

Chatham County Bicycle Plan

Chatham County | North Carolina | 2011



Adoption Page

Adopted by the Chatham County Board of County Commissioners on July 18, 2011.

Adopted by the Town of Siler City Board of Commissioners on August 1, 2011.

Adopted by the Town of Pittsboro Board of Commissioners on October 10, 2011.

Acknowledgements

The following individuals and organizations were instrumental in completion of this Plan:

Chatham County Board of County Commissioners

Brian Bock, Chair
Walter Petty, Vice Chair
Allen Michael "Mike" Cross
Sally Kost
Pam Stewart

Chatham County Transportation Advisory Board

Faythe Canson Clark, Chair
Philip Bors, Vice Chair
Delonda Alexander
Mary Bastin
David Bordsen
Dale Chodorow
Robin Emerson
Claire Kane

Chatham County Recreation Advisory Board

Andrew Allden
Ernest Clemons
Al Craven
Joe Fraser
Don Lein
Elizabeth Reid
Jennifer Sipe
Willie Snipes
George Pauly
Ray Sugg

Active Chatham Alliance

Anna Vila Mola
Annie Martinie
Bill Bussey
Bruce Murray
Carla Strickland
Don Lein
Evie Houtz
Joseph Ellen
Kelly Evenson
Kim Sevy
Lindsay Hickling
Marissa Jelks
Pam Rafetto
Rocco Richard
Scott Evenson

Chatham County

Pinaki Santra, Transportation Planning Intern
Melissa Guilbeau, Transportation Planner
Ben Howell, Planner
Tracy Burnett, Parks & Recreation Director
Megan Bolejack, Health Promotion Coordinator
Jeremy Poss, GIS Specialist

Town of Siler City

Joel Brower, Town Manager
Jack Meadows, Planning Director
Donald Dones, Director of Parks & Recreation

Town of Pittsboro

Stuart Bass, Planning Director
Paul Horne, Parks Planner

Other Government

Paul Black, former TARPO Coordinator
Dale McKeel, Durham Bike and Pedestrian Coordinator
Karen Lincoln, Orange County Transportation Planner

Chatham County Residents and Out-of-County

Bicyclists

Nearly 500 surveys regarding bicycling in Chatham County were completed. In addition, many survey respondents reviewed the Plan and made helpful suggestions.

Carolina Tarwheels Bicycle Club

University of North Carolina – Chapel Hill Department of City and Regional Planning

For pictures:

Dave Connelly
Wayne Clark

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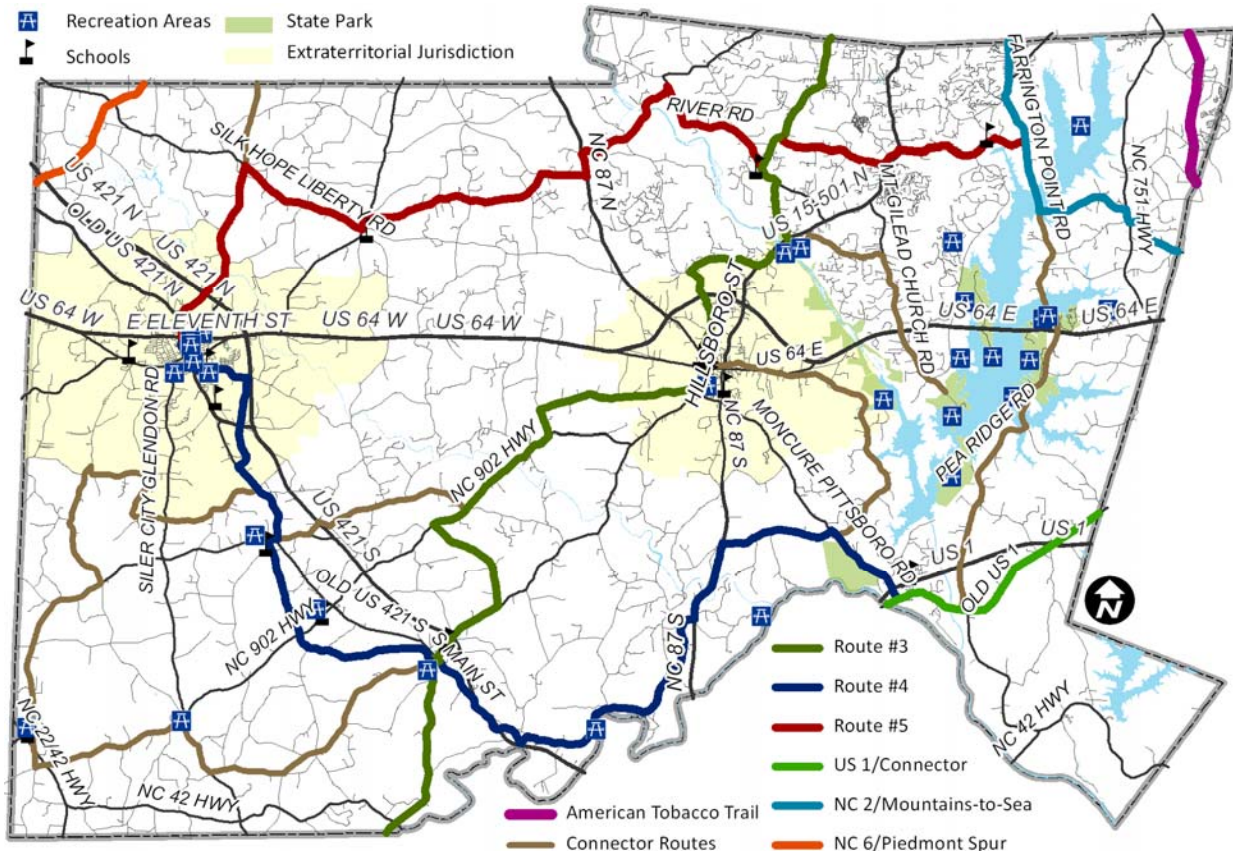
Executive Summary

This is the first official Bicycle Plan for Chatham County. The purpose of this Plan is to identify facility, program and policy recommendations to improve bicycling conditions in Chatham County. The Plan accomplishes this by establishing a vision and goals for bicycling in the county, assessing existing conditions and initiatives, identifying the needs of the users and recommending projects, policies and programs to achieve the vision.

The Vision
Chatham County has a bicycle transportation system that contributes to a healthier, more active population. This system provides an alternative to driving, improving the environment and reducing congestion. Riders of all experience levels have safe and accessible bicycling options. The system provides a high-quality recreation amenity for both residents and non-residents, contributing to the local economy and quality of life. Chatham accommodates the bicycle as a viable part of its transportation system.

Existing Conditions

Chatham County has just over 130 miles of signed on-road bike routes, as shown on the map below. None of these routes have extra accommodation for bicycles and there are no bike lanes in the county. The county's only off-road facility is the American Tobacco Trail, a shared use path connecting Durham to Cary through the northeastern corner of the county. A survey of nearly 500 bicyclists found that more would bike (and more often) if the county had more on- and off-road facilities and safer driving by motorists, among other factors.



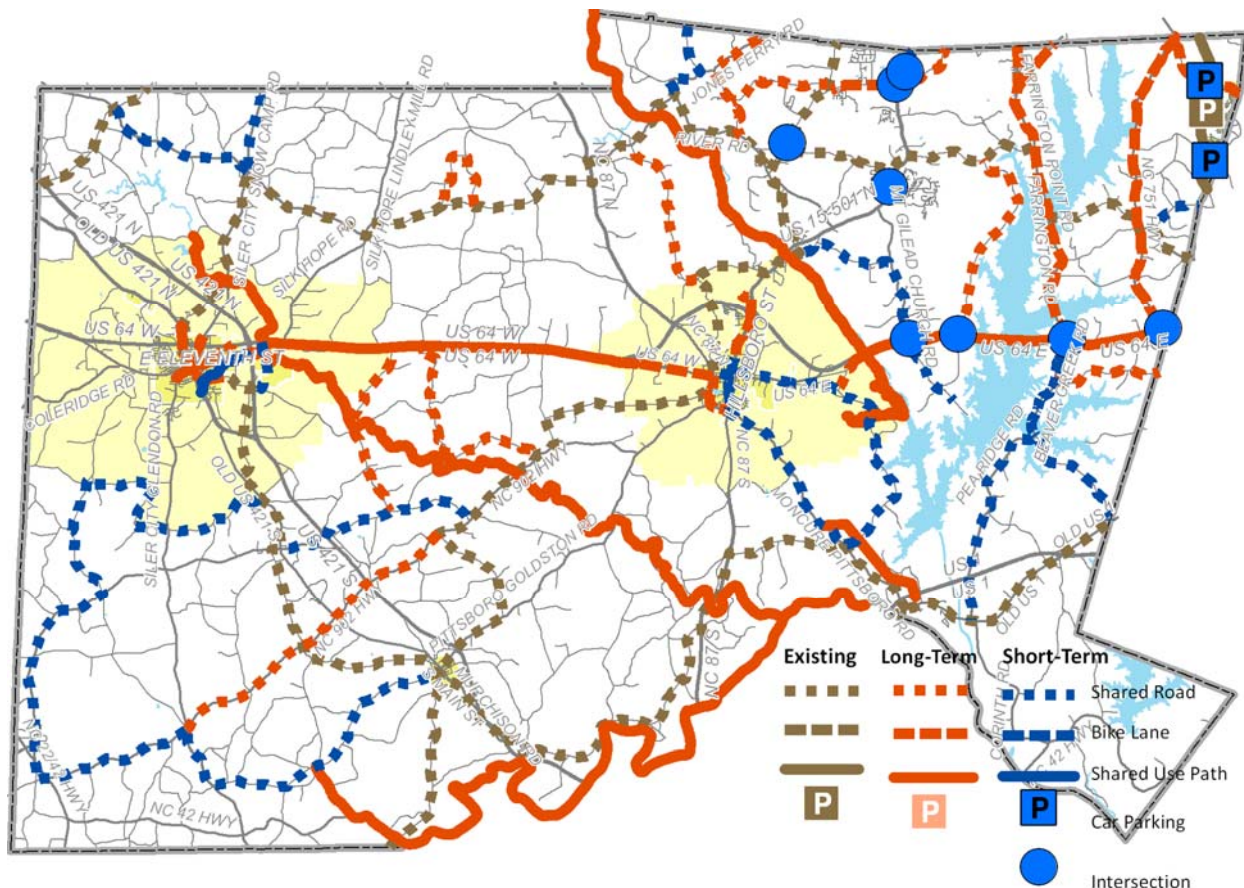
Recommended Projects

All roads in Chatham County are part of the county’s bicycle network, and should be designed, operated and maintained to safely accommodate all road users. Yet there are some roads and off-road facilities that deserve targeted attention for bicycles. This Plan identifies these corridors for improvement, and recommends a total of 421 miles of shared and signed roads, paved shoulders, on-street bike lanes and shared use paths, along with key intersection improvements and trailhead car parking.

Summary of Recommended Bicycle Infrastructure Projects

Facility Type	Existing (miles)	Future (miles)		Total (miles)
		Short-Term	Long-Term	
Shared Roads	0	93.4	52.5	145.9
Signed Routes on Shared Roads	131.3	0	0	131.3
Bike Lanes	0	2.5	36.2	38.7
<i>Total On-Street Facilities</i>	<i>131.3</i>	<i>95.9</i>	<i>88.7</i>	<i>308.7*</i>
Shared Use Paths	4.6	2.0	105.2	111.8
Total Facilities (miles)	135.9	97.9	193.9	420.5

*This total is 7.2 miles less than expected because some portions of the 131.3 miles of existing signed routes were identified as projects in need of improved signage or bike lanes.



Short-Term Projects

Shared Roads

- Oakley Church, Jim Brown, Mount Vernon Springs Rds (SW Chatham)
- Bernard Purvis, Chatham St, Bennett, Bonlee-Bennett, Airport Rds (near Bennett)
- McClaurin, Sandy Branch Church, Ike Brooks, Elmer Moore Rds (SE of Siler City)
- NC 902 and Jerry Frye Rd (near Bennett)
- Goldston Glendon, Mert McNamus, Wilson, Glendon Rds (near Goldston)
- Snow Camp Rd (NW Chatham)
- White Cross, Crawford Dairy, Chicken Bridge Rds (north central Chatham)
- Bynum, Bynum Ridge, Durham Eubanks, Mt. Gilead Church, Pea Ridge Rds (NE of Pittsboro)
- Lewter Shop Rd (NE Chatham)
- Moncure Pittsboro Rd (SW of Pittsboro)
- W Salisbury St, Thompson St, US 64 Business (Pittsboro)
- Gum Springs Church, Hanks Chapel Rd (E of Pittsboro)
- Credle St (Salisbury St to Sanford Rd)
- Pea Ridge Rd (SE Chatham)
- Beaver Creek and Farrington Rds south of US 64 (SE Chatham)
- Progress Blvd and Alston Bridge Rd (SE Siler City)
- Silk Hope Liberty Rd (Staley Snow Camp Rd to Siler City Snow Camp Rd)

Bike Lanes

- Hillsboro St (Park Dr to Salisbury St in Pittsboro)
- US 15-501 N (Mann’s Chapel Rd to Orange Co.)
- Sanford Rd (Womack St to NC 87/Moncure Pittsboro Rd)

Shared Use Paths

- Love’s Creek Greenway (Siler City)

Intersections

- US 64 and Big Woods Rd
- US 64 and Beaver Creek Rd
- US 15-501 and Mann’s Chapel Rd
- US 15-501 and Old Lystra Rd
- Mann’s Chapel Rd and Andrews Store Rd
- NC 751 and US 64
- US 64 and Mt. Gilead Rd
- US 15-501 and Village Way

Trailhead Car Parking

- New Hope Church Rd at the American Tobacco Trail
- O’Kelly Chapel Rd at the American Tobacco Trail

Recommended Programs and Policies

Providing a quality environment for bicycling also requires education, encouragement and enforcement programs and bike-friendly policies. Education programs include distribution of safety materials, bicycle rodeos, and training to law enforcement regarding bicycle traffic laws. Encouragement programs seek to persuade non-riders to bicycle and riders to bicycle more; these programs could include awareness days and events and bicycle map enhancements. Targeting roads traveled heavily by bicycles for stricter traffic enforcement (speeding, passing too closely to bicycles) is another way to improve safety for cyclists. Many local examples point to the effectiveness of these programs.

Policies and codes at the local and state level also have an impact on the bicycling climate. This Plan recommends modifications to ordinances for Chatham County, Siler City and Pittsboro related to future development and roadway design.

Implementation

Implementation of the Plan requires the coordination of county and municipal governments both within and outside the county. Coordination should start with the creation of a new Bike and Pedestrian Subcommittee (BPS) within the county's Transportation Advisory Board (TAB). This subcommittee can help the TAB advise the County Commissioners regarding issues related to walking and biking and help coordinate the implementation of the recommended projects, programs and policies.



Example of NCDOT Poster



Bicycle Rodeo in Elizabeth City

Chapter 1: Introduction

This chapter gives a **Background** of bicycling initiatives in the county, includes the **Purpose and Scope** of the plan, describes **A Vision for Bicycling in Chatham**, sets **Goals and Objectives** for the Plan, provides a summary of the **Methodology** that created the Plan, and describes the **Plan Chapters**.

1.1 Background, Purpose and Scope

This is the first official Bicycle Plan for Chatham County, though there have been other initiatives aimed at improving the county's bicycling environment. In the late 1990s, NCDOT's Division of Bicycle and Pedestrian Transportation, along with the Pittsboro-Siler City Convention & Visitor's Bureau, worked with local bicycle advocates and governments to create the Chatham County Bicycle Map showing a bicycle network utilizing existing roads. This map is set for updates and reprinting in 2011. More recently, the County's Public Health Department, in its *Chatham County 2010 Community Health Assessment*, found that one of the four major health concerns affecting Chatham residents was physical inactivity, noting that the county lacks many safe areas to bike or walk.

The **purpose** of this Plan is to identify facility, program and policy recommendations to improve bicycling conditions in Chatham County. The Plan accomplishes this by establishing a vision and goals for bicycling in the county, assessing existing conditions and initiatives, identifying the needs of the users and recommending projects, policies and programs to achieve the vision.

The Plan will serve as the basis for the Bicycle Element of the county's upcoming Comprehensive Transportation Plan, which is set to be completed in late 2012. It will also help the county secure funding for future bicycle facilities, since projects identified in an adopted Bicycle Plan score higher in NCDOT's Division of Bicycle and Pedestrian Transportation ranking system.

The Plan covers the entire county, including the Town of Siler City, Town of Pittsboro, Town of Goldston and the portion of the Town of Cary located in Chatham County. It addresses both on- and off-road projects, policies and programs for both recreational and non-recreational riding.

Chapter Contents

- 1.1 Background, Purpose and Scope
- 1.2 A Vision for Bicycling in Chatham
- 1.3 Goals and Objectives
- 1.4 Methodology
- 1.5 Plan Chapters

1.2 A Vision for Bicycling in Chatham

A vision helps focus a project to the final outcome and define its goals and objectives. The Vision expresses the desired outcome of the Plan, rather than the current conditions.



The Vision

Chatham County has a bicycle transportation system that contributes to a healthier, more active population. This system provides an alternative to driving, improving the environment and reducing congestion. Riders of all experience levels have safe and accessible bicycling options. The system provides a high-quality recreation amenity for both residents and non-residents, contributing to the local economy and quality of life. Chatham accommodates the bicycle as a viable part of its transportation system.

The Vision was drafted from comments from the online survey of local residents and riders, existing County plans and reports and input from County staff, and was refined through discussions with select Chatham Transportation Advisory Board (TAB) members and other bicycle supporters. The Vision also draws from the TAB's Strategic Plan, which states that the TAB values a transportation system that supports social/equity, health, economics, education, environment, connectivity and a balance of travel modes.

North Carolina Bicycle Laws (NCDOT 2008)

In North Carolina, the bicycle has the legal status of a vehicle. This means that bicyclists have full rights and responsibilities on the roadway and are subject to the regulations governing the operation of a motor vehicle. North Carolina traffic laws require bicyclists to:

- Ride on the right in the same direction as other traffic
- Obey all traffic signs and signals
- Use hand signals to communicate intended movements
- Equip their bicycles with a front lamp visible from 300 feet and a rear reflector that is visible from a distance of 200 feet when riding at night
- Wear a bicycle helmet on public roads, public paths and public rights-of-way if the bicyclist is under 16 years old

(Source: NCDOT, www.ncdot.gov/bikeped/lawspolicies/laws)

1.3 Goals and Objectives

The following goals and objectives were developed through input from the public, county and municipal staff, and helped guide development of this Plan:

Goal 1: Provide a safe bicycling transportation network for all experience levels

- Objective 1.1: Assess and make recommendations on existing bicycle network deficiencies.
- Objective 1.2: Assess and make recommendations on creating new bicycle facilities to connect county destinations.
- Objective 1.3: Ensure adequate parking for bicycles at public and commercial facilities throughout the county.

Goal 2: Encourage more residents to ride bicycles

- Objective 2.1: Develop encouragement programs to increase bicycling rates.

Goal 3: Improve bicycle safety through education and enforcement

- Objective 3.1: Develop and implement bicycle safety education programs for motorists, bicyclists, students and the public.

Goal 4: Make Chatham County a preferred bicycle tourism destination

- Objective 4.1: Assess and update the county Bicycle Map to help educate both residents and tourists.
- Objective 4.2: Encourage the opening of a bicycle shop in the county.
- Objective 4.3: Promote bicycling through local businesses, the Chamber of Commerce and other Chatham organizations.

1.4 Methodology

This Bicycle Plan was initially developed by a graduate student at the University of North Carolina-Chapel Hill’s Department of City and Regional Planning to fulfill his master’s project. It was then further refined by county staff. Development of the Plan included data collection, visioning and goal setting, analysis and project and program recommendations, as described below.

Data collection activities included:

- Windshield surveys on select roads
- Google Street View™ review of other roads
- Geographic information systems (GIS) analysis
- Discussion with county citizen advisory boards, Pittsboro and Siler City government representatives and other county staff

Public input included a survey of bicycle interests and needs with 463 residents and non-resident Chatham bicyclists, a more focused review of the Plan by Chatham residents and a subset of survey respondents, and a thorough review of existing plans and policies, many of which included public input.

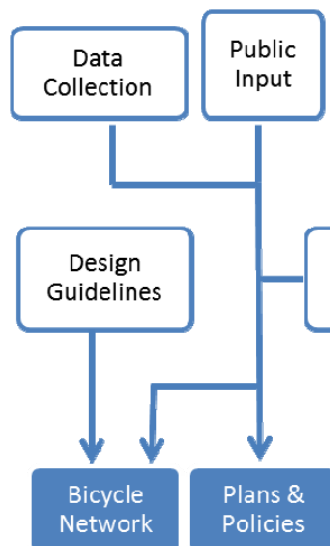


Figure 1: Plan Methodology

These activities also provided input to set the **vision, goals and objectives**, and provided a comprehensive depiction of the existing bicycling network and facilities in the county.

The **Recommended Bicycle Network** was developed in the following steps:

- Analyze existing bicycle conditions (as outlined in Chapter 2)
- Research bicycle facility types as well as state, federal and other guidelines (Appendix A)
- Map and analyze destinations, bicycle attractors such as parks and schools, vehicle counts provided by NCDOT and rider observations
- Input off-road bicycle routes from the Chatham Parks and Recreation Master Plan (2009-2029) and from the US 64 Corridor Plan

Programs for education, encouragement and enforcement to improve bicycling and **policies** that help improve the conditions for bicycling in the county were taken from national examples, and include resources for additional information.

1.5 Plan Chapters

The Plan includes the following chapters:

- **Chapter 2: Existing Conditions** gives an overview of the county's transportation system, existing bicycle facilities and conditions, crash statistics, and plans and policies related to bicycling; and provides results of a survey regarding bicycling in the county.
- **Chapter 3: Recommended Bicycle Network** proposes a future bicycle network that includes on- and off-street facilities. It describes the type, length and estimated cost of projects to complete the network. It also discusses other improvements that help improve bicycling in the county.
- **Chapter 4: Program and Policy Recommendations** provides potential programs and policy changes to help support bicycling, including encouragement, education and enforcement programs and policies at county and municipal levels.
- **Chapter 5: Implementation** describes how Chatham County and its municipalities can make the recommendations of this Plan a reality. It includes implementation steps, describes evaluation and monitoring options and includes potential funding sources.

There are also four appendices that complement these chapters:

- **Appendix A: Bicycle Survey Results** provides a complete summary of the Bicycling in Chatham County Survey, which was instrumental in the completion this Plan. Highlights of the survey are included in Chapter 2.
- **Appendix B: Facility Design Guidelines** provides an overview of national and state guidelines for bicycle facilities, including on- and off-street facilities, intersections, signage and parking.
- **Appendix C: Tables of Projects** includes a complete list of each short- and long-term project, including lengths and costs.
- **Appendix D: References and Image Sources** includes an extensive bibliography and the source of each of the images within the Plan.

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Chapter 2: Existing Conditions

Existing conditions were evaluated in order to understand the barriers, opportunities for improvement and desires of current users and residents for a bicycle transportation system, including:

- A **Community Overview** of socioeconomic and geographic characteristics and a description of the existing transportation system
- A description of the **Existing Bicycle Facilities and Conditions**
- **Bike Crash Statistics** since from 1997 to 2008
- A review of **Existing Plans, Policies and Programs** that contribute to the bicycling environment in Chatham County
- A **Summary of Survey Results** from residents and existing riders on biking attitudes, perceptions and route conditions

Chapter Contents

- 2.1 Community Overview
- 2.2 Existing Bicycle Facilities and Conditions
- 2.3 Bike Crash Statistics
- 2.4 Existing Plans, Policies and Programs
- 2.5 Summary of Survey Results

2.1 Community Overview

Chatham is a large, mostly rural county characterized by rolling hills, densely wooded areas and farmland. It is located at the geographic center of the State of North Carolina and between two large metropolitan regions – the Raleigh-Durham “Triangle” and the Greensboro “Triad”. Jordan Lake, a regional recreation attraction, is located in the eastern portion of the county.

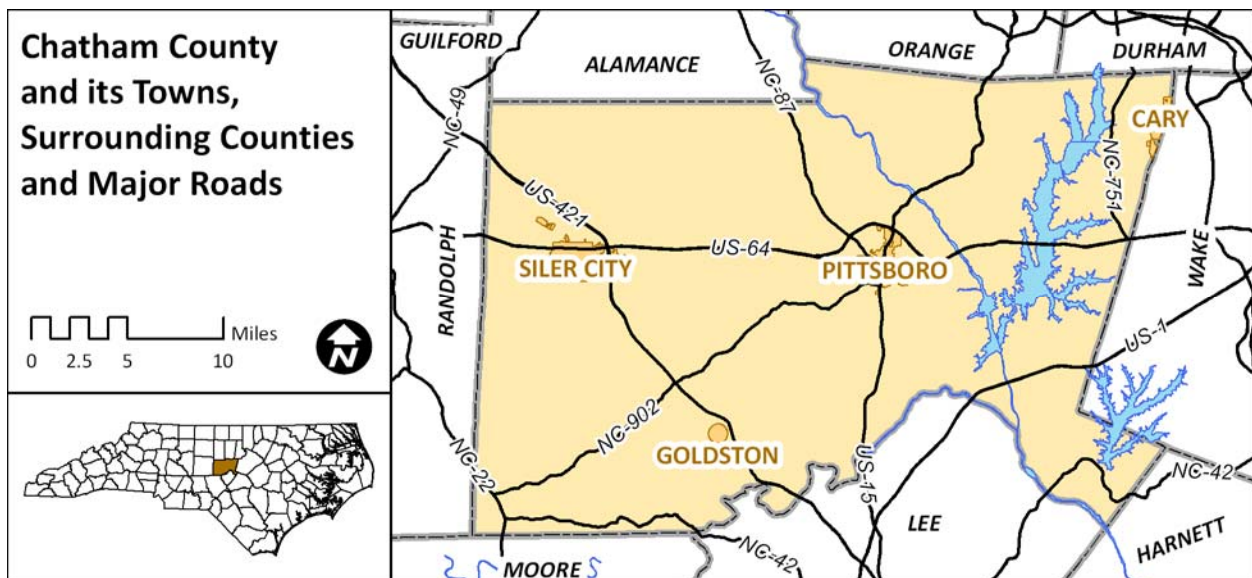


Figure 2: Context Map

Chapter 2: Existing Conditions

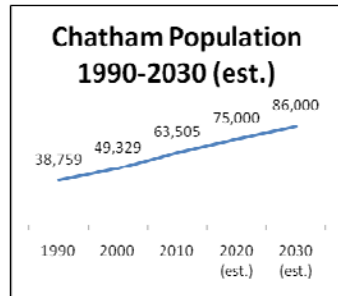


Figure 3: Population growth, 1990 to 2030 (estimated)

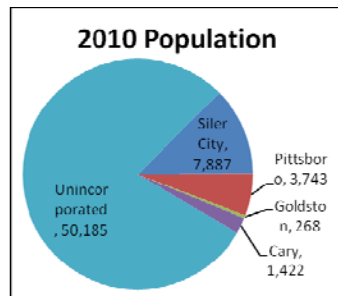


Figure 4: 2010 Populations

The eastern portion of the county, including the Towns of Pittsboro and Cary, includes many suburban housing developments and a population density higher than the rest of the county. The western portion of the county is characterized by working lands, with the exception of the Town of Siler City, which has the highest population densities in the county, as shown in the map below.

Chatham's population grew by 32% over the past 10 years, to 63,505 according to the 2010 Census, largely due to growth pressures from the adjacent Triangle region. The State has estimated that the population will continue to increase to over 75,000 in 2020 and 86,000 in 2030.¹ According to the 2010 Census, 21% of the population lives in the incorporated towns of Siler City (7,887), Pittsboro (3,743), Goldston (268) and Cary (1,422 in Chatham). The county's population has increasingly become Hispanic (12.9% of residents), mostly in the western section of the county.

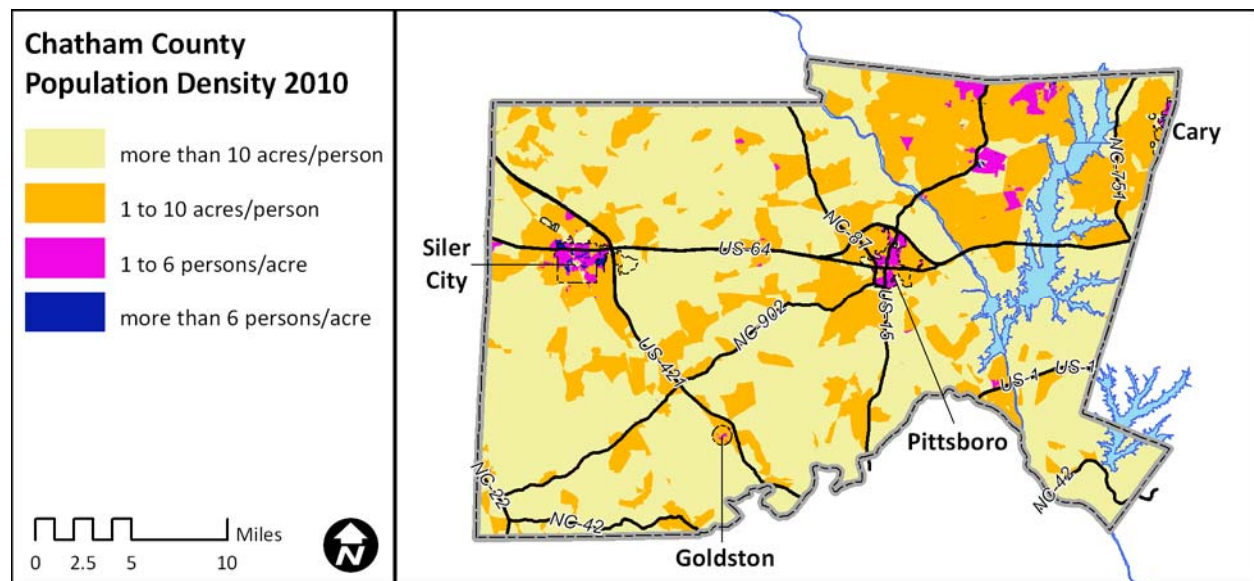


Figure 5: Population density in Chatham County (2010)

¹ Office of State Budget and Management. (September 2010) *County/State Population Projections*. Available: www.osbm.state.nc.us/ncosbm/facts_and_figures/socioeconomic_data/population_estimates/county_projections.shtm. Retrieved on March 1, 2011.

As of 2000, more than half of Chatham residents were employed out of the county, making it difficult for many to commute by bike.² In 2009, 76% of residents commuted to work alone by automobile³; less than one percent used bicycling as their primary method of getting to work. Many recreational bicyclists in the county ride in from other counties, notably Wake and Orange Counties.

A third of the local economy is based on agriculture and agribusiness.⁴ Tourism, mostly ecotourism and outdoor recreation, experienced double-digit growth over the past three years. Bicycling could potentially be an important part of this tourism in the county.

Four US highways cross Chatham – US 64, US 421, US 15-501 and US 1. These roads are four lane highways with a combination of controlled access, at-grade connections. Other roads in the county are generally two-lane rural roads, often curvy and hilly, with turning lanes and traffic signals at a few locations. There are sidewalks in Pittsboro, Siler City and some of the newest subdivisions in the county; bikes have been observed using these.



Figure 6: Typical two-lane road in Chatham County

2.2 Existing Bicycle Facilities and Conditions

Chatham County's existing, designated bicycle facilities are mostly on-road, signed routes with no dedicated space for bicyclists. There are three designated state bicycle routes and a number of unmarked "connector" routes. Additionally, portions of the US 1 Bicycle Highway, North Carolina Mountains to Sea Trail and the Piedmont spur of this trail pass through the county. There are two off-road facilities – the American Tobacco Trail and Old Bynum Bridge. Bike parking facilities are almost nonexistent, with a bike rack only at Mary Hayes Barber Holmes Park in Pittsboro and at the new Chatham Community Library in Pittsboro.

Existing dedicated bicycle facilities are shown in the figures on the pages that follow. These maps also show potential attractors such as recreation areas and schools.

² Chatham County North Carolina. (2011). Chatham County's Economy. Available: www.chathamnc.org/Index.aspx?page=27. Retrieved on March 21, 2011.

³ U.S. Census Bureau. (2010). *2005-2009 American Community Survey, Table B08301 MEANS OF TRANSPORTATION TO WORK - Universe: WORKERS 16 YEARS AND OVER*. Available: factfinder.census.gov.

⁴ Chatham County North Carolina. (2011). *Agriculture in Chatham County*. Available: www.chathamnc.org/Index.aspx?page=28. Retrieved on January 25, 2011.

Chapter 2: Existing Conditions



Figure 7: American Tobacco Trail in Chatham County

The **American Tobacco Trail (ATT)** is a shared use path that crosses the northeastern corner of the county. It is part of a larger 22 mile rails-to-trails project that connects Cary and Apex to the southeast with Durham to the north. It is also part of the East Coast Greenway which, when complete, will provide a continuous trail from Maine to Florida. It was constructed in an abandoned railroad corridor and opened in May 2010. The Chatham portion is surfaced with ten feet of asphalt and six feet of granite screenings for horses and joggers/walkers. The asphalt is in good condition and includes a very slight grade, with no steep slopes or sharp curves. Based on weekend observations and user comments, it is utilized by a large range of age groups and experience levels. Over 50% of the survey respondents stated they had ridden the trail, with 15% more planning to ride in the future.



Figure 8: Old Bynum Bridge

The **Old Bynum Bridge** also provides a short off-road facility for crossing the Haw River by Bynum. The bridge is closed to vehicular traffic and is part of State Bike Route #3. It is seventeen feet wide with some cracks and vegetation. It has signage and pavement markings and is physically blocked from vehicular traffic.

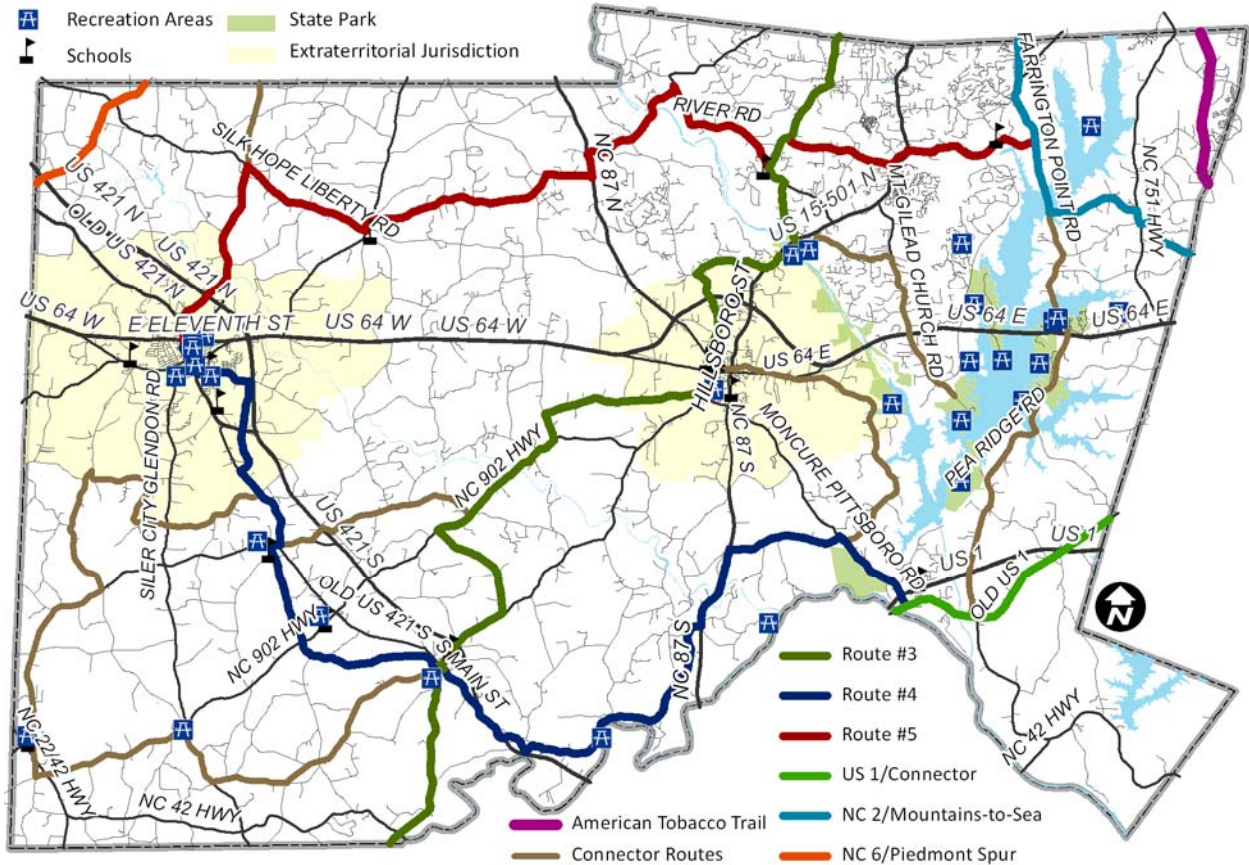


Figure 9: Existing Bike Routes, Roads and Attractions

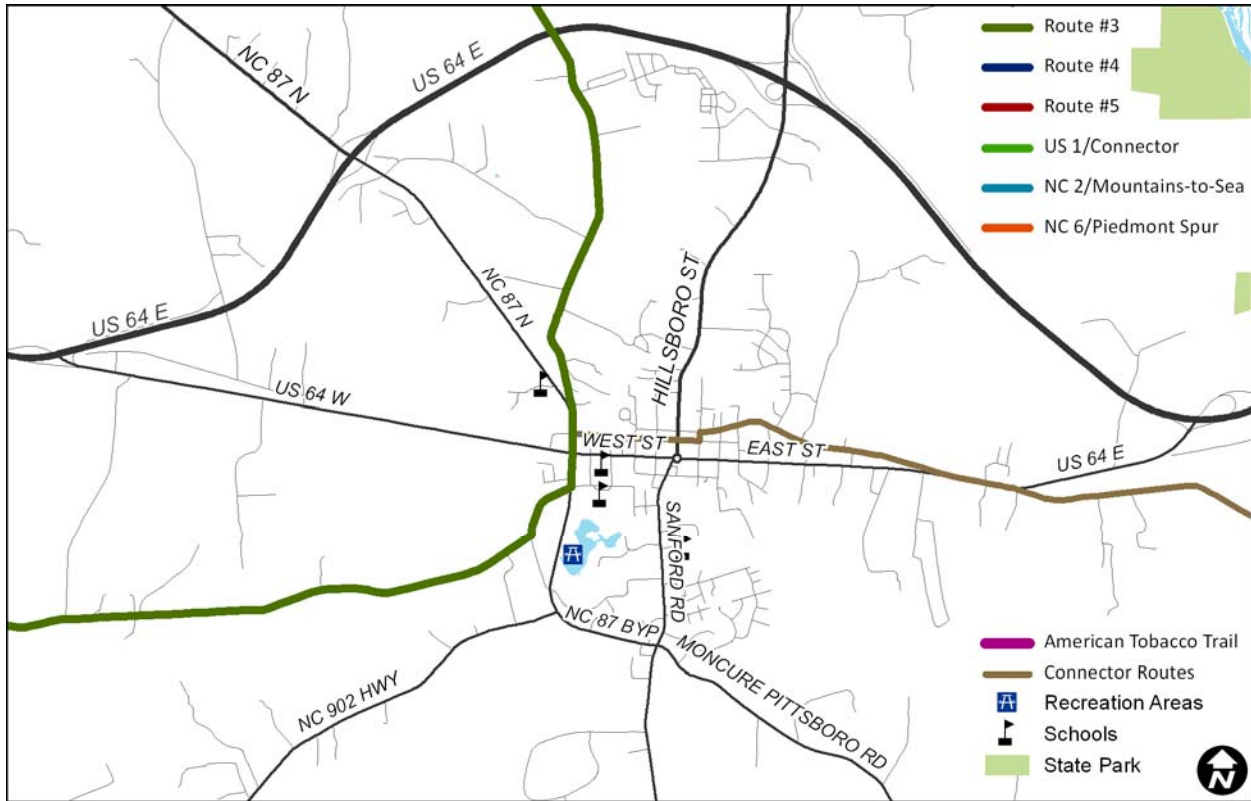


Figure 10: Existing Bike Routes, Roads and Attractions – Pittsboro

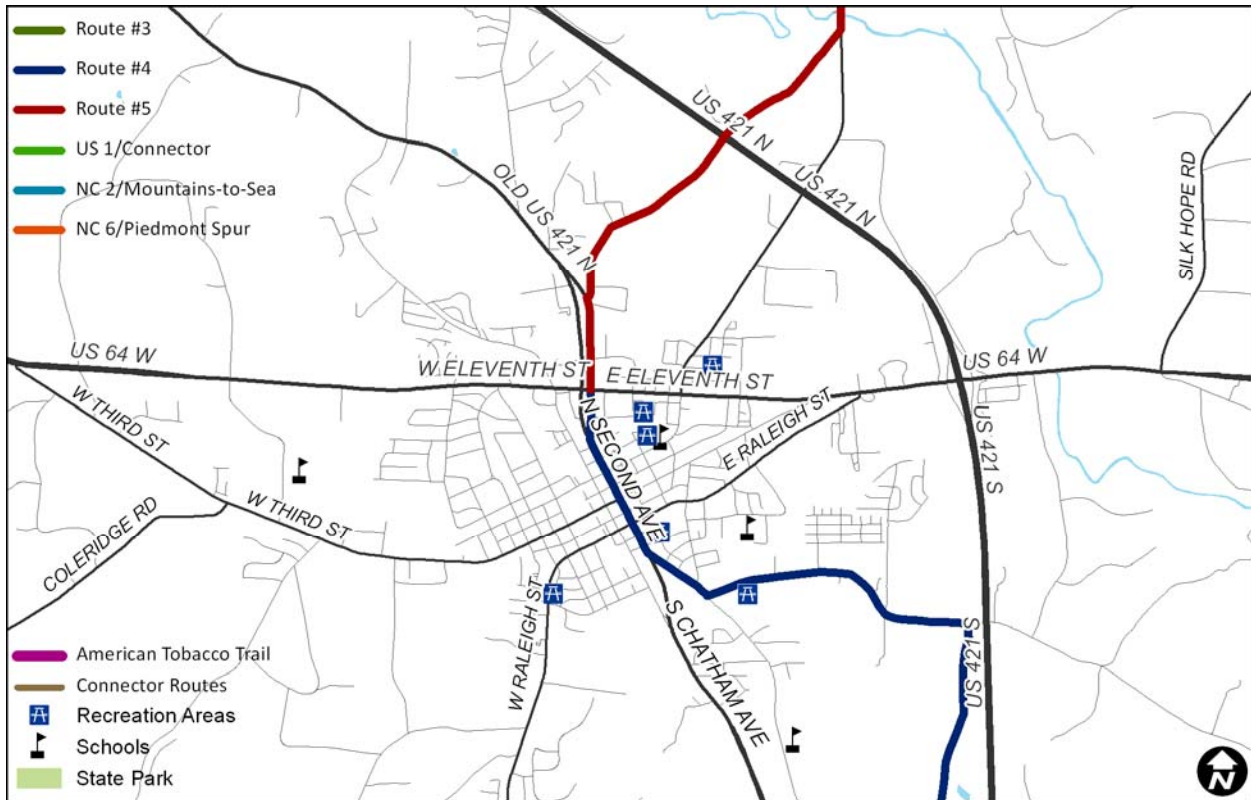


Figure 11: Existing Bike Routes, Roads and Attractions – Siler City

In summary, the existing bike network accommodates experienced road cyclists but not casual, inexperienced or commuter cyclists outside of residential subdivisions or the American Tobacco Trail. Bike routes typically follow rural two-lane roads, with no separate facilities for bicycling and often high speeds and poor sight distances due to curves and hills. In most cases, these are less travelled local roads with signs designating the route and “Share the Road” signs that increase motorists’ awareness of bicyclists. In some cases, signed bike routes go through more congested areas, mostly in the northeast portion of the county. Other than route signs, there is no bicycling infrastructure, such as bike-activated traffic signals, striped bike lanes or bike markings painted on streets. On US 64 and US 15-501, there are outside shoulders with no rumble strips, but these are not always of uniform width or clear of debris and the speed limit is 55mph.

Time and resource constraints limit the ability to inspect every road in the county; therefore, this Plan relies on user surveys and other sources to shed light on current deficiencies in the on-road biking network. Figures 11-13 on the pages that follow show routes and intersections where conditions are suboptimal for bikes and/or conflicts between vehicles and bicycles exist. These are also highlighted in Tables 1 and 2.

Table 1. Road Bicycling Issues from survey

Issue	Road Segment(s)
Vehicles not obeying traffic laws (passing bicycles too closely, speeding)	O’Kelly Chapel Rd, Mt. Carmel Church Rd
No shoulder	Most two-lane rural roads, US 64 and W Salisbury St through Pittsboro
Heavy vehicular traffic	NC 751, US 15-501, NC 87
Poor pavement quality (uneven or poor surface)	Andrews Store Rd between Mann’s Chapel Rd and US 15-501, Rives Chapel Rd
Poor quality or debris in shoulder	US 15-501 north of US 64 to Orange County Line; US 64
High number of logging trucks	Moncure Pittsboro Rd
Road is curvy and hilly; poor sight lines	Hamlet’s Chapel Rd

Table 2. Intersection Issues from survey

Issue	Intersection(s)
Traffic Signals not activated by bicycles	Beaver Creek Rd at US 64; US 15-501 at Old Lystra Rd; US 15-501 at Mann’s Chapel Rd; NC 751 at US 64
Cars not aware of bicyclists	Courthouse Circle in Pittsboro
Left turn extremely difficult	Intersections on NC 751
Dangerous/unsafe driver behavior	Mann's Chapel Rd at Andrews Store Rd; Martha's Chapel Rd at NC 1108; US 64 at Big Woods; US 64 at Mt. Gilead Rd; US 64 at Foxfire Trace; US 15-501 in front of Lowe’s Home Improvement in Pittsboro

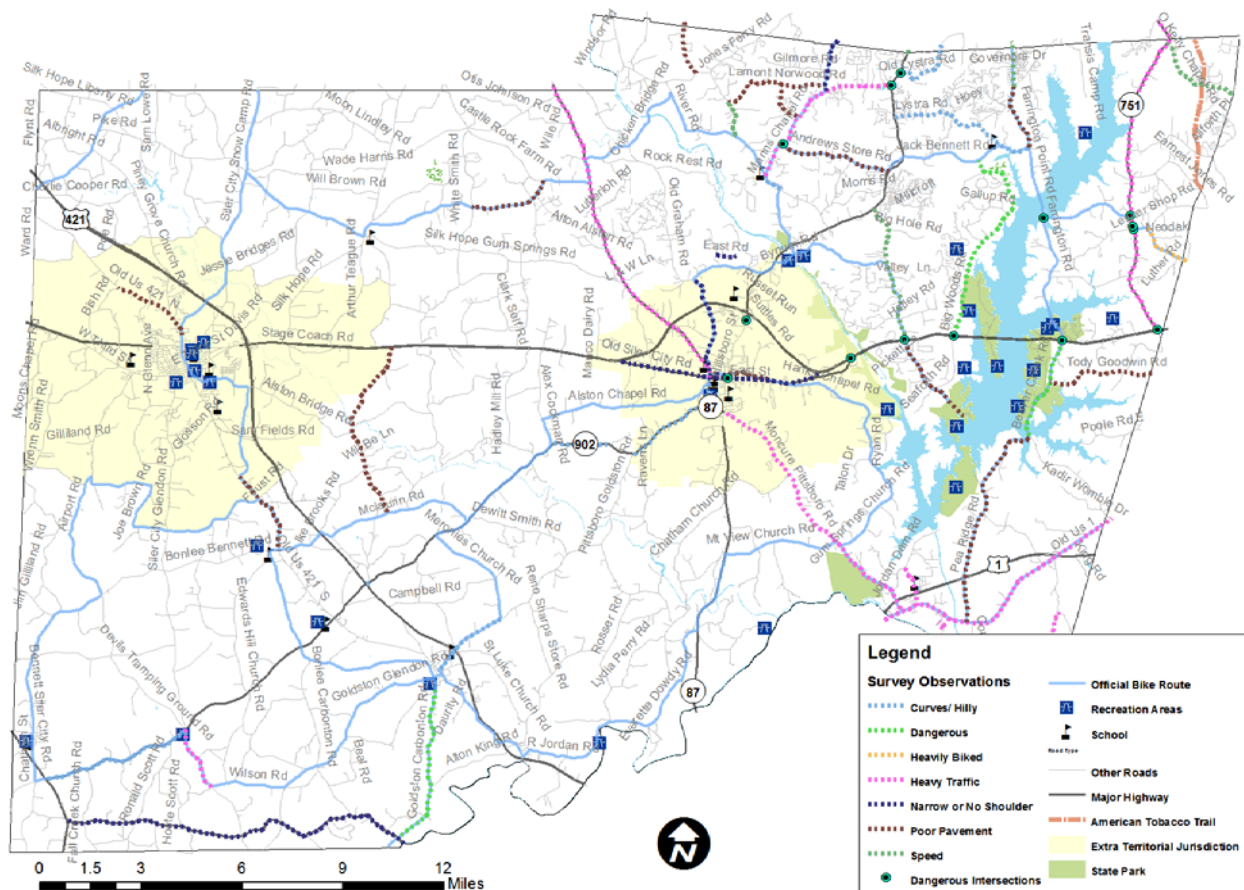


Figure 12: Map of Bicycling Issues

Chapter 2: Existing Conditions



Figure 13: Map of Bicycling Issues – Siler City

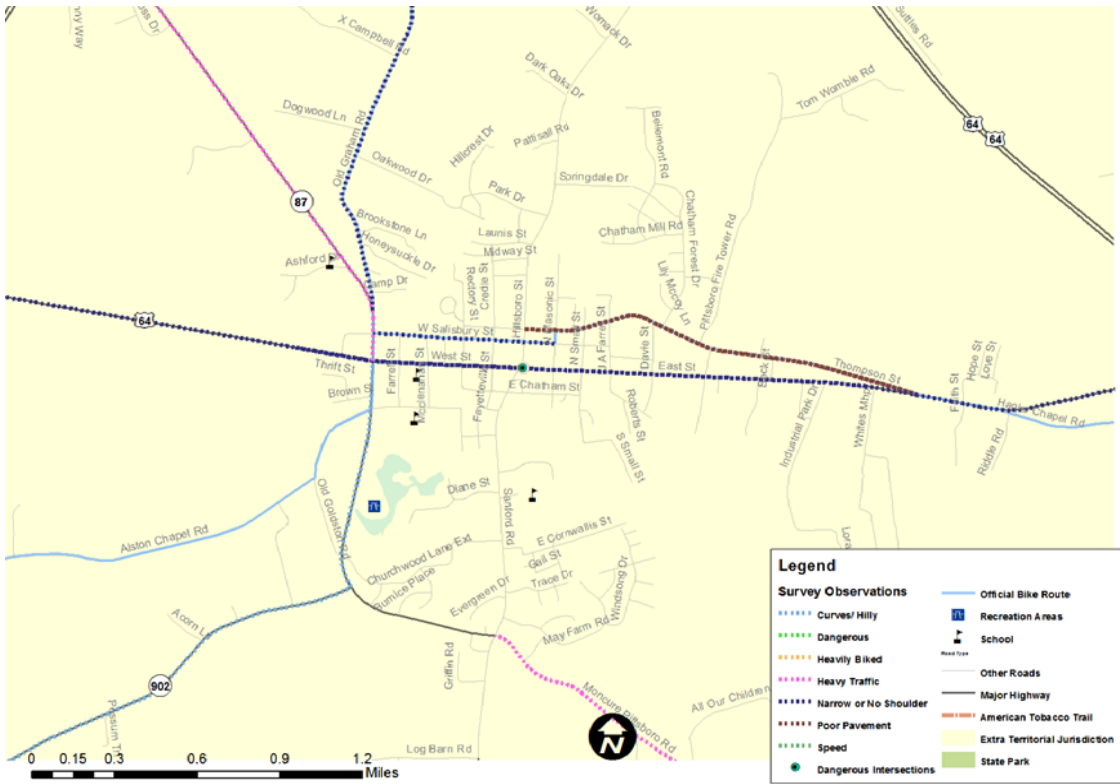


Figure 14: Map of Bicycling Issues – Pittsboro

2.3 Bike Crash Statistics

It is important to analyze the historical incidence of bike crashes in order to understand where improvements need to be made and to set a baseline to compare the success of new facilities, policies or programs.

Between 1997 and 2008, there were 50 reported car-bike crashes in the county, 13 of which were in Siler City and two in Pittsboro.⁵ Many of these crashes (nearly three per year) have been severe. These data include only crashes in which a police report was filed. The table below details the number of bike crashes by year.

Table 3. Car-Bike Crashes in Chatham County, 1997-2008


















































	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	Total
Unincorporated	3	2	2	2	3	4	3	2	2	2	4	6	35
Siler City	1	1	2	1	1	0	2	2	0	2	0	1	13
Pittsboro	0	0	0	0	2	0	0	0	0	0	0	0	2
Total	4	3	4	3	6	4	5	4	2	4	4	7	50

The bike crash data can be analyzed by the race or age of the bicyclist involved and the type of crash (highlighted in the figure on the following page). For bike crashes in Chatham County, minorities are disproportionately represented, involved in over 80% of crashes in Siler City and nearly half of the crashes overall. In looking at the type of crash, all six of the bicyclists traveling against traffic prior to crashes were minorities while all ten of the bicyclists involved in motorist-overtaking-bicyclist crashes were white.

Certain age groups also have higher crash rates, notably children under 16 and those between 30 and 39 years of age. Adult bicyclists between the ages of 20 and 59, a range that includes most "avid" road bicyclists, were faulted in only five of the 50 car-bike crashes. By comparison, motorists were faulted for 19 of the crashes involving bicyclists in this age range. Bicyclists under 16 were faulted for all 11 car-bike crashes involving their age range.

Further analysis of the types of bike crashes reveals two basic categories: "urban type" crashes, including intersection and crossing

⁵ UNC Highway Safety Research Center. (2011). *North Carolina Pedestrian and Bicycle Crash Data Tool*. Available: www.pedbikeinfo.org/pbcat. Retrieved on February 25, 2011.

Motorist Overtaking Bicyclist (10)	         
Bicyclist Left-turn/ Merge (7)	     
Bicyclist Failed to Yield Midblock (6)	     
Motorist Failed to Yield at Sign-Controlled Intersection (5)	    
Bicyclist Failed to Yield at Sign-Controlled Intersection (4)	   
Loss of Control/ Turning Error (4)	   
Motorist Left-turn/ Merge (4)	   
Unusual Circumstances (4)	   
Head-on (2)	 
Backing Vehicle (1)	
Crossing Paths (1)	
Non-roadway (1)	
Insufficient Detail (1)	

collisions; and “rural type” crashes, notably motorist-overtaking-bicyclist crashes on rural highways with high posted speed limits.

Among the urban type crashes, which total more than 30, most are related to young bicyclists making unsafe or illegal maneuvers. Of the 11 bicyclist failure-to-yield crashes (midblock and at sign-controlled intersections), nine involved children under the age of 16. Young children were also responsible for all three of the collisions involving cyclists riding through stop signs without stopping and four of the six crashes involving bicyclists riding against traffic.

Other urban type crashes included cyclists of all ages making left-turn errors, typically turning left from the right edge of the roadway and colliding with same-direction motor traffic, and six collisions involving motorists turning or entering at intersections and violating the right-of-way of bicyclists traveling lawfully in the correct direction.

All ten rural type crashes involved a motorist overtaking a bicyclist who was traveling lawfully in the travel lane of a two-lane road. Bicyclists were not faulted in any of these crashes, and three were hit-and-run. Eight occurred on roads with posted speed limits of 50-55 mph and two were posted 40-45 mph. All but one occurred in daylight. None of the overtaking motorists reported failure to see the bicyclist. The most common crash cause recorded was misjudgment of passing distance. All of the cyclists involved were aged 24 or older. The median age of the overtaking motorists was 53, with two 70 or older.

Figure 15: Number of car-bike crashes by type in Chatham County, 1997-2008

2.4 Existing Plans, Policies and Programs

There are a number of existing plans, policies and programs that pertain to bicycling in Chatham County. These exist at three levels:

- **Local**, which includes those in Chatham County, Siler City or Pittsboro
- **Regional**, which includes those promulgated in the region, generally by the Triangle Area Rural Planning Organization (TARPO) and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO)
- **State**, which includes any NCDOT programs or laws that pertain to bicycling

Recommendations for modifying these plans, policies and programs are discussed in Chapter 5, Program and Policy Recommendations.

2.4.1 Local

Pittsboro Pedestrian Transportation Plan (2009)

Pittsboro’s Pedestrian Transportation Plan provides an assessment of existing conditions and recommendations for both on- and off-street pedestrian improvements, including a greenway near downtown Pittsboro along railroad alignments and sewer easements. The plan includes many potential programs and policy recommendations to improve bicycling in the town and other parts of the county.

Pittsboro Land Use Plan (2001, currently in review)

Pittsboro’s current Land Use Plan includes a vision and goals that promote safe access for multiple modes, including bicycling as well as the creation of greenways. While the draft plan does not include specific recommendations regarding bicycling, it promotes alternative transportation options and includes general background information about the type and usage of bicycling facilities.

Pittsboro Zoning Ordinance (1994, amended 2007)

Pittsboro’s zoning ordinance has language that supports bicycling, including references to accommodating bicyclists when designing parking and when creating site plans for libraries, schools, public buildings and mixed use development. The ordinance also states that off-street parking shall include a bicycle rack, unless “excepted by Commissioners”. However, some language in the ordinance may preclude the types of bicycling facilities recommended in this Plan.

Pittsboro Subdivision Regulations (1993)

Pittsboro’s subdivision regulations define street classifications but only as related to vehicular traffic, without reference to the multimodal nature of the streets. Amendments to certain sections can be a way to include “complete streets” concepts to support bicycling in new development.

Siler City Ordinances

Siler City’s ordinances prohibit bicycling and skateboarding on sidewalks in the downtown area, but permit it in the rest of the town. The ordinances include sidewalk requirements for varying types of roadways and may also require developers to set aside a 10-foot easement for pedestrian facilities if there is no access from a subdivision to schools, parks, playgrounds or other facilities.

Chatham County Compact Communities Ordinance (2004)

The Compact Communities Ordinance (CCO) promotes compact developments which protect rural farmland and create a more sustainable development pattern. The CCO has three goals that specifically promote bicycling, including “compact... development...that is...walkable and bikable,” “a grid network of streets” and “parks...throughout...linked together by... trails.” Other key points include requiring mixed uses, interconnectivity of streets and creation of narrow streets. In its appendix, the CCO “strongly encourages” bike racks – at least 1 per block – in a village center. The CCO only applies to a very small area of the county, bounded on the east by US 15-501, by Andrews Store Rd on the south and by Mann’s Chapel Rd on the west and north.

Chatham County Subdivision Regulations (1980, revised 2008)

The County’s subdivision regulations have some provisions for bicycles. Block lengths are “geared toward creating a street network that accommodates bicycle... scale connections.” Maximum block lengths range from 480 feet in 8-unit developments to 660 feet in medium density and compact community areas, and 1320 feet in other areas. These regulations also discuss easements up to 20-foot wide which may be required for pedestrian or bicycling egress and ingress from schools, neighborhood parks and other public spaces.

Chatham County Zoning Ordinance (2008)

The County Zoning Ordinance does not include any requirements for bicycle parking or accommodation. The county permits bicycle shops in areas zoned for business (general, neighborhood, community and regional), though none currently exist in the county.

The Chatham Land Conservation and Development Plan (2001)

The Chatham Land Conservation and Development Plan includes two objectives that specifically address bicycling in the county. The first supports creating a greenway network that “includes...biking...trails when appropriate.” The second includes a suggestion to incorporate bike trails in new communities, including bike shoulders along roads and generally promoting alternative modes of transportation. The plan has 28 specific recommendations, one of which is a review of roadway design, including support for bicycle facilities. The transportation element of the plan reiterates the awareness of bicycling when revising roadway standards. The schools element recommends locating schools in neighborhoods and encouraging new adjacent residential development as ways to provide bicycle access for children.

Chatham County Parks and Recreation Master Plan (in process)

Chatham’s Parks and Recreation Master Plan 2009-2029, currently being considered for adoption, evaluates existing park and recreation facilities and proposes guidelines to implement the recommendations. This includes several recommendations related to bicycle facilities, including specific greenways and a comprehensive Greenway Master Plan. The plan also recommends bike lanes, provisions for bicycle travel on new roadways, bike racks at all publically owned facilities and bike trails at future parks. Public input indicated that bike trails were a high priority. The plan also highlights the potential of ecotourism, especially the economic impact of attracting bicyclists.

Advisory Boards

Citizen-led advisory boards can be instrumental in implementing the Bicycle Plan. Citizen advisory boards at the county level that have an impact on bicycling are the Transportation Advisory Board (TAB), the Recreation Advisory Board and the Active Chatham Alliance. Pittsboro also has a Parks & Recreation Advisory Board.

2.4.2 Regional

DCHC MPO Long Range Transportation Plan 2035 (2009)

The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) covers the northeastern portion of Chatham. The Long Range Transportation Plan (LRTP) provides recommendations for all transportation investments in this area. One of the LRTP’s goals is a bicycle and pedestrian system that includes safety, access to public transit, recreational opportunities and off-road facilities. The table below summarizes the bicycle projects listed in the LRTP for the county.

Table 4. DCHC MPO LRTP Bicycle Projects in Chatham County

Location	Type	Length (miles)	Cost
American Tobacco Trail	Path	5.2	completed
Mt. Carmel Church Rd	Lanes	1.2	\$600,000
NC 751	Lanes	3.2	\$1,600,000
Farrington Point/ Farrington Mill Rd	Lanes	3.66	\$1,830,000
O’Kelly Chapel Rd	Lanes	2.9	\$1,450,000
US 15-501 South	Lanes	3.2	\$1,600,000
Totals		19	\$7,080,000

Triangle GreenPrint Regional Open Space Assessment (2002)

This assessment identified important green spaces in the Triangle region, including Chatham County. Although not at a high level of detail, this document can be used to help identify potential greenway corridors in the county.

2.4.3 State

State Transportation Improvement Program (STIP)

The State Transportation Improvement Program (STIP) contains funding information and schedules for various transportation divisions including bicycle and pedestrian projects, highways/roads and transit. The Siler City 2013-2019 TIP Project list includes a paved trail along Loves Creek from SR 2208 (S Second Ave) to Pony Farm Rd in Siler City. Other Chatham TIP projects include road widening or creation of new roads. These projects, when appropriate, should accommodate multimodal travel.

Additionally, the North Carolina Department of Transportation (NCDOT) has adopted a number of policies addressing bicycles on state-maintained roadways. These policies and guidelines, applied on these roadways when there is new construction or resurfacing projects, impact the bicycling environment in Chatham County and include the following:

NC Complete Streets Policy (2009)

This NCDOT policy requires that planners and designers consider multimodality when planning and constructing any new or improved transportation facilities in growth areas of counties and municipalities. The policy is intended to encourage non-vehicular travel without reducing the safety, efficiency or function of the facility while ensuring that all users are considered in the creation and usage of the facility. NCDOT has convened a group of stakeholders that is currently in the process of developing guidelines for the design of complete streets.

Resolution Mainstreaming Bicycling and Walking as part of Transportation System (2000)

The NC Board of Transportation reaffirmed the importance of non-motorized transportation in its highway system. It states that “bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction and operations activities.”

Administrative Action to Include Local Adopted Greenway Plans in the NCDOT Highway Planning Process and Guidelines (1994)

This action requires highway planners developing highway alignments to take into consideration locally adopted greenway corridors and crossings.

NCDOT Bike Policy (1978, updated 1991)

This policy provides detailed guidelines for planning, design, construction, maintenance and operations pertaining to bicycle facilities. All bicycle improvements undertaken by the NCDOT are based upon this policy. The policy urges strong education of motorists and school children regarding traffic laws and safety. Lastly, the policy indicates that any state-funded buildings, parks and recreational facilities should include bicycle parking facilities.

Bridge Policy

This policy controls the design elements of new and reconstructed bridges on the state highway network, including minimum handrail height where bikeways cross bridges.

2.5 Summary of Survey Results

The general public was surveyed to assess existing conditions and potential remedies which would improve bicycling conditions and increase bicycling. The survey was provided in electronic format via “Survey Monkey” and was distributed via email to the County’s Transportation Advisory Board, Recreation Advisory Board and Planning Board; to bike rider groups who ride in the county; to County employees; and, was linked on the County website. 463 survey responses were received. This section provides key results of the survey; full results are provided in Appendix A.

To begin, survey respondents were asked to self-assess their ability level in one of four categories – Beginner, Intermediate, Expert and Non-rider. Survey responses dramatically differed based on the experience level of the respondent. Beginner and non-riders said they were most comfortable on off-street bike trails, while intermediate and advanced riders most liked riding on quiet back or local roads. Riders of all types ride because of exercise and recreational purpose, although 25% and 30% would or do ride to shop or commute to work, respectively. Only 12% of riders surveyed stated that the majority of their trips are for utilitarian (i.e. work, shopping, etc.) reasons.

Table 5. Survey Responses, Type of Rider, by Location

Location	Type of Rider				Total
	Advanced	Intermediate	Beginner	Non-Rider	
Chatham	77 15%	99 21%	16 3%	40 9%	225 49%
Not Chatham	146 32%	42 9%	7 2%	12 3%	207 45%
Did Not Answer	11 2%	8 2%	1 0%	11 2%	31 7%
Total	227 49%	149 32%	24 5%	63 14%	463 100%

The survey asked respondents whether they would ride more often, and asked what factors limited their riding. The majority of respondents felt that they would like to ride more often. The three most commonly cited factors in not riding more were consistent across biking experience levels, although advanced riders felt that unsafe/unlawful motorist behavior limited their riding more than any other factor. The table on the following page provides the top three rankings for each of the experience levels.

Table 6. Survey Responses, Reasons for Not Riding More, by Experience Level

	Advanced	Intermediate	Beginner	Non-Rider
#1	Unsafe/unlawful motorist behavior	No bike paths, bike lanes or bike routes	No bike paths, bike lanes or bike routes	Unsafe/unlawful motorist behavior
#2	No bike paths, bike lanes or bike routes	Unsafe/unlawful motorist behavior	Unsafe/unlawful motorist behavior	No bike paths, bike lanes or bike routes
#3	Bikeways/roads in poor condition	Bikeways/roads in poor condition	Bikeways/roads in poor condition	I don't have enough time

The average one-way ride distance (currently or potentially) of those surveyed differed based on experience level, with most advanced riders riding 20 miles or more and beginner and intermediate riders between one and five miles. Non-riders most often said they would not ride, but nearly as many said they would potentially ride one to five miles.

The survey also asked what improvements would encourage more bike riding. Almost two thirds of intermediate and advanced riders indicated they would ride more with either bike lanes or paved and widened shoulders. Beginner and intermediate riders felt that more off-street bike trails and paths would encourage them to ride. More driver and bicyclist education and better enforcement of traffic laws were a priority for advanced riders. On-road bike signage, maintenance of existing facilities, and bicycle parking and amenities like benches were seen as lower priorities for encouraging more biking.

Chapter 3: Recommended Bicycle Network

This chapter describes the proposed **Bicycle Network** for Chatham County. This includes **Prioritization Criteria** for the recommended projects, which are grouped into **Short-Term** and **Long-Term Projects**. It also describes **Other Improvements** that could help improve the bicycling conditions for riders in the county. The chapter’s focus is on infrastructure improvements; non-infrastructure programs and initiatives are described in Chapter 4.

Chapter Contents

- 3.1 Chatham’s Bicycle Network
- 3.2 Prioritization Criteria
- 3.3 Short-Term Projects
- 3.4 Long-Term Projects
- 3.5 Other Improvements

3.1 Chatham’s Bicycle Network

All roads in Chatham County are part of the county’s bicycle network, and should be designed, operated and maintained to safely accommodate all road users. Yet there are some roads and off-road facilities that deserve targeted attention for bicycles. This Plan identifies these corridors for improvement, and recommends a total of 421 miles of shared and signed roads, paved shoulders, on-street bike lanes and shared use paths. These recommended projects are described in this chapter and Appendix C.

The Plan recommends adding 146 miles of on-road facilities, the majority of which is “share the road” signage. On roads with more automobile traffic, widened shoulders are recommended. In Siler City and Pittsboro, the Plan recommends dedicated bike lanes. 112 miles of new off-road shared use paths are also included, mostly in the long-term. The Plan also recommends improving eight specific intersections to further enhance safety for bicyclists.

Table 7. Summary of Recommended Bicycle Network

Facility Type	Existing (miles)	Future (miles)		Total (miles)
		Short-Term	Long-Term	
Shared Roads	0	93.4	52.5	145.9
Signed Routes on Shared Roads	131.3	0	0	131.3
Bike Lanes	0	2.5	36.2	38.7
<i>Total On-Street Facilities</i>	<i>131.3</i>	<i>95.9</i>	<i>88.7</i>	<i>308.7*</i>
Shared Use Paths	4.6	2.0	105.2	111.8
Total Facilities (miles)	135.9	97.9	193.9	420.5

**This total is 7.2 miles less than expected because some portions of the 131.3 miles of existing signed routes were identified as projects in need of improved signage or bike lanes.*

3.2 Prioritization Criteria

Resource and funding constraints dictate that not all the network elements will be completed at the same time. Because of these constraints, projects have been placed into two phases – short-term, which can be completed within five years, and long-term, which may take up to 20 or 30 years to complete. Projects were prioritized based on three criteria: 1) impact on existing ridership, 2) impact on attracting ridership and 3) ease of construction/cost-effectiveness.

Impact on Existing Ridership

Survey comments and conversations with existing bicycle users have pinpointed the most heavily used routes. Among these routes, those that connect major attractors and have the most safety issues (i.e. conflicts with motorists, low visibility for cyclists) were identified as having higher priority than those routes with fewer issues. These routes include the existing signed and connector bicycle routes.

Impact on Attracting Ridership

Projects that might increase ridership are also prioritized. These projects include routes that link desired destinations (i.e. residential centers and parks or schools). While not excluding the current experienced cyclists, these projects are designed to attract more inexperienced riders. These generally include off-street facilities, bicycle lanes or routes on lightly travelled roads.

Ease of Construction/Cost-Effectiveness

Projects that require fewer resources (i.e. restriping, signage and signalization improvements) typically involve fewer parties to implement and are a more efficient use of limited resources.

Note: While ideally projects should be selected and implemented in order of priority, Chatham should take advantage of opportunities that arise through routine maintenance (such as repaving or restriping) or new road construction.

Chatham County Bicycle Plan

Recommended Short-Term Projects

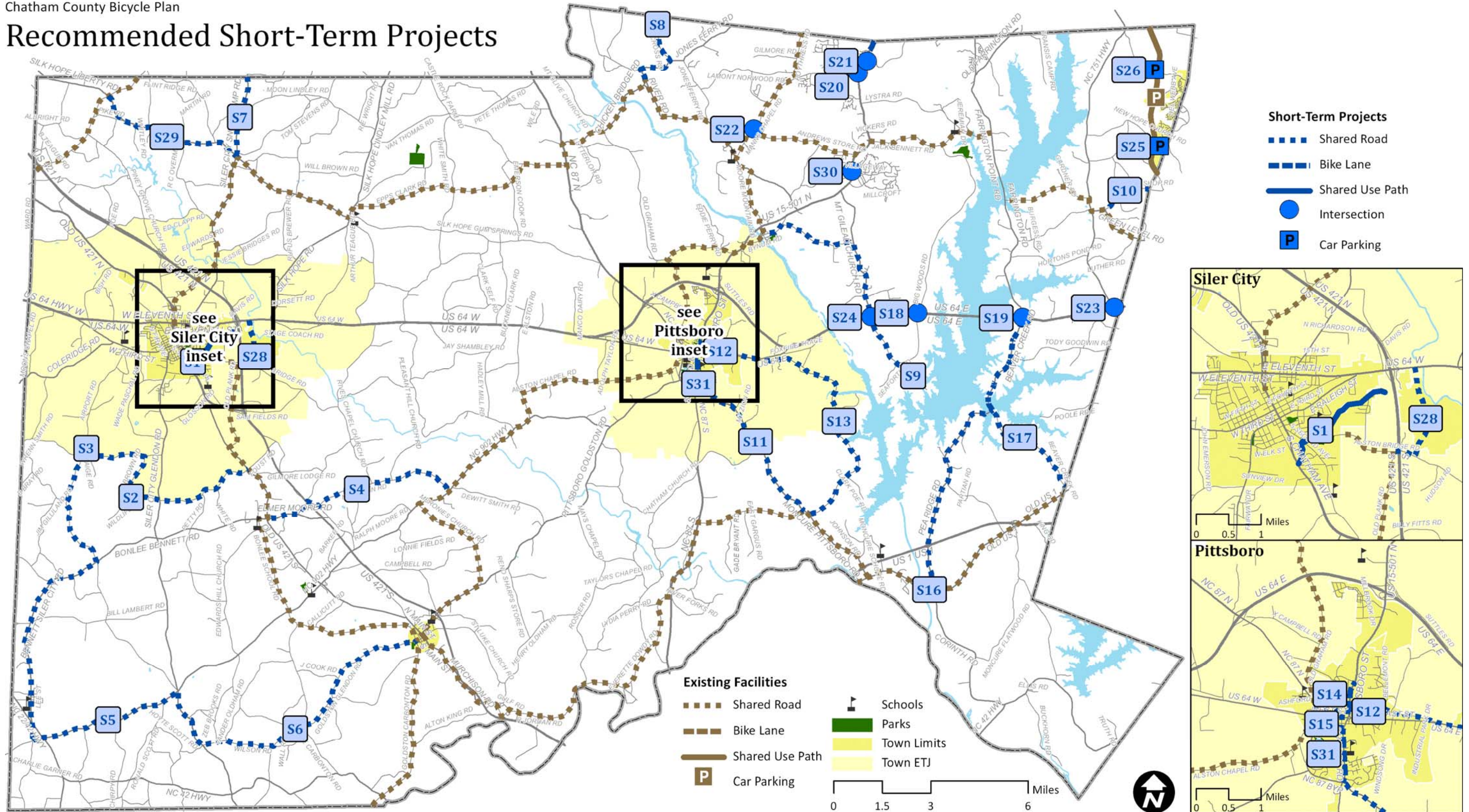


Figure 16: Short-Term Recommended Projects Map

Recommended Long-Term Projects

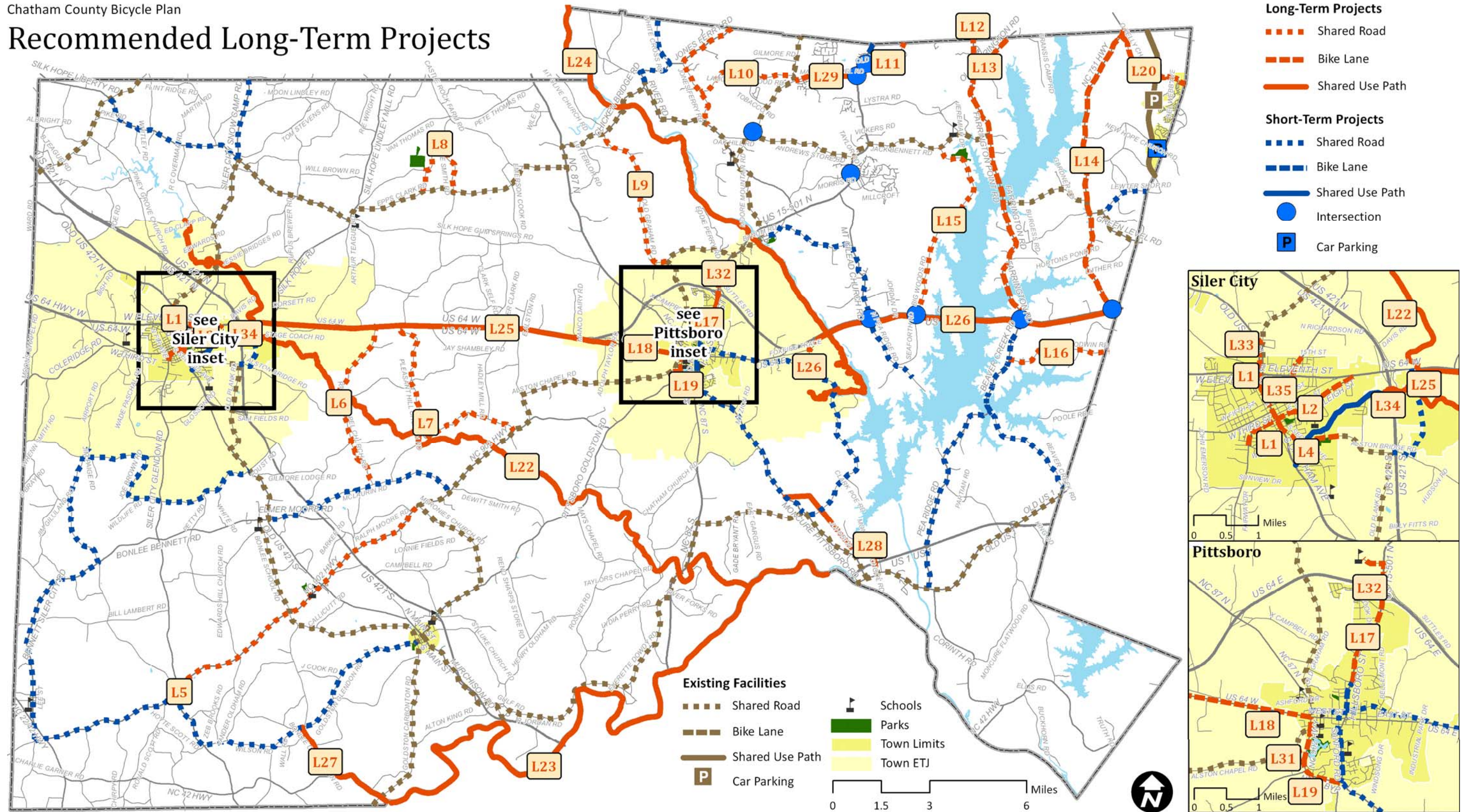


Figure 17: Long-Term Recommended Projects Map

3.3 Short-Term Projects

The following infrastructure projects are relatively low-cost and are either funded, part of an existing state-wide program or can be incorporated in future resurfacing projects. The section includes a description, location, planning-level cost estimates and potential funding sources for each project.

Projects S2-13, S15-17 & S28-29: Shared Roads 93.4 miles
County-wide \$43,600

Install “Share the Road” signage on the connector routes and ensure that directional signage is installed at junctions with signed routes. The share the road signs should be added after junctions with other roads. These signs will raise awareness to both bicyclists and motorists of the fact that bicyclists use the road. The directional signs will ensure that new riders and visitors can find and stay on the state and county routes.

Potential Funding Sources: NCDOT Division of Bicycle and Pedestrian Transportation funding

Resources: NCDOT Share the Road Program:
www.ncdot.org/bikeped/safetyeducation/signing



Figure 18: Share the Road sign

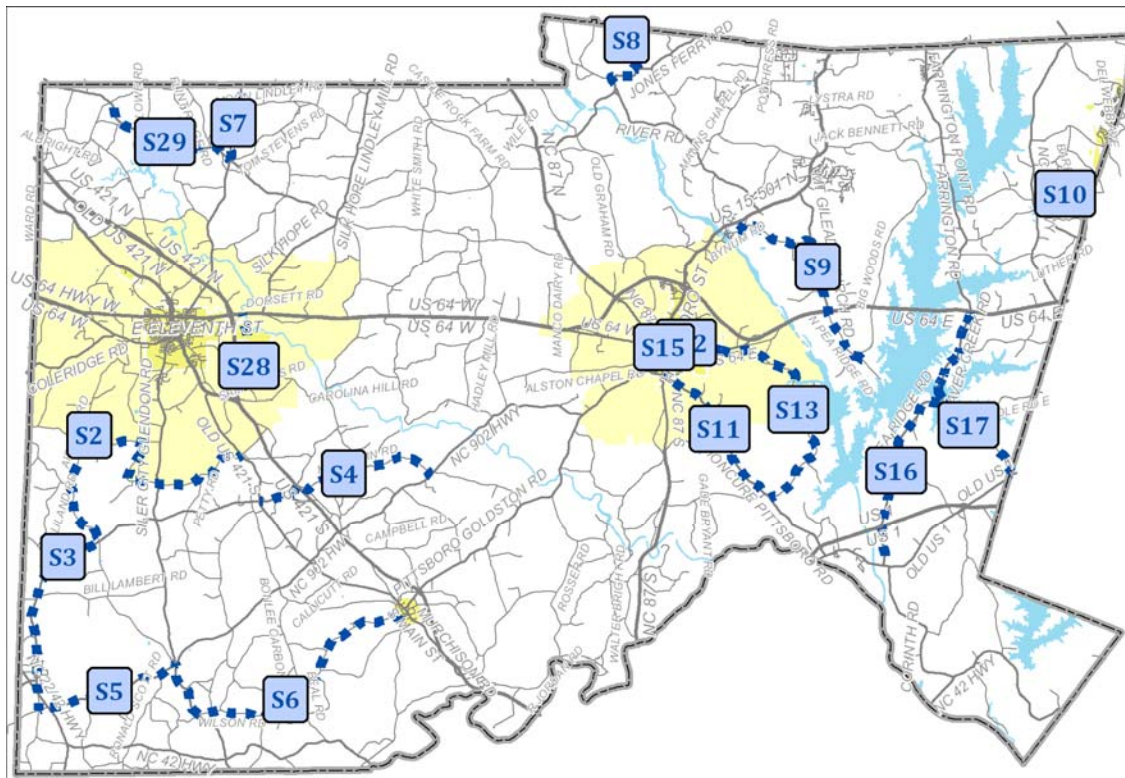


Figure 19: S2-13, S15-17 and S28-29: Shared Roads Project Map



Figure 20: S14 & S31: Hillsboro St and Sanford Rd Bike Lanes Project Map

**Project S14: Hillsboro St Bike Lanes
Park Dr to Salisbury St, Pittsboro**

**0.5 miles
\$7,300**

Restripe the existing pavement on Hillsboro St, just north of downtown Pittsboro: from Park Dr to Thompson St, reduce the driving lanes to 11-foot in each direction, remove on-street parking on one side of the street* and add a four-foot wide bike lane on the non-parking side and a five-foot wide bike lane on the other side; from Thompson to Salisbury St, restripe the existing diagonal parking to parallel to make room for bike lanes. The project will help bicycle commuters in Pittsboro reach downtown and county offices.

Potential Funding Sources: This should be combined with a future resurfacing project. Funding can be out of NCDOT Transportation Enhancement Program or State Street-Aid (Powell Bill) Program funds.

*The existing on-street parking should be studied to determine the feasibility of eliminating parking.

**Project S31: Sanford Rd Bike Lanes
Womack St to Moncure Pittsboro Rd, Pittsboro**

**0.8 miles
\$12,600**

Apply bike lane markings, and if necessary restripe, the existing wide shoulders and on-street parking. The project will help bicycle commuters in Pittsboro reach downtown and county offices.

Potential Funding Sources: This should be combined with a future resurfacing project. Funding can be out of NCDOT Transportation Enhancement Program or State Street-Aid (Powell Bill) Program funds.



Figure 21: S27: US 15-501 Bike Lanes Project Map

**Project S27: US 15-501 Bike Lanes
Mann's Chapel Rd to Orange Co.**

**1.3 miles
\$2,300,000**

Widen US 15-501, from the Orange County line to 400 feet south of Mann's Chapel Rd, by three to six feet on each side to create either 15-foot wide outside lanes or six-foot bike lanes. This section of US 15-501 is a four-lane divided highway, with typical 12-foot wide travel lanes, a 2.5-foot curb-and-gutter, a 45 mph speed limit and AADT of 21,000. There is no safe space for a bicycle to operate in this section, aside from potentially using the newly constructed four-foot wide sidewalk on the east side of the roadway. In contrast, US 15-501 just south of this section has six-foot wide shoulders, and north into Orange County the roadway has 13-foot wide outside lanes that transition to 6.5-foot wide shoulders.

Project S1: Love’s Creek Greenway **2.0 miles**
S Chatham Ave to US 421 Bypass, Siler City **\$750,000**

This shared use path along an existing sewer easement is part of Siler City’s funded Transportation Improvement Program and is currently in progress.



Figure 22: S1: Love’s Creek Greenway Project Map

Projects S25-26: Car Parking for the ATT **\$1.2 million**
New Hope Church and O’Kelly Chapel Rds

These projects construct new car parking lots for users of the American Tobacco Trail. The lot at New Hope Church Rd will be a paved lot for 100 cars, with a restroom/shelter and other site amenities, constructed by the Town of Cary in 2013 using CMAQ funding. The County, Town of Cary and NCDOT are looking at options for car parking in the vicinity of O’Kelly Chapel Rd. Car parking lots are needed as many ATT users are not comfortable riding on roads or do not live close enough to access the trail by bicycle. Trail users currently park on the shoulders along nearby roads, creating a potential safety risk for both vehicles and bicyclists. These parking areas, when possible, should also provide riders with other amenities, including drinking water.

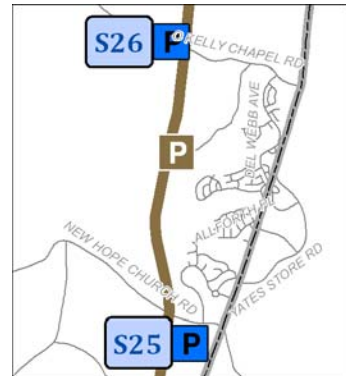


Figure 23: S25-26: Car Parking for the ATT Project Map

Projects S18-21 & S30: Bike Actuated Signals

Five locations **\$25,000**

These projects will add bicycle detection loops to five intersections, either by installation or calibrating of existing loop detectors. These intersections have signals that currently do not detect the presence of bicyclists, who must either wait extremely long or cross at a red light.

Projects S22-24: Improved Signage at Intersections

Three locations **\$4,800**

These projects will install signage that indicates the presence of bikes and bike route directional signage to help route wayfinding and safety.

Potential Funding Sources for Projects S18-24 and S30: NCDOT Division of Bicycle and Pedestrian Transportation funding, NCDOT road maintenance funding.

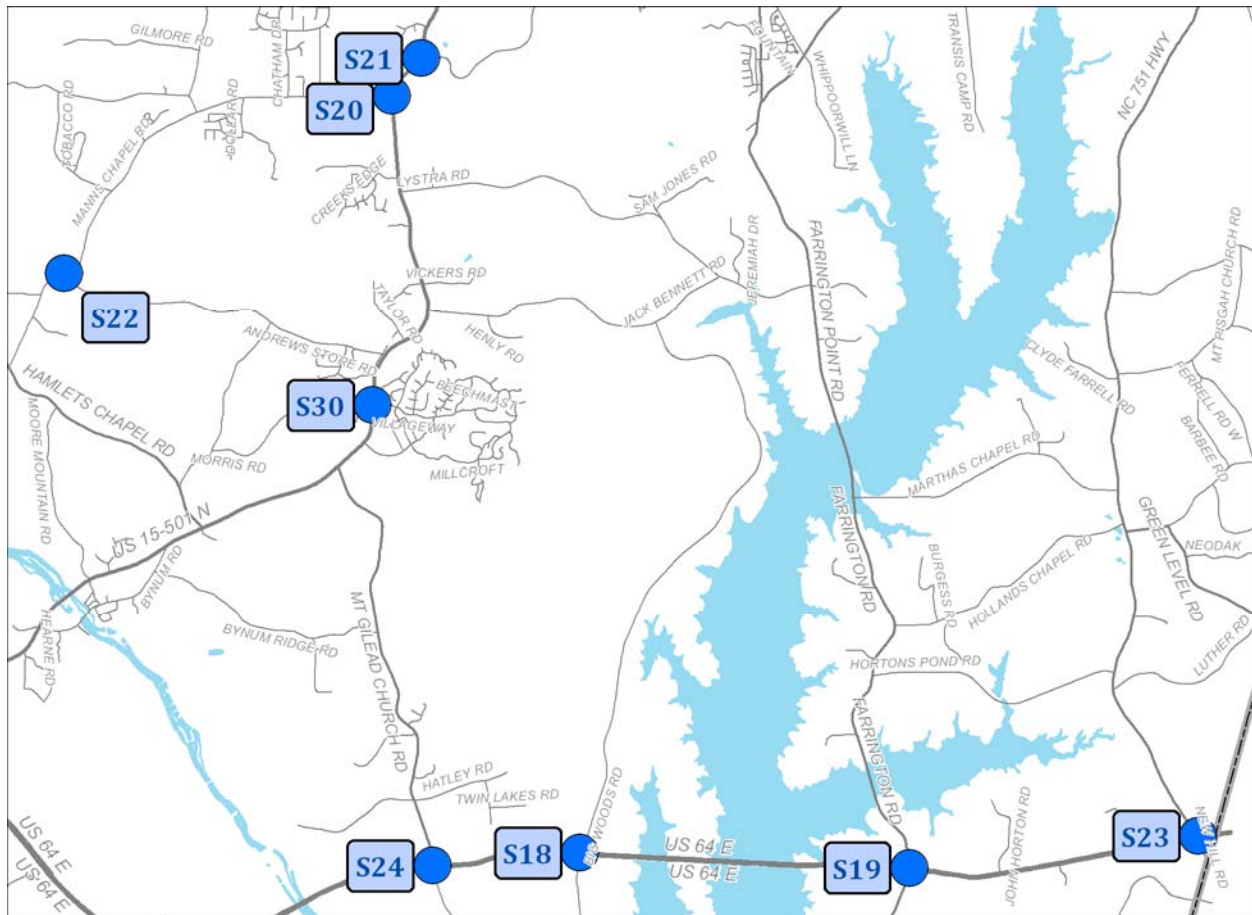


Figure 24: S18-24 and S30: Intersection Improvements Project Map

3.3 Long-Term Projects

Long-term projects are higher cost and require more significant construction and complexity. While the details of each of these projects have not been completely finalized, the Plan provides estimates of the relative costs.

Projects L3, 5-11, 15-16, 31, 33: Shared Roads 51.0 miles
County-wide \$21,400

Install “Share the Road” signage on the connector routes and ensure that directional signage is installed at junctions with signed routes. The share the road signs should be added after junctions with other roads. These roads have been deemed lower priority than the Short-Term Shared Road projects as they are less used bicycle routes or have less vehicular traffic.

Potential Funding Sources: NCDOT Division of Bicycle and Pedestrian Transportation funding

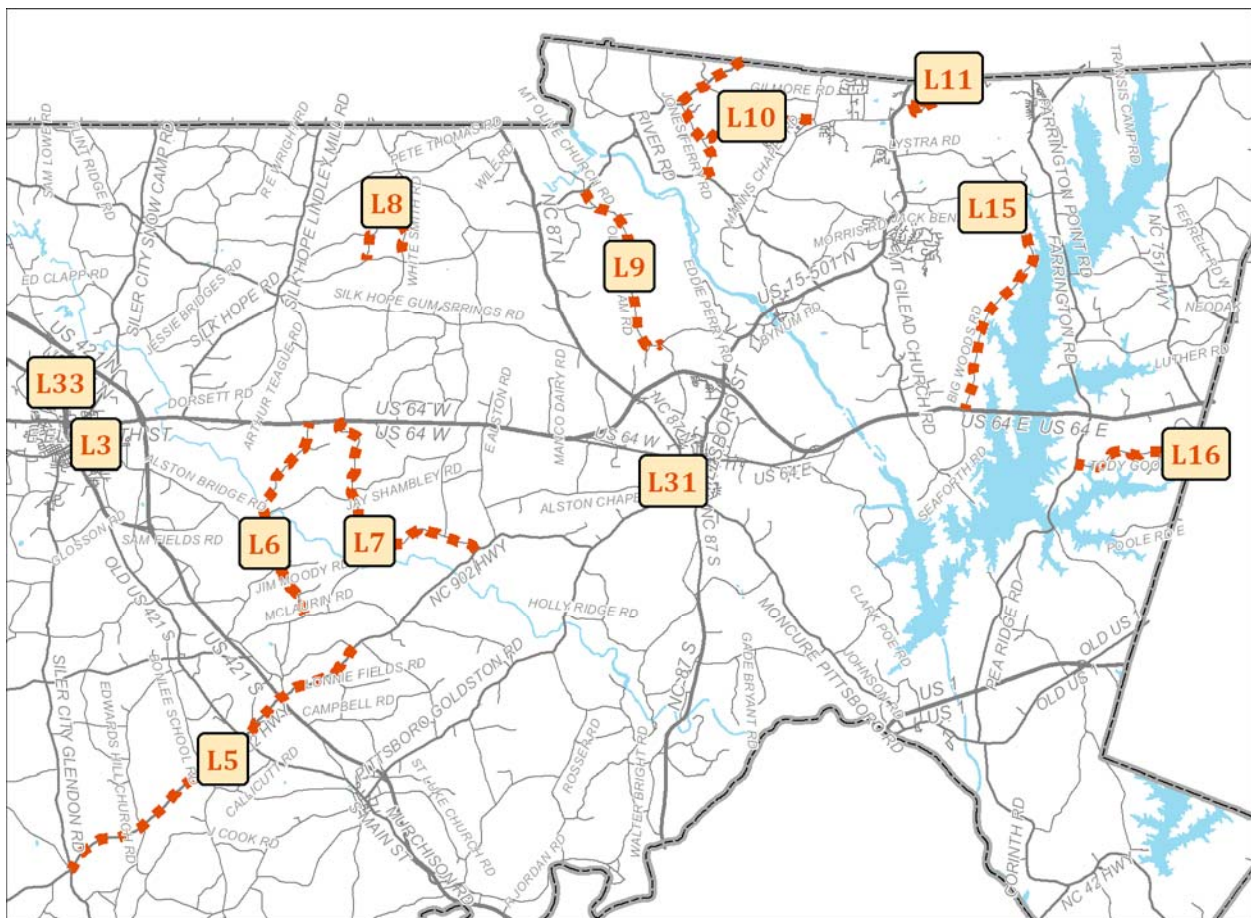


Figure 25: L3, L5-11, L15-16, L31, L33: Shared Roads Project Map

Project L1: 2nd Ave Bike Lanes **1.9 miles**
Siler Business Dr to Alston Bridge Rd, Siler City **\$353,000**

This project would create bike lanes on 2nd Ave through Siler City by: reducing the number of vehicular travel lanes from four to three and add bike lanes in each direction from Fayetteville to Cottage Grove Ave; and, widening the pavement from Siler Business Dr to Cottage Grove Ave. It would also add “share the road” signage on 2nd Ave from Fayetteville Ave to Alston Bridge Rd, since existing curbs and utility poles make widening this section difficult and expensive. It is part of NC bike route #4 and is noted on the county’s bike map as a “busy road.”

Project L2: Raleigh St Bike Lanes **2.0 miles**
US 64 to Dolphin St, Siler City **\$528,000**

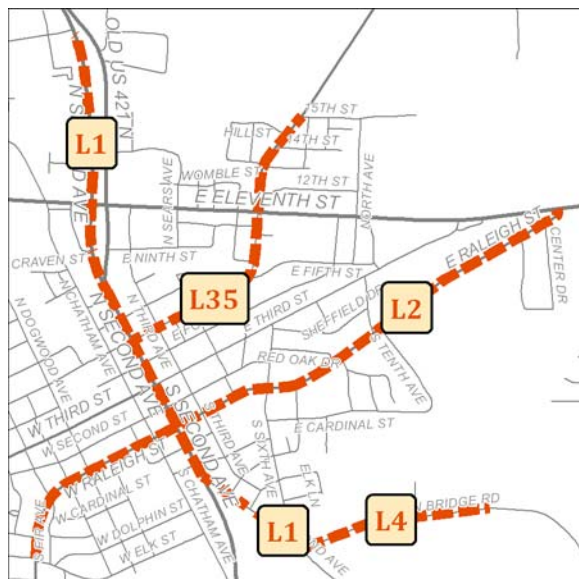
This project would create bike lanes on Raleigh St through Siler City by: reallocating the roadway space from Dolphin St to Seventh Ave; and, widening the pavement from Seventh Ave to US 64.

Project L4: Alston Bridge Rd Bike Lanes **0.6 miles**
Begin at 2nd Ave, Siler City **\$300,000**

This project would widen the pavement to create four to six-foot bike lanes in each direction. It is part of NC bike route #4.

Project L35: MLK Blvd Bike Lanes **0.9 miles**
15th St to 2nd Ave, Siler City **\$181,000**

This project would create bike lanes on Martin Luther King Jr Blvd through Siler City by: reallocating the roadway space from 2nd Ave to US 64; and, widening the pavement from US 64 to 15th St.



Potential Funding Sources for Projects L1-2, L4 and L35: State Transportation Improvement Program, Transportation Enhancement Program, part of other roadway expansion (capacity or resurfacing) projects

Figure 26: L1-2, L4 and L35: 2nd Ave, Raleigh St, Alston Bridge Rd and MLK Blvd Bike Lanes Project Map

Project L17: Hillsboro St Bike Lanes **1.3 miles**
US 64 Bypass to Park Dr, Pittsboro **\$626,000**

This project would widen the pavement to create four to six-foot bike lanes in each direction.

Project L18: US 64 Business W Bike Lanes **2.4 miles**
US 64 Bypass to NC 87, Pittsboro **\$1,200,000**

This project would widen the pavement to create four to six-foot bike lanes in each direction.

Project L19: NC 87 Bike Lanes **1.4 miles**
US 64 Business to US 15-501 S, Pittsboro **\$710,000**

This project would widen the pavement to create four to six-foot bike lanes in each direction.

Project L32: US 15-501 N Bike Lanes **1.1 miles**
US 64 Bypass to Northwood HS Rd, Pittsboro **\$530,000**

This project would widen the pavement to create four to six-foot bike lanes in each direction.

Projects L12-14, L20, L29: Bike Lanes **32.2 miles**
Northeast Chatham **\$16.2 million**

These projects would construct additional width to existing roadways to provide either four to six-foot wide paved shoulders or bike lanes. These are roads that have relative high vehicular volume or speed and either handle significant existing bicycle ridership or connect major attractors within and outside the county.

Potential Funding Sources for Projects L17-19, L32, L12-14, L20, L29: State Transportation Improvement Program, Transportation Enhancement Program, part of other roadway expansion (capacity or resurfacing) projects

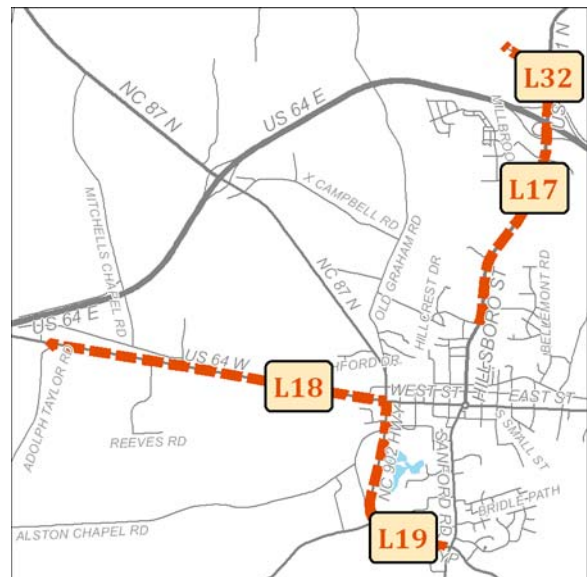


Figure 27: L17-19, L32: Hillsboro St, US 64 Business W, NC 87 and US 15-501 N Bike Lanes Project Map

Chapter 3: Recommended Bicycle Network

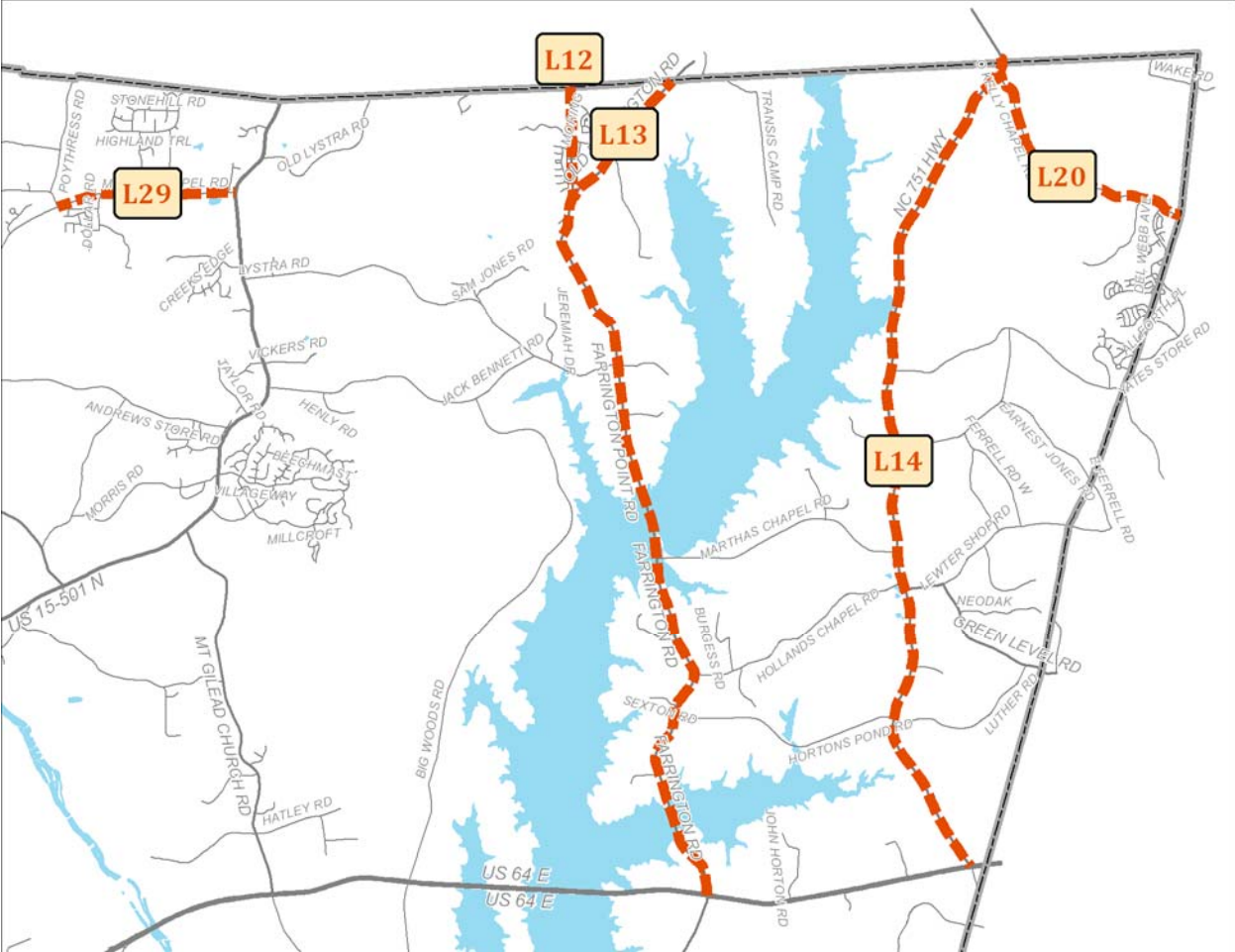


Figure 28: L12-14, L20, L29: Bike Lanes Project Map



Figure 29: L34: Love's Creek Greenway Extension Project Map

Project L34: Love's Creek Greenway Extension 0.7 miles \$252,000
Siler City

This project would extend project S1, Love's Creek Greenway, west to Progress Blvd and project L22 to create a continuous east-west path through Siler City.

Potential Funding Sources: Adopt-A-Trail (AAT) Grant Program; Recreational Trails Program; Parks and Recreation Trust Fund; Chatham Recreation Exaction Fund

Projects L25-26: US 64 Shared Use Paths West & East of Pittsboro 20.5 miles \$7.3 million

The US 64 Corridor Study includes a bicycle and pedestrian path adjacent to the roadway as part of its long-term improvement recommendations. This path starts west of the Haw River in Pittsboro and extends through eastern Chatham County, connecting to the American Tobacco Trail in western Wake County. This Plan recommends a similar shared use path along US 64 between Pittsboro and Siler City.



Figure 30: US 64 Shared Use Path Concept

Potential Funding Sources: Could be part of the overall US 64 project; some of the funding sources listed below for shared use paths

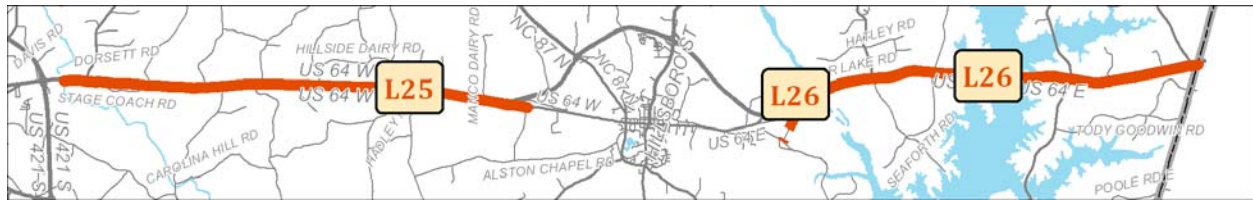


Figure 31: L25-26: US 64 Shared Use Paths Project Map

Projects L22-24, L27-28: Shared Use Paths County-wide 84.0 miles \$4.3 - \$22 million

The Chatham Parks and Recreation Master Plan 2009-2029 includes potential shared use paths around the county, including three along rivers. The plan does not propose specific path surfaces or widths; these paths may be natural surface paths that can only accommodate hikers and mountain bicycles or they could be paved paths that accommodate all types of bicycles and users. The cost estimates (with the exception of project L24, the Haw River Trail, which has already been designated as unpaved) include both unpaved and paved cost estimates.

Potential Funding Sources: Adopt-A-Trail (AAT) Grant Program; Recreational Trails Program; Parks and Recreation Trust Fund; Chatham Recreation Exaction Fund

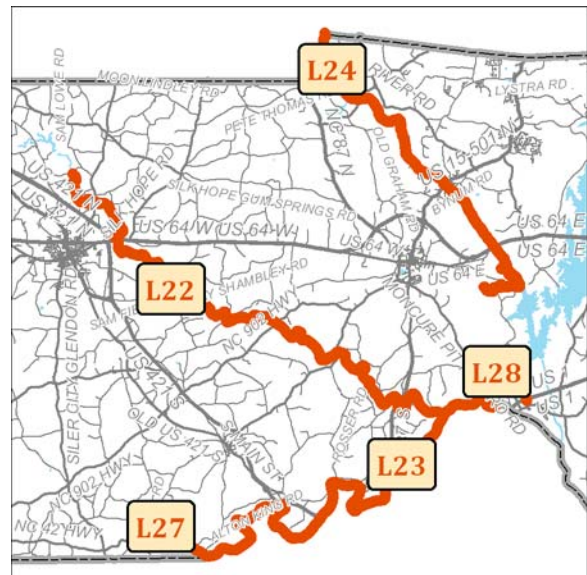


Figure 32: L22-24, L27-28: Shared Use Paths Project Map

3.5 Other Improvements

There are other types of roadway improvements that are not specifically identified but can contribute to an improved bicycling climate in the county. These include traffic calming, roadway maintenance programs, and spot improvements.

Traffic calming is intended to slow vehicular traffic in order to improve safety and generally improve the environment for pedestrians and bicyclists as well as vehicles. Traffic calming measures include speed bumps/humps, curb extensions, median islands and lane narrowing.

Roadway maintenance programs, including pothole repair and resurfacing projects, help improve the driving condition for vehicles and bicyclists alike. It's important that maintenance, especially on roads designated as bike routes, is compatible with comfortable bike riding. One resurfacing method, called "chip seal," is a more cost effective method of extending pavement life but is uncomfortable for bike riders; many survey respondents mentioned the poor condition of roadways with this treatment. Routine maintenance should include the clearing of debris from paved shoulders. Additionally, rumble strips present a fall hazard and reduce riding comfort for bicyclists, and should be eliminated when possible, especially on roads signed as bike routes.

Spot improvements to the road network include the installation of bicycle friendly drainage grates and paving of intersecting gravel or dirt roads or driveways to reduce the amount of debris on the roadway.

Chapter 4: Program and Policy Recommendations

To provide a good environment for bicycling in Chatham County, not only are safe and convenient bike facilities needed, but these must be complimented by programs and policies that support bicycling. This chapter makes **Program Recommendations**, including education, encouragement and enforcement programs, as well as **Policy Recommendations**.

Chapter Contents	
4.1	Program Recommendations
4.2	Policy Recommendations

4.1 Program Recommendations

Programs that support bicycling can be generally categorized as education, encouragement or enforcement – often referred to as the Three E’s. Recommendations, with potential responsible parties and links to local examples (when available), are detailed on the pages that follow. While these programs should be made available to all county residents and visitors, based on a review of the bike crash statistics, programs should first focus on encouraging novice cyclists to operate on roadways according to the rules-of-the-road and on encouraging motorists to slow and wait for oncoming traffic to clear before passing a bicyclist on rural, two-lane roads.

4.1.1 Education

Education programs seek to educate the public regarding proper bicycle riding, North Carolina bicycling laws, proper motorist behavior around bicyclists and safe and improved bicycle routes and facilities. Education can refer to safety materials, training programs and events. The table on the following page summarizes the proposed education programs.

There are many bicycle **safety materials** available for general use. In particular, NCDOT provides many ready-made guides that cover topics ranging from bike safety, tips to conducting a repair clinic and bicycle driving laws. Most of these guides can be downloaded from the NCDOT website; alternatively, NCDOT can provide up to 500 copies to agencies and residents. Several items, including videos and some manuals, are only available for loan. The guides should be distributed as broadly as possible, including to those taking vehicle driver tests, at festivals or at local restaurants. (Resource: www.ncdot.gov/bikeped/safetyeducation/materials)

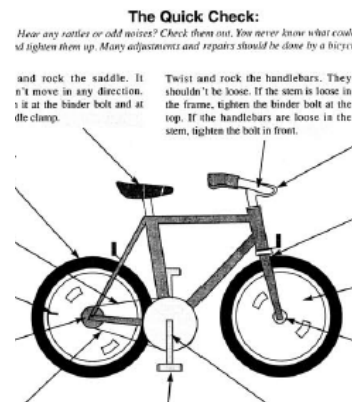


Figure 33: Example of NCDOT Handout



Figure 34: Example of NCDOT Poster

Table 8. Education Program Recommendations

Program	Details	Potential Responsible Party
Safety Materials	Create or borrow safety materials for distribution to county residents and riders	Bicycle and Pedestrian Subcommittee/ Chatham County Schools/ Chatham Sheriff's Office
Local Staff Training	Educate staff that will be part of implementation of this Plan	Bicycle and Pedestrian Subcommittee/ Planning
School Training	Teach children the safe, proper usage of bicycles	Chatham County Schools/ Chatham Sheriff's Office/ Siler City and Pittsboro Police Departments
Law Enforcement Training	Periodic training of law enforcement on the share the road laws to address common misconceptions	NCDOT Division of Bicycle and Pedestrian Transportation/ Chatham Sheriff's Office/ Siler City and Pittsboro Police Departments
Events	Educate the public on safe riding and promote safe bicycle riding; could include bike rodeos or bicycle safety clinics	Bicycle and Pedestrian Subcommittee
Bike Safety Campaign	Coordinate outreach to educate public on best bicycling practices and awareness	Bicycle and Pedestrian Subcommittee/ Chatham Sheriff's Office/ Siler City and Pittsboro Police Departments

Training programs can include those aimed at local staff, schools and law enforcement. Local staff tasked with implementing the Bicycle Plan should be kept up-to-date on bicycling accommodation methods and design in order to help institutionalize the accommodation of bicycles throughout the county. Training can include brown bag lunch sessions, modifications of employee handbooks or invitations to webinars. Chatham County Schools should implement safe bicycle education in elementary schools. NCDOT provides materials that can help the schools develop an education program that highlights safety and the benefits of bicycling through events and encouragement programs. Law enforcement training is discussed in section 4.1.3.

Events promoted throughout the year provide opportunities for bicycle safety training and promote bicycling as a recreational activity and a potential alternative to driving. Events could include:

- Bicycle Repair Clinics, where participants can learn about maintenance while socializing and exchanging tips. Partners can include bike activists and nearby bicycle shops. (Resource: www.durhambikecoop.org)

- Bicycle Rodeos are safety clinics that include bike inspections and instruction on riding safely targeted to young cyclists through middle school age. Siler City has hosted a Bicycle Rodeo in the past, but has been discontinued. Many communities in North Carolina (including Jacksonville, Wilson and Marvin) have hosted bicycle rodeos, so these communities can be resources in planning a future rodeo. Partners include local law enforcement and schools.



Figure 35: Bicycle Rodeo in Elizabeth City

All of these safety materials, training programs and events can be part of a broader **bicycle safety campaign**. Campaigns typically include coordinated outreach that increases the awareness around safety issues, including public service announcements (in English and Spanish), posters in high traffic areas and pamphlets. Messages in these campaigns should be consistently provided and convey information to improve bicycle safety. (Resource: www.bikesbelong.org/assets/documents/uploads/Bikes_Belong_Foundation_Safety_Campaign_Best_Practices_Report_reduced.pdf)

4.1.2 Encouragement

Establishing biking as an important recreational and commute mode in the county requires the initiation of encouragement activities. Many Chatham County residents might not be receptive to riding on the roads or in greenways unless given support through events and programs, including school encouragement, awareness days, bike tours/mass rides and an updated bicycle map.

Table 9. Encouragement Program Recommendations

Program	Details	Potential Responsible Party
School Encouragement	Programs that help encourage children to bicycle to school	Chatham County Schools
Awareness Days	Days, such as Bike to Work Day/Week, that spread awareness of the bicycle facilities and benefits of biking	Bicycle and Pedestrian Subcommittee/ Planning
Bike Tours/ Mass Rides	Group bike rides can help encourage bikers that are hesitant to ride solo, and highlight attractions and the bicycle network	Pittsboro-Siler City Convention & Visitors Bureau/ Cycling groups, such as Carolina Tarwheels
Updated Bicycle Map	Updated existing map that includes updated transportation (bike/road) network	NCDOT Division of Bicycle and Pedestrian Transportation/ Pittsboro-Siler City Convention & Visitors Bureau

There are a variety of **school encouragement** programs that parents and school administrators can use to encourage safe bicycling and walking to school. A prominent program, the Safe Routes to School Program, provides grant funding, resources and potential program examples.



Figure 36: Durham's Bull City Open Streets, 2010

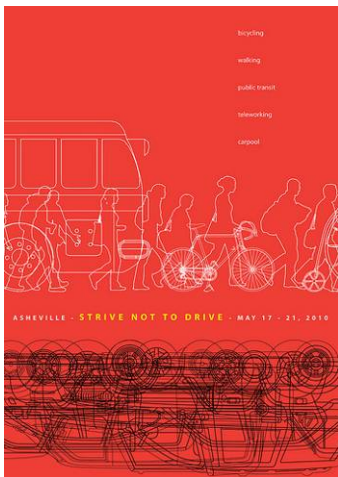


Figure 37: Asheville Strive Not to Drive poster



Figure 38: SmartCommute Challenge 2011 poster

Awareness days dedicated to specific themes, such as bicycling and active recreation, can be used to promote bicycling and related causes. Specific types of awareness days include:

- **Open Streets (or Ciclovias):** Cities around the world temporarily close their streets to automobile traffic on specific days or times of day, and use them instead for active recreation activities. Durham held its first Bull City Open Streets in 2010, closing several downtown streets and attracting over 1000 participants despite poor weather. (Resource: bullcityopenstreets.com)
- **Bike to Work Day/Month:** The League of American Bicyclists (LAB) sponsors May as Bike to Work month, with Bike to Work Day in the third week. LAB also provides ideas on events and programs that increase awareness of biking.
- **Strive Not to Drive Days:** These are often annual events that encourage the public to not use single occupancy vehicles to get to work or activities, but instead explore the benefits of walking, bicycling, carpooling or using public transit. (Resource: sites.google.com/site/strivenottodrive)
- **Family Bike Days:** Supports bike riding for all family members to increase awareness of enjoyment of riding and safety concerns. (Resource: www.sfbike.org/?family_day)
- **International Walk and Bike to School Day:** Held on the first Wednesday in October, this event promotes using active transportation to attend school.
- **Commute Challenge:** Employers can promote the usage of alternative commute modes by encouraging employees to pledge to change commuting habits for a certain period, in exchange for prizes or other incentives. GoTriangle sponsors a SmartCommute Challenge each year, with nearly 10,000 participating over a six-week period in 2010. (Resource: www.smartcommutechallenge.org)

Many riders might be more receptive to riding in a group as part of a **bike tour/mass ride**. Chatham County bike tours could lead cyclists from historic landmarks or to/from recreation areas. This could be combined to coincide with Bike Day or Bike Month. (Resource: Blue Ridge Breakaway in Haywood County: blueridgebreakaway.com)

Bicycle maps both educate the public on preferred bicycle routes and safety tips as well as encourage the public to try these routes. Chatham County’s bike map was developed over ten years ago and is currently being reprinted. Other local examples, such as from Randolph County, can be used for ideas in updating the county’s map.

Bicycling Randolph County

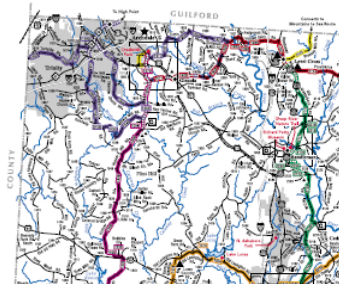


Figure 39: Randolph County Bicycle Map

4.1.3 Enforcement

Enforcement programs address unlawful behavior from road users and other residents that impact the bicycle environment, including driving, bicycling and leash laws.

Table 10. Enforcement Program Recommendations

Program	Details	Potential Responsible Party
Driving Laws	Target unsafe share the road practices (passing too closely, tailgating, excessive speeding) especially in areas with high numbers of bike traffic and crashes	Chatham Sheriff’s Office/ Siler City and Pittsboro Police Departments
Bicycling Laws	Target the most unsafe bicycling behaviors (wrong way riding, biking without lights)	Chatham Sheriff’s Office/ Siler City and Pittsboro Police Departments
Leash Laws	Cite owners who do not leash potentially dangerous animals; educate residents regarding existing leash laws	Chatham Sheriff’s Office/ Siler City and Pittsboro Police Departments

Many survey responses cited unsafe **driving**, including tailgating, passing at unsafe distances, general speeding and harassment, as an impediment to bicycling safely in the county. Law enforcement should increase enforcement of these unsafe, illegal practices by giving out citations or warnings, especially on roads more commonly traveled by bicyclists or with a history of crashes.

According to **bicycling laws** in North Carolina, bicyclists must follow all pertinent traffic laws. Bicyclists who ride against traffic and signals and violate other laws endanger themselves, other bikers and motorists, while also tarnishing the public image of bicyclists. Unfortunately, according to the survey, law enforcement personnel sometime reprimand law abiding cyclists. Law enforcement personnel should be

continually trained on the rights and responsibilities of both bicyclists and motorists; this training can focus on commonly misunderstood biking laws. For instance, survey respondents indicated that law enforcement sometimes think that cyclists are required to ride as far right as possible and in a single line, both of which are not true.

Increased enforcement of local **leash laws** may reduce instances where bicyclists are harassed or even injured by loose pets. Many bicyclists indicated this as a problem on Chatham County roads, causing some riders to modify their routes or even decrease their riding. Leaflets regarding leash laws can be provided at places like pet shops or veterinary offices to educate owners of their leashing responsibilities.

4.2 Policy Recommendations

Policies and codes at the local and state level have an impact on the bicycling climate. The changes recommended in this section address future development and roadway design; they can be implemented as part of routine code updates or in major updates. The tables on the pages that follow summarize the recommended changes for Chatham County, Siler City and Pittsboro. Recommendations related to state policy are at the end of the section.

Table 11. Chatham County Policy Recommendations

Document	Reference	Existing Text	Recommended Change
Compact Communities Ordinance	Section 10. Recreation and Open Space 10.2. Active Recreational Facilities	Any land proposed for dedication for active recreation shall be physically integrated into the design of the community and be easily and safely accessible by pedestrians.	Add "...and bicyclists" as follows: ...by pedestrians and bicyclists.
Land Conservation and Development Plan	Transportation Section	N/A	Include references to the Bicycle Plan in future updates.
Subdivision Regulations	7.2. Rural Roads, B. Relation to Present, Proposed and Future Road System	N/A	Add: 6. The recommended bicycling facilities within the Chatham Bicycle Plan shall be provided upon development of land adjacent to them.

Table 12. Siler City Policy Recommendations

Document	Reference	Existing Text	Recommended Change
UDO	Article XIV. Streets and Sidewalks; § 193 Street Classification	N/A	Add: (a)(4) Regardless of Street classification, every street should be designed to accommodate all road users, including vehicles, bicycles and pedestrians.
UDO	Article XIV. Streets and Sidewalks; § 196 Entrances to Streets (a)(1)	Vehicles can enter and exit from the lot in question without posing any substantial danger to themselves, pedestrians, or vehicles traveling in abutting streets...	Add “bicyclists” as follows: ...pedestrians, bicyclists , or vehicles...
UDO	Article XIV. Streets and Sidewalks; § 199 Street Width, Sidewalk, and Drainage Requirements in Subdivisions (a)	Street rights-of-way are designed and developed to serve several functions: (i) to carry motor vehicle traffic, and in some cases, allow on-street parking...	Add “and bicycle” as follows: ...to carry motor vehicle and bicycle traffic...
UDO	Article XIV. Streets and Sidewalks; § 204 Road and Sidewalk Requirements in Unsubdivided Developments (a)	(a) Within unsubdivided developments, all private roads and access ways shall be designed and constructed to facilitate the safe and convenient movement of motor vehicle and pedestrian traffic.	Add “bicycle” as follows: ...motor vehicle, bicycle and pedestrian traffic.

Table 13. Pittsboro Policy Recommendations

Document	Reference	Existing Text	Recommended Change
Zoning Ordinance	Article XV. Regulation of Development within Major Transportation Corridors	N/A	All new development within the Major Transportation Corridor district shall include the bicycling facilities recommended in the Chatham County Bicycle Plan.

Note: In addition to these changes, the Pittsboro Master Pedestrian Plan includes many proposed revisions to the Pittsboro Zoning Ordinance and Subdivision Regulations that address bicycling and greenways as well as pedestrian features.

NC Complete Streets Policy (2009)

Chatham County should make every effort to support NCDOT as it seeks to implement this new policy. This includes requesting that any new or reconstructed roadways include appropriate accommodations for all road users, including bicyclists, and supporting proposed NCDOT projects that contribute to a multimodal transportation system.

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Chapter 5: Implementation

This chapter describes how Chatham County and its municipalities can make the recommended network, programs and policy changes a reality. It includes specific **Implementation Steps**, described in as much detail as practical, and **Potential Funding Sources** to complete the Plan.

Chapter Contents

- 5.1 Implementation Steps
- 5.2 Potential Funding Sources

5.1 Implementation Steps

Implementation of the Plan requires the coordination of a multitude of agencies and groups such as the Board of County Commissioners, NCDOT and the municipalities. The Transportation Advisory Board can serve as a coordinating party for these agencies. Steps to implement the Plan include:

1. Establish a citizen advisory committee to lead bicycling and pedestrian efforts and ensure that the Plan is implemented.
2. Institute a coordination policy with NCDOT to ensure that roadway projects include bicycle facilities, when appropriate.
3. Fund, design and construct the recommended projects.
4. Make the recommended policy changes.
5. Implement the recommended education, encouragement and enforcement programs.
6. Coordinate this Plan with other plans, including the upcoming Comprehensive Transportation Plan.
7. Update the bicycle map to include new facilities and information about encouragement and education programs.
8. Apply to become a Bike Friendly Community.
9. Maintain the on- and off-road bicycle facilities.
10. Evaluate and monitor implementation of the Plan.

These steps are further described on the pages that follow and in the tables on pages 51 and 52, which detail specific tasks, lead and support agencies and task importance.

5.1.1 Establish a Citizen Advisory Committee

Implementation of the Bicycle Plan should be spearheaded by a newly formed Bicycle and Pedestrian Subcommittee (BPS) within Chatham County's Transportation Advisory Board (TAB). The BPS will coordinate

and help implement the action steps of this Plan and will improve the TAB's ability to advise the Board of County Commissioners on matters related to biking and walking. The BPS should focus on both bicycle and pedestrian transportation as many of the improvements and programs are complementary.

The TAB's bylaws allow for non-TAB members to serve on subcommittees. The BPS should include representatives from the TAB, the Recreation Advisory Board and Active Chatham, as well as any pertinent municipal groups such as the Pittsboro Parks & Recreation Advisory Board. In addition to representatives from these groups, bicyclists and pedestrians from around the county should also be encouraged to join.

5.1.2 Coordinate with NCDOT

The County and each municipality should develop processes and policies that improve communication and coordination with NCDOT regarding road projects. Since NCDOT has ownership of most of the roads in the county, most of the projects detailed in this plan will require NCDOT approval and oversight. County and municipal staff and bicycle advocates should be involved in the early stages of any design and maintenance processes to ensure that road projects contribute to an improved bicycling environment in the county. For instance, Orange County currently works with NCDOT on all resurfacing projects to identify opportunities to add two-foot shoulders to existing roadways. Similarly in Chatham County, NCDOT and county staff should take every opportunity to widen the shoulders on narrow rural roads, especially those designated as bike routes. There may also be opportunities to reallocate road space as part of restriping after a resurfacing project or to lower the speed limit on designated bike routes.

5.1.3 Construct the Recommended Projects

Over the next few years, county and municipal staff, in consultation with the BPS, DCHC MPO, TARPO and NCDOT, should actively pursue the funding and construction of the recommended short-term projects. The recommended long-term projects should also be programmed as opportunities arise.

5.1.4 Make Policy Changes

County and municipal staff should pursue the recommended policy changes as soon as practical to ensure new development contributes to an improved bicycling environment.

Recommended Short-Term Projects	
Love's Creek Greenway	2.0 miles
US 15-501 Bike Lanes	1.3 miles
Hillsboro St Bike Lanes	0.5 miles
Sanford Rd Bike Lanes	0.8 miles
Shared Roads	93.4 miles
Car Parking for the ATT	2 locations
Bike Actuated Signals	5 locations
Intersection Signage	3 locations

5.1.5 Implement Programs

The BPS should actively seek opportunities to implement the recommended programs and work with the appropriate partners to secure funding and resources.

5.1.6 Coordinate with Other Plans

Both local and other regional transportation and land use planning should be coordinated and not conflict with this plan. Of particular note, this Bicycle Plan is intended to be part of Chatham County's Comprehensive Transportation Plan (CTP), which is in the beginning stages and is slated for completion in 2012.

Regional cooperation is also a key for successful implementation of this Plan. Many of the proposed routes go to the county border, some of which connect with proposed or existing routes. As seen in the survey respondent profile, many out-of-county bicyclists ride in the county. As counties and municipalities build out their bicycle network or update their bicycle plans, Chatham County should stay informed about projects that might impact the county.

5.1.7 Update the Bicycle Map

Chatham County's bike map was developed over ten years ago and is currently being reprinted. It should be updated to include the American Tobacco Trail (with parking locations noted), new Chatham County parks and an updated road network, and should be periodically updated to include the new recommended facilities as they are constructed. As much as possible, ensure the colors and symbols used on the map coordinate with maps of adjacent communities.

5.1.8 Become a Bike Friendly Community

The League of American Bicyclists (LAB) has established a Bicycle Friendly Community (BFC) program recognizing communities that actively support bicycling. Meeting many of this Plan's goals would also meet many of the criteria for the BFC program, including a well-connected bicycle network and education, enforcement and encouragement programs, as well as the existence of an adopted plan and an advisory committee. Recognizing that there are different levels of support, LAB has instituted three separate rankings – Gold, Silver and Bronze. In North Carolina, the municipalities of Carrboro (Silver), Chapel Hill, Cary, Charlotte, Davidson, and Durham (Bronze) have all received the BFC designation. Though nearly all the communities in the program are municipalities, there are some counties included as well.

Communities of all sizes, even with populations less than 10,000, have been accepted into the program. Chatham County or its municipalities may not be able to apply for the program in the short-term, but achieving a designation can be a realistic mid-term goal after the implementation of the programs and a portion of the bicycle network.

5.1.9 Maintain Facilities

Maintaining high quality facilities is as important as building them. Maintenance strategies should be integrated into existing on and off-road maintenance programs. If roads are swept periodically, maintenance crews should ensure that the roads are swept to the curb or edge of shoulder, an area often neglected in street cleaning, but often used by cyclists. Additionally, the BPS can work with local groups, such as bicycle advocates or trail groups, to create “adopt a bikeway” programs that clean up litter and identify major issues with facilities.

5.1.10 Evaluate and Monitor

The County should establish performance measures to track progress toward meeting the objectives of the Plan. The performance measures should be gathered with low-cost methods, preferably using already existing data sources. Within two years of adoption of the Plan, the county should provide a report that determines the performance measures, provides an updated baseline profile of current conditions of these performance measures and sets targets for future years to guide the Plan. Performance measures and evaluation techniques could include:

- Estimated ridership by manual counts
- Online surveys to measure changes in attitudes/preferences and bicycling conditions; build upon the survey conducted for this Plan
- Number of attendees of education and enforcement programs
- Bicycle mode share from existing sources, such as the Census Journey to Work data and Census Transportation Planning Package (CTPP)
- Economic impact data related to bicycling, tourism and jobs

These and other performance measures should be collected and disseminated annually or bi-annually if possible.

Table 14. Short-Term Implementation Tasks

Task	Lead Agency (Support)	Importance
Create Bicycle and Pedestrian Subcommittee (BPS) within Transportation Advisory Board (TAB)	TAB (<i>Recreation Advisory Board, Active Chatham, Pittsboro Parks and Recreation</i>)	Essential to have a dedicated group to implement the Plan and coordinate actions
Update Chatham County policies	Chatham County Commissioners (<i>BPS, Planning Department</i>)	Ensures that policies conducive to bicycling are implemented countywide
Update Siler City policies	Siler City Board of Commissioners (<i>BPS, Siler City Planning Department</i>)	Ensures that policies conducive to bicycling are implemented in Siler City
Update Pittsboro policies	Pittsboro Board of Commissioners (<i>BPS, Pittsboro Planning Dept.</i>)	Ensures that policies conducive to bicycling are implemented in Pittsboro
Identify and secure funding for recommended short-term projects	Transportation Planner (<i>NCDOT, MPO, RPO</i>)	Ensures that short-term projects are funded and completed
Complete recommended short-term projects	NCDOT, municipalities (<i>BPS, Transportation Planner</i>)	
Develop a long-term funding strategy	Transportation Planner (<i>BPS, NCDOT, MPO, RPO</i>)	Improves the success of the overall bicycle network by planning for the recommended long-term projects
Develop updated Chatham County Bike Map	Pittsboro-Siler City Convention & Visitors Bureau (<i>BPS, NCDOT</i>)	Bicycle map needs to showcase bicycling for both residents and visitors
Introduce Safe Routes to School Program	Chatham County Schools (<i>BPS, NCDOT</i>)	This program is a proven way to increase physical activity among youths, bring awareness to cycling and walking and potentially bring more advocates for Plan implementation
Implement recommended education and encouragement events	BPS (<i>Chatham County Schools, CVB</i>)	Help market the benefits of biking, the proper ways to share roads with bicyclists and potentially bring more advocates for Plan implementation

Table 15. Long-Term Implementation Tasks

Task	Lead Agency (Support)	Importance
Plan and apply for designation by the League of American Bicyclists as a 'Bicycle Friendly Community' by 2020	BPS (Municipalities, NCDOT, Transportation Planner)	Provides a goal for Plan implementation and an opportunity for the county to showcase and market its bicycling environment
Identify and secure funding for recommended long-term projects	Transportation Planner (NCDOT, MPO, RPO)	Ensures that long-term projects are funded and completed
Complete recommended long-term projects	NCDOT, municipalities (BPS, Transportation Planner)	

Table 16. Ongoing Implementation Tasks

Task	Lead Agency (Support)	Importance
Coordinate with NCDOT Division 8 regarding projects on state-maintained roadways	NCDOT (Transportation Planner, BPS)	Ensure that roadway projects contribute to an improved bicycling environment
Coordinate with other local plans, including the upcoming Comprehensive Transportation Plan (CTP)	Transportation Planner, NCDOT (BPS, MPO, RPO)	Ensure that all plans are in pursuit of the same goals and projects
Implement law enforcement training regarding share the road laws	Chatham County Sheriff's Department (BPS)	Ensure safety of all road users
Coordinate with other regional planning efforts	BPS (DCHC MPO, TARPO, Town of Cary, Town of Chapel Hill, Town of Carrboro)	Many riders live outside of the county; ensure that these regional connections are phased and communicated to the public
Maintain bicycle facilities	NCDOT, Siler City, Pittsboro (Triangle Rails to Trails)	Routine, adequate maintenance is just as important as constructing new facilities
Continually support and evaluate implementation of this Plan	BPS	Ensure that the plan meets changing county conditions

5.2 Potential Funding Sources

Various funding sources are available to Chatham County and its municipalities to help construct facilities, perform planning activities and support new programs. Some of the programs described in this section are directed for general road construction and maintenance, activities which can still improve bicycle transportation.

North Carolina Division of Parks and Recreation Programs

The North Carolina Division of Parks and Recreation manages three grant programs. The Adopt-A-Trail (AAT) Grant Program funds projects related to the promotion, construction or renovation of trails or trail-side facilities, providing up to 100% of project costs with a maximum project cost of \$5,000. The Recreational Trails Program (RTP) funds projects related to the construction or renovation of trails or trail-side facilities, providing up to 75% of project costs with a maximum project cost of \$75,000. The Parks and Recreation Trust Fund (PARTF) provides dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the public, with a maximum project cost of \$500,000. (www.ncparks.gov/about/grants/trails_main.php)

Congestion Mitigation & Air Quality (CMAQ) Program

This competitive program funds transportation projects and programs in air quality nonattainment and maintenance areas to help achieve and maintain national standards for air quality pollutants. Bicycle projects are eligible as long as they are not exclusively used for recreational purposes. The program currently has a minimum project cost of \$100,000 and will fund up to 80% of the project cost. Projects in Chatham County must be located in Baldwin, Center, New Hope or Williams Townships.

(www.ncdot.org/doh/preconstruct/tpb/services/air.html)

Transportation, Community and System Preservation (TCSP) Program

This comprehensive initiative of research and grants investigates the relationships between transportation, community and system preservation plans and practices and identifies private sector-based initiatives to improve such relationships. States, metropolitan planning organizations, local governments and tribal governments are eligible for discretionary grants to carry out eligible projects to integrate transportation, community and system preservation plans and practices that improve the efficiency of the transportation system; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs,

services, and centers of trade; and, examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals. (www.fhwa.dot.gov/tcsp)

Safe Routes to School

The Safe Routes to School program is a federally funded initiative, administered by NCDOT, to increase rates of walking and biking to school. NCDOT provides reimbursement grants for both infrastructure and non-infrastructure projects. Infrastructure projects must be within two miles of an elementary or middle school that will encourage and enable children to walk or bike to school. Non-infrastructure projects (such as the education and encouragement programs described in Chapter 4) must support increased walking or biking to school. Any county agency, school board and non-profit organization is encouraged to apply. For more information, contact NCDOT's Division of Bicycle and Pedestrian Transportation at (919) 807-0774.

Transportation Improvement Program

NCDOT's Division of Bicycle and Pedestrian Transportation manages selection and approval for bicycle-specific TIP projects. These "independent" projects are handled and funded separately from "incidental" projects that are included in roadway new construction or enhancements (i.e. bike lanes, bicycle safe drainage grates).

Secondary Road Improvement Program

This program funds the improvement and maintenance of secondary roads, selected and prioritized in accordance with statewide criteria developed by NCDOT. Funds are allocated to each county annually from the Highway Fund and from the Highway Trust Fund.

High Hazard Elimination Program

This federally funded safety program provides funds to improve facilities with high crash rates. Projects are rated based on projected benefits in reducing crashes as compared to the costs of the project. The Safety Oversight Committee selects and approves projects before final approval by the NC Board of Transportation.

Bicycle and Pedestrian Planning Grant Initiative

This annual matching grant program, administered by the Division of Bicycle and Pedestrian Transportation, funds local comprehensive plans for walking and/or biking. Municipalities are reimbursed for planning activities included in creation of the plans and are limited to 18 months for plan completion. Only municipalities are eligible for the program, so this would only apply to Siler City, Pittsboro and Goldston.

Transportation Enhancement Program

This federal program, administered by NCDOT's Program Development Branch, funds surface transportation and related projects that benefit the traveling public and help communities increase transportation choices and access, enhance the built or natural environment and create a sense of place. The program has twelve qualifying activities and funds up to 80% of the project cost. Funding is allocated by county through an equity program. (www.ncdot.org/programs/enhancement)

TJCOG Transportation Demand Management Program

Triangle J Council of Governments (TJCOG), a voluntary council of governments in the Triangle and surrounding region, coordinates funding for marketing activities that promote alternative commuting practices such as bicycling, using transit and carpooling. TJCOG provides funding through an annual competitive grant program to its local governments. (www.tjcog.dst.nc.us/regplan/transdemand.shtml)

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Appendix A: Bicycle Survey Results

1. What kind of rider are you?

Beginner: New Rider or Child	5.2% (24)
Intermediate: Relatively skilled rider, but not comfortable on busy roads	32.2% (149)
Advanced: Highly skilled rider, comfortable “taking the lane”	49.0% (227)
I don't ride	13.6% (63)

2. Where are you or would you be comfortable riding? (check all that apply)

	Beginner	Intermediate	Advanced	Don't Ride	Totals
On busy, wide roads (like 15-501)	4.2% (1)	22.1% (33)	67.4% (153)	4.8% (3)	41.0% (190)
On busy, narrow roads (like Bus-64 going through downtown Pittsboro)	8.3% (2)	16.1% (24)	58.1% (132)	4.8% (3)	34.8% (161)
On quiet, back roads or local streets	70.8% (17)	84.6% (126)	96.9% (220)	39.7% (25)	83.8% (388)
On off-street trails or paths (like the American Tobacco Trail)	75.0% (18)	76.5% (114)	74.0% (168)	58.7% (37)	72.8% (337)
Not comfortable riding anywhere	12.5% (3)	1.3% (2)	0.0% (0)	25.4% (16)	4.5% (21)
Other (please specify)	2 replies	9 replies	20 replies	6 replies	37 replies

Beginner

- roads with bike lanes would be ideal
- In safe, designated areas such as bike paths or lanes

Intermediate

- On any road with bike lanes
- Would love more off road trails like Briar Chapel!
- Anywhere as long as the drivers are under control
- I ride 8000 to 10000 miles per year. I have ridden on 15-501 and 64 but don't feel comfortable
- 751, Farrington, Lystra, Martha's Chapel, Big Woods
- any road if it had a bike lane, love downtown Stockholm, Sweded, they have a specific lane for walkers/bikes/ scooters...
- Any street that has a bike lane

Appendix A: Bicycle Survey Results

- Prefer single track bicycle trails (Like Harris Lake trails), where there is no risk of injury due to a motor vehicle.
- A bike path parallel to roads

Advanced

- roads with shoulders
- busy, wide roads like 15-501 aren't my favorite, but if they're the only way to get somewhere I'll deal with them.
- Mountain Bike Trails
- do ride on 64 occasionally but do not feel comfortable with the speed of autos
- I ride on all roads, but prefer less-busy country roads like in Chatham Co.
- For recreational riding, I tend to take the routes lots of bike riders use
- It depends; US 15-501 N is OK; South of P'bo is not comfortable. US 64 in town is OK in downtown, but uncomfortable beyond CCC on the west and beyond downtown on the east...NC 87 is not good at all as a way
- prefer less busy but paved back roads
- busy roads if there is a wide shoulder
- Off road single-track for mountain bikes.
- Mountain biking trails as well.
- I ride short distances on 15-501, but it is not my road of choice. I appreciate the "bike lane" that is there.
- Most comfortable on country roads, but then can still be quite busy.
- Prefer to avoid the busy roads whenever possible!
- races, single track
- As long as there are sidewalks or bike lanes!!!
- Business 64 feels much safer than 15-501 to me.
- I'd be more comfortable if we had marked bike lanes.
- off-road too!
- I really like riding Chicken Bridge, River Road, and Lemont Norwood. It would be nice to have wider path for bikes on Jones Ferry

Don't Ride

- neighborhood streets
- cycling is dangerous on the roads for cyclists and cars
- I don't bike
- Bikers in packs create dangers for motorists
- It is not like Cary, where it is safe to ride.
- Definitely off any roads used by automobiles

3. Why do you or would you bike? (check all that apply)

	Beginner	Intermediate	Advanced	Don't Ride	Totals
For exercise/health reasons	91.7% (22)	98.0% (146)	99.6% (226)	68.3% (43)	94.4% (437)
For enjoyment	91.7% (22)	88.6% (132)	93.8% (213)	44.4% (28)	85.3% (395)
For shopping/errands	8.3% (2)	23.5% (35)	32.3% (73)	11.1% (7)	25.3% (117)
To get to work	25.0% (6)	20.1% (30)	43.2% (98)	6.3% (4)	29.8% (138)
To get to school	4.2% (1)	4.0% (6)	8.4% (19)	0.0% (0)	5.6% (26)
I don't and would not bike	0.0% (0)	0.0% (0)	0.0% (0)	25.4% (16)	3.5% (16)
Other (please specify)	2 replies	8 replies	13 replies	5 replies	28 replies

Beginner

- spend time with daughter
- To use less gas

Intermediate

- I would use for shopping if there were bike lanes
- I would bike for errands/work if I lived close enough...but the distance is 12plus miles.
- would love to be comfortable biking for errands but don't trust the roads I'd need to use -- too narrow
- would commute but afraid of roads at rush hour
- indoors only
- Bike on campus to meetings at NCSU and would bike in Chatham if accessible and safe roads were available
- to reduce carbon emissions
- Volunteering on American Tobacco Trail and other trails and greenways

Advanced

- Racing
- For bicycle touring/camping
- I would bike to work if safe routes existed
- For training, I am a competitive road cyclist just beginning the Pro level and am training to race in Europe in the spring.
- organized rides with cycling clubs/groups
- Camping
- I'd like to be able to use my bicycle as my main mode of transportation, but considering the optional routes(living on 15-501) it is not feasible to accomplish this task(yet).
- family outing
- I compete in triathlons and bike for training reasons as well.

Appendix A: Bicycle Survey Results

- Train for triathlons
- Racing/Training
- To reduce carbon emissions.
- As my job as a professional cyclist.

Don't Ride

- have not ridden since I was a child
- experiencing nature and culture of NC
- I am currently disabled, but would bike if I could , or will if I get better
- I would like to safely bike
- I would opt to ride elsewhere, not in Chatham.

4. How would you describe the majority of your current or potential bicycle trips?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Recreational (i.e. exercise, outdoors)	79.2% (19)	85.9% (128)	85.9% (195)	36.5% (23)	78.8% (365)
Utilitarian (i.e. work, school, shopping, etc.)	8.3% (2)	11.4% (17)	14.1% (32)	3.2% (2)	11.4% (53)
Not sure	12.5% (3)	2.7% (4)	0.0% (0)	22.2% (14)	4.5% (21)
I don't and will not bike	0.0% (0)	0.0% (0)	0.0% (0)	38.1% (24)	5.2% (24)

5. How often do you currently ride?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Never	4.2% (1)	2.0% (3)	0.4% (1)	73.0% (46)	11.0% (51)
Rarely (several times a year)	45.8% (11)	31.5% (47)	2.2% (5)	17.5% (11)	16.0% (74)
Sporadically (several times a month)	50.0% (12)	39.6% (59)	21.1% (48)	3.2% (2)	26.1% (121)
Often (two to three times a week)	0.0% (0)	24.8% (37)	58.6% (133)	3.2% (2)	37.1% (172)
Daily	0.0% (0)	2.0% (3)	17.6% (40)	3.2% (2)	9.7% (45)

6. How often would you like to ride?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Never	0.0% (0)	0.7% (1)	0.4% (1)	31.7% (20)	4.8% (22)
Rarely (several times a year)	8.3% (2)	1.3% (2)	0.0% (0)	25.4% (16)	4.3% (20)
Sporadically (several times a month)	29.2% (7)	18.8% (28)	0.4% (1)	22.2% (14)	10.8% (50)
Often (two to three times a week)	58.3% (14)	59.1% (88)	42.7% (97)	14.3% (9)	44.9% (208)
Daily	4.2% (1)	20.1% (30)	56.4% (128)	6.3% (4)	35.2% (163)

7. What prevents you from biking more often? (check all that apply)

	Beginner	Intermediate	Advanced	Don't Ride	Totals
No bike paths, bike lanes or bike routes	75.0% (18)	75.2% (112)	41.0% (93)	34.9% (22)	52.9% (245)
Insufficient bike parking or storage	8.3% (2)	15.4% (23)	9.3% (21)	9.5% (6)	11.2% (52)
Bikeways/roads are in poor condition	33.3% (8)	32.3% (48)	33.0% (75)	17.5% (11)	30.7% (142)
Biking facilities are not high quality or well planned	16.7% (4)	17.4% (26)	18.1% (41)	12.7% (8)	17.1% (79)
Unsafe/unlawful motorists behavior	62.5% (15)	62.4% (93)	50.2% (114)	39.7% (25)	53.3% (247)
Destinations are too far away	25.0% (6)	21.5% (32)	14.5% (33)	34.9% (22)	20.1% (93)
I have too many things to carry	4.2% (1)	5.4% (8)	7.9% (18)	12.7% (8)	7.6% (35)
I travel with small children	25.0% (6)	7.4% (11)	6.2% (14)	17.5% (11)	9.1% (42)
I don't have enough time	25.0% (6)	24.2% (36)	38.8% (88)	27.0% (17)	31.7% (147)
Insufficient lighting	25.0% (6)	12.1% (18)	15.0% (34)	12.7% (8)	14.3% (66)
Weather	16.7% (4)	24.8% (37)	28.2% (64)	12.7% (8)	24.4% (113)
Nothing is preventing me from riding	0.0% (0)	3.4% (5)	10.6% (24)	25.4% (16)	9.7% (45)
Other (please specify)	1 reply	12 replies	24 replies	16 replies	53 replies

Beginner

- I am a new rider and not comfortable enough with biking around a lot of traffic

Intermediate

- Weather: Too hot or cold,
- motorists can be aggressive and unwilling to share the road which tends to dictate where I will ride.
- Injury
- steep long hills, but not sure that anything could be done about that
- I ride almost daily in summer. Lack of daylight limits me in winter.
- I avoid certain paths because I have been chased by 2+ dogs viciously barking and chasing, very afraid of loose dogs. I don't think irresponsible dog owners should let their dogs loose and out in the road. I often just drive to the Tobacco Trail to avoid meeting dogs on the side roads. It is tremendously limiting to me.
- musculoskeletal issues
- my bike is in storage
- I don't think Chatham Co has created a biking culture with respect for bikers' safety. This has been done successfully in Carrboro, Orange Co, and other communities, through public service announcements, billboards, and other media. Drivers need to be educated about why folk bike, and how to drive safely near bikers. Bikers need to be equally engaged in safe SINGLE FILE biking, staying to the right, etc.
- not enough time
- do not own a bike
- I don't have my own bike and only bike with friends who have spare bikes that I can borrow

Advanced

- Don't currently own a bike.
- Too few Mountain Bike Trails
- I travel with beginner youth who need safer roads or preferably paths.
- No shower at my office.
- I avoid most roads during "rush hour" due to combination of lane width and motorist skill/behavior
- I do avoid certain areas and streets due to the unfriendliness of the roads and drivers
- I have to waste 40 hours a week at my job.
- I bike as much as my body will take at 66
- busy work schedule
- health reasons
- mostly its fear of drivers texting and talking on cell phones
- I spend most of my time cycling off road, because it is the safer option.
- work and daylight savings time
- I am 64 years old and have been a regular cyclist my entire adult life.
- Narrow roadways without shoulders
- not enough days off work
- chip seal roads, narrow shoulders

- There is no bike shop in Chatham County
- lack of showers at work
- Shoulders are too narrow, no bike lanes
- Limited Daylight and I don't trust motorists in NC at night to keep me safe
- No showers at work.
- Riding alone is terrifying and motorist can be really ugly. I think that wider roads are the answer. Just an extra 12-18" on the right of the white line would work in most cases. Motorists get frustrated because they cannot pass and also some cyclist are inconsiderate and will not ride single file or bare as far to the right as possible to let motorists pass.
- rural roads are too narrow and dangerous; too risky

Don't Ride

- no bicycle
- I do not reside in Chatham County
- no bike
- traffic
- disabled right now
- out of shape
- don't bike
- no bike
- Dont want to
- cyclists should bike in designated areas only - not back, curvey, country roads
- unsafe but not due to motorists behavior
- not a priority for county government
- Rather do something else most of the time
- I would prefer to bike anywhere else in NC or other states.
- Strongly resent bikes on the road and I will not be one of them. It should be illegal.
- Bikes are a hazard to motorists

8. On average, how far are your rides (one-way) now or potentially if you did ride?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Less than a mile	4.3% (1)	2.1% (3)	0.9% (2)	9.6% (5)	2.5% (11)
One to 5 miles	69.6% (16)	32.6% (46)	8.8% (19)	28.8% (15)	22.2% (96)
6-10 miles	17.4% (4)	28.4% (40)	10.2% (22)	9.6% (5)	16.4% (71)
11-20 miles	4.3% (1)	19.1% (27)	19.0% (41)	7.7% (4)	16.9% (73)
More than 20 miles	4.3% (1)	17.0% (24)	61.1% (132)	9.6% (5)	37.5% (162)
I would not ride	0.0% (0)	0.7% (1)	0.0% (0)	34.6% (18)	4.4% (19)

9. Would the following improvements influence you to bike more often?

Bike lanes on major roads?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	45.5% (10)	63.5% (87)	67.3% (140)	10.0% (5)	
Maybe, I might bike more often	27.3% (6)	21.9% (30)	16.3% (34)	30.0% (15)	
No, I would bike the same	18.2% (4)	10.2% (14)	15.9% (33)	16.0% (8)	
No, this would make me bike less often	4.5% (1)	1.5% (2)	0.0% (0)	28.0% (14)	
Not sure	4.5% (1)	2.9% (4)	0.5% (1)	16.0% (8)	
<i>Rating Average</i>	<i>1.95 (22)</i>	<i>1.58 (137)</i>	<i>1.50 (208)</i>	<i>3.10 (50)</i>	<i>1.74 (417)</i>

Widened outside/curb lanes on major roads?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	41.2% (7)	48.8% (62)	71.1% (150)	8.0% (4)	
Maybe, I might bike more often	35.3% (6)	33.9% (43)	18.0% (38)	32.0% (16)	
No, I would bike the same	11.8% (2)	11.8% (15)	10.4% (22)	16.0% (8)	
No, this would make me bike less often	5.9% (1)	1.6% (2)	0.0% (0)	24.0% (12)	
Not sure	5.9% (1)	3.9% (5)	0.5% (1)	20.0% (10)	
<i>Rating Average</i>	<i>2.00 (17)</i>	<i>1.78 (127)</i>	<i>1.41 (211)</i>	<i>3.16 (50)</i>	<i>1.77 (405)</i>

Paved and widened shoulders on rural roads?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	47.6% (10)	61.8% (84)	76.3% (158)	14.0% (7)	
Maybe, I might bike more often	28.6% (6)	26.5% (36)	15.9% (33)	28.0% (14)	
No, I would bike the same	19.0% (4)	8.1% (11)	7.7% (16)	20.0% (10)	
No, this would make me bike less often	4.8% (1)	0.7% (1)	0.0% (0)	18.0% (9)	
Not sure	0.0% (0)	2.9% (4)	0.0% (0)	20.0% (10)	
<i>Rating Average</i>	<i>1.81 (21)</i>	<i>1.57 (136)</i>	<i>1.31 (207)</i>	<i>3.02 (50)</i>	<i>1.63 (414)</i>

More off-street bike paths/trails?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	65.2% (15)	71.9% (97)	45.3% (87)	12.2% (6)	
Maybe, I might bike more often	26.1% (6)	14.8% (20)	22.4% (43)	42.9% (21)	
No, I would bike the same	8.7% (2)	9.6% (13)	29.2% (56)	14.3% (7)	
No, this would make me bike less often	0.0% (0)	0.7% (1)	1.0% (2)	12.2% (6)	
Not sure	0.0% (0)	3.0% (4)	2.1% (4)	18.4% (9)	
<i>Rating Average</i>	<i>1.43 (23)</i>	<i>1.48 (135)</i>	<i>1.92 (192)</i>	<i>2.82 (49)</i>	<i>1.85 (399)</i>

More on-road bike signage?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	15.8% (3)	22.1% (27)	31.2% (59)	4.0% (2)	
Maybe, I might bike more often	47.4% (9)	35.2% (43)	22.2% (42)	26.0% (13)	
No, I would bike the same	26.3% (5)	33.6% (41)	43.4% (82)	30.0% (15)	
No, this would make me bike less often	5.3% (1)	1.6% (2)	0.5% (1)	20.0% (10)	
Not sure	5.3% (1)	7.4% (9)	2.6% (5)	20.0% (10)	
<i>Rating Average</i>	<i>2.37 (19)</i>	<i>2.37 (122)</i>	<i>2.21 (189)</i>	<i>3.26 (50)</i>	<i>2.41 (380)</i>

More maintenance of existing facilities?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	11.1% (2)	24.2% (29)	31.5% (57)	4.1% (2)	
Maybe, I might bike more often	55.6% (10)	30.0% (36)	28.7% (52)	16.3% (8)	
No, I would bike the same	11.1% (2)	31.7% (38)	37.0% (67)	36.7% (18)	
No, this would make me bike less often	11.1% (2)	2.5% (3)	0.6% (1)	18.4% (9)	
Not sure	11.1% (2)	11.7 (14)	2.2% (4)	24.5% (12)	
<i>Rating Average</i>	<i>2.56 (18)</i>	<i>2.48 (120)</i>	<i>2.13 (181)</i>	<i>3.43 (49)</i>	<i>2.44 (368)</i>

Appendix A: Bicycle Survey Results

More driver and bicyclist education programs?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	26.3% (5)	28.5% (35)	50.8% (99)	12.0% (6)	
Maybe, I might bike more often	42.1% (8)	31.7% (39)	25.1% (49)	14.0% (7)	
No, I would bike the same	21.1% (4)	33.3% (41)	21.5% (42)	30.0% (15)	
No, this would make me bike less often	5.3% (1)	2.4% (3)	0.5% (1)	20.0% (10)	
Not sure	5.3% (1)	4.1% (5)	2.1% (4)	24.0% (12)	
<i>Rating Average</i>	<i>2.21 (19)</i>	<i>2.22 (123)</i>	<i>1.78 (195)</i>	<i>3.30 (50)</i>	<i>2.14 (387)</i>

Tighter enforcement of traffic laws?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	23.5% (4)	28.1% (34)	50.0% (95)	8.3% (4)	
Maybe, I might bike more often	41.2% (7)	28.9% (35)	25.3% (48)	25.0% (12)	
No, I would bike the same	23.5% (4)	33.9% (41)	22.6% (43)	27.1% (13)	
No, this would make me bike less often	0.0% (0)	2.5% (3)	0.5% (1)	16.7% (8)	
Not sure	11.8% (2)	6.6% (8)	1.6% (3)	22.9% (11)	
<i>Rating Average</i>	<i>2.35 (17)</i>	<i>2.31 (121)</i>	<i>1.78 (190)</i>	<i>3.21 (48)</i>	<i>2.16 (376)</i>

More bicycle parking/storage at destinations?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	11.1% (2)	19.8% (24)	20.6% (36)	4.2% (2)	
Maybe, I might bike more often	33.3% (6)	24.0% (29)	24.0% (42)	16.7% (8)	
No, I would bike the same	44.4% (8)	42.1% (51)	50.9% (89)	35.4% (17)	
No, this would make me bike less often	5.6% (1)	4.1% (5)	1.7% (3)	20.8% (10)	
Not sure	5.6% (1)	9.9% (12)	2.9% (5)	22.9% (11)	
<i>Rating Average</i>	<i>2.61 (18)</i>	<i>2.60 (121)</i>	<i>2.42 (175)</i>	<i>3.42 (48)</i>	<i>2.62 (362)</i>

Amenities (i.e. benches or water fountains)?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Yes, I would definitely bike more often	11.1% (2)	14.8% (17)	13.3% (21)	2.2% (1)	
Maybe, I might bike more often	27.8% (5)	21.7% (25)	14.6% (23)	24.4% (11)	
No, I would bike the same	55.6% (10)	51.3% (59)	64.6% (102)	33.3% (15)	
No, this would make me bike less often	0.0% (0)	5.2% (6)	1.9% (3)	20.0% (9)	
Not sure	5.6% (1)	7.0% (8)	5.7% (9)	20.0% (9)	
<i>Rating Average</i>	<i>2.61 (18)</i>	<i>2.68 (115)</i>	<i>2.72 (158)</i>	<i>3.31 (45)</i>	<i>2.78 (336)</i>

Other (please specify)?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
	0 replies	7 replies	11 replies	6 replies	24 replies

Intermediate

- I favor a road usage tag for bikes in the \$5-\$10 range annually for improvements
- Keep dogs off of roads or from chasing. More fences
- I would welcome ANY of these ideas. If we create a more welcoming environment for cyclists, motorists will expect to see them and will learn to exercise more care.
- With room for bikes, and less loose dogs, I would be able to bike many more places and keep the car parked.
- On-road bicyclists present a risk to themselves and vehicular traffic when driving in large groups or when riding side-by-side. I would encourage legislation/regulation limiting grouping/clustering. Most on-road
- Signage, tighter enforcement of traffic laws, and driver education are not components that would influence and change motorist behavior from experience.
- Bicycle paths and routes which actually GO somewhere I/we want to go such as grocery stores, restaurants, churches, schools, entertainment, city/town centers.

Advanced

- Finish and pave tobacco trail end to end
- Bike Paths and bike lanes are not needed. Enforcement of traffic laws are paramount.
- less sprawl, i.e., closer destinations
- my largest barrier to biking to work is the attitude of motorists during rush hour drive time. There needs to be consequence for their behavior
- Educating drivers to pass safely and educating bicyclists to share the road would be the most effective improvements.

Appendix A: Bicycle Survey Results

- Do not forget places for off-road mountain bike riding!
- Country roads need to have shoulders or wider shoulders. Many have none at all, which cause problems between bikes and cars. Bicyclists are here to stay.
- Off road cycling trails
- More bicyclists in Chatham County would encourage me to bike more often; power in Numbers. More/better street lights would encourage me to bike more often.
- I see the questions about maintenance of existing facilities. Other than greenways I don't know of any "bike facilities"
- signage is useless without facility improvement

Don't Ride

- I think biking in traffic is unsafe
- I find that true cyclists bike in a safe manner and do not need amenities or special consideration. As a vehicle operator/driver, I get frustrated that so much time and discussion appears to be spent on cycling.
- I think most of Chatham is unsafe for biking, both for drivers and for the cyclists
- don't bike
- Anything that would make the bike riders obey the traffic laws and yield to vehicles
- Signage for bicyclists to carry insurance just like automobile owners.

10. What Chatham County intersections or roads are difficult to bike on and why?

Beginner

- 751 and Lewter Shop Road - no shoulders and lots of traffic
- old graham rd narrow shoulders
- Jones Ferry / Hamlet Chapel - too narrow, too busy
- all other than hwy 64 due to lack of shoulders
- 15-501 - Fast driving motorists
- Tobacco Road off of Poythress - the road was scraped and gravel was placed down making for a very bumpy and dangerous portion of my route.
- 15-501- Too busy; motorists are not sensitive to bikers
- NC
- Pittsboro Goldston Rd/curves and hills in a rural area
- Green Level Rd - blind curves with no shoulders
- salisbury street narrow road
- Secondary roads - fast driving motorists
- thompson street--narrow road
-

Intermediate

- Hwy 64: No bike lanes
- Hwy 64 from Siler to Pittsboro [traffic and no bike lane]

- Silk hope rd -----to narrow---high traffic
- W. Third St. because traffic speed and no shoulder
- 15-501-Traffic
- circle around downtown Pittsboro
- Exiting the Piggly-Wiggly in Pittsboro is tricky when it is rush hour.
- hwy 64, scary, especially for kids
- HWY 751 - TOO NARROW - TRAFFIC TOO FAST
- 15-501 no dedicated bike lane
- pittsboro/goldston rd....traffic issues/no bike lanes
- County-wide: Dogs
- US-64 -- too busy and traffic too fast
- In general, a lot of cars pass bicycles too closely going too fast.
- 15/501 and Mann's Chapel - Unsafe drivers in the turning lanes
- Rt 751
- Tody Goodwin road because road surface is too rough.
- 15/501 Lots of traffic
- US64 - debris on shoulder. Too many flats
- US 64/Traffic
- Farrington Rd/Beaver Creek: narrow, traffic
- The shoulder of 64 from Pittsboro to Wilsonville is a minefield of debris and car parts. Very risky to ride. I don't like to ride on 64, but sometimes it's necessary for a short distance.
- 751 (narrow shoulders and high speed traffic)
- NC
- 15-501...insufficient bike lanes...I would prefer offroad (standalone) bike trails along side 15-501
- Hwy 751: No shoulders
- US 64 business east of town near hanks chapel... shoulder too narrow
- Old US 1 - lanes too narrow
- NC
- Business 64 (East). Narrow roads and higher speed than downtown. No shoulder.
- Farrington Rd, curvy and narrow
- all roads, because of speeding cars
- Highway 87 - narrow, trucking traffic way too fast, no bike lane
- N/A
- Big woods, no shoulder to ride on safely
- Business 64
- most roads are narrow and dangerous for biking to many close calls
- along Hwy 64
- 15-501...traffic, no safe lane
- The Farrington Road network from Lystra to Hwy 54 in Orange County is too busy for bicycle riders

Appendix A: Bicycle Survey Results

- old lystra and 15/501 trying to make left on 15/501 if no car is there the light never turns
- 15-501.. too busy
- 15-501 between Pittsboro and Cole Park Plaza. Lane edge is wide but no protection from fast vehicles.
- Mann's Chapel Road: folk drive too fast, there's no bike lane and the shoulder is non-existent; it's a busy road now and it will be a lot worse when Briar Chapel matures!
- Old 421-repaved and narrow road-vehicles typically are going beyond speed limit
- near Jordan lake almost anywhere
- 15-501 and Powell Ln. (intersection in front of the Mc Donalds). Busy traffic.
- Manns Chapel Rd. - no shoulder
- 15-501 - traffic too fast (45-55 mph posted, 50-70 mph actual) for how narrow & blind the curves are
- Manns Chapel - aggressive drivers and high traffic volume
- Hwy 64 West, road is too narrow. Not enough space for bikes
- Manns Chapel Road --no lanes, lots of hills
- Pittsboro Moncure
- Manns Chapel Road - narrow roads and fast drivers who drive too close to bikes
- Mann's Chapel-too narrow with no wide shoulder
- 15-501-- too much traffic, drivers too unsafe/unaware of cyclists, many rural chatham co. roads the same
- All Chatham County roads and intersections - not safe - no room
- all stop light intersections on 15/501. Bikes don't usually trigger the light. You have to wait for a car to trigger
- Mann's Chapel Rd. -too dangerous, too little space.
- Pittsboro goldstone rd. Narrow and high speed limit
- Siler City/Glendon Rd - too busy
- Mann's Chapel Road....no room anywhere and too many curves
- All Chatham Roads are dangerous
- Town of Pittsboro if more sidewalks need bike trails.
- Business 64 west of Pittsboro. Fairly narrow and high speed traffic and one decent hill
- 15/501: No bike lanes
- mt gilead, no shoulder
- US 64 no dedicated bike lane
- 64...no bike lane
- N. Pea Ridge -- too narrow and traveled by trailers with wide boats
- Jones Ferry/Hamlet's Chapel - Limited visibility and speeding motorists are a poor mix
- Rt 751 and Avent Ferry Intersection is NUTS that it isn't a 4 way stop.
- Farrington Rd near Jordan Lake, rough road, lots of traffic
- 15/501 – Traffic
- Old US 1: narrow, traffic

- Wide bike lanes on Lystra would be nice. As you probably know, Lystra is heavily used by cyclists for hill training. Nobody is ever going to climb that hill at a pace that will satisfy motorists, but we're going to keep climbing it.
- Andrews Store (rough, rutted pavement)
- Farrington Rd: No shoulders
- 15/501 in town -- the way parking is set up makes it difficult to ride
- Pea Ridge Rd - lanes too narrow
- Hollands Chapel, vicious loose dogs
- old graham road (old 87) - narrow, no bike lane
- along route 751
- 64 Bus...traffic, no safe lane
- Manns Chapel intersection at Andrews Store is very dangerous
- Mount Carmel Road - road too narrow to deal with fast vehicles
- Lystra Road: it's soooo steep, there's no bike lane and the shoulder is non-existent; and it's a busy road with a lot of truck traffic
- Hwy 902 West-Vehicle speed
- Hwy 751 - no shoulder - blind corners - fast traffic
- Mann's Chapel Rd - too narrow, no shoulders
- 15/501 Manns Chapel to Briar Chapel/Harris Teeter --back entrance not completed
- lystra church. curvy and cars often speed and the shoulder is not wide enough for cyclist to feel safe.
- 902 narrow and high speed limit
- As a car driver, I think the bicyclists on the road make it dangerous for all
- 15-501 hwy trail by roads
- 15-501 to chapel hill, busy, scary, not a big shoulder
- 902 narrow road
- 15-501...same
- Friendship Road Pavement is Terrible (Especially at the Rt 751 end and the Gap in road at bridge -both sides)
- 902 in spots: traffic, narrow
- Hortons Pond, loose dogs there too in a few places
- 64 - no bike lane, trash and debris on road
- 87...traffic, no safe lane
- Old Lystra Road: there's no bike lane and the shoulder is non-existent; it's twisty and hilly, lots of blind curves
- Manns Chapel to Southern Village park--sidewalk up 15/501 stops at Park and Ride, no safe way up Manns Chapel
- 751 no dedicated bike lane, crazy drivers
- unpaved section of Am Tobacco Trail: not paved
- Green Level West, very narrow and has a super bad/ blind curve

Appendix A: Bicycle Survey Results

- 15-501- no bike lane, trash and debris on road
- Pbo-Goldston Rd...no safe lane
- Big Woods Rd and 751 (both)...traffic, no safe lane

Advanced

- 87 & GumSprings Narrow
- Siler City Gendon Road has very little room for cyclist and cars to co-exist
- All
- Hanks Chapel / Hillsboro intersection - traffic moving too fast across 3 lanes with no pedestrian \$ bike crossway
- Hwy 64 and Mount Gilead Road - the light does not last long enough for a bike to cross
- Mount Carmel Church Road/Farrington Road
- Jones Ferry Road - high speed and heavy traffic, no shoulder for bikes to may way for cars
- NC
- Pothole on Lamont Norwood
- 751: The road is very useful -- goes to a lot of important places, but it's too narrow and too fast.
- beaver creek/ fearrington/ hwy 64 there is a lot of traffic at this light and intersection is large and the light rarely gives time to get across safely
- US 64 - Lots of junk on the shoulder – hazardous
- mt. carmel church road, too narrow, dangerous so close to cars, no bike lane
- New Hill / Olive Chapel
- nc 87; no shoulder and LOTS of traffic
- Left from 1108 to Martha's Chp. Cyclists unsafe in center of road--Have been passed by hi speed
- 15-501 High Speed. Little Bicycle signage
- Hwy 64 and 751. The light does not work for bikes turning north from hwy 64. You have to run the light when clear.
- OKelley Chapel: narrow and 50 mph speed limit too fast
- 751 due to high speed impatient traffic and width of lanes
- Big Woods and 64
- any narrow winding and/or hilly roads that don't have paved and widened shoulders
- 751 & Holland Chapel Road -- Cars driving too fast and too narrow of a road to see traffic behind you to make safe turn
- NC
- I avoid 751 because of speed and trucks
- None immediately come to mind.
- 15-501 and Mann's Chapel: busy intersection, drivers don't look for bikers, no bike lanes, no shoulder coming in from the north, businesses all around
- NC 87 Business Pittsboro due to lack of wider paved shoulder even the intown sections from new roundabout to 15-501
- Some traffic signals do not respond to bikes waiting at cross streets, left turn lanes
- NC751 - posted and acutal MV speeds too high for lane widths

- Greensboro/Chapel Hill Rd, between Snow Camp and Lindley Mill Rd. Cars/trucks speeding excessively with limited visibility (rolling hills)
- 751 & Lewter/Holland/Martha, difficult to make left hand turns
- see me; I can provide detailed info on map.
- crossing 64 and 15-501 is unsafe
- NC
- 15/501--no bike lane and the shoulder often has flat tire causing litter
- Mann's Chapel where is it two-laned.
- O'Kelley Chapel Rd- very narrow and heavy traffic
- NC 751- great spine route, but lots of traffic and not much shoulder
- US-64 between Mt. Gilead Rd. and Foxfire Trace: no other way to get to Gum Springs than via US-64
- pittsboro"s main circle
- Mt. Carmel Church road is too narrow, even for the traffic volume, much less for cyclists. I used to bike on it before Jordan Lake and the subsequent development.
- traffic circle: motorists cut in front of cyclists as they are turning out of or into circle
- narrow rural roads w/ little to no shoulder AND with high speed traffic
- White Cross Rd. southbound turning onto Crawford Dairy Rd- poor pavement conditions
- Rt 64: Lack of shoulder
- circle in downtown Pittsboro, traffic flow
- Old Lystra Rd/15-501 - Light does not detect cyclist coming off of Old Lystra onto 15-501 or onto turning onto Old Lystra from 15-501 going towards Pittsboro.
- HWY 64 and Farrington Rd
- 751 from 64 going north
- 15-501 - heavy/fast traffic
- Tar & Chip roads are not kept in good repair, broken pavement, rough wear spots, etc
- HWY 15-501 / 87 N/S there is practically no shoulder and huge trucks use that highway do not pass safely.
- Mt Guiliad Church no shoulder
- Mann's Chapel, narrow with no shoulder
- Mann's Chapel - narrow shoulder
- 15-501 entering Chatham. needs bike lanes
- 15-501 and Manns Chapel Road - can't get a left turn signal because I'm not heavy enough to trip the sensor
- Mann's Chapel Road / no bike lane with 45mph speed limit
- 15-501; bike lane in chapel hill section, but not in county (orange & chatham); crazy/fast drivers
- Manns Chapel/15/501 confusing light sequences
- 15-501 north of Mann's Chapel, there is no defined shoulder to ride on.
- 64E from the pittsboro circle; many cracks, potholes and gravel that is hell on tires and body

Appendix A: Bicycle Survey Results

- Generally rural roads are very narrow with little or no shoulder combined with fairly heavy traffic on some of these roads like Pittsboro-Moncure road, Hwy 87, Pittsboro-Goldston Road, Hwy 902.
- Ferrington Road from Jack Bennett north to the Chatham line. Narrow lanes, lots of traffic, cars at 80mph.
- All chipped and sealed roads are terrible to ride on, many bumps, uncomfortable, slow cyclists down
- 15-501 is terrifying, but that is the main corridor through which I have to go to get anywhere - school, work, shopping
- getting from Jordan Lake to downtown Pittsboro and CCCC. Busy traffic and debris on small shoulder
- The intersection of Hillsboro St & Thompson/Hanks St. There is no light, high traffic, and cars turning in all directions.
- 64, Shoulders have rumble strips which are difficult.
- NC-87 has narrow lanes, with big trucks driving fast. Not much safe space for cyclists
- Pittsboro Moncure rd it is too curvy
- Hwy 64 east, in Pittsboro, motorists tend to drift around the road, there's no bike lane.
- AB
- US 15-101, too busy, narrow shoulders
- Tobacco Road. Very loose chip seal and low traffic on road prevents surface from becoming smoother.
- Pittsboro Moncure road
- 15-501 & Old Lystra, awkward light timing
- NC 902, narrow, no bike lane
- 15/501 is certainly a challenge due to no shoulder or bike lane in spots and a prevailing attitude of motorists that does not respect cyclists on that road, despite the fact that you need to use it to access many other
- 15-501 north of town center and south of 64 bypass - narrow/no shoulder
- the community college trails don't have a wheelchair accessible egress and on ramp in the main entrance forcing us to get off the bike and walk it across the street
- Where Hwy 64 splits off onto Thompson Street. There is no shoulder on the road when heading west on 64, so I typically take Thompson Street and cut back to avoid the traffic and lack of paved shoulder.
- Manns Chapel Rd near 15-501 - traffic volume, speed, no shoulder, blind hill(s)
- Lemont Norwood is a little rough. Could use more shoulder. I like how River has been recently paved.
- 15-501 from Powell Place to Chatham Marketplace in Pittsboro due to narrow, crumbling shoulder
- Ferrington Rd - narrow with fast traffic
- 15-501 North from Downtown Pittsboro to the Haw River or points North
- Silk Hope & Gum Spring Line of sight

- Lower Rieves Chapel rd. The condition of the road is almost unrideable
- 15-501 - narrow shoulder within town limits
- Hwy 15-501 and Manns Chapel
- Hwy 87 - high speed and heavy traffic, little shoulder for bikes to may way for cars
- Rough pavement on roads on/around Crawford Dairy
- pea ridge road pavement conditions of much of this road are not rider friendly
- Beaver Creek Road
- nc 907 just west of pittsboro; no shoulder
- southbound autos on both my left and right side while waiting to turn left--Not Fun
- Highway 64 High Speed, Little Bicycle signage
- rt 751 too narrow, no good alternate side roads
- 15 501
- Farrington due to high speed impatient traffic and width of lanes
- US 64
- 751 & Martha's Chapel Road -- Cars driving too fast and too narrow of a road to see traffic behind you to make safe turn
- 15-501: shoulder is ok, but is often covered in glass, gravel, and road debris that makes riding difficult/dangerous
- Old 64 Business Pittsboro due to lack of wider paved shoulder and the bad gaps in pavement from old concrete sections settling
- NC 87, around Castle Rock Farm Rd and Chicken Bridge Rd. Cars/trucks speeding excessively.
- Andrews Store- heavily damaged road surface
- Beaver Creek Road/Farrington Point Road- would be nice to have more shoulder between T. Goodwin and Crosswinds Campground. Great bike camping route.
- US-15,501 between Lystra Rd. and Manns Chapel Rd.: no other way to go east or west to Lystra than via 15,501
- rives chaple / lousy road surface that keeps getting patched
- rives chapel church road: very rough riding due to pavement, although it is on some great bike routes and hard to avoid
- White Cross Rd. north and southbound at Old Greensboro- poor pavement conditions
- All rural roads: Lack of shoulder
- Rives Chapel Road, uneven surface
- Plaza Drive/Manns Chapel and 15-501 lights do not detect cyclist
- HWY 64 and Big Woods Rd
- Farrington north from 64
- 64 business - heavy traffic, many traffic lights
- Lystra Road, narrow with no shoulder
- 751 - narrow shoulder
- until recently, river rd. thanks for paving!
- Smith Level Road - way too narrow to safely ride and cars FLY on this road

Appendix A: Bicycle Survey Results

- Iystra rd. the shoulder is too narrow and cars travel very fast on this road.
- Jones Ferry from Frosties North to the Chatham Line. Limited sight distance, traffic above posted limit.
- mann's chapel road is also terrifying - no shoulder, no bike lanes, lots of blind curves and very aggressive drivers
- going from downtown Pittsboro to the Orange County border. Busy traffic, narrow shoulder, debris
- Thompson St. is scary to bike on. The road is narrow, windy, and drivers rarely follow the speed limit.
- 64 , Some shoulders are narrow.
- Pittsboro-Moncure Rd has narrow lanes, with many big trucks driving fast. Not much safe space for cyclists.
- moncure-pittsboro rd, no bike lane and many logging trucks.
- Most of north Chatham rural roads, busy and narrow
- Andrews Store Road/Loose new chip seal.
- All roads, leash laws not enforced
- Thompson street is only difficult when there is traffic because there is no shoulder. The potholes and cracks are also really dangerous. Lighting is terrible.
- 15-501 between Manns Chapel and Southern Village - traffic volume, speed, no bike lane
- Demascus Church, (not sure if quite in Chatham County) Not enough shoulder for cyclists
- In town (Pittsboro) due to traffic and road side parking/ cars moving quickly into and out of spaces
- Hwy 87 - narrow shoulder and fast-moving trucks
- Hwy 64 - large shoulder but trash, debris, and glass are often along this area
- hwy 751 much of this road has little shoulder and cars travel VERY fast with little regard for cyclists especially ay intersections
- Farrington Point
- us 64; although there is a full shoulder, it is unpleasantly busy
- 15-501 needs bike lanes
- bridge to Bynum Rd
- Mt Gilead Church and 64
- 751 & Lewter Shop Road -- Cars driving too fast and too narrow of a road to see traffic behind you to make safe turn
- Hamlet Chapel: very narrow, no shoulder at all (and it's hilly and curvy)
- 15-501 Business Pittsboro section on north side after 64 business no shoulder and no bike lanes until almosr downtown
- US-15,501 between Jack Bennett Rd. and Andrews Store Rd.: no other way to go east or west to Jack Bennett than via 15,501
- henderson tanyard by Shakori Hills / loose gravel road- very unsafe
- fearrington road near bells: especially rude and dangerously-driving motorists

- 15-501 between 64 and 87 - road is narrow and very busy road
- NC 751 (the entire road)
- 15-501 and 54 - cars make the turn onto the 54 on ramp regardless of cyclists trying to ride straight in the shoulder
- Green Level Road/Green Level Church. Frequent large cycling groups from Cary have upset motorists.
- Farrington Road. Busy traffic, narrow shoulder, debris
- "The Circle" -- Cars are not looking for/aware of cyclists.
- 15, 501, I worry about drivers not giving legal space to bikes.
- 15-501N in pittsboro towards Lowes has narrow lanes without much safe space for cyclists
- 902 could use a wider bike lane, especially in a route from pittsboro circling back to 64
- Back Roads in general/NC motorists understand to wait for a safe place to pass a tractor, but they will take stupid risks to pass a bike or group of bicyclists.
- Pittsboro Goldston Rd, narrow, no bike lane
- Traffic circle! People don't pay attention to pedestrians trying to cross the street, let alone a biker. It is dangerous to be riding your bike around the circle and so you end up having to walk and use the crosswalks,
- Lamont Norwood - rough road surface
- Jones Ferry could use more shoulder
- general county roads on many occasions drivers "sneak up" on cyclists and blow the horn loudly to scare riders. i've also had someone throw firecrackers at me while I was standing by the road
- Pea Ridge
- 15-501 in northern chatham. curbs make for dangerous riding. they are for water, not cyclists
- Ferrington & Martha's Chapel Road -- Cars driving too fast and too narrow of a road to see traffic behind you to make safe turn
- All rural roads: very narrow, no shoulder; ok for less busy roads but traffic has been picking up
- Martin Luther King section leaving Siler City north due to lack of wider paved shoulder and high speeds
- Big Woods Rd: lots of broken pavement on the outside of the road in both northbound and southbound directions
- 87 the road is narrow and busy
- Lewter Shop Rd and 751
- 54 and 40 - to ride east on 54 when the two right lanes turn right onto 40 is a bit of a pain. most motorists don't understand why I need to take over the middle lane
- 15-501 from Lowes Drive to downtown pittsboro. Narrow. No good alternative paved route.
- Moncure-Pittsboro Rd. -- The only route to Pittsboro from Mocure-Pittsboro Rd, very narrow shoulder, cars and logging trucks of all shapes and sizes often driving over speed limit and are not aware of/looking for
- Pittsboro Moncure Road is dangerous because it does not have a paved shoulder and because of the high traffic volume due to the tractor trailers using it as a short cut. The truck drivers have never been

Appendix A: Bicycle Survey Results

- Poythress could use more shoulder
- 15-501 just south of pittsboro; about one mile has very little shoulder and LOTS of traffic
- Old 421 is nice due to low traffic but needs repaving with wider shoulder and fixing old concrete gaps in pavement
- Martha's Chapel Rd and 751
- Franklin St in chapel hill - tons of cyclists but no protected lane - why! The risk of being doored here is super high.
- 15-501 at Mann's chapel intersection. Cyclists frequently run the red light.
- Rt 87 -- Major thoroughfare with a very narrow shoulder and drivers often speeding.
- 751 is quite scary, so is Ferrington

Don't Ride

- Farrington Road; not enough room for vehicles and groups of bicycle riders (congestion causes loss of patience)
- US 64 too much traffic
- Hwy 902 - narrow, curves, no shoulders, fast traffic
- Highway 902/road is too curvy to see bicyclists ahead of the curve, not enough places to pass on road
- 64- lots of junk on side of road
- in town Pittsborro...not enogh safe areas
- Hwy 902 near Pittsboro-there are no shoulders
- 87 north -- too narrow
- Mann's Chapel Road - busy and narrow.
- 15-501 from Cole Plaza north to the County Line, no room for cars to pass if traffic in both lanes
- Pittsboro Goldston--fast traffic
- None. A true cyclist should simply follow the law and show courtesy to those in vehicles
- All of route 902. Someone is going to get hurt, It's dangerous enough for cars with all those trucks and the curves and no shoulder. Bikes are a hazzard.
- Goldston/Carbonton Road not enough space on side of road to ride too hazardous
- Lystra Road (same problem as above)
- US 421 not as much traffic but still no safe place to ride
- Mt. Gilead Church Road...SPEED LIMIT SHOULD BE 45mph NOT 55mph, too much traffic, curves, unsafe
- Old Graham Rd -- too narrow
- Less Travelled roads throughout the County (and State) have little or no paved shoulder
- 902--too curvy and fast traffic
- Alex Cockman. It's barely safe for cars, never mind for cars and bikes.
- Hwy 42 not enough space on side of road to ride too hazardous
- US 15 501 way too much traffic and no where to ride
- Hywy 751 see above SPEED LIMIT SHOULD BE 45mph
- 15-501 /87 south -- too narrow -- no bike lane

- West street from route 87 to the bypass.
- NC Hwy 751 already dangerous road
- All back roads -- too narrow and no bike lane
- Alston Chapel between town and Alex Cockman.
- 15-501, north and south of the circle.

11. Have you ever ridden one of North Carolina’s State Bike Routes in Chatham County?

	Beginner	Intermediate	Advanced	Don’t Ride	Totals
Yes	0.0% (0)	27.7% (39)	62.0% (134)	5.8% (3)	40.7% (176)
No, but I want to	43.5% (10)	27.0% (38)	9.7% (21)	17.3% (9)	18.1% (78)
No, I’ve never heard of them	39.1% (9)	32.6% (46)	12.0% (26)	19.2% (10)	21.1% (91)
Not sure	4.3% (1)	10.6% (15)	16.2% (35)	0.0% (0)	11.8% (51)
No, I don’t ride	13.0% (3)	2.1% (3)	0.0% (0)	57.7% (30)	8.3% (36)

12. Have you ever ridden on the American Tobacco Trail in Chatham County?

	Beginner	Intermediate	Advanced	Don’t Ride	Totals
Yes	21.7% (5)	48.2% (68)	64.8% (140)	7.7% (4)	50.2% (217)
No	52.2% (12)	29.8% (42)	26.9% (58)	23.1% (12)	28.7% (124)
No, but I plan to	26.1% (6)	21.3% (30)	8.3% (18)	17.3% (9)	14.6% (63)
No, I don’t ride	0.0% (0)	0.7% (1)	0.0% (0)	51.9% (27)	6.5% (28)

13. Where in Chatham County do you live? (enter in municipality, subdivision or general area)

	Beginner	Intermediate	Advanced	Don’t Ride	Totals
Siler City	8.7% (2)	7.1% (10)	1.4% (3)	19.2% (10)	5.8% (25)
Pittsboro	34.8% (8)	28.4% (40)	15.3% (33)	17.3% (9)	20.8% (90)
Goldston	13.0% (3)	2.8% (4)	1.4% (3)	13.5% (7)	3.9% (17)
Other (specify in comment field)	13.0% (3)	31.9% (45)	14.4% (31)	26.9% (14)	21.5% (93)
I do not live in Chatham County (specify location in comment field)	30.4% (7)	29.8% (42)	67.6% (146)	23.1% (12)	47.9% (207)
Other (please specify)	8 replies	87 replies	165 replies	22 replies	282 replies

14. Please provide any comments or concerns you have regarding bicycling in Chatham County.

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Replies	3 replies	49 replies	97 replies	20 replies	169 replies

Beginner

- We need roads with wider shoulders.
- Our law enforcement - Sheriffs department - need to spend some quality time on 15-501 North and South. The driving speeds are ridiculous! I have even called 911 several times to report poor driving.
- We live in a rural area. The roads have hills and curves. It is dangerous to be traveling those roads while using safe driving skills, watching for deer, school buses and now cyclists. Rural roads without bike lanes or paths should not be utilized for cycling. When meeting large vehicles (school buses, poultry trucks, dump trucks, etc.) and given the road conditions, a driver cannot maneuver around cyclists safely. It is dangerous for me as a driver, my children as passengers and the cyclist. I don't mind cyclists but they should be in designated areas for their safety as well as motorized vehicles safety.

Intermediate

- Chatham Co. would be a great place to ride if there were more bike lanes.
- I feel highway & road bike riders should be required to have a usage tax or tag which could be utilized for bikes routes, etc. on our roads & highways.
- It would be great if some of Siler City streets were wider or had bike lane. It just doesn't seem safe to ride on the main roads...between the narrow roads (no shoulder); traffic moving at higher rate of speed than posted speed limit and idiot drivers paying more attention to their phones, ipods, radios, etc than to the road.
- The trails @ Briar Chapel are outstanding. I hope Native Trails has the opportunity to build more of them (in Chatham).
- I would like to ride and encourage my kids to ride more, but there are limited safe places. I would also like to consider riding to work at UNC, but I am not comfortable riding with fast traffic on busy roads with narrow shoulders. We have ridden from our house to Pittsboro several times, but riding on 64 is scary with kids.
- I would love to see more bike trails.
- Safety
- Road maintenance is the biggest problem, followed by no bike lanes. The fact that you are taking this survey is very heartening. Chatham is a great place to bike.
- More bicycle lanes would be a huge help. Also, law enforcement should take harassment of cyclists and unsafe passing seriously.
- I think making a bike path parallel to 15/501 between Chapel Hill and Pittsboro would be really cool.
- Thank you so much for doing this survey. I cycle mostly recreationally and I would like to cycle more. In the past year, I have had two friends get hit by cars and in one case it was a hit and

run. I also want to get my kids out on their bikes but worry about safety. We confine our family rides to our neighborhood. Raising awareness about these issues and welcoming cyclists can help create a cycling community.

- Please put in more bike trails and let us know where they are. :)
- I give Chatham County a lot of credit, because it is at least a place that one can ride some what safely, but it still could use some considerable work to make it safe and thoroughly enjoyable. ALL counties/states need to do a much better job in educating vehicle drivers of Bikers road rights. Most are great, but the few.....
- I live in Apex but take many long distance bicycle rides that take me into many parts of eastern Chatham County.
- Wide boat trailers that leave no room on the right as they pass are very dangerous.
- I live in Apex, right near county border
- The new ATT segment is beautiful! Can't wait until we get the I-40 bridge built in Durham, and we will be able to ride all the way on the bike path!
- Bike lanes, bike lanes, bike lanes
- Chatham County is very beautiful and would be a great place to ride more often.
- I ride the rural sections of Chatham County. You have some really great roads (scenic, challenging terrain, generally low traffic). Maintenance is the key. Nobody wants to ride on roads that destroy wheels and tires. Always nice to see Chatham County Sheriff Department support on the larger charity rides that go through there. I ride the ATT in Durham frequently, but I avoid the Chatham County sections because it it not paved. If I ever get a mountain bike, I'll try the Chatham County sections of the ATT.
- Chatham county has some wonderful biking opportunities and is definitely a big biking area today. Wide shoulders on big roads like 64 and 15/501 are helpful. If you could only flatten some of those hills :-)
- Main interests are wider shoulders on back roads and bike paths parallel to busy roads.
- Eastern Chatham County is very important to those of us road riders escaping the cycling hell that is Wake County. Wider shoulders would be most helpful on the rural roads in Chatham. Also, I ride my mountain bike frequently, and while I generally ride my road bike from home, I am willing to travel long distances and pay for gas, food, lodging etc. in order to get to a good set of mountain bike trails (single track). This is a feature lacking from Chatham County, which is a shame because it is such a beautiful county. If you added some nice singletrack, I'm certain a ton of people from around the Triangle would pour into Chatham County to use it.
- wantt more off-road options- new state land on Moncure road, other off-road parks like shaeron Harris
- I am an avid off road biker and ride a minimum of once a week. I do not consider riding on the roads in Chatham due to their being no shoulder or bike lane.
- Most of the problem is the "hate" between drivers and bikers. There are friendly drivers, but there are some drivers that just don't like bikers, and they seem to get as close as they can to scare the rider. Or they honk long and load. Some drivers think honking is nice to the riders, but really it is more disconcerting and scary. Bikers that wear headphones are a real problem.

Bikers that don't stop at stop signs, or move forward through red lights, are dangerous. So all in all more education on both sides would be beneficial!

- I would love to see off road bike paths or greenways that connect rural chatham to towns.
- No bike paths for major roads: 64 business, 15-501 N.
- I live off Farrington Rd.....in the summer I see hoards of bicycles go by and lots of vehicles with boat trailers, scary combination, I hear squealing tires all of the time. I ride alone, I would like to see large groups ride single file. I see cars pass them even if they are on a curve. I've seen 2 accidents on my curve over the years. It is a scenic route over the lake twice, would LOVE to see a specific BIKE lane, for roller blading, walking too. I've lived here 15 yrs and almost always drive somewhere to walk, roller blade or bike. I would also like to see some enforcement for loose dogs, I am VERY afraid of dogs that chase me. I had a friend that was chased and knocked down when they bit her back tire and required 2 yrs of shoulder surgery and therapy...she still aches in the cold weather.
- I have seen absolutely no effort by the county to promote biking other than some recreational trails. We need to support people in moving from a car-based lifestyle to something more sustainable and healthy. Bike lanes, signage, and education are so important.
- I'd like a place to run with my kids biking along side me- so more of a trail away from the road where elementary aged kids can bike safely.
- In addition to a distributed collection of single track trails, I would very much enjoy an interconnected route of off-road biking trails, so that it could be practical to commute/travel reasonable distances between such areas without the risks of road riding.
- Having Bike Paths along 64 would be a great asset to the community
- I ride around my neighborhood only. It's a 1.2 mile loop. I do lots of loops, but it's the only place I feel safe riding. Chatham County roads are not conducive to safe biking.
- I'd love to ride my bicycle more but the small roads scare me -- they're too narrow and winding for drivers to pass safely in many spots and I fear that drivers are in too big a hurry to slow down and wait for the right moment to pass.
- If the roads were more safe, with bike lanes, I would ride more often.
- Bicycling could be big in Chatham County especially along the 15-501 corridor if folks felt safe when cycling. I would love to ride to work (about 6 miles) whenever weather permitted if I felt safe along 15-501. Thanks for taking time to research this forward thinking strategy.
- Motorists are scary on roads with little or no shoulder as many pay no heed to cyclists.
- I would love to see and participate in more safe biking in our County. I think we have a way to go, especially in creating safe bike lanes / adequate shoulder areas to allow drivers and bikers to share the road safely. I am a very good driver who pays attention to everything around me. I try to be respectful to bikers but when they insist on riding 2x2 on busy roads, even when they hear you coming from far enough away, it's frustrating. I believe that our county needs to follow the path that Carrboro, Chapel Hill, and Orange County did awhile back-- Public service campaigns and engaging road signage to educate drivers and bikers to SHARE THE ROAD, etc. This will be critical as our county grows and places such as Briar Chapel spill thousands more cars onto 15-501 and surrounding roads. Bikers & pedestrians will be more at-risk, and as car

technology expands, drivers will be more distracted by electronic dashboard displays, texting, etc. Educating the public now can promote safety for all in advance of all the potential challenges we will face in years to come. Although paving costs more to add bike lanes and increased shoulder areas, it's the price of safety for drivers and bikers to be able to share the roads throughout our county. Thank you for the opportunity to comment!

- Despite marked "share the road" signs many motorists disregard cyclists and safety. As a cyclist, there have been a few times that safety has been a real concern. Despite a incidents, I will continue to bike in Chatham County because of the therapeutic benefits for health and well-being along with enjoying the beautiful countryside.
- cheap traffic signs make a huge difference!
- The American Tobacco trail is awesome. It would be nice to have a bike path closer to North Chatham. Even a 3 mile loop would be nice. Larger shoulders on back roads would also be great. They are really dangerous, almost more so than the major roads. As a paramedic in Orange County most of the bike accidents (vehicle hits) were on the back, rural roads because cars are travelling so fast on curvy , narrow lanes and there are no shoulders.
- I LOVE the new Tobacco Trail work!!!! Thank you!! We go every other weekend at least. We would probably barely use the car on the weekends and could bike or take the bus almost everywhere if Manns Chapel were safer for cyclists (maybe cross walk to Briar Chapel from highland Forest and safe lane up to the 15/501 light?). Now we get in the car, drive to Briar Chapel, and bike the trails. We would also bike every day in the Summer to the pool over the Orange county line (Heritage Hills) if there were a safe route up Manns. Same with the Lowes, restaurants in Cole Park Plaza, etc, or South to Harris Teeter. We could also bike with the kid to Woods Charter or the new Middle School if Manns were safer.
- Did you know that my children are no longer allowed to ride their bikes to Horton Middle School? They used to. But now the rules have changed. No bikes allowed.
- We desperately need/want bike trails and paths
- In general I've had good experience riding in Chatham County. the wider outside lane on 15/501 has made a big difference and the wider shoulder on Manns Chapel is really nice. I wish every road had a bike lane or at least a wide shoulder. I have had some run ins with rude motorists. I wish there was more education concerning cyclists and their rights. It's surprising to me how many people think that bicycles have no place on the road even after the recent economy has forced more people to turn to bikes for basic transportation. Also I love the mountain bike trails at Briar Chapel. I hope there will be more legal sustainable trails built in the county in the future.
- Motorists are not very safety conscious regarding bicycles.
- It would be nice to have more trails. I do not fell safe riding the side of the roads. Some drivers have no consideration for anyone or anything.
- My dream is for an off-road shared use path between Pittsboro and Siler City, as well as perhaps Jordan Lake and on to Apex and Cary.

Advanced

- Bike groups(10plus) should have to get a special permit to ride on the highway.
- When I first moved to Chapel Hill (May 2000) I did a lot of cycling in Chatham County with my bike club (Tricyclists). Over the past 10 years there has been so much development in some rural parts of Chatham County that I rarely ride there anymore.Roadways do not generally provide sufficient space for safe bicycle and automobile co-mingling.
- It would be wonderful if as routine maintenance a shoulder were provided on roads. This would provide a bit more room for bicyclists.
- I ride for recreation primarily, and I would LOVE to commute into work on a regular basis. But I cannot trust the motorists on Mount Carmel Church/Farrington Road. . .especially without a proper shoulder to the road.
- I live in Carrboro, but enjoy biking in Chatham County for recreation, to visit friends, and to attend events in Pittsboro or at Shakori Hills. I would like to see more done to promote courtesy between bikes and cars, and I realize this goes both ways. It would be great if some heavily traffic routes like Jones Ferry could be made safer for bike commuters. I am a seasoned rider, and one of the scariest rides I've ever done is coming into Chapel Hill from Chatham County on a Monday morning at around 8am.
- Mountain Biking Trails can be a day destination and bring myself and friends into the local area. We buy parts at local bike shops as well as food at local establishments before and after we bike. Having Mountain Bike Trails is great stimulus to local economy.anything that can be done to improve biking in the county will improve the quality of life for everyone.
- I rode years on Texas rural roads. We would camp and then take day rides as large groups with sponsored rest stops. Chatham co could be a great sight for bike groups with Jordan lake camping nearby. Which = tourist money. Plus weekly rides for those living here would be much more fun if wide roads promised safer rides for me and my kids.
- many bike lanes/paths are very short and go nowhere
- Just that you are interested in this feedback gives me a lot of hope that improvements can be made. Chatham County is a lovely place to ride and I love being there.
- Beautiful roads - lots of options - sometimes cyclists are not good at following the rules of the road...make it worse for the rest of us.
- there need to be more bike lanes on roads.
- Nice to ride out with less traffic although have had some run-ins with non educated auto drivers and is a long way from home if something should happen
- in spite of rampant development there still is lots of great bicycling in chatham county. there are many quiet back roads and most drivers are courteous enough. my biggest concern is in regards to the proposed high-speed corridor using us 64 across jordan lake. for cyclists heading east from pittsboro, although the current road is far from desirable, there is almost no alternative to using this route.
- Chatham County is very beautiful. Let's hope continued development does not significantly impact the county's beauty.

- marking with sharrows would be good first cheap step. road widening probably the biggest impact for me. trails wonderful, but likely expensive to install.
- As a physician, I would also like to see a mandatory helmet law for all riders.
- drivers buzzing -- driving too close -- to riders drivers honking at riders drivers cursing at riders
- My biggest concern with cycling in any part of NC is the attitude of the minority of drivers and the condition of the roads. A driver who drives only a foot away from cyclists combined with a pothole filled road is a deadly combination. The cyclist needs to avoid the potholes and the drivers, which is difficult and dangerous.
- I live in Holly Springs but cycle in Chatham County frequently.
- I love the beautiful country roads in Chatham County. I usually ride 60 - 100 miles each time I ride. Thank you for this survey. I hope it helps to bring more people into the world of cycling. It is great exercise and what it does for your mental attitude is awesome. It is like playing again outdoors when you were a kid!!!
- Wider roads would be most helpful. I've noticed over the past 5 years that roads repaved removed the shoulder. This has caused increased aggressive behavior toward cyclists by vehicles wanting to pass, but we now take up more of the lane because of reduced shoulders. Thanks for taking the survey.
- Chatham county or any county . . . Motorists drive very dangerously around bicycles. Bicycles are basically Pedestrians for all intents and purposes. Instead of slowing down to pass a rider safely, motorists speed up. Motorists have no idea of what small hazards a bicycle rider may encounter that could shift their path of travel to be directly in front of a improperly passing vehicle. A bicycle rider's safety should not come second to the slight inconvenience of a motorist that has to slow down and delay their arrival to their destination by a few seconds so that they may safely pass a cyclist. I understand the frustration some impatient motorists may have to experience when encountering a cyclist. However, the fact remains that motorists have very little respect for cyclists nor do they understand cyclists have the right by law to use the roadways, and as much of the roadways as they need to proceed safely. However, the problem in this area is much bigger than motorists vs. cyclists. In general, motorist driving habits are deplorable: 60-65 mph speed in 45 mph zones; Failure to "Ever" come to a complete stop at stop signs; passing in no passing zones; failure to "Ever" use turn signals. I am utterly amazed at the lack of police enforcement of traffic laws in this general area (Chatham, Wake, Durham, Orange County, etc.) If the laws are not going to be enforced then why even have them?
- We put on a bike ride for Relay For Life the first Sat. in August each year and part of the ride goes through Chatham Co.. Fall Creek Church Rd., 902, Antioch Church Rd., NC 42 and others. It would be safer to have signs & wider areas for cyclist on all the roads. Thank You for your efforts.
- I think Chatham County is a great place to ride. Better than Wake County overall. I think driver education is the key to safe cycling on the roads. I have ALLOT of experience riding on the roads and the biggest point to get across to motorists is that bike riders have every right that motorists do to be on (share!) the roads. My experience shows that many rural residents don't follow the "share the road" mentality.

Appendix A: Bicycle Survey Results

- I would like to see tighter enforcing of laws by officers concerning belligerent drivers and violent behaviors towards cyclists. I have had two incidents where they result is, "Well, you know we are near the lake and people like to drink near the lake." Sure...but they don't have to throw bottles and run us off of the road at the same time.
- Bike Paths and bike lanes are not needed. They do not in anyway provide safe roads for cyclists. They are only there to line the pockets of contractors with taxpayer dollars. People that do not ride will start to think that cyclists are not allow on the roads if more greenways and trails are built and they will slowly start to overturn existing traffic laws to get cyclists off the road. Enforcement of traffic laws is paramount. All funds for any projects that involve creating more bike lanes, trails, and greenways should be given to law enforcement so that they can patrol the roads more frequently and keep drivers from harassing cyclists. This happens nearly every single group ride that I have been on in Chatham County. Their are people who intentionally try to run down the group with their vehicles, throw objects out their windows, and yell obscenities. When calling in these complaints to Chatham County officials, very little is ever done to address these incidents.
- I do the majority of my cycling in Chatham County and have not had any serious incidents, but have to say my anxiety level while riding is often higher than I would like it to be. 15-501 is the only area road I've ridden that has a shoulder, although drivers tend to actually give less space than on shoulder-less roads. Signage/bike lane road paintings might be helpful in this regard. The shoulder is also so covered in gravel and road debris that riding can be difficult or dangerous. Country roads are almost all very narrow and feel very dangerous near curves and hills. One of the problems with many of these roads (e.g. Hamlet Chapel) is that the edges are often in bad condition, requiring that cyclists ride further out into the road.
- Often bike from home to Pittsboro on Old Graham or start at Pittsboro Elementary or Silk Hope Elementary and ride area west of Pittsboro. Ride Chatham Bike Routes #3,#4, #5 and connectors quite often. Ride Route #3 frequently great section is the Carbonton to Glenden section heading into Goldston, wide shoulders wide lanes, and low traffic volumes.
- Cary
- While it won't influence my decision to ride my bike in the future, I would like to see more driver and cyclist education regarding the rights and priveleges of each. It needs to be clearly communicated to cyclists that they are required to follow the same rules of the road as motorists, and motorists need to be aware that cyclists are to be treated with the same respect as motorists. Motorists also need to be made aware how vulberable cyclists are. Sometimes what they think is funny could actually be deadly. If we all follow the same rules in a consistent manner, we can all share the abundant roads and enjoy ourselves in a safe and responsible manner.
- I'm an experienced cyclist and enjoy riding in Chatham County very much. I understand, however, why novices and intermediate riders are shy about riding on many of the "farm-to-market" roads in the area. The expansion of the ATT and connecting greenways the next couple of years will provide opportunities for many people to use the trails, but it would be great if the major connecting east/west roads were made more bicycle-friendly. I suggest a combination of

education (for both cyclists and drivers), signage, road/shoulder widening and bike lanes where possible. Use of the ATT will increase significantly in the next few years. The biggest improvement on the Chatham portion of the trail going forward would be the addition of water supplies, either pumped in or available in containers. Many thanks, by the way, for creating a beautiful section of trail on the ATT through your county. Great work. I'm a League Cycling Instructor and member of Durham's Bicycle & Pedestrian Commission. You're welcome to contact me at cykklist@gmail dot com Best wishes, Ken Kaye

- Harassment from motorists is the single most unpleasant thing about cycling in Chatham County. Harassment might be less if the busiest roads were wide enough for drivers to pass a bicyclist without changing lanes (most state roads are not), but temporary inconvenience is no excuse for the behavior of many motorists. Motorists in other parts of the country or in other countries behave better on the same types of roads. Also, some group rides ride through stop signs without stopping; I prefer to stop when cycling but feel peer pressure to ride through. I usually drop off the back to stop without getting rear ended by other cyclists but then have to race to catch up.
- I ride 3 or 4 organized rides a year in Chatham county. They go over Jordan Lake and through Farrington, Fearington and Siler City. The county is a great place to ride. And the traffic is pretty reasonable. I'd say the biggest bang for the buck for the county with bicycles would be car driver education and law enforcement.
- desperately need motorist education on how to share the road. ditto education of law enforcement on enforcing rules of the road for all road users.
- Thanks for taking an interest in this topic and trying to think of ways to make improvements
- On the whole, Chatham County is a safe place to bicycle. Roads are well maintained, and most drivers are courteous. I bicycle to and through Chatham County often, and patronize restaurants, convenience stores, and hardware stores regularly. Thanks for making any improvements to the hot spots.
- I am one fo the Captains of TeamCBC and an organizer of rides in both Lee County and out of Holly Springs. We have a team of approximately 200 riders. We are in Chatham County often. We use the businesses in the county for rest stops and sometimes for destination stops.
- There's no drinking water on the ATT in Chatham or Wake, and no ATT parking at O'Kelly Chapel Rd.
- condition of some roads. Lack of shoulder.
- I would like to see bike lanes from bus stop to major destinations in Pittsboro and other bus stops
- It is mainly Motorist/Cyclist Education and Awareness - At the end of the day, COURTESY is the answer, and both need to share the road.
- there definitely needs to be more education for motorists and cyclists to know the rules of the road and the rights and responsibilities of cyclists. I wish Chatham/North Carolina would pass a three-foot passing rule.
- The existing shoulder on 15-501 would make for a great bike lane if it was painted as such and IF it was kept clean (rocks, glass, etc. swept on a regular basis).

Appendix A: Bicycle Survey Results

- I love riding in Chatham County. Thanks for asking for input!
- NC751 really needs wider shoulders. Maybe more bike parking in Pittsboro. There is a great connector route between the ATT and Jordan Lake campgrounds (New Hill-Olive Chapel, Toby Goodwin, Beaver Creek Rd, Farrington Point Rd). I'd like to see Chatham work with Wake County on improving these routes.
- I love bicycling in Chatham County. Even though I live in Wake County, I easily ride 2,000 to 3,000 miles per year in Chatham County. The main problem I have with cycling Chatham Co. is that I find myself having to ride on either US-64 or US-15,501 in order to connect with the back roads that I like to ride.
- I generally leave my bike at home when visiting but having a route from Farrington to downtown would definitely motivate me to go to town for lunch/etc.
- Thank you for developing a comprehensive bike plan. We bike weekly in Chatham Co.
- I live in Chapel Hill, but work in Pittsboro. I ride in Chatham County during my lunch hour for conditioning and recreation at least 3 days per week. On weekends I often cycling in Chatham County, as well. Chatham County is a marvelous place to ride a bike. The rural roads tend to have little traffic and most drivers are fairly courteous.
- Chatham co is a great place to ride. Drivers have with rare exceptions treated me with respect on the road as I have to them by always staying to the far right and single file when you hear or see a vehicle behind you...
- Motorists should not exceed 45 MPH on Jones Ferry Road, River Road, and Chicken Bridge Road. Cyclists should observe the rules of the road as well. I don't ride in large groups anymore, but I have. I understand that many motorists are concerned about how to navigate around a large group of semi-competitive cyclists that take up a large space on the highway. I don't have an answer for the problem which is why I usually ride solo or with one other riding partner, usually single file.
- Most motorists I have seen in Chatham County are patient and aware of cyclists. I try to be the same regarding motorists while I'm cycling. There have been a few instances where the motorist was rude or intentionally swerved toward me. I haven't ridden in big packs, and usually ride with 1 to 3 other people, so it is very frustrating to have someone in a car try to run me off the road. I often wonder if that person would feel regret or remorse if they caused a fatal accident with a cyclist. I feel like if they thought they might kill someone with their driving actions, they might think before acting that way. At least, I would like to think this would change their thinking. It is hard to understand why their prior bad encounter with a cyclist affects their attitude towards ALL cyclists. Most of us follow the traffic laws as we should and just want to ride safely without fear.
- I do a lot of recreational riding on rural Chatham County roads.
- Widened outside lanes are a good idea, or a wider lane in the case of simple two-lane roads. Adding a bike lane on roads outside of downtown areas (Chapel Hill, Carrboro, Pittsboro, etc.), however, tends to actually make riding bikes on those roads *more* dangerous because cyclists are forced farther to the right, which negatively affects the cyclist in two major ways. First, it causes greater danger to the cyclist by forcing him or her to ride through debris and potentially

poor road conditions on the shoulder of the road. Second, and more importantly, cyclists who are segregated by even a simple line painted on the road surface don't have the "lane presence" in motorists' perception that they would if the bike lane didn't exist and the motorist were sharing an existing lane, even one of the same width as the overall car plus bike lane's width. In instances like this, motorists often pass in unsafe circumstances because in their view, they have the entire lane available to them- but what if the cyclist needs to avoid an obstacle in the bike lane or the car driver passes without moving over enough to give a safe amount of space to the cyclist? Please do not add bike lanes to roads of this sort- again, widened lanes are great, but creating a false sense of separation by adding a painted line on the road is hazardous for all parties involved.

- I don't live in Chatham County, but many of my weekend bike rides go into Chatham. It's a wonderful county for cycling, but has great potential for improvement if the county takes a proactive approach to cyclists.
- Drivers disregard rider safety by speeding, not leaving significant space when passing, crossing over center and lane lines, and acting aggressively towards riders (I've had people yell and throw things). The roads do not allow any safe shoulder and are too twisty and hilly to offer protection from reckless or distracted drivers (which are most of them). On top of all that, there seems to be minimal to no punishment for hurting a cyclist. I've ridden for over 20 years, but have finally had to give it up because I moved to Chatham County. And to think I moved here specifically for the beautiful weather and cycling. How ironic!
- Driver education is imperative. Folks still think bikes don't belong on the road and are treated as a vehicle. I also think cyclist education is important. I've seen many cyclists in Chatham County riding shoulder to shoulder in conversation, ignoring the car stuck behind them. This enrages the driver and makes them less likely to treat cyclists with respect.
- Chatham county is one of the most beautiful places to ride. I am grateful for being able to live in and around such a wonderful place, and be able to ride and enjoy life. Building roads that have a wider shoulder on either side, which would give cyclist's room, would be a huge encouragement to others and make things much safer. Right now, when the road shoulder affords no room, it forces us onto roads into competition with autos, which is a battle we lose. Our only alternative is to ride as close to the shoulder as we can, but on the road so that we can be seen. Sometimes we have to ride two abreast so that autos do not try and make unsafe passes. If it is a choice between riding further out on the road or two abreast and being seen, or squeezing far to the right and potentially being driven off the road or hit, the choice we have to make is obvious. Here is a current story regarding such a problem: <http://abcnews.go.com/Business/martin-erzinger-morgan-stanley-hit-run-controversy/story?id=12088074>.
- Wider roads. More signs making people aware of looking out for cyclist. Paved Greenways.
- While I know that riders can sometimes be at fault and need education as well, almost every ride I have ever done in a rural setting has had at least one incident of a driver intentionally (or so it seems) trying to cause me or people in my group to have an accident. Drivers seem very angry and that causes them to do rash, stupid things for which they seem to have no idea of the potential consequences for everyone involved-including themselves. As a result of an incident

on my last ride I have not ridden in two months. Almost getting seriously injured or killed takes the fun out of it. Note-I have been on plenty of rides where I think the riders are not sharing the road either. That does not help our situation.

- The problem is that for people who do 'not' ride, they think all cyclists should be on bike paths (or sidewalks in the town). They don't understand there is a difference between a "road bike" and a "mtn bike". Road cyclists ride and train on the road, "not bike paths". I think that drivers need to be better educated about this. Also, I grew up in Pennsylvania where even the country roads are built with shoulders. That is not the case here in NC. Country roads here need to be built a little wider to accommodate both cyclists and vehicles simultaneously.
- I ride often on old US 1, Big Woods, Pea Ridge, Beaver Creek, 64, and surrounding roads. The single biggest issue is that some drivers are very aggressive and ignorant of bicycling laws. They do not "share the road" and insist on intimidating cyclists.
- The main concern is getting to a shoulder where I don't feel as though I might get run down by one of the huge trucks that fly by me. If there was just a little more shoulder room I would feel safer riding on that highway, and I love riding my bike to the store, (which is only 2-3 miles away) but I have to dodge that traffic.
- No off road trails.
- Bicyclists should not be expected to or encouraged to ride on the road shoulder inside the white line. These areas are often unmaintained and littered with road material and other trash and, therefore, unsafe.
- Chatham has a wonderful network of country roads that are enjoyed by countless cyclists. Wider shoulders and bike lanes would encourage more new riders. Education for drivers is always helpful. Most experiences with Chatham drivers have been positive.
- extending the bike lane striping on 15-501 south of Southern Village would be nice (I realize that Southern Village to Smith Level Rd is Orange County, but if Chatham county striped south of Smith Level, Orange county would look foolish not to strip the rest)
- I cyclocommute from Cary to Durham regularly during the work week and I utilize the ATT from New Hope Church to Massey Chapel. If it were not for the Trail now being open through Chatham Co., I would probably only cyclocommute 2 or 3 times a week at best, but now I aim for every day. It's wonderful! Since I ride regularly during the week, I do not ride frequently on weekends, though when I do I head out toward Jordan Lake for 40-50 mile spins. Traffic has really picked up in recent years, but I find the roads safe. I no longer participate in group rides.
- There's no bike shop or community shop in the area whereas chapel hill/carrboro has 6 or 7.
- I hope to be taking my kids out road riding in a couple years. It would be nice if drivers were more aware of cyclists
- My family and I primarily mountain bike. Right now we have to leave the county to get to quality trails and parks. I would love to see the development of more hiking and off road biking trails around pittsboro and around the county.
- I am a strong supporter of wide curb lanes. I am an avid cyclist and I am appalled at how many traffic laws I see violated by other cyclists. Motorists get angry and remain angry at cyclists in general after they witness a cyclist breaking a traffic law. "cyclists use single file" signs along

tight roadways could decrease close calls/driver rage. Shoulder erosion/debris/damage forces cyclists into lanes of traffic frequently. Enforcement of speed limits for drivers, especially during morning and evening commute times would increase safety of all road users.

- The main concern for me is the quality of roads. Orange county has been doing more and more chip/seal roads. I think these roads are TERRIBLE for both cyclists AND drivers. For cyclists, the chip/seal is incredibly uncomfortable, it slows riders down, and it is prone to potholes. For drivers, there is gravel and potholes everywhere that both damage cars and make for uncomfortable ride. Also, the road decays quickly especially over the winter; this means it will need to be repaved again soon. And chip/seal roads likely worsen gas mileage as well, since they are rough and cars will require more gas/energy use to maintain speed over them.
- PLEASE put in curbed bike lanes, or at least bike lanes, support a public ed campaign to increase biking safety, enforce traffic rules STRICTLY and aggressively, educate riders on safe riding (including proper lighting, reflective gear, etc.)
- Chatham County has some of the best roads for cycling in North Carolina (mostly west of the Haw River). I commuted to UNC Chapel Hill from Chatham County for eight years. Most of the problems I encountered with motorists occurred in Orange County. Wider shoulders on rural backroads would be a welcome addition and make cycling in Chatham County a lot safer for cyclists.
- Things like "more on-road bike signage" or "tighter enforcement of traffic laws" may not effect how often I ride but, will make me feel much more safe when I do ride. Things like "more bicycle parking/storage at destinations" or "More driver and bicyclist education programs" also, may not effect how often I ride but, may help to get more riders on the streets and more cars off. I bike throughout Chatham County out of necessity to be able to get to places, as I cannot afford a car, and it is good for the environment and my health. Very little keeps me from biking; I will do it no matter what because I have no other choice. However, just because I bike daily in Chatham County does not mean that it is enjoyable. It is extremely dangerous and difficult. Two cyclists are more visible to drivers than one. Anything that can be done to encourage more people to take their two wheels out instead of four would be a major improvement. One major problem is the lack of a bike shop. If a bike is in need of repair and there is no bike shop in the entire county, a bicyclist can end up waiting days and days before they get a chance to get out of the county to get the proper repairs and equipment.
- I would like better definition of bike routes in Chatham County. Who defines bike routes like 3 & 5 and where do they go? Where can I find this information? These are not the State Bike routes as the State has a different numbering system which overlaps with the county. This can be confusing to someone planing a tour across the State.
- bike lanes and driver education about cyclists would be beneficial. consider the positive impacts of cycling in the community for health and reducing environmental impacts of transportation. I ride my bicycle to work in pittsboro often and rarely see other commuter cyclists in town.
- I ride in Chatham county on group rides that go from Wilson Park in Carrboro. Still learning the roads in Chatham

Appendix A: Bicycle Survey Results

- It is basically unsafe to ride on back roads in north Chatham or northeast Chatham. The highways are wide enough but there's too much traffic and virtually no shoulders. I mostly ride in Pittsboro and south and west Chatham where rural roads are narrow but not busy at all. We need marked bike lanes and wider shoulders in north Chatham, 15-101, US 64 business and on rural roads between Pittsboro, Silk Hope and Chapel Hill. We also need bike trails that connect busy areas of the county. We need places to park bicycles safely, for example in downtown Pittsboro, we have a bus but no good place to park bikes nearby.
- I often ride in Chatham Co. and wish you well in your effort to improve the quality and safety for cyclists riding there. Stedyrider
- I feel like Chatham County has a wealth of bicycling related opportunities. Quiet roads are easy to find in Chatham County, but I just cringe at the way some motorists treat bicyclists. I wish there was a way to educate both drivers and cyclists alike on how to operate and share the roads together. More initiatives in this area would be beneficial for everybody.
- Generally good but could use some signage for rural routes and promote cycling awareness. Ought to have a "race" and rides with cooperative sponsorship to help people see cyclists and work with them
- I would really like to see the leash laws enforced. Roaming dogs probably pose more of a hazard to cyclists than cars do.
- As a cycling enthusiast who rides almost daily to work and for exercise/recreation, I appreciate the effort to consider the needs of cyclists and apparently try to identify and eliminate the barriers preventing people from cycling more often.
- Rural communities often do not understand cycling as an exercise, a sport, or a family event. I witness a race in Chatham county that had one resident out of his house, screaming obscenities at the participants. While clearly not impeding traffic, I have been harassed by cars, and forced to take evasive action.
- I think bike lanes are more helpful than bike paths
- Would love to see some greenways, like the tobacco trail. I use the tobacco trails 1-2 times a week, weather permitting but it's a 20 minute drive to get to.
- County Sheriffs are not up to date on current state and federal laws regarding cycling. I was riding along the white line (my tires were a few inches from the line) at the right edge of Lystra Road when a Chatham County Sheriff pulled up along side and told me I was supposed to pull over and stop to let cars pass. In doing so the Sheriff caused an oncoming car to pull over the white line in the oncoming lane to avoid hitting the Sheriff's car as it was straddling the double yellow line.
- Would love to see bike lanes on the busy streets, or at least paved shoulders. When new roads are constructed, a bike lane should be considered. Also, at public facilities like the Post Office or the bank, we need to have bike racks.
- I am a new resident of Chatham County (relocated from Carrboro) and I work in Chapel Hill. I would like to consider riding my bike to work, but the roads do not seem biker friendly until you reach Southern Village on 15-501. I am more comfortable riding recreationally on rural roads

with less traffic, but have not had an opportunity to do so yet. I would be interested in any and all bike planning/improvements Chatham County does in the northeast quadrant of the county.

- Chatham county is much friendlier than Wake County. I don't get as many angry drivers and the roads are pretty good. Bicyclist are typically good for commerce, too. Especially big organized rides. For example, me and my friends like to ride to the Pittsboro General Store for dessert.
- please use pavement instead of chip/seal for resurfacing. The gravel that accumulates in turns is very dangerous.
- Driver education Re cyclists rights on the road
- Rural roads are simply too narrow. While driving into work everyday I hit a section of road where the sun essentially blinds me for a short period. I'm a courteous, bicycle friendly driver but if there were a cyclist on the road at that moment when the sun is in my eye it's very likely that they'd be hit and injured and possibly killed. I live close enough to my work to cycle commute everyday but the risk makes the prospect untenable. If bike paths or wide enough shoulders were available I would bike-commute to work everyday. Furthermore, I want my tax money supporting a comprehensive transportation system emphasizing rail, bicycle and pedestrian facilities. Subsidies to Big Oil and auto manufacturers have made a rational transportation system much harder to achieve. One can include the wars in Iraq and Afghanistan, responsible for much of our Federal deficit, as part of this subsidy to support an auto dependent transportation system. Oil and other commodities will become increasingly expensive relative to the rapidly declining value of the dollar.

Don't Ride

- Keep bilers off all highways. Do not spend one dime of public money to support such a dangerous activity on public roads. Keep bikes in parks or locations like the tobacco Trail.
- If existing areas could be redone somewhat to allow for people to bike then I'm all for it and would probably use it too. However, we have much larger problems in this county that need attention so this needs to be at the bottom of the list.
- Bicyclists scare me when they are on roads without adequate trails/shoulders to accomodate a bike and a vehicle. Too many times I have seen near accidents because bicyclists are on Hwy 902, and similar roads, in a long line and cars come over a crest in the road or around a curve and hit the brakes hard to avoid hitting them.
- I'd love to bike to work, but I'd need to ride on 15-501, which I don't consider to be safe.
- add wider lanes to the many roads near jordan lake
- East of Pittsboro between Haw River and Jordon Lake
- Question 7 would not let me continue until I made a selection even though I had entered information in the "Other". I'm sure biking is great for some people but it is very scary for a driver who has to contend with a biker on a narrow curvy back road especially if there is more than one biker and they don't know how to go single file and ride closer to the right side of the road.

Appendix A: Bicycle Survey Results

- My biggest concern with biking on main roads is safety for everyone. There is insufficient room on the paved portion of the roadway for bikers and drivers when traveling in the same direction.
- roads are too narrow to bike safely/you can not see the bikes in curves/can not always pass safely /cars belong on roads not bikes
- the bike riders in Chatham County pose a serious traffic risk to all on the road. It should be banned!!
- Would love to bike up Mann's Chapel road to the shopping centers and on up 15/501 into chapel hill if I felt it were safe. I do not feel safe riding on the busy road and would prefer a separate bike path / side walk.
- Chatham County has more to worry about other than bicycling. You should spend your money, time, and resources on something that matters. Like the crime rate.
- If you want to ride a bike they should only be allowed on bike paths, not the highway. But why should my tax dollars pay for a bike path?
- Roads are either busy, or narrow Some cyclists hog the road, and make motorists angry at all riders Occasional Psycho Billies yelling and running me off the road (not that common)
- I have absolutely no concerns about cycling in Chatham County. I just would not. Furthermore, I find the demographic information you have laid out below (race, age, etc.) disgraceful. What difference does that make?
- I cringe when I hear people wanting to promote biking in Chatham. The back roads are scenic, but there are no shoulders and there is not enough room for bikes and cars. Cyclists do not have any respect for other vehicles that use the road, which results in too much frustration for drivers. I would love to bicycle to work, but there are not enough sidewalks or bike lanes and I'm afraid of riding in traffic. I think people who cycle on roads where the speed limit is more than 25 mph should have to register their vehicle and get a license.
- should be illegal - it is very unsafe for drivers and bikers. Bicyclists take over the roads around the Jordan Lake -Moncure-New Hill area, especially on Sunday mornings when people are trying to get to church. We have a lot of curvy roads and they ride in packs, taking up the entire width of the road. When trails like the American tobacco trail are available I don't understand why bikers still need to use our paved roads. I almost hit a guy on Saturday on Old US 1 - he was standing beside his bike - on the paved road - not on the shoulder - taking a water break - I had to slam on breaks and swerve to avoid hitting him. He still didn't move after all that. And another guy was doing the same thing not even a mile away. It's ridiculous. And it would be considered "our" fault if we hit them. This is a sore subject for me because I deal with this on an almost daily basis.
- Bike riders in Chatham County are arrogant, rude and inconsiderant. They do not "Share the Road".
- If bicycles use the highway used by automobiles, they need to have insurance just like automobile owners....was almost in a bad accident going around a curve at below the minimum speed limit and ran up on biker and thank goodness a car was not coming so I was able to move over into on-coming traffic lane!!! If car had been coming, it would have been tragic. Bicycles are

too slow for the highway of any kind. Bicycles need to have their own trail/s or either carry insurance to cover accident just like automobile owners.

- I think this would help for such a rural area as Siler City, as far as health and exercise. So maybe if there is a trail that is safe enough for the citizens to go maybe. I'm not sure most people would take the time to ride to work unless it was a very close destination (5 miles or less). This year alone, I began to see people running or jogging for the first time, so I'm not sure how long it would take to catch on, pertaining a bike trail.

15. Please fill out the contact information below if you would like to receive more information about the Bicycle Plan and the future of biking in Chatham County.

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Replies	5 replies	60 replies	100 replies	8 replies	173 replies

16. What is your age?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Under 18	0.0% (0)	0.0% (0)	0.9% (2)	0.0% (0)	0.5% (2)
19-30	26.1% (6)	10.1% (14)	13.6% (29)	14.0% (7)	13.1% (56)
31-45	47.8% (11)	33.1% (46)	47.2% (101)	38.0% (19)	41.5% (177)
46-60	26.1% (6)	44.6% (62)	32.7% (70)	38.0% (19)	36.9% (157)
60+	0.0% (0)	10.1% (14)	5.6% (12)	8.0% (4)	7.0% (30)
Prefer not to say	0.0% (0)	2.2% (3)	0.0% (0)	2.0% (1)	0.9% (4)

17. What is your gender?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
Male	18.2% (4)	45.3% (62)	78.0% (167)	46.9% (23)	60.7% (256)
Female	81.8% (18)	53.3% (73)	20.6% (44)	46.9% (23)	37.4% (158)
Prefer not to say	0.0% (0)	1.5% (2)	1.4% (3)	6.1% (3)	1.9% (8)

18. What is your race?

	Beginner	Intermediate	Advanced	Don't Ride	Totals
American Indian or Alaska Native	4.3% (1)	0.7% (1)	0.0% (0)	0.0% (0)	0.5% (2)
Asian	0.0% (0)	0.7% (1)	0.5% (1)	0.0% (0)	0.5% (2)
Black or African American	8.7% (2)	1.4% (2)	0.5% (1)	10.0% (5)	2.4% (10)
Native Hawaiian or Other Pacific Islander	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
White	73.9% (17)	84.2% (117)	89.7% (191)	78.0% (39)	85.6% (364)
Other	4.3% (1)	2.9% (4)	1.9% (4)	0.0% (0)	2.1% (9)
Prefer not to say	8.7% (2)	10.1% (14)	7.5% (16)	12.0% (6)	8.9% (38)

Appendix B: Facility Design Guidelines

Design guidelines are a critical component of any bicycle plan as they provide a reference guide for those responsible for implementing the Plan and provide a basis for planning-level cost estimates. Consistent design helps encourage ridership by helping riders gain familiarity with the system, improves safety by enhancing visibility of bicyclists to other road users and improves comfort and safety for existing bicyclists. This chapter includes:

- The pertinent **National and State Guidelines** that the standards are derived from
- Descriptions of **Bike Facility Types**, their appropriate usage and characteristics
- Features of **Bicycle Friendly Intersections**
- Appropriate **Signage** for bicycle facilities
- **Bicycle Parking** guidelines
- Guidelines for bicycle friendly **Drainage Grates**

National and State Guidelines

The guidelines discussed in this chapter are summarized key points from the *Guide for the Development of Bicycle Facilities* (AASHTO, 1999) as well as the *North Carolina Bicycle Facilities Planning and Design Guidelines* (NCDOT Office of Bicycle and Pedestrian Transportation, January 1994). These guidelines are intended for illustrative purposes only; planners and designers should review the latest versions of these and other publications for the most up-to-date standards.

Bike Facility Types

There are three basic types of bicycle facilities: shared roads, bike lanes and shared use paths. These facility types are described on the pages that follow. The table on the following page summarizes the proper usage and characteristics of the facilities. Some of these facility types, such as sharrows and wide outside lanes, can be combined in the same facility. It is important for planners and designers to be aware of the full range of facilities and treatments available and to select the optimal design to suit local conditions.

Shared Roads

Low speed and lightly travelled roads can accommodate bikes safely without pavement markings or other facility enhancements. These roads can include “Share the Road” signs in concert with traffic calming devices. These roads can be signed and numbered bicycle routes and like the existing bike routes, can be used in both rural and urban locations. They are meant to encourage ridership in comparison to other nearby parallel roads that might be less compatible for safe bicycle riding.

Table 17. Bike Facility Types and Characteristics

Facility Type	On Street Vehicle Speed	Curb/Gutter	Setting	Pavement Marking	On-Street Parking
Shared Road	<35 mph	Ok	Usually Urban, sometimes Rural	None	Ok
Wide Paved Shoulder	35-60mph	No	Rural/Countryside	Not required	No
Shared Lane Markings	<35 mph	Ok	Urban or Rural	Sharrow	Ok
Wide Outside Lanes	<35 mph	Ok	Urban or Rural	Not required	Ok
Bike Lanes	<35 mph	Ok	Urban	Bicycle Symbol or Words	Ok
Shared Use Path	N/A	N/A	Urban or Rural	Sometimes centerline, bike symbol	N/A

Wide Paved Shoulder

Adding or improving shoulders for bicycle usage is an important way to provide bicycling facilities in rural areas. This also can extend the life of a road by reducing edge degradation. When resources are limited, these can be placed on uphill sections to reduce conflicts with faster moving automobiles. Paved shoulders should be at least four-foot wide and five feet from any guardrail, curb or other roadside barrier. Roads with speed limits above 50 mph or with significant large vehicle traffic should include wider shoulders. Rumble strips, installed to warn drivers that they are moving off the roadway, should be avoided. If these are required, there should be ample buffer around the rumble strip to allow for a minimum of four-foot wide smooth area for safe bicycle travel.



Figure 40: Example of a wide paved shoulder

Shared Lane Markings

Shared lane markings (commonly called “sharrows”) are pavement markings with two chevrons on top of a bicycle. Sharrows serve a number of functions, including indicating where bicyclists should ride in order to avoid travelling in the “door zone,” conveying that the street is a preferred bike route and reminding motorists to share the road with bicyclists, reducing wrong-way bicycling and encouraging safe passing of bicycles by motorists.



Figure 41: Shared lane marking in Chapel Hill

In the Manual for Uniform Traffic Control Devices (MUTCD) (FHWA, 2009), Section 9C.07, Shared Lane Marking provides

dimensions of this marking and specific guidelines. Sharrows can be used in both rural and urban locations on streets with less than 35 mph speed limit, but not in shoulders or designated bike lanes.

Wide Outside Lanes

Wide outside lanes (sometimes called wide curb lanes) are preferred in areas where shoulders are not available, typically in more urban locations. This roadway design has outside lanes that are at least 14-foot wide. In roadway stretches with steep grades, on-street parking or drainage grates, a 15-foot lane may be necessary, but long stretches of 15-foot lanes may encourage cars to unsafely drive two cars within one lane. In cases where there are significant stretches of outside lane wider than 14 feet, bicycle lanes should be considered. Wide outside lanes should be avoided on very congested roads or roads with significant truck traffic. In these cases, off-street facilities, wide-paved shoulders or bike lanes may be more appropriate.

Door Zone: A dangerous zone where cyclists may hit open car doors. Bicyclists hitting these doors can be seriously injured or killed from the impact or the subsequent deflection onto the path of passing vehicles.



Figure 42: Example of a wide outside lane

Bike Lanes

Bike lanes are portions of a roadway designated by striping, signing and pavement markings for the exclusive use of bicyclists. These are typically used in urban locations or at intersections to guide cyclists and inform automobile drivers on the appropriate roadway position. The width of bike lanes depends on roadway characteristics. Bike lanes should never be placed between parking and the curb as they subject bikes to potential “dooring,” prevent left turns and reduce visibility to motorists, unless there is a physical separation between the parking and the roadway edge.



Figure 43: Bike lane in Winston-Salem

In addition to striping, bike lanes should be marked with pavement markings. These should include a bicycle symbol or the words “BIKE LANE” and a directional symbol.

Table 18. Minimum Bike Lane Width by Roadway Type

Characteristics	Minimum Bike Lane Width (feet)
No curb and gutter; No on-street parking	Four
Curb and gutter; No on-street parking	Five
Curb and gutter; On street parking; Striped parking lane	Five
No curb and gutter; On-street parking; No striped parking lane	11 (from road edge)
Curb and gutter; On-street parking; No striped parking lane	12 (from curb face)

Shared Use Paths

Shared use paths – sometimes called multi-use paths, off-road trails or bikeways – restrict motorized vehicles and are good candidates where the existing road system does not and cannot reasonably serve bicyclists or where wide utility or former railroad right-of-way provides the opportunity to construct such a path. These paths also handle other non-motorized users such as pedestrians or even horse riders. These paths should minimize any intersections with motor vehicles. Paths adjacent to existing roadways (sometimes called sidepaths) are not ideal as they reduce visibility of cyclists, increase the frequency of conflicts at driveway crossings and cause bicyclists to ride against the flow of traffic (a major cause of bicycle crashes). If a path must be built adjacent to a roadway, there needs to be a separation of at least five feet between the two facilities. If this is not possible, some type of physical barrier would help to indicate to both bicyclists and motorists that the path is a facility that is independent of the road.

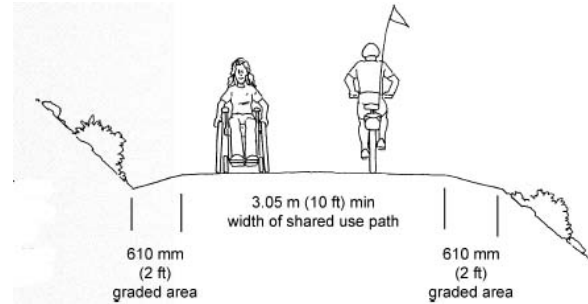


Figure 44: Recommended shared use path dimensions

A shared use path should be at least ten feet wide (eight feet for paths with limited usage) and have a maintained two-foot wide graded area with a maximum slope 1:6 adjacent to the path. The path should have a minimum design speed of 20mph; the speed should be at least the preferred speed of the fastest bicyclists to use the path. The AASHTO guidelines have more specific information on horizontal alignment (grades in curves), grading, sight distance and issues with roadway crossings.

Bicycle Friendly Intersections

Accommodating safe passage for bicycles through intersections is important as a high proportion of bicycle crashes occur there. Providing transitions, particularly at intersections with turn lanes, traffic signals and roundabouts, is important to reduce conflicts and improve safety. Bike lanes should not extend through the intersection or across crosswalks except in the most complicated circumstances. The solid striping at the approach for signalized or turning-lane equipped intersections should be replaced with a broken line.

Intersections with Turn Lanes

Bike lanes that pass through intersections that have turn lanes may increase potential conflicts between vehicles and cyclists. Improved striping may reduce this tendency; lanes can either be striped or eliminated before the intersection. In some cases, bike lanes can be striped approaching the stop bar even if there are no previous bike lanes on the road.

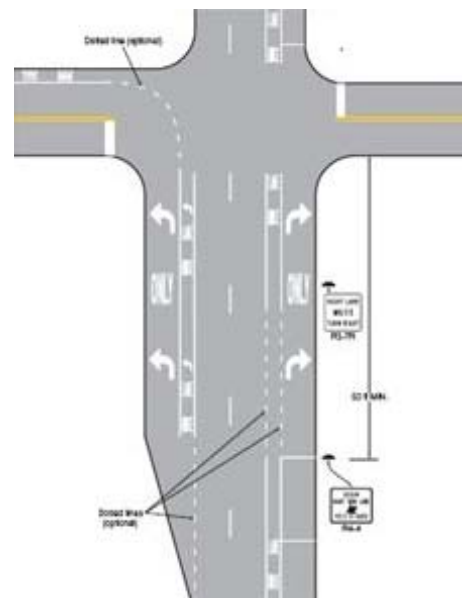


Figure 45: Potential bike lane striping through an intersection

Signalized Intersections

Modifying the signal operation at both pre-timed and actuated signalized intersections can improve comfort and safety for bicyclists at intersections. Many pre-timed signals do not provide enough time for bicyclists to cross. Signals at these intersections can be changed to provide a better experience for bicyclists.

Other intersections that use actuated (loop or camera) signals are not designed to trigger when bicyclists arrive, leaving bicyclists stranded or forcing them to ride illegally against the red to cross. Bike-activated loop detectors can be installed at these intersections to trigger a signal change and provide longer green times to allow bikes to travel through the intersection. The figure at right illustrates the recommended pavement marking for bike-actuated signals.



Figure 46: Pavement marking for bike actuated signal

Roundabouts

As roundabouts are designed for lower speeds, many experienced bicyclists feel comfortable using these as they would a normal roadway. Less experienced bicyclists who may not feel comfortable entering a roundabout can either stop and walk their bike like a pedestrian, or use an adjacent shared-use path or sidewalk, if available. If a path exists, there should be ramps from the roadway onto the curb so that bikes can safely navigate on and off the path. Bicycle lanes should not be extended through a roundabout.

Signage

Bicyclists are typically required to follow the same rules of the road as other users, but there are some signs and pavement markings specific to bicycling. “Share the Road” signs are approved by the NCDOT and are included in the State of North Carolina’s traffic control manual. These signs are typically used when designated bike routes use roads with higher levels of traffic, but can be used in other situations as well. The NCDOT website (www.ncdot.gov/bikeped/safetyeducation/signing) has further information regarding these signs.

In addition to the State manual, the MUTCD regulates all roadway signage in the US while offering guidance on the application of signs depending on the conditions. Part 9, Traffic Controls for Bicycle Facilities, provides specific location, size and usage for these signs. The figure at right shows the warning signs indicated in the manual.



Figure 47: Warning signs for bike facilities from the MUTCD

Bicycle Parking

Providing bike parking, specifically racks, encourages more ridership for those who have concerns about the security of their bikes. Quality bike racks discourage riders from locking bikes to trees, street poles or railings, which may impede pedestrian or even vehicular traffic. Facilities should be provided at both origins and destinations, when possible, and should be located near the entrances of buildings, but out of the way of major pedestrian paths. Racks should support the bicycle upright by its frame. These should be in clear view of windows to provide additional security.

Bike parking facilities in Chatham County should follow the Association of Pedestrian and Bicycle Professionals (APBP) guidelines. These guidelines have just been updated in 2010, but an earlier edition (2002) is freely available (www.apbp.org/link.asp?ymlink=17534). These guidelines include standards on the rack element, the rack itself, the rack area and its site. As discussed in the guidelines, color and types of mounting can vary considerably. The guidelines discourage the use of “wave” style racks, as they are more difficult for riders to park bikes. The guidelines encourage “Inverted U” or “A” style bike racks.



Figure 48: Inverted U-style bike rack

Drainage Grates

As bicyclists often ride as far to the right as possible in the roadway, inlets, catchment basins and drainage grates must allow safe passage of bicycles as well as adequate stormwater drainage. NCDOT’s Roadway Design Manual (Section 5-14) recommends certain types of grates; these grates have slots perpendicular to the path of travel to prevent the catching of wheels and potential accidents.



Figure 49: Bike friendly drainage grate

Appendix C: Tables of Projects

Table 19. Recommended Short-Term Projects

#	Facility Type	Location	Length (miles)	Cost	Notes
S1	Shared Use Path	Love's Creek Greenway (Siler City, SE of downtown)	2.0	\$750,000	
S2	Shared Road	Oakley Church, Jim Brown, Mount Vernon Springs Rds (SW Chatham)	7.6	\$3,100	Install "Share the Road" signs
S3	Shared Road	Bernard Purvis, Chatham St, Bennett, Bonlee-Bennett, Airport Roads (near Bennett)	10.8	\$4,400	Install "Share the Road" signs
S4	Shared Road	McClaurin Rd, Sandy Branch Church, Ike Brooks Rd, Elmer Moore Rd (SE of Siler City)	6.4	\$2,600	Install "Share the Road" signs
S5	Shared Road	NC 902 & Jerry Frye Rd (near Bennett)	4.9	\$2,000	Install "Share the Road" signs
S6	Shared Road	Goldston Glendon, Mert McNamus, Wilson, Glendon Rds (near Goldston)	10.1	\$4,100	Install "Share the Road" signs
S7	Shared Road	Snow Camp Rd (NW Chatham)	2.5	\$1,000	Install "Share the Road" signs
S8	Shared Road	White Cross, Crawford Dairy and Chicken Bridge Rd (north central Chatham)	2.9	\$1,200	Install "Share the Road" signs
S9	Shared Road	Bynum, Bynum Ridge, Durham Eubanks, Mt Gilead Church, Pea Ridge Roads (NE of Pittsboro)	7.9	\$3,200	Install "Share the Road" signs
S10	Shared Road	Lewter Shop Rd (NE Chatham)	1.6	\$700	Install "Share the Road" signs
S11	Shared Road	Moncure Pittsboro Rd (SW of Pittsboro)	5.3	\$2,200	Install "Share the Road" signs
S12	Shared Road (urban)	W Salisbury St, US 64 Bus, Thompson St (Pittsboro)	2.4	\$3,900	Install "Share the Road" signs

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#	Facility Type	Location	Length (miles)	Cost	Notes
S13	Shared Road	Gum Springs Church Rd & Hanks Chapel Rd (E of Pittsboro)	7.8	\$3,200	Install "Share the Road" signs
S14	Bike Lane (restriping)	Hillsboro St (Park Dr to Salisbury St)	0.5	\$7,300	Reconfigure on-street parking
S15	Shared Road (urban)	Credle St (Salisbury St to Sanford Rd)	0.3	\$500	Install "Share the Road" signs
S16	Shared Road	Pea Ridge Rd (SE Chatham)	6.5	\$2,600	Install "Share the Road" signs
S17	Shared Road	Beaver Creek & Farrington Rd south of US 64 (SE Chatham)	9.8	\$4,000	Install "Share the Road" signs
S18	Intersection	US 64 & Big Woods (east of Pittsboro)	N/A	\$5,000	Bike actuated traffic signal and markings
S19	Intersection	US 64 & Beaver Creek Rd (east of Pittsboro)	N/A	\$5,000	Bike actuated traffic signal and markings
S20	Intersection	US 15-501 & Mann's Chapel Rd (NE Chatham)	N/A	\$5,000	Bike actuated traffic signal and markings
S21	Intersection	US 15-501 & Old Lystra (NE Chatham)	N/A	\$5,000	Bike actuated traffic signal and markings
S22	Intersection	Mann's Chapel Rd & Andrews Store Rd (N Chatham)	N/A	\$1,600	Bicycle awareness signs and bike route directional signage
S23	Intersection	NC 751 & US 64 (east Chatham near Wake Co.)	N/A	\$1,600	Bicycle awareness signs and bike route directional signage
S24	Intersection	US 64 & Mt Gilead Rd (east Chatham)	N/A	\$1,600	Bicycle awareness signs and bike route directional signage
S25	Car Parking	New Hope Church Rd (NE Chatham adjacent to American Tobacco Trail)	N/A	\$1.2 million	Paved lot for 100 cars
S26	Car Parking	O'Kelly Chapel Rd (NE Chatham adjacent to American Tobacco Trail)	N/A	\$50,000	Gravel lot for 24 cars
S27	Bike Lane (construction)	US 15-501 N (Mann's Chapel Rd to Orange Co.)	1.1	\$2.3 million	Requires increasing pavement width; may or may not have bicycle pavement markings

#	Facility Type	Location	Length (miles)	Cost	Notes
S28	Shared Road (urban)	Progress Blvd & Alston Bridge Rd	1.8	\$2,900	Install "Share the Road" signs
S29	Shared Road	Silk Hope Liberty Rd (Staley Snow Camp Rd to Siler City Snow Camp Rd)	4.8	\$2,000	Install "Share the Road" signs
S30	Intersection	US 15-501 & Village Way (NE Chatham)	N/A	\$5,000	Bike actuated traffic signal and markings
S31	Bike Lane (restriping)	Sanford Rd (Womack St to NC 87/Moncure Pittsboro Rd)	0.8	\$12,600	Stripe and sign on existing pavement

Table 20. Recommended Long-Term Projects

#	Facility Type	Location	Length (miles)	Cost	Notes
L1	Bike Lane (construction)	2 nd Ave (Siler Business Dr to Cottage Grove Ave)	0.7	\$340,000	Stripe and sign on existing pavement
	Bike Lane (restriping)	2 nd Ave (Cottage Grove Ave to Fayetteville Ave)	0.8	\$12,100	Road diet, from 4 lanes to 3 plus bike lanes
	Shared Road (urban)	2 nd Ave (Fayetteville Ave to Alston Bridge Rd)	0.4	\$700	Install "Share the Road" signs
L2	Bike Lane (construction)	Raleigh St (US 64 to Seventh Ave)	1.0	\$512,000	Requires increasing pavement width
	Bike Lane (restriping)	Raleigh St (Seventh Ave to Dolphin St)	1.0	\$15,300	Adequate road width to restripe
L3	Shared Road (urban)	White Oak (Siler City)	0.2	\$300	Install "Share the Road" signs
L4	Bike Lane (construction)	Alston Bridge Rd (Siler City)	0.6	\$300,000	Requires increasing pavement width; may or may not have bicycle pavement markings
L5	Shared Road	NC 902 (south of Siler City)	9.7	\$3,900	Install "Share the Road" signs
L6	Shared Road	Rives Chapel Rd (east of Siler City)	5.7	\$2,300	Install "Share the Road" signs
L7	Shared Road	Pleasant Hill Rd (central Chatham)	7.4	\$3,000	Install "Share the Road" signs
L8	Shared Road	White Smith, Irving Lindley, Woody Store Rd (central Chatham)	3.7	\$1,500	Install "Share the Road" signs

Appendix C: Tables of Projects

#	Facility Type	Location	Length (miles)	Cost	Notes
L9	Shared Road	Old Graham Rd (NW of Pittsboro)	5.0	\$2,100	Install "Share the Road" signs
L10	Shared Road	Jones Ferry Rd & Lamont Norwood Rd (N of Pittsboro)	7.4	\$3,000	Install "Share the Road" signs
L11	Shared Road	Old Lystra Rd (NE Chatham near Orange Co.)	1.8	\$800	Install "Share the Road" signs
L12	Bike Lane (construction)	Farrington Point Road/ Farrington Mill Rd (NE Chatham)	9.3	\$4.65 million	Requires increasing pavement width; may or may not have bicycle pavement markings
L13	Bike Lane (construction)	Old Farrington Rd (NE Chatham)	1.7	\$830,000	Requires increasing pavement width; may or may not have bicycle pavement markings
L14	Bike Lane (construction)	NC 751 (NE Chatham)	9.4	\$4.7 million	Requires increasing pavement width; may or may not have bicycle pavement markings
L15	Shared Road	Big Woods Rd (NE Chatham Co)	6.4	\$2,600	Install "Share the Road" signs
L16	Shared Road	Tody Goodwin (E Chatham near Wake Co.)	3.3	\$1,400	Install "Share the Road" signs
L17	Bike Lane (construction)	Hillsboro St (US 64 Bypass to Park Dr) (Pittsboro)	1.3	\$626,000	Requires increasing pavement width; may or may not have bicycle pavement markings
L18	Bike Lane (construction)	US 64 W (from US 64 Bypass to NC 87) (W of downtown Pittsboro)	2.4	\$1.2 million	Requires increasing pavement width; may or may not have bicycle pavement markings
L19	Bike Lane (construction)	NC 87 (from US 64 Business to US 15-501 S) (Pittsboro)	1.4	\$710,000	Requires increasing pavement width; should have bicycle pavement markings
L20	Bike Lane (construction)	O'Kelly Chapel Hill Road (NE Chatham Co)	2.8	\$1.5 million	Requires increasing pavement width; may or may not have bicycle pavement markings

#	Facility Type	Location	Length (miles)	Cost	Notes
L22	Shared Use Path*	Rocky River (central Chatham)	29.8	\$1.5 M (unpaved) \$10.5 M (paved)	Trail surface and size has not been determined; from Parks and Recreation Master Plan
L23	Shared Use Path*	Deep River (SE Chatham)	25.0	\$1.3 M (unpaved) \$8.8 M (paved)	Trail surface and size has not been determined; from Parks and Recreation Master Plan
L24	Shared Use Path*	Haw River (north central Chatham)	21.6	\$1.1 M (unpaved)	Planned as a hiking and mountain bike trail with river access, bare earth with some gravel; from Parks and Recreation Master Plan
L25	Shared Use Path*	US 64 (between Siler City and Pittsboro)	11.0	\$3.9 million	Along side of highway
L26	Shared Use Path*	US 64 (between Pittsboro and Wake Co.)	9.5	\$3.4 million	Along side of highway; proposed in US 64 Corridor Study
L27	Shared Use Path*	Southwest Chatham Connector (adjacent to Bonlee Carbonton and NC 42 towards Deep RiverTrail)	3.7	\$185,000 (unpaved) \$1.3 M (paved)	Trail surface and size has not been determined; from Parks and Recreation Master Plan
L28	Shared Use Path*	Moncure Trail (on abandoned rail alignment near Moncure)	3.9	\$200,000 (unpaved) \$1.4 M (paved)	Trail surface and size has not been determined; from Parks and Recreation Master Plan
L29	Bike Lane (construction)	Mann's Chapel Rd (US 15-501 to Poythress)	1.9	\$900,000	Requires increasing pavement width; may or may not have bicycle pavement markings
L31	Shared Road	Old Goldston Rd (Alston Chapel Rd to NC 87)	0.3	\$200	Install "Share the Road" signs
L32	Bike Lane (construction)	US 15-501 & Northwood High School Rd (Northwood High School to Powell Place Ln)	1.1	\$530,000	Requires increasing pavement width; may or may not have bicycle pavement markings
L33	Shared Road (urban)	Old US 421 (Siler Business Dr to Harold Andrews Rd)	0.1	\$300	Install "Share the Road" signs

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#	Facility Type	Location	Length (miles)	Cost	Notes
L34	Shared Use Path*	Love’s Creek Greenway extension	0.7	\$252,000	
L35	Bike Lane (restriping)	Martin Luther King Jr Blvd (US 64 to 2 nd Ave)	0.6	\$10,000	Reconfigure on-street parking
	Bike Lane (construction)	Martin Luther King Jr Blvd (15 th St to US 64)	0.3	\$171,000	Requires increasing pavement width

*For Long-Term Shared Use Paths, lengths are approximate as the routes are under development and meant to help provide an idea of destinations connected and cost estimates.

Cost estimates do not include right-of-way, utility work or necessary bridges.

Table 21. Cost Assumptions by Facility Type

Facility Type	Cost per Unit	Unit Type
Shared Roads (rural, 1 sign per mile)	\$400	Mile
Shared Roads (urban, 4 signs per mile)	\$1,600	Mile
Bicycle Lane (construction)	\$500,000	Mile
Bicycle Lanes (restriping)	\$15,000	Mile
Shared Use Path (10 foot paved)	\$350,000	Mile
Shared Use Path (unpaved)	\$50,000	Mile
Signage at Intersection (bicycle awareness and route directional)	\$1,600	Intersection
Bike Actuated Signal and Markings	\$5,000	Intersection

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Appendix D: Credits & Additional Resources

Image Credits

Chapter 1, page 2: Vision picture; Wayne Clark

Figure 7: American Tobacco Trail; Wikiedia Commons,
upload.wikimedia.org/wikipedia/en/9/95/ATT_chatham.jpg

Figure 8: Old Bynum Bridge; Flickr User, Keith Weston, www.flickr.com/photos/kweston/729558755

Figure 18: Share the Road sign; NCDOT, Division of Bicycle and Pedestrian Transportation,
www.ncdot.gov/bikeped/safetyeducation/signing/default.html

Figure 30: US 64 adjacent shared use path concept; NCDOT, US 64 Thoroughfare Study,
www.ncdot.org/doh/preconstruct/tpb/shc/studies/us64/report

Figure 33: Example of NCDOT handout; NCDOT, Safety Education Materials,
www.ncdot.gov/bikeped/safetyeducation/materials

Figure 34: NCDOT poster example; NCDOT, Safety Education Materials,
www.ncdot.gov/bikeped/safetyeducation/materials

Figure 35: Bicycle Rodeo in Elizabeth City; City Elizabeth City, Police Athletic League,
www.cityofec.com/index.asp?Type=B_BASIC&SEC={88543DA4-0A07-492E-88A8-11BAD7B308D4}&DE={72BC5C54-8E32-4C03-9059-012B409F06A9}

Figure 36: Durham's Bull City Open Streets 2010; Facebook user Bull City Open Streets,
www.facebook.com/BullCityOpenStreets

Figure 37: Asheville Strive Not to Drive poster; Flickr User, Klein Digital,
www.flickr.com/photos/kleindigital/4619834458

Figure 38: SmartCommute Challenge 2011 poster; www.smartcommutechallenge.org

Figure 39: Randolph County Bicycle Map; NCDOT, Division of Bicycle and Pedestrian Transportation,
dotw-xfer01.dot.state.nc.us/gisdot/DOTBikeMaps/Randolph/randolph.pdf

Figure 40: Wide paved shoulder; NCDOT, Bicycle Facilities Guide, wide paved shoulders,
www.ncdot.org/bikeped/projectdevelopment/bicycle_project_type

Figure 42: Wide outside Lanes; NCDOT, Bicycle Facilities Guide, wide outside lanes,
www.ncdot.org/bikeped/projectdevelopment/bicycle_project_type

Figure 41: Sharrow in Chapel Hill; Flickr User, townofchapelhill,
www.flickr.com/photos/townofchapelhill/5395142979

Figure 43: Winston Salem bike lane; City of Winston Salem, Department of Transportation,
www.ci.winston-salem.nc.us/Home/Departments/Transportation

Figure 44: Recommended trail dimensions; Federal Highway Administration,
www.fhwa.dot.gov/environment/sidewalk2/sidewalks214.htm

Figure 45: Intersection with turning lanes; Federal Highway Administration, Manual on Traffic Control Devices, mutcd.fhwa.dot.gov/htm/2009/part9/part9c.htm#figure9C01

Figure 46: Pavement marking for bike actuated signal; Federal Highway Administration, Manual on Traffic Control Devices, mutcd.fhwa.dot.gov/htm/2009/part9/fig9c_07_longdesc.htm

Figure 47: Bicycle Warning Signs; Federal Highway Administration, Manual on Traffic Control Devices, mutcd.fhwa.dot.gov/htm/2009/part9/part9b.htm#figure9B03

Figure 48: U Style bike rack; City of Greensboro, Downtown Greensboro Bike Racks, www.downtowngreensboro.org/citylight/go/bike-racks

Figure 49: Bike friendly drainage grate; Federal Highway Administration, Maintenance of Drainage Features for Safety, safety.fhwa.dot.gov/local_rural/training/fhwasa09024

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