FAYETTEVILLE

BICYCLE PLAN

Adopted by City Council, March 23, 2020

bike Fayetteville

for:

The City of Fayetteville &
North Carolina Department of Transportation

March 2020

by: Stantec Consulting Services Inc., JS Lane Company,
& NCDOT Integrated Mobility Division

TABLE OF CONTENTS

The warehouse storage facility of The Bicycle Man. This organization, started by Moses Mathis and maintained by his widow Ann today, repairs and gives away thousands of bicycles to children in need every year. We are proud to dedicate this Plan to the memory and ongoing charity of Moses and Ann.

Ride on.

LIST OF FIGURES

LIST OF MAPS

LIST OF TABLES

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Acknowledgments

THIS PROJECT WAS MADE POSSIBLE BY THE CITY OF FAYETTEVILLE WITH A MATCHING GRANT FROM THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION INTEGRATED MOBILITY DIVISION. THANK YOU TO THE OVER FOUR HUNDRED RESIDENTS WHO PARTICIPATED IN THE DEVELOPMENT OF THE PLAN THROUGH MEETINGS, EVENTS, SURVEYS; SPECIAL THANKS TO THOSE WHO PARTICIPATED ON THE STEERING COMMITTEE.

DEDICATED TO MOSES AND ANN MATHIS (THE BICYCLE MAN) - THANK YOU.

ADOPTED BY CITY COUNCIL, MARCH 23, 2020

“It’s great to see the progress being made in downtown Fayetteville. Connecting all of these sites, and others, with bike friendly lanes or trails would add a whole new, and useful dimension to downtown.”

—Response from survey respondent

bike Fayetteville


bike Fayetteville

EXECUTIVE SUMMARY

Introduction to Bicycling in Fayetteville

The City of Fayetteville is located in the Sandhills of North Carolina, south of the Triangle Region, and home to Fort Bragg, the largest military installation in the world. The city is home to over 210,000 residents, contributing to the population of the fifth-largest metropolitan area in North Carolina.

Biking is a transportation choice for many due to necessity, or for those people making environmental and health-conscience decisions. The purpose of this plan is to evaluate the existing bicycle conditions within the City of Fayetteville and recommend infrastructure projects, policies, and programs to improve safety, connectivity, and well-being for people of all ages and abilities. Overall, this plan aims to ensure that businesses, citizens, and visitors to Fayetteville realize the health, mobility, safety, environmental, and economic benefits of bicycling.

WHY BICYCLING?

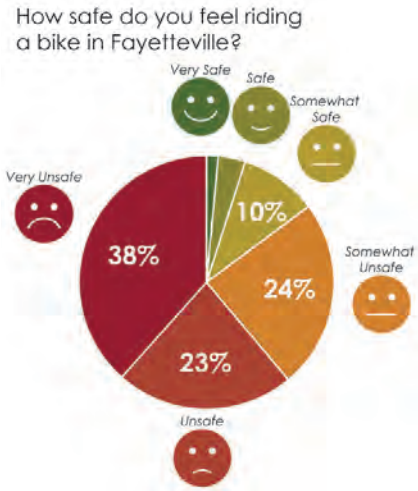
- ❒ Bicycling should be fun for everyone.
- ❒ Bicycling is more affordable than owning and driving a car.
- ❒ Bicycle facilities can be designed for all ages and abilities.
- ❒ Bicycling is a useful mode of travel.
- ❒ Bicycling helps the local economy.
- ❒ Bicycling rates nationwide have been increasing for all ethnicities.
- ❒ Bicycling supports healthy lifestyles.

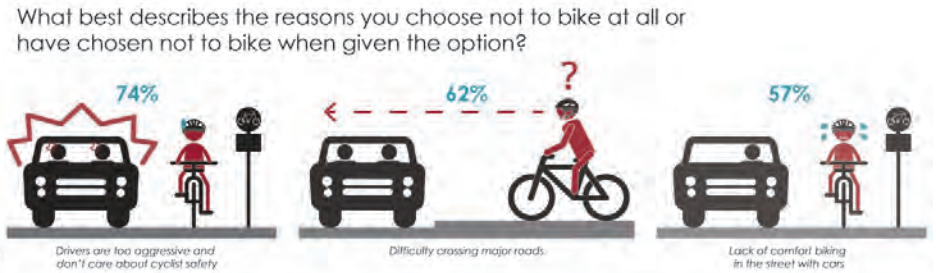
Vision:

The City of Fayetteville Bike Plan identifies opportunities for leadership to establish a bicycling network that offers a safe and reliable transportation system for users of all ages and abilities.

PLANNING PROCESS

The Fayetteville Bike Plan will provide the City, the North Carolina Department of Transportation (NCDOT), and other local and regional partners with a guide for facility development to improve biking in the City. This plan should be used by city staff and external partners such as NCDOT, local greenway coalitions, and the Fayetteville Area Metropolitan Planning Organization when considering solutions to future transportation projects and development. The process in developing the Plan started in February 2019 with the convening of the first Steering Committee meeting. The public engagement portion of the Plan began in March 2019 with an online survey and the project website.





Existing Conditions Summary

Bike facilities generally fall into three categories: shared streets, on-road transportation facilities, and separated, or off-street, paths including greenways and trails.

As the City continues to take steps to increase safe and reliable bicycling transportation options, further connectivity and additional facilities will become readily available to commuters and recreational users.

DEMOGRAPHICS

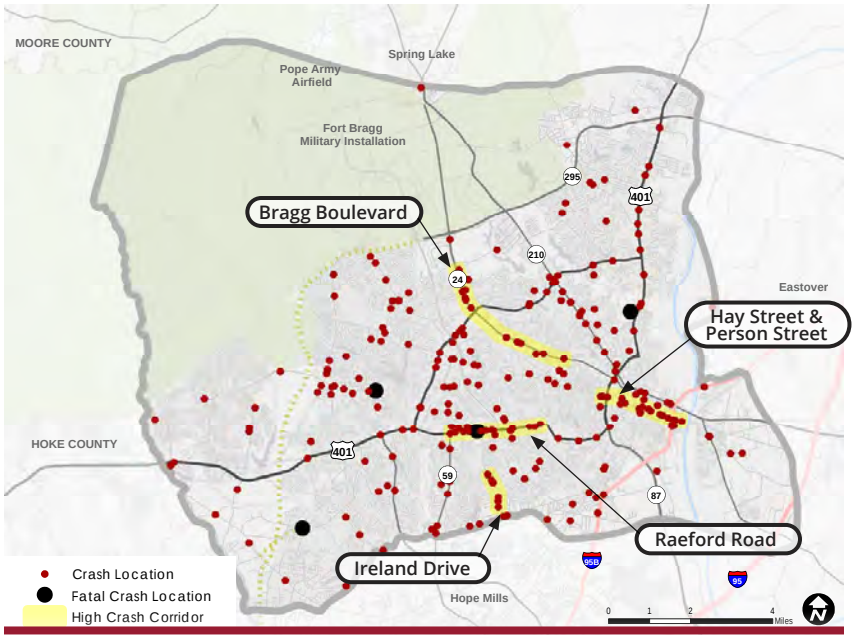
A study of an area's demographics can help define the population characteristics within Fayetteville that use, or would like to use, bicycle facilities. Lack of car ownership, commuting patterns, and poverty status are indicators of community needs and can project demand for a well-connected bicycle network. A demographic analysis was completed for the City of Fayetteville using 2010 US Census Bureau information and 2017 American Community Survey (ACS) data.

The population in Fayetteville has increased 6% in the last few years from 198,875 in 2010 to an estimated 209,468 in 2018. Approximately 19.3% of the population in Fayetteville lives below the federal poverty line, a percentage that is higher than the national and North Carolina averages. About 10.6% of the population is enrolled in college or graduate schools, another group that often does not have ready access to personal vehicles. It's estimated that approximately 7% of all households in Fayetteville do not have access to a vehicle.[1]

Other key population facts are listed below:

- 23% of the population is under 18;
- 16% of the population enrolled in a local K-12 school;
- 16% of the population is over the age of 55;
- 10% of the population reported commuting not by car, truck, or van (public transportation, walking, or other means such as bicycling); and
- The average travel time to work is 18.7 minutes with 19% of commutes being less than 10 minutes.[2]

2 American Fact Finder: https://fact-finder.census.gov/faces/nav/jsf/pages/index.html



BICYCLE CRASH LOCATIONS 2007-2016

BICYCLE CRASH ANALYSIS

A bicycle crash analysis is useful because it can indicate popular bicycling routes, and sometimes illustrate conflict areas between pedestrians and motorists. The North Carolina Department of Transportation provided data for bicycle crashes from 2007 – 2016. It is important to note that ***not all crashes are reported to the police***, unfortunately.

The Bicycle Crash Locations Map displays the location of the reported crashes. From 2007 to 2016, there were 277 crashes involving bicycles reported in Fayetteville. There were 3 fatalities and 5 crashes that led to disabling injuries. Among the crash victims, 56% were black, 86% were male, and most of the crashes involved an equal distribution in ages spanning from 10 to 59 years old.

A few roads in Fayetteville had higher rates of bicycle crashes per mile: Hay/Person Street, Ireland Drive, Raeford Road, and Bragg Boulevard. On Ireland Drive alone, out of the seven bicycle crashes, **six of them involved cyclists between the age of 11 and 19.**

1 American Fact Finder: https://factfinder.census.gov/faces/nav/jsf/pages/index.html

Recommended System Plan

BICYCLE NETWORK BASICS

The City of Fayetteville should strive to construct an interconnected and seamless network of bicycle facilities, which will be constructed incrementally over time. The network should be thoughtfully planned to connect users to desired destinations, both civic and recreational, and consider the comfort level of cyclists of all ages and abilities. Gaps in the bicycle network serve as potential barriers to most bicyclists, and therefore continual outreach to users is necessary to identify, document, and prioritize potential projects to limit or correct gaps.

All roadway improvement projects should include considerations for a bicycle facility treatment. Critical network links are those without an alternative (parallel) facility, and these links should be prioritized for an appropriate bikeway facility.

This plan helps to establish the need for an initial bike network, from which the City may begin to think strategically about investment and implementation one project at a time, and how a roadway contributes to the entire network (system) across the City. The plan will help agency staff set priorities, and discuss tradeoffs between multiple facility types and their intended user group(s).

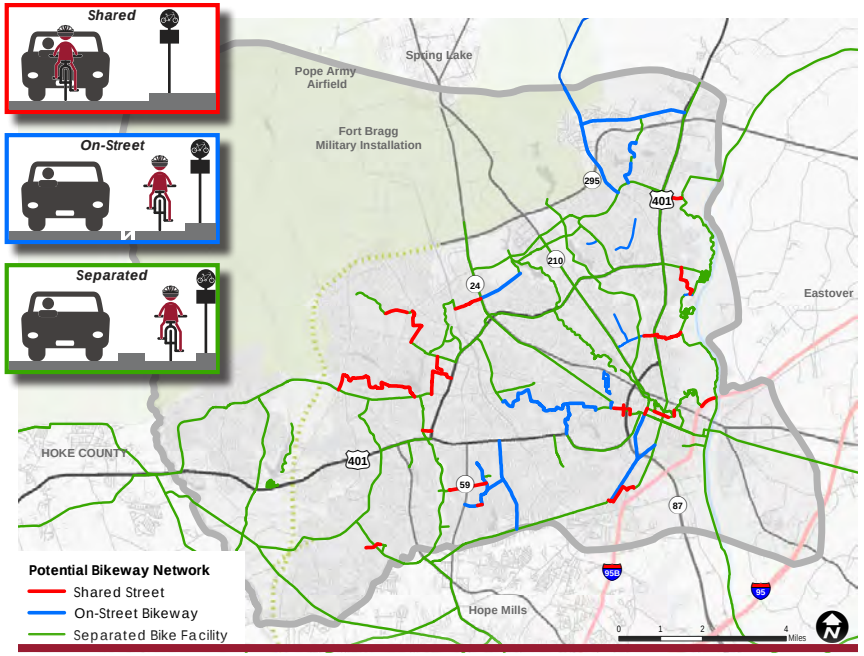
NETWORK GUIDANCE AND RESOURCES

More bicyclists are willing to ride along a connected bicycle network, provided that these routes are efficient, seamless, and easy to use. Three key principles for bicycle network design have particular importance in guiding bikeway selection:

- **Safety:** Reduce the frequency and severity of crashes and minimize potential conflict points between vehicles and bicyclists.
- **Comfort:** Minimize stress, anxiety, and safety concerns for the design user.
- **Connectivity:** Direct and convenient trips that provide access to desired community destinations served by the roadway network. Transition from shared street to on-road facilities, or on-road facilities to destinations should be seamless and clear.

TECHNICAL SCORING METHODOLOGY

The project recommendations were identified primarily by the public and reviewed by the Steering Committee. These projects were also prioritized based on reviews by the Steering Committee and public input. Implementation opportunities are described in the final chapter of this Plan. The resulting emphases were on safety and connectivity to popular destinations. These priorities were weighted according to input from the public to produce a prioritized list of projects for implementation.



POTENTIAL BIKEWAY NETWORK

PRIORITIZATION FACTORS & WEIGHTS

FACTORS	WEIGHT
Access To Popular Cycling Destinations	16%
Improve Safety & Reduce Crashes	24%
Separate Space For Bicyclists	23%
Improve Maintenance Conditions	18%
Increase Bike System Connectivity	19%

The weighted percentage for each factor was determined by public participation. Online survey respondents and public meeting attendees were asked to rank these factors by importance and the final scores were aggregated to determine project ranking.

DESIGN GUIDANCE

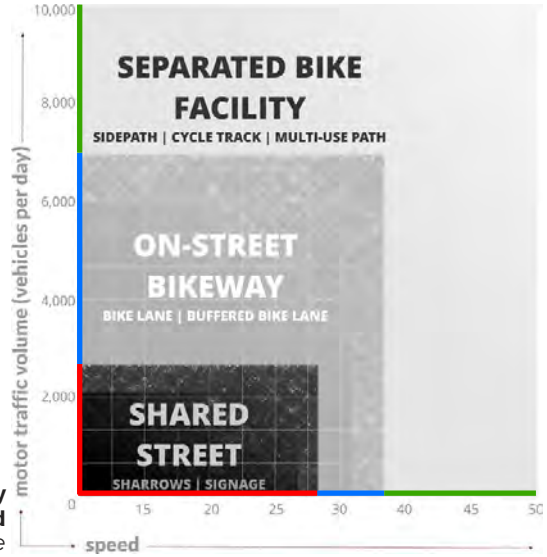
Selecting a suitable bicycle facility type depends on the context of the roadway and intended user group. The following presents a Bikeway Selection Framework that is consistent with national and international guidance. The selection framework can be used to select and evaluate potential bikeway facility types. Facility type decisions should also be informed by active public involvement and participation that occurs as part of the planning process.

Research has shown that motor vehicle speed and volume are key considerations in identifying a suitable bikeway facility based on peoples' level of comfort[1]. Higher motor vehicle speeds require increased separation for the safety and comfort of people cycling, while higher motor vehicle volumes increase the number of potential conflicts. The type of conflicting traffic can also impact the suitable bikeway type; streets carrying more trucks, military transports, and buses may also warrant different infrastructure.

1 Winters, M., Davidson, G., Kao, D., & Teschke, K. 2011. "Motivators and Deterrents of Bicycling: Comparing influences on Decisions to Ride". Transportation, 38, pp. 153-168.

Three-Tiered Bike Typology

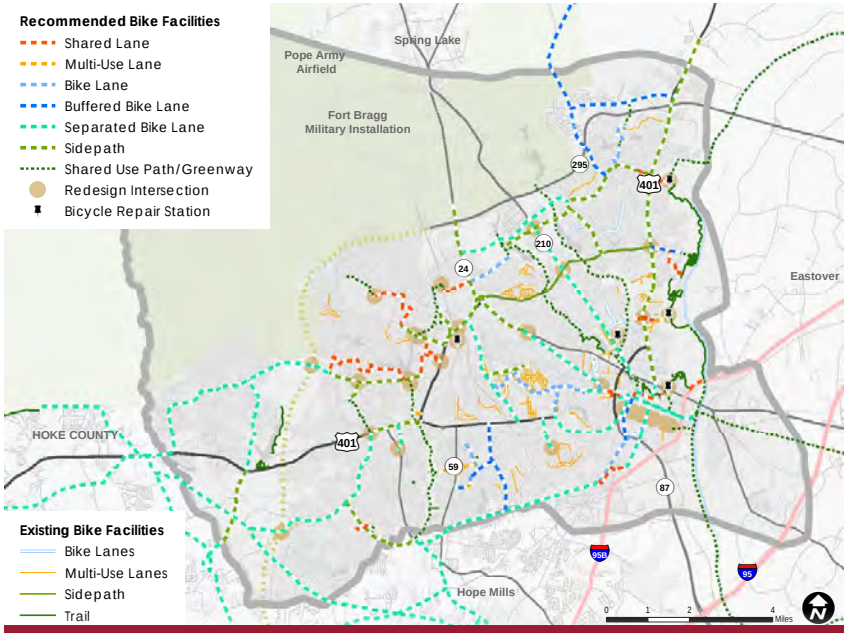
NCDOT has recently adopted a three-tiered bicycle selection methodology that is more suitable for high-level planning exercises where a lot of detailed information, or even volumes or speeds of traffic, are known in every instance. These three major types of bike facility are Separated, On-Street, and Shared Street.



General Framework for Bikeway Selection by VPD and Speed
Source: FHWA Bikeway Selection Guide

SUMMARY OF RECOMMENDED BIKE FACILITIES

This section steps through the process of formulating a bicycle network, applying evaluation criteria to prioritize corridors of local importance, and categorizing bikeways based on a three-tiered selection methodology (using traffic volume and speed). ***The Project Recommendations Map*** represents the culmination of this process with identified recommended bike facilities across the entire City. ***The Recommended Facilities Table*** summarizes the number of locations and total mileage of recommendations.



PROJECT RECOMMENDATIONS

RECOMMENDED FACILITIES

	RECOMMENDED BIKE FACILITIES	LOCATIONS	LENGTH (MI)
SHARED	Shared Lane Markings (SLM)	22	12.0
ON-STREET	Bike Lane	10	9.0
	Buffered Bike Lane	9	10.4
SEPARATED	Separated Bike Lane	27	41.3
	Two-way Separated Bike Lane	2	1.4
	Shared Use Path (SUP)	33	30.8
	Sidepath	24	29.8
	Redesign of Roadway/Intersection	21	5.6
	Total	***148***	***140.3***

CONCEPTUAL DESIGN "HOT SPOTS"

The following includes a detailed investigation into ten (10) areas in Fayetteville that were identified as having a high presence of pedestrians, cyclists and need to calm traffic. A combination of photographic renderings, graphic cross sections, and conceptual plans were completed of each area to depict potential enhancement solutions identified in the Plan. Recommendations including crossings, signals, bike lanes, and small width medians were recommended in many of the areas to increase cyclist safety. These projects are highlighted in the Plan because the project either provides a connection to existing infrastructure or high bicycle and pedestrian traffic and/or was heard input during the public involvement process. Further studies are recommended for each during the design phase to determine the most appropriate solutions and placements of cyclist amenities.

COMMON CONSIDERATIONS AND RECOMMENDATIONS

Hot Spot locations were selected based on the results of the existing conditions analysis and influenced by public and committee feedback on areas where bicycling is difficult. Several design considerations were present among these areas and are illustrated with icons. Additionally, treatment recommendations for bicycle infrastructure improvements involve a select number of strategies that are shown. The key considerations and recommendations for each hot spot will be illustrated with up to four icons, and further accompanied by text giving more site specific detailed analysis.

DESIGN CONSIDERATIONS

High (or Low) Travel Speed or Frequent Speeding

High (or Low) Traffic Volume or Number of Lanes

Bike Crash Location

Bus Corridor or High Number of Bus Stops

Lighting Improvements Needed

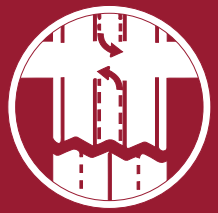
At Grade Rail Crossing or Old Rail Infrastructure

TREATMENT RECOMMENDATIONS

Shared Lane Marking (SLM)

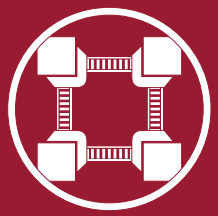
Sidepath, Shared Use Path (SUP), or Separated Bike Lane

Bike Lane or Buffered Bike Lane



Road Diet or Lane Reduction

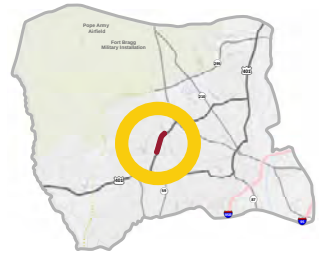
Rectangular Rapid Flashing Beacons (RRFB)



Intersection / Connectivity Improvements

Skibo Road

from Cliffdale Road to Lake Valley Drive



***Length:* 1.1 miles**

Heavy traffic volume, high speeds, and as many as eight lanes of traffic make this a challenging corridor to cross on bike.

Design Considerations:

- ❒ 50,000 vehicles per day near Cross Creek Mall
- ❒ Three bicycle crashes (2007-16) along the corridor
- ❒ Constrained bridge over All American Freeway
- ❒ Four FAST bus stop locations along the corridor
- ❒ Sidewalk gaps along the corridor
- ❒ Connect with proposed sidepath on Morganton Road
- ❒ Improve Shared Lane Marking (SLM) crossing at Campground Road intersection

Connect with:

- ❒ Proposed McFayden Lake Greenway (west)

Treatment Recommendations:

- ❒ Sidepath along Skibo Road (west) – former railroad corridor (potential rail-trail)
- ❒ Intersection improvements

Planning Level Unit Costs
(does not include ROW and design cost)

- ❒ $10,000 per mile Shared Lane Markings (SLM)
- ❒ $20,000 per Intersection Treatment
- ❒ $50,000 Signage along Skibo Road
- ❒ $700,000 per mile Sidepath/Shared Use Path (SUP)

**Google Maps used for streetview photos*

SKIBO ROAD HOT SPOT

Important intersection crossing

Proposed Cross Section

Recommended Programs & Policies

Understanding the different bicycle user types within the community will help inform the most appropriate programs and policies for encouraging more bicycle activity.

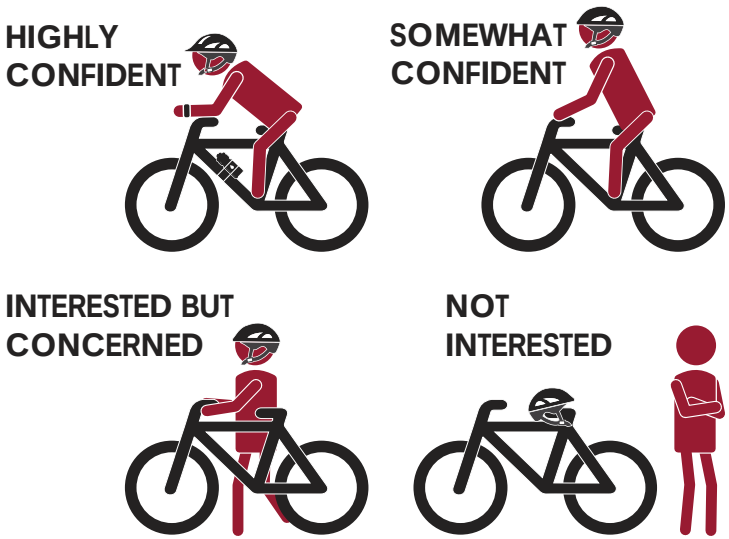
USER TYPES

It is important to consider the user comfort and skill level of different bicyclists because this will help influence the appropriate bikeway facility selection. Characteristics commonly used to classify user profiles are **comfort level**, **bicycling skill and experience**, **age**, and **trip purpose**. Many cyclists may not fit into a single user group, and therefore categories are not intended to be exclusive.

Comfort level and traffic stress are inversely related. Proximity to vehicles (speed and volume) is the primary contributor of stress. Bicycle networks that are high-comfort/low-stress serve the largest number of bicyclists while low-comfort/high-stress networks serve the fewest.

Communities seeking to serve all ages and abilities will need to establish low-stress bicycle networks to engage the larger interested but concerned user group.

Research suggests that these are the four basic bicycle user types. Many cyclists may not fit into a single user group, and therefore categories are not intended to be exclusive.

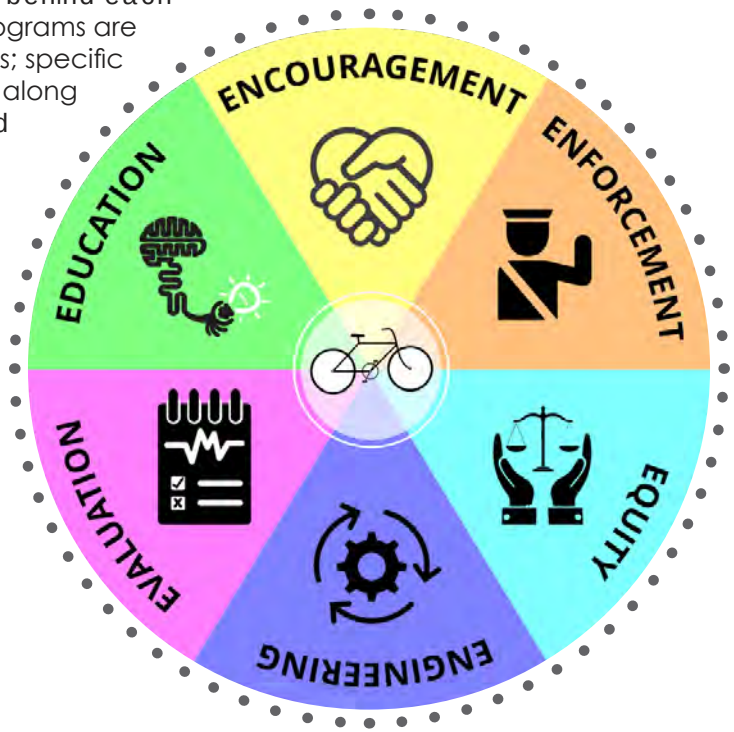


ROLE OF POLICY AND PROGRAMMATIC ELEMENTS

The project recommendations understandably receive the most attention in many plans, but bicycling and bicyclists are benefited the most in the long term by having favorable public and private policies. The recommendations in this section are based on a review of Fayetteville's policy and program environment including specific ordinance and plan language, as well as feedback from the Steering Committee and staff on existing actions.

ORGANIZATION

It is commonplace to speak of the six "E's" of safe bicycling when organizing categories of actions (borrowed perhaps from the five E's of education), and this typology was introduced again in this plan and to the Steering Committee: Education, Encouragement, Enforcement, Equity, Engineering, and Evaluation. The key ideas behind each of these categories of programs are explained on these pages; specific recommendations follow along with on-line resources and examples, if available.



Many people remember being pushed down the driveway as the only bicycle education they received from a parent. Bicycle training clinics (for adults and children) and North Carolina's Watch for Me NC and Let's Go NC programs can provide ongoing training and support.

EDU.1: BICYCLE TRAINING CLINICS

EDU.2: IN-CLASSROOM CURRICULA

To overcome the estimated 60% of people that are "interested but concerned" about bicycling, Fayetteville should take the lead on providing a clear bicycle facilities map, continuing to sponsor better block events, and promoting bike to school (and work) days.

ENC.1: Bicycle Suitability Map

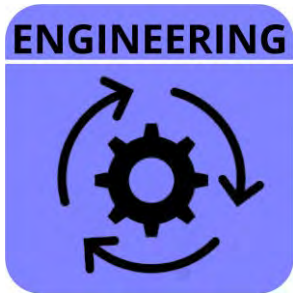
ENC.2: Cooperative Urbanism

ENC.3: Bike (and Walk) to School

Fayetteville has a rich resource in The Bicycle Man non-profit that provides new and repaired bikes to kids that can't afford them - they can be a great community partner for the City. The proposed projects in this plan consider car ownership and income as priority factors.

EQ.1: Prioritize Needs First

EQ.2: Support Non-Profits



Safety is always a factor in road improvements, but a Vision Zero policy puts safety in first place. Additionally, the City can adopt a Complete Streets policy and procedure that will help prioritize all modes of transportation in the planning and design processes.

ENG.1: Vision ZERO

ENG.2: A Complete Street Policy

Law enforcement isn't about writing tickets: stop-and-inform practices, coupled with printed information cards work well with drivers that aren't paying attention to the road. The Watch for Me NC program also sponsors officer training events that are beneficial.

ENF.1: Watch for Me Training

ENF.2: Stop-and-Inform

ENF.3: Crime Prevention through Environment Design (CPTED)

Gathering and reporting information on bicycle crashes and volumes is critical to understanding performance. Hiring a dedicated bicycle/pedestrian staff position would help immensely, and be in keeping with what other cities of Fayetteville's size are already doing.

EVA.1: Bike & Pedestrian Staff

EVA.2: Count what Counts

For more detail on each of these policy recommendations, please see "Policy Recommendations" on page 64 in Chapter 4.

Implementation Strategies

FUNDING CONSIDERATIONS

Implementing this plan will require a palette of sources comprised of many organizations and players, sometimes in collaboration to complete construction or maintenance of active mode infrastructure or programs. Grants and even state-level funding programs are subject to change; However, early and proactive planning are watchwords when seeking project funding.

Federal / State. Federal funds frequently pass through the state (NCDOT) before being disseminated to local government. Fayetteville should continue to have frequent communication with NCDOT Division 6 and Integrated Mobility Division (IMD) staff to understand repaving schedules that can result in markings and signage for bicycle lanes, intersection treatments, and so forth.

Local (City and County). The City may direct their own staff or engage contractors to implement projects, and seek to partner with NCDOT IMD staff when possible.

Private Sector. Private individuals, developers, and companies can play a major role in everything from financing new segments of sidepaths or greenways to providing employee-volunteers to help with typical clean-up or landscaping.

Grant Programs and Non-Governmental Organizations. Grant programs are a good resource, although all have differing project criteria and timelines for applications. Working through the Council of Governments and Metropolitan Planning Organization (FAMPO) may help Fayetteville compete for grants more effectively.

PLAN IMPLEMENTATION TABLE

Strategy	Contributing Stakeholders	Time Frame	Related Sections
POLICY			
Adopt this plan	City Council	Immediate	--
Amend the Cumberland County CTP to reference this plan	City/MPO Staff, City Council, Cumberland County, NCDOT	Immediate	Chapter 3
Engage the Bicycle and Pedestrian Advisory Committee (BPAC)	City/MPO Staff; BPAC	Immediate	Chapter 4
Expand City Policies for Vision Zero and Complete Streets	City Council; City/MPO Staff; BPAC	Mid-term	Chapter 4
Continue to Enforce State and Local Regulations	City Staff; Law Enforcement; BPAC	Near-term	Chapter 4
PROGRAM			
Expand Educational Outreach Programs	BPAC	Mid-term	Chapter 4
Hire a Bike/Ped Planning Position	City/MPO Staff	Near-term	Chapter 4
Expand Encouragement Outreach Programs and Events	BPAC	Mid-term	Chapter 4
Establish a Monitoring Program	City/MPO Staff; BPAC	Mid-term	Chapter 4
Become **Gold**-level Bike Friendly Community	City/MPO Staff; BPAC	Mid-term	Chapter 4
INFRASTRUCTURE			
Identify Funding Sources	City/MPO Staff; BPAC	Near-term	Chapter 5
Partner with FHWA to perform Road Safety Audit	FHWA; NCDOT IMD; City/MPO Staff	Mid-term	Chapter 4
Build Hot Spot Projects	NCDOT IMD; City/MPO Staff; BPAC	Mid-term	Chapter 5
Update CTP/MTP Projects for Bicycle Facilities	City/MPO Staff; BPAC	Long-term	Chapter 3

Acronyms
MPO: *Fayetteville Area Metropolitan Planning Organization*
BPAC: *Bicycle and Pedestrian Advisory Committee*
FHWA: *Federal Highways Administration*
NCDOT IMD: *Integrated Mobility Division*

TIME FRAME	
Immediate	Year 0
Near-term	Years 1-2
Mid-term	Years 2-4
Long-term	Years 4-6

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bike Fayetteville

CHAPTER 1: INTRODUCTION TO BICYCLING IN FAYETTEVILLE

Introduction

The City of Fayetteville is located in the Sandhills of North Carolina, south of the Triangle Region, and home to Fort Bragg, the largest military installation in the world. The city is home to over 210,000 residents, contributing to the population of the fifth-largest metropolitan area in North Carolina.

Biking is a transportation choice for many due to necessity, or for those people making environmental and health-conscience decisions. The purpose of this plan is to evaluate the existing bicycle conditions within the City of Fayetteville and recommend infrastructure projects, policies, and programs to improve safety, connectivity, and well-being for people of all ages and abilities. This bike plan will create a direction for positive change in peoples' lives by designing better environments for bicycling throughout the city. The presence of bicycle infrastructure means access to jobs, schools, and health care, as well as healthier communities as a result of new outdoor options for bicycling. Overall, this plan aims to ensure that businesses, citizens, and visitors to Fayetteville realize the health, mobility, safety, environmental, and economic benefits of bicycling.

"Bike-ability in Fayetteville is something we've wanted for a long time."

- Survey Respondent

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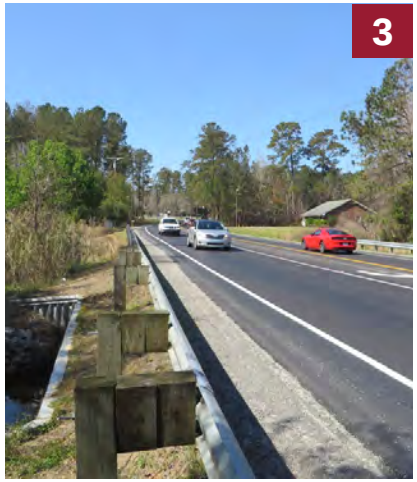
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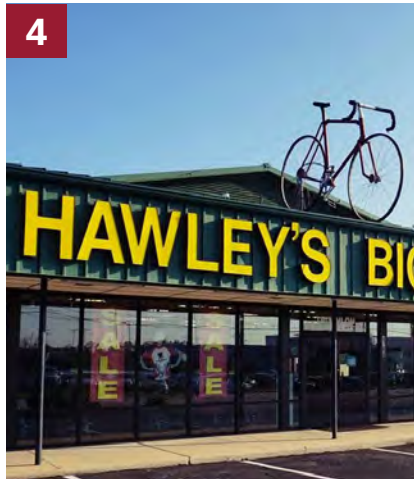

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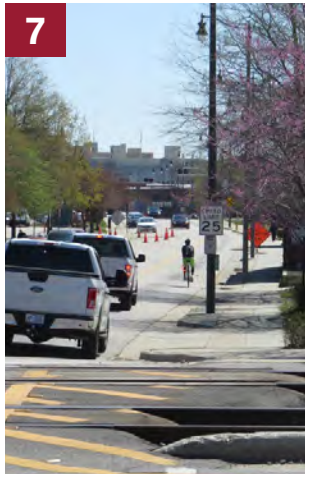
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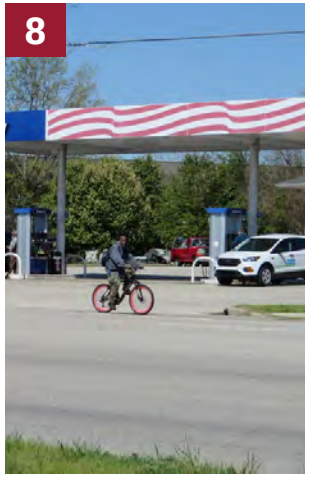
From left to right, top to bottom: 1) Riverside building; 2) Meeting with residents at the Folk Festival (10/5/19); 3) Constrained road-way shoulder over stream crossing; 4) Hawley's Bicycle World; 5) The Bicycleman Bike Shop; 6) Folk Festival (10/5/19); 7) Cyclist on a road undergoing maintenance; and 8) A cyclist passing a gas station driveway.


8

WHY BICYCLING?

Bicycling has many benefits to health, community, and personal mobility. One of the observations that the consulting team has made through many years of developing bicycle plans for towns, cities, counties, and states is that while people express *many different opinions* about bicycling, not all of them align with those of frequent bicycle riders. When asked directly why they don't ride or ride more often, the answers given are diverse, suggesting there are many physical and psychological barriers to be overcome. Supporting bicycle infrastructure, programs, and policies are the subject of this Plan, and the target audience are taxpayers, businesses, schools, city staff, and elected officials. The following paragraphs highlight the many benefits of bicycling, and the conclusions support this comprehensive planning effort for improving bicycle facility infrastructure as well as encouraging complementary programs and policies.

Bicycling should be fun for everyone, including adults, senior citizens and children. As children, bicycling can be an activity that provides freedom, happiness, and excitement. These qualities may also extend to adults and senior citizens, provided there are safe, convenient, and low-stress bicycle routes to follow. This plan is a foundational step toward the design and implementation phases of improving the city's bicycling network. By emphasizing bicyclist safety and considering all ages and abilities (AAA) within the bicycle facility selection process, the City of Fayetteville can reinforce the fun of bicycling for all of its residents, from children to adults and senior citizens.

Bicycling is a much more affordable and accessible form of transportation than owning and driving a car, and it makes public transportation better. Bicycling can be a viable form of transportation for many adults. This may include more than biking to work, but also short trips to the grocery store or pharmacy if there are adequately safe routes. In Fayetteville, about 27% of all household income is devoted to transportation costs. These costs are far from evenly distributed throughout the city, with lower-income and low-transit areas facing a greater burden. For low-income residents, the $8,000-plus cost associated with owning automobiles in Fayetteville may be out of reach for many households. A bicycle is a worthy alternative. Furthermore, bicycling makes sense for people reaching a transit stop that is just a little further than they may want to walk – the FAST (Fayetteville Area System of Transit) buses accommodate bicycles, and it's become an important part of the ridership attraction.

There are several different types of bicyclists, with varying skill levels. This plan acknowledges there are at least four different types of bicyclists, with differing needs and skill levels that influence how, and how well, bicycle facilities are utilized. These user types are discussed further in Chapter 4. Bicyclist skill level is correlated with user types, however these groups in ***Table 1.1*** are not one-in-the-same. For example, an Interested but Concerned Bicyclist may advance their skill level from new, to novice, or eventually to utility through practice, training, and physical condition, yet still retain a low-stress tolerance for riding with or adjacent

TABLE 1.1: BICYCLIST SKILL LEVELS AND NEEDS

LEVEL	DESCRIPTION	SKILL NEEDS
NEW	A person that perhaps has never ridden a bike, or not in a long time	Balance, handling, and individual skills
NOVICE	Knows how to ride, with reasonable control	Emergency maneuvers, riding in bike lanes or on multiuse paths
UTILITY	Rides a bike to work or other places because they can't or won't drive a car	Riding with cars in low-volume, low-speed situations
ADVANCED	Fast, fearless – and vulnerable to vehicular traffic	Traffic laws / safety, and how to be bike ambassadors for others

to vehicular traffic. An all ages and abilities approach to bicycle facility planning should acknowledge that safe bicycling isn't entirely about engineering infrastructure (described in ***"Chapter 3: Recommended System Plan"***), but also reinforces better biking and driving through policy enhancements (described in ***"Chapter 4: Recommended Programs & Policies"***), often referred to as the "six E's."

Bicycle injuries and fatalities are staying about the same in terms of its safety numbers, in spite of more cyclists and bicycling nationwide. While there are dangers associated with bicycling, there are also dangers associated with driving or riding in a car. The number of transportation-related fatalities in the United States (Figure 1.1) from every mode of travel increased by 13% between 2013 and 2017 – although the numbers of deaths of cyclists have stayed relatively stable for a decade at about 2% of all transportation-related fatalities. Still too many fatalities, but hardly an indicator of dangerous trends.

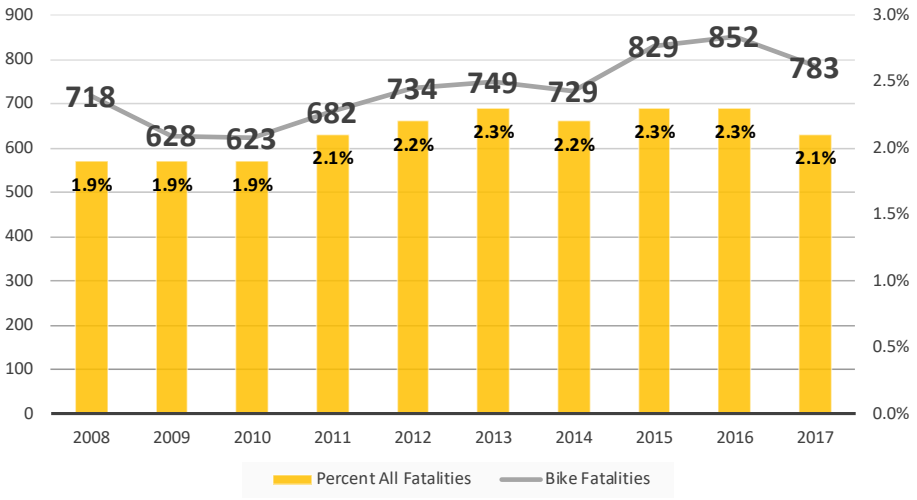


FIGURE 1.1: BICYCLE FATALITIES NATIONWIDE

Source: U.S. Department of Transportation, National Highway Traffic Safety Administration, 2017.

As with most trends, it's important to consider the baseline. Ten years ago the Great Recession was impacting travel volumes, modes, and patterns. Looking at data only from 2014 to 2017 (four years) yields a different pattern: all transportation fatalities went up by 13%; bike fatalities by 7% (although still nearly 2% of all fatalities); while population grew by only 2%. In North Carolina, bicycle injuries dropped 7% from 2008 to 2016; they fell by 50% in the City of Fayetteville *(source: NCDOT Bike/Pedestrian Crash Database)*.

50%

DECREASE IN BICYCLE INJURIES IN FAYETTEVILLE FROM 2008 TO 2016

Bicycle crashes, like other forms of accidental death, are almost entirely preventable. For the most recent 10 years of data (2007 to 2016), there were four total deaths in Fayetteville from bicycling and 180 with evident injuries, of which five were considered disabling. Total bicycling injuries have gone down during this 10-year period, in spite of Fayetteville's population increase of 7.5%. Transportation safety for all modes of travel should be made the top priority for these statistics to improve, a goal which has important implications for mobility and access objectives also facilitated by transportation infrastructure. It's also worth noting that a better-trained cyclist is less likely to be involved in a serious crash just as better-trained drivers are less likely to be involved in a serious automobile crash.

The USDOT has described the Fayetteville Metropolitan Statistical Area (MSA, a geographic unit of economic influence) in ***Table 1.2***. Road traffic fatalities in Fayetteville's MSA, as noted earlier, receive particularly high marks for cyclists, although overall roadway fatalities and pedestrian fatalities on roadways fare worse, bringing the chapter to a close with a final point concerning the benefits of bicycling.

Most of the things that make bicycling safer like lowering speeds, increasing neighborhood connectivity, reallocating space from car travel lanes to create buffered or separated bicycle facilities will also improve roadway safety for vehicles. The Smart Cycling program[1], administered by the League of American Bicyclists, offers nationwide instruction and certification. The League believes that when children go through better bicycling clinics, they are also learning the skills to be better drivers later on in life (scanning, signaling, respect). Everyone has a vested interest in the vision of creating better, safer bicycling, even if they never ride a bike.

In Fayetteville bicycling is a useful, and often necessary, mode of travel. During this planning process, people of all ages in Fayetteville were observed riding bicycles on fixed-gear, utility bikes dressed like they might be going to work, visiting a friend, or shopping. Fast, recreational, and commuting/utility cyclists are important purposes and equally valid; this Plan is for all of them. Realizing the physical and non-physical recommendations in this Plan will help ensure that young, old, physically challenged, novice,

1 https://www.bikeleague.org/ridesmart

and all cyclists can move around with equal or greater comfort and safety than if they were in a private automobile.

Bicycling helps local and larger economies thrive. Local and state bicycling events generate millions of dollars in tax revenues and sales for local businesses.[2] Business beneficiaries include not just retailers of bicycle equipment, but hotels, restaurants, and a cross-section of retail establishments as well. Bicyclists almost always own cars and pay fuel, sales, and property taxes just like everyone else – and, unlike cars and trucks, they don't use up valuable real estate for parking and present almost no wear-and-tear on roads. If more car drivers rode bicycles more often, costs from congestion, construction, maintenance, and pollution-related health impacts would decrease proportionately.

Bicycling has been available for almost everyone, and now every demographic is increasing their level of bike-riding. A survey and report conducted by PeopleForBikes and Alliance for Biking & Walking that uses data from a 2014 survey and US Census Bureau data from 2001 to 2009 shows how bicycling rates have increased for Hispanic, African-American, female, low-income, and elderly populations. The rise in bicycling rates may be correlated with many factors, including the prevalence of separated bike lane infrastructure within urban areas, as well as an overall emphasis on bike facilities for all-ages-and-abilities. This upward trend is encouraging, and should be sustained through comprehensive bicycle planning efforts to address physical improvements and supporting non-physical programs and policies for bicycling.[3]

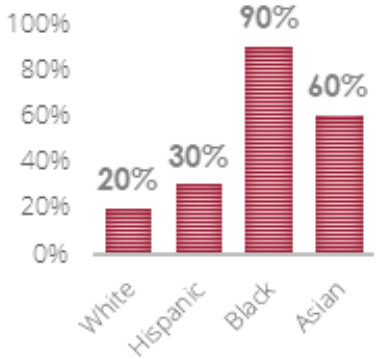


FIGURE 1.2: INCREASE IN SHARE OF BIKING BY ETHNIC / RACIAL DEMOGRAPHIC, 2001-2009

2 ITRE Evaluating the Economic Impact of Shared Use Paths in North Carolina, https://itre.ncsu.edu/focus/bike-ped/sup-economic-impacts/

3 PeopleForBikes and Alliance for Biking & Walking, "Building Equity Race, ethnicity, class, and protected bike lanes: An idea book for fairer cities," website: https://peopleforbikes.org/wp-content/uploads/2017/07/EquityReport2015.pdf.

Bicycling supports the health of people in Fayetteville. So much has been written about overweight and obese populations – especially children – and the increased health risks they face from cancer, heart disease, and mental illness. Bicycling is inherently a low-impact activity that can be accomplished by people in a range of physical conditions. Electric-assisted bicycles (eBikes) and three-wheeler options (adult tricycles) are becoming more commonplace in many cities to help those that need or want a little additional assistance.

TABLE 1.2: COMPARISON OF SAFETY METRICS - STATE AND CITY

Metric Value / Score*	NC	Fayetteville
Commute Mode Share - Auto	91.4% / 25	92.2% / 34
Commute Mode Share - Transit	1.1% / 31	0.5% / 25
Commute Mode Share - Bicycle	**0.3% / 23**	**0.2% / 25**
Commute Mode Share - Walk	1.9% / 19	3.2% / 69
Complete Streets Policies	Yes	None
DUI/DWI Fatalities per 100,000 Residents	0.41 / 34	0.7 / 8
Person Miles of Travel by Private Vehicle	30,394 / 43	53.4 / 40
Person Miles of Travel by Walking	136 / 16	0.46 / 28
Road Traffic Fatalities per 100,000 Residents - Auto	11.8 / 36	13.1 / 21
Road Traffic Fatalities per 100,000 Residents - Bicycle	**0.3 / 19**	**0.1 / 82**
Road Traffic Fatalities per 100,000 Residents - Pedestrian	1.7 / 15	2.6 / 5
Road Traffic Fatalities Exposure Rate - Auto	12.8 / 39	14.2 / 21
Road Traffic Fatalities Exposure Rate - Bicycle	**104.1 / 8**	**28.0 / 50**
Road Traffic Fatalities Exposure Rate - Pedestrian	97.8 / 11	81.8 / 28

**1 (worst) to 100 (best)*
Source: North Carolina Pedestrian and Bicycle Crash Data Tool

One of the more recent and largest studies of the health impacts of bicycling was reported in the British Medical Journal in 2017.[4] The commuting habits of more than 263,000 people (mean age: 52) were studied, controlling for a number of lifestyle factors. The results showed that bicycling was a statistically important factor in the prevention of cancer, cardiovascular disease, and all causes of mortality – and longer bicycling distances translate into more longevity and healthier outcomes. The researchers conclude their study by stating, "The findings, if causal, suggest population health may be improved by policies that increase active commuting, particularly bicycling, such as the creation of bicycle lanes, bicycle hire or purchase schemes, and better provisions for bicycles on public transport." It is also noteworthy that these findings are being reported in publications and media outlets that aren't narrowly targeted to the community of cyclists, such as Forbes Magazine (see text box below).

Conclusions. The positive effects that bicycling has on economies, health, and mobility are points that are readily made at the individual, local, state, and national levels. Bicycling creates opportunities for mobility, exercise, and access to local businesses that otherwise would be hard or impossible for many people to achieve, making biking an equity issue as well.

Project Goals, as derived from public input during prioritization phase:

- ❒ Improve Bicyclist Safety
- ❒ Provide Separation from Vehicles
- ❒ Increase Network Connectivity
- ❒ Address Maintenance Conditions
- ❒ Provide Access to Popular Destinations

Vision

The City of Fayetteville Bike Plan identifies opportunities for leadership to establish a bicycling network that offers a safe and reliable transportation system for users of all ages and abilities.

4 Carlos A Celis-Morales, et al., "Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study," BMJ 2017; 357, April 19, 2017. Website: https://doi.org/10.1136/bmj.j1456.

"Cycling to work was associated with very large health benefits. Commuters who cycled to work had a 41% lower risk of dying from all causes than people who drove or took public transport. They also had a 46% lower risk of developing and a 52% lower risk of dying from cardiovascular disease, and a 45% lower risk of developing and a 40% lower risk of dying from cancer."

Kevin Murnane, "New Research indicates Cycling to Work has Extraordinary Health Benefits," Forbes, Apr 25, 2017. Website: www.forbes.com/sites/kevinmurnane/2017/04/25/new-research-indicates-cycling-to-work-has-extraordinary-health-benefits/#767420ed3e62

Planning Process

The Fayetteville Bike Plan will provide the City, the North Carolina Department of Transportation (NCDOT), and other local and regional partners with a guide for facility development to improve biking in the city. This plan should be used by city staff and external partners such as NCDOT, local greenway coalitions, and the Fayetteville Area Metropolitan Planning Organization when considering solutions to future transportation projects and development. The process in developing the Plan started in February 2019 with the convening of the first Steering Committee meeting. This initial meeting was conducted in part to capture the opinions of the local stakeholders about important guiding principles for the Plan.

STEERING COMMITTEE

The project Steering Committee, listed in the Acknowledgments section, included representatives of the Cumberland County school administration, city leadership, police, NCDOT, and Fayetteville Area Metropolitan Planning Organization (FAMPO). The committee met four times over the course of project development to guide the vision of and recommendations for the Plan. The committee reviewed data on existing conditions, proposed new facilities, and evaluated outreach results.

PUBLIC INVOLVEMENT

In March 2019, the public engagement period opened for the Plan. A public survey was administered from March to July of 2019. The survey gathered information on existing biking behaviors, future needs for biking, and the strengths and weaknesses of the existing biking environment (***Figure 1.3***). The survey was offered in two formats, a paper questionnaire and an interactive map. Both formats were available on the project website (www.bikingfayetteville.com). Interviews were held with local stakeholders including local bike enthusiasts, bike shop employees, and owners to understand biking issues. Information about the Plan was left at Fayetteville stores, libraries, community facilities, transit stops, and posted on several social media outlets.

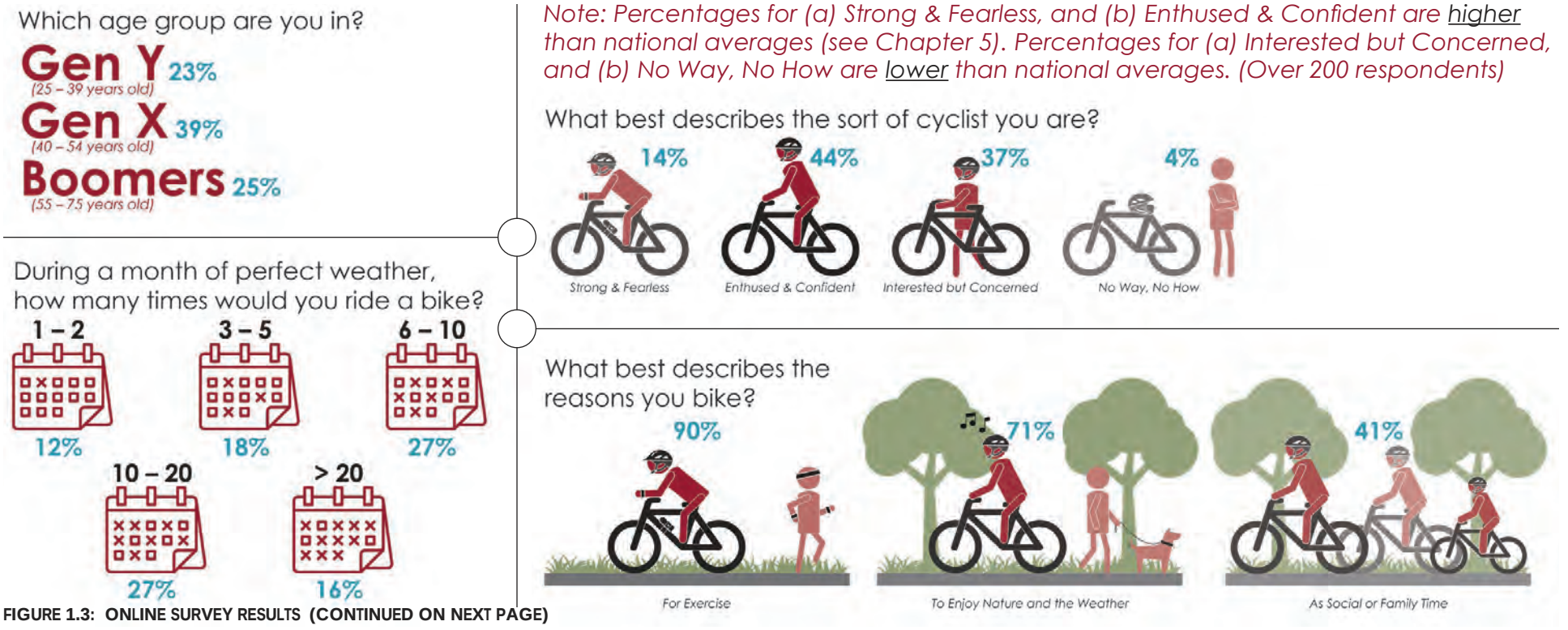
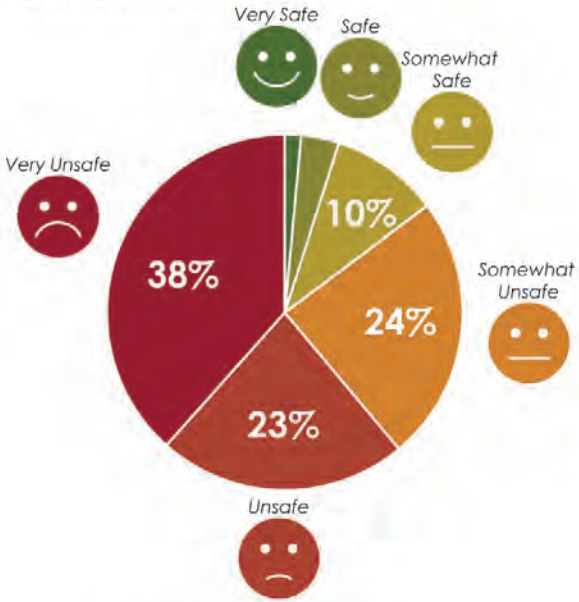


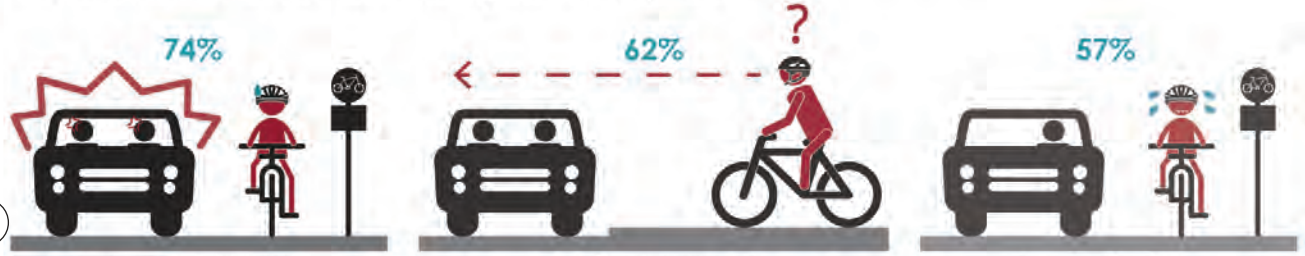
FIGURE 1.3: ONLINE SURVEY RESULTS **(CONTINUED ON NEXT PAGE)**

How safe do you feel riding a bike in Fayetteville?



Do you prefer riding a bike on:

What best describes the reasons you choose not to bike at all or have chosen not to bike when given the option?



Please rank the following destinations that you feel are most important to be able to reach.

1. **Downtown Fayetteville**
2. **Neighborhood Parks & Rec Centers**
3. **Existing Trails and Greenways**
4. **Regional or State Parks**
5. **Universities or Colleges**
6. **K-12 Schools**
7. **Grocery Stores**
8. **Major Employers**
9. **Farmers Market**
10. **Shopping Areas**
11. **Bus and Train Stations**

What types of bike facilities do you want to see more of in Fayetteville?

Benefits of Biking

Having a bicycle-friendly community in Fayetteville can lead to a multitude of economic, health, mobility, environment, safety, and quality-of-life benefits.

ECONOMIC BENEFITS

Investing in bicycle infrastructure can stimulate the local economy by generating tourism revenue, supporting local business, and creating jobs. Many tourists seek out places where they feel comfortable walking and bicycling to explore a new area. Building bike infrastructure creates an average of 11.4 jobs for every $1 million spent compared to roadway projects which create 7.8 jobs per $1 million[1]. Active streets that support biking are generally more attractive to businesses, increasing the opportunity for economic development. Building bicycle infrastructure can also be cost-effective. For the cost to construct a one-mile, four-lane freeway ($50 million), an entire network of bicycle facilities for a mid-sized city can be built.

In North Carolina, 790 jobs were created through the construction of four shared-use paths.

(source: NCDOT, Division of Bicycle & Pedestrian Transportation. *Evaluating the Economic Impact of Shared Use Paths in North Carolina*, 2015-2017.)

According to the National Association of Homebuilders, trails are consistently ranked one of the most important community amenities by prospective home buyers. This preference for communities that accommodate walking and bicycling is reflected in property values across the country.

QUALITY OF LIFE BENEFITS

The American Automobile Association found that the average American household spends almost $9,000/year to own and operate one car; the cost to own and maintain a bicycle is about $120/year[2]. Providing the infrastructure for people to travel safely by bicycle can be a huge cost saving to people who cannot afford to own and maintain a reliable automobile.

HEALTH BENEFITS

Providing facilities for walking and bicycling will allow Fayetteville residents to incorporate physical activity into their daily lives through active transportation, recreation, and exercise. In North Carolina, more than 65 percent of the population is overweight or obese, and the lack of physical activity has been identified as one of the greatest contributing factors.[3] The Center for Disease Control and Prevention recommends at least 150 minutes of moderate exercise each week, yet many people do not have safe access to basic forms of physical activity such as walking and bicycling.[4]

In addition, the health and well-being benefits of increased physical activity has a positive impact on individual and societal health costs. Each year North Carolinians spend $24 billion on health care related to the lack of physical activity, diabetes, excess weight, and poor nutrition. Walking and bicycling act as preventative measures against these and other conditions, potentially saving individuals and families thousands of dollars on health care. Every dollar invested in pedestrian and bicycle trails can result in a savings of nearly $3 in direct medical expenses.[5]

MOBILITY BENEFITS

2 https://www.aaa.com/autorepair/articles/what-does-it-cost-to-own-and-operate-a-car
3 https://www.ncdot.gov/bikeped/walkbikenc/health_post/benefits/default.aspx
4 https://www.ncdot.gov/bikeped/walkbikenc/health_post/benefits/default.aspx
5 https://www.ncdot.gov/bikeped/walkbikenc/health_post/existing-conditions/default.aspx

A 1993 study by the Federal Highway Administration of USDOT found that emissions and fuel consumption would be reduced by 0.7% to 4.3% between low- and high-investment scenarios studied. "Although a cost comparison is beyond our scope, the relatively low-cost nature of many walking and particularly bicycling facilities Suggests that actions to expand human-powered transportation could reduce air pollution for less per-unit cost than many other approaches (e.g., so-called "alternative fuels"). When the myriad other environmental and societal benefits of bicycling and walking are factored in as well, the case for expanding these modes becomes still more compelling."

"It's great to see the progress being made in downtown Fayetteville. My wife and I often visit the Airborne & Special Operations Museum, Festival Park, NC Veterans Park, the Museum and Poe House, shops, bars, restaurants and theaters, and soon the baseball stadium, and bring visitors with us. Connecting all of these sites, and others, with bike friendly lanes or trails would add a whole new, and useful dimension to downtown."
-Anonymous Citizen

Quote from citizen that completed the survey for the bike plan.

Almost 50%[6] of all trips made in the United States are three miles or less, yet 72%[7] of these short trips are driven. Many of these trips could be made by walking or bicycling if sidewalks, bike lanes, paths, or other facilities were provided to improve safety, efficiency, and convenience. By diverting short driving trips to walking or bicycle trips, traffic congestion and motor vehicle miles driven can be reduced. An individual who shifts three trips a week averaging 2.4 miles from driving to bicycling reduces congestion costs to other road users by approximately $216 in urban areas.[8] Increasing the ability to cycle also bolsters transit ridership as biking can be involved at either end of the trip, whether it is through one's own neighborhood, along a tree-lined greenway, or down a city street.

ENVIRONMENTAL BENEFITS

About 20%[9] of all air pollution in the US comes from the extraction and burning of fossil fuels in motor vehicles. Fossil fuel emissions are harmful to children, senior citizens, and individuals with heart or other respiratory illnesses as well as those susceptible to developing such conditions. These emissions are especially harmful to low-income populations that reside in neighborhoods near highways. Building on an earlier study that deemphasized cycling in a suite of tools to limit future carbon emissions, a 2015 study using a "high-shift" movement towards cycling indicated a 7% reduction in CO_2 emissions by 2030, also saving $6 trillion globally in the process.[10] In other studies, if 20% of people used bikes instead of cars for short trips in Milwaukee and Madison, Wisconsin, 57,405 fewer tons of carbon dioxide would be emitted (2010)[11]; a 2011 study[12] found that Barcelona's bike-share program reduces carbon dioxide emissions in that city by about 9,000 metric tons each year.

While the benefits achieved now by cycling and those forecasted in many studies under different assumptions focus on the conversion of automobile trips to bicycling trips (and has been known for a long time; refer to text box at right)[13], bicycling helps the environment in other ways that may not be as obvious. One novel way that cycling positively impacts the natural and human environments is that bicycle parking and travelways occupy less space than their automobile counterparts, preserving natural areas that absorb particulate and airborne pollutants (such as carbon dioxide). Sustainability professionals also talk about embodied carbon: the amount of

6 https://www.bikeleague.org/content/national-household-travel-survey-short-trips-analysis
7 https://www.bikeleague.org/content/national-household-travel-survey-short-trips-analysis
8 https://www.ncdot.gov/bikeped/walkbikenc/health_post/benefits/default.aspx
9 https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#transportation
10 Mason, Jacob; Fulton, Lew; and McDonald, Zane; "A Global High Shift Cycling Scenario: The Potential for Dramatically Increasing Bicycle and E-bike Use in Cities Around the World, with Estimated Energy, CO2, and Cost Impacts," Institute for Transportation & Development Policy and the University of California-Davis, November 12, 2015. Website: www.itdp.org/2015/11/12/a-global-high-shift-cycling-scenario
11 Grabow, Maggie; Hahn, Micah; and Whited, Melissa, "Valuing Bicycling's Economic and Health Impacts in Wisconsin," The Nelson Institute for Environmental Studies Center for Sustainability and the Global Environment, University of Wisconsin-Madison, January 2010.
12 Rojas-Rueda D, de Nazelle A; Tainio M; and Nieuwenhuijsen MJ, "The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study," British Medical Journal, August 4, 2011.
13 U.S. Department of Transportation, Federal Highway Administration, "The Environmental Benefits of Bicycling And Walking," National Bicycling And Walking Study, Case Study No. 15, Publication No. FHWA-PD-93-015, 1993. Website: https://safety.fhwa.dot.gov/ped_bike/docs/case15.pdf

carbon dioxide created and emitted in the manufacture and transportation of a vehicle to its new owner. Driven 100,000 miles over its useful life, a car may require as much carbon to create as it does to drive over that mileage (it should be noted that (1) figuring out embodied carbon content is very complex, and (2) driving the same car longer before replacing it lowers that ratio, while purchasing a larger, heavier car raises the ratio of carbon manufactured/driven). Bicycles require a small fraction of the amount of materials and transportation cost to create and transport, and therefore would be expected to represent a proportionately higher savings for embodied carbon compared to those required to manufacture a new automobile.[14]

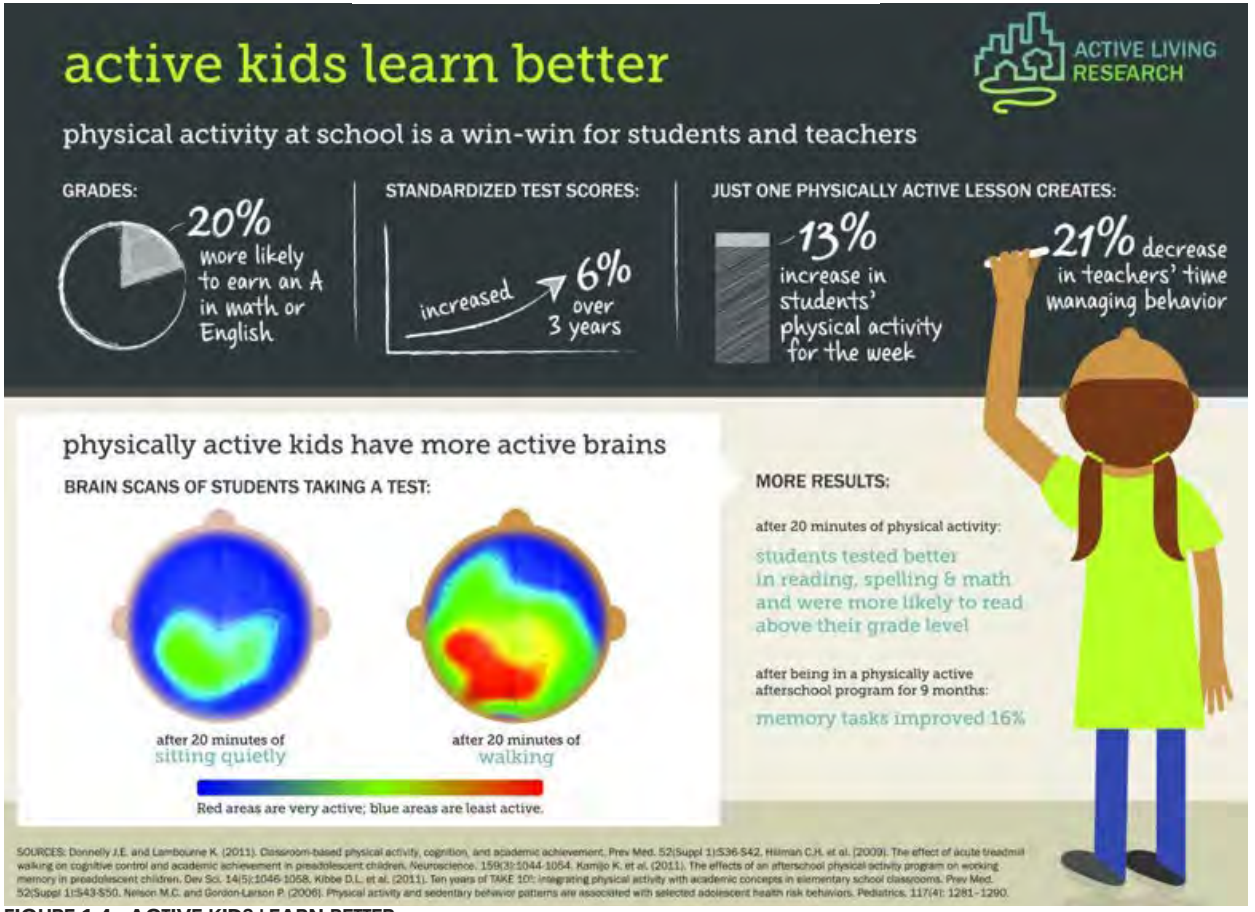


FIGURE 1.4: ACTIVE KIDS LEARN BETTER

Research that identifies benefits of a more active lifestyle for children. (source: www.activelivingresearch.org)

SAFETY BENEFITS

North Carolina is currently ranked as one of the most unsafe states for biking based on per capita bicyclist fatalities. According to the 2011 Bicycle and Pedestrian Safety Survey, at least 70%[15] of North Carolinians would walk or bike more for daily trips if walking and bicycling conditions were improved. Unfortunately, in the same survey 80% of respondents[16] felt that biking for daily needs was somewhat or very dangerous due to a lack of on-road bicycle facilities; lack of alternatives for cycling on main arterials; lack of bicycle paths and greenways; and motorists or bicyclists not sharing the road as contributing factors.

Bicycle-friendly communities are safer for *all* road users, including motorists. Installing bicycle lanes reduces motor vehicle travel lane widths while making pedestrians and bicyclists more visible to drivers. These changes are often effective at slowing traffic to people-friendly speeds and can help to ensure speed limit compliance by matching the physical design of the road to the posted speed limit. Furthermore, installing bike lanes increases cyclist predictability; reduces wrong-way riding and sidewalk riding (a contributing factor to many bicycle-car collisions); and increases traffic control compliance. The "safety in numbers" principle states that as walking and bicycling rates increase, streets become safer for pedestrians and bicyclists. When walking and bicycling rates double, pedestrian-motorist collision risk decreases by 34%.[17]

14 Berners-Lee, Mike; and Clark, Duncan, "What's the carbon footprint of ... a new car," The Guardian, September 23, 2010. Website: www.theguardian.com/environment/green-living-blog/2010/sep/23/carbon-footprint-new-car
15 NCDOT IMD, the Institute of Transportation Research and Education. 2011 Bicycle and Pedestrian Safety Summit Report. 2011.
16 Walk Bike NC: https://www.ncdot.gov/bikeped/walkbikenc/safety_post/existing-conditions/default.aspx
17 Walk Bike NC: https://www.ncdot.gov/bikeped/walkbikenc/safety_post/benefits/default.aspx


bike Fayetteville»

CHAPTER 2: EXISTING CONDITIONS SUMMARY

Existing Conditions

Bike facilities generally fall into three categories: shared streets, on-road transportation facilities, and separated, or off-street, paths including greenways and trails. Currently, Fayetteville has 64 miles of on-road bike lanes and 42 miles of greenways and trails. As the City continues to take steps to increase safe and reliable bicycling transportation options, further connectivity and additional facilities will become readily available to commuters and recreational users. An evaluation of street networks in Fayetteville revealed a lack of on-road facilities on all major roadways.

DEMOGRAPHICS

A study of an area's demographics can help define the population characteristics within Fayetteville that use, or would like to use, bicycle facilities. Lack of car ownership, commuting patterns, and income status are indicators of community needs and can project demand for a well-connected bicycle network. A demographic analysis was completed for the City of Fayetteville using 2010 US Census Bureau information and 2017 American Community Survey (ACS) data.

The population in Fayetteville has increased 6% in the last few years from 198,875 in 2010 to an estimated 209,468 in 2018. Approximately 19.3% of the population in Fayetteville lives below the federal poverty line, a percentage that is higher than the national and North Carolina averages. It should be noted that the poverty line is often considered a floor for impoverishment and need; many households above the poverty line do not have reliable, flexible transportation options. It's estimated that approximately 7% of all households in Fayetteville do not have access to a vehicle.[1] About 10.6% of the population is enrolled in college or graduate schools, another group that often does not have ready access to personal vehicles.

1 American Fact Finder: https://factfinder.census.gov/faces/nav/jsf/pages/index.html

Figure 2.1 shows some of these demographics in map format. The darker colors of the maps identify areas in Fayetteville that have a higher density of vulnerable populations. Focus should be given to these areas as the potential of using alternative modes of transportation tend to be higher. Other key population facts are listed below:

- 23% of the population is under 18;
- 16% of the population is enrolled in a local K-12 school;
- 16% of the population is over the age of 55;
- 10% of the population reported commuting not by car, truck, or van (public transportation, walking, or other means such as bicycling); and
- The average travel time to work is 18.7 minutes with 19% of commutes being less than 10 minutes.[2]

2 American Fact Finder: https://factfinder.census.gov/faces/nav/jsf/pages/index.html

Over 19% of Fayetteville's population lives below the federal poverty threshold; many of these families lack any, or any reliable, access to a private automobile.

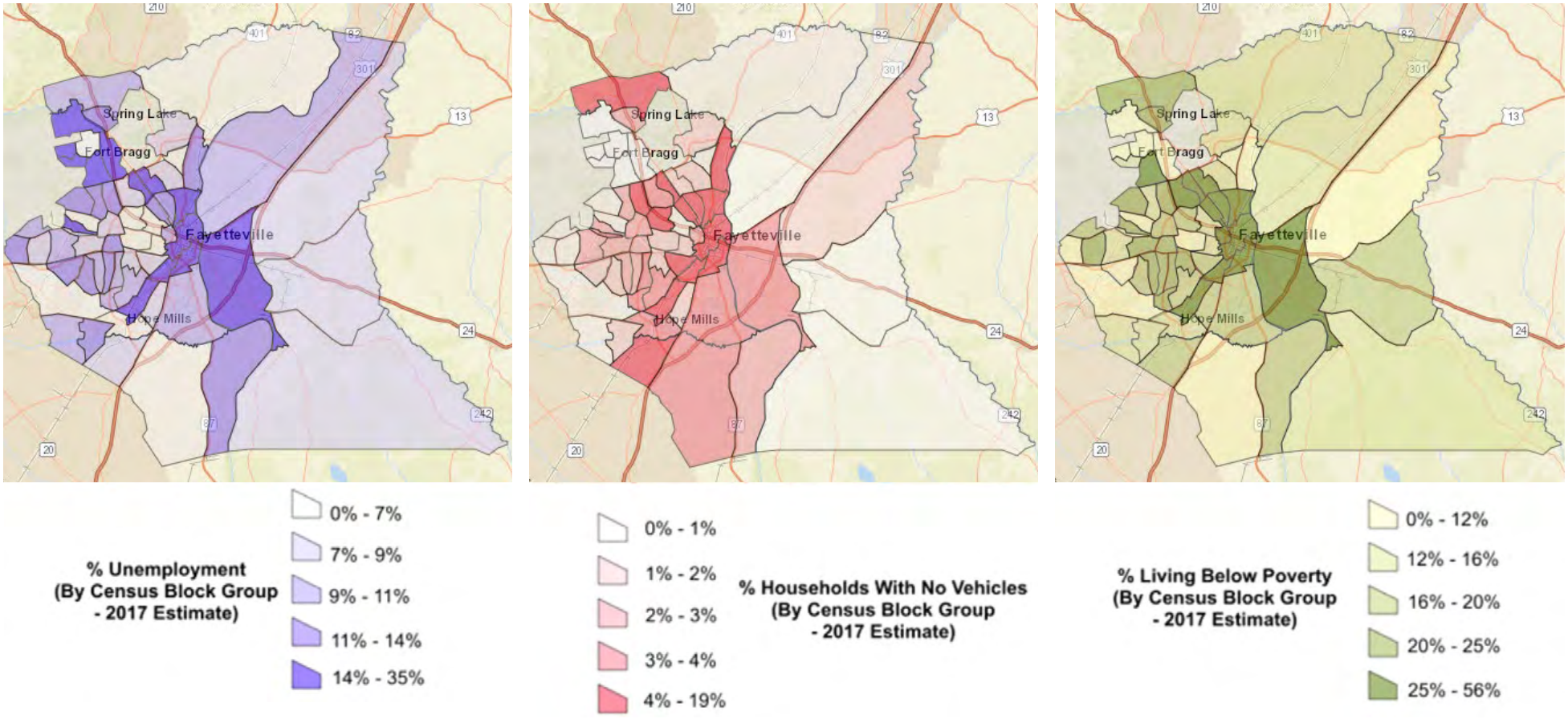


FIGURE 2.1: FAYETTEVILLE REGION DEMOGRAPHICS *Source: US Census, American Community Survey 5-year Estimates (2013-2017)*

BICYCLE CRASH ANALYSIS

A bicycle crash analysis is useful because it can be an indicator of the bicycle-friendliness of a community and can also provide information on key locations or educational outreach areas where improvements could be made to enhance safety. A crash analysis can indicate popular bicycling routes, and sometimes illustrate conflict areas between pedestrians and motorists. The North Carolina Department of Transportation provided data for bicycle crashes from 2007 – 2016. **It is important to note that not all crashes are reported to the police.**

Map 2.1 displays the location of the reported crashes. From 2007 to 2016, there were 277 crashes involving bicycles reported in Fayetteville. There were 3 fatalities and 5 crashes that led to disabling injuries during this study period. 56% of the crash victims were black, 86% of the crash victims were male and most of the crashes involved an equal distribution in ages spanning from 10 to 59.

More than half of crashes occurred in the vehicular travel lane (57%) and there was an equal split between crashes occurring at intersections and along the road corridor. Many of the crashes occurred in the months of August, September, and October, between Tuesday and Friday during the week, and between the 5 PM – 8 PM time frame. In terms of roadway characteristics, 38% of the bicycle crashes occurred on 2-lane roads and 67% of the crashes occurred on roads with a speed limit between 30-45 mph.

A few roads in Fayetteville had higher rates of bicycle crashes per mile: Hay/Person Street, Ireland Drive, Raeford Road, and Bragg Boulevard.

Hay Street & Person Street

In the 10-year analysis period, there were 14 bicycle crashes on Hay Street and Person Street between Morganton Road and Broad Street (2.3 miles). Hay and Person Street runs thru downtown Fayetteville and connects downtown Fayetteville to the Haymount neighborhood. Person Street also runs adjacent or near the Fayetteville Amtrak station, Greyhound bus station, and the Airborne & Special Operations Museum is located at the intersection of Hay Street & Bragg Boulevard. Hay Street and Person Street are mostly 4- and 5-lane cross-sections for these segments, except for the section between Ray Avenue and Bow Street, which is 2-lanes wide with perpendicular on-street parking. There was only one crash along the two-lane segment during this analysis period. Nine of the 14 bicycle crashes were due to motorists failing to yield the right of way to bicyclists (or overtaking) and were evenly split between bicyclists being positioned on the sidewalk and in the travel lanes. The speed limit on Hay and Person Street ranges from 15 – 35 mph.

Ireland Drive

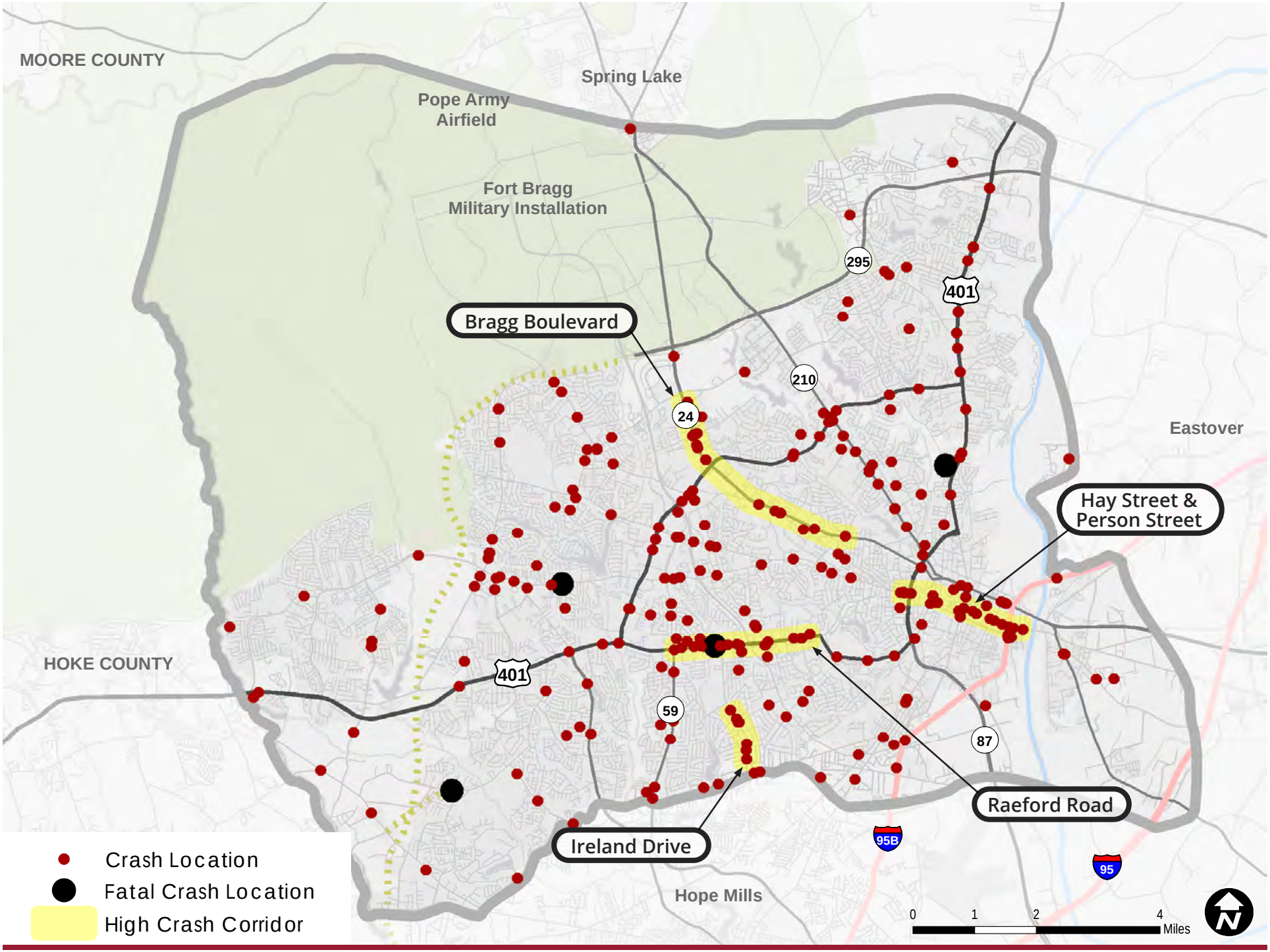
Seven bicycle crashes occurred along Ireland Drive between Martindale Drive and Kent Road (0.9 miles) during the analysis period. Ireland Drive connects Raeford Road with Cumberland Road and is more residential in nature. Ireland Drive is a 3-lane road with a speed limit of 35 mph. It is worth noting that there are several churches, five schools, and a public library located along Ireland Drive. These are all potential destinations for cyclists, especially those of younger ages. Out of the seven bicycle crashes, **six of them involved cyclists between the age of 11 and 19.**

Raeford Road

On Raeford Road between Hope Mills Road and Purdue Drive (2.08 miles), there were 14 bicycle crashes during the analysis period. Most injuries were Class B or C injuries but there was **one fatality that occurred at night between Scotland Drive and Ireland Drive (2013)**. Almost half of the crashes occurred with the bicyclist on the sidewalk with motorists failing to yield the right of way. Since Raeford Road is mostly a 7-lane undivided cross-section for this segment, the frequency of sidewalk crashes indicates that cyclists do not feel comfortable sharing the road with vehicles on Raeford Road. The speed limit on this segment of Raeford Road ranges from 35 – 45 mph.

Bragg Boulevard

Bragg Boulevard is mostly a 6-lane median divided roadway with a speed limit of 45 mph connecting downtown Fayetteville with Spring Lake and Fort Bragg. Some sections of Bragg Boulevard towards Fayetteville are 6-lanes with a center two way left turn lane and a 35 mph speed limit. On the segment of Bragg Boulevard between Stein Street and Glenville Avenue (3.6 miles),13 bicycle related crashes occurred during the analysis period. There was one crash that resulted in Class A (disabling) injuries at the intersection of Bragg Boulevard and Glenville Avenue. The crashes were split between occurring on the sidewalk and in the travel lane. More than half of the crashes along Bragg Boulevard were due to motorists failing to yield the right of way to cyclists.



MAP 2.1: BICYCLE CRASH LOCATIONS 2007-2016 *Source: NCDOT Bicyclist and Pedestrian Crash Map: https://www.arcgis.com/home/item.html?id=b4fcdc266d054a1ca075b60715f88aef*

Existing Plans, Programs and Policies

A review of existing plans, programs and polices provides an idea of what the City expects for the future. These ideas are studied and evaluated in the planning process to understand their importance and how they each related to the current needs of the City.

CITY OF FAYETTEVILLE UNIFIED DEVELOPMENT ORDINANCE

Section 16-218. Bicycles, roller skates, roller blades, and other nonmotorized or self-propelled coasters, scooters, skateboards, toy vehicles, pushcarts, and similar devices shall be permitted on sidewalks except in the Downtown Historic District as permitted in Chapter 24, article IV of the City Code.

Sec. 16-222. Every person propelling any pushcart, on roller blades or skates, or riding a bicycle or an animal upon a roadway, and every person driving any animal-drawn vehicle, shall be subject to the provisions of this chapter which apply to motor vehicles.

30-5.A.9. Within the Neighborhood Commercial (NC), Limited Commercial (LC), Mixed-Use (MU), and Downtown (DT) zoning districts, residential development with 30 or more dwelling units and nonresidential development with 5,000 or more square feet of gross floor area shall provide individual or shared bicycle parking facilities in accordance with the following standards.

- **30-3.D.1.** The residential base zoning districts established in this section are intended to provide a comfortable, healthy, safe, and pleasant environment in which to live and recreate. More specifically, they are intended to: "Provide for safe and efficient vehicular access and circulation and promote bicycle, pedestrian, and transit-friendly neighborhoods."

30-3.G. Planned Development Zoning Districts. Before approving a PD zoning district classification, the City Council shall find that the application for the PD zoning district classification, as well as the Master Plan and the Terms and Conditions document included as part of the application, comply with the following standard:

> *Identify the on-site transportation circulation system, including the general location of all public and private streets, existing or projected transit corridors, pedestrian and bicycle pathways, and how they will connect with existing and planned City systems.*

30-5.A.9. Bicycle Parking. Within the Neighborhood Commercial (NC), Limited Commercial (LC), Mixed-Use (MU), and Downtown (DT) zoning districts, residential development with 30 or more dwelling units and nonresidential development with 5,000 or more square feet of gross floor area shall provide individual or shared bicycle parking facilities in accordance with the following standards. Nonresidential uses of up to 20,000 square feet in size may share bicycle parking facilities in accordance with this section.

General Standards

- Bicycle parking facilities shall be conveniently located, and clearly visible from the front entrance but in no case shall such facilities be located more than 150 feet from the primary building entrance.
- Bicycle parking spaces shall be provided at the rate of one bicycle parking space per every 30 residential dwelling units and/or every 5,000 square feet of nonresidential floor area.
- Bicycle facilities shall include a rack or other device to enable bicycles to be secured with a 4 foot minimum distance from all fixed objects.
- Shared Bicycle Parking:

  Nonresidential uses of 20,000 square feet in size or less may share bicycle parking spaces provided (1) Each use provides or is served by improved pedestrian access from the bicycle parking facility to the primary building entrance; and (2) The shared bicycle parking facility and improved pedestrian access is depicted on a Site Plan.

  Adjustments should be made to include consideration of public bike racks within 150' of main entrance in downtown district(s).

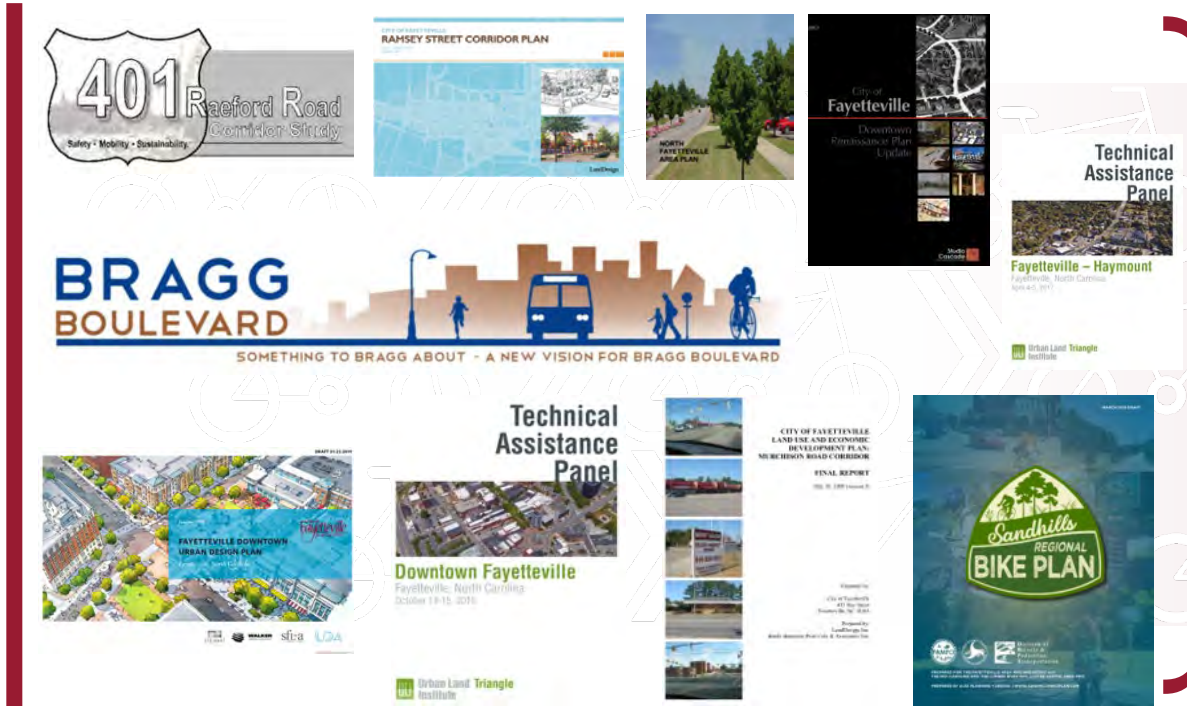
COMPLETE STREETS POLICY

North Carolina's Department of Transportation has had a policy (2009) and accompanying Planning and Design Guidelines document (2012) in place long enough for the concept to become an accepted part of NCDOT processes. Ten years later, NCDOT authorized an update of that policy based on two years' worth of assessment and investigation into those processes. The strengthened policy highlights the ethos of complete streets – that every street should be accessible and navigable by people of any ability and mode of transport – and adds in support for Vision Zero (a global movement that has been adopted by many cities and states to reduce traffic-related fatalities to zero). With exceptions like legal restrictions on bicycle or walking usage or some maintenance projects, a complete streets approach to planning is now the "law of the land" in North Carolina. For example, the Transportation Planning Division (TPD) of NCDOT has started to use project sheets that incorporate a complete street assessment of planned projects. Importantly, the tack being used is to assume first that all modes of travel will be using a planned street (or street improvement) unless it proves infeasible to implement. Although subject to some interpretation and continuing evolution of best practice, the adoption and recent amendment provides affirmation to the inclusion of bicycles in planning, design, construction, and maintenance processes in North Carolina.

REVIEW OF EXISTING PLANS

The City has worked to plan for the future of several roadways and small areas to accommodate transportation needs expressed by citizens. ***Table 2.1*** summarizes past planning efforts that relate to or impact cycling in Fayetteville.

OBSERVATIONS FROM EXISTING PLANS



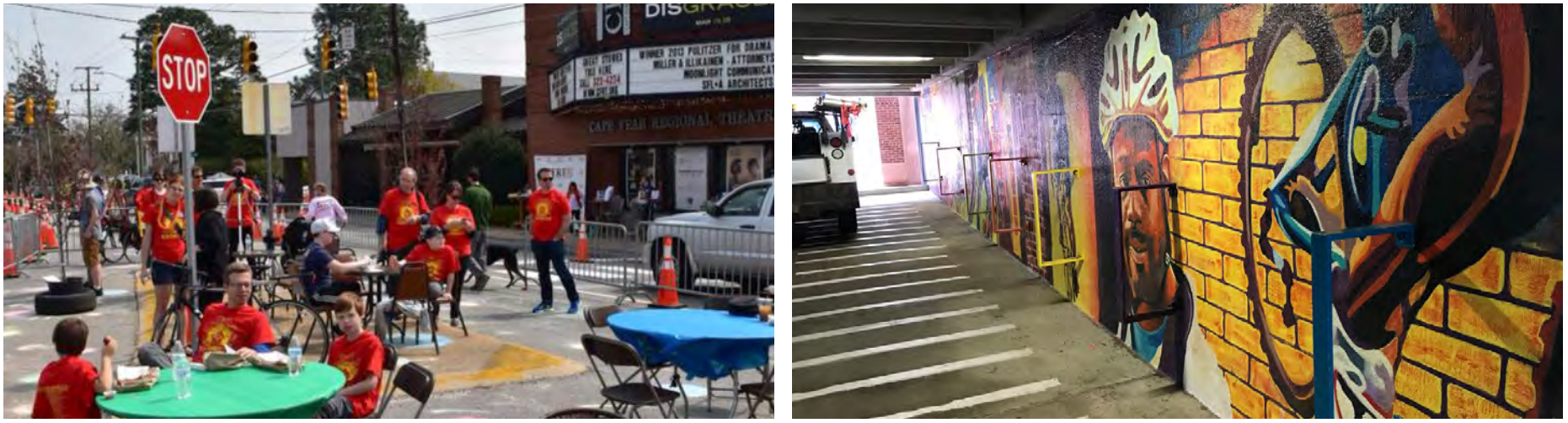
bike Fayetteville

TABLE 2.1: OBSERVATIONS FROM EXISTING PLANS

Plan	Summary of Recommendations
North Fayetteville Area Plan (2002) http://www.co.cumberland.nc.us/vd-planning/downloads/nfareaplanjan03.pdf	▪ Transportation recommendations were made for both vehicular and pedestrian circulation. The plan proposed a recreation area adjacent to Pine Forest High School by either a connector road or a pedestrian trail connecting the southern community to the school and recreation area. Also recommended was a north/south connector road between McCloskey and Andrews Roads. ▪ Proposed Improvements for Stacey Weaver Rd, Andrews Rd and McArthur Rd include multi-lanes with a boulevard type cross-section, landscaping, and sidewalks. ▪ Sidewalks are proposed along both sides of Honeycutt Rd, McArthur Rd, Andrews Rd, Tokay Dr, Stacey Weaver Dr with the proposed Cape Fear River greenway/pedestrian trail. Bike trails/sidewalks are proposed to provide safe passage over and/or under major thoroughfares, to include the Outer Loop. Also proposed is the design and implementation of a network of sidewalks, bike/jogging trails and road right-of-ways to provide pedestrian access throughout the community.
Land Use and Economic Development Plan – Murchison Road Corridor (2008) https://fayettevillenc.gov/home/showdocument?id=3149	▪ Recommendations include the implementation of the planned greenway allowing for improved pedestrian and multi-modal facilities and allowing for residential densities to support a broad offering of modal choice (car, transit, pedestrian, cycling).
Ramsey Street Corridor Plan (2009) https://fayettevillenc.gov/home/showdocument?id=3153	▪ Connectivity improvements from this study include more internal circulation to activities and neighborhoods by all transportation modes without forcing these activities directly onto Ramsey Street.
Bragg Boulevard Corridor Study (2012) https://fayettevillenc.gov/home/showdocument?id=724	▪ This plan presented a multi-modal transportation plan to enhance traveling by transit, bicycling, and walking in the area. ▪ Mobility options were identified along Bragg Boulevard between Fort Bragg and downtown Fayetteville ▪ The Plan illustrated how new urban development and redevelopment in the corridor can facilitate travel by bus, bike, and foot.
Downtown Renaissance Plan Update (2013) https://fayettevillenc.gov/home/showdocument?id=3145	▪ The updated plan identified the need for gateways to alert travelers of their entry to downtown. ▪ Cape Fear River – The 2002 plan identified the river as an under-used asset, promising increased opportunities for public access, historic ties and new development. ▪ The plan recommended that increased access to recreation and community activity can improve the quality of life.
Downtown Fayetteville ULI Technical Assistance Panel (2015) https://fayettevillenc.gov/home/showdocument?id=4952	▪ The plan recommended improvements to extend a high quality streetscape throughout Downtown and improve walking and biking conditions. ▪ Recommendations were also included to develop a link between Downtown and Fayetteville State University and neighborhoods to the north, to improve pedestrian and bicycle connectivity.
Fayetteville Haymount ULI Technical Assistance Panel (2017) https://fayettevillenc.gov/home/showdocument?id=7835	▪ A major recommendation from the plan proposed a road diet for portions of Hay Street, Morganton Road, and Fort Bragg Road that could help decrease the volume and the speed of traffic, provide additional on-street parking spaces, and enhance pedestrian connectivity and safety.

TABLE 2.1: OBSERVATIONS FROM EXISTING PLANS

Plan	Summary of Recommendations
Fayetteville Downtown Urban Design Plan (2019) https://fayettevillenc.gov/home/showdocument?id=11955	▪ The major recommendation from this plan included promoting a well-connected and beautiful downtown by improving walkability and bikeability, managing parking, and enhancing streetscapes and public spaces. ▪ Also recommended is the need to enhance parks and trail connections. ▪ Improve stormwater management and public spaces (trails and parks) to address the growing impacts of flooding.
Sandhills Regional Bike Plan (2019) https://www.sandhillsbikeplan.com/the-plan.html	▪ Recommendations from the Plan include the following: ▪ Explore greenway opportunities along Beaver Creek. ▪ Improve bicycle connections in Downtown. ▪ Complete a corridor study on Cliffdale Road. ▪ Study the rail-to-trail opportunity along Clinton Rd from East Fayetteville to Vander. ▪ Incorporate sidepaths along Cumberland Rd. ▪ Create neighborhood bike routes that link to larger regional connections. ▪ Improve NC 9 with paved shoulders. ▪ Complete a corridor study for the East Coast Greenway to identify alignment options. ▪ Bicycle facilities on Shaw Rd should be included during the roadway widening.
Raeford Road Corridor Study (2010) https://fayettevillenc.gov/home/showdocument?id=3435	▪ Recommendations included a southern bike route that follows Village Drive, portions of Ireland Drive, Coventry Road, Odom Drive, Watauga Road, and connects to Raeford Road via Scotland Drive (which is proposed to be signalized). ▪ A bicycle route was recommended to follow the Glensford Drive extension, Louise Street, Timberland Drive, Pritchett Road, a portion of Cliffdale Road, Bunce Road, and 71st School Road.



Bike parking can come in all shapes and respect local culture at the same time. The wall-mounted racks at right are inside the municipal parking deck in Leesburg, Virginia.

EXISTING FACILITIES

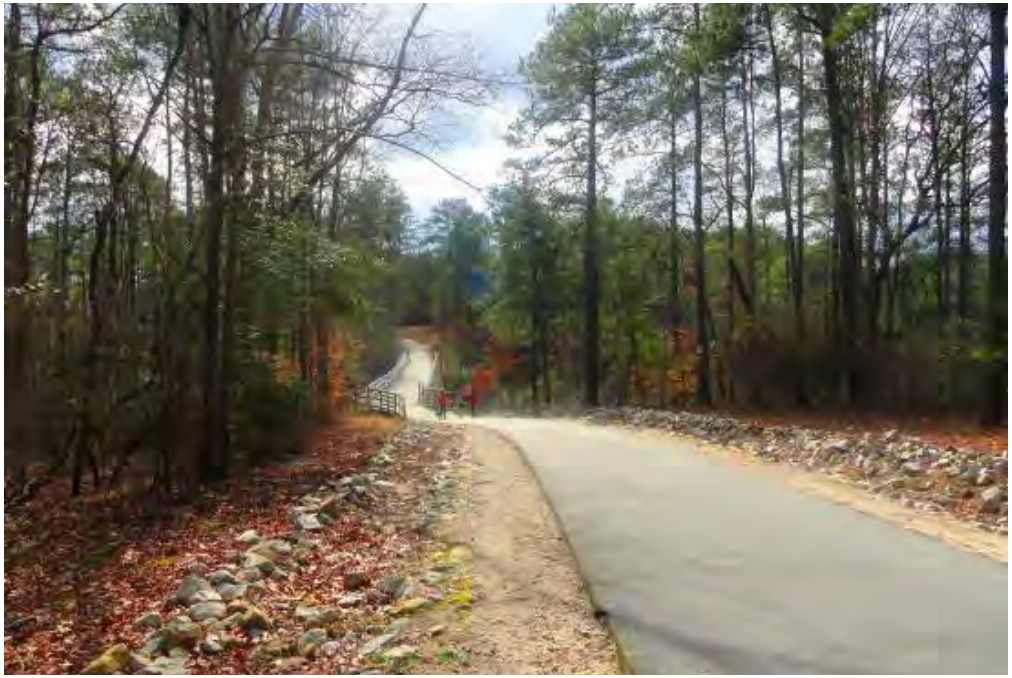
Understanding the existing facilities and how they are used is essential in determining future needs and recommendations for the City. A review of on-road and off-road facilities in the City of Fayetteville reveals the City maintains 64 miles of multi-use lanes on various City owned roadways. Multi-use lanes are typically installed on low traffic volume and low speed (25mph) residential roadways. The lanes are striped with solid white lines that delineate areas for pedestrians, cyclists, and parking. Typically the lanes are 4-5 feet wide. This facility type differs from typical bicycle lanes. Multi-use lanes do not have the same restrictions of use as bicycle lanes do, and bicycle lanes typically have design requirements for widths and placements. The City maintains nearly 20 miles of trails, including:

- Mazarick Park Trail;
- Lake Rim Park Trail;
- Festival Park Trail;
- Cross Creek Linear Park Trail;
- Clark Bike Trail; and
- Cape Fear River Trail.

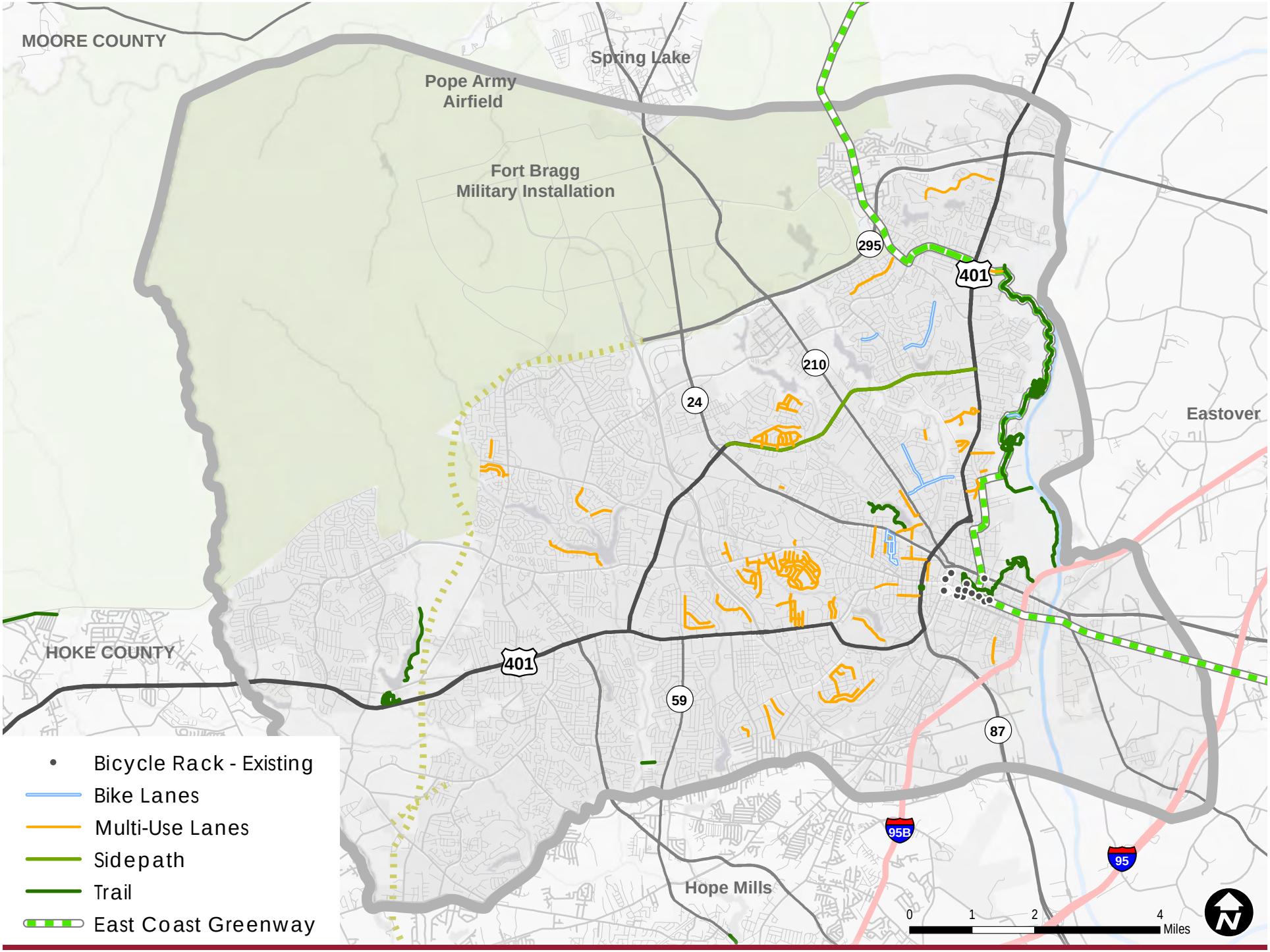
Map 2.2 identifies the locations of these facilities.

Connections by biking are lacking in Fayetteville. Even with the existing on-road facilities and trails, cyclists are unable to travel any significant distance due to the lack of safe connections and an established network in the area. Many of the streets in Fayetteville carry high volumes of traffic daily. Inexperienced riders generally will not attempt to explore cycling on these streets, or even on sidewalks adjacent to them. Due to safety concerns, more experienced riders may avoid these roads as well.

Ames Street Multi-Use Lane (shoulder)



Cape Fear River Trail (greenway)



MAP 2.2: EXISTING FACILITIES

TRIP GENERATORS/DESTINATIONS

The prioritization of bicycle facilities should depend in part on where cyclists want to go in the City. According to the results of the citizen survey, there are several important types of destinations for bicyclists.

Transit Service Areas

The Fayetteville Area System of Transit (FAST) operates public transportation in Fayetteville. FAST operates 19 routes at the time of writing, including a route to Fort Bragg, and is responsible for close to 600 bus stops. Many people rely on the bus as a primary means of transportation. Currently, buses have bike racks on the front of the vehicle, and FAST tracks each time a bike is loaded and unloaded from a bus. In 2018 there were 2,107 bikes loaded on a FAST bus, and bike-bus loading in 2019 is expected to far exceed the previous year. **In the first seven weeks of 2019 there were 2,027 bikes loaded onto a FAST bus.** The increasing rate is an indicator that cycling supports transit from the first mile to the last mile of every trip. The transit stops that reported the highest trips with bikes are the FAST Center, Cross Creek Mall, University Estates (Shaw Mill Rd), and Walmart on Skibo Road. ***Map 2.3*** displays the transit stops in the City as well as the stops and number of bicycle loads recorded at a few of the popular areas.

Universities

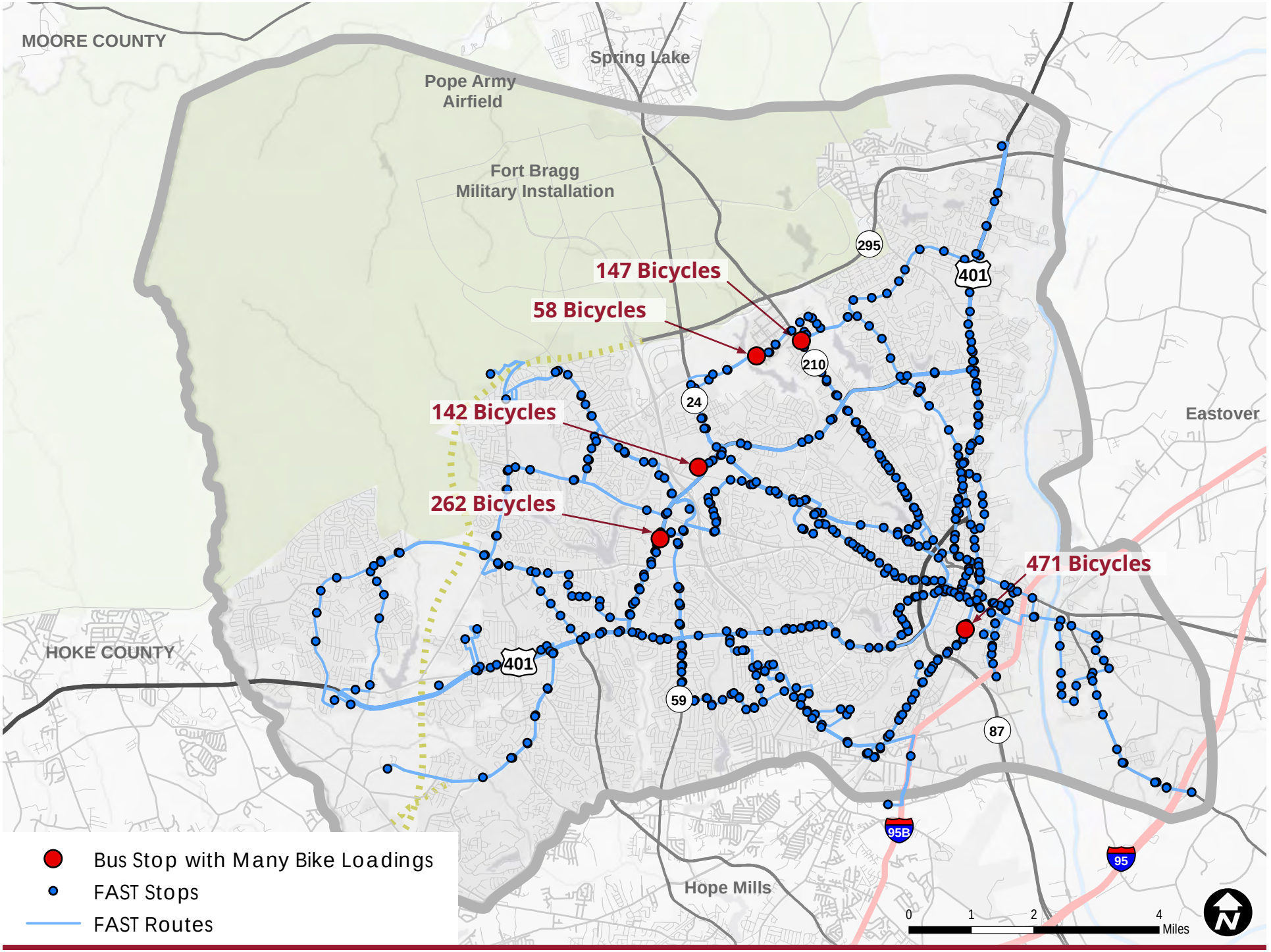
Fayetteville is home to several universities, including Methodist University, Fayetteville State University and Fayetteville Technical University. Combined, the total enrollment was over 13,000 students in 2018. Many of those enrolled do not own a vehicle or choose to travel by bike due to lack of parking privileges or to facilitate the commute from one campus building to another. Bicycle facilities in all these areas are currently lacking. A planned multi-use path along Ramsey Street will benefit students and faculty commuting to Methodist University. ***Map 2.4*** identifies the locations of area schools.

Commercial Centers

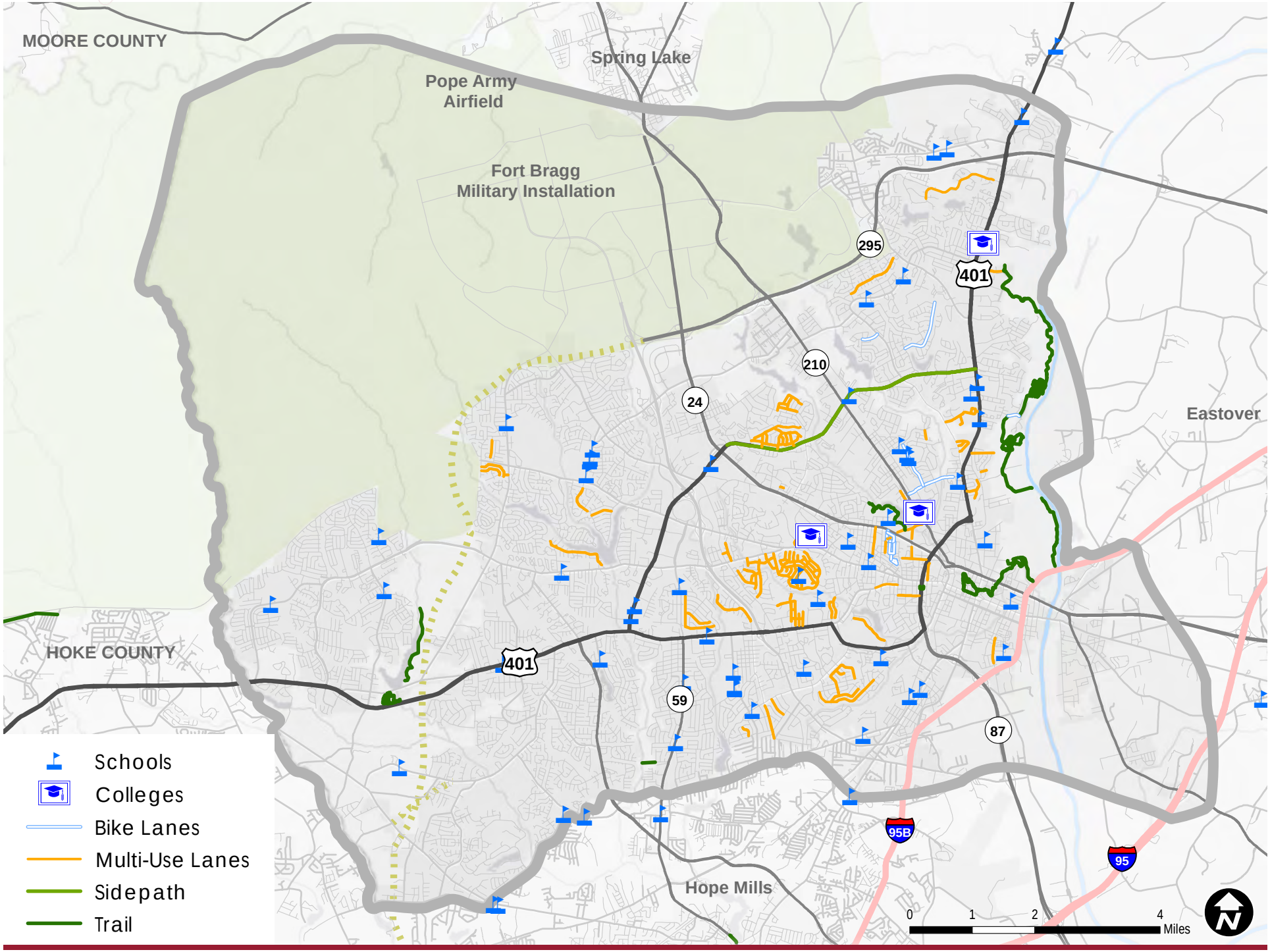
The larger commercial areas along Skibo Road and Ramsey Street as well as the Downtown area continuously appeared as areas that folks would like to reach by bike. These areas are packed with many retail shops and restaurants. Coincidently, these areas have had a higher rate of bicycle crashes in the past. Lack of facilities, traffic conflicts, and crash rates demonstrate that these areas need improved facilities. ***Map 2.5*** identifies destinations survey respondents frequently travel to by bike.

Methodist University - Ramsey Street

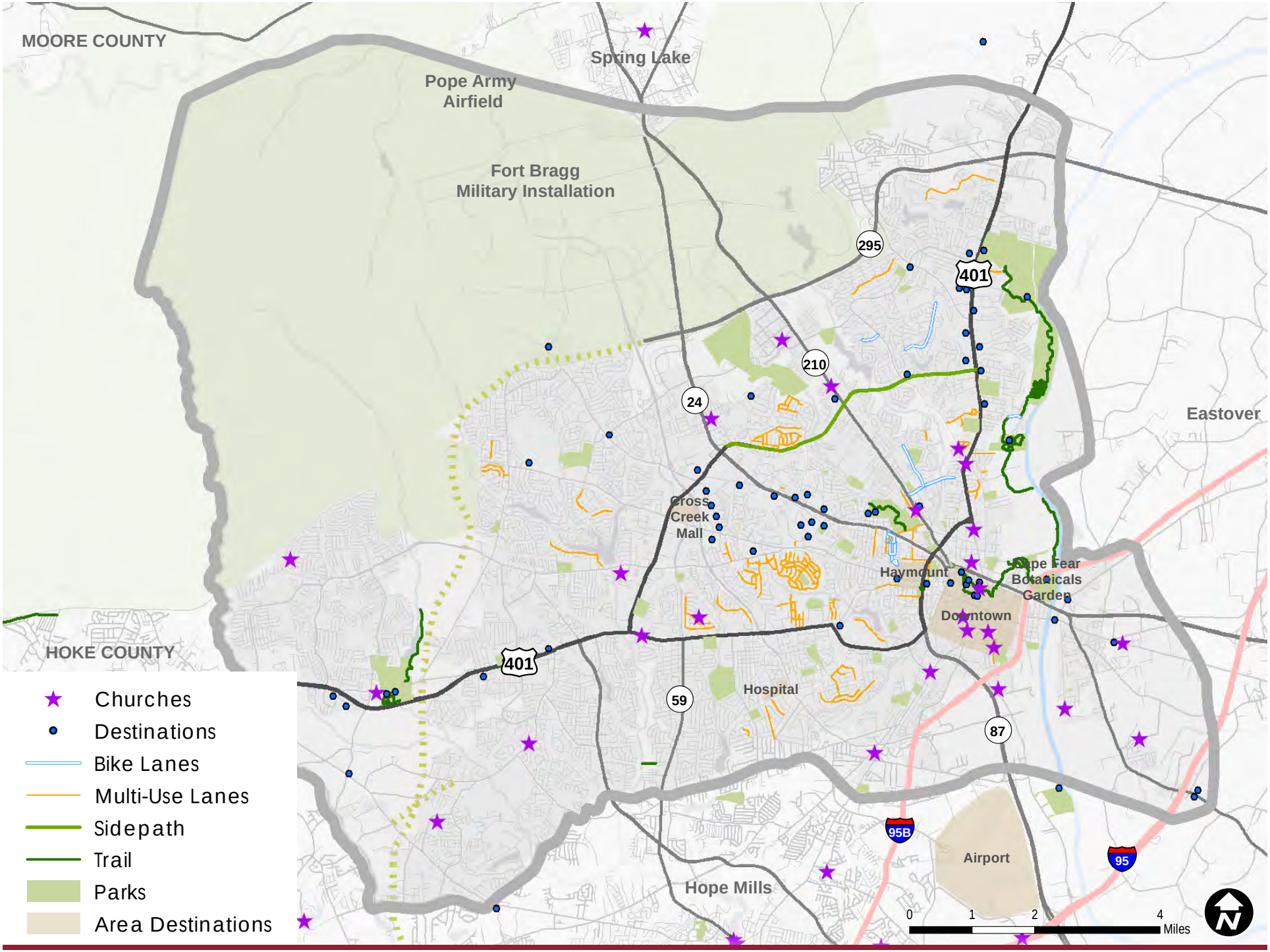

Commercial Area - Skibo Road



MAP 2.3: FAST BUS STOPS



MAP 2.4: AREA SCHOOLS



MAP 2.5: COMMON DESTINATIONS

PLANNED FACILITIES

The City of Fayetteville will continue to add bike lanes along local and residential streets where appropriate. Many of these additions will happen during the street maintenance and resurfacing process; for example, Langdon Street was recently resurfaced and bike lanes were added to the road during the summer of 2019.

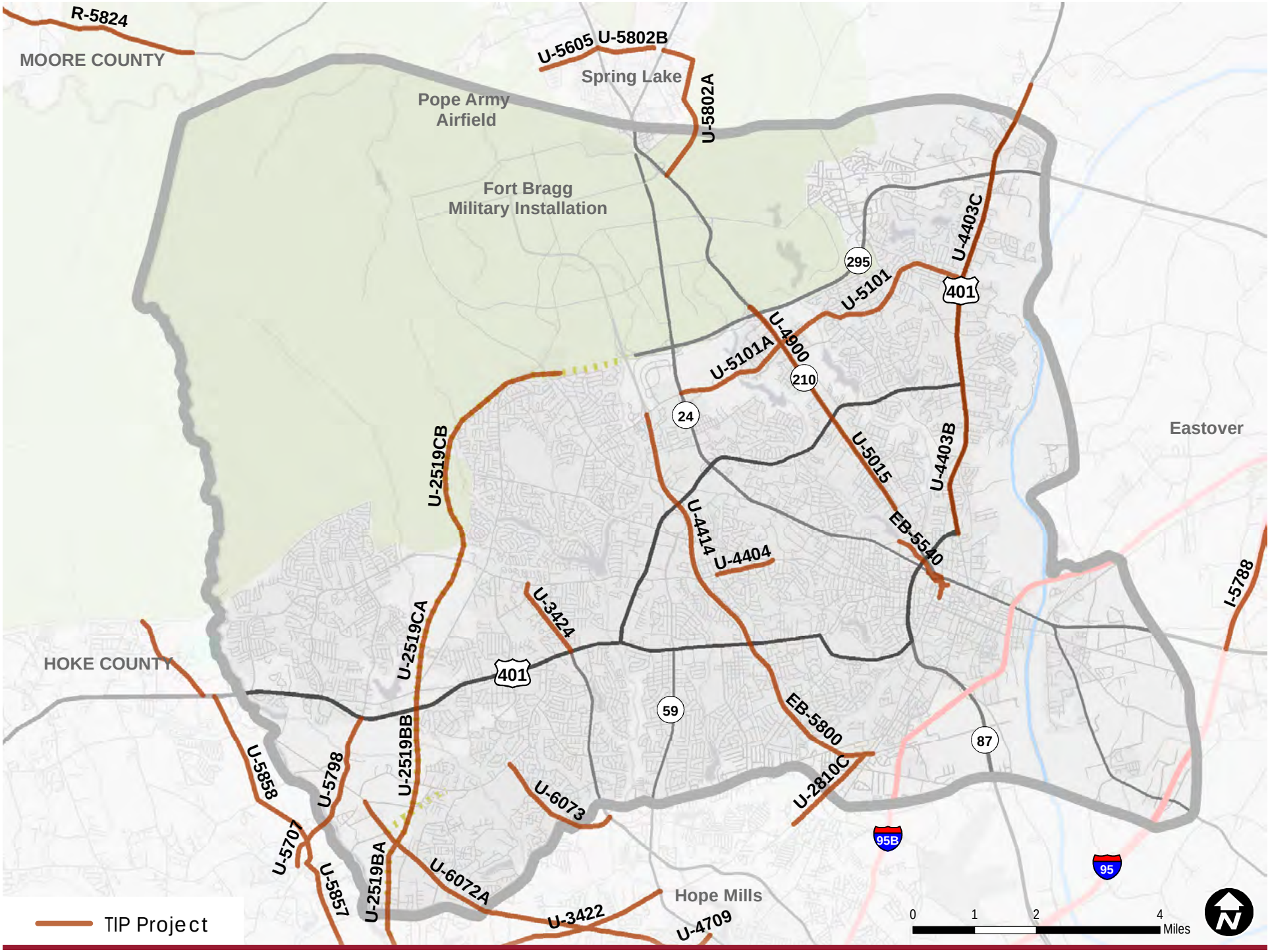
Below is a list of currently planned and programmed projects from the NCDOT 2018-2027 Statewide Transportation Improvement Plan (STIP) Note that bicycle facilities, crossing treatments, or other improvements may be included in the design and scope of primarily roadway projects that are incidental to widening, maintenance, safety, and other types of roadway improvement. **When designed/constructed concurrently, this is a tremendous cost and time savings to NCDOT and City of Fayetteville.** (***Map 2.6***). Current trail projects in development by the City's Parks and Recreation Department are: Cape Fear River Trail (Seg C), Filter Plant Drive to Rowan Street Bridge, and Fayetteville-Big Cross Creek Greenway (EB-5540).

Associated with the Fayetteville Outer Loop

- U-2519AA/U-2519AB Camden Road to I-95
- U-2519BA/U-2519BB US 401 to Raeford Road
- U-2519CA Cliffdale Road to US 401
- U-2519CB All American Freeway to Cliffdale Road

Other Areas

- EB-5540 Little Cross Creek Greenway Extension – Filter Plant Drive to Rowan Street bridge
- EB-5800 Sidewalk along east side of SR 1007 (Owen Drive)
- EB-5907 Cross Creek Parks Connector Trail (Downtown Connector Trail) – NC 24 (Bragg Boulevard) to Ray Avenue
- U-2809 Legion Road- Owen Drive to Cameron Road widen to multi lanes
- U-2810 Camden Road - NC59 to Owen Drive widen to multi lanes
- U-3422 Camden Road - Fayetteville Outer Loop to NC 59 widen to multi lanes
- U-3424 Bunce Road - Raeford Road to Cliffdale Road widen to multi lanes
- U-4403 US 401 (Ramsey St) - Martin Luther King Jr Freeway to I-295 widen to multi lanes - Multi-Use path to be included in project
- U-4404 Cliffdale Road - McPhearson Church Road to Morganton Road widen to multi lanes
- U-4414 SR 1007 (All American Freeway) – Owen Drive to North of Santa Fe Drive add additional lanes
- U-4709 Rockfish Road - Golfview Road to NC 59 widen to multi lanes
- U-4900 NC 210 (Murchison Road) – I-295 to south of US 401 Bypass add additional lanes
- U-5015 NC 210 (Murchison Road) – Langdon Street to US 401 Bypass modernize roadway
- U-5101 Shaw Road - US 401 to NC 210 widen Roadway/Construct Part on new location
- U-5605 Odell Road- Ft Bragg Boundary to NC 24 widen to multi lanes
- U-5707 Gillis Hill Road – Rockfish Road to Lindsay Road construct multi lane facility
- U-5753 Wayside Road – Plank Road to US 401 widen to multi lanes
- U-5798 Gillis Hill Road - Raeford Road to Lindsay Road widen to multi-Lane
- U-5802 Spring Lake Bypass – NC 210 (Murchison Road) to NC 210 (Lillington Highway)
- U-5930 NC 24 (N Bragg Boulevard) - Manchester Road Construct Interchange
- U-6051 Camden Road - Rockfish Road to Fayetteville Outer Loop widen to four-lane, divided with sidewalks
- U-6072 Rockfish Road - Strickland Bridge Road to Golfview Road widen to multi lanes
- U-6073 Fisher Road - Strickland Road to Bingham Drive widen to multi lanes



MAP 2.6: NCDOT PLANNED PROJECTS *Source: NCDOT TIP 2018-2027*

Table 2.2 includes an inventory of selected roadways that were mentioned during the data discovery phase and public input process. Understanding the current inventory is the first step in determining what improvements are needed to improve bikeability.

TABLE 2.2: INVENTORY OF SELECT ROADWAYS

Road Name	Width	Number of Lanes	AADT	Speed Limit (mph)	Existing Curb and Gutter
71st School Rd	37'	2 to 3	2,200-11,000	45	No
Andrews Rd	37'	2 to 3	15,000	45	Varies
Bailey Lake Rd	24'	2 to 3	4,300-5,600	45	No
Bingham Dr	65'	3 to 5	12,000-21,000	35-45	Yes
Bonanza Dr	60'	3 to 5	6,200-19,000	45	Yes
Bunce Rd	22'	2 to 4	12,000-13,000	35-45	Varies
Camden Rd	32'	2 to 3	3,500	35	Yes
Cliffdale Rd	60'	2 to 6	12,000-38,000	35-50	Yes
Clinton Rd	28'	2 to 5	8,000-15,000	35	Varies
Cumberland Rd	60'	2 to 5	6,500-24,000	45	Yes
Ft Bragg Rd	32'	2 to 4	3,100-12,000	35	Varies
Gillespie St	60'	3 to 5	5,800-11,000	35-45	Varies
Grove St	66'	4 to 7	24,000-36,000	45	Yes
Hope Mills Rd (NC 59)	59'	5	23,000-27,000	45	Yes
Ireland Dr	24'	2 to 3	9,700-13,000	35	Varies
Johnson St	20'	2	4,100	35	Varies
Morganton Rd	56'	2 to 7	12,000-34,000 (east of Reilly Rd), 3,700 (west of Reilly Rd)	25 (east of Dobbin Ave), 35-45 (west of Dobbin Ave)	Varies
Murchison Rd (NC 210)	52'	4 to 5	7,300-17,000	35-45	Yes

TABLE 2.2: INVENTORY OF SELECT ROADWAYS

Road Name	Width	Number of Lanes	AADT	Speed Limit (mph)	Existing Curb and Gutter
Owen Dr	95'	2 to 7	6,900-36,000	45	Varies
Person St	70'	2 to 5	6,100-15,000	15 (west of Cool Springs St), 35 (east of Cool Springs St)	Yes
Raeford Rd (US 401)	75 - 85'	2 to 8	9,800-49,000	35-55	Varies
Ramsey St (US 401/Bus)	64'	4 to 6	19,000-44,000	35-50	Yes
Robeson St (US 401/Bus)	60'	4 to 5	15,000-35,000	35-45	Yes
Rosehill Rd	29'	2 to 4	8,700-16,000	35	Varies
Roxie Ave	30'	2	2,700-5,700	35	Varies
Santa Fe Dr	60'	2 to 5	17,000-39,000 (east of Bonanza Dr)	25 (west of Bonanza Dr), 35-45 (east of Bonanza Dr)	Varies
Shaw Rd	26'	2	6,600-8,900	35-45	Varies
Skibo Rd (US 401)	90'	6	33,000-45,000	45	Yes
Stacey Weaver Dr	25'	2	12,000-14,000	35	Varies
Strickland Bridge Rd	22'	2 to 3	2,200-14,000	35-55	Varies
Village Dr	64'	2 to 5	17,000-20,000 (east of Ireland Dr)	25 (west of Ireland Dr), 35-45 (east of Ireland Dr)	Varies
Yadkin Rd	44'	5	16,000-24,000	35	Yes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CHAPTER 3: RECOMMENDED SYSTEM PLAN

Forming the Bicycle Network

BICYCLE NETWORK BASICS

The City of Fayetteville should strive to construct an interconnected and seamless network of bicycle facilities, which will be constructed incrementally over time (***Map 3.1***). The network should be thoughtfully planned to connect users to desired destinations, both civic and recreational, and consider the comfort level of cyclists of all ages and abilities. Gaps in the bicycle network serve as potential barriers to most bicyclists, and therefore continual outreach to users is necessary to identify, document, and prioritize potential projects to limit or correct network gaps (e.g., links or intersection treatments).

All roadway improvement projects, whether City or NCDOT funded, should include considerations for a bicycle facility treatment. Critical network links are those without an alternative (parallel) facility, and these links should be prioritized for an appropriate bikeway facility.

This plan helps to establish the need for an initial bike network, from which the City may begin to think strategically about investment and implementation one project at a time, and how a roadway contributes to the entire network (system) across the City. The plan will help agency staff set priorities and discuss tradeoffs between multiple facility types and their intended user group(s).

NETWORK GUIDANCE AND RESOURCES

More bicyclists are willing to ride along a connected bicycle network, provided that these routes are efficient, seamless, and easy to use. There are seven key principles for bicycle network design, and among these, the first three are particularly important in guiding bikeway selection:

- **Safety:** Reduce the frequency and severity of crashes and minimize potential conflict points between vehicles and bicyclists.
- **Comfort:** Minimize stress, anxiety, and safety concerns for the design user.
- **Connectivity:** Direct and convenient trips that provide access to desired community destinations served by the roadway network. Transition from shared street to on-road facilities, or on-road facilities to destinations should be seamless and clear.

The Seven Principles of Bicycle Network Design:

- ***Safety***
- ***Comfort***
- ***Connectivity***
- ***Directness***
- ***Cohesion***
- ***Attractiveness***
- ***Unbroken Flow***

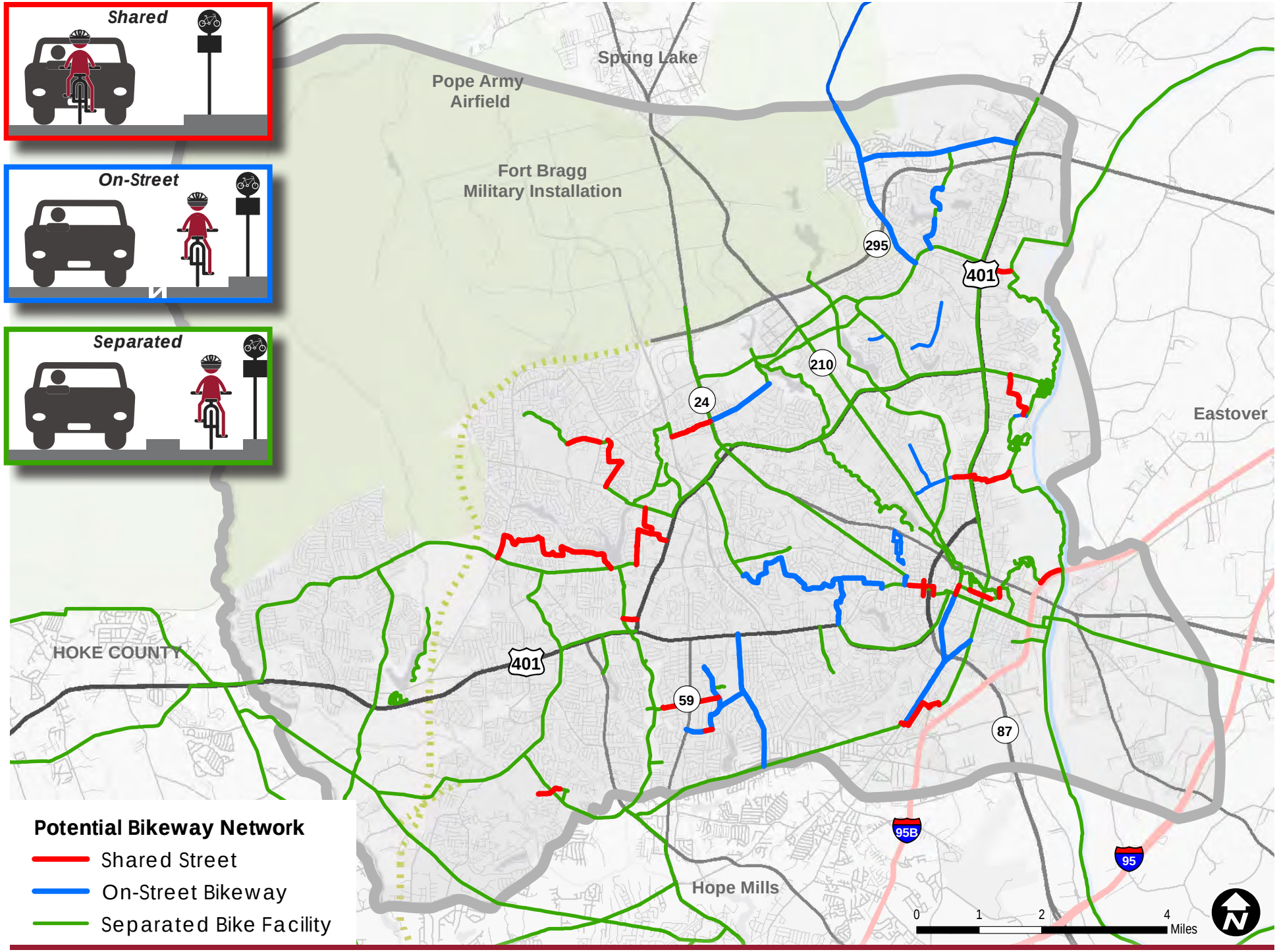
There are a number of planning resources available to communities seeking to build a connected bicycle network, including:

- FHWA Measuring Multimodal Network Connectivity.
- FHWA Bike Network Mapping Idea Book.
- PBIC white paper on Defining Connected Bike Networks.
- AASHTO Guide for the Development of Bicycle Facilities.
- ITE Transportation Planning Handbook.

CONSIDERATIONS FOR NETWORK OR BIKEWAY SELECTION

Some common questions to consider when selecting a bikeway that will be compatible with the bicycle network.

- Is this a primary (critical) or secondary (desirable) route within our network?
- Are there regional trails to connect with, or neighborhood trails that are frequented by younger, older, or disabled cyclists?
- Are there viable parallel alternatives to this route?
- Is the route along a relatively low-stress roadway (low speed or volume)?
- Are there improved connectivity points possible?
- What are the potential safety implications or trade-offs for different bikeway facility types?



MAP 3.1: POTENTIAL BIKEWAY NETWORK *Note: More information on the Bike facilities is available in the **Design Guidance** section, starting on **page 40.***

Evaluation Criteria for Prioritization

TECHNICAL SCORING METHODOLOGY

The project recommendations were identified primarily by the public and reviewed by the Steering Committee. These projects were also prioritized based on reviews by the Steering Committee and public input (***Table 3.1***). Implementation opportunities are described in the final chapter of this Plan. The resulting emphases were on safety and connectivity to popular destinations. These priorities were assigned values by using ArcGIS and weighted according to input from the public (***Table 3.1***) to produce a prioritized list of projects.

Note that some metrics (e.g., a location near a school) are products of the project location, while other metrics (e.g., increased buffer) are part of the project design. Generally, these projects are all viable, and the opportunity to complete a project should be exercised regardless of its priority in this list.

The project scores for each factor are found in Appendix A (digital only).

ORGANIZATION

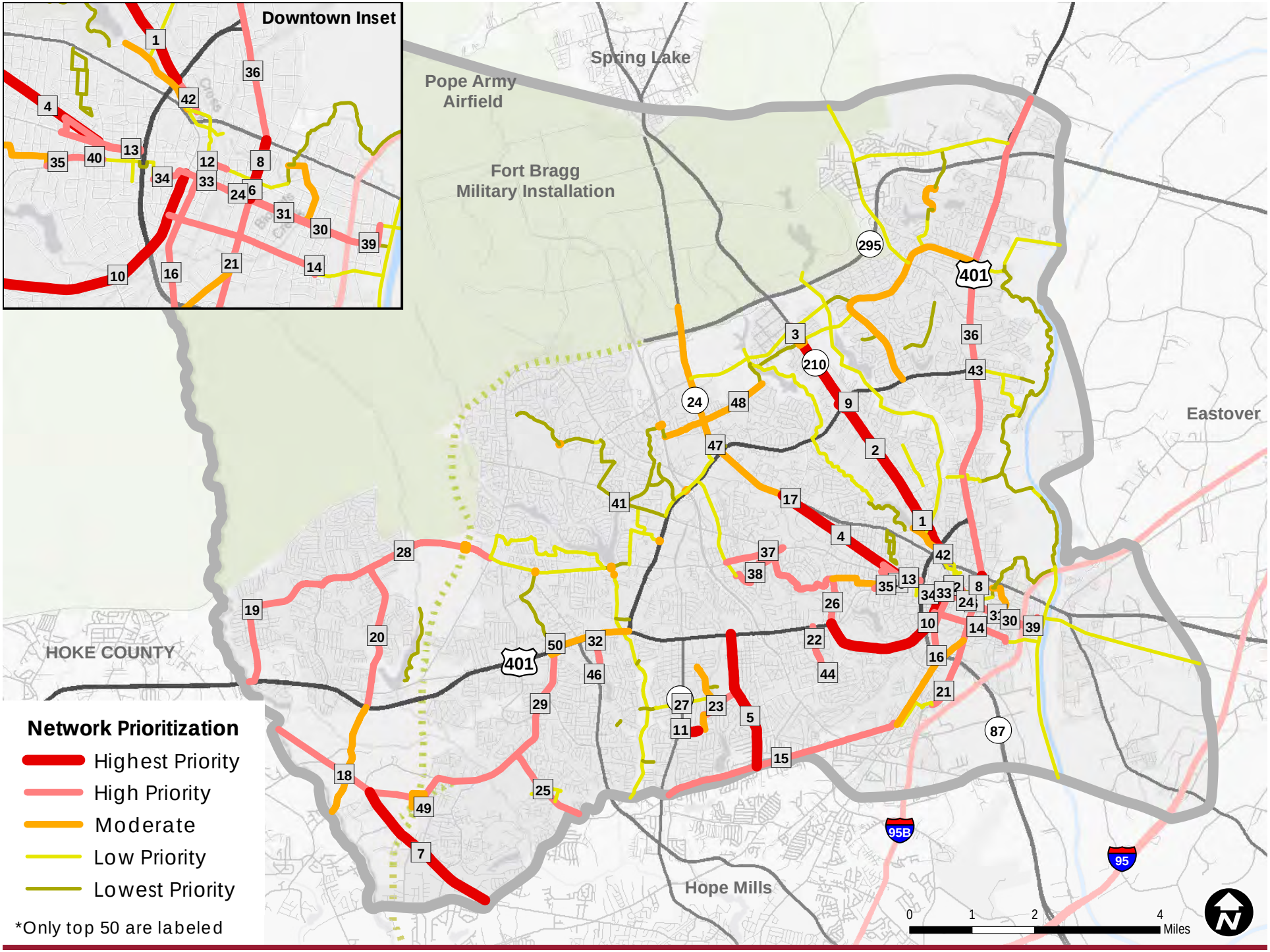
Projects that received high priority scores were placed in the short-term project category, whereas projects with lower priority scores were placed in the mid- or long-term project category. Projects in an existing "pipeline," such as NCDOT projects active in the area, also influenced the term of project implementation. By organizing projects in this fashion, the City has a list of projects that it can implement quickly in order to take immediate steps towards making Fayetteville more bicycle-friendly in the interim while more intensive, long-term projects are undertaken. ***Map 3.2*** displays the prioritization scores by location, and ***Table 3.2*** lists the top 50 highest priority projects.

The rest of this section describes the project build-out schedule as well as the opinion of probable costs estimated using the NCDOT unit cost values workbook.

TABLE 3.1: PRIORITIZATION FACTORS & WEIGHTS

FACTORS	WEIGHT
ACCESS TO POPULAR CYCLING DESTINATIONS WITHIN 1/4-MILE OF PROJECT	
School Neighborhood Tourist Destination Commercial District Civic (Library, Park)	**16%**
IMPROVE SAFETY & REDUCE CRASHES	
Bike Crash Poor Geometry	**24%**
SEPARATE SPACE FOR BICYCLISTS	
Increase Buffer from Road Bike Lane / Buffered Bike Lane On-Street Parking Present	**23%**
IMPROVE MAINTENANCE CONDITIONS	
Update Existing Infrastructure	**18%**
INCREASE BIKE SYSTEM CONNECTIVITY	
Connects to Existing Bike Facility Connects to Planned Bike Facility Connects to Current TIP Project	**19%**

The weighted percentage for each factor was determined by public participation. Online survey respondents and public meeting attendees were asked to rank these factors by importance and the final scores were aggregated to determine project ranking.



Map 3.2: Network Prioritization Scores, Top 50 Projects

TABLE 3.2: TOP 50 PRIORITIZED PROJECTS

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
1	NC 210 (Murchison Rd)	Langdon St	US 401 (Martin Luther King Jr Fwy)	Separated Bike Lane	0.96	13.0	16.9	18.5	17.8	18.8	**84.9**
2	NC 210 (Murchison Rd)	US 401 (Pamalee Dr)	Langdon St	Separated Bike Lane	1.79	16.2	16.9	18.5	17.8	9.4	**78.8**
3	NC 210 (Murchison Rd)	Shaw Rd	Country Club Dr	Separated Bike Lane	1.46	9.7	16.9	18.5	17.8	9.4	**72.3**
4	Fort Bragg Road	Bragg Blvd Off Ramp	Broadfoot Ave	Separated Bike Lane	2.28	16.2	16.9	18.5	17.8	1.9	**71.2**
5	Ireland Dr	Cumberland Rd	US 401 (Raeford Rd)	Buffered Bike Lane	2.21	13.0	16.9	18.5	17.8	1.9	**68.0**
6	Gillespie St	E Russell St	Hay St	Separated Bike Lane	0.14	9.7	7.2	23.1	17.8	9.4	**67.3**
7	Stoney Point Rd	Strickland Bridge Rd	Lakewood Rd	Separated Bike Lane	2.56	6.5	7.2	18.5	17.8	15.0	**65.0**
8	Green St	Hay St	NC 24 (Rowan St)	Separated Bike Lane	0.33	6.5	7.2	23.1	17.8	9.4	**64.0**
9	NC 210 (Murchison Rd)	US 401 (Pamalee Dr)	US 401 (Country Club Dr)	*Redesign Opportunity*	0.45	9.7	24.1	2.3	17.8	9.4	**63.3**
10	US 401 (Robeson St)	US 401 (Raeford Road)	W Russell St	Separated Bike Lane	2.44	16.2	7.2	18.5	17.8	1.9	**61.6**
11	Ashton Rd	NC 59 (Hope Mills Rd)	Inverness Dr	Buffered Bike Lane	0.31	6.5	16.9	18.5	17.8	1.9	**61.5**
12	Hay St	Winslow St	Ray Ave	Separated Bike Lane	0.18	6.5	2.4	23.1	17.8	9.4	**59.2**
13	Hay Street	Fort Bragg Road	Morganton-Ft Bragg Gateway	*Redesign Opportunity*	1.47	13.0	24.1	2.3	17.8	1.9	**59.1**
14	Campbell Ave	Robeson St	Campbell Terrace Rd	*Redesign Opportunity*	1.27	13.0	24.1	2.3	17.8	1.9	**59.1**
15	Cumberland Rd	Study Area Boundary	Eugene St	Separated Bike Lane	3.80	9.7	7.2	18.5	17.8	5.6	**58.9**
16	Winslow St	Southern Ave	Russell St	Buffered Bike Lane	1.13	13.0	7.2	18.5	17.8	1.9	**58.4**
17	NC 24 (Bragg Blvd)	Fort Bragg Road	-	*Redesign Opportunity*	0.13	9.7	24.1	2.3	17.8	1.9	**55.8**
18	Stoney Point Rd	Sykes Pond Rd	Fisher Rd	Separated Bike Lane	4.41	6.5	7.2	18.5	17.8	5.6	**55.6**
19	Hoke Loop Road	US 401 (Raeford Road)	Cliffdale Road	Separated Bike Lane	2.52	6.5	7.2	18.5	17.8	5.6	**55.6**
20	Rim Rd	US 401 (Raeford Rd)	Cliffdale Rd	Separated Bike Lane	2.35	9.7	7.2	18.5	17.8	1.9	**55.1**
21	Gillespie St	Reeves St	Russell St	Separated Bike Lane	1.78	9.7	7.2	18.5	17.8	1.9	**55.1**
22	Purdue Dr	Village Dr	US 401 (Raeford Rd)	Separated Bike Lane	0.79	9.7	7.2	18.5	17.8	1.9	**55.1**
23	Coventry Dr	Camelot Dr	Ireland Dr	Buffered Bike Lane	0.66	9.7	7.2	18.5	17.8	1.9	**55.1**
24	W Russell St One-way	W Russell St Bidirectional	Gillespie St	Separated Bike Lane	0.20	9.7	7.2	18.5	17.8	1.9	**55.1**
25	Fisher Road	Strickland Bridge Road	Adams Lake Drive	Sidepath	1.41	6.5	7.2	6.9	17.8	15.0	**53.5**

**Redesign Opportunity: May include road/lane diet, widening, geometric redesign, or other modification.*

TABLE 3.2: TOP 50 PRIORITIZED PROJECTS

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
26	McPhee Dr	US 401 (Raeford Road)	Mirror Lake Dr	Bike Lane	0.81	16.2	2.4	6.9	17.8	9.4	**52.7**
27	NC 59 (Hope Mills Rd)	Redwood Dr	-	*Redesign Opportunity*	0.11	6.5	24.1	2.3	17.8	1.9	**52.6**
28	Cliffdale Road	Hoke Loop Rd	Reilly Road	Separated Bike Lane	2.94	6.5	7.2	18.5	17.8	1.9	**51.9**
29	Strickland Bridge Road	Fisher Road	US 401 (Raeford Road)	Separated Bike Lane	1.90	6.5	7.2	18.5	17.8	1.9	**51.9**
30	Russell St One-way	W Russell St Bidirectional	I-95 (S Eastern Blvd)	Separated Bike Lane	1.03	6.5	7.2	18.5	17.8	1.9	**51.9**
31	E Russell St	Gillespie St	I-95 (S Eastern Blvd)	Separated Bike Lane	0.83	6.5	7.2	18.5	17.8	1.9	**51.9**
32	Bingham Dr	NC 162 (Bunce Rd)	US 401 (Raeford Rd)	Separated Bike Lane	0.64	6.5	7.2	18.5	17.8	1.9	**51.9**
33	W Russell St	Robeson St	W Russell St Oneway	Separated Bike Lane	0.33	6.5	7.2	18.5	17.8	1.9	**51.9**
34	McGilvary St	Branson St	Robeson St	Separated Bike Lane	0.29	6.5	7.2	18.5	17.8	1.9	**51.9**
35	Raeford Rd	Devane St	Highland Ave	Separated Bike Lane	0.45	3.2	2.4	18.5	17.8	9.4	**51.3**
36	US 401 (Ramsey St)	Rowan St	Study Area Boundary	Sidepath	8.60	16.2	16.9	6.9	1.8	9.4	**51.2**
37	Cliffdale Rd	McPherson Church Rd	Morganton Rd	Sidepath	0.95	6.5	16.9	6.9	1.8	18.8	**50.9**
38	Lennox Dr	McPherson Church Rd	Westview Dr	Bike Lane	2.34	13.0	2.4	6.9	17.8	9.4	**49.5**
39	E Russell St	I-95 (S Eastern Blvd)	Person St	Separated Bike Lane	0.39	3.2	7.2	18.5	17.8	1.9	**48.6**
40	Broadfoot Ave	Arsenal Ave	Fort Bragg Road	Bike Lane	0.14	6.5	7.2	6.9	17.8	9.4	**47.8**
41	Morganton Rd	Westlake Road	E Loch Haven Dr	*Redesign Opportunity*	0.11	1.6	24.1	2.3	17.8	1.9	**47.7**
42	NC 210 (Murchison Road)	US 401 (Martin Luther King Jr Fwy)	Rowan St	Separated Bike Lane	0.29	6.5	2.4	18.5	17.8	1.9	**47.1**
43	Shaw Road	NC 24 (Bragg Blvd)	NC 210 (Murchison Rd)	Separated Bike Lane	1.88	9.7	7.2	18.5	1.8	9.4	**46.6**
44	US 401 (Ramsey St)	US 401 (Country Club Dr)	Tokay Dr	*Redesign Opportunity*	0.17	6.5	16.9	2.3	17.8	1.9	**45.3**
45	Village Dr	Purdue Dr	-	*Redesign Opportunity*	0.11	6.5	16.9	2.3	17.8	1.9	**45.3**
46	US 401 (Ramsey St)	Langdon St	Colonial Drive	*Redesign Opportunity*	0.07	6.5	16.9	2.3	17.8	1.9	**45.3**
47	Bingham Drive	Marykirk Dr	-	*Redesign Opportunity*	0.11	6.5	16.9	2.3	17.8	1.9	**45.3**
48	NC 24 (Bragg Blvd)	Federal Route 907	Fort Bragg Road	Sidepath	3.68	9.7	7.2	6.9	17.8	1.9	**43.6**
49	Johnson St	NC 24 (Bragg Blvd)	SUP	Bike Lane	1.11	9.7	7.2	6.9	17.8	1.9	**43.6**
50	Strickland Bridge Rd	Barefoot Road Future	Future I-295	*Redesign Opportunity*	0.83	3.2	16.9	2.3	17.8	1.9	**42.1**

**Redesign Opportunity: May include road/lane diet, widening, geometric redesign, or other modification.*

Design Guidance

Selecting a suitable bicycle facility type depends on the context of the roadway and intended user group. The following presents a Bikeway Selection Framework that is consistent with national and international guidance. The selection framework can be used to select and evaluate potential bikeway facility types. Facility type decisions should also be informed by active public involvement and participation that occurs as part of the planning process.

Research has shown that motor vehicle speed and volume are key considerations in identifying a suitable bikeway facility based on peoples' level of comfort[1]. Higher motor vehicle speeds require increased separation for the safety and comfort of people cycling, while higher motor vehicle volumes increase the number of potential conflicts. The type of conflicting traffic can also impact the suitable bikeway type; streets carrying more trucks, military transports, and buses may also warrant different infrastructure.

Figure 3.1 suggests there are three groups of bikeway facilities (Shared, On-Street, and Separated) with overlap between each group that allows for flexibility. Increasing vehicles speeds (x-axis) or increasing vehicle volume (y-axis) will translate to more separation of the user from traffic. Similarly, user groups that are less comfortable riding within or near vehicle traffic will prefer more separation as speed or number of vehicles increases.

1 Winters, M., Davidson, G., Kao, D., & Teschke, K. 2011. "Motivators and Deterrents of Bicycling: Comparing influences on Decisions to Ride". Transportation, 38, pp. 153-168.

Three-Tiered Bike Typology

NCDOT has recently adopted a three-tiered bicycle selection methodology that is more suitable for high-level planning exercises where a lot of detailed information, or even volumes or speeds of traffic, are known in every instance. These three major types of bike facility are Separated, On-Street, and Shared Street. The sub-categories for each of these three types, as well as speed and volume contexts for each, are shown in the accompanying graphic.

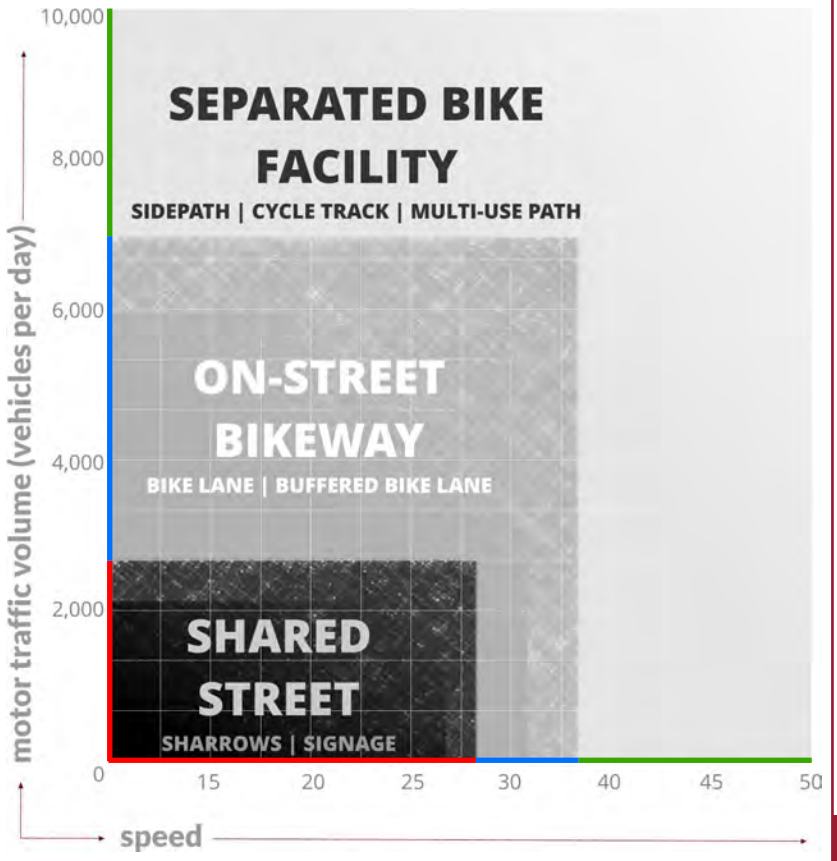


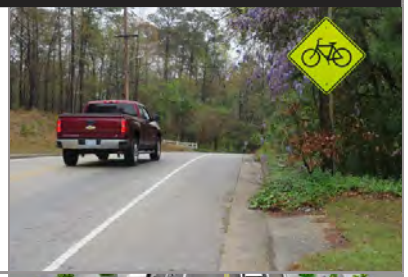
FIGURE 3.1: GENERAL FRAMEWORK FOR BIKEWAY SELECTION BY VPD AND SPEED
Source: FHWA Bikeway Selection Guide
*Note: These three categories correspond with **Map 3.1**, and **Table 3.4**.*

The rest of this section summarizes design selection resources and facility design considerations, including the range of speeds and volumes at **which various bikeway facilities is most likely to be suitable** for the design user group of the "Interested but Concerned" proportion of the population. The posted speed is used in this framework since it is generally known, whereas 85th percentile operating speed is usually not known. Additional considerations related to cycling and walking volumes and transit operations are also provided which impact facility selection. The designer is encouraged to use engineering judgment to select a facility for a street based on considerations of safety and accessibility.

It's important to recognize that there are a number of valuable guidance documents available to planners, designers, and the public. The following is a brief listing of cited sources that are regularly employed and that were used during the development of this plan.

- *Guide to Bicycle Facilities*, American Association of State Highway and Transportation Officials, 2012 (4th Edition)
- *Cycling Aspects of Austroads Guides*, Austroads, 2014
- *Design Manual for Bicycle Traffic*, R. de Groot, 2016
- *Separated Bike Lane Planning and Design Guide*, Federal Highway Administration, 2015
- *Separated Bike Lane Planning & Design Guide*, Massachusetts Department of Transportation, 2015
- *Ontario Traffic Manual*, Book 18: Cycling Facilities, Ministry of Transportation Ontario, 2013
- *Urban Bikeway Design Guide*, National Association of City Transportation Officials, 2014 (2nd Edition)
- Transportation Association of Canada. 2017 (pending publication). "Section 5.4, Bikeway Facility Selection," Geometric Design Guide for Canadian Roads.
- *Collection of Cycling Concepts*, Cycling Embassy of Denmark, Troels Andersen 2012
- "Motivators and Deterrents of Bicycling: Comparing influences on Decisions to Ride". *Transportation*, Winters, M., Davidson, G., Kao, D., & Teschke, K., 2011
- *Greenways: A Guide to Planning, Design and Development*, Charles A. Flink and Robert Searns,1993

TABLE 3.4: BIKEWAY FACILITIES SELECTION FRAMEWORK

	Bicycle Infrastructure Type	OTHER FACTORS	Suitable Conditions (typical)				Design Images
			Posted Speed Limit	Vehicle Volumes	Walking and/or Cycling Volumes	Transit Operations	
SHARED	**Shared Lanes (Sharrows)** *On low-volume, low-speed residential streets and some low-speed (downtown) commercial areas, bicycles can and do travel safely with other cars. On-street parking may indicate a need for sharrow markings for cyclist paths.*		5 mph – 20 mph	0 – 2,500 vpd	0 – 10/hour (often heavier in neighborhoods in early evening)	Vertical buffers are prohibitive with bus transit service. Painted buffers share the same concerns as Bike Lanes.	
ON-STREET	**Multi-use Lanes (Striped Shoulder)** *Unique to Fayetteville, the City has adopted the use of a "striped shoulder" in low-volume neighborhoods to demarcate space for cyclists, pedestrians, and even parking or trash pickup. It works - and people like them.*		5 mph – 25 mph	0 – 3,000 vpd	0 – 10/hour (often heavier in neighborhoods in early evening)	Transit is seldom a factor on suburban residential streets, and when it is present is typically of a slow speed and infrequent headway.	
	Bike Lane (Buffered Bike Lane) *Bike lanes are relatively easy to implement where the existing pavement has sufficient width to accommodate them - bike lanes are between 5' and 7' typically (wider bike lanes tend to get used for parking). As volumes and speeds approach the upper end of the ranges shown, a 1' to 2' painted buffer is warranted.*		20 mph – 40 mph	2,500 – 4,000 vpd	0 – 10/hour	Possible, but "leap-frogging" occurs with bikes and buses. Bus turnouts are favored by cyclists, but not bus drivers. Training for bus drivers can help address the problems.	 
SEPARATED	**Protected Bike Lane (Cycle Tracks, Separated Bike Lanes)** *Vertically separated bike lanes (the bike lane typically sits at sidewalk level, not street level) or those with vertical buffers or parked car buffers, allow for a wider range of users and can provide for two-way ('contraflow') travel.*		30 mph – 50 mph	4,000 – 40,000 vpd	10+ per hour	Vertical buffers are prohibitive with bus transit service. Painted buffers share the same concerns as Bike Lanes.	

connectivity function
driveway density / spacing
truck volumes
bus transit route and stops
pedestrian amenities

*Note: These three categories correspond with **Map 3.1**, and **Figure 3.1**.*

A Green Way

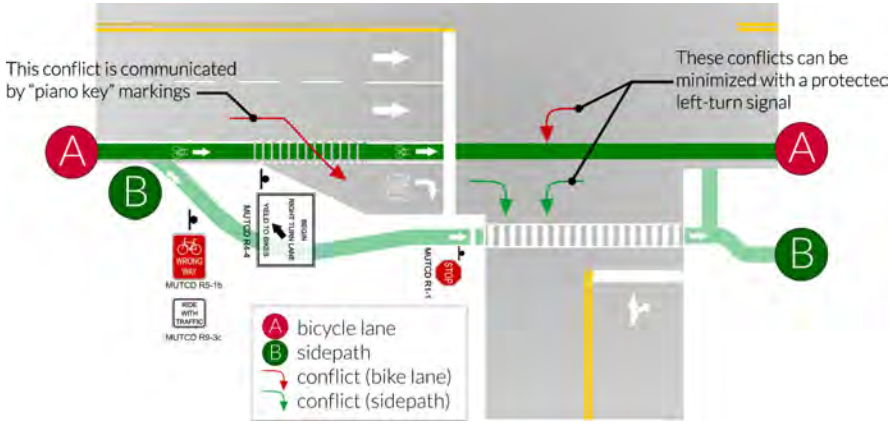
If traffic volumes, design widths, and other considerations make an on-road bicycle facility impractical or unsafe, then an off-road facility is advised. Greenways may be paved or unpaved ("soft trails") and are often located along streams or public utility easements. The full design considerations of greenways are well beyond the scope of this document, but an excellent source is (still) the Flink and Seams' *Greenways: A Guide to Planning, Design and Development*.

"Soft" Trail

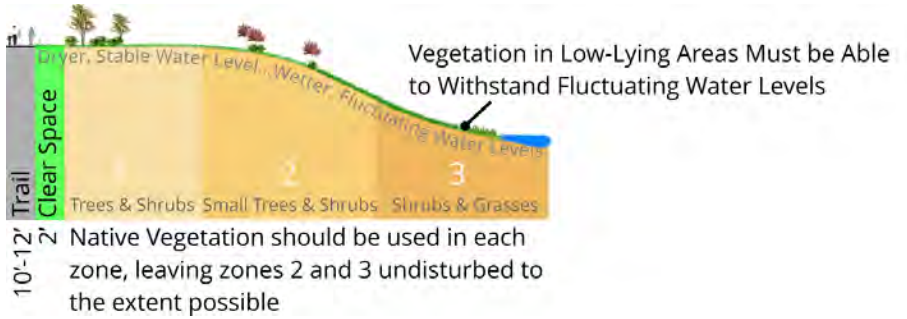
Source: Wake County Trail Design Guide, 2006.

Bike Lane Conflicts / Treatments at Intersections

Signage and pavement markings generally accomplish the task of increasing awareness of potentially crossing bicyclists, but limiting dual turning lanes and free-flow "slip" turn lanes is critical.



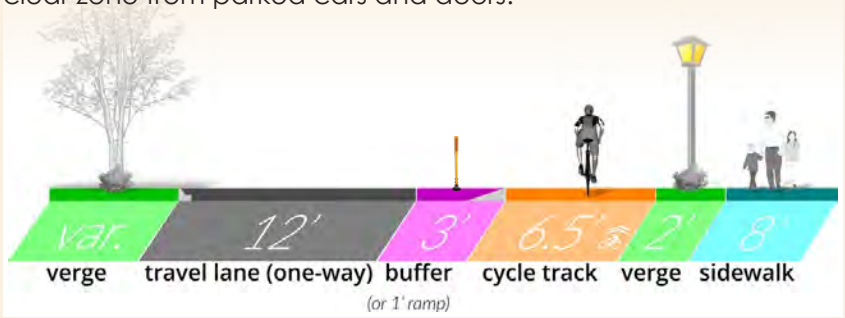
(Cross Section)



(Plan View)

One-Way Cycle Tracks

Bikeways that are vertically separated from the motor travelway are often called cycle tracks. The grade is usually in alignment with the adjacent sidewalk. Access can be from a mountable ramp; parallel parking needs a (3' minimum) buffer to establish a clear zone from parked cars and doors.

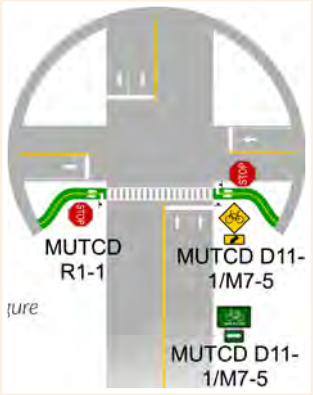


Source: NACTO Urban Bikeway Design Guide, Design Guidance for Raised Cycle Tracks. (https://nacto.org)

Bicycle Sidepaths at Intersections

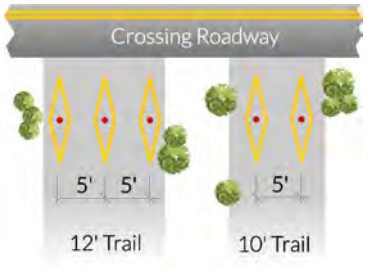
As sidepaths near a street intersection, the desired 10' minimum separation from the back of the curb should narrow so that crossing cyclists can see and be seen by turning vehicles.

Sources: (1) AASHTO Guide for the Development of Bicycle Facilities (Figure 22) and (2) MUTCD.



Managing Trailheads from Roadways

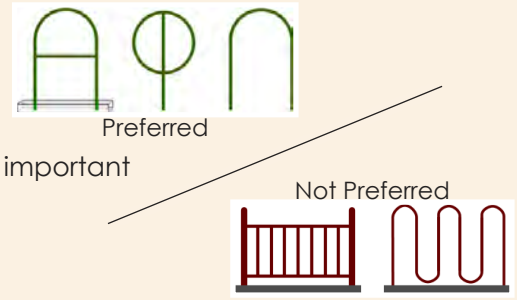
Roadway crossings have to be carefully managed, especially when they are not located at intersections. Lock-down bollards spaced no more than 5' apart permits cyclists and pedestrians (including those using appliances like wheelchairs) to pass through and discourages motorized vehicle access except for reasons of maintenance and emergency access.



Additional signage can be employed facing motor vehicle traffic on the crossing roadway, but may be overkill, particularly in low-volume locations.

Bicycle Parking

Fayetteville has a strong policy; providing clear areas around visible, accessible parking is just as important as car parking.



SUMMARY OF RECOMMENDED BIKE FACILITIES

This section steps through the process of formulating a bicycle network, applying evaluation criteria to prioritize corridors of local importance, and categorizing bikeways based on a three-tiered selection methodology (using traffic volume and speed). ***Map 3.3*** represents the culmination of this process with identified recommended bike facilities across the entire City. These recommendations are influenced by:

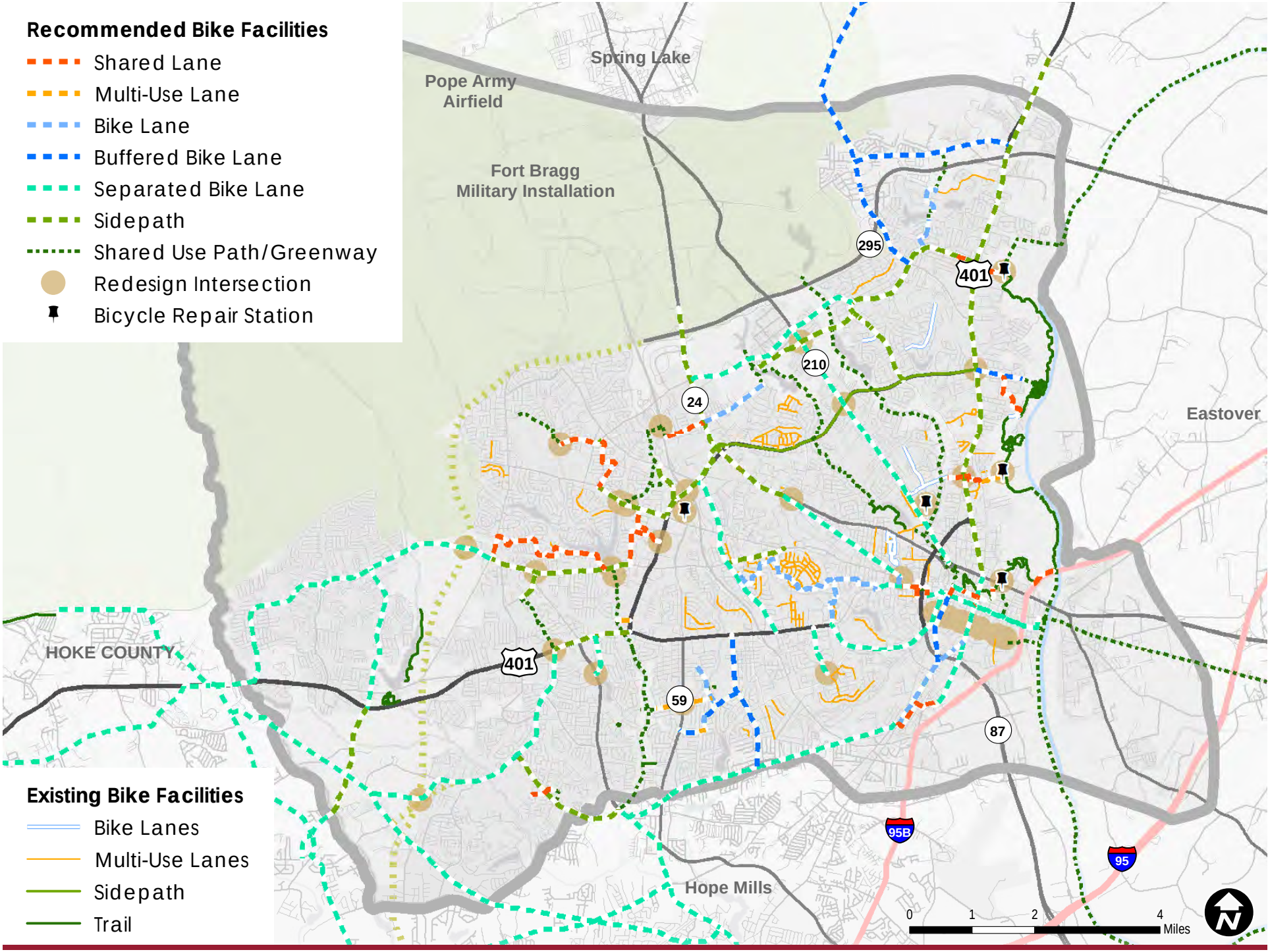
- Sandhills Regional Bicycle Plan recommendations;
- Public outreach and feedback from in-person meetings, online survey, and interactive webmap;
- Steering committee direction; and
- Transportation planning judgment.

Table 3.5 summarizes the number of locations and total mileage of recommendations.

TABLE 3.5: RECOMMENDED FACILITIES

	RECOMMENDED BIKE FACILITIES	LOCATIONS	LENGTH (MI)
SHARED	Shared Lane Markings (SLM)	22	12.0
ON-STREET	Bike Lane	10	9.0
	Buffered Bike Lane	9	10.4
SEPARATED	Separated Bike Lane	27	41.3
	Two-way Separated Bike Lane	2	1.4
	Shared Use Path (SUP)	33	30.8
	Sidepath	24	29.8
	Redesign of Roadway/Intersection	21	5.6
	Total	***148***	***140.3***

*Note: These three categories correspond with **Map 3.1**, and **Figure 3.1**.*



MAP 3.3: PROJECT RECOMMENDATIONS

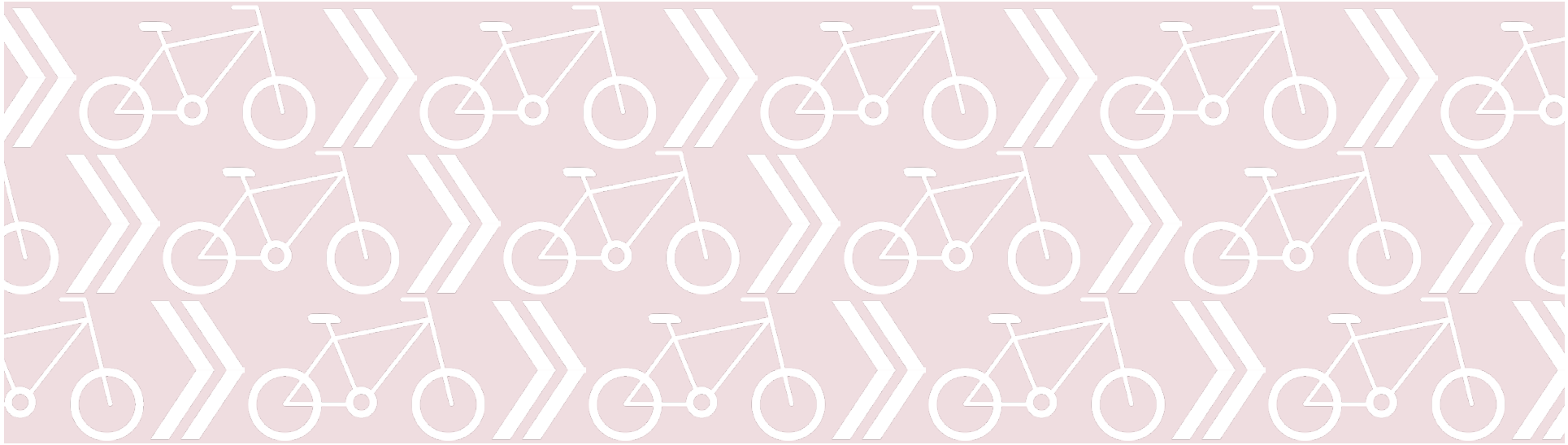
Conceptual Design "Hot Spots"

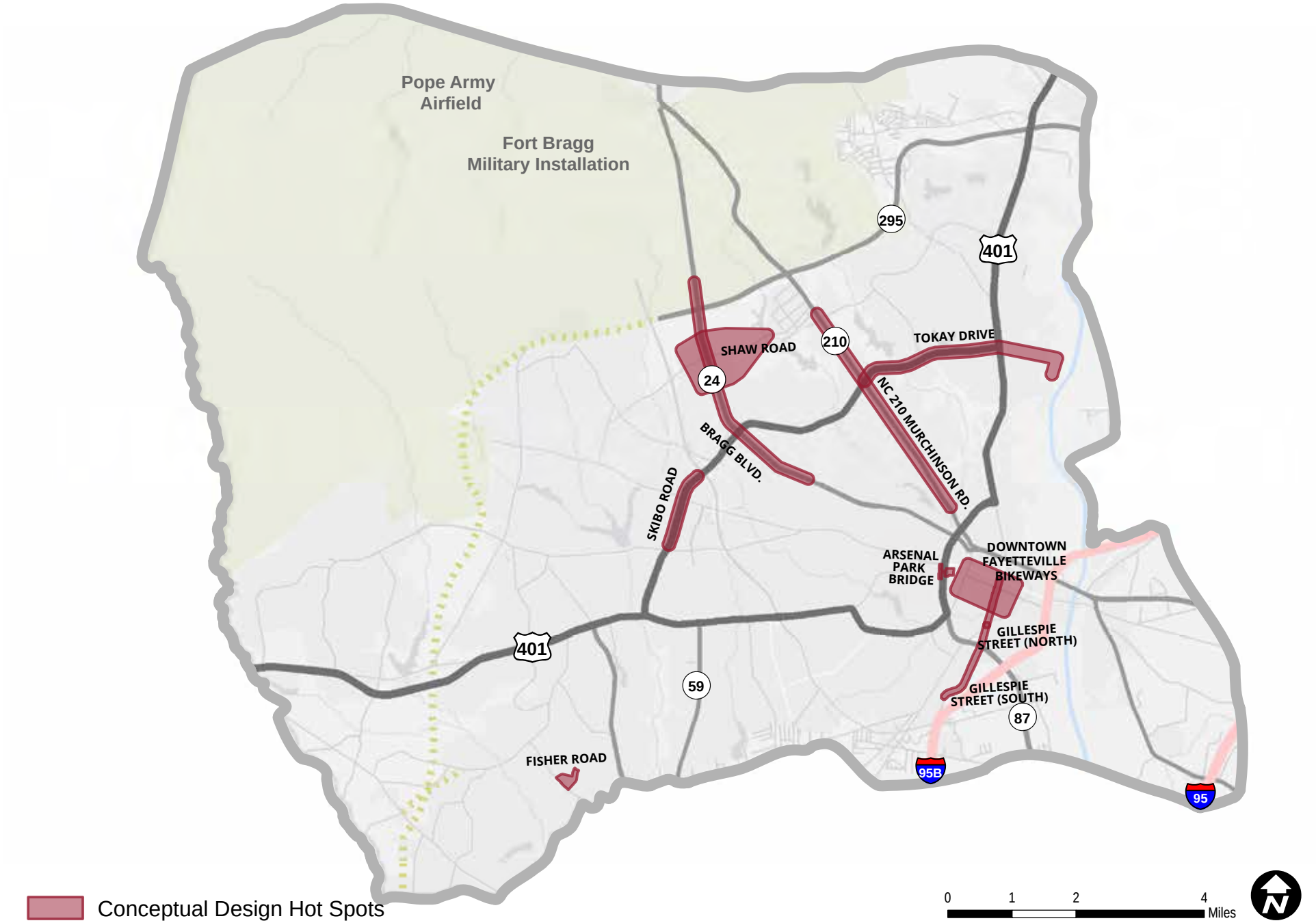
BACKGROUND

The following includes a detailed investigation into ten (10) areas in Fayetteville that were identified as important bicycle and pedestrian corridors. A combination of photographic renderings, graphic cross sections, and conceptual plans were completed of each area to depict potential enhancement solutions identified in the Plan. Recommendations including crossings, signals, bike lanes, and small width medians were recommended in many of the areas to increase cyclist safety. These projects are highlighted in the Plan because each project either provides a connection to existing infrastructure, serves high bicycle and pedestrian volumes, or was identified as a need during the public involvement process. ***Further studies are recommended for each during the design phase to determine the most appropriate solutions and placements of cyclist amenities.***

LOCATIONS (listed in no particular order)

- Skibo Road from Cliffdale Road to Lake Valley Drive
- Bragg Boulevard from Cain Road to Knox Street at Access Control Points (ACP)
- Fisher Road from Lakeway Drive to Lakeridge Drive
- Downtown Fayetteville Bikeways
- Shaw Road from Bragg Boulevard to Murchison Road
- Arsenal Park Bridge from Myrover Street to Bradford Avenue
- NC 210 (Murchison Road) from Cumberland Street to Shaw Mill Road
- Tokay Drive from Ramsey Street to Cape Fear River Trail
- Gillespie Street (South) from Trade Street to Southern Avenue
- Gillespie Street (North) from Southern Avenue to Hay Street





MAP 3.4: HOT SPOTS LOCATION MAP

COMMON CONSIDERATIONS AND RECOMMENDATIONS

Hot Spot locations were selected based on the results of the existing conditions analysis and influenced by public and committee feedback on areas where bicycling is difficult. Several design considerations were present among these areas and are illustrated with icons. Additionally, treatment recommendations for bicycle infrastructure improvements involve a select number of strategies that are shown. The key considerations and recommendations for each hot spot will be illustrated with up to four icons, and further accompanied by text giving more site specific detailed analysis.

DESIGN CONSIDERATIONS

High (or Low) Travel Speed or Frequent Speeding

High (or Low) Traffic Volume or Number of Lanes

Bike Crash Location

Bus Corridor or High Number of Bus Stops

Lighting Improvements Needed

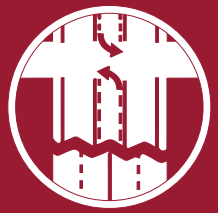
At Grade Rail Crossing or Old Rail Infrastructure

TREATMENT RECOMMENDATIONS

Shared Lane Marking (SLM)

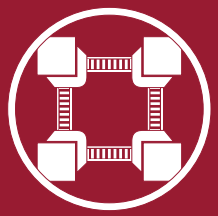
Sidepath, Shared Use Path (SUP), or Separated Bike Lane

Bike Lane or Buffered Bike Lane



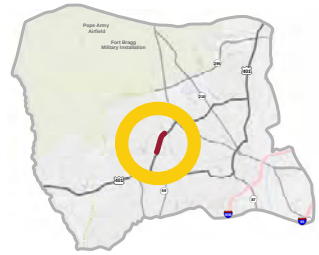
Road Diet or Lane Reduction

Rectangular Rapid Flashing Beacons (RRFB)



Intersection / Connectivity Improvements

Skibo Road
from Cliffdale Road to Lake Valley Drive



***Length:* 1.1 miles**

Heavy traffic volume, high speeds, and as many as eight lanes of traffic make this a challenging corridor to cross on bike.

Design Considerations:

- ❒ 50,000 vehicles per day near Cross Creek Mall
- ❒ Three bicycle crashes (2007-16) along the corridor
- ❒ Constrained bridge over All American Freeway
- ❒ Four FAST bus stop locations along the corridor
- ❒ Sidewalk gaps along the corridor
- ❒ Connect with proposed sidepath on Morganton Road
- ❒ Improve Shared Lane Marking (SLM) crossing at Campground Road intersection

Connect with:

- ❒ Proposed McFayden Lake Greenway (west)

Treatment Recommendations:

- ❒ Sidepath along Skibo Road (west) – former railroad corridor (potential rail-trail)
- ❒ Intersection improvements

Planning Level Unit Costs
(does not include ROW and design cost)

- ❒ $10,000 per mile Shared Lane Markings (SLM)
- ❒ $20,000 per Intersection Treatment
- ❒ $50,000 Signage along Skibo Road
- ❒ $700,000 per mile Sidepath/Shared Use Path (SUP)

Proposed Cross Section

**Google Maps used for streetview photos*

FIGURE 3.2: SKIBO ROAD HOT SPOT Important intersection crossing

Bragg Boulevard

from Cain Road to Knox Street Access Control Points (ACP)

***Length:* 3.8 miles**

A larger number of military personnel live off-base, and therefore morning traffic congestion can be significant. There is limited access to the military base, with no potential for alternative modes to enter/exit. Bragg Boulevard (NC 24) crosses under NC 295 highway with exit/entry ramps.

Design Considerations:

- 10,000 vehicles per day near Fort Bragg ACP; more than 38,000 vehicles south of NC 295
- Several bicycle crashes (2007-16) along the corridor
- Many FAST bus stop locations one mile south of ACP – potential park-&-bike

Connect with:

- Knox Street Access Control Point
- Shaw Road Separated Bike Lane

Treatment Recommendations:

- Sidepath along east side Bragg Boulevard
- Improved lighting and visibility under NC 295 interchange overpass

Planning Level Unit Costs

(does not include ROW and design cost)

- $20,000 signage improvements along Bragg Boulevard
- $50,000 lighting upgrades under NC 295 overpass
- $700,000 per mile-Sidepath/Shared Use Path (SUP)

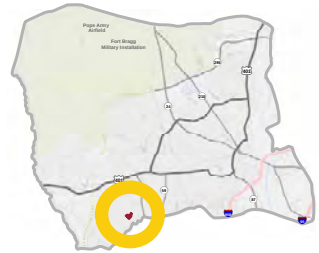
Proposed Cross Section

**Pedestrians and cyclists share the sidepath / Shared Use Path*

FIGURE 3.3: BRAGG BOULEVARD HOT SPOT

Fisher Road

from Lakeway Drive to Lakeridge Drive



***Length:* 0.14 miles + two intersections**

Crossing Fisher Road (45 mph) without traffic stopping is dangerous. Residential neighborhoods in this part of the City are not well connected by streets (cul-de-sac), which forces bicyclists to use heavier-volume roadways.

Design Considerations:

- 9,000 vehicles per day along Fisher Road
- One bicycle crash (2007-16) at Lakeway Drive intersection
- No FAST bus service
- Elementary and Middle schools nearby, along Fisher Road
- Residential neighborhoods in need of off-roadway connection

Connect with:

- Multiple neighborhood streets
- Two intersection crossings

Treatment Recommendations:

- Intersection improvements at Blockade Runner Drive and Lakeway Drive across Fisher Road – including RRFBs and marked crosswalks
- Property easement for shared use path (10') connection between Lakeway Drive and Dockside Drive (stub out streets)
- Sidepath along Fisher Road (south) - connect to schools

Planning Level Unit Costs

(does not include ROW and design cost)

- $30,000 per Intersection with Rectangular Rapid Flashing Beacon
- $700,000 per mile Sidepath/Shared Use Path (SUP)

**Google Maps used for streetview photos*

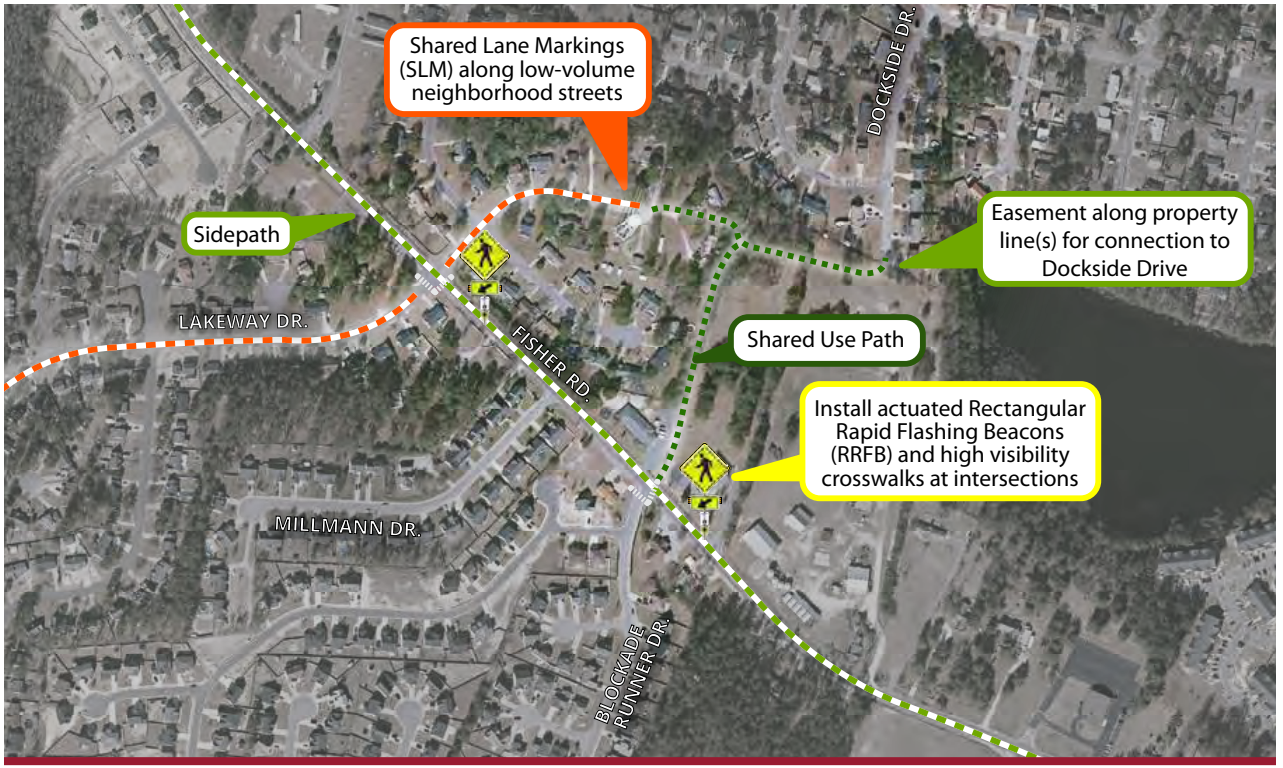


FIGURE 3.4: FISHER ROAD HOT SPOT

Downtown Fayetteville Bikeways

Downtown Fayetteville is experiencing a development renaissance, and vehicular parking is at a premium for many.

Design Considerations:

- 8,000-9,000 vehicles per day on parallel streets
- Nine bicycle crashes (2007-16) within Downtown
- Low posted speed limits (15mph-35mph)
- Connect with FAST Center – 325 Franklin Street
- Many at-grade railroad crossings
- Regional trail connections of significance: East Coast Greenway Trail through Downtown

Connect with:

- Cape Fear River Trail (northeast)
- Arsenal Avenue bridge over MLK Jr Freeway

Treatment Recommendations:

- Shared Lane Markings (SLM) along portion of Hay Street/Person Street
- Separated Bike lanes (bollards or curbing) along Robeson Street; Gillespie Street; Russell Street
- Buffered Bike Lanes along portion of Winslow Street

Planning Level Unit Costs

(does not include ROW and design cost)

- $10,000 per mile Shared Lane Markings (SLM)
- $90,000 per mile-Buffered Bike Lanes
- $400,000 per mile-Separated Bike Lane (existing pavement)

FIGURE 3.5: DOWNTOWN FAYETTEVILLE HOT SPOT

Hay Street Shared Lane Markings:

Robeson Street, Gillespie Street, and Russell Street Buffered or Separated Bike Lanes:

**Recommendations are consistent with City of Fayetteville Downtown Urban Design Plan (2019)*

Shaw Road

from Bragg Boulevard to Murchison Road

***Length:* 1.4 miles**

Bicycling as a necessary mode of transportation is more prevalent in this portion of the City. Shaw Road is a relatively low-volume, rural road, with a 45 MPH posted speed. This corridor provides a valuable east-west connection between more significant/regional corridors that support commercial development.

Design Considerations:

- 6,200 vehicles per day
- Two bicycle crashes (2007-16)
- Several FAST bus stop locations along this corridor
- Johnson Street as a parallel alignment - Bike Lane - with lower traffic volume/ speed alternative

Connect with:

- Sidepath along Bragg Boulevard

Treatment Recommendations:

- Separated Bike Lane along both sides of Shaw Road from Bragg Boulevard to NC 210 (Murchison Road)
- Connection with proposed Little Cross Creek Greenway/Shared Use Path (SUP)- See Murchison Road

Planning Level Unit Costs

(does not include ROW and design cost)

- $20,000 per Intersection Treatment
- $900,000 per mile-Separated Bike Lane

Separated Bike Lane along south side of Shaw Road

FIGURE 3.6: SHAW ROAD HOT SPOT

Arsenal Park Bridge

from Myrover Street to Bradford Avenue

***Length:* 0.4 miles**

An existing bicycle/pedestrian bridge crosses NC 87 (MLK Jr Freeway), and is under-utilized. Arsenal Park is a proposed historic City park to be developed along the west side of NC 87, with direct connection to the bridge through public property.

Design Considerations:

- Four bicycle crashes (2007-16) along Hay Street (north) – need to divert bicyclists from Hay Street (24,000 vehicles per day) to this alternative route
- FAST bus stop locations within 0.25 mile of property along Hay Street and Branson Street

Connect with:

- Multiple neighborhood streets
- Separated Bike Lane on McGilvary Street

Treatment Recommendations:

- Shared lane markings (SLM) along neighborhood streets connecting to the bridge along Bradford Avenue and Arsenal Avenue
- Separated Bike Lanes (bollards) along McGilvary Street heading into Downtown
- Sidewalk and lighting improvements needed for the Park property

Planning Level Unit Costs

(does not include ROW and design cost)

- $70,000 per mile-Bike Lanes
- $700,000 per mile-Shared Use Path (SUP)

Shared Lane Markings on Arsenal Avenue

FIGURE 3.7: ARSENAL PARK BRIDGE HOT SPOT

NC 210 (Murchison Road)

from Cumberland Street to Shaw Mill Road

***Length:* 3.6 miles**

Murchison Road is a significant commercial corridor with five lanes of traffic and is in need of access management to limit driveways and potential conflict points with bicyclists. Two TIP projects are proposed along this corridor (U-4900, U-5015) to modernize the corridor. Consideration of pedestrian and bicycle facilities are included in this design process.

Design Considerations:

- 20,000 vehicles per day near
- 15 bicycle crashes (2007-16)
- Dozens of FAST bus stop locations along the 3.75 mile corridor
- Fayetteville State University and local grocery store destinations along the corridor (public input)

Connect with:

- Existing sidepath along Country Club Drive (east-west)

Treatment Recommendations:

- Intersection redesign at:
  - Country Club Drive/Pamalee Drive
  - Shaw Mill Road/Hogan Street – connection to sidepath and proposed greenway trails along adjacent creeks
- Separated Bike Lane along NC 210 / (Murchison Road) (may be two-way separated bike lane)

Planning Level Unit Costs

(does not include ROW and design cost)

- $20,000 per Intersection Treatment
- $900,000 per mile-Separated Bike Lanes

Option A: Separated Bike Lanes

Option B: Two-way Separated Bike Lanes ("Cycle Track")

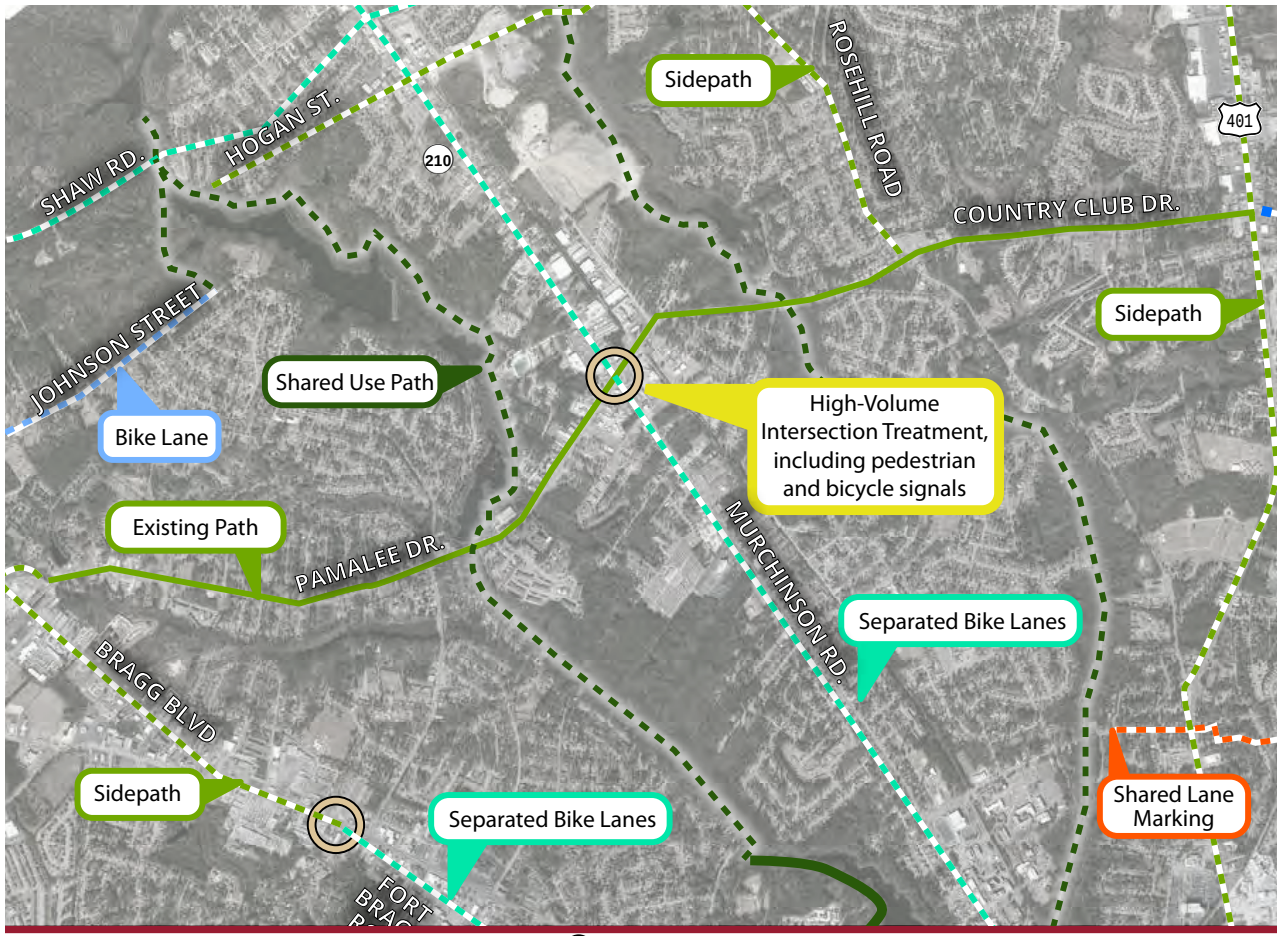
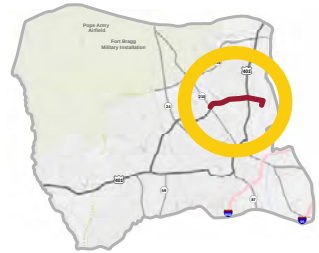


FIGURE 3.8: NC 210 MURCHISON HOT SPOT

Important intersection crossing

Tokay Drive

from Ramsey Street to Cape Fear River Trail



***Length:* 0.9 miles**

Continue to extend and connect with existing separated facilities, both along portions of Country Club Drive (south), and Cape Fear River Trail (east). This portion of Country Club Drive has been designated as US 401 Bypass, connecting east-west between the All-American Freeway and Ramsey Street.

Design Considerations:

- 25,000 vehicles per day near NC 210 (Murchison Road) intersection
- Five lanes, 50 mph posted speed
- Three bicycle crashes (2007-16)
- Three FAST bus stop locations at intersection nodes
- Partially completed sidepath along southside of Country Club Drive

Connect with:

- Cape Fear River Trail (east)
- Existing sidepath along Country Club Drive (west)
- U-4403 project along Ramsey Street

Treatment Recommendations:

- Potential redesign opportunity at intersection with US 401 / Ramsey Street
- Buffered Bike Lanes along Tokay Drive connecting with existing Cape Fear River Trail (east)

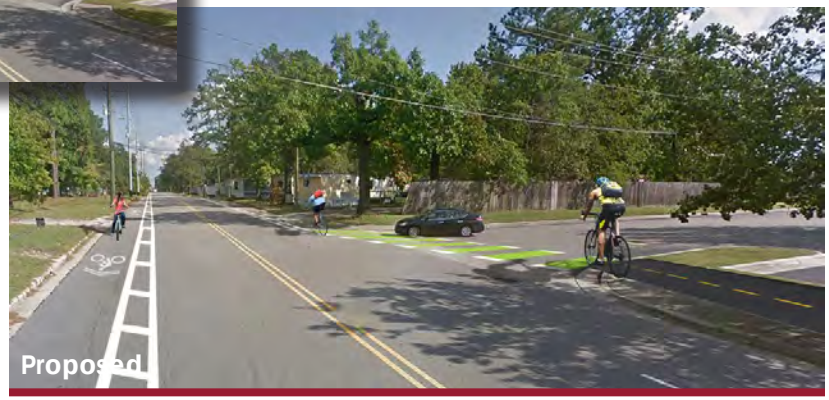
Planning Level Unit Costs

(does not include ROW and design cost)

- $600 per 12' lane-High Visibility Crosswalk
- $90,000 per mile-Buffered Bike Lanes

Proposed Cross Section

**Google Maps used for streetview photos*



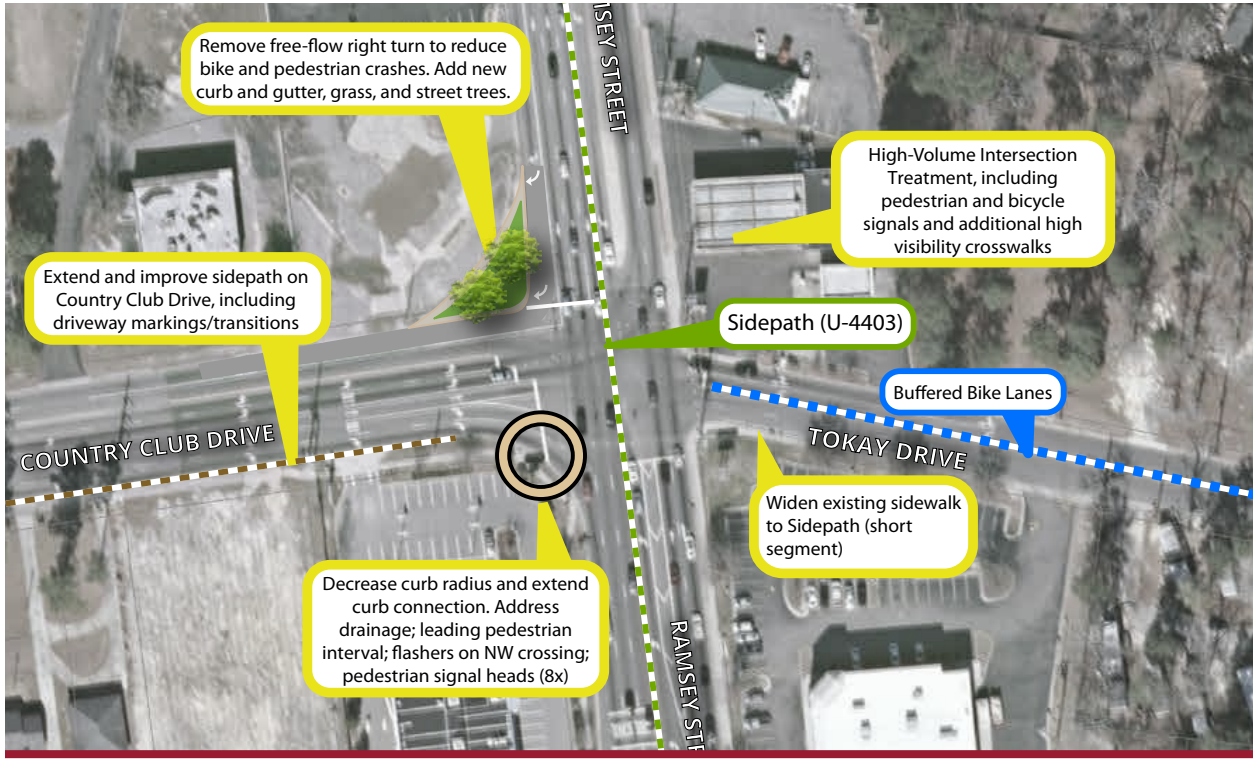
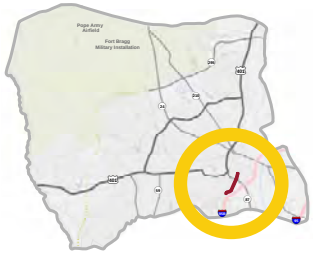


FIGURE 3.9: TOKAY ROAD HOT SPOT

Gillespie Street (South)

from Trade Street to Southern Avenue



***Length:* 1.4 miles**

Gillespie Street is a less-traveled corridor into Downtown that is currently five lanes wide and does not have the traffic volume to require this many travel lanes. If this pavement could be repurposed for bicycle facilities, then this corridor may prove to be a valuable, low-stress corridor from the Lakedale neighborhood (south of downtown).

Design Considerations:

- 9,000 vehicles per day, south of MLK Jr Freeway, with interchange and overpass bridges serve as roadway constraint
- Potential for road diet from 5-lane to 3-lane
- Zero bicycle crashes (2007-16)

Treatment Recommendations:

- Separated Bike Lane (bollards) along Gillespie Road
- Bike Lanes along Southern Ave
- Shared Lane Markings along several neighborhood streets: Progress, Delcross, Trade, Powell, and Foch Streets.

Planning Level Unit Costs

(does not include ROW and design cost)

- $10,000 per mile-Shared-Lane Markings (SLM)
- $70,000 per mile-Bike Lanes
- $400,000 per mile-Separated Bike Lane (existing pavement and bollards)

Proposed Cross Section

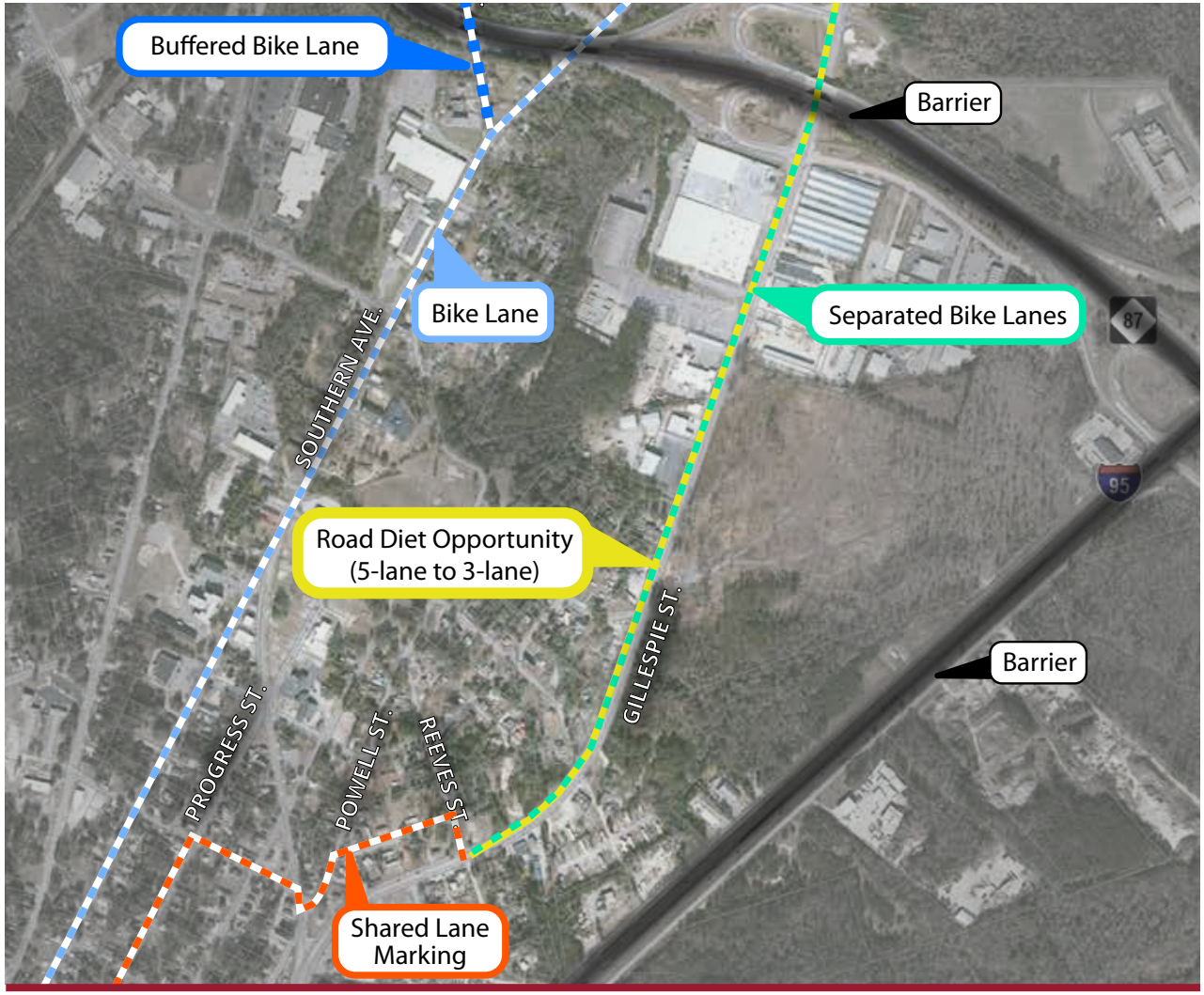
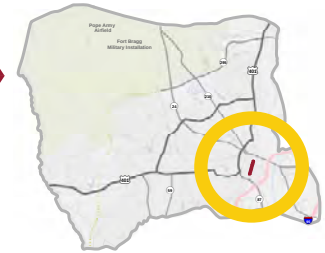


FIGURE 3.10: GILLESPIE STREET (SOUTH) HOT SPOT

Gillespie Street (North)

from Southern Avenue to Hay Street



***Length:* 0.8 miles**

The five-lane roadway cross section continues further north into Downtown, and eventually changes context at Russell Street. This is where the roadway transitions to parallel on-street parking before reaching the Market Square roundabout at Hay Street.

Design Considerations:

- 12,000 vehicles per day north of intersection with Southern Avenue
- Three bicycle crashes (2007-16)
- Four FAST bus stop locations

Connect with:

- Downtown Fayetteville
- Gillespie Street (South) section

Treatment Recommendations:

- Separated Bike Lanes (bollards) along Gillespie from Southern Avenue to Russell Street
- Shared Lane Markings (SLM) along Gillespie Street from Russell Street to Hay Street

Planning Level Unit Costs

(does not include ROW and design cost)

- $10,000 per mile-Shared Lane Markings (SLM)
- $400,000 per mile-Separated Bike Lane (existing pavement and bollards)

Proposed Cross Section

FIGURE 3.11: GILLESPIE STREET (NORTH) HOT SPOT


bike Fayetteville»

CHAPTER 4: RECOMMENDED PROGRAMS & POLICIES

Bicycle User Groups

Understanding the different bicycle user types within the community will help inform the most appropriate programs and policies for encouraging more bicycle activity.

USER TYPES

It is important to consider the user comfort and skill level of different bicyclists because this will help influence the appropriate bikeway facility selection. Characteristics commonly used to classify user profiles are **comfort level**, **bicycling skill and experience**, **age**, and **trip purpose**. Many cyclists may not fit into a single user group, and therefore categories are not intended to be exclusive. Skill level was previously described in the Existing Conditions Chapter ***(Table 1.1)***, consisting of four categories: New, Novice, Utility, and Advanced.

Proximity to vehicular traffic will influence a bicyclist's comfort, as will lighting, time of day, and presence of rain, wind, or debris along the road. Many commuter cyclists prefer off-road facilities (e.g., shared use paths or greenways) and would be dissuaded by the potential for stressful interactions with motor vehicles at intersections. The following sections examine how comfort, skill, and age may affect bicyclist behavior and preference for different types of bikeways.

Research suggest that among adults who have stated an interest in bicycling, there are three types of potential and existing bicyclists.[1] Children were not included in the research and require special consideration in the design of bikeways. There is some overlap between these groups, as referenced above. The purpose of identifying these three groups is to describe the general needs of different types of bicyclists, and plan for a larger bicycling population.

Bicycle user types and descriptions are adopted from FHWA Bikeway Selection Guide[2], and are described here.

Target Design User

Comfort level and traffic stress are inversely related, as one rises the other descends. Proximity to vehicles (speed and volume) is the primary contributor of stress. Bicycle networks that are high-comfort/low-stress serve the largest number of bicyclists while low-comfort/high-stress networks serve the fewest.

In many planning efforts, the noisiest group often receives the greatest benefit. For bicycle projects this often translates to the highly confident receiving priority for shared roadway facilities or traditional bicycle lanes along higher speed/volume corridors. Communities seeking to serve all ages and abilities will need to establish low-stress bicycle networks to engage the larger interested but concerned user group.

1 Dill, D. and N. McNeil. Revisiting the Four Types of Cyclists. In Transportation Research Record 2587. TRB, National Research Council, Washington, DC, 2016
2 Schultheiss, D. et. al. Bikeway Selection Guide. Federal Highway Administration FHWA-SA-18-077, Washington, DC, 2019

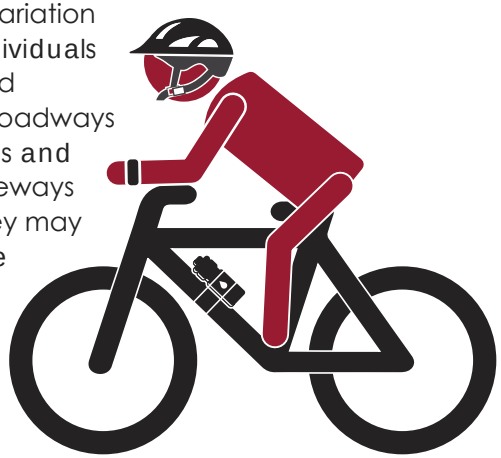
Survey respondents categorized themselves as these bicyclist types; however, the national averages for each group are different.

Fayetteville Survey Respondents (2019)
50 Largest Metro Respondents (2015)

HIGHLY CONFIDENT

14% +/- (7%)

Beginning with the group that has the highest comfort level and skill, the Highly Confident user type represents the smallest portion of the population. While some degree of variation may exist within this group, these individuals prefer direct routes and do not avoid operating in mixed traffic, even on roadways with higher vehicle operating speeds and traffic volumes. Many also enjoy bikeways separated from traffic; however, they may avoid bikeways which they perceive to be less safe or too crowded with pedestrians or other slower moving bicyclists, or which require deviation from their preferred route.



SOMEWHAT CONFIDENT

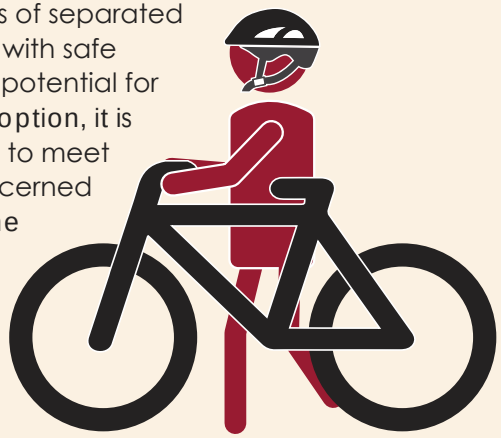
44% +/- (5%)

Somewhat Confident bicyclists may also be known as Enthused and Confident Bicyclists, these are the next-smallest group. They are comfortable on most types of bicycle facilities. They have a lower tolerance for traffic stress than the Highly Confident Bicyclist and generally prefer low-volume residential streets and striped or separated bike lanes on major streets. These user types are willing to tolerate higher levels of traffic stress for short distances to complete trips to destinations or to avoid out-of-direction travel.

INTERESTED BUT CONCERNED BICYCLIST

37% +/- (51%)

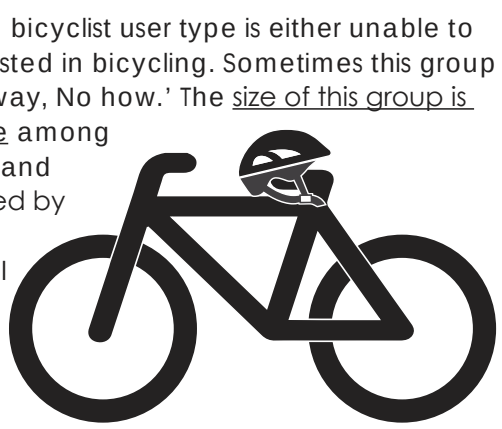
Interested but Concerned bicyclists are the single largest group identified by the research and have the lowest tolerance for traffic stress. Those who fit into this group tend to avoid bicycling except where they have access to networks of separated bikeways or very low-volume streets with safe roadway crossings. To maximize the potential for bicycling as a viable transportation option, it is important to design bicycle facilities to meet the needs of the Interested but Concerned Bicyclist category. This is generally the recommended design user profile as the resulting bikeway network will serve bicyclists of all ages and abilities, which includes Highly Confident and Somewhat Confident Bicyclists.



NOT INTERESTED

4% +/- (37%)

The remaining bicyclist user type is either unable to or is not interested in bicycling. Sometimes this group is called 'No way, No how.' The size of this group is highly variable among communities, and likely influenced by personal or environmental factors.



Policy Recommendations

ROLE OF POLICY AND PROGRAMMATIC ELEMENTS

The project recommendations understandably receive the most attention in many plans, but bicycling and bicyclists are benefited the most in the long term by having favorable public and private policies. The recommendations in this section are based on a review of Fayetteville's policy and program environment including specific ordinance and plan language, as well as feedback from the Steering Committee and staff on existing actions.

It's important to understand that many of the design guidelines, policy directives, and standards were put into place long ago and well before a good understanding about how people wanted to move around their city was developed. Periodically re-examining standards and ordinances isn't an admission of wrong-doing before, but rather an acknowledgment that Fayetteville has grown and matured as a great North Carolina city.

ORGANIZATION

It is commonplace to speak of the six "E's" of safe bicycling when organizing categories of actions (borrowed perhaps from the five E's of education), and this typology was introduced again in this plan and to the Steering Committee: Education, Encouragement, Enforcement, Equity, Engineering, and Evaluation. The key ideas behind each of these categories of programs are explained on these pages; specific recommendations follow along with on-line resources and examples, if available.

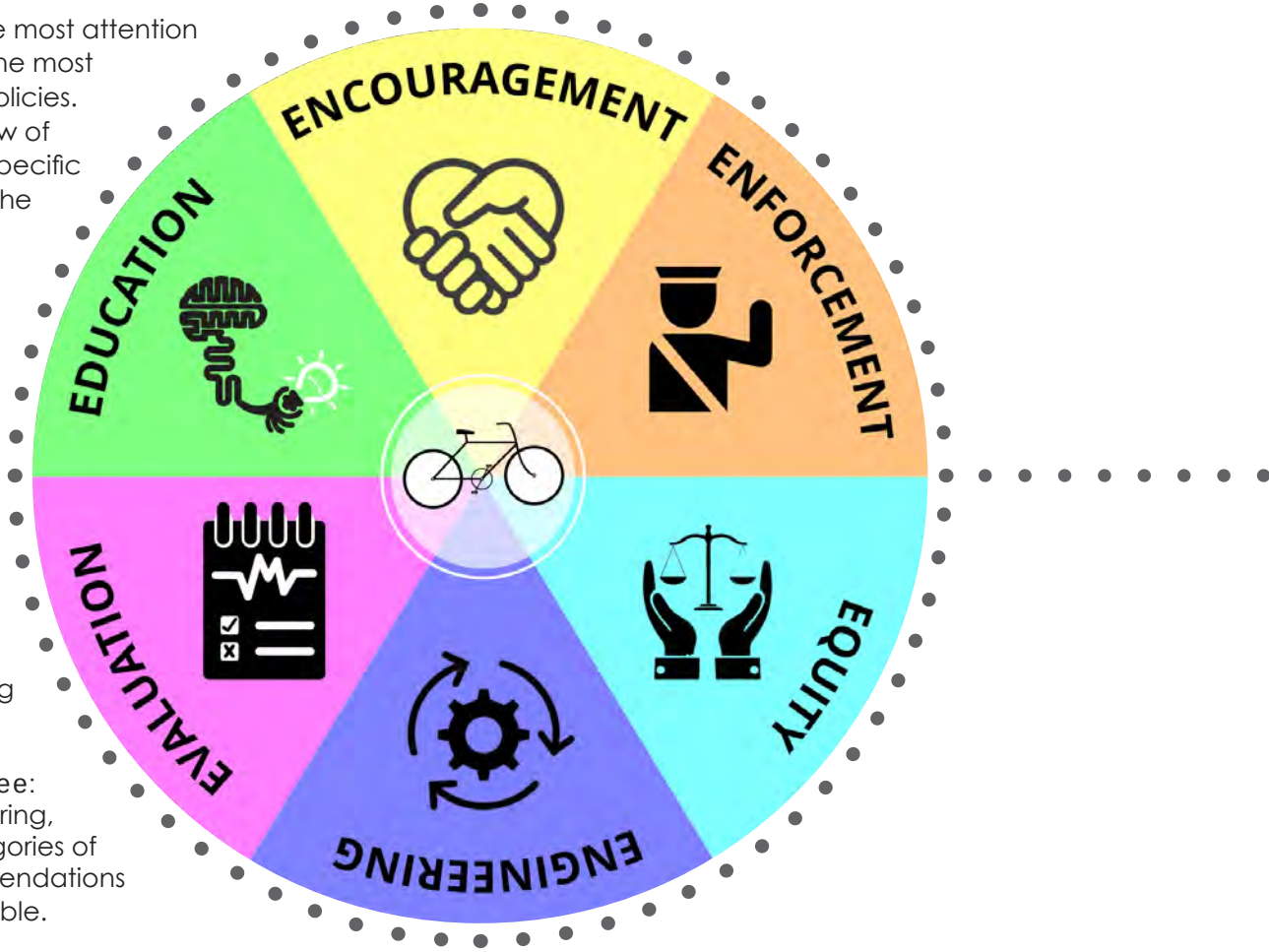
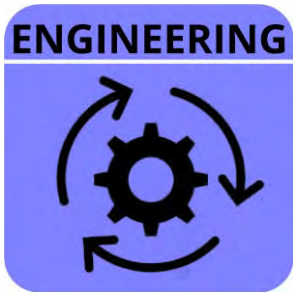


FIGURE 4.1: THE SIX E'S

Many people remember being pushed down the driveway as the only bicycle education they received from a parent. Bicycle training clinics (for adults and children) and North Carolina's *Watch for Me NC* and *Let's Go NC* programs can provide ongoing training and support.

To overcome the estimated 60% of people that are "interested but concerned" about bicycling, Fayetteville should take the lead on providing a clear bicycle facilities map, continuing to sponsor better block events, and promoting bike to school (and work) days.

Fayetteville has a rich resource in The Bicycle Man non-profit that provides new and repaired bikes to kids that can't afford them - they can be a great community partner for the City. The proposed projects in this plan consider car ownership and income as priority factors.



Safety is always a factor in road improvements, but a Vision Zero policy puts safety in first place. Additionally, the City can adopt a Complete Streets policy and procedure that will help prioritize all modes of transportation in the planning and design processes.

Law enforcement isn't about writing tickets: stop-and-inform practices, coupled with printed information cards work well with drivers that aren't paying attention to the road. The Watch for Me NC program also sponsors officer training events that are beneficial.

Gathering and reporting information on bicycle crashes and volumes is critical to understanding performance. Hiring a dedicated bicycle/pedestrian staff position would help immensely, and be in keeping with what other cities of Fayetteville's size are already doing.

FIGURE 4.2: POLICY CATEGORIES

EDU.1: Bicycle Training Clinics

This plan supports the efforts of law enforcement agencies and non-profits for conducting bicycle "rodeos" that teach bicycle balance and maneuvering to pre-school and older children that are just beginning to learn how to ride a bicycle. This recommendation goes beyond that to accommodate slightly older riders in elementary and middle schools by conducting youth safety clinics in accordance with the League of American Bicyclist's Youth Skills.

EDU.2: In-Classroom Curricula

North Carolina's *Let's Go NC!* program was developed for elementary school children to provide educational materials, teacher lesson plans, and instructional videos that educate young people how to be better, safer cyclists. The program is divided into two parts, *Let's Go Walk NC!* and *Let's Go Bike NC!*, with both programs having important benefits for classroom education in public and private schools in Fayetteville. Working with 1-2 pilot schools initially is important to get the details right before expanding the effort.

ENC.1: Bicycle Suitability Map

Fayetteville has an increasing number of visitors as well as military personnel and civilians moving in and out of the area. Providing them with a map showing facility suitability (safety) would help create a better knowledge base, especially for newcomers. The City of Raleigh and BikeRaleigh have developed a map and companion phone app that are inspiring examples.

ENC.2: Cooperative Urbanism

Some bike-friendly treatments, while commonplace elsewhere, can be vetted with the City (and NCDOT) staff with short-term pilot projects, typically 1-3 months in duration. This practice lets everyone see how cycle tracks, bike boxes, two-stage left-turns and other treatments work in the real world. Cooperative "tactical urbanism" in the planning and design lexicon of the City is good... as long as the City leads.

ENC.3: Bike (and Walk) to School

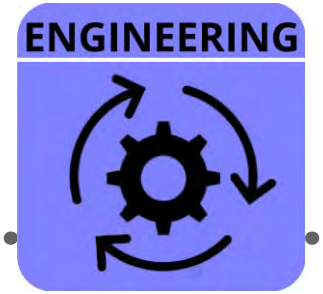
Work with 1-2 schools to host a bike-and-walk-to-school event, which are becoming popular in a number of cities.

EQ.1: Prioritize Needs First

Since bikes are allowed on the front of FAST buses, bicycles can extend the "reach" of transit in Fayetteville and provide direct means of transportation for trips of 2-3 miles or less for the average cyclist. This plan, and future plans, should prioritize healthy transportation and lifestyles, in part by increasing the technical score of projects proposed in lower-than-medium income and zero-car household areas of the City to create safe biking facilities for those that need them the most for basic transportation needs.

EQ.2: Support Non-Profits

The Bicycle Man is one example of non-profit organizations that can help Fayetteville extend its resources to reach more people with its programs. The Cross Creek and Sandhills Cycling clubs are good places to start in building more inclusive cycling communities. The Plan recommends conducting meetings with each of these potential partners to identify community program and infrastructure needs and build momentum for a bicycle-pedestrian action committee like that in Durham, NC.



ENG.1: Vision ZERO

Becoming a Vision Zero City (like Durham and Charlotte) makes sense: resolve to have a clear goal of eliminating traffic fatalities and severe injuries; ask the Mayor to publicly, officially commit to Vision Zero; have a Vision Zero plan or strategy in place; and ensure key city departments (including police, public services and emergency services) are engaged. Aiming towards a goal of zero traffic fatalities and injuries fundamentally changes the way cities do business.

ENG.2: A Complete Street Policy

Adopting a complete streets policy means "routinely designing and operating the entire right of way to enable safe access for all users, regardless of age, ability, or mode of transportation." The City of Fayetteville's Pedestrian Plan already called for this measure and provided detailed information on the resolution and guidance for actuating this item.

ENF.1: Watch for Me Officer Training

It is always assumed that police officers have a perfect understanding of every enforcement situation, but regular training is vitally important to fulfilling their mission. The second mention of North Carolina's *Watch for Me NC program is here*, with full and half-day (refresher) courses offered according to a published schedule. All Fayetteville police officers are encouraged to attend to learn how to conduct a pedestrian crosswalk enforcement operation and many other tools that they can use to do their jobs for us even better.

ENF.2: Stop-and-Inform

Creating an atmosphere of respect and better driving and bicycling is a valued part of policing. Communities have developed cards that are handed out to motorists and bicyclists that have good and lawful behavior for drivers printed on one side and cyclists on the other. Often, people really don't know or consciously think about what is legal and sound behavior. Handing out such a card is a good wake-up call for both parties.

ENF.3: Crime Prevention through Environment Design (CPTED)

See the following pages for details on CPTED.

EVA.1: Bike and Pedestrian Staff

While it's important to stress to engineering, planning, and public works staff in the City to keep bicycling and safety in the forefront, a dedicated staff person is necessary to execute the other aspect of these policy and program recommendations. Staffing the bicycle-pedestrian action committee, working with partners, meeting with the public, and reviewing development proposals are an essential part of this position's duties. Cities comparable to Fayetteville often have a dedicated bicycle and pedestrian planning staff member.

EVA.2: Count what Counts

What gets measured, matters. Data is collected routinely for automobile traffic during biannual NCDOT counts and for traffic impact analyses. Making sure these counts include non-motorized users is a crucial part of getting to what matters: moving people through Fayetteville, safely. The recommendation is to establish a pedestrian and bicyclist count program at the periphery of downtown, around colleges/universities, and at the entrances to Fort Bragg and major shopping destinations - approximately 25 in all.

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN: *MAKING STREETS SECURE AS WELL AS SAFER*

Purpose: *Cities, streets, and neighborhoods are made safer when there is a high level of maintenance, lighting, and design attention that allows clear delineations of public, private, and semi-private spaces. Proper design and management of the built environment can lead to reductions in the incidence and fear of crime, while improving community vitality and overall quality of life. These design principles stem from the seminal "eyes on the street" concept established by Jane Jacobs, which holds that urban areas are safer when more people are present.*[1]

Issues and Barriers to Success: Governments often view CPTED too narrowly, either omitting the benefits inherent in applying CPTED to site review processes and ordinance / plan development stages or by considering CPTED to be equated largely with "better lighting." Certified CPTED Specialists can help develop responsible civil code language and conduct site plan reviews as well as serve as a resource to law enforcement officers and planners alike to make communities safer. The monetary costs are relatively minimal and scalable, including staff training/certification, capital improvements in targeted areas for maintenance, and enforcement.

Strategies for Improvement

The first crucial step is communicating accurately what CPTED actually is and the benefits from consistent application of CPTED principles. The American Planning Association says that CPTED and traditional crime prevention are related, but not the same.

> *Both traditional crime prevention and CPTED share goals of anticipating and preventing injury and loss by initiating actions to remove or reduce risk. Traditional crime prevention, led by law enforcement, tends to focus on organized and mechanical strategies to prevent crime, such as neighborhood watch groups and security equipment. Conversely, CPTED focuses on incorporating "natural" or "passive" strategies that rely upon elements such as lighting, sightlines, entry design, landscaping, and planned social activities into the normal planning, design, and management activities of the built environment.*[2]

Crime Prevention: SeaTac, WA

The City of SeaTac has a section of their municipal code (Title 17) devoted to defining CPTED practices that apply to every land use category for new construction and major improvements, as well as parks (Angle Lake pictured).

www.codepublishing.com/WA/SeaTac

1 Crime Prevention Through Environmental Design, Puget Sound Regional Council Planning for Whole Communities Toolkit, website accessed 11/1/2019: www.psrc.org/sites/default/files/crime_prevention_through_environmental_design.pdf.

2 American Planning Association, Community CPTED, PAS QuickNotes No. 42. 2013.

CPTED has been shown to reduce crime rates by 40% or more repeatedly and has been adopted in many cities across North America and the world.[3] In order to realize that level of benefit, the government agency's ordinances, adopted plans, and their staff practices have to be considered. Capital improvement plans also need to reflect the importance of consistent maintenance, prioritizing areas that are more prone to street-level crime. CPTED, as it relates to community planning, consists primarily of several principles and strategies, including natural surveillance (design, placement, design of structural elements), access management (including wayfinding, lighting, and artwork), territorial reinforcement (delineating where the public should be allowed to go through landscaping and boundary treatments), and maintenance (both of physical infrastructure and public order through increased and consistent enforcement of minor violations).

3 (1) Crowe, Timothy revised by D. Fennelly, Lawrence. Crime Prevention Through Environmental Design . Elsevier Science. Kindle Edition. 2013. (2) Atlas, Randall C. 21st Century Security and CPTED: Designing for Critical Infrastructure Protection and Crime Prevention, Kindle Edition. 2008.

These strategies have secondary benefits, since public perception of the government, community relations, and social and economic investments should improve as CPTED practices take hold and become more visible to the public. The following are recommended steps to integrate CPTED practices into Fayetteville, supporting biking and walking, modes that depend heavily on a feeling of security.

1. **Ensure that 1-2 police officers are trained and certified in CPTED.** There are currently two primary certification agencies and routes for CPTED: the National Institute of Crime Prevention and the International CPTED Association. Both certifications require recertification every three years. Costs for certification vary from $250 to $5,000 and may include travel to a training site in the case of the NICP certification. These certified staff then become the source for completing additional CPTED actions, below.
2. **Revise the municipal code to include CPTED elements.** Some communities like SeaTac in Washington State have developed specific code language, although it is not necessary to have a separate section devoted to CPTED as SeaTac has done. Fayetteville should conduct a review of existing ordinances and propose specific language that is appropriate to each land use category and generally fits within its current planning framework.
3. **Conduct CPTED reviews as part of the normal site plan and subdivision review processes.** The trained CPTED staff in Fayetteville should receive site plan reviews and offer specific comments in accordance with the adopted ordinances and policies of the City, just like other divisions (e.g., fire, utilities, transportation). The same schedule for reviews should be applied to the CPTED review so as not to delay development reviews.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CHAPTER 5: IMPLEMENTATION STRATEGIES

Five Year Implementation Strategy

SO NOW WHAT?

Following through on these recommendations will require persistence and leadership from the local community, regional leaders, and state government. Successful implementation of the Plan will require the cooperation of several agencies and organizations. Many of these partnerships already exist, and this Plan will build on those partnerships. Examples of these partnerships include the relationships between NCDOT, City, County, and FAMPO. Still other connections will be formed through the implementation of this Plan. These coalitions will likely be formed within the community itself, as the City coordinates its efforts with local schools, athletic associations, and other community groups. Understanding roles for each partner is important from the onset.

ROLE OF NCDOT

As the administrator of the Bicycle and Pedestrian Planning Grant Initiative and the primary agency concerned with transportation planning, engineering, and construction in the State of North Carolina, NCDOT will be an important partner in the implementation of this Plan. After the adoption of this Plan, NCDOT should continue to provide technical assistance and consulting regarding bicycle transportation planning in Fayetteville. NCDOT Division 6 is responsible for construction and maintenance of bicycle and pedestrian facilities in the City. It will be the primary partner for the design and construction of recommended projects made in Chapter 3 of this Plan.

The Strategic Prioritization Office of Transportation (SPOT) process prioritizes most NCDOT division projects, per the state's Strategic Transportation Investment (STI) law. SPOT is a data-driven approach to project prioritization for all transportation mode projects, including bicycle and pedestrian project improvements. STI provides three funding tiers for transportation projects: Statewide Mobility, Regional Impact, or Division Needs.

ROLE OF FAYETTEVILLE AREA MPO

As the MPO responsible for long-range transportation planning within the Fayetteville metro-area, FAMPO should consider implementing the projects recommended in this Plan. For the infrastructure needs to be met, FAMPO should continue to revise and integrate the multimodal transportation needs of the City in its CTP, last updated in 2013, and its MTP, last updated in March 2019.

Opportunities to improve the bicycle environment should be taken when roadways are scheduled for maintenance or construction. Many of the projects outlined in this report can be accomplished in unison with maintenance programs initiated by the MPO and funded in combination with state roadway improvement programs such as SPOT.

ROLE OF CUMBERLAND COUNTY

Planning by the Cumberland County government has a very tangible effect on the City of Fayetteville. The County is the primary organization governing land use planning, transportation planning, and public health initiatives within and around the City. It is vital that these plans align with common goals that span municipal boundaries. There are several crucial ways for the County to support this Plan:

- Support active transportation through regional trails and networks.
- Promote active transportation and public health through county-wide programming.
- Prioritize pedestrian safety when updating the CTP.

ROLE OF CITY OF FAYETTEVILLE

The City of Fayetteville is responsible for implementing this Plan. Through its adoption, the City will be empowered to act as a champion for pedestrian and bicyclist needs. To guide implementation, the City should consider hiring a permanent Bicycle and Pedestrian Planner position. This planner would work closely with the Bicycle and Pedestrian Advisory Committee (BPAC), which will continue to serve as champions for bicycle (and pedestrian) planning in Fayetteville as recommended in this plan. As champions of active transportation, committee members and planner should encourage the full implementation of this Plan. This includes advocating for the project and programmatic recommendations in this Plan, as well as developing other events and programs as they work in the community.

ADOPT THIS PLAN

The first step, and most important step, for the City of Fayetteville to build upon the existing regional plans and policies is adopting this Plan. **Adoption is required for the City's eligibility to receive priority funding for projects from NCDOT.**

Remaining strategies are organized into three categories, Policy, Program, and Infrastructure, which will involve different contributing stakeholders, lead agencies, time frames, and relate to other report chapters (***Table 5.1***).

PERFORMANCE MEASURES

Performance measures should be developed to evaluate this Plan's action items and programs. Measures can be made to align with Federal performance measures required of the FAMPO for reporting progress with MAP-21 (now FAST Act)[1].

Baseline conditions, such as bicycle counts, safety, and event attendance, should be gathered before any of the action items are implemented. This allows the City and the BPAC to track the progress of successful programs as they grow and mature. Determining which programs are effective and which ones are less effective will be critical in making future decisions regarding the full implementation of this Plan.

1 MAP-21 Performance Management Program. Federal Highway Administration. Accessed September 15, 2019 https://www.fhwa.dot.gov/map21/factsheets/pm.cfm . Last Modified April 1, 2019.

TABLE 5.1: PLAN IMPLEMENTATION TABLE

Strategy	Contributing Stakeholders	Lead Agency	Time Frame	Duration	Related Sections
POLICY					
Adopt this plan	City Council	**City**	Immediate	Once	--
Amend the Cumberland County CTP to reference this plan	City/MPO Staff, City Council, Cumberland County, NCDOT	**City**	Immediate	Once	Chapter 3 - Recommended System Plan
Engage the Bicycle and Pedestrian Advisory Committee (BPAC)	City/MPO Staff; BPAC	**City**	Immediate	Ongoing	Chapter 4 - Evaluation EVA 1
Expand City Policies for Vision Zero and Complete Streets	City Council; City/MPO Staff; BPAC	**City/MPO**	Mid-term	Ongoing	Chapter 4 - Engineering ENG 1-2
Continue to Enforce State and Local Regulations	City Staff; Law Enforcement; BPAC	**City Police Department**	Near-term	Ongoing	Chapter 4 - Enforcement ENF 1-2
PROGRAM					
Expand Educational Outreach Programs	BPAC	**City/MPO**	Mid-term	Ongoing	Chapter 4 - Education EDU 1-2
Hire a Bike/Ped Planning Position	City/MPO Staff	**City**	Near-term	Ongoing	Chapter 4 - Evaluation EVA 1
Expand Encouragement Outreach Programs and Events	BPAC	**City/MPO**	Mid-term	Ongoing	Chapter 4 - Encouragement ENC 1-3
Establish a Monitoring Program	City/MPO Staff; BPAC	**City/MPO**	Mid-term	Periodic	Chapter 4 Evaluation EVA 2
Become **Gold**-level Bike Friendly Community	City/MPO Staff; BPAC	**City/MPO**	Mid-term	Periodic	Chapter 4 - Encouragement
INFRASTRUCTURE					
Identify Funding Sources	City/MPO Staff; BPAC	**NCDOT IMD; City/MPO**	Near-term	Periodic	Chapter 5 - Funding Considerations
Partner with FHWA to perform Road Safety Audit	FHWA; NCDOT IMD; City/MPO Staff	**NCDOT IMD; City/MPO**	Mid-term	Once	Chapter 4 - Engineering and Evaluation
Build Hot Spot Projects	NCDOT IMD; City/MPO Staff; BPAC	**City/MPO**	Mid-term	Ongoing	Chapter 5 - Conceptual Design "Hot Spots"
Update CTP/MTP Projects for Bicycle Facilities	City/MPO Staff; BPAC	**NCDOT IMD**	Long-term	Periodic	Chapter 3 - Formulating the Bicycle Network

Acronyms
MPO: *Fayetteville Area Metropolitan Planning Organization*
BPAC: *Bicycle and Pedestrian Advisory Committee*
FHWA: *Federal Highways Administration*
NCDOT IMD: *Integrated Mobility Division*

TIME FRAME	
Immediate	**Year 0**
Near-term	**Years 1-2**
Mid-term	**Years 2-4**
Long-term	**Years 4-6**

Funding Considerations

Implementing this plan will require a palette of sources comprised of many organizations and players, sometimes in collaboration to complete construction or maintenance of active mode infrastructure or programs. The following is a basic guide to the main sources of funding. Grants and even state-level funding programs are subject to change; However, early and proactive planning are watchwords when seeking project funding.

FUNDING OVERVIEW

Federal / State. These two categories are best considered together, since federal funds frequently pass through the state (NCDOT) before being disseminated to local government. Major streets are typically the purview of the state in coordination with local staff. Powell Bill funds are distributed to municipalities based on their population and miles of local streets and are currently used solely for resurfacing. The funds (Fayetteville received $5.2 million in FY 2018) can be used to construct safety-related projects, but are stretched thinly to address key maintenance issues. STIP (State Transportation Improvement Program) funding is allocated on a competitive formula basis. Fayetteville's active mode projects compete with other areas for Division-level funding, about 30% of the total programmed funds - none of which can be state funds, based on past legislative action. Quantitative information about primary and secondary destinations (e.g., schools, parks, tourism attraction, mixed-use neighborhoods), crashes, on-road speed limit, and cost / local matching funds are key factors. Finally, Fayetteville should continue to have frequent communication with NCDOT Division 6 and Integrated Mobility Division (IMD) staff to understand repaving schedules that can result in markings and signage for bicycle lanes, intersection treatments, and so forth.

Local (City and County). The City may direct their own staff or engage contractors to implement projects, and seek to partner with NCDOT IMD staff when possible. Not all funds collected can be used for any purpose (general fund); fees collected for water and sewer must be used for those purposes - although resetting drainage facilities sometimes requires modifying curb ramps that can also be updated with ADA-compliant tactile/visual warnings, for example. Fayetteville sales tax revenues amounted to $41.2 million in fiscal year 2018, and the ad valorem property tax distribution $69.2 million.

Private Sector. Private individuals, developers, and companies can play a major role in everything from financing new segments of sidepaths or greenways to providing employee-volunteers to help with typical clean-up or landscaping. For example, Fayetteville accepted $8.3 million of donations and grants in FY 2018, up more than $5 million from the preceding year. Most of this revenue was in the form of transportation donations, including streets and sidewalks. Ensuring that private development-sponsored projects conform to this plan specifically and incorporate best practice improvements for bicycling treatments generally will go a long way towards improving the transportation system over time.

Grant Programs and Non-Governmental Organizations. Grant programs are a good resource, although all have differing project criteria and timelines for applications. Having a dedicated person deal with these funds is advisable; working through the Council of Governments and Metropolitan Planning Organization (FAMPO) may help Fayetteville compete for grants more effectively. As noted, The Bicycle Man is a long-standing, volunteer-run organization that has donated over 30,000 bicycles across six counties in the greater Fayetteville area.

TABLE 5.2: FAYETTEVILLE CITY EXPENDITURES

Capital Expenditure Type	Capital Expenditures ($000s)
Downtown Streetscape	$1,513
Intersection Improvements	$1,131
Multi Use Lanes	$375
Sidewalk	$9,599
Streetlighting	$625
Trails	$8,525

Source: Capital Improvement Program (FY2020-2024)

FEDERAL FUNDING SOURCES

Fixing America's Surface Transportation (FAST) Act

The FAST Act was signed into law in 2015 and created a 5-year certainty for states and local governments to fund specific projects. The bill's five-year funding pot is $305 billion, with $835 million in 2016 and 2017, and $850 million in 2018-2020 dedicated to bicycle and pedestrian projects. The FAST Act is the first-ever federal transportation bill to include Complete Streets Guidelines. The requirements help ensure that new National Highway System roadways offer better transportation options to keep cyclists safe in and around roadway corridors. It also requires the use of NACTO's Urban Streets Design Guide when designing roadways, as well as permitting local governments to use their own adopted design guidelines if they are the direct recipient of federal funds, even if it differs from state standards. Part of the federal funding program, the Surface Transportation Block Grant (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure.

Federal Transit Administration

This program provides funding for transportation projects at the federal level and is allocated to State Department of Transportations. The State then applies funding to eligible projects. Projects including pedestrian projects are eligible as they increase safety for users and enhances interaction of all users on the full transportation network. One often-overlooked potential resource is funding for connecting transit stops with bicycle facilities. https://cms.fta.dot.gov/

Safe Routes To School (SRTS)

The Federal Safe Routes to School program was established in 2006 and provided funding to all State Departments of Transportation. More recent legislation did not include funds specifically for Safe Routes to School, though projects to improve walking and bicycling safety are still eligible under the Transportation Alternatives Program. Infrastructure projects can only be considered Safe Routes to School projects if they are located within two miles of an elementary or middle school.

Visit https://connect.ncdot.gov/projects/BikePed/Documents/NCDOT_SRTS_Description.pdf for more information.

Transportation Alternatives Program Grants

The Fixing America's Surface Transportation (FAST) Act set-aside program funding for transportation alternatives. These funds include all projects and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity. The City should continue to apply for grants to support funding for the projects in this Plan. As recently as 2018, the City received $1.1million in TAP funds for projects.

Federal Emergency Management Agency

No one likes to think about disaster planning, but that is what city officials in Fayetteville and elsewhere have to consider with every decision. Some communities have found cargo bikes to be important to their emergency management plans, but in the longer term FEMA funds can be used for reestablishing transportation networks into communities harmed by storms, flooding, or other disasters.

EVALUATING THE ECONOMIC IMPACT OF SHARED USE PATHS IN NC

$26.7M invested in four greenways across North Carolina has generated:

- **$19.4M annual sales revenue**
- **$684k annual local sales tax revenue**
- **$25.7M annual savings in healthcare/ safety related expenditures**
- **$48.7M business revenue from construction of greenways**
- **790 jobs**

Return on Investment: Every $1.00 spend on greenway construction generated or saved $1.72 annually for local businesses or government

**Source: NCSU/NCDOT Economic Benefit (2018)*

ADDITIONAL FEDERAL PROGRAMS & GRANTS:

Transportation Alternatives (TA) - NC Department of Transportation (NCDOT) - allocated through the STIP

Surface Transportation Block Program (STBG) - NC Department of Transportation (NCDOT) - allocated through the STIP

Surface Transportation Block Program (STBG) - **Direct Allocation by FHWA** Metropolitan Planning Organizations - through the Locally Administered Projects Program (LAPP)

Congestion Mitigation / Air Quality Program (CMAQ) - Statewide Funds - NC Department of Transportation (NCDOT) - allocated through the STIP

Congestion Mitigation / Air Quality Program (CMAQ) - Direct Allocation by FHWA - Metropolitan Planning Organizations - through the Locally Administered Projects Program (LAPP)

Highway Safety Improvement Program (HSIP) NC Department of Transportation (NCDOT)

Safe Routes to School (SRTS) - Non-Infrastructure Transportation Alternatives Program NC Department of Transportation (NCDOT) - Division of Bicycle and Pedestrian Transportation

Statewide and Non-Metropolitan Planning Funds - NC Department of Transportation (NCDOT) - through State Planning and Research (SPR) Program

Federal Transit Administration Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310) - Statewide Funds - NC Department of Transportation (NCDOT) Division of Public Transportation

Federal Transit Administration Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310) - Direct Allocation by FTA Metropolitan Planning Organizations

BUILD Transportation Discretionary Grant Program - US Department of Transportation

Federal Land and Water Conservation Fund NC - Department of Natural and Cultural Resources - Division of Parks and Recreation

Rivers, Trails, and Conservation Assistance Program - National Parks Service (NPS)

Community Development Block Grant (CDBG) - Direct Allocation by HUD Entitlement Communities

Neighborhood Revitalization Program (CDBG Funds) - NC Department of Commerce - Rural Economic Development Division

Rural Infrastructure Grant Program (CDBG Funds) - NC Department of Commerce - Rural Economic Development Division

Recreational Trails Program (RTP) - NC Department of Natural and Cultural Resources - Division of Parks and Recreation

Recreation Economy for Rural Communities - Environmental Protection Agency (EPA)

Economic Development Administration Public Works and Economic Adjustment Assistance Programs - US Economic Development Administration

STATE & LOCAL FUNDING SOURCES

Capital Improvement Program (CIP)

Currently Fayetteville has a CIP that outlines funded prioritized improvement projects. Future multi-modal transportation projects should be considered when amending the CIP each year.

Powell Bill

This program is paid to municipalities for the purposes of maintaining or constructing local streets that are the responsibility of the municipalities. Funds can be used for planning, construction, and maintenance of bikeways and sidewalks.

NCDOT State Transportation Improvement Program Projects

NCDOT funds projects both incidental to highway construction / widening and independent bicycle/pedestrian projects based on established project selection criteria. Approval of metropolitan or rural planning organizations is required.

Transportation Bonds

Revenue, general obligation, and special assessment bonds are used by various government entities – after a public referendum approving the bond proposal – to construct a variety of transportation improvements.

Fayetteville Area Metropolitan Planning Organization

The MPO for the Fayetteville area works closely with NCDOT and its member counties, municipalities, and Fort Bragg. The MPO has both technical and policy committees that meet regularly to discuss projects, plans, and policies directed from federal guidance and local, regional, and state interests in all modes of transportation. Ideally, the MPO would have a dedicated bicycle and pedestrian planner to serve as a resource person to the MPO and its member agencies, closely monitoring the plan's recommendations and local / state actions to ensure proper coordination takes place.

Governor's Highway Safety Program

The Governor's Highway Safety Program (GHSP) offers grants for safety improvement projects for state highways in North Carolina. Projects must focus on reducing crashes, injuries, and fatalities as conditional requirements for qualifying for a potential grant. Learn more about the GHSP https://connect.ncdot.gov/municipalities/Law-Enforcement/Pages/Law-Enforce-ment-Reporting.aspx.

Annual Budget Allocations (Capital Improvement Program)

The City should set aside a budget each year so it can be prepared to participate in funding opportunities that require local matches through grant or private sector opportunities as they arise. Typically, federal or foundation funds also require a certain percentage of matching funds by a local government. Preparedness would eliminate the chances of losing funding due to time needed for planning and locating funds for a match.

North Carolina Health and Wellness Trust Fund

The NC Health and Wellness Trust Fund was created by the General Assembly as one of three entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period. Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) established the Fit Community designation and grant program to recognize and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. Fit Community is one component of the jointly sponsored Fit Together initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to address this important issue. All North Carolina municipalities and counties are eligible to apply for a Fit Community designation, which will be awarded to those that have excelled in supporting physical activity,

ADDITIONAL STATE PROGRAMS & GRANTS:

Strategic Transportation Investments (STI) State Transportation Improvement Program (STIP) - NC Department of Transportation (NCDOT)

Incidental Projects NC Department of Transportation (NCDOT) - allocated through the STIP

Highway Maintenance Improvement Program (HMIP) - NC Department of Transportation (NCDOT) - Divisions 1-14

Spot Safety Program - NC Department of Transportation (NCDOT)

Highway Hazard Elimination Program - NC Department of Transportation (NCDOT) - allocated through the STIP

Small Construction Funds - NC Department of Transportation (NCDOT) - Divisions 1-14

High Impact / Low Cost Funds - NC Department of Transportation (NCDOT) - Divisions 1-14

Economic Development Funds - NC Department of Transportation (NCDOT) - Divisions 1-14

Statewide Contingency Funds - NC Department of Transportation (NCDOT) - Divisions 1-14

Governor's Highway Safety Program - NC Department of Transportation (NCDOT)

Appalachian Regional Commission Funds - NC Department of Commerce / Appalachian Regional Commission

Main Street Solution Funds - NC Department of Commerce - NC Main Street & Rural Planning Center

NC Parks and Recreation Trust Fund (PARTF) - NC Department of Natural and Cultural Resources - Division of Parks and Recreation

Clean Water Management Trust Fund (CWMTF) - NC Department of Natural and Cultural Resources - Division of Land and Water Stewardship

PRIVATE AND NON-PROFIT PROGRAMS & GRANTS:

Open Grants Program Golden Leaf Foundation

Economic Catalyst Program Golden Leaf Foundation

Doppelt Family Trail Development Fund Rails to Trails Conservancy

Acres for America Program National Fish and Wildlife Foundation Acres for America Program

Community Progress Fund Z. Smith Reynolds Foundation

Community Grantmaking Program North Carolina Community Foundation


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APPENDICES:

APPENDIX A: ONLINE SURVEY RESULTS

APPENDIX B: INTERACTIVE MAP RESPONSES

APPENDIX C: STEERING COMMITTEE MEETINGS

APPENDIX D: PRIORITIZED PROJECT RECOMMENDATIONS


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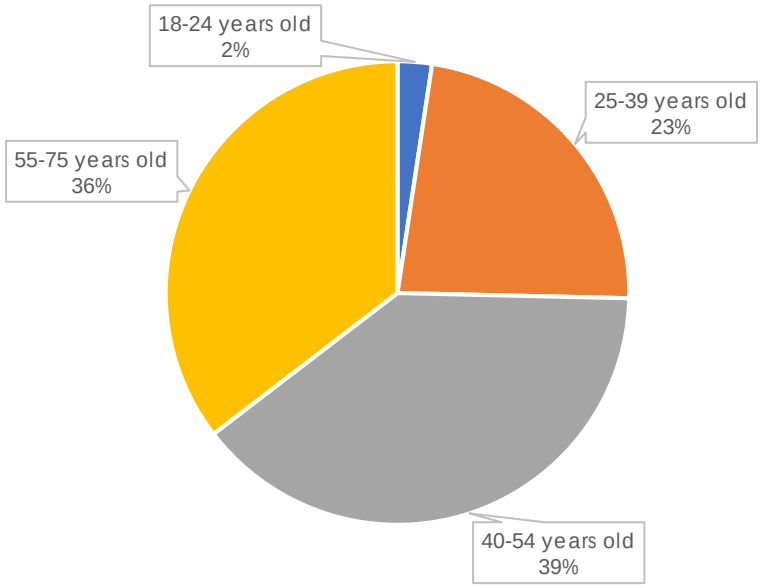
APPENDIX A: ONLINE SURVEY RESULTS

ONLINE SURVEY RESULTS

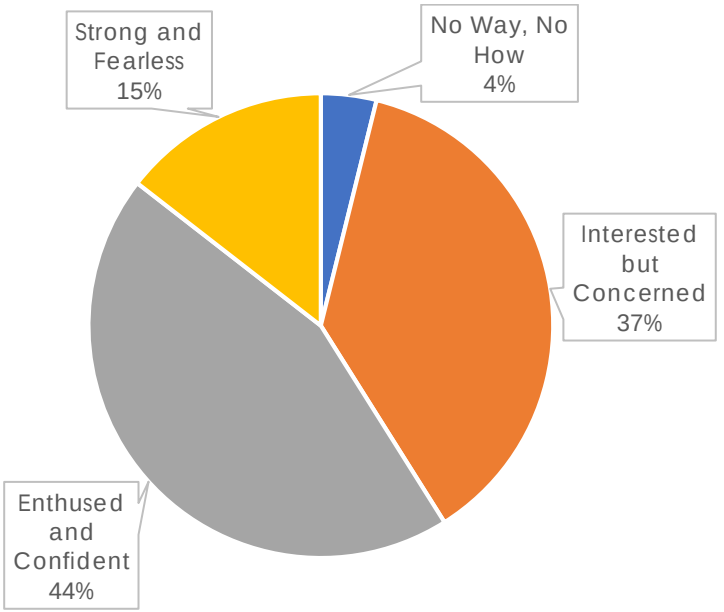
Q2: Which age group are you in?

Which age group are you in?	Responses	% Total
17 and under	-	0.0%
18-24 years old	5	2.4%
25-39 years old	48	23.0%
40-54 years old	82	39.2%
55-75 years old	74	35.4%
75+ years old	-	0.0%
Total	**209**	



Q4: What best describes the sort of cyclist you are?

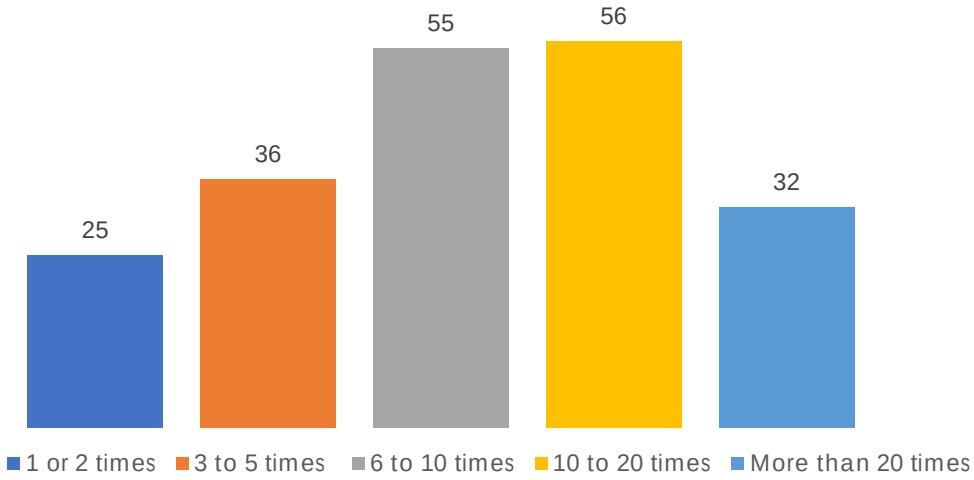
What best describes the sort of cyclist you are?	Responses	% Total
No Way, No How	8	3.9%
Interested but Concerned	77	37.2%
Enthused and Confident	92	44.4%
Strong and Fearless	30	14.5%
No Way, No How	8	3.9%
Total	**207**	



ONLINE SURVEY RESULTS

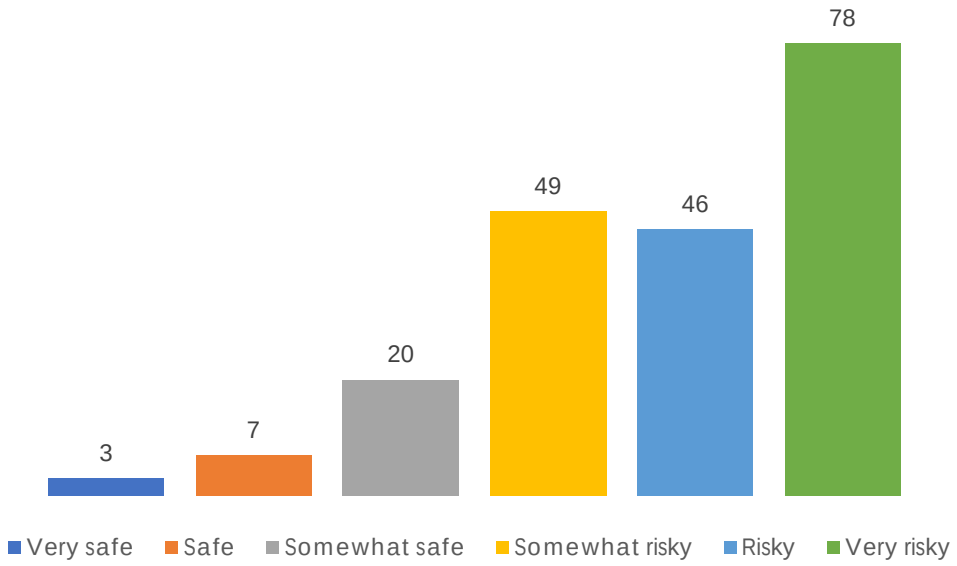
Q5: Over the course of a month with perfect weather, how often would you ride a bike?

Over the course of a month with perfect weather, how often would you ride a bike?	Responses	% Total
1 or 2 times	25	12.3%
3 to 5 times	36	17.6%
6 to 10 times	55	27.0%
10 to 20 times	56	27.5%
More than 20 times	32	15.7%
Total	**204**	



Q6: How safe do feel when riding a bike in Fayetteville?

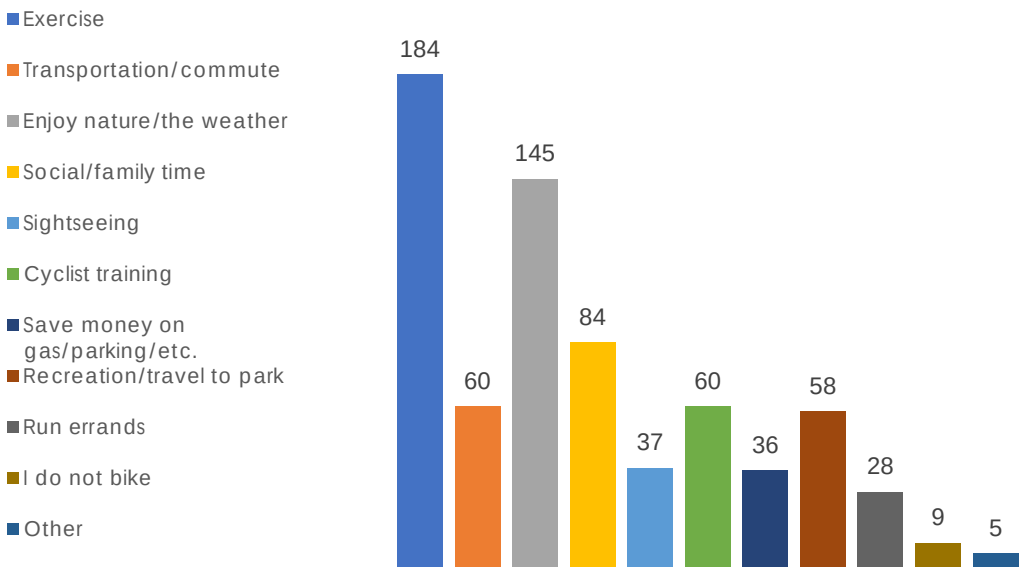
How safe do feel when riding a bike in Fayetteville?	Responses	% Total
Very safe	3	1.5%
Safe	7	3.4%
Somewhat safe	20	9.9%
Somewhat risky	49	24.1%
Risky	46	22.7%
Very risky	78	38.4%
Total	**203**	



ONLINE SURVEY RESULTS

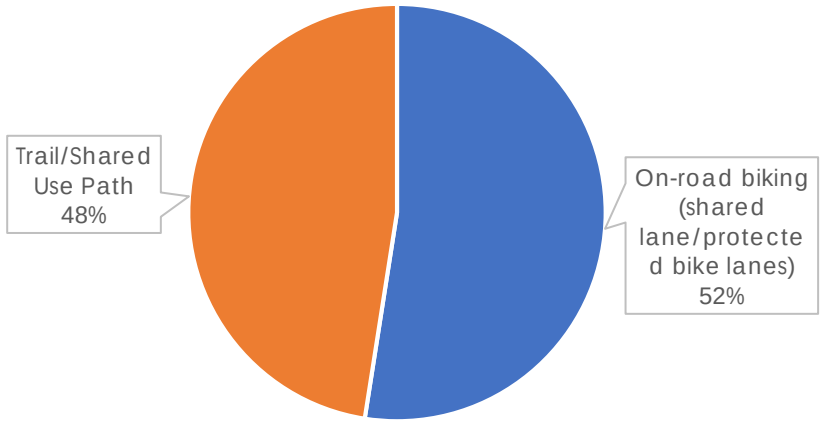
Q7: What best describes the reasons you bike? Select all that apply.

What best describes the reasons you bike? Select all that apply.	Responses	% Total
Exercise	184	26.1%
Transportation/commute	60	8.5%
Enjoy nature/the weather	145	20.5%
Social/family time	84	11.9%
Sightseeing	37	5.2%
Cyclist training	60	8.5%
Save money on gas/parking/etc.	36	5.1%
Recreation/travel to park	58	8.2%
Run errands	28	4.0%
I do not bike	9	1.3%
Other	5	0.7%
Total	**706**	



Q8: Do you prefer riding bikes on:

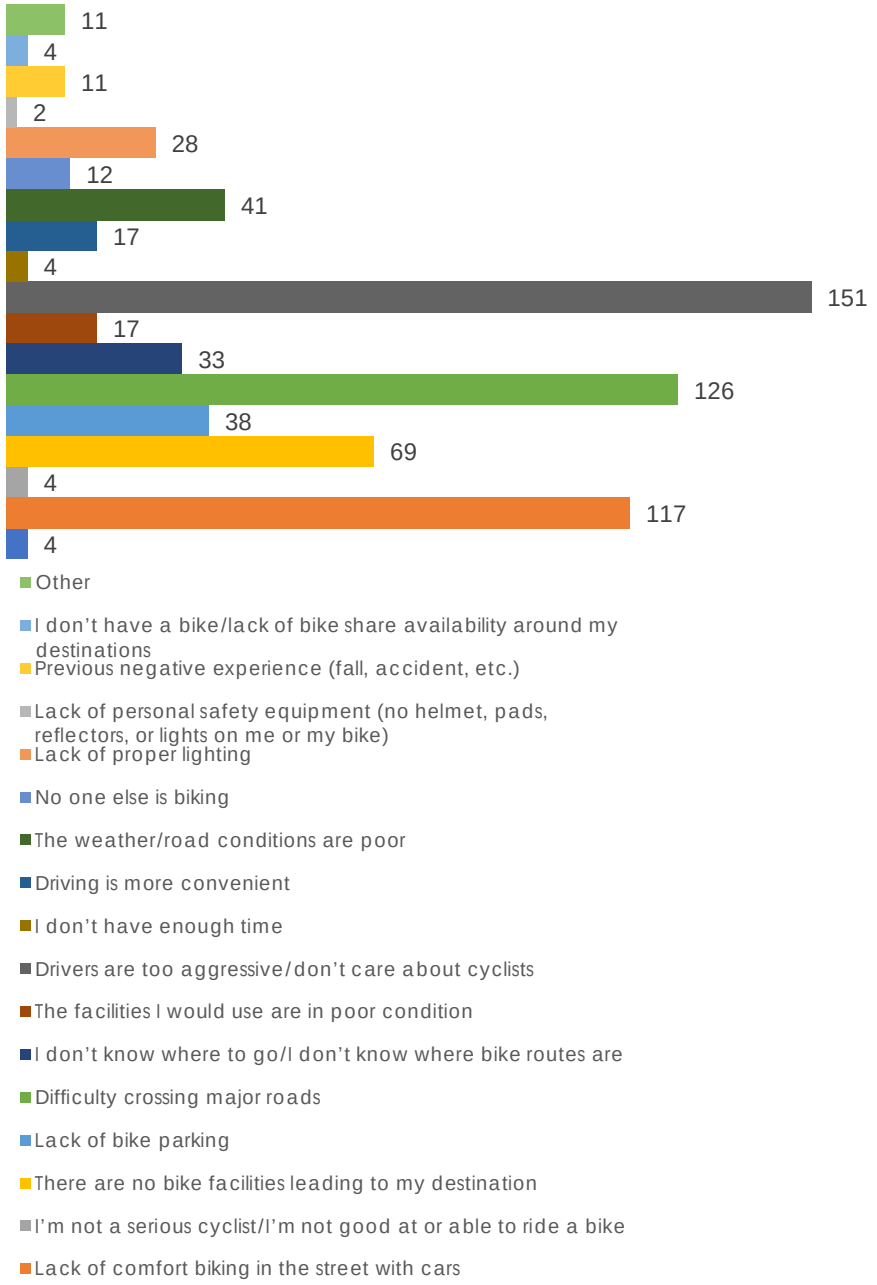
Do you prefer riding bikes on:	Responses	% Total
On-road biking (shared lane/protected bike lanes)	106	52.5%
Trail/Shared Use Path	96	47.5%
Total	**202**	



ONLINE SURVEY RESULTS

Q9: What best describes the reasons you choose not to bike at all or have chosen not to bike when given the option? Select all that apply.

What best describes the reasons you choose not to bike at all or have chosen not to bike when given the option? Select all that apply.	Responses	% Total
Lack of interest/not wanting to bike	4	0.6%
Lack of comfort biking in the street with cars	117	17.0%
I'm not a serious cyclist/I'm not good at or able to ride a bike	4	0.6%
There are no bike facilities leading to my destination	69	10.0%
Lack of bike parking	38	5.5%
Difficulty crossing major roads	126	18.3%
I don't know where to go/I don't know where bike routes are	33	4.8%
The facilities I would use are in poor condition	17	2.5%
Drivers are too aggressive/don't care about cyclists	151	21.9%
I don't have enough time	4	0.6%
Driving is more convenient	17	2.5%
The weather/road conditions are poor	41	6.0%
No one else is biking	12	1.7%
Lack of proper lighting	28	4.1%
Lack of personal safety equipment (no helmet, pads, reflectors, or lights on me or my bike)	2	0.3%
Previous negative experience (fall, accident, etc.)	11	1.6%
I don't have a bike/lack of bike share availability around my destinations	4	0.6%
Other	11	1.6%
Total	**689**	



ONLINE SURVEY RESULTS

Q10: Please rank the following destinations that you feel are most important to be able to reach by bike. List from most (1) to least important (11).

1. Downtown Fayetteville
2. Neighborhood and Community parks and recreational facilities
3. Existing Trails and Greenways
4. County/Regional or State Parks
5. Universities or College Campuses
6. K-12 Schools
7. Grocery Stores
8. Major Employers
9. Farmers Market
10. Shopping Area
11. Bus and Train Stations

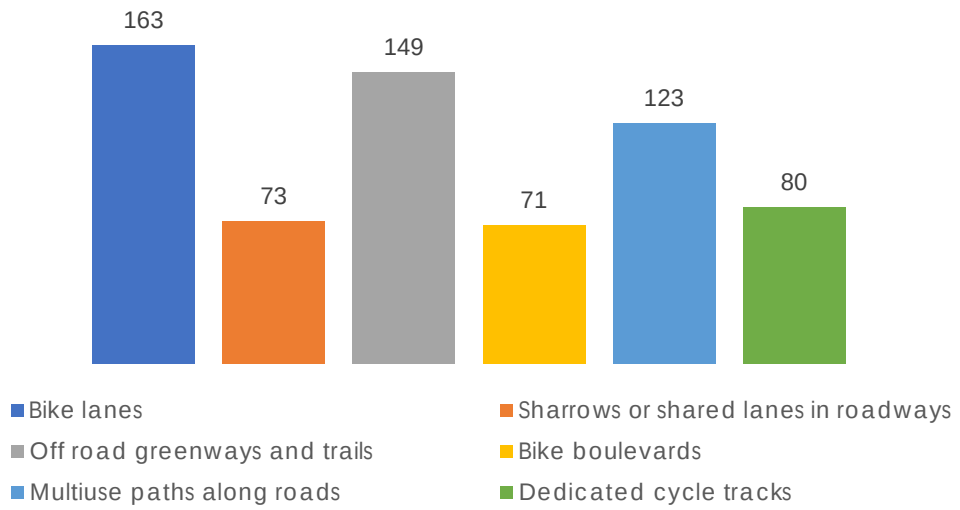
Respondent Ranking Counts for Each Destination:

Destinations	Ranking										
	1	2	3	4	5	6	7	8	9	10	11
Universities or College Campuses	28	18	5	14	19	19	10	17	9	15	20
Downtown Fayetteville	45	23	22	24	21	12	10	10	7	8	6
K-12 Schools	19	12	15	19	9	22	14	10	10	20	23
Neighborhood and Community parks and recreational facilities	16	41	42	20	11	13	8	8	11	7	4
County/Regional or State Parks	5	17	33	21	27	14	15	12	13	10	9
Existing Trails and Greenways	38	29	17	23	15	22	13	6	12	8	4
Farmers Market	5	2	6	14	24	13	35	24	22	14	12
Grocery Stores	9	14	12	14	13	22	15	24	21	16	11
Shopping Area	3	10	9	9	11	12	21	16	41	20	16
Major Employers	14	8	15	9	17	13	12	23	9	35	19
Bus and Train Stations	6	10	4	11	10	13	16	22	16	19	43

ONLINE SURVEY RESULTS

Q11: What type of bike facilities do you want to see more of in Fayetteville?

What type of bike facilities do you want to see more of in Fayetteville?	Responses	% Total
Bike lanes	163	24.7%
Sharrows or shared lanes in roadways	73	11.1%
Off road greenways and trails	149	22.6%
Bike boulevards	71	10.8%
Multiuse paths along roads	123	18.7%
Dedicated cycle tracks	80	12.1%
Total	**659**	



Q13: If you have any additional comments on biking in Fayetteville, or why biking is important to you, please share them below:

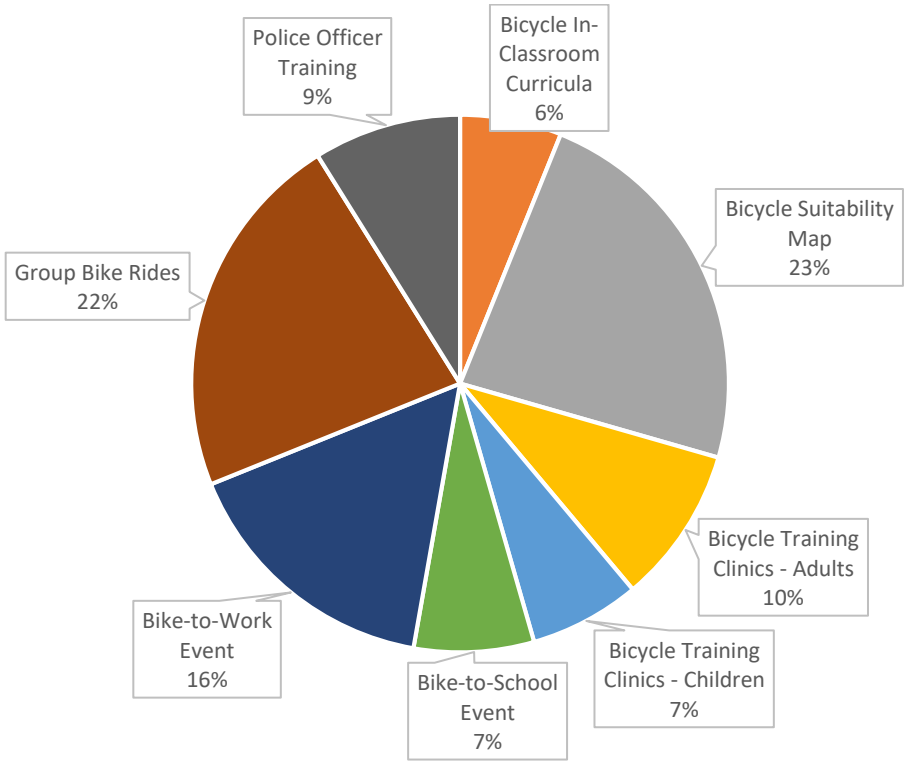
(87 responses received; common themes described below)

Common Themes	Number of Responses
More bicycle infrastructure (i.e., bike lanes, separated bike paths, rail trails, connectors, and greenways) is needed.	27
Biking in Fayetteville is dangerous.	12
More education and increased awareness of cycling laws is needed for cyclists and drivers.	11
Existing traffic laws need to be enforced for motorists and cyclists. Specific examples noted for motorists include penalties for motorists who harass cyclists, penalties for distracted drivers, cars parked in bike lanes. Traffic laws noted as not being followed by cyclists included stopping at red lights, riding on the correct side of the road, and wearing proper safety gear (helmets, vests, bright colors).	10
Drivers are too aggressive for biking to be safe.	8
Existing bicycle infrastructure needs to be upgraded or repaired.	8
Cyclists report being hit or attacked by motorists.	5
More off-road mountain biking trails are needed.	4
More bike parking, safe storage is needed.	2

Second Survey Results

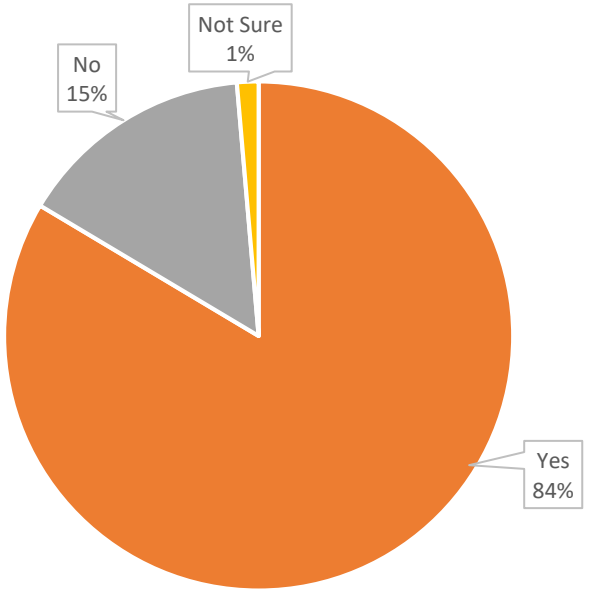
Q2: Which of the following Bicycle Programs would encourage you or your family members to participate? (check all that apply)

	Responses	% Total
Bicycle In-Classroom Curricula	11	6.11%
Bicycle Suitability Map	42	23.33%
Bicycle Training Clinics - Adults	17	9.44%
Bicycle Training Clinics - Children	12	6.67%
Bike-to-School Event	13	7.22%
Bike-to-Work Event	29	16.11%
Group Bike Rides	40	22.22%
Police Officer Training	16	8.89%
Total	**180**	



Q3: Do you support City funds to be spent for Bicycle Infrastructure, like bicycle lanes and greenways?

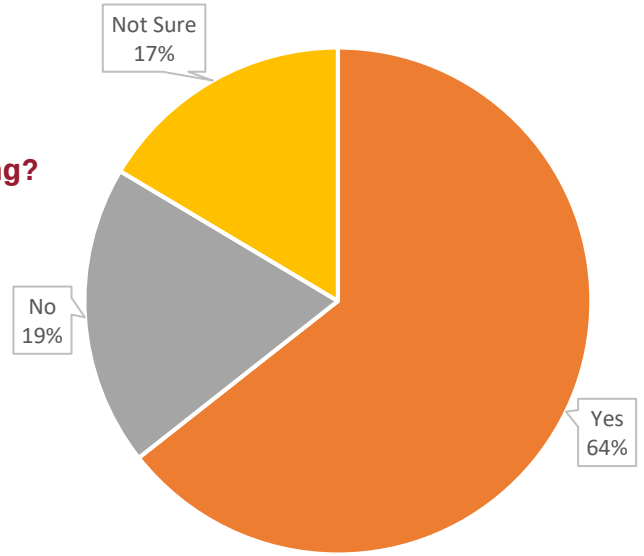
	Responses	% Total
Yes	61	83.56%
No	11	15.07%
Not Sure	1	1.37%
Total	**73**	



ONLINE SURVEY RESULTS

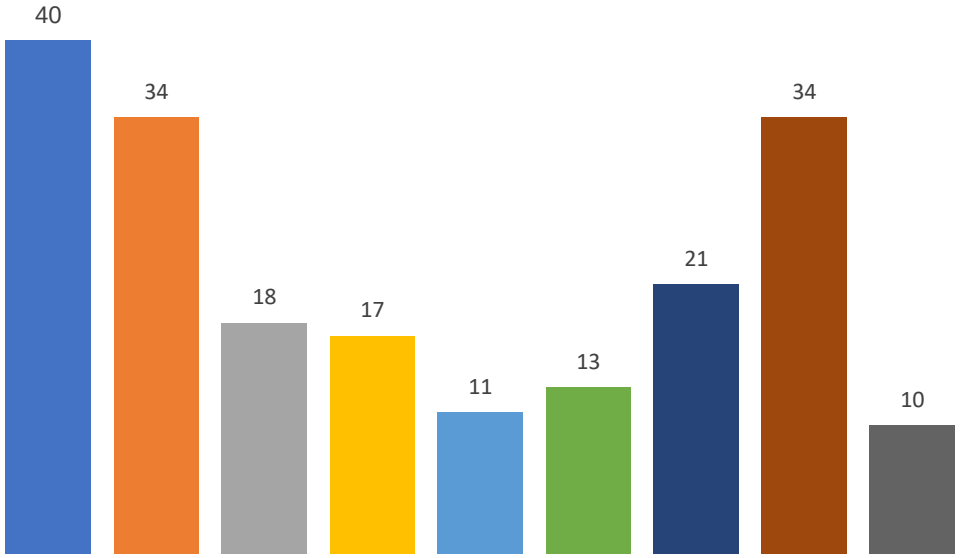
Q4: Do you support City funds to be spent for Bicycle Programs (non-infrastructure) to educate or encourage more and safer bicycling?

	Responses	% Total
Yes	47	64.38%
No	14	19.18%
Not Sure	12	16.44%
Total	**73**	



Q5: Acknowledging that City funds are limited, in your opinion, which of the following items should the City focus its resources to improve bicycling conditions in Fayetteville? (Check your top three)

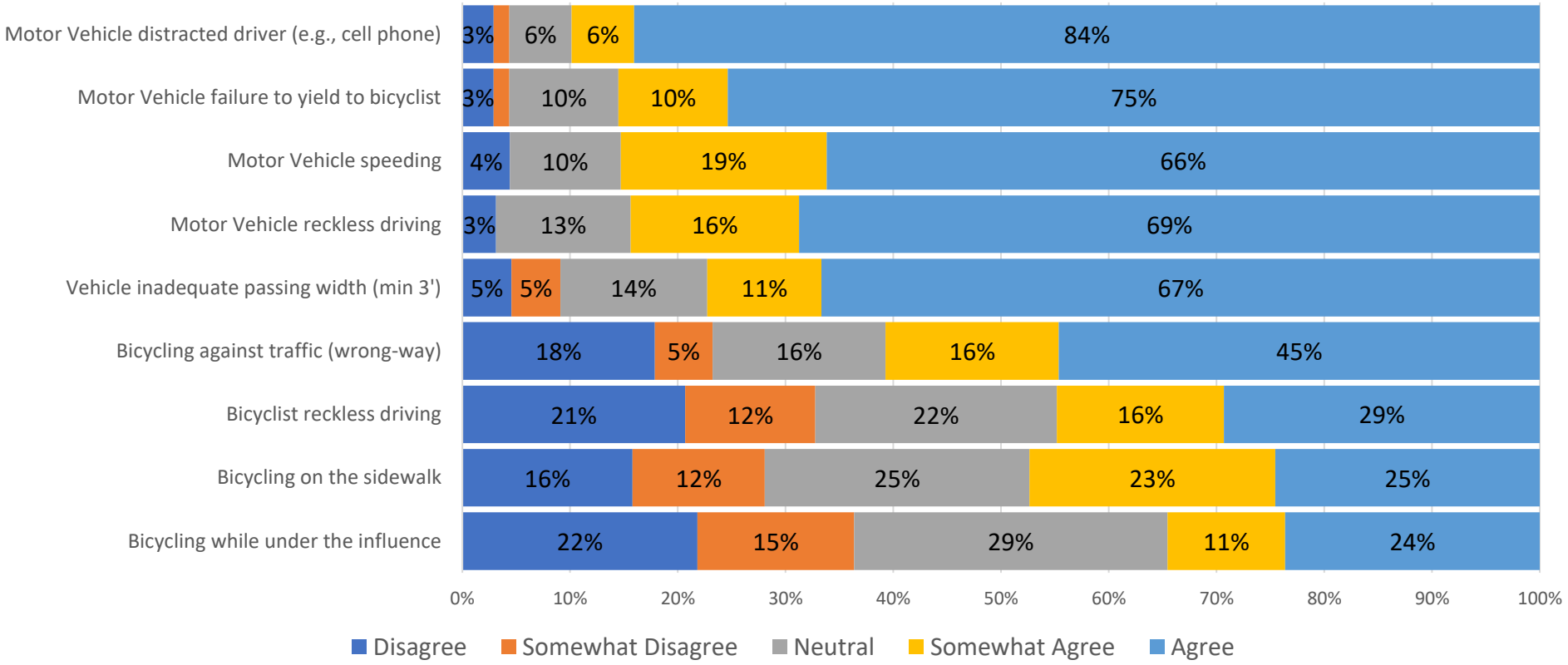
	Responses	% Total
Bicycle lanes (bikes to the side of the roadway)	40	20.20%
Greenway trails along stream corridors (and short connections to those trails)	34	17.17%
Intersection improvements to help bicyclists cross roadways	18	9.09%
Programs to educate and raise awareness of bicyclists and car drivers	17	8.59%
Programs to encourage more bicycling	11	5.56%
Programs to improve safety	13	6.57%
Safer intersection crossings for bicyclists	21	10.61%
Separated bicycle facilities (bikes beyond the curb, separate from cars)	34	17.17%
Shared street bicycle facilities (bike and cars in the same lane)	10	5.05%
Total	**198**	



ONLINE SURVEY RESULTS

Q6: Please indicate your level of agreement for whether each of the following are significant safety concerns for bicyclists in the City of Fayetteville:

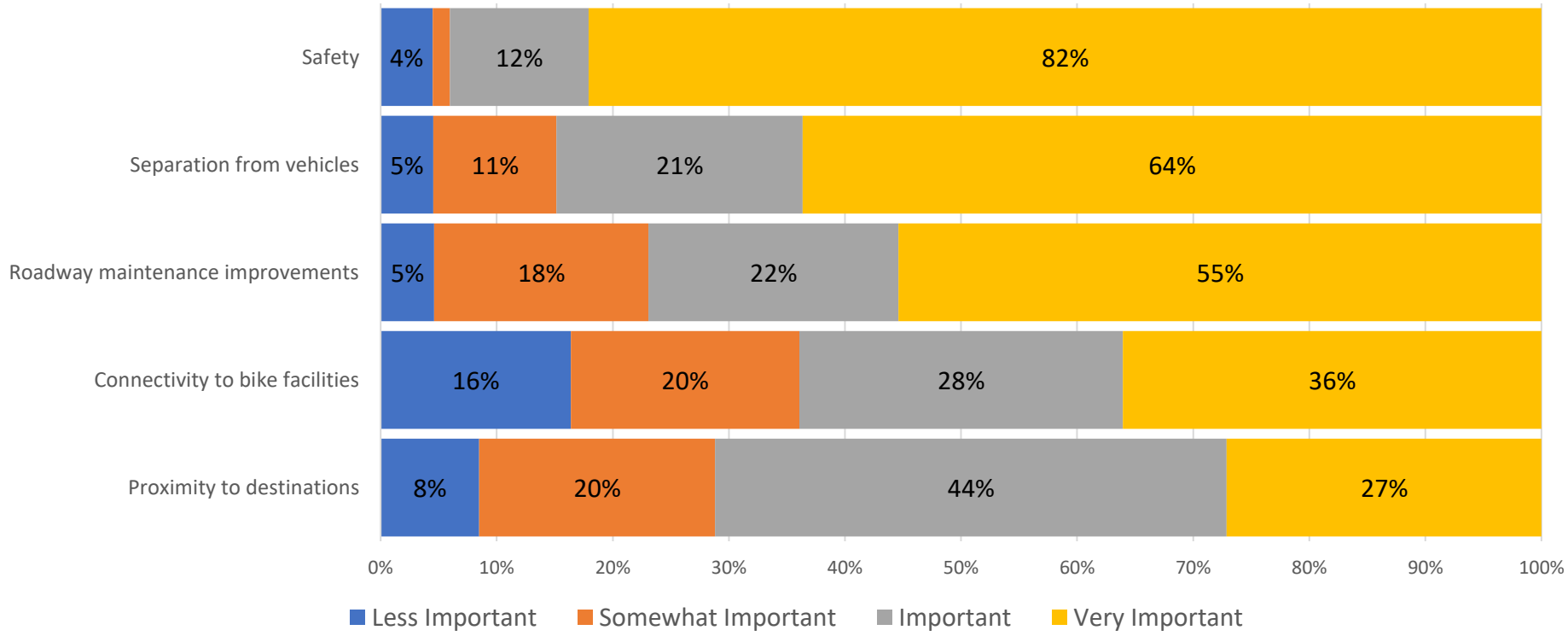
Safety Concerns	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree
Motor Vehicle distracted driver (cell phone)	2	1	4	4	58
Motor Vehicle failure to yield to bicyclist	2	1	7	7	52
Motor Vehicle speeding	3	0	7	13	45
Motor Vehicle reckless driving	2	0	8	10	44
Vehicle inadequate passing width (min 3')	3	3	9	7	44
Bicycling against traffic (wrong-way)	10	3	9	9	25
Bicyclist reckless driving	12	7	13	9	17
Bicycling on the sidewalk	9	7	14	13	14
Bicycling while under the influence	12	8	16	6	13



ONLINE SURVEY RESULTS

Q7: This process has identified five criteria to prioritize future bike improvements. How important are these criteria to you?:

Prioritizing Future Bike Improvements	Less Important	Somewhat Important	Important	Very Important
Safety	3	1	8	55
Separation from vehicles	3	7	14	42
Roadway maintenance improvements	3	12	14	36
Connectivity to bike facilities	10	12	17	22
Proximity to destinations	5	12	26	16

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APPENDIX B: INTERACTIVE MAP RESPONSES

B1: BARRIERS TO BIKING

Location	Comment
Person Street	Bikers are so afraid of biking downtown that they bike on the sidewalks. This scares the pedestrians. Need a way to separate peds from pedals!
Martin Luther King Jr. Freeway at Hay Street	None
Chicken Road	There should be an agreement with Fort Bragg to go from neighborhood to the Chicken Road. Chicken Road has a nice wide area on edge of road to bicycle into work on Fort Bragg.
Little Cross Creek at Mazarick Memorial Park	None
Raeford Road near Devane Street	Too much traffic
Morganton Road at Bryce Creek Lane	None
Morganton Road at Bryce Creek Lane	Where the sidewalk ends
Morganton Road at Farmbrook Road	Where the other sidewalk ends
Bill Hefner Elementary School	City owned Bill Hefner Elementary School mountain bike trail
Bill Hefner Elementary School	None
Bill Hefner Elementary School	Existing city mountain bike trail, not maintained lots of e legal dumping and trail block with falling trees, needs a barrier to stop vehicles from entering and dumping trash. This is a nice trail for walking and mountain biking, just needs to be maintained
Raeford Road near Bones Creek	None
Clinton Road	None
Rail corridor north of Sandy Creek	None
Clinton Road	None
Judson Church Road	Judson Church Road

B2: BIKE CRASHES

Location	Description
Intersection of **Raeford Road** and Dobbin Avenue	Speeders!
Intersection of Dobbin Avenue and Morganton Road	Lights make it hard to cross safely
Cliffdale Road at the All American Freeway Interchange	Scary cloverleaf from All American
Martin Luther King Jr Freeway near Robeson Street	Sidewalk is right next to cars going 45 to 50 miles an hour
Intersection of **Raeford Road** and Ireland Drive	This intersection is very dangerous for cyclists
Raeford Road at the All American Freeway Interchange	Very dangerous here
Intersection of **Raeford Road** and Ferncreek Drive	Very dangerous here

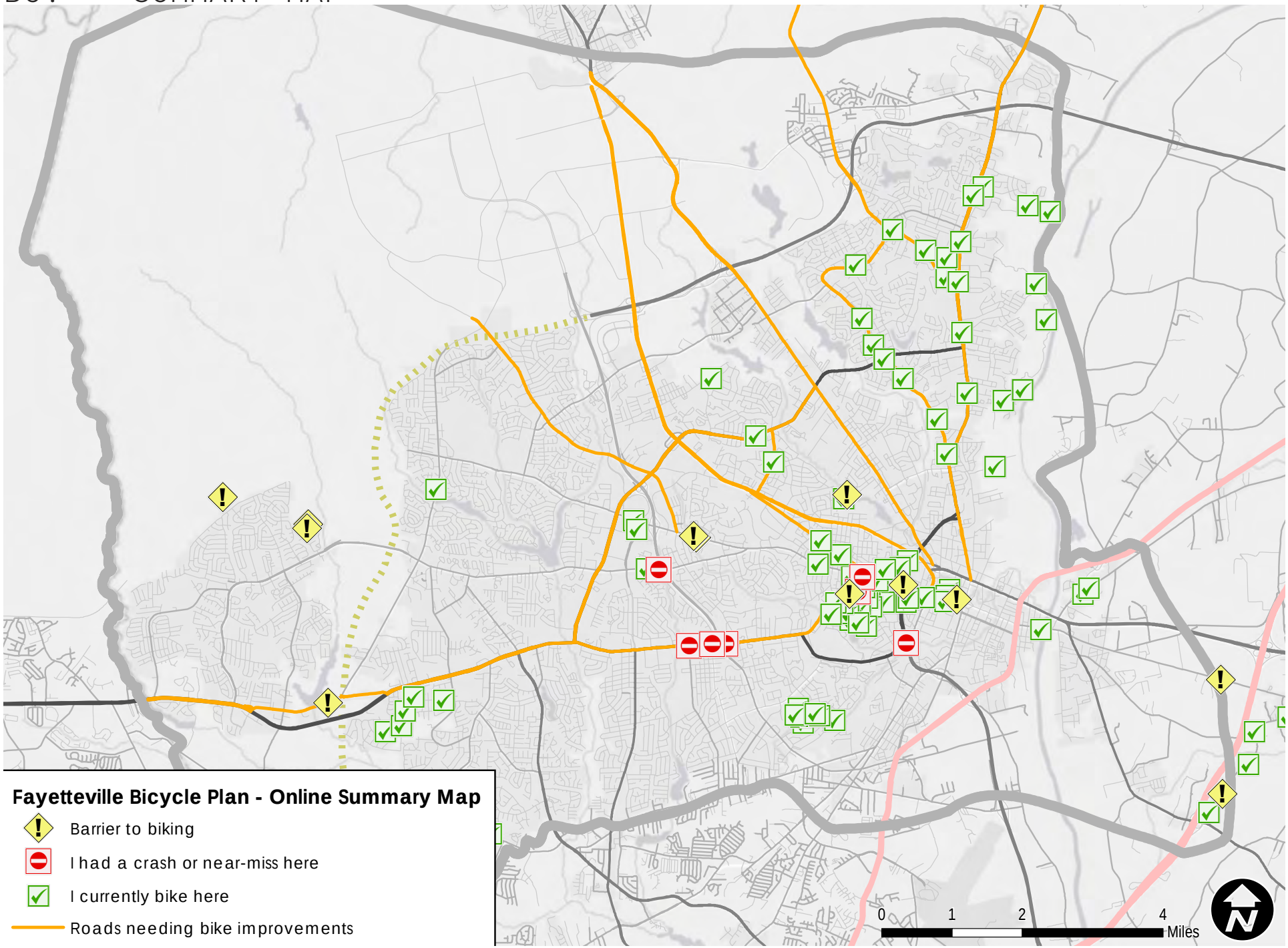
B3: ROADS NEEDING IMPROVEMENTS

Most Common Roads Identified as Needing Improvements
Cain Road
Fort Bragg Road
McArthur Road
McPherson Church Road
NC 210 / Murchison Road
NC 24 / Bragg Boulevard
Raeford Road
Rosehill Road
US 401 / Ramsey Street
US Route 401 / Pamalee Drive
US Route 401 / Skibo Road
Yadkin Road

B4: DESTINATIONS

Destination Category	Number of Responses
Shopping and Restaurants	19
Green Space and Recreation	14
Residential Neighborhoods	8
Grocery Store	8
Schools and Colleges	7
Other	6
Downtown	4
Post Office	2
Library	2
Museum	2
Church	1
Hotel	1
Medical Facility	1
Military Facility	1
Total	**76**

B5: SUMMARY MAP



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APPENDIX C: STEERING COMMITTEE MEETINGS

C1: MEETING #1 PRESENTATION
C2: MEETING #2 PRESENTATION
C3: MEETING #3 MATERIALS
C3.A: MEETING #3 PRESENTATION
C3.B: PRELIMINARY MAP MARK-UP
C3.C: MEETING SUMMARY NOTES

C1: MEETING #1 PRESENTATION

bike Fayetteville

www.bikingfayetteville.com

BIKE PLAN

1

This Plan is being completed in corporation with the
City of Fayetteville &
NCDOT Bicycle and Pedestrian Division
2017 grant award to the City to develop the Bike Plan.

THANK YOU!

2

WHO?

STANTEC CONSULTING
MICHELLE PEELE
SCOTT LANE
RYAN MARTINSON

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
JOHN VINE-HODGE

CITY OF FAYETTEVILLE
JOHN MCNEILL
LEE JERNIGAN

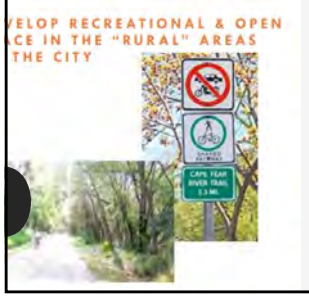
YOU!

3

Purpose

- Establish polices and standards that improve safety and mobility for bicyclists
- List of prioritized projects to implement over the next 20 years.

4



Recent Work

- 2045 Metropolitan Transportation Plan
- Sandhills Regional Bike Plan
- Cape Fear River Plan
- Medical Village Plan
- Bragg Blvd Corridor Plan
- Raeford Rd Plan
- NC Statewide Ped & Bike Plan
- FAMPO Bike Element LRTP

5

Benefits of Biking

- Improves mental health
- Improves physical health
  - Weight loss
  - More muscle
  - Decrease heart disease
  - Better lung health (people who ride a bike are actually exposed to fewer dangerous fumes than those who travel by car)
- Saves time
- Improve navigational skills
- Improve spatial awareness
- Improve air quality

6

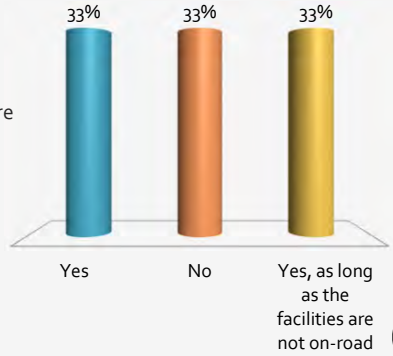
What is in the Plan?

- What questions will the Bike Plan answer?
  - How complete is the current system?
  - Where do cyclists want to go?
  - What are the recommended improvements ?
    - On-road facilities
      - Protected bike lanes
      - Buffered bike lanes
      - Shared Lanes/Sharrows
      - Bike boulevards
    - Multi-Use Paths, Greenways (new and improvements)
    - Redesign of Areas
    - Signs/Markings
  - How do you prioritize the limited number of dollars available?
  - What are the recommended changes to current codes, ordinances, standards, and policies?
  - Have we planned for this? Consolidate Other Plans (Bike Ped/Area Plans/Transportation Plans/Parks/Greenway Plans)

7

Should the City considered funding bicycle facilities in the future?

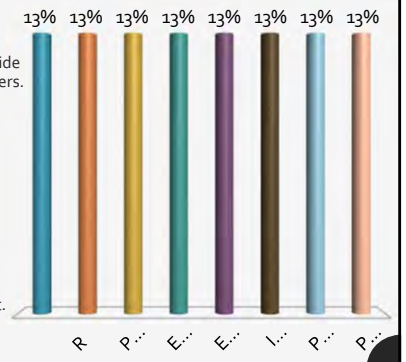
A. Yes
B. No
C. Yes, as long as the facilities are not on-road



8

Which do you think is the best reason to complete a bike plan? Pick 3

A. Provide a designated areas for cyclists to ride to increase awareness and safety for all users.
B. Reduce Fayetteville's carbon footprint.
C. Provide alternative to transportation.
D. Enhance connectivity.
E. Enhance health.
F. Increase liviability (support healthy, safe bikable neighborhoods)
G. Promote equity.
H. Positive impact on economic development.



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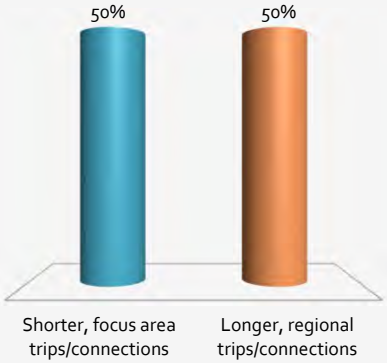
Should bicycle facilities focus on….

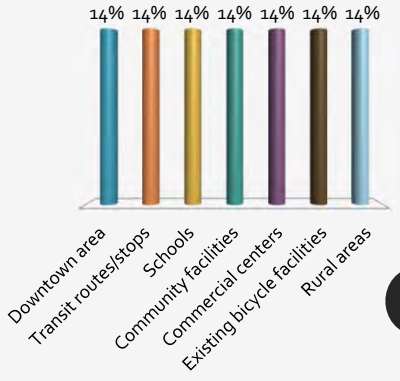
A. Shorter, focus area trips/connections
B. Longer, regional trips/connections



10

Rank by importance (1-6) areas that should be considered for improved bicycle connections.

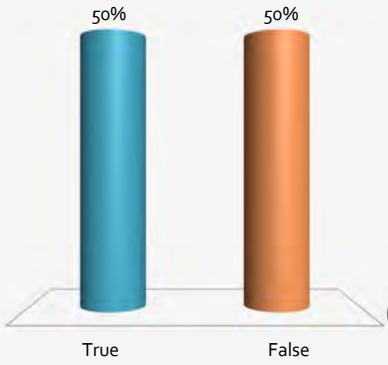
A. Downtown area
B. Transit routes/stops
C. Schools
D. Community facilities
E. Commercial centers
F. Existing bicycle facilities
G. Rural areas



11

Cost should not be a factor when planning for bicycle facilities.

A. True
B. False



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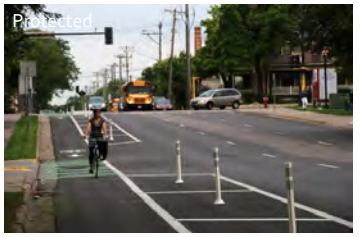
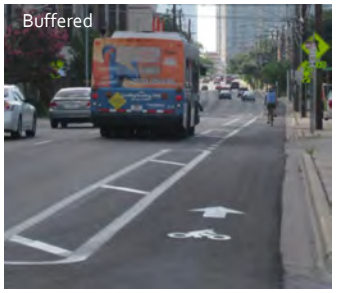
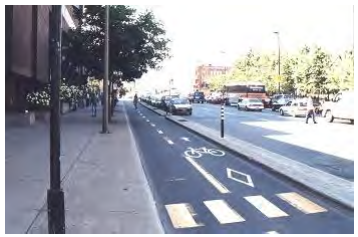




Bike Lane

- Dedicates space exclusively for bikes
- Buffered / Protected / Conventional
- All levels of users
- Reduces:
  - "dooring"
  - conflicts with vehicles
- Low cost when retrofitting existing facilities
- Ames St, Glenwood Dr, Woodland Dr, Woodside Ave

14



Cycle Track

- Separated path – space exclusively for bikes
- One-way or two-way
- All levels of users
- Reduces:
  - "dooring"
  - conflicts with vehicles
- Low cost when retrofitting existing facilities

15

Shared Use Path

- All types of users and levels
  - Pedestrians, cyclists, scooters, skaters

Bike Boulevard

- Streets with low traffic volumes and speeds
- Bikes get priority
- Low costs – signs/markings
- Maintain "quiet" street

16

Signs/Markings

Shared Lane (Sharrows)

- Encourages cyclists to one lane
- Alerts motorists to thee potential of cyclists
- Advertises a proper path for bikes
- Wayfinding elements

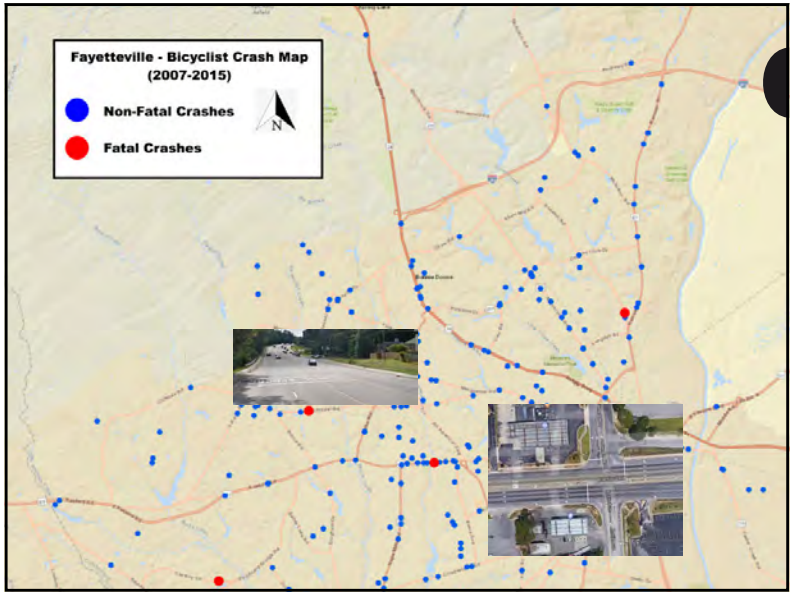
Colored Bike Facilities

- Increases visibility
- Identifies areas of conflict
- Priority for cyclist/prevents illegal parking

17

WHAT'S HAPPENING?

18



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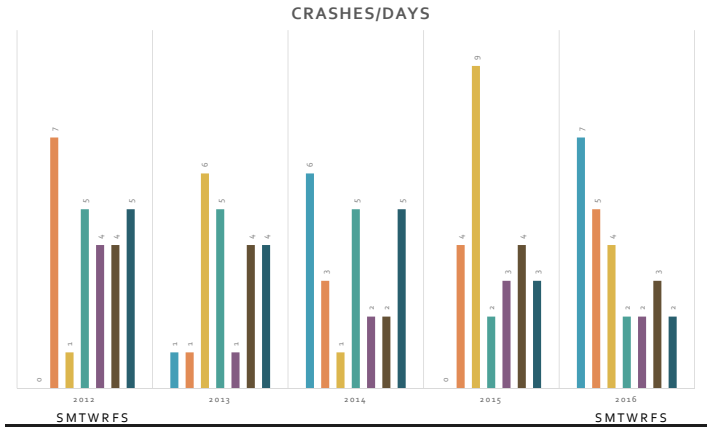

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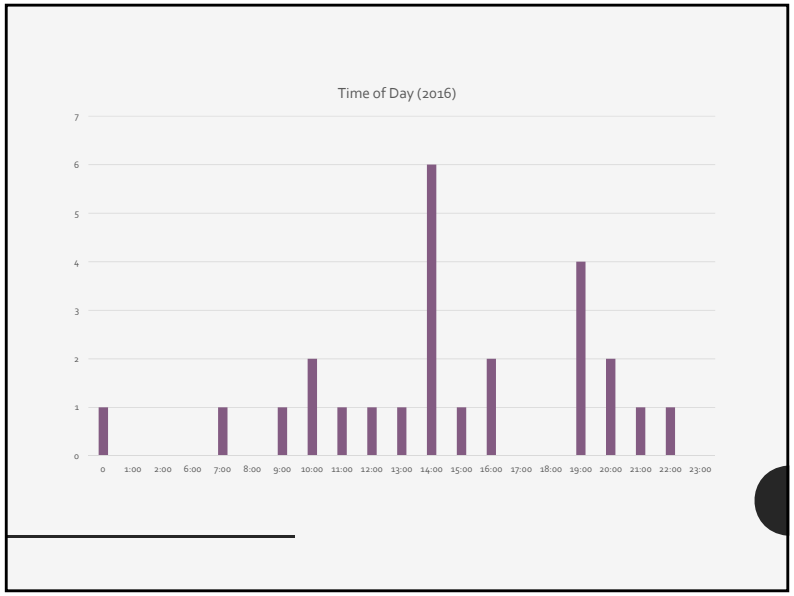

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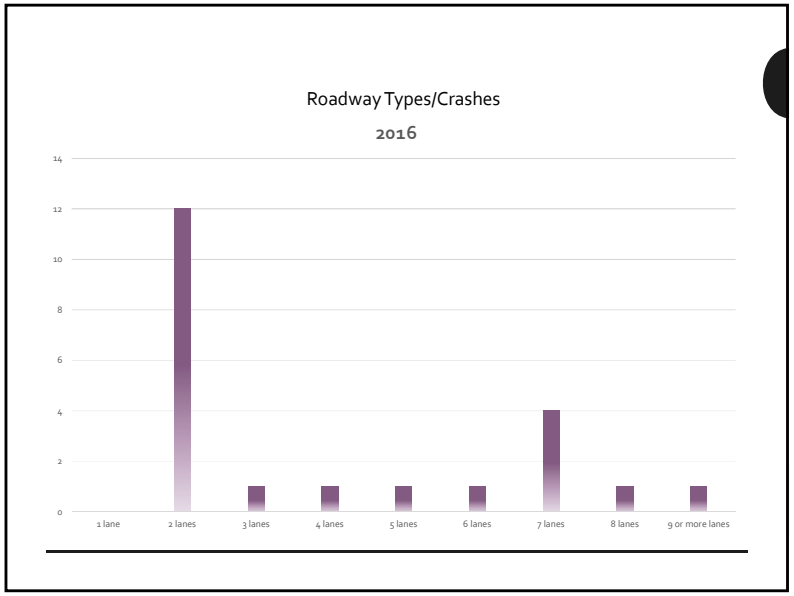

22

23

Organized Rides

- Cross Creek Cycling Club (every Saturday 9:00am & Wednesday 6:00pm). Normal Route – 42 miles.
- Ride of Silence (5/15/2019) Quiet slow ride to honor those injured or killed while cycling on public roadways.
- 2019 Ride Robeson 20 Miler & Metric (62 miles) Century (3/3/2019) -**Family Fun 5K by the Bicycle Shop in Fayetteville**. 3:30 PM- Free family cycling event for all ages.

24

EXISTING & PLANNED TRAILS (MTP)

25

Small Area Studies (10)

What do you see?
What areas?
What roads?

Focus Areas?
Downtown?
Schools?
Rural Areas?
Trails?

26

Next Steps

Public Meeting - March 22, 2019 – Fourth Friday

Existing Conditions Report
Demographic Analysis
Bicycle Suitability Map – Opportunities & Constraints

Steering Committee No. 2 – April 1, 2019 1:00pm
Focus Group
City Council Briefing

www.bikingfayetteville.com

27

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C2: MEETING #2 PRESENTATION

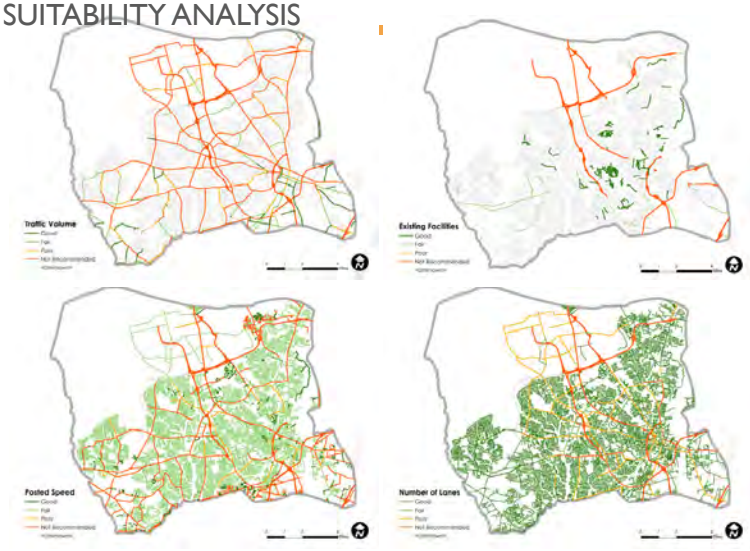
bike Fayetteville

WWW.BIKINGFAYETTEVILLE.COM

BIKE PLAN

1

SUITABILITY ANALYSIS



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SUITABILITY ANALYSIS - RESTULTS

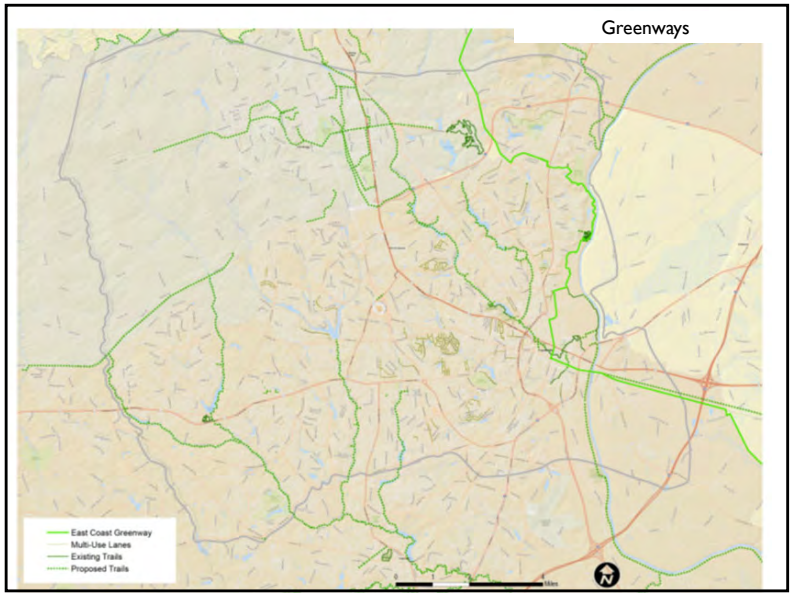
3

SMALL AREA STUDIES

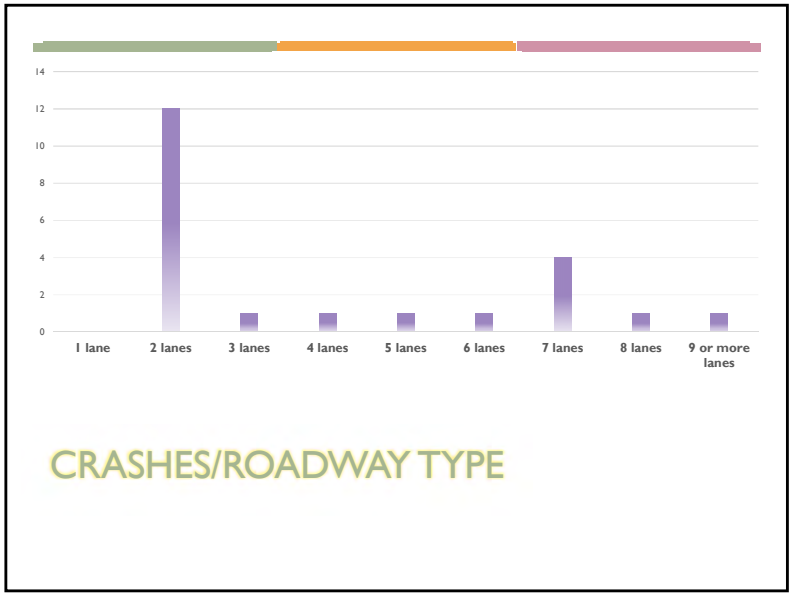
TEN (10)

SKIBO ROAD

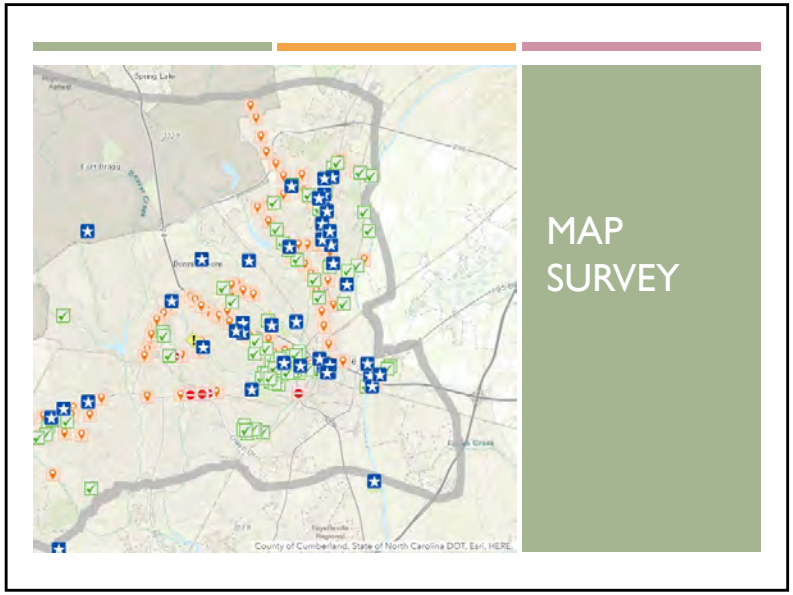
4


Greenways
East Coast Greenway
Multi-Use Lanes
Existing Trails
Proposed Trails

5


14
12
10
8
6
4
2
0
1 lane
2 lanes
3 lanes
4 lanes
5 lanes
6 lanes
7 lanes
8 lanes
9 or more lanes
CRASHES/ROADWAY TYPE

6

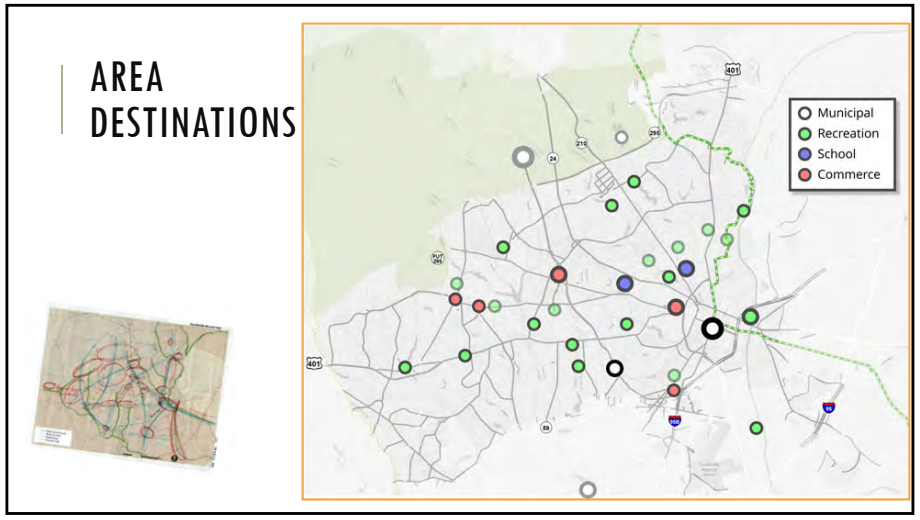

MAP
SURVEY

7

C3.A: MEETING #3 PRESENTATION

1

2



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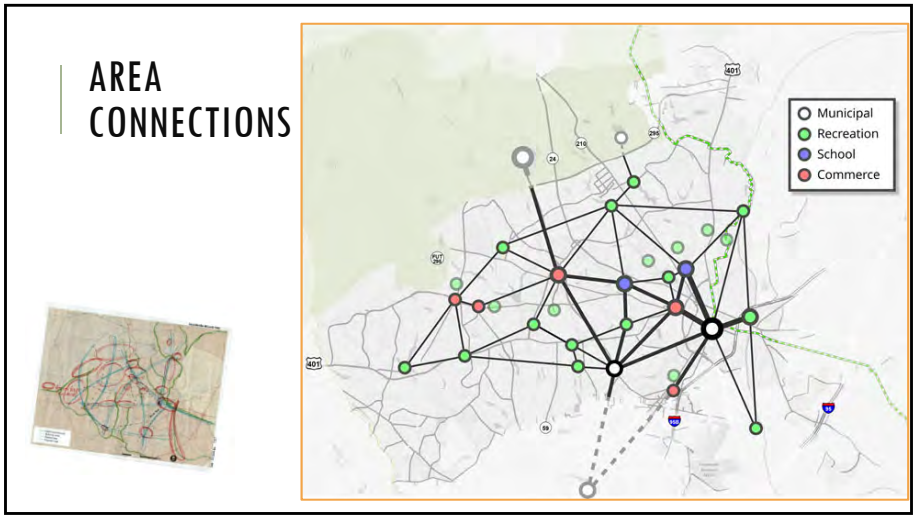

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FAYETTEVILLE AND SANDHILLS BICYCLE PLANS

This Plan		Sandhills
Citywide	SCALE	Region
Finer – Neighborhood	DETAIL	Coarser – Major Destinations
Yes	PROGRAMS	Yes
Transportation	PURPOSE	Recreation
Yes	POLICIES	Yes
Yes	FUNDING	No (Implementation Section: Yes)

5

PROJECT RECOMMENDATIONS

modification suggestions (Sandhills Plan)

- Linework Rectification
- Modification (Type, Alignment)

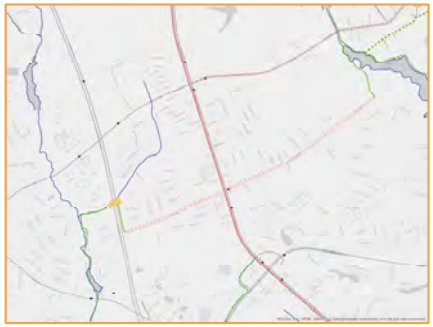
Sidepath Recommendation along Skibo Road (mall vicinity)

6

PROJECT RECOMMENDATIONS

new

- "Trunk" Lines
- Shorter Connectors
- Intersection and Other Spot Redesign



Alternative East-West Connection (part)

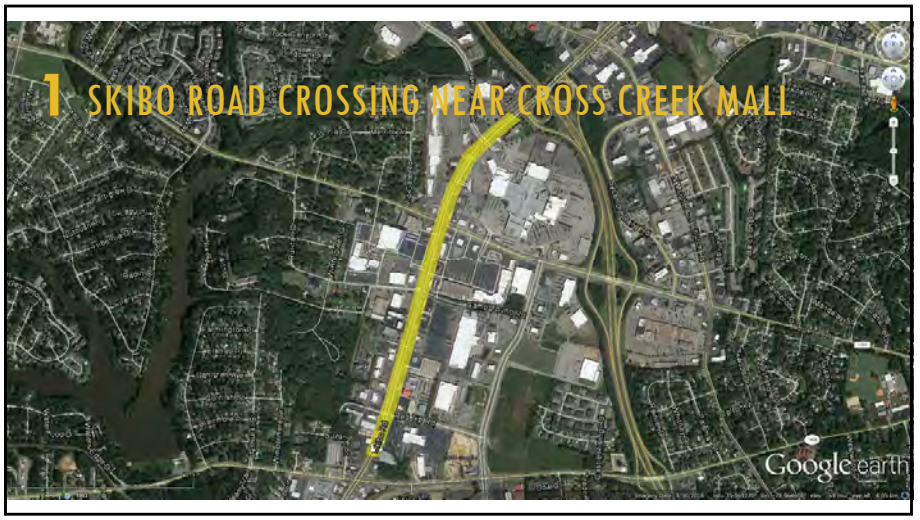
7

RECOMMENDATIONS

hot spots

8

9

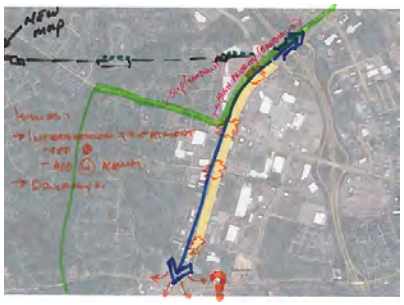


10

SKIBO ROAD CROSSING NEAR CROSS CREEK MALL

Multi-use path on the west side of Skibo Road, connecting commercial areas and crossing major arterials. At the north extent of this project there is an existing railway bridge that could be repurposed for active transportation users.

Key considerations: Treatments at intersections and driveways need to highlight to motor vehicle drivers that people walking and biking are in the area. Pedestrian and bicycle signals are recommended at all intersections in this commercial corridor.



Existing condition on Skibo Road

Possible treatment on Skibo Road

Conceptual cross section of Skibo Road

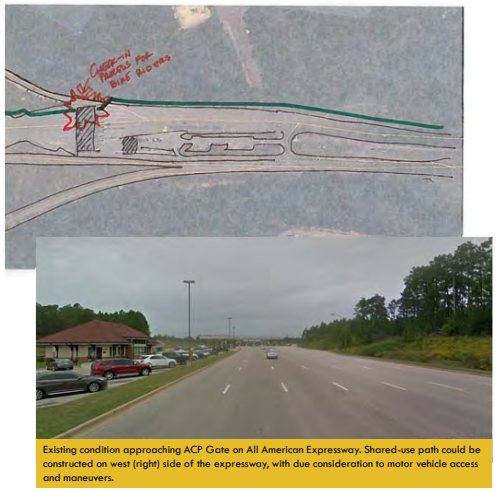
11

12

FORT BRAGG ACP

There is a portion of the people that travel to and from Fort Bragg that would like to do so by bicycle. There are a number of access control gates which are primarily designed for vehicle access. Separated bicycle facilities to and from the area would be recommended. As well, accommodation at the gate for persons arriving by bicycle may be considered at the nearest booth.

Special consideration for motor vehicle ramps and interactions between bicycle riders and motor vehicle drivers is required. With many activities in the area, it is imperative that vulnerable road users are visible and kept clear of moving vehicles as much as possible.



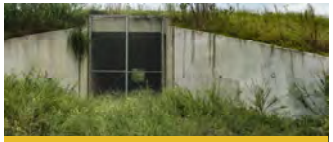
Existing condition approaching ACP Gate on All American Expressway. Shared-use path could be constructed on west (right) side of the expressway, with due consideration to motor vehicle access and maneuvers.

13

14

I-295 TUNNEL

There is an existing tunnel structure under I-295 that can be enhanced to provide a safe, direct, and comfortable connection between the communities and schools to the north of the highway to the communities to the south. Lighting and design aspects that increase socialization of the area is critical in making this place a safe and welcoming connection.



Existing condition of tunnel under I-295

Artist rendering of possible future condition of tunnel under I-295, with consideration for lighting, socialization, and pride of space

15

16

DOWNTOWN

The downtown area is a key gathering point for many residents and visitors to Fayetteville. Providing access within the downtown area for people riding bicycles has a variety of benefits, including reducing the need for expensive infrastructure for vehicle access and storage, increasing the health and equity of the city, and providing a new way for people to explore the many historic sites in the area.

Some routes were identified in the Sandhills report for bicycle accommodation. To complete the network further, four other routes could be considered for bicycle infrastructure.

Considerations:

- Suitability of the facilities for use by all ages and abilities of bicycle riders
- Constraints within the existing rights-of-way and current uses by adjacent land uses
- Intersection treatments to give appropriate level of comfort and safety to bicycle users

17

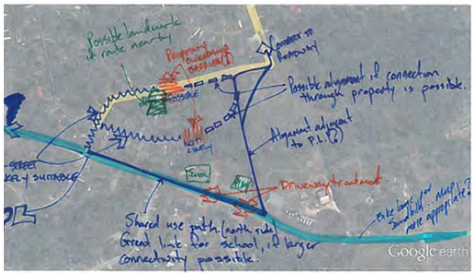
18

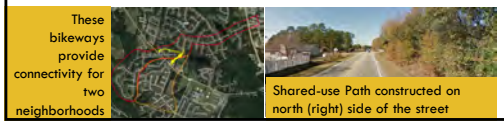
FISHER ROAD AT LAKEWAY DR

The linkages in this area connect two communities in Fayetteville that have little access to bicycle infrastructure. The intersection treatment at Lakeway Drive and Fisher Road is a critical component that helps to create this connection. Additionally, a connection to Dockside Drive via Lakeway Drive and a shared-use path on Fisher Road will help to connect communities to schools and other civic infrastructure.

Considerations:

- Drainage re-design to accommodate Fisher Road shared-use path
- Intersection controls at Lakeway Drive and Fisher Road to provide priority to bicycle users

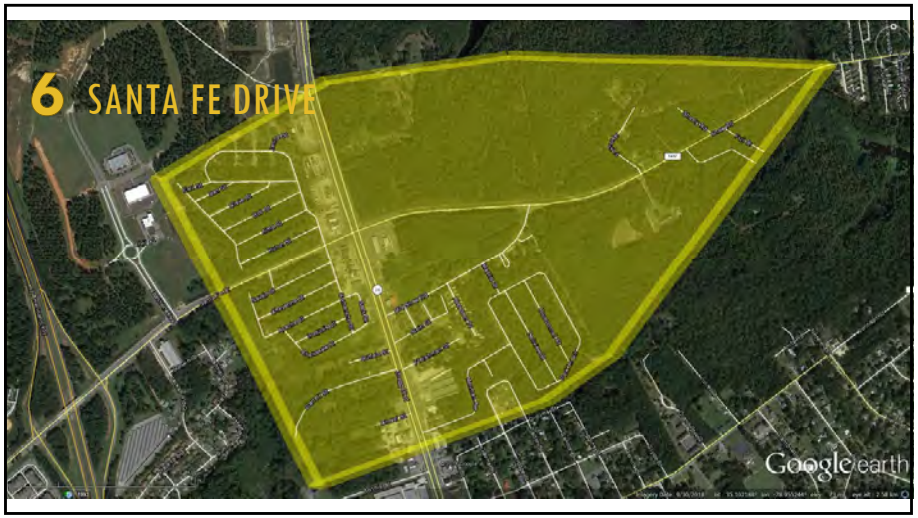




Shared-use Path constructed on north (right) side of the street


Easement for bikeway connection at Lakeway Drive

19



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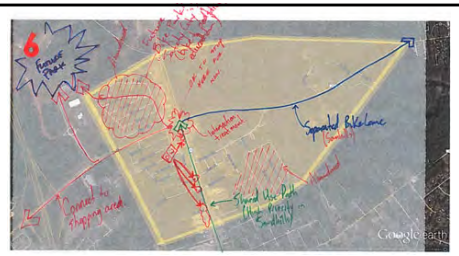
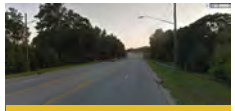
SANTA FE DRIVE

This area of Fayetteville has little bicycle infrastructure, but a high potential for usage. Two routes are identified in the Sandhills Plan, one on Bragg Boulevard and the other on Santa Fe Drive. Bragg Boulevard is identified as a shared-use path and designated with a high priority in the Sandhills Plan. West of Bragg Boulevard on Santa Fe Drive would also benefit from a bicycle connection since there is nearby commercial activity that could be accessed by the residents in the area. Some of the uninhabited neighborhoods could be used for bicycle training or road safety education by local advocacy groups or the City.

Considerations:

- Driveway treatments
- Intersection treatments
- Connection to the future park near the site





Additional connection on Santa Fe Drive via a shared-use path to connect to commercial area to the west

Shared-use Path, with high priority designation in Sandhills Plan, on Bragg Boulevard

Separated Bike Lane, in Sandhills Plan, Santa Fe Drive (from Bragg Blvd to the east)

21

22

ARSENAL AVE BRIDGE OVER MLK JR FREEWAY

This pedestrian and bicycle bridge is reported to not be well-known by people in Fayetteville. This connection, which follows alignment along Arsenal Avenue over the Martin Luther King Jr Freeway, can be a key connection between bicycle infrastructure on Arsenal Ave and McGilvary Street, as identified in the Sandhills Report.

Considerations:

- Connected infrastructure is required to ensure this facility is useful in the larger network
- Wayfinding is required to help users navigate the connections to the area
- Connectivity to the southwest and northeast areas adjacent to the bridge could be made via on-street signed routes or wayfinding

Shared Lane Markings / Bike Route on Arsenal Avenue, as proposed in Sandhills Report

Proposed Bike Lane on McGilvary St, as proposed in Sandhills Report

Bridge over Martin Luther King Jr Freeway that may have low utilization because of the poor connectivity it has in the area

23

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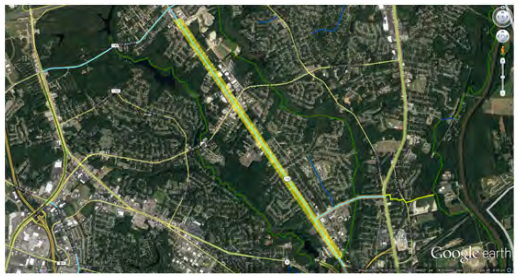
MURCHISON ROAD (NC 210) CORRIDOR

Cumberland Street to Shaw Mill Road. Sidepath or Shared Use Path. Vehicle-oriented, neighborhoods on both sides but poor crossing opportunities. LOTS of commercial nodes in the vicinity.



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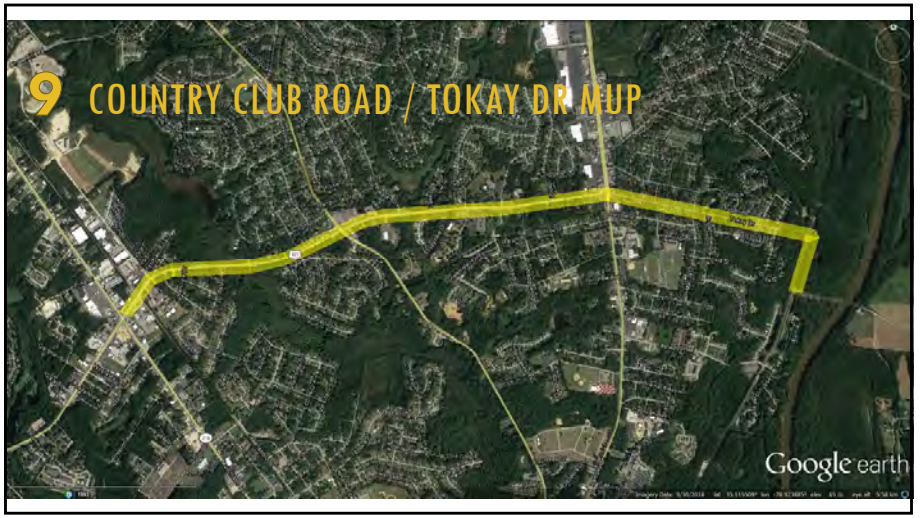
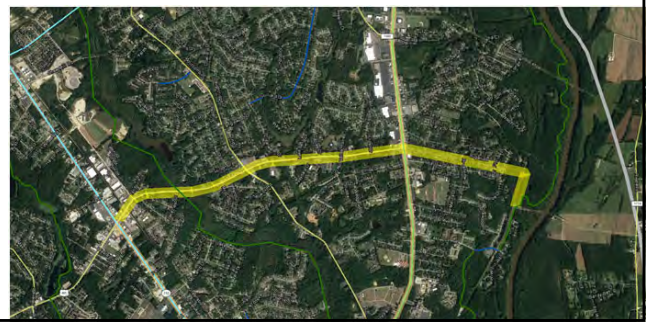


26

COUNTRY CLUB ROAD / TOKAY DR MUP

Murchison Road (NC 210) to Neuse River Trail (East Coast Greenway). SUP / Multi-use Path and or access / easement.

Connects to the Cape Fear River Trail which is a portion of the East Coast Greenway.



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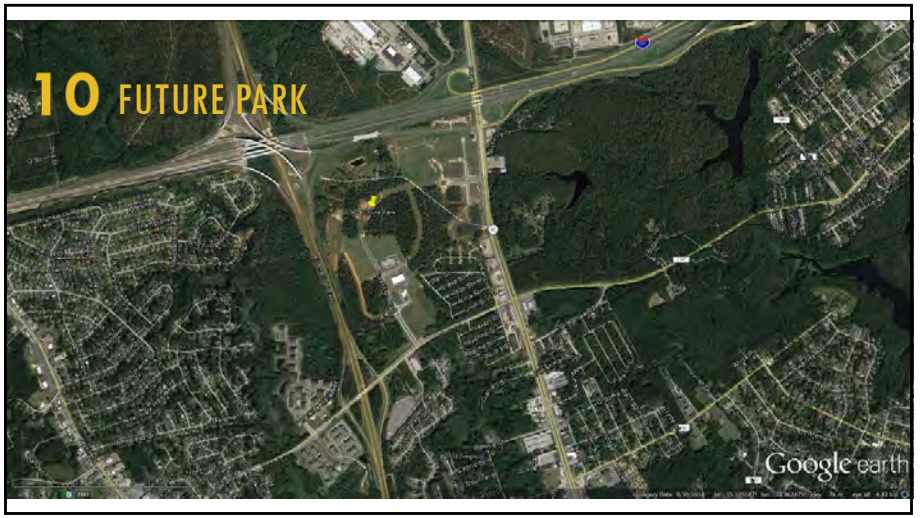


28

FUTURE PARK

This area is the site of a future park that is being undertaken by the Parks and Recreation Department. The connectivity to the north and west is compromised with the adjacent highways and interchanges; however, to the north is to Fort Bragg, therefore only access to the west should be considered as an opportunity for change. Connectivity to the south and east is feasible but requires bicycle infrastructure. Amenities at the future park will also be necessary to attract bicycle users to the amenity.

Considerations:

- Bicycle amenities
- Connectivity to the west over or under All American Expressway
- Connectivity to south and east via bicycle infrastructure

Separated Bike Lane, in Sandhills Plan, Santa Fe Drive (from Bragg Blvd to the east)

29

DISCUSSION OF PROGRAMS & POLICIES

- **E**ducation
- **E**ncouragement
- **E**nforcement
- **E**quity
- **E**valuation
- **E**ngineering

30

EDUCATION

Teaching bicycle skills, safety and the benefits of active transportation

Current Efforts

- Project Website: https://www.bikingfayetteville.com/
- Bicycle Rodeo: <Insert Date>

Going forward

- **Let's Go NC** – Pedestrian and Bicycle Curriculum
- **NC Vision Zero** initiatives https://ncvisionzero.org/safety-focus-areas/bicycle/
- Bicycle Safety & Education Classes
- Driver Education
- Internal Staff Education
- Police Training Program
- Public Involvement Efforts

https://activelivingresearch.org/ActiveEducationBrief

31

ENCOURAGEMENT

Activities to entice residents/visitors to utilize active transportation

Current Efforts

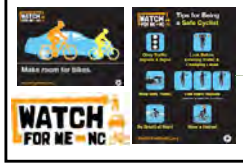
- Fayetteville State University - Lime Bike Program
- Fayetteville/Cumberland Parks & Recreation - Cape Fear River Trail and Cape Fear Mountain Bike Trail
- Unified Development Ordinance:
  - Bicycle parking within 150' of primary building entrance
  - One bicycle parking space per 30 dwelling units, or 5K gross square feet

Moving Forward

- **Safe Routes to School** (SRTS) partnerships
- Bicycle Incentives program – partner w/businesses to provide incentives
- Distribute helmets and safety lights
- Celebrate Bike-Friendly Businesses
- Bicycle map of existing bicycle facilities and recommended bicycle routes
- Special Events
  - National Bike Month (May)
  - Bike to Work Day events (May)
  - Open Streets Events – Cyclovia

32

ENFORCEMENT



Deter unsafe behavior and enforce safety rules, primarily by local law enforcement

Current Efforts

- Unified Development Ordinance (UDO): Bicycles allowed on sidewalks, (outside of Downtown)

Moving Forward

- **Watch for Me NC**
- Bicycle Registration/Theft deterrence
- Vehicle speed feedback signs
- Support partnerships between
  - community groups and law enforcement
  - law enforcement in encouragement or education events
- Targeted enforcement campaigns
  - Ticketing,
  - Police Stops ("Stop and Educate"),
  - Data-driven enforcement

33

EVALUATION

Future evaluation efforts help adjust the program and identify needs

- Are approaches successful?
- Are programs increasing health and equity?
- Are there any unintended consequences of the action items?

Current Efforts

- Online survey & interactive map

Moving Forward

- Annual Bicycle & Pedestrian Counts
- Bicycle Friendly Community Application
- Bicycle & Pedestrian Committee/Bicycle Staff Position
- Community Surveys
- Facility Inspection and Maintenance
- Road Safety Audits/Safety Data

34

EQUITY

Everyone in Fayetteville, no matter their background or situation, has the opportunity and ability to safely ride a bike.

Current Efforts

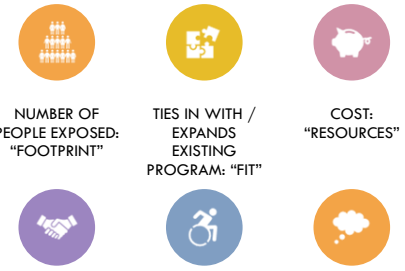
- The Bicycle Man – Donates new/refurbished bicycles to families in need

Moving Forward

- Are recipients of education efforts reflective of the demographics of the City?
- Are encouragement activities available to low-income residents and students of color?
- Are there strong, positive relationships between law enforcement and low-income residents and people of color?

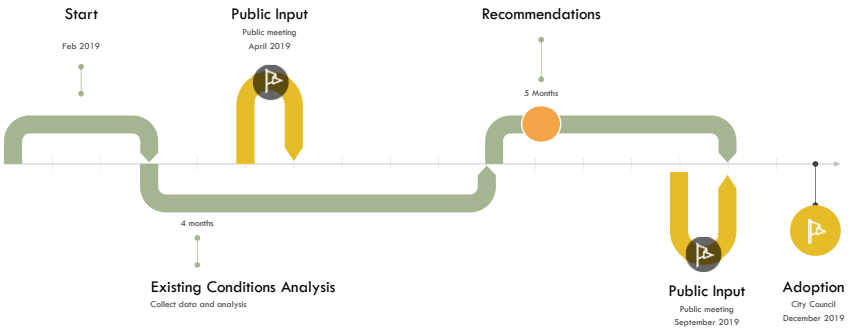
35

HOW DO YOU ASSIGN VALUE TO POLICIES AND PROGRAMS?



36

PROJECT SCHEDULE



37

NEXT STEPS...

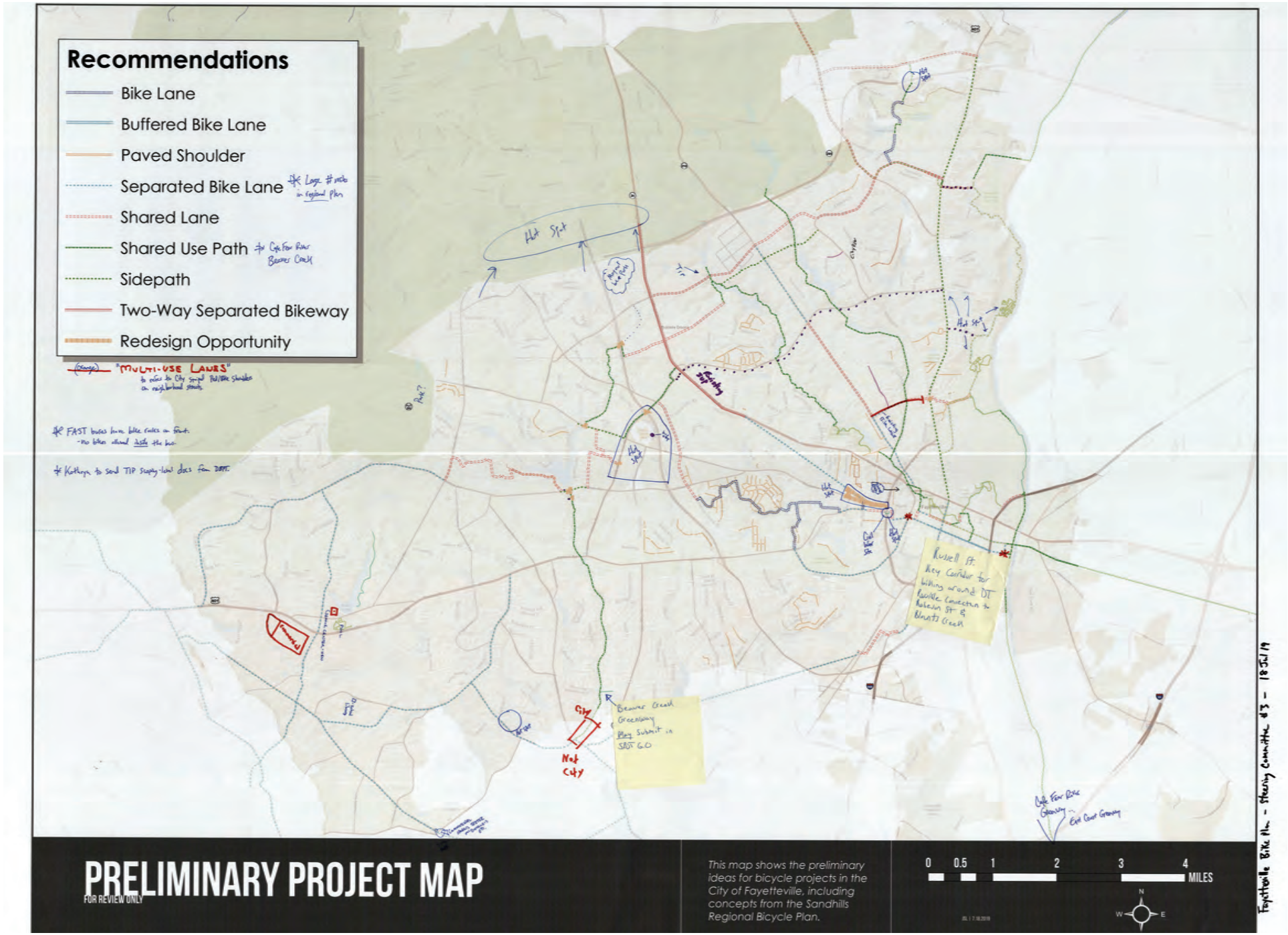
FINALIZE TECHNICAL PRIORITIES

COUNCIL BRIEFING & PUBLIC WORKSHOP

WHAT CAN WE DO TO HELP YOU?

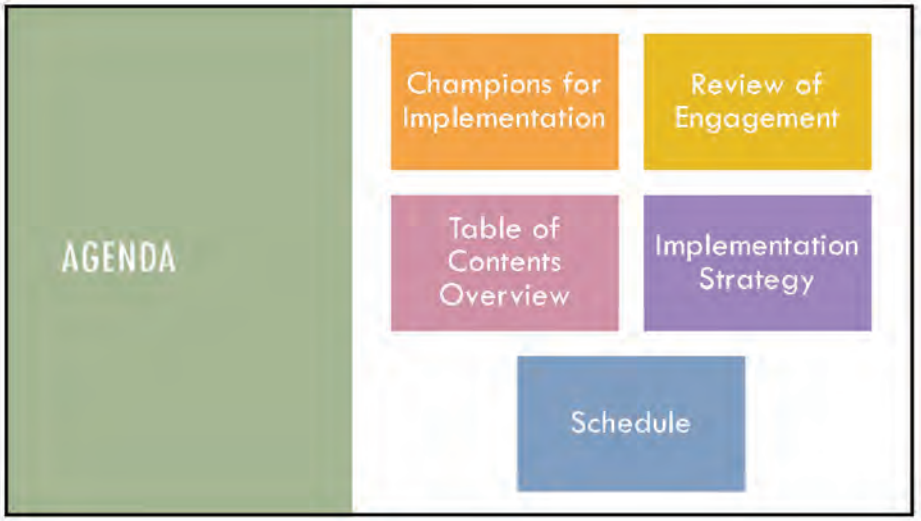
38

C3.B: MEETING #3 PRELIMINARY MAP MARK-UP



C4: MEETING #4 PRESENTATION

1



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ACKNOWLEDGEMENT

Steering Committee members

City Council + City Dept. Staff + MPO

NCDOT Division of Bicycle & Pedestrian Transportation

Local & Regional partners
- Cumberland County Departments
- Fayetteville State University
- Local bike shops

Public outreach attendees

Survey participants

3

WHAT HAVE WE ACCOMPLISHED?

Documented the purpose, need, and benefits

Gathered existing conditions

Engaged the public online (www.bikingfayetteville.com) and in-person

Developed bicycle network plan

Recommended facility improvements
- Integrated with Sandhills Regional Plan
- Incorporated prioritization factors
- Design guidance/resources

Recommended policy improvements

Developed 10 Conceptual Design "Hot Spots"

Five Year Implementation Strategy
- Roles
- Funding

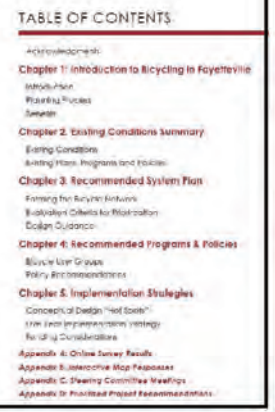


TABLE OF CONTENTS

4

CHAMPIONS FOR IMPLEMENTATION

It doesn't end here…

Plan is only the foundation – build the house!

5

ENGAGEMENT – ROUND TWO

RECAP

Sept-Nov 2019

6

ENGAGEMENT – ROUND TWO

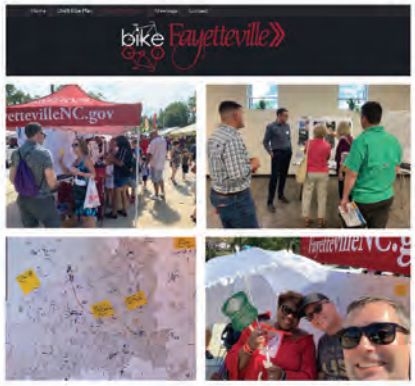
Sat Oct 5th International Folk Festival

Tue Oct 8th Cliffdale Rec Center

Tue Oct 15th Smith Lake Rec Center

Online survey through website

Distributed ~270 cards



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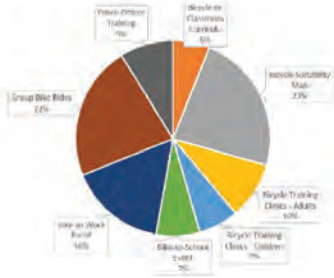
ENGAGEMENT – ROUND TWO

Which of the following Bicycle Programs would *encourage you* to participate?

- Bicycle Suitability Map 23%
- Group Bike Rides 22%
- Bike-to-Work Event 16%



8

ENGAGEMENT – ROUND TWO

How important are these criteria to you?

- Safety 24%
- Separation 23%
- Connectivity 19%
- Maintenance 18%
- Destinations 16%

Online + In-person voting

TABLE 3.1. PRIORITIZATION FACTORS & WEIGHTS

FACTORS	WEIGHT
ACCESS TO POPULAR CYCLING DESTINATIONS WITHIN 1/4-MILE OF PROJECT	
School Neighborhood Tourist Destination Commercial District Civic (Library, Park)	16%
IMPROVE SAFETY & REDUCE CRASHES	
Bike Crash Poor Geometry	24%
SEPARATE SPACE FOR BICYCLISTS	
Increase Buffer from Road Bike Lane / Buffered Bike Lane On-Street Parking Present	23%
IMPROVE MAINTENANCE CONDITIONS	
Update Existing Infrastructure	18%
INCREASE BIKE SYSTEM CONNECTIVITY	
Connects to Existing Bike Facility Connects to Planned Bike Facility Connects to Current TIP Project	19%

The weighted percentage for each factor was determined by public participation. Online survey respondents and public meeting attendees were asked to rank these factors by importance and the final scores were aggregated to determine project ranking.

9

ENGAGEMENT – ROUND TWO

Notable feedback

- Support for City funds to be spent on bicycle infrastructure (84%) an programs (64%)
- Preference for Bike Lanes/Greenways/Separated Bike Lanes over others
- Driver behaviors that present a safety concern:
  - Distracted driver(s) 84%
  - Failure to yield to bicyclist 75%
  - Reckless driving by vehicle 68%
  - Inadequate passing (<3') width 67%
  - Bicycling against traffic 44%
  - Bicycling on the sidewalk 25%

10

TABLE OF CONTENTS

First half of this project (Feb-June)

- Benefits of Biking
- Existing facilities
- Crashes/safety
- Previous planning efforts
- Planned TIP projects

TABLE OF CONTENTS

11

TABLE OF CONTENTS

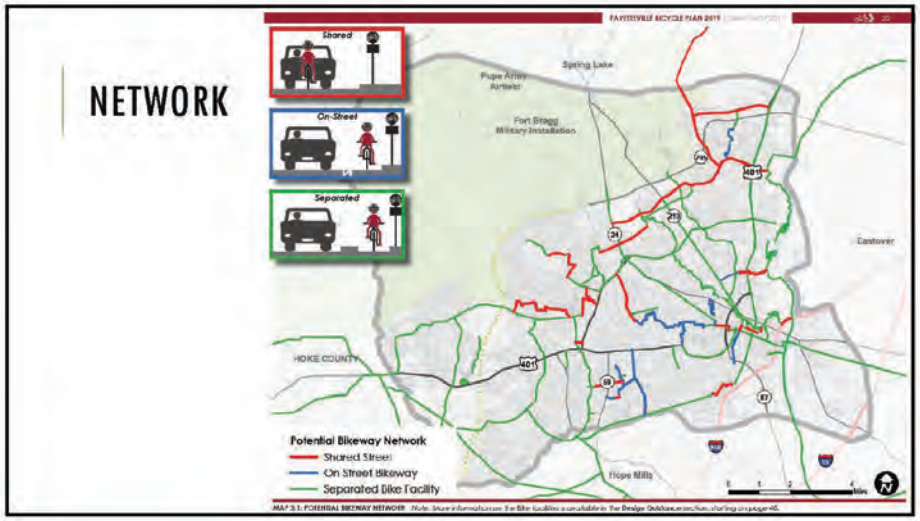
First half of this project (Feb-June)

Second half of this project (July-Dec)

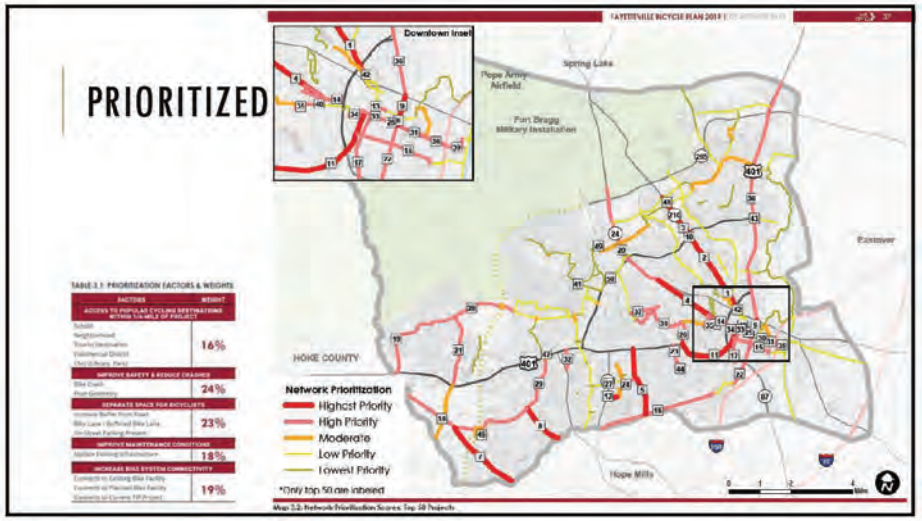
- Building a bicycle network
- Prioritization
- Design Guidance

TABLE OF CONTENTS

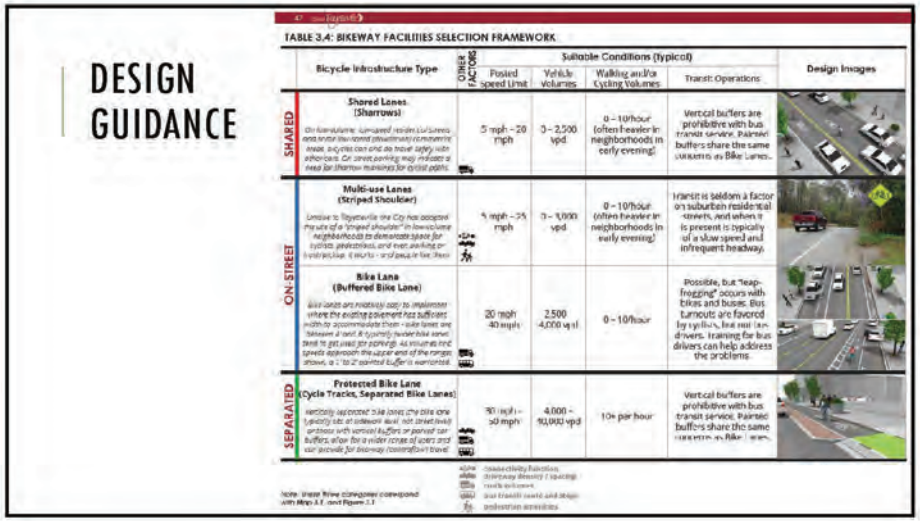
12


NETWORK
Shared
On-Street
Separated
Potential Bikeway Network
Shared Street
On Street Bikeway
Separated Bike Facility
Spring Lake
Pope Army Airfield
Fort Bragg Military Installation
Eastover
HOKE COUNTY
Hope Mills

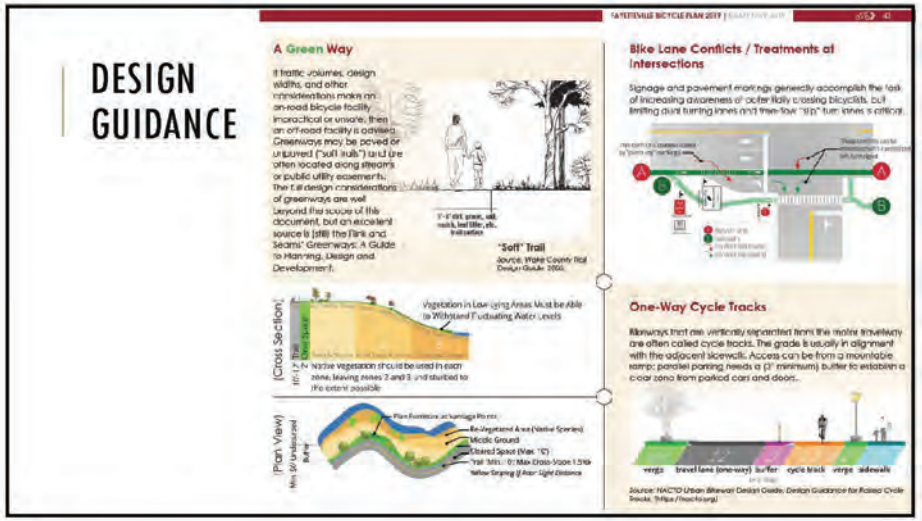
13


PRIORITIZED
Downtown Inset
Network Prioritization
Highest Priority
High Priority
Moderate
Low Priority
Lowest Priority
16%
24%
23%
18%
19%
Spring Lake
Pope Army Airfield
Fort Bragg Military Installation
Eastover
HOKE COUNTY
Hope Mills

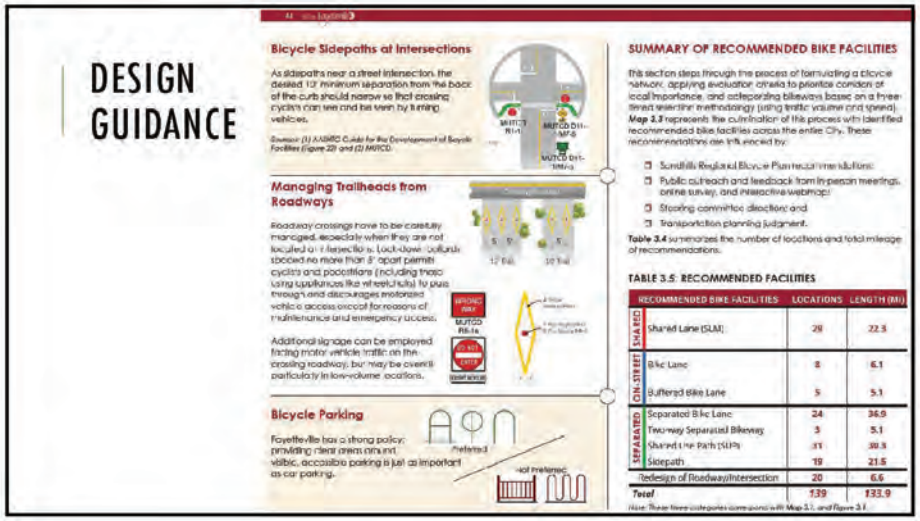
14


DESIGN GUIDANCE
TABLE 3.4: BIKEWAY FACILITIES SELECTION FRAMEWORK
Bicycle Infrastructure Type
Suitable Conditions (Typical)
Posted Speed Limit
Vehicle Volumes
Walking and/or Cycling Volumes
Transit Operations
Design Images
SHARED
Shared Lanes (Sharrows)
ON-STREET
Multi-use Lanes (Striped Shoulder)
Bike Lane (Buffered Bike Lane)
SEPARATED
Protected Bike Lane (Cycle Tracks, Separated Bike Lanes)

15


DESIGN GUIDANCE
A Green Way
"Soft" Trail
Bike Lane Conflicts / Treatments at Intersections
One-Way Cycle Tracks
(Cross Section)
(Plan View)

16


DESIGN GUIDANCE
Bicycle Sidepaths at Intersections
Managing Trailheads from Roadways
Bicycle Parking
SUMMARY OF RECOMMENDED BIKE FACILITIES
TABLE 3.5: RECOMMENDED FACILITIES
RECOMMENDED BIKE FACILITIES
LOCATIONS
LENGTH (MI)
Shared Lane (SLM)
Bike Lane
Buffered Bike Lane
Separated Bike Lane
Two-way Separated Bikeway
Shared Use Path (SUP)
Sidepath
Redesign of Roadway/Intersection
Total

17

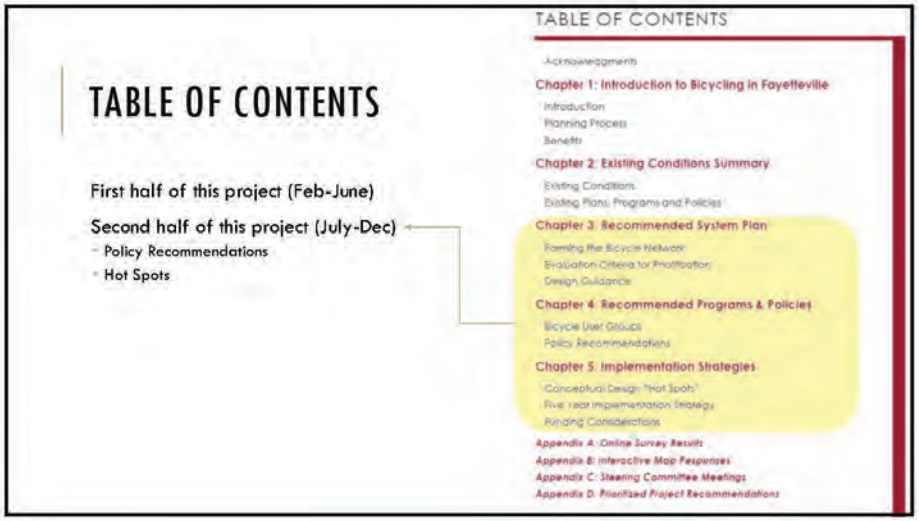
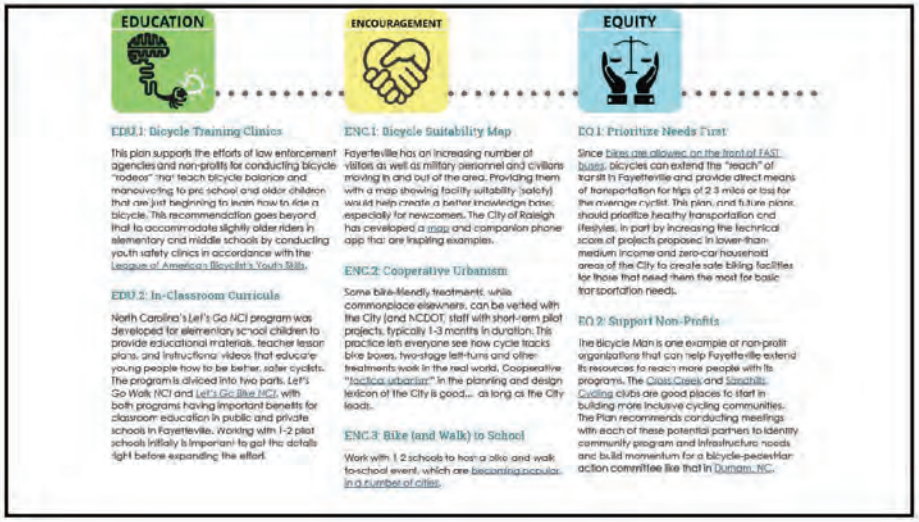


TABLE OF CONTENTS
First half of this project (Feb-June)
Second half of this project (July-Dec)
Policy Recommendations
Hot Spots
TABLE OF CONTENTS
Acknowledgments
Chapter 1: Introduction to Bicycling in Fayetteville
Introduction
Planning Process
Benefits
Chapter 2: Existing Conditions Summary
Existing Conditions
Existing Plans, Programs and Policies
Chapter 3: Recommended System Plan
Forming the Bicycle Network
Evaluation Criteria for Prioritization
Design Guidance
Chapter 4: Recommended Programs & Policies
Bicycle User Groups
Policy Recommendations
Chapter 5: Implementation Strategies
Conceptual Design "Hot Spots"
Five-Year Implementation Strategy
Funding Considerations
Appendix A: Online Survey Results
Appendix B: Interactive Map Responses
Appendix C: Steering Committee Meetings
Appendix D: Prioritized Project Recommendations

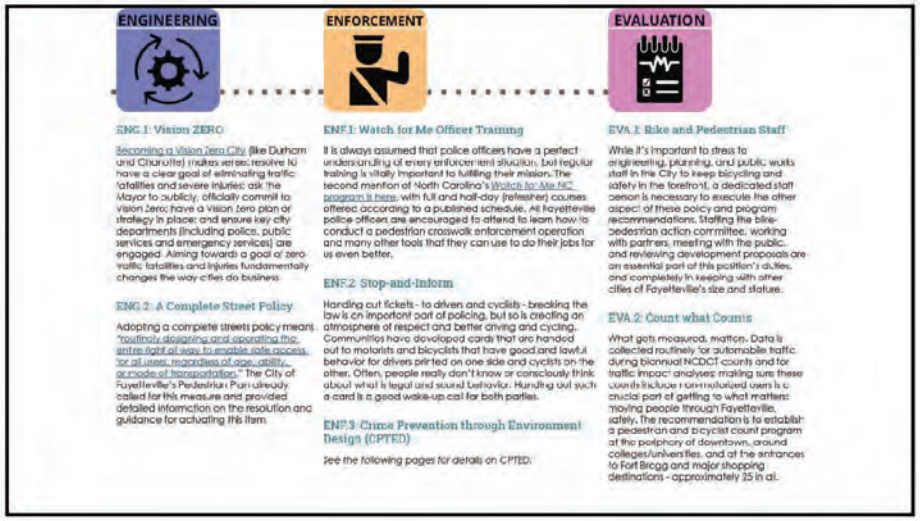
18


POLICY
EDUCATION
ENCOURAGEMENT
EQUITY
ENGINEERING
ENFORCEMENT
EVALUATION

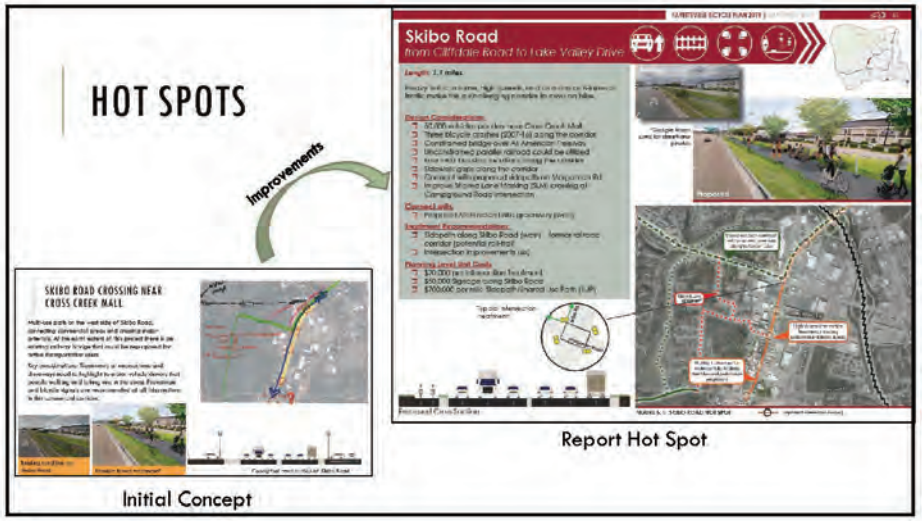
19


EDUCATION
ENCOURAGEMENT
EQUITY
EDU.1: Bicycle Training Clinics
EDU.2: In-Classroom Curricula
ENC.1: Bicycle Suitability Map
ENC.2: Cooperative Urbanism
ENC.3: Bike (and Walk) to School
EQ.1: Prioritize Needs First
EQ.2: Support Non-Profits

20



21



22

23

IMPLEMENTATION STRATEGY

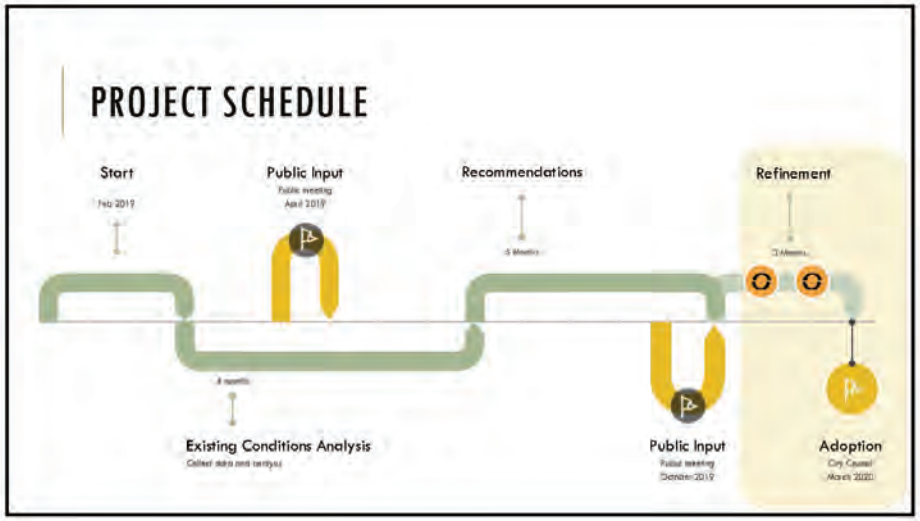
So now what?

- Partnerships & roles
- Performance Measures
- Coordination!

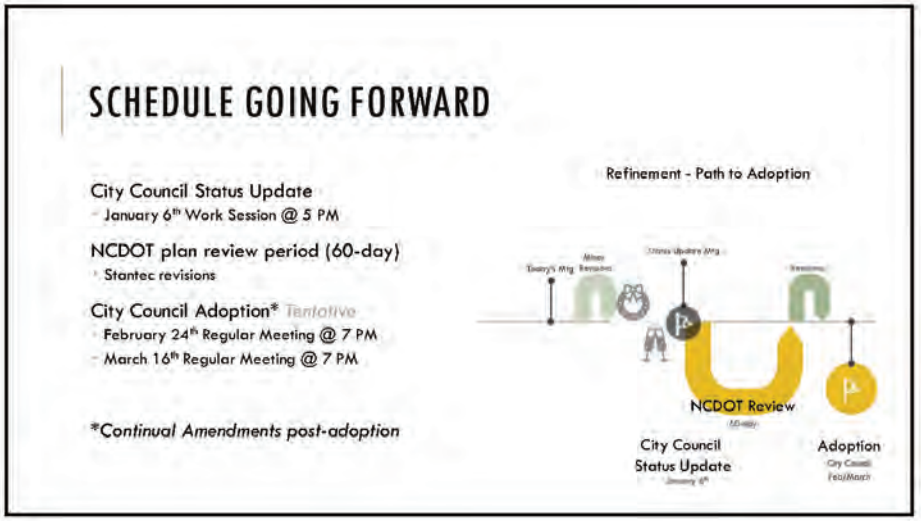
TABLE 5.1: PLAN IMPLEMENTATION TABLE

Strategy	Contributing Stakeholders	Lead Agency	Time Frame	Duration
POLICY				
Adopt this plan	City Council	City	Immediate	Once
Engage the Bicycle and Pedestrian Advisory Committee (BPAC)	City/MPO Staff; BPAC	City	Immediate	Ongoing
Expand City Policies for Vision Zero and Complete Streets	City Council; City/MPO Staff; BPAC	City/MPO	Mid-term	Ongoing
Continue to Enforce State and Local Regulations	City Staff; Law Enforcement; BPAC	City Police Department	Near-term	Ongoing
PROGRAM				
Expand Educational Outreach Programs	BPAC	City/MPO	Mid-term	Ongoing
Hire a Bike/Ped Planning Position	City/MPO Staff	City	Near-term	Ongoing
Expand Encouragement Outreach Programs and Events	BPAC	City/MPO	Mid-term	Ongoing
Establish a Monitoring Program	City/MPO Staff; BPAC	City/MPO	Mid-term	Periodic
Become **Gold**-level Bike Friendly Community	City/MPO Staff; BPAC	City/MPO	Mid-term	Periodic
INFRASTRUCTURE				
Identify Funding Sources	City/MPO Staff; BPAC	NCDOT DBPT; City/MPO	Near-term	Periodic
Partner with FHWA to perform Road Safety Audit	FHWA; NCDOT DBPT; City/MPO Staff	NCDOT DBPT; City/MPO	Mid-term	Once
Build Hot Spot Projects	NCDOT DBPT; City/MPO Staff; BPAC	City/MPO	Mid-term	Ongoing
Update CTP/MTP Projects for Bicycle Facilities	City/MPO Staff; BPAC	NCDOT DBPT	Long-term	Periodic

24


PROJECT SCHEDULE
Start
Public Input
Recommendations
Refinement
Existing Conditions Analysis
Public Input
Adoption

25


SCHEDULE GOING FORWARD
City Council Status Update
- January 6th Work Session @ 5 PM
NCDOT plan review period (60-day)
- Stantec revisions
City Council Adoption* Tentative
- February 24th Regular Meeting @ 7 PM
- March 16th Regular Meeting @ 7 PM
*Continual Amendments post-adoption
Refinement - Path to Adoption
NCDOT Review
City Council Status Update
Adoption

26


HAPPY
HOLIDAYS
Safe Travels

27


bike Fayetteville

APPENDIX D: PRIORITIZED PROJECT RECOMMENDATIONS

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
1	NC 210 (Murchison Rd)	Langdon St	US 401 (Martin Luther King Jr Fwy)	Separated Bike Lane	0.96	13.0	16.9	18.5	17.8	18.8	**84.9**
2	NC 210 (Murchison Rd)	US 401 (Pamalee Dr)	Langdon St	Separated Bike Lane	1.79	16.2	16.9	18.5	17.8	9.4	**78.8**
3	NC 210 (Murchison rd)	Shaw Rd	Country Club Dr	Separated Bike Lane	1.46	9.7	16.9	18.5	17.8	9.4	**72.3**
4	Fort Bragg Road	Bragg Blvd Off Ramp	Broadfoot Ave	Separated Bike Lane	2.28	16.2	16.9	18.5	17.8	1.9	**71.2**
5	Ireland Dr	Cumberland Rd	US 401 (Raeford Rd)	Buffered Bike Lane	2.21	13.0	16.9	18.5	17.8	1.9	**68.0**
6	Gillespie St	E Russell St	Hay St	Separated Bike Lane	0.14	9.7	7.2	23.1	17.8	9.4	**67.3**
7	Stoney Point Rd	Strickland Bridge Rd	Lakewood Rd	Separated Bike Lane	2.56	6.5	7.2	18.5	17.8	15.0	**65.0**
8	Green St	Hay St	NC 24 (Rowan St)	Separated Bike Lane	0.33	6.5	7.2	23.1	17.8	9.4	**64.0**
9	NC 210 (Murchison Rd)	US 401 (Pamalee Dr)	US 401 (Country Club Dr)	Redesign Opportunity	0.45	9.7	24.1	2.3	17.8	9.4	**63.3**
10	US 401 (Robeson St)	US 401 (Raeford Road)	W Russell St	Separated Bike Lane	2.44	16.2	7.2	18.5	17.8	1.9	**61.6**
11	Ashton Rd	NC 59 (Hope Mills Rd)	Inverness Dr	Buffered Bike Lane	0.31	6.5	16.9	18.5	17.8	1.9	**61.5**
12	Hay St	Winslow St	Ray Ave	Separated Bike Lane	0.18	6.5	2.4	23.1	17.8	9.4	**59.2**
13	Hay Street	Fort Bragg Road	Morganton-Ft Bragg Gateway	Redesign Opportunity	1.47	13.0	24.1	2.3	17.8	1.9	**59.1**
14	Campbell Ave	Robeson St	Campbell Terrace Rd	Redesign Opportunity	1.27	13.0	24.1	2.3	17.8	1.9	**59.1**
15	Cumberland Rd	Study Area Boundary	Eugene St	Separated Bike Lane	3.80	9.7	7.2	18.5	17.8	5.6	**58.9**
16	Winslow St	Southern Ave	Russell St	Buffered Bike Lane	1.13	13.0	7.2	18.5	17.8	1.9	**58.4**
17	NC 24 (Bragg Blvd)	Fort Bragg Road	-	Redesign Opportunity	0.13	9.7	24.1	2.3	17.8	1.9	**55.8**
18	Stoney Point Rd	Sykes Pond Rd	Fisher Rd	Separated Bike Lane	4.41	6.5	7.2	18.5	17.8	5.6	**55.6**
19	Hoke Loop Road	US 401 (Raeford Road)	Cliffdale Road	Separated Bike Lane	2.52	6.5	7.2	18.5	17.8	5.6	**55.6**
20	Rim Rd	US 401 (Raeford Rd)	Cliffdale Rd	Separated Bike Lane	2.35	9.7	7.2	18.5	17.8	1.9	**55.1**
21	Gillespie St	Reeves St	Russell St	Separated Bike Lane	1.78	9.7	7.2	18.5	17.8	1.9	**55.1**
22	Purdue Dr	Village Dr	US 401 (Raeford Rd)	Two-way Separated Bikeway	0.79	9.7	7.2	18.5	17.8	1.9	**55.1**
23	Conventry Dr	Camelot Dr	Ireand Dr	Buffered Bike Lane	0.66	9.7	7.2	18.5	17.8	1.9	**55.1**
24	W Russell St Oneway	W Russell St Bidirectional	Gillespie St	Separated Bike Lane	0.20	9.7	7.2	18.5	17.8	1.9	**55.1**
25	Fisher Road	Strickland Bridge Road	Adams Lake Drive	Sidepath	1.41	6.5	7.2	6.9	17.8	15.0	**53.5**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
26	McPhee Dr	US 401 (Raeford Road)	Mirror Lake Dr	Bike Lane	0.81	16.2	2.4	6.9	17.8	9.4	**52.7**
27	NC 59 (Hope Mills Rd)	Redwood Dr	-	Redesign Opportunity	0.11	6.5	24.1	2.3	17.8	1.9	**52.6**
28	Cliffdale Road	Hoke Loop Road	Reilly Road	Separated Bike Lane	2.94	6.5	7.2	18.5	17.8	1.9	**51.9**
29	Strickland Bridge Road	Fisher Road	US 401 (Raeford Road)	Separated Bike Lane	1.90	6.5	7.2	18.5	17.8	1.9	**51.9**
30	Russell St Oneway	W Russell St Bidirectional	I-95 (S Eastern Blvd)	Separated Bike Lane	1.03	6.5	7.2	18.5	17.8	1.9	**51.9**
31	E Russell St	Gillespie St	I-95 (S Eastern Blvd)	Separated Bike Lane	0.83	6.5	7.2	18.5	17.8	1.9	**51.9**
32	Bingham Dr	NC 162 (Bunce Rd)	US 401 (Raeford Rd)	Two-way Separated Bikeway	0.64	6.5	7.2	18.5	17.8	1.9	**51.9**
33	W Russell St	Robeson St	W Russell St Oneway	Separated Bike Lane	0.33	6.5	7.2	18.5	17.8	1.9	**51.9**
34	McGilvary St	Branson St	Robeson St	Separated Bike Lane	0.29	6.5	7.2	18.5	17.8	1.9	**51.9**
35	Raeford Rd	Devane St	Highland Ave	Separated Bike Lane	0.45	3.2	2.4	18.5	17.8	9.4	**51.3**
36	US 401 (Ramsey St)	Rowan St	Study Area Boundary	Sidepath	8.60	16.2	16.9	6.9	1.8	9.4	**51.2**
37	Cliffdale Rd	McPherson Church Rd	Morganton Rd	Sidepath	0.95	6.5	16.9	6.9	1.8	18.8	**50.9**
38	Lennox Dr	McPherson Church Road	Westview Dr	Bike Lane	2.34	13.0	2.4	6.9	17.8	9.4	**49.5**
39	E Russell St	I-95 (S Eastern Blvd)	Person St	Separated Bike Lane	0.39	3.2	7.2	18.5	17.8	1.9	**48.6**
40	Broadfoot Ave	Arsenal Ave	Fort Bragg Road	Bike Lane	0.14	6.5	7.2	6.9	17.8	9.4	**47.8**
41	Morganton Rd	Westlake Road	E Loch Haven Dr	Redesign Opportunity	0.11	1.6	24.1	2.3	17.8	1.9	**47.7**
42	NC 210 (Murchison Road)	US 401 (Martin Luther King Jr Fwy)	Rowan St	Separated Bike Lane	0.29	6.5	2.4	18.5	17.8	1.9	**47.1**
43	Shaw Road	NC 24 (Bragg Blvd)	NC 210 (Murchison Rd)	Separated Bike Lane	1.88	9.7	7.2	18.5	1.8	9.4	**46.6**
44	US 401 (Ramsey St)	US 401 (Country Club Dr)	Tokay Dr	Redesign Opportunity	0.17	6.5	16.9	2.3	17.8	1.9	**45.3**
45	Village Dr	Purdue Dr	-	Redesign Opportunity	0.11	6.5	16.9	2.3	17.8	1.9	**45.3**
46	US 401 (Ramsey St)	Langdon St	Colonial Drive	Redesign Opportunity	0.07	6.5	16.9	2.3	17.8	1.9	**45.3**
47	Bingham Srive	Marykirck Dr	-	Redesign Opportunity	0.11	6.5	16.9	2.3	17.8	1.9	**45.3**
48	NC 24 (Bragg Blvd)	Federal Route 907	Fort Bragg Road	Sidepath	3.68	9.7	7.2	6.9	17.8	1.9	**43.6**
49	Johnson St	NC 24 (Bragg Blvd)	SUP	Bike Lane	1.11	9.7	7.2	6.9	17.8	1.9	**43.6**
50	Strickland Bridge Rd	Barefoot Road Future	Future I-295	Redesign Opportunity	0.83	3.2	16.9	2.3	17.8	1.9	**42.1**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
51	US 401 (Raeford Rd)	Strickland Bridge Rd	Strickland Bridge Rd	Redesign Opportunity	0.49	3.2	16.9	2.3	17.8	1.9	**42.1**
52	NC 210 (Murchison Rd)	Hogan St	Shaw Mill Rd	Redesign Opportunity	0.39	3.2	16.9	2.3	17.8	1.9	**42.1**
53	All American Freeway	Beaver Creek	Dashland Drive	Redesign Opportunity	0.18	3.2	16.9	2.3	17.8	1.9	**42.1**
54	US 401 (Skibo Rd) Railroad	All American Freeway	-	Redesign Opportunity	0.11	3.2	16.9	2.3	17.8	1.9	**42.1**
55	US 401 (Skibo Road)	Shopping Center Entrance	South of Campground Road	Redesign Opportunity	0.08	3.2	16.9	2.3	17.8	1.9	**42.1**
56	Rosehill Rd	Shaw Mill Rd	Shaw Road Ext	Sidepath	0.21	6.5	16.9	6.9	1.8	9.4	**41.5**
57	Rosehill Road	US 401	Shaw Road	Sidepath	1.34	9.7	7.2	6.9	1.8	15.0	**40.7**
58	Cliffdale Rd	Future I-295	-	Redesign Opportunity	0.29	1.6	16.9	2.3	17.8	1.9	**40.5**
59	Cliffdale Road	Bridge and high-tension power lines overhead	West of Lansdowne Road	Redesign Opportunity	0.16	1.6	16.9	2.3	17.8	1.9	**40.5**
60	Morganton Rd	Beaver Creek Trail SUP	East of Westlake Road	Redesign Opportunity	0.10	1.6	16.9	2.3	17.8	1.9	**40.5**
61	Cliffdale Rd	Bunce Rd	Allonby Rd	Redesign Opportunity	0.10	1.6	16.9	2.3	17.8	1.9	**40.5**
62	Persimmon Creek Ped-Bike Bridge	Santa Fe Drive	-	Redesign Opportunity	0.10	1.6	16.9	2.3	17.8	1.9	**40.5**
63	Beaver Creek Trail SUP	Railroad	South of Cliffdale Road	Redesign Opportunity	0.05	1.6	16.9	2.3	17.8	1.9	**40.5**
64	Odom Dr	Coventry Rd	Walnut Dr	Bike Lane	0.71	6.5	7.2	6.9	17.8	1.9	**40.3**
65	Little Bridge Road	SUP	Kimsey Ln	Bike Lane	0.53	3.2	2.4	6.9	17.8	9.4	**39.8**
66	Shaw Rd	NC 210 (Murchison Rd)	Shaw Rd Ext	Separated Bike Lane	0.69	6.5	2.4	18.5	1.8	9.4	**38.6**
67	US 401 Raeford Rd	Beaver Creek Greenway	Strickland Bridge Rd	Sidepath	1.24	13.0	7.2	6.9	1.8	9.4	**38.3**
68	Gillis Hill Rd	Stoney Point Rd	US 401 (Raeford Rd)	Sidepath	1.15	3.2	16.9	6.9	1.8	9.4	**38.2**
69	Gillis Hill Road	Stewarts Creek	Stoney Point Road	Sidepath	0.65	6.5	7.2	6.9	1.8	15.0	**37.5**
70	Camelot Dr	Ashton rd	Coventry Rd	Bike Lane	0.23	3.2	7.2	6.9	17.8	1.9	**37.1**
71	SUP	Ames St	W Rowan St	Shared Use Path	0.73	6.5	2.4	6.9	1.8	18.8	**36.4**
72	Dashland Dr	All American Exp SUP	NC 210 (Bragg Blvd)	Shared Lane	0.66	6.5	7.2	2.3	17.8	1.9	**35.7**
73	Rush Rd	Westview Dr	Raeford Rd	Bike Lane	0.81	6.5	2.4	6.9	17.8	1.9	**35.5**
74	Shaw Rd Ext	Shaw Rd	Terminaion of Shaw Rd Ext	Separated Bike Lane	0.43	3.2	2.4	18.5	1.8	9.4	**35.3**
75	SUP	E Russell St	N Cool Spring St	Shared Use Path	0.62	9.7	7.2	6.9	1.8	9.4	**35.1**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
76	Southern Ave	Cumberland Road	Gillespie St	Bike Lane	1.73	13.0	7.2	6.9	1.8	5.6	**34.5**
77	Stacy Weaver Dr	McArthur Rd	US 401 (Ramsey St)	Sidepath	1.22	13.0	7.2	2.3	1.8	9.4	**33.7**
78	Rosehill Road	Golden Rd	McArthur Rd	Sidepath	1.20	13.0	7.2	2.3	1.8	9.4	**33.7**
79	Flat Rock Drive	Stacy Weaver Dr	Termination of Waterbury Dr	Bike Lane	0.56	3.2	2.4	6.9	17.8	1.9	**32.3**
80	Andrews Road	McArthur Rd	US 401 (Ramsey St)	Buffered Bike Lane	2.51	9.7	7.2	11.6	1.8	1.9	**32.2**
81	Hay St	Ray Ave	Green St	Shared Lane	0.25	6.5	7.2	6.9	1.8	9.4	**31.8**
82	Lynhurst Dr	Cliffdale Road	US 401 (Skibo Rd) via Nix Rd	Shared Lane	1.08	6.5	2.4	2.3	17.8	1.9	**30.9**
83	Cliffdale Rd	S Reilly Rd	Waters Edge Dr	Sidepath	1.86	13.0	7.2	6.9	1.8	1.9	**30.8**
84	Tokay Dr	US 401 (Ramsey St)	Melba Dr	Bike Lane	0.75	13.0	2.4	11.6	1.8	1.9	**30.6**
85	Reilly Rd	Cliffdale Rd	Cliffdale Rd	Shared Lane	2.80	9.7	7.2	2.3	1.8	9.4	**30.4**
86	McPherson Church Rd	US 401 (Skibo Rd)	Colinwood Dr	Separated Bike Lane	1.68	9.7	7.2	2.3	1.8	9.4	**30.4**
87	W Rowan St	SUP	SUP	Shared Use Path	0.27	9.7	2.4	6.9	1.8	9.4	**30.2**
88	SUP	W Rowan St	Railroad	Shared Use Path	0.27	9.7	2.4	6.9	1.8	9.4	**30.2**
89	Hillsboro St	Hay St	Rowan St	Shared Use Path	0.26	9.7	2.4	6.9	1.8	9.4	**30.2**
90	Ruritan Dr	Nix Road	Morganton Rd	Shared Lane	0.50	3.2	2.4	2.3	17.8	1.9	**27.6**
91	US 401 (Skibo Rd)	Morganton Rd	Bragg Blvd	Sidepath	1.44	9.7	7.2	6.9	1.8	1.9	**27.5**
92	SUP	Ottis F Jones Pkwy	N Cool Spring St	Shared Use Path	0.13	9.7	7.2	6.9	1.8	1.9	**27.5**
92	Person St	Market Sq	Ottis F Jones Pkwy	Shared Lane	0.12	9.7	7.2	6.9	1.8	1.9	**27.5**
94	Lakeway Drive	Dockvale Drive	Lakeway Drive End	Shared Lane	0.38	6.5	7.2	2.3	1.8	9.4	**27.2**
95	Myrover Street	US 401 (Hay Street)	McGilvary Street	Shared Lane	0.25	6.5	7.2	2.3	1.8	9.4	**27.2**
96	US 401 (Ramsey St)	Treetop Dr	Stacy Weaver Dr	Shared Use Path	0.10	6.5	2.4	6.9	1.8	9.4	**27.0**
97	Fisher Road	Dockside Drive	Lakeway Drive	Shared Use Path	0.33	6.5	2.4	6.9	1.8	9.4	**27.0**
98	SUP	Study area boundary	Cliffdale Road	Shared Use Path	3.97	9.7	2.4	6.9	1.8	5.6	**26.5**
99	SUP	Cape Fear River Trail Parking	Cape Fear River	Shared Use Path	1.13	9.7	2.4	6.9	1.8	5.6	**26.5**
100	SUP	N Pearl St	Bonnie Doone Lake	Shared Use Path	3.97	13.0	2.4	6.9	1.8	1.9	**26.0**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
						Dest.	Safety	Sep.	Maint.	Conn.	
101	SUP	Person St	SUP	Shared Use Path	0.86	13.0	2.4	6.9	1.8	1.9	**26.0**
102	SUP (partially on Belle St)	Campbell Terrace Rd	Cape Fear River	Shared Use Path	0.54	13.0	2.4	6.9	1.8	1.9	**26.0**
103	Treetop Drive	US 401 (Ramsey St)	Cape Fear River Trail	Shared Lane	0.49	9.7	2.4	2.3	1.8	9.4	**25.6**
104	Brookwood Drive	US 401 (Ramsey St)	Hoffer Dr	Shared Lane	0.35	9.7	2.4	2.3	1.8	9.4	**25.6**
105	Arsenal Ave	Highland Ave	Termination at US 401	Shared Lane	0.28	9.7	2.4	2.3	1.8	9.4	**25.6**
106	Langdon St	Powatan St	US 401 (Ramsey St)	Shared Lane	0.25	9.7	2.4	2.3	1.8	9.4	**25.6**
107	McArthur Rd	Study Area Boundary	Andrews Rd	Buffered Bike Lane	0.98	3.2	2.4	11.6	1.8	5.6	**24.6**
108	Person St	Broad St	SUP	Shared Use Path	0.11	6.5	7.2	6.9	1.8	1.9	**24.3**
109	SUP	Study Area Boundary	Person St	Shared Use Path	2.60	6.5	2.4	6.9	1.8	5.6	**23.2**
110	Clinton Rd	SUP	Study Area Boundary	Shared Use Path	2.59	6.5	2.4	6.9	1.8	5.6	**23.2**
111	McArthur Rd	Jossie St	Stacy Weaver Dr	Buffered Bike Lane	1.48	9.7	7.2	2.3	1.8	1.9	**22.9**
112	Progress St	Camden Rd	Gillespie St	Shared Lane	0.93	9.7	7.2	2.3	1.8	1.9	**22.9**
113	Redwood Dr	Birch Rd	Odom Dr	Multi-Use Lane	0.91	9.7	7.2	2.3	1.8	1.9	**22.9**
114	Seabrook Rd	Topeka St	Langdon St	Existing Bike Lane	0.73	9.7	7.2	2.3	1.8	1.9	**22.9**
115	SUP	SUP	Smith Lake Road	Shared Use Path	5.56	9.7	2.4	6.9	1.8	1.9	**22.7**
116	Shaw Mill Road	NC 210 (Murchison Road)	Rosehill Road	Sidepath	0.98	9.7	2.4	6.9	1.8	1.9	**22.7**
117	Santa Fe Dr	Bonanza Dr	Wichita Dr	Sidepath	0.12	9.7	2.4	6.9	1.8	1.9	**22.7**
118	SUP	Hillsboro St	Cross Creek crossing	Shared Use Path	0.10	9.7	2.4	6.9	1.8	1.9	**22.7**
119	SUP	N Eastern Blvd	Cape Fear River	Shared Use Path	0.06	9.7	2.4	6.9	1.8	1.9	**22.7**
120	Bradford Ave	Branson St	Arsenal Ave	Shared Lane	0.18	6.5	2.4	2.3	1.8	9.4	**22.4**
121	SUP	Cape Fear River Trail	Unnamed path	Shared Use Path	0.23	1.6	2.4	6.9	1.8	9.4	**22.1**
122	Broadview-Abbot-wood-Copenhagen Dr	Tokay Drive	Eastwood Ave	Shared Lane	0.85	9.7	2.4	2.3	1.8	5.6	**21.9**
123	SUP	N Pearl St	Filter Plant Dr	Existing Shared Use Path	1.02	13.0	2.4	2.3	1.8	1.9	**21.3**
124	Morganton Rd	Loch Haven Dr	US 401 (Skibo rd)	Sidepath	0.78	3.2	7.2	6.9	1.8	1.9	**21.1**
125	Morganton Rd	Longbranch Dr	E Loch Haven Dr	Sidepath	0.41	3.2	7.2	6.9	1.8	1.9	**21.1**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
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126	Bragg Blvd On Ramp	NC 24 (Bragg Blvd)	US 401 (Pamalee Dr)	Sidepath	0.16	3.2	7.2	6.9	1.8	1.9	**21.1**
127	Winslow St	W Russell St	Hay St	Shared Lane	0.15	6.5	7.2	2.3	1.8	1.9	**19.7**
128	SUP	Morganton Rd	Dashland Dr	Shared Use Path	1.95	6.5	2.4	6.9	1.8	1.9	**19.5**
129	SUP	Old Bunce Rd	US 401 (Raeford Rd)	Shared Use Path	1.01	6.5	2.4	6.9	1.8	1.9	**19.5**
130	Persimmon Creek Trail	Godfrey Drive	Persimmon Creek	Shared Use Path	0.94	6.5	2.4	6.9	1.8	1.9	**19.5**
131	SUP	Kimsey Ln	Andrews Rd	Shared Use Path	0.64	6.5	2.4	6.9	1.8	1.9	**19.5**
132	SUP	SUP	Johnson St	Shared Use Path	0.41	6.5	2.4	6.9	1.8	1.9	**19.5**
133	Hibiscus Road	Termination of road	Haileah Ct (proposed sidepath)	Sidepath	0.38	6.5	2.4	6.9	1.8	1.9	**19.5**
134	SUP	Odom Dr	Douglas Byrd High School	Shared Use Path	0.20	6.5	2.4	6.9	1.8	1.9	**19.5**
135	Old Bunce Rd	SUP	Cliffdale Rd	Sidepath	0.48	1.6	7.2	6.9	1.8	1.9	**19.4**
136	N Cool Spring St	Adam St	SUP	Shared Lane	0.14	3.2	2.4	2.3	1.8	9.4	**19.1**
137	Tokay Drive	End of Tokay Drive	Cape Fear River Trail	Shared Use Path	0.20	6.5	2.4	2.3	1.8	5.6	**18.6**
138	Rankin Street	Winslow Street	Robeson Street	Shared Lane	0.11	6.5	2.4	2.3	1.8	5.6	**18.6**
139	Cape Fear River Trail	Eastwood Drive	Treetop Drive	Existing Shared Use Path	3.58	9.7	2.4	2.3	1.8	1.9	**18.1**
140	SUP	SUP	Cape Fear River Trail	Existing Shared Use Path	1.22	9.7	2.4	2.3	1.8	1.9	**18.1**
141	Wichita Dr	Bonanza Dr	Morganton Rd	Shared Lane	1.05	9.7	2.4	2.3	1.8	1.9	**18.1**
142	Santa Fe Dr	Termination of road	Bonanza Dr	Shared Lane	0.53	9.7	2.4	2.3	1.8	1.9	**18.1**
143	Stacy Weaver Drive East-bound	Hampton Road	US 401 (Ramsey St)	Sidepath	0.31	9.7	2.4	2.3	1.8	1.9	**18.1**
144	Kooler Circle	Huske St	Glenwood Dr	Existing Bike Lane	0.27	9.7	2.4	2.3	1.8	1.9	**18.1**
145	General Lee Ave	Park Ave	Glen Pl	Existing Bike Lane	0.25	9.7	2.4	2.3	1.8	1.9	**18.1**
146	Louise Street	SUP	US 401 (Skibo Road)	Multi-Use Lane	0.22	9.7	2.4	2.3	1.8	1.9	**18.1**
147	Park Ave	General Lee Ave	Hilltop Ave	Existing Bike Lane	0.10	9.7	2.4	2.3	1.8	1.9	**18.1**
148	Hoffer Drive	North St	Cape Fear River Trail	Multi-Use Lane	0.39	1.6	2.4	2.3	1.8	9.4	**17.5**
149	Lake Valley Dr	US 401 (Skibo Rd)	Yadkin Rd	Sidepath	0.68	3.2	2.4	6.9	1.8	1.9	**16.2**
150	Cliffdale Road	Waters Edge Dr	Lynhurst Dr	Sidepath	0.40	3.2	2.4	6.9	1.8	1.9	**16.2**

PRIORITIZED RECOMMENDED PROJECTS LIST

Priority Rank	Road Name	From	To	Type	Length (mi)	Prioritization Factors					Priority Score
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151	SUP	SUP	Lake Valley Dr	Shared Use Path	0.28	3.2	2.4	6.9	1.8	1.9	**16.2**
152	SUP	Shenandoah Dr	Redwood Dr	Shared Use Path	0.26	3.2	2.4	6.9	1.8	1.9	**16.2**
153	Hogan St	Termination of road	NC 210 (Murchison Road)	Sidepath	0.24	3.2	2.4	6.9	1.8	1.9	**16.2**
154	SUP	Waterbury Dr	Little Bridge Rd	Shared Use Path	0.23	3.2	2.4	6.9	1.8	1.9	**16.2**
155	Sidepath	Hibiscus Road	Hogan St	Sidepath	0.17	3.2	2.4	6.9	1.8	1.9	**16.2**
156	Russell St	Broad Street	Cape Fear River	Shared Use Path	0.10	3.2	2.4	6.9	1.8	1.9	**16.2**
157	Shenandoah Drive	End of Road west of creek	Kara Court east of creek	Shared Use Path	0.09	3.2	2.4	6.9	1.8	1.9	**16.2**
158	SUP	SUP	Jefferson Dr	Shared Use Path	0.06	3.2	2.4	6.9	1.8	1.9	**16.2**
159	Cape Fear River Trail	SUP	Eastwood Ave	Existing Shared Use Path	1.70	6.5	2.4	2.3	1.8	1.9	**14.9**
160	Lake Rim Trail	Lake Rim	-	Existing Shared Use Path	1.38	6.5	2.4	2.3	1.8	1.9	**14.9**
161	SUP	N Cool Spring St	N Eastern Blvd	Existing Shared Use Path	1.25	6.5	2.4	2.3	1.8	1.9	**14.9**
162	Eastern Boulevard	Cross Creek	Cape Fear River	Shared Lane	0.38	6.5	2.4	2.3	1.8	1.9	**14.9**
163	Glenwood Dr	Huske St	NC 24	Existing Bike Lane	0.21	6.5	2.4	2.3	1.8	1.9	**14.9**
164	SUP	Arsenal Ave	Arsenal Ave	Existing Shared Use Path	0.12	6.5	2.4	2.3	1.8	1.9	**14.9**
165	Hillard Dr	Clearwater Dr	Larkspur Dr	Existing Bike Lane	1.03	3.2	2.4	2.3	1.8	1.9	**11.6**
166	Huske St	Woodland Dr	Kooler Circle	Existing Bike Lane	0.46	3.2	2.4	2.3	1.8	1.9	**11.6**
167	McArthur Rd	Center St	Braxton Blvd	Buffered Bike Lane	0.42	3.2	2.4	2.3	1.8	1.9	**11.6**
168	Tamarack Drive	Lake Pine Drive	Rosehill Road	Existing Bike Lane	0.26	3.2	2.4	2.3	1.8	1.9	**11.6**
169	Eastwood Dr	Cape Fear River Trail	Cape Fear River Trail	Existing Bike Lane	0.18	3.2	2.4	2.3	1.8	1.9	**11.6**
170	SUP	SUP	Queensdale Dr	Existing Shared Use Path	0.18	3.2	2.4	2.3	1.8	1.9	**11.6**
171	Ashton Rd	Inverness Dr	Camelot Dr	Multi-Use Lane	0.11	3.2	2.4	2.3	1.8	1.9	**11.6**