JUNE 2013

City of Sanford, NC

Comprehensive Bicycle Plan

Division of Bicycle & Pedestrian Transportation

CITY OF SANFORD, N.C.

alta GREENWAYS

Acknowledgements

Citizen Involvement

A special thanks to the 100+ local residents who participated in this planning process through comment forms, public workshops, and meetings.

KEY PARTNERS

The City of Sanford
Lee County
The North Carolina Department of Transportation (NCDOT)
NCDOT Division of Bicycle and Pedestrian Transportation (DBPT)
Triangle Area Planning Organization (TARPO)

Bicycle Plan Steering Committee

David Nestor, Community Resident, Adcock & Associates, and Interested but Concerned Cyclist
Adam Beal, Community Resident, BB & T, and Strong & Fearless Cyclist
Joe Wild, Community Resident, and Enthused & Confident Cyclist
Bob Oderkirk, Community Resident, and Enthused & Confident Cyclist
Charlie Storm, Storm Endurance Sports business owner, and Strong & Fearless Cyclist
Dr. Parker McConville, Active Families Foundation, Sanford Fitness Fest organizer, and Strong & Fearless Cyclist
Susan Condlin, NCSU Cooperative Extension, and Interested but Concerned Cyclist
Matt Day, Triangle J Council of Governments
John Payne, Lee County Parks and Recreation Department
Sandra Boyd, Lee County Health Department
David Montgomery, City of Sanford/Lee County Planning Department/Downtown Sanford
Bob Bridwell, City of Sanford/Lee County Planning Department

Project Consultants

Lindsay Smart, AICP, Alta/Greenways
Charles A. Flink, RLA, Alta/Greenways
Matt Hayes, AICP, Alta/Greenways
Brittain Storck, Alta/Greenways
Steve Bzomowski, Alta/Greenways
Allison Bullock, Alta/Greenways

TABLE OF CONTENTS

Tables & Figures

Tables

Figures

Existing Environment 1

Overview & Background

In 1874, the City of Sanford became the first incorporated community in what would become Lee County and has been shaped by transportation from the beginning. The City's downtown core developed along the active rail lines, and historical commerce was primarily based on the production of brick and pottery goods.[1] The area experienced significant population and development growth at the turn of the 20th century and the historic architecture and charm from this period still exists in Sanford's downtown core today.

In addition to the active rail lines in Sanford, several major highways including US 501, US 421, US 15, US 1, NC 87 and NC 42 traverse through the City limits. These major corridors offer easy access to Interstate 40, the Research Triangle, Uwharrie National Forest, Pinehurst, Southern Pines and other nearby communities. Numerous buildings located in Sanford are listed on the National Register of Historic Places, including Buffalo Presbyterian Church, the Farish-Lambeth House, the Lee County Courthouse, the Railroad House, the Temple Theater, the Seaboard Milling Company, the John D. McIver Farm, the W.B. Wicker School and the West Sanford Middle School.[2] The Endor Iron Furnace is a Civil War and Reconstruction Era structure located on the Deep River in northern Lee County. The Furnace was constructed around 1862 by John and Donald McRae and John W. R. Dix and produced pig iron for the Confederacy.[3] The remains of the Furnace are listed on the National Register of Historic Places, and future plans for Lee County include linking the existing greenway in Sanford to the Endor Iron Furnace property.

In an effort to preserve and enhance the quality of life of its residents and to continue the local momentum from the recently adopted *2010 Comprehensive*

Chapter Contents

Pedestrian Plan, the City of Sanford applied for and was awarded a North Carolina Department of Transportation 2011 Bicycle and Pedestrian Planning grant to develop this Comprehensive Bicycle Transportation Plan. This Plan builds on the City's past efforts to become a livable community, with new research and analysis, and includes substantial participation and contributions from the citizens of Sanford.

The result is a complete, up-to-date framework for moving forward with the development of tangible bicycle improvements.

Vision Statement

The following vision statement was determined early in the planning process to guide the development of the Comprehensive Bicycle Plan:

This Plan provides a framework for the City of Sanford and other partners such as Broadway and Lee County, in establishing a comprehensive network of regionally and locally connected bicycle facilities throughout Sanford and Lee County.

August 22, 2012 Project Kick-off Meeting

Bicycle Plan Goals

The goals presented below were developed by the Bicycle Plan Steering Committee during the kick-off meeting in August 2012 and were reinforced by the citizens of Sanford through the public involvement process.

Goals of the Bicycle Plan:

1. Achieve local and regional connectivity through bicycle facility development, a comprehensive signage program that includes wayfinding, and awareness initiatives.

2. Increase the miles of bicycle facilities available to residents and visitors who wish to safely travel to destinations, access points of interest, and enjoy the outdoors.

3. Encourage residents and visitors to view bicycling as a form of transportation and as a way to achieve healthier and more active lifestyles by educating all users on the rules of the road and the benefits of bicycling.

Planning Process

The Comprehensive Bicycle Plan was created through an open and participatory planning process, which strongly encouraged public involvement. The process involved all of the stakeholder members of the Steering Committee, the general public, plus direction from the planning consultant team.

Public Involvement

In order to gain local knowledge and input, a public outreach component was included as an integral part of planning efforts for this Plan. Public input was gathered through several different means, including the following: Steering Committee meetings, a project website, a project comment form, press releases, and public workshops.

The Steering Committee was involved throughout the planning process. During the kick-off meeting, the group reviewed and provided feedback on the project website and project comment form, established a vision statement and goals for the plan, and discussed the timeline and schedule of the planning process. Members of the Steering Committee worked with the consultant team to mark up existing conditions maps to identify potential priority areas and solutions. Input from the Steering Committee is reflected throughout the recommendations of this planning document.

Several public input workshops were conducted during the planning process. The first opportunity was a booth during the Downtown Jubilee in downtown Sanford at Depot Park in October of 2012. At this event, consultants sought preliminary input from citizens for the development of draft recommendations for the plan. The second opportunity for public engagement took place during the 2013 Family Health and Fitness Fair held on March 19, 2013 at the Dennis A Wicker Civic Center. This event solicited feedback from citizens on the proposed bicycle facility and programmatic recommendations for the plan. Recommendations were presented in map form and on educational boards during the event.

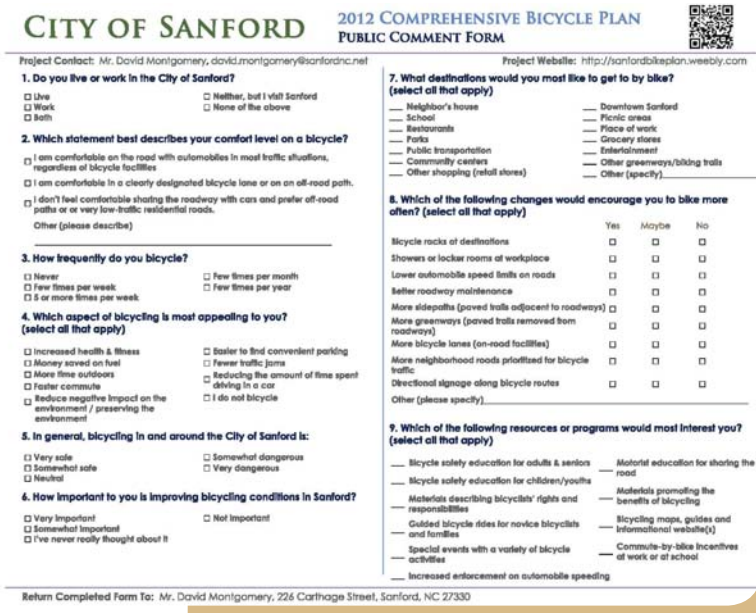
At all outreach and engagement sessions, public input was obtained in the form of map markups, written comments, verbal question and answer sessions, and discussions between citizens, consultant staff and representatives of the Steering Committee. In addition, a hardcopy public comment form was distributed for hand written responses during each event. More detailed information on public outreach and engagement efforts to different populations in Sanford can be found in Appendix A of this Plan.

Public Comment Form

Two comment forms, one in English and one in Spanish, were developed for the City of Sanford's Comprehensive Bicycle Plan and were made available in both hardcopy and online formats. The comment forms were available online throughout the duration of the project. To maximize responses to the online form, the web address was distributed at public meetings, advertised in press releases, sent out to local interest groups, and included on flyers that were distributed around the City. Close to 100 people completed the comment form.

Results of the comment form were collected and tabulated by the Consultant to provide insight into local residents' values and opinions about the project. The results are included in Appendix A of this Plan, along with detailed information on all outreach and engagement activities.

Spanish version of the project information card.


CITY OF SANFORD

2012 Comprehensive Bicycle Plan
Public Comment Form

Project Contact: Mr. David Montgomery, david.montgomery@sanfordnc.net
Project Website: http://sanfordbikeplan.weebly.com

1. Do you live or work in the City of Sanford?
☐ Live ☐ Work ☐ Both ☐ Neither, but I visit Sanford ☐ None of the above

2. Which statement best describes your comfort level on a bicycle?
☐ I am comfortable on the road with automobiles in most traffic situations, regardless of bicycle facilities
☐ I am comfortable in a clearly designated bicycle lane or on an off-road path.
☐ I don't feel comfortable sharing the roadway with cars and prefer off-road paths or on very low-traffic residential roads.
Other (please describe)

3. How frequently do you bicycle?
☐ Never ☐ Few times per week ☐ 5 or more times per week ☐ Few times per month ☐ Few times per year

4. Which aspect of bicycling is most appealing to you? (select all that apply)
☐ Increased health & fitness ☐ Money saved on fuel ☐ More time outdoors ☐ Faster commute ☐ Reduce negative impact on the environment / preserving the environment ☐ Easier to find convenient parking ☐ Fewer traffic jams ☐ Reducing the amount of time spent driving in a car ☐ I do not bicycle

5. In general, bicycling in and around the City of Sanford is:
☐ Very safe ☐ Somewhat safe ☐ Neutral ☐ Somewhat dangerous ☐ Very dangerous

6. How important to you is improving bicycling conditions in Sanford?
☐ Very important ☐ Somewhat important ☐ I've never really thought about it ☐ Not important

7. What destinations would you most like to get to by bike? (select all that apply)
___ Neighbor's house ___ School ___ Restaurants ___ Parks ___ Public transportation ___ Community centers ___ Other shopping (retail stores) ___ Downtown Sanford ___ Picnic areas ___ Place of work ___ Grocery stores ___ Entertainment ___ Other greenways/biking trails ___ Other (specify)

8. Which of the following changes would encourage you to bike more often? (select all that apply)

	Yes	Maybe	No
Bicycle racks at destinations	☐	☐	☐
Showers or locker rooms at workplace	☐	☐	☐
Lower automobile speed limits on roads	☐	☐	☐
Better roadway maintenance	☐	☐	☐
More sidepaths (paved trails adjacent to roadways)	☐	☐	☐
More greenways (paved trails removed from roadways)	☐	☐	☐
More bicycle lanes (on-road facilities)	☐	☐	☐
More neighborhood roads prioritized for bicycle traffic	☐	☐	☐
Directional signage along bicycle routes	☐	☐	☐

Other (please specify)

9. Which of the following resources or programs would most interest you? (select all that apply)
___ Bicycle safety education for adults & seniors ___ Bicycle safety education for children/youths ___ Materials describing bicyclists' rights and responsibilities ___ Guided bicycle rides for novice bicyclists and families ___ Special events with a variety of bicycle activities ___ Increased enforcement on automobile speeding ___ Motorist education for sharing the road ___ Materials promoting the benefits of bicycling ___ Bicycling maps, guides and informational website(s) ___ Commute-by-bike incentives at work or at school

Return Completed Form To: Mr. David Montgomery, 226 Carthage Street, Sanford, NC 27330

First page of the English version of the Public Comment Form

Berkley Place Community Park, Sanford, North Carolina

Current Conditions

This region of North Carolina has much to offer its residents and visitors in terms of active lifestyles, recreation and connections to the outdoors.The City of Sanford has made significant progress in recent years in its efforts to create a more livable community.

This section considers the current physical and natural conditions in Sanford and the surrounding area of Lee County, the study area of this Plan, as determined by the NCDOT Bicycle and Pedestrian Planning Grant. The evaluation of existing physical conditions, opportunities, and challenges serves as the foundation for comprehensive recommendations for the development of both on-road and off-road bicycle facilities. The evaluation includes a thorough analysis of GIS data and field work investigations in Sanford and Lee County. The field work investigations included the exploration of neighborhoods, schools, parks, existing trails, and the downtown core in former Jonesboro, and the downtown core of Sanford to identify opportunities for connections to basic needs.

Physical and Natural Features

In the development of the Comprehensive Bicycle Plan, it was important to identify potential environmentally sensitive areas that may impact the facility recommendations. These elements could be attractive destinations to consider connecting to the proposed trails and greenways.

The study area includes industrial, residential, commercial, urban and rural areas with features such as wooded/natural areas, water features, and neighborhoods with established tree canopies. These different environments were mapped with available GIS data and were thoroughly evaluated during field work investigations.

The GIS data used to evaluate existing conditions and to inform the recommendations of this Plan was provided by the Sanford/Lee County Strategic Services Department. On page 1-7, Figure 1.1 “Existing Conditions” includes information on potentially environmentally sensitive areas such as water features and floodplains. During future design and construction phases, it is also important to assess potential adverse impacts to these sensitive areas.

Destination Areas

There are numerous destination areas in and around Sanford that should be considered when developing a comprehensive network of bicycle facilities. These destinations are opportunities to meet basic needs, including grocery stores, pharmacies, restaurants, health care facilities, parks, commercial centers, public services such as the post office and library, and coffee shops. There are several schools located within bicycling distance of residential neighborhoods.

Existing Opportunities for Bicycle Facilities

The City of Sanford recently constructed Phase I of the Endor Iron Furnace Greenway and has adopted a plan for a future 28-mile greenway corridor that connects the Kiwanis Family Park to other areas in Sanford, Lee County, the historic Endor Furnace property, the Deep River, and Broadway. This proposed greenway corridor was investigated during field analysis, and there is great potential for future trails within the proposed corridor.

Many collector roadways in Sanford generally connect neighborhoods to destinations and to more than one arterial roadway. This grid network connectivity offers great implementation potential for on-road bicycle facilities. Many of the roadway corridors in Sanford have adequate width and have clear and level shoulders. These existing conditions provide suitable opportunities for bicycle lanes, paved shoulders, or multi-use trails. The roadways listed below have adequate width and/or clear and level shoulders for implementing bicycle facilities. These roadways are highlighted in yellow in Figure 1.1 on page 1-7.

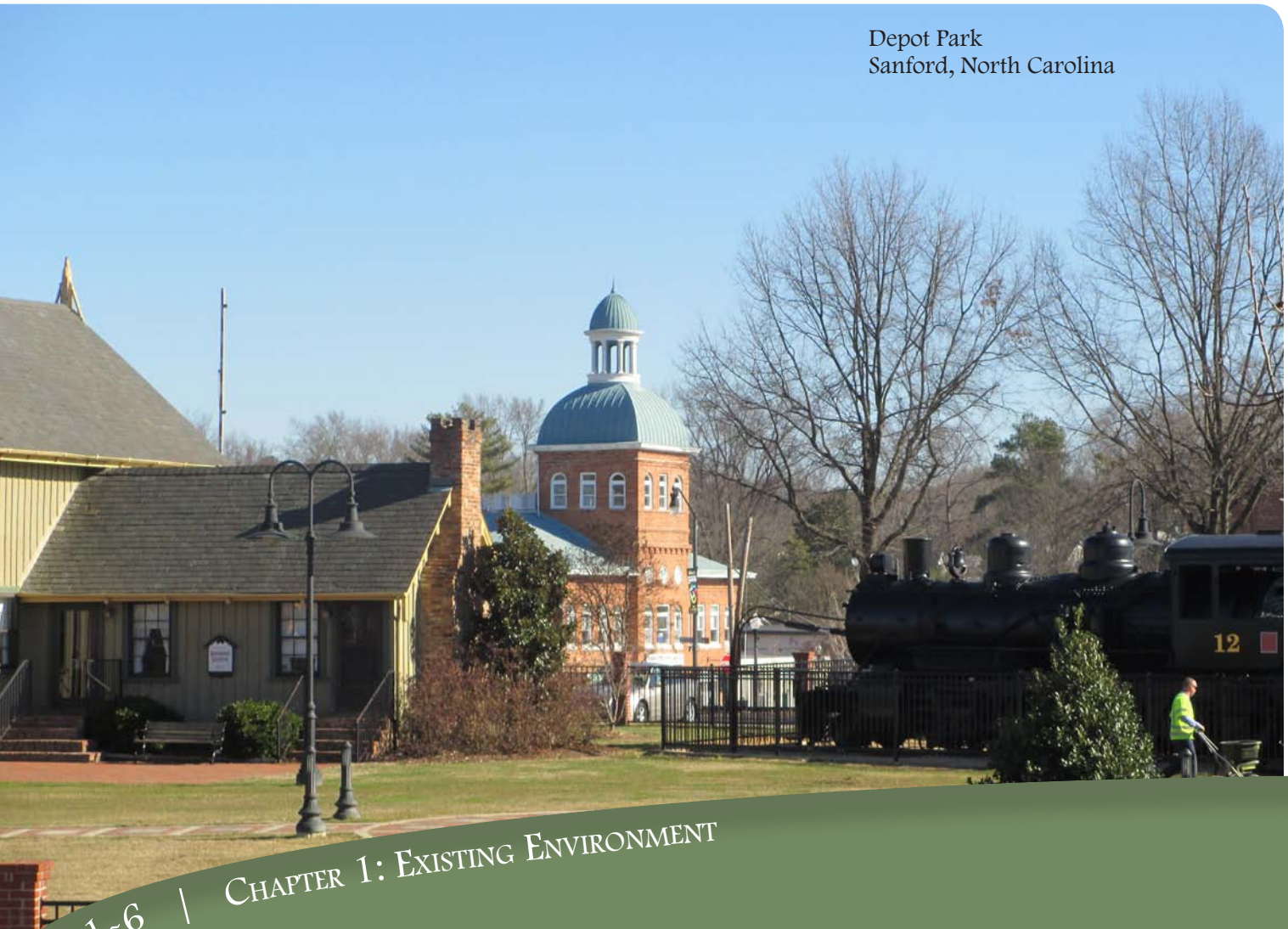
1. Spring Lane
2. Vance Street
3. McIver Street
4. Woodland Avenue
5. Washington Avenue
6. Rose Street

Intersection of Horner Blvd. and Weatherspoon St., Sanford, North Carolina

Existing Constraints of Roadway Network

During field work investigations, the consultant team identified constraints of the current roadway network as related to bicycling and the potential for bicycle facilities. A summary of key field observations is provided below:

- High-volume, high-speed roadways: There are several high-volume roadways with heavy vehicles and rural two-lane roadways throughout with higher speeds and/or little shoulder where bicyclists are not safe. Some of these roads include Horner Blvd., Charlotte Ave, and Third St.
- Narrow roadways and lanes: There are also many roadways that are too narrow for bicyclists to travel safely. These roads have little or no shoulder and have relatively high vehicle travel speeds which pose multiple hazards for bicyclists (e.g. Cool Springs Rd., Wilkins Dr., and Fields Dr.). With the existing roadway widths, there is very little opportunity for restriping to fit bicycle lanes or paved shoulders
- Lack of curb and gutter: Many roadways in Sanford and Lee County have a rural two-lane configuration lacking curb and gutter, including neighborhood roadways. Curb and guttered roadways offer greater opportunity for bicycle lanes and shared-lane markings.
- Roadways currently designed for automobiles only: Many roads were designed around the automobile and need to be redesigned to become more bicycle friendly. Narrowing existing lanes where possible and adding planted medians, sidewalks, miniature traffic circles, and shade trees could also help reduce speeding and the hazards that speeding presents to cyclists, pedestrians, and drivers.



Depot Park
Sanford, North Carolina

Figure 1.1 Existing Conditions

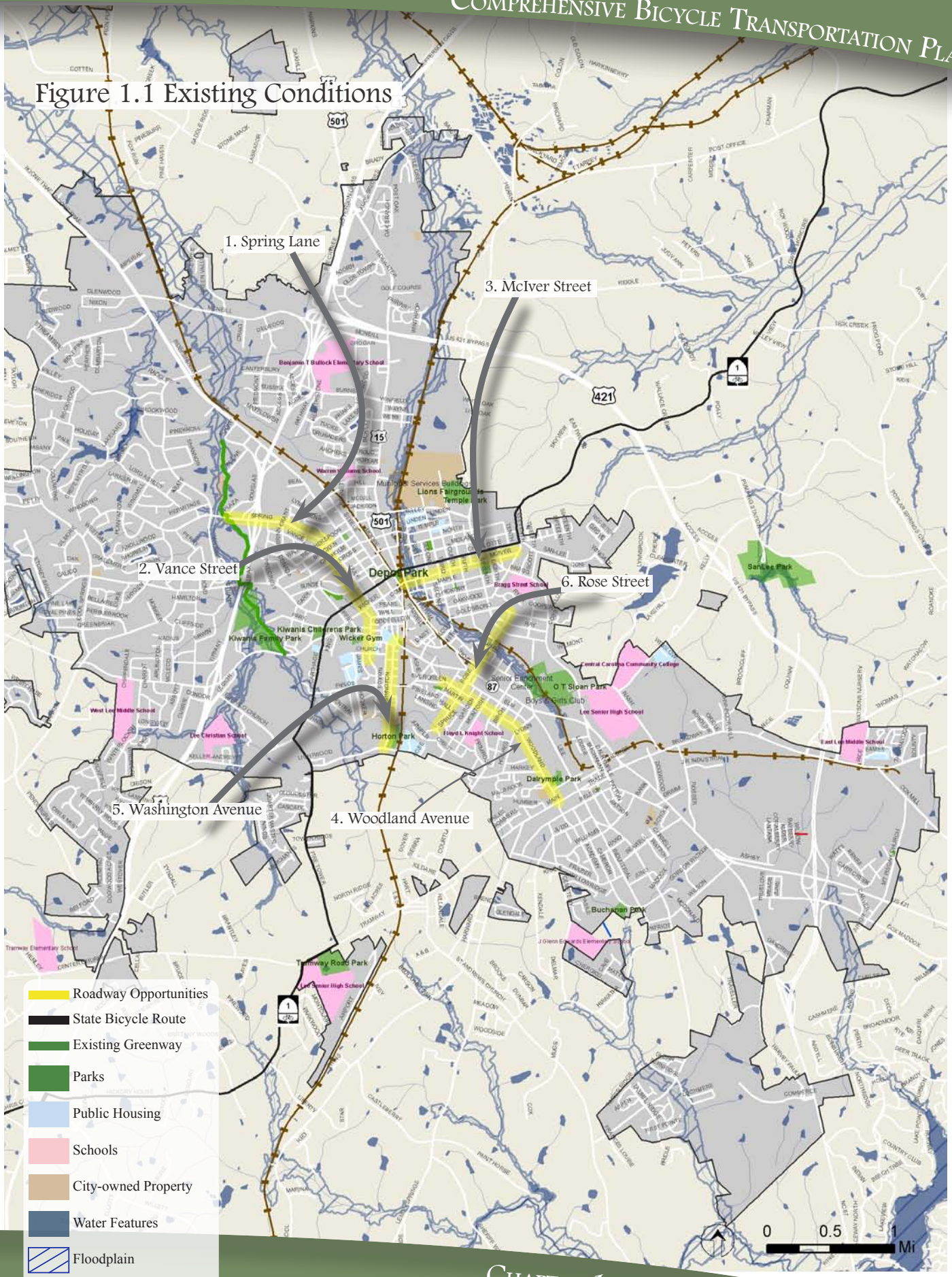


Figure 1.2 Existing Conditions Northern Sanford

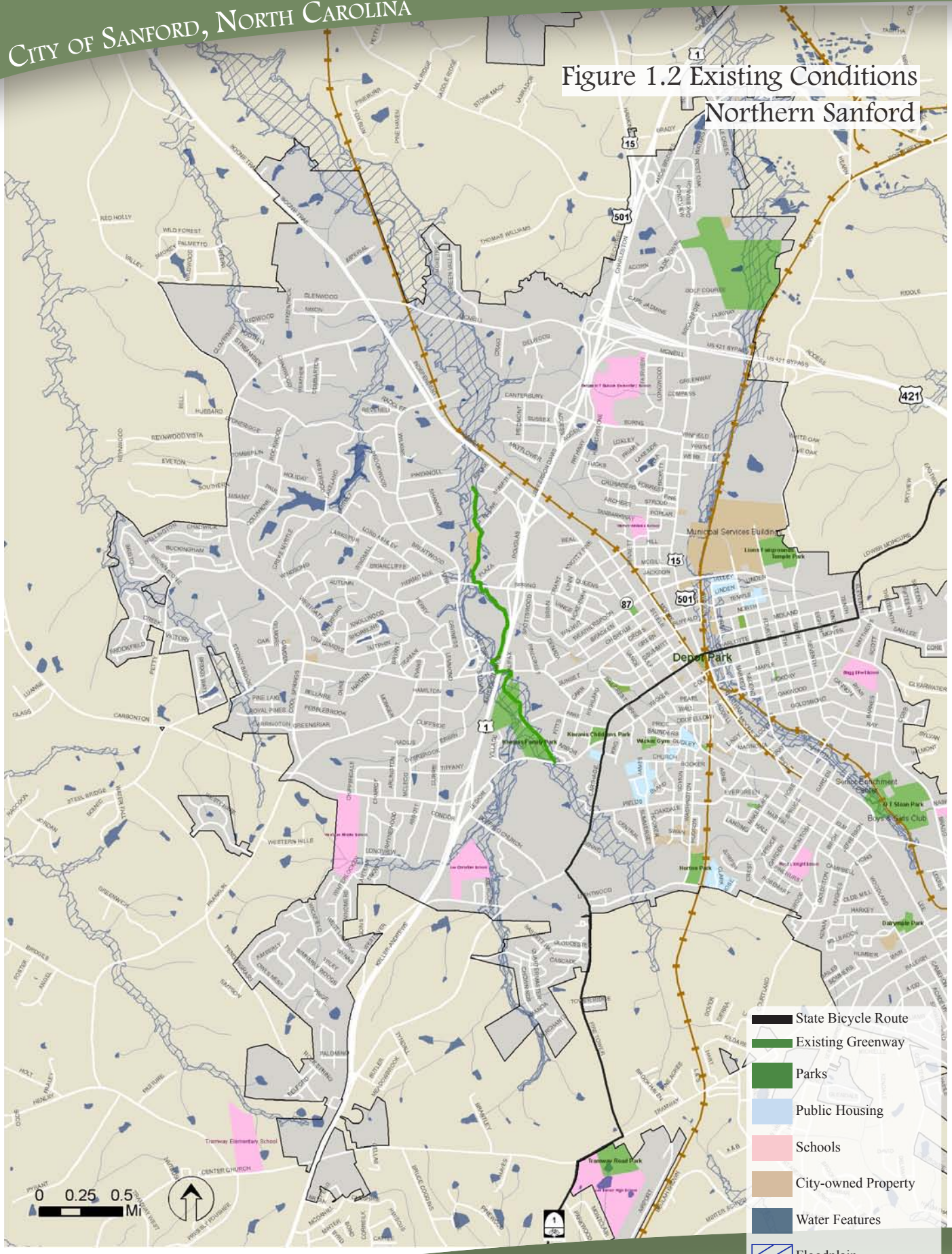


Figure 1.3 Existing Conditions Southern Sanford

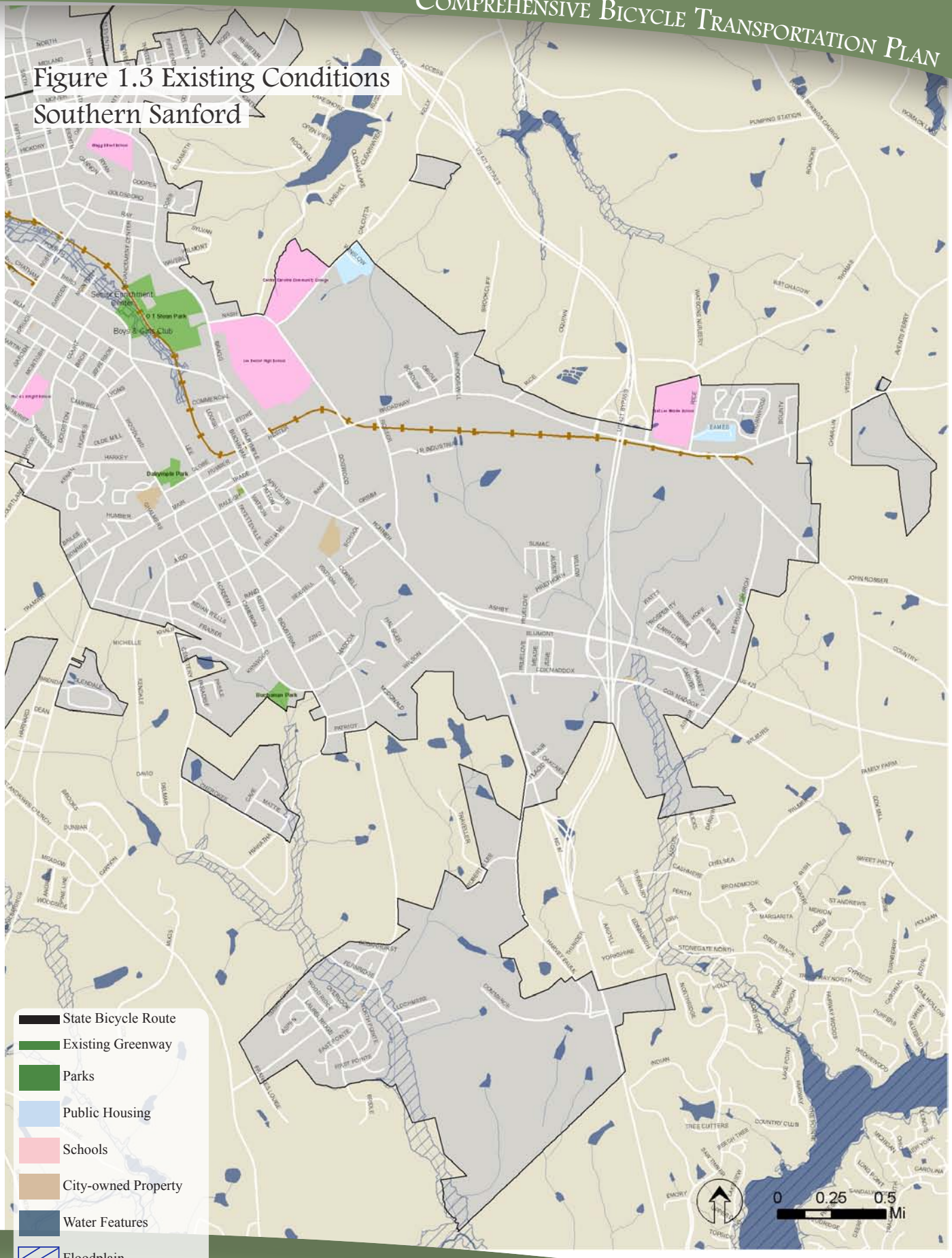


Figure 1.4 Existing Conditions Downtown Sanford

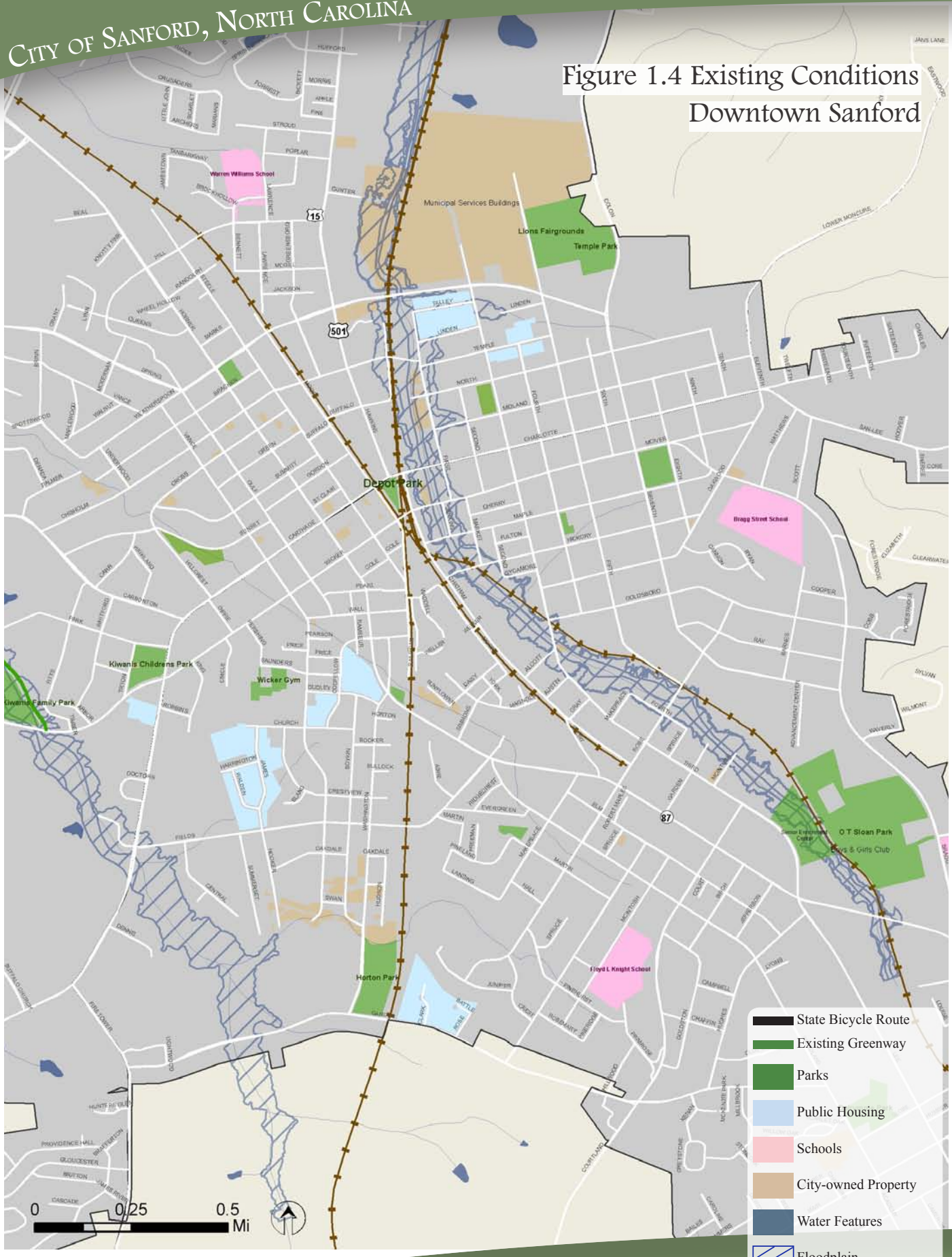
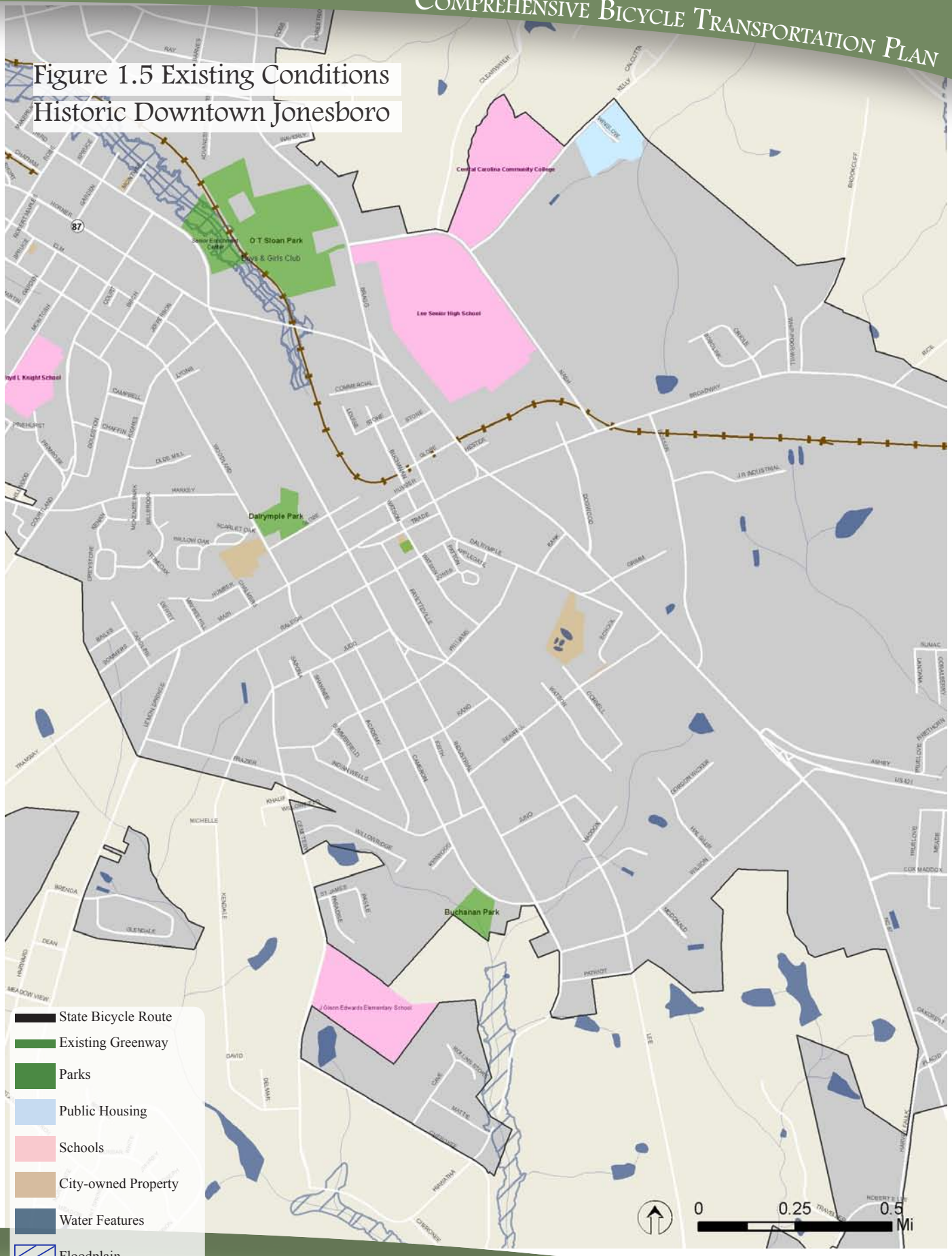


Figure 1.5 Existing Conditions
Historic Downtown Jonesboro



Demographic Analysis

Needs and demands related to bicycling can be better understood through an analysis of demographic information. 2010 U.S. Census Bureau data and 2006-2010 U. S. Census Bureau, American Community Survey (ACS) data were obtained and analyzed during the current conditions evaluation of this Comprehensive Bicycle Plan. Data sets such as population density, minority populations, citizens without access to a vehicle, people who commute to work by bicycle, and median household income were mapped by Census Block or Block Group.

Demographic analysis was performed in order to recognize potential "communities of concern." For the purposes of this Bicycle Plan, communities of concern are areas where the percentage of minority population or the percentage of Hispanic households is greater than that of the county-wide average for Lee County, or the number of households with median income below the poverty level for Lee County.

According to Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," Sanford and Lee County should identify and limit, to the greatest extent possible, disproportionately high and adverse human health or environmental effects that their programs, policies, and activities have on minority populations and low-income populations.

It is important to note that impacts from transportation projects can be either positive or negative. For example, positive impacts could be improved access to a recreational greenway trail or alternative mode of transportation. An example of a negative impact could be disruption to nearby residents and businesses during the construction period. As different bicycle facility projects progress through the planning and design stages, these areas should be carefully addressed.

Population Density

Figure 1.6 on page 1-13 shows the population density in Sanford and Lee County. As of the 2010 U.S. Census, Sanford and Lee County had a total population of 28,094 and 57,866 people, respectively. In Sanford, females represent 51.5 percent of the population and males 48.5 percent. Over half of the population (51.8%) falls between the ages of 18 and 65 years old. The most densely populated areas are in Sanford's downtown core. There are additional densely populated areas near Charlotte Ave, Oddfellow St., Seventh St., and in eastern Sanford along Thornwood Dr. Areas of higher population density that are located in close proximity to basic needs, commercial centers, and downtown were studied during field work investigations and recommendations that provide safe access between the highly populated areas and the destinations were considered high priorities for Sanford and Lee County.

Minority Populations (Race & Ethnicity)

The minority populations in Sanford and Lee County are calculated as percentages of the total population for each U.S. Census Block. The determination of what is disproportionately high and adverse human health or environmental effect as discussed by E.O. 12898 is context dependent. All Census Blocks in Sanford include members of protected populations, and the approach used in the development of this Comprehensive Bicycle Plan to identify communities of concern is only based on available U.S. Census Block data and the proportion of protected populations that they contain. All future project development processes should include additional efforts to utilize local knowledge of individual neighborhoods to identify potential populations that might have been missed during this Census-based analysis.

Minority Race Population

According to the 2010 U.S. Census, approximately 33.1 percent of the total Lee County population is considered to be minority. Using this threshold, if the minority population of a Census Block was greater than this amount, the level of concern can be assumed to be higher than in Census Blocks with minority populations below the 33.1 percent threshold. As shown in beige in Figure 1.7 on page 1-14, there are numerous Census Blocks that exceed the 33.1 percent threshold and based on this assessment should be considered potential "communities of concern."

While high concentrations of minority populations exist throughout Sanford and Lee County, the highest concentrations of minority population of Lee County reside just south of the downtown core. These areas have concentrations of minority populations as high as 98 percent. There are additional cluster areas on the eastern edge of Sanford, and in the southeastern portion of the community.

Figure 1.6 Population Density

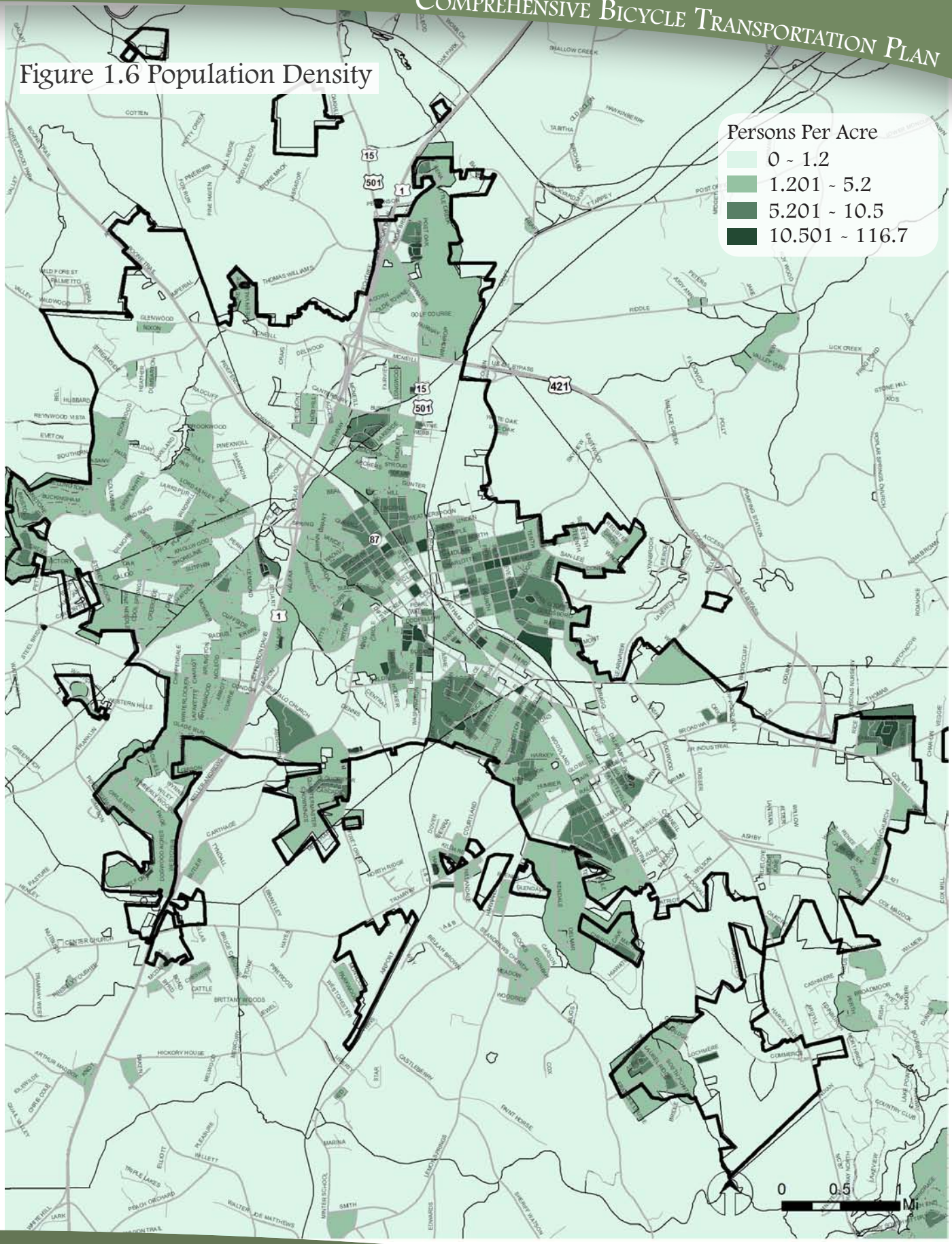


Figure 1.7 Percent Minority Population

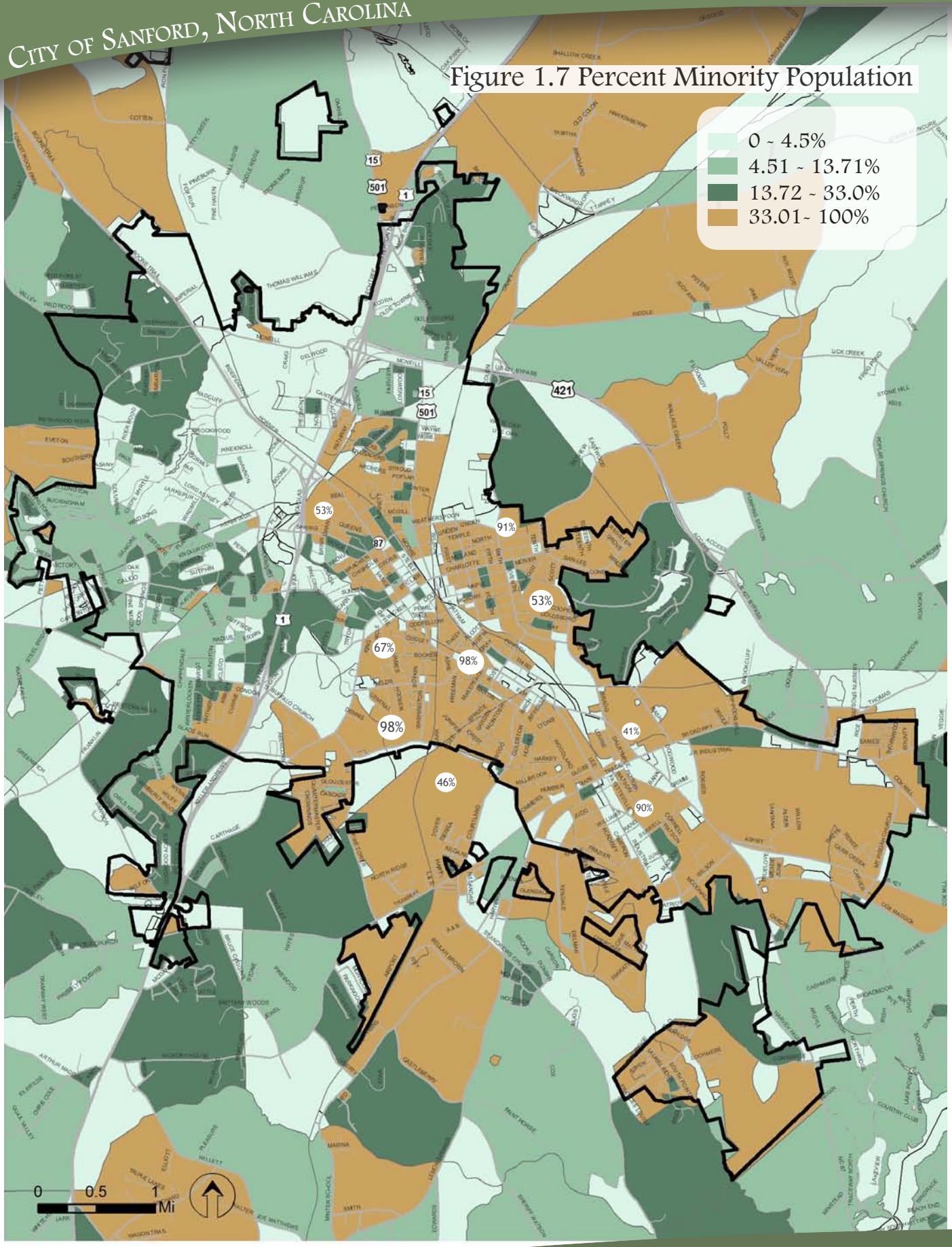
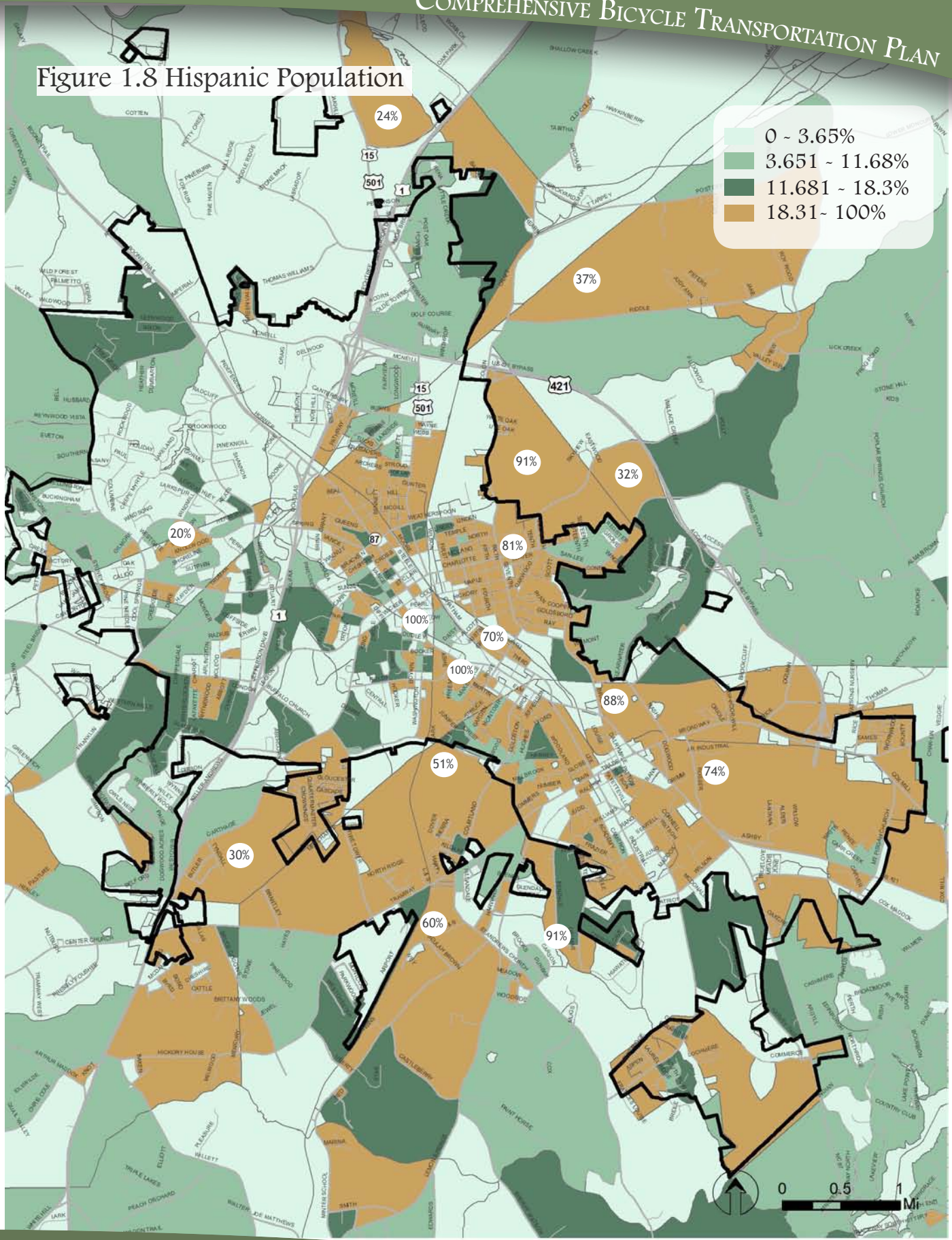


Figure 1.8 Hispanic Population



The Census Blocks that contain less than 4.5 percent minority populations are shown in the light green color, and the percentage increases from 4.5 to 13.71 percent in the medium green Census Blocks. The Blocks shown in shown in the darkest green color have percentages of minority populations between 13.72 and 33.0.

Hispanic or Latino Ethnicity/Origin Population

According to the 2010 U.S. Census, approximately 18.3 percent of the Lee County population is considered to be of Hispanic or Latino ethnicity/origin. Figure 1.8 on page 1-15 illustrates the concentrations of the Hispanic population in Sanford and Lee County. Census Blocks with populations of Hispanic or Latino ethnicity/origin greater than 18.3 percent can be assumed to have a higher level of concern than Census Blocks with populations below the 18.3 percent threshold. As shown in beige in Figure 1.8 on page 1-15, there numerous Census Blocks that exceed the 18.3 percent threshold and based on this assessment should be considered potential "communities of concern."

The highest concentrations of Hispanic population of Lee County reside in areas in and surrounding the downtown core, as well as areas of former Jonesboro. South of downtown Sanford and along the southern boundary between Sanford and Lee County are also higher percentages of residents with Hispanic ethnicity. There are additional cluster areas to the north of Sanford, just outside the northern city limits boundary. Some of the areas highlighted in beige have concentrations of Hispanic populations as high as 100 percent. There are additional cluster areas to the north of Sanford, just outside the northern city limits boundary.

Median Household Income Levels

Median Household Income is mapped by U.S. Census Block Group, as data are not available at the Census Block level. According to the 2010 U.S. Census, the median household income for Lee County is $44,120. Median household income levels for Sanford and Lee County are illustrated in Figure 1.9 on page 1-17 and range from $14,094 to $74,503. Using the Lee County median household income threshold of $44,120, the U.S. Census Block Groups that have median household income levels below this amount, should be given special consideration during the project prioritization process because lower-income residents may be more likely to rely on bicycling as a primary form of transportation.

As shown in beige in Figure 1.9 on page 1-17, there are numerous Census Block Groups below the $44,120 threshold and based on this assessment should be considered potential "communities of concern." To ensure convenient bicycling accessibility, it will be important that there is a good system of bikeways in place to safely connect lower-income residents to important destinations in Sanford and Lee County. Potential adverse impacts could include disruption to residences or businesses during construction of bicycle facility projects. As indicated earlier, these impacts should be taken into account as the bicycle network is designed and constructed.

Persons in Poverty

In addition to considering Median Household Income levels in Sanford and Lee County, the consultant team obtained Poverty Level statistics from the 2006-2010 U. S. Census Bureau, American Community Survey. The U.S. Census determines poverty status by comparing annual income to a set of dollar values called poverty thresholds that vary by family size, number of children and age of householder. If a family's before tax money income is less than the dollar value of their threshold, then that family and every individual in it are considered to be in poverty. For people not living in families, poverty status is determined by comparing the individual's income to his or her poverty threshold. The percentage of people living below the poverty level in Lee County is 16.8 percent, while 22.3 percent of the residents of the City of Sanford are living below the poverty level. Poverty levels were not mapped as part of this Comprehensive Bicycle Transportation Plan, however, these data were included in the review of current conditions and taken into account during the development of the recommended bicycle network presented in Chapter 2.

Commute by Bicycle Populations

Based on the 2006-2010 ACS estimates, one Census Block Group has a population that commutes to work by bicycle. As shown in beige in Figure 1.10 on page 1-18, the Census Block Group is located in the southern area of Sanford's downtown core. Outside of this one clustered area, less than one percent of the population commutes to work by bicycle, as shown in the light green color. The need for improved bicycle access and mobility exists in areas where populations commute to work by bicycle, as well as where populations currently do not commute to work by bicycle. Improved facilities and access would enable residents to consider commuting by bicycle.

Figure 1.9 Median Household Income

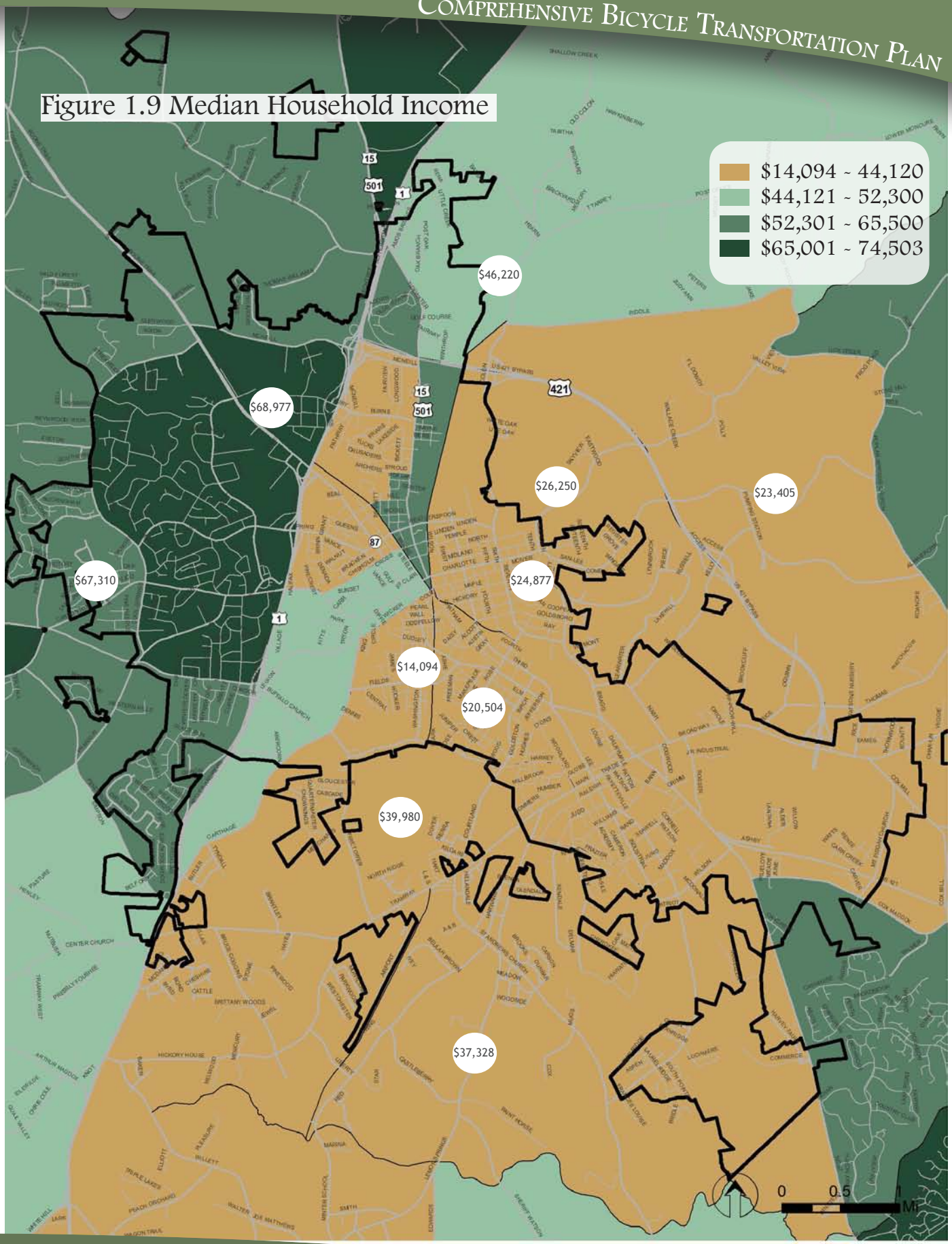


Figure 1.10 Population Commuting by Bicycle

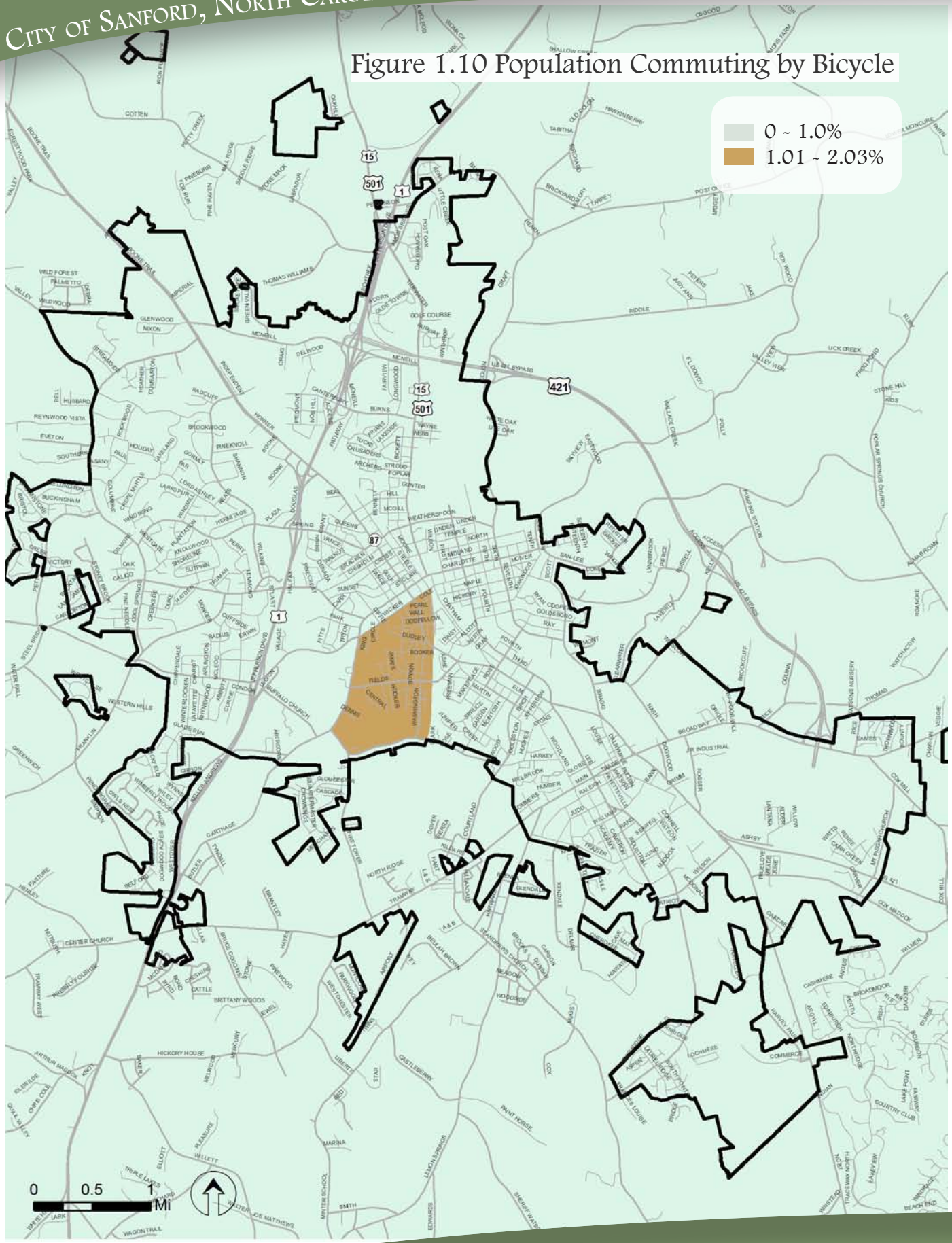
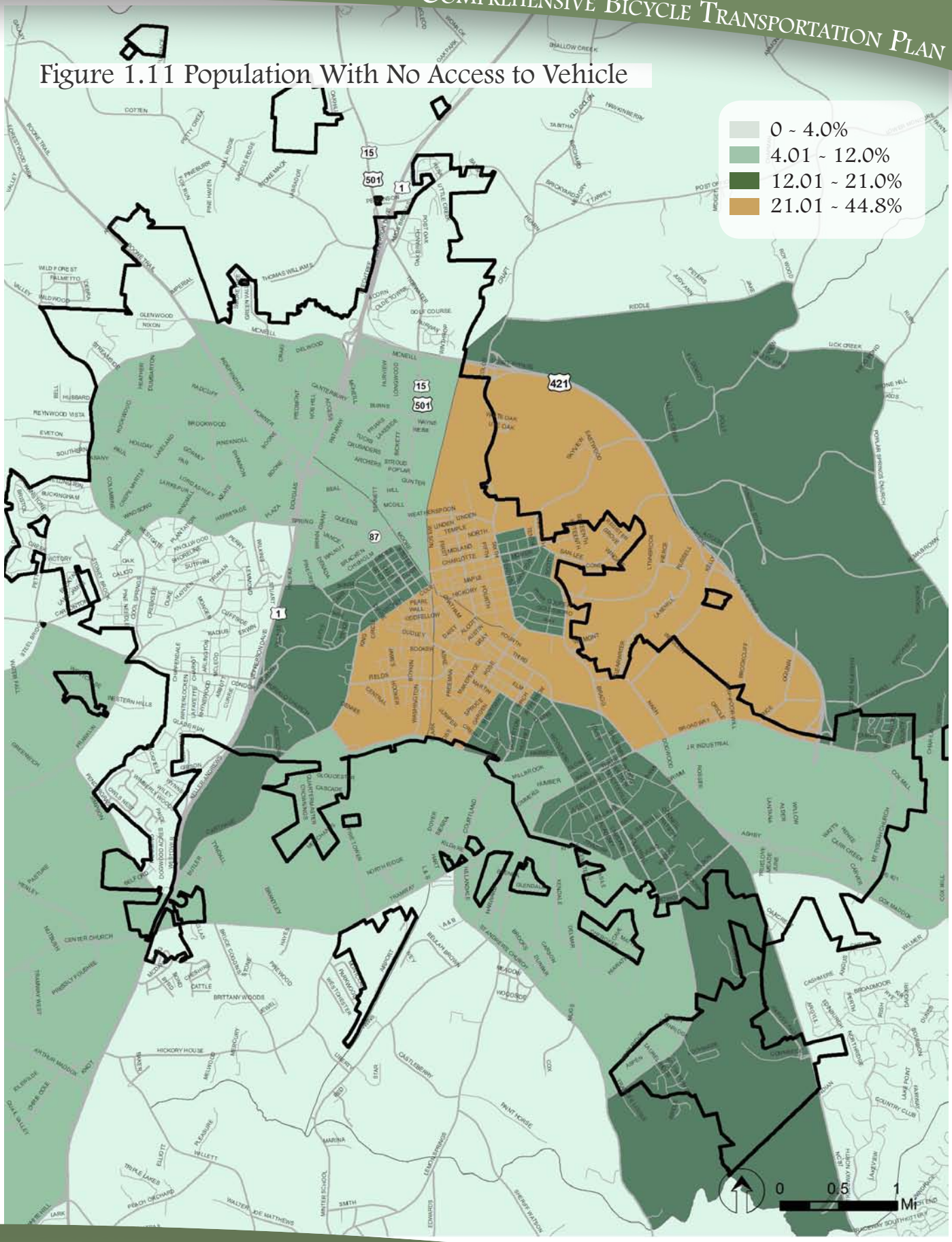


Figure 1.11 Population With No Access to Vehicle



Population with No Access to Vehicle

Based on the 2006-2010 ACS estimates, as much as 44.8 percent of the population in several Census Block Groups do not have access to a vehicle. Figure 1.11 on page 1-19 illustrates the concentrations of the population with no access to a vehicle. These residents rely on walking, bicycling, and public transit providers as their primary means of transportation. As shown in beige, the highest concentrations of populations with no access to a vehicle reside in areas of Sanford's downtown and areas located to the east and south of downtown. These areas have concentrations of populations with no access to a vehicle between 21.01 and 44.8 percent.

The Census Block Groups that contain 0 to 4.0 percent of populations with no access to a vehicle are shown in the light green color, and the percent of population increases from 4.01 to 12.0 percent in the medium green Block Groups. The Block Groups shown in dark green have percentages of populations with no access to a vehicle from 12.01 to 21.0.

Summary

During the planning process, it was crucial to consider the needs of all populations living in Sanford and Lee County. The need for improved bicycling access and mobility is greatest where the multiple communities of concern described in this section overlap, as these are the areas where the maximum number of residents would benefit from the development of bicycle facilities.

All segments of the population who live in Sanford may endure some short-term construction-related impacts related to visual changes, noise, and alterations in access during the construction of bicycle facilities. Neither minority, low-income, nor those without access to a vehicle in Sanford and Lee County are likely to endure disproportionate negative impacts due to the development of bicycle facilities. Trails, greenways, and on-road bicycle facilities that offer safe, affordable and convenient transportation opportunities to the residents and citizens of Sanford will be of great benefit to the populations discussed in this section. Should the development of any bicycle facilities utilize federal funding, future documentation for compliance with the National Environmental Policy Act (NEPA) may be required. During the NEPA process, for a transportation-related project a variety of issues will be evaluated, including an Environmental Justice (EJ) analysis pursuant to E.O. 12898. In addition, the development of the NEPA document will require public participation and local coordination throughout, with EJ issues to be identified and addressed.

San-Lee Drive, in an eastern area of Sanford, travels through an area where 21.01 - 44.8% of households do not have access to a vehicle.

Charlotte Avenue, an east-west roadway in downtown Sanford travels through neighborhoods with pockets of high density residential areas, large minority populations, large Hispanic origin populations, lower median household incomes, and high percentages of households without access to vehicles.

2000-2012 NCDOT Reported Bicycle Crashes

Data for bicycle crashes involving motor vehicles from 2000-2012 was provided by NCDOT and geocoded by the consultant. It is important to note that not all bicycle crashes are reported to the police, and only reported crashes are included in this evaluation. 30 crashes were mapped and can be seen in Figure 1.12 on page 1-23. With the exception of five crashes, all of the recorded bicycling crashes in Sanford took place in the downtown core, near densely populated areas, key destinations and schools. There have been 28 reported crashes that resulted in personal injury, one reported crash that resulted in a fatality, and one reported crash that resulted in personal property damage.

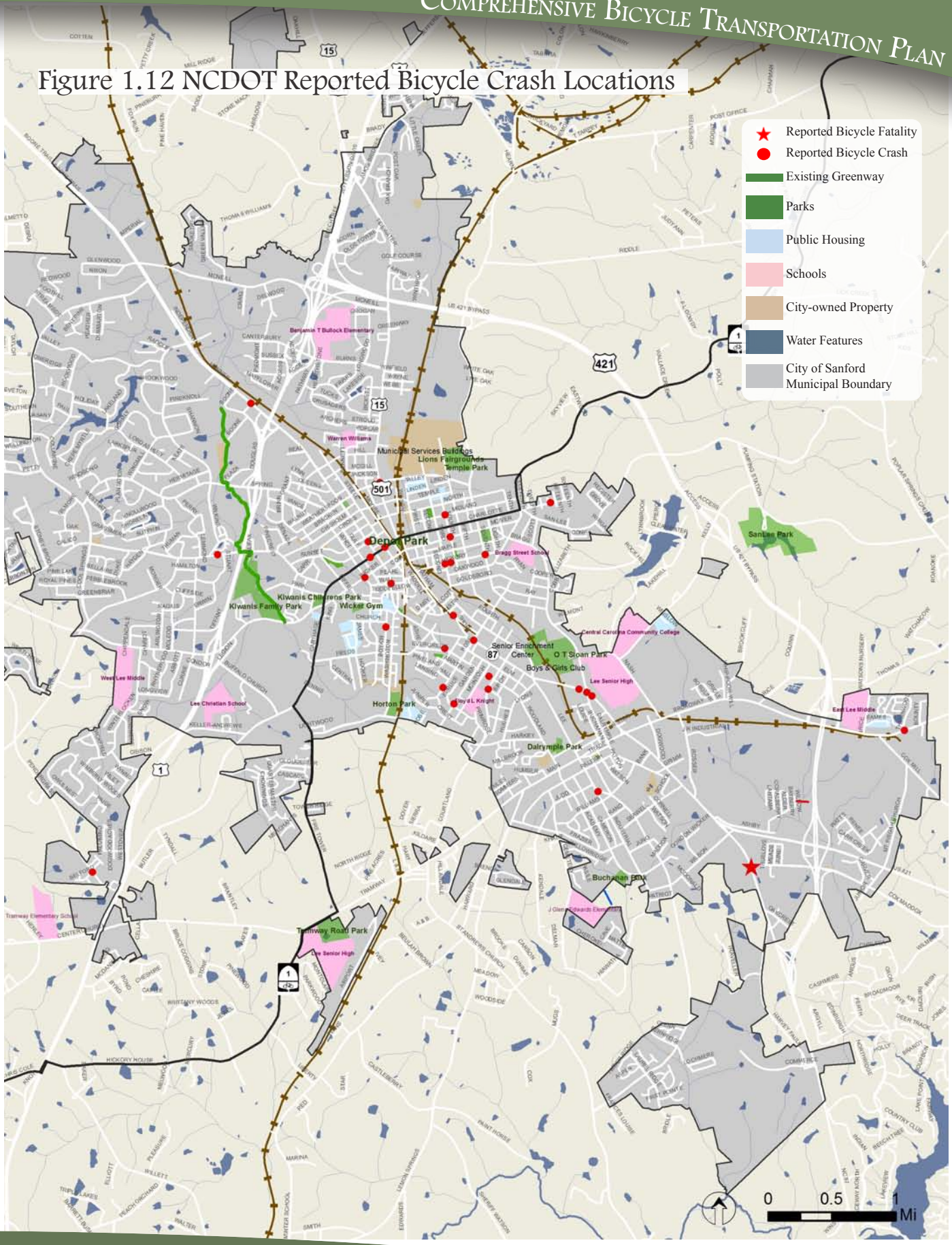
The locations of all 30 crashes were assessed during field work investigations. Existing roadway corridor conditions were noted, as well as any barriers to bicyclist or motorist safety. The recommendations presented in Chapter 2 take into account the locations of the 30 crashes and the results of the field work assessment of each crash location.

Horner Blvd. had the highest number of reported bicycle crashes between 2000 and 2012.

Table 1.1 NCDOT Bicycle Crash Locations

Roadway Name	Crash Severity	Date of Crash
BOYKIN AVE	B-Injury (Evident)	7/3/2003
BRAGG ST	C-Injury (Possible)	1/31/2005
BROADWAY RD	B-Injury (Evident)	3/30/2007
CARBONTON RD	A-Injury (Disabling)	5/26/2007
CARTHAGE ST	B-Injury (Evident)	12/24/2005
CHARLOTTE	A-Injury (Disabling)	6/21/2000
CHATHAM ST	A-Injury (Disabling)	8/2/2001
COURTLAND DR	A-Injury (Disabling)	2/21/2002
GARDEN ST	B-Injury (Evident)	10/6/2002
GORDON ST	B-Injury (Evident)	4/4/2004
HICKORY AVE	A-Injury (Disabling)	6/17/2005
HORNER BLVD	C-Injury (Possible)	1/30/2006
HORNER BLVD	C-Injury (Possible)	8/25/2006
MCIVER ST	C-Injury (Possible)	8/27/2004
MIDLAND AVE	A-Injury (Disabling)	5/25/2006
N HORNER BLVD	B-Injury (Evident)	6/11/2000
N STEELE ST	B-Injury (Evident)	6/8/2009
NC 87	Fatal (Killed)	12/10/2011
NOVEDADES ALLEYWAY	C-Injury (Possible)	6/4/2001
PENDERGRASS RD	B-Injury (Evident)	4/30/2012
ROSE ST	B-Injury (Evident)	5/14/2002
SEVENTH ST	B-Injury (Evident)	6/6/2005
THIRD ST	B-Injury (Evident)	6/30/2001
US 421	C-Injury (Possible)	8/20/2007
W COURTLAND DR	Property Damage Only	5/6/2012
WALL ST	B-Injury (Evident)	3/19/2008
WEATHERSPOON ST	C-Injury (Possible)	4/24/2008
WICKER ST	B-Injury (Evident)	4/2/2003
WOODLAND AVE	B-Injury (Evident)	2/8/2012
WOODLAND AVE	B-Injury (Evident)	8/20/2001

Figure 1.12 NCDOT Reported Bicycle Crash Locations

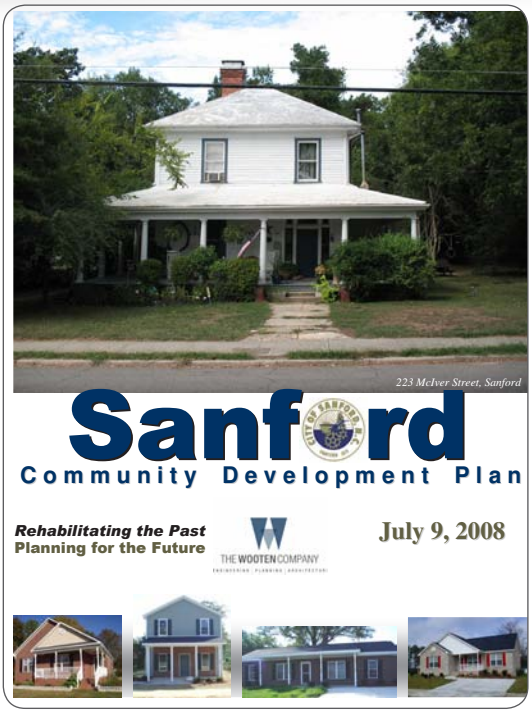


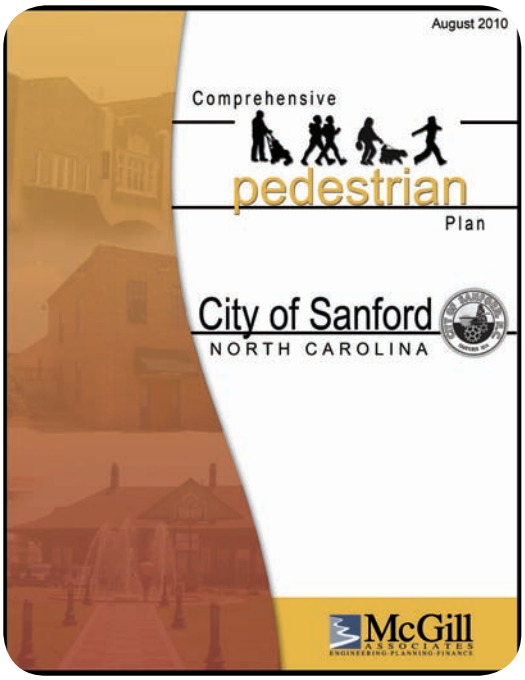
Existing Planning Efforts Summary

Numerous plans, guidelines, and strategies have addressed topics related to on-road bicycle facilities and off-road greenway trails in Sanford and Lee County. They have addressed improvements to existing parks and facilities and made suggestions for new parks, a comprehensive greenway system, and other facilities. All of these documents represent important efforts, provide valuable insight and background, and have influenced the development of this Bicycle Plan.

The following plans are reviewed and summarized in Appendix C of this Plan as they relate to existing conditions and future needs for on-road bicycle facilities, trails, and greenways. For further information, please consult the documents in their entirety.

- Lee County Comprehensive Transportation Plan 2011
- 2010 Comprehensive Pedestrian Plan
- Deep River Small Area Plan
- Greenwood Small Area Plan
- City of Sanford Community Development Plan
- Sanford & Lee County 2020 Land Use Plan
- Downtown Enhancement Master Plan
- 2010 Lee County Master Plan for Parks & Recreation Update
- 2012-2018 STIP Project List
- 2006-2012 TIP Project List





Existing Program Summary

Chapter 3 of this Bicycle Plan provides a thorough review of existing bicycle-related programs in Sanford and Lee County. Detailed improvement or enhancement guidance is offered for each existing program with the goal of helping to further the program's impact. Additionally, Chapter 3 includes new recommendations designed to raise the profile and public understanding of facility investments, increase bicycling mode share and public support, and create a local culture that values bicycling. The box to the right includes a short summary of existing programs; more detailed information can be found in Chapter 3.

Summary of Existing Programs

Currently, the City of Sanford does not run specific bicycle related programs. However Lee County administers the following programs that aim to promote healthy living choices for county-wide residents:

Community Transformation Grant (CTG) Program:

The North Carolina Division of Public Health received a CTG to serve communities across the State by expanding efforts to promote tobacco-free living, active living, and healthy eating.

Faithful Families Eating Smart and Moving More:

The goal of this program is to help low-income families make better decisions about healthy eating. A five-year, grant-funded research study will track eating and cooking habits of low-income families in Lee County with the purpose to reduce childhood obesity.

Safe Time

Safe Time is a partnership between Lee County Public Health, Sheriff's and the Police Departments to increase security in open spaces during the evening to encourage residents to practice outdoor sports.

Instant Recess Program

The goal of this program is to increase physical activity in seven County elementary schools by taking a 10-minute exercise break during the school day.

A Healthy Carolinians Partnership

The Healthy Carolinians Partnership established network of public-private partnerships in Lee County that share the common goal of creating environments that promote healthy life styles for all citizens.

Historic Downtown Sanford, North Carolina

Local Policy Review Summary

Existing land development, zoning and subdivision ordinances and technical standards have a significant effect on bicycle transportation and greenway trail development in Sanford and Lee County. The Sanford-Broadway-Lee County Unified Development Ordinance and the City of Sanford Code of Ordinances were reviewed as part of this bicycle transportation planning process. This section presents a summary of these policy documents and identifies the specific areas that should be strengthened to improve accommodations for non-motorized transportation and recreation facilities. A full review of both policy documents is presented in Chapter 3.

City of Sanford Code of Ordinances

The Sanford Code of Ordinances is the collection of all of the ordinances adopted over many years, now professionally published, or "codified," by Municipal Code Corporation, a company that specializes in the publication of local codes. The City of Sanford is a political subdivision of the State of North Carolina and thus derives its power and authority from the provisions of state law. The City may adopt ordinances and resolutions necessary for the exercise of its powers and prescribe fines and penalties for the violation for such ordinances.

An ordinance holds the same authority of law, and updates or revisions to Sanford ordinances that take bicyclists into consideration would support the City's goal of becoming more bicycle friendly. The sections of the Code of Ordinances included in Table 1.2 on page 1-27 have potential implications for bicycle policy. A full review of the Code with specific language recommendations is included in Chapter 3 of this Bicycle Plan.

Sanford-Broadway-Lee County Unified Development Ordinance

The County's Unified Development Ordinance (UDO) combines the zoning and subdivision authority of Lee County into one document. The UDO recites applicable statutory authority, the applicability of the UDO to various uses of the County, consistency with the Comprehensive Plan, coordination with other regulations, the effective date, violations, and related matters. The sections of the UDO included in Table 1.3 on page 1-28 have potential implications for bicycle policy. A full review of the UDO, with specific language recommendations is included in Chapter 3 of this Bicycle Plan.

Bicyclists and their needs were not covered in any significant detail or depth in either policy document. There is potential for confusion as bicyclists were not called out specifically in many situations where vehicular traffic is referenced but where directives did not seem to apply to bicyclists. Where bicycling was specifically mentioned, the primary focus was on bicycling for recreation, with no mention of the role of bicycling as a mode of transportation with wide-spread benefits for the community. Neither document addressed the following topics as they relate to bicycling:

- Bicycle parking standards
- Sight distance (from the bicyclist perspective)
- Sign location (from the bicyclist perspective)
- Provisions for safe access during construction

Table 1.2 Summary: City of Sanford Code of Ordinances

Sec. 12.2. - When petition unnecessary	ARTICLE II. - TRAFFIC CONTROL DEVICES
Sec. 15.1. - Subdivision control	Sec. 36-64. - One-way streets
Sec. 1-2. - Definitions and rules of construction	Sec. 36-9. - Manner of riding bicycles and motorcycles
Sec. 32-3. - Damaging street or sidewalk.	Sec. 36-9. - Manner of Riding Bicycles
Sec. 32-7. - Duty to keep sidewalks clean; removal of ice, snow and other obstructions	Sec. 36-31. - Obedience
Sec. 32-8. - Streetlights	111: Sec. 1-2. - Definitions and rules of construction
Sec. 32-31. - Goods, merchandise or other articles obstructing passage	306: Sec. 32-33. - Installation of covered passageways or closing of sidewalk at construction sites
Sec. 32-33. - Installation of covered passageways or closing of sidewalk at construction sites	221: Sec. 34-66. - Easements
Sec. 34-2. - Definitions.	330: Sec. 34-71. - Sidewalks
Sec. 34-10. - Preliminary plat	338: Sec. 36.31. - Obedience
Sec. 34-66. - Easements	339: Sec. 36-34
Sec. 34-71. - Sidewalks	
Sec. 36-1. - Definitions	

Table 1.3 Summary: Sanford-Broadway-Lee County Unified Development Ordinance Review

FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Recreation Elements	6.7.3 SIDEWALKS
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	6.7.2 BLOCK DESIGN
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	7.1 PURPOSE
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	7.4.4 RELATIONSHIP TO SIGHT TRIANGLES/TRAFFIC VISIBILITY
A-3 Definitions BICYCLE FACILITIES	7.8.5 GENERAL MAINTENANCE OF LANDSCAPING AND SITE
A-3 Definitions BICYCLE LANE (BIKE LANE)	8.3 REQUIRED AMOUNT OF OFF-STREET PARKING
A-3 Definitions BICYCLE PATH	8.4 PARKING SPACE DIMENSIONS
A-3 Definitions OPEN SPACE, ACTIVE	8.6 OFF-STREET LOADING AND UNLOADING AREA STANDARDS
A-3 Definitions PUBLIC RIGHT-OF-WAY	10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.2 SITE DESIGN
B-5 SITE PLANS (Conditional Rezoning /Special Use Permits)	10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.4. PEDESTRIAN CIRCULATION
TABLE 10-4: TND STREET DESIGN STANDARDS	10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.7 PARKING STANDARDS
4.15.2 DESIGN STANDARDS 4.15.2.2 Definitions	10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.9 EASEMENT AGREEMENTS
6.5 OPEN SPACE STANDARDS	10.3 MULTI-FAMILY RESIDENTIAL DEVELOPMENT 10.3.1 PURPOSE
6.5.1 PURPOSE	ARTICLE 11 SIGN REGULATIONS 11.1 PURPOSE & FINDINGS
6.5.2.3 EXEMPTION	ARTICLE 11 SIGN REGULATIONS 11.2 APPLICABILITY
6.5.3 ACCESS TO OPEN SPACE	11.6 PROHIBITED SIGNS ARTICLE 11 SIGN REGULATIONS
6.5.5 CONNECTION TO EXISTING PUBLIC PARKS, OPEN SPACE AND/OR GREENWAYS	APPENDIX A A-3 DEFINITIONS
6.5.6.3 MAINTENANCE REQUIREMENTS	B-5 SITE PLANS (Conditional Rezoning /Special Use Permits)
6.7.1.3 SIGHT DISTANCE AND SITE TRIANGLES	

Footnotes from “Overview & Background”:

1. http://www.sanfordnc.net/historic_preservation/past.htm

2. http://nrhp.focus.nps.gov/natreghome.do

3. http://endorfurnace.org/

Network Recommendations 2

Overview

The recommended bicycle network for the City of Sanford represents a comprehensive set of existing and proposed bicycle transportation and recreation facilities. The network includes on-road and off-road facilities, such as bicycle lanes, paved shoulders, multi-use side paths, and greenway trails.

This Chapter includes the following sections:

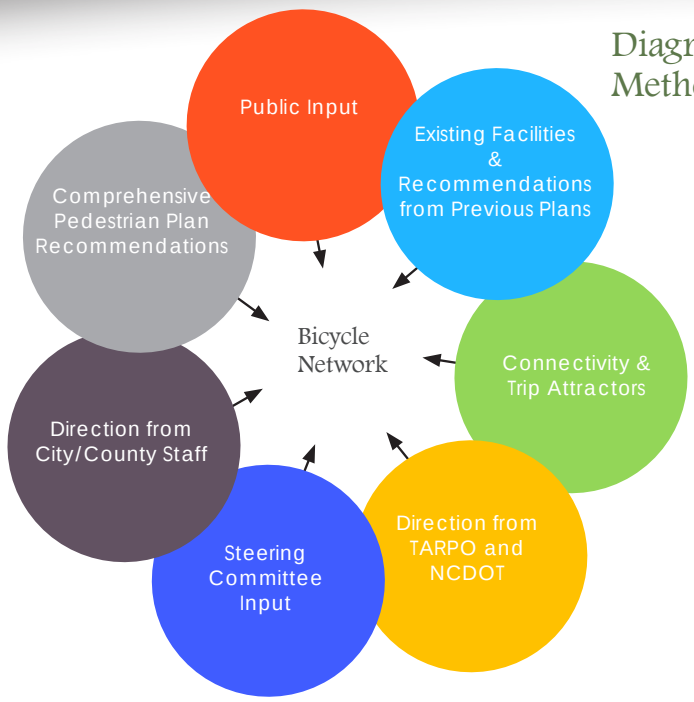
1. How the network was designed (methodology);
2. Descriptions of the types of bicyclists;
3. Descriptions of the types of on-road facilities and treatments;
4. Comprehensive bicycle facility network;
5. Prioritized on-road bicycle facility projects;
6. Descriptions of the types of off-road facilities and treatments; and
7. Off-road bicycle facility projects.

Methodology for Bicycle Network Design

The bicycle facility network was designed by first assembling all existing bicycle-related recommendations and information from current plans and studies. Second, a thorough analysis with GIS and fieldwork was conducted to examine roadways and potential greenway corridors for recommendations. The consulting team inventoried the existing roadway network based on existing suitability for bicycling as well as the potential for installing bicycle facilities through some type of roadway improvement.

Chapter Contents

Diagram 2.1 Bicycle Network Methodology



Objectives for the development of the bicycle network recommendations included:

- Overcome barriers and lack of connectivity.
- Achieve thorough geographic coverage across populated areas.
- Provide facilities that connect important destinations and serve all populations, particularly lower-income communities whose populations depend more on bicycling for transportation.
- Provide for safe travel while in automobile traffic flow.
- Ensure routes are continuous, direct, and convenient.

Where needed and feasible, the network aims to provide parallel routes to busy arterial roadways that serve the needs of all cyclists. The network segments were chosen with the following questions in mind:

- Have aesthetic and cultural considerations been addressed?
- Does this enhance access to important destinations such as, schools, shopping, employment centers, parks, trails, or downtown?
- Is the existing street right-of-way width sufficient for the recommended improvements?
- What is the relative ease of implementing bicycle improvements without widening the existing roadway (e.g., striping, pavement marking, or restriping)?
- Is this segment part of an already scheduled roadway improvement project (including projects from TARPO TIP list)?
- Are the traffic volumes and speeds relatively low (generally comfortable for bicyclists without major improvements)?
- Does the route provide connectivity within and between municipalities?
- Was the route recommended by the public and local government staff for bicycle improvements?
- Can the route circumvent barriers such as major highways, railroads, waterways, and bridges?
- Does the route complement and add to the existing and recommended greenway trails network?

In addition to answering the above listed questions, the recommended comprehensive bicycle facility was developed based on recommendations presented in the 2011 Comprehensive Transportation Plan (CTP) for Lee County. There are slight inconsistencies between the recommendations of the CTP and the recommendations of this Bicycle Plan. These inconsistencies are a result of detailed on-the-ground field work investigations, input obtained from the public, local government staff, the Steering Committee, and various project stakeholders. Further analysis will be needed during the design and construction phases for recommended projects that will determine the most appropriate facility type for each priority roadway segment.

All of the inputs highlighted in Diagram 2.1 "Bicycle Network Methodology" helped to inform and prioritize the overall system; through writing and drawing on input maps, filling-out comment forms, direct dialogue during meetings, and e-mailed comments.

Bicyclist "Types"

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclists' skill levels greatly influence expected speeds and behavior, both in separated bikeways and on shared roadways. The bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people. A framework for understanding the characteristics, attitudes, and infrastructure preferences of different bicyclists in the US population as a whole is illustrated on this page.

Strong and Fearless (approximately 1% of population)

Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections even if shared with vehicles over separate bicycle facilities such as shared use paths.

Enthused and Confident (5-10% of population)

This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

Interested but Concerned (approximately 60% of population)

This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.

No Way, No How (not pictured here) (approximately 30% of population)

Persons in this category are not bicyclists and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

"Strong and Fearless"

"Enthused and Confident"

"Interested but Concerned"

On-Road Bicycle Facility Types

A variety of bicycle facilities are recommended to account for the following conditions:

1) the range of skill and comfort levels involved in bicycling;
2) the range of existing conditions for bicycling in different landscapes and on different roadway environments.

One facility type will not fit all roadways because of variations in roadway configurations and land use; thus a toolbox of facility types is used. These recommendations are at a planning level only and will require further analysis before implementation.

The recommended bicycle system is made up of two major types of facilities: on-road and off-road. Within each type are multiple facility options that are recommended for specific segments of the overall system. Descriptions and standards for each type are described in Appendix B: Design Guidelines. The images and descriptions on the next couple of pages are provided for a quick reference when viewing the on-road bicycle network maps and the greenway trail network maps included in this Chapter.

Paved Shoulders

Paved shoulders, as shown in the picture to the right, are the part of a roadway which is contiguous and on the same level as the regularly traveled portion of the roadway. There is no minimum width for paved shoulders; however a width of at least four feet is preferred. Roadways with speeds greater than 40 mph should have paved shoulders of at least five feet in width.

Ideally, wide paved shoulders should be included in the construction of new roadways or the upgrade of existing roadways, especially where there is a need to safely accommodate bicycles. Recreational bicycling is very common across this region of North Carolina. Most rural roadways in their existing configuration either feature no shoulder or only a 1-2 foot paved shoulder which is not adequate for bicyclists. Roadways in which paved shoulders should be added or widened to a minimum of four or five feet are shown clearly in the recommended network maps included in this chapter.

Sidewalks on one or both sides of the street were recommended in the *2010 Comprehensive Pedestrian Plan* for several roadways that currently have open drainage. When sidewalks are constructed on these roads and curb and gutter are added, bicycle lanes should be included in the new roadway design.

Bicycle Shared-Lane Markings (Sharrows)

Shared lane markings, or "sharrows," as shown in the picture below, are placed in a linear pattern along a corridor, typically every 100-250 feet and after intersections. Shared lane markings can be used in roadways with travel lanes that are all the same width, and they can also be used in raodways with a 14 foot wide outside lane. They function in several important ways:

- They make motorists more aware of the potential presence of cyclists.
- They direct cyclists to ride in the proper direction.
- They remind cyclists to ride further from parked cars to avoid 'dooring' collisions.

Bicycle Lanes

A bicycle lane, as shown in the picture to the right, is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. The minimum width for a bicycle lane is four feet; five- and six-foot bicycle lanes are typical for collector and arterial roads. There are opportunities for bicycle lanes in Sanford on several existing roadways that feature wide automobile travel lanes and have curb and gutter. As a general practice in the future, any local roadway that is widened or reconstructed with curb and gutter should incorporate bicycle lanes, with consideration for speed limit reductions. An advanced visualization of bicycle lanes on Charlotte Avenue is presented on page 2-19.

Buffered Bicycle Lanes

A buffered bike lane, as shown in the picture to the right, is similar to a regular bike lane, but a buffered bicycle lane also includes a marked buffer between the bike lane and adjacent travel lanes. The purpose of a buffered bike lane is to provide distance between the automobile travel lane and the bicycle lane to increase safety.

The buffer is placed between the bike lane and automobile travel lane. The buffer is marked with white chevrons to indicate that no vehicles are allowed to travel in the buffered area. There may be opportunities for buffered bicycle lanes in Sanford on roadways that feature wide automobile travel lanes and have curb and gutter.

Bicycle Boulevards

Bicycle boulevards are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume, low-speed local streets modified to enhance bicyclists' comfort by using treatments such as signage, pavement markings, traffic calming and traffic reduction, and intersection modifications. These treatments allow the through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic. The following list presents general design guidelines for bicycle boulevards:

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Traffic calming is used to maintain an 85th percentile speed below 22 mph.
- Sanford and Lee County should implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. The target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.

Bicycle Parking

This Plan recommends adding bicycle racks to destinations throughout the City, including Sanford's downtown and historic downtown Jonesboro, parks, schools, libraries, post offices, grocery stores, shopping centers, employment centers, and multi-family housing communities. While this Plan recommends many bicycle parking locations, bicycle parking should not be limited to only the listed locations. Bicycle parking should be available in well-lit areas of commercial centers and destination areas in Sanford. More detailed information on bicycle parking design standards can be found in Appendix B of this Plan.

INVERTED "U"
One rack element supports two bikes.

POST AND LOOP
One rack element supports two bikes.

Project Prioritization Process

The prioritization process began with input from Steering Committee members during the project kick off meeting. The consultant team then reviewed previous planning documents for Sanford and Lee County and extracted information on priority projects listed in each planning document. During field work investigations the consultant team evaluated and ground-truthed the information obtained from the previous planning efforts.

Extensive public input was collected during the development of this Bicycle Plan, including information gathered during the public outreach events, and through the responses to the online comment form. All input and opinions on high priority project areas in Sanford and Lee County were taken into account during the project prioritization process.

After field work investigations were conducted, Steering Committee members were asked to assign a score to each prioritization criteria. The scores were then averaged, and a final weighted score for each criteria was determined. The criteria listed below were custom designed for Sanford and Lee County, based on public input, Steering Committee input, and available data. The results of the scoring exercise are presented in Table 2.1 on page 2-7.

Table 2.1 Weighted Scores for Project Prioritization Criteria

Prioritization Criteria	Weighted Score
Schools within 1/2 mile radius	4.45
Connectivity/access to Proposed Facilities	4.09
Parks or Recreation Centers within 1/2 mile radius	4.00
Direct Access to an Existing Trail	3.64
High Population Density Areas (US Census)	3.36
Top 1-3 Recommendations from 2012 Public Comments	3.27
Lower-vehicle Access Areas (US Census)	3.18
Direct Access to Major Shopping Centers/Groceries/Business Areas	3.00
Lower-income Areas (US Census)	2.91
Bicycle Crash Location	2.91
Minority Population Areas (US Census)	2.45

Priority On-Road Bicycle Facility Recommendations

Final priority projects were determined based on the comprehensive project prioritization process described above and reflect public opinion, previous planning efforts, guidance from the Steering Committee and local staff representatives, and the knowledge and expertise of the consultant team. The final priority projects were inventoried and divided into logical segments based on input from the public, Steering Committee, local staff and connections between destinations. The final priority project segments are listed in Table 2.2 below.

Table 2.2 Priority Project Segments for On-Road Bicycle Facilities

Project #	Road Name	From	To	Facility Type	Total Length (miles)	Prioritization Score
1	WOODLAND	Horner / NC 87	Main	bike lanes	1.516	30.35
2	CHARLOTTE	First	Eleventh	bike lanes	0.849	27.44
3	THIRD	Weatherspoon	Horner	bike lanes	1.931	27.44
4	BROADWAY	Horner / NC 87	Avents Ferry	paved shoulders	2.908	27.35
5	CARTHAGE	Carbonton	Moore	bike lanes	0.219	22.99
6	VANCE	Weatherspoon	Fields	bike boulevard/bike lanes	1.202	22.99

On- and Off-Road Project Cut Sheets (starting page 2-14)

Project cut sheets for the highest priority on-road projects, and the off-road multi-use greenway projects are provided beginning on page 2-14 of this chapter. The cut sheets are particularly useful for state and local agencies as they begin developing more detailed design work for these projects. They will also help planning and transportation agencies as they explain these projects to various parties, such as local elected officials, potential funding agencies, and interested citizens.

Figure 2.1 Comprehensive Bicycle Network Recommendations

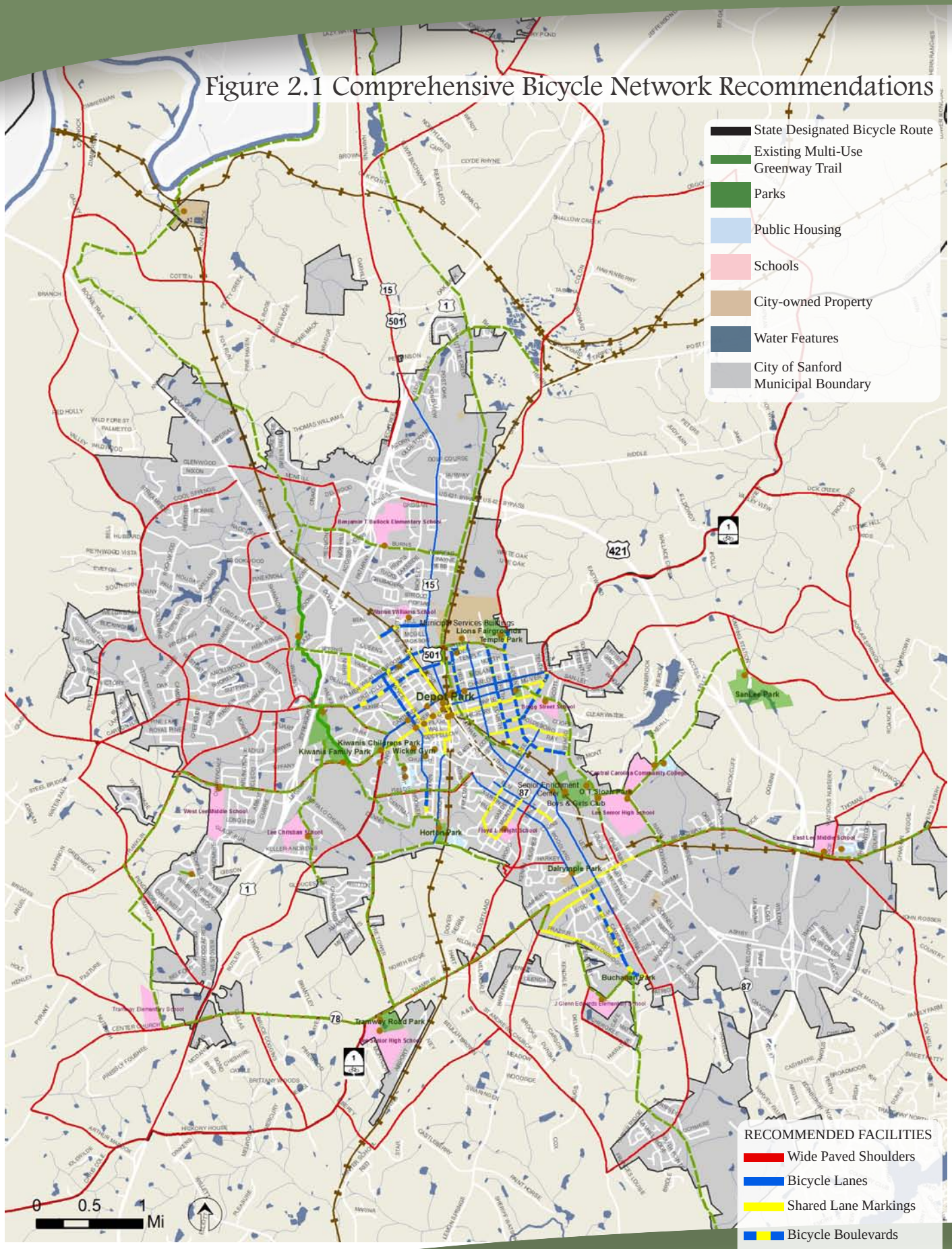


Figure 2.2 Comprehensive Bicycle Network Recommendations Northern Sanford

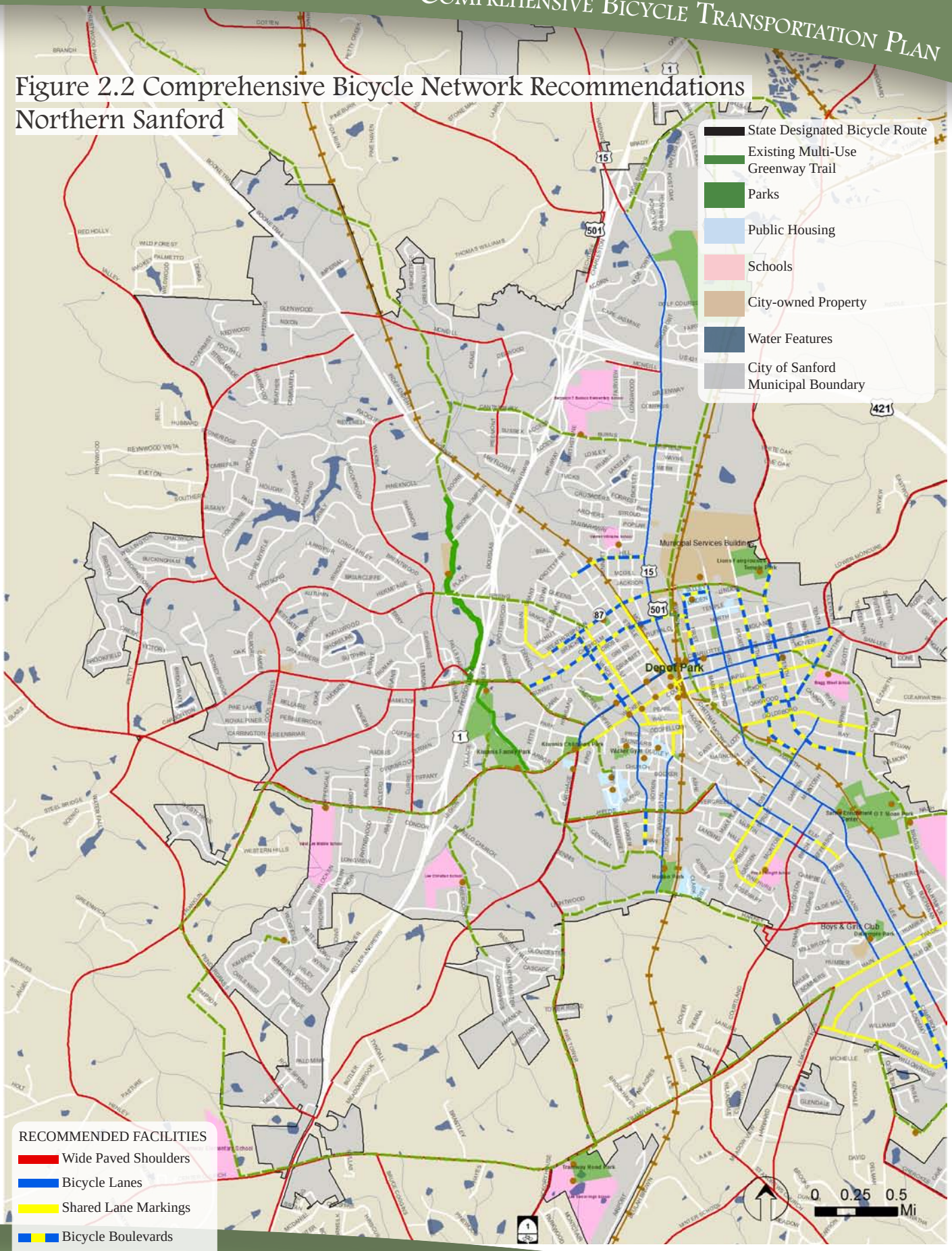


Figure 2.3 Comprehensive Bicycle Network Recommendations
Southern Sanford

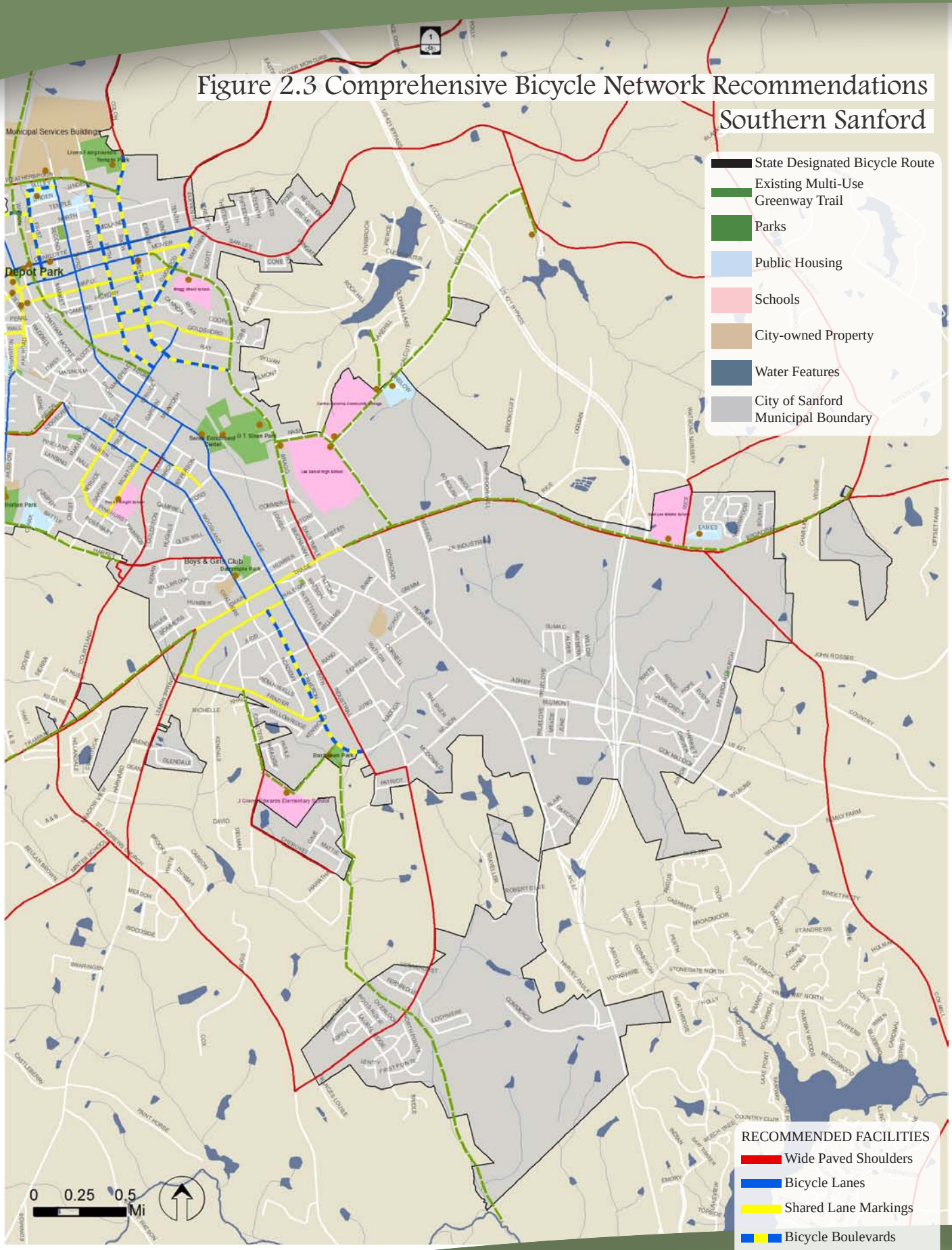


Figure 2.4 Comprehensive Bicycle Network Recommendations
Downtown Sanford

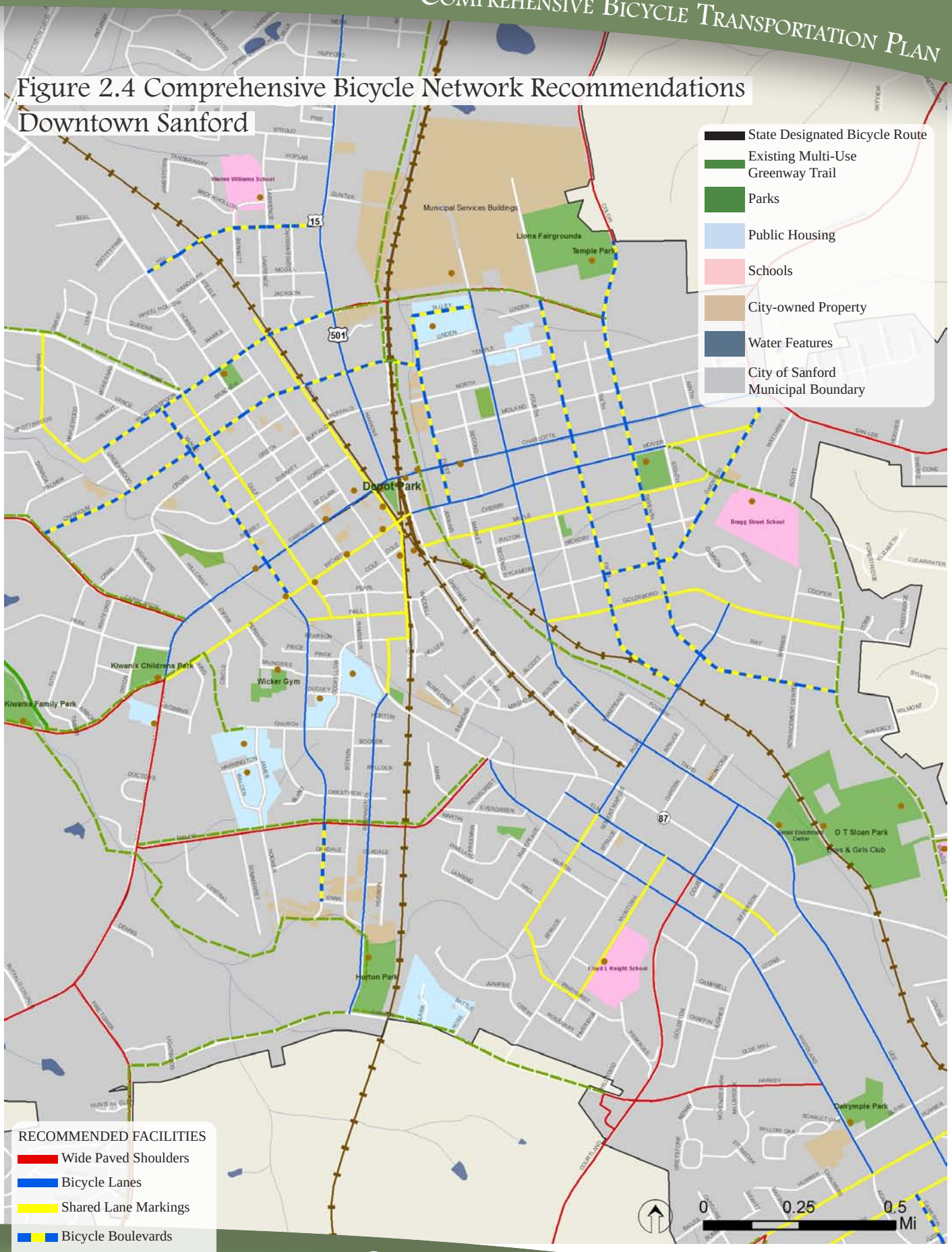


Figure 2.5 On-Road Bicycle Facility Recommendations

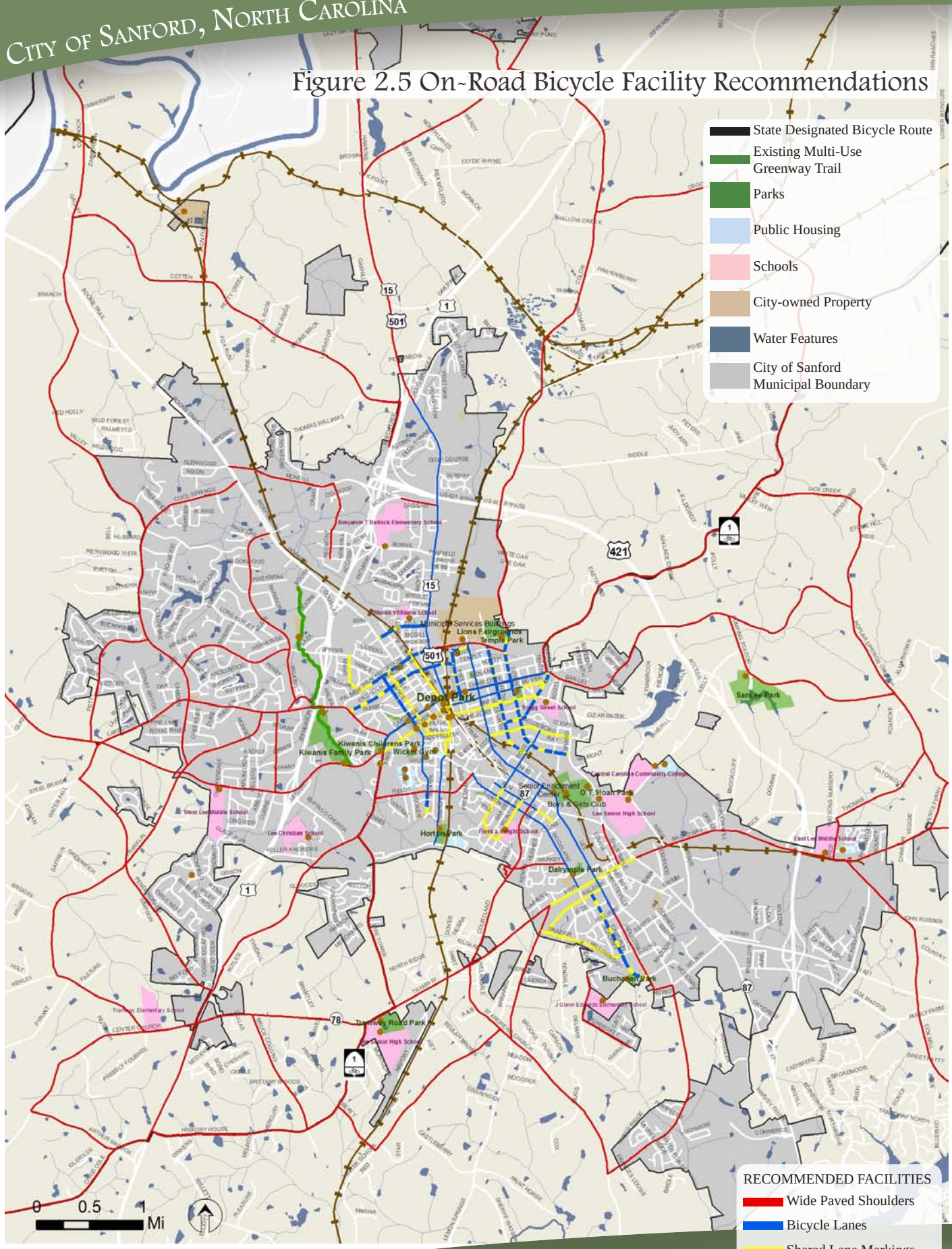
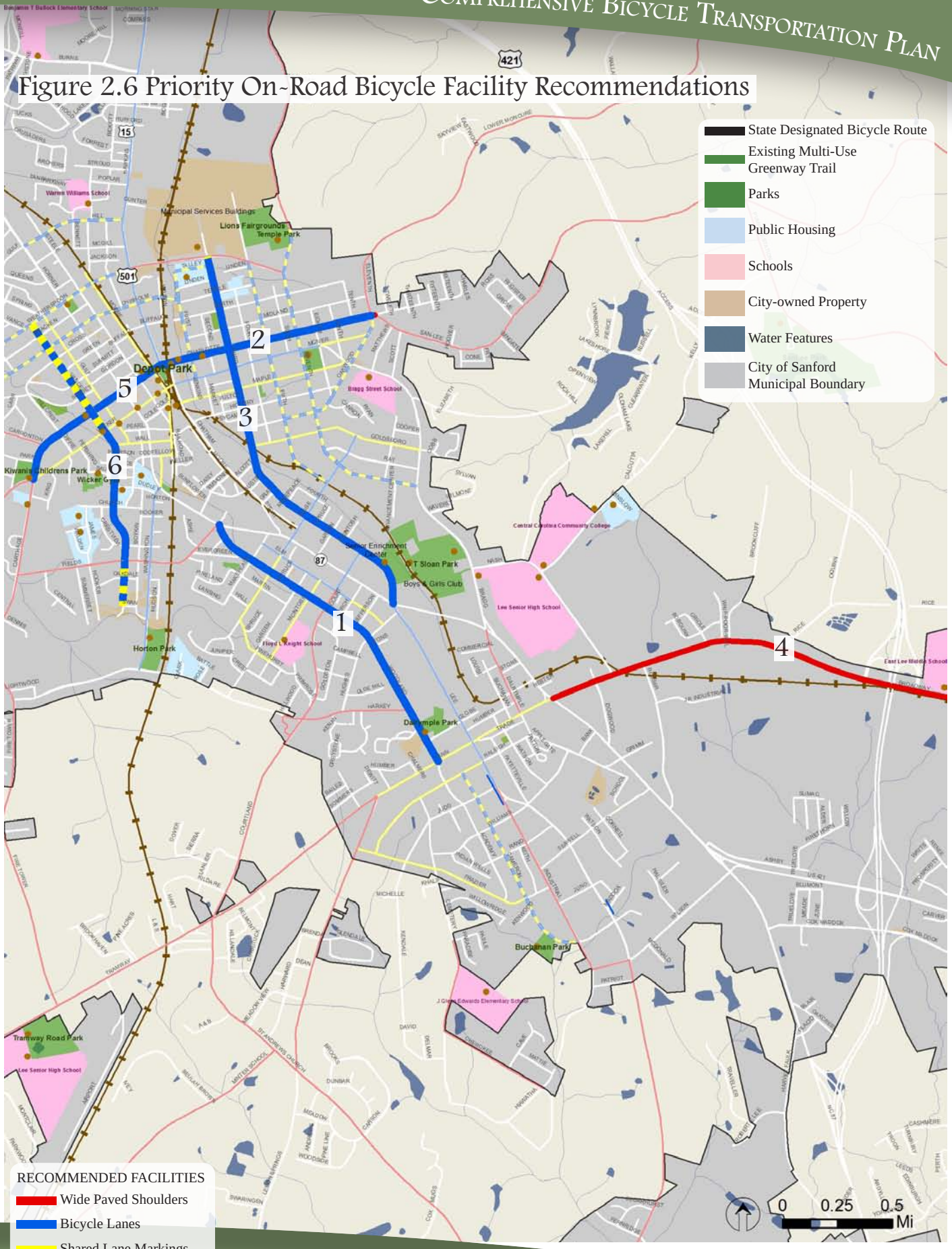


Figure 2.6 Priority On-Road Bicycle Facility Recommendations



Woodland Avenue,
Sanford, North Carolina

Priority Project #1: Woodland Avenue

Segment: from Horner Boulevard to Main Street

Description:

Woodland Avenue is a north-south collector road that links downtown Sanford with historic downtown Jonesboro. It is located west of Horner Boulevard and travels parallel to Horner Boulevard and to Lee Avenue until the intersection at Main Street. Land uses along Woodland Avenue are primarily residential and commercial.

Speed Limit:

25 mph - 35 mph

Distance:

~7,900 feet

Road/Land Ownership:

NCDOT/Sanford

Recommended Facility Type:

Bicycle Lanes

Existing Roadway Configuration:

Two travel lanes, on-street parking exists in some areas.

The existing corridor width varies from 40 feet - 78 feet, with narrower corridor widths existing on the southern end near Main St. and the widest corridor width existing at the intersection with Horner Blvd.

Proposed Roadway Configuration:

Two 11 foot travel lanes with turning lane at intersections if necessary, 7-8 foot on-street parallel parking where parking currently exists, and minimum 4 foot bicycle lanes.

Construction Method:

The cross section of Woodland Ave varies along this corridor and bicycle lanes should be added through means of restriping. Adequate width for bicycle lanes exists along the entire corridor. Bicycle lanes should be included in the design of any future roadway reconstruction projects. The City will need to continue to coordinate with NCDOT to ensure that bicycle and automobile lane widths meet state guidelines.

Trip Generators:

Floyd L. Knight Elementary School
Dalrymple Park
Historic Jonesboro
Horner Boulevard
Residential Areas

Function:

Bicycle Commuter Route
School-Park-Residential-Commercial Connector

Preliminary Cost Estimate

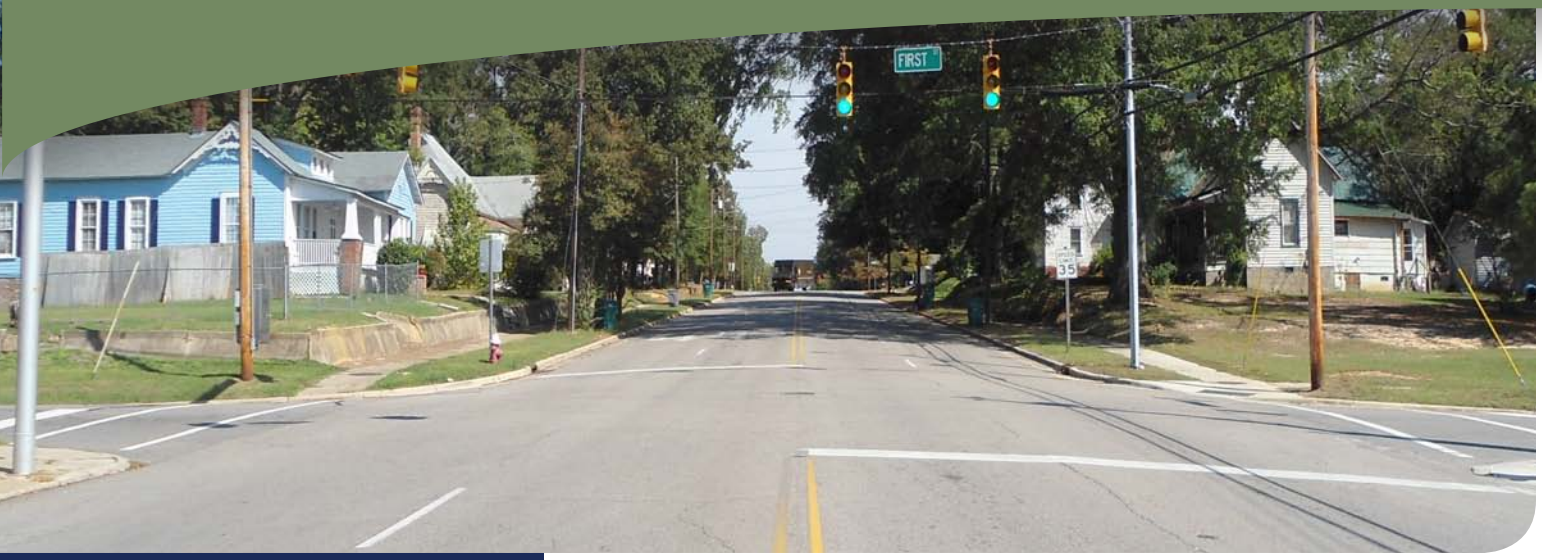
$73,149*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.7 Woodland Avenue

Existing Conditions: Woodland Avenue

Advanced Visualization: Woodland Avenue



Charlotte Avenue,
Sanford, North Carolina

Priority Project #2: Charlotte Avenue

Segment: from Chatham Street to Eleventh Street

Description:

Charlotte Avenue is an east-west collector road that links many residential areas with downtown Sanford. Charlotte Avenue connects with Carthage Street and is perpendicular to Horner Boulevard. This roadway corridor provides multi-modal connectivity to many destinations and should be a City priority.

Speed Limit/2011 ADT:

25 mph -35 mph / 8,100 - 1,600

Distance:

~5,000 feet

Road/Land Ownership:

NCDOT/Sanford

Recommended Facility Type:

Bicycle Lanes

Existing Roadway Configuration:

Two - four travel lanes, parallel parking exists in some areas near downtown Sanford.

The existing corridor width varies from ~54 feet where four travel lanes and on-street parking exist, to 32 feet where two travel lanes and no on-street parking exists.

Proposed Roadway Configuration:

Two 11 foot travel lanes with 10-11 foot center turn lane where necessary, 7-8 foot parallel parking where parking currently exists, and minimum 4 foot bicycle lanes.

Construction Method:

The existing four-lane cross section would be reduced to a two-lane cross section with an additional center turning lane between Chatham St. and Eighth St. and bicycle lanes through a FHWA "safety countermeasure" called a "road diet." From Eighth St. to Eleventh St. the existing two-lane cross section would be maintained and bicycle lanes would be added. The City will need to coordinate with NCDOT to ensure that bicycle and automobile lane widths meet state guidelines.

Trip Generators:

Downtown Sanford
Restaurants
Commercial Centers
Residential Areas

Function:

Bicycle Commuter Route
Recreation Cyclists Connector
Downtown-Residential-Commercial Connector

Preliminary Cost Estimate:

$91,003*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.8 Charlotte Avenue

Existing Conditions: Charlotte Avenue

Advanced Visualization: Charlotte Avenue

Third Street,
Sanford, North Carolina

Priority Project #3: Third Street

Segment: from Weatherspoon Street to Horner Boulevard

Description:

Third Street is a north-south route that serves as an arterial roadway for Sanford. Third Street links residential neighborhoods east of the railroad tracks to downtown Sanford. It also provides a connection to Sloan Park and Horner Boulevard. Land uses along Third Street are primarily residential and commercial. Third Street is perpendicular to Charlotte Avenue and bicycle facilities along this corridor would serve as the spine for the entire bicycle facility network in Sanford.

Speed Limit / 2011 ADT:

35 mph / 2,800

Distance:

~10,000 feet

Road/Land Ownership:

NCDOT/Sanford

Recommended Facility Type:

Bicycle Lanes

Existing Roadway Configuration:

Four travel lanes. The existing corridor width varies from ~83 feet near the intersection of Horner Blvd., to 40 feet near the intersection of Weatherspoon St.

Proposed Roadway Configuration:

Two 11 foot travel lanes with 10-11 foot turn lane where necessary, and minimum 4 foot bicycle lanes.

Construction Method:

The existing four-lane cross section would be reduced to a two-lane cross section with an additional center turning lane between Weatherspoon St. and Courtland St. and bicycle lanes through a FHWA "safety countermeasure" called a "road diet." From Courtland St. to Horner Blvd., the existing cross section would be maintained and bicycle lanes would be added. The City will need to coordinate with NCDOT to ensure that bicycle and automobile lane widths meet state guidelines.

Trip Generators:

Public Housing
Lee County Enrichment Center
Downtown
Commercial Centers
Residential Areas

Function:

Bicycle Commuter Route
Downtown-Park-Residential-Commercial Connector

Preliminary Cost Estimate:

$228,788*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.9 Third Street

Existing Conditions: Third Street

Advanced Visualization: Third Street

Broadway Road,
Sanford, North Carolina

Priority Project #4: Broadway Road

Segment: from Horner Boulevard to Avents Ferry Road

Description:

Broadway Road is an east-west collector road that links Sanford and historic Jonesboro with Broadway. East Lee Middle School is located on Broadway Road, and improvements to this roadway corridor would allow for bicycle transportation to East Lee Middle School and for connections to the proposed Nash Street Multi-Use Side Path.

Speed Limit:

45 mph - 55 mph

Distance:

~15,400 feet

Road/Land Ownership:

NCDOT/Sanford

Recommended Facility Type:

Wide (5ft) Paved Shoulders

Existing Roadway Configuration:

Two travel lanes and a center turning lane exist through the majority of the project, transitioning to two-lanes without a center turning lane at Rice Rd. The existing corridor width varies from ~48 feet near the intersection of Horner Blvd., to ~22 feet near the intersection of Rice Rd.

Proposed Roadway Configuration:

No changes to the roadway configuration are proposed.

Construction Method:

Paved shoulders should be added to the existing two- to three-lane cross section during any future roadway resurfacing, reconstruction, or widening projects. If increased development or density occurs along Broadway Road and curb and gutter are installed, the wide paved shoulders should become bicycle lanes.

Trip Generators:

Lee Middle School
Broadway and Veterans Park
Historic Jonesboro
Horner Boulevard
Residential Areas

Function:

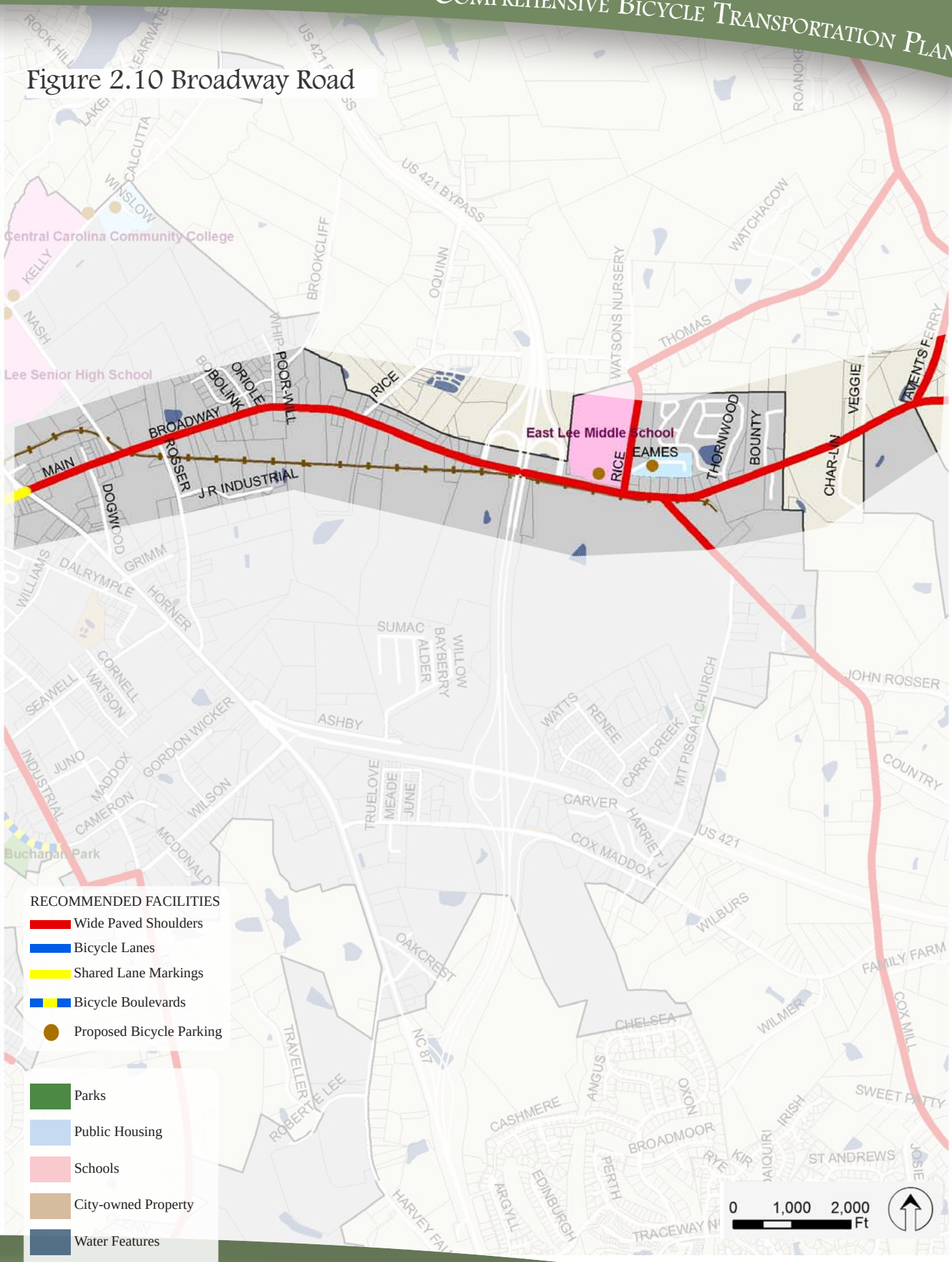
Bicycle Commuter Route
Recreation Cyclists Connector
Sanford-Broadway Connector

Preliminary Cost Estimate:

$1,253,616*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.10 Broadway Road



Carthage Street,
Sanford, North Carolina

Priority Project #5: Carthage Street

Segment: from Carbonton Road to Moore Street

Description:

Carthage Street is an east-west collector road that links many residential areas with downtown Sanford. Carthage Street connects with Charlotte Avenue and is perpendicular to Horner Boulevard. This roadway corridor provides multi-modal connectivity to many destinations, traverses downtown, and should be a City priority.

Speed Limit / 2011 ADT:

20 mph - 35 mph / 8,100 - 1,600

Distance:

~4,000 feet

Road/Land Ownership:

NCDOT/Sanford

Recommended Facility Type:

Bicycle Lanes

Existing Roadway Configuration:

Four travel lanes and a center turning lane, with on-street parallel parking in some areas. The existing corridor width varies from ~60 feet near the intersection of Vance St., to ~58 feet near the intersection of Moore St.

Proposed Roadway Configuration:

Two 11 foot travel lanes with 10-11 foot center turning lane, on-street parallel parking preserved where it currently exists, and minimum 4 foot bicycle lanes.

Construction Method:

The existing four-lane cross section would be reduced to a two-lane cross section with an additional center turning lane, on-street parallel parking and bicycle lanes through a FHWA "safety countermeasure" called a "road diet." The City will need to coordinate with NCDOT to ensure that bicycle and automobile lane widths meet state guidelines.

Trip Generators:

Lee County Library
Downtown
Depot Park (Railroad House Museum)
Kiwanis Childrens Park
Commercial Centers
Residential Areas

Function:

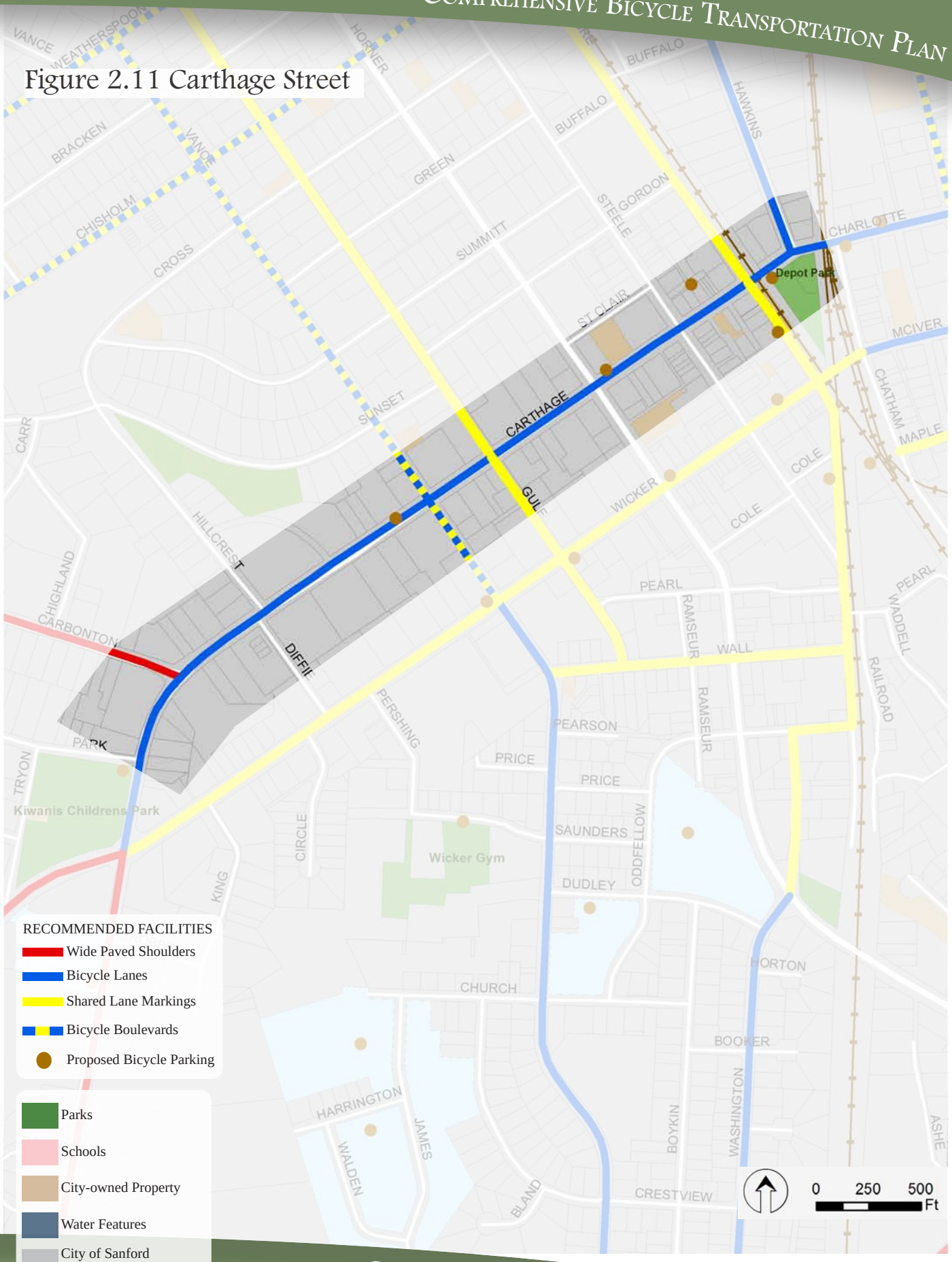
Bicycle Commuter Route
Recreational Cyclist Connector
Downtown-Residential-Commercial Connector

Preliminary Cost Estimate:

$95,204*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.11 Carthage Street



Vance Street,
Sanford, North Carolina

Priority Project #6: Vance Street

Segment: from Weatherspoon Street to Fields Drive

Description:

Vance Street is a north-south route that serves as a local neighborhood road alternative to Horner Boulevard. Vance Street links residential neighborhoods west of Horner Boulevard to downtown Sanford. Land uses along this corridor are primarily residential. Vance Street provides a connection between the commercial area on Spring Lane, the residential neighborhoods, downtown Sanford, and the neighborhoods in southwestern Sanford.

Speed Limit:

25 mph - 35 mph

Distance:

~6,400 feet

Road/Land Ownership:

Sanford

Recommended Facility Type:

Bicycle Boulevard/Bicycle Lanes

Existing Roadway Configuration:

Two travel lanes and a turning lane in some areas. The existing corridor width varies from ~45 feet near the intersection of Pearson Circle, to ~28 feet near the intersection of Weatherspoon St.

Proposed Roadway Configuration:

Two 11 foot travel lanes with 10-11 foot turning lane where necessary, and minimum 4 foot bicycle lanes.

Construction Method:

The existing two lane cross section would be retained with the addition of signage and pavement markings between Weatherspoon St. and Wicker St. Traffic calming techniques to create a "bicycle boulevard" such as speed limit reduction and mini traffic circles should also be considered but may not be necessary.

From Wicker St. to Fields Dr. there is adequate width to restripe the existing two-lane cross section to add 4' bicycle lanes. The City will need to coordinate with NCDOT to ensure that bicycle and automobile lane widths meet state guidelines.

Trip Generators:

Public Housing
W.B. Wicker School
Residential Areas
Commercial Areas

Function:

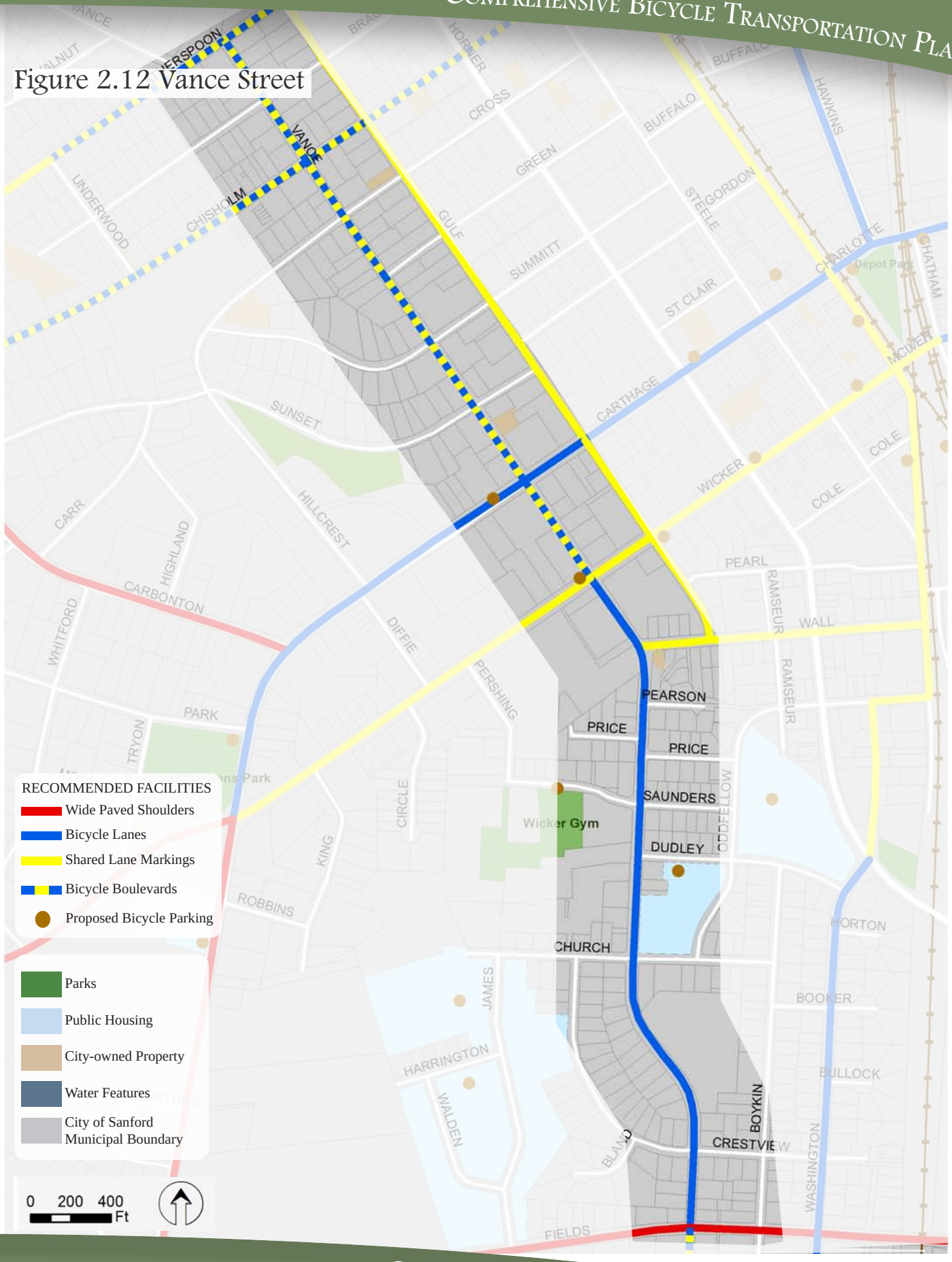
Bicycle Commuter Route
Recreation Cyclists Connector
School-Park-Residential-Commercial Connector

Preliminary Cost Estimate:

$104,570*

*Project costs vary over time and by geography. Further evaluation during project design will be needed to determine exact project costs.

Figure 2.12 Vance Street



Existing Conditions: Vance Street

Advanced Visualization: Vance Street

Off-Road Bicycle Facility Network

(Multi-use Greenway Trails)

The term "greenway trails" refers to both multi-use trails and multi-use side paths built in open space or stream corridors, or along a roadway. Greenway corridors often become off-road transportation facilities with simultaneous benefits. They help protect the environment, create an alternate mode of transportation, encourage healthy living, provide opportunities for recreation, and generate economic activity. Greenway trails that are built within greenway corridors give bicyclists, pedestrians, and other non-motorized trail users access to natural areas. Greenways also provide opportunities to restore wildlife habitat in areas that have been previously disturbed. Greenways are closed to motorized traffic and designed for two-way travel by bicyclists and pedestrians. As described in Appendix B: Design Guidelines, a greenway should be an all-weather surface and accessible within urban, suburban, and rural areas.

Trails can be constructed of many different materials, however, for trails that serve the purpose of bicycle transportation, hard surfaces such as asphalt or concrete are recommended. Each trail project will also require close coordination with nearby property owners. Design features such as landscaped screening, fencing, and other treatments should be considered to help ensure privacy where desired.

Previously Proposed Greenway Trails in Sanford and Lee County

There are several greenway trails currently in development, design, or advanced planning phases in Sanford and Lee County. The two longest proposed greenway trails are the Endor Iron Furnace Greenway Trail and the Buffalo Creek Greenway. The Endor Iron Furnace Greenway will connect Kiwanis Family Park to the historic Endor Iron Furnace site, which is owned by the North Carolina Division of Parks and Recreation (DPR). The City is working with NCDOT to implement portions of this trail. DPR plans to develop recreational amenities, including land and paddle trails (also called blueways), from the Endor Iron Furnace site east along the Deep River. The City of Sanford and Lee County have planned a greenway trail that will extend from the state-owned lands along the Deep River south along the Little Buffalo Creek. The Little Buffalo Creek Greenway would connect to Depot Park in downtown Sanford. The City's *2010 Comprehensive Pedestrian Plan* presents a connected network of greenway trail recommendations. To achieve consistency, these previously proposed recommendations were reviewed and evaluated during the development of this Comprehensive Bicycle Transportation Plan. The greenway trail recommendations in this chapter take into account the previously proposed recommendations, the GIS-based analysis performed by the consulting team, input received from Steering Committee members and the public, and the results of field work investigations.

Recommended Multi-Use Greenway Trails in Sanford

Outside the current initiatives previous discussed, the City of Sanford should work closely with Lee and Harnett Counties to develop multi-use greenway trail spurs and side paths that connect to neighborhoods, commercial areas, downtown Sanford, and the recommended on-road bicycle

network. Potential greenway opportunities exist in Sanford along Big Buffalo Creek, Deep River, Little Creek, and their tributaries. The following pages include maps and descriptions of where additional greenway trail connections should occur.

The multi-use greenway trail recommendations presented in the maps contained throughout this chapter are planning level analyses, and each corridor, waterway crossing, roadway crossing, and railroad will require additional evaluation during the feasibility and design phases of a project.

Multi-Use Greenway Trails

One type of greenway trail is a multi-use trail, as shown in the picture to the right. A multi-use trail is defined as a linear corridor of land that is typically more recreational in character and consists of trails along stream corridors and other open space (e.g., utility corridors such as power line easements and sewer easements, railroad right-of-way). Multi-use trails can be designed to accommodate a variety of trail users, including bicyclists, walkers, hikers, joggers, skaters, horseback riders, and those confined to wheelchairs. Greenway corridors can also serve environmental purposes, protecting forests and water quality, and offer ample opportunities for environmental education. Multi-use trails in Sanford should be integrated with and serve as an off-road extension of the on-road bicycle facility network.

Multi-Use Side Paths

A multi-use side path is a greenway trail that follows a road corridor but is separated from on-road traffic. Side paths are more transportation-oriented in character and used by bicyclists and pedestrians. They are typically only appropriate for bicyclists if there are a limited number of driveways and intersections. Where side paths are proposed in Sanford, factors such as the distance between destinations, adjacent land use, and population density were considered.

Families and novice bicyclists are most comfortable on off-road facilities. Therefore, a comprehensive network of multi-use greenway trails that includes multi-use trails and multi-use side paths is an integral part of the overall bicycle facility network, and its development should be a priority of the City of Sanford and Lee County. The photos to the right demonstrate side paths along rural, higher-speed roads in North Carolina.

Figure 2.13 Off-Road Bicycle Facility Recommendations (Multi-Use Greenway Trails)

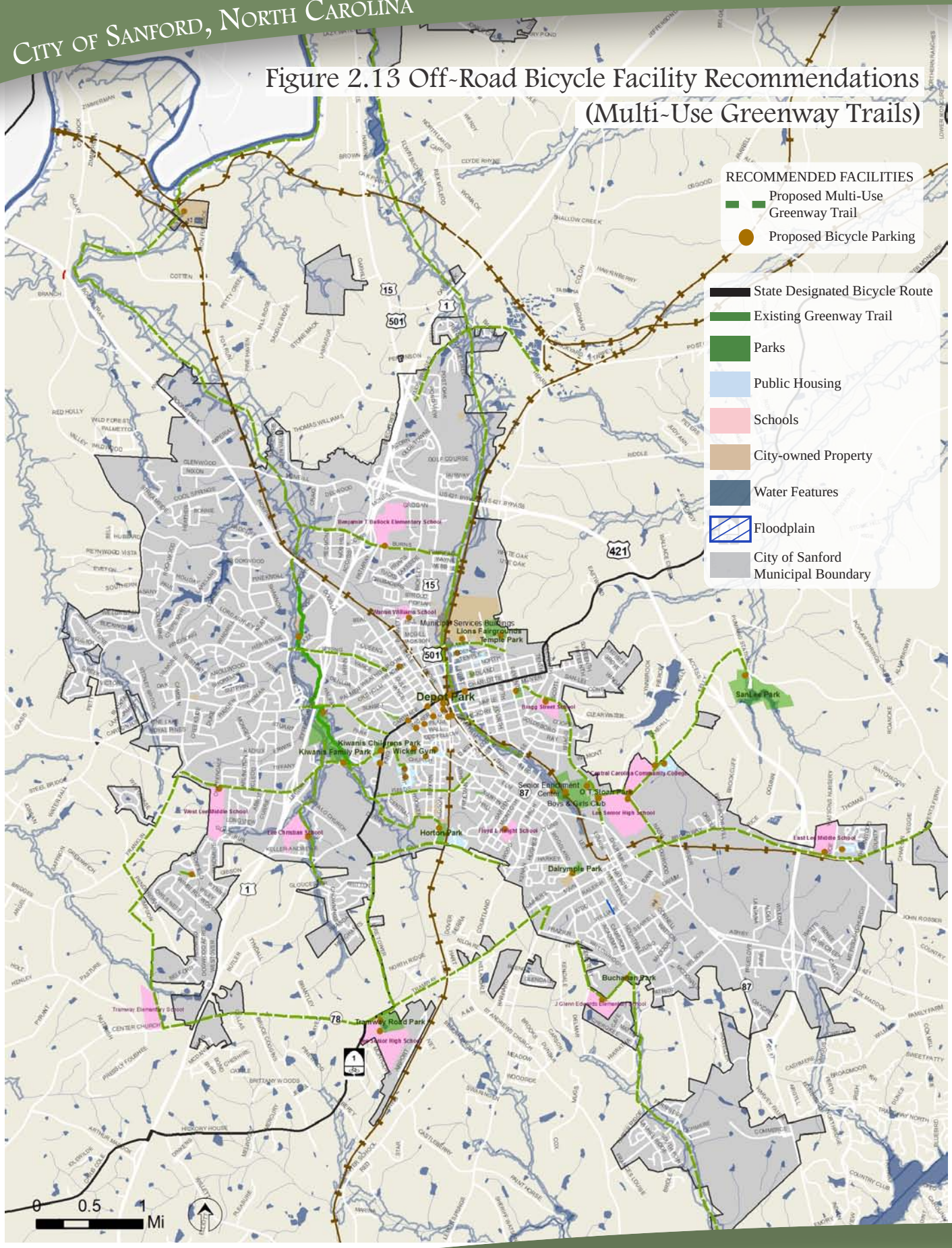


Table 2.3 Off-Road Bicycle Facility Recommendations (Multi-Use Greenway Trails)

Name	Previous/New Recommendation	Connections
Medical Mile (formerly Big Buffalo Creek Greenway South)	previous	Kiwanis Family Park, Cental Carolina Hospital, Horton Park Connector, Garden Street Connector, West Lee Middle Side Path
Horton Park Connector	previous	Medical Mile, Fields Drive neighborhoods, Horton Park
Carbonton Road Side Path	new	Kiwanis Family Park, Carbonton Road neighborhoods, Downtown Sanford
Church Street Connector	previous	Kiwanis Family Park, Church Street neighborhoods, W.B. Wicker School
Jonesboro Connector	previous	Jonesboro Greenway, Glenn Edwards Elementary, Buchanan Park, southern Sanford neighborhoods
Jonesboro Greenway	previous	Jonesboro Connector, Historic Jonesboro, Carolina Trace
SanLee Park Side Path	previous	Lee Senior High, Central Carolina Community College, SanLee Park, Bragg Street Side Path, Nash Street Side Path, neighborhoods
SanLee Connector	previous	SanLee Side Path, Central Carolina Community College, Lick Creek natural area
Sanford Greenway	previous	Benjamin T Bullock Elementary, Horner Blvd, Endor Furnace Greenway, Kiwanis Park Greenway, neighborhoods
West Lee Middle Side Path	new	West Lee Middle School, Kiwanis Family Park, neighborhoods, Buffalo Creek Connector
Bragg Street Side Path	new	Bragg Street School, Nash Street Side Path, Charlotte Ave, Lee Senior High School, Central Carolina Community College, neighborhoods
Nash Street Side Path	new	Bragg Street School, Bragg Street Side Path, Charlotte Ave, Lee Senior High School, Central Carolina Community College, neighborhoods, South SanLee Rail Trail
Glenn Edwards Elementary Connector	new	Jonesboro Greenway, Jonesboro Connector, Buchanan Park, southern Sanford neighborhoods
Buffalo Creek Connector	new	Lee Christian School, Kiwanis Family Park, neighborhoods, West Lee Middle Side Path
Tramway/Pendergrass Loop Side Path	new	West Lee Middle School, West Lee Middle Side Path, neighborhoods, Lee Senior High, Tramway Road Park
Endor Furnace Greenway	previous	Endor Furnace Historic Site, Deep River, Sanford Greenway, Kiwanis Family Park, Downtown Sanford, neighborhoods
Deep River Greenway	previous	Endor Furnace Historic Site, Deep River Park Area, Deep River
Fire Tower Road Side Path	new	Carthage, Lee Senior High School, Tramway Road Park, Tramway/ Pendergrass Loop Side Path
Little Buffalo Creek Greenway	previous	Sanford Greenway, neighborhoods, Municipal Complex, Lions Fairgrounds, Downtown Sanford, Depot Park
McCracken Heights Connector	previous	McCracken Heights Neighborhood, Little Buffalo Creek Greenway
Garden Street Connector	previous	Fire Tower Road Side Path, Medical Mile, Horton Park, Courtland Drive, Historic Jonesboro
Tramway Road Side Path	new	Tramway/Pendergrass Loop Side Path, Tramway Road Park, Southern Lee High School, San Lee Middle School, Historic Jonesboro
Spring Lane On-Road Side Path	new	West Lake neighborhoods, Endor Iron Furnace Greenway, Riverbirch Shopping Center, Lowes Foods Shopping Center, Rosemount-McIver Park Historic neighborhood
Amos Bridges Road Side Path	new	Food Lion, Apartment Complex, Little Buffalo Creek Greenway
Broadway Road Side Path	new	Historic Jonesboro, East Lee Middle School, Nash Street Side Path, Broadway community, Horner Boulevard

Existing Conditions: Bragg Street

Advanced Visualization: Bragg Street Side Path

Bullock Elementary,
Sanford, North Carolina

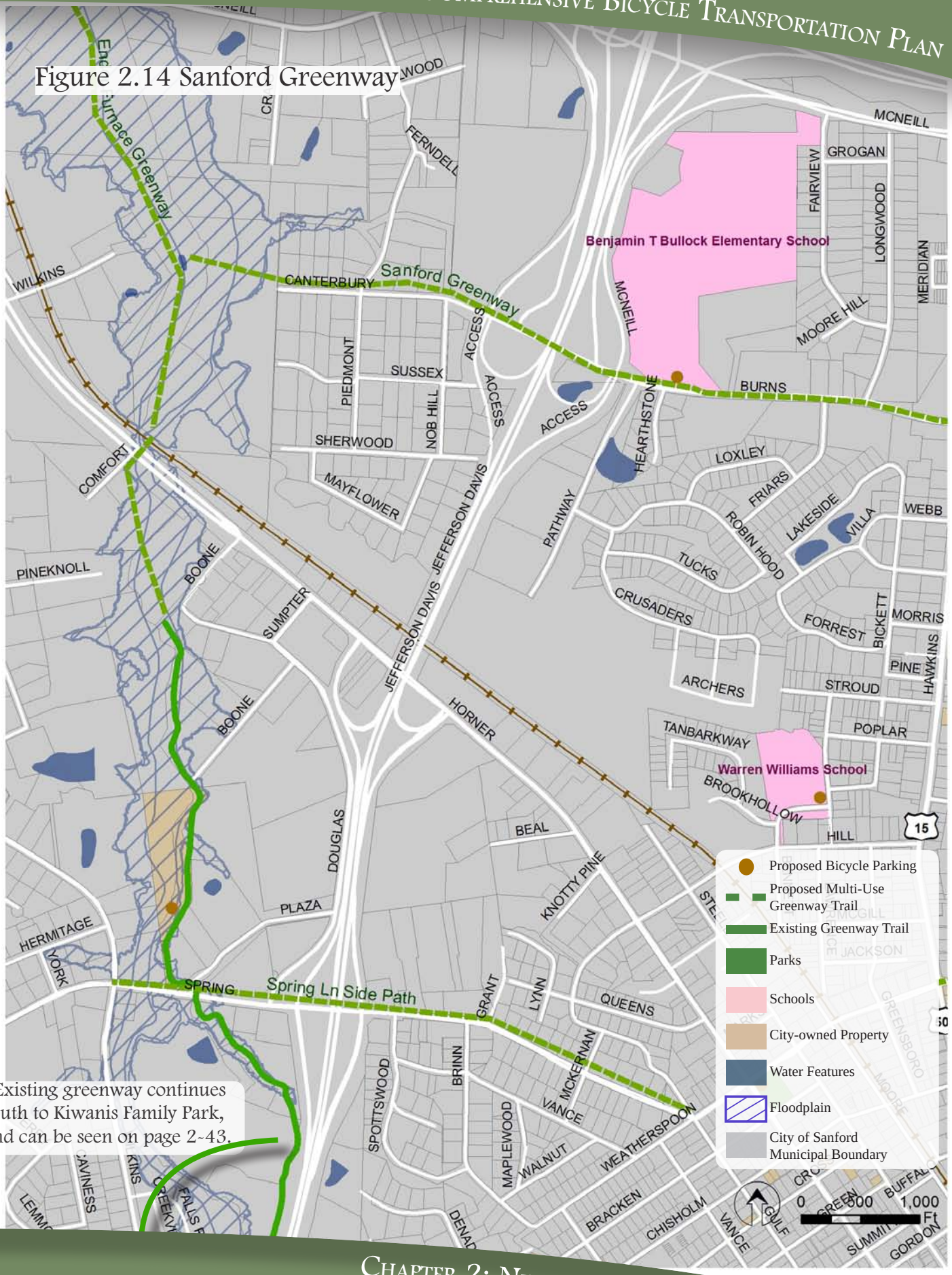
Sanford Greenway and Multi-Use Side Path

Just north of Horner Boulevard and the railroad tracks, a multi-use greenway trail should spur east off the Endor Furnace Greenway to connect to Benjamin Bullock Elementary and the surrounding neighborhoods. If right-of-way is available and easements can be negotiated, the multi-use greenway trail should extend parallel to Canterbury Road as a multi-use side path, crossing US 1, continuing along Burns Drive and connecting to the Benjamin T. Bullock Elementary School and the Hearthstone/Friars neighborhood. The multi-use side path should continue east, to connect to the Little Buffalo Creek Greenway.

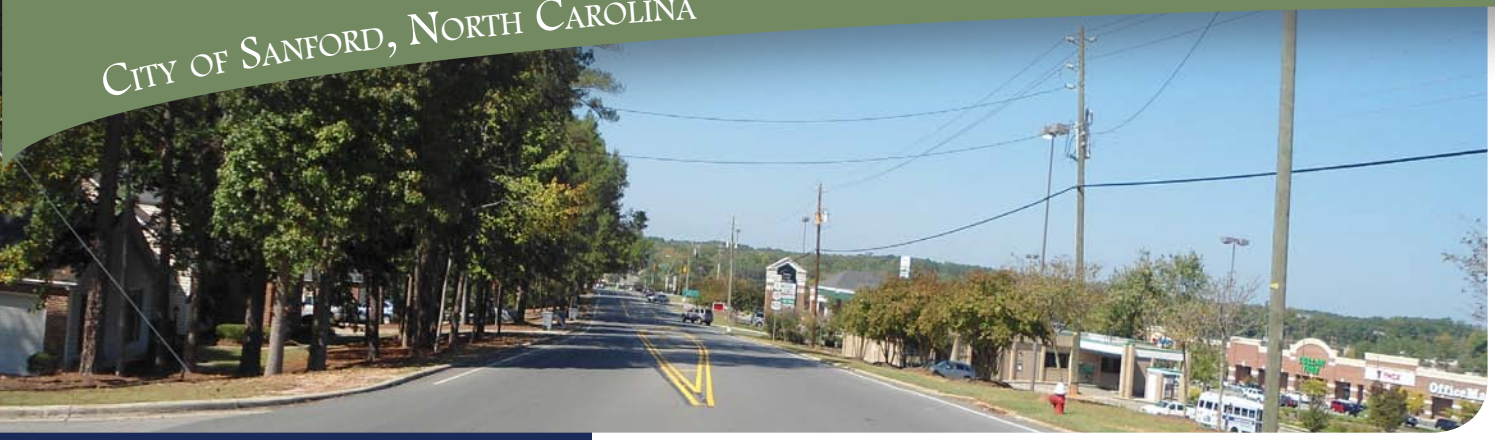
The existing Endor Furnace greenway travels south and intersects with Spring Lane (shown in the picture below), the River Birch commercial center, Kiwanis Family Park, nearby neighborhoods, and Horner Boulevard. This linkage offers greenway users an opportunity to connect to the proposed side path along Spring Lane to access downtown Sanford.

Spring Lane,
Sanford, North Carolina

Figure 2.14 Sanford Greenway



Existing greenway continues south to Kiwanis Family Park, and can be seen on page 2-43.



Spring Lane,
Sanford, North Carolina

Spring Lane Multi-Use Side Path

Spring Lane is currently an important roadway connection between the Riverbirch commercial center located on Spring Lane just west of US 1, and downtown Sanford. The Spring Lane multi-use side path would provide a desirable facility, for users of all skill levels preferring separation from traffic. Side paths generally provide directional travel opportunities for pedestrians and cyclists not provided by existing roadways. The Spring Lane multi-use side path would offer transportation opportunities for pedestrians and cyclists who wish to travel between the existing Endor Furnace greenway, the Riverbirch commercial center, downtown Sanford, the residential neighborhoods located in this area, and establish a safe connection to the proposed future on-street facilities along Weatherspoon Street and Wilkins Drive. The side path would support pedestrian and cyclist movement across US 1, which is currently a barrier for non-automotive transportation.

The following language from "Chapter 5: Design of Shared Use Paths" of the AASHTO Guide for the Development of Bicycle Facilities provides guidance regarding separation between a multi-use side path and automobile travel lanes.

"Separation is desirable between a two-way side path and the adjacent roadway to demonstrate to both the bicyclist and the motorist that the path functions as an independent facility for bicyclists and other users. The minimum recommended distance between a path and the roadway curb or edge of pavement (where there is no curb) is 5 feet (1.5 m). Where the separation is less than 5 feet (1.5 m), a physical barrier or railing should be provided between the path and the roadway. Such barriers or railings serve both to prevent path users from making undesirable or unintended movements from the path to the roadway and to reinforce the concept that the path is an independent facility. Where used, the barrier or railing should be a minimum of 42 inches (1 m) high. A barrier or railing between a shared use path and adjacent highway should not impair sight distance at intersections, and should be designed not to pose a hazard to errant motorists. The barrier or railing need not be of size and strength to redirect errant motorists toward the roadway, unless other conditions require a crashworthy barrier."

Concept graphic for the multi-use side path along Spring Lane, separated from automobile traffic by yellow striping.

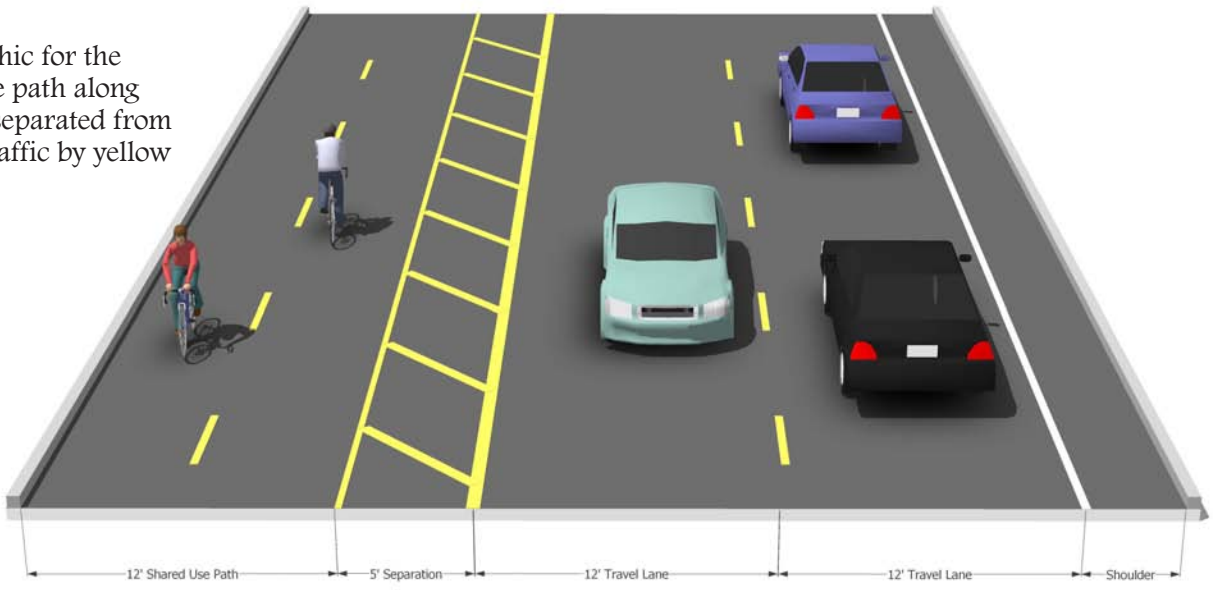
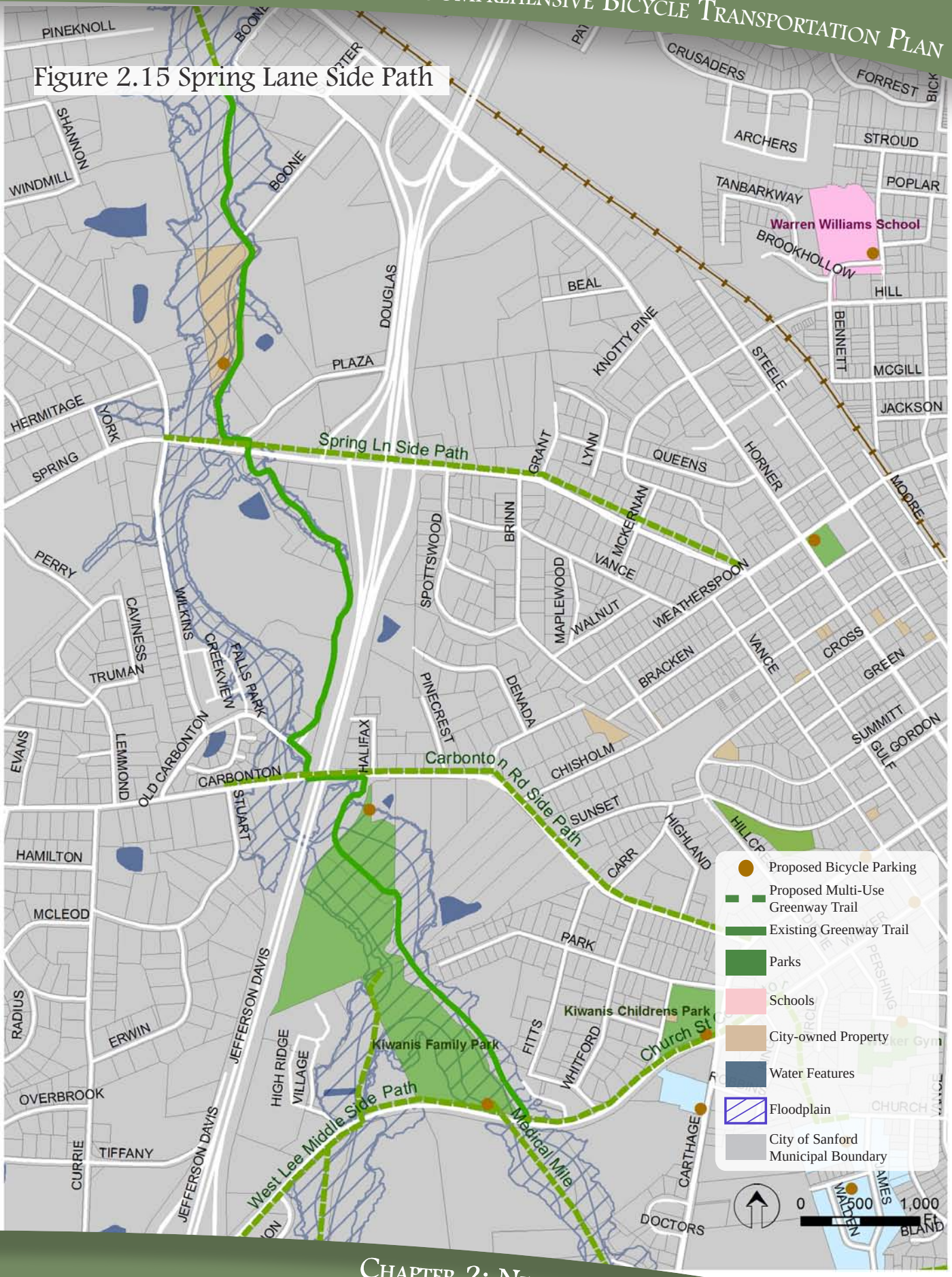


Figure 2.15 Spring Lane Side Path



Kiwanis Family Park,
Sanford, North Carolina

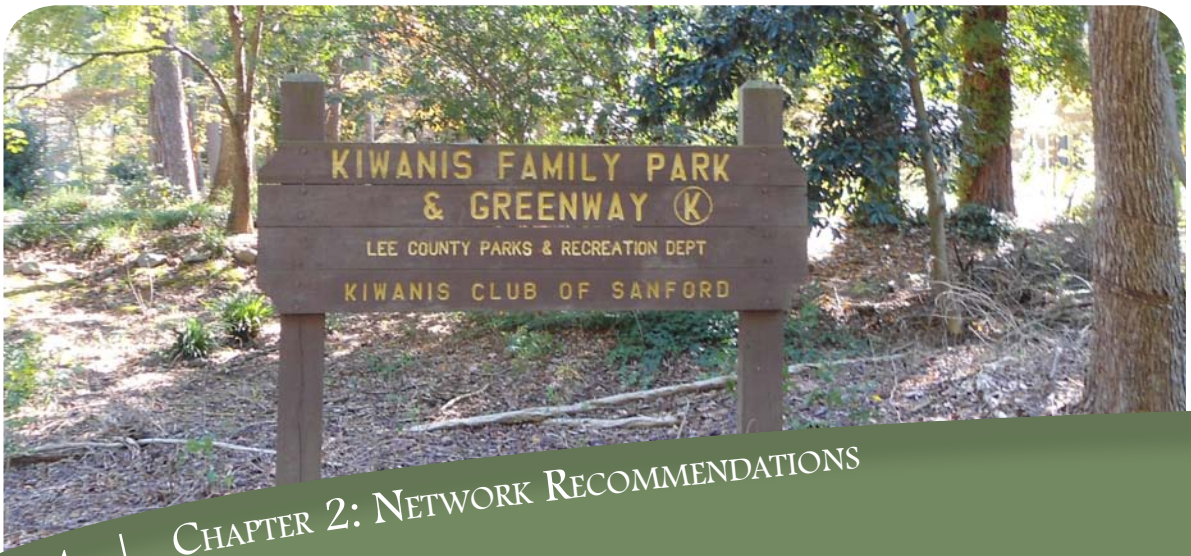
Endor Furnace Greenway Hub

The existing Endor Furnace multi-use greenway trail offers users a family-friendly north-south route to connect to other proposed greenways, the River Birch commercial areas, Kiwanis Children's Park, and Kiwanis Family Park. The Kiwanis Family Park has the opportunity to become a hub for greenway trail connections. West of Kiwanis Family Park, a multi-use side path along Wicker Street could connect to the Tramway/Pendergrass Loop (see description on following page) and to West Lee Middle School. East of Kiwanis Family Park, a multi-use side path along Wicker Street could connect to the Kiwanis Children's Park, the Church Street Connector and the surrounding neighborhood.

The south spur, called Medical Mile, would begin at Kiwanis Family Park and extend south along sewer easements and floodplains. At Carthage Street, the trail would cross at-grade connecting to the Horton Park Connector and community housing north of the park. Medical Mile would also link to the recommended side path along Fields Drive.

A second spur trail located south of Wicker Street along an existing sewer easement would connect Kiwanis Family Park to the Lee Christian School, and continue south to the Gloucester Drive neighborhood, ultimately connecting to the recommended side path along Fire Tower Road, the Lee Senior High School and the recommended Tramway Road side path.

The advanced visualization on page 2-45 depicts the Wicker Street high-visibility crossing just west of the Kiwanis Family Park. This crossing is necessary to create linkages between all of the proposed multi-use greenway trails, and will make this area a true hub for greenway connections.



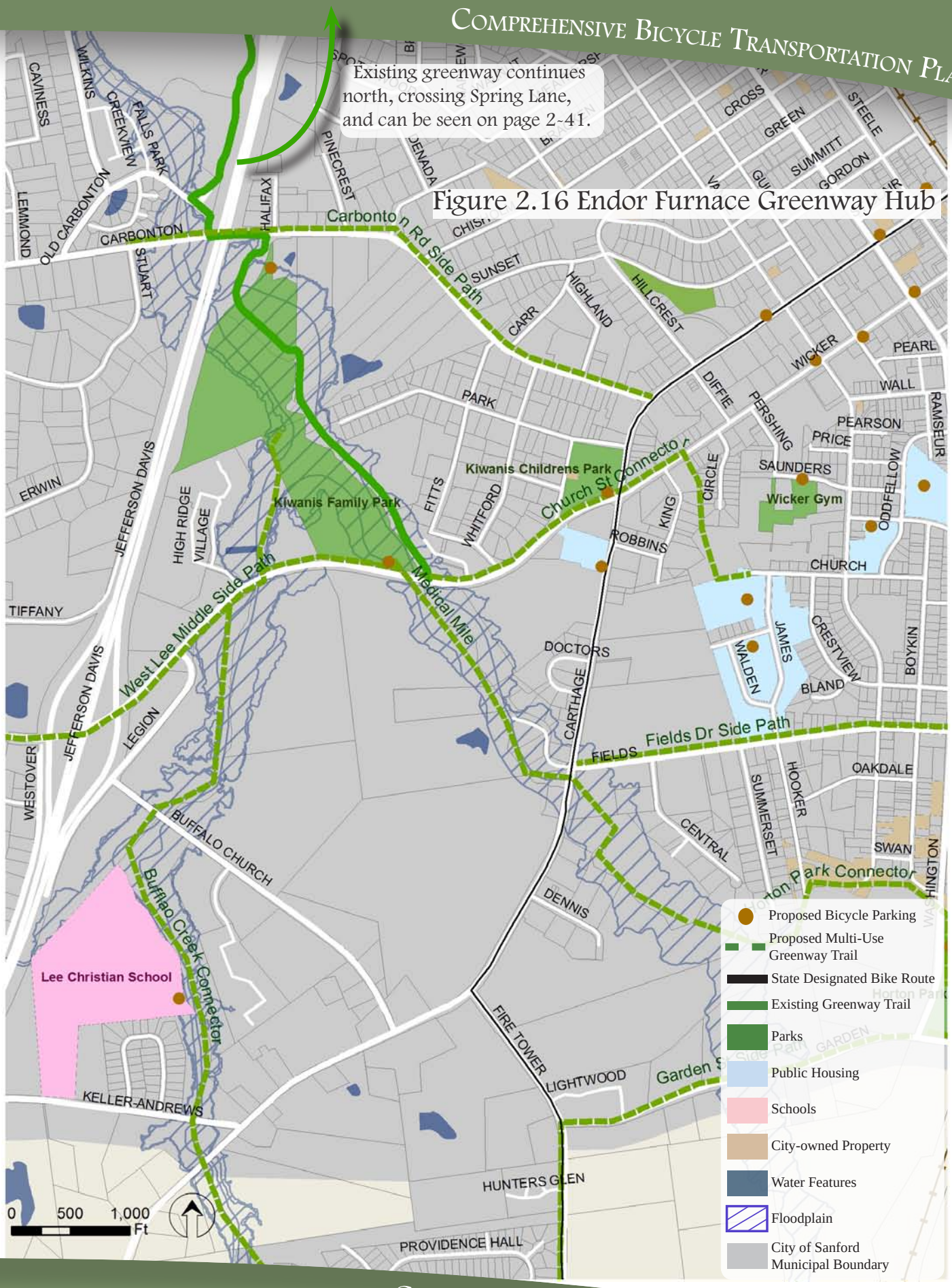
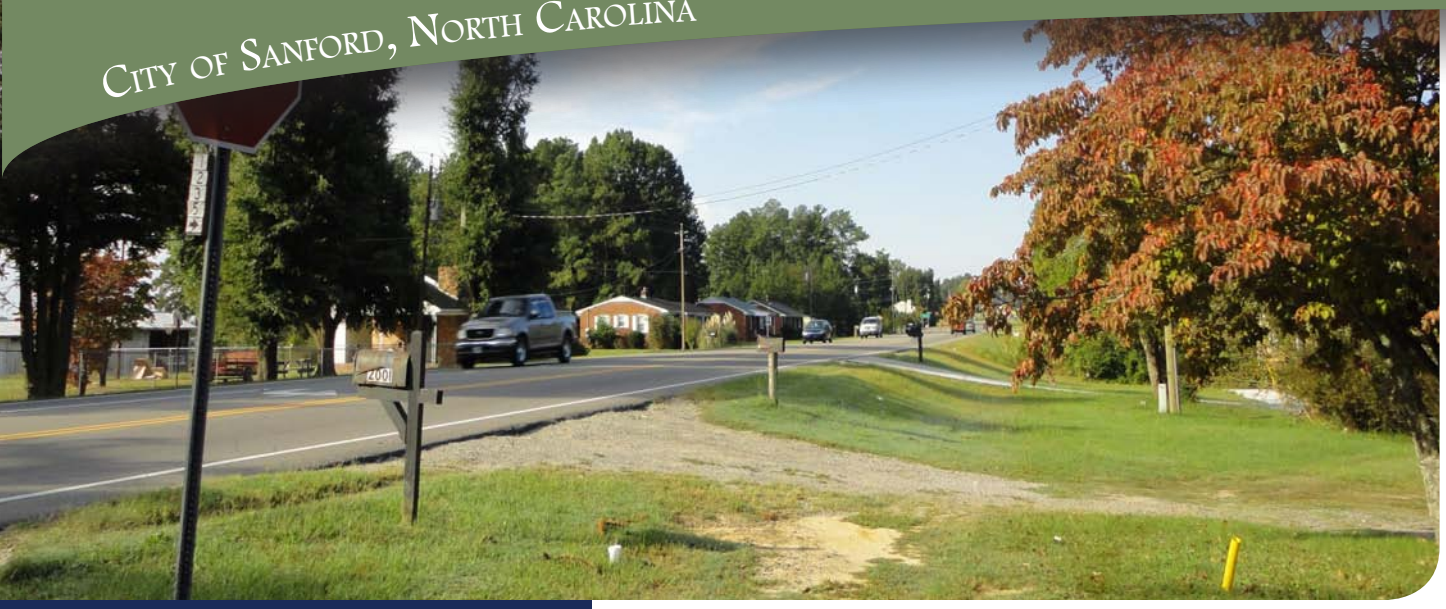


Figure 2.16 Endor Furnace Greenway Hub

Existing Conditions: Wicker Street

Advanced Visualization: Endor Furnace Greenway Hub Intersection of Buffalo Creek Connector and West Lee Middle Side Path. High-visibility multi-use trail crossing of Wicker Street.

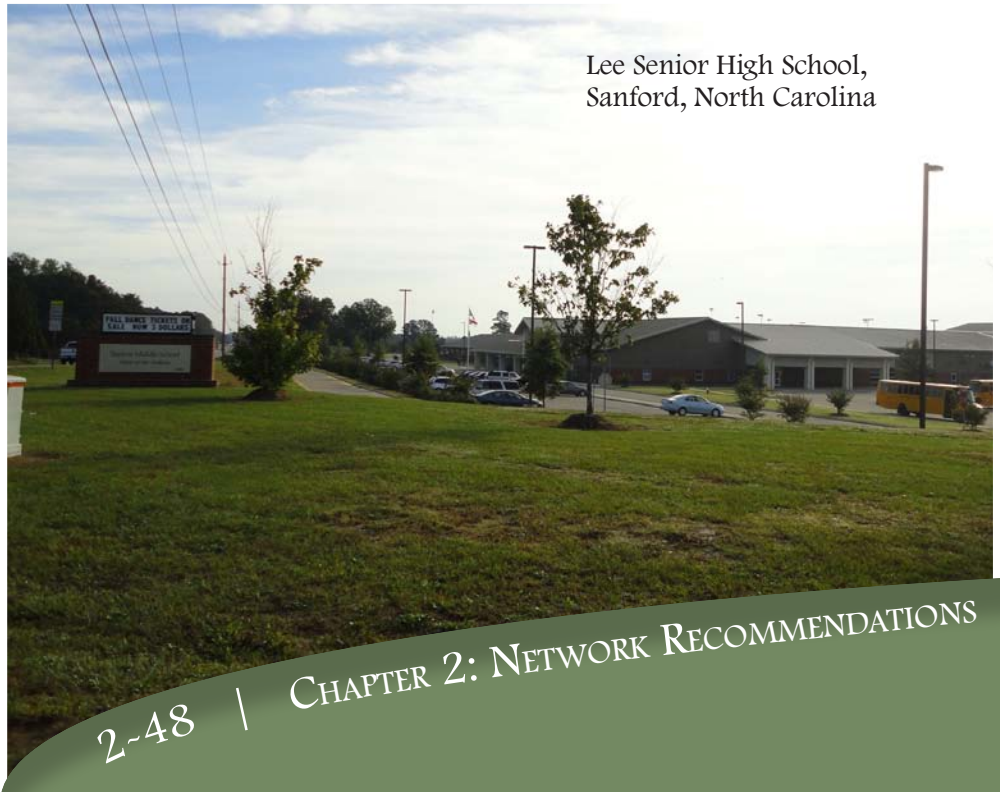


Tramway Road,
Sanford, North Carolina

Fire Tower/Tramway/Pendergrass Road Multi-Use Side Path

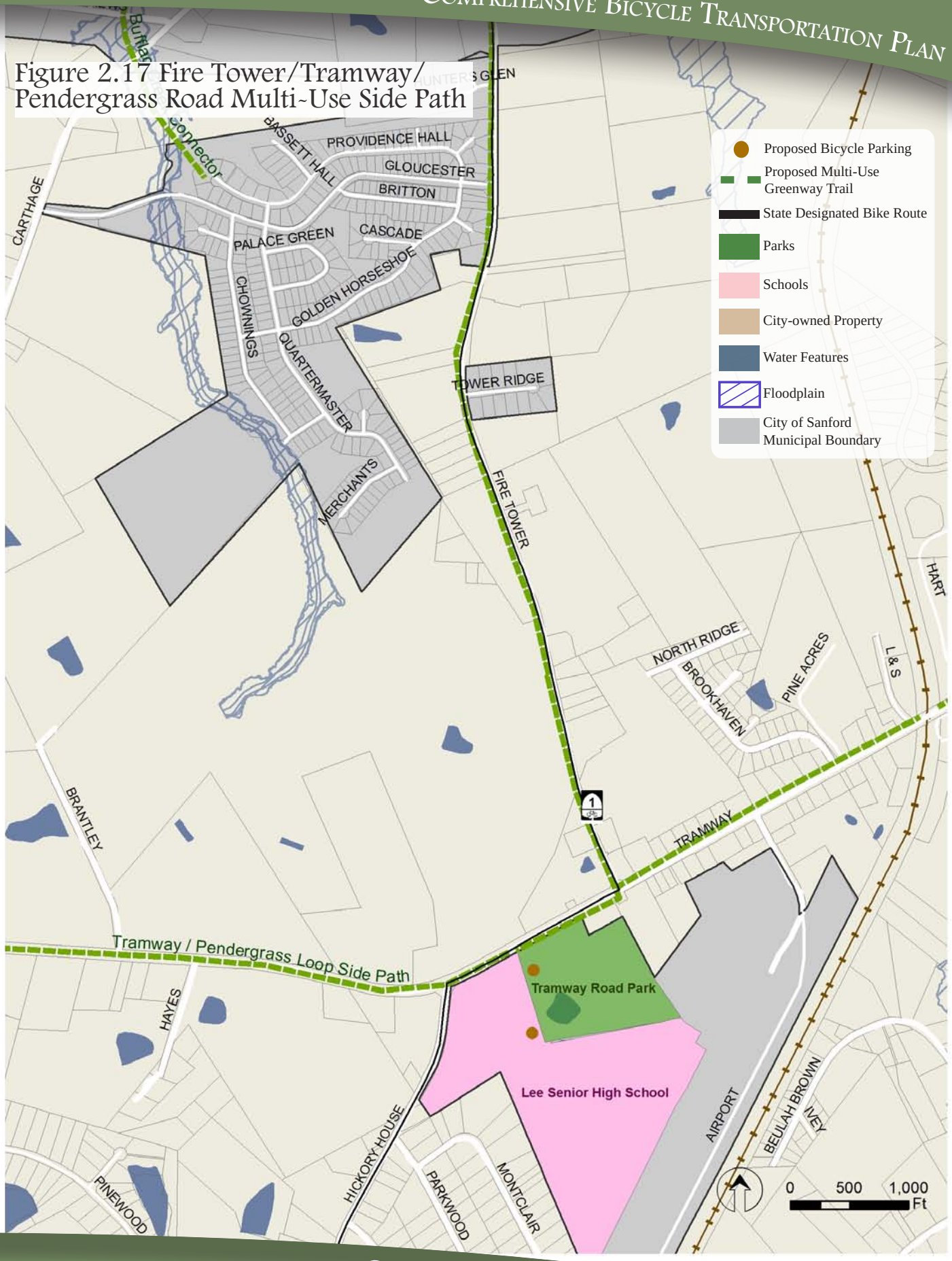
The recommended multi-use side path would extend along Fire Tower Road, on the west side of the roadway, connecting the neighborhood surrounding Gloucester Drive to the downtown Sanford and the recommended multi-use side path along Tramway Road.

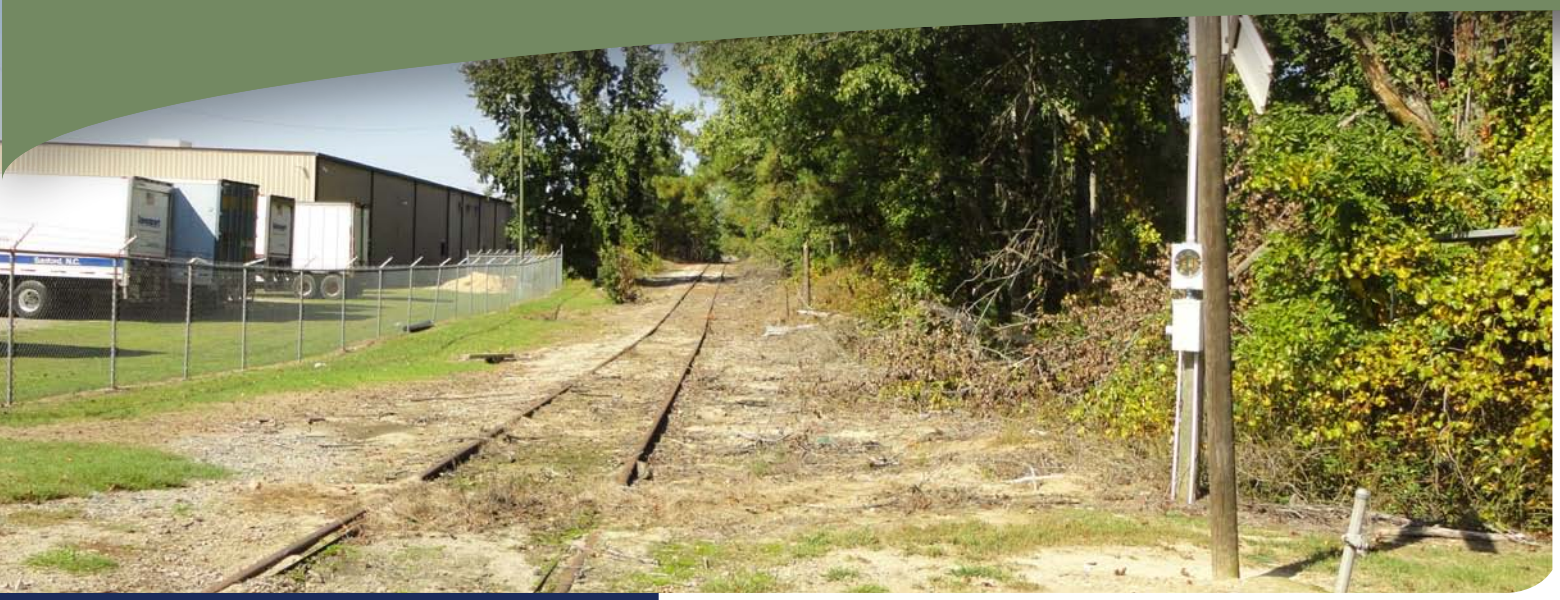
The recommended multi-use side path along Tramway Road would connect Tramway Road Park, and Lee Senior High School (shown in the picture below) to the recommended multi-use side path along Fire Tower Road, and historic downtown Jonesboro. West of Lee Senior High School, there is an opportunity to create a multi-use side path loop extending west along Tramway Road, north along Pendergrass Road to Franklin Drive, and then east along Carbonton Road to the Buffalo Creek Greenway South. The loop would connect Lee Middle and Lee Christian schools and existing and future neighborhoods. The multi-use side path loop would ultimately connect back to Kiwanis Family Park as discussed in the Endor Furnace Greenway Hub project on page 2-44.



Lee Senior High School,
Sanford, North Carolina

Figure 2.17 Fire Tower/Tramway/ Pendergrass Road Multi-Use Side Path





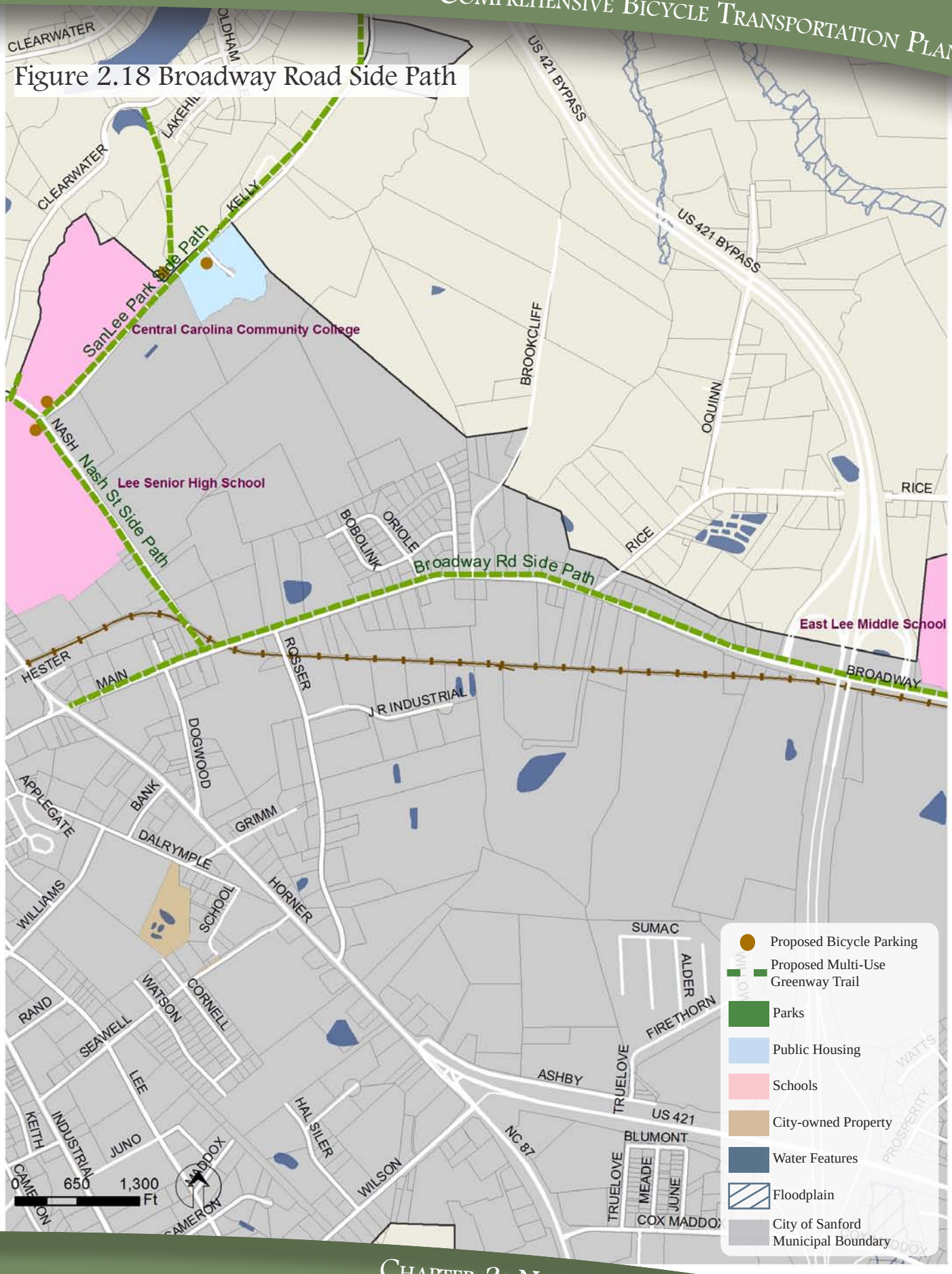
Railroad near Rosser Road,
Sanford, North Carolina

Broadway Road Multi~Use Side Path

A multi-use side path along Broadway Road would connect the on-street bicycle facilities and the existing sidewalks along Main Street in historic downtown Jonesboro with the Nash Street Side Path and East Lee Middle School. An at-grade crossing at US 421 would have to be studied during the design phase of this proposed project. The Broadway Road Multi-use Side Path is an important east-west route, providing a connection between the Broadway area and the rest of the greenway trail system in Sanford and Lee County. Connections to downtown Sanford, recreation facilities such as SanLee Park, neighborhoods, and commercial areas are made possible by the Nash Street Multi-use Side Path, the Bragg Street Multi-use Side Path, and on-road facilities along McIver Street and Charlotte Avenue. West of downtown historic Jonesboro, the multi-use side path would continue along Tramway Road and connect to the Pendergrass Loop trail.

East Lee Middle School,
Sanford, North Carolina

Figure 2.18 Broadway Road Side Path



Potential greenway trail connection at J. Glenn Edwards Elementary School

Jonesboro Greenway

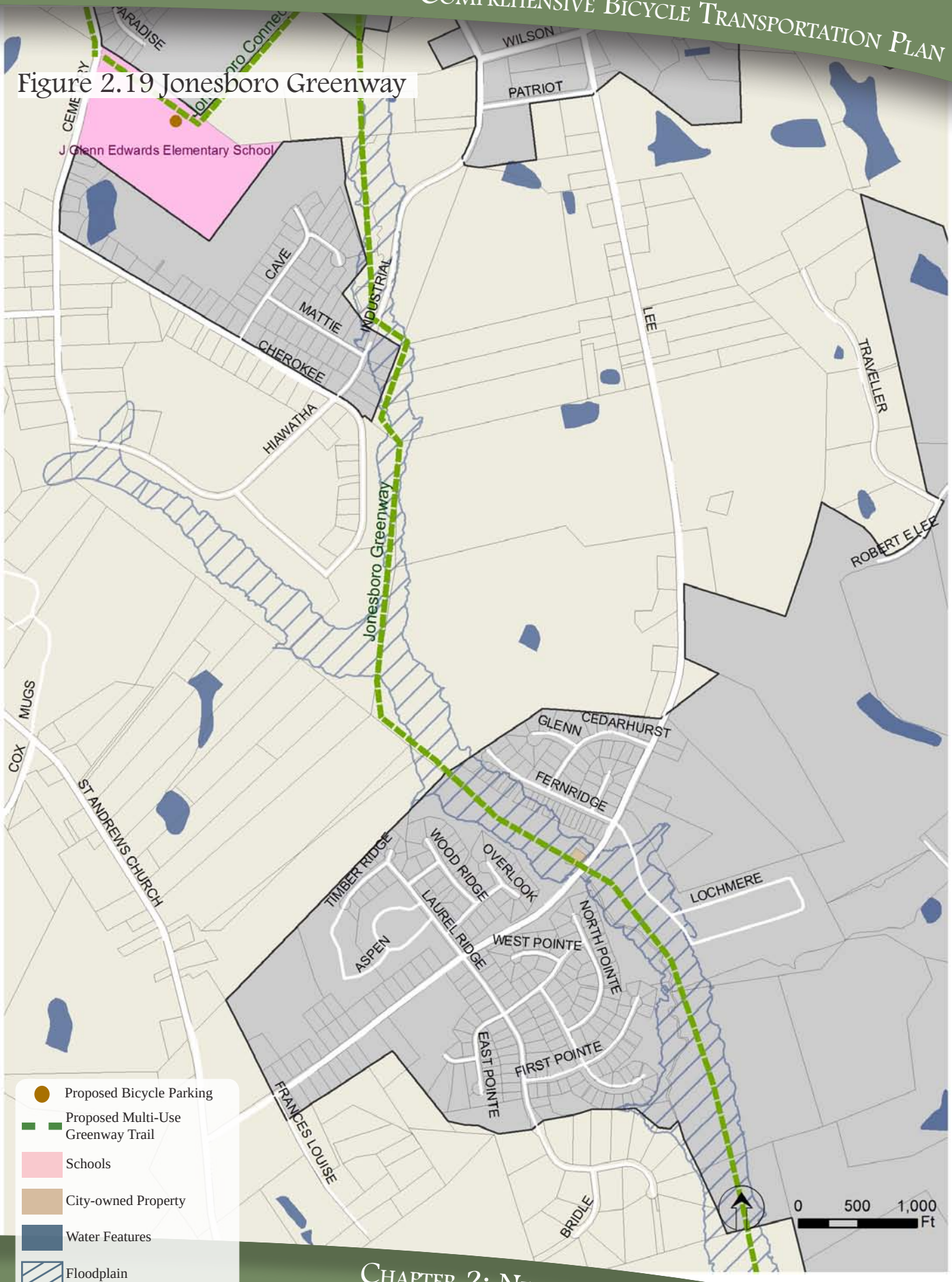
Off-road bicycle connections should extend into the southern parts of Sanford and portions of historic Jonesboro. Corridor opportunities exist along stream and floodplain areas south of Buchanan Park along Gaster Creek. The Jonesboro Greenway, a multi-use greenway trail would connect Buchanan Park, J Glenn Edwards Elementary School, Carolina Trace, and neighborhoods along Lee Avenue.

The *2010 Comprehensive Pedestrian Plan* presents the following information on the proposed Jonesboro Greenway:

Jonesboro Greenway
The Jonesboro Greenway follows a sewer easement from Buchanan Park south. The vast majority of this proposed greenway is in the County's jurisdiction, but it would provide a direct link into the City for residents of the area. By extending the Big Buffalo Creek Greenway - South down to meet the Jonesboro Greenway, a network of trails would be possible for this area.

Jonesboro Connector
By connecting the Jonesboro Greenway to the J. Glenn Edwards Elementary School, pedestrian access to the school is increased for nearby residential areas. Trail users driving to the trailhead, would also have an additional place to park on weekends and in the summer.

Figure 2.19 Jonesboro Greenway



San-Lee Park,
Sanford, North Carolina

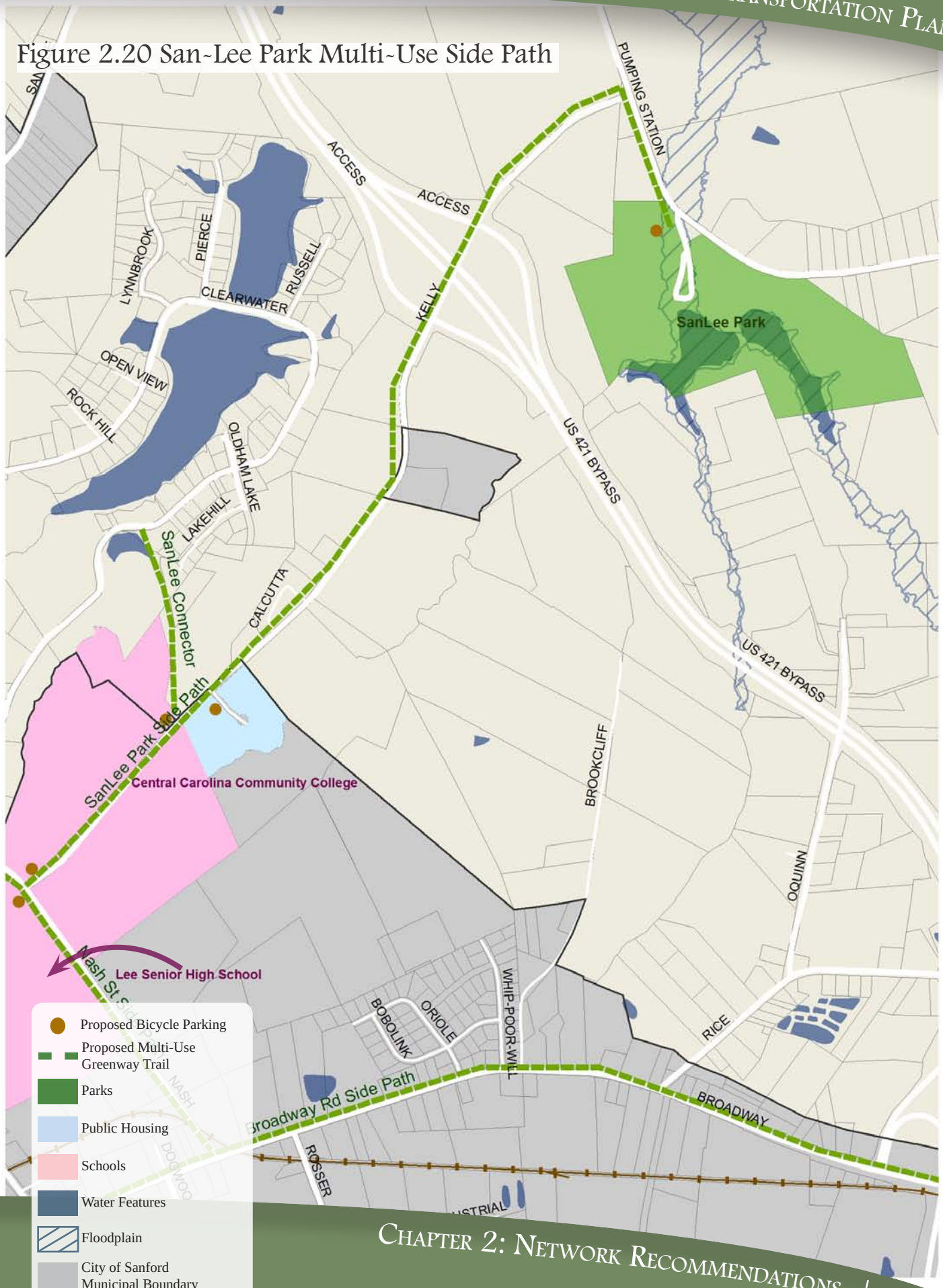
San-Lee Park Multi-Use Side Path

San-Lee Park is a popular destination for both residents and visitors of Sanford. Providing connections to the park via the recommended multi-use side path would encourage park visitors to consider alternatives modes of travel to the park. Activities such as mountain biking, paddling, fishing, and camping are offered at San-Lee Park. A multi-use side path spur should be developed extending north from Nash Street along Kelly Drive into the entrance of the park. Additional spurs are recommended along Kelly Drive that connect the Clearwater neighborhood to San-Lee Park and the recommended network.

San-Lee Park, located on Pumping Station Road, covers more than 177 acres and offers approximately four miles of hiking trails and 10.2 miles of mountain bike trails. Additionally, the park features a Nature Center, playground, picnic facilities, campgrounds and two stocked lakes for fishing. Paddle boat rentals are also available seasonally. (Information obtained from: http://leecountync.gov/Departments/SanLeePark.aspx)

SanLee Park,
Sanford, North Carolina

Figure 2.20 San-Lee Park Multi-Use Side Path



Depot Park, Downtown Sanford,
North Carolina

Policies & Programs 3

Overview

Creating a safe and inviting bicycle transportation system requires attention to more than physical infrastructure; it also requires implementation of bicycle-related programs and policies. A comprehensive approach is necessary to create a bicycle-friendly community. The approach must focus on overall livability and bikeability in all planning decisions involving land use, growth, and transportation.

A review of existing programmatic efforts undertaken by Lee County is presented in the first half of this chapter, followed by recommendations for new programmatic initiatives and strategies that Lee County and the City of Sanford should consider implementing.

Existing land development, zoning and subdivision ordinances and technical standards have a significant effect on bicycle transportation and greenway trail development in Sanford and Lee County. The existing policies should be strengthened to improve accommodations for non-motorized transportation and recreation facilities. The latter portion of this chapter contains a review of existing policies and recommended policy revisions for Lee County and Sanford to consider.

Targeted education, encouragement, enforcement, and evaluation strategies that improve Sanford and Lee County residents' health, safety, and their ability to incorporate bicycling into everyday life are important strategies that support the development and success of physical infrastructure. Successful programs must reach users and motorists in all different sectors of the population in Sanford and Lee County. A program may be presented as a campaign, effort, on-going initiative or one-time event, depending on its purpose. In essence, these different efforts market bicycling to the general public and ensure the maximum return on investment in the form of increased mode shift to bicycling.

Chapter Contents

Walking buses are a great way to engage parents and children in walking to school safely .

National advocacy organizations, such as the League of American Bicyclists and the National Center for Walking and Bicycling, recognize the importance of targeted programmatic strategies and recommend a multifaceted approach based on the five 'E's: Engineering, Education, Encouragement, Enforcement, and Evaluation. This Plan has been developed using the "5 Es" approach with an intent to provide action steps in each arena that the City and County can take towards becoming more bicycle friendly. This section presents a review of various efforts Lee County has taken to promote healthy living. Recommendations in each category that align with the vision and goals of this Plan are made, below, in two areas: to improve on existing efforts, and new targeted strategies.

Existing Program Review

This section presents a review of various efforts Lee County has made to promote healthy living. Recommendations that consider the five "E" categories and align with the vision and goals of this Plan are intended to compliment these existing efforts.

Community Transformation Grant Program (CTGP)

The Community Transformation Grant (CTG) Project is an initiative funded by the Centers for Disease Control and Prevention through the U.S. Department of Health and Human Services. The purpose of the CTG Project is to improve the health and wellness of all Americans through advocacy, systems change, and environmental change. Through these efforts, the CTG Project hopes to increase residents' access to healthy foods, areas where they can be physically active, and environments that are smoke-free and tobacco-free. The North Carolina Division of Public Health is responsible for distributing the grant funds to counties across the state. In 2011, through a non-competitive process, the Division of Public Health awarded 10 multi-county collaboratives the grant funds, with one county per region serving as the "lead" county. In our region, Cumberland County serves as the lead county. With funds from this grant, a health educator was hired to serve as the Healthy Eating and Active Living Coordinator for Region 6. This coordinator is based out of Lee County, and is housed by the Lee County Health Department.

Type: Timeframe through 2016

Recommendation: Establish a long-term funding strategy to sustain the Healthy Eating and Active Living Coordinator position after exhausting the funds from the grant, and ensure that strategies developed through this office reach communities across Lee County. Promote active transportation (walking and bicycling) as part of active living strategies. Residents of Lee County can learn of the benefits of active transportation through a campaign that encourage residents to seek alternative means of transportation, including bicycling.

Summary of Existing Programs

Currently the City of Sanford does not run specific bicycle related programs, however Lee County administers the following programs that aim to promote healthy living choices for countywide residents:

Community Transformation Grant Program

The North Carolina Division of Public Health received CTGP funds to serve communities across the State by promoting tobacco-free living, active living, and healthy eating.

Faithful Families Eating Smart and Moving More

Faithful Families Eating Smart and Moving More Program (Faithful Families) promotes healthy eating and physical activity in communities of faith.

Safe Time

This is a partnership between the Lee County Public Health Department, Sheriff's and the Police Departments to increase security in open spaces during the evening to encourage residents to practice outdoor sports.

Instant Recess Program

The goal of this program is to increase physical activity by producing a 10 minute exercise DVD or utilizing one of the online videos that showcases fun exercises that can be performed during the school day in elementary and middle schools, both public and private.

LeeCAN "A Healthy Carolinians Partnership"

This is an established network of public-private partnerships in Lee County that share the common goal of creating environments that promote healthy lifestyles for all citizens.

Voices into Action

Voices into Action partners with communities in Harnett, Lee, and Wake Counties to improve access to healthy, affordable food and places to be active.

Eat Smart Move More

This is a state-wide campaign to encourage healthier live choices to North Carolina residents. One of the strategies of the program is to promote healthy walking programs among public and private employers across the state.

Summary of Recommended Programs from the *2010 Sanford Comprehensive Pedestrian Plan*

The following is a summary of the programs recommended in the plan to increase walking and promote pedestrian safety in the City of Sanford:

Traffic Safety

This program recommends using web resources made available by the National Highway Traffic Safety Administration (NHTSA) for traffic and pedestrian safety as educational tools for schools.

Pedestrian Safety Action Plan

It is recommended that Sanford utilize materials available through the Pedestrian and Bicycle Information Center (PBIC) to develop a Pedestrian Safety Action Plan for the City.

Safe Routes To School

The goal of this program is to provide infrastructure or educational opportunities that encourage students to safely walk or bike to school. The NCDOT distributes federal funding to support pedestrian infrastructure improvements in the vicinity of schools across the State.

Safe Kids Walk this Way

This program aims to teach safe behavior to both motorists and children and to promote safe, walkable communities.

Walk to School Initiative

It is recommended that Sanford support and promote Walk to School events in October each year.

Mature Adults: Be Healthy, Walk Safely

It is recommended that Sanford utilize resources available through the NHTSA for mature adults, which provide tips for developing a personal walking exercise program and safety guidelines for dealing with traffic.

Traffic Safety Enforcement

It is recommended that Sanford's police officers enforce traffic laws that directly impact pedestrian and bicyclist safety (e.g., enforce speed limits, and respect of pedestrian right-of-way). In particular, the enforcement of such traffic laws in the vicinity of schools should be made a priority.

Faithful Families Eating Smart and Moving More

The Faithful Families Eating Smart and Moving More Program (Faithful Families) promotes healthy eating and physical activity in communities of faith.

Resources for the program include a 9-session Faithful Families curriculum and the Eating Smart and Moving More Planning Guide for Faith Communities.

The Faithful Families curriculum is co-taught by nutrition and physical activity educators and trained lay leaders from faith communities in small group sessions. Lay Leaders bring the spiritual elements into each session, through discussion questions and "Thinking it Through" prompts in each lesson.

The Faithful Families curriculum includes everything needed to implement the program, including ready-to-use PowerPoint slides and scripts for the nine-session series, a Lay Leader Training Guide and evaluation tools. Additionally, the kit includes Move More activities, recipes and faith-based discussion questions for each lesson. The Eating Smart and Moving More Planning Guide for Faith Communities is included as well, and available for free download on our website. The Eating Smart and Moving More Planning Guide for Faith Communities assist faith leaders in adopting policy and environmental change for their faith community and establishing health committees.

Faithful Families has been accepted as a "Practice-Tested Intervention" by the Center of Excellence for Training and Research Translation (Center TRT) at UNC Chapel Hill. Center TRT, in collaboration with the Centers for Disease Control and Prevention's (CDC) Nutrition and Physical Activity Program to Prevent Obesity and Other Chronic Diseases, has developed a process for reviewing, translating and disseminating interventions. This process is applied to obesity prevention interventions that have been tested through research studies or have been developed and evaluated in practice. Interventions are recommended by expert reviewers and CDC for dissemination. Faithful Families is the first faith-based intervention to achieve this status.

Type: Timeframe through 2016

Recommendation: The results of this study will be a great asset for communities in North Carolina looking to reduce early childhood obesity. However it will be important for the study to provide implementable strategies for improving low-income families' access to healthy foods (e.g., opening farmers markets to Electronic Benefit Transfer (EBT) or "food stamp" users). It should also provide recommendations for combining healthy eating habits with exercise (i.e., through active transportation).

Safe Time

Safe Time is an ongoing initiative of the Lee Community Action Network (LeeCAN) in response to citizens concerns about not feeling safe to participate in evening physical activity in various neighborhoods, as expressed during the 2010 Community Health Assessment. LeeCAN is a program of the Lee County Public Health Department implemented to increase awareness and provide resources to effectively address health and safety issues in Lee County through collaborative community efforts. The Lee County Sheriff's Department and the Sanford Police Department are collaborating with LeeCAN in the Safe Time program by placing regularly scheduled evening patrols in the targeted neighborhoods Safe Time is providing a more sense of security to Lee County citizens when they and their families are outside playing. Since the program started on April 5 2012, the

The presence of law enforcement at popular open spaces increases the sense of security for the community.

Sheriff's Department and Police Department report that the residents in the identified neighborhoods are pleased with these efforts.
Type: Ongoing

Recommendation: LeeCAN should develop a communication and outreach campaign for their ongoing programs. Currently the information about the initiative and related programs is minimal on the Lee County Public Health Department's website.

Instant Recess Program

LeeCAN is currently working with Lee County Schools to implement the national, evidence-based Instant Recess Program. The goal of this program is to increase physical activity by producing a 10 minute exercise DVD with the seven elementary schools, that showcases fun exercises that can be performed during the school day. According to Dr. Toni Yancey, MD, MPH of the UCLA School of Public Health, who developed the program, Instant Recess not only encourages physical fitness but also improves the behaviors and classroom performance the of students that participated. Instant Recess has been functioning in Winston-Salem/Forsyth County Schools System for over two years under the guidance of Dr. Melicia Whitt-Glover, Ph.D. Dr. Whitt-Glover is also the CEO of the Gramercy Research Group in Winston-Salem, NC, a private research firm focused on health and related issues.
Type: Ongoing

Recommendation: Expand the reach of the Instant Recess Program to other County departments. For example, every county office could adopt this program and track the health benefits of each of the employees that participate. To encourage different departments to engage in the program, LeeCAN could initiate an interoffice contest by tracking the number of miles or steps employees bike or walk everyday during their 10-minute recess. Miles can be recorded a in a database by each office team, and steps can be tracked using inexpensive pedometers.

LeeCAN "A Healthy Carolinians Partnership"

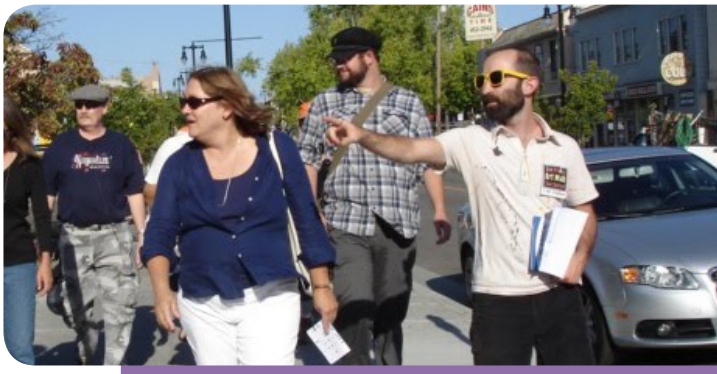
LeeCAN is "A Healthy Carolinians Partnership" that has been in existence for thirteen years. LeeCAN is a "network of public-private partnerships in Lee

CTGP Investing in Healthier Communities

In 2012, CTGP grants supported the following programs:

- Implementation awards were made to 35 communities to implement proven programs and strategies to improve their community's health and wellness.
- Capacity-building awards were made to 26 communities to build a solid foundation for community prevention efforts.
- National network awardees engaged community members to support, disseminate, and amplify the evidence-based strategies of the CTGP.

Source: http://www.healthcare.gov/news/factsheets/2011/09/community09272011a.html



10-minute recess walks can be guided by coworkers interested in showcasing specific community features.

Bicycling skills courses help kids and parents feel more confident, therefore encouraging them to use their bicycle more often for transportation.

County that share the common goal of creating environments that promote healthy lifestyles for all citizens". The local partnership consists of private citizens, representatives from agencies and organizations that serve the health and human service needs of the local community, businesses, faith-based organizations, schools, and civic groups. The LeeCAN Obesity Task force meets monthly to collaborate on the implementation of the desired initiatives.

Type: Ongoing

Recommendation: In addition to working with the Eat Smart Move More (ESMM) program, LeeCAN should consider working with the state Safe Routes to School (SRTS) program to develop SRTS plans. This will allow school-age children to increase their daily physical activity by safely walking or bicycling to school.

Voices into Action

The health department is also partnering with a USDA-a funded five year grant project out of NC State University, NC A&T State University, and NC Cooperative Extension called Voices into Action: The Families, Food, and Health Project. Voices into Action partners with communities in Harnett, Lee, and Wake Counties to improve access to healthy, affordable food and places to be active. In Lee County, Voices into Action has held a community asset-mapping workshop and has conducted research with mothers of young children to hear community voices. In collaboration with the LeeCAN Obesity Taskforce of LeeCAN and through mini-grant funding available to groups in Lee County, Voices into Action works with groups and organizations to create or support sustainable, community-initiated projects that increase healthy food access and places to be physically active.

New Programmatic Recommendations

Bicycle-related programs fall into three main categories: education, encouragement, and enforcement. All of these programs will complement engineering improvements such as bike lanes, routes, and greenways by giving Sanford residents the tools they need to safely and confidently use the bikeway network. The recommended program concepts were developed by the consulting team and were based on the following:

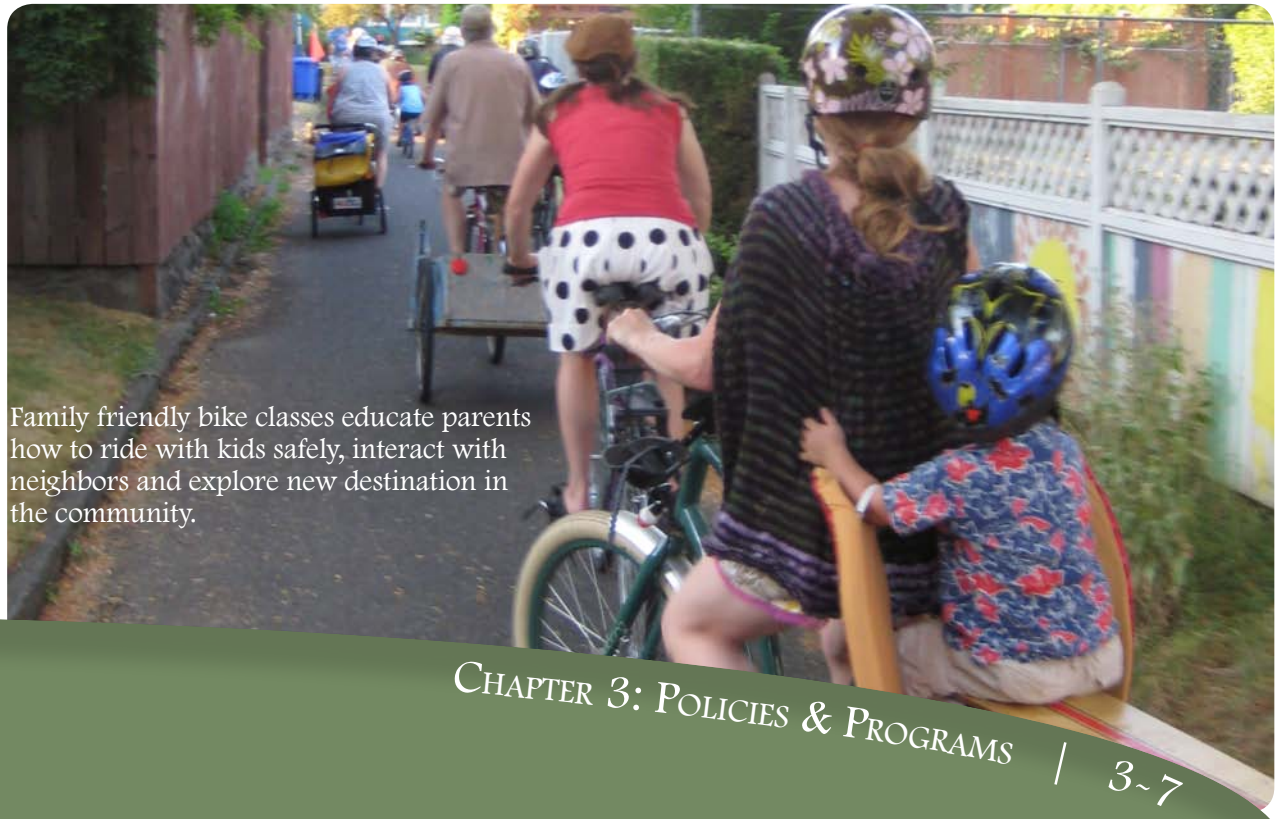
- Knowledge about existing programs in the city, region, and state.
- The Vision and Goals of this Plan.
- Input from the project's Steering Committee.
- The consultant team's knowledge about model programs and best practices.

Education

Providing educational opportunities is critical for increasing bicycling in Sanford. Education programs should span all age groups, cultures, abilities, and they should include motorists as well as current and potential cyclists and pedestrians. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the community-wide benefits of bicycling and walking, to technical trainings for local agency staff.

Every year, an average of 24 bicyclists are killed on North Carolina roadways. Through improvements to existing and past educational programs and the development of new education programs, Sanford will increase safety and reduce the number of fatal bicycle crashes each year. Priority should be given to educational campaigns targeting underserved communities, children, and populations who are more likely to walk and bicycle out of necessity.

Providing educational programs for decision-makers, such as engineering and planning staff representatives, raises the level of local expertise and develops the skill sets needed to design and construct state of the art bikeways, walkways, and greenways for the short- and long-term future of Sanford's bicycling environment.



Family friendly bike classes educate parents how to ride with kids safely, interact with neighbors and explore new destination in the community.

Youth Bicycle Safety Educational Classes

Target audience	School-age Children
Lead facilitator	School administration or school district
Time frame	On-going
Program Resource	League of American Bicyclists - *http://www.bikeleague.org/programs/education/courses.php#kids1* Bicycle Transportation Alliance – Portland, OR: *http://www.bta4bikes.org/resources/educational.php*

Typical school-based bicycle educational programs teach students about the rules of the road, the proper use of bicycle equipment, biking skills, street crossing skills, and the benefits of biking. Educational programs can be part of a Safe Routes to School program (see Encouragement section). Youth bicycle classes held during Bike Month in May will complement the annual youth bicycle safety education classes held as part of the Safe Routes to School program.

Kids enjoy their ride to school, while getting exercise.

Family Bicycling Classes

Target audience	Parents and families
Lead facilitator	Bicycle advocacy organizations, local bike clubs, bike shops, or volunteers
Time frame	Seasonal (based on demand)
Program Resource	Mayor's Family Bike Day (Baton Rouge, LA) - *http://brgov.com/dept/mayor/bikeday.htm* Family Bicycling Series (Minneapolis, MN) - *http://www.ci.minneapolis.mn.us/bicycles/WCMS1P-088472* San Francisco Bike Coalition (San Francisco, CA) - *http://www.sfbike.org/?familybiking*

Family bicycling classes are great tools for encouraging families to ride bicycles. The activities provide an avenue for families to understand the differences between bicycling ability levels, learn about opportunities to safely bike together, and build bicycling confidence in their children. These classes also teach parents to serve as role models for bicycle safety and handling. Education and encouragement events can include the following:

- "Freedom from Training Wheels" course
- Classes on how to carry children by bicycle
- Safety checks and instruction
- Basic bike maintenance classes
- Bicycle rodeos
- Bicycle parades around parks and schools

For example, a family cycling class is organized through the Community Cycling Center in Portland, Oregon. They teach urban riding and bicycle maintenance over five weekly sessions. They work with families to help them achieve the goals of improving fitness, reducing pollution, and having more fun.

Another example is from San Francisco, California. The San Francisco Bike Coalition organizes a "Freedom From Training Wheels" event. Families

meet at a park and attempt to teach their children to ride their bicycles without training wheels. The fun and encouraging atmosphere helps bring confidence to children learning to ride on two wheels.

Bicycle Education Courses (children & adults)

Target audience	Local community
Lead facilitator	Bicycle advocacy organizations, trained volunteers, or police departments
Time frame	Seasonal (based on demand)
Program Resource	League of American Bicyclists skills courses: http://bikeleague.org/programs/education/courses.php San Diego County Bicycle Coalition - Education programs: http://www.sdcbc.org/Adult-Bicyclist-Education.html

Bicycle education courses, also known as "bike rodeos" are individual events that help children or adults develop basic bicycling techniques and safety skills through the use of a bicycle safety course. Rodeos use playgrounds or parking lots set up with stop signs, traffic cones, and other props to simulate the roadway environment. Students receive instruction on how to maneuver, observe stop signs, and look for on-coming traffic before proceeding through intersections. Bicycle rodeos also provide an opportunity for instructors to teach proper helmet use and ensure bicycles are appropriately sized. Events can include free or low-cost helmet distribution and bike safety checks.

Trained adult volunteers, local police, and the fire department can administer rodeos. Bicycle rodeos can be stand-alone events or they can be incorporated into health fairs, back-to-school events, and walk and bike to school days.

Encouragement

Encouragement programs are critical for promoting and increasing bicycling. These programs should address all ages, abilities, and user groups from school children to working adults, and the elderly. They should also address recreational and transportation users. The goal of encouragement programs is to increase the bicycling in a community. Through history, all levels of leadership from neighborhood leaders to Presidents of the United States of America have encouraged Americans to increase their physical activity, and walking more or bicycling more is a simple way to do so. President Kennedy's 50-mile hike is an example of national level encouragement. It was directed first at US Marine Corps officers, but ultimately inspired the Nation. Encouragement programs also include work-place commuter incentives, bicycle friendly route maps, and the creation of a bicycle co-op.

According to a 2008 survey by the NHTSA, "71% of Americans said they would like to bicycle more than they do now." As bicycle infrastructure improvements are made, Sanford and Lee County must simultaneously develop targeted strategies for encouraging community residents to engage in bicycling activities,

Coffee station for bike commuters during "bike to work day" festivities.

and they must communicate information about safe and inviting places for bicycling. Improving existing encouragement programs and developing new encouragement programs that promote transportation and recreation choices and healthy, active lifestyles are important steps toward becoming a more bicycle friendly community.

Safe Routes to School

Target audience	K-8 Schools
Lead facilitator	Lee County Schools
Time frame	Ongoing
Program Resource	National Safe Routes to School Partnership: http://www.saferoutespartnership.org/ National Center for Safe Routes to School: http://www.saferoutesinfo.org/ NC Safe Routes to School Program: http://www.saferoutesinfo.org/program-tools/find-state-contacts/north-carolina

Safe Routes to School is a program with a simple goal: helping more children safely walk and bicycle to school. The program envisions active kids using safe streets, helped by engaged adults (from teachers to parents to police officers), surrounded by responsible drivers. Safe Routes to School programs use a variety of strategies (the five Es) to make it easy, fun, and safe for children to walk and bike to school.

Source: I ride Campaign

The five Es are defined as follows:

Education: programs designed to teach children about traffic safety, bicycle and pedestrian skills, and traffic decision-making.

Encouragement: programs that make it fun for kids to walk and bike. These programs may be challenges, incentive programs, regular events (e.g., "Walk and Bike Wednesdays"), or classroom activities.

Engineering: physical projects that are built to improve walking and bicycling conditions.

Enforcement: law enforcement strategies to improve driver behavior near schools.

Evaluation: strategies to help understand program effectiveness, identify improvements, and ensure program sustainability.

The National Center for Safe Routes to School assists communities in developing successful Safe Routes programs and strategies. The National Center offers information on how to start and sustain a Safe Routes to School program, case studies of successful programs, and many other resources for training and technical assistance.

Local Safe Routes to School programs are sustained by parents, community leaders, and citizens to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. Recently, the State of North Carolina has started the NC Safe Routes to School Program based on the national program. The state has funding for infrastructure improvements within two miles of schools. This funding can also be used toward the development of school-related programs to improve safety, walking and biking. The state requires the completion of a competitive application for funding and a workshop at the school to determine which improvements are needed.

Bike Month Activities

Target audience	Local community
Lead facilitator	City of Sanford, local government agencies
Timeframe	Annually
Program Resource	National Bike Month: http://www.bikeleague.org/programs/bikemonth/ Charlotte Area Bicycle Alliance: http://charlottebikes.org/may-bike-month-upcoming-events/

Cities and towns across the country participate in National Bike Month annually during May. The League of American Bicyclists (LAB) hosts a website for event organizers. The website contains information on nationwide and local events, an organizing handbook, and promotional materials.

It is recommended that the City of Sanford host National Bike Month events and activities annually, with the support of local bicycling groups and shops. Events and activities for Bike Month may change from year to year, and the total number of activities should increase each year as the bicycling community in Sanford grows.

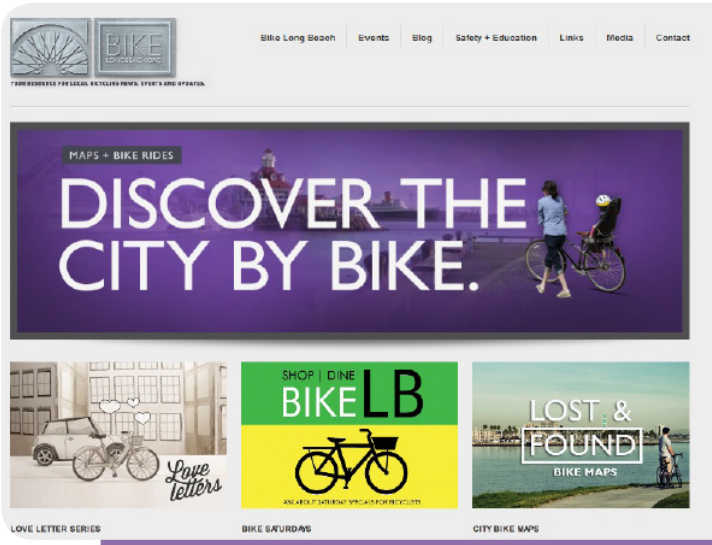
Bike Month activities may include the following:

- Bike to Work Day events: morning-commute energizer stations with food, encouragement, information, and sponsored goodies for participants; a rally or celebration with raffles, food, and vendors.
- A group ride with the mayor.
- Discounts at local businesses for bicycle commuters.
- Short (six miles or less), themed community bicycle rides such as a park tour, restaurant tour, or steeple chase (church tour).
- Participation in the national Ride of Silence to bring awareness to cyclist safety.
- Mountain biking skills clinics.
- Adult bicycle commuter course or youth bike rodeos taught by certified League Cycling Instructors.

Positive Media Campaigns

Target audience	Local community
Lead facilitator	City of Sanford, local government agencies
Time frame	Ongoing
Program Resource	Portland "I Ride" Campaign - http://www.communitycyclingcen-ter.org/index.php/introducing-the-i-ride-bicycling-campaign/

Oftentimes, the general public thinks of negative stereotypes when they hear about "cyclists." A media campaign that shows a wide range of ordinary residents using their bicycles for a variety of purposes will help break down those stereotypes, raise awareness of bicycling, and create geniality towards people who ride bicycles. One excellent example is the "I Ride" campaign from the Community Cycling Center in Portland, Oregon. They have created posters showing people of a wide variety of ages, races, and body types, with a wide variety of bicycle types. Each



One Stop Websites can guide and encourage cyclists in the city

person was invited to complete the sentence "I ride _____." The images were distributed at bus stops, on bus benches, and online.

In the City of Sanford, the "I ride" slogan may be considered, or another equally humanizing slogan could be created. Donated media placement should be sought for print media and other public installations, such as benches, billboards, or other locations. A professional photographer should be engaged, and a well-known community member or local business owner could be invited to be one of the first faces of the media campaign. Other people should be invited to participate to demonstrate that women, families, and older residents ride bicycles in the community.

Bike and Walk to Health Campaigns

Target audience	Local community
Lead facilitator	Lee County Public Health Department
Time frame	Flexible, Ongoing
Program Resource	Arlington County, VA- Healthify your community: http://www.arlingtontransportationpartners.com/pages/business/atp-services-for-employers/healthify/

Open street events promote health and community while celebrating bicycling and walking.

Many cities around the country are implementing campaigns to encourage residents to live healthy and active lifestyles. Obesity and sedentary lifestyles are on the rise for both adults and children in America, and daily physical activity is a critical part of combating that trend. Walking and bicycling provide great opportunities to be active in daily life. A Bike and Walk to Health Campaign is consistent with both national and local public health goals. This campaign should build on the City's existing relationship with the public health department. It is recommended that the City work with public health department staff to develop a city-wide Bike and Walk to Health campaign that includes the following:

- A website used as a central location for information on getting started, events, advice from health professionals, and safety for adults and children.
- Print ads and editorials in community newspapers to increase the exposure of the campaign.
- Walking maps with suggested loop routes; health and environmental information, such as calories burned in a walk around a downtown loop, could also be included.
- Promotion of the campaign through existing and new community events and rides.
- Promotion of multi-generational activities such as co-sponsored events with the Safe Routes to School program.
- Existing efforts such as the Healthy Carolinas Partnership and Eat Smart Move More North Carolina programs should be supported with specific training and resources to promote bicycling and walking.

One-Stop Website

Target audience	Current and future bicycling community members
Lead facilitator	City of Sanford
Time frame	Ongoing
Program Resource	Long Beach CA: http://www.bikelongbeach.org/ Portland, OR: http://bikeportland.org/ Charlotte, NC: http://www.bikecharlotte.org/

Many current and potential bicyclists do not know where to turn to find out about bicycling laws, events, maps, tips, and groups. The City of Sanford should develop a "one-stop shopping" website with comprehensive bicycling information. The Sanford "Bike Central" website should include the following elements:

- A list of local and regional bicycling groups, including clubs, racing teams, and advocacy groups.
- Information about the Bicycle Advisory Committee, if one is created.
- Information about current projects and how citizens may get involved (e.g., public meetings, and comment periods).
- Resources for Sanford and the region such as links to online maps and brochures, project contacts, and information about requesting mailed materials.
- Links to laws and statutes relating to bicycling.
- Bicycling tips and safety information.
- Information about bicycling events such as rides, classes, and volunteer opportunities.
- A list of local bike shops with phone numbers, addresses, and links to the shops' websites, when applicable.
- An events calendar.
- A request form for route planning assistance.
- Message boards.
- A blog featuring stories and news.
- Photo galleries from events, as submitted by readers.
- Popular ride routes.

A one-stop bike website is not usually difficult to set up, but it will only be successful if the site is both easy to use and updated frequently. All website content should be reviewed regularly for accuracy. The bicycling community can assist in keeping the site up to date.

Police departments can help with these campaigns, enforcing the use of lights for cyclists.

Open Streets Events

Target audience	Local community, general public
Lead facilitator	City of Sanford, or local bike advocacy group.
Time frame	Periodically or annually
Program Resource	The Open Streets Project http://openstreetsproject.org/ Portland Sunday Parkways: http://www.portlandonline.com/Transportation/index.cfm?c=46103 http://www.streetfilms.org/portlands-sunday-parkways/ (video)

Open street events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. The events are periodic street "openings" (i.e., "open" to users besides just cars) usually on Sundays, that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller-skating, and other non-motorized activities. They have been very successful internationally and are rapidly becoming popular in the United States. Open street events promote health by creating a safe and attractive space for physical activity and social contact, and they are cost-effective compared to new parks for the same purpose. Events can be weekly events or one-time occasions, and are generally very well attended.

Group Bicycle Rides

Target audience	Local community
Lead facilitator	Lee County Cyclist Facebook Group, local bike shops
Time frame	Ongoing
Program Resource	San Diego County Bike Coalition: http://www.sdcbc.org/Rides-Events.html

Group bicycle rides are a healthy way to promote healthy, active living by encouraging residents to bike for recreation. Group bicycle rides can cater to different difficulty levels and they target different community groups (e.g., women only rides, or family rides). Groups that can organize group bicycle rides include County staff, local bike groups, and volunteers that want the public to interact with the physical environment in the community.

Design and Provide Comprehensive Signage Program for the City of Sanford

Target audience	Local community
Lead facilitator	City of Sanford
Time frame	One-time design and installation; maintenance, updates, and replacement as needed
Program Resource	See Appendix B Design Guidelines

The City of Sanford should develop and install standardized, branded signage that includes wayfinding to key destinations to support the circulation of cyclists in the city including walk/bike time and distance to destinations.

Wayfinding signage, as part of a signage program that also includes warning and regulatory signage, enhances resident and visitor orientation. A clear wayfinding system should support the character of the City and contribute to the economic development by indicating key destinations, restaurants, and entertainment venues. Directional signage targeted for use by motor vehicle drivers, pedestrians, and cyclists will complete a multimodal legibility package. Materials for signage should reflect the character of Sanford and be selected for longevity and ease of maintenance. The images on the right show a proposed wayfinding concept for the City of Sanford. A comprehensive guide to signage types and placement is presented in Appendix B: Design Guidelines.

Group bicycle rides encourage more cyclists to get out and ride for recreation or to travel to another destination.

Open Streets Events generate community building and offer families opportunity to bicycle on safe streets while interacting with their neighbors.

Enforcement & Evaluation

Enforcement and evaluation initiatives are critical to ensure that both motorists and bicyclists are obeying the laws. These initiatives serve as a means to educate and protect all users. The goal of enforcement is for bicyclists and motorists to recognize and respect each other's rights on the roadway. In many cases, officers and citizens do not fully understand state and local laws for motorists and bicyclists, making targeted education an important component of every enforcement effort.

According to the Alliance for Biking and Walking, North Carolina ranks 41st out of the 50 states for pedestrian safety and 44th for bicycling safety. Enforcement programs are a key tool in improving bicyclists' safety, and perceptions of safety.

School Crossing Guard Training

Target audience	Crossing guards & trainers
Lead facilitator	Lee County School Administration
Time frame	Ongoing
Program Resource	NCDOT School Crossing Guard Training Program: http://www.ncdot.gov/bikeped/about/training/school_crossing_guard/

The NCDOT developed a *School Crossing Guard Training Manual* as a tool for trainers to lead instruction workshops for crossing guards. Elements covered in this manual include crossing procedures, characteristics of children in traffic, responsibilities of the crossing guard, emergency procedures, signalization and traffic signs, professional guidelines, and legal issues. The *School Crossing Guard Training Manual* serves an important role for law enforcement agencies responsible for training crossing guards. With the exception of adding changes to the MUTCD component, the manual has not been updated since 2001, but it could still be considered a valuable resource.

The City of Sanford and Lee County should obtain a copy of the manual and work with county and municipal law enforcement agencies to establish targeted workshops every two years to "train the trainers" of crossing guards.

"Watch For Me NC" Campaign

Target audience	Pedestrians, motorists, law enforcement
Lead facilitator	NCDOT, Sanford, and Lee County
Time frame	Ongoing
Program Resource	NCDOT Watch for Me NC: http://www.watchformenc.org/about/

The "Watch For Me NC" campaign is intended to improve pedestrian safety by influencing the behaviors of drivers and pedestrians through safety messaging and enforcement. The program is currently targeted to the Triangle region of North Carolina. The effort was launched in 2012 through Transportation Enhancement funding provided by the NCDOT and federal funds from the NHTSA. Funding for and expansion of the bicycle component are expected in 2013.

The City of Sanford and Lee County should become familiar with the campaign, request that the NCDOT host an informational workshop for local officials and staff, and provide a "toolkit"of materials for implementing the program locally. Sanford and Lee County should request funding for program development and guidance for utilizing local staff and resources to bolster the program. Bicyclists' safety, rights and etiquette, along with street crossing rules, traffic signal messages and meanings, and how to follow and obey pavement markings should be taught to children and adolescents to increase their safety and reduce automobile-bicycle crashes in Sanford and Lee County.

Communicate Maintenance Schedules

Target audience	Planning and engineering staff, Sanford and NCDOT
Lead facilitator	Sanford and Lee County
Time frame	Ongoing
Program Resource	N/A

Sanford and Lee County should request that the NCDOT Division 8 office provide early notification to planning and engineering staff of maintenance and restriping schedules. Sanford and Lee County should facilitate annual meetings to be held when updated maintenance and restriping schedules are released to allow for face to face conversation between local staff and NCDOT Division 8 staff. This information would allow Sanford and Lee County an opportunity to provide input regarding their bicycle facility needs and support accommodation measures, such as restriping to include bicycle lanes and other relevant markings.

Automated Speed Enforcement Devices & Systems

Target audience	Motorists and law enforcement
Lead facilitator	Sanford and Lee County law enforcement
Time frame	Ongoing
Program Resource	FHWA resource: http://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Safety%20Effects%20of%20ASE%20Review%20of%20Intl%20Lit.pdf

Automated speed enforcement devices and systems can be an effective tool for managing speed and reducing speed related crashes. Some devices record and visibly display vehicle speed, and other devices capture a real-time photo of traffic. Most devices use radar and motorists with a radar detector in their vehicle will be alerted of the presence of the radar. This program would change motorists behavior by encouraging safe, responsible driving, staying alert, and obeying the posted speed limit.

Sanford and Lee County should install permanent, fixed photo speed enforcement devices. If these are too expensive to consider, mobile photo speed units may be a more viable option.

Bicycle and Pedestrian Needs Checklist

Target audience	Developers, Sanford and Lee County staff
Lead facilitator	Sanford and Lee County staff
Time frame	Ongoing
Program Resource	Example resource: ftp://ftp.dot.state.pa.us/public/PubsForms/Forms/D-310.pdf

Sanford and Lee County should create a bicycle and pedestrian needs checklist as an additional phase in the project design and site plan review process. A bicycle and pedestrian needs checklist would ensure the full participation and timely review of the planning and engineering staff in the development of new projects that have the potential to benefit cyclists and pedestrians. The checklist would include bicycle and pedestrian related amenities at intermodal facilities and any existing or future park & ride facilities. Adding amenities such as bicycle parking racks can make multimodal travel easier. There are many examples of checklists available online in the form of "Complete Streets" checklists, and there is an opportunity for incorporating a bicycle and pedestrian needs checklist in a future update or revision to the Sanford/Lee County "Complete Streets" document that was recently adopted.

Elements from the example checklists below should be considered by Sanford and Lee County.

- http://www.seattle.gov/transportation/compSt_how.htm
- http://www.mtc.ca.gov/planning/bicyclespedestrians/routine_accommodations.htm
- www.state.nj.us/transportation/capital/pd/documents/CompleteStreetsChecklist.doc

Facility Inspection and Maintenance

Target audience	Residents, Sanford and Lee County staff
Lead facilitator	Sanford and Lee County staff
Time frame	Ongoing
Program Resource	http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=403

Setting and maintaining minimum condition standards for acceptable bicycle facility conditions will enable all users to use the facilities safely. Sanford and Lee County should establish standards for maintenance of bikeways, including replacing worn pavement markings and damaged signs, sweeping away debris, repaving streets, and repairing potholes. The City has set up a Smart Phone application to efficiently collection information regarding problematic facilities such as potholes or debris clearing.

Additional staff may be necessary to adequately perform these duties in the future.

Well maintained facilities provide safe opportunities for bicycle transportation.

Existing Policy Review & Recommendations

Policies have the greatest long-term implications of any action that a government can take to alter its future conditions. Policies also have a tremendous impact on pedestrian and bicycle options, particularly in the areas of financing and land development-transportation infrastructure relationships. North Carolina grants municipalities and counties their current levels of authority over land development practices; if a method of control isn't explicitly mentioned in the N.C. General Statutes, it likely would not pass a legal challenge.

For the purposes of this Comprehensive Bicycle Transportation Plan, the *Sanford-Broadway-Lee County Unified Development Ordinance (UDO)* and the *City of Sanford Code of Ordinances* were reviewed to identify the specific areas that should be strengthened to improve accommodations for non-motorized transportation and recreation facilities.

In addition to the UDO and the Code of Ordinances, Sanford and Lee County recently developed and adopted a "Complete Streets" guidance policy. The development and adoption of this policy document emphasizes that the community is committed to providing an efficient multi-modal transportation network such that the access, mobility, and safety needs of motorists and bicyclists are accommodated.

The North Carolina Department of Transportation also recently adopted a "Complete Streets" policy. The NC Board of Transportation approved the "Complete Streets" policy at the July 2009 board meeting. Information on this policy can be found on the following website:

http://www.bytrain.org/fra/general/ncdot_streets_policy.pdf

Sanford-Broadway-Lee County Unified Development Ordinance

The County's Unified Development Ordinance (UDO) combines the zoning and subdivision authority of Lee County into one document. The UDO recites applicable statutory authority, the applicability of the UDO to various uses of the County, consistency with the Comprehensive Plan, coordination with other regulations, the effective date, violations, and related matters. The UDO review table, with specific language recommendations, begins on page 3-26 of this chapter.

City of Sanford Code of Ordinances

The City of Sanford is a political subdivision of the State of North Carolina and thus derives its power and authority from the provisions of state law. The City may adopt ordinances and resolutions necessary for the exercise of its powers and it may prescribe fines and penalties for the violation for such ordinances.

An ordinance holds the same authority of law, and updates or revisions to Sanford ordinances that take bicyclists into consideration would support the City's goal of becoming more bicycle friendly. The Code of Ordinances review table, with specific language recommendations begins on page 3-20 of this chapter.

In both policy documents, neither bicyclists nor their needs were covered in any significant detail. There is potential for confusion, as bicyclists were not called out specifically in many situations where vehicular traffic is referenced, but the directives did not seem to apply to bicyclists. Where bicycling was specifically mentioned, the primary focus is on bicycling for recreation, with no mention of bicycling as a mode of transportation. The following topics as they relate to biking were not addressed:

- Bike parking standards.
- Sight distance (from the bicyclist perspective).
- Sign location (from the bicyclist perspective).
- Provisions for safe access during construction.

Table 3.1 City of Sanford Code of Ordinances

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
Sec. 12.2. - When petition unnecessary	(b) That such street or part thereof is unsafe for vehicular traffic and it is in the public interest	Needs clarification that 'vehicular traffic' includes those travelling by bicycle also. This also raises the issue that facilities or operating conditions that may be safe for motorized traffic may not be safe for those travelling by bicycle on the public street.
Sec. 15.1. - Subdivision control	Any subdivision control ordinance enacted by the City Council under authority of general law may provide for the more orderly development of subdivisions within the subdivision control jurisdiction of the City by requiring the construction of community service facilities, including water lines; sewer lines; street paving, curbing and guttering; sidewalks and trails, and street drainage facilities in accordance with policies established by the City Council.	There appears to be an opportunity here to add sidewalks and trails to the list of facilities that are required as part of new subdivision development.
Sec. 1-2. - Definitions and rules of construction	Sidewalk. The term "sidewalk" means that portion of a street between the curbline, or the lateral line of a roadway where there is no curb, and the adjacent property lineor on easements of private property that is paved or improved and intended for the use of pedestrians.	The MUTCD 2009 definition is somewhat broader and should be used as a reference when updating the definition in the Code of Ordinances.
Sec. 1-2. - Definitions and rules of construction	Street. The term "street" means and includes any public way, road, highway, street, avenue, boulevard, parkway, alley, lane, viaduct or bridge and the approaches thereto within the city, and shall mean the entire width thereof between abutting property lines. It shall also be construed to include a sidewalk or footpath, unless the contrary is expressed or unless such construction would be inconsistent with the manifest intent of the city council.	It is unclear how this definition works with the definition of 'street' under 'Sec. 34-2. - Definitions'. This definition does not include trails or any other type of bikeway within the public right of way as part of the 'street'.
Sec. 32-3. - Damaging street or sidewalk	(a) It shall be unlawful for any person to break up, destroy or otherwise damage any street or sidewalk within the city without first obtaining from the public works director a permit so to do.	Include information about the requiring of an alternative accessible route for the duration of the disruption as well as adequate advance warning so that users can decide to cross street in advance at appropriate location. This particular issue impacts the least-able users of sidewalk facilities more than other users of the same facilities.
Sec. 32-7. - Duty to keep sidewalks clean; removal of ice, snow and other obstructions	(a) Every occupant of a residence, store or business establishment in front of which the sidewalk is paved with stone, brick, asphalt or cement shall remove snow, ice or other obstructions from the sidewalk at the earliest possible time and as soon as the weather permits.	Does this requirement apply to trails also? This requirement may need further clarification.

Table 3.1 City of Sanford Code of Ordinances - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
Sec. 32-8. - Streetlights	(b) Additional lights. Streets with sharp turns which block the view of the streetlight may be granted additional lights when it appears necessary to promote public safety.	The provision of high-quality lighting is a significant factor in many bicycling decisions as well as bicyclist safety in terms of seeing and being seen. It is recommended to expand the lighting requirements to recognize further the role that lighting plays in biking participation and encouragement.
Sec. 32-31. - Goods, merchandise or other articles obstructing passage	(a) No person shall place or suffer to lie on or in any alleyway, street, sidewalk or other route of the city any goods, wares, merchandise, or other substances or articles so as to prevent or obstruct the free passage of persons, or vehicles. (b) Any person erecting or repairing a building may, with permission of the city engineer, place building material for immediate use on the streets or sidewalks in such a way as to not interfere with the usual traffic.	While bicycling is covered in the current definitions, it may be useful to be more explicit that bicycle travel should not be disrupted.
Sec. 32-33. - Installation of covered passageways or closing of sidewalk at construction sites	(a) Before building or remodeling at any place which is in close proximity to the sidewalk, an overhead covered passageway shall be constructed so as to leave the sidewalk unobstructed and provide safe and easy passage. (b) Within a reasonable period of time, the city engineer is authorized, at his discretion, to allow the owner to close a section of sidewalk where an arrangement has been made for proper signing and safe passageway for pedestrian traffic around the construction site.	
Sec. 34-2. - Definitions	Street means a dedicated and accepted public right-of-way for vehicular traffic.	Clarify whether 'vehicular traffic' includes bicyclists so that it is clear that bicycles are part of the road traffic. See definition for Sec. 1-2 at left.
Sec. 34-10. - Preliminary plat	(d) The following information shall be shown on the preliminary plat or on sheets attached thereto: (1) City limit lines, property lines, rights-of-way, easements, streets, railroads, utility transmission lines, storm sewers, ditches and culverts, sanitary sewers, water mains, bridges and buildings.	Require that any trails and greenways, existing and proposed, be shown.
Sec. 34-66. - Easements	(b) Walkways. Pedestrian easements or walkways shall be provided through the interior of blocks where easements are needed. Pedestrian easements shall be at least ten feet wide and shall be laid out along front, side or rear property lines.	This further expands the range of terms used for where residents can walk (sidewalk, footpath, walkway). It is unclear whether there are differences between these facilities in terms of the construction or operation. It is also unclear whether any bicycles can be operated on these facilities (e.g., by minors or where the roadway conditions are hazardous). Suggest limiting the range of terms and clarifying the users in each case.

Table 3.1 City of Sanford Code of Ordinances - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
Sec. 34-71. - Sidewalks	(a) Sidewalks of a type suitable for handling pedestrian traffic shall be provided when deemed necessary by both the council and the planning board. The location and type of sidewalk shall be decided by the planning board after determining expected development densities, expected pedestrian traffic volumes, and suitable pedestrian routes.	While this does not expand on the criteria for 'deemed necessary', it could potentially mean a high bar for requiring sidewalks if based on pedestrian volumes or similar criteria. However, not providing a sidewalk in a particular location can cause a significant gap in a wider network, and it can impact a small number of users significantly. Perhaps this requirement could be that sidewalks are to be provided as the default with a list of possible exceptions.
Sec. 36-1. - Definitions	Crosswalk means that portion of a roadway ordinarily included within the prolongation or connection of the lateral lines of sidewalks at intersections, or any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.	Suggest using the more detailed MUTCD 2009 definition as it covers more situations : Crosswalk—(a) that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the center line; (b) any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by pavement marking lines on the surface, which might be supplemented by contrasting pavement texture, style, or color.
Sec. 36-1. - Definitions	Motor vehicle means every vehicle which is self-propelled and every vehicle which is propelled by electric power obtained from overhead trolley wires, but not operated on rails. This shall not include mopeds as defined in G.S. 20-4.01(27)d1.	It is unclear how this relates to the use of the term 'vehicular' elsewhere in the ordinance. It appears to exclude bicycles from the definition. However, in other cases where the term 'vehicular' is used, it is assumed that bicycles are part of the requirements.
Sec. 36-1. - Definitions	Pedestrian means any person afoot	Use the MUTCD 2009 definition: Pedestrian—a person on foot, in a wheelchair, on skates, or on a skateboard.
Sec. 36-1. - Definitions	Sidewalk means that portion of a street between the curblines, or the lateral lines of a roadway, and the adjacent property, intended for the use of pedestrians.	Use the MUTCD 2009 definition: Sidewalk—that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
Sec. 36-1. - Definitions	Traffic means pedestrians, ridden or herded animals, vehicles, streetcars and other conveyances either singly or together while using any street for purposes of travel.	Use the MUTCD 2009 definition: Traffic—pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using for purposes of travel any highway or private road open to public travel.

Table 3.1 City of Sanford Code of Ordinances - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
Sec. 36-1. - Definitions	Vehicle means every device in, upon or by which any person or property is or may be transported or drawn on a highway, excepting devices moved by human power or used exclusively on fixed rails or tracks; provided that, for the purposes of this chapter, bicycles shall be deemed vehicles and every driver of a vehicle, except those which by their nature can have no application. This term shall not include a device which is designed for and intended to be used as a means of transportation for a person with a mobility impairment, and is suitable for use both inside and outside a building, and whose maximum speed does not exceed 12 miles per hour when the device is being operated by a person with a mobility impairment.	Use the MUTCD 2009 definition: Vehicle—every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit equipment operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.
ARTICLE II. - TRAFFIC CONTROL DEVICES		In the section on traffic control devices, suggest being explicit about bicycles and bicyclists and how they are to be controlled as well as what signs and signals are to be obeyed. In addition, suggest adding wording about bicycle-specific signs and signals as possible controls.
Sec. 36-64. - One-way streets	Upon those streets and parts of streets at the entrances to which signs are posted indicating that vehicular traffic is to move only in a certain direction, no person shall drive a vehicle except in the direction indicated by the signs.	Clarify whether this section applies to bicycles. It may also be useful to mention a future exception for bicycles so that such facilities as a contraflow cycle track can be installed.
Sec. 36-9. - Manner of riding bicycles and motorcycles	(c) No person shall ride a bicycle or motorcycle on any sidewalk or walkway within the City.	Does this apply to minors and young children also? Consider adding exceptions for all users for when roadway conditions are hazardous at a pinch point. Novice and older riders in particular may be uncomfortable riding adjacent to fast-moving vehicles. It is assumed that this does not apply to trails, so the definitions of trails, sidewalks and walkways need to distinguish clearly between facility types and their operations.
	(a) The operator of a motorcycle or bicycle, when on a street, shall not carry any person on the handlebar, frame or tank of the vehicle, nor shall any person so ride on any such vehicle.	This definition seems to preclude the use of certain types of bicycle child seats which attach to the front handle bars or to the frame top tube.
Sec. 36-9. - Manner of Riding Bicycles	(b) No person shall ride a bicycle…on any street without having his hands upon the handlebars.	This seems to imply both hands must always be on the handlebars. This is not considered normal for a bicycle, as hands and arms are used for directional signaling. Consider adding specific language to state, "with the exception of signaling for a turn or stop."

Table 3.1 City of Sanford Code of Ordinances - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
Sec. 36-31. - Obedience	Every driver of a vehicle and every pedestrian shall obey the directions of any official traffic control device applicable to him and placed in accordance with the provisions of this chapter, unless otherwise directed by a police officer, and subject to the exceptions granted the driver of an authorized emergency vehicle in section 36-3.	The phrase "Driver of a vehicle" suggests that only motorized vehicles are being considered in this directive although the definition for vehicles does include bicycles. Language that include bicyclists should be added. Consider changing wording to "operator of a vehicle."
111: Sec. 1-2. - Definitions and rules of construction	Sidewalk. The term "sidewalk" means that portion of a street between the curbline, or the lateral line of a roadway where there is no curb, and the adjacent property line, intended for the use of pedestrians.	The MUTCD 2009 definition of sidewalk should be used. The definition is: that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
306: Sec. 32-33. - Installation of covered passageways or closing of sidewalk at construction sites	(b) Within a reasonable period of time, the city engineer is authorized, at his discretion, to allow the owner to close a section of sidewalk where an arrangement has been made for proper signing and safe passageway for pedestrian traffic around the construction site.	The safety needs of bicyclists should be included in this section. There may be similar closings of bikeways needing proper signing and a safe alternative pathway.
221: Sec. 34-66. - Easements	(b) Walkways. Pedestrian easements or walkways shall be provided through the interior of blocks where the easements are needed. Pedestrian easements shall be laid out along front, side or rear property lines.	It is unclear whether bicyclists (including minors) are permitted to use pedestrian walkways or easements. It may be useful to clarify the use of pedestrian easements and walkways for bicycling access, as such routes may provide important connectivity for bicyclists or allow bicyclists to avoid unsafe alternatives.
330: Sec. 34-71. - Sidewalks	(a) Sidewalks of a type suitable for handling pedestrian traffic shall be provided when deemed necessary by both the council and the planning board. The location and type of sidewalk shall be decided by the planning board after determining expected development densities, expected pedestrian traffic volumes, and suitable pedestrian routes	While this does not expand on the criteria for 'deemed necessary', it could potentially set a high bar for requiring sidewalks if based on pedestrian volumes. However, not providing a sidewalk in a particular location can lead to a significant gap in a wider network or impact a small number of users significantly. This requirement could be modified with sidewalks required as the default and a list of possible exceptions.
335: Sec. 36.1 Definitions	Right-of-way means the privilege of the immediate use of the roadway.	This may be confused with other right-of-way definitions. It also only pertains to roadway so it is does not clarify the rights or privileges of bicyclists and pedestrians using sidewalks, pedestrian walkways, or trails.
335: Sec. 36.1 Definitions	Roadway means that portion of a street improved, designed or ordinarily used for vehicular travel, exclusive of the shoulder. If a highway includes two or more separate roadways, the term 'roadway' shall refer to any such roadway separately but not to all such roadways collectively.	Does 'vehicular travel' include bicyclists? On-road bicyclists may switch between riding in the travel lane and the shoulder, depending on available lane widths which could potentially add confusion when using this definition.

Table 3.1 City of Sanford Code of Ordinances - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional Comments and Suggestions
	Safety zone means the area or space officially set apart within a roadway for the exclusive use of pedestrians and which is protected or is so marked or indicated by adequate signs as to be plainly visible at all times while set apart as a safety zone.	The use of the term 'roadway' here does not seem consistent with the definition of roadway on page 3-24.
336: Sec. 36.1 Definitions	Sidewalk means that portion of a street between the curblines, or the lateral lines of a roadway, and the adjacent property, intended for the use of pedestrians	The MUTCD 2009 definition of sidewalk should be used. The definition is: that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
336: Sec. 36.1 Definitions	Traffic means pedestrians, ridden or herded animals, vehicles, streetcars, bicycles, and other conveyances either singly or together while using any street for purposes of travel.	Suggest adding the term 'bicycle' to the definition so that it is clearly included.
338: Sec. 36.31 Obedience	Every driver of a vehicle and every pedestrian shall obey the directions of any official traffic control device applicable to him and placed in accordance with the provisions of this chapter, unless otherwise directed by a police officer, and subject to the exceptions granted the driver of an authorized emergency vehicle in section 36-3.	'Driver of a vehicle' suggests that only motorized vehicles are being considered in this directive although the definition for vehicles does include bicycles. Language that include bicyclists should be added. Consider changing wording to "operator of a vehicle."
339: Sec. 36-34	(1) Green alone, or "go": a. Vehicular traffic facing the signal may proceed straight through or turn right or turn left unless a sign at the place prohibits either such turn, but vehicular traffic shall yield the right-of-way to other vehicles and to pedestrians lawfully within the intersection at the time the signal is exhibited. b. Pedestrians facing the signal may proceed across the roadway within any marked or unmarked crosswalk.	While this provides direction for vehicular traffic and pedestrians in relation to the green signal, additional clarification may be needed regarding bicyclists when they are mixed with vehicular traffic on the road or crossing the street at a pedestrian signal.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Recreation Elements	(a) Not less than 20 percent (20%) of the residential units shall be located within 660 feet of a pedestrian, equestrian and bicycle trail.	Consider additional uses with these design elements: trails are suitable for transportation, short trips, short-cuts, adding connectivity to the network. Suggest increasing these values to create higher thresholds.
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	(a) Park-and-ride lots may be incorporated with planned facilities.	Ensure that high-quality bike parking and access is incorporated into any park and ride plan.
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	(b) Bicycle lanes should be included along at least seventy percent (70%) of the linear frontage of all planned collector streets.	What is the basis for the seventy percent value? It may not reflect actual biking need and safety issues at a particular location. Suggest a policy of requiring that biking be accommodated along planned collector streets.
FIGURE 4.9-1. – RECOMMENDED DESIGN ELEMENTS FOR A PLANNED UNIT DEVELOPMENT (PUD) Transportation Elements	(c) Bicycle parking facilities should be provided for all uses except single-family detached and duplex residences.	Expand this bike parking requirement to distinguish between short-term and long-term bike parking as well as to set requirement standards (i.e., types of racks, lighting, shelter, etc.).
	A device propelled by human power upon which any person may ride, having two tandem wheels either of which is more than sixteen (16) inches in diameter or having three wheels in contact with the ground any of which is more than sixteen (16) inches in diameter.	This is a limited definition of a bicycle and may not cover the increasing range of bicycles in use (including folding bicycles and those with tagalongs). The MUTCD definition of a bicycle should be used. A bicycle is a pedal-powered vehicle upon which the human operator sits.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
A-3 Definitions BICYCLE FACILITIES	A general term denoting improvements and provisions made or approved by public agencies to accommodate or encourage bicycling, including parking facilities, mapping, and bikeways, and shared roadways not specifically designated for bicycle use.	This definition should be updated to the MUTCD definition: Bicycle Facilities—a general term denoting improvements and provisions that accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically defined for bicycle use.
A-3 Definitions BICYCLE LANE (BIKE LANE)	A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.	This definition should be updated to the MUTCD definition: Bicycle Lane—a portion of a roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and, if used, signs.
A-3 Definitions BICYCLE PATH	A hard surfaced path for bicycles. This bikeway is physically separated from motorized vehicular traffic by an open space barrier and either within the highway right- of-way or within an independent right-of-way.	The term bikepath should be replaced by the term bikeway, and the definition should be updated to the MUTCD definition of bikeway: Bikeway—a generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
A-3 Definitions OPEN SPACE, ACTIVE	Any park and recreational facility that is not dependent upon a specific environmental or natural resource, which is developed with recreation and support facilities that can be provided anywhere for the convenience of the user. Activity-based recreation areas include, but are not limited to, playgrounds, golf courses, bicycle trails, baseball or softball fields, football or soccer fields, basketball courts, swimming pools, clubhouses, equestrian facilities, and tennis courts.	Expand language to cover various types of biking, including single track trails,, and BMX.
A-3 Definitions PUBLIC RIGHT-OF-WAY	Any area on or adjoining a street, road, highway, alley, or pedestrian/bicycle way, trail, or other special purpose way or utility installation owned by, or reserved to, the County, City, Town, or State of North Carolina for present or future public use.	

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
B-5 SITE PLANS (Conditional Rezoning /Special Use Permits)	(9) The traffic and the pedestrian circulation system, including the location and width of all streets, driveways, entrances to parking areas and parking structures, walkways and bicycle paths and trails.	
TABLE 10-4: TND STREET DESIGN STANDARDS	k. Bike Lanes (Table shows widths of 6' for bike lanes)	The bike-lane width values as shown may not allow for design nuance such as buffering, contraflow, cycle tracks, etc.
4.15.2 DESIGN STANDARDS 4.15.2.2 Definitions	Sight Triangle – An area that prohibits the placement of objects, such as fences, which could obstruct the ability of motorists to view opposing traffic movements at intersections. Sight triangles are determined by measuring along the edge of each intersecting street or driveway a predetermined distance and then connecting those points with a line. The area within these lines is considered the sight triangle. For public streets, the predetermined measuring distance is sixty (60) feet. For private driveways, the predetermined measurement distance is ten feet.	Expand the definition of sight triangle as it seems to only consider the sight needs of motorists: bicyclists and pedestrians need to be seen and also to be able to see as they make their decisions. They may have a different line of sight due to different eye height
6.5 OPEN SPACE STANDARDS	Protection of public health by the provision of recreational opportunities, active transportation and opportunities for exercise and participation in community activities.	Include the idea of access via active transportation choices such as biking and walking.
6.5.1 PURPOSE	Minimizing traffic congestion by providing for recreational opportunities within walking and biking distance of new homes and businesses.	Bicycling should be added this the definition. The definition should be further expanded to include the idea that congestion could potentially be reduced by the provision of walking and biking infrastructure to improve access to community facilities, employment centers, and schools.
6.5.2.3 EXEMPTION	Major Subdivisions or Multi-family developments located within ½ mile from an existing or planned public park (or a public school with recreation facilities accessible to the general public) are exempt from the Open Space requirements. For purposes of this section, a "planned public park" means a park which is included in a capital improvements program or capital budget of the County of Lee, Town of Broadway, or City of Sanford.	For this exemption to apply, safe and comfortable walking and biking access must be required between the major subdivision/ multi-family development and the facilities listed.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
6.5.3 ACCESS TO OPEN SPACE	All areas to be preserved for open space shall be accessible to pedestrians and bicyclists by one of the following: • frontage (width as required in this Section) on a public street right-of-way; or • a recorded pedestrian easement at least fifteen (15) feet wide; or • fee simple property	Bicyclists should be added this the access requirement.
6.5.5 CONNECTION TO EXISTING PUBLIC PARKS, OPEN SPACE AND/OR GREENWAYS	The Department of Community Development shall require pedestrian and bicycling connections to a community park and/or open space network and/or trails system (greenways) if the proposed development is adjacent to the boundary of a park and/or open space area as included in a parks or open space plan adopted by the County of Lee which specifically recites this section. The open space/ trail system shall be maintained by the applicant or subsequent owners provided, however, that the applicant may request to publicly dedicate any trail specifically delineated in the Plan.	The type of connection should be specified to explicitly include pedestrians and bicyclists.
6.5.6.3 MAINTENANCE REQUIREMENTS		See previous recommendation about connections. Also add connections to maintenance requirements.
6.7.1.3 SIGHT DISTANCE AND SITE TRIANGLES	Sight Distance and Site Triangles shall comply with the North Carolina Department of Transportation, Subdivision Roads - Minimum Construction Standards (July 1, 1985), G.2 and Figures 3 and 4 in the unincorporated area of the County, and with the Public Work's Policy Manual (Chapter 3) in the incorporated areas of Lee County.	See previous comment about sight distance requirements applying to bicycling and walking users of facilities. Also see comment about the height of the line of sight.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
6.7.3 SIDEWALKS	6.7.3.1 New single-family residential subdivisions composed of lots with a minimum lot size of less than 20,000 square feet shall be required to provide pedestrian sidewalks or multi-use paths along one side of a new public street. In determining the lot size for a proposed subdivision, the following shall be considered: •The actual lot sizes as proposed, not the underlying zoning, shall be used in determining if the subdivision will be required to provide sidewalks. •For subdivisions with a range of lot sizes proposed, the average of all the lots shall be calculated and used to determine if the project will be required to provide sidewalks. 6.7.3.2 Specific design standards for sidewalks shall be obtained from the respective jurisdiction's engineering department or other authorized agency.	The requirement for the provision of sidewalks on only one side should be considered further as it impacts such issues as access, safe crossing, encouragement, connectivity, etc. It particularly impacts those with limited mobility or who require mobility devices.
6.7.2 BLOCK DESIGN	6.7.2.1 The purpose of this section is to encourage appropriately sized street blocks that encourage street connectivity and efficiency of public and safety services.	It should also be noted that increased connectivity and reduced block size are major factors in bicycling and walking access, comfort and encouragement.
7.1 PURPOSE	7.1.1. The purpose of these landscaping, screening, and buffer requirements is to provide standards that will protect the health, safety and general welfare of the public, enhance property values, improve the appearance of the community: •Address the design of entry ways into the County of Lee to express the community's values; •Promote walkable and bikeable human-scale streetscapes, traditional neighborhoods, and compact centers by exempting uses which relate to each other functionally and visually from certain requirements of this Section.	This section should be revised to include new and additional wording.
7.4.4 RELATIONSHIP TO SIGHT TRIANGLES/ TRAFFIC VISIBILITY	No plantings as required within this Article 7 shall be installed such that the planting will create a traffic hazard or otherwise inhibit the view for vehicular traffic at intersections or other vehicular traffic movements. No plantings in excess of three feet shall be permitted within any designated sight triangle.	See previous comment about sight distance requirements applying to bicycling and walking users of facilities. Also see comment about the height of the line of sight.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
7.8.5 GENERAL MAINTENANCE OF LANDSCAPING AND SITE	7.8.5.1 The property owner, including subsequent or successor owner, and their authorized agents are jointly and severally responsible for maintenance of landscaping on the property on a continuing basis for the life of the development as specified in this Section. All required landscaping shall be maintained in a neat and orderly manner at all times. This shall include, but is not limited to, mowing, edging, pruning, fertilizing, watering, weeding and other activities common to the maintenance of landscaping.	Maintenance of sight distance area as this is a key maintenance task to preserve safety.
8.3 REQUIRED AMOUNT OF OFF-STREET PARKING	8.3.6 Off-street parking requirements of a given use may be met with off-site, off-street parking facilities of another use when, and if, all of the following conditions are met.	Add bike parking and bike corral option to list.
8.4 PARKING SPACE DIMENSIONS		Include a section on bike parking and bike corral dimensions (refer to APBP Bicycle Parking Guidelines).
8.6 OFF-STREET LOADING AND UNLOADING AREA STANDARDS	8.6.1 There shall be provided on the same lot with each nonresidential building or structure, adequate space for off-street loading, unloading and the maneuvering of shipping and delivery vehicles. Off-street maneuvering space shall be provided so that no backing onto or from a public street is required. Off-street loading space shall be screened from adjacent residentially zoned or developed property as provided in Article 7 (Landscaping Standards) of this Ordinance. 8.6.2. Off-street loading/unloading spaces shall be sized such that any reasonably anticipated vehicles utilizing the space will not protrude into any required Parking Space and/or Street right-of-way or bicycle parking area.	

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.2 SITE DESIGN	10.2.2.1 Outdoor Space. Commercial Uses shall provide at least one outdoor space, or site amenity, to beautify the site in addition to the minimum landscaping requirements of Article 7. The outdoor space or site amenity is intended to enhance the vehicular, bicycle and pedestrian entry ways to the site and the buildings on the site. An "outdoor space" or "site amenity" may include, but is not limited to, the following and other landscaping design alternatives: •A public plaza or courtyard on the site; •A landscaped median for the driveway(s) leading into the site and landscaped pedestrian areas; or •A public square or park on the site, or on adjacent land.	Add amenities to the list such as sheltered bike parking or bike corrals.
10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.4. PEDESTRIAN CIRCULATION	10.2.4.1. Sidewalks shall be constructed within the interior of the development to link buildings with other destinations such as, but not limited to: parking, adjoining streets, adjoining sidewalks, close by trails or adjoining developments or amenities where appropriate pedestrian connections can be reasonably accomplished. These interior sidewalks shall be constructed in accordance with the standards for sidewalks as set forth in Article 10 of this Ordinance. 10.2.4.2 Sidewalks, in combination with curb and gutter, shall be required adjacent to all public streets that provide access to the development. Such improvements may be subject to road widening and other related improvements. Road widening, sidewalks, curb and guttering, utility relocations, and all other related improvements shall be the responsibility of the developer and/or owner. Design standards shall be subject to review and approval as described in Article 10.	
10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.7 PARKING STANDARDS		Add bike parking provisions and standards such as lighting, and distance for retail facilities for both employee and customer use.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
10.2 SHOPPING CENTERS AND SUPERSTORES 10.2.9 EASEMENT AGREEMENTS	Easement agreements, for the purposes of vehicular, bicycling or walking access and/or extension of public utilities, shall be reviewed by the appropriate jurisdictional Attorney prior to recordation. All such easements shall also be shown on related subdivision plat(s) as set forth in Article 6 of this Ordinance.	Additional wording added.
10.3 MULTI-FAMILY RESIDENTIAL DEVELOPMENT 10.3.1 PURPOSE	10.3.1.1 The purpose of this Section is to provide reasonable design standards for multi-family residential developments and single-family attached residential developments which: •provide design flexibility; •accommodate affordable housing for current and future residents of the County; •protect the health, safety and general welfare of the general public and occupants of the units; •protect the property values of surrounding dwelling units; •promote a pedestrian-friendly, walkable, bikeable streetscape; and •provide for aesthetically	Additional wording added.
ARTICLE 11 SIGN REGULATIONS 11.1 PURPOSE & FINDINGS	11.1.1 This sign ordinance is adopted under the zoning authority of the County of Lee in furtherance of the more general purposes set forth in this Ordinance. The purpose of these sign regulations are: (a) to encourage the effective use of signs as a means of communication in the County of Lee while preserving the rights of free speech under the First Amendment to the United States Constitution; (b) to maintain and enhance the aesthetic environment and the County of Lee's ability to attract sources of economic development and growth; to improve pedestrian and traffic safety; (c) to minimize the possible adverse effect of signs on nearby public and private property; and (d) to enable the fair and consistent enforcement of these sign restrictions.	Additional reasons for sign ordinance include to enhance and protect public safety for all users of the right-of-way.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
ARTICLE 11 SIGN REGULATIONS 11.2 APPLICABILITY	11.2.7 Existing signs that are required to be moved as a result of a public infrastructure improvement project (i.e., a road widening project, etc.) may be relocated and shall not be required to meet the requirements of this article, provided there is not any expansion, addition or structural change or new sign plan and/or design for that sign. If a pylon sign is to be relocated, the sign shall be relocated to meet the appropriate setback as set forth in this Article 11.	It is unclear whether this exception will consider the impact of the sign relocation on sight distance for bicyclists and pedestrians.
11.6 PROHIBITED SIGNS ARTICLE 11 SIGN REGULATIONS	Signs placed within any required Sight Distance, except approved traffic control signage.	While only traffic control signage is mentioned, consideration should also be given to the location of signal control boxes within the sight distance area as they can particularly obstruct views, especially of children.
APPENDIX A A-3 DEFINITIONS	BICYCLE A device propelled by human power upon which any person may ride, having two tandem wheels either of which is more than sixteen (16) inches in diameter or having three wheels in contact with the ground any of which is more than sixteen (16) inches in diameter.	This is a limited definition of a bicycle and may not cover the increasing range of bicycles in use (including folding bicycles and those with tagalongs). Use the MUTCD definition: Bicycle—a pedal-powered vehicle upon which the human operator sits.
APPENDIX A A-3 DEFINITIONS	BICYCLE FACILITIES A general term denoting improvements and provisions made or approved by public agencies to accommodate or encourage bicycling, including parking facilities, mapping, and bikeways, and shared roadways not specifically designated for bicycle use.	Expand to the MUTCD 2009 definition: Bicycle Facilities—a general term denoting improvements and provisions that accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically defined for bicycle use.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
APPENDIX A A-3 DEFINITIONS	BICYCLE PATH A hard surfaced path for bicycles. This bikeway is physically separated from motorized vehicular traffic by an open space barrier and either within the highway right- of-way or within an independent right-of-way.	The term bikepath should be replaced by the term bikeway, and the definition should be updated to the MUTCD definition of bikeway: Bikeway—a generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
APPENDIX A A-3 DEFINITIONS	IMPROVEMENTS Right-of-way pavements, curbs, gutters, sidewalks, paths, bikeways, sedimentation control facilities, re-vegetation, water mains, sanitary and storm sewers, drainageways, gas lines, electrical and telephone lines and appurtenances, street signs, trees and lights, lot pin monuments, range point boxes, and any other similar items required for compliance with the regulations of this Ordinance or the conditions of approval.	Add term 'bikeways'.
APPENDIX A A-3 DEFINITIONS	PARK, LINEAR A linear park is an area developed for one or more varying modes of recreational travel such as hiking, biking, horseback riding and canoeing. Often times the linear park will be developed to connect recreational facilities, as well as schools and residential neighborhoods. The acreage and service area of a linear park is variable and subject to existing natural and man-made features, the existence of public right-of-way and the public demand for this type of park. In some cases, a linear park is developed within a large land area designated for protection and management of the natural environment, with the recreation use a secondary objective.	The value of park trails as part of the transportation network should also be considered. Recreational park trails can provide important network connections and shortcuts. They can also act as an alternative to heavily-trafficked or unsafe routes for many transportation bicyclists.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
APPENDIX A A-3 DEFINITIONS	PARKING GARAGE An attached or detached building which is used for the parking or storing of motor and other vehicles, open to public use without charge or for a fee, and shall without limiting the foregoing, include all real and personal property, driveways, roads, approaches, structures, garages, meters, mechanical equipment, and all appurtenances and facilities either on, above or under the ground which are used or usable in connection with such parking or storing of such vehicles. (Adapted from: Parking Authority Law, NCGS § 160A-551).	It is unclear whether this definition considers bike parking. Parking garages are good locations for high-quality longer-term bicycle parking. Such facilities can provide shelter from the elements, higher levels of security, as well as additional amenities such as lighting.
APPENDIX A A-3 DEFINITIONS	PARKING LOT Any lot, parcel, area or place for the parking or storing of motor and other vehicles, open to public use without charge or for a fee, and shall without limiting the foregoing, include all real and personal property, driveways, roads, approaches, structures, garages, meters, mechanical equipment, and all appurtenances and facilities either on, above or under the ground which are used or usable in connection with such parking or storing of such vehicles. (Adapted from: Parking Authority Law, NCGS § 160A-551)	It is unclear whether this definition considers the suitability of parking lots for both short and longer-term bike parking facilities.
APPENDIX A A-3 DEFINITIONS	PEDESTRIAN PATH An improvement located within a public right-of-way or private area which is designed primarily for the use of pedestrians and/or bicyclists.	Use the more general all-encompassing MUTCD definition: Pedestrian Facilities—a general term denoting improvements and provisions made to accommodate or encourage walking.
APPENDIX A A-3 DEFINITIONS	PEDESTRIAN RIGHT-OF-WAY A right-of-way or easement dedicated for public pedestrian and bicyclist access.	Include the following additional wording: It is generally useful to clarify that bicyclists do have access to public facilities as there are many cases where bicyclists are unable to use the street such as in the case of novice, younger or older riders.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
APPENDIX A A-3 DEFINITIONS	PUBLIC RIGHT-OF-WAY Any area on or adjoining a street, road, highway, alley, or pedestrian/bicycle way, trail or other special purpose way or utility installation owned by, or reserved to, the County, City, Town, or State of North Carolina for present or future public use.	Add trail to the definition, as it is called out separately in the definitions.
APPENDIX A A-3 DEFINITIONS	ROAD A public or private street, hard-surface road, dirt road, or railroad. (Source: NCGS § 113A-33)	Use the MUTCD 2009 definition for road or roadway: Roadway—that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used in this Manual shall refer to any such roadway separately, but not to all such roadways collectively.
APPENDIX A A-3 DEFINITIONS	ROADWAY The improved portion of a street within a right-of-way and/or easement.	Use the MUTCD 2009 definition: Roadway—that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used in this Manual shall refer to any such roadway separately, but not to all such roadways collectively.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
APPENDIX A A-3 DEFINITIONS	SIDEWALK The portion of a street or cross walkway, paved or otherwise surfaced, intended for pedestrian use only.	Use the MUTCD 2009 definition: Sidewalk—that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
APPENDIX A A-3 DEFINITIONS	STREET Any public thoroughfare, street, avenue, or boulevard which has been dedicated or deeded to the public for public use. (Source: North Carolina State Building Code, Vol. 1, § 201.3). Includes any Road.	Use the MUTCD 2009 definition: Highway—a general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.
APPENDIX A A-3 DEFINITIONS	TRAIL Any paved greenway, unpaved greenway, or wildlife/botanical greenway dedicated to public use. The term ""trail"" includes: 1. Park trail. -- A trail designated and managed as a unit of the North Carolina State Parks System under NCGS Chapter 113, Article 2C. 2. Designated trail. -- A trail designated by the Secretary pursuant to this Article as a component of the State trails system and that is managed by another governmental agency or by a corporation listed with the Secretary of State. 3. A State scenic trail, State recreation trail, or State connecting trail under NCGS 113A-86 when the intended primary use of the trail is to serve as a park trail or designated trail. 4. Any other trail that is open to the public and that the owner, lessee, occupant, or person otherwise in control of the land on which the trail is located allows to be used as a trail without compensation, including a trail that is not designated by the Secretary as a component of the State trails system (Source: North Carolina Trails System Act , NCGS § 113A-85)	It may be worthwhile adding to the definition to recognize the important role that trails play for bicyclists filling in missing links of the transportation network and providing alternatives to high-speed or unsafe streets.

Table 3.2 Sanford-Broadway-Lee-County Unified Development Ordinance - Continued

Ordinance	Existing Ordinance Text (Abridged) Suggested additions shown in red. Attention is drawn to text in green	Additional comments
APPENDIX A A-3 DEFINITIONS	VEHICLE Any self-propelled device in, upon, or by which any person or property may be transported upon a public highway excepting devices moved by human power or used exclusively upon stationary rails or tracks.	Use the MUTCD 2009 definition: Vehicle—every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit equipment operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.
B-5 SITE PLANS (Conditional Rezoning /Special Use Permits).	(9) The traffic and the pedestrian circulation system, including the location and width of all streets, driveways, entrances to parking areas and parking structures, short- and long-term bike parking facilities, walkways and bicycle paths. (10) Off-street parking and loading areas and structures, including the number of spaces; dimensions of spaces and aisles; short-and long-term bike parking facilities and landscaping for parking areas.	Add bike parking facilities to the list.

Implementation Strategies 4

Overview

This chapter defines a structure for managing the implementation of the City of Sanford and Lee County Comprehensive Bicycle Transportation Plan. Implementing the recommendations within this Plan will require leadership and dedication to bicycle facility development on the part of a variety of agencies. Equally critical, and perhaps more challenging, will be meeting the need for a recurring source of revenue. Even small amounts of local funding could be very useful and beneficial when matched with outside sources. Most importantly, the local governments within the region need not accomplish the recommendations of this Plan by acting alone; success will be realized through collaboration with state and federal agencies, the private sector, and non-profit organizations. Funding resources that may be available to Sanford and Lee County are presented in Chapter 5 of this Plan.

Given the present day economic challenges faced by local governments (as well as their state, federal, and private sector partners), it is difficult to know what financial resources will be available at different time frames during the implementation of this Plan. However, there are still important actions to take in advance of major investments, including key organizational steps, the initiation of education and safety programs, and the development of strategic, lower-cost on-road bicycle facilities. Following through on these priorities will allow the key stakeholders to prepare for the development of the regional network over time while taking advantage of strategic opportunities, as they arise. Key action steps fall into three categories: policies, programs, and infrastructure. Each of the recommendations that constitute these categories have been presented in the previous chapters of this Plan. Infrastructure recommendations are presented in Chapter 2, and policy and program recommendations are presented in Chapter 3.

Chapter Contents

More detailed action steps tied to each of these categories are found in the table at the end of this chapter along with the responsible agency and expected time frame for completion.

Policy Action Steps

Several policy steps are crucial to the success of future facility development. These steps will legitimize the recommendations found in this Plan and enable the right-of-way acquisition necessary to carry out those recommendations.

Adopt This Plan

Adoption procedures vary from community to community depending on existing plans and policies. In each jurisdiction, the planning board (as applicable) should review and recommend the plan to its governing body, which in turn must consider and officially incorporate the recommended trails of this plan into its land-use plans. The following entities should adopt this plan:

- The Triangle Area Rural Planning Organization
- The City of Sanford
- Lee County

Adoption of this Plan also signifies that the design guidelines provided in Appendix B are established as bicycle facility standards for each of the adopting agencies. This will establish consistency in design across jurisdictional boundaries, ensuring that future facilities will be developed with consistency and will accommodate a variety of user types.

This Plan and its recommended on- and off-road facilities should be approved by the NCDOT and NCDENR, and they should be included in the future planning of each agency. This Plan's recommendations should be integrated into an update to the Comprehensive Transportation Plan for Lee County. NCDOT should refer to this document when assessing the impact for future projects and plans. Likewise, NCDENR's Division of Parks and Recreation should refer to this Plan in any projects relating to the state parks in Lee County, such as the Endor Iron Furnace and the future Deep River State Park.

Establish Land Right-of-Way Acquisition Mechanisms

It is recommended that each local zoning and subdivision ordinance be amended to ensure that, as developments are planned and reviewed, the bicycle facilities and greenway corridors identified in this Plan are protected. This would entail amending development regulations to have developers set aside land for trails whenever a development proposal overlaps with the proposed routes, as adopted. Sanford and Lee County staff should ensure that an effective review of all bicycle and pedestrian elements of proposed developments takes place.

In addition, local policies should be revised so that all new sewer and utility easements allow for public access for trail users, as a matter of right. Although many easements do not currently prohibit greenway development, they do require the approval of landowners, increasing the complexity of trail development in these easements.

Greenway trail right-of-way acquisition can be accomplished through a number of other methods where trail recommendations run through currently developed areas. Wherever acquisition is successful, property owners should be approached and informed by the implementing agency (e.g., the municipality, the county, NCDENR, etc.) in advance of the design process.

Cameron Road,
Sanford, North Carolina

Program Action Steps

While policies provide a legal basis for on- and off-road facility development, the program recommendations included in Chapter 3 of this Plan will build community support for the creation of new facilities and establish a strong bicycling and walking culture.

Form a Bicycle and Pedestrian Advisory Commission

The City of Sanford should establish a Bicycle and Pedestrian Advisory Commission (BPAC) to assist in the implementation of this Plan. The City/County Planning Department would oversee this group. The BPAC would be comprised of both commuting and recreational cyclists and bicycle advocates, and it should champion the recommendations of this Plan. Formation of the BPAC will also represent a significant step toward becoming a Bicycle Friendly Community through the League of American Bicyclists. The BPAC would provide a communications link between the citizens of the community and the government. The BPAC should meet periodically to assist City and County staff in community outreach, marketing, and educational activities recommended by this Plan.

Become Designated as a Bicycle Friendly Community

A long term goal for Sanford may be for the City to seek a "BicycleFriendly Community" (BFC) designation. The Bicycle Friendly Community campaign is an award program that recognizes municipalities that actively support bicycling activities and safety. A Bicycle Friendly Community provides safe accommodation for bicycling and encourages its residents to bicycle for transportation and recreation. The program is administered through the League of American Bicyclists and many North Carolina communities have become designated as Bicycle Friendly Communities or are seeking designations as such.

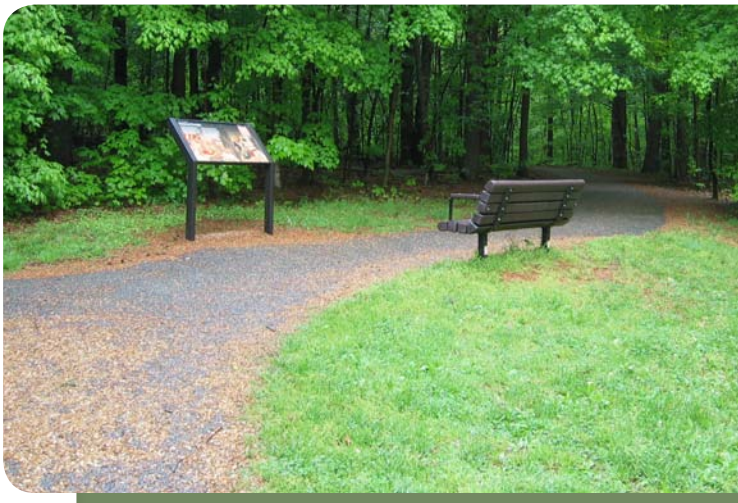
The development and implementation of this Plan is an essential first step toward becoming a Bicycle Friendly Community. With ongoing efforts and the short-term work program recommended here, the City should be in a position to apply for and receive BFC status within a few short years.

Communication and Outreach

A subgroup of the BPAC should be created to establish a communication campaign to celebrate successes as facilities are developed and otherwise raise awareness of the overall bicycle network and its benefits. A key first task of this group is to design and implement a bicycle and pedestrian wayfinding system. Please refer to Appendix B: Design Guidelines for more information about signage and wayfinding.

Establish a Monitoring Program

From the beginning, and continuously through its life, the BPAC should brainstorm specific benchmarks to track through a monitoring program and honor their completion with public events and media coverage. Monitoring should be supported by the programmatic recommendations included in Chapter 3, such as a bicycle and pedestrian needs checklist and a facility inspection and maintenance program. Benchmarks should be revisited and revised periodically as the bicycle facility network evolves.



Existing greenway,
Greensboro, North Carolina

Sanford, North Carolina

Infrastructure Action Steps

While establishing the policies and programs described, Sanford and Lee County should move forward with the design and construction of priority projects. They should also work to identify funding for long-term, higher-cost projects.

Identify Funding

Achieving the vision defined within this Plan will require, among other things, a stable and recurring source of funding. Communities across the country that have successfully engaged in bicycle programs have relied on multiple funding sources to achieve their goals. No single source of funding will meet the recommendations identified in this Plan. Instead, stakeholders will need to work cooperatively with municipality, state, and federal partners to generate funds sufficient to implement the program.

A stable and recurring source of revenue is needed that can then be used to leverage grant dollars from state, federal, and private sources. The ability of local agencies to generate a source of funding for bicycle facilities depends on a variety of factors, such as taxing capacity, budgetary resources, voter preferences, and political will. It is very important that these local agencies explore the ability to establish a stable and recurring source of revenue for facilities.

Donations from individuals or companies are another potential source of funding. The BPAC should establish an Adopt-A-Greenway program as a mechanism to collect these donations for the development of the greenway trail recommendations discussed in Chapter 2. In addition to a formalized program, a website should be set up as an easy way for individuals to donate smaller amounts. The need for a donation mechanism was identified during the stakeholder interviews that took place at the beginning of the planning process.

Federal and state grants should be pursued along with local funds to pay for necessary ROW acquisition and project design, construction, and maintenance expenses. "Shovel-ready" designed projects should be prepared in the event that future federal stimulus funds become available. Additional recommended funding sources may be found in Chapter 5: Funding Resources.

Complete Short-Term Priority Projects

By quickly moving forward on priority projects, Sanford and Lee County will demonstrate their commitment to carrying out this Plan and will better sustain the enthusiasm generated during the public outreach stages of the planning process. Refer to Chapter 2: Network Recommendations for priority project ranking and the prioritization methodology.

Key Partners in Implementation

The following are suggested roles for the core types of stakeholders involved in implementation. Actual roles may vary depending on how this Plan is implemented over time and the ongoing level of interest and involvement by specific stakeholders.

Role of State Agencies (NCDENR and NCDOT)

As key supporting partners in the development of this Plan, NCDOT and NCDENR should continue to play a role in implementation, including participation in the following tasks.

The NCDOT Division of Bicycle and Pedestrian Transportation should be prepared to provide guidance and technical support to local NCDOT offices that are implementing trail-related facilities, such as multi-use paths in roadway corridors, trail-roadway crossings, and improvements that increase safety for bicyclists and pedestrians crossing bridges on state roadways.

NCDOT should also continue to work with local and regional planners to coordinate upcoming and future roadway projects with trail recommendations.

NCDENR should be a supporting partner and provide guidance on recommendations, such as trail interface with natural resource areas and proper alignment of trails through sensitive and regionally significant environmental features.

Role of the Local NCDOT, Division 8

Division 8 of the NCDOT is responsible for the construction and maintenance of bicycle facilities on NCDOT-owned and maintained roadways in the City of Sanford, except where it allows for the City to do so with encroachment agreements. Division 8 should be prepared to:

- Recognize this Plan as an adopted plan of the City of Sanford, and assist in the integration of this Plan's recommendations into an update to the NCDOT's CTP for Lee County.
- Become familiar with the bicycle facility recommendations for NCDOT roadways in this Plan (Chapter 2); take initiative in incorporating this Plan's recommendations into the Division's schedule of improvements whenever possible.

Railroad House,
Sanford, North Carolina

- Become familiar with the standards set forth in Appendix B of this Bicycle Plan as well as state and national standards for bicycle facility design; construct and maintain bicycle facilities using the highest standards allowed by the State (including the use of innovative treatments on a trial basis).
- Notify the City of Sanford Engineering, and Public Works Departments of all upcoming roadway reconstruction, resurfacing and restriping projects in Sanford, by no later than the design phase and provide sufficient time for comments from the planning staff.
- If needed, seek guidance and direction from the NCDOT Division of Bicycle and Pedestrian Transportation on issues related to this Plan and its implementation.

Role of the Triangle Area Rural Planning Organization (RPO)

The RPO is the transportation planning agency serving the City of Sanford and the surrounding communities. Local governments are represented by an elected official on the Transportation Advisory Committee (TAC) and staff members, NCDOT, and FHWA staff comprise the Technical Coordinating Committee (TCC). The RPO should be prepared to:

- Become familiar with the recommendations of this Plan and support its implementation.
- Oversee long range transportation planning and ensure the development of a multi-modal transportation network.
- Ensure recommendations from this Bicycle Plan are integrated into regional planning and project implementation.
- Produce updates to the Long Range Transportation Plan (LRTP) that incorporate recommendations from this Bicycle Plan.
- Ensure that TIP projects are updated with recommendations from this Plan.
- Follow upcoming roadway reconstruction and resurfacing projects and work early in the design process with City and NCDOT staff to ensure bicycle facilities are incorporated into the design.
- Keep up with current and changing funding sources and opportunities such as Safe Routes to School.

Role of the City Council

The City Council will be responsible for adopting this Plan. Through adoption, the City's leadership would further recognize the value of bicycle transportation and put forth a well-thought out set of recommendations for improving public safety and overall quality of life (see the 'Benefits of a Bikeable Community' in Chapter 6). By adopting this Plan, the City Council would also signify that they are prepared to support the efforts of other key partners in the Plan's implementation, including the work of City departments and NCDOT Division 8.

Greenway trail construction, Greensboro, North Carolina

Role of the City of Sanford/Lee County Planning and Community Development Department

The planning staff handles comprehensive planning, zoning and code enforcement. The department will take primary responsibility for the contact with new development to implement the plan, with support from the Public Works Department. The staff should be prepared to:

- Communicate and coordinate with local developers on adopted recommendations for bicycle facilities, including paved multiuse trails.
- Assist the Public Works Department in communicating with the NCDOT and regional partners.
- Maintain and update the bicycle and pedestrian facility GIS database which includes sidewalks, greenways, bicycle facilities and crossing facilities.

Role of the City of Sanford Public Works Department

The Public Works Department handles the responsibility for the construction and maintenance of bicycle facilities on City-owned and maintained roadways, as well as on NCDOT roadways, where encroachment agreements are secured. The department also operates and maintains traffic signalization, traffic signs, and markings. The department should be prepared to:

- Communicate and coordinate with other City departments and the BPAC on priority bicycle projects.
- Become familiar with the design standards set forth in Appendix B of this Bicycle Plan, as well as state and national standards for bicycle facility design.
- Secure encroachment agreements for work on NCDOT-owned and maintained roadways.
- Assist with local roadway projects and ensure bicycle accommodations are being made
- Design, construct and maintain bicycle facilities.

American Tobacco Trail maintenance, Durham, North Carolina

- Communicate and coordinate with NCDOT Division 8 on this Plan's recommendations for NCDOT-owned and maintained roadways. Provide comment and reminders about this Plan's recommendations no later than the design phase.
- Work with Division 8 to ensure that when NCDOT-owned and maintained roadways in Sanford are resurfaced or reconstructed, that this Plan's adopted recommendations for bicycle facilities are included on those streets. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Bicycle Transportation for guidance on appropriate alternatives.

Role of the City of Sanford Police Department

The City of Sanford Police Department is responsible for providing the community the highest quality law enforcement service and protection to ensure the safety of the citizens and visitors to Sanford. The Police Department should be prepared to:

- Become experts on bicycle-related laws in North Carolina.
- Develop bicycle unit of bicycle-trained law enforcement officers to utilize existing equipment.
- Continue to enforce not only bicycle-related laws, but also motorist laws that affect the safety of bicyclists, such as speeding, running red lights, aggressive driving, etc.
- Participate in bicycle-related education programs.
- Review safety considerations with the Public Works Department as projects are implemented.

Existing trail,
Davidson, North Carolina

Role of the Bicycle Pedestrian Advisory Committee

The Committee should be prepared to:

- Meet with staff from the RPO, engineering, planning, and the public works department.
- Evaluate progress of the plan's implementation and offer input regarding bicycle-related issues; assist City staff in applying for grants and organizing bicycle-related events and educational activities.
- Build upon current levels of local support for bicycle issues and advocate for local project funding.

Role of Developers

Developers in Sanford and Lee County can play an important role in facility development whenever a project requires the enhancement of transportation facilities or the dedication and development of sidewalks, trails or crossing facilities. Developers should be prepared to:

- Become familiar with the benefits, both financial and otherwise, of providing amenities for walking and biking (including trails) in residential and commercial developments.
- Become familiar with the standards set forth in Appendix B of this Plan, as well as state and national standards for bicycle facility design.
- Be prepared to account for bicycle and bicycle circulation and connectivity in future developments.

Role of Local & Regional Stakeholders

Stakeholders for bicycle facility development and related programs, surrounding jurisdictions, the Lee County School system, and local economic development organizations play important roles in the implementation of this plan. Local and regional stakeholders should be prepared to:

- Become familiar with the recommendations of this Plan, and communicate & coordinate with the City for implementation, specifically in relation to funding opportunities, such as grant writing and developing local matches for facility construction.
- Lee County should coordinate with the City on regional trail development and SRTS grants.
- The local school system and school leaders should assist in carrying out SRTS workshops, programs, and also assist in SRTS grant applications.

Role of Local Residents, Clubs and Advocacy Groups

Local residents, clubs and advocacy groups play a critical role in the success of this plan. They should be prepared to:

- Continue offering input regarding bicycling issues in Sanford and Lee County
- Assist City staff and BPAC by volunteering for bicycle-related events and educational activities and participate in such activities.
- Assist City staff and the BPAC by speaking at City Council meetings and advocating for local bicycle project and program funding.

Role of Volunteers

Services from volunteers, student labor, and seniors, or donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as an Adopt-a-Trail or greenway or Adopt-a-Highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service group. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the City's greenway and bicycle networks.

Facility Development Methods

Rail-to-Trail Process

Many communities in the Southeastern United States, and North Carolina in particular, are beginning to more frequently pursue the development of greenway trail projects along former railroad corridors, known as "rail to trail" projects, through the federal process of "railbanking".

The following information on "railbanking" was obtained from the Rails-to-Trails Conservancy website. Railbanking takes place during the rail corridor abandonment process. Official negotiations with the railroad begin after the railroad submits an initial

Wide outside lanes allow adequate room for cyclists to avoid "dooring" collisions with on-street parking.

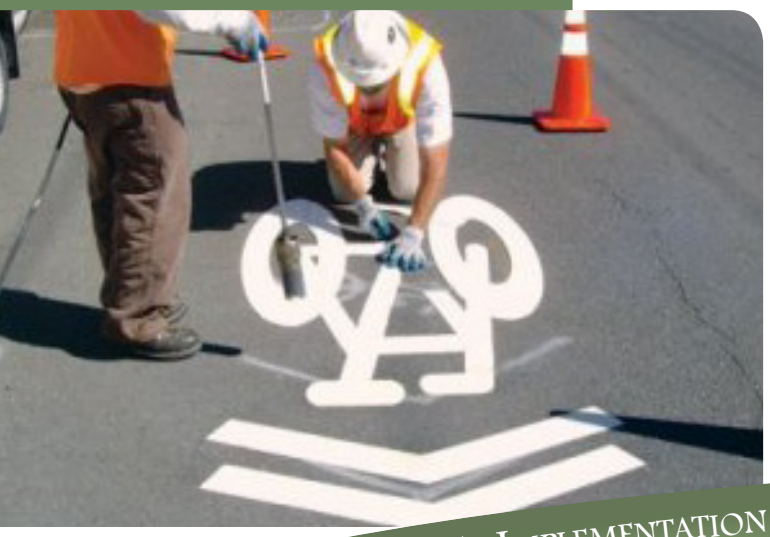
notification to abandon the line (similar to a letter of intent to abandon) to the Surface Transportation Board (STB). Negotiations end with either railbanking or line abandonment.

Railroads must follow one of three abandonment procedures that the STB has developed: Regulated Abandonment (the most stringent and least common), Individual Exemption or Class Exemption. Railroads that follow the Individual Exemption procedure will file a Petition for Exemption, which is used when the transaction is of "limited scope," or when regulation of the transaction is "not needed to protect the shippers from the abuse of market power." Class Exemptions, currently the most common option, apply if the line has not been in use for two or more years, or if the STB finds there is no vital interest in continuing rail service on that line.

Under the railbanking statute, a railroad is allowed to remove all of its equipment, with the exception of bridges, tunnels, and culverts, from a corridor and to turn the corridor over to any qualified private organization or public agency that has agreed to maintain the corridor for future rail use. This property transfer precludes abandonment.

In 1990 the U.S. Supreme Court unanimously ruled, in the case of Preseault v. United States, that preserving a corridor for future rail use through railbanking is a legitimate exercise of governmental power. Although the corridor will no longer have tracks and ties, it is still being used for railroad purposes, legally speaking. This means that a railroad can legally transfer all forms of its ownership, including easements, to a trail group.

Shared lane marking or "sharrow"



Any railroad may legally decide to re-establish rail service on a railbanked corridor. Should that occur, the trail managing agency would be entitled to compensation from the railroad that wants to reestablish rail service. In most cases, a trail group could expect to receive fair market value for the property as well as payment for all improvements. However, this issue may need to be specifically addressed in the initial contract with the abandoning railroad, since it may want to develop other payment terms.

As railbanking is voluntary, Sanford and Lee County will need to convince the railroad that railbanking the corridor is in the railroad's best interest. This is particularly important because most railroad personnel have historically relied on the piecemeal sale of a corridor as their preferred method for disposing of a corridor.

Information on railbanking obtained from:
http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/how_to_railbank.html

Removing Parking

Some neighborhood collector roadways are wide enough to stripe with bike lanes, but they are used by residents for on-street parking, especially in the evening. In locations like this, removing parking is likely to create considerable controversy and is not recommended unless there is no other solution (unless the parking is never used). In the rare case that removing parking is being considered, the parking should not be removed unless there is a great deal of public support for the bike lanes on that particular roadway and a full public involvement process with adjacent residents and businesses is undertaken prior to removing parking.
If it is not practical to add a bike lane, edgelines and shared lane markings may be considered. On roads where the outside lane and parking area combined are more than 17-feet-wide, 10-foot-wide travel lanes can be striped with an edgeline, leaving the rest of the space on either side for parking. The stripe would help slow motor vehicles and provide extra comfort for bicyclists, especially during the daytime when fewer cars would be parked along the curb. On roads with outside lane and parking areas that are narrower than 17-feet-wide, shared lane

markings can be provided every 100 to 200 meters on the right side of the motor vehicle travel lane to increase the visibility of the bike route.

Repaving

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to create narrower lanes and provide space for bike lanes and shoulders, where feasible.

In addition, if the spaces on the sides of non-curb and gutter streets have relatively level grades and few obstructions, the total pavement width can be widened to include paved shoulders.

Installing Shared Lane Markings

The City of Sanford should adopt the use of shared lane markings, or "sharrows," as one of its bicycle facility types. Shared lane markings have been newly incorporated into the Manual on Uniform Traffic Control Devices (MUTCD). They take the place of traditional bicycle lanes where lanes are too narrow for striping, where speeds do not exceed 35 mph, and/or where there is on-street parking. The intent of the shared lane marking is threefold:

1. They draw attention to the fact that the roadway is accommodating bicycle use and traffic;

2. They clearly define the direction of travel for both bicyclists and motorists; and

3. With proper placement, they remind bicyclists to bike further from parked cars to prevent "dooring" collisions.

While shared-lane markings are not typically recommended or needed on local, residential streets, they are sometimes used along such streets when part of a signed route or bicycle boulevard.

Roadway Construction and Reconstruction

Bicyclists should be accommodated any time a new road is constructed or an existing road is reconstructed. In the long-term, all roadways should have on-road bicycle facilities. However, side paths can be an acceptable solution when a road has few driveways and high-speed, high-volume traffic.

Reedy Creek Trail,
Raleigh, North Carolina

Bridge Replacement

All new or replacement bridges should accommodate bicycles with on-road facilities on both sides of the bridge. If the bridge is in a developed area or an area that may experience development in the future, it should also have wide sidewalks on both sides to accommodate all types of bicyclists and bicycles.

Potential bridge replacement locations for high priority projects include:

- Bridge #37 on SR 1162 (Sheriff Watson Rd)
- Bridge #36 on SR 1162 (Sheriff Watson Rd)
- Bridge #50 on SR 1305 (Henley Rd)
- Bridge #98 on SR 1500 (Lower River Rd)
- Bridge #10 on US 15-501 (crossing the Deep River)

Federal law, as established in the Transportation Equity Act for the 21st Century (TEA-21), makes the following statement with respect to bridges:

"In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations." (23 U.S.C. Section 217)

Bridge replacement projects on controlled access freeways where bicycles and bicyclists are prohibited by law should not include facilities to accommodate bicyclists and bicycles. In cases, however, where a bridge replacement project on a controlled access freeway impacts a non-controlled access roadway (i.e., a new overpass over an arterial roadway), the project should include the necessary access for bicycles and bicyclists on the non-limited access roadway (e.g., paved shoulders, sidewalks, and pedestrian/bicycle crossing improvements).

Existing and planned greenway crossings, both at-grade and below new bridges, should be similarly accommodated during bridge replacement projects.

Retrofit Roadways with New Bicycle Facilities

There may be critical locations in the bicycle network that have bicycle safety issues or are essential links to destinations. In these locations, it may be justifiable to add new bicycle facilities before a roadway is scheduled to be repaved or reconstructed.

In some places, it may be relatively easy to add extra pavement for shoulders, but others may require removing trees, moving landscaping or fences, or regrading ditches or hills. Retrofitting roadways with side paths creates similar challenges. Improvements in these locations are typically recommended in the long-term.

Some roads may require a "road diet" solution in order to accommodate bicycle facilities. Road diets involve removing vehicle travel lanes and replacing these lanes with on-road bicycle facilities and sidewalks or side paths. These are generally recommended only in situations where the vehicular traffic count can be safely and efficiently accommodated with a reduced number of travel lanes. Further study may be necessary for recommended road diets to ensure that capacity needs are balanced against bicycling needs, maintaining expected levels of service for each.

Signage and Wayfinding Projects

Signage programs that include informational, warning, and regulatory signage along specific routes or in an entire community can be updated to include wayfinding signage, to make it easier for people to find destinations. Bicycle route signs are one example of these wayfinding signs, and they should be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project. More information on signage design standards can be found in Appendix B of this Plan.

Table 4.1 Action Steps for Implementation of the Comprehensive Bicycle Transportation Plan

Task	Lead Agency	Support	Details	Phase
Present Plan to City/ County	Project Consultants	Planning Staff	Presentation to City BOC in Summer 2013	Summer 2013
Adopt this plan	City Council	Planning Staff, Project Consultants	Through adoption, the Plan becomes an official planning document of the City. Adoption shows that the City of Sanford has undergone a successful, supported planning process.	Summer 2013
Designate Staff	City Council & City Manager	Leadership of City/County Departments	Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. It is recommended that a combination of existing Planning and Engineering Staff oversee the day-to-day implementation of this plan.	Summer 2013
Create a Bicycle and Pedestrian Advisory Committee (BPAC)	City/County	Planning Staff	The committee should help coordinate the implementation of this Plan, develop programs, listen to community needs, promote the bicycle network, and keep positive momentum going.	Summer 2013
Provide police officers with educational material to hand out with warnings	Police Department	NCDOT Bike/Ped Division	Provide officers with an informational handout to be used during bicycle and pedestrian-related citations and warnings.	Summer 2013
Present this Plan to other local and regional bodies and agencies.	Planning Staff	BPAC	This Plan should be presented to other local and regional bodies and agencies. Possible groups to receive a presentation might include the regional transportation and greenway planners, health clubs and fitness facilities, schools and youth organizations, environmental clubs, civic organizations, chambers of commerce, and large neighborhood groups.	Fall 2013
Present this Plan's recommendations to NCDOT Division and District Offices, as well as other Departments.	Planning Staff	NCDOT Bike/Ped Division	This Plan should be presented to other NCDOT Divisions, Districts and Departments to integrate this Plan's recommendations into an update to the Comprehensive Transportation Plan (CTP).	Fall 2013

Table 4.1 Action Steps for Implementation of the Comprehensive Bicycle Transportation Plan - Continued

Task	Lead Agency	Support	Details	Phase
Adopt the Recommendations for Amendments to the City Code of Ordinances & UDO	City Council	Planning Staff, City Engineering, City Legal, NCDOT Bike/ Ped Division	Changing current policy has the greatest long-term implication of any action that a government can take to alter its future conditions. By doing so, it implies that the community is committed to providing an efficient multi-modal transportation network such that access, mobility, and safety needs of motorists, pedestrians, and bicyclists are accommodated.	Fall/Winter 2013
Launch Programs as New Projects are Built	BPAC	Planning Staff	Assist in the coordination of education and encouragement programs, such as Bicycle Month Activities.	Ongoing/ Beginning Fall 2013
Begin Semi-annual Meeting With Key Project Partners	Planning Staff	City/County Departments, NCDOT, BPAC, and local & regional stakeholders	Key project partners should meet on an semi-annual basis to evaluate the implementation of this Plan. Meetings could also occasionally include on-site tours of locations where facilities are recommended. TARPO meetings could also serve as an opportunity to coordinate.	Ongoing/ Beginning Fall-2013
Seek Multiple Funding Sources and Begin Facility Development	Planning Staff	Finance Director, BPAC	Chapter 2 contains recommended projects. See 2-7 through 2-53 for facility development options. See Chapter 5 for potential funding opportunities.	Ongoing/ Beginning Fall 2013
Design Orientation	Public Works and NCDOT Division 8	NCDOT Bike/Ped Division	Become familiar with the guidelines featured in Appendix B of this Plan, as well as state and national standards for bicycle facility design.	Fall 2013
Develop Bicycle Facility and Trail Specifications	Engineering Staff	Planning Staff	City staff could prepare these using the design guidelines in Appendix B.	Ongoing/ Beginning Fall 2013
Notify City/County Planning staff of all upcoming roadway reconstruction or resurfacing/ restriping projects, no later than the design phase.	Public Works Director, and NCDOT Division 8	Planning Staff, NCDOT Bike/ Ped Division, & NCDOT Lee County Maintenance Engineer	Provide sufficient time for comments. Incorporate pedestrian recommendations from this Plan. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Pedestrian Transportation for guidance on appropriate alternatives. Also, coordinate with the NCDOT Lee County Maintenance Engineer, on the Annual Resurfacing Plan's 3-year project list.	Ongoing/ Beginning Fall 2013

Task	Lead Agency	Support	Details	Phase
Develop a long term funding strategy	City Manager & Finance Director	Planning Staff & City Council	To allow continued development of the overall system, capital and Powell Bill funds for bicycle facility construction should be set aside every year, even if only a small amount (small amounts of local funding can be matched to outside funding sources). Funding for an ongoing maintenance program should also be included in the City's operating budget.	Spring 2014
Ensure planning efforts are being integrated regionally	Planning Staff	Regional planning organizations, neighboring municipalities, BPAC	Combining resources and efforts with surrounding municipalities, regional entities, and stakeholders is mutually beneficial, especially with trail development. Communicate and coordinate with the regional partners on regional trails and bicycle facilities and partner on joint-funding opportunities. After adoption by the City, this document should also be recognized in regional transportation plans.	Spring 2014
Apply for further Safe Routes to School Grants and Infrastructure Funding	Planning Staff	NCDOT Division 8 & BPAC	Establish 'bike-to-school' groups, 'walking school buses' or other similar activities for children through the Safe Routes to School Program. Inquire about pedestrian infrastructure funding for projects within 1.5 miles of schools through NCDOT Division 8.	Spring 2014
Explore possibility of a regional multi-modal coordinator	City Manager	Planning Staff, BPAC, regional planning organizations, and neighboring municipalities	Explore the possibility of partnership with neighboring municipalities or the RPO in hiring a regional Multi-Modal Transportation Coordinator	Spring 2015
Become familiar with the bicycle facility recommendations for NCDOT roadways in this Plan (Chapter 2); take initiative in incorporating this Plan's recommendations into the Division's schedule of improvements.	NCDOT Division 8	Planning Staff, NCDOT Bike/Ped Division	Construct and maintain all bicycle and pedestrian facilities using the highest standards allowed by the State (including the possibility of using innovative treatments on a trial-basis). Seek guidance and direction from the NCDOT Division of Bicycle and Pedestrian Transportation on issues related to this Plan and its implementation.	Ongoing

Page Intentionally Left Blank for Printing

Funding Resources 5

Overview

Due to the cost of most construction activities, it may be necessary to consider several sources of funding, that when combined, would support full project construction. This chapter outlines likely sources of funding for the identified projects at the federal, state, local government level and from the private sector. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing this Plan. The funding amounts, funding cycles, and even the programs themselves are susceptible to change without notice.

Chapter Contents

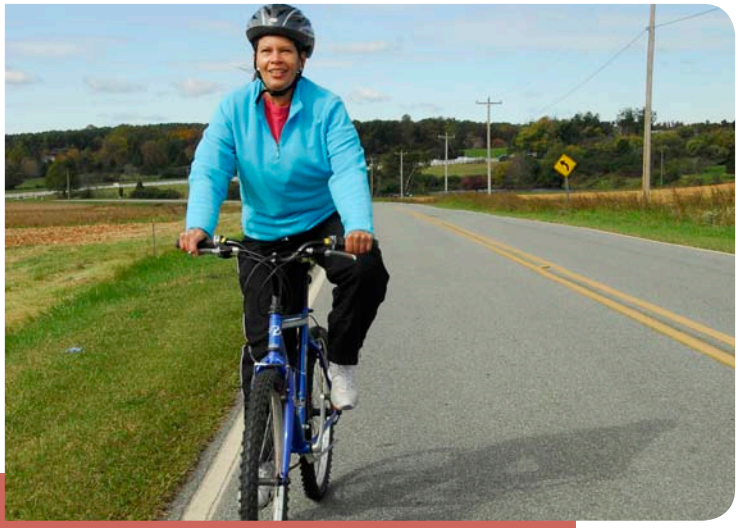
Federal Funding Resources

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets, where shortfalls may make it difficult to accurately forecast available funding for future project development. Federal funding typically requires a local match, but there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match. Since these funding categories are difficult to forecast, it is recommended that the City of Sanford and Lee County work with the Triangle Area Rural Planning Organization (RPO) on getting bicycle projects listed in the State Transportation Improvement Program (STIP), as discussed below.

Included in this section is a list of possible Federal funding sources that could be used to support construction of many bicycle and pedestrian improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits.

Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicycle and pedestrian is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.



Rural, low-volume roads offer cyclists a safe and comfortable place to ride.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.
There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. Unless the Governor of a given state chooses to opt out of Recreational Trails Program funds, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides $85 million nationally for the RTP.

Complete eligibilities for TA include:

1. Transportation Alternatives as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure

projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity.

For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

2. Recreational Trails. TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

   Recreational Trails Program funds may be used for:

   - Maintenance and restoration of existing trails
   - Purchase and lease of trail construction and maintenance equipment
   - Construction of new trails, including unpaved trails
   - Acquisition or easements of property for trails
   - State administrative costs related to this program (limited to seven percent of a State's funds)
   - Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds)
   - NC's dedicated annual RTC funds for 2012 total $1,506,344.

For funding levels in subsequent years, please visit: http://www.fhwa.dot.gov/MAP21/funding.cfm

3. Safe Routes to School. The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8).

   Eligible projects may include:

   - Engineering improvements. These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
   - Education and Encouragement Efforts. These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
   - Enforcement Efforts. These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, bicyclist and pedestrian sting operations.

4. Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways. At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Safe crossing areas at major intersections are an important element of a bicycle network.

Horner Boulevard,
Sanford, North Carolina

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations. Current projected obligations for NC are available at this website: http://www.fhwa.dot.gov/MAP21/funding.cfm. Note that state DOT's may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed on the website represents the maximum potential funding.

Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50% of each state's STP funds are suballocated geographically by population; the remaining 50% may be spent in any area of the state.

Highway Safety Improvement Program

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds.

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide,

and particulate matter which reduce transportation related emissions. States with no nonattainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible. The City of Sanford and Lee County are not currently in a nonattainment or maintenance area and therefore are not currently eligible for CMAQ funds.

New Freedom Initiative

MAP-21 continues a formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

More information: http://www.hhs.gov/newfreedom/

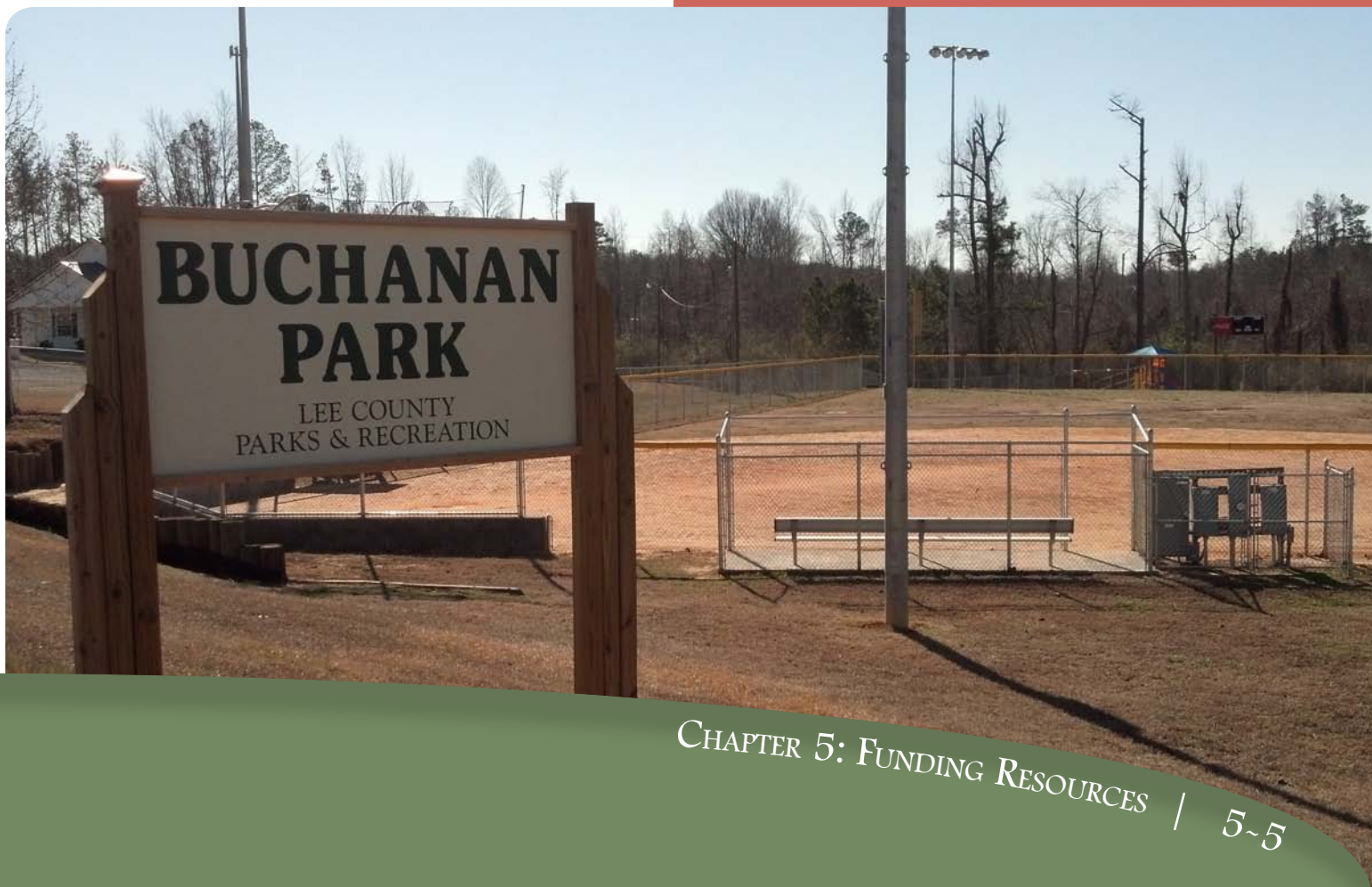
Pilot Transit-Oriented Development Planning

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to "facilitate multimodal connectivity and accessibility," and "increase access to transit hubs for pedestrian and bicycle traffic."

Federal Transit Administration Programs

Federal Transit Administration (FTA) funding is available for projects designed to improve access to transit. Individual grant programs vary on the specific goals, but eligible improvements include crossing improvements, pedestrian signals, sidewalks and trails. Programs of the FTA are described in the following section.

Buchanan Park,
Sanford, North Carolina



FTA Urbanized Area Formula Program

FTA capital/Operating grant for urbanized areas over 50,000. This grant can be used for pedestrian or bicyclist access to transit.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3561.html

Downtown streets with lower vehicle speeds offer cyclists a safe and comfortable place to ride.

FTA Rural Areas Formula Program

This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3555.html

FTA Job Access and Reverse Commute Projects

The FTA funds Job Access and Reverse Commute (JARC) projects under both the Urbanized Area Formula Program and the Rural Area Formula Program to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Capital, planning and operating expenses for projects that transport low income individuals to and from jobs and activities related to employment, and for reverse commute projects. In North Carolina, these funds have been granted for sidewalks and bicyclist/pedestrian crossing signals.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3550.html

FTA Enhanced Mobility of Seniors and Individuals with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3556.html

FTA Bus and Bus Related Facilities

This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3557.html

FTA Metropolitan and Statewide Planning Programs

These programs provide funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities include pedestrian or bicycle planning to increase safety for non-motorized users, and to enhance the interaction and connectivity of the transportation system across and between modes.

More information: http://www.fta.dot.gov/funding/grants/grants_financing_3563.html

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental

Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants).

North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to bicycle and/or pedestrian improvement efforts.

More information: http://www.epa.gov/smartgrowth/partnership/

Community Development Block Grant Funds

State level Community Development Block Grant Recovery (CDBG-R) funds are allocated through the NC Department of Commerce, Division of Community Assistance to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low- and moderate-income.

Federal CDBG grantees may "use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs."

State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. Some urban counties and cities in North Carolina receive CDBG funding directly from HUD.

Each Year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. Approximately $50 million is available statewide to fund a variety of projects.

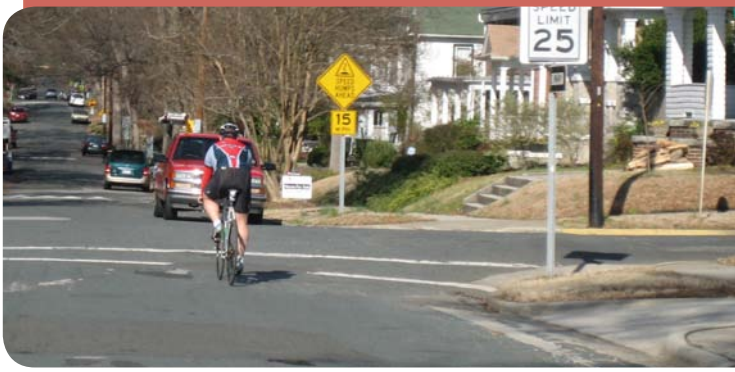
More information: http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/CommunityDevelopmentBlockGrants/

Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are $250,000. The local match may be provided with in-kind services or cash.

More information: http://www.ncparks.gov/About/grants/lwcf_main.php

Neighborhood streets can provide alternative routes for cyclists who wish to avoid arterial roads.



Wicker Street,
Downtown Sanford, North Carolina

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source.

More information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507-5691

National Scenic Byways Discretionary Grant Program

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.
Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction.

More information: http://www.bywaysonline.org/grants/

Federal Lands Highway Program

The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands. Funding for pedestrian or bicycle improvements is available through the Public Lands Highway – Discretionary, and Forest Highways Programs.

Department of Energy

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants may

be used to reduce energy consumptions and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future.

More information: http://www.eecbg.energy.gov

Public Lands Highway - Discretionary

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction of improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities.

More information: http://flh.fhwa.dot.gov/programs/plh/discretionary/

Moore Street,
Downtown Sanford, North Carolina

State Funding Resources

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program

NCDOT's Policy to Projects process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff, to determine transportation priorities. This approach ranks projects for all modes of transportation in priority order, based on the department's goals and also determines which projects are included in the department's State Transportation Improvement Program (STIP), a federally mandated transportation planning document that details transportation improvements prioritized by stakeholders for inclusion in the Work Program over the next seven years. The STIP is updated every two years.

The STIP contains funding information for various transportation divisions of NCDOT including: highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program. Access to many federal funds require that projects be incorporated into the STIP. The STIP is the primary tool NCDOT uses to allocate state and federal funding to projects, making it the largest single avenue for securing project funding.

To access the STIP: http://www.ncdot.org/planning/development/TIP/TIP/. For more about the STIP process: http://www.ncdot.org/performance/reform/

Bicycle lanes and center medians can create an enhanced gateway area into downtown Sanford.

Spot Safety Program

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues.

The program is funded with state funds and currently receives approximately $9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is $250,000.

The Spot Safety Program targets hazardous locations for expedited low cost safety improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on bicyclists, pedestrians and schools, division and region priorities, and public interest.

More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

High Hazard Elimination Program

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded

with 90% federal funds and 10% state funds. The cost of Hazard Elimination Program projects typically ranges between $400,000 and $1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STIP).

More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

NCDOT Discretionary Funds

The Statewide Discretionary Fund is administered by the Secretary of the Department of Transportation. This $10 million fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for consideration, by the Secretary upon direct appeal from a North Carolina jurisdiction.

NCDOT Contingency Fund

The Statewide Contingency Fund is a $10 million fund administered by the Secretary of Transportation. The Division Engineer elicits written requests from municipalities, counties, businesses, schools, citizens, legislative members and NCDOT staff. The appeals are reviewed on their merits by the Contingency and Small Urban Funds Committee, which makes recommendations for funding to the Secretary. Written requests must provide technical information such as justification, location, improvements being requested, timing, etc., for thorough review.

More information: http://www.ncdot.gov/doh/preconstruct/traffic/teppl/Topics/F-19/F-19_mm.pdf

Small Urban Funds

Each NCDOT Highway Division administers $2 million of funds for small-scale improvement projects in urban areas. Projects must be within 2 miles of city limits and have a maximum cost of $250,000. Requests for small urban funds may be made by municipalities, counties, businesses, school and industrial entities. A written request should be submitted to the Division Engineer providing technical information such as justification, location, improvements being requested, timing, etc., for thorough review.

American Tobacco Trail,
Durham, North Carolina

Spot Improvement Program

The Division of Bicycle and Pedestrian Transportation (DPBT) budgets $500,000 per year for "spot" safety improvements throughout North Carolina. Eligible improvements include drain grate replacement, bicycle loop detectors, pedestrian signals and other small-scale improvements. These funds are used for small-scale projects not substantial enough to be included in the STIP. Proposals should be submitted directly to the Division of Bicycle and Pedestrian Transportation.

Small Construction Funds

The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the state. There is a $250,000 maximum amount per request per fiscal year. Any project with a total cost greater than $150,000 requires a resolution or a letter of support for the project from the local jurisdiction.

More information: http://www.nctransportationanswers.org/ourforms/SMALLCONSTRUCTIONFORM.pdf

Hawkins Avenue,
Sanford, North Carolina

Governor's Highway Safety Program

The Governor's Highway Safety Program (GHSP) funds safety improvement projects on state highways throughout North Carolina. All funding is performance-based. Substantial progress in reducing crashes, injuries and fatalities is required as a condition of continued funding. This funding source is considered to be "seed money" to get programs started. The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends. State Highway Applicants must use the web-based grant system to submit applications.

More information: http://www.ncdot.org/programs/ghsp/

Bicycle and Pedestrian Planning Grant Initiative

The Bicycle and Pedestrian Planning Grant Initiative is a matching grant program administered through NCDOT that encourages municipalities to develop comprehensive bicycle plans and pedestrian plans. The Division of Bicycle and Pedestrian Transportation (DPBT) and the Transportation Planning Branch (TPB) sponsor this grant. All North Carolina municipalities are eligible and are encouraged to apply. Funding allocations are determined on a sliding scale based on population. Municipalities who currently have bicycle plans or pedestrian plans, either through this grant program or otherwise, may also apply to update their plan provided it is at least five years old.

More information: http://www.ncdot.gov/bikeped/planning/

Incidental Projects

Bicycle and pedestrian accommodations such as bike lanes, sidewalks, intersection improvements, widened paved shoulders and bicycle and pedestrian-safe bridge design are frequently included as incidental features of highway projects. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds and with a local fund match.

Road Resurfacing

When space allows the inclusion of a bicycle lane onto a road without requiring significant drainage, Right-of-Way, or grading work, NCDOT can install the improvement during road resurfacing projects. If a project is feasible, the NCDOT can inform the affected community and offer them the opportunity to contribute to the marginal cost associated with these improvements.

Eat Smart, Move More North Carolina Community Grants

The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to support their efforts to develop community-based interventions that encourage, promote and facilitate physical activity. The current focus of the funds is for projects addressing youth physical activity. Funds have been used to construct trails and conduct educational programs.

More information: http://www.eatsmartmovemorenc.com/Funding/CommunityGrants.html

The North Carolina Parks and Recreation Trust Fund (PARTF)

The Parks and Recreation Trust Fund (PARTF) provides dollar-for-dollar matching grants to counties, incorporated municipalities and public authorities, as defined by G.S. 159-7. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. A local government can request a maximum of $500,000 with each application. An applicant must match the grant dollar-for-dollar, 50% of the total cost of the project, and may contribute more than 50%. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match.

More information: http://www.ncparks.gov/About/grants/partf_main.php

The North Carolina Division of Parks and Recreation

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking and horseback riding to river trails and off-highway vehicle trails.

More information: http://www.ncparks.gov/About/grants/main.php

Recreational Trails Program

The Recreational Trails Program (RTP) of the federal transportation bill provides funding to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, and equestrian use. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

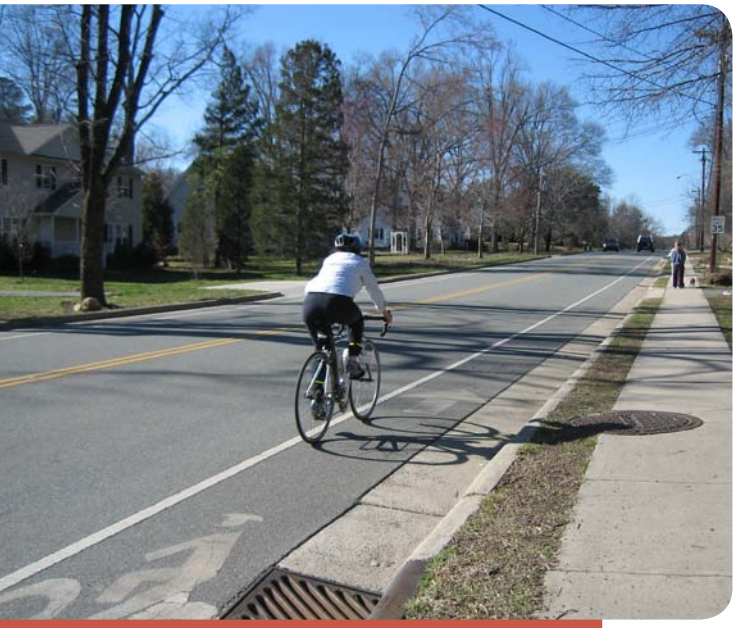
Elm Street,
Sanford, North Carolina

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a state's RTP dollars)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state's RTP dollars)

In North Carolina, the Recreational Trails Program is administered by the North Carolina Division of Parks and Recreation. This grant is specifically designed to pay for recreational trail projects rather than utilitarian transportation-based projects. Grants up to $75,000 per project, and applicants must be able to contribute 20% of the project costs with cash or in-kind contributions. Projects must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP).

More information: http://www.ncparks.gov/About/trails_grants.php



Bicycle lane striping should be included as part of the repaving schedule for collector roadways in Sanford.

Adopt-A-Trail Program

The Adopt-A-Trail (AAT) Program is a source of small funds for trail construction, maintenance, and land acquisition for trails. The program funds $108,000 annually in North Carolina, and awards grants up to $5,000 per project with no local match required. Applications are due in February. More information is available from Regional Trails Specialists and the Grants Manager.

More information: http://www.ncparks.gov/About/grants/docs/AAT_info.pdf

Powell Bill Funds

Annually, Powell Bill State street-aid allocations are made to incorporated municipalities that establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding allocations are based on population and mileage of town-maintained streets.

More information: http://www.ncdot.org/programs/Powell_Bill/

Clean Water Management Trust Fund (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each year, a minimum of $30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits.

More information: http://www.cwmtf.net/#appmain.htm

State Administered Community Development Block Grants

State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways, bicycle and pedestrian improvements that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects.

More information: www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ or (919) 733-2853

North Carolina Health and Wellness Trust Fund

The North Carolina Health and Wellness Trust Fund (HWTF) in partnership with Blue Cross and Blue Shield of North Carolina (BCBSNC) offers the Fit Community Grants, designed to help communities become Fit Community designees. Up to eight communities that demonstrate a compelling need, proven capacity and promising opportunity for policy and environmental change in addressing physical activity and/or healthy eating behaviors will be awarded two-year grants up to $60,000 each.

More information: http://www.fitcommunitync.org

Urban and Community Forestry Grant

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between $1,000 and $15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c)(3) organizations and other tax-exempt organizations. First-time municipal applicant and municipalities seeking Tree City USA status are given priority for funding.

For more about Tree City USA status, including application instructions, visit: http://ncforestservice.gov/Urban/urban_grant_overview.htm

Shared lane marking, Seattle, Washington

Buchanan Park,
Sanford, North Carolina

Local Government Funding Resources

Municipalities often plan for the funding of bicycle and pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing bicycle projects are described below. However, many will require specific local action as a means of establishing a program, if not already in place.

Capital Reserve Fund

Municipalities have statutory authority to create capital reserve funds for any capital purpose, including bicycle and pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants and donations for the specified use.

Capital Project Ordinances

Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

Local Improvement Districts (LIDs)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

Municipal Service District

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the citywide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can

include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

Tax Increment Financing

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it.

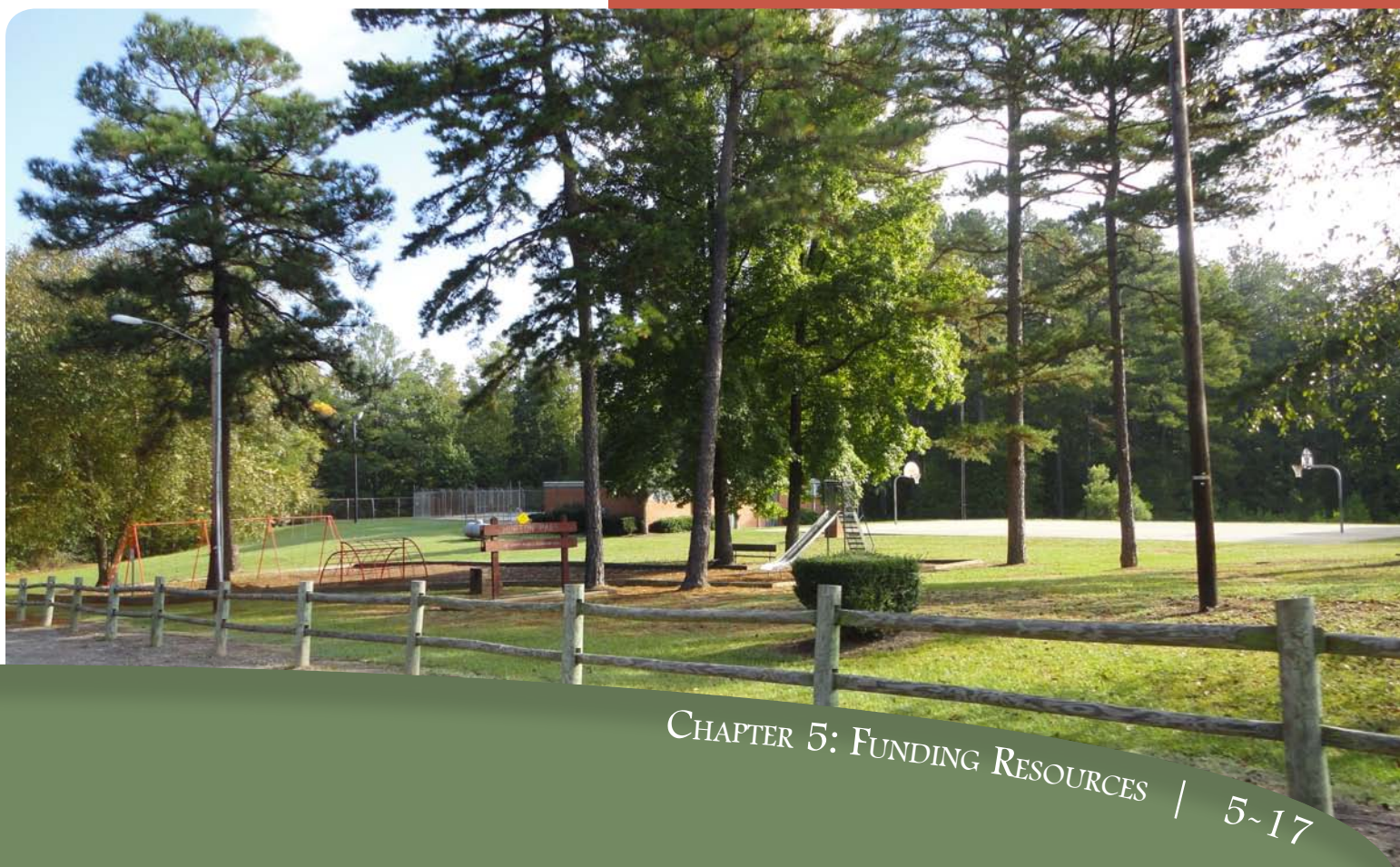
Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment or lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

Taxes

Many communities have raised money for general transportation programs or specific project needs through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one- cent sales tax increase, which provided an additional $5 million for the development of the

Horton Park,
Sanford, North Carolina



overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

Sales Tax

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

Mini traffic circles slow vehicular traffic and enhance neighborhood streetscapes.

Property Tax

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

Excise Taxes

Excise taxes are taxes on specific goods and services. These taxes require special legislation and funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

Occupancy Tax

The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

Fees

A variety of fee options have been used by local jurisdictions to assist in funding pedestrian and bicycle improvements. Enabling actions may be required for a locality to take advantage of these tools.

Stormwater Utility Fees

Greenway trail property may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.
Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and create a need for stormwater management services. Thus, users with more impervious surface are charged more for

stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services.

Streetscape Utility Fees

Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per-foot fee based on the length of frontage streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

Impact Fees

Developers can be required to pay impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth so that "growth pays its own way."

In North Carolina, impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or off-site bicycle improvements that will encourage residents/tenants to walk or use transit rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

Sanford Criterion
Sanford, North Carolina

Exactions

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or bicycle facility that crosses through the property, or adjacent to the property being developed.

In-Lieu-Of Fees

As an alternative to requiring developers to dedicate on-site greenway or bicycle facility that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off-site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls short of qualitative interests.

Bonds and Loans

Bonds have been a very popular way for communities across the country to finance their pedestrian, bicycle and

Downtown Sanford, North Carolina

greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of its bicycle and trail system.

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues from a specific local government activity. The entity issuing bonds pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

General Obligation Bonds

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. The local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges.

However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of pedestrian and bicycle facilities. Voter approval is required.

Special Assessment Bonds

Special assessment bonds are secured by a lien on the property that benefits from the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners

in the assessment area.

State Revolving Fund Loans

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

Endor Iron Furnace Greenway,
Sanford, North Carolina

Private/Non Profit Foundation and Organization Funding Resources

Many communities have solicited greenway, bicycle and pedestrian infrastructure funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available in North Carolina.

Wayfinding signage, Wilmington, North Carolina

Land for Tomorrow Campaign

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to reject legislation that threatens to reduce funding of conservation focused trust funds. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for many generations. In 2011, the Land for Tomorrow Campaign suffered an 85 percent budget cut and future program funding is uncertain.

More information: http://www.landfortomorrow.org/

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

For more information about what types of projects are funded and how to apply, visit http://www.rwjf.org/grants/

North Carolina Community Foundation

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organization and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, which makes grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide.

More information: http://www nccommunityfoundation.org/Grants

Walmart State Giving Program

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/ economic opportunity, health and wellness, and

environmental sustainability. Both programmatic and infrastructural projects are eligible for funding. State Giving Program grants start at $25,000, and there is no maximum award amount. The program accepts grant applications on an annual, state by state basis January 2nd through March 2nd.

Online resource: http://walmartstores.com/CommunityGiving/8168.aspx?p=8979

The Rite Aid Foundation Grants

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis. A wide array of activities are eligible for funding, including infrastructure and programmatic projects.

Online resource: http://www.riteaid.com/company/community/foundation.jsf

Z. Smith Reynolds Foundation

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to offer support in other areas of open space and greenways development.

More information is available at http://www.zsr.org

Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low- and moderate-income communities and serves to encourage entrepreneurial business development.

More information: http://www.bankofamerica.com/foundation

Duke Energy Foundation

Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business "sponsor"
- A clear business reason for making the contribution

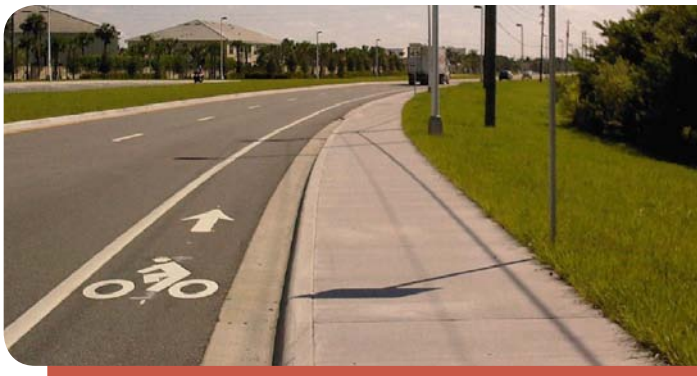
The grant program has three focus areas: Environmental and Energy Efficiency, Economic Development, and Community Vitality. The Foundation can support programs that support conservation, training and research around environmental and energy efficiency initiatives.

More information: http://www.duke-energy.com/community/foundation.asp

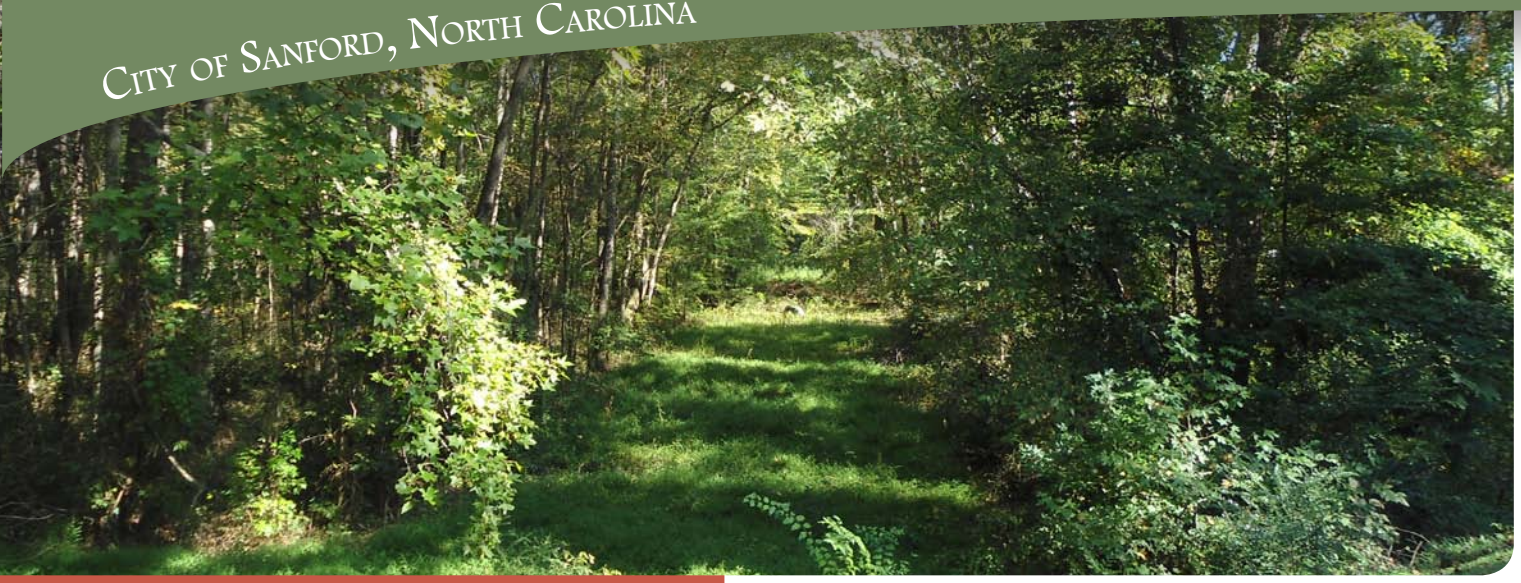
American Greenways Eastman Kodak Awards

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. Currently, the grant program is on hold until further notice.

More information: http://www.conservationfund.org/kodak_awards



Bicycle lanes are an affordable facility type for roadways with existing adequate width.



Existing sewer easement near Wicker Street.
Sanford, North Carolina

National Trails Fund

American Hiking society created the National Trails Fund in 1998 as the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting, and maintaining foot trails in America. The society provides funds to help address the $200 million backlog of trail maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails that will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects, including volunteer recruitment and support.

More information: http://www.americanhiking.org/

The Conservation Alliance

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation - groups like Southern Utah Wilderness Alliance, Alliance for the Wild Rockies, The Greater Yellowstone Coalition, the South Yuba River Citizens' League, RESTORE: The North Woods and the Sinkyone Wilderness Council (a Native American-owned/operated wilderness park). For these groups, who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about $35,000 each), and have often made the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has contributed $4,775,059 to grassroots environmental groups across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed-all through grassroots community efforts.

The Conservation Alliance is a unique funding source for grassroots environmental groups. It is the only environmental grant maker whose funds come from a potent yet largely untapped constituency for protection of ecosystems - the non-motorized outdoor recreation industry and its customers. This industry has great incentive to protect the places in which people use the clothing, hiking boots, tents and backpacks it sells.

The industry is also uniquely positioned to educate outdoor enthusiasts about threats to wild places, and engage them to take action. Finally, when it comes to decision-makers - especially those in the Forest Service, National Park Service, and Bureau of Land Management, this industry has clout - an important tool that small advocacy groups can wield.

The Conservation Alliance Funding Criteria: The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation. The Alliance does not look for mainstream education or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.

More information: http://www.conservationalliance.com/grants

BlueCross BlueShield of North Carolina Foundation

BlueCross BlueShield (BCBS) focuses on programs that use an outcome approach to improve the health and well being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant funds projects that enhance the physical environment to create spaces and places for physical activity. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide an audit.

More information: http://www.bcbsncfoundation.org/grants/

Annual Azalea Celebration

NC Beautiful has promoted environmental education, beautification, and stewardship in North Carolina for 40 years and holds the Annual Azalea Celebration to help non-profit organizations enhance their community spaces. Winning applicants receive 100 azalea plants free of charge to beautify school- and church grounds, parks, greenways, public rights-of-way, and community and senior centers. In addition, recipients who sustain their projects and keep their azaleas healthy for a 3-year period are eligible to receive cash awards and additional plants through the A.J. Fletcher Award.

More information: http://www.ncbeautiful.org/programs/celebration.html

Charlotte Avenue,
Sanford, North Carolina

Bikes Belong Grants

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists.

Applicants can request a maximum amount of $10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years.

A new Bikes Belong opportunity is Community Partnership Grants. These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of facilities such as bike lanes, trails, and paths. The lead organization must be a non-profit organization with IRS 501(c)3 designation or a city or county government office.

More information: http://www.bikesbelong.org/grants/

The Cinergy Foundation

The Cinergy Foundation places special emphasis on projects that help communities help themselves. The Foundation supports local community, civic and leadership development projects. The Cinergy Foundation also views community foundations as positive vehicles for sustaining the long-term health of a community and promoting philanthropic causes. Infrastructure needs by a community will not be considered.
The Cinergy Foundation supports health and social service programs which promote healthy life styles and preventative medical care. United Way campaigns are included in Health and Social Services funding.

More information: http://www.cinergy.com/foundation/categories.asp

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Valuable in-kind gifts include donations of services, equipment, labor, or reduced costs for supplies.

Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and / or projects.

Private Individual Donations

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

Fundraising / Campaign Drives

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

Volunteer Work

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor, pedestrian or bicycle facility. Furthermore volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming

needs. education or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.

Web site: www.conservationalliance.com/index.m.

E-mail: john@conservationalliance.com.

National Fish and Wildlife Foundation (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, nonprofit, tax-exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.
The Foundation awards matching grants under its Keystone Initiatives to achieve measurable outcomes in the conservation of fish, wildlife, plants and the habitats on which they depend. Awards are made on a competitive basis to eligible grant recipients, including federal, tribal, state, and local governments, educational institutions, and non-profit conservation organizations. Project proposals are received on a year-round, revolving basis with two decision cycles per year. Grants generally range from $50,000-$300,000 and typically require a minimum 2:1 non-federal match.

Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

Website: http://www.nfwf.org/AM/Template.cfm?Section=Grants where additional grant programs are described.

The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

- Create urban parks, gardens, greenways, and riverways
- Build livable communities by setting aside open space in the path of growth
- Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:

- Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
- Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.
- Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
- Research and Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.
- Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. For more information, visit www.tpl.org/.

Railroad House,
Sanford, North Carolina

Benefits of a Bicycle Friendly Community 6

Overview

When considering the level of dedication in time and valuable resources that it takes to create a lively and bikeable community, it is also important to assess the immense value of alternative transportation modes. A bicycle-friendly community in Sanford and Lee County will help to improve the health and fitness of residents, transportation options, the local economy, and environmental conditions while contributing to a greater sense of community – and fun! Scores of studies from the fields of public health, urban planning, urban ecology, real estate, transportation, and economics consistently affirm the value of supporting bicycling as it relates to these issues. Small towns, big cities, and entire regions across the United States and throughout the world are implementing strategies for creating bicycle-friendly communities, and have been doing so for many years. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of bicycling.

Chapter Contents

Health and Physical Activity

A growing number of studies show that the design of our communities and the built environment—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). According to the Centers for Disease Control and Prevention (CDC), "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic."[1] The increased rate of disease associated

with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments. Sanford and Lee County are representative of the health challenges facing the State of North Carolina. According to the CDC Behavioral Risk Factors Surveillance System, more than half of North Carolina adult residents (65.3 percent) is overweight or obese and 53.6 percent of the adult population is physically inactive.[2]

The CDC has determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week.[3] This is significant considering that for people who are inactive, even small increases in physical activity

SanLee Road,
Sanford, North Carolina

can bring measurable health benefits. Establishing a safe and reliable bicycle network in Sanford will positively impact the health of local residents. The Rails-to-Trails Conservancy puts it simply: "Individuals must choose to exercise, but communities can make that choice easier."[4]

Walking and bicycling are some of the most basic forms of physical activity, and the construction of a dedicated path separated from motorized traffic for these activities would help to better connect communities to convenient recreation and exercise options. These connections also make it possible to take short trips without needing to get in the car, thereby incorporating physical activity into daily life. Regular physical activity such as bicycling and walking:

- Reduces the risk and impact of cardiovascular disease and diabetes
- Reduces the risk of some types of cancer
- Controls weight
- Improves mood
- Reduces the risk of premature death

The CDC reports that "30 minutes of moderately intense exercise" is equivalent to:

- 1.5 miles of walking; or
- 5 miles of bicycling; or
- 1 less slice of pizza.

Transportation Choices

A National Household Travel Survey found that roughly 40% of all trips taken by car are less than two miles.[5] By replacing short car trips with bicycle trips, residents have a significant positive impact on local traffic and congestion. Traffic congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress in drivers. Substituting bicycling for some of these trips relieves the congestion, benefiting all road users. In addition, an improved bicycle network provides greater and safer mobility for residents who do not have access to a motor vehicle.

Based on the U.S. Census Bureau's 2006-2012 ACS data, as high as 44.8 percent of the households in several Census Block Groups do not have access to a vehicle. American demographics show that typically around 30% of a community's population do not or cannot drive or own a car due to age (under 16), physical or mental disabilities or old age, and/or income. Bicycling for transportation is an important option for these populations, especially those with more than one working family member. There is a small percentage (between 1%-2%) of Sanford residents that are already taking advantage of the transportation benefits of bicycling.

Taking short trips by foot or by bike can help to

greatly reduce motor vehicle miles driven and traffic congestion. Under the Nonmotorized Transportation Pilot Program, bicycling and walking investments averted an estimated 32 million driving miles in four pilot communities between 2007 and 2010. These individual changes in travel behavior can add up to produce significant societal benefits. An individual who shifts 160 annual trips (about three per week) averaging 2.4 miles from driving to bicycling reduces congestion costs to other road users by approximately $216 in urban areas and about $108 in rural settings. Traffic on arterials and other streets can be mitigated as people use the network of existing sidewalks, new bikeways and trails to access more destinations. Parking lots can also be made less congested by reducing crowding, circling, and waiting for open spots.

Affordable Transportation Options & Cost-Efficient Projects

Walking and bicycling are also among the most affordable forms of transportation. According to an annual study conducted by the American Automobile Association (AAA), the average cost of owning and operating one car for one year is $8,946, while walking is virtually free and owning and operating a bicycle for one year costs approximately $120. In addition to the personal savings costs of walking and bicycling, these transportation options also produce a number of benefits for other drivers and society as a whole. A study from the Victoria Transport Policy Institute found that replacing a single car trip with a bike trip saves individuals and society $2.73 per mile in gas costs, congestion reduction, vehicle cost savings, roadway cost savings, parking cost savings, energy conservation, air pollution reduction, and traffic safety improvements. These benefits and the relatively low construction and maintenance costs make walking and bicycling projects some of the most cost-effective transportation investments possible. For the cost of 1 mile of four-lane urban highway ($50 million), an entire network of facilities for a mid-sized city could be built, providing feasible travel options that increase the overall efficiency of our transportation system.

The average annual cost of a gym membership is about $480 to $600.[6] Bicycling for transportation becomes even more attractive from an individual's standpoint when the unstable price of gas is factored into the equation (e.g., in January 2013, the national average price for gasoline was $3.30 a gallon).[7] Whether bicycling for transportation, fun, or exercise, bicyclists who are physically active on a regular basis can avoid costly medical expenses in the long run, and can avoid the cost of gym memberships in the short run.

According to the U.S. Census Bureau, there are more than 60 million Americans who do not drive because they are not old enough. Another 30 million adults are not licensed to drive for a variety of reasons including economics, age, disability and choice. Eight million Americans above the age of 60 do not have a driver's license,and there are other licensed drivers who choose not to drive. If there are 90+ million non-drivers in the United States then providing a comprehensive bicycle network to increase mobility for these 90+ million non-drivers will offer a safe, efficient and desirable place to ride a bike, enhance environmental conditions, decrease traffic congestion, improve overall health and contribute to a greater sense of community.

Spring Lane,
Sanford, North Carolina

Carthage Street,
Sanford, North Carolina

Economic Development

The economic benefits of bicycling are being realized in cities throughout the country and the Southeast. From mountain biking destinations to cyclist touring routes, from bike shop businesses to premier special events, bicycling can have a significant impact on a local economy. For example, Greenville, SC has seen a dramatic increase in the number of bike shops that exist and in bike shop sales in the last five years. In a 2011 survey, nearly every shop owner identified the City's Bicycle Friendly Community initiative to be a leading contributor to that growth.[8] Additionally, the Augusta, GA area estimates the economic impact of cycling-related sporting events in just the last three years (2009-2011) to total $15.5 million. As one example, the region hosted the 2010 International Mountain Bike Association (IMBA) Summit in 2010, which brought nearly $0.5 million in local spending.[9]

Beyond bicycle shops, bicycle rentals, and major cycling events, there are others ways that communities are benefiting economically from investments in bicycling.

Energy Conservation and Independence

According to the National Association of Realtors and Transportation for America, 89 percent of Americans believe that transportation investments should support the goal of reducing energy use. The transportation sector currently accounts for 71 percent of all U.S. petroleum use, with 40 percent of daily trips made within two miles or less and 28 percent less than a mile. Providing alternative modes of travel has the potential to reduce dependency on foreign oil and promote more energy-efficient transportation choices in communities. Most of the short trips made in the U.S. and in North Carolina are single-occupancy vehicle trips and in Sanford and Lee County, those trips could be made by bike if there were additional safe bicycle facilities developed.

The benefits of fully accommodating bicyclists and increased rates of bicycling are diverse and substantial. While increased safety for bicyclists is the most apparent benefit to many, a comprehensive bicycle network that allows for safe bicycling reduces the collision risk for all users and contribute valuable health, economic, transportation, and stewardship benefits to residents of Sanford and Lee County, and the State of North Carolina as a whole.

Bicycle Tourism

Investments in the bicycling environment can lead to increases in bicycling tourism. Communities are realizing the economic potential of bicycle facilities as highly desirable destinations that bring dollars into the places they serve. In addition

to preserving critical open space and providing important transportation options, bicycle networks that include greenway trails attract visitors from near and far—visitors who facilitate job growth in tourism-related opportunities like restaurants, local stores and lodging.

The Sanford Criterium/Fitness Fest:
"Fitness Fest began as a bicycle race or criterium. The popular annual event was launched by Sanford physician Parker McConville, who had seen similar events spring up in Moore County and Chapel Hill. 2013 is the sixth year for the event and Fitness Fest has become more than just a bike race.

It draws hundreds of cyclists to compete in a series of races in a closed-off section of downtown Sanford. In addition, several hundred local runners and their families compete in the 5k Run/Walk, 10k Run, Kids Fun Run and Kids Bike Race. There is something for everyone: bounce houses, a rock climbing wall, food, crafts, and more occur simultaneously between 9:30 a.m.- 4:30 p.m. Proceeds from Fitness Fest are donated to several local charities".[10]

In the Outer Banks, NC, bicycling is estimated to have a positive annual economic impact of $60 million; 1,407 jobs are supported by the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area. The annual return on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment.[11] Even though there are substantial differences between the City of Sanford and the Outer Banks (such as beach access and available lodging), Sanford could still achieve positive economic gains proportional to its own attractions and its own future investments in community wide bicycle facilities. The quality of bicycling in the Outer Banks region positively impacts vacationers' planning—it is not all about the beaches:

- 12% of vacationers report staying three to four days longer to bicycle
- 43% of vacationers report that bicycling is an important factor in their decision to come to the area
- 53% of vacationers report that bicycling will strongly influence their decision to return to the area in the future.[12]

In terms of tourism, Sanford has the benefit of its proximity to the Triangle area, the Endor Iron Furnace historic site, the Deep River, future regional connections planned to the Deep River State Park and scenic, low-

Cemetery Road,
Sanford, North Carolina

volume rural roads that are already popular with existing cyclists from around the region. As Sanford expands its attractive network of trails, bikeways, and bicycle routes, the City will win over some bicycle-related tourism from other regions, and attract new tourists as an easily accessible bicycling destination.

Real Estate Values

From a real estate standpoint, consider the positive impact of greenway trails, which are essential components of a complete bicycle network. According to a 2002 survey of homebuyers by the National Association of Home Realtors and the National Association of Home Builders, trails ranked as the second most important community amenity out of a list of 18 choices.[13] Additionally, the study found that 'trail availability' outranked 16 other options including security, ball fields, golf courses, parks, and access to shopping or business centers. Findings from the American Planning Association (How Cities Use Parks for Economic Development, 2002), the Rails-to-Trails Conservancy (Economic Benefits of Trails and Greenways, 2005), and CEO's for Cities (Walking the Walk: How Walkability Raises Home Values in U.S. Cities, 2009) further substantiate the positive connection between greenway trails and property values across the country.

Dennis Wicker Civic Center
Sanford, North Carolina

Environmental Improvements

As demonstrated by the Southern Resource Center of the Federal Highway Administration, when people get out of their cars and onto their bicycles, they reduce measurable volumes of pollutants.[14] Other environmental impacts include a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes. Greenway trails are also part of an attractive bicycle network, conveying unique environmental benefits. Greenway trails protect and link fragmented habitat and provide opportunities for protecting plant and animal species. As part of the comprehensive bicycle network, they connect places without the use of emission-producing vehicles, while also reducing air pollution by protecting large areas of plants that create oxygen and filter pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. Finally, greenway corridors can improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

Quality of Life

Many factors go into determining quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community.

Communities with bikeway and trail amenities can attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is positively impacted by bicycling through the increased social connections that take place by residents being active, talking to one another and spending more

time outdoors and in their communities. According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years.[15] All but the most fortunate seniors will confront an array of medical and other constraints on their mobility even as they continue to seek both an active community life, and the ability to age in place. Off-road trails built as part of the bicycle transportation network generally do not allow for motor vehicles; however, they do accommodate motorized wheelchairs, which is an important asset for the growing number of senior citizens who deserve access to independent mobility. For those seniors who remain very ambulatory, off-road trails provide an excellent and safe opportunity for exercise and fitness.

Children under 16 are another important subset of our society who deserve access to safe mobility and a higher quality of life. According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students between 5 and 15 walked or biked to or from school.[16] According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods."[17]

In a 2004 CDC survey, 1,588 adults answered questions about barriers to walking to school for their youngest child aged 5 to 18 years.[18] The main reasons cited by parents included distance to school, at 62%, and traffic-related danger, at 30%. A network of bikeways in Sanford could reduce the travel distance from homes to schools, and overall bicycle improvements can improve the safety of our roadways. The availability of a good bicycle network has become a hallmark of a community with a high quality of life – one of the reasons that they are almost always included in new planned communities.

The creation of a safe bicycle facility network will serve as a link to the outdoors, providing residents of Lee County easily accessible opportunities for community-building, recreation, education, exercise and transportation. Bikeways and greeway trails are facilities that are available to all income groups, all neighborhoods, all community groups, regardless of background and experiences. Many residents will take pride in the facilities, as they will become part of their daily, weekly or monthly lives, and will allow residents to access basic needs and interact with neighbors without automobile dependence.

Connecting downtown Sanford to the Endor Iron Furnace historic site through the expansion of the existing greenway trail network will bring the historic site back to life. At one time, Endor Iron Furnace had a positive impact on the region's economy, and greenway trail users will have a chance to rediscover the regional history of the built and natural environments by traveling to the site and reading historical information that should be included along the greenway trail as interpretive educational signage. A greenway trail can also serve as a hands-on environmental classroom for people of all ages to learn historical information, experience natural landscapes, furthering environmental awareness. Local schools and community groups will be able incorporate outdoor learning activities into their curriculums and expose children to the experience of outdoor education. Outdoor classrooms also provide alternatives for all to gain a better knowledge of what natural resources are and to understand the interconnectedness of these resources. Opportunities are available in an outdoor classroom to educate youth on the importance of taking care of the environment.[19]

Footnotes from "Benefits of a Bicycle Friendly Community"

1. http://www.cdc.gov/healthyplaces/healthtopics/physactivity.htm
2. http://www.eatsmartmovemorenc.com/Data/Texts/Quick%20Facts.pdf
3. Centers for Disease Control and Prevention. Physical Activity for Everyone: Guidelines: Adults. http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html
4. http://www.railstotrails.org/resources/documents/resource_docs/HealthandWellness.pdf
5. http://www.bikeleague.org/resources/why/environment.php
6. http://www.cnbc.com/id/26663228/The_True_Cost_of_Gym_Memberships
7. http://newsroom.aaa.com/2013/01/gas-prices-aaa%E2%80%99s-fuel-gauge-report-january-14-2013/
8. City of Greenville Bicycle Master Plan, 2011
9. Alta Planning + Design phone interview with the Augusta Sports Council, 2011
10. http://www.sanfordfitnessfest.com/#!about-us
11. http://www.ncdot.gov/bikeped/download/bikeped_research_eiafulltechreport.pdf
12. http://www.ncdot.gov/bikeped/download/bikeped_research_eiafulltechreport.pdf
13. National Association of Realtors. (2011). The 2011 Community Preference Survey: What Americans are looking for when deciding where to live. Retrieved from: http://www.stablecommunities.org/sites/all/files/library/1608/smartgrowthcommsurveyresults2011.pdf
14. Federal Highway Administration, Southern Resource Center. (1999). Off-Mode Air Quality Analysis: A Compendium of Practice
15. Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization
16. US EPA. (2003). Travel and Environmental Implications of School Siting
17. National Center for Safe Routes to School (2006). National Center for Safe Routes to School Talking Points
18. Centers for Disease Control and Prevention. The Importance of Regular Physical Activity for Children. Accessed 9/16/05 at http://www.cdc.gov/nccdphp/dnpa/kidswalk/health_benefits.htm
19. Creig C. Kimbro. Developing an Outdoor Classroom to Provide Education Naturally. UT Extension Agent.

Public Outreach & Engagement A

Overview

Public engagement involved numerous components to spread awareness of the Comprehensive Bicycle Transportation Plan and to ensure a variety of local perspectives containing essential insight were appropriately incorporated into the plan. Various mediums and resources were constructed so that all members of Sanford, Lee County, and the surrounding areas had the opportunity to participate. Some people prefer or only have the resources to communicate in person, in writing, and/or electronically. The public engagement component included the following:

1. Steering Committee Meetings
2. Public Outreach Events
3. Project Information Resources
    - Project website with Hispanic Community outreach section
    - Project comment forms in English and Spanish
    - Project information cards in English and Spanish
    - Static informational project display board

Appendix Contents

Steering Committee Meetings

The Steering Committee was involved throughout the planning process. During the kick-off meeting, the group reviewed and provided feedback on the project

Interested citizens stopped by the Comprehensive Bicycle Transportation Plan booth during the Jubilee in October of 2012, to learn about the project and provide input on unsafe areas for bicycling.

website, project comment form, established a mission statement and goals for the plan, and discussed the timeline and schedule of the planning process. Members of the Steering Committee worked with the consultant team to mark up local and regional maps to identify gaps in the current network and high priority areas. Input from the Steering Committee is reflected throughout the recommendations of this planning document.

Public Events

Downtown Sanford Jubilee

In the Fall of 2012, a booth was set up during the Downtown Jubilee to promote the project and receive community input on high priority areas in Sanford and Lee County. Project information, including existing conditions maps and educational boards were presented at this event. Citizens provided input and discussed the importance of a more bicycle friendly community.

Family Health and Fitness Fair

Alta/Greenways hosted a booth during the 3rd Annual Family Health and Fitness Fair, held on March 19, 2013 at the Dennis A. Wicker Civic Center. This event was selected by the Steering Committee as an opportunity to engage a diverse cross-section of community residents. The Family Health and Fitness Fair offered numerous physical activity demonstrations for children and their families. Groups performed demonstrations on stage throughout the Fair. A goal of the Fair was to encourage residents to become more active, and be healthy, and do everything they can to live a healthy lifestyle.

In anticipation of the expected attendance for this event, Alta/Greenways had staff at the booth who could communicate in Spanish to Hispanic/Latino residents. Spanish language project materials were brought to the event and efforts were made to connect and collect input from Spanish-speaking residents.

At all meetings, events, and workshops, public input was obtained in the form of map markups, written comments, verbal question and answer sessions, and discussions between citizens, consultant staff and representatives of the Steering Committee. In addition, hardcopy public comment forms in English and in Spanish were distributed for hand written responses during each meeting. These were important opportunities to connect to a wide range of citizens in the area.

Project Resources

A number of resources were developed to enhance project awareness and participation. These tools also played a significant role in ensuring all members of the general public would have the opportunity to participate.

Project Website

A project website was developed to provide further project information, another avenue for public input, maps, contact information, and additional resources. The public comment form page of the website featured a section in Spanish, offering an opportunity for the Latino community in Sanford to become engaged and participate in the planning process.

Public Comment Form

A comment form was developed in English and Spanish, and was made available in both hardcopy and online formats. The comment form was available online throughout the duration of the project. To maximize responses to the online form, the web address was distributed at public meetings, advertised in press releases, sent out to local interest groups, and included on flyers that were distributed around the City. Close to 100 residents completed eitehr the English or the Spanish comment form.

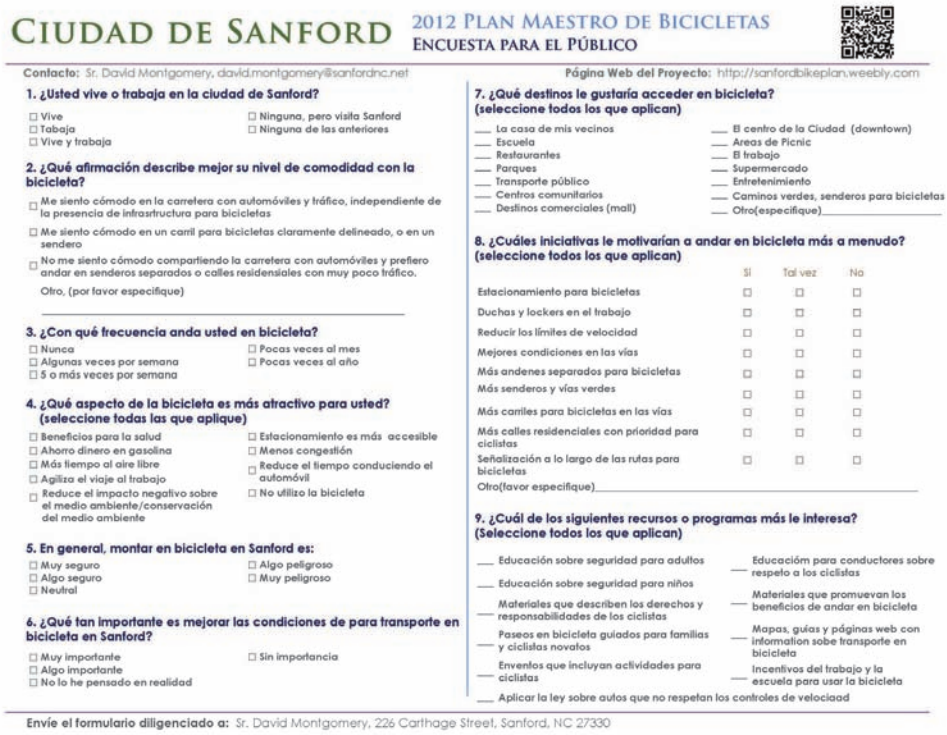
Results of the comment form were collected and tabulated by the Consultant to provide insight into local residents' values and opinions about the project. The results are included in this Appendix.

Project Information Cards

The information card shown below was designed in both English and Spanish to spread awareness of the project as well as where further information and project contacts could be found. With a diverse general public having access to different avenues of communication opportunities, these public engagement components provided mediums through which all voices of the Sanford and Lee County community could be heard.

Static Informational Display Exhibit

An informational board was developed in the Fall of 2012 and was used by the City of Sanford during local meetings and events such as the Chamber of Commerce's morning coffee meetings, Kiwanis Club meetings. The informational board was also displayed at the Public Library, and at local schools throughout the planning process. An image of the display board can be found on page A-4 of this Appendix.



Static Informational Display Exhibit

http://sanfordbikeplan.weebly.com/

CITY OF SANFORD

Comprehensive Bicycle Plan

Purpose

The Comprehensive Bicycle Plan will guide the City of Sanford, NCDOT, and other local and regional partners in improving infrastructure for cyclists in Sanford and Lee County, fostering a 'cycling culture' through related programs and policies.

Vision Statement

This plan provides a framework for the City of Sanford and other partners such as Broadway and Lee County to follow to establish a comprehensive network of regionally and locally connected bicycle facilities throughout Sanford and Lee County.

Background

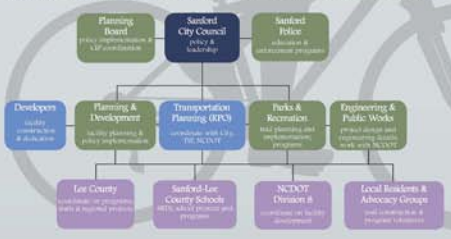
NCDOT's Bicycle and Pedestrian Planning Grant Initiative

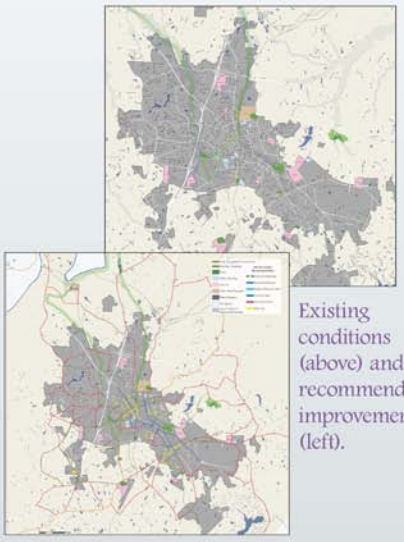
In 2012, the City of Sanford was awarded a matching grant from the North Carolina Department of Transportation (NCDOT) Bicycle and Pedestrian Planning Grant Initiative. The purpose of the grant is to encourage municipalities to develop comprehensive bicycle plans and pedestrian plans. This program has assisted more than 100 North Carolina communities and is administered through NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT).

Community Initiative

This Plan combines past planning efforts with new research and analysis, and includes public input. The result is a complete, up-to-date framework for moving forward with tangible bicycle improvements, complimented by a series of programmatic recommendations to educate and encourage cyclists and motorists in Sanford and Lee County.

Organizational Framework for Bicycle Plan Implementation





Existing conditions (above) and recommended improvements (left).

Bragg Street

Bragg Street provides important connections between downtown, neighborhoods, Lee Senior High, Central Carolina Community College, Bragg Street School and Sloan Park. During the planning process, this corridor should be evaluated for potential greenway or on-road facility opportunities.

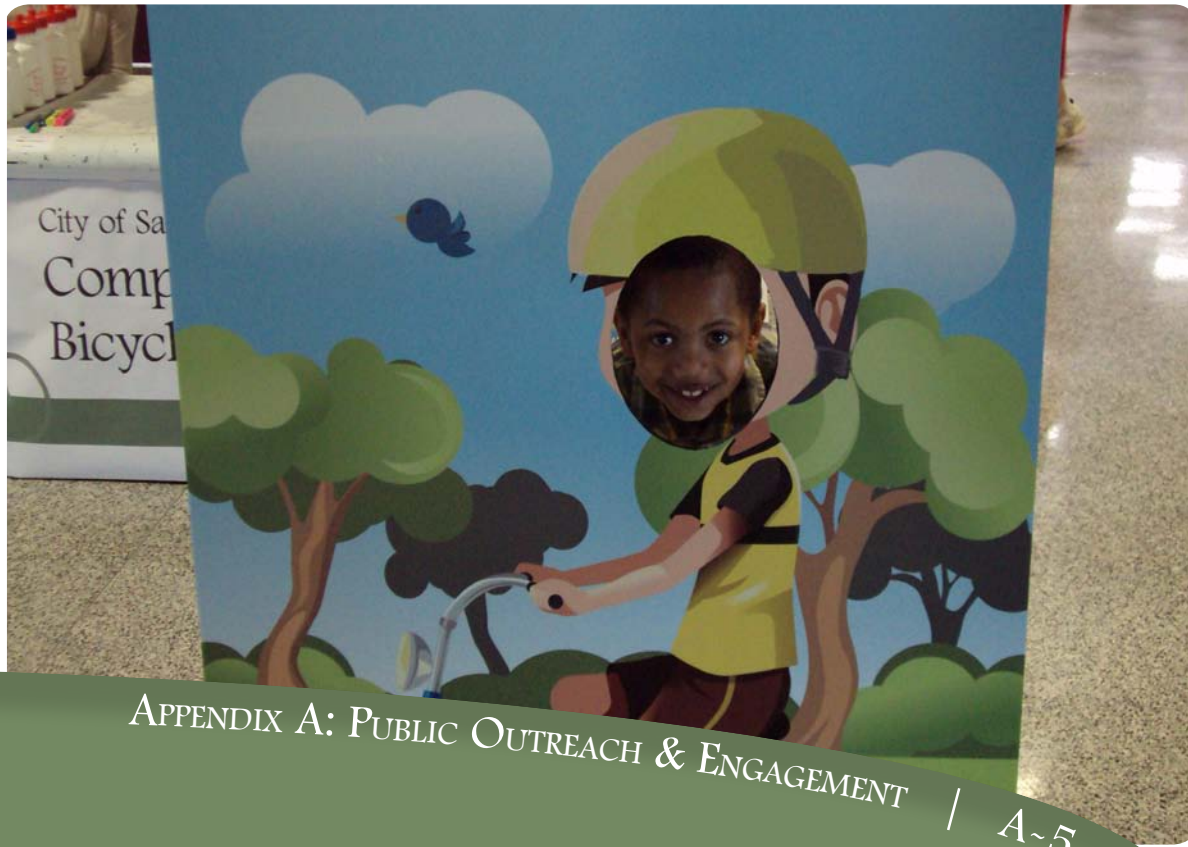
Planning Process Underway

On Wednesday, August 22nd, the Steering Committee kicked off the Comprehensive Bicycle Plan and developed a vision statement and goals to guide the process.

First Outreach Event a Success

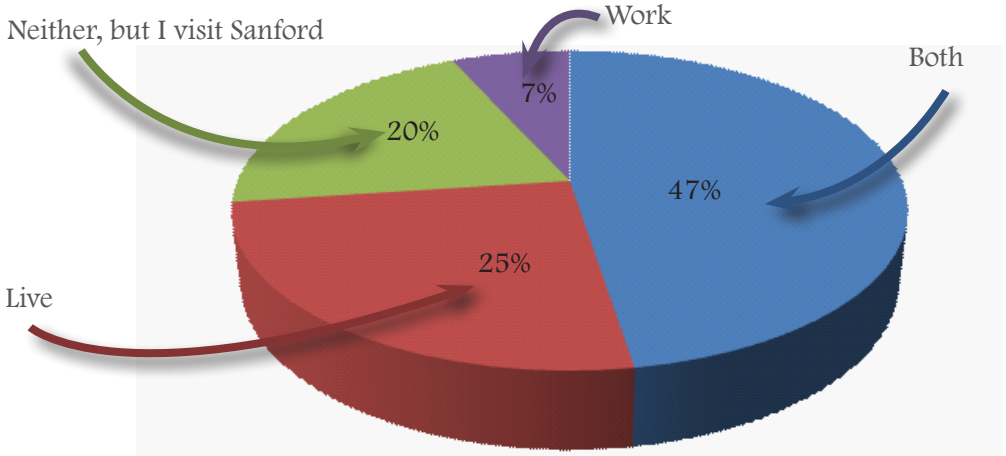
The first public outreach and engagement event was held Saturday, October 6th, during the Downtown Sanford Jubilee. Sanford residents stopped by the booth to learn about the bicycle planning process and to provide input on where they like (or don't like) to bicycle in Sanford.

Photos above and below on this page were taken 03/19/2013 during the Lee County School System Family Health and Fitness Fair.

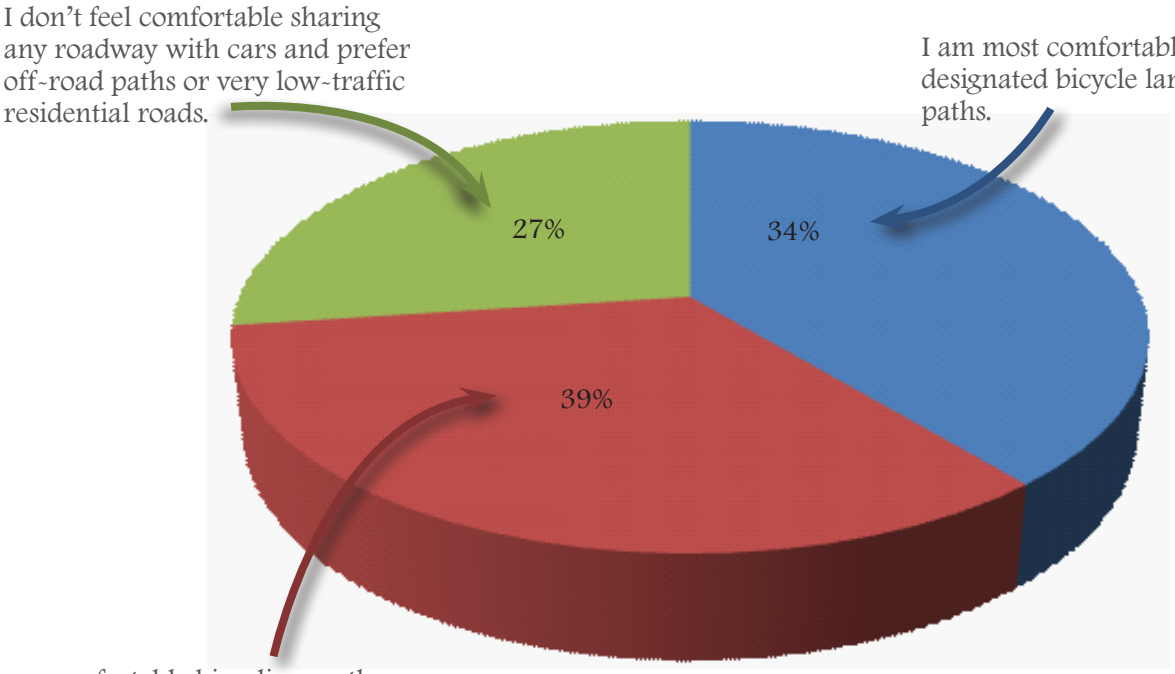


Results:
2012/2013 Comprehensive Bicycle Transportation Plan Public Comment Form

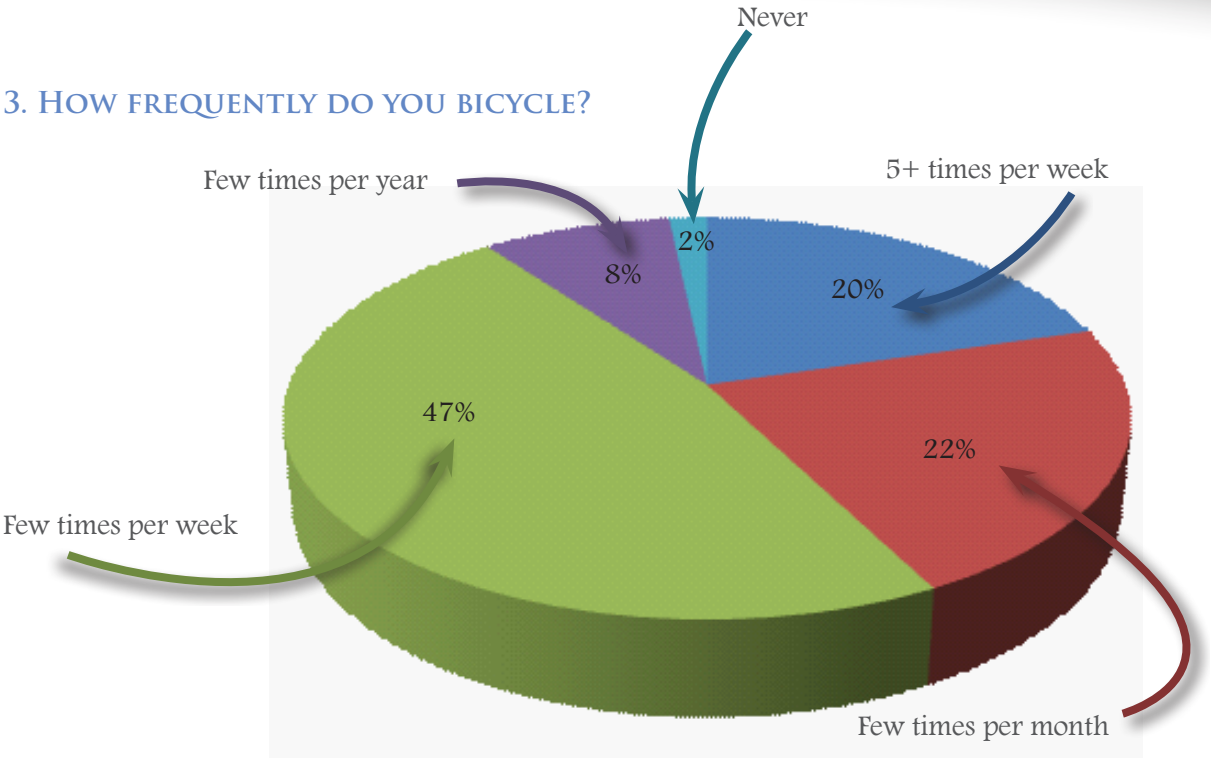
1. Do you live or work in the City of Sanford?



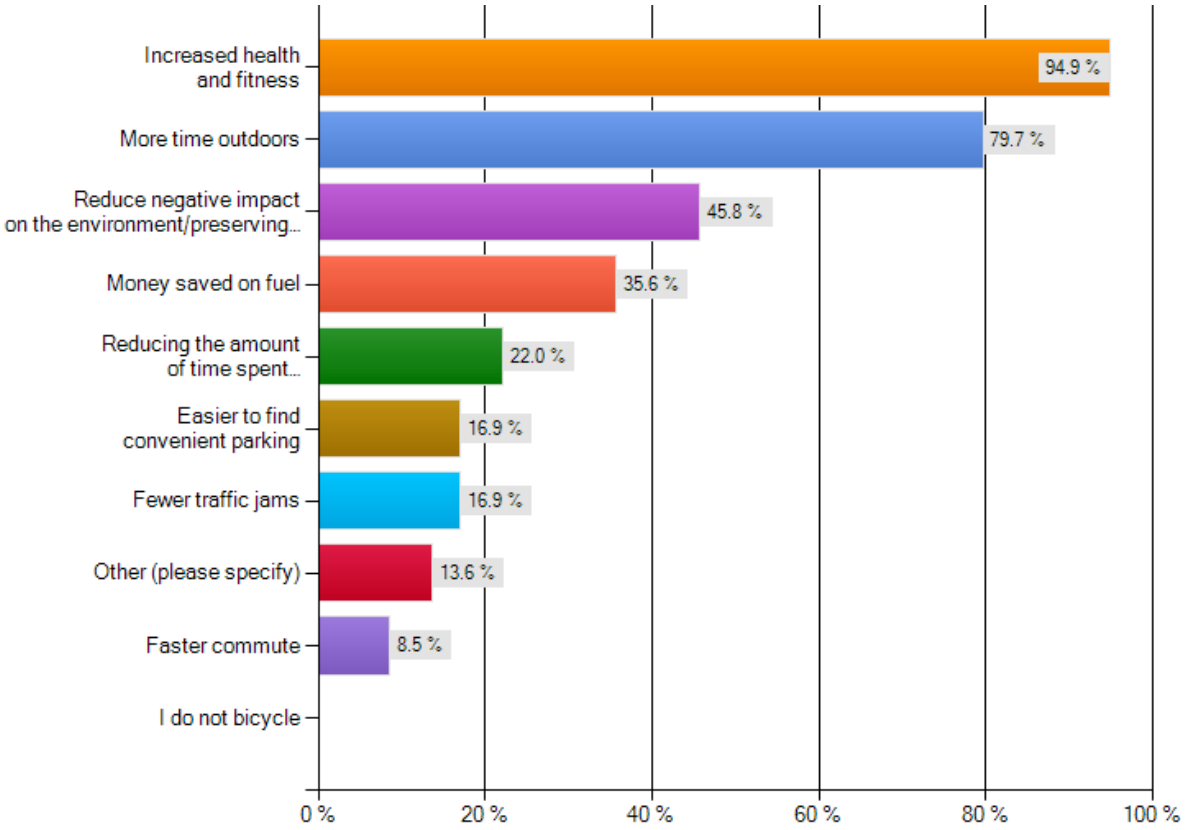
2. Which statement best describes your comfort level on a bicycle?



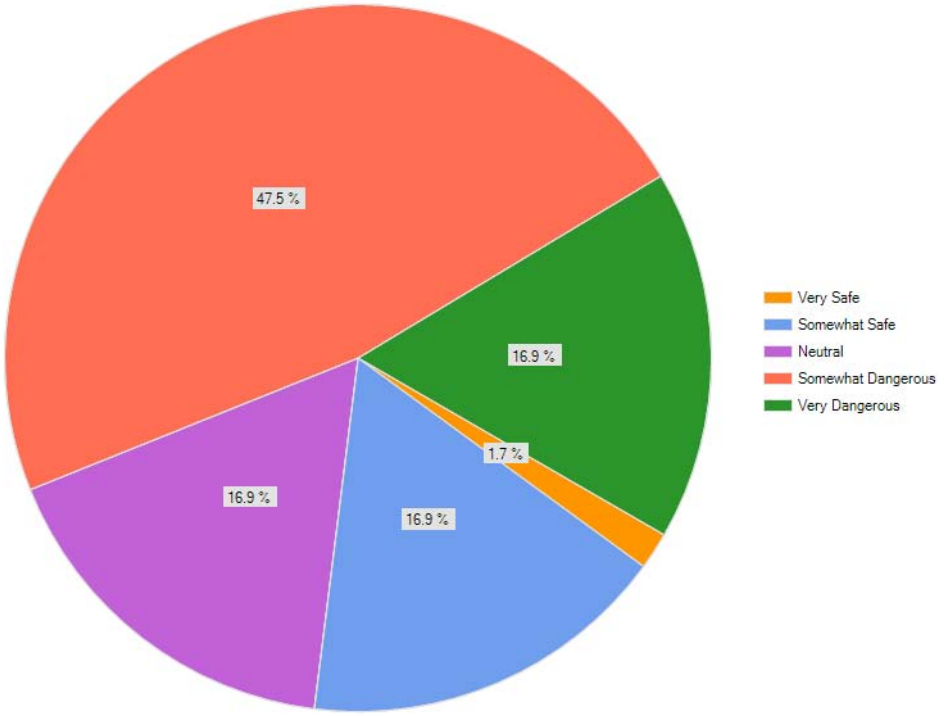
3. How frequently do you bicycle?



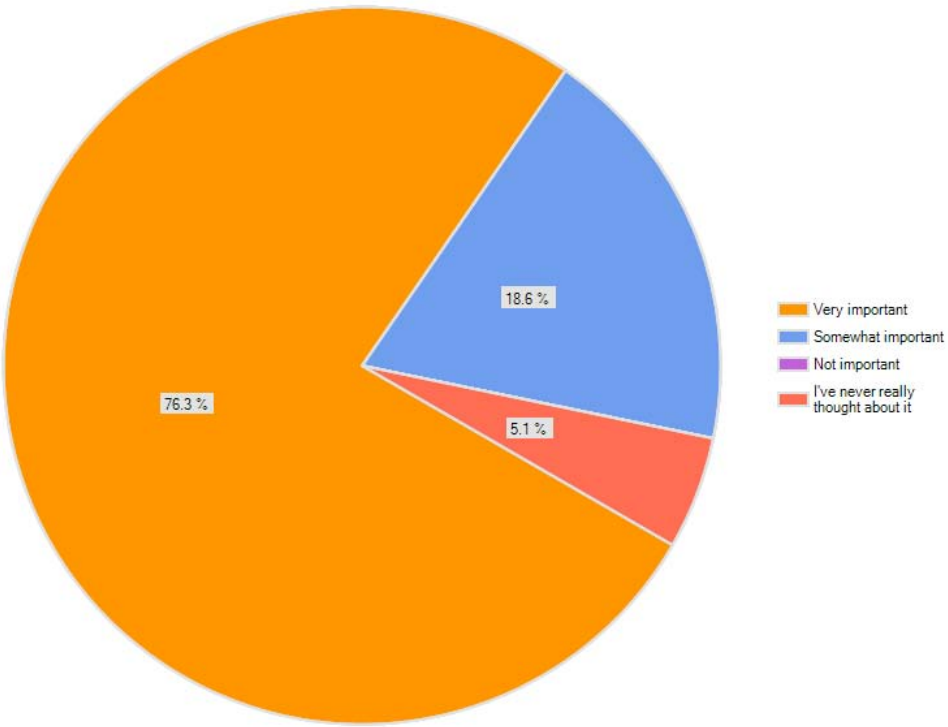
4. Which aspect of bicycling is most appealing to you? (select all that apply)



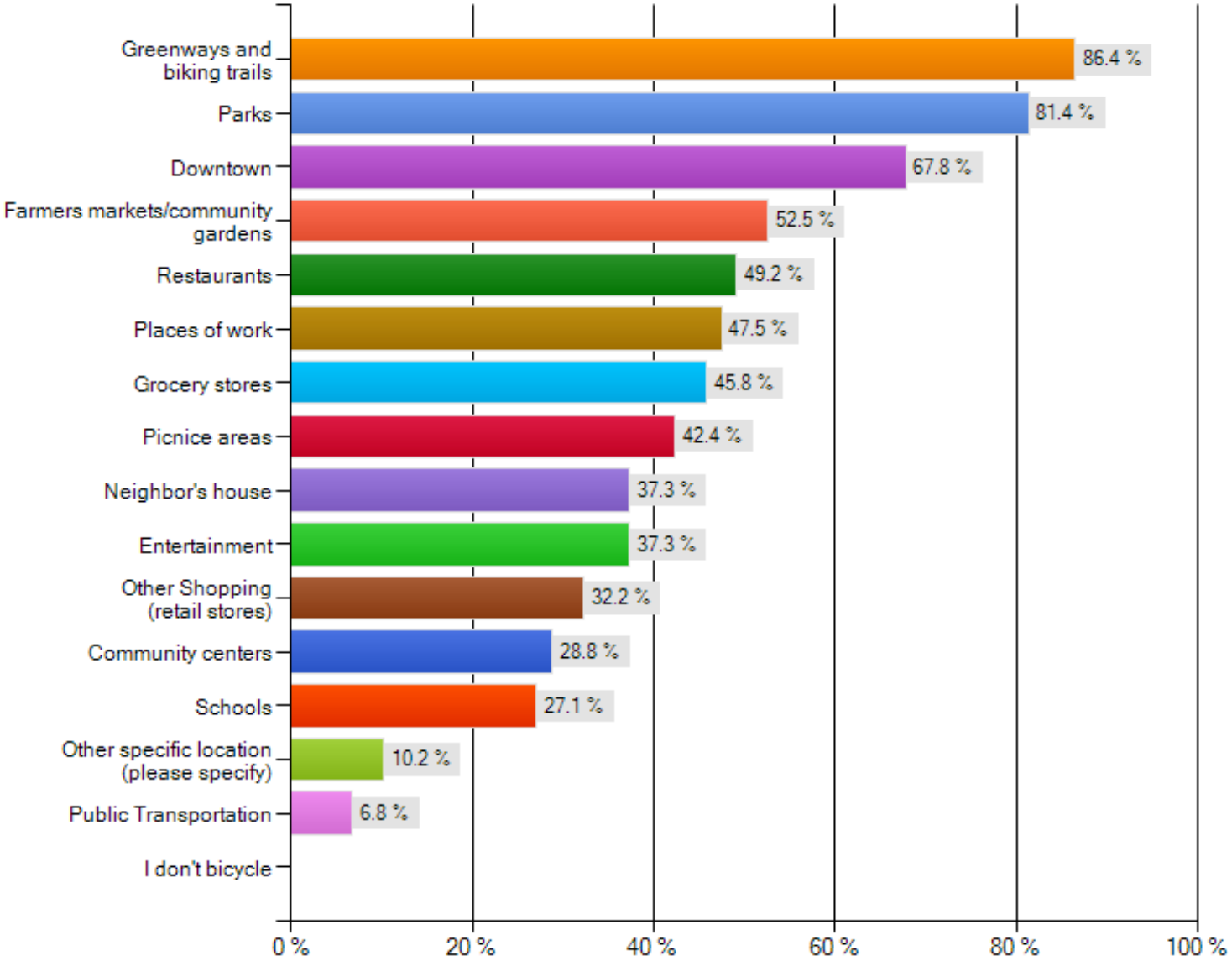
5. In general, bicycling in and around the City of Sanford is:



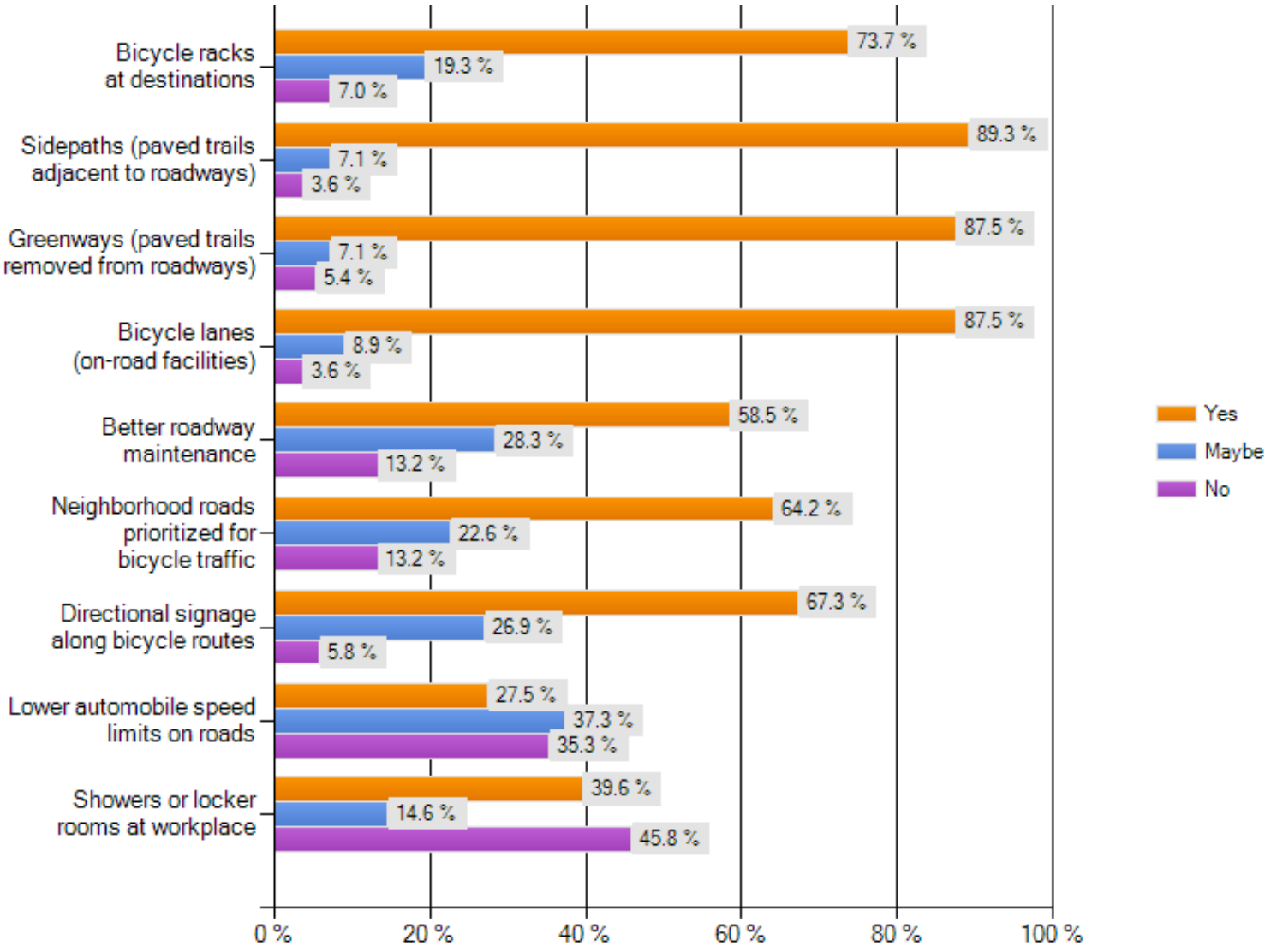
6. How important to you is improving bicycling conditions in Sanford?



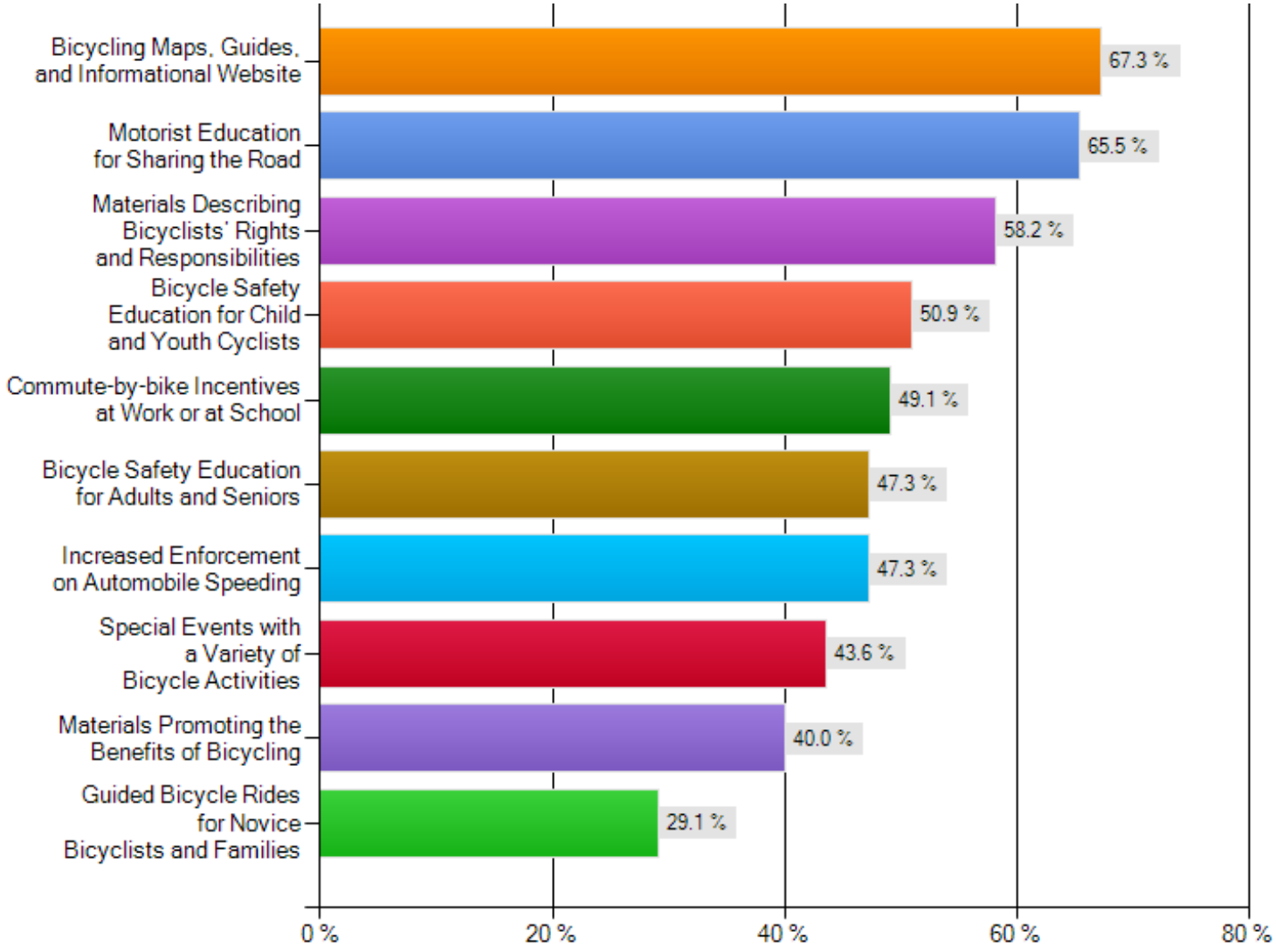
7. What destinations would you most like to get to by bike? (select all that apply)



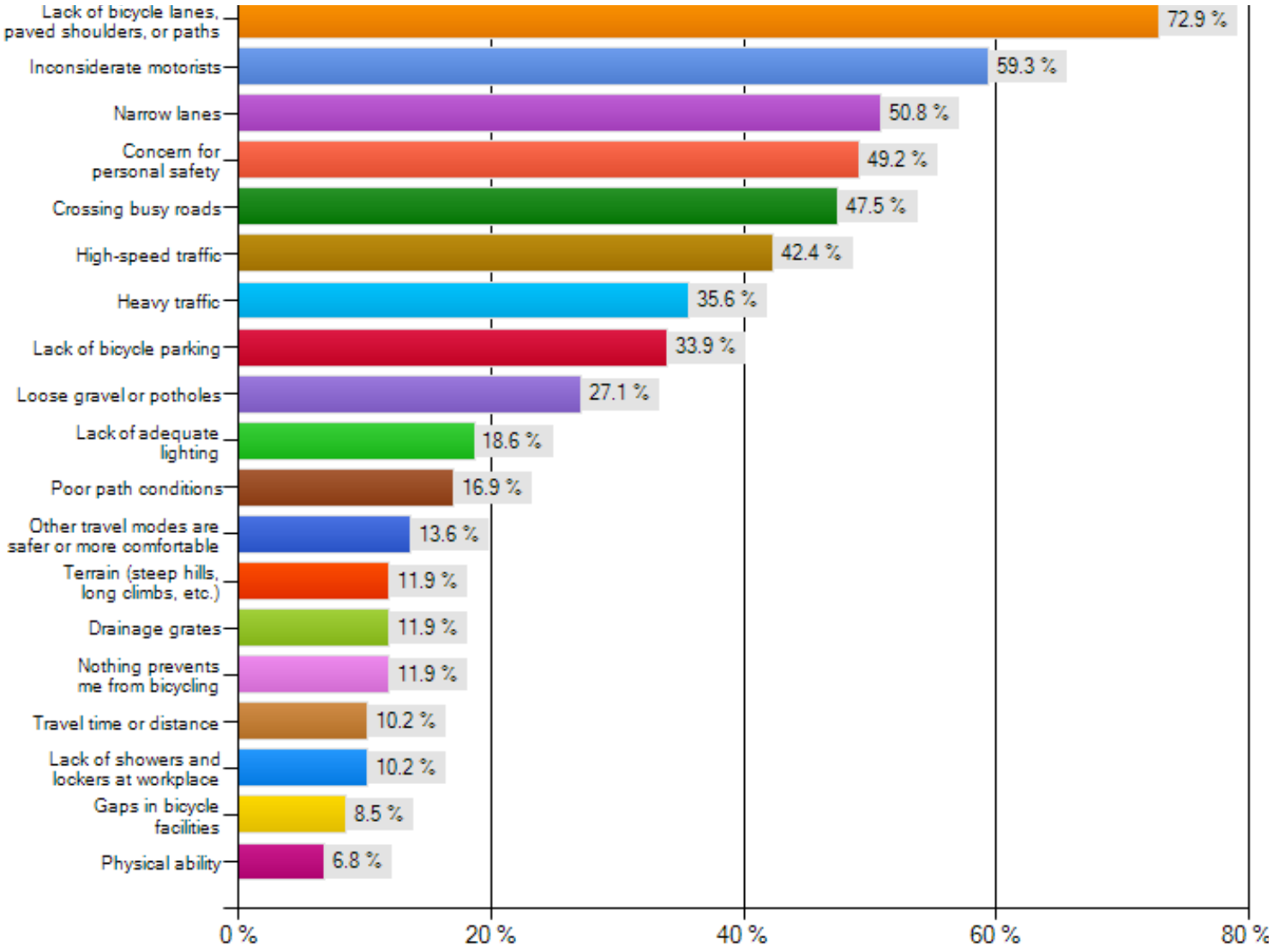
8. Which of the following changes would encourage you to bike more often? (select all that apply)



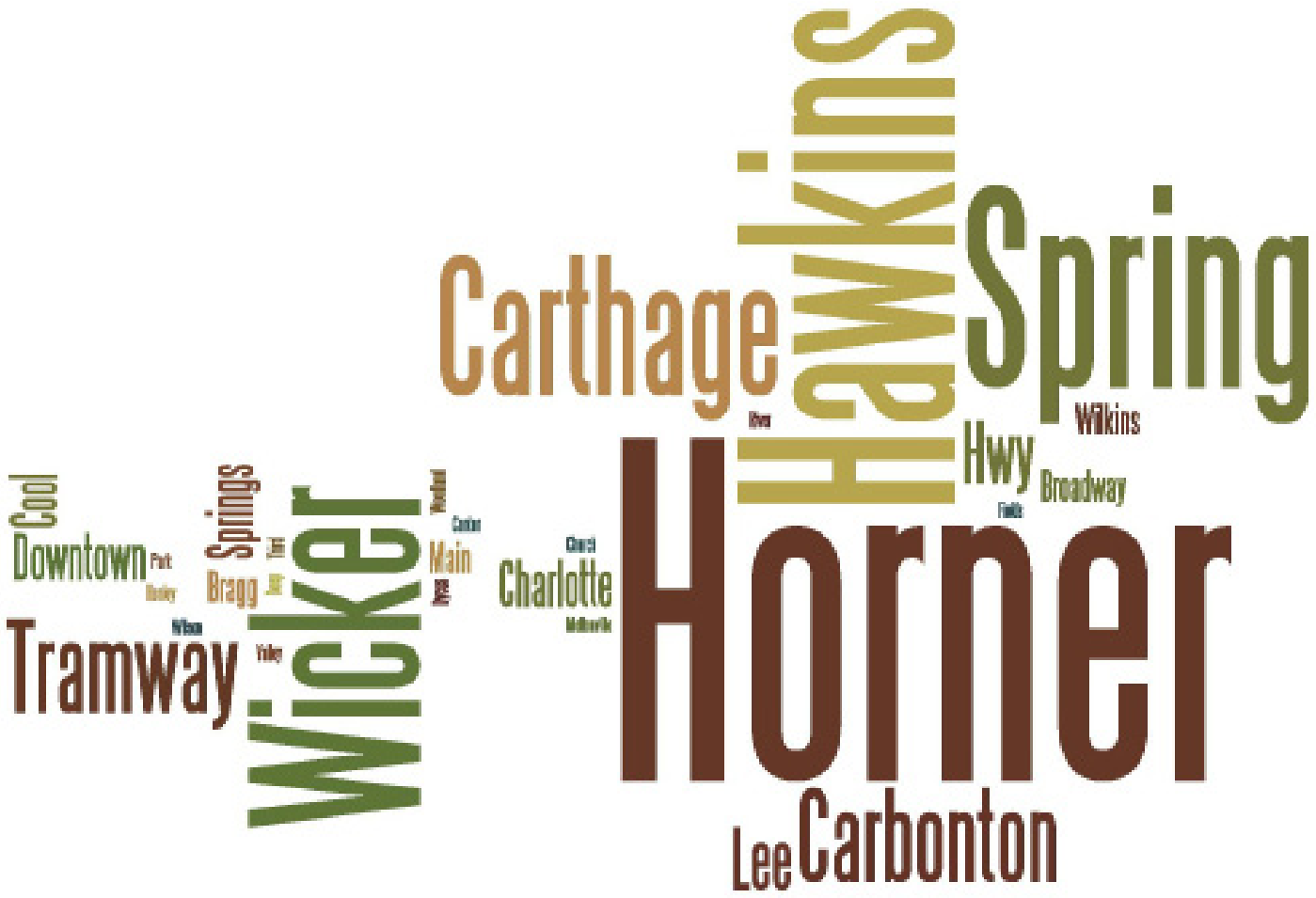
9. Which of the following resources or programs would most interest you? (select all that apply)



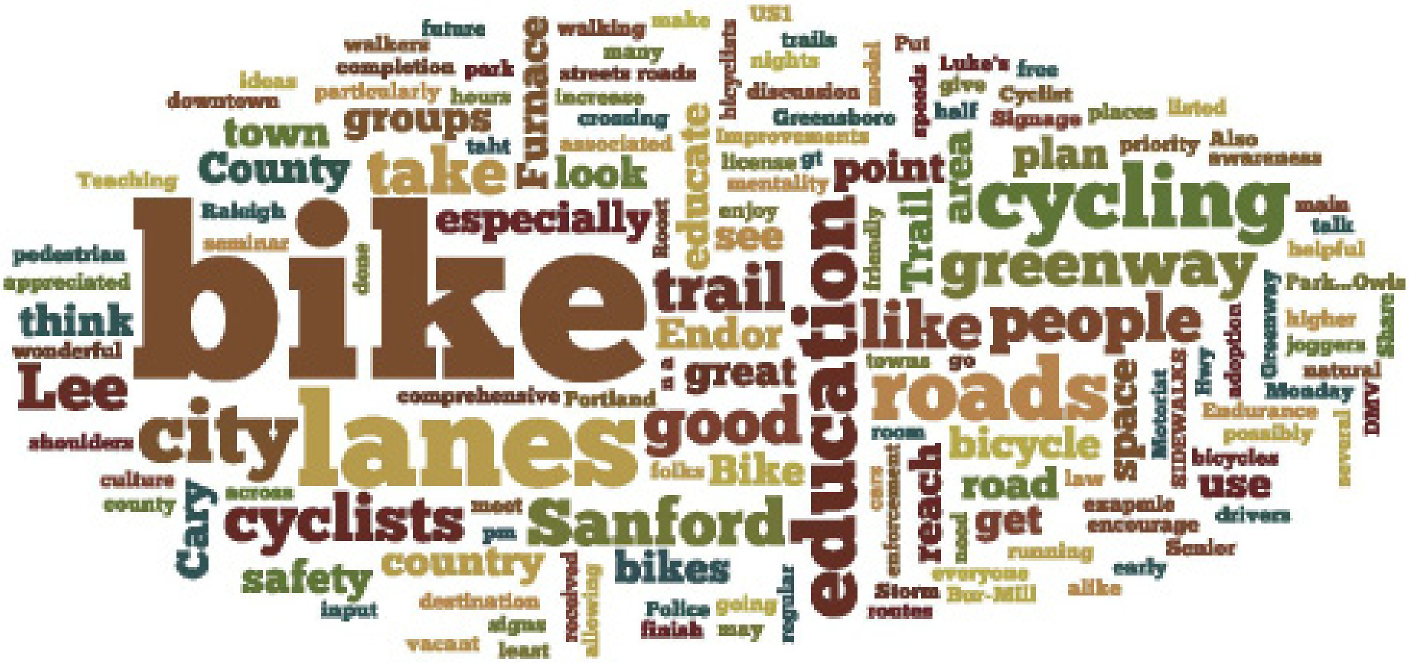
10. Which of the following factors prevent you from bicycling or bicycling more often? (select all that apply)



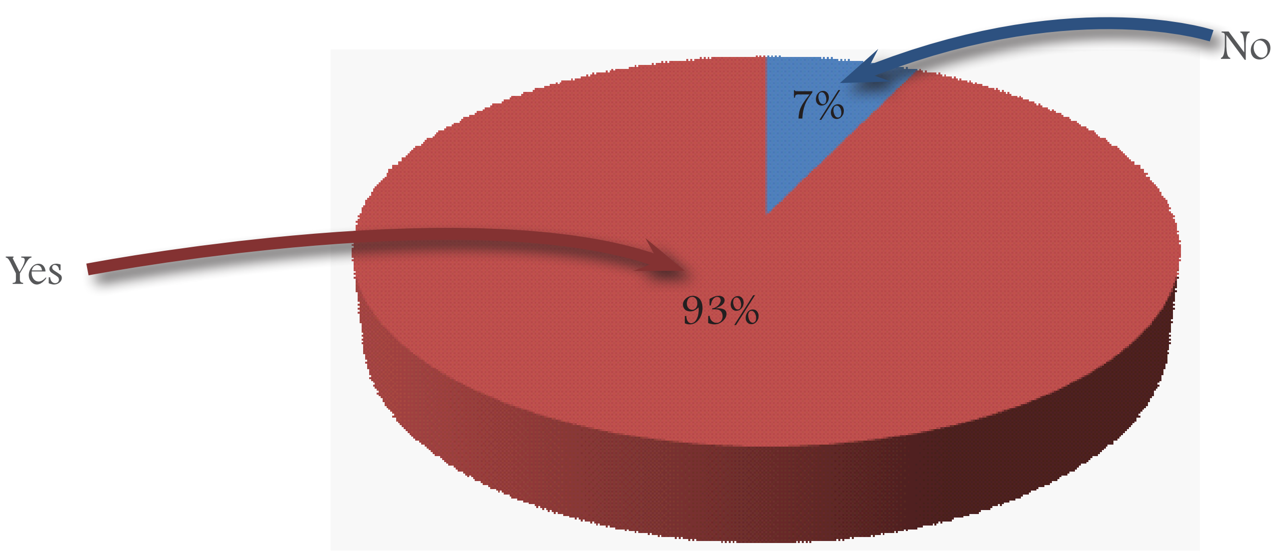
11. What do you think are the top three (3) roadways in Sanford most needing bicycling improvements?



12. What other bicycle-related improvements do you consider priorities?



13. Should public funds (federal grants, local taxes, state funds, other public grants, etc,) be used to improve bicycling conditions?

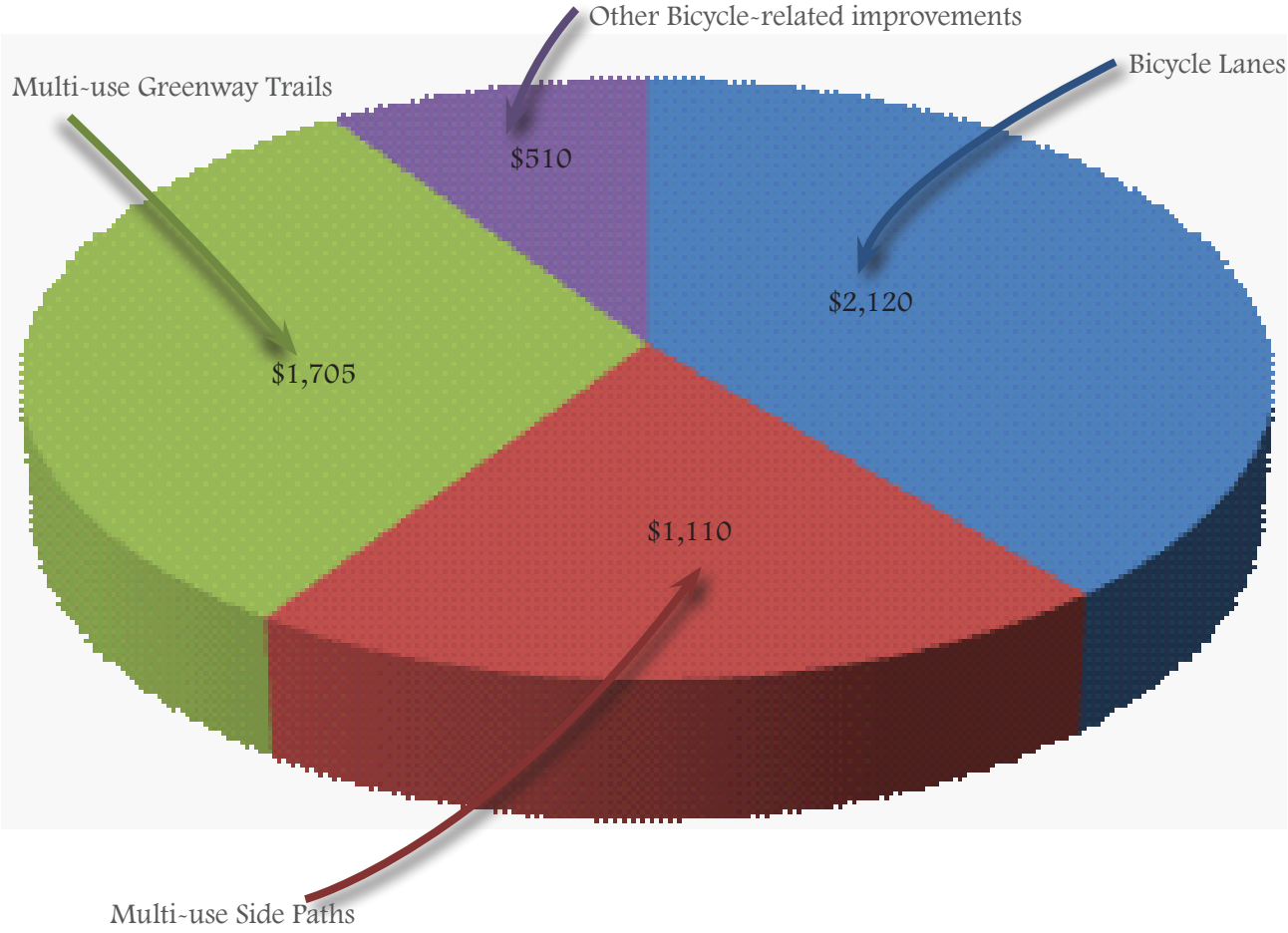


14. If you had one hundred dollars ($100) to spend on bicycle facilities, how you would spend it? Please spend your $100 however you would like. You may spend it all on 1 item, or on several, as long as the total equals $100.

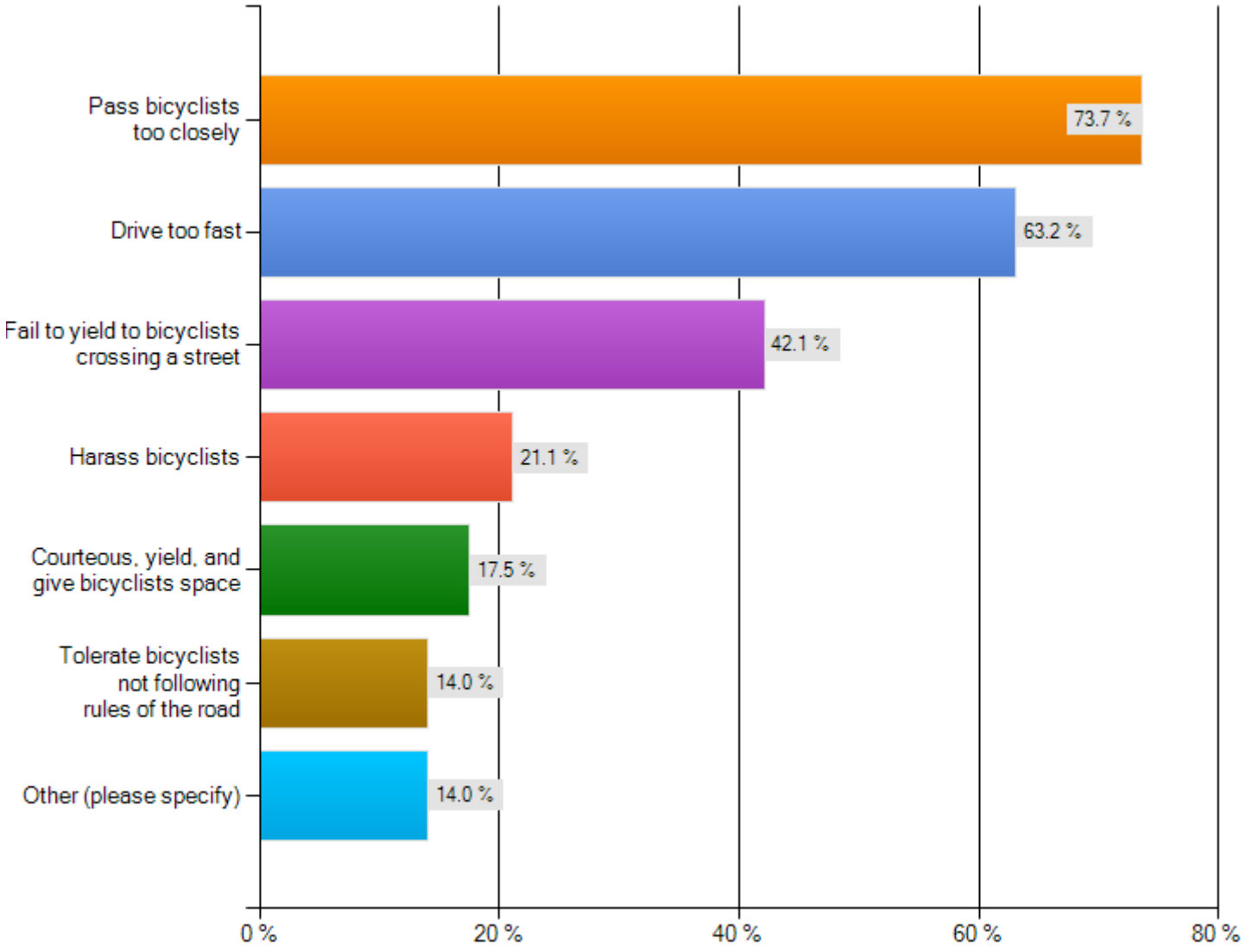
example:

Bicycle lanes 45 | Multi-use Side paths 10

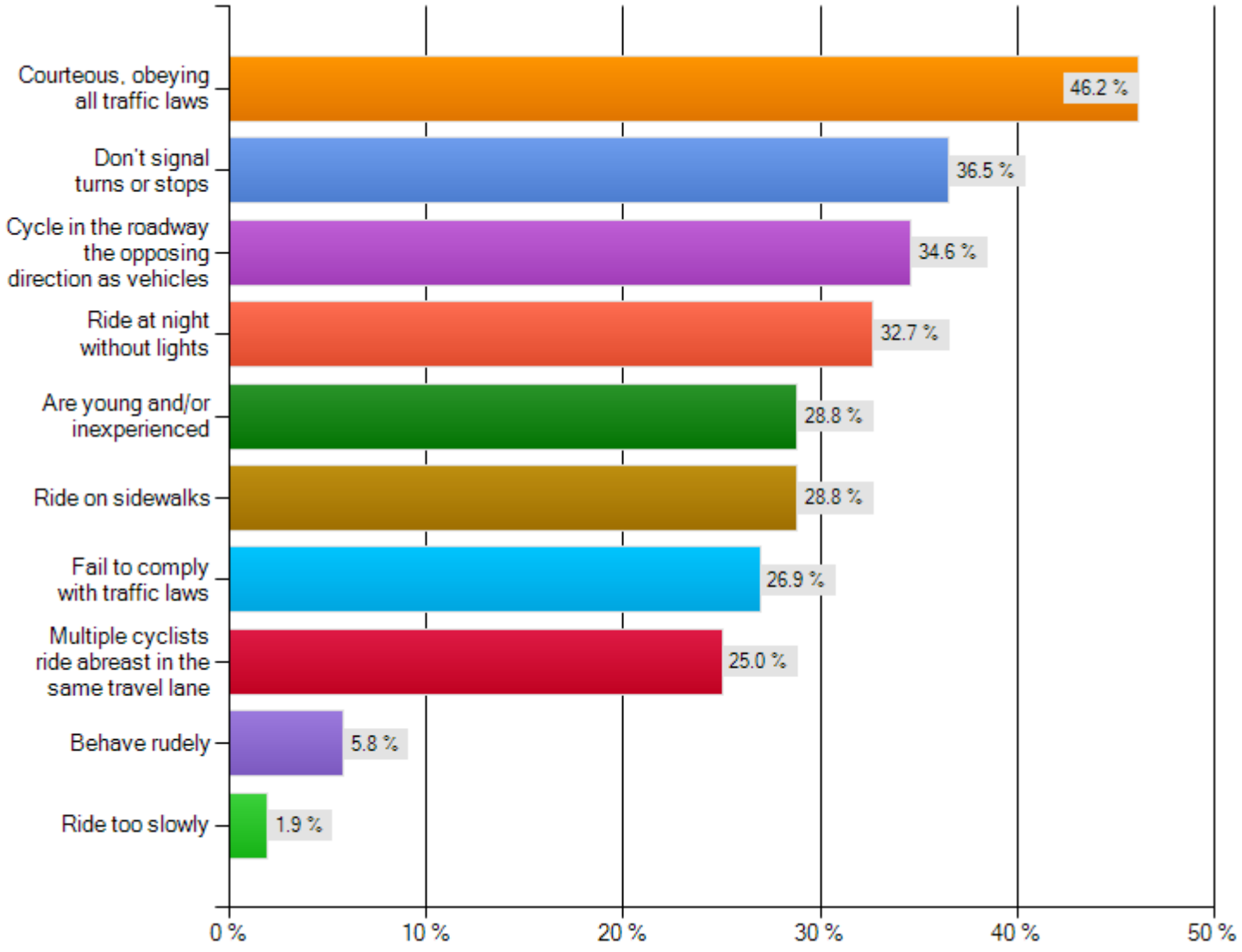
Multi-use Greenways 30 | Other bicycle-related improvements 15



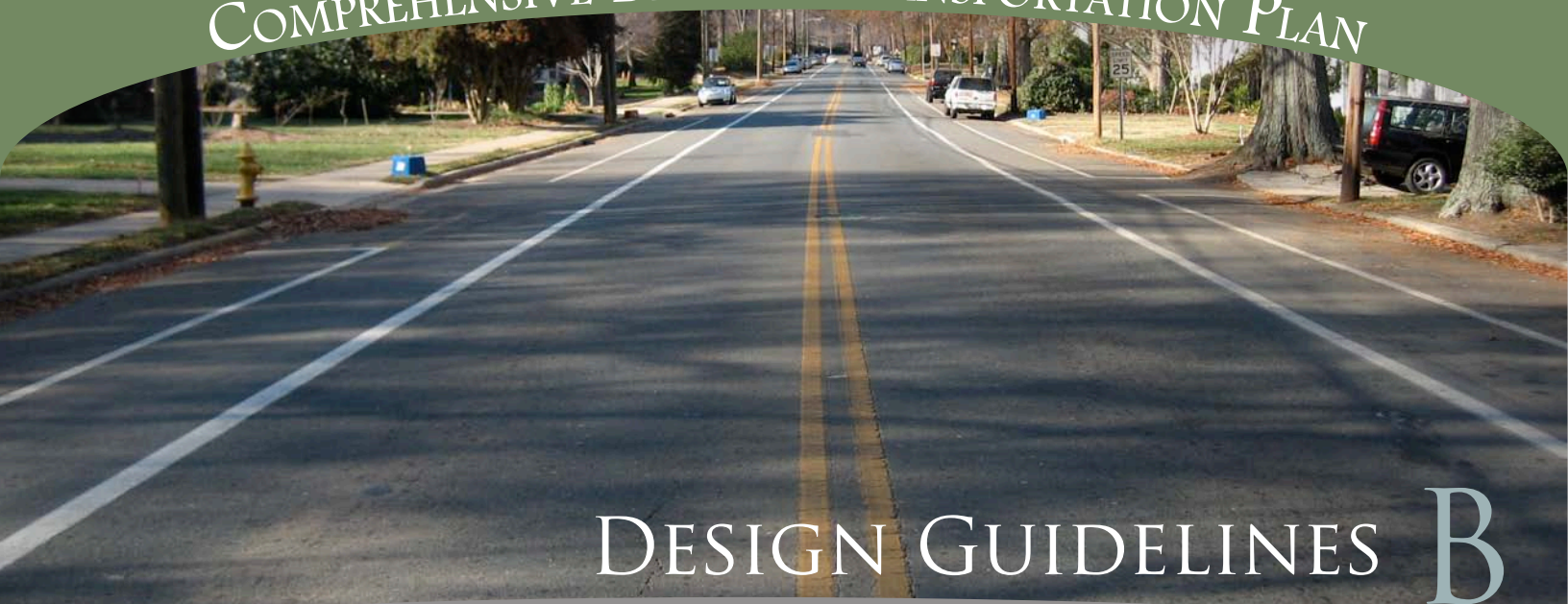
15. How do you feel drivers in your area typically behave around bicyclists? (select all that apply)



16. How do you feel bicyclists in your area typically behave? (select all that apply)



Photos on this page were taken during the Downtown Jubilee in October 2012, and during the Lee County School System Family Health and Fitness Fair in March 2013.



Design Guidelines B

Overview

The sections that follow serve as an inventory of bicycle design treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent the tools for creating a bicycle-friendly, safe, accessible community. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the NCDOT for specific design solutions. The following standards and guidelines are referred to in this guide.

- The Federal Highway Administration's **Manual on Uniform Traffic Control Devices** (MUTCD) is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.
- American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities**, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.
- The National Association of City Transportation Officials' (NACTO) 2012 **Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.
- Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle facility project. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines** (PROWAG) and the **2010 ADA Standards for Accessible Design**(2010 Standards) contain standards and guidance for the construction of accessible facilities.

Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

Appendix Contents

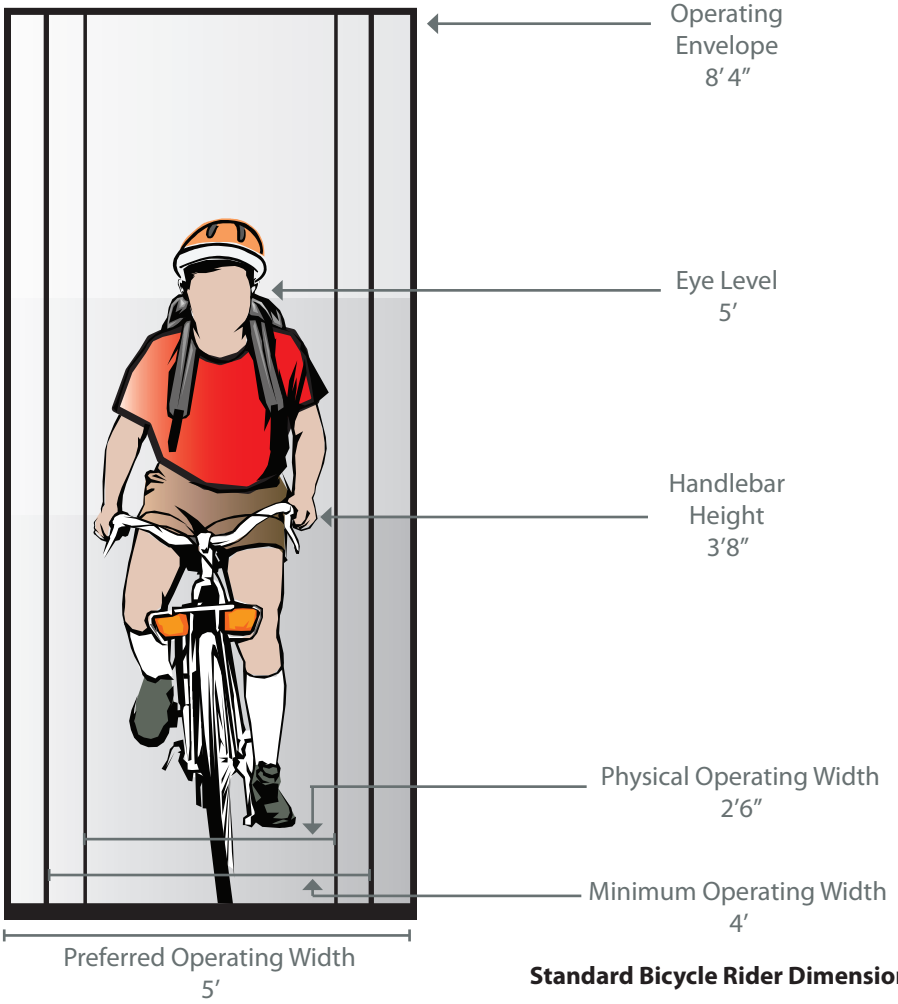
Design Needs of Bicyclists

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

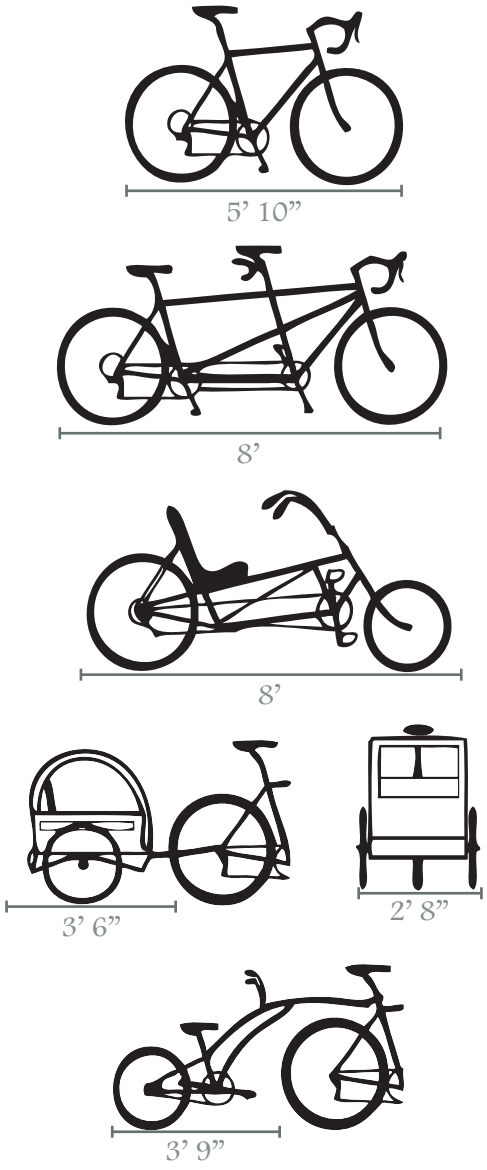
The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.



Standard Bicycle Rider Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Bicycle as Design Vehicle - Typical Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition *AASHTO does not provide typical dimensions for tricycles.

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as multi-use paths. The table to the right provides typical bicyclist speeds for a variety of conditions.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	8 ft
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 8 in

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	18 mph

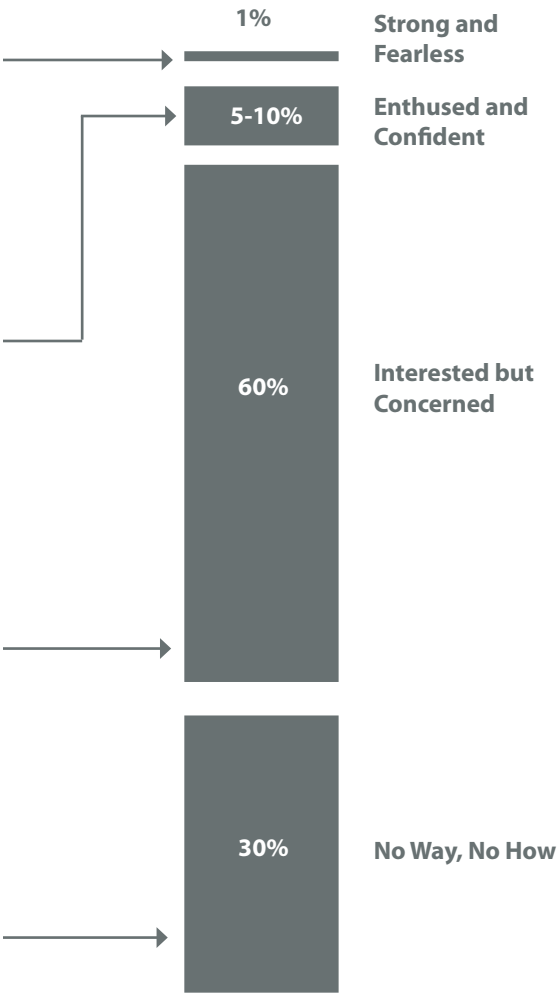
*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

Types of Bicyclists

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as Advanced, Basic, or Child[1]. A more detailed understanding of the US population as a whole is illustrated in the figure below. Developed by planners in Portland, OR[2] and supported by data collected nationally since 2005, this classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

- Strong and Fearless (approximately 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as multi-use paths.
- Enthused and Confident (5-10% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.
- Interested but Concerned (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.
- No Way, No How (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.



Typical Distribution of Bicyclist Types

1 *Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073*

2 *Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. http://www.portlandonline.com/transportation/index.cfm?&a=237507*

Bicycle Facility Selection Guidelines

This section summarizes the bicycle facility selection typology developed for the City of Oxford. The specific facility type that should be provided depends on the surrounding environment (e.g. auto speed and volume, topography, and adjacent land use) and expected bicyclist needs (e.g. bicyclists commuting on a highway versus students riding to school on residential streets).

Facility Selection Guidelines

There are no 'hard and fast' rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly. This section provides guidance on various factors that affect the type of facilities that should be provided.

This section includes:

- Facility Classification
- Facility Continua

Facility Classification

Description

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

Shared Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.

Shared Roadways may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Shared-lane markings are included in this class of treatments.

Separated Bikeways, such as bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists. Paved Shoulders are also included in this classification.

Cycle Tracks are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

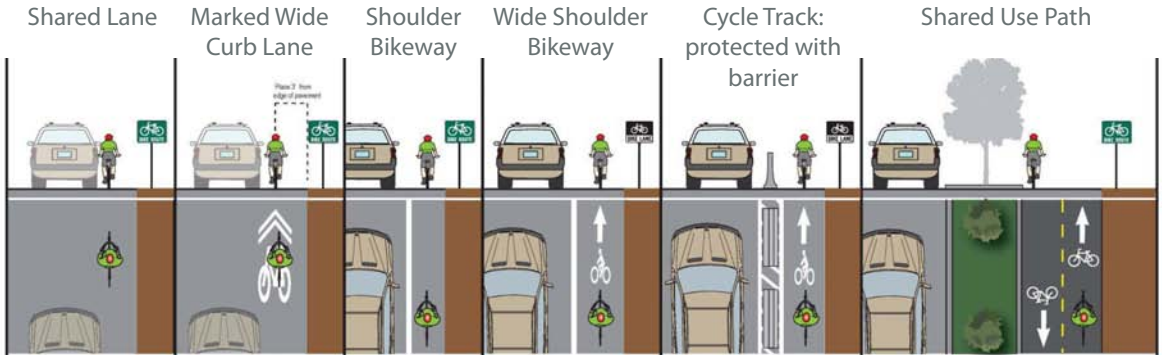
Multi-use Paths are facilities separated from roadways for use by bicyclists and pedestrians. Greenways and sidepaths are included in this classification.

Facility Continua

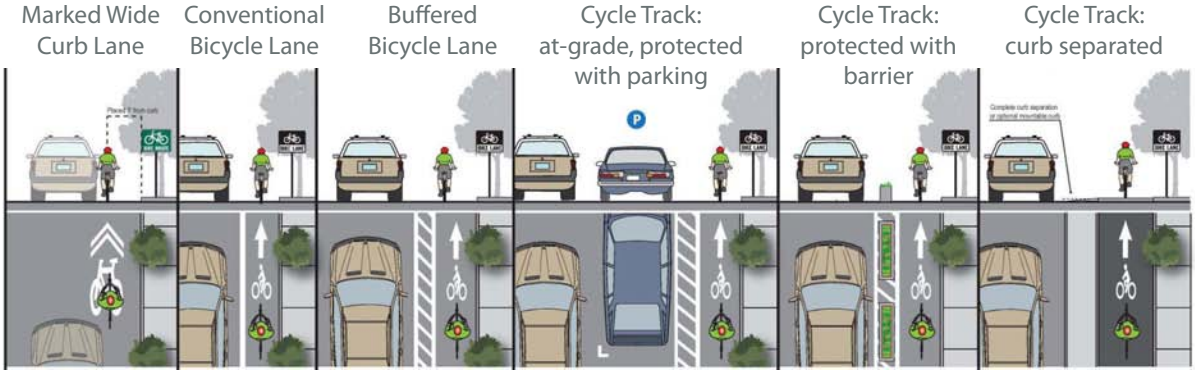
The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.

Least Protected → Most Protected

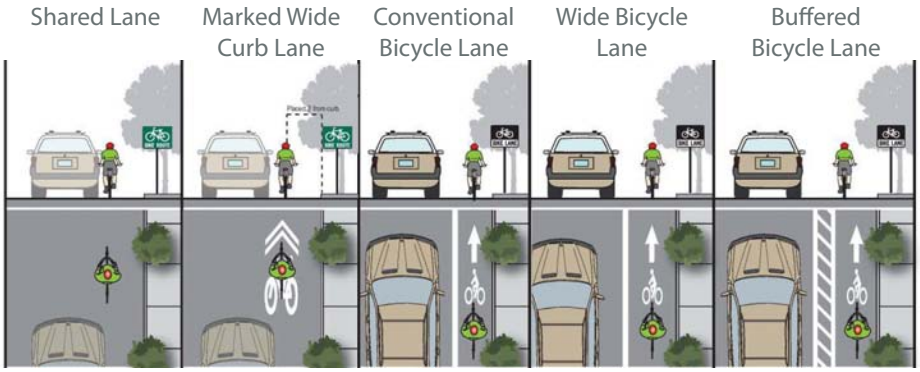
Arterial/Highway Bikeway Continuum (without curb and gutter)



Arterial/Highway Bikeway Continuum (with curb and gutter)



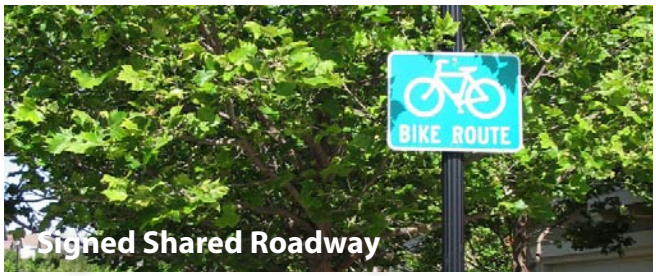
Collector Bikeway Continuum



Shared Roadways

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.



Signed Shared Roadway


Marked Shared Roadway


Bicycle Boulevard

This section includes:

- Signed Shared Roadway
- Marked Shared Roadway
- Bicycle Boulevard

Signed Shared Roadways

Guidance

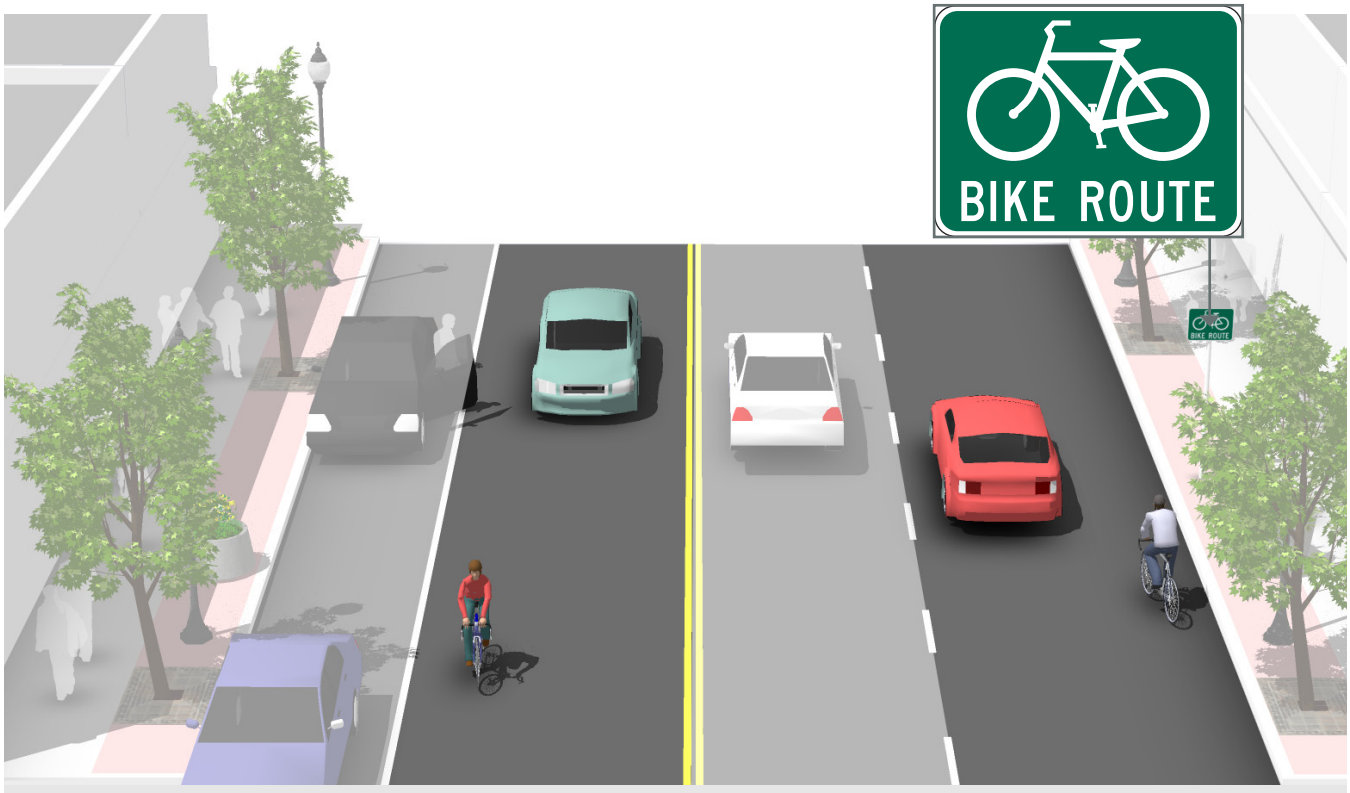
Lane width varies depending on roadway configuration.

Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.

Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.



Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

Marked Shared Roadway

Guidance

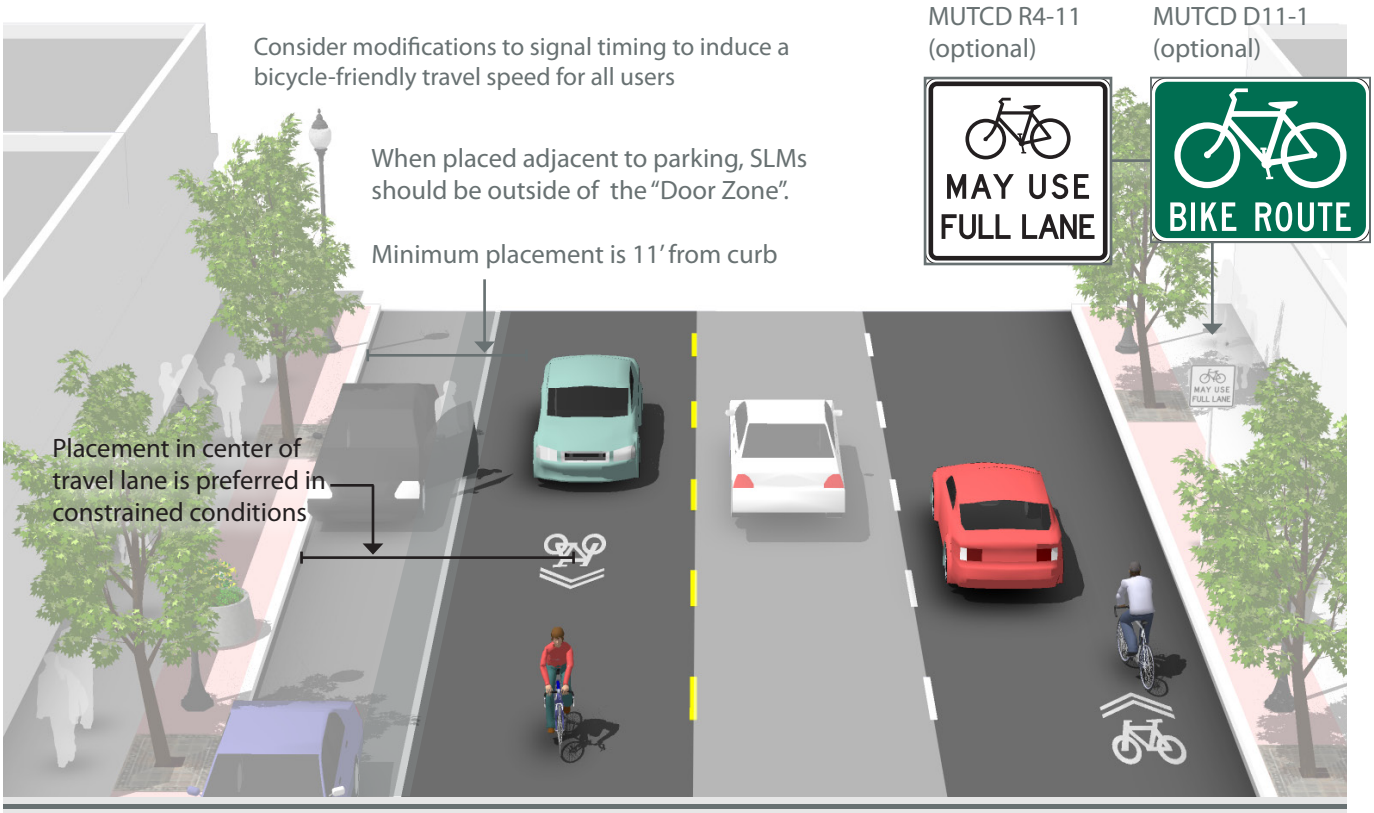
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.

In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.



Discussion

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated **Bike Lanes**, or to designate **Bicycle Detection** at signalized intersections. (MUTCD 9C.07)

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.
NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

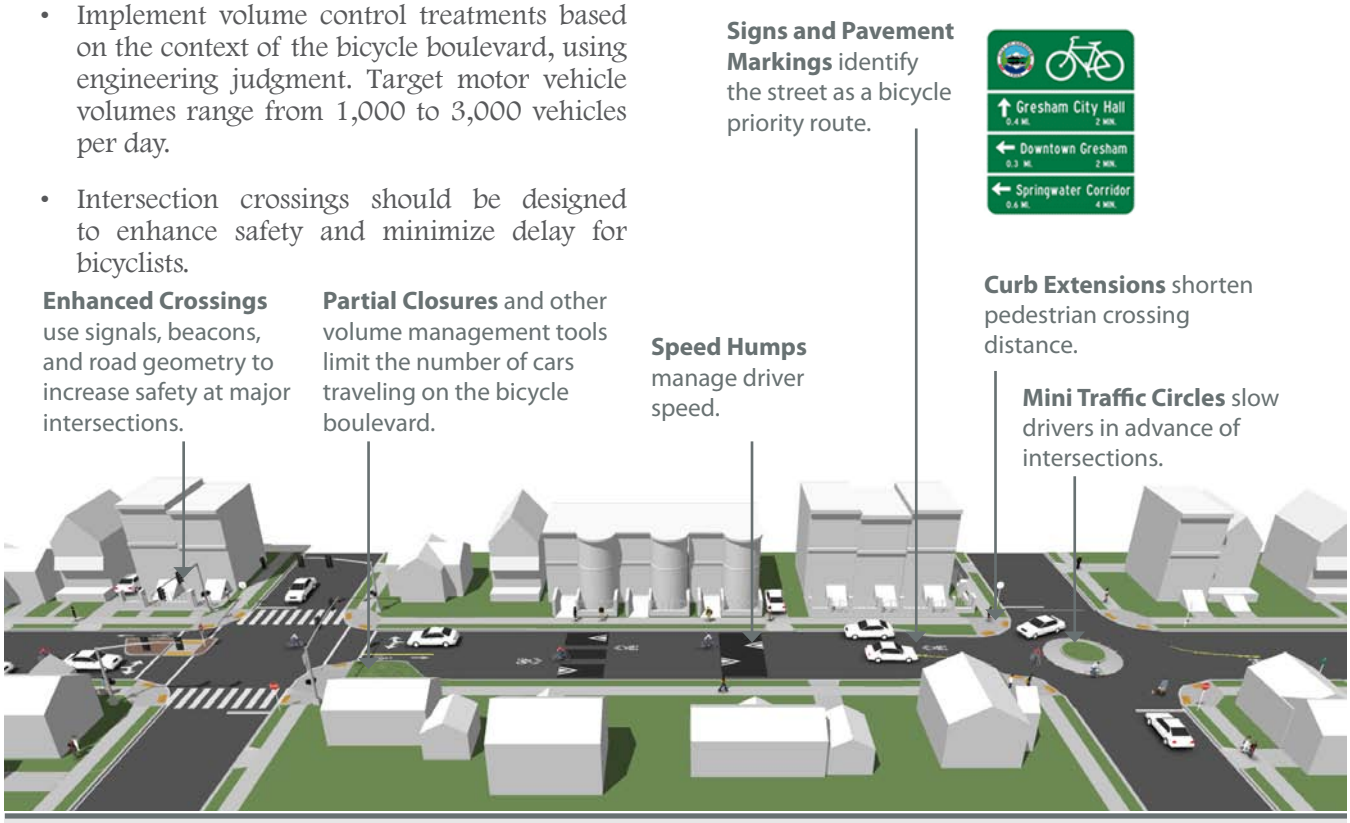
Bicycle Boulevard

Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

Description

Bicycle boulevards are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume, low-speed local streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.



Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Additional References and Guidelines

Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning and Design Handbook.

BikeSafe. (No Date). Bicycle countermeasure selection system.

Ewing, Reid. (1999). Traffic Calming: State of the Practice.

Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Separated Bikeways

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.


Shoulder Bikeways


Bicycle Lanes


Buffered Bike Lanes


Uphill Bicycle Climbing Lane

This section includes:

- Shoulder Bikeways
- Bicycle Lanes
- Buffered Bike Lanes
- Uphill Bicycle Climbing Lane
- Cycle Tracks


Cycle Tracks

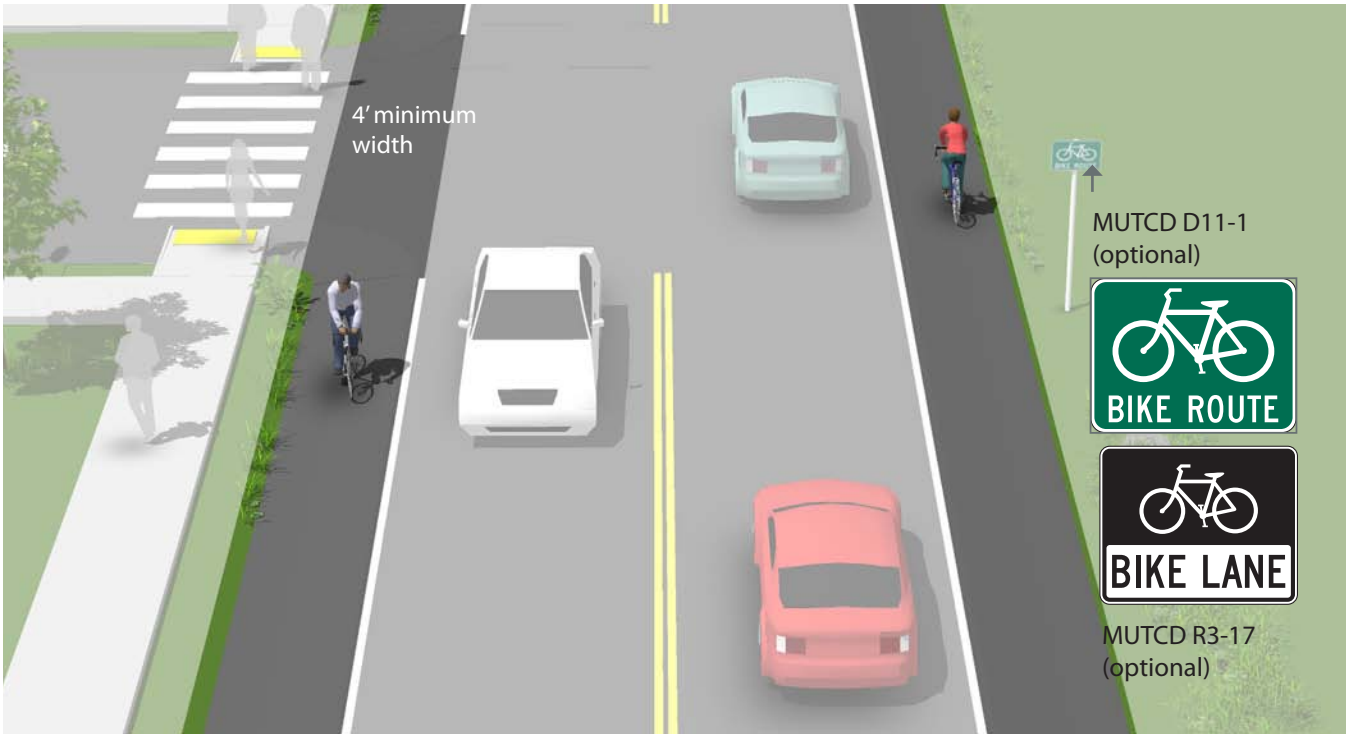
Shoulder Bikeways

Guidance

- 4 foot minimum width. Greater widths preferred.
- If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Description

Typically found in less-dense areas, shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways should be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used where constraints exist.



Discussion

A wide outside lane may be sufficient accommodation for bicyclists on streets with insufficient width for bike lanes but which do have space available to provide a wider (14'-16') outside travel lane. Consider configuring as a marked shared roadway in these locations.

Where feasible, roadway widening should be performed with pavement resurfacing jobs.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Shoulder bikeways should be cleared of snow through routine snow removal operations.

Bicycle Lanes

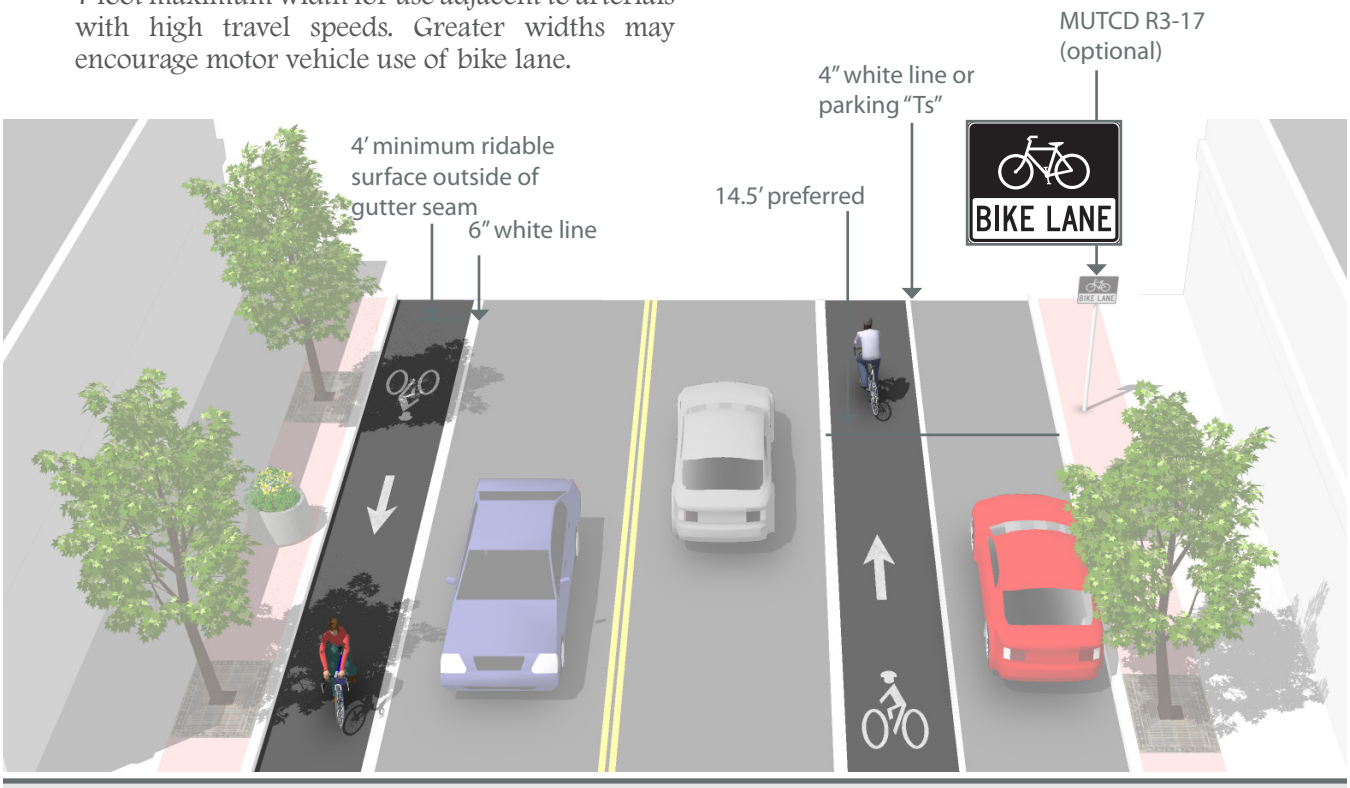
Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane. (12 foot minimum).
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider Buffered Bicycle Lanes when further separation is desired.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.
NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines.
NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Buffered Bike Lanes

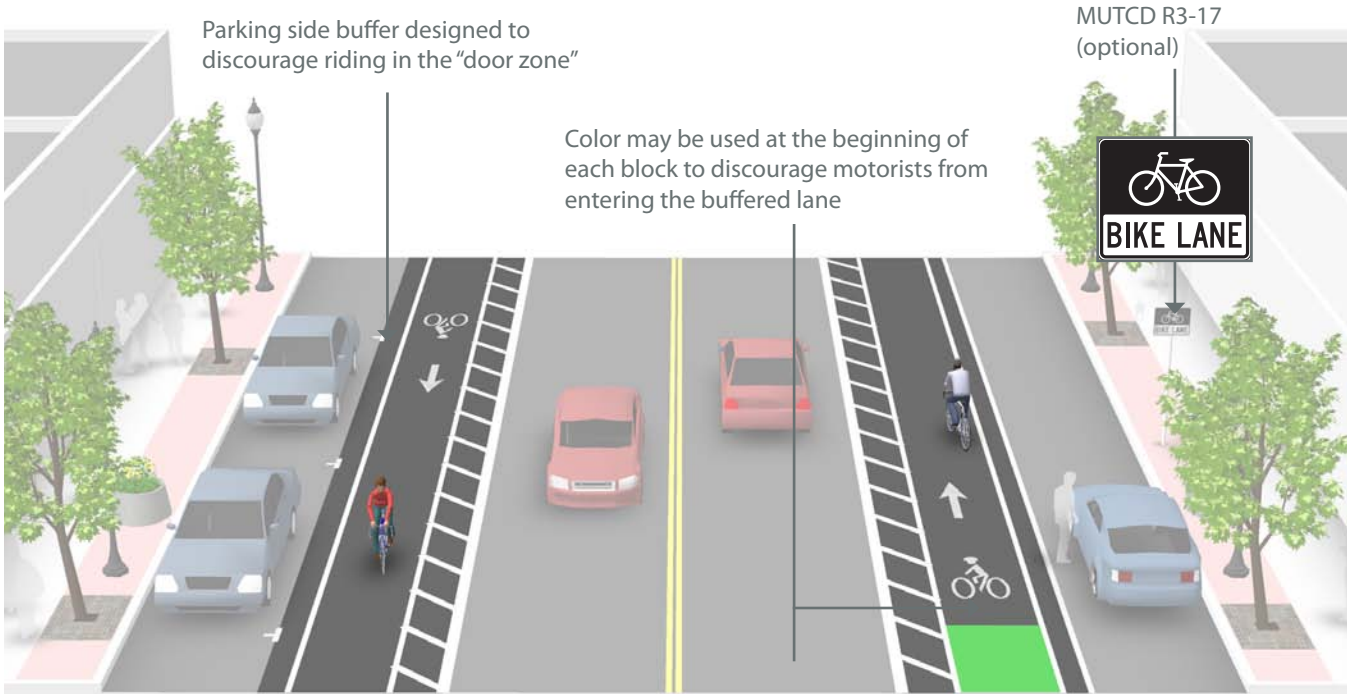
Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.

Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices. (3D-01)
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

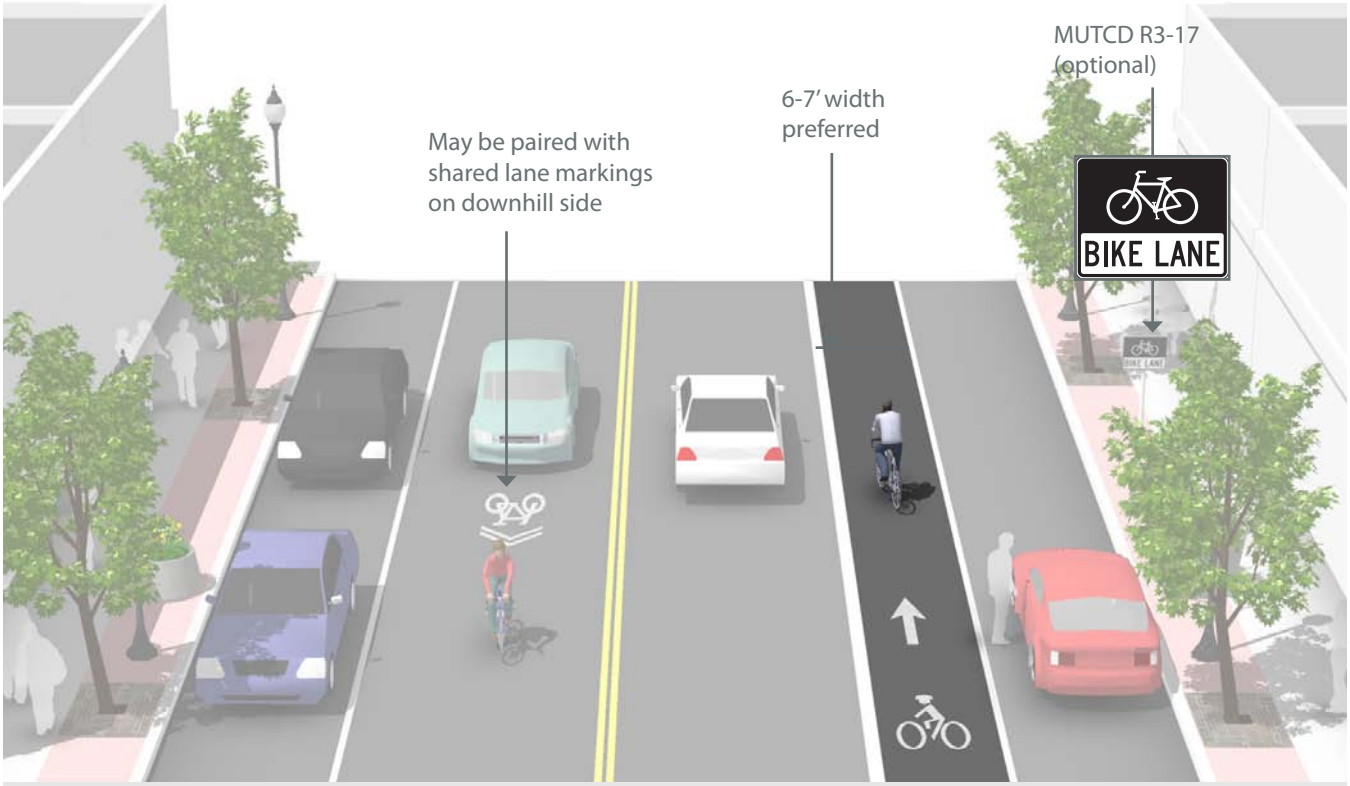
Uphill Bicycle Climbing Lane

Guidance

- Uphill bike lanes should be 6-7 feet wide (wider lanes are preferred because extra maneuvering room on steep grades can benefit bicyclists).
- Can be combined with Shared Lane Markings for downhill bicyclists who can more closely match prevailing traffic speeds.

Description

Uphill bike lanes (also known as "climbing lanes") enable motorists to safely pass slower-speed bicyclists, thereby improving conditions for both travel modes.



Discussion

This treatment is typically found on retrofit projects as newly constructed roads should provide adequate space for bicycle lanes in both directions of travel. Accommodating an uphill bicycle lane often includes delineating on-street parking (if provided), narrowing travel lanes and/or shifting the centerline if necessary.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.
AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

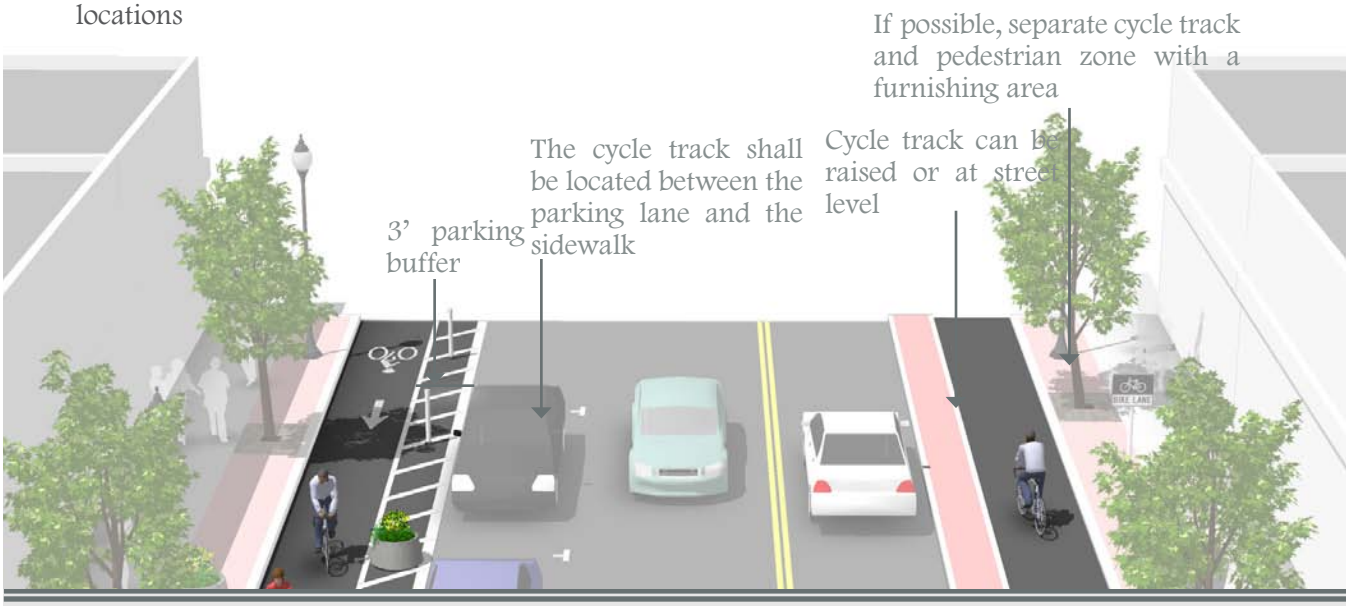
Cycle Tracks

Guidance
Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One-Way Cycle Tracks
- 7 foot recommended minimum to allow passing. 5 foot minimum width in constrained locations.

Two-Way Cycle Tracks
- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations

Description
A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.
Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.



Discussion
Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and "Yield to Bikes" signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

Additional References and Guidelines
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance
In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.

Separated Bikeways at Intersections

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

Bike Lanes at Right Turn Only Lanes


Colored Bike Lanes in Conflict Areas

Combined Bike Lane/Turn Lane


Intersection Crossing Markings


Bicyclists at Single Lane Roundabouts

This section includes:

- Bike Lanes at Right Turn Only Lanes
- Colored Bike Lanes in Conflict Areas
- Combined Bike Lane/Turn Lane
- Intersection Crossing Markings
- Bicycles at Single Lane Roundabouts

Bike Lanes at Right Turn Only Lanes

Description

The appropriate treatment at right-turn lanes is to place the bike lane between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a shared bike lane/turn lane.

The design (right) illustrates a bike lane pocket, with signage indicating that motorists should yield to bicyclists through the conflict area.

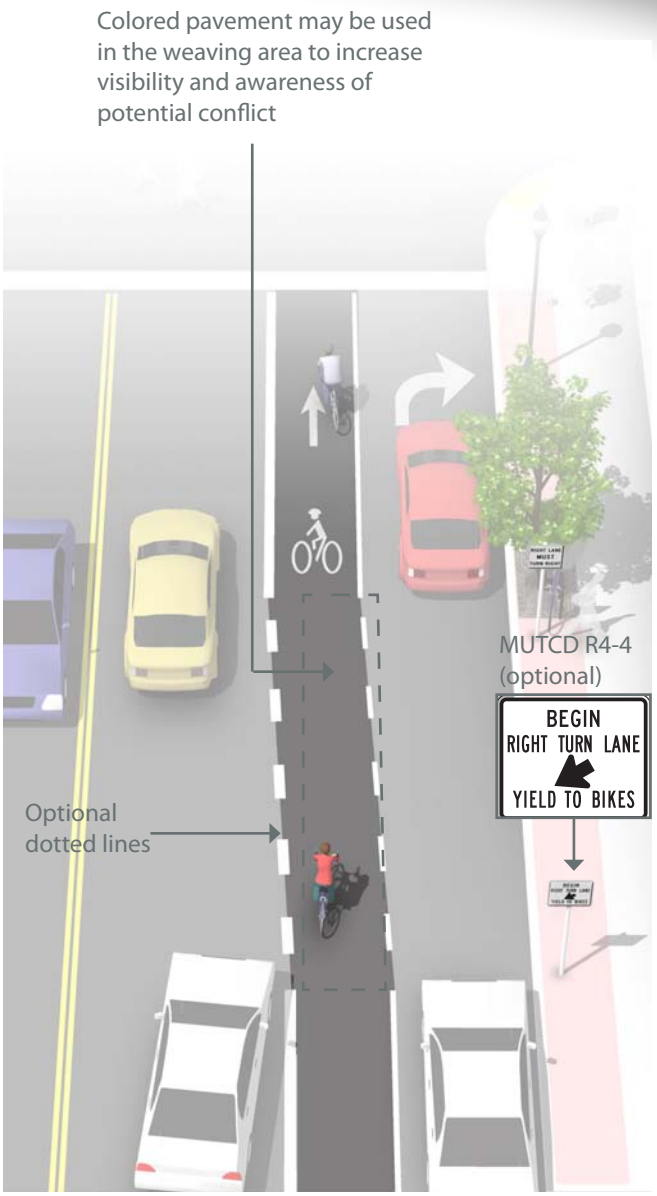
Guidance

At auxiliary right turn only lanes (add lane):

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using colored conflict areas to promote visibility of the mixing zone.

Where a through lane becomes a right turn only lane:

- Do not define a dotted line merging path for bicyclists.
- Drop the bicycle lane in advance of the merge area.
- Use shared lane markings to indicate shared use of the lane in the merging zone.



Discussion

For other potential approaches to providing accommodations for bicyclists at intersections with turn lanes, please see shared bike lane/turn lane, bicycle signals, and colored bike facilities.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.

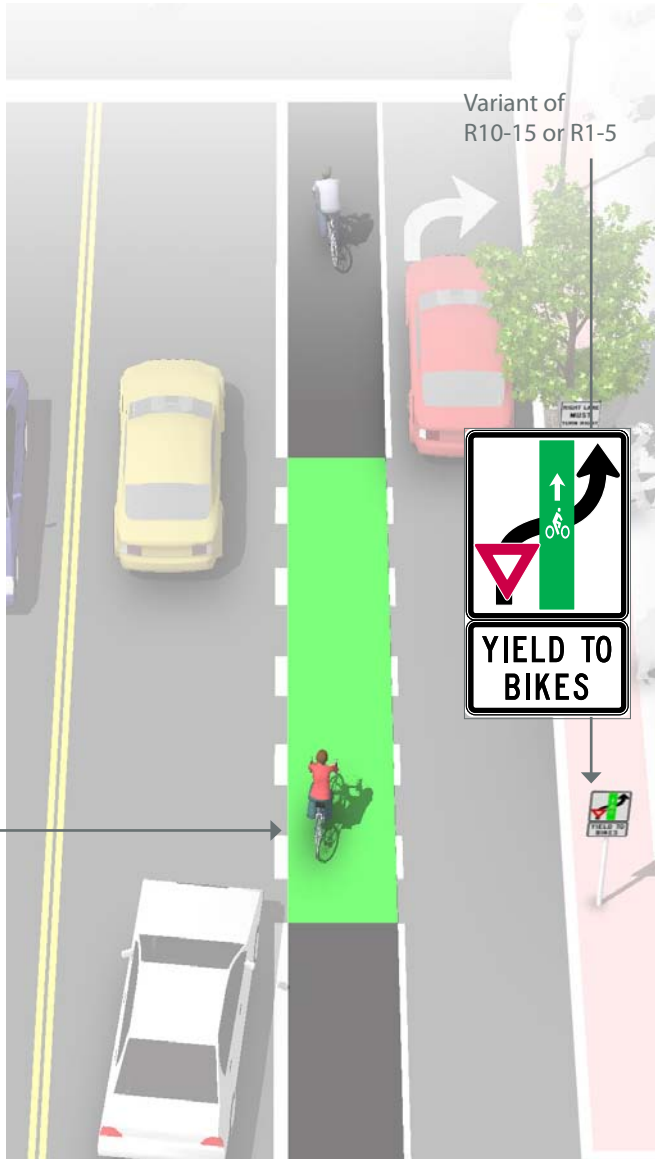
Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

Colored Bike Lanes in Conflict Areas

Description
Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

Guidance
- Green colored pavement was given interim approval by the Federal Highways Administration in March 2011. See interim approval for specific color standards.
- The colored surface should be skid resistant and retro-reflective.
- A "Yield to Bikes" sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.



Discussion
Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

Additional References and Guidelines
FHWA. (2011). Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10

NACTO. (2012). Urban Bikeway Design Guide.

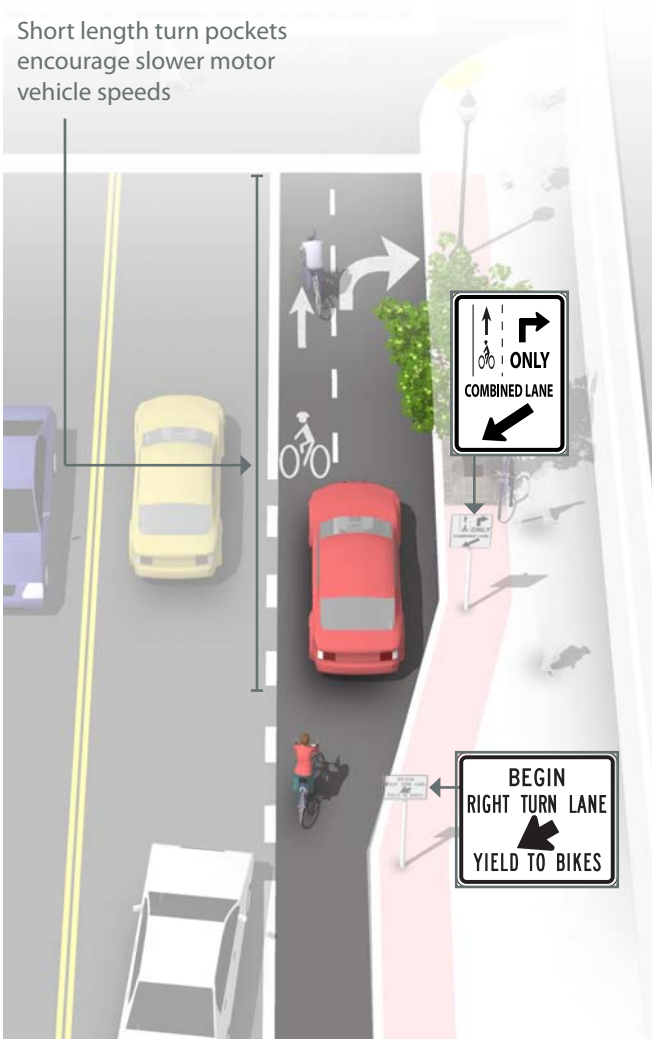
Materials and Maintenance
Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

Combined Bike Lane / Turn Lane

Description

The combined bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.



Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A "Right Turn Only" sign with an "Except Bicycles" plaque may be needed to make it legal for through bicyclists to use a right turn lane.

Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.

This treatment is currently slated for inclusion in the next edition of the AASHTO Guide for the Development of Bicycle Facilities

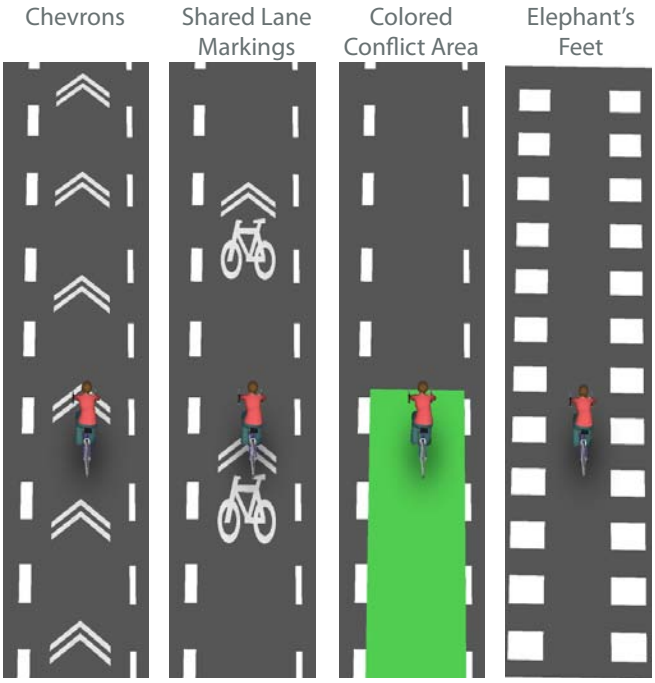
Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.

Intersection Crossing Markings

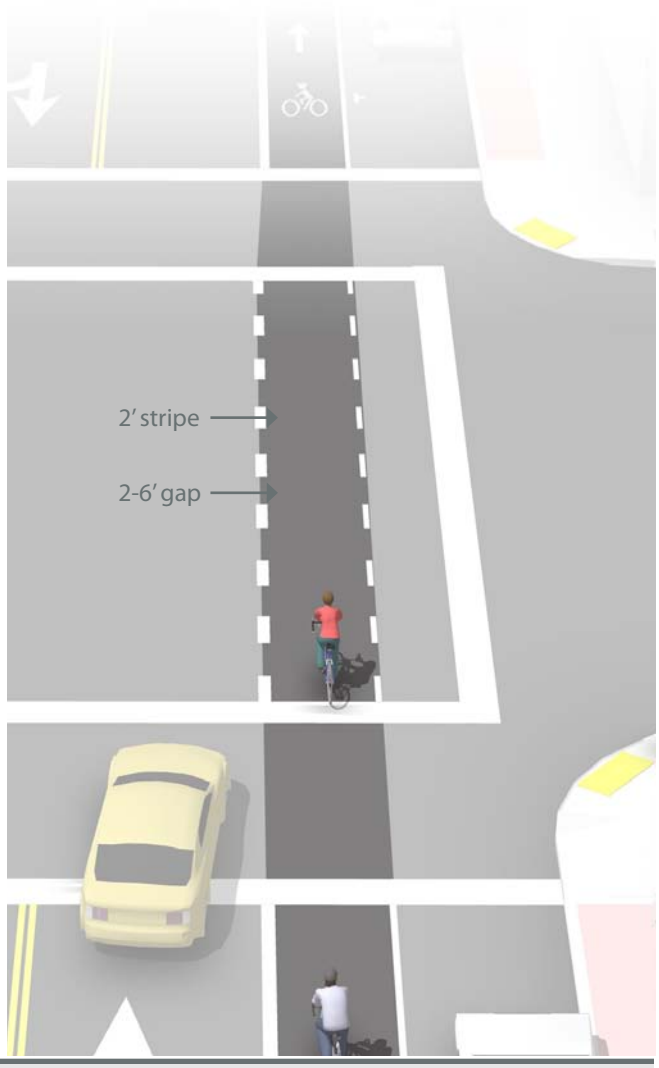
Guidance

- See MUTCD Section 3B.08: "dotted line extensions"
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or colored bike lanes in conflict areas may be used to increase visibility within conflict areas or across entire intersections. Elephant's Feet markings are common in Canada, and in use in Chicago, IL.



Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



Discussion

Additional markings such as chevrons, shared lane markings, or colored bike lanes in conflict areas are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices. (3A.06)
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

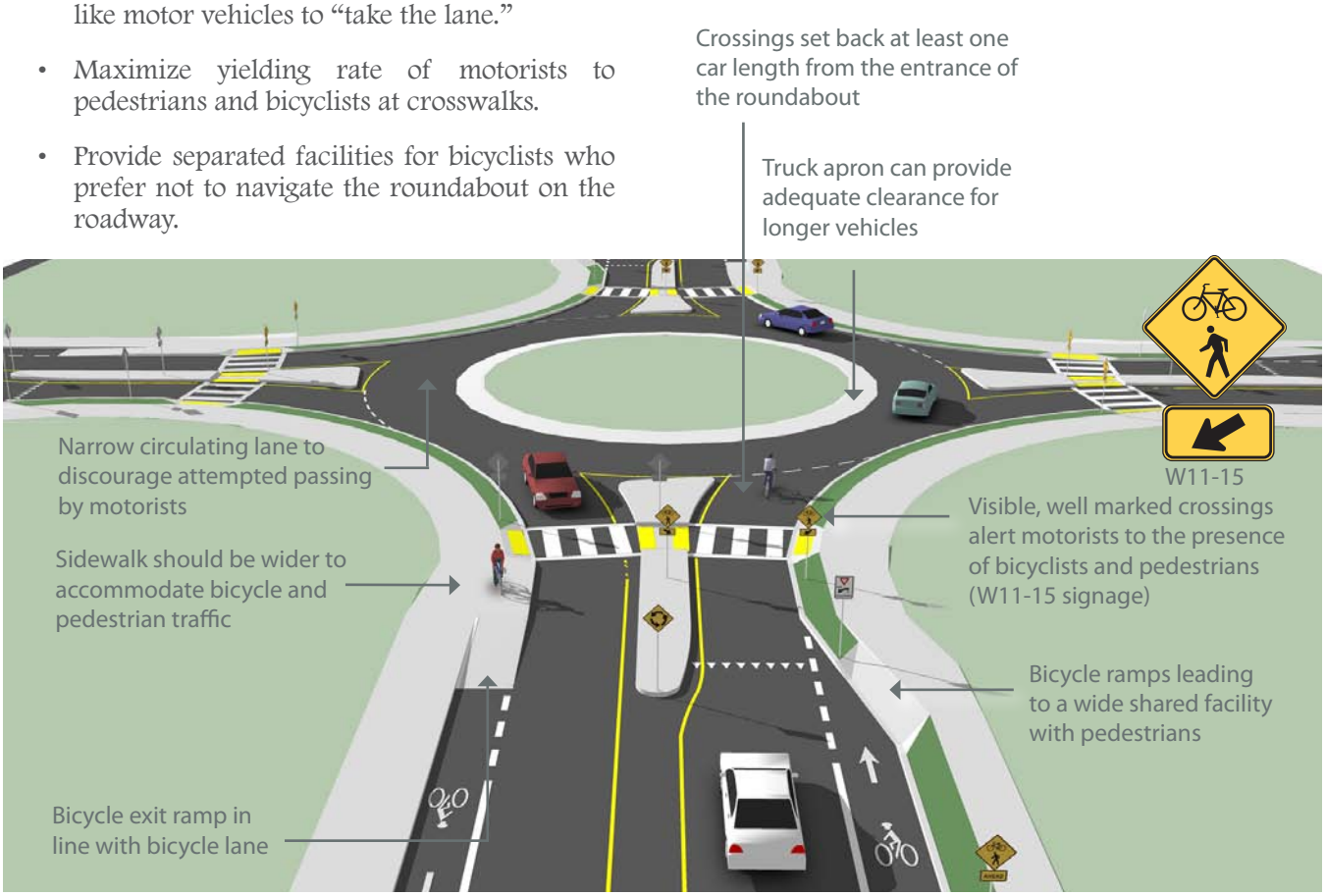
Bicyclists at Single Lane Roundabouts

Guidelines

- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to "take the lane."
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.

Description

In single lane roundabouts it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.



Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2000). Roundabouts: An Informational Guide
FHWA. (2010). Roundabouts: An Informational Guide, Second Edition.
NCHRP 672

Materials and Maintenance

Signage and striping require routine maintenance.

Signage Program

A comprehensive system of signage ensures that information is provided regarding the safe and appropriate use of all facilities, both on-road and on greenways. The bicycle network should be signed seamlessly with other alternative transportation routes, such as bicycle routes from neighboring jurisdictions, trails, historic and/or cultural walking tours, and wherever possible, local transit systems.

Signage includes post- or pole-mounted signs and pavement striping. Signage is further divided into information signs, directional/wayfinding signs, regulatory signs and warning signs. Trail signage should conform to the Manual on Uniform Traffic Control Devices and the American Association of State Highway Transportation Official Guide for the Development of Bicycle Facilities. Bicycle signage should also be coordinated with local colleges and universities.

Share the Road signs remind motorists that bicyclists have the right to ride on the roadway

The "Bikes Allowed Use of Full Lane" sign is currently used on an experimental basis in several cities.

Directional Signs

Implementing a well-planned and attractive system of signing can greatly enhance bikeway facilities by signaling their presence and location to both motorists and existing or potential bicycle users. Effective signage can encourage more bicycling by leading people to bikeways, and by creating a safe and efficient transportation option for local residents and visitors.

The signage examples to on page B-27 show a number of different signs and markings, both on poles and on the roadway. Wayfinding signs such as these improve the clarity of travel direction while illustrating that destinations are only a short ride away. The signs shown are provided only as a point of reference for the purposes of these guidelines and are not being adopted by Sanford.

Regulatory/Warning Signs

Regulatory and warning bicycle signage like the examples shown on page B-25 should conform to the Manual on Uniform Traffic Control Devices (MUTCD). The signage on page B-25 are examples of regulatory signs for bicycle (their labels are sign reference numbers for the MUTCD).

Special Purpose Signage

The "Share the Road" sign (to the left), is designed to advise motorists that bicyclists are allowed to share and have the right to cycle on narrow roadways with motor vehicles. For more on the "Share the Road Initiative" go to: http://ncdot.org/transit/bicycle/safety/programs_initiatives/share.html

Innovative signage is often developed to increase bicycle awareness and improve visibility (such as 'Bikes Allowed Use of Full Lane', bottom left). Special purpose signs to be installed on public roadways in North Carolina must be approved by NCDOT's Traffic Control Devices Committee and/or the City of Sanford. New designs can be utilized on an experimental basis with NCDOT approval.

R1-1

R1-2

R3-17

R3-17a

R3-17b

R4-1

R4-2

R4-3

R4-4


R4-7

R5-1b

R9-3c

R5-3


R5-6

R7-9

R7-9a


R9-3a

R9-5

R9-6

R9-7

R10-3

R10-22

R15-1

Bikeway Signing

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems.
Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

Sign Types


Sign Placement

This section includes:

- Sign Types
- Sign Placement

Sign Types

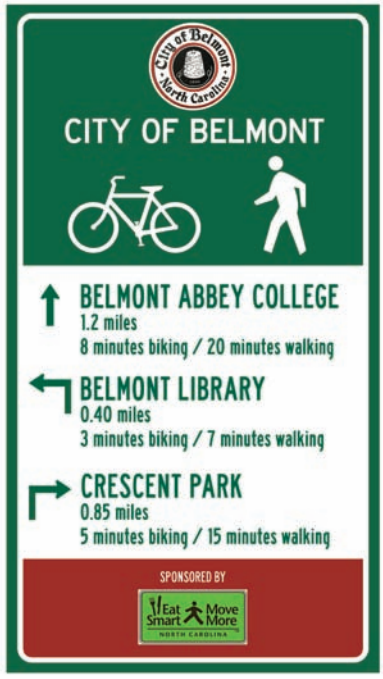
Description
A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

Confirmation Signs
Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route. Can include destinations and distance/time. Do not include arrows.

Turn Signs
Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings. Include destinations and arrows.

Decisions Signs
Mark the junction of two or more bikeways.
Inform bicyclists of the designated bike route to access key destinations.
Destinations and arrows, distances and travel times are optional but recommended.

Alternative Designs
A customized alternative design may be used to include pedestrian-oriented travel times, local city logos, and sponsorship branding.



Discussion
There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

Additional References and Guidelines
AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance
Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

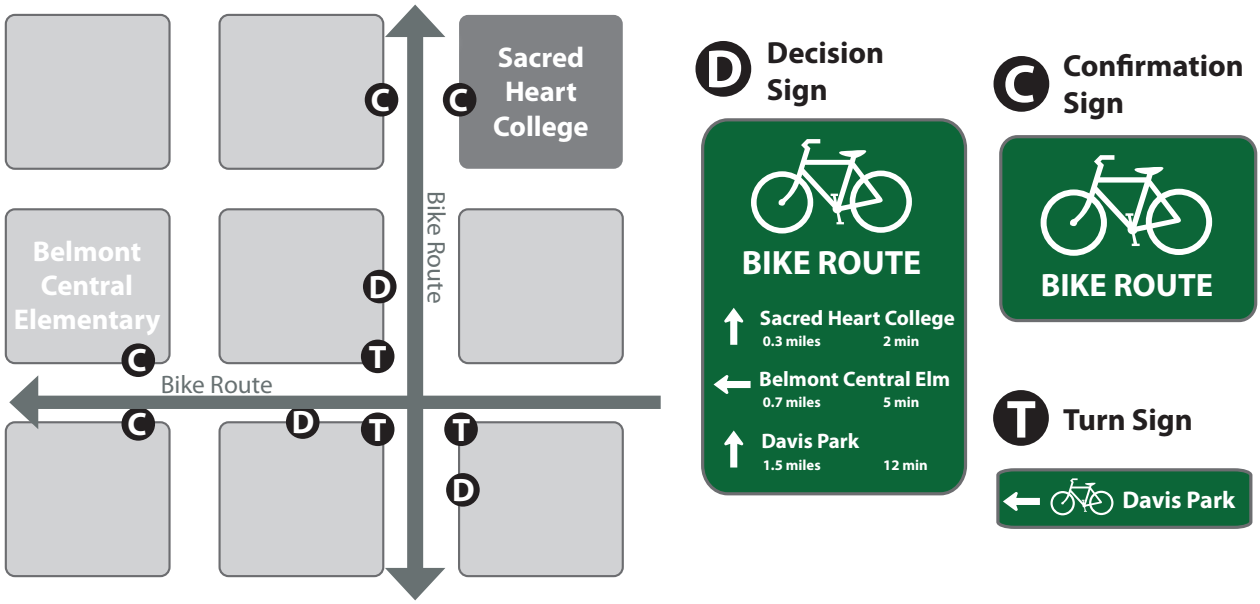
Sign Placement

Guidance
Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

Decisions Signs
Near-side of intersections in advance of a junction with another bicycle route.
Along a route to indicate a nearby destination.

Confirmation Signs
Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs
Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.



Discussion
It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Additional References and Guidelines
AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance
Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

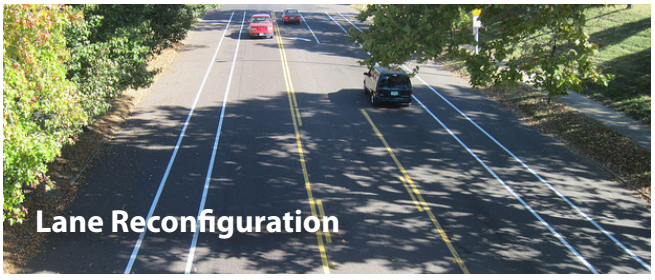
Retrofitting Existing Streets to add Bikeways

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.


Roadway Widening


Lane Narrowing


Lane Reconfiguration


Parking Reduction

This section includes:

- Roadway Widening
- Lane Narrowing
- Lane Reconfiguration
- Parking Reduction

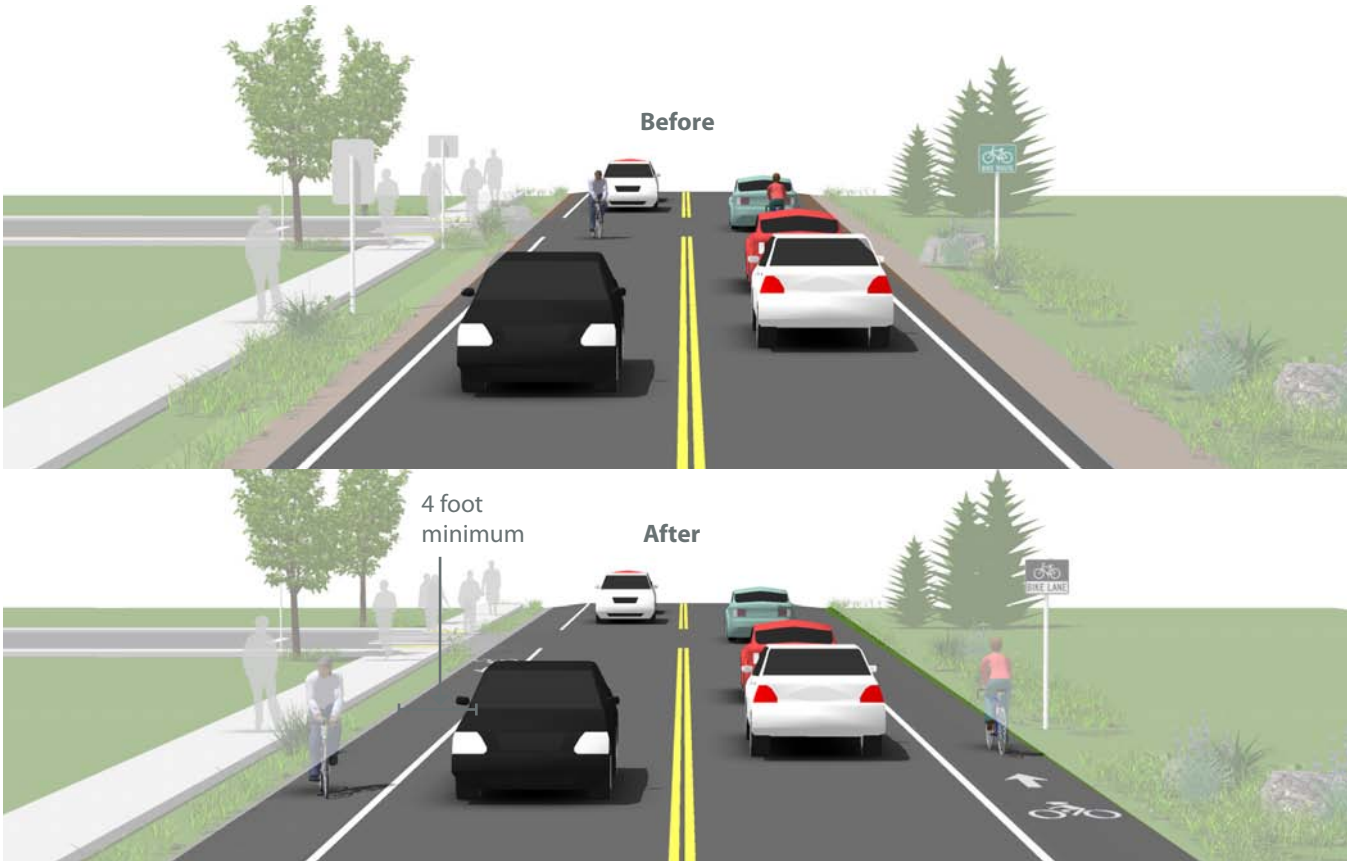
Roadway Widening

Guidance

- Guidance on bicycle lanes applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.

Description

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.



Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks.
If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

Lane Narrowing

Guidance

Vehicle lane width:

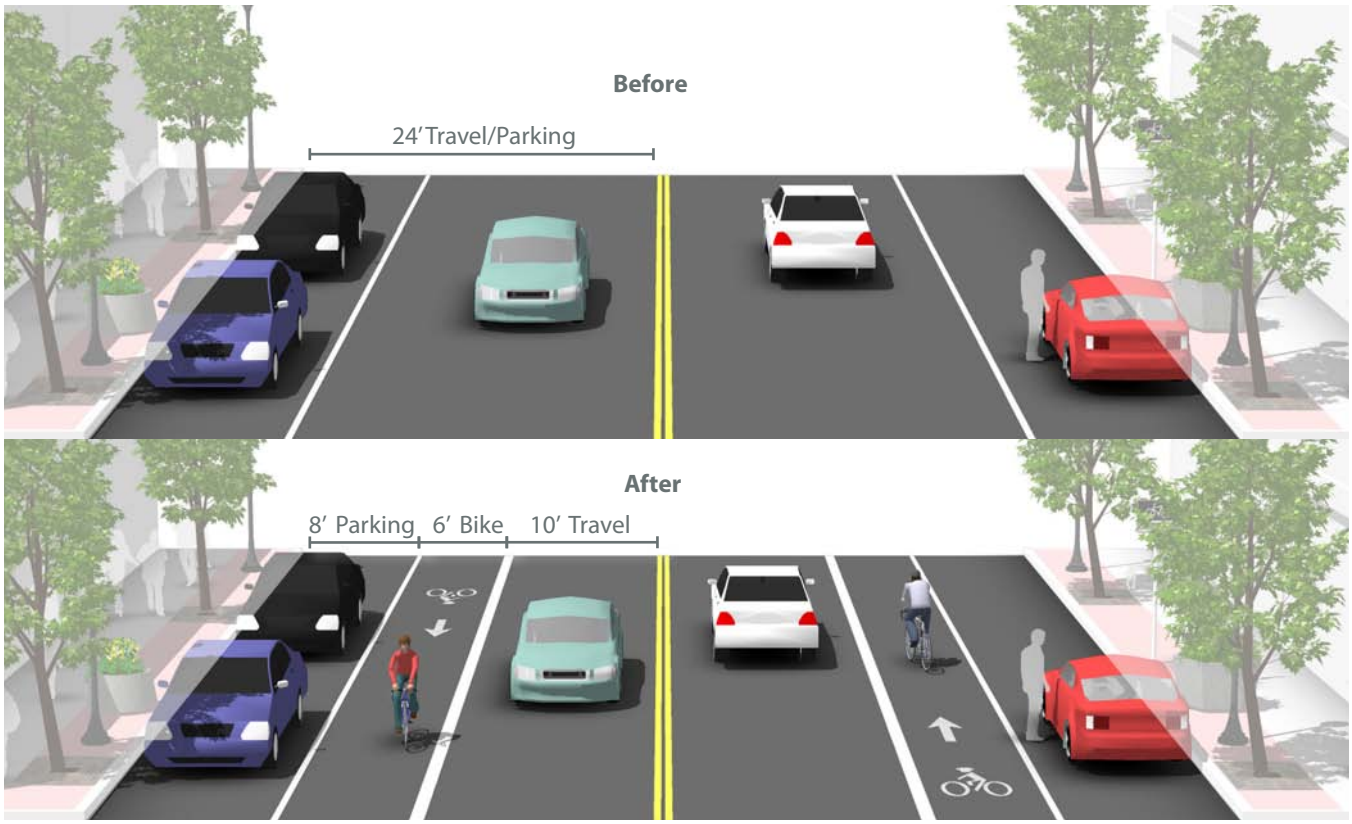
- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."*

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Lane Reconfiguration

Guidance

Vehicle lane width:

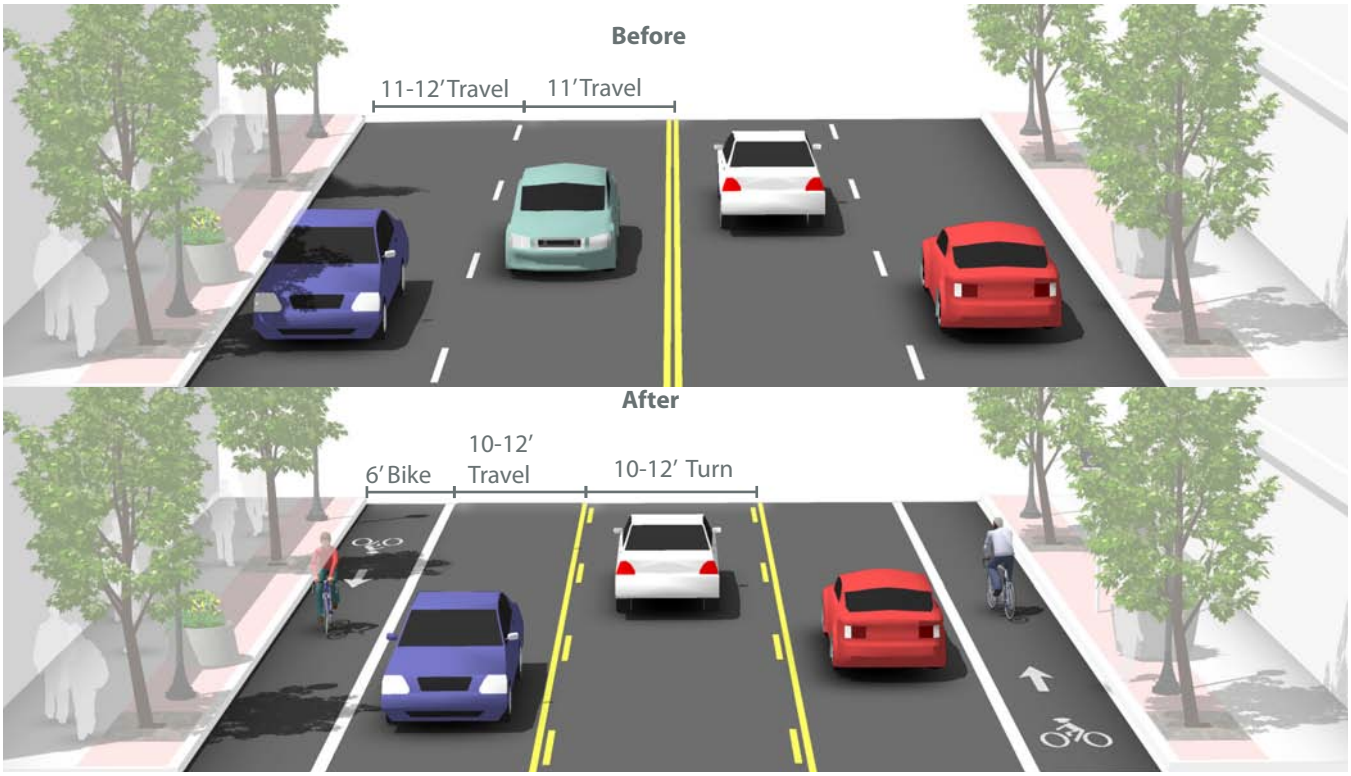
- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes. Publication Number: FHWA-HRT-10-053

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Parking Reduction

Guidance

Vehicle lane width:

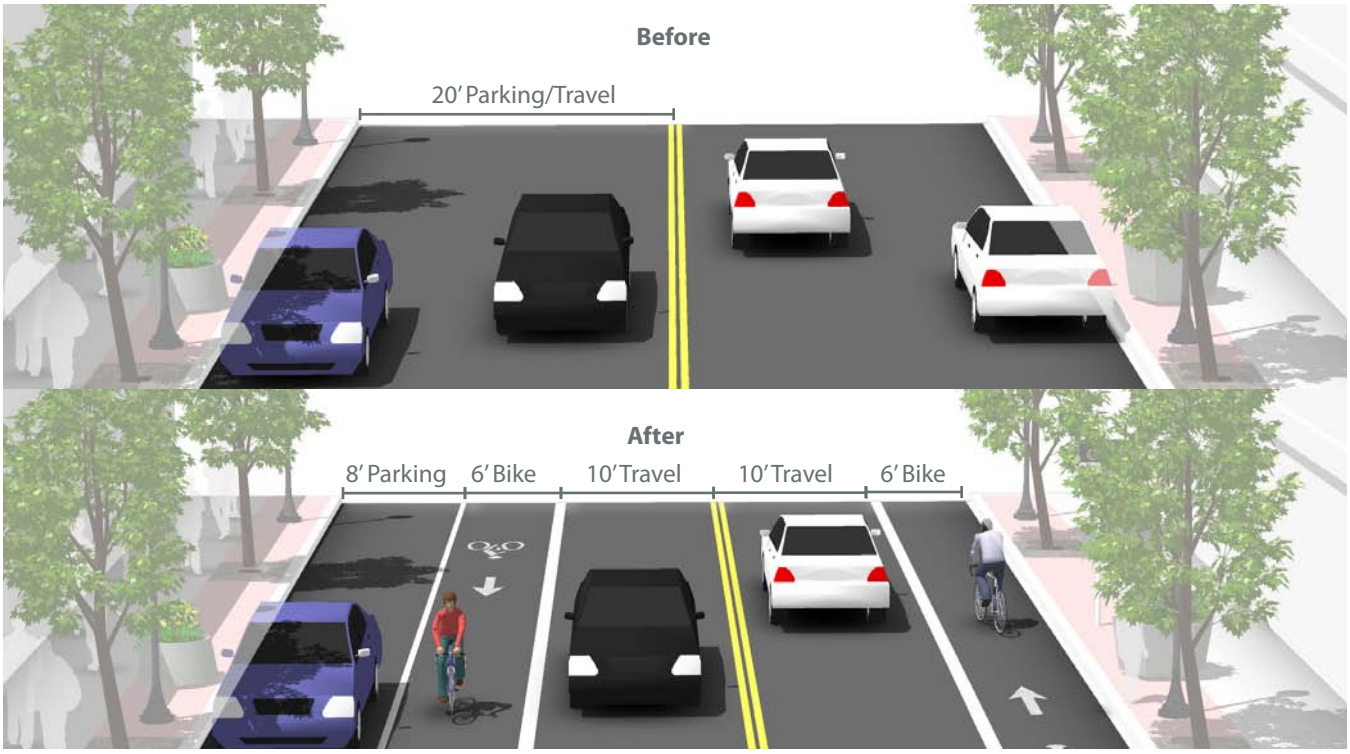
- Parking lane width depends on project. No travel lane narrowing may be required depending on the width of the parking lanes.

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.

Description

Bike lanes can replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. For example, parking may be needed on only one side of a street. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on approaching side streets and driveways.



Discussion

Removing or reducing on-street parking to install bike lanes requires comprehensive outreach to the affected businesses and residents. Prior to reallocating on-street parking for other uses, a parking study should be performed to gauge demand and to evaluate impacts to people with disabilities.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement

Greenways and Off-Street Facilities

A greenway (also known as a multi-use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

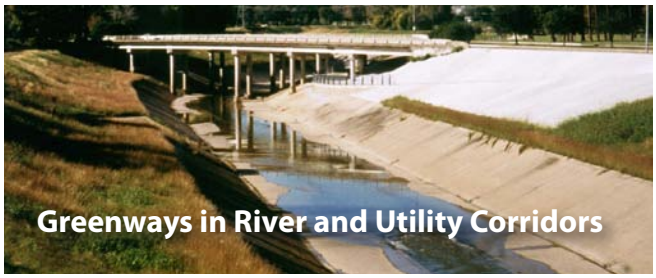
Key features of greenways include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.

This Section Includes:

- General Design Practices
- Trails in River and Utility Corridors
- Trails in Abandoned Rail Corridors
- Local Neighborhood Accessways
- Multi-Use Paths along Roadways


General Design Practices


Greenways in River and Utility Corridors


Greenways in Abandoned Rail Corridors


Local Neighborhood Accessways


Multi-Use Paths Along Roadways

General Design Practices

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of shared use paths along roadways. Also known as "sidepaths", these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Greenways in River and Utility Corridors

Guidance
Greenways in utility corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

Access Points
Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

Path Closure
Public access to the greenway may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

Description
Utility and waterway corridors often offer excellent greenway development and bikeway gap closure opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.

Discussion
Similar to railroads, public access to flood control channels or canals is undesirable by all parties. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all constitute risks for public access. Appropriate fencing may be required to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

Additional References and Guidelines
AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance
Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Greenways in Abandoned Rail Corridors

Guidance

Greenways in abandoned rail corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

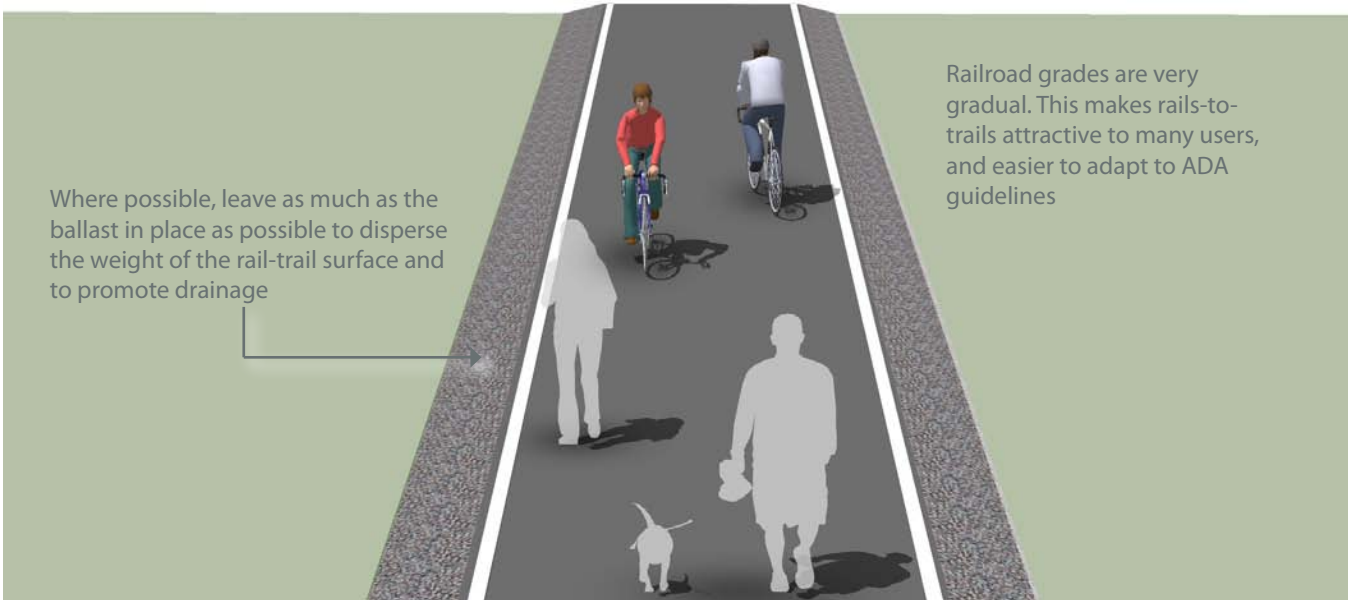
In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.

If converting a rail bed adjacent to an active rail line, see Greenways in Existing Active Rail Corridors.

Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use. The railroad may form an agreement with any person, public or private, who would like to use the banked rail line as a trail or linear park until it is again needed for rail use. Municipalities should acquire abandoned rail rights-of-way whenever possible to preserve the opportunity for trail development.



Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

Rail-to-trails can involve many challenges including the acquisition of the right of way, cleanup and removal of toxic substances, and rehabilitation of tunnels, trestles and culverts. A structural engineer should evaluate existing railroad bridges for structural integrity to ensure they are capable of carrying the appropriate design loads.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Local Neighborhood Accessways

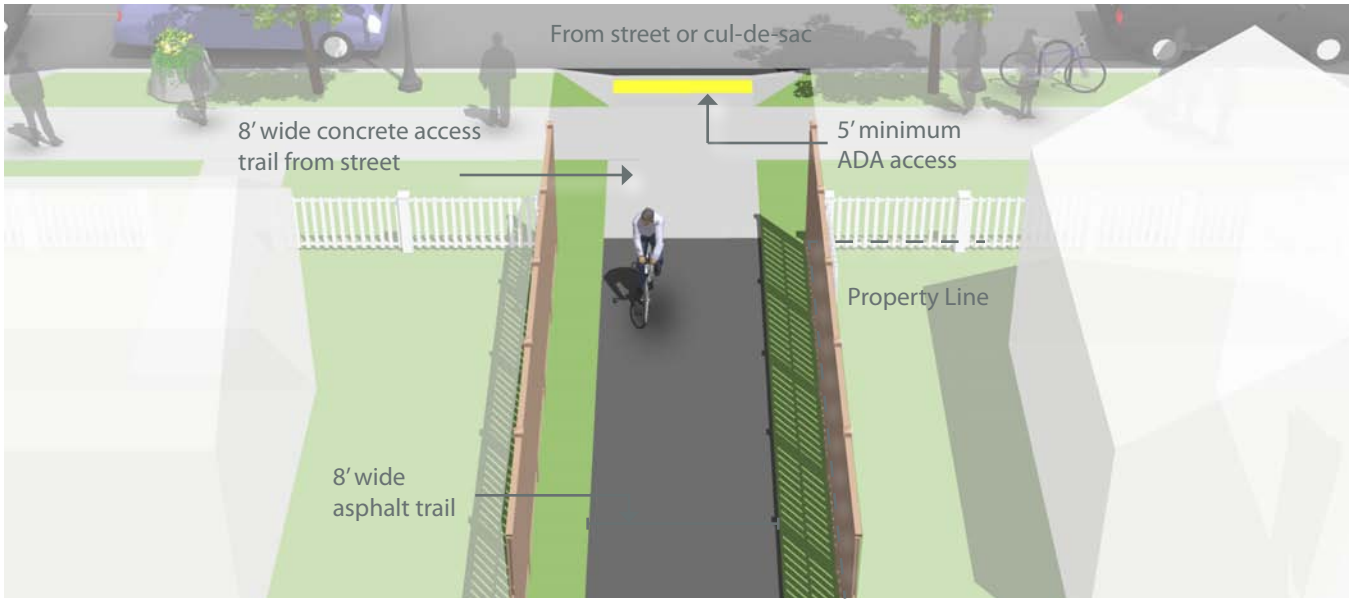
Guidance

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.

Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.



Discussion

Neighborhood accessways should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

For existing subdivisions, Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable. Nearby residents and adjacent property owners should be invited to provide landscape design input.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.

FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Multi-Use Paths Along Roadways

Description

A multi-use path allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.

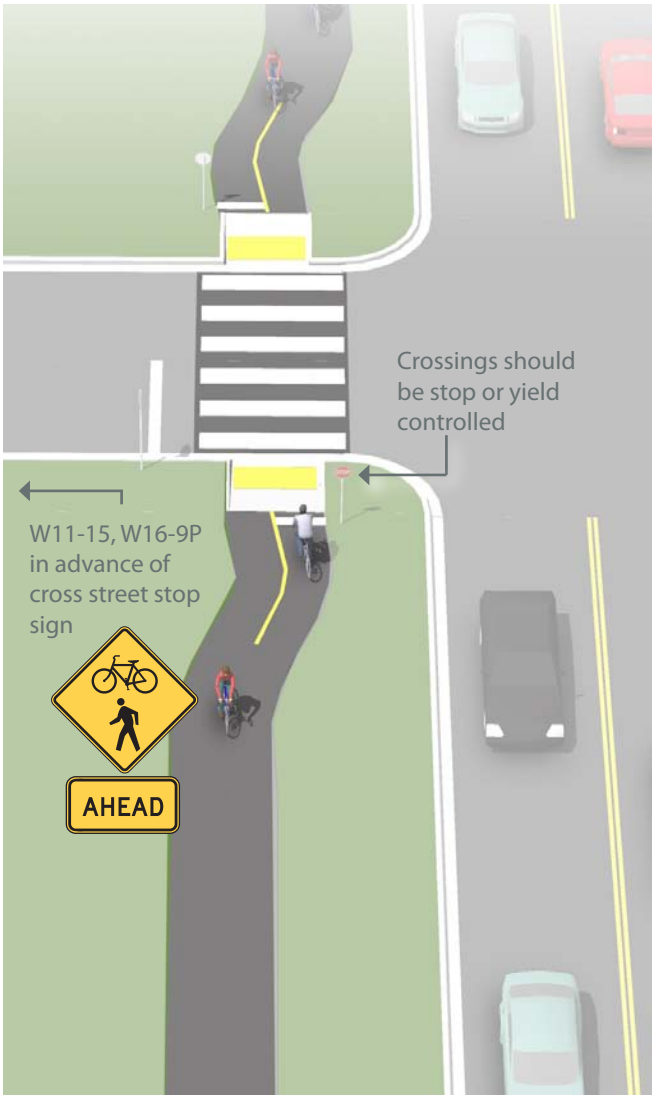
Along roadways, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where bicyclists enter or leave the path.

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of multi-use paths directly adjacent to roadways.

Guidance

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, rollerbladers and pedestrians. A separate track (5' minimum) can be provided for pedestrian use.
- Bicycle lanes should be provided as an alternate (more transportation-oriented) facility whenever possible.

Pay special attention to the entrance/exit of the path as bicyclists may continue to travel on the wrong side of the street.



Discussion

When designing a bikeway network, the presence of a nearby or parallel path should not be used as a reason to not provide adequate shoulder or bicycle lane width on the roadway, as the on-street bicycle facility will generally be superior to the "sidepath" for experienced bicyclists and those who are cycling for transportation purposes.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

NACTO. (2012). Urban Bikeway Design Guide. See entry on Raised Cycle Tracks.

NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Bikeway Support and Maintenance

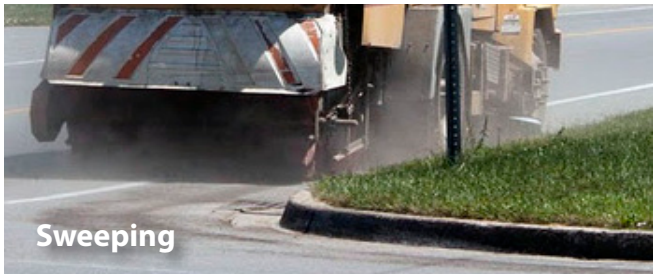
Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of 2 hours or less, or long-term parking for employees, students, residents, and commuters.

Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities.

Bicycle Racks


Sweeping

This Section Includes:

- Bicycle Racks
- Sweeping

Bicycle Racks

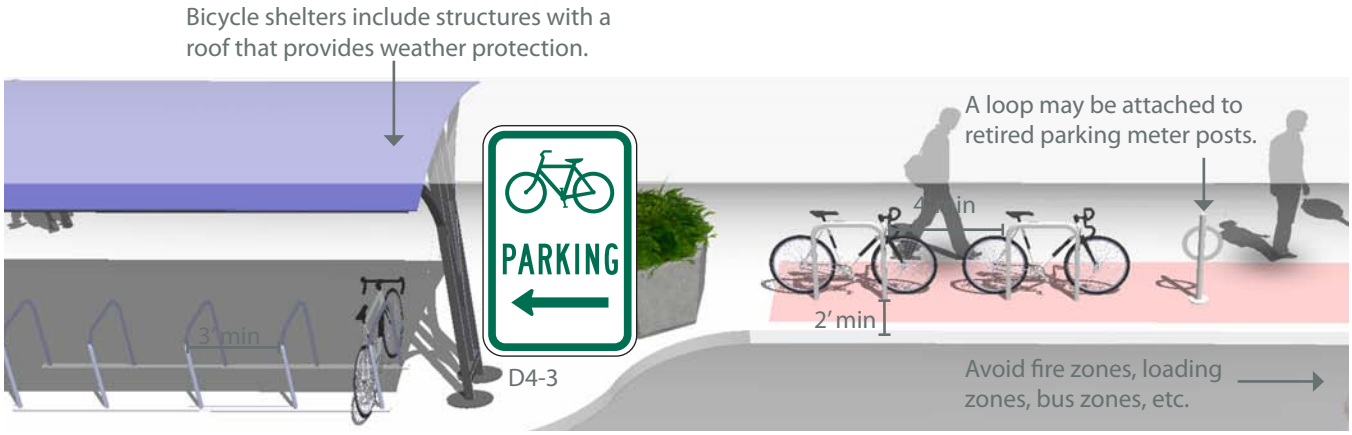
Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Locate racks in areas that cyclists are most likely to travel.

Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. Racks should:

- Support the bicycle in at least two places, preventing it from falling over.
- Allow locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.



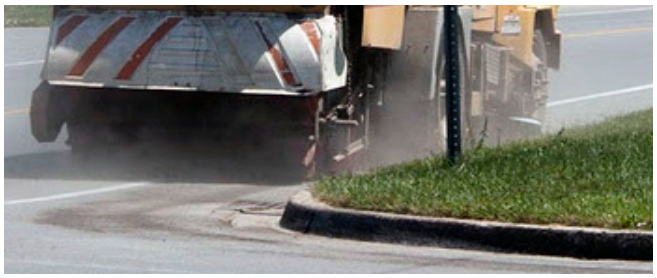
Sweeping

Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate .

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.



STANDARDS COMPLIANCE

Some of these treatments covered by these guidelines are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. An "X" marking in the following table identifies the inclusion of a particular treatment within the national and state design guides. A "-" marking indicates a treatment may not be specifically mentioned, but is compliant assuming MUTCD compliant signs and markings are used.

In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

	Manual of Uniform Traffic Control Devices (2009)	Guide for the Development of Bicycle Facilities (2012)	Urban Bikeway Design Guide (2012)	NCDOT Bicycle Facilities & Planning Design Guidelines
Signed Shared Roadway	X	X		X
Marked Shared Roadway	X	X	X	
Bicycle Boulevard		X	X	
Shoulder Bikeway	X	X		X
Bicycle Lane	X	X	X	X
Buffered Bike Lane	-	X	X	
Uphill Bicycle Climbing Lane	-	X	X	
Cycle Tracks	-	Called "one-way sidepath"	X	
Bike Lanes at Right Turn Only Lanes	X	X	X	X
Colored Bike Lanes in Conflict Areas	Interim Approval Granted	X	X	
Combined Bike Lane/Turn Lane	-		X	
Intersection Crossing Markings	X	X	X	
Bicyclists at Single Lane Roundabouts	-	X		
Wayfinding Sign Types	X	X	X	X
Wayfinding Sign Placement	X	X	X	X
Greenways	X	X		X
Shared Use Paths along Roadways	X	Discouraged		Discouraged

Existing Plans Summary C

Overview

Numerous plans have addressed topics related to non-motorized transportation in Sanford and Lee County. These plans address recommendations for bicycle and pedestrian improvements along city streets, and have suggestions for new greenway trails and regional bicycle routes. All of these documents represent important efforts, provide valuable insight and background, and have influenced the development of this Plan.

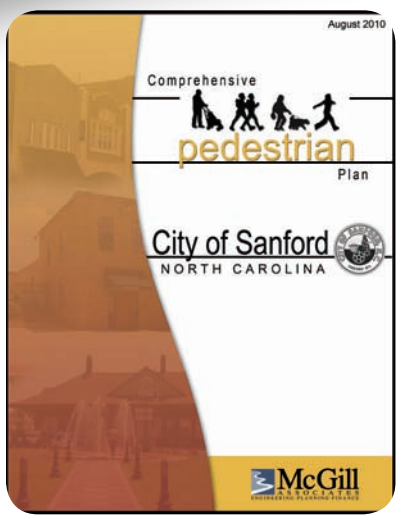
The following plans are reviewed and summarized below only as they relate to existing conditions and future needs for bicycle infrastructure. For further information, please consult the reviewed document in its entirety.

2010 Comprehensive Pedestrian Plan

Purpose & Relevance

Pedestrian facilities are the primary focus of this plan, in particular, sidewalks (located on City streets and state roads) and pedestrian safety. In addition, off-street pedestrian facilities such as greenways and multi-purpose trails are examined. The Comprehensive Pedestrian Plan delineates the location, implementation and maintenance of the proposed facility improvements, thereby creating a pedestrian network that allows for connectivity within the City.

Appendix Contents



Greenways

- The City and Lee County are building a greenway trail from Kiwanis Park to the Endor Furnace site on the Deep River. Another greenway trail is planned along the Little Buffalo Creek from the Depot Park, north to the Deep River. The two trails will be connected by the Deep River Trail, under development by the State.
- The Kiwanis Family Park offers the only dedicated recreational trails in the City at this time. The park has two miles of trails including a one mile fitness trail and a half mile greenway trail.
- Both SanLee Park and Tramway Park, located in Lee County have walking trails.
- The City of Sanford and Lee County are joining together to develop a 28 mile greenway trail loop. The greenway will have two separate components, one along the Big Buffalo Creek and the other along the Little Buffalo Creek. The two will be joined in the north by merging into the planned North Carolina State Deep River Trail.
- The Big Buffalo Creek segment (approximately 7 miles) will begin at the Kiwanis Family Park in Sanford. As of the date of the 2010 Comprehensive Pedestrian Plan NCDOT has begun work on the first 1.5 mile segment of the trail. The trail will eventually lead to the historic Endor Iron Furnace, located on the Deep River. The State of North Carolina is working with the Triangle Land Conservancy to develop the Deep River Trail through the property.
- As of the date of the 2010 Comprehensive Pedestrian Plan the City of Sanford has begun purchasing needed property along the Little Buffalo Creek within the city limits. This section of the trail through the City is seen as a pedestrian/bicycle connection between the City Government Center and Sanford's downtown.
- The plan contents includes greenway/trail recommendations, and cost estimates for proposed greenways.

Existing Pedestrian Corridors that may be relevant for bicycle corridors include:

- Horner Blvd/421
- Lee Avenue
- Hawkins Avenue
- 3rd Street
- Carthage Street/Charlotte Avenue
- Wicker Street/McIver Street

Proposed Pedestrian Corridors that may be relevant for bicycle corridors

- Woodland Avenue
- Fields Drive
- Vance Street
- Carbonton Road
- Spring Lane
- Weatherspoon Street
- 7th Street
- Bragg Street
- Rose Street
- Fire Tower Road
- Avents Ferry Road

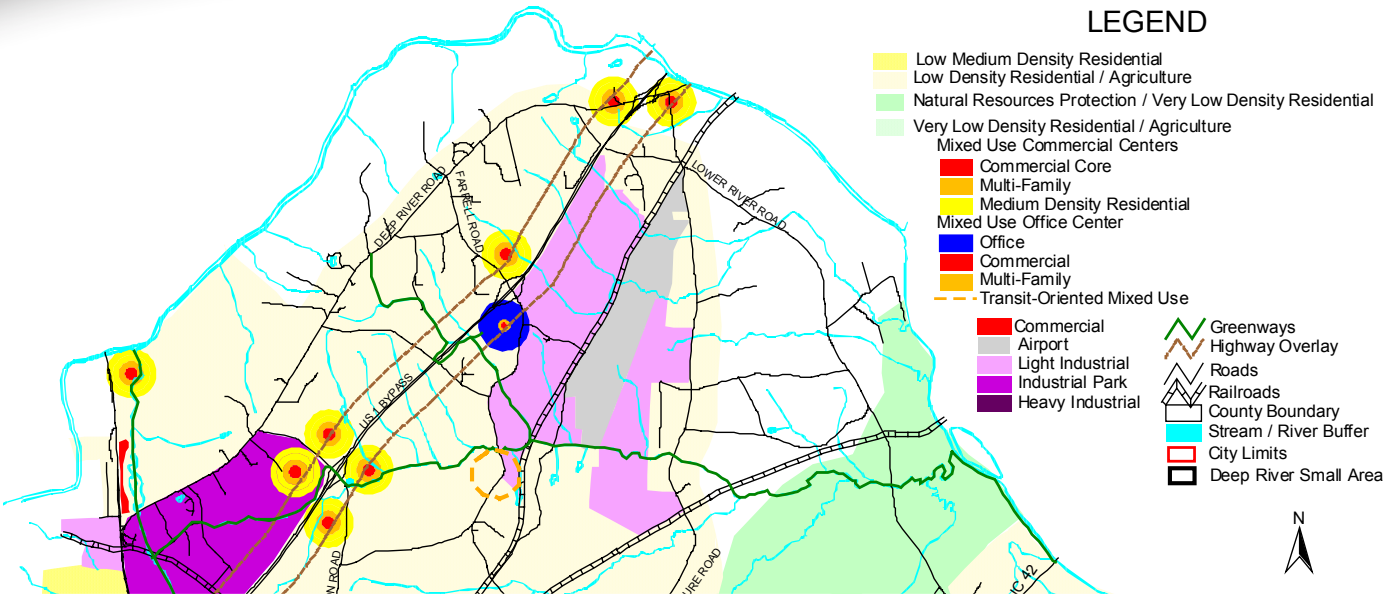
None of the public schools within the City of Sanford are connected to sidewalk (and assuming bicycle) facilities. The following destinations may be considered for observation during fieldwork for bicycling feasibility:

- All public schools: B. T. Bullock Elementary School, J. R. Ingram, Jr. Elementary School, SanLee Middle School, West Lee Middle School, East Lee Middle School, Lee County High School, Southern Lee High School, Central Carolina Community College, Bragg Street Academy, Montessori School of Sanford.
- Major gateways into downtown.
- Public parks and recreation facilities, including Kiwanis Family Park, Kiwanis Children's Park, and Depot Park, Temple Park, Horton Park, Dalrymple Park, Weatherspoon Courts, O. T. Sloan Park, Lion's Club Fairgrounds, Wicker Gymnasium, Bob E. Hales Recreation Center.

Recommended greenway corridors:

- Big Buffalo Creek Greenway South (along sewer easements from Kiwanis Family Park to Tramway Road).
- Church Street Connector (branch off BBC Greenway south and connect to Girls and Boys Club on Church Street).
- Horton Park Connector (along sewer easements from BBC Greenway south along north and east perimeters of Horton Park).
- Garden Street Greenway (connect residents with central Sanford, Horton Park, and BBC Greenway south).
- Jonesboro Greenway (along sewer easement from Buchanan Park south).
- Jonesboro Connector (Jonesboro Greenway to J Glenn Edwards Elementary School).
- Sanford Loop Greenway (along utility easements west from BBC Greenway south and then NE to Endor Iron Furnace Greenway and River Birch Shopping Center).
- Sanford Greenway (from River Birch Shopping Center NE to planned Little BC Greenway).
- McCracken Heights Greenway (will connect McCracken neighborhood with Sanford Greenway and BBC Greenway north).
- Bullock Greenway (from Endor Iron Furnace Greenway to Bullock Elementary and the Sanford Greenway).
- Highland Connector (neighborhoods NW to the Endor Iron Furnace Greenway).
- Sanlee Park Greenway (from CCCC campus to Sanlee Park).
- Sanlee Connector (along utility easements from neighborhoods to Sanlee Park Greenway and Sanlee Park.
- Atlantic and Western RWT or RTT (possibility of shared use ROW with Atlantic and Western RR, would connect east Sanford).
- South SanLee Greenway (6 miles along inactive rail line from DT Jonesboro through Lee County to the Harnett County line).

Deep River Small Area Land Use Map
Source: Deep River Small Area Plan



Deep River Small Area Plan

The Deep River Small Area plan sets goals for accommodating growth in Sanford while preserving property rights, neighborhood character, and natural habitat and resources. As of 2001 when this plan was produced, there were no recommendations for walking or biking facilities in the Deep River area. State Bicycle Route 1 passes through Deep River on Lower Moncure Road to Sanford, but the road does not have any bicycle facilities (no bike lane or wide paved shoulder) as of 2001. Before this plan, no pedestrian corridors had been identified in the Deep River area. The Deep River Land Use Plan map (see map above) shows recommendations for greenways.

As of the date of this plan, the City of Sanford and Lee County plan to acquire a buffer and construct a greenway along portions of Little Buffalo Creek in the downtown area with the help of a Clean Water Management Trust Fund grant.

Greenway recommendations:

- Extend the planned Little Buffalo Creek Greenway north to the Deep River, as indicated on the Deep River Land Use Plan map shown above.
- Connect the Deep River Elementary School with the Little Buffalo Creek Greenway, and with the Cape Fear River by way of a greenway running along a potential sewer easement route, as indicated on the Deep River Land Use Plan map shown above.

City of Sanford Community Development Plan – 2008

The Community Development Plan of 2008 focuses on community development needs including housing and specific neighborhoods needing general infrastructure improvements. Certain streets needing improvements are highlighted; however, specific discussion of bicycle facilities is limited.

The notes outlined below were included because of the potential to directly or indirectly affect bicycle facilities and may be useful for current bicycle planning efforts.

The following grants potentially related to bicycle facilities were received prior to 2008:

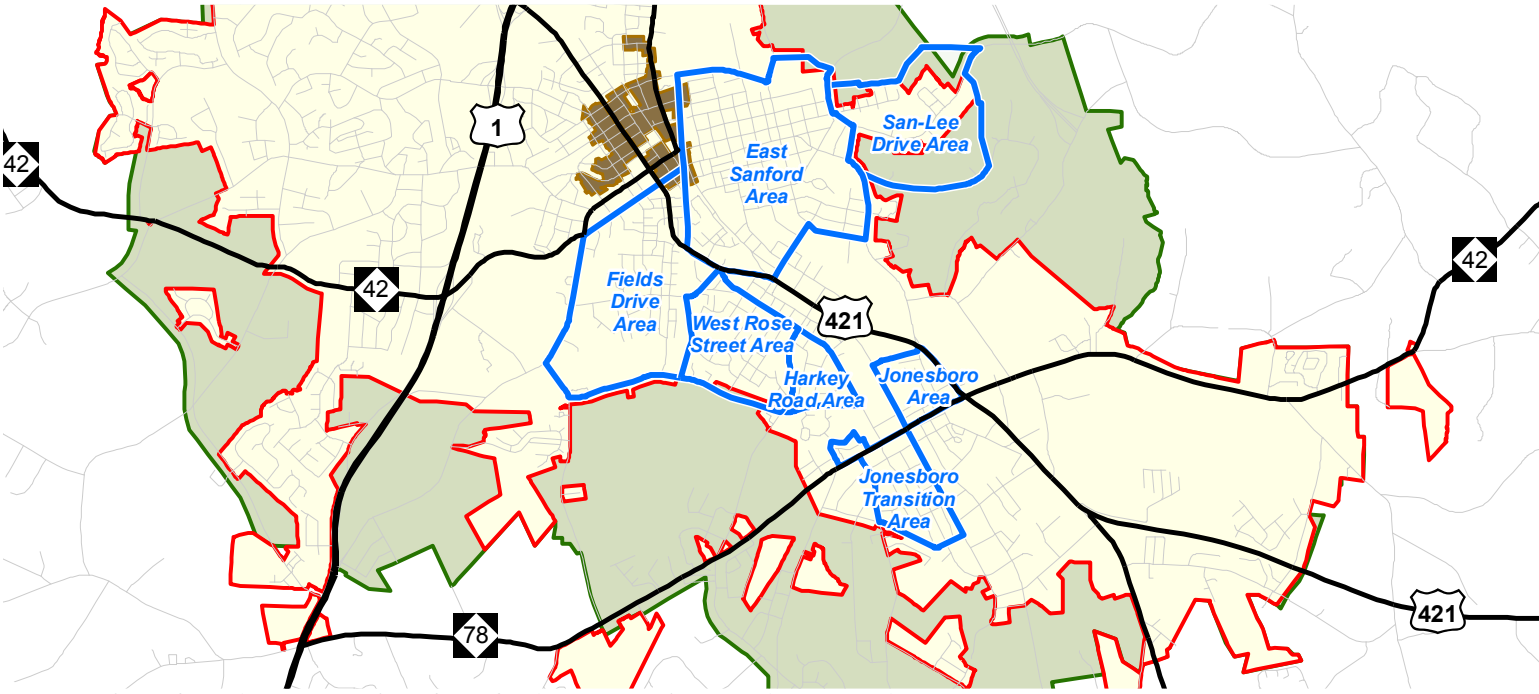
YEAR	GRANT	TOTAL	SOURCE
1999	Clean Water Management Trust Fund	$765,000	NCCWMTF
2002-2006	Revitalization Strategies	$1,750,000	NCDCA
2002	NC DOT Enhancement	$92,722	NCDOT
2003	CDBG-Urban Redevelopment	$900,000	NCDCA
2004	NC DOT Enhancement	$182,267	NCDOT
2006	Urgent Repair Program	$75,000	NCHFA

East Sanford Study Area as prime focus area for community revitalization (see map below to reference study area locations)

The housing stock in the East Sanford Study Area will continue to experience a high rate of deterioration. Due to the limited income potential for rental properties within the area, owners will avoid spending money to fix deteriorated dwellings. As dwellings continue to be neglected by property owners, blight and deterioration will increase unless the City steps in to stabilize the area. The combination of these factors makes East Sanford a prime focus area for community revitalization.

Jonesboro Study Area

Increasing development and traffic volumes along Horner Boulevard have resulted in increased volumes of cut-through traffic through the neighborhood and increased pressures to transition from residential to commercial uses. Increased traffic decreases pedestrian safety and interrupts neighborhood cohesiveness. The average per square foot housing value in the Jonesboro Study Area is significantly lower than the other study areas. The properties and infrastructure located along Dalrymple, Stone, Globe and Buchanan streets have severe and immediate needs.



Location of Study Areas - City of Sanford Community Development Plan

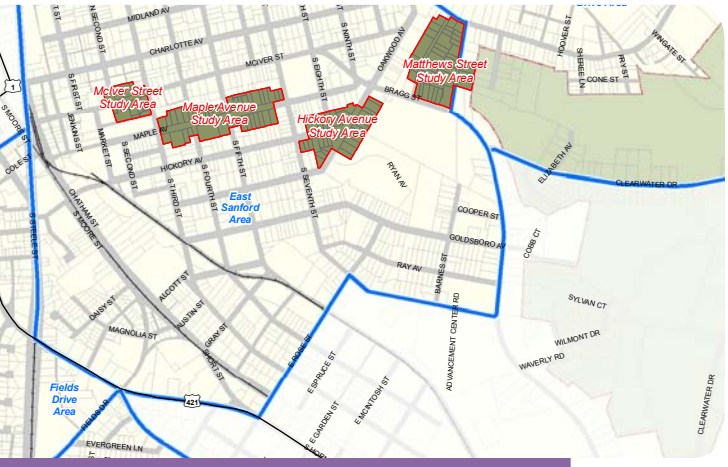
Jonesboro Transition Study Area
The greatest infrastructure needs within the Jonesboro Transition Study Area are along Maybee Hill Drive and Humber Street which are not paved and have inadequate right-of-way.

San-Lee Drive Study Area
Both Cone Street and Fry Street are unpaved and need improvements.

West Rose Street Study Area
Within the West Rose Street Study Area, development has taken place along a private drive known as Martin Street. Several homes have been built with inadequate access for delivery of public services. To address this issue, the street needs to be improved to city standards which would require acquisition of public right-of-way, pavement and drainage improvements.

Infrastructure Needs – Streets
The City of Sanford has more than 2.5 miles of unpaved streets. Most of these streets do not meet minimum right-of-way standards and have poor storm water drainage. Unpaved streets within the seven study areas include Ashe Street, Cone Street, Fulton Street, E. Globe Street, Maybee Hill Drive, Sheree Lane, and W. Humber Street.

East Sanford Study Area
Of the seven study areas, the East Sanford Study Area appears to have the greatest and most pressing needs for housing and infrastructure assistance.



Focus Areas - City of Sanford Community Development Plan

Funding Opportunities
Six focus areas were identified for more detailed investigation for possible Community Development Block Grant (CDBG) funding opportunities (see map on the left). Four of the focus areas – McIver Street, Maple Avenue, Hickory Avenue, and Matthews Street – are located within the East Sanford Study Area. The fifth focus area – West Humber Street – is located in the Jonesboro Transition Study Area and the sixth focus area – Dalrymple Street – is located in the Jonesboro Study Area.

Action Plan
Inventory vacant lots, identify properties with potential for park, open space or greenway development.

Sanford & Lee County 2020 Land Use Plan

(1999, updated 12/2010)

Purpose & Relevance
The identification and appropriate recreational development of a system of open space greenways within the planning area should be encouraged. The use of natural corridors, such as stream flood plains, and secondarily, man-made corridors, such as utility and transportation right-of-way and easements, should be emphasized. In addition, acquiring land and then developing major public recreation areas along the Cape Fear River and Deep River areas, opening a multi-county state park, establishing greenways, and preserving farm land will enhance the quality of life in the Community.

Downtown Enhancement Master Plan – 2011

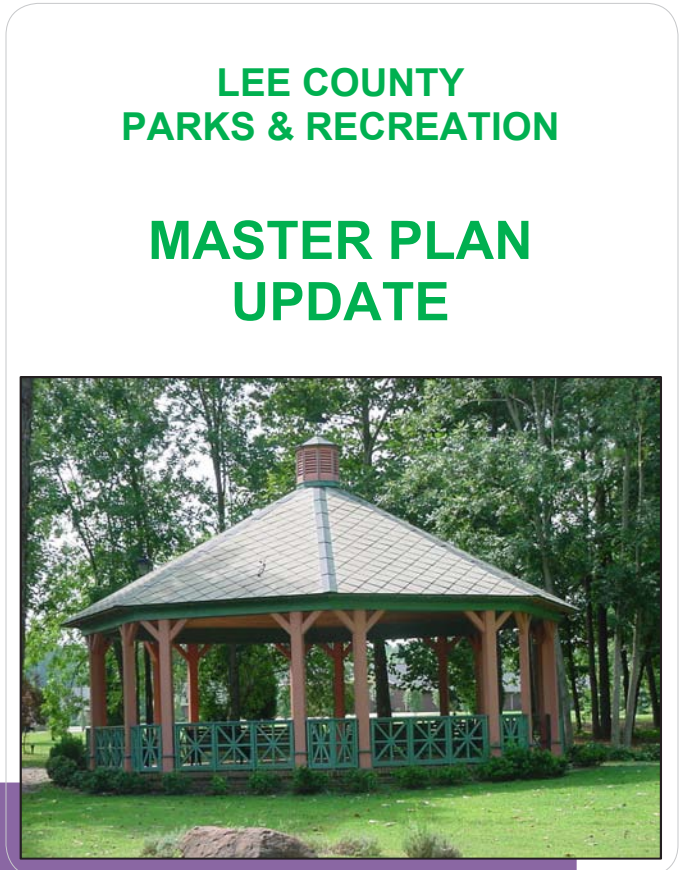
The purpose of the downtown master plan is to provide a framework and vision for revitalization of the downtown area, focusing on aesthetics and economic opportunities as well as emphasizing accessibility, traffic flow, and safety. This plan does not directly include considerations for bicycle usage and facilities, but walkability and pedestrian needs are incorporated.

The following recommendations for streets and intersections highlighted in the map below are included (for pedestrians in general), and have the potential to affect bicycle users and planning:

- Cathage Street and Steele Street intersection improvements.
- Moore Street streetscape enhancements.
- Streetscape improvements on Carthage Street – between Horner Blvd and Moore Street.
- Streetscape improvements on Carthage Street – between Horner Blvd and Wicker Street.
- Gateway improvements at Wicker Street and Carthage Street intersection.
- Gateway improvements at intersection of Main Street and Lee Avenue.

Downtown Sanford Master Plan - Existing Conditions Map - Unsafe Intersections

2010 Lee County Master Plan for Parks & Recreation Update



Lee County Parks and Recreation Master Plan Cover

Purpose & Relevance

Improve facilities by connecting to or continuing existing greenways and trails. Support and encourage non-motorized links within the community as well as to adjacent communities and regional trail systems.

Goals

It is very important to maintain existing facilities in a safe and accessible condition. Providing quality facilities that are clean, with equipment that is safe, with trails and walks that are free of hazards, with plumbing and lighting that is maintained contributes to the leisure experience and increases the appreciation of the facility by the user.

Facilities

Lee County currently owns and manages 323.15 (includes 10-acre gift adjacent to Sloan Family Park) parks and recreation acres. Lee County manages several trails and greenways including Big Buffalo Creek that contains a 0.7 mile trail. The County also leases a 7,700 square foot gymnastics facility.

There are two Regional Park facilities in Lee County. San-Lee Park is 160 acres and offers a nature center in addition to varied amenities and recreational facilities in a natural and serene environment such as RV parking, camp grounds, and hiking and mountain bike trails. Big Buffalo Creek Greenway will be a seven mile greenway along the scenic Deep River that flows from Kiwanis Family Park down to Endor Iron Furnace.

The citizens of Lee County enjoy ample trail systems for leisure walking, running, and biking. The Parks and Recreation Department currently maintains four (4) walking trails for a total of two (2) miles; hiking trails totaling four (4) miles; and mountain biking trails totaling five (5) miles. NRPA Standards only require one (1) trail system per region, and the Department has worked diligently to insure that needs are currently being met by offering variety. The Department intends to connect portions of isolated walking trails to the main network to guarantee continuity of surface material.

Lee County Comprehensive Transportation Plan 2011

Bicycle Element

The Lee County CTP includes the following bicycle facilities recommendations. These facilities are depicted in the map below.

1. Big Buffalo Creek Greenway

An off-road bicycle facility is proposed on the Big Buffalo Creek Greenway spanning from Carthage Street (SR 1237) approximately where it intersects with Fields Drive (SR 1107) north to the railroad tracks near Iron Furnace Road (SR 1463).

2. Little Buffalo Creek Greenway

An off-road bicycle facility is proposed on the Little Buffalo Creek Greenway from Charlotte Avenue north to the Chatham County line.

On-street bicycle facilities are recommended along several county roadways to serve as connections for the off road portions of the trail. Bike lanes are recommended on US Bike Route 1 (The Carolina Connection), which enters northern Lee County at the Chatham County line and exits southern Lee County at the Moore County line. This route coincides with portions of Carthage Street and Charlotte Avenue in Sanford.

3. Hawkins Avenue (US 1 BUS)

Widen and upgrade facility to a 4-lane, divided boulevard from US 1 to Burns Drive (SR 1406). Recommendations include bicycle lanes along the entire roadway length. The intersection of Hawkins Avenue (US 15-501) at Burns Drive (SR 1406) is recommended for a roundabout.

4. NC 87

A wide shoulder that will also serve as a bicycle lane is proposed from Cox Mill Road (SR 1529) to Swanns Station Road (SR 1144).

Lee County CTP- Bike Facilities Map

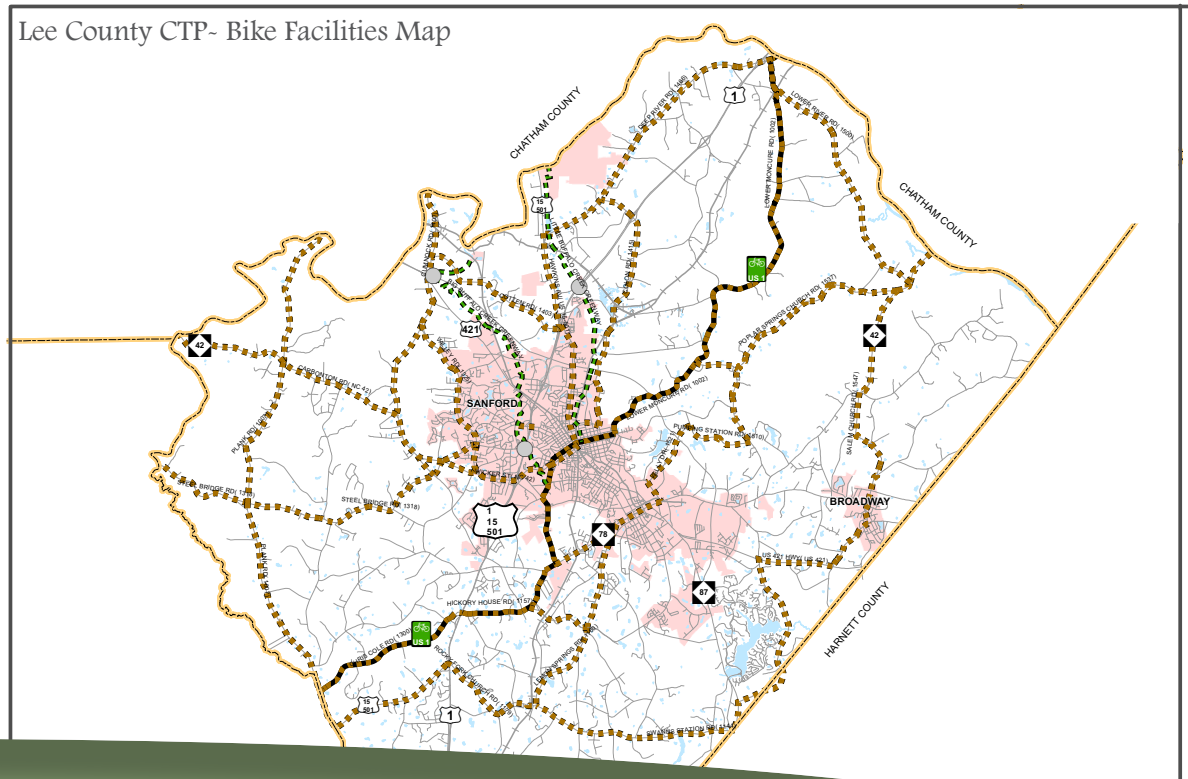


Figure 1, Sheet 4
Bicycle Map

LEE COUNTY
Comprehensive Transportation Plan

Plan date: October 8, 2007

Bicycle Routes

On-road
- Existing
- Needs Improvement
- Recommended

Off-road
- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

Miles
0 1 2 3

2005 Greenwood Small Area Plan

The Greenwood Small Area Plan studies the area located in the southern part of Lee County. The Greenwood Area is bounded by Center Church Road and the City of Sanford's jurisdiction on the north, by NC Highway 87 on the east, by Moore and Harnett Counties on the south and west. The Lemon Springs, Tramway, White Hill, and Murchisontown communities are located in this area.

Greenwood Area Goals and Strategies

The Greenwood Small Area Goals represent the community's vision for the future of the Greenwood Area. These goals are grouped under the three overall principles identified in the Sanford/Lee County 2020 Land Use Plan. The Greenwood Area Strategies explain how the community intends to reach these goals.

Summary of Greenwood Area Goals

GOAL 1.
Growth and development which does not overburden roads, schools, utilities, or police and fire services.
GOAL 2.
Balanced tax base which allows tax rates to remain low.
GOAL 3.
Protection of the rights of individual property owners.
GOAL 4.
Preservation of low-density, quiet, rural neighborhoods.
GOAL 5.
Concentration of higher-density growth in planned, mixed-use employment and residential centers.
GOAL 6.
Preservation of forests, open space, and farmland.
GOAL 7.
A system of parks and greenways.
GOAL 8.
Sign, building, and landscaping design standards that maintain the rural character of the area.
GOAL 9.
Protection of natural habitat and water quality.
GOAL 10.
Land uses which are appropriate for the area and are compatible with the desires of the local community.

Pedestrian and Bicycle Features

The North Carolina Department of Transportation web sites http://www.doh.dot.state.nc.us/preconstruct/traffic/safety/test/bicycle_routes.htm, and http://www.ncdot.org/transit/bicycle/maps/maps_highways.html , accessed October 15, 2004 identify the "Carolina Connector" as a bike route located in the Greenwood Area. This bike route is designated as a portion of US Bike Route I, which runs from Maine to Florida, this route covers almost 200 miles of rolling terrain north-south through central North Carolina. San-Lee Park, Umstead State Park, and Kerr Lake State Recreation Area lie along this route, providing an opportunity to incorporate activities such as swimming, fishing, hiking, and nature study into the area. In addition NCDOT has prepared a map showing the bike routes located on Hickory House Road and Chris Cole Road in the Greenwood Area. This map was prepared on 12-31-95 and has been revised four (4) times on the following dates; 01-01-98, 08-06-98, 01-01-99, and 03-31-99 and can be reviewed in the City of Sanford's Engineering Department located in City Hall on Weatherspoon Drive. (Map 10)

Recommended Strategies to Develop a System of Parks and Greenways (Goal #7):

1. Emphasize natural area conservation, visual enhancement, promotion of culture and history, and watershed and floodplain protection as well as active recreation potential in determining future sites for public parks.

2. Coordinate local park and open space planning with regional plans.

3. Coordinate recreational facilities and greenways.

4. Require or encourage new development to provide for greenway connections.

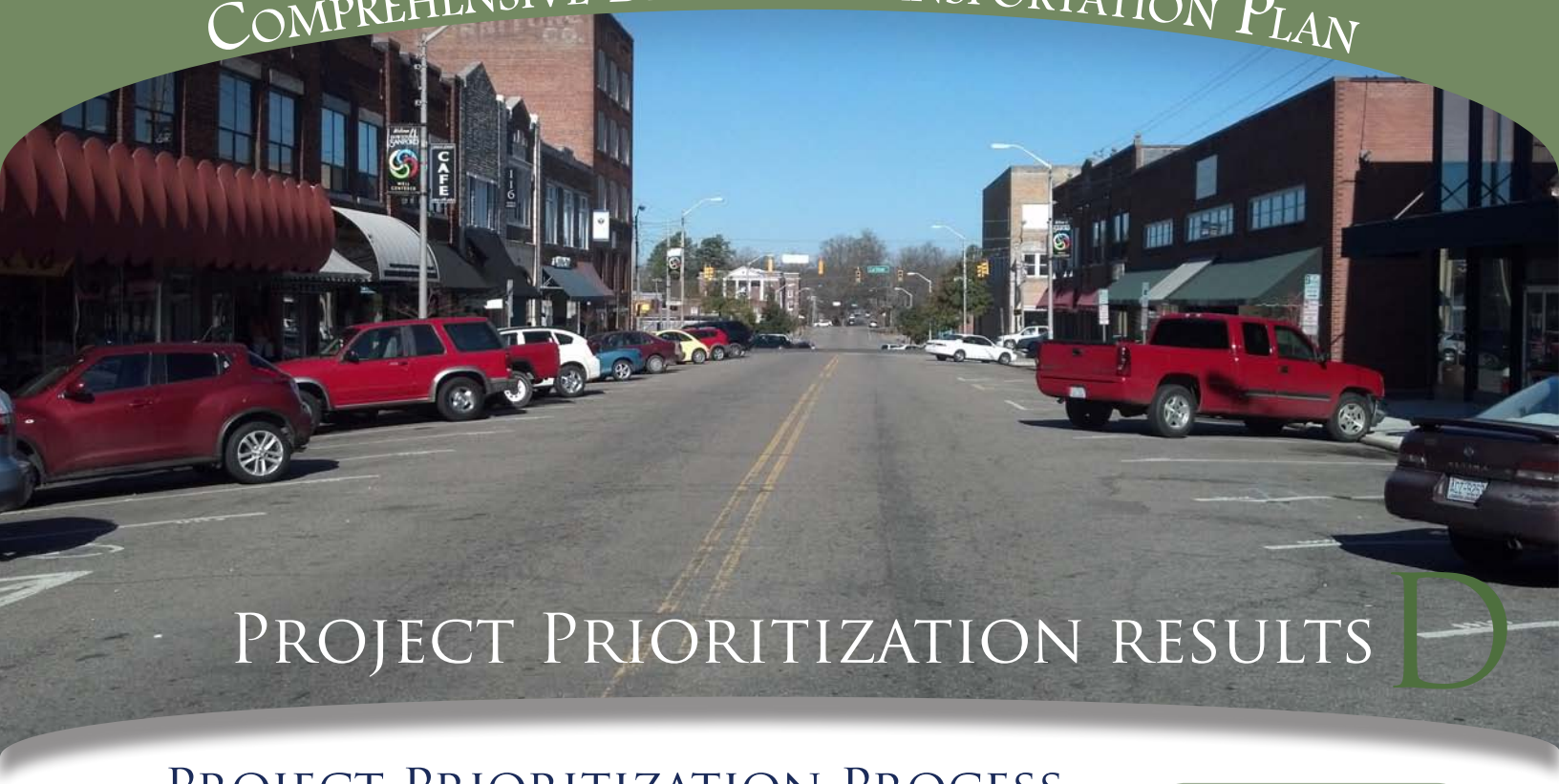
2006-2012 TIP Project List

- U-3602 - Lee County (Broadway Road)
- U-2565 SR 1515 (Third Street Extension)
- U-3461 SR 1107 (Fields Drive)
- FS-0208A US 1 Business (Hawkins Avenue)
- E-4946 Phase I: Charlotte Avenue, Moore Street and US 15-501 (Hawkins Avenue).
- E-4981 Endor Iron Furnace Bicycle Trail
- E-4947 phase I: Archaeology survey to determine the roadbed site from the Endor Iron Furnace to the Deep River.

2012-2018 STIP Project List

- R-2417 – US 421/NC 87 Sanford Bypass
- R-3830 – NC 42/SR 1579 (Broadway Rd) improvements from Horner Blvd to Harrington Ave
- B-4968 – Replace Bridge #10 over Deep River on US 15-501

This Page Intentionally Left Blank for Printing



Project Prioritization results D

Project Prioritization Process

The prioritization process began with each Steering Committee member assigning a score to each prioritization criteria. The scores were then averaged, and a final weighted score for each criteria was determined. Roadways identified during previous planning efforts, by the public, by the Steering Committee and by the consultant team during field work investigations were inventoried and divided into logical segments. Weighted criteria were then used to rank each segment. The criteria listed below were custom designed for Sanford and Lee County, based on public input, committee input, and available data.

Table D.1 Weighted Scores for Project Prioritization Criteria

Prioritization Criteria	Weighted Score
Schools within 1/2 mile radius	4.45
Connectivity/access to Proposed Facilities	4.09
Parks or Recreation Centers within 1/2 mile radius	4.00
Direct Access to an Existing Trail	3.64
High Population Density Areas (US Census)	3.36
Top 1-3 Recommendations from 2012 Public Comments	3.27
Lower-vehicle Access Areas (US Census)	3.18
Direct Access to Major Shopping Centers/Groceries/Business Areas	3.00
Lower-income Areas (US Census)	2.91
Bicycle Crash Location	2.91
Minority Population Areas (US Census)	2.45

Appendix Contents

This Page Intentionally Left Blank for Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
WOODLAND	Horner	Main	bike lanes	1.516	0	4.45	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	30.35
MCIVER	Chatham	Eight	bike lanes	0.686	0	4.45	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	30.35
HORNER	US 421	Lee	bike lanes	1.851	3.27	4.46	0	4.09	4	3.18	2.91	2.45	3	2.91	0	30.27
HAWKINS	Carthage	Hill	bike lanes	0.689	3.27	4.45	0	4.09	4	0	2.91	2.45	3	0	3.36	27.53
INDUSTRIAL	Williams	Wilson	paved shoulders	0.793	0	4.46	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.45
CHARLOTTE	First	Eleventh	bike lanes	0.849	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
THIRD	Weatherspoon	Horner	bike lanes	1.931	0	4.45	0	4.09	4	3.18	2.91	2.45	3	0	3.36	27.44
CAMERON	Raleigh	Industrial	bike boulevard	0.980	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
COURTLAND	Elm	Lee	bike lanes	0.219	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
ELM	Makepeace	Birch	bike lanes	0.486	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
ELM	Birch	Hughes	sharrow	0.180	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
GOLDSBORO	Third	Bragg	sharrow	0.796	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
HARKEY	Courtland	Woodland	paved shoulders	0.494	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
MAIN	Lemon Springs	NC 87	sharrow	0.921	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
OAKWOOD	Fifth	Charlotte	bike boulevard	0.680	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
STEELE	Oddfellow	Wicker	sharrow	0.309	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
BROADWAY	NC 87	Avents Ferry	paved shoulders	2.952	0	4.45	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	27.35
ROSE	Elm	Goldsboro	bike lanes	0.656	0	4.45	0	4.09	0	3.18	2.91	2.45	3	2.91	3.36	26.35
WALL	Vance	Moore	sharrow	0.261	0	0	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	25.9
CHEROKEE	Cemetery	Hiawatha	paved shoulders	0.522	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
COURTLAND	Tramway	Elm	paved shoulders	1.643	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
ELEVENTH	Eastwood	Charlotte	paved shoulders	1.005	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
FIRE TOWER	Carthage	Tramway	paved shoulders	1.705	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
FRAZIER	Lemon Springs	Cameron	sharrow	0.829	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
LEE	Horner	Raleigh	bike lanes	0.835	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	0	24.08
SAN-LEE	Charlotte	Poplar Springs Church	paved shoulders	3.579	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	0	24.08
MCINTOSH	Pinehurst	Elm	sharrow	0.442	0	4.45	0	4.09	0	3.18	0	2.45	3	2.91	3.36	23.44
MOORE	Wicker	Weatherspoon	sharrow	0.606	0	4.45	0	4.09	0	3.18	0	2.45	3	2.91	3.36	23.44
SPRING	Plaza	Weatherspoon	on-road side path	0.847	3.27	0	3.64	4.09	4	0	0	2.45	3	2.91	0	23.36
CARTHAGE	Carbonton	Moore	bike lanes	0.607	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
FIRST	Talley	McIver	bike boulevard	0.494	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
GULF	Weatherpoon	Wall	sharrow	0.708	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
LEMON SPRINGS	St. Andrews Church	Main	paved shoulders	1.336	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
RALEIGH	Frazier	Industrial	sharrow	0.670	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
TALLEY	First	Third	bike boulevard	0.161	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99

Page Intentionally Left Blank For Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results - Continued

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
VANCE	Weatherspoon	Wicker	bike boulevard	0.592	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
VANCE	Wicker	Fields	bike lanes	0.621	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
WEATHERSPOON	Underwood	15-501	bike boulevard	0.710	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
WICKER	Carthage	Chatham	sharrow	0.779	0	0	0	4.09	4	3.18	2.91	2.45	3	2.91	0	22.54
WICKER	Steel Bridge	Carthage	paved shoulders	2.880	0	4.45	3.64	4.09	4	3.18	0	2.45	0	0	0	21.81
FIFTH	Weatherspoon	Rose	bike boulevard	1.120	0	4.45	0	4.09	4	3.18	0	2.45	0	0	3.36	21.53
CARTHAGE	Wicker	US 1	paved shoulders	2.790	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	0	21.08
CARBONTON	Plank	Carthage	paved shoulders	7.758	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	0	21.08
OLD CARBONTON	Carbonton	dead-end	paved shoulders	0.295	0	0	3.64	4.09	4	0	0	2.45	3	0	3.36	20.54
RICE	Broadway	Broadway	paved shoulders	1.322	0	4.45	0	4.09	0	3.18	0	2.45	0	2.91	3.36	20.44
INDUSTRIAL	Raleigh	Williams	bike lanes	0.300	0	0	0	4.09	4	3.18	2.91	0	3	2.91	0	20.09
CHISHOLM	Carbonton	First	bike boulevard	1.100	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
WASHINGTON	Horner	Harkey	bike lanes	0.854	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
FIELDS	Carthage	Horner	paved shoulders	0.996	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
BRINN	Spring	Weatherspoon	sharrow	0.391	0	0	0	4.09	4	0	0	2.45	3	2.91	3.36	19.81
WILSON	Lee	NC 87	paved shoulders	0.606	0	0	0	4.09	4	3.19	0	2.45	3	2.91	0	19.64
TRAMWAY	Hickory House	Lemon Springs	paved shoulders	2.058	0	4.45	0	4.09	4	0	0	2.45	0	0	3.36	18.35
SPRING	Cool Springs	Plaza	paved shoulders	1.300	0	0	3.64	4.09	4	0	0	0	3	0	3.36	18.09
HICKORY HOUSE	US 1	Tramway	paved shoulders	2.692	0	4.46	0	4.09	4	0	0	2.45	0	2.91	0	17.91
CENTER CHURCH	Arthur Maddox	US 1	paved shoulders	1.924	0	4.45	0	4.09	4	0	0	2.45	0	2.91	0	17.9
WILKINS	421	Old Carbonton	paved shoulders	1.858	0	0	3.64	4.09	4	0	0	0	3	2.91	0	17.64
COX MILL	Broadway	Cox Maddox	paved shoulders	1.686	0	4.45	0	4.09	0	0	0	2.45	0	2.91	3.36	17.26
HAWKINS	Hill	Northview	paved shoulders	3.444	0	4.45	0	4.09	0	0	0	2.45	0	2.91	3.36	17.26
THOMAS	Poplar Springs Church	Rice	paved shoulders	1.083	0	4.45	0	4.09	0	3.18	0	2.45	0	2.91	0	17.08
CARTHAGE	Wicker	Carbonton	bike lanes	0.161	0	0	0	4.09	4	3.18	0	2.45	3	0	0	16.72
COLON	Weatherspoon	Old Colon	paved shoulders	3.988	0	0	0	4.09	4	3.18	0	2.45	0	2.91	0	16.63
CHARLOTTE	Moore	First	sharrow	0.193	0	0	0	4.09	0	3.18	0	2.45	3	2.91	0	15.63
COX MADDOX	NC 87	Mount Pisgah Church	paved shoulders	0.958	0	0	0	4.09	0	3.18	2.91	2.45	0	2.91	0	15.54
CURRIE	Wicker	Carbonton	paved shoulders	0.752	0	4.45	0	4.09	4	0	0	2.45	0	0	0	14.99
MCNEILL	US 421	15-501	paved shoulders	1.856	0	4.45	0	4.09	0	0	0	0	3	0	3.36	14.9
PUMPING STATION	Poplar Springs Church	San-Lee	paved shoulders	2.038	0	0	0	4.09	4	3.18	0	0	0	2.91	0	14.18
AVENTS FERRY	Broadway	Poplar Springs Church	paved shoulders	0.458	0	0	0	4.09	0	3.18	0	2.45	0	2.91	0	12.63
LOWER MONCURE	Riddle	Eleventh	paved shoulders	3.384	0	0	0	4.09	0	3.18	0	2.45	0	2.91	0	12.63
NC 87	Wilson	Cox Maddox	paved shoulders	0.310	0	0	0	4.09	0	0	2.91	2.45	3	0	0	12.45
COOL SPRINGS	Franklin	Valley	paved shoulders	2.456	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99

Page Intentionally Left Blank For Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results - Continued

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/ University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
DEEP RIVER	Hawkins	Phil Johnson	paved shoulders	3.212	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99
FRANKLIN	Henley	Wicker	paved shoulders	2.500	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99
POPLAR SPRINGS CHURCH	Avents Ferry	Lick Creek	paved shoulders	4.921	0	0	0	4.09	0	3.18	0	0	0	2.91	0	10.18
PENDERGRASS	Steel Bridge	US 1	paved shoulders	2.467	0	0	0	4.09	0	0	2.91	0	0	2.91	0	9.91
ST ANDREWS CHURCH	Tramway	Lee	paved shoulders	2.496	0	0	0	4.09	0	0	0	2.45	0	2.91	0	9.45
BRUCE COGGINS	Tramway	Hickory House	paved shoulders	1.201	0	0	0	4.09	0	0	0	0	0	2.91	0	7
COTTEN	15-501	Cumnock	paved shoulders	11.280	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
CUMNOCK	Deep River (river)	US 421	paved shoulders	2.214	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
FORESTWOOD PARK	US 421	US 421	paved shoulders	1.021	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
HENLEY	Covered Bridge	Center Church	paved shoulders	2.316	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
VALLEY	Wilkins	Forestwood Park	paved shoulders	3.428	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
ARTHUR MADDOX	Chris Cole	Center Church	paved shoulders	0.881	0	0	0	4.09	0	0	0	0	0	0	0	4.09
CHRIS COLE	Jefferson Davis	Plank	paved shoulders	4.067	0	0	0	4.09	0	0	0	0	0	0	0	4.09
IRON FURNACE	COTTEN	Iron Furnace property	paved shoulders	0.749	0	0	0	4.09	0	0	0	0	0	0	0	4.09
JONES CHAPEL	Deep River	dead-end	paved shoulders	0.544	0	0	0	4.09	0	0	0	0	0	0	0	4.09
LIBERTY	Minter School	Hickory House	paved shoulders	0.552	0	0	0	4.09	0	0	0	0	0	0	0	4.09
LICK CREEK	Lower Moncure	Poplar Springs Church	paved shoulders	1.056	0	0	0	4.09	0	0	0	0	0	0	0	4.09
STEEL BRIDGE	Wicker	Pendergrass	paved shoulders	0.408	0	0	0	4.09	0	0	0	0	0	0	0	4.09
FARRELL	Osgood	Lower Moncure	paved shoulders	1.495	0	0	0	0	0	0	0	0	0	0	0	0

Page Intentionally Left Blank For Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
WOODLAND	Horner	Main	bike lanes	1.516	0	4.45	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	30.35
MCIVER	Chatham	Eight	bike lanes	0.686	0	4.45	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	30.35
HORNER	US 421	Lee	bike lanes	1.851	3.27	4.46	0	4.09	4	3.18	2.91	2.45	3	2.91	0	30.27
HAWKINS	Carthage	Hill	bike lanes	0.689	3.27	4.45	0	4.09	4	0	2.91	2.45	3	0	3.36	27.53
INDUSTRIAL	Williams	Wilson	paved shoulders	0.793	0	4.46	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.45
CHARLOTTE	First	Eleventh	bike lanes	0.849	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
THIRD	Weatherspoon	Horner	bike lanes	1.931	0	4.45	0	4.09	4	3.18	2.91	2.45	3	0	3.36	27.44
CAMERON	Raleigh	Industrial	bike boulevard	0.980	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
COURTLAND	Elm	Lee	bike lanes	0.219	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
ELM	Makepeace	Birch	bike lanes	0.486	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
ELM	Birch	Hughes	sharrow	0.180	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
GOLDSBORO	Third	Bragg	sharrow	0.796	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
HARKEY	Courtland	Woodland	paved shoulders	0.494	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
MAIN	Lemon Springs	NC 87	sharrow	0.921	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
OAKWOOD	Fifth	Charlotte	bike boulevard	0.680	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
STEELE	Oddfellow	Wicker	sharrow	0.309	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	3.36	27.44
BROADWAY	NC 87	Avents Ferry	paved shoulders	2.952	0	4.45	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	27.35
ROSE	Elm	Goldsboro	bike lanes	0.656	0	4.45	0	4.09	0	3.18	2.91	2.45	3	2.91	3.36	26.35
WALL	Vance	Moore	sharrow	0.261	0	0	0	4.09	4	3.18	2.91	2.45	3	2.91	3.36	25.9
CHEROKEE	Cemetery	Hiawatha	paved shoulders	0.522	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
COURTLAND	Tramway	Elm	paved shoulders	1.643	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
ELEVENTH	Eastwood	Charlotte	paved shoulders	1.005	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
FIRE TOWER	Carthage	Tramway	paved shoulders	1.705	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
FRAZIER	Lemon Springs	Cameron	sharrow	0.829	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	3.36	24.44
LEE	Horner	Raleigh	bike lanes	0.835	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	0	24.08
SAN-LEE	Charlotte	Poplar Springs Church	paved shoulders	3.579	0	4.45	0	4.09	4	3.18	0	2.45	3	2.91	0	24.08
MCINTOSH	Pinehurst	Elm	sharrow	0.442	0	4.45	0	4.09	0	3.18	0	2.45	3	2.91	3.36	23.44
MOORE	Wicker	Weatherspoon	sharrow	0.606	0	4.45	0	4.09	0	3.18	0	2.45	3	2.91	3.36	23.44
SPRING	Plaza	Weatherspoon	on-road side path	0.847	3.27	0	3.64	4.09	4	0	0	2.45	3	2.91	0	23.36
CARTHAGE	Carbonton	Moore	bike lanes	0.607	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
FIRST	Talley	McIver	bike boulevard	0.494	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
GULF	Weatherpoon	Wall	sharrow	0.708	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
LEMON SPRINGS	St. Andrews Church	Main	paved shoulders	1.336	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
RALEIGH	Frazier	Industrial	sharrow	0.670	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99
TALLEY	First	Third	bike boulevard	0.161	0	0	0	4.09	4	3.18	0	2.45	3	2.91	3.36	22.99

Page Intentionally Left Blank For Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results - Continued

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
VANCE	Weatherspoon	Wicker	bike boulevard	0.592	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
VANCE	Wicker	Fields	bike lanes	0.621	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
WEATHERSPOON	Underwood	15-501	bike boulevard	0.710	0	0	0	4.09	4	3.18	2.91	2.45	0	2.91	3.36	22.9
WICKER	Carthage	Chatham	sharrow	0.779	0	0	0	4.09	4	3.18	2.91	2.45	3	2.91	0	22.54
WICKER	Steel Bridge	Carthage	paved shoulders	2.880	0	4.45	3.64	4.09	4	3.18	0	2.45	0	0	0	21.81
FIFTH	Weatherspoon	Rose	bike boulevard	1.120	0	4.45	0	4.09	4	3.18	0	2.45	0	0	3.36	21.53
CARTHAGE	Wicker	US 1	paved shoulders	2.790	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	0	21.08
CARBONTON	Plank	Carthage	paved shoulders	7.758	0	4.45	0	4.09	4	3.18	0	2.45	0	2.91	0	21.08
OLD CARBONTON	Carbonton	dead-end	paved shoulders	0.295	0	0	3.64	4.09	4	0	0	2.45	3	0	3.36	20.54
RICE	Broadway	Broadway	paved shoulders	1.322	0	4.45	0	4.09	0	3.18	0	2.45	0	2.91	3.36	20.44
INDUSTRIAL	Raleigh	Williams	bike lanes	0.300	0	0	0	4.09	4	3.18	2.91	0	3	2.91	0	20.09
CHISHOLM	Carbonton	First	bike boulevard	1.100	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
WASHINGTON	Horner	Harkey	bike lanes	0.854	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
FIELDS	Carthage	Horner	paved shoulders	0.996	0	0	0	4.09	4	3.18	0	2.45	0	2.91	3.36	19.99
BRINN	Spring	Weatherspoon	sharrow	0.391	0	0	0	4.09	4	0	0	2.45	3	2.91	3.36	19.81
WILSON	Lee	NC 87	paved shoulders	0.606	0	0	0	4.09	4	3.19	0	2.45	3	2.91	0	19.64
TRAMWAY	Hickory House	Lemon Springs	paved shoulders	2.058	0	4.45	0	4.09	4	0	0	2.45	0	0	3.36	18.35
SPRING	Cool Springs	Plaza	paved shoulders	1.300	0	0	3.64	4.09	4	0	0	0	3	0	3.36	18.09
HICKORY HOUSE	US 1	Tramway	paved shoulders	2.692	0	4.46	0	4.09	4	0	0	2.45	0	2.91	0	17.91
CENTER CHURCH	Arthur Maddox	US 1	paved shoulders	1.924	0	4.45	0	4.09	4	0	0	2.45	0	2.91	0	17.9
WILKINS	421	Old Carbonton	paved shoulders	1.858	0	0	3.64	4.09	4	0	0	0	3	2.91	0	17.64
COX MILL	Broadway	Cox Maddox	paved shoulders	1.686	0	4.45	0	4.09	0	0	0	2.45	0	2.91	3.36	17.26
HAWKINS	Hill	Northview	paved shoulders	3.444	0	4.45	0	4.09	0	0	0	2.45	0	2.91	3.36	17.26
THOMAS	Poplar Springs Church	Rice	paved shoulders	1.083	0	4.45	0	4.09	0	3.18	0	2.45	0	2.91	0	17.08
CARTHAGE	Wicker	Carbonton	bike lanes	0.161	0	0	0	4.09	4	3.18	0	2.45	3	0	0	16.72
COLON	Weatherspoon	Old Colon	paved shoulders	3.988	0	0	0	4.09	4	3.18	0	2.45	0	2.91	0	16.63
CHARLOTTE	Moore	First	sharrow	0.193	0	0	0	4.09	0	3.18	0	2.45	3	2.91	0	15.63
COX MADDOX	NC 87	Mount Pisgah Church	paved shoulders	0.958	0	0	0	4.09	0	3.18	2.91	2.45	0	2.91	0	15.54
CURRIE	Wicker	Carbonton	paved shoulders	0.752	0	4.45	0	4.09	4	0	0	2.45	0	0	0	14.99
MCNEILL	US 421	15-501	paved shoulders	1.856	0	4.45	0	4.09	0	0	0	0	3	0	3.36	14.9
PUMPING STATION	Poplar Springs Church	San-Lee	paved shoulders	2.038	0	0	0	4.09	4	3.18	0	0	0	2.91	0	14.18
AVENTS FERRY	Broadway	Poplar Springs Church	paved shoulders	0.458	0	0	0	4.09	0	3.18	0	2.45	0	2.91	0	12.63
LOWER MONCURE	Riddle	Eleventh	paved shoulders	3.384	0	0	0	4.09	0	3.18	0	2.45	0	2.91	0	12.63
NC 87	Wilson	Cox Maddox	paved shoulders	0.310	0	0	0	4.09	0	0	2.91	2.45	3	0	0	12.45
COOL SPRINGS	Franklin	Valley	paved shoulders	2.456	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99

Page Intentionally Left Blank For Printing

Table D.2 On-Road Bicycle Facility Project Prioritization Results - Continued

Road Name	From	To	Facility Type	Total Length (miles)	Top 1-3 Responses from Comment Form	Elem., Middle, High School, and College/ University Proximity (1/2 mile radius)	Direct Access to/from an Existing Trail	Connectivity/ access to Proposed Facilities	Park or Recreation Center Proximity (1/2 mile radius)	Serves Areas with Lower Access to Vehicle Rates	Segment Contains Reported Bicycle Accidents	Direct Access to/from Higher Minority Population Neighborhoods	Direct Access to Major Shopping Centers/ Groceries	Direct Access to/from Lower-Income Neighborhoods	Direct Access to/ from Higher Density Residential Areas	Priority Score Total
DEEP RIVER	Hawkins	Phil Johnson	paved shoulders	3.212	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99
FRANKLIN	Henley	Wicker	paved shoulders	2.500	0	4.45	0	4.09	0	0	0	2.45	0	0	0	10.99
POPLAR SPRINGS CHURCH	Avents Ferry	Lick Creek	paved shoulders	4.921	0	0	0	4.09	0	3.18	0	0	0	2.91	0	10.18
PENDERGRASS	Steel Bridge	US 1	paved shoulders	2.467	0	0	0	4.09	0	0	2.91	0	0	2.91	0	9.91
ST ANDREWS CHURCH	Tramway	Lee	paved shoulders	2.496	0	0	0	4.09	0	0	0	2.45	0	2.91	0	9.45
BRUCE COGGINS	Tramway	Hickory House	paved shoulders	1.201	0	0	0	4.09	0	0	0	0	0	2.91	0	7
COTTEN	15-501	Cumnock	paved shoulders	11.280	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
CUMNOCK	Deep River (river)	US 421	paved shoulders	2.214	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
FORESTWOOD PARK	US 421	US 421	paved shoulders	1.021	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
HENLEY	Covered Bridge	Center Church	paved shoulders	2.316	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
VALLEY	Wilkins	Forestwood Park	paved shoulders	3.428	0	0	0	4.09	0	0	0	2.45	0	0	0	6.54
ARTHUR MADDOX	Chris Cole	Center Church	paved shoulders	0.881	0	0	0	4.09	0	0	0	0	0	0	0	4.09
CHRIS COLE	Jefferson Davis	Plank	paved shoulders	4.067	0	0	0	4.09	0	0	0	0	0	0	0	4.09
IRON FURNACE	COTTEN	Iron Furnace property	paved shoulders	0.749	0	0	0	4.09	0	0	0	0	0	0	0	4.09
JONES CHAPEL	Deep River	dead-end	paved shoulders	0.544	0	0	0	4.09	0	0	0	0	0	0	0	4.09
LIBERTY	Minter School	Hickory House	paved shoulders	0.552	0	0	0	4.09	0	0	0	0	0	0	0	4.09
LICK CREEK	Lower Moncure	Poplar Springs Church	paved shoulders	1.056	0	0	0	4.09	0	0	0	0	0	0	0	4.09
STEEL BRIDGE	Wicker	Pendergrass	paved shoulders	0.408	0	0	0	4.09	0	0	0	0	0	0	0	4.09
FARRELL	Osgood	Lower Moncure	paved shoulders	1.495	0	0	0	0	0	0	0	0	0	0	0	0

Page Intentionally Left Blank For Printing