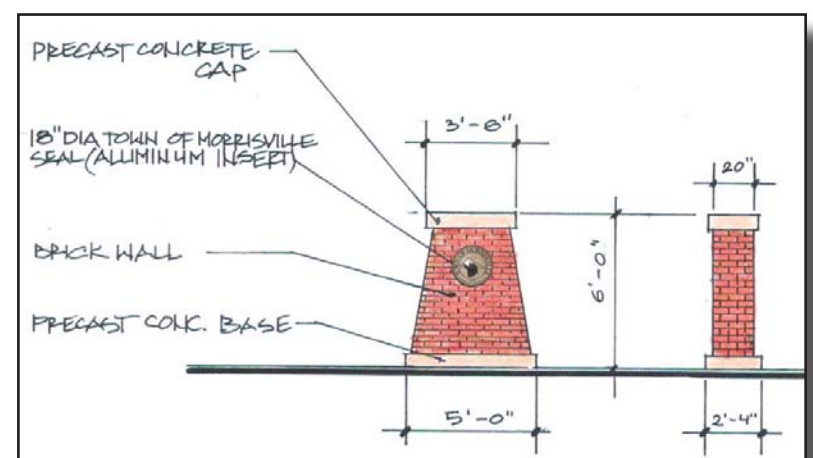


Figure 5.11 Gateway Marker Locations



Sketch of the new gateway sign for Morrisville.

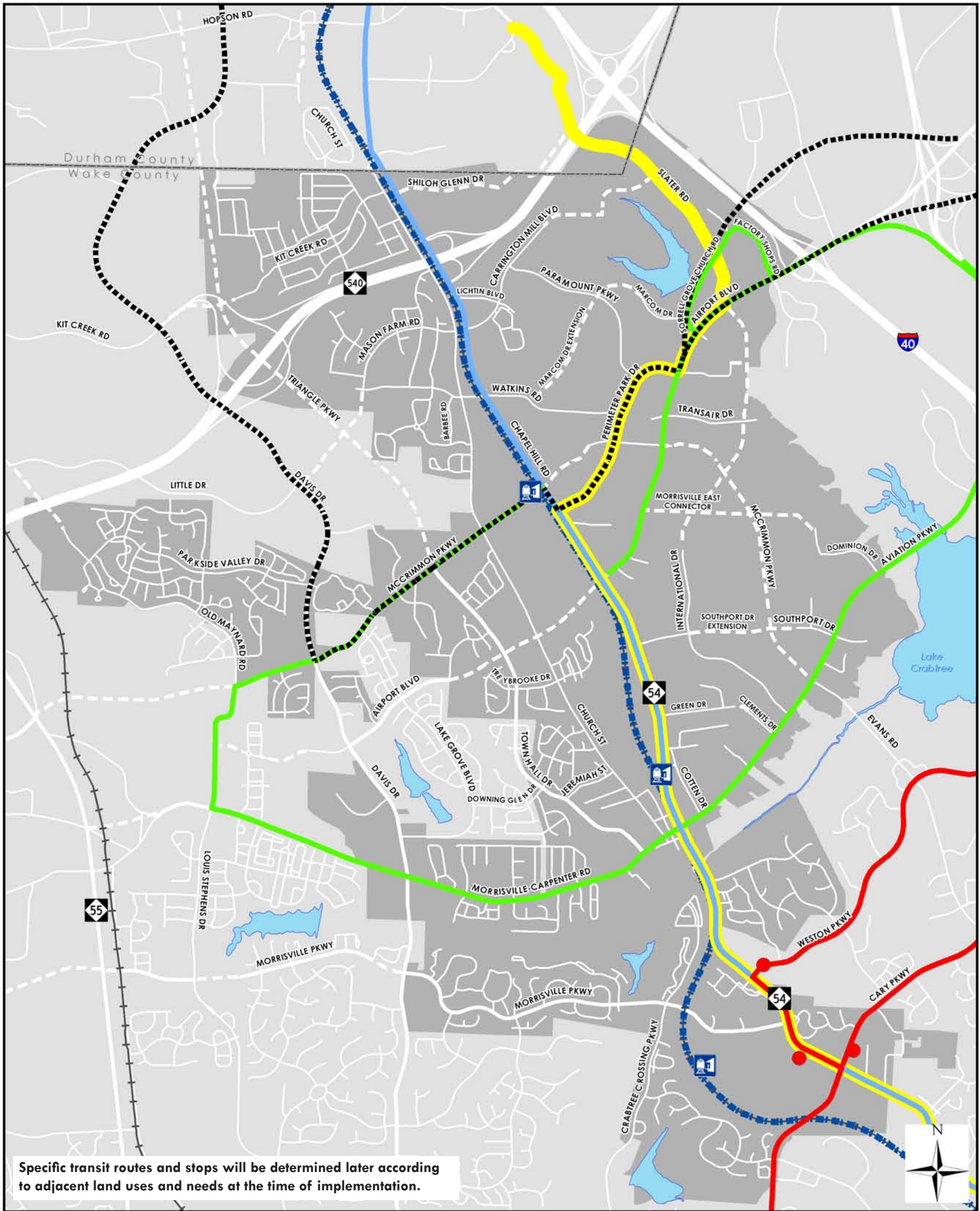
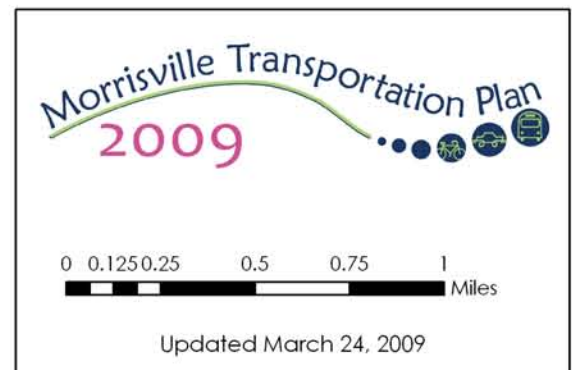


Figure 5.12 Public Transportation Recommendations



5.3 Public Transportation, cont'd

Figure 5.13 Qualitative Service Assessment of Public Transportation Service Options

Option	Cost/Benefit	Feasibility	Service Quality	Performance	Ridership
Fixed Route Case Study*	●●	↔	●●	●●	●
Deviated Fixed Route	●●	↔	●	●●●	●
Limited Deviation Fixed Route	●	↔	↔	●●	●
Increase Funds to Wake TRACS	●	●●	●	●	●
Cooperate with C-Tran to Expand Services Into Morrisville:					
Cary Parkway/Weston Parkway (planned)	●●	●●	●●	●●	●●
NC 54 (north-south) (potential future route)	●	●	●●	●	●
Airport Boulevard (east-west) (potential future route)	●●	●	●●	●●	●

Notes:

* Refers to a fixed route run independently by the Town of Morrisville. See Appendix H for details.

Factor	Definition
Cost-Benefit	The potential benefits compared to the costs of starting the service in years 1-3
Feasibility	The constructability and staff requirements to implement
Service Quality	The timeliness, reliability, and frequency of service
Performance	How well the service performs financially
Ridership	The potential ridership of the service

Legend:

- ↔ = Neutral
- = Positive
- = Negative

More dots = more impact

Positive/negative impacts are from the perspective of the Town.

Definitions of Transit Services

Fixed Route: Transit service that follows a fixed timetable and serves a routine set of stops.

Deviated Fixed Route: Transit route follows a set of scheduled stops, but also services additional stops as they are called in to the dispatcher.

Limited Deviation Fixed Route: Transit route that follows a set of scheduled stops, but also services a subarea or point on demand as determined by calls into the dispatcher.

Figure 5.14 Public Transportation Recommendations

SHORT-TERM (1-3 YEARS)	Issue an RFP to conduct a detailed study to determine the most cost-efficient transit service that meets the needs of Morrisville residents and businesses. The focus should be on creating a service agreement between the Town of Cary to expand C-Tran service into Morrisville at a pace that synchronizes with the Cary planned improvements. Coordinate stops in Morrisville along planned Cary Parkway/Weston Parkway route.
	Ensure integrated land use-transportation design now that includes strong pedestrian, cycling, lighting, and stop design standards to accommodate public transit services in the identified corridors.
	Increase participation in the Wake County TRACS Service to accommodate additional riders only as needed. Currently, there is not a need to expand the number of guaranteed seats beyond the current three.
	Initiate a universal pass for Town employees, and work with selected businesses to provide discounts for their employees who use public transportation, carpool/vanpool riders, and bicycle/pedestrian commuters. Work with Triangle Transit to coordinate this effort since they offer this type of service for free.
	Work with Triangle Transit to improve the NC 54 corridor to accommodate the 301 route. Triangle Transit has suggested that it is willing to relocate this route off I-40 to NC 54. Identify stop locations and finance shelters and pedestrian facilities, lighting, and other improvements to these locations.
MID-TERM (3-10 YEARS)	North Carolina Railroad Company (NCR) has suggested that there should be a 1/4-mile "buffer" of lower-density and non-residential uses in the vicinity of the railroad tracks to address risk from the transport of hazardous materials on the railroad. However, in some locations this advice is impractical or already behind the pace of development. The Town should work with the NCR and Norfolk Southern Railroad Companies to develop a hazardous waste transport safety plan that includes the following elements: designation of a safety officer and points-of-contact within each agency (Town and railroads); work with the railroad companies to discourage any storage and minimize the idle time of train cars or sets in Town; review and evaluate, annually, critical transportation and other infrastructure and procedures to ensure that determine the level of information that should be supplied to the Town on a regular or special basis regarding scheduling of hazardous waste, respecting the fact that access to such information is extremely sensitive; identify primary evacuation routes and communicate whenever these routes are temporarily closed due to construction or breakdowns; establish a regular schedule of communication between the Town officials and railroad company executives to provide a regular information sharing collaboration between the Town and railroad companies to create risk-based assessment strategies and minimize risk from hazardous materials transport; as densities increase in the area, perform annual security exercises and use the results to modify and improve security plans; and as regional rail becomes a viable option, ensure that rail stations and facilities have proper security protocols in place for employees and staff.
	Continue to work with Triangle Transit and other regional partners to develop a circulator route between Durham, Research Triangle Park, and Raleigh-Durham International Airport.
LONG-TERM (11-20 YEARS)	Explore possible future routes with C-Tran, including a north-south route along NC 54 and an east-west route along Airport Boulevard to connect the growing northwest area of Cary with south RTP and RDU International Airport. An alternative routing (or second east-west route) could occur along Aviation Parkway to reach the Town Center area, RDU, and Lake Crabtree.
	Continue to work with Triangle Transit and the North Carolina Railroad Company to support passenger rail service. Potential station locations are identified at McCrimmon Parkway, Aviation Parkway, or Cary Parkway. The Town needs a detailed study closer to the time of implementation in order to choose a specific location. The station should be a benefit to Morrisville residents. Land use considerations must account for the fact that this line occasionally carries hazardous waste and AMTRAK service, and is planned to carry high-speed rail service at some point in the future.



NCDOT's Five E's of sound bicycle and pedestrian planning.

I think Morrisville is better than where I lived [before]. I did not like the feeling of being scared to be hit by a speeding car or my dog hurt and no places to walk or ride my bike.

- Youth Focus Group Participant (January, 2008)

Bicycle/Pedestrian Facility Definitions

Bike Lane - A portion of the roadway that has been designated by striping, signing and pavement markings for the preferential and exclusive use of bicyclists.

Multi-use Path - Physically separated from motor vehicle traffic, usually within the roadway right-of-way. Wider than a sidewalk, typically 8 to 10 feet wide.

Greenway - Similar to a Multi-use Path, but contained in an independent right-of-way, separated from roadways.

Signed Bicycle Route - Designated route with directional and informational markers.

Designated along more lightly traveled residential or secondary roads where additional facilities are not necessary.

Wide Outside Lane - The through lane closest to the curb is wider (generally 14 feet, rather than 12 or 11 feet), allowing cars to more safely pass bicyclists.

Sharrow - Sharrows are streets marked with bicycle symbols to denote that bicycles "share" the travel lane with motorized traffic.

5.4 Bicycle and Pedestrian Network

Overall, Morrisville has tremendous potential as a bicycling and walking community due to a number of as-yet-undeveloped stream corridors and easements that could be used to provide a "trunk" system of off-road facilities, and a rapidly expanding roadway system with a number of road widening projects being conducted by both public and private entities that can be used to leverage on-road improvements for both pedestrians and cyclists. Caution should be exhibited, however, as intersections and roads are designed to ensure that pedestrians and cyclists are accommodated more than just adequately and ensure not only their safety, but their convenience as well. The objective is to encourage more walking and bicycling by increasing the attractiveness of the pedestrian and cycling environments.

To create excellent walking and bicycling opportunities, Morrisville needs to participate in ensuring that the Five E's of sound bicycle and pedestrian planning are accomplished: Engineering, Education, Enforcement, Encouragement, and Evaluation (this idea originated with NCDOT). The first four are accomplished by creating projects and programs that address cycling and walking problems, and create a better transportation system for all levels of users. The last, Evaluation, is part of an ongoing outreach program, which Morrisville is already very good at doing; holding public meetings and conducting citizen surveys on a regular basis. The Five E's typically require the partnership with other agencies besides a town planning department to implement successfully and continuously. These partners can and should include health-based organizations, law enforcement agencies, engineering staff, state and regional planning agencies, and the business community.

Bicycle and Pedestrian Project Recommendations

The Morrisville Transportation Plan worked closely with the community and Plan Advisory Committee to develop project priorities. A public workshop conducted on March 27, 2008, asked participants to identify roadway, transit, and bicycle/pedestrian improvements using both markers and string to prioritize improvements to the transportation systems. A variety of considerations were used to develop the initial candidate project listing, including:

- The Morrisville Parks, Greenways, and Open Space Master Plan (2006), which contains recommendations particularly for off-road greenway facilities.
- Public comments received at three public workshops and three focus groups, particularly the Youth Focus Group conducted on January 8, 2008.
- Comments received from the Plan Advisory Committee.
- Field observations conducted by members of the consulting staff experienced in bicycle/pedestrian planning and development.
- Comments received from the Town of Morrisville Staff at several coordination meetings, notably including one coordination meeting with the Town of Cary in April, 2008.
- Triangle J Council of Governments Center of the Region Enterprise (CORE) bicycle and pedestrian plans.

An important consideration in the development of biking and walking recommendations is that while bikers and walkers do "cross paths" on greenway facilities, the two modes of travel are as fundamentally different from each other as either one is compared to driving a car. These differences include emphases on skills, facility types, safety features, governing policies/regulations, and the degree of interaction with vehicular traffic. Therefore, the recommendations have to respect these differences, as do the priorities that the Town should emphasize to create better environments for pedestrians and cyclists. Certainly, both cyclists and pedestrians share the experience of a slower pace; more exposure to sensory elements like lighting, noise, and odors; and heightened sensitivity of the distance between origins and destinations than their car-driving counterparts making the same trip. Hence, walking is about more than sidewalks and cycling is about more than a bicycle lane or parking rack. Both modes benefit greatly from a diverse and complementary set of land uses in near proximity to one another; superior façade and landscaping treatments; adequate ground-level lighting conditions; and an awareness and enforcement of safe walking, driving, and cycling habits that comes from program and policy changes.

The general recommendation of this Plan is for 8-foot multi-use paths on both sides of major roads as well as 4-foot bike lanes (plus a 2-foot gutter pan). Exceptions are Airport Boulevard and Aviation Parkway, which will have 6-foot bike lanes in recognition of higher traffic volumes and speeds; Davis Drive and Cary Parkway, which will have wide outside lanes to match the cross-section in Cary; and NC 54, which has a 10-foot walkway on the east side, 5-foot sidewalk on the west side, and 6-foot bike lanes (4-foot in the Town Center). Smaller roadways will have 5-foot sidewalks on both sides of the roadway; two-lane roads have wide lanes to allow for bicycles sharing the road, and four-lane roads have wide outside lanes.

Small-scale bicycle and pedestrian improvements, which could be implemented at a lower cost to the Town and as interim solutions to immediate safety and accessibility problems until funds for larger-scale renovations are available, are listed in Figure 5.15. One recommendation for specific improvements to the Airport Boulevard and Factory Shops Road area is detailed in Figure 5.16, and several are displayed in the map in Figure 5.17. Some of the projects in the map are described as primary recommendations in Figure 5.18; additional projects shown on the map are planned to be implemented at the same time as new roadway construction. Estimated cost for many projects is listed; the estimates are for the specific project improvements only, and will not include ancillary costs associated with signal, intersection, or crossing improvements; those without a cost would likely be constructed as part of a major roadway widening project, and the costs are included in the roadway improvement cost listed in Figure 5.6.

Policies that affect biking and walking are often contained in different places, like subdivi-

5.4 Bicycle and Pedestrian, cont'd

Figure 5.15 Small-Scale Bicycle/Pedestrian Recommendations (numbers in parentheses refer to numbers marked on Figure 5.17)

	Project	Description	Cost	Implemented
HIGH PRIORITY	Continue sidewalk along NC 54 near NC 540 (2)	Shiloh Crossing will be constructing sidewalk on the east side of NC 54 along its frontage north of NC 540, to the northernmost NC 540 ramp. The Town will be constructing sidewalk and making other pedestrian improvements such as pedestrian signals and crosswalks from the northernmost ramp to Lichtin Blvd.	\$30,000	Town
	Construct sidewalk along Cary Parkway	A short portion of sidewalk is missing along the north side of Cary Parkway north of NC 54, fronting the Marquis Apartments and other parcels.	\$50,000	Town
	Morrisville Outlet Mall Area Pedestrian Improvements (1)	Improvements at both Factory Shops Road and Slater Road intersections with Airport Boulevard. The proximity of hotels, Morrisville Outlet Mall and regional bus service make these locations a prime opportunity for pedestrian signals, crosswalks, and sidewalk / landscaping improvements. See Figure 5.16.	\$100,000	Town / State
	Sidewalk Connections on Church Street near Schools	Construct five-foot sidewalks on west side of Church Street between Downing Glen and Treybrooke Drive.	\$185,000	Town/Grant
	Sidewalk Connections on Morrisville-Carpenter Road	Construct five-foot sidewalks on Morrisville-Carpenter Road between Davis Drive and Church Street where missing. This project may be done in segments: North side along utility site (\$56k), Savannah to Church Street (\$105k north side, \$86k south side).	\$247,000	Private / Town
	Implement Town Streetscaping Program (various locations)	Create pedestrian "pockets" at key locations at gateway entrances, destinations, and civic institutions that connect on-street and off street biking/walking facilities. Utilize volunteer labor for maintenance.	\$264,000	Town / Private
MEDIUM PRIORITY	Install directional signage and wayfinding for greenway system	Directional signing (wayfinding, e.g. American Tobacco Trail intersection Two miles) would be important as the greenway system and walking transportation are further developed, to let people know where the route leads.	\$354,000	Town
	Sidewalk Connections on McCrimmon Parkway	Complete sidewalk connections on south side of McCrimmon Parkway east of Davis Drive.	\$30,000	Town
	Pedestrian Intersection Improvements at Treybrooke Drive Intersections (3)	Implement pedestrian signals, paint crosswalks, and post advance warning signage at the intersections of Treybrooke Drive and Town Hall Drive and Church Street.	\$6,000	Town/Private
	Intersection Improvements at Davis Drive and Morrisville-Carpenter Road (4)	Implement crosswalk, pedestrian signals, and signal timing considerations to ease crossing of this wide intersection located at a potentially popular shopping destination.	\$100,000	Town
	Mid-block Pedestrian Crossing on Morrisville-Carpenter Road where Greenway Crosses (5)	Once the greenway section of Grace Park is completed to the north, this mid-block location will be a natural pedestrian crossing to Community Park. Signs, painted crosswalk and lighting will improve safety.	\$89,000	Private
LOW PRIORITY	Improve Pedestrian Crossing on Crabtree Crossing Parkway south of Morrisville Parkway (7)	A golf cart/pedestrian crossing currently exists across Crabtree Crossing Parkway just south of Morrisville Parkway, but its alignment does not allow vehicles to easily see those crossing. The pathway should be re-aligned to the intersection, with pedestrian signals, high-visibility signage and crosswalks added.	\$20,000	Town
	Improve Railroad Crossing East of Crabtree Crossing Parkway Intersection on Morrisville Parkway (8)	Improve bicycle and pedestrian crossing conditions at this location, including replacing asphalt sidewalks, installing ADA ramps, and improving crossing smoothness across tracks for cyclists.	\$24,000	Town

sion regulations, zoning ordinances, development review processes, and existing planning documents. Following is a brief overview of the existing plans and policies that contain recommendations or otherwise potentially influence pedestrian and cycling facilities and programs. Additional information on these plans can be found in Appendix D. The Town of Morrisville must also adhere to NCDOT regulations on the majority of streets, since the state of North Carolina has the responsibility for maintaining them.

Capital Area Metropolitan Planning Organization (CAMPO). As the responsible federal entity for liaising between the Town of Morrisville and federal transportation practices, CAMPO has a strong influence on which transportation projects are prioritized for implementation, including bicycle and pedestrian projects. Chief among the products produced and services offered by CAMPO are the following:

- Regional Bicycle and Pedestrian Plan, typically stitched together from existing local priorities and overlaid with regional priorities;
- Facility definitions; and
- Prioritization of new bicycle and pedestrian facilities funded by state and federal sources.

Center of the Region Enterprise (CORE). The CORE Plan, currently under revision, is an ongoing planning effort intended to coordinate the actions of the several municipal, county, and other service and employment agencies between Cary, RTP, Durham, and Raleigh. A relevant part of the CORE Plan are the maps that describe biking and walking facilities that are planned, and their priority to servicing movements inside the Region. A casual glance at these maps indicates that Morrisville is crisscrossed by numerous, future on-road and off-road bicycle / pedestrian facilities. The priorities of these facilities should be closely examined to support connections to Research Triangle Park (principally through Davis Drive); major shopping and work destinations; and transit services provided by Triangle Transit and Town of Cary (C-Tran) fixed-route bus service. The Triangle J Council of Governments (TJ-COG) sponsors this ongoing planning effort, and can help keep these recommendations

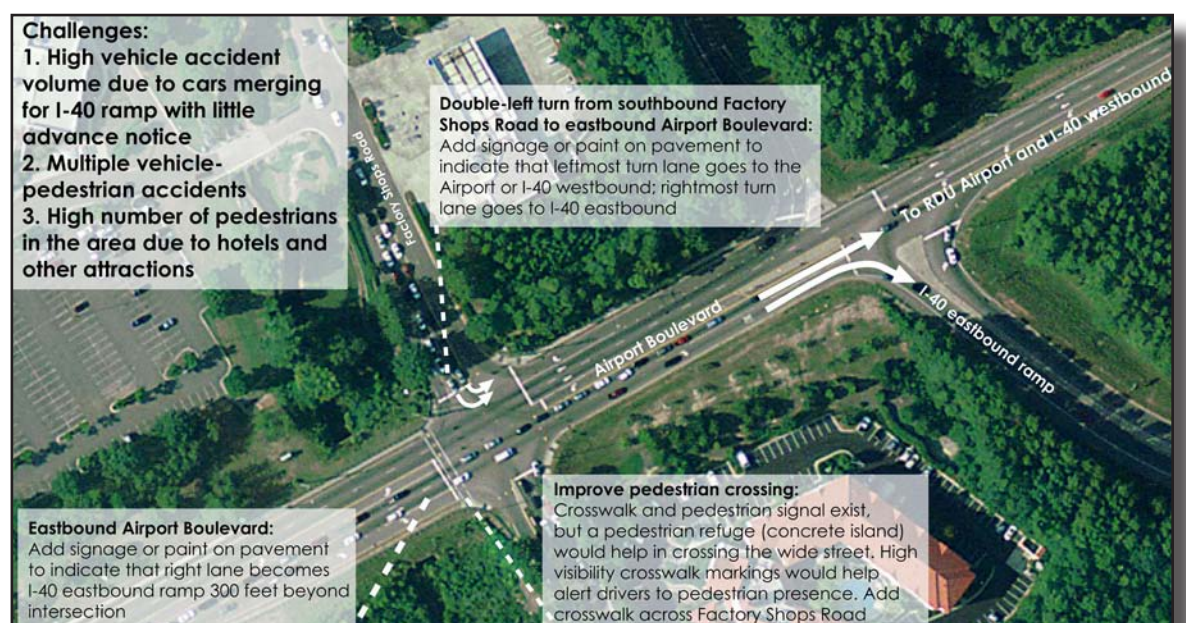


Figure 5.16 Proposed Pedestrian and Traffic Improvements to Airport Boulevard at Factory Shops Road

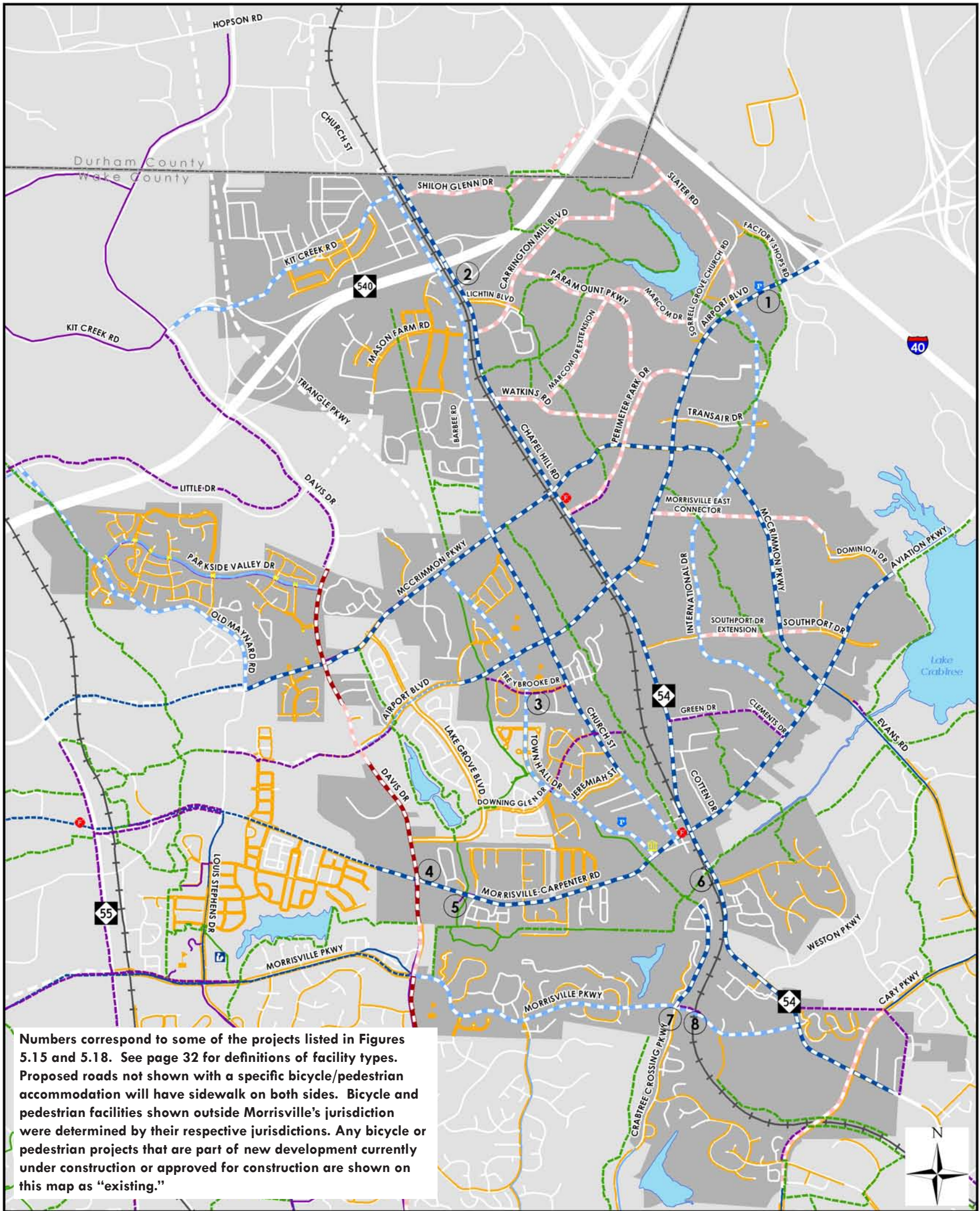


Figure 5.17 Recommended Bicycle/Pedestrian Facilities

<ul style="list-style-type: none"> Town Hall Library Police Station Fire Station Schools County Boundary Morrisville Planning Jurisdiction Lakes Railroad Roads Proposed Roads 	<p>Existing Bike/Ped Facilities</p> <ul style="list-style-type: none"> Crosswalk, high visibility Sidewalk Greenway Multi-use Path Bike Lane Wide Outside Lane 	<p>Recommended Facilities</p> <ul style="list-style-type: none"> Sidewalk Greenway Multi-use Path Bike Lane Wide Outside Lane Bike Lane + Multi-Use Path Bike Lane + Sidewalk Wide Outside Lane + Multi-Use Path Wide Outside Lane + Sidewalk
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Updated March 24, 2009

5.4 Bicycle and Pedestrian Network, cont'd

Figure 5.18 Major Bicycle/Pedestrian Recommendations (numbers in parentheses refer to numbers marked on Figure 5.17)

	Project	Description	Cost	Implemented
HIGH PRIORITY	Bicycle Lanes and Multi-Use Paths on Church Street South of McCrimmon Parkway	Construct four-foot bicycle lanes and eight-foot multi-use paths (both sides) on Church Street between Morrisville-Carpenter Road and McCrimmon Parkway <i>Church Street serves elementary schools as well as a primary north-south alternative to the congested NC 54 facility. Essential to enhancing this recommendation is providing consistent streetscaping and lighting along this corridor as it develops.</i>	*	Town / Private
	Aviation Parkway Bicycle Lanes and Multi-Use Paths	Construct six-foot bicycle lanes and eight-foot multi-use paths (both sides) from NC 54 to Lake Crabtree causeway. <i>This roadway connects the Town Center area to businesses, Wake County Lake Crabtree Park, and regional bicycle systems. Important to this recommendation is the continuation of bicycle facilities across the causeway (in Cary jurisdiction), terminating at Lake Crabtree Park. Multi-use paths on the north side of Aviation Parkway are the most critical.</i>	*	Private / Town
	Greenway connection between Indian Creek Greenway and Crabtree Crossing Parkway	Construct off-road 10-foot ribbon asphalt greenway, including foot bridge over Crabtree Creek and boardwalk over wetlands <i>In lieu of constructing Crabtree Crossing Parkway Extension, a greenway will connect from the southern end of the existing Indian Creek Greenway (Town Hall Drive and Morrisville-Carpenter Road) to the northern end of Crabtree Crossing Parkway. This greenway will provide bicycle and pedestrian access to the town center and schools for residents living in the southern end of the town.</i>	\$420,000	Private / Town
	Greenway connections east of Community Park, leading to Cedar Fork County Park	Construct off-road 10-foot ribbon asphalt greenway <i>There are currently trails within Community Park and within Cedar Fork County Park. Some greenway connections are being constructed within the Savannah subdivision, but other connections are necessary to effectively connect the parks. In addition, this item is dependent on a pedestrian crossing under the railroad and NC 54 for pedestrians to reach Cedar Fork County Park.</i>	\$1,026,000	Private / Town
	Pedestrian crossing for greenway to Cedar Fork County Park (6)	Perform grading and trail work, possibly a grade separation <i>In order to safely connect greenways on the west side of NC 54 to Cedar Fork County Park, a pedestrian crossing is necessary. It is possible that this could be achieved underneath the railroad and NC 54, using the existing culverts, but more work may be necessary for pedestrians to cross safely.</i>	\$44,000	Private / Town
	Greenway connection from McCrimmon Parkway to Providence Place	Construct off-road 10-foot ribbon asphalt greenway <i>The Indian Creek greenway, constructed in 2008-2009, will end at Town Hall Drive and McCrimmon Parkway. Greenway easements are included in developments under construction at Providence Place and Shiloh Grove. A greenway would be needed to connect these parts to the Indian Creek greenway, through the Future Town Park and Town Hall Commons. An existing power line easement will be used.</i>	\$290,000	Private / Town
MEDIUM PRIORITY	Bicycle Lanes and Multi-Use Paths on Church Street North of McCrimmon Parkway	Construct four-foot bicycle lanes and eight-foot multi-use paths (both sides) on Church Street from McCrimmon Parkway to the town boundary. <i>This connection will provide a continuous north-south alternate route to NC 54 for commuters, as well as connecting the heavily-populated Kit Creek and RTP offices to the downtown and other links in the system. Obviously, the recommendation for bicycle lanes at the south end of Church Street is a key, supporting item.</i>	*	Town / State
	Bicycle Lanes and Multi-Use Paths on Morrisville-Carpenter Road	Construct four-foot bicycle lanes and eight-foot multi-use paths (some five-foot sidewalk already exists) on Morrisville-Carpenter Road from NC 54 to Davis Drive. <i>Cyclists will need to merge with traffic at the NC 54 intersection on the east end, but the remainder of this corridor will connect the Town Center area to the east with one of two grocery and shopping centers in Morrisville on the west end. Other key recommendations that support this are (A) the Church Street bicycle lanes and (B) the bicycle lanes on Aviation Parkway.</i>	*	Town / State
	Bicycle Lanes and Multi-Use Paths on Airport Boulevard	Construct six-foot bicycle lanes and eight-foot multi-use paths on Airport Boulevard between Factory Shops Road and NC 54. <i>The additional width of these bike lanes here will help provide a level of comfort and safety in this heavily-traveled corridor with a moderate number of driveway breaks. Anchored by businesses on the west end and shopping/hotels/restaurants on the north end, this recommendation connects strongly to the recommendation to improve the Slater Road and Factory Shops Road intersections with Airport Boulevard.</i>	*	Town / State
	Bicycle Lanes and Sidewalks on NC 54	Construct six-foot bicycle lanes, ten-foot walkway along the east side, and five-foot sidewalk along the west side of NC 54 in Morrisville. <i>These facilities will be constructed as part of the widening of NC 54, which is planned to occur in segments. See page 26 and page E-17 in the appendices for more information about the phasing of NC 54 improvements.</i>	*	Town / State
LOW PRIORITY	Bicycle Lanes and Multi-Use Paths on McCrimmon Parkway, NC 54 to Old Maynard Road/Louis Stephens Drive	Construct four-foot bicycle lanes and eight-foot multi-use paths (where they do not already exist) on McCrimmon Parkway from NC 54 to Old Maynard Road/Louis Stephens Drive. <i>This section of bicycle lanes completes the envisioned "loop" of facilities that includes Davis Drive; Morrisville-Carpenter Road; Aviation Parkway; and McCrimmon Parkway Extension. This particular segment connects the schools on Town Hall Drive, future Town Park, residential development, and McCrimmon Corners on the west end of the project with the Davis Drive multi-use path (and RTP to the north).</i>	*	State / Town / Cary
	Restripe Morrisville Parkway, Perimeter Park Drive and Paramount Parkway	Restripe existing pavement on Morrisville Parkway for bike lanes, restripe existing pavement on Perimeter Park Drive and Paramount Parkway for wide outside lanes. <i>These three roadways are already four lanes and have a low probability of roadway widening/improvements in the near future. None currently has any on-road bicycle facilities, but the Town can restripe the existing pavement (without widening) at relatively low cost for bike lanes (Morrisville Parkway) and wide outside lanes (Perimeter Park Drive and Paramount Parkway).</i>	**	Town / State
	Coordinate with Town of Cary for bike/ped facilities on Lake Crabtree Causeway	Coordinate with the Town of Cary to continue appropriate bike/ped facilities from the town boundary on Aviation Parkway to Lake Crabtree County Park. <i>The Town of Cary currently plans to expand Aviation Parkway in its jurisdiction to six-lanes with a median. Town of Morrisville staff should coordinate with Town of Cary staff to ensure consistency and appropriate timing of construction of bike/ped facilities along Aviation Parkway to allow safe access for Morrisville residents to Lake Crabtree County Park.</i>		State

* These improvements would likely occur during the planned roadway widening, so their cost is included in the roadway improvement cost listed in Figure 5.6.

** Restriping would be done by NCDOT on Morrisville Parkway at no cost to the Town. Costs for restriping along Perimeter Park Drive and Paramount Parkway would be the Town's responsibility.

Note that this is not a complete list of proposed facilities. Some proposed facilities shown on Figure 5.17 would occur during the construction or widening of a roadway, such as Louis Stephens Drive, Slater Road, Carrington Mill Boulevard, International Drive, and sidewalks and wide outside lanes on other proposed roads.

5.4 Bicycle and Pedestrian Network, cont'd

valid given the changes in direction from these numerous partners as well as the updated priorities contained in this Plan.



Example of screening techniques.

Town of Morrisville Ordinances. The Town of Morrisville created new ordinance language in September 2006 that described pedestrian and cycling facility terms, where bicycles and walking are allowed; and safe cycling and walking behavior. The terms from this ordinance stem sometimes from other sources like the North Carolina General Statutes, and are used to define facility types in the design section of the *Transportation Plan*. Most importantly, this ordinance states (by omission) that bicycles are allowed on sidewalks, which runs counter to safety studies that suggest riding on sidewalks is from 2 to 24 times more dangerous than riding a bicycle in the road and that sidepaths and sidewalks encourage more wrong-way cycling (which further increases the chance of injury). The ordinance does require that when multi-lane (four lanes or wider) roadways are constructed or widened in the town, the outer lane should be a wide outside lane of at least 14 feet. Wide outside lanes allow cars to more safely pass cyclists on the roadway. Other ordinance language affecting bicycle/pedestrian travel is scattered throughout the ordinance, for example, the 4% density bonus allowed for the construction of each 1,000 feet of greenway constructed in Planned Unit Development overlay areas (Section 3.2.3). Section 5.4.2 of the Morrisville Design and Construction Ordinance specifies developer requirements for sidewalks, including their installation on both sides of all town streets.

Morrisville's subdivision and zoning ordinances also codify development practices that get realized in private (and public) development actions. The ordinance is impressive in its requirements for off-street parking placement and design, requiring pedestrian walkways and/or greenspace every third aisle and, in many areas, for parking lots to be located in side or rear yards. Parking areas often create "dead zones" for pedestrians and frequent curb cuts produce conflict points for cyclists, so the additional attention paid to these details is appreciable. One area of the parking ordinance to reconsider is the Type 3 Area parking requirements for areas of "lower community prominence" where it is not clear that the parking location requirements still hold. These areas on non-residential collector streets can serve as integral, low-volume corridors for cyclists and pedestrians, and should be treated similarly to other streets, especially given the large amount of land that may be developed as institutional or industrial/commercial uses east of NC 54. The aesthetics of greenway areas are specifically addressed through screening requirements (e.g., Section 3.3(a) and 4.2(a)(1)) as demonstrated in the photo.

These ordinances are implemented through a development review process, which is aided (as much for the developer as the staff) by a development review checklist. This checklist contains a review of bicycle and pedestrian accommodations, and again could serve as a model for other communities to adopt. More specificity on these requirements may be necessary to fully impart the significance of the location and design.

Town of Morrisville Adopted Plans. In addition to the Transportation Plan, three types of plans already adopted by the Town have a particular bearing on the recommended projects and policies that need to be considered in this comprehensive transportation plan: parks/greenways, small area, and downtown revitalization. Each of these three is considered briefly in the following paragraphs.

- *Parks, Recreation, Greenways & Open Space Comprehensive Master Plan (2006).* The Plan identifies standards for the provision of community facilities like parks and softball fields, but does not recommend a standard for greenways (e.g., miles of greenway per resident). Proposed greenways are indicated in stream, utility easement, and rail (south of Morrisville-Carpenter Road) corridors. A survey conducted in conjunction with the Plan indicated a relevant need for more bicycle lanes and greenways, as well as more opportunities for youth and seniors to be active.
- *North Morrisville-Shiloh Small Area Plan (2002).* This Plan was created to preserve the heritage of the Shiloh Community and guide future development plans. There are several implied elements that indirectly affect project recommendations, particularly: incorporating the Shiloh Cemetery into a heritage trail plan; the mixed use and commercial development mixtures in some areas; and an overpass of the railroad at Lichtin Boulevard (now Carrington Mill Road). The most direct mention of bicycle/pedestrian accommodations is the area west of NC 54 and Church Street, which was recognized for its potential for greenways and park development:

A well spaced network of stream and drainage corridors for potential greenway linkages benefits the North Morrisville/Shiloh Area west of NC 54. In addition, an overhead transmission line passes through the area on a north south axis, creating an easement underneath. Collectively, this network affords the opportunity to provide for pedestrian/trail access (1) from residential areas to major open space areas (2) from residential areas to the Shiloh village center (3) from areas south of McCrimmon Parkway up into the Shiloh community (and vice versa). Trail development along natural drainage corridors will require the dedication of easements parallel to these streams.

- *State of North Carolina Standards, Policies, and Law.* In 2000, the N.C. Board of Transportation, which has individual project and policy approval authority for almost all of the work conducted by NCDOT, adopted a resolution declaring bicycling and walking a critical part of the transportation system. The resolution states that the Board of Transportation:

...concurs that bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities and supports the Department's study and consideration of methods of improving the inclusion of these modes into the everyday operations of North Carolina's transportation system.



Bike lanes and multi-use path along Parkside Valley Drive.

5.4 Bicycle and Pedestrian Network, cont'd

While this statement has become more integrated into the everyday operations of NCDOT over time, there are still some notable discrepancies, such as local governments being required to pay a portion of pedestrian facilities ancillary to a roadway improvement. NCDOT funds projects that are independent of a roadway improvement project and incidental to roadway projects, including pedestrian overpasses/underpasses; on- and off-road facilities; signage; and mapping projects. NCDOT has developed policies on Traditional Neighborhood Development Street Design Guidelines (August, 2000) and guidance on the policies and laws affecting bicyclists and pedestrians (www.ncdot.org/transit/bicycle/laws/laws_intro.html).

Based on the review of these policies, the following changes are recommended to improve the cycling and walking potential of the Town. These recommendations are based upon existing research into bicycling and walking safety and encouragement practices; more information can be obtained from national resources such as www.pedbikeinfo.org, which contains information and links to other sources.

Program Recommendations. Programs should be designed with the resources, issues, and characteristics of individual communities in mind, but their importance in obtaining safety and promotional goals for walking and cycling are hard to overstate. Often, partnering agencies like schools, law enforcement agencies, health centers, gardening clubs, and business communities support or participate in these programs.

- Work with other small towns in the Capital Area MPO to petition CAMPO to designate a full-time bicycle/pedestrian coordinator for the MPO whose sole function is to maintain the planning documentation for the long-range transportation plan and metropolitan transportation improvement program, as well as work closely with partnering agencies in the MPO and local governments to develop, finance, and implement programs. This action will greatly aid all of the small towns in the MPO planning area in developing program and policy changes. There are opportunities to link and expand bicycle and pedestrian networks with neighboring jurisdictions, such as collaborating with Durham County to place a greenway along Triangle Parkway.
- Create School-Based Education and Safety Programs. Working with Cedar Fork and Morrisville elementary schools and the Montessori school, develop a one-week study curriculum of bicycle and pedestrian safety like that shown in Figure 5.19. Each day would take one class period (or less) to perform, but would optimally have some assistance from the Town to provide guidance, materials, and support.



Safe Routes to School “Walk-to-School Day” at Highlands Elementary.

Figure 5.19 Sample One-Week Bicycle and Pedestrian Safety Curriculum

Day	Exercise	Purpose
Monday	Diagram the school grounds and ¼-mile vicinity	Identify places where walking and cycling could be made safer, like intersections, curb ramps, signals, traffic speeds, aesthetics, etc. Provide disposable digital cameras to at least two students in each class to help document the findings.
Tuesday	Conduct a Walk-to-School Day	Notify parents of walk-to-school day, and send an educational flyer home in advance of the event to explain the purpose and note how many calories are burned, safety issues, etc. (see also: www.walktoschool.org).
Wednesday	Sidewalk and Parking Lot Art	Provide inexpensive buckets of colored chalk to students to create cartoons and illustrations cautioning drivers in pickup/drop-off areas of the school to practice safe behavior. (The chalk comes off after a couple of days.)
Thursday	Create School Diagrams	Use the diagram and pictures from Monday and found on the internet to illustrate improvements that could be done to behaviors and physical conditions to make biking and walking safer, as well as good things that are there now that make the experience better.
Friday	Report and Celebrate	Have students write one paragraph on what they've learned and their ideas for making biking and walking better. Celebrate with a pizza party, and invite their parents to showcase what has been accomplished. Taking pictures of the activities throughout the week is important.

5.5 Connection to Town Center Plan Recommendations

The Morrisville Town Center Plan, adopted in 2007, sets out a number of transportation recommendations as part of its strategies to improve circulation, safety, amenities, and overall quality of life in the Town Center. The recommendations of this Plan recognize and take into account the Town Center Plan recommendations in many ways, including the following:

- Narrowed cross-sections for NC 54, Morrisville-Carpenter Road, and Church Street as they enter the Town Center area to reduce impacts on existing development. Proposed roundabout on Church Street at Jeremiah Street as recommended in the Town Center Plan.
- The emphasis on a safe, linked pedestrian network with on- and off-road facilities to accommodate a range of users on all major roadways.
- The Town Center Plan explicitly discusses and prioritizes transit options. This Plan identifies several viable short-term and potential long-term transit options to serve residents and employees. Discussions held during the planning process with several transit agencies furthered the groundwork laid by the Town Center Plan and advanced the overall timeline for improving transit options.

6.0 DESIGN GUIDANCE

6.1 Bicycle and Pedestrian Design Guidance

Bicycle and pedestrian standards do not need to conflict with the desire to move vehicular traffic safely and expediently, but opportunities exist throughout Morrisville to expand upon the “bikability” and “walkability” of the whole town. No other mode of transportation is as available to everyone as walking. Everyone becomes a pedestrian at some point, whether in a parking lot, on a greenway, or just walking through the neighborhood.

Special emphasis is placed on existing and proposed Activity Centers, the best practices that make the differences to cyclists and pedestrians, getting across railroads, and making intersections easier to navigate by pedestrians, especially in low-speed conditions.

The inclusion of bicycle and pedestrian facilities and design components that encourage walking and cycling are not amenities or extra improvements, but required elements of the design of new and retrofitted (change in land use or result in the increase of 25% of the square footage) private and public developments in the Town of Morrisville. Similarly, when considering design, maintenance, and upfits to all new and redeveloped properties, compliance with the Americans with Disabilities Act (ADA) of 1990 and associated guidance and amendments is mandatory.

Part I. Design Guidance

The following site design guidance has been extracted from the Federal Highway Administration; other guidance documents are from equally credible sources including the Institute for Transportation Engineers; North Carolina Department of Transportation, and American Association of State Highway and Transportation Officials (refer to guidance section for these and other resources).

Residential Design for Bicycle and Pedestrian Compatibility. A residential subdivision layout (including planned unit developments) should provide safe, convenient, and direct bicycle and pedestrian access to adjacent and nearby (within ¼-mile for walking and two miles for bicycling) residential areas, bus stops, and neighborhood activity centers such as schools, parks, commercial and industrial areas, and office parks.

Subdivision Connections. During subdivisions of properties, all streets, bicycle paths, and sidewalks should be designed to connect to adjacent properties so that a secondary grid-based system of roads and sidewalks develops over time. When subdivisions are built with only one outlet to a main thoroughfare, the result is heavy traffic congestion and difficult intersections for both motorists and pedestrians. For projects in which only part of the land owned by the applicant is

proposed for development, a sketch plan showing the tentative locations of streets, bicycle facilities, and public access ways should be submitted for the entirety of the land owned. Stub-outs (open connections for future development) should be constructed to allow for bicycle and pedestrian facilities on-site, and the next construction phase should be designed to connect to this network. Feasibility analysis of the proposed connection on the adjacent parcel should be done to demonstrate that the connection on the adjacent site is constructible and able to be permitted.

Circulation Requirements. Adequate provisions should be made for bicycle and pedestrian circulation between buildings and related uses on development sites. The Americans with Disabilities Act (ADA) also contains regulations for on-site circulation.

Reduced Parking Options. Parking codes should be modified to allow a reduced parking option for developments that are located on bus routes and provide facilities that encourage bicycling and walking. In general, shopping center parking lots should not be designed to handle volumes that occur only once or twice per year, but rather more typical volumes.

Commercial Design for Bicycle and Pedestrian Compatibility. Buildings should not automatically be separated from the street by parking lots—this discourages pedestrian access and primarily serves those who arrive by automobile. A maximum setback requirement of (15 to 25 feet) can help to encourage pedestrian activity. Parking, driving, and maneuvering areas should not be located between the main building entrance and the street. Exceptions to this may be considered for handicapped parking spaces and drop-off areas for facilities serving a majority of seniors and school-age children. Parking lots should be located on the side and rear yards of the property whenever possible. For developments with multiple buildings, direct pedestrian access to public transit should be provided by clustering buildings near bus stops.

Building Orientation and Facades. Main building entrances should be oriented to face the street, especially any street designated as a bus route. Entrances and paved walkways should lead directly to a bus stop. Visual stimulation is very important to pedestrians—long, blank walls with no openings onto the street discourage walking. Building facades should maintain continuity of design elements such as windows, entries, storefronts, roof lines, materials, pedestrian spaces and amenities, and landscaping. Parking garages on streets with bus service should have ground-floor street frontage developed for office, retail, or other pedestrian-oriented uses.

On-site Walkways. For developments with multiple buildings and/or outparcels, all building entrances on the site should be connected by

Figure 6.1 (A)

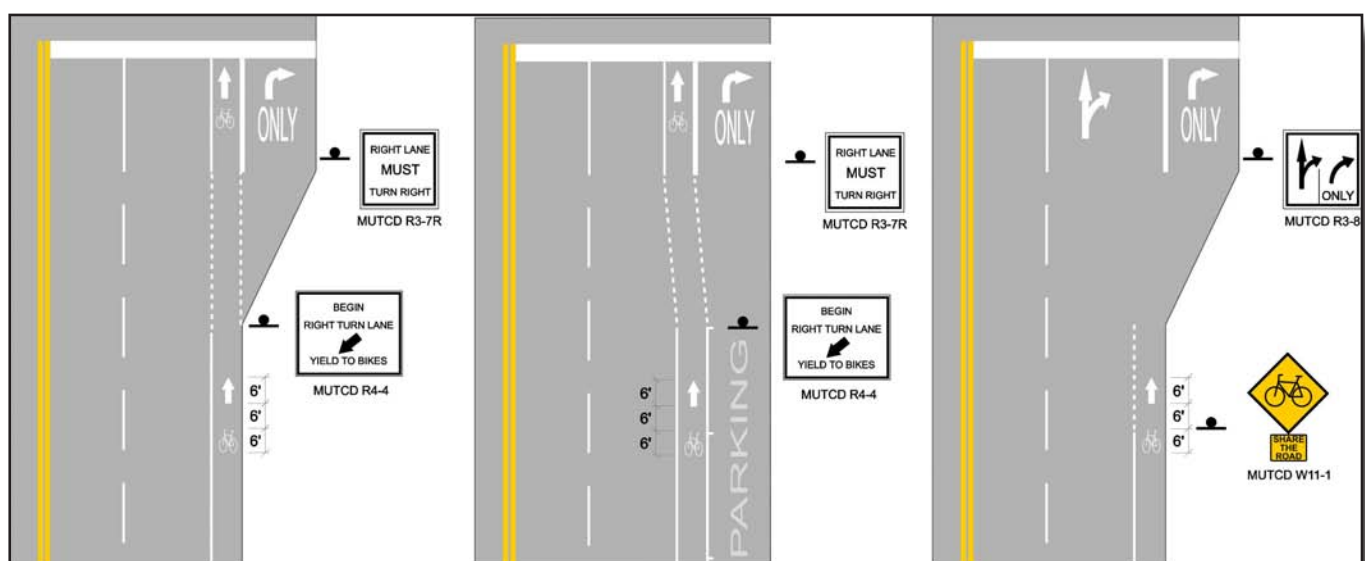
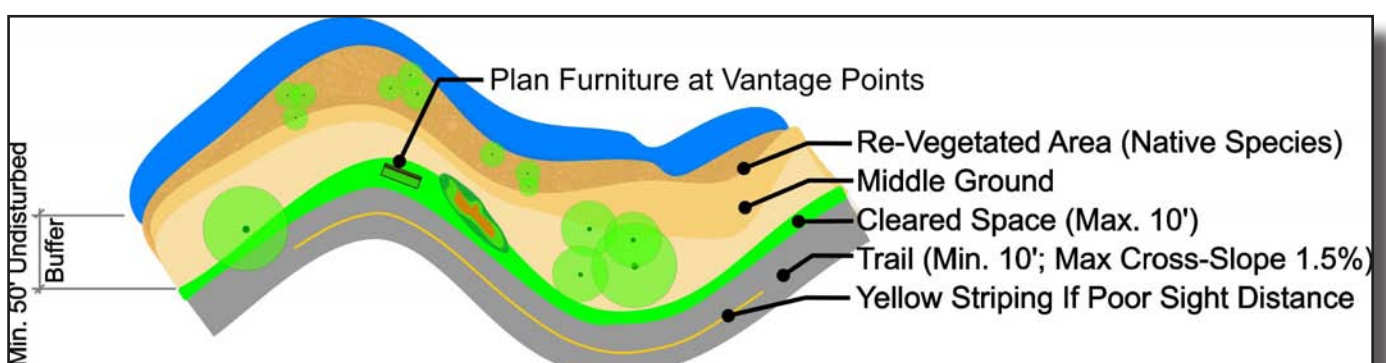


Figure 6.1 Bicycle Design

(A) Bicycle lanes are appropriate on streets with fewer driveways and street intersections, but sooner or later an intersection will need to be addressed. These figures show three different marking treatments, with the middle image indicating an on-street parking situation. The left and right images indicate two different philosophies of how to handle right-turn bays.

(B) Creating a good trail system requires an in-depth examination of the features that make each trailway unique and responsive to its setting. Many trails are developed in conjunction with streams, rivers, and lakes. A 20' to 30' right-of-way can contain a 12' asphalt wearing surface, as well as at least 2' “clear zones” on each side of the trail, and occasional trail furniture to take advantage of scenic vistas, historic markers, or high-traffic points.

Figure 6.1 (B)



6.1 Bicycle and Pedestrian Design Guidance, cont'd

walkways to encourage walking between buildings and to provide a safe means of travel for pedestrians. Sidewalks between the building edge and parking lots should allow pedestrians safe and convenient access to building entrances without having to walk within driving aisles of parking lots.

Pedestrian Access Between Adjacent Developments. To encourage walking instead of driving between uses on the development site, sidewalks should connect those uses to adjacent activity centers. Barriers such as fences or vegetation should not be placed so as to hinder access between developments.

Lighting. Pedestrian-scale lighting should be designed to light, and illumination should be concentrated as to not disturb adjacent uses sensitive to light pollution, such as residential units.

Improvements Between the Building and the Street. Design elements in the area between the building and the street are critical to successful pedestrian spaces. The streetscape should provide visual interest for the pedestrian and shade, where possible. The area should be landscaped.

Parking Lot Design. Parking lots with 50 or more spaces should be divided into separate areas with walkways and landscaped areas in between that are at least 10 feet in width. Pedestrian paths should be designed with minimal direct contact with traffic, including overhanging vehicles protruding into pedestrian areas (for example, minimum 3' separation between wheelstops and sidewalks). Where pedestrian paths cross the traffic stream, raised speed tables that slow cars while providing an elevated pedestrian walkway should be provided. Additional recommendations for pedestrian-oriented parking lots include:

- *Location.* Keep parking on one or two sides of the shopping center, away from the side that will generate the most pedestrian access. This pedestrian access point could be an office park, outparcel shopping or restaurant, or a residential area.
- *Direct Pedestrian Paths.* Provide a direct pedestrian path from parking lots and parking decks to the buildings they serve. Clearly delineate this path by striping, using different paving materials, or situating the path through the center of a series of strategically placed parking islands.
- *Use of Landscaping.* Landscaping can be used to channel and organize the traffic flow in parking lots as well as to provide pedestrian refuge areas. Avoid open parking lots that allow cars to move in any direction.

Part II. Recommendations for Amending Current Morrisville Policies

Specific recommendations for changes to the biking and pedestrian policies for any municipality must consider both the current and desired conditions for cyclists and pedestrians; political willingness to take a strong stand for the needs of pedestrians and cyclists; and the experience and capacity of the town staff to enforce specific policies. (Note: for the purposes of this section, the term "retrofitted" development shall mean any modification to an existing, developed property inside the municipal and extraterritorial boundaries of the Town of Morrisville that will result in a change in use or an increase greater than 25% in the square footage of the property.)

1. Modify section 1.5 of the current subdivision ordinance to include bicycle parking requirements for all new / retrofitted developments as noted in the design standards of the 2009 Transportation Plan.
2. Strike section 11.1(d) from the current subdivision ordinance policy, which implies that greenways, greenway trails and sidewalks are "oversized improvements."
3. Modify section 5.4(b) from the current zoning ordinance policy, which requires that a landscaped OR pedestrian walkway should be provided every third parking aisle to read that a landscaped pedestrian walkway should be provided every third aisle in cases where 10 or more spaces are in any one aisle; for sites with more than 50,000 leasable square feet every, the policy should require a landscaped OR pedestrian walkway should be provided every second aisle in cases where 10 or more spaces are in any one aisle; ADA-compliant access ramps will be provided at handicapped parking spaces and each longitudinal end of the pedestrian walkway. Modify Figure 4 (page 97) accordingly.
4. Add a new section to the subdivision ordinance specifying that bicycle lanes and greenway trails shall be provided on the perimeter or through new / retrofit private developments in accordance with the recommendations contained in the 2009 Transportation Plan.
5. Cul-de-sacs are to be discouraged in all new and redeveloped private developments. Where it is not practicable as determined by the Town Engineer to provide a connecting street due to extreme costs associated with acquiring privately-held rights-of-way or crossing environment barriers, every effort shall be made to make a pedestrian connection typically ten feet (10') in width; eight (8') widths may be considered

Figure 6.1 (C)



Figure 6.1 (D)

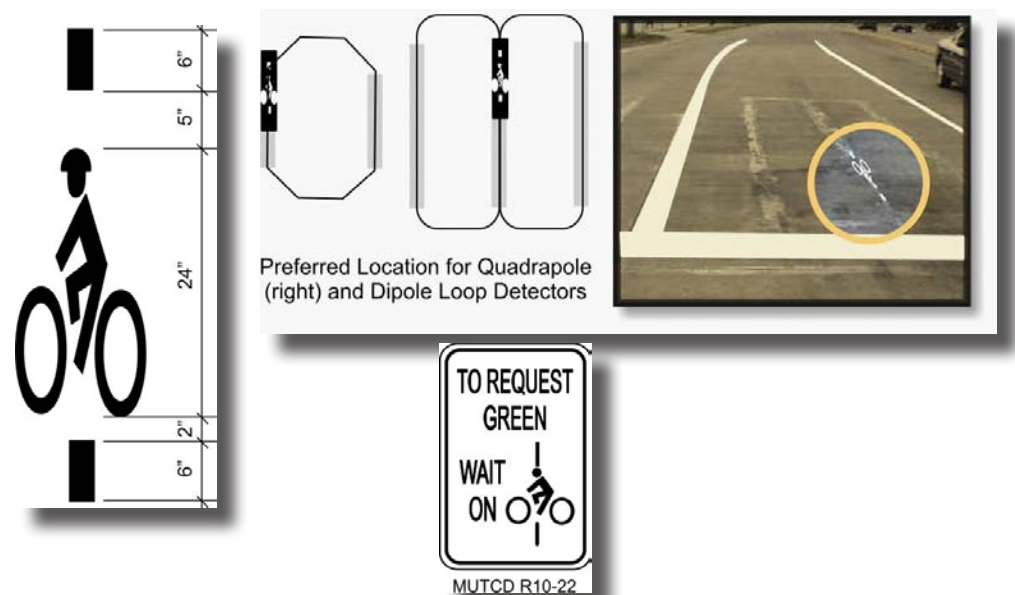


Figure 6.1 Bicycle Design cont'd

(C) Small design details, particularly on public campuses, can make a big difference to the bicycle-friendliness of the environment. The image on the right indicates a grooved runway for guiding bicycles up the stairs as the rider dismounts and walks up the stairs.

(D) Most bicyclists are aware that the "sweet spot" for detecting bicycles at loop detection signal-equipped intersections is in the middle – an important concept for those that own bicycles with frames composed primarily of carbon composites. Placing a small marking showing the right location can also help reinforce proper bicycle driving technique as well as remind motorists of the proper place for a cyclist on the road.

6.1 Bicycle and Pedestrian Design Guidance, cont'd

only in circumstances where a 10' minimum is impractical due to specific site conditions.

6. Modify the existing subdivision ordinance to specify a maximum block length of 600 feet (450 feet in Town Center Area and Activity Centers) except where it is not practicable as determined by the Town Engineer.
7. During construction, enforce the recommendations contained in the *Manual on Uniform Traffic Control Devices* to provide pedestrian and bicycle detours where sidewalks and/or bicycle facilities are blocked temporarily.
8. Off-site pedestrian and bicycle improvements are warranted in the near vicinity of a major pedestrian or bicycle trip generator in the same way that off-site improvements to vehicular traffic are warranted if the development negatively affects the level-of-service of existing roadways. Importantly, there must be a clear and causal connection between the need for any off-site improvement and the proposed development; a developer cannot, for instance, be required to repair an existing deficiency in the system that s/he is not aggravating through the increased demand presented by the proposed development action. Therefore, it is hereby recommended that the Town of Morrisville amend the current subdivision and zoning ordinances to include mandatory pedestrian (including off-street greenway) and bicycle connections within ¼-mile of a new / retrofitted development when all of the following conditions exist, except as determined not practicable by the Town Engineer:
 - Public right-of-way is available to make a currently non-existing connection to an existing or approved pedestrian / bicycle facility; AND
 - The proposed new / retrofitted development is expected to generate 250 or more trips per day according to the latest edition of the *ITE Trip Generation Manual*.

Additional Guidance and Resources

AASHTO, Guide for the Development of Bicycle Facilities (website: www.sccrtc.org/bikes/AASHTO_1999_BikeBook.pdf). Note: Update of the 1999 edition forthcoming at the time of this writing.

Institute of Transportation Engineers, Design and Safety of Pedestrian Facilities, A Recommended Practice, 1998.

Federal Highway Administration, Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide, 1999.

Federal Highway Administration / Project for Public Spaces, Context Sensitive Solutions (website: www.contextsensitivesolutions.org).

Accommodating Bicycle and Pedestrian Travel: A Recommended Approach, A US DOT Policy Statement Integrating Bicycling and Walking into Transportation Infrastructure, Design Guidance (website: www.fhwa.dot.gov/environment/bikeped/design.htm#d5).

Town of Morrisville Subdivision Ordinance v.8.0 and Zoning Ordinance v.8.0 (www.ci.morrisville.nc.us/planning/downloads.asp).

Charlotte, North Carolina, Urban Street Design Guidelines (website: www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.htm).

The Louis Berger Group, Inc., City of Durham DurhamWalks! Pedestrian Plan. 2006.

Wisconsin Department of Transportation, Bicycle Facility Handbook, January, 2004.

Federal Highway Administration, Manual on Uniform Traffic Control Devices (website: <http://mutcd.fhwa.dot.gov/>).

Figure 6.2 Additional Bicycle Facility Design

(A) Generally, the multi-use trail, sometimes called a "sidepath" as shown in (B), is difficult to design on streets that have a large number of driveway and/or street intersections due to conflicts with turning vehicles and the additional threat posed by cyclists riding against traffic in the near vehicular travel lane. The risks can be minimized by moving the multi-use trail at least 10' off the near travel lane, and bringing it back to the intersection for street crossings (bottom). Otherwise, a mid-block crossing may be warranted for crossings with large numbers of pedestrians and cyclists crossing (greater than 20 in the peak hour, for example). Mid-block crossing safety is improved when pedestrian-activated signals are used along with clearly visible stop bars and crossing markings.

(B) The City of Charlotte, examining pedestrian safety factors, considers the factors shown in this diagram as an initial screening of when to install mid-block crossing devices for multi-use and pedestrian crossings. Taken together, these factors comprise a "solution space" where mid-block crossing treatments are recommended, then further studied to determine which specific treatment is used.

Figure 6.2 (A)

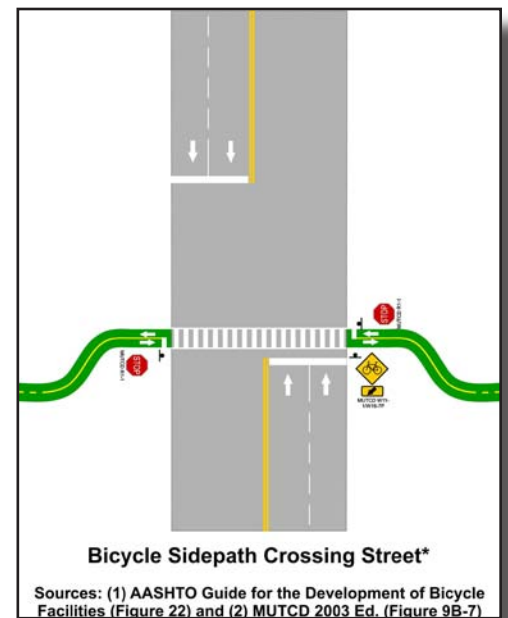
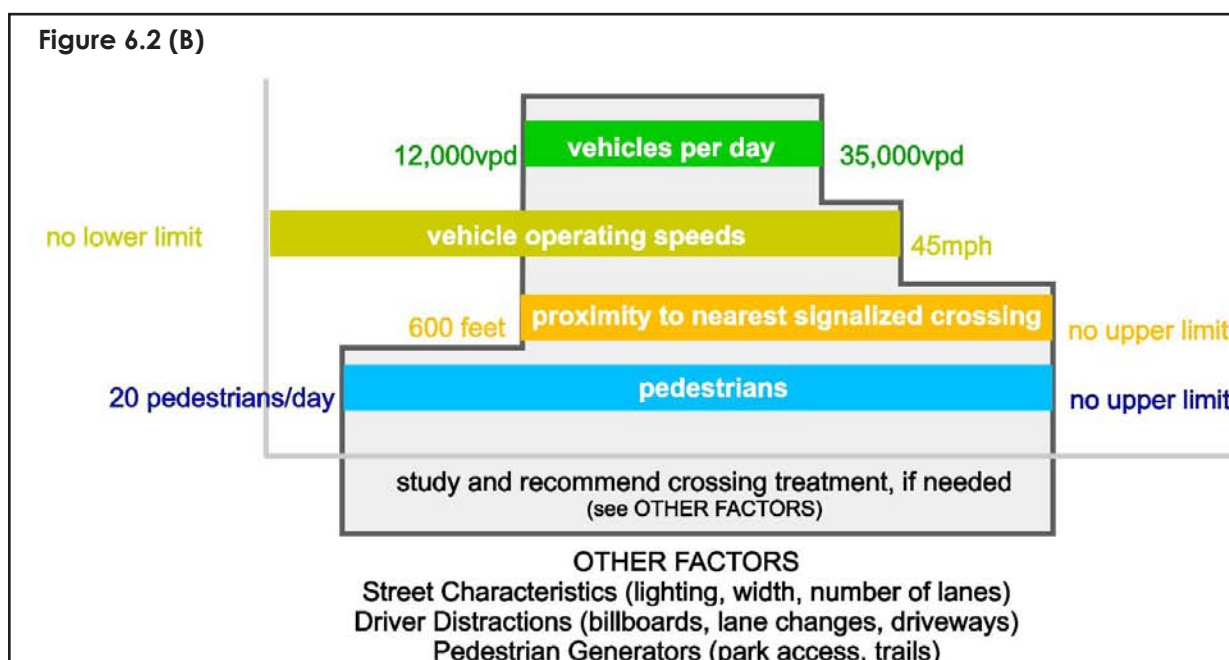


Figure 6.2 (B)



6.1 Bicycle and Pedestrian Design Guidance, cont'd

Figure 6.3 Bicycle Parking Requirements

Bicycle parking should be required for all development and redevelopment that requires a site plan, according to the details provided in Figure 6.3 (A). A minimum of two bicycle parking spaces should be applied to all development types and sizes. Shopping centers, multi-family developments, and offices are obvious choices for bicycle parking associated with new/expanded private developments, but industrial uses such as warehousing, manufacturing, and distribution centers are important to consider since many of these workers have low rates of access to reliable, private cars. Schools, libraries, recreation centers, Town offices, and healthcare facilities are a few examples of public facilities that will benefit from bicycle parking. The Town should also develop a retrofit plan for existing facilities that includes a matching fund program for racks and installation. These policies will continue to open the wider community to cycling. The preferred bicycle parking rack style is the "inverted U" or "post-and-loop" arrangement show in Figure 6.3 (B). A secure concrete base 4" thick and clearance of at least 6' around the perimeter of the rack are important design factors for their correct placement (Figure 6.3 (C)).

Ordinance Elements

General: Bicycle parking required for any new building or reconstruction that requires more auto parking

Number / Type of Spaces: According to bicycle parking schedule (Figure 6.3 (A)), 10% covered for college and shopping centers

Location: Well-lit, proximate to main entrance, not impeding pedestrian or automobile circulation, 6' min. separation from walls or other obstructions (Figure 6.3(C))

Conversion: Allow maximum of 5% of car parking or 15 bike spaces (whichever is greater) to convert to bike parking

Summary of 145 Bike Parking Ordinances: www.massbike.org/bikelaw/parkcomp1.htm

Figure 6.3 (A) Bicycle Parking Spaces

Use	Spaces
School	10% Students + 3% FTEs
College	6% students + 3% FTEs
Shopping Center	5% of auto
Office	10% of auto
Government	10% of auto
Movie/Restaurant	8% of auto
Industrial	4% of auto
Apartments	10% of auto
Town Center Area	1 per 5,000 square feet commercial space or per 10 employees, whichever is greater
All Other	5%-10% of auto

FTE = Full-time equivalent

Figure 6.3 (C) Bicycle Rack Placement

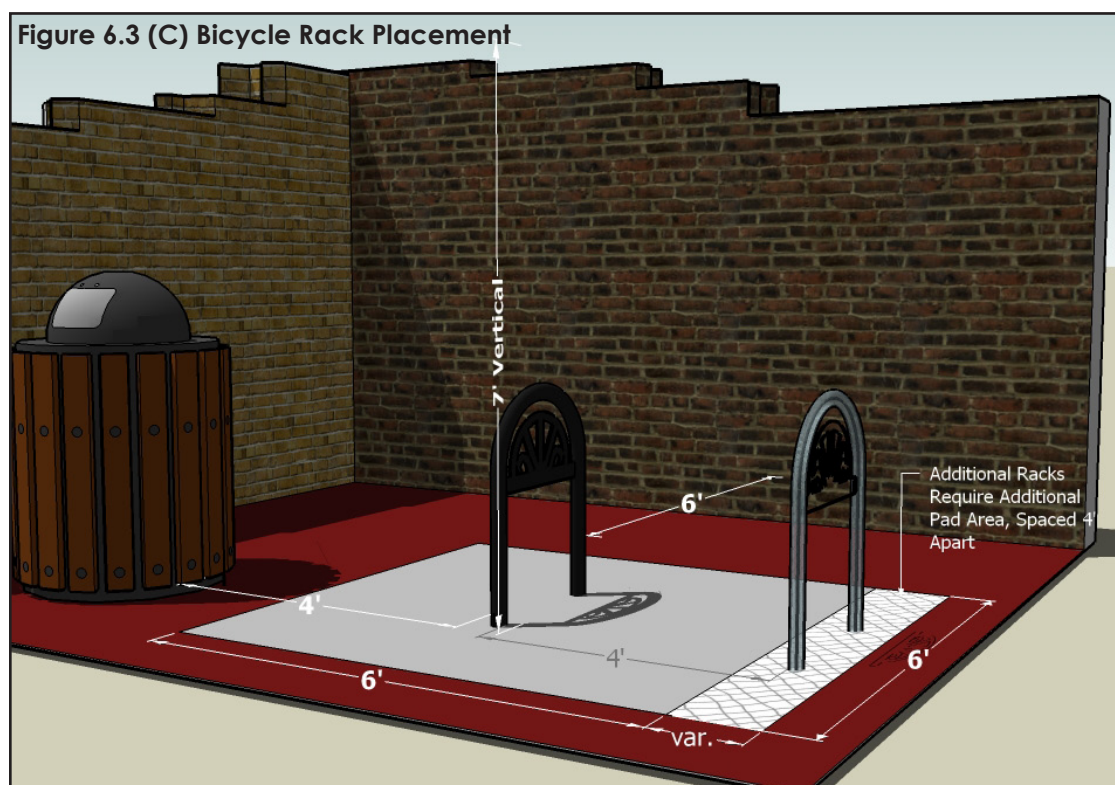
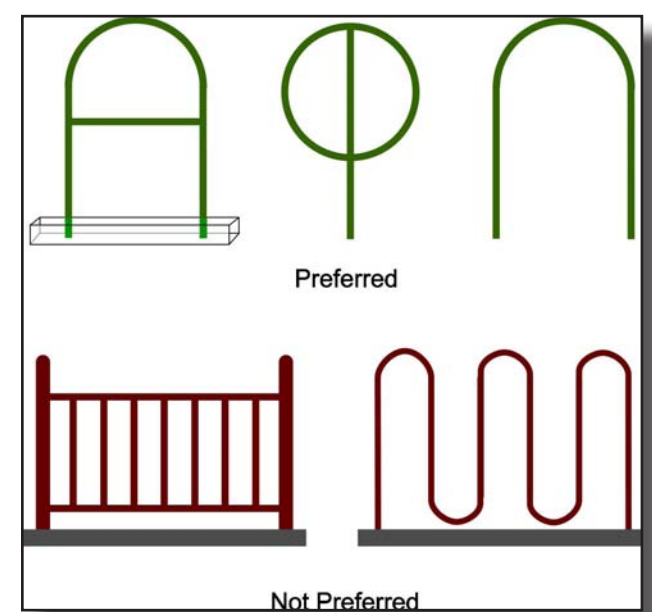


Figure 6.3 (B) Bicycle Rack Designs



The location of bicycle parking is critical to its usability for the public. This photo shows a bad example of bike parking, located in a dark corner of a parking garage.



Determining how much bicycle parking to provide is based on the nearby land uses as well as other factors, such as the availability of other forms of transportation. This photo shows many bicycles parked at the last stop of a light rail transit line in Portland, Oregon.



Bicycle racks can have traditional designs or more innovative designs, such as those shown above, which can also function as public art.

6.1 Bicycle and Pedestrian Design Guidance, cont'd

Figure 6.4 Railroading and Pedestrians

The Norfolk Southern line in Morrisville is an ever-present reality. While the line originally helped create the need for the Town, it presents interesting challenges now in terms of crossing it safely. Safety crossing treatments (A); addressing skewed crossings of greenway paths (B); and warning signage (C) are the primary tools that help to manage safety concerns.

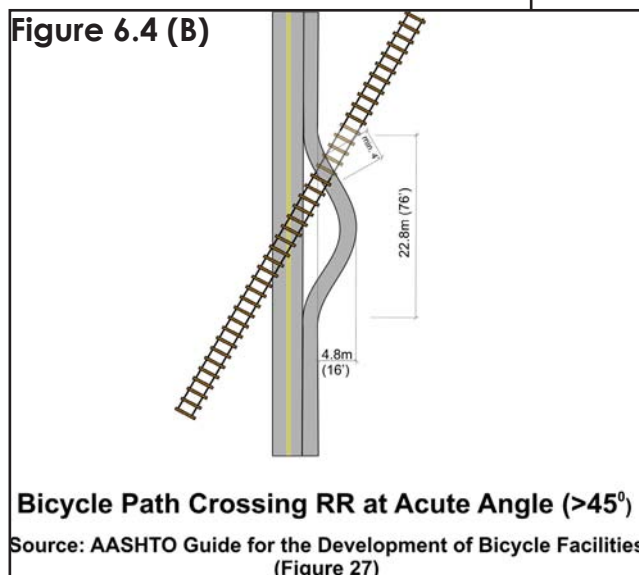
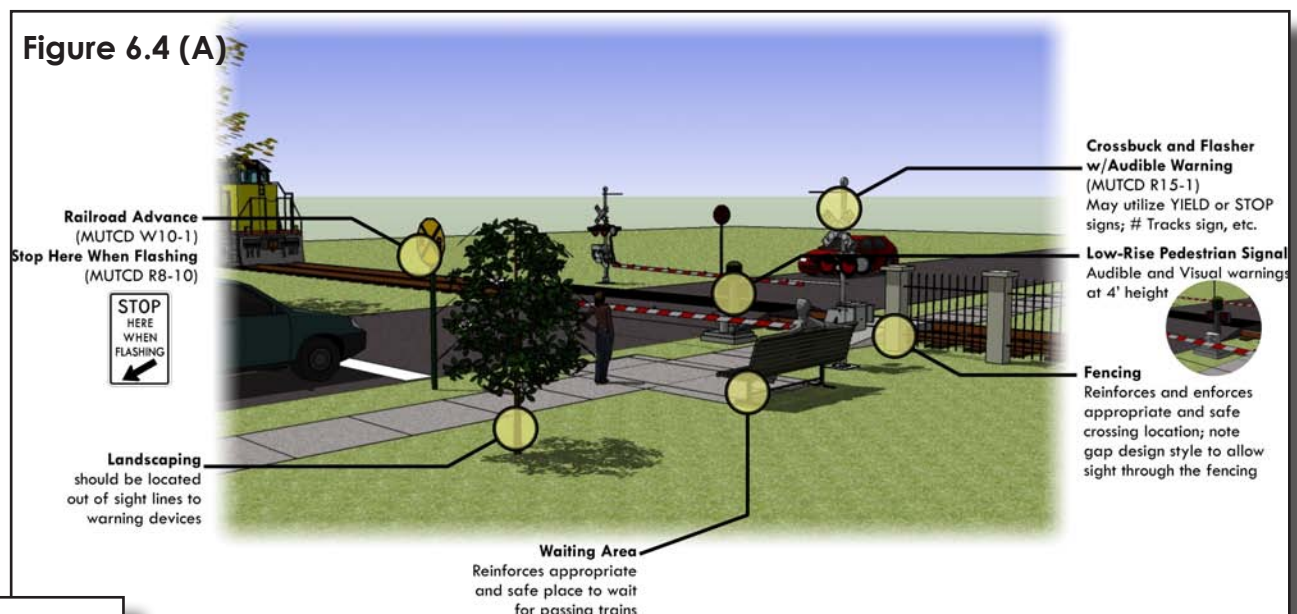


Figure 6.4 (C)

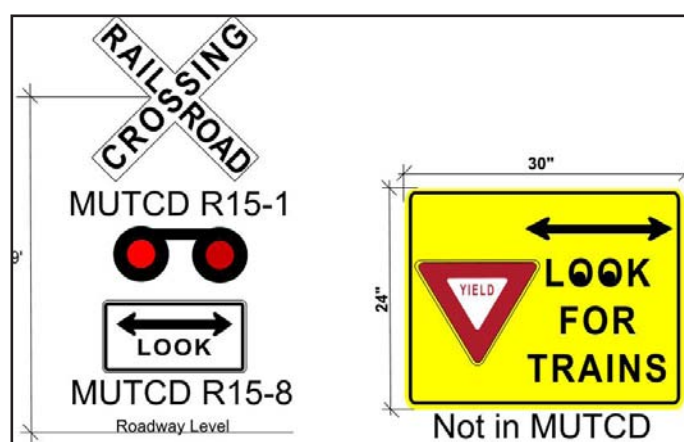


Figure 6.5 (A)

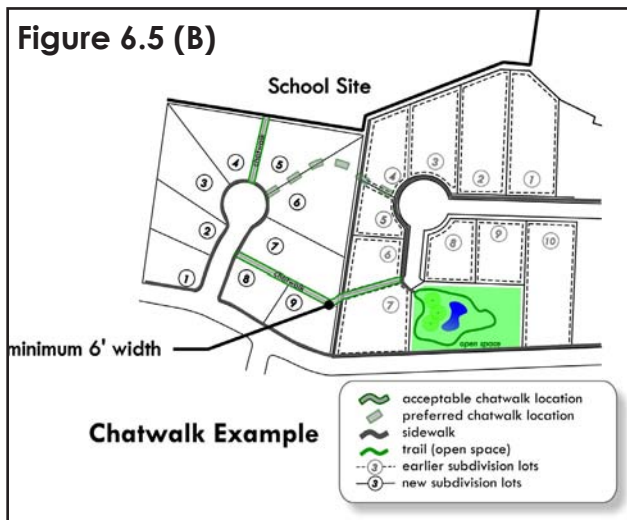
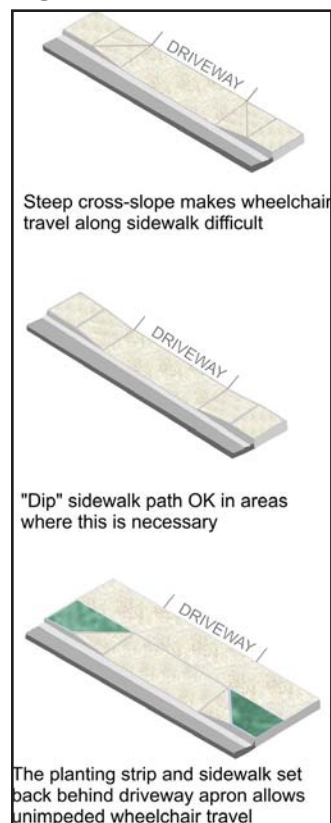


Figure 6.5 Additional Pedestrian Design

(A) For mobility impaired citizens, going down a sidewalk can become hazardous if proper slope control is absent. The diagram on the bottom is a requirement for new construction; the diagram on the top is not acceptable, as it tends to angle wheelchair users into travel lanes.

(B) In this example, two residential areas are connected to open space, but the same could be said for a well-lit corridor connection from residences to commercial centers or schools.

(C) Providing refuge at busy intersections is important for pedestrian safety. The diagram indicates the role of both curb extensions and center island traffic refuges, both of which are intended to reduce crossing distances.

(D) The diagram indicates some of the principles of good design, including a center pedestrian lane that emphasizes and channels pedestrian flows to the entrance.

Figure 6.5 (C)

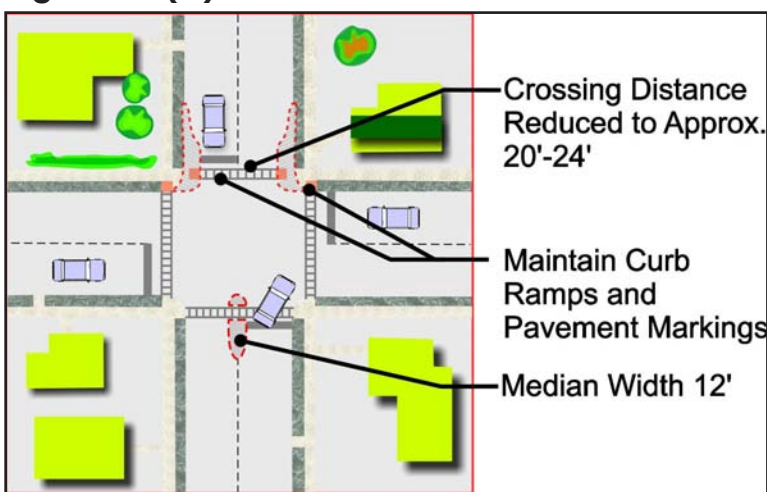
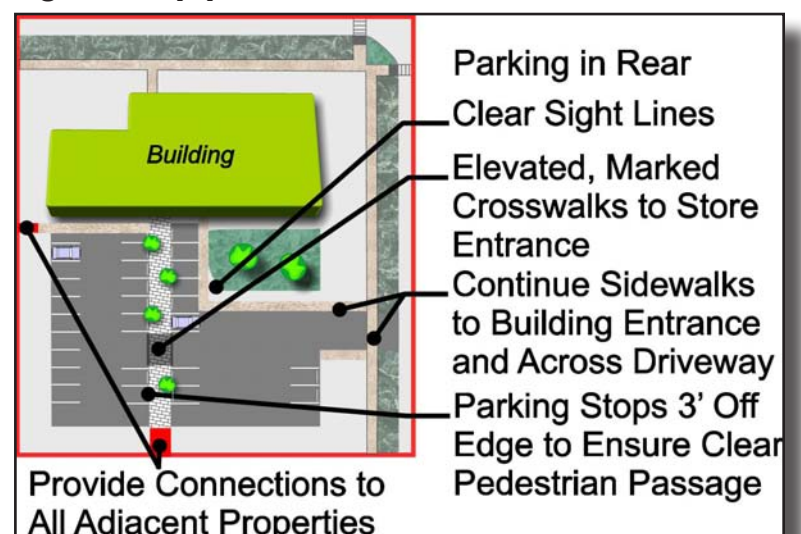


Figure 6.5 (D)



6.2 Transit Design Guidance

Transit design can strongly influence, and is influenced by, the design/density of buildings; of streets and intersections; and the quantity and quality of pedestrian facilities.

A special emphasis on transit best practice is placed on design features for the short-term bus-oriented transit operators, since that will comprise the majority of transit services. Special needs for rail stations are difficult if not impossible to generalize beyond basic parking requirements, and so must be designed to fit the rail station location.

Figure 6.6 Transit Design Guidance

Proposed Land Use (size)	Sign	Pad (8' x 18')	Shelter	Bench	Trash Receptacle	Bus Bay	Solar Lighting
Residential (<100 Units)	Required	Required	Required	Required	Required	Required	Required
Residential (>100 Units)	Required	Required	Required	Required	Required	Required	Required
Shopping/Commercial (>25,000 sq. ft.)	Required	Required	Required	Required	Required	Required	Required
Shopping/Commercial (>75,000 sq. ft.)	Required	Required	Required	Required	Required	Required	Required
Office/Industrial (>20,000 sq. ft.)	Required	Required	Required	Required	Required	Required	Required
Other (>50 employees + on transit route)	Required	Required	Required	Required	Required	Required	Required
Other (on transit route)	Required	Required	Required	Required	Required	Required	Required

Legend: ■ = Required; ■ = Required On Staff Review

Figure 6.6 (A) Amenities at Bus Stops
The amenity set at a bus stop is largely dependent on the anticipated number of users of the stop and surrounding land development densities. The chart above should be considered a baseline; "higher-end" developments may choose to add features to further enhance the value of the property.

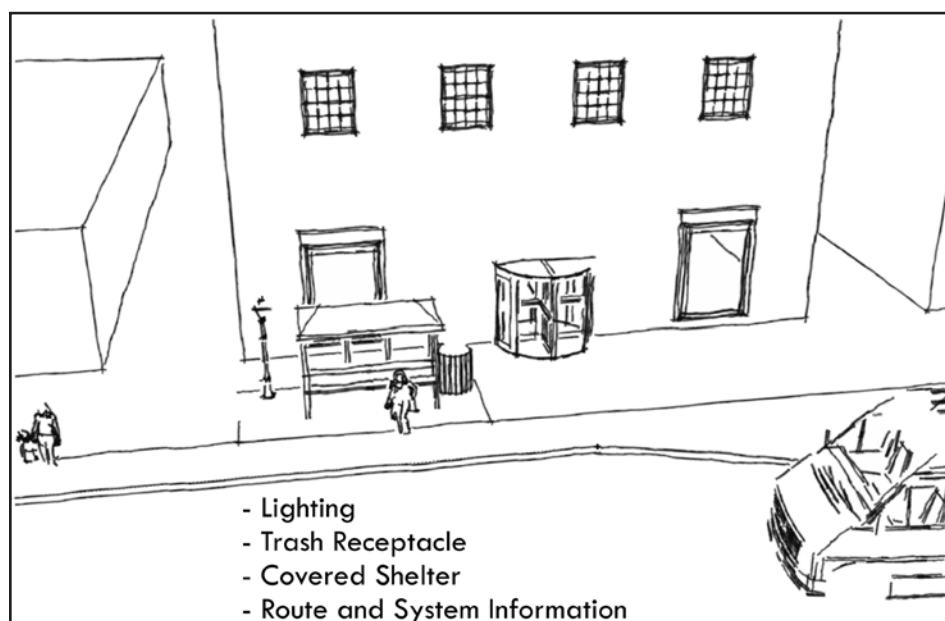
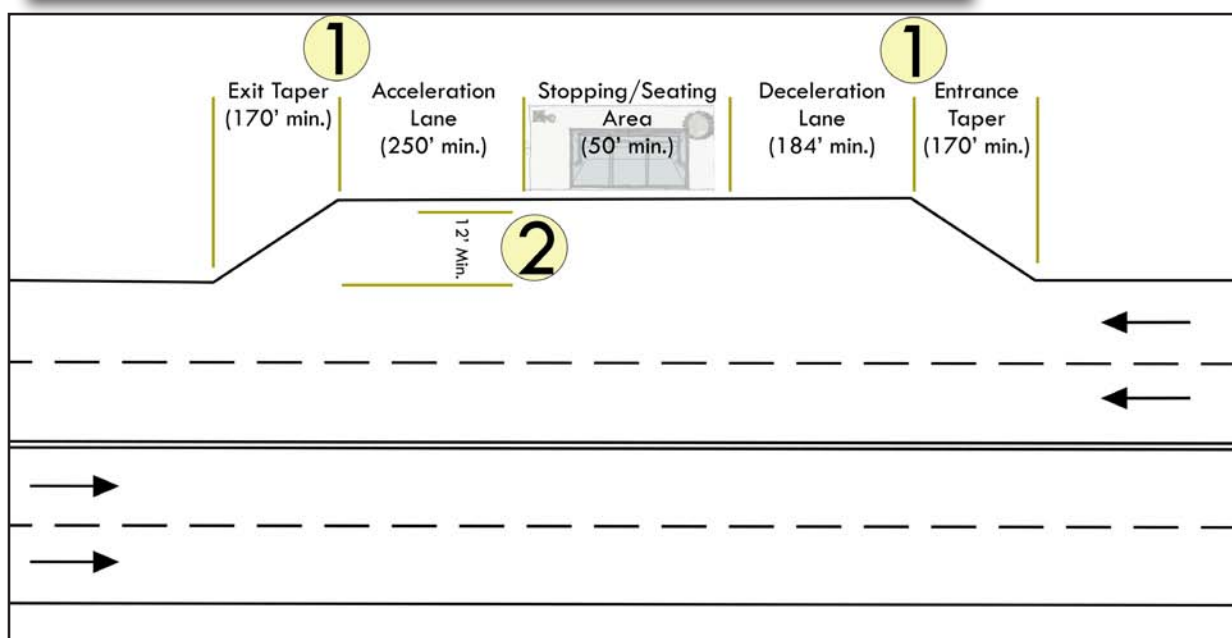
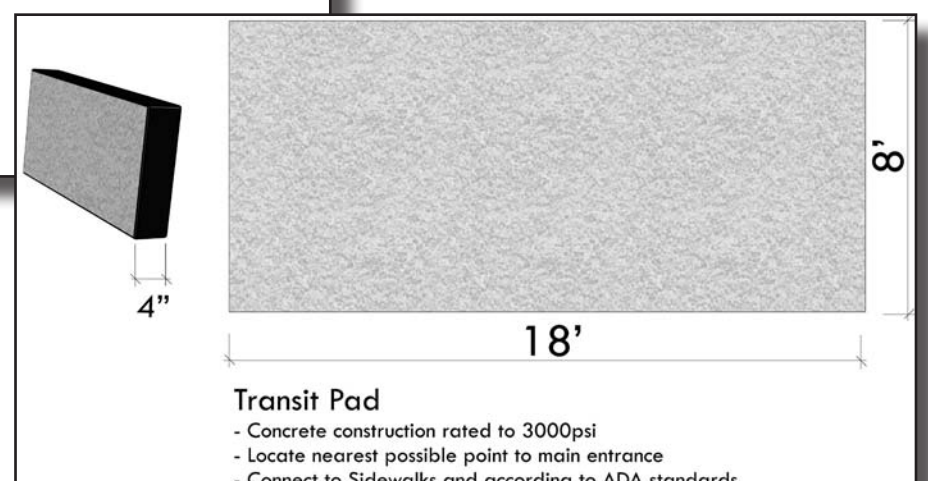


Figure 6.6 (B) Design of Bus Stops
To properly design a bus stop area, the character of the area, development intensity, and vehicle / roadway characteristics must be assessed. Since Morrisville will generally be reliant upon 15-passenger, lift-equipped vans to service the local populations, the dimensions shown are adequate for most situations. For larger vehicles (e.g., 35' buses) such as those used by the Triangle Transit for many of their fixed-route bus lines, the dimensions of the entrance and exit lanes and tapers may need to be adjusted, especially on higher-volume, higher-speed streets.



Source: TCRP Report No. 19: Guidelines for the Location and Design of Bus Stops (1996)

- Notes:
- (1) Lengths of acceleration lanes and tapers vary proportionately with posted speed of the adjacent roadway.
 - (2) The depth of the bus bay is preferably 12'; lesser widths can be accommodated to 10' for streets with posted speeds of 30mph or less.



6.3 Roadway Design Guidance

Access Management

Access management is defined as "...the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway," as well as other design factors such as local/state policies, spacing of traffic signals, and median treatment types.¹ Managing roadway access from driveways and cross-streets has become increasingly important as funds to widen major roadways on the secondary transportation system have dwindled. Core reasons to enforce access management include reduction of accidents, improving bicycling conditions, providing safer pedestrian pathways, increasing business market area / access, and extending the serviceable life of roadways and roadway capacity. It is important to manage the access of roadways before the land around them becomes developed, as retrofitting roadways is often extremely costly and controversial compared to protecting access management before a roadway becomes saturated with driveways and street intersections.

Figure 6.7 identifies typical actions that should be taken and the common effects on roadway performance and business activity (often a concern with retrofitting access controls). This table complements the one on the following page that describes various roadways and treatments. Among the important factors to consider are that additional, frequent, and poorly designed driveways can decrease travel speeds by five to 10 miles per hour, and accidents (as well as associated travel delays during accidents) can increase by 40% or more if proper access management techniques are not followed. Business failure rates along unmanaged corridors are also higher than along well-managed roads.

Figure 6.7 Principles of Access Management

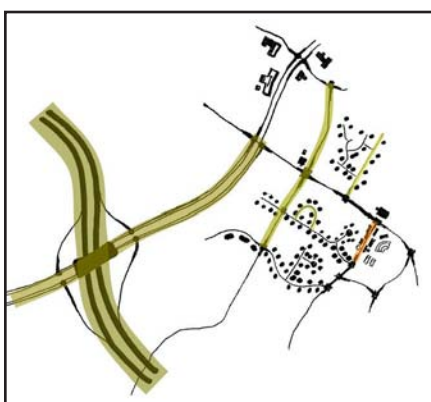
Principle	Action(s)	Researched Effects
Maintain a Strong Roadway and Intersection Hierarchy	Reduce Signals / Mile: 4.0 6.0 8.0	Increase in Travel Time Compared to 2.0: 16% 29% 39%
Limit Direct Access to Major Roadways	Access Points / Mile: 10 20 30 40 or more	Reduction in Free-Flow Speed (mph): 2.5 5.0 7.5 10
Favor Through Movements	Prohibit on-street parking	20% - 40% reduction in crashes
Separate and Limit Points of Conflict	Long signal spacing	42% reduction in crashes 59% reduction in delay 57,500 gallons of fuel reduction per mile
Separate Turning Moves (esp. left turns)	Add left-turn bay Raised divider separating lefts from through traffic	25% - 50% reduction in crashes (four-lane roads) 67% reduction in total crashes
Use Medians	Install median Install continuous, two-way left-turn lane Replace TWLTL with a median	35% reduction in accidents 30% reduction in vehicular delay 15%-57% reduction in crashes (four-lane roads)
Support Internal and External Connectivity	Increase driveway illumination	42% reduction in crashes

Roadway Hierarchy

Roadways are typically described by just two functions: the mobility that they provide to move vehicular (especially motorized vehicles) traffic quickly, and the degree to which the roadway provides access to adjacent lands. In North Carolina, roadways are frequently given classifications that describe their place in the hierarchy of streets. The following categories of street are generally recognized by transportation professionals, along with some of their major characteristics (Figure 6.8).

Notice that some of the values overlap between categories, indicating that the roadway's definition is perhaps determined by plans for it instead of simply a matter of how wide it is or how fast the posted speed limit. This overlap also suggests that other factors besides mobility and accessibility can play significant roles in the design and development of roads, shown below in no particular order.

- Number of large trucks that use the roadway
- Degree of peak traffic congestion (compared to how much traffic the roadway generally carries throughout the day)
- Topography, water courses, wetlands, ridgelines, floodplains, and other natural features shape roadways
- The crossings of other roadways, rail lines, and even bicycle/pedestrian accommodations influence roadway design, width, and speed for short intervals
- Amount of through traffic compared to traffic that has destinations or origins immediately adjacent to the road
- History of accidents on the roadway and similar roadways
- The kinds of land uses that border the roadway – commercial, residential, distribution, and so forth
- The users of the road – would more cyclists or pedestrians use the road if there were better provisions for them;
- How constrained is the public right-of-way for the road, and how does that influence design and construction costs
- Are there utilities that use the same right-of-way as the road – water, sewer, electrical, cable, or fiber optic
- The access to / from the roadway currently controlled by law, policy, design or some other means?



The street network.

¹ Transportation Research Board, "Access Management Manual." Committee on Access Management, Washington, DC, 2003.

6.3 Roadway Design Guidance, cont'd

Figure 6.8 Roadway Classifications and Typical Characteristics

Roadway Classification	Number of Lanes*	Daily Traffic Volume*	Access Control*	Land Use Service*	Posted Speeds*
Freeway	Four or Greater	40,000 or Greater	High	None	50mph or Greater
Major Thoroughfare	Two to Seven	20,000 or Greater	Moderate	Low	45mph to 55mph
Minor Thoroughfare	Two to Five	10,000 to 40,000	Fair	Moderate	35mph to 45mph
Collector	Two to Three	1,000 to 20,000	Low	Moderate-High	25mph to 40mph
Local	Two to Three	50 to 12,000	Very Low	High	15mph to 35mph

*Typical values, not hard definitions.

How these standards apply to Morrisville's roadways is shown in Figure 6.10, and a more thorough and recommended set of roadway characteristics is presented in Figure 6.11. Figure 6.11 accommodates some of the comments received throughout the planning process as well as being sensitive to the context of the area in which the roadway traverses. Safety is an external factor that must figure into the detailed design of all roadways; however, the sacrifice of safety in the name of gaining greater posted and design speeds should be resisted, as should compromising pedestrian and bicycle access in the name of increased motorized vehicular safety.

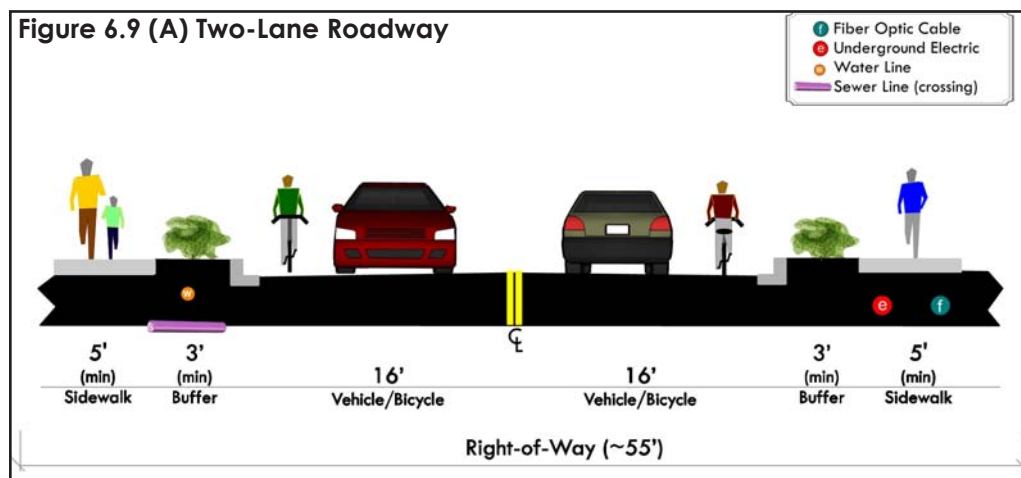
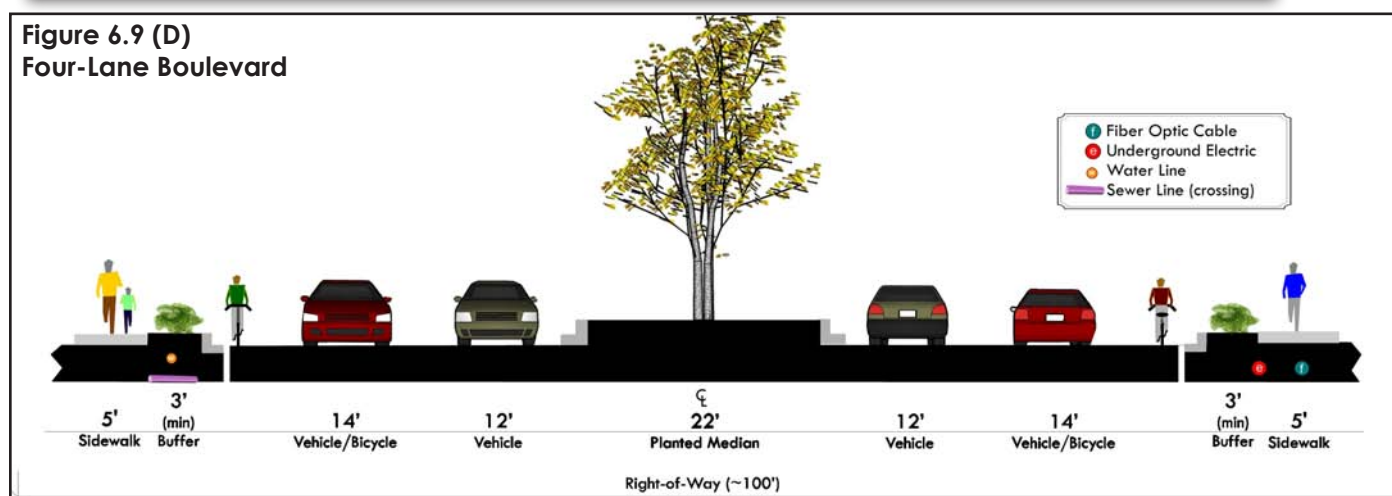
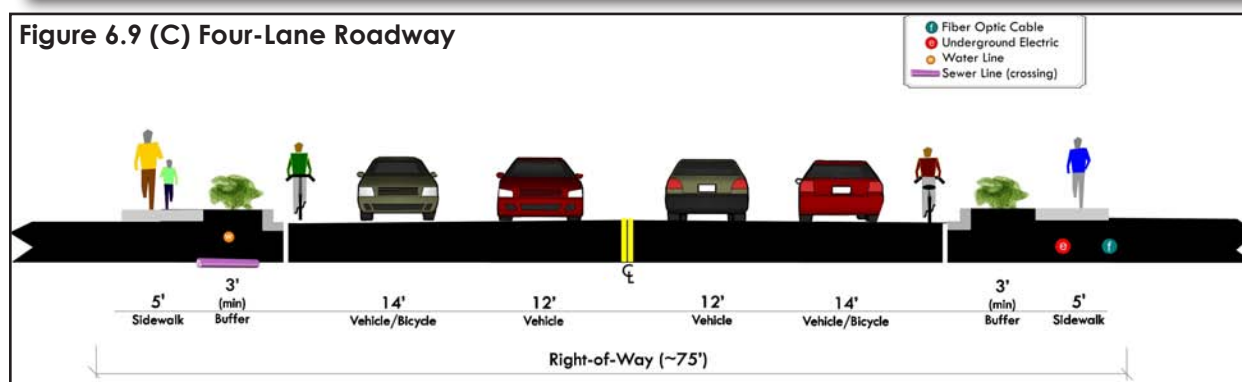
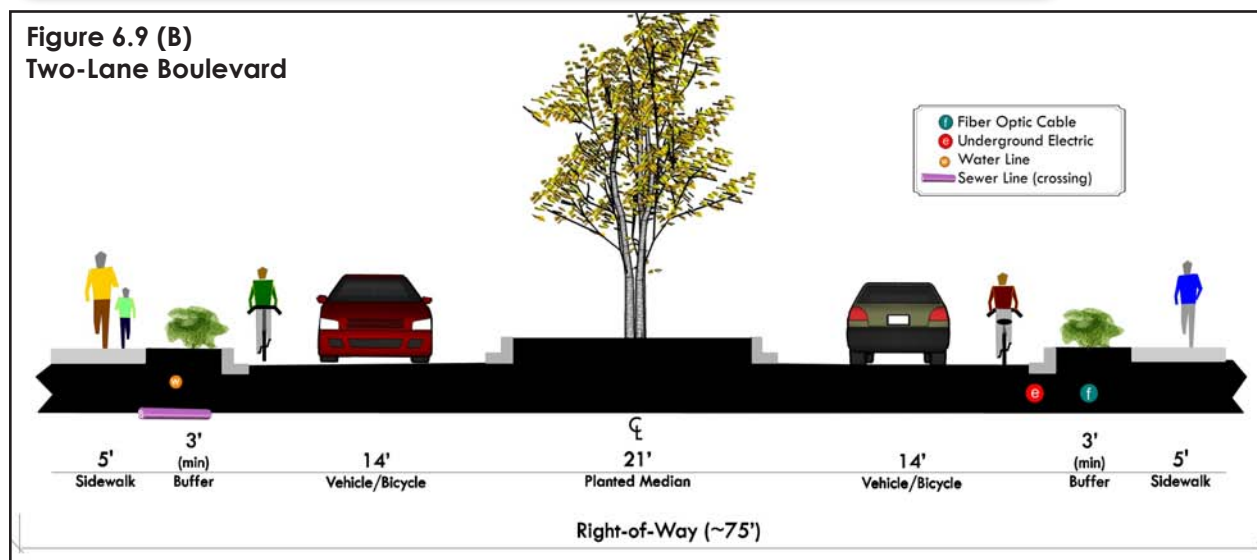


Figure 6.9 General Roadway Cross-Sections

This figure includes several standard cross sections for Morrisville roads. Recommendations for specific roadways appear in Appendix E. Notes: 1. Right-of-way listed includes only through lanes. Additional right-of-way will be needed for turn lanes, transit stops, deceleration lanes and other infrastructure. 2. Curb & gutter and one foot on either side of the sidewalk are included in right-of-way total.



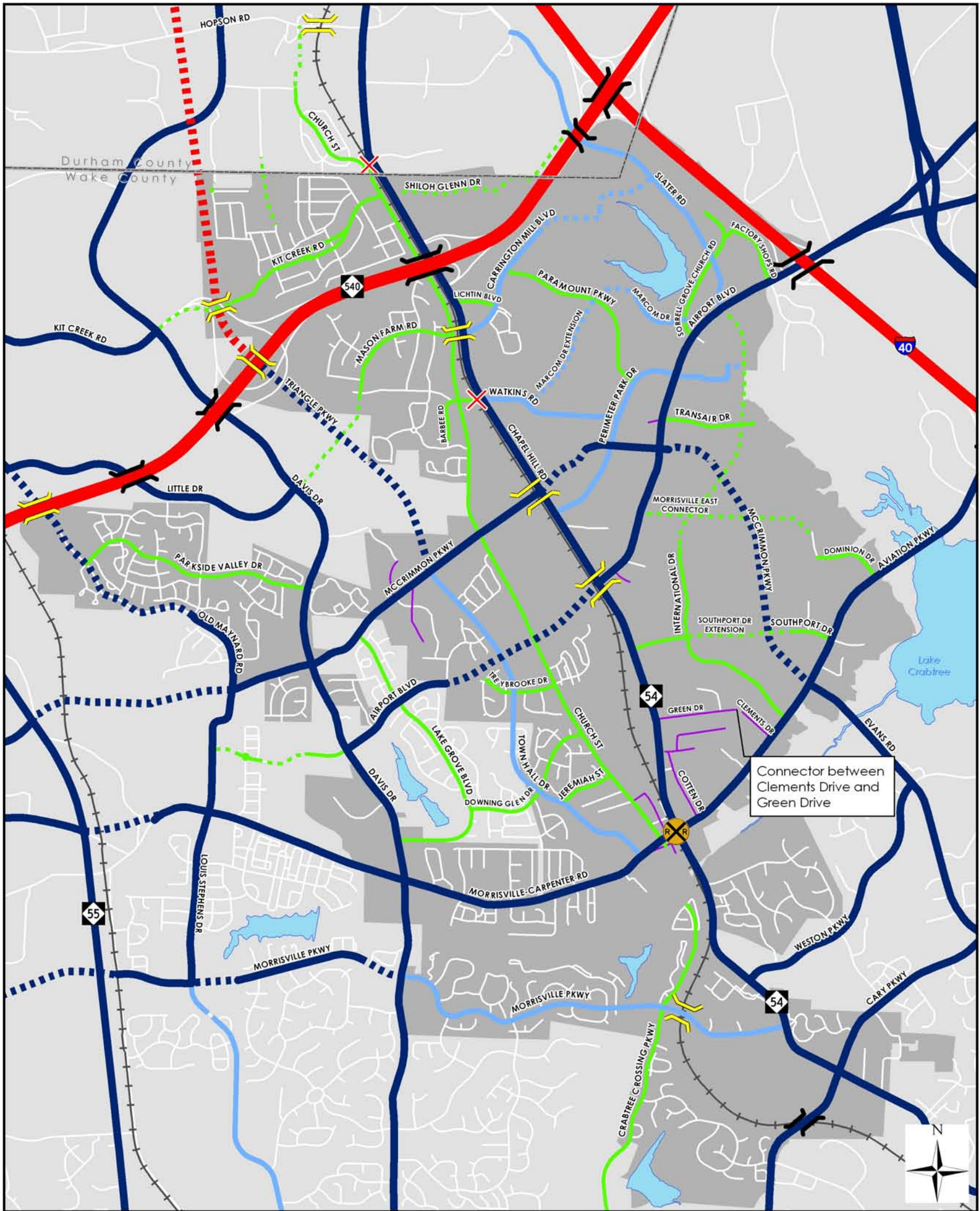


Figure 6.10 Future Roadway Hierarchy

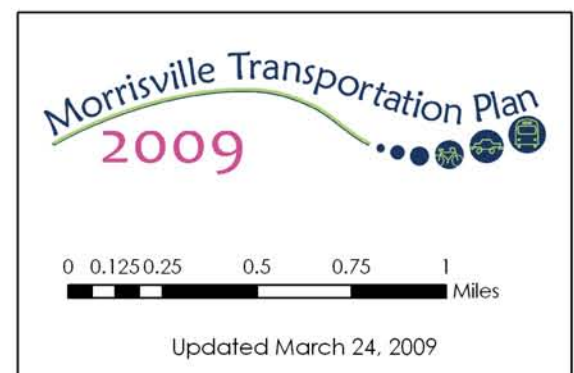
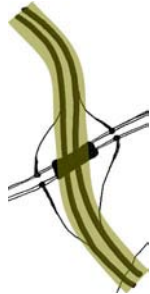
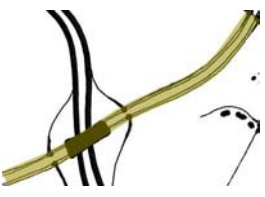

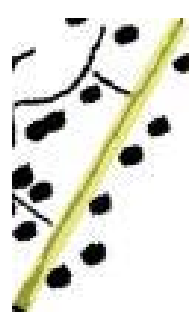
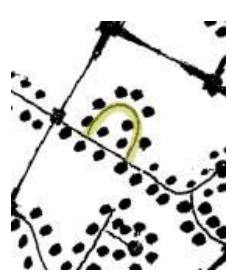
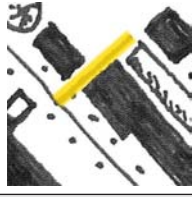
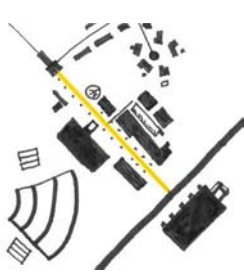


Figure 6.11 Recommended Roadway Typical Characteristics

Roadway Classification	Number of Lanes*	Daily Traffic Volume*	Access Control*	Land Use Service*	Posted Speeds*
 <p>Freeway</p>	Four or Greater	40,000 or Greater	High	None	50mph or Greater
	<p>Land Use: Adjacent land uses tend towards basic retail, food services, distribution, warehousing, and commercial types. Generally not suitable for noise- and vibration-sensitive uses.</p> <p>Median Treatment: Nearly always, and frequently in excess of 40' in width often with variable heights between the two road directions.</p> <p>Pedestrian/Cyclist Accommodations: None, although breakdown lanes of 8' or wider are typically present, along with additional "soft" shoulder leading to an open ditch line for drainage in rural areas. Bridges should be wide enough to accommodate pedestrian sidewalks on at least one side of the road, and 14' outside lanes for cyclists. Minimizing free-flow right turns and narrowing the intersections also aid in pedestrian and cyclist movements and safety. To-edge of property greenway connections are required; off-property pedestrian improvements may also be requested to connect to schools, parks, or other pedestrian destinations.</p> <p>Intersection Treatments: No at-grade intersections, only ramps are allowed. At the end of the ramp tying to a surface street, signals are present in urban and STOP controls for the ramps in rural areas.</p>				
 <p>Major Thoroughfare</p>	Two to Seven	20,000 or Greater	Moderate	Low	45mph to 55mph
	<p>Land Use: Adjacent land uses typically include retail shopping, banking, and other service-oriented industries. Recommend clustering these uses around a cross-street (Minor Thoroughfare) and limiting accesses for driveways to at least 1,000 feet between major generators and cross-streets outside activity centers. Inside the activity centers the minimum recommended separation is 600'.</p> <p>Median Treatment: Recommended, with a minimum width of 22' to accommodate significant plantings as well as future turn lanes at intersections.</p> <p>Pedestrian/Cyclist Accommodations: At higher volumes (over 25,000 vpd), bicycle lanes of 4' to 6' are recommended. At volumes higher than 35,000 vpd and speeds of 45mph, off-road treatments are desirable for cyclists. Sidewalks of 5' width (minimum) on both sides of the street are required, as are audible countdown pedestrian signals at street intersections. To-edge of property greenway connections are required; off-property pedestrian improvements may also be requested to connect to schools, parks, or other pedestrian destinations.</p> <p>Intersection Treatments: Extend turning lanes before adding a second turn lane in dense urban areas near high-walk zones and activity centers. Include pedestrian refuges at intersections; pedestrian-activated signals at major crossings and greenway crossings; and disallow high-speed right-turning movement designs.</p>				
 <p>Minor Thoroughfare</p>	Two to Five	5,000 to 40,000	Fair	Moderate	35mph to 45mph
	<p>Land Use: Adjacent land uses may include limited residential driveways, but no new residential driveways should be permitted. Typical uses include neighborhood retail, although the number of driveways and cross-streets should be sharply limited to allow the efficient movement from local streets to the Major Thoroughfares.</p> <p>Median Treatment: Recommended minimum width of 22' to accommodate significant plantings as well as future turn lanes at intersections.</p> <p>Pedestrian/Cyclist Accommodations: Typical treatments include wide outside lanes (14' min.) or bicycle lanes (4' to 6') where there are fewer cross-streets and driveways, and continuous sidewalks, audible pedestrian signals, and crosswalks at all intersections. To-edge of property greenway connections are required; off-property pedestrian improvements may also be requested to connect to schools, parks, or other pedestrian destinations.</p> <p>Intersection Treatments: Intersections should be designed to minimize walking distances at the lower-level cross-street by providing smaller curb radii (30') and curb extensions in activity centers. Minimum driveway spacing no less than 400', and intersection clearance at 100' from driveway tangent to cross-street tangent.</p>				
 <p>Collector</p>	Two to Three	1,000 to 20,000	Low	Moderate-High	25mph to 40mph
	<p>Land Use: Encourage development off side streets only, limiting the number of driveways on the main street. Very limited, low-intensity service businesses at major street intersections only are encouraged. Street trees are encouraged in the buffer to create a height-to-width ratio of 3:2 to 3:1, wherever possible. May be in a residential or nonresidential area.</p> <p>Median Treatment: Medians of 10' to 22' may be provided depending on the nature of the street relative to its position inside an activity center or other higher-density environment.</p> <p>Pedestrian/Cyclist Accommodations: Wide outside lanes or sharrows are common accommodations for cyclists, the latter occurring where on-street parking is present. Pedestrian accommodations are intense in activity centers, including furniture, scaled lighting, and continuous sidewalks on both sides of the street as well as crosswalks and pedestrian signals at intersections with Major or Minor Thoroughfares. To-edge of property greenway connections are required; larger private developments may be required to construct off-site pedestrian improvements to reach major pedestrian destinations such as parks, schools, and other facilities within ¼-mile.</p> <p>Intersection Treatments: Intersections should be designed to minimize walking distances at the lower-level cross-street by providing smaller curb radii (25' to 30') and curb extensions in activity centers. Separation between driveways to an intersection should be kept to 100' minimum, and spacing between driveways 250' minimum.</p>				
 <p>Local</p>	Two to Three	50 to 12,000	Very Low	High	15mph to 35mph
	<p>Land Use: Nearly exclusively for residential uses, typically single-family driveways and multiple, attached units (e.g., duplexes and townhomes). The only commercial uses would be allowable home-based or auxiliary services.</p> <p>Median Treatment: Typically, none.</p> <p>Pedestrian/Cyclist Accommodations: Typically, no bicycle accommodations are needed unless traffic volumes reach the higher end of this range (wide outside lanes of 14'); pedestrians should be accommodated with sidewalks on both sides of the developed street completed prior to final inspection. To-edge of property greenway connections are required of new developments; larger private developments may be required to construct off-site pedestrian improvements to reach major pedestrian destinations such as parks, schools, and other facilities within ¼-mile.</p> <p>Intersection Treatments: Intersections are designed with the pedestrian in mind and curb radii no larger than 20'. Ladder-style crosswalk markings may be required for intersections with Minor and Major Thoroughfares.</p>				
 <p>Alleyways</p>	Two	10 to 250	Very Low	Very High	5mph to 10mph
	<p>Land Use: Connects residential rear yards to parking areas and trash pick-up points, and connects street fronts to rear-yard parking lots in commercial and downtown districts.</p> <p>Median Treatment: None; total roadway width is typically only 12' to 14' with 5' on each side of the road.</p> <p>Pedestrian/Cyclist Accommodations: Landscaping, pedestrian furniture, and lighting are key elements of great alleyways. Sidewalks are not typically necessary, but the narrow width prohibits on-street parking.</p> <p>Intersection Treatments: Not applicable.</p>				
 <p>Main Street</p>	Two to Three	250 to 10,000	Very Low	Very High	15mph to 25mph
	<p>Land Use: A range of civic uses, attached residential units, and street-level retail are common. Zero or narrow setbacks and sideyards, emphasis on massing, voids, and façade elements are critical to obtain a 3:2 height-to-width ratio along the street.</p> <p>Median Treatment: Frequently, 10' to 22' planted medians are present, although narrower streets are more in keeping with the design of main streets in North Carolina and allow better pedestrian access.</p> <p>Pedestrian/Cyclist Accommodations: Very high intensity, with street furniture, pedestrian-scaled lighting, wide (10' minimum) sidewalks and wide (8' minimum) planted swales or inside curb extrusions ("bulb-outs") are commonplace. Design details like crosswalks, audible pedestrian signalization, on-sidewalk dining/sales; bicycle parking (post-and-loop) and other treatments are made at a detailed level during a design or redesign phase.</p> <p>Intersection Treatments: The walkability of these areas is important – any break in the continuity of building frontage, streetscaping, or other elements is perceived by the user as an end to the main street. Intersections typically feature curb extrusions, simulated paving stone crosswalks, and limited or no string-mounted signal heads to further enhance the main street atmosphere. Landscaped and well-lit alleys complement the architectural style of the environment.</p>				

*Typical values, not hard definitions.

6.4 Intersection Design Guidance

Figure 6.12 (A)



Intersections at roadways deserve special treatment and consideration in the planning and design processes for several reasons:

- Intersections are where the majority of conflicts between cars, pedestrians, and cyclists occur;
- Intersections mark transition zones between one type of roadway and another, often with each road having different capacity and speed characteristics; and
- Intersections are the places where the highest land values and most space are typically provided, often generating higher intensity developments than typically occur mid-block.

Streets and intersections can be broken down into five categories, as shown in Figure 6.12 (A). The street zone is everything between the curb lines; but what happens in the other four zones leading into the built up area is equally as important to ensure compatibility between street and development design. The width of each area depends on the intensity of the land use and the amount of available right-of-way and setbacks from buildings. Narrower setbacks may be desirable in lower speed areas to help create the feeling of an enclosed space to slow traffic and create a more walkable community. In such cases, the Streetscape and Amenity Zones are often one and the same, and the door zone becomes narrow with special attention paid to entranceways and window-driven retail opportunities.

Figure 6.12 (B)

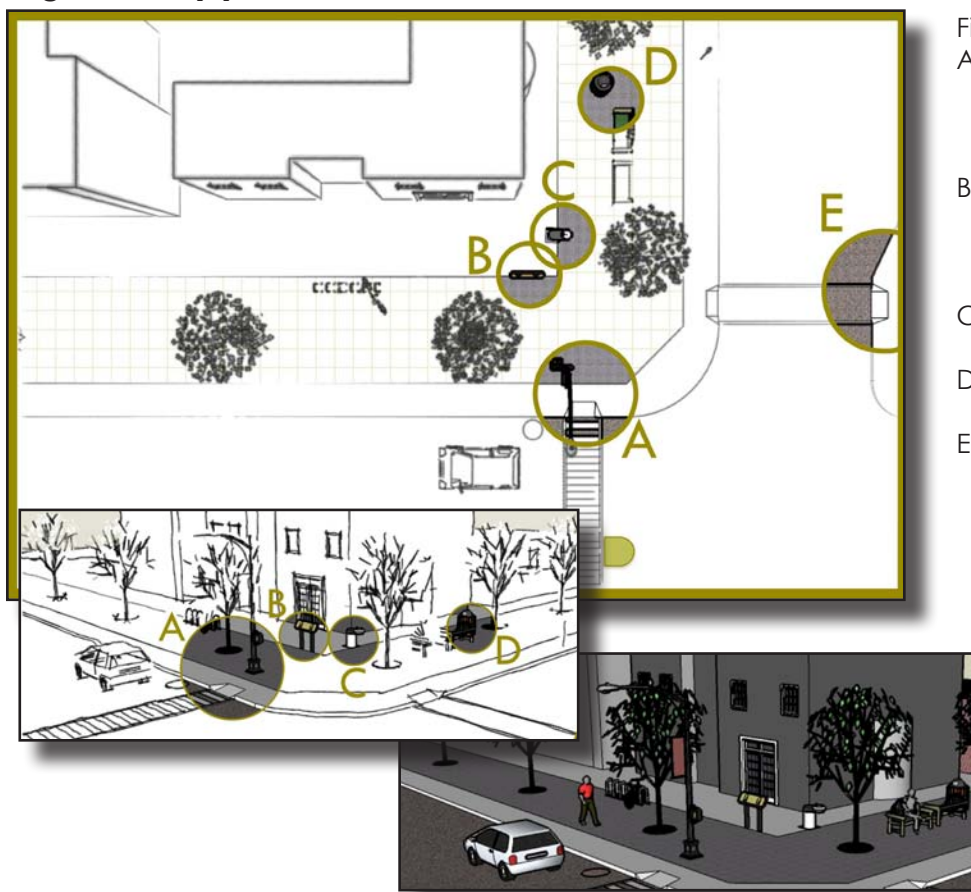


Figure 6.12 (B) illustrates some common design considerations.

- Ensure that all intersections have ADA curb ramps designed to NCDOT and national specifications, and that other features like light poles (shown here with a required pedestrian countdown signal head) allow for easy movement of wheelchair users.
- Wayfinding signage should be consistent, and consistently located to ensure high visibility. Again, allowing for at least 40" of clear space around the sign is desirable, as are viewing characteristics that support ADA populations.
- Similarly, water fountains like the one shown here should allow maneuverability without sacrificing accessibility.
- Waste receptacles should be conveniently-placed, highly visible, and emptied frequently.
- The curb extension shown here is desirable in downtown locations to help reduce pedestrian crossing distances, provide a more secure parking area behind the extension, and slow traffic turning speeds.

Figure 6.12 (C)

Intersection Treatments and Amenities	Typical Cost	Cost Unit
Basic Infrastructure		
Sidewalks	\$53	linear foot
Curbing	\$27	linear foot
Signal Mast Arm with Signal*	\$150,000	each
Signal Mast Arm (Double) with 2 Signals*	\$175,000	each
Strand (Wire) Signal Pole with Signal*	\$80,000	each
Pedestrian Signal	\$1,900	each
Sign and Post	\$250	each
Wayfinding Sign	\$500 - \$1,000	each
ADA Ramp	\$1,200	each
Amenities		
Bike Racks (Inverted 'U', 2 bicycles)	\$700	each
Crosswalk (Tape, Transverse Lines)	\$100	each
Crosswalk (Tape, Ladder)	\$300	each
Crosswalk (Textured Concrete)	\$20,000	each
Refuge Island	\$10,000- \$40,000	each
Curb Extension	\$10,000	each corner
Raised Crosswalk (Speed Table)	\$2,500	each
Speed Hump	\$2,000	each

*Note: Does not include site-specific cost of installation, e.g., electrical and wiring, foundations.

Basic costs for intersection treatments are indicated in Figure 6.12 (C). The actual cost will vary somewhat depending on the size (number and width of lanes) as well as the traffic control devices already in place. Crossing width is used to determine whether to use a mast arm rather than a strand wire signal. Up to 70 feet is a reasonable length for a mast arm; longer crossings are permissible, up to 84 feet, but the width of the base, foundation and other materials increase. Three to four feet at the tip of the mast arm is reserved for a sign, and about 16 feet at the pole end is needed to clear the sidewalk and buffer. This translates into a functional crossing width of about 48 feet, or four lanes of traffic.

Because intersections are such highly visible locations, they get noticed much more than other parts of the street. Therefore, textured / colored pavement treatments, wayfinding signage, and quality amenities like furniture and pedestrian-scale lighting features tend to have superior cost-benefit characteristics.

The design criteria in Figure 6.12 (D), adapted from the NCDOT Traditional Neighborhood Design Manual, may be adjusted according to NCDOT standard policies on state-maintained streets inside of Morrisville. These criteria fit pedestrian-oriented areas; higher design values may be required on higher-speed streets with little pedestrian and bicycle activity.

Figure 6.12 (D)

Street Intersection	Land Use	Posted Speed	Curb Radius	Planting Strip	Sidewalks	Bike Treatment
Alley	Commercial	<20mph	15'	0' - 3'	None	None
Local - Residential	Low-Density Residential	25mph	15'	3'	5' one side	Wide Outside Lane
Local - Activity Center	Mixed Residential-Commercial	15-25mph	15'-20'	6' or greater	8' two sides	Wide Outside Lane or Sharrows
Collector	Mixed Residential-Commercial	25-35mph	20'-25'	5' Min.	5' two sides	Wide Outside Lane or Sharrows
Minor Arterial	Medium Density Res.-Commercial	35-45mph	25'	8' Min.	5' two sides	4' - 6' Bicycle Lane
Major Arterial	Commercial	35-55mph	25' +	8' Min.	5' two sides	6' Bicycle Lane

7.0 ACTION ITEMS

With any long-range and comprehensive plan, the need is paramount for a set of specific strategies to take a community from its current state to its desired future. Seen at a glance, the combined Transportation and Land Use Plans that have been developed have a considerable amount of information. However, when broken down into discrete parts, the Plans become more manageable, more real to the staff and citizens.

The following action items describe short-term (3 years or less, shown in green), longer-term (longer than 3 years, shown in blue), and ongoing (shown in orange) strategies that the Town and its partnering agencies can undertake to realize the goals and policies stated in the Plans. Year One Goals/Activities refer to the first year that the item is to be implemented, regardless of what year that is. Years shown are calendar, rather than fiscal, years. The reader is encouraged to refer to the complete listing of Goals and Policy Statements in Section Four to provide additional clarity on the intent of these action items.

Action Items	2009	2010	2011	2012	2013	2014-2035
Goal 1: Ensure a diverse development pattern that sustains livability and the environment by encouraging future development and public infrastructure that is complementary with existing development.						
<p>1.1 Amend Zoning Ordinance. Ensure that current zoning district descriptions are compatible with the general intent of the land use districts in the plan. Incorporate zoning categories for small-scale mixed use and transit oriented development. Note that this does not imply rezoning properties to match the land uses in this plan - only ensuring that matching zoning categories exist to allow rezoning upon a property owner's request. This is a short-term solution; development of the Unified Development Ordinance in item 1.4 is the long term solution for amending the zoning ordinance.</p> <p>Related Policies: 1A, 1B, 1D, 1E, 2A, 2D, 2E, 3A-E, 5A-F Estimated Cost: 100 hours staff time + \$10,000 consulting fees Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Staff review of zoning ordinance and land use plan. Year 2-5 Goals/Activities: Propose amendment to zoning ordinance as soon as possible Performance Measures: Completed amendment in 2010</p>						
<p>1.2 Update Language for Traffic Impact Analyses (TIA). TIAs are intended to ensure that traffic generated from a proposed development is appropriate to the transportation infrastructure. Recommendations should include bicycle, pedestrian, and roadway improvements, including adjacent connections to facilities near schools and parks.</p> <p>Related Policies: 1A, 1B, 1C, 2C, 3A, 3B, 3D, 3E, 3F, 3G Estimated Cost: 120 hours staff time + \$5,000 consulting fees Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Identify weaknesses in current TIA policy; recommend changes; acquire adoption by Boards Year 2-5 Goals/Activities: None Performance Measures: Completed amendment in 2011</p>						
<p>1.3 Maintain and Enhance GIS System. Maintain the data on development impacts created for the plan updates in Synchro and CommunityViz models, and identify additional data to be acquired. This practice will assist in analyzing impacts of development proposals, to ensure consistency with the Plans.</p> <p>Related Policies: 1A Estimated Cost: 40 hours staff time annually Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Transfer files from consultant and ensure that Planning staff understand how they can be used. Identify additional data to be acquired as well as metadata protocols to ensure long-term understanding of the data structures Year 2-5 Goals/Activities: Continue updating and enhancing the system Performance Measures: None, but the program should be adjusted as new data becomes available</p>						
<p>1.4 Create Unified Development Ordinance. This ordinance revision will allow for important updates and clarification of existing codes, making it easier for developers to understand the Town's needs. It will provide an opportunity to formalize the future land use map presented in this Plan. In particular, the UDO will take a focused look at the design of Regional Activity Centers and address compatibility with and transitions to surrounding uses.</p> <p>Related Policies: 1A-F, 2A-E, 3A-G, 4A-E, 5A-F Estimated Cost: 500 hours staff time + \$110,000 consulting fees Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Develop and approve scope of services, including specific target areas for modification; Retain consultant Year 2-5 Goals/Activities: Develop and adopt new ordinance; create educational seminar for developers to explain the changes in the development ordinance components Performance Measures: (1) Retain consultant in 2009; (2) gather input from at least 50 stakeholders on the draft ordinance</p>						
<p>1.5 Develop Specific Plans for Redevelopment of Koppers (former Superfund) Site. This site has an excellent location in Morrisville and holds potential to be an asset to the community. Creating clear options for how it could be redeveloped, as well as reaching out to developers, would hasten reaching the potential of this central property. A Plan should include how transit oriented development might be used to redevelop the site. Related to Item 3.17.</p> <p>Related Policies: 1A, 1B, 1E, 2A, 2B, 2D, 3A, 3C, 4A-E, 5B, 5C Estimated Cost: 40 hours staff time + \$75,000 consulting fees Lead Agency(ies): Morrisville Planning Department in cooperation with the Chamber of Commerce</p> <p>Year One Goals/Activities: Retain development consultant, create, and approve action plan for marketing Year 2-5 Goals/Activities: Implement action plan Performance Measures: (1) Retain consultant in 2012; (2) Implement action plan in 2013</p>						

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<p>1.6 Create Small Area Plan or Master Plan for McCrimmon Parkway Extension Area. This area, the largest vacant land left in Morrisville, needs specific attention to ensure that land uses are balanced and meet the needs of the Town. Such a plan could involve a full public involvement process led by staff, possibly also with the involvement of a developer.</p> <p>Related Policies: 2A-E, 3A-G, 4A-E, 5A-F Estimated Cost: 380 hours staff time + \$80,000 consulting fees Lead Agency(ies): Morrisville Planning Department, in conjunction with private developers, public involvement, and stakeholder steering committee</p> <p>Year One Goals/Activities: Retain consultant after developing discrete scope of services Year 2-5 Goals/Activities: Develop the master plan for this area, including transportation and utility infrastructure, design elements, stormwater control measures, and key design elements as part of a small area plan Performance Measures: Complete plan with a major public involvement effort in 2013.</p>						

Action Items	2009	2010	2011	2012	2013	2014-2035
Goal 2. Ensure that Morrisville retains a small town atmosphere by integrating attractively and sustainably designed communities of complementary uses.						
<p>2.1 Prepare Ordinance Language for Green Building and Neighborhood Standards. Morrisville will create stormwater, building design/orientation, and materials codes that represent LEED standards for commercial and residential structures to reduce energy consumption, pollution, and help achieve long-term sustainability. Related to Item 1.4.</p> <p>Related Policies: 1A-F, 2A-E, 3A-G, 4A, 4B, 4C, 4E, 5A, 5C, 5E, 5F Estimated Cost: 120 hours staff time + \$20,000 consulting fees Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Review the finalized neighborhood, commercial, and residential LEED standards published by the US Green Building Council Year 2-5 Goals/Activities: Adopt flexible standards during the Unified Development Ordinance process Performance Measures: Adoption of green building standards concurrent with UDO update</p>						
<p>2.2 Prepare Updated Ordinance Language for Floodplain Development. Reducing the amount of development allowed within the 100-year floodplain will prevent loss of life and property, assist in addressing stormwater runoff and water quality problems, and provide additional greenspace for town residents. Related to Item 1.4.</p> <p>Related Policies: 1F, 2B, 2C, 3D, 4B, 4C, 4E Estimated Cost: 80 hours of staff time Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Engage the staff's certified floodplain manager to prepare, review, and adopt revised ordinance language Year 2-5 Goals/Activities: None Performance Measures: Adoption of revised floodplain ordinance in 2011</p>						
<p>2.3 Examine Possible Expansion of Required Riparian Buffers from 50 feet to 100 feet. Similar to increasing the floodplain regulation, this change would help address water quality and flooding issues in town. Such a policy should be examined for its potential costs and benefits to the Town for greenfield and redevelopment projects. Address as part of UDO.</p> <p>Related Policies: 1F, 2B, 2C, 3D, 4B, 4C Estimated Cost: 40 hours staff time Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Research and develop new policy, considering Phase II standards developed by NCDENR Year 2-5 Goals/Activities: Adopt riparian buffer policy Performance Measures: Adoption of new riparian buffer policy in 2011</p>						
<p>2.4 Restrict Fast-Food Restaurants and Drive-Through Window Establishments. Revise permitted use table to exclude by-right allowance of drive-through operations in selected districts that are more pedestrian friendly in order to limit traffic, air quality, and aesthetic issues, and encourage sit-down eating establishments. Address as part of UDO.</p> <p>Related Policies: 1A, 1B, 1D, 3A, 3B, 3F Estimated Cost: 40 hours of staff time Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: None Year 2-5 Goals/Activities: Review legal standing and develop draft language restricting (A) food-operation drive-through windows; and, alternatively, (B) additional restrictions on all (e.g., banking) drive-through windows Performance Measures: Ordinance amendment adopted in 2012</p>						
<p>2.5 Prepare Ordinance Language for Neighborhood Protection Overlay for Shiloh Community. Create a protection overlay district to protect historic structures in the Shiloh community. Could potentially be included as part of the UDO process.</p> <p>Related Policies: 1C, 5E Estimated Cost: 120 hours of staff time Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Research history of the Shiloh area and identify key cultural elements and buildings for preservation; appoint a Neighborhood Protection Committee to develop ordinance. Year 2-5 Goals/Activities: Finalize and adopt ordinance. Performance Measures: Ordinance completed by end of 2012</p>						

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<p>2.6 Evaluate Possible Additional Mechanisms for Protecting Greenspace in a Nonresidential Context. Ordinances in place in Morrisville that require developers to reserve open space are currently focused on residential development. This item will explore the possibilities for additional open space protection as part of nonresidential development, within the Town's existing legal limits.</p> <p>Related Policies: 1F, 2B, 2C, 3D, 4B, 4C, 4E Estimated Cost: 120 hours of staff time Lead Agency(ies): Morrisville Planning Department, Parks and Recreation Department</p> <p>Year One Goals/Activities: Coordinate with Parks, Recreation, & Cultural Resources Department on study scope Year 2-5 Goals/Activities: Work with IOG and other partners to evaluate additional options for protecting non-residential green space in the town Performance Measures: Complete recommendations for action by the end of 2012</p>						

Action Items	2009	2010	2011	2012	2013	2014-2035
Goal 3: Improve transportation mobility by integrating land uses with transportation infrastructure.						
<p>3.1 Establish Sidewalk Design Standards Linking Residential and Commercial Areas. In some instances, sidewalks have been built very close to residential homes. While having connections between residential and commercial areas is important, they need to be designed to minimize impact on residents. Address as part of UDO.</p> <p>Related Policies: 1B, 3E Estimated Cost: 80 hours of staff time Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Research and develop revised sidewalk connectivity policy Year 2-5 Goals/Activities: None Performance Measures: Complete policy revisions in 2011</p>						
<p>3.2 Establish a Provision for Bicycle and Pedestrian Amenities. Policies need to cover the provision of bicycle and pedestrian amenities during roadway construction and widening (to ensure that bicyclists and pedestrians are not negatively impacted during construction activities), and requirements for bicycle parking (quantity, type and location) as part of new development. See Figure 6.3 in the Transportation Plan for more information on bicycle parking. Address as part of UDO.</p> <p>Related Policies: 1C, 3B, 3C, 3D, 3E Estimated Cost: 40 hours of staff time Lead Agency(ies): Morrisville Planning Department, Engineering Department, and Inspections Department</p> <p>Year One Goals/Activities: Complete construction and parking policies; implement policies and construction inspection procedure Year 2-5 Goals/Activities: None Performance Measures: Implement pedestrian-bicycle construction and parking policies in 2010</p>						
<p>3.3 Update Zoning Code for Future Transit Stops and Easements. This will include establishing a policy for developers to install or plan for transit amenities where future stops are indicated. Standards will include pedestrian, cycling, lighting and stop design to accommodate future public transit services. Related to Item 1.2; could be conducted at the same time. Address as part of UDO.</p> <p>Related Policies: 1A, 3A, 3F Estimated Cost: 120 hours of staff time Lead Agency(ies): Morrisville Planning Department, with coordination between C-Tran and Triangle Transit organizations</p> <p>Year One Goals/Activities: None Year 2-5 Goals/Activities: Establish transit station policy (refer to Transit Design Section of Transportation Plan) Performance Measures: Adopt transit station policy/ordinance code in 2010</p>						
<p>3.4 Conduct a Detailed Study to Determine the Most Cost-Efficient Transit Service. The study will address a range of transit services, focusing on creating a service agreement with the Town of Cary to expand C-Tran service into Morrisville at a pace that synchronizes with the Cary planned improvements.</p> <p>Related Policies: 1D, 5A-F Estimated Cost: 200 hours of staff time + \$50,000 consultant fees Lead Agency(ies): Morrisville Planning Department in conjunction with C-Tran and Triangle Transit operators</p> <p>Year One Goals/Activities: Complete coordination with C-Tran and Triangle Transit to devise scope of services for a detailed study; retain consultant (if needed); and develop/adopt Morrisville Transit Service Plan Year 2-5 Goals/Activities: None Performance Measures: Adoption of Morrisville Transit Service Plan in 2012. Evaluate on a periodic basis</p>						
<p>3.5 Consider Whether to Increase Participation in the Wake County TRACS Service to Accommodate Additional Riders As Needed. Currently, there is not a need to expand the number of guaranteed seats beyond the current three.</p> <p>Related Policies: 5C Estimated Cost: \$10,000 annually (fee to Wake County Coordinated Transit Services) Lead Agency(ies): Morrisville Planning Department in cooperation with Wake County</p> <p>Year One Goals/Activities: Dedicate funding to Wake County for doubling the number (from 3 to 6) guaranteed riders; conduct marketing through existing outlets Year 2-5 Goals/Activities: Review and adjust funding, as needed Performance Measures: Increase the number of Morrisville riders on the TRACS service</p>						

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<p>3.6 Initiate a Universal Pass for Town Employees, and Work with Businesses of a Certain Size to Provide Discounts for their Employees who use Public Transportation, Carpool/Vanpool Riders, and Bicycle/Pedestrian Commuters. To support local transit (especially improvements noted in transit component of Transportation Plan) and regional transit options, work to adopt a pass system discounted to Morrisville residents and businesses.</p> <p>Related Policies: 1B, 1C, 1D, 5B, 5C Estimated Cost: \$10,000 annually Lead Agency(ies): Morrisville Planning Department, Public Information Office and Human Resources Department, in cooperation with Triangle Transit and C-Tran transit operators</p> <p>Year One Goals/Activities: Create and implement marketing and discount pass program Year 2-5 Goals/Activities: None Performance Measures: Increase number of Morrisville transit riders (origin or destination) transit trips by 25% at end of 2012 (compared to 2010)</p>						
<p>3.7 Work with Triangle Transit to Improve the NC 54 Corridor to Accommodate the 301 Bus Route. Triangle Transit has proposed to relocate this route off I-40 (and Morrisville Outlet Mall stops) to NC 54. Identify stop locations and finance shelters and pedestrian facilities, lighting, and other improvements to these locations.</p> <p>Related Policies: 3A, 3E, 3F Estimated Cost: 200 hours of staff time + infrastructure costs Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Conduct series of meetings with Triangle Transit staff to determine stop locations and slate of amenities Year 2-5 Goals/Activities: Construct or work with private developers to construct transit stop facilities Performance Measures: (1) Identify stop locations / amenities by end of 2010; (2) implement transit stop facilities</p>						
<p>3.8 Continue to Work with Triangle Transit and Other Regional Partners to Develop a Circulator Route between Durham, Research Triangle Park, and Raleigh-Durham International Airport. This circulator, possibly using an automated transit system, has been proposed both through the Center of the Region Enterprise (CORE) and Special Transit Advisory Committee (STAC).</p> <p>Related Policies: 5A-F Estimated Cost: 300 hours of staff time (possible participation in consulting fees) Lead Agency(ies): Morrisville Planning and Engineering Departments, in cooperation with Triangle Transit, Research Triangle Foundation, Triangle J COG, and RDU Airport Authority</p> <p>Year One Goals/Activities: Possible participation in workgroup Year 2-5 Goals/Activities: Continue to work with regional partners to identify route and service characteristics; work to help implement project Performance Measures: Continue moving forward with planning, design and implementation of the Durham/RTP/RDU Circulator</p>						
<p>3.9 Explore the Development of Future Transit Routes with C-Tran. Preliminary routes have been discussed, but need to be further researched and developed in conjunction with C-Tran.</p> <p>Related Policies: 5A-F Estimated Cost: 300 hours of staff time + \$80,000 for service fees to C-Tran/Cary Lead Agency(ies): Morrisville Planning Department in cooperation with Town of Cary</p> <p>Year One Goals/Activities: Work with Cary to develop new / expanded C-Tran routes Year 2-5 Goals/Activities: Work with Cary to develop new / expanded C-Tran routes Performance Measures: Develop C-Tran route (one) that services Morrisville residents</p>						
<p>3.10 Identify Funding Sources for Bicycle/Pedestrian Improvements. The priority projects are initially identified in the pedestrian plan element of the Transportation Plan. Additional priorities will be added as more funding becomes available.</p> <p>Related Policies: 1B, 1D, 3A, 3D, 3E, 3F, 4D, 5B, 5C, 5D, 5E, 5F Estimated Cost: \$100,000 annually Lead Agency(ies): Morrisville Planning and Engineering Departments working with CAMPO and NCDOT</p> <p>Year One Goals/Activities: Commit the \$100,000 in the Capital Improvements Plan for pedestrian improvements to add sidewalks under the NC 540 overpass on the east side of NC 54. Identify priority projects to receive \$13,300 in annual bike/pedestrian funding from CAMPO. Identify and pursue additional funding sources. Year 2-5 Goals/Activities: Identify and pursue additional funding sources Performance Measures: (1) Complete sidewalk under NC 540 on east side of NC 54 by 2010; (2) construct additional sidewalk in priority locations connecting schools and parks; (3) Construct from public funds a minimum of one mile of sidewalk per year by 2012.</p>						
<p>3.11 Coordinate with the Town of Cary Transportation Planners. This coordination should include discussion on expanding C-Tran bus service to Morrisville; development reviews; and ensuring consistent and connected bicycle/pedestrian facilities along the same road in different jurisdictions.</p> <p>Related Policies: 3B, 3D, 3E, 3F, 5A-F Estimated Cost: 80 hours of staff time Lead Agency(ies): Morrisville Planning Department in cooperation with Town of Cary</p> <p>Year One Goals/Activities: Initiate quarterly coordination meetings with Town of Cary Year 2-5 Goals/Activities: Continue quarterly meetings Performance Measures: Conduct four coordination meetings with Town of Cary in calendar year 2009</p>						
<p>3.12 Conduct Pre-NEPA Work on New Location Roadways. This work will identify any potential environmental issues ahead of the engineering design of roadways, to avoid costly delays later in the process.</p> <p>Related Policies: 1A, 2B, 3D, 4B Estimated Cost: \$100,000 consulting fees + 450 hours of staff time Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: \$100,000 has been allocated from the town budget for this purpose. Priority projects should be identified and consultant hired to perform this work. Year 2-5 Goals/Activities: None Performance Measures: Complete new location studies in 2012</p>						

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<p>3.13 Update Zoning Ordinance Regarding Connectivity Between Sites for Cross-Access Easements. Cross-access allows much shorter and more feasible walking trips, helping to provide alternatives to traffic congestion for many shopping and recreational activities. Address as part of UDO.</p> <p>Related Policies: 3B, 3E, 3F, 3G Estimated Cost: 40 hours of staff time Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Complete the zoning ordinance revision Year 2-5 Goals/Activities: None Performance Measures: Adopt the zoning ordinance revision requiring cross-access easements to adjacent properties and pedestrian/bikeways by the end of 2012</p>						
<p>3.14 Identify Funding Sources for Roadway Improvements. The Town has planned for future budget allocations for roadway improvements. Staff should also work with NCDOT and developers to facilitate planned roadway improvements and leverage local funds with public and private financing.</p> <p>Related Policies: 3G, 4A Estimated Cost: 120 hours of staff time annually Lead Agency(ies): Morrisville Planning, Finance and Engineering Departments</p> <p>Year One Goals/Activities: Identify funding opportunities through various mechanisms (TIF, public-private developer agreements, etc.) and create internal policies to streamline and promote partnering opportunities Year 2-5 Goals/Activities: Identify funding opportunities through various mechanisms (TIF, public-private developer agreements, etc.) and create internal policies to streamline and promote partnering opportunities Performance Measures: (1) Adopt policies by 2012; and (2) Implement and promote partnering arrangements with NCDOT and private development interests</p>						
<p>3.15 Create an Access Management Policy. Each additional driveway and cross-street increases the number of opportunities for vehicles to enter and exit the main traffic stream, producing conflict points and the potential for accidents. Access management limits these opportunities and decreases the number of accidents.</p> <p>Related Policies: 1A, 2D, 3A, 3B, 3E, 3F Estimated Cost: 240 hours of staff time Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Research access management policies Year 2-5 Goals/Activities: Develop access management policy and adoption by Boards for specified roadways Performance Measures: (1) Create draft access management policy in 2011; and (2) Adopt policy/overlay districts by mid-2012</p>						
<p>3.16 Explore Potential Solutions to Connect Gaps in Sidewalk. Possibilities include lobbying the state legislature to allow creation of special taxing district to connect sidewalks in advance of development.</p> <p>Related Policies: 1A, 3E, 3F, 3G Estimated Cost: 240 staff hours Lead Agency(ies): Morrisville Planning and Public Works Departments</p> <p>Year One Goals/Activities: Explore opportunities to create a revolving tax fund to create sidewalk improvements Year 2-5 Goals/Activities: Explore opportunities to create a revolving tax fund to create sidewalk improvements Performance Measures: Provide for 8 gap projects / 0.5 miles of sidewalk construction annually beginning in 2012.</p>						
<p>3.17 Create a Small Area Plan for the Planned McCrimmon @ NC 54 Grade Separation Alignment. The ramp system and overpass will require additional engineering to refine the design of this area, making sure to accommodate the proposed cross-section of NC 54, cyclists, and pedestrians as well as the number of motor vehicles passing through this interchange. Related to Item 1.5, could be conducted at the same time.</p> <p>Related Policies: 1A, 1B, 3B, 3E, 3F Estimated Cost: \$75,000 (Preliminary Design fee) Lead Agency(ies): Morrisville Engineering Department</p> <p>Year One Goals/Activities: Develop scope of services; retain consulting firm; complete preliminary design Year 2-5 Goals/Activities: None Performance Measures: Completion of preliminary roadway design by end of 2012</p>						
<p>3.18 Continue to work with Triangle Transit and the North Carolina Railroad Company to Support Passenger Rail Service. Potential station locations are identified at McCrimmon Parkway, Aviation Parkway, or Cary Parkway. Land use considerations must account for the fact that this line occasionally carries hazardous waste and AMTRAK service, and is planned to carry high-speed rail service at some point in the future.</p> <p>Related Policies: 1A, 5A-F Estimated Cost: 100 hours of staff time/year Lead Agency(ies): Morrisville Planning Department in cooperation with Triangle Transit and the NCRR company</p> <p>Year One Goals/Activities: Initiate coordination Year 2-5 Goals/Activities: Continue coordination efforts Performance Measures: (1) Regular communication and information sharing with Triangle Transit and NCRR partners; (2) Reporting to Morrisville Boards semi-annually on progress</p>						

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<p>3.19 Initiate Process to Change the Name of Existing Triangle Parkway to Southport Drive Extension (or other suitable name). There is an existing small road named Triangle Parkway located off NC 54, connecting to International Drive. In order to avoid confusion by residents, visitors, emergency services, and postal workers with the planned Triangle Parkway between NC 540 and NC 147, the name of the existing road should be changed. Plans call for it to connect to Southport Drive, so it could be called Southport Drive Extension.</p> <p>Related Policies: 5E, 5F Estimated Cost: 10 hours of staff time Lead Agency(ies): Morrisville Planning Department in cooperation with Public Safety departments, NCDOT and the U.S. Postal Service</p> <p>Year One Goals/Activities: Notify business owners along the existing Triangle Parkway and any vacant land owners of the proposed change. Follow the accepted process to change the name through NCDOT and the U.S. Postal Service. Year 2-5 Goals/Activities: None Performance Measures: Complete name change as soon as practical, ideally before new Triangle Parkway is constructed</p>	■					
<p>3.20 Conduct Engineering Design Study for Church Street Improvements. Church Street faces a number of complexities, such as a narrow and unclear right-of-way through the Town Center, a planned roundabout, and road realignment at the northern end. A full engineering study should be conducted to resolve some of these complications and create a specific plan so that improvements can move forward.</p> <p>Related Policies: 2D, 3A-G Estimated Cost: \$50,000 consulting fee + 60 hours of staff time Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Prepare RFP and scoping language; advertise; and retain consultant. Conduct study and identify any specific actions that the Town needs to take in order to proceed with making the planned improvements to Church Street. Year 2-5 Goals/Activities: None Performance Measures: Complete study and make progress on securing right-of-way and funding to make improvements</p>			■			
<p>3.21 Study and Coordinate NC 54 Improvements. The Major Thoroughfare through Morrisville. Addressing traffic congestion on NC 54 is critical to the function of the overall transportation network, but it is important to maintain a small-town feel, especially in the Town Center area. Long-term cross-sections have been identified for NC 54 and are illustrated on pages E-15 and E-16 in the Transportation Plan appendices. Following are short-, medium- and long-term actions necessary to achieve the proposed improvements.</p> <p>Related Policies: 3A-F Estimated Cost: 350 hours staff time + 100 hours staff time annually + \$150,000 consulting fees Lead Agency(ies): Morrisville Planning and Engineering Departments</p> <p>Year One Goals/Activities: Continue requesting 124' right-of-way dedication from developers along NC 54 and requiring developers to build laneage on their side along frontage (to equal their half of 4-lane cross-section); begin planned intersection improvements at NC 54 and Aviation Parkway/Morrisville-Carpenter Road; continue pursuing state funds for improvements including grade separations; Initiate NC 54 Corridor Study - Phase 1 Phasing Study (to provide instructions for staff and developers for improving the roadway along frontage properties; provide a more detailed plan for how and when improvements should be made in different segments to provide the most benefit to the town with the least interruption of capacity). Year 2-5 Goals/Activities: Complete planned improvements at NC 54 and Aviation Parkway/Morrisville-Carpenter Road; consider improvements to other intersections along NC 54 to improve flow after widening of Davis Drive has been completed; work to get project listed on the MTIP and STIP; maintain and update maps tracking the amount of right-of-way the town controls along NC 54 and set target dates for acquiring sufficient right-of-way; continue pursuing state funds for improvements including grade separations; continue requesting 124' right-of-way dedication from developers along NC 54 and requiring developers to build laneage on their side along frontage (to equal their half of 4-lane cross-section); Complete NC 54 Corridor Study - Phase 1 (described above) and Phase 2 Preliminary Design; Evaluate whether to proceed with NC 54 Corridor Study - Phase 3 Functional Design and NEPA (an additional \$150,000 consultant fee). Year 6-25 Goals/Activities: Work with NCDOT and Town of Cary to plan and conduct improvements to NC 54 as quickly as feasible, including additional intersection improvements, widening as funds and right-of-way are acquired, and construction of grade separations as funding is available. Performance Measures: Complete initial design for improvements and make progress on securing right-of-way and funding to make improvements.</p>	→					

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
Goal 4: Provide community services and public infrastructure to maintain and enhance the quality of life for Town citizens of today; the elderly that have enriched our past, and future generations.						
Additional related items: 2.1 and 3.13						
<p>4.1 Update Telecommunications Tower Ordinance. Revise language in zoning ordinance regarding cell towers and other telecommunications facilities to allow for this infrastructure while ensuring community safety, appearance, and appropriate location.</p> <p>Related Policies: 2A Estimated Cost: 40 hours of staff time + \$2,500 consulting fees Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Project is currently underway Year 2-5 Goals/Activities: None Performance Measures: Adopt revised ordinance by the end of 2009</p>	■					
<p>4.2 Create Tree Preservation Ordinance. To protect and conserve trees during development, maintain a rural atmosphere, and limit the heat island effect of urban development patterns.</p> <p>Related Policies: 2A Estimated Cost: 120 hours of staff time Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Complete the tree conservation ordinance study already underway, with the assistance of the working group; adopt new ordinance Year 2-5 Goals/Activities: Implement policy, and educate development community on specifics Performance Measures: Adoption of tree conservation ordinance by end of 2009</p>	■					
<p>4.3 Create Enhanced Infrastructure Tracking System. Develop system to better track infrastructure needs and planned improvements. Include component on infrastructure impacts of proposed development projects.</p> <p>Related Policies: 3A, 3G, 4A-E, 5A-F Estimated Cost: 200 hours of staff time + \$20,000 consulting fees Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Advertise and hire consultant; outline the needs of the town. Prepare a document for presentation to the Town Council summarizing the system that the Town currently uses to determine infrastructure requirements and how that system would work with the addition of an Enhanced Data Tracking System. Year 2-5 Goals/Activities: Complete new system design, test and implement Performance Measures: New system in place in 2011</p>	■					
<p>4.4 Perform a Lifecycle Housing Analysis. This analysis would determine the current affordable housing stock in Morrisville, compare the wages of Morrisville jobs to the cost of living in Morrisville, analyze the affordable housing need and lifecycle housing need in the town, and create an action plan for addressing this need. Consider universal design standards to accommodate the aging population.</p> <p>Related Policies: 2E Estimated Cost: 240 hours of staff time Lead Agency(ies): Morrisville Planning Department and Human Resources Department</p> <p>Year One Goals/Activities: Complete housing inventory and assessment, prepare report Year 2-5 Goals/Activities: Create/adopt action plan for improving housing options, as determined by the study Performance Measures: (1) Completion of affordable housing analysis, report, and action items in 2012; (2) implement thereafter</p>			■			
<p>4.5 Create Stormwater Utility. Evaluate the establishment of a stormwater utility to offset the associated costs of complying with the Town's National Pollutant Discharge Elimination System (NPDES) Phase II Permit and constructing the necessary stormwater improvements.</p> <p>Related Policies: 1F, 2B, 4B, 4C Estimated Cost: 300 hours of staff time Lead Agency(ies): Morrisville Engineering Department</p> <p>Year One Goals/Activities: Identify costs for needed improvements required by NPDES Year 2-5 Goals/Activities: Evaluate overall feasibility of establishing a stormwater utility to recover costs; implement the utility if determined feasible Performance Measures: Reach a determination on establishing the utility and implement if applicable in 2010</p>	■					

7.0 ACTION ITEMS, CONT'D

Action Items	2009	2010	2011	2012	2013	2014-2035
<i>Goal 5: Foster a collaborative environment internally and with relevant local, regional, state, and federal partners to develop new opportunities for Morrisville's residents and business community.</i>						
<p>5.1 Institute a Schedule for Regular Updates to the Future Land Use Map and Plan and the Transportation Maps and Plan. The comprehensive land use and transportation plans will rapidly go out-of-date and will need regular updating.</p> <p>Related Policies: None. Estimated Cost: 40 hours of staff time annually after 2009 Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Complete the review of the existing land use and transportation maps, and revise, as needed, every year following adoption (starting in 2010). Year 2-5 Goals/Activities: Complete a major update every fifth year. Performance Measures: (1) Completion of annual updates; and (2) complete major update every fifth year</p>		■	■	■	■	■
<p>5.2 Establish Performance Measures to Track Implementation of the Land Use and Transportation Plans. The implementation items herein are provided with discrete performance measures. The Planning Department will report on the progress of the Action Items annually.</p> <p>Related Policies: 5E, 5F Estimated Cost: 40 hours of staff time annually Lead Agency(ies): Morrisville Planning Department</p> <p>Year One Goals/Activities: Establish reporting template and complete first annual report Year 2-5 Goals/Activities: Complete assessment and report to Morrisville Boards, annually Performance Measures: (1) Complete annual assessments and report to Morrisville Boards; (2) use feedback to adjust performance measures in annual update of the Land Use and Transportation Plans; and (3) include record of each annual report/feedback session in appendix of both Plans</p>		■	■	■	■	■
<p>5.3 Develop a Hazardous Waste Transport Safety Plan. The Town should work with the NCRR and Norfolk Southern Railroad Companies to develop a hazardous waste transport safety plan that recognizes the danger in having hazardous waste shipments in close proximity to growing residential populations. Details of what should be included in the plan are described in Figure 5.14.</p> <p>Related Policies: 5B, 5C Estimated Cost: 80 hours of staff time + \$25,000 consulting fees Lead Agency(ies): Morrisville Planning Department in cooperation with NCRR and Norfolk Southern Railroad Company</p> <p>Year One Goals/Activities: Initiate series of meetings with NCRR and Norfolk Southern to outline and agree upon the contents of the plan. Year 2-5 Goals/Activities: Implement plan, which will include ongoing communication and review of procedures. Performance Measures: Concrete safety and coordination procedures in place by 2013</p>			■			
<p>5.4 Confirm with Wake County the Timing and Process for Development Proposed for Areas within Morrisville's Short Range Urban Services Area (SRUSA). Explore the possibility of the Town annexing these areas prior to development proposals. See Figure 1.1 for the location of SRUSA areas. The reconnection of Kit Creek Road and extension of Louis Stephens Road will change the development dynamic in these areas.</p> <p>Related Policies: 5A, 5C, 5D Estimated Cost: 80 hours of staff time Lead Agency(ies): Morrisville Planning Department in cooperation with Wake County</p> <p>Year One Goals/Activities: Coordinate with Wake County to confirm the process and timing for development in these areas Year 2-5 Goals/Activities: Submit an ETJ Extension Request to Wake County Performance Measures: Complete extension request by 2012</p>		■				

Appendices

APPENDIX A. GLOSSARY OF TERMS AND ACRONYMS..... A-1

Alphabetical list of some of the terminology used in the Land Use and Transportation Plans, for the easy reference of the reader. Some graphic and photo examples.

APPENDIX B. REFERENCES AND RESOURCES B-1

List of plans consulted in the planning process, and an extensive list of websites that may be of interest to readers, including neighboring jurisdictions, transit services, local points of interest, and state and national agencies.

APPENDIX C. HOW THESE PLANS WERE CREATED..... C-1

Public Involvement Methods..... C-1

Includes brief summaries of the three public workshops, three focus groups, and seven Plan Advisory Committee meetings. Also includes documentation of how town staff and consultants reached out to contact the citizens of Morrisville, through postcards, flyers and the plan updates website.

Public Survey Instrument C-3

A copy of the survey itself, which was distributed by paper and the internet from January through March 2008.

Summary of Public Survey Results C-5

Selected results of the survey are depicted graphically and summarized.

Public Comment Themes..... C-7

Table summarizing some of the common themes in the comments of the public, via workshops, focus groups, surveys, and Plan Advisory Committee meetings. Describes how each theme was addressed in the Plans.

Coordination With Regional Partner Organizations..... C-9

List of other jurisdictions and regional partner organizations that were consulted and coordinated with during the development of the Plans. Describes the nature of the input from each organization and if changes were made in the Plans directly as a result.

APPENDIX D. SUMMARY OF POLICY FRAMEWORK AND POLICY AUDIT.....D-1

The Policy Audit and Policy Framework are two separate documents created by the consultants during the planning process, describing the current policies in Morrisville and how they affect land use and transportation. This appendix briefly summarizes the content of those documents; the full versions are available by contacting the Town of Morrisville Planning Department (see below).

APPENDIX E. ROADWAY INVENTORY E-1

Provides additional detail on specific roadways and intersections within Morrisville. For each major street, a page is provided that describes the current conditions and proposed cross-section of the roadway.

APPENDIX F. INTERSECTION STUDIES F-1

Engineering drawings showing proposed changes to five key intersections.

APPENDIX G. CRABTREE CROSSING PARKWAY EXTENSION..... G-1

Additional information about this proposed extension, which was included on the 2002 Transportation Plan, and why it was removed.

APPENDIX H. FIXED ROUTE TRANSIT CASE STUDYH-1

Describes the overall feasibility and costs associated for Morrisville to initiate its own public transit (bus) service.

Looking for more information?

These appendices are included to provide additional information that might be helpful to the reader, can offer more detail on public input into the planning process, and further illustrates the results included in the Plan itself. In the interest of keeping this document a reasonable length, not all materials are included here. If you are interested, please contact Town of Morrisville Planning staff (919-463-6194) to receive a CD-ROM with the following additional files:

- Summaries of all three Public Workshops, including all public comments received and results of group exercises
- Minutes of all Plan Advisory Committee meetings
- Complete results of the public survey (the survey document itself and selected results appear in Appendix C)
- Policy Audit (described in Appendix D)
- Policy Framework (described in Appendix D)

APPENDIX A. GLOSSARY OF TERMS AND ACRONYMS

Bike Lane - A portion of the roadway that has been designated by striping, signing and pavement markings for the preferential and exclusive use of bicyclists.

CAMPO - Capital Area Metropolitan Planning Organization. A multi-jurisdictional agency with federal responsibility for long-range transportation planning for the Raleigh area including Morrisville.

CIP - Capital Improvement Plan. A CIP details the infrastructure improvements (streets, water and sewer facilities, as well as police and fire stations) that the Town will need to meet the needs of growth over the next five years.

Collector Street - Collect traffic from local roads and connects with thoroughfares. Lower speed and shorter distances than arterials.

Committed Land Use - Parcels that are developed and are likely to stay in their current use for the time period covered by the Land Use Plan, or parcels that are undevelopable for other reasons. E.g. parcels built 1996 or later, Town, State or Federally owned developed parcels.

ETJ - Extra-Territorial Jurisdiction. An ETJ is the area adjacent to and outside of the town limits in which the municipality has authority to exercise planning, zoning, building and subdivision regulation.

Freeway - Multi-lane roadway with limited access and relatively high speeds.

FAR - Floor Area Ratio. FAR is the ratio of the floor area of a building to the area of the lot on which the building is located. A 1:1 FAR might be reached with a one story covering the entire lot, 2 stories covering half of the lot, or 4 stories covering a quarter of the lot. A greater FAR implies a more intensive use of the land, although it need not be in terms of impervious surface coverage.

Future Land Use - The proposed future use for land in the town. This designation is made for planning purposes only and does not restrict the property owner in any way.

Greenway - Similar to a Multi-use Path, but contained in an independent right-of-way, separated from roadways.

Gross Density and Net Density - Gross density is calculated by dividing the number of dwelling units by the total area of the subdivision, including roads, open space, and unbuildable areas. It results in a lower number of dwelling units per acre than net density, which is calculated by dividing the number of dwelling units by only the developed area, such as houses and private yards.

High-Visibility Crosswalk - Instead of two simple stripes, a bold pattern of reflective paint, combined with high-visibility signage.

Intensity - Related to the discussion of density of residential or commercial land uses, intensity refers more to the design of the facilities rather than the actual number of units per land area. Developments with the same density can have different intensities depending on how they are designed.

Land Use Plan - The vehicle for town staff and the public to express their vision for the town's future. It is intended to guide public officials in their consideration of proposed developments, but it does not legally bind the town or property owners to a particular land use.

Local Roads - All roads not defined as freeways, thoroughfares or collectors. Provide access to land with little or no through movement.

Multi-use Path - Wide sidewalk, typically 8 to 10 feet wide. Physically separated from motor vehicle traffic, but usually within the roadway right-of-way.

NCDENR - North Carolina Department of Environment and Natural Resources

NC DOT - North Carolina Department of Transportation

Net Density - See Gross Density above.

PAC - Plan Advisory Committee. Group of ten citizens and two alternates selected by the Town Council to provide input to the staff and consultants in drafting the Plans.

Planning Jurisdiction - The town limits, ETJ and SRUSA comprise the town's planning jurisdiction.

RDU - Raleigh-Durham International Airport. Located adjacent to and northeast of Morrisville.

Redevelopment Potential - Parcels that are developed but are underutilized for their location. Sufficient value exists in the location that developers may benefit from redeveloping it for a different or more intensive use. E.g. parcels with older/smaller buildings that are near major roadways.

RTP - Research Triangle Park. Office and industrial park covering 7,000 acres in Durham and Wake counties. Located northwest and adjacent to Morrisville.

Sharrow - Sharrows are streets marked with bicycle symbols to denote that bicycles "share" the travel lane with motorized traffic.

Short-Range Urban Services Area - All land in the jurisdiction that: (a) is projected and intended to be urbanized and served by municipal services in the next 10 years; and (b) is not located within a water supply watershed. A water supply watershed includes all land that drains down to an existing or planned surface water source of drinking water and is subject to the State's minimum water supply watershed protection regulations.

Signed Bicycle Route - Designated route with directional and informational markers. Designated along more lightly traveled secondary roads where additional facilities are not necessary.

Thoroughfare - Relatively high level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control.

TIP - Transportation Improvement Program. Plan that contains a seven-year forecast of transportation improvements. Forms the basis for state funding of transportation projects.

Travel Demand Model - Computer simulation to project traffic using future transportation network conditions. Described in more detail on page X of the Transportation Plan.

UDO - Unified Development Ordinance. A combination of zoning ordinances and subdivision ordinances, it also includes regulations such as nuisance regulations and sign regulations.

Wide Outside Lane - The through lane closest to the curb is wider (generally 14 feet, rather than 12 or 11 feet), allowing cars to more safely pass bicyclists.

Zoning Ordinance - The set of laws that govern how property owners can develop their land, stating the acceptable uses and densities for each category. Zoning is the legally-binding form of control on property, rather than the Land Use Plan.

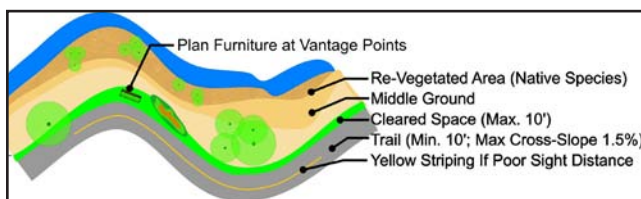
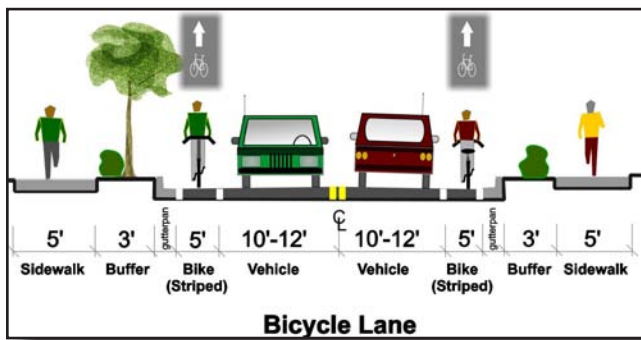
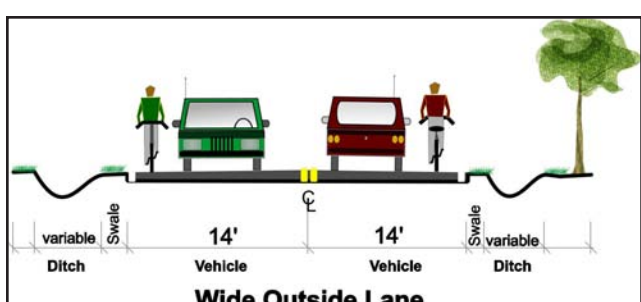
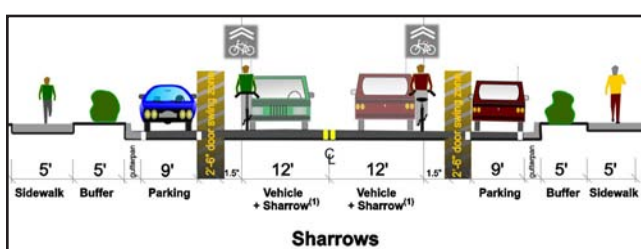


Diagram of a greenway.



High-Visibility Crosswalk in front of Cedar Fork Elementary.



APPENDIX B. REFERENCES AND RESOURCES

Plans and Documents Consulted

Many are available at <http://www.townofmorrisville.org/planning/downloads.asp>

Town of Morrisville Land Use Plan, 1999. Adopted November 8, 1999.

Town of Morrisville Transportation Plan, 2002.

Town of Morrisville Town Center Plan, 2007. Adopted January 22, 2007.

North Morrisville/Shiloh Small Area Plan, 2003. Approved January 6, 2003.

Town of Morrisville Parks, Recreation, Greenways & Open Space Comprehensive Master Plan, 2006. Adopted December 19, 2006.

Additional Sources and Websites of Interest

Town of Morrisville

<http://www.townofmorrisville.org/default.asp>

Town of Morrisville Zoning Ordinance

<http://www.townofmorrisville.org/planning/documents/ZoningOrdinance8.0.pdf>

Town of Morrisville Subdivision Ordinance

<http://www.townofmorrisville.org/planning/documents/SubdivisionOrdinance8.0.pdf>

Wake County

<http://www.wakegov.com/>

City and County of Durham

<http://www.durhamnc.gov/>

Research Triangle Park

<http://www.rtp.org/>

City of Raleigh

<http://www.raleigh-nc.org/>

Town of Cary

<http://www.townofcary.org/>

Raleigh-Durham International Airport

<http://www.rdu.com/>

Triangle J Council of Governments

<http://www.tjcog.dst.nc.us/>

Capital Area Metropolitan Planning Organization

<http://www.campo-nc.us/>

Wake County Public Schools

<http://www.wcpss.net/>

C-Tran (Cary Transit)

<http://www.townofcary.org/ctran/ctranoverview.htm>

Wake Coordinated Transportation Service (TRACS)

<http://www.wakegov.com/humanservices/adult/transportation/default.htm>

Triangle Transit

<http://www.triangletransit.org>

Special Transit Advisory Commission (STAC)

<http://www.transitblueprint.org/index.shtml>

Umstead State Park

<http://www.ncparks.gov/Visit/parks/wium/main.php>

Lake Crabtree County Park

<http://www.wakegov.com/parks/lakecrabtree/default.htm>

Information on Superfund Site in Morrisville (Koppers Co., Inc, EPA ID: NCD003200383)

<http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0402647>

North Carolina Crash Data, Highway Safety Research Center

<http://www.hsrc.unc.edu/crash/datatool.cfm>

North Carolina Department of Natural Resources

<http://www.enr.state.nc.us/>

North Carolina Department of Transportation

<http://www.ncdot.org/>

North Carolina Department of Transportation Traffic Survey Maps

<http://www.ncdot.org/it/img/DataDistribution/TrafficSurveyMaps/default.html>

North Carolina State Demographer

<http://demog.state.nc.us/>

U.S. Census

<http://www.census.gov/main/www/cen2000.html>

U.S. Census Longitudinal Employer-Household Dynamics Survey

<http://lehd.did.census.gov/led/>

APPENDIX C. HOW THESE PLANS WERE CREATED



Public Involvement Methods

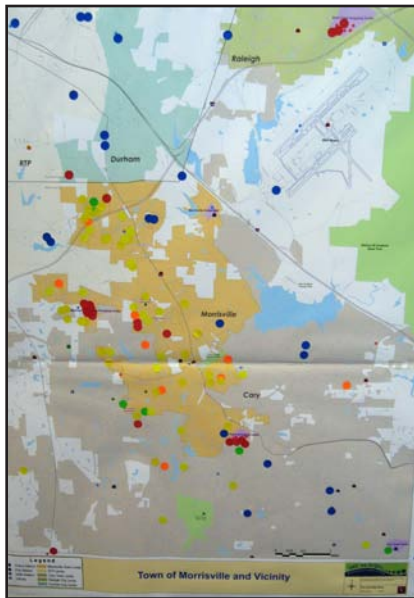
A true highlight of the Morrisville Land Use and Transportation Plans Update Project (the "Project") was the extensive and innovative use of public involvement. Over the course of the plans update process (October 2007 through May 2008), there were three public workshops with interactive group exercises, three focus group meetings, seven meetings of the Plan Advisory Committee (PAC), one online and paper public survey, and an ongoing project website and hotline phone number. The graphic to the

Plans Update Schedule (September 2007 - November 2008).

left illustrates the schedule of the planning process as well as the board review process.

Over the course of this public input process, there were at least 248 meeting attendees, equating to 180 unique individuals who took part in the active planning process, excluding town staff and consultants. In addition, 180 public surveys were received (the surveys were anonymous, so we don't know how much overlap existed with the meeting attendees).

At each public workshop and focus group meeting, a large map of Morrisville and the surrounding area was displayed, and participants were encouraged to place sticky dots on the map to represent where they live, work and shop. This map, pictured at left, allowed the staff and consultants to track the geographic diversity of the participants. Ensuring not only adequate numbers of participants but a diverse group of participants was a primary goal of this public involvement process. More detail on each of the outreach methods is included below.

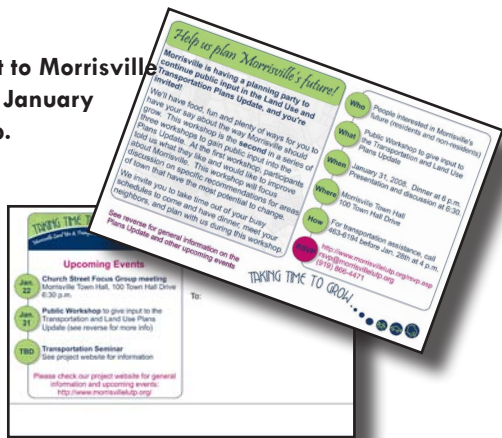


"Dots" map showing where meeting participants live, work and shop.

Public Workshops

Three public workshops and one Open House were conducted to engage the public on land use and transportation issues. Each public workshop followed a similar format but with a distinct focus. The workshop began with dinner provided to all attendees, followed by "meet & greet" time to eat and visit with other participants. Brief presentations by the consultants and staff were introduced by Mayor Jan Faulkner. Then the participants were divided into small tables of 6 to 8 people for the group exercises, where they could actively participate in the planning process. At the end of each meeting, the results of the small groups were presented to the large group. The focus and group exercises of each meeting are discussed in more detail below. Each workshop also featured handouts (information to take home as well as quick comment cards to fill out and hand back) and additional information presented on posters in the back of the room. Several Town Planning Department staff members and consultants were on hand to answer questions about the planning process or development in Morrisville in general. Raffle prizes were given away at each workshop as an incentive for participation. There was excellent attendance at the public workshops, with over 80 attendees at each.

Postcard sent to Morrisville residents for January 31 workshop.



Each of the three public workshops was advertised through an announcement in the town newsletter and citizen email listserv, as well as flyers posted at Town Hall, schools and other gathering spots. In addition, for the second and third public workshops, postcards advertising them were sent to each of Morrisville's 6,700 households and businesses.

October 29, 2007. The purpose of this first Public Workshop was to gain insight from community members about what they like about Morrisville and what issues they would like to see addressed in the future. The workshop also served to introduce the public to the Land Use and Transportation Plan Update process. Each small group was given a large map of Morrisville, colored sticky dots, markers, and a large sheet of paper. They were asked to answer the following questions: What elements of great communities does Morrisville have or lack? and What do you want to see for the future of Morrisville?. Then they marked on the large map the areas they would like to preserve, areas they would like to change/improve, and five road intersections that they would like to see improved. When groups were ready, a spokesperson from each small group presented a summary of their discussion to the larger group.

January 31, 2008. This workshop focused group discussion on specific land use recommendations for areas of town that have the most potential to change. Each group was given large maps of Morrisville showing the land that is vacant and has redevelopment potential, as well as transparent circles showing 1/4-mile and 1/2-mile walking distance, colored sticky dots, markers, a notepad. They were asked to place the circles on the map where activity "nodes" should be, write and use dots to mark desirable future land uses, and draw transportation connections that are needed to improve circulation in Morrisville. In addition, several posters and a computer display in the back of the room presented a Visual Preference Survey, showing photos and graphics of different design types for various land uses. Participants marked their preferences on handouts for the staff.



Attendees participate in group exercises, have dinner and take the visual preference survey at public workshops.

March 27, 2008. The purpose of this third public workshop was to gain public input on the transportation improvement priorities of the public. Each group was given a large map of Morrisville, markers, string, dots, scissors and tape. A staff "banker" was assigned to guide the exercise for each group. Each group was allocated a transportation improvement "budget" and told the costs for new roadways, new greenways, and bus service, etc. The participants had to work together and with their banker to prioritize the different types of projects while staying in budget. They marked their selections by taping different colored lengths of string to the maps where they would like to see improvements. In addition, there were draft alternative land use scenario maps in the back of the room for people to consider and provide comment on, as well as the draft vision/goals/policies for the plans.

APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

Focus Groups

To study individual areas in the Town, and to reach people that are often not engaged in general public forums, three focus meetings were conducted for youth, transit/bike/ped users, and the historic Church Street/Shiloh community. More detailed discussions were able to be held at these meetings, and "guest speakers" from transportation and other agencies talked about their perspectives on transit services, railroad impacts, and other issues. Each meeting was held in the evening during January/February 2008 and was advertised to the public, although the specific groups were the target audiences. One highlight of these meetings was the Youth Focus Group, which was attended by the Youth Advisory Committee for the Town of Morrisville. The small group was asked questions about their perspectives on Morrisville, drew "mental maps" of the Town to help highlight their values (see picture at right), and was interviewed for a television news segment.



Map of important places in Morrisville, from the Youth Focus Group.

Plan Advisory Committee

In September 2007, the Morrisville Town Council selected ten members and two alternates to serve on the Plan Advisory Committee (PAC). Members nominated themselves for consideration and were selected to represent a diverse range of viewpoints and interests. A photo of PAC members appears to the right. The role of the PAC was review and provide input to the planning process in a more detailed manner than members of the general public may be able to at the public workshops. A summary of the PAC duties is as follows:



Above: Members of the PAC. Below: PAC Members discuss future land uses.

1. Plan and staff exhibits at appropriate events as a representative of the PAC, such as public workshops, presentations to the public, Planning and Zoning Board and Town Council.
2. Review and comment on related events and suggestions.
3. Act as a representative or ambassador by seeking input from friends, associates, and acquaintances in the general public.
4. Participate with the staff and consulting team to review progress, discuss comments and suggestions from the public and provide feedback.
5. Recommend changes and or additions to the PAC.

The PAC met seven times, roughly once a month, from October 2007 through May 2008. Over the course of those meetings, all of which were open to the public, members were asked to offer their input and engage in discussion on a variety of topics, including future land uses, bicycle/pedestrian facilities, transportation priorities, and vision/goals/policies for the plans. The PAC also received and was solicited for comments on a draft version of the Land Use and Transportation Plans prior to their submittal to the Planning and Zoning Board. Minutes and materials from all of the PAC meetings are available from the Town of Morrisville Planning Department.

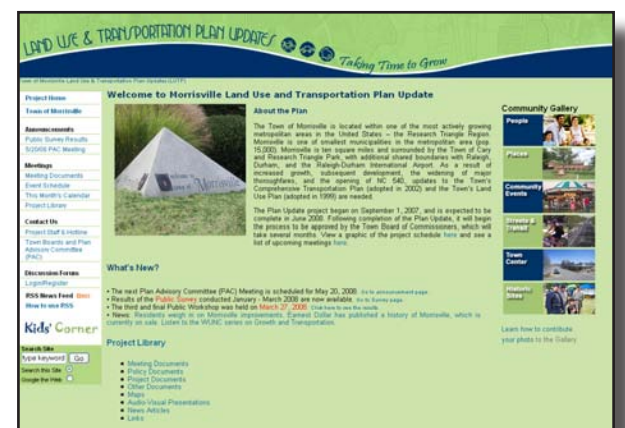


Public Survey

From January 10th through March 19th, 2008, the public was asked to participate in a survey to provide input to the plans. Questions covered respondents' bicycling and walking habits, key problematic intersections, and ideas for development types in different areas of town. The survey was conducted via hardcopy and internet, with paper copies available at Town Hall, the Planning Department, and other town meetings. The internet link was placed on the Town's website and distributed via the citizen email listserv and citizen newsletter. There were 180 survey responses. The survey instrument itself and selected survey results appear in Appendix D. Complete survey results are available by contacting the Town of Morrisville Planning Department.

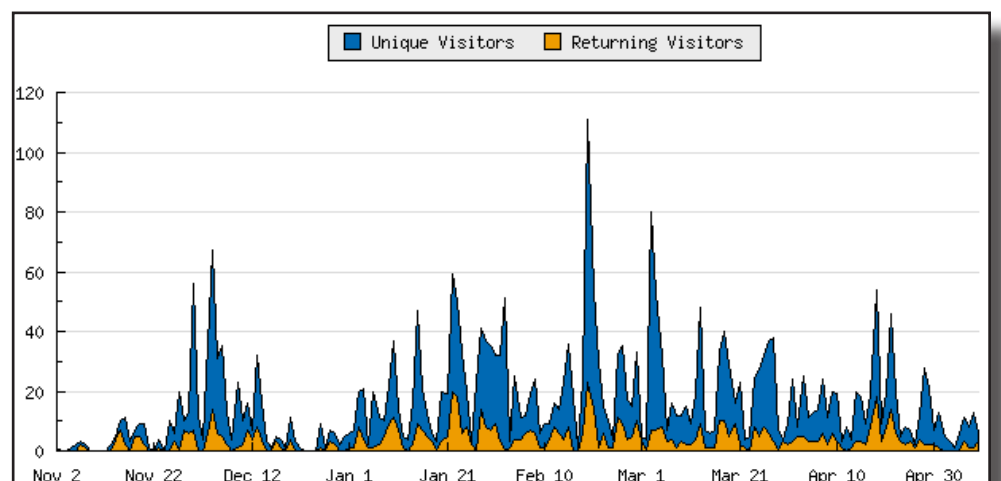
Plans Update Website

A key tool used to communicate with the PAC and the public, the project website (<http://www.morrisvillelutp.org>) developed for the Plans Update was instrumental to its success. The website both provided the public access to materials and offered opportunities for them to participate and give input to the process. The website featured a calendar of upcoming meetings and events; contact information for project staff and consultants; a project library with materials and minutes from past meetings including photos and videos, and related news articles, website links, policy documents and other materials; a community gallery with the option for the public to submit their own photos; a link to the public survey; an online discussion forum for people to post and respond to questions and comments; an RSS feed for participants to link to an automated news feed; a Kid's Corner with planning-related games; and an online RSVP function for public workshops. The website was updated at least once a week during the planning process, with the results of meetings often posted within two or three days. It was linked from the Town's website and promoted on all Plans Update materials.



Above: The Plans Update Website. Below: Website Unique and Returning Visitors November 2007 - April 2008.

The graph to the right shows the number of visitors per day to the project website over the planning period (November 2007 through April 2008). Over this period, there were 3,111 unique visitors to the site, of which 2,392 were first-time visitors, and 719 were returning visitors. Although these statistics are based only on computer "cookies" and therefore likely overstate the total number of visitors, it is nonetheless an impressive total. The website was overall a very successful means of both communicating with and receiving input from the public.



APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D
Public Survey Instrument



Town of Morrisville Transportation and Land Use Survey

Part I. Tell us About Yourself

1. Please tell us if you live or work in Morrisville. (check one)

- I live in Morrisville.
- I work in Morrisville.
- I live AND work in Morrisville.
- I neither live nor work in Morrisville.

2. Please tell us how long you have lived in Morrisville. (check one)

- I have lived in Morrisville less than two years.
- I have lived in Morrisville between two and five years.
- I have lived in Morrisville between five and ten years.
- I have lived in Morrisville longer than 10 years.

3. Please give us an idea of your family status (check all that apply).

- I live alone.
- I live with a spouse or partner.
- I live with one or more roommates (not a spouse or partner).
- I live with one or more adult family members (not a spouse or partner).
- I live with one or more children.
- If you have other living arrangements, please describe:

Part II. About Transportation in Morrisville

4. Please tell us how much you walk or bike to the following places NOW. If the location is not applicable to you, leave it blank.

	I walk/bike there now more than twice per week.	I walk/bike there now at least once per month.	I never walk/bike to this place.	I don't go to this place.
Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grocery Store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park/Rec.Center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friend's House/Visit Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please tell us how much you WOULD walk or bike to the following places if they were made safer. If the location is not applicable to you, leave it blank.

	I would walk/bike there more often if there were more sidewalks or bike lanes.	I would walk/bike there if the location were closer.	I would walk/bike there if one or more intersections were made safer to cross.	I would walk/bike there more often if there were benches, bike parking or other amenities.	I wouldn't walk or bike there even if conditions were ideal.	I don't go to this place.
Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grocery Store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park/Rec.Center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friend's House/Visit Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Many people say that they like the "small town feel" of Morrisville, but also appreciate its close proximity to work, entertainment, and shopping opportunities. Please RATE THE FOLLOWING future growth strategies in terms of their importance to you.

	1 Least Important	2	3 Neutral / No Opinion	4	5 Most Important
Develop the downtown with shops, residences, and entertainment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop cultural and arts center	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote and protect historic sites and buildings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make the town so that kids and elderly can walk or bike where they want	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discourage and new business development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote more sit-down restaurants and small businesses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discourage any new residential development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promoter more single-family home development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please tell us which locations or roadways in Town should be made more pedestrian-friendly (e.g. add sidewalks, crosswalks, push-button signals, etc).

1. _____
2. _____
3. _____

8. Please tell us which locations or roadways in Town should be made more bicycle-friendly (e.g. which roadways need bike lanes or wide shoulder, where should there be greenways).

1. _____
2. _____
3. _____

9. Please tell us which roadways you would like to see improved (adding lanes, turn lanes, or extending further) from those listed below, or you can only check your TOP THREE roads.

- Airport Boulevard
- McCrimmon Parkway
- Aviation Parkway
- Morrisville-Carpenter Road
- NC 54 / Chapel Hill Road
- Crabtree Crossing Parkway
- Other _____

10. Please tell us which three intersections need to be improved to make traffic move faster and / or safer. You may check only your TOP THREE intersections.

- Factory Shops Road and Airport Boulevard
- McCrimmon Parkway and Church Street
- Morrisville Parkway and Crabtree Crossing Parkway
- Morrisville-Carpenter Road and Town Hall Drive
- NC 54/Chapel Hill Road and Aviation Parkway
- NC 54/Chapel Hill Road and McCrimmon Parkway
- Other _____

Part III. Additional Comments

11. Please tell us if you have any other comments or concerns about TRANSPORTATION issues in Morrisville.

12. Please tell us if you have any other comments or concerns about LAND USE issues in Morrisville.

13. If you would like for us to contact you individually, please provide us with your name and contact information.

Please contact me - I have a question for you.

Please notify me of upcoming events.

Contact Information

NAME _____

ADDRESS _____

Phone _____

Email _____

Hurry!
Respond by
March 19th

Continued on back

APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

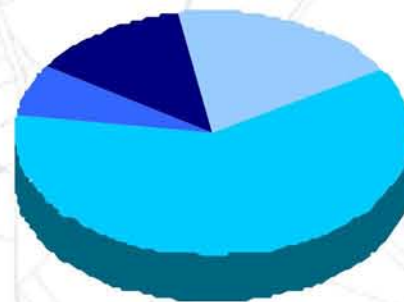
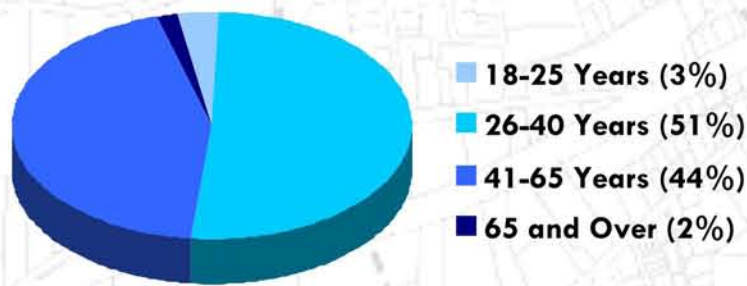
Summary of Public Survey Results

About The Survey...

There were 180 completed surveys overall; some people did not answer every question, but most (usually over 150 people) did answer every question. Here is what the survey respondents had to say about themselves and about Morrisville. The items in quotation marks scattered throughout are just some of the comments received; you can see the complete results and all of the comments by contacting Town of Morrisville Planning Department staff.

"Balance retail with residential and recreational uses..."

What is Your Age?

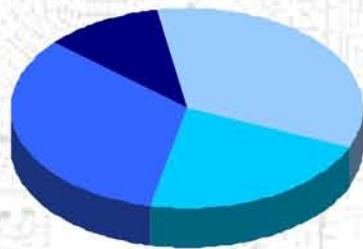


Do you live and/or work in Morrisville?

- Live and work in Morrisville (19%)
- Live in Morrisville (61%)
- Work in Morrisville (7%)
- Neither live nor work in Morrisville (13%)

How Long Have You Lived in Morrisville?

- 0 - 2 Years (34%)
- 2 - 5 Years (22%)
- 5 - 10 Years (33%)
- Longer than 10 Years (11%)



Make roads safe for everyone (cyclists, walkers...) not just cars"

Demographics:

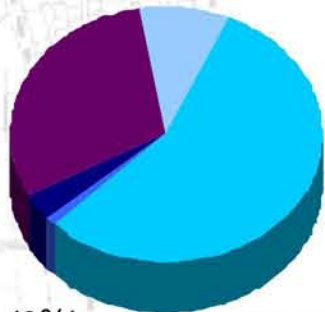
- Most survey respondents live in Morrisville but work elsewhere;
- A large majority live with their spouse/partner and kids; and
- Not many survey respondents have lived in Morrisville longer than 10 years; a lot of them are under the age of 40.

Roadways and Intersections:

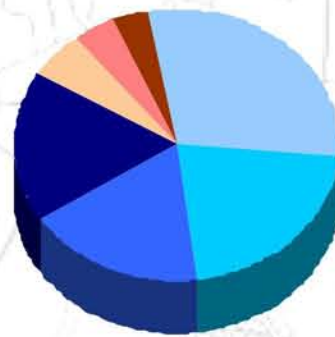
- NC 54 and Morrisville-Carpenter Road were consistently ranked highly for both widening and intersection improvements. McCrimmon Parkway came in third.

What is Your Living Arrangement?

- I live alone (9%)
 - I live with a spouse or partner (56%)
 - I live with one or more roommates (not a spouse/partner) (1%)
 - I live with one or more adult family members (not a spouse/partner) (1%)
 - I live with one or more children (30%)
- (Respondents could check more than one option)



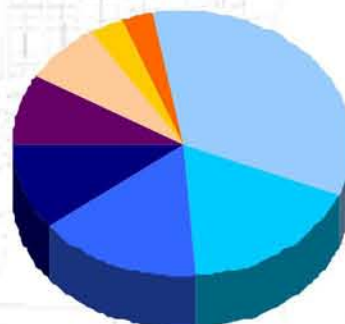
Which Intersections Should Be Improved?



- NC 54/Chapel Hill Road and Aviation Parkway (28%)
- NC 54/Chapel Hill Road and McCrimmon Parkway (21%)
- Morrisville-Carpenter Road and Town Hall Drive (17%)
- McCrimmon Parkway and Church Street (17%)
- Morrisville Parkway and Crabtree Crossing Parkway (5%)
- Church Street and NC 54 (4%)
- Davis Drive and McCrimmon Parkway (3%)

(Respondents could check up to three intersections and three roadways)

Which Streets Need to Be Widened?

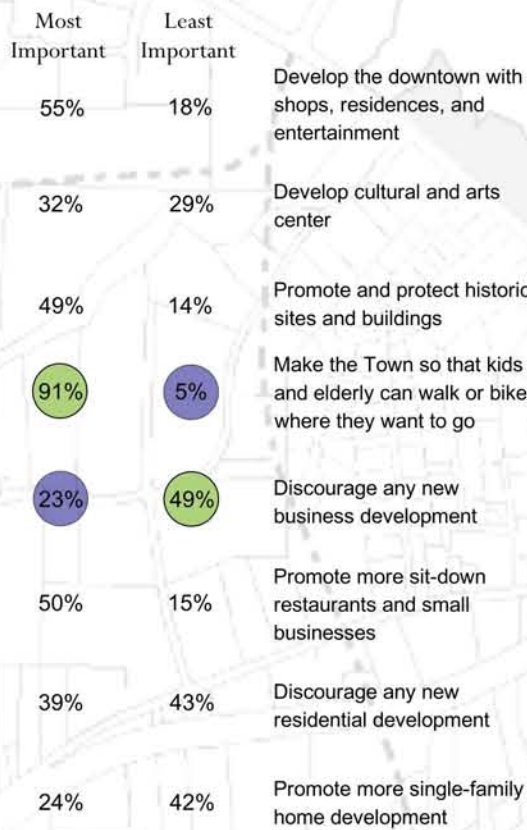


- NC 54 / Chapel Hill Road (34%)
- Morrisville-Carpenter Road (17%)
- McCrimmon Parkway (16%)
- Aviation Parkway (11%)
- Airport Boulevard (8%)
- Church Street (7%)
- Crabtree Crossing Parkway (3%)
- Davis Drive (3%)

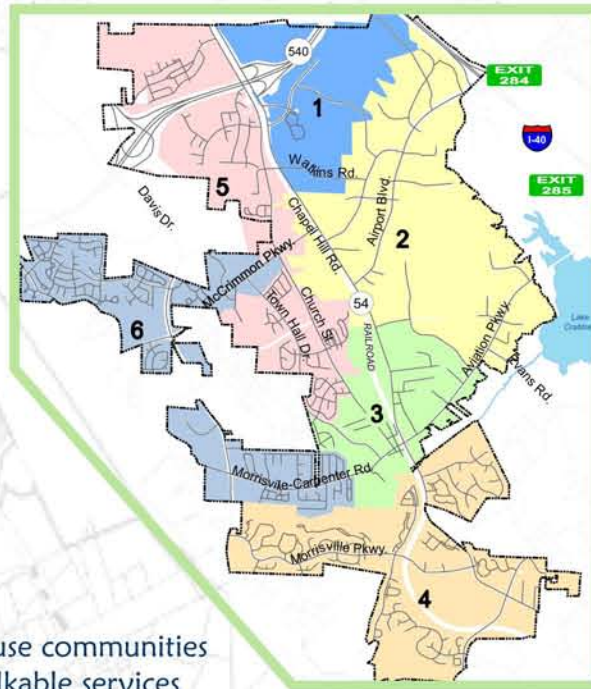
APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

Summary of Public Survey Results, cont'd

What's Important to Our Small-Town Atmosphere?



Compare (Green is Highest; Blue is Lowest)



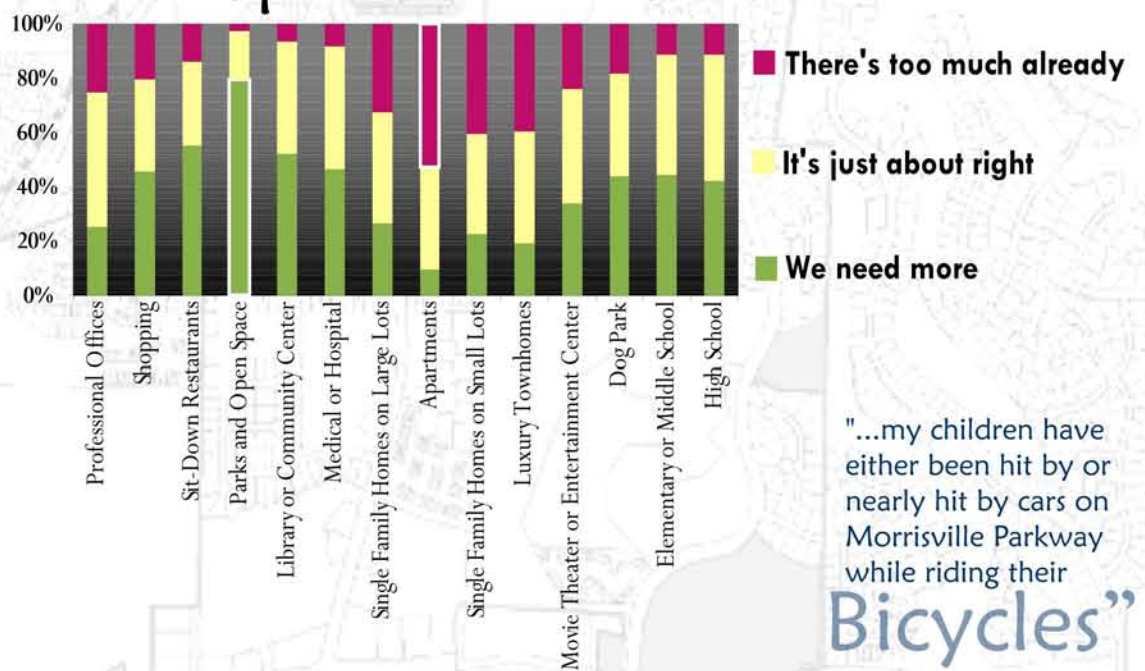
"Mixed use communities with walkable services would be Fantastic"

Development:

When we asked people if there was "too much, about enough, or more needed" for different kinds of development in the numbered areas shown on the map at left, these were some of the results:

- Generally, there were very few differences in the answers for different parts of town;
- Regardless of the part of town, people preferred fewer apartments and more parks and open space;
- Luxury townhomes and houses on large and small lots were evenly regarded;
- Sit-down restaurants, schools, and
- Professional offices were slightly more preferred in Area 1 (Northeast).

Development in Morrisville...

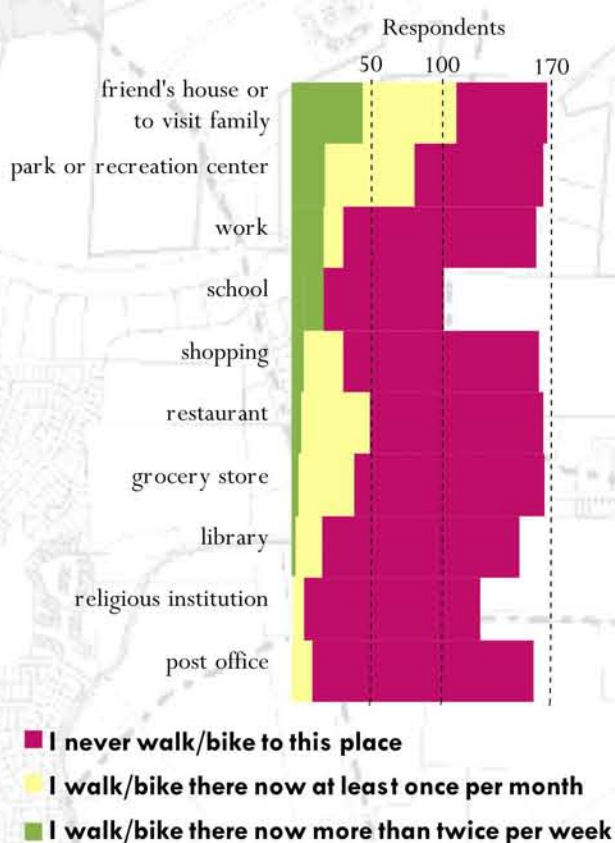


"...my children have either been hit by or nearly hit by cars on Morrisville Parkway while riding their Bicycles"

Bicycle/Pedestrian:

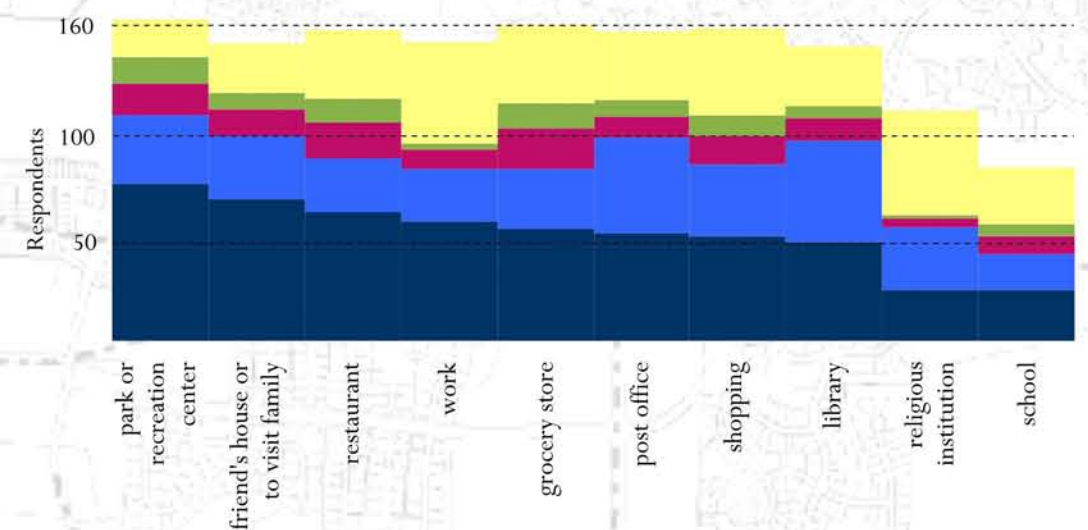
- A friend's house or a park are the places that people walk to most often now;
- Restaurants and work are also places more people would walk to if they were made safer or were closer to home; and
- Increasing sidewalks and reducing distance between land uses were cited as the best ways to improve the walkability of Morrisville.

How Often Do You Walk To...



Best Ways to Make Walking/Biking Better

- I wouldn't walk or bike there even if conditions were ideal.
- I would walk/bike there more often if there were benches, bike parking or other amenities.
- I would walk/bike there if one or more intersections were made safer to cross.
- I would walk/bike there if the location were closer.
- I would walk/bike there more often if there were more sidewalks or bike lanes.



Graphs omit respondents who said they never go to that place

APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

Public Comment Themes

Throughout the public involvement process of workshops, focus groups, surveys, and Plan Advisory Committee meetings, there were common themes to many of the comments received. The table below describes each theme of comments and how it has been addressed in the Plans (in gray under each comment). To see the original comments received, please contact the Planning Department for a CD-ROM containing minutes and summaries of all of the public meetings.

Key to Public/PAC Comments	
●	= Light (PAC: 0-2 Members; Public: 5-10 Comments)
●	= Moderate (PAC: 3-4 Members; Public: 11-20 Comments)
●	= Heavy (PAC: 5-6 Members; Public: 21-30 Comments)
●	= Greatest (PAC: > 6 Members; Public: > 30 Comments)

General Comment	Public	PAC	Details
Bicycling Opportunities	●	●	The PAC cited this as an issue during their 10.16.2007 meeting.
<i>Numerous bicycling accommodations are suggested in the Transportation Plan, including some type of on-road facility for nearly all of the roadway improvements and prioritized greenway (off-road) projects.</i>			
Traffic Congestion (General)	●	●	The PAC cited this as an issue during their 10.16.2007 meeting.
<i>A variety of roadway capacity improvements, grade separations, and intersection improvements are proposed throughout the Town, with most major and minor thoroughfares being widened to at least four lanes of traffic (Davis Drive and NC 54).</i>			
NC 54 Traffic Congestion	●	●	The PAC cited this as an issue during their 10.16.2007 and 4.21.2008 meetings; the public identified this issue at the 1.31.2008 public workshop, through the strings-and-ribbons exercise (3.27.2008), and survey responses as the premier transportation issue in the Town.
<i>The recommendations for this roadway have been made in several segments. Sections with four lanes and planted median: North of NC 540 to boundary with Durham, McCrimmon Parkway to Sunset Avenue, Keybridge Drive to Cary Parkway. Section with four lanes and no median: Sunset Avenue to Keybridge Drive (to avoid impacts to existing buildings in the Town Center). Section with six lanes: South of Cary Parkway to boundary with Cary. The section between NC 540 and McCrimmon Parkway will initially be four lanes with a planted median but may be expanded to six lanes in the future if a Traffic Impact Analysis or NC 54 Corridor Study recommend expansion and the Town Council agrees. In addition, smaller improvements at intersections and along NC 54 will facilitate traffic flow. Grade separations are proposed at Airport Boulevard, McCrimmon Parkway, Carrington Mill Boulevard and Morrisville Parkway.</i>			
Crabtree Crossing Parkway Extension	●	●	The PAC discussed this issue at the 4.21.2008 and 5.20.2008 PAC meetings, with members of the public speaking on the project at the 5.20.2008 PAC meeting. The public also commented favorably (2 of 9 groups) on this proposed project during the 3.27.2008 Public Workshop.
<i>This roadway was initially proposed as a 2-lane roadway with bike lanes and sidewalks, along with traffic calming features to prevent cut-through traffic. In response to citizen concerns about traffic impacts to neighborhoods along Crabtree Crossing Parkway south of the proposed extension, it was removed from the 2009 Transportation Plan. See Appendix G in the Transportation Plan for more information.</i>			
Roadway Maintenance	●	●	The PAC cited this as an issue during their 10.16.2007 meeting.
<i>This issue was only lightly discussed after the first two PAC meetings, and the public rarely cited this as an issue. However, maintenance will be an ongoing issue and is important to maintain clear bicycle lanes as well as maintain traffic flow. Most streets are under the ownership of NCDOT, which uses state and federal monies to do basic maintenance activities (shoulder repair, crack sealing, resurfacing, etc).</i>			
Transportation Connectivity	●	●	The PAC cited this as an issue during their 10.16.2007 meeting; the public noted the issue at 1.31.2008 and 3.27.2008 Public Workshops.
<i>East-west connectivity and north-south capacity are significant issues that were stated several different ways. Connections between Aviation and Airport as well as across NC 54 were cited during the 3.27.2008 Public Workshop, for example, and have been recommended. Improving connectivity is one strategy to improve traffic congestion on major road, such as NC 54, which received many comments from the public.</i>			
Sustainability	●	●	The PAC cited this as an issue during their 10.16.2007 and meeting.
<i>The issue of sustainability is addressed by several recommendations for policy changes, particularly those addressing stormwater runoff and energy efficient building practices. Bicycle and pedestrian improvements, as well as creating proximate land uses that encourage alternative modes of travel in the activity centers are also important physical recommendations.</i>			

APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

General Comment	Public	PAC	Details
Recreation / Open Space / Parks	●	●	The PAC cited this as an issue at several meetings, including their 10.16.2007 and 4.21.2008 meetings. The public asked for more greenway connections at the 3.27.2008 Public Workshop, and for more parks/recreation (9 comments) and greenways (11 comments – the largest category of comments) opportunities at the 1.31.2008 Public Workshop.
<p><i>A number of prioritized greenway connections, including specific recommendations for greenways connecting existing parks, are recommended. As far as parks and recreation areas, we are indicating the need for additional space designated in the undeveloped area between Airport Boulevard and Aviation Parkway. The Town has acquired a number of parcels recently for parks including along Church Street north of McCrimmon Parkway, along Louis Stephens Drive (Old Maynard Road) near Breckenridge and a nature park along Crabtree Creek.</i></p>			
More Low-Density Housing	●	●	The PAC cited this as an issue during several of their meetings in 2008. The public noted this issue particularly at the 1.31.2008 workshop. It was also expressed through responses to the public survey.
<p><i>This comment took two forms: requests for more low-density housing (or for any future additional housing to be lower rather than higher density), and concerns about there being too much high density housing currently in the town. For example, a majority of survey respondents felt that there were too many apartments in Morrisville. These concerns were addressed in the Land Use Plan by not increasing the land classified as high density residential in the town (it is impractical to re-designate existing high-density residential as a lower density in the future). Additional high density residential could be added in the Regional Activity Centers or Southern Activity Center if approved by the Town Council. Several additional residential areas were added to the plan and were classified as low or medium density. In addition, none of the areas designated for low-density housing in the 1999 Land Use Plan were eliminated in the 2009 Plan (though some have been built at higher densities between 1999 and 2009), and an additional 227 acres of land not designated for residential in the 1999 Plan have been designated as low or medium density (single family detached) residential use in the 2009 Plan.</i></p>			
Changes in Amount of Retail / Shopping	●	●	The PAC cited this as an issue during their 10.16.2007 meeting; the need for more shopping and restaurants was noted by many commenters at the 1.31.2008 workshop. Some PAC members (4.21.2008 meeting) asked for less mixed-use development.
<p><i>Higher-end retailers were sometimes noted as desirable by both the PAC and public commenters. The policy recommendations include restricting drive-through retailers and consolidating new retail agglomerations into a limited number of activity centers in attempt to balance the desire for more low-density development throughout the Town.</i></p>			
Aesthetics / Beautification	●	●	The PAC cited this as an issue during their 10.16.2007 meeting; numerous members of the public cited this as an issue at the 10.29.2007 workshop.
<p><i>Gateway areas (small, landscaped areas near the entranceways to Town) were recommended in a number of locations; some of the policy recommendations and street cross-sections were intentionally designed to introduce more landscaping and streetscaping into future infrastructure.</i></p>			
Need for More Public Schools	●	●	The PAC cited this as an issue and discussed the matter extensively during their 4.21.2008 meeting.
<p><i>In North Carolina, public schools and school siting are handled by county government; however, local governments can participate in locating and preserving sites that may be suitable for public schools. The criteria for school sites are discussed in the 2009 Land Use Plan, and options for school sites were discussed on several occasions during PAC meetings. The plan notes several sites meeting the criteria but does not designate any of them as school sites since Wake County Public School System is not including the Town in its current search for sites.</i></p>			
Need for More Public Transportation	●	●	The PAC discussed transit options at 3.18.2008 and 4.21.2008 meetings; the public cited this issue at the 1.31.2008 workshop.
<p><i>A variety of public transportation recommendations, both short- and longer-term, are present in the 2009 Transportation Plan, including transit service along NC 54 and Aviation Parkway, as well as a cross-town connector servicing south RTP and RDU International Airport. Longer-term recommendations will accommodate future regional rail transit stations.</i></p>			

Key to Public/PAC Comments	
●	= Light (PAC: 0-2 Members; Public: 5-10 Comments)
●	= Moderate (PAC: 3-4 Members; Public: 11-20 Comments)
●	= Heavy (PAC: 5-6 Members; Public: 21-30 Comments)
●	= Greatest (PAC: > 6 Members; Public: > 30 Comments)

APPENDIX C. HOW THESE PLANS WERE CREATED, CONT'D

Coordination With Regional Partner Organizations

The Town of Morrisville staff are committed to engaging neighboring jurisdictions and regional planning groups as active participants in the planning process. Morrisville's location in the heart of the Triangle necessitates this kind of cooperation in order to plan effectively. The purpose of multi-jurisdictional coordination is to inform the other groups of the Town's intent regarding future land use and transportation changes, coordinate plans for adjacent areas and roadways that run through more than one town, receive feedback on issues of interest to the other groups, and collaborate on solutions to some of the more challenging aspects of planning in Morrisville. As such, the Town planning staff and/or consultants have met with the following groups during the planning process (October 2007 through May 2008) and made changes to the plans as described below:

- **Town of Cary.** Met several times to discuss transportation issues related to roadways that go through both jurisdictions, to ensure coordinated improvements. Resulted in changes to the cross-section for NC 54 and Davis Drive, and bicycle/pedestrian improvements on several other roadways. Discussed widening the causeway on Aviation Parkway, which is controlled by NCDOT but within Cary's jurisdiction, to provide bicycle/pedestrian access from Morrisville to Lake Crabtree Park. Also received email comments on land use issues, including the clarification of urban services areas. Representatives attended two of the public workshops.
- **Research Triangle Park (RTP).** Discussed potentially extending Little Drive through undeveloped areas of RTP to meet Mason Farm Road in Morrisville. This connection would provide an additional East-West route and connectivity. Discussions on making this connection are ongoing.
- **North Carolina Railroad Company (NCRR).** This organization controls the railroad right-of-way through Morrisville. Planners met with NCRR staff to discuss grade crossings (reducing at-grade crossings in favor of grade separations), hazardous waste transport through the area, future land use policies in the areas around the railroad, and the status of the regional rail study that is currently underway. The plans include an action item to further investigate the hazardous waste issue and manage risk to the residents of Morrisville.
- **RDU Airport Authority.** Discussed the purpose of continuing the airport noise overlay zoning in Morrisville, which prevents residential and other sensitive land uses from locating in areas with greater than 65 db of airport noise. A representative of the Airport Authority made a presentation and answered questions at a meeting of the Plan Advisory Committee (PAC) and attended a public workshop. Discussions are ongoing regarding the possibility of allowing residential development west of NC 54 even where the overlay exists.
- **Capital Area Metropolitan Planning Organization (CAMPO).** Discussed transportation priority funding through the Transportation Improvement Program (TIP). Agreed on modifications to some of the planned improvements, such as shifting the planned McCrimmon grade separation north of the existing roadway.
- **Triangle J Council of Governments (TJCOG).** Collaborated on the route for the proposed RDU-RTP circulator (curb-guided bus) to ensure that it follows a route least likely to impact existing development in Morrisville.
- **C-Tran (Cary Transit).** Discussed the possibility of having C-Tran operate bus service to and within the Town of Morrisville, with the Town's financial support. Such a provision would cost much less to Morrisville than initiating its own program. Discussed changes in planned C-Tran route along Cary Parkway, changing the route to actually come through Morrisville along NC 54, with stops within the town. Future transit routes through Morrisville (North-South along NC 54 and East-West loop around Airport Boulevard, Aviation Parkway, Morrisville-Carpenter Road and McCrimmon Parkway) were agreed upon from a preliminary standpoint. Participated as a speaker at the Transit focus group meeting.
- **Triangle Transit.** Discussed and agreed to make future plans to change the 301 bus route that currently serves the Morrisville Outlet Mall to run down NC 54 and up Airport Boulevard to the Outlet Mall. Such an altered route would provide additional access to regional transit for Morrisville residents. Participated as a speaker at the Transit focus group meeting.
- **Wake Coordinated Transit.** Discussed a short-term expansion of transit service within Morrisville in order to provide more options to Morrisville residents. Participated as a speaker at the Transit focus group meeting.
- **Wake County School Board.** Discussed new school search radii and how any potential school sites in the town's jurisdiction would be treated.
- **NCDOT.** A representative of the NCDOT Rail Division participated in the Church Street focus group meeting, making a presentation and answering questions from citizens on railroad crossing closures. The NCDOT Division Office was provided a copy of the plans and invited to the meetings. They provided no comment.
- **North Carolina Turnpike Authority.** A representative of the NCDOT Rail Division participated in the Church Street focus group meeting, making a presentation and answering questions from citizens on Triangle Parkway.
- **Regional Transportation Alliance (RTA).** Met to discuss overall goals of the transportation plan. Made suggestions regarding the importance of highlighting the Aviation Parkway and Evans/McCrimmon intersection as a "feature intersection."

The Town also invited all of these entities to all three of the public workshops held as part of the planning process, and several representatives of the groups participated in those workshops. Most of these groups received draft copies of the plans to facilitate their review. The Town has also followed the adjacent communities' updates of their plans. CAMPO, Raleigh, Cary, RTP, and Triangle Transit are all updating their plans at this time. The Town staff also meet regularly with the jurisdictions participating in the Center of the Region Enterprise (Cary, Durham City, Durham County, Raleigh, Wake County) convened by TJCOG, and with staff from all the municipalities and the county through the Wake Municipal Planners Group convened by Wake County.

APPENDIX D. SUMMARY OF POLICY FRAMEWORK AND POLICY AUDIT

The following section describes two separate documents created by the consultants during the planning process. Each document may be obtained by contacting the Town of Morrisville Planning Department.

Policy Framework

As a part of the Land Use and Transportation Plans Update Project (the "Project"), a comprehensive inventory of the past and current planning and policy work has been undertaken. In all, 14 documents, plans, agencies, or procedures that deeply influence and shape the policy environment in Morrisville were considered. The Policy Framework Summary provides a brief overview of existing documents and planning processes currently directing land use and transportation planning and policy in the Town of Morrisville. These include the following reports and agency interviews.

- Morrisville Land Use Plan
- The Town Center Master Plan
- North Morrisville-Shiloh Small Area Plan
- The Parks and Greenways Master Plan
- CORE Bicycle-Pedestrian-Green Space Plan
- Zoning Ordinance
- Subdivision Ordinance
- Morrisville Transportation Plan
- Town of Morrisville Design and Construction Ordinance
- Parks and Greenways Master Plan
- Prior and Current Comprehensive Annual Financial Reports (CAFRs)
- Capital Area MPO
- Raleigh-Durham International Airport
- Triangle Transit
- Development Procedure
- BOC Vision Statement

The purpose of this policy review is to help planning staff, Plan Advisory Committee (PAC) members, and elected and appointed officials evaluate how current policies and regulations shape development in the Town. It is also intended to help identify the elements of the Town's basic vision for future growth and development. This basic understanding of the existing policy framework and vision for the future of the Town is an important platform on which to base the update process for the Land Use and Transportation Plan Update Project that is currently underway.

In connection with the Town Council's stated goals, a few core themes have emerged from the policy analysis. These themes include those listed below.

- Ensure that Morrisville remains a small town with a high quality of life and a balance of stable residential neighborhoods and vibrant business centers that are attractively designed and compatibly located within a system of natural buffers and greenways.
- Create a vibrant, walkable gathering place at Morrisville's historic crossroads to help ensure that residents continue to enjoy the best qualities of small-town living as the community grows. Municipal bonds have been identified as a funding method.
- Encourage development in areas that are served by public utilities and facilities. Review of proposed water and sewer facilities by the Town of Cary has been integrated into the Morrisville development review process.
- Improve connectivity and manage traffic congestion with a convenient, accessible multi-modal transportation system, and safe and well-designed streets through the Town. This objective may include an aggressive approach to incorporating traffic calming and low-impact design to maintain the livability of communities.

Policy Audit

The Land Use Policy Audit takes the Policy Framework Summary a step further by providing the consultant's analysis of the key issues of conformance or lack of conformance between the Town's land use policies and regulations (specifically, the 1999 Land Use Plan, the zoning ordinance, subdivision ordinance, and other relevant plans). This analysis is organized according to the same overall themes that were identified in the Policy Framework Summary.

The purpose of the following Land Use Policy Audit is to provide planning staff, PAC members, and elected and appointed officials with the consultant's assessments of how consistently the existing policies and implementation mechanisms foster the type of growth and development that is envisioned for the future in the current Land Use Plan. The Land Use Policy Audit is intended to help identify potential disconnects between the Town's stated policies, and their implementation through zoning and other codes.

This report is organized into two sections. The first section provides a brief overview of the relationship between the thematic vision identified in the Policy Framework Summary and the 1999 Land Use Plan. The second section provides the consultant's assessments of overall consistency between the Land Use Plan, Zoning Ordinance, and other relevant documents. This basic understanding of the existing policy and implementation framework for the Town is an important platform on which to base the update process for the Land Use and Transportation Plan Update Project that is currently underway.

APPENDIX E. ROADWAY INVENTORY

This appendix provides additional detail on specific roadways within Morrisville. Streets are listed in alphabetical order below, with page numbers of relevant pages listed for the reader's reference. For each major street, a page is provided that describes the current conditions along the roadway (number of lanes, lane width, right-of-way width, adjacent land uses) and a proposed perspective street diagram. Minor streets refer to a general street cross-section for that type.

The streets index also makes reference to Appendix F, which contains detailed engineering studies of five Morrisville intersections.

Name	Location	Status	Owner	Future Roadway Type	Future Thoroughfare Type	Future ROW (Feet)	Page Numbers
AIRPORT BOULEVARD	NC 54 to I-40	Existing	State	4-Lane Boulevard	Major Thoroughfare	120*	E-5, F-1, F-2, 33
AIRPORT BOULEVARD EXTENSION	NC 54 to W. town boundary	Proposed	State	4-Lane Boulevard	Major Thoroughfare	120	E-5, F-1
AIRTECH DRIVE	Off Airport Boulevard	Existing	Morrisville	2-Lane Roadway	Local	55	E-3, F-1
AVIATION PARKWAY	NC 54 to Lake Crabtree causeway	Existing	State	4-Lane Boulevard	Major Thoroughfare	120	E-6, F-3
BARBEE ROAD	Off Church Street	Existing	State/ Morrisville	2-Lane Roadway	Collector	55	E-3
CARRINGTON MILL BOULEVARD	Off NC 54	Existing	Morrisville	4-Lane Boulevard	Minor Thoroughfare	100	E-4
CARRINGTON MILL BOULEVARD EXTENSION	Current terminus to Slater Road	Proposed	Morrisville	4-Lane Boulevard	Minor Thoroughfare	100	E-4
CARY PARKWAY	Wilson Road to Darrington Drive	Existing	State	4-Lane Boulevard	Major Thoroughfare	109	E-7
CHURCH STREET	McCrimmon Parkway to Jeremiah Street	Existing	State	2-Lane Boulevard	Collector	75	E-8, 27
CHURCH STREET	Jeremiah Street to Morrisville-Carpenter Road; McCrimmon Parkway to northern town boundary	Existing	State	2-Lane Roadway	Collector	55	E-8, 27
CLEMENTS DRIVE	Off Aviation Parkway	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
COPLEY PARKWAY	Factory Shops Road to Sorrel Grove Church Road	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
COTEN DRIVE	Off Aviation Parkway	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
CRABTREE CROSSING PARKWAY	Southern town boundary north to terminus	Existing	Morrisville	2-Lane Boulevard	Collector	88	28, G-1
DAVIS DRIVE	In town jurisdiction	Existing	State	6-Lane Boulevard	Major Thoroughfare	136	E-9
DOMINION DRIVE	Off Aviation Parkway	Existing	Morrisville	2-Lane Boulevard	Collector	75	E-4
DOWNING GLEN DRIVE	Church Street to town boundary	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
EVANS ROAD	In town jurisdiction	Existing	State	6-Lane Boulevard	Major Thoroughfare	124	E-13
FACTORY SHOPS ROAD	Aviation Boulevard to Copley Parkway	Existing	Private	2-Lane Roadway	Collector	55	E-3, 33
FAIRVIEW AVENUE	Off Sunset Avenue	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
FAMILY FARM ROAD	Off McCrimmon Parkway	Existing	Private	2-Lane Roadway	Local	55	E-3
FRANKLIN UPCHURCH SR STREET	Off Morrisville-Carpenter Road	Existing	State	2-Lane Roadway	Local	55	E-3
GREEN DRIVE	Off NC 54	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
GREEN DRIVE EXTENSION	Connects Green Drive to Clements Drive	Proposed	Morrisville	2-Lane Roadway	Local	55	E-3
HARRIS MILL ROAD	Off McCrimmon Parkway	Existing	Private	2-Lane Roadway	Local	55	E-3
INTERNATIONAL DRIVE	Off Aviation Parkway	Existing	Morrisville	4-Lane Roadway	Collector	97	E-10
INTERNATIONAL DRIVE EXTENSION	Current terminus to Airport Boulevard	Proposed	Morrisville	4-Lane Roadway	Collector	97	E-10
JEREMIAH STREET	Church Street to Town Hall Drive	Existing	Morrisville	2-Lane Roadway	Collector	60	**
JERUSALEM DRIVE	Off Airport Boulevard	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
KEYBRIDGE DRIVE	Off NC 54	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
KIT CREEK ROAD	Church Street west to terminus	Existing	Morrisville	2-Lane Boulevard	Collector	60-80	***
KIT CREEK ROAD EXTENSION	Current terminus west to connect to western portion in RTP	Proposed	State	2-Lane Roadway	Collector	55	***
KITTS CREEK CONNECTORS	Connects Kitts Creek subdivision to Keystone development	Proposed	Morrisville	2-Lane Roadway	Collector	55	E-3
LAKE GROVE BOULEVARD	Davis Drive to town boundary	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
LICHTIN BOULEVARD	NC 54 to Carrington Mill Boulevard	Existing	State	2-Lane Boulevard	Collector	75	E-4
LOUIS STEPHENS DRIVE	McCrimmon Parkway to northern terminus	Existing	State	4-Lane Boulevard	Major Thoroughfare	100	E-11
LOUIS STEPHENS DRIVE EXTENSION	Current terminus north to Louis Stephens Drive in RTP	Proposed	State	4-Lane Boulevard	Major Thoroughfare	100	E-11
MARCOM DRIVE	Off Sorrel Grove Church Road	Existing	Private	4-Lane Roadway	Minor Thoroughfare	75	E-4
MARCOM DRIVE EXTENSION	Current terminus to Watkins Road	Proposed	Morrisville	4-Lane Roadway	Minor Thoroughfare	75	E-4

APPENDIX E. ROADWAY INVENTORY, CONT'D

Name	Location	Status	Owner	Future Roadway Type	Future Thoroughfare Type	Future ROW (Feet)	Page Numbers
MASON FARM ROAD	Off Church Street	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
MCCRIMMON PARKWAY	Old Maynard Road/Louis Stephens Drive to NC 54	Existing	State	4-Lane Boulevard	Major Thoroughfare	114*	E-12, F-5, F-6
MCCRIMMON PARKWAY	Perimeter Park Drive to Airport Boulevard	Existing	State	4-Lane Boulevard/ 6-Lane Boulevard	Major Thoroughfare	124*	E-13
MCCRIMMON PARKWAY EXTENSION	NC 54 to Perimeter Park Drive; Airport Boulevard to Aviation Parkway	Proposed	State	4-Lane Boulevard/ 6-Lane Boulevard	Major Thoroughfare	124*	E-13, F-3, F-5, F-6
MORRISVILLE-CARPENTER ROAD	Town Hall Drive to town boundary	Existing	State	4-Lane Boulevard	Major Thoroughfare	119	E-14, F-4, 39 (Land Use)
MORRISVILLE-CARPENTER ROAD	NC 54 to Town Hall Drive	Existing	State	4-Lane Roadway	Major Thoroughfare	85	E-14, F-4
MORRISVILLE EAST CONNECTOR	Airport Boulevard to Nova Drive	Proposed	Morrisville	2-Lane Roadway	Collector	55	E-3
MORRISVILLE PARKWAY	NC 54 to Davis Drive	Existing	State	4-Lane Boulevard	Minor Thoroughfare	100	E-15
NC 54 (CHAPEL HILL ROAD)	NC 540 to McCrimmon Parkway; Cary Parkway to S. town boundary	Existing	State	4-Lane Boulevard/ 6-Lane Boulevard	Major Thoroughfare	124	E-16, E-17, F-5, F-6, 26
NC 54 (CHAPEL HILL ROAD)	N. town boundary to NC 540; McCrimmon Parkway to Sunset Avenue; Keybridge Drive to Cary Parkway	Existing	State	4-Lane Boulevard	Major Thoroughfare	124	E-16, E-17, F-1, F-5, F-6, 26
NC 54 (CHAPEL HILL ROAD)	Sunset Avenue to Keybridge Drive	Existing	State	4-Lane Roadway	Major Thoroughfare	79	E-16, E-17, 26
OLD MAYNARD ROAD	See Louis Stephens Drive	Existing	State	4-Lane Boulevard	Major Thoroughfare	100	E-11
PAGE STREET	Off Morrisville-Carpenter Road	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
PARAMOUNT PARKWAY	Carrington Mill Boulevard east to Perimeter Park Drive	Existing	Morrisville	4-Lane Roadway	Collector	70	E-18
PARKSIDE VALLEY DRIVE	Davis Drive to Willingham Road	Existing	Morrisville	2-Lane Boulevard	Collector	100	E-19
PARKSIDE VALLEY DRIVE	Willingham Road to Old Maynard Road/Louis Stephens Drive	Existing	Morrisville	2-Lane Boulevard	Collector	100	E-19
PERIMETER PARK DRIVE	NC 54 to McCrimmon Parkway; Airport Boulevard to eastern terminus	Existing	Morrisville	4-Lane Roadway	Minor Thoroughfare	70	E-20
PERIMETER PARK DRIVE	McCrimmon Parkway to Airport Boulevard	Existing	Morrisville	4-Lane Boulevard	Minor Thoroughfare	100*	E-20
PERIMETER PARK DRIVE EXTENSION	Connects Perimeter Park Drive east of Airport Boulevard to International Drive extension	Proposed	Morrisville	2-Lane Roadway	Minor Thoroughfare	55	E-3
SHILOH GLENN DRIVE	NC 54 east to Slater Road in Durham	Proposed	Morrisville	2-Lane Roadway	Collector	55	E-3
SLATER ROAD	Airport Boulevard to Carrington Mill Boulevard	Existing	State/ Morrisville	4-Lane Boulevard	Minor Thoroughfare	100	E-4, F-2
SLATER ROAD	Carrington Mill Boulevard to NC 540	Existing	Morrisville	2-Lane Roadway	Minor Thoroughfare	55	E-3
SORRELL GROVE CHURCH ROAD	Airport Boulevard to Slater Road	Existing	State	2-Lane Roadway	Collector	55*	E-3
SOUTHPORT DRIVE	Off Aviation Parkway	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
SOUTHPORT DRIVE EXTENSION	Connects Southport Drive to existing Triangle Parkway (off NC 54)	Proposed	Morrisville	2-Lane Roadway	Collector	55	E-3
SUNSET AVE	Off NC 54	Existing	Morrisville	2-Lane Roadway	Local	55	E-3
TOWN HALL DRIVE	McCrimmon Parkway to Morrisville-Carpenter Road	Existing	Morrisville	4-Lane Boulevard	Minor Thoroughfare	80	E-21, F-4
TRANS AIR DRIVE	Off Airport Boulevard	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
TREYBROOKE DRIVE	Church Street to terminus west of Town Hall Drive	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
TRIANGLE PARKWAY	See Southport Drive Ext	Existing	Morrisville	2-Lane Roadway	Collector	55	E-3
TRIANGLE PARKWAY	McCrimmon Parkway to NC 540	Proposed	State	4-Lane Boulevard	Major Thoroughfare	100	E-4
WATKINS ROAD	NC 54 to Perimeter Park Drive	Existing	State	4-Lane Boulevard	Minor Thoroughfare	100	E-4

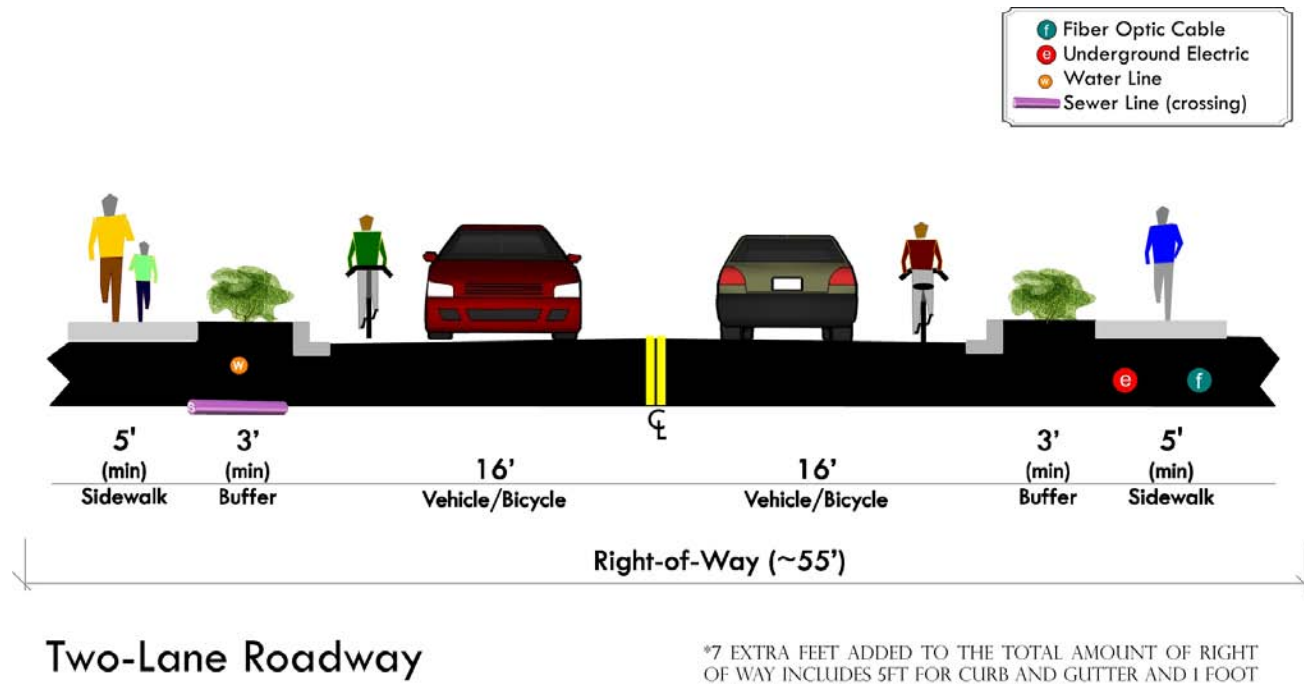
* May require up to 32 feet of additional right-of-way to accommodate the proposed RTP-RDU Circulator.

** Jeremiah Street is atypical. It has 60' ROW, 2 lanes, no median, with 8' sidewalk on both sides. Lane widths are 10' where there is parallel on-street parking and 12' elsewhere.

*** Kit Creek Road is atypical. The existing eastern section of the road has approximately 80' ROW, two lanes and a median; the center section splits into a one-way pair to accommodate the community center; the western section is two lanes, no median, about 60' ROW. The reconnection west of Kitts Creek subdivision will have two 12' lanes, no median, plus 4' bike lane and 5' sidewalk on both sides.

Note: Right-of-way listed includes only through lanes. Additional right-of-way will be needed for turn lanes, transit stops, deceleration lanes and other infrastructure.

APPENDIX E. ROADWAY INVENTORY, CONT'D

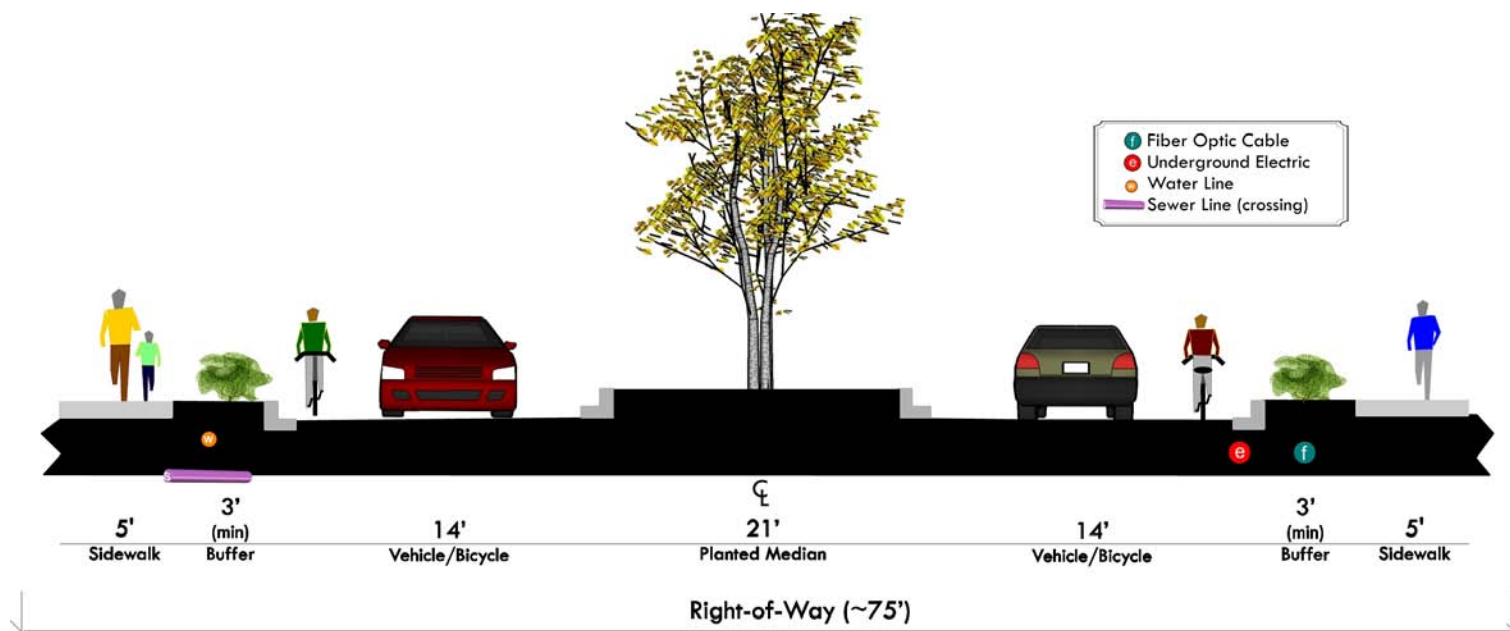


Note: Sidewalk may be wider where there are greenways or greenway connectors. Please consult the 2005 Greenway Plan to see the location of required greenways and multi-use paths.

2-Lane Roadway cross-section above applies to the following roads in Morrisville:

- Airtech Drive
- Barbee Road. Note that the at-grade railroad crossing on this roadway is expected to close within six months of the completion of improvements at the intersection of Aviation Parkway/Morrisville-Carpenter Road and NC 54.
- Clements Drive. Note that a future connection is planned from the terminus of this roadway to Green Drive.
- Copley Parkway
- Downing Glen Drive
- Factory Shops Road
- Fairview Avenue
- Family Farm Road
- Franklin Upchurch Road
- Green Drive. Also applies to the planned connection/extension to Clements Drive.
- Harris Mill Road
- Jerusalem Drive
- Keybridge Drive
- Kitts Creek Connectors. Possible short connections from Kitts Creek subdivision to Keystone development in Durham.
- Lake Grove Boulevard
- Mason Farm Road. Planned connections from this road include from western terminus to Davis Drive in RTP (meeting up with Little Drive); from eastern terminus connecting via grade separation to Carrington Mill Boulevard.
- Morrisville East Connector. New roadway proposed to connect from Airport Boulevard to Nova Drive.
- Page Street
- Perimeter Park Drive Extension. Connects Perimeter Park Drive east of Airport Boulevard to International Drive Extension.
- Shiloh Glenn Drive
- Slater Road. From Carrington Mill Boulevard to NC 540.
- Sorrell Grove Church Road. May require up to 32 feet of additional right-of-way on the north side to accommodate the proposed RTP-RDU Circulator.
- Southport Drive. Also applies to the planned extension west to meet the existing Triangle Parkway.
- Sunset Avenue
- Trans Air Drive
- Treybrooke Drive
- Triangle Parkway (existing). This roadway will be renamed Southport Drive Extension (see Action Item 3.19) and eventually connected to Southport Drive.

APPENDIX E. ROADWAY INVENTORY, CONT'D

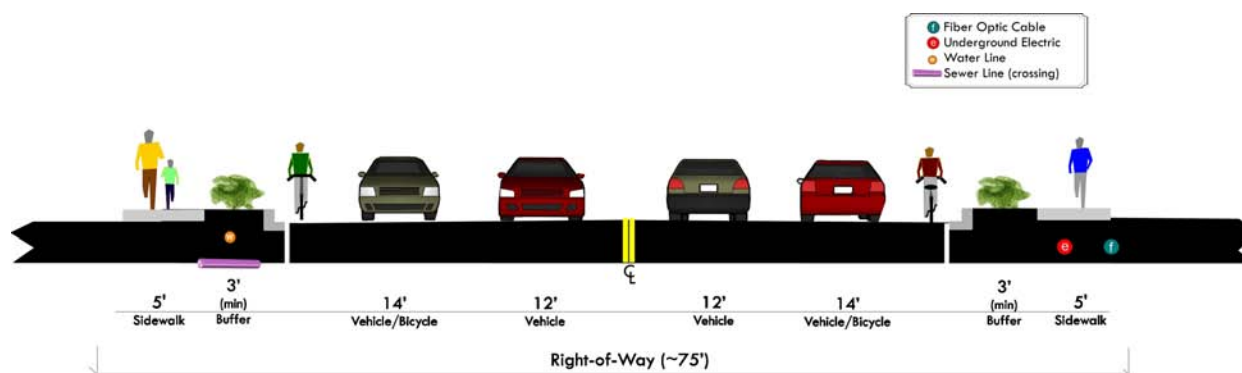


Two-Lane Boulevard

*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

2-Lane Boulevard cross-section above applies to the following roads in Morrisville:

- Dominion Drive
- Lichtin Drive

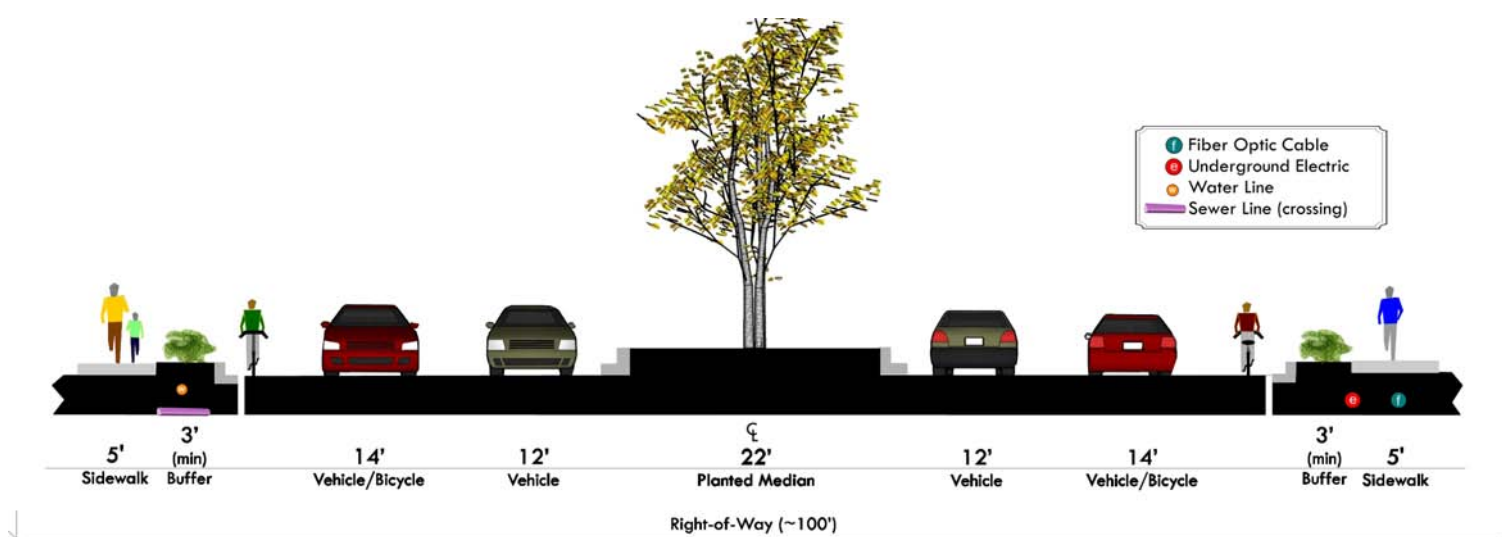


Four-Lane Roadway

*7 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 5FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

4-Lane Roadway cross-section above applies to the following roads in Morrisville:

- Marcom Drive. Also applies to extension of Marcom Drive to Watkins Road.



Four-Lane Boulevard

*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

4-Lane Boulevard cross-section above applies to the following roads in Morrisville:

- Carrington Mill Boulevard. Also applies to the extension of Carrington Mill Boulevard to Slater Road. There is a planned grade separation to connect the western terminus of this road to Mason Farm Road.
- Slater Road. From Airport Boulevard to Carrington Mill Boulevard.
- Triangle Parkway (proposed). From NC 540 to McCrimmon Parkway.
- Watkins Road. Note that the at-grade railroad crossing on this roadway is expected to close within six months of the completion of improvements at the intersection of Aviation Parkway/Morrisville-Carpenter Road and NC 54.

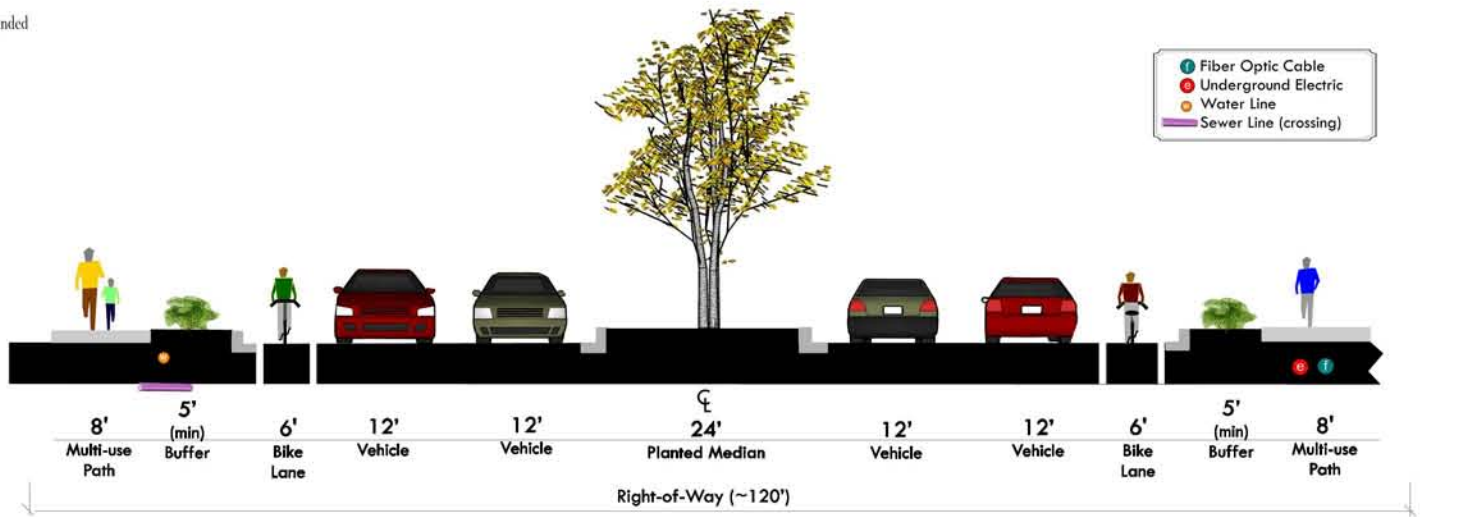
APPENDIX E. ROADWAY INVENTORY, CONT'D



Comments

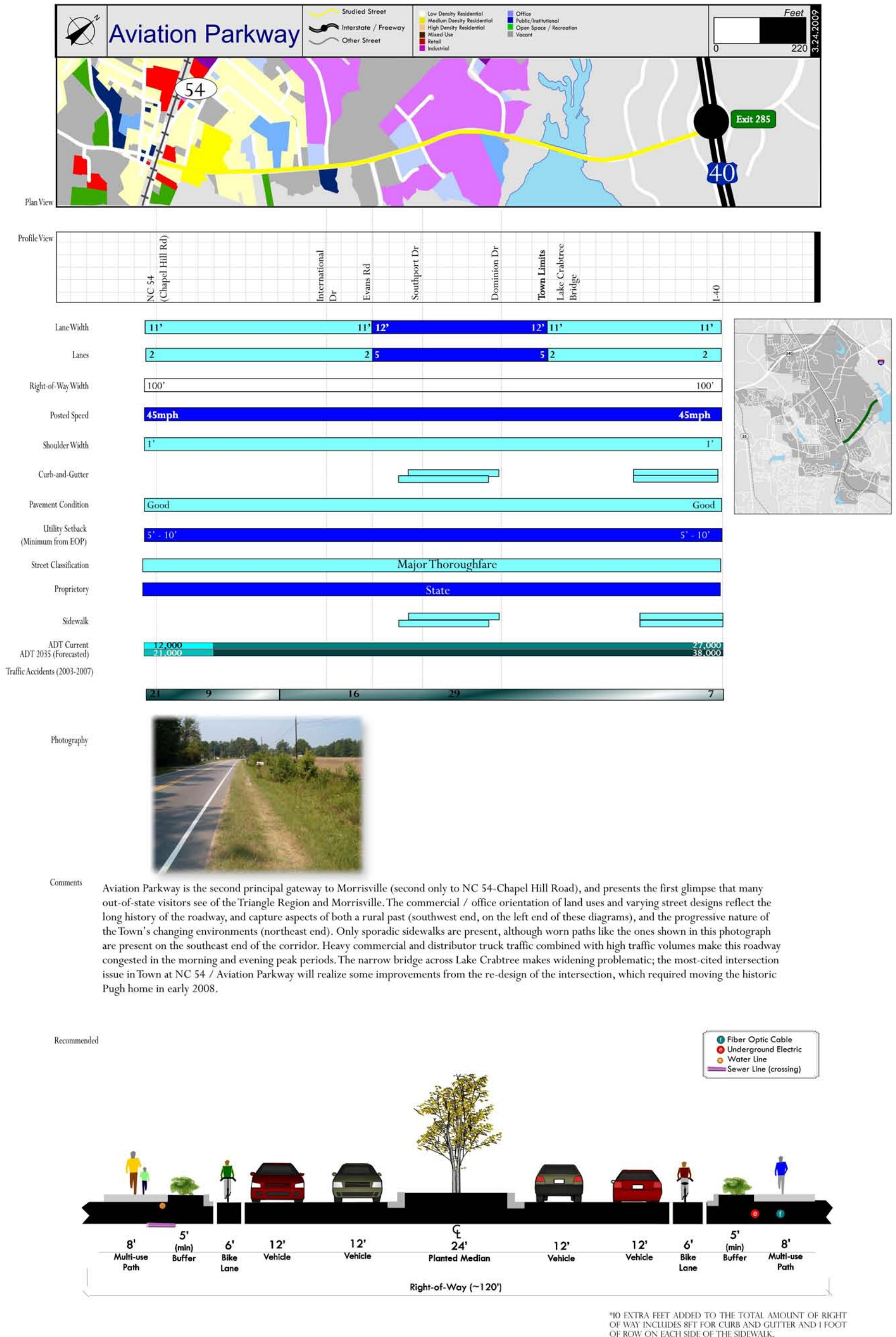
Airport Boulevard from NC 54 to McCrimmon Parkway is being widened to four lanes in 2008-2009. This cross-section applies to the existing roadway as well as the proposed extension. Up to 32 feet of additional right-of-way may be required along the north side of Airport Boulevard from Perimeter Park Drive to Sorrell Grove Church Road to accommodate the proposed RTP-RDU Circulator.

Recommended

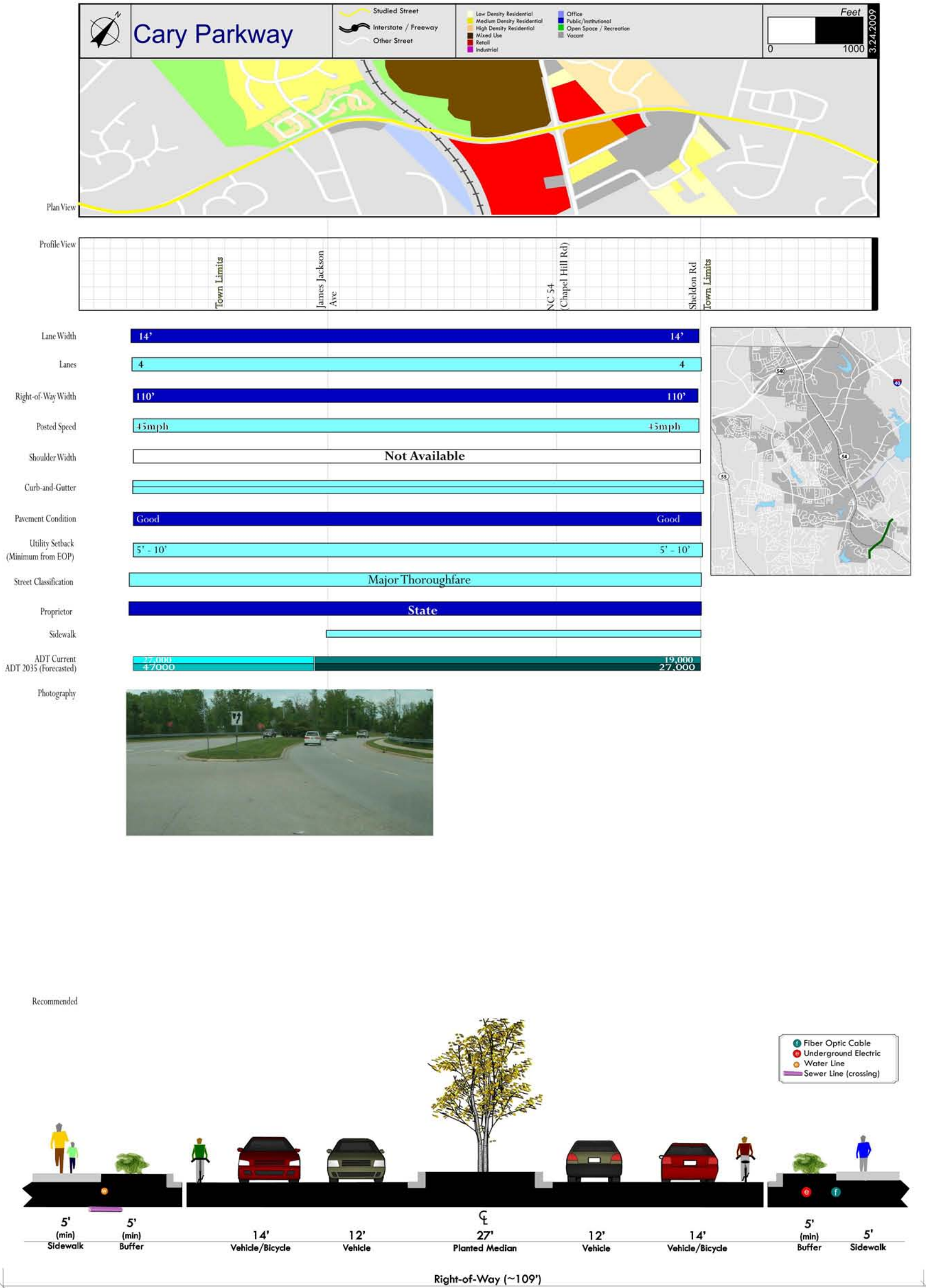


*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

APPENDIX E. ROADWAY INVENTORY, CONT'D

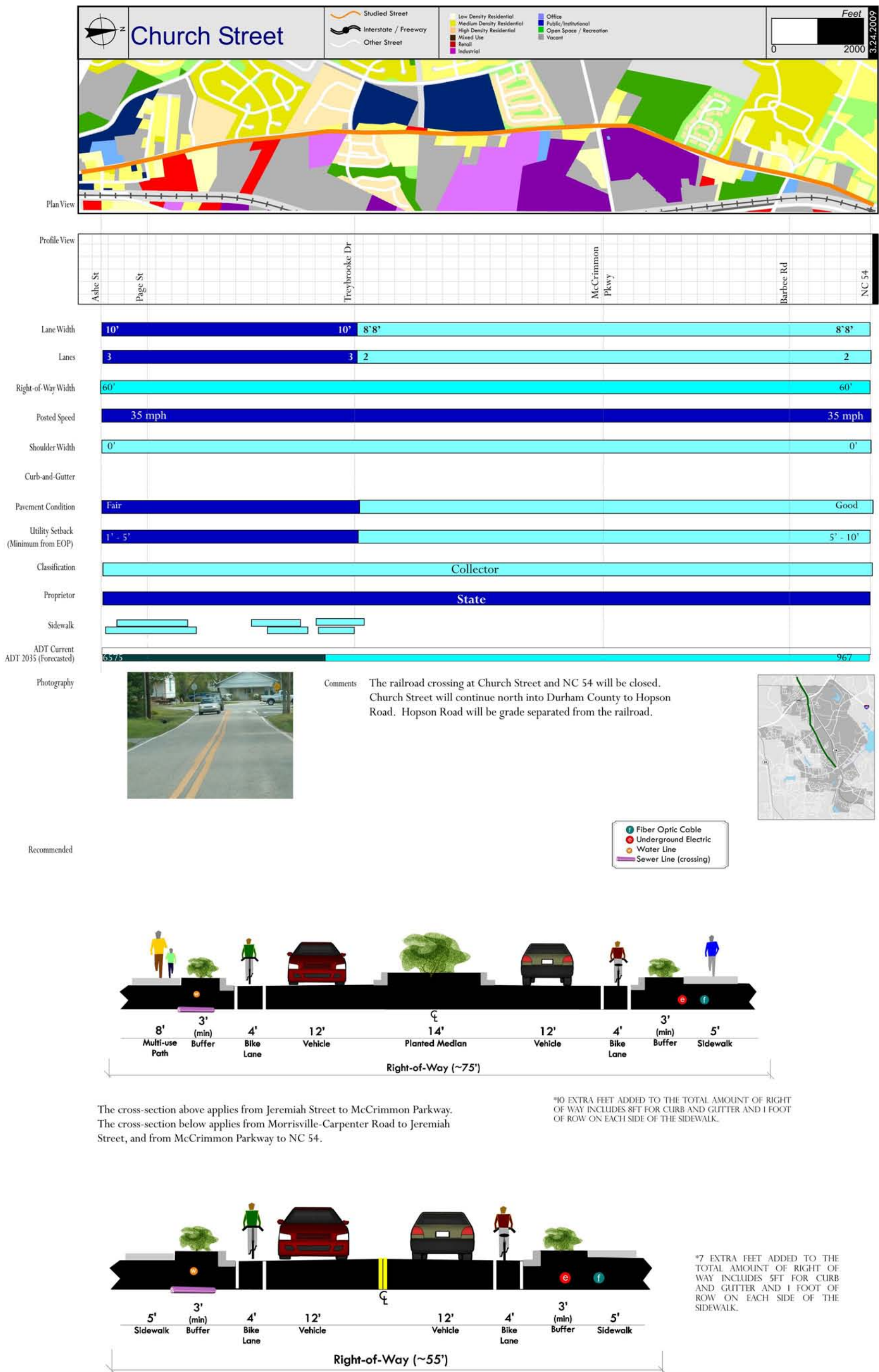


APPENDIX E. ROADWAY INVENTORY, CONT'D

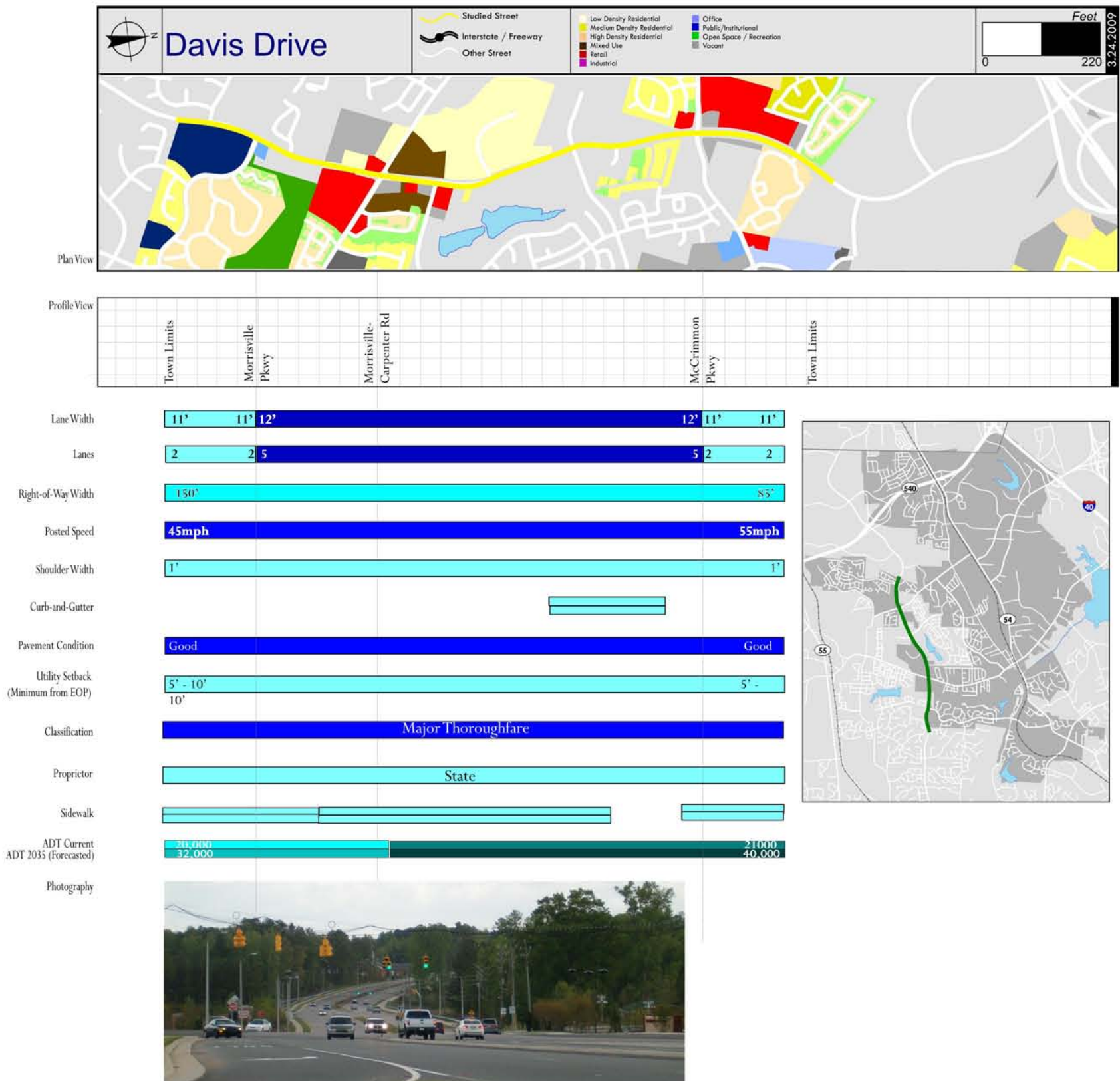


*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

APPENDIX E. ROADWAY INVENTORY, CONT'D

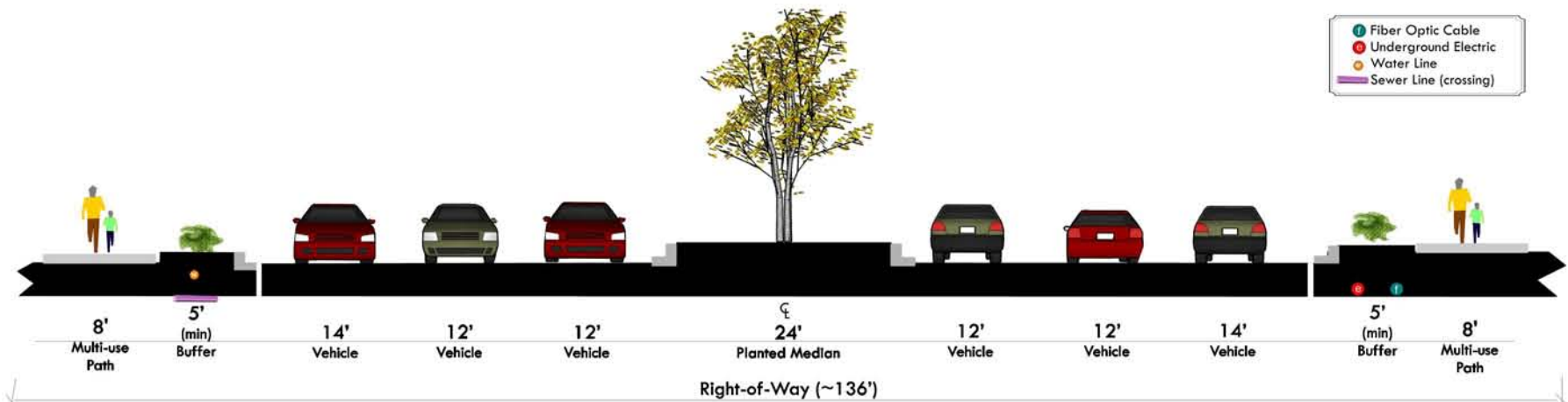


APPENDIX E. ROADWAY INVENTORY, CONT'D



Comments Davis Drive is being widened to four lanes in Morrisville's jurisdiction in 2008-09.

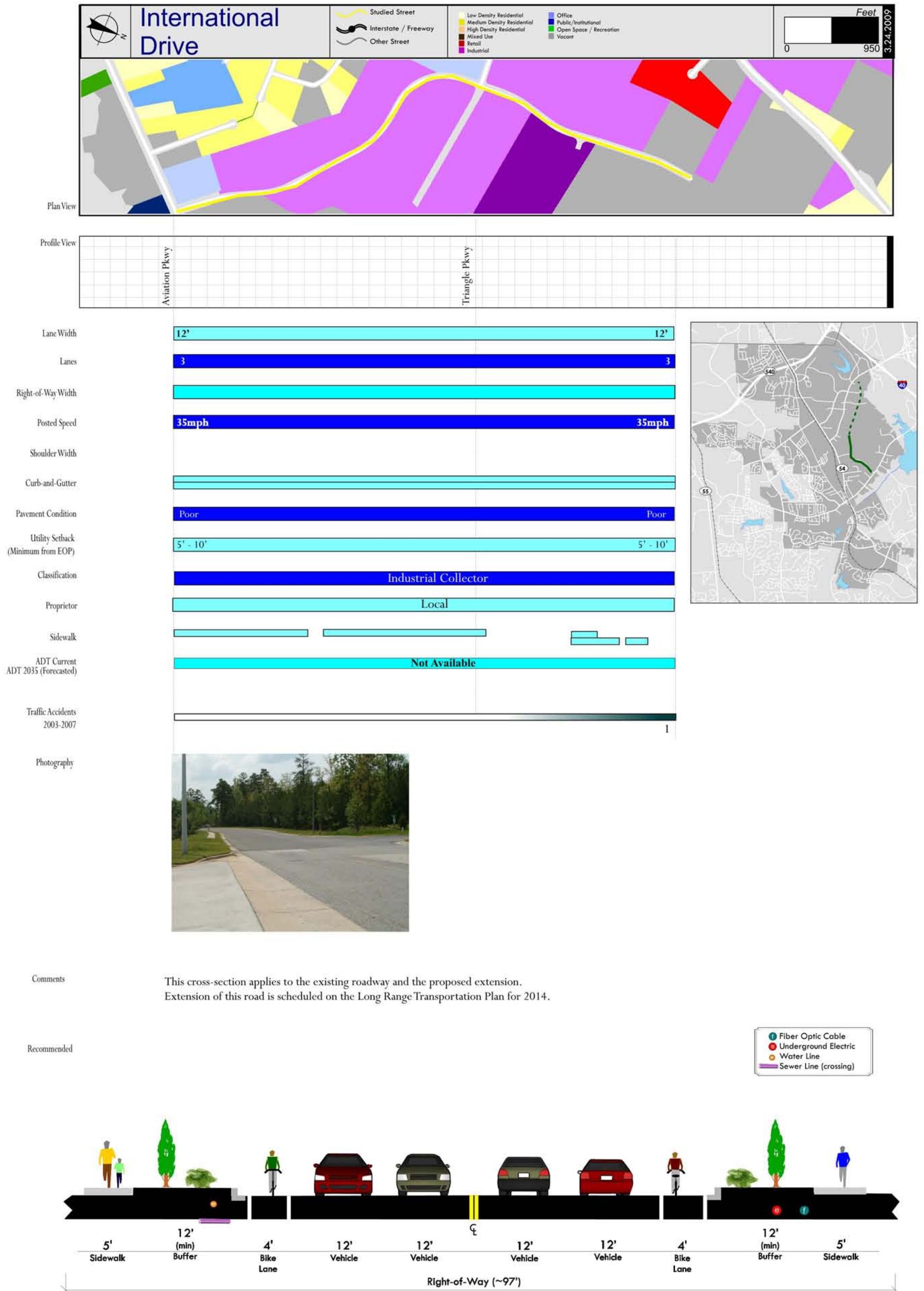
Recommended



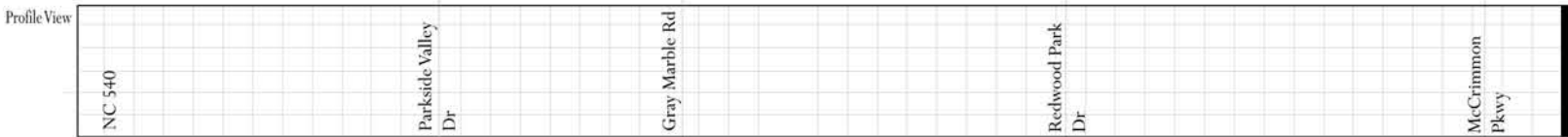
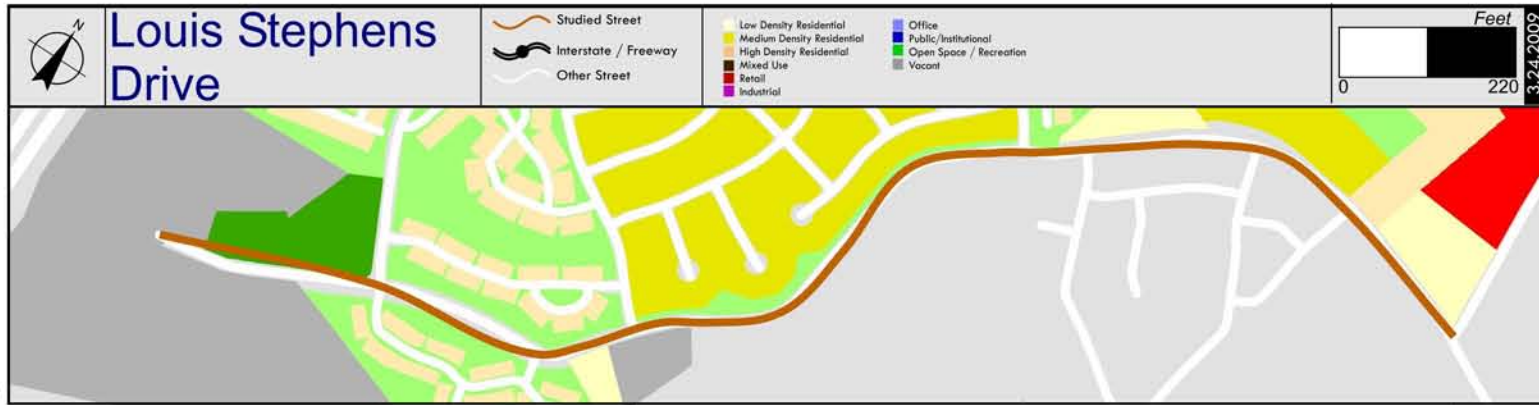
*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

Appendices

APPENDIX E. ROADWAY INVENTORY, CONT'D



APPENDIX E. ROADWAY INVENTORY, CONT'D



Lane Width	Gravel		12'	12'
Lanes	2		2	
Right-of-Way Width				
Posted Speed	35mph		35 mph	
Shoulder Width				
Curb-and-Gutter				
Pavement Condition	Gravel	Gravel	Good	
Utility Setback (Minimum from EOP)	5'-10'		5'-10'	
Classification	Major Thoroughfare			
Proprietary	State			
Sidewalk				
ADT Current				
ADT 2035 (Forecasted)	Not Available			
Traffic Accidents (2003-2007)	Not Available			

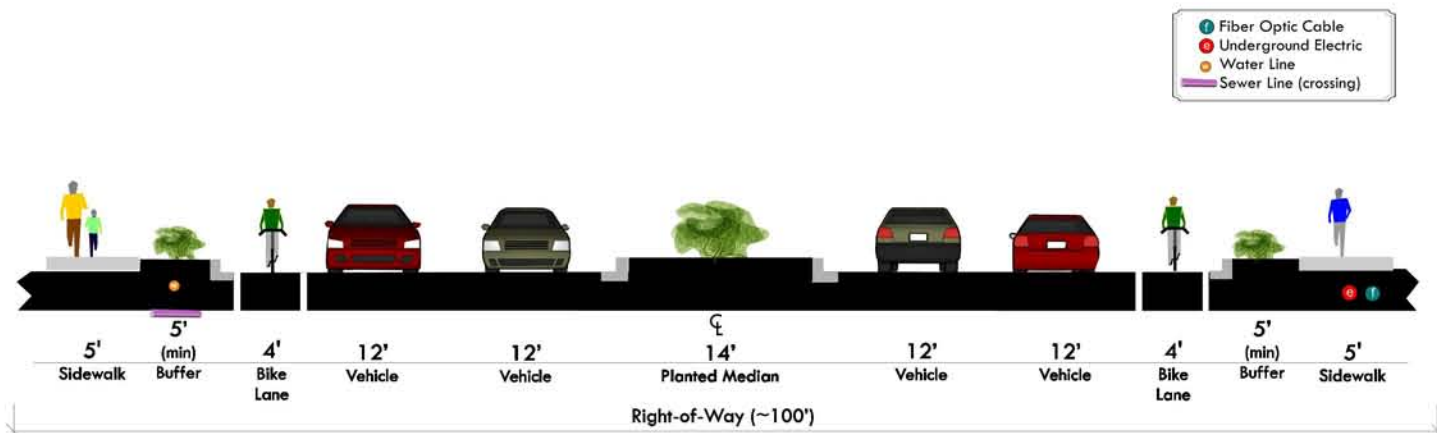
Photography



Comments

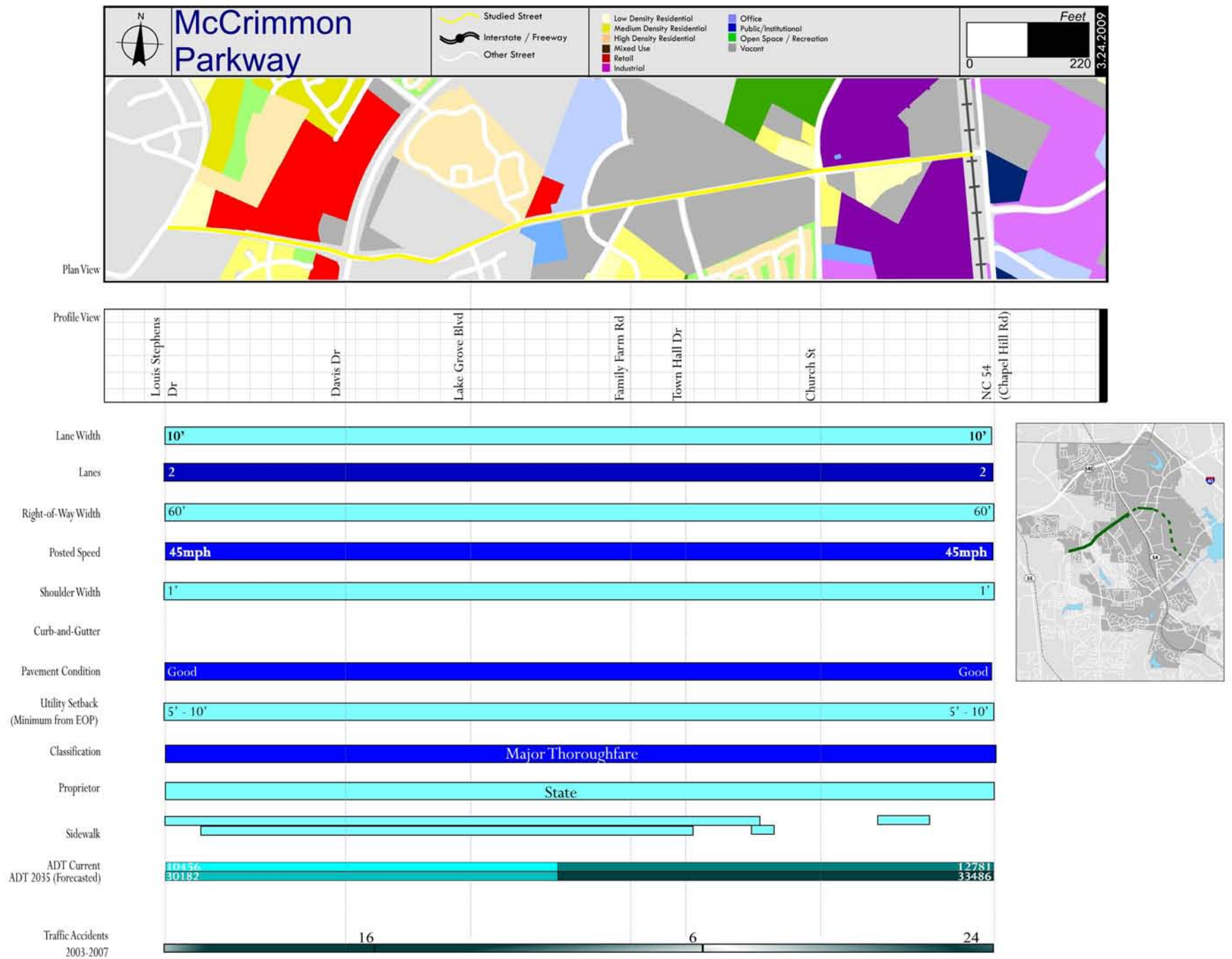
This section of roadway is currently named Old Maynard Road, but will be renamed Louis Stephens Drive. The Town of Cary and RTP are funding the paving and extension of the road, which will eventually connect from Cary to RTP. The extension will go underneath NC 540 without access to it. The roadway will initially be 2-lane ribbon asphalt with no sidewalk, with plans for future improvement to the cross-section shown here.

Recommended



*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

APPENDIX E. ROADWAY INVENTORY, CONT'D



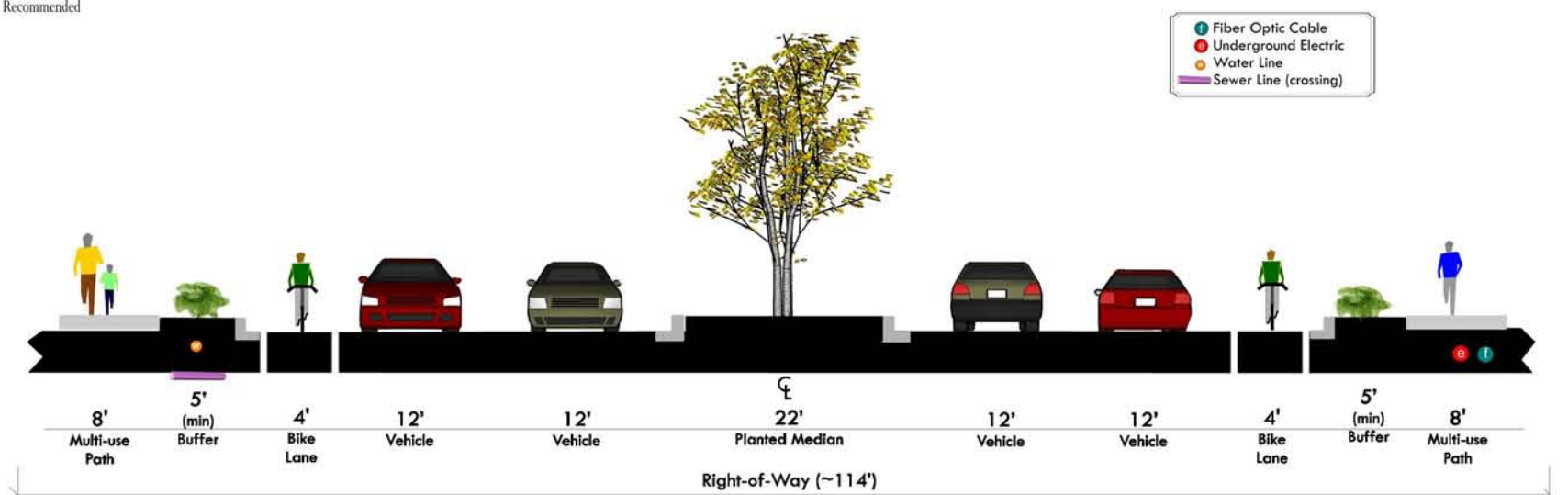
Photography



Comments

The cross-section below applies to the existing roadway from Louis Stephens Drive to NC 54. See the next page for cross sections applying to portions of McCrimmon Parkway and future extension east of NC 54. Up to 32 feet of additional right-of-way may be required along the north side of the road from Davis Drive to Perimeter Park Drive to accommodate the proposed RTP-RDU Circulator.

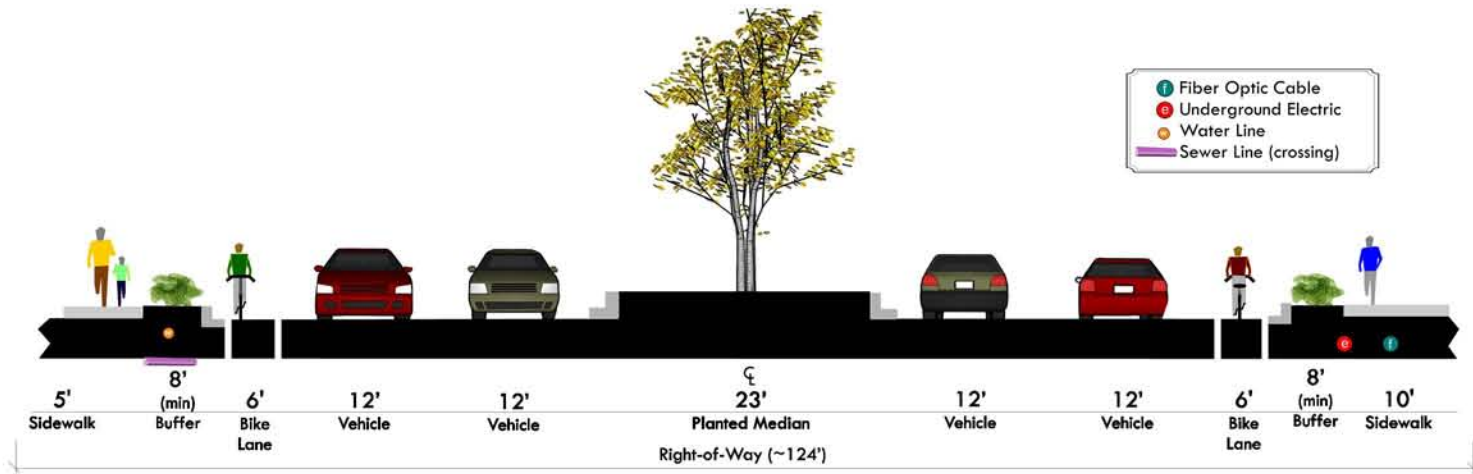
Recommended



*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

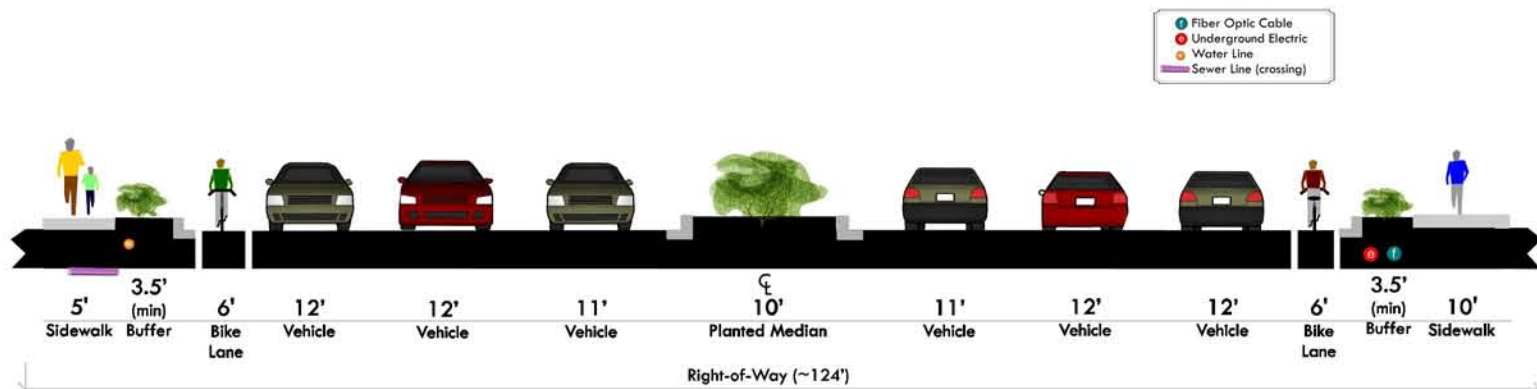
APPENDIX E. ROADWAY INVENTORY, CONT'D

McCrimmon Parkway Extension, Evans Road and Morrisville East Connector



*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

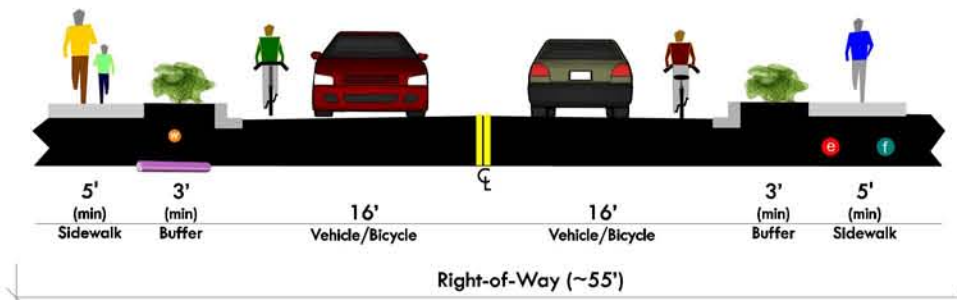
The cross-section above applies to McCrimmon Parkway east of NC 54 (existing portion between Perimeter Park Drive and Airport Boulevard, as well as the extension from Airport Boulevard to Aviation Parkway). The extension from NC 54 to Perimeter Park Drive has 114 feet of right-of-way or less and will have an atypical cross-section.



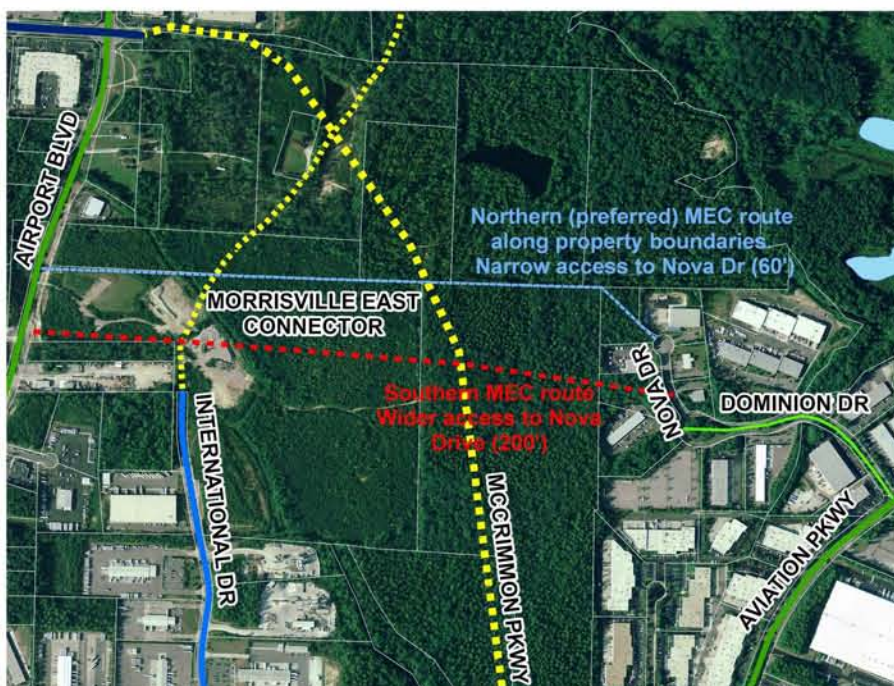
*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

McCrimmon Parkway (existing and extension) east of NC 54 is planned to be four lanes in the short term. Expansion to six lanes using the above cross-section is possible if a TIA shows the improvement is needed and it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council. The above cross-section also applies to the portion of Evans Road within the Town of Morrisville's jurisdiction.

Morrisville East Connector is a new roadway to connect from Airport Boulevard to Nova Drive, intersecting with the extensions of International Drive and McCrimmon Parkway. The cross-section to the right applies to this roadway. Two alignments are shown in the map below, only one will be constructed. The northern (blue) alignment is preferred by the Town Council as it runs along parcel lines and would share the burden among several property owners. The ultimate alignment of this roadway may change depending on the outcome of the pre-NEPA review conducted by staff for environmental or other considerations.

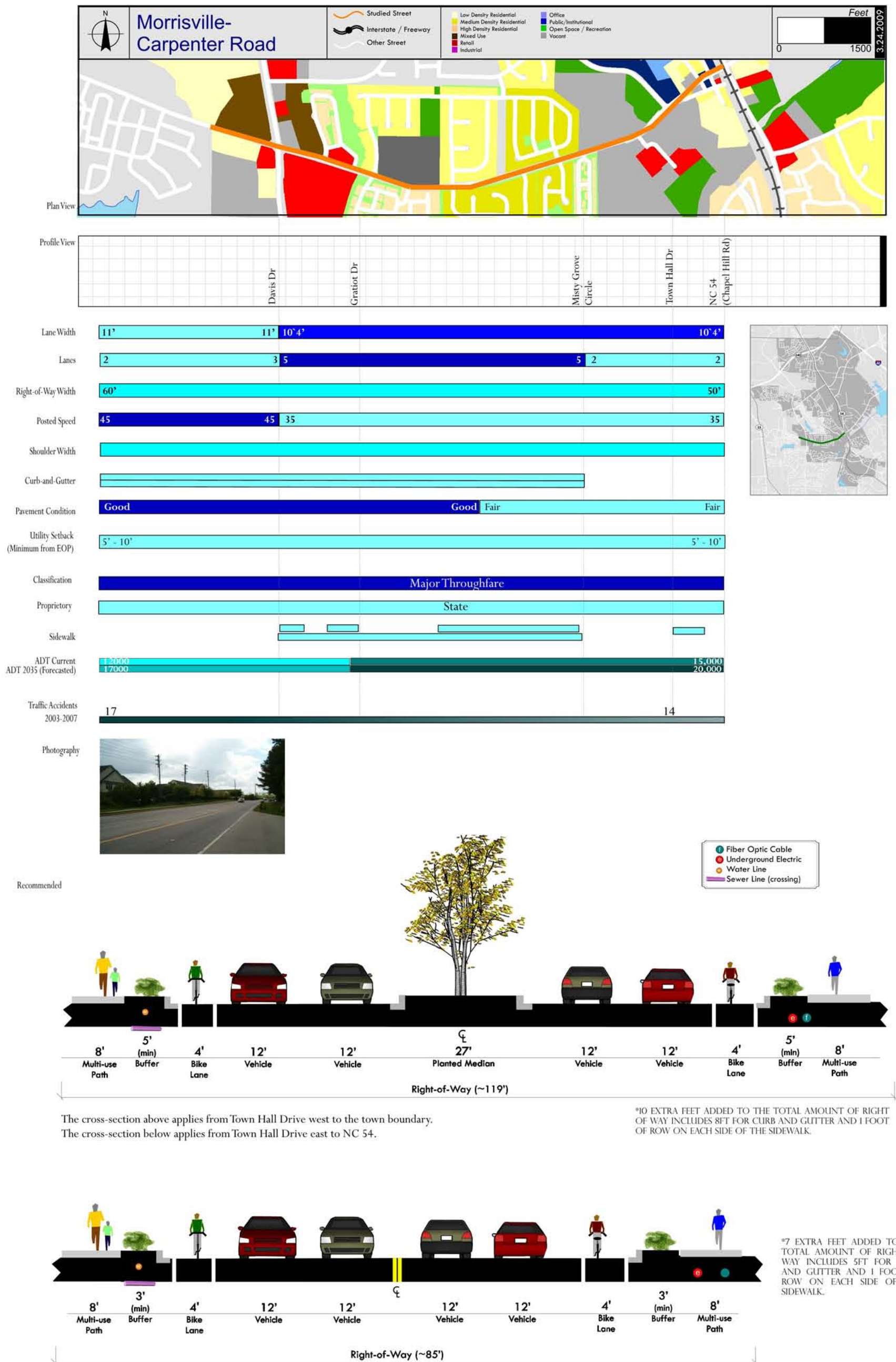


*7 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 5FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

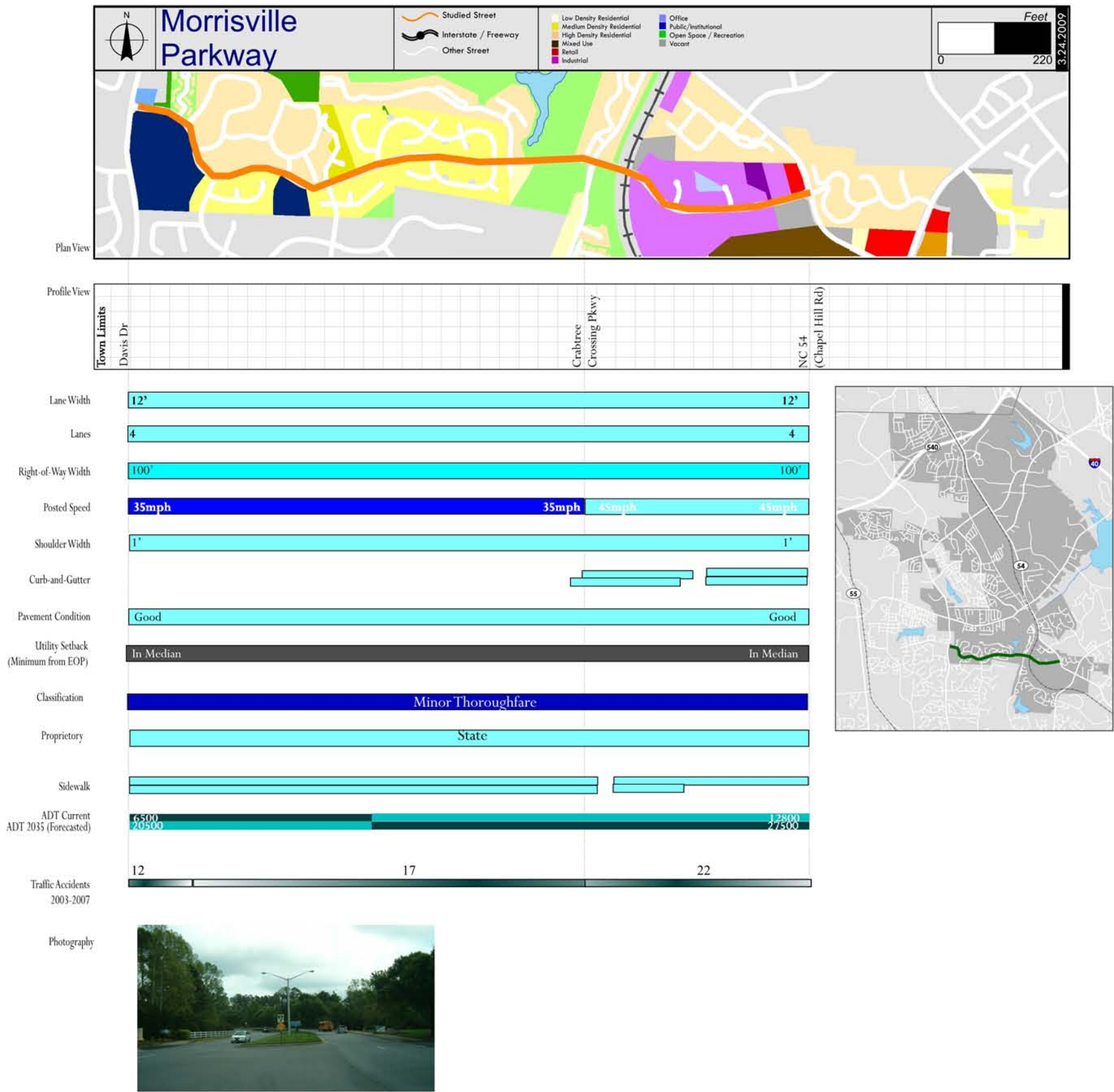


Appendices

APPENDIX E. ROADWAY INVENTORY, CONT'D

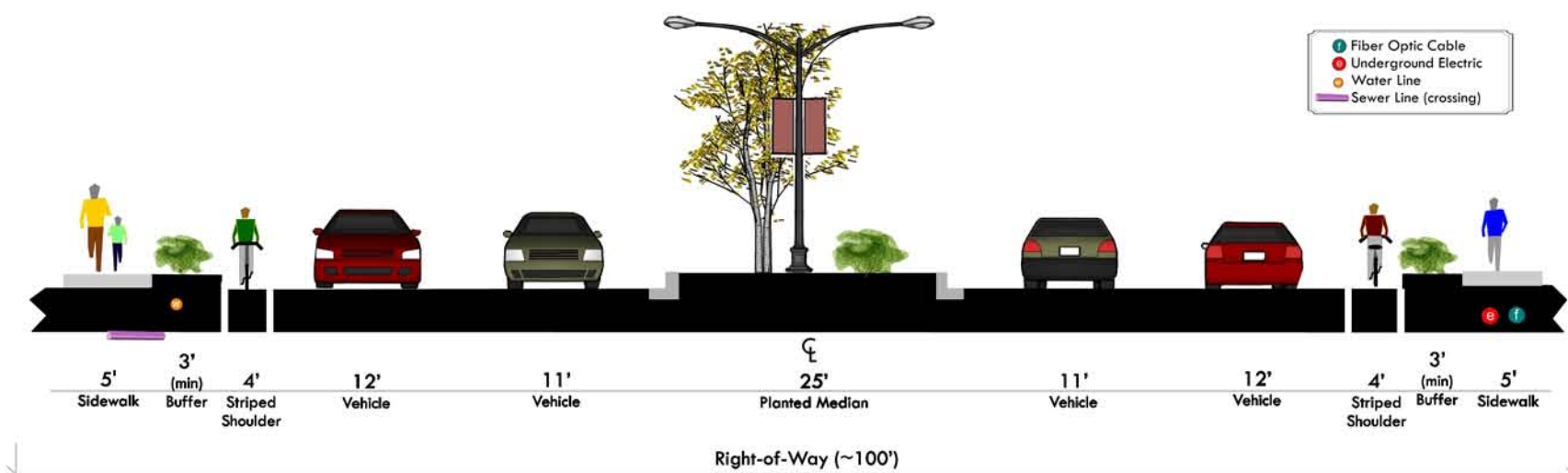


APPENDIX E. ROADWAY INVENTORY, CONT'D



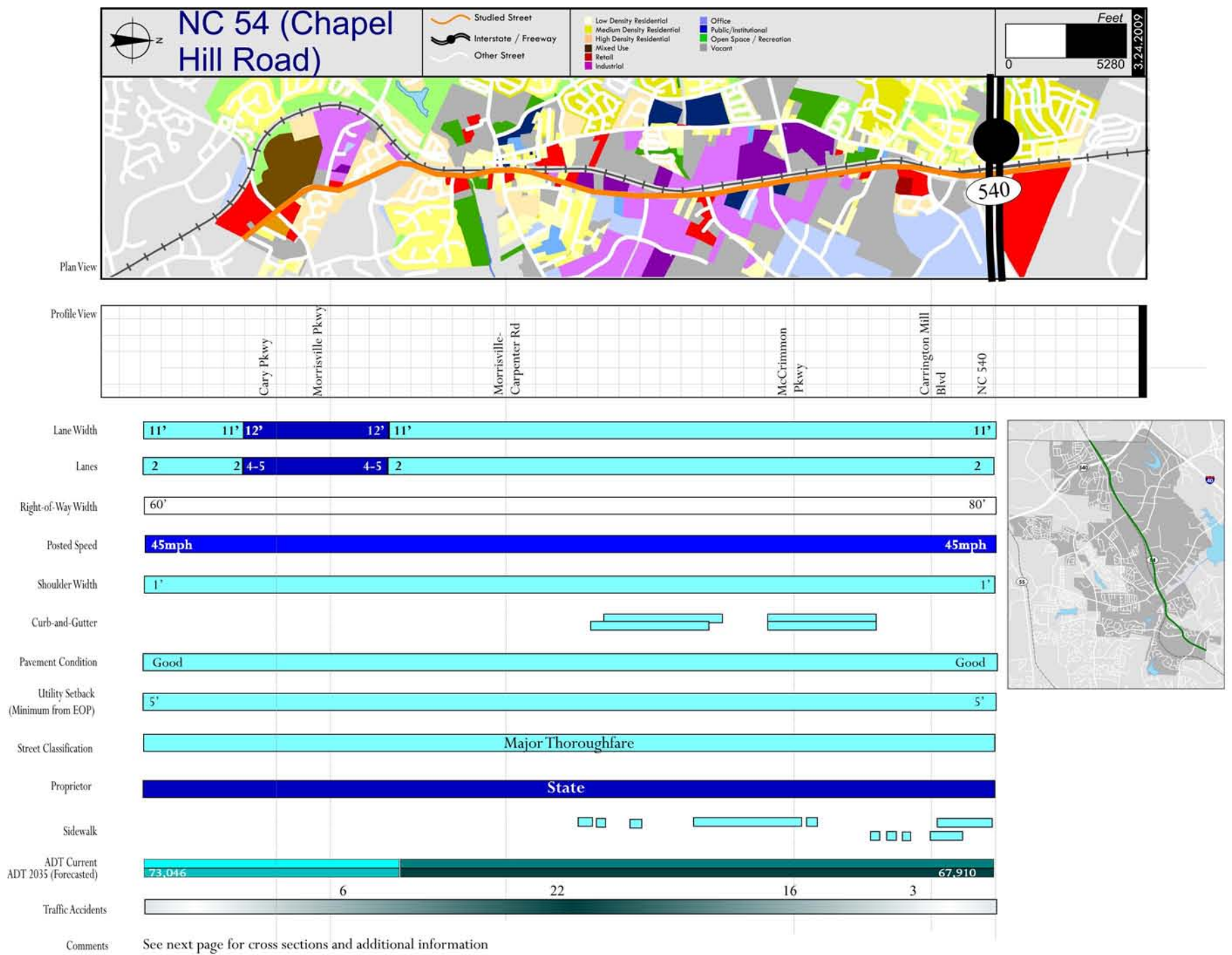
Comments: Curb and Gutter will need to be removed to include the striped shoulder.

Recommended



*5 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 3FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

APPENDIX E. ROADWAY INVENTORY, CONT'D



The NC 54 Corridor has 60% to 80% of the traffic traveling in the same direction during peak periods of the day – westbound towards Research Triangle Park during the morning commute, and eastbound towards the large residential communities in Morrisville and Cary in the evening. In order to facilitate this large amount of through traffic and to reduce accident-causing conflicts from cars turning into and out of the traffic stream, left turns should be limited to surface streets only, maximizing the use of shared parking and interconnected parking features throughout the corridor. Limiting left turns also greatly helps promote cycling and pedestrian travel since it reduces conflicts for these modes as well. Alternative left turning treatments, such as median u-turns, intersection u-turns, quadrant and jughandle roadway intersections (see graphics below), separated grade crossings, and median crossovers should be considered during the design of new developments and intersection redesign efforts.

Diagram of Quadrant Roadway Intersection

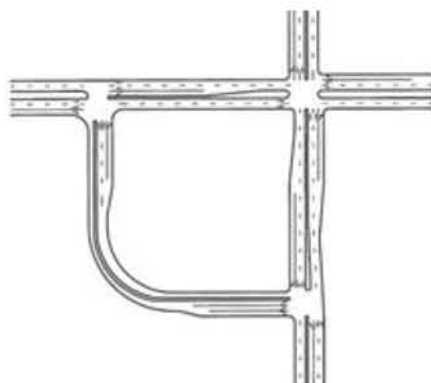
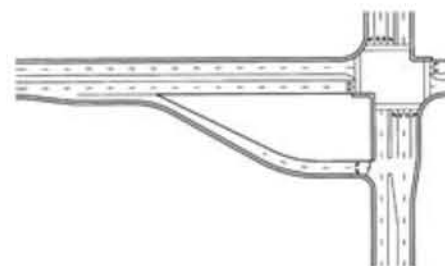
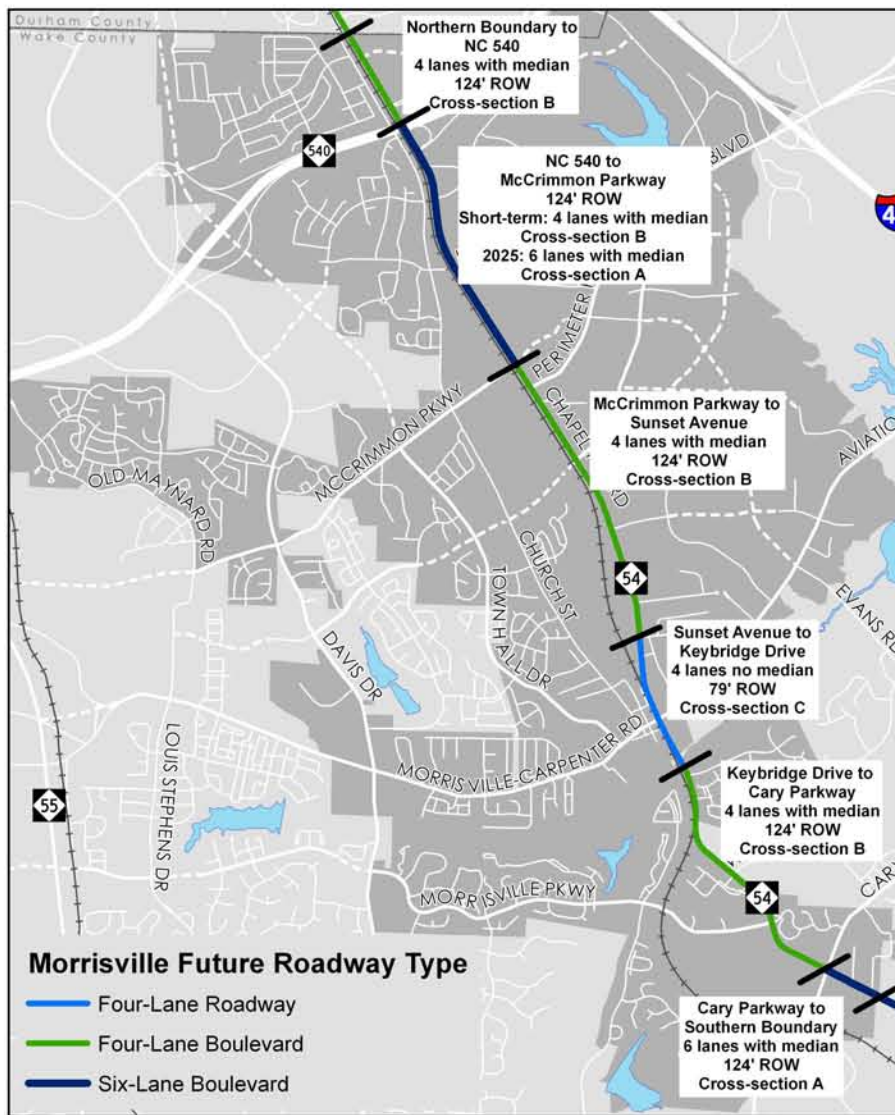


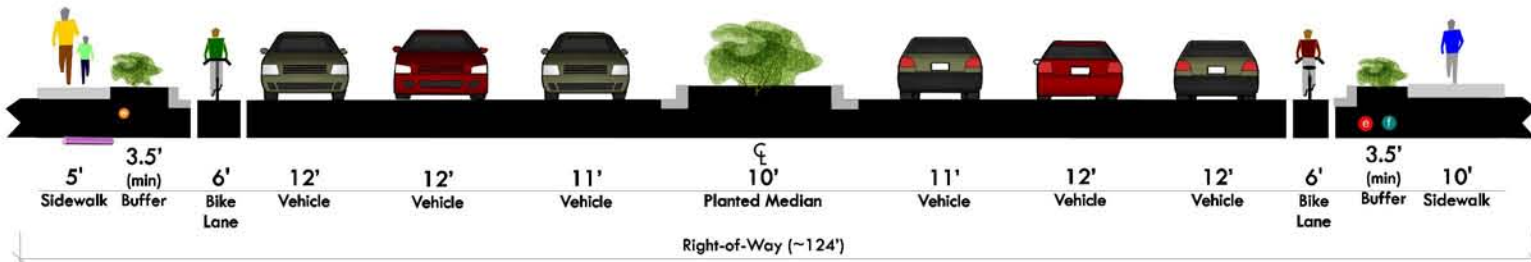
Diagram of a Jughandle Intersection



APPENDIX E. ROADWAY INVENTORY, CONT'D



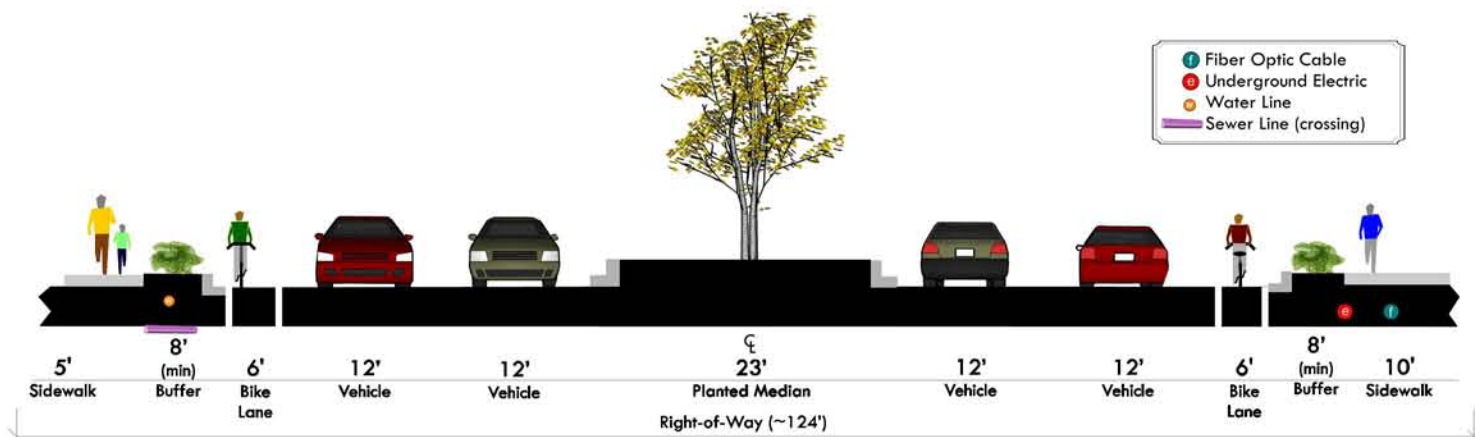
Cross-section A



*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

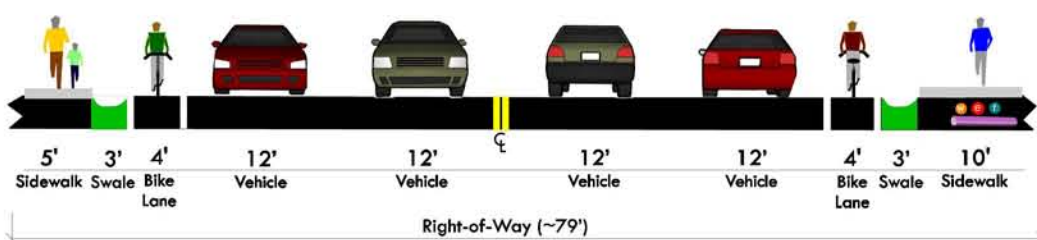
NC 54 from McCrimmon Parkway to NC 540 is planned to be four lanes in the short term. Expansion to six lanes using the above cross-section is possible if a TIA shows the improvement is needed and it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council.

Cross-section B



*10 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 8FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

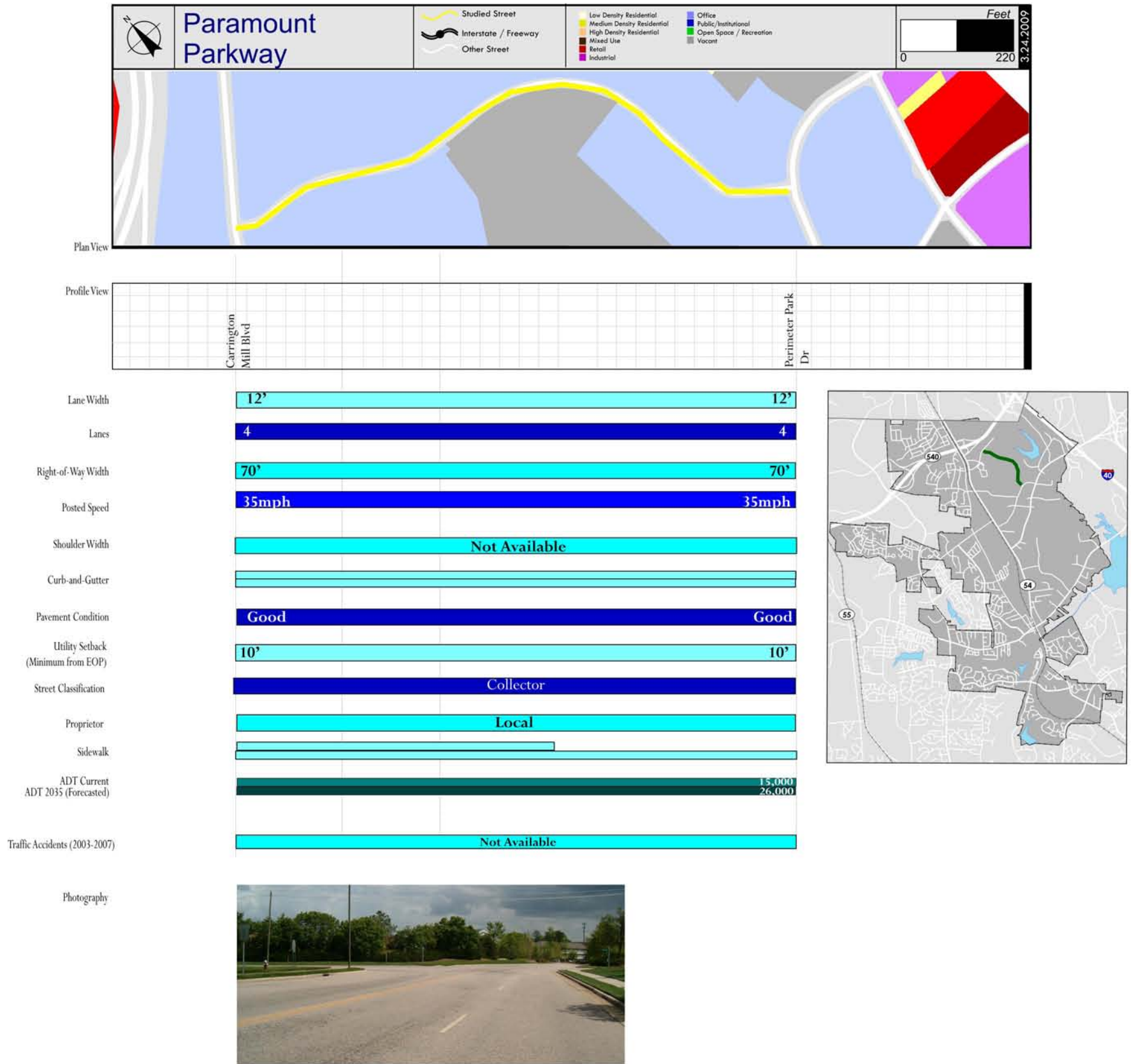
Cross-section C



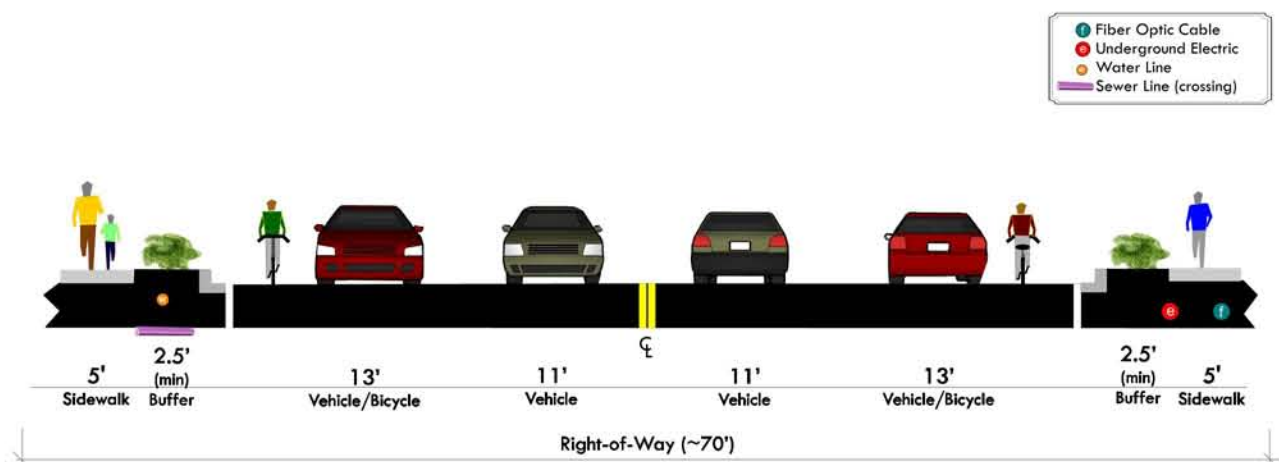
*2 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 1 FOOT OF ROW ON EACH SIDE OF THE PAVEMENT.

NC 54 improvements should include additional pedestrian amenities in the Town Center, including pedestrian havens at intersections even though there is no median shown in the cross section. Turn lanes and deceleration lanes will only be provided at the intersection of Morrisville-Carpenter Road and NC 54.

APPENDIX E. ROADWAY INVENTORY, CONT'D

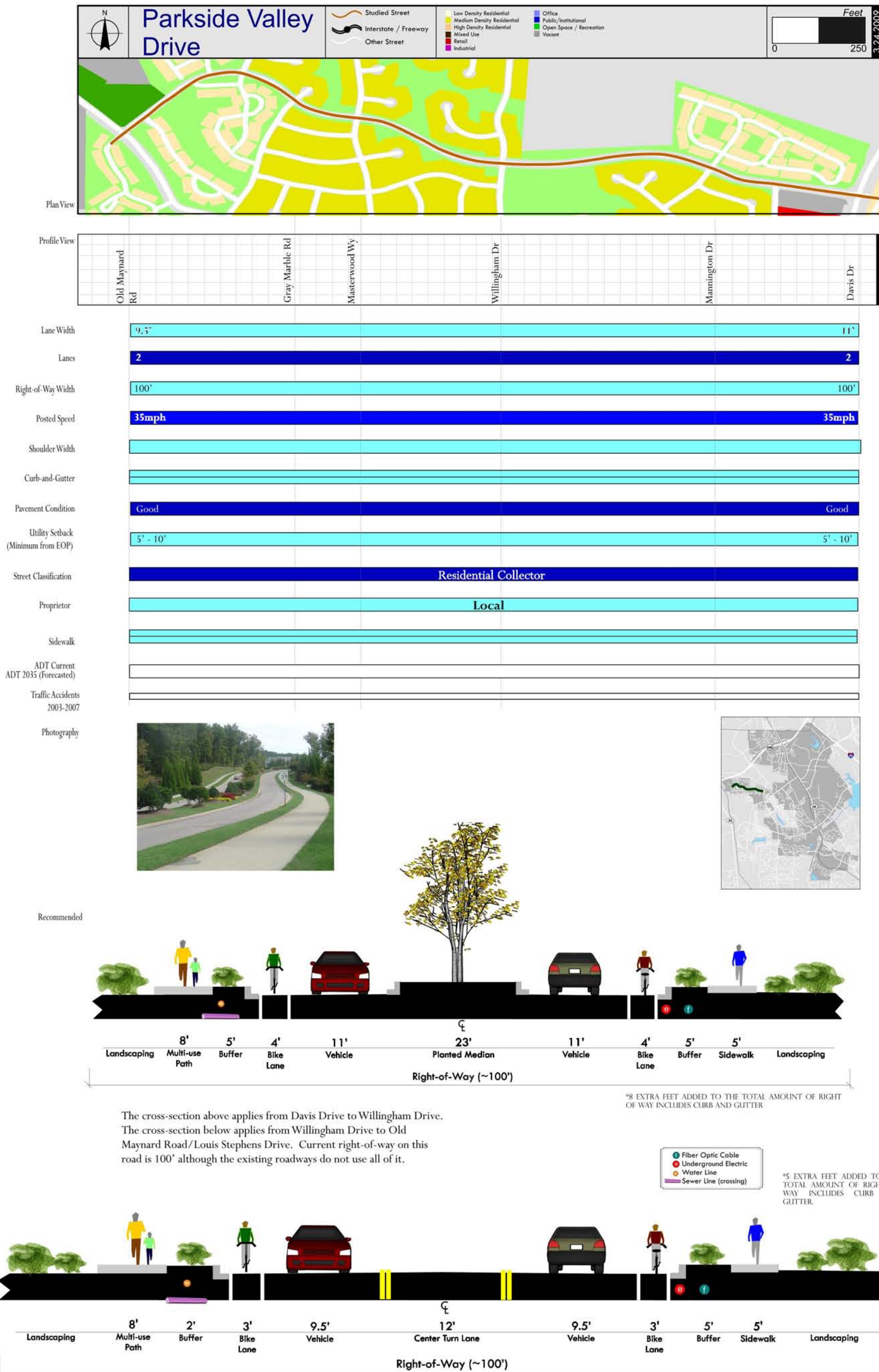


Recommended:

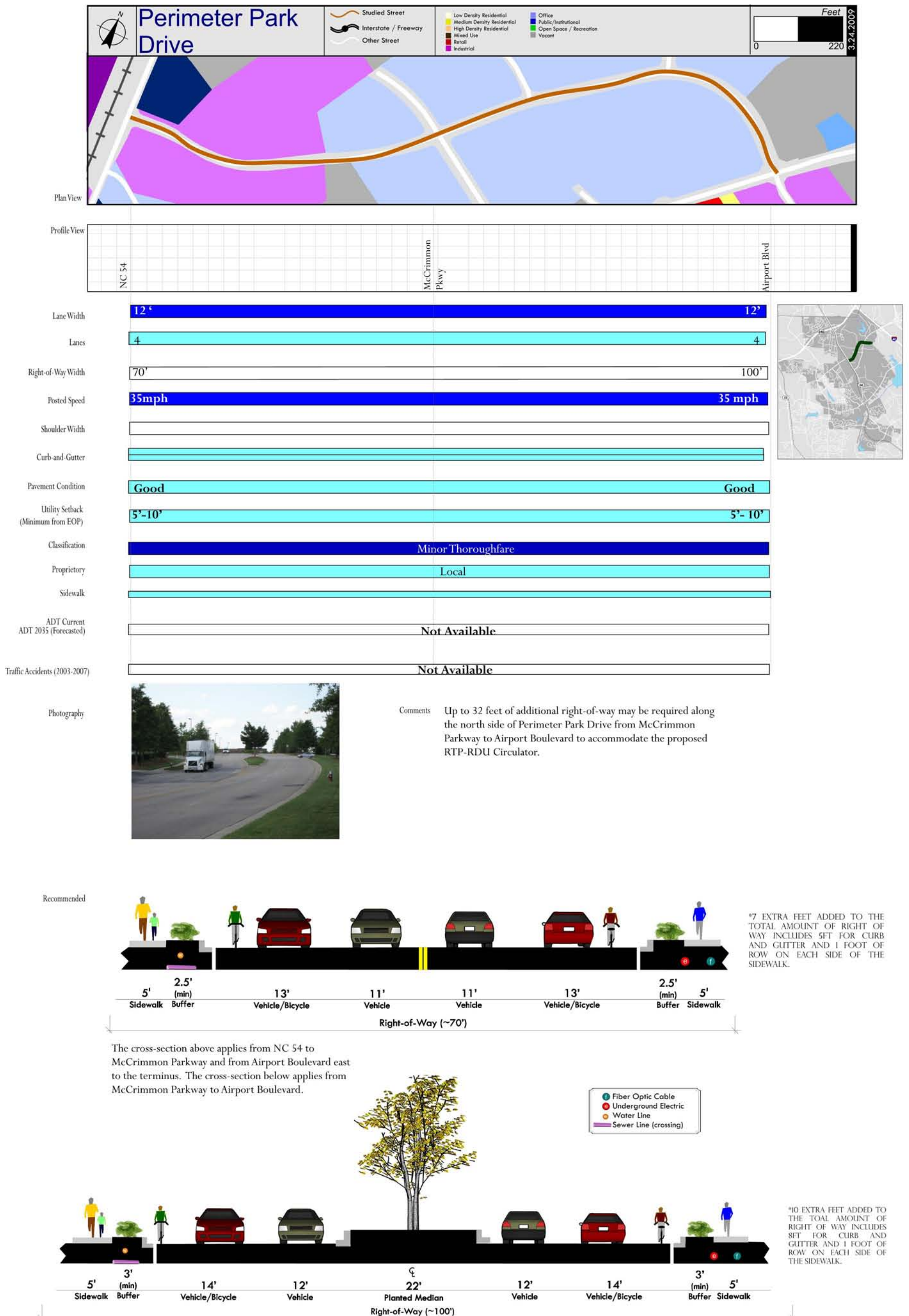


*7 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES 5FT FOR CURB AND GUTTER AND 1 FOOT OF ROW ON EACH SIDE OF THE SIDEWALK.

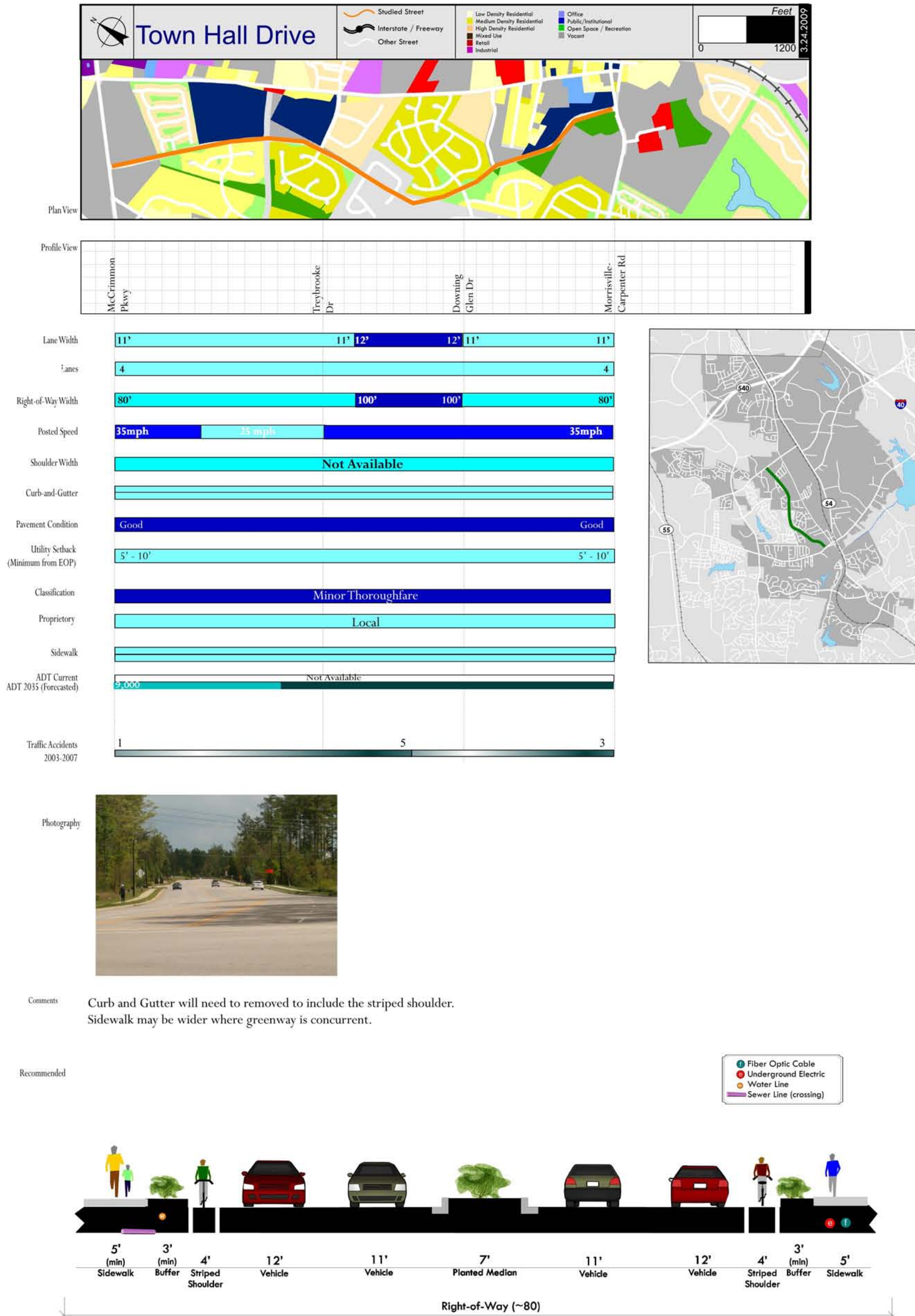
APPENDIX E. ROADWAY INVENTORY, CONT'D



APPENDIX E. ROADWAY INVENTORY, CONT'D

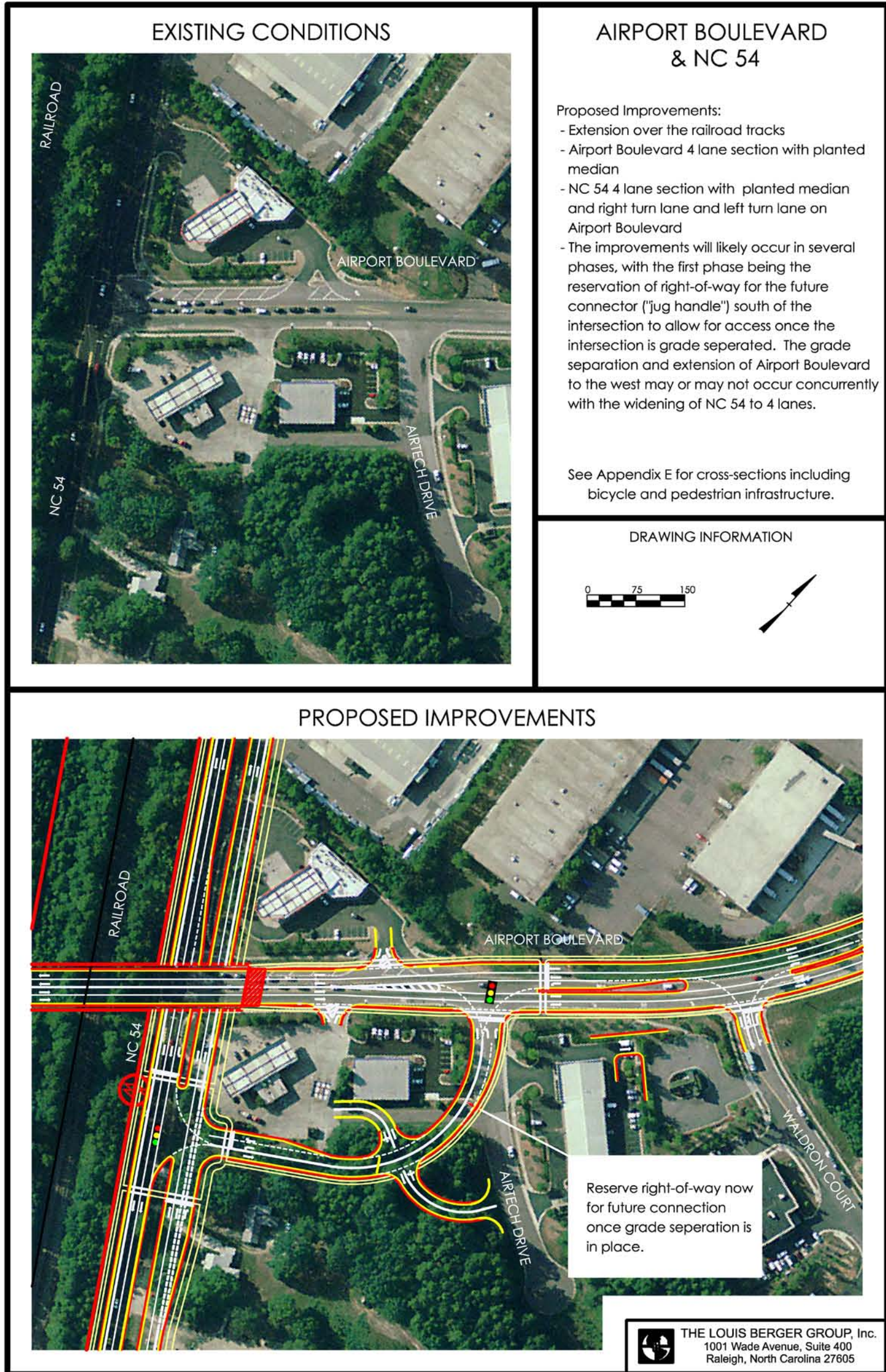


APPENDIX E. ROADWAY INVENTORY, CONT'D

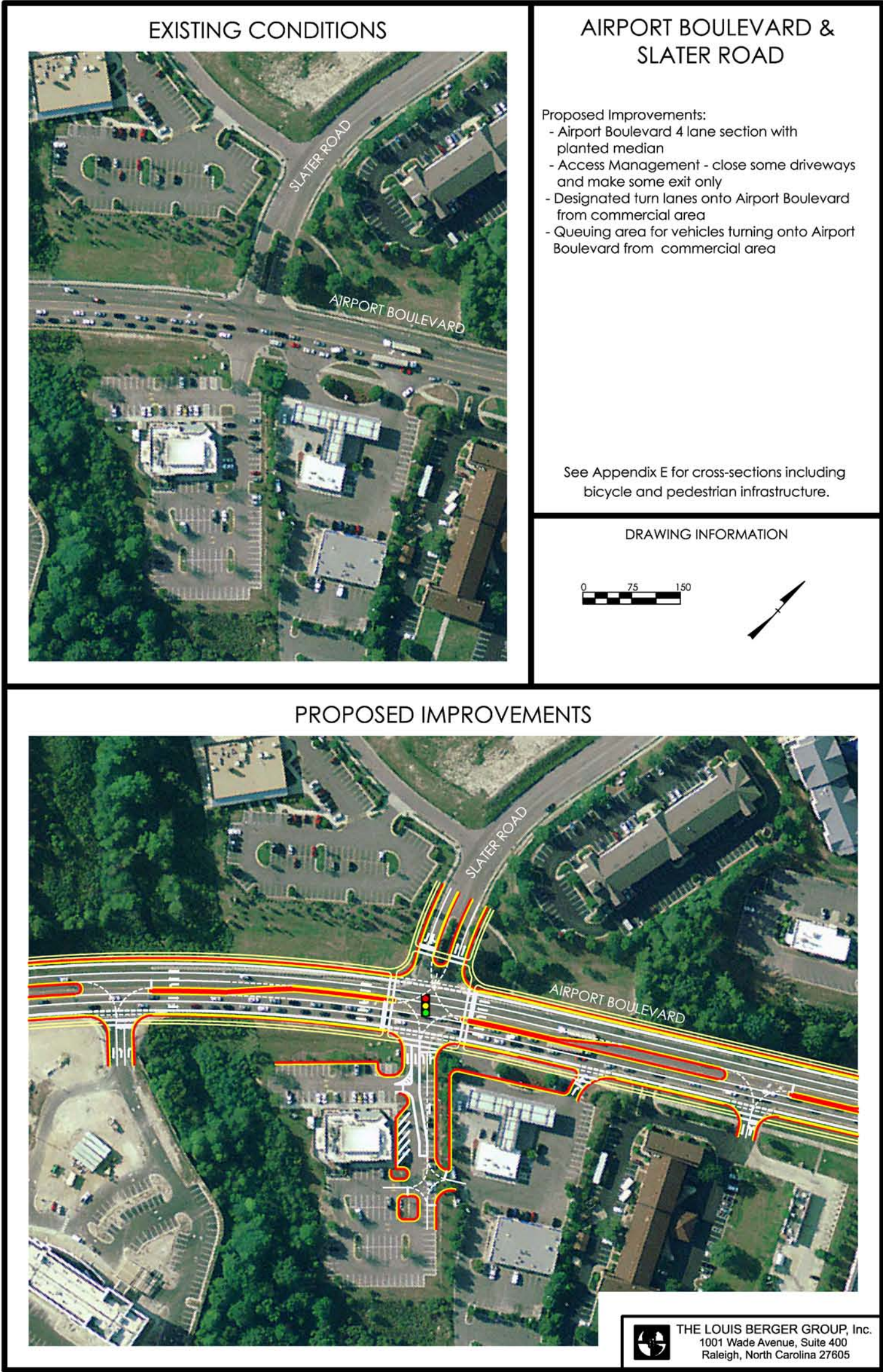


*3 EXTRA FEET ADDED TO THE TOTAL AMOUNT OF RIGHT OF WAY INCLUDES CURB AND GUTTER.

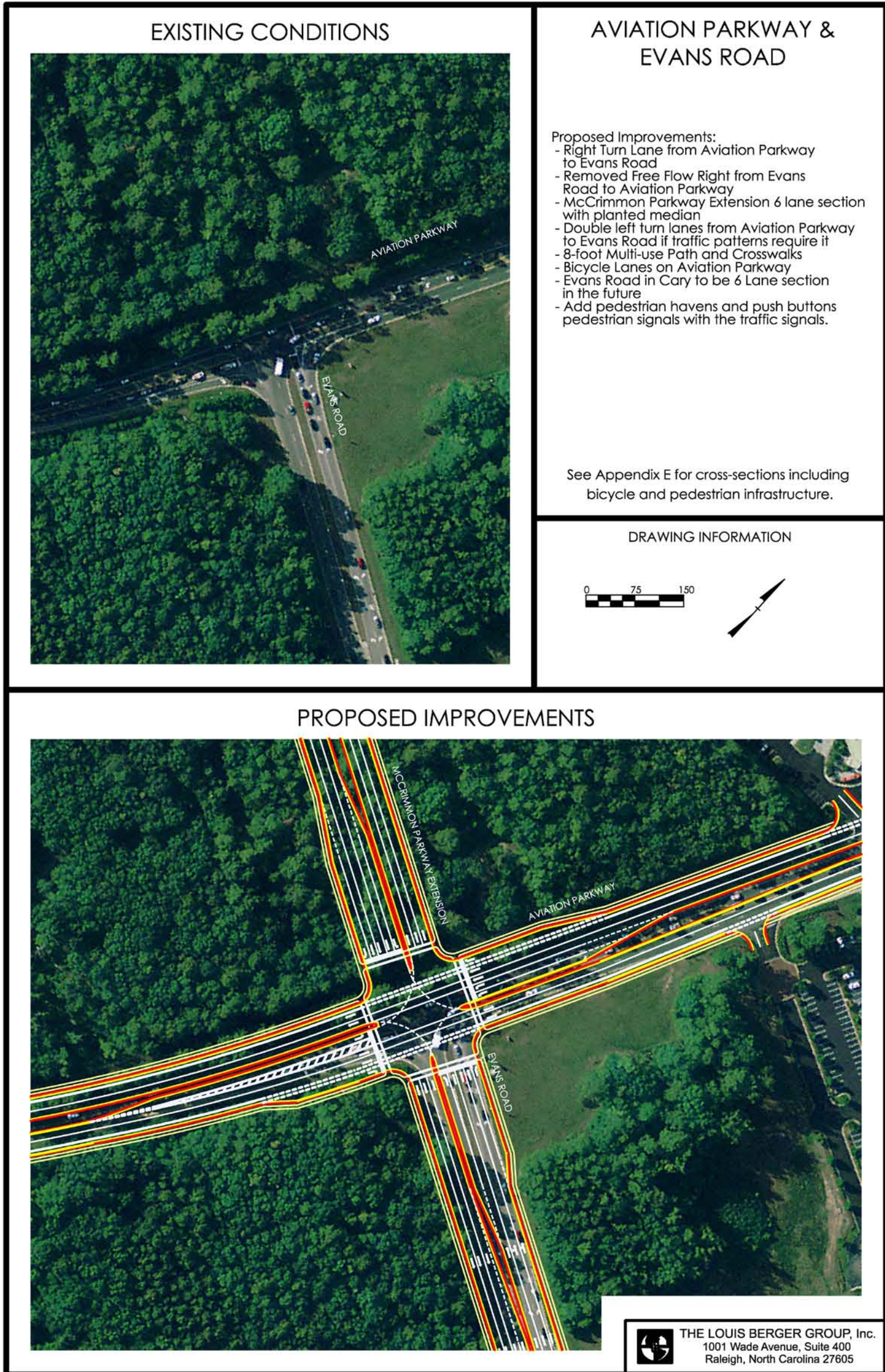
APPENDIX F. INTERSECTION STUDIES



APPENDIX F. INTERSECTION STUDIES, CONT'D

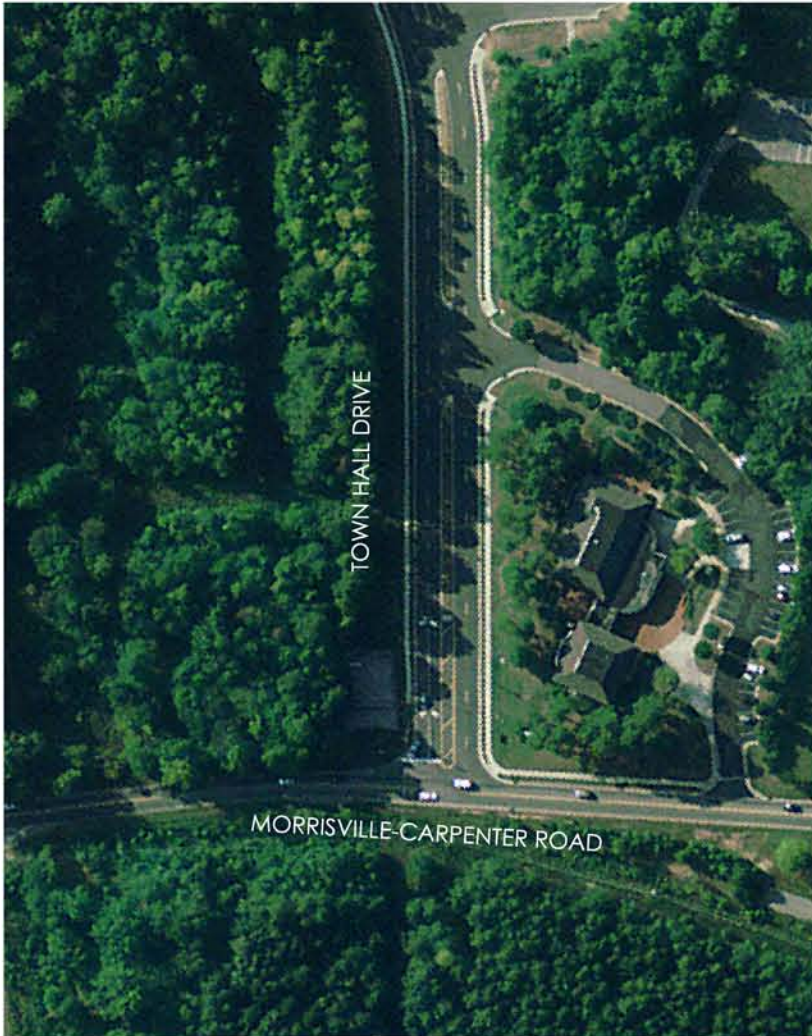


APPENDIX F. INTERSECTION STUDIES, CONT'D



APPENDIX F. INTERSECTION STUDIES, CONT'D

EXISTING CONDITIONS



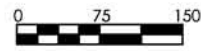
MORRISVILLE-CARPENTER ROAD & TOWN HALL DRIVE

IMPROVEMENTS:

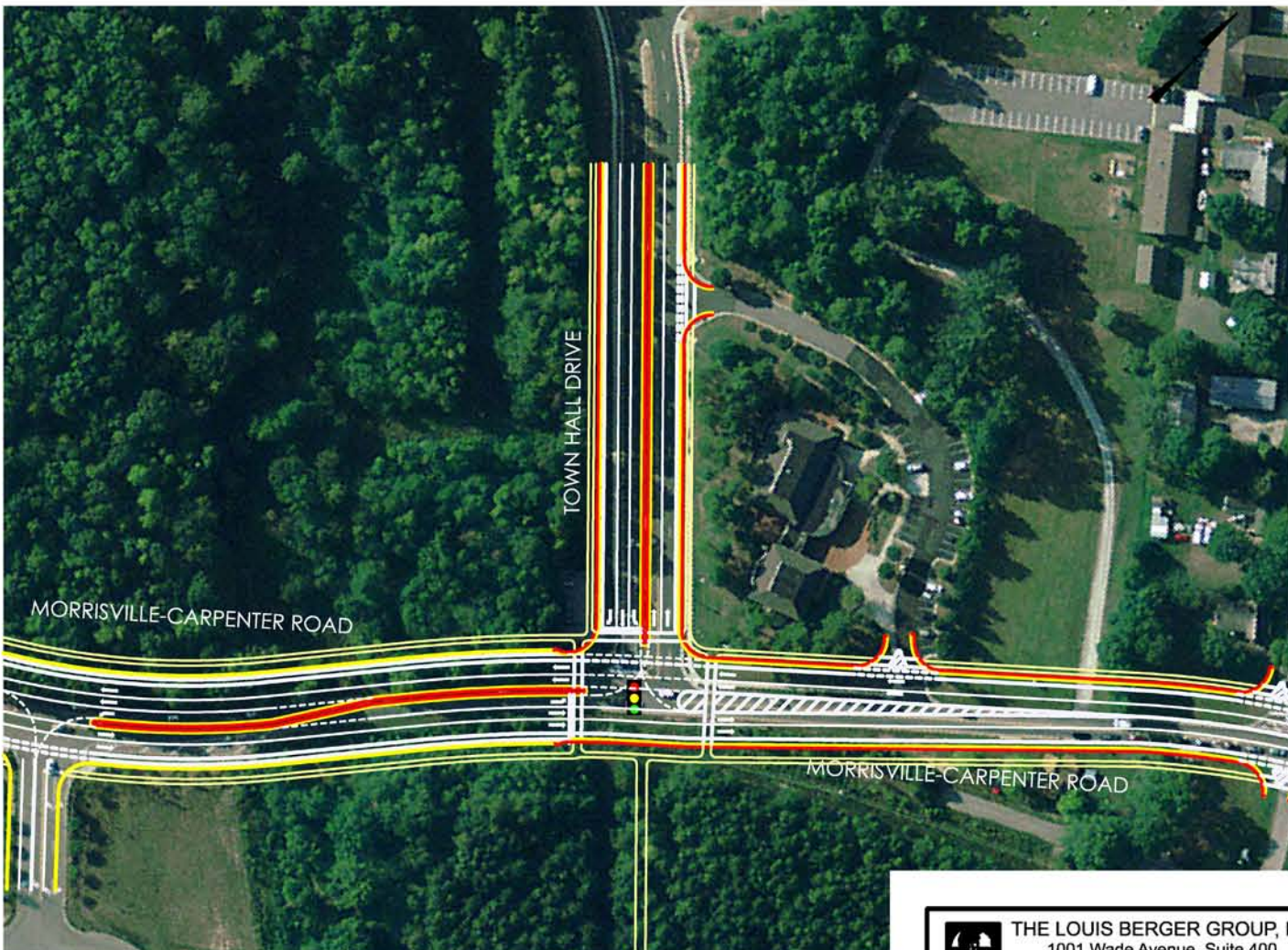
- Morrisville-Carpenter Road is a 4 lane section with planted median west of Town Hall Drive, east of Town Hall Drive Morrisville-Carpenter Road is a 4 lane section with no median
- Right and Left turn lanes to Morrisville-Carpenter Road

See Appendix E for cross-sections including bicycle and pedestrian infrastructure.

DRAWING INFORMATION

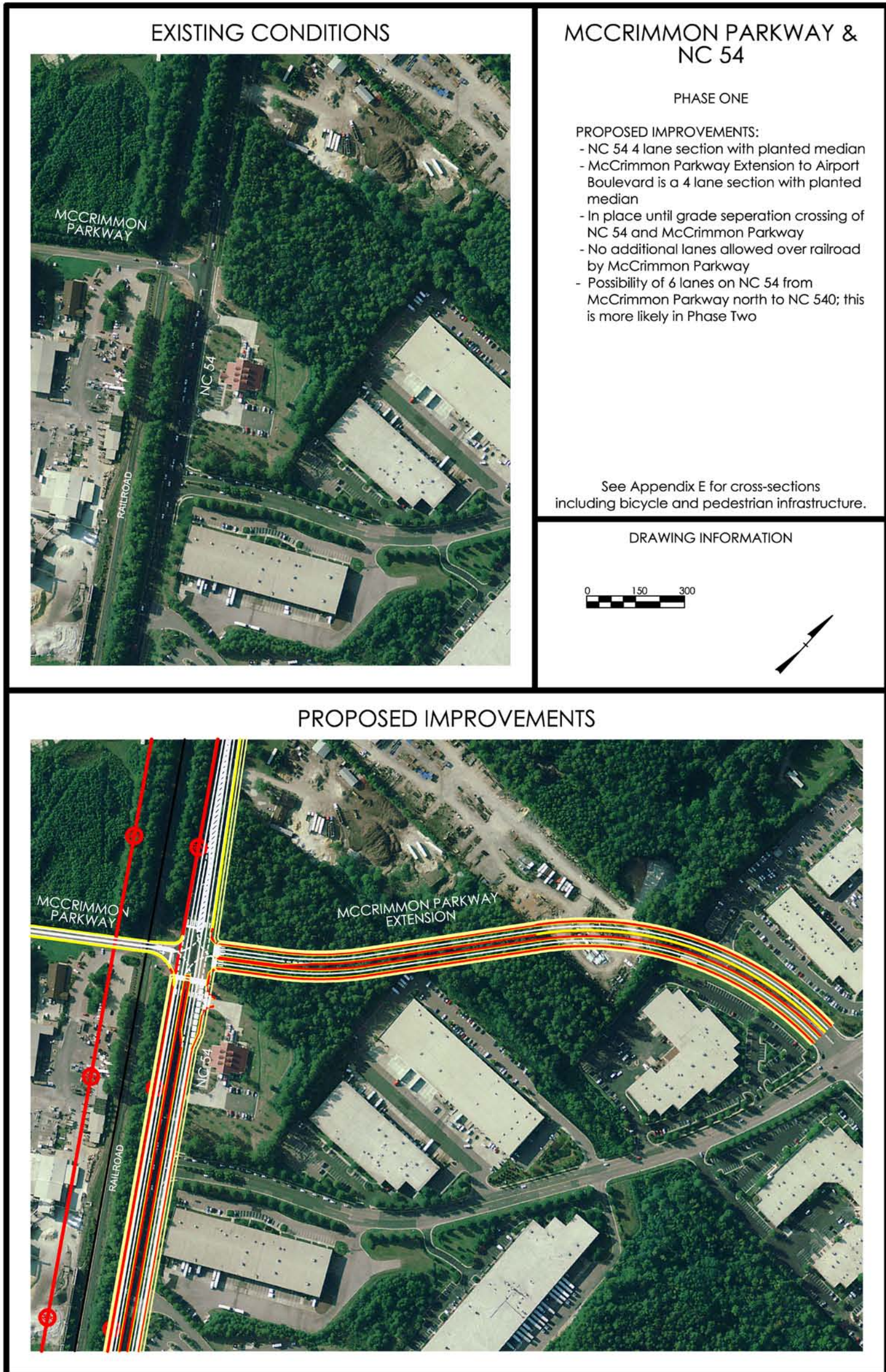


PROPOSED IMPROVEMENTS



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

APPENDIX F. INTERSECTION STUDIES, CONT'D



APPENDIX F. INTERSECTION STUDIES, CONT'D

EXISTING CONDITIONS



MCCRIMMON PARKWAY & NC 54

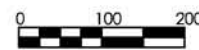
PHASE TWO

PROPOSED IMPROVEMENTS:

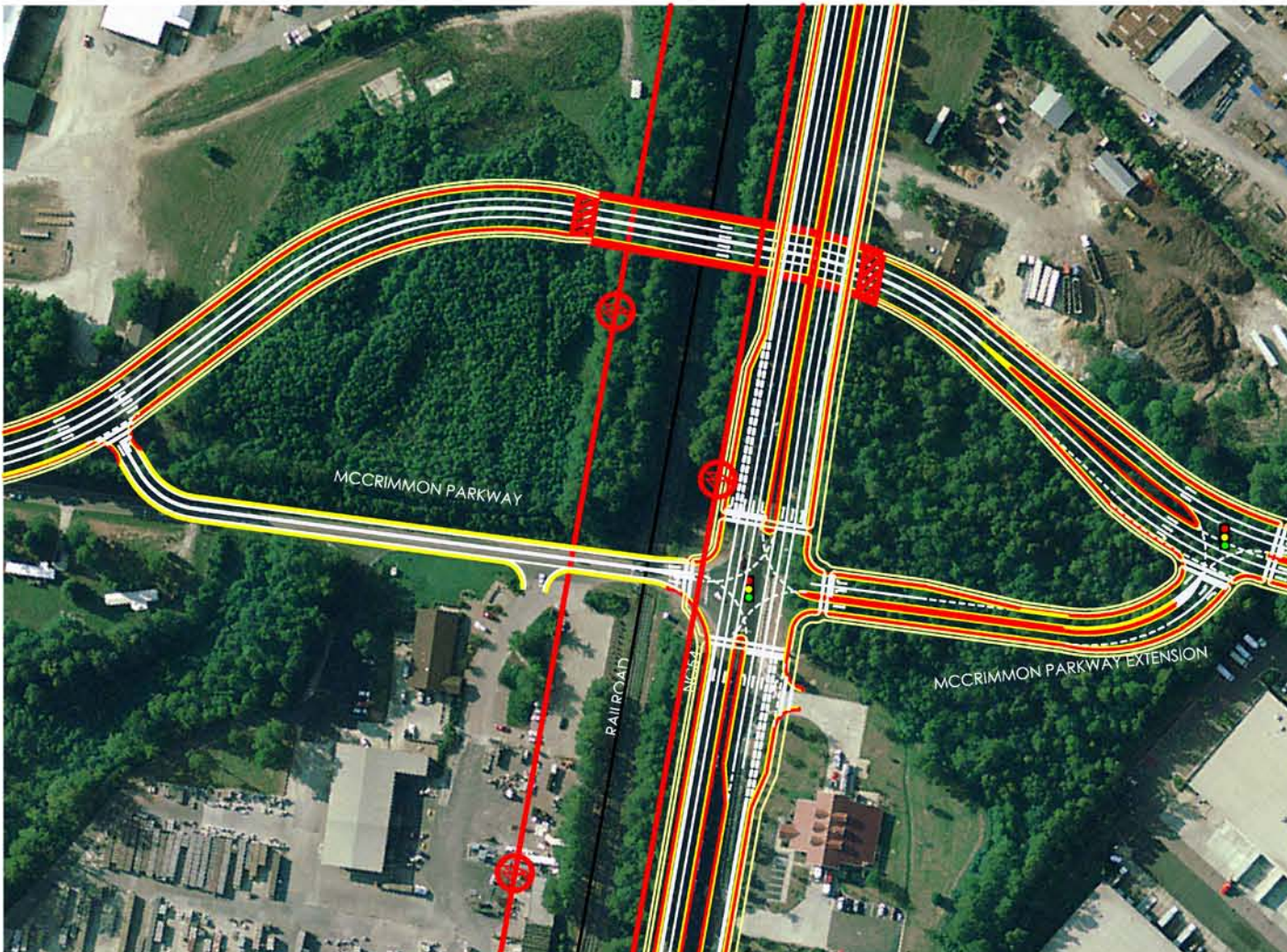
- McCrimmon Parkway Extension to Airport Boulevard 6 lane section with planted median
- Connection over railroad tracks
- Loop Road from NC 54 to McCrimmon Parkway Extension
- Firestation access preserved
- NC 54 from McCrimmon Parkway to NC 540 and McCrimmon Parkway east of NC 54 are planned to be four lanes in the short term. Expansion to 6 lanes is possible if a TIA shows the improvement is need or it is approved by the Town Council, or if the NC 54 Corridor Study shows a future need and it is approved by Town Council.
- McCrimmon may be 6 lanes from Aviation Parkway to NC 54 if deemed necessary by the Town Council as a result of the NC 54 Corridor Study or a TIA.

See Appendix E for cross-sections including bicycle and pedestrian infrastructure.

DRAWING INFORMATION



PROPOSED IMPROVEMENTS



APPENDIX G. CRABTREE CROSSING PARKWAY EXTENSION

The following is an encapsulation of the history and design considerations for the Crabtree Crossing Parkway Extension project, which was initially proposed in draft versions of the 2009 *Transportation Plan*. The project would be approximately 0.3 miles in length, and would connect Town Hall Drive to the existing Crabtree Crossing Parkway and the Town of Cary to the south. Crabtree Crossing Parkway Extension (CCPE) would be desirable in terms of providing additional connectivity to heavily developed residential areas for local motorists and non-motorists wishing to travel north-south without using the more heavily traveled alternatives such as NC 54/Chapel Hill Road.

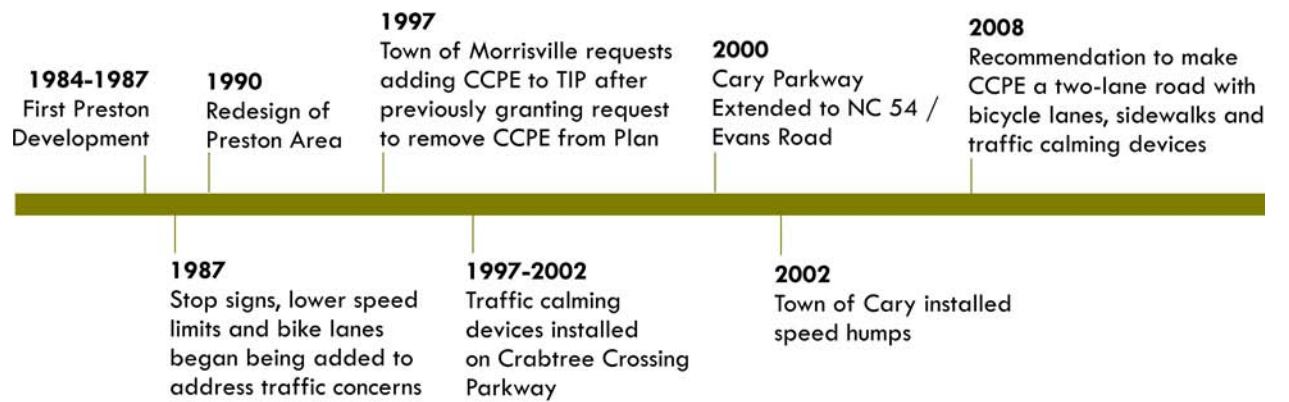


Figure G.1 General History of the Crabtree Crossing Extension Project

Source: Town of Morrisville Town Council Minutes

History. The Crabtree Crossing Parkway Extension has, over time, referred to more than one section of roadway. In the current context, we refer to the CCPE as the section between the current terminus of Crabtree Crossing Parkway northward to Morrisville-Carpenter Road at its current intersection with Town Hall Drive. Figure G.1 illustrates some of the history of the roadway and its genesis from the Preston subdivisions. The first mention of the CCPE was on January 12, 1996 when the current Crabtree Crossing Parkway was indicated as a road to be extended on a set of plans.

The value of this project has been examined previously, most recently in an analysis conducted in 2006. The prior traffic analysis was conducted by Parsons Brinckerhoff Quade & Douglas (PBQ&D, now PB World) and reported in the June 9, 2006 "Comparative Traffic Study: Morrisville-Carpenter Road Widening vs. Crabtree Crossing Extension." The comparisons of the resulting traffic values assigned to Crabtree Crossing Parkway Extension from the PBQ&D study and the 2009 *Transportation Plan* have been the source of some confusion, and the various points of information are summarized in Figure G.2.

Description	PBQ&D Study (2006)	Transportation Plan/LBG Study (2009)
Reason for Studying CCPE	Comparing three build alternatives to discern value-benefit of each alternative	Small part of a much larger study looking at feasible transportation improvements throughout the Town
Level of Detail	Fine, includes detailed traffic movement analysis	Coarse, traffic impacts studied at the corridor level in general
Forecast Year	2008 (from 2006)	2035
Method of Generating Traffic Volumes	Assumed 2% annual growth rate at key intersections based on 2003 traffic counts, then 10% reduction at Morrisville-Carpenter Road/NC 54 intersection	Approved Triangle Regional Model using land use forecasts supplied by the Town of Morrisville (and Cary)
Method of Distributing Traffic	Assumed diversions, primarily from NC 54 / Chapel Hill Road and some from closure of Church Street	Approved Triangle Regional Model
Cost of Construction	Assumes 2006 dollars and value of materials; possibly assumes four-lane road and structure	Assumes 2008 dollars and value of materials; assumes two/three-lane road and structure
Other Roadway Assumptions	Depending on the scenario being discussed, Morrisville-Carpenter Road widened to five lanes	Major roadways are widened, including Davis Drive, NC 55, NC 54, Western Wake Freeway, and Morrisville Carpenter Road

Figure G.2 Contrasting the PBQ&D Report and 2009 Transportation Plan

Source: PBQ&D, 2006; The Louis Berger Group, Inc., 2009

Because of the differences explained by Figure G.2, the resulting traffic volumes projected for Crabtree Crossing Parkway Extension are different for the two studies: 6,600 vehicles per day (vpd) for the PBQ&D study, and approximately 1,500 vpd for the studies conducted during the planning process for the 2009 *Transportation Plan*.

Influence of Park West Village. One question about CCPE has been the influence of additional traffic created by the mixed use development Park West Village. Figure G.3 illustrates the various dwelling unit (housing) and employment projections in the Park West Village area from the 2005 and 2035 Triangle Regional Model, and the 2035 Preferred Scenario developed during the planning process for the 2009 Transportation and Land Use Plans. Two traffic analysis zones (TAZs) contain information about future development in the Park West Village Area, and both extend beyond the proposed Park West Village site. Through the planning process for the 2009 Transportation and Land Use Plans, the residential and employment densities were adjusted to reflect the most current understanding of the development potential in this area, including Park West Village.

Water Quality. A review of wetlands and stream features was conducted for an area spanning 300 feet centered on the centerline of the proposed new alignment. The Louis Berger Group, Inc. conducted a scoping field view on May 5, 2008. Wetland areas identified in the field were evaluated for jurisdictional status by the three-parameter method outlined in the Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987). Stream channels were identified by using indicators of Ordinary High Water Mark (OHWM), the North Carolina Division of Water Quality (NCDWQ) stream rating method, and the US Army Corps of Engineers (USACE) stream rating method. Jurisdictional boundaries were not delineated during this field visit; however, positions at key locations of potentially jurisdictional waters were logged in the field with a GPS unit capable of sub-meter accuracy.

Berger scientists identified six potentially jurisdictional channels within the study area. Channels identified included the main stem of Crabtree Creek and multiple unnamed tributaries. One upland ditch draining to Crabtree Creek was also observed. No potentially jurisdictional wetlands were identified during the field review.

Wildlife Habitat. The predominant natural community within the review area is a bottomland hardwood forest community. The upper canopy was dominated by red maple (*Acer rubrum*), green ash (*Fraxinus pen-*

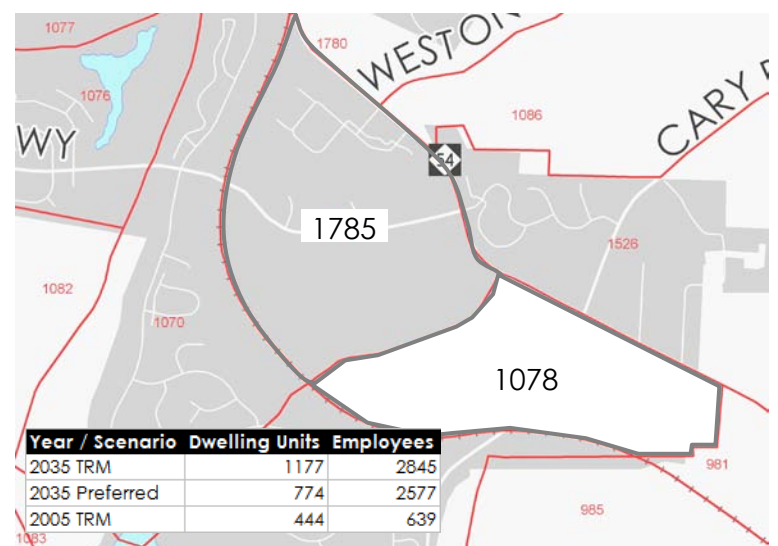


Figure G.3 Population and Employment in Park West Village Area

Sources: Triangle Regional Model and 2009 Transportation Plan

APPENDIX G. CRABTREE CROSSING PARKWAY EXTENSION, CONT'D

Start Point	End Point	Distance	Travel Time
Fire Station #1 (150 Town Hall Drive)	Morrisville Aquatics Center (1301 Morrisville Pkwy)	2.3 / 1.7 miles	3:56 / 2:52
Fire Station #1 (150 Town Hall Drive)	Crabtree Crossing Pkwy at Morrisville Pkwy	1.9 / 0.9 miles	3:18 / 1:29
Fire Station #1 (150 Town Hall Drive)	Morrisville Pkwy Elementary School	1.9 / 2.0 miles	3:18 / 3:26
Fire Station #1 / Fire Station #2	Morrisville Manor	1.7 / 3.1 / 1.9 miles	2:51 / 5:16 / 3:11
Fire Station #1 (with NC 54 Shut Down)	Morrisville Manor	6.3 / 1.9 miles	10:48 / 3:11

Without CCPE | With CCPE | From Fire Station #2

Figure G.4 Estimated Emergency Response Times With and Without CCPE

Source: Town of Morrisville staff

sylvanica), loblolly pine (*Pinus taeda*), and sycamore (*Platanus occidentalis*). The shrub strata was highly invaded with Chinese privet (*Ligustrum sinense*). Wildlife sighted by direct observation included an individual barred owl (*Strix varia*) and a herd of whitetail deer (*Odocoileus virginianus*). Raccoons (*Procyon lotor*) were identified by tracks and scat.

Emergency Response. One reason for increasing connectivity in the town is to facilitate emergency response (police, fire, ambulance) service when alternative roadways are congested. At the request of the Town Council, the town staff presented the information in Figure G.4 regarding the change in emergency response times with and without the connection created by the CCPE project.

Design and Construction. The existing portion of Crabtree Crossing Parkway south of Morrisville Parkway is a very wide, two-lane street with a planted median. Residents have cited speeding, hazardous crossing conditions (including for golf carts south of Morrisville Parkway) and sight distance issues, which led to the installation of traffic calming measures between 1997 and 2002. There have been eight reported accidents in Morrisville between the southern terminus of the proposed Crabtree Crossing Parkway Extension and Ridge Creek Drive between 2004 and early 2008. Most are sideswipe, turning, or fixed-object reports, with one reporting an injury.

Specifically, the following design elements and language were incorporated into the draft 2009 Transportation Plan to address these issues.

Specifically, the following design elements and language were incorporated into the draft 2009 Transportation Plan to address these issues.

- The design of the proposed CCPE project in the 2009 Transportation Plan took into account the concerns about negative neighborhood impacts expressed by several citizens during the planning process by designing for a lower volume and speed limit. The proposed roadway was reduced from a four-lane cross-section to a two-lane cross-section. This cross-section is very comparable to the two-lane section to the south of Morrisville Parkway, but quite different from the four-lane, divided cross-section of Town Hall Drive to the north.
- The proposed cross-section would accommodate both bicycle lanes as well as sidewalks for non-motorized traffic, as well as provide additional pedestrian and bicycle connectivity to the large residential developments to the south and the shopping, schools, and other uses to the north.
- The Transportation Plan included language supporting traffic calming at the south end of the roadway (existing Crabtree Crossing Parkway) and a roundabout at Wolfsnare Lane (see Figure G.5) to help slow through traffic.
- The priority of the proposed roadway was intentionally set lower than capacity improvements for major north-south roadways to provide through traffic less incentive to find alternative routes through this area.

The rough cost estimate for completing the CCPE project, which is subject to change based upon additional engineering refinements that would normally occur during a design phase of work, is \$7.7 million.

Resolution. Much discussion during the review process for the 2009 Transportation Plan with the Planning and Zoning Board and the Town Council focused on the potential impacts of the proposed Crabtree Crossing Parkway Extension. Many members of the public expressed concern about traffic impacts from the project, despite the narrower cross-section, delayed timeframe and traffic calming measures included in the draft Transportation Plan. Information regarding the positive impact to emergency response times and the benefits of additional connectivity in the town were also the subject of much discussion with the boards. The Town Council ultimately decided in March 2008 to remove the proposed CCPE project, but retain a greenway in that location to allow bicycle and pedestrian access.



Figure G.5 Crabtree Crossing Parkway Extension Illustration

APPENDIX H. FIXED ROUTE TRANSIT CASE STUDY

This section describes a sample potential public transportation service in Morrisville if the town decided to start its own system from scratch. It is the most complicated option of the several examined. The service described will be provided six days per week including holidays. Both daily, fixed-route and Americans with Disabilities Act (ADA) complementary demand response service are provided. Funding sources, yearly capital and operating budgets, and transit system operations and management are also discussed.

System Management and Operation. Starting up a full service transit system from scratch can be a daunting challenge. Securing an operations staff consisting of drivers, dispatchers, supervisors, and maintenance staff, along with operations and administration of the various capital and operating assistance funding streams, would require a significant level of commitment and support from Town departments and the Town Council.

Many startup transit systems have chosen to hire outside contractors that specialize in transit operations. Contracted transit operators provide drivers, dispatchers, and day-to-day operations supervisors that run the system on behalf of the Town. This option would still require a full-time transit director on the Town's staff to provide contractor oversight and administration of federal and state funding sources. The Town's Transit Director would also be responsible for coordinating with other local and regional transit agencies in the Triangle, the Capital Area MPO, NCDOT, and USDOT. Cary and the C-Tran system are important potential partners as well, not only in terms of coordination of services, but potentially for shared garage space (the C-Tran garage is currently located in Morrisville) and even a merged system. Transit fleet maintenance and fueling can generally be provided by existing Town personnel and resources, but sharing the costs of garaging and maintaining equipment and vehicles would reduce the costs associated with independent operations. Support from other Town departments including Planning, Finance, Public Works, Police, Information Technology, Administration, and the Budget Office would also be required in order to ensure a successful transit system.

Funding for the transit system would come from several sources. Federal funding is available through formula grants from the Federal Transit Administration (FTA) that require local matching funds. These grants can provide funding assistance for capital, operational, and planning expenses. The State of North Carolina also provides operating assistance funding and a portion of the matching funds required for the federal grants. In addition to these funding sources, the Town would be required to provide matching funds for the federal grants, which are only partially offset by farebox and, possibly, advertising revenues. This example illustrates a potential funding scenario for a transit system in Morrisville. Assumptions made for capital and operating expenses are for discussion purposes only. Further refinement through the development of a Transit Master Plan would be needed prior to committing to a particular approach.

Fixed-Route Service. Primary transit service throughout Morrisville would consist of a fixed route, day-time system that would operate on a 60-minute cycle during operating hours (Figure H.1 illustrates a potential route). The operating parameters of the fixed route and ADA demand response service are critical to determine the startup and ongoing costs. For this example, the daytime service will operate between 6am and 6pm Monday through Friday and from 10 am to 6 pm on Saturdays and holidays. Two, light-duty ("cutaway") transit vehicles and a third spare vehicle will provide the most cost-effective option for serving the proposed route. The typical cutaway vehicle is an ADA lift-equipped vehicle that has a seating capacity of 28 ambulatory with two wheelchair tie-down positions.

Complementary Paratransit Services. Complementary paratransit services, or demand response service, would be provided in accordance with policies established by the Town through an ADA Complementary Demand Response Service Plan. Eligible persons with disabilities will be serviced who reside within three-quarters of a mile of the fixed route service but are unable to utilize a fixed route transit stop. Demand response service could be provided through the use of a single, ADA-equipped van and have the same operating schedule as the fixed route service.

Capital Expenditures. Capital costs include several onetime and periodic replacement costs for major system investments. Examples of capital expenses include transit buses, system wide passenger amenities, and maintenance facilities. Figure H.2 provides a summary of the initial capital expenditures required to start a transit system. An initial capital budget of approximately \$1,500,000 would include three light duty transit vehicles, one ADA equipped van, transit stop amenities, and administrative and maintenance facility improvements. The majority of the capital items listed below are one time expenditures. Vehicle costs are a recurring capital cost tied to the usable life cycle of a transit vehicle. Federal reimbursement grants can be used to fund up to 83 percent of vehicle purchases and up to 80 percent of other capital expenses. North Carolina will provide an 8 percent match for vehicle purchases and up to 10 percent matching funds on other capital expenditures. The resulting local match would be nine percent for vehicle purchases and 10 percent for all other capital expenses. Figure H.3 provides an example of expenditures and revenues for five years of transit operations. A transit Capital Improvement Program should be developed in order to better identify and plan for long-term system needs.

Operations Expenditures. Operating costs include all items and expenses necessary to provide for the day-to-day operation of the trans-

Definitions of Transit Services

Fixed Route: Transit service that follows a fixed timetable and serves a routine set of stops.

Deviated Fixed Route: Transit route follows a set of scheduled stops, but also services additional stops as they are called in to the dispatcher.

Limited Deviation Fixed Route: Transit route that follows a set of scheduled stops, but also services a subarea or point on demand as determined by calls into the dispatcher.

Paratransit / Demand Responsive Service: Flexible, demand-responsive passenger transportation that does not follow fixed routes or schedules. Typically vans or mini-buses are used to provide paratransit service, but also share taxis and jitneys are important providers in some markets. The term "paratransit services" often refers to the provision of complementary service to fixed-route systems for mobility-impaired passengers, per the Americans with Disabilities Act (ADA).

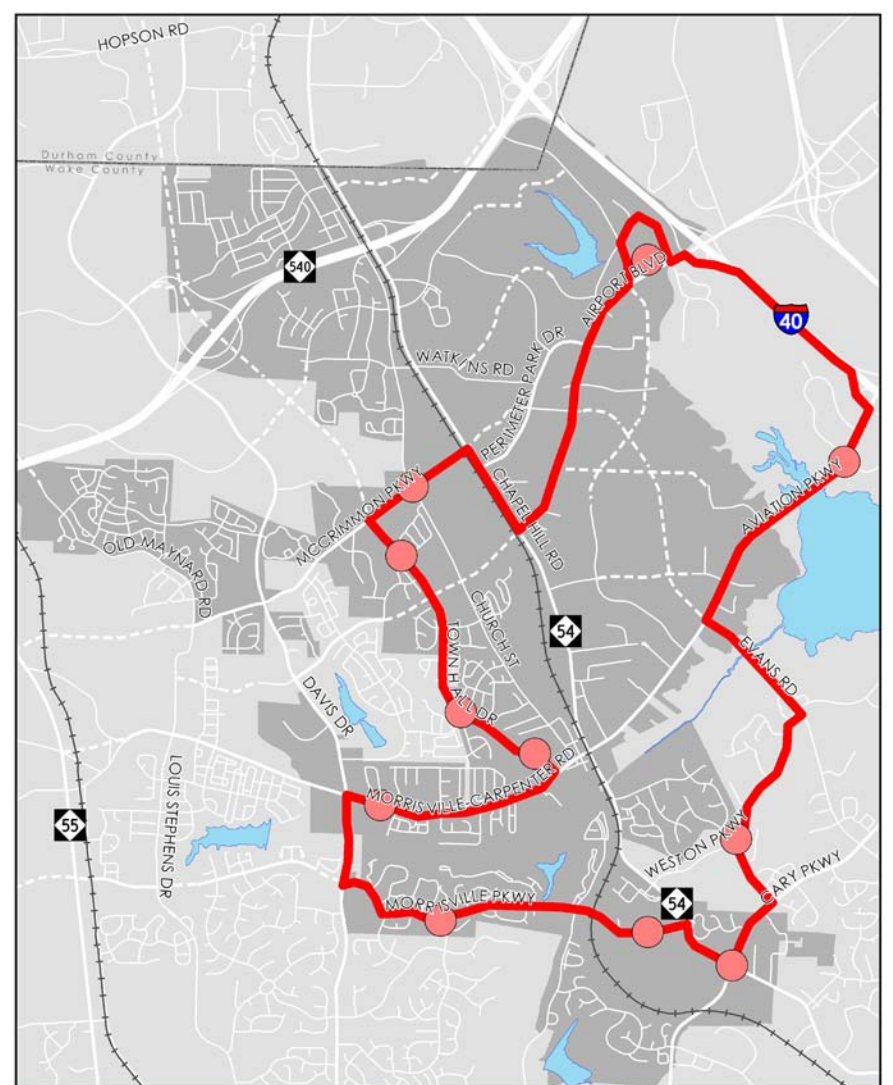


Figure H.1 Fixed Route Service Case Study

APPENDIX H. FIXED ROUTE TRANSIT CASE STUDY, CONT'D

sit system during each fiscal year. Examples of operational expenses include salaries and benefits for transit-related Town employees; vehicle maintenance and cleaning; vehicle fuel; advertising; training; and contractor fees. Operational expenditures are eligible for up to a 50 percent reimbursement from federal grant programs after fare box revenues have been accounted for. North Carolina's State Maintenance Assistance Program (SMAP) provides for an allocation of up to 25 percent of the operational costs as well. This results in as little as 25 percent of the yearly operating expenses being borne by the Town's operating budget. Figure H.4 provides a typical operational budget for the transit system.

Town Operational Costs include salary and benefits for the Town's Transit Director as well as portions of other Town staff providing services in support of the transit system. Contracted Services include the cost associated with a contractor providing day-to-day transit operations after transit revenue operations have begun. Contractor startup costs are associated with a one-time expense that typically covers the costs of the contractor prior to revenue operations commencing. This may include localized staff training, route familiarization, and establishment of oversight and communication protocols with Town staff. Additional operational expenses for public information include transit system advertising, website creation and maintenance, and organizational branding efforts.

Fixed-Route Case Study Example Summary. Using the assumptions in this example, the Town of Morrisville can anticipate an average annual transit expense of approximately \$98,000 (Figure H.3). Major capital expenses for startup vehicle acquisition and facility improvements in Year One would cost the Town \$208,500 (in 2008 dollars). In addition to operating expenses, Year Four expenditures include replacement revenue vehicles for a total expenditure of approximately \$132,500. Federal and State grant funding provide the majority of transit system funding after farebox revenue subtracts from the total yearly operating expense.

Figure H.2 Summary of Capital Expenditures for Fixed Route Transit Case Study

Capital Budget	Number	Unit Cost	Total	Federal	State	Local
Vehicles	3	\$125,000	\$375,000	\$311,250	\$30,000	\$33,750
ADA Vehicle	1	\$36,000	\$36,000	\$29,880	\$2,880	\$3,240
Shelters	10	\$15,500	\$155,000	\$124,000	\$15,500	\$15,500
Transit Stop Amenities (incl. sign, bench, trash can, solar lighting, and ADA upgrades)	50	\$5,000	\$250,000	\$200,000	\$25,000	\$25,000
Office Equipment	1	\$10,000	\$10,000	\$8,000	\$1,000	\$1,000
Maintenance Facility Equipment	1	\$250,000	\$250,000	\$200,000	\$25,000	\$25,000
Totals	-	-	\$1,076,000	\$873,130	\$99,380	\$103,490

Figure H.3 Summary of Fixed Route Transit Case Study Budget Years 1-5

Summary Budget	Year 1	Year 2	Year 3	Year 4	Year 5
Capital Expenditures	\$1,076,000	-	-	\$411,000	-
Operating Expenditures	\$435,000	\$391,000	\$397,000	\$403,000	\$409,000
Total Expenditures	\$1,511,000	\$391,000	\$397,000	\$814,000	\$409,000
Farebox Revenue	\$15,000	\$16,500	\$18,150	\$19,965	\$21,962
Capital Assistance	\$972,510	-	-	\$374,010	-
Operating Assistance	\$315,000	\$280,875	\$284,138	\$287,276	\$290,279
Local Funds	\$208,490	\$93,625	\$94,713	\$132,749	\$96,760
Total Revenue	\$1,511,000	\$391,000	\$397,000	\$814,000	\$409,000

Figure H.4 Summary of Operational Expenditures for Transit Case Study

Operations Budget	Total	Federal	State	Local
Town Operational Costs	\$100,000	\$50,000	\$25,000	\$25,000
Fuel	\$60,000	\$30,000	\$15,000	\$15,000
Contracted Services	\$200,000	\$100,000	\$50,000	\$50,000
Contractor Start Up	\$50,000	\$25,000	\$12,500	\$12,500
Public Information	\$25,000	\$12,500	\$6,250	\$6,250
Totals	\$435,000	\$210,000	\$105,000	\$105,000

The Town of Morrisville will be an innovative crossroads where cultural heritage meets the next generation nurturing vibrant communities of thriving families and businesses while preserving small-town values.