TOWN OF CARRBORO

PLANNING BOARD

301 West Main Street, Carrboro, North Carolina 27510

7:30 P.M. ***REMOTE MEETING****

A G E N D A

THURSDAY, OCTOBER 1, 2020

Item	Topic/Action	Person/Agency	Time (Approx)
I.	**WELCOME & INTRODUCTIONS**	Chair	8:00
II.	**JOINT REVIEW ITEMS**		
	A) Review of Update to the Comprehensive Bicycle Transportation Plan	Transportation Planner/Advisory Boards	8:05
III.	**APPROVAL OF MINUTES**		
	A) September 3, 2020	Chair/Planning Board	8:35
IV.	**OTHER MATTERS**		
	A) Review of Update to the Comprehensive Bicycle Transportation Plan	Chair/Planning Board	8:40
	B) Follow-up discussion from Transit Summit		9:15
V.	**ADJOURNMENT**	Chair	9:30

**To view the advisory board meeting, please email Tina Moon at cmoon@townofcarrboro.org to receive an invitation to view the meeting. If you wish to make public comment, at the time of the public comment, the staff person will be able to allow speakers to remotely enter the meeting one-by-one to comment. Please send any written statement or materials to the same email provided above. Requests to remotely attend the meeting shall be made within 24 hours of the meeting start time. The requester should also specify if they wish to make any comments in the email. All written statements and materials will be forwarded to the advisory board members.*

PUBLIC COMMENT AT PLANNING BOARD MEETINGS

If members of the public wish to address the Planning Board, a time will be provided during the meeting. Speakers may address the Board only after being recognized by the Chair and only from the podium, subject to a three-minute time limit.

TOWN HALL IS ACCESSIBLE FOR PERSONS WITH DISABILITIES.

FOR MORE INFORMATION, CONTACT STAFF AT 919-918-7325.

JOINT REVIEW

AGENDA ITEM ABSTRACT

MEETING DATE: THURSDAY, OCTOBER 1, 2020

SUBJECT: **UPDATED BICYCLE TRANSPORTATION PLAN**

DEPARTMENT: **PLANNING DEPARTMENT**	**PUBLIC HEARING**: **YES** __ **NO X**
ATTACHMENTS: **A. DRAFTUPDATE BICYCLE PLAN DOCUMENT** **B. DRAFT PLAN APPENDIX**	**FOR INFORMATION CONTACT:** **Zachary Hallock, Transportation Planner, 919-918-7329 or zhallock@townofcarrboro.org**

PURPOSE

Starting in 2019, the Town of Carrboro contracted with Alta Planning and Design, Inc. for the creation of an updated bicycle plan. On September 23rd, 2020, the Town Council set a public hearing for October 27th, 2020 to consider adopting the plan and refered it to advisory boards for comment.

INFORMATION

The majority of the work in developing the draft plan was performed between January 2019 and November 2019. The plan contains an assessment of existing conditions, a description of public outreach, identification of strategic priority projects, projects to add to the long-term bicycle network, and policy/program recommendations. Public outreach and stakeholder engagement for the plan was made up of three parts:

1. General public outreach at major Town events (Open Streets, Carrboro Day, Bike Breakfast, Bike on Bus) and gathering of feedback from use of Bike Plan Survey;
2. Targeted efforts with specific stakeholder groups (Staff from other public agencies, Local Bike Advocates, Middle School Mountain Biking Teams, Karen/Burmese speaking-community w/Translators, Spanish-language survey at El Centro, long-term Carrboro residents, Rogers Road community, direct mailings to historically underserved neighborhoods);
3. Steering Committee with members from Carrboro Advisory Boards, Local Residents, Town Staff, and Staff from regional transportation partners (Chapel Hill, Orange Co, DCHC MPO, TJCOG, NCDOT, UNC).

RECOMMENDATIONS

Town staff recommends that the Joint Review Boards review/discuss the plan documents attached and provide comments taking into consideration the following questions:

1. Are the proposed programs and policies ones which would help make the choice to ride a bicycle for transportation easier?
2. Are the proposed bicycle network improvements once which would make biking safer and facilitate movement throughout Town on a bicycle?
3. Are there any areas in Town which have not been adequately represented?
4. Are there any groups of people which have not been adequately represented?

SEPTEMBER 2020

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TOWN OF CARRBORO UPDATED BIKE PLAN

ACKNOWLEDGEMENTS

Thank you to the local residents, community leaders, and government staff that participated in the development of this Plan through meetings, workshops, events, comment forms, and plan review. Special thanks to those who participated as steering committee members, listed below.

PROJECT STEERING COMMITTEE

The Steering Committee was made up of local residents, government staff, and community members.

- Colleen Barclay, Carrboro Bicycle Coalition
- Lisa Brown, Carrboro Northern Transition Area Advisory Committee
- Becki Cleveland, Carrboro Recreation and Parks Commission
- Chris Colvin, Carrboro Resident
- Ray Enoch, Carrboro Fire-Rescue Department
- Barbara M Foushee, Carrboro Board of Alderman
- Lyndsay Gavin, Environmental Advisory Board
- Rachel Gaylord-Miles, Carrboro Planning Board
- Tyler Gilmore, Orange Literacy – ESOL Program Coordinator
- Linda Haac, Carrboro Transportation Advisory Board
- Kevin Hicks, Triangle Bikeworks
- Charlie Hileman, Carrboro Resident
- Brent Hobby, Carrboro Police Department
- Barbara Jessie-Black, PTA Thrift Shop
- Rachel Kelley, Carrboro Resident
- Dave Mabe, Carrboro Greenways Commission
- Dale McKeel, DCHC MPO
- Abigaile Pittman, Orange County Planning Department
- Nishith Trivedi, Orange County Planning Department
- Galen Poythress, Carrboro Recreation and Parks Department
- Donnie Rhoads, Chapel Hill Police Department
- Steve Rogers, NCICL (North Carolina Interscholastic Cycling League)
- Tamara Sanders, Clean Machine Bike Shop
- Lee Schimmelfing, Orange County Resident
- Jon Scott, Carrboro Resident
- Daniel Snipes, Carrboro Public Works Department
- Kurt Stolka, UNC Chapel Hill Transportation and Parking
- John Vine-Hodge, NCDOT Division of Bicycle and Pedestrian Transportation
- Anahid Vrana, Carrboro Northern Transition Area Advisory Committee
- Josh D Worshofsky, Carrboro Resident
- Kathryn Zeringue, NCDOT Division of Bicycle and Pedestrian Transportation

DRAFT

Prepared for the Town of Carrboro, North Carolina

Project Contact: Zachary Hallock, Transportation Planner, Town of Carrboro
zhallock@townofcarrboro.org

Town Hall, Planning, Zoning, and Inspections Department, 301 W. Main St., Carrboro, NC 27510 | Phone 919-919-7329
www.townofcarrboro.org

This project was made possible with a matching grant from the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT).

Cover art adapted from the League of American Bicyclists' Bicycle Friendly Community Program

Prepared by Alta Planning + Design
Adopted by the Town of Carrboro on _____.

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1 THE VISION

Photo Credit: The Town of Chapel Hill

2020 VISION STATEMENT:

"Envisioning Carrboro as a place where biking is accessible, safe, and convenient for everyone between the ages of 8 to 80."

PROJECT BACKGROUND

The Town of Carrboro is a bikeable community because of its long-standing commitment to biking as a safe and efficient form of transportation. The 2020 Carrboro Bicycle Plan is a new plan, based on the 2009 Bicycle Plan, showing the Town's continued commitment. The new Vision Statement is a simplification of the 2009 vision.

While Carrboro is one of the most bikeable places in North Carolina today, the Town is dedicated to evaluating opportunities for improvement to ensure biking in Carrboro is safe, fun and accessible for all ages and abilities.

The graphic below illustrates the planning process for this Updated Bike Plan. This plan aims to:

- **Engage** an active steering committee of stakeholders to guide the planning process
- **Develop** an Equity Framework to ensure all residents are considered
- **Recommend** projects and programs that are grounded in realistic implementation
- **Present** a final plan that is a reflection of community needs and national best practices.

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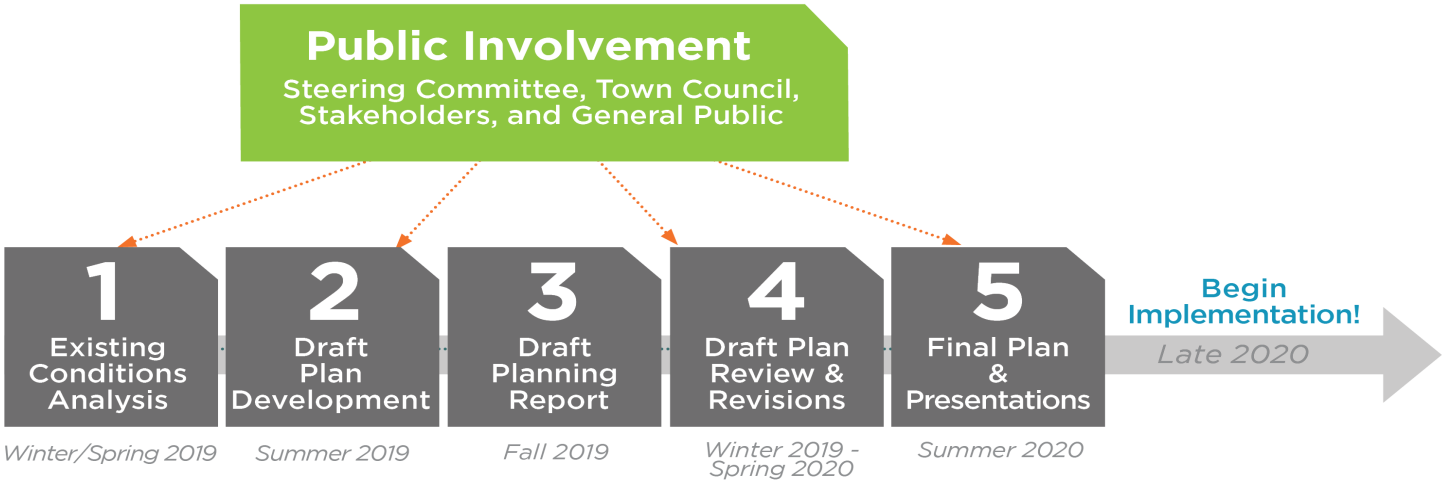

REFLECTION ON THE 2009 PLAN

The previous Carrboro Bicycle Plan, adopted in 2009, was the first of its kind for the Town. Despite having bike lanes since the 1970s, bicycle infrastructure was largely implemented as opportunities arose and policies developed incrementally rather than through a comprehensive vision. This process was guided by a clear vision statement, which also outlined the goals and objectives of the Bicycle Plan. The vision proposed for this updated Plan (p5) is effectively a distillation of that previous statement shown below.

Despite the benefits of such a vision, the rate of growth of Carrboro's bicycle network has slowed in recent years. This could be due to any number of factors including the implementation of easier projects first, the difficultly associated with installing bicycle facilities on roads which are not maintained by the town, and changes to funding mechanisms. This updated Plan reassesses the existing conditions, identifies new projects, and provides updated design standards to account for advancements in bicycle facility design which have occured over the past 10 years.

"Carrboro will be a place that is bicycle-friendly; where people have an accessible, safe, and convenient option of bicycling for transportation, recreation, and health; where bicycle lanes and greenways provide a connected system within and outside Town; where future development provides access and facilities for bicyclists; where bicycle transportation is the easy choice; and where programs educate, inspire, and encourage residents and enforce safe bicyclist and motorist behavior."

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EXISTING PLANS AND DOCUMENTS

The following plans and documents, both local and regional, have been reviewed as part of the updated Plan. More information about these plans can be found in the Appendix.

- **CONNECT 2045 (2019)** - The Triangle's Metropolitan Transportation Plan
- **NC 54 Safety Study (2019)** - Bike-Ped Safety analysis in Carrboro-Chapel Hill
- **NC 54 W Corridor Study (2018)** - Carrboro-Graham Corridor Assessment
- **203 S Greensboro Project (2018)** - Orange Co. Southern Branch Library
- **Carrboro Economic Sustainability Plan (2017)**
- **Carrboro Downtown Parking Plan (2017)**
- **Carrboro Community Climate Action Plan (2017)**
- **Carrboro Bicycle Program Review (2016)**
- **Carrboro Bike Parking Ordinance (2015)**
- **Carrboro Affordable Housing Goals and Strategies (2014)**
- **Carrboro Safe Routes to School Plan (2012)**
- **Morgan Creek Greenway Study (2010)**
- **Bolin Creek Greenway Concept Plan (2009)**
- **Carrboro Bicycle Plan (2009)**
- **Residential Traffic Management Plan (2006)**
- **Downtown Traffic Circulation Study (2005)**
- **Carrboro Vision 2020 Plan (2000)**

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PLAN GOALS

These goals build upon the vision statement and help to inform this Plan's analysis and recommendations. As shown below, there is no other single type of investment in Carrboro that could support this many issues related to quality of life.

ENHANCE CONNECTIVITY

Create a network of bike routes that allow Carrboro residents and visitors to access activity centers and surrounding communities by bike.

CREATE A POSITIVE ECONOMIC IMPACT

Recognize the economic benefits of a bicycle-friendly community, and capitalize on the return on investment for bike infrastructure.

PROTECT THE ENVIRONMENT

Reduce the level of transportation-related greenhouse gas emissions in Carrboro.

ADVANCE EQUITY

Create a network of bike routes that allow ALL Carrboro residents to safely and easily access parks and activity centers by biking and strive to make Carrboro a place where cycling rates are not predictable by race.

ENHANCE HEALTH

Provide transportation options and recreational opportunities that promote an active lifestyle.

INCREASE SAFETY

Address the safety and level of comfort of the transportation system for people who bicycle; Reduce the number of bicycle crashes, injuries, and fatalities over time.

INCREASE LIVABILITY

Implement complete street solutions which will incorporate all modes, including bicycles, to support healthy, safe, and bikeable neighborhoods.

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BENEFITS OF INCREASED BICYCLING

By increasing the rates of bicycling, we can help to improve people's health and fitness, increase the livability of our community, decrease automobile dependency, improve environmental conditions by reducing greenhouse gas emissions, and develop a greater sense of community.

The following section outlines the many benefits of bicycling and this Plans main themes: connectivity, economic benefit, environment, equity, health, and safety.

Photo credit: BikeCarrboro

Photo credit: Carrboro Recreaction and Parks Department

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Connectivity

Almost all of Carrboro falls within a 2-mile radius of its town center (roughly at Town Hall), meaning that many of the Town's centers of employment, recreation, education, shopping, and culture are within a reasonable bicycling distance of one another.

Similarly, nearby destinations such as UNC Chapel Hill, the Town of Chapel Hill, and rural Orange County are all within a similar bicycling distance. The challenge becomes making safe, comfortable, and convenient bikeways and greenways across these distances, which is a goal of this Plan.

60% of all driving trips **made in the U.S.** are shorter than five miles (see chart below), indicating an opportunity to shift those trips to bike trips with a connected, low-stress network.

26% of young people **nationally** (aged 16 to 34) don't have a driver's license and rely on other means of transportation according to the National Household Travel Survey.

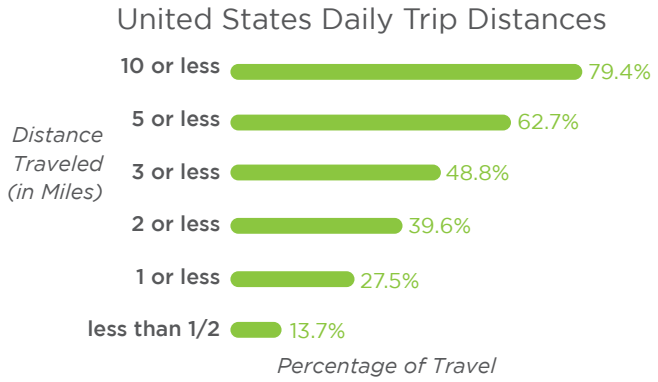
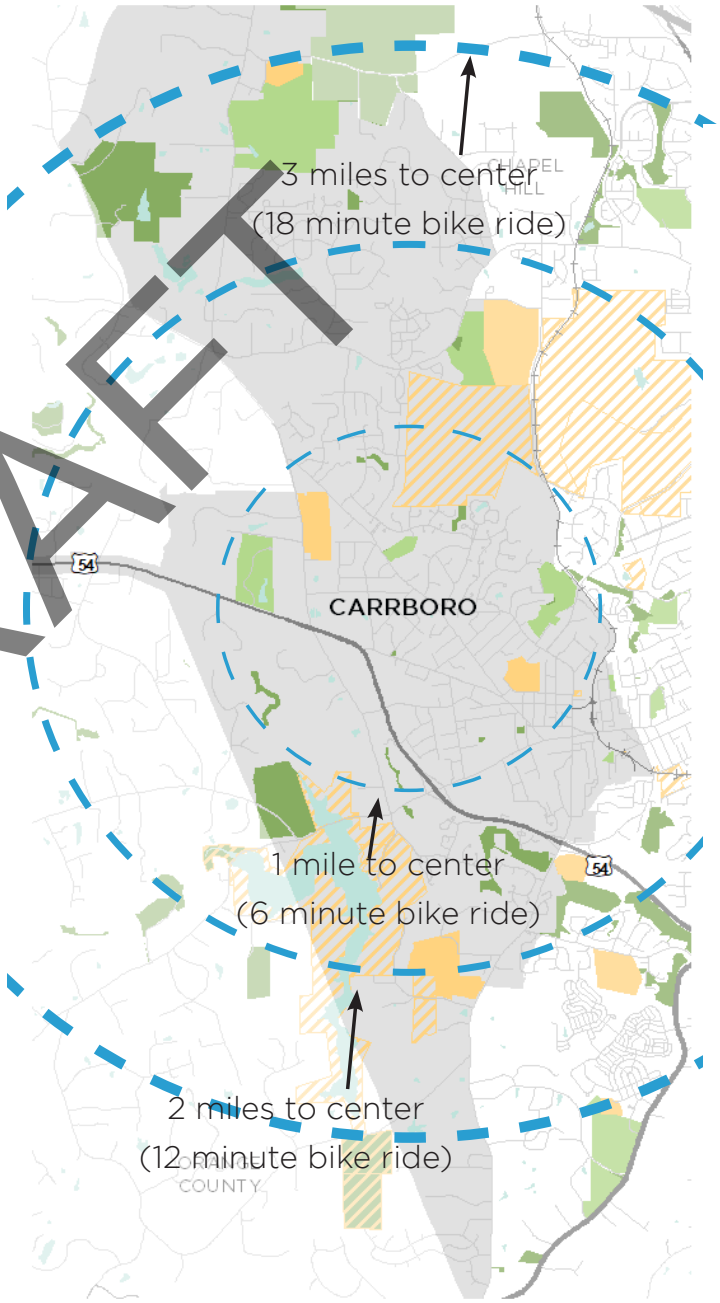


Chart from the Bicycle and Pedestrian Information Center, www.pedbikeinfo.org

MAP 1: EXAMPLE TRIP DISTANCES & BICYCLE RIDE TIMES IN THE CARRBORO AREA



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Economic Impact

There are many economic benefits of biking in the form of tourism, development and maintenance of facilities, increased property values, commercial activity, and infrastructure savings.

Below are some key economic trends related to bicycling and greenway trails:

- In North Carolina, every $1.00 of initial trail construction supports $1.72 annually from sales revenue, sales tax revenue, and benefits related to health and transportation.*
- A study of the behavioral effects of completing a critical link in the American Tobacco Trail (ATT) found that with the connection installed over I-40, use of the ATT increased by 133%, with an additional $3.7 million spent annually on goods and services for those using the trail.*
- Nationally, cities report higher retail sales along bicycling corridors. In San Francisco, 66% of merchants reported increased sales after bike lanes were installed on Valencia Street.**
- The raw cost for the installation and maintenance of bicycle facilities is negligible compared to those same costs for cars and highways, although bicycle projects do require local match with NCDOT.
- Bicycling, when it can be used in a community as a viable form of transportation, can at least partially replace car ownership and maintenance, keeping household disposable income available for other important wants and needs.

**Institute of Transportation Research and Education, 2017.*
***People for Bikes*

"Trails can be associated with higher property value, especially when a trail is designed to provide neighborhood access and maintain residents' privacy. Trails, like good schools or low crime, create an amenity that commands a higher price for nearby homes. Trails are valued by those who live nearby as places to recreate, convenient opportunities for physical activity and improving health, and safe corridors for walking or cycling to work or school."

- Headwaters Economics (www.headwaterseconomics.org/trail)

Carrboro's identity as a bicycle-friendly town influences the businesses in the area. Photo credit: Open Eye Cafe/Carrboro Coffee Roasters

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Environment

Bicycle facilities, greenways, and other trails can help increase rates of bicycling (and walking) to reduce rates of driving and thus reduce greenhouse gas emissions; a goal of the Town's climate action plan. Off-road facilities, like greenways, eliminate most opportunity for conflicts with motorized vehicles, which can help encourage newer people bicycling to leave their cars at home. With careful design, greenways can be incorporated into natural areas and act as natural buffer zones that protect streams, rivers, and lakes by filtering pollutants, minimizing runoff from impervious surfaces and limiting soil erosion. Greenways and trails also help guide movement of people walking and bicycling through natural areas and preserve sensitive areas. Simultaneously, these can provide the community with safe and appealing opportunities to access the outdoors can spur environmental stewardship and the appreciation of the natural beauty in Carrboro and the surrounding region. Increased time spent outdoors in nature has been shown to increase wellbeing and provide health benefits, both physically and mentally.

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ENVIRONMENTAL HEALTH BENEFITS OF WALKABLE AND BIKEABLE COMMUNITIES

CURRENT U.S. ENVIRONMENT & HEALTH STATISTICS

ASTHMA IS THE LEADING CHRONIC DISEASE IN CHILDREN and the number one reason for missed school days

(CDC)

Exposure to **TRAFFIC EMISSIONS** is linked to exacerbation of **ASTHMA, REDUCED LUNG FUNCTION, ADVERSE BIRTH OUTCOMES** and childhood **CANCERS**

(CDC)

40% OF ALL TRIPS in the U.S. are **TWO MILES OR LESS**, and two-thirds of them happen in cars

(NHTS, 2009)

ENVIRONMENT & HEALTH BENEFITS

A minimum of **20 MINUTES OF PHYSICAL ACTIVITY, 3X WEEK, STRENGTHENS THE LUNGS**, including those of individuals living with asthma

(US National Lib of Medicine)

IF 8% MORE CHILDREN LIVING WITHIN 2 MILES OF A SCHOOL WERE TO WALK OR BIKE TO SCHOOL, the air pollution reduced from not taking a car would be **EQUIVALENT TO REMOVING 60,000 CARS FROM THE ROAD** for one year

(Pedroso, 2008, SRTS)

BIKING 2 MILES, rather than driving, **AVOIDS EMITTING 2 lbs OF POLLUTANTS**, which would take 1.5 months for one tree to sequester.

(EPA, 2000 and NC State, 2001)

Equity

According to the American Community Survey, about 8% of Carrboro households do not have access to an automobile (2017). Of the households without an automobile, 43% are of minority race/ethnicity (2015). Households without access to vehicles are not well-served by auto-oriented transportation solutions and require walking, bicycling, and transit infrastructure.

Similarly, children under 16, seniors who no longer drive, and people with disabilities who cannot drive deserve safe ways to access community destinations without depending on an automobile.

Automobile dependent communities in the United States spend over $8,500 of their household income on transportation compared to households living in communities with more accessible land use and more multi modal systems. In those communities, it was found that approximately $5,500 of household income went to transportation costs according to a 2000 study.[1]

1 Barbara McCann (2000), Driven to Spend; The Impact of Sprawl on Household Transportation Expenses, STPP (www.transact.org)

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Photo credit: Scott Scala

Photo credit: BikeCarrboro

Health

A growing number of studies show that the design of our communities—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth).

CURRENT U.S. HEALTH STATISTICS

80% of Americans **DO NOT ACHIEVE** the recommended 150 minutes per week of **MODERATE EXERCISE**

(CDC)

2/3 of Americans **ARE OVERWEIGHT OR OBESE**

(CDC)

CARDIOVASCULAR DISEASES are the **#1 CAUSE OF DEATH** in the United States

(American Heart Association)

61% of American adults 65 years or older **HAVE AT LEAST ONE ACTIVITY-BASED LIMITATION**

(CDC)

1 in 5 Americans report their **STRESS LEVELS AS EXTREME**

(American Psychological Association)

On average, **CHILDREN** spend more than **7.5** hours per day **IN FRONT OF A SCREEN**

(Kaiser Family Foundation)

HEALTH BENEFITS

Residents of **WALKABLE AND BIKEABLE COMMUNITIES** are **2.4x** as **LIKELY TO MEET PHYSICAL ACTIVITY GUIDELINES** compared to those who do not live in walkable neighborhoods

(Frank, 2005)

For every **0.6 MILE WALKED** there is a **5% REDUCTION IN THE LIKELIHOOD OF OBESITY**

(Frank, 2004)

20 MINUTES WALKING OR BIKING each day is associated with **21% LOWER RISK OF HEART FAILURE FOR MEN** and **29% LOWER RISK FOR WOMEN**

(Rahman, 2014 and 2015)

PHYSICAL ACTIVITY HELPS PREVENT OR DELAY ARTHRITIS, OSTEOPOROSIS AND DIABETES, while helping maintain balance, mental congition, and independence

(NIH-National Institute on Aging)

BIKE COMMUTERS REPORT LOWER STRESS LEVELS compared to auto commuters

(New Economics Foundation)

Youth who engage in **60 MINUTES** of moderate to vigorous **PHYSICAL ACTIVITY** daily have **BETTER COGNITIVE PROCESSING, ATTENTION SPANS, ACADEMIC PERFORMANCE AND SELF-ESTEEM**

(Institute of Medicine)

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Safety

There are many factors that influence the safety, both perceived and actual, that people who bicycle experience.

The following is an example of different safety strategies:

- Before and after studies of bicycle lane installations show a crash reduction of 35 percent (CMF ID: 1719) for vehicle/bicycle collisions after bike lane installation.
- Simply getting more people on bicycles is in itself a safety measure. Shifts from driving to active modes tend to reduce total per capita crash rates in an area, thus providing a safety benefit.
- Straightforward reduction of speed limits can have a profound effect on safety, and comfort for people who bicycle or walk (as seen in the graphic below).

From 2012 through 2016, Carrboro had an average of 4 reported bike crashes per year. During those 5 years, the lowest number of reported bike crashes was in 2016 with 1 crash and the highest number of reported bike crashes was in 2015 with 7 crashes.

Statewide, North Carolina had an average of 935 bike crashes per year during those same 5 years. (North Carolina Pedestrian and Bicycle Crash Data Tool, pedbikeinfo.org)

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Source: SFMTA Vision Zero, Institute of Transportation Engineers, US Dept. of Transportation

2 BIKING IN CARRBORO TODAY

Photo Credit: The Recyclery NC

PROGRESS SINCE THE 2009 BIKE PLAN

The Town of Carrboro's 2009 Bike Plan included a list of implementation action steps, the results of which are listed below.

Completed Action Steps

- Expanded bike parking requirements in Land Use Ordinance
- Added multiple on-road bikeways, completing several priority projects
- Formation of the Carrboro Bicycle Coalition
- Worked to ensure people who bicycle are incorporated into future transit service planning and design
- Continued "Basics of Bicycling" course
- Promoted Bike Month and created additional activities
- Continued school crossing guard program and expansion evaluation
- Used Census Data to determine new mode share
- Create a maintenance request system for bicycle-specific facilities

On-Track Action Steps

- Hosted training sessions for Town engineers and planners
- Partnered with DCHC MPO and other organizations for training programs
- Ensured bike facilities are part of new bridge design
- Improved signage and mapping
- Launched traffic calming public education program targeting all roadway users
- Enhanced enforcement of unsafe behavior
- Developed educational bike map
- Applied for additional Safe Routes to School funding
- Developed bicycle rodeos, summer bike camps, and other bike events
- Used greenways and bike facilities for events
- Supported the ReCYCLEry program
- Enforced illegal actions by people who dirve related to bike safety
- Created bike patrol positions
- Regularly reviewed and updated bicycle-related policies
- Completed updated Plan with 5-10 years
- Reach out to Spanish-speaking population

Incomplete Action Steps

- Develop brochures, articles, newsletters, and billboards
- Initiate training sessions for local-law enforcement
- Increase number of League Cycling Instructors
- Host own bike riding tours/races
- Research crashes and initiate crash reduction programs
- Measure new facilities as constructed and report on facility quality
- Create bicycle ambassador program
- Provided incentives for employees who commute by bike

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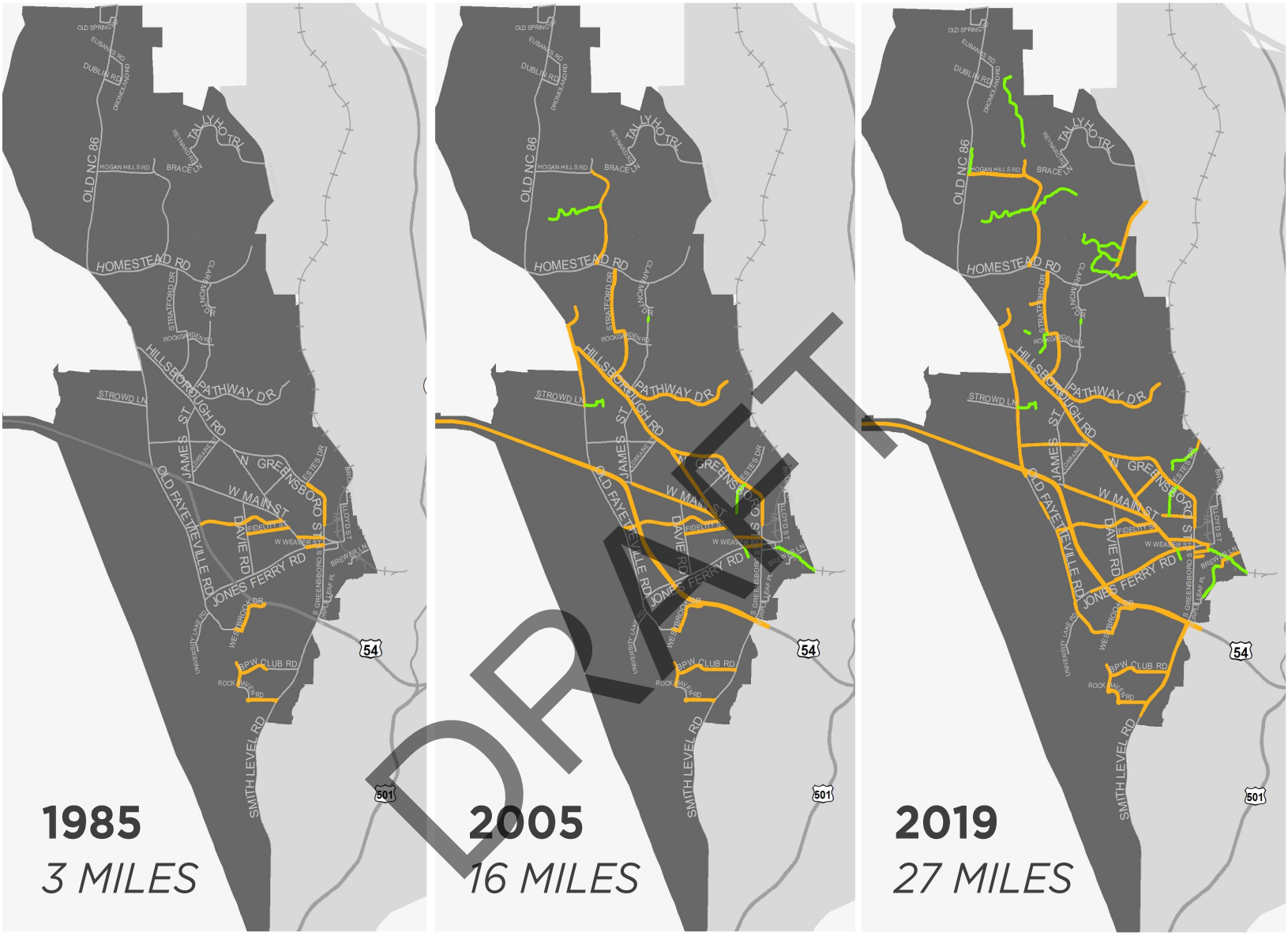
MAP 2: BIKEWAY NETWORK GROWTH



2019 NETWORK MILEAGE BY FACILITY TYPE

Shared Use

5 miles

Bike Lanes

16 miles

Sharrow

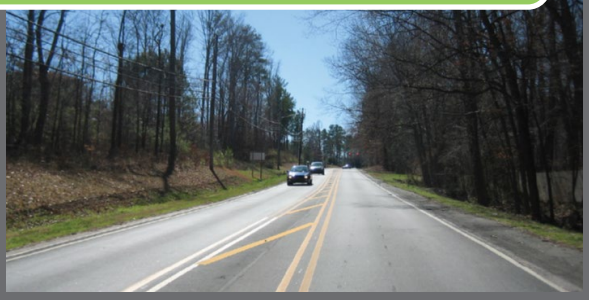
2 miles

Wide Shoulder

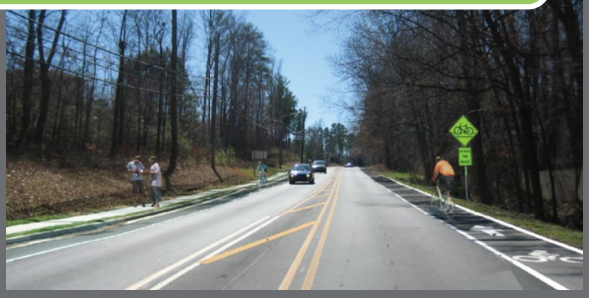
4 miles

CARRBORO BIKEWAYS TODAY

Smith Level Road - 2009



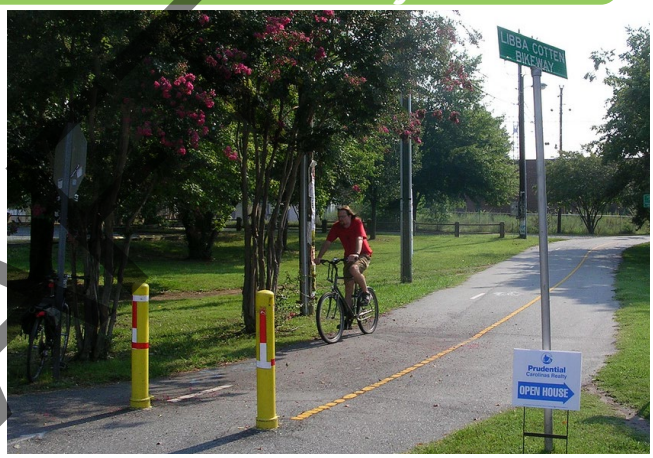
Smith Level Road - 2009



Smith Level Road - Today

Wilson Park Trail

Libba Cotton Bikeway



Weaver Street

Estes Drive

N Greensboro Street

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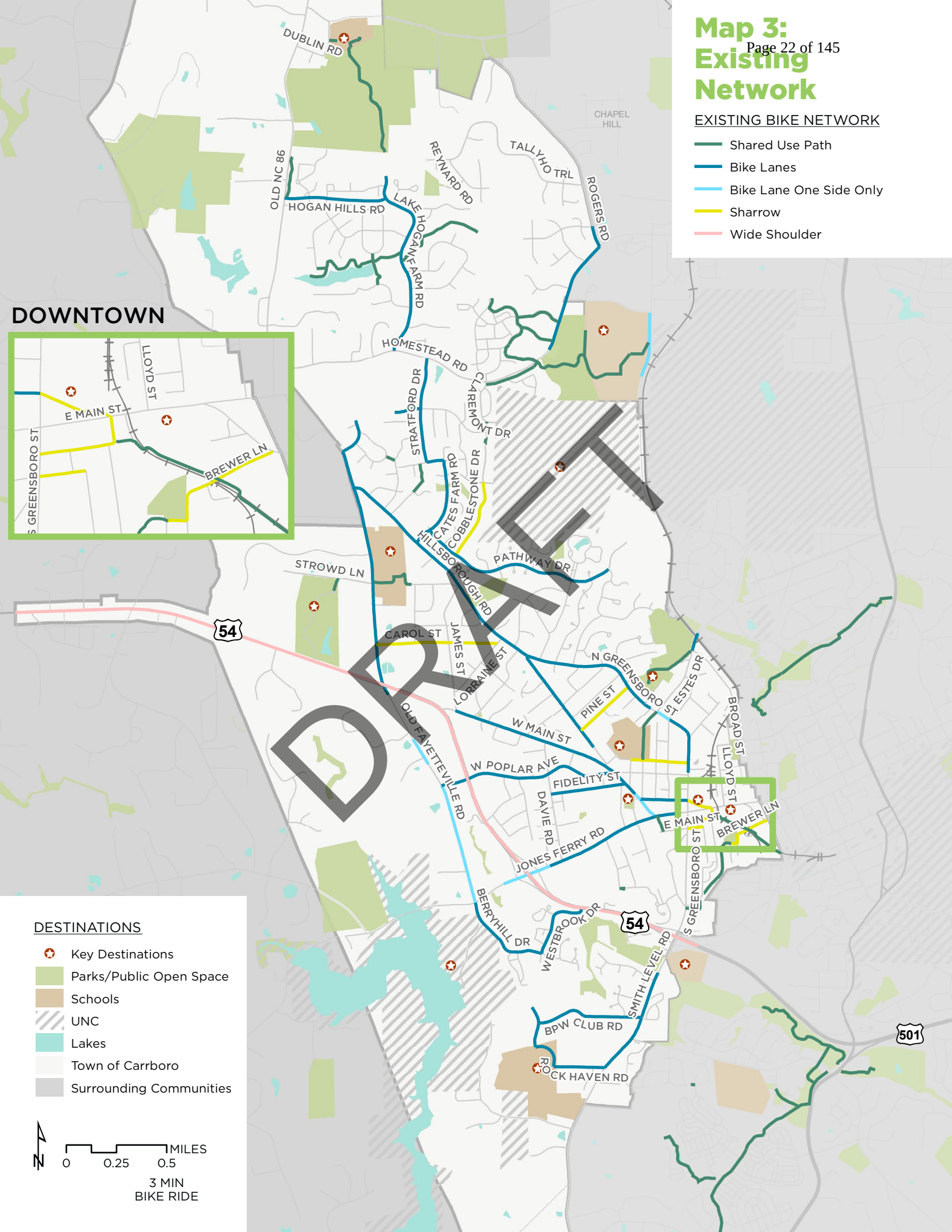
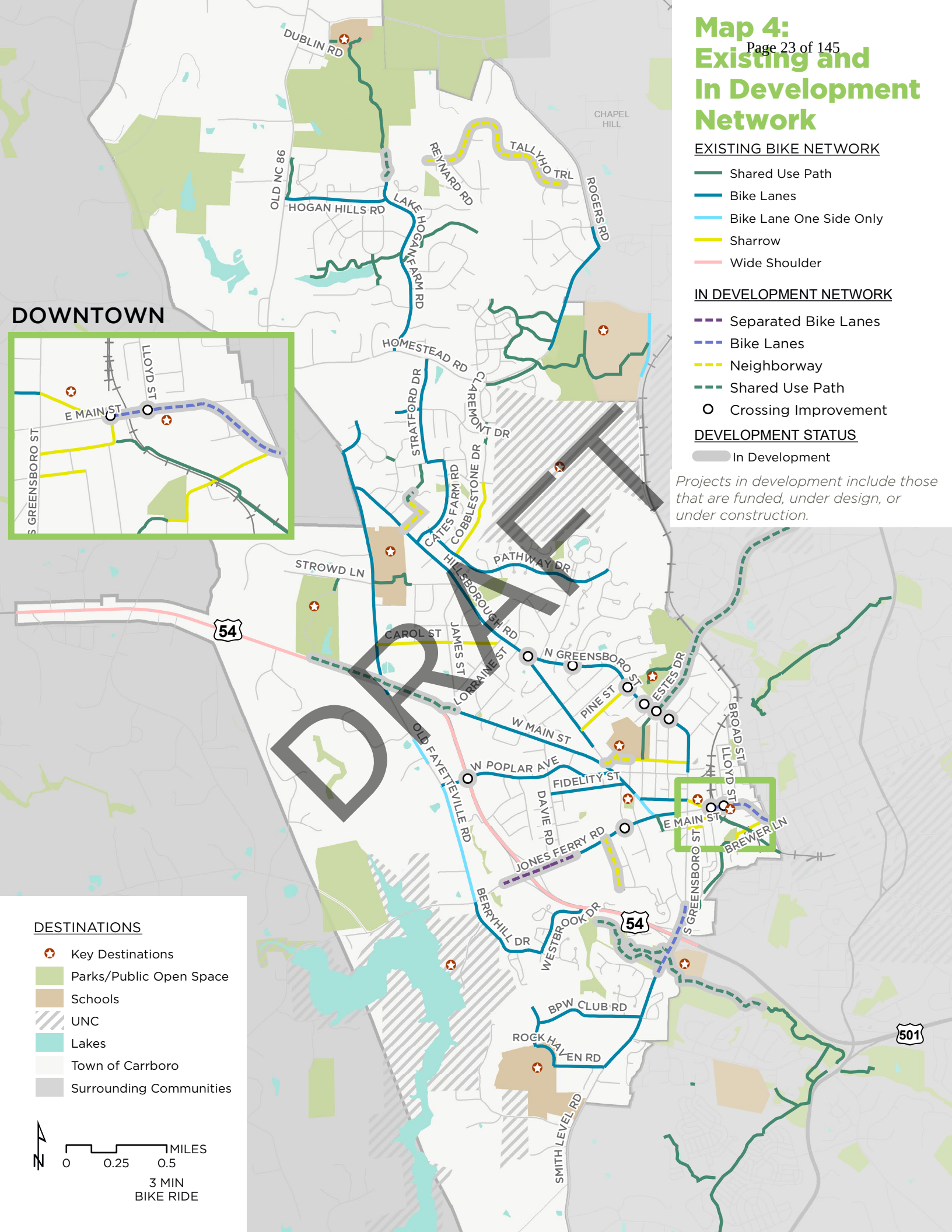
Map 3: Existing Network



Map 4: Existing and In Development Network



EQUITY ANALYSIS

Without access to transportation, people in Carrboro will have a harder time getting to work, buying healthy food, seeing a doctor, going to school, or connecting with others.

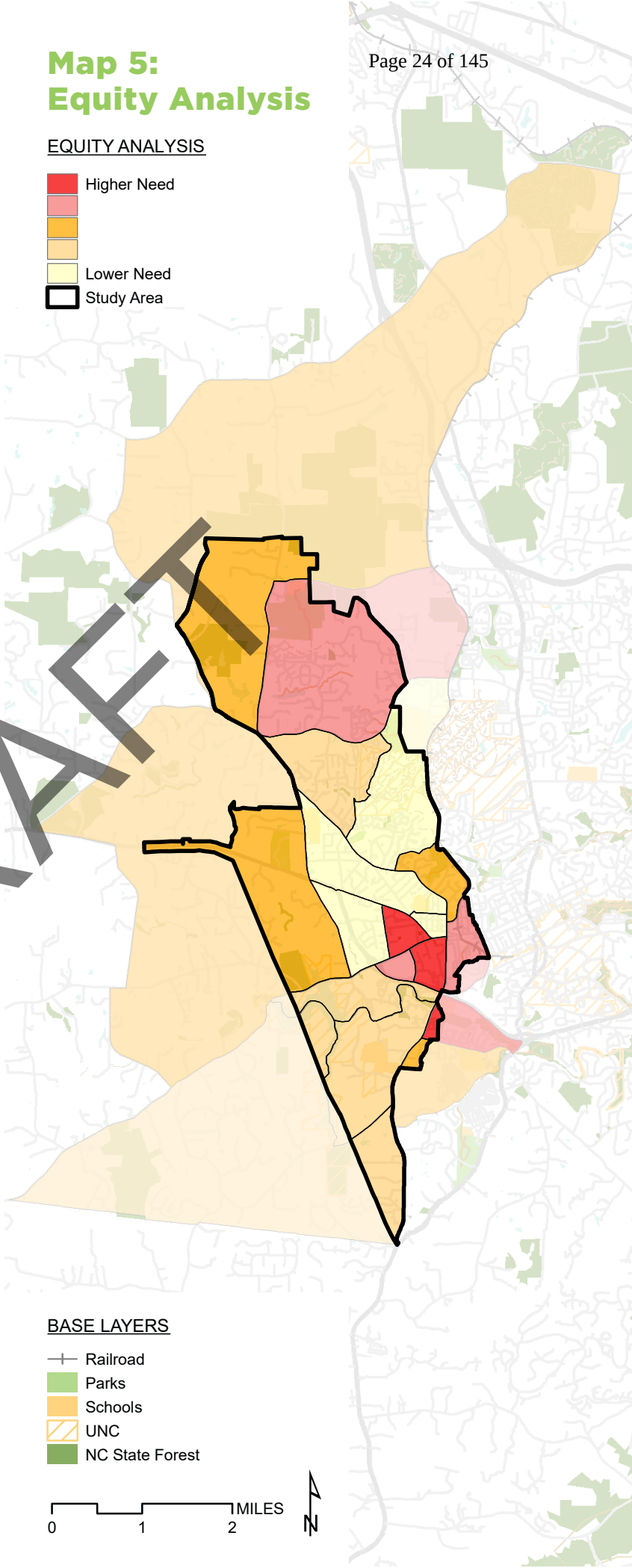
The equity analysis considers populations that may experience poor financial, health, and housing circumstances, and/or physical or communication limitations that prevent fulfilling basic needs without safe, convenient transportation options.

The map to the right reflects the average of six equity indicators with higher concentrations of:

- Households living below or near the poverty line
- Households without access to a vehicle
- Non-White populations
- People with limited English proficiency
- People without a high school diploma
- Children and senior citizens

These groups are more likely to be dependent on multimodal transportation such as bicycling, walking, or taking public transit thus resulting in a greater need for active transportation resources. Integrating this equity analysis into the development of the bicycle network and the prioritization of the network will further Carrboro's efforts of being a welcoming and inclusive environment that enhances the overall social, physical and mental well-being of the community.

Map 5: Equity Analysis



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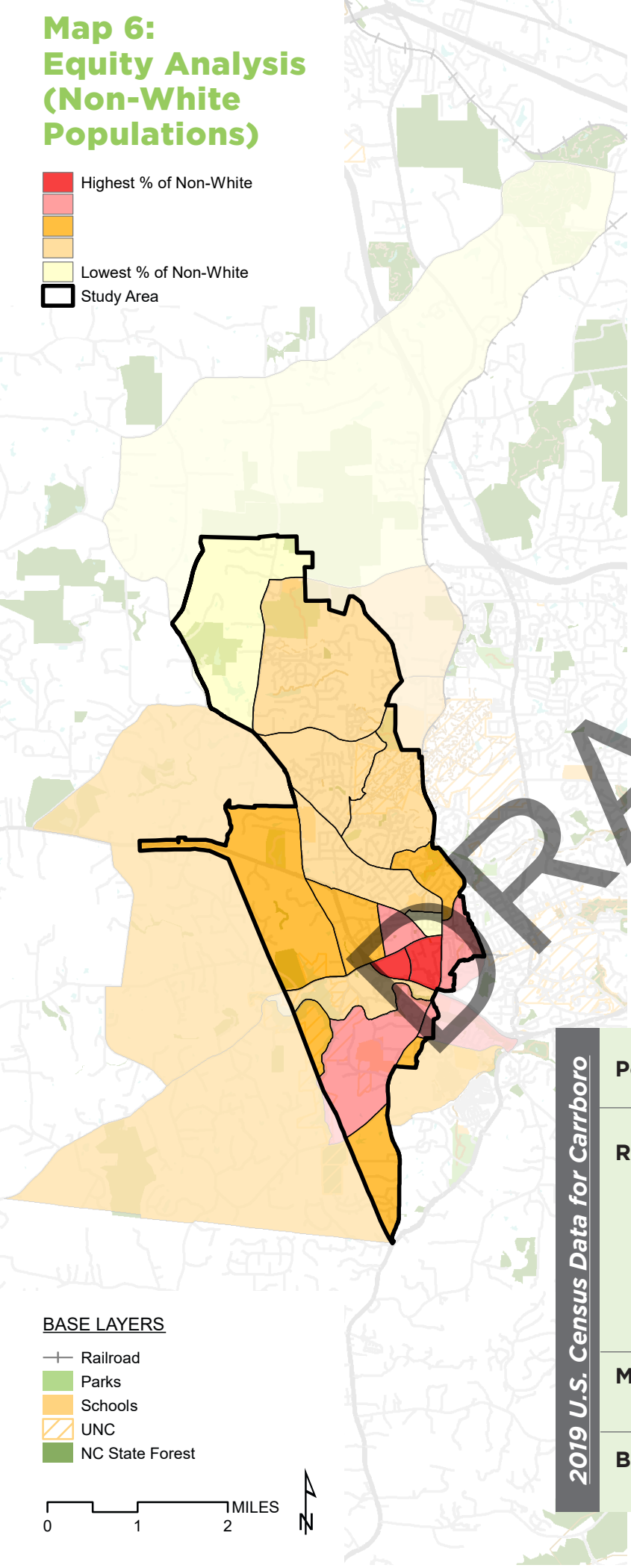
Map 6: Equity Analysis (Non-White Populations)



The Town of Carrboro is also a committed member of the Government Alliance on Race and Equity (GARE), a national network of government working to achieve racial equity and advance opportunities for all. GARE members make a commitment of achieving racial equity, focus on the power and influence of their own institution, and work in partnership with others. This commitment seeks to put racial equity at the forefront of all policies and decision-making including those involving bicycle infrastructure and associated programs.

A key wrinkle in the assessment of demographic data within Carrboro is that Census Block Groups which over low density areas tend to be quite large. Because of this, they do not fall entirely within Carrboro's Town Limits and assuming that the data for the block group is perfectly analogous to the area within Carrboro may or may not be true.

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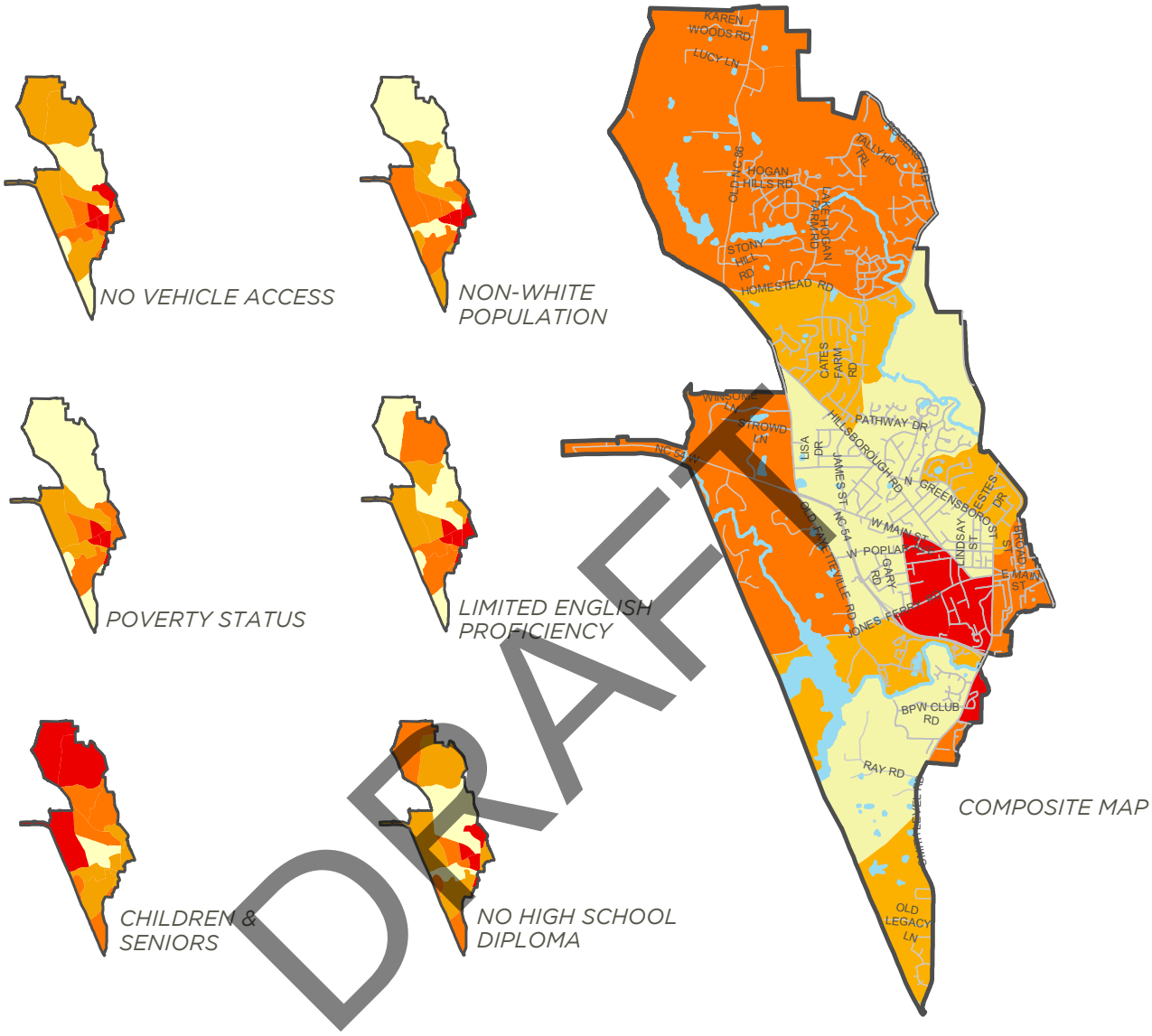
2019 U.S. Census Data for Carrboro

Population	21,190
Race	White (70%); Black or African-American (11.8%); American Indian and Alaska Native (0.9%); Asian (10.6%); Two or More Races (4.3%); Hispanic or Latino (8.1%)
Median Age	32.3
Bicycle Mode Share	4.8% (2018 ACS)

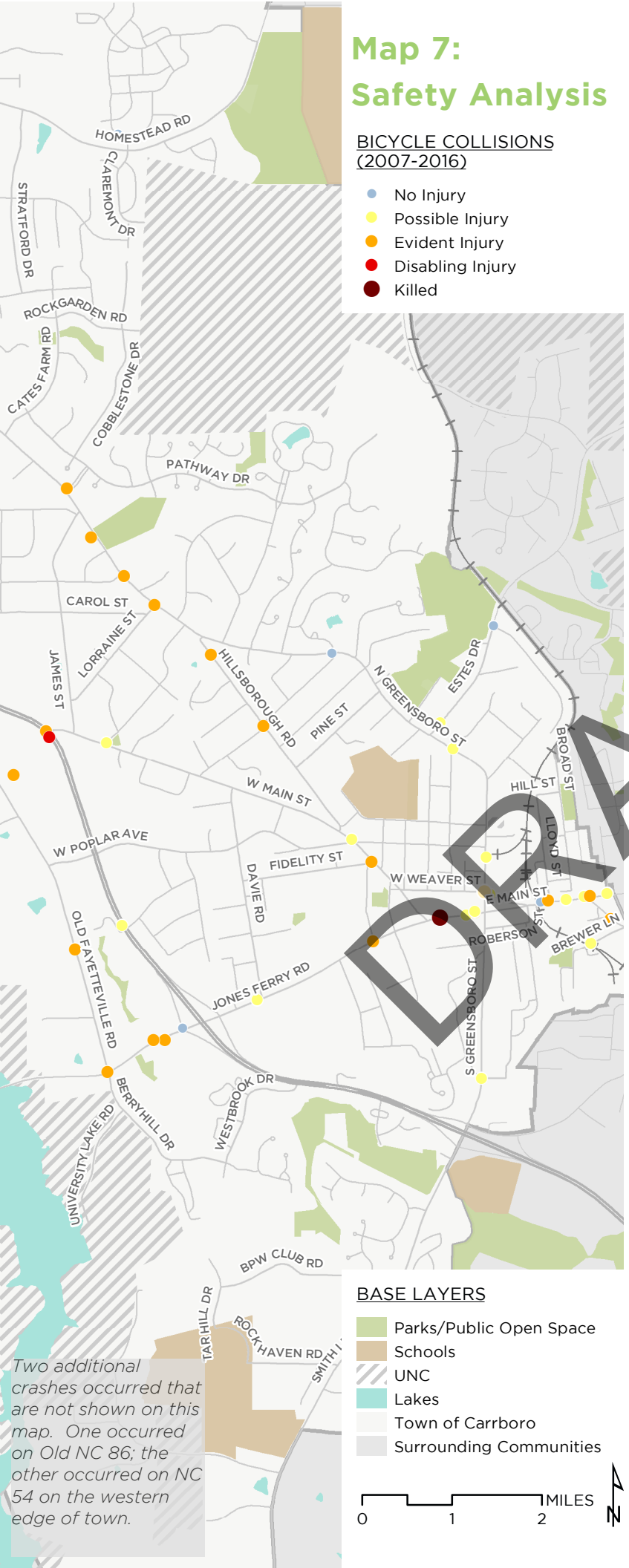
COMPOSITE MAP INPUTS



The figure above displays all six component maps (Poverty Rate, Vehicle Access, Non-white Populations, Limited English Proficiency, People without a HS Diploma, and Young and Old People). These individual maps were provided in the interest of transparency, as it can be somewhat challenging to understand the inputs for the composite map, shown on p22.

The key takeaways from the individual maps are that there are block groups with a high concentration of 5 out of 6 indicators near the center of Carrboro. The exception is Young and Old People, which tend to have higher concentrations in the north and west areas of the Town. This is reflected in the Composite map as 5 of the 6 block groups in the top two need tiers are within a mile of the center of Town. More details on the Equity Analysis can be found in the appendix.

Map 7: Safety Analysis



Two additional crashes occurred that are not shown on this map. One occurred on Old NC 86; the other occurred on NC 54 on the western edge of town.

SAFETY SUMMARY

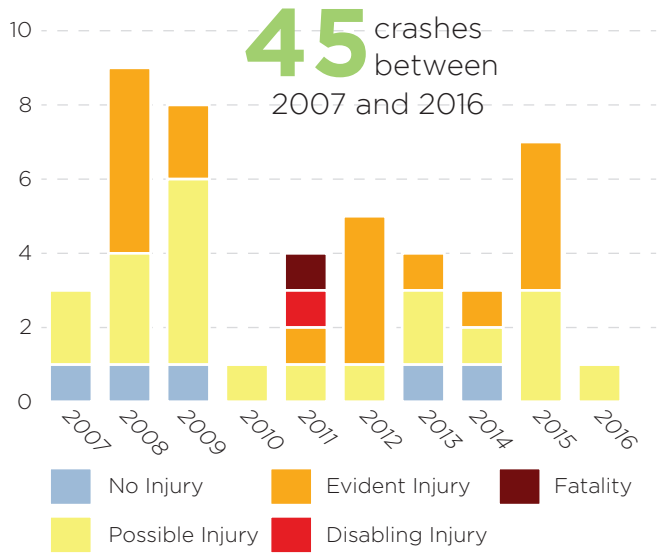
Crash data for the 10-year period from 2007 through 2016 indicates that all of the recorded accidents involving a person on a bike occurring within the downtown commercial district and surrounding residential neighborhoods.

The following corridors have the highest frequency of bicycle related crashes in Carrboro:

- Jones Ferry Road
- Hillsborough Road
- West Main Street
- W Rosemary Street
- N Greensboro Street
- Estes Drive

48% of all bicycle crashes occurred in or immediately adjacent to areas of Town with the highest need (top two of the five tiers as expressed in the equity analysis on p22). This represents only 25% of the land area of the Town.

REPORTED BICYCLE CRASHES BY YEAR



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LEVELS OF TRAFFIC STRESS (LTS)

The level of traffic stress for people who bicycle is determined based on factors including posted speed limit, street width, and the presence and character of bicycle lanes. The pictures to the right generalize the scale of the four levels of traffic stress.

Generally, lower stress roadways can be found in the downtown core and in residential areas.

The greater number of lanes and higher posted speeds impact the ability of bicycle lanes to decrease stress. Where possible, separation should be considered, especially along high-stress corridors such as:

- Old Fayetteville Road
- Main Street
- Hillsborough Road
- N Greensboro St
- Jones Ferry Road
- Smith Level Road
- Homestead Road

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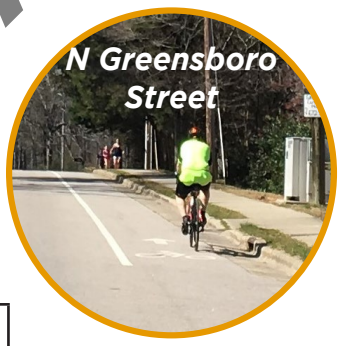
LTS 1

Comfortable for all ages and abilities

LTS 2

Comfortable for most adults

LTS 3



Comfortable for people who bicycle confidently

LTS 4

Uncomfortable for most

LTS 1: Strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
LTS 2: Except in low speed / low volume traffic situations, people on bikes have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate. Tolerable for the "Interested but concerned" group (see page 33)
LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. Tolerable for the "enthused and confident"
LTS 4: Involves interaction with higher speed traffic or close proximity to high speed traffic. Only for the "strong and fearless"

LTS ratings and table directly from the 2012 Mineta Transportation Institute Report 11-19: Low-Stress Bicycling and Network Connectivity

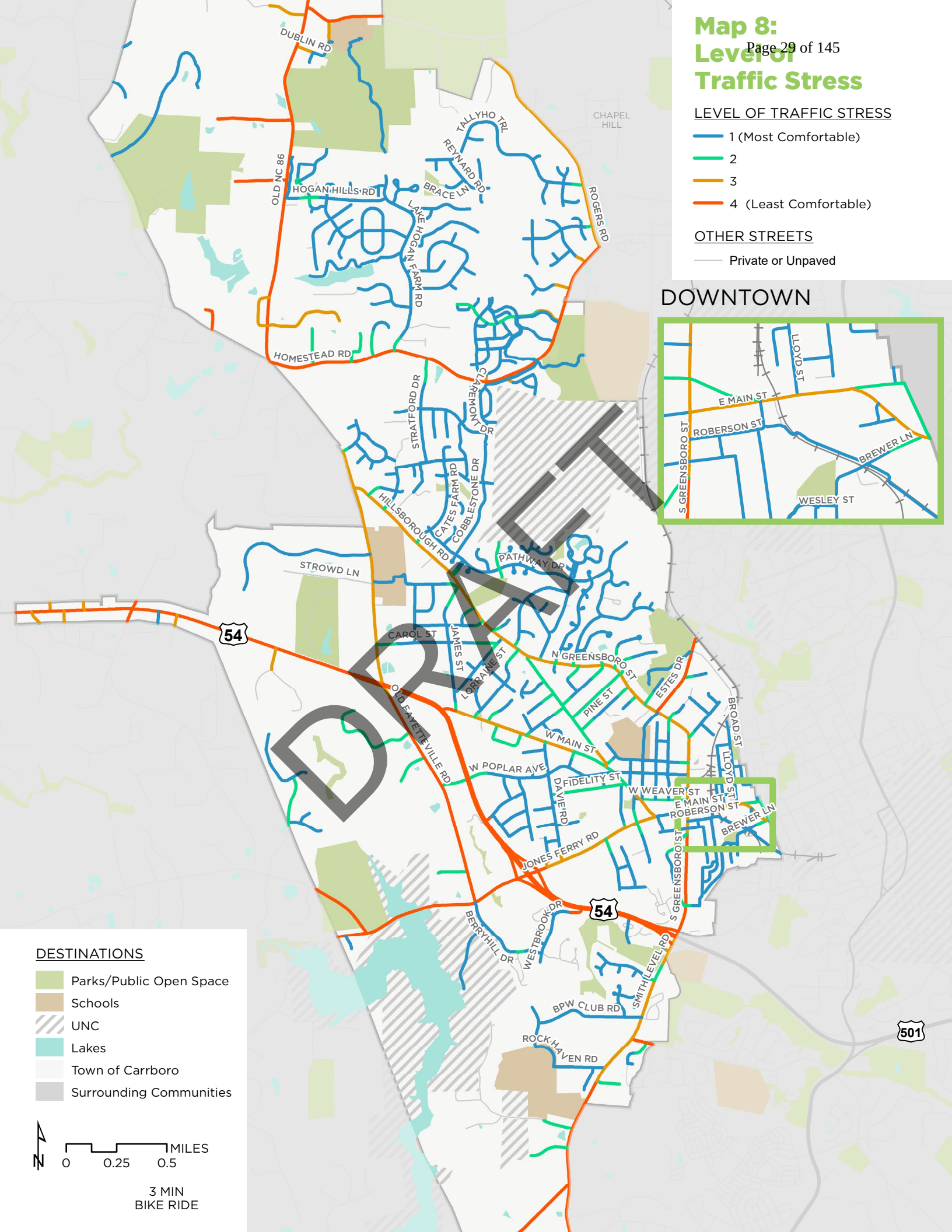
Map 8: Level of Traffic Stress

LEVEL OF TRAFFIC STRESS

- 1 (Most Comfortable)
- 2
- 3
- 4 (Least Comfortable)

OTHER STREETS

- Private or Unpaved



KEY OPPORTUNITIES & CONSTRAINTS

A variety of physical opportunities and constraints either improve conditions for people on bikes or present barriers, respectively.

» **Overall Transportation Network:** The majority of streets have low to moderate traffic, with notable exceptions, such as NC 54 and Main Street. The busiest section of roadway is NC 54, from Jones Ferry Road to S. Greensboro Street, with over 34,000 vehicles per day.

» **Physical Barriers:** A major barrier to bicycle travel is NC 54, as a high-traffic volume 4-lane divided state highway, with limited access to people bicycling and walking. Additionally, Jones Ferry Road and Main Street intersect in the heart of downtown Carrboro and feed traffic to E Main Street and onto W Franklin Street, the main corridor in Chapel Hill. The railroad that runs north/south through the eastern side of Town is also challenging to bicycle connectivity.

» **Topography:** The presence of steep or challenging terrain may discourage some bicycle riders. Roads such as Estes Drive, Spring Valley Road, Cates Farm Road, Cobblestone Drive, S Greensboro Street, and Barrington Hill Road have challenging topography.

» **Regional Connectivity:** Orange County offers a variety of biking experiences including several bike routes suitable for day rides. Primary routes near Carrboro include Old Greensboro Road and Dairyland Road. The opportunity exists for Carrboro to develop a bikeway connection to both the Town of Chapel Hill and the Town of Hillsborough. NC 2 (Mountains to Sea State Bike Route) connects through downtown Carrboro as well.

NC 54 through Carrboro

Steep hills on Cates Farm Rd

Connections to County and State Bike Routes

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Map 9: Destinations

DESTINATIONS

Bike Shop
1 - PARcycles, Inc
2 - The Clean Machine
3 - Back Alley Bikes

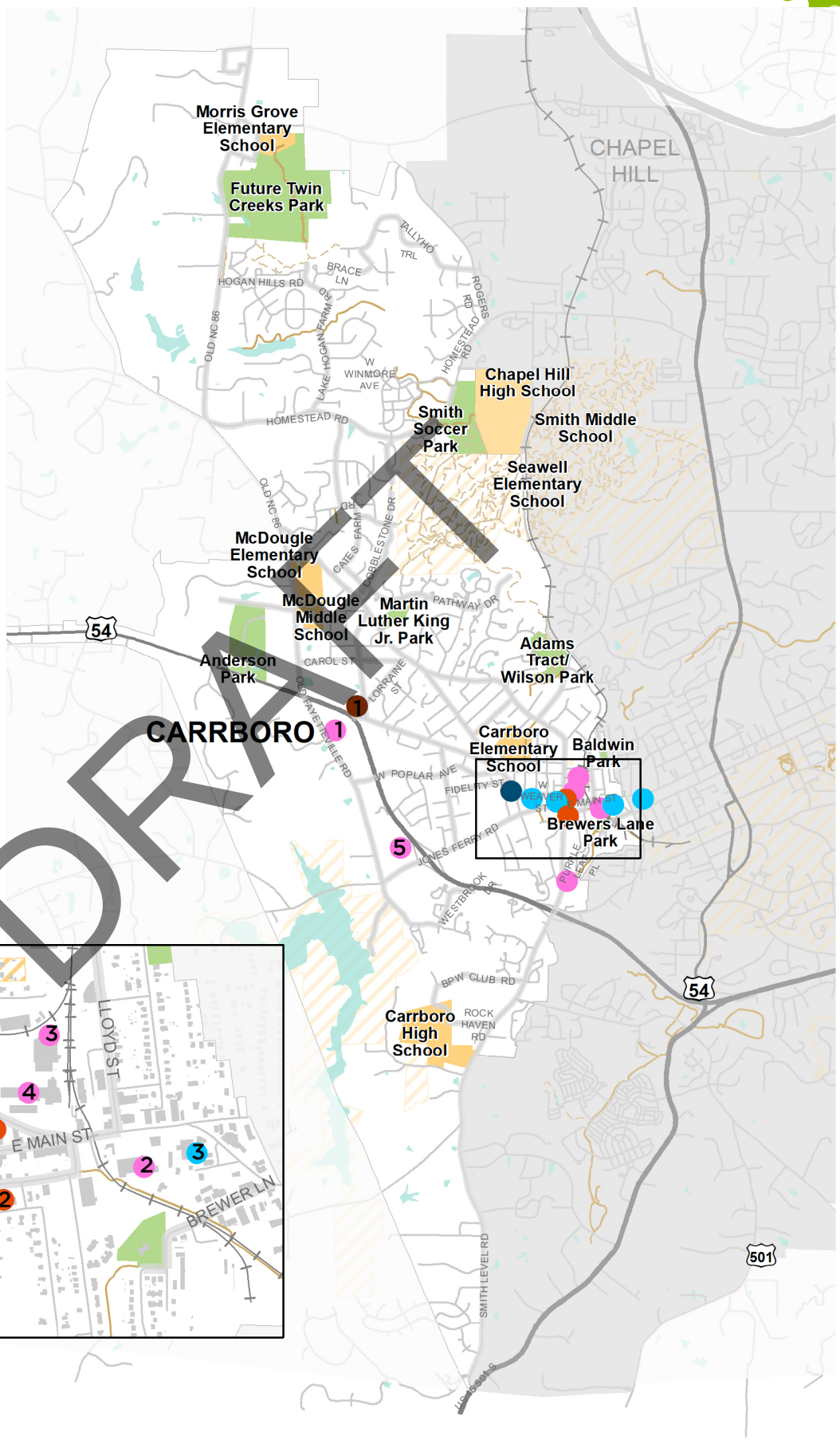
Shopping Center
1 - Carrboro Plaza
2 - 300 E Main
3 - Harris Teeter
4 - Weaver Street Market/ Carr Mill Mall
5 - Food Lion/ Willow Creek Shopping Center

Library
1 - OC Public Library/ Century Center
2 - OC Southern Branch Library (Future)

Points of Interest
1 - Carrboro Town Hall

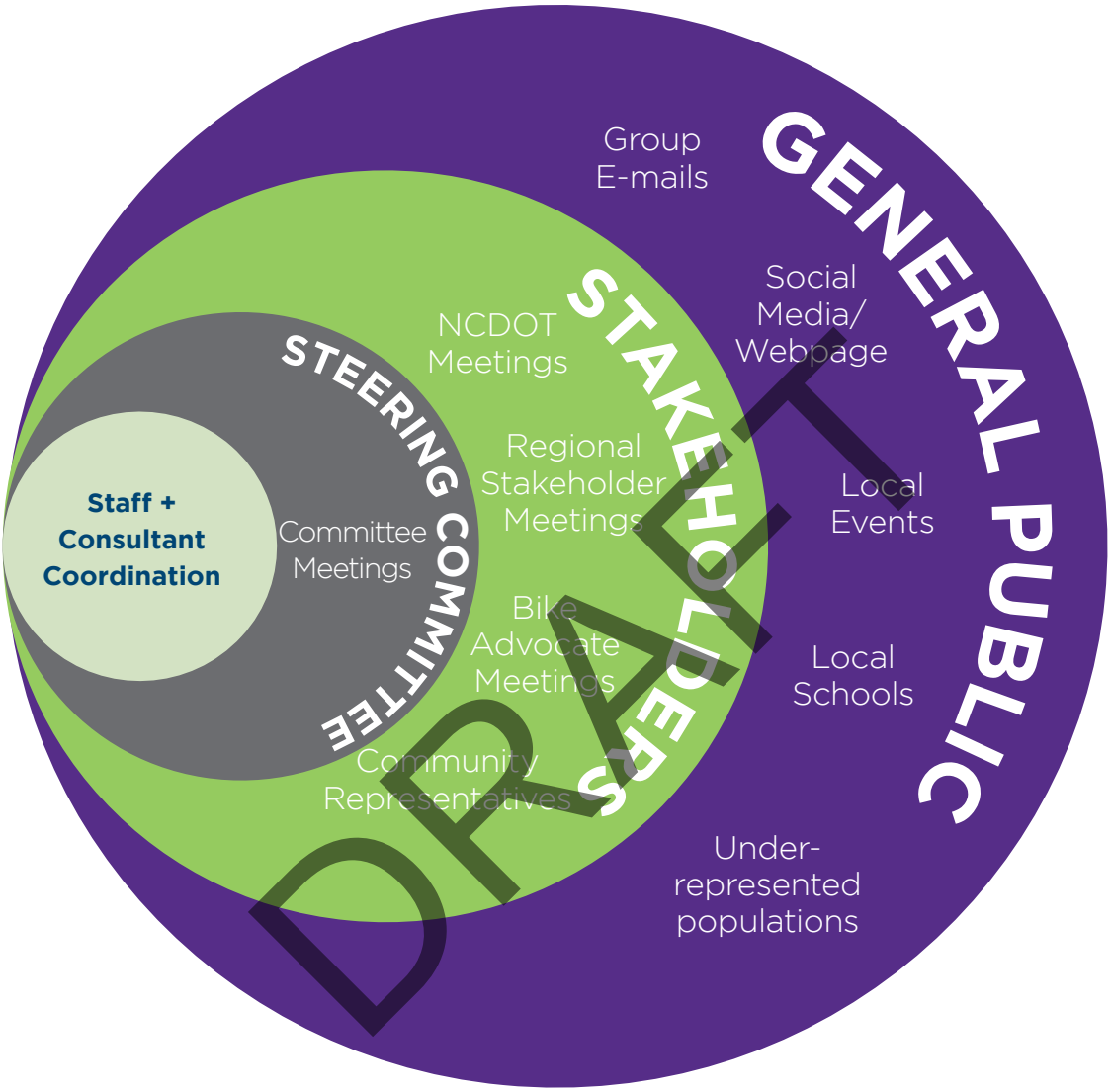
Post Office
1 - Carrboro Post Office

Lakes
Parks
Schools
UNC
Railroad
Streets



3 WHAT WE HEARD

PUBLIC PROCESS OVERVIEW



5 STEERING COMMITTEE MEETINGS

4 OUTREACH SESSIONS AT LOCAL EVENTS

7 STAKEHOLDER INTERVIEWS

30 STEERING COMMITTEE MEMBERS

439 PUBLIC COMMENT FORMS

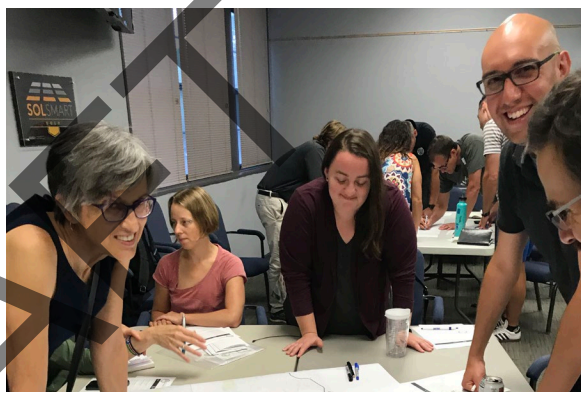
STAKEHOLDER INPUT

Local residents, bicycle advocates, community leaders, and government staff were selected to help guide the public input process. The thirty-person committee met on four separate occasions to provide input and direction on the elements of this Plan including recommendations for priority projects.

Stakeholder interviews (listed to the right) were conducted to gain specific insights into Carrboro's diverse range of communities. For the Spanish-speaking community, it was determined that the best way to gather input was to host a Spanish language survey at El Centro Hispano during the months of August and September of 2019, and garnered over 30 responses.

Stakeholder interviews were conducted with:

- NCDOT
- Regional Stakeholders
- Karen/Burmese Community
- Youth Council
- Bike Advocates
- 20+ Year Carrboro Residents



The steering committee meetings were interactive to encourage idea sharing during each meeting.

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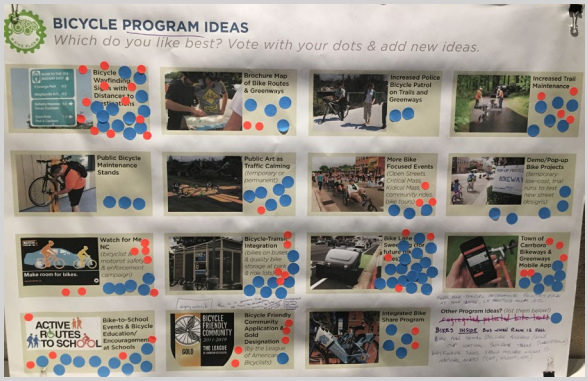
BIKE SHOP POSTERS

Project materials were placed at the Clean Machine, a local Carrboro bike shop, to allow an easy way for the community to share their ideas and thoughts. Participants marked up a map with their network ideas, shared information on their comfort level bicycling and their preferred facility type. Separated bicycle lanes received the most votes, with buffered bicycle lanes close behind.

Bicycle Program Ideas

The public voted with dots for their favorite bicycle program ideas. The top three programs were:

1. Bike **wayfinding signs** with distances to destinations
2. Bike lane **sweeping** (for future bike lanes)
3. **Bike-to-school** events & bike education/ encouragement at schools

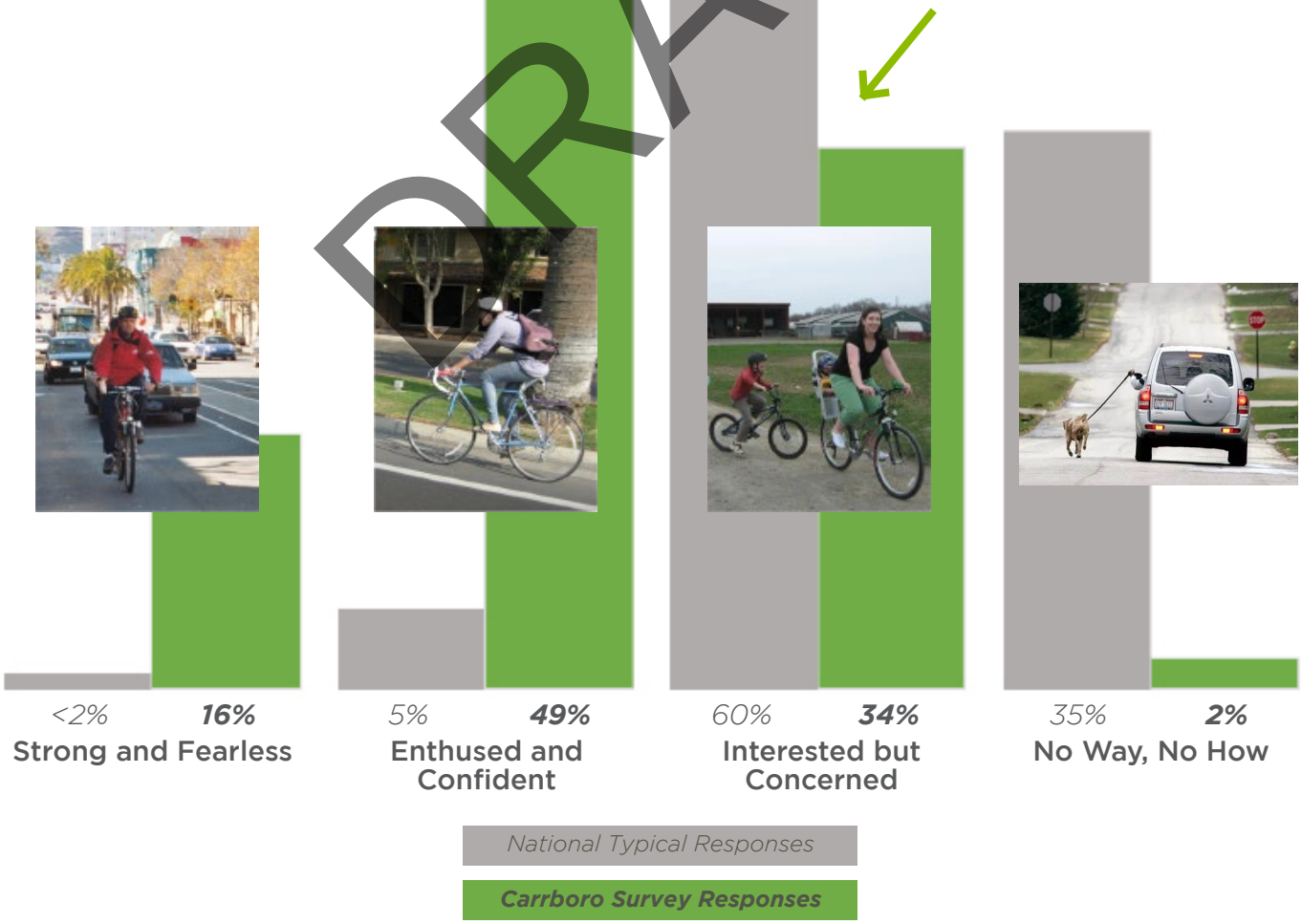


TYPES OF PEOPLE WHO BICYCLE IN CARRBORO

Although some people who bicycle will ride on any road, regardless of an available bikeway ("strong and fearless"), a much larger portion of the population will ride only where there is a high-quality bikeway ("interested but concerned" population). Understanding this concept has led communities to design more low-stress bikeways that provide the high-quality experience the majority of people who bicycle desire.

The chart below shows a "typical" national distribution of people who bicycle compared to the survey results of this planning effort.

Designing for ages 8 to 80 will be the most effective way to reach the "Interested but Concerned" group. The "8 to 80" movement encompasses the belief that if we design well for an 8 year old and an 80 year old, then it will be great for all people.



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WHAT WE HEARD

A significant portion of feedback was taken from the community survey that was developed for this Plan. Over 400 responses from all segments of the community were gathered and the project team took every effort to ensure a representative sampling of the community was reached. The responses below are taken directly from the responses received, hence some inconsistent wording.

My favorite place to bike in Carrboro is....

- the awesome trails like:
  - Libba Cotten Bikeway
  - Frances Shetley Bikeway
  - Wilson Park Trail
  - Carolina North Forest trails
- the existing bike lanes on Greensboro Street, West Main Street, and Hillsborough Road
- on low-traffic neighborhood roads
- to Downtown Carrboro and destinations like Weaver Street Market and the Farmers' Market
- to elementary schools, such as:
  - Carrboro Elementary School
  - Morris Grove Elementary School
- to Maple View Farms!
- the streets that have bike lanes!
- everywhere!

The most difficult place to bike in Carrboro is...

- intersections! Especially:
  - Weaver Street at North Greensboro Street
  - Weaver Street at Main Street
  - Estes Drive Extension at North Greensboro Street
- crossing NC 54 and the lack of bike infrastructure on S Greensboro Street to Smith Level Road
- streets with no separated bike lanes like:
  - Old Fayetteville Road
  - E Main Street
  - Homestead Road
  - Hillsborough Road
- when the bike lane ends
- riding over railroad tracks
- going to school
- going to Weaver Street Market

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Weaver Street Market bike racks are often full.

NC 54 is challenging for many people who bicycle. Photo Credit: NC 54 Corridor Safety Study

I would bike more if...(Responses from survey & comment form)

There were better routes connecting Carrboro and Chapel Hill. Taking Main street onto Rosemary or Franklin is unpleasant and dangerous, not to mention disjointed in terms of cycling "facilities". The Cotten Bike path is nice, but Cameron Ave doesn't take me to many of the places I want to go.

There were more separated trails or physically separated lanes. I have young children and while I'm comfortable biking on roads myself, I'm scared to take my kids on the roads since they are lower down and less visible in the bike trailer or tandem bike attachment.

Bikes had a clearer route through intersections.

The roads were cleared more quickly of debris after storms and after people put their leaves and tree branches in them - it is dangerous to have to go into the street to avoid them

The bikeable network was connected. Often one unsafe stretch will prevent me from biking at all.

There were more bike lanes and more green trails (or green trails connected by bike lanes). As a family with 2 kids and 4 bikes, we enjoy recreational riding - but it tends to be more a case of drive to a place, for example to the community center, to take the Bolin creek trail, or to the Northern Forest to the pumpkin loop. I would probably bike more as a commuter, if it were safe, and more lanes.

Motorists were educated about how to avoid dangerous situations when passing people bicycling.

The #1 thing that would make me bike more is more people bicycling on the road. The critical mass and the natural visibility of a lot of people bicycling is the best encouragement.

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4 THE FRAMEWORK

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Mayor's Bike Ride
Photo Credit: The Town of Carrboro

INTRODUCTION

While transportation infrastructure – roads, bikeways, trails – are critical for improving bicycling, other components must also be used to create a truly bike-friendly Carrboro. This Plan incorporates these strategies to make bicycling safe, comfortable, and fun.

Non-infrastructure recommendations are organized according to two distinct categories:

Policies

Policies add political backing and institutionalize recommendations and design guidelines into town codes. Policies may be specific to infrastructure elements or may be broad and include multiple jurisdictions and stakeholders.

Programs

Programs can engage the broader community to encourage more people to bike, educate community members on rights and responsibilities, and enforce traffic laws to improve safety for all modes.

KEY PARTNERS

Numerous partners, ranging from public to private to non-profit, will be essential for rolling out a variety of programs. Some of these are shown below:

- Town of Chapel Hill
- GoChapelHill
- BikeCarrboro
- The Bicycle Chain/Clean Machine
- The ReCYCLEry
- Orange County
- The YMCA
- Chapel Hill-Carrboro City Schools
- Back Alley Bikes
- Carrboro Business Alliance
- Parcycles, Inc

Helmet Fitting & Bike Maintence Event organized by BikeCarrboro and the Clean Machine
Photo Credit: Molly De Marco

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POLICIES

STRATEGIC PRIORITIES	**Expand Bike Parking Requirements**	High quality and convenient bike parking is a necessary component to encourage bike ridership.
	Shared Mobility Policy	The Town will need to stay up-to-date on trends related to bike share, scooter share, and the like and ensure policies reflect community goals.
	Tactical Urbanism Policy	Create a streamlined permitting process to allow community partners to collaborate on pilot projects.
LONG TERM	**Expand Enforcement**	Police support for the safety of people bicycling, including encouraging reporting, provides the data for the Town to fully evaluate countermeasures.
	Speed Enforcement for Hot Spots	Using bicycle crash data and public feedback to identify hot spots and perform targeted enforcement can help prevent future crashes.
	Dedicated Funding	A dedicated funding stream would allow for more reliable and consistent long term bicycle planning and implementation.
	Allocation of Bicycle Program Tasks	Dedicate more staff hours to research, implementation and outreach. Ensure coordination and accountability of tasks
	Maintenance	Ensuring facilities is clear of debris is important to increase ridership and increase safety.

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PROGRAMS

STRATEGIC PRIORITIES	**Tactical Urbanism**	Provides the ability to test new infrastructure and allows for immediate public feedback and early detection of obstacles before making large investments. The Town's future traffic calming policy includes some specifics for Tactical Urbanism.
	Continue Safe Routes to School Efforts + Partnerships	Continue work from the adopted 2012 plan in order to increase the number of students who bike to or at school.
	Bicycle Wayfinding	Wayfinding elements such as signage, pavement markings, and mile markers will help to draw visitors, help users identify the best routes, and enhance their ability to access major destinations.
LONG TERM	**Regional Map/Mobile App**	Ensure that the Town of Carrboro is represented and supported by the developing DCHC/CAMPO regional app that provides an easily accessible resource to plan bicycle routes, identify maintenance issues, and report safety issues.
	Expand Options for Skills Training + Social Rides in Diverse Neighborhoods	Making cycling accessible and enjoyable for all who bicycle, including the "interested but concerned" riders, should be a priority (current Town effort ongoing).
	Encouragement Campaign	Building off of Watch for Me, NC - a targeted encouragement campaign that fits within the culture and brand of Carrboro, would help educate users and encourage more bike trips.
	Advocacy Ambassador Program	Support and partner with Carrboro's existing bicycle advocates to help with public outreach and bike plan implementation.
	Expand Count Program	Counts are collected along state-maintained roads; the Town is working to expand counts along local roads and greenways. Accurate count information allows the Town to identify trends and determine where investment should be made.
	Education of People on bikes and People in vehicles on Rules of the Road	Ensure that educational opportunities about rules of the road are available for youth and adults.

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Policy Spotlight: Shared Mobility Policy

BACKGROUND

Shared mobility programs are designed to provide cost-effective, environmentally-friendly and convenient travel options for short trips within a city or region. The systems consist of a fleet of user-friendly and durable bicycles, electric power-assisted bicycles or lightweight electric scooters (e-scooters) intended to be driven while standing. Both bike or scooter share programs are relatively inexpensive and quick to launch—compared to highway and transit projects—and can provide an extension to Carrboro's public transportation system.

As more success has been realized, larger cities are expanding shared mobility into lower density and lower income areas, and mid-size and smaller cities have launched successful bike share and scooter share systems. Bike share and scooter share have been transformative transportation system offerings for many cities in North America. They can provide sustainable transportation options, infill first/last mile connectivity (extend the reach of transit), create jobs, reduce reliance on private automobiles, and improve the health of Carrboro residents.

POLICY RECOMMENDATIONS

Cities and towns have had some challenges in implementing bike share and/or scooter share systems in recent years. In some cases, private vendors have dropped scooters in a city without any advanced warning. Today, cities are becoming better prepared with their own policies to effectively manage systems that work for them. Some specific policy areas for the Town to consider are:

» **Fleet Size -** Communities piloting shared mobility for the first time may opt for deploying a limited fleet in the interest of gauging public interest in the service and observing modal interaction between e-scooters, people on bikes, people walking, and motor vehicles. Other communities using static fleet caps may have determined the designated number of units is an appropriate or manageable amount for a community of their size, land-use pattern, or traffic conditions. *The Town of Carrboro should set an initial fixed fleet size with immediate demand-based expansion and reduction procedures within a set pilot period. This approach gradually integrates shared mobility devices into the streetscape.*

» **Speed Limits** - Shared Mobility devices are most compatible with designated bike lanes and low-to-mid speed travel lanes (under 25 MPH). Most municipalities regulating shared mobility systems require that vendors cap device speed at 15 MPH, a suitable speed for bike lanes, shared use paths and local streets. Some jurisdictions are exploring requirements to cap device speeds in high-traffic areas, such as downtown centers or in public parks. *To start, the Town of Carrboro should clearly state in its permit regulations that all electric devices should be*

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equipped to achieve a speed of no more than 15 MPH throughout the designated service area.

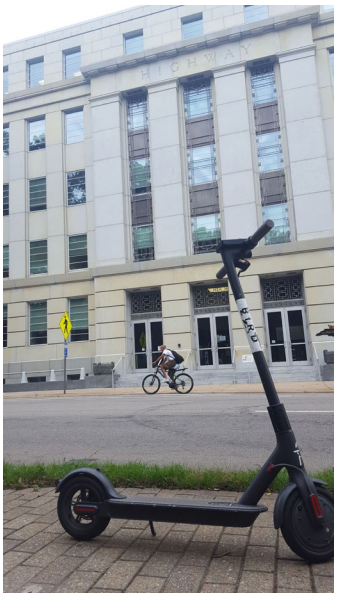
» **Sidewalk Use -** Most municipalities strongly discourage, if not outright prohibit the use of shared mobility devices on sidewalks to avoid posing unnecessary danger and discomfort to people walking. On sidewalks, people walking and especially people with disabilities have the clear right of way. Therefore, sidewalk riding by shared scooters should be actively discouraged or prohibited to ensure access, comfort, and safety where people walking have the right of way *The Town may consider prohibiting sidewalk use throughout all service areas, with potential exceptions in discrete areas where traffic speeds are high and pedestrian traffic is low.*

» **Parking Policy -** Improper parking procedures are another challenge, in that scooters and bikes can create hazards for people traveling on the sidewalk, particularly those people in wheelchairs, with visual impairments or ambulatory disabilities. While systems have long encouraged users to park in the "furnishing zone" of sidewalks (where bike racks, benches, trees and signage are located), some cities have enhanced the formality and enforceability of scooter parking policy. Formalizing the relationship between device parking standards and pedestrian accessibility begins with setting a minimum sidewalk clearance requirement that riders are required to obey when parking. "Drop zones" are an emerging tactic aimed at reducing improper parking procedures. Drop zones are small designated parking areas for dockless bikes or e-scooters within the public right of way, identified with paint and/or signage. *If a bike or scooter share system is established, the Town should mandate shared mobility parking areas/drop zones in busy pedestrian areas and elsewhere, to mitigate blocked sidewalks and clutter. The Town should also include incentives in its scooter or bike share pilot program regulations.*

» **Accessible Bike Rentals** - While bikeshare and other shared mobility systems have become increasingly popular over the past few years there is still a lack of accessible devices (such as tricycles or handcycles). There are some examples of cities partnering with local bicycle shops or accessibility adovcates to provide an accessible bike rental service so that a system is available to people of all abilities.

Examples of accessible rental programs and partnerships include:

Portland, OR and KerrBikes:
www.adaptivebiketown.com
Eugene, OR Parks & Rec Dept:
www.eugene-or.gov/134/Adaptive
Detroit and Adaptive MoGo:
www.mogodetroit.org/mogo-for-all/adaptive-mogo/
Milwaukee, WI and Bublrbikes:
https://bublrbikes.org/adaptive
San Francisco and Bay Area Outdoor Recreation Partnership:
https://www.lyft.com/bikes/bay-wheels/adaptive-bike-share



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Policy Spotlight: Bicycle Parking Policy

TODAY'S EFFORTS

The Town of Carrboro's bicycle parking regulations and guidelines are integrated in the Town's 2009 Bike Plan and Land Use Ordinance (Article XVIII Parking). The Land Use Ordinance outlines the location requirements, recommended design elements, space requirements, trade-offs, and deviations for Carrboro business owners and developers. The Town is currently working towards linking to the APBP bike parking guidance in the Land Use Ordinance.

Creating a document, based on the APBP bike parking guidance, with easy to understand information and visuals tied to the Land Use Ordinance would allow Carrboro business owners, developers, and other interested parties to know what is required of them. Providing more resources and incentives will help support the expansion and enhancement of bicycle parking in Carrboro, which in turn encourages ridership.

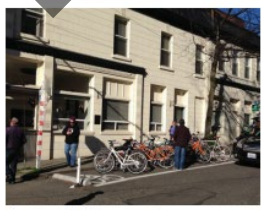
CASE STUDY: CHARLOTTE, NC

Charlotte Department of Transportation created a City of Charlotte Bicycle Parking document, which provides direct guidance and graphics for recommended bike rack styles and the benefits of providing bicycle parking in the city right-of-way. This document's primary purpose is to help businesses apply to the Bicycle Rack Partnership Program. It details the application process and provides inverted "U" Rack specifications and other guidance for Charlotte businesses.

Seattle Department of Transportation (SDOT) has a similar document with helpful graphics.

Showing photos of bike racks helps users understand how to meet requirements. Photo Credit: SDOT

GOOD SHORT-TERM BICYCLE PARKING EXAMPLES



On-street bike corral near an intersection in Ballard *(Photo: Alta Planning + Design)*

Racks are protected under building cover at Swedish First Hill *(Photo: Alta Planning + Design)*

Racks under a shelter with lighting & repair station at UW *(Photo: MIG|SvR)*

Multiple public racks at a high demand location at the University Stadium Light Rail Station *(Photo: MIG|SvR)*

Rail type rack with space for a cargo bike on Greenwood Ave N *(Photo: MIG|SvR)*

On-street racks in leftover space from angle parking on Terry Ave *(Photo: MIG|SvR)*

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Program Spotlight: Wayfinding

TODAY'S EFFORTS

As of writing, Carrboro is developing a branded wayfinding system, which will include a variety of new signs around town. These include bike parking signs, "bike trailblazer" signs, and bike share signs. Future options can be developed to include a separate sign for other forms of micromobility devices.

Photo Credit: Axia Consulting

RECOMMENDATIONS

This new wayfinding signage system should be applied to the proposed neighborway network (see Chapter 5) as a low-cost, quick action item. The town's bike maps should also be updated with this new information so people who bicycle can plan routes both before and during rides.

CASE STUDY: TRAVELERS REST, SC

The City of Travelers Rest, SC, population 4,600, has transformed itself into a "trail town" with careful planning and incremental implementation. A large part of this transformation has been its wayfinding system. By using branded, clear wayfinding signage, not only was it safer and more enjoyable for people who bicycle to find their way around town and to the surrounding trails, but also promoted a sense of place.

Signs, such as the ones in these images, create a sense of identify and place within a town for people who bicycle.

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Program Spotlight: Tactical Urbanism

TODAY'S EFFORTS

The Town of Carrboro has experience with both pedestrian- and bicycle-focused tactical urbanism projects, such as the painted crosswalk on Weaver Street and a traffic calming pilot project on Cobblestone Drive.

RECOMMENDATIONS

Due to Carrboro's enthusiastic bicycle community, bicycle-focused tactical urbanism projects would be a great option for the Town. These short, relatively quick interventions using low-cost materials allow the Town to experiment, gather data, and receive immediate feedback on bikeway projects before making large investments in permanent infrastructure. The Town can complement their own programs with creating policies to allow community groups to initiate their own bicycle-focused tactical urbanism projects.

CASE STUDY: MORGAN HILL, CA

Alta Planning + Design worked with Town of Morgan Hill staff, Morgan Hill's Downtown Association, and Street Plans Collaborative to create a demonstration project utilizing tactical urbanism techniques for a six-month pilot project. Meetings were held with city staff, stakeholders, and residents to determine the two favorite alternatives which would be built in the three-day pop-up event. After the pop-up event, buffered bike lanes were chosen by the public and were installed for six months.

CASE STUDY: RALEIGH, NC

Raleigh's city government and local advocacy group Oaks & Spokes installed a pop-up, two-way cycle track for three blocks in downtown Raleigh for a weekend. Cones and donated planters were used as temporary protection for the cycle track. Because of its success, a permanent cycle track will be implemented.

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Program Spotlight: Bicycle Count Programs

TODAY'S EFFORTS

Currently, the Town of Carrboro has bicycle counters on the Libba Cotten Bikeway and on Old NC 86 north of Hillsborough Road.

RECOMMENDATIONS

Adding more counters in new locations will provide data for evaluation of bicycle facilities and for future bicycle infrastructure decisions. The data collected from counters can also help quantify the benefits of biking and make bicycle projects more competitive for funding opportunities.

CASE STUDY: SAN DIEGO, CA

The County of San Diego Health and Human Services Agency, San Diego Association of Governments, and San Diego State University collaborated to install automated bicycle counters throughout the region using grant funding. Data is collected every 15 minutes and uploaded daily to the SANDAG website.

CASE STUDY: SAN FRANCISCO, CA

San Francisco has a multi-pronged approach to bicycle counting. While they have "invisible bike counters" that are installed in the pavement, they also have installed digital bike counters. Digital bike counters were placed on San Francisco's busiest biking streets to not only gather data on ridership, but also to send a message to people that bicycle and the public that people who bicycle count. The digital signs display the weather, the count of people bicycling that day, and a bar indicating the number of people bicycling that year.

Digital bicycle counters gather data and are also a form of encouragement for people who bicycle. Photo Credit: SFMTA

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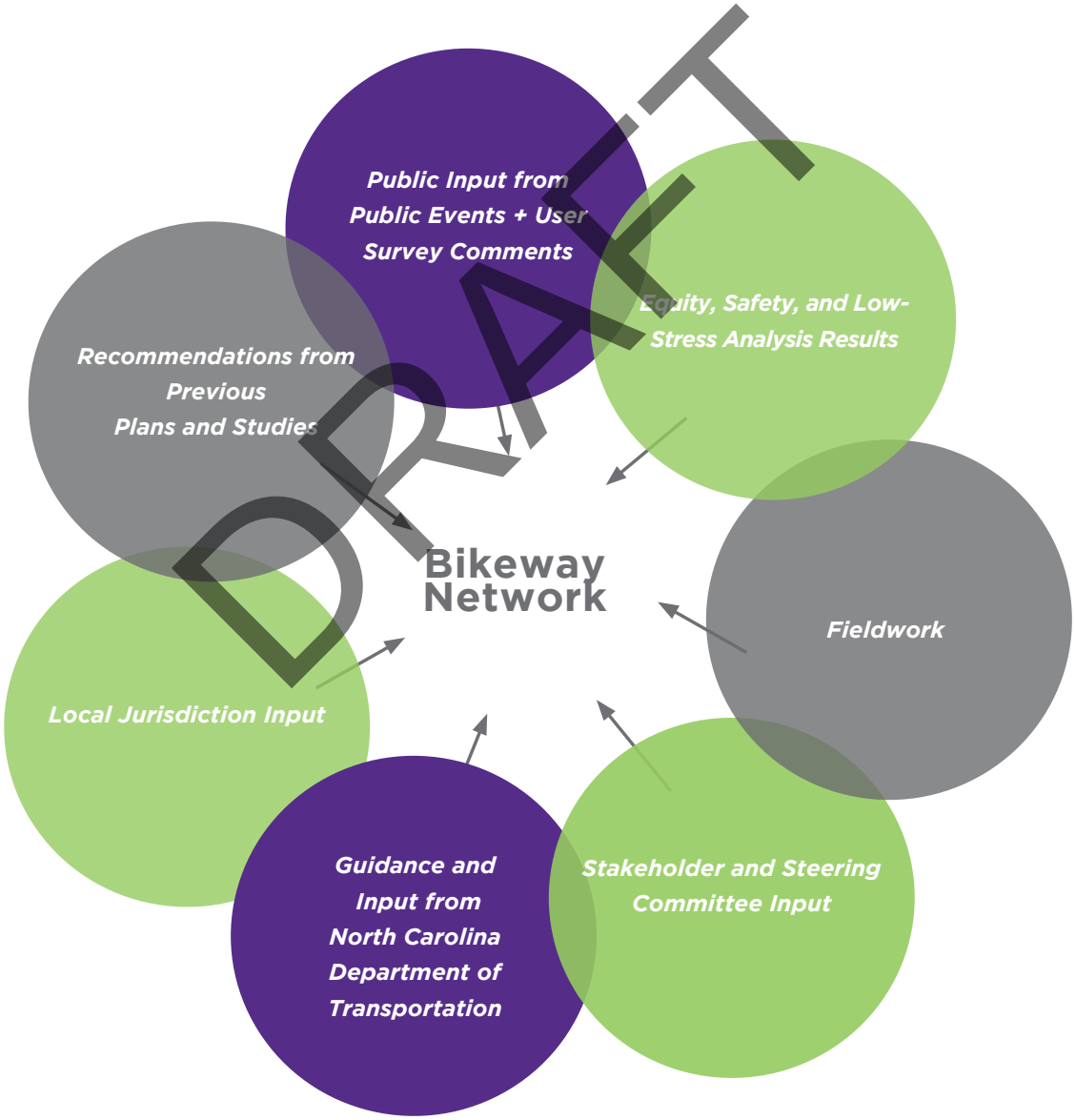
5 THE NETWORK

People on bikes in Carrboro

CARRBORO'S APPROACH

The proposed network seeks to:

- Reflect our vision and goals
- Address the needs of all ages and abilities in Carrboro
- Balance the transportation system with safety as the #1 priority for all roadway users
- Integrate seamlessly with future development and land uses



TYPES OF BIKEWAYS

Shared Use Path

Shared Use Paths are completely separated from motorized vehicular traffic and are constructed in their own corridor, often within an open-space area. Shared Use Paths can be paved and should be a minimum of 10' wide. Pavement widths of 12-, 14-, and even 16-feet are appropriate in high-use urban situations.

Private Connections

A private connection includes the development of a public bike facility on a privately owned street or land. The recommendations found here include shared use paths taking advantage of privately owned open space and shared use neighborways on privately owned residential streets. These facilities are often kept short to minimize impacts on private property but are critical components to a well-connected network.

Separated Bike Lanes

This updated Plan defines a separated bike lane as a bicycle facility that is physically separated from motor vehicle traffic within a street corridor. For this Plan, this includes cycle tracks and buffered bike lanes, in addition to the City's shared-use path and greenway network. The on-road physical separation can be achieved through parked cars, curbs, medians, bollards/ traffic posts, planters, or marked buffered space between the bike lane and adjacent travel lane.

Bike Lanes

A bike lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of people who bicycle. Bike lanes are almost always located on both sides of the road (except one way streets), and carry people who bicycle in the same direction as adjacent motor vehicle traffic. In some cases, climbing bicycle lanes (on uphill side) can be paired with shared-lane markings on the downhill section. The minimum width for a bike lane is 4 feet; five- and six-foot bike lanes are typical for collector and arterial roads.

Neighborways

In residential neighborhoods, neighborways—also known as bicycle boulevards—improve travel for people who bicycle while calming traffic and greening neighborhoods. Neighborways are shared by automobiles and bicycles, but at speeds that make travel more comfortable for people who bicycle. Typical treatments along neighborways may include mini-circles, chicanes, wayfinding signage, and shared-lane markings.

Advisory Bike Lane

An advisory bike lane defines a preferred space for people who bicycle and people who drive to operate on narrow streets that would otherwise be a shared roadway environment. Roads with advisory bike lanes accommodate low to moderate volumes of motor vehicle traffic and provide a prioritized space for people who bicycle with little or no widening of the paved roadway surface. A contraflow version allows people who bicycle to move against the flow of motor vehicle traffic on one-way

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IDENTIFYING STRATEGIC PRIORITIES

This Plan is designed to serve as a short-term call to action document that identifies projects that provide critical connections yet are feasible and realistic to implement. Full implementation of the long term network will take many years and require a significant amount of investment.

The projects were selected using the evaluation criteria displayed in the graphic below and also through feedback from the public, the steering committee, and town staff.

There are 10 total strategic priorities that are recommended by this Plan. More details for five of the strategic projects start on page 50. These were selected to provide implementation techniques for a variety of facility types. They were also the most highlighted by the Steering Committee and general public. The additional five projects not described on the following pages are:

- Claremont/Cobblestone Neighborway
- Parkview Avenue Neighborway
- Williams Street Neighborway
- Elm Street/ Laurel Avenue Neighborway
- West Carr Street Neighborway

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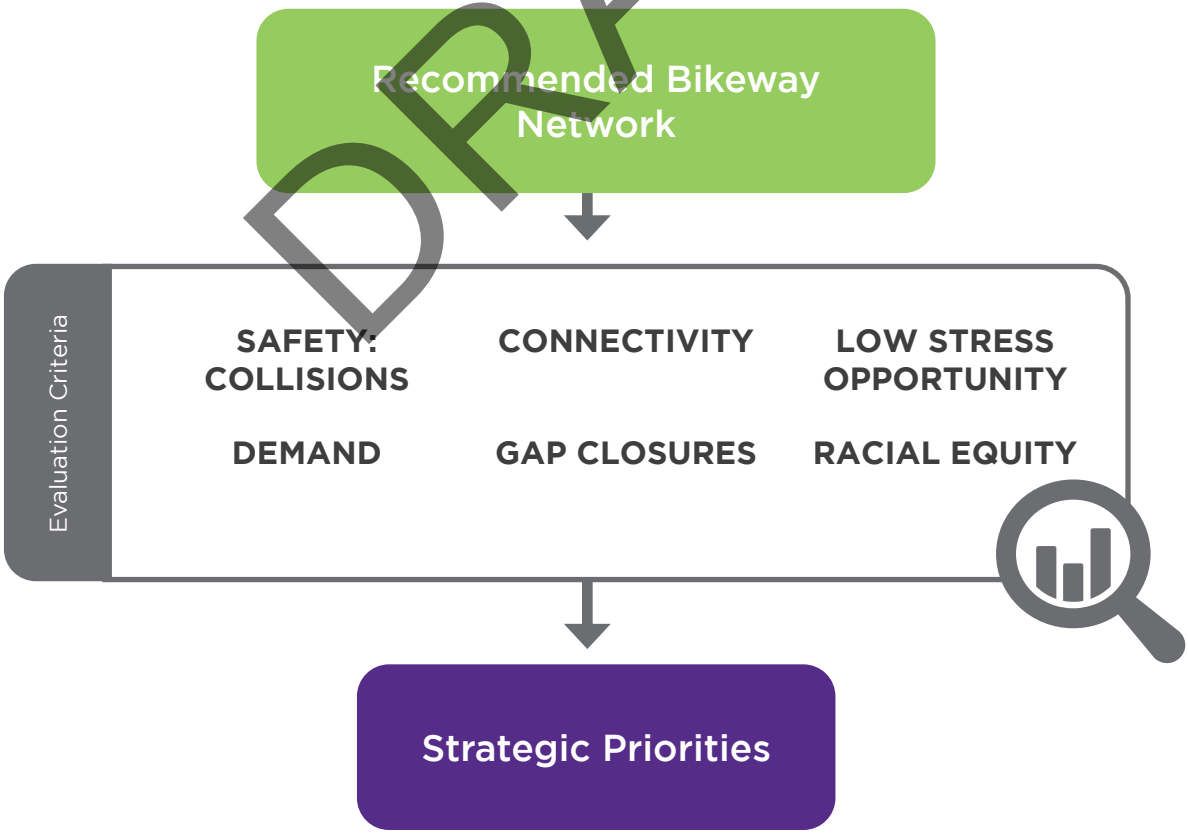
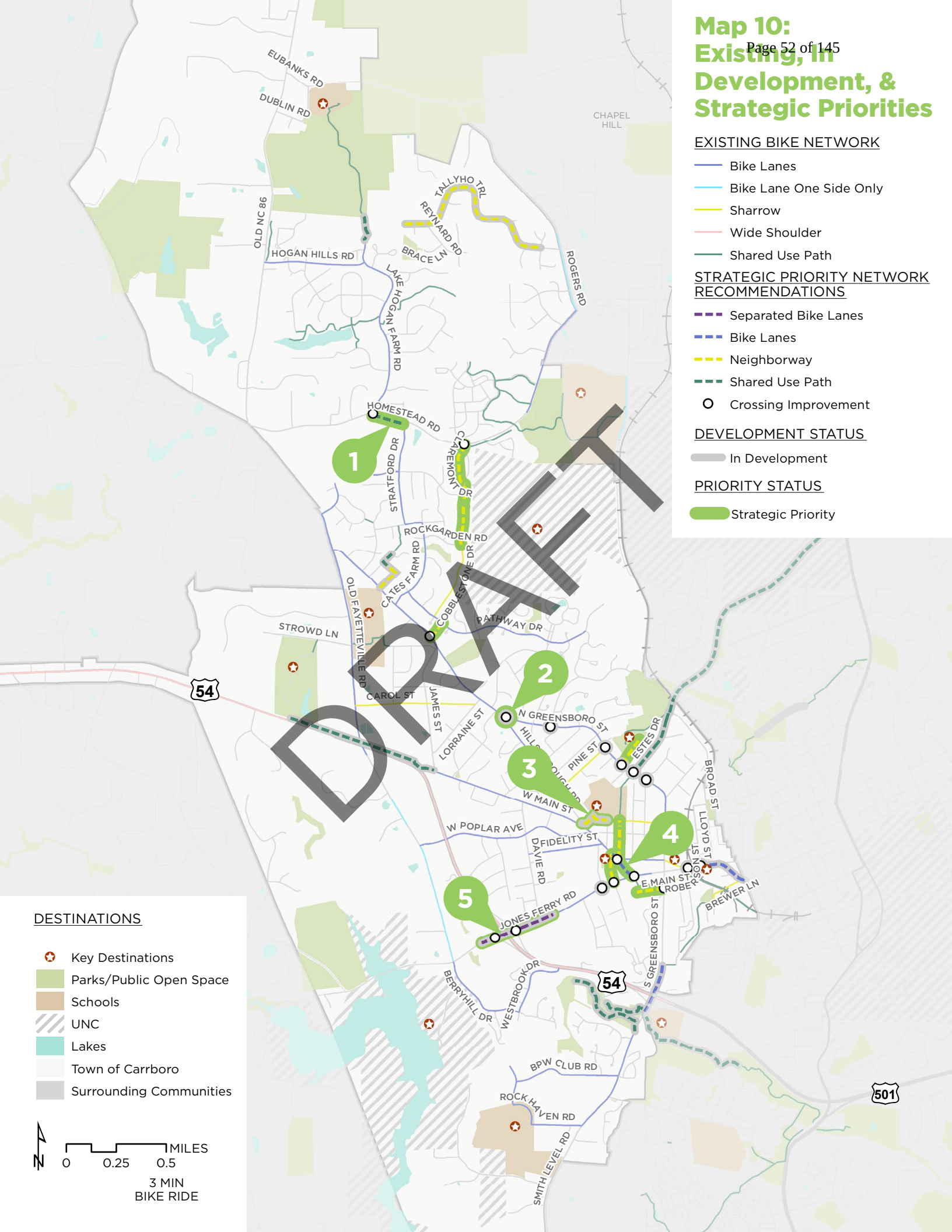


Map 10: Existing, In Development, & Strategic Priorities



1 HOMESTEAD RD SIDEPATH LINK

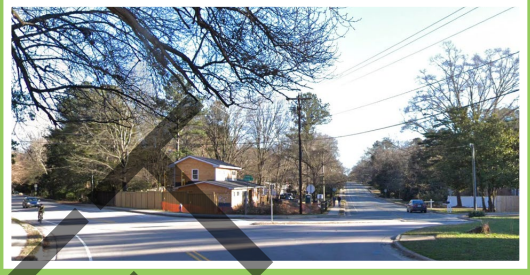
pg. 52

This project will connect large residential hubs and fill a gap from north Carrboro to downtown by connecting bike lanes along Lake Hogan Farm Rd and Stratford Dr.

2 HILLSBOROUGH ST AND N GREENSBORO ST INTERSECTION IMPROVEMENTS

pg. 54

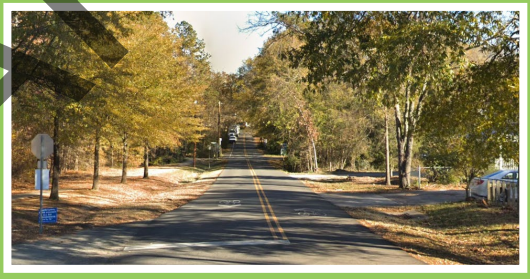
This is a an unsignalized intersection along a critical bike route. Improving the intersection will increase safety and comfort for all users.



3 SHELTON ST CONTRAFLOW BIKE LANE

pg. 56

The Shelton St contraflow bike lane will fill an important gap between the Hillsborough St bike lanes and Carrboro Elementary.



4 WEST MAIN ST BIKE LANES & INTERSECTION IMPROVEMENTS

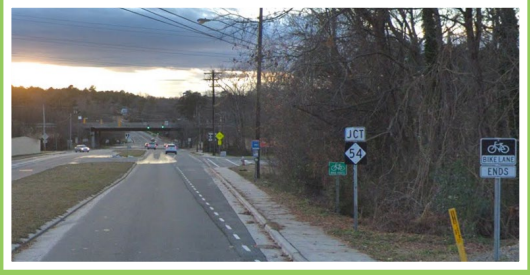
pg. 58

Intersection improvements and bike lanes on both sides of the street (filling gaps) will improve bike access to downtown along West Main St.

5 JONES FERRY RD SEPARATED BIKE LANES

pg. 62

Separated bike lanes along Jones Ferry Rd will bring much-desired safety benefits to this heavily used commuter corridor.



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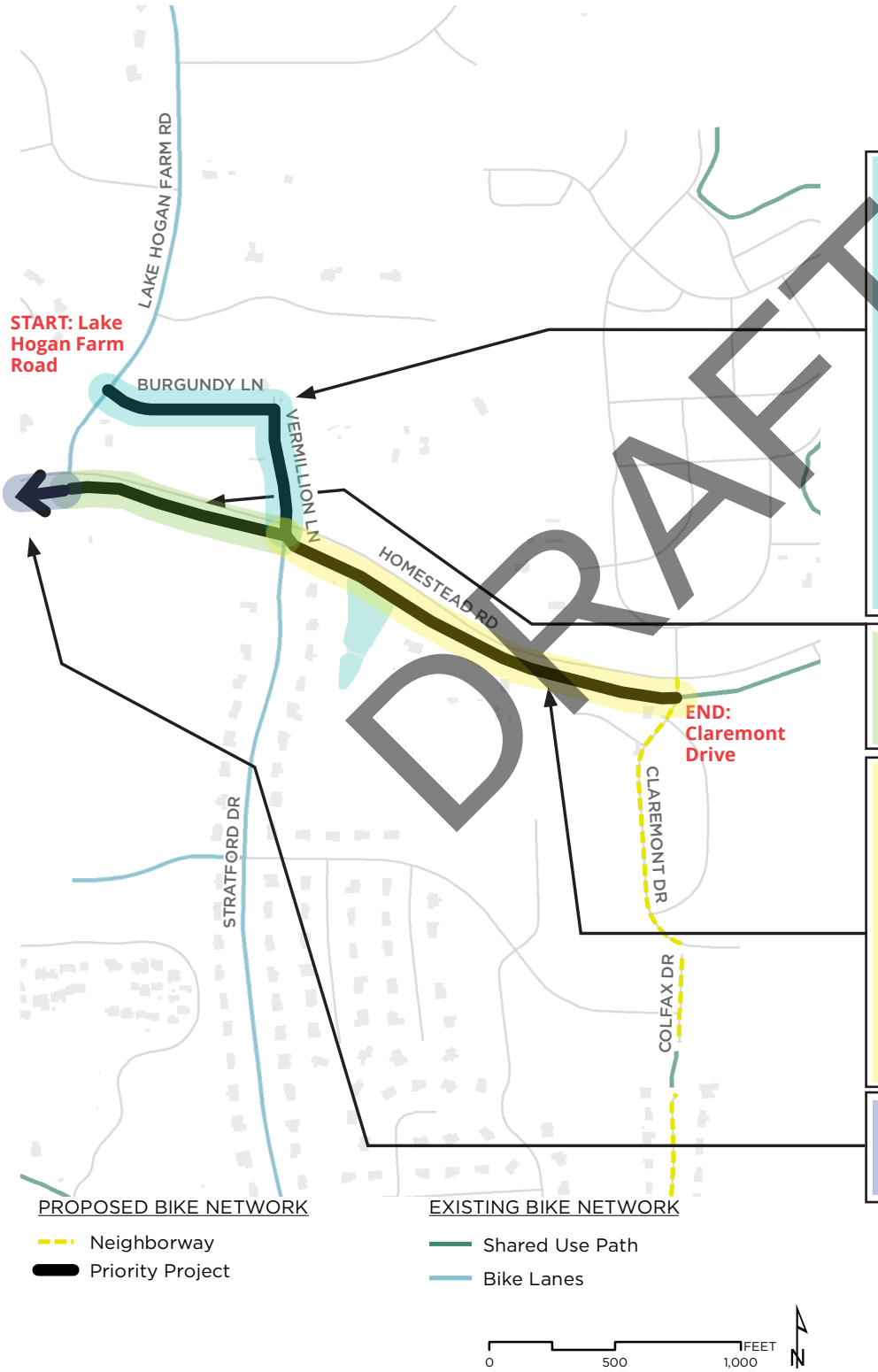
1 - HOMESTEAD RD SIDEPATH LINK

FROM:
Lake Hogan Farm Road

TO:
Stratford Drive

LENGTH:
1,200 Feet



It is recommended that a corridor/alignment study be conducted. The study should consider completing this priority project in three phases:

PHASE 1: Implement **neighborway** treatments through Burgundy Ln and the short segment of Vermillion Ln. Construct a short **shared use path** segment from the southern terminus of Vermillion Ln to the Stratford Dr intersection, connecting the existing bike lanes on Lake Hogan Farm Rd to the Stratford Dr bike lanes. Coordination will be needed with the property owners between Vermillion Ln and Homestead Rd.

PHASE 2: Construct **sidepath** along south side of Homestead Rd from Lake Hogan Farm Rd to Stratford Dr.

PHASE 3: Construct a **sidepath** along the south side of Homestead Rd from the proposed phase 2 sidepath terminus at Stratford Dr to the recently constructed sidepath extending east from Claremont Dr. 1,500' east of Clarement Dr, the existing sidepath connects to the Claremont/Chapel Hill High School greenway.

LONG-TERM: Continue **sidepath** west to Old NC 86 and east to High School Road.

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

TRIP GENERATORS:

- Chapel Hill High School
- Smith Middle School
- Seawell Elementary School
- Carolina North Forest
- Claremont Greenway
- Adjacent neighborhoods

POTENTIAL ROW NEEDS:

- Additional ROW needed along Homestead Rd for sidepath construction as well as for the shared use path connector between Homestead Rd and Vermillion Ln.

POTENTIAL PARTNERSHIPS:

- NCDOT
- Town of Carrboro
- Wexford Home Owners Association
- Burgundy Lane property owners
- Other adjacent property owners

OPINION OF TOTAL CONSTRUCTION COST (2019) FOR PHASE 1: $168,740

OPINION OF TOTAL CONSTRUCTION COST (2019) FOR PHASE 2: $367,510

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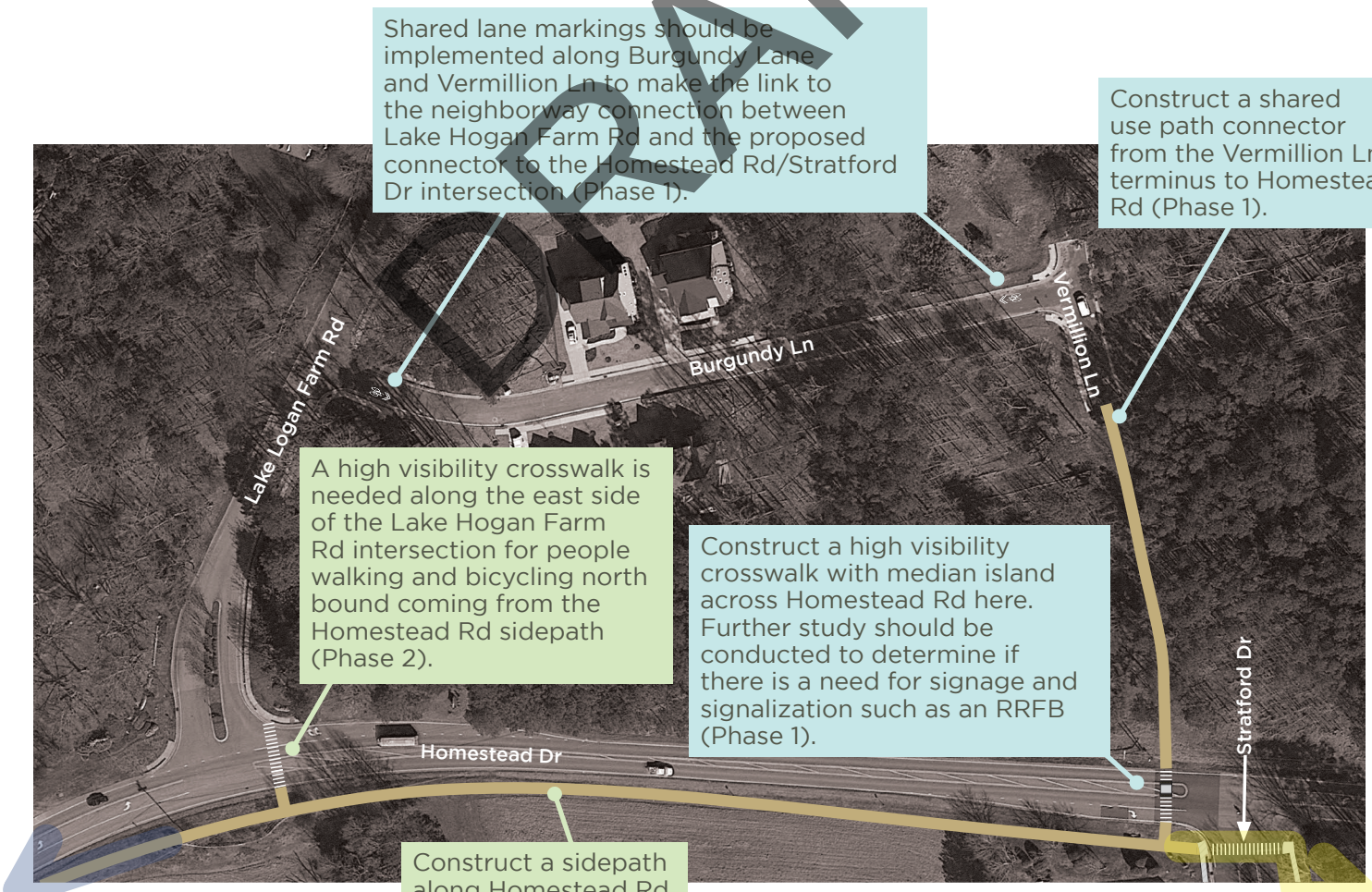
PHASE 1 & 2: CONNECTING STRATFORD DR BIKE LANES TO LAKE HOGAN FARM RD BIKE LANES



2 - HILLSBOROUGH RD & N GREENSBORO ST INTERSECTION IMPROVEMENTS

The intersection at Hillsborough Road and North Greensboro Street is a key link in the network. However, in its current state, the intersection feels uncomfortable for many and lacks clear delineation of movement.

The recommended improvements will increase safety and comfort for all users by defining the space, slowing movement, and reducing confusion.

OPINION OF TOTAL CONSTRUCTION COST (2019):

$253,110*

TRIP GENERATORS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Residences adjacent to the corridor
- Charles Herman Wilson Park
- Martin Luther King Jr. Park & Carrboro Community Garden
- Downtown Carrboro
- Adjacent property owners/neighborhood associations

POTENTIAL PARTNERSHIPS:

- Town of Carrboro
- Adjacent property owners/neighborhood associations

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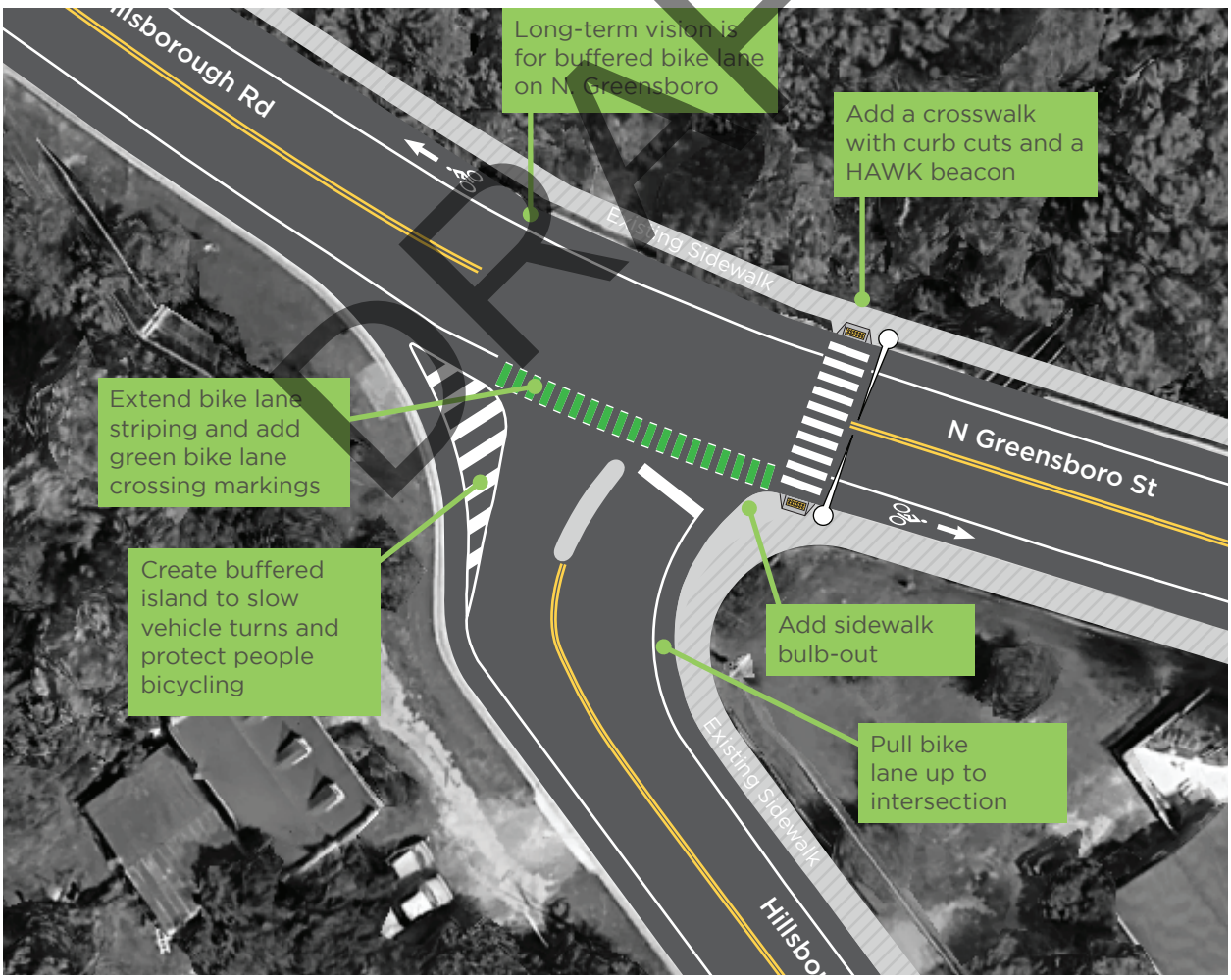

**Eliminating the HAWK beacon and the associated utility relocation would substantially reduce the project cost but would also reduce the potential safety impacts.*

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

DESIGN GUIDANCE FOR COLORED BIKE LANES:

Colored pavement within a bicycle lane increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to people who bicycle in conflict areas and in areas with pressure for illegal parking. Color can be applied along the entire corridor or as a spot improvement at intersections.

Currently, NCDOT does not have Interim Approval for the application of green paint for bicycle lanes - but that likely will change. Carrboro does have this interim approval and can install green paint through encroachment agreements provided the Town include a copy of the approval letter as an exhibit.

The following required features and maintenance considerations are provided from the *NACTO Urban Bikeway Design Guide.*

REQUIRED FEATURES:

- The color green shall be used to minimize confusion with other standard traffic control markings.
- Color shall be applied to the road surface to delineate space, increase visibility, and emphasize proper vehicle priority.
- Normal white bike lane lines shall be provided along the edges of the colored lane to provide consistency with other facilities and to enhance nighttime visibility.

MAINTENANCE:

- Colored pavement requires varying levels of maintenance depending on materials.
- Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.
- Colored facilities should be maintained to be free of potholes, broken glass, and other debris.

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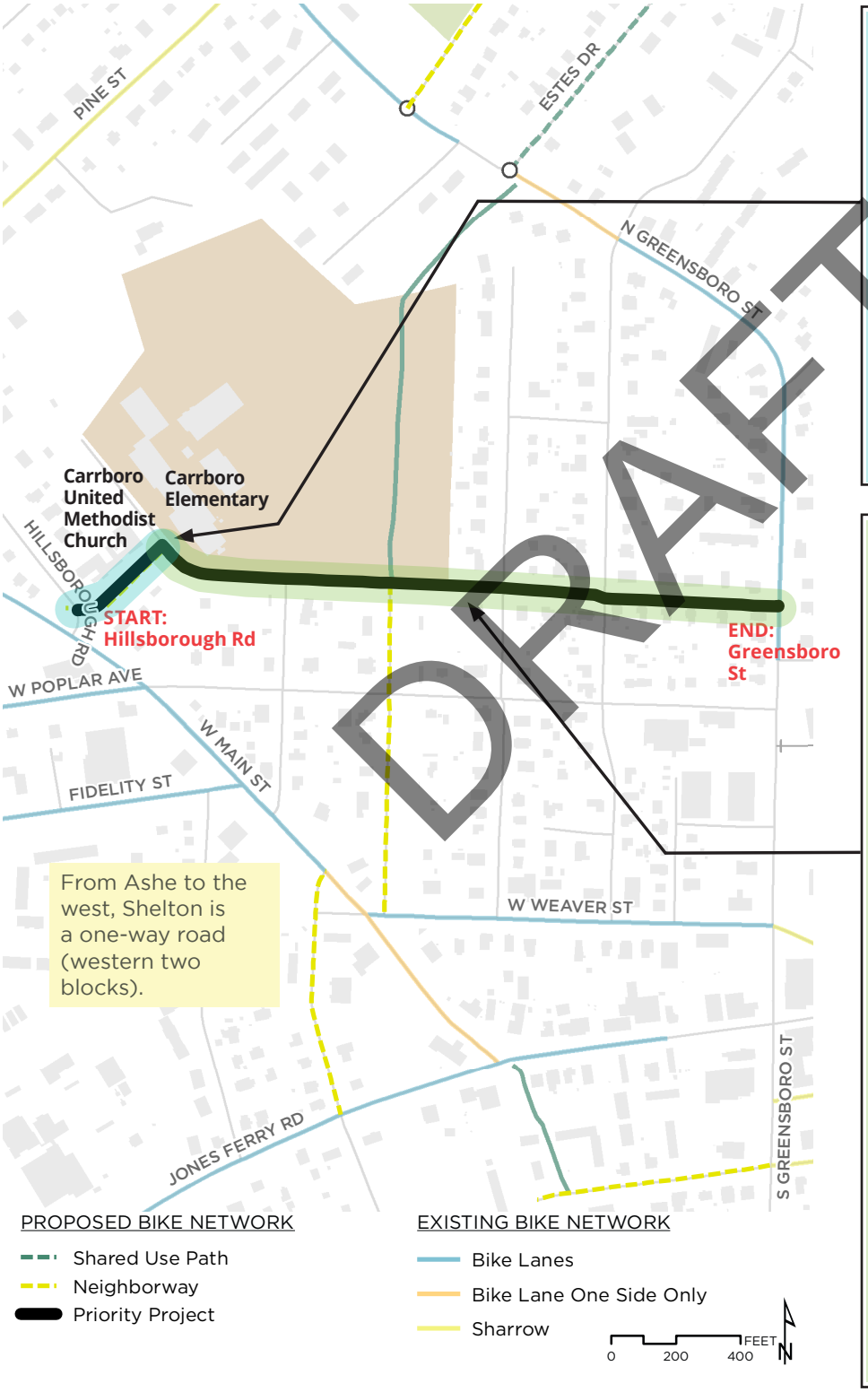
3 - SHELTON ST CONTRAFLOW BIKE LANE

FROM:
Hillsborough Road

TO:
N Greensboro Street

LENGTH:
2,300 Feet



From Ashe to the west, Shelton is a one-way road (western two blocks).

PHASE 1: Shelton St from Hillsborough Rd to Carrboro Elementary should be reconfigured to include a **contraflow bike lane**. Ideally, parking would be removed on one side of the street to allow for the greatest separation between people on bikes and in cars. It is possible to keep parking on both sides of the street - see City of Durham example (Watts St) on the following page. Watts St in Durham has nearly the same pavement width as Shelton St and parking on both sides.

LONG-TERM: Consider implementing dedicated bicycle facilities along Shelton St from Carrboro Elementary to Greensboro St. Bus circulation, school pick-up/drop-off circulation, and the needs of residents along the corridor will need to be closely examined. Currently, shared lane markings are included along Shelton St from Ashe St to Greensboro St.

The Town of Carrboro, Carrboro Elementary, and residents along the corridor should meet to discuss options that balance all needs.

Options to consider include the following:

- Shared Use Path within existing pavement with one-way conversion
- Advisory Shoulders
- No change - keeping shared lane markings

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

TRIP GENERATORS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Residences adjacent to the corridor
- Businesses along Greensboro St as well as Hillsborough Rd and Main St

POTENTIAL PARTNERSHIPS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Town of Carrboro
- Adjacent property owners/neighborhood associations

POTENTIAL ROW NEEDS:

- None (unless option to construct shared use path outside of the existing Shelton St pavement width is selected)

OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE 1: $24,310

CONTRAFLOW BIKE LANE DESIGN CONSIDERATIONS:

Several requirements and options for contraflow bike lane signage are shown below. See the NACTO Urban Bikeway Design Guide for further design considerations for contraflow bike lanes - https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/contra-flow-bike-lanes/.

A "ONE WAY" sign (MUTCD R6-1, R6-2) with "EXCEPT BIKES" plaque shall be posted along the facility and at intersecting streets, alleys, and driveways informing people in cars to expect two-way

A "DO NOT ENTER" sign (MUTCD R5-1) with "EXCEPT BIKES" plaque should be posted along the facility to only permit use by bicycles.

Warning signage, such as a modified "TWO WAY" sign (MUTCD W6-3) may be posted along the facility to inform people in cars to expect two-way traffic.

The short section of Shelton St from Hillsborough Rd to Carrboro Elementary has nearly the same pavement width (slightly more) and parking configuration of an existing contraflow bike lane in Durham, NC (Street view of Watts St pictured to the right and below). See the NACTO Urban Bikeway Design Guide for further design considerations for contraflow bike lanes - https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/contra-flow-bike-lanes/.

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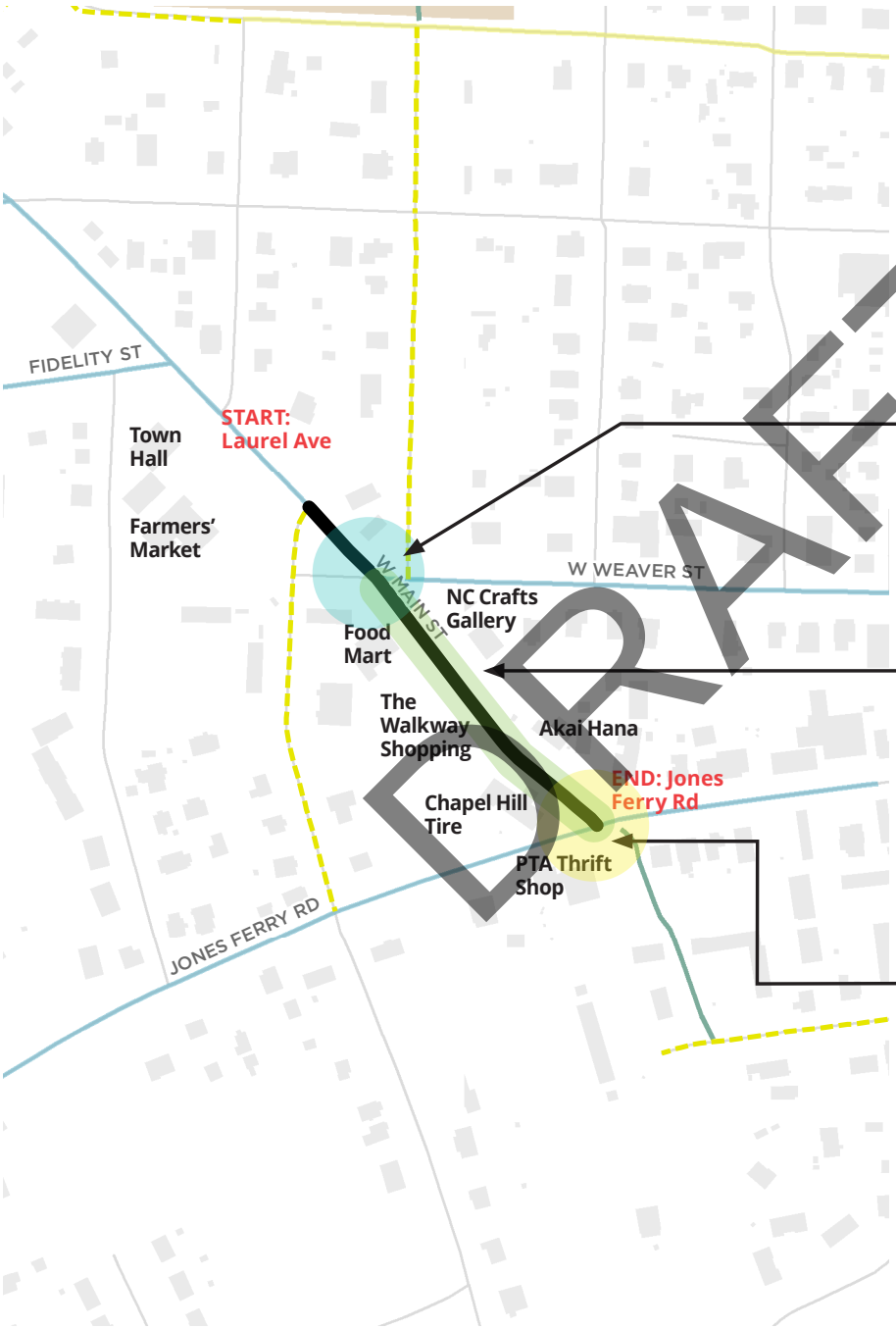
4 - W MAIN ST BIKE LANES & INTERSECTION IMPROVEMENTS

FROM:
Laurel Avenue

TO:
Jones Ferry Road

LENGTH:
800 Feet



PHASE 1: Fill in bike lane gaps, improve intersections, and develop a consistent southbound bike lane from Laurel Ave to Jones Ferry Rd. With an existing pavement width of 35'-43', this can be accomplished within the existing curbs.

The Weaver St, Laurel Ave, and Main St intersection should be improved to better delineate spaces and create room for a **southbound bike lane** from Laurel Ave to Jones Ferry Rd (detail on following page).

A LONG-TERM VISION includes restricting vehicular left turn movements from Main St to Weaver St. The space currently used for a dedicated turn lane could be used for a **separated bike lane** between Laurel Ave and Jones Ferry Rd.

The Jones Ferry Rd and Main St intersection should be improved as a **protected intersection**. This would also require curb modification (helping alleviate current accessibility issues on the south side of the intersection. In the short term, conflict markings should be painted through the intersection).

PROPOSED BIKE NETWORK
- Neighborway
- Priority Project

EXISTING BIKE NETWORK
- Shared Use Path
- Bike Lanes
- Sharrow

0 100 200 FEET N

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

TRIP GENERATORS:

- Town Hall
- Farmers' Market
- Downtown Carrboro
- Businesses and residences along/near the corridor

POTENTIAL ROW NEEDS:

- None (for short term recommendations) - Long term recommendations may require additional ROW at the intersections

POTENTIAL PARTNERSHIPS:

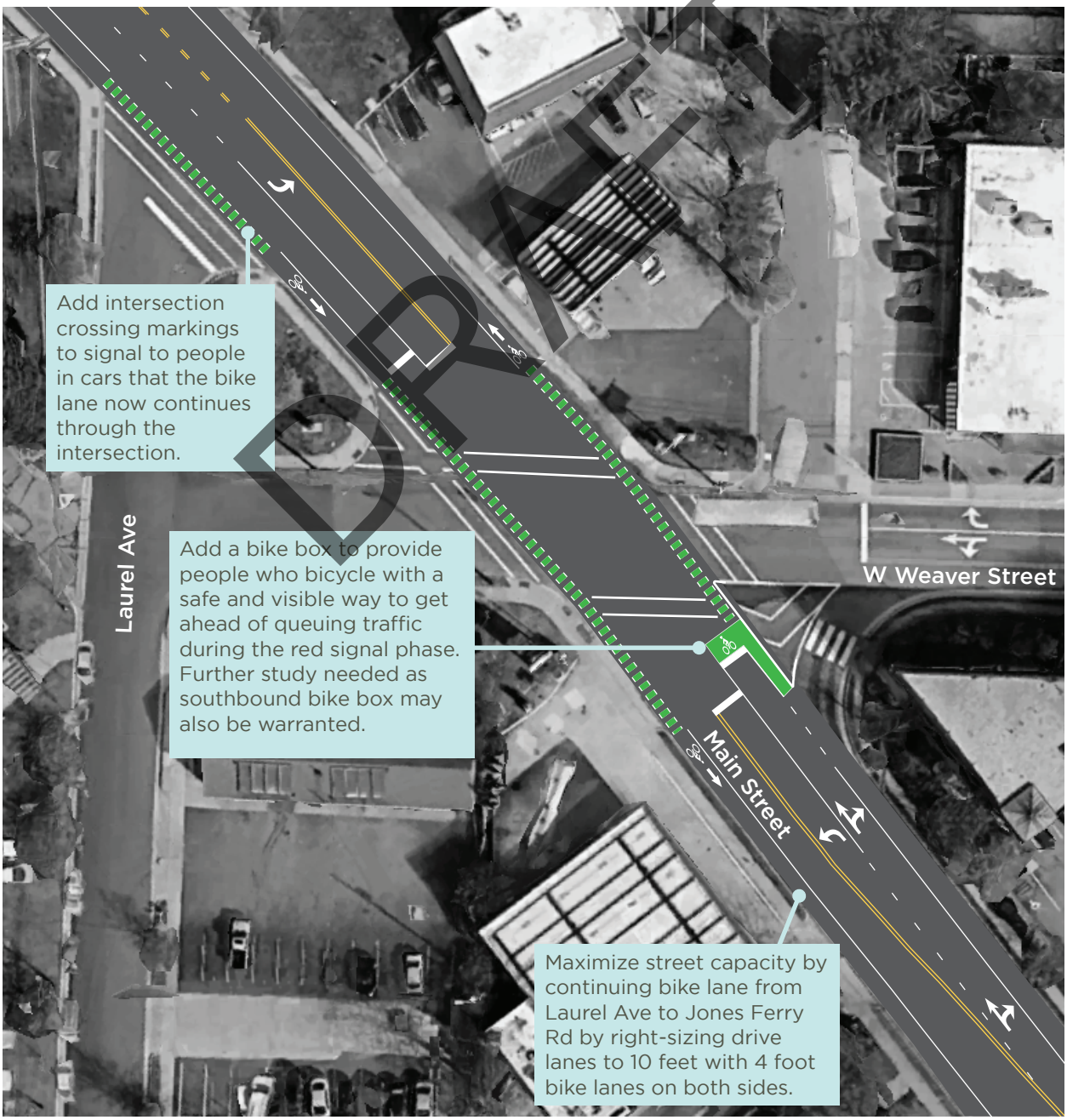
- NCDOT
- Businesses along the corridor
- Town of Carrboro

OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE I: $145,860

ADDITIONAL NOTES

- NCDOT does not have interim approval for application of green paint. The Town of Carrboro does have this interim approval and can install green paint and bike boxes through encroachment with the approval letter as an exhibit.

PHASE 1 CONCEPT: COMPLETE BIKE LANE AND INTERSECTION IMPROVEMENTS



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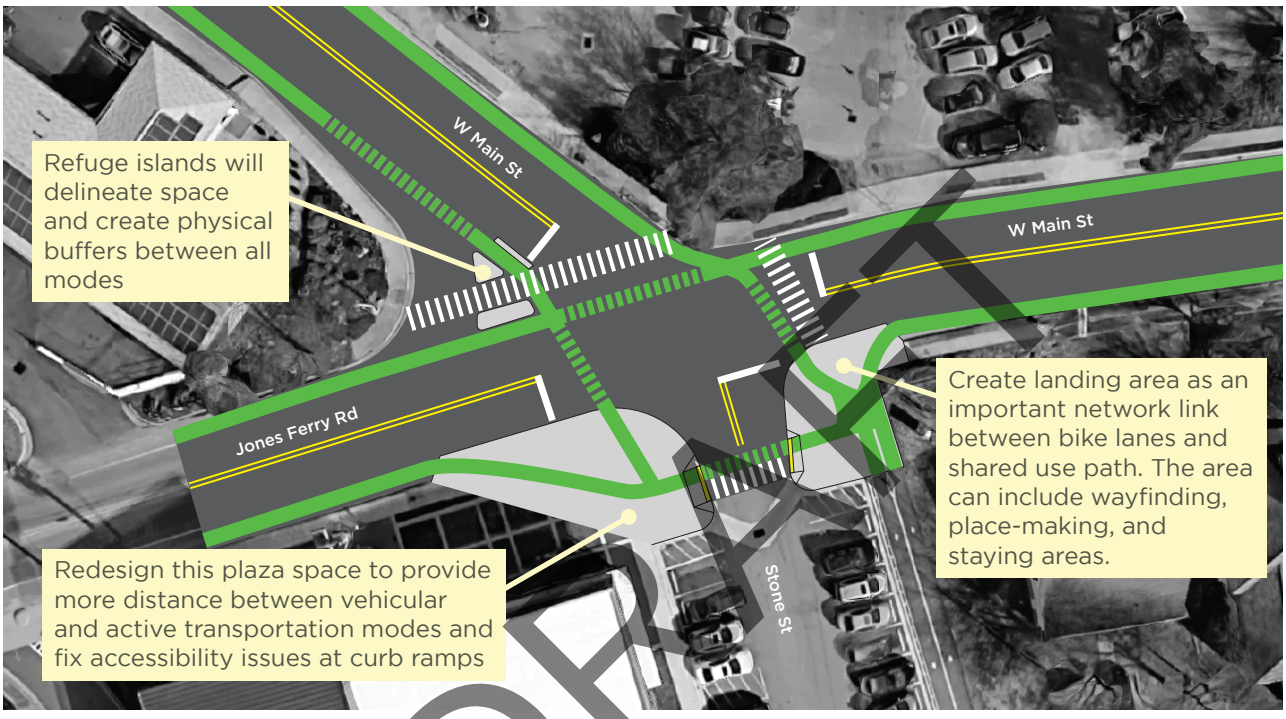
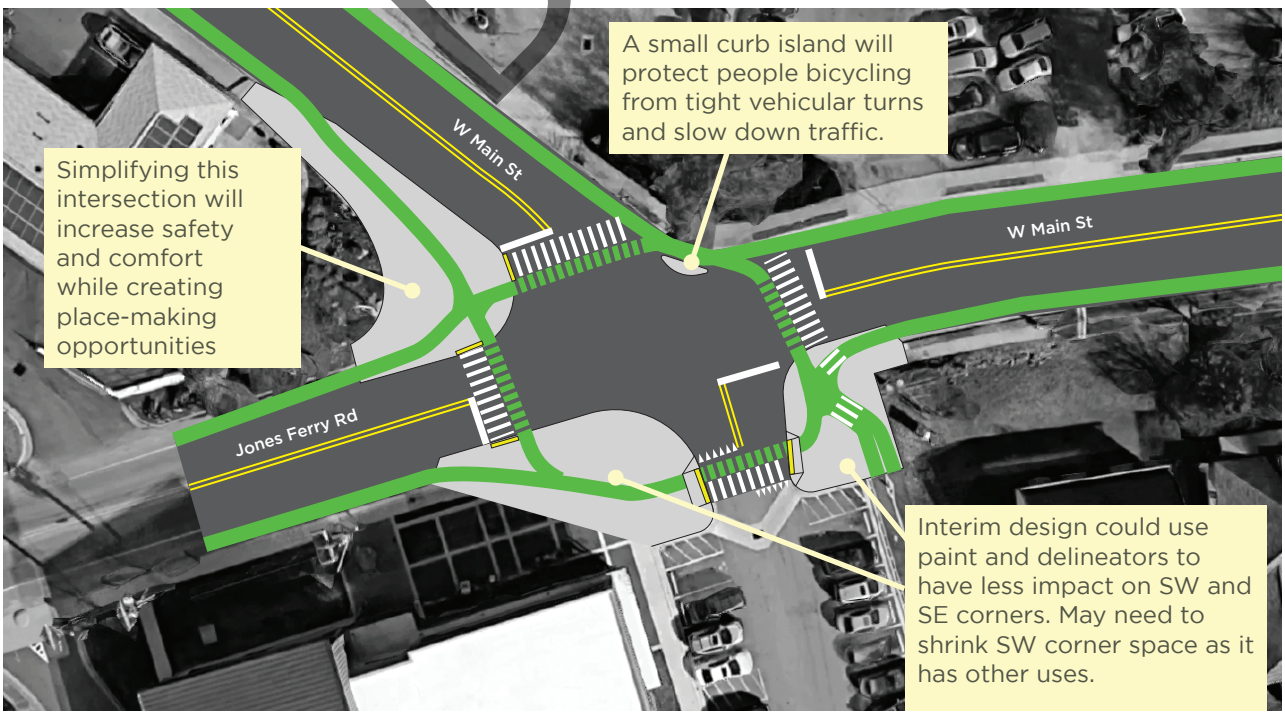
DESIGN OPTIONS AND CONSIDERATIONS:

The following graphics express long-term concepts for a Main St and Jones Ferry Rd protected intersection. This project would require a heavy reworking of the existing curbs, including the recently completed area in front of the PTA Thrift Store.

DESIGN ALTERNATIVE 1:



DESIGN ALTERNATIVE 2:



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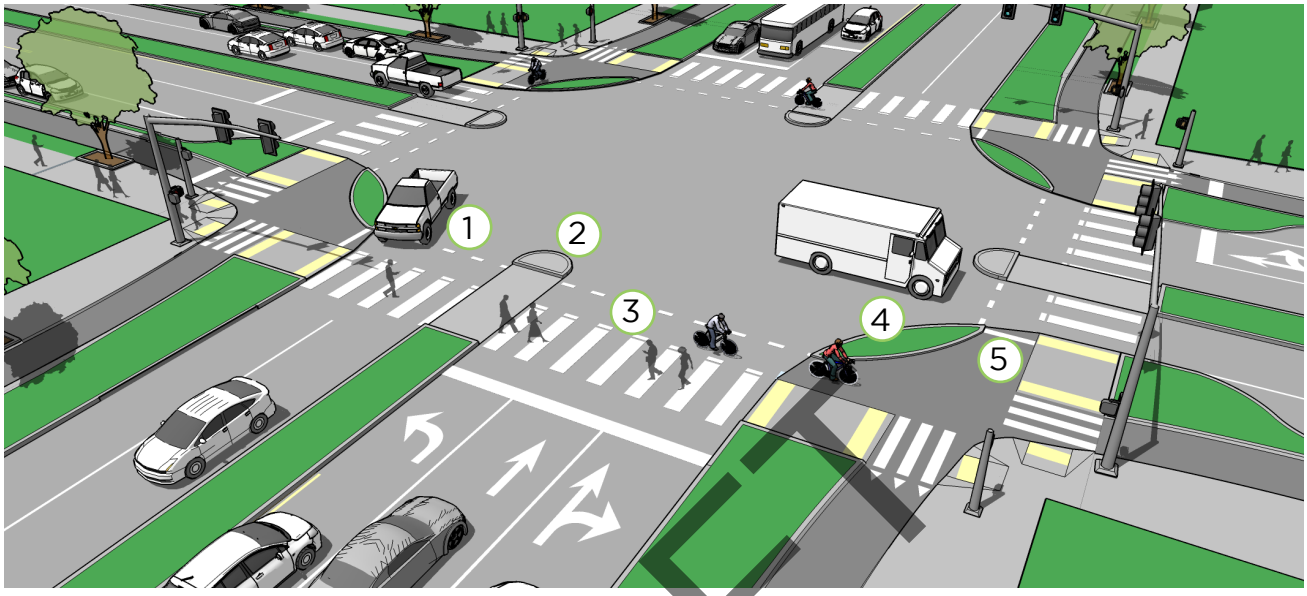
PROTECTED INTERSECTION DESIGN GUIDANCE



1. Setback bicycle crossing of 20ft allows for one passenger car to queue while yielding. A larger setback is desired in high speed areas (>35 mph). Small setback distance is possible in slow-speed, space constrained conditions.
2. If a permissive left turn is allowed, a median island extending into the intersection should be used to channelize and direct left turning motor vehicles.
3. Corner safety island with a 15-20ft corner radius slows motor vehicle speeds. Larger radius designs may be possible when paired with a deeper setback or a protected signal phase.
4. Intersection crossing markings should be used to identify the bicycle crossing. Consider green pavement to highlight the crossing area.
5. A forward stop bar should indicate the area for people bicycling to wait at a red signal.

Salt Lake City, UT - These protected intersections are used to improve safety and circulation at intersections where two separated bicycle lanes cross.

FURTHER CONSIDERATIONS

Colored pavement may be used within the corner refuge area to clarify use by people bicycling and discourage use by people walking or driving.

Intersection approaches with high volumes of right turning vehicles should provide a dedicated right turn only lane paired with a protected signal phase to separate the right turn movements from through bicycle movements (Stanek, 2015).

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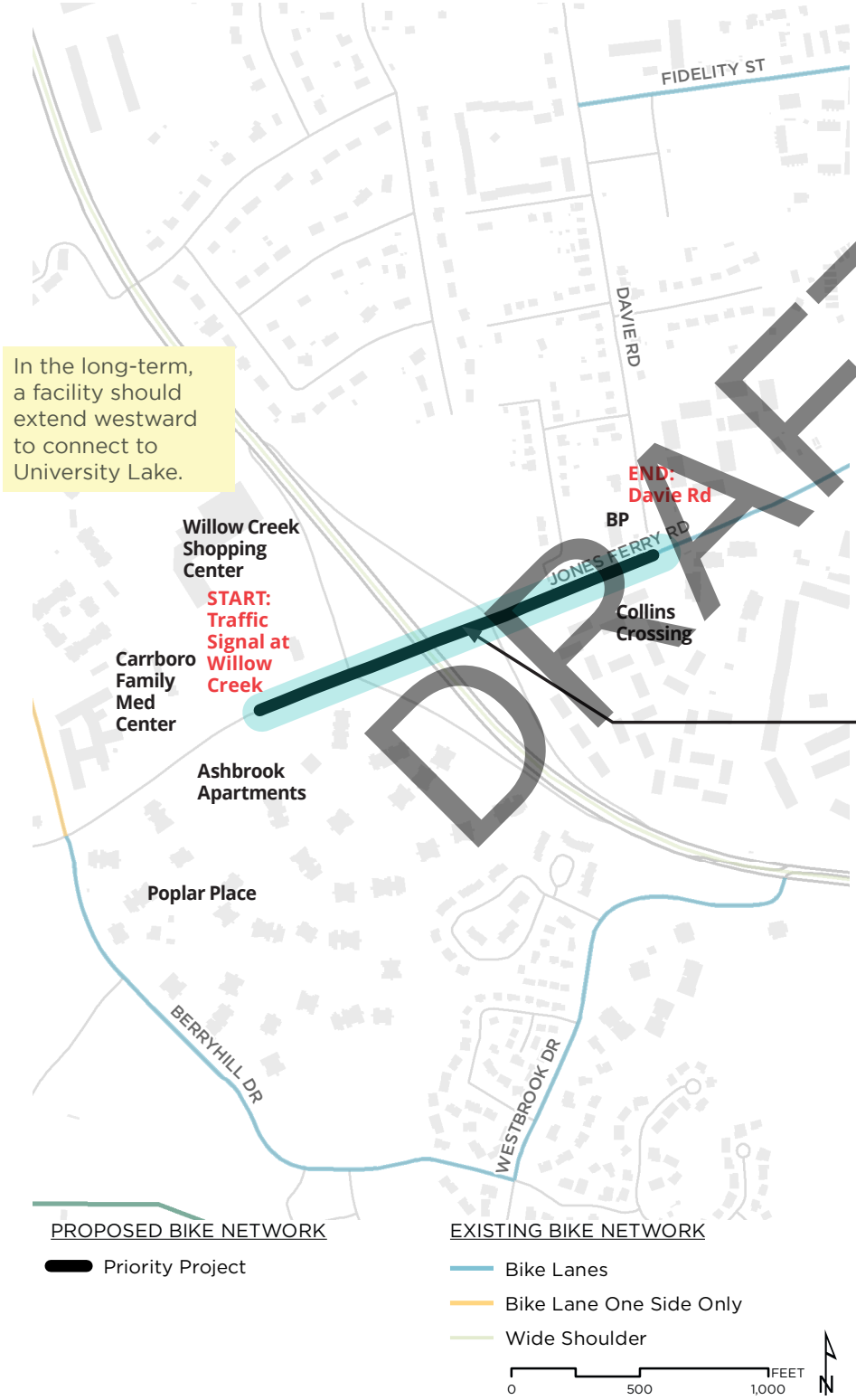
5 - JONES FERRY RD SEPARATED BIKE LANES

FROM:
Traffic Signal at Willow Creek

TO:
Davie Road

LENGTH:
1,600 Feet



In the long-term, a facility should extend westward to connect to University Lake.

Jones Ferry Rd, from the traffic light at Willow Creek to Davie Rd, currently has a buffered bike lane along the uphill (eastbound) side (implemented in 2016), and no bicycle facilities along the downhill (westbound) side. The Town is working with NCDOT Division 7 and the IMD Division to develop a pilot project with three test treatments which would create a protected bike lane using the buffer on the eastbound side. The proposed treatments are standard delineator posts, zebra bumps, and thermoplastic rumble strips.

PHASE 1: Given the relatively high traffic volumes (8,300-12,000 AADT) and 35 mph speed limit through this section, **separated bike lanes** are recommended along both sides of Jones Ferry Rd.

For the downhill (westbound) portion, this would require eliminating the far right turn lane to create space for a buffered bike lane (and physical barrier such as flexible bollards).

For the uphill section (eastbound), a physical barrier should be constructed in the existing buffer space (such as flexible bollards).

A capacity analysis will be needed for project west of NC 54 ramps.

LONG-TERM: Consider constructing a landscaped median to improve safety, green infrastructure, and aesthetics in the separated bike lane buffer space.

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

TRIP GENERATORS:

- Willow Creek Shopping Center (Food Lion)
- Adjacent residential areas
- Downtown Carrboro

POTENTIAL PARTNERSHIPS:

- NCDOT
- Town of Carrboro
- Businesses and apartment complex owners along corridor

POTENTIAL ROW NEEDS:

- None

OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE I: $111,540

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EXISTING

PHASE 1: FLEXIBLE BOLLARD SEPARATED BIKE LANE

PHASE 2: LANDSCAPED MEDIAN PROTECTED BIKE LANE

THE LONG TERM NETWORK

The proposed long term bike network was developed with the goal of creating a system of well-connected, low-stress facilities for people of all ages and abilities. This network is intended to identify roadways in need of bicycling improvements so that as roadway and development projects occur, these bicycle facilities should be implemented.

In addition, once the strategic priority projects are implemented, projects from the long-term system will be selected as the next to implement.

The visual facility legend to the right highlights each facility type and the total mileage recommended in the proposed network.

The Town should remain flexible to opportunities as well as constraints that may require adjustments to this long-term network. As an example, the community is currently holding conversations to determine the potential alignment and surface type for a greenway trail through Carolina North along Bolin Creek. Additional projects may require refining with further local conversations and coordination with NCDOT and Chapel Hill Transit. These include the N Greensboro St separated (or buffered) bike lanes, E Main St separated bike lanes, and potential, future Rail Trail to Hillsborough, among others potentially.

NCDOT will have corridor studies and roadway projects in the future as well. The Town should remain coordinated with NCDOT to communicate its desires and take advantage of any opportunities to advance bikeways.

Separated Bike Lanes

Bike Lanes

Private Connections

Neighborway

Shared Use Path

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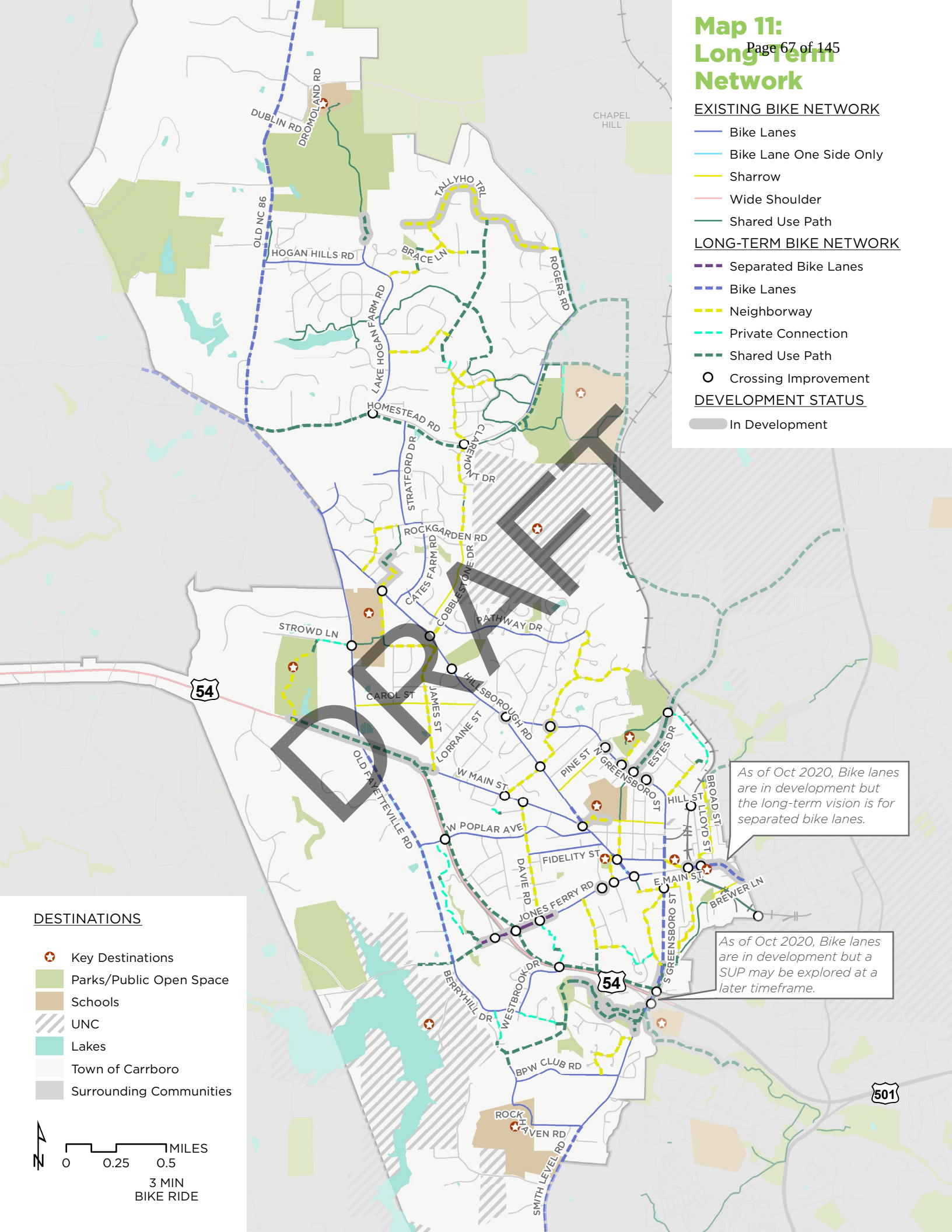
Map 11: Long-Term Network



REGIONAL CONNECTIVITY

There are numerous opportunities for increasing regional bicycle connectivity that would benefit people getting to and from Carrboro. Carrboro has a deep connection to its neighboring communities. Many neighborhoods, commercial areas, attractions, and institutions overlap between multiple jurisdictions. The projects and categories below highlight areas of opportunity where the Town of Carrboro can leverage its partnerships to develop bicycle facilities that increase livability and economic vitality for not only Carrboro residents, but for the region.

1 CHAPEL HILL TO HILLSBOROUGH RAIL TRAIL

A 10.2-mile rail corridor from downtown Carrboro northward towards Hillsborough could be a landmark project for the region by linking Carrboro, Chapel Hill, Hillsborough, and Durham. The State University Railroad corridor is currently used infrequently and with very slow-speed trains. A feasibility study managed through the DCHC MPO is recommended to pursue the possibilities.

PARTNERSHIPS

- University Railroad (Norfolk Southern)
- Town of Carrboro
- Town of Chapel Hill
- Town of Hillsborough
- NCDOT
- UNC - Chapel Hill
- Orange County

2 CHAPEL HILL AND UNC CONNECTIONS

UNC-Chapel Hill and its institutions are large employers of many Carrboro residents. In addition, Carrboro and Chapel Hill residents commonly utilize services, recreation, and shopping across the "border" given the adjacent proximity. There are numerous key corridors linking Carrboro and Chapel Hill including Main St, Rosemary St, Estes Dr, Homestead Rd, Morgan Creek Greenway, and the Libba Cotton Bikeway. These all represent vital connections between the two communities. Ensuring continuity amongst bicycle facilities is paramount in ensuring a safe and comfortable regional network for regular users.

PARTNERSHIPS

- Town of Carrboro
- Town of Chapel Hill
- UNC - Chapel Hill
- NCDOT

3 ORANGE COUNTY CONNECTIONS

Orange County has always been a popular recreational riding region with one of the first state bike routes established for the county. There are currently 206 miles of bicycle routes throughout Orange County, connecting communities and rural landscapes. Today, the communities of Carrboro, Chapel Hill, Hillsborough, and Mebane have expanded their bike networks. Thoughtfully tying these networks together into the future will help reduce future congestion and increase livability in this growing area.

PARTNERSHIPS

- Town of Carrboro
- Town of Chapel Hill
- Orange County
- Adjacent property owners
- NCDOT

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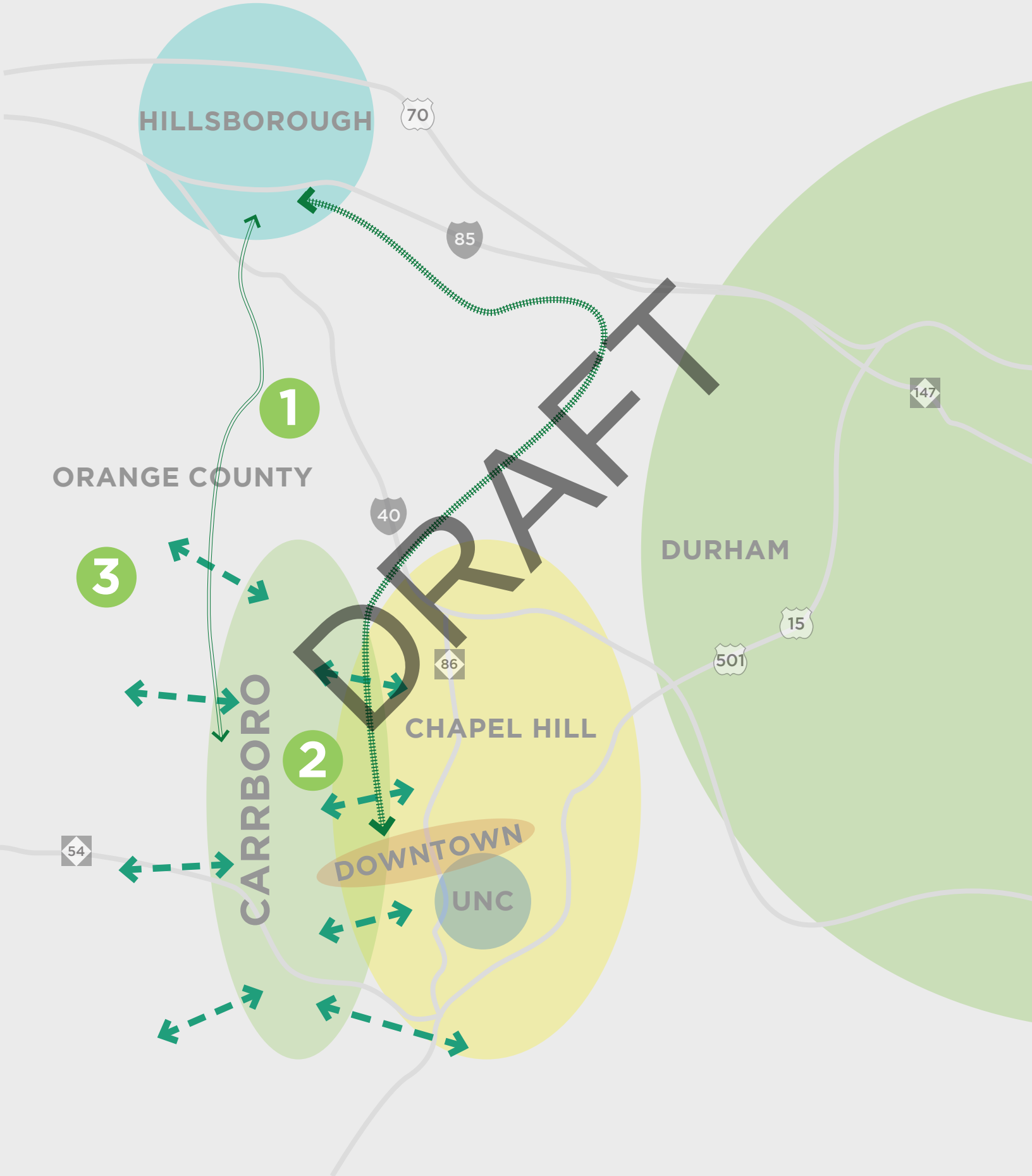
HILLSBOROUGH
70
85
1
ORANGE COUNTY
40
3
DRAFT
DURHAM
147
15
501
86
CHAPEL HILL
2
CARRBORO
54
DOWNTOWN
UNC

LONG TERM NETWORK - OTHER PROJECTS OF INTEREST

In addition to the long-term network shown on page 65, there are other projects of interest, while not shown on that map, warrant additional discussion. These projects are ones that the Town is still interested in finding an appropriate route to implementation, but additional work is needed in clearing administrative hurdles, design review & approval, or identifying community consensus. Showing these as lines on a map fails to acknowledge the underlying complexities and work needed to make these projects a reality.

Bolin Creek Greenway

Carrboro adopted a Greenways Master Plan in 2006, that first identified the Bolin Creek Corridor as a potential alignment for greenway development. This is a multi-phase project of which sections 1A and 1B have been completed. Phase 2 as identified in that plan should still be considered for potential bicycle transportation projects. Consideration of other alignments in that plan were not discussed as part of this planning process, because as of September 2020, direction has yet to be determined by the Carrboro Town Council.

Buffered/Separated Bike Lanes

Throughout the development of this Plan, there was a significant interest in separated bicycle lanes, in particular along N Greensboro Street and Hillsborough Road. These facilities are of utmost important in providing safe routes for people on bikes of all ages and abilities, and the Town is fully supportive of them, but there are implementation hurdles worth acknowledging. There are currently no separated bicycle lanes on NCDOT maintained facilities. This means that there are no design standards in place to facilitate efficient review and approval of any proposed design for separated bicycle lanes on their facilities. Carrboro is currently working with NCDOT to develop a pilot project for the Jones Ferry Road corridor, which would place physical separation in the buffer space that already exists. The implementation process for future separated bike lanes on NCDOT facilities will be better refined based on the information gathered and lessons learned from that project.

Rail Trails

The current Libba Cotten bikeway is a key piece of bicycle infrastructure in Carrboro. There has been significant interest received in extending that route along the rail corridor to points further north; In particular to use that as part of a route to Hillsborough or the Campus to Campus Connector. The Libba Cotten is a unique section of rail with trail in that it exists through an agreement between the University of North Carolina (who owns the rail spur) & the Town of Carrboro (who built and maintains the trail). The implementation for the Libba Cotten included an extensive discussion of liability, one that would likely need to be held again if another rail trail is to be considered. To extend the trail further would require developing a separate agreement with Norfolk Southern, the owner of the ROW along its alignment north of East Main Street in downtown.

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N. Greensboro Street and Hillsborough Road represent opportunities for enhancing the current bicycle lane to a buffered bike lane or separated bike lane. Given the curb-to-curb constraints, buffered bike lanes may be the only alternative that is the least impactful, in the long-term, and would still provide benefit to people on bikes.

DESIGN GUIDE RESOURCES

Overview

Planners and project designers should refer to these standards and guidelines in developing the infrastructure projects recommended by this Plan. The following resources are from the NCDOT website, for "Bicycle & Pedestrian Project Development & Design Guidance", located here:

https://connect.ncdot.gov/projects/BikePed/Pages/Guidance.aspx

All resources listed below are linked through the web page listed above, retrieved in August 2018.

National Guidelines

American Association of State Highway and Transportation Officials (AASHTO):
- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design, and Operation of Pedestrian Facilities

The Federal Highway Administration (FHWA):
- Accessibility Guidance
- Design Guidance
- Facility Design
- Facility Operations

Manual on Uniform Traffic Control Devices (MUTCD):
- 2009 NC Supplement to MUTCD
- Part 4E: Pedestrian Control Features
- Part 7: Traffic Controls for School Areas
- Part 9: Traffic Controls for Bicycle Facilities

National Association of City Transportation Officials (NACTO):
- Urban Bikeway Design Guide
- Urban Street Design Guide

Safe Routes to School (SRTS) Non-Infrastructure:
- National Center for Safe Routes to School
- National Partnership for Safe Routes to School

US Access board:
- ABA Accessibility Standards
- ADA Accessibility Guidelines
- ADA Accessibility Standards
- Public Rights-of-Way, Streets & Sidewalks, and Shared Use Paths

North Carolina Guidelines

North Carolina Department of Transportation (NCDOT):
- WalkBikeNC: Statewide Pedestrian & Bicycle Plan
- Glossary of North Carolina Terminology for Active Transportation
- NCDOT Complete Streets, including the Complete Streets Planning and Design Guidelines
- Evaluating Temporary Accommodations for Pedestrians
- NC Local Programs Handbook
- Traditional Neighborhood Development Guidelines

Greenway Construction Standards:
- Greenway Standards Summary Memo
- Design Issues Summary
- Greenway Design Guidelines Value Engineering Report
- Summary of Recommendations
- Minimum Pavement Design Recommendations for Greenways
- Steps to Construct a Greenway or Shared-Use Trail

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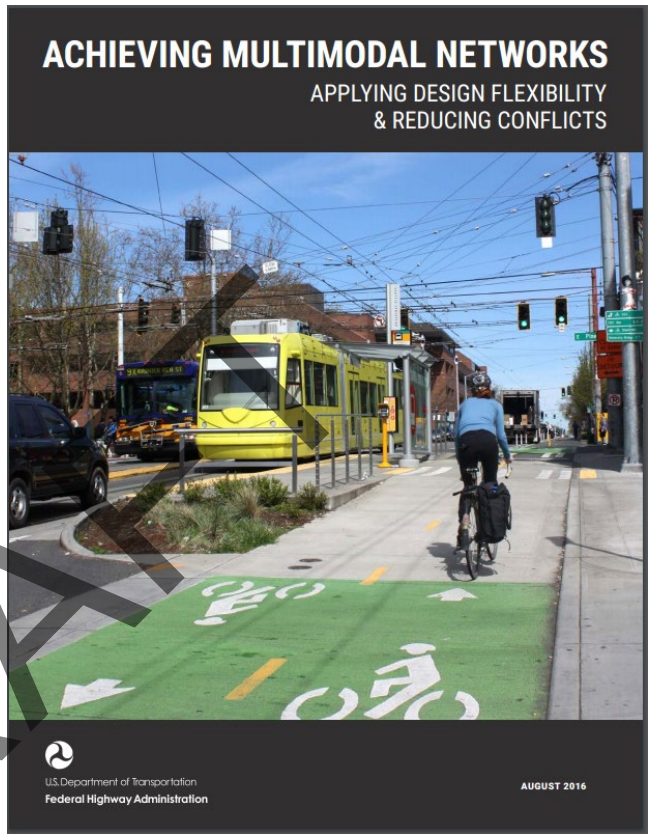
NCDOT Bicycle and Pedestrian Policies
https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx

Additional FHWA resources not currently linked through the main NCDOT link above:

- Achieving Multimodal Networks (2016)
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/
- Separated Bike Lane Planning and Design Guide (2015)
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm
- Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/
- Small Town and Rural Multimodal Networks Design Guide (2017)
  Main Guide:
  http://ruraldesignguide.com/

  Section specific to side paths:
  http://ruraldesignguide.com/physically-separated/sidepath



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6 STRATEGIES

ROLES + RESPONSIBILITIES

At the heart of every successful plan is a coordinated effort by town staff, stakeholders, and other partners to support safe travel by bike. Everyone has a key role to play in implementing this Plan.

CARRBORO STAFF

Town staff should use this report to establish programs and policies that educate, encourage, and prioritize infrastructure investments proposed throughout the town. This Plan should be a living document that is continuously updated and evaluated to ensure Carrboro remains a premier biking community.

NCDOT

NCDOT staff, specifically within Division 7, can use this Plan to get familiar with proposed priority projects. NCDOT will play an integral role in the design and construction of bicycle facilities throughout the town both through ongoing activities at the Division level and via statewide Transportation Improvement Project (TIP) submittals.

DURHAM-CHAPEL HILL-CARRBORO MPO

The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization is responsible for transportation planning in the region. It also plays a central role in prioritizing, requesting, and overseeing federal and state dollars to the Town of Carrboro. The MPO should become familiar with the priorities of this Plan and assist the Town in selecting projects for funding.

TRANSPORTATION ADVISORY BOARD

The Transportation Advisory Board can use this Plan as a framework for coordinating the development of the policies and programs recommended for the town. They can also use the framework chapter and action step table to advocate for improvements in Carrboro. This Board will be instrumental in implementing the Plan. In addition, this Board should consider meeting quarterly with the Recreation and Parks Commission and Greenways Commission to coordinate efforts.

LOCAL STAKEHOLDERS

Local stakeholders can use this Plan to understand and confirm the conditions in their neighborhoods and near their organizations (if applicable) as well as become familiar with the ways in which they can support program goals. In many cases, education and encouragement programs require these dedicated volunteers.

Other stakeholders include Chapel Hill Transit, GoTriangle, Orange County, Town of Chapel Hill, UNC-Chapel Hill, Triangle Trails Initiative, and others.

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PERFORMANCE MEASURES

The performance measures in this Plan are important for assessing whether the Plan is meeting its goals over time. Data on these measures should be collected on a routine basis to help track progress. This information will allow for adjustments to help ensure that this Plan's goals are achieved.

The Plan performance measures are based on the goals of the Plan (see Chapter 1).

The performance measures are generally outcome-based, and the intent is to prioritize investments that do the best job of achieving desired Plan outcomes.

The performance measures were selected based on Carrboro's ability to collect relevant data.

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Table 1 Bicycle Plan Performance Measure Targets

Goal	Example Performance Measure	Performance Target/ Desired Trend
Improve Access	Average travel time by mode	Decrease in average travel time*
	Number of jobs accessible by travel time, mode, and industry	Increase number of jobs accessible
Create a Positive Economic Impact	Retail Sales tax revenue	Increase sales tax revenue
Protect the Environment	Vehicle trips reduced by project	Decrease in the number of vehicle trips
	Bicycle Commute Mode Share	Increase in percentage of commute trips made by bike
Promote Equity	Housing and Transportation Affordability Index	Increase in H+T Index*
Enhance Health	Percentage of children and adults who meet physical activity recommendations	Increase in childhood and adult physical activity level*
Safety	Bicycle collision rate	Reduce bicycle collision rate
	Number of fatalities and serious injuries	Zero fatalities

**These data are challenging to obtain and scale to the Town's geography and to the bicycling mode, specifically. The Town can consider surveys to determine progress with equity, average travel time, and physical activity levels due to bicycle facility improvements..*

FUNDING SOURCES

In order to achieve the goals of this Plan, the Town of Carrboro and its partners will need to fund improvements from a variety of funding sources and partners. Funding sources will need to be opportunistic and consistent in order to implement this plan. Five primary funding sources make up the core funding strategy for this Plan:

- **Federal Funds.** There are several federal funding programs that can be used for biking projects that are administered by NCDOT to the DCHC MPO or local jurisdictions. Examples include the Transportation Alternatives Programs, Surface Transportation Program, and the Highway Safety Improvement Program. The Strategic Mobility Formula aligns bicycle and pedestrian projects with funds from the Transportation Alternatives Program and Surface Transportation Program.
- **Grants.** Competitive grants through public agencies or through private or non-profit foundations can generate additional resources for projects and programs.
- **Capital & Department Budgets.** Carrboro can implement this Plan through regularly scheduled capital projects, such as streetscape projects, street resurfacing, or new public or private property construction.
- **Fees.** User fees or development impact fees provide an opportunity to generate revenue to fund infrastructure projects, such as sidewalk and trail construction, as well as programs, such as bicycle education classes.
- **Fundraising Campaigns.** Fundraising through neighborhood groups, advocacy groups, or even crowd-funding can help generate additional resources for projects and programs.

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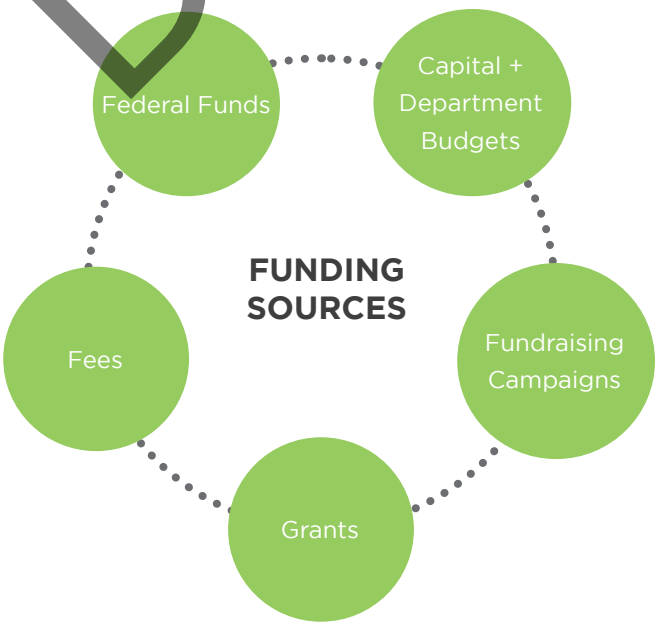

BIKE-FRIENDLY COMMUNITY RECOGNITION

The Bicycle Friendly Community (BFC) program led by the League of American Bicyclists is intended to assist communities in making bicycling a viable transportation option. The program incorporates assessments in the score card that can help Carrboro gauge where they are excelling and where they are falling short.

The Town has participated in the League of American Bicyclists' Bicycle Friendly Community program since 1999 and its bronze-level designation inspired the Town to frame its first comprehensive bicycle plan around actions that could help lead to higher level designations.

In 2010, the Town was awarded with a silver-level designation – the first to achieve this ranking in North Carolina. The League of American Bicyclists attributed Carrboro's active Transportation Advisory Board, the percentage of arterial streets with bike lanes, and the percentage of people bicycling daily as key contributors to the Town's silver-level designation. The League submitted the guidance below to help Carrboro think about ways to advance to a gold-level recognition.

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Going for Gold!

- Continue to expand on and off street bike network connectivity both within the Town and to surrounding areas. Protected bike lanes are recommended, especially on roads with speed limits above 35 mph.
- Develop a system of bicycle boulevards on quiet, neighborhood streets.
- Make intersections safer and more comfortable for people who bicycle.
- Increase high quality bicycle parking.
- Expand Safe Routes to School programs.
- Continue to expand public education and bicycling skills workshops.
- Promote cycling throughout the year by offering community bike rides.
- Encourage communication between the Carrboro Police Department and cycling community.
- Ask police officers to step up enforcement for people driving and bicycling.

KEY PRIORITIES

1 KEEP MOMENTUM ON BICYCLE PROJECTS THAT ARE ALREADY IN DEVELOPMENT.

Map 4 (pg. 19) features existing facilities along with projects that have some level of funding, design, or construction in progress. These "in-development" projects should be fully funded first, as the lowest hanging fruit for new bicycle infrastructure. *Timeline: IMMEDIATE*

2 USE EQUITY TO PRIORITIZE PROJECTS FOR FUTURE IMPLEMENTATION

Maps 5 & 6 display the composite and racial equity assessment for the Town. As a condition of Carrboro's participation in GARE, this information will be used to help prioritize future priojects wtih the goal of ensuring that bicycle ridership is not predictable by race. *Timeline: IMMEDIATE*

3 STRATEGICALLY AND PROACTIVELY FUND AND BUILD STRATEGIC PRIORITY PROJECTS.

Map 9 (pg. 44) features a set of priority projects that developed out of the Carrboro Bike Plan process. These are detailed in individual project cut-sheets (starting on page 50) that summarize why the project is a priority, and what the key opportunities and challenges are to its development. *Timeline: 5-10 years*

4 USE THE LONG TERM NETWORK OF RECOMMENDATIONS TO BUILD OTHER PROJECTS INCREMENTALLY OVER TIME.

As Carrboro continues to grow, new development and roadway construction projects should incorporate facilities recommended in Map 10 (pg. 59). As progress is made on priority projects, new priorities should be selected from this comprehensive map of recommendations. *Timeline: 10+ years*

5 LEVERAGE PARTNERSHIPS TO IMPLEMENT NEW POLICY AND PROGRAMS.

Working with existing partners and reaching out to new organizations with common goals may help implementation of the short-term recommendations outlined in chapter 4. *Timeline: 3-10 years*

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BIKE PLAN

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Division of Bicycle & Pedestrian Transportation

alta PLANNING + DESIGN

Prepared for the Town of Carrboro, North Carolina

Prepared by Alta Planning + Design

This project was made possible with a matching grant from the North Carolina Department of Transportation (NCDOT)

Division of Bicycle and Pedestrian Transportation (DBPT).

A APPENDIX

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BIKE PLAN

TOWN OF CARRBORO

BIKE PLAN

111 E. Chapel Hill Street
Suite 100
Durham, NC 27701
www.altaplanning.com

Existing Conditions Memorandum

Date: April 17, 2019

To: Zachary Hallock, Transportation Planner, Town of Carrboro

From: Jennifer Baldwin, Senior Associate, Alta Planning + Design

Re: **Existing Conditions**

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Local Context + 2009 Carrboro Bike Plan

The Town of Carrboro has always been a bicycling pioneer in North Carolina, installing the first bicycle lane in the state in 1980 and becoming the state's first Bicycle Friendly Community (BFC). Its unique culture and history of dedication to providing bicycle infrastructure and programs for its residents is unparalleled in the state. The Town features a population of long-time residents and transient UNC students, many of whom bike for recreation and transportation purposes. Also, unlike most North Carolina cities, the bicycle network is substantial with bike lanes, sharrows, and shared-use paths connecting much of the community. However, there is still room for improvement as evidenced by the Bicycle Friendly Community (BFC) report card noting the areas to address to reach "gold" status.

The 2009 Carrboro Comprehensive Bicycle Transportation Plan recommends the implementation of an additional 54 miles of bicycle facilities, including paved shoulders, bicycle lanes, sharrows, sidepaths, intersection improvements and off-road trails. The facilities are recommended in phases, and are prioritized for implementation. The plan adopted the following vision statement:

> "Carrboro will be a place that is bicycle-friendly; where people have an accessible, safe, and convenient option of bicyclist for transportation, recreation, and health; where bicycle lanes and greenways provide a connected system within and outside the Town; where future development provides access and facilities for bicyclists; where bicycle transportation is an easy choice; and where proposed policies and programs educate, inspire, and encourage residents and enforce safe bicyclists and motorist behavior."

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The following existing conditions analysis will be used to assess progress since the 2009 Carrboro Bicycle Plan and to identify need and opportunity for making Carrboro even more bicycle-friendly.

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Existing and Planned Bikeways

The Town of Carrboro has a network of bicycle facilities that while fragmented, provides significant coverage to key destinations around Town. Existing greenways are found in town parks like Wilson Park and bike lanes are found along major corridors such as W Main Street and Hillsborough Road. Below is the estimated total mileage of the bicycle network within Carrboro.

Existing Bikeway Network Summary

Type of Bike Facility	Definition	Example Photo	Total Mileage in Carrboro Today
Shared Roadway or Sharrow	A **Shared Roadway** may either be a low volume (less than 3000 cars per day) roadway with traffic calming and signage to create a safe shared use environment, OR a higher volume roadway with wide (14') outside lanes. A **Sharrow** is used on roadways where lanes are too narrow for striping designated bike lanes. The sharrow marking makes motorists more aware of the potential presence of cyclists; directs cyclists to ride in the proper direction; and reminds cyclists to ride further from parked cars to avoid 'dooring' collisions.	 	1.8 MILES
Paved Shoulder	**Paved Shoulders** are the part of a roadway which is contiguous and on the same level as the regularly traveled portion of the roadway. Shoulders should be provided on both sides of the road. There is no minimum width for paved shoulders, however a width of at least 4 feet is preferred. Paved shoulders are typically found in more rural areas, where there is no curb and gutter in place.		4.0 MILES

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Type of Bike Facility	Definition	Example Photo	Total Mileage in Carrboro Today
Bicycle Lane	A **Bicycle Lane** is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes are always located on both sides of the road (except one-way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is 4 feet; five- and six-foot bike lanes are typical for collector and arterial roads.		16 MILES
Greenway	**Greenways** (also referred to as multi-use paths) are completely separated from motorized vehicular traffic and are constructed in their own corridor, often within an open-space area. Greenways can be paved and where paved should be a minimum of 10' wide travelway. Pavement widths of 12-, 14-, and even 16-feet are appropriate in high-use urban situations.		5.4 MILES

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Bike Network Growth Over Time

Year	Miles Added	Total
1989	3.01	3.0 miles
By 2005	+ 12.94	16 miles
By 2012	+ 7.25	23.2 miles
By 2013	+ 0.36	23.6 miles
By 2014	+ 0.32	23.9 miles
By 2015	+ 1.96	25.8 miles
By 2016	+ 0.83	26.7 miles
By 2018	+ 0.4	27.1 miles
2019	**0**	**27.1 miles**

Existing Low-Stress Bikeways

The last decade has seen tremendous investment in bicycle infrastructure locally and across the United States. However, one key realization is now shaping how bicycle investments are made and that's the fact that different cyclists have different needs.

Although some bicyclists will ride on any road, regardless of an available bikeway ("strong and fearless"), a much larger portion of the population will ride only where there is a high-quality bikeway ("interested but concerned" population). Understanding this concept has led us to design more low-stress bikeways that provide the high-quality experience the majority of cyclist's desire

Bike lanes, trails, and low speed neighborhood routes all mike biking more comfortable. While Carrboro currently has 24.5 miles of bikeways, only roadways such as Pathway Drive and Lake Hogan Farm Road fall into the "low-stress" category. Low stress bikeways include the following:

- **Trails + Separated Bikeways:** Shared use trails and separated bikeways separate bicyclists from automobiles and improve overall safety. Separated bikeways are especially useful on roads with higher speeds or traffic volumes. The Libba Cotton Bikeway is one example of a shared use trail in Carrboro but there are currently no examples of a separated bikeway.

- **Bicycle Boulevards:** In residential neighborhoods, bicycle boulevards – also known as neighborhood greenways, improve travel for bicyclists while calming traffic and greening neighborhoods. Bicycle Boulevards are shared by automobiles and bicycles, but at speeds that make travel more comfortable. While Carrboro doesn't currently have a designated network of Bicycle Boulevards, the opportunity exists to connect several neighborhoods to key destinations along low volume, low speed corridors.

- **Intersection Improvements:** One persistent challenge to building high-quality routes is integrating bicyclists at intersections. Providing protected intersections, or just marked crossings, can help make motorists more aware of cyclists.

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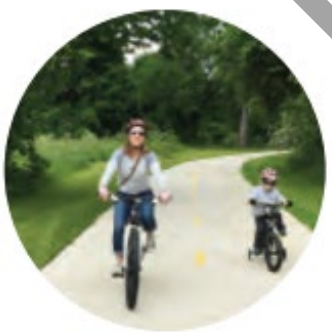


Example of a Separated Bikeway

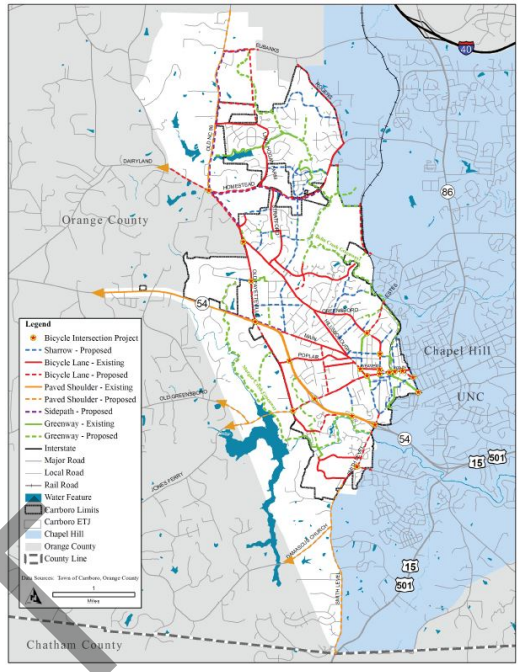
Example of a Bicycle Boulevard

Example of an Intersection Improvement

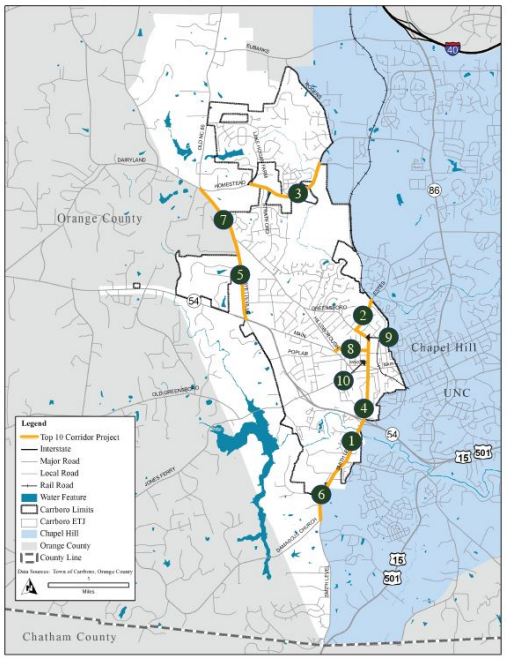
2009 Recommended Bikeways

The Town of Carrboro's Comprehensive Bicycle Transportation Plan (2009) shows recommended bicycle facilities to make up a complete Bicycle Network Map, including bicycle corridors, greenway corridors, and recommended intersection improvements. These facilities, in conjunction with the five E's (engineering, education, encouragement, enforcement, and evaluation and planning), seek to fulfill the goals of creating a safe, accessible, and comprehensive bicycle network.

The prioritization process of the 2009 plan began with a list generated by recommendations from the steering committee and general public. The roadways were then broken down into segments at logical points, such as major intersections and were generally under a mile long. The plan consisted of 30-miles of commended improvements for bicycle facilities, including long term solutions and interim treatments for the top 10 priority bicycle corridors. The high priority projects were intended to provide a guide for the community that responds to changing conditions and community priorities. The shorter, residential segments were left out. The projects highlighted below in red are the projects that were not implemented (short-term nor long-term solution) as recommended in the 2009 plan.



Bicycle Network Map from 2009 Carrboro Bike Plan



Bicycle Corridor Map of Top 10 Priority Projects from 2009 Carrboro Bike Plan

Carrboro's 2009 Bike Plan's Top 10 Priority Corridors

Rank	Corridor	From	To
1	Smith Level	NC 54	Rock Haven
2	Estes	Greensboro	Town Limits
3*	Homestead	High School	Lake Hogan Farm
4*	S Greensboro	Weaver	NC 54
5	Old Fayetteville	Hillsborough	NC 54
6	Smith Level	Rock Haven	Damascus Church
7*	Old 86	Homestead	Hillsborough
8	Shelton	N Greensboro	Hillsborough
9	N Greensboro	Estes	Shelton
10	N Greensboro	Shelton	Weaver

*Partial long-term recommendation completed

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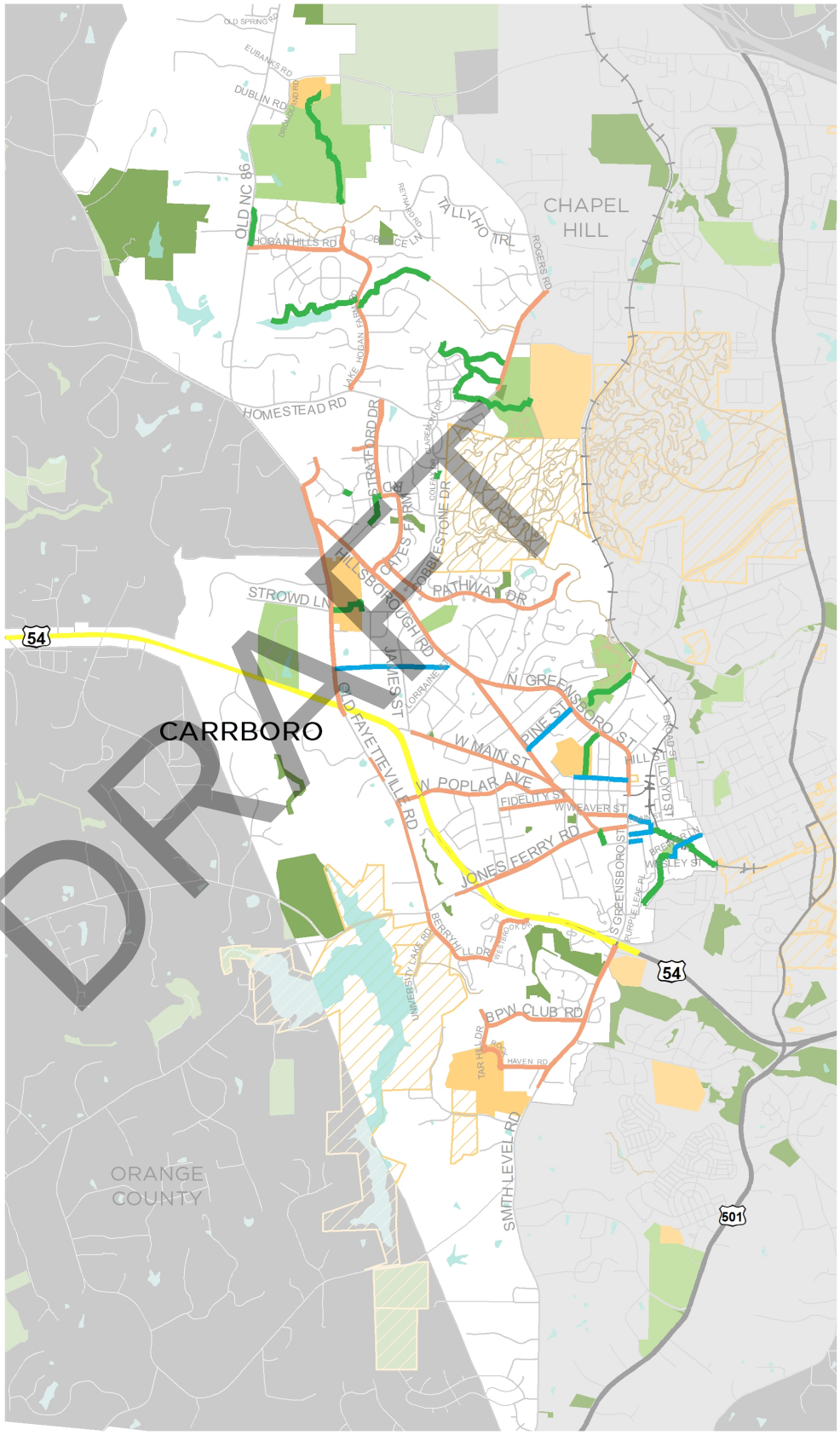
EXISTING BIKE FACILITIES

CARRBORO
BIKE PLAN
UPDATE



BIKE NETWORK

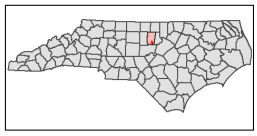
- Bike Lane
- Greenway (paved)
- Sharrow
- Wide Shoulder
- Rural Trails

BASE LAYERS

- Railroad
- Streets
- Lakes
- NC State Forest
- Parks
- Schools
- UNC

N

0 0.5 1 MILES
3 MIN 6 MIN BIKE RIDE



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Data provided by NCDOT and the Town of Carrboro. Map produced March 2019.

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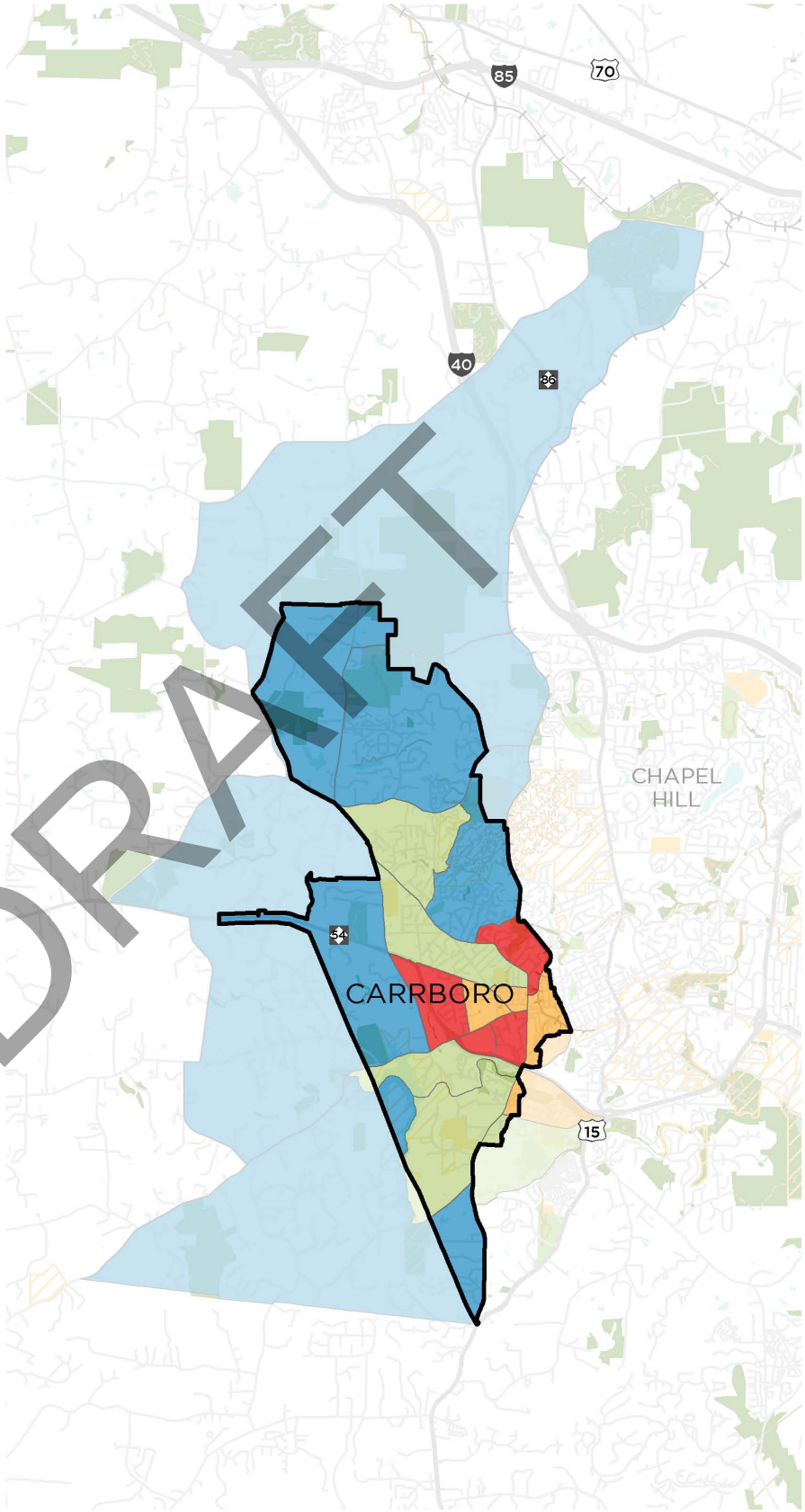
POPULATION DENSITY ANALYSIS

CARRBORO BIKE PLAN UPDATE



POPULATION DENSITY ANALSIS

- Higher Population Density
- Lower Population Density
- Study Area

BASE LAYERS

- Railroad
- Parks
- Schools
- UNC
- NC State Forest

0 1 2 MILES

N

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Data provided by NCDOT and the Town of Carrboro. Map produced March 2019.

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Safety Analysis

Introduction

Around the U.S., concerns about safety are the most common reasons why people do not bicycle. Bicycle crash research supports concerns about bicycle and motorist interactions, since crashes occur mostly at arterial intersections. Local crash data is a valuable source of information for identifying difficult or dangerous areas for bicyclists. It can also highlight specific interactions between bicyclists and motorists that require increased awareness or engineering.

In 2017, the Town of Carrboro experienced nine total bicycle crashes, eight resulting in injuries. Orange County on a whole had 27 bicycle crashes in 2017, 25 resulting in injuries. Between 2013 and 2017, Orange County had six bicycle fatalities, one that occurred in Carrboro. Designing a complete and safe bicycle network can have implications for existing and future traffic operations, as well as increase visibility of bicyclists to motorists. Improving safety for bicyclists is the primary goal of the Carrboro Bicycle Transportation Plan.

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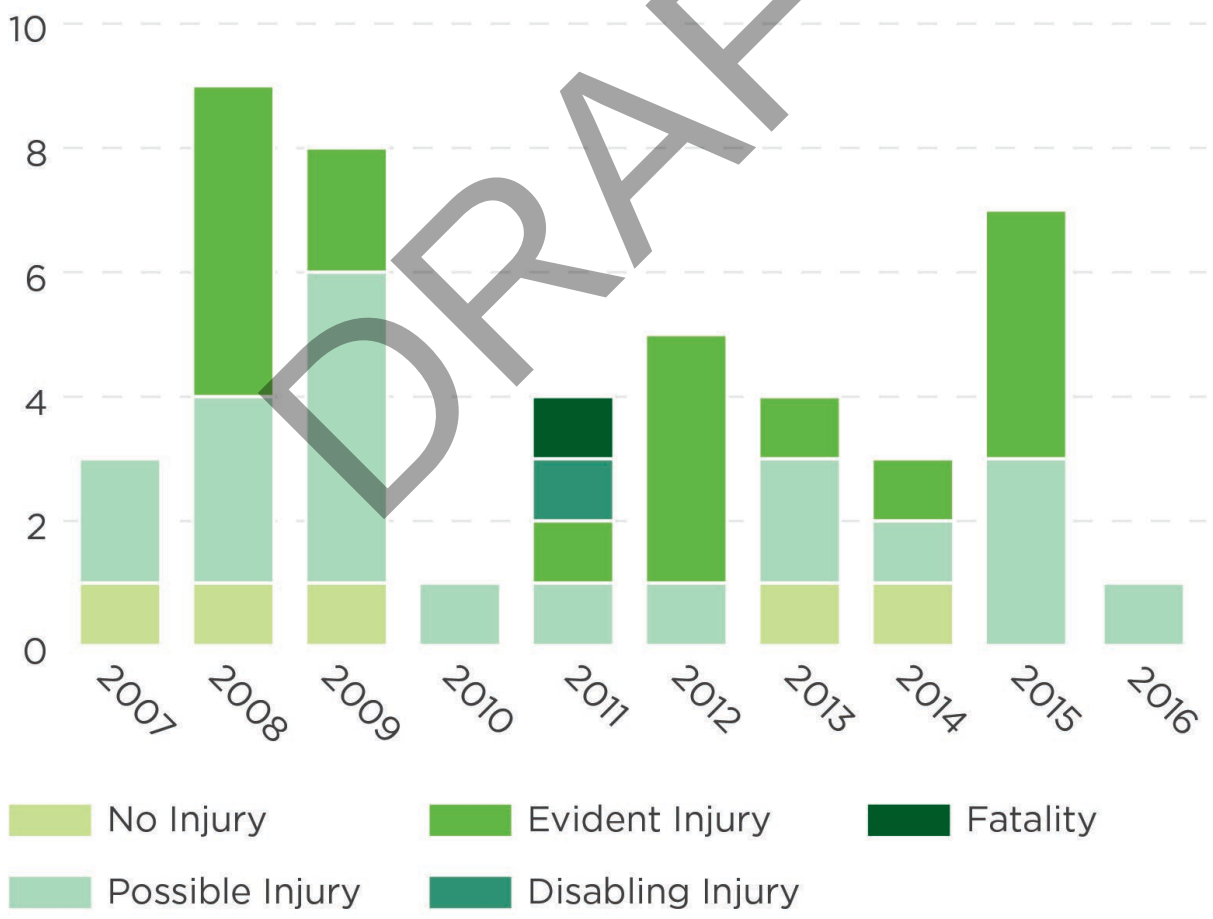
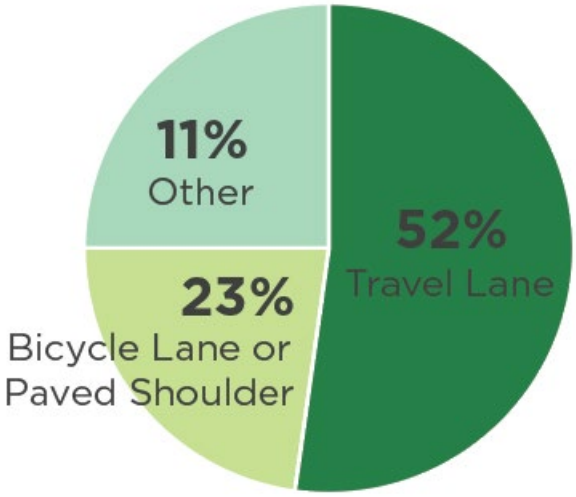
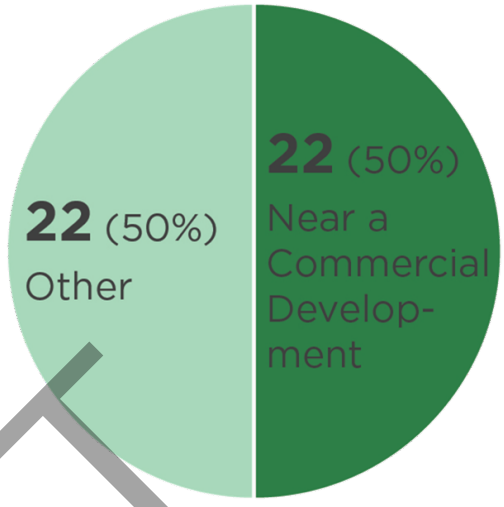
Carrboro Bicycle Crashes by Year



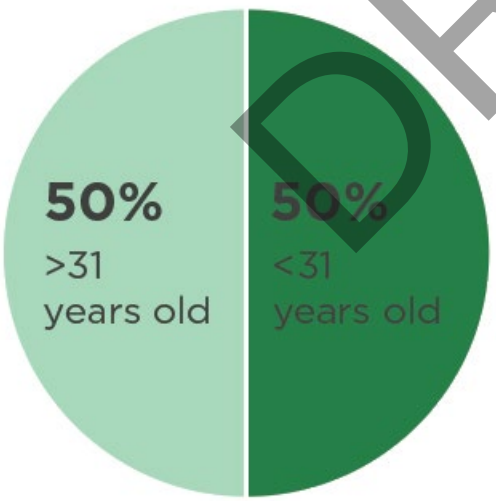
Where Bicyclist was at Point of Crash



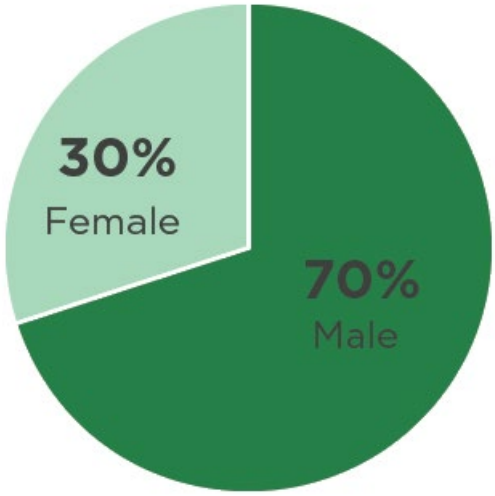
Location of Bicycle Crash



Age of Bicyclist Involved in Crash



Sex of Bicyclist Involved in Crash



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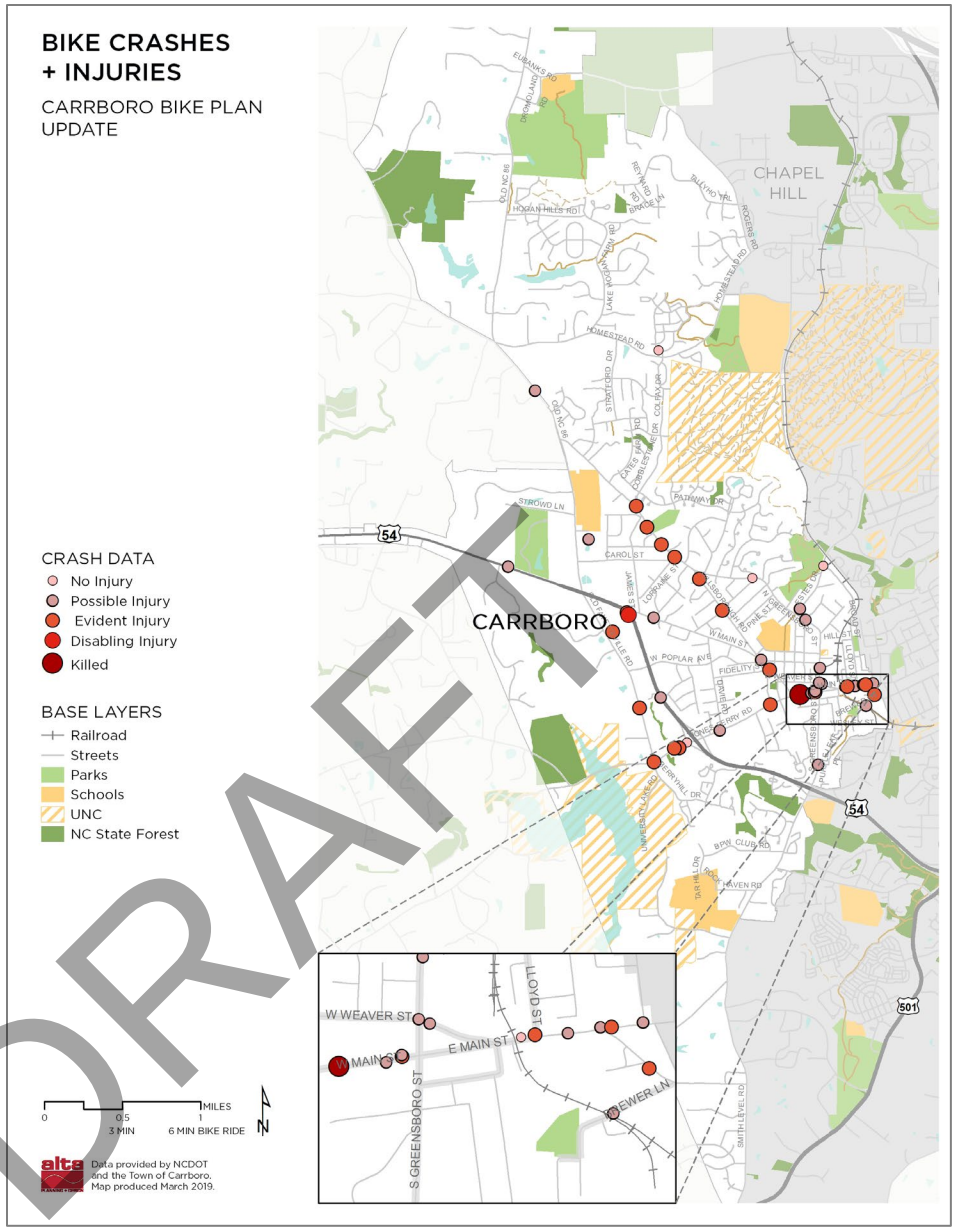
High Crash Corridors

The map to the right shows all of the crash locations between 2007 and 2015 with the size of the dot reflecting the frequency of crashes over time.



The following corridors have the highest frequency of bicycle related crashes and will be investigated further for potential safety improvements:

- **Jones Ferry Road** included a high frequency of crashes involving motorist overtaking cyclists, bicyclists making right turns and conditions where bicyclists or motorists failed to yield near SR-54
- **Hillsborough Road** has several evident injury bicycle crashes with conflicts of turning, overtaking roadways, and failing to yield
- **West Main Street** is the location of the 2011 death of bicyclist due to motorist overtaking bicyclist
- **W Rosemary Street** has several crashes recorded that mostly consist of injuries involving motorists failing to yield and conflicts with turning vehicles
- Crashes along **N Greensboro Street** consist of motorist turning conflicts with commercial driveways and intersections
- **Estes Drive** crashes consist of bicyclists losing control and motorist turning conflicts from commercial driveways

The map on page 11 highlights the crash locations overlapped with the equity analysis. The corridors of Jones Ferry Road and Main Street have the highest frequency of crashes that also fall within the highest tier of vulnerable users (see Equity Analysis memo for more details).

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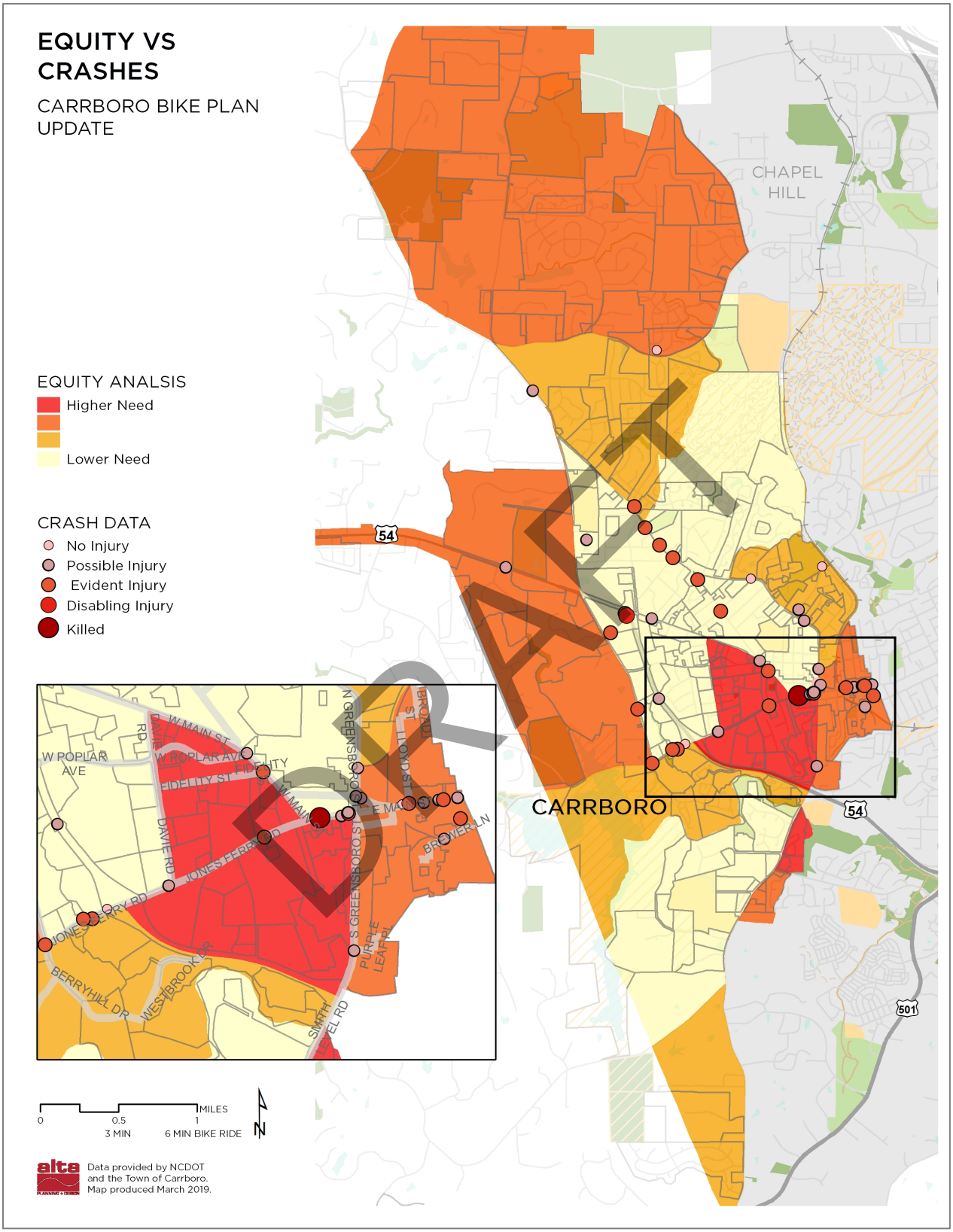
EQUITY VS CRASHES
CARRBORO BIKE PLAN UPDATE
EQUITY ANALSIS
Higher Need
Lower Need
CRASH DATA
No Injury
Possible Injury
Evident Injury
Disabling Injury
Killed
CHAPEL HILL
CARRBORO
54
501
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W POPLAR AVE
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DAVIE RD
JONES FERRY RD
BERRYHILL DR
WESTBROOK DR
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S GREENSBORO ST
PURPLE LEAF PL
SMITH LEVEL RD
BROAD ST
LLOYD ST
E MAIN ST
BREWER LN
0
0.5
1
MILES
3 MIN
6 MIN BIKE RIDE
N
Data provided by NCDOT and the Town of Carrboro. Map produced March 2019.

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Current Conditions

The following tables and map series describe key opportunities and challenges in Carrboro related to current conditions for bicycling, and provide a basic inventory of existing facilities, destinations, and conditions.

Opportunities + Challenges

Opportunities and Challenges	Assessment
Overall Transportation Network	The majority of streets in Carrboro see relatively low to moderate traffic, with several notable exceptions., such as NC54 and Main Street which are the main arterial roadways that carry high volumes of traffic through the area. The busiest section of roadway is the section of NC54 between Jones Ferry Road and South Greensboro Street that sees over 34,000 vehicles per day.
Ownership of Public Road Right-of-Ways	The roadway network in Carrboro is a combination of locally-owned and state-owned roads. The ownership of the public right-of-way is important for determining: 1) the types of facilities that can be constructed in or along a roadway; 2) the agency in charge of maintaining the roadway and implementing bicycle recommendations; and 3) how improvements are scheduled, funded, and constructed. The map on page 16 shows which roadways in Carrboro are state- versus locally-owned. The town will need to coordinate with NCDOT Division 7 and the Division of Bicycle and Pedestrian Transportation to implement this plan's recommended improvements along State roadways.
Size and Scale of Carrboro for Bicycling	If Carrboro were completely flat with no obstacles, it would take less than 10 minutes (1.6 miles) to ride from the Carrboro Farmers Market to UNC's Davis Library (as the crow flies; based on 12 MPH average). Carrboro is well suited for bicycling in terms of its size and scale; consider Raleigh, for example, which is 20 miles across at its longest, end to end.
Safe Routes to School	Carrboro's Safe Routes to School Strategic Action Plan, adopted in 2012, provides the vision and goals for Carrboro Elementary School and McDougle Elementary. The report stated that around 60 children walk or bike to Carrboro Elementary and about 140 walk or bike to McDougle Elementary. In 2014, Carrboro Elementary was also the first school in the state to introduce curriculum that will help teachers promote safe transportation habits. In addition, Carrboro's Safe Route to School Implementation Committee and Carrboro's Youth Advisory Board were put in place in 2016. Compared to other NC schools, Carrboro has shown the necessary commitment to improving safe routes to school, which can be expanded within this update to the bike plan.

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Opportunities and Challenges	Assessment
Climate	North Carolina's climate is very well-suited for bicycling, with cycling possible almost year-round, aside from a few months of the year during the peak extremes of summer and winter. The most bike-friendly small town in the U.S. (Davis, CA), has similar annual average temperatures, the key difference being humidity levels.
Topography	There is a significant amount of elevation change throughout the Town of Carrboro. Hills are found primarily north of N Greensboro Street/Hillsborough Road and south of Jones Ferry Road. The majority of road segments observed to have a significant slope are also scored as LTS 1 (low level of traffic stress). This is likely due to the shared characteristics of many hilly neighborhoods having low-speed residential roads. Also, while these roads may have a lower level of traffic stress, the presence of steep or challenging terrain may discourage the "interested but concerned" bicycle riders. For this reason, slopes can influence facility type that increase comfort and safety; or routing, where steep roads are avoided. Roads such as Estes Drive, Spring Valley Road, Cates Farm Road, Cobblestone Drive, and Barington Hills Road have challenging topography, especially for inexperienced cyclists.
Physical Barriers	Like most small and suburban towns, the major infrastructure that prohibits bicycle travel in Carrboro are major roads and intersections. NC 54 is a 4-lane divided state highway that contains the highest traffic volumes in Carrboro with limited access to bicyclists and pedestrians. The north and south segments of Greensboro Street continues through the middle of the Town and connects to Estes Drive, which is one of the main routes to the Town of Chapel Hill. Additionally, Jones Ferry Road and Main Street interest in the heart of downtown Carrboro and feed traffic to E Main Street and onto W Franklin Street, the main corridor in Chapel Hill. In addition, the railroad that runs north/south through the eastern side of Town is challenging to bicycle connectivity. These barriers to bicycling create "bikeable islands" within residential areas. (See Bicycle Level of Comfort memo, in which these somewhat isolated bikeable areas are visible).
University of North Carolina	UNC promotes biking as a safe and healthy alternative means of transportation. Students at UNC serve as strong advocates for two-wheel transport and provide an opportunity to the Town to convert short, single occupancy vehicle trips to bicycle trips.
Regional Connectivity	Orange County offers a variety of biking experience included several bike routes suitable for day rides, from 25 miles to 83 miles, reaching all municipalities and all parts of the County. The opportunity exists for Carrboro to develop a bikeway connection to both the Town of Chapel Hill and the Town of Hillsborough.

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Inventory of Select Roadways

Roadway Segment	From	To	Roadway Class	Width	# Traffic Lanes	Speed Limit	Bike Facilities	Maint.	Traffic Volume (AADT)	Roadway Configuration
Jones Ferry Rd	NC 54	W Main St	Arterial	35'	2	35	Bike lanes on both sides	NCDOT	8300	Undivided
Homestead Rd	Lake Hogan Farm Rd	Stratford Dr	Arterial	25'	2	45	No	NCDOT	5300-8000	Undivided
Homestead Rd	Stratford Dr	Smith Soccer Fields	Arterial	25'	2	45	Wide shoulder	NCDOT	5300-8000	Undivided
N Greensboro St	Main St	E Poplar Ave	Arterial	35'	3	20	No	Carrboro	9500-14000	Undivided
N Greensboro St	E Poplar Ave	Hillsborough Rd	Arterial	35'	2	20	Bike lanes on both sides	Carrboro	6000	Undivided
S Greensboro St	NC 54	Main St	Arterial	20'	2	35	No	NCDOT	11000	Undivided
Pathway Dr	Cates Farm Rd	Wild Oak Ln	Collector	35'	2	25	Bike lanes on both sides	Carrboro	N/A	Undivided/ Residential
Stratford Dr	Autumn Dr	Homestead Rd	Collector	35'	2	25	Bike lanes on both sides	Carrboro	N/A	Undivided/ Residential
Cobblestone Dr	Pathway Dr	Carolina North Forest	Local	25'	2	25	No	Carrboro	N/A	Undivided/ residential
Claremont Dr	Carolina North Forest	Homestead Rd	Local	25'	2	25	No	Private/ Carrboro	N/A	Undivided/ Residential
Estes Dr	N Greensboro St	Town Limits (Village Dr)	Arterial	20'	2	35	No	NCDOT	13000	Undivided
Strowd Ln	Old Fayetteville Rd	Anderson Community Park	Private	20'	Not paved	35	No	NCDOT	N/A	Gravel road
Rosemary St	E Main St	N Merritt Mill Rd	Collector	40'	3	25	No	Carrboro	N/A	Undivided
Rosemary St	N Merritt Mill Rd	S Robertson St	Collector	40'	3	25	Protected bike lanes both sides	Chapel Hill	N/A	Undivided
Brewer Ln	Hargraves St	E Main St	Local	20'	2	25	Sharrows	Carrboro	N/A	Undivided
Smith Level Rd	Ray Rd	NC 54	Arterial	45'	2	40	Bike lane on both sides	NCDOT	9700-17000	Undivided w/ Center Turn Lane

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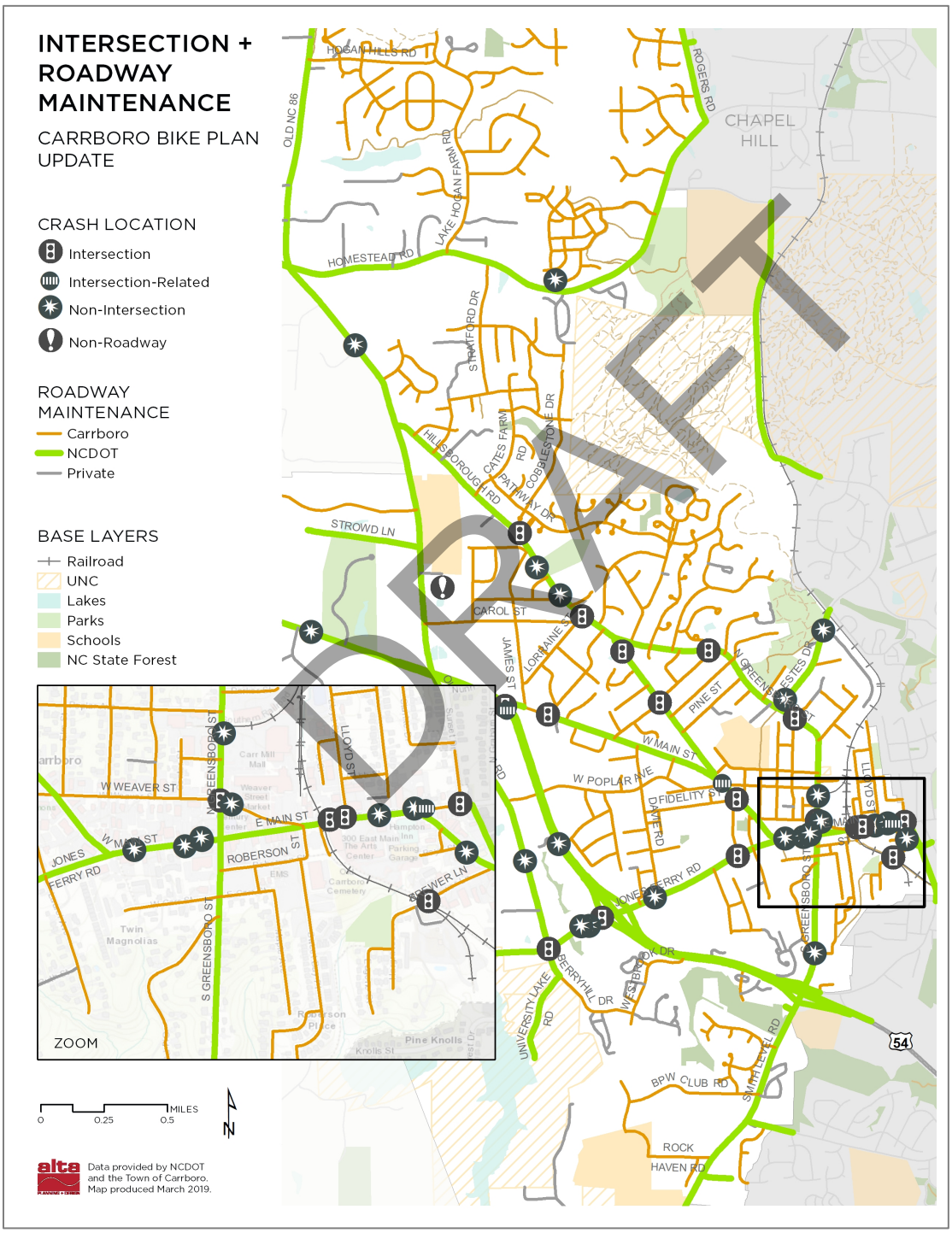
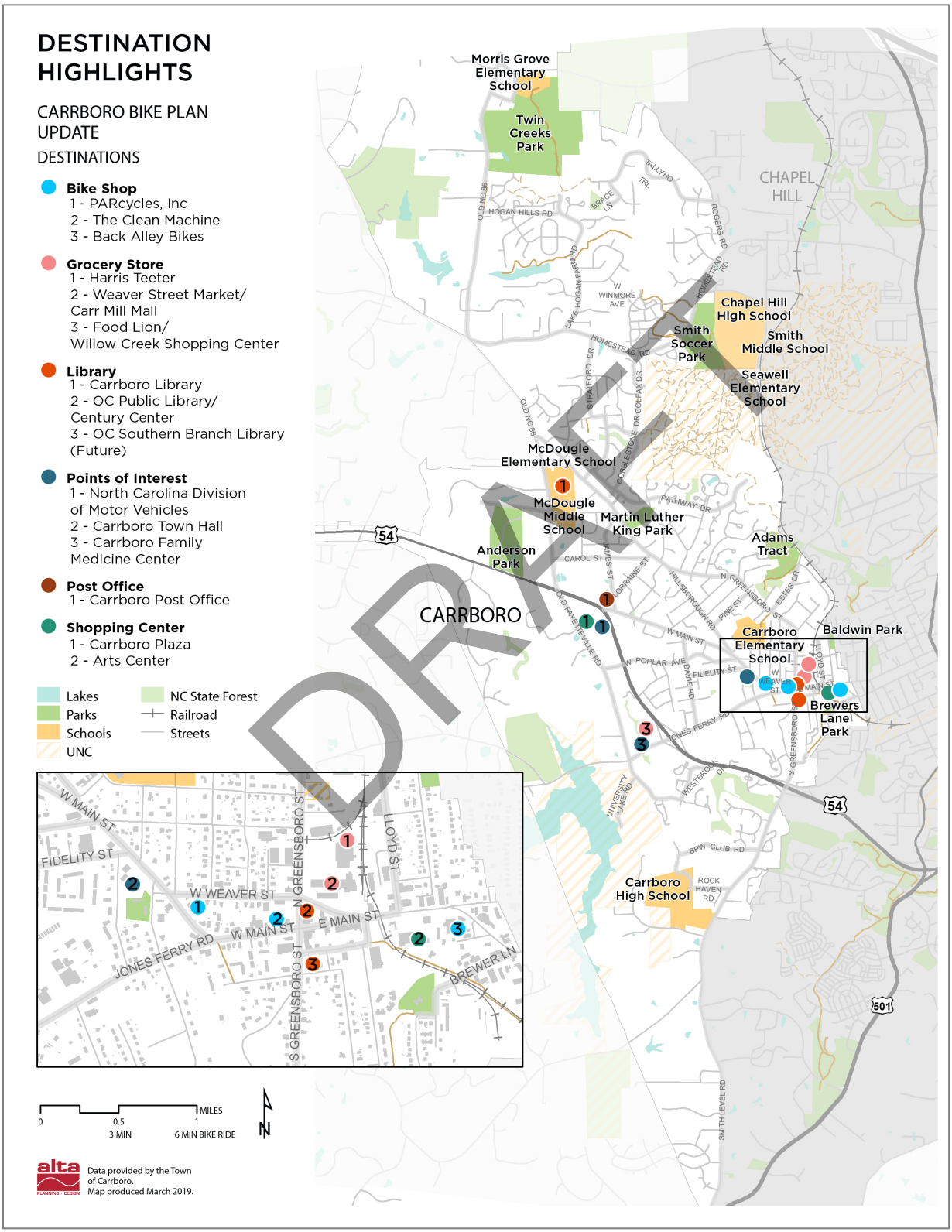
Inventory of Select Intersections

Identifying types of crashes involving bicyclists suggests several design and engineering solutions for reducing crashes. Some crash types can be reduced through good design at specific intersections, while other types indicate the need for greater overall education and visibility of bicyclists on the roadways or in paths. The following map highlights the roadway ownership (NCDOT vs Local) as well as the traffic control devises at key intersections.



Key Destinations

This map highlights numerous community destinations and regional links that include schools, parks, commercial areas, and other local biking destinations.



Existing Mode Share

Data obtained from the American Community Survey (ACS) based on demographic information from the U.S. Census Bureau provides information regarding the means of transportation to work and an important starting point to understanding current use. Commute to work data is our only metric to understand bicycle travel currently. The Town will need to develop a more robust program to fully understand the comprehensive bicycle use in Carrboro. The mean travel time to work for Carrboro residents is about 21 minutes, two minutes lower than the North Carolina average. At 4.7% existing bike mode share, Carrboro has the highest percentage of bicycle commuters in the state of North Carolina, with the state average of 0.2 percent.

Means of Transportation to Work, Carrboro, NC (2017)

Workers over age of 16 (2017 ACS):	12,103	(100%)
Drove alone	7,634	(63.1%)
Carpooled	1,029	(8.5%)
Public Transportation (bus)	1,331	(11%)
Walked	375	(3.1%)
Bicycle	**568**	**(4.7%)**
Motorcycle	169	(1.4%)
Worked at home	992	(8.2%)

Mode Share Comparisons

The table below compares Carrboro's existing commute mode shares against several peer and aspirational cities across the United States. While Carrboro's bicycle mode share is high for a silver-ranking bicycle friendly community, communities with a platinum-ranking have more than double the percent of people commuting by bike.

Community	Drove Alone	Carpooled	Public Transportation	Walked	Bicycle	Taxi/motorcycle	Worked at home
Carrboro, NC (SILVER)	63.1%	8.5%	11%	3.1%	**4.7%**	1.4%	8.2%
Chapel Hill, NC (SILVER)	55.9%	6.1%	11.4%	13.0%	**2.2%**	1.9%	9.4%
Durango, CO (GOLD)	64.7%	6.1%	3.3%	11.7%	**5.8%**	1.1%	7.3%
Ashland, OR (GOLD)	65.0%	7.1%	0.9%	10.1%	**3.7%**	0.5%	12.7%
Boulder, CO (PLATINUM)	50.9%	5.6%	7.9%	11.3%	**10.4%**	1.1%	12.8%
Davis, CA (PLATINUM)	53.0%	8.2%	6.9%	4.4%	**19.7%**	1.2%	6.7%

*Data based on 2013-2017 American Community Survey 5-Year Estimates

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Program Review

The Town of Carrboro has shown a commitment to improving bicycle safety, education and awareness through the implementation of several programs. The following summary is a snapshot of existing efforts and programs, organized by the four E's: Education, Encouragement, Enforcement, and Evaluation.

Education

- 51-75% of public and private elementary schools in Carrboro offer bicycle education (e.g. Safe Routes to School or similar) but there are currently no programs offered to middle or high schoolers.
- Town is a partner in Watch for Me NC, a statewide education and enforcement campaign focusing on cyclists, pedestrians, and motorists. Carrboro has made Watch for Me NC and other bicycle safety materials available at community events.
- Carrboro has had two adult bicycling education classes to provide adult bicycle education by League Cycling Instructors (LCI) in the community.
- Local bike shops such as Clean Machine and ReCYCLEry have hosted bicycle maintenance classes.
- Carrboro Bicycle Coalition (CBC) has done several grant-funded projects in Chapel Hill and Carrboro that have reached underserved populations, including a fix-a-flat workshops at low-income apartment complexes and provided them with lights, pumps, patch kits, and tire irons so they can be seen and continue to maintain their bikes. They have advertised these workshops in Spanish and Karen to draw those communities in, and have provided translators at several of the events. In 2014, the CBC received the Community Diversity Award from the University of North Carolina for its work in these areas.
- Carrboro Police Department routinely distributes bike lights to night riders without them.

Encouragement

- The Town of Carrboro partners with the Town of Chapel Hill and coordinates with other stakeholders (CBC, bike shops, ReCYCLEry, Tarwheels, local businesses, regional TDM coordinator, GoTriangle, etc.) on Bike Month events.
- Events like Open Streets, Bike to Work Day, Kidical Mass, and Walk/Bike to School Day have been great ways of promoting biking in the area. Events are promoted in email newsletters, posters, at Board/Council meetings where Bike Month proclamations are made, and via internet and social media.
- Cycling clubs such as Carolina Tarwheels, Luna Chix, Triangle Off-Road Cyclists, and Triangle Bikeworks are several ways to engage and encourage biking in Carrboro.

Enforcement

- Training such as basic academy training and National Highway Traffic Safety Administration Law Enforcement Training are the only programs offered to police officers regarding traffic law for bicyclists.
- Enforcement programs such as light giveaways, targeting motorist and cyclist infractions, and share the road campaigns help enforce bicycle safety in Carrboro.
- In Feb. 2014, the Board of Aldermen deleted a provision from the Town Code requiring bicyclists to ride single file when doing otherwise would obstruct traffic and never ride more than two abreast.

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Evaluation & Planning

- Carrboro voters approved a Sidewalks and Greenways Bond program in November 2003. Ten years following that, it has been used to provide the local match for greenways projects throughout the study area.
- Carrboro has used Federal Surface Transportation Program funding (directly apportioned to the MPO and sub-allocated to MPO member jurisdictions) to provide the federal share of greenways projects. There is no stable annual amount; funding has been allocated on a project-by-project basis.
- The Institute for Transportation Research and Education (ITRE) is assisted NCDOT in establishing a statewide bicycle and pedestrian count program that completed in Summer 2018, which had two locations in Carrboro that included Libba Cotton Bikeway shared use path and a sidewalk along one side of Old NC 86. Based on the North Carolina Non-Motorized Volume Data Program Report, both locations saw a mixture of volume types between bicyclist and pedestrians.

Count Station	Location	2017 AADBT	2017 AADPT	AADT	AADT Year
CRB_LCB	Libba Cotton Bikeway	81	360	NA	NA
CRB_OLD	Old NC 86	81	61	11,000	2015

AADBT = Annual Average Daily Bicycle Traffic
AADPT = Annual Average Daily Pedestrian Traffic
AADT = Annual Average Daily Traffic (motorized vehicles)

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Equity Memorandum

To: Zachary Hallock, Transportation Planner, Town of Carrboro, NC

From: Jennifer Baldwin, Senior Associate, Alta Planning + Design

Date: April 17, 2019

Re: Carrboro Bicycle Plan: Equity Analysis

Introduction – Why Consider Equity?

Without access to transportation, people in our community will have a harder time getting to work, buying healthy food, seeing a doctor, going to school, or connecting with others. While all communities offer a variety of ways to get around, not everyone has equal access to a wide range of convenient, safe, and affordable means of transportation. Many communities rely on a variety of modes to connect to basic services that are necessary to live productive, fulfilling, and healthy lives. However, convenient, safe, and affordable transportation options are not always available to those that need them most. Referenced here as communities of concern, the following analysis considers populations that have been historically disadvantaged or are otherwise considered vulnerable to unsafe, disconnected, or incomplete active transportation facilities. These communities—that may experience poor financial, health, and housing circumstances, and/or physical or communication limitations —are prevented from fulfilling basic needs without safe, convenient transportation options.

Transportation facilities are essential components in creating communities of opportunity and reducing the disproportionate economic and health burdens on communities of concern.[4] Often, traditionally vulnerable populations, such as children, older adults, people of color, people with limited English proficiency, and low-income individuals rely heavily on affordable transportation, especially active transportation modes like walking, biking, and transit.[1–3] Further, many areas with a concentration of low income or non-English speaking populations suffer from an underinvestment in transportation infrastructure. A lack of high-quality walking, biking, and transit facilities can result in unsafe travel conditions and/or long travel times. Uneven distribution of active transportation infrastructure can also provide health, safety, mobility, and economic benefits for those who are more fortunate, while increasing hardships for communities of concern. One way this becomes apparent is in the disparity in the number of collisions involving bicyclists or pedestrians in disadvantaged areas.[26]

In this memorandum, we define the pursuit of equitable outcomes in planning as having two steps: a) Understanding the historic situations that have disadvantaged certain communities, and b) seeking to reduce the impact of those disadvantages by providing these populations with resources to live more healthy lives. By having the resources to provide mobility options all members of a community, communities can experience improved access to jobs, housing, and other critical services. These needs include access to jobs, housing, and other critical services. Equity recognizes that different people experience different barriers to securing their needs.[4] Working towards equity may mean prioritizing active transportation funding in areas with a greater concentration of disadvantaged populations instead of distributing funding equally based on geography.

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For Alta's equity analysis process, we have defined the following equity indicators, which are factors derived from US Census data that have historically been connected to disadvantaged and vulnerable populations, including: concentrations of children, older adults, people of color, people with limited English proficiency, households with no access to a vehicle, and low-income individuals. Equity is particularly important for these groups because of their common reliance on active and public transportation, which renders them more vulnerable to poor infrastructure.

Alta's equity analysis identifies where the majority of individuals within each indicator reside within Carrboro's Jurisdiction. Understanding where these individuals are most densely located helps to prioritize transportation improvements to address historic inequities. Increasing transportation opportunities for the communities that most depend on such services improves access to life-enhancing services and opportunities.

Methods

The project team conducted an equity analysis using existing demographic information from the US Census Bureau. All data was obtained from the 2012-2016 American Community Survey (ACS) 5-year estimates and analysis was conducted at the Census Block Group level for Carrboro's Jurisdiction. Each of the six indicators received equal weight in determining the composite equity score. For this analysis, the following indicators were used:

- **Race**: This indicator measures the percentage of the population that identifies as non-white.
- **Age**: Individuals under the age of 18 and over the age of 65 comprise this indicator. These two age groups are displayed separately to better identify the differing needs of these populations.
- **Income**: This indicator measures individuals of working age living at or below 200% of the Federal Poverty Level, which is a threshold set by the U.S. Census Bureau and is updated annually.
- **Educational Attainment**: This indicator represents the percentage of the population over 25 years of age that does not have a high school diploma or equivalent.
- **Limited English Proficiency (LEP)**: This indicator measures the percentage of the population that identifies as not speaking English well or at all.
- **Access to a Vehicle:** This indicator measures the percentage of household that do not have regular access to a vehicle.

The equity analysis demonstrates relative need for transportation investments based on concentrations of the populations listed above. Results for each Census Block Group are based on a comparison to all Census Block Groups within North Carolina in order to provide greater context for the relative need identified through these indicators. For each Census Block Group, the equity score reflects the distance from the mean of the comparative geography (North Carolina).

All indicators help identify where populations that may have specific mobility needs (youth and elderly populations, no access to a vehicle) or have historically been disadvantaged (LEP, Race, Income, Education) live within Carrboro's Jurisdiction. These populations may rely on active transportation networks for daily trips, access to services or recreational facilities. While this analysis does not directly assess access to existing facilities, the results identify areas where more facilities may be needed or access to existing facilities should be improved. The project team can use the resulting maps to identify focus areas for new investments that may address equity needs.

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Equity Analysis Results and Discussion

The following discussion explains why each indicator is utilized.

Race: Non-White Population

Rationale: Racial or ethnic minorities are more likely to live in areas with poor or limited active transportation facilities, educational opportunities, job resources, and healthy food outlets.[1,6] They tend to be more dependent on transit and active transportation; black individuals are more than four times and Hispanics three times as likely to not have access to a household car compared to their white counterparts, regardless of income.[7] In turn, these deficits exacerbate the disproportionate health burdens communities of color experience. Lastly, communities of color experience a greater proportion of pedestrian crashes and have increased risk of mortality after pedestrian injury.[9,10] Therefore, increasing active transportation facilities and connectivity may promote physical activity, enhance economic opportunities, and increase transportation safety. Facility planning, designing and implementation should be done with special attention to input and ideas from communities of color.[6]

Age: Under 18

Rationale: The population under 18 years of age is thought to have higher active transportation infrastructure need because they have less access to motor vehicles and may rely more on alternative modes of transportation. Other youth-related vulnerabilities may include lacking knowledge of safe travel behaviors; greater susceptibility to environmental exposures, such as damage caused to developing bodies through emissions; and difficulty navigating poorly-designed areas.[1] Youth especially need safe transportation to/from places to be physically active and to build social connections.[1] Research on transportation facilities shows that road design and sidewalk conditions determine youth physical activity; safe crossings, well-built sidewalks, and traffic calming strategies are all associated with greater physical activity in youth.[11] Promoting physical activity in youth is important for physical and social development, boosting academic achievement and self-esteem, and preventing costly chronic diseases.[12] Further, physical and cognitive development impact a child's ability to safely walk and bicycle in a high traffic scenario.[30,31] For younger children in particular, this means that children lack proficiency in actions such as scanning for traffic and identifying safe locations for crossing. Areas with high concentrations of youth populations will benefit from improved crossing conditions and additional separated facilities.

Age: Over 65

Rationale: The population over 65 years of age may have more mobility needs than the general adult population, specifically in that they may require more alternatives to driving. Older adults increasingly depend on active transportation modes, such as using public transit, walking and/or biking when they decrease or stop driving. Prioritizing active transportation needs enables older adults to maintain positive well-being, despite the onset of functional limitations.[13] Walkable access to adequate public transportation is essential for older adults to maintain their daily activities and independence.[14] Additionally, safe, walkable communities that promote physical activity help prevent or delay chronic diseases such as arthritis, osteoporosis and diabetes in older adults.[15] As 61% of American adults ages 65 years or older have at least one activity-based limitation, creating communities where older adults can safely be active and access necessary resources is crucial to the future prevention of such disability.[16] Lastly, older adults are especially vulnerable to social isolation, which can result in significant declines in physical health; increasing walkability enhances older adults' ability to connect with others.[2,14]

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Income: Poverty

Rationale: Poverty is a socioeconomic vulnerability, linked with disproportionate exposure to poor housing, homelessness, and limited access to resources, such as transportation services, quality food, recreation facilities and health care facilities.[1,17,18] With transportation costs, especially those associated with vehicle ownership, often comprising the second largest portion of an individual's income (second to housing), reduced access to transit and active transportation networks may lead to greater reliance on an automobile and therefore have significant financial impacts on poor households.[29] Populations with higher levels of poverty may have limited access to vehicles and rely more on active transportation networks to access daily trips. Of U.S. residents with incomes at or below 200% of the Federal Poverty Level (FPL), 32% overall do not have access to a household vehicle.[7] Comparatively, 55% of Black and 39% of Hispanic individuals at or below the 200% FPL do not have such access.[7] Even with increased dependence on non-automotive transportation, low-income residential areas are often less walkable, a condition that creates barriers to living safe, social, and active lives.[1,18] Lastly, children living in low socioeconomic status areas are more likely to experience traffic injuries and more likely to die from traffic injuries than children in more affluent areas.[19] Increasing low-income residents' active transportation facilities can improve access to economic and educational opportunities, improve health through increased physical activity, and promote safety.[20,21]

Education: No High School Diploma or Equivalent

Rationale: Nationwide those without high school diplomas have the highest rates of walking and the second highest rates of biking to and from work.[3] These individuals may depend on walking and biking due to financial constraints and lack of adequate and/or convenient transportation options. Educational attainment, as a socioeconomic indicator, correlates with income levels. Therefore, although this population is most likely to walk to work, individuals without high school diplomas tend to live in areas without adequate biking and walking facilities.[1] Boosting active transportation resources in areas where these individuals reside could promote increased access to educational resources and job opportunities.

Limited English Proficiency

Rationale: Individuals with Limited-English Proficiency (LEP), or who identify as not speaking English well or at all, tend to rely more on active transportation as their primary means of transportation than the average English speaker.[20,22] General low economic status of LEP individuals may correlate with low car ownership rates and high reliance on active transportation facilities.[23] Given low car ownership and poor active transportation conditions, immigrants and LEP individuals are more likely to walk and ride along roads that lack appropriate biking and walking facilities, forcing individuals into unsafe transportation situations.[20] Therefore, access to active transportation services is critical for LEP individuals to access basic employment and other necessities.[23] Further, LEP individuals are less likely to participate in decision-making processes, in part due to barriers caused by limited English proficiency and in part due to the correlation with low-income status and implications of work schedule.[24] Additional, multilingual outreach is needed in communities with high LEP concentrations in order to better understand active transportation access needs.[24,25] Engaging LEP communities using focus groups in the policy, planning, and designing processes may assist in creating more appealing transportation improvements.[1] LEP populations may be less likely to engage in planning processes because of language barriers and language exclusion, and if so, they may not be as likely to advocate for active transportation facilities in their area.[25]

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Access to a Motor Vehicle

Rationale: In less urbanized locations, specifically those with limited transit access and coverage, access to a motor vehicle carries strong implications for one's ability to reach employment, access healthy foods, and reach basic services.[27] A diverse transportation system that offers multiple modes, including transit, bicycling, and walking, reduces reliance on automobiles and can provide for more equitable access to services.[20] Providing access via quality walking and bicycling infrastructure is one method for increasing equity in access for locations with limited vehicle availability.[20] Studies have also found that access to a motor vehicle improves employment rates, as it provides a reliable means to commute to work.[27]The addition of safe and comfortable walking and biking routes, as well as developing improved connections to transit, have the ability to also serve as a reliable means to commute to work. This has the potential to alleviate the necessity of a motor vehicle to reach employment opportunities.

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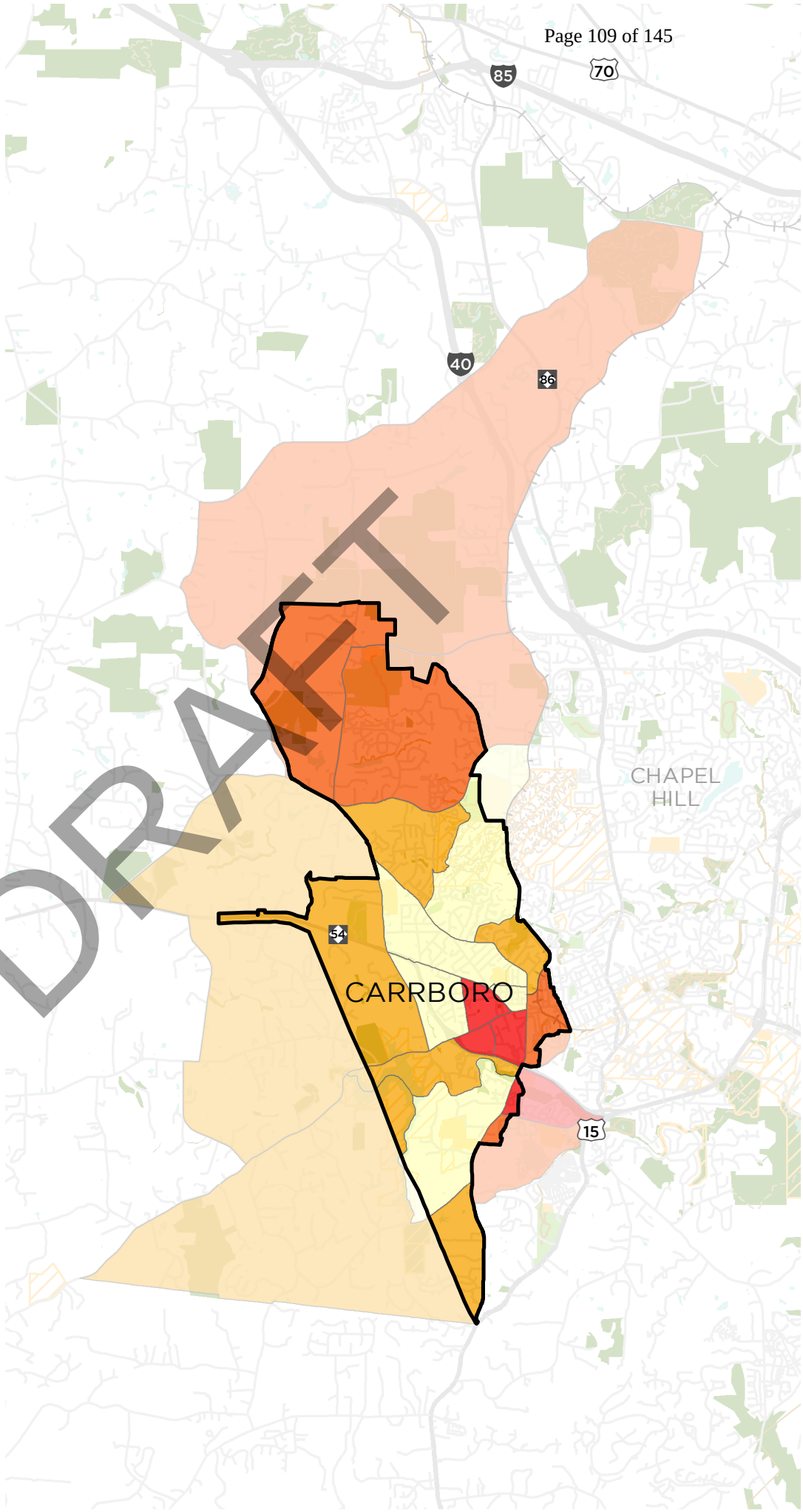
EQUITY ANALYSIS

CARRBORO BIKE PLAN UPDATE



EQUITY ANALSIS

- Higher Need
- Lower Need
- Study Area

BASE LAYERS

- Railroad
- Parks
- Schools
- UNC
- NC State Forest

0 1 2 MILES

N

alta PLANNING + DESIGN

Data provided by NCDOT and the Town of Carrboro. Map produced March 2019.

111 E. Chapel Hill Street
Suite 100
Durham, NC 27701
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Level of Traffic Stress Analysis Memorandum

To: Zachary Hallock, Town of Carrboro

From: Alta Planning + Design

Date: August 27, 2020

Re: Carrboro Bicycle Plan: Level of Traffic Stress Methodology and Results

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Level of Traffic Stress (LTS) Analysis

Overview

The Level of Traffic Stress Analysis was adapted from the 2012 Mineta Transportation Institute Report 11-19: Low-*Stress Bicycling and Network Connectivity*. A level of comfort for bicyclists is determined based on factors including posted speed limit, street width, and the presence and character of bicycle lanes. The combination of this criteria separates the bicycle network into one of four scores:

- LTS 1: Low-stress roadway suitable for all ages and abilities
- LTS 2: Roadway comfortably ridden by the mainstream adult population
- LTS 3: Roadway ridden by "enthused and confident" cyclists
- LTS 4: Roadway ridden by the "strong and fearless" cyclists

In general, a separated bicycle facility, such as a trail or a cycle track, would qualify as a low-stress (LTS 1) bikeway, while roadway shared with motor vehicle traffic operating at high speeds would receive a higher-stress score. The results of the LTS analysis helps identify existing areas with a high level of service as well as focus areas for improvement.

LTS provides an intuitive framework to describe the benefits of bicycle infrastructure, and demonstrates that some roadways need more intervention than others to provide a truly comfortable experience. LTS is based on a national framework that does not translate perfectly to each locality. The LTS methodology has been modified to better account for bike stress conditions in the Town of Carrboro.

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Methodology

The Level of Traffic Stress analysis is completed through an assessment of street segments and intersections using spatial data and aerial imagery. In this context, every street link (a section of roadway) receives two scores based on its characteristics: one score for its segment, the space of roadway between intersecting streets; and one score for its intersection, where one segment crosses another. See Table 1 below for more information about data limitations and assumptions.

The table on the following page shows Levels of Traffic Stress (LTS Definitions). Source: Mineta Transportation Institute Report 11-19

LTS 1	Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride. Suitable for almost all cyclists, including children trained to safely cross intersections. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where cyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross. Accessible for people between 8 and 80 years old.
LTS 2	Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
LTS 3	More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. Offering cyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2, but are still considered acceptably safe to most adult pedestrians.
LTS 4	A level of stress beyond LTS3.

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The scores assigned are based on a link's characteristics that affect a bicyclist's perception of safety and comfort. The scores range from 1 to 4, where 1 represents the lowest stress, and 4 represents highest stress and discomfort. These two scores determine the overall LTS score. It is important to note that LTS scores are assigned based on a weakest link principle; this means that while a segment may provide a relatively low-stress path, a high-stress intersection will result in an overall high-stress score. Tables 2, 3 and 4 below summarize the scoring methodology used in this analysis.

Private roads, limited access roads, and unpaved roads were omitted from the analysis.

Table 1: Data Assumptions and Limitations

Inputs	Notes	Assumptions/Logic
Roads Classified as Private	**For the purposes of this analysis, private roadways were excluded from the network. Private roadways were identified based on the Class attribute in the provided dataset.**	**Private roads are omitted to focus on roadways where the Town has jurisdiction and ability to implement improvements.**
Residential Roadways	**Centerline data was not available; to better identify which roadways provide a low-stress pathway, roads that were defined as Local based on the Class attribute and have a posted speed of 25 mph were considered to meet the threshold for a residential roadway as it applied in Table 2 below. Based on a visual check against land use data, these roadways are generally consistent with residential areas.**	**Low-speed roadways with no marked centerline are considered low stress (LTS 1) as these roadways encourage shared space and often represent roadways with low volumes.**

The following tables specify the scoring criteria based on roadway configuration, bike lane and crossing condition. The criteria are adapted from the original 2012 Mineta Institute report. These tables are used in combination to create the segment, approach, and intersection scores described above.

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Table 2: Criteria for Level of Traffic Stress in Mixed Traffic

Posted Speed Limit (mph)	Street Width		
	2 -3 Lanes Volume < 3,000 AADT	**2 -3 Lanes Volume >= 3,000 AADT**	**4-5 Lanes**
≤ 30	LTS 1 or 2*	LTS 3	LTS 3
35	LTS 3	LTS 4	LTS 4
≥ 40	LTS 4	LTS 4	LTS 4

**Lower value is used for streets without marked centerlines or classified as residential with fewer than 3 lanes. Residential roadway were determined in this analysis based on land use data.*

Table 3: Criteria for Bike Lanes

Posted Speed Limit (mph)	Street Width		
	2 -3 Lanes Volume < 3,000 AADT	**2 -3 Lanes Volume >= 3,000 AADT**	4 – 5 lanes
≤ 30	LTS 1 or 2*	LTS 2	LTS 2
35	LTS 2	LTS 3	LTS 3
≥ 40	LTS 4	LTS 4	LTS 4

**Lower value is used where the bike lane width is 6 feet or more*

Table 4: Criteria for Unsignalized Crossings[1]

Speed Limit of Street Being Crossed	Width of Street Being Crossed	
	Up to 3 Lanes	4-5 Lanes
Up to 30 mph	LTS 1	LTS 2
35 mph	LTS 2	LTS 3
40 mph or more	LTS 3	LTS 4

Findings

Map 1 illustrates the Level of Traffic Stress for public roadways in the Town of Carrboro. Generally, lower stress roadways are found in residential areas. Lower speeds and fewer number of lanes contribute to this condition. Roads with higher posted speeds and/or higher traffic, such as Greensboro Street, Jones Ferry Road, some of Main Street, Rogers Road, and some of Hillsborough Road are classified as high-stress. These high-stress roadways create barriers for travel amongst neighborhoods and other lower-stress roadways. Some major roadways, such as Hillsborough Road closer to downtown, have lower volumes and speeds and existing bike lanes, which make them effective low stress connections between local roads..

It should also be noted that there is a dense network of unpaved trails in the Carolina North Forest that is bordered by low-stress roadways to the south and west. While these trails are not accounted for in the analysis as they are unpaved, they may be used for commuting purposes to reduce out-of-direction travel between low-stress roads.

Additionally, many high stress roadways include bicycle lanes; the greater number of lanes and higher posted speeds impact the ability of bicycle lanes to improve the comfort along these roadways. Where possible, separation should be considered, especially along high-stress corridors. Roadways with a high level of traffic stress (LTS 3 and LTS 4) and a bicycle lane include:

- Old Fayetteville Road (all)
- Main Street (except W. Main Street to Greensboro Street)
- Greensboro Street (all)
- Hillsborough Road (north of Greensboro Street, at W. Main Street junction)
- Jones Ferry Road (all)
- Smith Level Road (except short segment north of Willow Oak Lane)
- Homestead Road (all)

None of the LTS scores were dictated by their respective crossing score and no crossing score exceeded an LTS 3.

Low-Stress Connectivity Analysis

Map 2 (attached) analyzes the connectivity of existing low-stress connections. Low-stress roadways that provided for continuous travel are displayed in the same color; when the color of a collection of roadways changes, this indicates that a

[1] Signalized crossings provide a dedicated cycle for roadway crossings. Signalized intersections are not considered to have a negative impact to crossing locations and are not evaluated in this analysis.

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high stress roadway or crossing is impeding travel among low-stress network links. Low-stress roadways are classified as either an LTS 1 or 2.

The results of this exercise demonstrate that while large portions of the city can be reached through travel on low-stress network links, there is still a lot of fragmentation. There are 43 distinct low stress "islands" across the Town of Carrboro.

Major Island Clusters:

- Downtown shows a strong network of connectedness but Greensboro Street acts as a barrier to northern or southern travel.
- Isolated between Homestead Avenue and Hillsborough Road/Greensboro Street is a large area of connected residential streets.
- The zone between Hillsborough Road and Main Street is composed of numerous small "islands" without a low-stress travel route beyond its barriers.
- Neighborhoods near the northern and southern extents of the study area (i.e. north of Homestead Avenue and south of NC 54) experience both internal and external network isolation.

While these results depict some relatively large areas of connected low-stress roadways, it is important to consider the potential out-of-direction travel that is associated with reaching crossing opportunities in areas where a major roadway otherwise creates a barrier.

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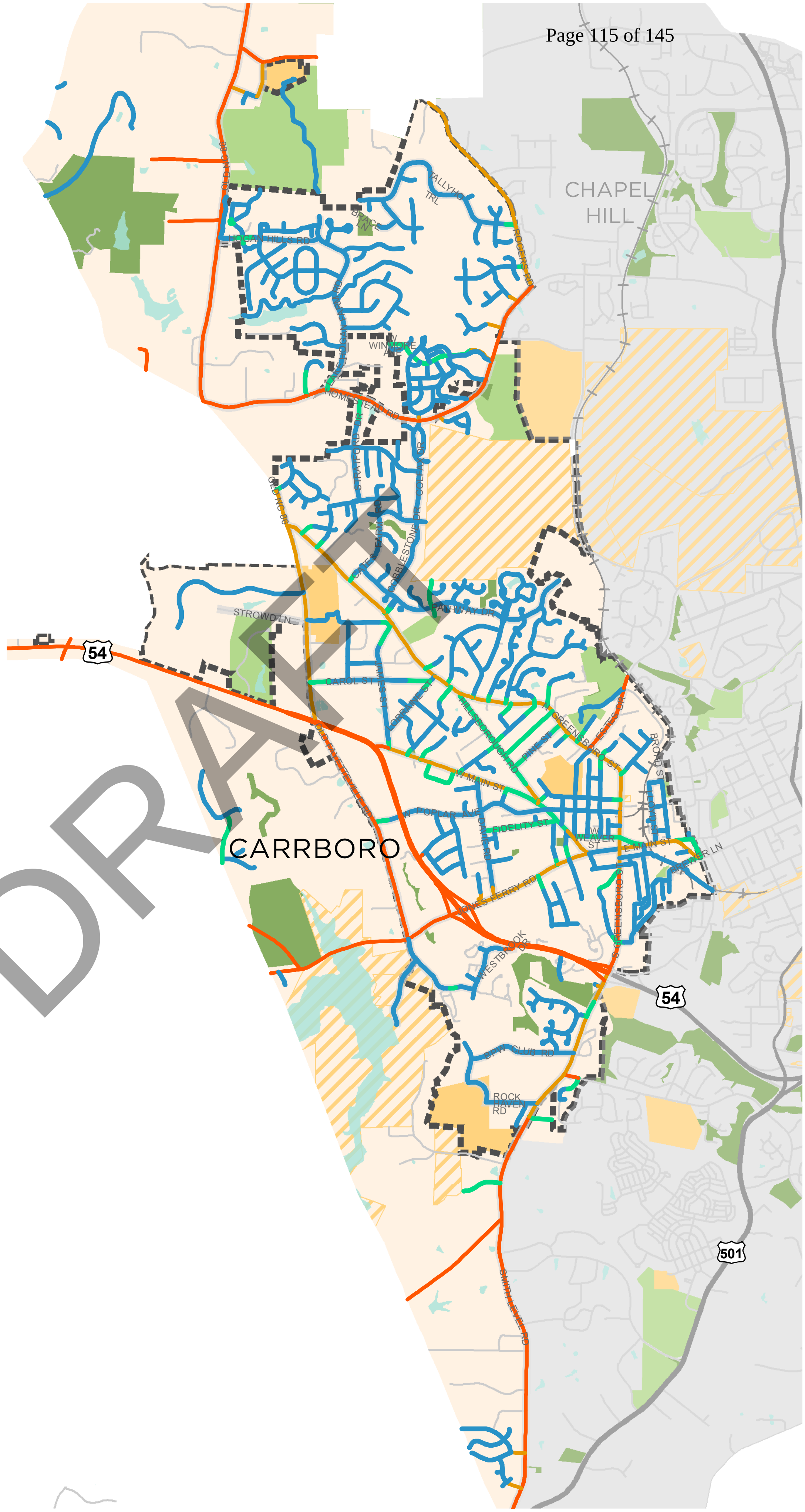
LEVEL OF STRESS ANALYSIS

CARRBORO BIKE PLAN UPDATE



LEVEL OF TRAFFIC STRESS

- 1 (Most Comfortable)
- 2
- 3
- 4 (Least Comfortable)

- Lakes
- Carrboro Town Limits
- Parks
- Schools
- UNC
- NC State Forest
- Railroad
- Streets

0 | 0.5 | 1 MILES

3 MIN | 6 MIN BIKE RIDE

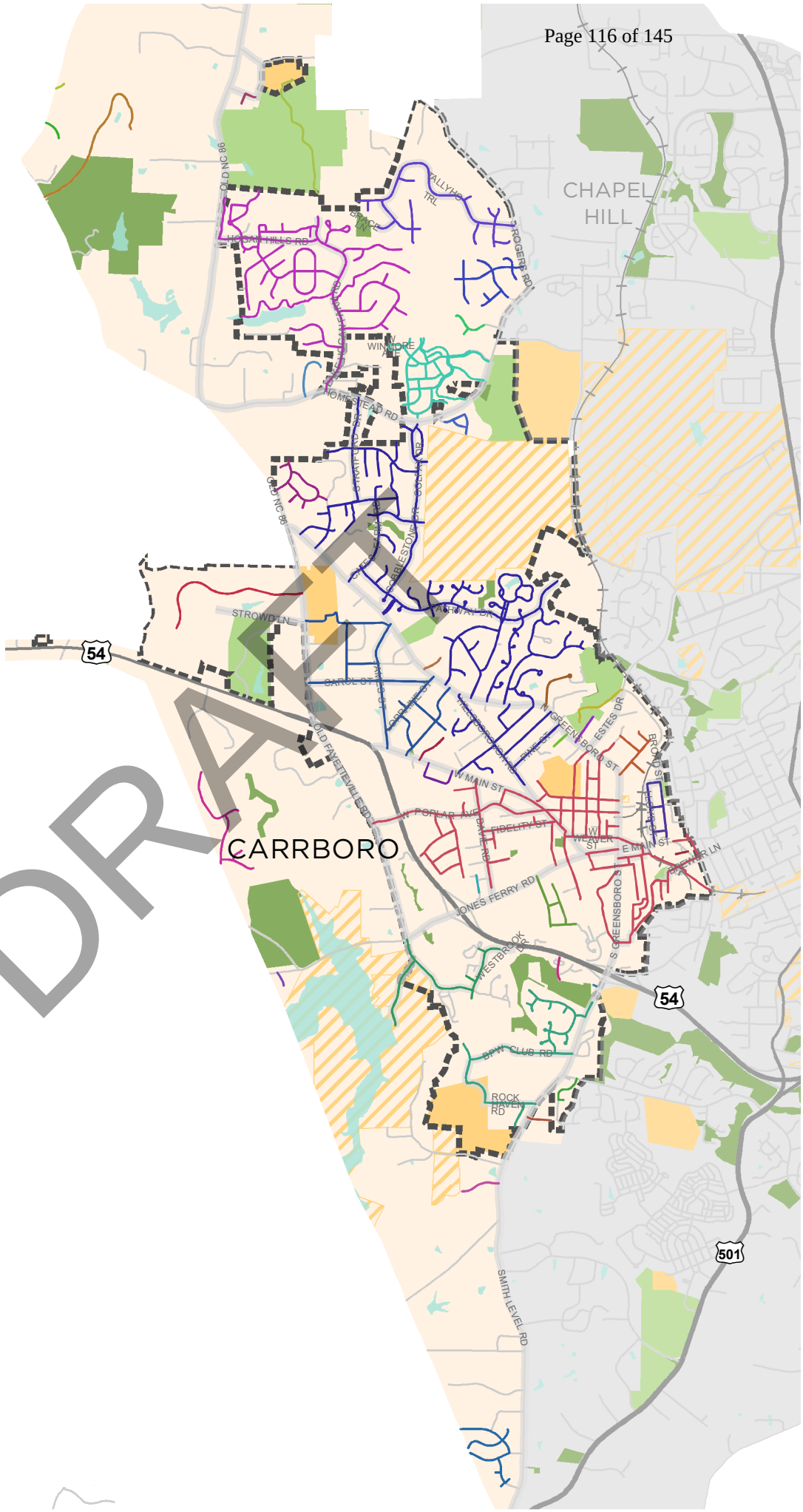
N

Data provided by the [DATA SOURCE 1, DATA SOURCE 2]. Map produced [MONTH] [YEAR].

LEVEL OF TRAFFIC STRESS ANALYSIS

Connectivity Islands

CARRBORO BIKE PLAN UPDATE



Lakes
Carrboro Town Limits
Parks
Schools
UNC
NC State Forest
Railroad
Streets

0 0.5 1 MILES
3 MIN 6 MIN BIKE RIDE

N

Data provided by the [DATA SOURCE 1, DATA SOURCE 2].
Map produced [MONTH] [YEAR].

Carrboro Bicycle Plan - Previously Adopted Plans or Policies			
Document Name	**Year**	**Purpose**	**Key Recommendations**
CONNECT 2045: The Research Triangle Region's Metro Transportation Plan (Metropolitan Planning Org)	Jan-19	This document contains the 2045 Metropolitan Transportation Plans for CAMPO and the DCHC MPO. These plans are the guiding documents for future investments in roads, transit services, bicycle and pedestrian facilities and related transportation activities and services to match the growth expected in the Research Triangle Region.	Local plans and inventories used for pedestrian facility recommendations (Figure 7.5.1) - page 56 Local plans used for bicycle facility recommendations (Figure 7.5.2) - page 57 Increase bike and pedestrian safety and possible incentives to provide to get more people walking/biking in region (pg 58): Education: Institutionalize bicycle and pedestrian safety education within public schools; Provide bicycle instruction to adult cyclists; Provide educational messages to better inform drivers and pedestrians about pedestrian and bicycle safety laws and best practices; Educate motorists on cyclists' rights to use the road; Establish a local fund for bicycle and motorist education. Enforcement: Update bicycle traffic laws; Provide an active enforcement program; Appoint a "Bicycle Liaison Officer"; Develop "Bicycle Patrol Units" within local police departments. Encouragement: Offer incentives to employers to encourage employee bicycle commuting; Conduct a well-publicized annual "Bike-to-Work" week with multiple events; Improve access to transit for pedestrians and bicyclists; Develop a publicity campaign to raise awareness of cycling issues; Conduct annual regional bicycle events; Publicize the region as "bicycle-friendly"; Encourage community-based support for cycling; Develop cooperative relationships; Promote Safe Routes to Schools and walk/bike to school events; Participate in the Triangle Transportation Demand Management activities and programs.
NC 54 West Corridor Study	Oct-18	The NC 54 Corridor Study is an in-depth review of the 20.4 mile stretch of NC 54 between Old Fayetteville Road in Carrboro and I-85 in Graham. This regionally significant roadway helps 6,000 to 15,000 vehicles per day reach work, schools, and stores, so local governments are interested in opportunities and strategies to improve the roadway and support the communities alongside it.	The NC 54 West Corridor Study recommends a phased package of conceptual improvements summarized below. Widening and related improvements are recommended for completion when the practical capacity of the roadway is forecasted to be exceeded. The implementation schedule consists of four overlapping ten year phases. The widening schedule is preliminary, and it reflects reasonable assumptions about overall conditions within each corridor segment. The probable cost of the entire package of widening improvements described totals just under $180 million (in 2018 dollars). Corridor Level Given the length of the corridor, recommendations are described according to six segments. Recommended roadway cross sections consist of two variations of a 4-lane median divided roadway from NCDOT's Complete Streets Guidelines. The other cross section is a ditch and swale design with paved shoulders and shallow, vegetated, open-channel drainage, rather than concrete curb-&-gutter with piped runoff. The other cross section is a curb-and-gutter version; the median and inner travel lane have the same dimensions as the ditch and swale version, but the outer lane is 14 feet wide with a 2-foot curb and gutter pan. Both cross sections allocate space for a shared-use path.
The 203 Project	Sep-18	The 203 Project is a combined effort that will offer a community based facility that will provide opportunities for education, art, and togetherness.	Completed a study to show the need for Town facilities and future space. The use was identified as needed by the Town and compatible users. Facilities will include the Town's Recreation and Parks Department, the Orange County Southern Branch Library, the newly relocated ArtsCenter, and community radio station WCOM.

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Town of Carrboro Economic Sustainability Plan 2017	Nov-17	Provide a set of values, guiding principles, and action items for the continued development and economic well being of the Town - based around environment, people, and local economy	Grow the Town's pedestrian network and connectivity to businesses; provide access to public transit and use as a measurement to economic success; preserving and growing bikability as a means of attracting people and businesses; strengthen partnerships with education and economic development as a means of connecting talent developement and community assets; support and grow its locally owned and operated business community -- Focused on recommendations of the Climate Action Plan (CAP) and the Parking Plan, especially wayfinding signs that help customers locate parking; support and implement goals of the Affordable Housing Plan
Downtown Parking Plan	Jul-17	The plan vision was decribed as process to examine the current and future states of parking in Carrboro, involving public outreach to identify potential barriers that may be preventing residents from visiting downtown more frequently. Measurable output first involving a full documentation of the existing parking conditions, supplemented by an online survey of residents to identify parking behaviors and perspectives relating to parking. Preliminary findings were presented to the public and feedback was obtained during the early stages of the project. After incorporating citizen feedback and more refined existing conditions data, business owners were contacted to discuss concerns and potential parking management strategies for the short-term and long-term growth of the Town.	Based on model assumptions, the calculated parking surplus for downtown Carrboro on a typical weekday is 1,281 empty spaces for the existing conditions and an estimated future surplus of 908 empty spaces, within a range of +/- 140 throughout the day. The data collected does not support the need for the Town to provide additional parking spaces today. During the course of the next five (5) years, parking demand is expected to increase by 900 new parking spaces due to new development; these projects should provide a sufficient number of additional new spaces to mitigate this demand. The balance of spaces needed will reduce the existing surplus of more than 1,200 spaces to approximately 900 surplus spaces, which factors in an artificial maximum occupancy of 85% (leaving 15% of spaces empty). This quantitative analysis does not support the need for the Town to construct additional parking spaces in the next five (5) years.

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Community Climate Action Plan	Jan-17	Reduce emissions of greenhouse gases that are causing global climate change	Community Integration: Create grass roots partnerships to engage community; Expand public partnerships to more explicitly consider climate action; Create green neighborhood program; Integrate climate action with local living economy; Expand capacity; Facilitate low cost financing for energy efficiency and renewable energy projects; Integrate climate action and social/equity initiatives Building Energy Efficiency Measures: Reducing emissions by 50% by 2025; Energy audit/performance ratings; Demonstrate pursue energy performance beyond mininum requirements for new development; Create rental property task force and process; Create rental property registry/certification **Transportation:** **Reduce emissions by 50%; Enhance transit service; Improve vanpool/carpool options; Further promote walking, biking transit; Limit idling in school loading zones; Improve bicycle and pedestrian infrastructure** Renewable Energy: Pursue commuity solar projects; Pursue downtown geothermal heating and cooling; create rental property task force and process Ecosystem: Pursue stormwater utility; Evaluate extent to which the deer population and climate change affect native plant ecosystems; Accerate/expand organiz waste collection/composting; Tree preservation, protection and conservation; Improve regulations and community capacity to discourage invasive plants and encourage native plants; Pursue watershed restoration actions to protect local streams from changes in rainfall due to climate change Food Choice: Reduce emissions by 50%; Develop local dietary consumption and associated GHG profile
Carrboro Bike Program Review	Dec-16	This guide is meant to be a summary of current practices in bicycle infrastructure, with some redundancy with the 2009 Carrboro Comprehensive Bicycle Plan.	Encouraged the Town of Carrboro to update the bicycle plan in the short-term, with recommendations– detailed by chapter – in the pages that follow. Suggestions for how to revise the plan from its last iteration that apply generally to many parts of the report: -Reduce the text length and improve readability by eliminating repetitive sections, cutting out extraneous detail, and transforming paragraphs to bullet-point form -Convert text to infographics, charts, and tables where applicable -Add quotes, from the public engagement survey, to illustrate perspective of Carrboro residents on biking in the town -Use photographs of local facilities (in Carrboro or other nearby places) whenever possible -When mentioning information detailed in other sections, reference the page number and section where information is discussed in full -With unchanged information, refer to 2009 report over repeating text. -In sections describing different types of facilities or programs, summarize information in a table at the start of the section, so that users know to use it as a reference as they read. -When referring to types of cyclists, use the more inclusive, welcoming definitions included in the updated survey rather than the definitions used in the 2009 report (Modified from Geller, 2006).

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Carrboro Bike Parking	Dec-16	This section summarizes Carrboro's current bike parking requirements, providing the background information necessary to compare Carrboro to national leaders in bicycle parking and our proposed prioritization model. Safe bike parking is often regarded as a major concern for cyclists and can even be considered as a barrier to entry for potential cyclists.	Specifically in regards to Section 15-291 Number of Parking Spaces Required in the Carrboro Land Use Ordinance, the Comprehensive Bicycle Transportation Plan requires that the 5 bicycle parking spaces used as a replacement parking space are both provided by the developer and conveniently located near a building entrance - a step up from the language in the Land Use Ordinance. 1. A bicycle storage room, bicycle lockers, or bicycle racks within a building; 2. Bicycle racks or lockers in a parking structure, underneath an awning or marquee, or near a main building; or 3. Bicycle racks on the public right-of-way with approval from the Town or State and where such racks do not conflict with pedestrian use. Recommend that the Town compare requests for additional parking infrastructure to determine their level of priority. There was a decision tree that was developed so files each project into a priority tier and determines which requests should be filled first. This approach is well-suited to this task because it is easily applied, easily modified according to values and regulations, and transparent. This decision tree begins with two pre-conditions that must be met for the project to reach a prioritization tier. The first pre-condition that each proposed site must meet is that it must be near destinations. These destinations might be residential, commercial, civic, industrial, recreational, or otherwise. Second, there must be available right of way at this location. The term "available" should be considered a loaded term: the right of way is only "available" for bicycle parking if installing the facility does not compromise design or legal (e.g., ADA compliance) standards.

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Affordable Housing Goals and Strategies	2014	To support and increase affordable housing opportunities in Carrboro, short-term and long-term	Affordable Homeownership: - Increase # of homeownership units that are permanently affordable in Carrboro. - Evaluate and reduce housing density restrictions to slow the climb of housing prices and diversity housing stock, particularly in high transit areas - Decrease barriers to first-time homeownership and to homeownership retention, particularly seniors - Continue to improve public transit access, focused on moderate-income homeownership communities and development with an affordability component Affordable Rentals -Increase # of rental units that are permanently affordable to individuals/families earning less than 60% of AMI ($33,943.80 in 2017). - Reduce negative effects of parking requirements on rental prices - Slow the pressure on rental prices by increasing rental housing stock, particularly in high-transit areas - Reduce erosion of rental housing quality and affordability - Examine the current marketplace for mobile and modular homes Overarching Priorities - Concerted land use planning/small land use plan for 3 high priority/high potential areas - Improve opportunities for developers and potential partners to identify affordability in a project - Develop a dedicated funding source-in partnership with county and peer municipalities - Ensure implementation of the Affordable Housing Strategy - Provide greater incentives for developers to include affordable housing in their projects - Reduce utility costs - Acquisition of land/property-be proactive with OWASA in the land or parcels they are saying they will offer to munipalities first-Start to engage with them
Safe Routes to School Strategic Action Plan	Dec-10	The plan highlights goals and visions for enhancing opportunities for active travel to school, and outlines ways to turn those opportunities into realities, addressing Carrboro Elementary and McDougle Elementary Schools	Safety and infrastructure improvements at both school locations-- McDougle Elementary: new sidewalk along west side of Hillsborough Rd; new multi-use path on Horne Hollow Rd from existing bike path near Autumn Drive to Hillsborough Rd; repair pathway of Quail Roost Drive path to McDougle Elementary Carrboro Elementary: new sidewalks- Pine St from Greensboro St to Hillsborough Rd, north side of W Main St from Pine Hill Dr to Hillsborough Rd, south side of W Main St from Poplar Ave to Fidelity St, Davie Rd form W Poplar Ave to W Main St, west side of Hillsborough Rd from Simpson St to W Main St; greenway/crossings - path or trail from Pine St to Carrboro Elementary, lighted multi-use path or trail from Estes Aprtmts to Pleasant Dr, path or trail from Todd St to Carrboro Elementary
Morgan Creek Greenway	Mar-10	The primary purpose of this study is to determine the opportunities and constraints for a trail location along Morgan Creek between Smith Level Road and University Lake. In addition, the study included an exploration to determine the opportunities and constraints for a connector trail from the main Morgan Creek trail to Carrboro High School.	Goals: - To determine the feasibility of a trail along Morgan Creek to provide a trail connection between University Lake Drive and Smith Level Road with a spur connection to Carrboro High School - To determine a recommended trail alignment - To create a phasing plan to build the most effective and cost efficient connectors earliest - To determine a cost estimate by Plan broken apart in phases highlighting trail segments and implementation steps

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Bolin Creek Greenway - Conceptual Master Plan	Dec-09	The Bolin Creek Greenway project was initiated by the Town for the purposes of alternative transportation, recreation, and environmental protection and restoration. Some of the key issues in the development of the Bolin Creek Greenway: Ecology and the Natural Environment; Transportation; Recreation & Quality of Life	Preserve land and provide continuity to an open space system providing multiple benefits to the community and the environment. Connect natural areas and provide habitat for wildlife, as well as corridors for recreation. Greenways help filter sediment and pollutants from runoff thereby improving water quality; they enhance the natural function of streams and floodplains and accommodate stormwater flows. Creating a greenway along Bolin Creek provides an important opportunity to enhance the environment and quality of life for Town of Carrboro citizens.
Carrboro Bicycle Transportation Plan	2009	Funded by NCDOT Bicycle and Pedestrian Planning Grant, Carrboro made a commitment to improve bicycle facilities and programs within the Town, giving residents and visitors an accessible, safe, and convenient option of bicycling for transportation, recreation, and health.	Goals: -To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes. -A continuing process for reviewing, updating, and implementing bicycle-related policies. -A robust comprehensive bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs. -A safe and accessible network of bicycle facilities. The Plan recommends the implementation of an additional 54 miles of bicycle facilities, including paved shoulders, bicycle lanes, sharrows, sidepaths, intersection improve-ments and off-road trails. The facilities are recommended in phases, and are prioritized for implementation. Recommended improvements include re-striping, repaving, or signage installation with few actual roadway alterations; others will involve new construction or property acquisition in the form of right-of-way or public easement.
Town of Carrboro Residential Traffic Management Plan for Speed and Traffic Control	Oct-06	Based on concerns regarding speeding in neighborhoods, this plan provides a process for identifying and addressing existing problems related to speeding, excessive volumes, and safety on town-maintained residential streets -- proper actions can be taken depending on severity	Process of procedure: Report the problem; develop petition and neighborhood consensus; data collection done by Town staff; review by Town staff and determine if street is eligible for Stage 1 Traffic Calming alone or both Stage 1 (primarily education and enforcement measures) and Stage 2 (physical modifications of the street) Traffic Calming; Staff recommendations, TAB review, and Board of Alderman Approval; Follow-up evaluation
Downtown Traffic Circulation Study	Jun-05	To describe various ideas about how the transportation system can be used and improved to expand and enhance the virbrancy of downtown Carrboro.	The recommended order of projects is listed below. Pre-requisites for project 9 - the redesign of East Main Street include projects 2, 3 and 7. To gain NCDOT approval of project 9, the Town also may consider project 12 - the extension of Hosiery Street as a pre-requisite. Doing so would complete a network of interconnected streets that could support the conversion of Main Street to a "complete street." 1. Weaver Street Repaving and Restriping 2. Roberson Street Extension 3. Railroad Agreement 4. Walkability Improvements 5. Bikeability Improvements 6. Bus Stop Improvements 7. Roberson Street Improvement 8. Greensboro Street Corridor Improvements 9. East Main Street Redesign 10. Town Hall Roundabout 11. Jones Ferry Roundabout 12. Hosiery Street Extension 13. Gateway Roundabout

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Carrboro Vision 2020	Dec-00	To establish guiding principles for growth and development in the Town through the year 2020 and preserve the Town's history and qualities in an atmosphere of desirable growth	Outlined: Programming, Services and Amenities; Development; Economic Development; Transportation; Environmental Protection and Promotion; and Housing

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111 E. Chapel Hill Street
Suite 100
Durham, NC 27701
www.altaplanning.com

Stakeholder and Public Engagement Memorandum

To: Zachary Hallock, Transportation Planner, Town of Carrboro, NC

From: Jennifer Baldwin, Senior Associate, Alta Planning + Design

Date: August 27, 2020

Re: Carrboro Bicycle Plan: Stakeholder and Public Engagement

Stakeholder and Public Engagement

Strong emphasis was placed on stakeholder and public engagement through the process of developing the Carrboro Bicycle Plan. A variety of methods were used including in-person intercept events, targeted outreach, project website, comment form, and steering committee meetings. This memo includes some of the materials used, survey results, and steering committee meeting notes. A list of these specific outreach events is provided below:

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Steering Committee Meetings:

- February 28th, 2019 - Project Kickoff
- March 28th, 2019 - Existing Conditions
- May 30th, 2019 - Network Recommendations
- June 27th, 2019 - Program and Policy Recommendations

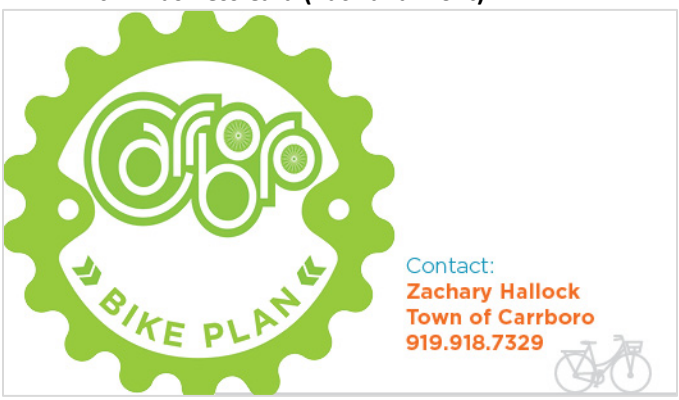
General Public Outreach:

- Survey opened to public at Carrboro Open Streets 2019 on April 7th, 2019
- Intercept Surveys conducted at Carrboro Plaza Food Lion, Willow Creek Food Lion, and Carrboro Community Health Center during the week of April 29th, 2019
- Survey hosted alongside Carrboro Bicycle Breakfast on May 14th, 2019
- Survey hosted alongside Bike on Bus @ the Carrboro Farmer's Market on May 18th, 2019

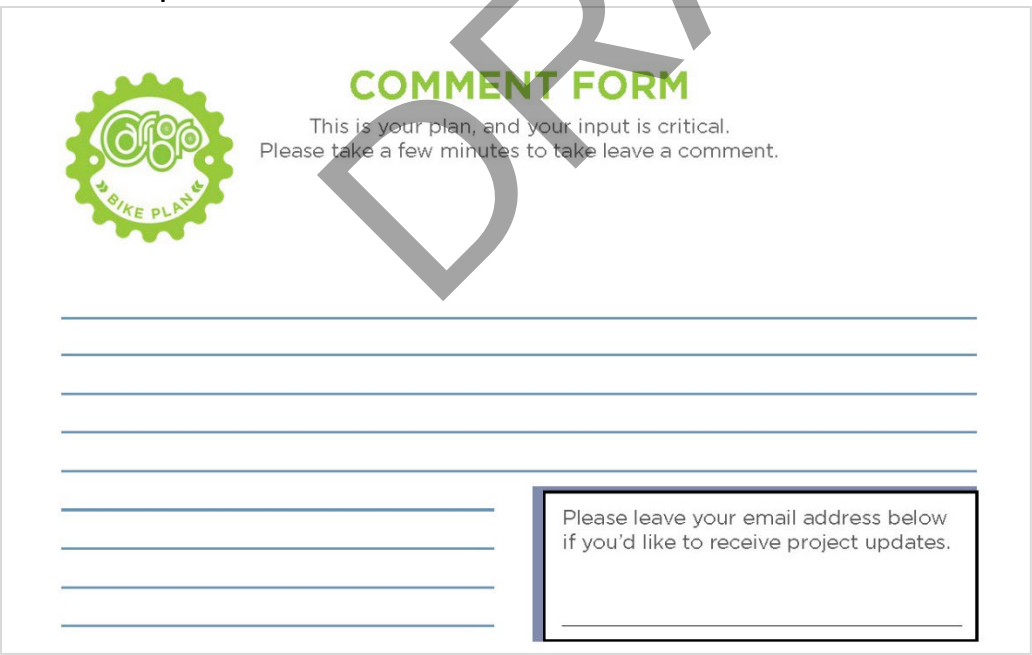
Targeted Outreach:

- Hosted information session at the Clear Machine during the week of June 1st 2019
- Hosted information session at the Century Center with members of local middle school biking teams on June 15th, 2019
- Hosted session at Wilson Park with translators for Burmese/Karen speaking community members on June 15th, 2019
- Hosted session at Town Hall targeted towards long-term Carrboro Residents on June 21st, 2019
- Hosted information session with surveys and draft bike plan network at the Rogers Road RENA Community Center on July 1st, 2019
- Hosted surveys at El Centro/CEL during the month of September 2019
- Direct survey mailing to residents (with pre-stamped return envelope) in the Rogers Road, King Street, Barnes Street, Alabama Avenue, and Lloyd/Broad neighborhoods conducted during the month of September 2019.

- **Materials:**
  - **Business Card (Back and Front)**



  - **Open-ended Comment Form**



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- **Social Media/Flyers**
  - A variety of social media and web-based and print materials were developed for the Plan. Posts were made on Twitter, Facebook, and NextDoor.

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- **Materials in Spanish**

Encuesta de Plan de Bicicleta

TU VOZ IMPORTA

¡La cuiudad de Carrboro quiere saber tu opinion!

¡Porfavor tome unos minutos para informarnos cómo Podemos crear un plan de bicicletas de calidad que beneficie a los residentes!

¿Cada cuanto usas tu bicicleta durante la semana en Carrboro? (marque uno)

Siempre	Casi Siempre	A veces	Casi Nunca	Nunca
☐	☐	☐	☐	☐

¿Qué tipo de ciclista te describiría mejor?

Fuerte + Sin Miedo	Entusiasta + Confiado	Interesado + Preocupado	De ninguna manera
☐	☐	☐	☐

¿Qué factor(es) te animaría a montar bicicleta más? (marque todos los que correspondan)

- ☐ Clases de educación y mantenimiento de bicicleta
- ☐ Carriles para bicicletas
- ☐ Programa de bicicletas compartidas
- ☐ Señalización de orientación de bicicletas
- ☐ Más estacionamiento para bicicletas
- ☐ Tráfico más lento
- ☐ Intersecciones seguras
- ☐ Senderos o acceso a vías verdes
- ☐ Otro: _____

Yo andaría en bicicleta más si...

_____

_____

Mi lugar favorito para andar en bicicleta en Carrboro es...

_____

_____

El lugar más difícil para andar en bicicleta en Carrboro es...

_____

_____

¿Hay alguna idea, inquietud o problema adicional que quieres compartir?

_____

_____

_____

_____

¿Cuánto tiempo has vivido en Carrboro

- ☐ menos de 3 años
- ☐ 3-5 años
- ☐ 6-10 años
- ☐ 11-15 años
- ☐ Más de 15 años
- ☐ Yo no vivo en Carrboro
- ☐ Prefiero no contestar

¿Cual es tu código postal? _____

Si vives en Carrboro, ¿en qué calle vives?

_____

¿Cuál es su raza? Seleccione todos los que apliquen.

- ☐ Indio Americano o Nativo de Alaska
- ☐ Asiático
- ☐ Negro o Afroamericano
- ☐ Hispano o Latino
- ☐ Nativo de Hawai o de otras islas del Pacifico
- ☐ Blanco o caucásico
- ☐ Prefiero no contestar
- ☐ Otro: _____

¿Cuantos años tienes?

- ☐ menos de 18
- ☐ 18-44
- ☐ 45-64
- ☐ 65+
- ☐ Prefiero no contestar

¿Cuál es su género?

- ☐ Hombre
- ☐ Mujer
- ☐ No binario
- ☐ Prefiero no contestar

¿Cuál es el nivel más alto de educación que ha completado?

_____

Por favor deje su correo electrónico a continuación si desea recibir actualizaciones del proyecto:

_____

GRACIAS!

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MEMORANDUM

Date: March 4, 2019

To: Zachary Hallock, AICP, EI – Town of Carrboro

From: Jennifer Baldwin – Alta Planning + Design

Meeting Date: Thursday, February 29, 2019

Internal Team Meeting Attendees: Jennifer Baldwin, Matt Hayes and Angela Coullias from Alta Planning + Design; Zachary Hallock, Town of Carrboro Transportation Planner; Trish McGuire, Town of Carrboro Planning Director; Tina Moon, Planning Administrator

Re: Carrboro Bike Plan – Steering Committee Kickoff Meeting Notes

DRAFT

Meeting Attendees

Tyler Gilmore	Orange Literacy – ESOL Program Coordinator	tgilmore@orangeliteracy.org
Donnie Rhoads	Chapel Hill PD	drhoads@townofchapelhill.org
Galen Poythress	Carrboro Rec	jpoythress@townofcarrboro.org
Anahid Vrana	Advisory Board NTAAC	Anahid.vrana@gmail.com
Steve Rogers	NCICL (North Carolina Interscholastic Cycling League)	Sfr1224@gmail.com
Brent Hobby	Carrboro PD	chobby@townofcarrboro.org
Ray Enoch	Carrboro Fire	renoch@townofcarrboro.org
Daniel Snipes	Carrboro Public Works	dsnipes@townofcarrboro.org
Jon Scott	Carrboro	Scott.jss@gmail.com
Becki Cleveland	Carrboro Rec	Becki.cleveland@gmail.com
Dave Mabe	Carrboro GWC	Davemabe@gmail.com
Rachel Gaylord-Miles	Carrboro Planning Board	Rlgaylordmiles@gmail.com
Lyndsay Gavin	TJCOG/EAB	lgavin@tjcog.org
Rachel Kelley	Carrboro	Rbellkelly4@gmail.com
Josh D Worshofsky	Citizen at large	joshalope@gmail.com
Abigaile Pittman	Orange County	abpittman@orangecountync.gov
Lee Schimmelfing	Orange County	leeschim@email.unc.edu
Barbara Jessie-Black	PTA Thrift Shop	info@ptathriftsghop.org
Linda Haac	Carrboro TAB	lindahaac@yahoo.com
Colleen Barclay	Carrboro Bike Coalition	Colleen.j.barclay@gmail.com
Charlie Hileman	Citizen	carrbonate@gmail.com
Chris Colvin	Citizen	Christopher.colvin@gmail.com
Tamara Sanders	Clean Machine Bike Shop	tamara@thecleanmachine.com
Kurt Stolka	UNC Chapel Hill	kurt@unc.edu
Dale McKeel	DCHC MPO	Dale.mckeel@durhamnc.gov

Scope/Schedule Overview

- Existing conditions analysis to include:
  - Level of Traffic Stress analysis
  - Mode share analysis
  - Crash analysis
  - Place of interests (grocery stores, walk sheds around schools)
  - Inventory of existing/signalized intersections
  - Review of program recommendations from 2009 Plan and providing update on projects that have been implemented and where there is need
  - Compile list of NCDOT transportation improvement projects (TIP) in and around Carrboro
- Recommendations to focus on low-stress network solutions so that we can reach the "interested but concerned" population
- Phased approach to identify short-term, mid-term and long-term projects
- Tactical urbanism approach to be investigated for low-cost and quick build solutions

2009 vs 2019 Steering Committee Discussion

- Bicycle Friendly Community – not the complete focus in 2019 but can provide a solid framework
- 2019 Bicycle Transportation Plan should be a simpler document than 2009 with achievable goals
- High priority focus is the "interested but concerned" group
- Look into developing a progress update dashboard for committee members and residents to keep updated on tentative and active improvement projects in correlation with plan
  - Opportunity to show progress made between 2009 and 2019 and then provide additional information on priority projects moving forward
  - Main focus is accountability and providing phasing of implementation
- Breaking down the five "E's":
  - Use of enforcement methods as education opportunity
  - Look into education integrations (ex. Safe Routes to Schools in Orange County)
  - Another "E" to focus on: Engagement
- Peer city review- coordination with other cities/towns in the region
- Possibility for plan to include cost analysis so that future budgets can be made available and dedicated to fund improvements
- Surrounding neighborhoods should be highlighted to increase connectivity
- Showing ridership (modeshare) metrics
  - Comparison of before and after (2009 vs 2019)
  - Commuting vs utilitarian ridership
- Critical needs outlined in 2009 – need to determine if they still the same? Have they improved?

Public Outreach Steering Committee Discussion

- Alta team to develop a user survey to be distributed in both hard copy format and on-line
- Town to develop a project page for the bike plan at https://townofcarrboro.org/
- The committee discussed potential public outreach events in April to share project information and collect user surveys. The following potential outreach opportunities were discussed:
  - Carrboro Open Streets event – April 7th
  - Equitable engagement – include all of Carrboro's diverse population
    - Orange Literacy group (Tyler) – reaching out to all demographics
  - Parks and Rec integration
  - School engagement with kids

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        - Piggyback with Safe Routes to School events and educational opportunities
    - Door-to-door engagement in all neighborhoods
    - Bike maintenance workshops (Bike Carrboro past event)
        - Bike light giveaway
    - Pop-up events to showcase engineering and design of different concepts, while also providing education
        - Integrating visual ques and educating how to react to pedestrians and bicyclists

Map Exercise

- The committee divided into three groups to review an existing condition map and discuss existing opportunities and constraints around what it's like to bike in Carrboro today.
- The following topics were discussed and highlighted on each map:
    - Safety concerns along specific corridors with big hills, such as Estes Dr and Rosemary/Weaver St
    - Improvements needed at intersections, like Jones Ferry Rd at Davie Rd and W. Weaver St at Greensboro St
    - Providing some sort of vertical separation along Greensboro St/Hillsboro Rd for the existing bike lanes would make it much more attractive for the "interested but concerned" riders
    - Focus on safe connections to schools, such as Carrboro Elementary
    - Close the gap on Homestead Rd between Lake Hogan Farm Rd and Stratford Dr
    - Connect neighborhoods to the north, such as Lake Hogan Farm Community, with downtown
    - Focus on connections to parks and community centers
    - Carolina Forest and University Lake are key bike destinations
    - Potential economic development opportunities by connecting downtown Hillsborough to downtown Carrboro

Next Steps

- Project team to develop public outreach materials to launch on the project website and promote during key public events during March and April
- The next committee meeting date will be on Thursday, March 28th at 6:30pm at Town Hall to review existing condition findings and discuss low-stress bikeway design options.

DRAFT

MEMORANDUM

Date: April 2, 2019

To: Zachary Hallock, AICP, EI – Town of Carrboro

From: Jennifer Baldwin – Alta Planning + Design

Meeting Date: Thursday, March 28th, 2019

Internal Team Meeting Attendees: Jennifer Baldwin, Matt Hayes and Angela Coullias from Alta Planning + Design; Zachary Hallock, Town of Carrboro Transportation Planner; Tina Moon, Planning Administrator

Re: Carrboro Bike Plan – Steering Committee Existing Conditions Meeting Notes

DRAFT

Meeting Attendees

Lisa Brown (for Anahid Vrana)	Advisory Board NTAAC	downtownLB@gmail.com
Jon Scott	Citizen	Scott.jss@gmail.com
Tyler Gilmore	Orange Literacy – ESOL Program Coordinator	tgilmore@orangeliteracy.org
Josh D Worshofsky	Citizen at large	joshalope@gmail.com
Brent Hobby	Carrboro PD	chobby@townofcarrboro.org
Dave Mabe	Carrboro GWC	Davemabe@gmail.com
Dale McKeel	DCHC MPO	Dale.mckeel@durhamnc.gov
Becki Cleveland	Carrboro Rec	Becki.cleveland@gmail.com
Steve Rogers	NCICL (North Carolina Interscholastic Cycling League)	Sfr1224@gmail.com
Rachel Kelley	Resident, At-Large	Rbellkelley4@gmail.com
Linda Haac	Carrboro TAB	lindahaac@yahoo.com
Kevin Hicks	Triangle Bikeworks	kevin@trianglebikeworks.org
Rachel Gaylord-Miles	Carrboro Planning Board	Rlgaylordmiles@gmail.com
Daniel Snipes	Carrboro Public Works	dsnipes@townofcarrboro.org
John Vine-Hodge	NCDOT Bike/Ped	javinehodge@ncdot.gov
Donnie Rhoads	Chapel Hill PD	drhoads@townofchapelhill.org
Barbara M Foushee	Carrboro Board of Alderman	bmfoushee@townofcarrboro.org
Colleen Barclay	Carrboro Bike Coalition	Colleen.j.barclay@gmail.com
Tamara Sanders	Clean Machine Bike Shop	tamara@thecleanmachine.com
Kurt Stolka	UNC Chapel Hill	kurt@unc.edu

Meeting Agenda

- Progress since 2009 plan
- Biking in Carrboro Today
  - Bikeway Network Growth
  - Existing Bike Network
  - Equity analysis
  - Level of Traffic Stress (LTS) analysis
  - LTS Connectivity Islands
- Public Involvement
  - Events + Outreach Materials
- Upcoming Schedule

2009 Action Step Assessment Steering Committee Discussion

- Overview of action step plan from 2009 – the project team developed a infographic to assess progress towards key recommendations from the 2009 Carrboro Bike Plan. Recommendations were sorted into the five E's and committee included:
  - **Engineering**
    - Bike parking ordinance considered complete, but should be re-evaluated to provide recommendations for improvements.
    - Bicyclists should continually be accommodated for in long term transit services plans, including design opportunities like covered shelters and bike parking. Should also be included with UNC plans.
    - Online app outlining bike facilities would be helpful to outline current network.
  - **Education**
    - Focus on creating social media platform for bicyclists AND motorists instead of handouts/newsletters/brochures, integrating that as a new key recommendation.
    - Re-evaluate "Basics of Bicycling" course, especially pertaining to women comfort level and older children.
    - Based on 2009 key recommendations, important to re-evaluate engagement with Town, local police departments, schools, and other local organizations on education of roadway/bike laws and spread positive message about biking in the community.
    - Discussion of advocacy ambassador program integrated with the Carrboro Bike Coalition. Currently nothing formal in place.
    - Expand familiarity of bicyclists culture regarding the expansion of League Cycling Instructors (LCI).
    - Discussion involving state level education, including DMV licensure with bike education tips and questions.
  - **Encouragement**
    - Look at funding for Safe Kids NC and their level of involvement.
    - Carrboro Bike Coalition developed own Bicycle Friendly Business (BFB), but by in-large most businesses haven't done much in Carrboro. Revisit ways to incentivize commuting by bike.
    - Local private groups host bike riding tours/races so it would be important to get support from Town on addition events to promote safe bicycling.
  - **Enforcement**
    - In regards to bike patrol positions, there's difficulty in recruiting and budget. Not enough full-time officers on staff to have full-time bike patrol.
    - Additional officer training will have to fall on the State or locally. Watch for Me NC safety program offered training courses to enforcement agencies and university police. Issue with younger officers not knowing the laws to enforce and abide by.
  - **Evaluation**
    - Big need for measurement before and after implementation of new bike facilities.

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        - Near miss reporting for bicycle crashes for evaluation of crash reduction.

Equity and Level of Stress (LTS) Steering Committee Discussion

- Equity Analysis
    - Additional information to possibly include:
        - Full Census blocks to show overview of how Carrboro's extra-territorial jurisdiction (ETJ) fits within the overall equity analysis
        - Population density
        - Property real estate value
    - Project team to target the following areas for outreach:
        - Lake Hogan area based on education level and limited English proficiency
        - Estes Park location
        - The multiple apartments south of NC 54 based on large student population
        - Multiple businesses and organizations that can help with outreach in limited English proficiency
            - El Centro, Refugee Community partners, etc
- LTS Analysis
    - The committee discussed the following factors that the LTS analysis does not include:
        - Parking lots
            - Sometimes act as alternate bike routes in order to connect to other roadways with bike facilities
        - Topography
            - Directional differentiation on certain roadways based on topography changes (i.e. steep hill upward in one direction versus downhill direction in another)
        - Population density
        - Major destinations
        - Main roadways connecting to Chapel Hill (Rosemary, Main, Estes)
        - Strava data to highlight highly-used corridors and routes.
    - The project team will look into the following segments:
        - Downtown Greensboro Street (between Main Street and Pleasant Drive) is marked LTS 2 but feels like a LTS 3 based on nonexistent bike facilities, uphill traffic, and numerous parking lot driveways.
        - Pathway Drive based strictly on topography
        - Discussion of Hillsborough Road being less stressful than N Greensboro Street even though both are rated an LTS 3 based on volume of traffic
        - Main Street near downtown as a possibility as an LTS 4
        - Smith Level Road based on speed and traffic volumes

Next Steps

- Town of Carrboro staff to conduct public outreach during Open Streets
- All materials will be sent to the Steering Committee digitally for review
- The next committee meeting date will tentatively be Thursday, May 30th at 6:30pm at Town Hall to review preliminary bike plan recommendations
    - Meeting subject to change based on availability due to the Memorial Day holiday

DRAFT

MEMORANDUM

Date: July 1, 2019

To: Zachary Hallock, AICP, EI – Town of Carrboro

From: Jason Reyes – Alta Planning + Design

Meeting Date: Thursday, June 27, 2019

Internal Team Meeting Attendees: Jennifer Baldwin and Jason Reyes from Alta Planning + Design; Zachary Hallock, Town of Carrboro Transportation Planner; Trish McGuire, Town of Carrboro Planning Director; Tina Moon, Town of Carrboro Planning Administrator.

Re: Carrboro Bike Plan – Steering Committee Draft Plan Meeting Notes

DRAFT

Meeting Attendees

Chris Colvin	Citizen	mailto:Christopher.colvin@gmail.com
Tyler Gilmore	Orange Literacy – ESOL Program Coordinator	mailto:tgilmore@orangeliteracy.org
Josh D Worshofsky	Citizen at large	mailto:joshalope@gmail.com
Dave Mabe	Carrboro GWC	mailto:Davemabe@gmail.com
Becki Cleveland	Carrboro Rec	mailto:Becki.cleveland@gmail.com
Linda Haac	Carrboro TAB	mailto:lindahaac@yahoo.com
Charlie Hileman	Citizen	mailto:carrbonate@gmail.com
Jeremy Galen Poythress	Carrboro Recreation & Parks	mailto:jpoythress@townofcarrboro.org
Donnie Rhoads	Chapel Hill PD	mailto:drhoads@townofchapelhill.org
Colleen Barclay	Carrboro Bike Coalition	mailto:Colleen.j.barclay@gmail.com
Kurt Stolka	UNC Chapel Hill	mailto:kurt@unc.edu

Meeting Agenda

- Programs (Education, Encouragement, Enforcement, Evaluation) Presentation
- Policy Recommendations
- Evolution of bike network and updated DRAFT network map
- Priority project idea list
- Next Steps

Programs & Policies Comments

The following is a summary of the comments collected during discussion of draft programs and policies:

- **Bike wayfinding: Regional map/app**
  - The app should allow users to turn a BLOS layer off/on when viewing the map
  - The app should allow for crash and near-miss reporting, if possible
  - Town has a flood reporting app that is managed by their GIS developer – could be a resource in designing this app, or at least be a stakeholder for its development
- **Tactical Urbanism/Demonstration Projects**
  - This was the most discussed program of the meeting. The discussion focused on the desire to use this program to increase visibility of bicycling opportunities is Carrboro, and to be able to test solutions on roadways before they permanent.
  - Funding for demonstration projects could be supplemented by private sources; Town should seek partnerships with groups such as Fifth Season Gardening Co (for lending plants to be used in demonstration medians/buffers), Cannondale, UNC Healthcare, and other local/regional entities
  - The Town could partner with Chapel Hill to create a demonstration project trailer that houses materials to be used (and re-used) during demonstration projects. This could be a Triangle initiative as well, to expand resources.
  - Committee members can learn more about this topic here: http://tacticalurbanismguide.com/
- **Partner with Carrboro Bike Coalition (CBC) to expand options for skills training and social rides**
  - Town representatives expressed interest in this topic, at least in terms of cross-promotion through the Town Recreation & Parks Calendar on the Town's website.
  - CBC recently shifted focus away from activities such as leading social rides. There may still be an opportunity for partnership, with roles to be determined.
- **Continue to expand bicyclist count programs**
  - Counter positioning/placement is key; an example was given of a counter in Carrboro that was placed just after most bicyclists turn from the corridor. The Town was aware of this issue and recently adjusted it.
- **Continue success of safe routes to school programs and partnerships**
  - The success of a SRTS program for bicycling in Carrboro will depend in large part on having safe infrastructure
  - For program development, start with the PTA Council President, then the school principals and PTA. Gather their ideas and address their concerns.
  - See Boulder, CO, for an example of a program that uses branding as a key element for promotion and community visibility.
- **General Programs/Policies Comments**
  - Partner with High School to offer opportunities for students to apply their service hours towards some of the recommended program activities.
  - The Town need to have commitment to these programs (and the plan as a whole) in order for any of them to work. Participants suggested ways for the Town to be accountable for the plan, with ideas ranging from an Annual Report Card to weekly or monthly meetings.

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Program Ranking

In addition to the discussion above, participants also ranked the draft list of program ideas (highest scores = most important), and submitted written comments, with the following results:

Program	Score	Written Comments (verbatim)
Tactical urbanism for testing new infrastructure	43	Make it visible to motorists - and potential cyclists; Use to establish separation facilities on current bike lanes
Bike wayfinding: Sign system	25	Promote signs on social media
Continued traffic calming programs	23	Expand to merge volume of bike boulevard locations
Continue success of safe routes to school programs and partnerships	23	Whatever we do has to work for families- not just bachelors like me!
Expand & enhance bike parking	15	Carr Mill/HT is often full; Especially off the main drags (Main & Franklin)
Expand police promotion of safety for bicyclists, including “near miss” reporting	15	"Near miss" as part of larger bike app.; Make this part of the app
Bike wayfinding: Regional map/app	13	Would like it connected to larger app- I use CIA's MapMyRide; Integrate with Google, OpenStreetMap, Strava heat maps
Partner with Carrboro Bike Coalition to expand options for skills training and social rides	12	New cyclists need a community, resources, etc.; Or Recreation & Parks (a couple youth plus parent education courses happening this fall!) Partner with bars for the social rides, and bike shops
Speed enforcement for hot spots	8	Coordinate with slow zone for downtown
Continue to expand bicyclist count programs	6	By far the most important; Visible counters/Upgrade counters to show # of people for day and lifetime; Also app capability on the backend
Carrboro-based social media campaign aimed at bicyclists & motorists (instead of print material)	4	App (on the bike side)
Formalize an advocacy ambassador program integrated with the Carrboro Bike Coalition	3	The town(s) can't do it all
Other Program Ideas:		
Expand community partnerships to extend to northern neighborhoods and their HOA, also Friends of Bolin Creek, other stakeholders to wider beyond bikers and gov. entities.		
All: sustained commitment from Alderman/staff		
Town commitment to maintain bikeways and prioritize bike access		
Website/portal to collect/crowdsource any/all local biking related info (group rides, bike shops, etc.)		

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Draft Network & Priority Project Comments

- **NC 54**
  - Wide shoulder label is misleading – not bikeable for many people
- **Carolina North Forest**
  - Add path connection on cleared easement (drawn from Waterside Dr north to Seawell Elementary and Chapel Hill High School)
- **Carr St & S Greensboro Intersection**
  - Difficult intersection, but key for avoiding traveling along Main St; Explore potential for intersection crossing improvements for bicyclists in conjunction with future library project.
- **Cobblestone Dr**
  - Steep elevation makes for a difficult bicycling connection (especially as a bicycle blvd)
- **Estes Dr Ext. to Village Dr**
  - Connection between Carrboro and Chapel Hill often used by committee member
- **N Greensboro St to Lloyd St Connector**
  - Explore potential grade separated crossing of railroad between these two streets, in the vicinity of Mulberry St and Parker St. Town may have resources to do a feasibility study for a crossing in this area.
- **N Greensboro St**
  - Bolin Forest Dr to Oak St: Add separation on corridor in long term
- **N Greensboro St**
  - Network gap needs to be addressed, including crossing improvements, from E Poplar Ave to Weaver St
- **N Greensboro St at Milton Dr**
  - Add signal?
- **S Greensboro St**
  - W Main St to Roberson St: [illegible; likely: "Add lanes; remove parking"]
- **Jones Ferry Rd**
  - Consider extending the recommended buffer/separated bike lanes from Davie Rd to Laurel Ave
- **Libba Cotton Bikeway**
  - Need an official connection to the Arts Center
- **Morgan Creek Greenway**
  - Portions of this could be noted as in-development sections near S Greensboro St have let for construction
- **Orange County**
  - Potential greenway connection noted from Carrboro High School heading south along Orange Water and Sewer Authority (OWASA) corridors towards Starpoint/Walmart employment area at US 15 501 & Smith Level Road.
- **Pathway Dr (eastern half)**
  - Steep elevation makes for a difficult bicycling connection
- **Prince St Connector**
  - Neighborhood connection or dirt path opportunity on north end of Prince St connecting to Jones ferry Rd
- **Purple Leaf Place/S Greensboro St**
  - Rather than the bicycle blvd as shown at the south end of Purple Leaf Place, consider a shared use path connecting the south end of the Roberson Bike Path to the recommended path along S Greensboro St
- **Roberson St**
  - Consider a Woonerf pilot project on Roberson St, from Libba Cotton Bikeway to S Greensboro St
- **Rose Walk Lane to Tar Hill Dr Bike Lanes**
  - Comment: "Yay!"
- **Known Map Corrections/Additions:**
  - Pacifica Easement & Adams Riparian Conservation Easement: These are limited to pedestrian access; remove recommended bicycle connection through these areas.
  - RR tracks are now gone west of N Greensboro St, just north of Fitch Lumber & Hardware (small section shown as existing on map)

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- W Main St, between Jones Ferry Rd and Greensboro St: The existing bike lanes do not go all the way up the Greensboro St intersection (causing problems for bicyclists); update map to show where they stop
- Check greenway labeled "Roberson Place" – should it be "Roberson Bike Path"? (street sign in the neighborhood says the latter)
- Check existing greenway alignment as shown through Seawell Elm/High School, especially on the eastern end. A dedicated connection was noted/drawn from the existing shared use path at Seawell Elementary to recommended shared use path on Seawell School Rd
- Add recommendation for contraflow advisory bike lane (w/ sharrow in direction of traffic) on:
  - one-way section of Shelton St, from Hillsborough Rd to Ashe St
  - one-way section of E Poplar Ave, from Hillsborough Rd to N Greensboro St
- Add Rose Walk Greenway as existing? If so, confirm extents.
- Add existing gravel trail (or unpaved trail) from north end of Anderson Park parking lot to Strowd Lane
- Remove duplicate Wilson Park label and Anderson Park label
- Key Destination and Crossing Improvement symbols are too symbol – use a different color for one of them
- General: Consider showing topography, even if slightly, to help show steep slopes

Next Steps

- July: Draft Plan Production
- August: Draft Plan Internal Review (Town and NCDOT)
- September: Draft Plan Open House (tentative, depending on Town's September calendar; possibly October)

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2019 CARRBORO BIKE PLAN PUBLIC SURVEY RESPONES (as of 5/31/2019)

Q1. How often do you bike during the week?

Answer Choices	# of Responses	Percent
76-100% of the time	63	16.00%
51-75% of the time	80	20.40%
26-50% of the time	119	30.40%
1-25% of the time	108	27.60%
Never	22	5.60%
Answered	**392**	
Skipped	**0**	

Q2. What type of cyclist best describes you?

Answer Choices	# of Responses	Percent
Strong and Fearless	58	14.80%
Enthusiastic and Confident	191	48.72%
Interested but Concerned	133	33.93%
No Way, No How	10	2.55%
Answered	**392**	
Skipped	**0**	

Q3. What factor(s) would encourage you to bike more? (Check all that apply)

Answer Choices	# of Responses	Percent
Bike education and maintenance cl	68	17.35%
Bike lanes	313	79.85%
Bike wayfinding signage	101	25.77%
Bikeshare program	37	9.44%
More bike parking	103	26.28%
Safe intersections	246	62.76%
Slower traffic	140	35.71%
Trail or greenway access	284	72.45%
Other*	36	9.18%
Answered	**392**	
Skipped	**0**	

*Other responses included driver education, maintenace stations, protected bike lanes, and enforcement

Q4: I would bike more if…

Most Frequent Responses	# of Responses
More Bike lanes	79
If I felt safer	72
More Greenways/trails	56
Less Traffic	24
If I had time	15
Work-related issue	12
Weather	10
Answered	**392**
Skipped	**0**

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Q5: My favorite place to bike in Carrboro is…

Most Frequent Responses	# of Responses
Greenways/bike paths	47
Libba Cotton Bikeway	37
Anywhere/everywhere	19
Hillsborough	18
Carolina North	17
Downtown	17
N Greensboro	17
Farmers Market	8
Answered	**307**
Skipped	**85**

Q6: The most difficult place to bike in Carrboro is...

Most Frequent Responses	# of Responses
Main	62
Weaver	52
Estes	51
S Greensboro	44
N Greensboro	41
Downtown	37
Hwy 54	35
Smith Level	15
Homestead	10
Jones Ferry	9
Hillsborough	7
Answered	**314**
Skipped	**78**

Q7. How long have you lived in Carrboro?

2019 Carrboro Bike Plan Survey		
Answer Choices	# of Responses	**Percent**
Less than 3 years	85	**22.08%**
3-5 years	81	**21.04%**
6-10 years	50	**12.99%**
11-15 years	41	**10.65%**
Over 15 years	70	**18.18%**
I don't live in Carrboro	58	**15.06%**
Answered	**385**	
Skipped	**3**	

2018 Biennial Citizen Survey Report	
Percent	Answer Choices
6.60%	0-1 years
22.10%	2-5 years
20.90%	6-10 years
19.80%	11-20 years
17.60%	Over 20 years
13%	Native

Q8: Please select your zip code:

Answer Choices	# of Responses	**Percent**
27510	215	**59.23%**
27516	124	**34.16%**
Other*	24	**6.61%**
Answered	**363**	
Skipped	**28**	

*Other Zip Codes included 27514 (Chapel Hill), 27517 (Chapel Hill), 27278 (Hillsborough), 27701 (Durham), and 27707 (Durham)

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Q9: What street do you live on in Carrboro?

Most Frequent Responses	# of Responses
Greensboro	14
Pathway	14
Davie	10
Fidelity	8
Poplar	8
NC 54	7
Jones Ferry	6
Bim	5
Laurel	5
Oak	5
Viburnum	5
Answered	**281**
Skipped	**110**

Top Responses for Zip Code 27516	# of Responses
Della	3
Pathway Dr	3
Jewell Dr	3
Cates Farm	2
Drayton Ct	2
Hogan Woods Cir	2
Kiley St	2
Lake Hogan Farms	2
Piano	2
Shadow Ridge	2
Sunset Creek	2
Whispering Oak	2
Cobblestone	2

Q10. What is your gender?

2019 Carrboro Bike Plan Survey			2018 Biennial Citizen Survey Report	
Answer Choices	# of Responses	Percent	Percent	Answer Choices
Male	184	48.04%	50.60%	Male
Female	179	46.74%	49.40%	Female
I prefer not to answer	20	5.22%		
Answered	**383**			
Skipped	**8**			

Q11. What is your age?

2019 Carrboro Bike Plan Survey			2018 Biennial Citizen Survey Report	
Answer Choices	# of Responses	Percent	Percent	Answer Choices
Under 18	5	1.30%	N/A	N/A
18 - 44	225	58.29%	55.70%	18-45
45 - 64	129	33.42%	34.50%	46-65
65+	22	5.70%	9.90%	66+
I prefer not to answer	5	1.30%	N/A	N/A
Answered	**386**			
Skipped	**5**			

Q12. What is your race? (Check all that apply)

2019 Carrboro Bike Plan Survey			2018 Biennial Citizen Survey Report	
Answer Choices	# of Responses	Percent	Percent	Answer Choices
American Indian or Alaska Native	0	0.00%	N/A	N/A
Asian or Asian American	11	2.91%	3.10%	Asian
Black or African American	2	0.53%	10.20%	African American
Hispanic or Latino	25	6.61%	4.50%	Hispanic
Native Hawaiian or other Pacific Isl	1	0.26%	N/A	N/A
White or Caucasian	302	79.89%	78.80%	Caucasian
I prefer not to answer	37	9.79%	N/A	N/A
Other (please specify)	6	1.59%	3.40%	Other
Answered	**384**			
Skipped	**13**			

Q13. What is the highest level of education that you have completed?

2019 Carrboro Bike Plan Survey			2018 Biennial Citizen Survey Report	
Answer Choices	# of Responses	Percent	Percent	Answer Choices
Less than high school	2	0.53%	12.00%	High School or Less
High School Diploma or Equivalent	21	5.54%		
Some college, no degree	12	3.17%	23.80%	Some College
Associate Degree	5	1.32%	26.60%	College Degree

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Bachelor's Degree	116	30.61%	26.66%	College Degree
Graduate Degree	210	55.41%	31.70%	Graduate Degree PhD/JD/MD
I prefer not to answer	13	3.43%	N/A	N/A
Answered	**379**			
Skipped	**12**			

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TOWN OF CARRBORO

PLANNING BOARD JOINT ADVISORY MEETING

301 West Main Street, Carrboro, North Carolina 27510

SEPTEMBER 3, 2020 REMOTE (ZOOM) MEETING

MEMBERS	GUESTS	STAFF
Catherine Fray, Chair	Trent Stewart, Village Law	Tina Moon
David Clinton	Jack Haggerty, Architect	Marty Roupe
Braxton Foushee, Vice Chair	Phil Szostak, Architect	James Thomas
Rachel Gaylord-Miles, Vice Chair	**TOWN COUNCIL**	Laura Janway
Kirsten Leloudis	Sammy Slade	Zach Hallock
Elmira Mangum	Randee Haven O'Donnell	Marsha Pate
Eliazar Posada	Barbara Foushee	
Susan Poulton		
Bruce Sinclair		

Absent/Excused**:** Rasam Tooloee, Susan Romaine (Town Council Liaison) (Excused)

I. WELCOME & AGENDA ADJUSTMENTS

Catherine Fray opened the Joint Advisory Board meeting at 7:40 PM. Fray reviewed the agenda for the Planning Board, the Appearance Commission, Transportation Advisory Board, Environmental Advisory Board, applicants and guests. The agenda and protocol for the meeting were presented to attendees. Once quorums were confirmed, the presentations began. There were no adjustments to the agenda.

II. JOINT REVIEW

A) Concept Plan Review for 721 Jones Ferry Road Conditional Use Permit

Roupe introduced the item explaining the requirements for a conditional use permit for the project because of its location in the Watershed Residential zoning district, and the review of a concept plan. Roupe introduced Phil Szostak, the project architect who provided a short presentation (see packet for visuals) for the single family lot. Szostak provided information regarding building placement, drainage, buffer, and material selection. General questions followed including placement and material for construction of the driveway, sewer access, and the lot shading.

B) Concept Plan Review for 1716 Smith Level Road Conditional Use Permit

Roupe introduced the item and explained that the applicant has submitted an application for a CUP to split the lot into two, lots, with the intent to construct a new law office on the site of a former older home. Trent Stewart presented the concept plan (see packet) detailing the lot specifications, challenges with placement of buildings due to the stream buffer, and plans for the development for his client.

General questions followed including slope, tree canopy benefits, and challenges associated the location of the septic field. Consideration for an electric vehicle charging station was suggested. Alternative entrance development was recommended.

C) Major Modification to CUP for Club Nova at 103 West Main Street

Roupe introduced the item to the advisory boards explaining the history of the project, staff input and guidance, and how recommendations from the advisory board members from previous joint review meetings were incorporated into the new, modified CUP. The proposal includes the demolition of the existing buildings on the lot. Fundraising efforts are underway. If approved, construction would begin once adequate funding has been secured.

Jack Haggerty, project architect for Club Nova, presented a detailed overview of the project, which is considered a major modification to the conditional use permit. The major changes include returning to a single, smaller building, with a single driveway. Haggerty discussed the window placement and review of the glazing requirements, changes to the proposed number to trees, and information relating to the roof which will be solar capable. Haggerty spoke to the list of staff recommendations in the agenda packet noting the items where he is asking the permit issuing authority (Town Council) to consider a lesser requirement as provided for in the LUO.

General questions followed including the addition of electric vehicle charging stations, clarification of sewer placement/requirements, and the potential for better placed bike racks. Meg Horton, owner of neighboring lot suggested that the use of Maple trees near foundations be replaced with an approved tree which would be less likely to damage nearby building foundations.

Roupe reiterated that the CUP exists and the revised conditions/recommendations of the staff with the major modification. Advisory boards are asked to review the proposal and prepare a recommendation for inclusion in the public hearing materials that will go to the Town Council. The recommendation should address whether the Town Council should approve or deny the application and whether the advisory board supports the conditions identified as part of the staff report.

8:48PM Ends the Joint Advisory Board Portion of the Meeting

III. APPROVAL OF MINUTES

Foushee moved to approve the minutes from June 25, 2020 and July 2, 2020; Posada seconded the motion. **VOTE:** AYES (9) Fray, Clinton, Foushee, Gaylord-Miles, Leloudis, Mangum, Posada, Poulton, Sinclair; **NOES** (0); ABSENT/EXCUSED (1) , and Tooloee (Excused) The June 25, 2020 and July 2, 2020 Planning Board minutes were approved.

IV. OTHER MATTERS

(A) Major Modification to CUP for Club Nova at 103 West Main Street

Haggerty returned to the meeting, responding to questions from the Planning Board including:
Q: Where will services for their clients be conducted during construction?

A: During the construction phase, there will be a temporary location for Club Nova to continue services for their clients. This location is at an IFC owned building in Chapel Hill formally used for a shelter.
Q: Has Club Nova considered pre-wiring for charging electric vehicles?
A: Yes
Q. Will bike rack locations be sorted out?
A: Yes
Q. Can you provide more information regarding the changes to the façade of the building?
A: The changes to the design of the exterior of the building reflects the interior uses, and specifically efforts to provide better window placement for natural light.

Following discussion, a recommendation to the Town Council was drafted.
Sinclair moved to recommend that the Town Council approve the Major Modification to the CUP for Club Nova at 301 West Main Street with the staff recommendations; Leloudis seconded the motion. **VOTE:** AYES (9) Clinton, Fray, Foushee, Gaylord-Miles, Leloudis, Mangum, Posada, Poulton, Sinclair; **NOES** (0); **ABSTAINED** (0); **ABSENT/EXCUSED** (1) Tooloee

(B) Concept Plan Review for 721 Jones Ferry Road

Fray led discussion with attention to the sighting of lots with the consideration of usable soil; the location of the drainage pipes; the challenge with building placement with encroachment to the stream buffer; the placement of the driveway including slopes; and the preservation of tree canopy. Comments were drafted regarding the concept plan for the proposed residential homes to be conveyed to the applicant.

Foushee moved to recommend the comments regarding the proposal for 721 Jones Ferry Road involving subdividing the lot into two parcels and the proposal for a single family home. Poulton seconded the motion. **VOTE:** AYES (8) Fray, Foushee, Gaylord-Miles, Leloudis, Mangum, Posada, Poulton, Sinclair; **NOES** (0); **ABSTAINED** (1) Clinton; **ABSENT/EXCUSED** (1) Tooloee

(C) Concept Plan Review for 1716 Smith Level Road Conditional Use Permit

Discussion included the building design and lot selection, the limitations on access to public sewer services, the tree canopy preservation, and installation of a conduit for vehicle charging. Members expressed support for the project and drafted comments for the applicant.

Foushee moved to recommend the comments regarding the concept plan for the proposed office building at 1716 Smith Level Road. Gaylord-Miles seconded the motion. **VOTE:** AYES (9) Clinton, Fray, Foushee, Gaylord-Miles, Leloudis, Mangum, Posada, Poulton, Sinclair; **NOES** (0); A**BSTAINED** (0); **ABSENT/EXCUSED** (1) Tooloee

IV. ADJOURNMENT

Motion was made by Foushee and seconded by Gaylord-Miles to adjourn. The September 3, 2020 Planning Board meeting ended at 10:00 PM.