



APPENDIX

B

Technical Memos



**TOWN OF
CARRBORO**

BIKE PLAN



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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.”

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.

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	<p>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.</p> <p>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.</p>	 	1.8 MILES
Paved Shoulder	<p>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.</p>		4.0 MILES

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

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 make 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.



Example of a Separated Bikeway



Example of a Bicycle Boulevard



Example of an Intersection Improvement

2009 Recommended Bikeways

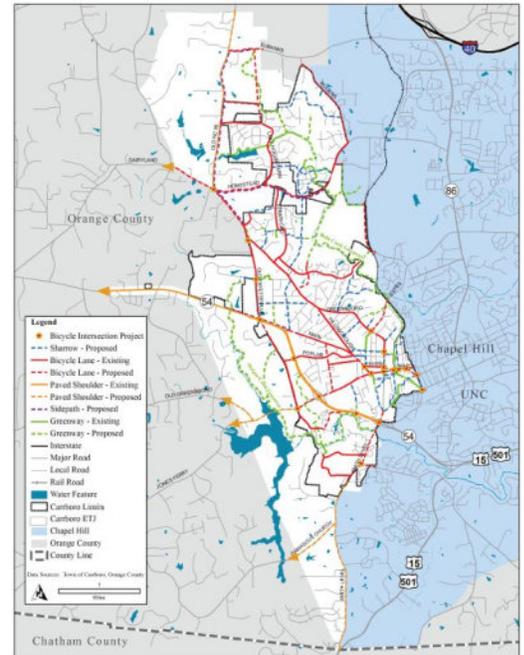
The Town of Carrboro’s Comprehensive Bicycle Transportation Plan (2009) shows recommended bicycle facilities to make up a complete Bicycle Network Map, including bicycle corridors, greenway corridors, and recommended intersection improvements. These facilities, in conjunction with the five E’s (engineering, 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.

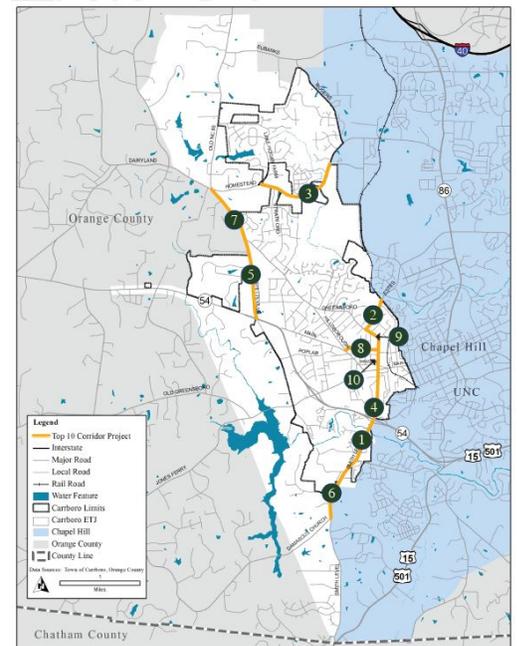
Carrboro’s 2009 Bike Plan’s Top 10 Priority Corridors

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



Bicycle Network Map from 2009 Carrboro Bike Plan



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

EXISTING BIKE FACILITIES

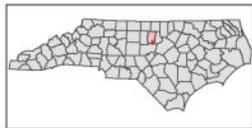
CARRBORO BIKE PLAN UPDATE

BIKE NETWORK

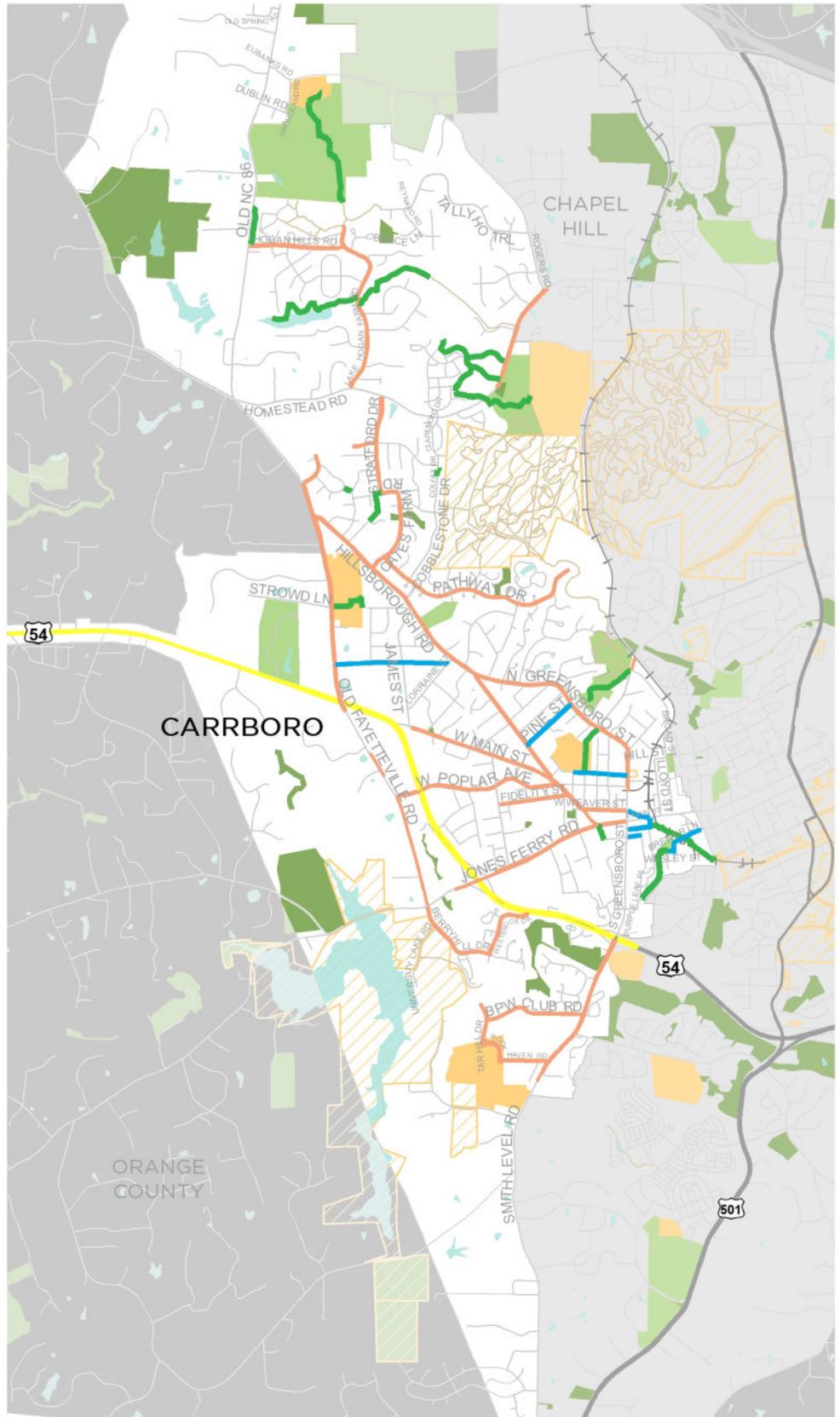
- Bike Lane
- Greenway (paved)
- Sharrow
- Wide Shoulder
- Rural Trails

BASE LAYERS

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



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



POPULATION DENSITY ANALYSIS

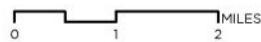
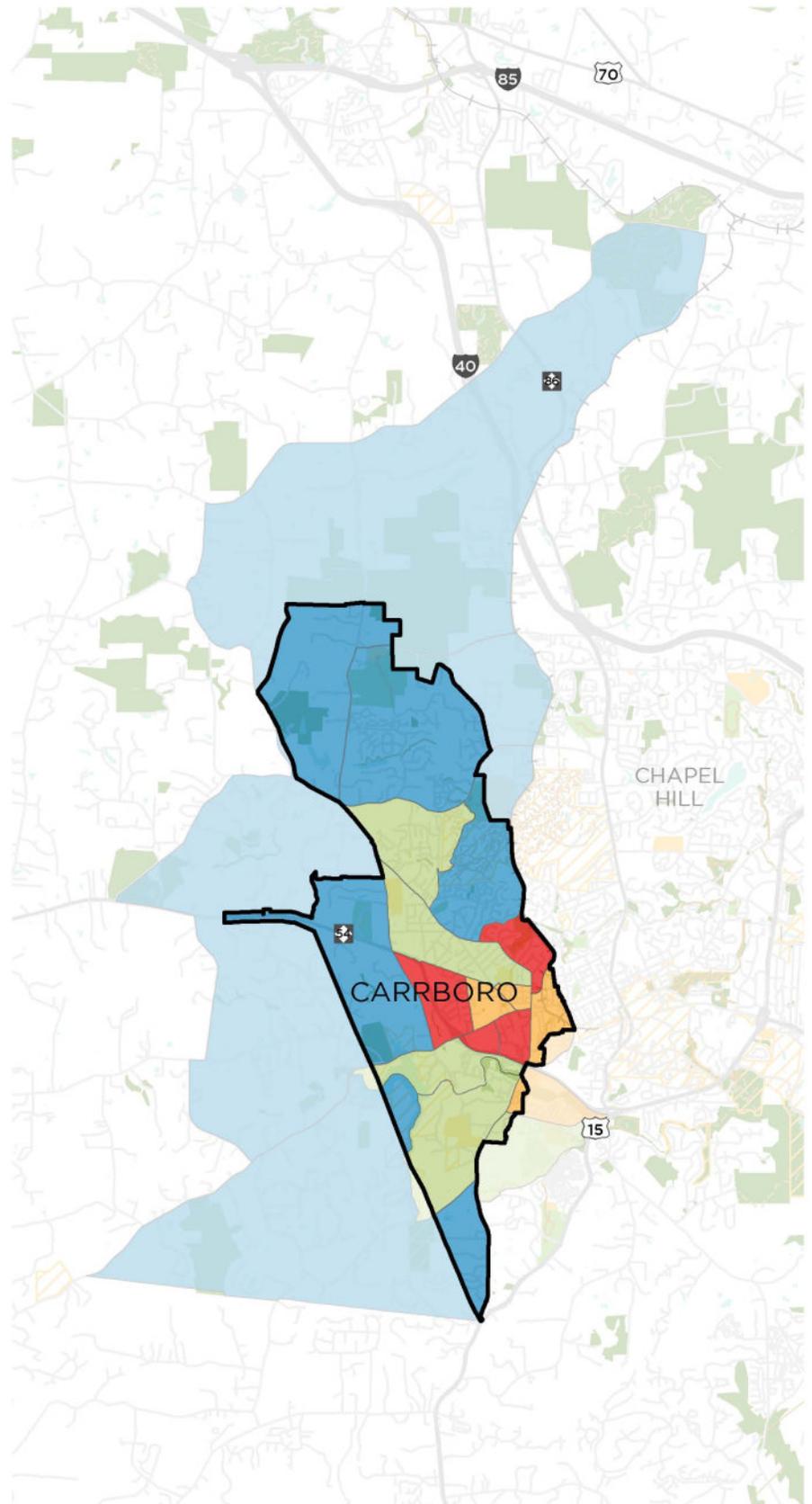
CARRBORO BIKE PLAN UPDATE

POPULATION DENSITY ANALYSIS

- Higher Population Density
- Lower Population Density
- Study Area

BASE LAYERS

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



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

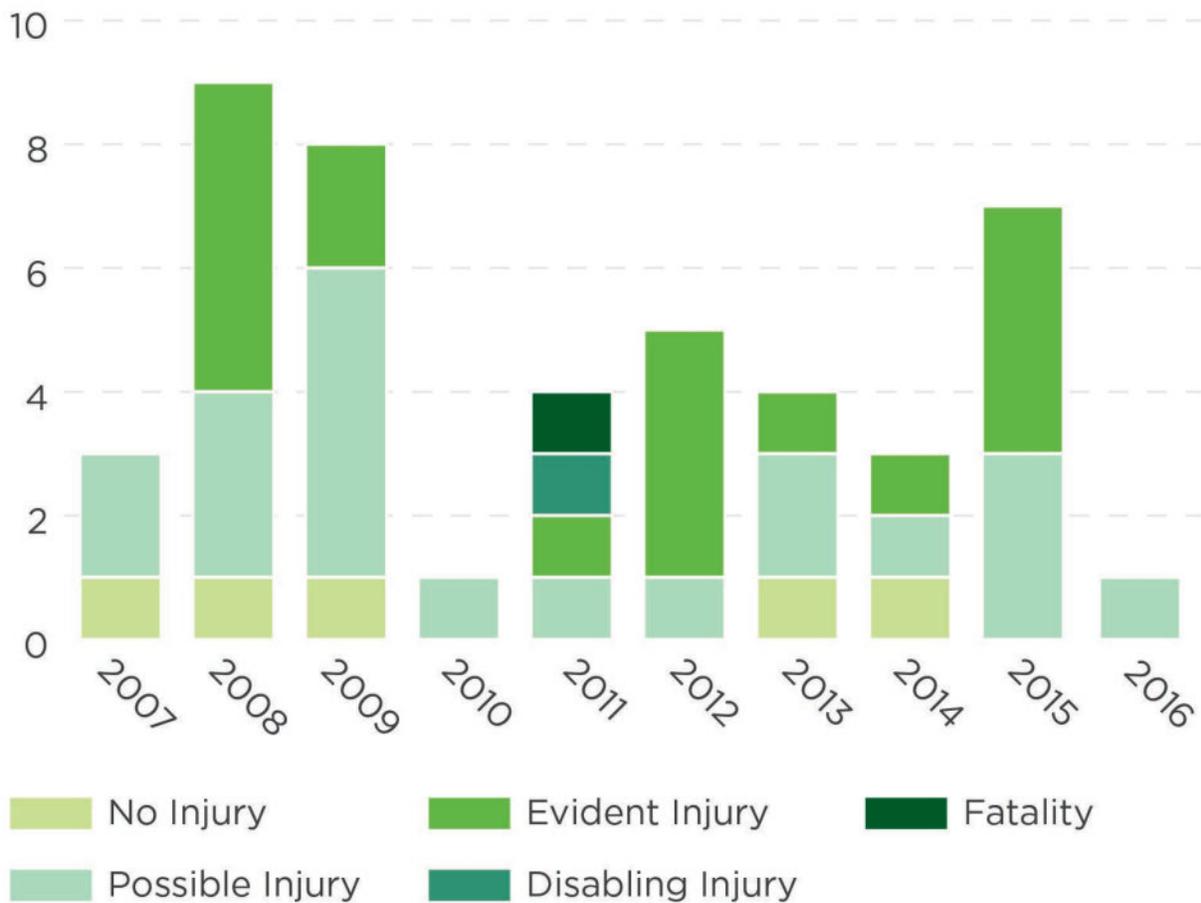
Safety Analysis

Introduction

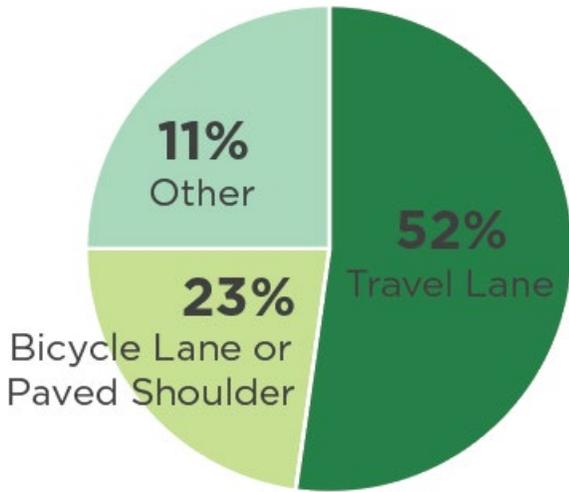
Around the U.S., concerns about safety are the most common reasons why people do not bicycle. Bicycle crash research supports concerns about bicycle and motorist interactions, since crashes occur mostly at arterial intersections. Local crash data is a valuable source of information for identifying difficult 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.

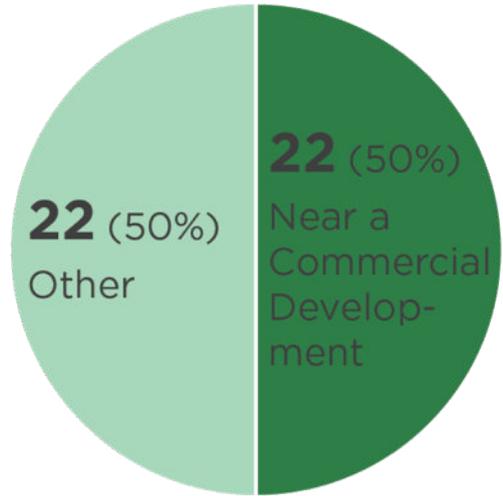
Carrboro Bicycle Crashes by Year



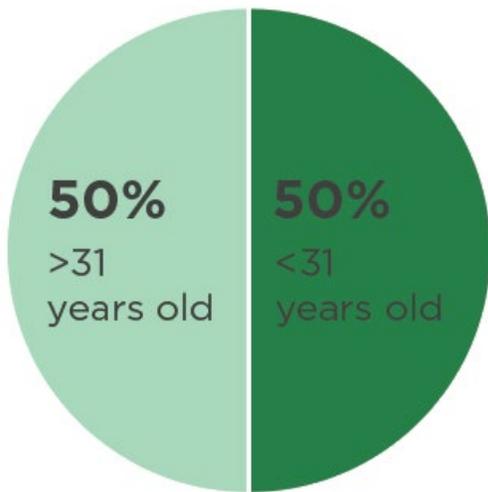
Where Bicyclist was at Point of



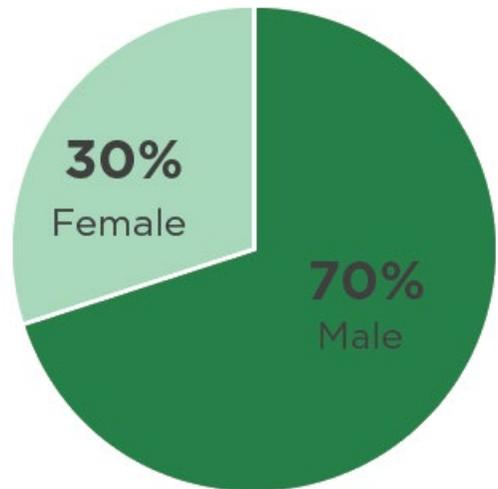
Location of Bicycle Crash



Age of Bicyclist Involved in Crash



Sex of Bicyclist Involved in Crash

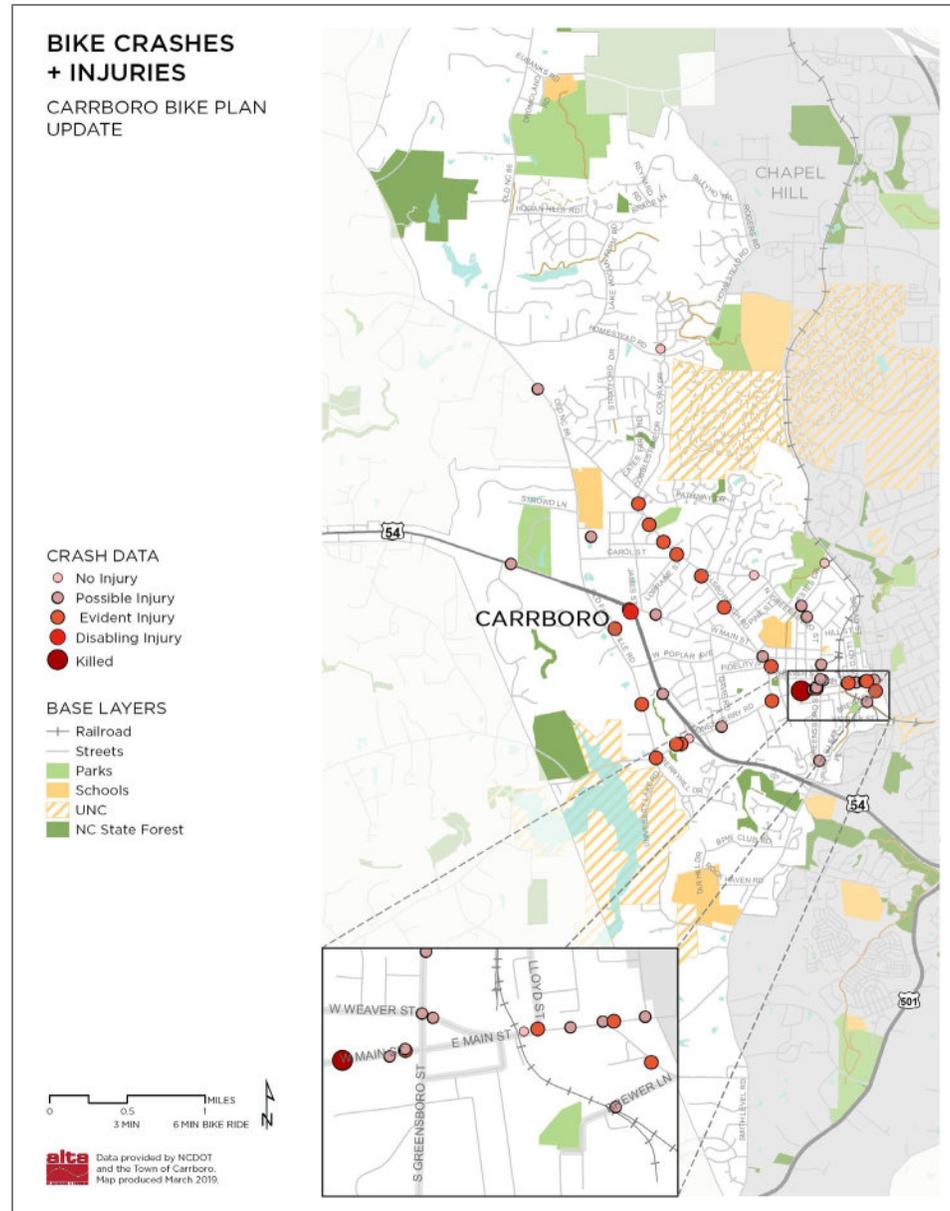


High Crash Corridors

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).

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.

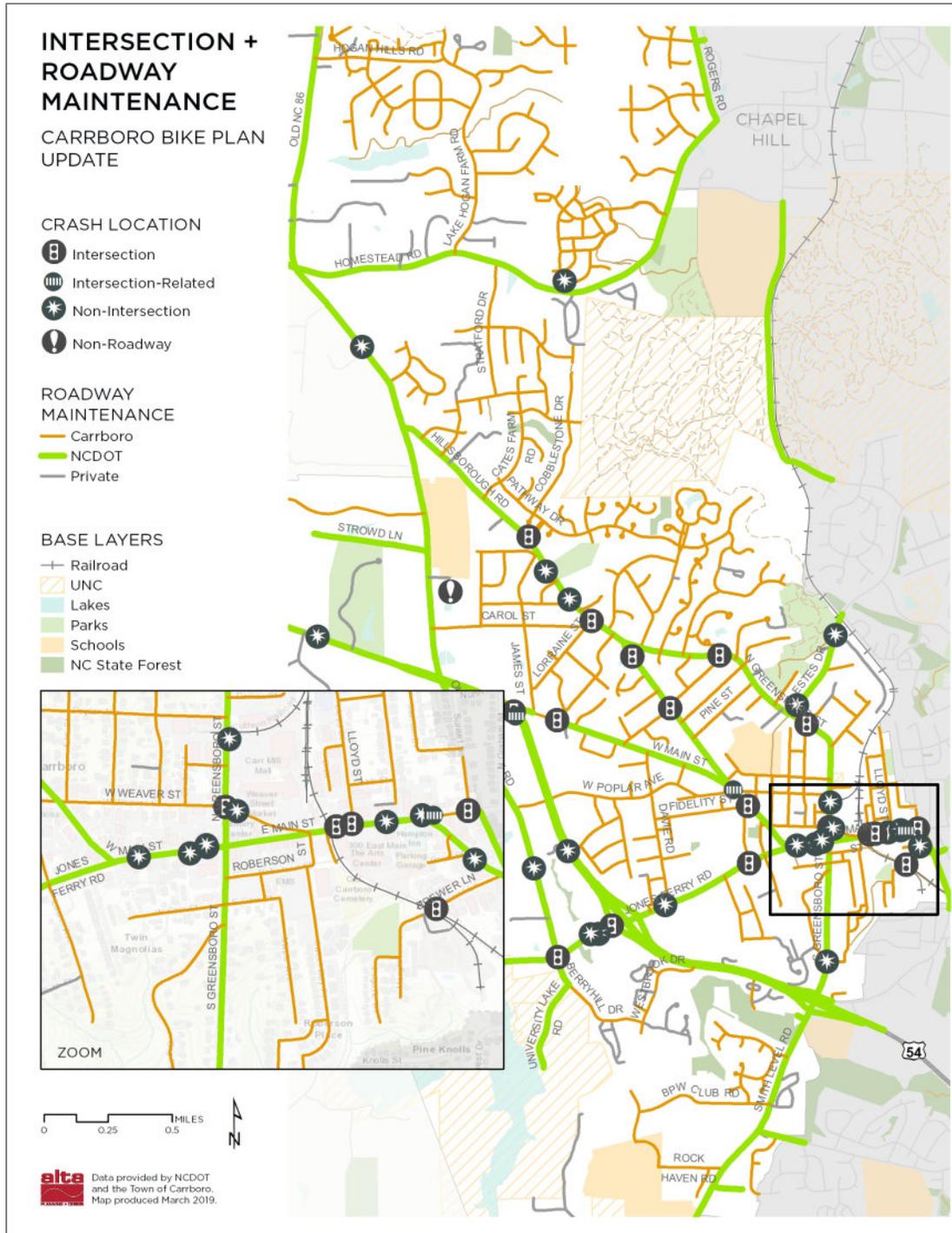
Opportunities and Challenges	Assessment
<p>Climate</p>	<p>North Carolina’s climate is very well-suited for bicycling, with cycling possible almost year-round, aside from a few months of the year during the peak extremes of summer and winter. The most bike-friendly small town in the U.S. (Davis, CA), has similar annual average temperatures, the key difference being humidity levels.</p>
<p>Topography</p>	<p>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.</p> <p>Roads such as Estes Drive, Spring Valley Road, Cates Farm Road, Cobblestone Drive, and Barington Hills Road have challenging topography, especially for inexperienced cyclists.</p>
<p>Physical Barriers</p>	<p>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).</p>
<p>University of North Carolina</p>	<p>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.</p>
<p>Regional Connectivity</p>	<p>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.</p>

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

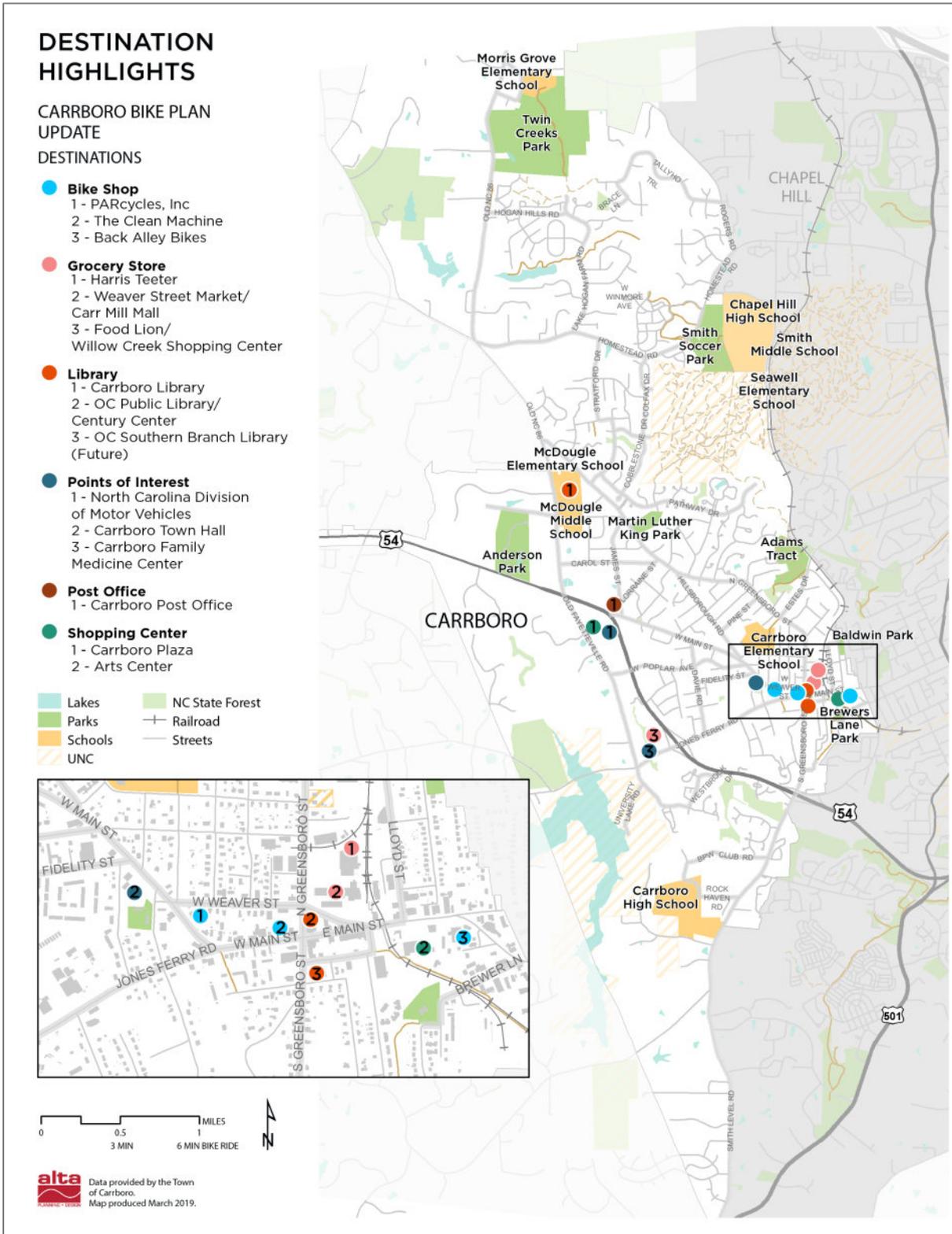
Inventory of Select Intersections

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

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.

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 AADBТ	2017 AADPT	AADT	AADT Year
CRB_LCB	Libba Cotton Bikeway	602	358	NA	NA
CRB_OLD	Old NC 86	84	61	13,000	2017

AADBТ = 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.

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.

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}

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

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

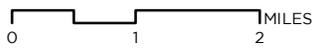
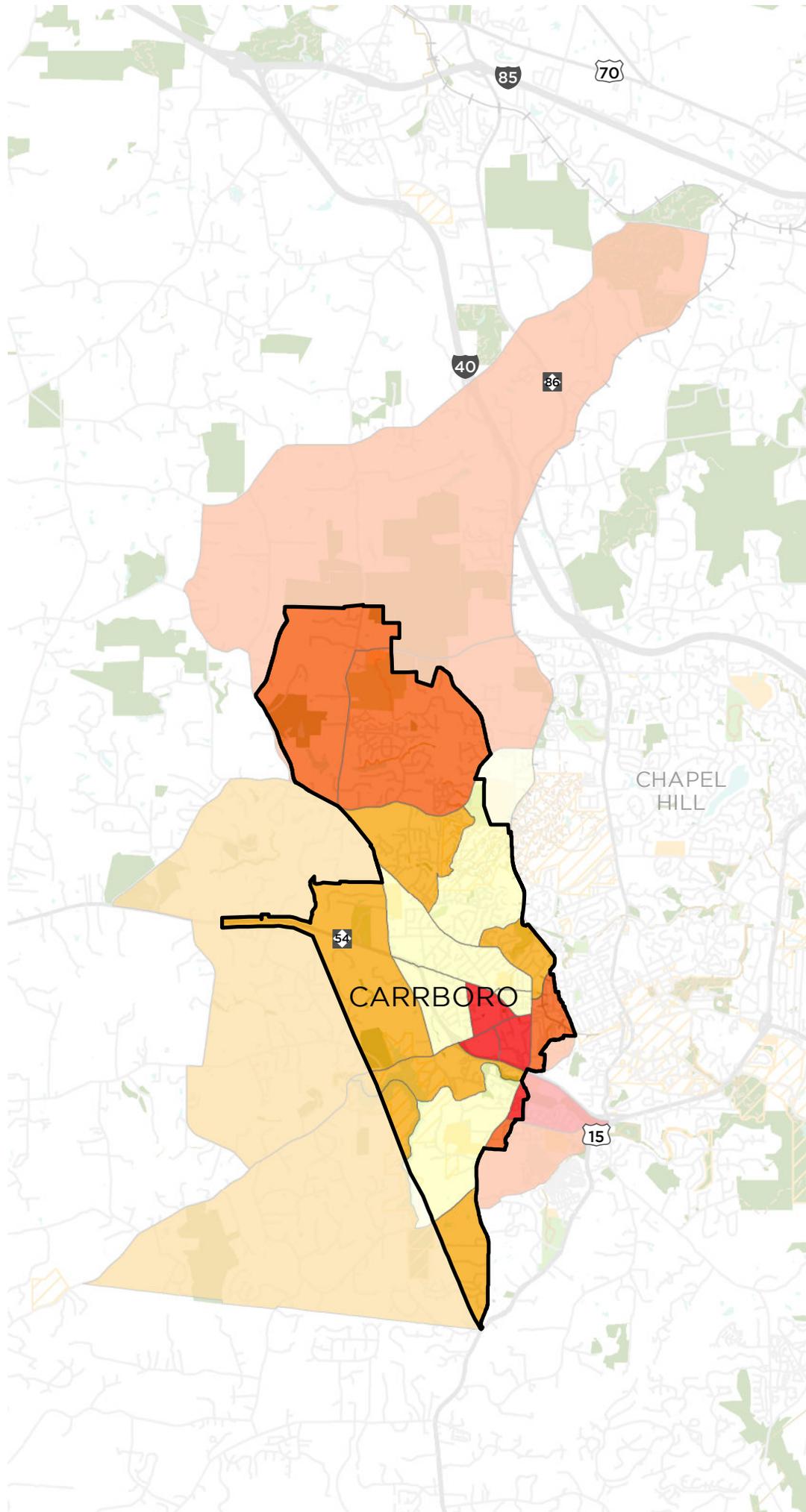
CARRBORO BIKE PLAN UPDATE

EQUITY ANALYSIS

- Higher Need
- Lower Need
- Study Area

BASE LAYERS

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





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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

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.

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.



LTS 1

comfortable for all ages and abilities



LTS 2

comfortable for most adults



LTS 3

comfortable for confident bicyclists



LTS 4

uncomfortable for most



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.

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 Crossings¹

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.

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.

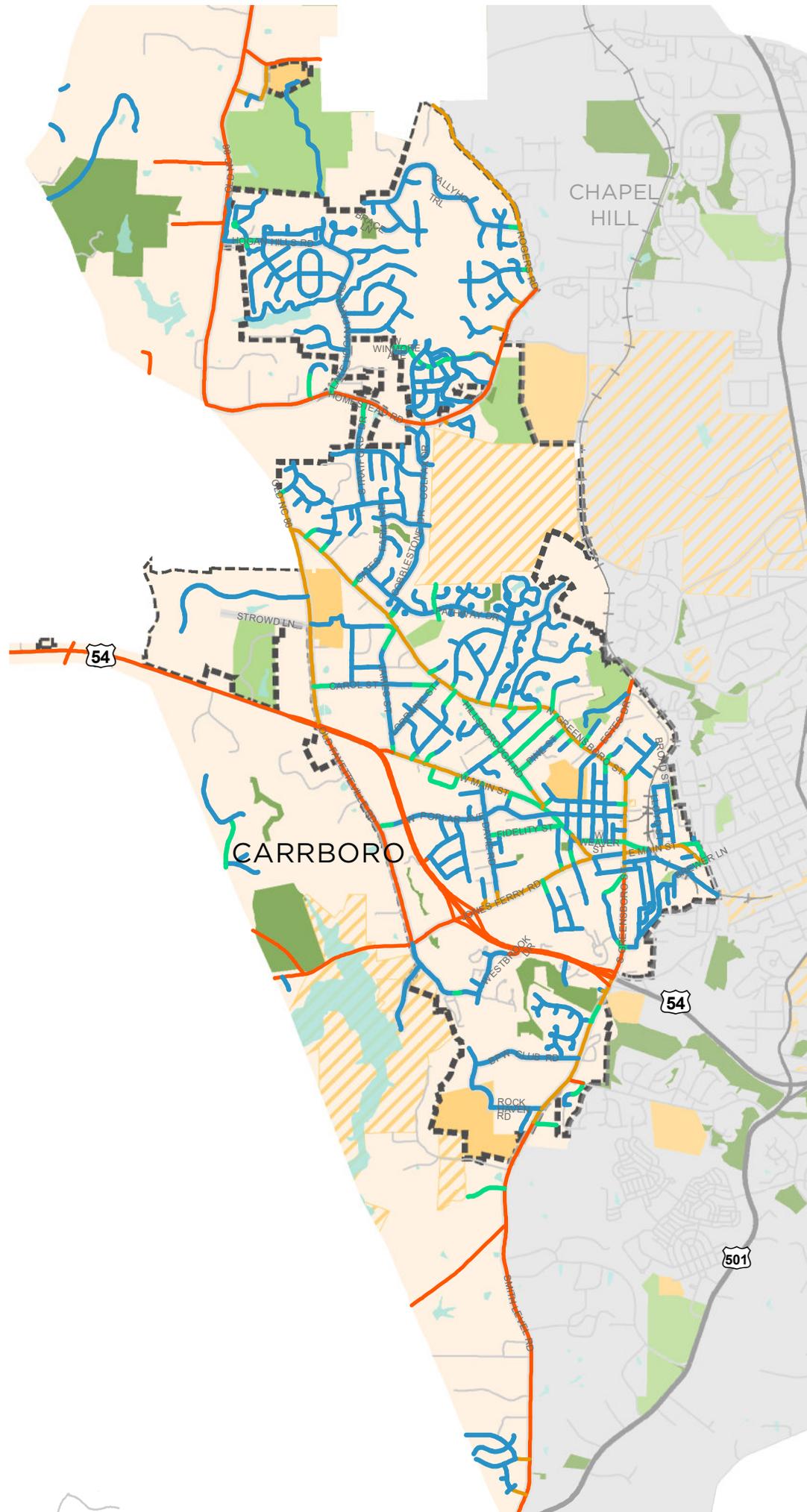
LEVEL OF STRESS ANALYSIS

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



LEVEL OF TRAFFIC STRESS ANALYSIS

Connectivity Islands

CARRBORO BIKE PLAN UPDATE



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



Carrboro Bicycle Plan - Previously Adopted Plans or Policies

Document Name	Year	Purpose	Key Recommendations
<p>CONNECT 2045: The Research Triangle Region's Metro Transportation Plan (Metropolitan Planning Org)</p>	<p>Jan-19</p>	<p>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.</p>	<p>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): <u>Education:</u> 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. <u>Enforcement:</u> Update bicycle traffic laws; Provide an active enforcement program; Appoint a "Bicycle Liaison Officer"; Develop "Bicycle Patrol Units" within local police departments. <u>Encouragement:</u> 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.</p>
<p>NC 54 West Corridor Study</p>	<p>Oct-18</p>	<p>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.</p>	<p>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). <u>Corridor Level</u> 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.</p>
<p>The 203 Project</p>	<p>Sep-18</p>	<p>The 203 Project is a combined effort that will offer a community based facility that will provide opportunities for education, art, and togetherness.</p>	<p>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.</p>

<p>Town of Carrboro Economic Sustainability Plan 2017</p>	<p>Nov-17</p>	<p>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</p>	<p>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 development 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</p>
<p>Downtown Parking Plan</p>	<p>Jul-17</p>	<p>The plan vision was described 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.</p> <p>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.</p>	<p>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.</p> <p>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.</p>

<p>Community Climate Action Plan</p>	<p>Jan-17</p>	<p>Reduce emissions of greenhouse gases that are causing global climate change</p>	<p><u>Community Integration:</u> 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</p> <p><u>Building Energy Efficiency Measures:</u> Reducing emissions by 50% by 2025; Energy audit/performance ratings; Demonstrate pursue energy performance beyond minimum requirements for new development; Create rental property task force and process; Create rental property registry/certification</p> <p><u>Transportation:</u> 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</p> <p><u>Renewable Energy:</u> Pursue community solar projects; Pursue downtown geothermal heating and cooling; create rental property task force and process</p> <p><u>Ecosystem:</u> Pursue stormwater utility; Evaluate extent to which the deer population and climate change affect native plant ecosystems; Accelerate/expand organic 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</p> <p><u>Food Choice:</u> Reduce emissions by 50%; Develop local dietary consumption and associated GHG profile</p>
<p>Carrboro Bike Program Review</p>	<p>Dec-16</p>	<p>This guide is meant to be a summary of current practices in bicycle infrastructure, with some redundancy with the 2009 Carrboro Comprehensive Bicycle Plan.</p>	<p>Encouraged the Town of Carrboro to update the bicycle plan in the short-term, with recommendations– detailed by chapter – in the pages that follow.</p> <p>Suggestions for how to revise the plan from its last iteration that apply generally to many parts of the report:</p> <ul style="list-style-type: none"> -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).

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.

<p>Affordable Housing Goals and Strategies</p>	<p>2014</p>	<p>To support and increase affordable housing opportunities in Carrboro, short-term and long-term</p>	<p>Affordable Homeownership:</p> <ul style="list-style-type: none"> - 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 <p>Affordable Rentals</p> <ul style="list-style-type: none"> -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 <p>Overarching Priorities</p> <ul style="list-style-type: none"> - 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 municipalities first-Start to engage with them
<p>Safe Routes to School Strategic Action Plan</p>	<p>Dec-10</p>	<p>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</p>	<p>Safety and infrastructure improvements at both school locations--</p> <p><u>McDougle Elementary</u>: 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</p> <p><u>Carrboro Elementary</u>: 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 from 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</p>
<p>Morgan Creek Greenway</p>	<p>Mar-10</p>	<p>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.</p>	<p>Goals:</p> <ul style="list-style-type: none"> - 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 <p>Plan broken apart in phases highlighting trail segments and implementation steps</p>

<p>Bolin Creek Greenway - Conceptual Master Plan</p>	<p>Dec-09</p>	<p>The Bolin Creek Greenway project was initiated by the Town for the purposes of alternative transportation, recreation, and environmental protection and restoration.</p> <p>Some of the key issues in the development of the Bolin Creek Greenway: Ecology and the Natural Environment; Transportation; Recreation & Quality of Life</p>	<p>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.</p>
<p>Carrboro Bicycle Transportation Plan</p>	<p>2009</p>	<p>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.</p>	<p>Goals:</p> <ul style="list-style-type: none"> -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. <p>The 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. 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.</p>
<p>Town of Carrboro Residential Traffic Management Plan for Speed and Traffic Control</p>	<p>Oct-06</p>	<p>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</p>	<p>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</p>
<p>Downtown Traffic Circulation Study</p>	<p>Jun-05</p>	<p>To describe various ideas about how the transportation system can be used and improved to expand and enhance the vibrancy of downtown Carrboro.</p>	<p>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."</p> <ol style="list-style-type: none"> 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

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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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:

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**

COMMENT FORM

This is your plan, and your input is critical.
Please take a few minutes to take leave a comment.

Please leave your email address below
if you'd like to receive project updates.

- **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.

**LEND YOUR VOICE
FOR THE CARRBORO BIKE PLAN!**

WE WANT TO HEAR FROM YOU!



**SHARE YOUR
IDEAS**



**TAKE THE
SURVEY**



**CARRBORO
BICYCLE PLAN**



Carrboro and NCDOT are working together to develop a plan that will enhance bicycling as a mode of transportation while improving connectivity and safety for bicycling throughout the town. Let's create better bicycling connections and opportunities in Carrboro!

We want to hear from you!

Please share your vision and ideas for the plan and tell us how to improve bicycling in Carrboro. Visit our website to learn more and take the online survey at:

WWW.TOWNOFCARRBORO.ORG/1174/2019-BIKE-PLAN-UPDATE



CONTACT:
Carrboro Planning Department
301 W. Main St.,
Carrboro, NC 27510
Phone: 919-918-7329
Email: zhallowck@townofcarrboro.org



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

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@ptathriftshop.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

- 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 cues 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.



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

Meeting Attendees

Table with 3 columns: Name, Title, and Email. Rows include Lisa Brown (for Anahid Vrana), Jon Scott, Tyler Gilmore, Josh D Worshofsky, Brent Hobby, Dave Mabe, Dale McKeel, Becki Cleveland, Steve Rogers, Rachel Kelley, Linda Haac, Kevin Hicks, Rachel Gaylord-Miles, Daniel Snipes, John Vine-Hodge, Donnie Rhoads, Barbara M Foushee, Colleen Barclay, Tamara Sanders, and Kurt Stolka.

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 an 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.

- 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



MEMORANDUM



Date: May 30, 2019
 To: Zachary Hallock, AICP, EI – Town of Carrboro
 From: Jennifer Baldwin – Alta Planning + Design
 Meeting Date: Thursday, May 30th, 2019

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

Re: Carrboro Bike Plan – Steering Committee Meeting Notes

Meeting Attendees

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
Becki Cleveland	Carrboro Rec	Becki.cleveland@gmail.com
Linda Haac	Carrboro TAB	lindahaac@yahoo.com
Rachel Gaylord-Miles	Carrboro Planning Board	Rlgaylordmiles@gmail.com
Daniel Snipes	Carrboro Public Works	dsnipes@townofcarrboro.org
Donnie Rhoads	Chapel Hill PD	drhoads@townofchapelhill.org
Barbara M Foushee	Carrboro Board of Alderman	bmfoushee@townofcarrboro.org
Lee Schimmelfing	Senior Games	leeschim@email.unc.edu
Bergen Watterson	Town of Chapel Hill	bwatterson@townofchapelhill.org
Galen Poythress	Carrboro Rec	jpoythress@townofcarrboro.org

Meeting Agenda

- Proposed Low-Stress Bike Network
- Implementation Strategy – Priority Projects
- Next Steps

Draft Network Steering Committee Discussion

- Committee members broke up into groups and marked up the network maps, identifying areas of agreement and opportunities for network modifications. The comments included the following:

"Greensboro/Hillsborough/Jones Ferry are 35 mph posted and operate over that. They are not low stress. Need separation on main corridors."
"Ensure bike boulevards have significant traffic calming, not just sharrows."
"Look for connections to Southern Village" (south of Culbreth Rd and East of Smith Level Rd)
"Love the bicycle boulevards network - add High Street"
"Longer term, but look at downtown core and the missing connections (i.e. in front of Harris Teeter on Greensboro)"
"Comprehensive, well-thoughtout and responsive to the Committee's thoughts and feedback"
"Any suggestion of a greenway in Bolin Forest is a non-starter with the community"
"Start at intersections downtown, then work out. Intersections needs lots of work."
"Opportunities for private funding. Adopt-a-bike lane."
"Review topography before committing to bike lane/blvds."
"Focus on downtown"
"Wayfinding signage to increase use of existing bike facilities"
"Please be ambitious. Don't assume NCDOT or the RR will say no. Aim for the best facilities."
Possible contra flow bike lane along E Poplar Ave (one suggestion said to remove the bike blvd option on Shelton St to Poplar Ave)
Additional intersection improvement at Brewer Ln and E Main St
Additional intersection improvement at Main St and NC 54
RRFB on Estes Dr (?)
Private connection between Jones Ferry Rd and W Poplar Ave is shown going thru parking lots - could be problematic
Intersection improvement at Jones Ferry Rd and NC 54
Intersection improvement at Smith Level Rd and NC 54
Intersection improvement at Old Fayetteville Rd and NC 54
Change the option for a bike blvd on Lorraine St to James St in order to connect Hillsborough Rd and W Main St
Intersection improvement on N Greensboro St and E Poplar Ave
Intersection improvement W Weaver St and N Greensboro St
Could there be a possibility of Rails-to-Trail or Rails-with-Trail scenario that connects downtown Carrboro to Hillsborough? Look into land ownership along railroad

NCDOT project set for Estes Drive, late 2019/early 2020 looking for design recommendation with possible bike facility along Estes Drive that connects with Frances Shetley Bikeway
Should all existing sharrows be shown as a bike blvd? Highlight separate bike recommendations?
Add long-term regional connectors, including Old NC 86 and Old Fayetteville Rd bike facility option
Turn all waterways on, including creeks
Combine SUP and sidepath options
Show downtown inset
Provide short connect between MLK Park to Pathway Dr
Sharrow (SRTS) down Lisa Dr between Quail Roost Dr and Carol St (to the east of McDougle Elementary/Middle Schools)
Connect Lake Hogan Farm Greenway to Tallyho Trail potentially using sewer easement
Implementation Priority - looking at Tallyho Trail as a shorter term project since it's only a mile long
Greensboro/Hillsborough - doing some ADA improvements and crosswalks
Important to sync up with NC 54 Safety Study from Main to Columbia
Crosswalk will be added at Greensboro near roundabout
Possible connection between Charles St thru Adams Tract (connected to Charles Herman Wilson Park) to Bolin Creek Dr/Bolin Forest Dr
N Greensboro, Hillsborough and Jones Ferry need bike protection - families are concerned

Top 3 Priority Projects Committee Exercise

- Committee members completed a blank form, selecting their top 3 projects. The results are as follows:

Cobblestone Dr bike blvds connecting McDougle Schools, Smith, Chapel Hill HS, Carolina North to residents	4
E Main Street	3
Jones Ferry Road - continue separate bike trail to downtown	3
Intersection at Greensboro and Hillsborough St	3
N Greensboro St - any kind of improvement	3
Crossing improvements throughout Carrboro	2
Intersection at Main St and Weaver St	2
Intersection at Weaver St and Greensboro Street	2
Weaver St	3
Intersection improvements on N Greensboro	2
Hillsborough/N Greensboro St - separate lanes	1
Old 86 between the intersection of Old Fayetteville Rd through Calvander and Dairyland	1
W Main St from Hillsborough to Jones Ferry Rd	1
Intersection at Jones Ferry and Bim St	1
Connection between Tar Hill and Berryhill Dr	1

Bel Arbor path between Bel Arbor and Phipps St	1
Connection between Hogan Hills Rd and existing trail-in design	1
East-west route through downtown Carrboro and Chapel Hill	1
Connect parking lots of Carrboro Plaza, Carolina Spring, The Crest (?), and Kingswood (?) - from crossing @ NC 54/Poplar to University Lake area	1
Intersections in downtown	1
Separated Hillsborough/Main/Weaver and crossing	1
West of NC54 between Poplar/Jones Ferry - private crossing	1
Homestead Rd	1
Connections	1
Bike lanes on Rosemary (continued from Chapel Hill infrastructure)	1
Pathway Dr as bike blvd instead of bike lanes	1
Intersection at E Weaver St and Roberson St	1
Crossing Greensboro to go towards Chapel Hill	1
Wayfinding	1
Intersection at Hillsborough and W Main	1
NC 54 intersections (W Main, W Poplar Ave)	1
NC 54 sidepaths	1
Estes Drive	1
Paved trail through Carolina North (Pathway/Estes to CHHS)	1
Bolin Creek Greenway	1
Protected bike lanes into downtown	1

Top intersections for improvement were:

Intersection at Greensboro and Hillsborough St	3
Intersection at Weaver St and Greensboro Street	2
Intersection at Main St and Weaver St	2
Intersection improvements on N Greensboro	2
Intersection at Jones Ferry and Bim St	1
Intersections in downtown	1
Intersection at E Weaver St and Roberson St	1
Intersection at Hillsborough and W Main St	1

Next Steps

- Upcoming stakeholder meetings
- Refine network recommendations; review with NCDOT
- Develop policy and program recommendations
- Draft Plan development
- The next committee meeting date will tentatively be Thursday, June 27th at 6:30pm at Town Hall to review draft plan recommendations



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

Meeting Attendees

Table with 3 columns: Name, Role, and Email Address. Rows include Chris Colvin, Tyler Gilmore, Josh D Worshofsky, Dave Mabe, Becki Cleveland, Linda Haac, Charlie Hileman, Jeremy Galen Poythress, Donnie Rhoads, Colleen Barclay, and Kurt Stolka.

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 in 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.

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.)		

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)

- 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)

Combined Assessment: Strategic Priorities & Racial Equity

EXISTING BIKE NETWORK

- Bike Lanes
- Bike Lane One Side Only
- Sharrow
- Wide Shoulder
- Shared Use Path

STRATEGIC PRIORITY NETWORK RECOMMENDATIONS

- Separated Bike Lanes
- - - Bike Lanes
- - - Neighborway
- - - Shared Use Path
- Crossing Improvement

DEVELOPMENT STATUS

- In Development

PRIORITY STATUS

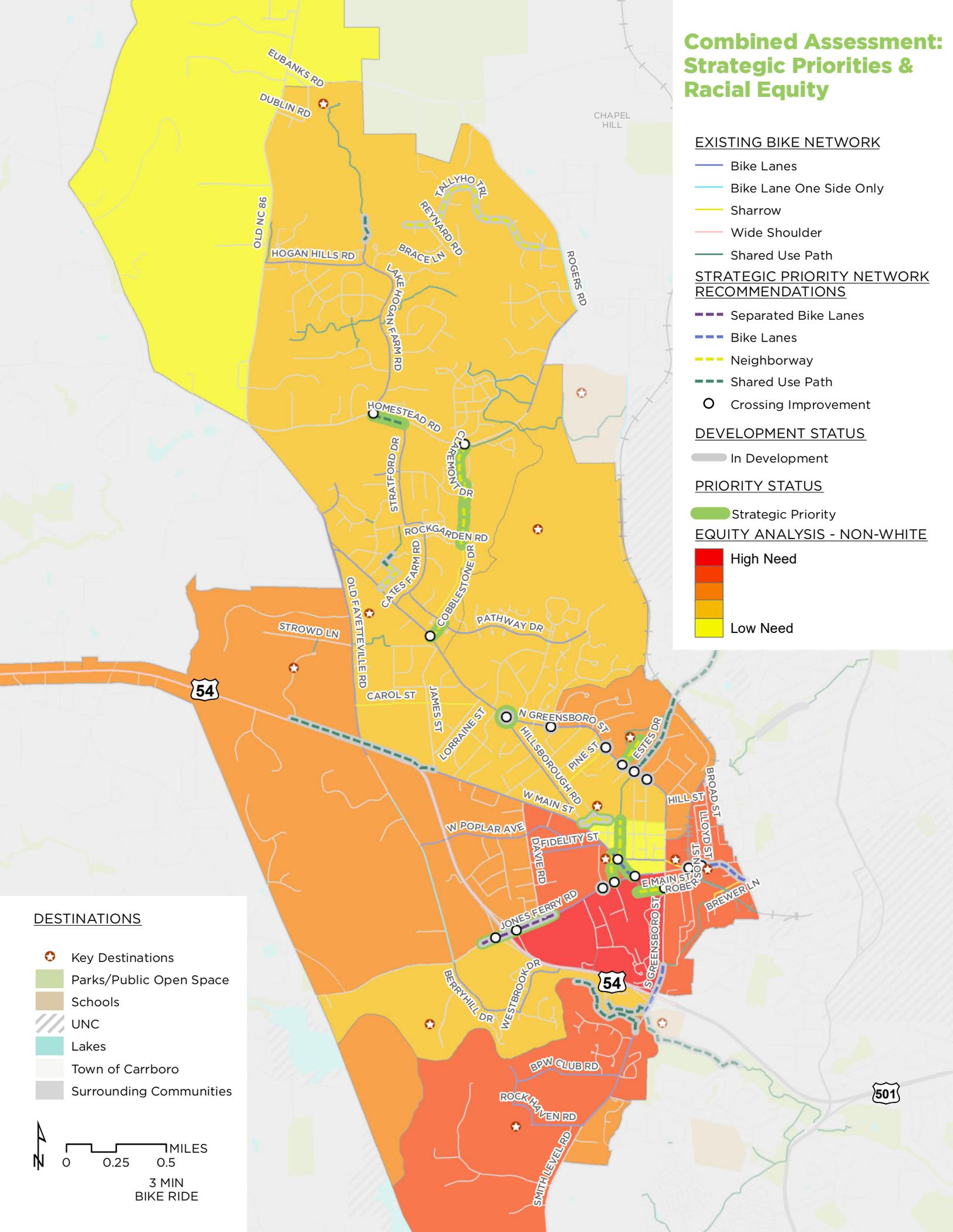
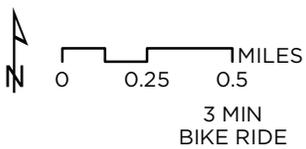
- Strategic Priority

EQUITY ANALYSIS - NON-WHITE

- High Need
-
- Low Need

DESTINATIONS

- ★ Key Destinations
- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities



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